REPAIR MANUAL 2010

450 SX ATV
505 SX ATV

Article no. 3206070en

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

Only use **ORIGINAL 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 misprints 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
5230 Mattighofen, Austria

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 below.

Proprietary name	Denotes a proprietary name.
Name®	Denotes a protected name.
Brand™	Denotes a brand available on the open market.

Warranty

The work prescribed in the service schedule must be carried out in an authorized KTM workshop only and confirmed in the customer's service record, since otherwise no warranty claims will be recognized. No warranty claims can be accepted for damage resulting from manipulations and/or alterations to the vehicle.

Fuel, oils, etc.

You should use the fuels, oils and greases according to specifications as listed in the owner's manual.

Spare parts, accessories

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

The current **KTM PowerParts** for your vehicle can be found on the KTM website.
International KTM Website: http://www.ktm.com

Work rules

Special tools are needed for certain tasks. They are not included with the vehicle but can be ordered under the number in parentheses. E.g.: valve spring mounter (59029019000)
When assembling the equipment, non-reusable parts (e.g. self-locking screws and nuts, seals, seal rings, O-rings, pins, lock washers) must be replaced with new parts.
If a thread locker (e.g. **Loctite®**) is used for screw connections, follow the instructions for use from the manufacturer.
Parts that are to be reused after being disassembled should be cleaned and checked for damage and wear. Replace damaged or worn parts.
After finishing the repair and maintenance work, ensure that the vehicle is roadworthy.

Notes/warnings

Pay close attention to the notes/warnings.

Info
Various information and warning labels are affixed to the vehicle. Do not remove information/warning labels. If they are missing, you or others may not recognize potential hazards and may therefore be injured.

Grades of risks

Danger
Identifies a danger that will immediately and invariably lead to fatal or serious permanent injury if the appropriate measures are not taken.

Warning
Identifies a danger that is likely to lead to fatal or serious 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
Identifies a danger that will lead to environmental damage if the appropriate measures are not taken.

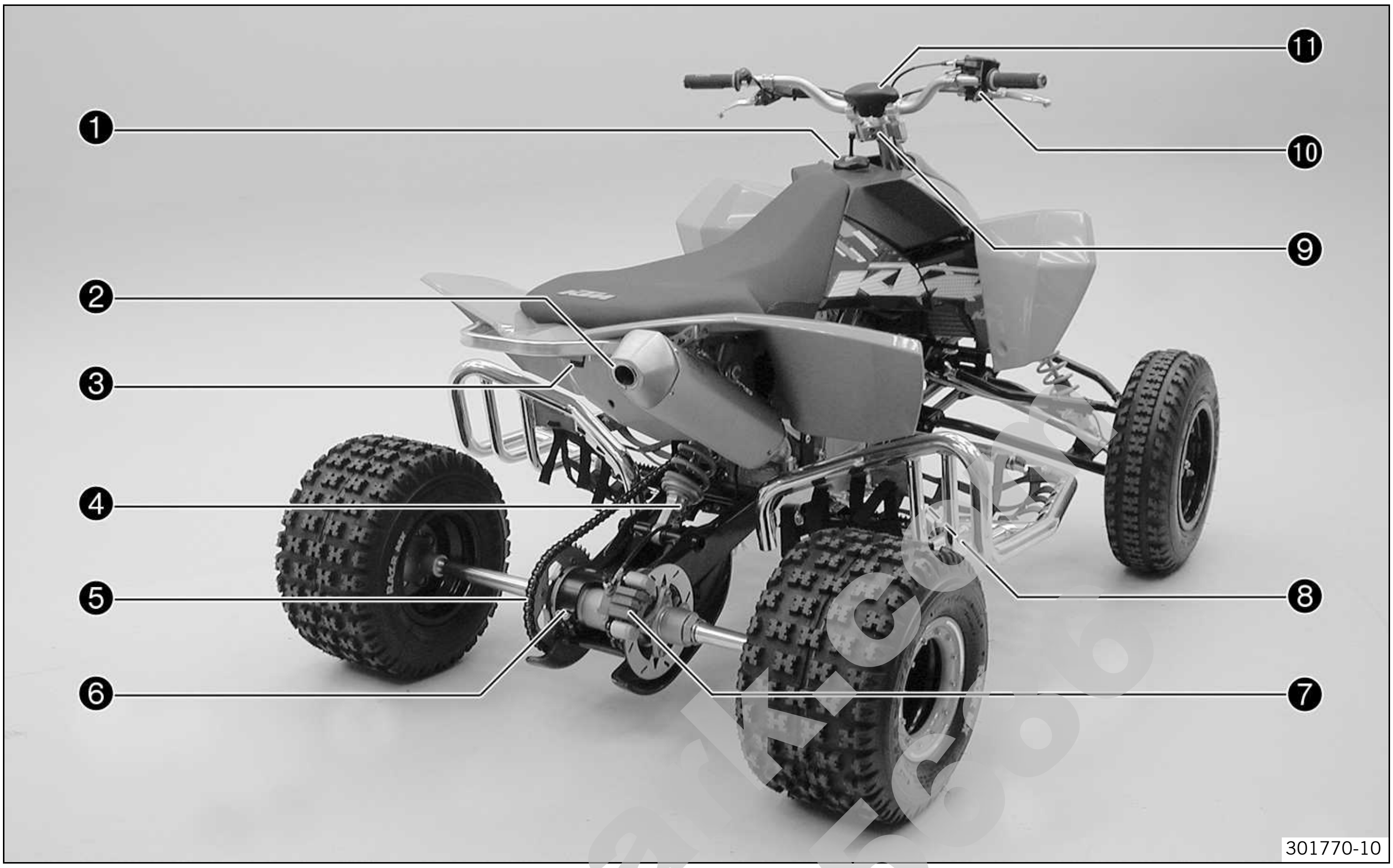
Repair instructions

- It is imperative that you read this owner's manual carefully and completely before the start of work. It contains extensive information and many tips to help you repair and maintain your vehicle.
- The necessary KTM special tools must be available and the workplace and workshop must be fully equipped.

View of the vehicle from the left front (example)

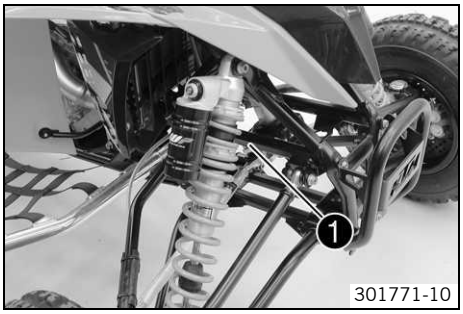
1	Hand brake lever
2	Fuse box
3	Shock absorber compression adjustment
4	Front shock absorber
5	Shock absorber rebound adjustment
6	Heel protector
7	Shift lever
8	Kill switch/emergency OFF switch with rip cord
9	Clutch lever
10	Hot start lever

View of the vehicle from the right rear (example)



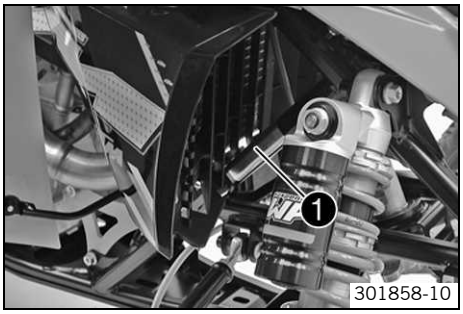
1	Filler cap
2	Main silencer
3	Seat release
4	Shock absorber rebound adjustment
5	Rear sprocket with chain
6	Rear wheel eccentric element
7	Rear brake
8	Foot brake pedal
9	Handlebar bridge
10	Throttle lever
11	Handlebar cushion

Chassis number



The chassis number ❶ is stamped on the right side of the frame in the vicinity of the upper control arm.

Type label



The type label ❶ is located on the frame tube on the right and left in front of the radiator.

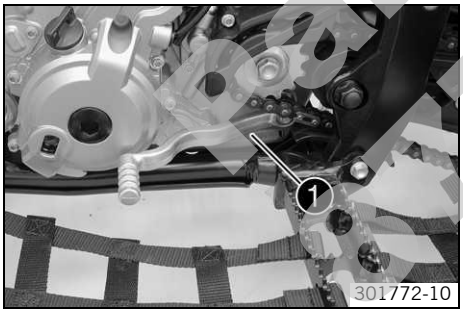
Key number

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

Info

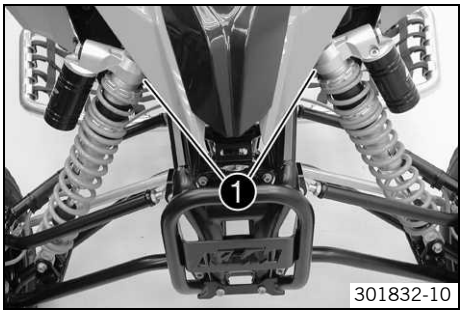
You need the key number to order a replacement key. Keep the **KEYCODECARD** in a safe place.

Engine number



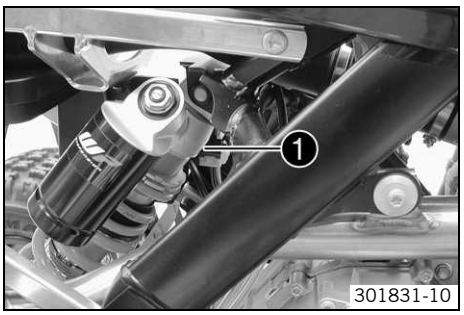
The engine number ❶ is stamped on the left side of the engine under the engine sprocket.

Shock absorber part number, front



The shock absorber part number ❶ is stamped on the upper part of the shock absorber.

Shock absorber part number, rear



The shock absorber part number ❶ is stamped on the upper part of the shock absorber.

Jacking up the vehicle

Note

Danger of damage Danger of damage from tipping of vehicle.

– Jack up the vehicle on a firm and horizontal surface. Use a flex-free work stand.

– Jack up the vehicle on the frame underneath the engine. The wheels must no longer touch the ground.
– Secure the vehicle.

Removing the vehicle from the work stand

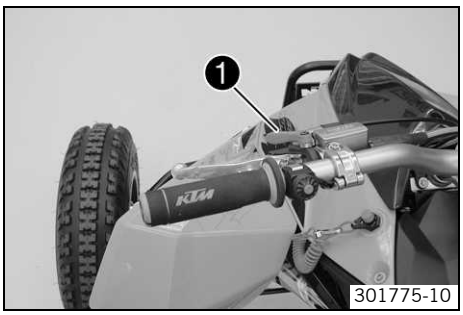
Note

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

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

– Lower the vehicle.
– Remove the work stand.

Hot start lever



Hot start lever ❶ is fitted on the left side of the handlebar.
If you pull the hot start lever to the handlebar when starting the engine, an opening is exposed in the carburetor through which the engine can draw additional air. This gives a leaner fuel-air mixture, which is needed for a hot start.

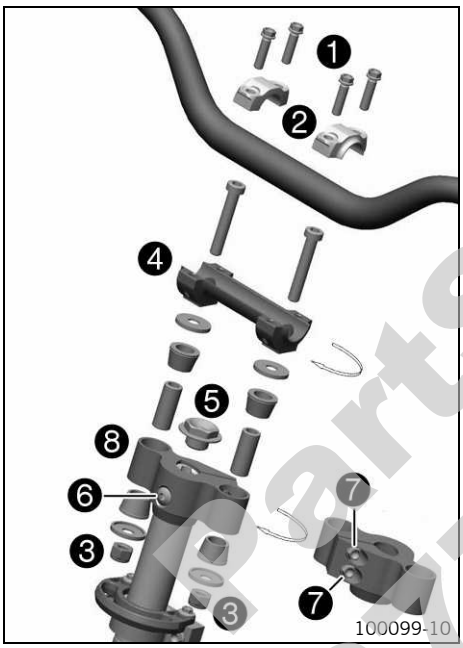
Possible states

- Hot start function is activated – The hot start lever has been pulled all the way out.
- Hot start function is deactivated – The hot start lever has been pushed all the way in.

Adjusting handlebar position

– Remove the handlebar cushion.

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



– Remove the four screws ❶. Remove the handlebar clamps ❷, swing the handlebar forward and set it down.
– Remove the nuts ❸ and remove the handlebar support ❹ with the screws.
– Remove screws ❺ and ❻.
– Remove screws ❼. Remove the handlebar bridge ❽.
– Place the handlebar bridge ❽ onto the steering column in the desired position. Mount and tighten screw ❻.

Guideline

Screw, steering bridge	M8	20 Nm (14.8 lbf ft)

– Mount and tighten screw ❺.

Guideline

Screw, steering column, top	M20x1.5	25 Nm (18.4 lbf ft)

– Mount and tighten screws ❼.

Guideline

Screw, steering bridge	M8	20 Nm (14.8 lbf ft)

– Mount the handlebar support ❹ in the desired position using the screws. Mount new self-locking nuts ❸ and tighten.

Guideline

Nut, handlebar support	M10	45 Nm (33.2 lbf ft)

– Position the handlebar and fix it with the handlebar clamps ❷. Mount and tighten screws ❶.

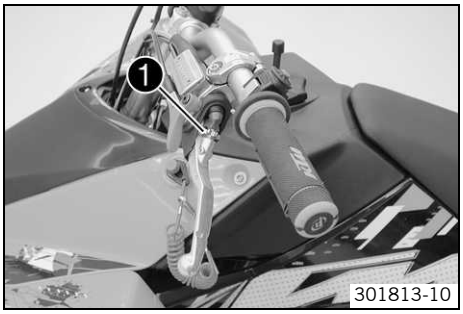
Guideline

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

Info
Make sure cables and wiring are positioned correctly.

– Mount the handlebar cushion.

Adjusting basic position of clutch lever

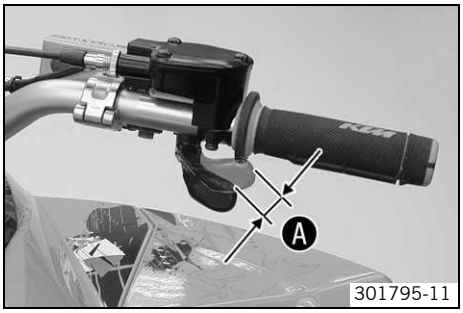


– Adjust the basic setting of the clutch lever to your hand size by turning adjusting screw ❶.

Info

Turn the adjusting screw counterclockwise to increase the distance between the clutch lever and the handlebar.
Turn the adjusting screw clockwise 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 play in the throttle cable



– Move the handlebar to the straight-ahead position. Move the throttle lever back and forth slightly to ascertain the play in the throttle cable Ⓐ.

Guideline

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. 14)

Danger

Danger of poisoning Exhaust gases are poisonous and inhaling them may result in unconsciousness and/or death.

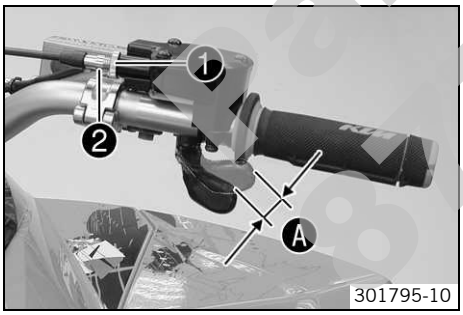
– When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in an enclosed space without an effective exhaust extraction system.

– 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. 14)

Adjusting play in throttle cable



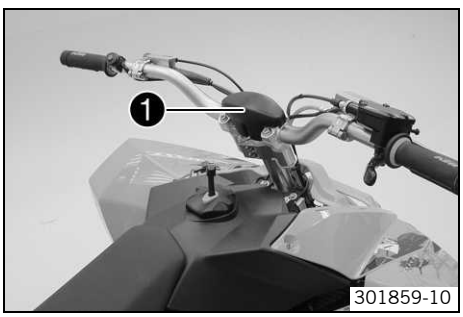
– Check throttle cable route.
– Move the handlebar to the straight-ahead position.
– Loosen the nut ❶ and use the screw ❷ to adjust the play in the throttle cable Ⓐ.

Guideline

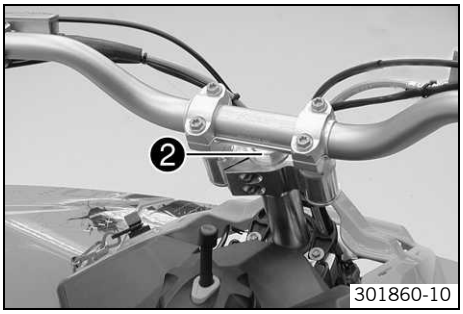
Play in throttle cable	3... 5 mm (0.12... 0.2 in)

– Tighten nut ❶.

Removing the steering column

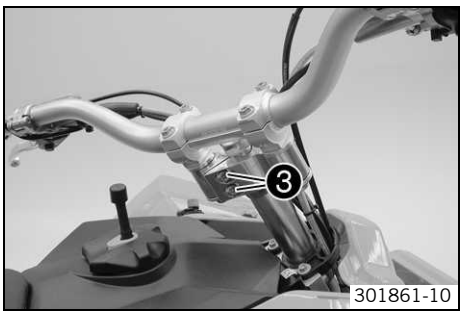


– Remove the front cover. (☛ p. 69)
– Remove handlebar cushion ❶.

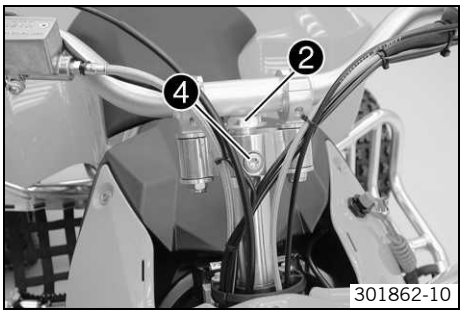


– Loosen screw ❷.

Info
The screw cannot be removed.

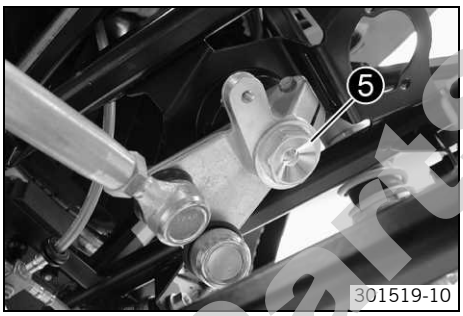


– Loosen screws ❸.

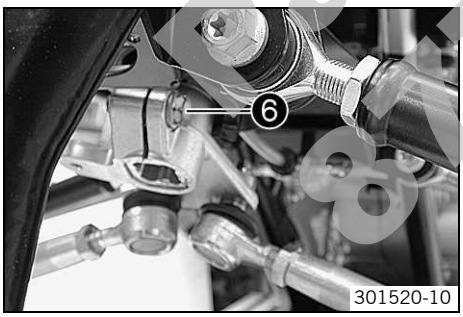


– Remove screw ❹.
– Take off the handlebar with the handlebar bridge and screw ❷, swing it forward and set it down.

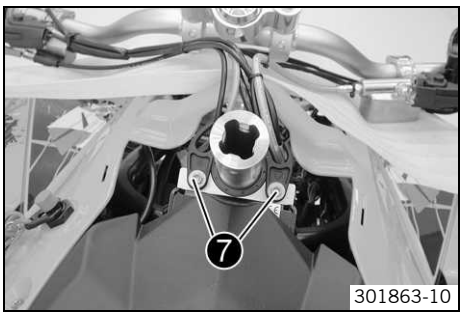
Info
Protect the vehicle and its attachments from damage by covering them.



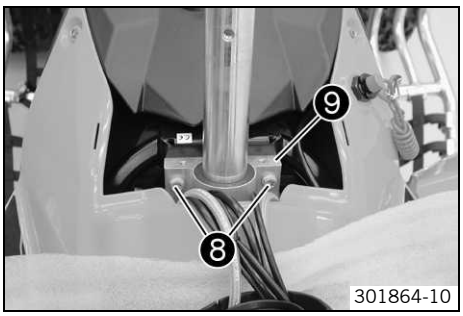
– Remove screw ❺.



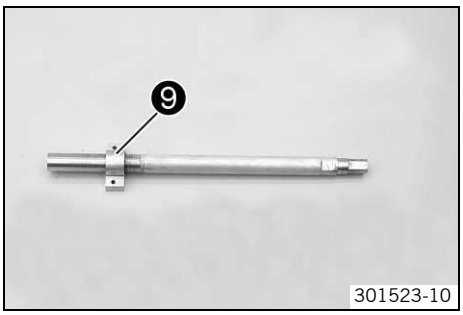
– Loosen screws ❻.
– Pull the steering arm down.



– Remove screws ❼.
– Swing the cable guide forward.



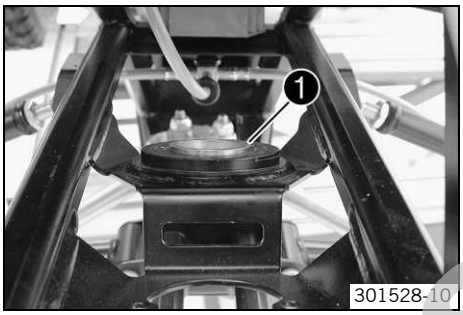
– Remove screws ❽.
– Pull out the steering column with bearing support ❾ from above.



– Pull bearing support ❾ off from above.

Changing the steering column bearing

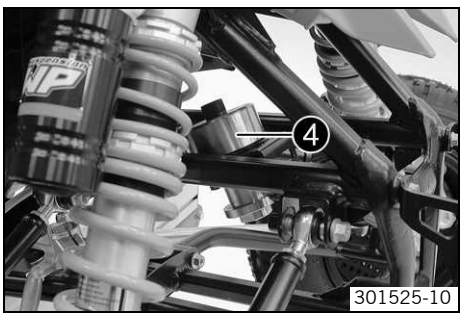
– Remove the steering column. (☛ p. 14)



– Remove spacer ❶.

– Remove shaft seal ring ❷.

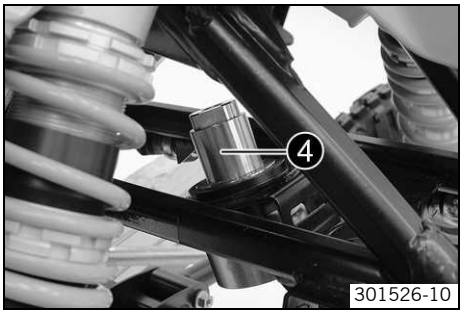
– Remove lock ring ❸.



– Mount special tool ❹.

Extractor (83019020000) (☛ p. 235)

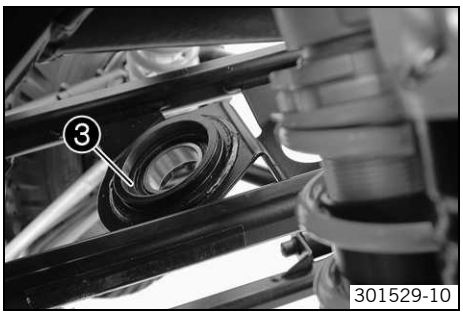
– Press out the steering column bearing by turning in the screw.



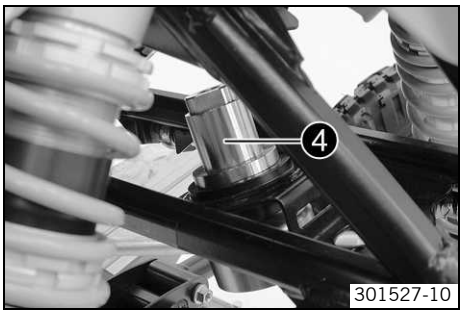
– Position the steering column bearing.
– Mount special tool ❹.

Extractor (83019020000) (☛ p. 235)

– Press in the steering column bearing by turning in the screw.



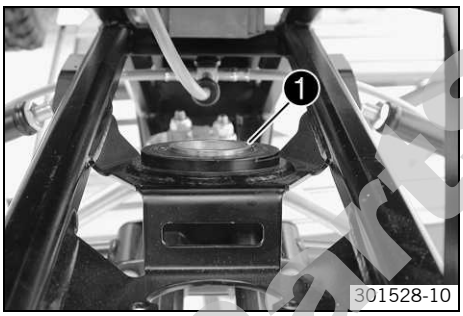
– Mount lock ring ❸.



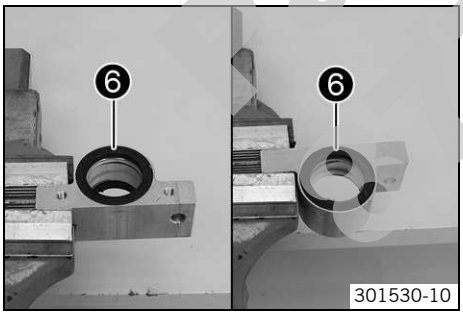
– Position the shaft seal ring.
– Mount special tool ❹.

Extractor (83019020000) (☛ p. 235)

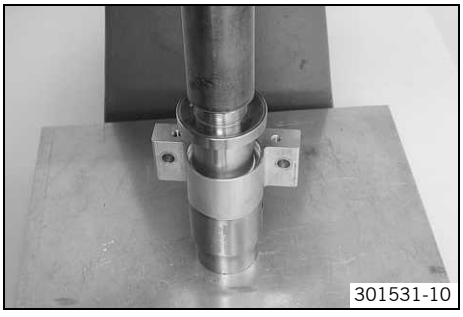
– Press in the shaft seal ring by turning in the screw.



– Mount spacer ❶.

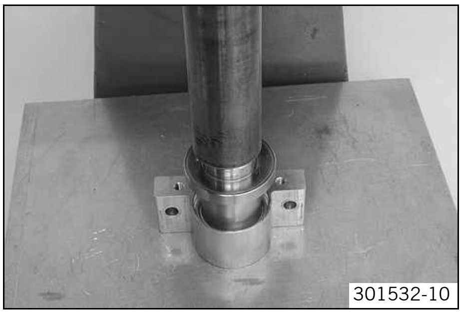


– Remove shaft seal rings ❻ from the bearing support.



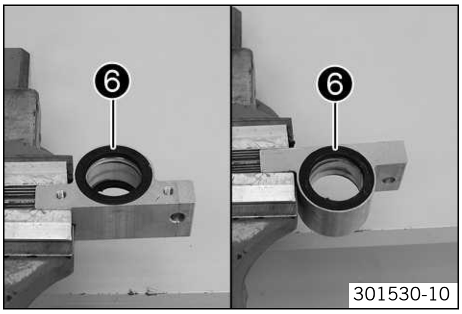
– Press out the sleeve bearing.

Extractor (83019020000) (☛ p. 235)



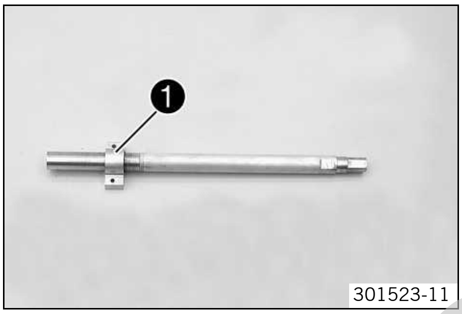
- Press in the sleeve bearing.

Extractor (83019020000) (☛ p. 235)	



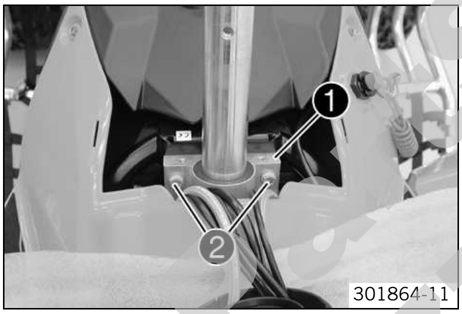
- Press in shaft seal rings ❻ from the outside to the inside with the open side facing inward.

Installing the steering column



- Lightly grease bearing support ❶ and slide it onto the steering column.

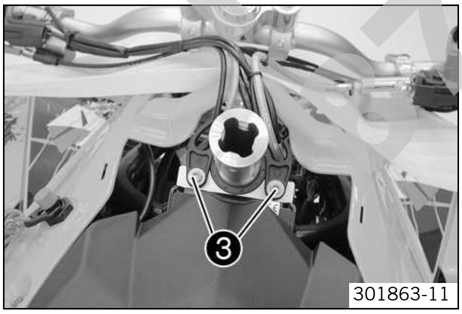
Long-life grease (☛ p. 225)	



- Mount the steering column with bearing support ❶ from above.
- Position the bearing support.
- Mount and tighten screws ❷.

Guideline

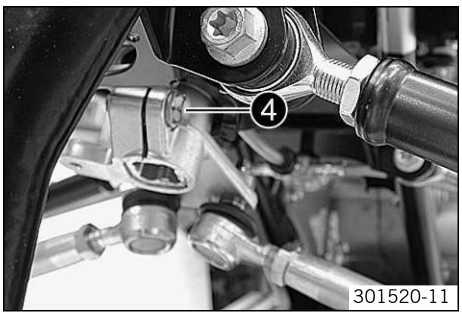
Screw, bearing support, steering	M8	25 Nm (18.4 lbf ft)



- Position the cable guide.
- Mount and tighten screws ❸.

Guideline

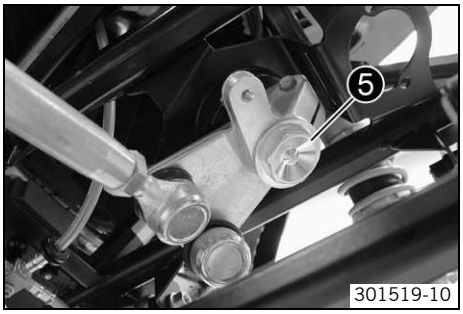
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)



- Position the steering arm.
- Tighten screw ❹.

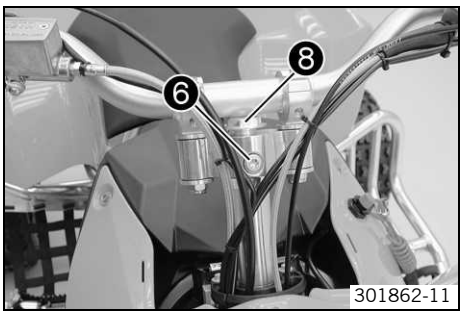
Guideline

Screw, steering column at bottom of steering lever	M10	25 Nm (18.4 lbf ft)



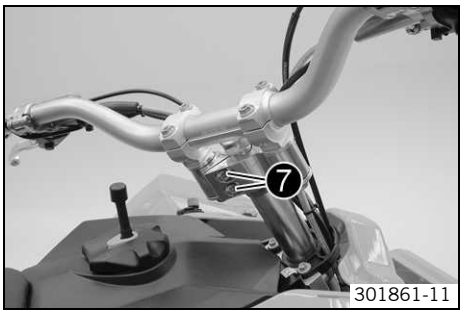
– Mount and tighten screw ❺.
Guideline

Screw, steering column, bottom	M20x1.5	40 Nm (29.5 lbf ft)



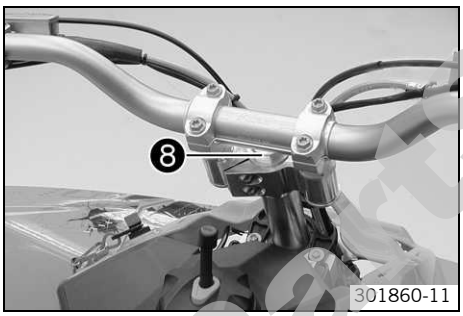
– Mount the handlebar with the handlebar bridge and screw ❽.
– Mount and tighten screw ❻.
Guideline

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



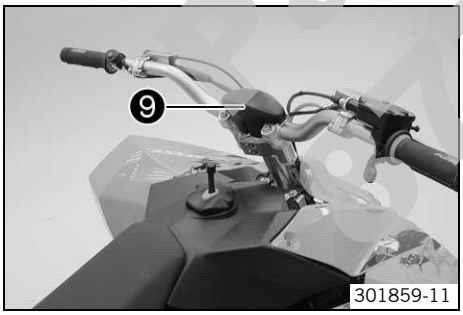
– Tighten screws ❼.
Guideline

Screw, steering bridge	M8	20 Nm (14.8 lbf ft)



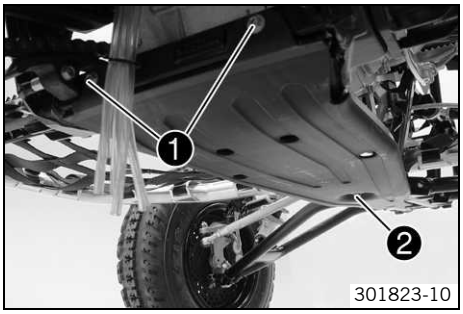
– Tighten screw ❽.
Guideline

Screw, steering column, top	M20x1.5	25 Nm (18.4 lbf ft)



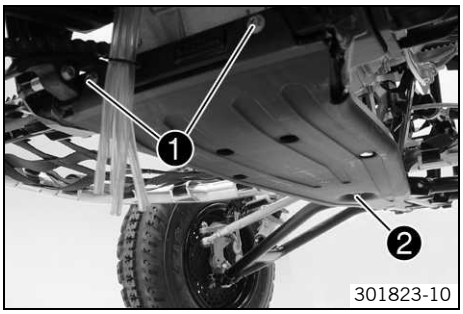
– Mount handlebar cushion ❾ on the handlebar.
– Install the front cover. (☛ p. 69)

Removing the engine guard



– Remove screws ❶ and ❷. Remove the engine guard.

Installing the engine guard



– Position the engine guard on the frame bearer. Mount and tighten screws ❶ and ❷.

Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)
Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)

Front shock absorber - adjusting the high-speed compression damping

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.

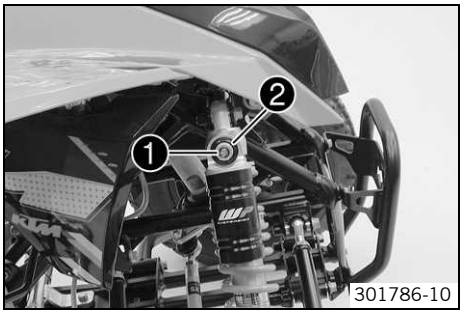
Warning

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.

Info

The high-speed setting has an impact on the fast compression of the shock absorber.
The left and right shock absorbers should have the same settings.



– Turn adjusting screw ❶ all the way clockwise with a socket wrench.

Info

Do not loosen nut ❷!

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

Guideline

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

Info

Turn clockwise to increase damping; turn counterclockwise to reduce damping.

Front shock absorber - adjusting the low-speed compression damping

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.

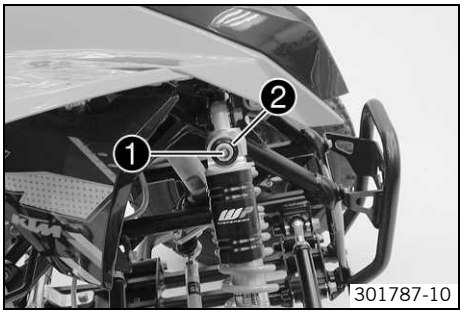
Warning

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.

Info

The low-speed setting has an impact on the slow to normal compression of the shock absorber.
The left and right shock absorbers should have the same settings.



– 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	20 clicks
Standard	15 clicks
Sport	12 clicks

Info
Turn clockwise to increase damping; turn counterclockwise to reduce damping.

Front shock absorber - adjusting the rebound damping

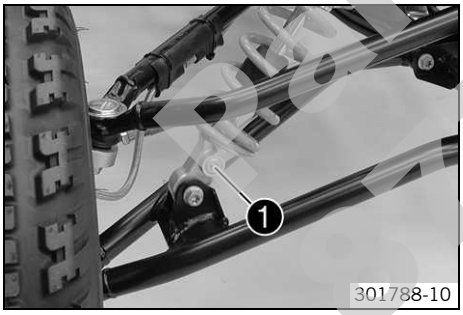
Danger
Danger of accidents Disassembly of pressurized parts can lead to injury.

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

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.

Info
The rebound damping setting has an impact on the rebound of the shock absorber.
The left and right shock absorbers should have the same settings.



– Turn adjusting screw ❶ 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	20 clicks
Standard	15 clicks
Sport	12 clicks

Info
Turn clockwise to increase damping; turn counterclockwise to reduce damping.

Front shock absorber - adjusting the spring preload

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.

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.

Info

Increasing the spring preload raises the center of gravity of the vehicle. This can have a large impact on vehicle handling.

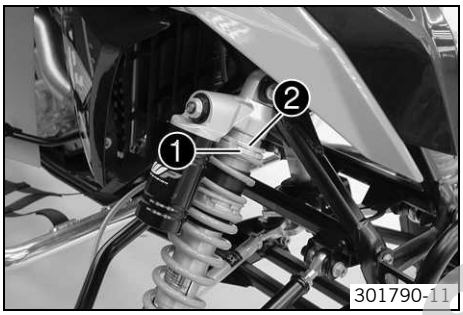
Tip

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

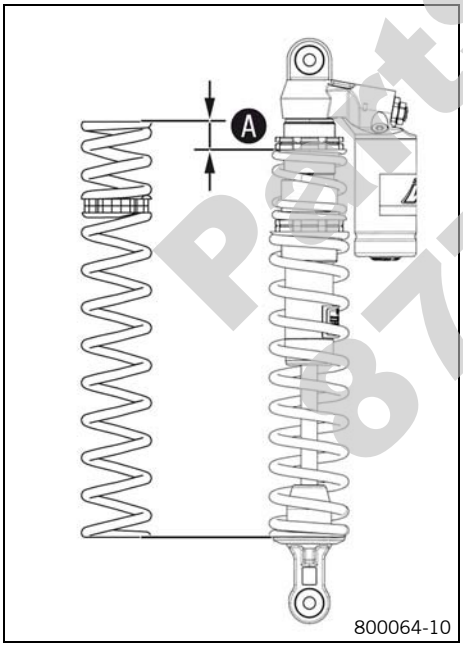
– Jack up the vehicle. (☛ p. 12)
– Clean the shock absorber thoroughly.
– Release counter ring ❶.

Hook wrench (83019001000) (☛ p. 234)

– Turn adjusting ring ❷ until the spring pack is no longer under tension.
– Measure the overall spring pack when not under tension.



301790-11



800064-10

– Tighten the spring pack by turning adjusting ring ❷ to measurement Ⓐ.

Guideline

Spring preload	
Comfort	3 mm
Standard	5 mm
Sport	8 mm

Info

Spring preload Ⓐ is the difference in length between the spring pack when it is unloaded and when it is installed.
The spring pack should never be installed loosely (without preload). The standard setting is the lowest permissible spring preload. Therefore, you can only increase the spring preload.
If you increase the spring preload, you should also slightly increase the rebound damping.
The left and right shock absorbers should have the same settings.

– Tighten the lock ring and adjusting ring.
– Remove the vehicle from the work stand. (☛ p. 12)

Front shock absorber - adjusting the cross over

Danger

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

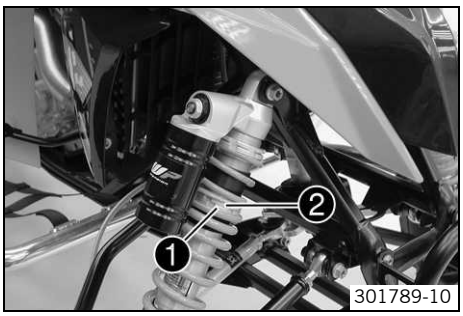
– The shock absorber is filled with high density nitrogen. Adhere to the description provided.

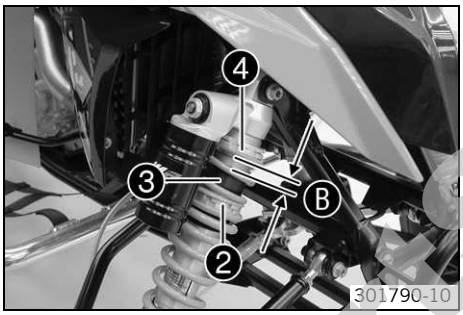
Info

The cross over setting is used to adjust the suspension travel of the short (soft) spring.
Greater cross over makes the spring action at the front softer and the front of the vehicle lies lower. The suspension travel and the progressive part of the long (hard) spring is not fully utilized.
Less cross over makes the spring action at the front harder and the front of the vehicle lies higher.

– Adjust the spring preload for the front shock absorbers. (☛ p. 23)
– Jack up the vehicle. (☛ p. 12)
– Clean the shock absorber thoroughly.
– Loosen adjusting rings ❶ and ❷.

Hook wrench (83019001000) (☛ p. 234)





– Measure the cross over setting 🅑 between sliding bushing ❸ and the collar of adjusting ring ❹.

Guideline

Cross over	19±1.5 mm (0.75±0.059 in)

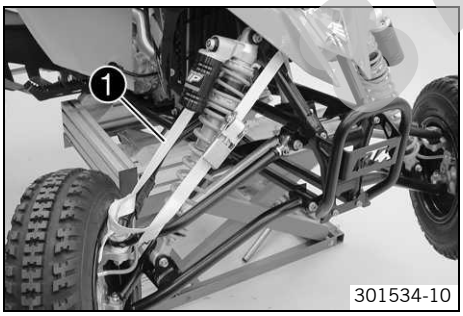
– Adjust the sleeve by turning adjusting ring ❷ to the specified measurement 🅑.
– Lock the adjusting rings.
– Remove the vehicle from the work stand. (☛ p. 12)

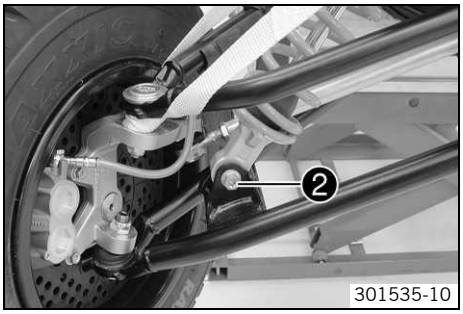
Removing the front shock absorber

Info

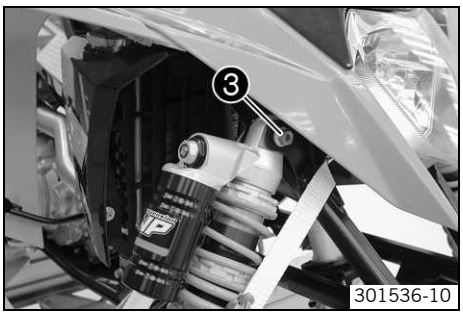
The operations are the same on the left and right sides.

– Jack up the vehicle. (☛ p. 12)
– Secure the upper A-arm on the frame using tension belt ❶.





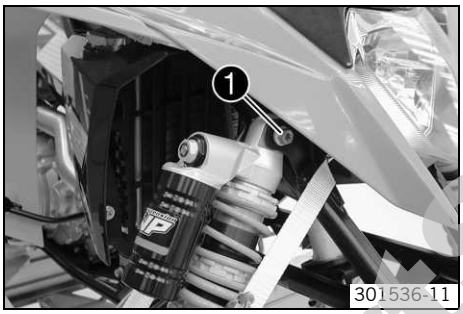
– Remove screw ❷.



– Remove screw ❸. Remove the shock absorber.

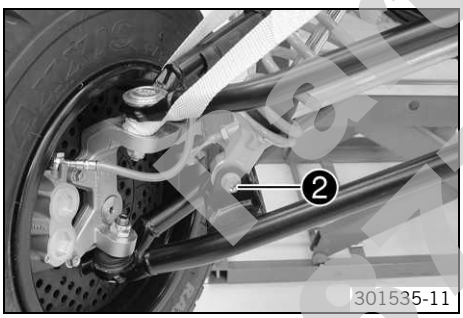
Installing the front shock absorber

Info
The operations are the same on the left and right.



– Position the front shock absorber. Mount and tighten screw ❶.
Guideline

Screw, front shock absorber	M10	45 Nm (33.2 lbf ft)



– Position the shock absorber in the lower A-arm. Mount and tighten screw ❷.
Guideline

Screw, front shock absorber	M10	45 Nm (33.2 lbf ft)

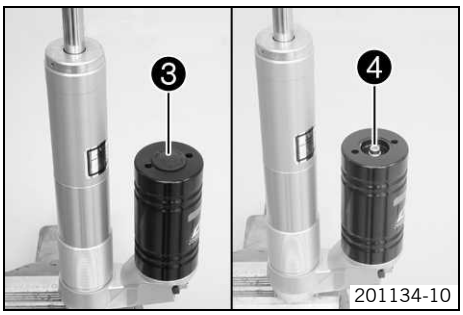
– Remove the tension belt.
– Remove the vehicle from the work stand. (☛ p. 12)

Front shock absorber - changing the oil

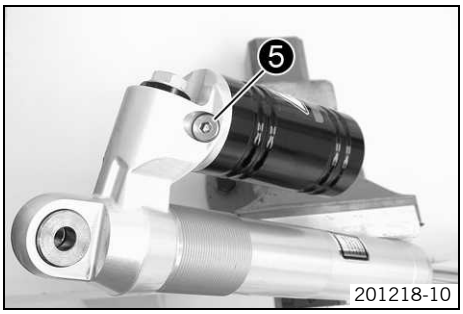
Danger
Danger of accidents Disassembly of pressurized parts can lead to injury.
– The shock absorber is filled with high density nitrogen. Adhere to the description provided.

Condition
The shock absorber has been removed.
– Remove the spring from the front shock absorber. (☛ p. 28)

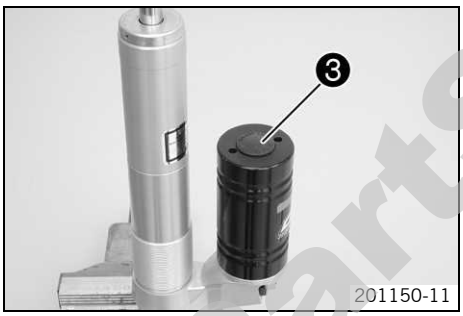
– Note down the present state of rebound damping ❶ and compression damping ❷.
– Completely open the adjusters of the rebound and compression damping.



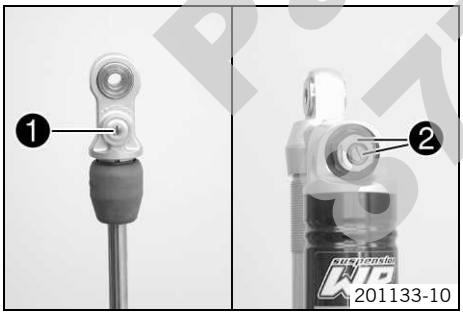
– Remove rubber cap ❸ of the reservoir.
– Slowly open screw ❹.
  ✔ The pressurized nitrogen is bled off.



– Remove screw ❺. Let the oil drain out.
– Bleed and fill the damper of the front shock absorber. (☛ p. 34)
– Fill the damper of the front shock absorber with nitrogen. (☛ p. 37)



– Mount rubber cap ❸ of the reservoir.



Alternative 1

– Turn adjusting screw ❶ 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	20 clicks
Standard	15 clicks
Sport	12 clicks

– Turn adjusting screw ❷ 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	20 clicks
Standard	15 clicks
Sport	12 clicks

– Turn adjusting screw ❷ all the way clockwise with a socket wrench.
– Turn back counterclockwise by the number of turns corresponding to the shock absorber type.

Guideline

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

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.

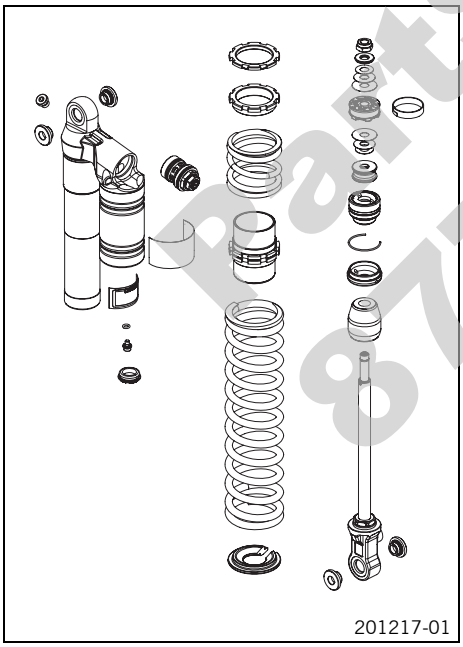
– Turn adjusting screw ❶ and ❷ to the position determined when the part was removed.

– Install the spring of the front shock absorber. (☛ p. 38)

Service the front 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.



Condition
The shock absorber has been removed.

– Remove the spring from the front shock absorber. (☛ p. 28)
– Disassemble the damper of the front shock absorber. (☛ p. 28)
– Disassemble the piston rod of the front shock absorber. (☛ p. 29)
– Remove the heim joint from the front shock absorber. (☛ p. 31)
– Check the damper of the front shock absorber. (☛ p. 30)
– Install the heim joint of the front shock absorber. (☛ p. 31)
– Assemble the piston rod of the front shock absorber. (☛ p. 32)
– Assemble the damper of the front shock absorber. (☛ p. 33)
– Install the spring of the front shock absorber. (☛ p. 38)

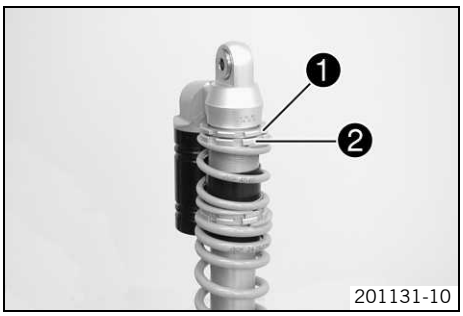
Front shock absorber - removing the spring

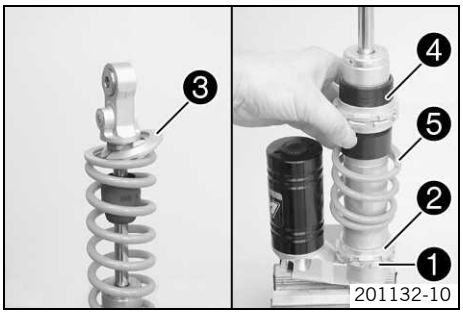
Condition

The shock absorber has been removed.

– Clamp the shock absorber in a vise using soft jaws.
– Measure and note down the spring length in the preloaded state.
– Release counter ring ❶.
– Turn adjusting ring ❷ all the way up.

Hook wrench (83019001000) (☛ p. 234)

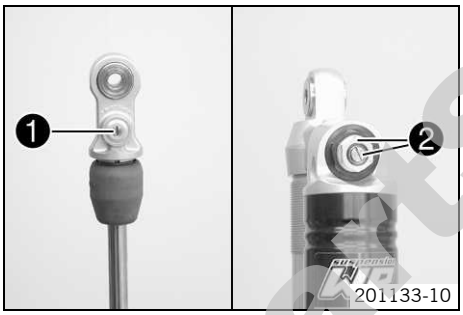




– Pull the spring down. Remove spring retainer ❸.
– Remove the spring.
– Remove sleeve ❹.
– Remove spring ❺.
– Remove adjusting ring ❷ and retaining ring ❶.

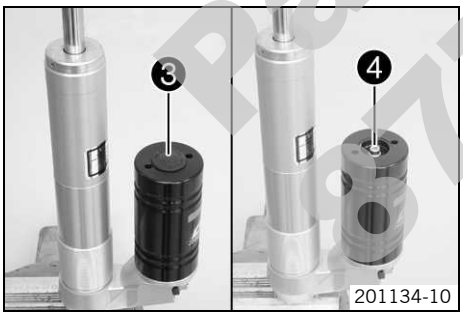
Front shock absorber - disassembling the damper

– Remove the spring from the front shock absorber. (☛ p. 28)
– Note down the present state of rebound damping ❶ and compression damping ❷.
– Completely open the adjusters of the rebound and compression damping.



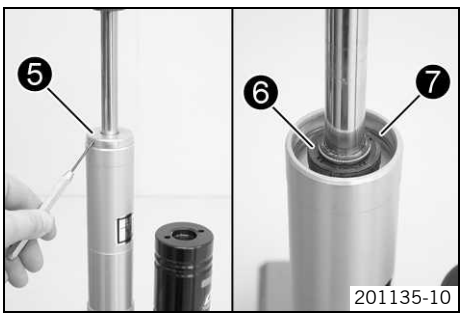
– Remove rubber cap ❸ of the reservoir.
– Slowly open screw ❹.

✓ The pressurized nitrogen is bled off.



– Remove locking cap ❺.
– Press in seal ring retainer ❻. Remove lock ring ❼.

Info
Do not scratch the inner surface.



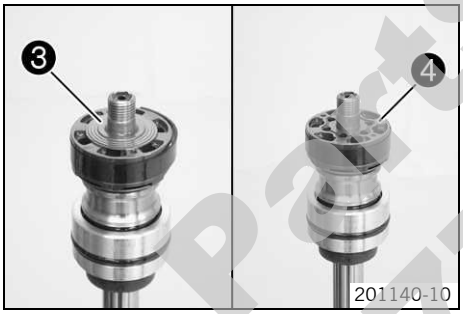
– Remove the piston rod. Drain the oil.

– Remove compression damping ❽. Remove the spring and piston.

Front shock absorber - disassembling the piston rod

– Disassemble the damper of the front shock absorber. (☛ p. 28)
– Clamp the piston rod with the heim joint in a bench vise.

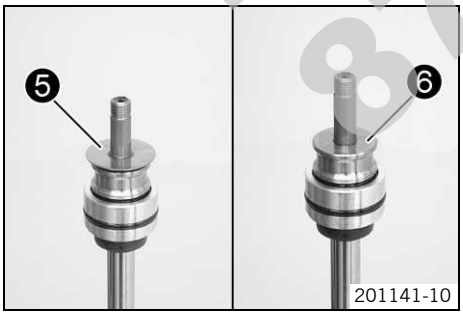
– Remove nut ❶.
– Remove supporting plate ❷.



– Remove rebound shim stack ❸.

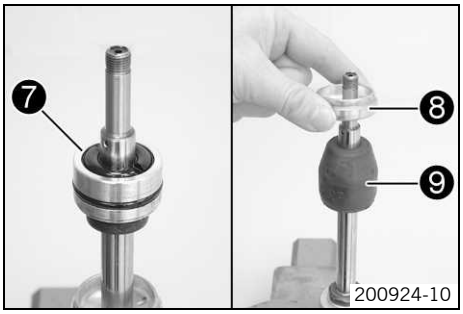
Info
Thread the rebound shim stack onto a screwdriver and set them down together.

– Remove piston ❹.



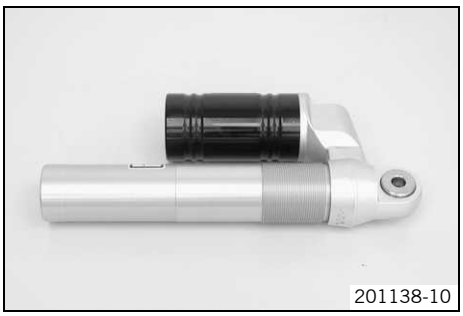
– Remove compression shim stack ❺ with bushing ❻.

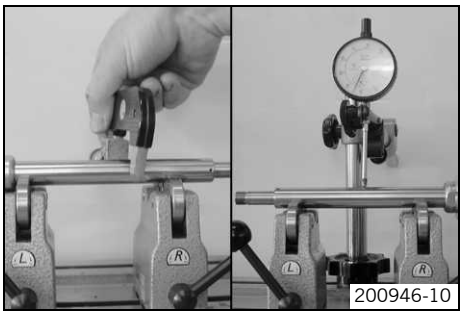
Info
Thread the compression shim stack onto a screwdriver and set them down together.

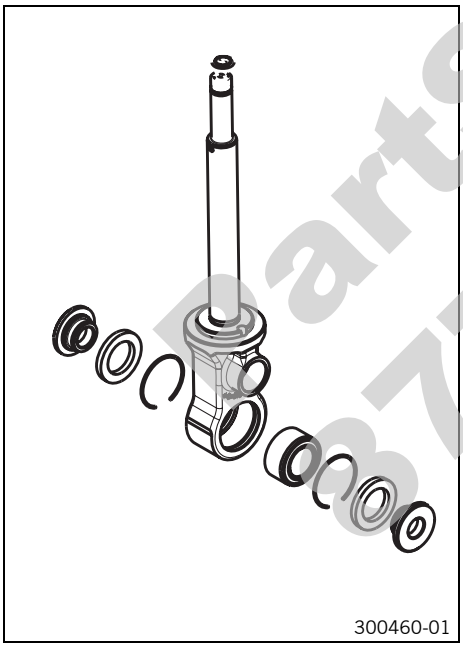


– Remove seal ring retainer ❼.
– Remove locking cap ❽ and rubber buffer ❾.

Front shock absorber - checking the damper


201138-10


200946-10


300460-01

Condition

The damper has been disassembled.

– Measure the inside diameter on both ends and in the middle of the damper cartridge.

Damper cartridge	
Minimum diameter	36.04 mm (1.4189 in)

» If the measured value is greater than the specified value:
  – Change the damper cartridge.

– Check the damper cartridge for damage and wear.

» If there is damage or wear:
  – Change the damper cartridge.

– Measure the diameter of the piston rod.

Piston rod	
Diameter	≥ 13.95 mm (≥ 0.5492 in)

» If the specified value is not reached:
  – Replace the piston rod.

– Measure the run-out of the piston rod.

Piston rod	
Run-out	≤ 0.06 mm (≤ 0.0024 in)

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

– Check the piston for damage and wear.

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

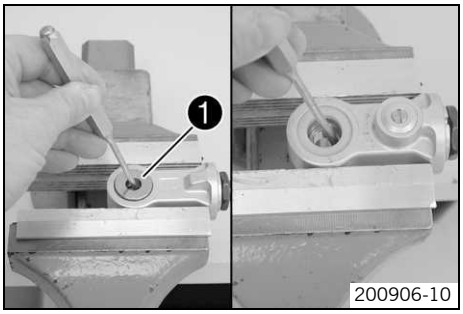
– Check the heim joint for damage and wear.

» If there is damage or wear:
  – Change the heim joint.

Front shock absorber - removing the heim joint

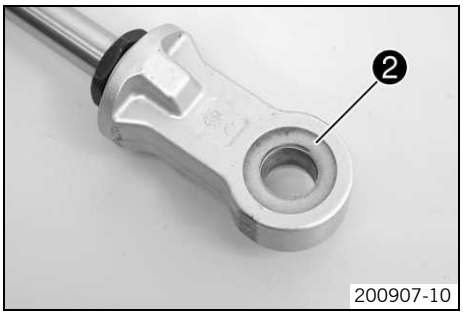
Info
The operations are the same on the top and bottom heim joint.

Condition
The shock absorber has been removed.

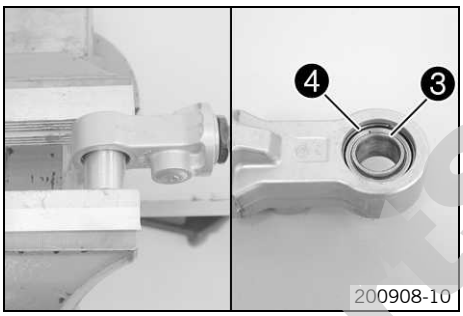


– Clamp the shock absorber in a vise using soft jaws.
– Remove both collar bushings ❶ of the heim joint.

Pin (T120) (☛ p. 237)



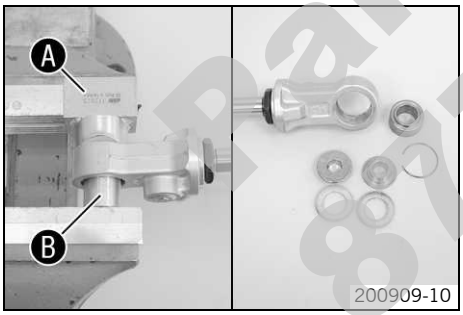
– Remove seal rings ❷ on both sides.



– Press heim joint ❸ to the side.

Pressing tool (T1207S) (☛ p. 238)

✓ The heim joint is lined up with a lock ring.
– Remove the other lock ring ❹.

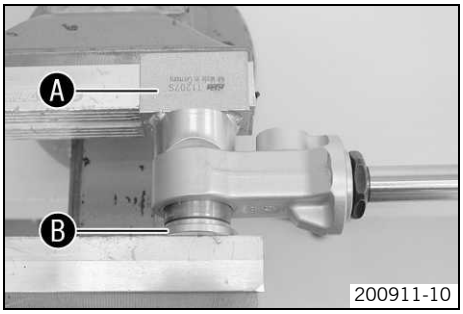


– Place special tool Ⓐ underneath and press out the heim joint using special tool Ⓑ.

Pressing tool (T1207S) (☛ p. 238)

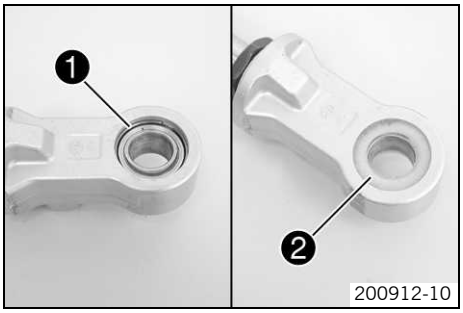
Front shock absorber - installing the heim joint

Info
The operations are the same on the top and bottom heim joint.



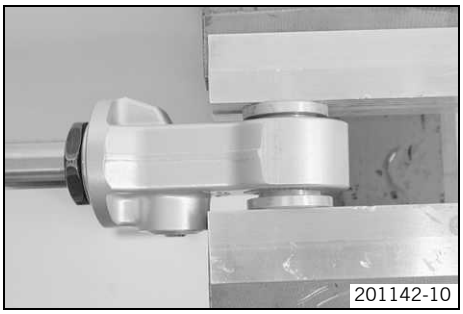
– Place special tool Ⓐ underneath and press in the heim joint to the lock ring using special tool Ⓑ.

Pressing tool (T1207S) (☛ p. 238)
Pressing tool (T1206) (☛ p. 238)



– Mount the second lock ring ❶.
– Mount and grease seal rings ❷ on both sides.

Lubricant (T158) (☛ p. 225)



– Press in both collar bushings of the heim joint.

Front shock absorber - assembling the piston rod

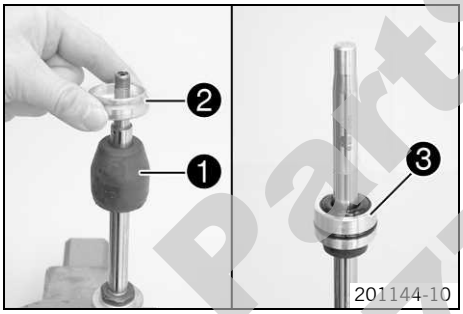
– Check the damper of the front shock absorber. (☛ p. 30)
– Clamp the piston rod with the heim joint in a bench vise.
– Mount bump rubber ❶ and locking cap ❷.
– Position special tool ❸ on the piston rod.

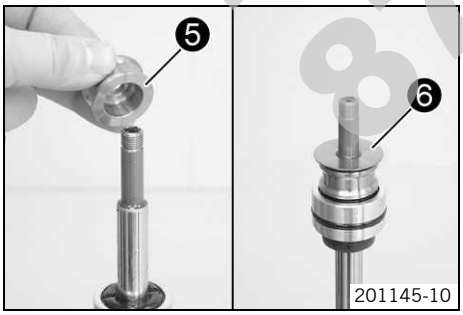
Mounting sleeve (T313) (☛ p. 239)

– Grease the seal ring and slide seal ring retainer ❹ onto the piston rod.

Lubricant (T625) (☛ p. 225)

– Remove the special tool.





– Mount bushing ❺.

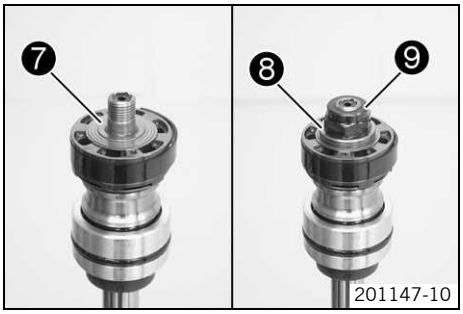
Info
Mount the larger inside diameter of the supporting plate facing downward.

– Mount compression damping shim stack ❻ with the smaller shims facing downward.

– Grind the piston 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 ❼ with the smaller shims at the top.
– Mount supporting plate ❽.
– Mount and tighten nut ❾ with the collar facing upward.

Guideline

Nut, piston rod	M10x1	30 Nm (22.1 lbf ft)

Front shock absorber - assembling the damper

– Slide the spring and piston onto compression damping adjuster ❶.
– Lubricate the O-rings.

Lubricant (T158) (☛ p. 225)

– Lubricate the thread.

Lubricant (T159) (☛ p. 226)

– Mount and tighten the compression damping adjuster.

Guideline

Compression damping adjuster	M31x1	50 Nm (36.9 lbf ft)

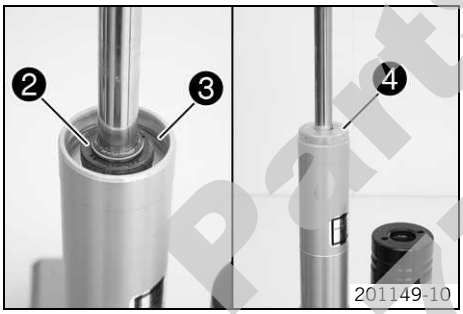
– Fill the damper cartridge about half full.

Shock absorber oil (SAE 2,5) (50180342S1) (☛ p. 224)

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

Lubricant (T158) (☛ p. 225)

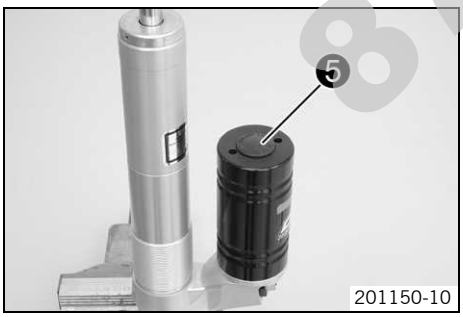
– Carefully mount the piston rod.



– Mount seal ring retainer ❷ and slide it below the ring groove.
– Mount lock ring ❸.

Info
Do not scratch the inner surface.

– Pull out the piston rod until the seal ring retainer is in line with the lock ring.
– Mount locking cap ❹ of the damper cartridge.
– Bleed and fill the damper of the front shock absorber. (☛ p. 34)
– Fill the damper of the front shock absorber with nitrogen. (☛ p. 37)
– Mount rubber cap ❺ of the reservoir.



Alternative 1

– Turn adjusting screw ❻ 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	20 clicks
Standard	15 clicks
Sport	12 clicks

– Turn adjusting screw ❼ 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	20 clicks
Standard	15 clicks
Sport	12 clicks

– Turn adjusting screw ❽ all the way clockwise with a socket wrench.
– Turn back counterclockwise by the number of turns corresponding to the shock absorber type.

Guideline

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

Alternative 2

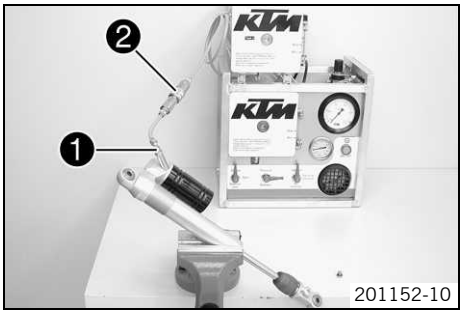
Warning
Danger of accidents Modifications to the suspension settings can seriously alter the vehicle's ride behavior.

– 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.

– Turn adjusting screws ❻, ❼ and ❽ to the position determined when the part was removed.

Front shock absorber - bleeding and filling the damper

Info
Before working with the vacuum pump, carefully read the vacuum pump operating manual.
Completely open the adjusters of the rebound and compression damping.

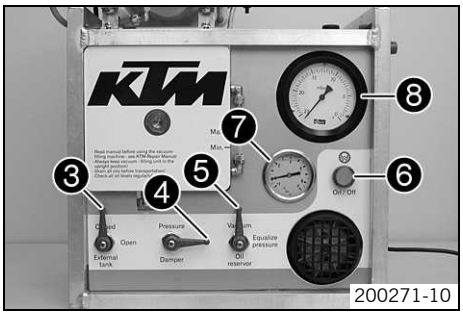


– Remove the screw from the filling port.
– Mount adapter ❶ on the damper.

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



– 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

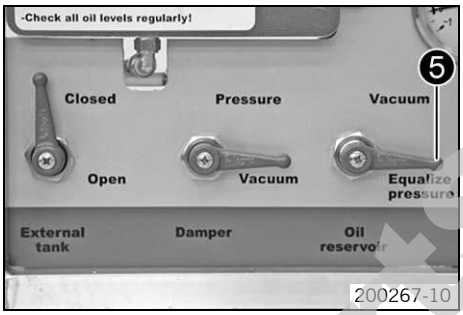
✓ Vacuum gauge ❽ drops to the required value.

4 mbar

– When the vacuum gauge reaches the specified value, measure distance Ⓐ between the floating piston and reservoir hole using the special tool.

Depth micrometer (T107S) (☛ p. 237)

✓ The floating piston is positioned in the lowermost position.

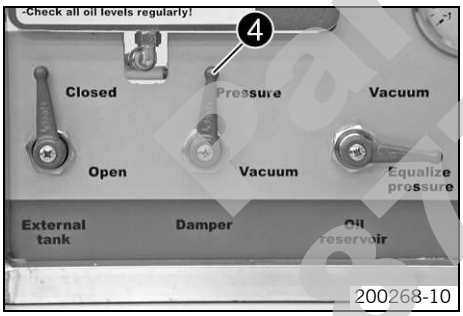


– Turn control lever **Oil reservoir** ❺ to **Equalize pressure**.
Guideline

4 mbar

✓ The pressure gauge increases to the required value.

0 bar

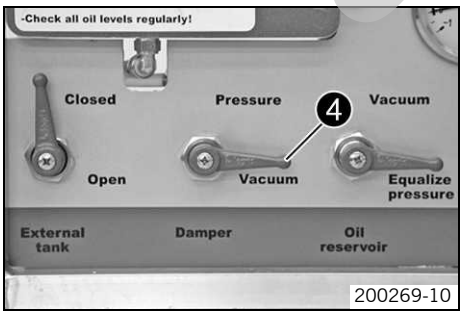


– When the pressure gauge reaches the required value, turn control lever **Damper** ❹ to **Pressure**.
Guideline

0 bar

✓ Oil is pumped into the damper.
✓ The pressure gauge increases to the required value.

3 bar

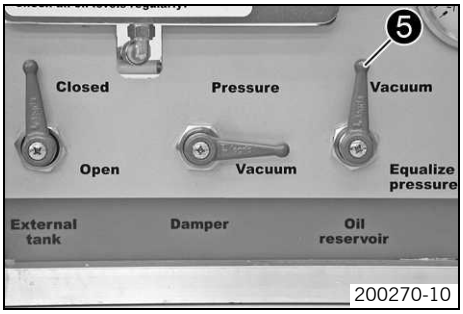


– When the pressure gauge reaches the required value, turn control lever **Damper** ❹ to **Vacuum**.
Guideline

3 bar

✓ The pressure gauge drops to the required value.

0 bar



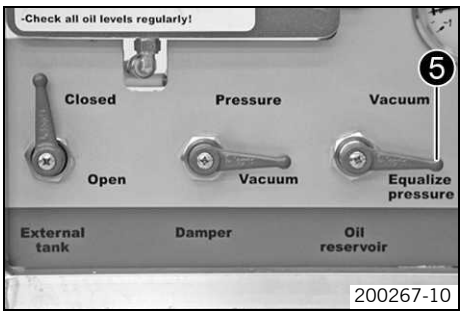
– When the pressure gauge reaches the required value, turn control lever **Oil reservoir** ❺ to **Vacuum**.

Guideline

0 bar

✔ The vacuum gauge drops to the required value.

8 mbar



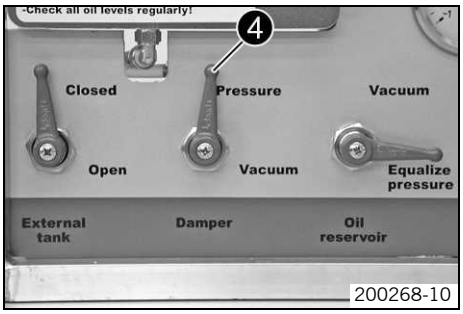
– When the vacuum gauge reaches the required value, turn control lever **Oil reservoir** ❺ to **Equalize Pressure**.

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**.

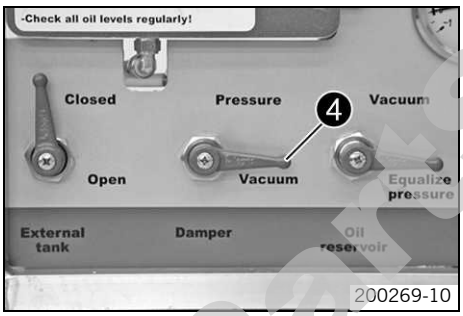
Guideline

0 bar

✔ Oil is pumped into the damper.

✔ The pressure gauge increases to the required value.

3 bar



– 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.

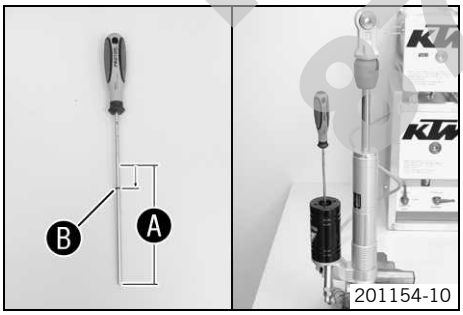
0 bar

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

Guideline

0 bar

✔ The vacuum pump is switched off.



– Stand the damper in a vertical position.

Info
Do not close off the adapter yet.

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

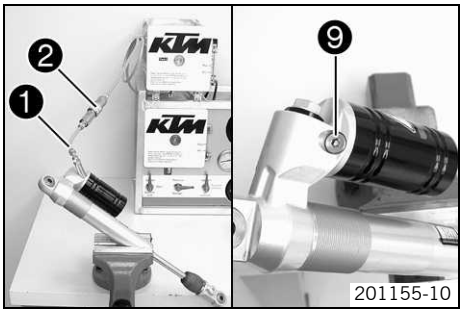
Guideline

10 mm

Depth micrometer (T107S) (☛ p. 237)

– 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.
– 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.

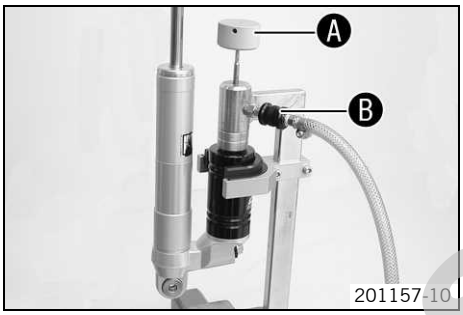
Guideline

Screw, filling port	M10x1	14 Nm (10.3 lbf ft)

Front shock absorber - filling the damper with nitrogen

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

Info
The piston rod is fully extended.



– 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 turning handle ❹ engages in the female hexagonal section of the filling port screw.

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

Guideline

Gas pressure	10 bar (145 psi)

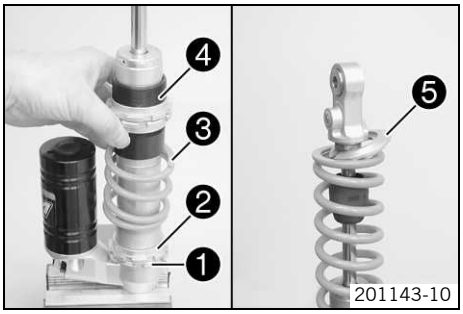
Info
Watch the pressure regulator dial.
Ensure that the damper is filled to the specified pressure.

– Screw the filling port shut with turning handle ❸.
– Close the spigot and remove the damper from the special tool.
– Tighten the filling port screw.

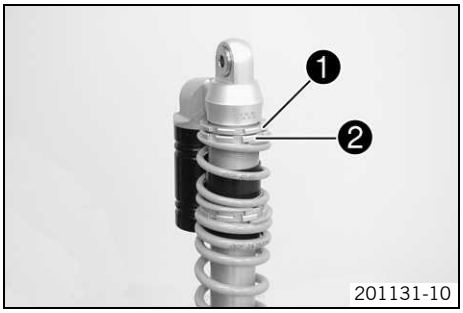
Guideline

Screw, filling port for reservoir	M5	3 Nm (2.2 lbf ft)

Front shock absorber - installing the spring



– Clamp the damper in a vise using soft jaws.
– Mount retaining ring ❶ and adjusting ring ❷.
– Measure the overall spring length in an unloaded state.
– Position spring ❸.
– Mount sleeve ❹.
– Position the spring and pull it down.
– Mount spring retainer ❺.
✔ The open end is opposite to the spring end.



Alternative 1

– Tighten the spring by turning adjusting ring ❷ to the specified measurement.
Guideline

Spring preload	
Comfort	3 mm
Standard	5 mm
Sport	8 mm

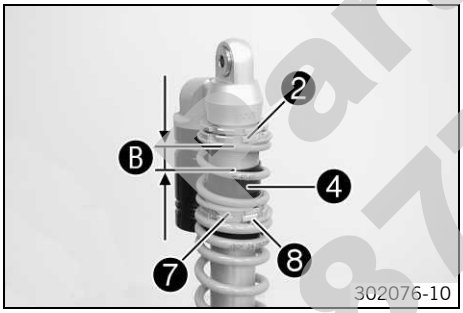
Hook wrench (83019001000) (☛ p. 234)

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 position determined when it was removed.
– Hold the adjusting ring in place. Tighten retaining ring ❶.
– Loosen adjusting rings ❼ and ❽.

Hook wrench (83019001000) (☛ p. 234)



– Measure the cross over setting Ⓑ between sliding bushing ❹ and the collar of adjusting ring ❷.
Guideline

Cross over	19±1.5 mm (0.75±0.059 in)

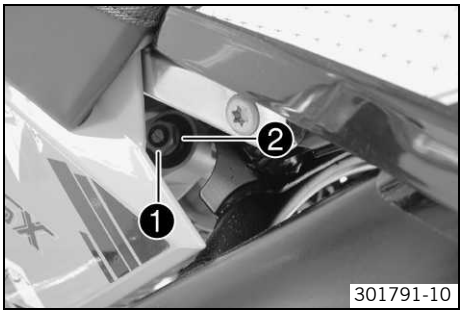
– Adjust the sleeve by turning adjusting ring ❼ to the specified measurement Ⓑ.
– Lock the adjusting rings.

Rear shock absorber - adjusting the high-speed compression damping

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.

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.

Info
The high-speed setting has an impact on the fast compression of the shock absorber.



– Turn adjusting screw ❶ all the way clockwise with a socket wrench.

Info
Do not loosen nut ❷!

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

Guideline

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

Info
Turn clockwise to increase damping; turn counterclockwise to reduce damping.

Rear shock absorber - adjusting the low-speed compression damping

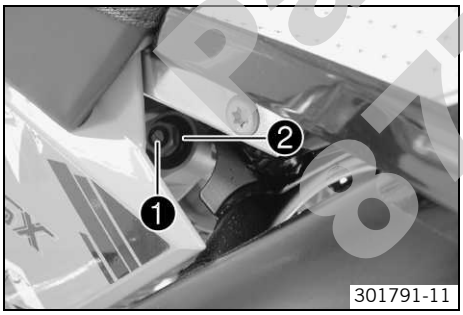
Danger
Danger of accidents Disassembly of pressurized parts can lead to injury.

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

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.

Info
The low-speed setting has an impact on 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	20 clicks
Standard	15 clicks
Sport	15 clicks

Info
Turn clockwise to increase damping; turn counterclockwise to reduce damping.

Rear shock absorber - adjusting the rebound damping

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.

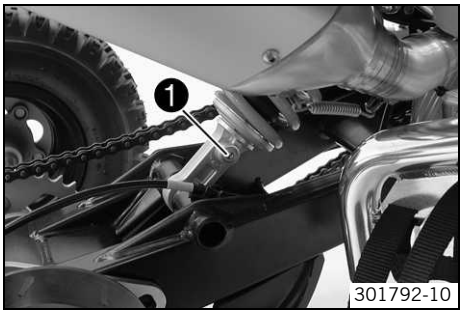
Warning

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.

Info

The rebound damping setting has an impact on the rebound of the shock absorber.



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

Guideline

Rebound damping	
Comfort	20 clicks
Standard	15 clicks
Sport	15 clicks

Info

Turning to the right increases damping, while turning to the left lessens damping.

Rear shock absorber - adjusting the spring preload

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.

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.

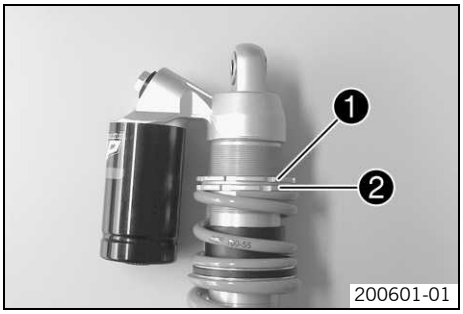
Info

Increasing the spring preload raises the center of gravity of the vehicle. This can have a large impact on vehicle handling.

Tip

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

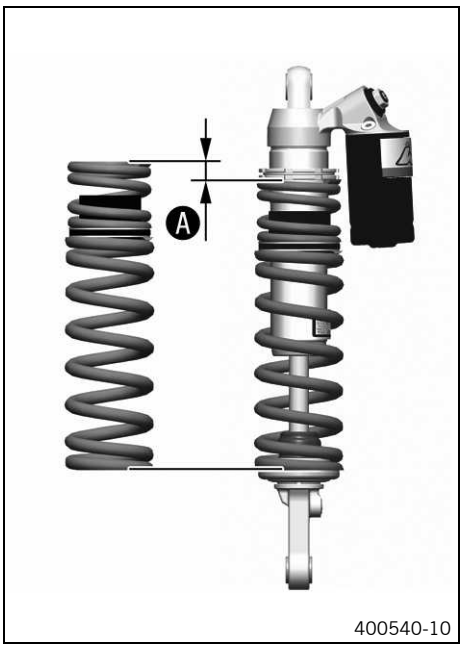
– Remove the rear shock absorber. (☛ p. 41)
– After removing the shock absorber, clean it thoroughly.



– Release counter ring ❶. Hold adjusting ring ❷ while doing so.

Hook wrench (83019002000) (☛ p. 234)

– Turn the adjusting ring until the spring pack is no longer under tension.



– Measure the overall spring pack when not under tension.

Info
The spring preload Ⓐ is the difference in length between the spring pack when it is unloaded and when it is installed.

– Tighten the spring pack by turning the adjusting ring to the specified measurement.

Guideline

Spring preload	
Comfort	3 mm
Standard	5 mm
Sport	5 mm

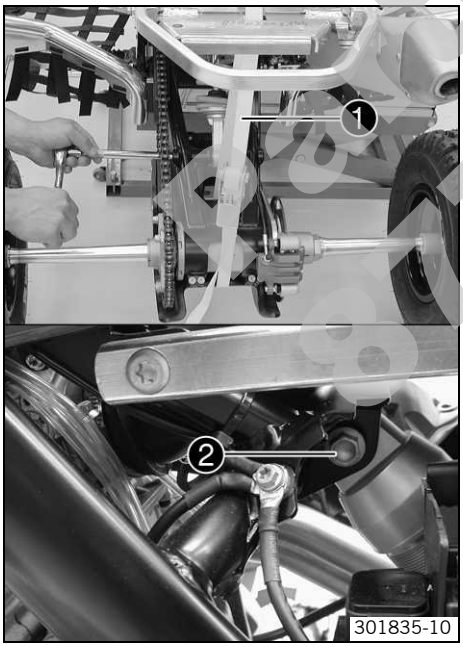
– Tighten the lock ring and adjusting ring.

Info
If you increase the spring preload, you should also slightly increase the rebound damping.

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

Removing the rear shock absorber

– Jack up the vehicle. (☛ p. 12)
– Remove the rear fender. (☛ p. 70)



Note
Danger of damage The chain sliding piece and frame can be damaged from incorrect handling.
– When removing the rear shock absorber, secure the swingarm with a tension belt to prevent it from swinging down further.

– Attach the swingarm to the subframe with a tension belt ❶ to relieve the shock absorber.
– Remove the bottom screw of the shock absorber.

Tip
Press the screw out of the swingarm with a screw driver while moving the tension belt.

– Remove the top screw ❷ of the shock absorber and carefully remove the shock absorber out of the vehicle toward the rear.

Installing the rear shock absorber

– Position the shock absorber in the vehicle with the reservoir on the right. Mount and tighten the top screw ❶.

Guideline

Screw, rear top shock absorber	M12	60 Nm (44.3 lbf ft)

– Position the shock absorber in the swingarm. Mount and tighten the bottom screw.

Guideline

Screw, rear bottom shock absorber	M12	70 Nm (51.6 lbf ft)

– Remove the tension belt.
– Install the rear fender. (☛ p. 71)
– Remove the vehicle from the work stand. (☛ p. 12)

Rear shock absorber - changing the oil

Danger

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

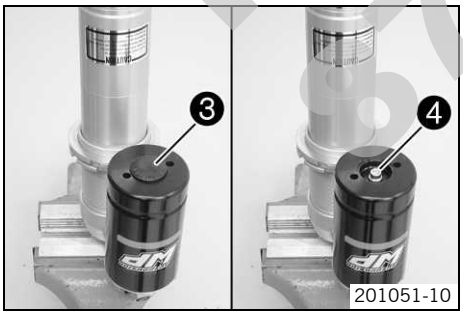
– The shock absorber is filled with high density nitrogen. Adhere to the description provided.

Condition

The shock absorber has been removed.

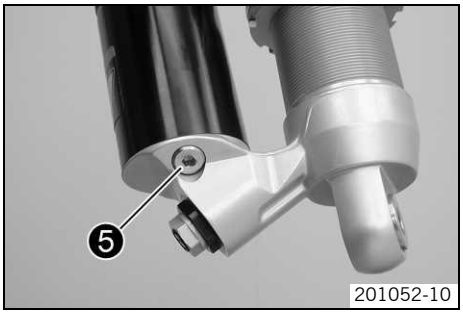
– Remove the spring from the rear shock absorber. (☛ p. 44)

– Note down the present state of rebound damping ❶ and compression damping ❷.
– Completely open the adjusters of the rebound and compression damping.



– Remove rubber cap ❸ of the reservoir.
– Slowly open screw ❹.

✔ The pressurized nitrogen is bled off.



– Remove screw ❺. Let the oil drain out.
– Bleed and fill the damper of the rear shock absorber. (☛ p. 54)
– Fill the damper of the rear shock absorber with nitrogen. (☛ p. 56)

– Mount rubber cap ❸ of the reservoir.

Alternative 1

– Turn adjusting screw ❶ 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	20 clicks
Standard	15 clicks
Sport	15 clicks

– Turn adjusting screw ❷ 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	20 clicks
Standard	15 clicks
Sport	15 clicks

– Turn adjusting screw ❷ all the way clockwise with a socket wrench.
– Turn back counterclockwise by the number of turns corresponding to the shock absorber type.

Guideline

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

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.

– Turn adjusting screw ❶ and ❷ to the position determined when the part was removed.

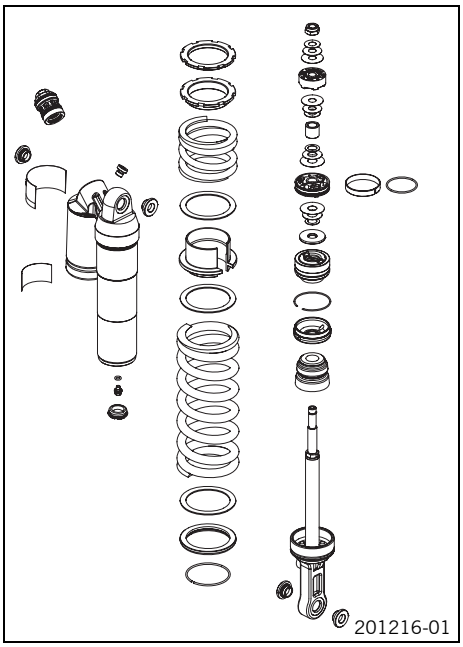
– Install the spring of the rear shock absorber. (☛ p. 57)

Servicing the rear 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.



Condition

The shock absorber has been removed.

– Remove the spring from the rear shock absorber. (☛ p. 44)
– Disassemble the damper of the rear shock absorber. (☛ p. 45)
– Disassemble the piston rod of the rear shock absorber. (☛ p. 46)
– Disassemble the seal ring retainer of the rear shock absorber. (☛ p. 47)
– Checking the damper of the rear shock absorber. (☛ p. 48)
– Assemble the seal ring retainer of the rear shock absorber. (☛ p. 50)
– Assemble the piston rod of the rear shock absorber. (☛ p. 51)
– Assemble the damper of the rear shock absorber. (☛ p. 52)
– Install the spring of the rear shock absorber. (☛ p. 57)

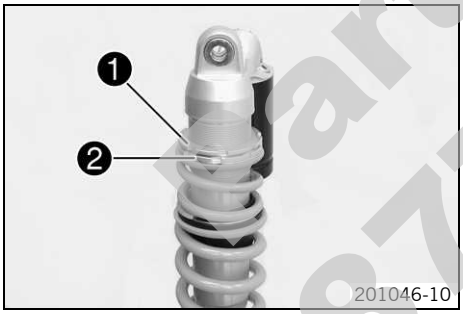
Rear shock absorber - removing the spring

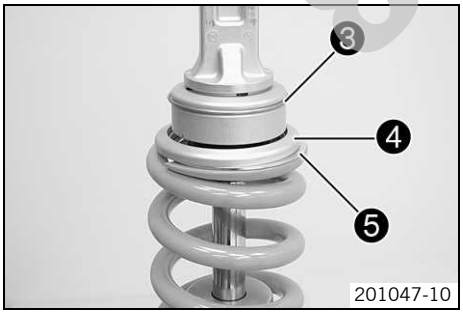
Condition

The shock absorber has been removed.

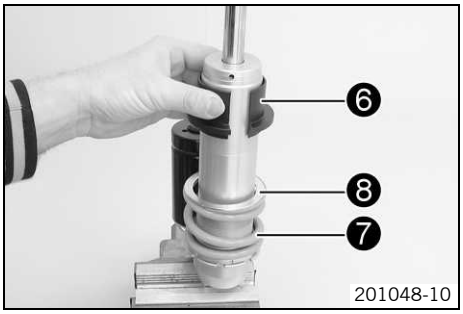
– Clamp the shock absorber in a vise using soft jaws.
– Measure and note down the spring length in the preloaded state.
– Release counter ring ❶.
– Turn adjusting ring ❷ until the spring is no longer under tension.

Hook wrench (T157S) (☛ p. 239)





– Remove ring ❸.
– Remove spring retainer ❹ and washer ❺.
– Remove spring.

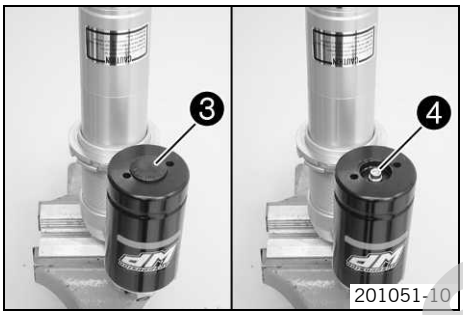


– Remove sleeve ❻.
– Remove spring ❼ with washer ❽.

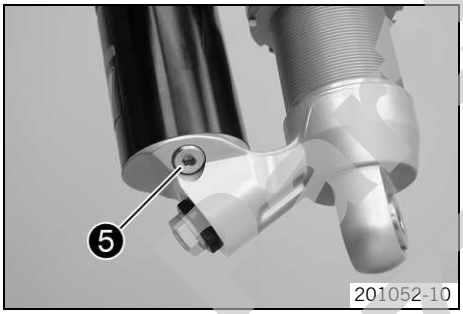
Rear shock absorber - disassembling the damper

– Remove the spring from the rear shock absorber. (☛ p. 44)

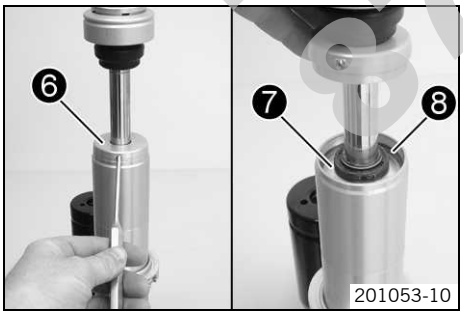
– Note down the present state of rebound damping ❶ and compression damping ❷.
– Completely open the adjusters of the rebound and compression damping.



– Remove rubber cap ❸ of the reservoir.
– Slowly open screw ❹.
✔ The pressurized nitrogen is bled off.

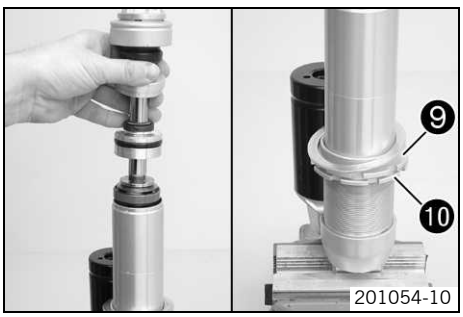


– Remove screw ❺. Let the oil drain out.

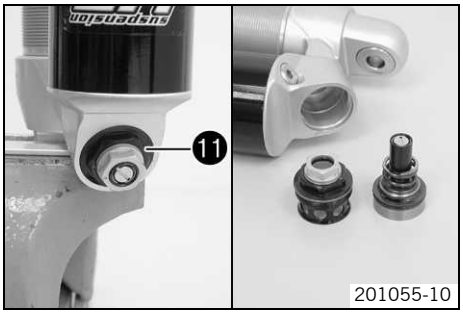


– Remove locking cap ❻.
– Press in seal ring retainer ❼.
– Remove lock ring ❽.

Info
Do not scratch the inner surface.



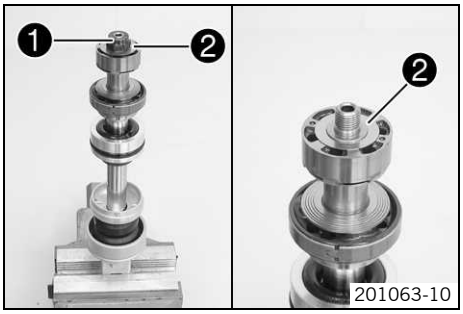
– Remove the piston rod. Drain the remaining oil.
– Remove adjusting ring ❾ with the intermediate washer and retaining ring ❿.



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

Rear shock absorber - disassembling the piston rod

– Disassemble the damper of the rear shock absorber. (☛ p. 45)
– Clamp the piston rod into a vise.



– Remove nut ❶.
– Remove rebound shim stack ❷.

– Remove piston ❸.
– Remove compression shim stack ❹.

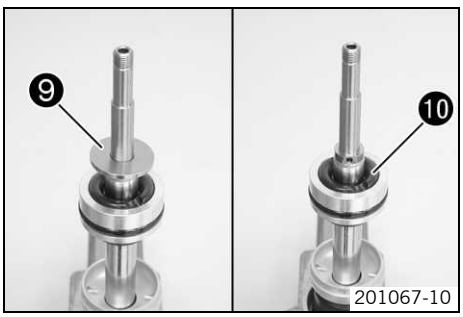
Info
Thread the compression shim stack onto a screwdriver and set them down together.

– Remove sleeve ❺.
– Remove rebound shim stack ❻.

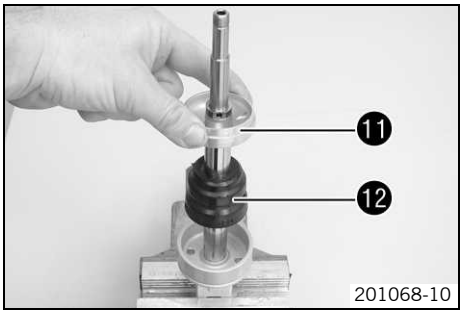
Info
Thread the rebound shim stack onto a screwdriver and set them down together.

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

Info
Thread the compression shim stack onto a screwdriver and set them down together.



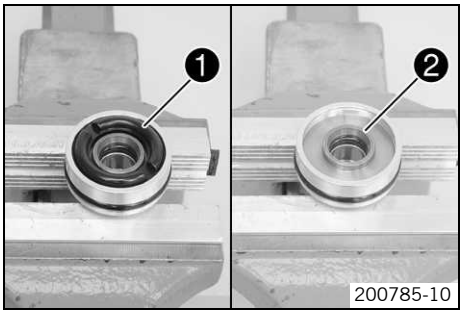
– Remove rebound washer ❾.
– Remove seal ring retainer ❿.



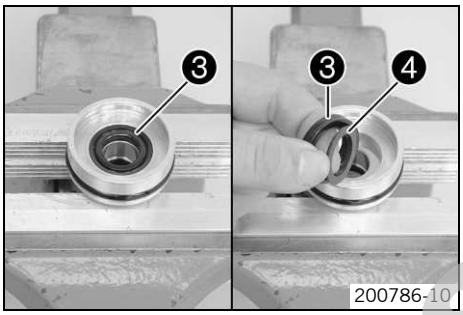
– Remove locking cap ⓫ and rubber buffer ⓬.

Rear shock absorber - disassembling the seal ring retainer

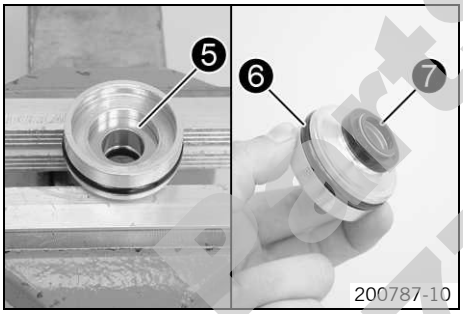
– Disassemble the piston rod of the rear shock absorber. (☛ p. 46)



– Remove rebound rubber ❶.
– Remove centering disk ❷.



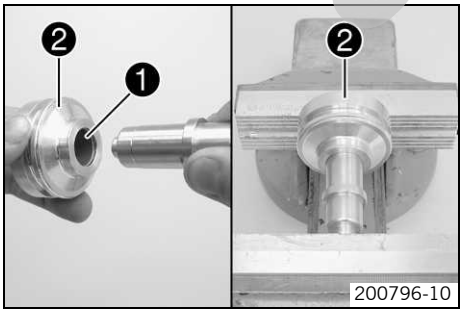
– Remove seal ring ❸.
– Remove washer ❹ from seal ring ❸.



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

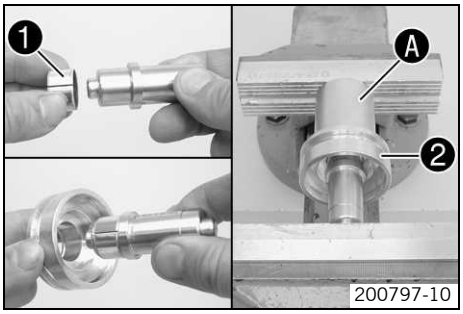
Changing the pilot bushing

– Disassemble the seal ring retainer of the rear shock absorber. (☛ p. 47)



– Press pilot bushing ❶ out of seal ring retainer ❷ using the special tool.

Press drift (T1504) (☛ p. 238)



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

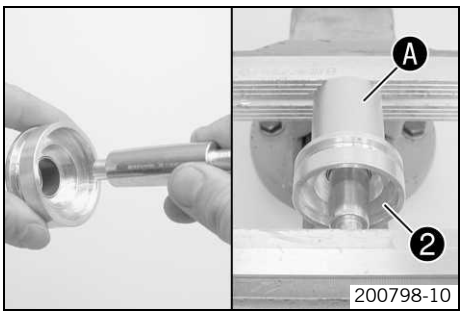
Press drift (T1504) (☛ p. 238)

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

Press drift (T1504) (☛ p. 238)

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

Assembly tool (T150S) (☛ p. 238)



– Lubricate the special tool.

Fork oil (SAE 5) (☛ p. 224)
Calibration pin (T1205) (☛ p. 238)

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

Assembly tool (T150S) (☛ p. 238)

– Press the special tool through the new pilot bushing.

Calibration pin (T1205) (☛ p. 238)

✓ The pilot bushing is calibrated.

– Assemble the seal ring retainer of the rear shock absorber. (☛ p. 50)

Rear shock absorber - checking the damper

Condition

The damper has been disassembled.

– Measure the inside diameter on both ends and in the middle of the damper cartridge.

Damper cartridge	
Minimum diameter	46.10 mm (1.815 in)

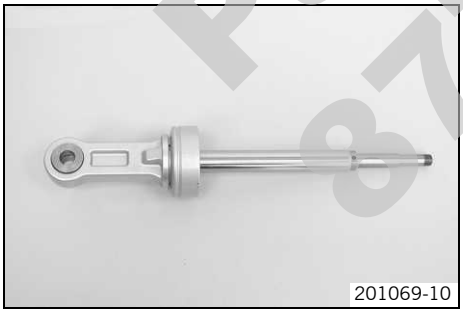
» If the measured value is greater than the specified value:
  – Change the damper cartridge.

– Check the damper cartridge for damage and wear.

» If there is damage or wear:
  – Change the damper cartridge.

– Check the heim joint for damage and wear.

» If there is damage or wear:
  – Change the heim joint.



– Measure the diameter of the piston rod.

Piston rod	
Diameter	≥ 17.95 mm (≥ 0.7067 in)

» If the specified value is not reached:
  – Replace the piston rod.

– Measure the run-out of the piston rod.

Piston rod	
Run-out	≤ 0.03 mm (≤ 0.0012 in)

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

– Check the piston for damage and wear.

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

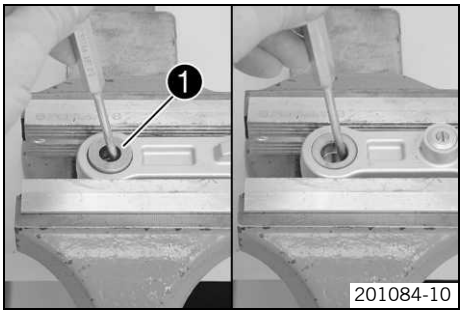

200813-10

– Check the piston rings for damage and wear.
  » If damaged or if a bronze-colored surface is visible:
    – Change the piston rings.

Rear shock absorber - removing the heim joint

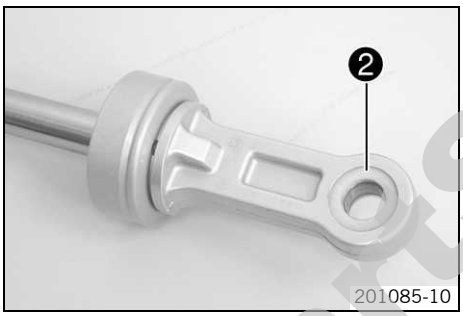
Info
The operations are the same on the top and bottom heim joint.

Condition
The shock absorber has been removed.



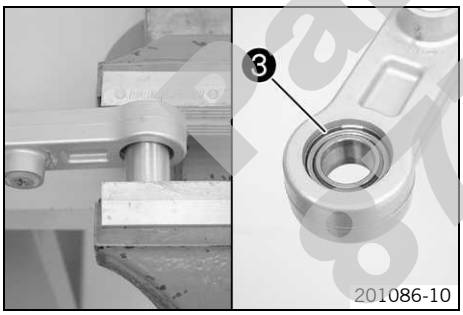
201084-10

– Clamp the shock absorber in a vise using soft jaws.
– Remove both collar bushings ❶ of the heim joint using a pin.



201085-10

– Remove seal rings ❷ on both sides.

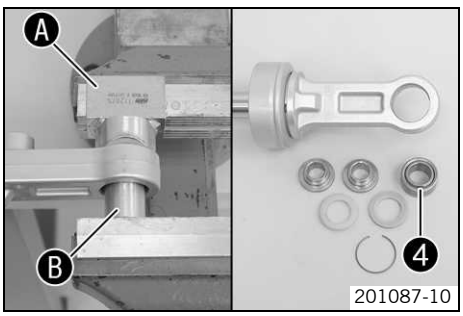


201086-10

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

Pressing tool (T1207S) (☛ p. 238)

– Remove the second lock ring ❸.



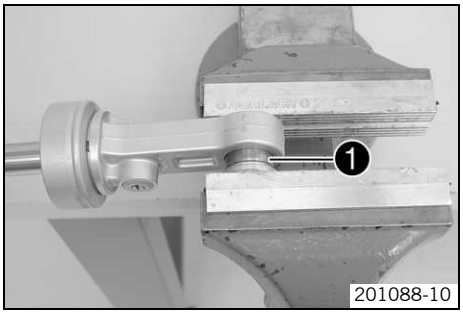
201087-10

– Place special tool Ⓐ underneath and press out heim joint ❹ using special tool Ⓑ.

Pressing tool (T1207S) (☛ p. 238)

Rear shock absorber - installing the heim joint

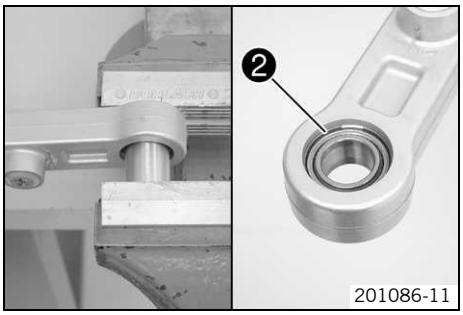
Info
The operations are the same on the top and bottom heim joint.



– Position the new heim joint ❶ and the special tool.

Pressing tool (T1206) (☛ p. 238)

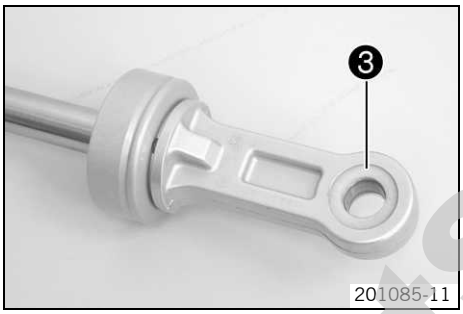
– Press the heim joint all the way in.



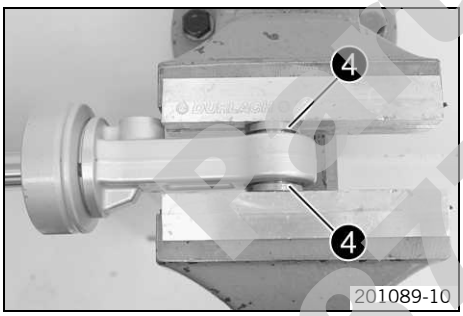
– Press the heim joint against the lock ring using the special tool.

Pressing tool (T1207S) (☛ p. 238)

– Mount the second lock ring ❷.

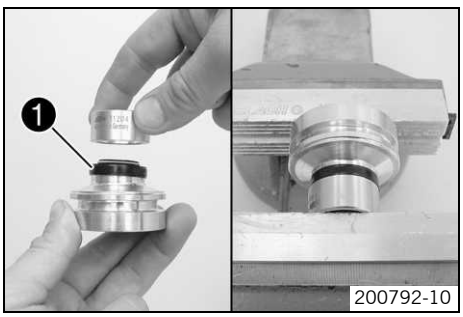


– Mount seal rings ❸ on both sides.



– Position and press in both collar bushings ❹.

Rear shock absorber - assembling the seal ring retainer

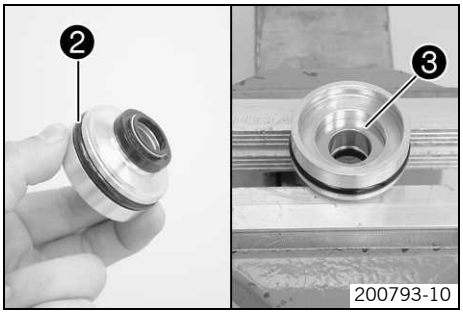


– Mount dust boot ❶ with the special tool.

Mounting sleeve (T1204) (☛ p. 237)

– Lubricate the sealing lip of the dust boot.

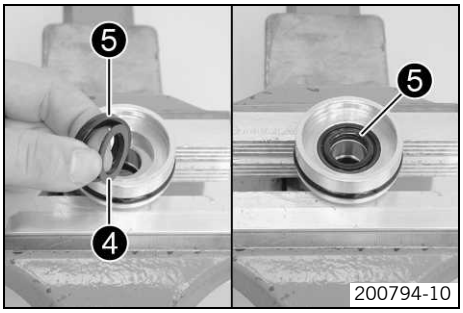
Lubricant (T625) (☛ p. 225)



– Lubricate the groove of the O-ring.

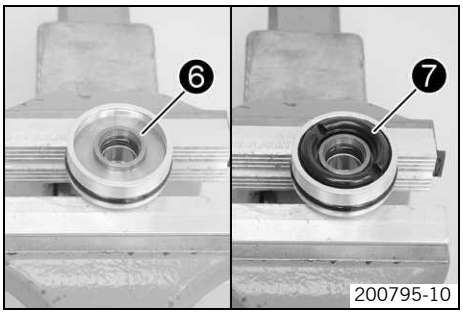
Lubricant (T158) (☛ p. 225)

– 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.

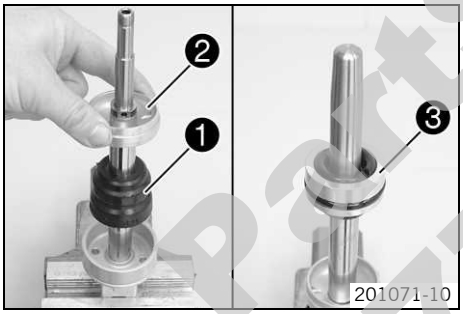
Lubricant (T511) (☛ p. 226)



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

Rear shock absorber - assembling the piston rod

– Assemble the seal ring retainer of the rear shock absorber. (☛ p. 50)



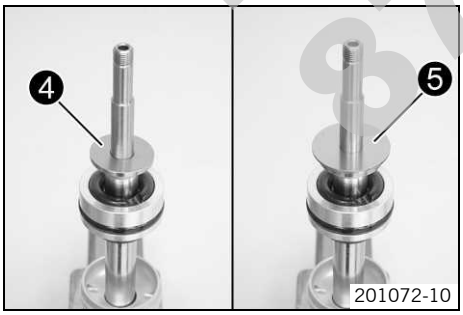
– Clamp the piston rod into a vise.
– Mount bump rubber ❶ and locking cap ❷.
– Position the special tool on the piston rod.

Mounting sleeve (T1554) (☛ p. 239)

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

Lubricant (T625) (☛ p. 225)

– 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

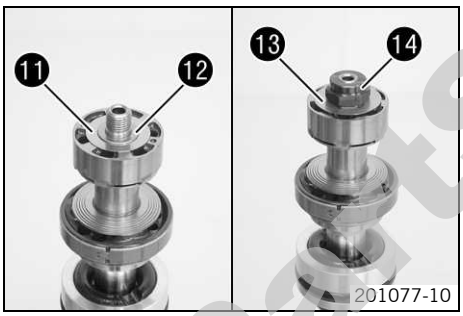
– Mount rebound damping shim stack ❼ with the smaller shims at the top.
– Mount sleeve ❽.

– 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 the lower rebound washer ⓫ and washer ⓬.

Info
The washer centers the lower rebound washer.

– Mount the upper rebound washer ⓭.
– Mount and tighten nut ⓮.

Guideline

Nut, piston rod	M10x1	30 Nm (22.1 lbf ft)

Rear shock absorber - assembling the damper

– Assemble the piston rod of the rear shock absorber. (☛ p. 51)
– Slide the spring and piston onto compression damping adjuster ❶.
– Lubricate the O-rings.

Lubricant (T158) (☛ p. 225)

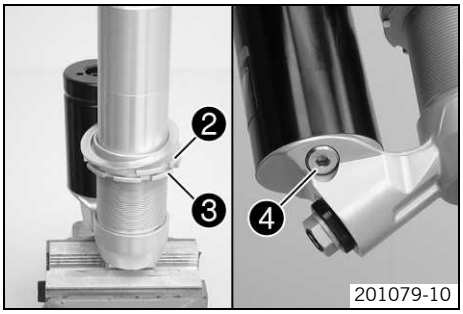
– Lubricate the thread.

Lubricant (T159) (☛ p. 226)

– Mount and tighten compression damping adjuster ❶.

Guideline

Compression damping adjuster	M31x1	50 Nm (36.9 lbf ft)



– Mount adjusting ring ❷ with the intermediate washer and retaining ring ❸.

Info
It is not possible to mount the rings after the piston rod has been mounted.

– Mount screw ❹ but do not tighten yet.

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

Lubricant (T158) (☛ p. 225)

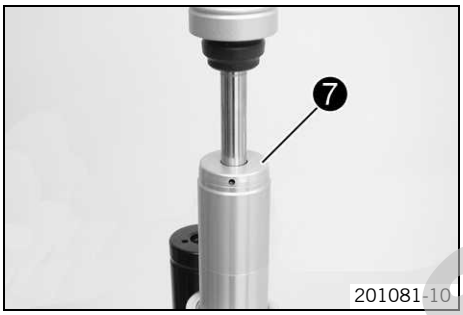
– Fill the damper cartridge about half full.

Shock absorber oil (SAE 2,5) (50180342S1) (☛ p. 224)

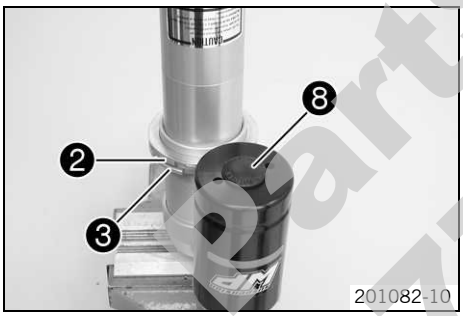
– Carefully mount the piston rod.
– Mount seal ring retainer ❺ and slide it below the ring groove.
– Mount lock ring ❻.

Info
Do not scratch the inner surface.

– Pull out the piston rod until the seal ring retainer is in line with the lock ring.



– Mount locking cap ❼ of the damper cartridge.
– Bleed and fill the damper of the rear shock absorber. (☛ p. 54)
– Fill the damper of the rear shock absorber with nitrogen. (☛ p. 56)



– Mount rubber cap ❽ of the reservoir.
– Turn adjusting ring ❷ with the intermediate washer and retaining ring ❸ all the way down.

Alternative 1

– Turn adjusting screw ❾ 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	20 clicks
Standard	15 clicks
Sport	15 clicks

– Turn adjusting screw ❿ 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	20 clicks
Standard	15 clicks
Sport	15 clicks

– Turn adjusting screw ⓫ all the way clockwise with a socket wrench.
– Turn back counterclockwise by the number of turns corresponding to the shock absorber type.

Guideline

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

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.

– Turn adjusting screws ❾, ⓾ and ⓫ to the position determined when the part was removed.

Rear shock absorber - bleeding and filling the damper

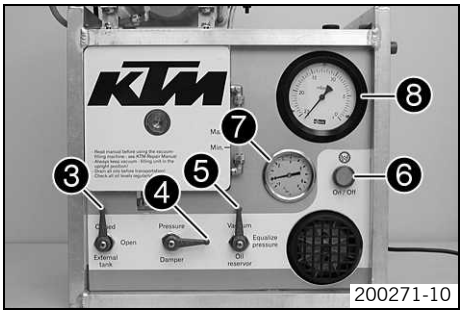
Info
Before working with the vacuum pump, carefully read the vacuum pump operating manual.
Completely open the adjusters of the rebound and compression damping.

– 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 point.
The piston rod moves in and out during filling; do not immobilize it by holding it with your hand.

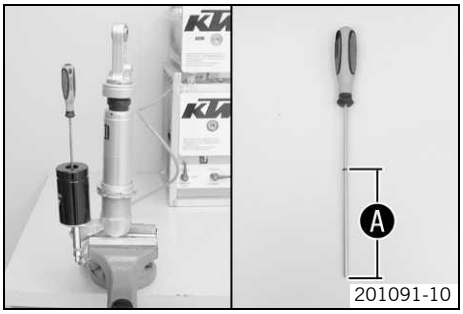


– Position the control lever as shown in the photo.
✓ Control lever **External tank** ❸ is set to **Closed**; **Damper** ❹ is set to **Vacuum**; and **Oil reservoir** ❺ is set to **Vacuum**.
– Activate **On/Off** switch ❻.
✓ The suction process begins.
✓ Pressure gauge ❼ drops to the required value.

< 0 bar

✓ Vacuum gauge ❽ drops to the required value.

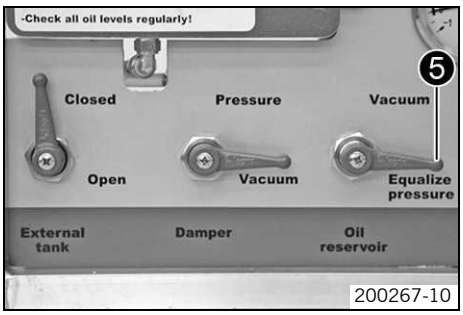
4 mbar



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

Depth micrometer (T107S) (☛ p. 237)

✔ The floating piston is positioned in the lowermost position.



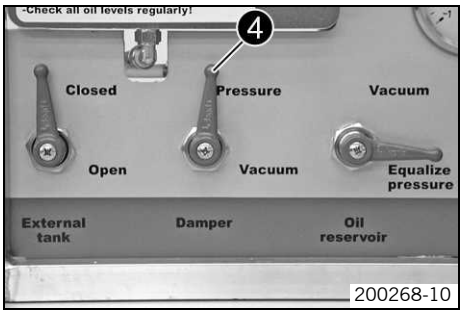
– When the vacuum gauge reaches the required value, turn control lever **Oil reservoir ❺** to **Equalize pressure**.

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**.

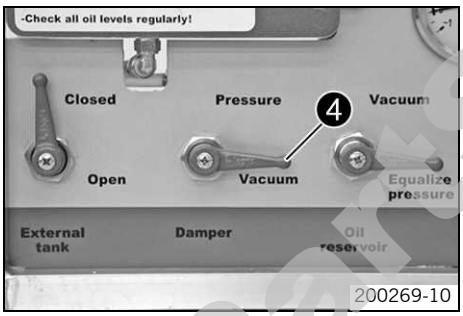
Guideline

0 bar

✔ Oil is pumped into the damper.

✔ The pressure gauge increases to the required value.

3 bar



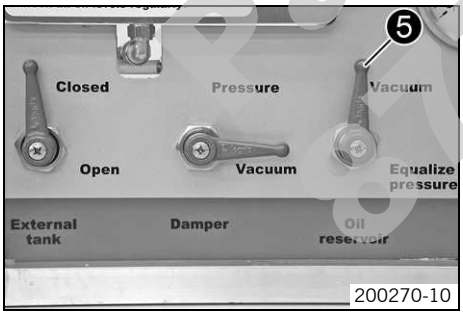
– When the pressure gauge reaches the required value, turn control lever **Damper ❹** to **Vacuum**.

Guideline

3 bar

✔ The pressure gauge drops to the required value.

0 bar



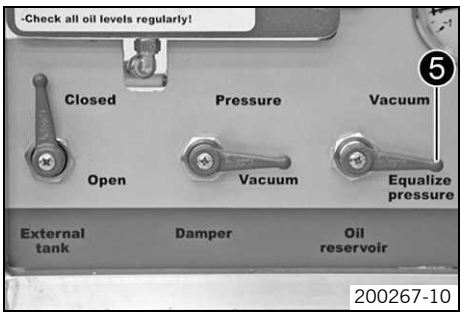
– When the pressure gauge reaches the required value, turn control lever **Oil reservoir ❺** to **Vacuum**.

Guideline

0 bar

✔ The vacuum gauge drops to the required value.

8 mbar



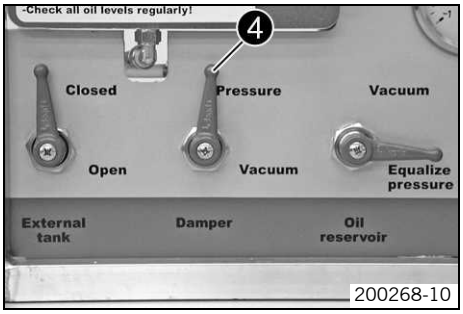
– When the vacuum gauge reaches the required value, turn control lever **Oil reservoir ❺** to **Equalize Pressure**.

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**.

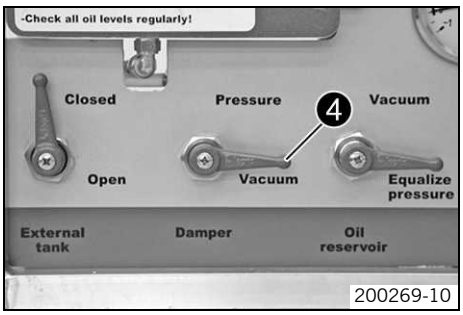
Guideline

0 bar

✔ Oil is pumped into the damper.

✔ The pressure gauge increases to the required value.

3 bar



– 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.

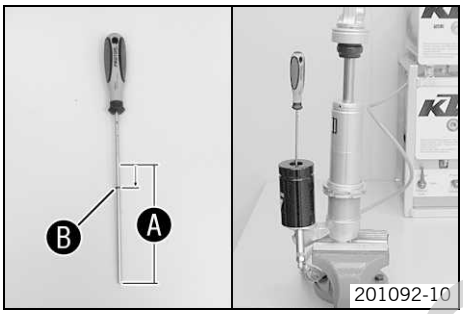
0 bar

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

Guideline

0 bar

✔ The vacuum pump is switched off.



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

Guideline

10 mm

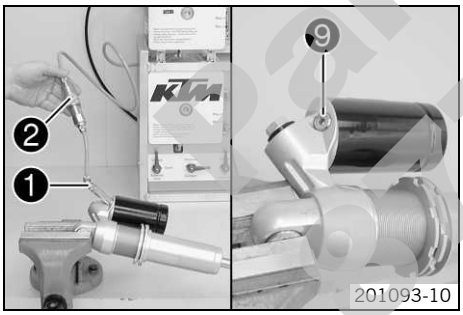
Depth micrometer (T107S) (☛ p. 237)

– 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.



– 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

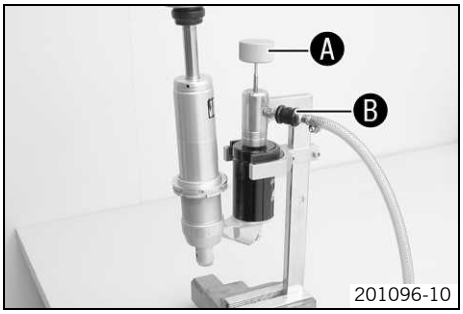
Screw, filling port	M10x1	14 Nm (10.3 lbf ft)

Rear shock absorber - filling the damper with nitrogen

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

Info

The piston rod is fully extended.



– 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 turning handle ❹ engages in the female hexagonal section of the filling port screw.

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

Guideline

Gas pressure	10 bar (145 psi)

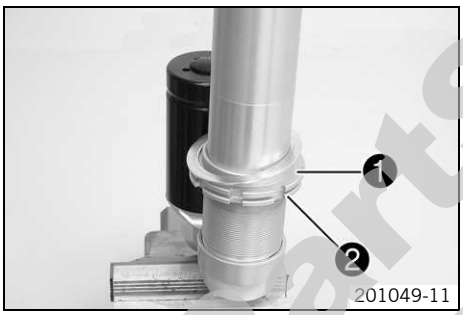
Info
Watch the pressure regulator dial.
Ensure that the damper is filled to the specified pressure.

– Screw the filling port shut with turning handle ❹.
– Close spigot ❸ and remove the damper from the special tool.
– Tighten the filling port screw.

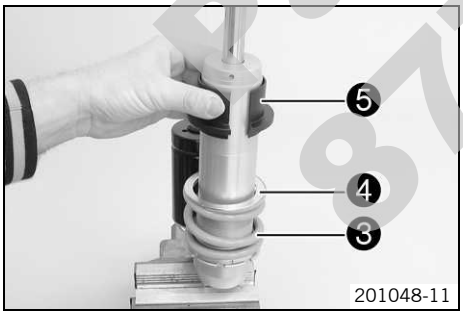
Guideline

Screw, filling port for reservoir	M5	3 Nm (2.2 lbf ft)

Rear shock absorber - installing the spring



– Ensure that adjusting ring ❶ is screwed on with the washer and retaining ring ❷.
– Screw the adjusting ring and retaining ring all the way down.

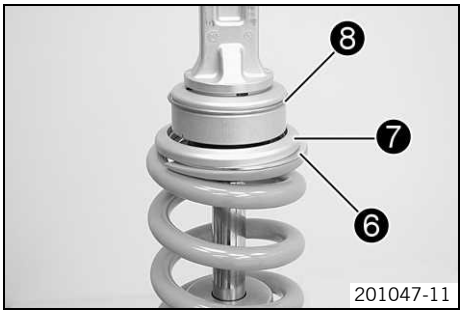


– Measure the overall spring length in an unloaded state.
– Position spring ❸.

Guideline

Spring rate, auxiliary spring	100 N/mm (571 lb/in)

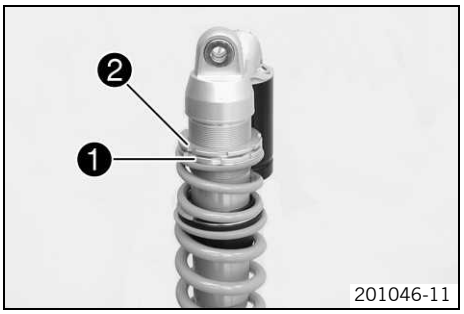
– Mount washer ❹ and sleeve ❺.



– Position the spring.

Guideline

Spring rate, main spring	
Weight of rider: 65… 75 kg (143… 165 lb.)	78 N/mm (445 lb/in)
Weight of rider: 75… 85 kg (165… 187 lb.)	82 N/mm (468 lb/in)
Weight of rider: 85… 95 kg (187… 209 lb.)	85 N/mm (485 lb/in)



– Mount washer ❻ and spring retainer ❼.
– Mount ring ❽.

Alternative 1

– Tighten the spring by turning adjusting ring ❶ to the specified measurement.

Guideline

Spring preload	
Comfort	3 mm
Standard	5 mm
Sport	5 mm

Hook wrench (T157S) (☛ p. 239)

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 adjusting ring ❶ to the position determined when it was removed.

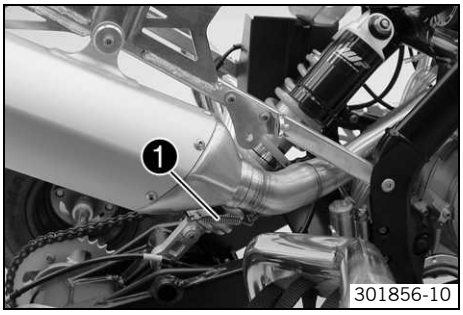
Hook wrench (T157S) (☛ p. 239)

– Hold adjusting ring ❶ and tighten lock ring ❷.

Hook wrench (T157S) (☛ p. 239)

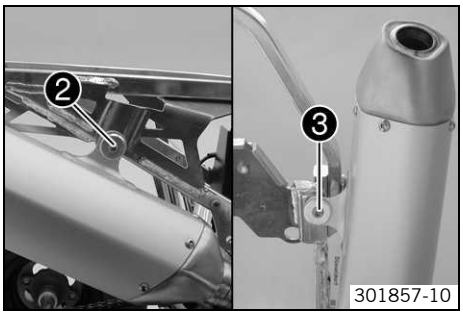
Removing the main silencer

Info
In order to present them more clearly, the following steps are shown with a removed fender.



– Remove spring ❶.

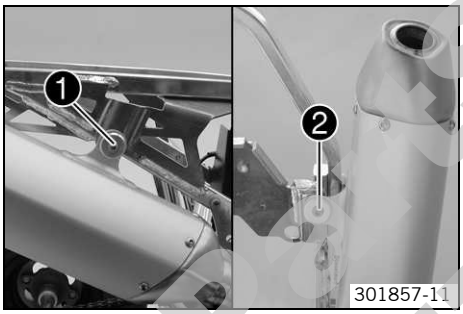
Spring hooks (50305017000) (☛ p. 227)



– Remove screws ❷ and ❸ and remove the main silencer.

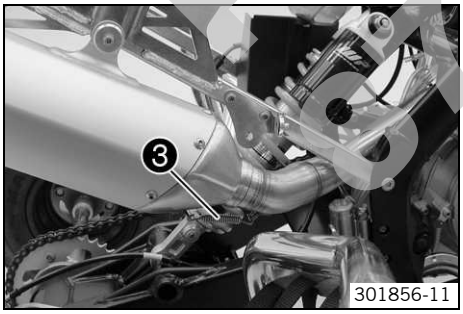
Installing the main silencer

Info
In order to present them more clearly, the following steps are shown with a removed fender.



– Attach the main silencer and position and tighten screws ❶ and ❷.
Guideline

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

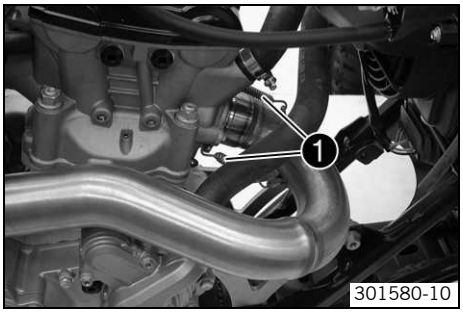


– Reconnect spring ❸.

Spring hooks (50305017000) (☛ p. 227)

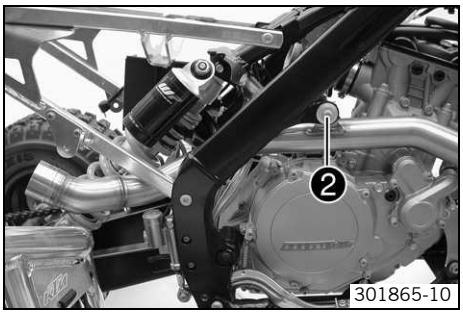
Removing the manifold

Info
In order to present them more clearly, the following steps are shown with a removed fender.



– Remove the main silencer. (☛ p. 59)
– Remove both springs ❶.

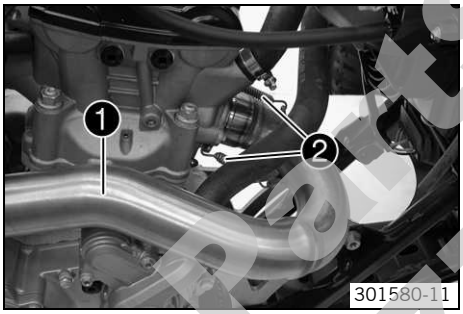
Spring hooks (50305017000) (☛ p. 227)



– Remove screws ❷.
– Slip out the manifold.

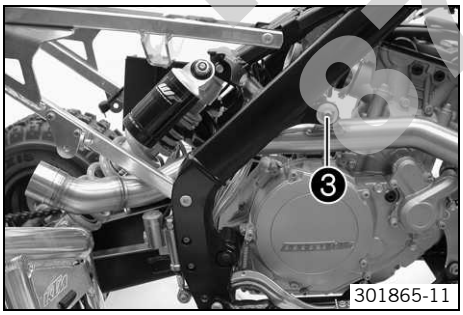
Installing the manifold

Info
In order to present them more clearly, the following steps are shown with a removed fender.



– Position manifold ❶ and mount springs ❷.

Spring hooks (50305017000) (☛ p. 227)



– Mount and tighten screw ❸.
Guideline

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

– Install the main silencer. (☛ p. 59)

Removing the air filter

Note

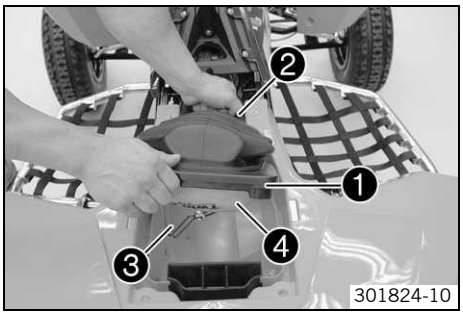
Engine failure Unfiltered intake air has a negative effect on the service life of the engine.

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

Warning

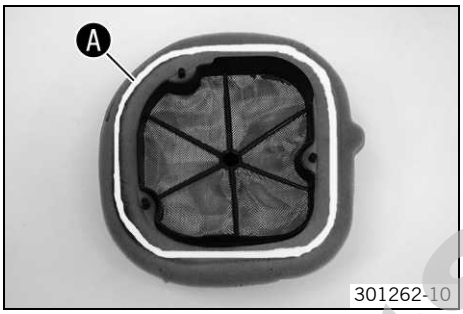
Environmental hazard Hazardous substances cause environmental damage.

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



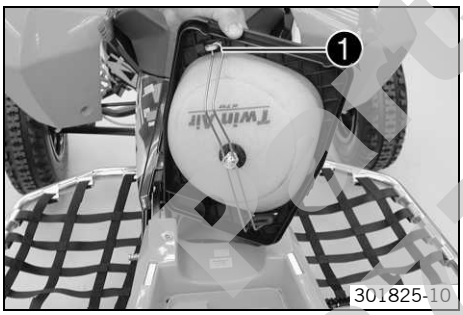
– Remove the seat (☛ p. 63)
– Raise the rear of the air filter box lid ❶. At the same time, use your other hand to press on the carburetor connection boot ❷ to kink it at that location. This prevents the carburetor connection boot from disconnecting from the carburetor.
– Unhook the air filter holder ❸ and swing it to the side. Remove the air filter ❹ 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.
– Grease the air filter in area Ⓐ.

Long-life grease (☛ p. 225)



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

Info

If the air filter is not correctly mounted, dust and dirt can penetrate into the engine and can cause damage.

– Mount the air filter box lid.

Info

If the air filter box lid is not correctly mounted, dust and dirt can penetrate into the engine and cause damage.

– Mount the seat. (☛ p. 63)

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 petroleum 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. 225)

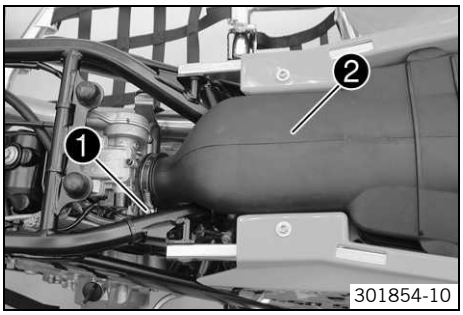
Info
Only press the air filter to dry it, never wring it out.

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

Oil for foam air filter (☛ p. 226)

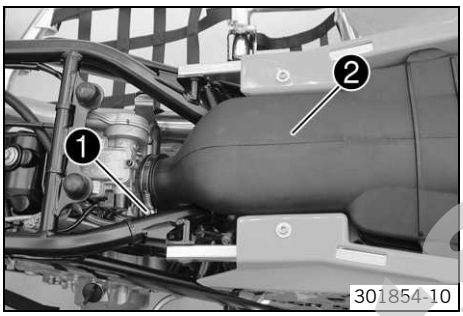
– Clean the air filter box.
– Check carburetor connection boot for damage and tightness.
– Install the air filter. (☛ p. 61)

Removing the air filter box lid with the carburetor connection boot



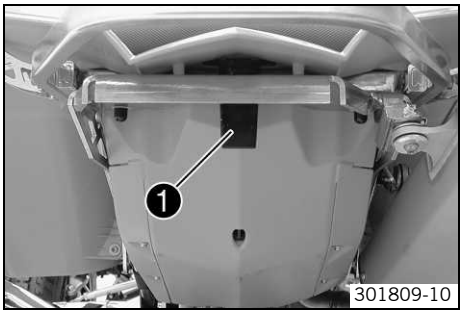
– Remove the seat (☛ p. 63)
– Remove hose clip ❶.
– Raise the air filter box lid and remove with carburetor connection boot ❷.

Installing the air filter box lid and the carburetor connection boot



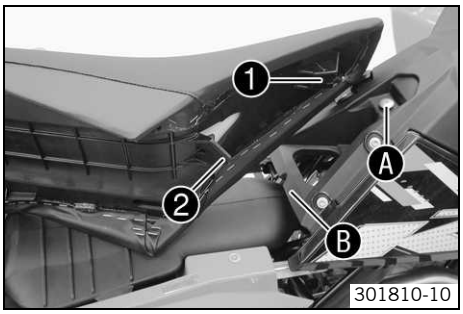
– Attach the air filter box lid with carburetor connection boot ❷ and hose clip ❶ to the carburetor.
– Position the air filter box lid.
– Position hose clamp ❶ and tighten.
– Mount the seat. (☛ p. 63)

Removing the seat

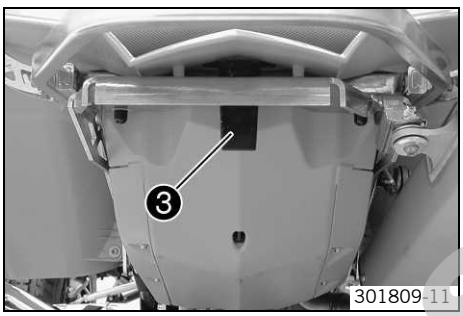


– Pull the release hook ❶ back. Lift up the seat at the rear, pull it back and then remove from above.

Mounting the seat



– Hook slot ❶ on the seat into collar sleeve Ⓐ of the fuel tank, lower the rear of the seat and slide tab ❷ under fuel tank Ⓑ.

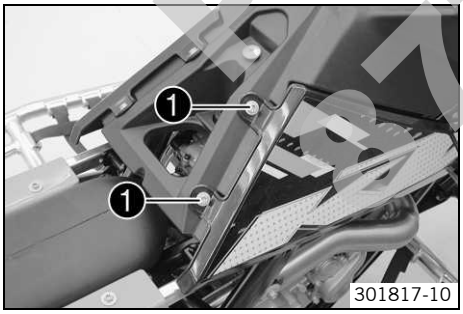


– Push down the rear of the seat until release hook ❸ engages.
– Make sure that the seat is correctly locked in.

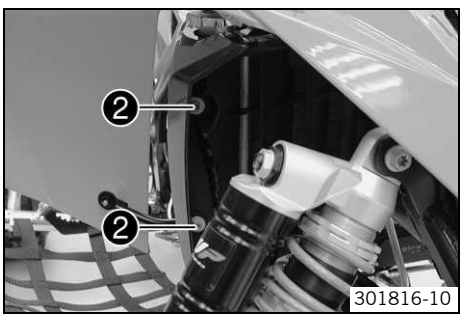
Removing the radiator spoiler

Info
The operations are the same on the left and right.

– Remove the seat (☛ p. 63)



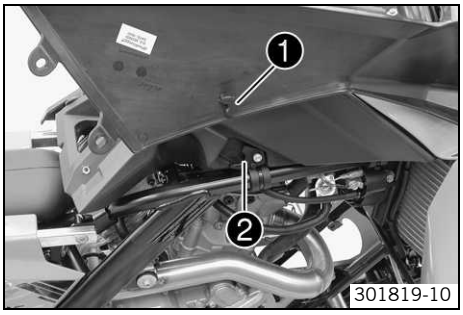
– Remove the screws ❶ on the fuel tank.



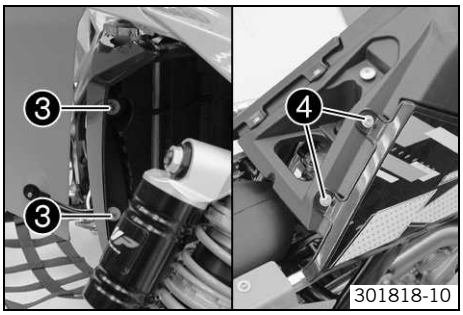
– Remove the screws ❷ on the radiator.
– Detach the radiator spoiler and remove it.

Installing the radiator spoiler

Info
The operations are the same on the left and right.



– Hook catch ❶ of the radiator spoiler into holder ❷ of the fuel tank and position it on the radiator.



– Mount and tighten screws ❸ on the radiator.
Guideline

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

– Mount and tighten screws ❹ on the fuel tank.
Guideline

Screw on fuel tank	M6	6 Nm (4.4 lbf ft)

– Mount the seat. (☛ p. 63)

Removing the fuel tank

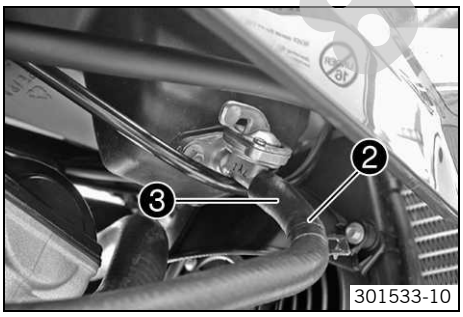
Danger
Fire hazard Fuel is highly flammable.

– Never refuel the vehicle near open flames or burning cigarettes, and always switch off the engine first. Be careful that no fuel is spilt, especially on hot vehicle components. Clean up spilt fuel immediately.
– Fuel in the fuel tank expands when warm and can escape if the tank is overfilled. See the notes on refueling.

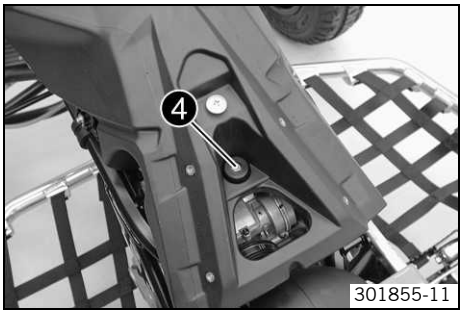
Warning
Danger of poisoning Fuel is poisonous and a health hazard.

– 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.

– Remove the front trim. (☛ p. 69)
– Remove the radiator spoiler. (☛ p. 63)
– Turn the handle ❶ of the fuel tap to **OFF**.
– Undo hose clip ❷.
– Pull off fuel hose ❸.



Info
Remaining fuel may run out of the fuel hose.



– Remove screw ❹ and take off the fuel tank.

Installing the fuel tank

Danger

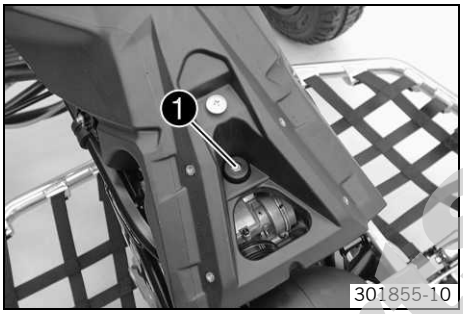
Fire hazard Fuel is highly flammable.

– Never refuel the vehicle near open flames or burning cigarettes, and always switch off the engine first. Be careful that no fuel is spilt, especially on hot vehicle components. Clean up spilt fuel immediately.
– Fuel in the fuel tank expands when warm and can escape if the tank is overfilled. See the notes on refueling.

Warning

Danger of poisoning Fuel is poisonous and a health hazard.

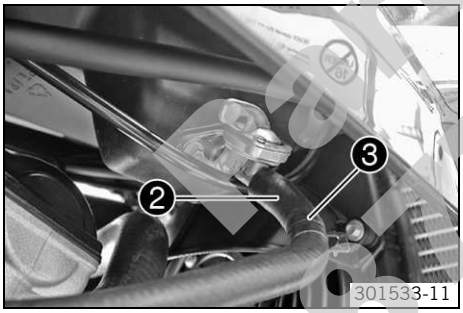
– Avoid contact between fuel and skin, eyes and clothing. Do not inhale fuel vapors. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If fuel is swallowed, contact a doctor immediately. Change clothing that has come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



– Position the fuel tank, insert screw ❶ with the bushing and tighten.

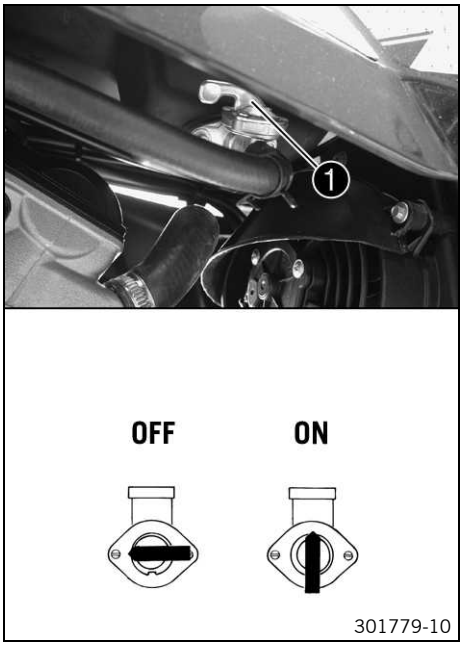
Guideline

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



– Connect fuel hose ❷.
– Position hose clip ❸.
– Install the radiator spoiler. (☛ p. 64)
– Install the front trim. (☛ p. 70)

Fuel tap

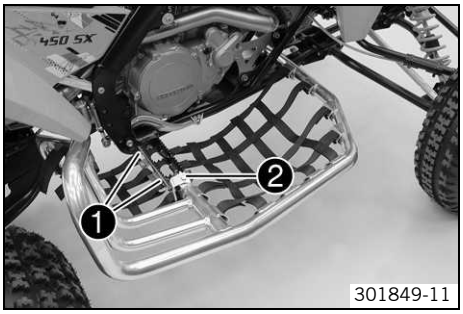


The fuel tap is located on the right side of the fuel tank.
With tap handle ❶ on the fuel tap, you can open or close the supply of fuel to the carburetor.

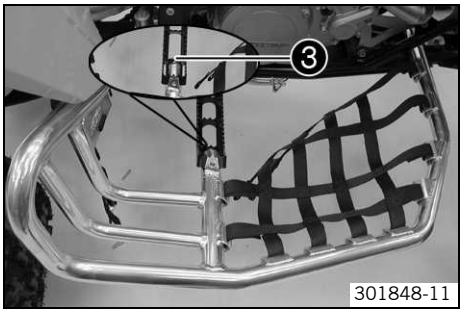
Possible states

- 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 completely.

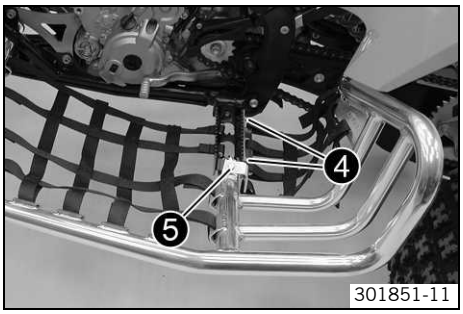
Removing the heel protector



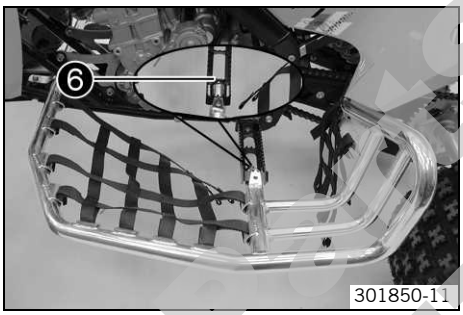
– Remove screws ❶.
– Remove screw ❷.



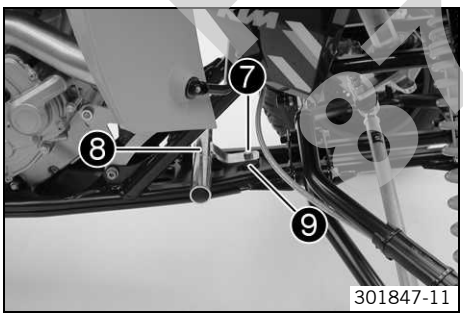
– Remove screw ❸.
– Pull the heel protector off of the cross member.



– Remove screws ❹.
– Remove screw ❺.

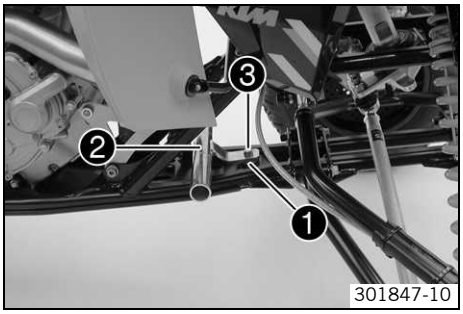


– Remove screw ❻.
– Pull the heel protector off of the cross member.



– Remove screw ❼.
– Take off brace ❽ and washer ❾.

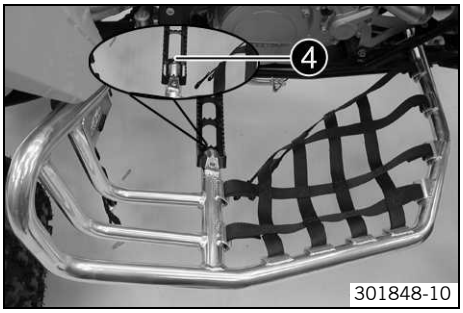
Installing the heel protector



– Position washer ❶ and cross member ❷.
– Mount screw ❸ but do not tighten yet.

Guideline

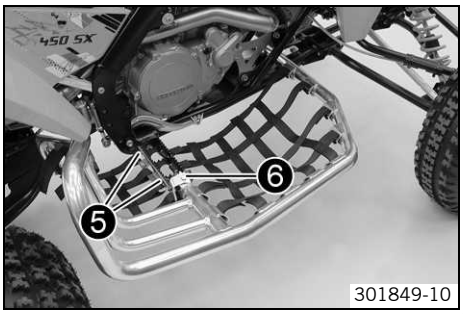
Remaining nuts, chassis	M8	30 Nm (22.1 lbf ft)



– Slide the heel protector onto the cross member and position it.
– Mount screw ❹ but do not tighten yet.

Guideline

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



– Position the retaining bracket.
– Mount screws ❺ but do not tighten yet.

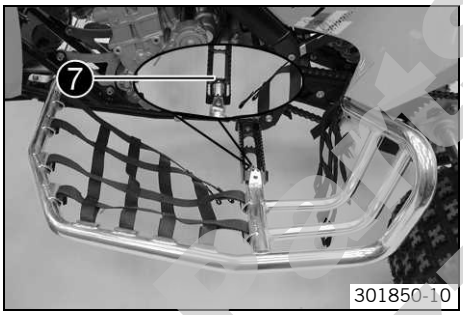
Guideline

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

– Mount screws ❻ but do not tighten yet.

Guideline

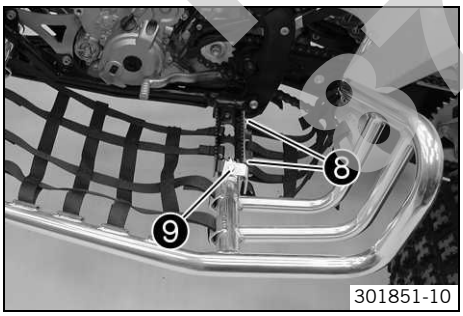
Remaining nuts, chassis	M6	15 Nm (11.1 lbf ft)



– Slide the heel protector onto the cross member and position it.
– Mount screw ❼ but do not tighten yet.

Guideline

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



– Position the retaining bracket.
– Mount screws ❽ but do not tighten yet.

Guideline

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

– Mount screws ❾ but do not tighten yet.

Guideline

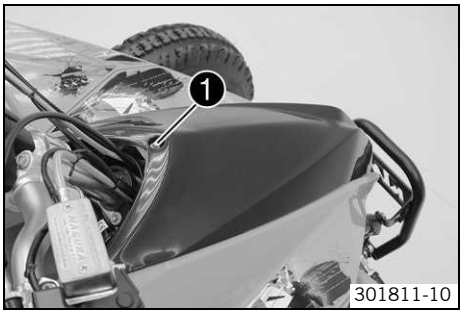
Remaining nuts, chassis	M6	15 Nm (11.1 lbf ft)

– Tighten all screws.

Guideline

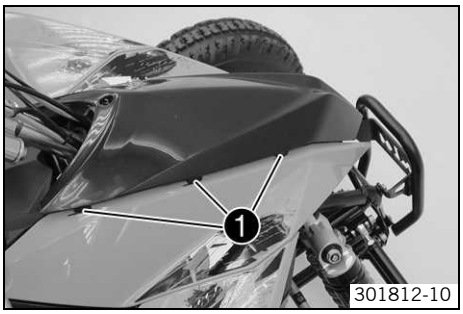
Remaining nuts, chassis	M6	15 Nm (11.1 lbf ft)
Remaining nuts, chassis	M8	30 Nm (22.1 lbf ft)

Removing the front cover



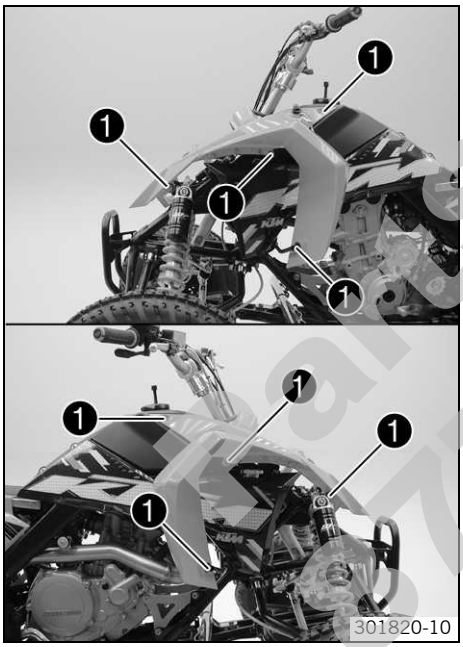
– Remove screw ❶.
– Slide the front cover up and remove it.

Installing the front cover



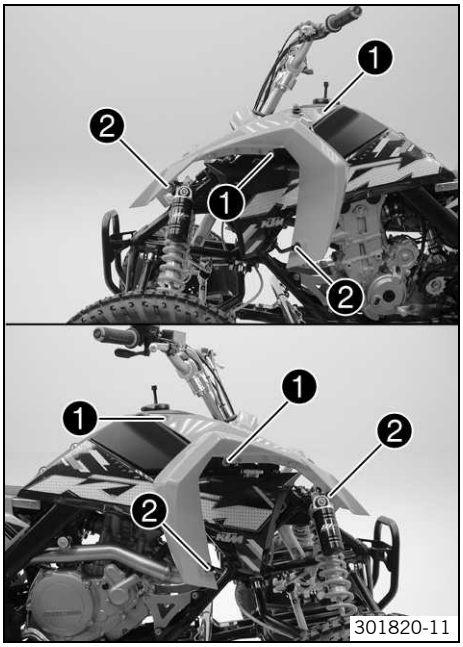
– Position the front cover in slots ❶ on both sides of the front trim.
– Mount and tighten the screw.

Removing the front trim



– Remove the front cover. (☛ p. 69)
– Remove screws ❶.
– Raise the front trim and disconnect the plug-in connector from the emergency OFF switch with the rip cord.
– Remove the front trim.

Installing the front trim



– Connect the plug-in connector of the emergency OFF switch with the rip cord and position the front trim.
– Mount all screws.
– Fully tighten screws ❶.

Guideline

Screw on fuel tank	M6	6 Nm (4.4 lbf ft)

– Fully tighten screws ❷.

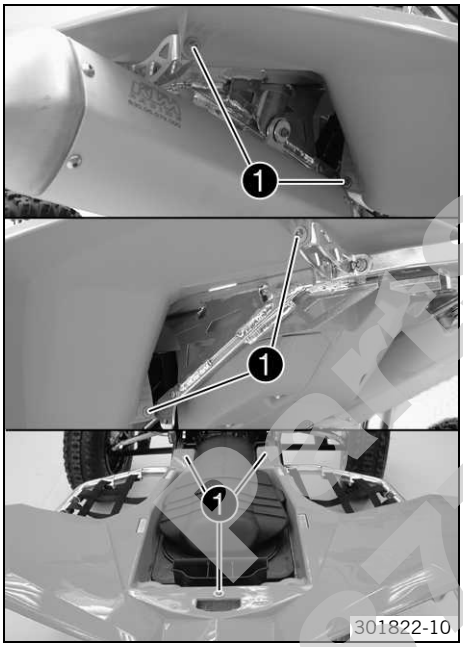
Guideline

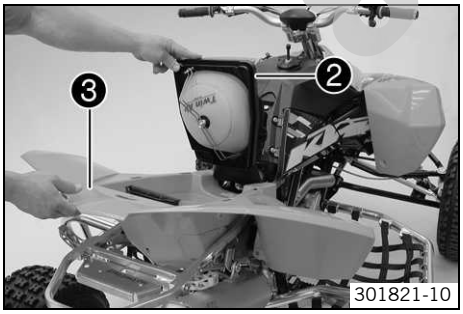
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

– Install the front cover. (☛ p. 69)

Removing the rear fender

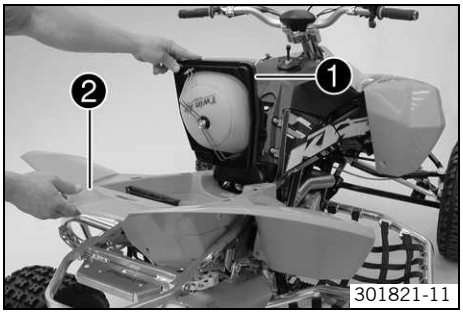
– Remove the seat (☛ p. 63)
– Remove screws ❶.

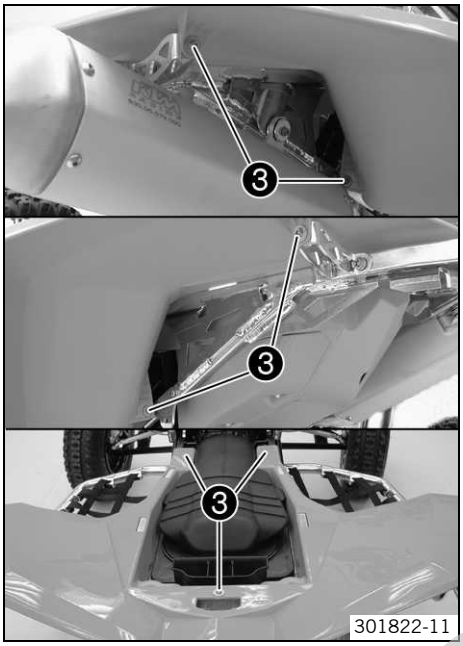




– Raise the rear of the air filter box lid ❷. At the same time, use your other hand to press on the carburetor connection boot to kink it at that location. This prevents the carburetor connection boot from disconnecting from the carburetor.
– Raise fender ❸ at the rear and remove it.

Installing the rear fender





– Raise the rear of air filter box lid ❶. At the same time, use your other hand to press on the carburetor connection boot to kink it at that location. This prevents the carburetor connection boot from disconnecting from the carburetor.
– Position front fender ❷.
– Fix the air filter box lid in the fender.

Info

If the air filter box lid is not correctly mounted, dust and dirt can penetrate into the engine and cause damage.

– Mount and tighten screws ❸.

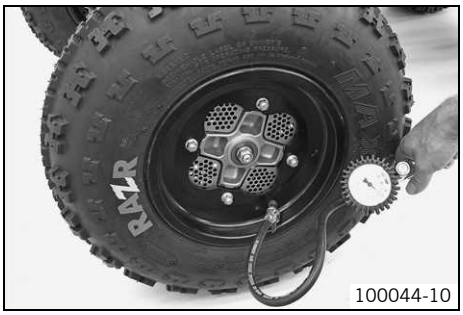
Guideline

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

– Mount the seat. (☛ p. 63)

Checking the 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.
Check the tire pressure on all wheels and correct it if necessary.



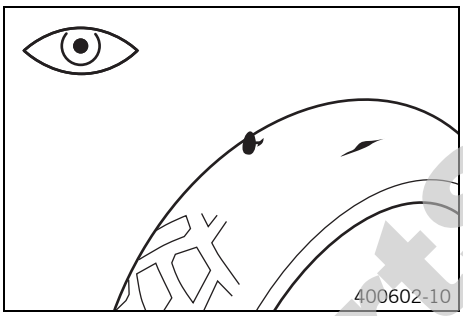
– Remove the dust cap.
– Check the tire air pressure when the tires are cold.

Tire pressure gauge (83519001000)	
Tire air pressure off road	0.3 bar (4 psi)

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

Checking the tire condition

Info
Only mount tires that have been approved and/or recommended by KTM.
Other tires could have a negative effect on vehicle handling.
The type, condition and air pressure of the tires all have an important impact on the handling characteristics of the vehicle.
The tires mounted on the front and rear wheels must have similar profiles.
Worn tires have a negative effect on vehicle handling, especially on wet surfaces.



– Examine the tire for cuts, foreign bodies and other damage.
– Check the tire age.

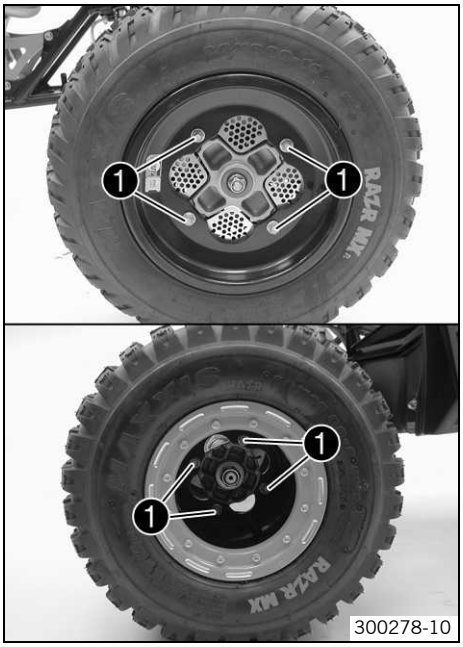
Info
The tire's date of manufacture is usually part of the tire markings and is indicated by the last four digits of the **DOT** marking. The first two digits indicate the week of manufacture and the last two digits the year of manufacture.
KTM recommends that the tires be changed after 5 years at the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

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

Removing wheel/wheels

Info
Proceed in the same way on the other wheels if necessary.

– Pull the hand brake lever, push the locking pawl ❷ down and release the hand brake lever. (Figure 301776-10☛ p. 88)



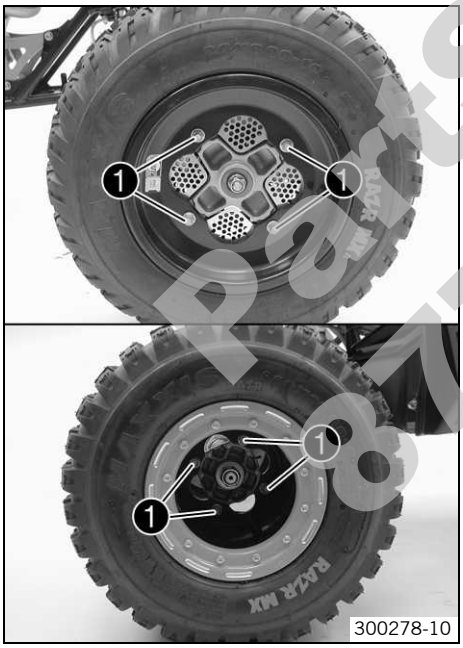
– Loosen the wheel nuts ❶.
– Jack up the vehicle. (☛ p. 12)
– Remove the wheel nuts. Remove the wheel.

Info
Carefully remove the wheel, making sure it does not become jammed with the threads of the screws.

Installing the wheel/wheels

Note
Material damage Damage and destruction of components from incorrect positioning and mounting.
– Do not swap the wheels; the tire valves must always be on the outside when the wheels are positioned and mounted.

Info
Proceed in the same way on the other wheels if necessary.



– Position the wheel on the hub.

Info
Note the direction of travel of the front wheels.
Carefully position the wheel on the hub, being careful not to damage the threads of the screws.

– Mount wheel nuts ❶ but do not tighten.
– Remove the vehicle from the work stand. (☛ p. 12)
– Pull the hand brake lever, push the locking pawl ❷ down and release the hand brake lever. (Figure 301776-10☛ p. 88)
– Tighten the wheel nuts crosswise.

Guideline

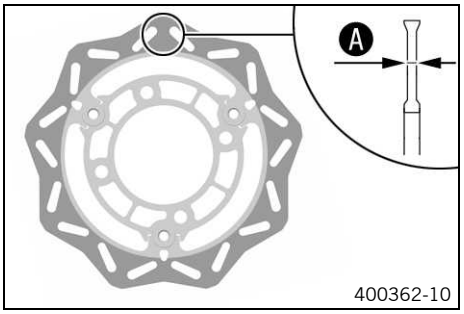
Wheel nut	M10x1.25	45 Nm (33.2 lbf ft)

Checking 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	3.5 mm (0.138 in)
Rear	3.5 mm (0.138 in)

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

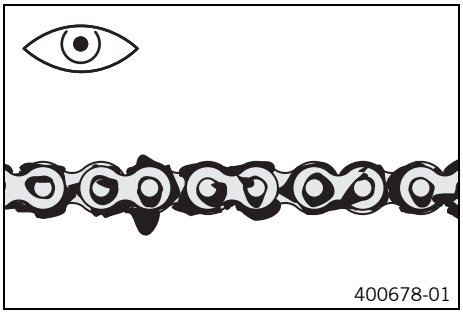
– Change the brake disc.

– 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.

Checking chain dirt

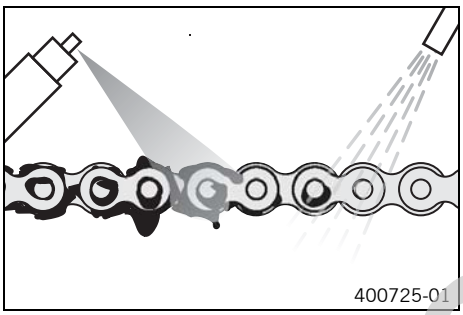


– Check the chain for heavy soiling.
  » If the chain is very dirty:
    – Clean the chain. (☛ p. 75)

Cleaning the chain

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.

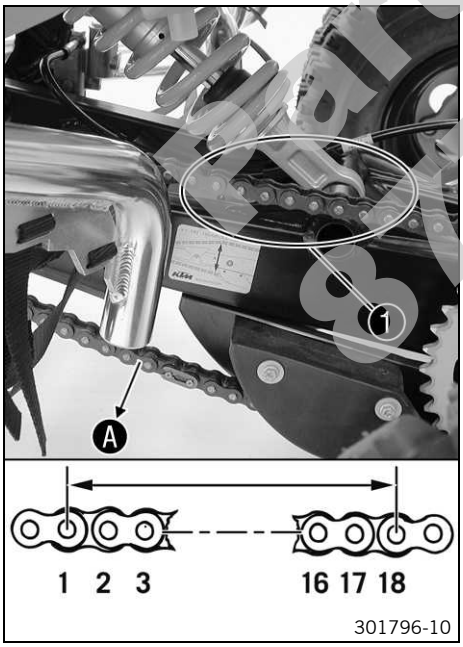
Info
The service life of the chain depends largely on its maintenance.



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

Chain cleaner (☛ p. 225)
Off-road chain spray (☛ p. 226)

Checking chain wear



– Park the vehicle on a horizontal surface and shift gears to neutral.
– Pull on the lower part of the chain with the specified weight Ⓐ.
Guideline

Chain-wear measuring weight	10... 15 kg (22... 33 lb.)

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

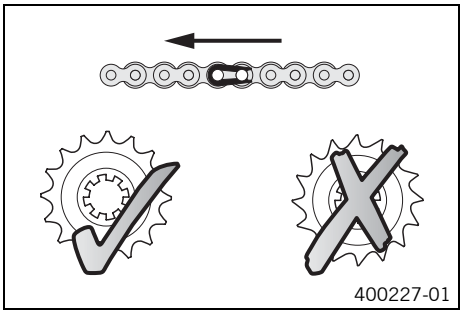
Info
Chain wear is not always even, so you should repeat this measurement at different chain positions.

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 the rear sprocket and engine sprocket.
New chains wear out faster on old, worn sprockets.

Checking rear sprocket / engine sprocket for wear



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

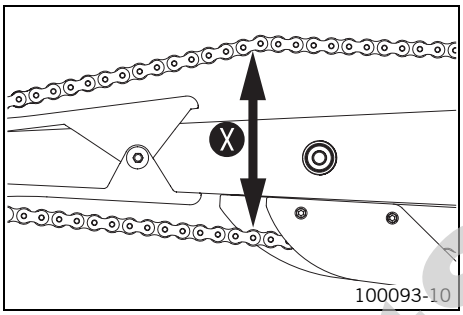
Info
When fitting the chain joint, always make sure that the closed side of the joint faces forward (riding direction).
The engine sprocket, rear sprocket and chain should always be replaced together.

– Check that the chain guides are tight.

Checking the chain tension

Warning
Danger of accidents Danger caused by incorrect chain tension.

– If the chain tension is too high, the components of the secondary power train (chain, engine sprocket, rear sprocket, bearings in transmission and rear wheel eccentric element) are under additional load. Apart from premature wear, in extreme transmission output shaft or the drive chain may snap. Conversely, if the chain is too loose it may jump off the engine and rear sprockets, causing the rear wheel to lock up or even leading to engine damage. Check for correct chain tension and adjust if necessary.



– Park the vehicle on a horizontal surface and shift gears to neutral.
– Push the upper chain section at the end of the chain sliding component upwards to measure the chain tension ❌.

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

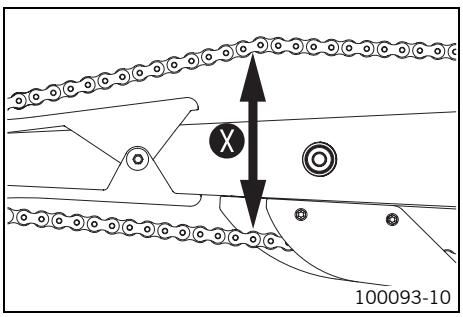
Chain tension	140... 145 mm (5.51... 5.71 in)

» If the chain tension does not meet specifications:
  – Adjust the chain tension. (☛ p. 76)

Adjusting chain tension

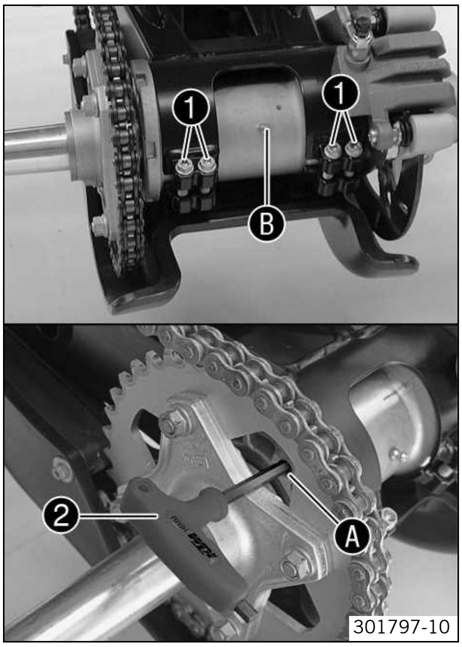
Warning
Danger of accidents Danger caused by incorrect chain tension.

– If the chain tension is too high, the components of the secondary power train (chain, engine sprocket, rear sprocket, bearings in transmission and rear wheel eccentric element) are under additional load. Apart from premature wear, in extreme transmission output shaft or the drive chain may snap. Conversely, if the chain is too loose it may jump off the engine and rear sprockets, causing the rear wheel to lock up or even leading to engine damage. Check for correct chain tension and adjust if necessary.



– Park the vehicle on a horizontal surface and shift gears to neutral.
– Push the upper chain section at the end of the chain sliding component upwards to measure the chain tension ❌.

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



301797-10

– Loosen the screws ❶ by four turns.

Alternative 1

– Insert the tool ❷ from the tool set into the hole Ⓐ of the rear wheel eccentric element.

Alternative 2

– Position the special tool at the rear wheel eccentric element.

Hook wrench (83019011000) (☛ p. 234)

– To adjust the chain tension Ⓧ, slowly turn at the rear wheel or the special tool to rotate the rear wheel eccentric element forward or backward.

Guideline

Chain tension	140... 145 mm (5.51... 5.71 in)

Info

Rotating the rear wheel eccentric element forward increases chain tension.
Rotating the rear wheel eccentric element backward reduces chain tension.
The rear wheel eccentric element should always be positioned such that the grease nipple Ⓑ is visible. This ensures that the vehicle has the greatest ground clearance.

– Fully tighten screws ❶.

Guideline

Screw, rear wheel eccentric element	M8	20 Nm (14.8 lbf ft)

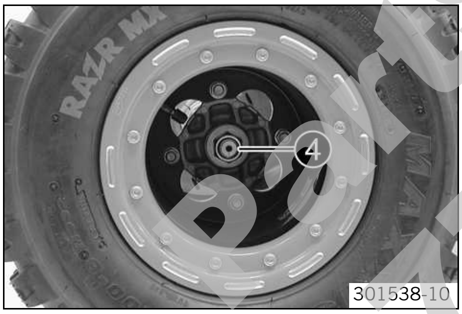
– Remove the tool ❷.

Adjusting the toe width of rear axle

Warning

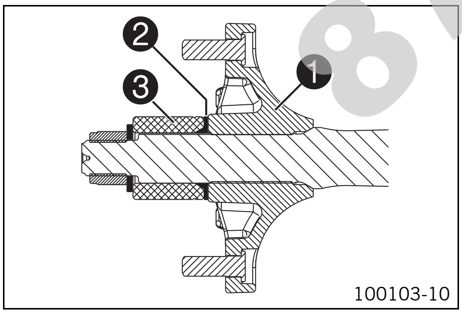
Danger of accidents Modifications to the suspension settings can seriously alter the vehicle's ride behavior.

– Following modifications, ride slowly at first to get the feel of the new ride behavior.



301538-10

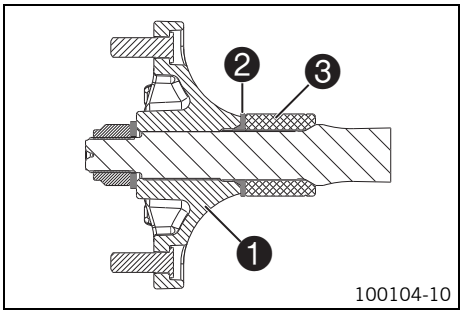
– Engage 1st gear.
– Loosen nuts ❹ of the wheel hubs on both sides.
– Jack up the vehicle. (☛ p. 12)
– Remove the nuts ❹ on both sides and take all parts off of the rear axle.



100103-10

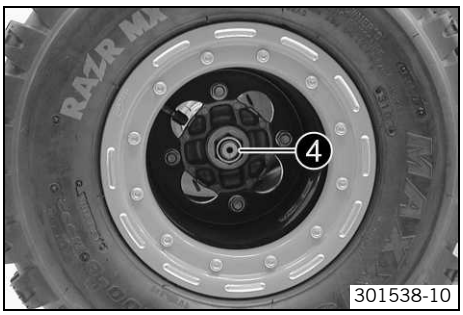
Setting a narrow toe width:

– Mount the wheel hub ❶.
– Mount the conical ring ❷ with the cone facing outward.
– Mount the spacer ❸ with the cone facing inward.
– Mount the washer and the new self-locking nut.



Setting a wide toe width:

- Mount the spacer ❸ with the cone facing inward.
- Mount the conical ring ❷ with the cone facing outward.
- Mount the wheel hub ❶.
- Mount the washer and the new self-locking nut.



- Remove the vehicle from the work stand. (☛ p. 12)
- Tighten nuts ❹ on both sides.

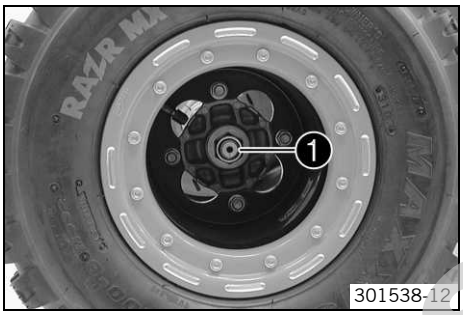
  Guideline

Nut, rear wheel hub	M18x1.5	130 Nm (95.9 lbf ft)

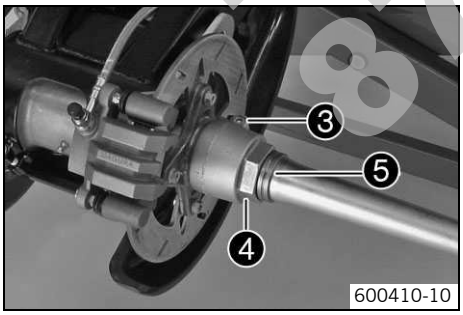
- Shift gear to neutral.

Removing the rear axle

- Engage 1st gear.
- Loosen nuts ❶ of the wheel hubs on both sides.
- Jack up the vehicle. (☛ p. 12)
- Remove nuts ❶ on both sides and take all parts off of the rear axle.



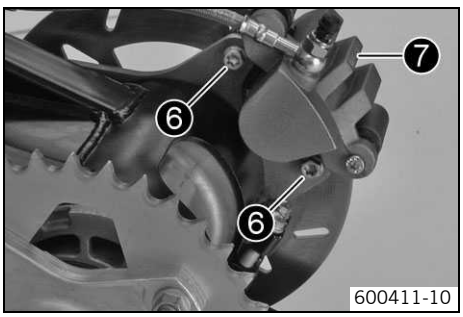
- Remove chain joint ❷. Remove the chain from the rear sprocket.



- Loosen screw ❸.
- Turn clamping nut ❹ counterclockwise using the special tool until lock rings ❺ are freely accessible. Remove the lock rings.

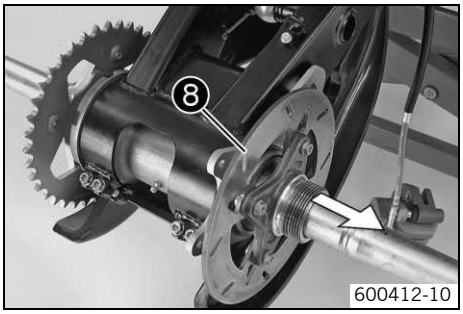
Open-end wrench attachment, 46 mm (83019010461) (☛ p. 234)

- Turn clamping nut ❹ clockwise using the special tool and remove.

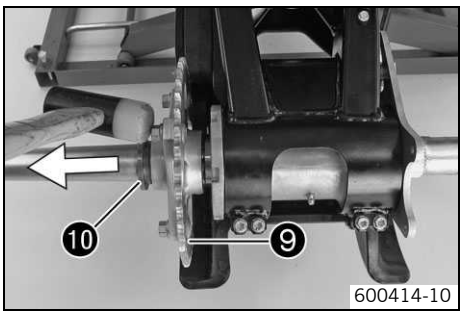


- Remove screws ❻.
- Push back the brake linings by tilting brake caliper ❼ slightly to one side on the brake disc. Carefully pull the brake caliper off of the brake disc and let it hang to one side.

Info
Do not operate the foot brake when the brake caliper has been removed.



– Take brake disc ❽ off the rear axle with the holder.
– Remove the O-ring.



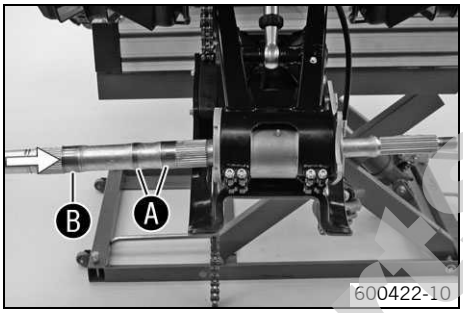
– Push the rear axle slightly to the left. Using a plastic hammer, lightly strike against the chain sprocket carrier ❾ to release the chain sprocket carrier from the lock rings. Remove lock rings ❿.
– Pull the rear axle out of the swingarm in the direction of the arrow.

Info
Hold the rear sprocket carrier.

– Remove rear sprocket carrier ❾ with the O-ring.

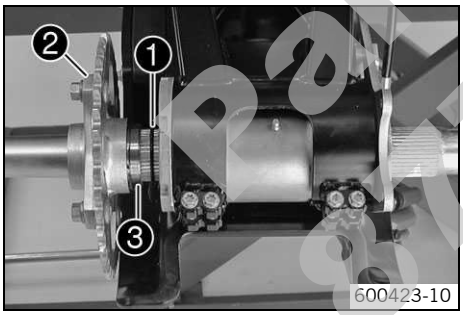
Installing the rear axle

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.



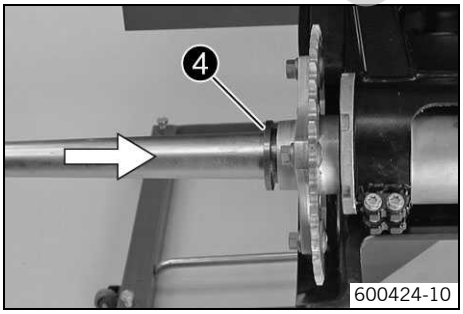
– Slide on the rear axle from the left to the right all the way.

Info
The machined surfaces Ⓐ must be to the right of bearing seat Ⓑ.

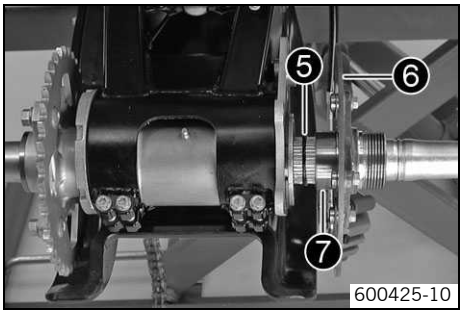


– Position O-ring ❶. Attach chain sprocket carrier ❷ with the nuts facing outward.
– Carefully insert sealing area ❸ on the chain sprocket carrier into the shaft seal ring of the rear wheel eccentric by lightly turning and tilting the rear axle.

Info
Do not damage the sealing lip of the shaft seal ring.

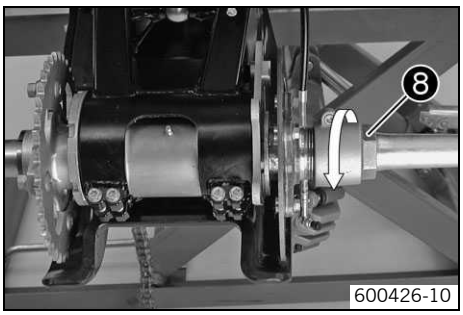


– Position lock ring ❹ with the high collar facing to the left. Slide the main shaft all the way in in the direction of the arrow.
– Check that the lock rings are seated properly.



– Position O-ring ❺. Attach brake disc holder ❻ with the thread facing outward.
– Carefully insert sealing area ❼ on the brake disc carrier into the shaft seal ring of the rear wheel eccentric by lightly turning and tilting the rear axle.

Info
Do not damage the sealing lip of the shaft seal ring.

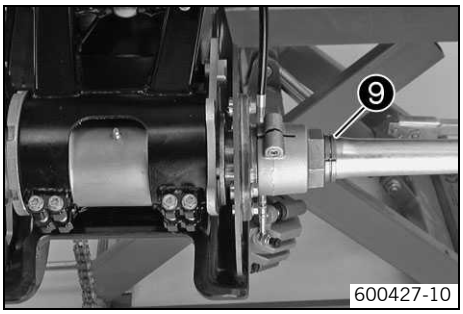


– Lightly grease the thread of the clamping nut.

Long-life grease (☛ p. 224)

– Ensure that the rear axle and the brake disc holder have been correctly installed.
– Turn clamping nut ❽ all the way onto the brake disc holder.

Info
LH thread!



– Position lock rings ❾.

– Tighten the clamping nut in the direction of the arrow using the special tool.

Guideline

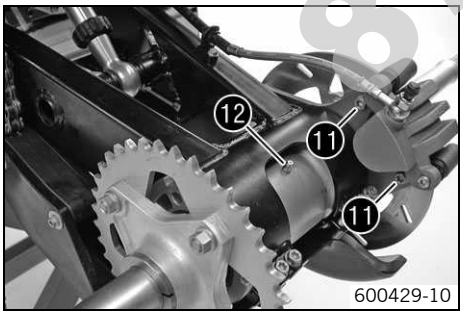
Clamping nut, rear axle	2"-10UNS-2B-LH	25 Nm (18.4 lbf ft)	Only applies when using: Open-end wrench attachment, 46 mm (83019010461) (☛ p. 234)

Open-end wrench attachment, 46 mm (83019010461) (☛ p. 234)

– Tighten screw ❿.

Guideline

Screw, clamping nut, rear axle	M6	10 Nm (7.4 lbf ft)



– Position the brake caliper. Mount and tighten screws ⓫.

Guideline

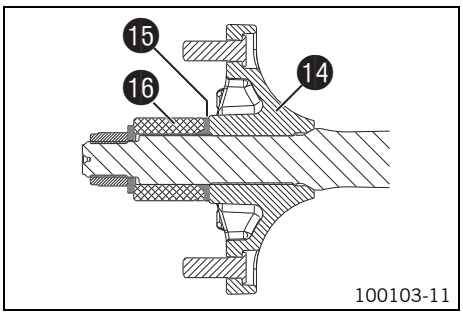
Screw, rear brake caliper	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**

– Clean the brake disc and brake disc holder.
– Operate the foot brake lever repeatedly until the brake linings lie on the brake disc and there is a pressure point.
– Fill the rear wheel eccentric with grease via grease nipple ⓬.

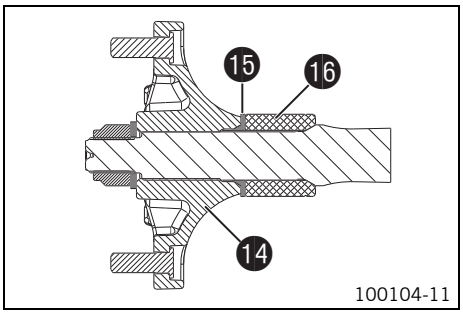
Long-life grease (☛ p. 224)

– Place the chain on the sprocket. Mount chain joint ⓭.

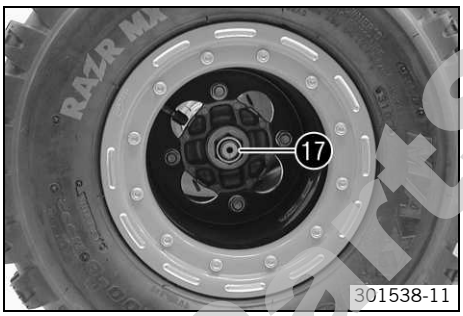
Info
When installing the chain joint, always make sure that the closed side of the joint is facing forward (direction of travel).



Setting a narrow toe width:
– Mount wheel hub ⓮.
– Mount conical ring ⓯ with the cone facing outward.
– Mount spacing sleeve ⓰ with the cone facing inward.
– Mount the washer and the new self-locking nut.



Setting a wide toe width:
– Mount spacing sleeve ⓰ with the cone facing inward.
– Mount conical ring ⓯ with the cone facing outward.
– Mount wheel hub ⓮.
– Mount the washer and the new self-locking nut.

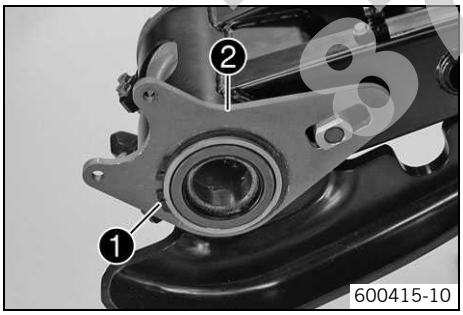


– Remove the vehicle from the work stand. (☛ p. 12)
– Tighten nuts ⓱ on both sides.
Guideline

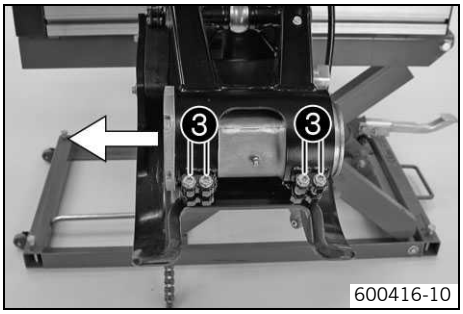
Nut, rear wheel hub	M18x1.5	130 Nm (95.9 lbf ft)

– Check the chain tension. (☛ p. 76)

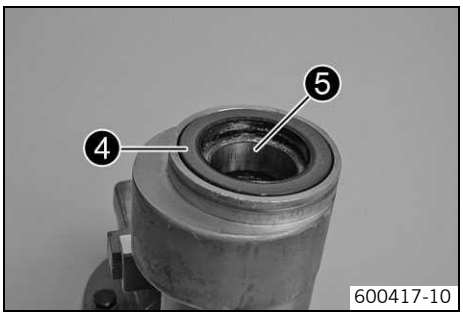
Changing the rear axle bearing



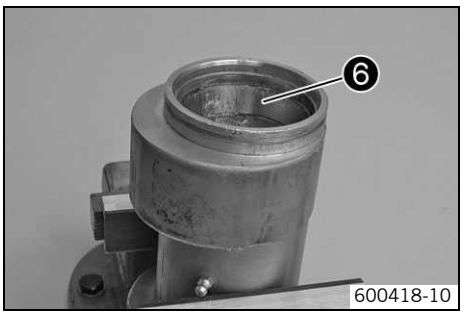
– Remove the rear axle. (☛ p. 78)
– Remove lock ring ❶.
– Remove brake caliper support ❷.



– Mark the position of the rear wheel eccentric in the swingarm.
– Loosen screw ❸. Remove the rear wheel eccentric in the direction of the arrow.



– Take out shaft seal rings ❹ on both sides and remove inner bearing races ❺.



– Remove old grease and clean the rear wheel eccentric.
– Heat the rear wheel eccentric.

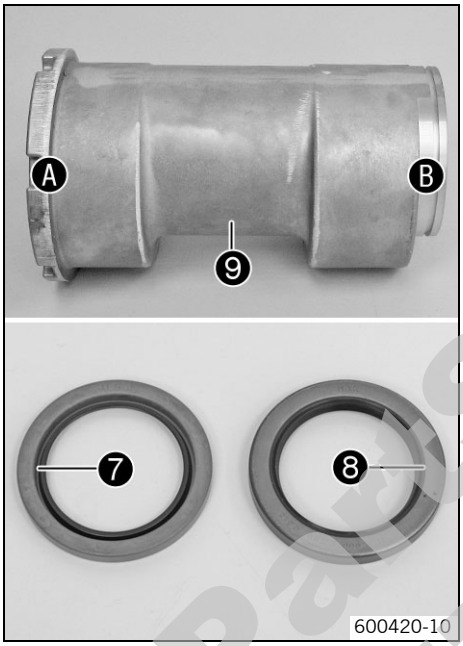
Guideline

100 °C (212 °F)

– Remove outer bearing races ❻ on both sides.
– Mount the new outer bearing races using the special tool.

Press mandrel (83019012000) (☛ p. 234)

– After the rear wheel eccentric has cooled, check that the bearing races are firmly seated.



– Insert the inner bearing race in rear wheel eccentric ❾ on the left side Ⓐ.
– Mount shaft seal ring ❼ with the blue marking on the left side Ⓐ. Use the special tool.

Press mandrel (83019012000) (☛ p. 234)

– Insert the inner bearing race in rear wheel eccentric ❾ on the right side Ⓑ.
– Mount shaft seal ring ❽ with the green marking on the right side Ⓑ. Use the special tool.

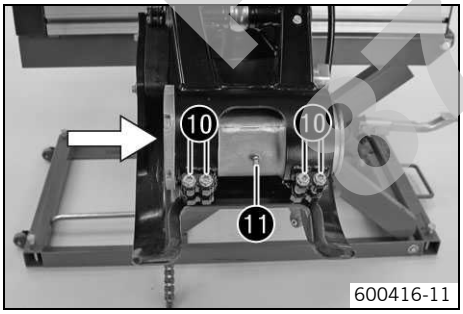
Press mandrel (83019012000) (☛ p. 234)

Info

Do not swap the shaft seal rings, as otherwise grease may get onto the brake disc from the rear wheel eccentric.

– Lightly grease the sealing lips of the shaft seal rings.

Long-life grease (☛ p. 224)



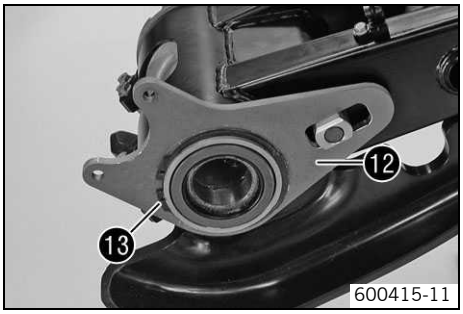
– Insert the rear wheel eccentric into the swingarm and align it with the marking made when it was dismantled.
– Tighten screws ❿.

Guideline

Screw, rear wheel eccentric element	M8	20 Nm (14.8 lbf ft)

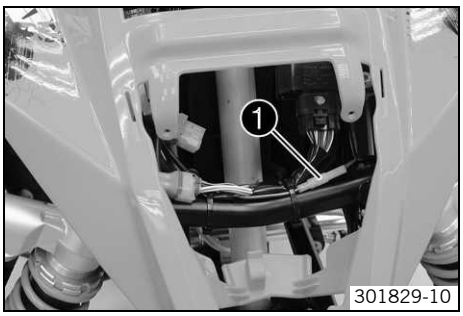
Info

The rear wheel eccentric element should always be positioned such that the grease nipple ⓫ is visible. This ensures that the vehicle has the greatest ground clearance.



– Position brake caliper support ⓬.
– Mount lock ring ⓭.
– Install the rear axle. (☛ p. 79)

Ignition curve plug connection



Plug-in connector ❶ is located under the trim at the front on the frame tube.

Possible states

- Performance – The plug-in connector is connected to achieve better performance.
- Soft – The plug-in connector is disconnected for better driveability.

Changing the ignition curve

– Remove the front trim. (☛ p. 69)

Changing the ignition curve from Performance to Soft.

– Disconnect plug-in connector ❶. (Figure 301829-10☛ p. 83)

✓ Soft – The plug-in connector is disconnected for better driveability. (☛ p. 83)

Changing the ignition curve from Soft to Performance.

– Connect the plug-in connector ❶. (Figure 301829-10☛ p. 83)

✓ Performance – The plug-in connector is connected to achieve better performance. (☛ p. 83)

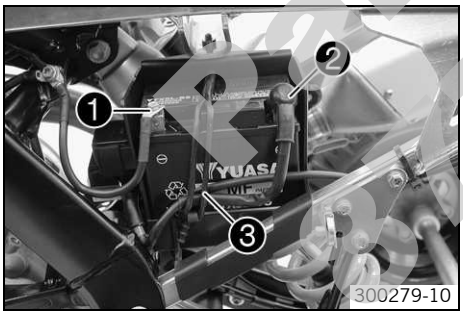
– Install the front trim. (☛ p. 70)

Removing the battery

Warning

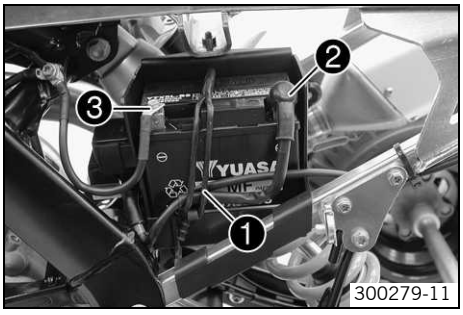
Risk of injury Battery acid and battery gases cause serious cauterization.

– 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 fire. Charge only in well ventilated rooms.
– 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 doctor.



– Switch off all power consumers and switch off the engine.
– Remove the rear fender. (☛ p. 70)
– Disconnect the negative (minus) cable ❶ of the battery.
– Pull back the plus pole cover and disconnect the positive (plus) cable ❷ of the battery.
– Loosen the rubber band ❸.
– Remove the battery.

Installing the battery



– Place the battery in the battery holder.

Battery (YTX5L-BS) (☛ p. 210)

– Reconnect rubber band ❶.
– Attach the positive (plus) cable and replace the plus pole cover ❷.
– Connect the negative (minus) cable ❸ of the battery.
– Install the rear fender. (☛ p. 71)

Recharging the battery

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

- 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 fire. Charge only in well ventilated rooms.
- 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 doctor.

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.

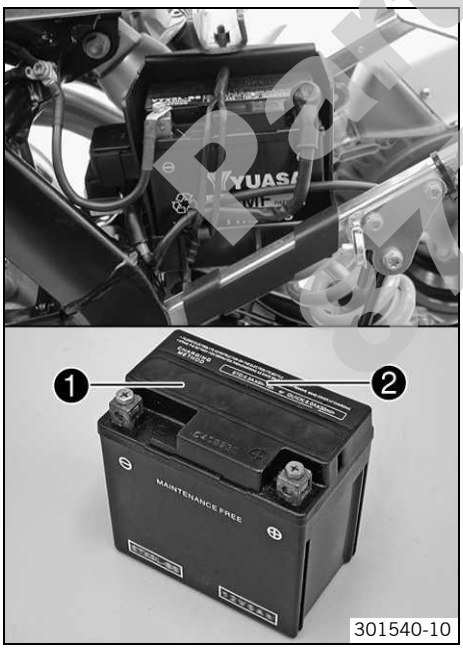
- Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
Even if there is no load on the battery, it still loses power steadily.
The charge state and the type of charge are very important for the service life of the battery.
Rapid charging with a high charging current has a negative impact on the service life.
If the charging current, charging voltage and charging time are exceeded, electrolyte escapes via the safety valves. This reduces the battery capacity.
If the vehicle is started repeatedly until the battery is depleted, the battery must be charged immediately.
If the battery is left in a discharged state for an extended period, it will drain completely and sulfate, destroying the battery.
The battery is maintenance-free, which means that the acid level does not need to be checked.

- Switch off all power consumers and switch off the engine.
- Remove the rear fender. (☛ p. 70)
- Disconnect the minus (negative) cable of the battery to avoid damage to the vehicle'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 rest potential and start potential of the battery, and to test the alternator. With this device, you cannot overcharge the battery.



Info
Never remove the lid ❶.
Charge the battery to a maximum of 10% of the capacity specified on the battery housing ❷.

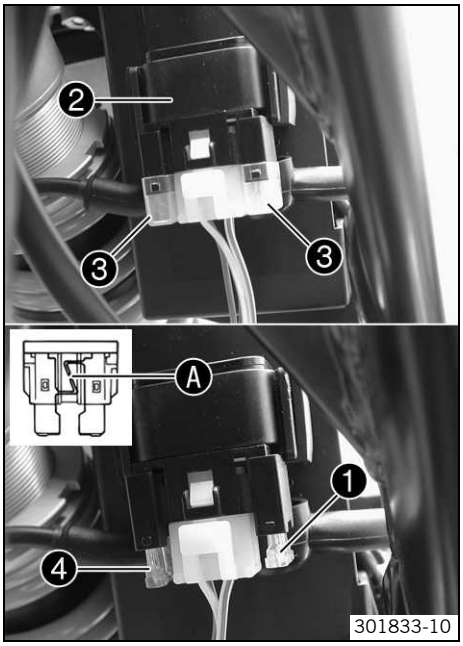
- Switch off the charger after charging. Disconnect the battery.

Guideline

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

- Install the rear fender. (☛ p. 71)

Changing the main fuse



– Switch off all power consumers and switch off the engine.
– The main fuse ❶ is located in the starter relay ❷ in front of the battery.
– Remove protection covers ❸.
– Remove the faulty main fuse.

Info
You can recognize a blown fuse by its broken filament Ⓐ.

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.

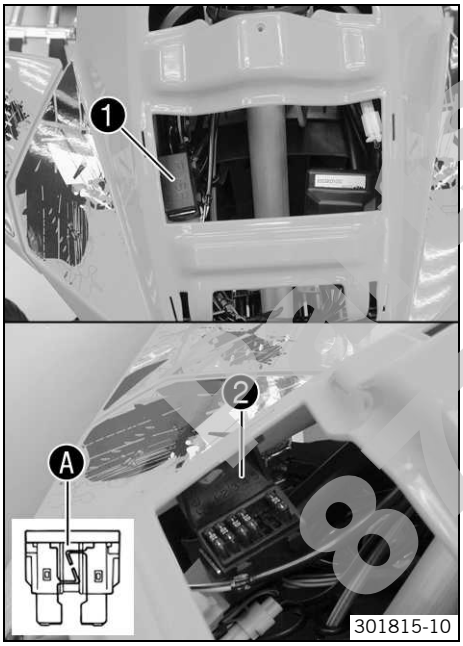
– Insert the new fuse.

Fuse (58011109120)

Tip
Replacement fuse ❹ should always be present in the starter relay to make sure it is available when needed.

– Replace the protection covers.

Changing the fuses of individual power consumers



– Remove the front cover. (☛ p. 69)
– Switch off all power consumers and switch off the engine.
– Open the cover ❷ of the fuse box ❶.

Info
The designation of the fuses is located on the inside cover of the fuse box ❷.

– Remove the faulty fuse.

Guideline

Fuse **1** - 10A - CDI controller
Fuse **2** - 10A - radiator fan
Fuse **3** - not used
Fuse **4** - not used
Fuse **5** - power supply for auxiliary equipment
Fuse **res.** - 10A - spare fuses

Info
You can recognize a blown fuse by its broken filament Ⓐ.

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.

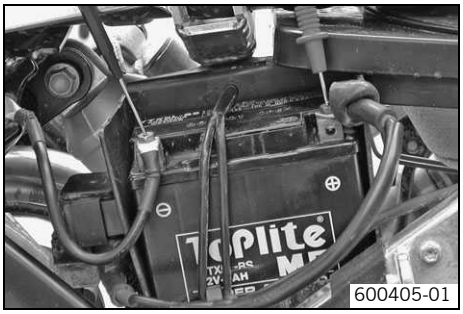
– Insert a new fuse of the appropriate strength.

Fuse (58011109110)

Tip
The replacement fuses should always be present in the fuse box to make sure they are available when needed.

– Close the cover of the fuse box.
– Install the front cover. (☛ p. 69)

Checking the battery voltage

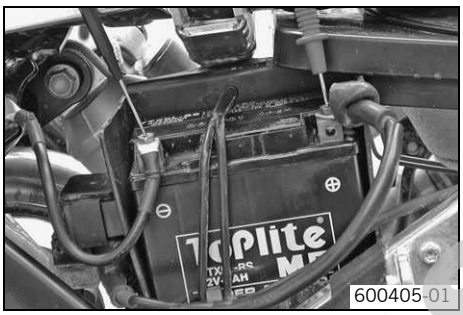


– Turn the key in the ignition switch to the position ⊠.
– Remove the rear fender. (☛ p. 70)
– Connect the measuring leads of the multimeter to the battery terminals.
– Measure the voltage while unloaded (no electrical consumer is switched on).

Battery voltage	
unloaded:	12.4... 12.8 V

» If the displayed value does not meet specifications:
– Recharge the battery.

Checking the charging voltage



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

– Remove the rear fender. (☛ p. 70)
– Connect the multimeter. The black measuring lead is connected to the negative terminal (ground) of the battery. Connect the red measuring lead to the positive terminal.
– Measurement while loaded (light switched on, brakes activated)

Charging voltage	
under load at: 5,000 rpm	13.5... 15 V

» If the value displayed does not meet specifications:
– Check the alternator. (☛ p. 190)
» If the alternator is working properly:
– Change the voltage regulator.

Checking the quiescent current

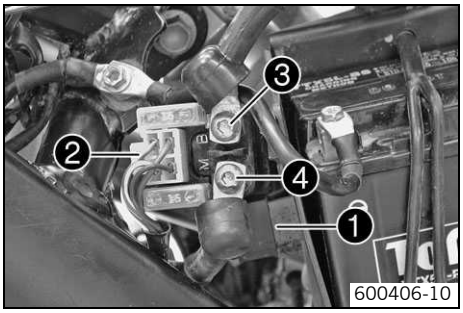
– Switch off all power consumers and switch off the engine.
– Remove the rear fender. (☛ p. 70)
– Disconnect the negative (minus) cable of the battery.
– Connect the multimeter between the negative cable and negative terminal of the battery. Check the quiescent current.

Maximum quiescent current	< 1 mA

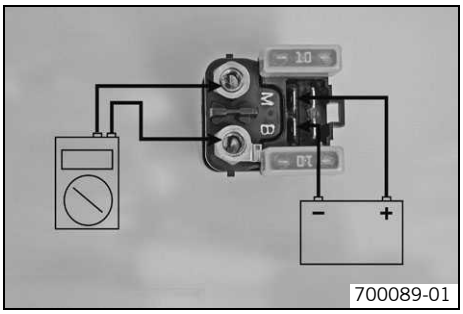
» If the measured value exceeds the specified value:
– Check the plug-in connections and wiring harness.
– To identify the power consumer, disconnect and reconnect the power consumers from the wiring harness one by one while observing the quiescent current.

Info
The power consumers in question may be a faulty voltage regulator/rectifier or creepage current in the plug-in connectors.

Checking the starter relay



– Remove the rear fender. (☛ p. 70)
– Disconnect the negative (minus) cable of the battery.
– Remove the starter relay from holder ❶ next to the battery.
– Disconnect connector ❷ from the starter relay.
– Disconnect cables ❸ and ❹ from the starter relay.



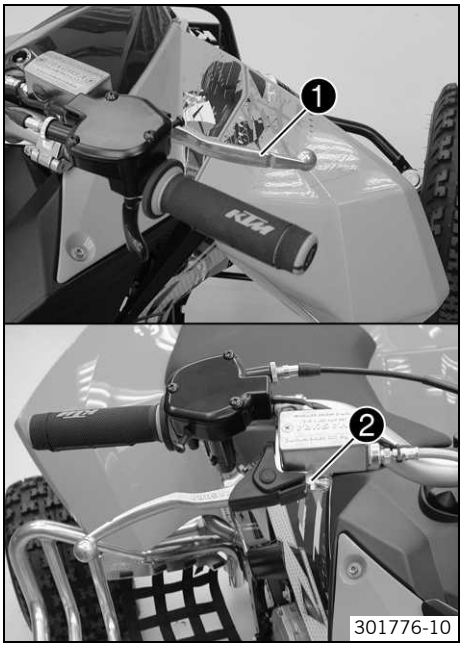
– Connect the starter relay to a 12 V power supply as shown in the figure. Use a multimeter to check the route between the terminals.

Info
When the starter relay is switched, a clicking sound can also be heard.

Resistance with the starter relay pulled	0 Ω

» When the display does not equal the setpoint:
– Change the starter relay.

Hand brake lever, parking brake



The hand brake lever ❶ is located on the right side of the handlebar and operates the front brakes.
The hand brake lever is combined with the parking brake, which blocks the front wheels to prevent the vehicle from rolling away.
To activate the parking brake, pull the hand brake lever, push the locking pawl ❷ down and release the hand brake lever.

Possible states

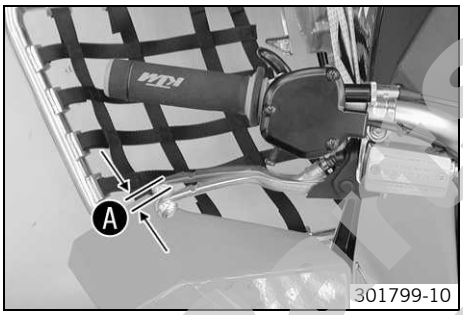
- Hand brake lever in basic position – Front wheels are not locked.
- Hand brake lever pulled and locked in position – Front wheels are locked.

Checking the free travel of the hand brake lever

Warning

Danger of accidents Brake system failure.

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



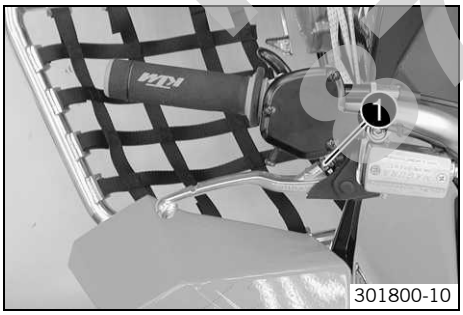
– Push the hand brake lever forward and check free travel Ⓐ.

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

» If the free travel does not meet specifications:

– Adjust the basic position of hand brake lever. (☛ p. 88)

Adjusting basic position of hand brake lever



– Check the free travel of the hand brake lever. (☛ p. 88)
– Adjust the basic setting of the hand brake lever to your hand size by turning adjusting screw ❶.

Info

Pull the brake lever forward and turn the adjusting screw.
Turn the adjusting screw clockwise to increase the distance between the hand brake lever and the handlebar.
Turn the adjusting screw counterclockwise to decrease the distance between the hand brake 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!

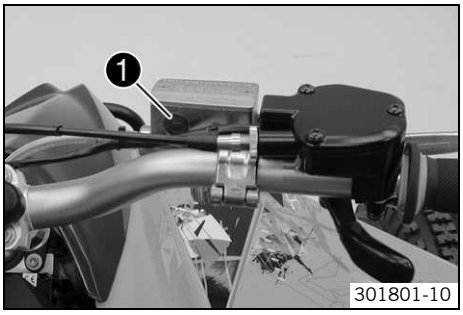
Checking front brake fluid level

Warning
Danger of accidents Brake system failure.

– If the brake fluid level falls below the bottom of the viewer, this indicates a leakage in the brake system or worn-out brake linings. Check the brake system and not continue riding.

Warning
Danger of accidents Reduced braking effect caused by 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 the viewer ❶.
  » When the brake fluid level has dropped below the bottom of the viewer:
    – Add front brake fluid. (☛ p. 89)

Topping up the front brake fluid

Warning
Danger of accidents Brake system failure.

– If the brake fluid level falls below the bottom of the viewer, this indicates a leakage in the brake system or worn-out brake linings. Check the brake system and 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.

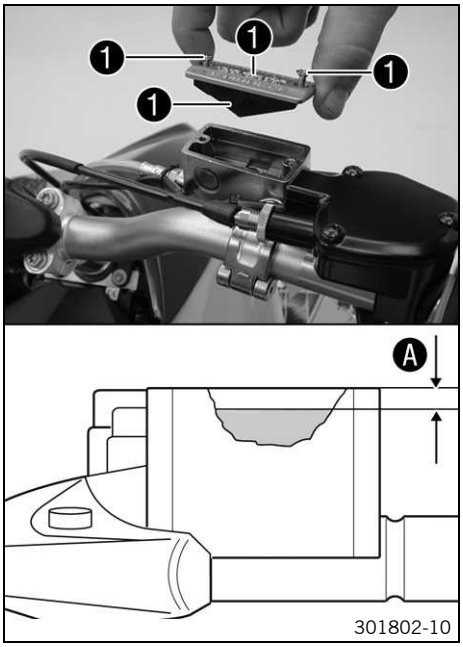
Warning
Danger of accidents Reduced braking effect caused by old brake fluid.

– 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! 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 may damage painted surfaces!
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

Dimension Ⓐ (brake fluid level below top edge of container)	5 mm (0.2 in)

Brake fluid DOT 4 / DOT 5.1 (☛ p. 223)

– Position the cover with the membrane. Mount and tighten 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.
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Info
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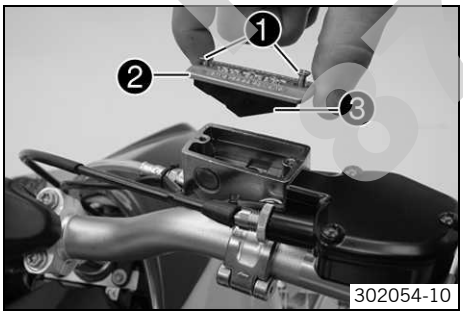
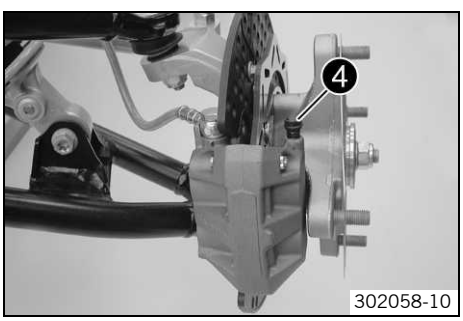
Avoid contact between brake fluid and painted parts. Brake fluid is corrosive!
Use only clean brake fluid from a sealed container!

– Remove the wheel/wheels. (☛ p. 72)



– 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 fresh brake fluid.

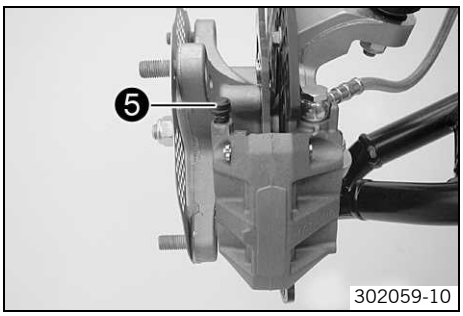
Bleed syringe (50329050000) (☛ p. 227)
Brake fluid DOT 4 / DOT 5.1 (☛ p. 223)



– Pull off dust cap ❹ and connect a commercially available suction device (workshop equipment).
– Remove the bleeder screw and suck out the old brake fluid.

Info
During suction, ensure that the brake fluid reservoir is always sufficiently filled with fresh brake fluid.

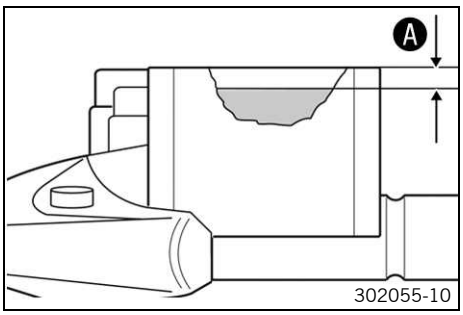
– Tighten the bleeder screw. Remove the suction device and attach the dust cap.



– Pull off dust cap ❺ and connect a commercially available suction device (workshop equipment).
– Remove the bleeder screw and suck out the old brake fluid.

Info
During suction, ensure that the brake fluid reservoir is always sufficiently filled with fresh brake fluid.

– Tighten the bleeder screw. Remove the suction device and attach the dust cap.



– Add brake fluid to level ❹.

Guideline

Measurement of ❹	5 mm (0.2 in)

Brake fluid DOT 4 / DOT 5.1 (☛ p. 223)

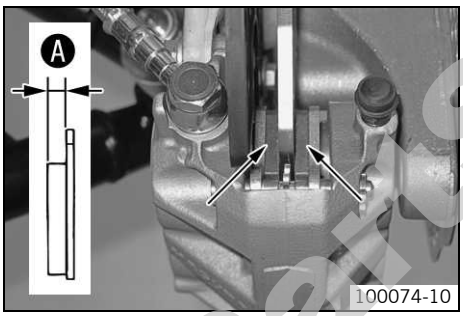
– Position the cover with the membrane. Mount and tighten the screws.

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

– Install the wheel/wheels. (☛ p. 73)

Checking the front brake linings

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



– Remove the wheel/wheels. (☛ p. 72)
– Check the brake linings of both front brake calipers for minimum thickness ❹.

Minimum thickness ❹	≥ 1 mm (≥ 0.04 in)

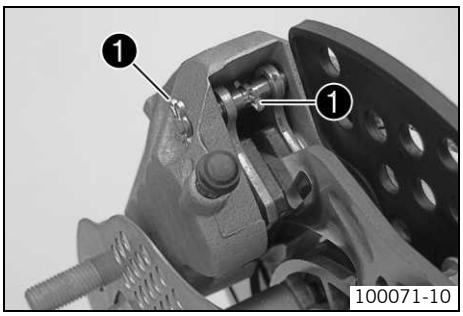
» If the minimum thickness is less than specified:
– Change the front brake linings. (☛ p. 92)
– Check the brake linings for damage and cracking.
» If damage or cracking is visible:
– Change the front brake linings. (☛ p. 92)
– Install the wheel/wheels. (☛ p. 73)

Removing front brake linings

Warning
Danger of accident Brake system failure.
– Maintenance work and repairs must be carried out professionally.

Info
The operations are the same on the left and right.

– Remove the wheel/wheels. (☛ p. 72)
– Pull the hand brake lever and release it again.
✓ Locking pawl moves into its basic position, parking brake is deactivated.



– Push the brake piston back to release pressure on the brake linings.
– Remove the locking split pins ❶, withdraw the bolt, and take out the brake linings.
– Clean the brake caliper and bolts.

Mounting front brake linings

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

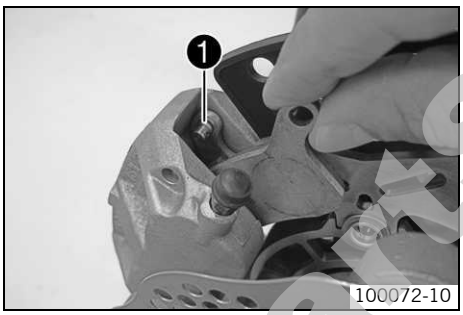
– Always keep the brake discs free of oil and grease, and clean them with brake cleaner when necessary.

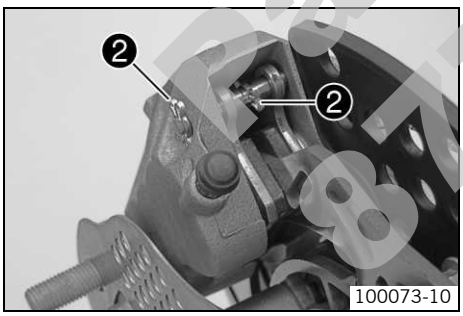
Warning
Danger of accidents Reduced braking efficiency due to use of non-approved brake linings.

– 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.

Info
The operations are the same on the left and right.

– Check the brake discs. (☛ p. 74)
– Insert the inside brake lining into the brake caliper and fix with bolt ❶.
– Insert the external brake lining into the brake caliper and slide the bolts in all the way.





– Mount the locking split pins ❷.
– Operate the hand brake lever repeatedly until the brake linings lie on the brake disc and there is a pressure point.
– Install the wheel/wheels. (☛ p. 73)

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.

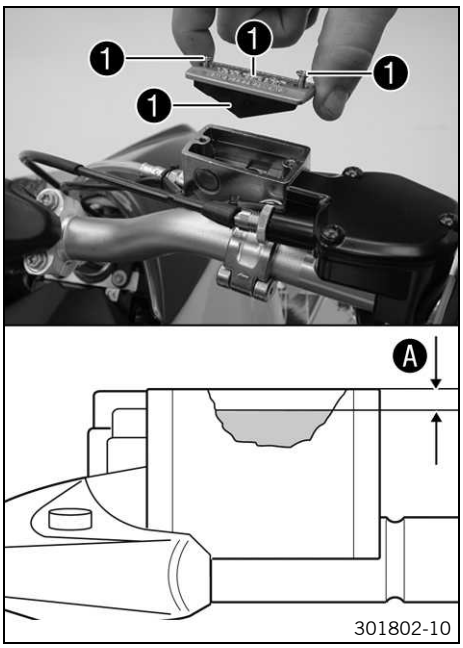
Warning
Danger of accidents Reduced braking effect caused by old brake fluid.

– 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 is corrosive and may damage painted surfaces!
Use only clean brake fluid from a sealed container!



– Remove the front brake linings. (☛ p. 91)
– 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. 92)
– Correct brake fluid level to Ⓐ.

Guideline

Dimension Ⓐ (brake fluid level below top edge of container)	5 mm (0.2 in)

Brake fluid DOT 4 / DOT 5.1 (☛ p. 223)

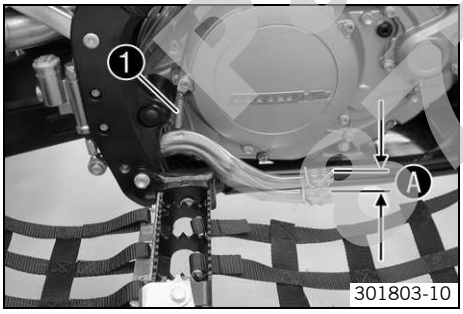
– Position the cover with the membrane. Mount and tighten screws.

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 lever, pressure builds up on the rear brake circuit. The rear brake can fail due to overheating. Adjust free travel on foot brake lever 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

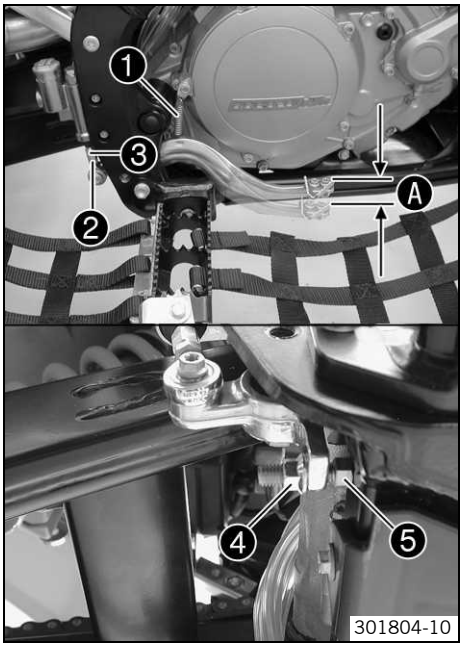
Free travel at foot brake lever	3... 5 mm (0.12... 0.2 in)

» If the free travel does not meet specifications:
  – Adjust the basic position of the foot brake lever. (☛ p. 93)
– 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 lever, pressure builds up on the rear brake circuit. The rear brake can fail due to overheating. Adjust free travel on foot brake lever according to specifications.



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

Info
The range of adjustment is limited.

– Turn push rod ❸ accordingly until you have 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 ❺ and tighten nut ❹.

Guideline

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

– Hold push rod ❸ and tighten nut ❷.

Guideline

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

– Reconnect spring ❶.

Checking rear brake fluid level

Warning
Danger of accidents Brake system failure.

– If the brake fluid level falls below the bottom of the viewer, this indicates a leakage in the brake system or worn-out brake linings. Check the brake system and not continue riding.

Warning
Danger of accidents Reduced braking effect caused by old brake fluid.

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

– Park the vehicle on a horizontal surface.
– Check the brake fluid level in the viewer ❶.
» When the brake fluid level has dropped to the bottom of the viewer ❶:
– Add rear brake fluid. (☛ p. 94)

Adding rear brake fluid

Warning
Danger of accidents Brake system failure.

– If the brake fluid level falls below the bottom of the viewer, this indicates a leakage in the brake system or worn-out brake linings. Check the brake system and 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.

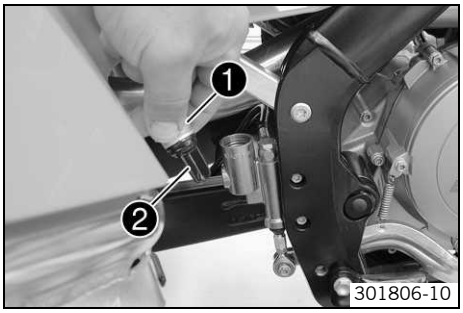
Warning
Danger of accidents Reduced braking effect caused by old brake fluid.

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

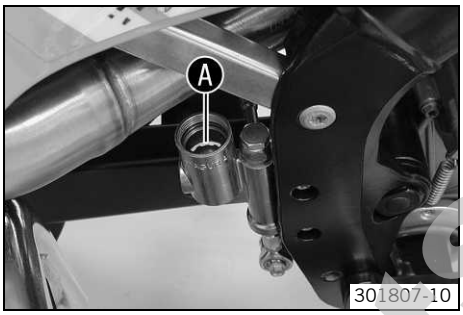
Warning
Environmental hazard Hazardous substances cause environmental damage.

– 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 is corrosive and may damage painted surfaces!
Use only clean brake fluid from a sealed container!



– Remove screw ❶ with membrane ❷.



– Add brake fluid to level Ⓐ.

Brake fluid DOT 4 / DOT 5.1 (☛ p. 223)

– Refit screw ❶ with membrane ❷.

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.

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– Wear suitable protective clothing and goggles.
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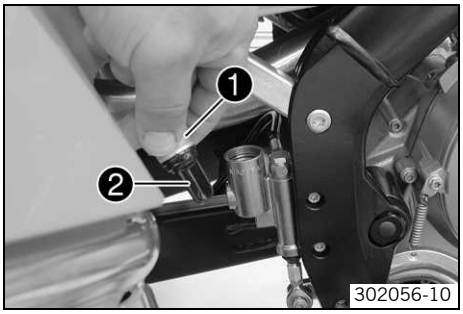
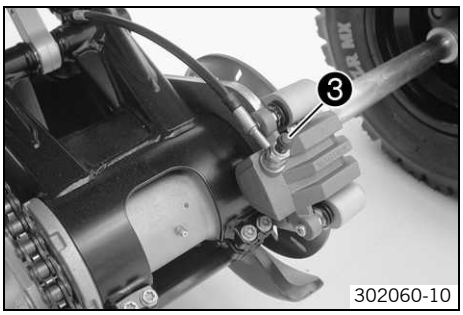


– Remove screw cap ❶ with membrane ❷.
– Extract the old brake fluid from the brake fluid reservoir with a syringe and add fresh brake fluid.

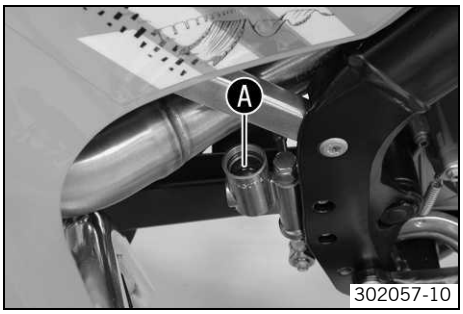
Bleed syringe (50329050000) (☛ p. 227)
Brake fluid DOT 4 / DOT 5.1 (☛ p. 223)



– Pull off dust cap ❸ and connect a commercially available suction device (workshop equipment).
– Remove the bleeder screw and suck out the old brake fluid.

Info
During suction, ensure that the brake fluid reservoir is always sufficiently filled with fresh 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. 223)

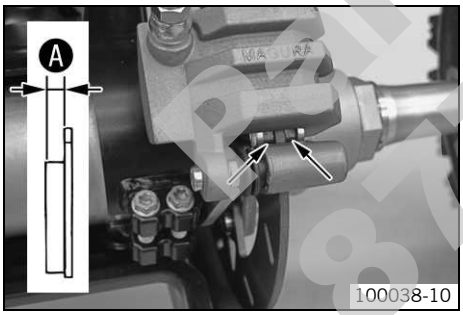
– Mount the screw cap with the membrane.

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

– Repeatedly activate the foot brake lever until a firm pressure point is reached.

Checking rear brake linings

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



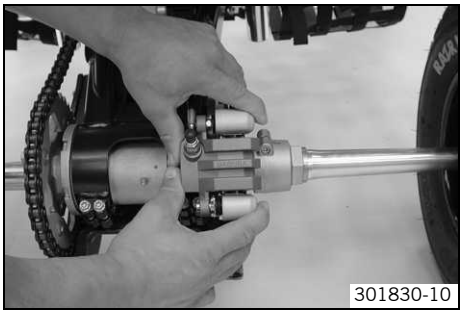
– Check the brake linings for minimum thickness Ⓐ.

Minimum thickness Ⓐ	≥ 1 mm (≥ 0.04 in)

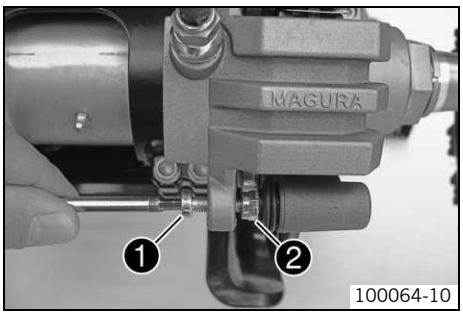
» If the minimum thickness is less than specified:
– Change the rear brake linings. (☛ p. 98)
– Check the brake linings for damage and cracking.
» If damage or cracking is visible:
– Change the rear brake linings. (☛ p. 98)

Removing rear brake linings

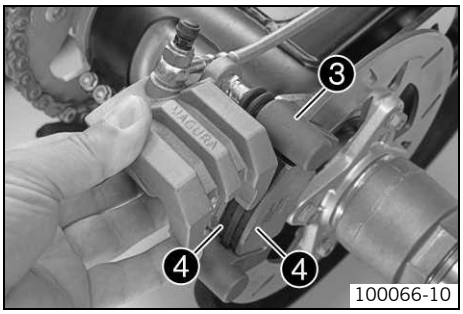
Warning
Danger of accident Brake system failure.
– Maintenance work and repairs must be carried out professionally.



– Press the brake caliper by hand on to the brake disc in order to press back the brake piston.



– Loosen the screw ❶ while holding the hexagonal head ❷ of the bearing bolt. Unscrew the screw by approx. 10 turns and use the screw to press the bearing bolt out of the brake caliper. Remove screw.



Note

Danger of damage Kinking of brake line.

– Position and handle the brake line without straining it. The brake line must be replaced if it is kinked.

– Swing the brake caliper up, unhook it from the brake caliper support ❸ and set it down.
– Remove the brake linings ❹.
– 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.

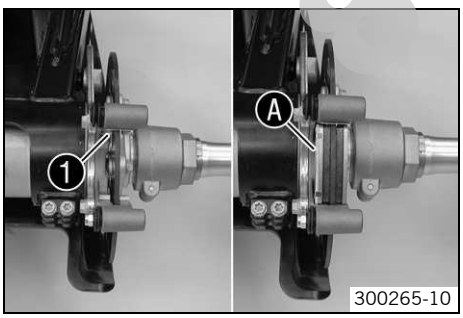
– Always keep the brake discs free of oil and grease, and clean them with brake cleaner when necessary.

Warning

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

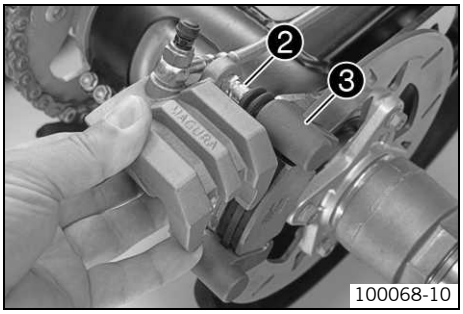
– Brake linings available from accessory suppliers are often not tested and approved for use on KTM vehicles. The construction and friction factor of the brake linings and therefore the brake power can differ considerably from the original KTM brake linings. If brake linings are used that differ from 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. 74)
– Check that the sliding plate ❶ is seated correctly in the brake caliper support and insert the brake linings.



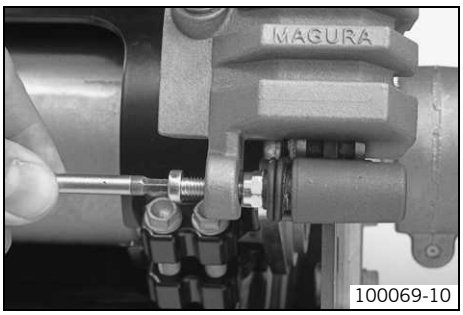
Info

Make sure that the decoupling plate Ⓐ is mounted on the piston side of the brake lining.



– Grease the bearing bolt ❷ and insert the brake caliper with the bearing bolt into the brake caliper support ❸.

Lubricant (T625) (☛ p. 225)



– Swing the brake caliper downward. Mount and tighten the screw.

Guideline

Screw, rear brake caliper	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**

– Operate the foot brake lever repeatedly until the brake linings lie on the brake disc and there is a pressure point.

Changing 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.

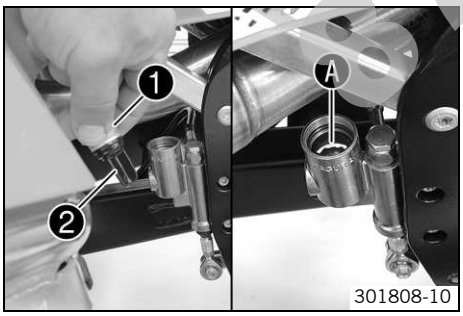
Warning
Danger of accidents Reduced braking effect caused by old brake fluid.

– 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 is corrosive and may damage painted surfaces!
Use only clean brake fluid from a sealed container!



– Remove the rear brake linings. (☛ p. 96)
– Remove screw ❶ with membrane ❷.
– 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. 97)
– Add brake fluid to level Ⓐ.

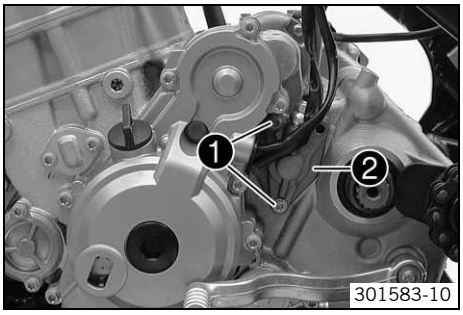
Brake fluid DOT 4 / DOT 5.1 (☛ p. 223)

– Refit screw ❶ with membrane ❷.

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

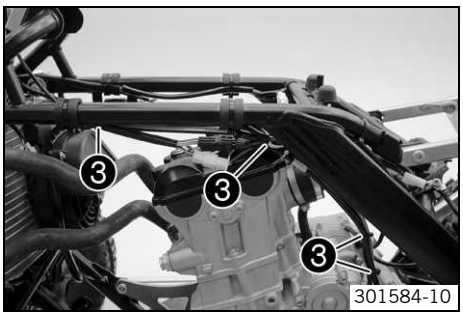
Removing the engine

– Remove the engine guard. (☛ p. 20)
– Remove the heel protector. (☛ p. 67)
– Drain the coolant. (☛ p. 181)
– Remove the rear fender. (☛ p. 70)
– Remove the manifold. (☛ p. 60)
– Remove the carburetor. (☛ p. 164)
– Remove the engine sprocket. (☛ p. 179)
– Disconnect the negative cable from the battery.
– Remove screws ❶ and take off clutch slave cylinder ❷.

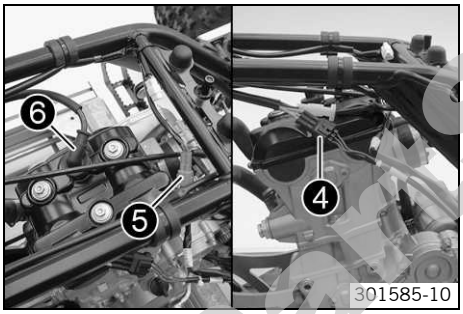


Info
Do not activate the clutch lever if the clutch slave cylinder has been removed.

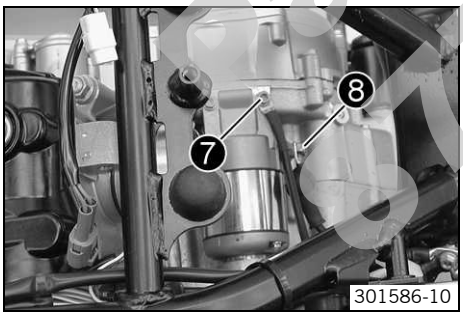
– Remove cable binder ❸.



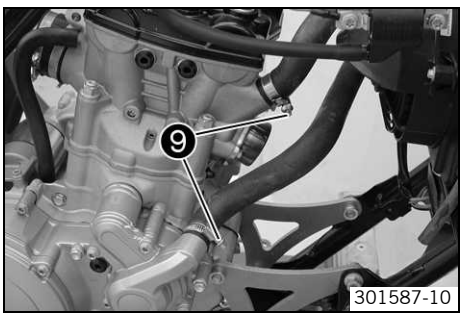
– Disconnect plug ❹ of the alternator.
– Disconnect plug ❺ of the ignition pulse generator.
– Detach spark plug connector ❻.

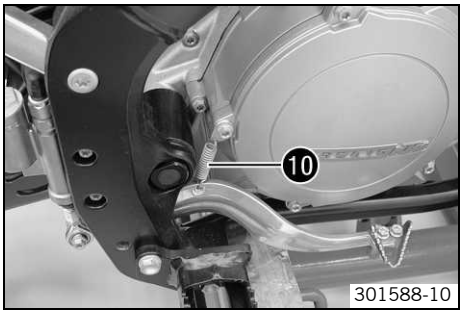


– Remove screw ❼. Hang the ground wire to the side.
– Slide back the cover. Remove nut ❽ from the electrical connection on the starter motor and detach the cable.



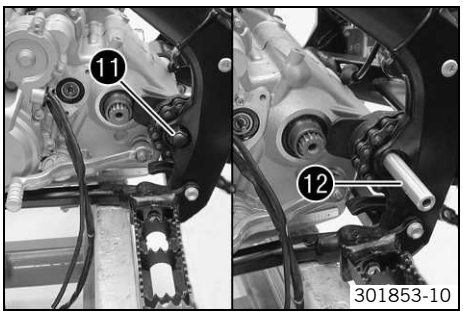
– Loosen hose clips ❾ and remove the radiator hoses and hose clips.





– Disconnect spring ❿.

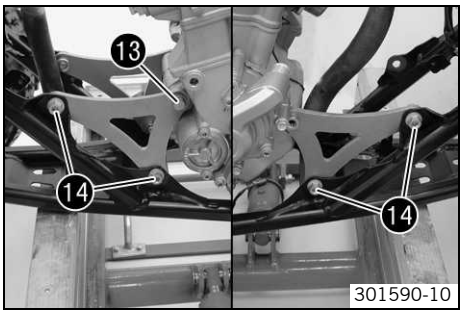
Spring hooks (50305017000) (☛ p. 227)



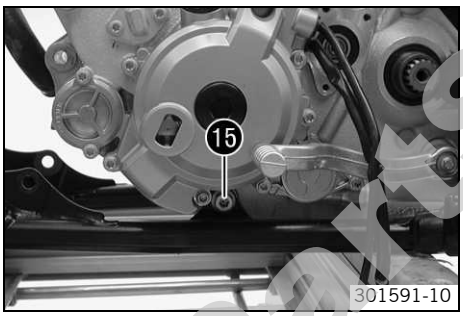
– Remove nut ⓫.
– Pull out the swingarm pivot.

Info
Pull the swingarm pivot to the point where it is still being held.

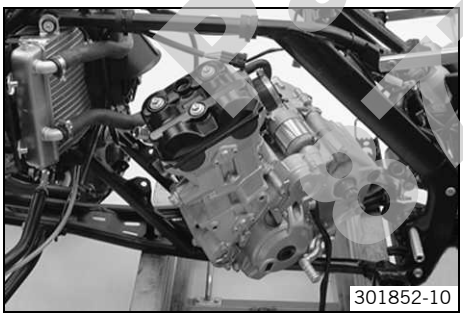
– Secure the swingarm with a suitable pin ⓬.



– Remove screw ⓭.
– Remove screws ⓮ and take off both engine bearers.



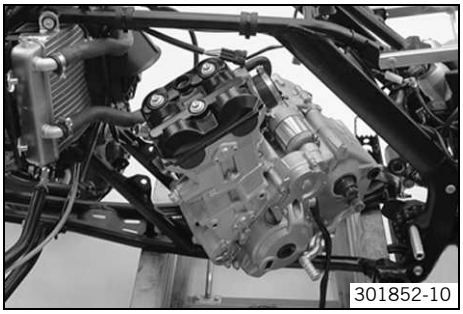
– Remove screw ⓯.



– Lift the engine out of the frame.

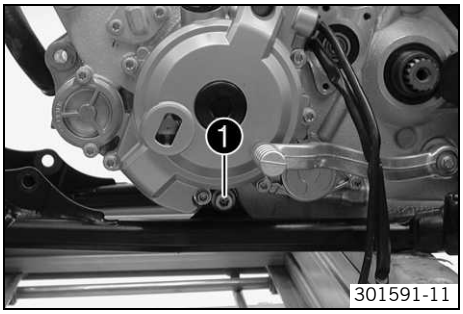
Info
It is recommended to have assistance for performing this step.

Installing the engine



– Position the engine in the frame.

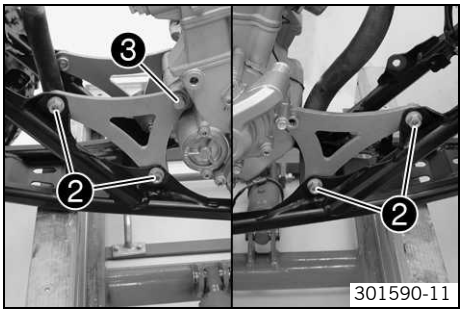
Info
It is recommended to have assistance for performing this step.



– Mount screw ❶ but do not tighten yet.

Guideline

Engine mounting bolt	M10	60 Nm (44.3 lbf ft)



– Position both engine bearers on the frame. Mount screws ❷ but do not tighten yet.

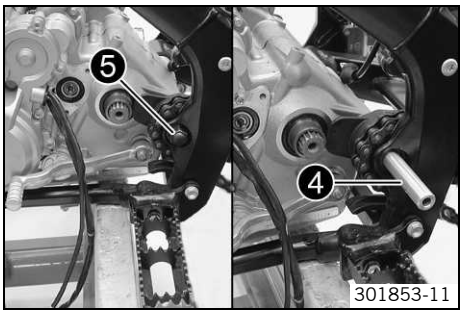
Guideline

Engine bracket screw	M10	60 Nm (44.3 lbf ft)

– Mount screw ❸ but do not tighten yet.

Guideline

Engine mounting bolt	M10	60 Nm (44.3 lbf ft)



– Remove pin ❹.
– Mount the swingarm pivot.
– Mount and tighten nut ❺.

Guideline

Nut, swingarm pivot	M16x1.5	100 Nm (73.8 lbf ft)

– Tighten screw ❶.

Guideline

Engine mounting bolt	M10	60 Nm (44.3 lbf ft)

– Tighten screw ❷.

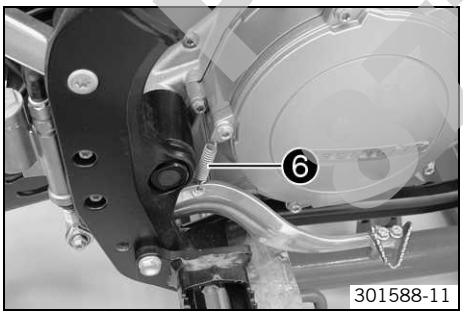
Guideline

Engine bracket screw	M10	60 Nm (44.3 lbf ft)

– Tighten screw ❸.

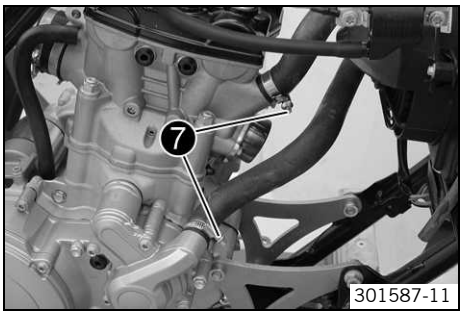
Guideline

Engine mounting bolt	M10	60 Nm (44.3 lbf ft)

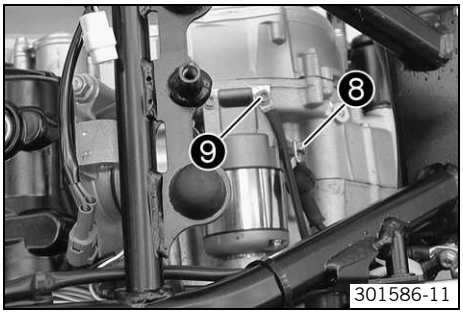


– Reconnect spring ❻.

Spring hooks (50305017000) (☛ p. 227)



– Attach the radiator hoses. Position and tighten hose clamps ❼.



– Position the electrical connection on the starter motor. Mount and tighten nut ❽. Slide on the cover.

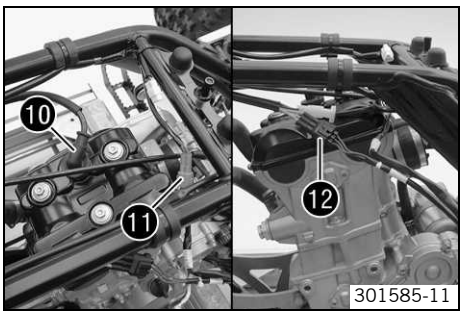
Guideline

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

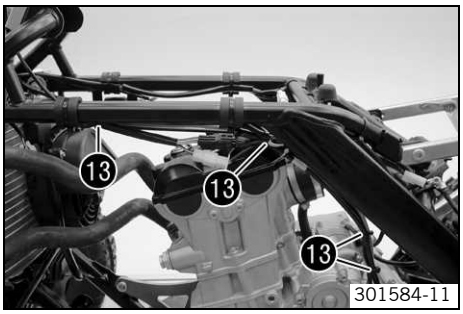
– Position the ground wire. Mount and tighten screw ❾.

Guideline

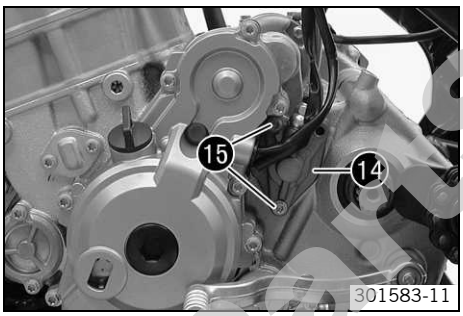
Screw, starter motor	M6	10 Nm (7.4 lbf ft)



– Mount spark plug connector ❿.
– Plug in connector ⓫ of the ignition pulse generator.
– Connector plug ⓬ of the alternator.



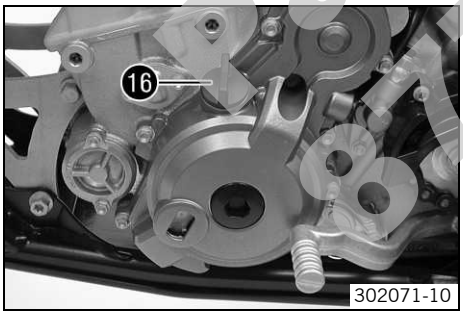
– Secure the cable with cable binder ⓭.



– Position clutch slave cylinder ⓮. Mount and tighten screws ⓯.

Guideline

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



– Connect the negative cable of the battery.
– Install the engine sprocket. (☛ p. 179)
– Install the carburetor. (☛ p. 166)
– Install the manifold. (☛ p. 60)
– Install the rear fender. (☛ p. 71)
– Remove the filler cap ⓰ on the clutch cover and fill up with engine oil.

Engine oil	2.00 l (2.11 qt.)	External temperature: ≥ 0 °C (≥ 32 °F)	Engine oil (SAE 10W/50) (☛ p. 223)
		External temperature: < 0 °C (< 32 °F)	Engine oil (SAE 5W/40) (☛ p. 223)

– Mount and tighten screw cap ⓯.
– Fill coolant/bleed the cooling system. (☛ p. 181)
– Install the heel protector. (☛ p. 68)
– Install the engine guard. (☛ p. 20)
– Take a short test ride.
– Check the engine for leakage.
– Check the engine oil level. (☛ p. 185)
– Check the cooling system for leakage.
– Check the coolant level. (☛ p. 180)

Preparations

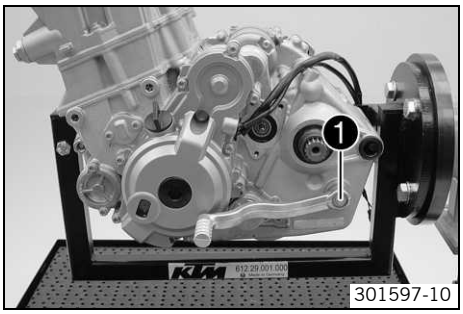
– Mount the special tool on the engine work stand.

Engine fixing arm (83529002000) (☛ p. 237)
Engine work stand (61229001000) (☛ p. 230)

– Mount the engine on the special tool.

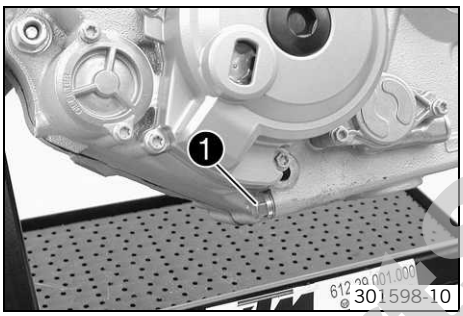
Info
Use a helper or motorized hoist.

Removing the shift lever



– Remove screw ❶. Take off the shift lever.

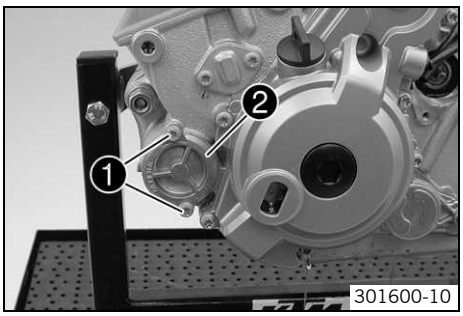
Draining the engine oil



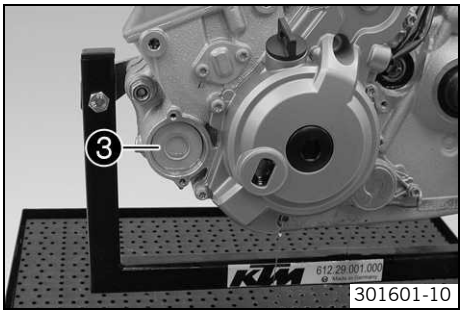
– Remove oil drain plug with magnet ❶.

– Loosen screw plug ❷ by striking it lightly with a hammer a few times.
– Remove screw plug ❷ with the oil screen and the O-rings.
– Completely drain the engine oil.

Removing the oil filter



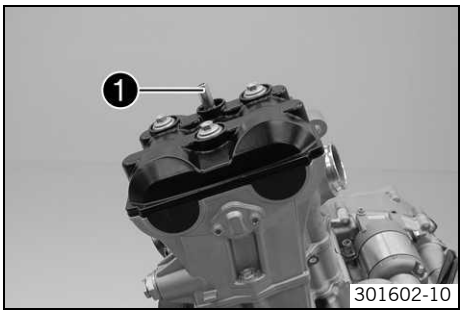
– Remove screws ❶. Remove oil filter cover ❷ with the O-ring.



– Pull oil filter ❸ out of the oil filter housing.

Circlip pliers reverse (51012011000) (☛ p. 228)

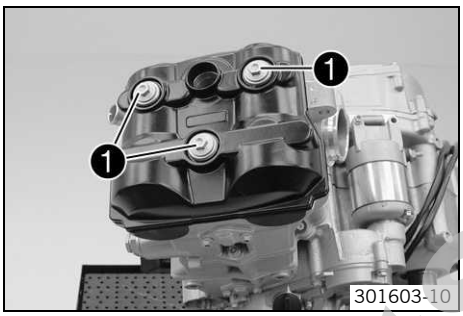
Removing the spark plug



– Remove the spark plug using special tool ❶.

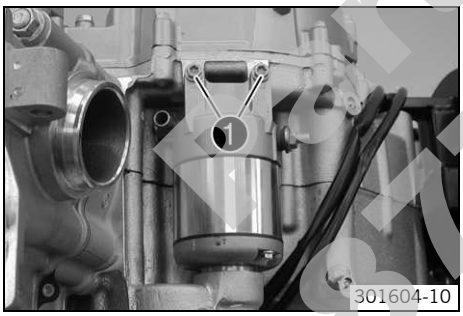
Spark plug wrench (77329072000) (☛ p. 232)

Removing the valve cover



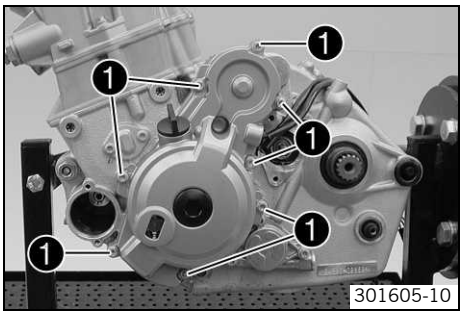
– Remove screws ❶. Remove the valve cover with the valve cover seal.

Removing the starter motor

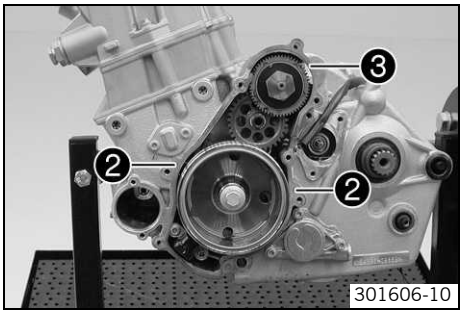


– Remove screws ❶ and the starter motor.

Removing the alternator cover

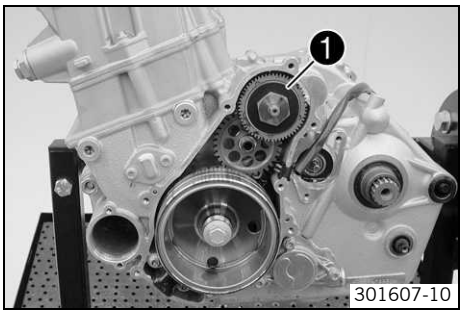


– Remove screws ❶. Take off the alternator cover.



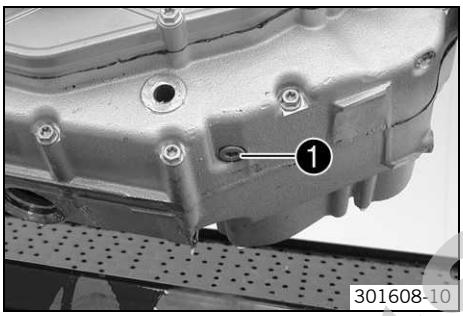
– Remove centering pins ❷. Take off the alternator cover gasket ❸.

Removing the torque limiter

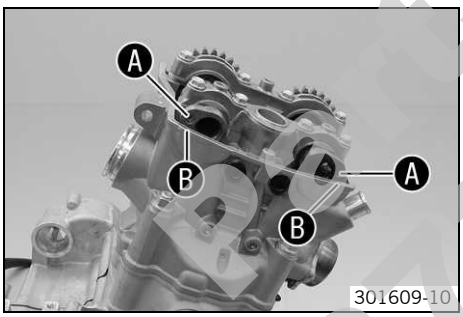


– Remove torque limiter ❶.

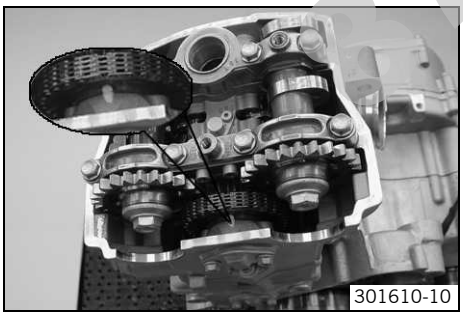
Positioning the engine at ignition top dead center (TDC)



– Remove screw ❶.

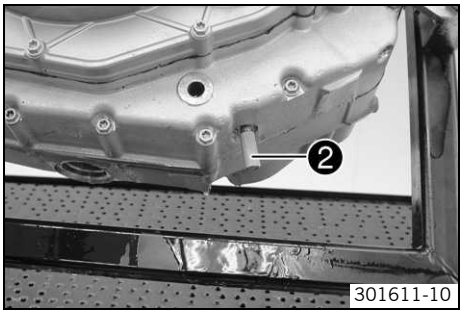


– Turn the crankshaft counterclockwise until holes Ⓐ of the camshafts are flush above sealing area Ⓑ.



– Mark the double wheel and the cylinder head in one line.

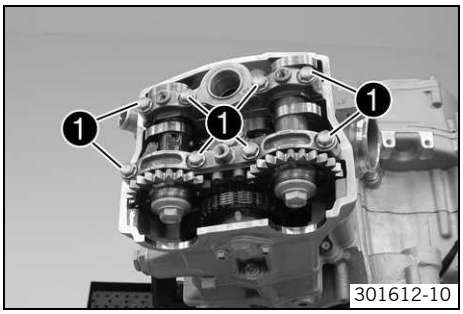
Info
The markings will be of assistant when the camshafts are assembled.



– Mount special tool ❷.

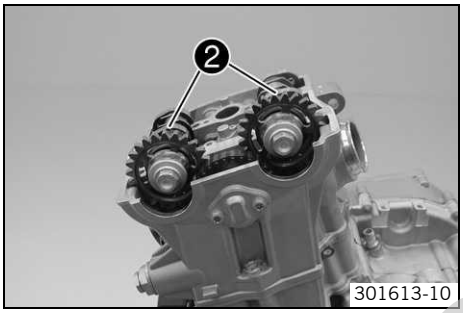
Engine blocking screw (77329010000) (☛ p. 231)

Removing the camshaft



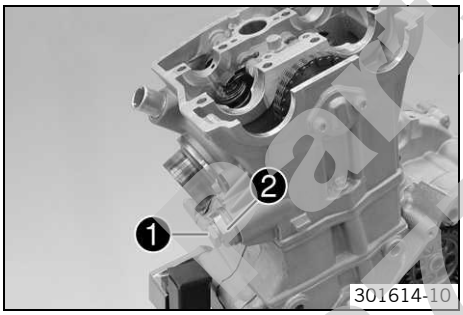
– Remove screws ❶.
– Take off the camshaft bearing bridge.

Info
Ensure that the needle rollers and the O-ring remain in place.

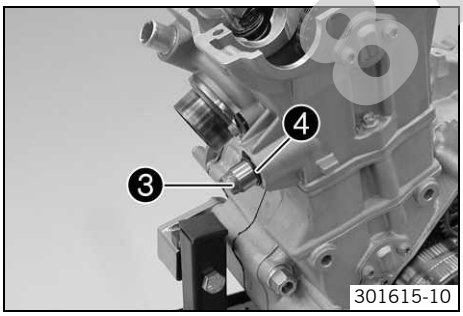


– Remove camshafts ❷.

Removing the timing chain tensioner

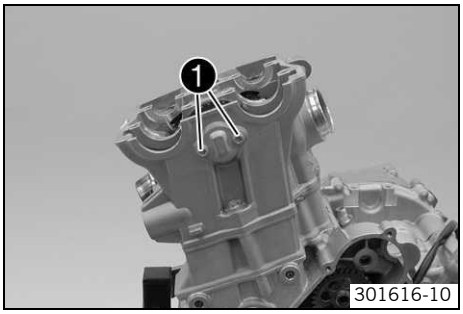


– Loosen screw ❶.
– Remove screw ❷ with the seal ring.

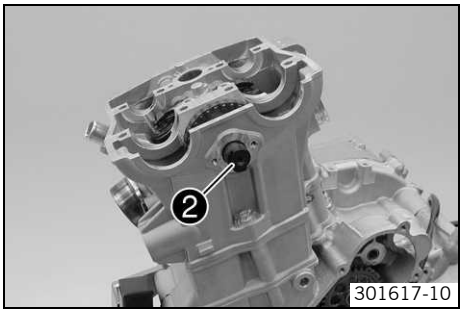


– Pull out timing chain tensioner ❸. Remove O-ring ❹.

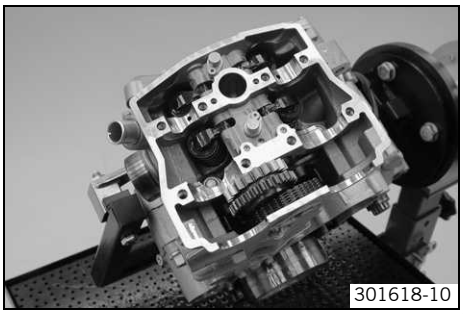
Removing the double wheel



– Remove screws ❶.
– Take off the retaining bracket.

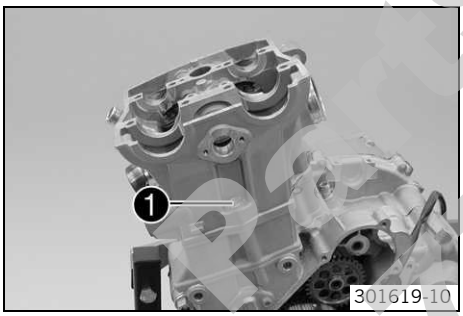


– Screw a fitting screw into spindle ❷.
– Hold the double wheel and remove spindle ❷.

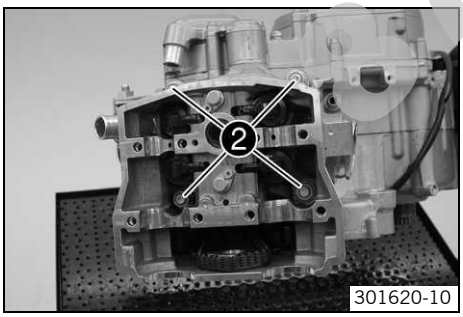


– Take the timing chain off the double wheel.
– Remove the double wheel with both needle bearings.
– Remove the screw from the spindle.

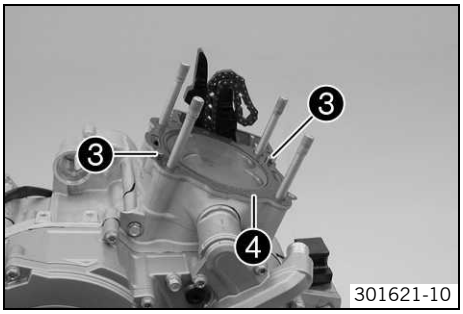
Removing the cylinder head



– Remove nut ❶.

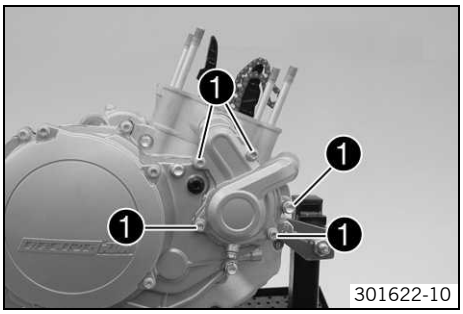


– Unscrew nuts ❷ in a crisscross pattern and remove them with the washers.
– Take off the cylinder head.



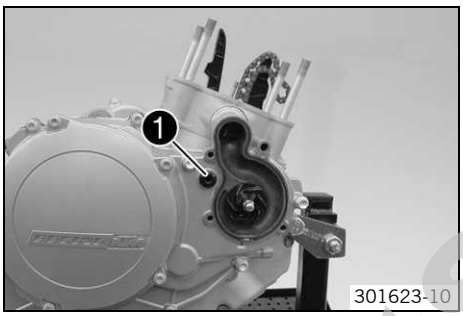
– Remove centering pins ❸ and cylinder head gasket ❹.

Removing the water pump cover



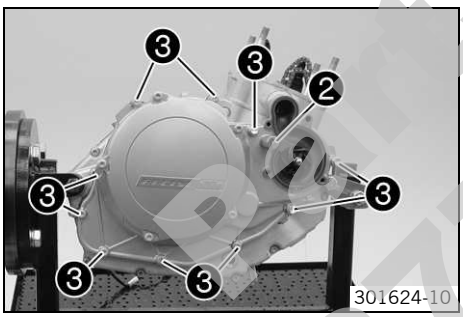
– Remove screws ❶. Take off the water pump cover.
– Remove the gasket.

Removing the clutch cover



– Remove screw ❶.

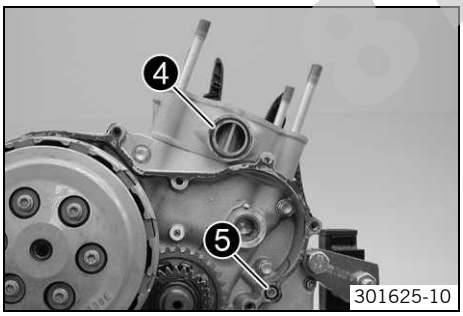
Info
If work is to be performed on the water pump, unscrew the nut of the water pump impeller.



– Mount special tool ❷.

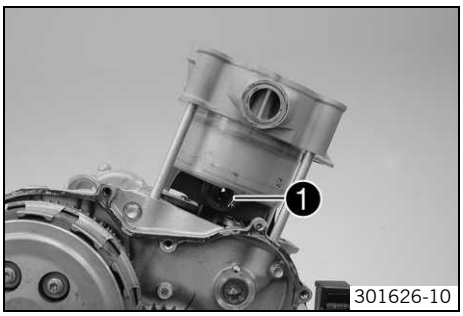
Assembly pin (77329012100) (☛ p. 231)

– Remove screws ❸ and take off the clutch cover.



– Remove the locating pins.
– Remove quad ring ❹.
– Take off O-ring ❺.

Removing the piston

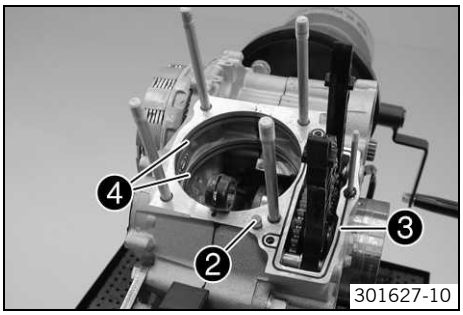


– Push the cylinder upward.

Info
Only push the cylinder as far up as necessary to take the piston pin out.

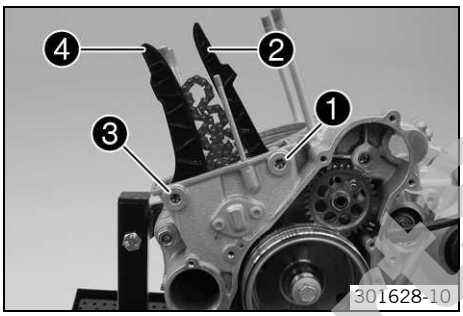
– Remove the piston pin retainer ❶.
– Remove the piston pin.
– Take off the cylinder and piston.
– Push the piston upward out of the cylinder.

Info
If no further work is to be performed on the cylinder and piston, the piston can remain in the cylinder.



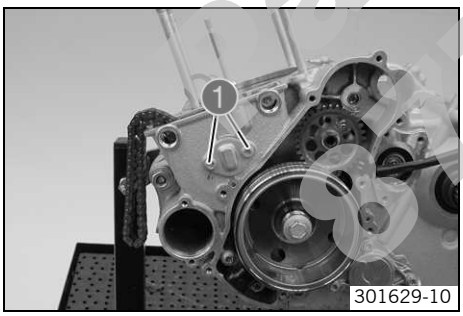
– Take off locating pins ❷ and cylinder base gasket ❸.
– Remove O-rings ❹.

Removing the timing chain rails

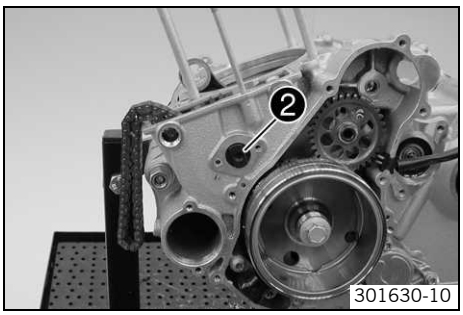


– Remove spindle ❶.
– Remove the timing chain guide rail ❷ from above.
– Remove spindle ❸.
– Remove the timing chain tensioning rail ❹ from above.

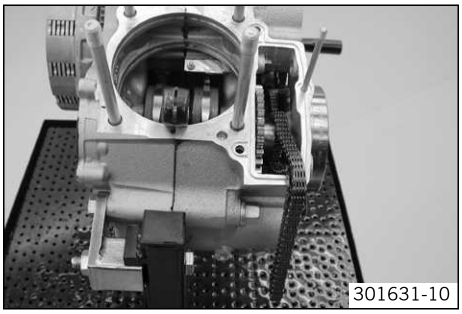
Removing the timing chain



– Remove screws ❶.
– Take off the retaining bracket.



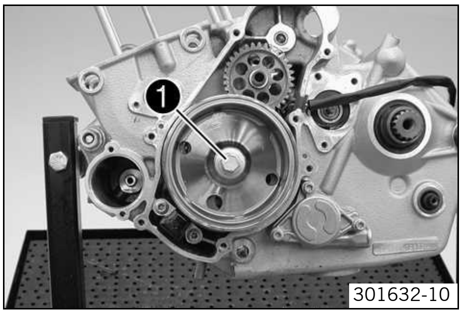
– Screw a fitting screw into spindle ❷.
– Hold the timing chain and remove spindle ❷.


301631-10

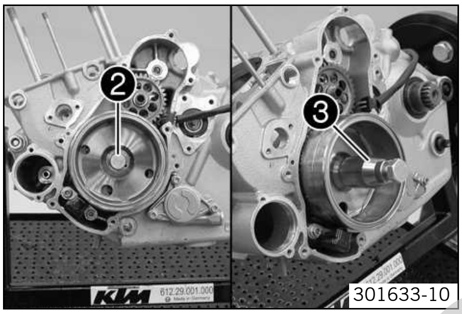
- Take off the timing chain and balancer gear with the needle bearings.

> **Info**
> Identify the direction of travel.

Removing the rotor and starter idler gear


301632-10

- Remove screw ❶.


301633-10

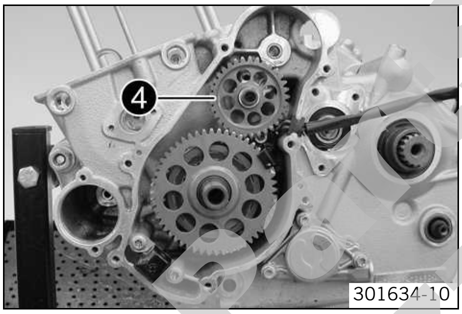
- Insert special tool ❷ into the crankshaft.

Protection cover (75029090000) (☛ p. 230)

- Attach special tool ❸ to the rotor. Counteracting with the special tool, pull off the rotor by screwing in the screw.

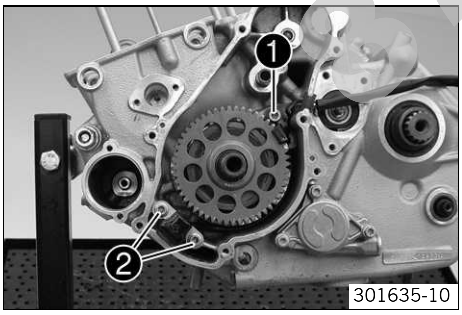
Extractor (58012009000) (☛ p. 228)

> **Info**
> Ensure that the spring washer remains in place.


301634-10

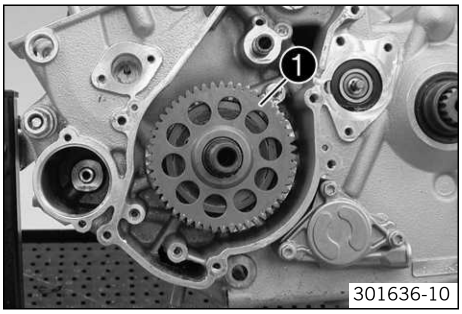
- Remove starter idler gear ❹.

Removing the ignition pulse generator


301635-10

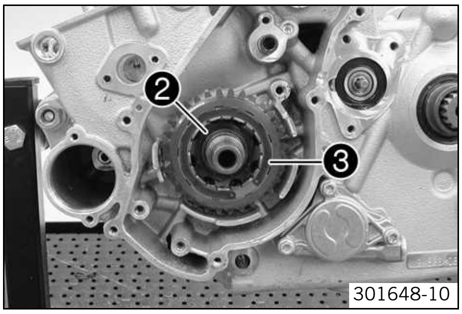
- Remove screws ❶.
- Take off the retaining bracket.
- Pull the cable support sleeve from the engine case.
- Remove screws ❷.
- Take off the ignition pulse generator with the holder.

Removing the drive wheel of the balancer gear



301636-10

– Remove freewheel gear ❶ with the needle bearing.



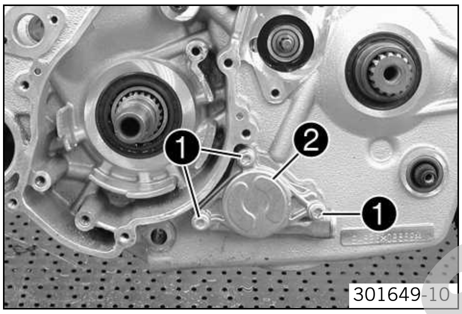
301648-10

– Remove nut ❷ with the special tool.

Special socket, 36 mm; ½" drive (77329021000) (☛ p. 231)

– Take off drive wheel ❸ of the balancer gear.

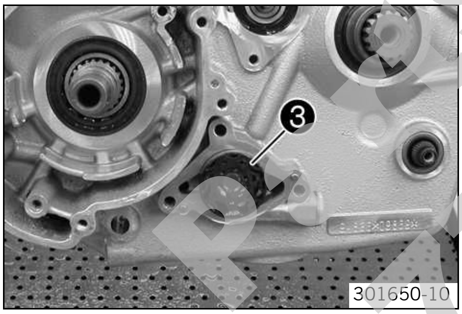
Removing the force pump



301649-10

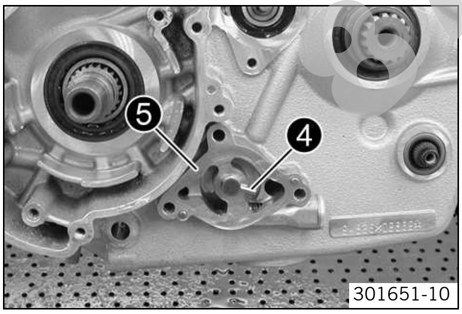
– Remove screws ❶.
– Take off oil pump housing ❷.

Info
Ensure that the dowel pins remain in place.



301650-10

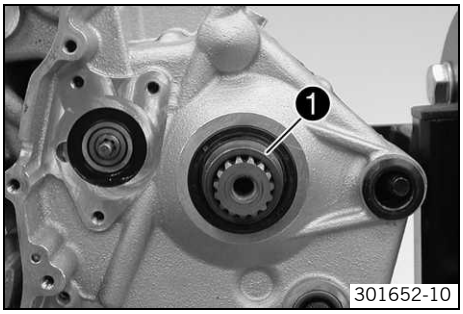
– Take off force pump ❸.



301651-10

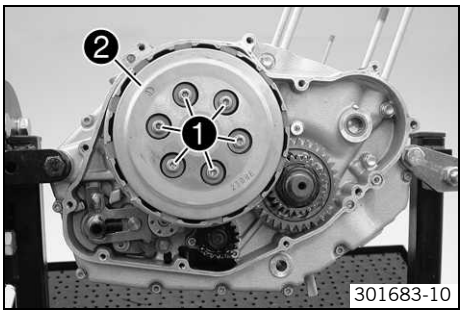
– Remove needle roller ❹.
– Remove oil pump housing ❺ with the gasket.

Removing the spacer

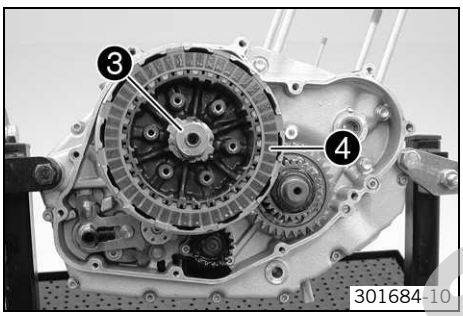


– Remove spacer ❶ from the countershaft.
– Remove the O-ring.

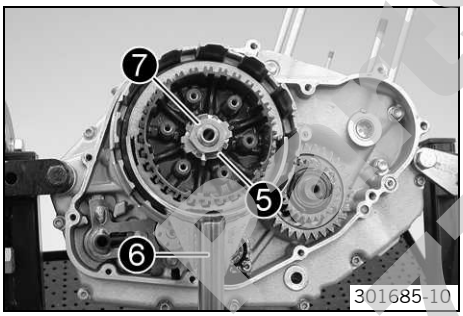
Removing the outer clutch hub



– Unscrew screws ❶ and remove them with the washers and springs.
– Remove pressure cap ❷.



– Remove pressure piece ❸ with the push rod.
– Completely remove clutch discs ❹.



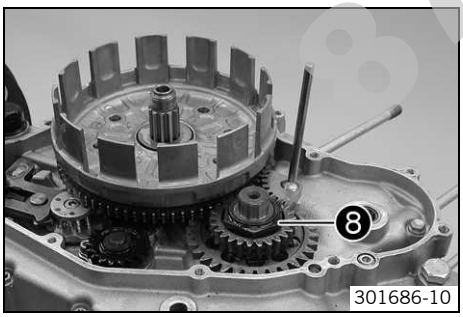
– Remove the special tool.

Engine blocking screw (77329010000) (☛ p. 231)

– Bend open lock washer ❺.
– Hold the inner clutch hub with special tool ❻ and remove nut ❼ with the lock washer.

Clutch holder (77329003000) (☛ p. 231)

– Take off the inner clutch hub.

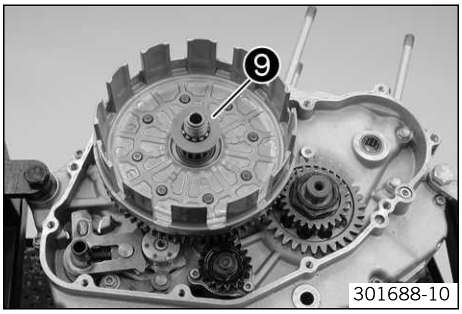


– Lock the outer clutch hub and primary gear using the special tool.

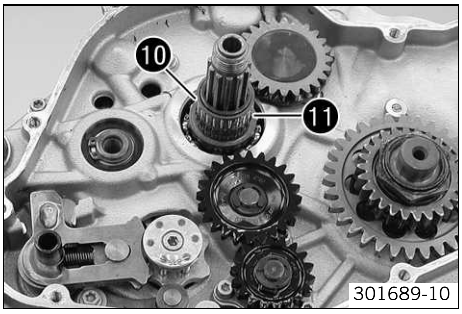
Gear quadrant (80029004000) (☛ p. 233)

– Loosen nut ❽ with the special tool.

Special socket, 36 mm; ½" drive (77329021000) (☛ p. 231)

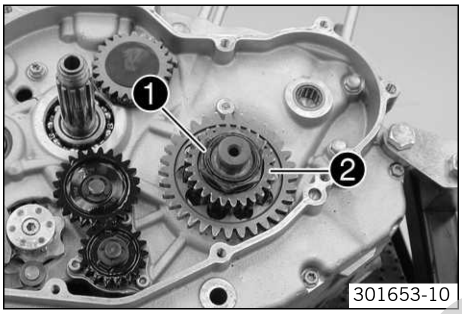


- Take off washer ❾.
- Take off the outer clutch hub.

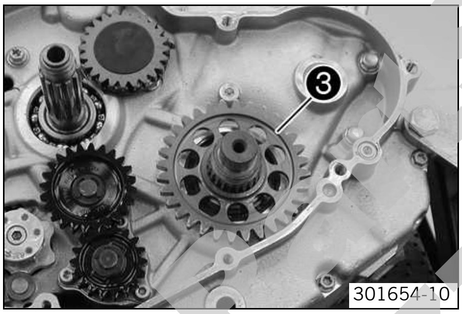


- Remove needle bearing ❿ and collar sleeve ⓫.

Removing the primary gear

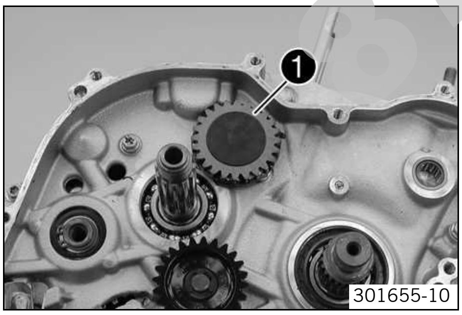


- Remove nut ❶.
- Take off primary gear ❷.



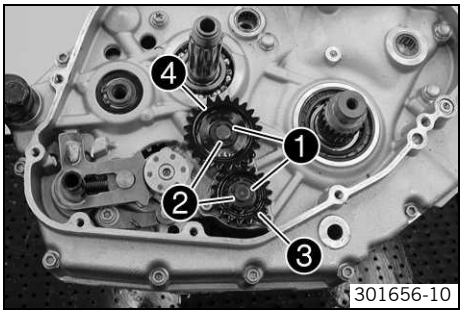
- Remove the drive wheel of balancer shaft ❸.

Removing the centrifugal separator

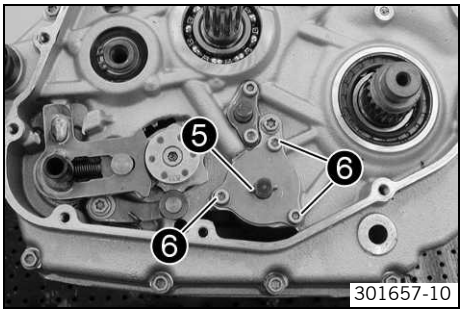


- Take off centrifugal separator ❶.

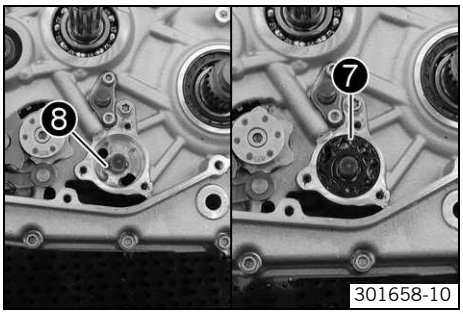
Removing the suction pump



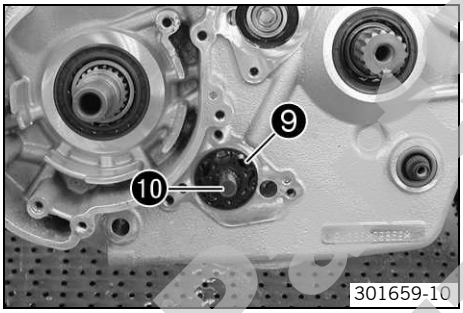
- Remove the shaft locking device ❶.
- Take off washers ❷.
- Remove oil pump gear ❸ and oil pump idler gear ❹ with the bearing.



- Remove pin ❺.
- Remove screws ❻.
- Take off the oil pump cover.

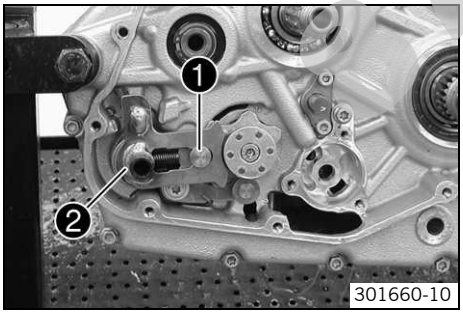


- Remove suction pump ❼.
- Remove pin ❽.



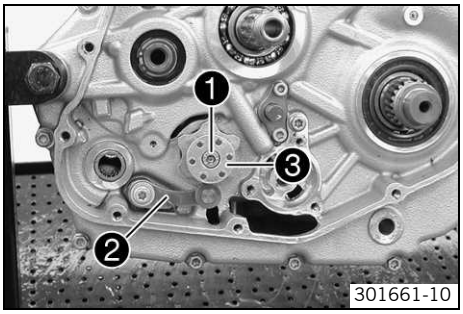
- Remove suction pump ❾ with the needle roller and oil pump shaft ❿.

Removing the shift shaft



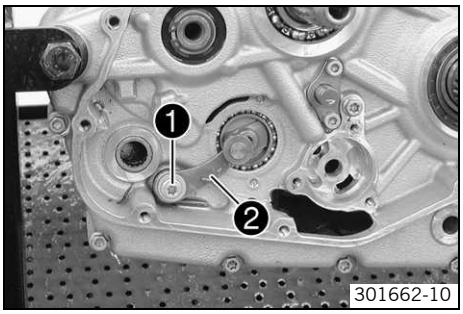
- Push sliding plate ❶ away from the shift drum locating unit.
- Remove shift shaft ❷ with the washer.

Removing the shift drum locating unit



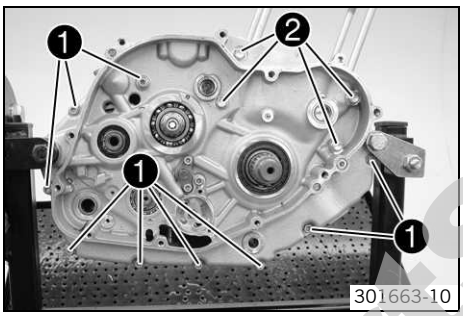
– Remove screw ❶.
– Push away locking lever ❷ from shift drum locating unit ❸ and remove the shift drum locating unit.
– Relieve tension from the locking lever.

Removing the locking lever

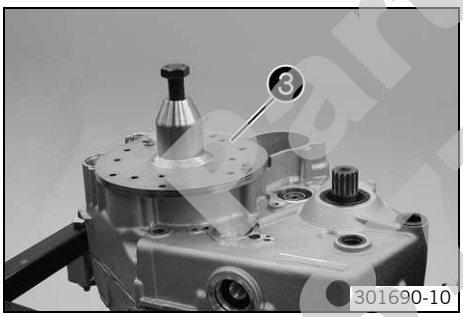


– Unscrew ❶ and remove together with locking lever ❷, washer, sleeve and spring.

Removing the left section of the engine case



– Remove screws ❶.
– Remove screws ❷.
– Tilt the left section of the engine case upward and remove the threaded fasteners of the engine fixing arm.



– Insert the special tool into the crankshaft.

Protection cover (75029090000) (☛ p. 230)

– Mount special tool ❸ with the appropriate screws.

Extractor (83529048000) (☛ p. 237)

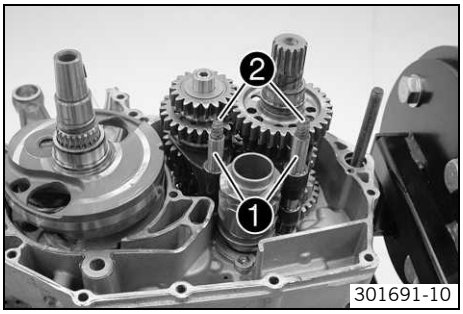
Info
Use the drill hole marked with **835**.

– Take off the section of the engine case.

Info
Do not subject the section of the engine case to any stress.
The washer of the main shaft usually adheres to the bearing.

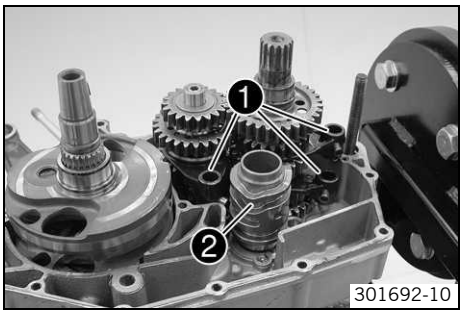
– Take off the left section of the engine case.
– Remove the special tool.

Removing the shift rails



– Remove shift rails ❶ together with upper springs ❷ and the lower springs.

Removing the shift drum

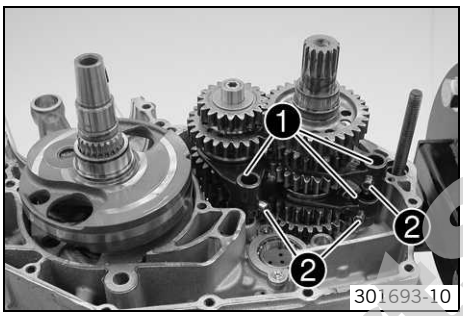


– Tilt shift forks ❶ to the side.

Info
Do not misplace the shift rollers.

– Remove shift drum ❷.

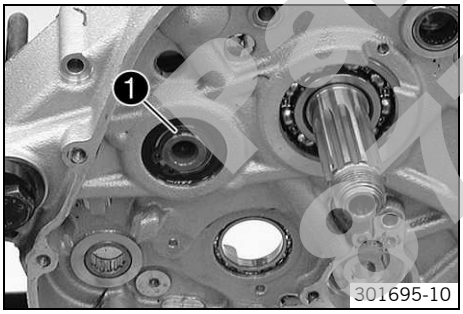
Removing the shift forks



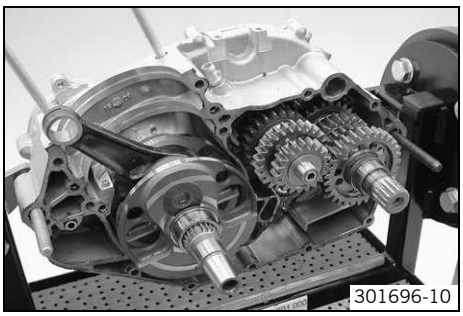
– Remove shift forks ❶.

Info
Do not misplace shift rollers ❷.

Removing the transmission shafts



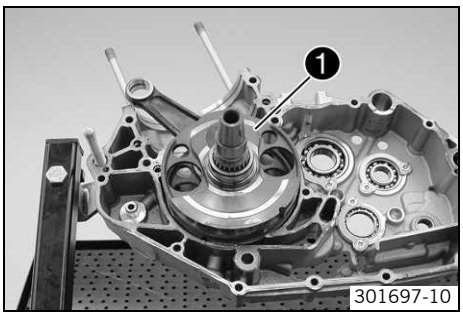
– Secure the engine in an upright position.
– Remove lock ring ❶.



– Pull out both transmission shafts together from the bearing seats.

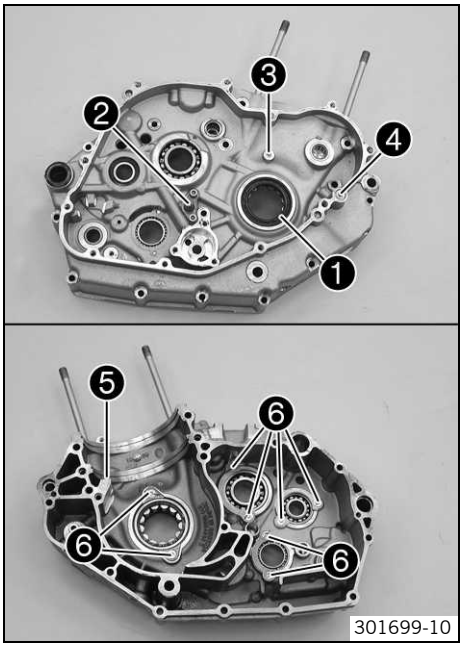
Info
Do not misplace the washers.

Removing the crankshaft



– Take out crankshaft ❶.
– Take off the right section of the engine case.

Working on the right section of the engine case



– Remove all dowels.
– Remove shaft seal ring ❶ of the crankshaft.
– Remove the screws of bearing bolt ❷.
– Take off bearing bolt ❷ with the lock washer.
– Remove jet ❸.
– Remove oil jet ❹ for conrod bearing lubrication.
– Remove oil jet ❺ for piston cooling.
– Remove screws ❻. Remove the bearing retainers.
– Remove the rest of the sealing compound and thoroughly clean the section of the engine case.
– Warm the section of the engine case in 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.

– 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 to 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.

– Mount the dowels.
– Press in shaft seal ring ❶ of the crankshaft with the open side facing out so it is flush.
– Position bearing bolt ❷ with the lock washer.
– Mount and tighten the screws of bearing bolt ❷.

Guideline

Screw, bearing bolt of oil pump idler shaft	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

– Mount and tighten jet ❸.

Guideline

Jet, engine case breather	M4	On block	**Loctite® 243™**

– Mount and tighten oil jet ❹ for conrod lubrication.

Guideline

Oil jet for conrod lubrication	M4	4 Nm (3 lbf ft)	**Loctite® 243™**

– Mount and tighten oil jet ❺ for piston cooling.

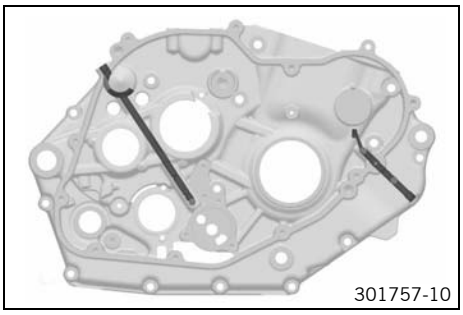
Guideline

Oil jet, piston cooling	M4	4 Nm (3 lbf ft)	**Loctite® 243™**

– Position all bearing retainers.
– Mount and tighten screws ❻.

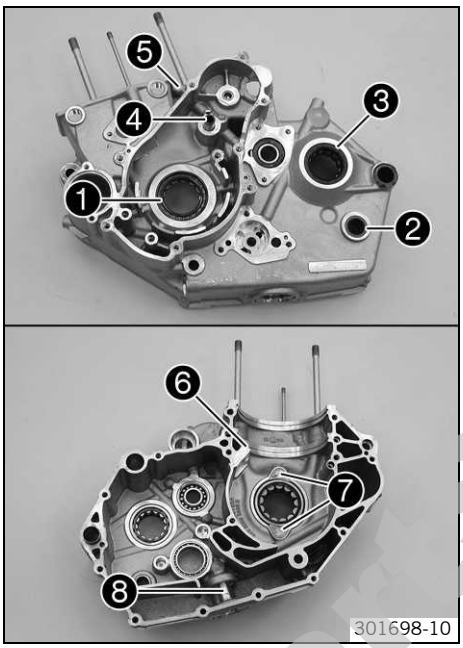
Guideline

Locking screw for bearing	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**


301757-10

– Blow out the oil channel with compressed air and check that it is clear.

Working on the left section of the engine case



301698-10

– Remove all dowels.
– Remove shaft seal ring ❶ of the crankshaft, shift shaft ❷ and countershaft ❸.
– Remove bearing bolt ❹.
– Remove oil jet ❺ in the oil channel.
– Remove oil jet ❻ for piston cooling.
– Remove screws ❼. Remove the bearing retainers.
– Remove oil suction pipe ❽.
– Remove the rest of the sealing compound and thoroughly clean the section of the engine case.
– Warm the section of the engine case in 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.

– 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.

– Insert bearing bolt ❹.
– 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.

– Mount the dowels.
– Press in shaft seal ring ❶ of the crankshaft so it is flush with the open side facing out.
– Press in shaft seal ring ❷ of the shift shaft so it is flush with the open side facing in.

– Press in shaft seal ring ❸ of the countershaft so it is flush with the open side facing in.
– Mount and tighten oil jet ❺ in the oil channel.

Guideline

Oil jet, clutch oil supply	M5x1	6 Nm (4.4 lbf ft)	**Loctite® 243™**

– Mount and tighten oil jet ❻ for piston cooling.

Guideline

Oil jet, piston cooling	M4	4 Nm (3 lbf ft)	**Loctite® 243™**

– Position all bearing retainers.
– Mount and tighten screws ❼.

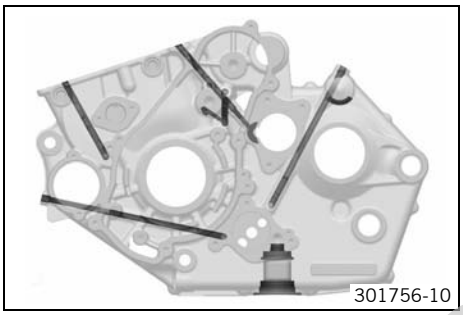
Guideline

Locking screw for bearing	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

– Mount and tighten oil suction pipe ❽.

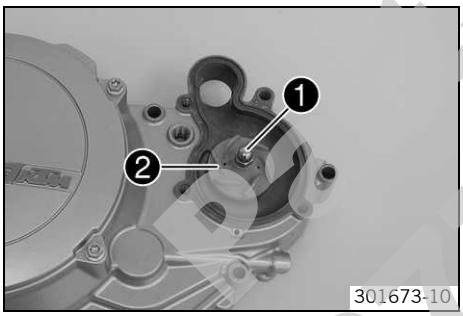
Guideline

Oil suction pipe	M14x1	15 Nm (11.1 lbf ft)	**Loctite® 243™**


301756-10

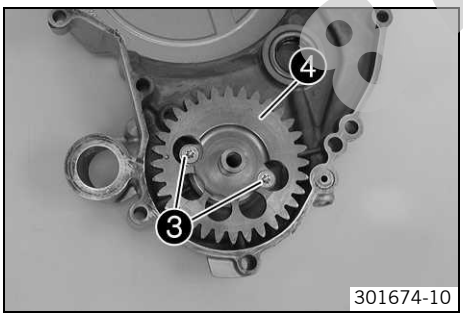
– Blow out the oil channel with compressed air and check that it is clear.

Removing the water pump



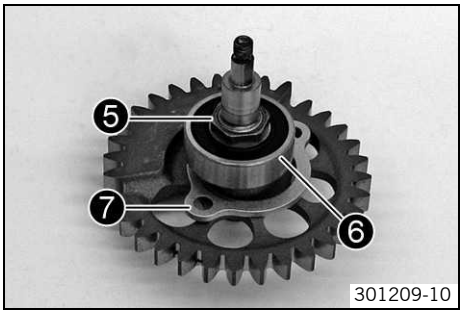
301673-10

– Remove nut ❶.
– Take off the water pump impeller ❷.



301674-10

– Remove screws ❸.
– Press out balancer shaft gear ❹ with the bearing.

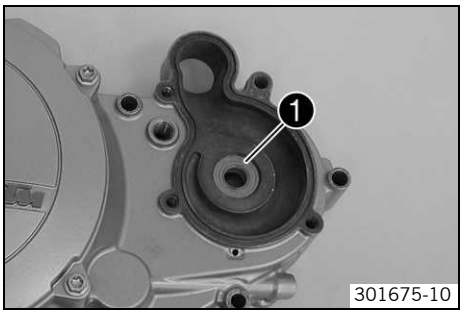


– Remove nut ❺.
– Pull off bearing ❻.

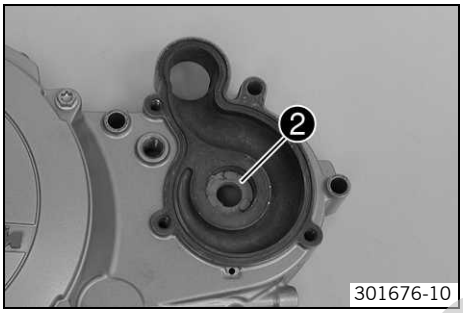
Extractor (59029033000) (☛ p. 229)

– Remove retaining bracket ❼.

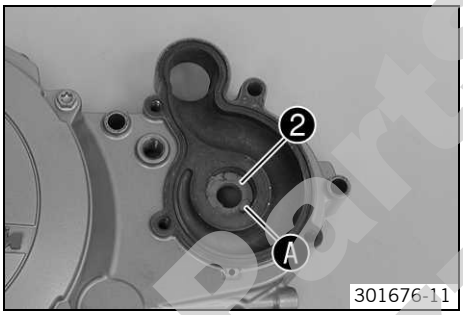
Changing the shaft seal ring of the water pump



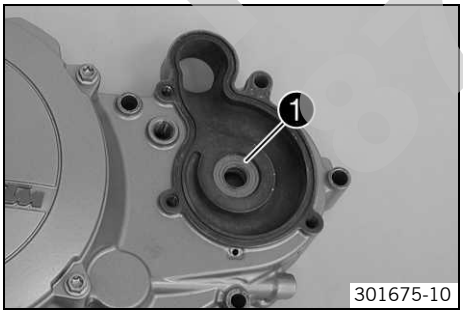
– Remove shaft seal ring ❶.



– Remove shaft seal ring ❷.

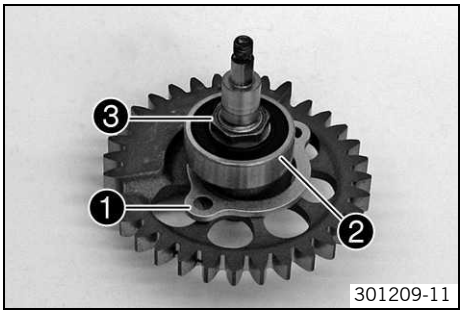


– Press in shaft seal ring ❷ all the way, with the open side facing inward.
✓ Distance pieces Ⓐ face outward.



– Press shaft seal ring ❶, with the open side facing inward, all the way in toward distance pieces Ⓐ.

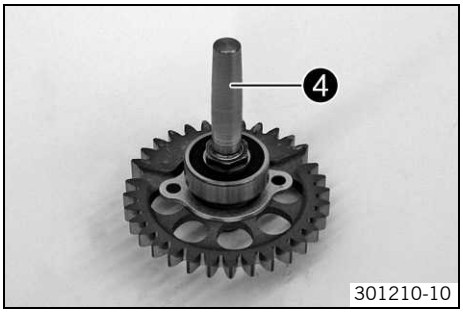
Installing the water pump



– Position retaining bracket ❶.
– Press bearing ❷ in place.
– Mount and tighten nut ❸.

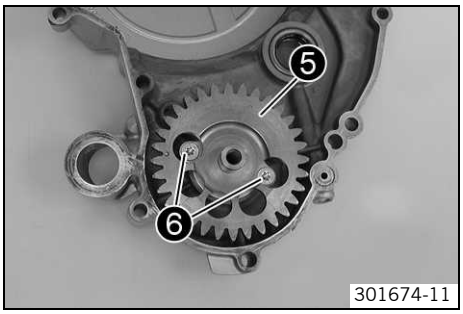
Guideline

Nut, compensating sprocket	M14x1	20 Nm (14.8 lbf ft)	**Loctite® 243™**



– Mount special tool ❹.

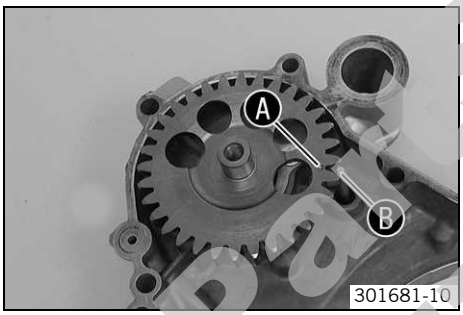
Mounting sleeve (58529005000) (☛ p. 228)



– Press balancer gear ❺ into the clutch cover.
– Position the retaining bracket.
– Mount and tighten screws ❻.

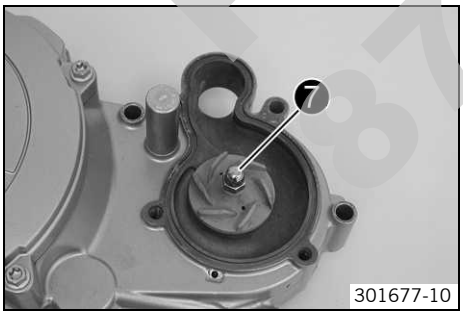
Guideline

Locking screw for bearing	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**



– Align marking ❹ with special tool ❸.

Assembly pin (77329012100) (☛ p. 231)

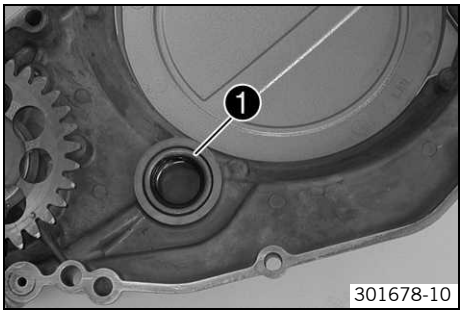


– Mount and tighten nut ❼.

Guideline

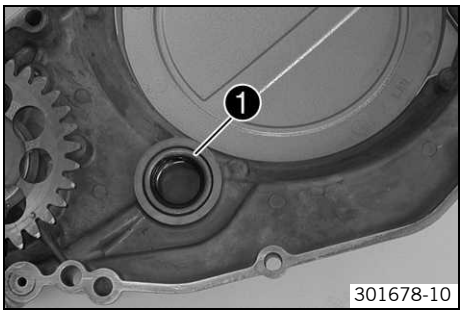
Nut, water-pump wheel	M6	6 Nm (4.4 lbf ft)	**Loctite® 243™**

Removing the crankshaft seal ring in the clutch cover



– Remove shaft seal ring ❶ of the crankshaft.

Installing the crankshaft seal ring in the clutch cover

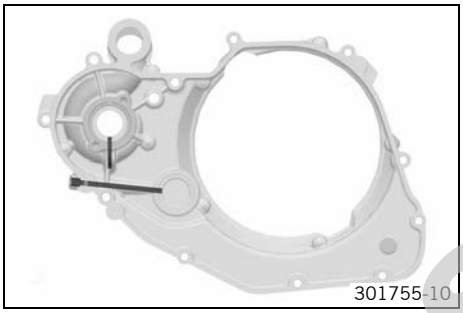


– Press in shaft seal ring ❶ all the way, with the open side facing inward.

Info
Support the clutch cover properly when pressing in.

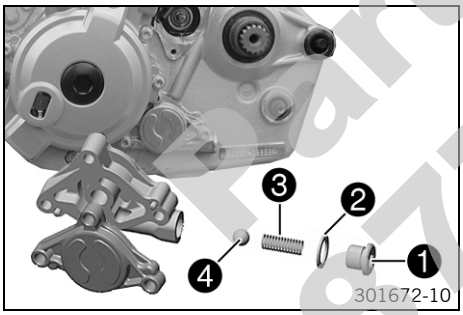
– Grease the sealing lip.

Long-life grease (☛ p. 225)



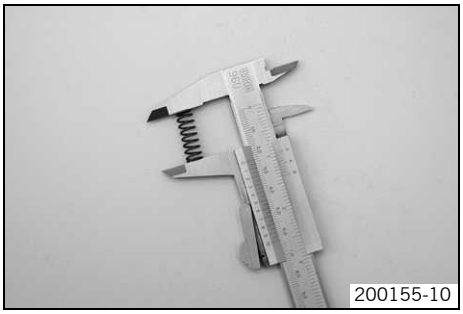
– Blow out the oil channel with compressed air and check that it is clear.

Removing the oil pressure regulator valve



– Remove screw plug ❶ with sealing washer ❷.
– Remove pressure spring ❸ and ball ❹.

Checking spring length of oil pressure regulator valve

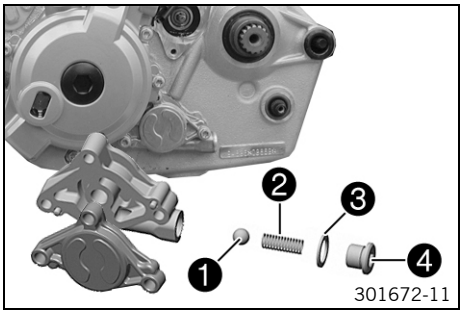


– Remove the oil pressure regulator valve. (☛ p. 123)
– Measure the spring length of the oil pressure regulator valve.

Oil pressure regulator valve	
Minimum length of pressure spring	38.5 mm (1.516 in)

» If the measured value does not meet specifications:
  – Change the spring.
– Install the oil pressure regulator valve. (☛ p. 124)

Installing the oil pressure regulator valve

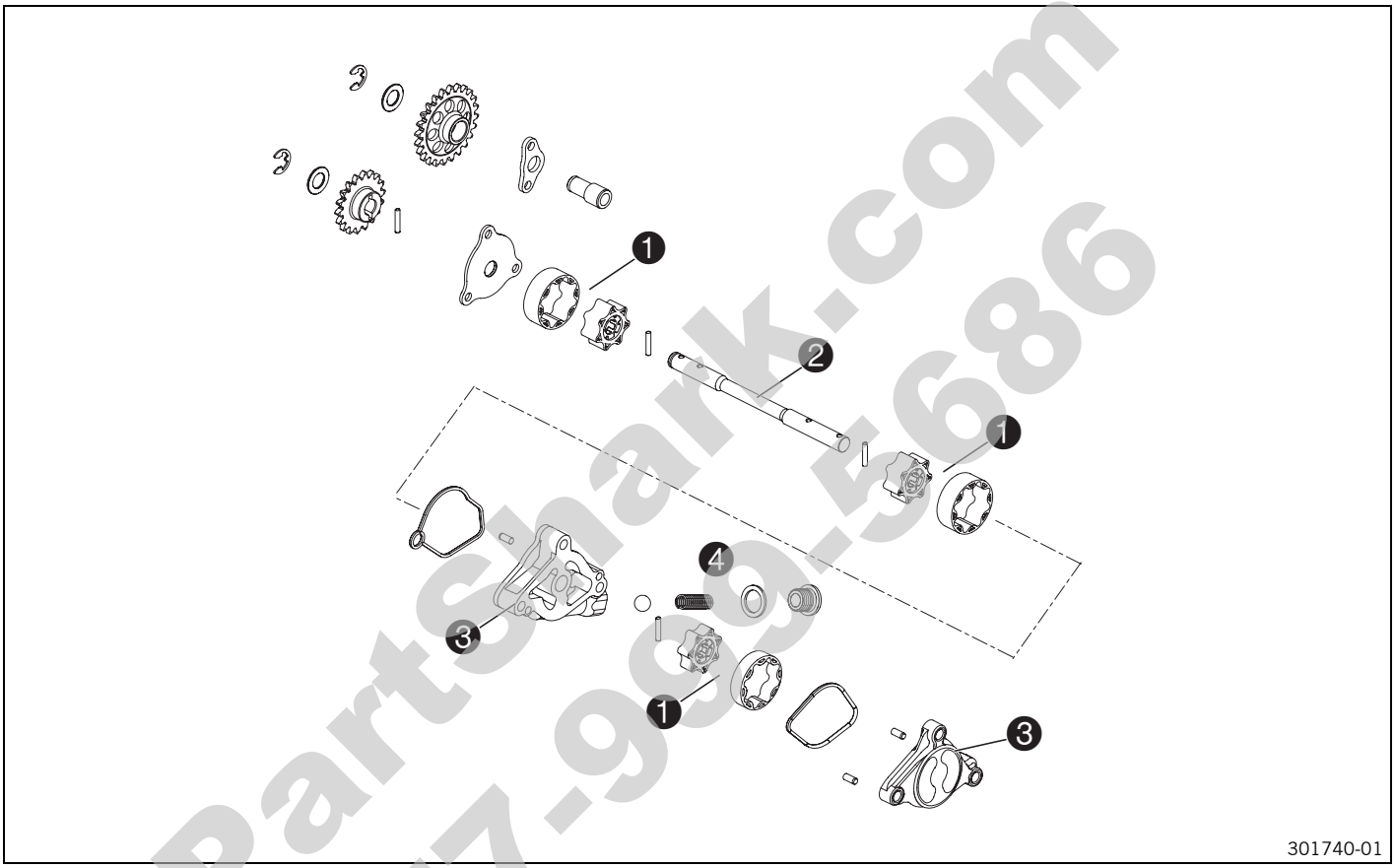


– Install ball ❶ and pressure spring ❷.
– Mount and tighten screw plug ❹ with sealing washer ❸.

Guideline

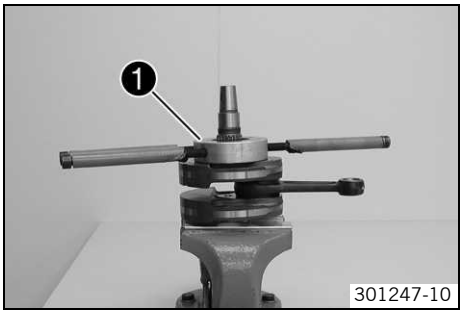
Oil pressure regulator valve plug	M14x1.5	18 Nm (13.3 lbf ft)

Checking the lubrication system



– Check the internal rotor and external rotor of oil pumps ❶ for damage and wear.
  » If there is damage or wear:
    – Change the oil pumps.
– Check oil pump shaft ❷ for damage and wear.
  » If there is damage or wear:
    – Change the oil pump shaft.
– Check oil pump housing ❸ and oil pressure regulator valve ❹ for damage and wear.
  » If there is damage or wear:
    – Change the oil pump housing, oil pressure regulator valve and, if necessary, the engine case.
– Check the oil pump cover for damage and wear.
  » If there is damage or wear:
    – Change the oil pump cover.

Removing the crankshaft bearing inner race



– Fix the crankshaft in the vise.

Info
Use soft jaws.

– Warm up special tool ❶.

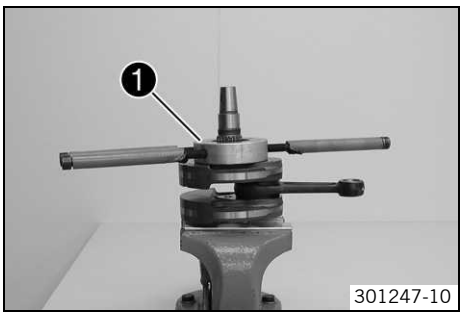
Guideline

150 °C (302 °F)

Tool for inner bearing race (58429037037) (☛ p. 228)

– Push the warmed up special tool ❶ onto the crankshaft bearing inner race, press firmly together and pull jointly from the crankshaft.
– Take off the compensating disk.
– Repeat these steps on the opposite side.

Installing the crankshaft bearing inner race



– Fix the crankshaft in the vise.

Info
Use soft jaws.

– Slide on the compensating disk.
– Heat the crankshaft bearing inner race in special tool ❶ and mount together.

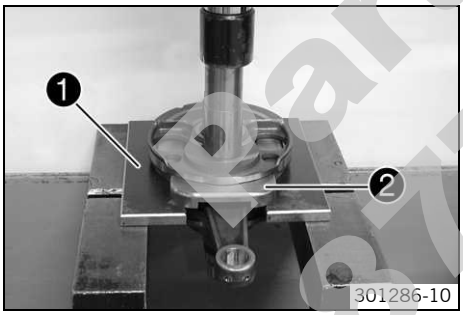
Guideline

120 °C (248 °F)

– Repeat these steps on the opposite side.
– Ensure that the new crankshaft bearing inner race is flush.

Info
After replacing the crankshaft bearings, the crankshaft end play must be measured.

Changing connecting rod, conrod bearing and crank pin



– Position the crankshaft in the press with the special tool ❶.

Extrude plate, base (77629009001) (☛ p. 233)

– Position the special tool ❷ between the crank webs.

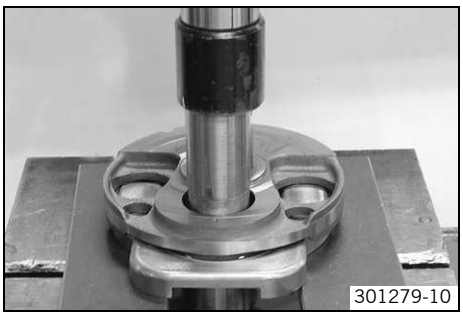
Extrude plate, top (77629009002) (☛ p. 233)

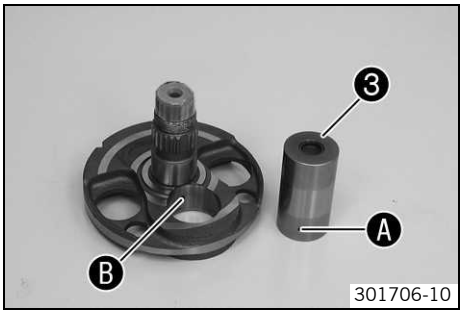
– Press the crank pin with the special tool out of the upper crank web.

Pressing device for crankshaft, complete (75029047000) (☛ p. 230)

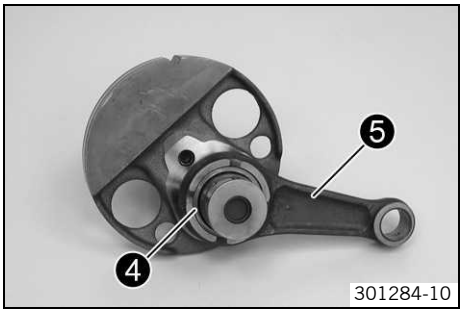
Info
Hold the lower crank web.

– Remove the connecting rod and bearing.
– Press the crank pin out of the lower crank web.



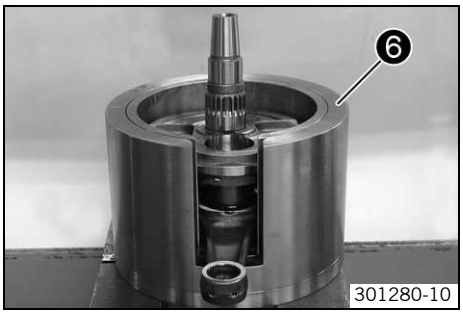


– Press in the new crank pin ❸ as far as possible.
  ✓ Oil hole Ⓐ is aligned with oil hole Ⓑ.
  ✗ If the oil holes are not correctly aligned, the conrod bearing will not be supplied with oil.
– Use compressed air to check that the oil hole is clear.



– Mount the new bearing ❹ and connecting rod ❺.

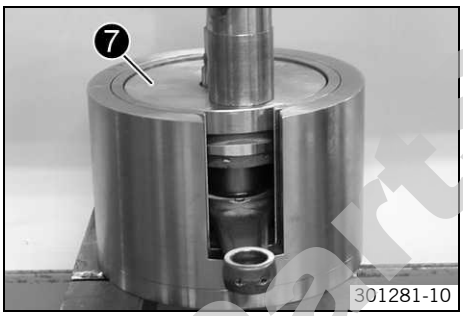
Info
Thoroughly oil the bearing.



– Position the special tool ❻ on the press.

Pressing device for crankshaft, complete (75029047000) (☛ p. 230)
Pressing tool, crankshaft (77629008000) (☛ p. 233)

– Insert the crank web with connecting rod and bearing. Position the second crank web.



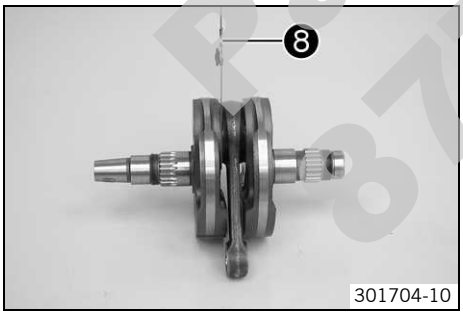
– Position the special tool ❼ with the heel pointing down.

Pressing tool, crankshaft (77629008000) (☛ p. 233)

– Press in the upper crank web as far as possible.

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.



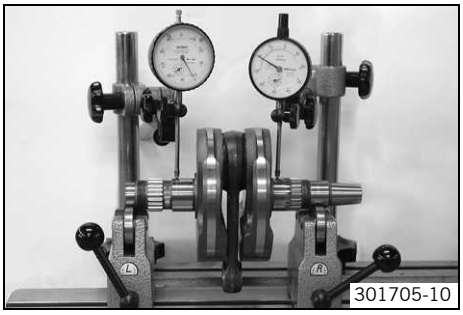
– Measure the end play between the connecting rod and the crank webs with the special tool ❽.

Feeler gauge (59029041100) (☛ p. 229)

Connecting rod - end play of lower conrod bearing	0.40... 0.60 mm (0.0157... 0.0236 in)

» If the 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. 126)

Checking crankshaft run-out at bearing pin



– Position the crankshaft on a roller block.
– Turn the crankshaft slowly.
– Check the crankshaft run-out on both bearing pins.

Crankshaft - run-out at bearing pin	≤ 0.10 mm (≤ 0.0039 in)

» If the crankshaft run-out at the bearing pin is larger than the specification:
  – Align the crankshaft.

Measuring the crankshaft end play


301214-10

– Insert the crankshaft in the right section of the engine case.

> **Info**
> Do not forget the fitted bushings.

– Mount the left section of the engine case.
– Mount and tighten the screws.

Guideline

Screw, engine case	M6	10 Nm (7.4 lbf ft)
Screw, engine case	M7x1	14 Nm (10.3 lbf ft)

– Mount the dial gauge support on the engine case, and measure and note the crankshaft end play.

Guideline

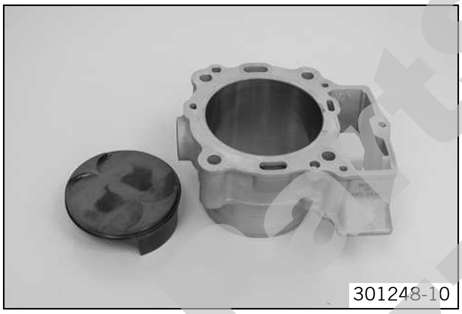
Crankshaft - end play	0.25… 0.35 mm (0.0098… 0.0138 in)

» If the measured value does not meet specifications:
  – Remove the crankshaft.
  – Remove the crankshaft bearing inner race. (☛ p. 125)
  – Determine the thickness of the compensating disks by calculating.
  – Add or subtract compensating disks equally on both sides.

> **Info**
> If the end play is too small, compensating disks must be removed.
> If the end play is too large, compensating disks must be added.

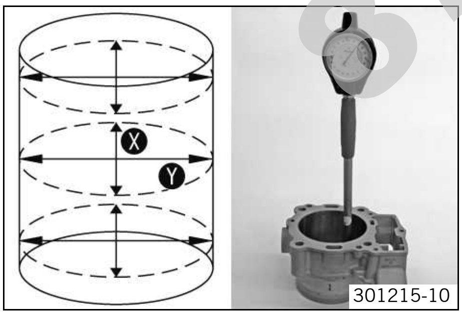
  – Install the crankshaft bearing inner race. (☛ p. 125)

Cylinder - Nikasil® coating


301248-10

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

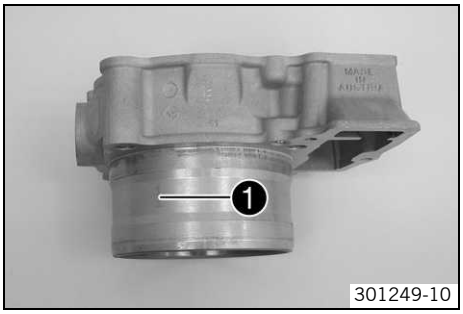


301215-10

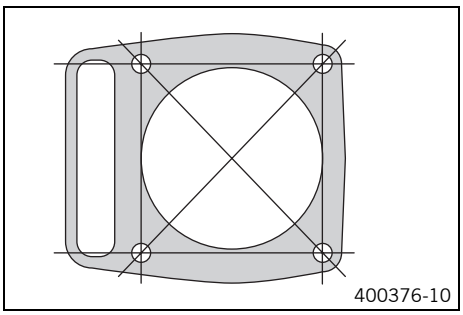
– Check the cylinder bearing surface for damage.
  » If the cylinder bearing surface is damaged:
    – Change the cylinder and piston.
– Measure the cylinder diameter at several locations on the ⓧ- and ⓨ-axes using a micrometer to identify oval wear.

Guideline

Cylinder - drill hole diameter (450 SX ATV)	
Size I	97.000… 97.012 mm (3.81889… 3.81936 in)
Size II	97.013… 97.025 mm (3.8194… 3.81987 in)
Cylinder - drill hole diameter (505 SX ATV)	
Size I	100.000… 100.012 mm (3.937… 3.93747 in)
Size II	100.013… 100.025 mm (3.93751… 3.93798 in)



– The cylinder size ❶ is marked on the cylinder collar.



– Using a straightedge and the special tool, check the sealing area of the cylinder head for distortion.

Feeler gauge (59029041100) (☛ p. 229)

Cylinder/cylinder head - distortion of sealing area	≤ 0.10 mm (≤ 0.0039 in)

» If the measured value does not meet specifications:
– Change the cylinder.

Checking/measuring the piston

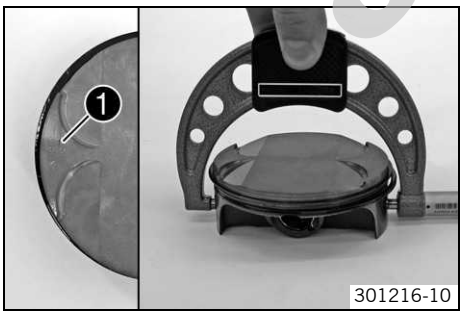
– Check the piston sliding surface for damage.
» If the piston sliding surface is damaged:
– Replace the piston and, if necessary, the cylinder.
– Check that the piston rings move easily in the piston ring grooves.
» If a piston ring exhibits excessive resistance:
– Clean the piston ring groove.

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.



– Measure the pistons at the piston skirt, perpendicular to the piston pin.

Guideline

Piston - diameter (450 SX ATV)	
Size I	96.960... 96.970 mm (3.81732... 3.81771 in)
Size II	96.971... 96.980 mm (3.81775... 3.8181 in)
Piston - diameter (505 SX ATV)	
Size I	99.960... 99.970 mm (3.93543... 3.93582 in)
Size II	99.971... 99.980 mm (3.93586... 3.93621 in)

Info
Piston dimensions ❶ are marked on the piston head.

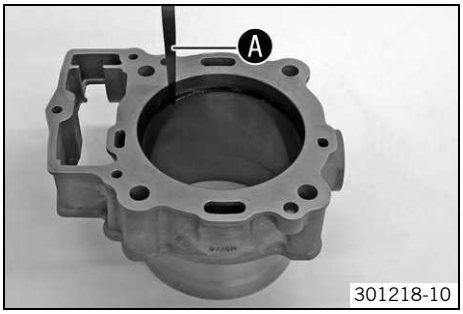
Measuring piston/cylinder mounting clearance

– Check/measure the cylinder. (☛ p. 127)
– Check/measure the piston. (☛ p. 128)
– 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	0.030... 0.052 mm (0.00118... 0.00205 in)
Size II	0.032... 0.054 mm (0.00126... 0.00213 in)
Wear limit	0.070 mm (0.00276 in)

Checking the piston ring end gap



– Remove the piston ring from the piston.
– Place the piston ring in the cylinder and align with the piston.

Guideline

Below the upper edge of the cylinder	10 mm (0.39 in)

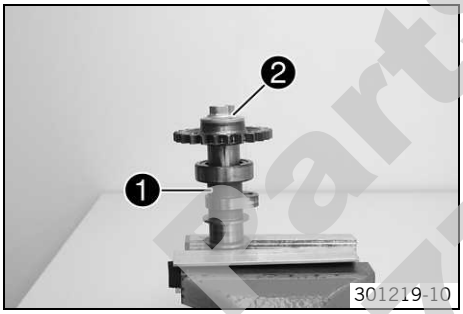
– Measure the end gap with feeler gauge Ⓐ.

Guideline

Piston ring - end gap	
Compression ring	≤ 0.80 mm (≤ 0.0315 in)
Oil scraper ring	≤ 1.00 mm (≤ 0.0394 in)

» If the end gap is greater than the specified measurement:
– Check/measure the cylinder. (☛ p. 127)
» If cylinder wear lies within the specified tolerance:
– Replace the piston ring.
– Mount the piston ring with the marking facing toward the piston head.

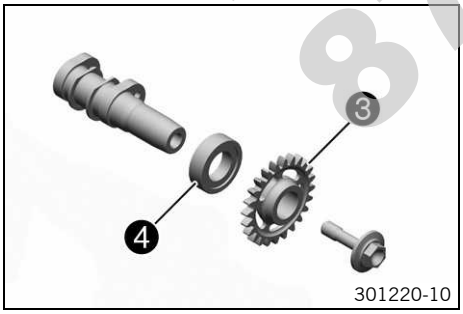
Changing the camshaft bearing



– Clamp camshaft ❶ into a vise.

Info
Protect the outer cam of the camshaft against damage with an adhesive tape.
Use soft jaws.

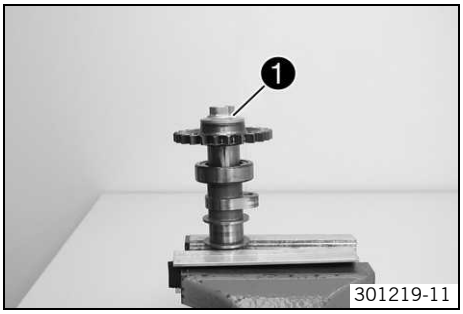
– Remove screw ❷.



– Force camshaft gear ❸ off the camshaft.
– Take off roller bearing ❹.
– Degrease the cone of the camshaft and camshaft gear.
– Oil roller bearing ❹ and slide it on the camshaft.

lubricated with engine oil

– Mount camshaft gear ❸.



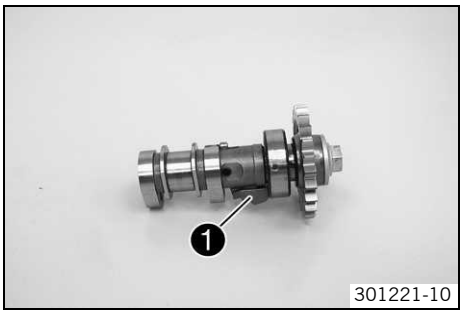
– Mount screw ❶ but do not tighten yet.

Guideline

Screw, camshaft gear	M10x1	50 Nm (36.9 lbf ft)	lubricated with engine oil

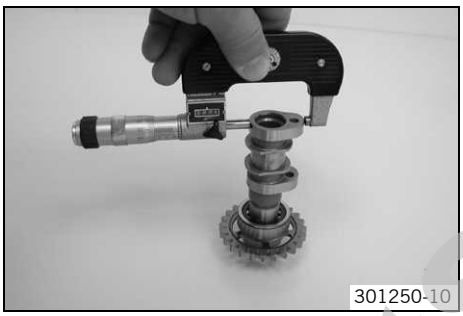
– Repeat these steps for the second camshaft.

Checking the autodecompressor



– Check the autodecompressor for damage.
  » If there is damage or wear:
    – Change the exhaust camshaft.
– Slide the camshaft bearing to the camshaft gear.
– Pull lever ❶ away from camshaft and release it.
  » If the lever does not return to its original position:
    – Change the exhaust camshaft.

Checking camshafts

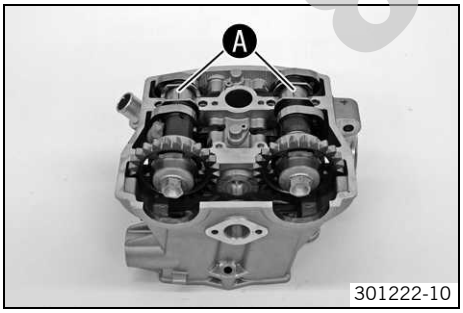


– Check the camshaft for damage and wear.
  » If there is damage or wear:
    – Change the camshaft.
    – If the surface of the cams is damaged, check the oil supply to the camshaft and cam lever.
– Measure the cams of the camshaft.

Camshaft - cam height	
Exhaust	33.10... 33.30 mm (1.3031... 1.311 in)
Camshaft - cam height (450 SX ATV)	
Intake	33.90... 34.10 mm (1.3346... 1.3425 in)
Camshaft - cam height (505 SX ATV)	
Intake	34.20... 34.40 mm (1.3465... 1.3543 in)

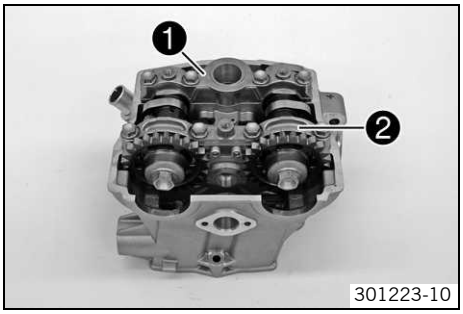
  » If the measured value does not meet specifications:
    – Change the camshaft.

Checking the radial clearance of the camshaft bearings



– Position the camshafts.
  ✔ The valves are not activated.
– Insert the **Plastigauge** clearance gauge in area ❹.

Plastigauge measuring strips (60029012000) (☛ p. 230)

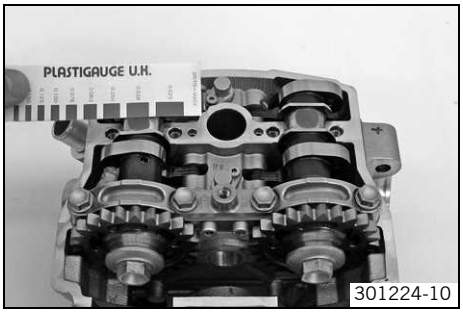


– Position camshaft bearing bridge ❶ and ❷. Mount and tighten the screws.

Guideline

Screw, camshaft bearing bridge	M7x1	14 Nm (10.3 lbf ft)	lubricated with engine oil

Info
Do not forget the O-ring and needle rollers.
Do not turn the camshaft.



– Remove camshaft bearing bridge ❶ again. Compare the **Plastigauge** clearance gauge with the specifications on the packaging.

Guideline

Camshaft bearing - radial clearance	
Radial clearance	0.029... 0.053 mm (0.00114... 0.00209 in)
Wear limit	0.055 mm (0.00217 in)

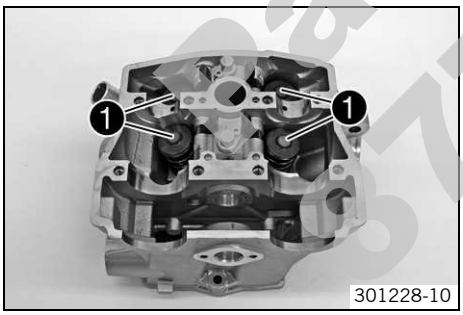
Info
The width of the **Plastigauge** clearance gauge is a measure of the bearing play.

– Remove camshaft bearing bridge ❷.
– Take off the camshafts and clean the parts.

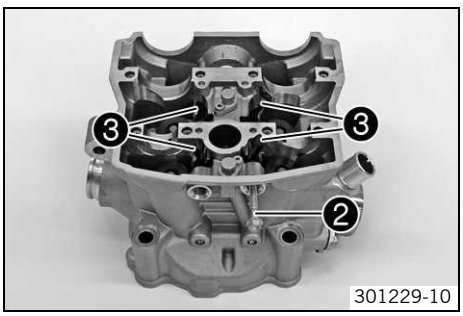
Checking the camshaft bearing bridges

– Check the camshaft bearing bridges for damage.
  » If there is damage or wear:
    – Change the cylinder head with the camshaft bearing bridge.

Removing the valves

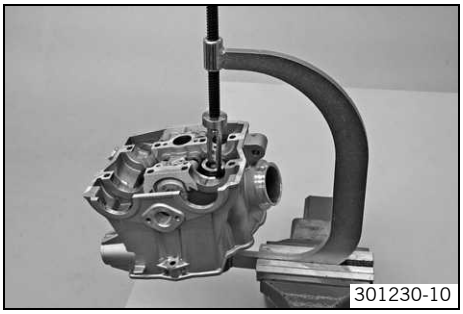


– Fold up the cam levers.
– Take shims ❶ out of the valve spring retainers and set them aside in the arrangement corresponding to their installation positions.



– Remove the screw plugs of the cam lever shaft with the O-ring.
– Turn screw ❷ into the cam lever shaft.
– Hold cam levers ❸ and remove the cam lever shafts.

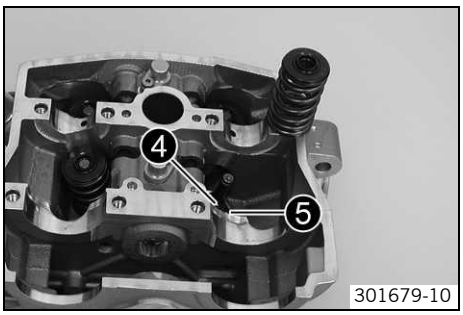
Info
If the cam levers will continue to be used, note down their installation position.


301230-10

– Pre-tension the valve springs using the special tool.

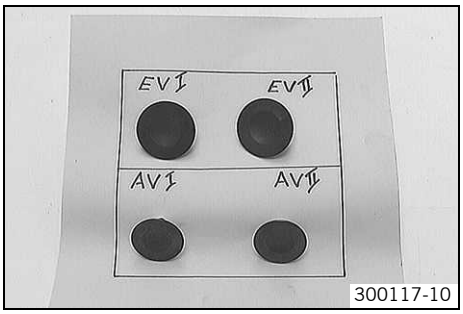
Valve spring compressor (59029019000) (☛ p. 229)
Insert for valve spring lever (77329060000) (☛ p. 232)

– Remove the valve keys and unload the valve springs.



301679-10

– Remove the valve spring retainer and valve springs.
– Pull the valve out of the valve guide from below and remove valve stem seal ❹ and valve spring seat ❺.



300117-10

– Mark the valves corresponding to their installation position.

Info
Place the valves in a carton corresponding to their installation position and label them.

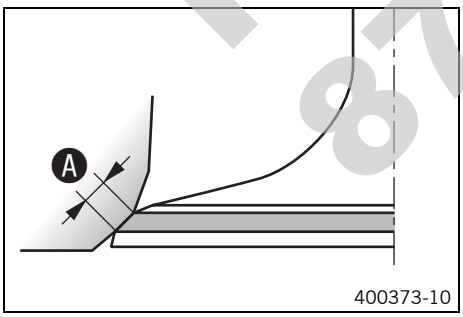
Checking the valves


200193-10

– Check the valve plate for run-out.

Valve - run-out	
At the valve plate	≤ 0.05 mm (≤ 0.002 in)

» If the measured value does not meet specifications:
– Change the valve.



400373-10

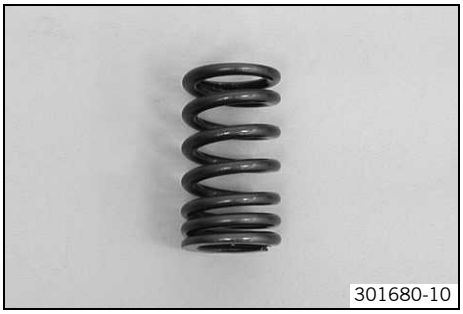
– Check sealing seat Ⓐ on the valve.

Valve - sealing seat width	
Intake	1.50 mm (0.0591 in)

Valve - sealing seat width	
Exhaust	1.50 mm (0.0591 in)

» If the sealing seat is not centered on the valve seat or deviates from the specification:
– Machine the valve seat.

Checking the valve springs

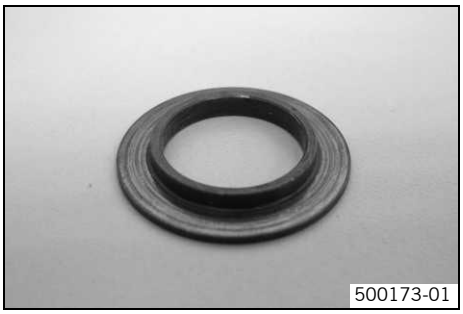

301680-10

– 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	
Minimum length	42.8 mm (1.685 in)

  » If the measured value does not meet specifications:
    – Change the valve springs.

Checking valve spring seat

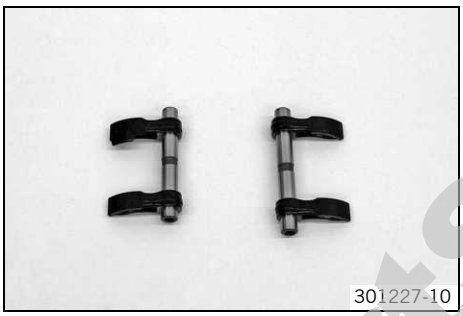

500173-01

– 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 seat - thickness	1.4... 1.5 mm (0.055... 0.059 in)

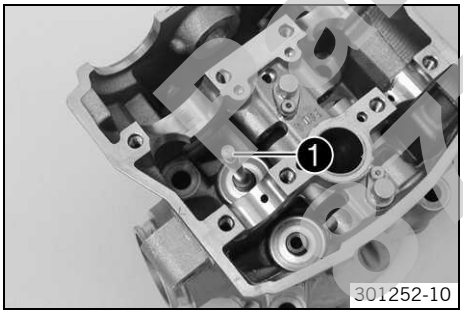
  » If the measured value does not meet specifications:
    – Change the valve spring seat.

Checking the cam levers


301227-10

– Check the cam levers and cam lever shafts for damage and wear.
  » If there is damage or wear:
    – Change the cam levers and/or cam lever shafts.

Checking cylinder head

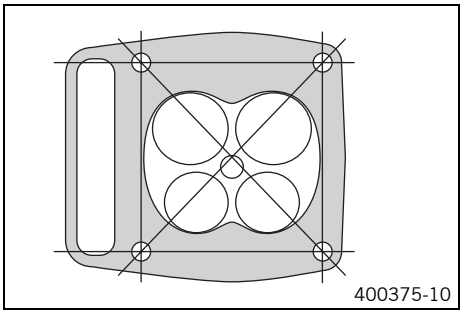


301252-10

– Check the valve guides with the special tool ❶.

Limit plug gauge (59029026006) (☛ p. 229)

  » 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 from damage and cracking.
  » If there is damage or cracking:
    – Change the cylinder head.

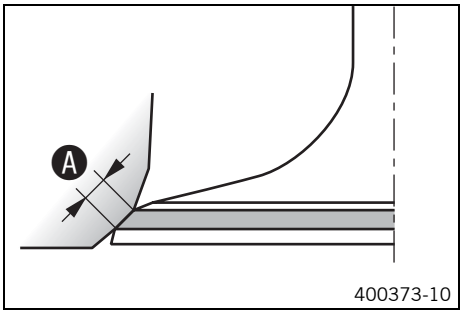

400375-10

– Using a straightedge and the special tool, check the sealing area of the cylinder for distortion.

Feeler gauge (59029041100) (☛ p. 229)

Cylinder/cylinder head - distortion of sealing area	≤ 0.10 mm (≤ 0.0039 in)

  » If the measured value does not meet specifications:
    – Change the cylinder head.



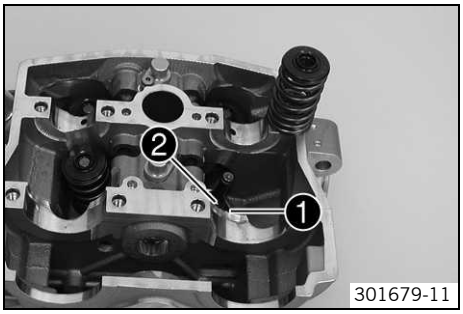
– Check sealing seat ❹ of the valves.

Valve - sealing seat width	
Intake	1.50 mm (0.0591 in)

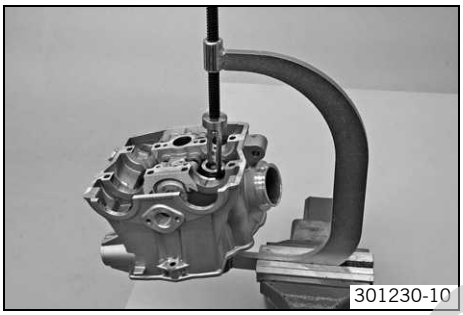
Valve - sealing seat width	
Exhaust	1.50 mm (0.0591 in)

» If the measured value does not meet specifications:
  – Machine the valve seat.
– Blow out all oil holes with compressed air and check that they are clear.

Installing the valves

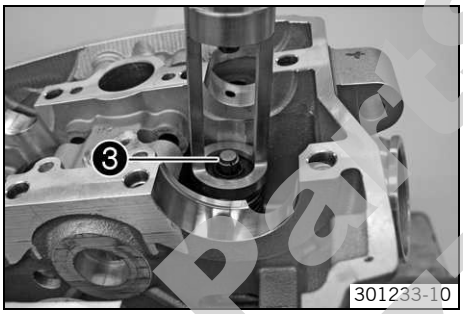


– Position valve spring seat ❶. Mount valve stem seal ❷.
– Mount the valves corresponding to their installation position.
– Mount the valve springs with the tighter coil at the bottom.
– Mount the valve spring retainers.



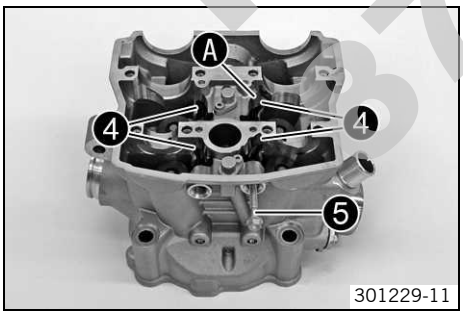
– Pre-tension the valve springs using the special tool.

Valve spring compressor (59029019000) (☛ p. 229)
Insert for valve spring lever (77329060000) (☛ p. 232)



– Mount valve keys ❸.

Info
When mounting the valve keys, ensure that they are seated properly; it is recommended to adhere the valve keys to the valves with a small amount of grease.

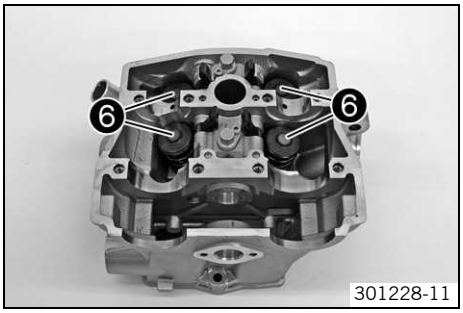


– Position cam levers ❹ in the positions they had before they were removed.

Info
Note the wider cam lever ❹ for autodecompressors.

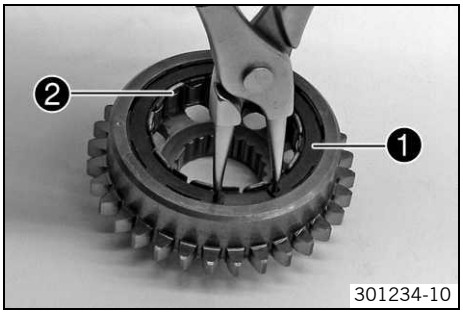
– Mount the cam lever shafts.
– Remove screw ❺.
– Mount and tighten the screw plugs.
  Guideline

Screw plug, cam lever shafts	M10x1	10 Nm (7.4 lbf ft)



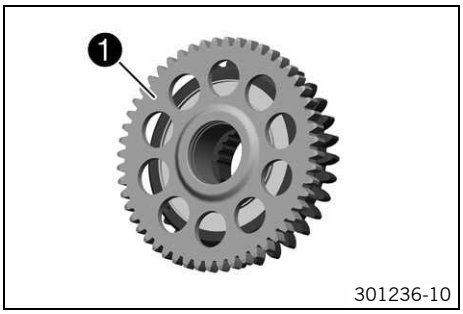
– Place the shims ❻ in the valve spring retainers in the positions they had before they were removed.

Removing the freewheel



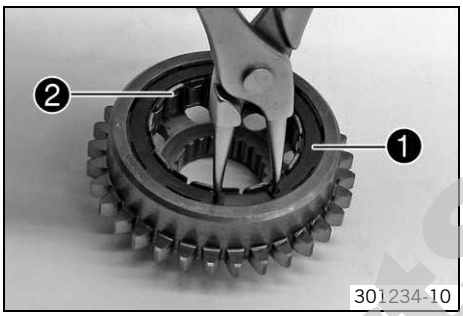
– Press expansion ring ❶ together using suitable pliers.
– Take freewheel ❷ out of the freewheel hub.

Checking the freewheel



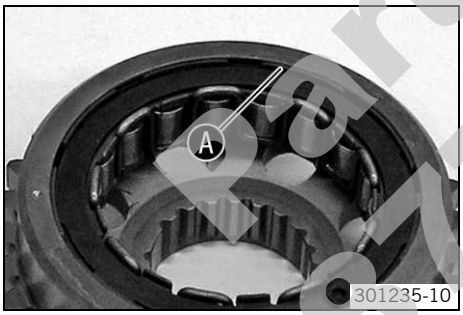
– Insert freewheel gear ❶ into the freewheel hub, turning the freewheel gear clockwise; do not wedge.
– Check the locking action of starter gear ❶.
  » If the freewheel gear does not turn clockwise or if it does not lock counterclockwise:
    – Remove the freewheel. (☛ p. 135)
    – Turn the freewheel 180°.
    – Install the free wheel. (☛ p. 135)

Installing the free wheel



– Thoroughly oil all parts.
– Pull the ends of expansion ring ❶ together.
– Slide freewheel ❷ into the freewheel hub.

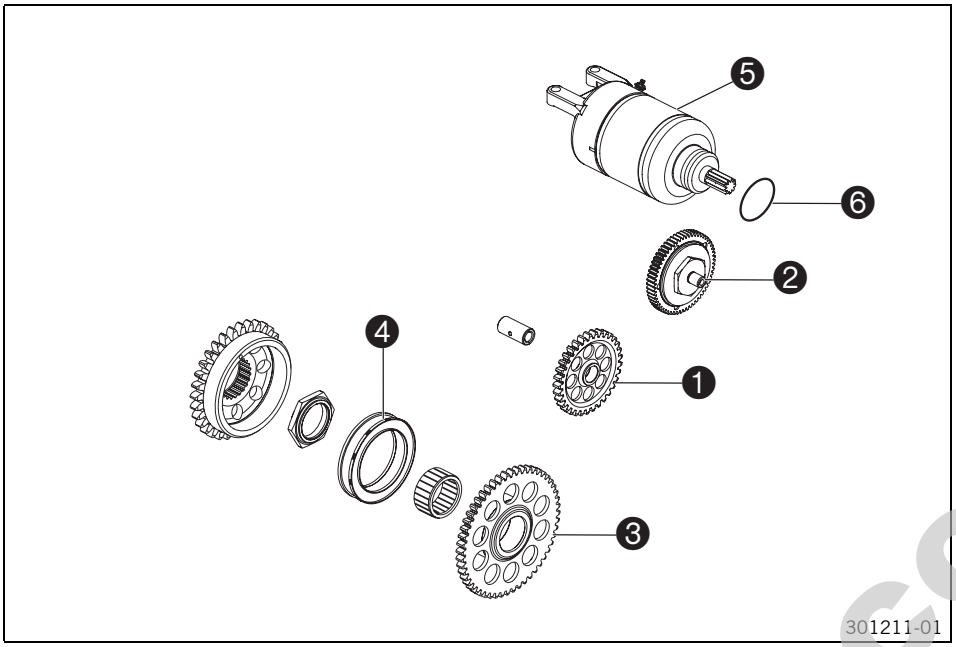
Info
Note the direction of rotation.



– Ensure that all of the tabs of the expansion ring pass through the slots Ⓐ of the freewheel.

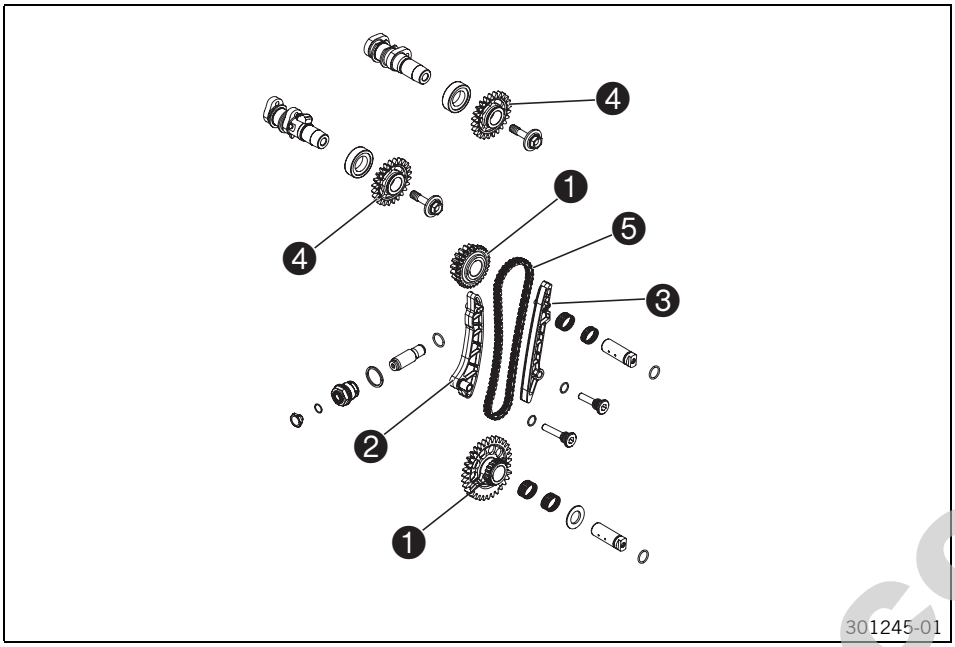
Info
If necessary, apply pressure using a screwdriver.

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 freewheel gear ❸ for damage and wear.
  » If there is damage or wear:
    – Change the freewheel 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 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.

Checking the timing assembly



- Clean all parts well.
- Check the balancer gear/double wheel ❶ for damage and wear.
  - » If there is damage or wear:
    - Change the balancer gear/double wheel.
- 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 camshaft gears ❹ for damage and wear.
  - » If there is damage or wear:
    - Change the camshaft gears.
- 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

- Press the timing chain tensioner together completely.

Info
This requires some force, as the oil must be pressed out.
Without pressure, the timing chain tensioner extends again completely.

– Place two spacing washers or similar aids next to the timing chain tensioner piston. This ensures that, when pressed in, the piston cannot go in all the way.

Guideline

Thickness of the spacing washers	2... 2.5 mm (0.08... 0.098 in)

– Release the timing chain tensioner.

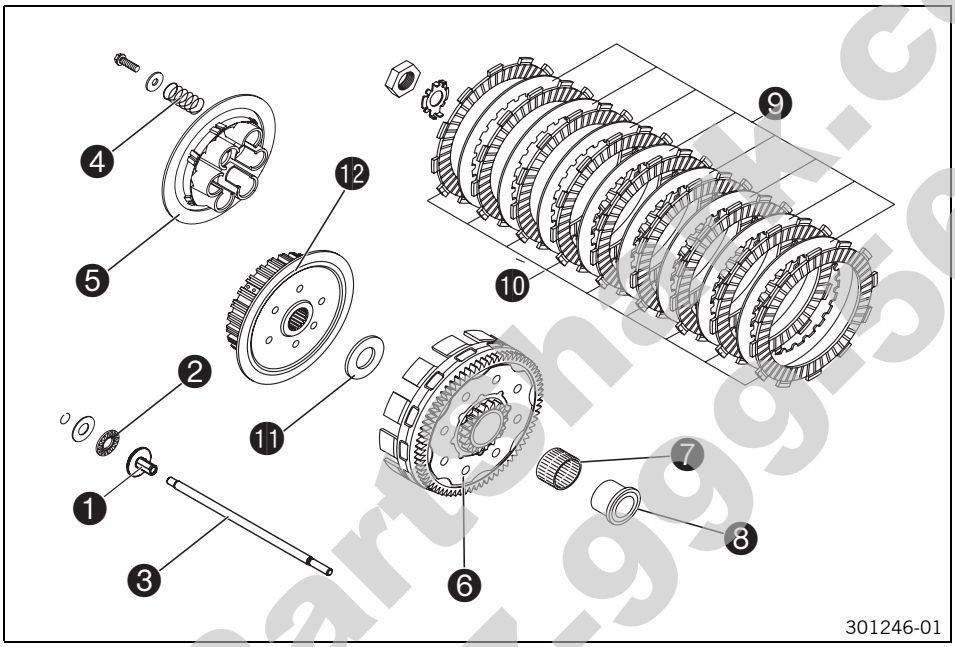
✓ The detent mechanism engages and the piston remains in place.

Final position of the piston after engagement	3 mm (0.12 in)

Info

This position is necessary for installation.
If the timing chain tensioner is now pressed again and is only extended a maximum of half way (it is prevented from extending completely), this locks the detent mechanism and the timing chain tensioner can no longer be squeezed together. This function is necessary in order to ensure sufficient timing chain tension even at low oil pressures.

Checking clutch



– 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	39.0... 40.0 mm (1.535... 1.575 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 thrust surfaces of the clutch lining discs in the outer clutch hub ❻ for wear.

Contact surface of clutch facing discs in outer clutch hub	≤ 0.5 mm (≤ 0.02 in)

» If the contact surface exhibits significant wear:
– Change the clutch lining discs and the 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 disc ❾ for damage and wear.
» If the intermediate discs are not flat or have punctiform outbreaks:
– Change all intermediate discs.

– Check clutch facing discs ❿ for discoloration and scoring.
» If there is discoloration or scoring:
– Change all clutch lining discs.

– Check the thickness of clutch facing discs ❿.

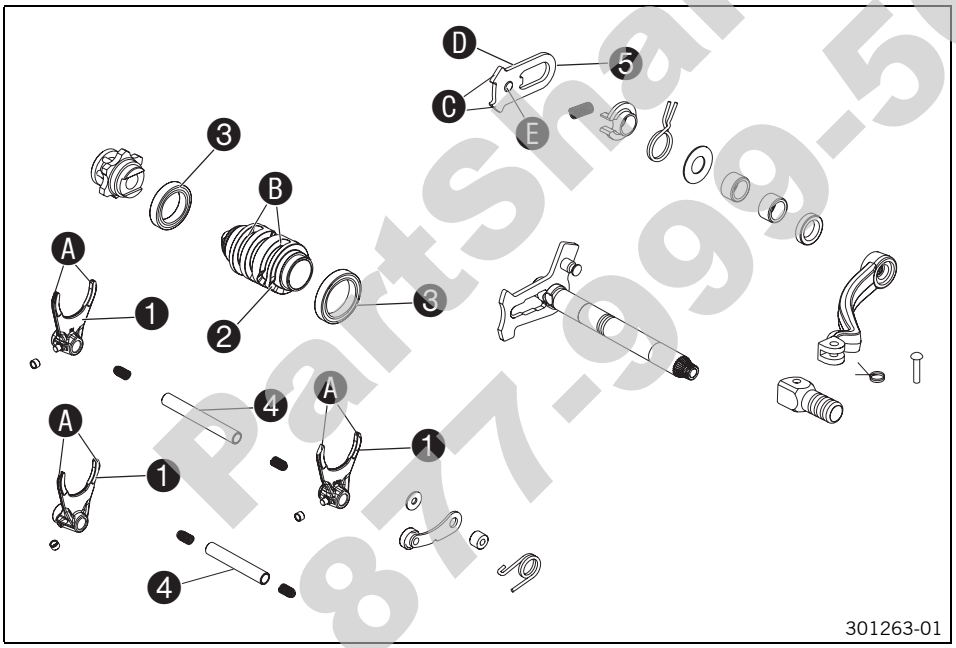
Clutch facing disk - thickness	≥ 2.6 mm (≥ 0.102 in)

» If the clutch lining disc does not meet specifications:
– Change all clutch lining discs.

– Check the disc ⓫ for damage and wear.
» If there is damage or wear:
– Change the disc.

– Check the inner clutch hub ⓬ for damage and wear.
» If there is damage or wear:
– Change the inner clutch hub.

Checking shift mechanism



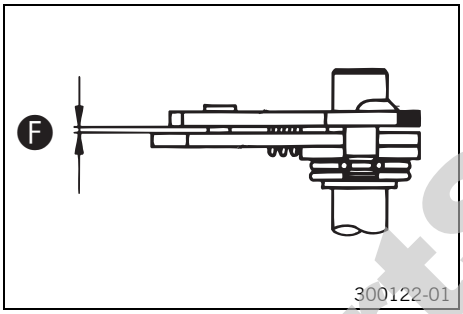
– Check the shift forks ❶ on disc Ⓐ for damage and wear (visual check).
» If there is damage or wear:
– Change the shift fork and idler/fixed wheel pair.

– Check shift grooves Ⓑ of shift drum ❷ for wear.
» If the shift groove is worn:
– Change the shift drum.

– Check the seating of the shift drum in the grooved ball bearings 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 bearings are stiff or worn:

  - Change the grooved ball bearing.
- Check the shift rollers for damage and wear.
  - » If there is damage or wear:
    - Change the shift rollers.
- Check the springs of the shift rails ❹ for damage and wear.
  - » If the spring is damaged or worn:
    - Change the spring of the shift rail.
- Check the shift rails ❹ for run-out on a flat surface.
  - » If there is run-out:
    - Change the shift rail.
- Check the shift rails for scoring, wear and smooth operation in the shift forks.
  - » If scoring or wear is present or of the shift fork is stiff:
    - Change the shift rail.
- Check sliding plate ❺ for wear on contact areas ❻.
  - » If the sliding plate is worn:
    - Change the sliding plate.
- Check return surface ❶ on the sliding plate for wear.
  - » If there is severe grooving:
    - 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. 140)

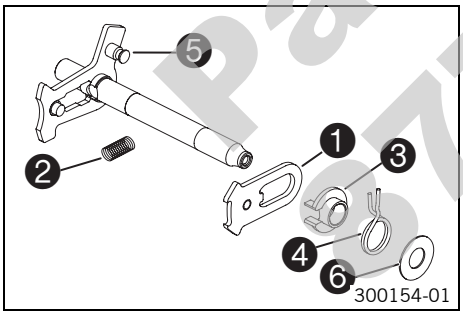


- Preassemble the shift shaft. (☛ p. 140)
- Check clearance ❼ between the sliding plate and the shift quadrant.

Shift shaft - sliding plate/shift quadrant clearance	0.40... 0.80 mm (0.0157... 0.0315 in)

  - » If the measured value does not meet specifications:
    - Change the sliding plate.

Preassembling the shift shaft



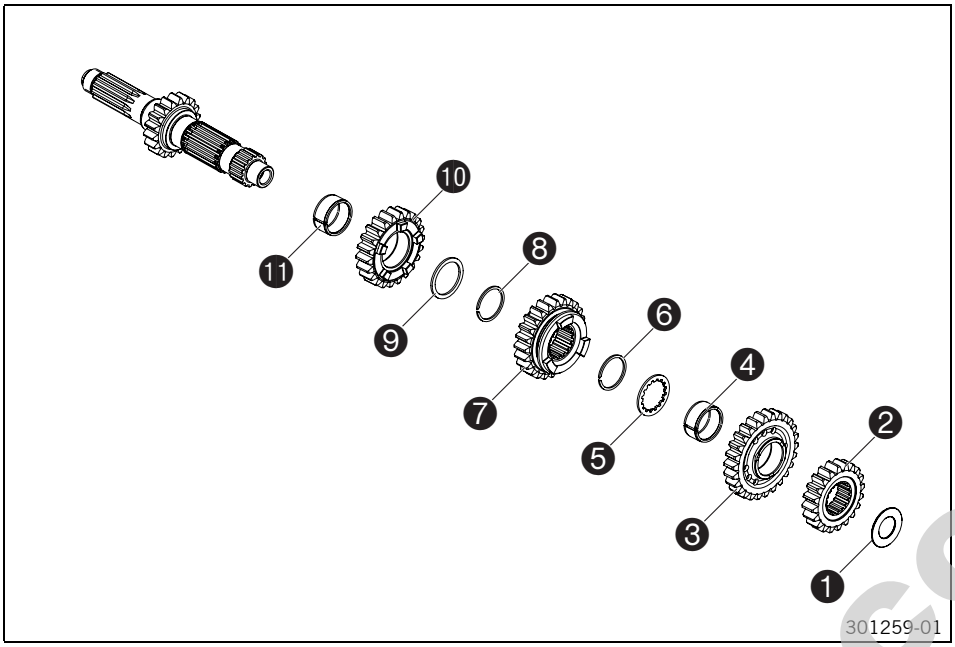
- Secure the short end of the shift shaft in the bench vise.

Guideline

Use soft jaws.

- Mount sliding plate ❶ with the guide pin facing downward and put the guide pin on the shift quadrant.
- Mount pressure spring ❷.
- Slide on spring guide ❸, push return spring ❹, with the offset end facing upward, over the spring guide and lift the offset end over abutment bolt ❺.
- Mount stop disk ❻.

Disassembling the main shaft

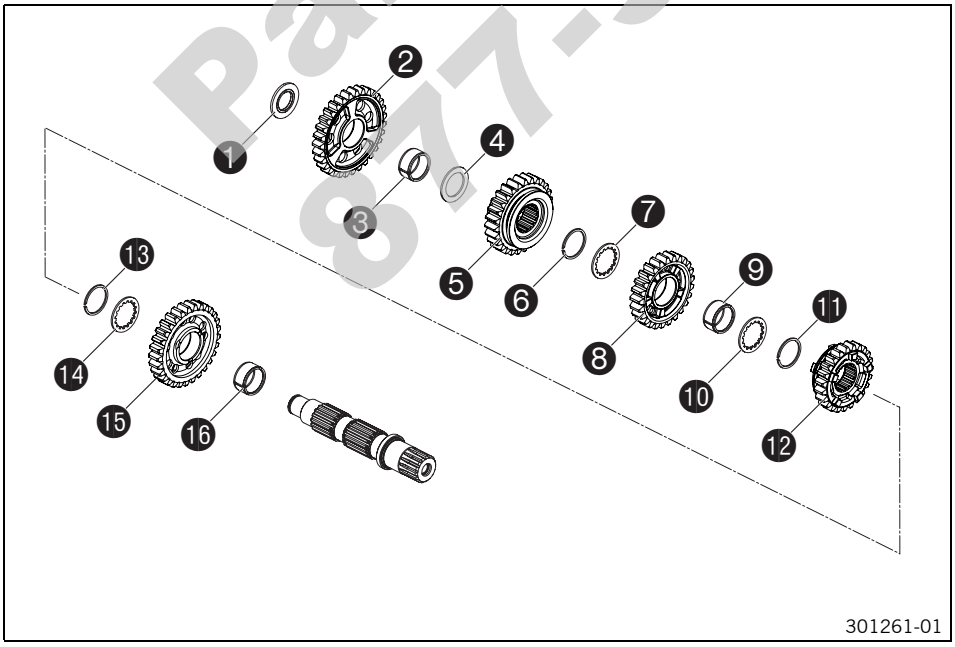


– Secure the main shaft with the toothed end facing downward in the vise.
  Guideline

Use soft jaws.

– Remove stop disk ❶ and 2nd-gear fixed gear ❷.
– Remove 5th-gear idler gear ❸ and needle bearing ❹.
– Remove stop disk ❺.
– Remove lock ring ❻.
– Remove 4th-gear sliding gear ❼.
– Remove lock ring ❽.
– Remove stop disk ❾.
– Remove 3rd-gear idler gear ❿.
– Remove needle bearing ⓫.

Disassembling the countershaft

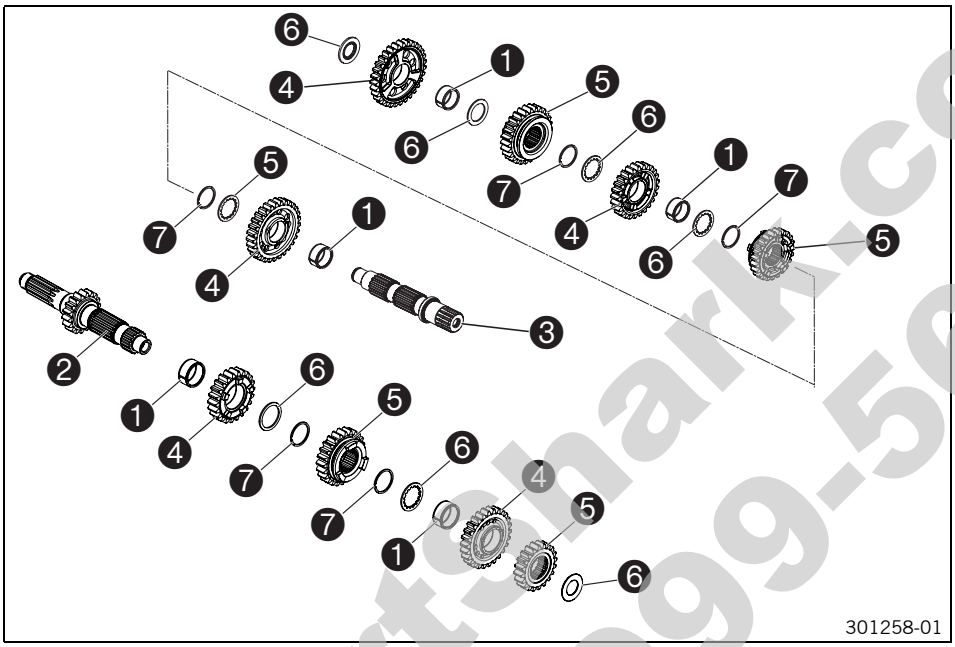


– Secure the countershaft with the toothed end facing downward in the vise.
  Guideline

Use soft jaws

– Remove stop disk ❶ and 1st-gear idler gear ❷.
– Remove needle bearing ❸ and stop disk ❹.
– Remove 3rd-gear sliding gear ❺.
– Remove lock ring ❻.
– Remove stop disk ❼.
– Remove the 4th-gear idler gear ❽ and needle bearing ❾.
– Remove stop disk ❿.
– Remove lock ring ⓫.
– Remove 5th-gear sliding gear ⓬.
– Remove lock ring ⓭.
– Remove stop disk ⓮.
– Remove 2nd-gear idler gear ⓯ and needle bearing ⓰.

Checking transmission



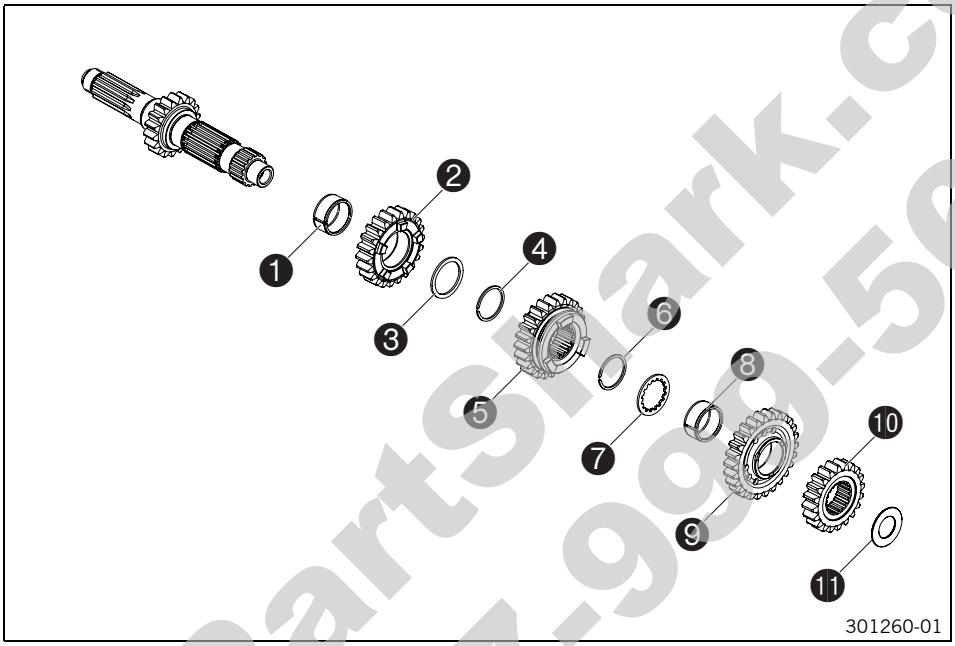
– Check the needle bearings ❶ for damage and wear.
  » If there is damage or wear:
    – Change the needle bearing.
– Check the pivot points of main shaft ❷ and countershaft ❸ for damage and wear.
  » If there is damage or wear:
    – Change the main shaft and/or countershaft.
– Check the tooth profile 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 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.

Assembling the main shaft

Info
Use new lock rings with every repair.

– Carefully lubricate all parts before assembling.
– Check the transmission. (☛ p. 142)

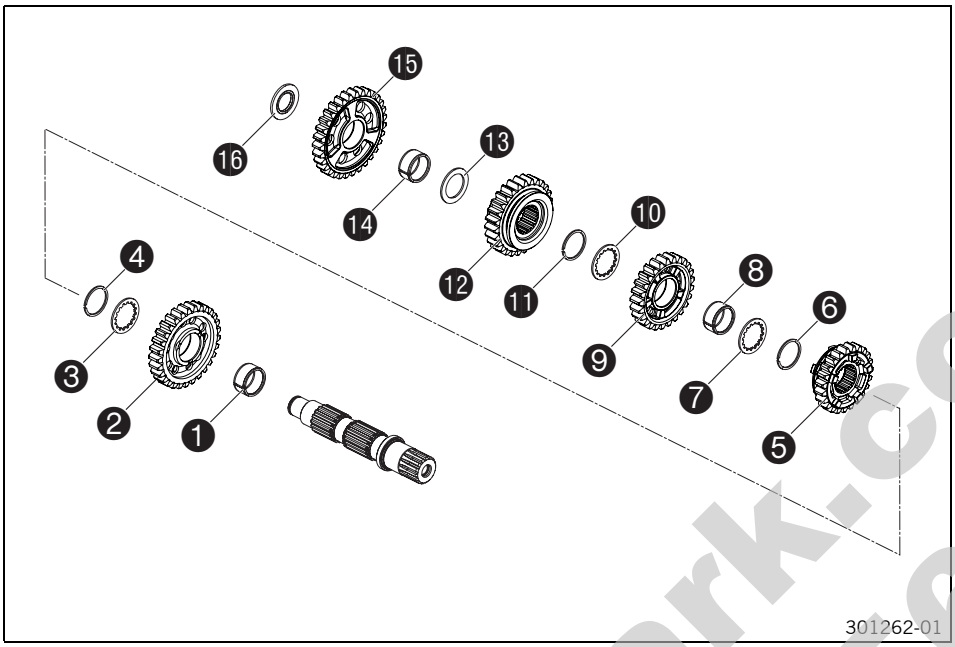


– Mount needle bearing ❶.
– Mount 3rd-gear idler gear ❷.
– Mount stop disk ❸ and lock ring ❹.
– Mount 4th-gear sliding gear ❺.
– Mount lock ring ❻ and stop disk ❼.
– Mount needle bearing ❽.
– Mount 5th-gear idler gear ❾.
– Mount 2nd-gear fixed gear ❿ and stop disk ⓫.
– In conclusion, check all gear wheels for smooth operation.

Assembling the countershaft

Info
Use new lock rings with every repair.

– Carefully lubricate all parts before assembling.
– Check the transmission. (☛ p. 142)

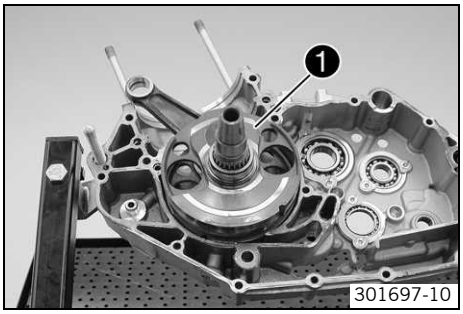


– Secure the countershaft with the toothed end facing downward in the vise.
Guideline

Use soft jaws

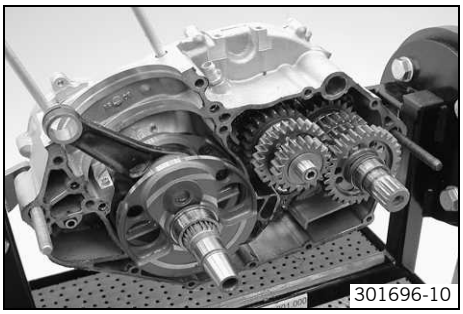
– Mount needle bearing ❶ and 2nd-gear idler gear ❷ onto the countershaft with the protruding collar facing downward.
– Mount stop disk ❸ and lock ring ❹.
– Mount the 5th-gear sliding gear ❺ with the shift groove facing up.
– Mount lock ring ❻ and stop disk ❼.
– Mount needle bearing ❽ and 4th-gear idler gear ❾ with the shift dogs facing upward.
– Mount stop disk ❿ and lock ring ⓫.
– Mount the 3rd-gear sliding gear ⓬ with the shift groove facing downward.
– Mount stop disk ⓭.
– Mount needle bearing ⓮ and 1st-gear idler gear ⓯.
– Mount stop disk ⓰.
– In conclusion, check all gear wheels for smooth operation.

Installing the crankshaft



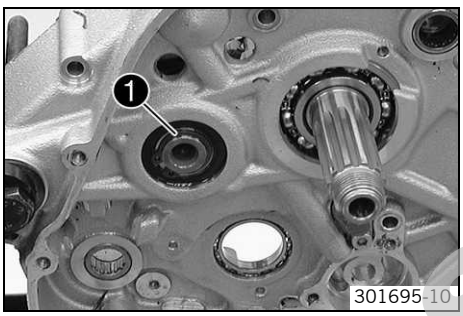
– Position the right section of the engine case in the engine work stand.
– Push crankshaft ❶ into the bearing seat.

Installing the transmission shafts



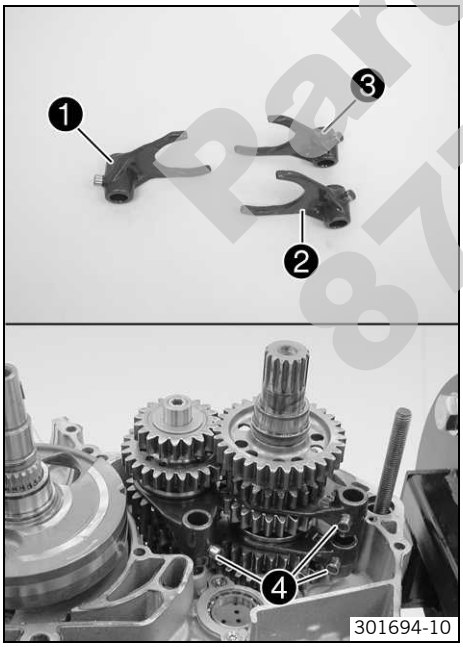
– Slide both transmission shafts into the bearing seats.

Info
Do not misplace the washers.



– Mount lock ring ❶.

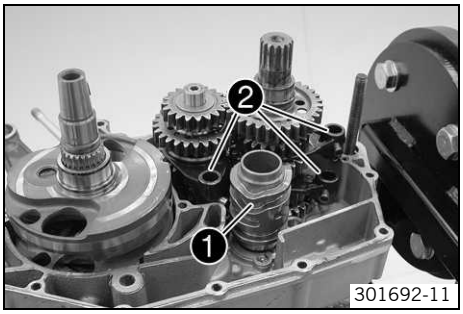
Installing the shift forks



– Shift fork ❶ has a smaller inside diameter; mount this 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 rollers ❹.

Tip
Fix the shift rollers to the shift forks with grease.
Markings **In** of shift forks ❷ and ❸ face each other

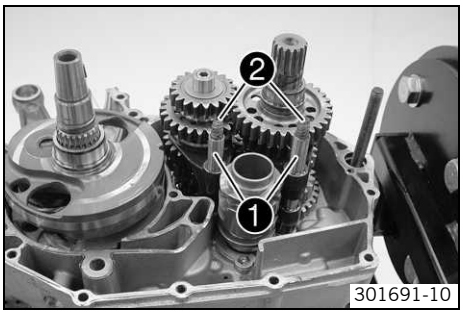
Installing the shift drum



– Push shift drum ❶ into the bearing seat.
– Put shift forks ❷ in the shift drum.

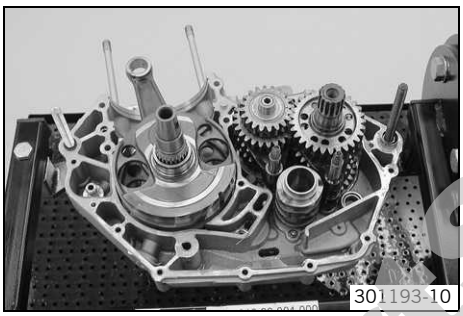
Info
Do not misplace the shift rollers.

Installing the shift rails



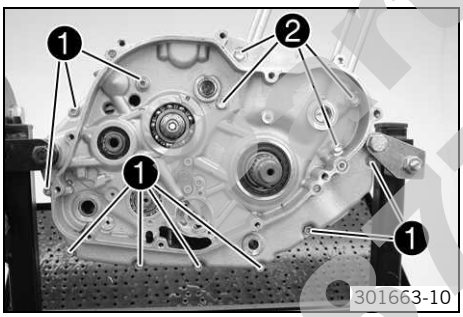
– Install shift rails ❶ together with upper springs ❷ and lower springs.

Installing the left engine case



– Mount the dowels.
– Degrease the sealing area. Apply the sealing compound to the left section of the engine case.

Loctite® 5910



– Mount the left section of the engine case. If necessary, strike it lightly with a rubber mallet and turn the transmission shafts.

Info
Do not use the screws to pull the two sections of the engine case together.

– Mount screws ❶ and, once all screws of the left section of the engine case have been mounted, tighten them.

Guideline

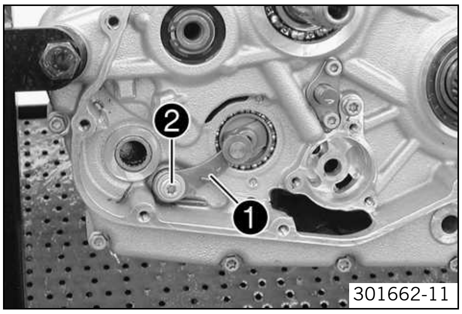
Screw, engine case	M6	10 Nm (7.4 lbf ft)

– Mount screws ❷ and tighten all screws in a crisscross pattern.

Guideline

Screw, engine case	M7x1	14 Nm (10.3 lbf ft)

Installing the locking lever

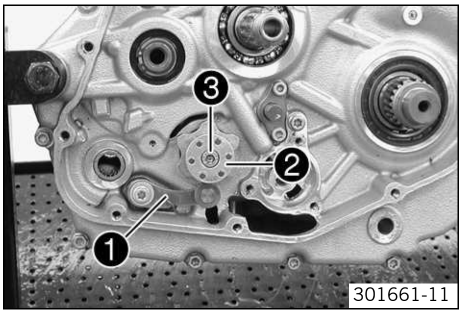


– Mount locking lever ❶ with the sleeve and spring.
– Mount and tighten screw ❷ with the washer.

Guideline

Screw, locking lever	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

Installing the shift drum locating unit



– Push away locking lever ❶ from the shift drum locating unit and position the shift drum locating unit ❷.

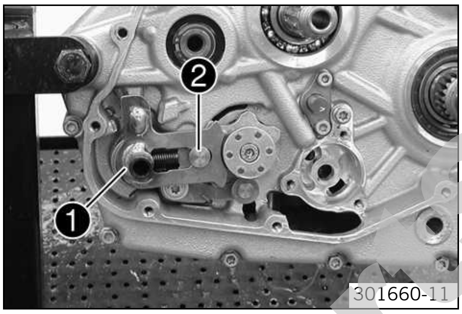
> **Info**
> The flat areas of the shift drum locating unit are not symmetric.

– Relieve tension from the locking lever.
– Mount and tighten screw ❸.

Guideline

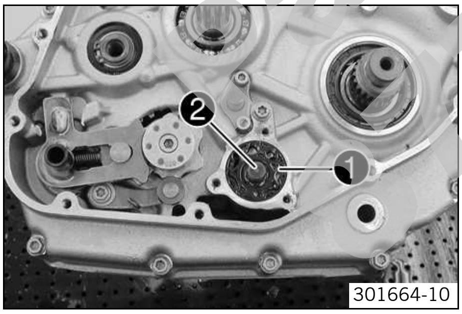
Screw, shift drum locating	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**

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 unit. Insert the shift shaft all the way.
– Let sliding plate ❷ engage in the shift drum locating unit.
– Shift through the transmission.

Installing the suction pumps

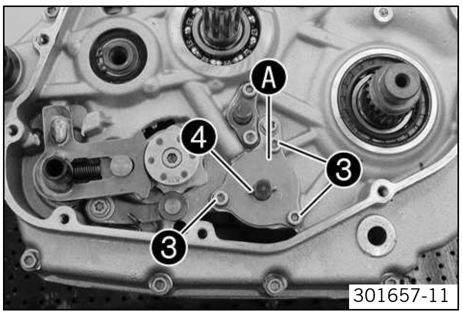


– Oil the oil pump shaft, internal rotor and external rotor before assembly.

Engine oil (SAE 10W/50) (☛ p. 223)

– Mount suction pump ❶ with the pin and oil pump shaft ❷.

> **Info**
> The rounded side of the suction pump faces the engine case.

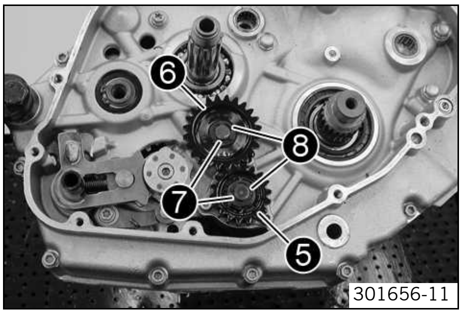


– Position the oil pump cover. Mount and tighten screws ❸.

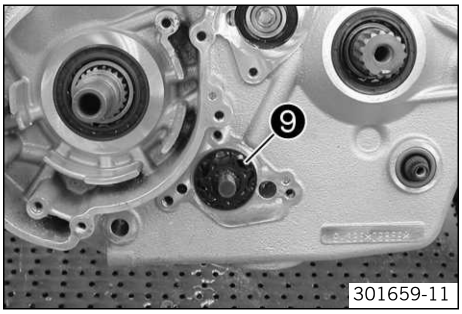
Guideline

Screw, oil pump cover	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

✓ Marking Ⓐ faces upward.
– Insert pin ❹.

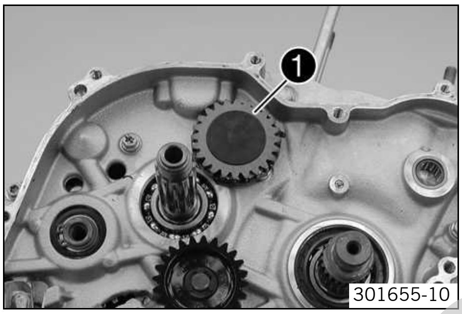


- Position oil pump gear ❺ and oil pump idler gear ❻ with the bearing.
- Position washers ❼.
- Mount shaft locking devices ❽.
- Crank the oil pump gear and ensure that it can move easily.



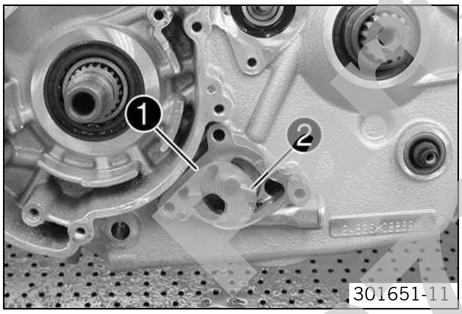
- Mount the needle roller.
- Insert suction pump ❾.

Installing the centrifugal separator



- Mount centrifugal separator ❶.

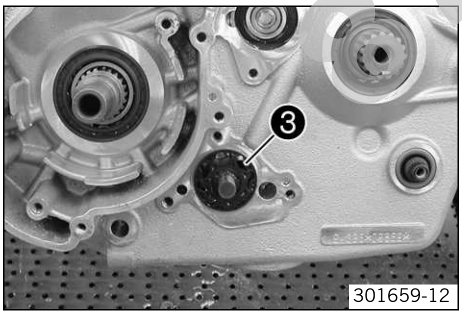
Installing the force pump



- Mount oil pump housing ❶ with the gasket.

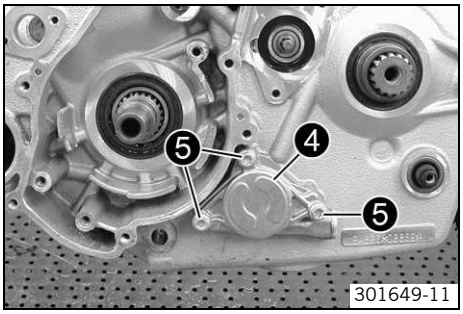
Info
Ensure that the dowel pins are seated properly.

- Insert needle roller ❷.



- Position force pump ❸.

Info
Ensure that the dowel pins are seated properly.



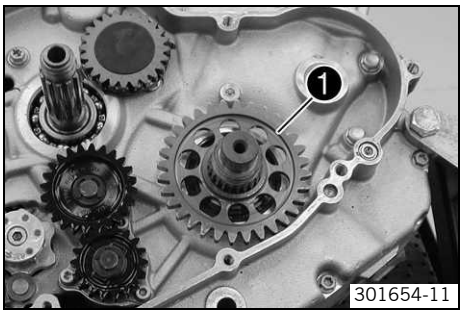
– Position oil pump housing ❹.
– Mount and tighten screws ❺.

Guideline

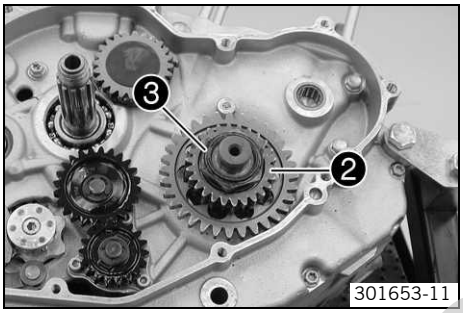
Screw, oil pump casing	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**

– Crank the oil pump gear and ensure that it can move easily.

Installing the primary gear



– Position the drive wheel of balancer shaft ❶.

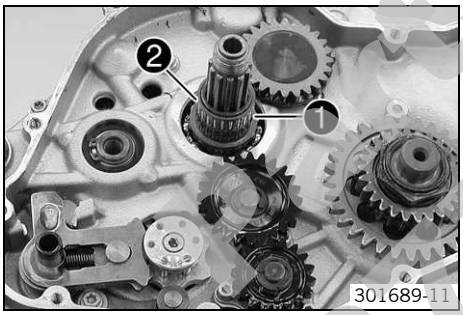


– Position primary gear ❷.
– Mount nut ❸ but do not tighten yet.

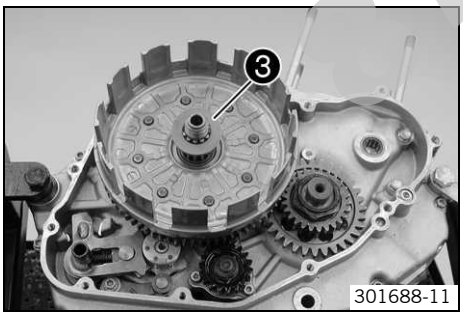
Guideline

Nut, primary gear	M27x1	80 Nm (59 lbf ft)	**Loctite® 243™**

Installing the outer clutch hub



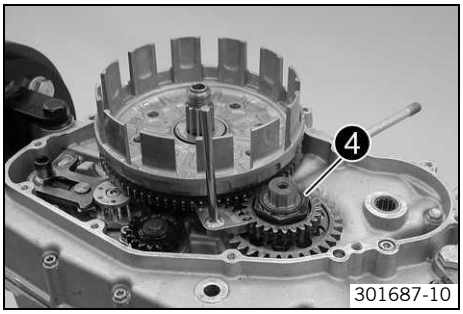
– Mount collar sleeve ❶ and needle bearing ❷.



– Mount the outer clutch hub.

Info
Turn the outer clutch hub and oil pump gears back and forth slightly to help them engage.

– Mount washer ❸.



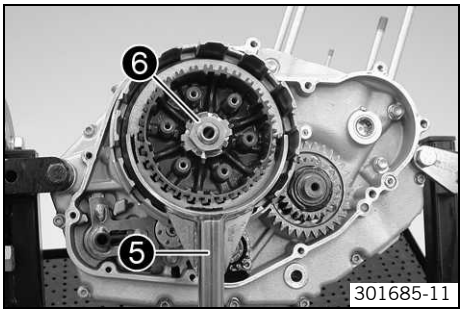
– Lock the outer clutch hub and primary gear with the special tool and tighten nut ❹.

Guideline

Nut, primary gear	M27x1	80 Nm (59 lbf ft)	**Loctite® 243™**

Gear quadrant (80029004000) (☛ p. 233)

Info
Ensure that the crankshaft is not locked.



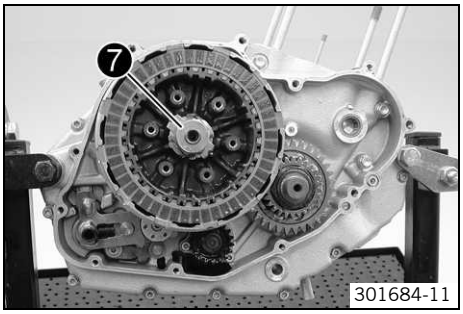
– Mount the inner clutch hub.
– Position the new lock washer and mount nut ❻. Hold the inner clutch hub using special tool ❺ and tighten the nut.

Guideline

Nut, inner clutch hub	M18x1.5	80 Nm (59 lbf ft)	**Loctite® 243™**

Clutch holder (77329003000) (☛ p. 231)

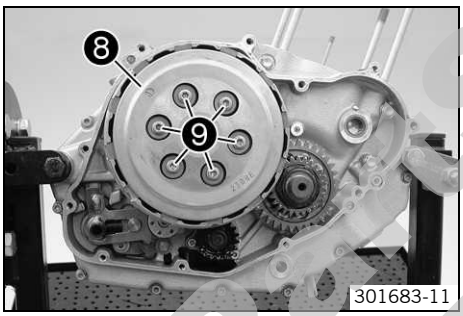
– Secure the nut with the lock washer.



– Thoroughly oil the clutch facing discs.

Engine oil (SAE 10W/50) (☛ p. 223)

– Beginning with an intermediate disc, alternately insert all other clutch facing discs and intermediate discs into the outer clutch hub.
– Insert pressure piece ❼ with the push rod into the gearbox main shaft.



– Position the crankshaft at TDC and lock it with the special tool.

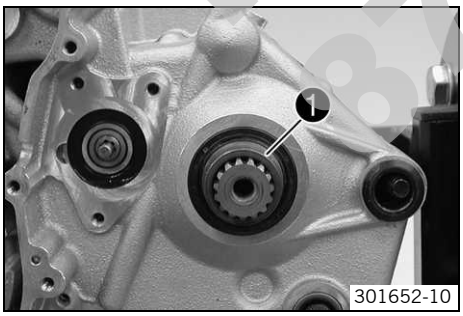
Engine blocking screw (77329010000) (☛ p. 231)

– Position pressure cap ❽. Mount screws ❾ with the washers and springs. Tighten the screws in a crisscross pattern.

Guideline

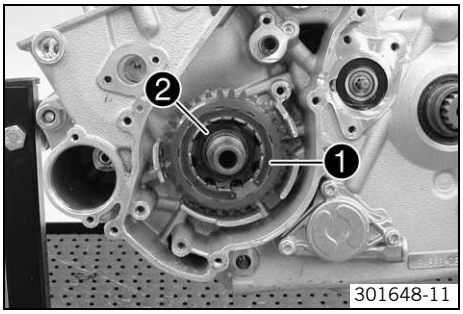
Screw, clutch spring	M6	10 Nm (7.4 lbf ft)

Installing the spacer



– Grease the shaft seal ring before mounting.
– Position the O-ring. Mount spacer ❶ with the bevel facing inward.

Installing the drive wheel of the balancer gear



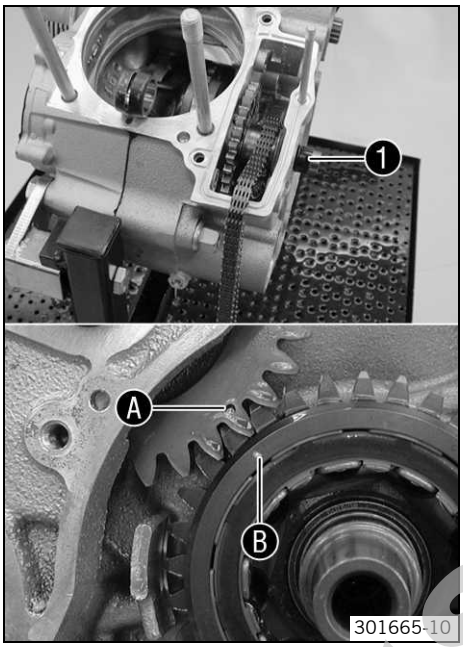
– Position drive wheel ❶ of the balancer gear.
– Mount and tighten nut ❷ with the special tool.

Guideline

Nut, freewheel hub	M27x1	80 Nm (59 lbf ft)	**Loctite® 243™**

Special socket, 36 mm; ½" drive (77329021000) (☛ p. 231)

Installing the timing chain



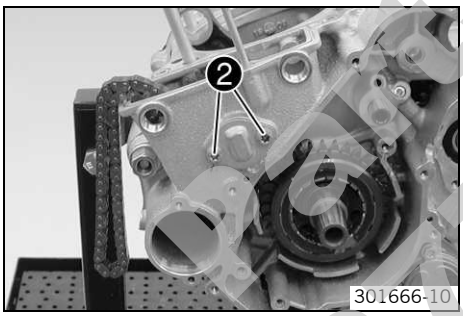
– Insert the needle bearings in the balancer gear and oil.

lubricated with engine oil

– Place the timing chain on the balancer gear.

Info
If the timing chain was used before, ensure it is running in the correct direction.

– Mount the stop disks with the collar facing the balancer gear.
– Insert the timing chain, balancer gear with stop disk and needle bearings into the chain shaft.
– Align markings Ⓐ and Ⓑ to each other.
– Mount spindle ❶ with the O-ring.

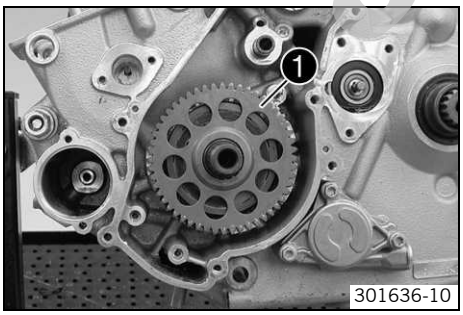


– Position the retaining bracket.
– Mount and tighten screws ❷.

Guideline

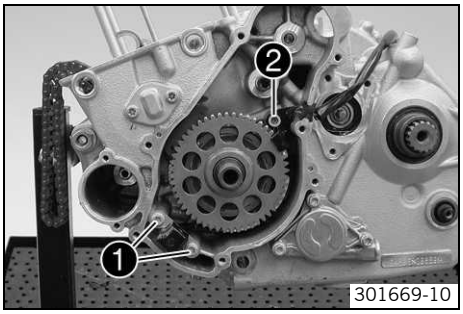
Screw, timing train axle retaining bracket	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

Installing the free wheel gear



– Oil the starter freewheel and needle bearing.
– Mount freewheel gear ❶ with the needle bearing.

Installing the ignition pulse generator



– Position the ignition pulse generator.
– Mount screws ❶ but do not tighten yet.

Guideline

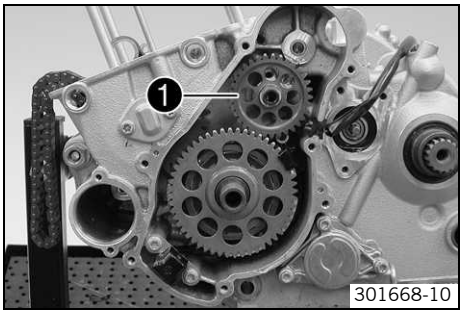
Screw, ignition pulse generator adapter	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

– Position the cable and insert the cable support sleeve into the engine case.
– Position the retaining bracket.
– Mount and tighten screws ❷.

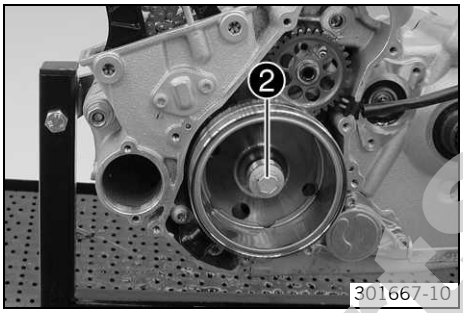
Guideline

Screw, ignition pulse generator cable holder	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**

Installing the rotor



– Mount starter idler gear ❶.

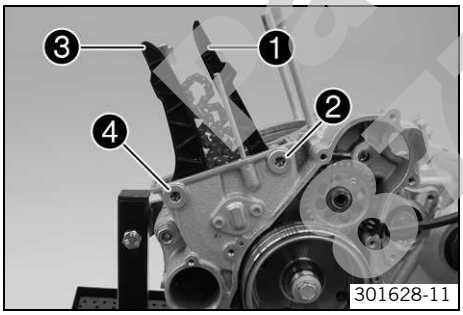


– Ensure that the spring washers are seated properly. Mount the rotor.
– Mount and tighten screw ❷.

Guideline

Screw, rotor	M10x1	80 Nm (59 lbf ft)	lubricated with engine oil

Installing the timing chain rails



– Slip in the timing chain guide rail ❶ from above. Mount and tighten spindle ❷.

Guideline

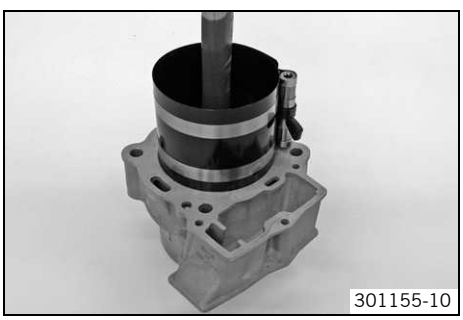
Axle guide rail for timing chain	M14x1	15 Nm (11.1 lbf ft)

– Slip in the timing chain tensioning rail ❸ from above. Mount and tighten spindle ❹.

Guideline

Axle tension rail for timing chain	M14x1	15 Nm (11.1 lbf ft)

Installing the piston



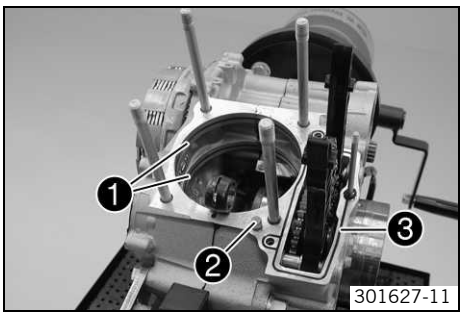
– Move the joints of the compression ring and oil scraper ring so they are offset by 180°.
– Place the oiled piston on the cylinder. Compress the piston rings using the special tool.

Piston ring mounting tool (60029015000) (☛ p. 230)

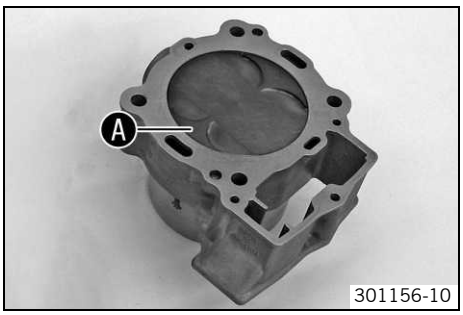
✓ The special tool must press the piston rings together properly and lie flush with the cylinder.

– Carefully tap the piston into the cylinder using the handle of the hammer.

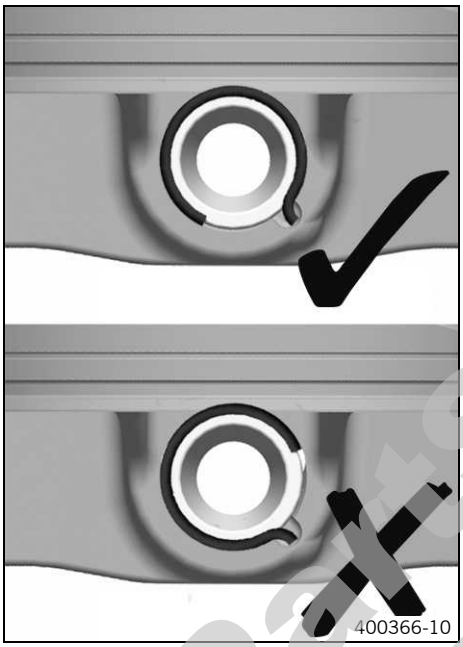
✓ The piston rings should not catch or they will be damaged.



– Mount O-rings ❶.
– Mount locating pins ❷ and position cylinder base gasket ❸.



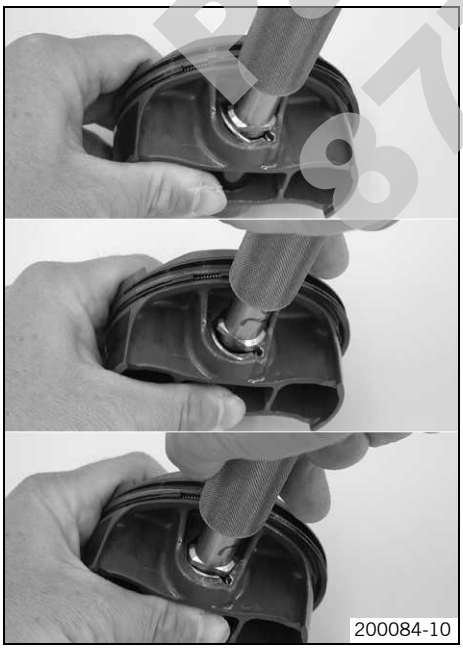
– Ensure that piston mark Ⓐ faces the exhaust side.



– Cover the engine case 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.

– Position the piston pin retainer.



– 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.

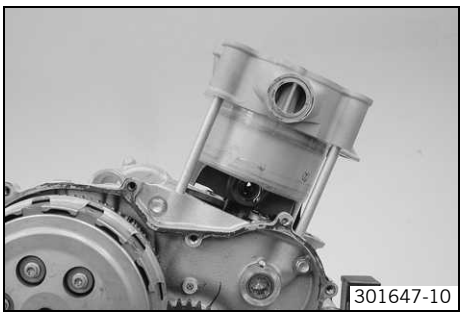
(450 SX ATV)

Insert for piston pin retainer (77329030100) (☛ p. 232)

(505 SX ATV)

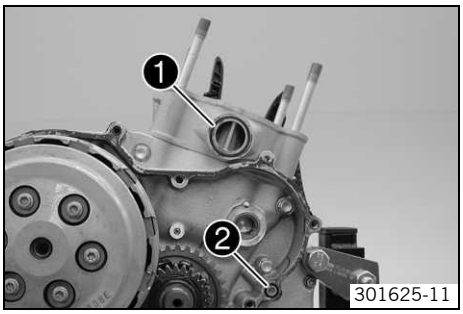
Insertion for piston ring lock (77629030000) (☛ p. 233)

– Ensure that the piston pin retainer is seated properly on both sides.

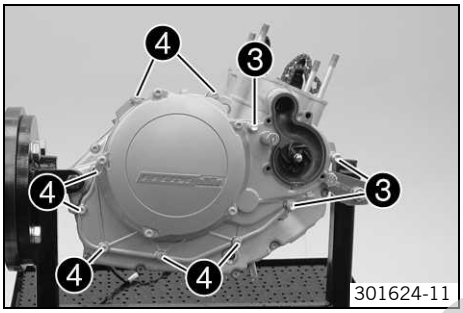


– Remove the cloth. Keep the timing chain taut.
– Carefully push the cylinder downward, letting the locating pins engage.

Installing the clutch cover



– Insert quad ring ❶.
– Mount O-ring ❷.
– Position the dowel pins.



– Ensure that the crankshaft has been locked in the TDC position.
– Degrease the sealing area and thinly apply sealant to it.

Loctite® 5910

– Mount the clutch cover.
– Mount screws ❸ and tighten once all of the clutch cover screws have been mounted.

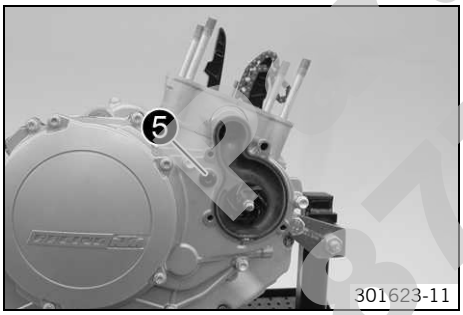
Guideline

Screw, clutch cover	M7x1	14 Nm (10.3 lbf ft)

– Mount screws ❹ and tighten all screws in a crisscross pattern.

Guideline

Screw, clutch cover	M6	10 Nm (7.4 lbf ft)



– Remove the special tool.

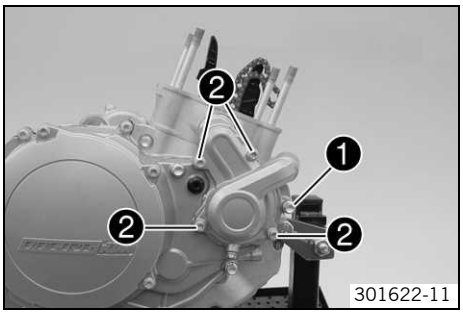
Assembly pin (77329012100) (☛ p. 231)

– Mount and tighten screw ❺ with the O-ring.

Guideline

Screw plug, clutch cover	M10x1	10 Nm (7.4 lbf ft)

Installing the water pump cover



– Position the gasket.
– Put the water pump cover on. Mount screw ❶ and tighten once all of the water pump cover screws have been mounted.

Guideline

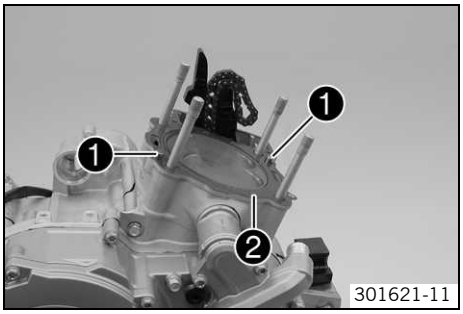
Screw, water pump cover	M7x1	14 Nm (10.3 lbf ft)

– Mount screw ❷ and tighten all screws in a crisscross pattern.

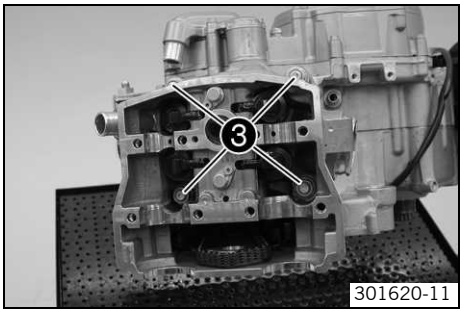
Guideline

Screw, water pump cover	M6	10 Nm (7.4 lbf ft)

Installing the cylinder head



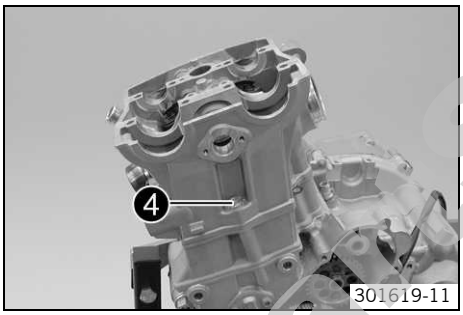
– Mount centering pins ❶.
– Position cylinder head gasket ❷.
– Put the cylinder head in place.



– Mount nut ❸ with the washers and tighten in a crisscross pattern.

Guideline

Nut, cylinder head	M10x1.25	Tightening sequence: Tighten in diagonal sequence. Tightening stage 1 10 Nm (7.4 lbf ft) Tightening stage 2 30 Nm (22.1 lbf ft) Tightening stage 3 50°	lubricated with engine oil

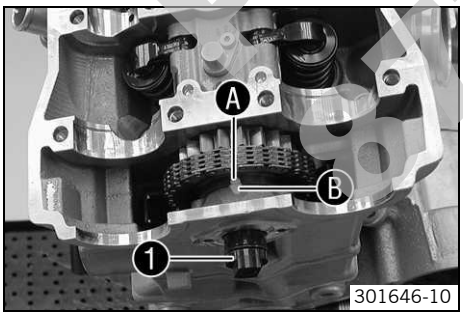


– Mount and tighten nut ❹.

Guideline

Nut, cylinder head	M6	10 Nm (7.4 lbf ft)	lubricated with engine oil

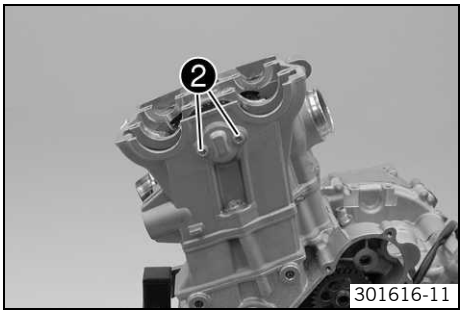
Installing the double wheel



– Oil the needle bearings and insert them in the double wheel.

lubricated with engine oil

– Place the timing chain on the double wheel.
– Align markings Ⓐ and Ⓑ to each other.
– Mount spindle ❶ with the O-ring.

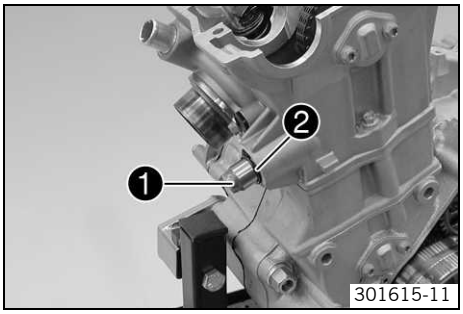


– Align the spindle for the retaining bracket.
– Position the retaining bracket.
– Mount and tighten screws ❷.

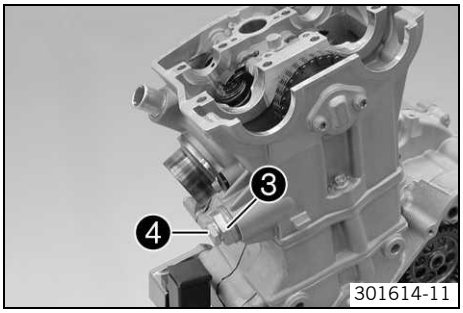
Guideline

Screw, camshaft bearing retaining bracket	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

Installing the timing chain tensioner



– Position timing chain tensioner ❶ and insert it with new O-ring ❷.

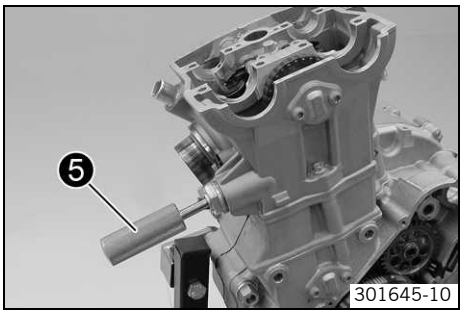


– Mount and tighten screw plug ❸ with the seal ring.

Guideline

Plug, timing chain tensioner	M24x1.5	25 Nm (18.4 lbf ft)

– Remove screw ❹.



– Press the timing chain tensioner toward the timing chain using special tool ❺.

Release device for timing chain tensioner (77329051000) (☛ p. 232)

✔ The timing chain tensioner unlocks.

– Mount and tighten screw ❹.

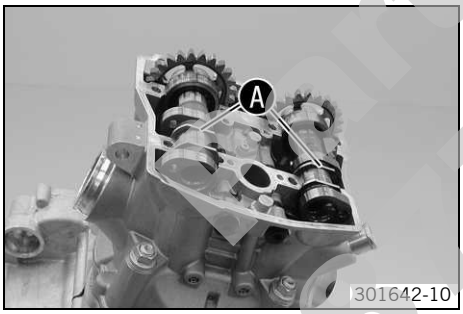
Guideline

Screw, unlocking of timing chain tensioner	M10x1	10 Nm (7.4 lbf ft)

Checking the valve timing

Condition

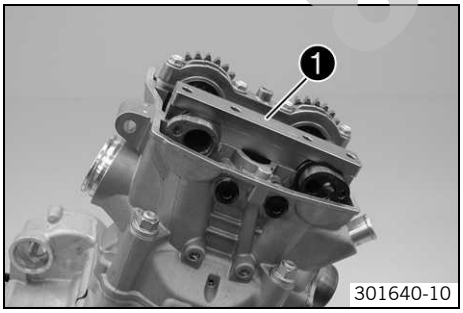
The camshaft has not been disassembled.



– Oil the camshafts and bearing positions.

lubricated with engine oil

– Position the camshafts and turn them so the flat surfaces Ⓐ face upward.



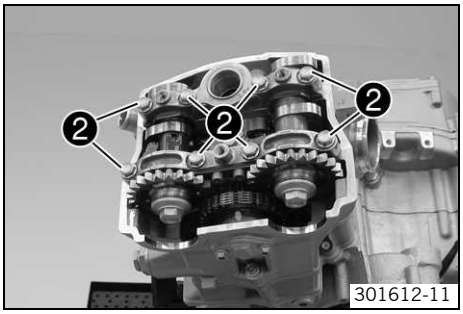
– Position special tool ❶.

Adjustment bush bridge (77329050000) (☛ p. 232)

– Check the valve timing.

The special tool must be full contact with the cylinder head and flat surfaces.

» If the special tool is not in full contact:
  – Take off the special tool.
  – Remove the camshafts.
  – Force the camshaft gears off the camshafts.
  – Adjust the valve timing. (☛ p. 157)



– Position the camshaft bearing bridges.

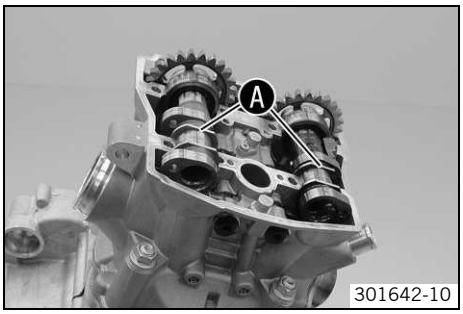
Info
Ensure that the needle rollers and the O-ring are correctly seated.

– Mount screws ❷ and tighten from the inside to the outside.

Guideline

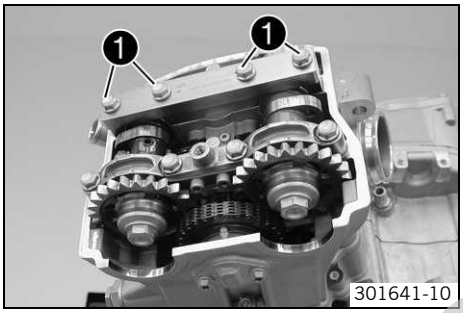
Screw, camshaft bearing bridge	M7x1	14 Nm (10.3 lbf ft)	lubricated with engine oil

Adjusting the valve timing



– Position the camshafts and turn them so the flat surfaces Ⓐ face upward.

✓ The valves are not activated.



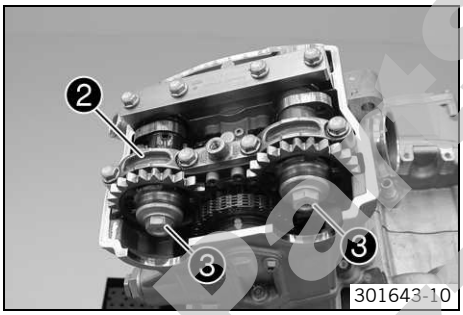
– Mount the special tool.

Adjustment bush bridge (77329050000) (☛ p. 232)

– Mount and tighten screws ❶.

Guideline

Screw, camshaft bearing bridge	M7x1	14 Nm (10.3 lbf ft)	lubricated with engine oil



– Position camshaft bearing bridge ❷.

Info
Ensure that the locating pins are seated properly.

– Mount and tighten the screws.

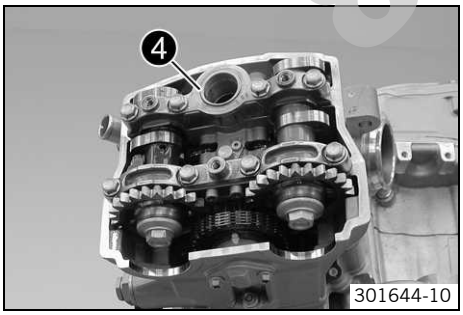
Guideline

Screw, camshaft bearing bridge	M7x1	14 Nm (10.3 lbf ft)	lubricated with engine oil

– Tighten screw ❸.

Guideline

Screw, camshaft gear	M10x1	50 Nm (36.9 lbf ft)	lubricated with engine oil



– Remove the special tool.

Adjustment bush bridge (77329050000) (☛ p. 232)

– Position camshaft bearing bridge ❹.

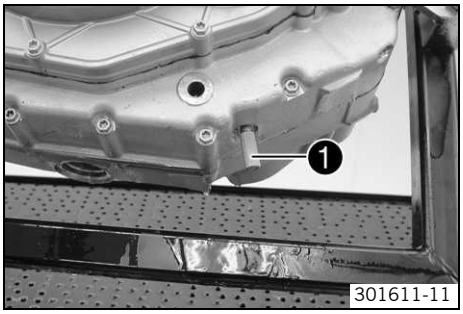
Info
Ensure that the needle rollers and the O-ring are correctly seated.

– Mount and tighten the screws.

Guideline

Screw, camshaft bearing bridge	M7x1	14 Nm (10.3 lbf ft)	lubricated with engine oil

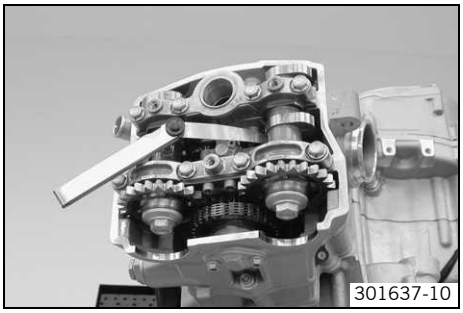
Checking the valve clearance



– Remove special tool ❶.

Engine blocking screw (77329010000) (☛ p. 231)

– Crank over the engine repeatedly.
– Position the engine at ignition top dead center (TDC). (☛ p. 105)



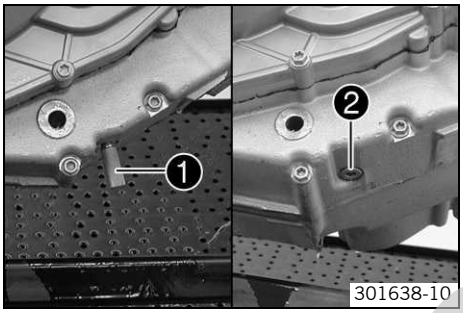
– Check the valve clearance at all valves between the camshaft and cam levers.

Guideline

Valve clearance, cold, exhaust	0.12... 0.18 mm (0.0047... 0.0071 in)
Valve clearance, cold, intake	0.07... 0.13 mm (0.0028... 0.0051 in)

Feeler gauge (59029041100) (☛ p. 229)

» If the valve clearance does not meet specifications:
  – Adjust the valve clearance. (☛ p. 158)



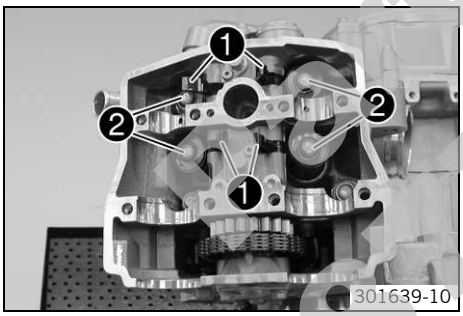
– Remove special tool ❶.
– Mount and tighten screw ❷.

Guideline

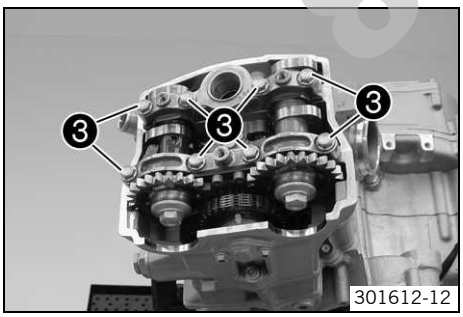
Plug, crankshaft location	M8	20 Nm (14.8 lbf ft)

Adjusting the valve clearance

– Remove the camshaft. (☛ p. 106)



– Raise cam levers ❶.
– Remove shims ❷ and set down in the position in which they were installed.
– Correct the shims according to the findings from checking the valve play.
– Insert the fitting shims.



– Position the camshaft bearing bridges.

Info
Ensure that the needle rollers and the O-ring are correctly seated.

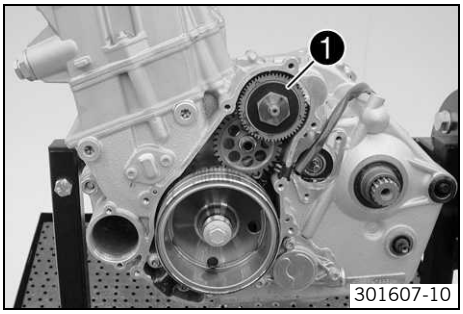
– Mount screws ❸ and tighten from the inside to the outside.

Guideline

Screw, camshaft bearing bridge	M7x1	14 Nm (10.3 lbf ft)	lubricated with engine oil

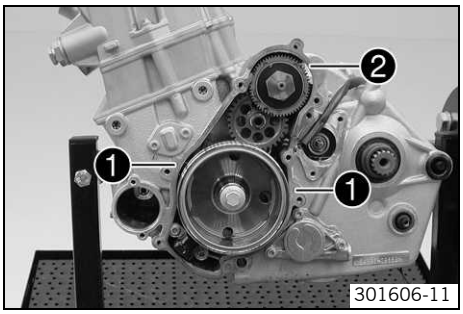
– Check the valve clearance. (☛ p. 158)

Installing the torque limiter

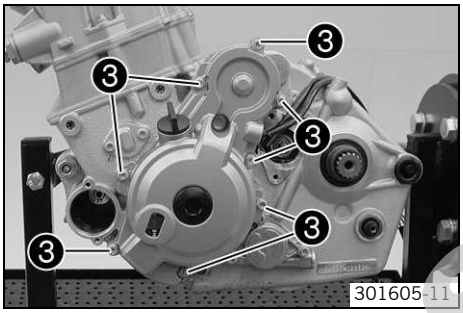


– Mount torque limiter ❶.

Installing the alternator cover



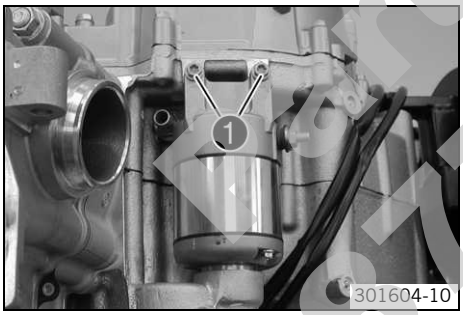
– Mount centering pins ❶. Position alternator cover gasket ❷.



– Position the alternator cover. Mount screws ❸ and tighten in a crisscross pattern.
Guideline

Screw, alternator cover	M6	10 Nm (7.4 lbf ft)

Installing the starter motor



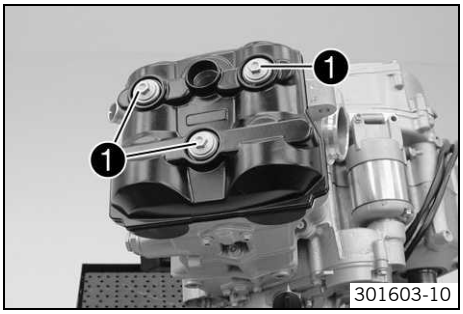
– Grease the O-ring. Position the starter motor.

Long-life grease (☛ p. 225)

– Mount and tighten screws ❶.
Guideline

Screw, starter motor	M6	10 Nm (7.4 lbf ft)

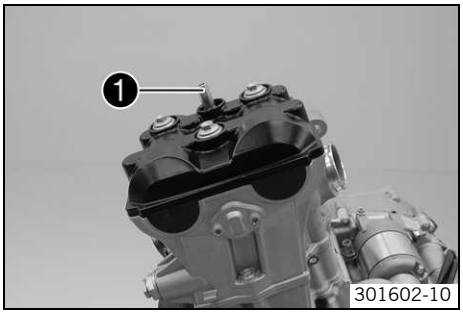
Installing the valve cover



– Position the valve cover with the gasket. Mount and tighten screws ❶.
Guideline

Screw, valve cover	M6	8 Nm (5.9 lbf ft)

Installing the spark plug



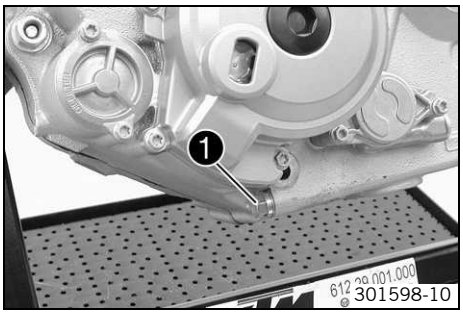
– Mount and tighten the spark plug with special tool ❶.

Guideline

Spark plug	M10	10... 12 Nm (7.4... 8.9 lbf ft)

Spark plug wrench (77329072000) (☛ p. 232)

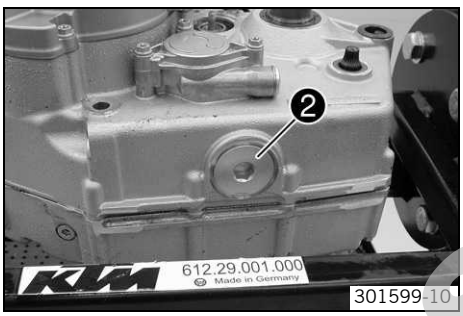
Installing the oil screen



– Mount and tighten the oil drain plug with magnet ❶ and the new sealing ring.

Guideline

Oil drain plug with magnet	M12x1.5	20 Nm (14.8 lbf ft)

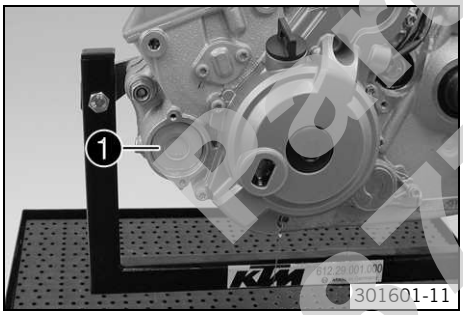


– Mount and tighten screw plug ❷ with the oil screen and the O-rings.

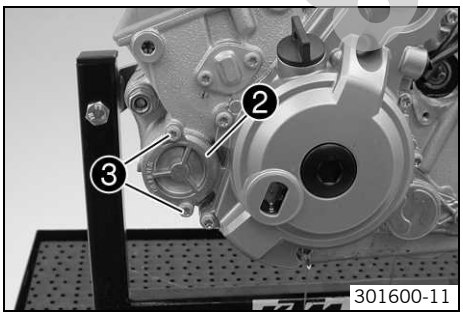
Guideline

Plug, oil screen	M32x1.5	30 Nm (22.1 lbf ft)

Installing the oil filter



– Tilt the engine on one 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.

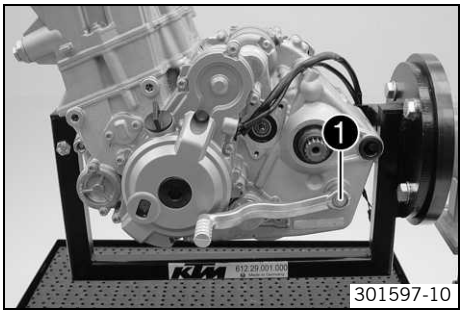


– Oil the O-ring of the oil filter cover.
– Mount oil filter cover ❷.
– Mount and tighten screws ❸.

Guideline

Screw, oil filter cover	M5	6 Nm (4.4 lbf ft)

Installing the shift lever



– Position the shift lever. Mount and tighten screw ❶ with the collar sleeve.

Guideline

Screw, shift lever	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**

Removing the engine from the universal mounting rack

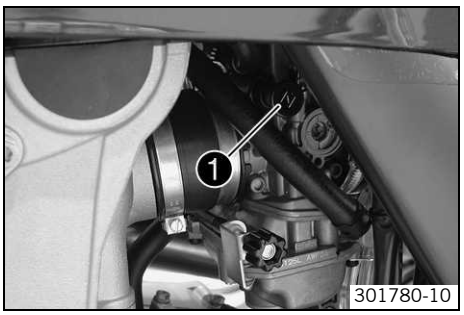
– Remove the screw connection from the special tool.

Engine fixing arm (83529002000) (☛ p. 237)

– Remove the engine from the universal mounting rack.

Engine work stand (61229001000) (☛ p. 230)

Choke

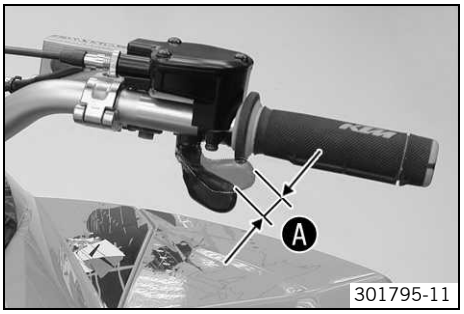


The choke ❶ is fitted on the left side of the carburetor.
Activating the choke function frees an opening through which the engine can draw extra fuel. This gives a richer fuel-air mixture, which is needed for a cold start.

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.

Checking the play in the throttle cable



– Move the handlebar to the straight-ahead position. Move the throttle lever back and forth slightly to ascertain the play in the throttle cable Ⓐ.

Guideline

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. 14)

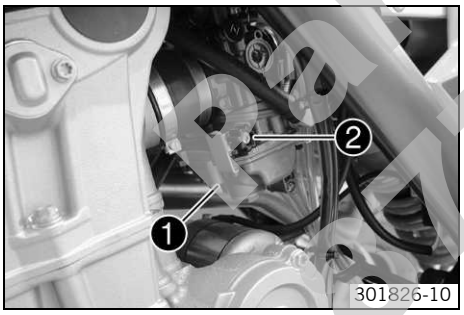
Danger
Danger of poisoning Exhaust gases are poisonous and inhaling them may result in unconsciousness and/or death.
– When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in an enclosed space without an effective exhaust extraction system.

– 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. 14)

Carburetor - adjusting idle



– Screw in the idle adjusting screw ❶ until it stops and then to the prescribed basic setting.

Guideline

Idle mixture adjusting screw	
Open	1.5 turns

Adjustment tool for mixture control screw (59029034000) (☛ p. 229)

– Run the engine until warm.

Guideline

Warm-up time	≥ 5 min

– Adjust the idle speed with the adjusting screw ❷.

Guideline

Choke function deactivated – The choke lever is pushed in to the stop. (☛ p. 162)	
Idle speed	1,500... 1,600 rpm

Info
If the idle speed is set significantly higher, the engine does not start. When the electric starter button is activated, the electric starter turns over the engine, but the engine does not start because there is no ignition spark.

– Turn the idle adjusting screw ❶ slowly clockwise 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 large increase in the engine speed, reduce the idle speed to a normal level and repeat the above steps.
The extremely sporty rider will set the mixture about 1/4 of a turn back from this ideal value (leaner, clockwise) since the engine has a higher operating temperature 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 fit 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 the adjusting screw ❷.

Guideline

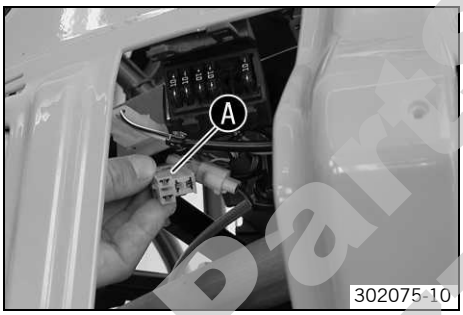
Choke function deactivated – The choke lever is pushed in to the stop. (☛ p. 162)	
Idle speed	1,500... 1,600 rpm

Info

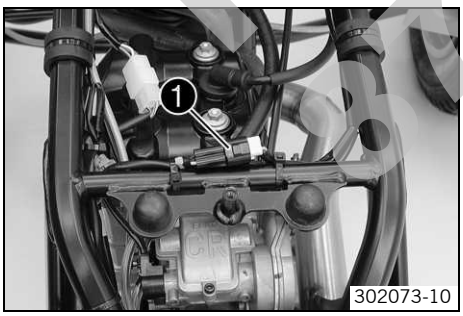
Following extreme air temperature or altitude changes, adjust the idle speed again.

Checking the position of the throttle position sensor

– Remove the fuel tank. (☛ p. 64)
– Remove the front cover. (☛ p. 69)
– Remove the relay.
– Mount a cable jumper between the green and red-white cables on connector Ⓐ.



– Disconnect plug-in connector ❶ of the throttle position sensor.

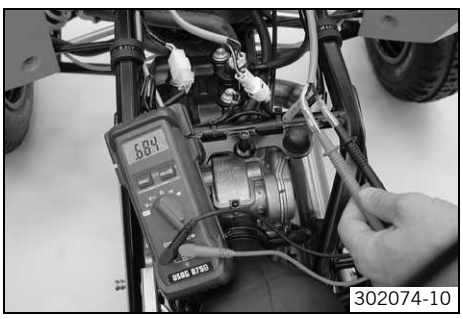


– Connect the special tool to both connectors.

Adapter cable (83029043000) (☛ p. 236)

– Connect the positive cable of the multimeter to the yellow cable and the ground wire to the black cable of the special tool. Measure the throttle position sensor voltage.

Variable throttle position sensor voltage V_{var} (throttle slide closed)	0.505... 0.855 V



» If the specified value is not reached:
– Carburetor - adjust the idle speed. (☛ p. 162)
– Adjust the position of the throttle position sensor. (☛ p. 174)
» If the specified value is reached:
– Remove the cable jumper.
– Connect the relay and mount it.
– Remove the special tool.

Adapter cable (83029043000) (☛ p. 236)

– Connect the plug-in connector of the throttle position sensor.

– Install the fuel tank. (☛ p. 65)
– Install the front cover. (☛ p. 69)

Draining the carburetor float chamber

Danger
Fire hazard Fuel is highly flammable.

– Never refuel the vehicle near open flames or burning cigarettes, and always switch off the engine first. Be careful that no fuel is spilt, especially on hot vehicle components. Clean up spilt fuel immediately.
– Fuel in the fuel tank expands when warm and can escape if the tank is overfilled. See the notes on refueling.

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

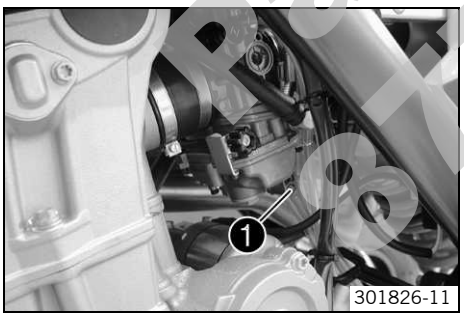
– Avoid contact between fuel and skin, eyes and clothing. Do not inhale fuel vapors. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If fuel is swallowed, contact a doctor immediately. Change clothing that has come 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 301779-10☛ p. 66)
✓ No more fuel flows from the tank to the carburetor.
– Guide the hose coming down behind the engine into a suitable container.

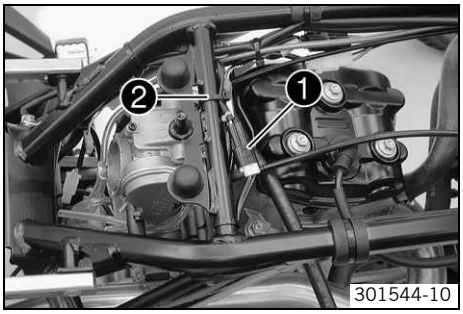


Info
Water in the float chamber results in malfunctioning.

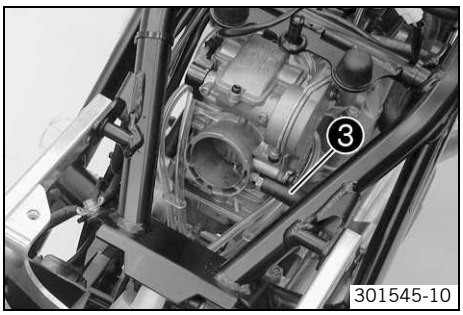
– Undo the screw ❶ (turn it counterclockwise) a few turns and drain the fuel from the float chamber.
– Tighten screw ❶.

Removing the carburetor

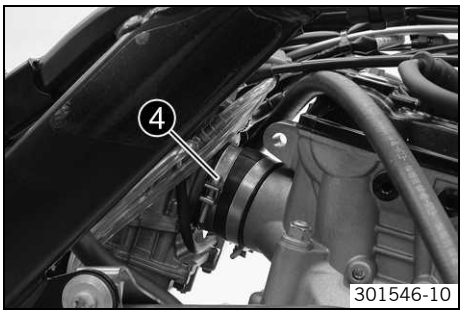
– Remove the fuel tank. (☛ p. 64)
– Remove the air filter box lid with the carburetor connection boot. (☛ p. 62)



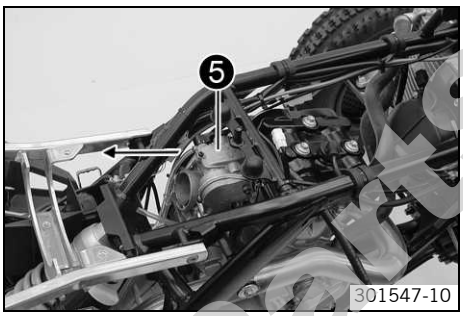
– Unplug connector ❶ of the throttle position sensor.
– Remove cable binder ❷.



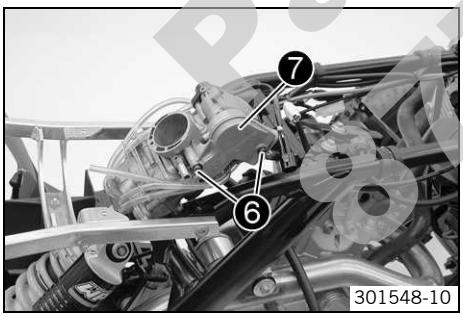
– Detach engine breather hose ❸ from the carburetor.



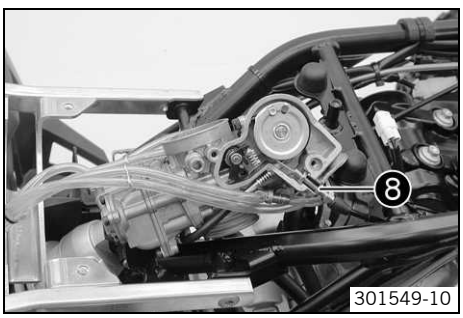
– Loosen hose clip ❹.



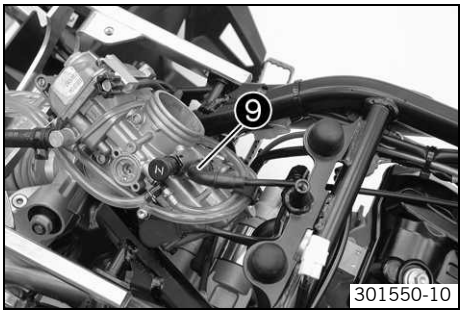
– Take carburetor ❺ out of the frame from the rear and set it down on the frame.



– Remove screws ❻. Remove carburetor cover ❼.

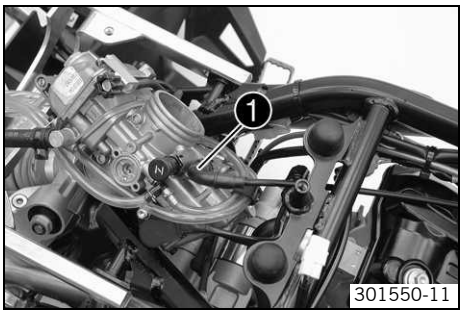


– Loosen nut ❽. Detach the throttle cable and hang it to the side.



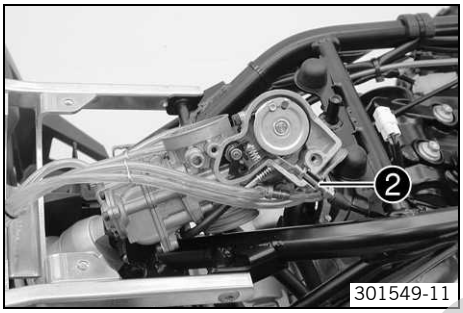
– Unscrew the hot start activation ❾.
– Remove the carburetor.

Installing the carburetor



– Mount the hot start activation ❶.
Guideline

Hot start activation	M12	2.5 Nm (1.84 lbf ft)

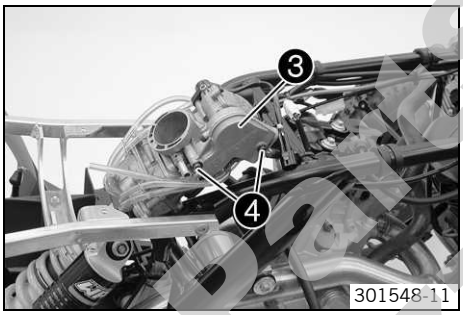


– Attach the throttle cable.

Info
Ensure that the throttle cable is routed correctly.

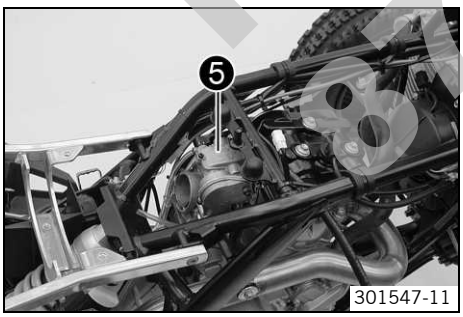
– Adjust the play in the throttle cable and tighten nut ❷.
Guideline

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



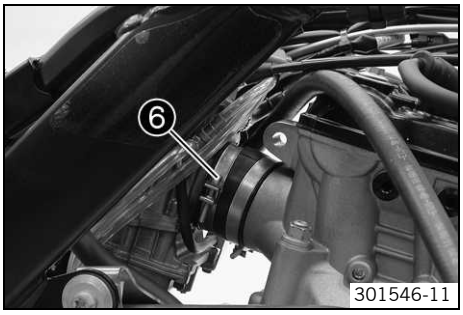
– Position carburetor cover ❸. Mount and tighten screws ❹.
Guideline

Other screws, carburetor	M5	5 Nm (3.7 lbf ft)

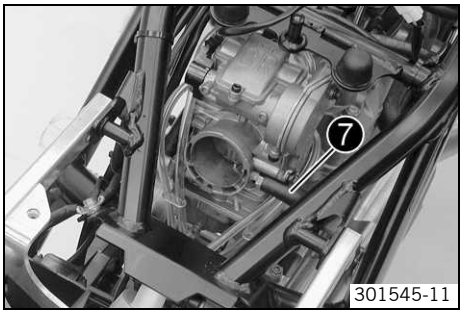


– Insert carburetor ❺ into the rubber sleeve.

Info
Ensure that the carburetor hoses are routed correctly.

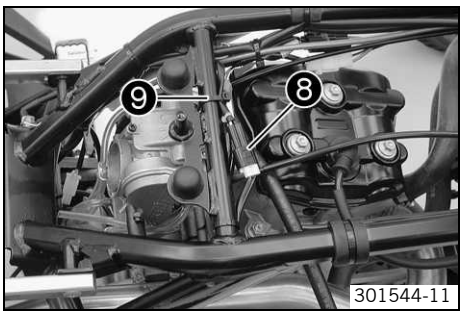


– Position and tighten hose clamp ❻.



– Attach engine breather hose ❼ to the carburetor.

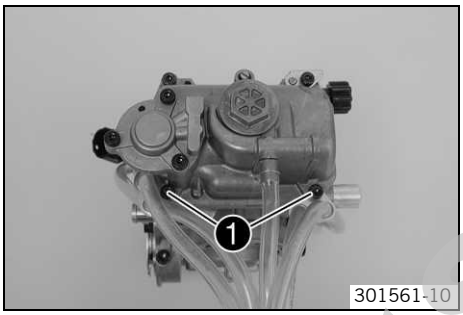
Info
Ensure that the engine breather hose is routed properly.



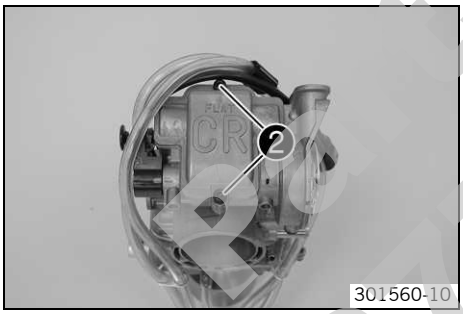
– Connect plug ❽ of the throttle position sensor.
– Secure the cables with cable binders ❾.
– Install the air filter box lid and the carburetor connection boot. (☛ p. 62)
– Install the fuel tank. (☛ p. 65)
– Check the play in the throttle cable. (☛ p. 162)

Disassembling the carburetor

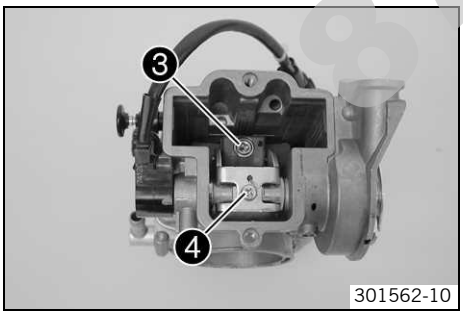
Condition
The carburetor has been removed.



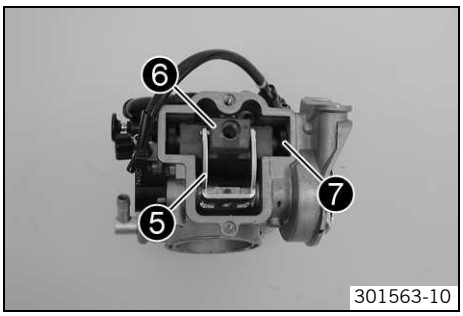
– Remove screws ❶ and detach all vent hoses from the carburetor.



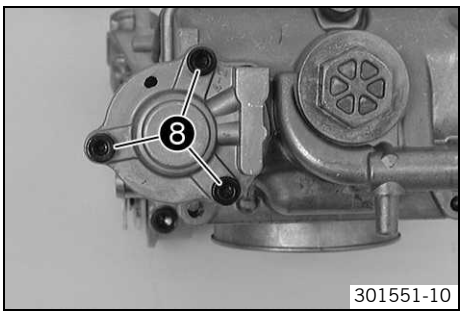
– Remove screws ❷. Take off the throttle slide cover and seal.



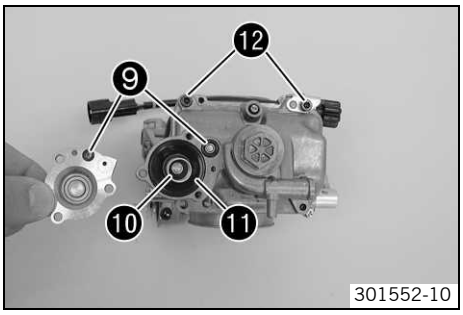
– Remove screw ❸ with the spring and washer.
– Pull the jet needle out of the throttle slide.
– Remove screw ❹.



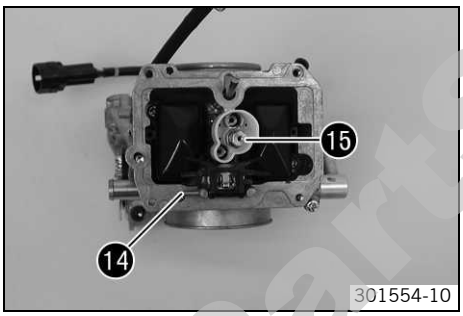
– Pull up throttle slide arm ❺. Take throttle slide ❻ out of the carburetor along with throttle slide roller ❼ and the throttle slide plate.



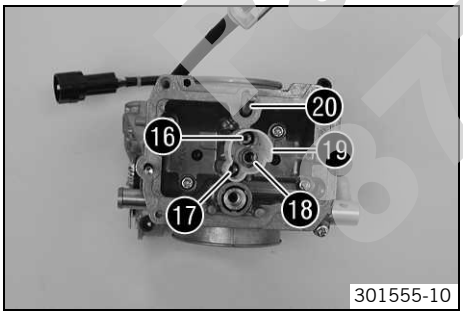
– Remove screws ❽. Take off the accelerator pump cover with the seal ring.



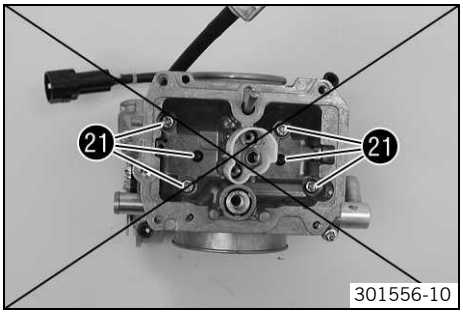
– Remove seal rings ❾, spring ❿ and membrane ⓫.
– Remove screws ⓬ and take off the float chamber body.



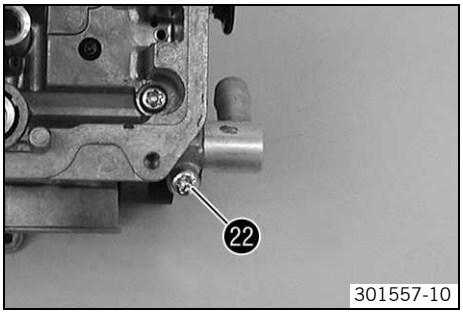
– Remove fulcrum pin ⓭. Take off the float and float needle valve.
– Remove main jet ⓮.



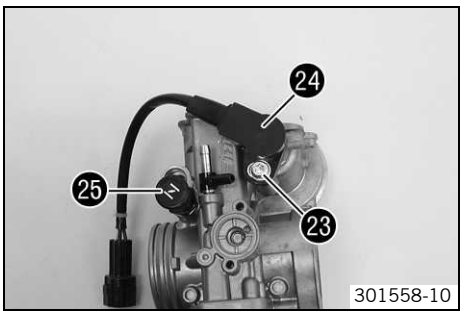
– Remove idling jet ⓯, cold start jet ⓰, needle jet ⓱ and buffer plate ⓲.
– Screw in mixture control screw ⓳ all the way, counting and noting down the number of rotations.
– Remove the mixture control screw with the spring, washer and O-ring.



– Screws ⓴ should not be removed.



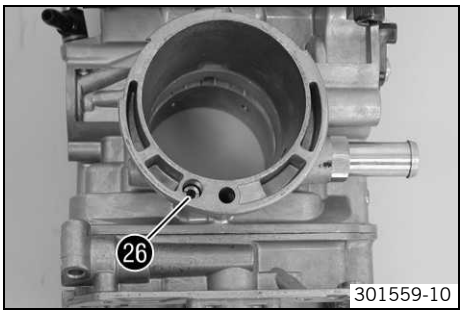
– Remove screw ㉑. Pull the hose connector out of the carburetor.



– Remove screw ㉒. Take off throttle position sensor ㉓.

Info
Only remove the throttle position sensor if necessary. If screw ㉒ is loosened, the throttle position sensor must be readjusted.

– Unscrew choke slide ㉔.



– Remove idle air jet ㉕.
– Clean all jets and other parts thoroughly and blow out with compressed air.

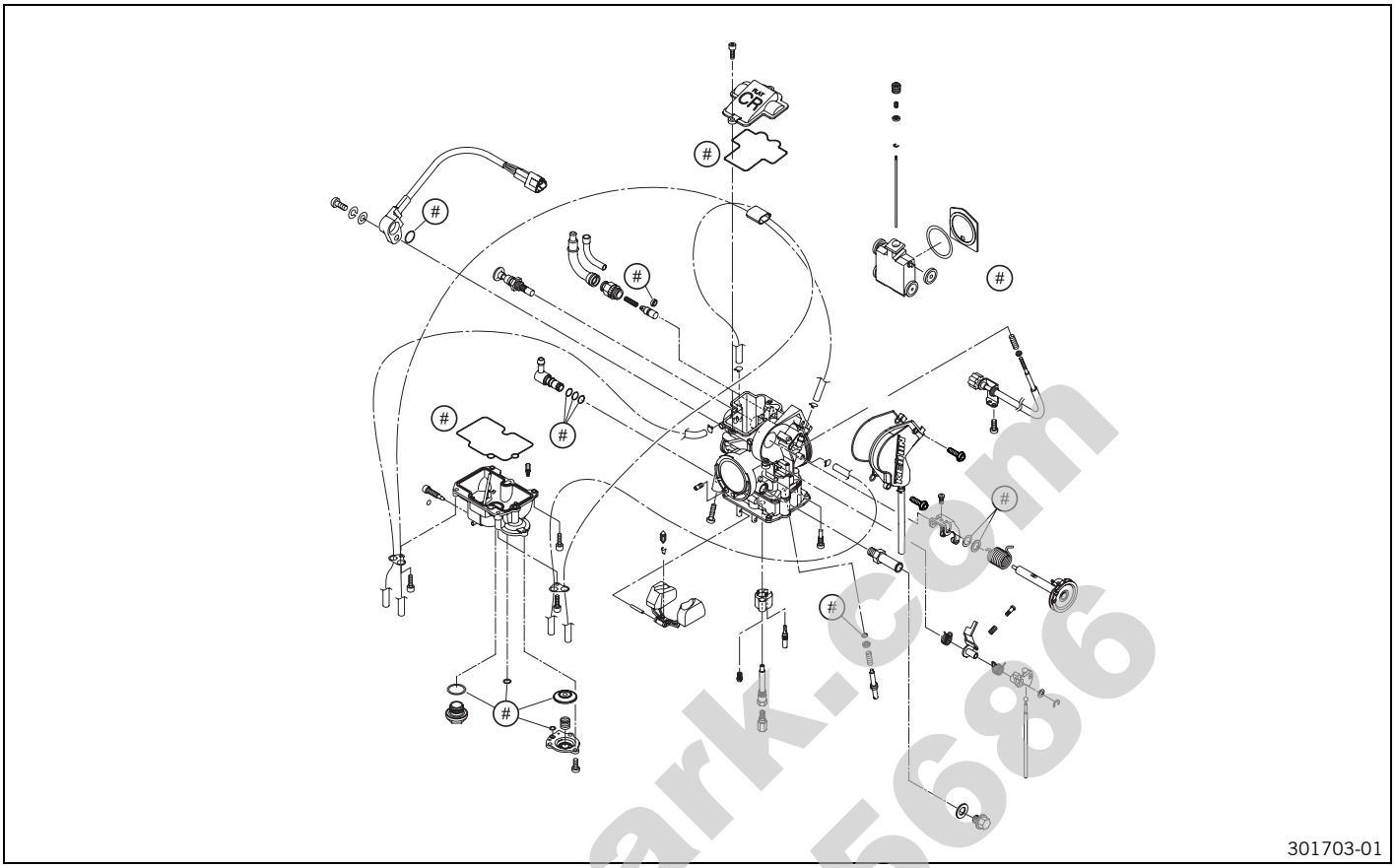
Carburetor cleaner (☛ p. 225)

– Clean the carburetor housing and blow out all channels in the carburetor with compressed air.

Carburetor cleaner (☛ p. 225)

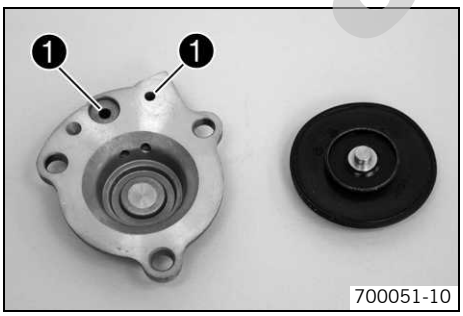
Info
Do not use nitro thinner to clean the carburetor.

Checking/adjusting the carburetor components



- Disassemble the carburetor. (☛ p. 167)
- Check/adjust the accelerator pump. (☛ p. 170)
- Check the choke slide. (☛ p. 171)
- Check the jet needle. (☛ p. 172)
- Check the throttle slide. (☛ p. 172)
- Check the needle jet. (☛ p. 173)
- Check the float needle valve. (☛ p. 173)
- Check/adjust the float level. (☛ p. 174)
- Check/adjust the throttle slide opening. (☛ p. 173)
- Check the throttle position sensor. (☛ p. 171)
- Assemble the carburetor. (☛ p. 175)

Checking/adjusting the accelerator pump

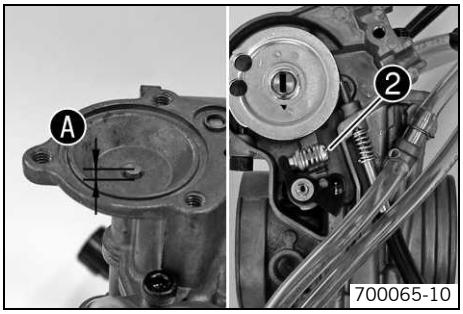


Condition

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 holes ❶ to ensure that they are free.
  - » If the holes are not free:
    - Clean the holes.

Carburetor cleaner (☛ p. 225)



– Check/adjust the throttle slide opening. (☛ p. 173)

Info
Adjustment of the play of the accelerator pump affects the starting point of injection and has no influence on the injection rate or the intensity of the accelerator pump.

– Check piston rod overhang ❶.

Guideline

Piston rod overhang	0.9... 1.0 mm (0.035... 0.039 in)

» If piston rod overhang ❶ does not meet specifications:
– Correct the piston rod overhang by turning adjusting screw ❷.

Checking the choke slide

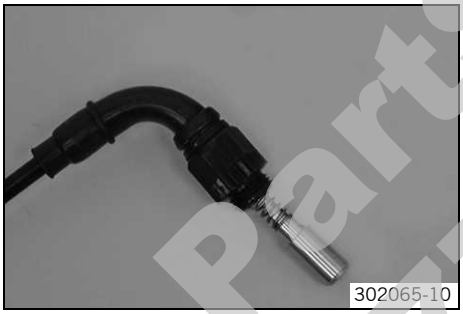
Condition
The choke slide has been removed.

– Check the choke slide for smooth operation.
» If the choke slide cannot be moved easily or is soiled:
– Clean the choke slide.

Carburetor cleaner (☛ p. 225)

– Check the plunger of the choke slide for damage and wear.
» If the plunger 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 hot start slide



Condition
The hot start slide has been removed.

– Check the hot start slide for smooth operation.
» If the hot start slide cannot be moved easily or is soiled:
– Clean the hot start slide.

Carburetor cleaner (☛ p. 225)

– Check the plunger of the hot start slide for damage and wear.
» If the plunger of the hot start slide is damaged or worn:
– Change the hot start slide.
– Check the rubber collar.
» If the rubber collar is damaged or brittle:
– Change the hot start slide.

Checking the throttle position sensor

Info
The value in the figure is an example only.

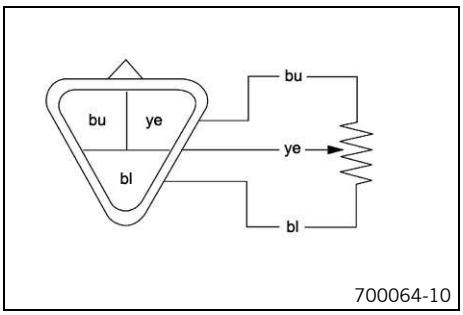
Condition
The carburetor has been removed.
Component temperature: 20 °C (68 °F)

– Check/adjust the throttle slide opening. (☛ p. 173)

– 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

Throttle position sensor, total resistance R_{tot}	4… 6 kΩ



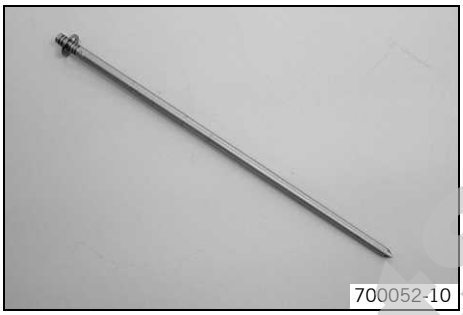
– Connect the plus cable of the multimeter to the yellow (ye) cable and the ground cable to the black (bl) cable of the throttle position sensor connector.
– Slowly open the throttle slide and measure the variable throttle position sensor resistance R_{var}.

Variable throttle position sensor, resistance R_{var} (throttle slide fully open)	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. 174)

Checking the jet needle

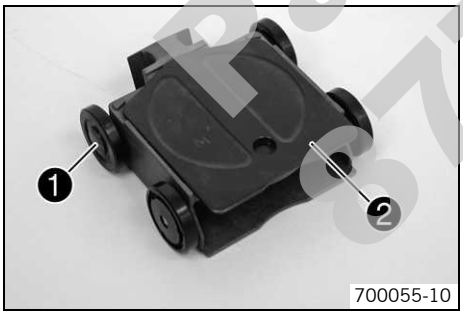
Condition
The jet needle has been removed.



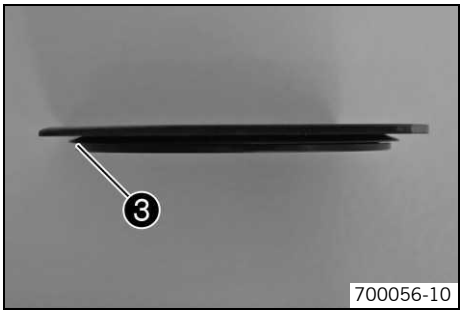
– Check the jet needle for bending and wear of the coating.
» If the jet needle is bent, or the coating is damaged or worn:
– Change the jet needle.
– Check that the needle clip is firmly seated.
» If the needle clip is not firmly seated:
– Change the needle clip or jet needle.

Checking the throttle slide

Condition
The throttle slide has been removed.



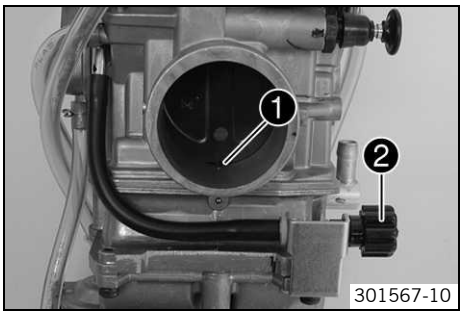
– Check the throttle slide rollers for damage and wear.
» If the throttle slide rollers do not turn smoothly, are worn or have flattened surfaces:
– Change the throttle slide.
– Except for the throttle slide valve ❶ (removable), all rollers must be firmly seated on the throttle slide.
» If the throttle 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.



– 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/adjusting 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.



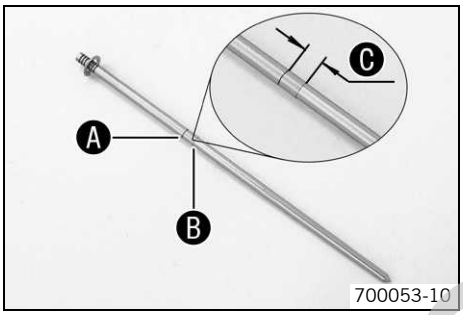
Condition
The carburetor has been removed.

– 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 needle jet



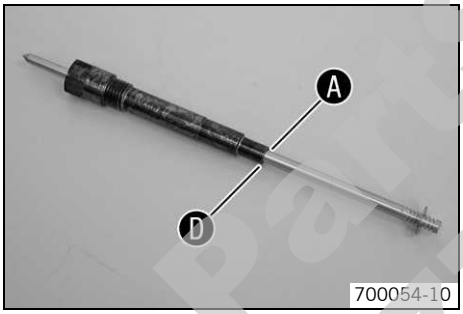
Condition
The needle jet has been removed.

– Use a new jet needle as a gauge. On the jet needle, make a mark ❹ above the level ❸ at a distance ❷.

Guideline

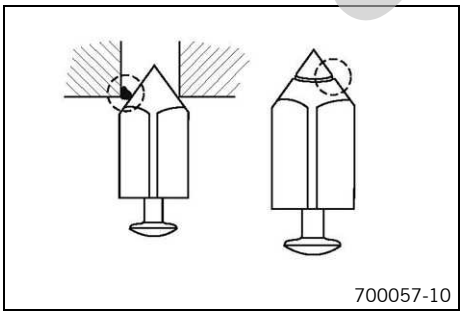
Distance ❷	3 mm (0.12 in)

Info
The marking must be completely removable.



– Insert the marked jet needle into the needle jet to be tested. Push the two parts together carefully.
– Check the needle jet.
» If marking ❹ is not visible on the jet needle at the upper edge ❶ of the needle jet:
– Change the needle jet.

Checking the float needle valve



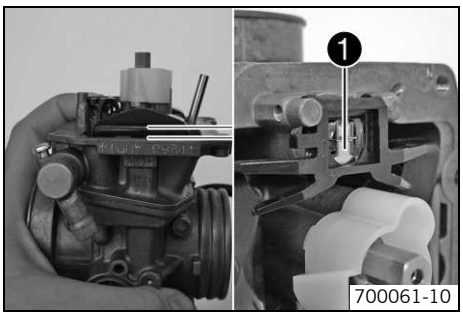
Condition
The float needle valve has been removed.

– 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. 225)

– Check the float needle valve for wear and check the sealing areas for notches.
» If the sealing area is damaged or worn:
– Change the float needle valve.

Checking/adjusting the float level



Condition

The carburetor and float chamber have been removed.

– Tilt the carburetor to one side, preventing the pin of the float from falling out.
– Tilt the carburetor until the float rests against the float needle valve but the float needle valve is not pushed together.
  » If the edge of the float is not parallel to the sealing area of the float housing in this position:
    – Adjust the float level by bending float lever ❶.

Adjusting the position of the throttle position sensor

Info

The value in the figure is an example only.

Condition

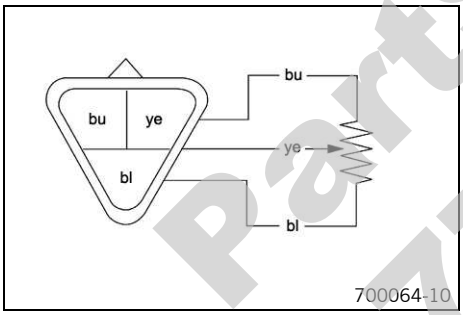
The carburetor has been removed.
Component temperature: 20 °C (68 °F)

– Check/adjust the throttle slide opening. (☛ p. 173)

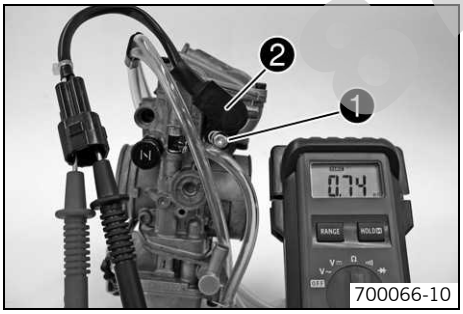
– Connect the plus cable of the multimeter to the blue (bu) cable and the ground cable to the black (bl) cable of the throttle position sensor connector. Measure the total throttle position sensor resistance R_{tot}.

Guideline

Throttle position sensor, total resistance R_{tot}	4… 6 kΩ



– 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)



– 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.

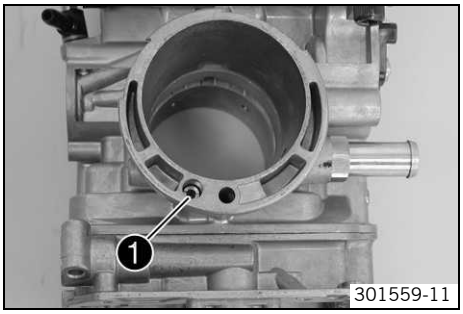
– Loosen screw ❶. Adjust the throttle position sensor ❷ by turning to the calculated value.
– Tighten screw ❶.

Guideline

Screw, throttle position 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.

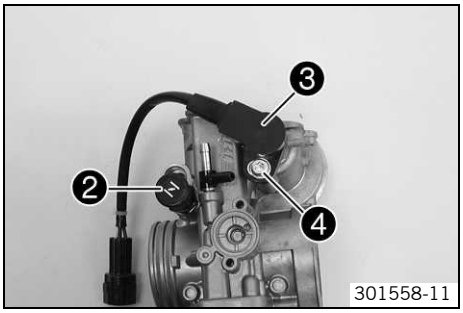
Assembling the carburetor



– Mount and tighten idle air jet ❶.

Guideline

Idle air jet	M4.5x0.75	2 Nm (1.5 lbf ft)



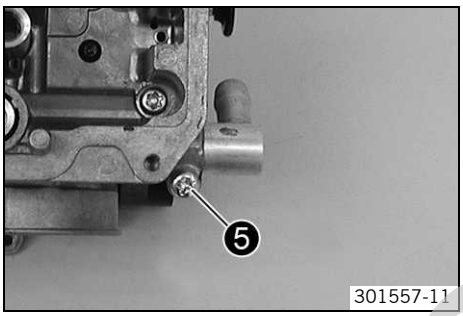
– Mount and tighten choke slide ❷.

Guideline

Choke slide	M12	2.5 Nm (1.84 lbf ft)

– Position throttle position sensor ❸. Mount screw ❹ with the spring ring and washer but do not tighten yet.

Info
When installing the throttle position sensor, ensure that the flat area of the inner clutch hub engages in the recess of the throttle position sensor.

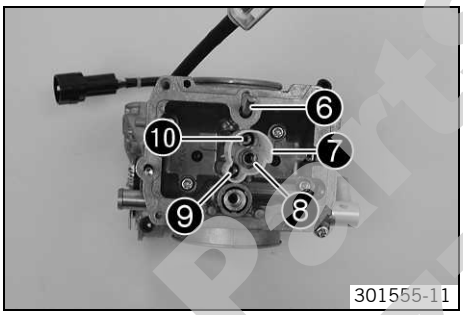


– Position the hose connection. Mount and tighten screw ❺.

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 the mixture control screw ❻ with the spring, washer, and O-ring all the way.

Guideline

Mixture control screw	M6x0.5	1 Nm (0.7 lbf ft)

– Screw in the mixture control screw ❻ by the number of turns that were required to disassemble it, or adjust it to the specified basic setting.

Guideline

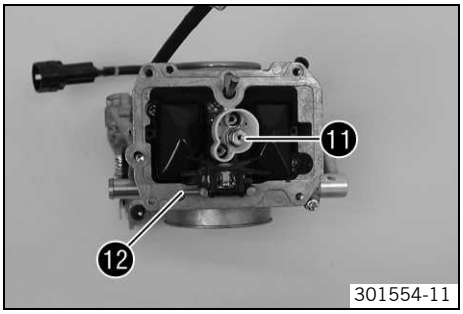
Idle mixture adjusting screw	
Open	1.5 turns

Info
The mixture control screw may be open a maximum of 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)

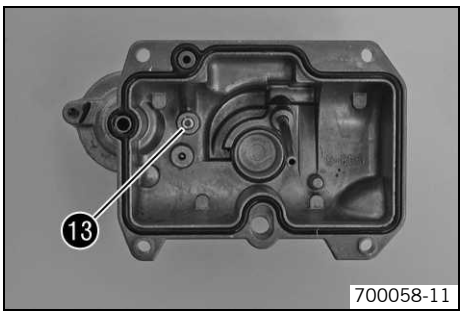


– Mount and tighten main jet ⓫.

Guideline

Main jet	M5x0.75	2 Nm (1.5 lbf ft)

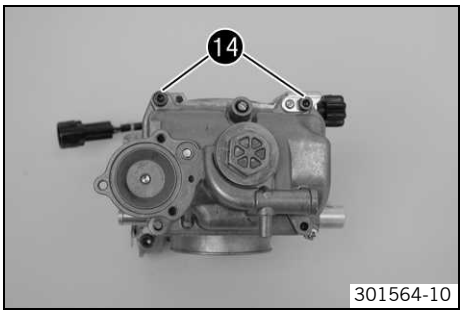
– Position the float together with the float needle valve, and mount fulcrum pin ⓬.
– Check/adjust the float level. (☛ p. 174)



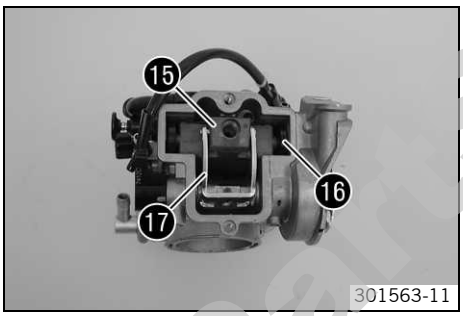
– Mount and tighten spill jet ⓭.

Guideline

Spill jet	M4x0.7	2 Nm (1.5 lbf ft)



– Position the float chamber and adjusting screw.
– Mount screws ⓮ but do not tighten yet.

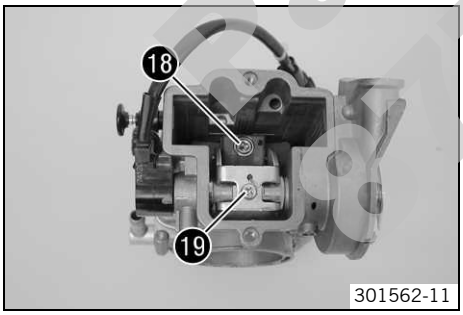


– Insert throttle slide ⓯ with throttle slide roller ⓰ and the throttle slide plate into throttle slide arm ⓱ and position it in the carburetor.
– Position the needle clip on the jet needle.

Guideline

Needle position	3rd position from top

– Insert the jet needle.



– Mount and tighten screw ⓲ with the spring and washer.

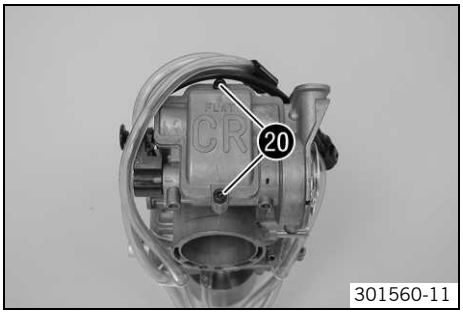
Guideline

Needle screw	M8	3.5 Nm (2.58 lbf ft)

– Mount and tighten screw ⓳.

Guideline

Screw, throttle slide arm	M4	2 Nm (1.5 lbf ft)	**Loctite® 243™**

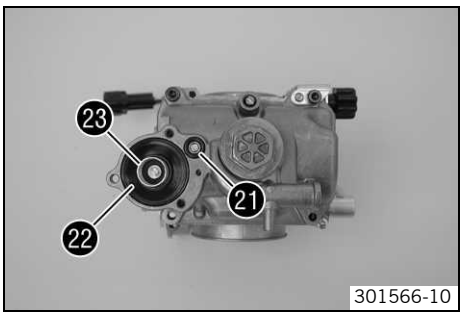


– Position the throttle slide cover with the gasket. Mount and tighten screws ⓴.

Guideline

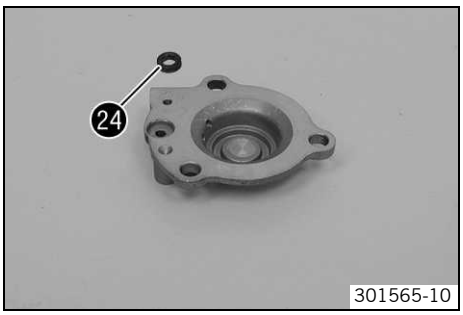
Other screws, carburetor	M4	2 Nm (1.5 lbf ft)

– Check/adjust the throttle slide opening. (☛ p. 173)

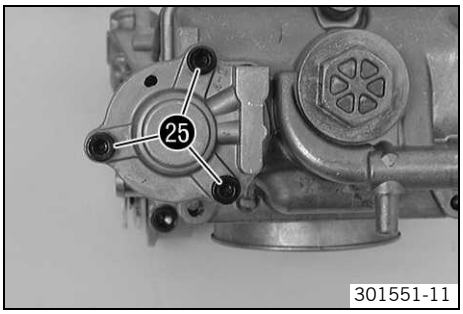


– Check/adjust the accelerator pump. (☛ p. 170)
– Position seal ring ㉑, membrane ㉒ and spring ㉓.

Info
The label on the membrane must be visible when the membrane is mounted.



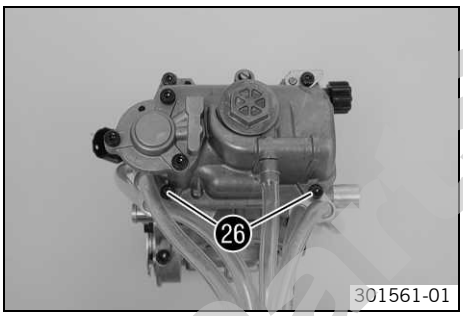
– Position seal ring ㉔ in the accelerator pump cover with the rounded side facing out.



– Position the accelerator pump cover. Mount and tighten screws ㉕.

Guideline

Other screws, carburetor	M4	2 Nm (1.5 lbf ft)



– Position and mount the bleeder hoses.
– Position the hose holder. Mount screws ㉖ and tighten all screws in a crisscross pattern.

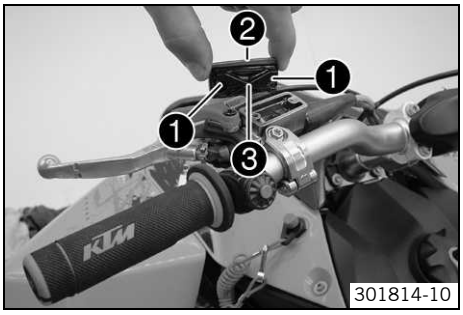
Guideline

Other screws, carburetor	M4	2 Nm (1.5 lbf ft)

– Adjust the position of the throttle position sensor. (☛ p. 174)

Checking fluid level of hydraulic clutch

Info
The fluid level rises with increasing wear of the clutch lining disc.
Do not use brake fluid.



– 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 under top level of container	4 mm (0.16 in)

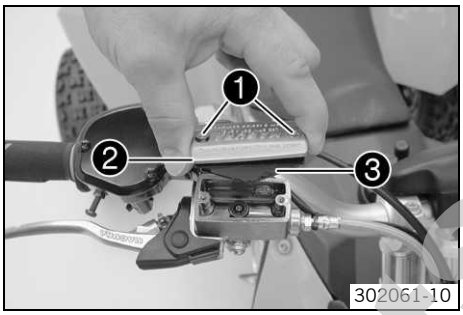
» If the coolant level does not meet specifications:
– Correct the fluid level of the hydraulic clutch.

Hydraulic fluid (15) (☛ p. 224)

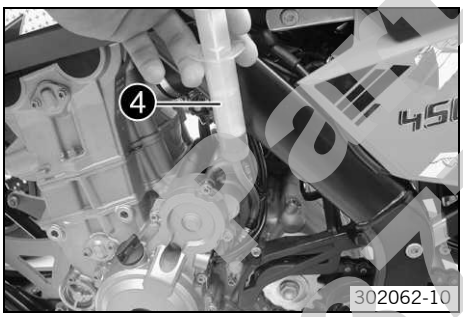
– Position the cover with the membrane. Mount and tighten screws.

Changing the hydraulic clutch fluid

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.



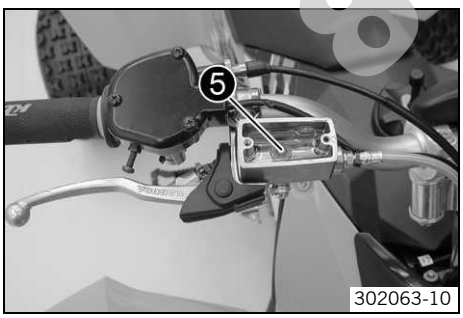
– Move the clutch fluid reservoir mounted on the handlebar to a horizontal position.
– Remove screws ❶.
– Remove cover ❷ with membrane ❸.



– Fill bleeding syringe ❹ with the appropriate hydraulic fluid.

Bleed syringe (50329050000) (☛ p. 227)
Hydraulic oil (15) (☛ p. 224)

– Remove the bleeder screw on the clutch slave cylinder and mount the bleeding syringe.

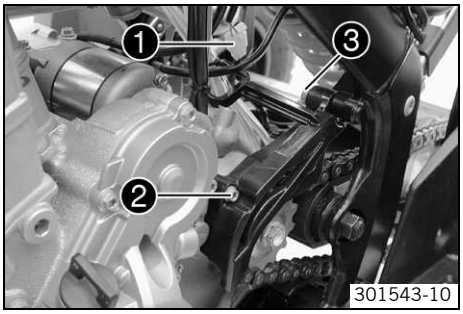


– Inject the liquid into the system until it escapes from hole ❺ of the clutch master cylinder without bubbles.
– To prevent overflow, interrupt this process to drain fluid from the master cylinder reservoir.
– Remove the bleeding syringe. Mount and tighten the bleeder screw.
– Correct the fluid level of the hydraulic clutch.
Guideline

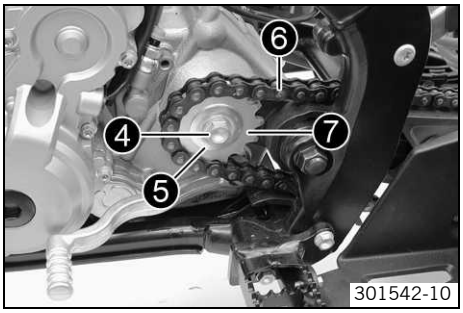
Fluid level below container rim	4 mm (0.16 in)

– Position the cover with the membrane. Mount and tighten the screws.
– Check that the clutch is functioning properly.

Removing the engine sprocket

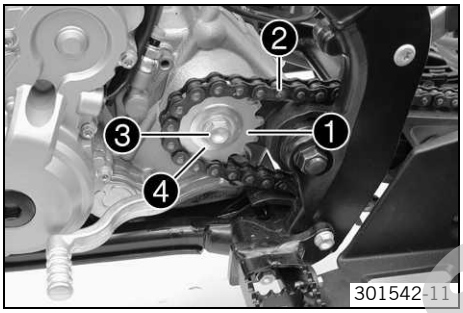


– Disconnect plug ❶ of the brake light switch.
– Remove screws ❷ and ❸. Take off the engine sprocket cover.



– Activate the rear brake and remove screw ❹ with spring washer ❺.
– Pull engine sprocket ❼ off the countershaft with chain ❻. Remove the engine sprocket.

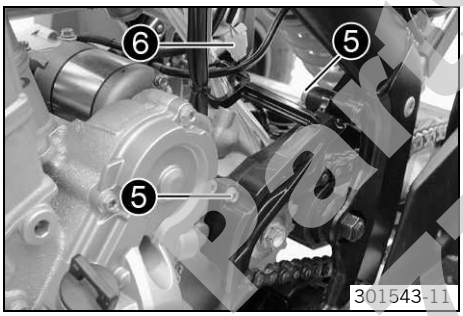
Installing the engine sprocket



– Insert engine sprocket ❶ into chain ❷ with the collar facing the engine and slide onto the countershaft together.
– Activate the rear brake. Mount and tighten screw ❸ with spring washer ❹.

Guideline

Screw, engine sprocket	M10	60 Nm (44.3 lbf ft)	**Loctite® 243™**



– Position the engine sprocket cover. Mount and tighten screws ❺.

Guideline

Screw, clutch slave cylinder	M6	10 Nm (7.4 lbf ft)
Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)

– Connect plug ❻ of the brake light switch.

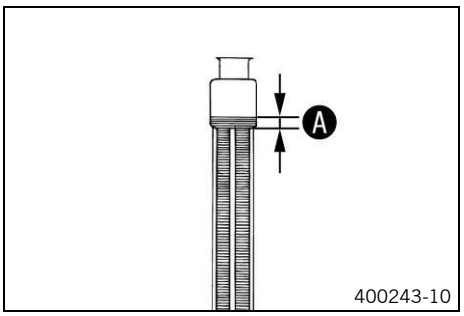
Checking antifreeze and coolant level

Warning
Danger of scalding The coolant gets very hot and is under high pressure when the vehicle is operated.

– Do not remove the radiator cap or remove radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. If you scald yourself, hold the affected area under lukewarm water immediately.

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

– Avoid contact between coolant and skin, eyes and clothing. If it 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 coolant out of the reach of children.



– Remove the front trim. (☛ p. 69)
– Remove the radiator cap.
– Check antifreeze of coolant.

−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 Ⓐ 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. 223)

Alternative 2

Coolant (mixed ready to use) (☛ p. 223)

– Mount the radiator cap.

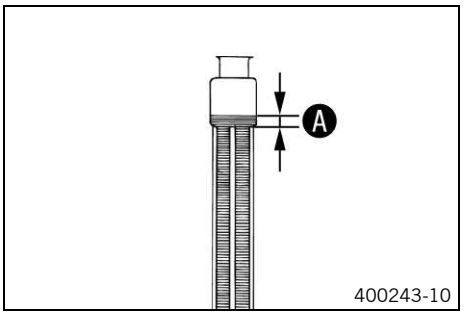
Checking the coolant level

Warning
Danger of scalding The coolant gets very hot and is under high pressure when the vehicle is operated.

– Do not remove the radiator cap or remove radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. If you scald yourself, hold the affected area under lukewarm water immediately.

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

– Avoid contact between coolant and skin, eyes and clothing. If it 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 coolant out of the reach of children.



– Remove the front trim. (☛ p. 69)
– Remove the radiator cap.
– Check the coolant level in the radiator.

Coolant level Ⓐ 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. 223)

Alternative 2

Coolant (mixed ready to use) (☛ p. 223)

– Mount the radiator cap.

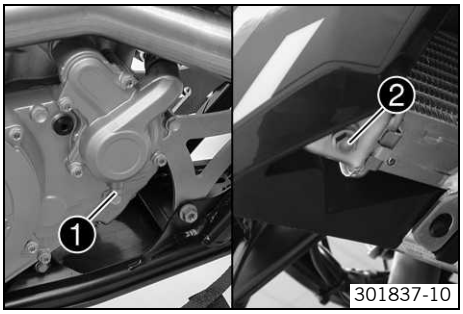
Draining coolant

Warning
Danger of scalding The coolant gets very hot and is under high pressure when the vehicle is operated.

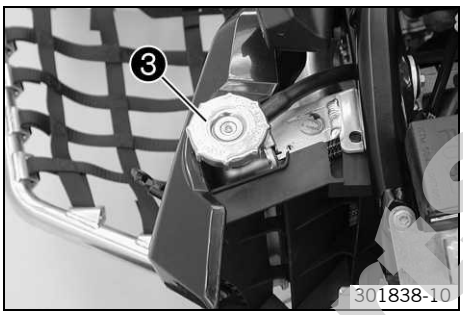
– Do not remove the radiator cap or remove radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. If you scald yourself, hold the affected area under lukewarm water immediately.

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

– Avoid contact between coolant and skin, eyes and clothing. If it 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 coolant out of the reach of children.



– Remove the front trim. (☛ p. 69)
– Place a suitable container under the vehicle.
– Remove screw ❶.
– Remove screw ❷.



– Remove the radiator cap ❸. Completely drain the coolant.
– Mount screw ❶ with a new seal and tighten it.

Guideline

Screw, water pump cover	M6	10 Nm (7.4 lbf ft)

– Mount screw ❷ with a new seal and tighten it.

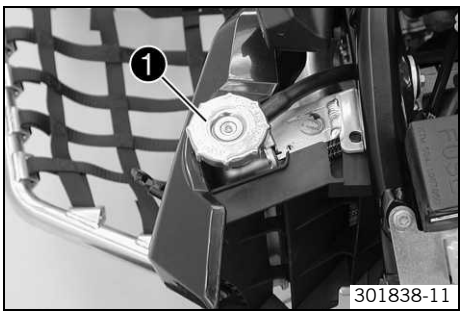
Guideline

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

Filling coolant/bleeding the cooling system

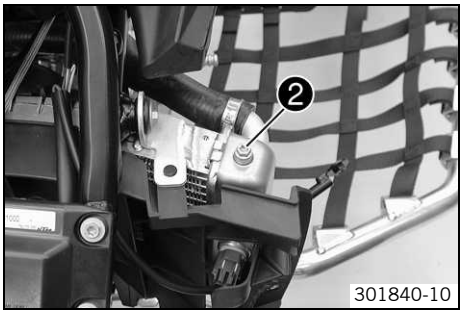
Warning
Danger of poisoning Coolant is poisonous and a health hazard.

– Avoid contact between coolant and skin, eyes and clothing. If it 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 coolant out of the reach of children.



– Remove the front trim. (☛ p. 69)
– Remove the radiator spoiler. (☛ p. 63)
– Remove the radiator cap ❶.
– Fill the coolant into the radiator.

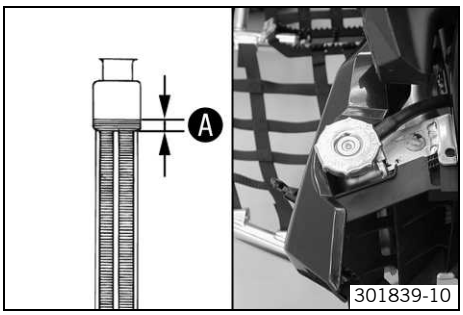
Coolant	1.50 l (1.59 qt.)	Coolant (☛ p. 223)
		Coolant (mixed ready to use) (☛ p. 223)



– Open screw ❷ to bleed the radiator. Tighten the screw when coolant emerges from the opening.

Guideline

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



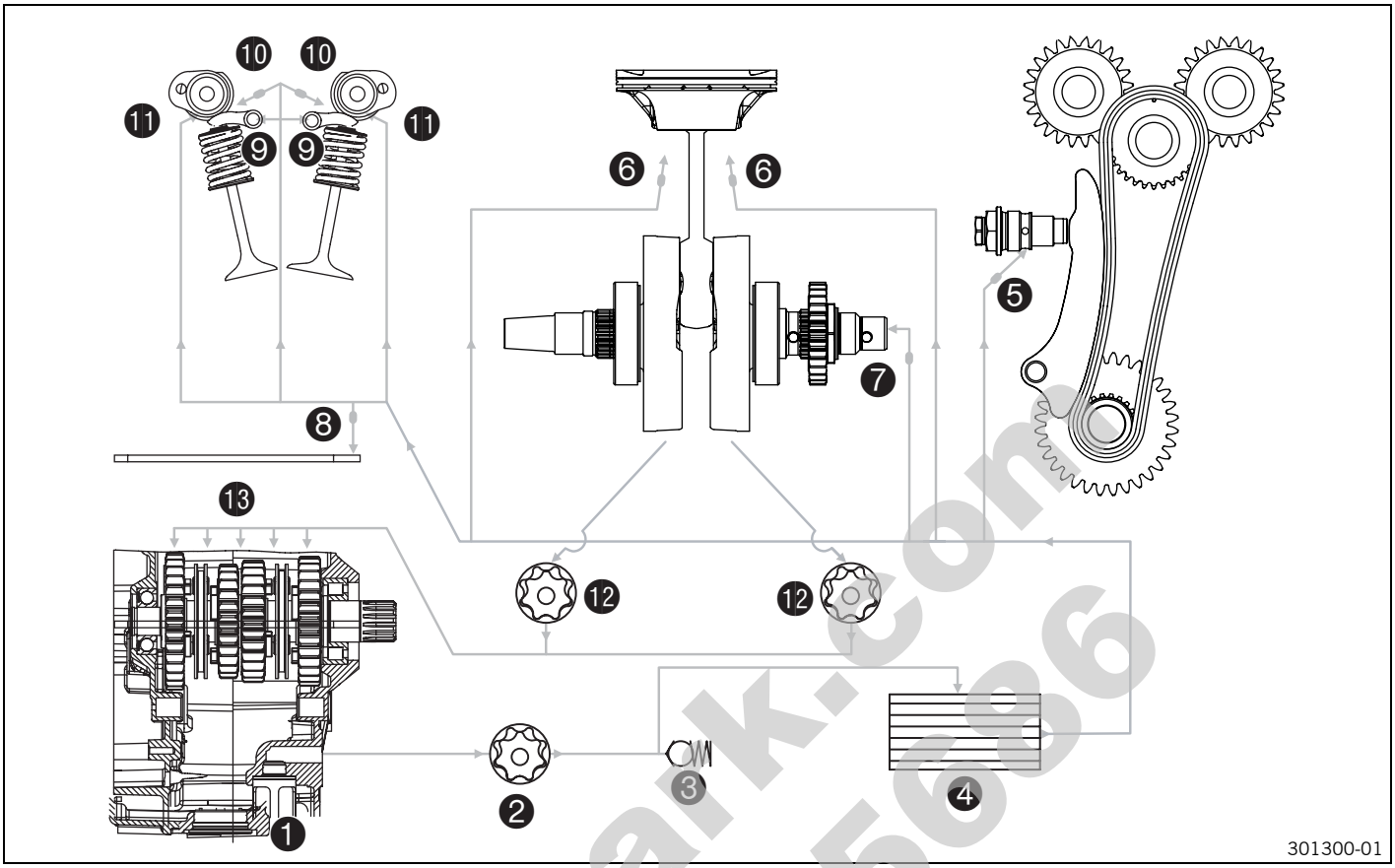
– Add coolant to level Ⓐ above the radiator fins.

Guideline

10 mm (0.39 in)

– Mount the radiator cap.
– Install the front trim. (☛ p. 70)
– Make a short test ride.
– Check the coolant level. (☛ p. 180)

Oil circuit



Oil circuit, force pump

1	Oil screen
2	Force pump
3	Oil pressure regulator valve
4	Oil filter
5	Oil jet, timing chain tensioner
6	Oil jet, piston cooling
7	Oil jet, conrod lubrication
8	Oil jet for oil supply, clutch
9	Oil channel, cam lever bearing
10	Oil jet for cam lever lubrication
11	Oil channel, camshaft bearing

Oil circuit, suction pump

12	Suction pump for evacuating the crank chamber
13	Oil channel, transmission lubrication

Changing the engine oil and oil filter, cleaning the oil screen

- Drain the engine oil. (☛ p. 184)
- Remove the oil filter. (☛ p. 184)
- Install the oil filter. (☛ p. 185)
- Fill up with engine oil. (☛ p. 185)

Draining the engine oil

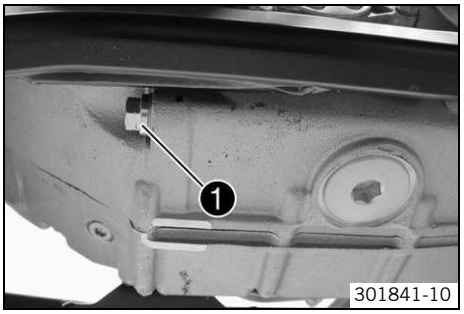
Warning
Danger of scalding Engine oil and gear oil get very hot when the vehicle is driven.

– Wear suitable protective clothing and gloves. If you scald yourself, hold the affected area under lukewarm water 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
Drain the engine oil only when the engine is warm.



– Park the vehicle on a horizontal surface.
– Remove the engine guard. (☛ p. 20)
– Place a suitable container under the engine.
– Remove oil drain plug ❶ with the seal ring.
– Completely drain the engine oil.
– Thoroughly clean the oil drain plug with the magnet.
– Clean the sealing area on the engine.
– Fit oil drain plug ❶ with seal ring and tighten it.

Guideline

Oil drain plug with magnet	M12x1.5	20 Nm (14.8 lbf ft)

– Clean the oil screen.

Removing the oil filter

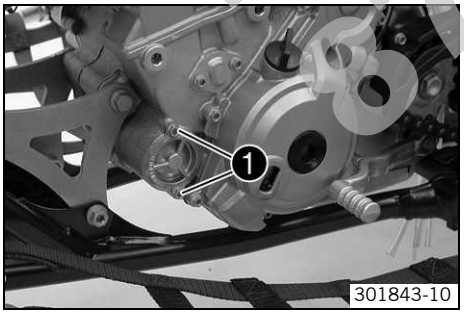
Warning
Danger of scalding Engine oil and gear oil get very hot when the vehicle is driven.

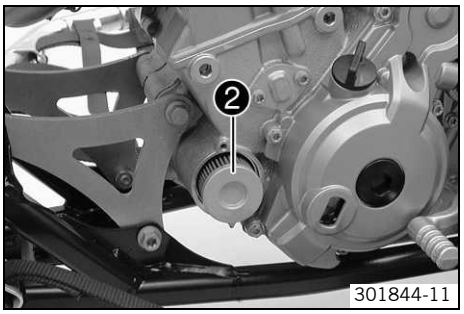
– Wear suitable protective clothing and gloves. If you scald yourself, hold the affected area under lukewarm water immediately.

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.

– Place a suitable container under the engine.
– Remove screws ❶. Take off the oil filter cover with the O-ring.



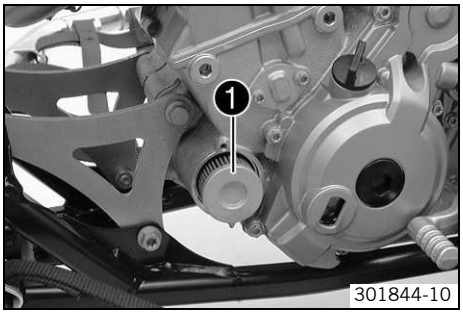


– Pull oil filter element ❷ out of the oil filter case.

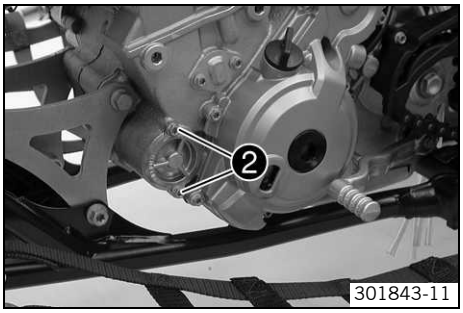
Circlip pliers reverse (51012011000) (☛ p. 228)

– Completely drain the engine oil.
– Thoroughly clean parts and sealing area.

Installing the oil filter



– Fill oil filter ❶ with engine oil and place it in the oil filter housing.



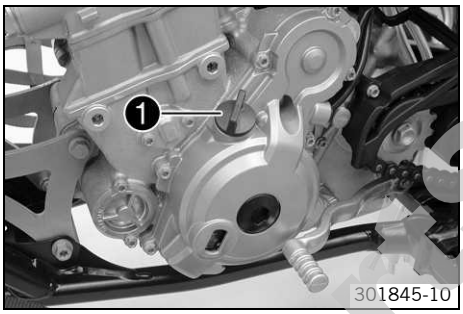
– Oil the O-ring of the oil filter cover and install it with the oil filter cover.
– Mount and tighten screws ❷.

Guideline

Screw, oil filter cover	M5	6 Nm (4.4 lbf ft)

Filling up with engine oil

Info
A lack of engine oil or poor-quality engine oil results in premature wear to the engine.



– Remove the filler cap ❶ on the clutch cover and fill up with engine oil.

Engine oil	2.00 l (2.11 qt.)	External temperature: ≥ 0 °C (≥ 32 °F)	Engine oil (SAE 10W/50) (☛ p. 223)
		External temperature: < 0 °C (< 32 °F)	Engine oil (SAE 5W/40) (☛ p. 223)

– Mount and tighten filler cap ❶.

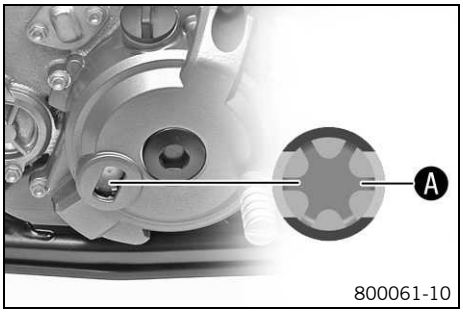
Danger
Danger of poisoning Exhaust gases are poisonous and inhaling them may result in unconsciousness and/or death.

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

– Start the engine and check that it is oil-tight.
– Check the engine oil level. (☛ p. 185)

Checking the engine oil level

Info
The engine oil level can be checked on a cold or hot engine.



– Park the vehicle on a horizontal surface.

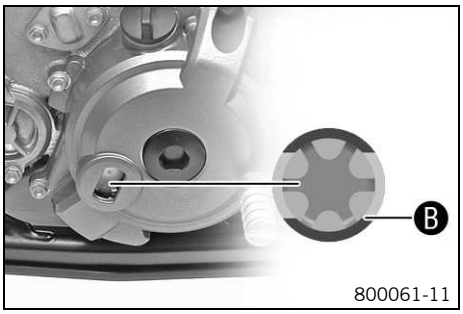
Condition
The engine is at operating temperature.

– Check the engine oil level.

Info
After switching off the engine, wait one minute before checking the level.

The engine oil reaches the middle of the viewer Ⓐ.

» When the engine oil does not reach the middle of the viewer Ⓐ:
– Add engine oil. (☛ p. 186)



Condition

The engine is cold.

– Check the engine oil level.

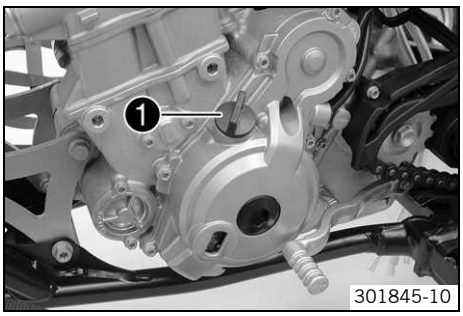
The engine oil reaches the bottom of the viewer Ⓑ.

» When the engine oil does not reach the bottom of the viewer Ⓑ:
– Add engine oil. (☛ p. 186)

Adding engine oil

Info

A lack of engine oil or poor-quality engine oil results in premature wear to the engine.



– Check the engine for leakage.
– Remove the filler cap ❶ on the clutch cover and fill up with engine oil.

Condition

External temperature: ≥ 0 °C (≥ 32 °F)

Engine oil (SAE 10W/50) (☛ p. 223)

Condition

External temperature: < 0 °C (< 32 °F)

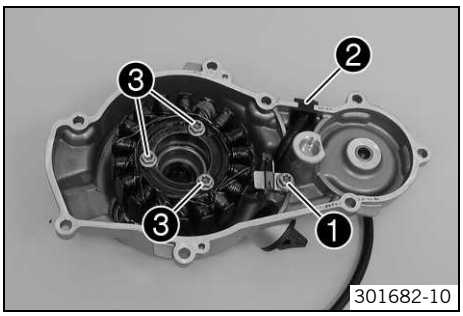
Engine oil (SAE 5W/40) (☛ p. 223)

info

To ensure optimal engine oil performance, it is advisable to not use different engine oils.
We recommend making an oil change in this case.

– Mount and tighten filler cap ❶.

Removing the stator

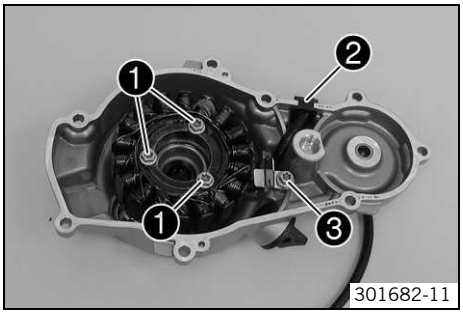


Condition

The alternator cover has been removed.

– Remove screw ❶ and the retaining bracket.
– Remove cable support sleeve ❷ from the alternator case.
– Remove screws ❸.
– Take the stator out of the alternator cover.

Installing the stator



– Position the stator in the alternator cover.
– Mount screws ❶.

Guideline

Screw, stator bracket	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

– Position cable support sleeve ❷ in the alternator case.
– Position the retaining bracket. Mount and tighten screw ❸.

Guideline

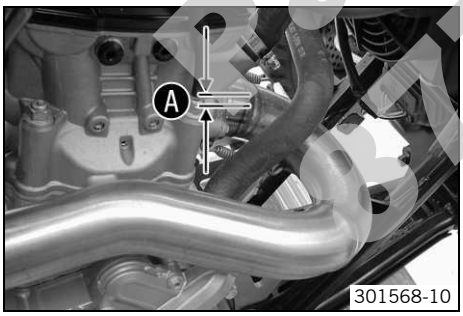
Screw, stator cable holder	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

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

The battery must be charged.
The fuse in the starter relay must be functional.

– Shift gear to neutral.
– Pull off the spark plug connector and remove the spark plug connector from the ignition wire. Hold the free end of the ignition wire a distance Ⓐ from ground.

Guideline

Distance Ⓐ	5 mm (0.2 in)

– Press the electric starter button.

Info

Do not open the throttle.

– Check the ignition spark.
  » If an ignition spark is not visible:
    – 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 by simple means but must be placed on an ignition test bench.

    – Check the ignition coil. (☛ p. 188)
    – Check the ignition pulse generator. (☛ p. 189)

– Check the alternator. (☛ p. 190)
– Check the spark plug connector. (☛ p. 189)
– Change the spark plug.


301569-10

– Connect the spark plug connector with the ignition wire again. Unscrew the spark plug and insert it into the spark plug connector. Touch the spark plug to ground.
– Press the electric starter button.

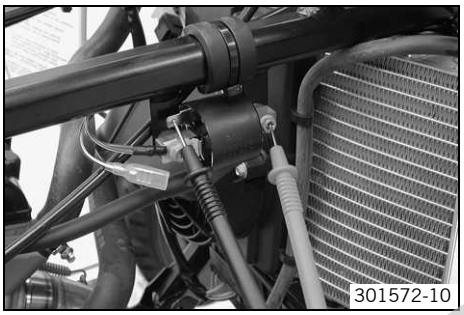
Info
Do not open the throttle.

– Check the ignition spark.
» If an ignition spark is not visible:
– Change the 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.

– Remove the fuel tank. (☛ p. 64)
– Remove the spark plug connector.
– Measure the primary winding with a multimeter.


301572-10

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 set value:
– Change the ignition coil.

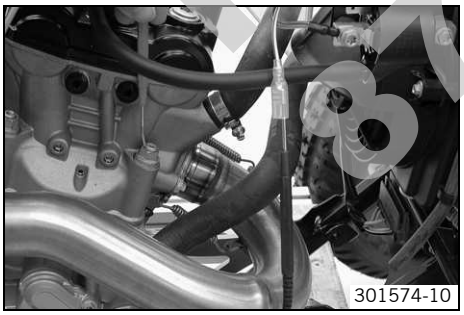
– Measure the secondary winding with a multimeter.


301573-10

Ignition coil - secondary winding	
Ignition wire - ignition coil input at: 20 °C (68 °F)	5... 7.5 kΩ

» If the measured value differs from the set value:
– Change the ignition coil.

– Connect the special tool to the multimeter.


301574-10

Peak voltage adapter (58429042000) (☛ p. 228)

Info
When using the peak voltage adapter, the measurement range of the multimeter should be set to DCV.

– Follow the instructions on starting the engine.
– Touch the red measuring lead of the special tool to ground. Touch the black measuring lead to the ignition coil input.

Ignition coil	
Ground - ignition coil input	190... 210 V

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

Checking the spark plug connector

– Measure the dismantled spark plug connector with a multimeter.

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

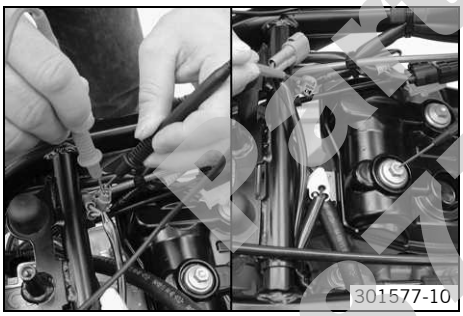
Info
Never check the CDI controller with a conventional measuring instrument. This may result in the destruction of highly sensitive electronic components.

– Check the cables and plug-in connections of the CDI controller. A functional check of the CDI controller is only possible 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 fuel tank. (☛ p. 64)



– Disconnect the electrical plug-in connector connecting the ignition pulse generator to the CDI controller.
– Measure the resistance of the ignition pulse generator using a multimeter.

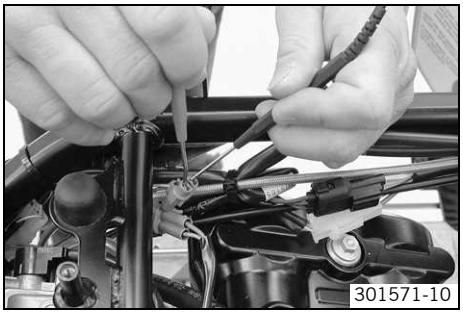
Ignition pulse generator - resistance	
Red - green at: 20 °C (68 °F)	80... 120 Ω
Red - ground at: 20 °C (68 °F)	∞

» If the measured value differs from the set value:
  – Change the ignition pulse generator.

– Connect the special tool to the multimeter.

Peak voltage adapter (58429042000) (☛ p. 228)

Info
When using the peak voltage adapter, the measurement range of the multimeter should be set to DCV.



– Connect the red measuring lead of the special tool to the green wire. Connect the black measuring lead to the red wire.
– Press the electric starter button.

Ignition pulse generator - output voltage - connector disconnected	
Red - green at: 20 °C (68 °F)	1.5... 3 V

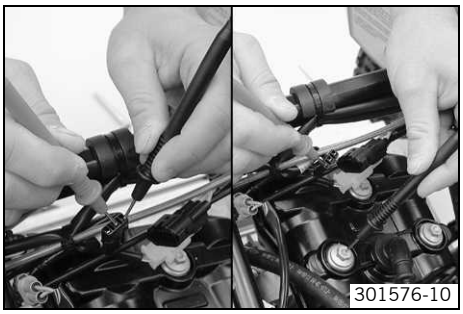
» If the displayed value does not meet specifications:
  – Change the ignition pulse generator.

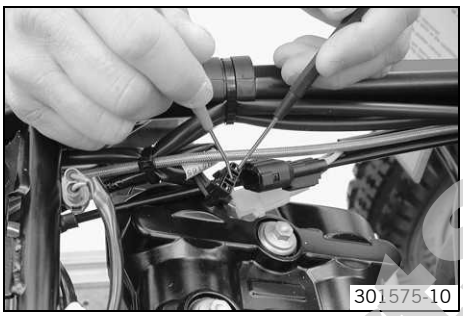
– Connect the CDI controller. Connect the red measuring lead of the special tool to the green wire. Connect the black measuring lead to the red wire.
– Remove the spark plug connector.
– Press the electric starter button.

Ignition pulse generator - output voltage - connector connected	
Red - green at: 20 °C (68 °F)	1... 2 V

» If the displayed value does not meet specifications:
– Change the ignition pulse generator.

Checking the alternator





Condition
All plug-in contacts must be free of corrosion and firmly connected.
The battery must be charged.

– Remove the fuel tank. (☛ p. 64)
– Disconnect the electrical plug-in connector of the stator coil.
– Measure the stator coil with a multimeter.

Stator coil - resistance	
Alternator outputs against each other	≤ 1 Ω
Alternator outputs against ground	∞

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

– Check the alternator output for voltage between the individual wires.
– Connect the special tool to the multimeter.

Peak voltage adapter (58429042000) (☛ p. 228)

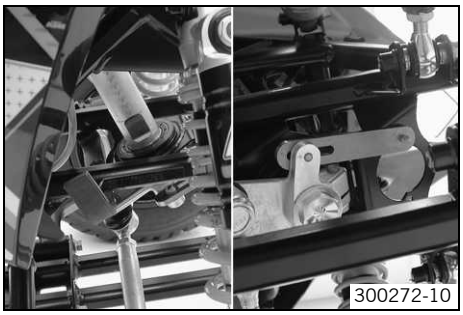
Info
When using the peak voltage adapter, the measurement range of the multimeter should be set to DCV.

– Pull off the spark plug connector.
– Measure the charging coil with the peak voltage adapter.
– Press the electric starter button.

Alternator output/plug disconnected	
Alternator outputs against each other	9... 13 V

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

Checking the toe

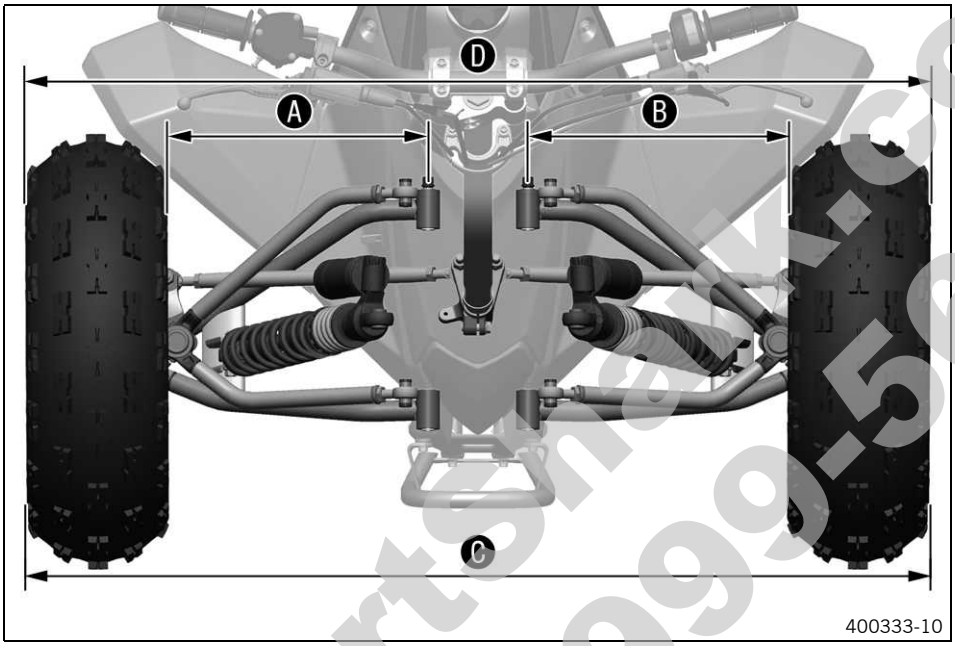


– Park the vehicle on a horizontal surface.
– Check the tire condition. (☛ p. 72)
– Check the tire air pressure. (☛ p. 72)
– Check the chassis parts for damage, play and wear.
– Load the vehicle with the specified weight.
  Guideline

Average rider weight	70... 80 kg (154... 176 lb.)

– Move the handlebar into the straight-ahead position and fix it.

Handlebar fixation for straight-ahead position (83019015100) (☛ p. 235)



– Measure distances Ⓐ and Ⓑ.
  » If distances Ⓐ and Ⓑ are not equal:
    – Adjust the toe. (☛ p. 192)
– Measure distances Ⓒ and Ⓓ.
  Guideline

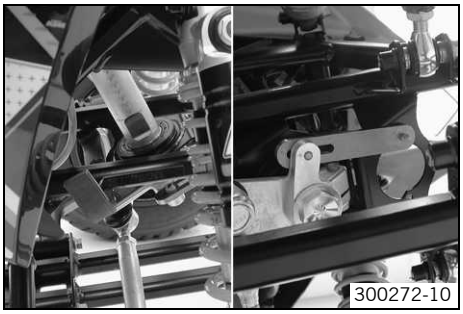
Toe	
Front	0 mm (0 in)

Info
The toe is the difference in length between distances Ⓓ and Ⓒ by which the wheels are spaced at the front or rear when driving straight ahead. The distance is measured at the height of the wheel center from rim flange to rim flange.

  » If the toe does not meet specifications:
    – Adjust the toe. (☛ p. 192)

Adjusting the toe

– Park the vehicle on a horizontal surface.
– Check the tire condition. (☛ p. 72)
– Check the tire air pressure. (☛ p. 72)
– Check the chassis parts for damage, play and wear. Replace damaged or worn parts.



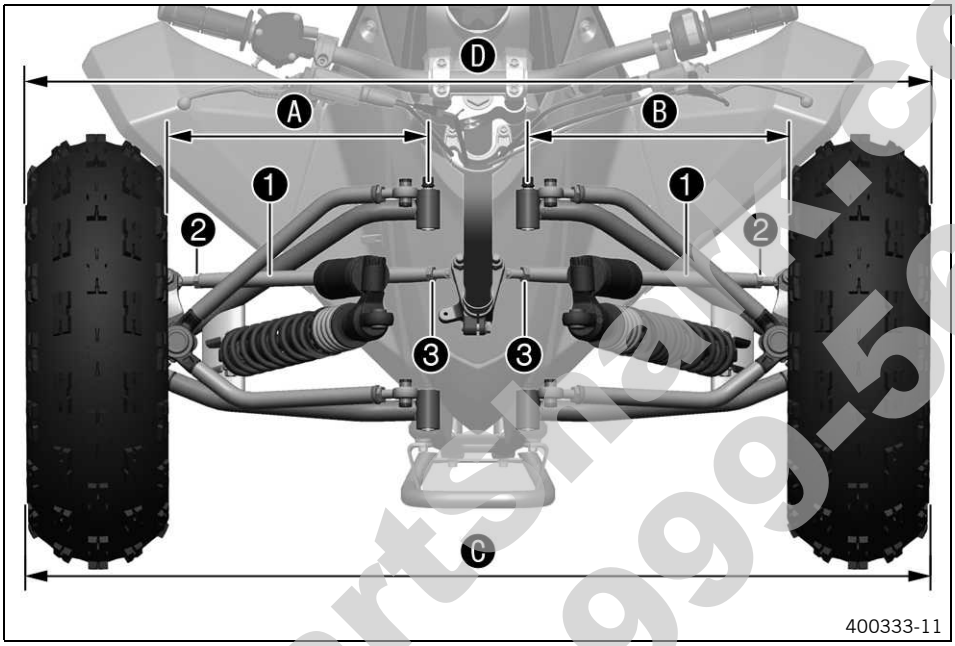
– Load the vehicle with the specified weight.

Guideline

Average rider weight	70... 80 kg (154... 176 lb.)

– Move the handlebar into the straight-ahead position and fix it.

Handlebar fixation for straight-ahead position (83019015100) (☛ p. 235)



– Loosen nuts ❷ and ❸.
– Adjust the distances Ⓐ and Ⓑ to the same value by rotating the tie rods ❶.
– Adjust the distances Ⓒ and Ⓓ to the specified value by evenly rotating the tie rods ❶.

Guideline

Toe	
Front	0 mm (0 in)

Info
The toe is the difference in length between distances Ⓓ and Ⓒ by which the wheels are spaced at the front or rear when driving straight ahead. The distance is measured at the height of the wheel center from rim flange to rim flange.

– Tighten nuts ❷ and ❸.

Guideline

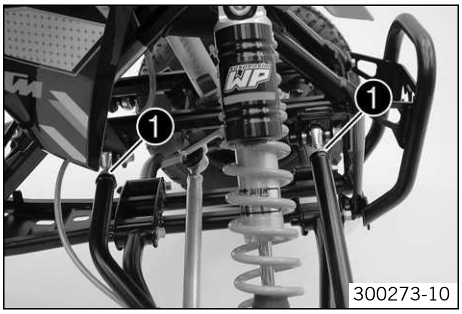
Lock nut, tie rod, outside	M12x1.25	20 Nm (14.8 lbf ft)
Lock nut, tie rod, inside	M12LHx1.25	20 Nm (14.8 lbf ft)

Info
The tie rods ❶ must still be freely movable.

Checking/adjusting the camber

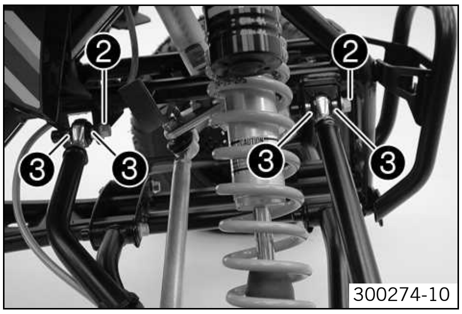
Info
The left and right camber should have the same settings.
The operations are the same on the left and right.

– Jack up the vehicle. (☛ p. 12)



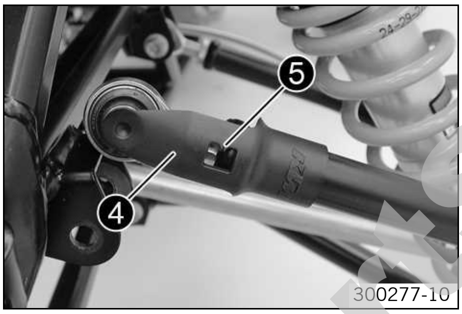
300273-10

– Loosen nuts ❶.



300274-10

– Remove screws ❷ with bushings ❸.

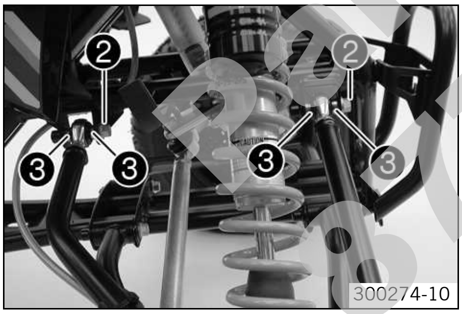


300277-10

– Insert tool ❹ in the heim joint and clip onto the A-arm.

Camber gauge (83019014000) (☛ p. 235)

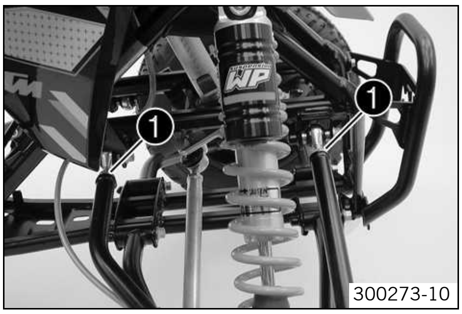
– Check the camber on both heim joints.
  » If marking ❺ is not aligned with the top edge of the A-arm:
    – Turn tool ❹ with the heim joint in steps of 180° until the marking is in line with the top edge of the A-arm.
– Remove tool ❹.



300274-10

– Position the A-arm with bushings ❸. Mount and tighten screws ❷.
Guideline

Screw, A-arm top	M10x52	45 Nm (33.2 lbf ft)



300273-10

– Align the heim joint at right angles to screws ❷ and tighten nut ❶.
Guideline

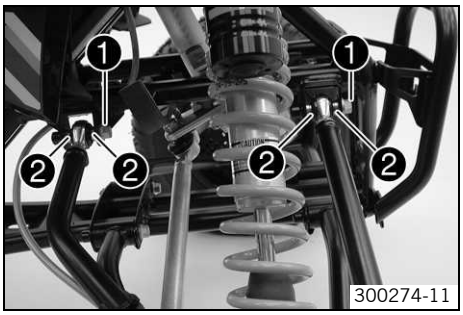
Nut, A-arm top	M12x1.25	30 Nm (22.1 lbf ft)

Info
All four heim joints must be checked and adjusted if necessary.

– Remove the vehicle from the work stand. (☛ p. 12)

Adjusting the fork offset

Info
The left and right fork offset should have the same settings.
The operations are the same on the left and right.



– Jack up the vehicle. (☛ p. 12)
– Remove screws ❶ with bushings ❷.
– Place the A-arm with bushings ❷ in the desired position. Mount and tighten screws ❶.

Guideline

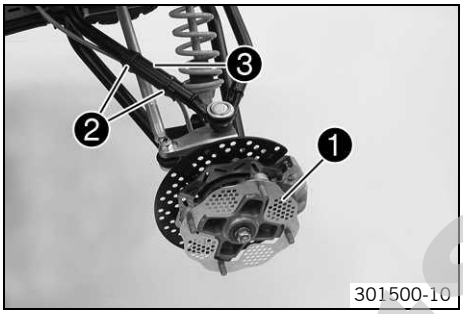
Screw, A-arm top	M10x52	45 Nm (33.2 lbf ft)

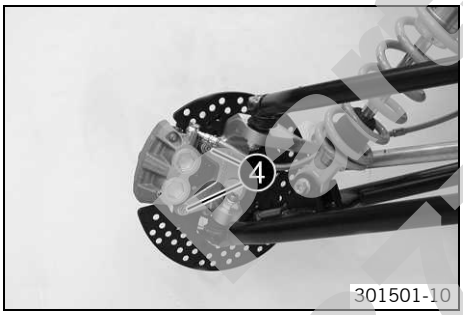
– Remove the vehicle from the work stand. (☛ p. 12)

Removing the wheel carrier

Info
The operations are the same on the left and right.

– Remove the wheel/wheels. (☛ p. 72)
– Remove brake disc guard ❶.
– Remove cable clamp ❷ and take off brake line guide ❸.



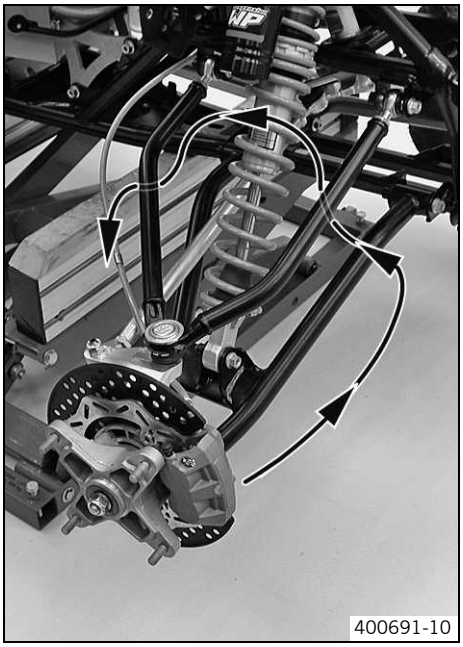


– Pull the hand brake lever and release it again.

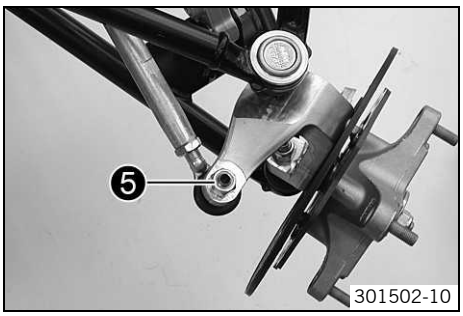
✓ Locking pawl moves into its basic position, parking brake is deactivated.

– Remove screws ❹. Press the brake caliper onto the brake disc by hand in order to push back the brake piston.
– Remove the brake caliper.

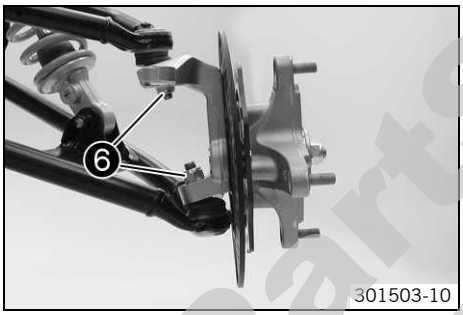
Info
Do not operate the hand brake lever when the brake caliper has been removed.



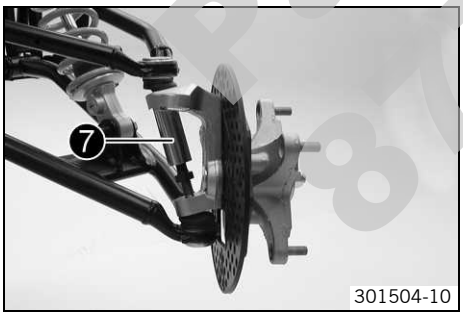
– Unthread the brake caliper.
– Hang the brake caliper and the brake line loosely to one side.



– Remove nut ❺ and take the tie rod out of the wheel carrier.

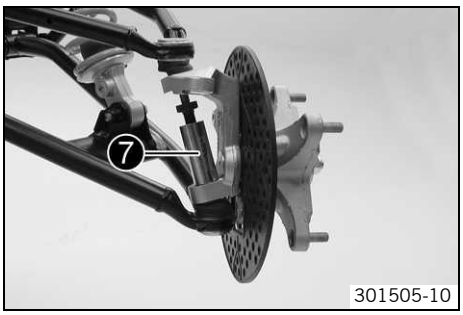


– Remove nuts ❻.



– Position special tool ❼. Press the lower ball head out of the wheel carrier.

Push-out tool (83019021000) (☛ p. 236)

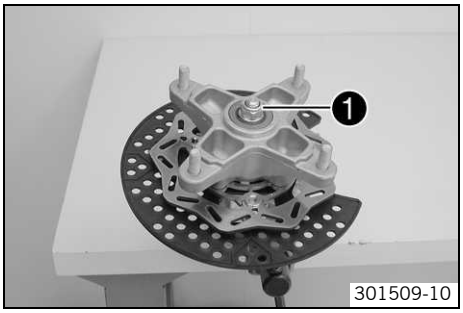


– Turn and position special tool ❼. Press the upper ball head out of the wheel carrier.
– Remove the wheel carrier.

Changing the wheel bearing

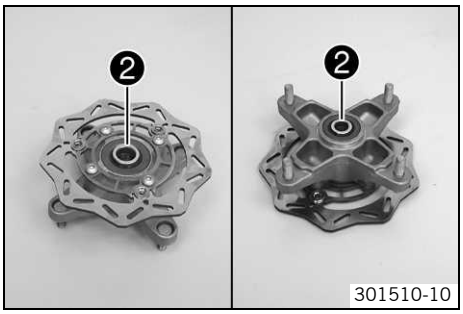
Info
The operations are the same on the left and right.

– Remove the wheel carrier. (☛ p. 194)
– Fix the wheel carrier in the vise.

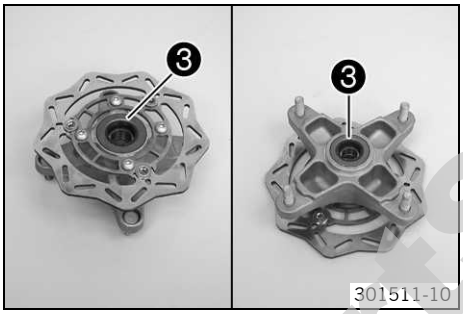


Info
Use soft jaws.

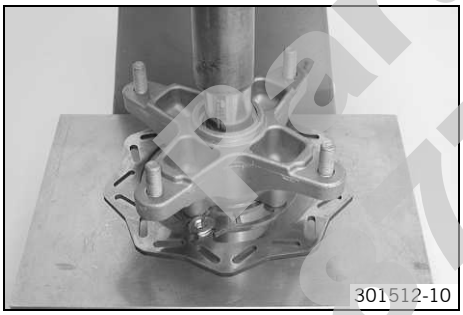
– Remove nut ❶.
– Remove the wheel hub.



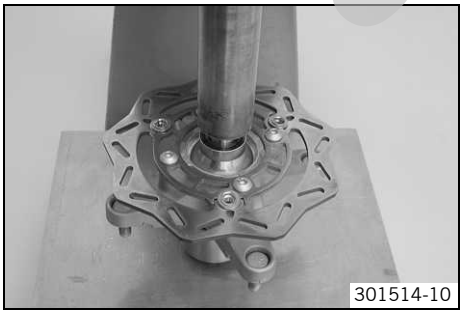
– Remove spacers ❷.



– Pry out shaft seal rings ❸.



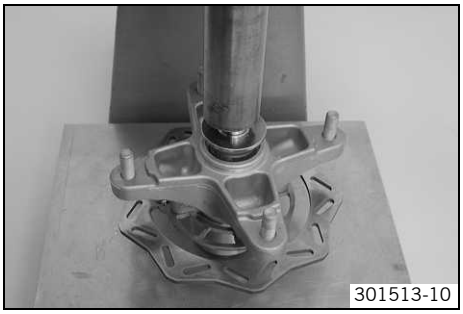
– Secure the wheel bearing with a suitable tool.
– Remove the bearing spacer.



– Press the wheel bearing all the way in.

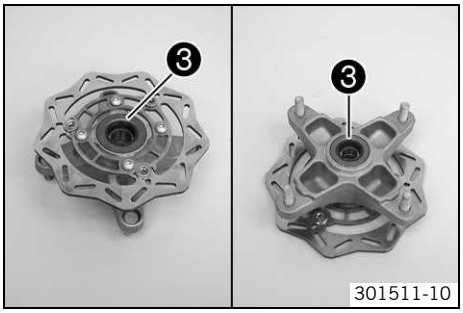
Press mandrel (83019013000) (☛ p. 235)

– Mount the bearing spacer.

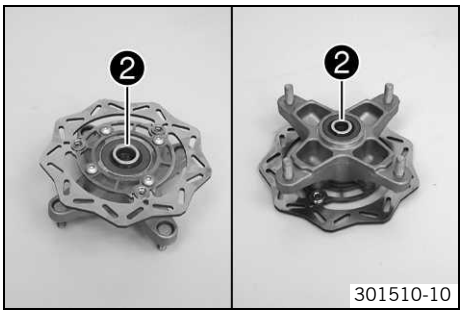


– Press the wheel bearing all the way in.

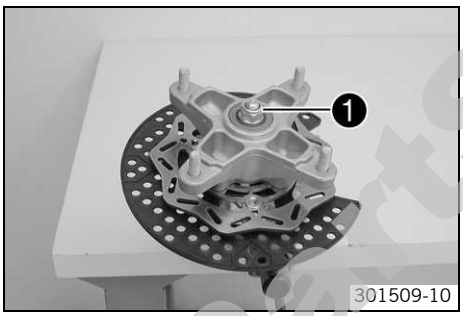
Press mandrel (83019013000) (☛ p. 235)



– Press in shaft seal rings ❸ so they are flush.



– Mount spacers ❷.



– Slide the wheel hub onto the wheel carrier.
– Mount and tighten nut ❶.

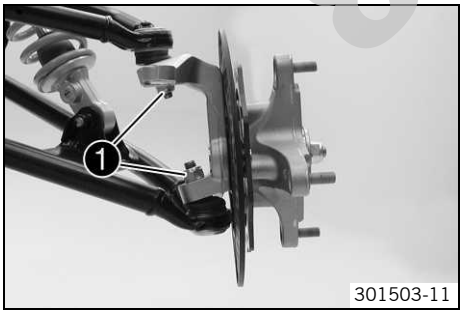
Guideline

Nut, front wheel hub	M12	70 Nm (51.6 lbf ft)

– Install the wheel carrier. (☛ p. 197)

Installing the wheel carrier

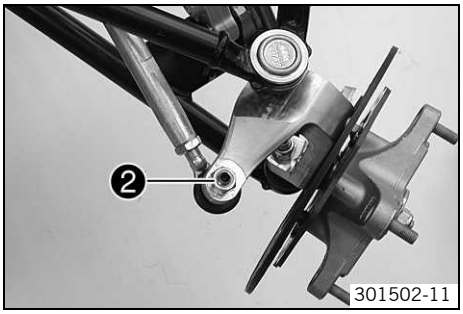
Info
The operations are the same on the left and right sides.



– Insert the wheel carrier between the A-arms. Mount and tighten nuts ❶.

Guideline

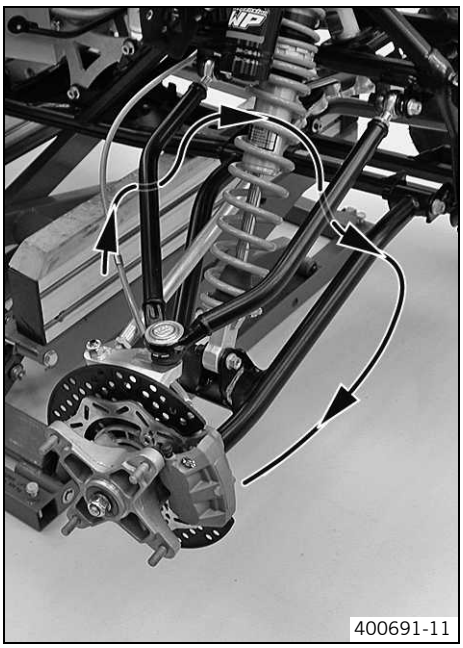
Nut, ball head, A-arm bottom	M12x1.5	40 Nm (29.5 lbf ft)
Nut, ball head, A-arm top	M10x1.25	35 Nm (25.8 lbf ft)



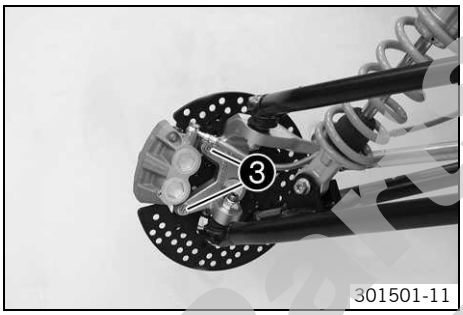
– Insert the tie rod in the wheel carrier. Mount and tighten nut ❷.

Guideline

Nut, tie rod end	M10x1.25	45 Nm (33.2 lbf ft)



– Thread the brake caliper and position it.

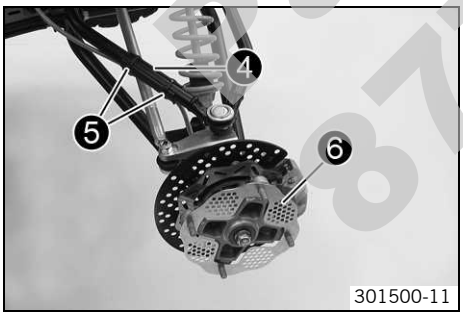


– Mount and tighten screws ❸.

Guideline

Screw, front brake caliper	M8	20 Nm (14.8 lbf ft)	**Loctite® 243™**

– When both Brake calipers have been mounted, activate the hand brake lever several times until the brake linings are in contact with brake disc and there is a pressure point.



– Position brake line guide ❹ and secure it with cable clamp ❺.

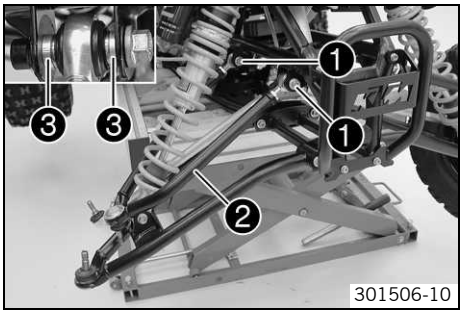
Info
Note the holding lug of the brake line guide.

– Mount brake disc guard ❻.
– Install the wheel/wheels. (☛ p. 73)
– Check the toe. (☛ p. 191)

Removing the A-arms

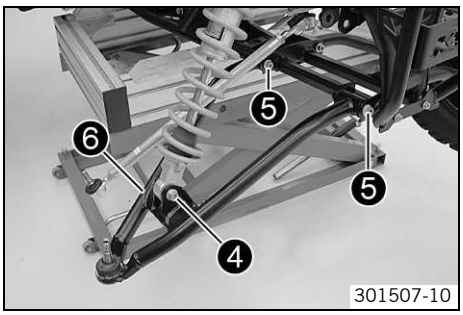
Info
The operations are the same on the left and right sides.

– Remove the wheel carrier. (☛ p. 194)



– Remove screws ❶ and take off upper A-arm ❷.

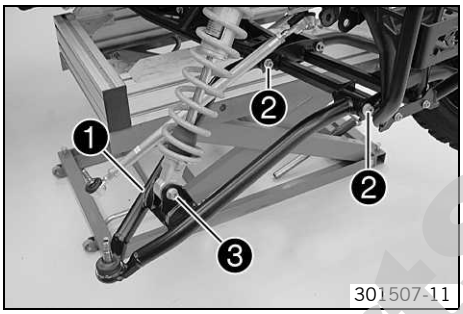
Info
When removing screws ❶, make sure that bushings ❸ remain in place.



– Remove screw ❹ and the shock absorber out of the guide.
– Remove screws ❺ and take off lower A-arm ❻.

Installing the A-arms

Info
The operations are the same on the left and right sides.

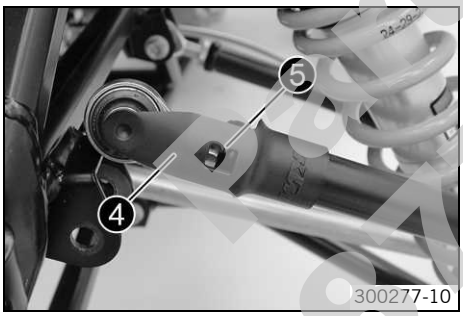


– Position lower A-arm ❶. Mount and tighten screws ❷.
Guideline

Screw, A-arm bottom	M10x70	45 Nm (33.2 lbf ft)

– Position the shock absorber in the lower A-arm. Mount and tighten screw ❸.
Guideline

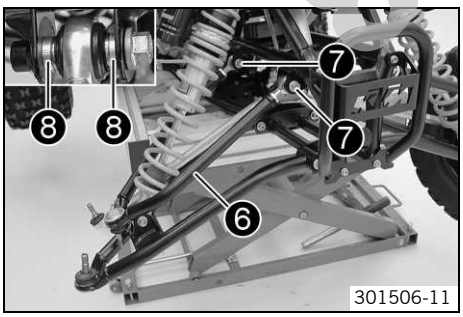
Screw, front shock absorber	M10	45 Nm (33.2 lbf ft)



– Insert tool ❹ in the heim joint and clip onto the A-arm.

Camber gauge (83019014000) (☛ p. 235)

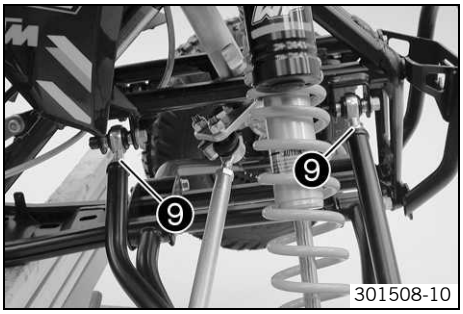
– Check the camber on both heim joints.
» If the marking ❺ is not flush with the top edge of the A-arm:
– Remove the nuts on the heim joint.
– Turn tool ❹ with the heim joint in steps of 180° until the marking is in line with the top edge of the A-arm.
– Remove tool ❹.



– Position upper A-arm ❻ with bushings ❽. Mount and tighten screws ❼.
Guideline

Screw, A-arm top	M10x52	45 Nm (33.2 lbf ft)

Info
The fork offset is set using the bushings ❽.



– When the nuts on the heim joint have been released, align the heim joint at right angles to the screws and tighten nut ❾.

Guideline

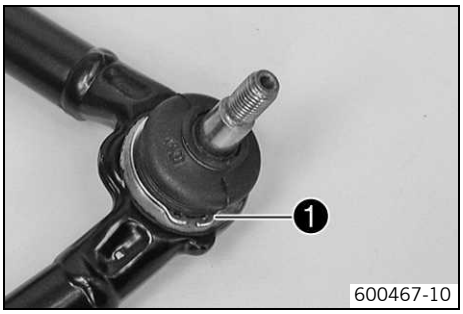
Nut, A-arm top	M12x1.25	30 Nm (22.1 lbf ft)

– Install the wheel carrier. (☛ p. 197)

A-Arm top - changing the bearing

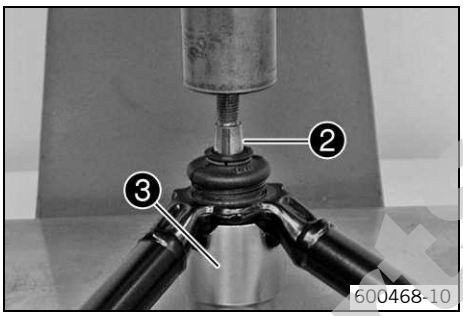
Info
The operations are the same on the left and right sides.

– Remove the A-arms. (☛ p. 198)



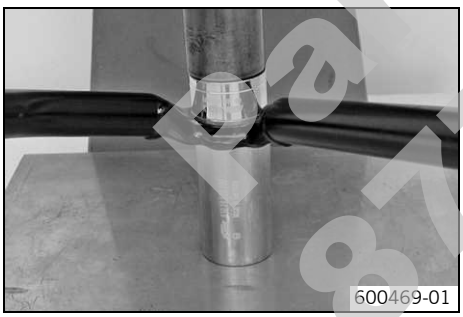
– Remove lock ring ❶.

Circlip pliers reverse (51012011000) (☛ p. 228)



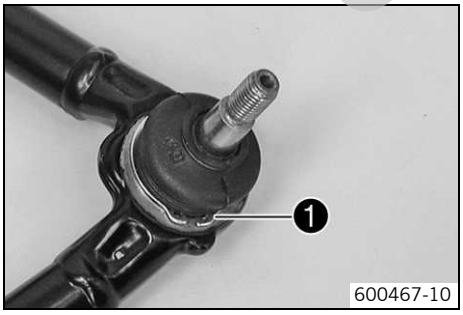
– Press out ball head ❷ using special tool ❸.

Disassembly/assembly holder (83019020150) (☛ p. 236)



– Press in the ball head using the special tool.

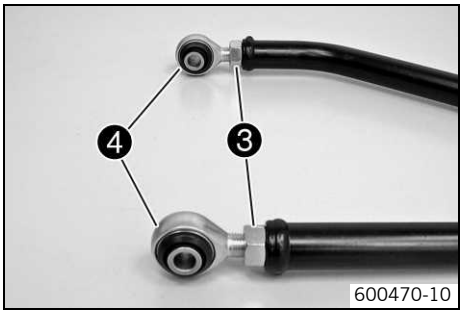
Press mandrel (83019020130) (☛ p. 236)
Mounting sleeve (83019020100) (☛ p. 235)



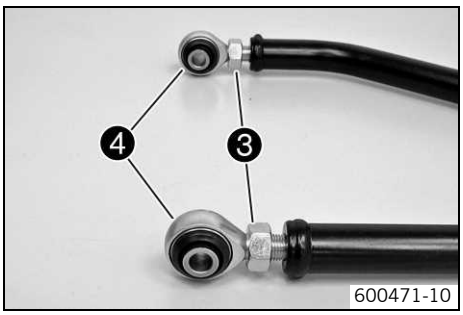
– Mount lock ring ❶.

Circlip pliers reverse (51012011000) (☛ p. 228)

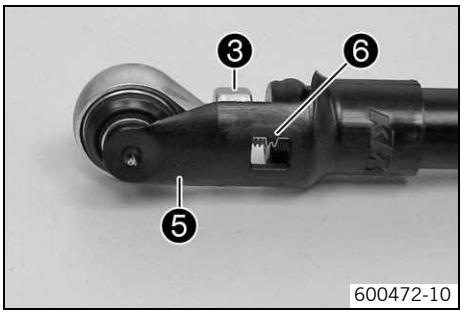
Info
When mounting the lock ring, do not damage the rubber boot.



– Loosen nuts ❸. Remove heim joint ❹. Screw the nuts off of the heim joints.



– Screw the nuts on the new heim joints. Mount the heim joints ❹.



– Insert the tool ❺ in the heim joint and clip onto the A-arm.

Camber gauge (83019014000) (☛ p. 235)

– Align marking ❻ with the upper edge of the A-arm by rotating the heim joint.

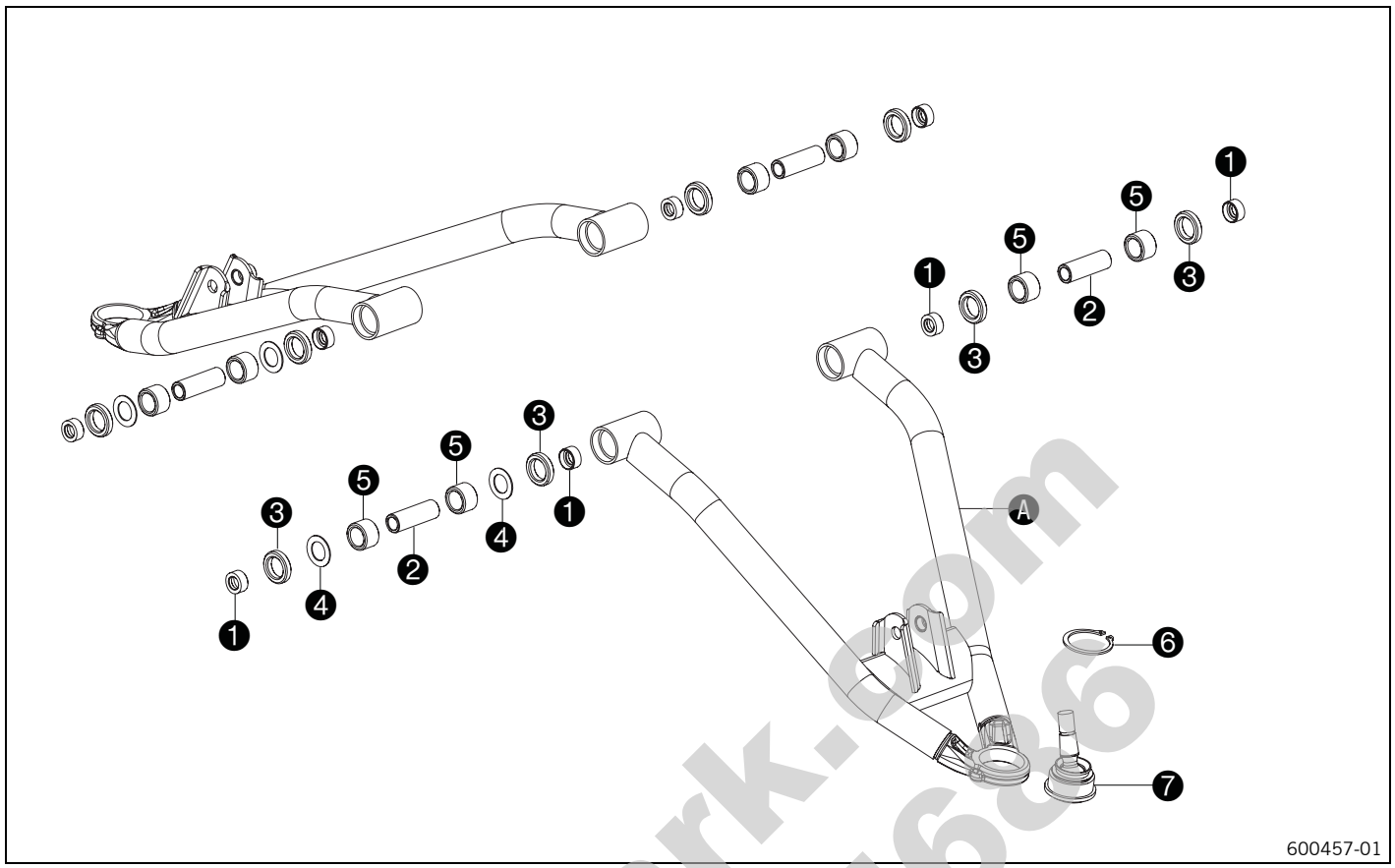
Info
Nuts ❸ are tightened when the A-arm is installed.

– Install the A-arms. (☛ p. 199)

A-Arm bottom - changing the bearing

Info
The operations are the same on the left and right sides.

– Remove the A-arms. (☛ p. 198)



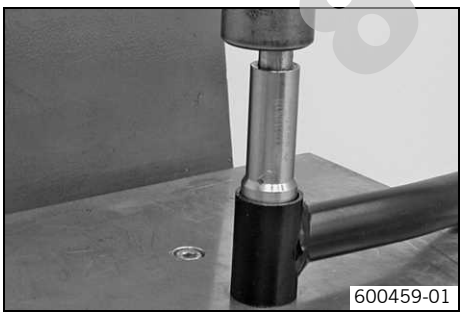
– Remove flange adapters ❶ and bearing sleeves ❷.
– Remove shaft seal rings ❸.
– Remove spacing washers ❹.

Info
The spacing washers are only installed at the front pivot point.

– Press out needle bearing ❺ using the thin long side of the special tool.

Press mandrel (83019020170) (☛ p. 236)
Press mandrel (83019020130) (☛ p. 236)

– Clean the pivot point.

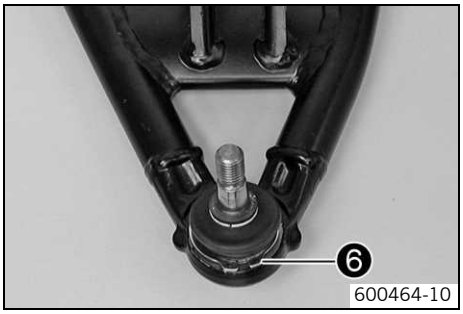


– Press in a new needle bearing on all pivot points using the thick end of the special tool.

Press mandrel (83019020170) (☛ p. 236)

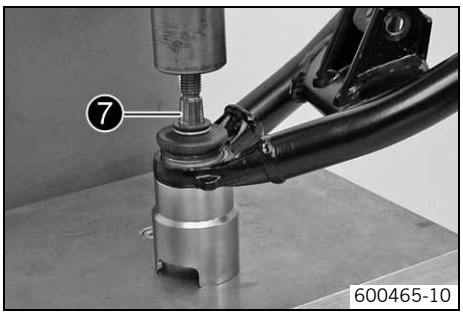
Info
The needle bearing cannot be pushed through from one side.

– Grease the needle bearing.
– On the front pivot point, insert the two spacing washers.
– Install the new shaft seal rings. Lightly grease the sealing lips of the shaft seal rings.
– Mount the bearing sleeves and flange adapters.



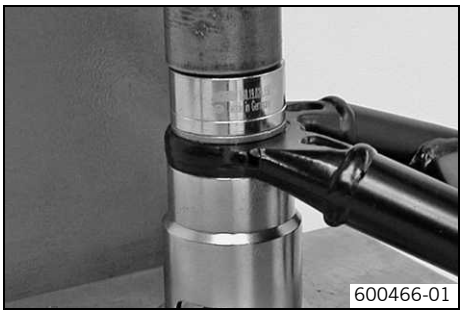
– Remove lock ring ❻.

Circlip pliers reverse (51012011000) (☛ p. 228)



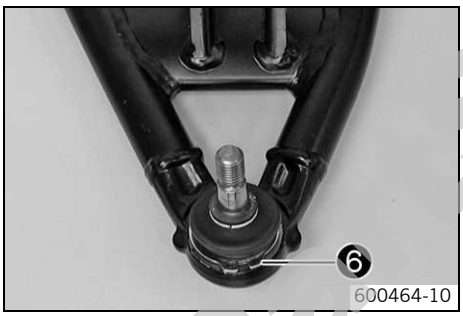
– Press out ball head ❼ using the special tool.

Disassembly/assembly holder (83019020150) (☛ p. 236)



– Press in the ball head using the special tool.

Press mandrel (83019020130) (☛ p. 236)
Disassembly/assembly holder (83019020150) (☛ p. 236)



– Mount lock ring ❻.

Circlip pliers reverse (51012011000) (☛ p. 228)

Info
When mounting the lock ring, do not damage the rubber boot.

– Install the A-arms. (☛ p. 199)

Design	1-cylinder 4-stroke engine, water-cooled
Displacement (450 SX ATV)	449.3 cm³ (27.418 cu in)
Displacement (505 SX ATV)	477.5 cm³ (29.139 cu in)
Stroke	60.8 mm (2.394 in)
Bore (450 SX ATV)	97 mm (3.82 in)
Bore (505 SX ATV)	100 mm (3.94 in)
Compression ratio	12.5:1
Control	DOHC, four valves controlled via cam lever, drive via helical gear pair and tooth-wheel chain
Valve diameter, intake	40.4 mm (1.591 in)
Valve diameter, exhaust	31.7 mm (1.248 in)
Valve clearance, cold, intake	0.07... 0.13 mm (0.0028... 0.0051 in)
Valve clearance, cold, exhaust	0.12... 0.18 mm (0.0047... 0.0071 in)
Crankshaft bearing	2 cylinder roller bearing
Conrod bearing	Needle bearing
Piston pin bearing (450 SX ATV)	Bronze bush
Piston pin bearing (505 SX ATV)	not a bearing bush - DLC-plated piston pins
Pistons	Forged light alloy
Piston rings	1 compression ring, 1 oil scraper ring
Engine lubrication	Pressure circulation lubrication with 3 rotor pumps
Primary transmission	29:74
Clutch	Multidisc clutch in oil bath/hydraulically activated
Transmission ratio	
1st gear	16:34
2nd gear	19:31
3rd gear	20:26
4th gear	23:25
5th gear	26:24
Alternator	12 V, 42 W
Ignition	Contactless controlled fully electronic ignition with digital ignition adjustment
Spark plug	NGK CR 9 EKB
Spark plug electrode gap	0.7 mm (0.028 in)
Cooling	Water cooling, permanent circulation of coolant by water pump
Starting aid	Electric starter

Capacity - engine oil

Engine oil	2.00 l (2.11 qt.)	External temperature: ≥ 0 °C (≥ 32 °F)	Engine oil (SAE 10W/50) (☛ p. 223)
		External temperature: < 0 °C (< 32 °F)	Engine oil (SAE 5W/40) (☛ p. 223)

Capacity - coolant

Coolant	1.50 l (1.59 qt.)	Coolant (☛ p. 223)	
		Coolant (mixed ready to use) (☛ p. 223)	

Camshaft - cam height	
Exhaust	33.10... 33.30 mm (1.3031... 1.311 in)
Camshaft - cam height (450 SX ATV)	
Intake	33.90... 34.10 mm (1.3346... 1.3425 in)
Camshaft - cam height (505 SX ATV)	
Intake	34.20... 34.40 mm (1.3465... 1.3543 in)
Camshaft bearing - radial clearance	
Radial clearance	0.029... 0.053 mm (0.00114... 0.00209 in)
Wear limit	0.055 mm (0.00217 in)
Valve spring	
Minimum length	42.8 mm (1.685 in)
Valve - sealing seat width	
Intake	1.50 mm (0.0591 in)
Exhaust	1.50 mm (0.0591 in)
Valve - run-out	
At the valve plate	≤ 0.05 mm (≤ 0.002 in)
At the valve stem	≤ 0.05 mm (≤ 0.002 in)
Valve spring seat - thickness	1.4... 1.5 mm (0.055... 0.059 in)
Cylinder/cylinder head - distortion of sealing area	≤ 0.10 mm (≤ 0.0039 in)
Piston - diameter (450 SX ATV)	
Size I	96.960... 96.970 mm (3.81732... 3.81771 in)
Size II	96.971... 96.980 mm (3.81775... 3.8181 in)
Piston - diameter (505 SX ATV)	
Size I	99.960... 99.970 mm (3.93543... 3.93582 in)
Size II	99.971... 99.980 mm (3.93586... 3.93621 in)
Cylinder - drill hole diameter (450 SX ATV)	
Size I	97.000... 97.012 mm (3.81889... 3.81936 in)
Size II	97.013... 97.025 mm (3.8194... 3.81987 in)
Cylinder - drill hole diameter (505 SX ATV)	
Size I	100.000... 100.012 mm (3.937... 3.93747 in)
Size II	100.013... 100.025 mm (3.93751... 3.93798 in)
Piston/cylinder - mounting clearance	
Size I	0.030... 0.052 mm (0.00118... 0.00205 in)
Size II	0.032... 0.054 mm (0.00126... 0.00213 in)
Wear limit	0.070 mm (0.00276 in)
Piston ring - end gap	
Compression ring	≤ 0.80 mm (≤ 0.0315 in)
Oil scraper ring	≤ 1.00 mm (≤ 0.0394 in)
Connecting rod - end play of lower conrod bearing	0.40... 0.60 mm (0.0157... 0.0236 in)
Crankshaft - run-out at bearing pin	≤ 0.10 mm (≤ 0.0039 in)
Crankshaft - end play	0.25... 0.35 mm (0.0098... 0.0138 in)
Clutch facing disk - thickness	≥ 2.6 mm (≥ 0.102 in)
Clutch spring - length	39.0... 40.0 mm (1.535... 1.575 in)
Contact surface of clutch facing discs in outer clutch hub	≤ 0.5 mm (≤ 0.02 in)
Oil pressure regulator valve	
Minimum length of pressure spring	38.5 mm (1.516 in)
Shift shaft - sliding plate/shift quadrant clearance	0.40... 0.80 mm (0.0157... 0.0315 in)

Jet, engine case breather	M4	On block	**Loctite® 243™**
Oil jet for conrod lubrication	M4	4 Nm (3 lbf ft)	**Loctite® 243™**
Oil jet, cam lever lubrication	M4	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Oil jet, piston cooling	M4	4 Nm (3 lbf ft)	**Loctite® 243™**
Locking screw for bearing	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, bearing bolt of oil pump idler shaft	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, camshaft bearing retaining bracket	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, ignition pulse generator	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, ignition pulse generator adapter	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, locking lever	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, oil filter cover	M5	6 Nm (4.4 lbf ft)	–
Screw, oil pump cover	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, stator bracket	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, stator cable holder	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, timing train axle retaining bracket	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Oil jet, clutch oil supply	M5x1	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Nut, cylinder head	M6	10 Nm (7.4 lbf ft)	lubricated with engine oil
Nut, water-pump wheel	M6	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, alternator cover	M6	10 Nm (7.4 lbf ft)	–
Screw, clutch cover	M6	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, engine case	M6	10 Nm (7.4 lbf ft)	–
Screw, exhaust flange	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
Screw, ignition pulse generator cable holder	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
Screw, oil pump casing	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
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, valve cover	M6	8 Nm (5.9 lbf ft)	–
Screw, water pump cover	M6	10 Nm (7.4 lbf ft)	–
Stud, cylinder head	M6	10 Nm (7.4 lbf ft)	–
Oil jet, timing chain tensioner	M6x0.6	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, camshaft bearing bridge	M7x1	14 Nm (10.3 lbf ft)	lubricated with engine oil
Screw, clutch cover	M7x1	14 Nm (10.3 lbf ft)	–
Screw, engine case	M7x1	14 Nm (10.3 lbf ft)	–
Screw, water pump cover	M7x1	14 Nm (10.3 lbf ft)	–
Plug, crankshaft location	M8	20 Nm (14.8 lbf ft)	–
Screw, engine sprocket	M10	60 Nm (44.3 lbf ft)	**Loctite® 243™**
Spark plug	M10	10... 12 Nm (7.4... 8.9 lbf ft)	–
Plug, cam lever axle	M10x1	10 Nm (7.4 lbf ft)	–
Screw, camshaft gear	M10x1	50 Nm (36.9 lbf ft)	lubricated with engine oil
Screw, rotor	M10x1	80 Nm (59 lbf ft)	lubricated with engine oil
Screw, unlocking of timing chain tensioner	M10x1	10 Nm (7.4 lbf ft)	–

Nut, cylinder head	M10x1.25	Tightening sequence: Tighten in diagonal sequence. Tightening stage 1 10 Nm (7.4 lbf ft) Tightening stage 2 30 Nm (22.1 lbf ft) Tightening stage 3 50°	lubricated with engine oil
Stud, cylinder head	M10x1.25	20 Nm (14.8 lbf ft)	–
Oil drain plug with magnet	M12x1.5	20 Nm (14.8 lbf ft)	–
Screw-in fitting, engine case	M12x1.5	20 Nm (14.8 lbf ft)	–
Axle guide rail for timing chain	M14x1	15 Nm (11.1 lbf ft)	–
Axle tension rail for timing chain	M14x1	15 Nm (11.1 lbf ft)	–
Nut, compensating sprocket	M14x1	20 Nm (14.8 lbf ft)	Loctite® 243™
Oil suction pipe	M14x1	15 Nm (11.1 lbf ft)	Loctite® 243™
Oil pressure regulator valve plug	M14x1.5	18 Nm (13.3 lbf ft)	–
Nut, inner clutch hub	M18x1.5	80 Nm (59 lbf ft)	Loctite® 243™
Plug, timing chain tensioner	M24x1.5	25 Nm (18.4 lbf ft)	–
Nut, freewheel hub	M27x1	80 Nm (59 lbf ft)	Loctite® 243™
Nut, primary gear	M27x1	80 Nm (59 lbf ft)	Loctite® 243™
Plug, oil screen	M32x1.5	30 Nm (22.1 lbf ft)	–

Carburetor type	KEIHIN FCR-MX 41
Carburetor identification number	4125L
Needle position	3 th position from top
Idle mixture adjusting screw	
Open	1.5 turns
Pump membrane stop	2.15 mm (0.0846 in)
Hot start button	
Diameter of bore in carburetor body	2.5 mm (0.098 in)
Main jet	175
Jet needle	OBEKR
Idling jet	42
Idle air jet	100
Cold start jet	85

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™**
Spill jet	M4x0.7	2 Nm (1.5 lbf ft)	–
Idle air jet	M4.5x0.75	2 Nm (1.5 lbf ft)	–
Screw, carburetor cover	M5	2.5 Nm (1.84 lbf ft)	–
Screw, throttle position 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)	–
Mixture control screw	M6x0.5	1 Nm (0.7 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	M8	3.5 Nm (2.58 lbf ft)	–
Choke slide	M12	2.5 Nm (1.84 lbf ft)	–
Hot start activation	M12	2.5 Nm (1.84 lbf ft)	–

Frame	Double cradle of chromium molybdenum steel tubes, powder-coated
Wheel suspension	
Front	Single wheel suspension with double transverse control arm
Rear	Rigid axle
Suspension travel	
Front	244 mm (9.61 in)
Rear	258 mm (10.16 in)
Fork offset	
Front	50 mm (1.97 in)
Toe	
Front	0 mm (0 in)
Camber	
Front	0°
Toe width	
Front	1,265 mm (49.8 in)
Rear, narrow	1,265 mm (49.8 in)
Rear, wide	1,341 mm (52.8 in)
Wheelbase	1,280±10 mm (50.39±0.39 in)
Turning radius	5,685 mm (223.82 in)
Fording depth	305 mm (12.01 in)
Seat height unloaded	795 mm (31.3 in)
Ground clearance unloaded	265 mm (10.43 in)
Weight	
Fuel tank empty	165 kg (364 lb.)
Fuel tank full	173 kg (381 lb.)
Maximum allowable axle load	
Front	144 kg (317 lb.)
Rear	149 kg (328 lb.)
Maximum permissible overall weight	293 kg (646 lb.)
Vehicle length	1,810 mm (71.26 in)
Vehicle width	1,265 mm (49.8 in)
Vehicle height	1,100 mm (43.31 in)
Brake system	
Front	Disc brakes, brake calipers fixed, 4 brake pistons per brake caliper
Rear	Disc brake, brake caliper floating, 1 brake piston
Brake discs - diameter	
Front	180 mm (7.09 in)
Rear	200 mm (7.87 in)
Brake discs - wear limit	
Front	3.5 mm (0.138 in)
Rear	3.5 mm (0.138 in)
Tire air pressure off road	0.3 bar (4 psi)
Rim	
Front	5x10" DWT Al 6061
Rear	8x8" DWT Al 6061
Rear wheel gearing	14:38
Chain	5/8 x 1/4"
Rear sprockets available	37, 38, 39

Battery	YTX5L-BS	Battery voltage: 12 V Nominal capacity: 4 Ah Maintenance-free

Tires

Front tire	Rear tire
21 x 7.00 - 10 MAXXIS Razr M-931	**20 x 11.00 - 9** MAXXIS Razr M-932
Additional information is available in the Service section under: http://www.ktm.com	

Capacity - fuel

Total fuel tank capacity approx.	10.3 l (2.72 US gal)	Super unleaded (ROZ 95 / RON 95 / PON 91) (☛ p. 224)

Fuel reserve approx.	3 l (3 qt.)

Shock absorber part number	03.18.7J.16
Shock absorber	**WP Suspension** 3612 BAVP DCC
Compression damping, high-speed	
Comfort	1.5 turns
Standard	1 turn
Sport	1 turn
Compression damping, low-speed	
Comfort	20 clicks
Standard	15 clicks
Sport	12 clicks
Rebound damping	
Comfort	20 clicks
Standard	15 clicks
Sport	12 clicks
Cross over	19±1.5 mm (0.75±0.059 in)
Spring preload	
Comfort	3 mm
Standard	5 mm
Sport	8 mm
Spring rate, main spring	
Weight of rider: 64... 75 kg (141... 165 lb.)	21... 26 N/mm (120... 148 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	24... 29 N/mm (137... 166 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	27... 32 N/mm (154... 183 lb/in)
Spring rate, auxiliary spring	40 N/mm (228 lb/in)
Spring length, main spring	275 mm (10.83 in)
Spring length, auxiliary spring	60 mm (2.36 in)
Fitted length	463 mm (18.23 in)
Gas pressure	10 bar (145 psi)

Shock absorber oil	Shock absorber oil (SAE 2,5) (50180342S1) (☛ p. 224)

Shock absorber part number	15.18.7J.16
Shock absorber	**WP Suspension** PDS 4618 BAVP DCC
Compression damping, high-speed	
Comfort	1.5 turns
Standard	1 turn
Sport	1 turn
Compression damping, low-speed	
Comfort	20 clicks
Standard	15 clicks
Sport	15 clicks
Rebound damping	
Comfort	20 clicks
Standard	15 clicks
Sport	15 clicks
Cross over	19±1.5 mm (0.75±0.059 in)
Spring preload	
Comfort	3 mm
Standard	5 mm
Sport	5 mm
Spring rate, main spring	
Weight of rider: 65... 75 kg (143... 165 lb.)	78 N/mm (445 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	82 N/mm (468 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	85 N/mm (485 lb/in)
Spring rate, auxiliary spring	100 N/mm (571 lb/in)
Spring length, main spring	200 mm (7.87 in)
Spring length, auxiliary spring	55 mm (2.17 in)
Fitted length	440.5 mm (17.342 in)
Gas pressure	10 bar (145 psi)

Shock absorber oil	Shock absorber oil (SAE 2,5) (50180342S1) (☛ p. 224)

Remaining nuts, chassis	M6	15 Nm (11.1 lbf ft)	–
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)	–
Screw on fuel tank	M6	6 Nm (4.4 lbf ft)	–
Screw, clamping nut, rear axle	M6	10 Nm (7.4 lbf ft)	–
Screw, foot brake cylinder	M6	7 Nm (5.2 lbf ft)	**Loctite® 243™**
Screw, rear brake caliper	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
Remaining nuts, chassis	M8	30 Nm (22.1 lbf ft)	–
Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)	–
Screw, bearing support, steering	M8	25 Nm (18.4 lbf ft)	–
Screw, front brake caliper	M8	20 Nm (14.8 lbf ft)	**Loctite® 243™**
Screw, front brake disc	M8	25 Nm (18.4 lbf ft)	**Loctite® 243™**
Screw, handlebar clamp	M8	20 Nm (14.8 lbf ft)	–
Screw, rear brake caliper	M8	20 Nm (14.8 lbf ft)	**Loctite® 243™**
Screw, rear brake disc	M8	25 Nm (18.4 lbf ft)	**Loctite® 243™**
Screw, rear wheel eccentric element	M8	20 Nm (14.8 lbf ft)	–
Screw, steering bridge	M8	20 Nm (14.8 lbf ft)	–
Screw, subframe	M8	35 Nm (25.8 lbf ft)	**Loctite® 243™**
Engine bracket screw	M10	60 Nm (44.3 lbf ft)	–
Engine mounting bolt	M10	60 Nm (44.3 lbf ft)	–
Nut, handlebar support	M10	45 Nm (33.2 lbf ft)	–
Remaining nuts, chassis	M10	50 Nm (36.9 lbf ft)	–
Remaining screws, chassis	M10	45 Nm (33.2 lbf ft)	–
Screw, A-arm bottom	M10x70	45 Nm (33.2 lbf ft)	–
Screw, A-arm top	M10x52	45 Nm (33.2 lbf ft)	–
Screw, footrest	M10	45 Nm (33.2 lbf ft)	–
Screw, front shock absorber	M10	45 Nm (33.2 lbf ft)	–
Screw, steering column at bottom of steering lever	M10	25 Nm (18.4 lbf ft)	–
Nut, ball head, A-arm top	M10x1.25	35 Nm (25.8 lbf ft)	–
Nut, rear sprocket screw	M10x1.25	45 Nm (33.2 lbf ft)	**Loctite® 243™**
Nut, tie rod end	M10x1.25	45 Nm (33.2 lbf ft)	–
Wheel nut	M10x1.25	45 Nm (33.2 lbf ft)	–
Nut, front wheel hub	M12	70 Nm (51.6 lbf ft)	–
Screw, rear bottom shock absorber	M12	70 Nm (51.6 lbf ft)	–
Screw, rear top shock absorber	M12	60 Nm (44.3 lbf ft)	–
Lock nut, tie rod, inside	M12LHx1.25	20 Nm (14.8 lbf ft)	–
Lock nut, tie rod, outside	M12x1.25	20 Nm (14.8 lbf ft)	–
Nut, A-arm top	M12x1.25	30 Nm (22.1 lbf ft)	–
Nut, ball head, A-arm bottom	M12x1.5	40 Nm (29.5 lbf ft)	–
Nut, swingarm pivot	M16x1.5	100 Nm (73.8 lbf ft)	–
Nut, rear wheel hub	M18x1.5	130 Nm (95.9 lbf ft)	–
Screw, steering column, bottom	M20x1.5	40 Nm (29.5 lbf ft)	–
Screw, steering column, top	M20x1.5	25 Nm (18.4 lbf ft)	–
Clamping nut, rear axle	2"-10UNS-2B-LH	25 Nm (18.4 lbf ft)	Only applies when using: Open-end wrench attachment, 46 mm (83019010461) (☛ p. 234)

Cleaning the vehicle

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 vehicle regularly, its value and appearance are maintained over a long period.
Avoid direct sunshine on the vehicle during cleaning.

Info

Do not rest the vehicle on its rear frame bracket to clean it as it could fall over.
Never lift the vehicle by yourself, even if a gear is engaged.
Fuel can emerge from the fuel tank.

– Seal the exhaust system to keep water out.
– First remove coarse dirt particles with a gentle spray of water.
– Spray very dirty areas with a normal motorcycle cleaner and then clean with a brush.

Motorcycle cleaner (☛ p. 226)

Info

Use warm water containing normal motorcycle cleaner and a soft sponge.

– After rinsing the vehicle with a gentle spray of water, allow it to dry thoroughly.
– Clean and dry the air filter box.
– Drain the carburetor float chamber. (☛ p. 164)

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 a short distance until the engine reaches operating temperature.

Info

The heat produced causes water at inaccessible locations in the engine and the brakes to evaporate.

– Push back the protection covers of the handlebar grips to allow any water that has penetrated to evaporate.
– After the vehicle has cooled off, oil or grease all moving parts and bearings.
– Clean the chain. (☛ p. 75)
– Treat bare metal parts (except for brake discs and exhaust system) with corrosion's materials.

Cleaning and preserving materials for metal, rubber and plastic (☛ p. 225)

– Treat all plastic parts and undercoated parts with a mild cleaning and care product.

Paint cleaner and polish for high-gloss and matte finishes, bare metal and plastic surfaces (☛ p. 226)

– To prevent electrical problems, treat electric contacts and switches with contact spray.

Contact spray (☛ p. 225)

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 store the vehicle for a longer period, take the following actions.

Info

Before storing the vehicle, 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 vehicle. (☛ p. 215)
– Change the engine oil and oil filter, clean the oil screen. (☛ p. 183)
– Check the antifreeze and coolant level. (☛ p. 180)
– Drain the fuel from the tank into a suitable container.
– Drain the carburetor float chamber. (☛ p. 164)
– Check the tire air pressure. (☛ p. 72)
– Remove the battery. (☛ p. 83)
– Recharge the battery. (☛ p. 84)

Guideline

Storage temperature of battery without direct sunshine	0... 35 °C (32... 95 °F)

– Store the vehicle in a dry location that is not subject to large fluctuations in temperature.
– Cover the vehicle with a tarp or cover that is permeable to air.

Info

Do not use non-porous materials since they prevent humidity from escaping, thus causing corrosion.
Avoid running the engine of a vehicle in storage for a short time only. Because the engine will not warm up sufficiently, the water vapor produced during combustion will condense, causing engine parts and the exhaust system to rust.

Putting the vehicle into operation after storage

– Install the battery. (☛ p. 83)
– Fill up with fuel.
– Checks before putting into operation
– Make a cautious test ride.

Important maintenance work to be carried out by an authorized KTM workshop

		S1N	S3N	S10A	S30A
Engine	Change the engine oil and oil filter, clean the oil screen. (☛ p. 183)	•	•	•	•
	Replace spark plug.				•
	Check the valve clearance and adjust if necessary.		•	•	•
	Check engine mounting screws for tightness.		•	•	•
	Clean spark plug connectors and check for tightness.		•	•	•
	Check shift lever screw for tightness.		•	•	•
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 leaks.		•	•	•
	Check the antifreeze and coolant level. (☛ p. 180)		•	•	•
	Check the exhaust system for leakage and faulty attachment.			•	•
	Check control cables for damage, smooth operation and routing without sharp bends.		•	•	•
	Check the fluid level of the hydraulic clutch. (☛ p. 178)		•	•	•
	Clean the air filter. (☛ p. 61)		•	•	•
	Check cables for damage and kink-free routing.			•	•
	Check the functioning of the electrical equipment.		•	•	•
Brakes	Check the front brake linings. (☛ p. 91)		•	•	•
	Check the rear brake linings. (☛ p. 96)		•	•	•
	Check the brake discs. (☛ p. 74)		•	•	•
	Check the front brake fluid level. (☛ p. 89)		•	•	•
	Check the rear brake fluid level. (☛ p. 94)		•	•	•
	Check that brake lines are undamaged and free of leaks.		•	•	•
	Check the free travel of the hand brake lever. (☛ p. 88)		•	•	•
	Check the free travel of the foot brake lever. (☛ p. 93)		•	•	•
	Check the brake system.		•	•	•
	Check screws and guide pins of the brake system for tightness.		•	•	•
Chassis	Check shock absorbers for cracks and proper functioning.		•	•	•
	Check the steering column bearing for wear and smooth operation.		•	•	•
	Clean and grease bearing and sealing elements of steering column.		•	•	•
	Check the handlebar for smooth operation and play.		•	•	•
	Check the handlebar bridge bearing for excessive play.		•	•	•
	Check tie rods and tie rod ends for damage and play.		•	•	•
	Check front wheel suspension for wear and tightness.		•	•	•
	Check that front and rear wheel hubs are tight.		•	•	•
	Check the swingarm bearing.			•	•
	Check the bearing of the rear axle for play.		•	•	•
	Grease the rear wheel eccentric element.			•	•
	Check all screws to make sure they are tight.		•	•	•
Wheels	Check rim run-out.		•	•	•
	Check the tire condition. (☛ p. 72)		•	•	•
	Check the tire air pressure. (☛ p. 72)		•	•	•
	Check the chain wear. (☛ p. 75)		•	•	•
	Check the chain tension. (☛ p. 76)		•	•	•
	Clean the chain. (☛ p. 75)		•	•	•
	Check front wheel bearing for play.		•	•	•

S1N: Once after 1 service hour - corresponds to about 7 liters of fuel (1.8 US gal)
S3N: Once after 3 service hours - corresponds to about 21 liters of fuel (5.5 US gal)
S10A: Every 10 service hours - corresponds to about 70 liters of fuel (18.5 US gal) / after every race
S30A: Every 30 service hours - corresponds to about 210 liters of fuel (55.5 US gal)

Important maintenance work to be carried out by an authorized KTM workshop (as an additional order)

	S10A	S20A	S40A	S80A	J1A	J2A
Change the oil in the front shock absorber. (☛ p. 25)			•	•		
Service the front shock absorber. (☛ p. 27)				•		•
Change the oil in the rear shock absorber. (☛ p. 42)		•	•	•		
Service the rear shock absorber. (☛ p. 44)			•	•		•
Treat electric contacts with contact spray.					•	•
Change the hydraulic clutch fluid. (☛ p. 178)					•	•
Change the front brake fluid. (☛ p. 90)					•	•
Change the rear brake fluid. (☛ p. 95)					•	•
Check the clutch. (☛ p. 138)		•	•	•		
Check/measure the cylinder. (☛ p. 127)			•	•		
Replace piston.			•	•		
Check the camshafts. (☛ p. 130)			•	•		
Check the valve spring seat. (☛ p. 133)			•	•		
Check the cylinder head. (☛ p. 133)			•	•		
Change the valves.			•	•		
Change the valve springs.			•	•		
Check the timing-chain tensioner function.			•	•		
Check the crankshaft run-out at the bearing pin. (☛ p. 126)			•	•		
Change the connecting rod, conrod bearing and crank pin. (☛ p. 125)			•	•		
Check the seating of the piston pin.			•	•		
Change the crankshaft main bearing.			•	•		
Check the transmission. (☛ p. 142)			•	•		
Check the shift mechanism. (☛ p. 139)			•	•		
Check the spring length of the oil pressure regulator valve. (☛ p. 123)			•	•		
Change glass fiber yarn filling of main silencer.	•	•	•	•		
Replace foot brake cylinder seals.		•	•	•		
Check/adjust the carburetor components. (☛ p. 170)			•	•	•	•

S10A: Every 10 service hours - corresponds to about 70 liters of fuel (18.5 US gal)
S20A: Every 20 service hours - corresponds to about 140 liters of fuel (37 US gal)
S40A: Every 40 service hours - corresponds to about 280 liters of fuel (74 US gal)
S80A: Every 80 service hours - corresponds to about 560 liters of fuel (148 US gal)
J1A: Annually
J2A: Every two years

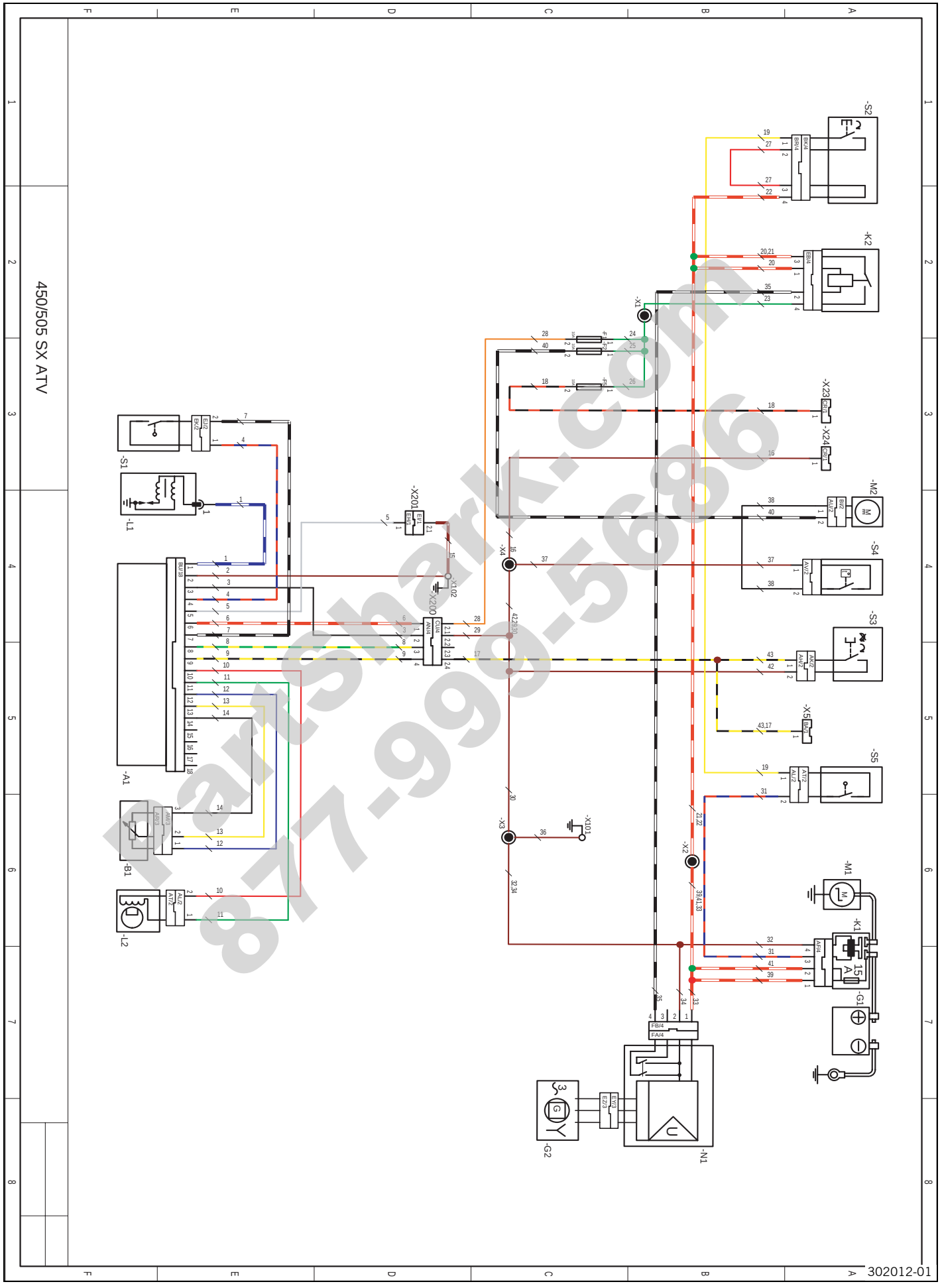
Important checks and maintenance work to be carried out by the rider

	NB1A
Check the engine oil level. (☛ p. 185)	•
Check the front brake fluid level. (☛ p. 89)	•
Check the rear brake fluid level. (☛ p. 94)	•
Check the front brake linings. (☛ p. 91)	•
Check the rear brake linings. (☛ p. 96)	•
Check and adjust control cables.	•
Clean the chain. (☛ p. 75)	•
Check the chain tension. (☛ p. 76)	•
Check the chain wear. (☛ p. 75)	•
Check rear sprocket / engine sprocket for wear. (☛ p. 76)	•
Clean the air filter. (☛ p. 61)	•
Check the tire air pressure. (☛ p. 72)	•

	NB1A
Check the tire condition. (☛ p. 72)	•
Check the coolant level. (☛ p. 180)	•
Check that all controls for smooth operation.	•
Check braking force (incl. parking brake).	•
Check all screws, nuts and hose clamps regularly for tightness.	•

NB1A: Depending on conditions of use according to requirements.

450/525 SX ATV



Components	
A1	CDI controller
B1	Throttle position sensor
G1	Battery
G2	Alternator
K1	Starter relay with fuse
K2	Power relay
L1	Ignition coil
L2	Ignition pulse generator
M1	Starter motor
M2	Radiator fan
N1	Voltage regulator/rectifier
S1	Switch for throttle lever
S2	Electric starter button
S3	Emergency OFF switch with rip cord
S4	Temperature switch for radiator fan
S5	Clutch switch

Cable colors	
1	White-blue
2	brown
3	white
4	Blue-red
5	Grey
6	white-red
7	White-black
8	Yellow-green
9	Black-yellow
10	Red
11	Green
12	Blue
13	Yellow
14	Black
15	White-brown
16	Brown
17	Black-yellow
18	Black-red
19	Yellow
20	White-red
21	White-red
22	White-red
23	Green
24	Green
25	Green
26	Green
27	Red
28	Orange
29	Brown
30	Brown
31	Blue-red
32	Brown
33	White-red
34	Brown

35	White-black
36	Brown
37	Brown
38	Black
39	White-red
40	White-black
41	White-red
42	Brown
43	Black-yellow

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**

Engine oil (SAE 5W/40)

According to
– JASO T903 MA (☛ p. 240)
– SAE (☛ p. 240) (SAE 5W/40)

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®
– **Power Synt 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**

Hydraulic fluid (15)

According to
– ISO VG (15)

Guideline
– Use only hydraulic fluid that complies with the specified standards (see specifications on the container) and that possesses the corresponding properties. KTM recommends **Motorex®** products.

Supplier
Motorex®
– **Hydraulic Fluid 75**

Hydraulic oil (15)

According to
– ISO VG (15)

Guideline
– Use only hydraulic oil that complies with the specified standards (see specifications on the container) and that possesses the corresponding properties. HUSABERG recommends **Motorex®** products.

Supplier
Motorex®
– **Hydraulic Fluid 75**

Long-life grease

According to
– NLGI

Guideline
– Use only grease that complies with the specified standards (see specifications on the container) and that possesses the corresponding properties. KTM recommends **Motorex®** products.

Supplier
Motorex®
– **Fett 2000**

Shock absorber oil (SAE 2,5) (50118034251)

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 possesses 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 preserving 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**

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 (T625)

Guideline

– KTM recommends **Molykote®** products.

Supplier
Molykote®

– **33 Medium**

Lubricant (T159)

Guideline

– KTM recommends **Bel-Ray®** products.

Supplier
Bel-Ray®

– **MC-11®**

Lubricant (T511)

Guideline

– KTM recommends **Lubcon®** products.

Supplier
Lubcon®

– **Turmsilon® GTI 300 P**

Motorcycle cleaner

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Moto Clean 900**

Off-road 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**

Paint cleaner and polish for high-gloss and matte finishes, bare metal and plastic surfaces

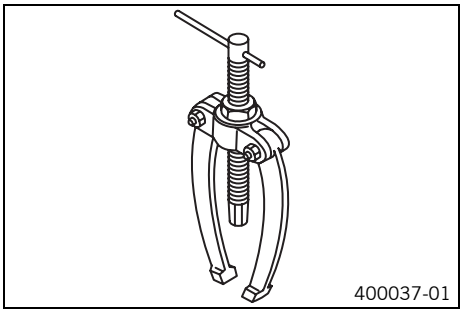
Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

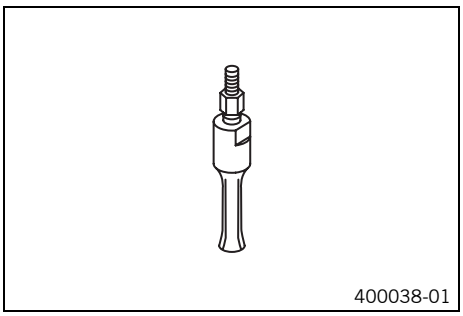
– **Clean & Polish**

Bearing puller



Art. no.: 15112017000

Insert for bearing puller

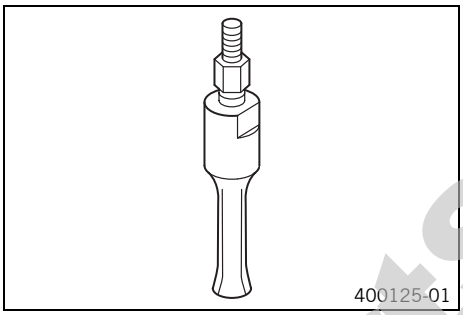


Art. no.: 15112018000

Feature

12... 16 mm (0.47... 0.63 in)

Insert for bearing puller

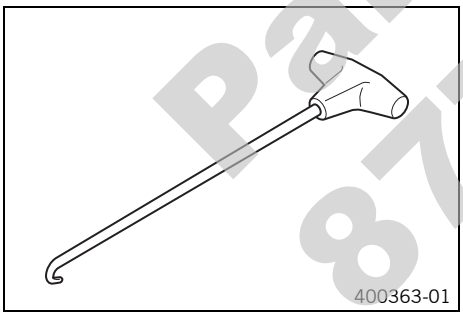


Art. no.: 15112018100

Feature

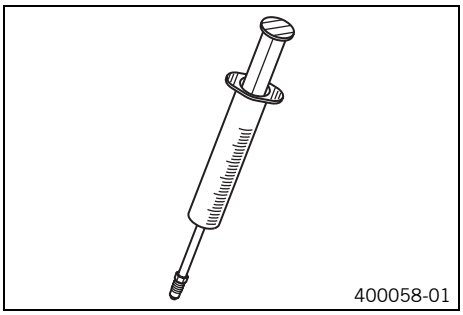
18... 23 mm (0.71... 0.91 in)

Spring hooks



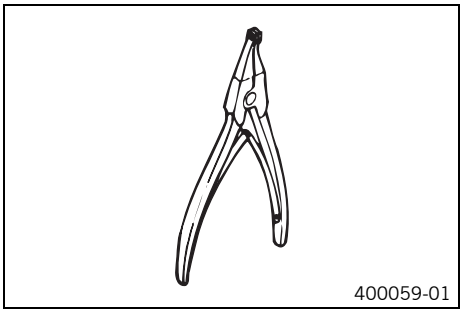
Art. no.: 50305017000

Bleed syringe



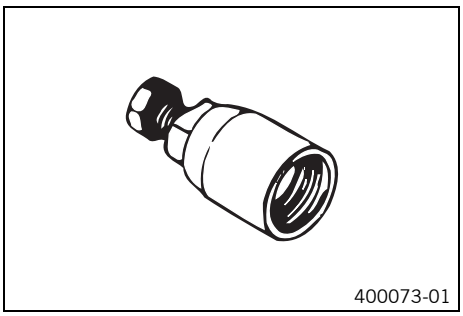
Art. no.: 50329050000

Circlip pliers reverse



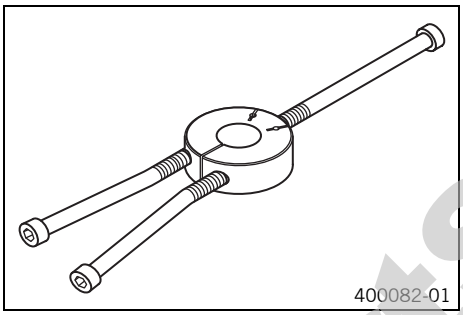
Art. no.: 51012011000

Extractor



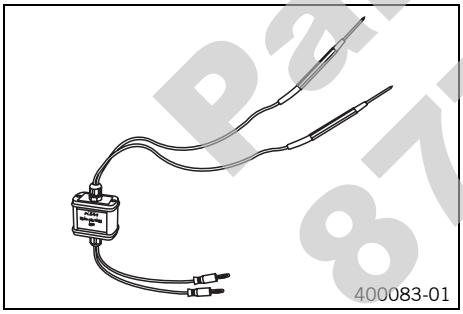
Art. no.: 58012009000

Tool for inner bearing race



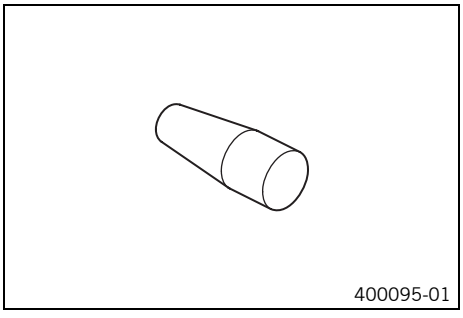
Art. no.: 58429037037

Peak voltage adapter



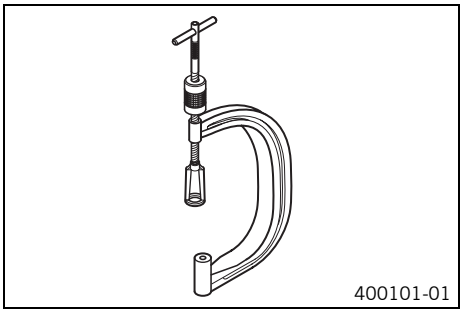
Art. no.: 58429042000

Mounting sleeve



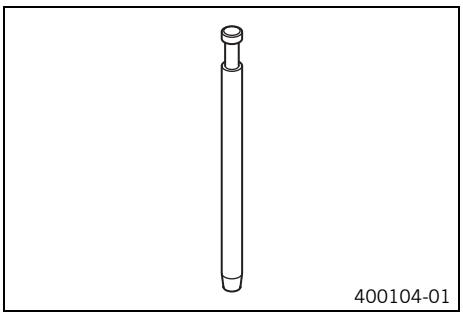
Art. no.: 58529005000

Valve spring compressor



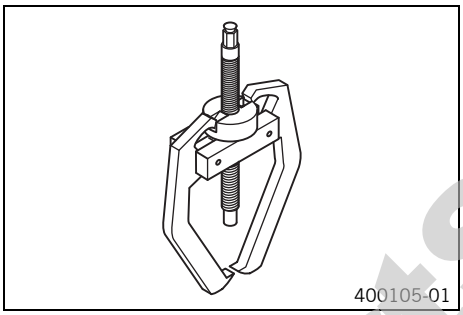
Art. no.: 59029019000

Limit plug gauge



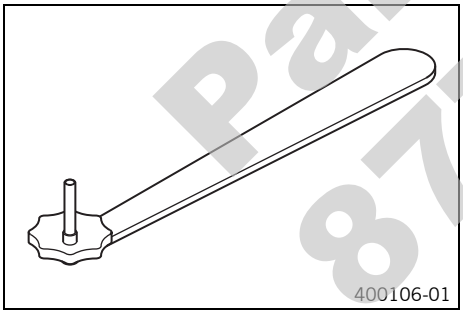
Art. no.: 59029026006

Extractor



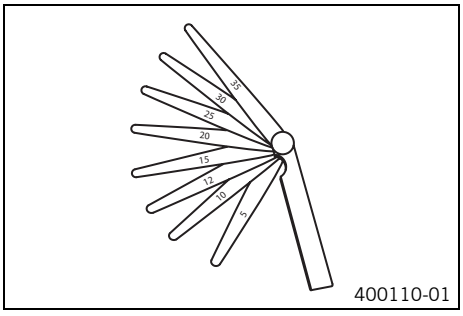
Art. no.: 59029033000

Adjustment tool for mixture control screw



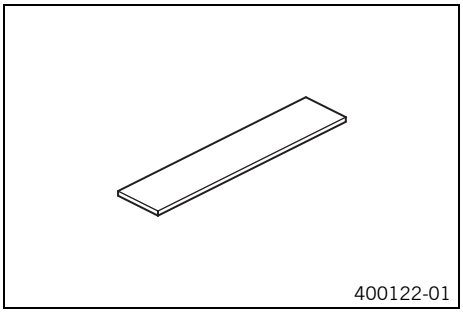
Art. no.: 59029034000

Feeler gauge



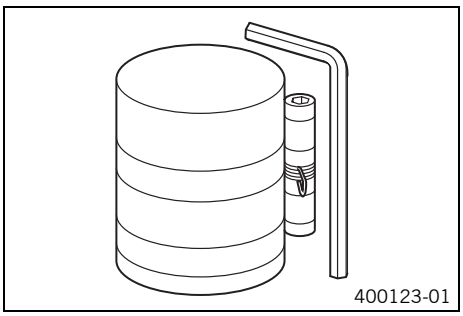
Art. no.: 59029041100

Plastigauge measuring strips



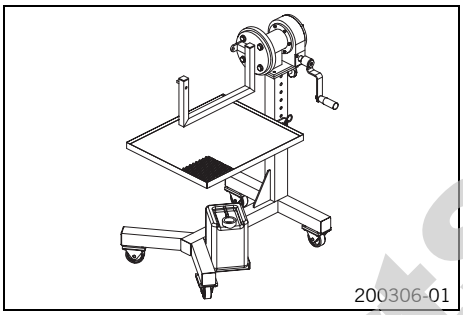
Art. no.: 60029012000

Piston ring mounting tool



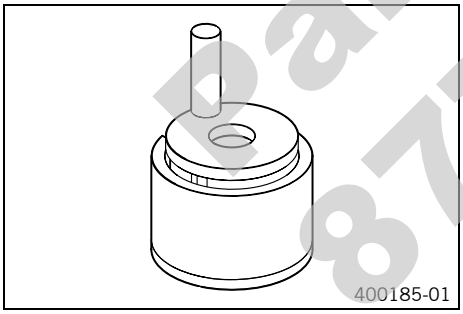
Art. no.: 60029015000

Engine work stand



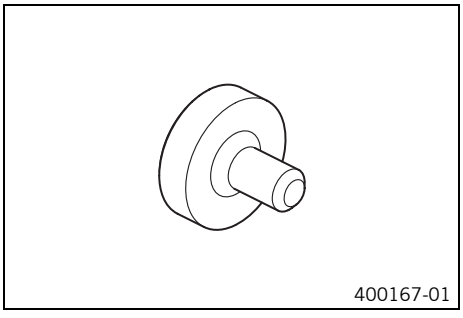
Art. no.: 61229001000

Pressing device for crankshaft, complete



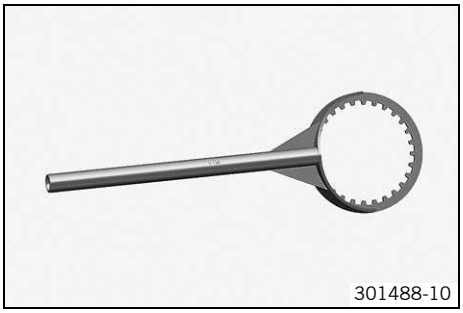
Art. no.: 75029047000

Protection cover



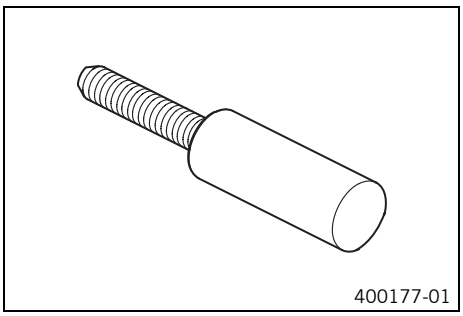
Art. no.: 75029090000

Clutch holder



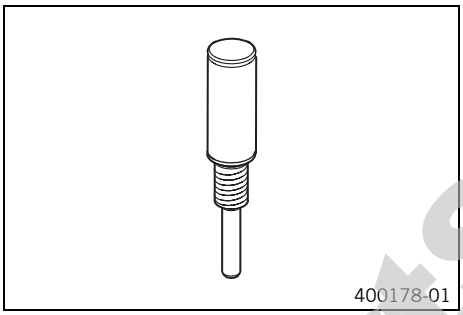
Art. no.: 77329003000

Engine blocking screw



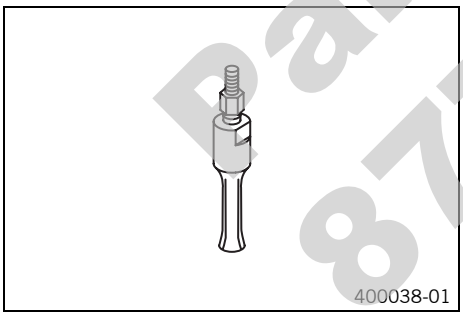
Art. no.: 77329010000

Assembly pin



Art. no.: 77329012100

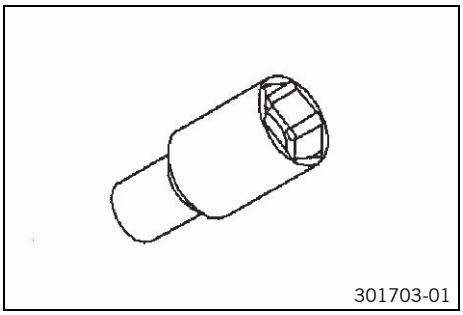
Internal bearing puller



Art. no.: 77329020000

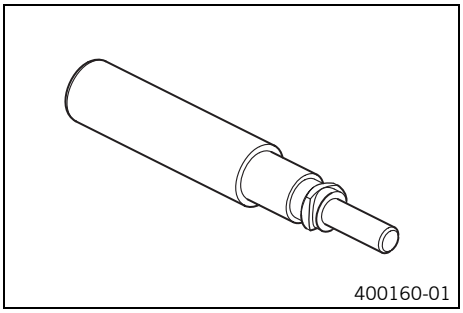
Feature
8... 12 mm (0.31... 0.47 in)

Special socket, 36 mm; ½" drive



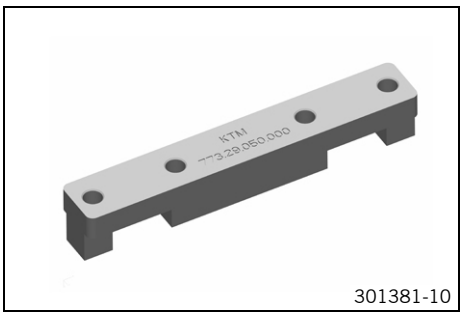
Art. no.: 77329021000

Insert for piston pin retainer



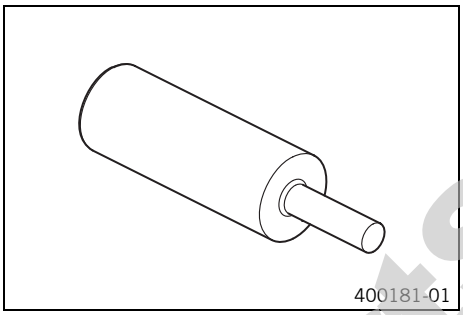
Art. no.: 77329030100

Adjustment bush bridge



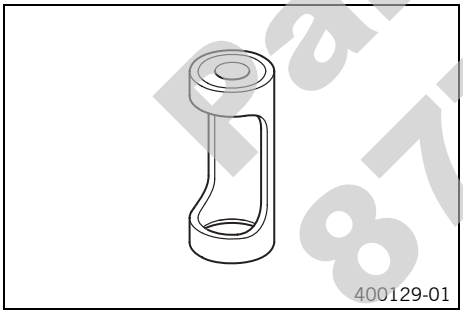
Art. no.: 77329050000

Release device for timing chain tensioner



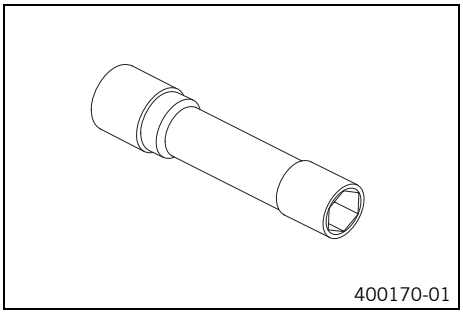
Art. no.: 77329051000

Insert for valve spring lever



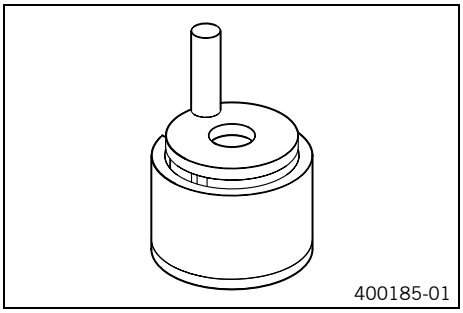
Art. no.: 77329060000

Spark plug wrench



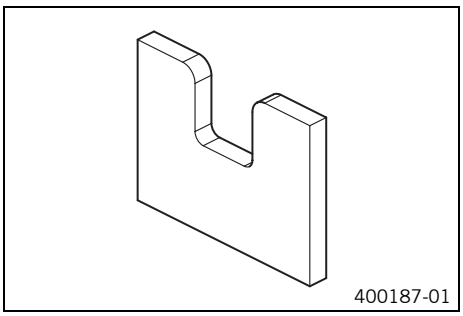
Art. no.: 77329072000

Pressing tool, crankshaft



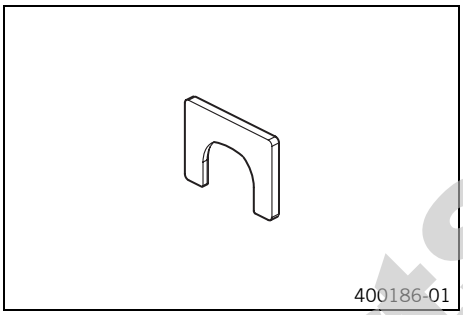
Art. no.: 77629008000

Extrude plate, base



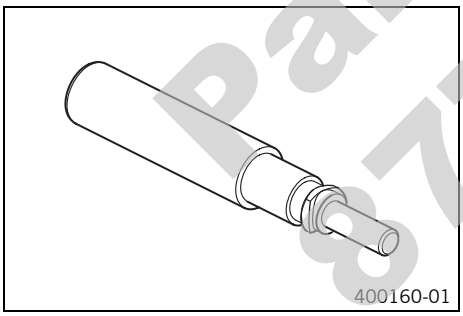
Art. no.: 77629009001

Extrude plate, top



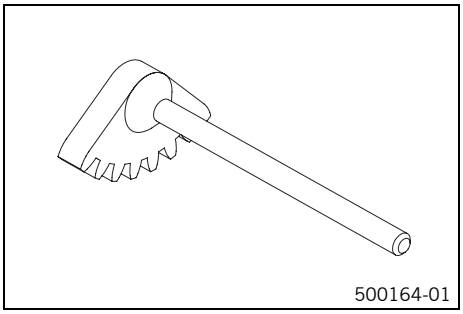
Art. no.: 77629009002

Insertion for piston ring lock



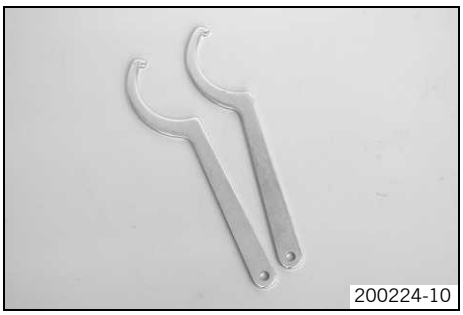
Art. no.: 77629030000

Gear quadrant



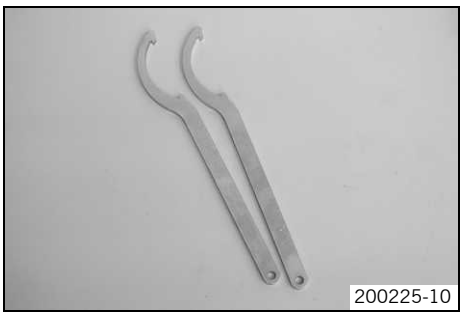
Art. no.: 80029004000

Hook wrench



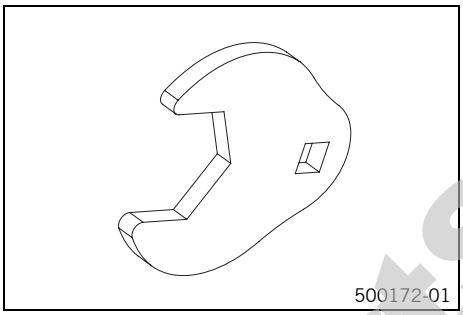
Art. no.: 83019001000

Hook wrench



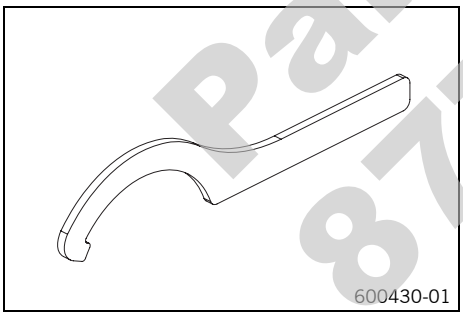
Art. no.: 83019002000

Open-end wrench attachment, 46 mm



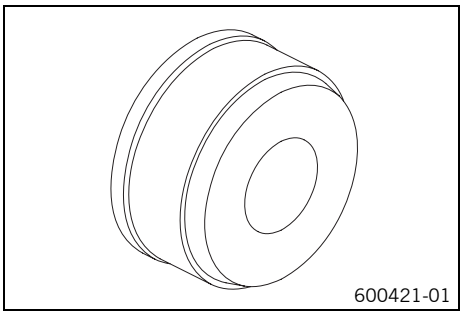
Art. no.: 83019010461

Hook wrench



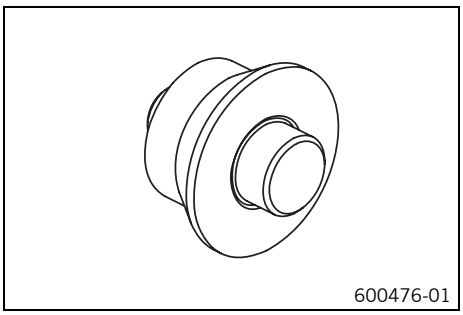
Art. no.: 83019011000

Press mandrel



Art. no.: 83019012000

Press mandrel

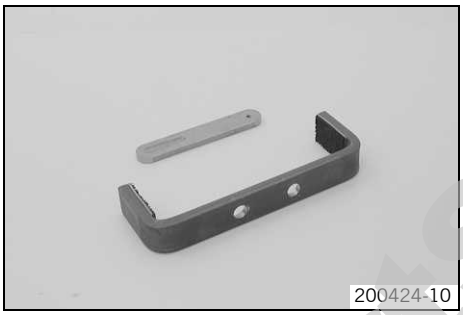


Art. no.: 83019013000

Camber gauge

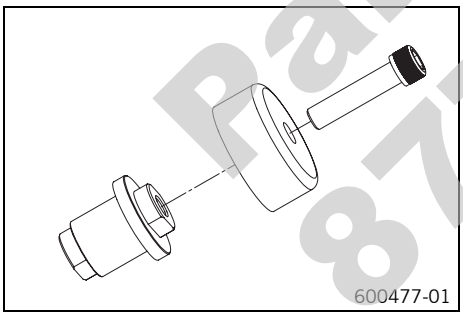
Art. no.: 83019014000

Handlebar fixation for straight-ahead position



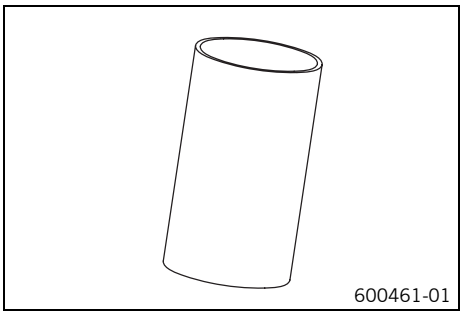
Art. no.: 83019015100

Extractor



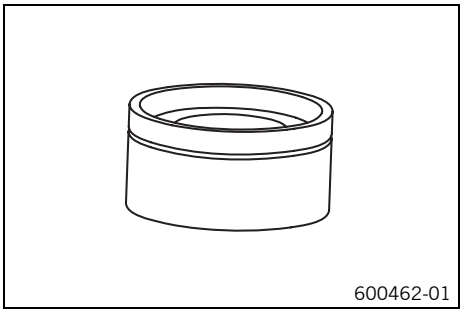
Art. no.: 83019020000

Mounting sleeve



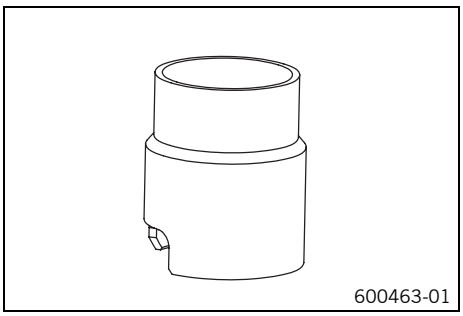
Art. no.: 83019020100

Press mandrel



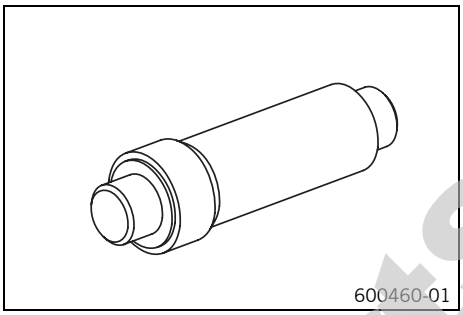
Art. no.: 83019020130

Disassembly/assembly holder



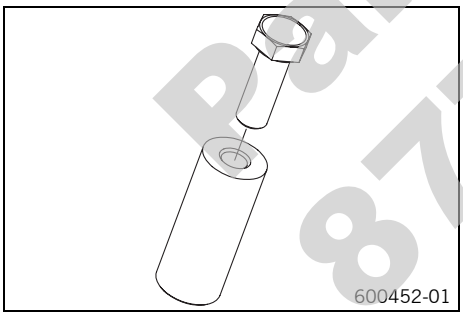
Art. no.: 83019020150

Press mandrel



Art. no.: 83019020170

Push-out tool

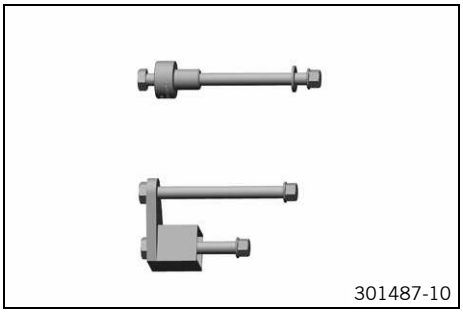


Art. no.: 83019021000

Adapter cable

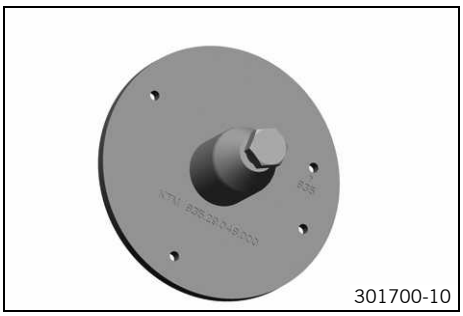
Art. no.: 83029043000

Engine fixing arm



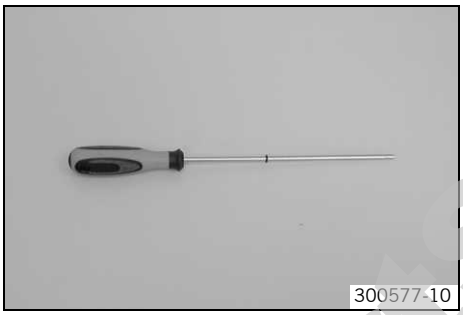
Art. no.: 83529002000

Extractor



Art. no.: 83529048000

Depth micrometer



Art. no.: T107S

Pin

Art. no.: T120

Mounting sleeve

Art. no.: T1204

Calibration pin

Art. no.: T1205

Pressing tool

Art. no.: T1206

Pressing tool

Art. no.: T1207S

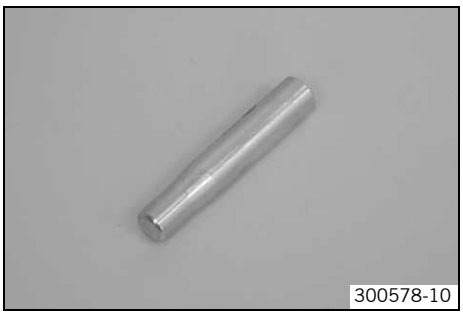
Press drift

Art. no.: T1504

Assembly tool

Art. no.: T150S

Mounting sleeve

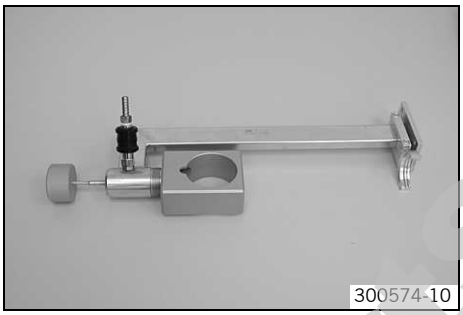


Art. no.: T1554

Hook wrench

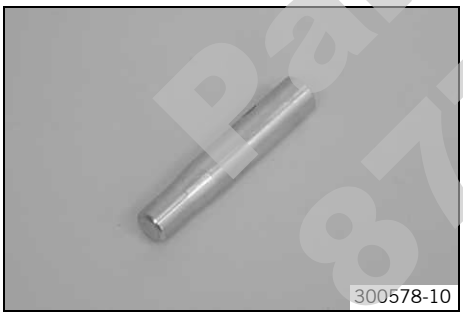
Art. no.: T157S

Nitrogen filling tool



Art. no.: T170S1

Mounting sleeve



Art. no.: T313

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.

3206070en

09/2009 Photo: Mitterbauer

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