REPAIR MANUAL 2013

WWW.KTM.COM

390 Duke EU
390 Duke AUS
390 Duke MAL
390 Duke 2014 COL

Art. no. 3206167en

INTRODUCTION

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

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 supply.

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ISO 9001(12 100 6061)
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Issued by: TÜV Management Service

KTM-Sportmotorcycle AG
5230 Mattighofen, Austria

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1 MEANS OF REPRESENTATION

1.1 Symbols used

The meaning of specific symbols is described below.

✓	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).
☛	Indicates a page reference (more information is provided on the specified page).
i	Indicates information with more details or tips.
»	Indicates the result of a testing step.
V	Denotes a voltage measurement.
A	Denotes a current measurement.
Ω	Denotes a resistance measurement.

1.2 Formats used

The typographical formats used in this document are explained below.

Proprietary name	Identifies a proprietary name.
Name®	Identifies a protected name.
Brand™	Identifies a trademark.

2 SAFETY ADVICE

2.1 Repair Manual

Read this Repair Manual carefully and thoroughly before beginning work. It contains useful information and tips that will help you repair and maintain your vehicle.
This manual assumes that the necessary special KTM tools and KTM workplace and workshop equipment are available.

2.2 Safety advice

A number of safety instructions need to be followed to operate the vehicle safely. Therefore, read this manual carefully. The safety instructions are highlighted in the text and are referred to at the relevant passages.

Info
The vehicle has various information and warning labels at prominent locations. Do not remove information/warning labels. If they are missing, you or others may not recognize dangers and may therefore be injured.

2.3 Degrees of risk and symbols

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.

Caution
Identifies a danger that may lead to minor injuries 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.

2.4 Work rules

Special tools are necessary for certain tasks. The tools are not contained in the vehicle but can be ordered under the number in parentheses. E.g.: bearing puller (15112017000)
During assembly, non-reusable parts (e.g. self-locking screws and nuts, seals and seal rings, O-rings, pins, lock washers) must be replaced by new parts.
In some instances, a thread locker (e.g. **Loctite®**) is required. The manufacturer instructions for use must be followed.
After disassembly, clean the parts that are to be reused and check them for damage and wear. Change damaged or worn parts.
After you complete the repair or service work, check the operating safety of the vehicle.

3 IMPORTANT INFORMATION

3.1 Guarantee, warranty

The work prescribed in the service schedule must be carried out by an authorized KTM workshop only and confirmed in the customer's Service & Warranty Booklet and in the **KTM dealer.net**; otherwise, all warranty claims will be void. No warranty claims can be considered for damage resulting from manipulations and/or alterations to the vehicle.
Additional information on the guarantee or warranty and the procedures involved can be found in the Service & Warranty Booklet.

3.2 Operating and auxiliary substances

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.

Use the operating and auxiliary substances (such as fuel and lubricants) as specified in the manual.

3.3 Spare parts, accessories

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

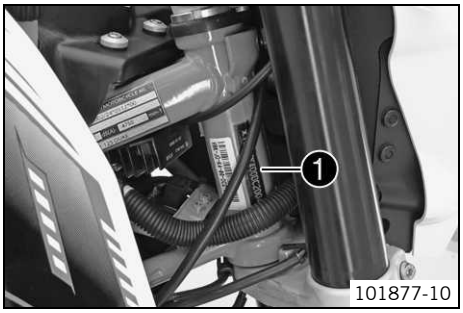
The current **KTM PowerParts** for your vehicle can be found on the KTM website.
International KTM Website: http://www.ktm.com

3.4 Figures

The figures contained in the manual may depict special equipment.
In the interest of clarity, some components may be shown disassembled or may not be shown at all. It is not always necessary to disassemble the component to perform the activity in question. Please follow the instructions in the text.

4 SERIAL NUMBERS

4.1 Chassis number/type label



The chassis number ❶ is stamped on the right of the steering head.
The type label ❷ is on the right of the frame behind the steering head.

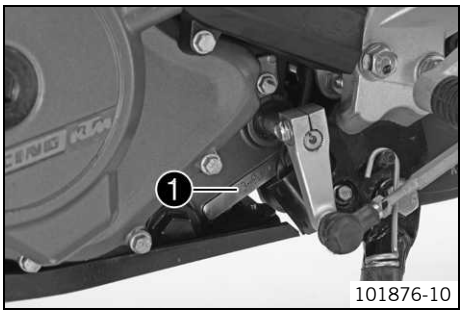
4.2 Key number

The key number ❶ can be found on the **KEYCODECARD**.

Info

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

4.3 Engine number



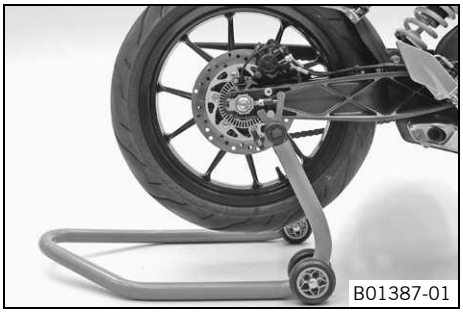
The engine number ❶ is stamped on the left side of the engine under the engine sprocket.

5.1 Raising the motorcycle with the rear wheel stand

Note

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

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



– Mount the support of the wheel stand.
– Insert the adapter in the rear wheel stand.

Adapter (61029055130) (☛ p. 190)
Rear wheel stand (61029055400) (☛ p. 191)

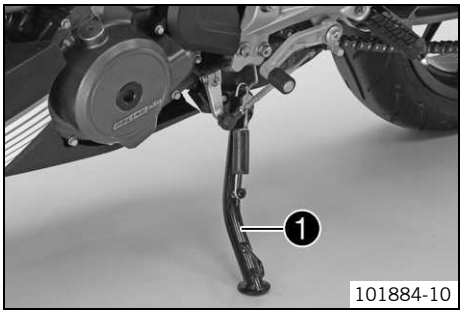
– Stand the motorcycle upright, align the lifting gear with the swingarm and the adapters, and lift the motorcycle.

5.2 Taking the motorcycle off of the rear wheel stand

Note

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

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



– Secure the motorcycle against falling over.
– Remove the rear wheel stand and lean the vehicle on the side stand ❶.
– Remove the support of the wheel stand.

5.3 Raising the motorcycle with the front wheel stand

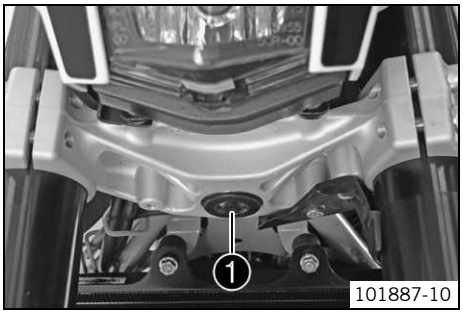
Note

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

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

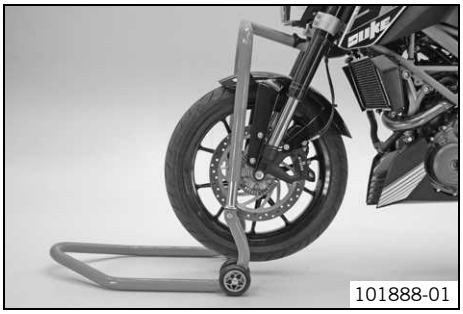
Preparatory work

– Raise the motorcycle with the rear wheel stand. (☛ p. 9)



Condition

– Remove cap ❶.



– Move the handlebar to the straight-ahead position. Attach the lifting gear to the steering stem.

Adapter (61029955620) (☛ p. 191)
Front wheel stand (61029055500) (☛ p. 191)

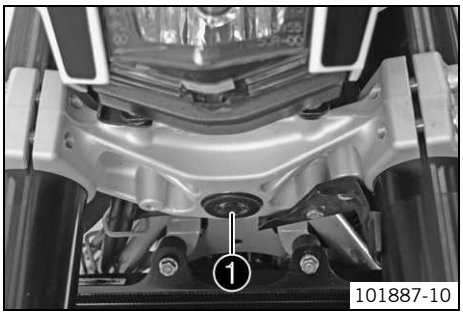
Info
Always raise the rear of the motorcycle first.

– Raise the front of the motorcycle.

5.4 Taking the motorcycle off of the front wheel stand

Note
Danger of damage The parked vehicle may roll away or fall over.
– Always place the vehicle on a firm and even surface.

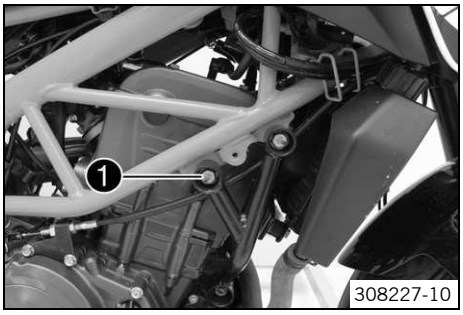
– Secure the motorcycle against falling over.
– Remove the front wheel stand.



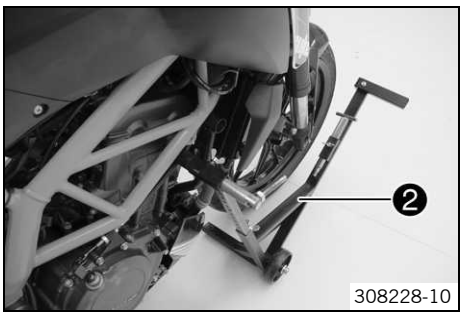
– Mount cap ❶.

5.5 Raising the motorcycle with 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.

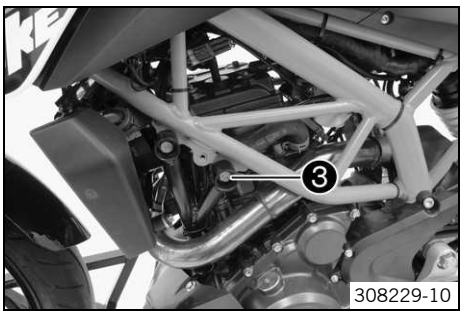


– Remove screw ❶.

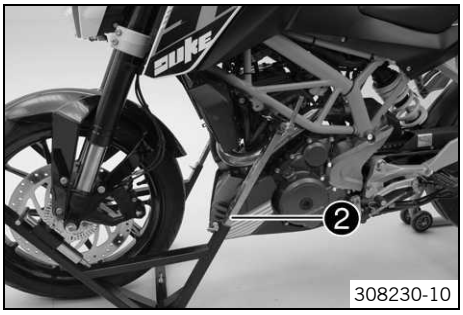


– Mount special tool ❷ on the right side of the vehicle.

Work stand (62529055000) (☛ p. 192)



– Remove screw ❸.



– Mount special tool ❷ on the left side of the vehicle.

Work stand (62529055000) (☛ p. 192)

– Position the motorcycle upright, align the special tool and raise the motorcycle.

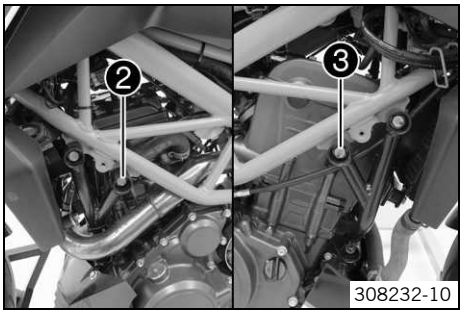
5.6 Removing the motorcycle from the work stand

Note

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

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

– Secure the motorcycle against falling over.
– Remove special tool ❶.



– Mount and tighten screws ❷❸.

Guideline

Screw, engine bearer on frame	M8	30 Nm (22.1 lbf ft)

5.7 Starting

Danger

Danger of poisoning Exhaust gases are toxic 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.

Caution

Danger of accidents If the vehicle is operated with a discharged battery or without a battery, electronic components and safety equipment may be damaged.

– Never operate the vehicle with a discharged battery or without a battery.

Note

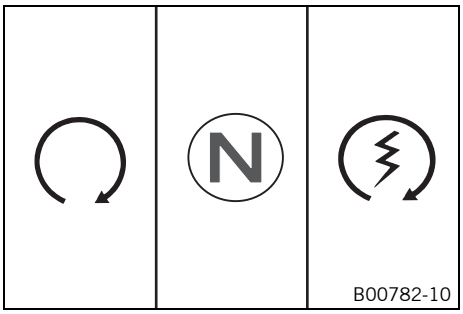
Engine failure Unfiltered intake air has a negative effect on the service life of the engine.

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

Note

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

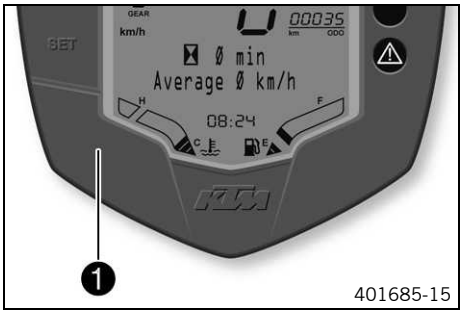
– Always warm up the engine at low engine speeds.



– Sit on the vehicle, take the weight off of the side stand, and move up all the way.
– Turn the emergency OFF switch to the position ○.
– Switch on the ignition by turning the ignition key to the position ○.
  ✔ After you switch on the ignition, you can hear the fuel pump working for about two seconds. The function check of the combination instrument is run at the same time.
– Shift gear to neutral.
  ✔ The green idling speed indicator lamp **N** lights up.
  ✔ The ABS warning lamp lights up and goes back out after starting off.
– Press the electric starter button ⓢ.

Info

Do not press the electric starter button until the combination instrument function check is finished.
When starting, **DO NOT** open the throttle. If you open the throttle during the starting procedure, fuel is not injected by the engine management system and the engine cannot start.
Press the starter for a maximum of 5 seconds. Wait for a least 5 seconds before trying again.
This motorcycle is equipped with a safety starting system. You can only start the engine if the transmission is in neutral or if the clutch is pulled when a gear is engaged. If the side stand is folded out and you shift into gear and release the clutch, the engine stops.



Switching off ABS

KTM recommends riding with ABS at all times. However, situations may arise in which ABS is not advantageous.

Condition

Vehicle stationary, engine running.

– Press the ❶ button for 3 – 5 seconds.

✔ The ABS warning lamp starts flashing; ABS is deactivated.

5.8 Starting the motorcycle to make checks

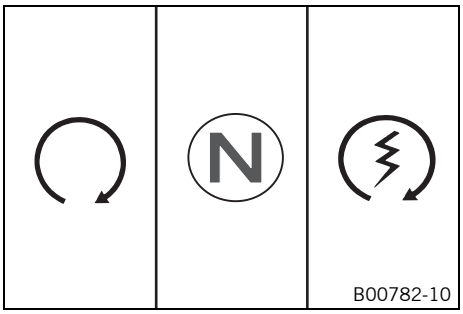
Danger

Danger of poisoning Exhaust gases are toxic 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.

Info

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

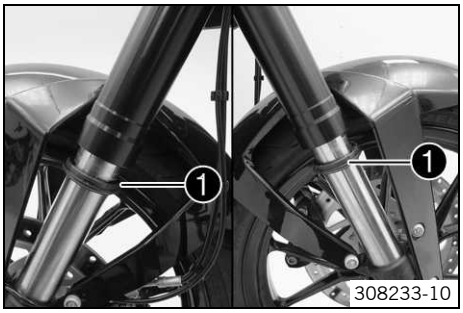


– Turn the emergency OFF switch to the position ○.
– Shift gear to neutral.
– Switch on the ignition by turning the ignition key to the position ○.
– Press the electric starter button Ⓢ.

Info

Do not open the throttle.

6.1 Cleaning the dust boots of the fork legs



– Push dust boot ❶ of both fork legs downwards.

Info
The dust boots should remove dust and coarse dirt particles from the fork tubes. Over time, dirt can penetrate behind the dust boots. If this dirt is not removed, the oil seals behind can start to leak.

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

– Clean and oil the dust boots and inside fork tube of both fork legs.

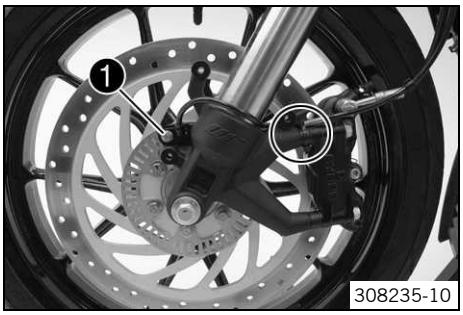
Universal oil spray (☛ p. 188)

– Press the dust boots back into their normal position.
– Remove excess oil.

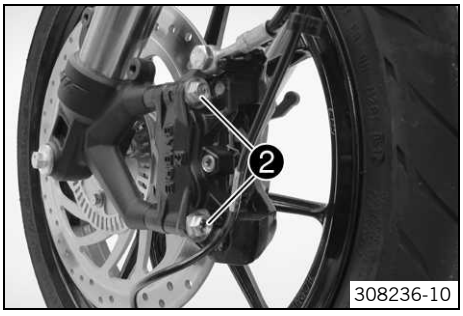
6.2 Removing fork legs

Preparatory work
– Raise the motorcycle with the work stand. (☛ p. 10)
– Tie the rear of the vehicle down.
– Dismount the front fender. (☛ p. 48)

Main work

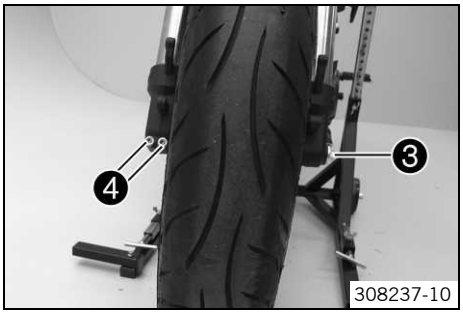


– Remove screw ❶.
– Remove the cable binder.
– Pull off the ABS sensor and hang it to one side.



– Remove screws ❷.
– Press back the brake linings with a light lateral tilting of the brake caliper on the brake disc. Pull the brake caliper carefully back from the brake disc and hang it to one side.

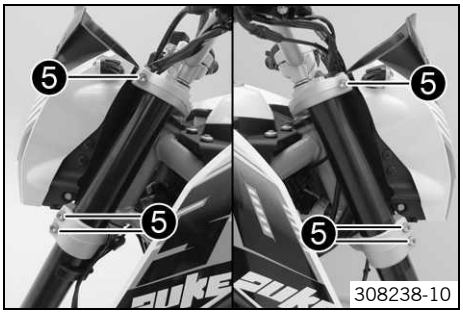
Info
Do not pull the hand brake lever when the brake caliper has been removed.



– Loosen screws ❸ and screw ❹.
– Unscrew screw ❸ about six turns and press your hand on the screw to push the wheel spindle out of the axle clamp. Remove screw ❸.

Warning
Danger of accidents Reduced braking effect caused by damaged brake discs.
– Always lay the wheel down in such a way that the brake discs are not damaged.

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



– Loosen screws ❺. Remove the fork legs from the bottom.

6.3 Installing the fork legs

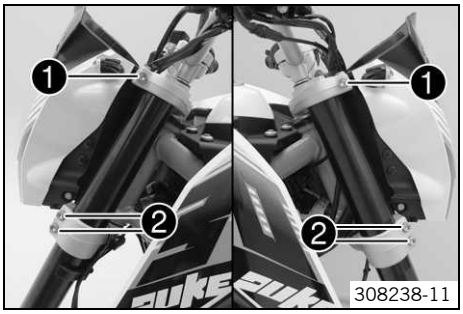
Warning

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.

Main work

– Push the fork legs into the triple clamps.
– Align the fork legs in the required position using the fork rings.



– Tighten screws ❶.

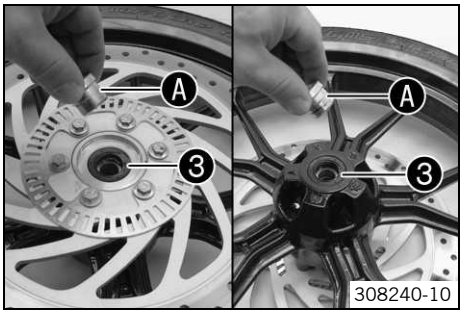
Guideline

Screw, top triple clamp	M8	11 Nm (8.1 lbf ft)

– Tighten screws ❷.

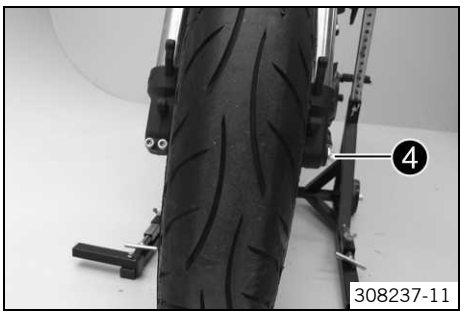
Guideline

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



– Check the wheel bearing for damage and wear.
  » If the wheel bearing is damaged or worn:
    – Change the wheel bearing.
– Clean and grease the shaft seal rings ❸ and contact surfaces Ⓐ of the spacers.

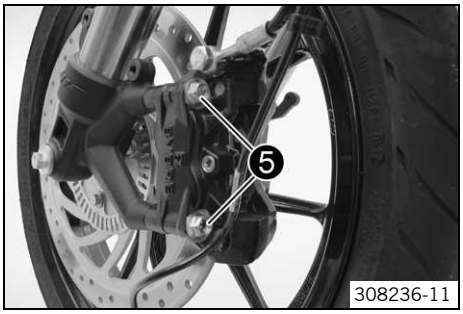
Long-life grease (☛ p. 187)



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

Guideline

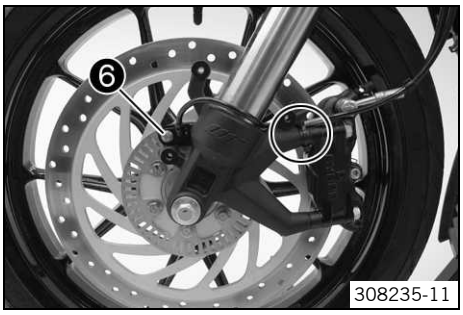
Screw, front wheel spindle	M8	30 Nm (22.1 lbf ft)



– Position the brake calipers and check that the brake linings are seated correctly.
– Mount screws ❺ but do not tighten yet.
– Operate the hand brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point. Fix the hand brake lever in the activated position.
  ✔ The brake calipers straighten.
– Tighten screws ❺.
  Guideline

Screw, front brake caliper	M8x1	27 Nm (19.9 lbf ft)	**Loctite® 243™**

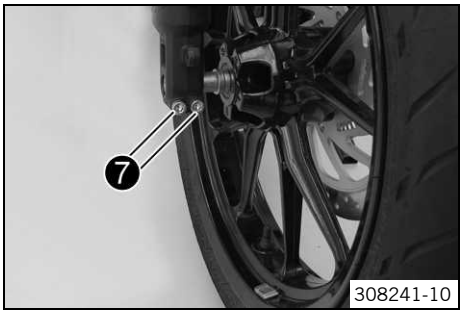
– Remove the fixation of the hand brake lever.
– Unload the rear of the vehicle.
– Remove the motorcycle from the work stand. (☛ p. 11)



– Position the ABS sensor.
– Mount and tighten screw ❻.
  Guideline

Screw, wheel speed sensor holder	M6	8 Nm (5.9 lbf ft)

– Route the cable and secure with a cable binder.



– Pull the front brake and compress the fork powerfully a few times.
  ✔ The fork legs straighten.
– Tighten screws ❼.
  Guideline

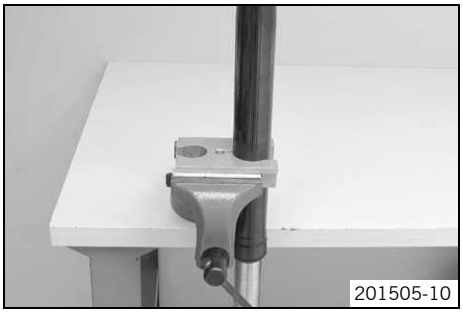
Screw, fork stub	M8	15 Nm (11.1 lbf ft)

Finishing work
– Install front fender. (☛ p. 48)

6.4 Disassembling the fork legs

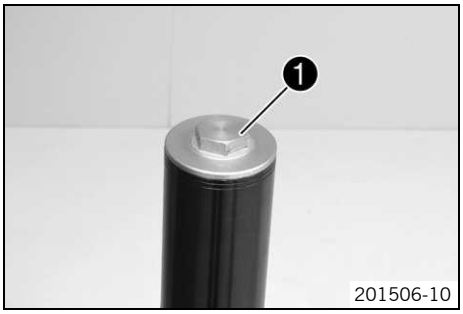
Info
These operations are the same on both fork legs.

Condition
The fork legs have been removed.



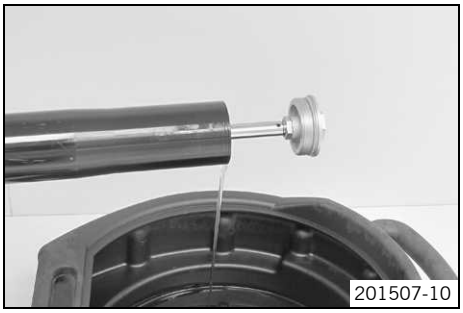
– Clamp the fork leg in the area of the lower triple clamp.

Clamping stand (T612S) (☛ p. 197)



– Loosen the screw cap ❶.

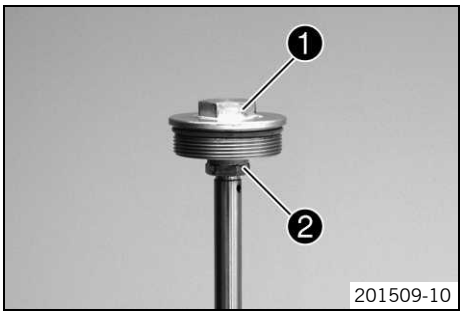
Info
The screw cap cannot be removed yet.



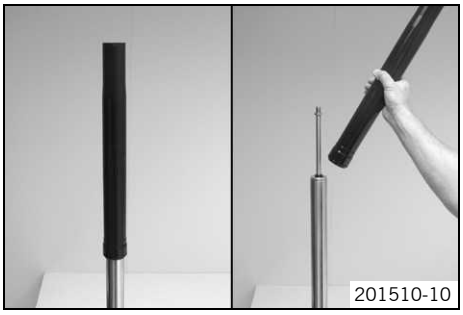
– Empty the fork oil.

– Release the fork leg and clamp it with the fork stub.

Info
Use soft jaws.



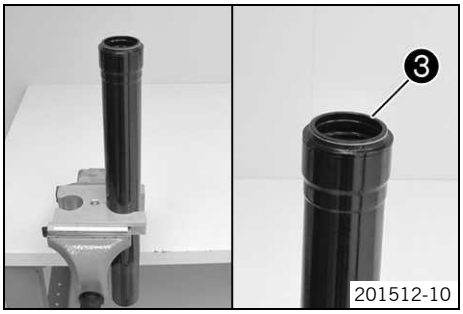
– Push the outer tube downward.
– Hold screw cap ❶. Loosen nut ❷. Remove the screw cap.



– Detach the outer tube from the inner tube.

Info
Place a container underneath to catch any oil that may run out.

– Unclamp the inner tube. Drain the oil.



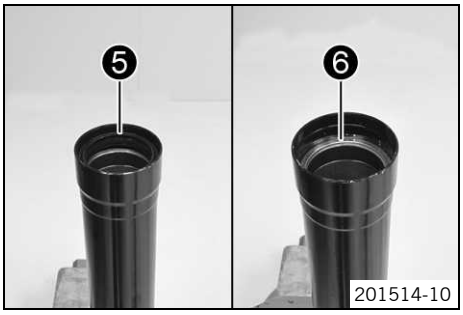
– Clamp the outer tube in the area of the lower triple clamp.

Clamping stand (T612S) (☛ p. 197)

– Remove dust boot ❸.

– Remove lock ring ❹.

Info
The lock ring has a beveled end where a screwdriver can be applied.



– Remove seal ring ❺. Remove support ring ❻.

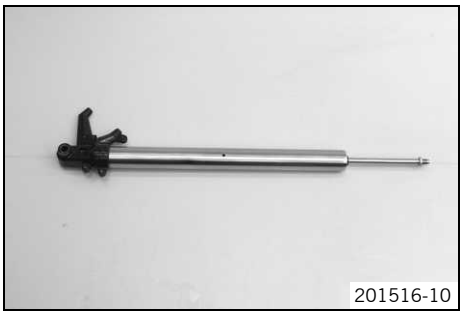
– Unclamp the outer tube.
– Heat up the outer tube in the area of sliding bushing ❼.
  Guideline

50 °C (122 °F)

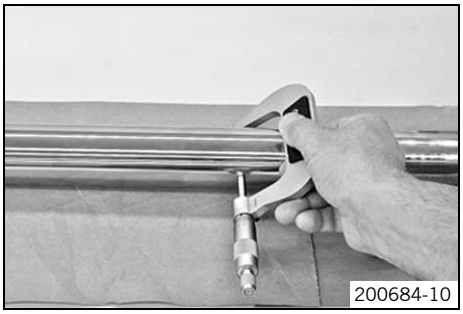
– Strike the lower edge of the outer fork tube on a wooden board.
  ✓ Sliding bushing ❼ must fall out of its seat.

6.5 Checking the fork legs

Condition
The fork legs have been disassembled.



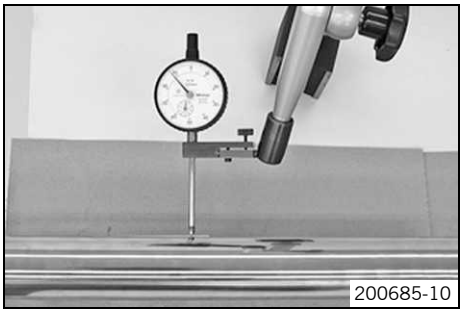
– Check the inner tube and the axle clamp for damage.
  » If damage is found:
    – Change the fork leg.



– Measure the outside diameter of the inner tube in several places.

External diameter of inner tube	42.975... 43.005 mm (1.69193... 1.69311 in)

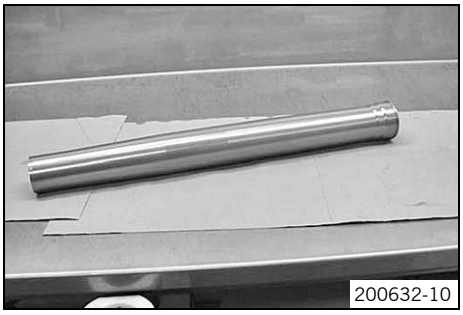
» If the measured value is less than the specified value:
– Change the fork leg.



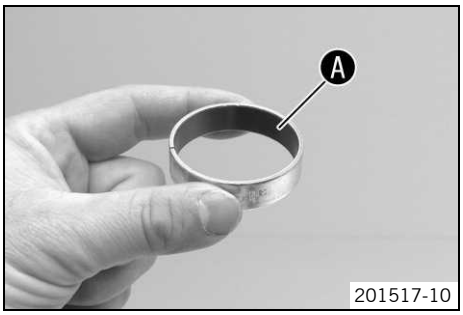
– Measure the run-out of the inner tube.

Run-out of inner tube	≤ 0.20 mm (≤ 0.0079 in)

» If the measured value is greater than the specified value:
– Change the fork leg.



– Check the outer tube for damage.
» If damage is found:
– Change the fork leg.

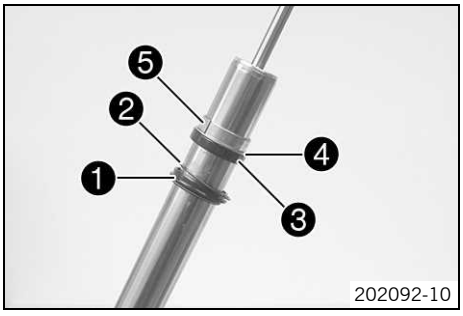


– Check the surface of the sliding bushings.
» If the dark layer Ⓐ is worn off:
– Change the fork leg.

6.6 Assembling the fork legs

Info
These operations are the same on both fork legs.

Preparatory work
– Check the fork legs. (☛ p. 18)



Main work
– Clamp in the inner tube with the axle clamp.
Guideline

Use soft jaws.

– Grease and slide on dust boot ❶.

Lubricant (T511) (☛ p. 187)

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

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

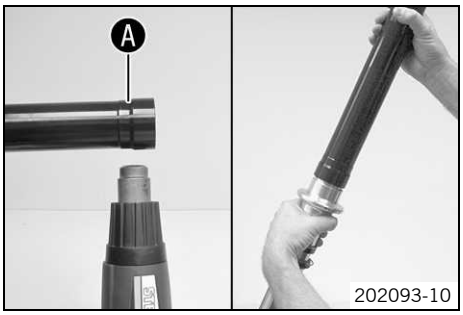
Lubricant (T511) (☛ p. 187)

Info
Mount with the sealing lip facing down and the open side facing up.

– Slide on support ring ❹.
– Sand the edges of sliding bushing ❺ with 600-grit sandpaper, then clean and grease.

Fork oil (SAE 4) (48601166S1) (☛ p. 186)

– Slide on sliding bushing ❺.



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

50 °C (122 °F)

– Slide the outer tube onto the inner tube.
– Hold the sliding bushing with the longer shoulder of the special tool.

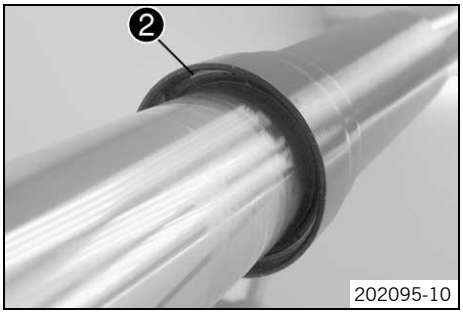
Mounting tool (T528S) (☛ p. 197)

– Push the sliding bushing all the way into the outer tube.

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

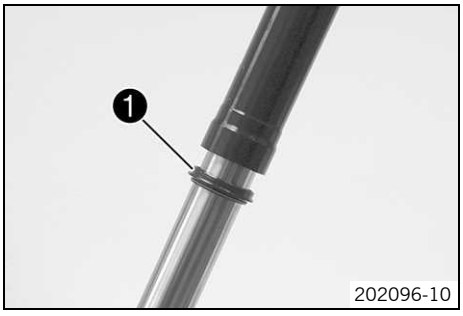
Mounting tool (T528S) (☛ p. 197)

– Push the seal ring and support ring all the way into the outer tube.

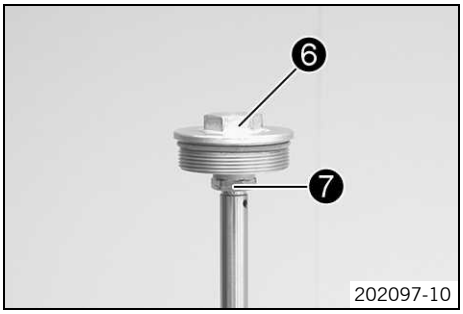


– Mount lock ring ❷.

Info
The lock ring must engage audibly.



– Install dust boot ❶.



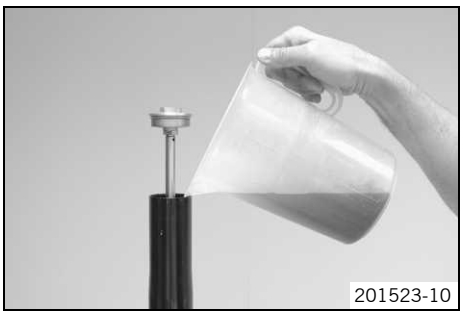
– Mount screw cap ❻ onto the piston rod.

Info
Nut ❼ must be turned all the way down.

– Hold the screw cap and tighten the nut.

Guideline

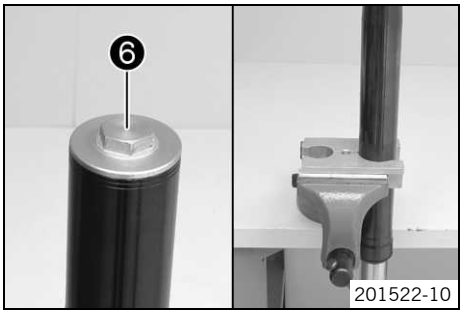
Nut, piston rod on screw cap	M12x1	30 Nm (22.1 lbf ft)



– Fill it with fork oil.

Fork oil	450 ml (15.21 fl. oz.)	Fork oil (SAE 4) (48601166S1) (☛ p. 186)

Info
If it should be impossible to add the full quantity of oil, close the screw cap of the outer tube, unclamp the fork and bounce a number of times. Then add the remaining quantity.



– Push the outer tube upward.
– Mount screw cap ❻.
– Unclamp the fork leg in the area of the lower triple clamp.

Clamping stand (T612S) (☛ p. 197)

– Tighten the screw cap.

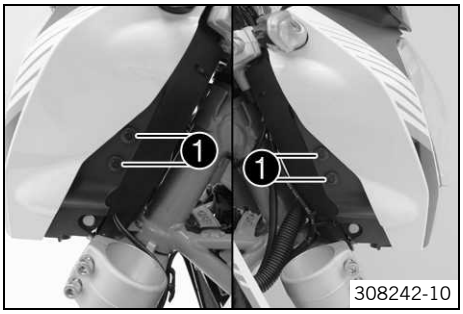
Guideline

Screw cap on outer tube	M47x1.5	30 Nm (22.1 lbf ft)

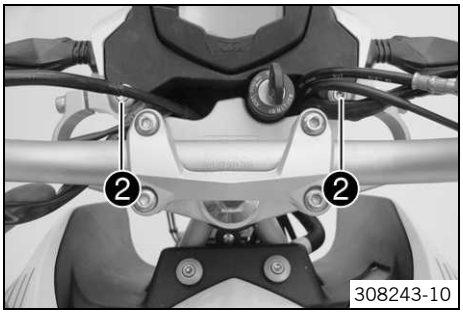
6.7 Removing the lower triple clamp

Preparatory work
– Raise the motorcycle with the work stand. (☛ p. 10)
– Tie the rear of the vehicle down.
– Dismount the front fender. (☛ p. 48)
– Remove the fork legs. (☛ p. 14)

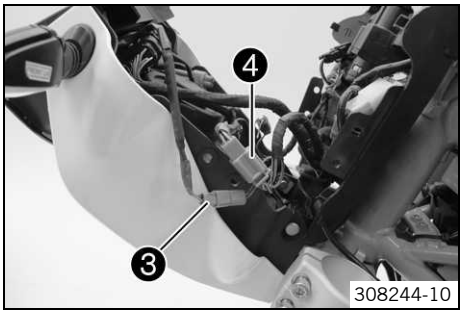
Main work



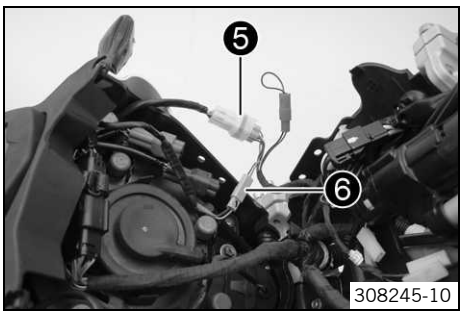
– Remove expanding rivets ❶.



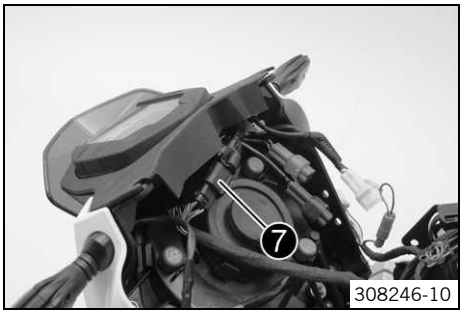
– Remove screws ❷.
– Lift the headlight mask slightly and swing forward.



– Detach connectors ❸ and ❹.

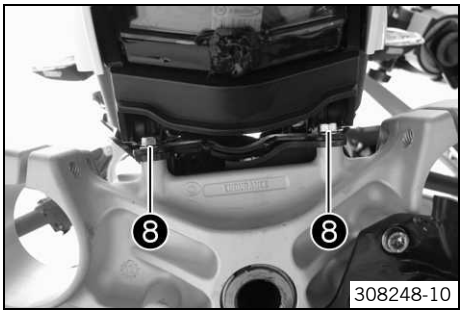


– Detach connectors ❺ and ❻.

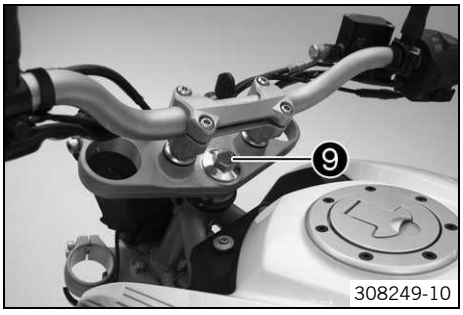


– Remove the connector holder.
– Disconnect connector ❼.

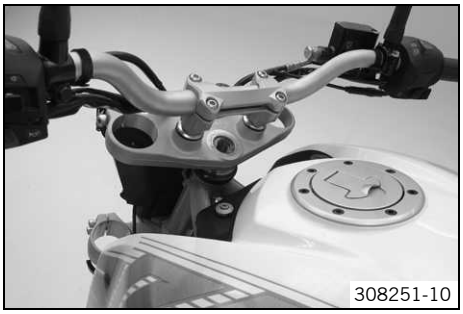
– Remove the combination instrument.



– Remove screws ❽.
– Remove the headlight mask.

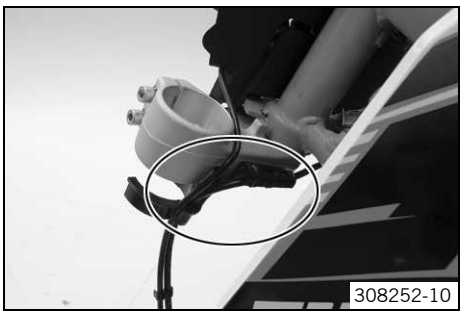


– Remove screw ❾.

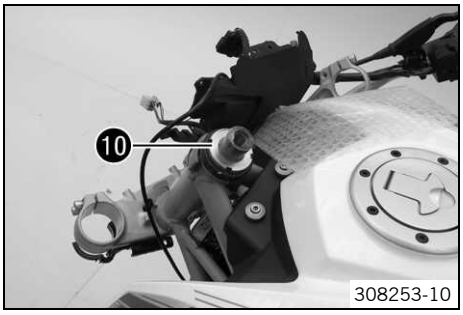


– Remove the upper triple clamp with the handlebar and set aside.

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

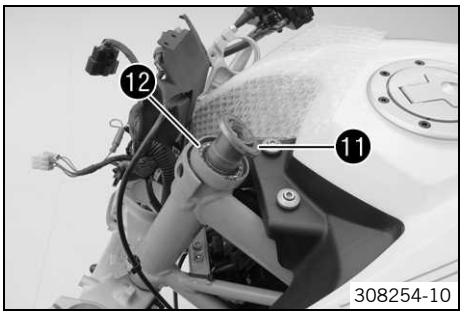


– Expose the cable.



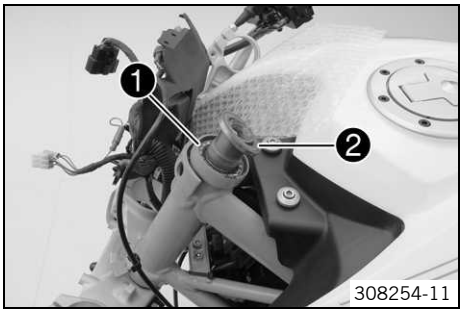
– Remove nut ❿.

Castle nut wrench; ½" drive (90129050100) (☛ p. 195)



– Remove washer ⓫.
– Remove steering head bearing ⓬.
– Remove the lower triple clamp with the steering stem.

6.8 Installing the lower triple clamp

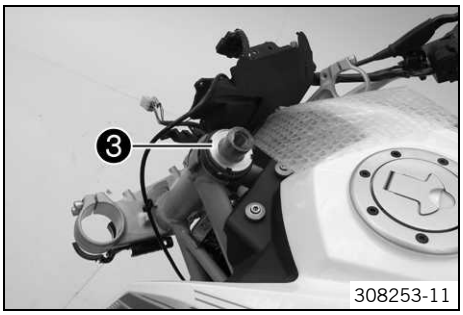


Main work

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

High viscosity grease (☛ p. 187)

– Insert the lower triple clamp with the steering stem.
– Mount the upper steering head bearing ❶.
– Mount washer ❷ with the cut-out facing downward.



Alternative 1

A new steering head bearing is used.

– Mount and tighten nut ❸.

Guideline

Nut, steering head	M30x1	Step 1 50 Nm (36.9 lbf ft) 2nd stage (loosen, counter-clockwise) 2 turns Step 3 5 Nm (3.7 lbf ft)

Castle nut wrench; ½" drive (90129050100) (☛ p. 195)

Alternative 2

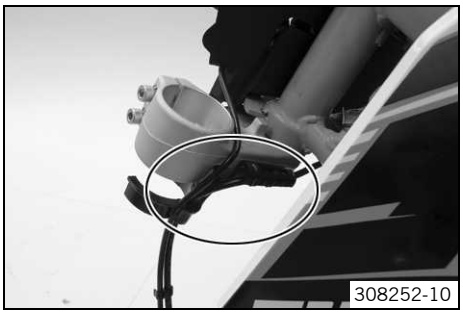
The steering head bearing is used again.

– Mount and tighten nut ❸.

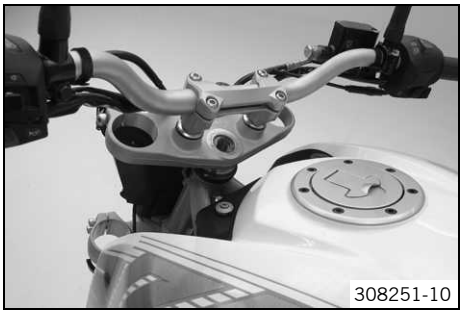
Guideline

Nut, steering head	M30x1	5 Nm (3.7 lbf ft)

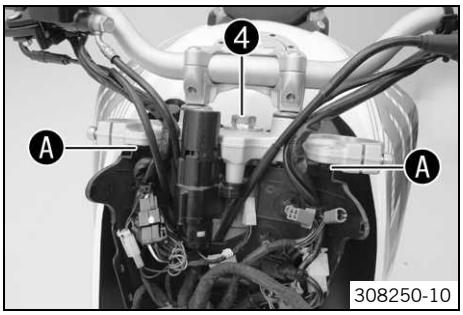
Castle nut wrench; ½" drive (90129050000) (☛ p. 195)



– Secure the cable in the bracket.



– Position the upper triple clamp with the handlebar.

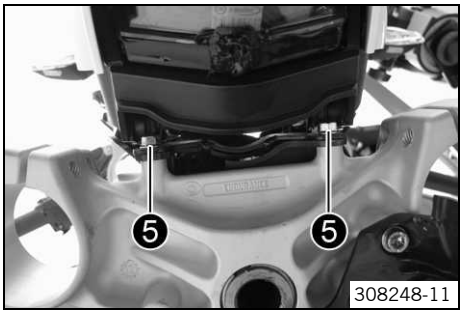


– Mount screw ❹ with the washer but do not tighten it yet.

Guideline

Screw, top steering head	M16x1.5	52 Nm (38.4 lbf ft)

✓ Holding lugs Ⓐ reach into the drilled holes.

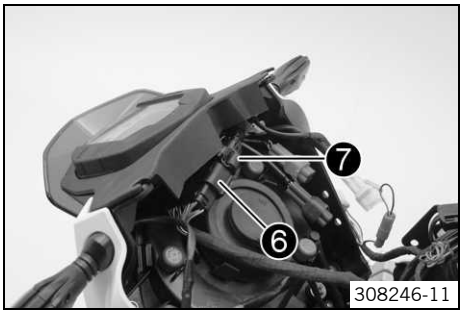


– Position the headlight mask.

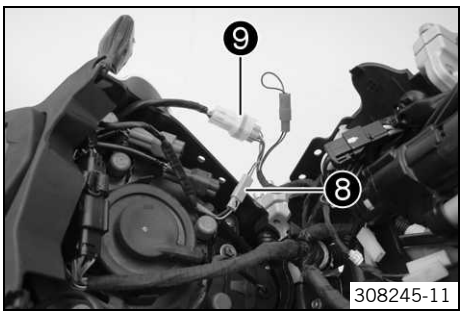
– Mount and tighten screw ❺.

Guideline

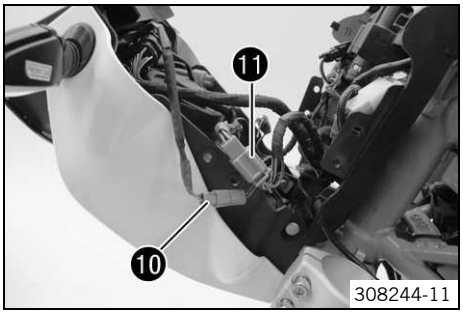
Screw, headlight mask	M6	11 Nm (8.1 lbf ft)



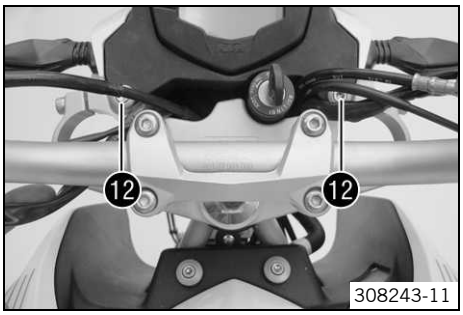
– Position the combination instrument.
– Plug in connector ❻.
– Mount the connector holder ❼.



– Plug in connectors ❽ and ❾.

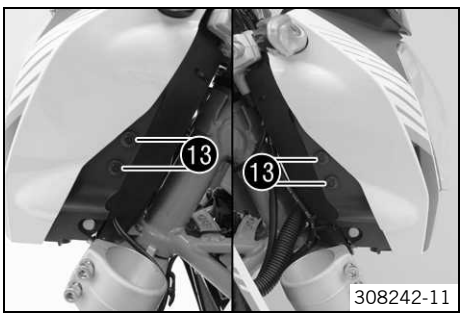


– Plug in connectors ❿ and ⓫.

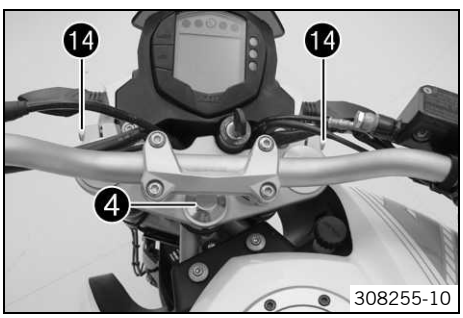


– Fold the headlight mask up.
– Mount and tighten screws ⓬.
Guideline

Screw, headlight mask	M6	11 Nm (8.1 lbf ft)



– Mount expanding rivets ⓭ on both sides.
– Install the fork legs. (☛ p. 15)



– Loosen screws ⓮.
– Using a plastic hammer, tap lightly on the upper triple clamp to avoid strains.
– Tighten screw ❹.
Guideline

Screw, top steering head	M16x1.5	52 Nm (38.4 lbf ft)

– Tighten screws ⓮.
Guideline

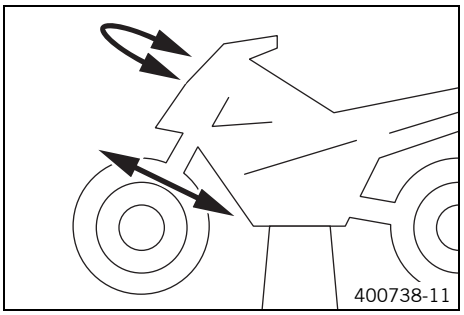
Screw, top triple clamp	M8	11 Nm (8.1 lbf ft)

Finishing work
- Check that the wiring harness, throttle cables, and brake line have the necessary freedom of movement and are correctly routed.
- Check the steering head bearing play. (☛ p. 26)
- Remove the motorcycle from the work stand. (☛ p. 11)

6.9 Checking the steering head bearing play

Warning
Danger of accidents Unstable vehicle handling from incorrect steering head bearing play.
- Adjust the steering head bearing play without delay.

Info
If the bike is ridden with play in the steering head bearing, the bearing and the bearing seats in the frame can become damaged with time.



Preparatory work
- Raise the motorcycle with the work stand. (☛ p. 10)

Main work
- Move the handlebar to the straight-ahead position. Move the fork legs to and fro in the direction of travel.

No play should be noticeable in the steering head bearing.

  » If there is noticeable play present:
    - Adjust the play of the steering head bearing. (☛ p. 26)
- Move the handlebar to and fro over the entire steering range.

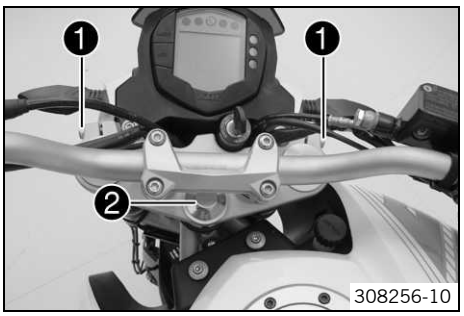
The handlebar must be able to move easily over the entire steering range. No resting locations should be noticeable.

  » If click positions are noticeable:
    - Adjust the play of the steering head bearing. (☛ p. 26)
    - Check the steering head bearing and change if necessary.

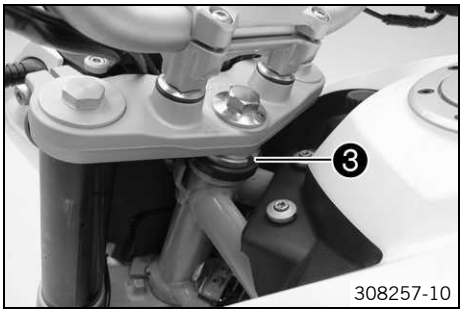
Finishing work
- Remove the motorcycle from the work stand. (☛ p. 11)

6.10 Adjusting the steering head bearing play

Preparatory work
- Raise the motorcycle with the work stand. (☛ p. 10)

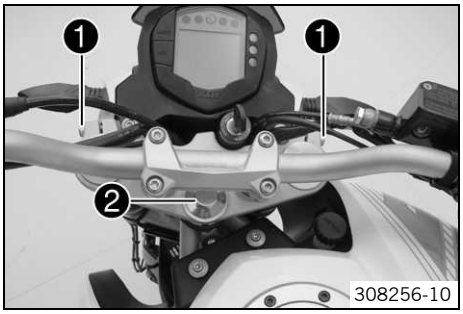


Main work
- Loosen screws ❶.
- Loosen screw ❷.



- Tighten nut ❸ with the special tool until there is no play in the steering head bearing.

Key for steering head bearing (90129051000) (☛ p. 195)



– Using a plastic hammer, tap lightly on the upper triple clamp to avoid strains.
– Tighten screw ❷.

Guideline

Screw, top steering head	M16x1.5	52 Nm (38.4 lbf ft)

– Tighten screws ❶.

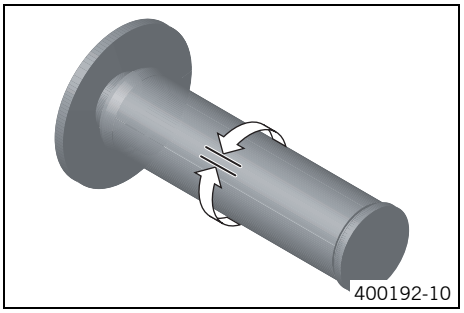
Guideline

Screw, top triple clamp	M8	11 Nm (8.1 lbf ft)

Finishing work

– Check the steering head bearing play. (☛ p. 26)
– Remove the motorcycle from the work stand. (☛ p. 11)

7.1 Checking the play in the throttle cable



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

Throttle cable play	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. 28)

Danger

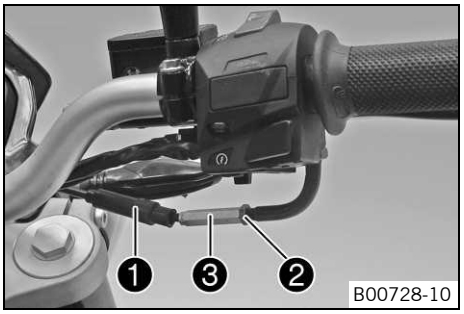
Danger of poisoning Exhaust gases are toxic and inhaling them may result in unconsciousness and/or death.
– When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in an enclosed space without an effective exhaust extraction system.

– 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:
– Check the throttle cable routing.

7.2 Adjusting the play in the throttle cable

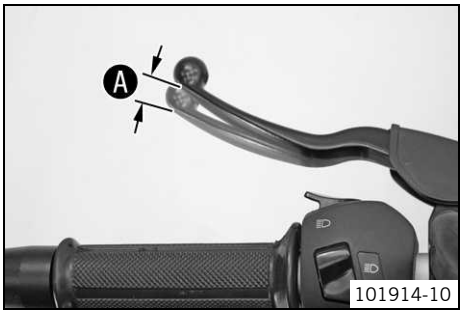


– Move the handlebar to the straight-ahead position.
– Push back sleeve ❶.
– Loosen lock nut ❷.
– Adjust the play in the throttle cable by turning adjusting screw ❸.
Guideline

Throttle cable play	3... 5 mm (0.12... 0.2 in)

– Tighten lock nut ❷.
– Slide on sleeve ❶.

7.3 Checking the clutch lever play



– Check the clutch lever for smooth operation.
– Move the handlebar to the straight-ahead position. Lightly pull the clutch lever and ascertain the clutch lever play Ⓐ.

Clutch lever play	1... 3 mm (0.04... 0.12 in)

» If the clutch lever play does not meet specifications:
– Adjust the clutch cable play. (☛ p. 29)

Note

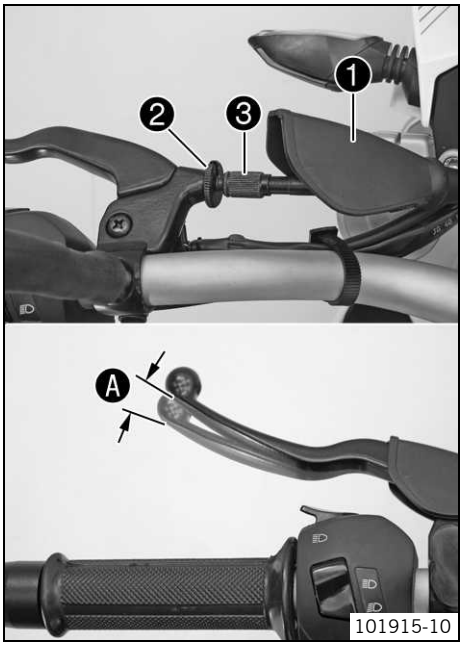
Clutch damage If there is no play on the clutch lever, the clutch will begin to slip.
– When operating the motorcycle, always check the clutch lever play.

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

The clutch lever play must not change.

» If the clutch lever play changes:
– Check the routing of the clutch cable.

7.4 Adjusting the clutch cable play



– Move the handlebar to the straight-ahead position.
– Push back sleeve ❶.
– Loosen lock nut ❷.
– Adjust the play in the clutch level Ⓐ by turning adjusting screw ❸.

Guideline

Clutch lever play	1... 3 mm (0.04... 0.12 in)

– Tighten lock nut ❷.
– Slide on sleeve ❶.

8.1 Adjusting the spring preload of the shock absorber

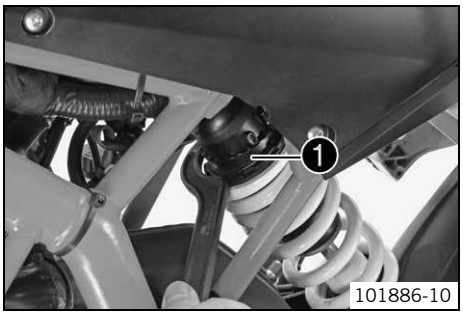
Warning

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.

Info

The spring preload defines the initial situation of the spring process on the shock absorber.
The best spring preload setting is achieved when it is set for the weight of the rider and that of any baggage and a passenger, thus ensuring an ideal compromise between maneuverability and stability.



– Adjust the spring preload by turning adjusting ring ❶.

Guideline

Spring preload	
Standard	3 clicks
Full payload	10 clicks

Hook wrench (T106S) (☛ p. 196)

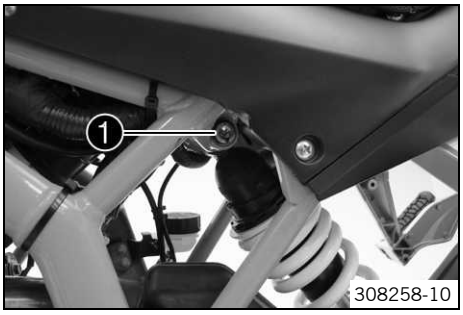
Info

The spring preload can be set to 10 different positions.

8.2 Removing the shock absorber

Preparatory work

– Raise the motorcycle with the work stand. (☛ p. 10)

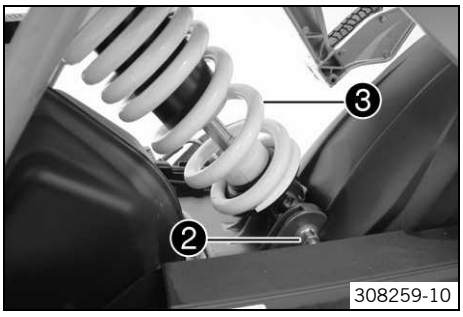


Main work

– Remove screw ❶.

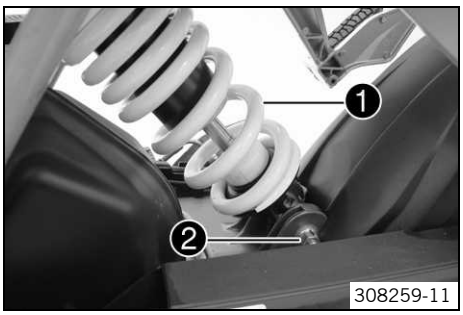
Info

Protect the link fork and attachments from damage.
Ensure that the chain and brake line are not damaged.



– Remove fitting ❷.
– Lift the link fork and take out the shock absorber ❸ toward the rear.

8.3 Installing the shock absorber



Main work

– Lift the link fork and position shock absorber ❶.
– Mount fitting ❷ but do not tighten yet.

Guideline

Fitting, bottom shock absorber	M10x1.25	45 Nm (33.2 lbf ft)

– Lift the link fork.
– Mount and tighten screw ❸.

Guideline

Screw, top shock absorber	M10x1.25	50 Nm (36.9 lbf ft)

– Tighten fitting ❷.

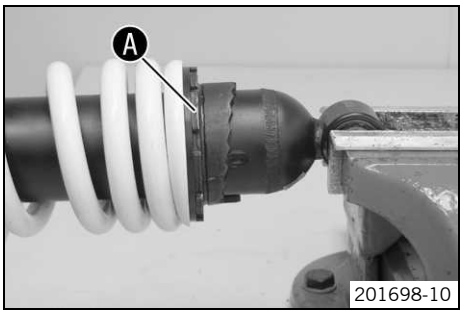
Guideline

Fitting, bottom shock absorber	M10x1.25	45 Nm (33.2 lbf ft)

Finishing work
– Remove the motorcycle from the work stand. (☛ p. 11)

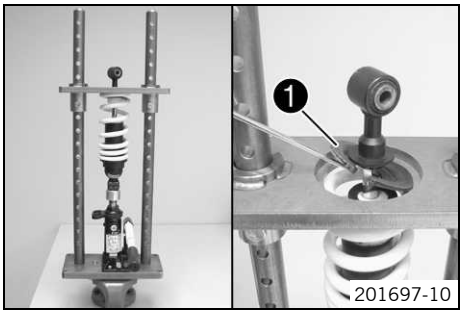
8.4 Removing the spring

Condition
The shock absorber has been removed.



– Clamp the shock absorber in the vise using soft jaws for protection.
– Note the position of the spring preload.
– Loosen adjusting ring ❹ using the special tool.

Hook wrench (T106S) (☛ p. 196)



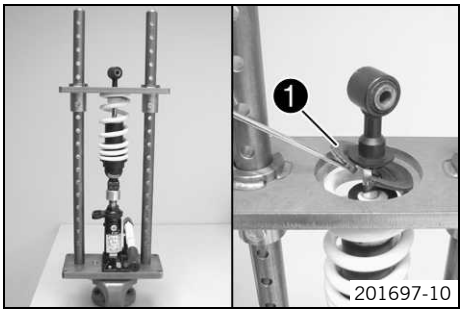
– Clamp the shock absorber into the special tool.

Spring compressor (T14050S) (☛ p. 196)

Info
Use the ring of the special tool with the smallest possible inside diameter. It must be pressed directly onto the spring.

– Compress the spring.
– Remove spring retainer ❶.
– Release the spring. Remove the shock absorber from the special tool.
– Remove the spring.

8.5 Installing the spring

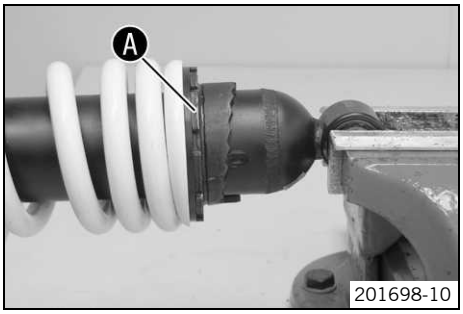


– Mount the spring.
✓ The tight coil of the spring is at the bottom.
– Clamp the shock absorber into the special tool.

Spring compressor (T14050S) (☛ p. 196)

Info
Use the ring of the special tool with the smallest possible inside diameter. It must be pressed directly onto the spring.

– Mount spring retainer ❶.
✓ The open end is opposite the spring end.
– Release the spring. Remove the shock absorber from the special tool.
– Clamp the shock absorber in the vise using soft jaws for protection.



Alternative 1

– Tension the spring to the prescribed position by turning the adjusting ring.

Guideline

Spring preload	
Standard	3 clicks
Full payload	10 clicks

Hook wrench (T106S) (☛ p. 196)

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 suspension components 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.

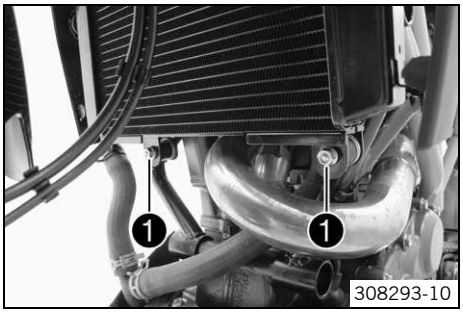
– Tension the spring to the position measured during dismantling by turning the adjusting ring.

9.1 Removing the exhaust manifold

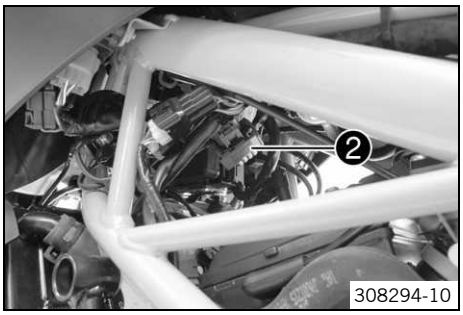
Warning

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

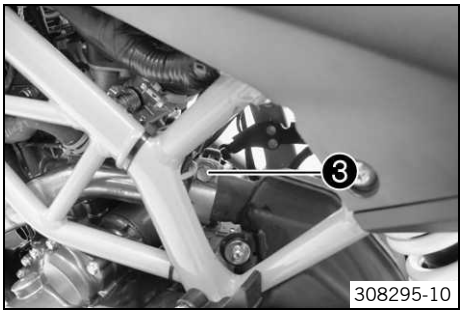
– Allow the exhaust system to cool down. Do not touch hot components.



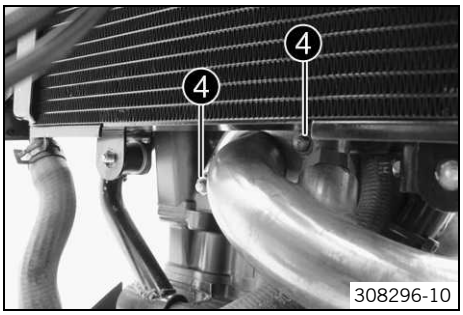
– Remove nuts ❶ with the washers.
– Swing the radiator forward slightly.



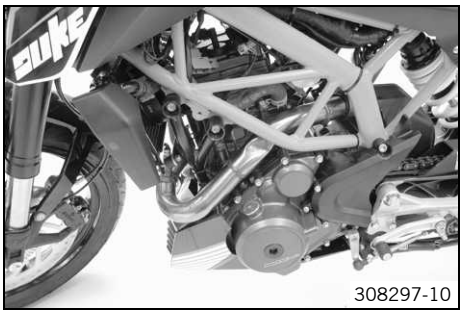
– Remove the cable binder, expose the connector ❷ of the lambda probe, and detach.



– Loosen exhaust clamp ❸.

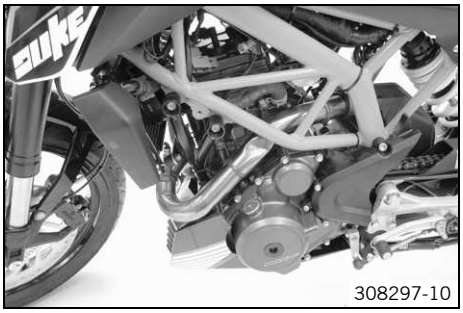


– Remove the nuts ❹.

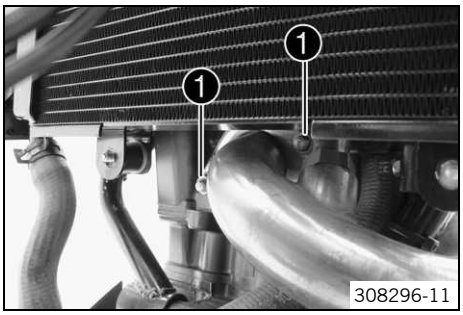


– Remove the exhaust manifold toward the front.

9.2 Installing the exhaust manifold



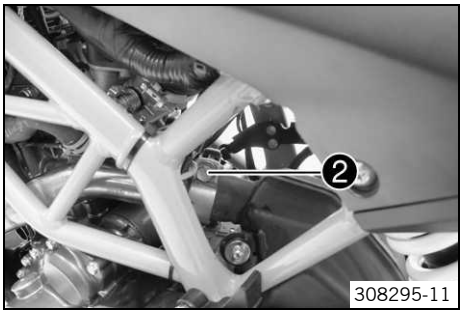
– Position the exhaust manifold.



– Mount nuts ❶ but do not tighten them yet.

Guideline

Nut, exhaust flange	M8	22 Nm (16.2 lbf ft)



– Position and tighten exhaust clamp ❷.

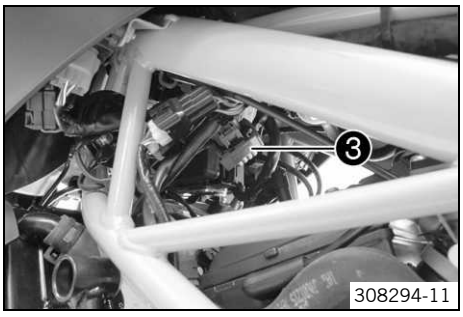
Guideline

Exhaust clamp	-	10 Nm (7.4 lbf ft)

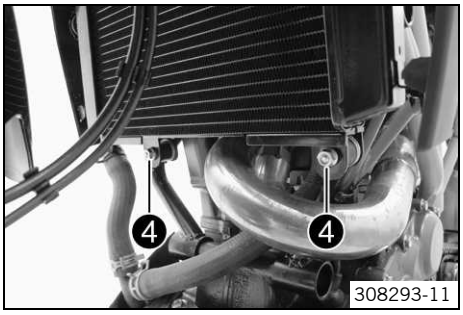
– Tighten nuts ❶.

Guideline

Nut, exhaust flange	M8	22 Nm (16.2 lbf ft)



– Plug in connector ❸.
– Secure the connector with a cable binder.



– Position the radiator.
– Mount and tighten nuts ❹ with the washers.

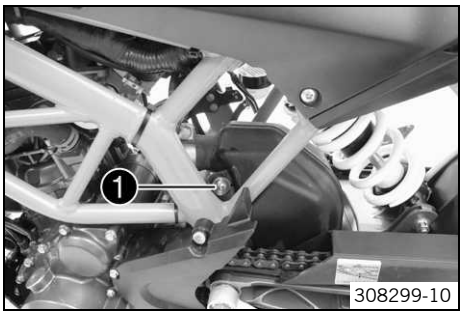
Guideline

Nut, radiator	M6	5 Nm (3.7 lbf ft)

9.3 Removing the main silencer

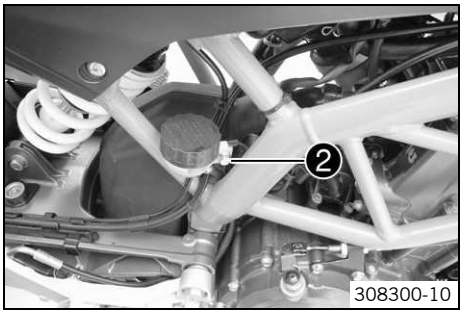
Preparatory work

– Remove the exhaust manifold. (☛ p. 33)



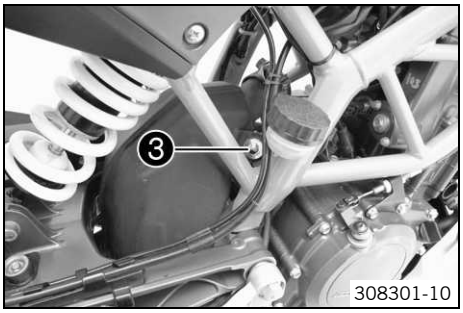
Main work

– Remove screw ❶ with washers.

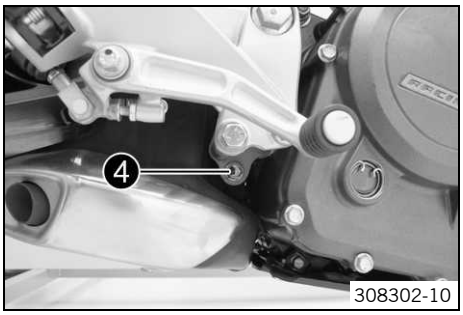


– Remove screw ❷ with the sleeve.
– Hang the brake fluid reservoir to the side.

Info
Ensure that brake fluid does not escape.

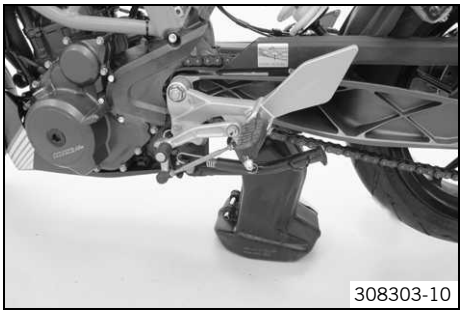


– Remove screw ❷ with washers.



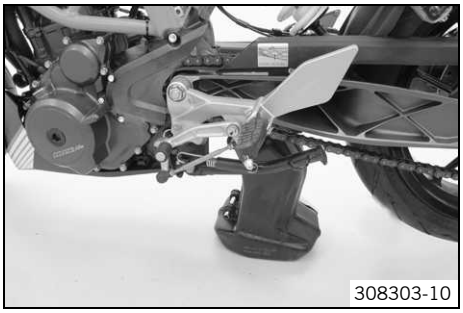
– Remove screw ❹.

Info
Do not misplace the sleeves.



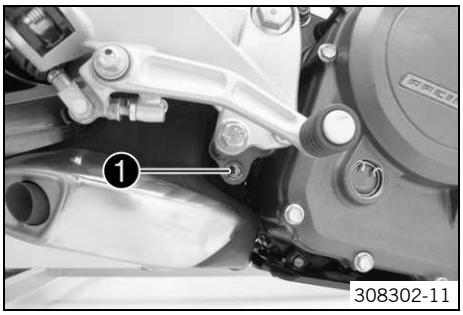
– Take off the main silencer toward the bottom.

9.4 Installing the main silencer



Main work

– Position the main silencer.

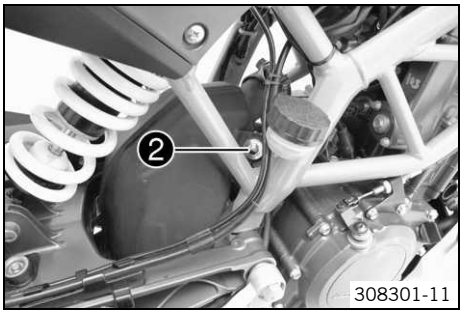


– Mount and tighten screw ❶.

Guideline

Screw, main silencer	M8	23 Nm (17 lbf ft)

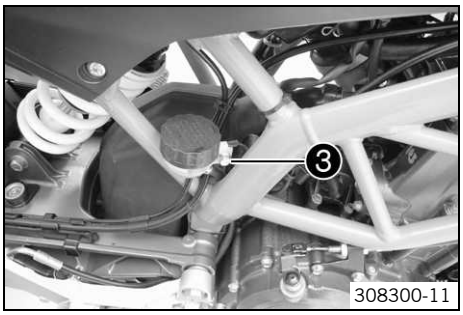
Info
Make sure the sleeves are seated correctly.



– Mount and tighten screw ❷ with the washers.

Guideline

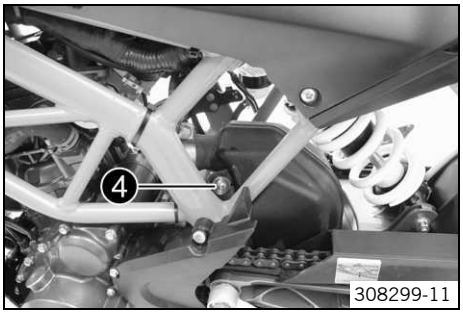
Screw, main silencer	M6	11 Nm (8.1 lbf ft)



– Position the brake fluid reservoir.
– Mount and tighten screw ❸ with the sleeve.

Guideline

Screw, brake fluid reservoir of rear brake	M6	9 Nm (6.6 lbf ft)



– Mount and tighten screw ❹ with the washers.

Guideline

Screw, main silencer	M6	11 Nm (8.1 lbf ft)

Finishing work

– Install the exhaust manifold. (☛ p. 34)

10 AIR FILTER

10.1 Removing the air filter

Note

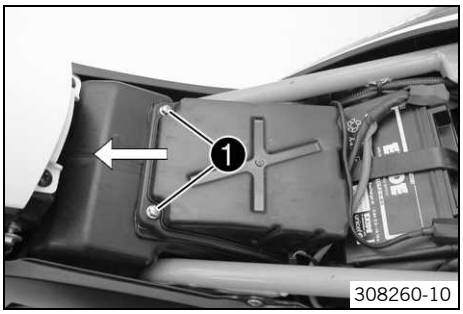
Engine failure Unfiltered intake air has a negative effect on the service life of the engine.

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

Preparatory work

– Remove the passenger seat. (☛ p. 39)

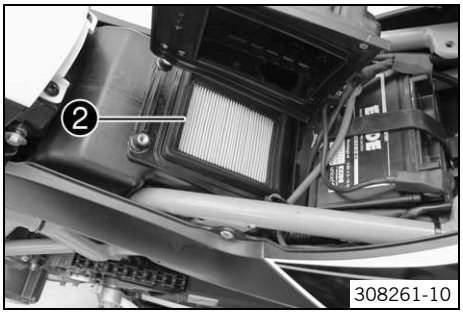
– Remove the seat. (☛ p. 38)



Main work

– Remove screws ❶.

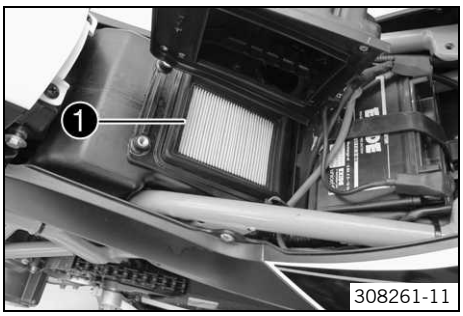
– Pull the air filter box lid forward and move to the side.



– Remove air filter ❷.

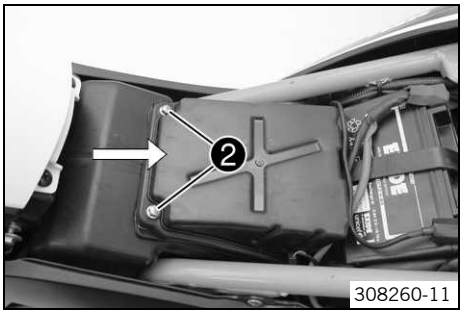
– Clean the air filter box.

10.2 Installing the air filter



Main work

– Position air filter ❶.



– Mount air filter box lid.

Info
Make sure the air filter box lid is seated correctly.

– Mount and tighten screws ❷.

Guideline

Screw, air filter box	M6	6 Nm (4.4 lbf ft)

Finishing work

– Mount the seat. (☛ p. 39)

– Mount the passenger seat. (☛ p. 39)

11.1 Opening the filler cap

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.
- The fuel in the fuel tank expands when warm and may emerge if overfilled. Follow the instructions on refueling.

Warning

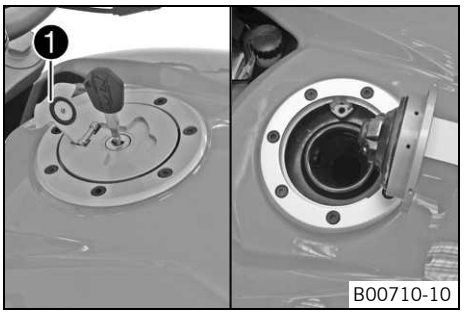
Danger of poisoning Fuel is poisonous and a health hazard.

- Fuel must not come into contact with the skin, eyes, or clothing. Do not breathe in the fuel vapors. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If fuel is swallowed, contact a physician immediately. Change clothing that is contaminated with fuel. Store fuel properly in a suitable canister and keep away from 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.



- Lift the cover ❶ of the filler cap and insert the ignition key in the lock.

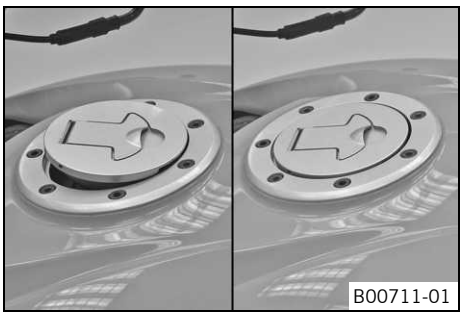
Note

Danger of damage Ignition key breakage.

- To take pressure off of the ignition key, push down on the filler cap. Damaged ignition keys must be replaced.

- Turn the ignition key 90° clockwise.
- Open the filler cap.
- Remove the ignition key.

11.2 Closing the filler cap



Warning

Fire hazard Fuel is highly flammable, poisonous and harmful to your health.

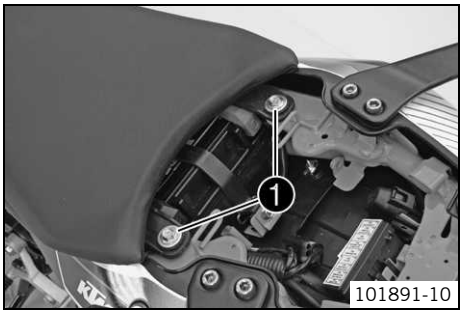
- After closing the filler cap, ensure that it is locked properly. Change clothing that has been contaminated with fuel. Immediately clean contaminated areas on the skin with soap and water.

- Close the filler cap.
- Push down the filler cap until the lock engages.

11.3 Removing the seat

Preparatory work

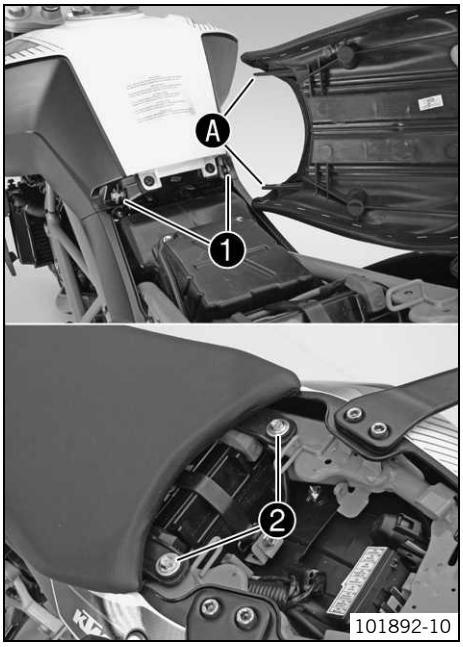
- Remove the passenger seat. (☛ p. 39)



Main work

- Remove screws ❶.
- Raise the rear of the seat, pull it towards the rear, and remove it upwards.

11.4 Mounting the seat



Main work

– Attach seat recesses Ⓐ at screws ❶ and lower at the rear.
– Mount and tighten screws ❷.

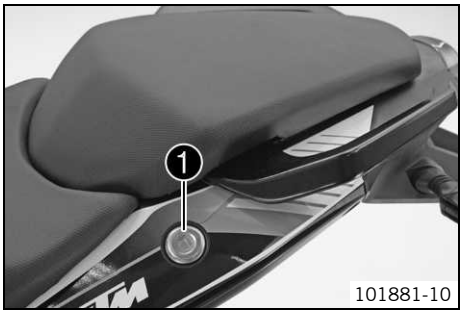
Guideline

Screw, seat	M6	11 Nm (8.1 lbf ft)

Finishing work

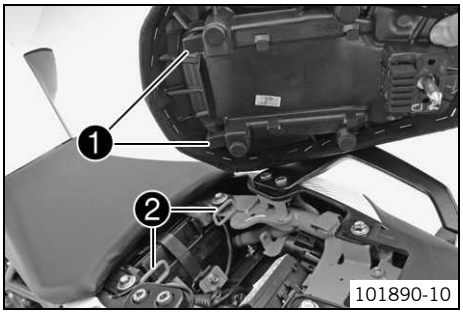
– Mount the passenger seat. (☛ p. 39)

11.5 Removing the passenger seat



– Insert the ignition key in seat lock ❶ and turn it clockwise.
– Raise the rear of the seat, push it towards the rear, and remove it upwards.
– Remove the ignition key from the seat lock.

11.6 Mounting the passenger seat



– Attach hooks ❶ on the passenger seat to brackets ❷ on the subframe, and lower it at the rear while pushing forward.
– Press down the passenger seat until it clicks into place.

Warning

Danger of accidents The passenger seat can come loose from the anchoring if it is not mounted correctly.

– After mounting the passenger seat, check that it is locked correctly by pulling up.

– Finally, check that the passenger seat is correctly mounted.

11.7 Removing the fuel tank cover

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.
– The fuel in the fuel tank expands when warm and may emerge if overfilled. Follow the instructions on refueling.

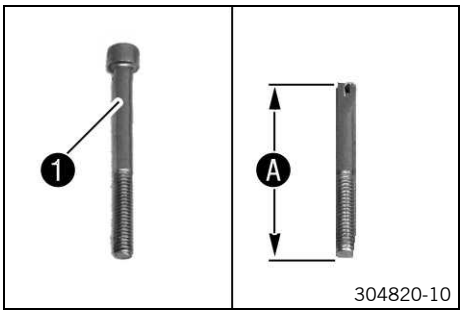
Warning
Danger of poisoning Fuel is poisonous and a health hazard.

– Fuel must not come into contact with the skin, eyes, or clothing. Do not breathe in the fuel vapors. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If fuel is swallowed, contact a physician immediately. Change clothing that is contaminated with fuel. Store fuel properly in a suitable canister and keep away from 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.

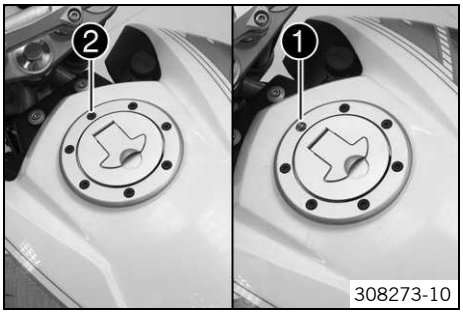
Preparatory work
– Remove the passenger seat. (☛ p. 39)
– Remove the seat. (☛ p. 38)



Create the tool (special screw):
Three conventional screws are required.
– Cut off screw ❶ to length Ⓐ.
Guideline

Screw	M5x50
Length Ⓐ	40 mm (1.57 in)

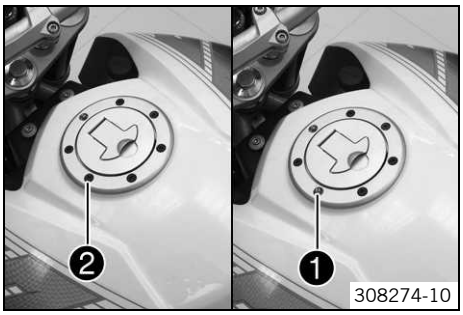
– Cut a slot into the top end of the screw.



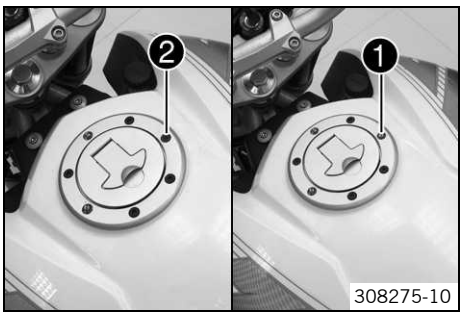
– Remove screw ❷.

Info
Always remove the screws individually and replace them with a special screw to avoid distorting the fuel tank.

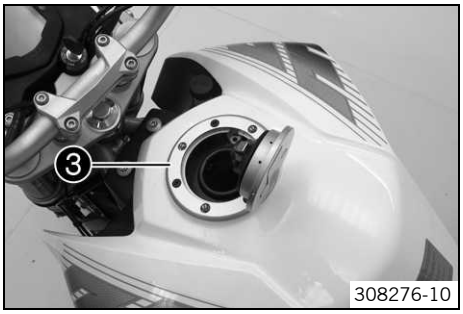
– Mount and tighten special screw ❶.



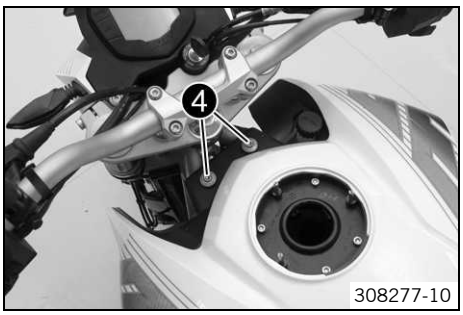
– Remove screw ❷.
– Mount and tighten another special screw ❶.



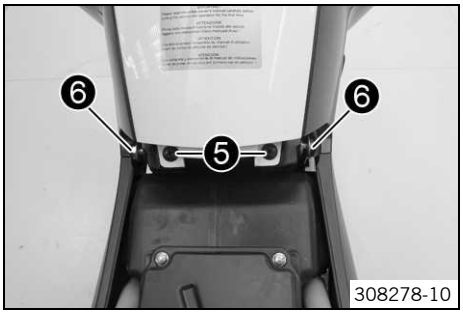
– Remove screw ❷.
– Mount and tighten another special screw ❶.
– Open the filler cap. (☛ p. 38)



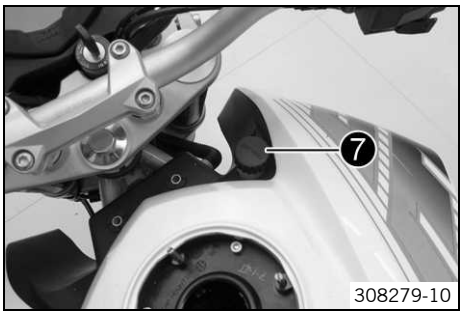
– Remove filler cap ❸.



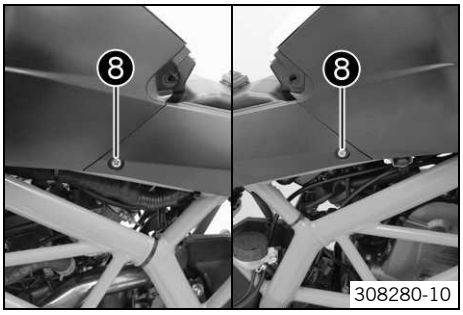
– Remove screws ❹ with the washers.



– Remove screws ❺.
– Remove screws ❻.

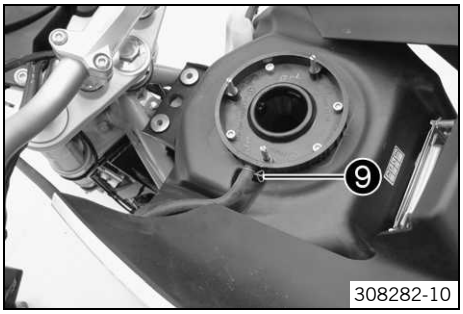


– Remove cap ❼ from the compensating tank.



– Remove screws ❽.

– Lift the fuel tank cover.
– Detach the side covers on both sides.



– Push back hose clamp ❾.
– Pull off the vent hose.
– Remove the fuel tank cover.

– Close the fuel tank with a suitable plug.

11.8 Installing the fuel tank cover

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.
– The fuel in the fuel tank expands when warm and may emerge if overfilled. Follow the instructions on refueling.

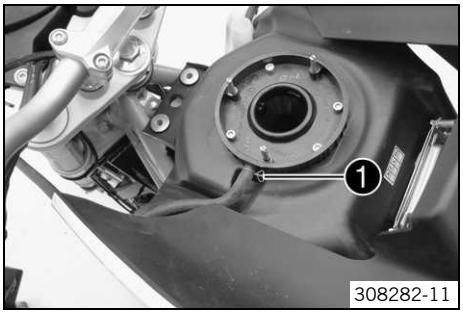
Warning
Danger of poisoning Fuel is poisonous and a health hazard.

– Fuel must not come into contact with the skin, eyes, or clothing. Do not breathe in the fuel vapors. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If fuel is swallowed, contact a physician immediately. Change clothing that is contaminated with fuel. Store fuel properly in a suitable canister and keep away from children.

Warning
Environmental hazard Improper handling of fuel is a danger to the environment.

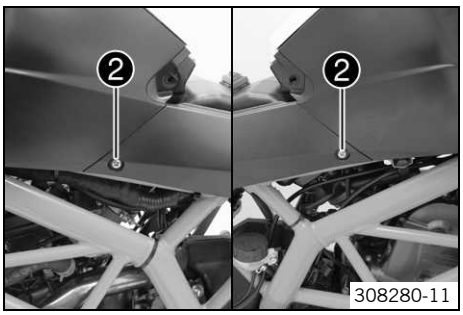
– Do not allow fuel to get into the ground water, the ground, or the sewage system.

Main work
– Remove the plug.



– Mount the vent hose.
– Position hose clamp ❶.

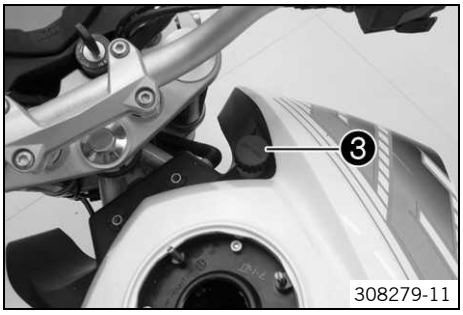
– Position the fuel tank cover.
– Attach the side cover on both sides.



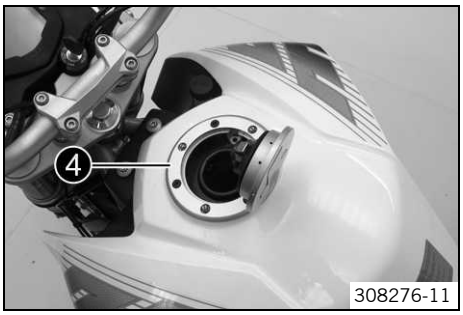
– Mount and tighten screws ❷.

Guideline

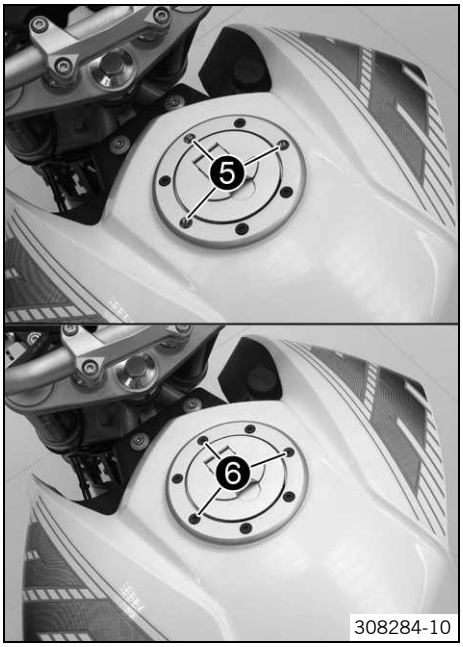
Remaining screws, chassis	M5	5 Nm (3.7 lbf ft)



– Mount plug ❸ of the compensating tank.



– Mount filler cap ❹.



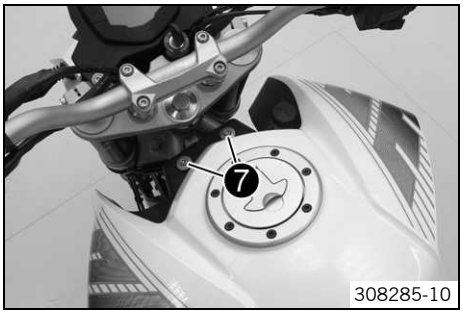
– Individually remove special screws ❺ and replace with screws ❻.

Info
Always replace the screws individually, or the fuel tank will become distorted and it will no longer be possible to mount the screws.

– When all screws have been replaced, tighten the screws crosswise.

Guideline

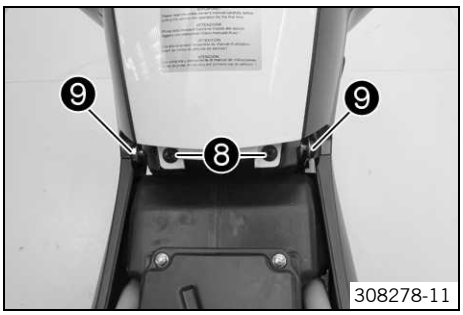
Screw, fuel tank cover	M5	4 Nm (3 lbf ft)



– Mount and tighten screws ❼ with the washer.

Guideline

Screw, fuel tank	M6	11 Nm (8.1 lbf ft)



– Mount and tighten screws ❽.

Guideline

Screw, fuel tank trim	M5	5 Nm (3.7 lbf ft)

– Mount and tighten screws ❾.

Guideline

Screw, front seat fixing	M6	5 Nm (3.7 lbf ft)

Finishing work

– Mount the seat. (☛ p. 39)
– Mount the passenger seat. (☛ p. 39)

11.9 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.
– The fuel in the fuel tank expands when warm and may emerge if overfilled. Follow the instructions on refueling.

Warning

Danger of poisoning Fuel is poisonous and a health hazard.

– Fuel must not come into contact with the skin, eyes, or clothing. Do not breathe in the fuel vapors. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If fuel is swallowed, contact a physician immediately. Change clothing that is contaminated with fuel. Store fuel properly in a suitable canister and keep away from children.

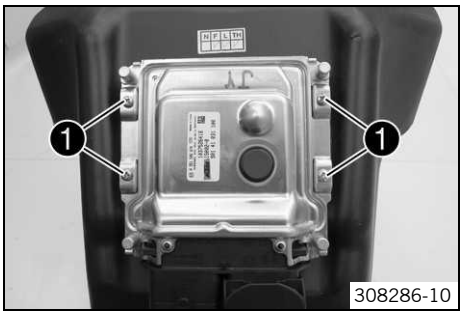
Warning

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.

Preparatory work

– Remove the passenger seat. (☛ p. 39)
– Remove the seat. (☛ p. 38)
– Remove the fuel tank cover. (☛ p. 39)

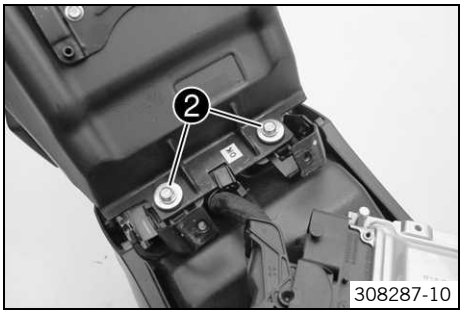


Main work

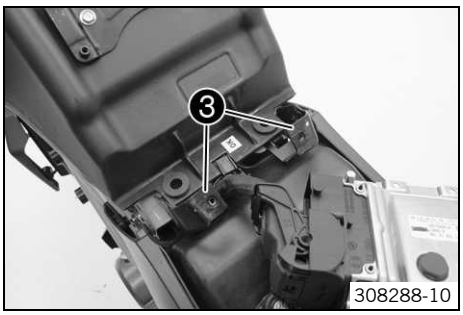
– Remove screw ❶.
– Hang the EFI control unit to one side.

Info

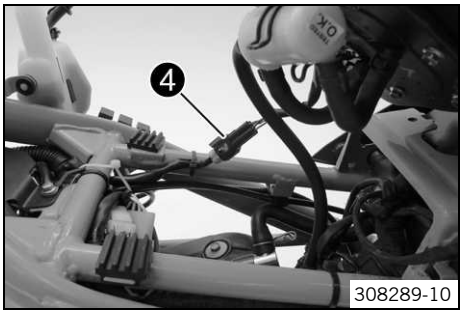
Protect the frame and attachments from damage.



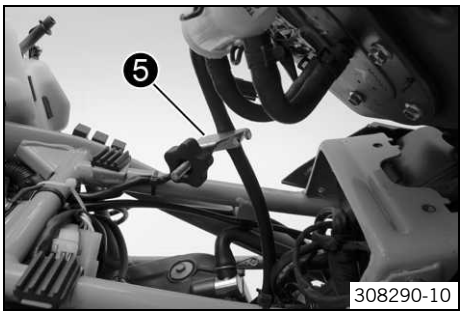
– Remove screws ❷.



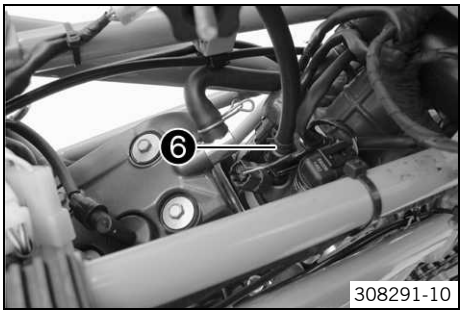
– Take off the holder ❸.



– Detach connector ❹.



– Detach the fuel line with a suitable tool ❺.



– Push back hose clamp ❻.
– Pull off the fuel line and remove the fuel tank.

11.10 Installing the fuel tank

Danger
Fire hazard Fuel is highly flammable.

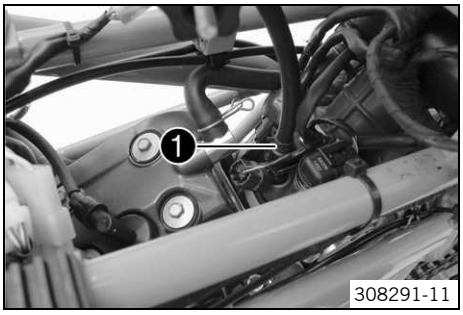
– Never refuel the vehicle near open flames or burning cigarettes, and always switch off the engine first. Be careful that no fuel is spilt, especially on hot vehicle components. Clean up spilt fuel immediately.
– The fuel in the fuel tank expands when warm and may emerge if overfilled. Follow the instructions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

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

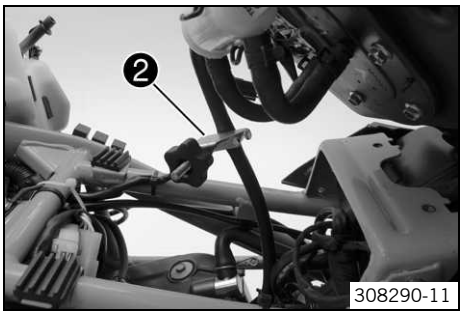
– Fuel must not come into contact with the skin, eyes, or clothing. Do not breathe in the fuel vapors. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If fuel is swallowed, contact a physician immediately. Change clothing that is contaminated with fuel. Store fuel properly in a suitable canister and keep away from children.

Warning
Environmental hazard Improper handling of fuel is a danger to the environment.

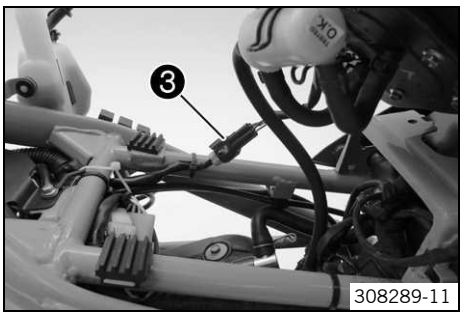
– Do not allow fuel to get into the ground water, the ground, or the sewage system.



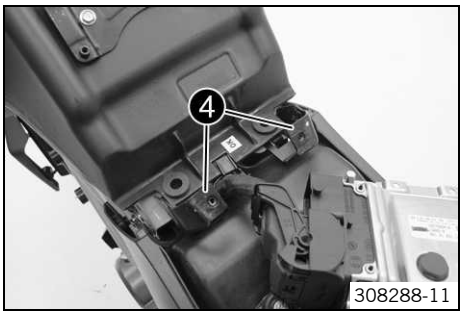
Main work
– Connect the fuel line.
– Position hose clamp ❶.



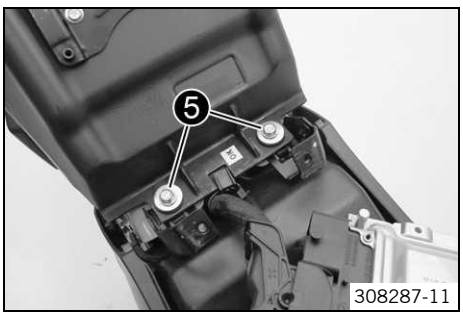
– Remove tool ❷.



– Plug in connector ❸.

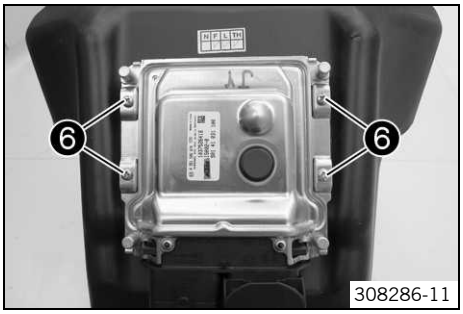


– Position the fuel tank.
– Position the holder ❹.



– Mount and tighten screws ❺.
Guideline

Screw, fuel tank	M6	11 Nm (8.1 lbf ft)



– Position the EFI control unit.
– Mount and tighten screws ❻.

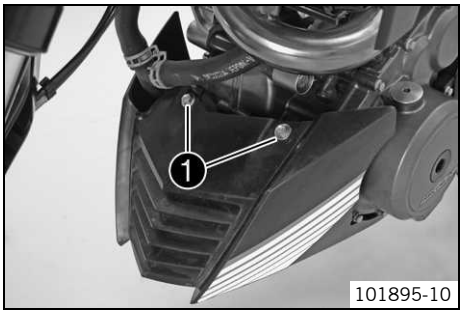
Guideline

Screw, EFI control unit	M4	4 Nm (3 lbf ft)

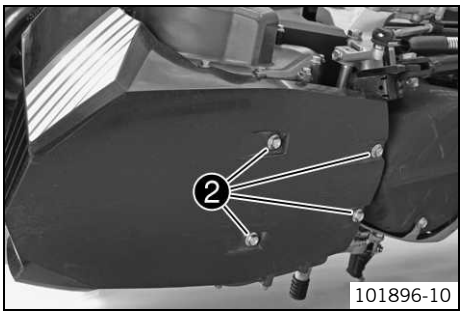
Finishing work

– Install the fuel tank cover. (☛ p. 42)
– Mount the seat. (☛ p. 39)
– Mount the passenger seat. (☛ p. 39)

11.11 Removing the front spoiler

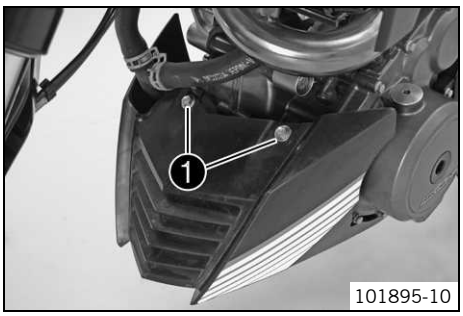


– Remove screws ❶.

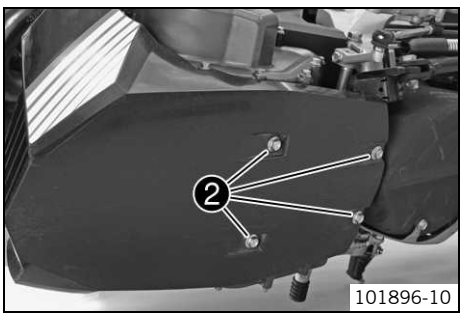


– Remove screws ❷.
– Take off the front spoiler.

11.12 Fitting front spoiler



– Position the front spoiler. Mount screws ❶ but do not tighten yet.



– Mount and tighten screws ❷.

Guideline

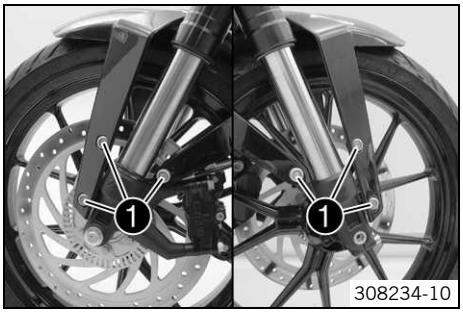
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

– Tighten screw ❶.

Guideline

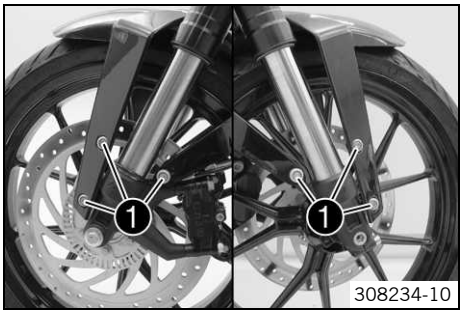
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)

11.13 Dismounting the front fender



– Remove screws ❶. Remove the front fender.

11.14 Installing the front fender



– Position the front fender. Mount and tighten screws ❶.

Guideline

Screw, front fender	M6	11 Nm (8.1 lbf ft)

11.15 Checking the fuel pressure

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.
– The fuel in the fuel tank expands when warm and may emerge if overfilled. Follow the instructions on refueling.

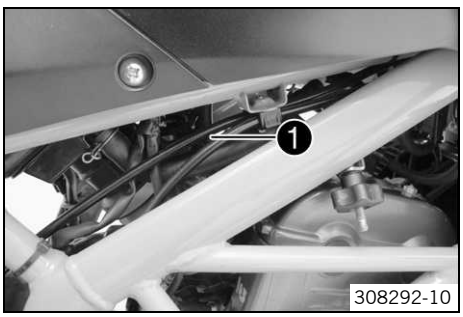
Warning

Danger of poisoning Fuel is poisonous and a health hazard.

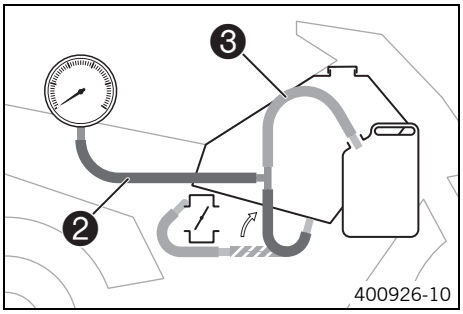
– Fuel must not come into contact with the skin, eyes, or clothing. Do not breathe in the fuel vapors. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If fuel is swallowed, contact a physician immediately. Change clothing that is contaminated with fuel. Store fuel properly in a suitable canister and keep away from children.

Condition

The fuel tank is full.
Ensure that the battery voltage does not drop below 12.5 V.
The ignition is off.
The diagnostics tool is connected.



– Detach the fuel line with a suitable tool.
– Push back hose clamp ❶ and pull off the fuel line.



– Mount special tool ❷.

Pressure testing tool (61029094000) (☛ p. 191)

– Mount special tool ❸ with the nozzle code **0,45**.

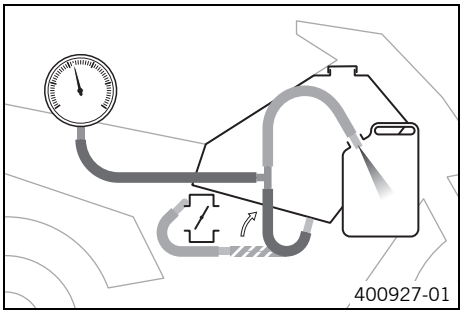
Testing hose (61029093000) (☛ p. 191)

– Position the hose end in a fuel can.

Guideline

Minimum size of fuel can	10 l (2.6 US gal)

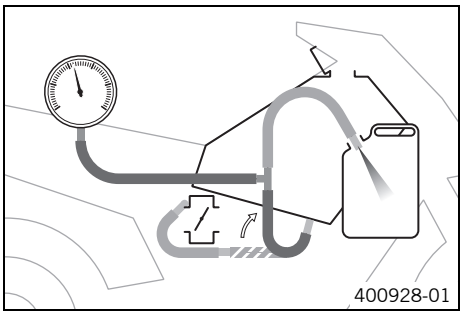
– Switch the ignition on.
– Execute **"Actuator test"** > **"Fuel pump relay function test"**.
– Check the fuel pressure with the filler cap closed.



Fuel pressure	
When the fuel pump is active	2.5... 2.9 bar (36... 42 psi)

» If the specification is not reached:
– Open the filler cap. (☛ p. 38)
– Check the tank air vent system.

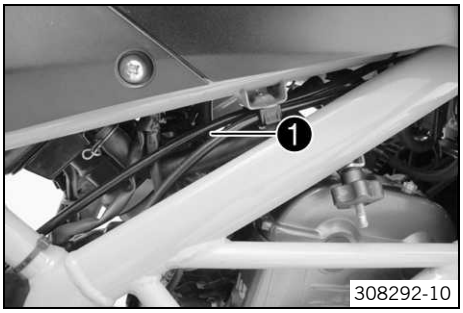
– Check the fuel pressure with the filler cap open.



Fuel pressure	
When the fuel pump is active	2.5... 2.9 bar (36... 42 psi)

» If the specification is not reached:
– Check that the fuel line is clear.
– Change the fuel filter. (☛ p. 49)
– Replace the fuel pump. (☛ p. 51)

– Stop the **"Function test of fuel pump control"** actuator test by pressing the **"Quit"** button.
– Remove the special tools.
– Connect the fuel line and position hose clamp ❶.
– Remove the tool.



11.16 Changing the fuel filter

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.
– The fuel in the fuel tank expands when warm and may emerge if overfilled. Follow the instructions on refueling.

Warning

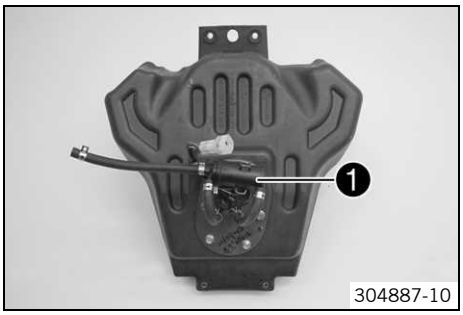
Danger of poisoning Fuel is poisonous and a health hazard.

– Fuel must not come into contact with the skin, eyes, or clothing. Do not breathe in the fuel vapors. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If fuel is swallowed, contact a physician immediately. Change clothing that is contaminated with fuel. Store fuel properly in a suitable canister and keep away from children.

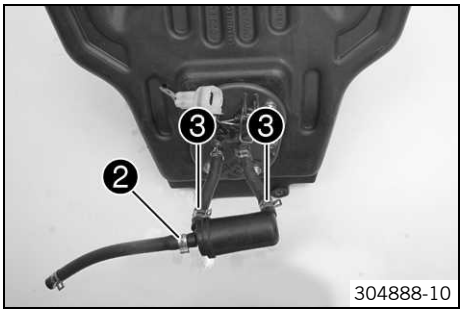
Warning
Environmental hazard Improper handling of fuel is a danger to the environment.
– Do not allow fuel to get into the ground water, the ground, or the sewage system.

Preparatory work
– Remove the passenger seat. (☛ p. 39)
– Remove the seat. (☛ p. 38)
– Remove the fuel tank cover. (☛ p. 39)
– Dismount the fuel tank. (☛ p. 44)
– Drain the fuel from the fuel tank into a suitable container.

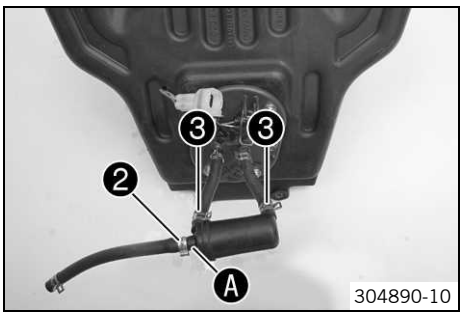
Main work



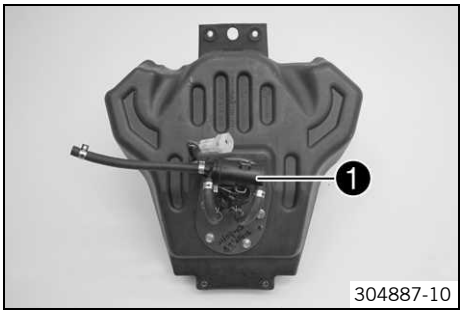
– Take fuel filter ❶ out of the holder.



– Remove hose clamp ❷ and pull off the fuel hose.
– Push back hose clamp ❸ and remove the fuel filter.



– Position the fuel filter.
  ✓ Connection Ⓐ faces to the left.
– Position the fuel hoses and mount hose clamp ❷.
– Position hose clamps ❸.



– Position fuel filter ❶ in the holder.

Finishing work
– Install the fuel tank. (☛ p. 45)
– Install the fuel tank cover. (☛ p. 42)
– Mount the seat. (☛ p. 39)
– Mount the passenger seat. (☛ p. 39)

11.17 Replacing the fuel pump

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.
- The fuel in the fuel tank expands when warm and may emerge if overfilled. Follow the instructions on refueling.

Warning

Danger of poisoning Fuel is poisonous and a health hazard.

- Fuel must not come into contact with the skin, eyes, or clothing. Do not breathe in the fuel vapors. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If fuel is swallowed, contact a physician immediately. Change clothing that is contaminated with fuel. Store fuel properly in a suitable canister and keep away from children.

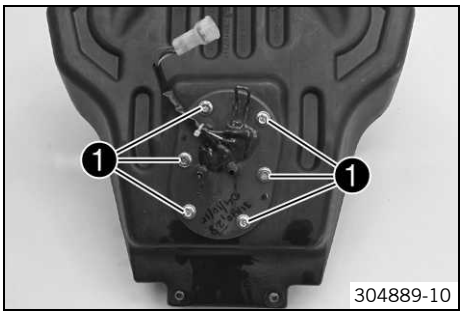
Warning

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.

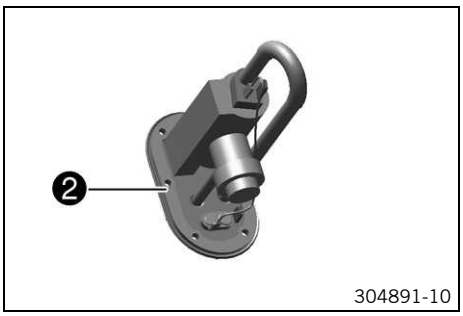
Preparatory work

- Remove the passenger seat. (☛ p. 39)
- Remove the seat. (☛ p. 38)
- Remove the fuel tank cover. (☛ p. 39)
- Dismount the fuel tank. (☛ p. 44)
- Drain the fuel from the fuel tank into a suitable container.

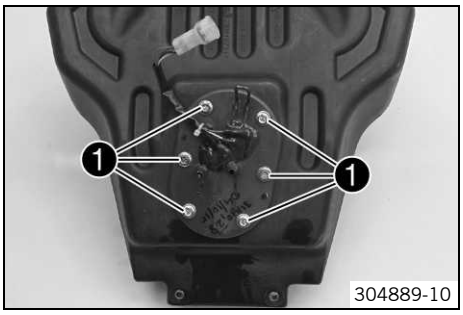


Main work

- Remove screws ❶.
- Remove the fuel pump with the gasket.



- Position gasket ❷.



- Position the fuel pump with the gasket.
- Install the screws ❶ and tighten them diagonally.

  Guideline

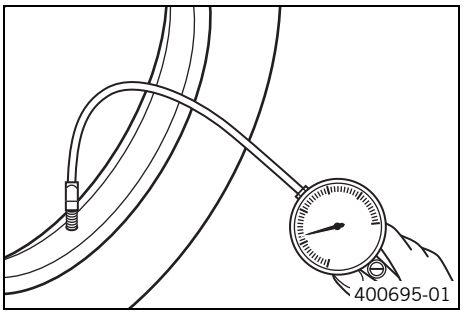
Screw, fuel pump	M5	5 Nm (3.7 lbf ft)

Finishing work

- Install the fuel tank. (☛ p. 45)
- Install the fuel tank cover. (☛ p. 42)
- Mount the seat. (☛ p. 39)
- Mount the passenger seat. (☛ p. 39)

12.1 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.



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

Tire air pressure, solo	
Front	2.0 bar (29 psi)
Rear	2.0 bar (29 psi)

Tire air pressure with passenger/full payload	
Front	2.0 bar (29 psi)
Rear	2.2 bar (32 psi)

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

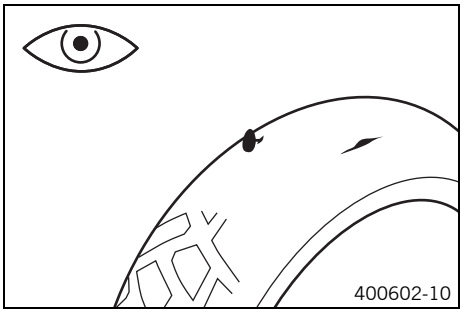
12.2 Checking the tire condition

Warning
Danger of accidents Uncontrollable vehicle handling in the event of a flat tire.
– In the interest of safety, replace damaged or worn tires immediately.

Warning
Danger of crashing Poor vehicle handling due to different tire tread patterns on front and rear wheels.
– The front and rear wheels must be fitted with tires with similar tread patterns to prevent loss of control over the vehicle.

Warning
Danger of accidents Uncontrollable handling characteristic due to non-approved and/or non-recommended tires/wheels.
– Only tires/wheels approved by KTM and with the corresponding speed index should be used.

Info
The type, condition and air pressure of the tires all have a major impact on the riding behavior of the motorcycle.
Worn tires have a negative effect on riding behavior, especially on wet surfaces.



– Check the front and rear tires for cuts, run-in objects and other damage.
» If the tires exhibit cuts, run-in objects or other damage:
– Change the tires.
– Check the depth of the tread.

Info
Note local national regulations concerning the minimum tread depth.

Minimum tread depth	≥ 2 mm (≥ 0.08 in)

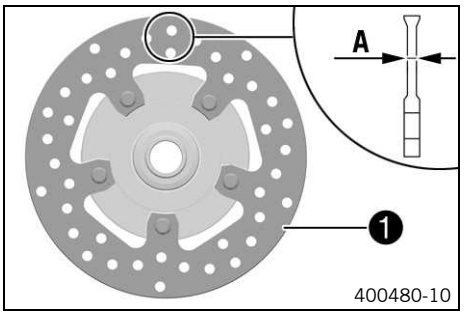
» If the tread depth is less than the minimum permissible depth:
– Change the tires.
– Check the age of the tires.

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

» If a tire is more than 5 years old:
– Change the tires.

12.3 Checking the brake discs

Warning
Danger of accidents Reduced braking efficiency due to worn brake disc(s).
– Change the worn brake disc(s) without delay.



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

Info
Wear reduces the thickness of the brake disc in area ❶ of the brake disc.

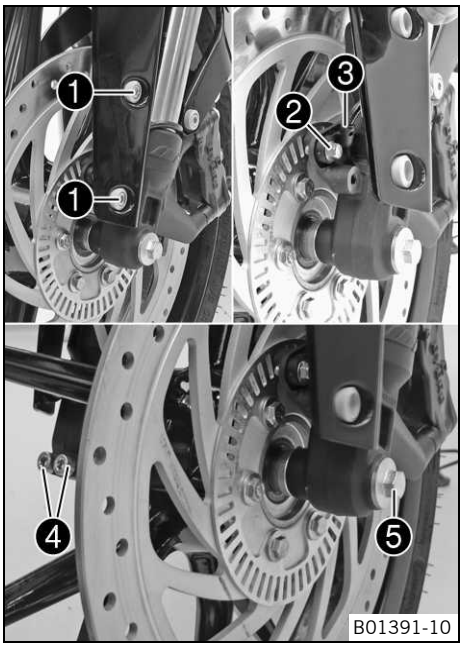
Brake discs - wear limit	
Front	3.6 mm (0.142 in)
Rear	3.6 mm (0.142 in)

» If the brake disc thickness is less than the specified value:
– Change the brake discs.
– Check the front and rear brake discs for damage, cracking, and deformation.
» If the brake disc shows signs of damage, cracking, or deformation:
– Change the brake discs.

12.4 Front wheel

12.4.1 Removing the front wheel

Preparatory work
– Raise the motorcycle with the rear wheel stand. (☛ p. 9)
– Raise the motorcycle with the front wheel stand. (☛ p. 9)



Main work
– Remove screws ❶ and push the fender to the side.
– Remove screw ❷ and pull wheel speed sensor ❸ out of the hole.
– Loosen screws ❹ and screw ❺.
– Unscrew screw ❺ about six turns and press your hand on the screw to push the wheel spindle out of the axle clamp. Remove screw ❺.

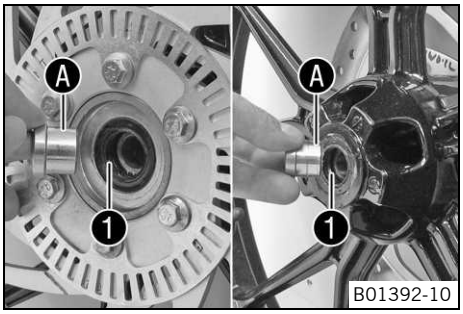
Warning
Danger of accidents Reduced braking effect caused by damaged brake discs.
– Always lay the wheel down in such a way that the brake discs are not damaged.

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

Info
Do not pull the hand brake lever when the front wheel is removed.

12.4.2 Installing the front wheel

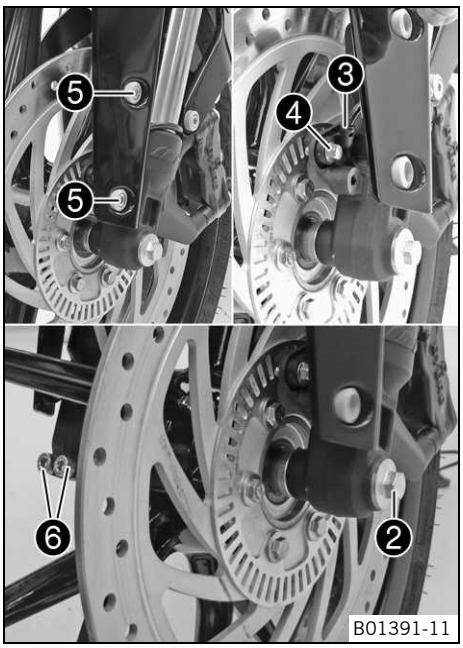
Warning
Danger of accidents Reduced braking efficiency due to oil or grease on the brake discs.
– Always keep the brake discs free of oil and grease, and clean them with brake cleaner when necessary.



Main work
- Check the wheel bearing for damage and wear.
  - » If the wheel bearing is damaged or worn:
    - Change the wheel bearing.
- Clean and grease the shaft seal rings ❶ and mating surfaces Ⓐ of the spacers.

Long-life grease (☛ p. 187)

- Insert the spacers.



- Clean the thread of the wheel spindle and screw ❷.
- Position the front wheel and insert the wheel spindle.
  - ✓ The brake linings are correctly positioned.
- Mount and tighten screw ❷.

  Guideline

Screw, front wheel spindle	M8	30 Nm (22.1 lbf ft)

- Insert wheel speed sensor ❸ into the hole. Mount and tighten screw ❹.

  Guideline

Screw, wheel speed sensor holder	M6	8 Nm (5.9 lbf ft)

- Mount and tighten screws ❺.
- Take the motorcycle off of the front wheel stand. (☛ p. 10)
- Pull the front brake and push down hard on the fork several times to align the fork legs.
- Tighten screws ❻.

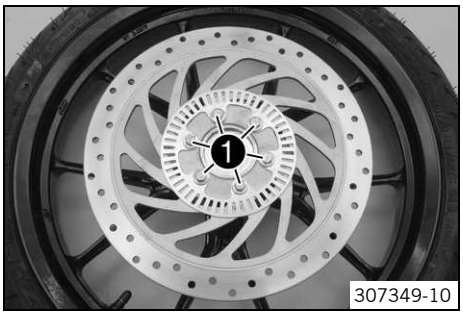
  Guideline

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

Finishing work
- Take the motorcycle off of the rear wheel stand. (☛ p. 9)

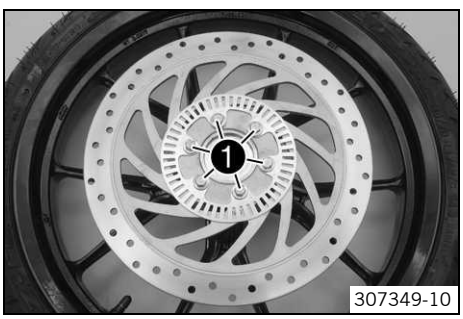
12.4.3 Removing the brake disc of the front brake

Preparatory work
- Raise the motorcycle with the rear wheel stand. (☛ p. 9)
- Raise the motorcycle with the front wheel stand. (☛ p. 9)
- Remove the front wheel. (☛ p. 53)



Main work
- Remove screws ❶.
- Take off the ABS sensor wheel and brake disc.

12.4.4 Installing the brake disc of the front brake



Main work
- Clean the contact surface of the brake disc.
- Position the brake disc with the label facing outward.
- Position the ABS sensor wheel.
- Mount and tighten screws ❶.

  Guideline

Screw, front brake disc	M8	30 Nm (22.1 lbf ft)	**Loctite® 243™**

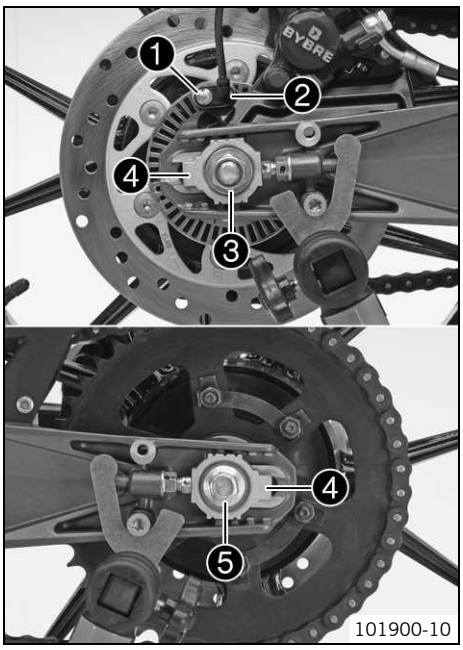
Finishing work
- Install the front wheel. (☛ p. 53)
- Take the motorcycle off of the rear wheel stand. (☛ p. 9)

12.5 Rear wheel

12.5.1 Removing the rear wheel

Preparatory work
- Raise the motorcycle with the rear wheel stand. (☛ p. 9)

Main work
- Remove screw ❶ and pull wheel speed sensor ❷ out of the hole.
- Remove nut ❸ and the washer. Remove chain adjuster ❹.
- Holding the rear wheel, withdraw wheel spindle ❺❹ with the washer and chain adjuster.
- Push the rear wheel forward as far as possible and take the chain off the rear sprocket.



Warning
Danger of accidents Reduced braking effect caused by damaged brake discs.
- Always lay the wheel down in such a way that the brake discs are not damaged.

- Pull the rear wheel back and take it out of the swingarm.

Info
Do not operate the foot brake when the rear wheel is removed.

12.5.2 Installing the rear wheel

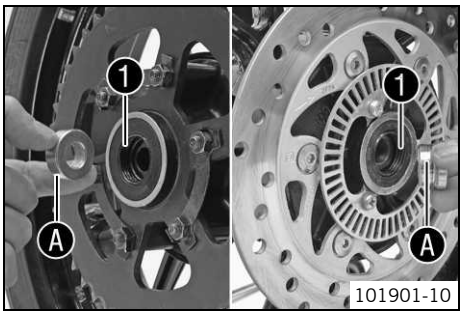
Warning
Danger of accidents Reduced braking efficiency due to oil or grease on the brake discs.
- Always keep the brake discs free of oil and grease, and clean them with brake cleaner when necessary.

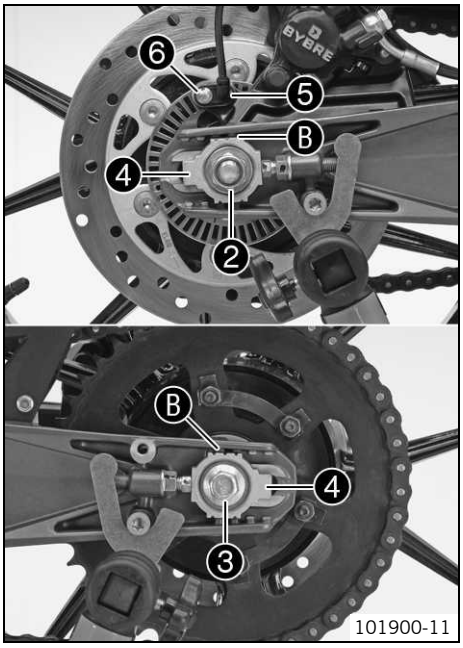
Warning
Danger of accidents No braking effect when operating the rear brake.
- After installing the rear wheel, always operate the foot brake until the pressure point is reached.

Main work
- Check the rear hub rubber dampers. (☛ p. 60)
- Check the wheel bearing for damage and wear.
  - » If the wheel bearing is damaged or worn:
    - Change the wheel bearing.
- Clean and grease the shaft seal rings ❶ and mating surfaces Ⓐ of the spacers.

Long-life grease (☛ p. 187)

- Clean the thread of the wheel spindle and nut ❷.
- Clean the fixing locations on the brake caliper support and swingarm.
- Install the rubber damper and rear sprocket carrier on the rear wheel.
- Position the rear wheel.
  - ✓ The brake linings are correctly positioned.
- Push the rear wheel as far forward as possible and place the chain on the rear sprocket.





– Pull the rear wheel back and mount wheel spindle ❸ with the washer and chain adjuster ❹.

Info
Mount the left and right chain adjusters ❹ in the same position.

– Mount nut ❷ and washer.
– Push the rear wheel forward so that the chain adjusters are on the screws, and tighten nut ❷.

Guideline

In order for the rear wheel to be correctly aligned, the markings on the left and right chain adjusters must be in the same position relative to the reference marks ❽.

Nut, rear wheel spindle	M14x1.5	90 Nm (66.4 lbf ft)

– Insert wheel speed sensor ❺ into the hole. Mount and tighten screw ❻.

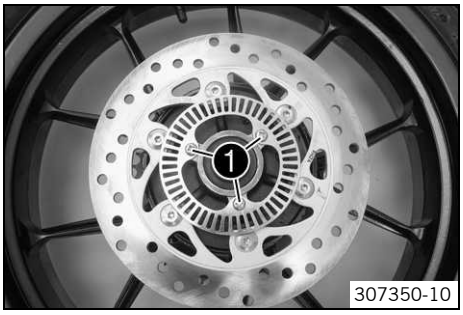
Guideline

Screw, wheel speed sensor holder	M6	8 Nm (5.9 lbf ft)

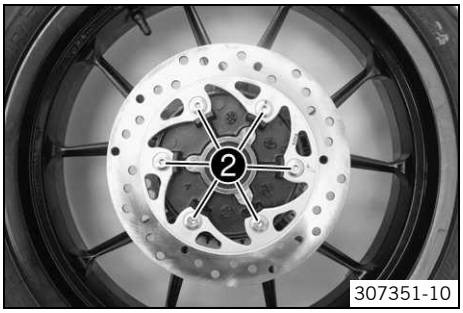
Finishing work
– Take the motorcycle off of the rear wheel stand. (☛ p. 9)

12.5.3 Removing the brake disc of the rear brake

Preparatory work
– Raise the motorcycle with the rear wheel stand. (☛ p. 9)
– Remove the rear wheel. (☛ p. 55)

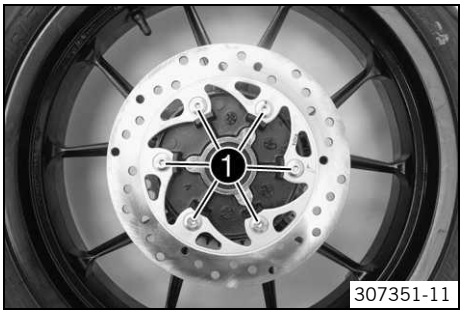


Main work
– Remove screws ❶.
– Take off the ABS sensor wheel.



– Remove screws ❷.
– Remove the brake disc.

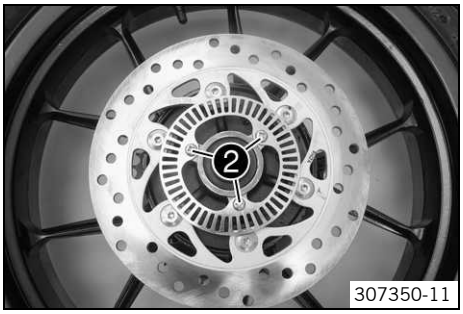
12.5.4 Installing the brake disc of the rear brake



Main work
– Clean the contact surface of the brake disc and the ABS sensor wheel.
– Position the brake disc with the label facing outward.
– Mount and tighten screws ❶.

Guideline

Screw, rear brake disc	M8	30 Nm (22.1 lbf ft)	**Loctite® 243™**



– Position the ABS sensor wheel.
– Mount and tighten screws ❷.

Guideline

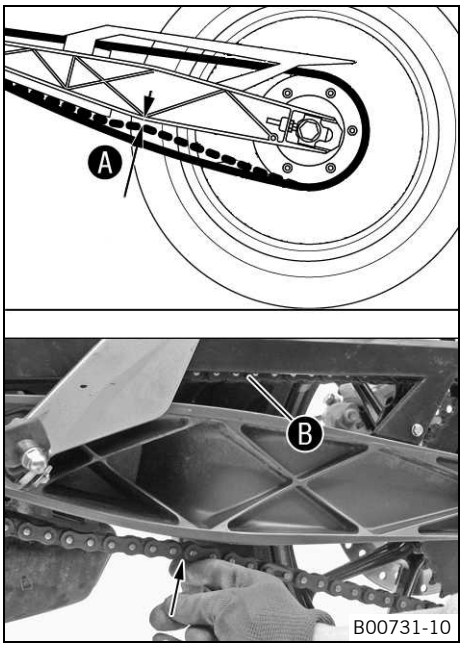
Screw, ABS sensor wheel	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**

Finishing work
– Install the rear wheel. (☛ p. 55)
– Take the motorcycle off of the rear wheel stand. (☛ p. 9)

12.5.5 Checking the chain tension

Warning
Danger of accidents Danger caused by incorrect chain tension.

– If the chain is too taut, the components of the secondary power transmission (chain, engine sprocket, rear sprocket, bearings in the transmission and in the rear wheel) will be under additional load. In addition to premature wear, this can cause the chain or the countershaft of the transmission to break in extreme cases. If the chain is too loose, however, it may fall off the engine sprocket or rear sprocket and block the rear wheel or damage the engine. Ensure that the chain tension is correct and adjust it if necessary.



– Lean the motorcycle on the side stand.
– Shift gear to neutral.
– In the area of chain sliding guard, press the chain upward toward the swingarm and determine chain tension ❹.

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

Chain tension	5... 7 mm (0.2... 0.28 in)

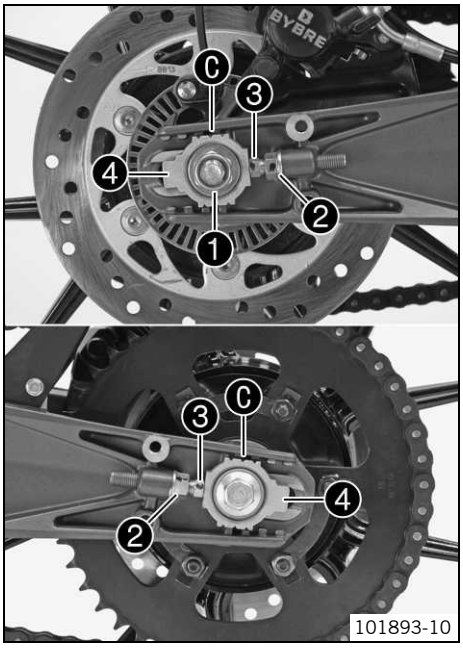
» If the chain tension does not meet specifications:
– Adjust the chain tension. (☛ p. 57)

12.5.6 Adjusting the chain tension

Warning
Danger of accidents Danger caused by incorrect chain tension.

– If the chain is too taut, the components of the secondary power transmission (chain, engine sprocket, rear sprocket, bearings in the transmission and in the rear wheel) will be under additional load. In addition to premature wear, this can cause the chain or the countershaft of the transmission to break in extreme cases. If the chain is too loose, however, it may fall off the engine sprocket or rear sprocket and block the rear wheel or damage the engine. Ensure that the chain tension is correct and adjust it if necessary.

Preparatory work
– Check the chain tension. (☛ p. 57)



Main work

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

Guideline

Chain tension	5... 7 mm (0.2... 0.28 in)
Turn adjusting screws ❸ on the left and right so that the markings on the left and right chain adjuster ❹ are in the same position in relation to reference marks ❻. The rear wheel is then correctly aligned.	

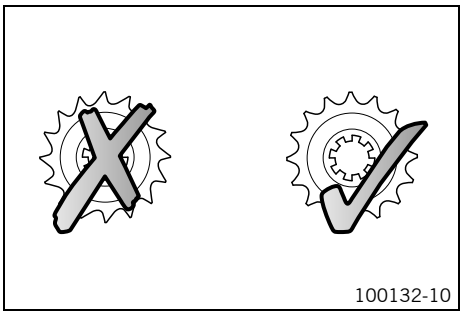
Info
The upper chain section must be taut.
Chain wear is not always even, so you should check the setting at different chain positions.

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

Guideline

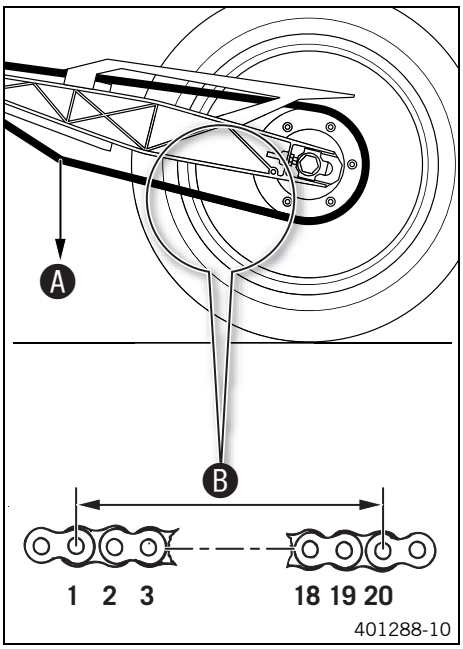
Nut, rear wheel spindle	M14x1.5	90 Nm (66.4 lbf ft)

12.5.7 Checking the chain, rear sprocket, and engine sprocket



– Check the rear sprocket and engine sprocket for wear.
» If the rear sprocket and engine sprocket are worn:
– Change the power set.

Info
The engine sprocket, rear sprocket, and chain should always be replaced together.



– Shift gear to neutral.
– Pull the lower chain section with specified weight ❹.

Guideline

Weight, chain wear measurement	15 kg (33 lb.)

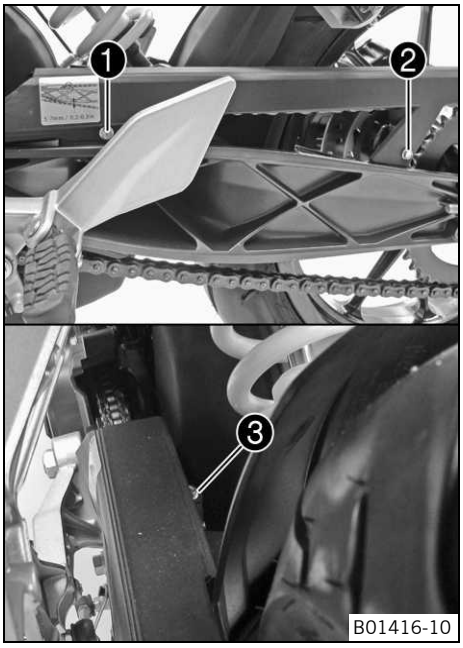
– Measure the distance ❽ of 20 chain links in the lower chain section.

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

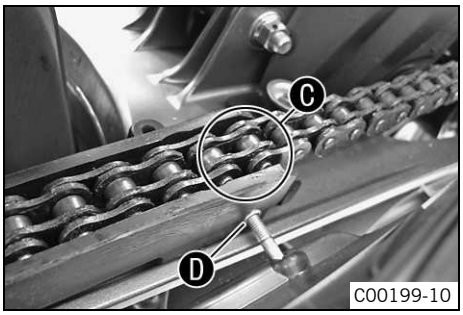
Maximum distance ❽ at the longest chain section	301.6 mm (11.874 in)

» If the distance ❽ is greater than the specified measurement:
– Change the power set.

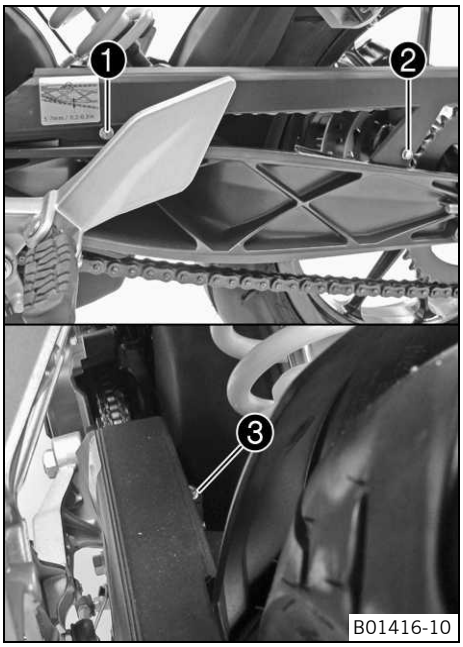
Info
When the chain is replaced, the rear sprocket and engine sprocket should also be changed.
New chains wear out faster on old, worn sprockets.



– Remove screws ❷ and ❸ and release screw ❶. Push the chain guard aside.



– Check the chain sliding guard for wear.
  » If drill hole ❶ becomes visible on the chain sliding guard in area ❷:
    – Change the chain sliding guard.
– Check that the chain sliding guard is firmly seated.
  » If the chain sliding guard is loose:
    – Tighten the chain sliding guard.



– Position the chain guard and tighten screw ❶.
  Guideline

Screw, chain guard	**EJOT PT®**	4 Nm (3 lbf ft)

– Tighten screw ❷.
  Guideline

Screw, chain guard	**EJOT PT®**	4 Nm (3 lbf ft)

– Tighten screw ❸.
  Guideline

Remaining screws, chassis	M5	5 Nm (3.7 lbf ft)

12.5.8 Cleaning the chain

Warning
Danger of accidents Oil or grease on the tires reduces their grip.

– Remove oil and grease with a suitable cleaning material.

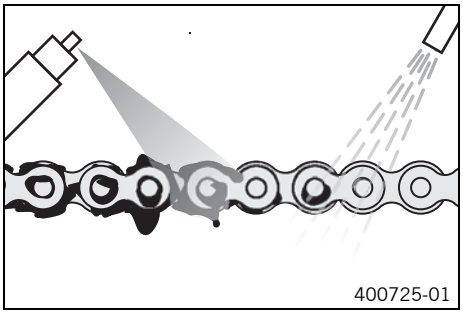
Warning
Danger of accidents Reduced braking efficiency due to oil or grease on the brake discs.

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

Warning
Environmental hazard Hazardous substances cause environmental damage.

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

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


400725-01

– Clean the chain regularly.
– Rinse off loose dirt with a soft jet of water.
– Remove old grease remains with chain cleaner.

Chain cleaner (☛ p. 187)

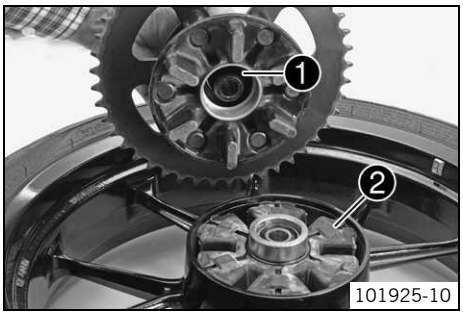
– After drying, apply chain spray.

Chain lube for road use (☛ p. 187)

12.5.9 Checking the rear hub rubber dampers

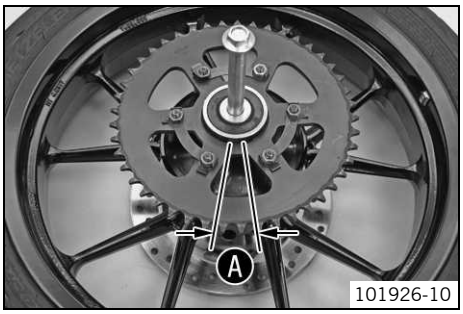
Info
The engine power is transmitted from the rear sprocket to the rear wheel via 6 rubber dampers. They eventually wear out during operation. If the rubber dampers are not changed in time, the rear sprocket carrier and the rear hub will be damaged.

Preparatory work
– Raise the motorcycle with the rear wheel stand. (☛ p. 9)
– Remove the rear wheel. (☛ p. 55)



101925-10

Main work
– Check bearing ❶.
  » If the bearing is damaged or worn:
    – Change the bearing.
– Check the rubber dampers ❷ of the rear hub for damage and wear.
  » If the rubber dampers of the rear hub are damaged or worn:
    – Change all rubber dampers in the rear hub.



101926-10

– Lay the read wheel on a workbench with the rear sprocket facing upwards and insert the wheel spindle in the hub.
– To check the play Ⓐ, hold the rear wheel tight and try to rotate the rear sprocket.

Info
Measure the play on the outside of the rear sprocket.

Play in rubber dampers, rear wheel	≤ 5 mm (≤ 0.2 in)

  » If play Ⓐ is larger than the specified value:
    – Change all rubber dampers in the rear hub.

Finishing work
– Install the rear wheel. (☛ p. 55)
– Take the motorcycle off of the rear wheel stand. (☛ p. 9)

13.1 Removing the battery

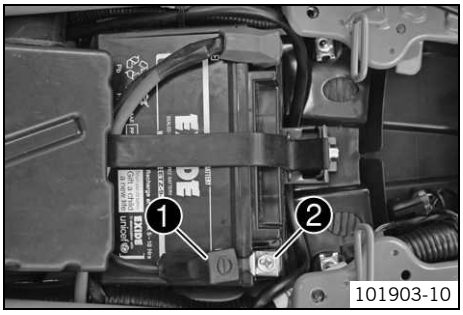
Warning

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

- Keep batteries out of the reach of children.
- Wear suitable protective clothing and goggles.
- Avoid contact with battery acid and battery gases.
- Keep sparks and open flames away from the battery. Only charge 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 physician.

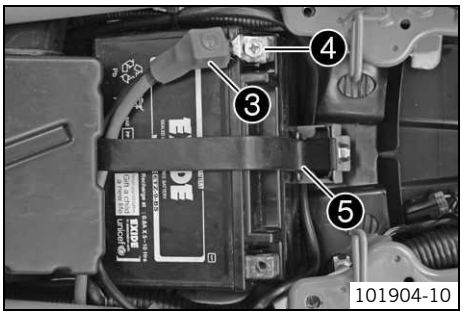
Preparatory work

- Remove the passenger seat. (☛ p. 39)
- Remove the seat. (☛ p. 38)



Main work

- Pull back the negative terminal cover ❶.
- Disconnect the negative cable ❷ of the battery.

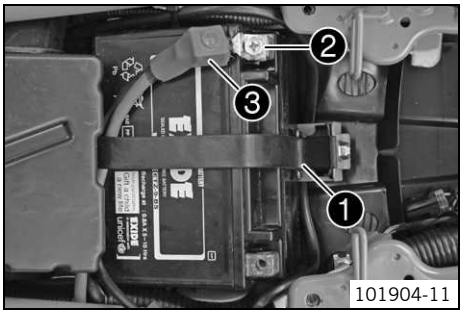


- Pull back the positive terminal cover ❸.
- Disconnect the positive cable ❹ of the battery.
- Detach rubber band ❺.
- Pull the battery up and out of the battery holder.

Info

Never operate the motorcycle with a discharged battery or without a battery. In both cases, electrical components and safety devices can be damaged. The vehicle is therefore no longer roadworthy.

13.2 Installing the battery



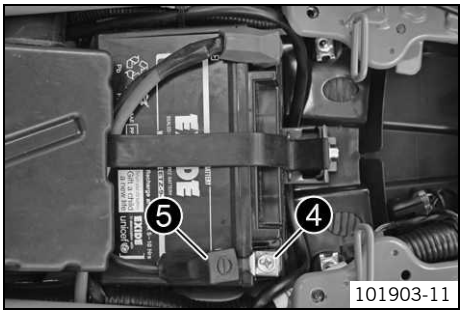
Main work

- Position the battery in the battery holder.

Info

The battery terminals must be at the top.

- Attach rubber band ❶.
- Reconnect the positive cable ❷ of the battery.
- Position positive terminal cover ❸.



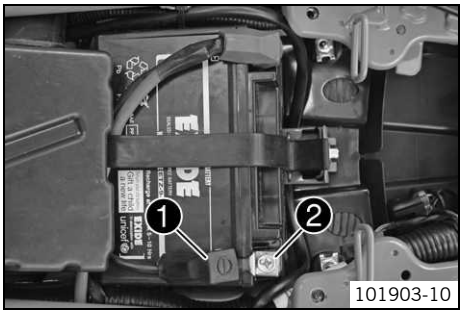
- Connect the negative cable ❹ of the battery.
- Position the negative terminal cover ❺.

Finishing work

- Mount the seat. (☛ p. 39)
- Mount the passenger seat. (☛ p. 39)
- Set the clock. (☛ p. 76)

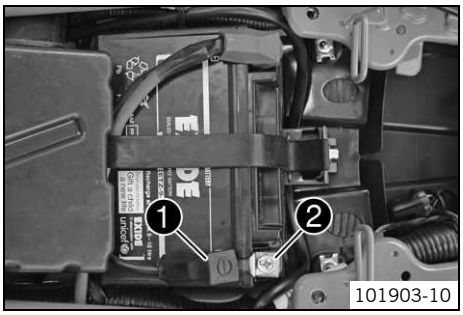
13.3 Disconnecting the negative cable of the battery

Preparatory work
- Remove the passenger seat. (☛ p. 39)
- Remove the seat. (☛ p. 38)



Main work
- Pull back the negative terminal cover ❶.
- Disconnect the negative cable ❷ of the battery.

13.4 Reconnecting the negative cable of the battery



Main work
- Connect the negative cable ❷ of the battery.
- Position the negative terminal cover ❶.

Finishing work
- Mount the seat. (☛ p. 39)
- Mount the passenger seat. (☛ p. 39)
- Set the clock. (☛ p. 76)

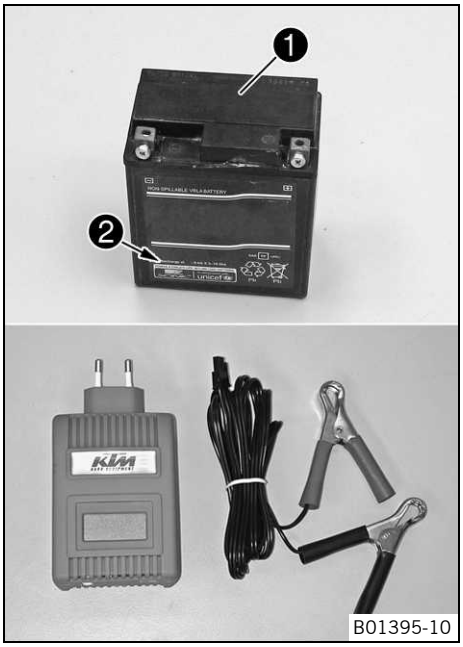
13.5 Recharging the battery

Warning
Risk of injury Battery acid and battery gases cause serious chemical burns.
- Keep batteries out of the reach of children.
- Wear suitable protective clothing and goggles.
- Avoid contact with battery acid and battery gases.
- Keep sparks and open flames away from the battery. Only charge 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 physician.

Warning
Environmental hazard The battery contains elements that are harmful to the environment.
- Do not discard batteries with the household waste. Dispose of faulty batteries in an environmentally compatible manner. Give the battery to your authorized KTM dealer or dispose of it at a collection point for used batteries.

Info
Even when 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 recharging with a high charging current shortens the battery's service life.
If the charging current, charging voltage, and charging time are exceeded, electrolyte escapes through the safety valves. This reduces the battery capacity.
If the battery is depleted from starting the vehicle repeatedly, the battery must be charged immediately.
If the battery is left in a discharged state for an extended period, it will become over-discharged and sulfate, destroying the battery.
The battery is maintenance-free, which means that the acid level does not need to be checked.

Preparatory work
- Switch off all power consumers and switch off the engine.
- Remove the passenger seat. (☛ p. 39)
- Remove the seat. (☛ p. 38)
- Disconnect the negative cable of the battery to avoid damage to the motorcycle's electronics.



Main work
- 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 lid ❶.
Charge the battery with a maximum of 10% of the capacity specified on battery housing ❷.

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

Guideline

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

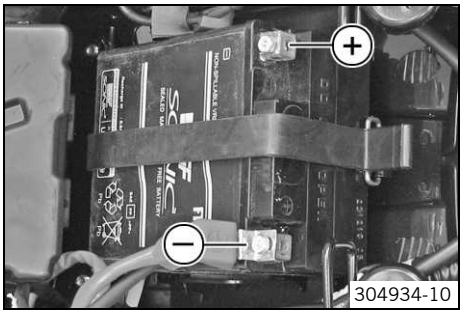
Finishing work
- Mount the seat. (☛ p. 39)
- Mount the passenger seat. (☛ p. 39)
- Set the clock. (☛ p. 76)

13.6 Checking the charging voltage

Condition
The battery must be fully functional and completely charged.

Preparatory work
- Remove the passenger seat. (☛ p. 39)
- Remove the seat. (☛ p. 38)

Main work
- Start the motorcycle to make checks. (☛ p. 13)



- V Measure the voltage between the specified points.
  Measuring point **Plus (+)** – Measuring point **Ground (–)**

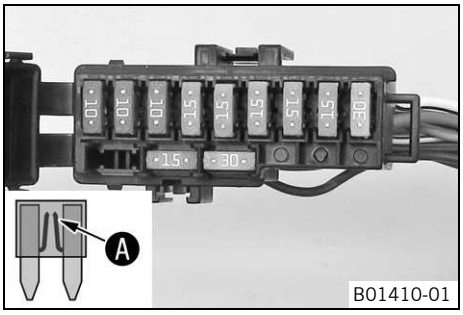
Charging voltage	
5,000 rpm	13.5... 15.0 V

» If the displayed value is less than the specified value:
  - Check the cable from the alternator to the voltage regulator.
  - Check the cable from the voltage regulator to the wiring harness.
  - Check the stator winding of the alternator. (☛ p. 156)

» If the displayed value is greater than the specified value:
  - Change the voltage regulator.

13.7 Changing the fuses of individual power consumers

Info
The fuse box with the main fuse and the fuses of the individual power consumers is located under the passenger seat.



Preparatory work
- Switch off all power consumers and switch off the engine.
- Remove the passenger seat. (☛ p. 39)

Main work
- Open fuse box cover.
- Remove the defective fuse.

  Guideline

Fuse **1** - 30 A - main fuse
Fuse **2** - 15 A - start auxiliary relay, alarm system (OPTIONAL)
Fuse **3** - 15 A - control unit, power relay
Fuse **4** - 15 A - ignition coil
Fuse **5** - 15 A - radiator fan
Fuse **6** - 15 A - horn, brake light, turn signal, high beam, low beam, parking light, tail light, license plate lamp
Fuse **7** - 10 A - ABS control unit
Fuse **8** - 10 A - combination instrument, control unit
Fuse **9** - 10 A - auxiliary equipment

Info
A defective fuse is indicated by a burned-out fuse wire Ⓐ.

Warning
Fire hazard The electrical system can be overloaded if the wrong fuses are used.
- Use only fuses with the prescribed amperage. Never by-pass or repair fuses.

- Use spare fuses with the correct rating only.

Fuse (75011088010) (☛ p. 160)
Fuse (75011088015) (☛ p. 160)
Fuse (75011088030) (☛ p. 160)

Tip
Replace the spare fuse in the fuse box so that it is available if needed.

- Check that the power consumer is functioning properly.
- Close the fuse box cover.

Finishing work
- Mount the passenger seat. (☛ p. 39)

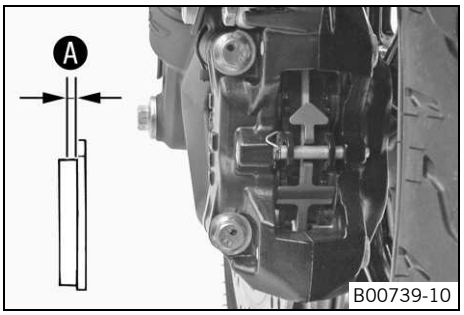
14.1 Checking the front brake linings

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

– Change worn brake linings immediately.

Note
Danger of accidents Reduced braking efficiency caused by damaged brake discs.

– If the brake linings are not changed in time, the steel brake lining carriers grind on the brake disc. The braking effect is greatly reduced and the brake discs are destroyed. Check the brake linings regularly.



– Check the brake linings for minimum thickness Ⓐ.

Minimum thickness Ⓐ	≥ 1 mm (≥ 0.04 in)

» If the minimum thickness is less than specified:
– Change the front brake linings. (☛ p. 65)

– Check the brake linings for damage and cracking.

» If there is wear or tearing:
– Change the front brake linings. (☛ p. 65)

14.2 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 comes into contact with the eyes, flush the eyes thoroughly with water and consult a physician immediately.

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

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

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.

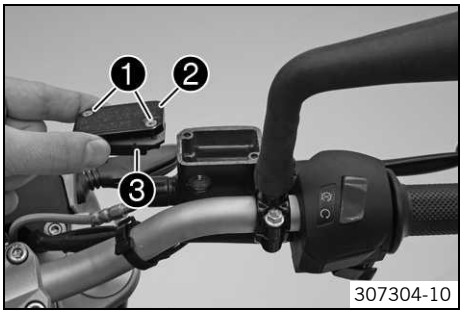
Warning
Danger of accidents Reduced braking efficiency due to use of non-approved brake linings.

– 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.

Warning
Environmental hazard Hazardous substances cause environmental damage.

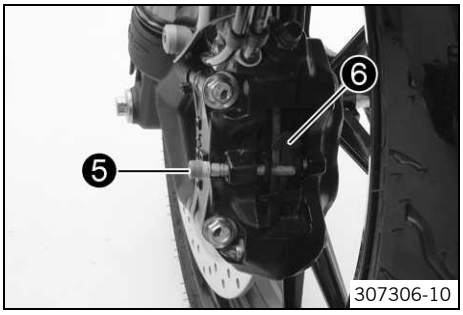
– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container.

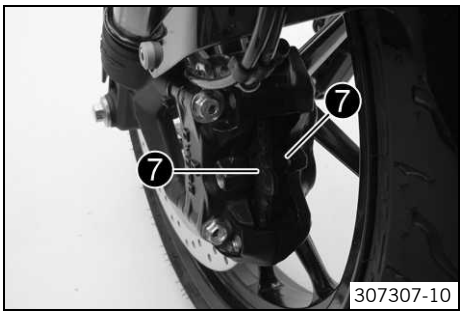


– Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
– Remove screws ❶.
– Remove cover ❷ with membrane ❸.

– Remove locking clip ❹.



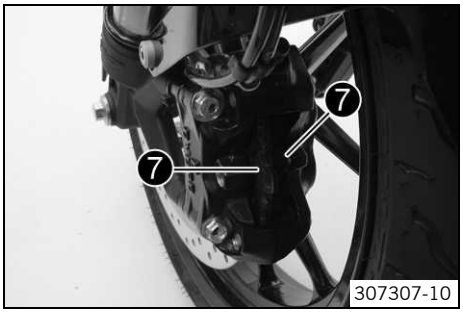
– Remove pin ❺.
– Take off springs ❻.



– Remove brake linings ❼.
– Clean the brake caliper.

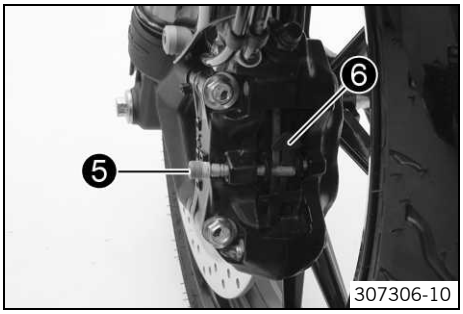
– Press the brake piston back to its basic position and make sure that no brake fluid overflows from the brake fluid reservoir. Suction it off if necessary.

Info
Protect the components against damage.



– Position brake linings ❼.

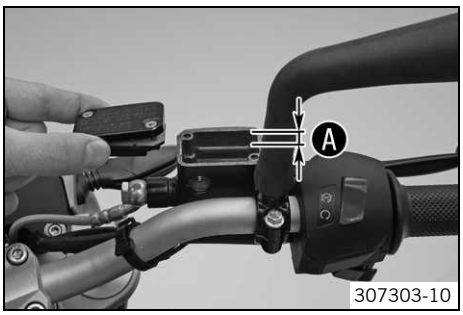
Info
Always change the brake linings in pairs.



– Position springs ❻.
✓ The arrow on the spring points in the direction of travel.
– Mount pin ❺.

Info
Make sure the springs are seated correctly.

– Activate the hand brake lever until there is a firm pressure point.



– Correct the brake fluid level to level Ⓐ.
Guideline

Level Ⓐ	5 mm (0.2 in)

Brake fluid DOT 4 / DOT 5.1 (☛ p. 186)

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

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

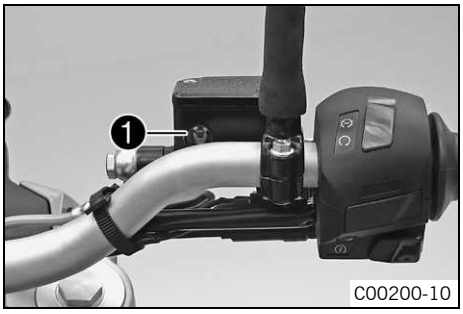
14.3 Checking the brake fluid level of the front brake

Warning
Danger of accidents Failure of the brake system.

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

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

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



– Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
– Check the brake fluid level in viewer ❶.
» If the brake fluid is below the **MIN** marking:
– Add front brake fluid. (☛ p. 67)

14.4 Adding front brake fluid

Warning
Danger of accidents Failure of the brake system.

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

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

– Avoid contact with skin and eyes, and keep out of the reach of children.
– Wear suitable protective clothing and goggles.
– If brake fluid comes into contact with the eyes, flush the eyes thoroughly with water and consult a physician immediately.

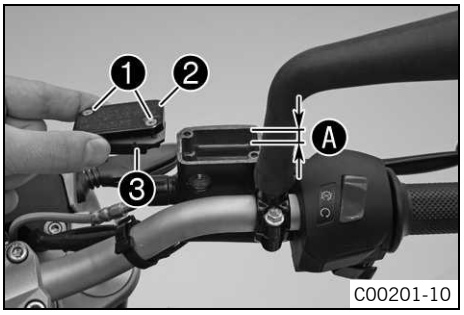
Warning
Danger of accidents Reduced braking efficiency due to old brake fluid.

– Change the brake fluid of the front and rear brake 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
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container.



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

Guideline

Level Ⓐ	5 mm (0.2 in)

Brake fluid DOT 4 / DOT 5.1 (☛ p. 186)

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

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

14.5 Changing the front brake fluid

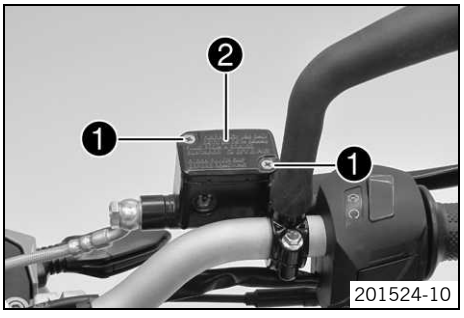
Warning
Skin irritation Brake fluid can cause skin irritation on contact.

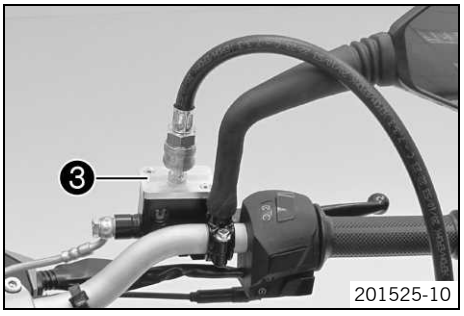
– Avoid contact with skin and eyes, and keep out of the reach of children.
– Wear suitable protective clothing and goggles.
– If brake fluid comes into contact with the eyes, flush the eyes thoroughly with water and consult a physician immediately.

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
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container.





– Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
– Cover painted parts.
– Remove screws ❶.
– Remove cover ❷ with the membrane.
– Draw the old brake fluid out of the brake fluid reservoir using a syringe and fill with fresh brake fluid.

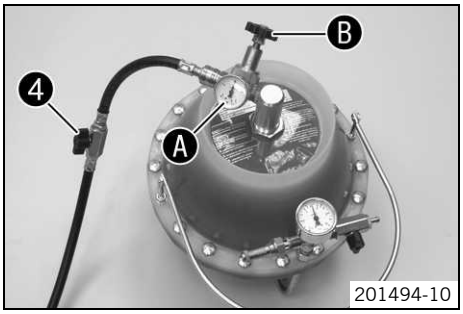
Bleed syringe (50329050000) (☛ p. 189)
Brake fluid DOT 4 / DOT 5.1 (☛ p. 186)

– Mount the corresponding bleeder cover ❸ from the special tool set.

Bleeder cover (00029013000) (☛ p. 189)

– Connect the bleeding device.

Bleeding device (00029013100) (☛ p. 189)



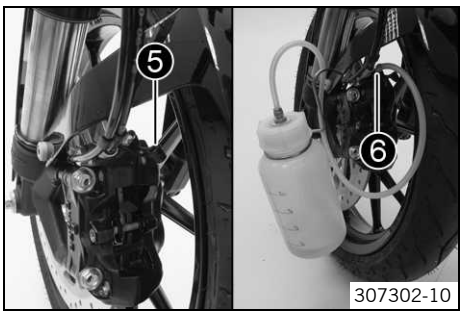
– Open shut-off valve ❹.

Info
Follow the operating instructions of the bleeding device.

– Ensure that the filling pressure is set on pressure gauge Ⓐ. Correct the filling pressure on pressure regulator Ⓑ if necessary.

Guideline

Filling pressure	2... 2.5 bar (29... 36 psi)



– Pull off dust cap ❺ of the bleeder screw of the brake caliper. Connect the bleeder bottle hose.

Bleeding device (00029013100) (☛ p. 189)

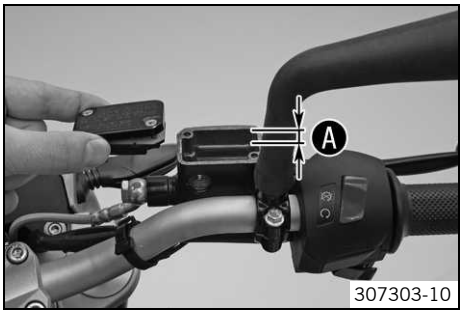
– Open bleeder screw ❻ by approximately one half turn.

Info
Drain until fresh brake fluid emerges in the bleeder bottle hose without bubbles.

– Tighten the bleeder screw.
– Close shut-off valve ❹.
– Open the bleeder screw again until no more brake fluid emerges.

Info
Overfilling of the brake fluid reservoir is prevented.

– Tighten the bleeder screw. Remove the bleeder bottle hose. Attach the dust cap.
– Disconnect the bleeding device. Remove the bleeder cover.



– Correct the brake fluid level to level Ⓐ.

Guideline

Level Ⓐ	5 mm (0.2 in)

Brake fluid DOT 4 / DOT 5.1 (☛ p. 186)

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

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

– Check the hand brake lever for a firm pressure point.

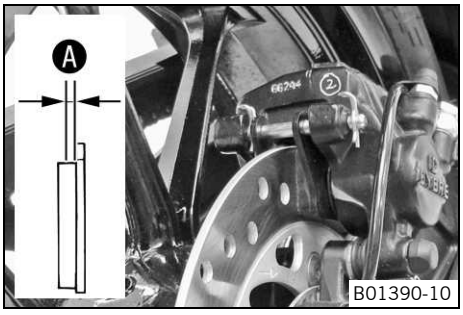
14.6 Checking the rear brake linings

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

– Change worn brake linings immediately.

Note
Danger of accidents Reduced braking efficiency caused by damaged brake discs.

– If the brake linings are not changed in time, the steel brake lining carriers grind on the brake disc. The braking effect is greatly reduced and the brake discs are destroyed. Check the brake linings regularly.



– 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. 70)

– Check the brake linings for damage and cracking.

» If there is wear or tearing:
– Change the rear brake linings. (☛ p. 70)

14.7 Changing the rear brake linings

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

- Avoid contact with skin and eyes, and keep out of the reach of children.
- Wear suitable protective clothing and goggles.
- If brake fluid comes into contact with the eyes, flush the eyes thoroughly with water and consult a physician immediately.

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

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

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.

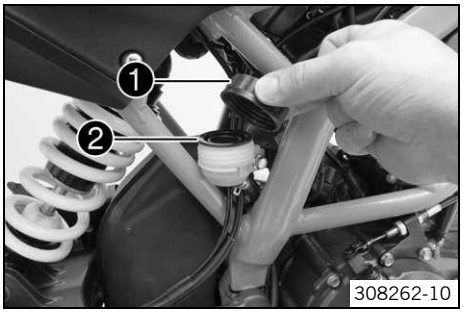
Warning
Danger of accidents Reduced braking efficiency due to use of non-approved brake linings.

- 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.

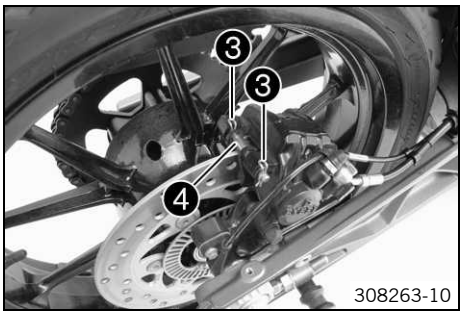
Warning
Environmental hazard Hazardous substances cause environmental damage.

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

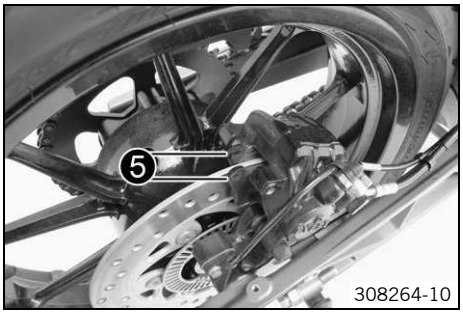
Info
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container.



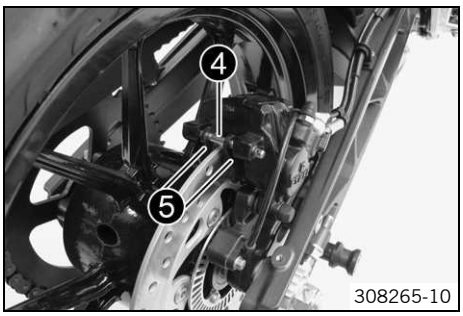
- Stand the vehicle upright.
- Remove screw cap ❶ and membrane ❷.
- Push the brake caliper toward the brake disc with your hand to push back the brake piston; ensure that brake fluid does not runs out of the brake fluid reservoir, removing it if it does.



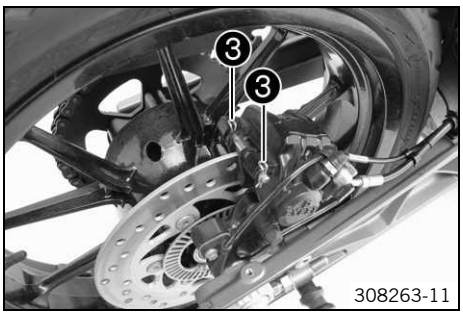
- Remove locking clips ❸.
- Remove pin ❹.



- Remove brake linings ❺.
- Clean the brake caliper.



– Position brake linings ❺.
– Mount pin ❹.



– Mount locking clips ❸.

– Operate the foot brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point.
– Add brake fluid to the **MAX** marking.

Brake fluid DOT 4 / DOT 5.1 (☛ p. 186)

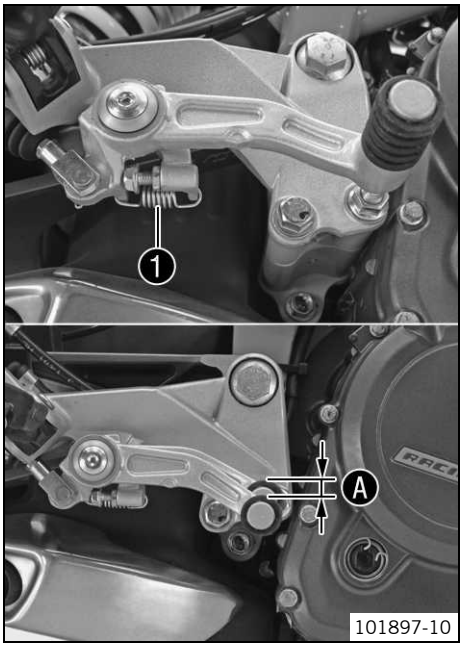
– Mount the screw cap with the washer and membrane.

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

14.8 Checking the 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 the free travel on foot brake lever according to specifications.



– Disconnect spring ❶.
– Move the foot brake lever back and forth between the end stop and the contact to the foot brake cylinder piston and check free travel Ⓐ.

Guideline

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

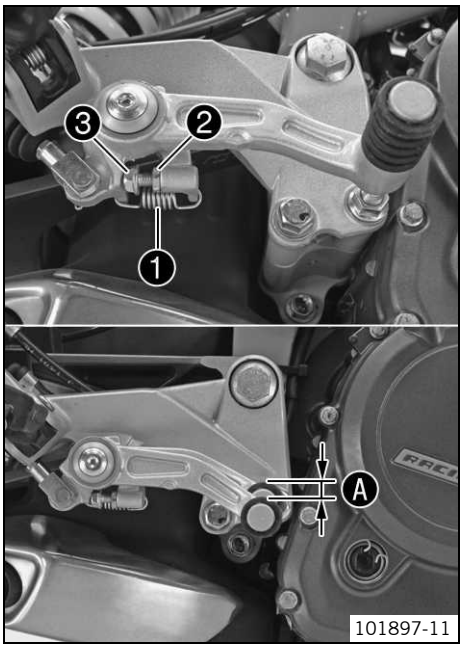
» If the free travel does not meet specifications:
– Adjust the free travel of the foot brake lever. (☛ p. 72)

– Reconnect spring ❶.

14.9 Adjusting the free travel of the 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 the free travel on foot brake lever according to specifications.



– Disconnect spring ❶.
– Release nut ❷ and use screw ❸ to adjust the specified free travel Ⓐ.

Guideline

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

Info
The range of adjustment is limited.

– Hold screw ❸ and tighten nut ❷.
– Attach spring ❶.

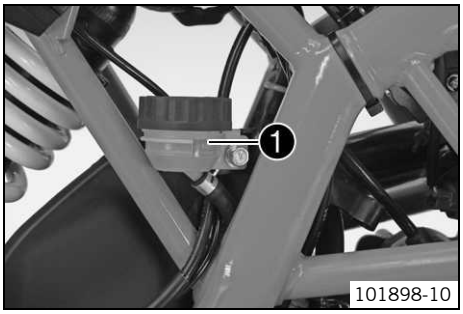
14.10 Checking the rear brake fluid level

Warning
Danger of accidents Failure of the brake system.

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

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

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



– Stand the vehicle upright.
– Check the brake fluid level in the brake fluid reservoir.
  » If the fluid level reaches the **MIN** marking ❶:
    – Add rear brake fluid. (☛ p. 73)

14.11 Adding rear brake fluid

Warning
Danger of accidents Failure of the brake system.

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

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

– Avoid contact with skin and eyes, and keep out of the reach of children.
– Wear suitable protective clothing and goggles.
– If brake fluid comes into contact with the eyes, flush the eyes thoroughly with water and consult a physician immediately.

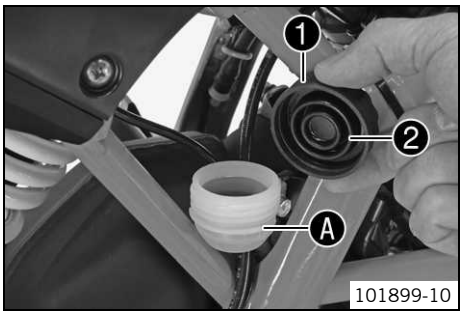
Warning
Danger of accidents Reduced braking efficiency due to old brake fluid.

– Change the brake fluid of the front and rear brake 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
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container.



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

Brake fluid DOT 4 / DOT 5.1 (☛ p. 186)

– Refit screw cap with membrane.

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

14.12 Changing the rear brake fluid

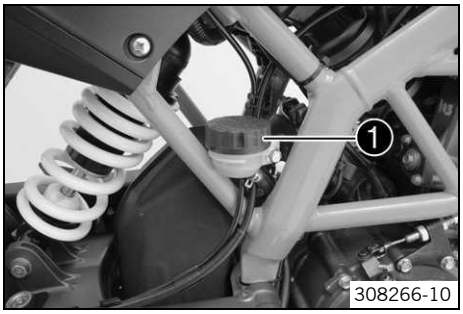
Warning
Skin irritation Brake fluid can cause skin irritation on contact.

– Avoid contact with skin and eyes, and keep out of the reach of children.
– Wear suitable protective clothing and goggles.
– If brake fluid comes into contact with the eyes, flush the eyes thoroughly with water and consult a physician immediately.

Warning
Environmental hazard Hazardous substances cause environmental damage.

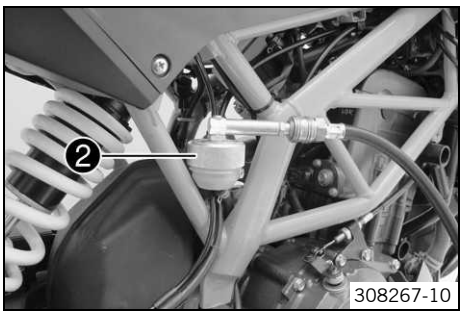
– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Info
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container.



– Cover painted parts.
– Remove screw cap ❶ with membrane.
– Draw the old brake fluid out of the brake fluid reservoir using a syringe and fill with fresh brake fluid.

Bleed syringe (50329050000) (☛ p. 189)
Brake fluid DOT 4 / DOT 5.1 (☛ p. 186)

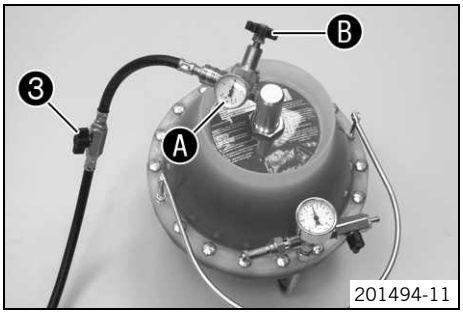


– Mount the corresponding bleeder cover ❷ from the special tool set.

Bleeder cover (00029013000) (☛ p. 189)

– Connect the bleeding device.

Bleeding device (00029013100) (☛ p. 189)



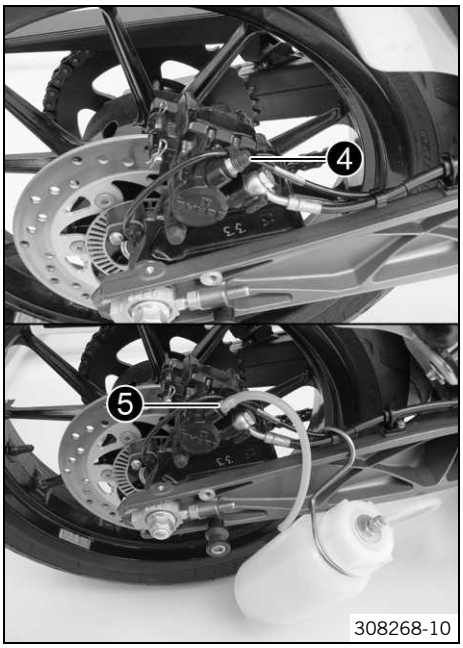
– Open shut-off valve ❸.

Info
Follow the operating instructions of the bleeding device.

– Ensure that the filling pressure is set on pressure gauge Ⓐ. Correct the filling pressure on pressure regulator Ⓑ if necessary.

Guideline

Filling pressure	2... 2.5 bar (29... 36 psi)



– Pull off dust cap ❹ of the bleeder screw. Connect the bleeder bottle hose.

Bleeding device (00029013100) (☛ p. 189)

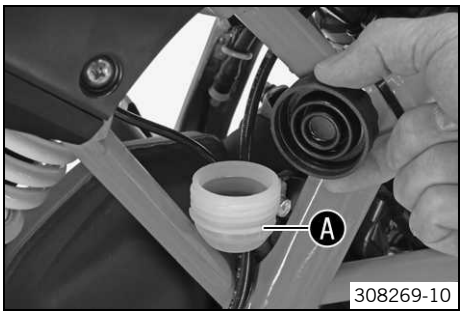
– Open bleeder screw ❺ by approximately one half turn.

Info
Drain until fresh brake fluid emerges in the bleeder bottle hose without bubbles.

– Tighten the bleeder screw.
– Close shut-off valve ❸.
– Open the bleeder screw again until no more brake fluid emerges.

Info
Overfilling of the brake fluid reservoir is prevented.

– Tighten the bleeder screw. Remove the bleeder bottle hose. Attach the dust cap.
– Disconnect the bleeding device. Remove the bleeder cover.



– Stand the vehicle upright.
– Correct the brake fluid to level Ⓐ.

Brake fluid DOT 4 / DOT 5.1 (☛ p. 186)

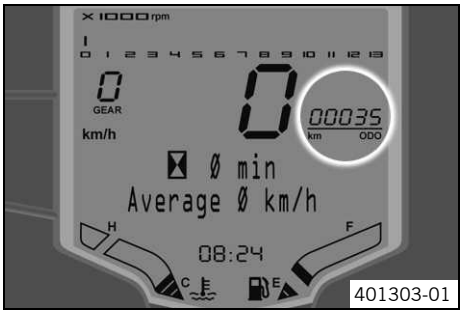
– Refit screw cap with membrane.

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

– Check the foot brake lever for a firm pressure point.

15.1 Setting kilometers or miles

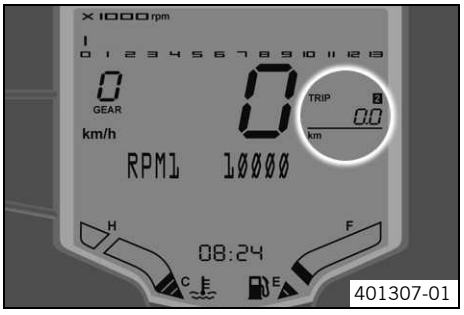
Info
Make the country-specific setting.



Condition
The ignition is on.
The motorcycle is stationary.

– Press the **MODE** button briefly and repeatedly until **ODO** appears on the display.
– Press the **MODE** button for 5 - 10 seconds.
✓ The display changes from **km/h** to **mph** or from **mph** to **km/h**.

15.2 Adjusting the shift speed RPM 1



Condition
The ignition is on.
The motorcycle is stationary.

– Press the **MODE** button briefly and repeatedly until **TRIP 2** appears on the display.
– Press the **MODE** button for 5 - 10 seconds.
✓ The display **RPM 1** appears.

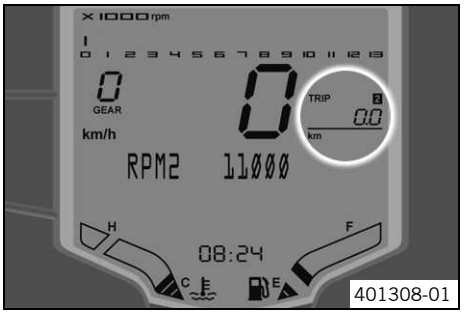
Info
The engine speed can be set at intervals of 50.
RPM 1 is the engine speed above which the shift warning light starts to flash.

– Set the speed with the **MODE** and **SET** buttons.

Info
The **MODE** button increases the value.
The **SET** button decreases the value.

– Do not activate the two buttons for approx. 15 seconds.
✓ The display **RPM 1** goes out and the set speed is stored.

15.3 Adjusting the shift speed RPM 2



Condition
The ignition is on.
The motorcycle is stationary.

– Press the **MODE** button briefly and repeatedly until **TRIP 2** appears on the display.
– Press the **SET** button for 5 - 10 seconds.
✓ The display **RPM 2** appears.

Info
The engine speed can be set at intervals of 50.
RPM 2 is the engine speed above which the shift warning light lights up constantly.
The speed **RPM 2** must always be higher than the speed **RPM 1**.

– Set the speed with the **MODE** and **SET** buttons.

Info
The **MODE** button increases the value.
The **SET** button decreases the value.

– Do not activate the two buttons for approx. 15 seconds.
✓ The display **RPM 2** goes out and the set speed is stored.

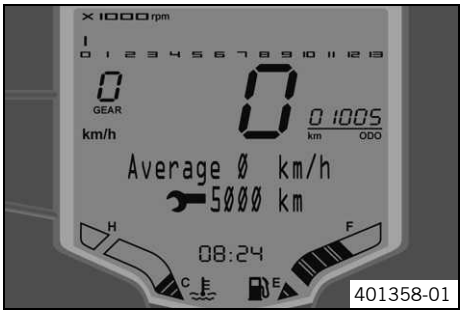
15.4 Setting the time

401303-01

Condition
The ignition is on.
The motorcycle is stationary.

– Press the **MODE** button briefly and repeatedly until **ODO** appears on the display.
– Press the **MODE** and **SET** buttons for 5 - 10 seconds.
✓ The time display begins to flash.
– Set the hours display using the **MODE** button.
– Set the minutes display using the **SET** button.
– Press the **MODE** and **SET** buttons for 5 - 10 seconds.
✓ The time is set.

15.5 Resetting the service interval display



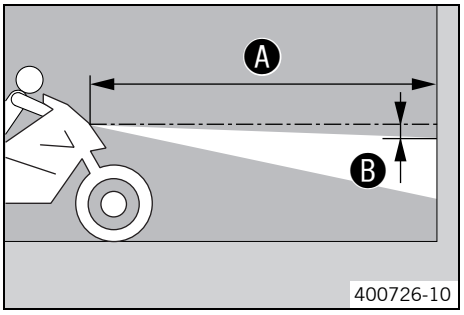
401358-01

Condition
The ignition is on.
The engine is switched off.
The motorcycle is stationary.

– Press the **SET** button for more than 10 seconds.

Info
The service interval display can only be reset. It is not possible to individually adjust the distance or time to the next required service.

15.6 Checking the headlight setting



400726-10

– Position the vehicle upright on a horizontal surface in front of a light wall and make a mark at the height of the center of the low beam headlight.
– Make another mark at a distance Ⓑ under the first mark.
Guideline

Distance Ⓑ	5 cm (2 in)

– Position the vehicle vertically at a distance Ⓐ in front of the wall and switch on the low beam.
Guideline

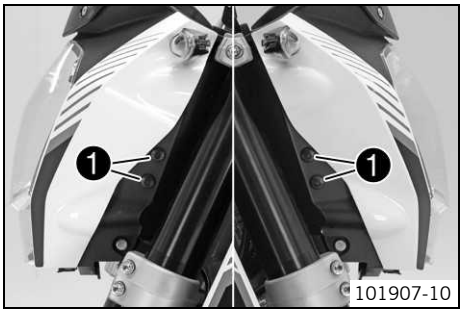
Distance Ⓐ	5 m (16 ft)

– The rider, with luggage and passenger if applicable, now mounts the motorcycle.
– Check the headlight setting.

The light-dark boundary must lie exactly on the lower mark when the motorcycle is ready to operate with the rider mounted along with any luggage and a passenger if applicable.

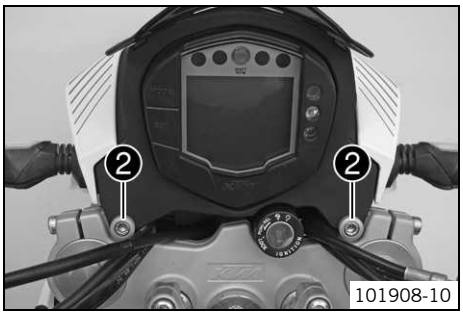
» If the boundary between light and dark does not meet specifications:
– Adjust the headlight range. (☛ p. 77)

15.7 Adjusting the headlight range

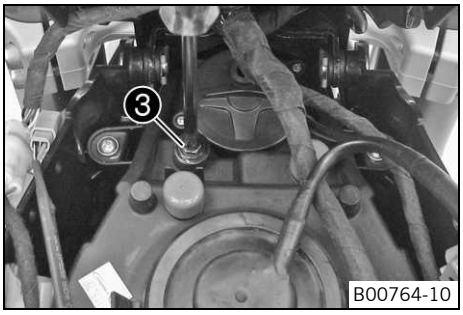


Main work

– Remove expanding rivets ❶.



– Remove screws ❷.
– Lift the headlight mask slightly and swing forward.



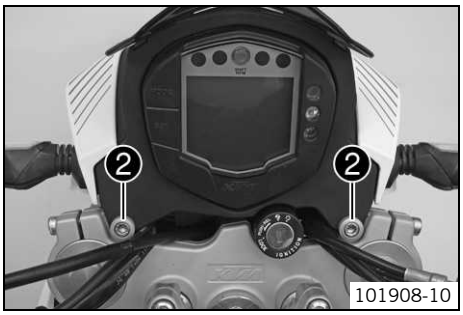
– Adjust the beam distance of the headlight by turning screw ❸.

Guideline

For a motorcycle with rider, and with luggage and a passenger if applicable, the light/dark boundary must be exactly on the lower mark (applied in: Checking headlight adjustment).

Info

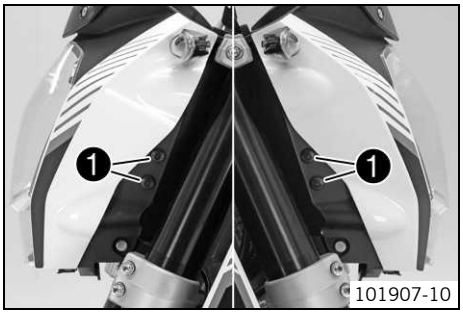
Turn clockwise to increase the headlight range; turn counterclockwise to reduce the headlight range.



– Fold the headlight mask up.
– Mount and tighten screws ❷.

Guideline

Screw, headlight mask	M6	11 Nm (8.1 lbf ft)



– Mount expanding rivets ❶ on both sides.

Finishing work

– Check the headlight setting. (☛ p. 76)

15.8 Changing the parking light bulb

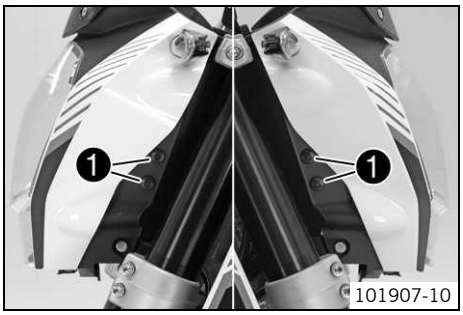
Note

Damage to reflector Reduced brightness.

– Grease on the lamp will evaporate due to the heat and be deposited on the reflector. Clean the lamp and keep it free of grease before mounting.

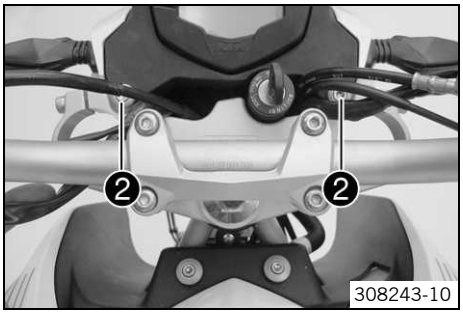
Preparatory work

– Switch off all power consumers and switch off the engine.

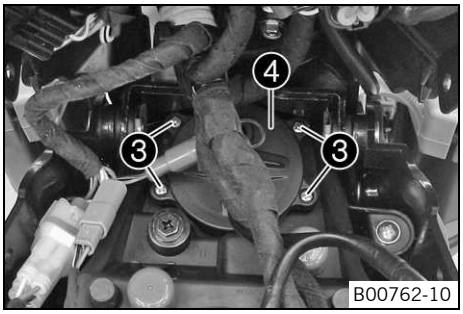


Main work

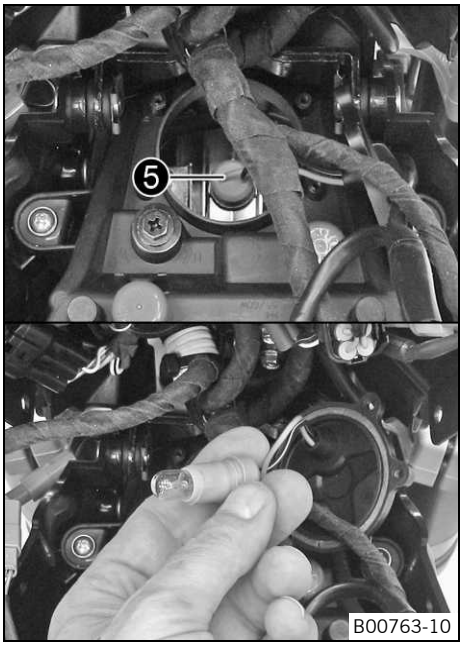
– Remove expanding rivets ❶.



– Remove screws ❷.
– Lift the headlight mask slightly and swing forward.



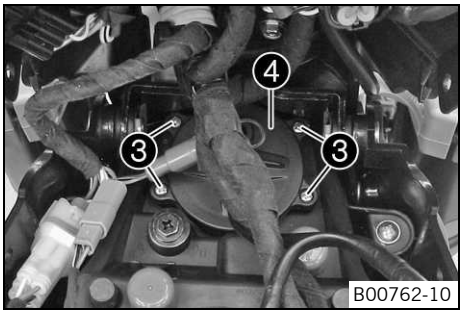
– Remove screws ❸.
– Take off cover ❹.



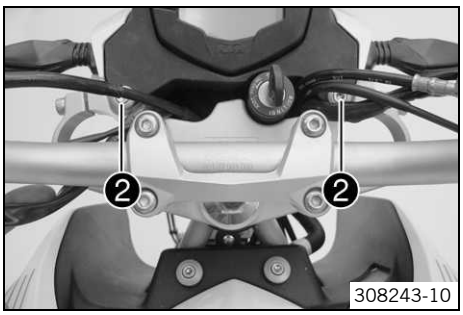
– Pull the socket with bulb ❺ out of the housing.
– Remove the bulb.
– Position a new light bulb in the socket.

Parking light (W5W/socket W2.1x9.5d) (☛ p. 160)

– Position the socket with bulb ❺ in the housing.



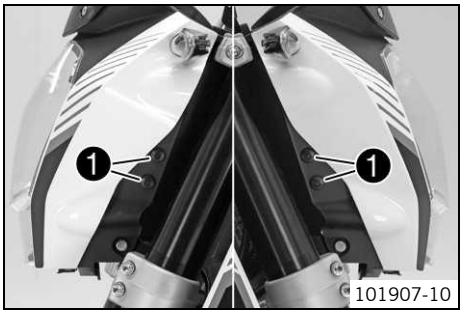
– Position cover ❹.
– Mount and tighten screws ❸.



– Fold the headlight mask up.
– Mount and tighten screws ❷.

Guideline

Screw, headlight mask	M6	11 Nm (8.1 lbf ft)



– Mount expanding rivets ❶ on both sides.
– Check that the lighting is functioning properly.

15.9 Changing the headlight bulb

Note

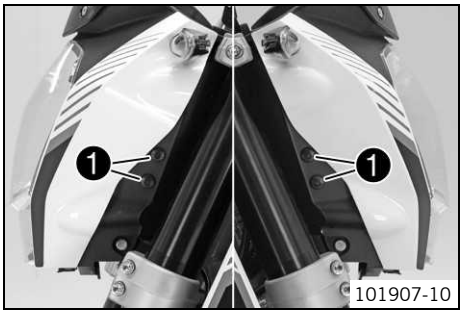
Damage to reflector Reduced brightness.

– Grease on the lamp will evaporate due to the heat and be deposited on the reflector. Clean the lamp and keep it free of grease before mounting.

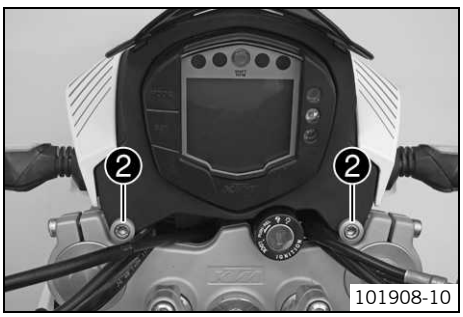
Preparatory work

– Switch off all power consumers and switch off the engine.

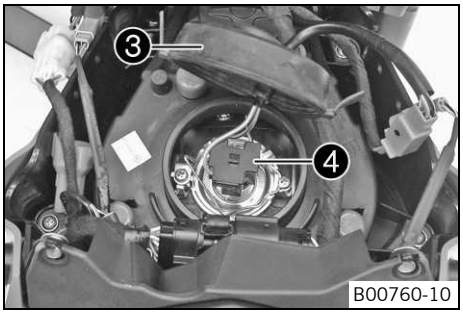
Main work



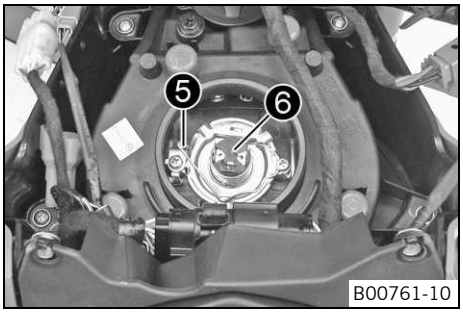
– Remove expanding rivets ❶.



– Remove screws ❷.
– Lift the headlight mask slightly and swing forward.



– Take off protection cap ❸.
– Disconnect plug-in connector ❹.

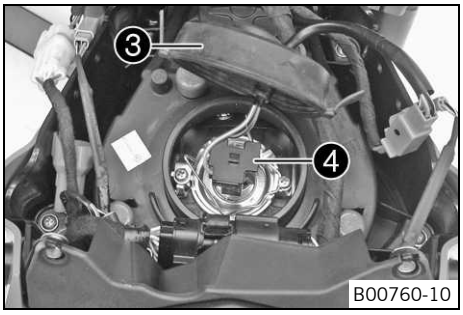


– Detach retaining clamp ❺.
– Remove headlight bulb ❻.
– Position the new headlight bulb in the headlight housing.

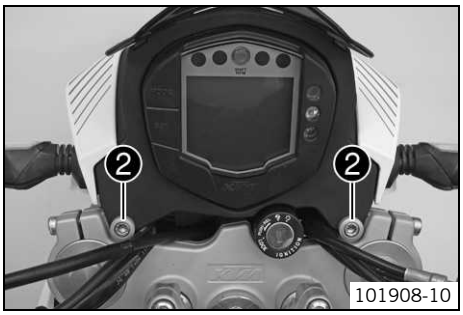
Headlight (H4/socket P43t) (☛ p. 160)

Info
Insert the headlight bulb so that the catches latch into the recesses.

– Attach retaining clamp ❺.

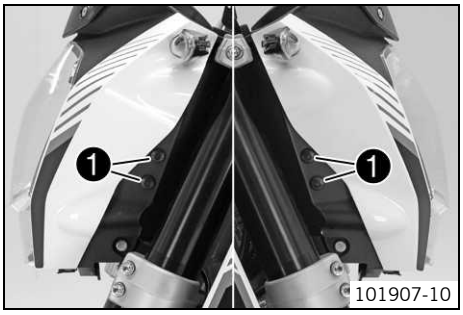


– Connect plug-in connection ❹.
– Mount protection cap ❸.



– Fold the headlight mask up.
– Mount and tighten screws ❷.
Guideline

Screw, headlight mask	M6	11 Nm (8.1 lbf ft)



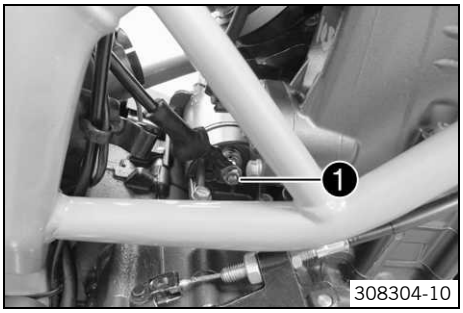
– Mount expanding rivets ❶ on both sides.
– Check that the lighting is functioning properly.

16.1 Removing the engine

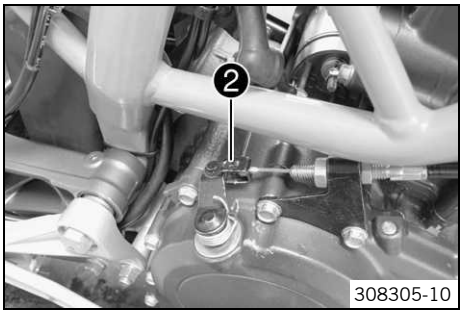
Preparatory work

– Raise the motorcycle with the rear wheel stand. (☛ p. 9)
– Remove the front spoiler. (☛ p. 47)
– Remove the passenger seat. (☛ p. 39)
– Remove the seat. (☛ p. 38)
– Disconnect the negative cable of the battery. (☛ p. 62)
– Drain the coolant. (☛ p. 148)
– Remove the exhaust manifold. (☛ p. 33)

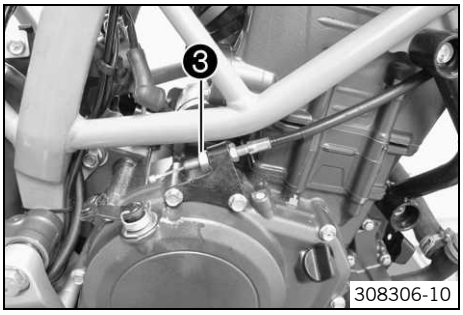
Main work



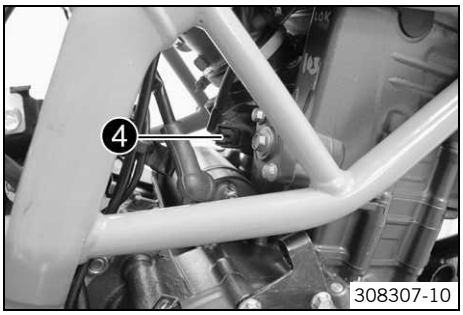
– Push back the rubber cap.
– Remove nut ❶ with washers.
– Hang the cable to one side.



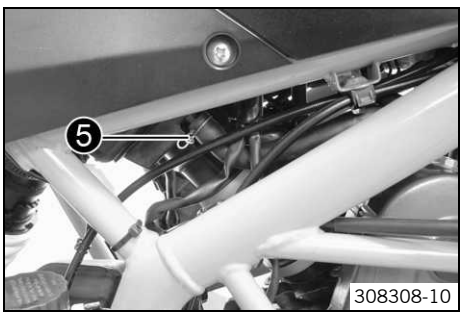
– Bend up the lock washer ❷.
– Detach the clutch cable.



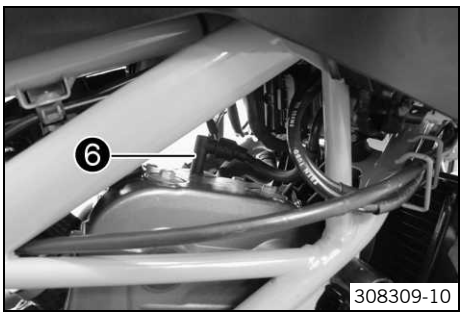
– Remove nut ❸.
– Detach the clutch cable.



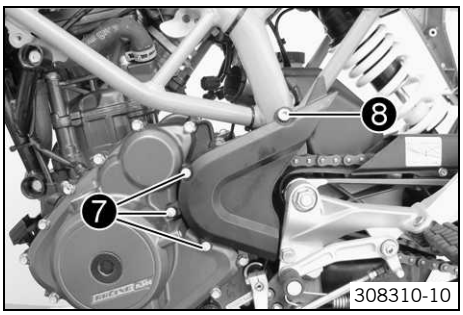
– Disconnect connector ❹.



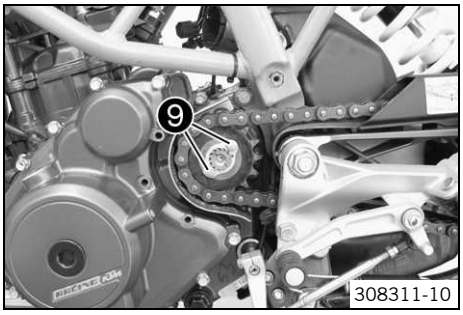
– Push back hose clamp ❺.
– Pull off the vent hose.



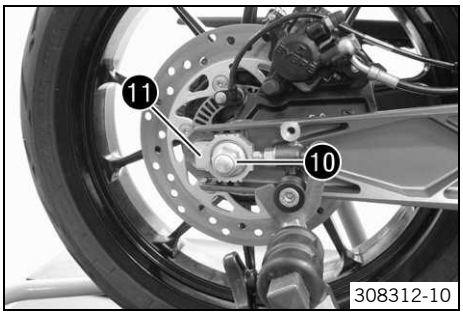
– Detach spark plug connector ❻.



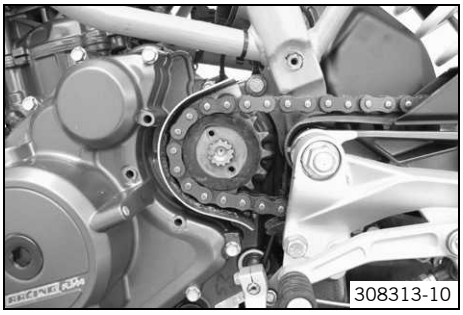
– Remove screws ❼.
– Remove screw ❽.
– Take off the engine sprocket cover.



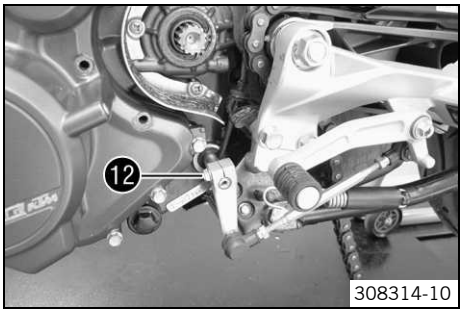
– Remove screws ❾ and take off the lock washer.



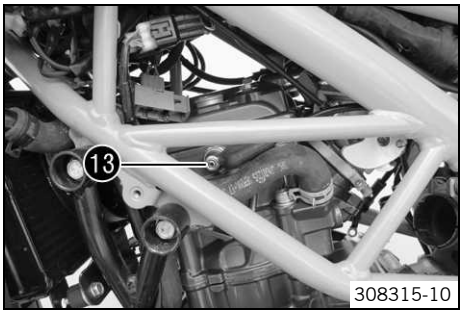
– Remove nut ❿ with washer.
– Take off chain adjuster ⓫.
– Push the rear wheel into the foremost position.



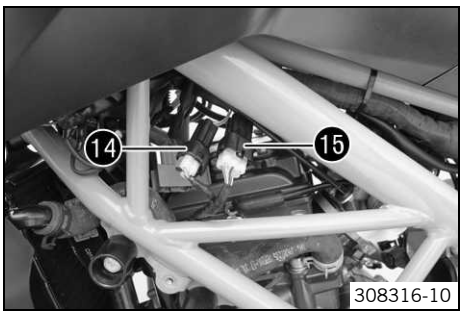
– Pull the engine sprocket off of the countershaft and remove it.



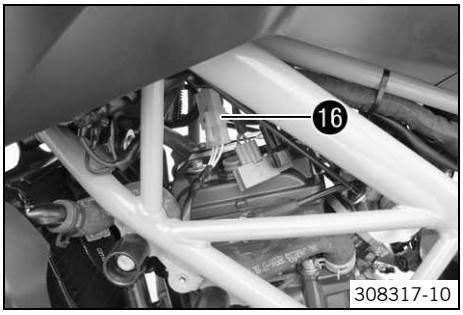
– Remove screw ⓬.
– Pull off the shift linkage and hang it to one side.



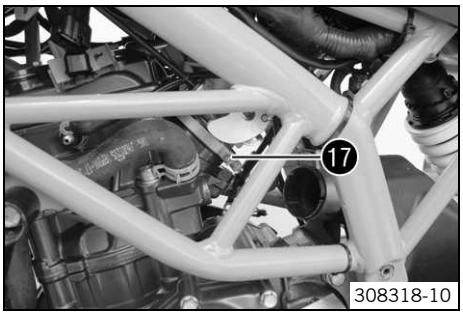
– Push back the rubber cap.
– Remove nut ⓭ with washer.



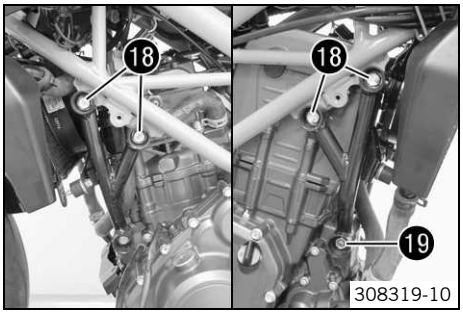
– Expose the cable and unplug connectors ⓮ and ⓯.



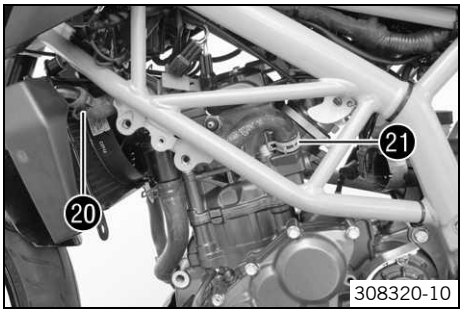
– Expose the cable and unplug connector ⓰.



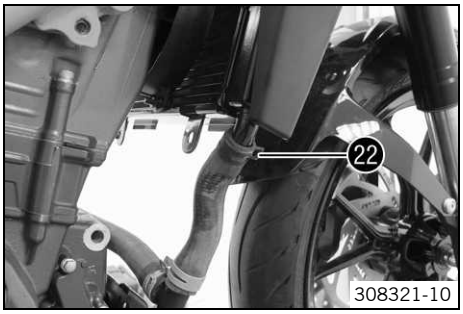
– Release hose clip ⓱.
– Push the throttle valve body upward out of the intake flange.



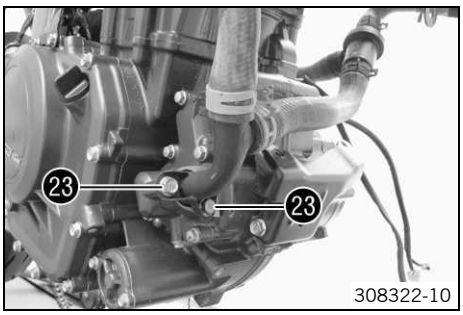
– Remove screws ⓲.
– Remove fitting ⓳.
– Remove both engine fixing arms.



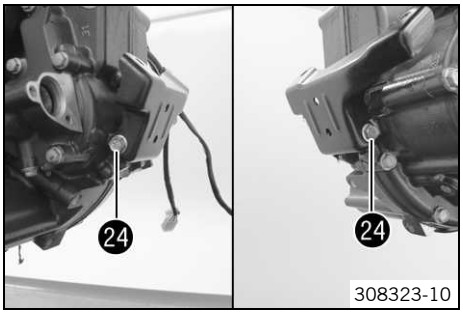
– Push back hose clamps ⓴ and ㉑.
– Pull off the radiator hoses.



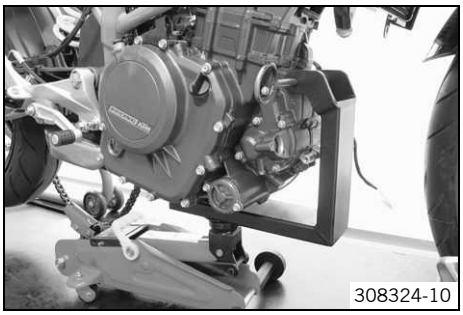
– Push back hose clamp ㉒.
– Pull off the radiator hose.



– Remove screws ㉓.
– Pull off the radiator pipe and hang it to one side.

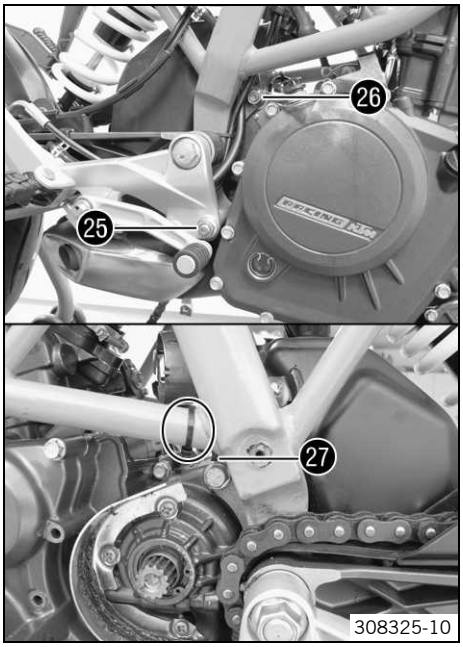


– Remove screws ㉔.
– Take off the retaining bracket.

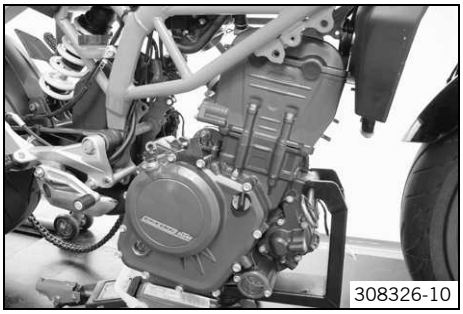


– Position the floor jack under the engine and fix it using the special tool.

Floor jack attachment (75029055000) (☛ p. 192)



– Remove fitting ㉕.
– Remove fitting ㉖.
– Remove the cable binder.
– Hang ground wire ㉗ to the side.



– Lower the engine.

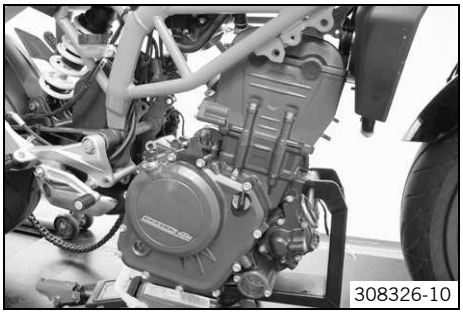
Info
You should have an assistant for this step.
Make sure that the engine is sufficiently secured against falling over.
Protect the frame and attachments from damage.

16.2 Installing the engine

Preparatory work

– Lift the motor onto the special tool and secure it.

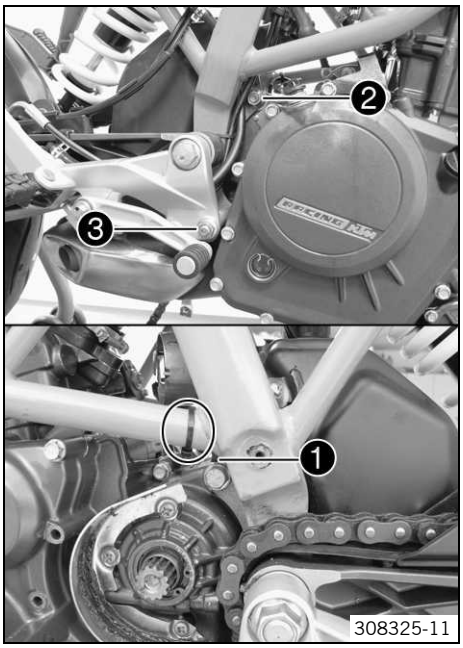
Floor jack attachment (75029055000) (☛ p. 192)



Main work

– Position the engine in the frame.

Info
It is useful to draw on the help of an assistant.
Protect the frame and attachments against damage.



– Position ground wire ❶ and secure it with a cable binder.
– Mount fitting ❷ but do not tighten yet.

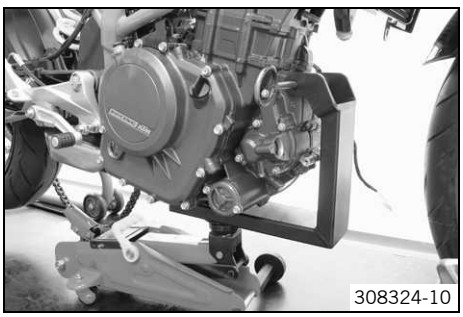
Guideline

Fitting, engine mounting bracket	M10	55 Nm (40.6 lbf ft)

– Mount fitting ❸ but do not tighten yet.

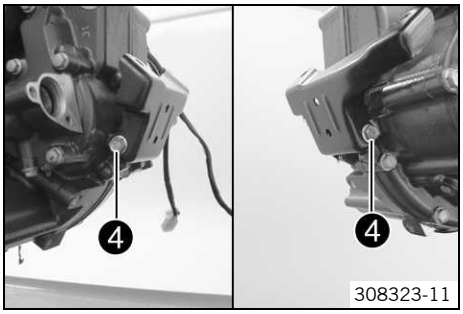
Guideline

Fitting, engine mounting bracket	M10	55 Nm (40.6 lbf ft)



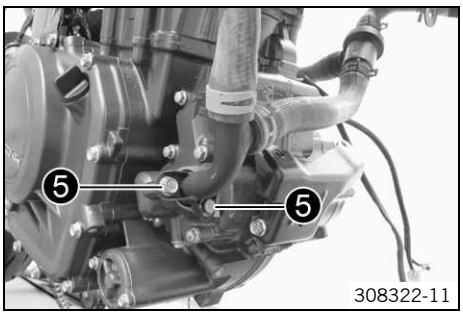
– Remove the floor jack with the special tool.

Floor jack attachment (75029055000) (☛ p. 192)



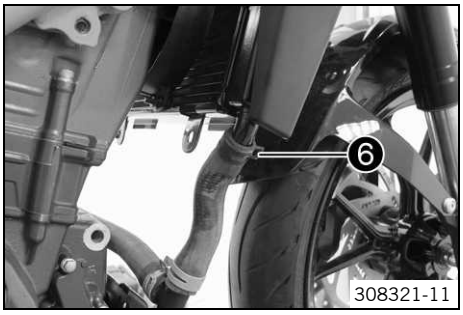
– Position the retaining bracket.
– Mount and tighten screws ❹.
Guideline

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

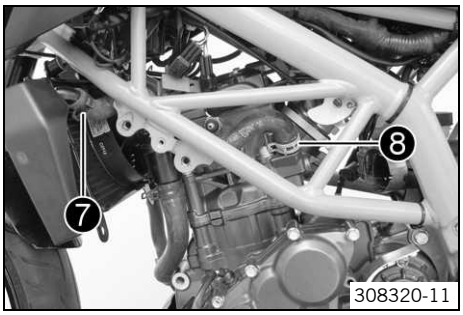


– Mount the radiator pipe with the O-ring.
– Mount and tighten screws ❺.
Guideline

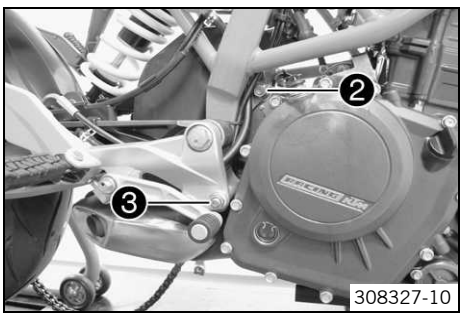
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)



– Mount the radiator hose.
– Position hose clamp ❻.

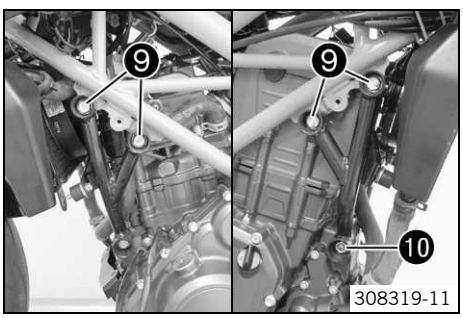


– Mount the radiator hoses.
– Position hose clamps ❼ and ❽.



– Tighten fittings ❷ and ❸.
Guideline

Fitting, engine mounting bracket	M10	55 Nm (40.6 lbf ft)

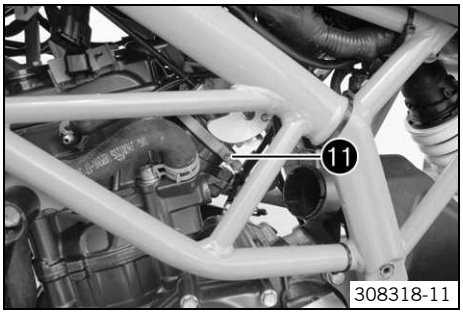


– Position both engine fixing arms.
– Mount and tighten screws ❾.
Guideline

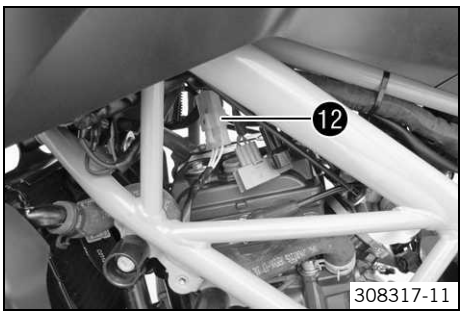
Screw, engine bearer on frame	M8	30 Nm (22.1 lbf ft)

– Mount and tighten fitting ❿.
Guideline

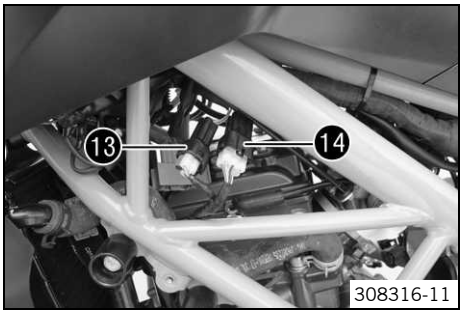
Fitting, engine mounting bracket	M10	55 Nm (40.6 lbf ft)



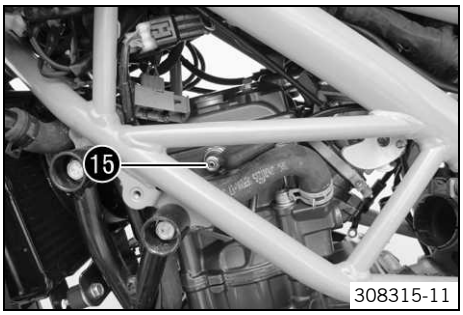
– Position the throttle valve body in the intake flange.
– Tighten hose clip ⓫.



– Plug in connector ⓬.
– Position the cable and secure with cable binders.



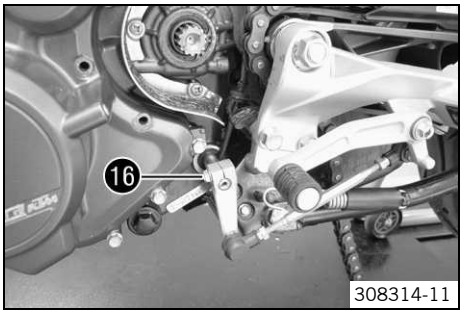
– Plug in connectors ⓭ and ⓮.
– Position the cable and secure with cable binders.



– Mount and tighten nut ⓯ with the washer.
Guideline

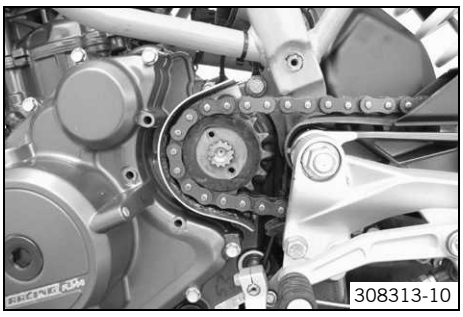
Remaining nuts, chassis	M5	3 Nm (2.2 lbf ft)

– Position the rubber cap.

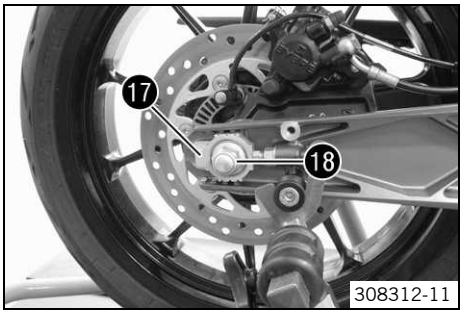


– Position the shift linkage.
– Mount and tighten screw ⓰.
Guideline

Screw, shift activation	M6	11 Nm (8.1 lbf ft)	**Loctite® 243™**



– Position the engine sprocket in the chain and slide onto the countershaft.

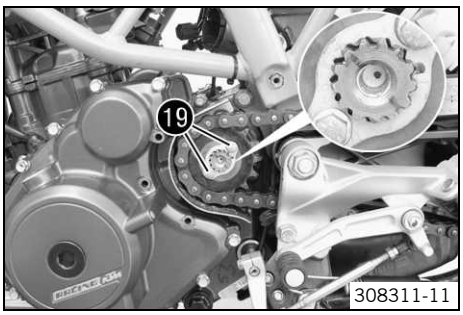


– Pull the rear wheel toward the rear.
– Mount chain adjuster ⓱.
– Mount and tighten nut ⓲ with the washer.

Guideline

For the rear wheel to be aligned correctly, the markings on the left and right of the chain adjuster must be in the same position as the reference marks.

Nut, rear wheel spindle	M14x1.5	90 Nm (66.4 lbf ft)



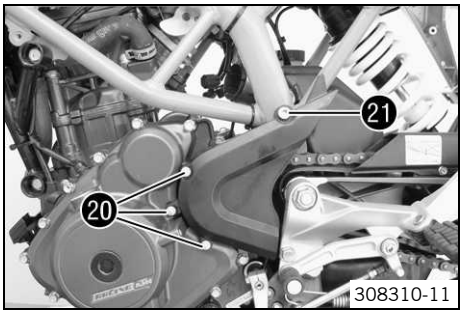
– Mount the lock washer and turn it slightly.

✓ The lock washer engages in the gear teeth of the countershaft.

– Mount and tighten screws ⓳.

Guideline

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



– Position the engine sprocket cover.
– Mount and tighten screws ⓴.

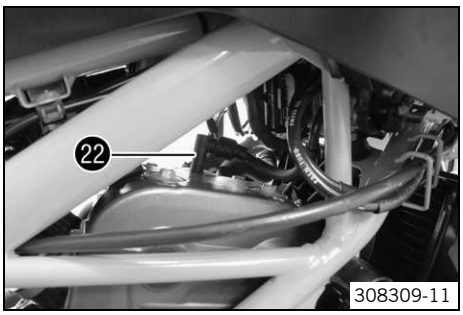
Guideline

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

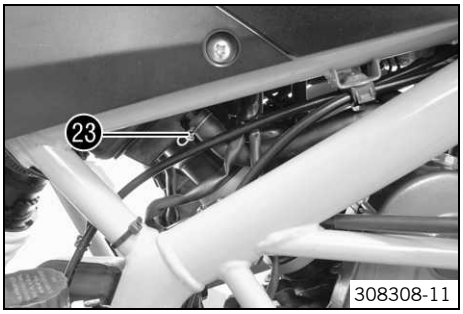
– Mount and tighten screw ㉑.

Guideline

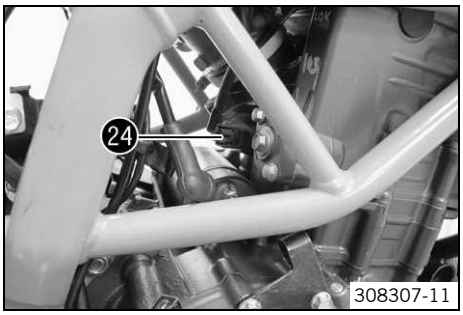
Remaining nuts, chassis	M6	15 Nm (11.1 lbf ft)



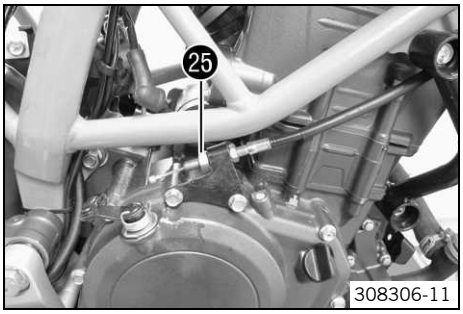
– Mount the spark plug connector ㉒.



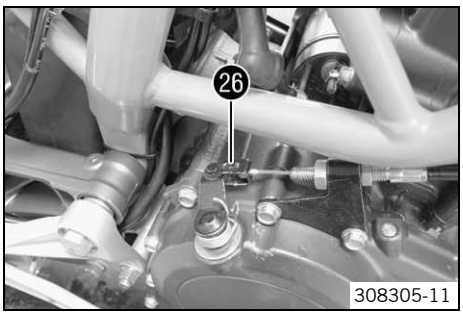
– Mount the vent hose.
– Position hose clamp ㉓.



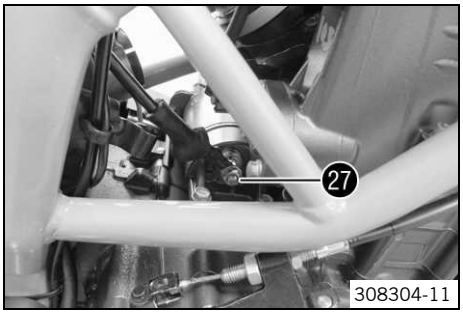
– Plug in connector ㉔.



– Attach the outer clutch cable.
– Mount and tighten nut ㉕.



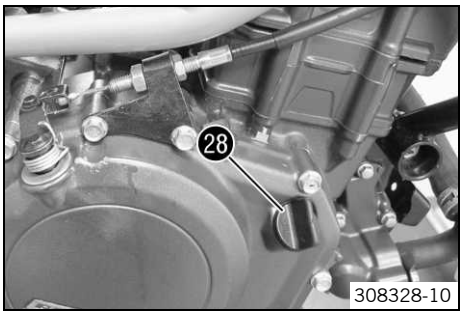
– Attach the inner clutch cable.
– Secure the inner clutch cable with lock washer ㉖.



– Mount and tighten nut ㉗ with the washers.
Guideline

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

– Position the rubber cap.
– Position the cable and secure with cable binders.



– Remove the oil filler plug ㉘ with the O-ring from the clutch cover and fill up with engine oil.

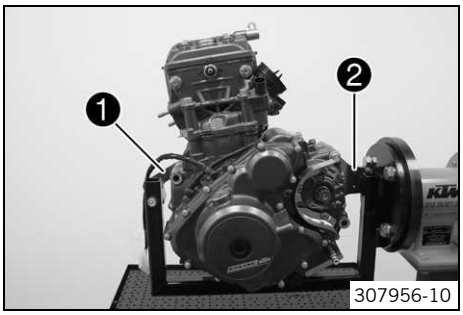
Engine oil	1.6 l (1.7 qt.)	Engine oil (SAE 15W/50) (☛ p. 186)

– Mount and tighten the oil filler plug with the O-ring.

Finishing work
– Install the exhaust manifold. (☛ p. 34)
– Reconnect the negative cable of the battery. (☛ p. 62)
– Set the clock. (☛ p. 76)
– Mount the seat. (☛ p. 39)
– Mount the passenger seat. (☛ p. 39)
– Take the motorcycle off of the rear wheel stand. (☛ p. 9)
– Fill/bleed the cooling system. (☛ p. 148)
– Fit the front spoiler. (☛ p. 47)
– Take a short test ride.
– Read out the fault memory using the KTM diagnostics tool.
– Check the engine for leak tightness.
– Check the engine oil level. (☛ p. 152)
– Check the coolant level. (☛ p. 150)

16.3 Disassembling the engine

16.3.1 Preparations



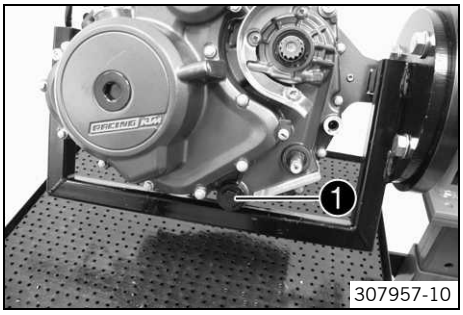
– Mount special tools ❶ and ❷ on the engine assembly stand.

Engine fixing arm (90129002060) (☛ p. 194)
Engine fixing arm (90129002050) (☛ p. 193)
Engine assembly stand (61229001000) (☛ p. 192)

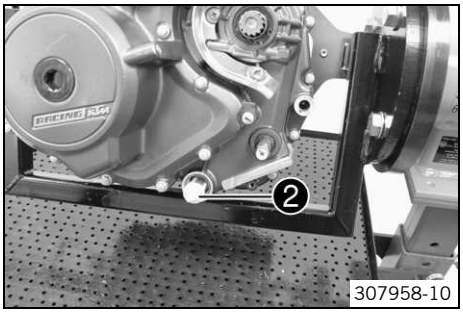
– Mount the engine on special tool.

Info
Have an assistant help you or use a crane.

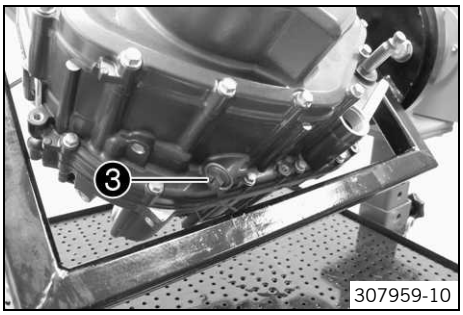
16.3.2 Draining the engine oil



– Remove oil drain plug ❶ with the O-ring.

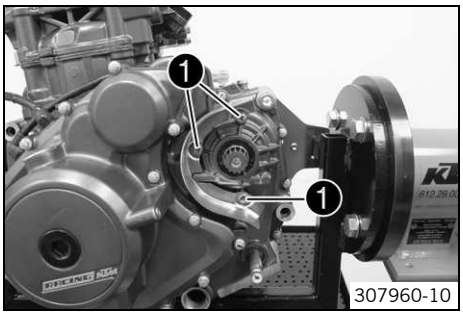


– Remove oil screen ❷ with the O-ring.
– Completely drain the engine oil.



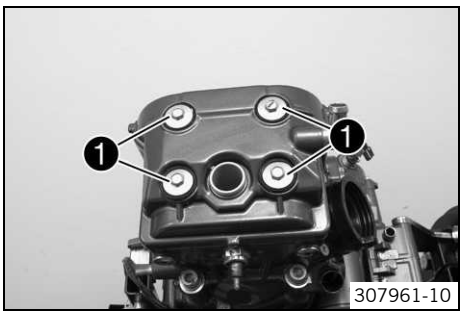
– Remove screw plug ❸ with the O-ring and oil screen.

16.3.3 Removing the chain securing guide

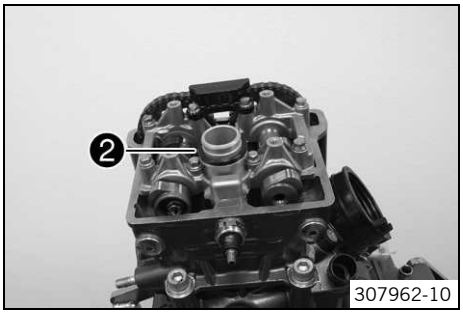


– Remove screws ❶.
– Take off the chain securing guide.

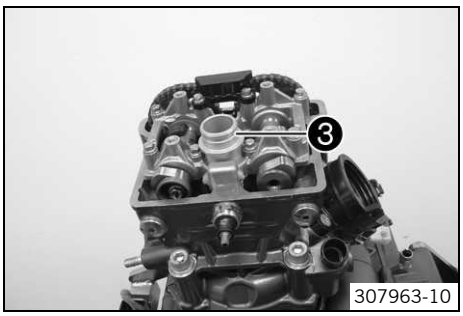
16.3.4 Removing the valve cover



– Remove screws ❶ with the gasket.
– Take off the valve cover with the valve cover seal.

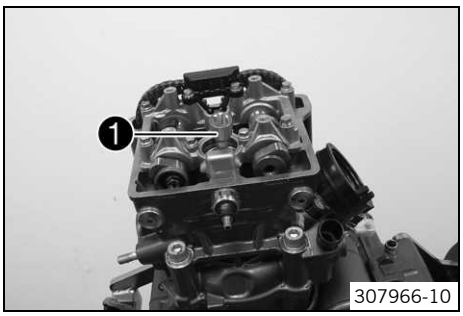


– Take off gasket ❷.



– Remove the spark plug shaft insert ❸.

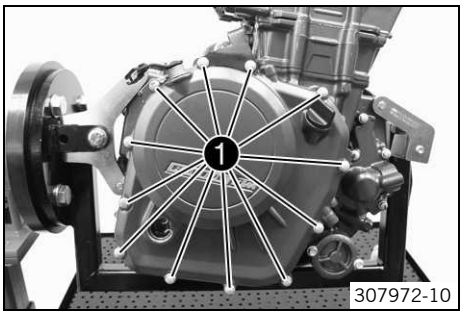
16.3.5 Removing the spark plug



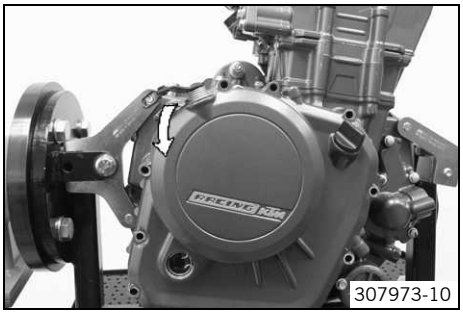
– Remove the spark plug using special tool ❶.

Spark plug wrench (77229172000) (☛ p. 193)

16.3.6 Removing the clutch cover

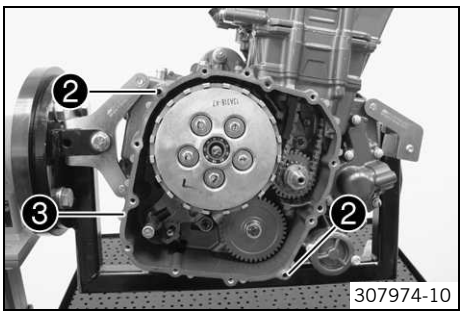


– Remove screws ❶.



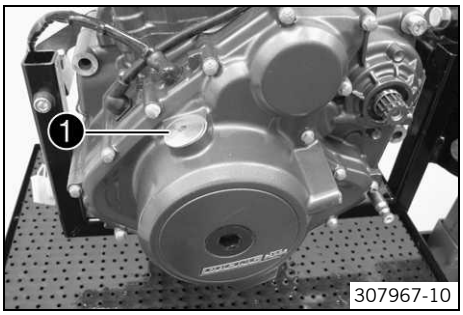
– Take off the clutch cover.

Info
Pull the clutch lever forward slightly.

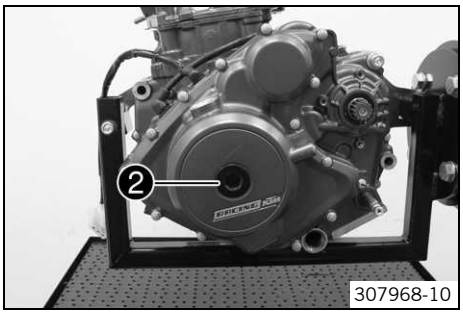


– Remove dowels ❷.
– Take off clutch cover gasket ❸.

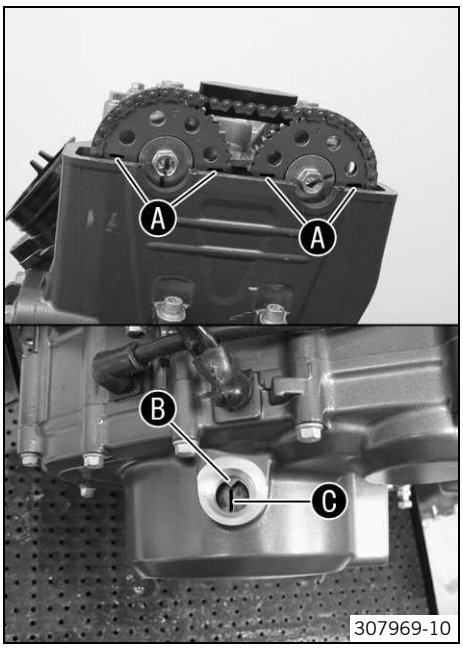
16.3.7 Setting the engine to ignition top dead center



– Remove screw plug ❶.



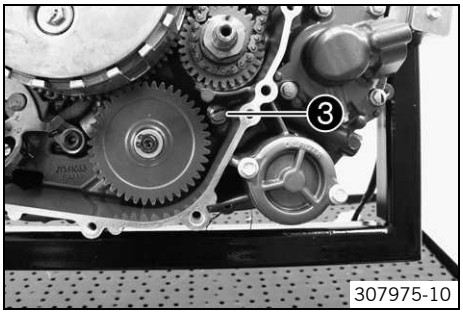
– Remove screw plug ❷.



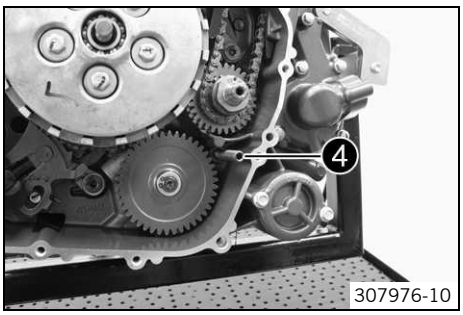
– Turn the crankshaft counterclockwise until markings Ⓐ align with the edge of the cylinder head.

Castle nut wrench; ½" drive (90129021000) (☛ p. 194)

✔ Markings Ⓑ and Ⓒ align.



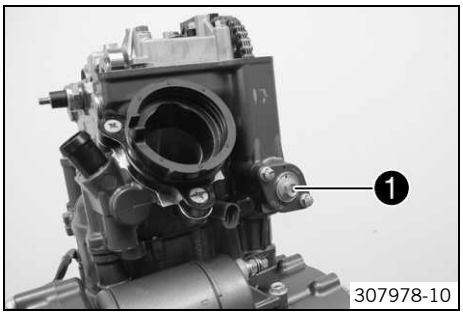
– Remove screw ❸.



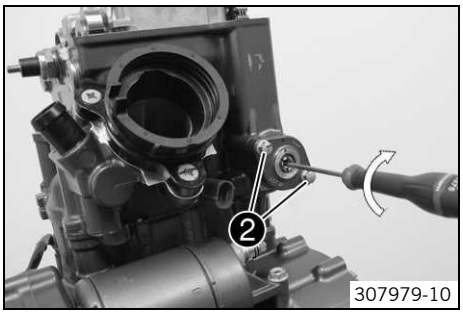
– Mount special tool ❹.

Engine blocking screw (61229015000) (☛ p. 192)

16.3.8 Removing the timing chain tensioner

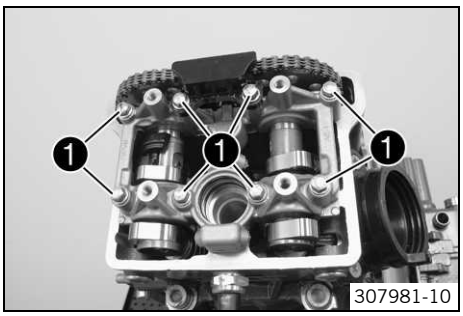


– Remove screw ❶ with the O-ring.

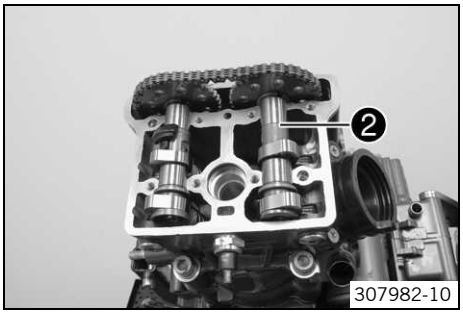


– Turn the timing chain tensioner screw clockwise.
  ✓ The timing chain tensioner is locked.
– Remove screw ❷.
– Remove the timing chain tensioner with the gasket.

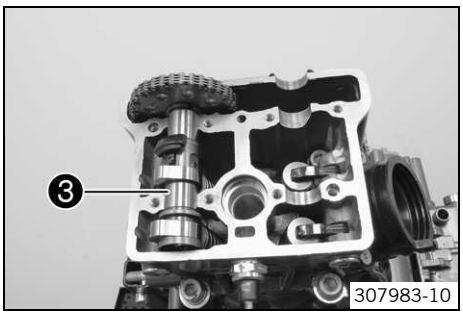
16.3.9 Removing the camshaft



– Release screws ❶ from the outside to the inside and remove them.
– Remove the camshaft bearing bridge.
– Remove dowels.

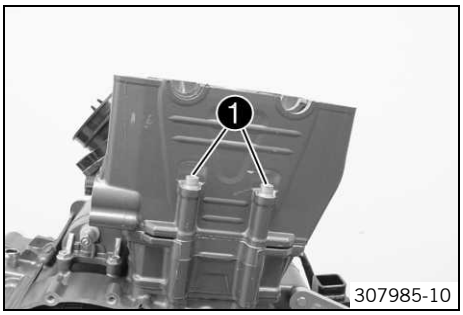


– Remove intake camshaft ❷.

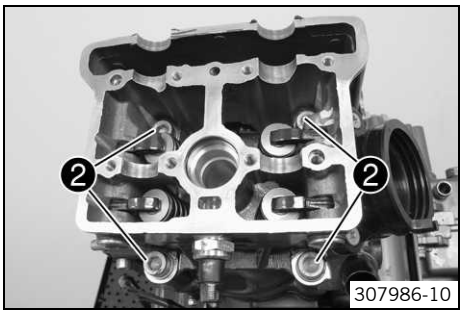


– Remove exhaust camshaft ❸.

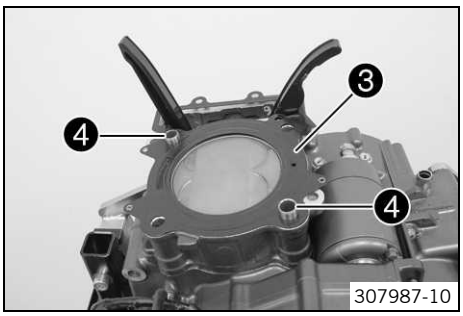
16.3.10 Removing the cylinder head



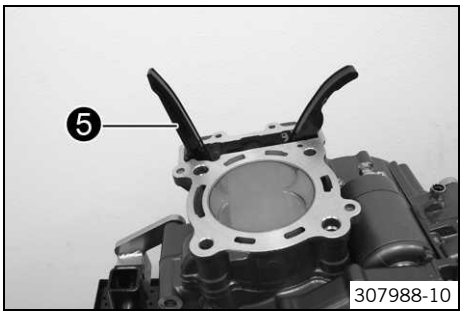
– Remove screws ❶.



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

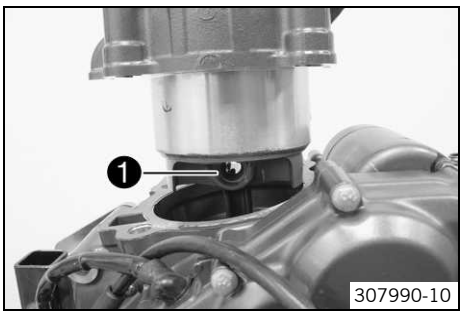


– Take off the cylinder head gasket ❸.
– Remove dowels ❹.



– Remove timing chain guide rail ❺.

16.3.11 Removing the piston

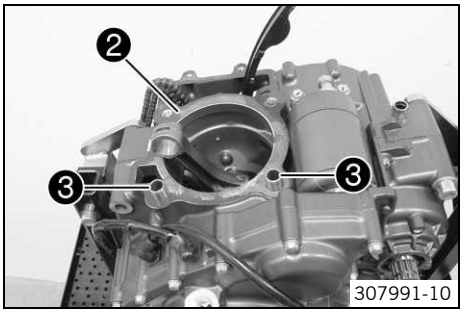


– Push the cylinder upward.

Info
Push the cylinder upward only far enough to allow removal of the piston pin.

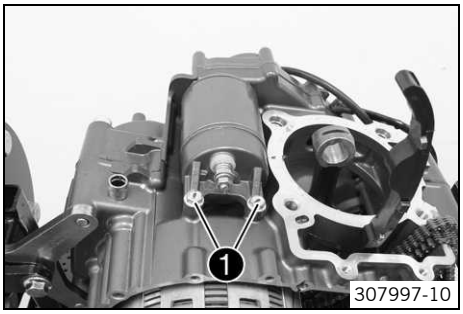
– Remove piston pin retainer ❶.
– Remove the piston pin.
– Take off the cylinder with the piston.
– Push the piston upward out of the cylinder.

Info
If no other work is required on the cylinder and the piston, you can leave the piston in the cylinder.



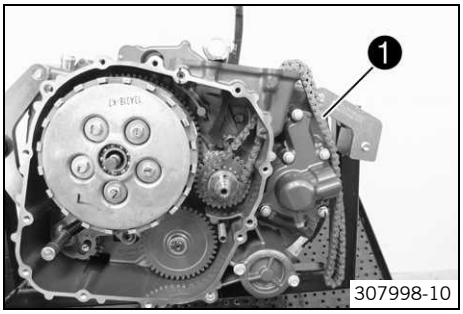
– Take off cylinder base gasket ❷.
– Remove dowels ❸.

16.3.12 Removing the starter motor



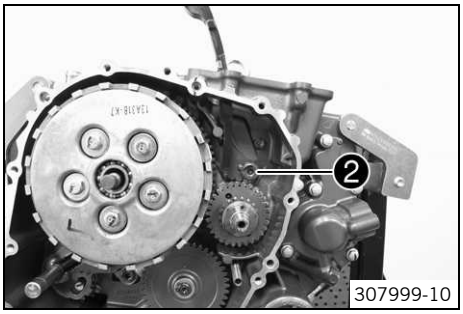
– Remove screws ❶.
– Take off the starter motor.

16.3.13 Removing the timing chain



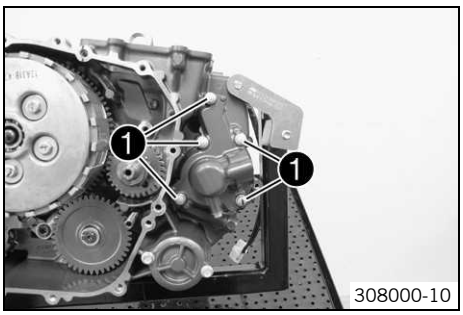
– Feed out timing chain ❶.

Info
If the timing chain is to be reused, mark the direction of travel.

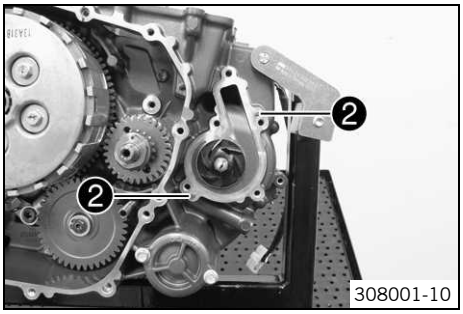


– Remove screw ❷.
– Take off the timing chain tensioning rail toward the top.

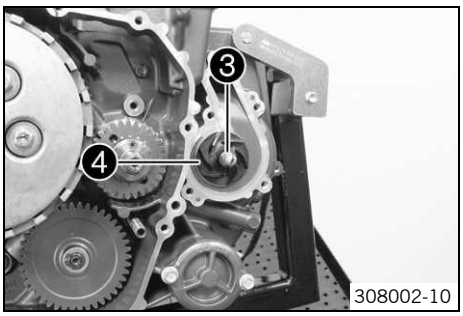
16.3.14 Removing the water pump wheel



– Remove screws ❶.
– Remove the water pump cover with the gasket.

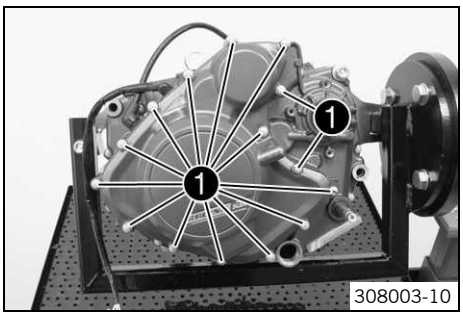


– Remove locating pins ❷.

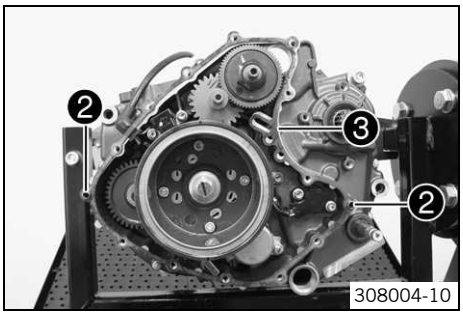


– Remove nut ❸ with washer.
– Take off the water pump impeller ❹.

16.3.15 Removing the alternator cover

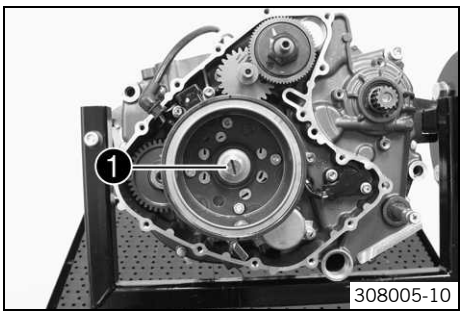


– Remove screws ❶.
– Take off the alternator cover.

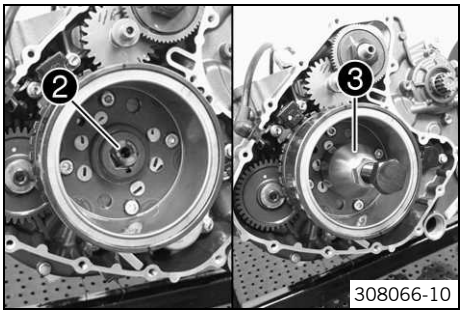


– Remove dowels ❷.
– Take off alternator cover gasket ❸.

16.3.16 Removing the rotor



– Remove screw ❶ with the washer.



– Mount special tool ❷ in the crankshaft.

Pressure screw for crankshaft (90129020000) (☛ p. 194)

– Mount special tool ❸ on the rotor.

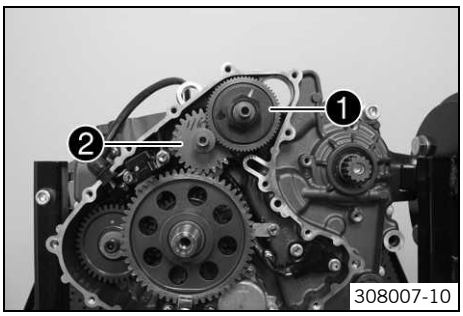
Info
Left-handed thread!

– Hold it tight using the special tool and pull off the rotor by turning the screw in.

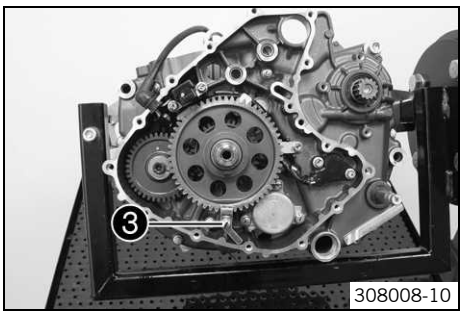
Puller for rotor (90229009000) (☛ p. 196)

– Remove the spring washer.

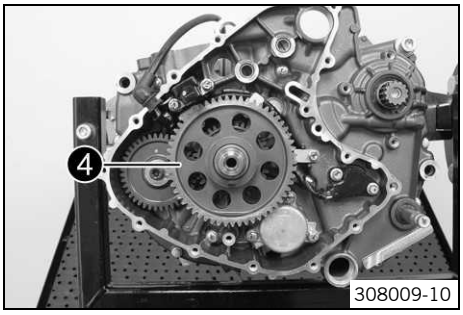
16.3.17 Removing the starter drive



– Take off torque limiter ❶.
– Remove starter idler gear ❷.

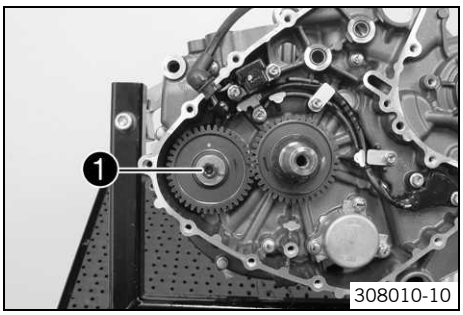


– Remove screw ❸.
– Remove the retaining bracket.

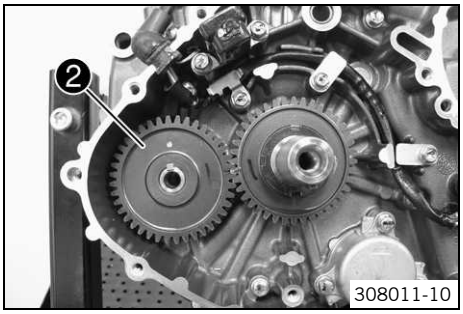


– Remove freewheel gear ❹.

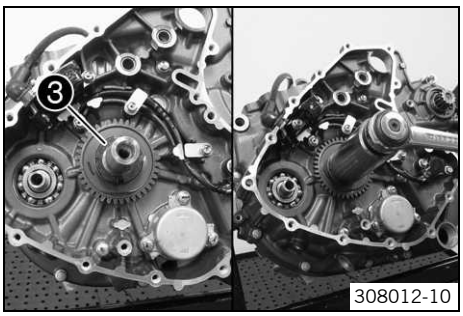
16.3.18 Removing the balancer shaft drive wheel



– Remove screw ❶ with the washer.



– Remove balancer shaft gear ❷ with a wedge.

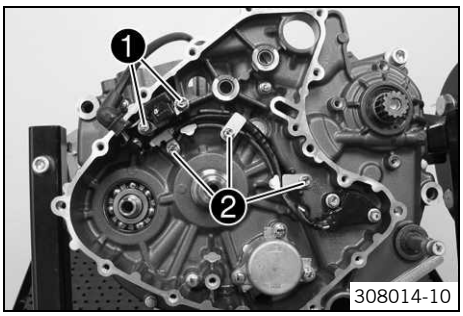


– Remove nut ❸ with washers.

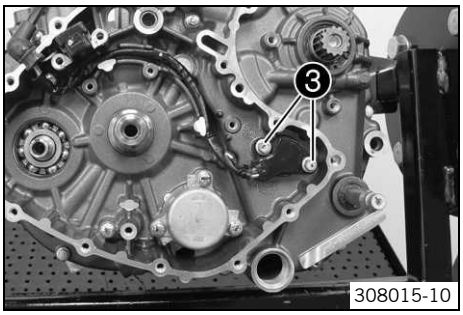
Castle nut wrench; ½" drive (90129022000) (☛ p. 194)

– Take off drive wheel of the balancer shaft.
– Remove the spring washer.

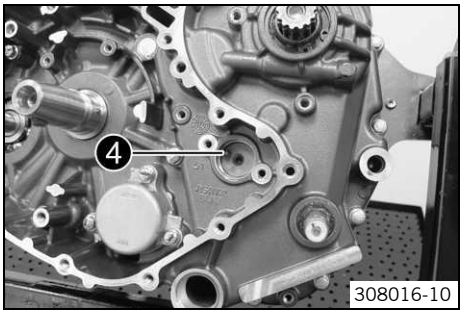
16.3.19 Removing the gear position sensor



– Remove screws ❶.
– Take off the retaining bracket.
– Remove screws ❷.
– Pull off the ignition pulse generator.

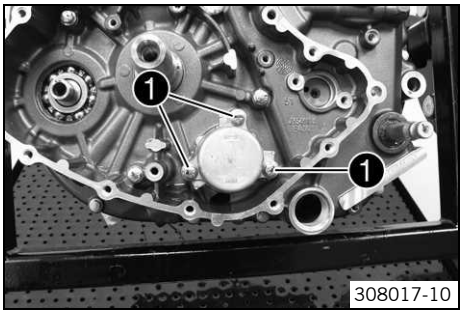


– Remove screws ❸.
– Take off the gear position sensor and ignition pulse generator with the cable.

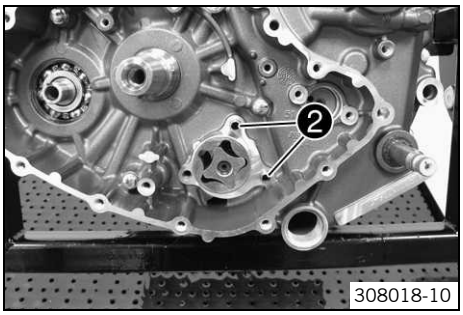


– Remove contact pin ❸ and the contact spring.

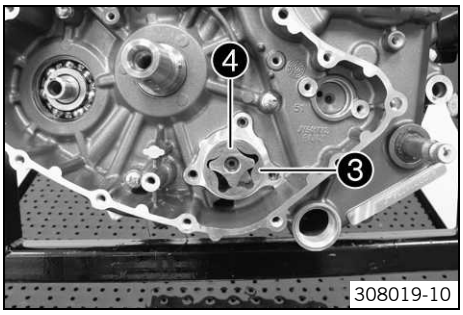
16.3.20 Removing the suction pump



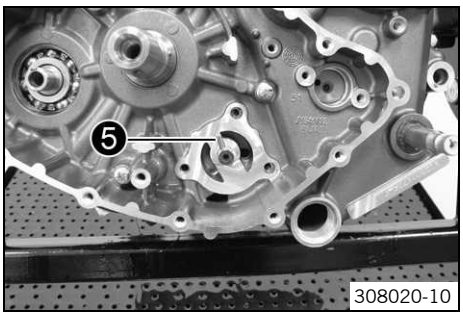
– Remove screws ❶.
– Take off the oil pump housing of the suction pump.



– Remove dowels ❷.

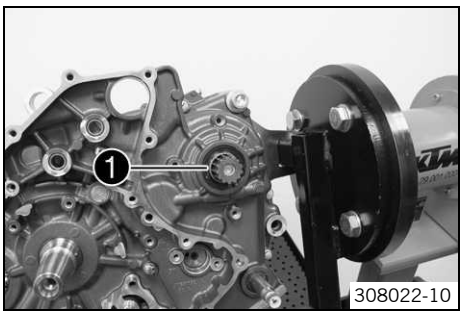


– Remove external rotor ❸ and internal rotor ❹.



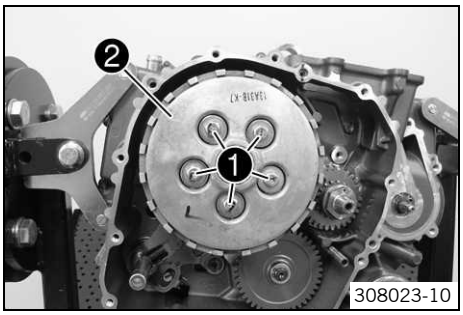
– Take off pin ❺.

16.3.21 Removing the spacer

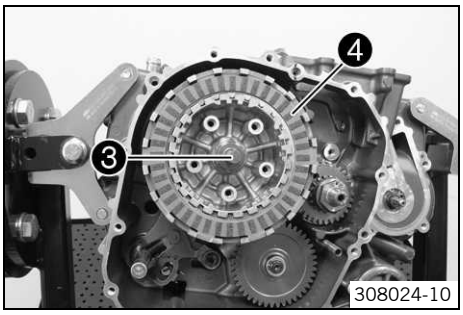


– Remove the spacer ❶ of the countershaft.

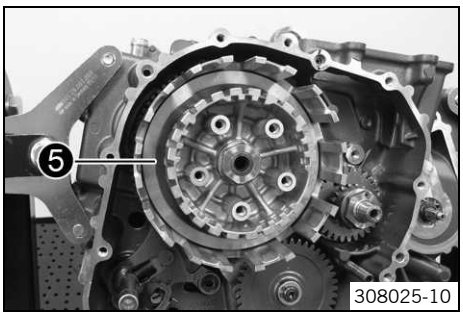
16.3.22 Removing the clutch cage



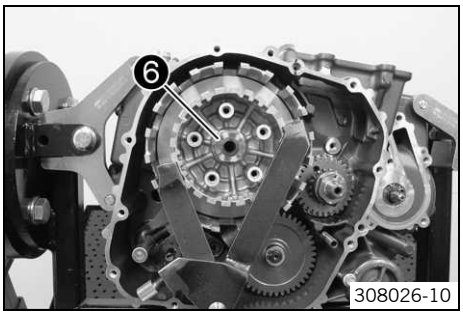
– Loosen screws ❶ in a crisscross pattern and remove together with the washers and the clutch springs.
– Take off pressure cap ❷.



– Remove pull rod ❸.
– Remove clutch discs ❹.



– Take off support ring and pretension ring ❺.

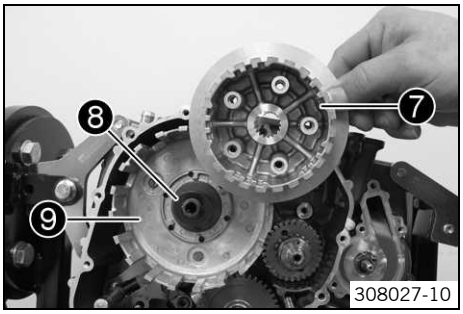


– Hold the clutch basket using the special tool.

Clutch holder (51129003000) (☛ p. 189)

– Remove nut ❻ with washer.

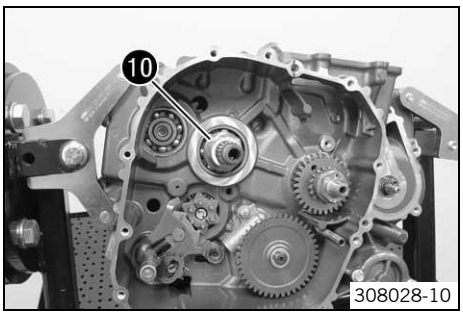
Info
Left-handed thread!



– Take off inner clutch hub ❼ and washer ❽.

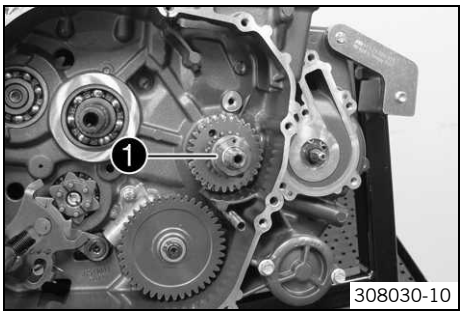
Info
The washer usually sticks to the inner clutch hub.

– Take off clutch basket ❾.

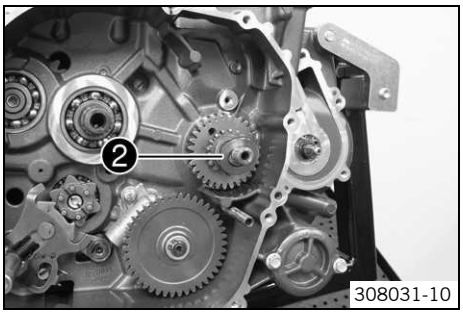


– Remove collar sleeve ❿.

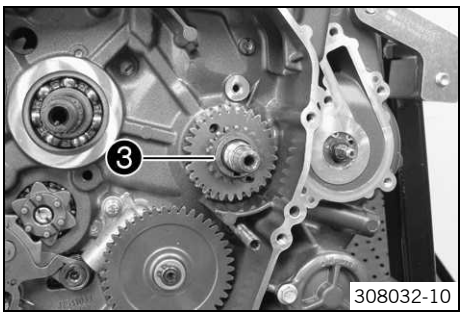
16.3.23 Removing the primary gear



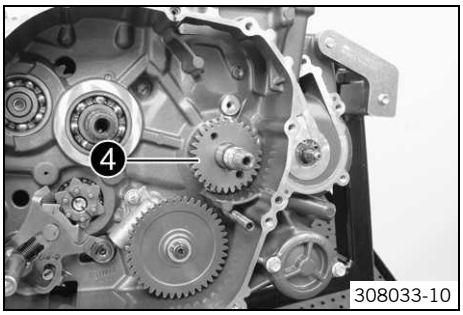
– Remove nut ❶ with washer.



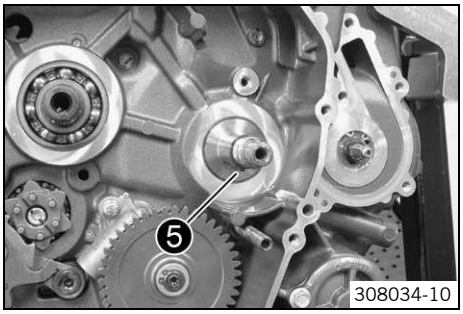
– Remove washer ❷.



– Remove the timing chain sprocket ❸.

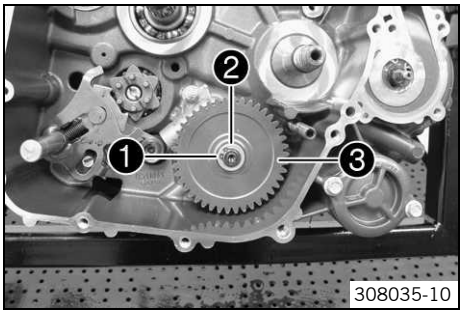


– Remove primary gear ❹.

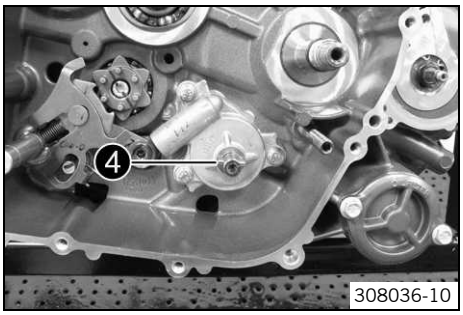


– Remove woodruff key ❺.

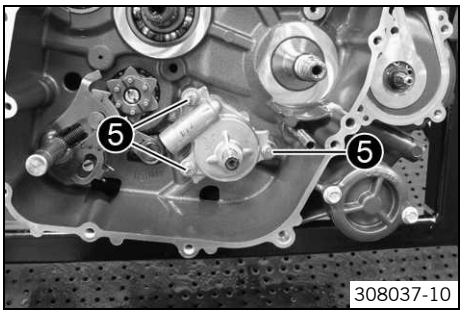
16.3.24 Removing the force pump



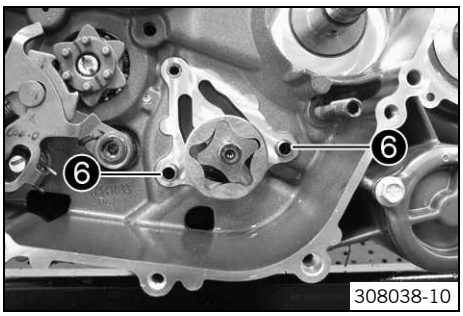
– Remove lock ring ❶.
– Take off washer ❷.
– Remove the oil pump gear ❸.



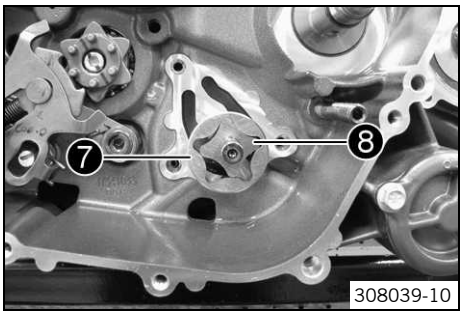
– Remove pin ❹.
– Take off the washer.



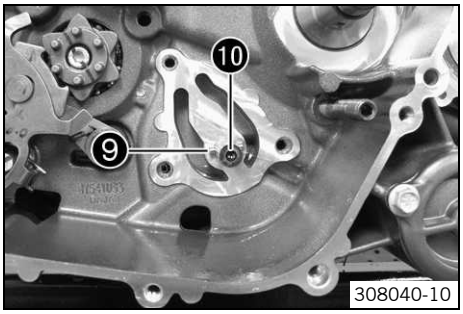
– Remove screws ❺.
– Take off the pressure pump housing.



– Remove dowels ❻.

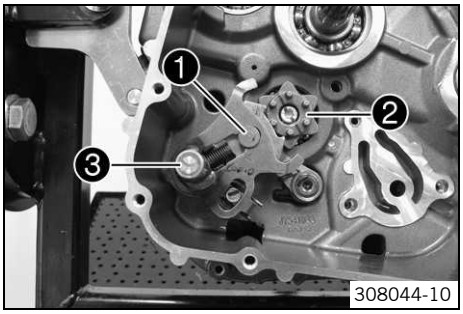


– Remove external rotor ❼.
– Remove internal rotor ❽.



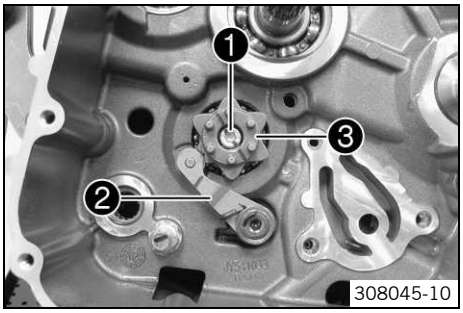
– Remove pin ❾.
– Remove the oil pump shaft ❿.

16.3.25 Removing the shift shaft



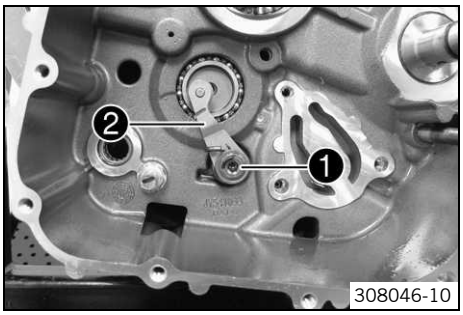
– Push sliding plate ❶ away from the shift drum locating ❷. Remove shift shaft ❸ with the washer.

16.3.26 Removing the shift drum locating



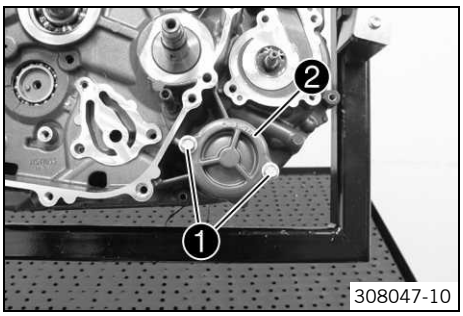
– Remove screw ❶.
– Press locking lever ❷ away from shift drum locating ❸ and take off the shift drum locating.
– Release the locking lever.

16.3.27 Removing the locking lever

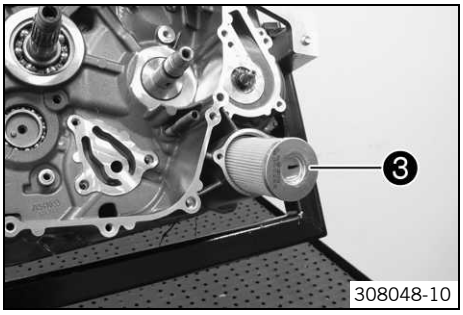


– Remove screw ❶.
– Take off locking lever ❷ together with the washers and spring.

16.3.28 Removing the oil filter



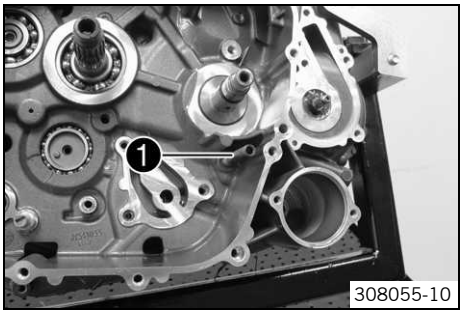
– Remove screws ❶.
– Remove the oil filter cover ❷ with the O-ring.



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

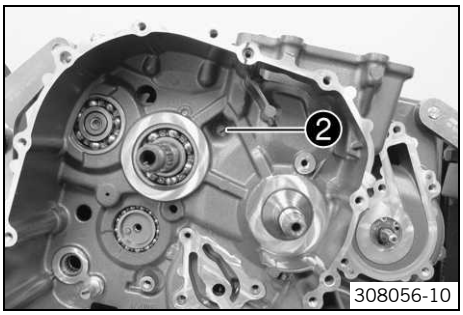
Circlip pliers reverse (51012011000) (☛ p. 189)

16.3.29 Removing the left engine case

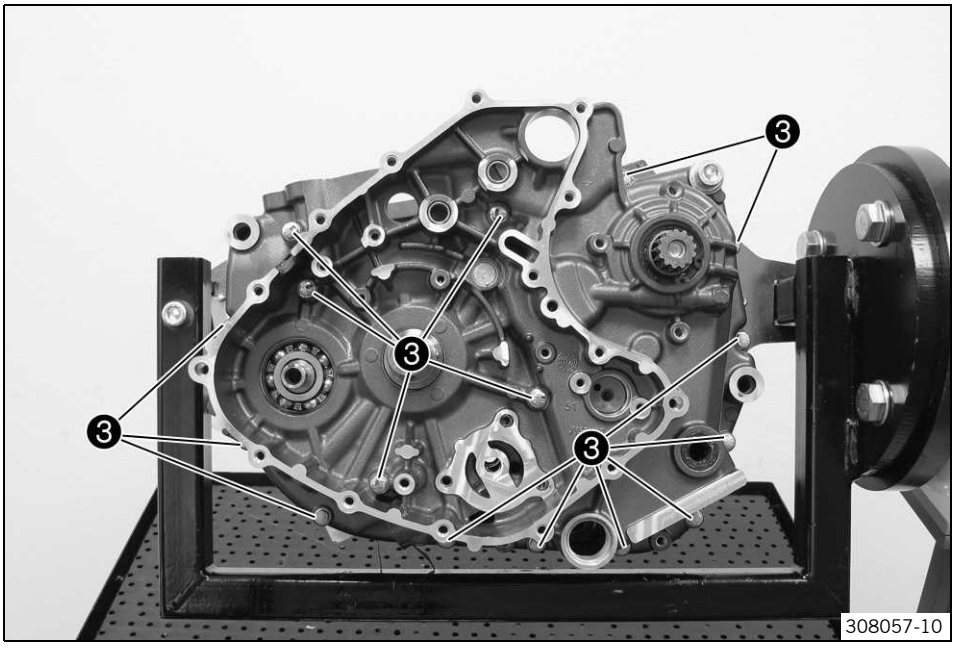


– Remove special tool ❶.

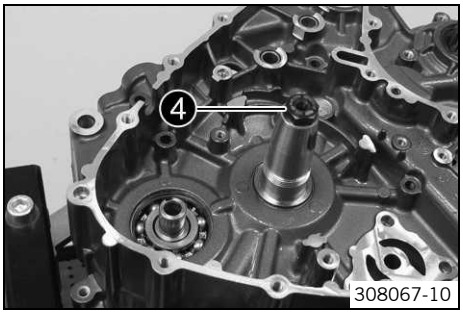
Engine blocking screw (61229015000) (☛ p. 192)



– Remove screw ❷.

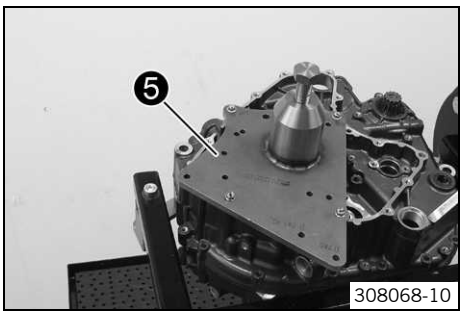


– Remove screws ❸.
– Swing the left section of the engine case up and remove the fitting of the engine fixing arm.



– Mount special tool ❹.

Pressure screw for crankshaft (90129020000) (☛ p. 194)



– Mount special tool ❺ with suitable screws.

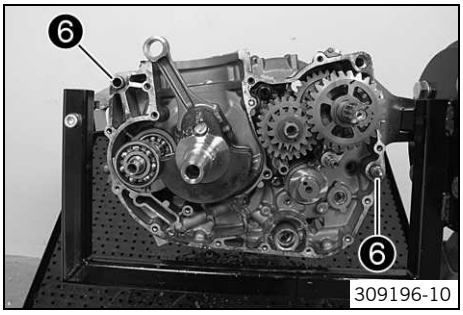
Case separating tool (90129048100) (☛ p. 195)

Info
Use the drill hole marked with **902**.

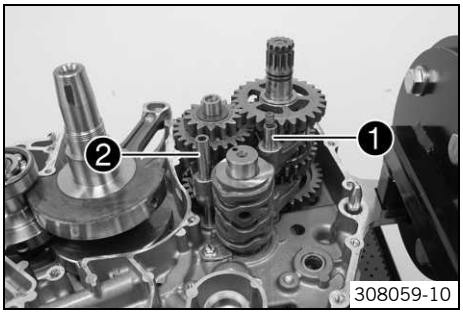
– Pull off the section of the engine case by screwing in the screw.

Info
Do not wedge the engine case section.
The washer of the main shaft usually sticks to the bearing.

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

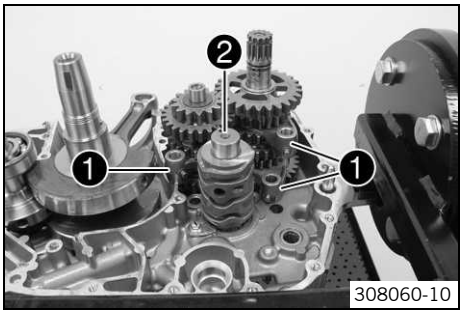


16.3.30 Removing the shift rails



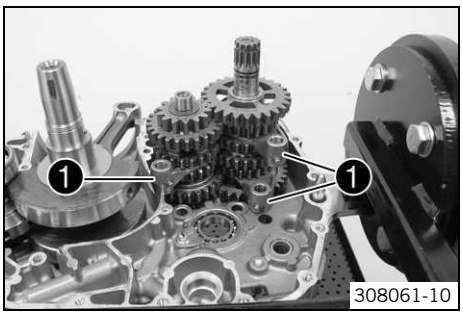
– Remove shift rail ❶ together with upper spring and the lower spring.
– Remove shift rail ❷.

16.3.31 Removing the shift drum



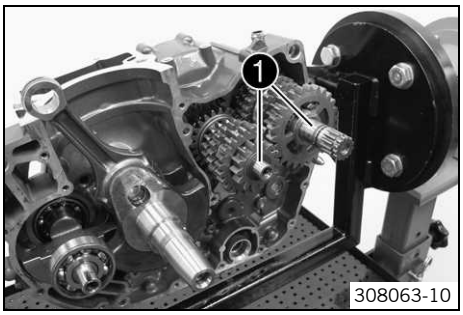
– Swing shift forks ❶ to one side.
– Remove shift drum ❷.

16.3.32 Removing the shift forks



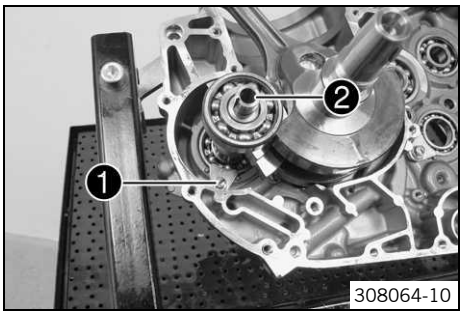
– Remove shift forks ❶.

16.3.33 Removing the transmission shafts



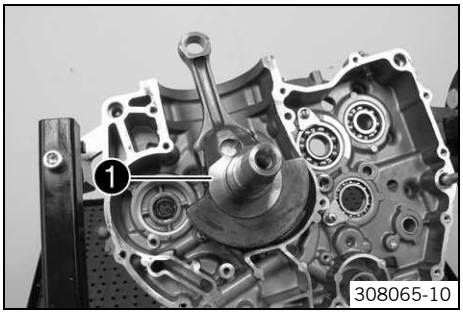
– Pull both transmission shafts ❶ out of the bearing seats together.

16.3.34 Removing the balancer shaft



– Remove screw ❶.
– Take off the lock washer.
– Remove balancer shaft ❷.

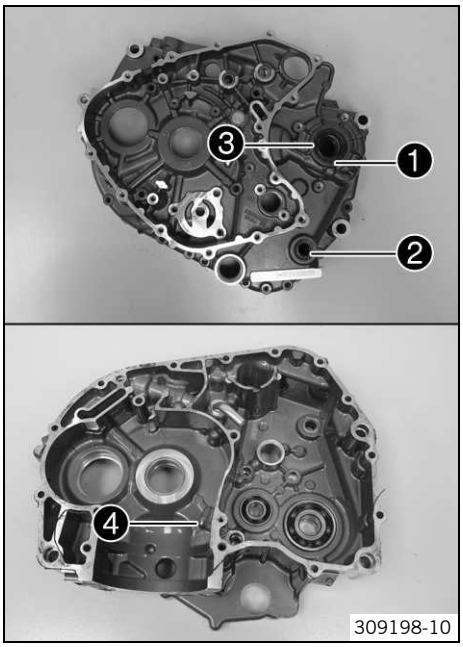
16.3.35 Removing the crankshaft



– Remove crankshaft ❶.

16.4 Work on individual parts

16.4.1 Work on the left section of the engine case



– Remove all dowels.
– Remove lock ring ❶.
– Remove shaft seal ring ❷ of the shift shaft and ❸ of the countershaft.
– Remove oil nozzle ❹.
– Remove any sealing mass remnants and clean the engine case section thoroughly.
– Warm the engine case section in an oven.

Guideline

150 °C (302 °F)

– Knock the engine case section against a level wooden plate. This will cause the bearings to drop out of the bearing seats.

Info
Any bearings that remain in the engine case section must be removed using a suitable tool.

– Insert the new cold bearings into the bearing seats of the hot engine case section and, if necessary, use a suitable press drift to push the bearing all the way to the stop or so that it is flush.

Info
When pressing the bearing in, ensure that the engine case section is level to prevent damage.
Only press the bearings in via the outer ring; otherwise, the bearings will be damaged when they are pressed in.

– After the engine case section has cooled, check that the bearings are firmly seated.

Info
If the bearings are not firmly seated after cooling, it is likely that they will rotate in the engine case when warm. In this case, the engine case must be renewed.

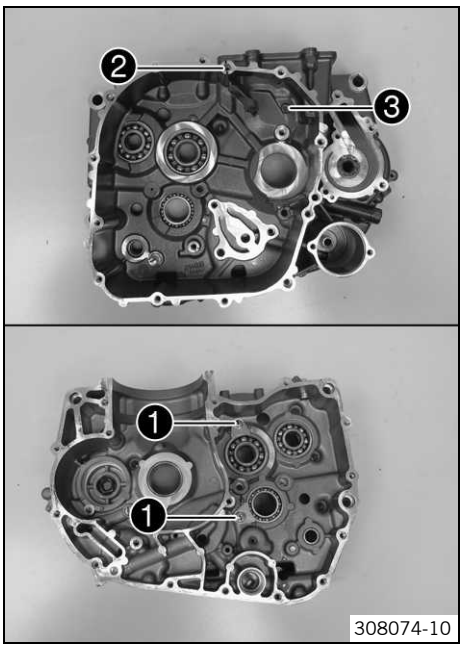
– Mount the dowels.
– Press in shaft seal ring ❷ of the shift shaft with the open side facing inward so that it is flush.
– Press in shaft seal ring ❸ of the countershaft with the open side facing inward so that it is flush.
– Mount lock ring ❶.
– Mount and tighten oil nozzle ❹.

Guideline

Oil nozzle	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

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

16.4.2 Work on the right section of the engine case



– Remove all dowels.
– Remove screws ❶. Remove the bearing retainers.
– Remove oil nozzle ❷.
– Remove nozzle ❸.
– Remove any sealing mass remnants and clean the engine case section thoroughly.
– Warm the engine case section in an oven.

Guideline

150 °C (302 °F)

– Knock the engine case section against a level wooden plate. This will cause the bearings to drop out of the bearing seats.

Info
Any bearings that remain in the engine case section must be removed using a suitable tool.

– Insert the new cold bearings into the bearing seats of the hot engine case section and, if necessary, use a suitable press drift to push the bearing all the way to the stop or so that it is flush.

Info
When pressing the bearing in, ensure that the engine case section is level to prevent damage.
Only press the bearings in via the outer ring; otherwise, the bearings will be damaged when they are pressed in.

– After the engine case section has cooled, check that the bearings are firmly seated.

Info
If the bearings are not firmly seated after cooling, it is likely that they will rotate in the engine case when warm. In this case, the engine case must be renewed.

– Mount the dowels.
– Position all bearing locks.
– Mount and tighten screws ❶.

Guideline

Screw, bearing retainer	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**

– Mount and tighten oil nozzle ❷.

Guideline

Oil nozzle	M6	6 Nm (4.4 lbf ft)	**Loctite® 243™**

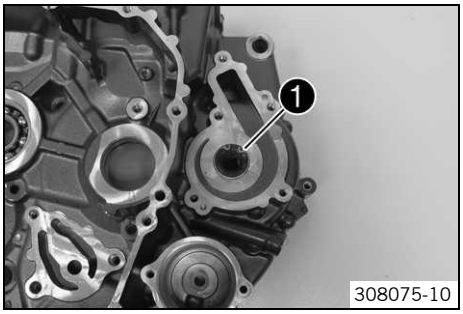
– Mount and tighten nozzle ❸.

Guideline

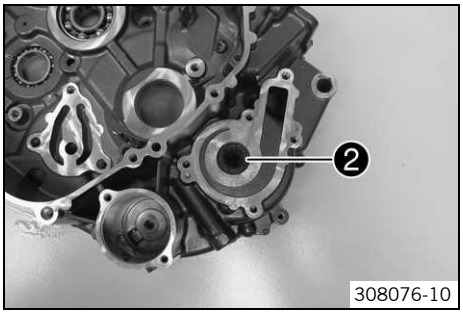
Oil nozzle	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

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

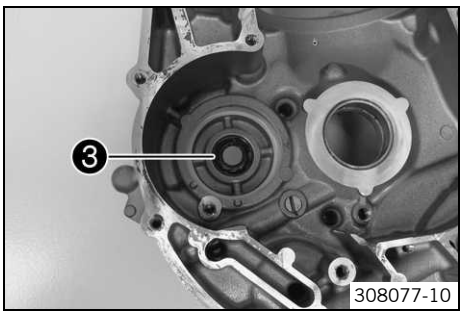
16.4.3 Changing the shaft seal ring of the water pump



– Remove lock ring ❶.

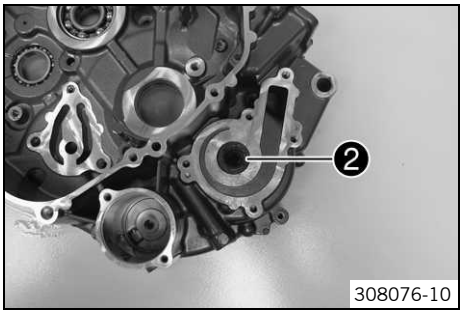


– Remove shaft seal ring ❷.



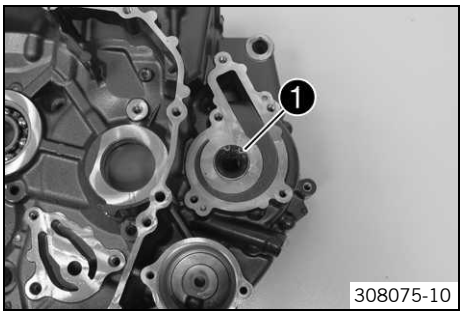
– Remove shaft seal ring ❸.
– Press the new shaft seal ring ❸ in all the way with the open side facing inward.

Mounting sleeve (90129043000) (☛ p. 195)



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

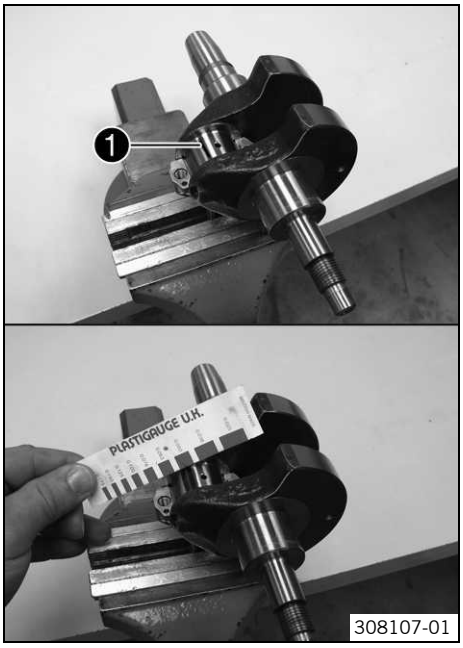
Mounting sleeve (90129043000) (☛ p. 195)



– Mount lock ring ❶.

16.4.4 Checking the radial play of the lower conrod bearing

Condition
The conrod bearing is bulging.



– Clamp the connecting rod with soft jaws.
– Position the crankshaft.
– Position the bearing shells. Insert the **Plastigauge** clearance gauge ❶ offset by 90° to the bearing face.

Plastigauge measuring strips (60029012000) (☛ p. 190)

– Position the conrod bearing cover. Mount and tighten the screws.

Guideline

Screw, conrod bearing	M8x1	34 Nm (25.1 lbf ft)

Info
Do not twist the connecting rod.

– Remove the conrod bearing cover again. Compare the **Plastigauge** clearance gauge with the specifications on the packaging.

Guideline

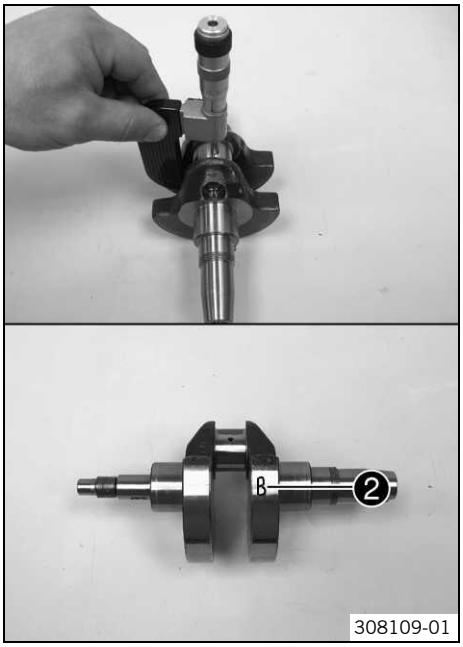
Connecting rod - radial play of lower conrod bearing	
New condition	0.045... 0.068 mm (0.00177... 0.00268 in)
Wear limit	0.080 mm (0.00315 in)

Info
The width of the **Plastigauge** clearance gauge is equivalent to the bearing play.

– Clean the parts.

16.4.5 Changing the conrod bearing

– Clamp the connecting rod with soft jaws.
– Remove screws ❶.
– Remove the conrod bearing cover and crankshaft. Remove the bearing shells.



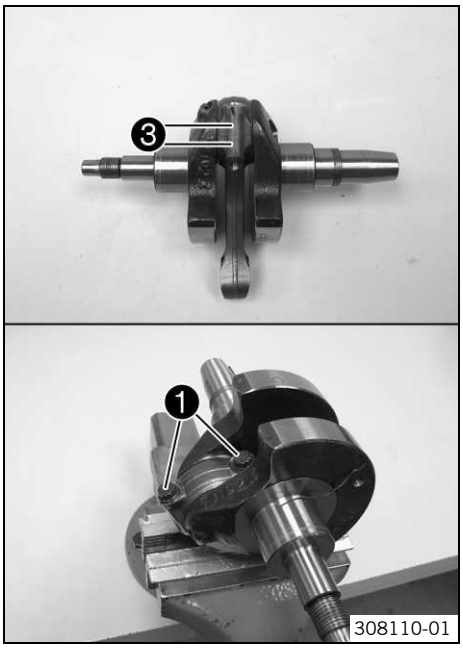
– Measure the crank pin diameter.

Guideline

Crankshaft – diameter, crank pin	
Crankshaft classification **A**	31.970... 31.977 mm (1.25866... 1.25893 in)
Crankshaft classification **B**	31.978... 31.985 mm (1.25897... 1.25925 in)

Info
The crankshaft classification is indicated by marking ❷.

– Check the radial play of the lower conrod bearing. (☛ p. 109)

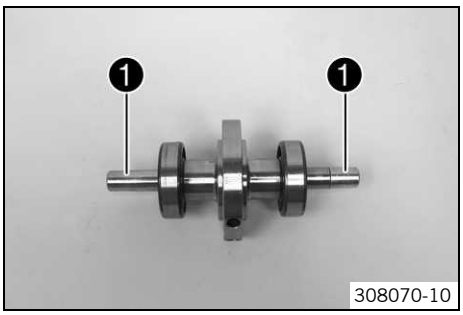


– Position and oil the bearing shells.
– Position the connecting rod and conrod bearing cover according to markings ❸.
– Mount and tighten screws ❶.

Guideline

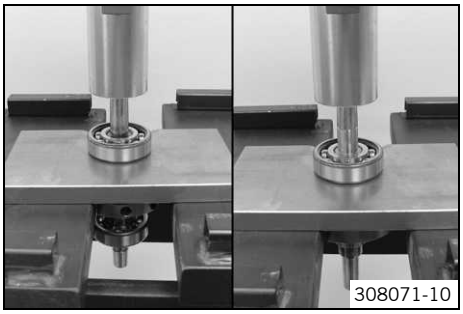
Screw, conrod bearing	M8x1	34 Nm (25.1 lbf ft)

16.4.6 Changing the balancer shaft bearing

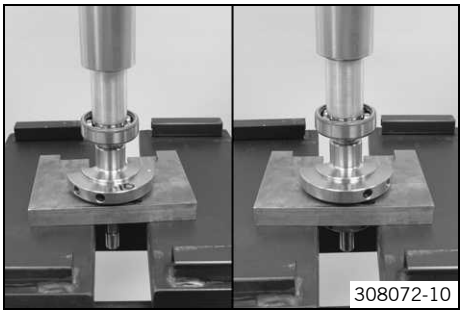


– Mount special tools ❶.

Disassembly tool, balancer shaft bearing (90129056000) (☛ p. 196)



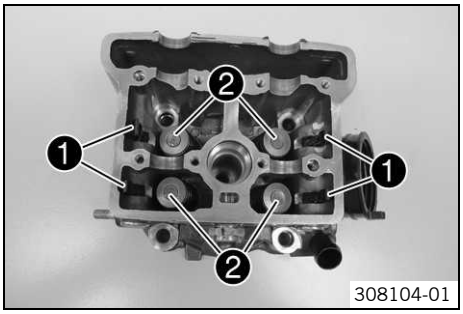
– Position the balancer shaft in the press using a suitable tool.
– Press out the bearing.



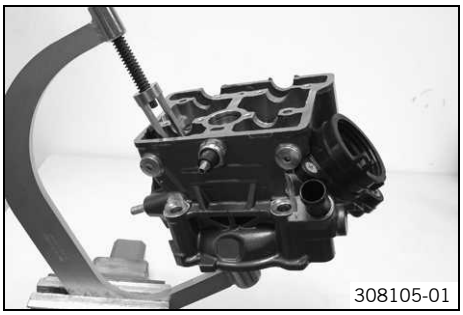
– Press on the balancer shaft bearing with a suitable tool.
– Remove the special tools.

Disassembly tool, balancer shaft bearing (90129056000) (☛ p. 196)

16.4.7 Work on the cylinder head

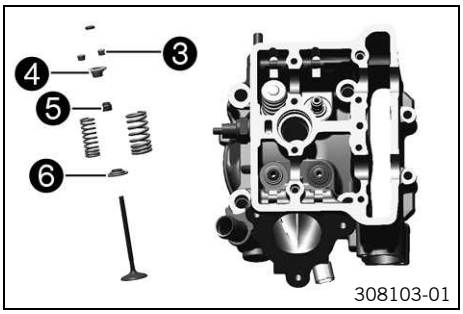


– Fold cam lever ❶ up.
– Take the shims ❷ out of the valve spring retainers and lay them to one side according to their normal built-in position.



– Pretension the valve spring using the special tool.

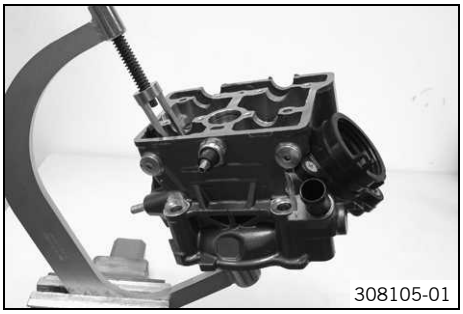
Valve spring compressor (59029019000) (☛ p. 190)
Insert for valve spring lever (77029041100) (☛ p. 193)



– Remove valve keys ❸ and relax the valve spring.
– Remove valve spring retainer ❹.
– Remove valve spring, valve stem seal ❺, and valve spring seat ❻.

Info
Place the valve into a box according to the installation position and label the box.

– Check the cylinder head. (☛ p. 113)
– Mount valve spring seat ❻ and the new valve stem seal ❺.
– Mount the valve spring.
– Mount valve spring retainer ❹.



– Pretension the valve spring using the special tool.

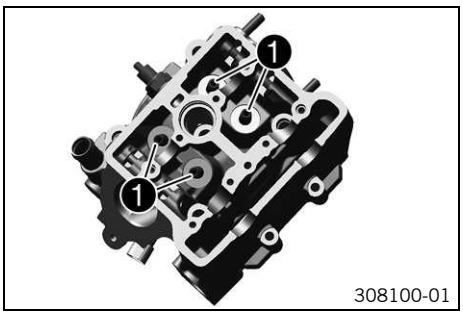
Valve spring compressor (59029019000) (☛ p. 190)
Insert for valve spring lever (77029041100) (☛ p. 193)

– Mount valve keys. Relax the valve spring.

Info
When mounting the valve keys, check that they are seated correctly; preferably, fix the valve keys to the valve with a little grease.

– Place shims into the valve spring retainers according to the installation position.

16.4.8 Checking the cylinder head



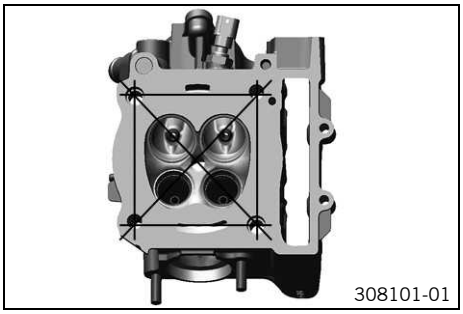
– Check valve guides ❶ with the special tool.

Limit plug gauge (77029026000) (☛ p. 193)

» If the special tool is easy to insert into the valve guide:
– Change the valve guides and valves.

– Check the sealing area of the spark plug thread and the valve seats for damage and tearing.

» If there is wear or tearing:
– Change the cylinder head.

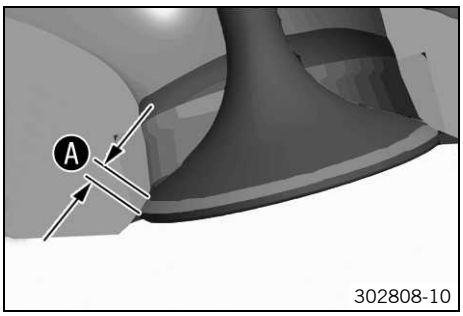


– Check the sealing area of the cylinder for distortion using a straight edge and the special tool.

Feeler gauge (59029041100) (☛ p. 190)

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

» If the measured value does not equal the specified value:
– Change the cylinder head.



– Check sealing seat Ⓐ of the valves.

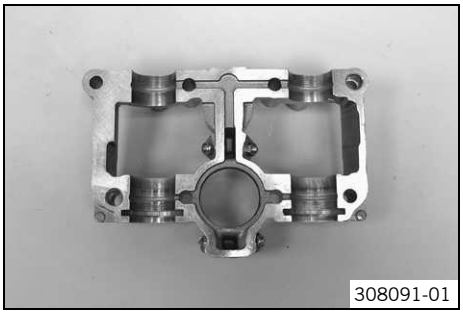
Valve - sealing seat width	
Intake	0.90... 1.10 mm (0.0354... 0.0433 in)

Valve - sealing seat width	
Exhaust	0.90... 1.10 mm (0.0354... 0.0433 in)

» If the measured value does not equal the specified value:
– Machine the valve seat.

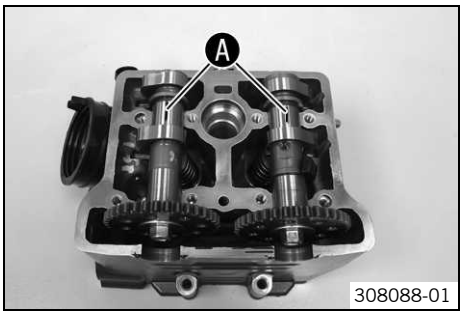
– Blow compressed air through all oil holes and check that they are clear.

16.4.9 Checking the pivot point of the camshafts



– Check the pivot points of the camshafts.

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

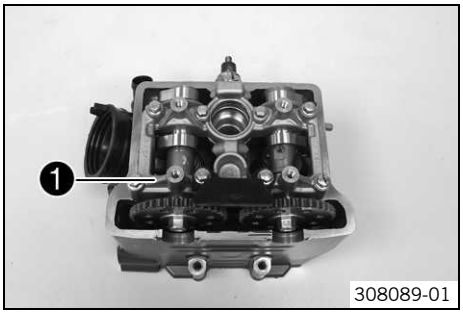


– Position the camshafts.

✓ The valves are not actuated.

– Insert the **Plastigauge** clearance gauge in area Ⓐ.

Plastigauge measuring strips (60029012000) (☛ p. 190)

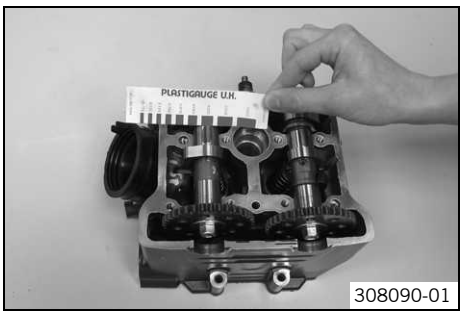


– Position camshaft bearing bridge ❶.
– Mount the screws and tighten in a crisscross pattern from the inside to the outside.

Guideline

Screw, camshaft bearing bridge	M6	11 Nm (8.1 lbf ft)

Info
Make sure the dowel pins are seated correctly.
Do not twist the camshaft.



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

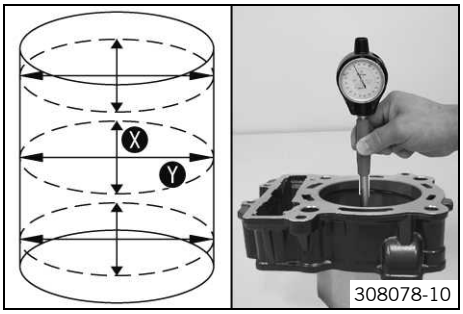
Guideline

Camshaft bearing - slide bearing	
Radial clearance	0.025… 0.053 mm (0.00098… 0.00209 in)
Wear limit	0.065 mm (0.00256 in)

Info
The width of the **Plastigauge** clearance gauge is equal to the bearing play.

– Take off the camshafts and clean the parts.

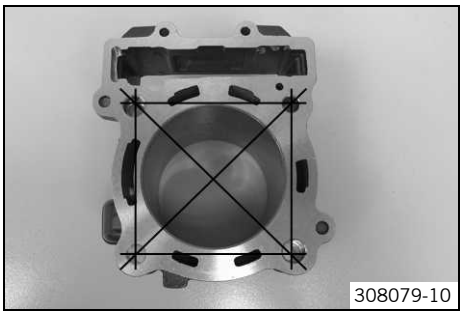
16.4.10 Checking/measuring the cylinder



– 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 places in the ❎ and ❍ axes using a micrometer to check for oval wear.

Guideline

Cylinder - bore diameter	88.982… 88.998 mm (3.50322… 3.50385 in)



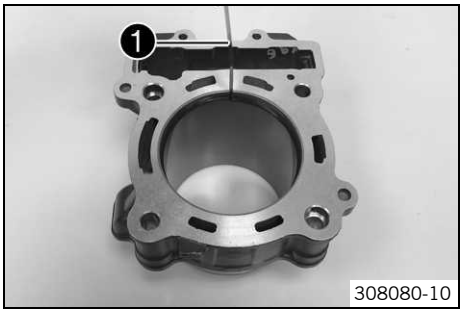
– Check the sealing area of the cylinder head for distortion using a straight edge and the special tool.

Feeler gauge (59029041100) (☛ p. 190)

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

  » If the measured value does not equal the specified value:
    – Change the cylinder and piston.

16.4.11 Checking the piston ring end gap



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

Guideline

Under the upper edge of the cylinder	20 mm (0.79 in)

– Using special tool ❶, measure the end gap.

Guideline

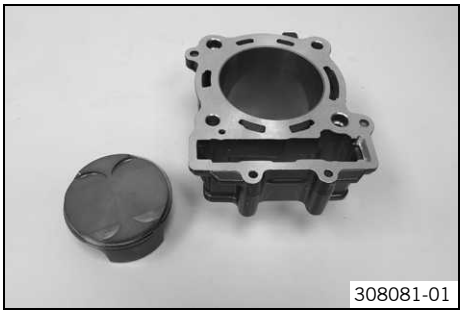
Piston ring end gap	
Compression ring	≤ 0.40 mm (≤ 0.0157 in)
Oil scraper ring	≤ 0.80 mm (≤ 0.0315 in)

Feeler gauge (59029041100) (☛ p. 190)

  » If the end gap is more than the specified value:
    – Check/measure the cylinder. (☛ p. 114)

» If the cylinder wear is within the tolerance range:
– Change the piston ring.
– Mount the piston ring with the marking facing toward the piston head.

16.4.12 Checking/measuring the piston



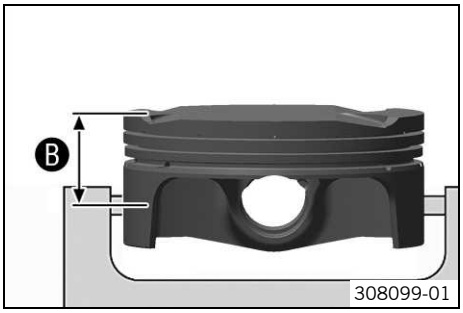
– Check the piston bearing surface for damage.
» If the piston bearing surface is damaged:
– Change the piston and, if necessary, the cylinder.
– Check that the piston rings can move easily in the piston ring grooves.
» If the piston ring is stiff:
– Clean the piston ring groove.

Tip
Use an old piston ring to clean the piston ring groove.

– Check the piston rings for damage.
» If the piston ring is damaged:
– Change the piston ring.

Info
Mount the piston ring with the marking facing upward.

– Check the piston pin for discoloration or signs of wear.
» If the piston pin has strong discoloration/signs of wear:
– Change the piston pin.
– Insert the piston pin into the connecting rod and check the bearing for play.
» If the piston pin bearing has too much play:
– Change the connecting rod and the piston pin.

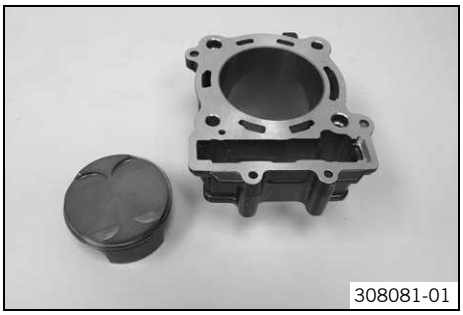


– Measure the piston at the piston skirt, at right angles to the piston pin, at a distance ❶.

Guideline

Distance ❶	9 mm (0.35 in)
Piston - diameter	88.931... 88.949 mm (3.50121... 3.50192 in)

16.4.13 Checking the piston/cylinder mounting clearance



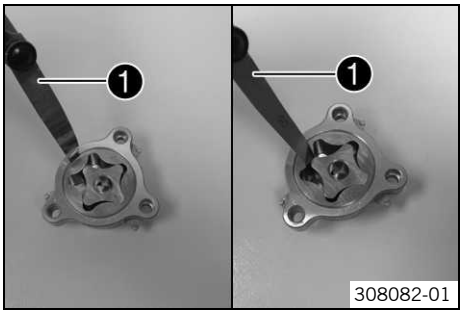
– Check/measure the cylinder. (☛ p. 114)
– Check/measure the piston. (☛ p. 115)
– The piston/cylinder mounting clearance is the result of the cylinder bore diameter minus the piston diameter.

Guideline

Piston/cylinder - mounting clearance	
New condition	0.033... 0.067 mm (0.0013... 0.00264 in)
Wear limit	0.08 mm (0.0031 in)

16.4.14 Checking the oil pump

Info
The following operations apply to both oil pumps.



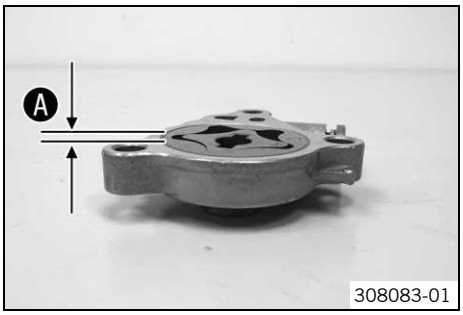
– With special tool ❶, check the play between the internal rotor and external rotor and between the external rotor and the oil pump housing.

Feeler gauge (59029041100) (☛ p. 190)

Oil pump	
Play between external rotor and internal rotor	0.10... 0.20 mm (0.0039... 0.0079 in)

Oil pump	
Play between external rotor and oil pump housing	0.09... 0.20 mm (0.0035... 0.0079 in)

» If the play exceeds the specification:
  – Change the oil pump and, if necessary, the oil pump housing.

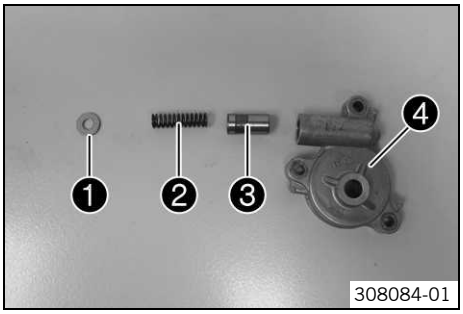


– Check axial play Ⓐ of the oil pump.

Oil pump	
Axial play	0.10... 0.25 mm (0.0039... 0.0098 in)

» If the play exceeds the specification:
  – Change the oil pump and, if necessary, the oil pump housing.

16.4.15 Checking the oil pressure regulator valve

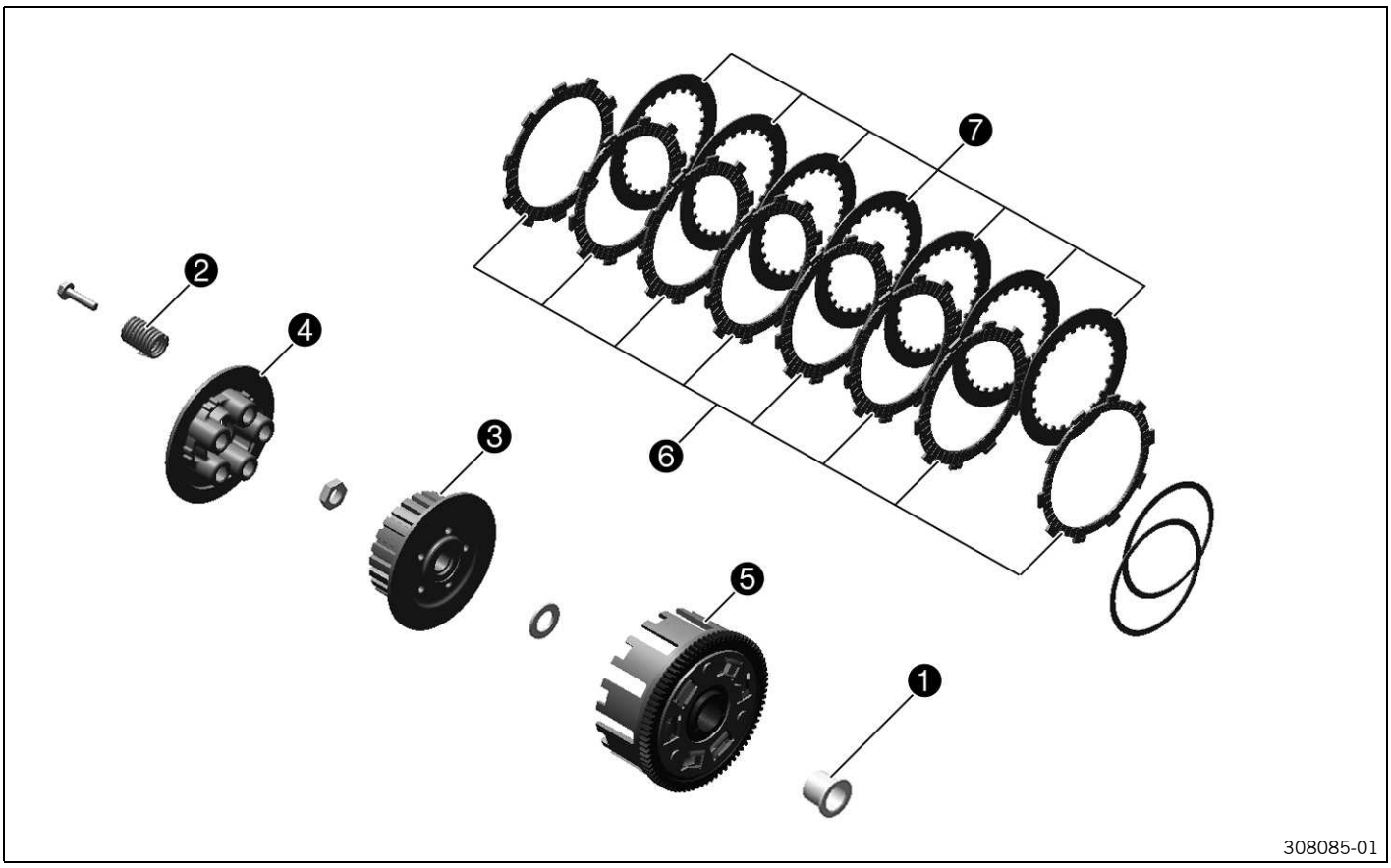


– Remove washer ❶.
– Remove spring ❷.
– Measure the length of spring ❷.

Oil pressure regulator valve - minimum spring length	26.00 mm (1.0236 in)

» If the measured length is less than the specification:
  – Change the spring.
– Check control piston ❸ for damage and wear.
» If there is damage or wear:
  – Change the control piston.
– Check the control piston in the pressure pump housing for smooth operation.
» If the control piston does not move easily:
  – Change the control piston or the pressure pump housing.
– Check the control piston bore in the pressure pump housing ❹ for damage and wear.
» If there is damage or wear:
  – Change the pressure pump housing.
– Thoroughly oil control piston ❸ and spring ❷ and mount.
– Mount washer ❶.

16.4.16 Checking the clutch



– Check collar sleeve ❶ for damage and wear.
  » If there is damage or wear:
    – Change the collar sleeve.
– Check the length of clutch springs ❷.

Clutch spring - length	≥ 37 mm (≥ 1.46 in)

  » If the clutch spring length is less than the specified value:
    – Change all clutch springs.
– Check inner clutch hub ❸ for damage and wear.
  » If there is damage or wear:
    – Change the inner clutch hub.
– Check clutch pressure cap ❹ for damage and wear.
  » If there is damage or wear:
    – Change the clutch pressure cap.
– Check the contact surfaces of the clutch facing discs in the outer clutch hub ❺ for wear.

Contact surface, clutch facing discs in clutch basket	≤ 0.5 mm (≤ 0.02 in)

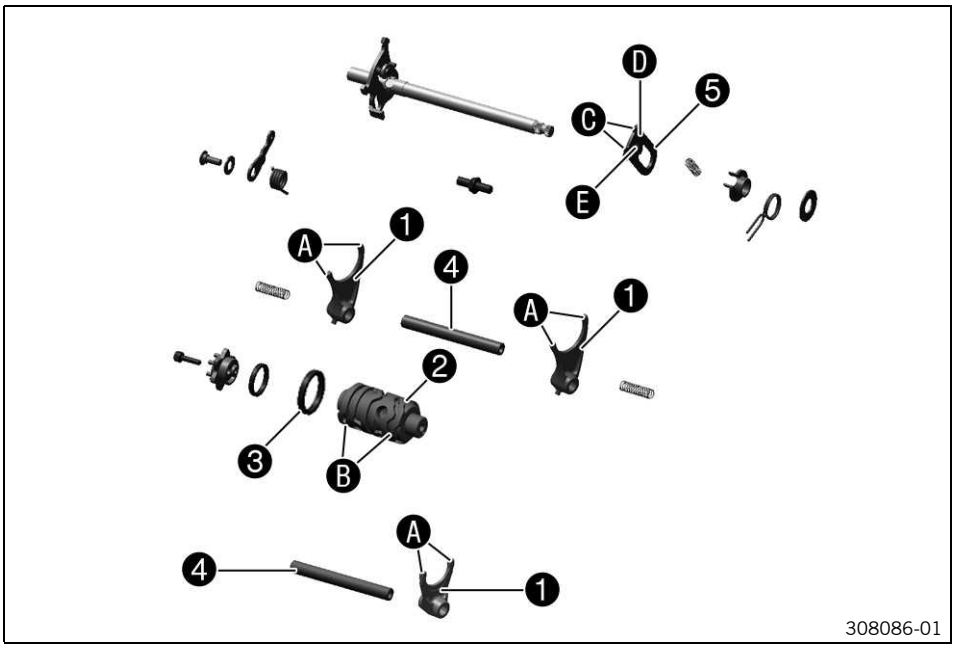
  » If the contact surface is very worn:
    – Change the clutch facing discs and the outer clutch hub.
– Check clutch facing discs ❻ for discoloration and scoring.
  » If there is discoloration or scoring:
    – Change all clutch facing discs.
– Check the thickness of clutch facing discs ❻ and intermediate discs ❼.

Thickness of overall package	≥ 35.00 mm (≥ 1.378 in)

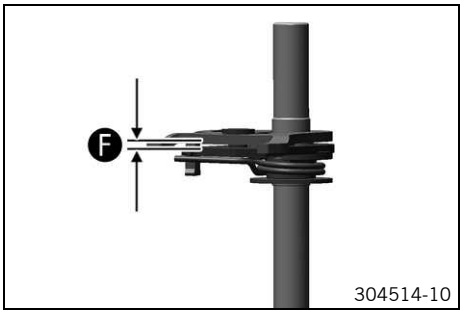
  » If the clutch facing discs do not meet specifications:
    – Change all clutch facing discs.
– Check intermediate discs ❼ for damage and wear.

» If the intermediate discs are not level or are pitted:
– Replace all intermediate discs.

16.4.17 Checking the shift mechanism



– Check the shift forks ❶ (see Ⓐ) for damage and wear (visual check).
» If there is damage or wear:
– Change the shift fork and gear wheel pair.
– Check shift grooves Ⓑ of shift drum ❷ for wear.
» If the shift groove is worn:
– Change the shift roller.
– Check the seat of the shift drum in bearing ❸.
» If the shift roller is not seated correctly:
– Replace the shift drum and/or the bearing.
– Check bearing ❸ for stiffness and wear.
» If the bearing is stiff or worn:
– Change the bearing.
– Check shift rail ❹ on a flat surface for run-out.
» If there is run-out:
– Change the shift rail.
– Check the shift rail for scoring, signs of corrosion and stiffness in the shift forks.
» If there is scoring or corrosion, or if the shift fork is stiff:
– Change the shift rail.
– Check sliding plate ❺ in contact areas Ⓒ for wear.
» If the sliding plate is worn:
– Change the shift shaft.
– Check return surface Ⓓ on the sliding plate for wear.
» If deep notches are present:
– Change the shift shaft.
– Check guide pin Ⓔ for looseness and wear.
» If the guide pin is loose and/or worn:
– Change the shift shaft.

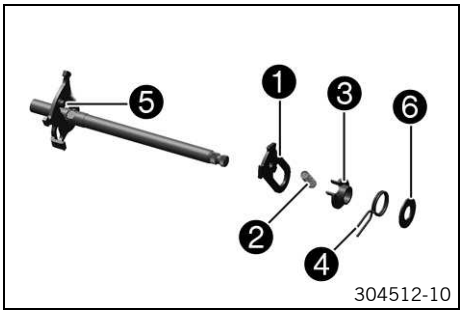


– Preassemble the shift shaft. (☛ p. 119)
– Check the play ❶ between the sliding plate and the shift quadrant.

Shift shaft – play in sliding plate/shift quadrant	0.15... 0.45 mm (0.0059... 0.0177 in)

» If the measured value does not equal the specified value:
– Change the shift shaft.

16.4.18 Preassembling the shift shaft

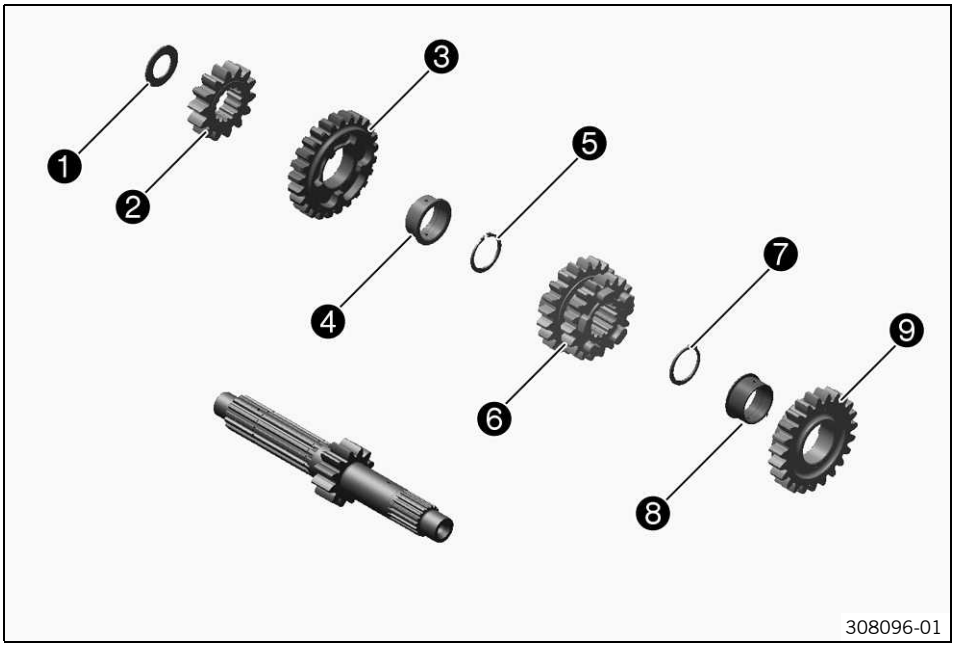


– Fix the short end of the shift shaft in a vise.
Guideline

Use soft jaws.

– Mount sliding plate ❶ with the guide pin facing down and attach the guide pin to the shift quadrant.
– Mount preload spring ❷.
– Push on spring guide ❸, push return spring ❹ over the spring guide with the offset end facing upward and lift the offset end over abutment bolt ❺.
– Mount washer ❻.

16.4.19 Disassembling the main shaft

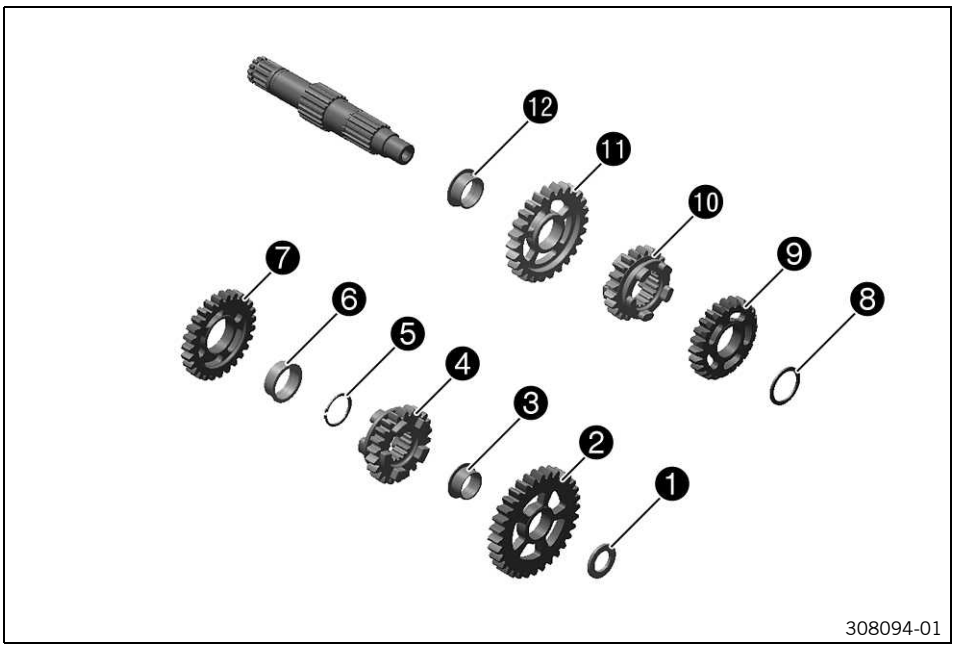


– Fix the main shaft in the vise with the geared end facing downward.
Guideline

Use soft jaws.

– Remove stop disk ❶ and 2nd-gear fixed gear ❷.
– Remove the 5th-gear idler gear ❸.
– Remove collar bushing ❹.
– Remove lock ring ❺.
– Remove 3rd/4th-gear sliding gear ❻.
– Remove lock ring ❼.
– Remove collar bushing ❽.
– Remove sixth-gear idler gear ❾.

16.4.20 Dismantling the countershaft



– Fix the countershaft in the vise with the geared end facing downward.

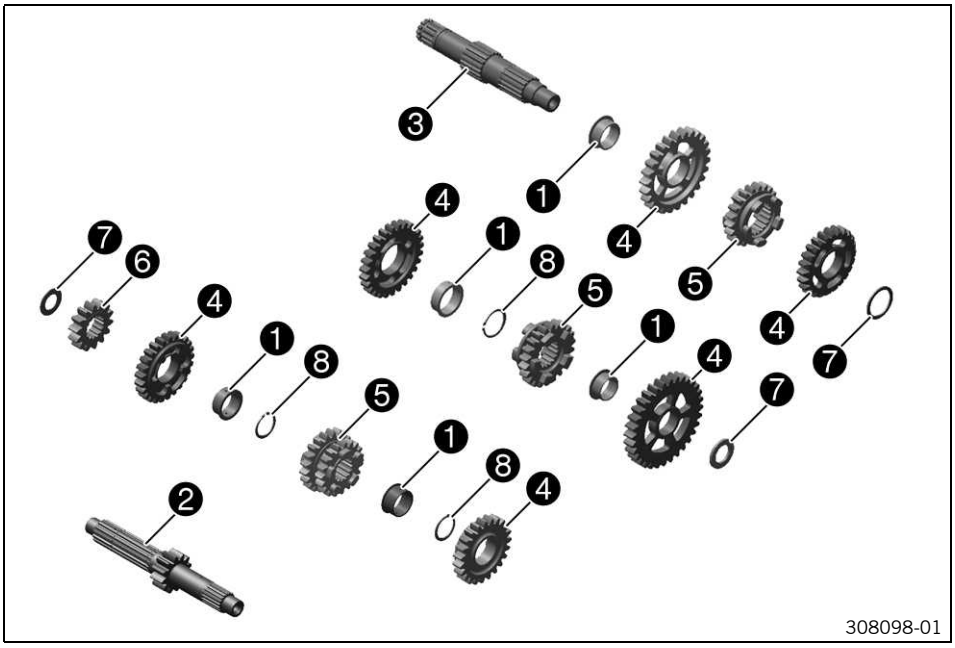
  Guideline

Use soft jaws

– Remove stop disk ❶ and the 1st-gear idler gear ❷.
– Remove collar bushing ❸.
– Remove the 6th-gear sliding gear ❹.
– Remove lock ring ❺.
– Remove collar bushing ❻.
– Remove the 3rd-gear idler gear ❼.
– Remove washer ❽.
– Remove the 4th-gear idler gear ❾.
– Remove fifth-gear sliding gear ❿.
– Remove the second-gear idler gear ⓫.
– Remove collar bushing ⓬.

16.4.21 Checking the transmission

Condition
The transmission has been disassembled.

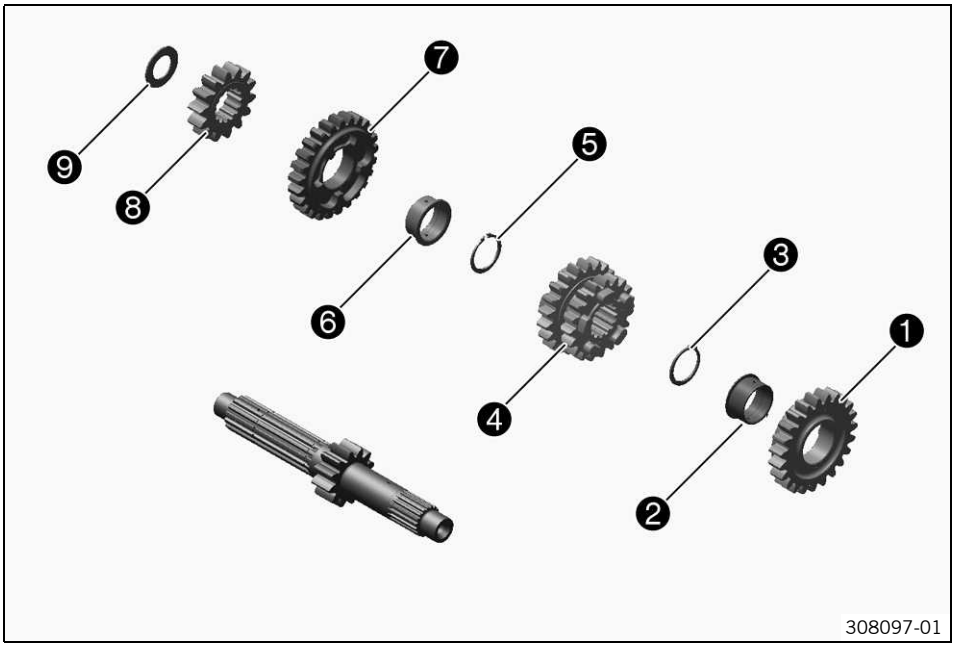


– Check collar bushings ❶ for damage and wear.
  » If there is damage or wear:
    – Change the collar bushings.
– Check the pivot points of main shaft ❷ and countershaft ❸ for damage and wear.
  » If there is damage or wear:
    – Change the main shaft and/or countershaft.
– Check the tooth profiles of 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 gear wheel pair.
– Check the shift dogs of idler gears ❹ and sliding gears ❺ for damage and wear.
  » If there is damage or wear:
    – Change the gear wheel pair.
– Check the tooth faces of idler gears ❹, sliding gears ❺, and fixed gear ❻ for damage and wear.
  » If there is damage or wear:
    – Change the gear wheel pair.
– Check the tooth profiles of sliding gears ❺ for damage and wear.
  » If there is damage or wear:
    – Change the gear wheel pair.
– Check sliding gears ❺ for smooth operation in the profile of main shaft ❷.
  » If the sliding gear does not move easily:
    – Change the sliding gear or the main shaft.
– Check sliding gears ❺ for smooth operation in the profile of countershaft ❸.
  » If the sliding gear does not move easily:
    – Change the sliding gear or the countershaft.
– Check stop disks ❼ for damage and wear.
  » If there is damage or wear:
    – Change the stop disk.
– Use new lock rings ❽ with every repair.

16.4.22 Assembling the main shaft

Info
Use new lock rings in every repair job.

Preparatory work
- Oil all parts carefully before assembling.
- Check the transmission. (☛ p. 120)



Main work
- Fix the main shaft in the vise with the geared end facing downward.

  Guideline

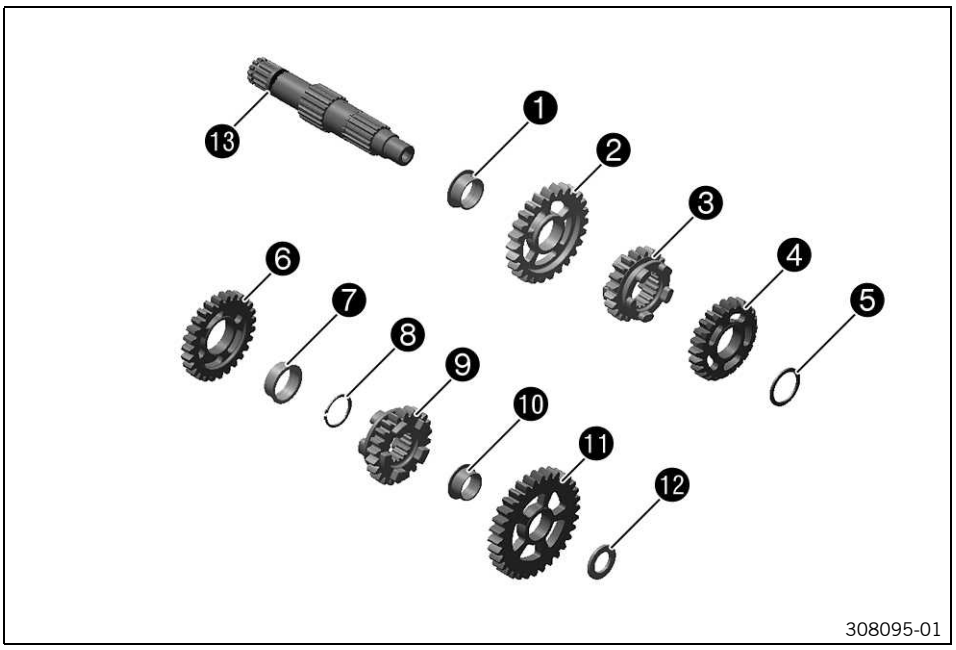
Use soft jaws

- Mount sixth-gear idler gear ❶.
- Mount collar bushing ❷.
- Mount lock ring ❸.
- Mount third/fourth-gear sliding gear ❹ with the small gear wheel facing up.
- Mount lock ring ❺.
- Mount collar bushing ❻.
- Mount fifth-gear idler gear ❼.
- Mount second-gear fixed gear ❽ and stop disk ❾.
- Finally, check all gear wheels for smooth operation.

16.4.23 Assembling the countershaft

Info
Use new lock rings in every repair job.

Preparatory work
- Oil all parts carefully before assembling.
- Check the transmission. (☛ p. 120)



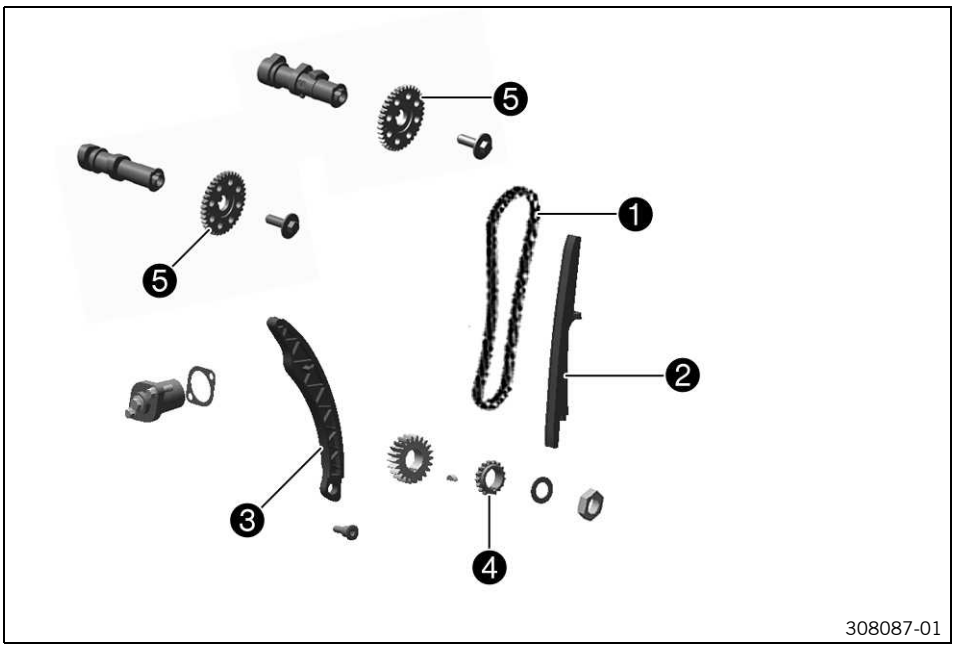
Main work

– Fix the countershaft in the vise with the geared end facing downward.
  Guideline

Use soft jaws

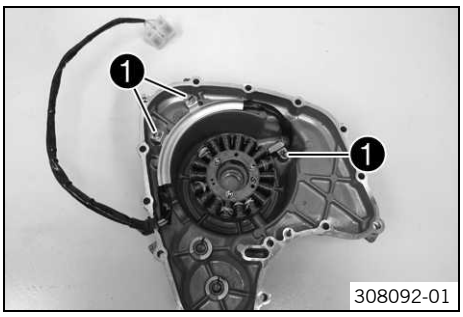
– Mount collar bushing ❶.
– Mount second-gear idler gear ❷.
– Mount the fifth-gear sliding gear ❸ with the shift groove facing upward.
– Mount fourth-gear idler gear ❹.
– Mount washer ❺.
– Mount third-gear idler gear ❻.
– Mount collar bushing ❼.
– Mount lock ring ❽.
– Mount sixth-gear sliding gear ❾ with the shift groove facing downward.
– Mount collar bushing ❿.
– Mount first-gear idler gear ⓫.
– Mount stop disk ⓬.
– Replace O-ring ⓭ of the countershaft.
– Finally, check all gear wheels for smooth operation.

16.4.24 Checking the timing assembly

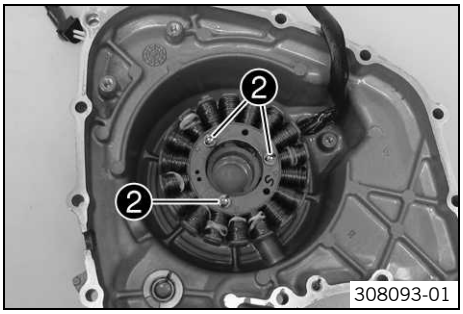


– Check timing chain ❶ for damage and wear.
  » If there is damage or wear:
    – Change the timing chain.
– Let the timing chain hang down freely. Check that the timing chain links move easily.
  » If the chain links no longer straighten out:
    – Change the timing chain.
– Check timing chain guide rail ❷ for damage and wear.
  » If there is damage or wear:
    – Change the timing chain guide rail.
– Check timing chain tensioning rail ❸ for damage and wear.
  » If there is damage or wear:
    – Change the timing chain tensioning rail.
– Check timing chain sprocket ❹ for damage and wear.
  » If there is damage or wear:
    – Change the timing chain sprocket.
– Check camshaft gears ❺ for damage and wear.
  » If there is damage or wear:
    – Change the camshaft gears.

16.4.25 Changing the stator



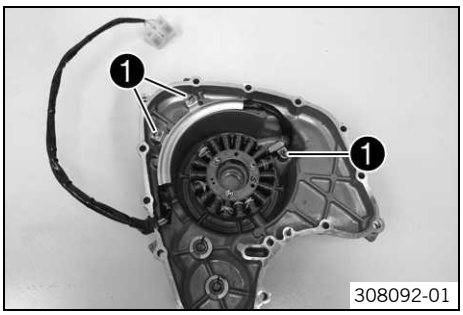
– Remove screws ❶.
– Remove the cable retainer.



– Remove screws ❷.
– Remove the stator.
– Position the new stator.
– Mount and tighten screws ❷.

Guideline

Screw, stator	M5	8 Nm (5.9 lbf ft)	**Loctite® 243™**

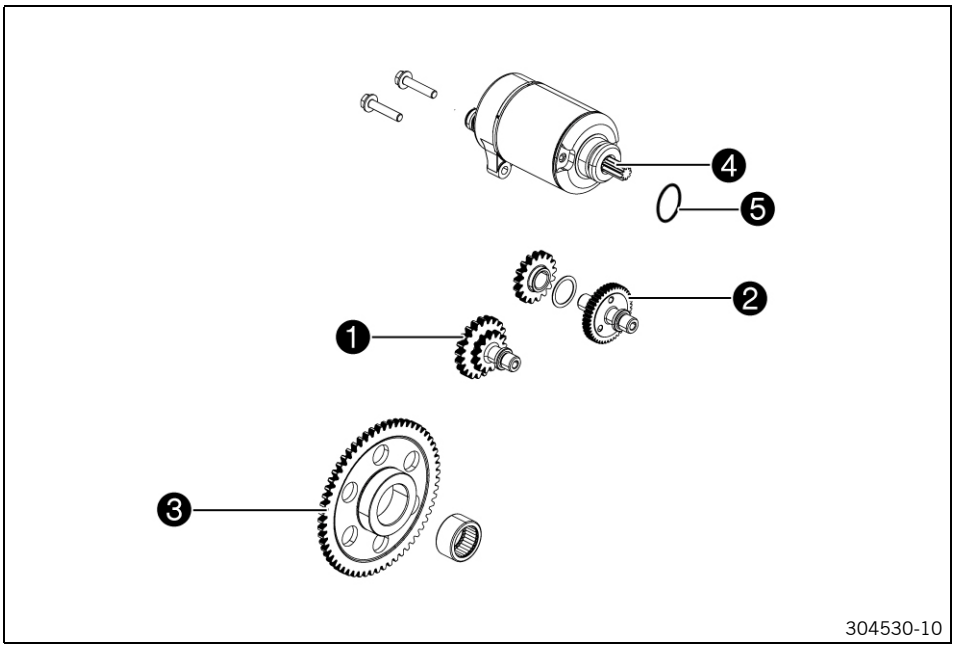


– Position the cable guide in the alternator cover.
– Position the cable retainer.
– Mount and tighten screws ❶.

Guideline

Screw, retaining bracket, stator cable	M5	8 Nm (5.9 lbf ft)	**Loctite® 243™**

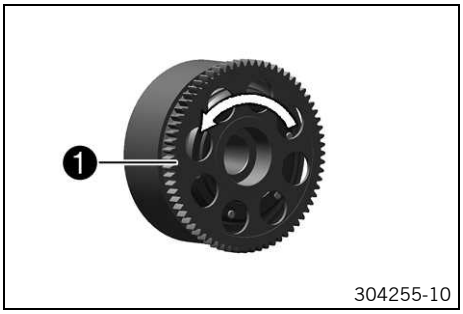
16.4.26 Checking the electric starter drive



– Check the teeth and seating of the starter idler gear ❶ for damage and wear.
  » If there is damage or wear:
    – Change the starter idler gear.
– Check the teeth and seating of the torque limiter ❷ for damage and wear.
  » If there is damage or wear:
    – Change the torque limiter.
– Check the toothing and bearing of freewheel gear ❸ for damage and wear.
  » If there is damage or wear:
    – Replace the freewheel gear and/or the bearing.
– Check toothing ❹ of the starter motor for damage and wear.
  » If there is damage or wear:
    – Replace the starter motor.
– Replace the O-ring ❺ of the starter motor.
– Clamp the minus (negative) cable of a 12 Volt power supply to the starter motor housing. Briefly connect the positive cable of the power supply to the starter motor connection.
  » If the starter motor does not turn when you close the power circuit:

– Replace the starter motor.

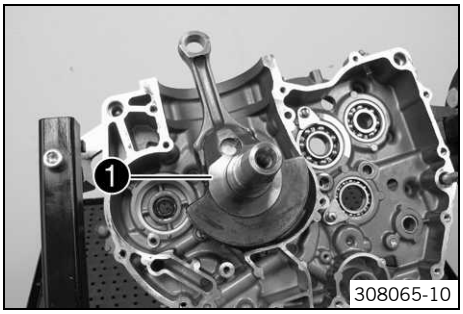
16.4.27 Checking the freewheel



– Insert freewheel gear ❶ into the freewheel hub by turning the freewheel gear clockwise; do not wedge!
– Check the locking action of the freewheel gear.
  » If the freewheel gear does not turn clockwise or if it does not lock counterclockwise:
    – Replace the freewheel.

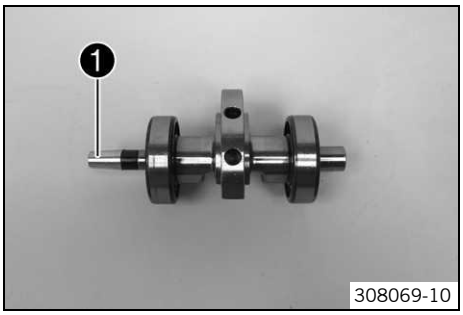
16.5 Assembling the engine

16.5.1 Installing the crankshaft



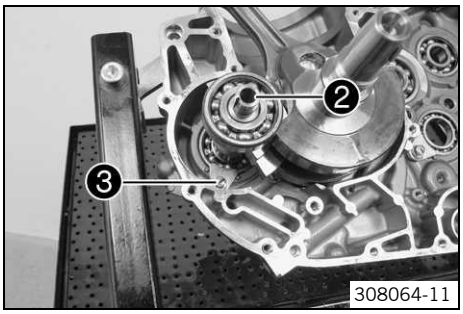
– Oil the bearing.
– Slide crankshaft ❶ into the bearing seat.

16.5.2 Installing the balancer shaft



– Mount special tool ❶.

Mounting sleeve (90129005000) (☛ p. 194)



– Mount balancer shaft ❷ with the bearing.

Info
If necessary, heat the engine case.

– Position the retaining bracket.
– Mount and tighten screw ❸.

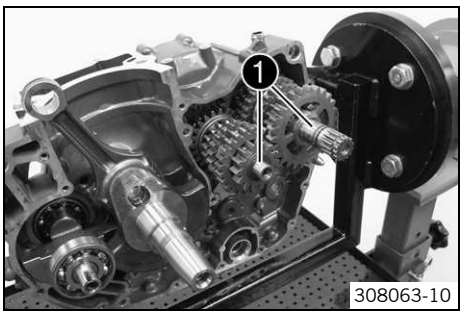
Guideline

Screw, bearing retainer	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**

– Remove the special tool.

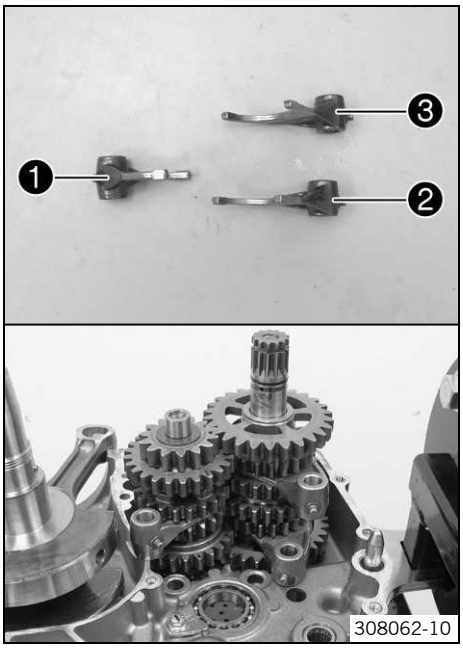
Mounting sleeve (90129005000) (☛ p. 194)

16.5.3 Installing the transmission shafts



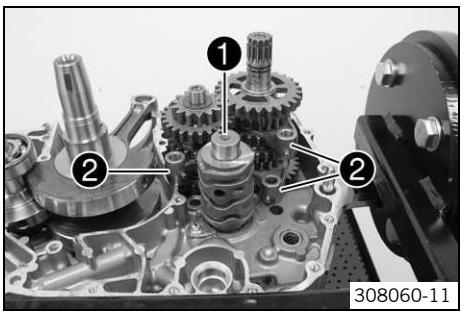
- Oil the bearing.
- Slide both transmission shafts ❶ into the bearing seats together.

16.5.4 Installing the shift forks



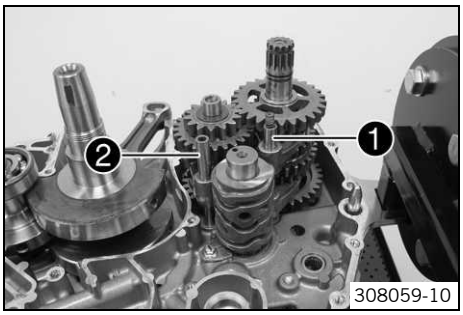
- Oil all parts carefully before assembling.
- Shift fork ❶ has a smaller inside diameter; mount it in the shift groove of the main shaft.
- Mount shift fork ❷ in the lower shift groove of the countershaft.
- Mount shift fork ❸ in the upper shift groove of the countershaft.

16.5.5 Installing the shift drum



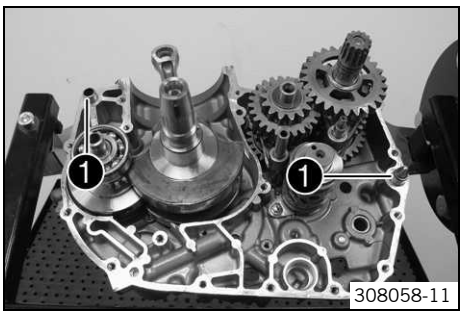
- Slide shift drum ❶ into the bearing seat.
- Hang shift forks ❷ into the shift drum.

16.5.6 Installing the shift rails

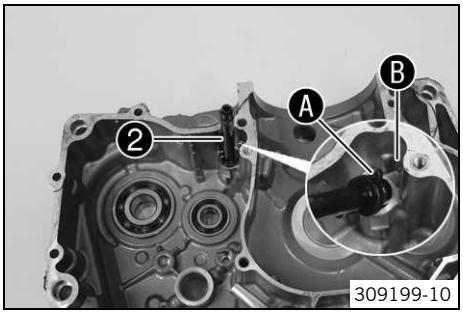


- Oil all parts carefully before assembling.
- Mount shift rail ❶ together with upper spring and the lower spring.
- Mount shift rail ❷.

16.5.7 Installing the left engine case

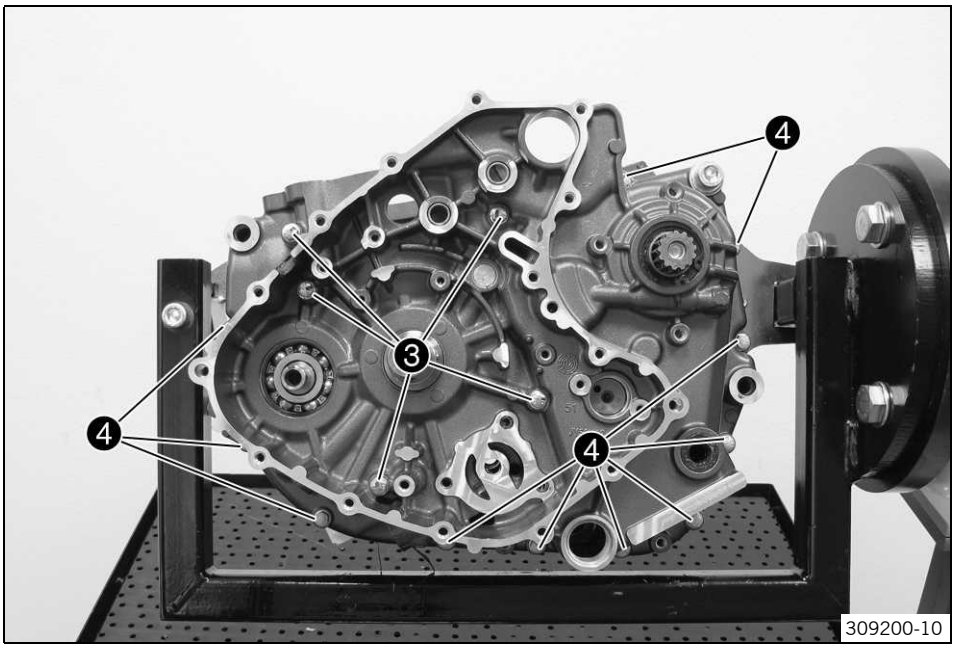


– Clean the sealing areas.
– Mount dowels ❶.



– Mount the new O-rings on oil spray tube ❷.
– Mount the oil spray tube.
  ✔ Catch Ⓐ engages in recess Ⓑ.
– Apply sealing compound to the left section of the engine case.

Loctite® 5910



– Mount the engine case section. If necessary, tap lightly with a rubber mallet while turning the transmission shafts.

Info
Do not tighten the engine case sections using the screws.

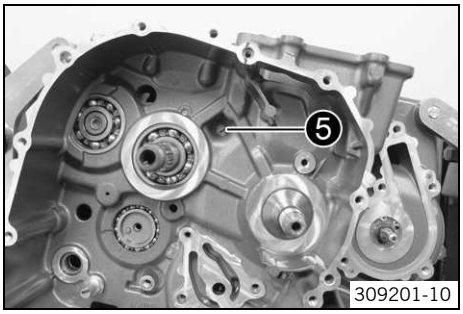
– Mount screws ❸ but do not tighten them yet.
  Guideline

Screw, engine case	M6x75	12 Nm (8.9 lbf ft)

– Mount screws ❹ and tighten all screws in a crisscross pattern.
  Guideline

Screw, engine case	M6x35	12 Nm (8.9 lbf ft)

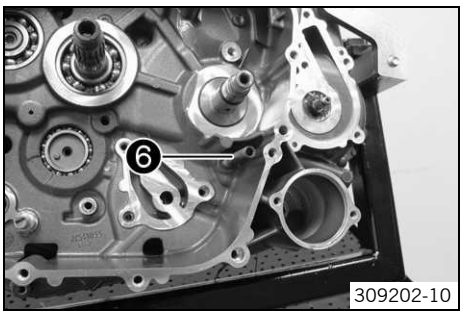
– Mount the fitting of the engine fixing arm.



– Mount and tighten screw ❺.

Guideline

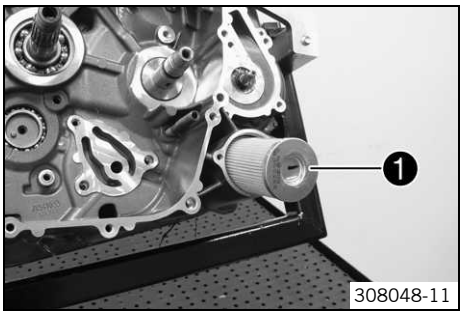
Screw, engine case	M6x35	12 Nm (8.9 lbf ft)



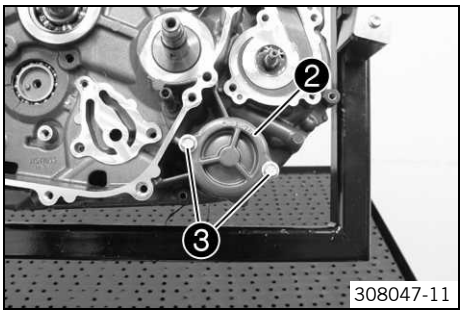
– Position crankshaft to TDC and block with special tool ❻.

Engine blocking screw (61229015000) (☛ p. 192)

16.5.8 Installing the oil filter



– Tilt the engine sideways and fill the oil filter housing approx. ⅓ full with engine oil.
– Fill oil filter ❶ with engine oil and insert it in the oil filter housing.

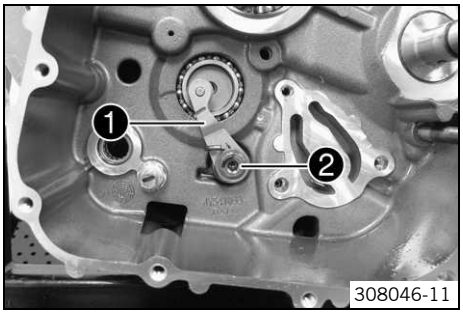


– Oil the O-ring of the oil filter cover.
– Install the oil filter cover ❷.
– Mount and tighten screws ❸.

Guideline

Screw, oil filter cover	M5	8 Nm (5.9 lbf ft)

16.5.9 Installing the locking lever

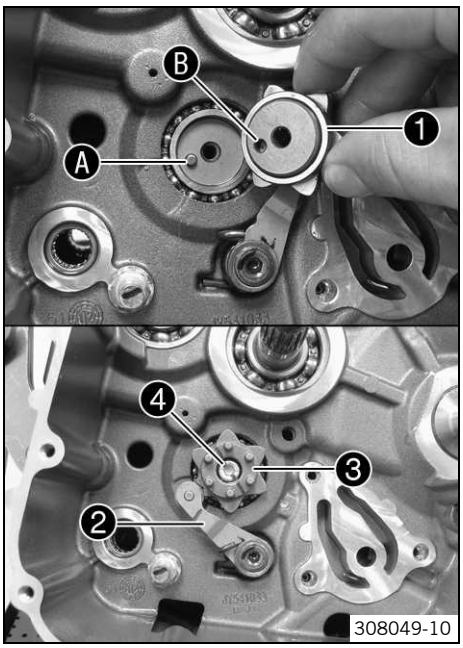


– Mount locking lever ❶ with the sleeve, washers and spring.
– Mount and tighten screw ❷ with the washer.

Guideline

Screw, locking lever	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**

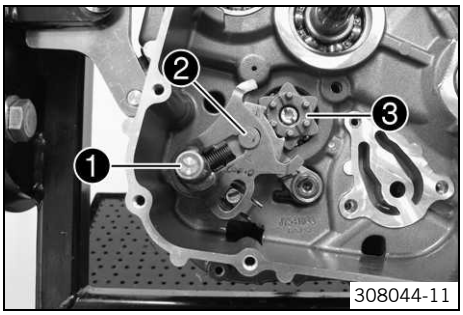
16.5.10 Installing the shift drum locating



– Mount spacer ring ❶ on the shift drum locating unit.
– Press locking lever ❷ away from the shift drum locating and position the shift drum locating ❸.
  ✔ Pins Ⓐ engage in hole Ⓑ.
– Release the locking lever.
– Mount and tighten screw ❹.
  Guideline

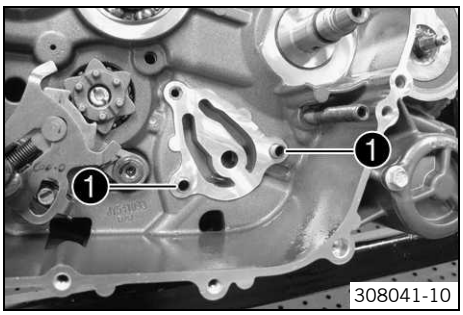
Screw, shift drum locating	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**

16.5.11 Installing the shift shaft

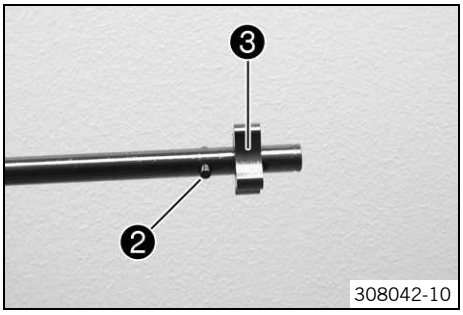


– Slide shift shaft ❶ with the washer into the bearing seat.
– Push sliding plate ❷ away from the shift drum locating ❸. Insert the shift shaft all the way.
– Let the sliding plate engage in the shift drum locating.
– Shift through the transmission.

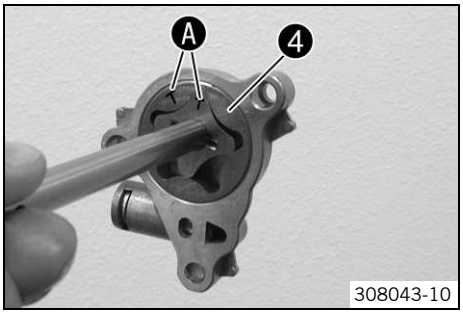
16.5.12 Installing the oil pump



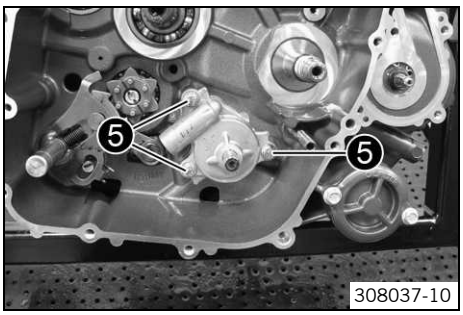
– Mount dowels ❶.



– Position pin ❷ and internal rotor ❸ on the oil pump shaft.

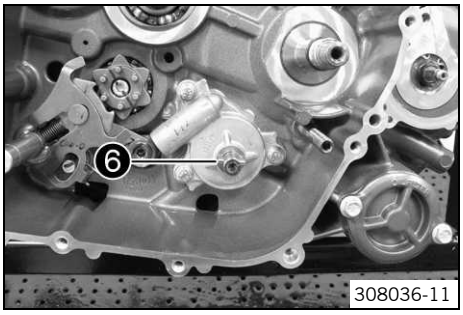


– Position the oil pump shaft with the internal rotor in the pressure pump housing.
– Position external rotor ❹ in the pressure pump housing.
✔ Markings Ⓐ are visible after assembly.

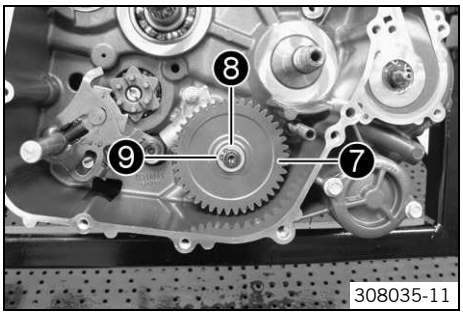


– Check that the oil holes are clear and fill with a small amount of oil.
– Position the oil pump.
– Mount and tighten screws ❺.
Guideline

Screw, oil pump	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**

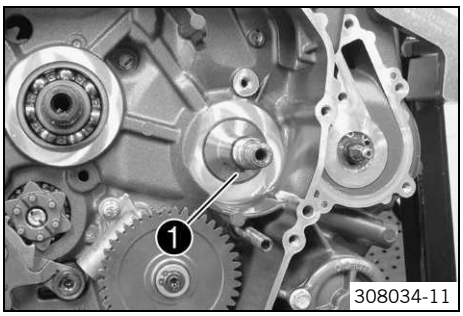


– Position the washer.
– Position pin ❻.

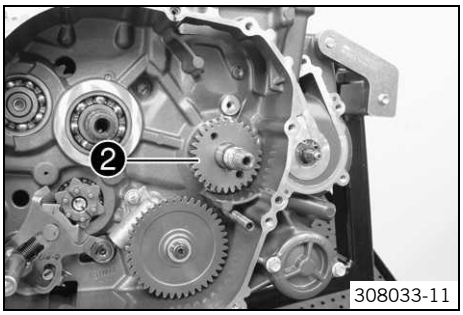


– Position the oil pump gear ❼.
– Position washer ❽.
– Mount lock ring ❾.
– Crank the oil pump gear and check for stiffness.

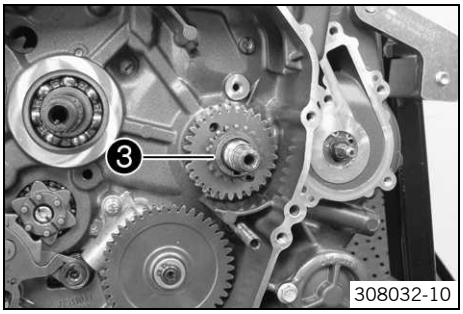
16.5.13 Installing the primary gear



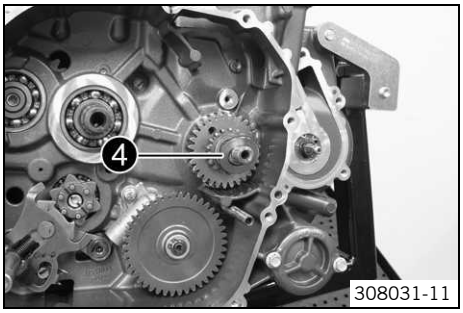
– Mount woodruff key ❶.



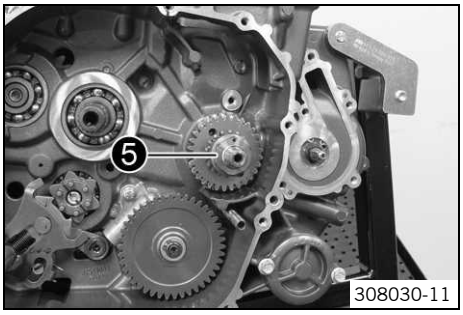
– Mount primary gear ❷.



– Mount timing chain sprocket ❸.



– Mount washer ❹.

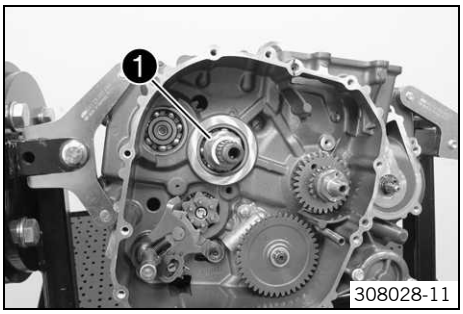


– Mount and tighten nut ❺ with the washer.

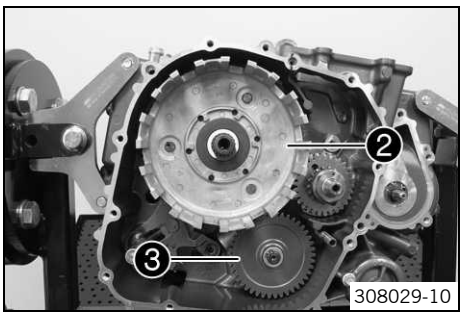
Guideline

Nut, primary gear/timing chain sprocket	M16x1.5	120 Nm (88.5 lbf ft)	**Loctite® 243™**

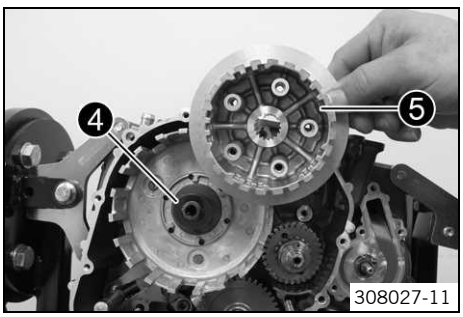
16.5.14 Installing the clutch cage



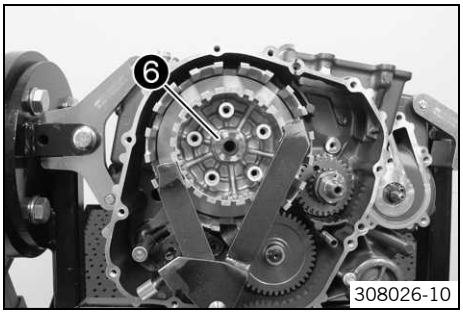
– Mount collar sleeve ❶.



– Slide clutch basket ❷ onto the main shaft.
– Turn oil pump gear ❸ until the gear teeth of the clutch basket engage.



– Slide on washer ❹ and inner clutch hub ❺.

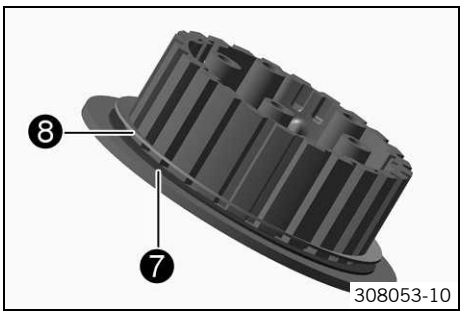


– Mount nut ❻ with the washer. Hold the inner clutch hub with the special tool and tighten the nut.

Guideline

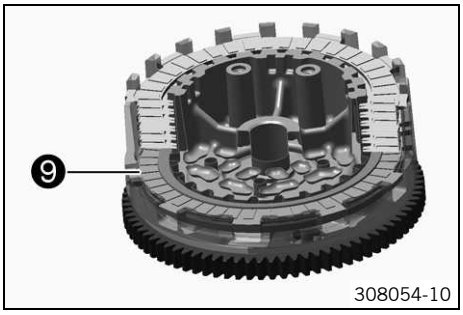
Nut, inner clutch hub	M16LHx1.5	120 Nm (88.5 lbf ft)	**Loctite® 243™**

Clutch holder (51129003000) (☛ p. 189)

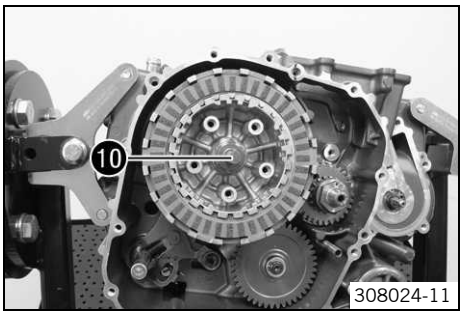


– Mount support ring ❼ and pretension ring ❽.

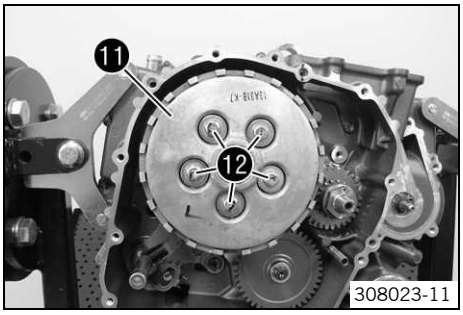
✓ The inside of the pretension ring rests against the support ring and the outside faces away from the support ring.



– Oil the clutch facing discs thoroughly.
– Mount the clutch facing disc ❾ with the largest inside diameter.
– Alternately mount all of the other intermediate clutch discs and clutch facing discs.



– Mount pull rod ❿.

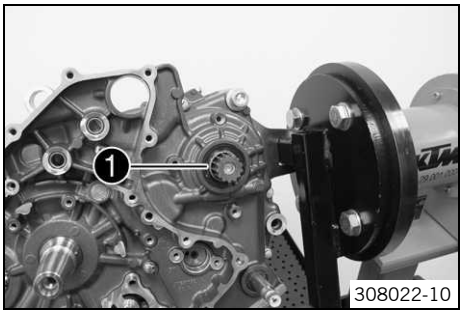


– Position pressure cap ⓫.
– Mount screws ⓬ with the washers and springs and tighten them in a crisscross pattern.

Guideline

Screw, clutch spring	M6	10 Nm (7.4 lbf ft)

16.5.15 Installing the spacer

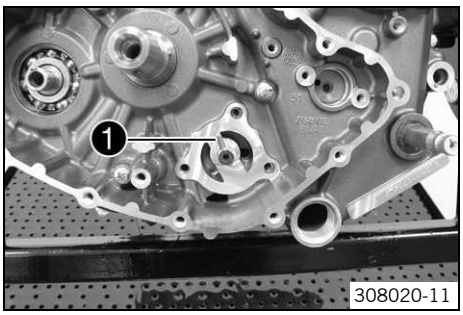


– Grease the shaft seal ring of the countershaft before mounting.

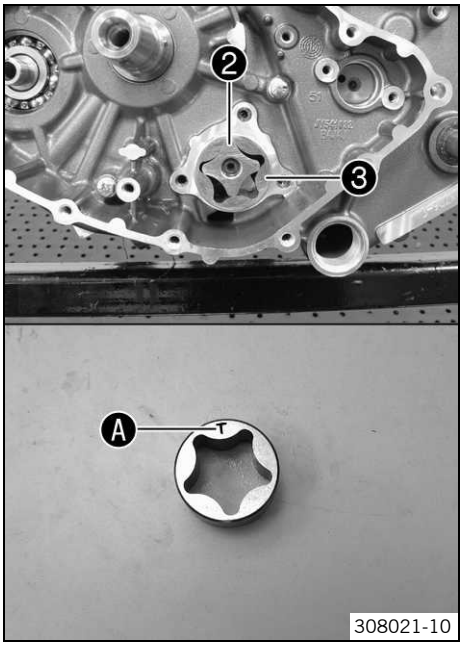
Long-life grease (☛ p. 187)

– Mount spacer ❶.

16.5.16 Installing the suction pump

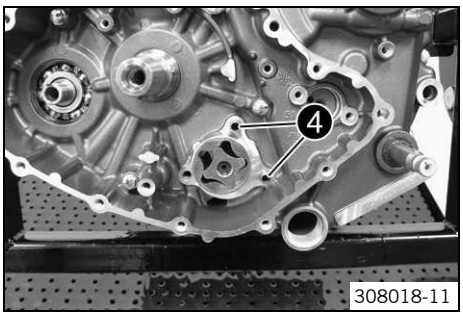


– Position pin ❶.

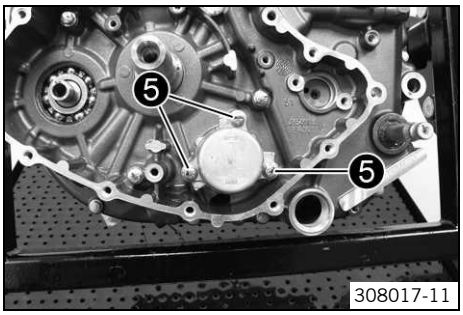


– Mount internal rotor ❷ and external rotor ❸.

✔ Marking Ⓐ of the external rotor is not visible after assembly.



– Mount dowels ❹.

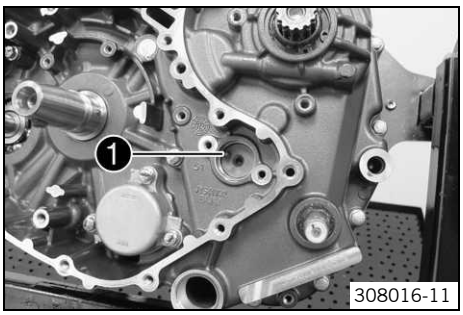


– Oil the oil pump.
– Position the oil pump housing.
– Mount and tighten screws ❺.

Guideline

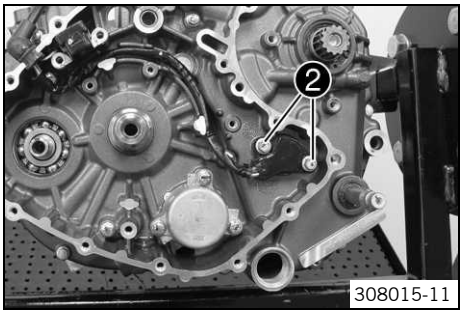
Screw, oil pump	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**

16.5.17 Installing the gear position sensor



– Mount the contact spring and contact pin ❶.

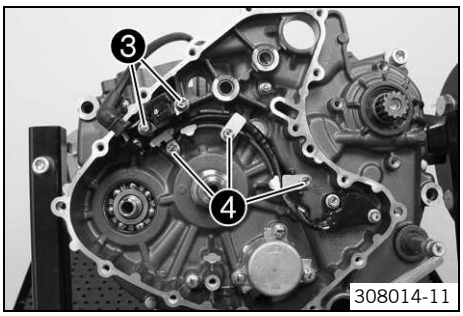
✓ The rounded sides of the contact pins face the sensor.



– Install the gear position sensor.
– Mount and tighten screws ❷.

Guideline

Screw, gear sensor	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**



– Position the cable guide in the engine case.
– Position the retaining bracket.

Info
Ensure that the cable is correctly routed.

– Position the ignition pulse generator.
– Mount and tighten screws ❸.

Guideline

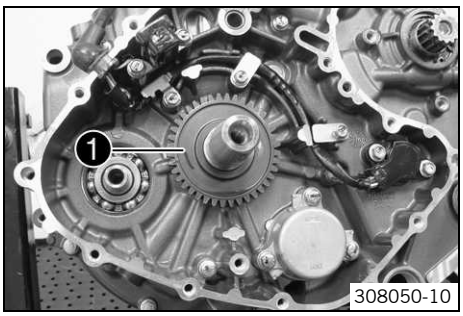
Screw, ignition pulse generator	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

– Mount and tighten screws ❹.

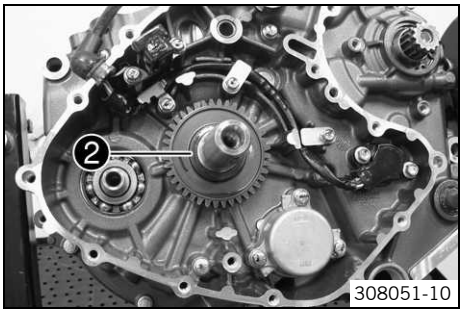
Guideline

Screw, retaining bracket	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**

16.5.18 Installing the balancer shaft drive wheel

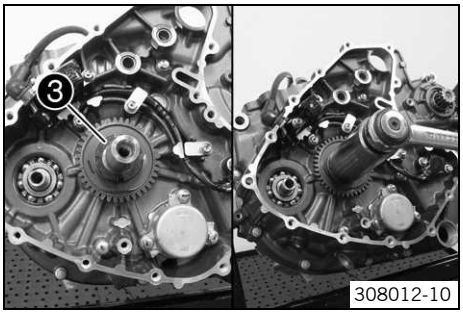


– Mount the spring washer.
– Mount drive wheel ❶ of the balancer shaft.



– Mount washer ❷.

✓ The outer side of the washer is in contact with the drive wheel and the inside faces away from the drive wheel.

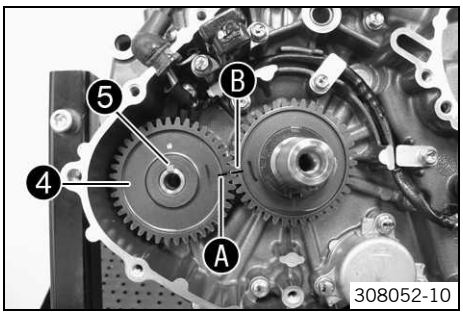


– Mount and tighten nut ❸.

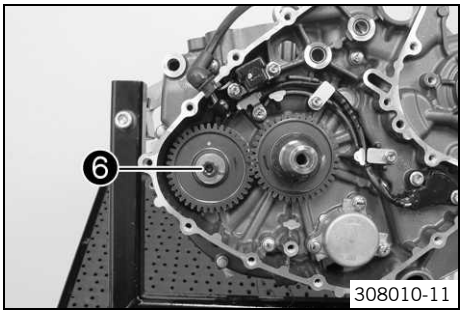
Guideline

Nut, drive wheel for balancer shaft	M28	60 Nm (44.3 lbf ft)

Castle nut wrench; ½" drive (90129022000) (☛ p. 194)



– Position balancer shaft gear ❹.
  ✓ Markings Ⓐ and Ⓑ align.
– Mount wedge ❺.

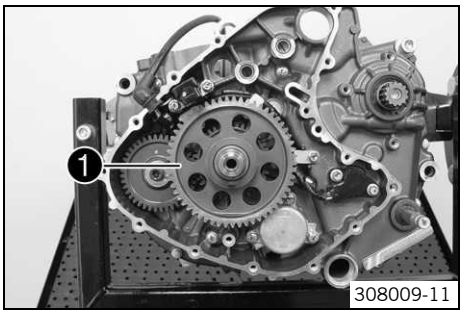


– Mount and tighten screw ❻.

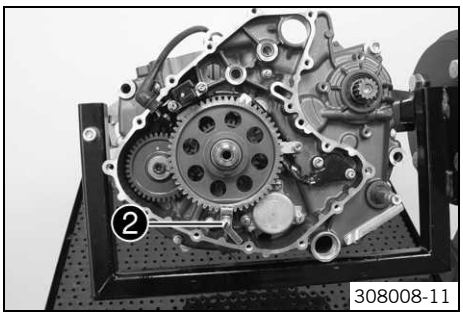
Guideline

Screw, balancer shaft gear	M8	20 Nm (14.8 lbf ft)	**Loctite® 243™**

16.5.19 Installing the starter drive



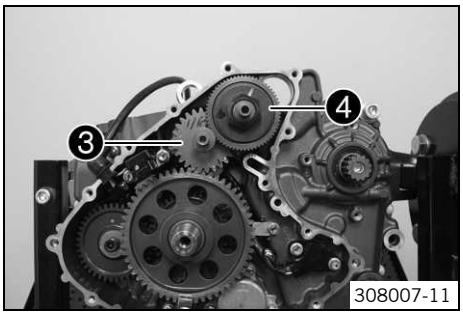
– Position freewheel gear ❶.



– Position the retaining bracket.
– Mount and tighten screw ❷.

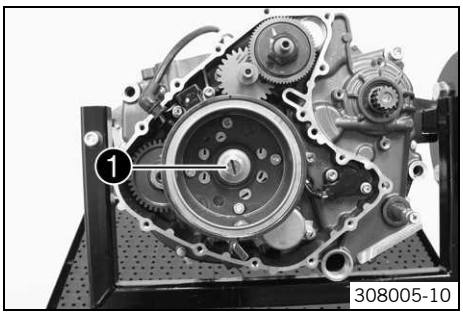
Guideline

Screw, freewheel gear retaining bracket	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**



– Mount starter idler gear ❸.
– Mount torque limiter ❹.

16.5.20 Installing the rotor



– Mount the spring washer.
– Mount the rotor.

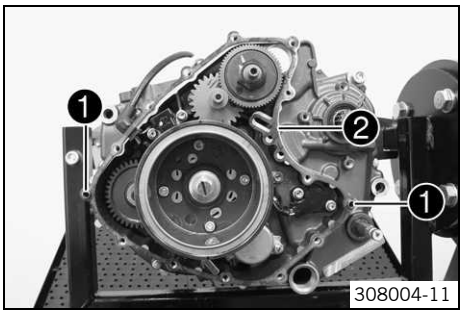
Info
Turn the freewheel gear counterclockwise to simplify assembly.

– Mount and tighten screw ❶.

Guideline

Rotor screw	M10	75 Nm (55.3 lbf ft)	**Loctite® 243™**

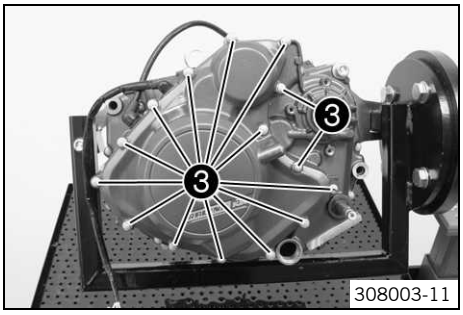
16.5.21 Installing the alternator cover



– Mount the dowels ❶.
– Seal the cable guide.

Loctite® 5910

– Mount the alternator cover gasket ❷.

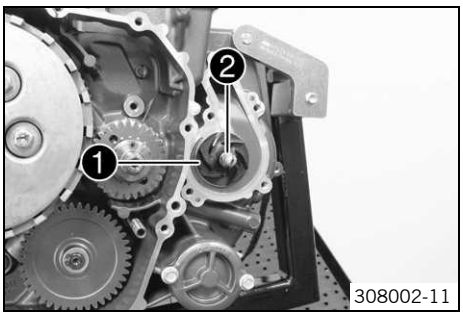


– Position the alternator cover.
– Install the screws ❸ and tighten them diagonally.

Guideline

Screw, alternator cover	M6	12 Nm (8.9 lbf ft)

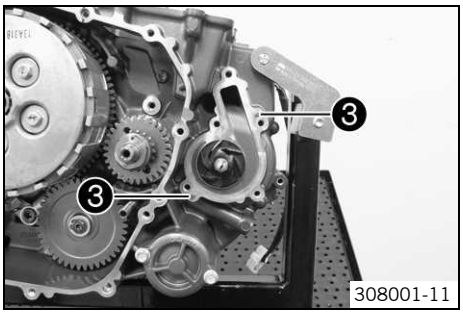
16.5.22 Installing the water pump cover



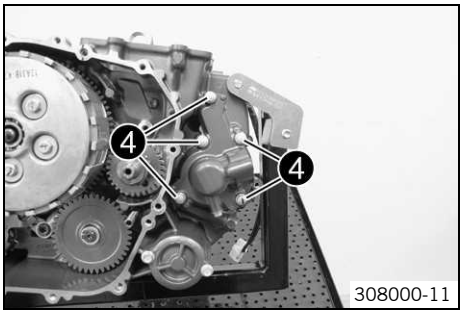
– Mount water pump impeller ❶.
– Mount and tighten nut ❷ with the washer.

Guideline

Nut, water pump impeller	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**



– Mount locating pins ❸.

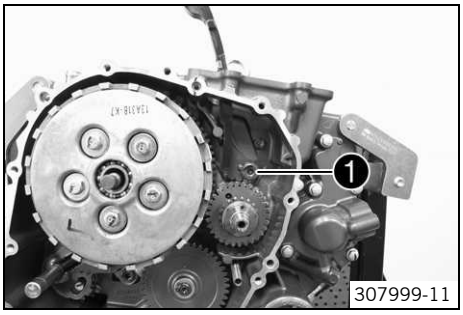


– Mount the water pump cover with the seal ring.
– Mount screws ❹ and tighten them in a crisscross pattern.

Guideline

Screw, water pump cover	M6	12 Nm (8.9 lbf ft)

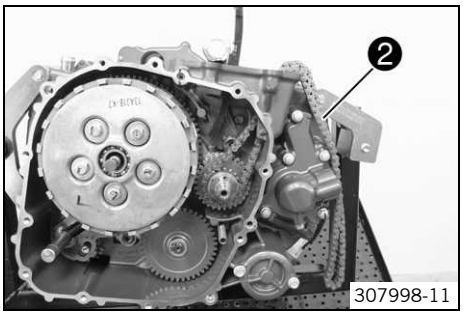
16.5.23 Installing the timing chain



– Feed in the timing chain tensioning rail from above.
– Mount and tighten screw ❶.

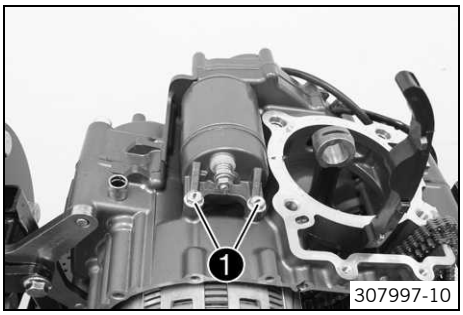
Guideline

Screw, timing chain tensioning rail	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**



– Position timing chain ❷ in the engine case according to the direction of travel.

16.5.24 Installing the starter motor



– Grease the O-ring. Position the starter motor.

Long-life grease (☛ p. 187)

– Mount and tighten screws ❶.

Guideline

Screw, starter motor	M6	12 Nm (8.9 lbf ft)

16.5.25 Installing the piston

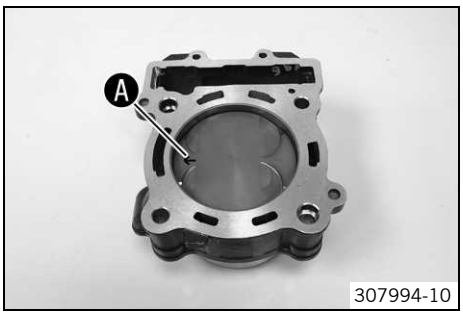
– Shift the joint of the piston rings by 120°.
– Place the special tool onto the oiled piston. Clamp the piston rings together using the special tool.

Piston ring mounting tool (60029015000) (☛ p. 190)

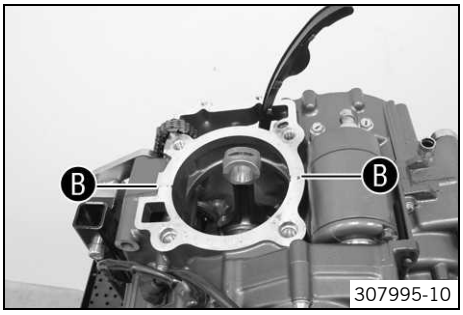
✓ The piston ring are squeezed together fully.

– Position the piston with the special tool on the cylinder.
– Carefully slide the piston into the cylinder from the top.

Info
The piston rings should not become caught; otherwise, they may be damaged.



– Ensure that piston marking ❹ faces the outfeed side.



– Thinly apply sealing compound to area ❸.

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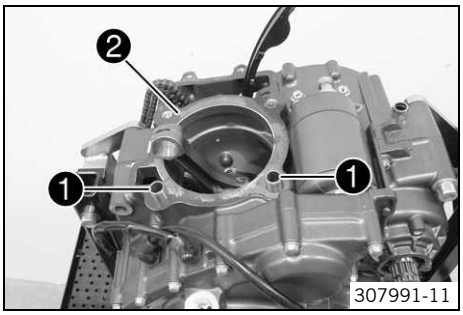
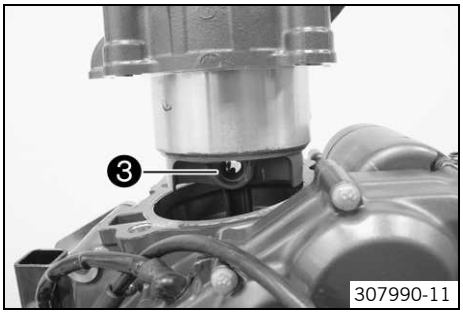
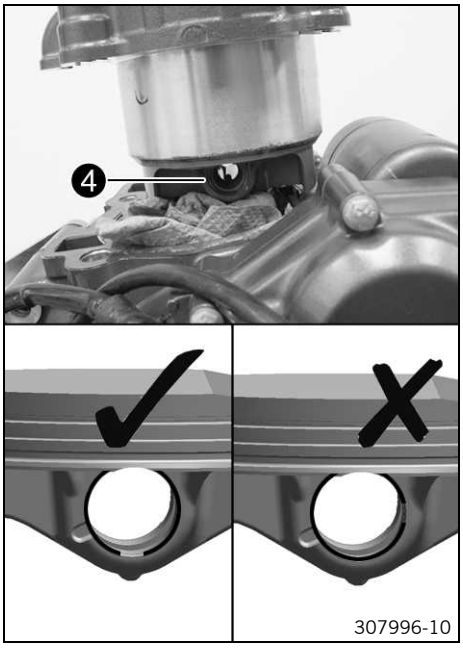
– Position the cylinder base gasket.



– Mount dowels ❶ and position the cylinder base gasket ❷.



– Feed the timing chain through the chain shaft. Mount piston pin ❸.

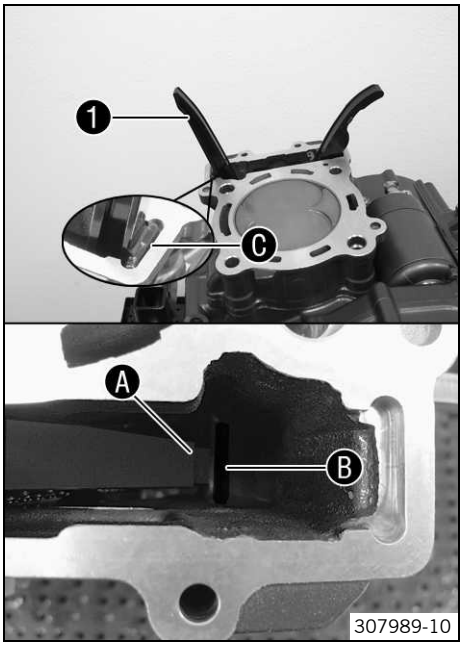


– Cover the engine case opening with a cloth.
– Position piston ring lock ❹.
  ✔ 6-o'clock position.
– Insert the special tool and firmly press it toward the piston.

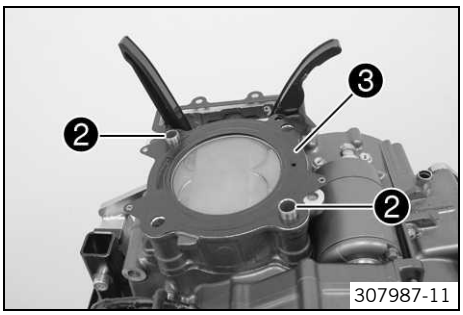
Insert for piston pin retainer (77329030100) (☛ p. 193)

– Turn the special tool clockwise, thereby pressing the piston pin retainer into the groove.
– Make sure that the piston pin retainer is seated correctly on both sides.
– Remove the cloth.
– Keep the timing chain tensioned. Push the cylinder down carefully and let the dowels engage.

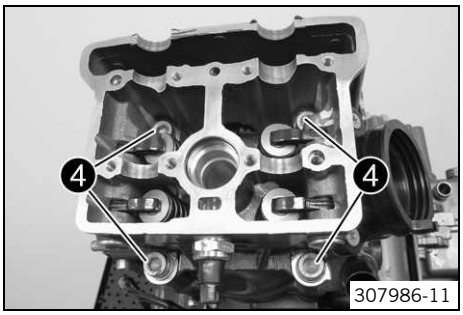
16.5.26 Installing the cylinder head



– Position timing chain guide rail ❶.
  ✔ Pins Ⓐ engage in recess Ⓑ.
  ✔ The timing chain guide rail engages in recess Ⓒ.



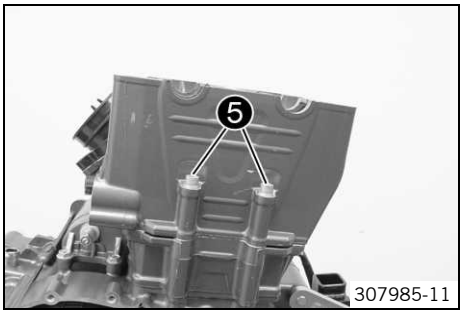
– Mount dowels ❷.
– Put on cylinder head gasket ❸.
– Mount the cylinder head.



– Mount screws ❹ with the washer and tighten in a crisscross pattern.

Guideline

Screw, cylinder head	M10	1st stage 30 Nm (22.1 lbf ft) 2nd stage 60 Nm (44.3 lbf ft)	Thread is oiled, head flat is greased

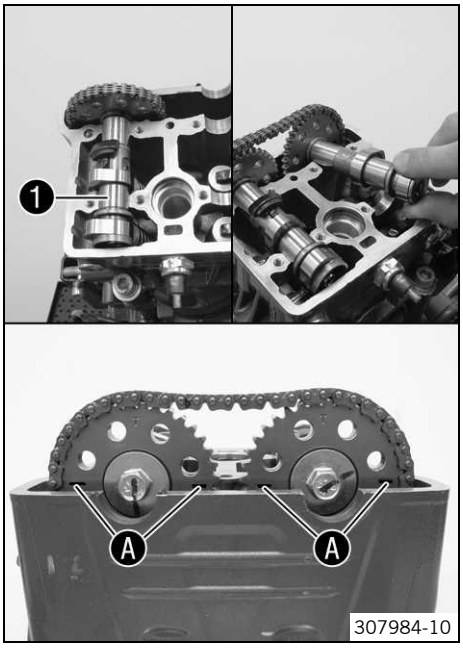


– Mount and tighten screws ❺.

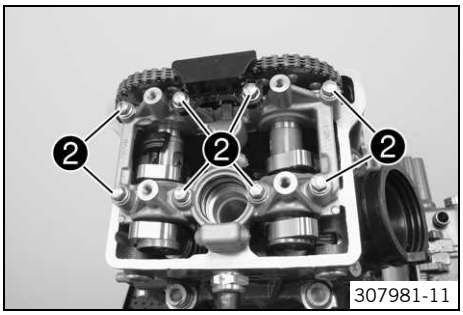
Guideline

Cylinder head screw	M6	12 Nm (8.9 lbf ft)

16.5.27 Installing the camshafts



– Oil the camshafts and pivot points.
– Ensure that the crankshaft is blocked in the TDC position.
– Pull up the timing chain and insert exhaust camshaft ❶.
– Place the timing chain over the camshaft gear of the intake camshaft.
  ✓ Markings Ⓐ of the camshafts align with the edge of the cylinder head.

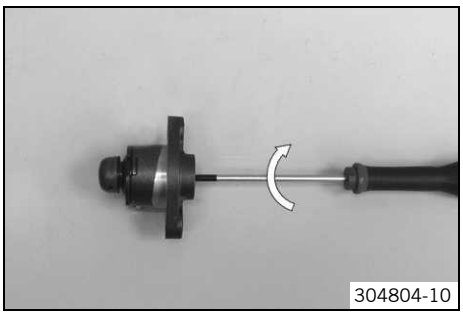


– Thoroughly clean all oil jets and blow through with compressed air.
– Mount the dowels.
– Position the camshaft bearing bridge.
– Mount screws ❷ and tighten from the inside to the outside.

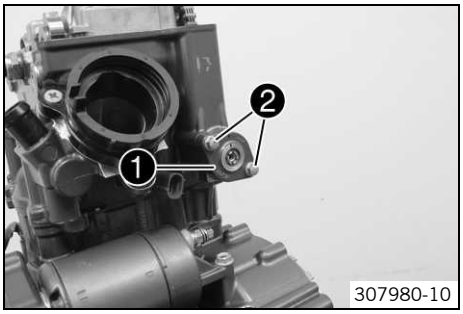
Guideline

Screw, camshaft bearing bridge	M6	11 Nm (8.1 lbf ft)

16.5.28 Installing the timing chain tensioner



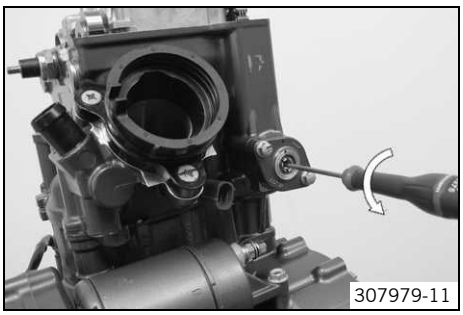
– Turn the timing chain tensioner screw clockwise.
  ✓ The timing chain tensioner is locked.



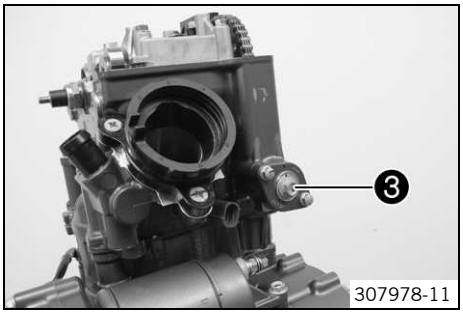
– Holding it with the correct orientation, mount the timing chain tensioner ❶ with the gasket.
– Mount and tighten screws ❷.

Guideline

Screw, timing chain tensioner	M6	12 Nm (8.9 lbf ft)



– Unlock the timing chain tensioner screw counterclockwise.
– Check the timing chain tension.

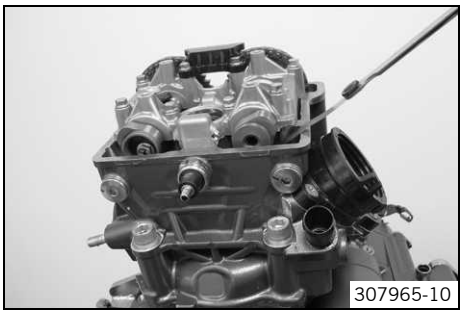


– Mount and tighten screw ❸ with the O-ring.

Guideline

Screw, unlocking of timing chain tensioner	M6	10 Nm (7.4 lbf ft)

16.5.29 Checking the valve clearance



– Remove the special tool.

Engine blocking screw (61229015000) (☛ p. 192)

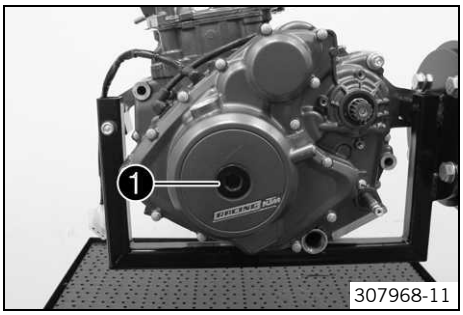
– Crank the engine several times.
– Set the engine to ignition top dead center. (☛ p. 92)
– Check the valve clearance at all valves between the camshaft and cam lever.

Guideline

Valve clearance, exhaust, cold	0.13... 0.17 mm (0.0051... 0.0067 in)
Valve clearance, intake, cold	0.08... 0.12 mm (0.0031... 0.0047 in)

Feeler gauge (59029041100) (☛ p. 190)

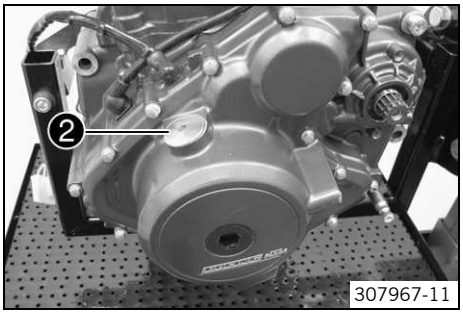
» If valve clearance does not meet specifications:
– Adjust the valve clearance. (☛ p. 143)



– Mount and tighten screw plug ❶.

Guideline

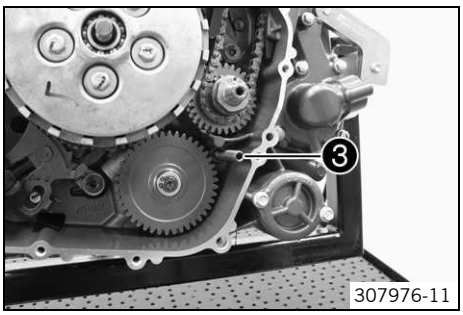
Screw plug, alternator cover	M18x1.5	10 Nm (7.4 lbf ft)



– Mount and tighten screw plug ❷.

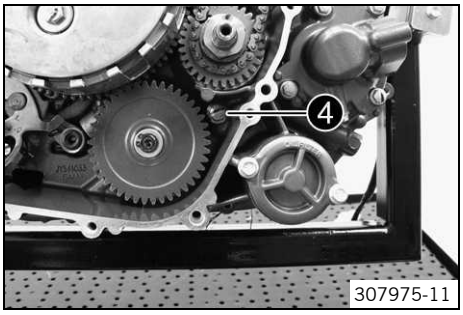
Guideline

Screw plug, alternator cover	M24x1.5	10 Nm (7.4 lbf ft)



– Remove special tool ❸.

Engine blocking screw (61229015000) (☛ p. 192)



– Mount and tighten screws ❹.

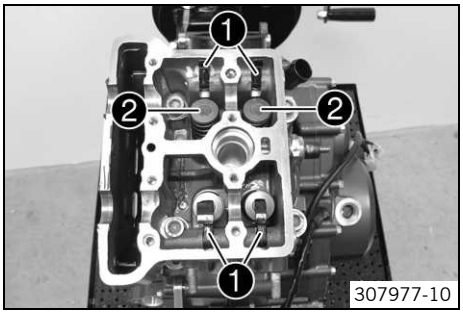
Guideline

Screw plug	M8	12 Nm (8.9 lbf ft)

16.5.30 Adjusting the valve clearance

Preparatory work

– Remove the timing chain tensioner. (☛ p. 93)
– Remove the camshaft. (☛ p. 93)



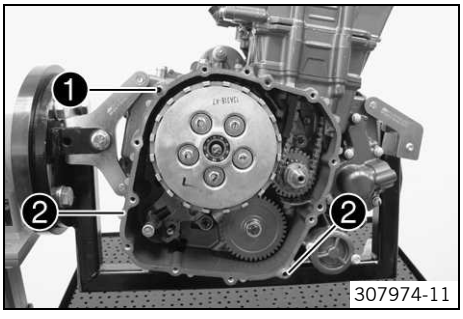
Main work

– Swing up cam lever ❶.
– Correct the shims ❷ as indicated by the results of the valve clearance check.

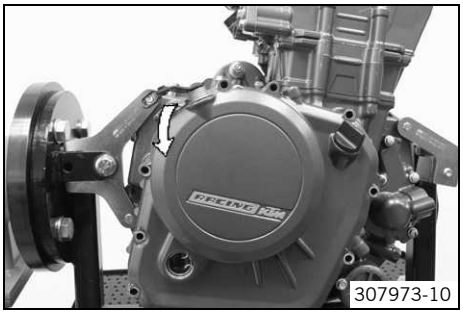
Finishing work

– Install the camshafts. (☛ p. 141)
– Install the timing chain tensioner. (☛ p. 141)
– Check the valve clearance. (☛ p. 142)

16.5.31 Installing the clutch cover

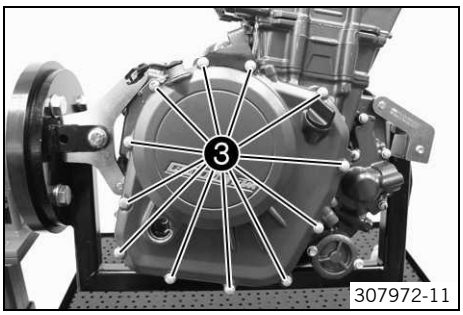


– Mount dowel ❶ and clutch cover gasket ❷.



– Position the clutch cover.

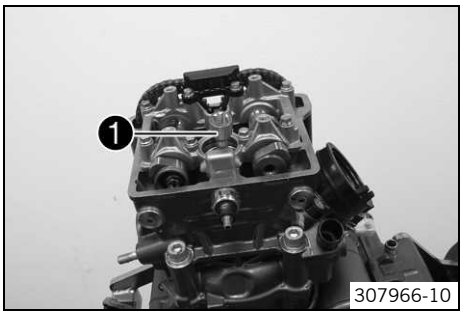
Info
Pivot the clutch lever.



– Mount and tighten screws ❸.
Guideline

Screw, clutch cover	M6	12 Nm (8.9 lbf ft)

16.5.32 Installing the spark plug



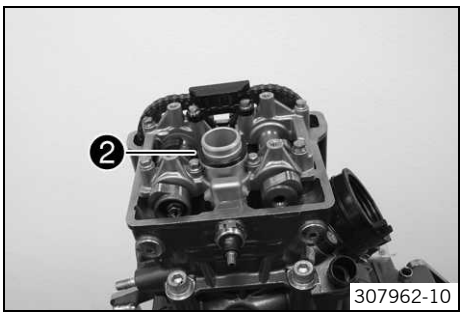
– Mount and tighten the spark plug using special tool ❶.
Guideline

Spark plug	M12	15 Nm (11.1 lbf ft)

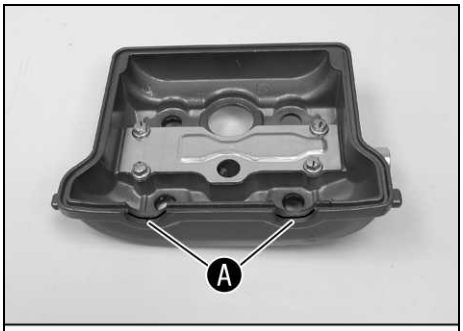
Spark plug wrench (77229172000) (☛ p. 193)

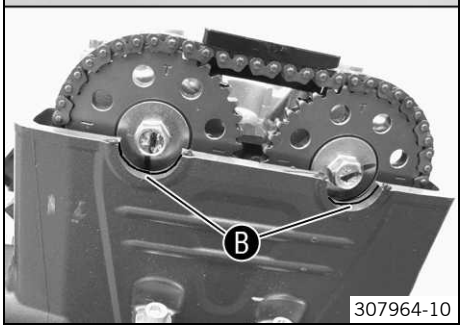
16.5.33 Installing the valve cover

– Grease the O-rings and mount spark plug shaft insert ❶.



– Mount gasket ❷.

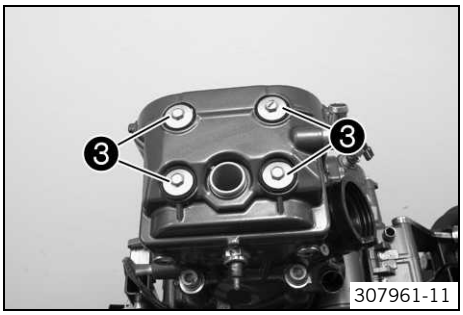




– Degrease the sealing areas and thinly coat with sealant in areas Ⓐ and Ⓑ.

Loctite® 5910

– Position the gasket in the valve cover.

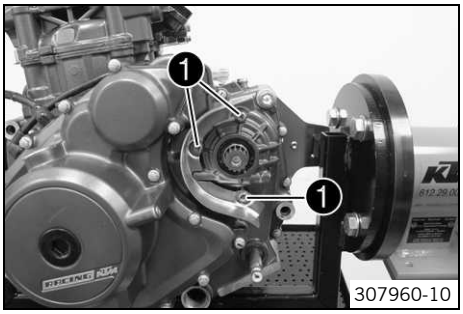


– Position the valve cover with the gasket.
– Mount and tighten screws ❸ with the gaskets.

Guideline

Screw, valve cover	M6	12 Nm (8.9 lbf ft)

16.5.34 Installing the chain securing guide

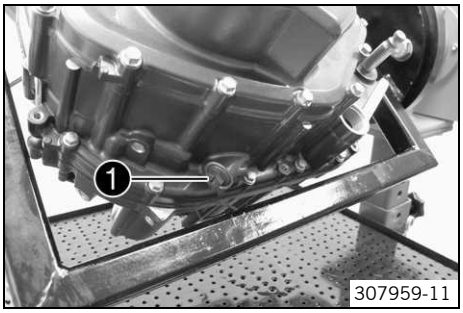


– Position the chain securing guide.
– Mount and tighten screws ❶.

Guideline

Screw, chain securing guide	M6	11 Nm (8.1 lbf ft)	**Loctite® 243™**

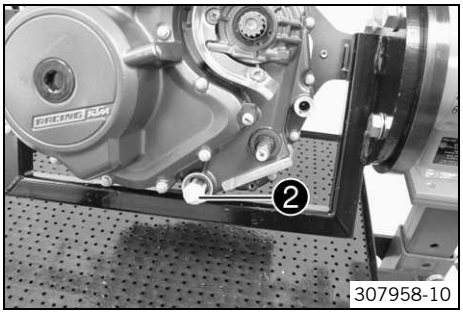
16.5.35 Installing the oil screen



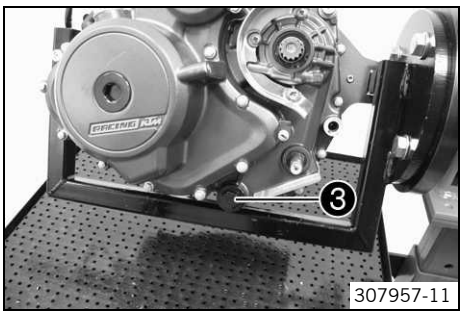
– Mount and tighten screw plug ❶ with the O-ring and oil screen.

Guideline

Oil screen screw plug, small	M17x1.5	12 Nm (8.9 lbf ft)



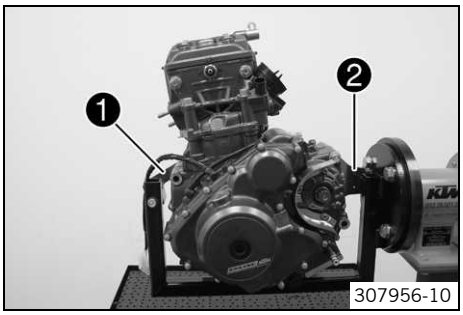
– Mount oil screen ❷ with the O-ring.



– Mount and tighten oil drain plug ❸ with the O-ring.
Guideline

Oil drain plug	M24x1.5	15 Nm (11.1 lbf ft)

16.5.36 Removing the engine from the engine assembly stand



– Remove the fitting from special tools ❶ and ❷.

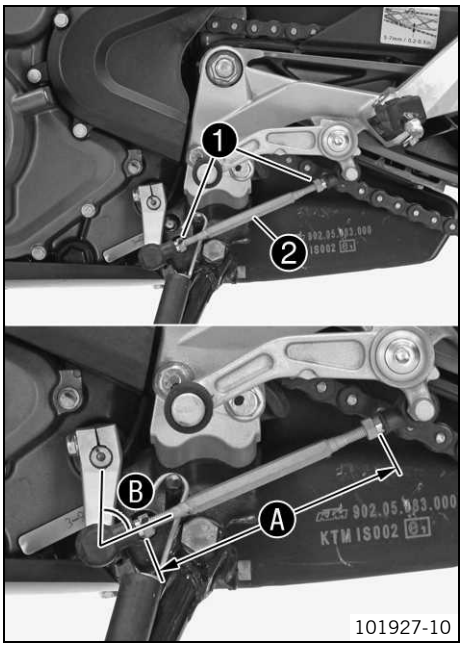
Engine fixing arm (90129002060) (☛ p. 194)
Engine fixing arm (90129002050) (☛ p. 193)

– Remove the engine from the engine assembly stand.

Info
Have an assistant help you or use a crane.

17.1 Adjusting the shift lever

Info
The adjustment range of the shift lever is limited.



– Loosen nuts ❶.
– Adjust the shift lever by turning shift rod ❷.
Guideline

Shift rod adjustment range Ⓐ	110... 122 mm (4.33... 4.8 in)

Info
Make the same adjustments on both sides.
At least five screw threads must be screwed into the seating.

– Check adjusting angle Ⓑ.
Guideline

Adjusting angle Ⓑ shift rod - linkage - shift lever	75°

– Tighten nuts ❶.

Info
After the nuts have been tightened, the bearings of the shift rod must be central and aligned identically to each other in order to ensure freedom of movement in the bearing shells.

– Check the shift lever to ensure it is functioning properly and can move freely.

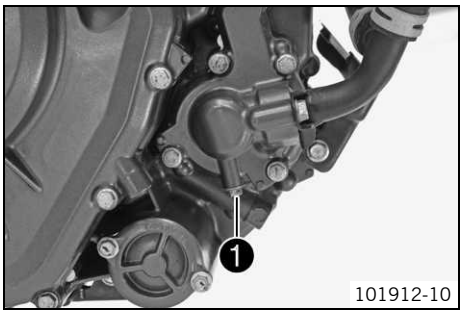
18.1 Draining the coolant

Warning
Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

– Do not remove the radiator cap, radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. In case of scalding, rinse immediately with lukewarm water.

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

– Coolant must not come into contact with the skin, eyes, or clothing. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If coolant is swallowed, contact a physician immediately. Change clothing that is contaminated with coolant. Keep coolant out of reach of children.



Condition
The engine is cold.

Preparatory work
– Remove the front spoiler. (☛ p. 47)

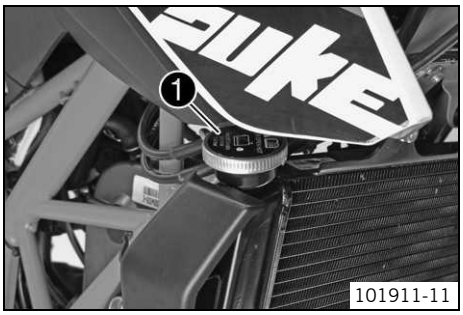
Main work
– Stand the motorcycle upright.
– Place a suitable container under the engine.
– Remove screw ❶.
– Remove the radiator cap.
– Completely drain the coolant.
– Mount screw ❶ with a new seal ring and tighten it.
Guideline

Plug, water pump drain hole	M6	8 Nm (5.9 lbf ft)

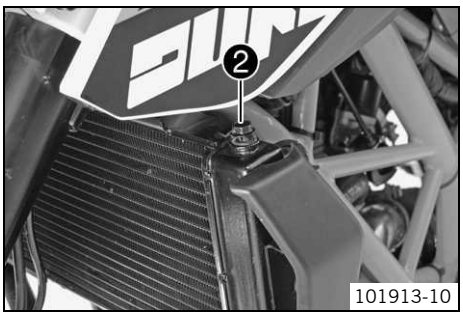
18.2 Filling/bleeding the cooling system

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

– Coolant must not come into contact with the skin, eyes, or clothing. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If coolant is swallowed, contact a physician immediately. Change clothing that is contaminated with coolant. Keep coolant out of reach of children.



– Remove radiator cap ❶.



– Open bleeder screw ❷ by three turns.
– Tilt the vehicle slightly to the right.
– Pour in coolant until it emerges without bubbles at the bleeder screw, and then mount and tighten the bleeder screw immediately.

Alternative 1

Coolant (☛ p. 186)

Alternative 2

Coolant (mixed ready to use) (☛ p. 186)

– Fill the radiator completely with coolant. Mount the radiator cap.

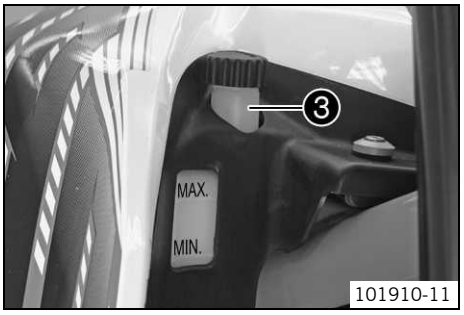
– Rest the vehicle on the side stand.

Danger

Danger of poisoning Exhaust gases are toxic 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 warm.
– Stop the engine and allow it to cool down.
– When the engine is cool, check the coolant level in the radiator and, if necessary, add coolant.
– Remove the cap of the compensating tank ❸ and add coolant until the coolant level is up to the **MAX** mark.
– Mount the cap of the compensating tank.
– Fit the front spoiler. (☛ p. 47)



18.3 Checking the antifreeze and coolant level

Warning

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

– Do not remove the radiator cap, radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. In case of scalding, rinse immediately with lukewarm water.

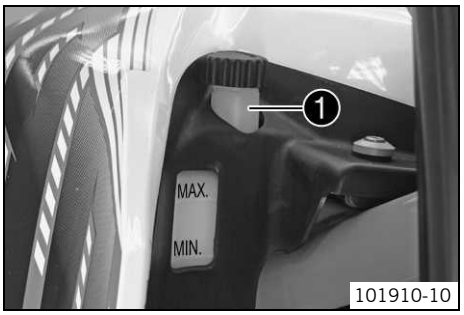
Warning

Danger of poisoning Coolant is poisonous and a health hazard.

– Coolant must not come into contact with the skin, eyes, or clothing. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If coolant is swallowed, contact a physician immediately. Change clothing that is contaminated with coolant. Keep coolant out of reach of children.

Condition

The engine is cold.



– Stand the motorcycle upright on a horizontal surface.
– Remove the cap of the compensating tank ❶.
– Check the coolant antifreeze.

−25... −45 °C (−13... −49 °F)

» If the coolant antifreeze does not meet specifications:
– Correct the coolant antifreeze.

– Check the coolant level in the compensating tank.

The coolant level must be between **MIN** and **MAX**.

» If the coolant level does not meet specifications:
– Correct the coolant level.

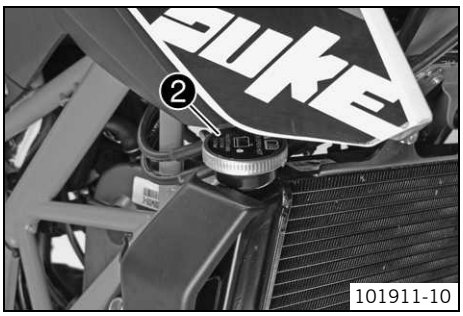
Alternative 1

Coolant (☛ p. 186)

Alternative 2

Coolant (mixed ready to use) (☛ p. 186)

– Mount the cap of the compensating tank.



– Remove radiator cap ❷.
– Check the coolant antifreeze.

−25... −45 °C (−13... −49 °F)

» If the coolant antifreeze does not meet specifications:
– Correct the coolant antifreeze.

– Check the coolant level in the radiator.

The radiator must be completely filled.

» If the coolant level does not meet specifications:
– Correct the coolant level and find out the cause of the loss.

Alternative 1

Coolant (☛ p. 186)

Alternative 2

Coolant (mixed ready to use) (☛ p. 186)

» If you had to add more coolant than the specified amount:
> 0.20 l (> 0.21 qt.)
– Fill/bleed the cooling system. (☛ p. 148)

– Mount the radiator cap.

18.4 Checking the coolant level

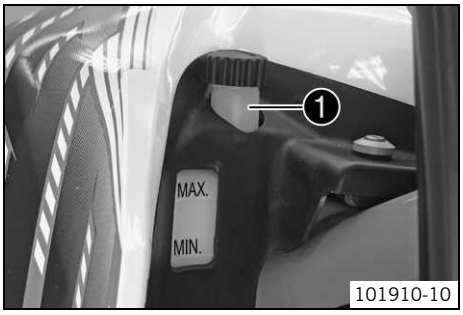
Warning
Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

– Do not remove the radiator cap, radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. In case of scalding, rinse immediately with lukewarm water.

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

– Coolant must not come into contact with the skin, eyes, or clothing. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If coolant is swallowed, contact a physician immediately. Change clothing that is contaminated with coolant. Keep coolant out of reach of children.

Condition
The engine is cold.



– Stand the motorcycle upright on a horizontal surface.
– Check the coolant level in the compensating tank ❶.

The coolant level must be between **MIN** and **MAX**.

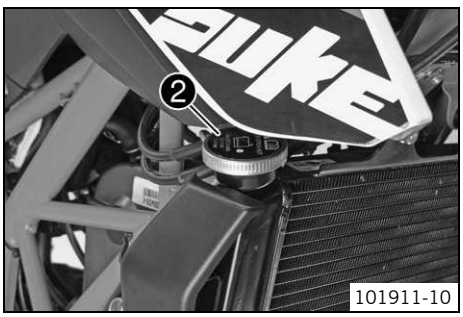
» If the coolant level does not meet specifications:
– Correct the coolant level.

Alternative 1

Coolant (☛ p. 186)

Alternative 2

Coolant (mixed ready to use) (☛ p. 186)



– Remove radiator cap ❷ and check the coolant level in the radiator.

The radiator must be completely filled.

» If the coolant level does not meet specifications:
– Correct the coolant level and find out the cause of the loss.

Alternative 1

Coolant (☛ p. 186)

Alternative 2

Coolant (mixed ready to use) (☛ p. 186)

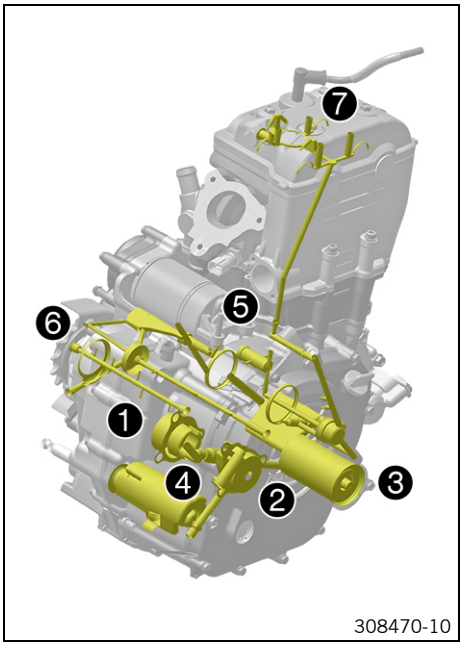
» If you had to add more coolant than the specified amount:
> 0.20 l (> 0.21 qt.)

– Fill/bleed the cooling system. (☛ p. 148)

– Mount the radiator cap.

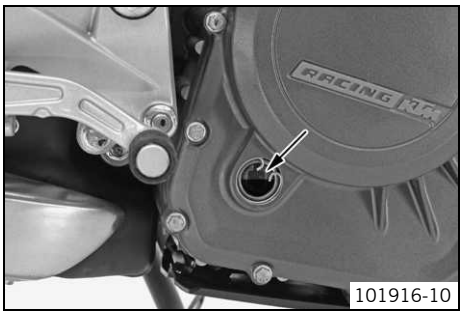
19 LUBRICATION SYSTEM

19.1 Oil circuit



1	Suction pump
2	Force pump
3	Oil filter
4	Oil pressure regulator valve
5	Oil jet for piston cooling
6	Oil spray tube
7	Oil jet for cam follower lubrication

19.2 Checking the engine oil level



Condition

The engine is at operating temperature.

Preparatory work

– Stand the motorcycle upright on a horizontal surface.

Main work

– Check the engine oil level.

Info

After switching off the engine, wait one minute before checking the level.

The engine oil must be between the lower and upper edge of the oil level viewer.

» If the engine oil level is not at the specified level:

– Add the engine oil. (☛ p. 155)

19.3 Checking the engine oil pressure

Warning

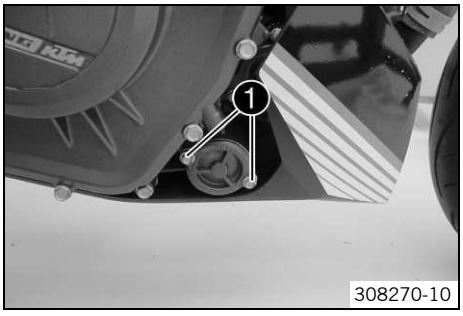
Danger of scalding Engine oil and gear oil get very hot when the motorcycle is ridden.

– Wear appropriate protective clothing and safety gloves. In case of burns, rinse immediately with lukewarm water.

Warning

Environmental hazard Hazardous substances cause environmental damage.

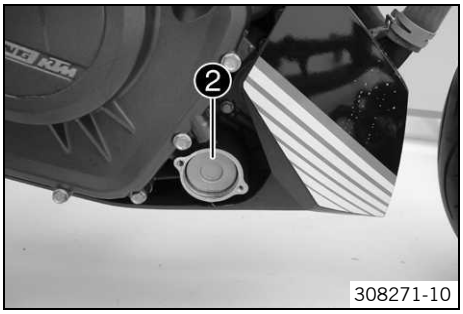
– Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.



Main work

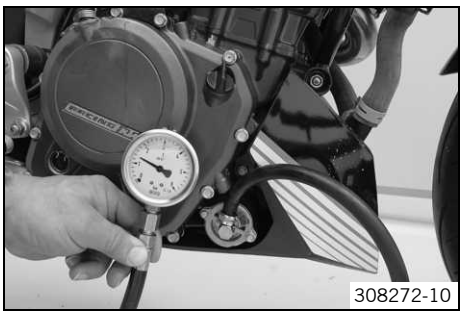
– Place a suitable container under the engine.

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



– Remove oil filter ❷.

Circlip pliers reverse (51012011000) (☛ p. 189)



– Position the special tool with the O-ring. Mount and tighten the screws.

Guideline

Screw, oil filter cover	M5	8 Nm (5.9 lbf ft)

Oil pressure adapter (75029094000) (☛ p. 192)

– Connect the pressure tester to the special tool without the T-plate.

Pressure testing tool (61029094000) (☛ p. 191)

– Check the engine oil level. (☛ p. 152)

Danger

Danger of poisoning Exhaust gases are toxic 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.
– Check the engine oil pressure.

Engine oil pressure	
Coolant temperature: ≥ 70 °C (≥ 158 °F) Engine speed: 1,500 rpm	≥ 0.7 bar (≥ 10 psi)
Coolant temperature: ≥ 70 °C (≥ 158 °F) Engine speed: 5,000 rpm	≥ 2.4 bar (≥ 35 psi)

» If the specification is not reached:

– Check oil pumps for wear. Check all oil channels for free flow.

– Switch off the engine.

Warning

Danger of burns Some vehicle components get very hot when the machine is driven.

– Wear appropriate protective clothing and safety gloves. In case of burns, rinse immediately with lukewarm water.

– Remove the special tools.
– Insert the new oil filter.
– Oil the O-ring of the oil filter cover. Mount the oil filter cover.
– Mount and tighten the screws.

Guideline

Screw, oil filter cover	M5	8 Nm (5.9 lbf ft)

Finishing work

– Check the engine oil level. (☛ p. 152)

19.4 Changing the engine oil and oil filter, cleaning the oil screen

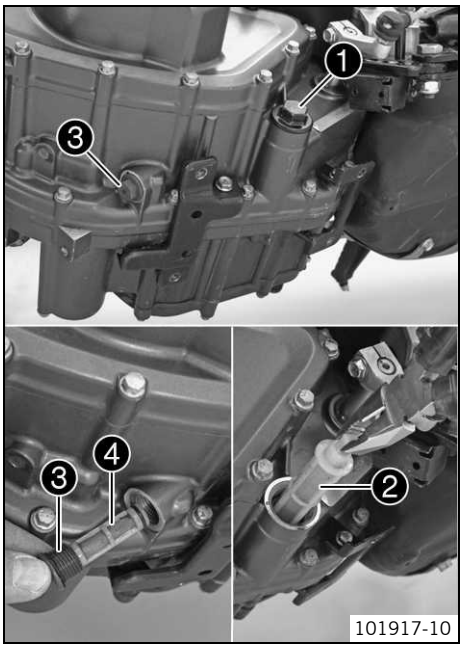
Warning
Danger of scalding Engine oil and gear oil get very hot when the motorcycle is ridden.
– Wear appropriate protective clothing and safety gloves. In case of burns, rinse immediately with lukewarm water.

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

Info
Drain the engine oil only when the engine is warm.

Preparatory work
– Remove the front spoiler. (☛ p. 47)
– Stand the motorcycle on its side stand on a horizontal surface.

Main work

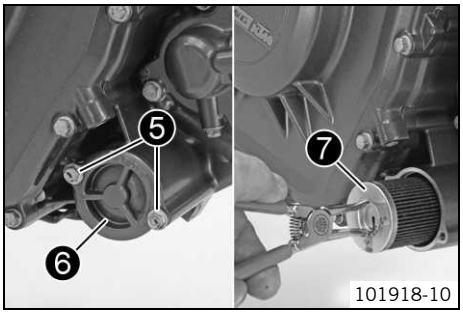


– Place a suitable container under the engine.
– Remove the oil drain plug ❶ with the O-ring.
– Remove oil screen ❷ with the O-ring.
– Remove screw plug ❸ with oil screen ❹.
– Completely drain the engine oil.
– Thoroughly clean the oil drain plugs and oil screens.
– Position oil screen ❷ and mount and tighten oil drain plug ❶ with the O-ring.
Guideline

Oil drain plug	M24x1.5	15 Nm (11.1 lbf ft)

– Mount and tighten screw plug ❸ with oil screen ❹ and the O-ring.
Guideline

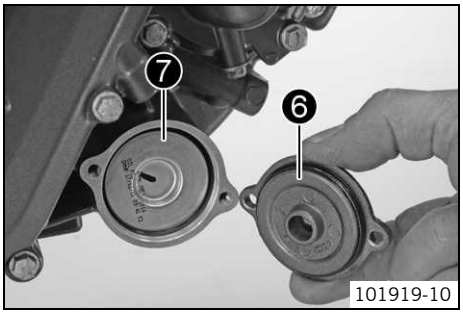
Oil screen screw plug, small	M17x1.5	12 Nm (8.9 lbf ft)



– Remove screws ❺. Remove the oil filter cover ❻ with the O-ring.
– Pull oil filter ❼ out of the oil filter housing.

Circlip pliers reverse (51012011000) (☛ p. 189)

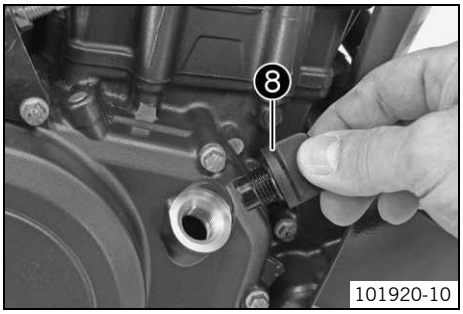
– Completely drain the engine oil.
– Thoroughly clean the parts and sealing area.



– Insert oil filter ❼.
– Oil the O-ring of the oil filter cover. Mount oil filter cover ❻.
– Mount and tighten the screws.
Guideline

Screw, oil filter cover	M5	8 Nm (5.9 lbf ft)

Info
Too little engine oil or poor-quality engine oil results in premature wear to the engine.



– Remove the oil filler plug ❽ with the O-ring from the clutch cover and fill up with engine oil.

Engine oil	1.6 l (1.7 qt.)	Engine oil (SAE 15W/50) (☛ p. 186)

– Install and tighten the oil filler plug with the O-ring.

Danger

Danger of poisoning Exhaust gases are toxic 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.

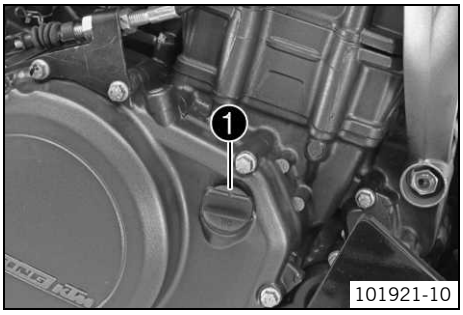
Finishing work

– Fit the front spoiler. (☛ p. 47)
– Check the engine oil level. (☛ p. 152)

19.5 Adding engine oil

Info

Too little engine oil or poor-quality engine oil results in premature wear to the engine.



Main work

– Remove the oil filler plug ❶ with the O-ring from the clutch cover and fill up with engine oil.

Engine oil (SAE 15W/50) (☛ p. 186)

Info

For optimal performance of the engine oil, do not mix different types of engine oil.
If appropriate, change the engine oil.

– Install and tighten the oil filler plug with the O-ring.

Danger

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

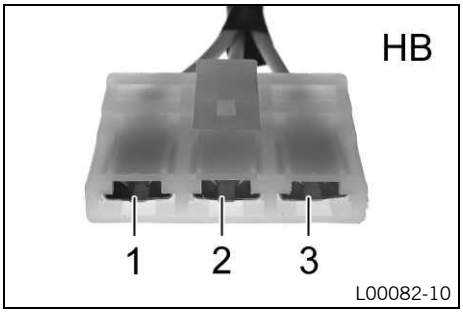
– When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in an enclosed space without an effective exhaust extraction system.

– Start the engine and check that it is oil-tight.

Finishing work

– Check the engine oil level. (☛ p. 152)

20.1 Alternator - checking the stator winding



Stator winding, measurement I - check the resistance

– Measure the resistance between the specified points.
Stator, connector **HB** pin **1** – Stator, connector **HB** pin **2**

Alternator	
Resistance of stator winding at: 20 °C (68 °F)	≤ 1 Ω

» If the displayed value does not equal the setpoint value:

– Change the stator.

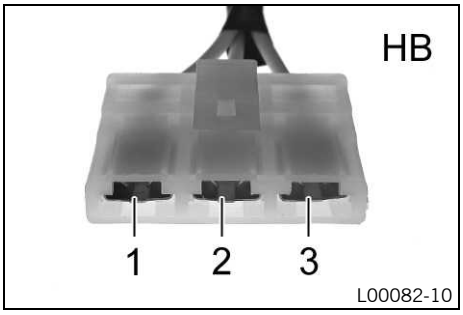
Stator winding, measurement II - check the resistance

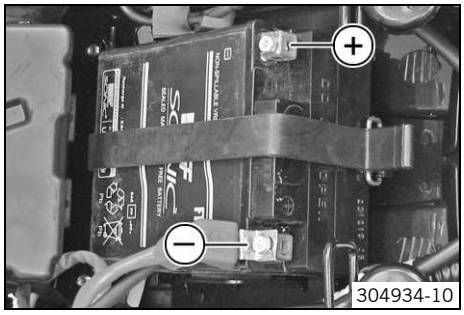
– Measure the resistance between the specified points.
Stator, connector **HB** pin **1** – Stator, connector **HB** pin **3**

Alternator	
Resistance of stator winding at: 20 °C (68 °F)	≤ 1 Ω

» If the displayed value does not equal the setpoint value:

– Change the stator.





Stator winding - check the short circuit to ground (terminal 31)

– Measure the resistance between the specified points.
Stator, connector **HB** pin **1** – Measuring point **Ground (–)**

Resistance	∞ Ω

» If the displayed value does not equal the setpoint value:

– Change the stator.

21.1 Engine

Design	1-cylinder 4-stroke engine, water-cooled
Displacement	375 cm³ (22.88 cu in)
Stroke	60 mm (2.36 in)
Bore	89 mm (3.5 in)
Compression ratio	12.8:1
Control	DOHC, 4 valves controlled via cam lever, chain drive
Valve diameter, intake	36 mm (1.42 in)
Valve diameter, exhaust	29 mm (1.14 in)
Valve clearance, intake, cold	0.08... 0.12 mm (0.0031... 0.0047 in)
Valve clearance, exhaust, cold	0.13... 0.17 mm (0.0051... 0.0067 in)
Crankshaft bearing	2 slide bearings
Conrod bearing	Sleeve bearing
Pistons	Forged light alloy
Piston rings	1 compression ring, 1 tapered compression piston ring, 1 oil scraper ring
Engine lubrication	Pressure circulation lubrication with two rotary pumps
Primary transmission	30:80
Clutch	Clutch in oil bath/mechanically activated
Transmission	6-gear, claw shifted
Transmission ratio	
1st gear	12:32
2nd gear	14:26
3rd gear	19:27
4th gear	21:24
5th gear	23:22
6th gear	25:21
Mixture preparation	Electronically controlled fuel injection
Ignition	Contactless controlled fully electronic ignition with digital ignition adjustment
Alternator	12 V, 238 W
Spark plug	BOSCH VR 5 NE
Spark plug electrode gap	0.8 mm (0.031 in)
Cooling	Water cooling, permanent circulation of coolant by water pump
Idle speed	1,550... 1,650 rpm
Starting aid	Electric starter

21.2 Engine tolerance, wear limits

Valve - sealing seat width	
Intake	0.90... 1.10 mm (0.0354... 0.0433 in)
Exhaust	0.90... 1.10 mm (0.0354... 0.0433 in)
Cylinder/cylinder head - distortion of sealing area	≤ 0.10 mm (≤ 0.0039 in)
Cylinder - bore diameter	88.982... 88.998 mm (3.50322... 3.50385 in)
Piston - diameter	88.931... 88.949 mm (3.50121... 3.50192 in)
Piston/cylinder - mounting clearance	
New condition	0.033... 0.067 mm (0.0013... 0.00264 in)
Wear limit	0.08 mm (0.0031 in)
Piston ring end gap	
Compression ring	≤ 0.40 mm (≤ 0.0157 in)
Oil scraper ring	≤ 0.80 mm (≤ 0.0315 in)
Connecting rod - radial play of lower conrod bearing	
New condition	0.045... 0.068 mm (0.00177... 0.00268 in)

Wear limit	0.080 mm (0.00315 in)
Crankshaft – diameter, crank pin	
Crankshaft classification **A**	31.970... 31.977 mm (1.25866... 1.25893 in)
Crankshaft classification **B**	31.978... 31.985 mm (1.25897... 1.25925 in)
Clutch facing discs – thickness of total package	≥ 21.30 mm (≥ 0.8386 in)
Clutch spring - length	≥ 37 mm (≥ 1.46 in)
Contact surface, clutch facing discs in clutch basket	≤ 0.5 mm (≤ 0.02 in)
Oil pressure regulator valve - minimum spring length	26.00 mm (1.0236 in)
Oil pump	
Play between external rotor and oil pump housing	0.09... 0.20 mm (0.0035... 0.0079 in)
Play between external rotor and internal rotor	0.10... 0.20 mm (0.0039... 0.0079 in)
Axial play	0.10... 0.25 mm (0.0039... 0.0098 in)
Shift shaft – play in sliding plate/shift quadrant	0.15... 0.45 mm (0.0059... 0.0177 in)

21.3 Engine tightening torques

Oil nozzle	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, gear sensor	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, ignition pulse generator	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, oil filter cover	M5	8 Nm (5.9 lbf ft)	–
Screw, retaining bracket	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, retaining bracket, stator cable	M5	8 Nm (5.9 lbf ft)	**Loctite® 243™**
Screw, stator	M5	8 Nm (5.9 lbf ft)	**Loctite® 243™**
Cylinder head screw	M6	12 Nm (8.9 lbf ft)	–
Nut, water pump impeller	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
Plug, water pump drain hole	M6	8 Nm (5.9 lbf ft)	–
Screw, alternator cover	M6	12 Nm (8.9 lbf ft)	–
Screw, bearing retainer	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**
Screw, camshaft bearing bridge	M6	11 Nm (8.1 lbf ft)	–
Screw, chain securing guide	M6	11 Nm (8.1 lbf ft)	**Loctite® 243™**
Screw, clutch cover	M6	12 Nm (8.9 lbf ft)	–
Screw, clutch spring	M6	10 Nm (7.4 lbf ft)	–
Screw, engine case	M6x40	12 Nm (8.9 lbf ft)	–
Screw, engine case	M6x60	12 Nm (8.9 lbf ft)	**Loctite® 243™**
Screw, engine vent plate	M6	10 Nm (7.4 lbf ft)	**Loctite® 243™**
Screw, freewheel gear retaining bracket	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**
Screw, locking lever	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**
Screw, oil pump	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**
Screw, retaining bracket, shaft seal ring, clutch cover	M6	11 Nm (8.1 lbf ft)	**Loctite® 243™**
Screw, shift drum locating	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**
Screw, starter motor	M6	12 Nm (8.9 lbf ft)	–
Screw, timing chain tensioner	M6	12 Nm (8.9 lbf ft)	–
Screw, timing chain tensioning rail	M6	12 Nm (8.9 lbf ft)	**Loctite® 243™**
Screw, unlocking of timing chain tensioner	M6	10 Nm (7.4 lbf ft)	–
Screw, valve cover	M6	12 Nm (8.9 lbf ft)	–
Screw, water pump cover	M6	12 Nm (8.9 lbf ft)	–
Nut, exhaust flange	M8	22 Nm (16.2 lbf ft)	–
Screw, balancer shaft gear	M8	20 Nm (14.8 lbf ft)	**Loctite® 243™**
Screw, return spring, quick shifter	M8	12 Nm (8.9 lbf ft)	**Loctite® 243™**
Stud, exhaust flange	M8	22 Nm (16.2 lbf ft)	–
Screw, conrod bearing	M8x1	34 Nm (25.1 lbf ft)	–

Oil pressure sensor	M10	14 Nm (10.3 lbf ft)	–
Rotor screw	M10	75 Nm (55.3 lbf ft)	**Loctite® 243™**
Screw, camshaft drive sprocket	M10	32 Nm (23.6 lbf ft)	**Loctite® 243™**
Screw, cylinder head	M10	1st stage 30 Nm (22.1 lbf ft) 2nd stage 60 Nm (44.3 lbf ft)	Thread is oiled, head flat is greased
Water temperature sensor	M10	14 Nm (10.3 lbf ft)	–
Spark plug	M12	15 Nm (11.1 lbf ft)	–
Nut, timing chain sprocket	M14	55 Nm (40.6 lbf ft)	**Loctite® 243™**
Nut, inner clutch hub	M16LHx1.5	120 Nm (88.5 lbf ft)	**Loctite® 243™**
Nut, primary gear/timing chain sprocket	M16x1.5	120 Nm (88.5 lbf ft)	**Loctite® 243™**
Screw plug, alternator cover	M18x1.5	10 Nm (7.4 lbf ft)	–
Oil drain plug	M24x1.5	15 Nm (11.1 lbf ft)	–
Nut, drive wheel for balancer shaft	M28	60 Nm (44.3 lbf ft)	–

21.4 Capacities

21.4.1 Engine oil

Engine oil	1.6 l (1.7 qt.)	Engine oil (SAE 15W/50) (☛ p. 186)

21.4.2 Coolant

Coolant	1.1 l (1.2 qt.)	Coolant (☛ p. 186)
		Coolant (mixed ready to use) (☛ p. 186)

21.4.3 Fuel

Total fuel tank capacity, approx.	11 l (2.9 US gal)	Super unleaded (ROZ 95/RON 95/PON 91) (☛ p. 186)

Fuel reserve, approx.	1.5 l (1.6 qt.)

21.5 Chassis

Frame	Lattice frame of steel tubes, powder-coated
Fork	**WP Suspension**
Shock absorber	**WP Suspension**
Brake system	
Front	Disc brake with four-pot brake caliper
Rear	Disc brake with single-piston brake caliper, floating
Suspension travel	
Front	150 mm (5.91 in)
Rear	150 mm (5.91 in)
Brake discs - diameter	
Front	300 mm (11.81 in)
Rear	230 mm (9.06 in)
Brake discs - wear limit	
Front	3.6 mm (0.142 in)
Rear	3.6 mm (0.142 in)
Tire air pressure, solo	
Front	2.0 bar (29 psi)
Rear	2.0 bar (29 psi)
Tire air pressure with passenger/full payload	
Front	2.0 bar (29 psi)

Rear	2.2 bar (32 psi)
Secondary ratio	15:45
Chain	5/8 x 1/4” (520) O-ring
Steering head angle	65°
Wheelbase	1,367±15 mm (53.82±0.59 in)
Seat height, unloaded	800 mm (31.5 in)
Ground clearance, unloaded	172 mm (6.77 in)
Weight without fuel, approx.	142 kg (313 lb.)

21.6 Electrical system

Battery	FTZ-9	Battery voltage: 12 V Nominal capacity: 8 Ah Maintenance-free
Fuse	75011088010	10 A
Fuse	75011088015	15 A
Fuse	75011088030	30 A
Headlight	H4/socket P43t	12 V 60/55 W
Parking light	W5W/socket W2.1x9.5d	12 V 5 W
Instrument lights and indicator lamps	LED	
Turn signal	LED	
Brake/tail light	LED	
License plate lamp	LED	

21.7 Tires

Front tires	**Rear tires**
110/70 R 17 M/C 54S TL MRF revz FC	**150/60 R 17 M/C 66S TL** MRF revz C
Additional information is available in the Service section under: http://www.ktm.com	

21.8 Fork

Fork part number	90101000044

Fork	**WP Suspension**
Fork length	736 mm (28.98 in)

Fork oil	450 ml (15.21 fl. oz.)	Fork oil (SAE 4) (48601166S1) (☛ p. 186)

21.9 Shock absorber

Shock absorber part number	90204010000
Shock absorber	**WP Suspension**
Spring preload	
Standard	3 clicks
Full payload	10 clicks
Static sag	15 mm (0.59 in)
Riding sag	50... 55 mm (1.97... 2.17 in)
Fitted length	300 mm (11.81 in)

21.10 Chassis tightening torques

Exhaust clamp	-	10 Nm (7.4 lbf ft)	–
Screw, chain guard	**EJOT PT®**	4 Nm (3 lbf ft)	–
Screw, headlight	**EJOT PT®**	4 Nm (3 lbf ft)	–
Remaining screws, chassis	M4	4 Nm (3 lbf ft)	–
Screw, EFI control unit	M4	4 Nm (3 lbf ft)	–
Screw, trim, subframe, bottom	M4	2 Nm (1.5 lbf ft)	–
Remaining nuts, chassis	M5	3 Nm (2.2 lbf ft)	–
Remaining screws, chassis	M5	5 Nm (3.7 lbf ft)	–
Screw, brake fluid reservoir of rear brake	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, fuel pump	M5	5 Nm (3.7 lbf ft)	–
Screw, fuel tank closure flange	M5	3 Nm (2.2 lbf ft)	–
Screw, fuel tank cover	M5	4 Nm (3 lbf ft)	–
Screw, fuel tank trim	M5	5 Nm (3.7 lbf ft)	–
Screw, license plate holder	M5	11 Nm (8.1 lbf ft)	–
Screw, rollover sensor	M5	6 Nm (4.4 lbf ft)	**Loctite® 243™**
Screw, side stand switch	M5	5 Nm (3.7 lbf ft)	**Loctite® 243™**
Screw, spoiler	M5	5 Nm (3.7 lbf ft)	–
Screw, subframe cover, bottom	M5	5 Nm (3.7 lbf ft)	**Loctite® 243™**
Screw, windshield	M5	3 Nm (2.2 lbf ft)	–
Nut, foot brake lever adjustment	M6	10 Nm (7.4 lbf ft)	–
Nut, radiator	M6	5 Nm (3.7 lbf ft)	–
Remaining nuts, chassis	M6	15 Nm (11.1 lbf ft)	–
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)	–
Screw, air filter box	M6	6 Nm (4.4 lbf ft)	–
Screw, bottom of rear part	M6	11 Nm (8.1 lbf ft)	–
Screw, brake fluid reservoir of rear brake	M6	9 Nm (6.6 lbf ft)	–
Screw, cable holder, side stand switch	M6	9 Nm (6.6 lbf ft)	**Loctite® 243™**
Screw, chain sliding guard	M6	9 Nm (6.6 lbf ft)	**Loctite® 243™**
Screw, compensating tank	M6	11 Nm (8.1 lbf ft)	–
Screw, foot brake cylinder	M6	9 Nm (6.6 lbf ft)	**Loctite® 243™**
Screw, front fender	M6	11 Nm (8.1 lbf ft)	–
Screw, front seat fixing	M6	5 Nm (3.7 lbf ft)	–
Screw, fuel tank	M6	11 Nm (8.1 lbf ft)	–
Screw, headlight holder	M6	11 Nm (8.1 lbf ft)	–
Screw, headlight mask	M6	11 Nm (8.1 lbf ft)	–
Screw, ignition coil	M6	9 Nm (6.6 lbf ft)	–
Screw, license plate holder	M6	14 Nm (10.3 lbf ft)	–
Screw, magnetic holder on side stand	M6	5 Nm (3.7 lbf ft)	**Loctite® 243™**
Screw, main silencer	M6	11 Nm (8.1 lbf ft)	–
Screw, radiator bracket	M6	6 Nm (4.4 lbf ft)	–
Screw, radiator holder	M6	9 Nm (6.6 lbf ft)	–
Screw, rear splash protector	M6	9 Nm (6.6 lbf ft)	–
Screw, rollover sensor holder	M6	11 Nm (8.1 lbf ft)	–
Screw, seat	M6	11 Nm (8.1 lbf ft)	–
Screw, shift activation	M6	11 Nm (8.1 lbf ft)	**Loctite® 243™**
Screw, voltage regulator	M6	10 Nm (7.4 lbf ft)	–
Screw, voltage regulator holder	M6	15 Nm (11.1 lbf ft)	–
Remaining nuts, chassis	M8	30 Nm (22.1 lbf ft)	–
Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)	–

Screw, bottom triple clamp	M8	15 Nm (11.1 lbf ft)	–
Screw, engine bearer on frame	M8	30 Nm (22.1 lbf ft)	–
Screw, foot brake lever	M8	15 Nm (11.1 lbf ft)	**Loctite® 243™**
Screw, fork stub	M8	15 Nm (11.1 lbf ft)	–
Screw, front brake disc	M8	30 Nm (22.1 lbf ft)	**Loctite® 243™**
Screw, front wheel spindle	M8	30 Nm (22.1 lbf ft)	–
Screw, handlebar clamp	M8	21 Nm (15.5 lbf ft)	–
Screw, handrail	M8	31 Nm (22.9 lbf ft)	–
Screw, horn	M8	6 Nm (4.4 lbf ft)	–
Screw, main silencer	M8	23 Nm (17 lbf ft)	–
Screw, rear brake disc	M8	30 Nm (22.1 lbf ft)	**Loctite® 243™**
Screw, rear footrest bracket	M8	26 Nm (19.2 lbf ft)	**Loctite® 243™**
Screw, shift lever	M8	15 Nm (11.1 lbf ft)	**Loctite® 243™**
Screw, top triple clamp	M8	11 Nm (8.1 lbf ft)	–
Screw, front brake caliper	M8x1	27 Nm (19.9 lbf ft)	**Loctite® 243™**
Fitting side stand	M10	34 Nm (25.1 lbf ft)	–
Fitting, engine mounting bracket	M10	55 Nm (40.6 lbf ft)	–
Nut, mirror	M10	16 Nm (11.8 lbf ft)	–
Remaining nuts, chassis	M10	50 Nm (36.9 lbf ft)	–
Remaining screws, chassis	M10	45 Nm (33.2 lbf ft)	–
Fitting, bottom shock absorber	M10x1.25	45 Nm (33.2 lbf ft)	–
Fitting, handlebar support	M10x1.25	21 Nm (15.5 lbf ft)	–
Nut, rear sprocket screw	M10x1.25	32 Nm (23.6 lbf ft)	–
Nut, turn signal	M10x1.25	6 Nm (4.4 lbf ft)	–
Screw, front footrest bracket	M10x1.25	46 Nm (33.9 lbf ft)	–
Screw, side stand bracket	M10x1.25	25 Nm (18.4 lbf ft)	**Loctite® 243™**
Screw, top shock absorber	M10x1.25	50 Nm (36.9 lbf ft)	–
Nut, rear wheel spindle	M14x1.5	90 Nm (66.4 lbf ft)	–
Nut, swingarm pivot	M14x1.5	140 Nm (103.3 lbf ft)	–
Screw, top steering head	M16x1.5	52 Nm (38.4 lbf ft)	–
Lambda sensor	M18x1.5	40... 60 Nm (29.5... 44.3 lbf ft)	Lubricant (T152) (☛ p. 188)
Nut, steering head	M30x1	5 Nm (3.7 lbf ft)	–

22.1 Cleaning the motorcycle

Note

Material damage Damage and destruction of components by high-pressure cleaning equipment.

– When cleaning the vehicle with a pressure cleaner, do not point the water jet directly onto electrical components, connectors, cables, bearings, etc. Maintain a minimum distance of 60 cm between the nozzle of the pressure cleaner and the component. Excessive pressure can cause malfunctions or destroy these parts.

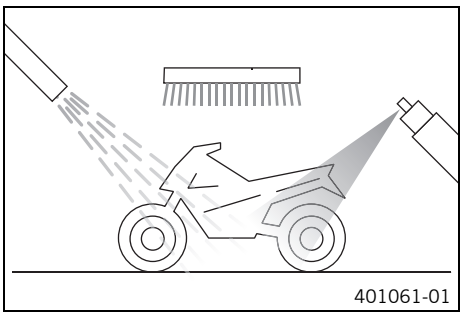
Warning

Environmental hazard Hazardous substances cause environmental damage.

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

Info

If you clean the motorcycle regularly, its value and appearance will be maintained over a long period.
Avoid direct sunshine on the motorcycle during cleaning.



– 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 paintbrush.

Motorcycle cleaner (☛ p. 188)

Info

Use warm water containing normal motorcycle cleaner and a soft sponge. Never apply motorcycle cleaner to a dry vehicle; always rinse the vehicle with water first.
If the vehicle was operated in road salt, clean it with cold water. Warm water would enhance the corrosive effects of salt.

– After rinsing the motorcycle with a gentle spray of water, allow it to dry thoroughly.
– Remove the closure of the exhaust system.

Warning

Danger of accidents Reduced braking efficiency due to a wet or dirty brake system.

– Clean or dry a dirty or wet brake system by riding and braking gently.

– After cleaning, ride the vehicle a short distance until the engine warms up.

Info

The heat produced causes water at inaccessible locations in the engine and on the brake system to evaporate.

– Push back the sleeves of the handlebar controls to allow any water that has penetrated to evaporate.
– After the motorcycle has cooled off, lubricate all moving parts and bearings.
– Clean the chain. (☛ p. 59)
– Treat bare metal parts (except for brake discs and exhaust system) with anti-corrosion materials.

Cleaning and preserving materials for metal, rubber and plastic (☛ p. 187)

– Treat all painted parts with a mild paint polish.

High-luster polish for paint (☛ p. 187)

– Treat all plastic parts and powder-coated parts with a mild cleaning and care product.

Paint cleaner and polish for high-gloss and matte finishes, bare metal and plastic surfaces (☛ p. 188)

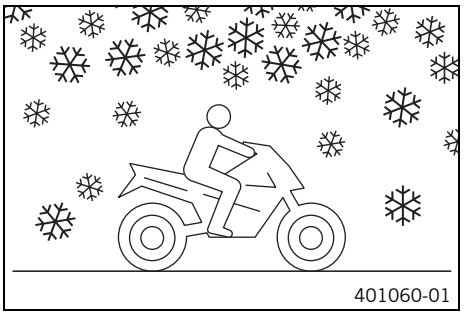
– Oil the ignition/steering lock.

Universal oil spray (☛ p. 188)

22.2 Checks and maintenance steps for winter operation

Info

If the motorcycle is used in the winter, salt can be expected on the roads. Precautions need to be taken against road salt corrosion.
If the vehicle was operated in road salt, clean it with cold water after riding. Warm water would enhance the corrosive effects of salt.


401060-01

– Clean the motorcycle. (☛ p. 163)
– Clean the brakes.

Info

After **EVERY** trip on salted roads, thoroughly wash the brake calipers and brake linings with cold water and dry carefully. This should be done after the parts are cooled down and while they are installed.
After riding on salted roads, thoroughly wash the motorcycle with cold water and dry it well.

– Treat the engine, swingarm, and all other bright and zinc-plated parts (except for the brake discs) with a wax-based corrosion inhibitor.

Info

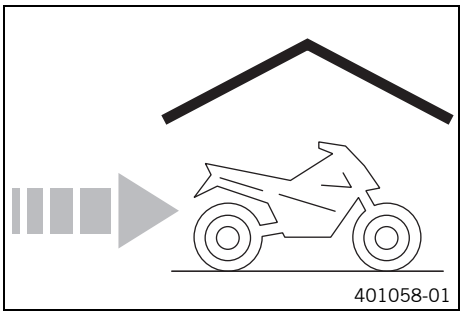
Corrosion inhibitor is not permitted to come in contact with the brake discs as this would greatly reduce the braking force.

– Clean the chain. (☛ p. 59)

23 STORAGE

23.1 Storage

Info
If you want to garage the motorcycle for a longer period, take the following steps.
Before storing the motorcycle, check all parts for function and wear. If service, repairs or replacements are necessary, you should do this during the storage period (less workshop overload). In this way, you can avoid long workshop waiting times at the start of the new season.


401058-01

– When refueling for the last time before taking the motorcycle out of service, add fuel additive.

Fuel additive (☛ p. 187)

– Refuel.
– Clean the motorcycle. (☛ p. 163)
– Change the engine oil and oil filter, clean the oil screen. (☛ p. 154)
– Check the antifreeze and coolant level. (☛ p. 149)
– Check the tire air pressure. (☛ p. 52)
– Remove the battery. (☛ p. 61)
– Recharge the battery. (☛ p. 62)

Guideline

Storage temperature of battery without direct sunlight	0... 35 °C (32... 95 °F)

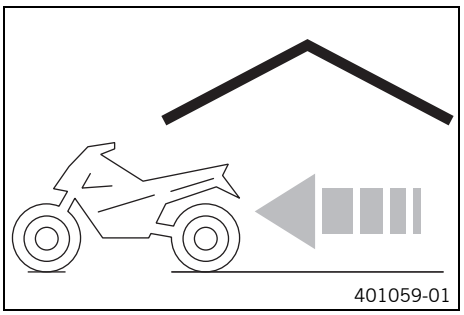
– Store the vehicle in a dry location that is not subject to large fluctuations in temperature.

Info
KTM recommends jacking up the motorcycle.

– Raise the motorcycle with the rear wheel stand. (☛ p. 9)
– Raise the motorcycle with the front wheel stand. (☛ p. 9)
– Cover the motorcycle with a tarp or similar 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 for a short time only. Since the engine cannot warm up properly, the water vapor produced during combustion condenses and causes valves and exhaust system to rust.

23.2 Preparing for use after storage


401059-01

– Take the motorcycle off of the front wheel stand. (☛ p. 10)
– Take the motorcycle off of the rear wheel stand. (☛ p. 9)
– Recharge the battery. (☛ p. 62)
– Install the battery. (☛ p. 61)
– Set the clock. (☛ p. 76)
– Perform checks and maintenance steps when preparing for use.
– Take a test ride.

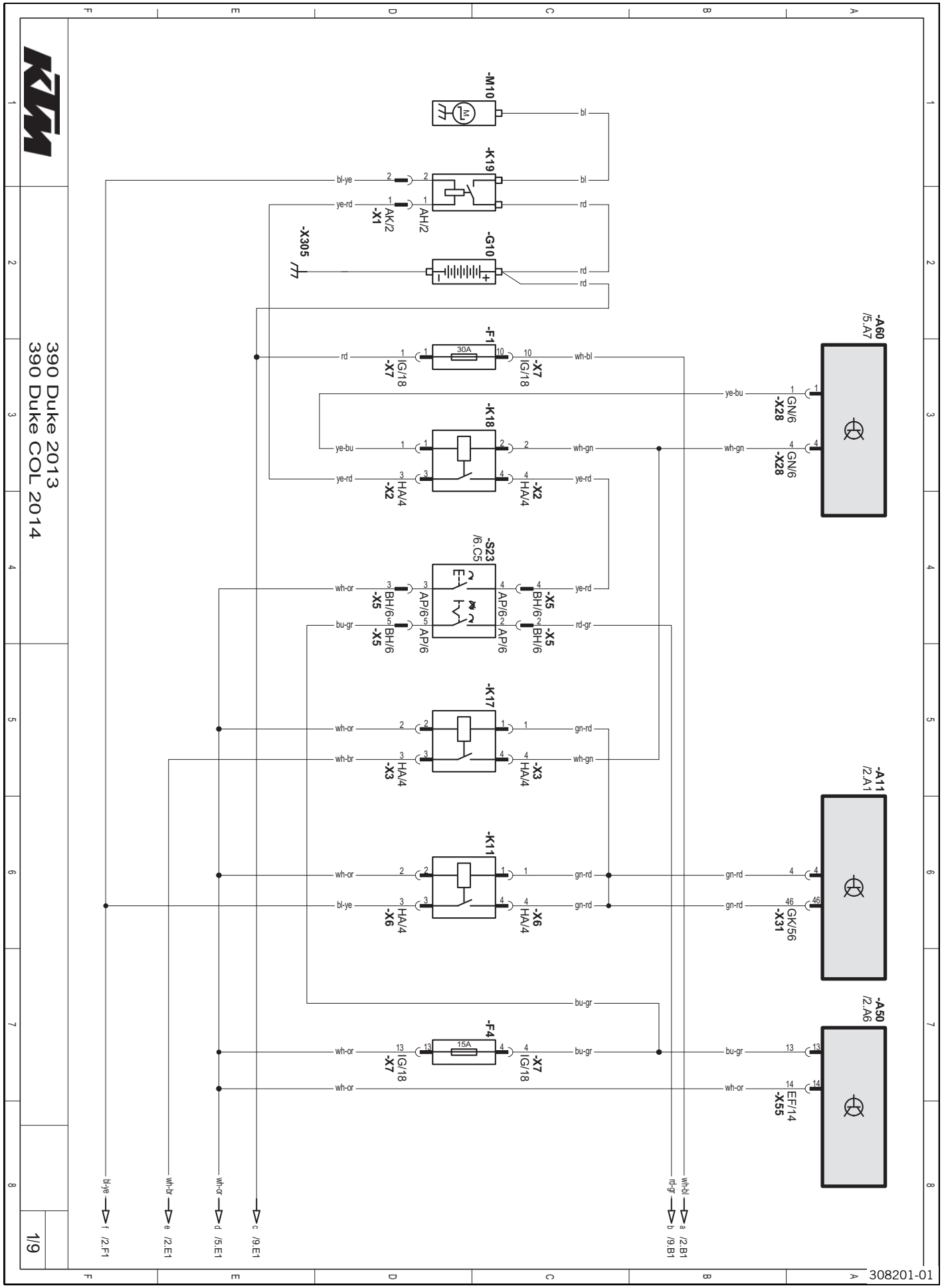
24.1 Service schedule

	Once after 1,000 km (621.4 mi)	Every 7,500 km (4,660 mi) or annually	Every 15,000 km (9,321 mi) or every 2 years
Check the functioning of the electrical equipment.	○	●	
Read out the fault memory using the KTM diagnostics tool.	○	●	
Change the engine oil and oil filter, clean the oil screen. (☛ p. 154)	○	●	
Check the front brake linings. (☛ p. 65)	○	●	
Check the rear brake linings. (☛ p. 69)	○	●	
Check the brake discs. (☛ p. 53)	○	●	
Check the brake lines for damage and leakage.	○	●	
Check the rear brake fluid level. (☛ p. 72)	○	●	
Check the shock absorber and fork for leaks.	○	●	
Check the swingarm bearing.		●	
Check the wheel bearing for play.		●	
Check the tire condition. (☛ p. 52)	○	●	
Check the tire air pressure. (☛ p. 52)	○	●	
Check the chain, rear sprocket, and engine sprocket. (☛ p. 58)		●	
Check the chain tension. (☛ p. 57)	○	●	
Grease all moving parts (e.g. side stand, hand lever, chain, ...) and check for smooth operation.	○	●	
Clean the dust boots of the fork legs. (☛ p. 14)		●	
Check the brake fluid level of the front brake. (☛ p. 67)	○	●	
Check the steering head bearing play. (☛ p. 26)	○	●	
Change the spark plugs.			●
Check the valve clearance.	○		●
Check all hoses (e.g. fuel, cooling, bleeder, drainage, etc.) and sleeves for cracking, leaks, and correct routing.	○	●	
Check the antifreeze and coolant level. (☛ p. 149)	○	●	
Check the cables for damage and routing without sharp bends.		●	
Check that the throttle cables are undamaged, routed without sharp bends, and set correctly.	○	●	
Change the air filter. Clean the air filter box.		●	
Check the screws and nuts for tightness.	○	●	
Change the front brake fluid. (☛ p. 68)			●
Change the rear brake fluid. (☛ p. 73)			●
Check the headlight setting. (☛ p. 76)	○	●	
Check that the radiator fan is functioning properly.	○	●	
Final check: Check the vehicle for roadworthiness and take a test ride.	○	●	
Read out the fault memory using the KTM diagnostics tool after a test ride.	○	●	
Make the service entry in **KTM DEALER.NET** and in the service booklet.	○	●	

○ One-time interval

● Periodic interval

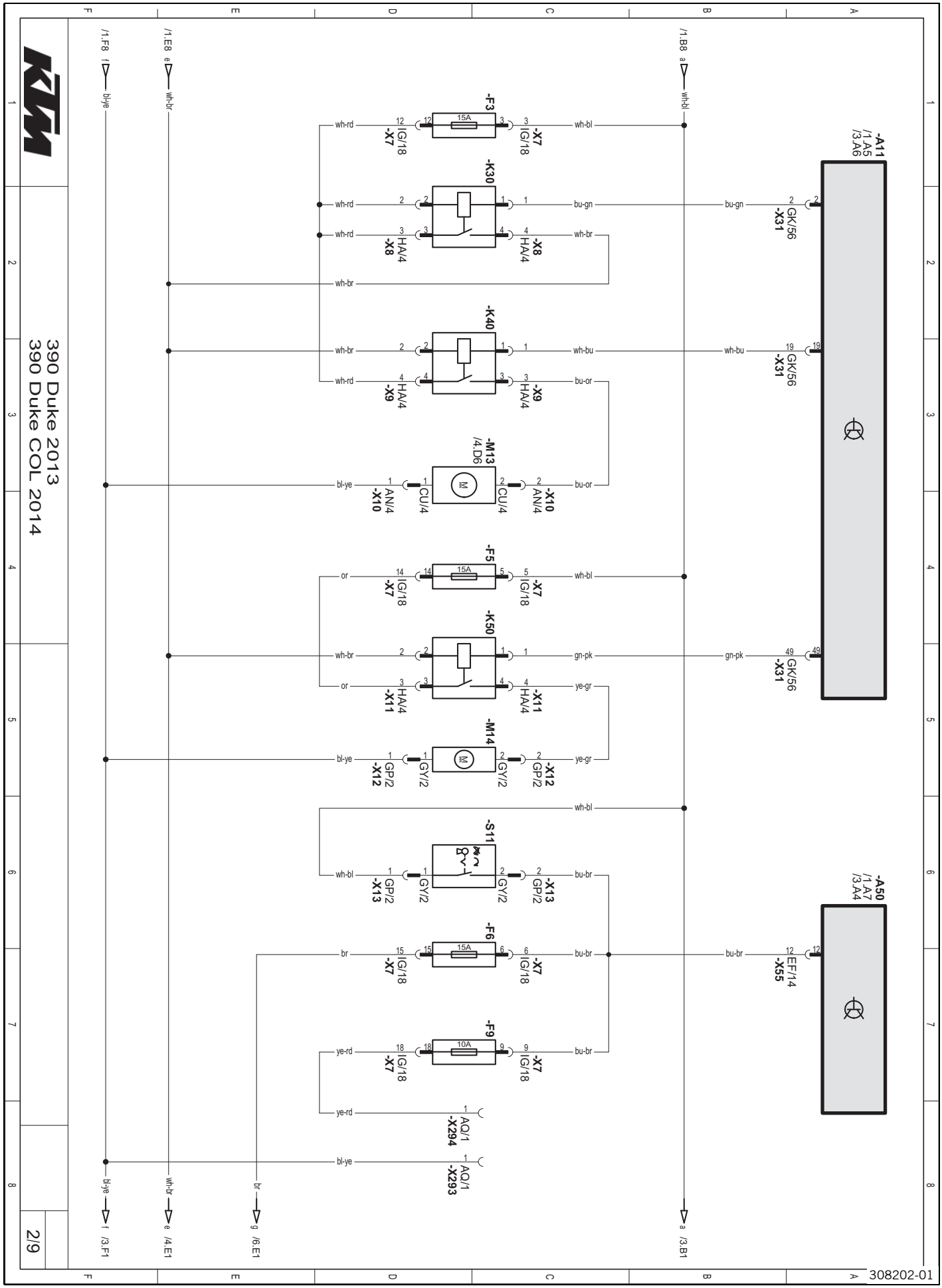
25.1 Page 1 of 9



Components:

A11	EFI control unit
A50	Alarm system (optional)
A60	Vehicle control unit
F1	Fuse
F4	Fuse
G10	Battery
K11	Start auxiliary relay 1
K17	Start auxiliary relay 2
K18	Start auxiliary relay 3
K19	Starter relay
M10	Starter motor
S23	Emergency OFF switch, electric starter button

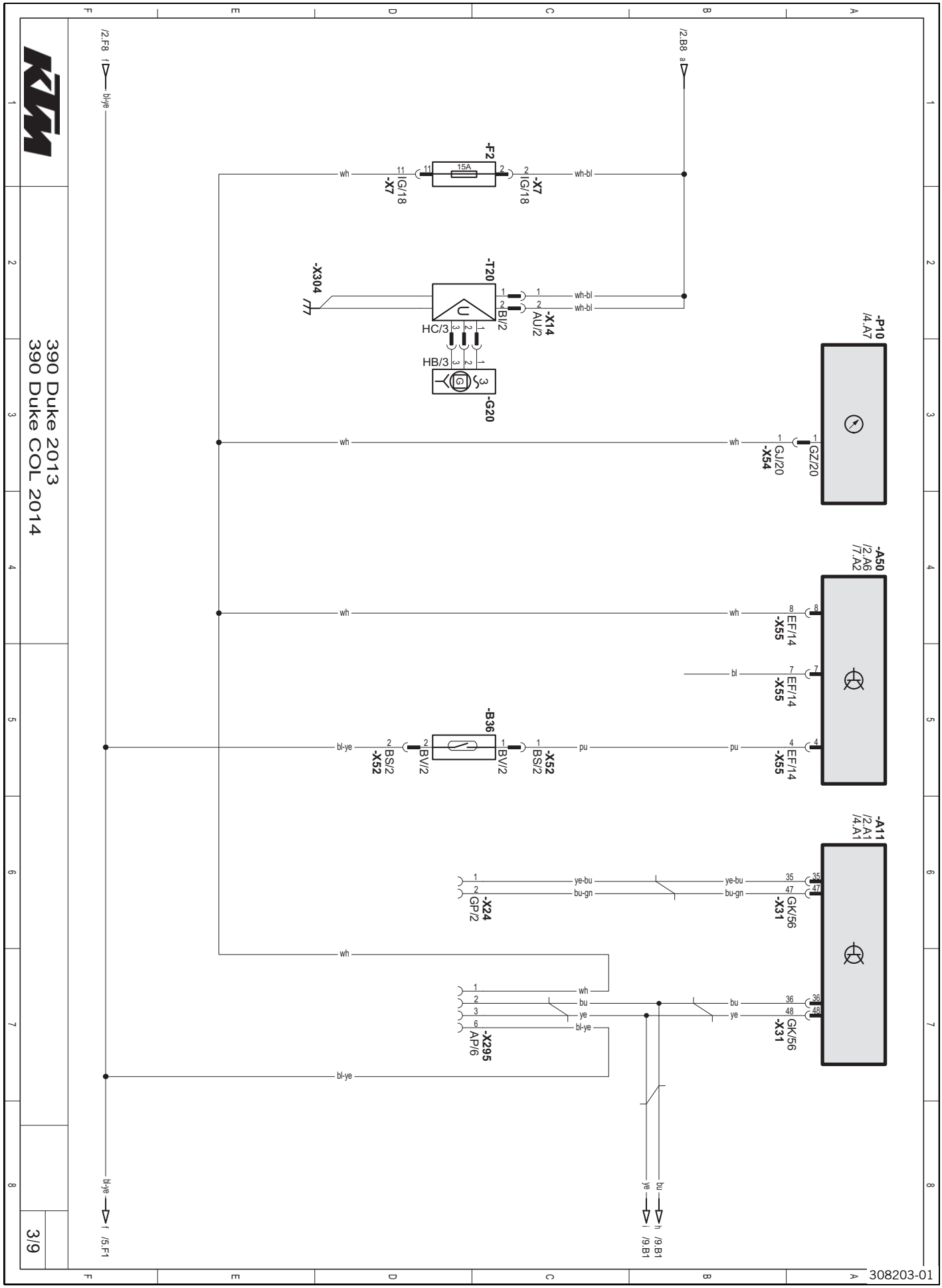
25.2 Page 2 of 9



Components:

A11	EFI control unit
A50	Alarm system (optional)
F3	Fuse
F5	Fuse
F6	Fuse
F9	Fuse
K30	Power relay
K40	Fuel pump relay
K50	Radiator fan relay
M13	Fuel pump
M14	Radiator fan
S11	Ignition/steering lock
X293	Connector for accessory ground ACC 2 (not assigned)
X294	Connector for accessory plug terminal 15 ACC 2 (not assigned)

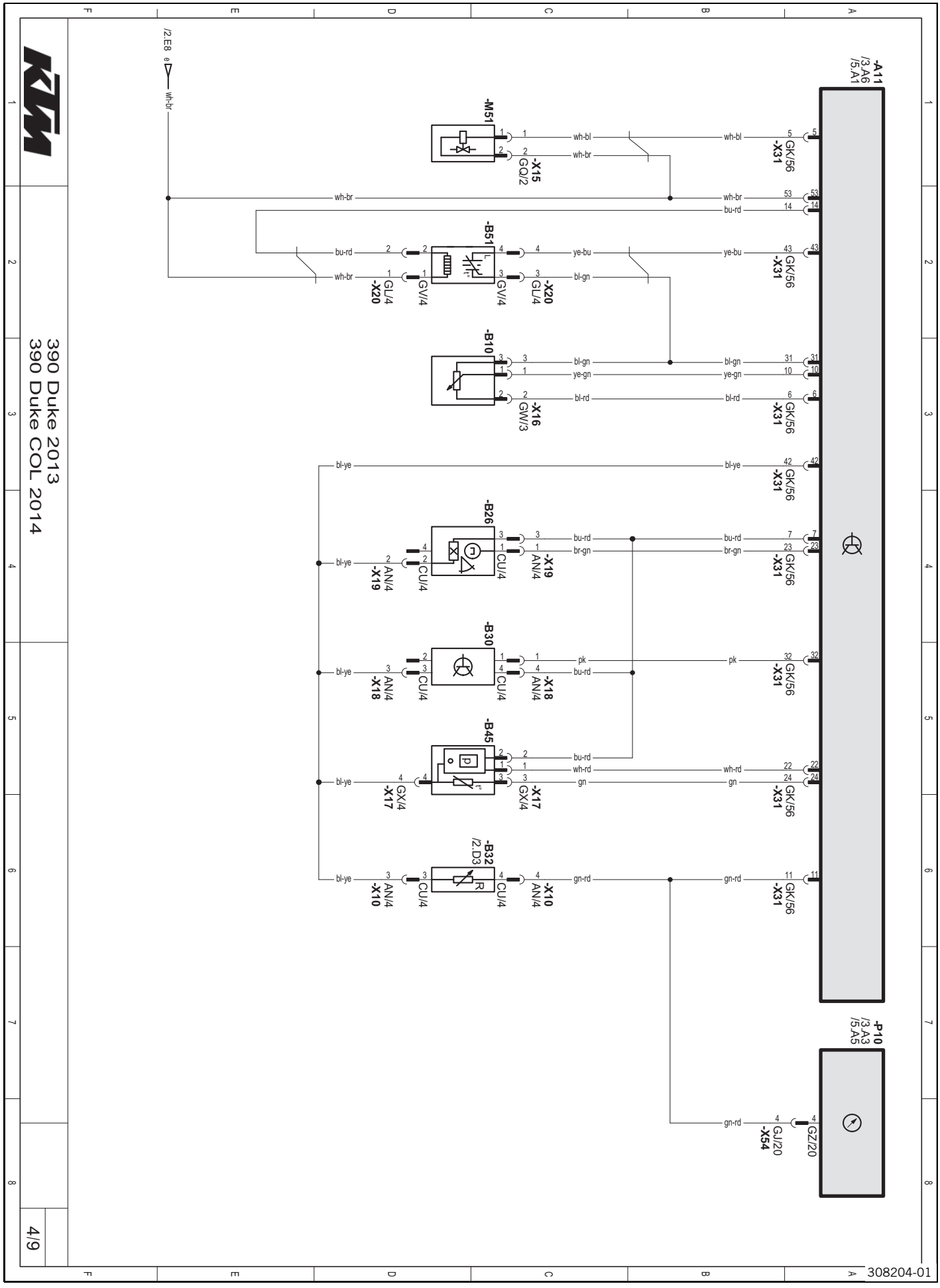
25.3 Page 3 of 9



Components:

A11	EFI control unit
A50	Alarm system (optional)
B36	Alarm system switch (optional)
F2	Fuse
G20	Alternator
P10	Combination instrument
T20	Voltage regulator
X295	Diagnostics connector

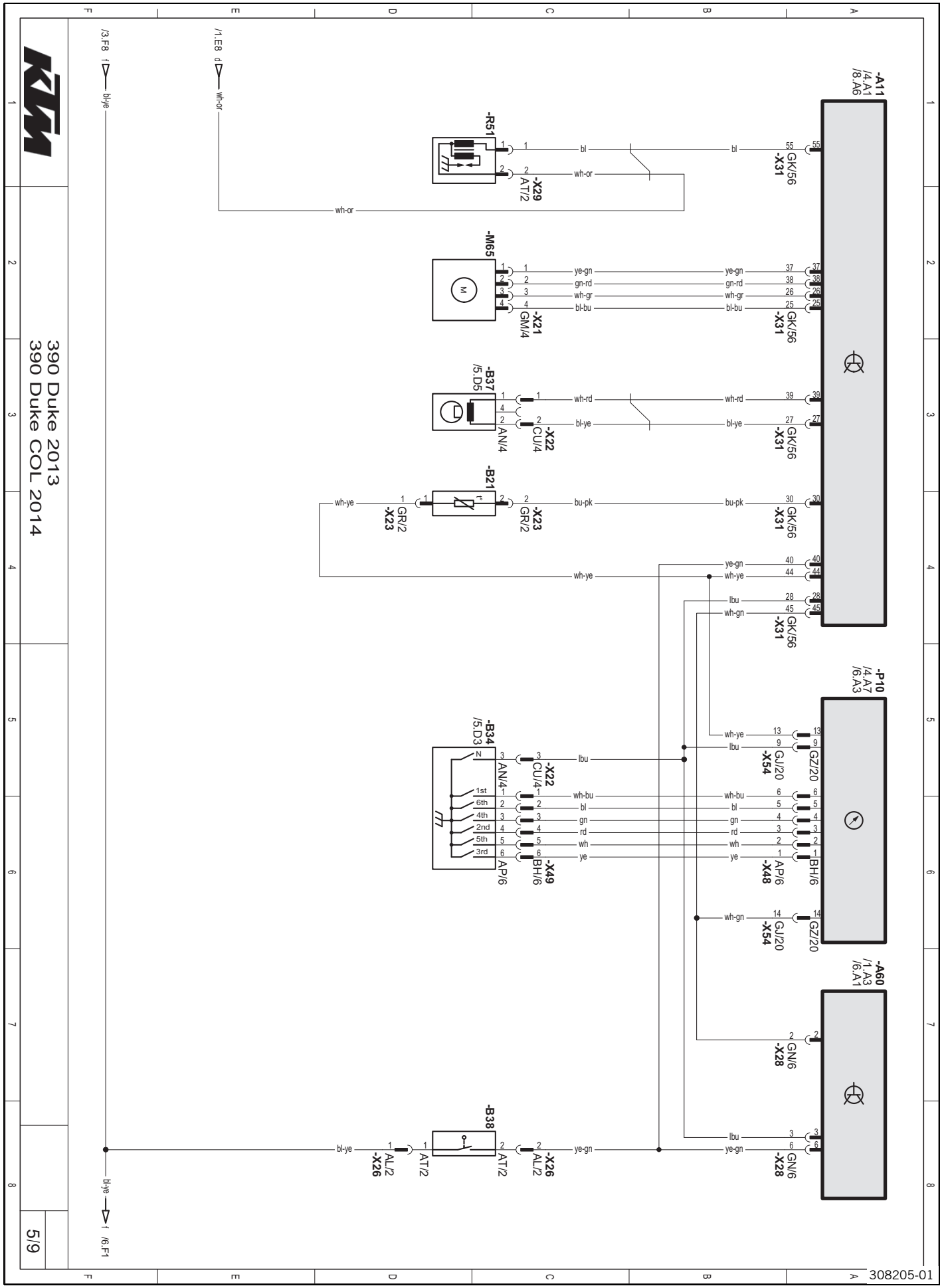
25.4 Page 4 of 9



Components:

A11	EFI control unit
B10	Throttle position sensor circuit A
B26	Rollover sensor
B30	Side stand switch
B32	Fuel tank sensor
B45	Temperature and manifold absolute pressure sensor
B51	Lambda sensor (cylinder 1)
M51	Injection valve (cylinder 1)
P10	Combination instrument

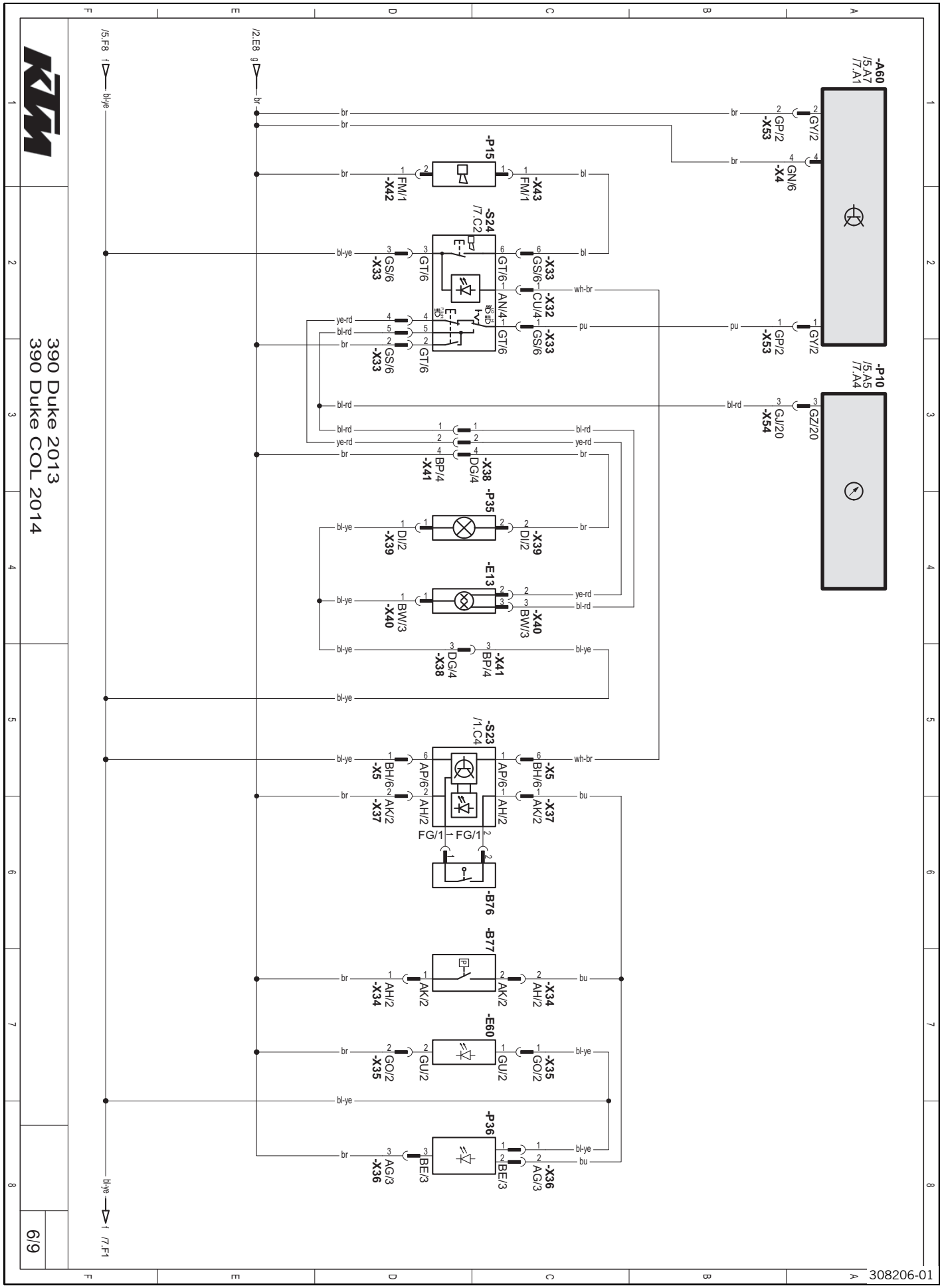
25.5 Page 5 of 9



Components:

A11	EFI control unit
A60	Vehicle control unit
B21	Coolant temperature sensor (cylinder 1)
B34	Gear position sensor
B37	Ignition pulse generator
B38	Clutch switch
M65	Idle speed actuator
P10	Combination instrument
R51	Ignition coil (cylinder 1)

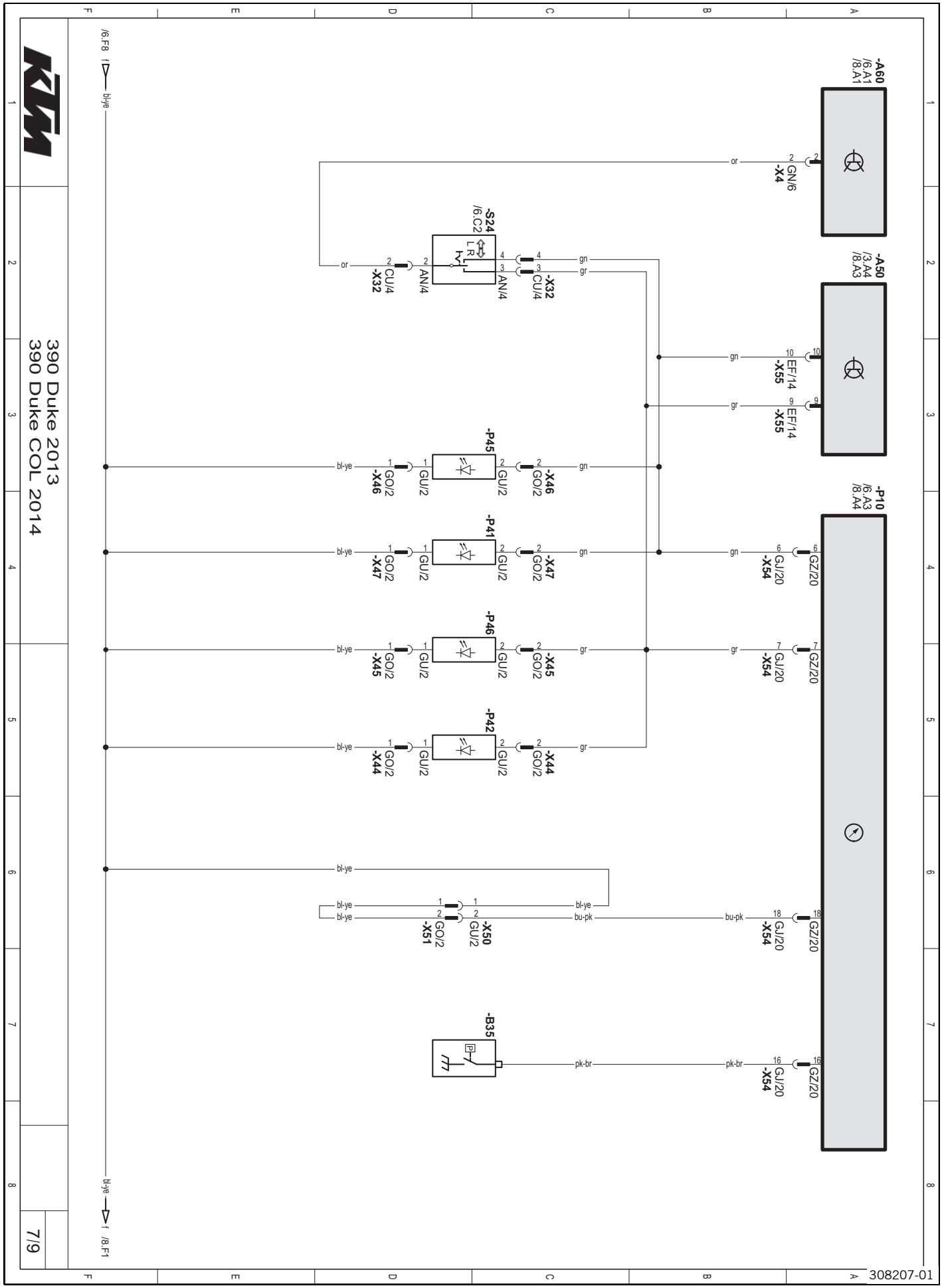
25.6 Page 6 of 9



Components:

A60	Vehicle control unit
B76	Brake light switch, front
B77	Brake light switch, rear
E13	Low beam, high beam
E60	License plate lamp
P10	Combination instrument
P15	Horn
P35	Parking light
P36	Brake/tail light
S23	Emergency OFF switch, electric starter button
S24	Light switch, horn button, high beam flasher button, turn signal switch

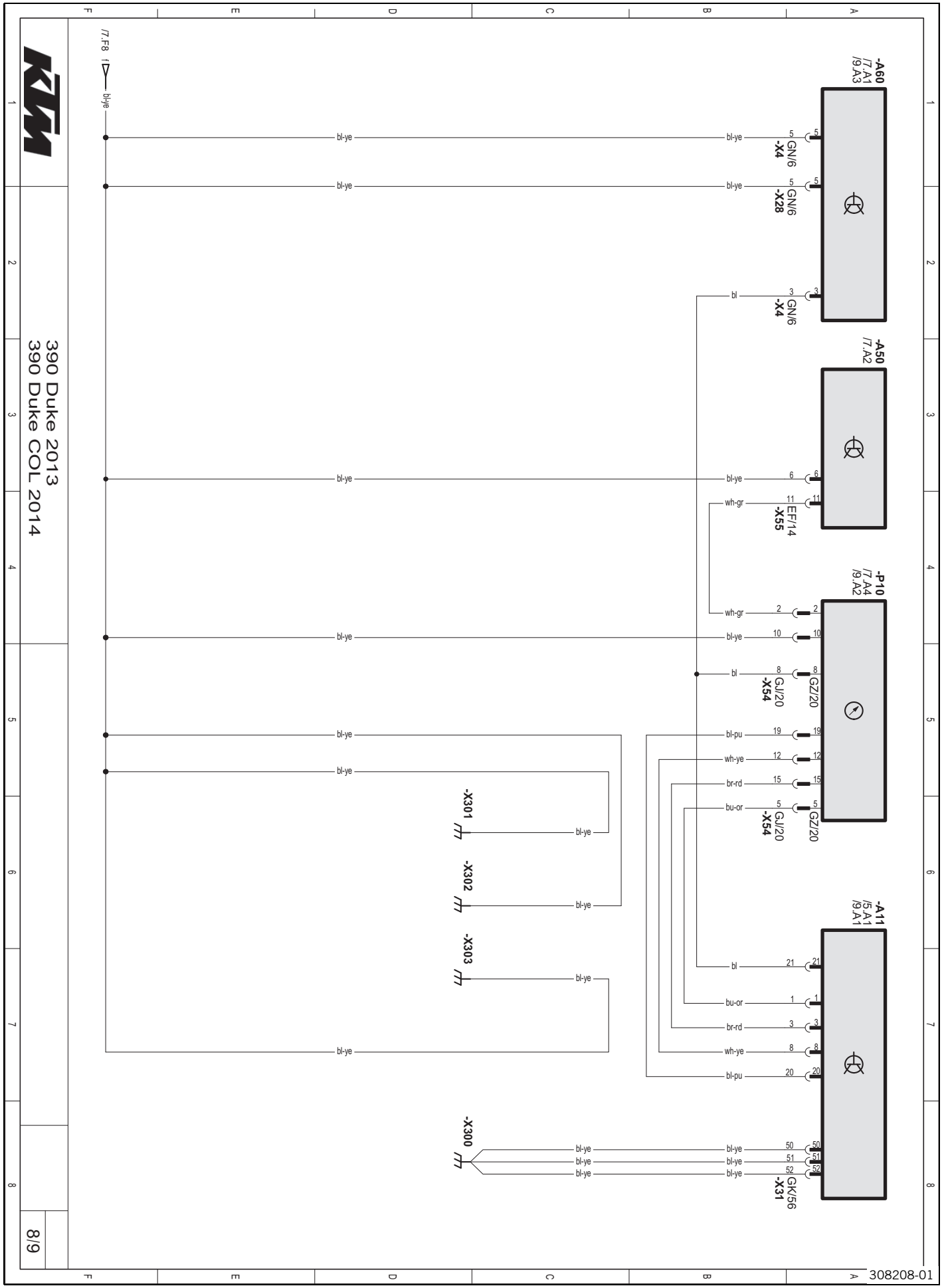
25.7 Page 7 of 9



Components:

A50	Alarm system (optional)
A60	Vehicle control unit
B35	Oil pressure sensor
P10	Combination instrument
P41	Turn signal, front left
P42	Turn signal, front right
P45	Turn signal, rear left
P46	Turn signal, rear right
S24	Light switch, horn button, high beam flasher button, turn signal switch

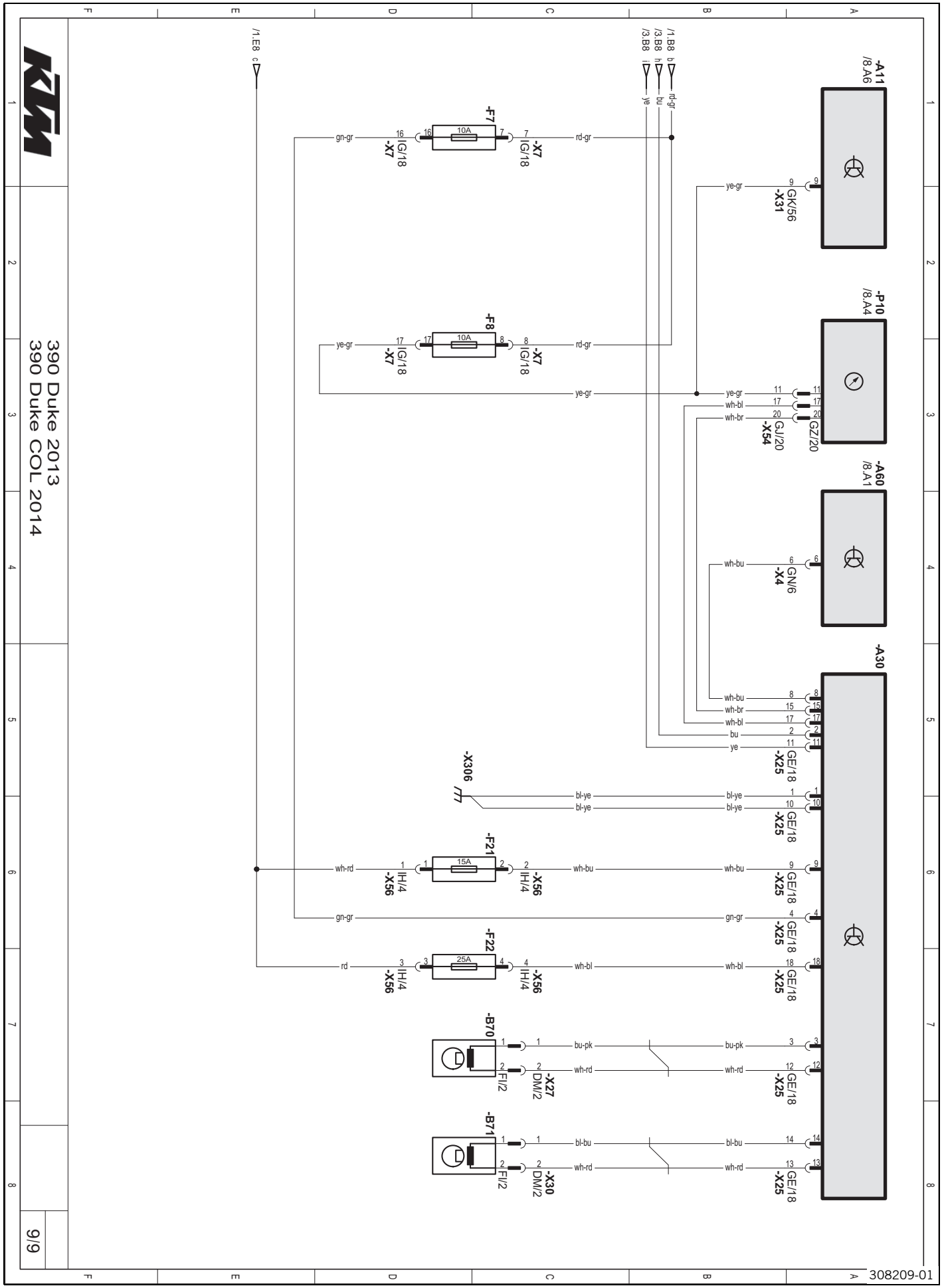
25.8 Page 8 of 9



Components:

A11	EFI control unit
A50	Alarm system (optional)
A60	Vehicle control unit
P10	Combination instrument

25.9 Page 9 of 9



Components:	
A11	EFI control unit
A30	ABS control unit
A60	Vehicle control unit
B70	Wheel speed sensor, front
B71	Wheel speed sensor, rear
F7	Fuse
F8	Fuse
F21	ABS fuse
F22	ABS fuse
P10	Combination instrument
Cable colors:	
bl	Black
br	Brown
bu	Blue
gn	Green
gr	Gray
lbu	Light blue
or	Orange
pk	Pink
pu	Violet
rd	Red
wh	White
ye	Yellow

Brake fluid DOT 4 / DOT 5.1

According to
– DOT

Guideline
– Use only brake fluid that complies with the specified standard (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®
– **COOLANT G48**

Engine oil (SAE 15W/50)

According to
– JASO T903 MA (☛ p. 198)
– SAE (☛ p. 198) (SAE 15W/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.

Partially synthetic engine oil

Supplier
Motorex®
– **Formula 4T**

Fork oil (SAE 4) (48601166S1)

According to
– SAE (☛ p. 198) (SAE 4)

Guideline
– Use only oils that comply with the specified standards (see specifications on the container) and that possess the corresponding properties.

Super unleaded (ROZ 95/RON 95/PON 91)

According to
– DIN EN 228 (ROZ 95/RON 95/PON 91)

Guideline
– Only use unleaded super fuel that matches or is equivalent to the specified fuel grade.
– Fuel with an ethanol content of up to 10 % (E10 fuel) is safe to use.

Info
Do **not** use fuel containing methanol (e. g. M15, M85, M100) or more than 10 % ethanol (e. g. E15, E25, E85, E100).

Chain cleaner

Guideline
– KTM recommends **Motorex®** products.

Supplier
Motorex®
– **Chain Clean**

Chain lube for road use

Guideline
– KTM recommends **Motorex®** products.

Supplier
Motorex®
– **Chainlube Road**

Cleaning and preserving materials for metal, rubber and plastic

Guideline
– KTM recommends **Motorex®** products.

Supplier
Motorex®
– **Protect & Shine**

Fuel additive

Guideline
– KTM recommends **Motorex®** products.

Supplier
Motorex®
– **Fuel Stabilizer**

High viscosity grease

Guideline
– KTM recommends **SKF®** products.

Supplier
SKF®
– **LGHB 2**

High-luster polish for paint

Guideline
– KTM recommends **Motorex®** products.

Supplier
Motorex®
– **Moto Polish**

Long-life grease

Guideline
– KTM recommends **Motorex®** products.

Supplier
Motorex®
– **Bike Grease 2000**

Lubricant (T511)

Guideline
– KTM recommends **Lubcon®** products.

Supplier
Lubcon®
– **Turmsilon® GTI 300 P**

Lubricant (T152)

Guideline

– KTM recommends **Bel-Ray®** products.

Supplier
Bel-Ray®

– **Molylube® Anti-Seize**

Motorcycle cleaner

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Moto Clean 900**

Paint cleaner and polish for high-gloss and matte finishes, bare metal and plastic surfaces

Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Clean & Polish**

Universal oil spray

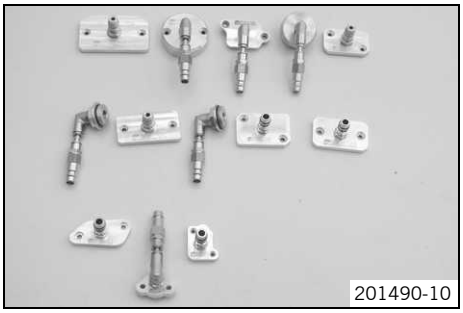
Guideline

– KTM recommends **Motorex®** products.

Supplier
Motorex®

– **Joker 440 Synthetic**

Bleeder cover

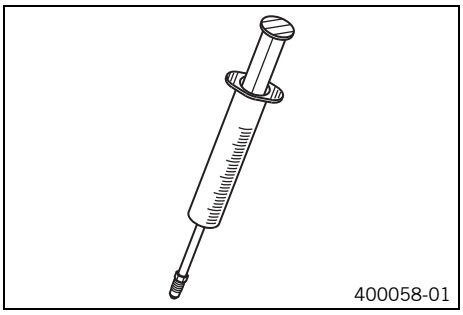


Art. no.: 00029013000

Bleeding device

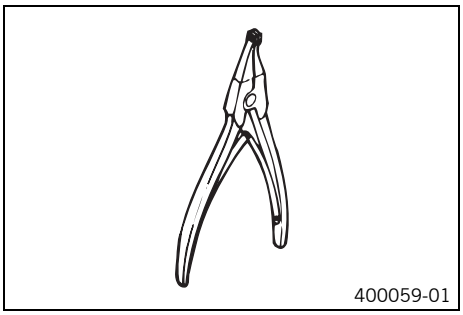
Art. no.: 00029013100

Bleed syringe



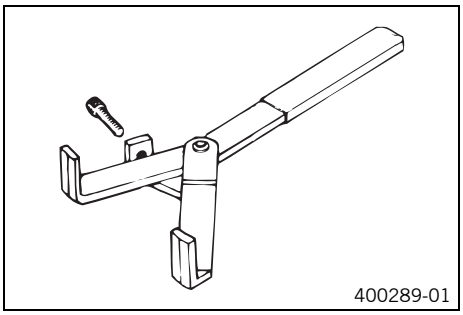
Art. no.: 50329050000

Circlip pliers reverse



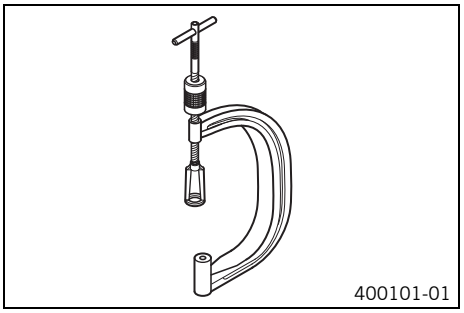
Art. no.: 51012011000

Clutch holder



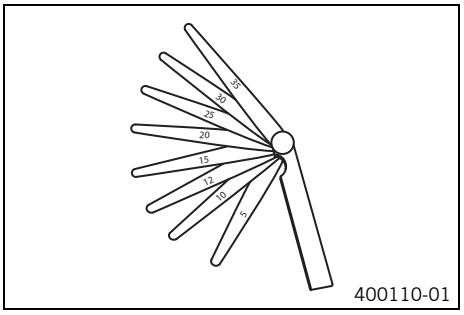
Art. no.: 51129003000

Valve spring compressor


400101-01

Art. no.: 59029019000

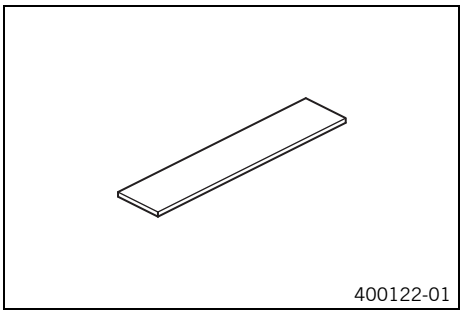
Feeler gauge



400110-01

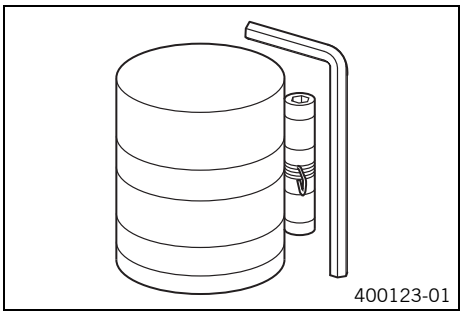
Art. no.: 59029041100

Plastigauge measuring strips


400122-01

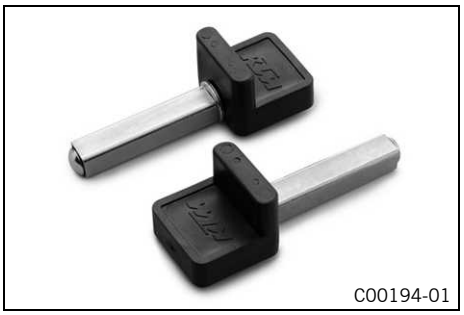
Art. no.: 60029012000

Piston ring mounting tool


400123-01

Art. no.: 60029015000

Adapter


C00194-01

Art. no.: 61029055130

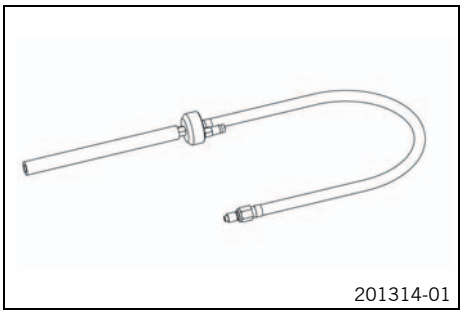
Rear wheel stand

Art. no.: 61029055400

Front wheel stand

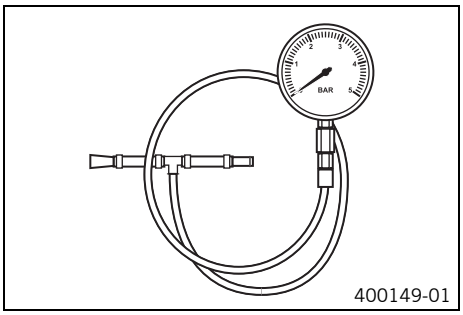
Art. no.: 61029055500

Testing hose



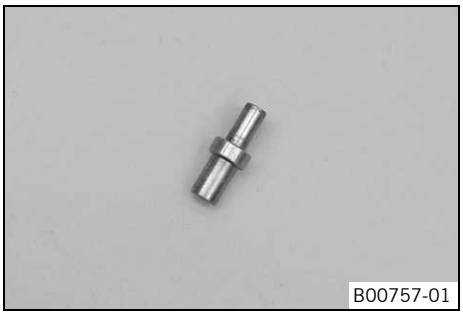
Art. no.: 61029093000

Pressure testing tool



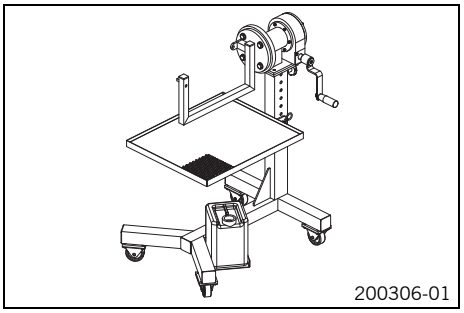
Art. no.: 61029094000

Adapter



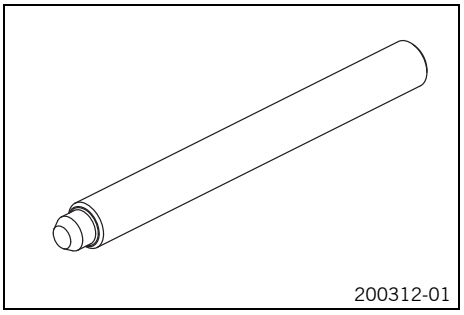
Art. no.: 61029955620

Engine assembly stand



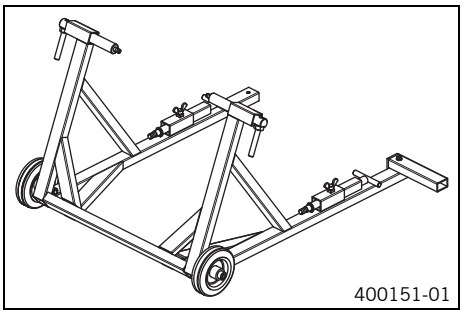
Art. no.: 61229001000

Engine blocking screw



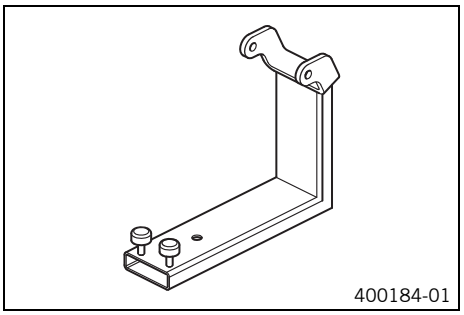
Art. no.: 61229015000

Work stand



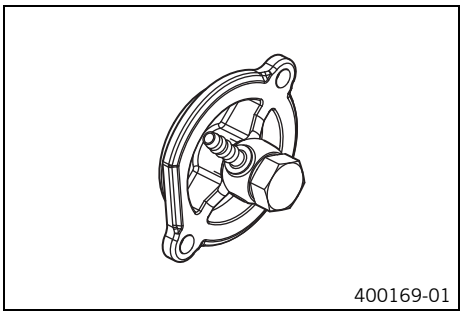
Art. no.: 62529055000

Floor jack attachment



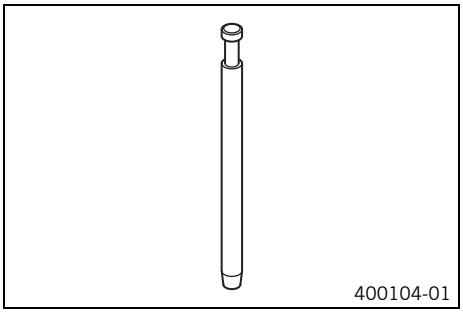
Art. no.: 75029055000

Oil pressure adapter



Art. no.: 75029094000

Limit plug gauge

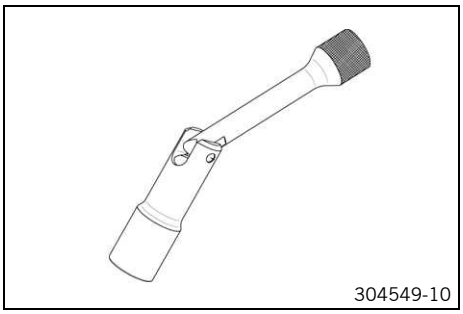


Art. no.: 77029026000

Insert for valve spring lever

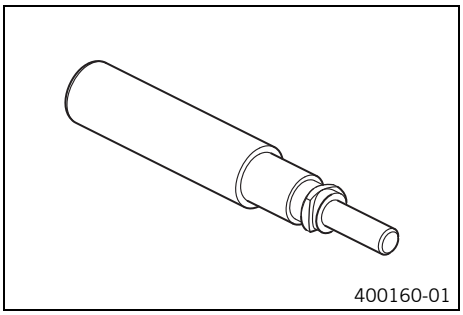
Art. no.: 77029041100

Spark plug wrench



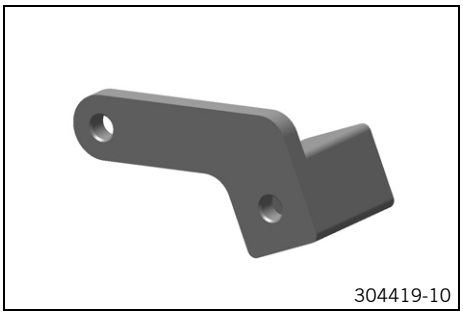
Art. no.: 77229172000

Insert for piston pin retainer



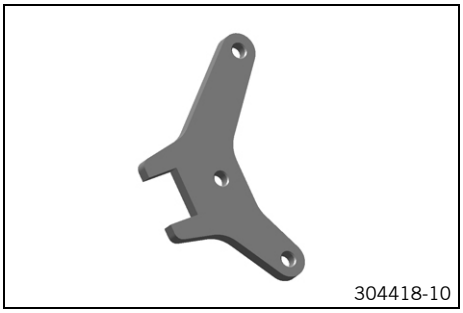
Art. no.: 77329030100

Engine fixing arm



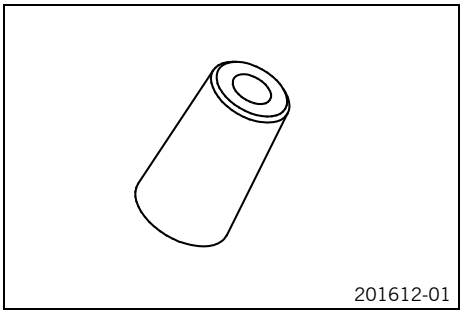
Art. no.: 90129002050

Engine fixing arm


304418-10

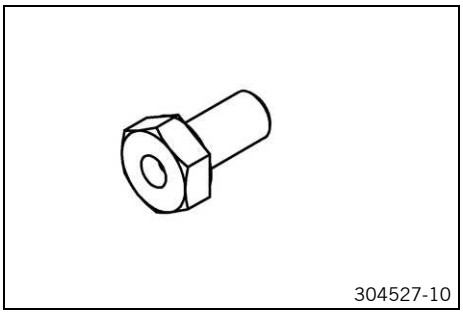
Art. no.: 90129002060

Mounting sleeve


201612-01

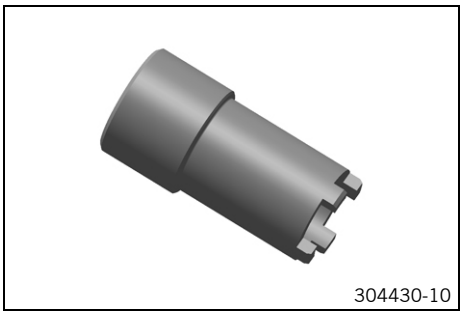
Art. no.: 90129005000

Pressure screw for crankshaft


304527-10

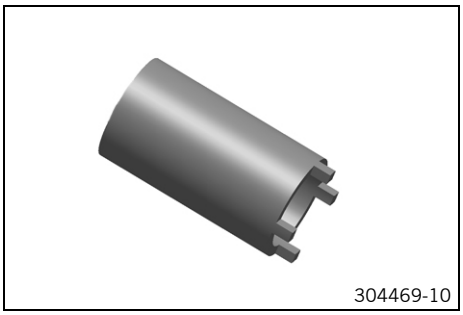
Art. no.: 90129020000

Castle nut wrench; ½" drive


304430-10

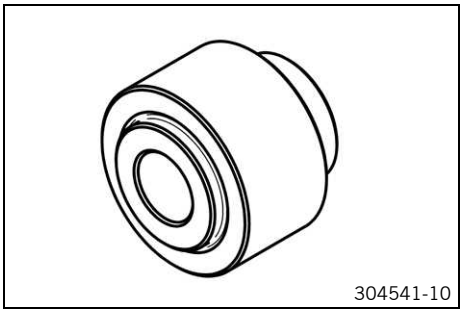
Art. no.: 90129021000

Castle nut wrench; ½" drive


304469-10

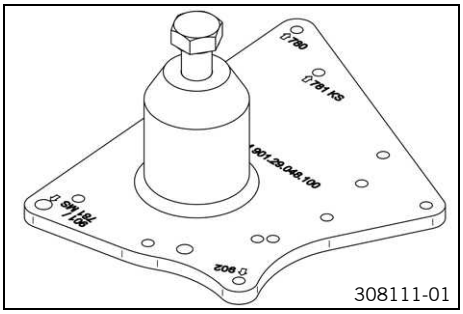
Art. no.: 90129022000

Mounting sleeve


304541-10

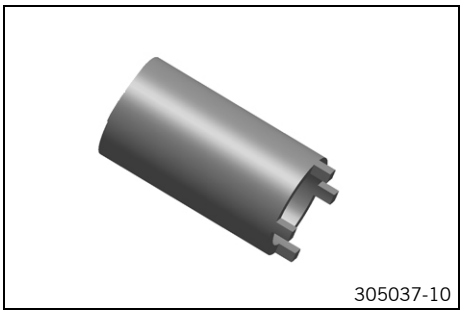
Art. no.: 90129043000

Case separating tool



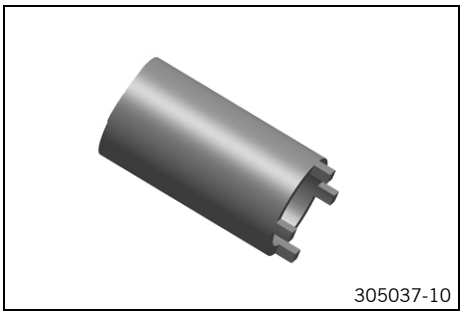
Art. no.: 90129048100

Castle nut wrench; ½" drive


305037-10

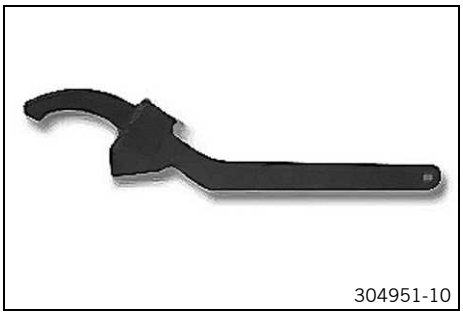
Art. no.: 90129050000

Castle nut wrench; ½" drive


305037-10

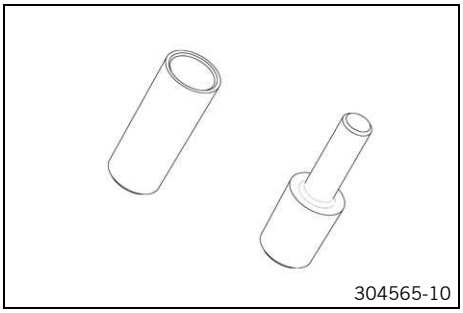
Art. no.: 90129050100

Key for steering head bearing


304951-10

Art. no.: 90129051000

Disassembly tool, balancer shaft bearing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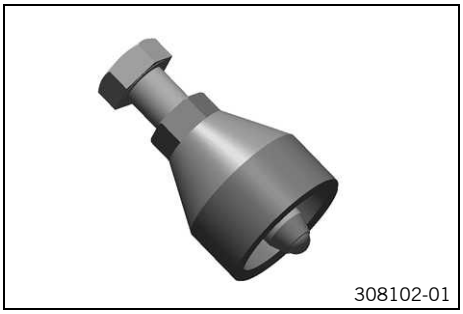
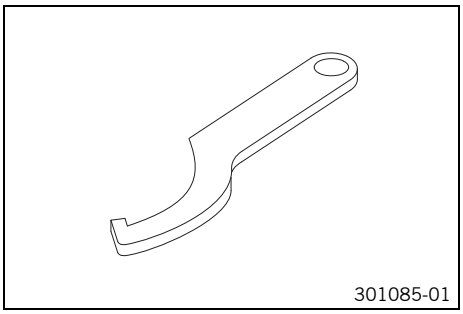
Art. no.: 90129056000

Puller for rotor


308102-01

Art. no.: 90229009000

Hook wrench


301085-01

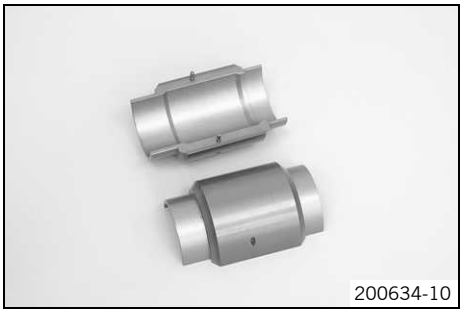
Art. no.: T106S

Spring compressor


201648-10

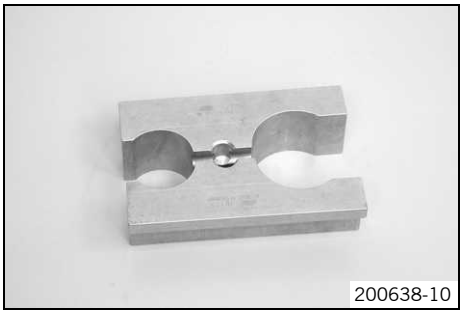
Art. no.: T14050S

Mounting tool



Art. no.: T528S

Clamping stand



Art. no.: T612S

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. In 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.

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