REPAIR MANUAL 2016

READY TO RACE
»www.ktm.com

390 Duke

Art. no. 3206261en

KTM

Read this repair manual carefully and thoroughly before beginning work.

The vehicle will only be able to meet the demands placed on it if the specified service work is performed regularly and properly.

This repair manual was written to correspond to the latest state of this model series. We reserve the right to make changes in the interest of technical advancement without updating this repair manual at the same time.
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 the repair work will be performed by a fully trained mechanic.

All specifications are non-binding. KTM Sportmotorcycle GmbH 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 figures and descriptions, misprints, and other errors. The models portrayed partly contain special equipment that does not belong to the regular scope of supply.

ISO 9001(12 100 6061)
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REG.NO. 12 100 6061

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This document is valid for the following models:

390 Duke EU (F4303P1, F4303P2, F4303P3, F4303P4)

390 Duke AU (F4360P1, F4360P2)

390 Duke JP (F4386P1, F4386P2)

390 Duke AR (F4342P1, F4342P2)

390 Duke ASIA (F4388P1, F4388P2)

390 Duke CN (F4387P1)

390 Duke MY (F4389P1, F4389P2)

390 Duke TH (F4383P1, F4383P2)

390 Duke US (F4375P1, F4375P2)

390 Duke 2017 BR (F4340P1, F4340P2)

390 Duke 2017 CO (F4341P3, F4341P4)

3206261en

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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	Indicates a voltage measurement.
A	Indicates a current measurement.
Ω	Indicates a resistance measurement.
◀	Indicates the end of an activity including potential rework.

1.2 Formats used

The typographical formats used in this document are explained below.

Proprietary name	Indicates a proprietary name.
Name®	Indicates a protected name.
Brand™	Indicates a brand available on the open market.
Underlined terms	Refer to technical details of the vehicle or indicate technical terms, which are explained in the glossary.

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 product described safely. Therefore read this instruction and all further instructions included carefully. The safety instructions are highlighted in the text and are referred to at the relevant passages.

Info
Various information and warning labels are attached in prominent locations on the product described. Do not remove any information or 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.

Note
Indicates 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 a component of the vehicle, but can be ordered using the number in parentheses. Example: bearing puller (15112017000)
During assembly, use new parts to replace parts which cannot be reused (e.g. self-locking screws and nuts, seals, sealing rings, O-rings, pins, and lock washers).
In the case of certain screws, a thread locker (e.g. **Loctite®**) is required. Apply according to the manufacturer's instructions.
After disassembly, clean the parts that are to be reused and check them for damage and wear. Change damaged or worn parts.
After completing a repair or service work, check the operating safety of the vehicle.

3 IMPORTANT NOTES

3.1 Manufacturer and implied warranty

The work specified in the service schedule may only be performed in an authorized KTM workshop and must be recorded in both the Service & Warranty Booklet and in **KTM Dealer.net**, otherwise any warranty coverage will become void. Damage or secondary damage caused by tampering with and/or conversions on the vehicle are not covered by the warranty.
Additional information on the manufacturer or implied warranty and the procedures involved can be found in the Service & Warranty Booklet.

3.2 Operating and auxiliary substances

Note

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

– Do not allow fuel to enter the groundwater, the soil, 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

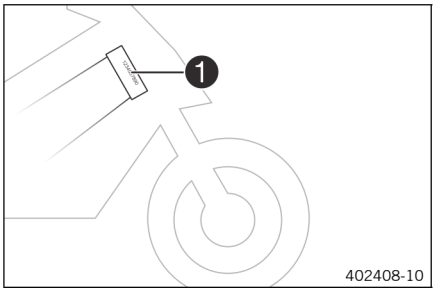
Only use spare parts and accessories approved and/or recommended by KTM. KTM accepts no liability for other products and any resulting damage or loss.

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

3.4 Figures

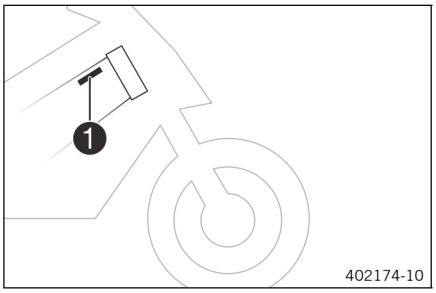
The figures contained in the manual may depict special equipment.
In the interest of clarity, some components may be shown disassembled or may not be shown at all. It is not always necessary to disassemble the component to perform the activity in question. Please follow the instructions in the text.

4.1 Chassis number



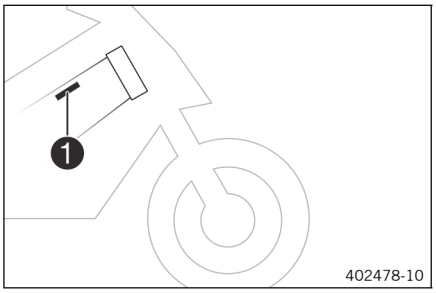
The chassis number ❶ is stamped on the right side of the steering head.

4.2 Type label



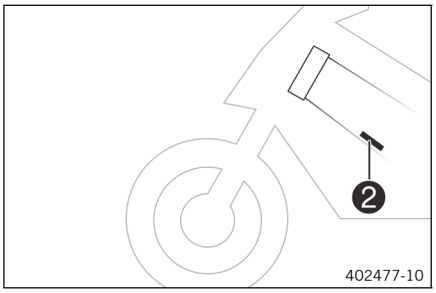
(EU/AU/JP/AR, ASIA/CN/MY/TH; BR/CO 2017)

The type label ❶ is on the right of the frame behind the steering head.



(US)

The type label USA ❶ is located on the top frame on the right.

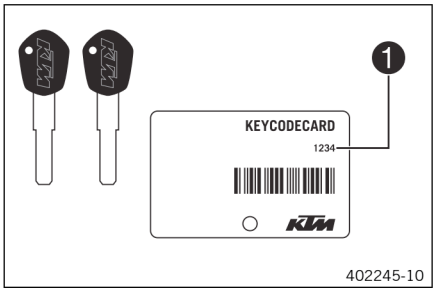


(US)

The type label Canada ❷ is located on the bottom frame on the left.

4 SERIAL NUMBERS

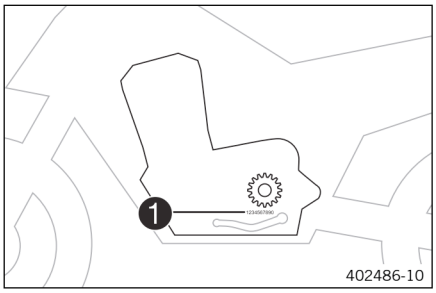
4.3 Key number



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.

4.4 Engine number



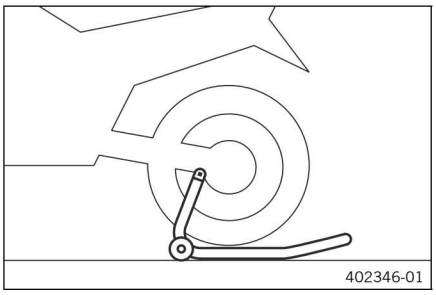
The engine number ❶ is stamped on the left side of the engine under the engine sprocket.

5.1 Raising the motorcycle with the rear lifting gear

Note

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

– Park the vehicle on a firm and level surface.



– Mount the supports of the lifting gear.
– Insert the adapter in the rear lifting gear.

Universal V adapter with bushings (61029955244) (p. 264)
Rear wheel work stand (69329955000) (p. 265)

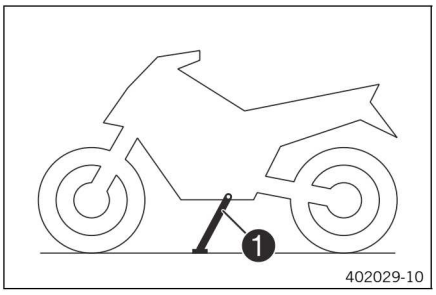
– Stand the motorcycle upright, align the lifting gear with the swingarm and the adapters, and lift the motorcycle.

5.2 Removing the rear of the motorcycle from the lifting gear

Note

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

– Park the vehicle on a firm and level surface.



– Secure the motorcycle against falling over.
– Remove the rear lifting gear and lean the vehicle on side stand 1.
– Remove bushings kit.

5.3 Lifting the motorcycle with the front lifting gear

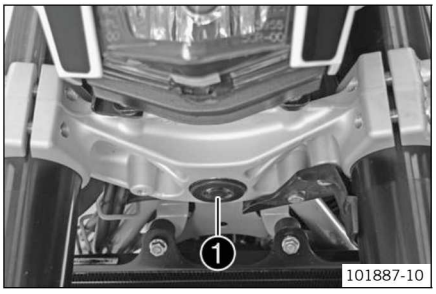
Note

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

– Park the vehicle on a firm and level surface.

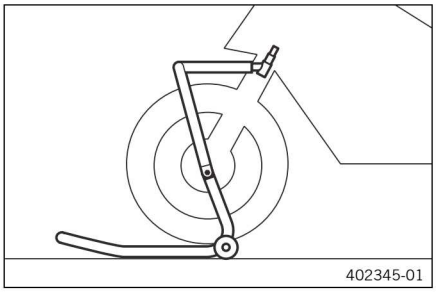
Preparatory work

– Raise the motorcycle with the rear lifting gear. (p. 11)



Condition

– Remove protection cap 1.



– Move the handlebar to the straight-ahead position. Position the lifting gear.

Mounting pin (69329965030) (📖 p. 265)
Front wheel work stand, large (69329965000) (📖 p. 265)

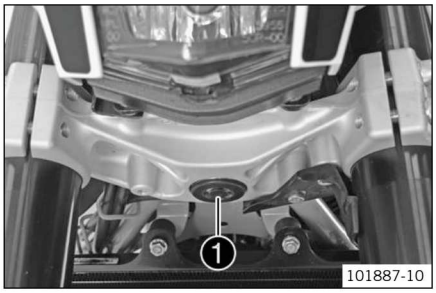
Info
Always raise the motorcycle at the rear first.

– Lift the motorcycle at the front.

5.4 Taking the motorcycle off the front lifting gear

Note
Danger of damage The parked vehicle can roll away or fall over.
– Park the vehicle on a firm and level surface.

Main work
– Secure the motorcycle against falling over.
– Remove the front lifting gear.

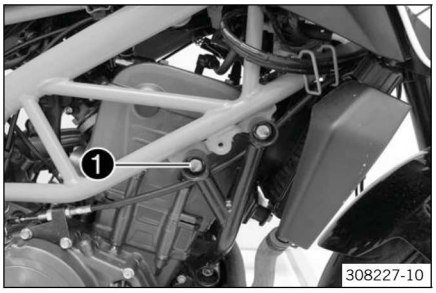


– Mount protection cap ❶.

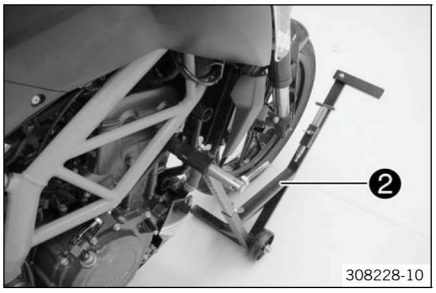
Finishing work
– Remove the rear of the motorcycle from the lifting gear. (📖 p. 11)

5.5 Raising the motorcycle with the work stand

Note
Danger of damage The parked vehicle can roll away or fall over.
– Park the vehicle on a firm and level surface.

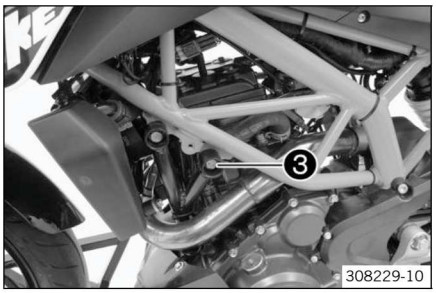


– Remove screw ❶.

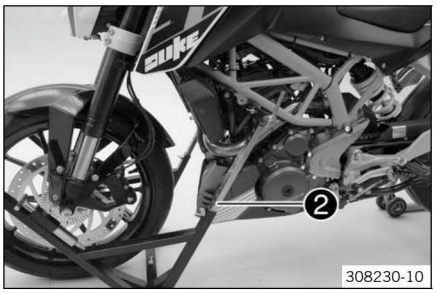


– Mount special tool ❷ on the right side of the vehicle.

Work stand (62529055100) (p. 264)



– Remove screw ❸.



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

Work stand (62529055100) (p. 264)

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

◀

5.6 Removing the motorcycle from the work stand

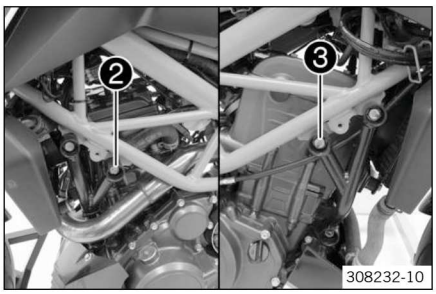
Note

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

– Park the vehicle on a firm and level surface.

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

Work stand (62529055100) (📖 p. 264)



– Mount and tighten screws ❷ ❸.

Guideline

Screw, engine bearer on engine	M8	25 Nm (18.4 lbf ft)

5.7 Starting

Danger

Danger of poisoning Exhaust gases are toxic and inhaling them may result in unconsciousness and death.

– Always make sure there is sufficient ventilation when running the engine.
– Use an effective exhaust extraction system when starting or running the engine in an enclosed space.

Caution

Danger of accidents Electronic components and safety devices will be damaged if the battery is discharged or missing.

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

Note

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

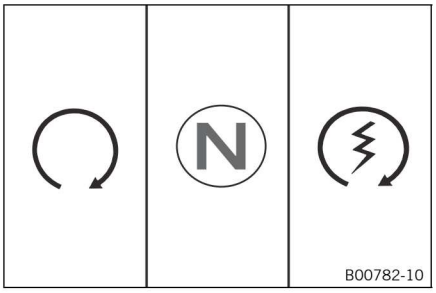
Dust and dirt will enter the engine without an air filter.

– Never start to use the vehicle without an air filter.

Note

Engine damage High revving speed with a cold engine negatively impacts the lifespan of the engine.

– Always run the engine warm at a low speed.



– Unlock the steering.
– 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 lever 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 button ❶ for 3 – 5 seconds.
  ✔ The ABS warning lamp starts flashing; ABS is deactivated.

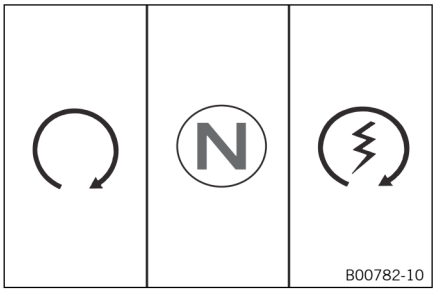
5.8 Starting the motorcycle to make checks

Danger

Danger of poisoning Exhaust gases are toxic and inhaling them may result in unconsciousness and death.
– Always make sure there is sufficient ventilation when running the engine.
– Use an effective exhaust extraction system when starting or running the engine in an enclosed space.

Info

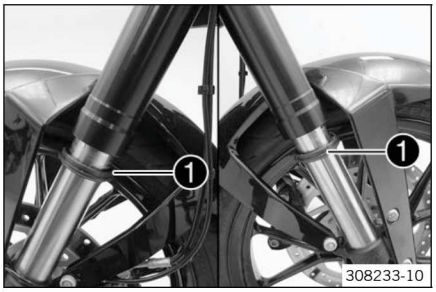
Press the starter for a maximum of 5 seconds. Wait for a least 5 seconds before trying again.



– 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 Oil or grease on the brake discs reduces the braking effect.
– Always keep the brake discs free of oil and grease.
– Clean the brake discs with brake cleaner when necessary.

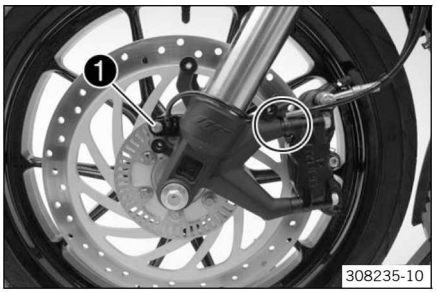
– Clean and oil the dust boots and inside fork tube of both fork legs.

Universal oil spray (p. 259)

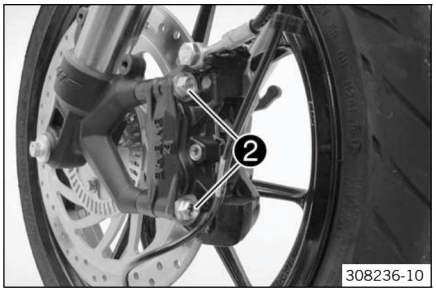
– Press the dust boots back into their normal position.
– Remove excess oil.

6.2 Removing the fork legs

Preparatory work
– Raise the motorcycle with the work stand. (p. 12)
– Clamp down the rear of the vehicle.
– Remove front fender. (p. 62)

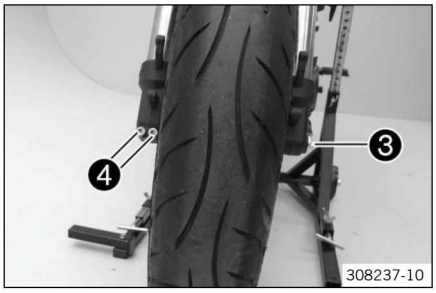


Main work
– Remove screw ❶.
– Remove the cable tie(s).
– Pull the wheel speed sensor out of the hole and hang to the side.



– 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.

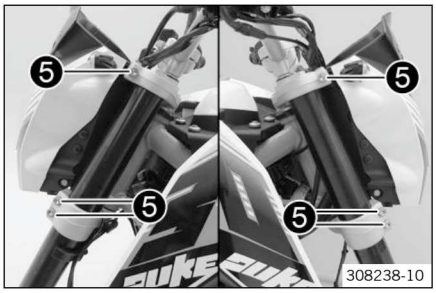
Info
Do not actuate the hand brake lever when the brake caliper has been removed.



- Loosen screw ❸ by several rotations.
- Loosen screws ❹.
- Press on screw ❸ 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.

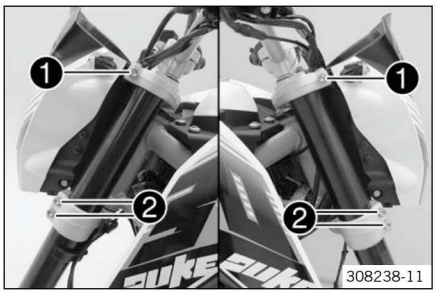


- Loosen screws ❺. Remove the fork legs from the bottom.

6.3 Installing the fork legs

Warning
Danger of accidents Modifications to the suspension setting may seriously alter the handling characteristic.
- Ride slowly to start with after making adjustments to get the feel of the new handling characteristic.

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.

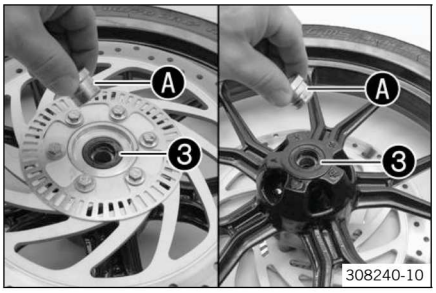
Guideline

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 shaft seal rings ❸ and contact surfaces Ⓐ of the spacers.

Long-life grease (📖 p. 258)

– Insert the spacers.

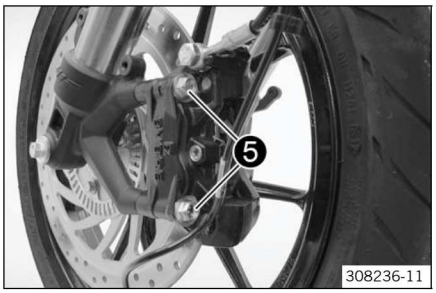
– Clean the thread of the wheel spindle and screw ❹.
– Clean and grease wheel spindle.

Long-life grease (📖 p. 258)

– Position the front wheel and insert the wheel spindle.
– Mount and tighten screw ❹.

Guideline

Screw, front wheel spindle	M8	25 Nm (18.4 lbf ft)

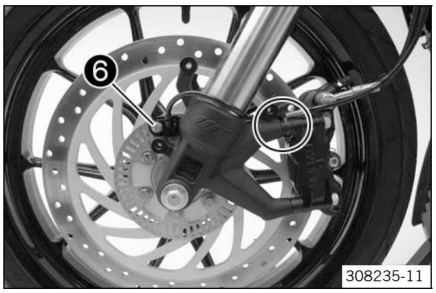


– Position the brake calipers and check that the brake linings are seated correctly.
– Mount screws ❺ but do not tighten yet.
– Operate the hand brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point. Fix the hand brake lever in the activated position.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

Guideline

Screw, front brake caliper	M8x1	25 Nm (18.4 lbf ft) **Loctite® 204™**

– Remove the locking piece of the hand brake lever.
– Remove the load from the rear of the vehicle.
– Remove the motorcycle from the work stand. (📖 p. 14)

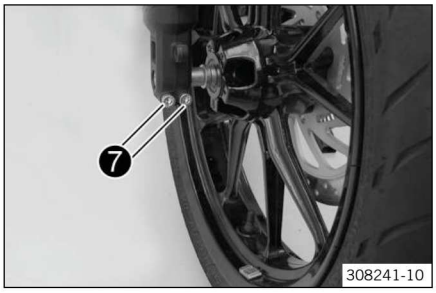


– Position wheel speed sensor in the drill hole.
– Mount and tighten screw ❻.

Guideline

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

– Route the cable and secure with cable tie(s).



– Operate the front brake and compress the fork a few times firmly.
  ✔ The fork legs straighten.
– Tighten screws 7.
  Guideline

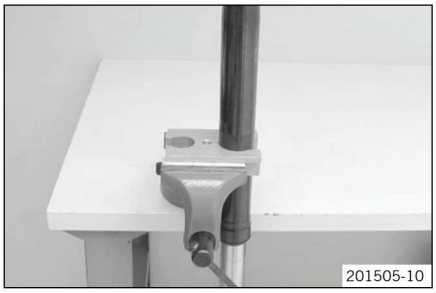
Screw, fork stub	M8	15 Nm (11.1 lbf ft)

Finishing work
– Install front fender. (📖 p. 63)

6.4 Disassembling the fork legs

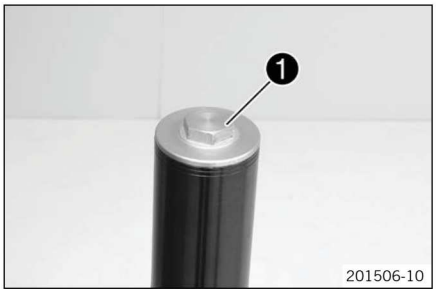
Info
The operations are the same on both fork legs.

Condition
The fork legs have been removed.



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

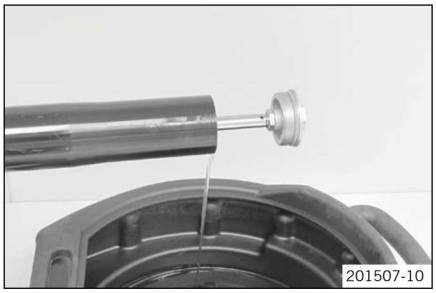
Clamping stand (T612S) (📖 p. 272)



– Loosen the screw cover 1.

Info
The screw cover cannot be removed yet.

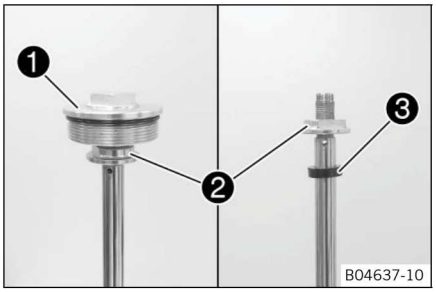
– Unclamp the fork leg.



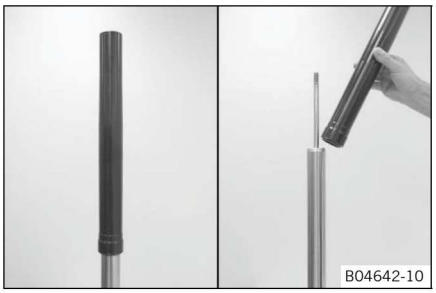
– Drain the fork oil.

– Unclamp the fork leg with the axle clamp.

Info
Use soft jaws.

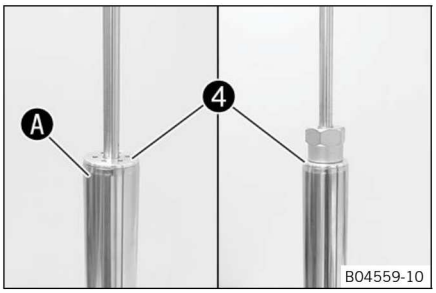


– Slide the outer tube down.
– Counterhold screw cap ❶ and loosen nut ❷.
– Remove the screw cap.
– Remove nut ❷.
– Remove rubber damper ❸.

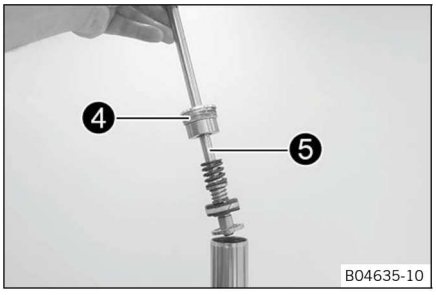


– Remove the outer tube from the inner tube.

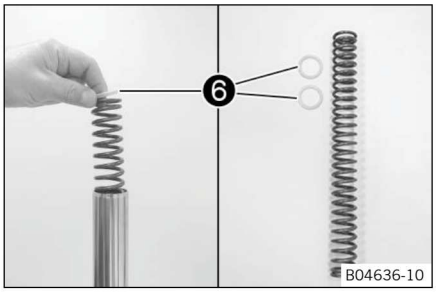
Info
Place a container underneath as oil will run out in most cases.



– Heat the inner tube in area Ⓐ.
Guideline
50 °C (122 °F)
– Loosen sliding bushing support ❹.
Socket (T729) (p. 272)



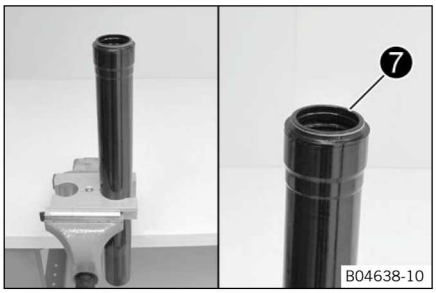
– Pull piston rod ❺ with sliding bushing support ❹ out of the inner tube.



– Remove spring with preload spacers ❻.

Info
There may only be one preload spacer installed, or none at all.

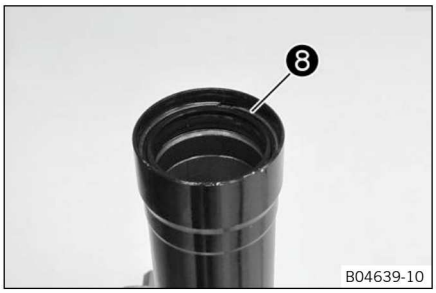
– Unclamp the inner tube. Drain the oil.



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

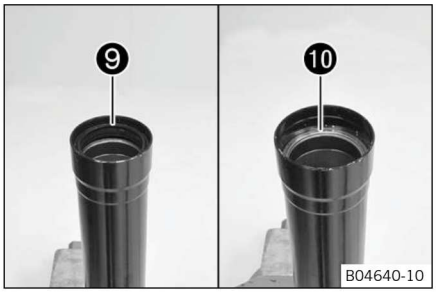
Clamping stand (T612S) (📖 p. 272)

– Remove dust boot ❼.



– Remove lock ring ❽.

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



– Remove seal ring ❾. Remove support ring ❿.

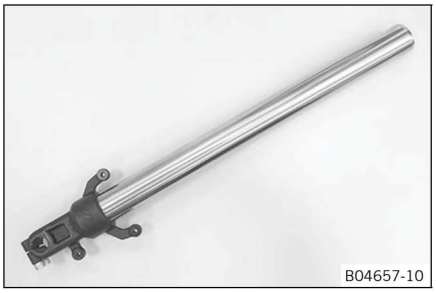
– Unclamp the outer tube.
– Heat up the outer tube in the area of sliding bushing 11.
  Guideline

50 °C (122 °F)

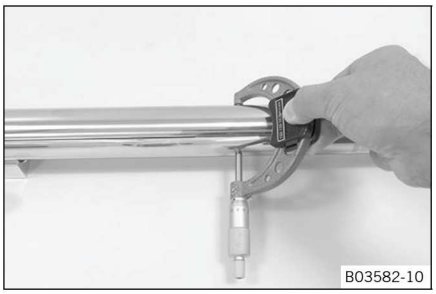
– Strike the lower edge of the outer fork tube on a wooden board.
  ✓ Sliding bushing 11 falls out of its seat.

6.5 Checking the fork legs

Condition
The fork legs have been disassembled.



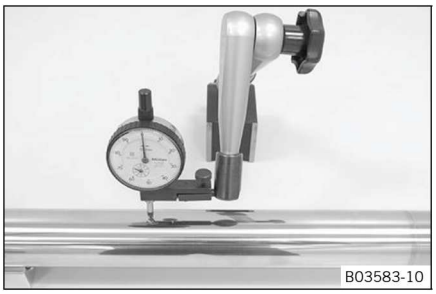
– Check the inner tube and the axle clamp for damage.
  » If damage is found:
    – Change the inner tube.



– 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)

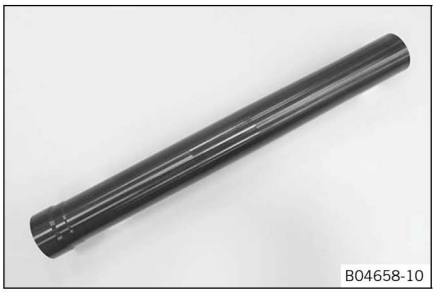
  » If the measured value is less than the specified value:
    – Change the inner tube.



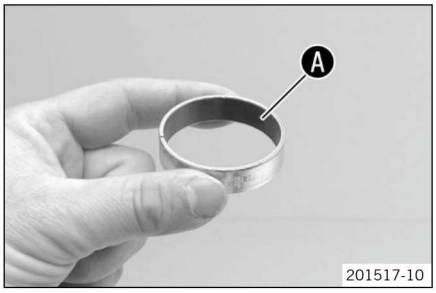
– Measure the run-out of the inner tube.

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

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



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

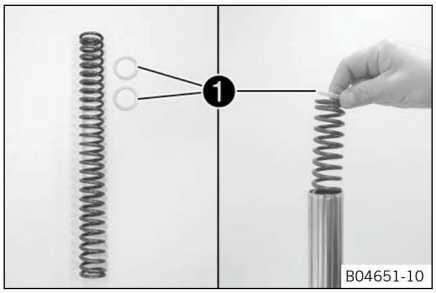


– Check the surface of the sliding bushings.
  » If the dark layer Ⓐ is worn off:
    – Change the sliding bushings.

6.6 Assembling the fork legs

Info
The procedures are the same on both fork legs.

Preparatory work
– Check the fork legs. (p. 23)

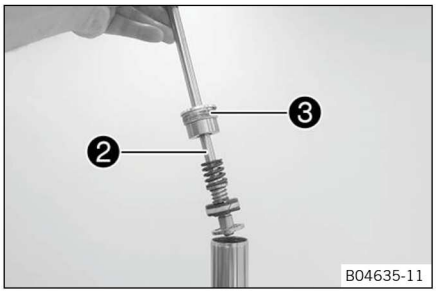


Main work
– Clamp the inner tube with the axle clamp.
  Guideline

Use soft jaws.

– Position the spring with the preload spacers Ⓛ in the inner tube.

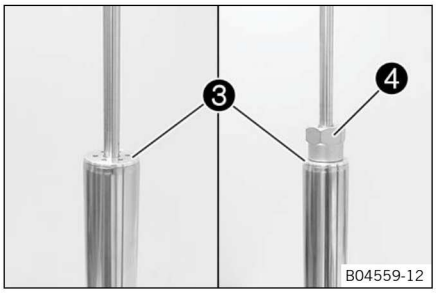
Info
There may only be one preload spacer installed, or none at all.



– Clean and lubricate piston.

Fork oil (SAE 4) (48601166S1) (p. 257)

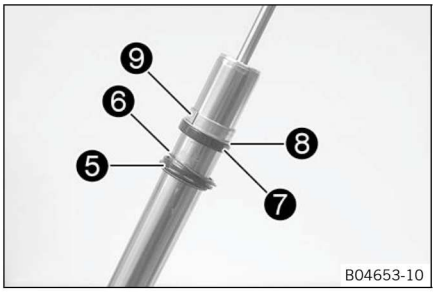
– Mount the piston rod Ⓑ with the sliding bushing support Ⓒ in the inner tube.



– Tighten sliding bushing support Ⓒ with special tool Ⓓ.
  Guideline

Sliding bushing support	M39x1	80 Nm (59 lbf ft) **Loctite®2701™**

Socket (T729) (p. 272)



– Grease and push on dust boot ❺.

Lubricant (T14034) (p. 258)

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

– Push on lock ring ❻.
– Grease and push on seal ring ❼.

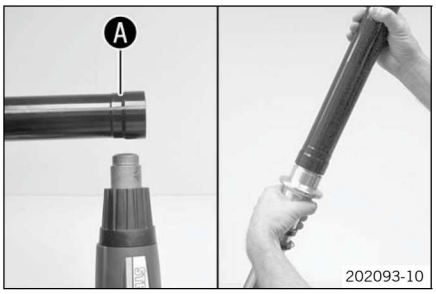
Lubricant (T14034) (p. 258)

Info
Sealing lip downward, open side upward.

– Push on support ring ❽.
– Sand the edges of sliding bushing ❾ with 600-grit sandpaper, then clean and grease.

Fork oil (SAE 4) (48601166S1) (p. 257)

– Slide on sliding bushing ❾.



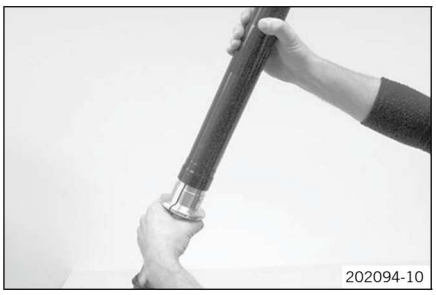
– Warm up the outer tube in area Ⓐ of the lower sliding bushing.
Guideline

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. 272)

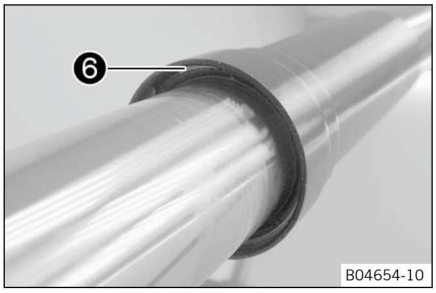
– Press the sliding bushing all the way into the outer tube.



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

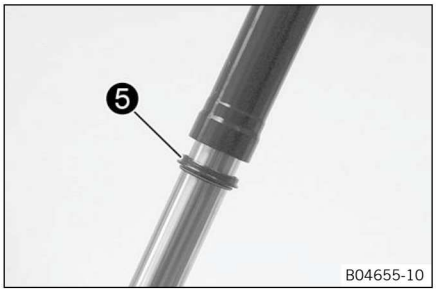
Mounting tool (T528S) (p. 272)

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

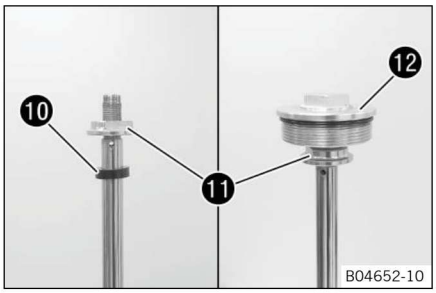


– Mount lock ring ❻.

Info
The lock ring must engage audibly.



– Mount dust boot ❺.



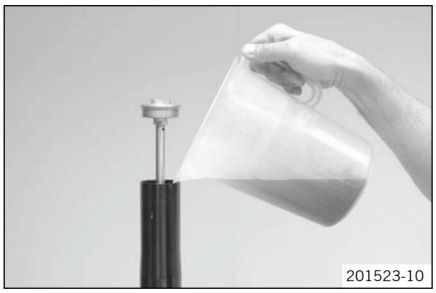
– Push the rubber damper ❿ onto the piston rod.
– Mount nut ⓫.
– Mount screw cap ⓬ onto the piston rod.

Info
Nut ⓫ must be turned all the way down.

– Hold the screw cap and tighten the nut.

Guideline

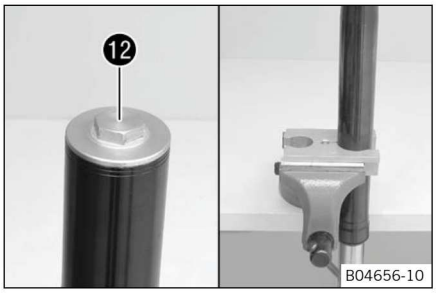
Nut, piston rod on screw cap	M12x1	30 Nm (22.1 lbf ft)



– Fill with fork oil.

Fork oil	440 ml (14.88 fl. oz.)	Fork oil (SAE 4) (48601166S1) (📖 p. 257)

Info
If it is not possible to pour in 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 ⓬.
– Unclamp the fork leg in the area of the lower triple clamp.

Clamping stand (T612S) (📖 p. 272)

– Tighten the screw cover.

Guideline

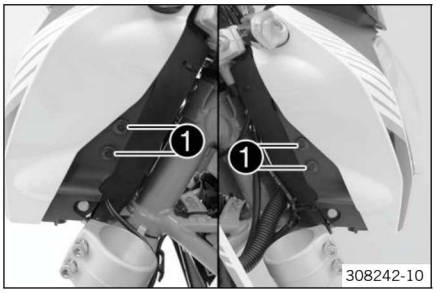
Screw cap on outer tube	M47x1.5	30 Nm (22.1 lbf ft)

6.7 Removing the lower triple clamp

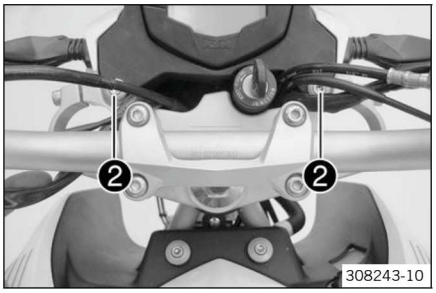
Preparatory work

- Raise the motorcycle with the work stand. (p. 12)
- Clamp down the rear of the vehicle.
- Remove front fender. (p. 62)
- Remove the fork legs. (p. 17)

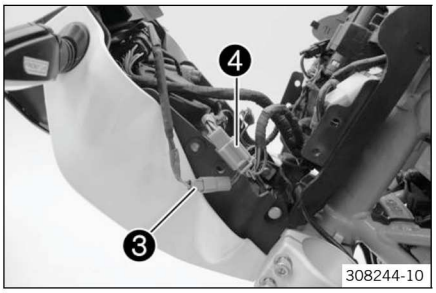
Main work



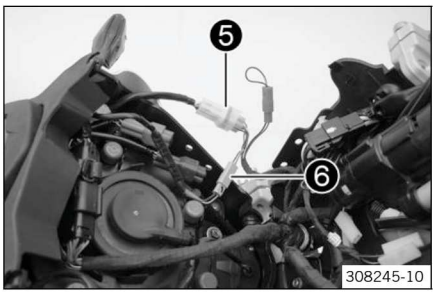
- Remove expanding rivets ❶.



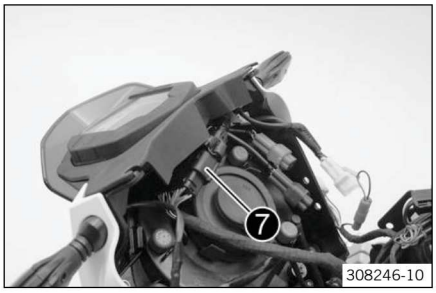
- Remove screws ❷.
- Lift the headlight mask slightly and swing forward.



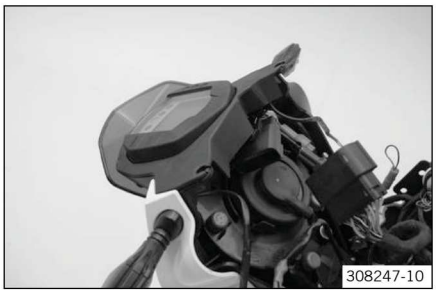
- Detach connectors ❸ and ❹.



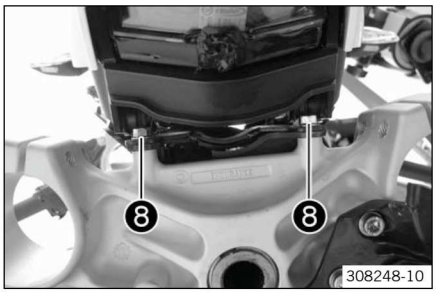
- Detach connectors ❺ and ❻.



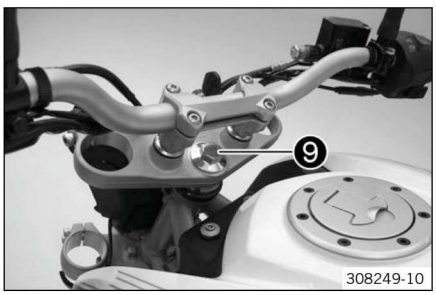
– Remove the plug holder.
– Unplug connector ❼.



– Remove the combination instrument.



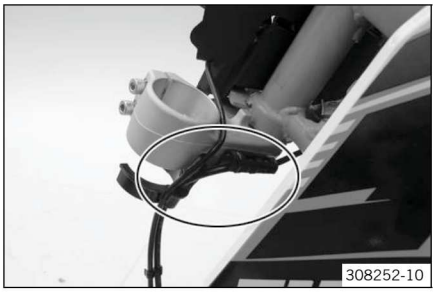
– Remove screws ❽.
– Take off the headlight mask.



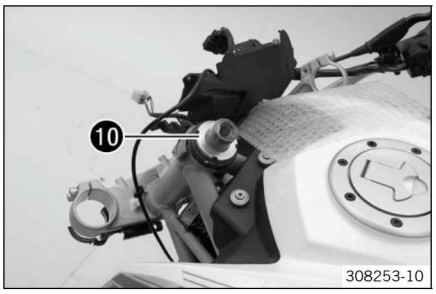
– Remove screw ❾.

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

Info
Cover the components to protect them against damage.

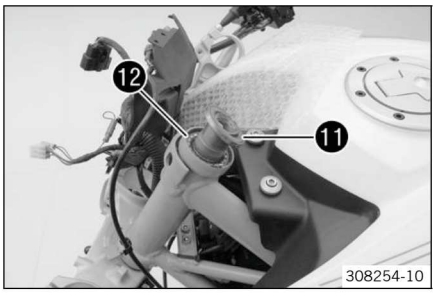


– Expose the cable.



– Remove nut ❿.

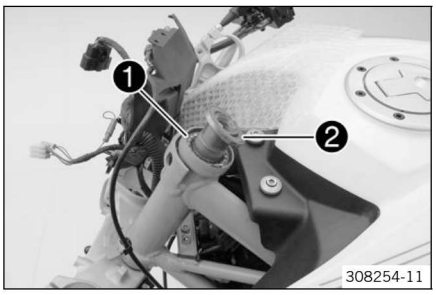
Groove nut wrench (90129050100) (📖 p. 268)



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

◀

6.8 Installing the lower triple clamp

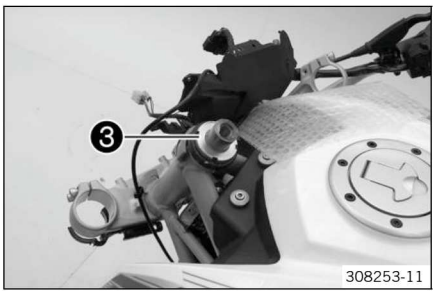


Main work

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

High viscosity grease (📖 p. 258)

– Insert the lower triple clamp with the steering stem.
– Mount 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 55 Nm (40.6 lbf ft) 2nd stage (loosen, counterclockwise) 2 turns Step 3 5 Nm (3.7 lbf ft)

Groove nut wrench (90129050100) (📖 p. 268)

Alternative 2

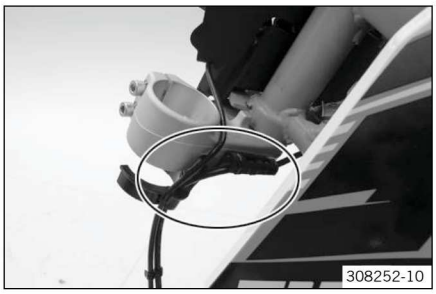
The steering head bearing is used again.

– Mount and tighten nut ❸.

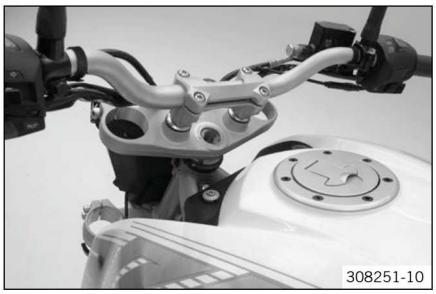
Guideline

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

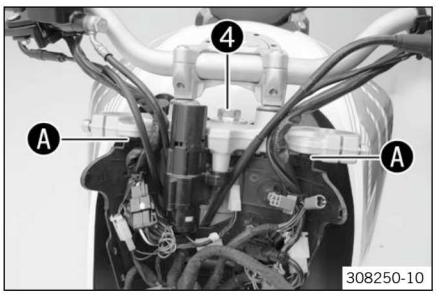
Groove nut wrench (90129050100) (📖 p. 268)



– Secure the cable in the bracket.



– Position the upper triple clamp with the handlebar.

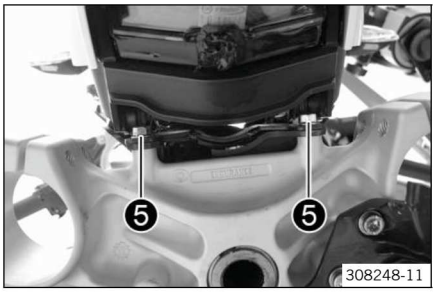


– Mount screw ❹ with the washer but do not tighten yet.

Guideline

Screw, top steering head	M16x1.5	53 Nm (39.1 lbf ft) **Loctite®243™**

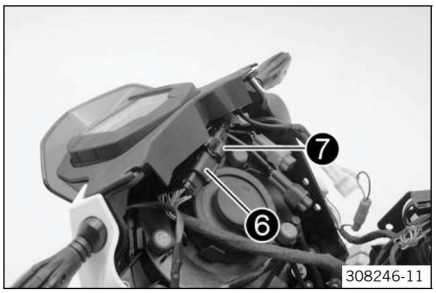
✔ Holding lugs Ⓐ reach into the drilled holes.



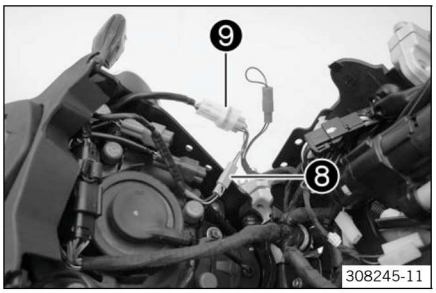
– Position the headlight mask.
– Mount and tighten screws ❺.

Guideline

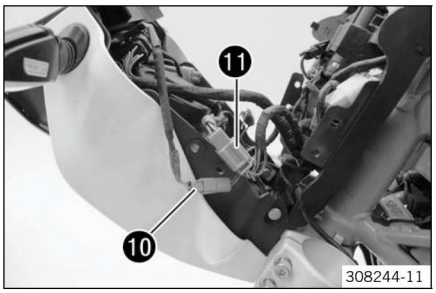
Screw, headlight mask	M6	9 Nm (6.6 lbf ft) **Loctite®243™**



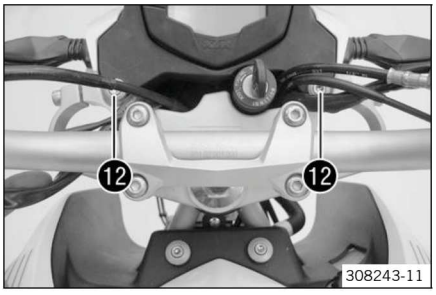
– Position the combination instrument.
– Plug in connector ❻.
– Mount the connector holder ❼.



– Plug in connectors ❽ and ❾.



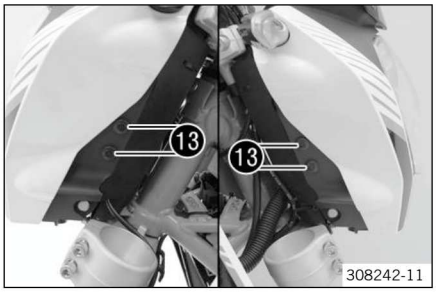
– Plug in connectors ❿ and ⓫.



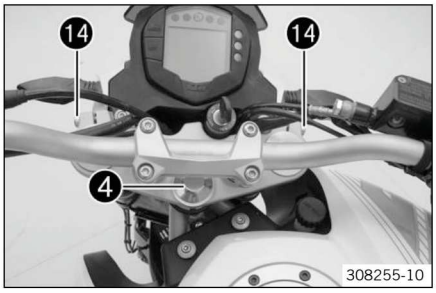
– Swivel the headlight mask up.
– Mount and tighten screws ⓬.

Guideline

Screw, headlight mask	M6	9 Nm (6.6 lbf ft) **Loctite®243™**



- Mount expanding rivets 13 on both sides.
- Install the fork legs. (p. 18)



- Loosen screws 14.
- Using a plastic hammer, tap lightly on the upper triple clamp to avoid stresses.
- Tighten screw 4.

  Guideline

Screw, top steering head	M16x1.5	53 Nm (39.1 lbf ft) **Loctite®243™**

- Tighten screws 14.

  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 play of the steering head bearing. (p. 32)
- Remove the motorcycle from the work stand. (p. 14)

6.9 Checking the play of the steering head bearing

Warning

Danger of accidents Incorrect steering head bearing play impairs the handling characteristic and damages components.

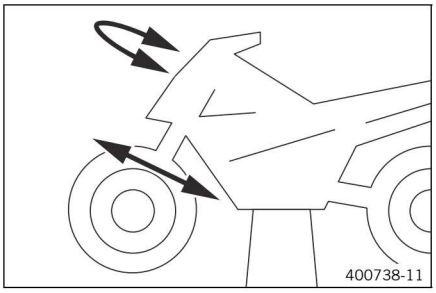
- Correct incorrect steering head bearing play immediately.

Info

If the vehicle is operated for a lengthy period with play in the steering head bearing, the bearings and the bearing seats in the frame can become damaged over time.

Preparatory work

- Raise the motorcycle with the work stand. (p. 12)
- Clamp down the rear of the vehicle.



Main work

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

Play should not be detectable on the steering head bearing.

» If there is detectable play:

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

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

It must be possible to move the handlebar easily over the entire steering range. There should be no detectable detent positions.

» If detent positions are detected:

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

– Check the steering head bearing and adjust if necessary.

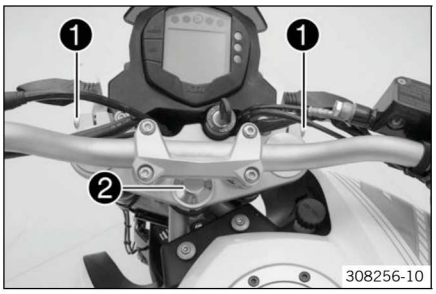
Finishing work

– Remove the motorcycle from the work stand. (p. 14)

6.10 Adjusting the steering head bearing play

Preparatory work

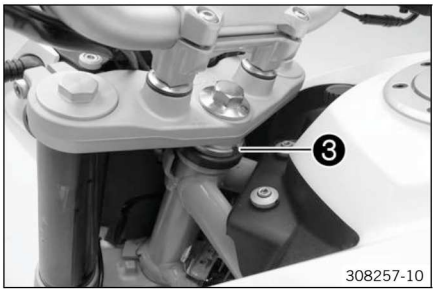
– Raise the motorcycle with the work stand. (p. 12)



Main work

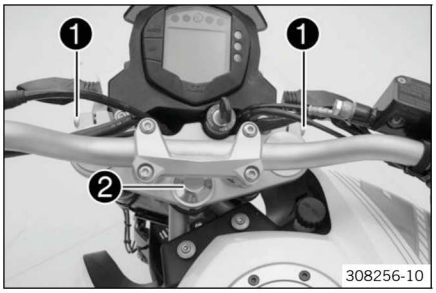
– Loosen screws 1.

– Loosen screw 2.



– Tighten nut 3 with the special tool until there is no play in the steering head bearing.

Holding wrench (90129051000) (p. 269)



– Using a plastic hammer, tap lightly on the upper triple clamp to avoid stresses.

– Remove screw 2.

– Mount and tighten screw 2.

Guideline

Screw, top steering head	M16x1.5	53 Nm (39.1 lbf ft) **Loctite®243™**

– Tighten screws 1.

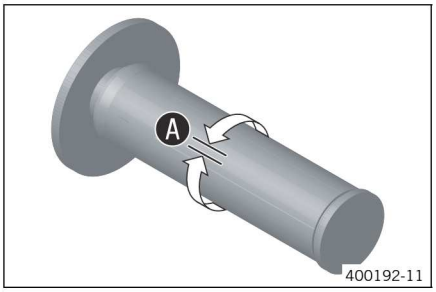
Guideline

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

Finishing work

– Check the play of the steering head bearing. (p. 32)
– Remove the motorcycle from the work stand. (p. 14)

7.1 Checking the play in the throttle cable



– Check the throttle grip for smooth operation.
– Move the handlebar to the straight-ahead position. Turn the throttle grip back and forth slightly and determine the play in throttle cable Ⓐ.

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

» If the throttle cable play does not meet the specified value:
– Adjust the play in the throttle cable. (📖 p. 35)

Danger

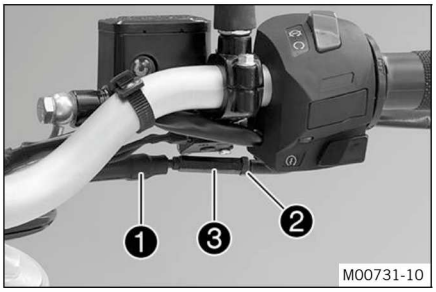
Danger of poisoning Exhaust gases are toxic and inhaling them may result in unconsciousness and death.
– Always make sure there is sufficient ventilation when running the engine.
– Use an effective exhaust extraction system when starting or running the engine in an enclosed space.

– 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 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

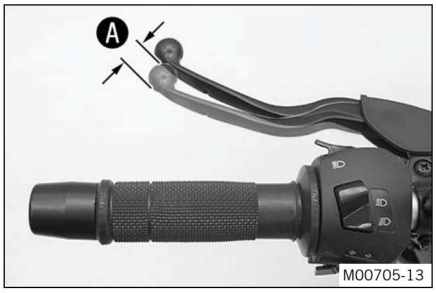
Throttle cable play	3 ... 5 mm (0.12 ... 0.2 in)

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

7.3 Checking the clutch lever play

Note

Clutch damage If there is no free travel by the clutch lever, the clutch will begin to slip.
– Check the free travel of the clutch lever each time before using the motorcycle.
– Adjust the free travel of the clutch lever when necessary in accordance with the specification.



– Check the clutch lever for smooth operation.
– Move the handlebar to the straight-ahead position.
– Pull the clutch lever until resistance is perceptible, and determine the play in the clutch lever Ⓐ.

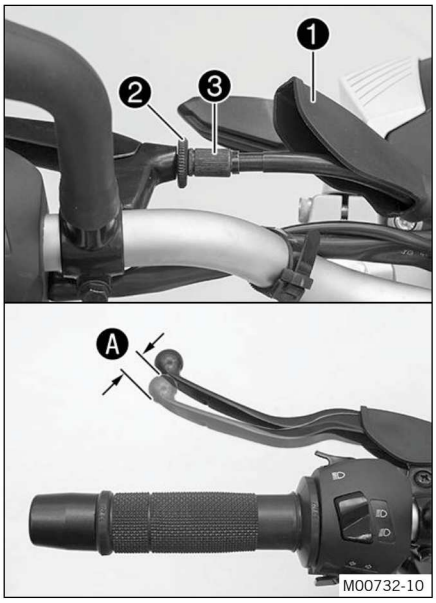
Clutch lever play Ⓐ	1 … 3 mm (0.04 … 0.12 in)

» If the clutch lever play does not meet the specified value:
  – Adjust play in the clutch lever. (📖 p. 36)
– 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 play in the clutch lever

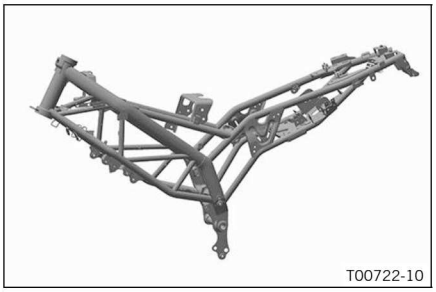


– Move the handlebar to the straight-ahead position.
– Push back sleeve ❶.
– Loosen lock nut ❷.
– Adjust the play in the clutch level Ⓐ by turning adjusting screw ❸.
  Guideline

Clutch lever play Ⓐ	1 … 3 mm (0.04 … 0.12 in)

– Tighten lock nut ❷.
– Position bellows ❶.

8.1 Checking the frame

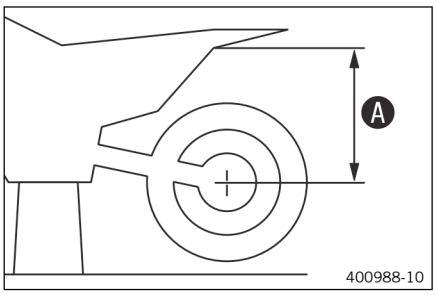

T00722-10

– Check the frame for cracks and deformation.
  » If the frame exhibits cracks or deformation due to a mechanical impact:
    – Change the frame.

Info
Always replace a frame that has been damaged due to a mechanical impact. Repair of the frame is not authorized by KTM.

9 SHOCK ABSORBER, SWINGARM

9.1 Measuring the rear wheel dimension unloaded



Preparatory work

– Raise the motorcycle with the work stand. (p. 12)

Main work

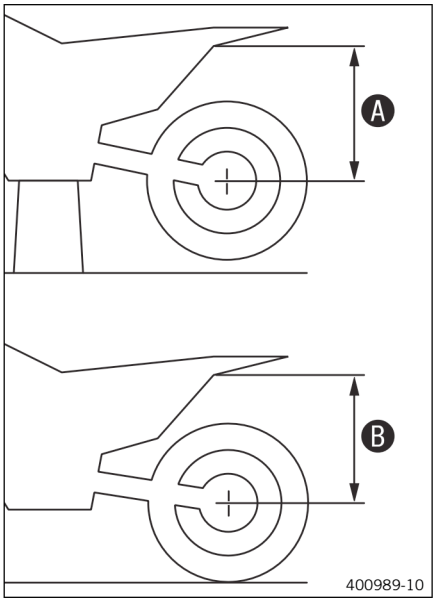
– Measure the distance – as vertical as possible – between the rear axle and a fixed point, for example, a mark on the rear fairing.

– Note down the value as dimension A.

Finishing work

– Remove the motorcycle from the work stand. (p. 14)

9.2 Checking the static sag of the shock absorber



– Measure dimension A of rear wheel unloaded. (p. 38)

– Hold the motorcycle upright with the aid of an assistant.

– Measure the distance between the rear axle and the fixed point again.

– Note down the value as dimension B.

Info

The static sag is the difference between measurements A and B.

– Check the static sag.

Guideline

Static sag	15 mm (0.59 in)

9.3 Adjusting the spring preload of the shock absorber

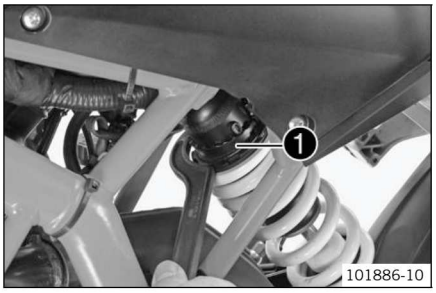
Warning

Danger of accidents Modifications to the suspension setting may seriously alter the handling characteristic.

– Ride slowly to start with after making adjustments to get the feel of the new handling characteristic.

Info

The spring preload defines the initial status of the spring operation 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 luggage and a passenger, thus ensuring an ideal compromise between handling and stability.



– Adjust the spring preload by turning adjusting ring ❶.

Guideline

Spring preload	
Comfort	1 click
Standard	3 clicks
Sport	6 clicks
Full payload	10 clicks

Hook wrench (T106S) (📖 p. 271)

Info
The spring preload can be set to 10 different positions.

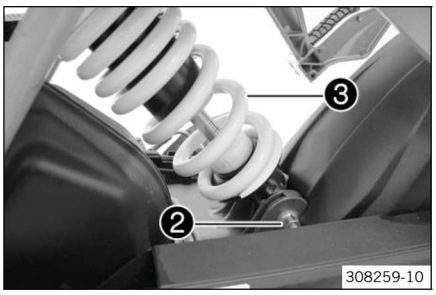
◀

9.4 Removing the shock absorber

Preparatory work
– Raise the motorcycle with the work stand. (📖 p. 12)

Main work
– Remove screw ❶.

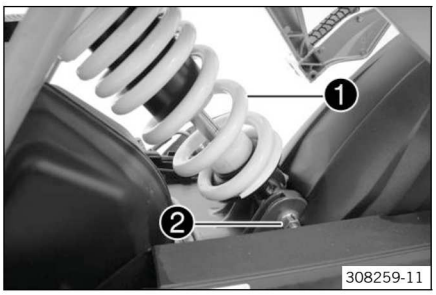
Info
Protect the swingarm and attachments from damage.
Ensure that the chain and brake line are not damaged.



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

◀

9.5 Installing the shock absorber



Main work
– Lift the swingarm 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 swingarm.
– Mount and tighten screw ❸.

Guideline

Screw, top shock absorber	M10x1.25	45 Nm (33.2 lbf ft) **Loctite®243™**

– Tighten fitting ❷.

Guideline

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

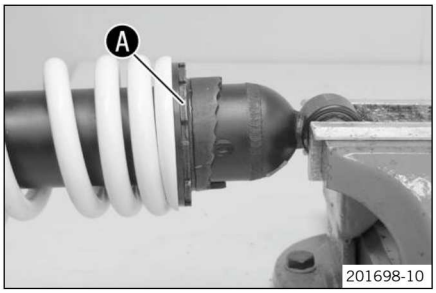
Finishing work

– Remove the motorcycle from the work stand. (📖 p. 14)

9.6 Removing the spring

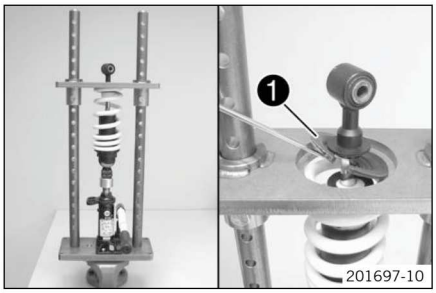
Condition

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 Ⓐ using the special tool.

Hook wrench (T106S) (📖 p. 271)



– Clamp the shock absorber into the special tool.

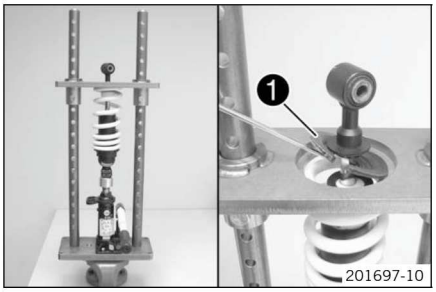
Spring compressor (T14050S) (📖 p. 272)

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.

9.7 Installing the spring

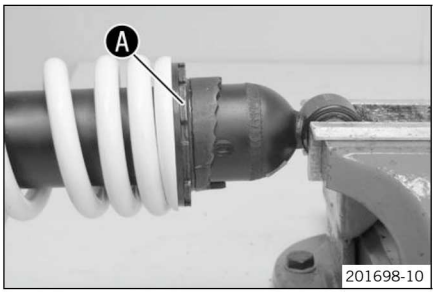


– Mount the spring.
  ✔ The tight coil of the spring is at the bottom.
– Clamp the shock absorber into the special tool.

Spring compressor (T14050S) (📖 p. 272)

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 1.
  ✔ 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 adjusting ring A.

Guideline

Spring preload	
Comfort	1 click
Standard	3 clicks
Sport	6 clicks
Full payload	10 clicks

Hook wrench (T106S) (📖 p. 271)

Alternative 2

Warning
Danger of accident Modifications to the suspension setting may seriously alter the handling characteristic.
Extreme modifications to the suspension setting may cause a serious deterioration in the handling characteristic and overload components.
– Only make adjustments within the recommended range.
– Ride slowly to start with after making adjustments to get the feel of the new handling characteristic.

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

◀

9.8 Checking the swingarm


R01993-10

– Check the swingarm for damage, cracking, and deformation.
  » If the swingarm shows signs of damage, cracking, or deformation:
    – Change the swingarm.

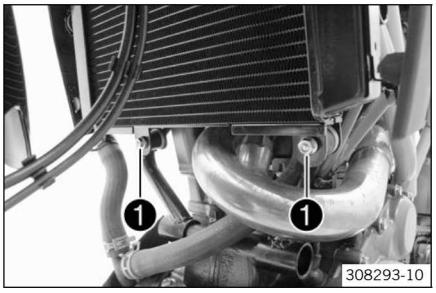
Info
Always change a damaged swingarm. Repair of the swingarm is not authorized by KTM.

10.1 Removing the exhaust manifold

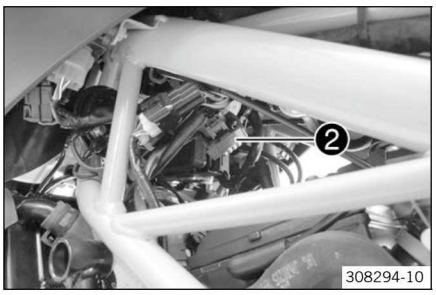
Warning

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

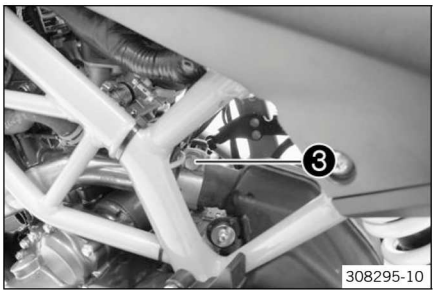
– Allow the exhaust system to cool down before performing any work on the vehicle.



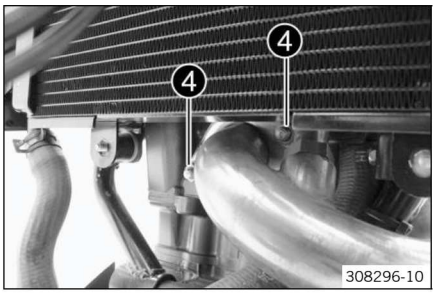
– Remove nuts ❶ with washers.
– Swing the radiator forward slightly.



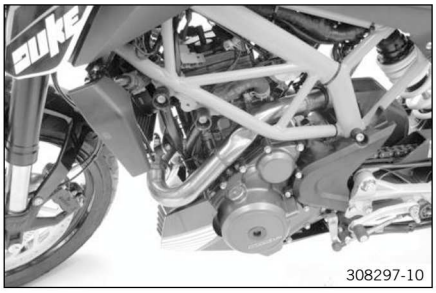
– Remove the cable tie, expose the connector ❷ of the lambda sensor, and detach.



– Loosen exhaust clamp ❸.

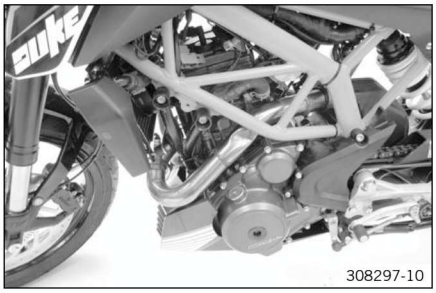


– Remove nuts ❹.

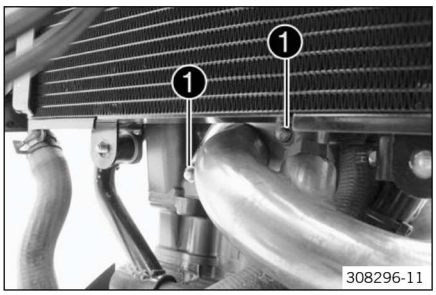


– Take off the exhaust manifold toward the front.

10.2 Installing exhaust manifold

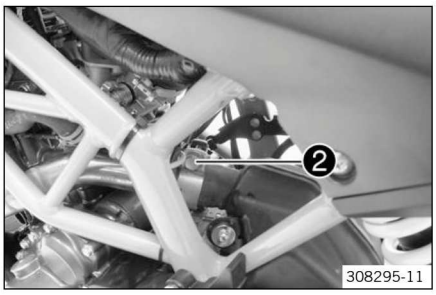


– Position the exhaust manifold.



– Mount nuts ❶ but do not tighten yet.
Guideline

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

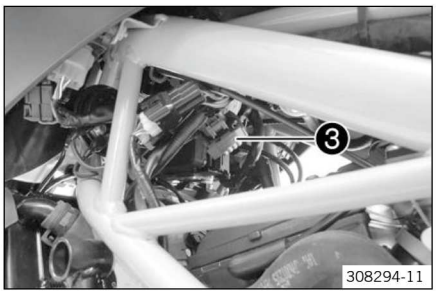


– Position and tighten exhaust clamp ❷.
Guideline

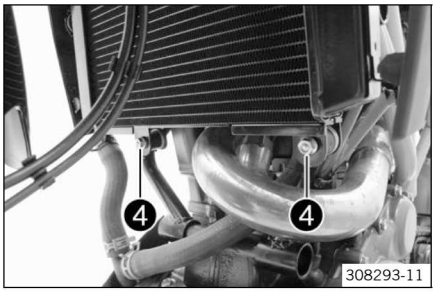
Exhaust clamp	-	20 Nm (14.8 lbf ft)

– 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.

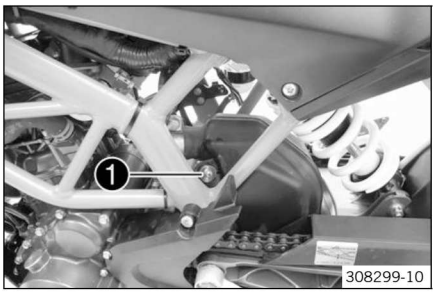


– Position the radiator.
– Mount and tighten nuts ❹ with the washers.
Guideline

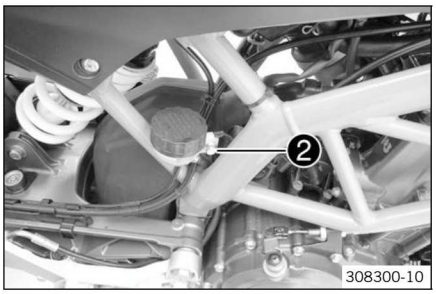
Nut, radiator	M6	5 Nm (3.7 lbf ft)

10.3 Removing the main silencer

Preparatory work
– Remove the exhaust manifold. (📖 p. 43)

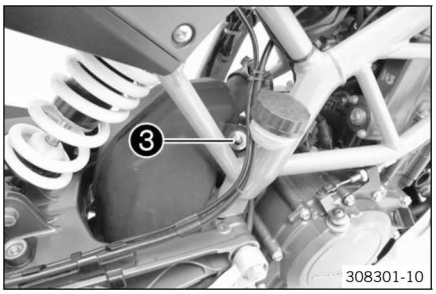


Main work
– Remove screw ❶ with washers.

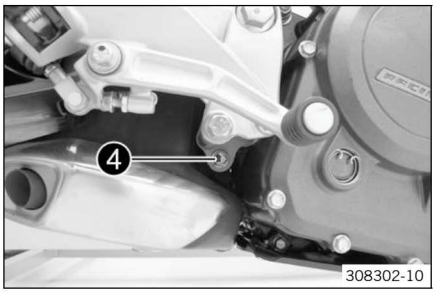


– Remove screw ❷ with the sleeve.
– Hang the brake fluid reservoir to the side.

Info
Ensure that brake fluid does not escape.

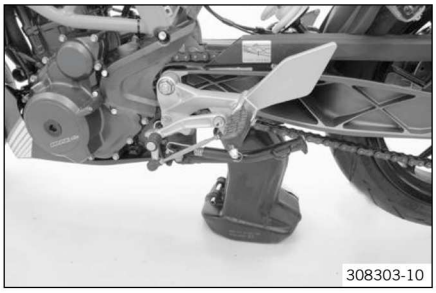


– Remove screw ❸ with washers.



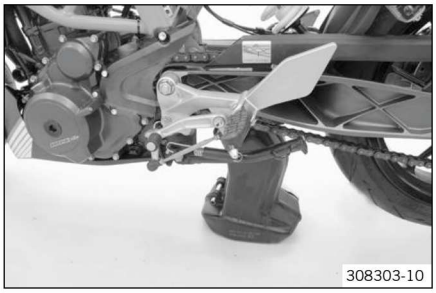
– Remove screw ❹.

Info
Do not misplace the sleeves.



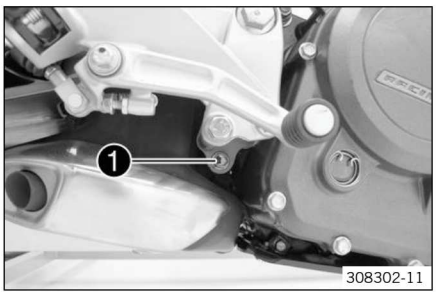
– Take off the main silencer toward the bottom.

10.4 Installing the main silencer



Main work

– Position the main silencer.

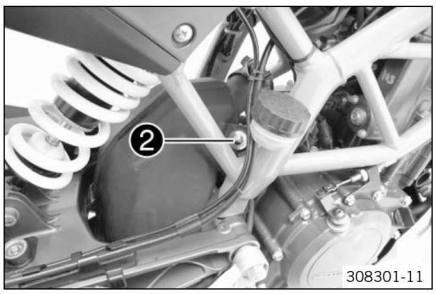


– Mount and tighten screw ❶.

Guideline

Screw, main silencer	M8	24 Nm (17.7 lbf ft)

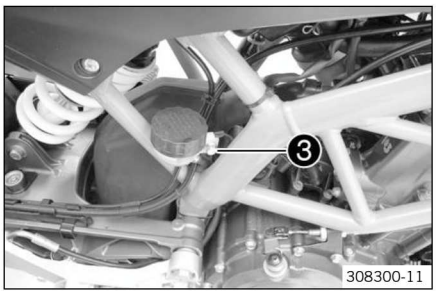
Info
Make sure the sleeves are seated correctly.



– Mount and tighten screw ❷ with the washers.

Guideline

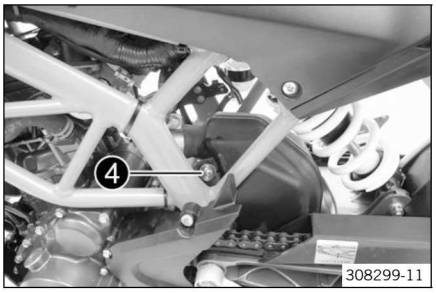
Screw, main silencer	M6	9 Nm (6.6 lbf ft)



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

Guideline

Screw, brake fluid reservoir of rear brake	M6	8 Nm (5.9 lbf ft) **Loctite®243™**



– Mount and tighten screw ❹ with the washers.
Guideline

Screw, main silencer	M6	9 Nm (6.6 lbf ft)

Finishing work
– Install the exhaust manifold. (📖 p. 44)

11 AIR FILTER

11.1 Removing the air filter

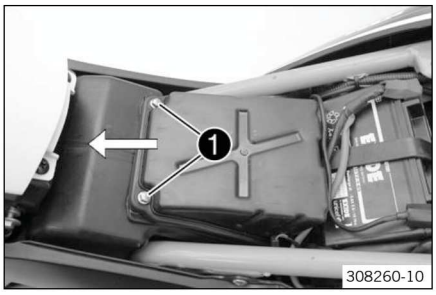
Note

Engine damage Unfiltered intake air has a negative effect on the service life of the engine.
Dust and dirt will enter the engine without an air filter.

– Never start to use the vehicle without an air filter.

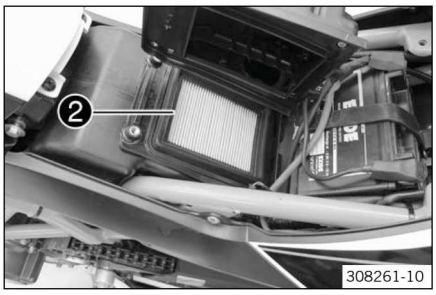
Preparatory work

– Remove the passenger seat. (📖 p. 52)
– Remove the seat. (📖 p. 51)



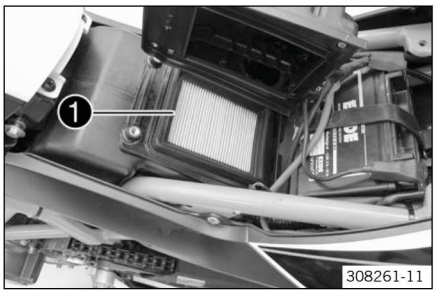
Main work

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



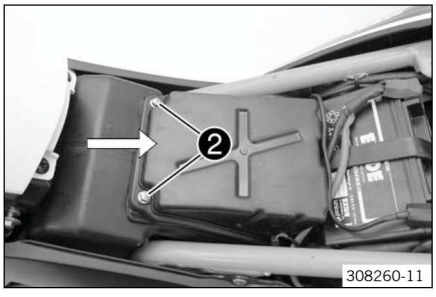
– Remove air filter ❷.
– Clean the air filter box.

11.2 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 cover	M6	3 Nm (2.2 lbf ft)

Finishing work

– Mount the seat. (📖 p. 51)
– Mount the passenger seat. (📖 p. 52)

12 FUEL TANK, SEAT, TRIM

12.1 Opening the filler cap

Danger

Fire hazard Fuel is highly flammable.

The fuel in the fuel tank expands when warm and can escape if overfilled.

- Do not refuel the vehicle in the vicinity of open flames or lit cigarettes.
- Switch off the engine for refueling.
- Make sure that no fuel is spilled; particularly not on hot parts of the vehicle.
- If any fuel is spilled, wipe it off immediately.
- Observe the specifications for refueling.

Warning

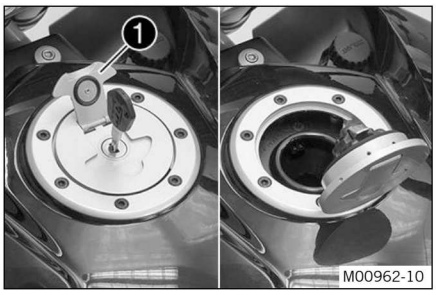
Danger of poisoning Fuel is poisonous and a health hazard.

- Avoid skin, eye and clothing contact with fuel.
- Immediately consult a doctor if you swallow fuel.
- Do not inhale fuel vapors.
- In case of skin contact, rinse the affected area with plenty of water.
- Rinse the eyes thoroughly with water, and consult a doctor in case of fuel contact with the eyes.
- Change your clothing in case of fuel spills on them.
- Keep fuels correctly in a suitable canister, and out of the reach of children.

Note

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

- Do not allow fuel to enter the groundwater, the soil, or the sewage system.



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

Note

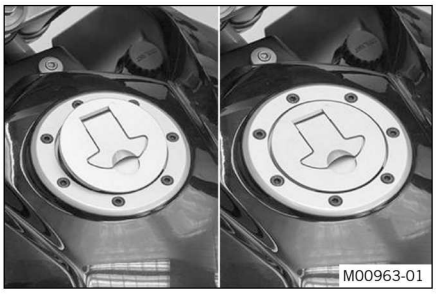
Danger of damage The ignition key may break if overloaded.

Damaged ignition keys must be replaced.

- Push down on the filler cap to take pressure off the ignition key.

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

12.2 Closing the filler cap



Warning

Fire hazard Fuel is highly flammable, toxic and a health hazard.

- Check the filler cap is locked correctly after closing.
- Change your clothing in case of fuel spills on them.
- Rinse the affected area immediately with plenty of water in the event of contact with the skin.

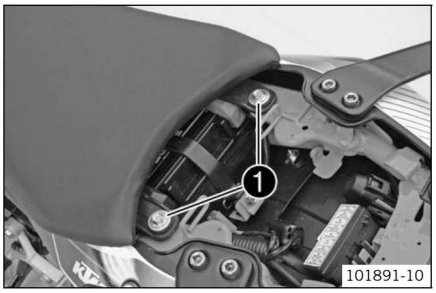
- Close the filler cap.

– Push down the filler cap until the lock engages.

12.3 Removing the seat

Preparatory work

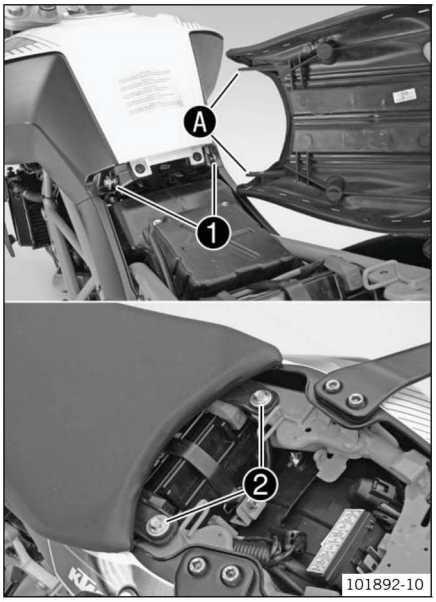
– Remove the passenger seat. (p. 52)



Main work

– Remove screws 1.
– Raise the rear of the seat, pull it towards the rear, and remove it upwards.

12.4 Mounting the seat



Main work

– Attach seat recesses A at screws 1 and lower at the rear.
– Mount and tighten screws 2.

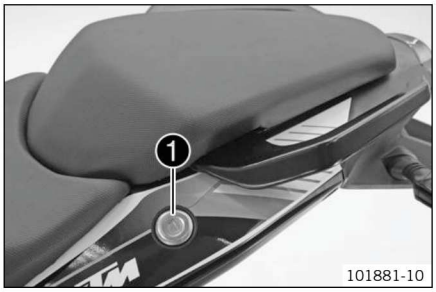
Guideline

Screw, seat	M6	9 Nm (6.6 lbf ft)

Finishing work

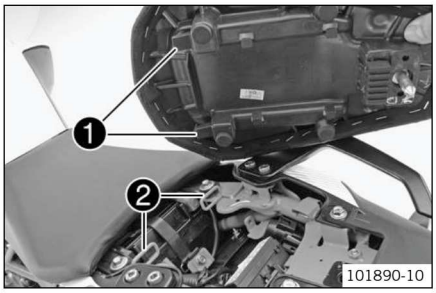
– Mount the passenger seat. (p. 52)

12.5 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 lift it off.
- Remove the ignition key from the seat lock.

12.6 Mounting the passenger seat



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

Warning
Danger of accidents The seat can come loose from the anchoring if it is not mounted correctly.
- After assembly, check whether the seat is correctly locked and cannot be pulled up.

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

12.7 Removing the fuel tank cover

Danger
Fire hazard Fuel is highly flammable.
The fuel in the fuel tank expands when warm and can escape if overfilled.
- Do not refuel the vehicle in the vicinity of open flames or lit cigarettes.
- Switch off the engine for refueling.
- Make sure that no fuel is spilled; particularly not on hot parts of the vehicle.
- If any fuel is spilled, wipe it off immediately.
- Observe the specifications for refueling.

Warning
Danger of poisoning Fuel is poisonous and a health hazard.
- Avoid skin, eye and clothing contact with fuel.
- Immediately consult a doctor if you swallow fuel.
- Do not inhale fuel vapors.
- In case of skin contact, rinse the affected area with plenty of water.
- Rinse the eyes thoroughly with water, and consult a doctor in case of fuel contact with the eyes.
- Change your clothing in case of fuel spills on them.
- Keep fuels correctly in a suitable canister, and out of the reach of children.

Note

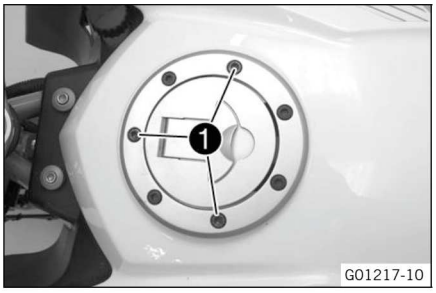
Environmental hazard Improper handling of fuel is a danger to the environment.

– Do not allow fuel to enter the groundwater, the soil, or the sewage system.

Preparatory work

– Remove the passenger seat. (p. 52)

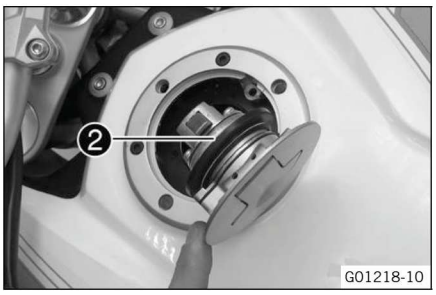
– Remove the seat. (p. 51)



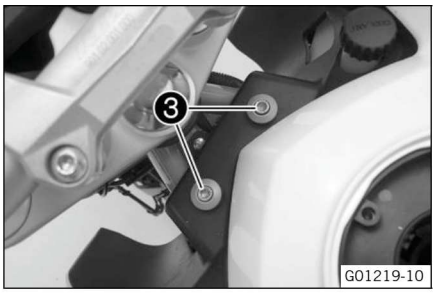
Main work

– Remove screws ❶.

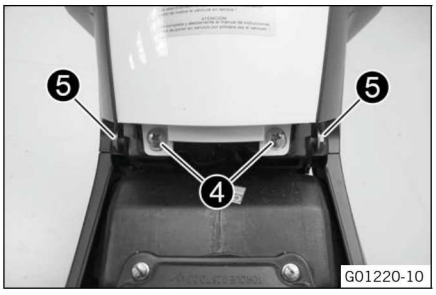
– Open the filler cap. (p. 50)



– Take off filler cap ❷.

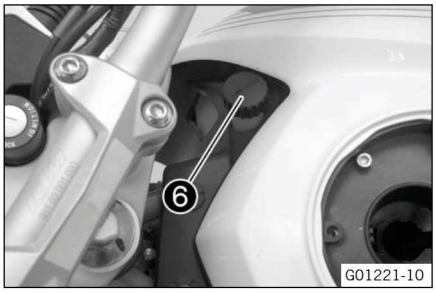


– Remove screws ❸ with the washers.

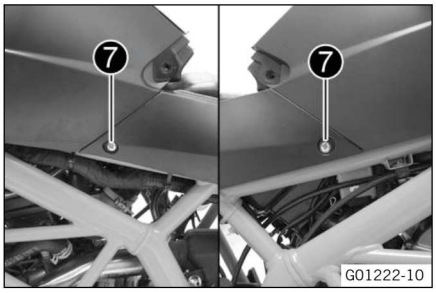


– Remove screws ❹.

– Remove screws ❺.

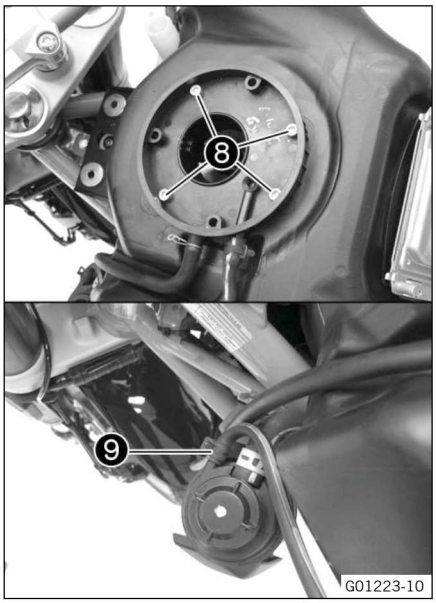


– Remove plug ❻ from the compensating tank.



– Remove screws ❼.

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



– Remove screws ❽.
– Push back hose clamp ❾ and pull off the vent hose.
– Take off the tank insert and gasket.

– Close the fuel tank with a suitable plug.

12.8 Installing the fuel tank cover

Danger

Fire hazard Fuel is highly flammable.

The fuel in the fuel tank expands when warm and can escape if overfilled.

– Do not refuel the vehicle in the vicinity of open flames or lit cigarettes.
– Switch off the engine for refueling.
– Make sure that no fuel is spilled; particularly not on hot parts of the vehicle.
– If any fuel is spilled, wipe it off immediately.
– Observe the specifications for refueling.

Warning

Danger of poisoning Fuel is poisonous and a health hazard.

– Avoid skin, eye and clothing contact with fuel.
– Immediately consult a doctor if you swallow fuel.
– Do not inhale fuel vapors.
– In case of skin contact, rinse the affected area with plenty of water.
– Rinse the eyes thoroughly with water, and consult a doctor in case of fuel contact with the eyes.
– Change your clothing in case of fuel spills on them.
– Keep fuels correctly in a suitable canister, and out of the reach of children.

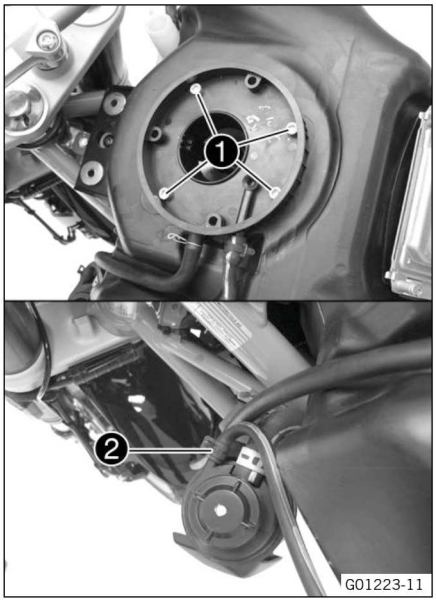
Note

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

– Do not allow fuel to enter the groundwater, the soil, or the sewage system.

Main work

– Remove the plug.

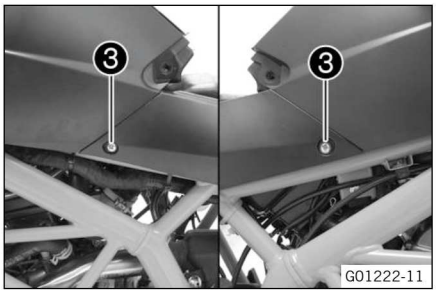


– Position the tank insert with the gasket.
– Mount and tighten screws ❶.
Guideline

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

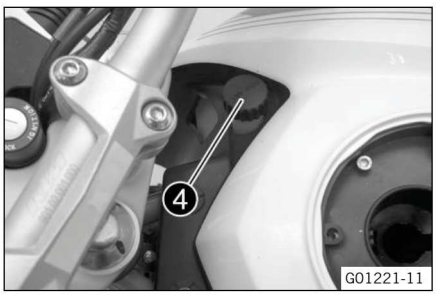
– Mount the vent hose.
– Position hose clamp ❷.

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



– Mount and tighten screws ❸.
Guideline

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



– Mount cap ❹ of the compensating tank.

– Mount and tighten screws ❺.

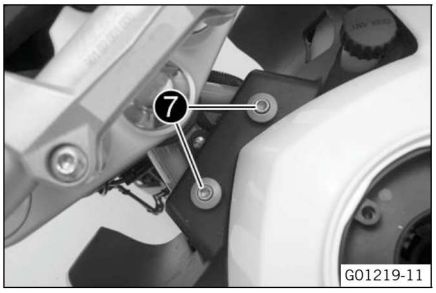
Guideline

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

– Mount and tighten screws ❻.

Guideline

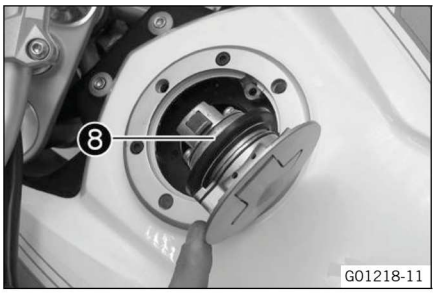
Screw, front seat fixing	M6	6 Nm (4.4 lbf ft)



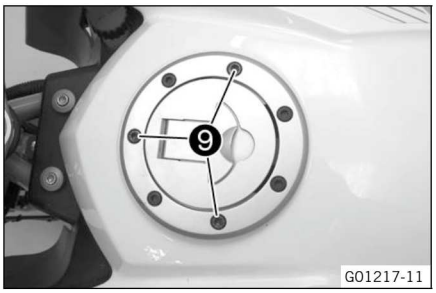
– Mount and tighten screws ❼ with the washers.

Guideline

Screw, fuel tank	M6	9 Nm (6.6 lbf ft)



– Position filler cap ❽.



– Mount and tighten screws ❾.

Guideline

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

Finishing work

– Mount the seat. (📖 p. 51)

– Mount the passenger seat. (📖 p. 52)

◀

12.9 Removing the fuel tank

Danger

Fire hazard Fuel is highly flammable.

The fuel in the fuel tank expands when warm and can escape if overfilled.

- Do not refuel the vehicle in the vicinity of open flames or lit cigarettes.
- Switch off the engine for refueling.
- Make sure that no fuel is spilled; particularly not on hot parts of the vehicle.
- If any fuel is spilled, wipe it off immediately.
- Observe the specifications for refueling.

Warning

Danger of poisoning Fuel is poisonous and a health hazard.

- Avoid skin, eye and clothing contact with fuel.
- Immediately consult a doctor if you swallow fuel.
- Do not inhale fuel vapors.
- In case of skin contact, rinse the affected area with plenty of water.
- Rinse the eyes thoroughly with water, and consult a doctor in case of fuel contact with the eyes.
- Change your clothing in case of fuel spills on them.
- Keep fuels correctly in a suitable canister, and out of the reach of children.

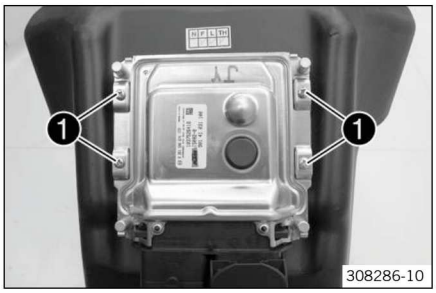
Note

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

- Do not allow fuel to enter the groundwater, the soil, or the sewage system.

Preparatory work

- Remove the passenger seat. (p. 52)
- Remove the seat. (p. 51)
- Remove the fuel tank cover. (p. 52)

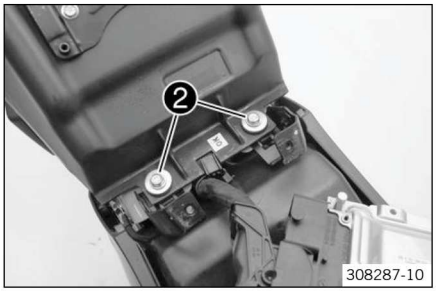


Main work

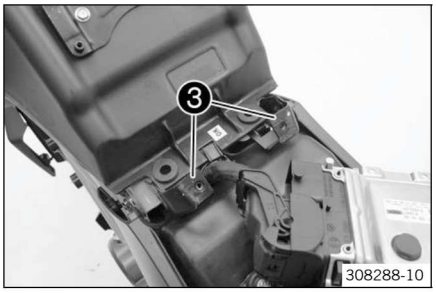
- Remove screws ❶.
- Hang the EFI control unit to one side.

Info

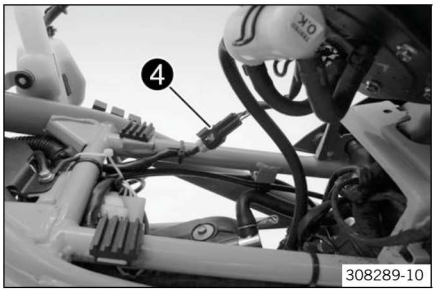
Protect the frame and attachments against damage.



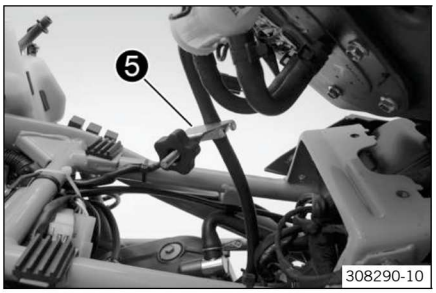
- Remove screws ❷.



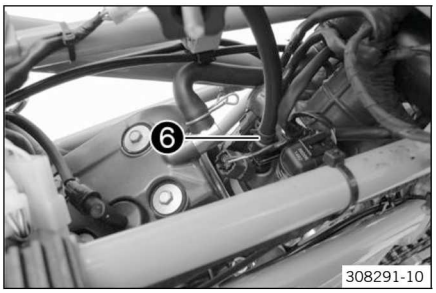
– Take off the holder ❸.



– Unplug 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.

12.10 Installing the fuel tank

Danger

Fire hazard Fuel is highly flammable.

The fuel in the fuel tank expands when warm and can escape if overfilled.

– Do not refuel the vehicle in the vicinity of open flames or lit cigarettes.
– Switch off the engine for refueling.
– Make sure that no fuel is spilled; particularly not on hot parts of the vehicle.
– If any fuel is spilled, wipe it off immediately.
– Observe the specifications for refueling.

Warning

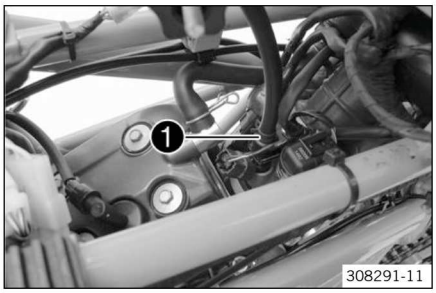
Danger of poisoning Fuel is poisonous and a health hazard.

- Avoid skin, eye and clothing contact with fuel.
- Immediately consult a doctor if you swallow fuel.
- Do not inhale fuel vapors.
- In case of skin contact, rinse the affected area with plenty of water.
- Rinse the eyes thoroughly with water, and consult a doctor in case of fuel contact with the eyes.
- Change your clothing in case of fuel spills on them.
- Keep fuels correctly in a suitable canister, and out of the reach of children.

Note

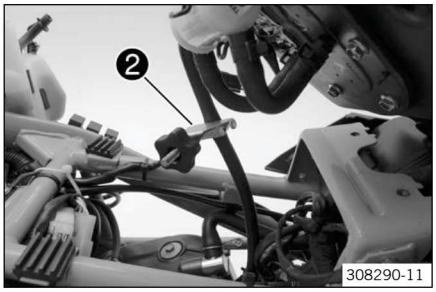
Environmental hazard Improper handling of fuel is a danger to the environment.

- Do not allow fuel to enter the groundwater, the soil, or the sewage system.

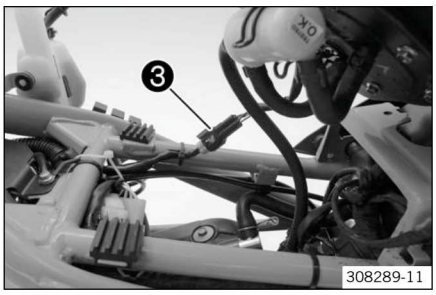


Main work

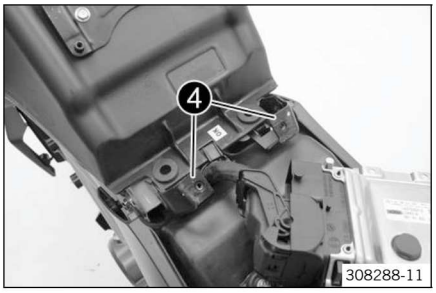
- Connect the fuel line.
- Position hose clamp ❶.



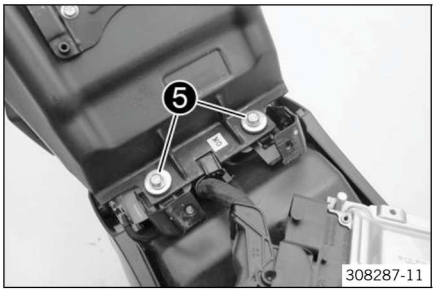
- Remove tool ❷.



- Plug in connector ❸.

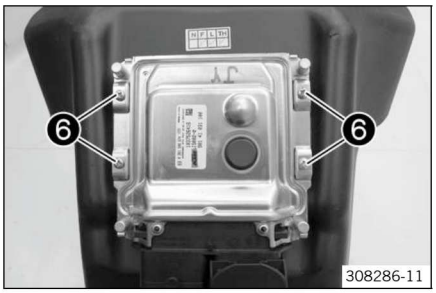


– Position the fuel tank.
– Position the holder ❹.



– Mount and tighten screws ❺.
Guideline

Screw, fuel tank	M6	9 Nm (6.6 lbf ft)

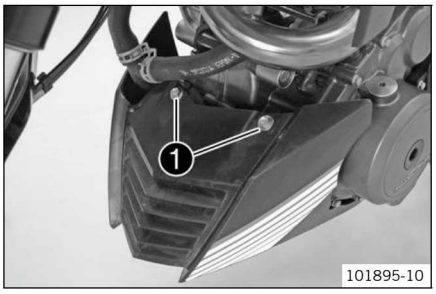


– Position the EFI control unit.
– Mount and tighten screws ❻.
Guideline

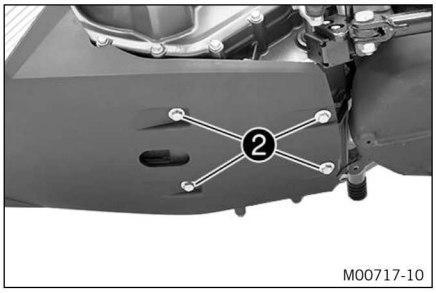
Screw, EFI control unit	M4	4 Nm (3 lbf ft)

Finishing work
– Install the fuel tank cover. (📖 p. 55)
– Mount the seat. (📖 p. 51)
– Mount the passenger seat. (📖 p. 52)

12.11 Removing the front spoiler

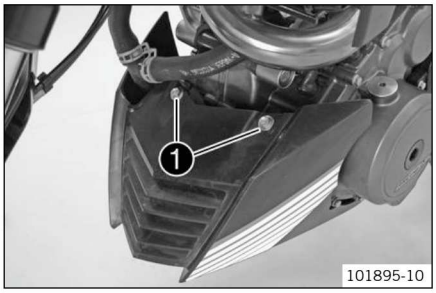


– Remove screws ❶.

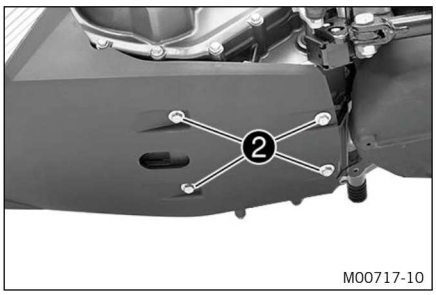


– Remove screws 2.
– Take off the front spoiler.

12.12 Fitting front spoiler



– Position the front spoiler. Mount screws 1 but do not tighten yet.



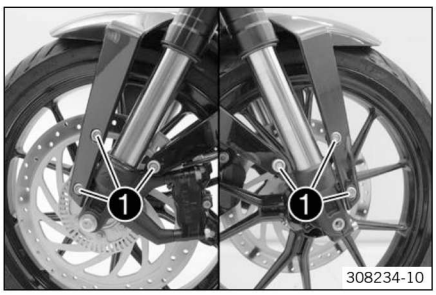
– Mount and tighten screws 2.
Guideline

Screw, front spoiler	M6	7 Nm (5.2 lbf ft)

– Tighten screw 1.
Guideline

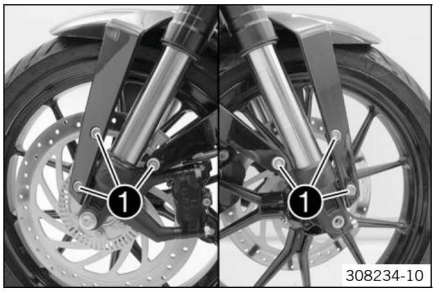
Screw, front spoiler	M6	7 Nm (5.2 lbf ft)

12.13 Removing front fender



– Remove screws 1. Take off the front fender.

12.14 Installing front fender



– Position front fender. Mount and tighten screws ❶.

Guideline

Screw, front fender	M6	9 Nm (6.6 lbf ft)

12.15 Checking the fuel pressure

Danger

Fire hazard Fuel is highly flammable.

The fuel in the fuel tank expands when warm and can escape if overfilled.

– Do not refuel the vehicle in the vicinity of open flames or lit cigarettes.
– Switch off the engine for refueling.
– Make sure that no fuel is spilled; particularly not on hot parts of the vehicle.
– If any fuel is spilled, wipe it off immediately.
– Observe the specifications for refueling.

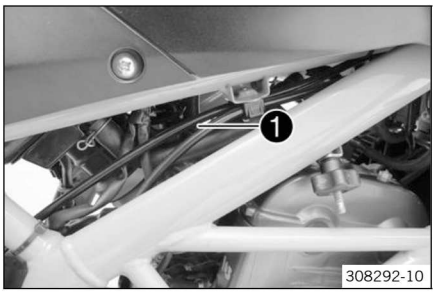
Warning

Danger of poisoning Fuel is poisonous and a health hazard.

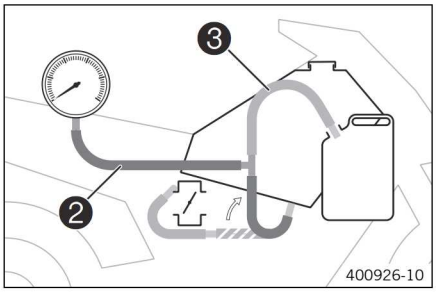
– Avoid skin, eye and clothing contact with fuel.
– Immediately consult a doctor if you swallow fuel.
– Do not inhale fuel vapors.
– In case of skin contact, rinse the affected area with plenty of water.
– Rinse the eyes thoroughly with water, and consult a doctor in case of fuel contact with the eyes.
– Change your clothing in case of fuel spills on them.
– Keep fuels correctly in a suitable canister, and out of the reach of children.

Condition

The fuel tank is completely 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. 263)

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

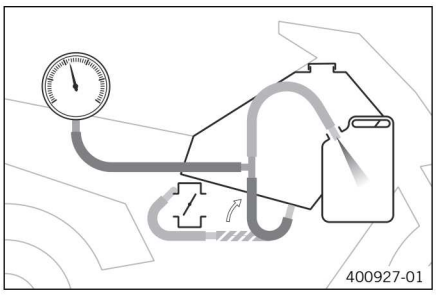
Testing hose (61029093000) (📖 p. 263)

– Position the hose end in a fuel can.

Guideline

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

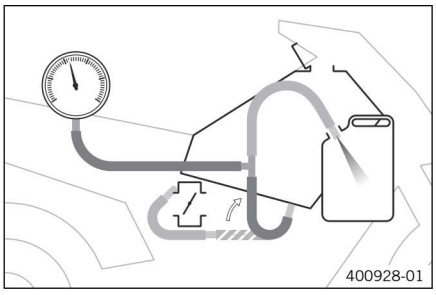
– Switch the ignition on.
– Execute **"Actuator Test"** > **"Function test of fuel pump control"**.



– Check the fuel pressure with the filler cap closed.

Fuel pressure	
When the fuel pump is active	3.2 ... 3.7 bar (46 ... 54 psi)

» If the specification is not reached:
  – Open the filler cap. (📖 p. 50)
  – Check the tank air vent system.

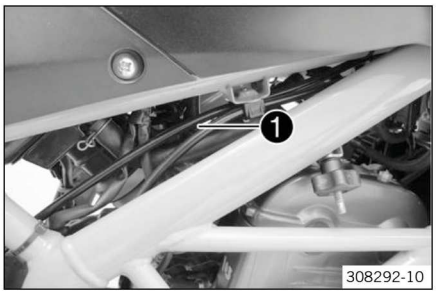


– Check the fuel pressure with the filler cap open.

Fuel pressure	
When the fuel pump is active	3.2 ... 3.7 bar (46 ... 54 psi)

» If the specification is not reached:
  – Check that the fuel line is clear.
  – Change the fuel filter. (📖 p. 65)
  – Replace the fuel pump. (📖 p. 66)

– 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.

12.16 Changing the fuel filter

Danger

Fire hazard Fuel is highly flammable.

The fuel in the fuel tank expands when warm and can escape if overfilled.

- Do not refuel the vehicle in the vicinity of open flames or lit cigarettes.
- Switch off the engine for refueling.
- Make sure that no fuel is spilled; particularly not on hot parts of the vehicle.
- If any fuel is spilled, wipe it off immediately.
- Observe the specifications for refueling.

Warning

Danger of poisoning Fuel is poisonous and a health hazard.

- Avoid skin, eye and clothing contact with fuel.
- Immediately consult a doctor if you swallow fuel.
- Do not inhale fuel vapors.
- In case of skin contact, rinse the affected area with plenty of water.
- Rinse the eyes thoroughly with water, and consult a doctor in case of fuel contact with the eyes.
- Change your clothing in case of fuel spills on them.
- Keep fuels correctly in a suitable canister, and out of the reach of children.

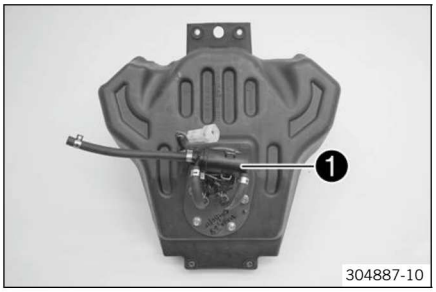
Note

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

- Do not allow fuel to enter the groundwater, the soil, or the sewage system.

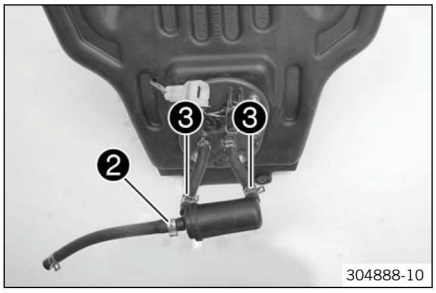
Preparatory work

- Remove the passenger seat. (p. 52)
- Remove the seat. (p. 51)
- Remove the fuel tank cover. (p. 52)
- Remove the fuel tank. (p. 58)
- Drain the fuel from the fuel tank into a suitable container.

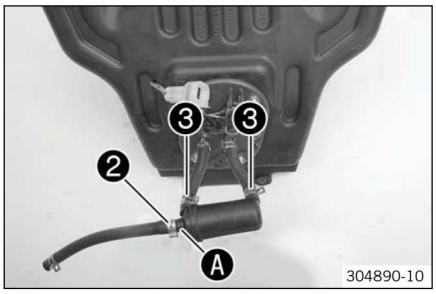


Main work

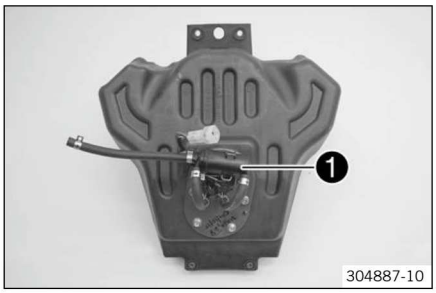
- Take fuel filter ❶ out of the holder.



- 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. 59)
- Install the fuel tank cover. (📖 p. 55)
- Mount the seat. (📖 p. 51)
- Mount the passenger seat. (📖 p. 52)

12.17 Replacing the fuel pump

Danger

Fire hazard Fuel is highly flammable.

The fuel in the fuel tank expands when warm and can escape if overfilled.

- Do not refuel the vehicle in the vicinity of open flames or lit cigarettes.
- Switch off the engine for refueling.
- Make sure that no fuel is spilled; particularly not on hot parts of the vehicle.
- If any fuel is spilled, wipe it off immediately.
- Observe the specifications for refueling.

Warning

Danger of poisoning Fuel is poisonous and a health hazard.

- Avoid skin, eye and clothing contact with fuel.
- Immediately consult a doctor if you swallow fuel.
- Do not inhale fuel vapors.
- In case of skin contact, rinse the affected area with plenty of water.
- Rinse the eyes thoroughly with water, and consult a doctor in case of fuel contact with the eyes.
- Change your clothing in case of fuel spills on them.
- Keep fuels correctly in a suitable canister, and out of the reach of children.

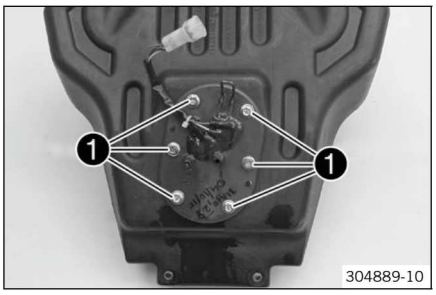
Note

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

- Do not allow fuel to enter the groundwater, the soil, or the sewage system.

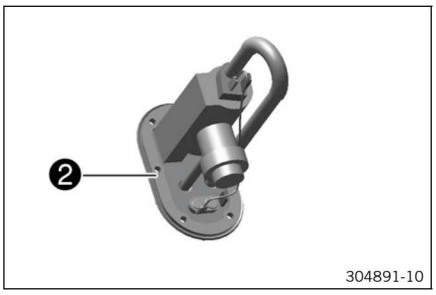
Preparatory work

- Remove the passenger seat. (p. 52)
- Remove the seat. (p. 51)
- Remove the fuel tank cover. (p. 52)
- Remove the fuel tank. (p. 58)
- Drain the fuel from the fuel tank into a suitable container.

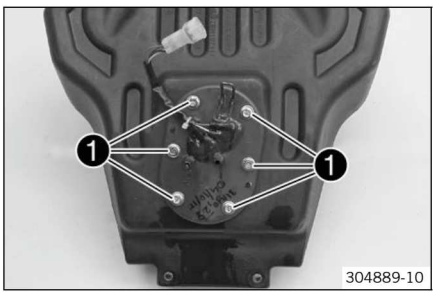


Main work

- Remove screws 1.
- Remove the fuel pump with the gasket.



- Position gasket 2.



- Position the fuel pump with the gasket.
- Install the screws 1 and tighten them diagonally.

  Guideline

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

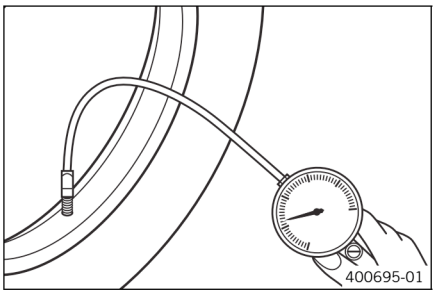
Finishing work

- Install the fuel tank. (p. 59)
- Install the fuel tank cover. (p. 55)

– Mount the seat. (p. 51)
– Mount the passenger seat. (p. 52)

13.1 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.

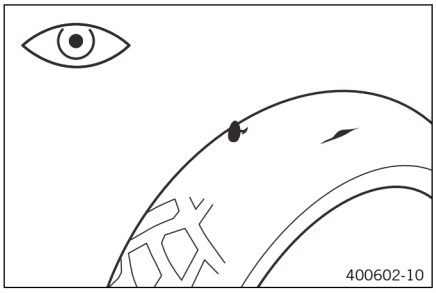
13.2 Checking the tire condition

Warning
Danger of accidents If a tire bursts while riding, the vehicle becomes uncontrollable.
– Ensure that damaged or worn tires are replaced immediately.

Warning
Danger of crashing Different tire tread patterns on the front and rear wheel impair the handling characteristic.
Different tire tread patterns can make the vehicle significantly more difficult to control.
– Make sure that only tires with a similar tire tread pattern are fitted to the front and rear wheel.

Warning
Danger of accidents Non-approved or non-recommended tires and wheels impact the handling characteristic.
– Only use tires/wheels approved by KTM with the corresponding speed index.

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



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

Info
Observe the minimum profile depth required by national law.

Minimum tread depth	≥ 2 mm (≥ 0.08 in)

  » If the tread depth is less than the minimum tread depth:
    – Change the tires.

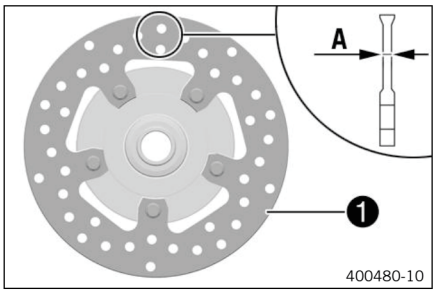
– Check the tire age.

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

  » If the tires are more than 5 years old:
    – Change the tires.

13.3 Checking the brake discs

Warning
Danger of accidents Worn-out brake discs reduce the braking effect.
– Make sure that worn-out brake discs are replaced immediately.



– Check the front and rear brake disc thickness at multiple points for the dimension Ⓐ.

Info
Wear will reduce the thickness of the brake disc at contact surface ❶ of the brake linings.

Brake discs - wear limit	
front	3.6 mm (0.142 in)
rear	3.6 mm (0.142 in)

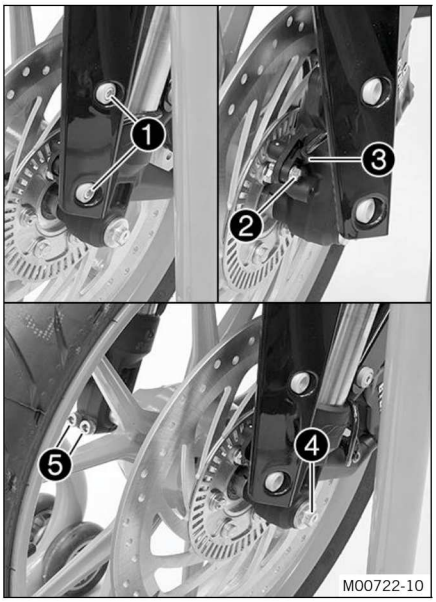
  » If the brake disc thickness is less than the specified value.
    – Change the front brake disc. (📖 p. 72)
    – Change the rear brake disc. (📖 p. 75)
– Check the front and rear brake discs for damage, cracking, and deformation.

» If the brake disc exhibits damage, cracking, or deformation:
– Change the front brake disc. (p. 72)
– Change the rear brake disc. (p. 75)

13.4 Front wheel

13.4.1 Removing the front wheel

Preparatory work
– Raise the motorcycle with the rear lifting gear. (p. 11)
– Lift the motorcycle with the front lifting gear. (p. 11)



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 screw ❹ by several rotations.
– Release screws ❺.
– Press on screw ❹ to push the wheel spindle out of the axle clamp.
– Remove screw ❹.

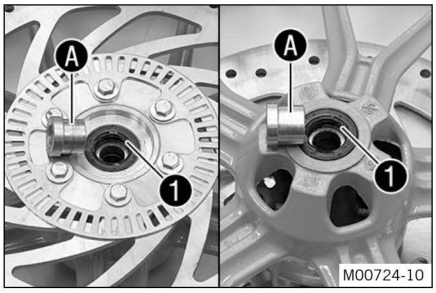
Warning
Danger of accidents Reduced braking effect caused by damaged brake discs.
– Always lay the wheel down in such a way that the brake discs are not damaged.

– 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.

13.4.2 Installing the front wheel

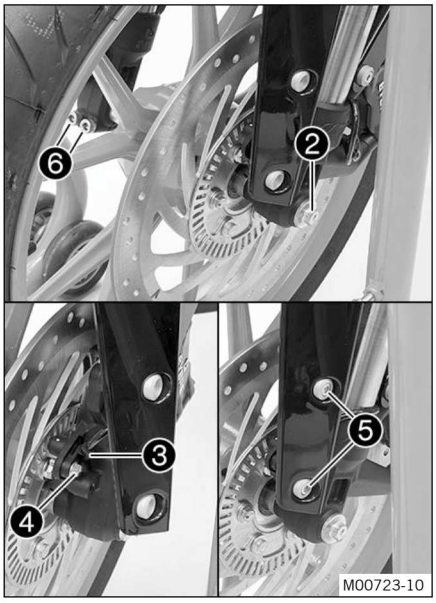
Warning
Danger of accidents Oil or grease on the brake discs reduces the braking effect.
– Always keep the brake discs free of oil and grease.
– Clean the brake discs with brake cleaner when necessary.



– 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. 258)

– Insert the spacers.



– Clean the thread of the wheel spindle and screw ❷.
– Clean and grease wheel spindle.

Long-life grease (📖 p. 258)

– 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	25 Nm (18.4 lbf ft)

– Position wheel speed sensor ❸ in the drill hole.
– Mount and tighten screw ❹.
  Guideline

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

– Mount and tighten screws ❺.
– Operate the hand brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point.
– Take the motorcycle off the front lifting gear. (📖 p. 12)
– Remove the rear of the motorcycle from the lifting gear. (📖 p. 11)
– Operate the front brake and compress the fork a few times firmly.
  ✔ The fork legs straighten.
– Tighten screws ❻.
  Guideline

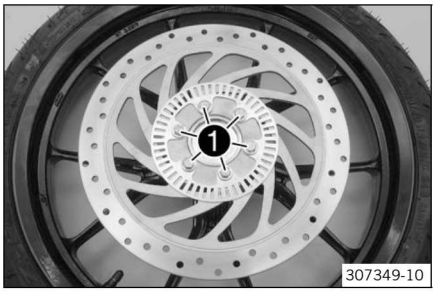
Screw, fork stub	M8	15 Nm (11.1 lbf ft)

◀

13.4.3 Changing the front brake disc

Info
If the brake discs are changed, the brake linings must also be changed.

Preparatory work
– Raise the motorcycle with the rear lifting gear. (📖 p. 11)
– Lift the motorcycle with the front lifting gear. (📖 p. 11)
– Remove the front wheel. (📖 p. 71)



Main work

- Remove screws 1.
- Take off the ABS sensor wheel and brake disc.
- Clean the contact surface of the brake disc.
- Position the new brake disc with the label facing outward.
- Position the ABS sensor wheel.
- Mount and tighten screws 1.

  Guideline

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

Finishing work

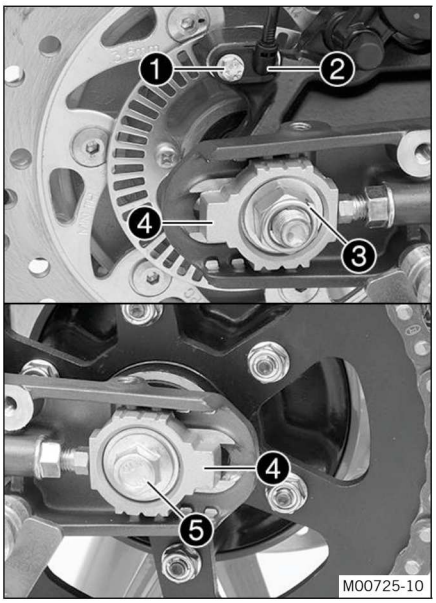
- Install the front wheel. (p. 71)

13.5 Rear wheel

13.5.1 Removing the rear wheel

Preparatory work

- Raise the motorcycle with the rear lifting gear. (p. 11)



Main work

- Remove screw 1 and pull wheel speed sensor 2 out of the hole.
- Remove nut 3 and washer.
- Remove chain adjuster 4.
- Holding the rear wheel, withdraw wheel spindle 5 with the washer and chain adjuster 4.
- 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 lever when the rear wheel is removed.

13.5.2 Installing the rear wheel

Warning

Danger of accidents Oil or grease on the brake discs reduces the braking effect.

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

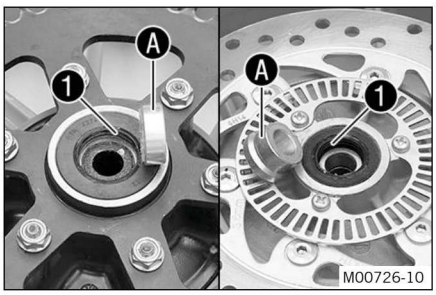
Warning

Danger of accidents There is no braking effect to start with at the rear brake after installing the rear wheel.

– Actuate the foot brake several times before going on a ride until you can feel a firm pressure point.

Main work

– Check the rear hub rubber dampers. (📖 p. 80)



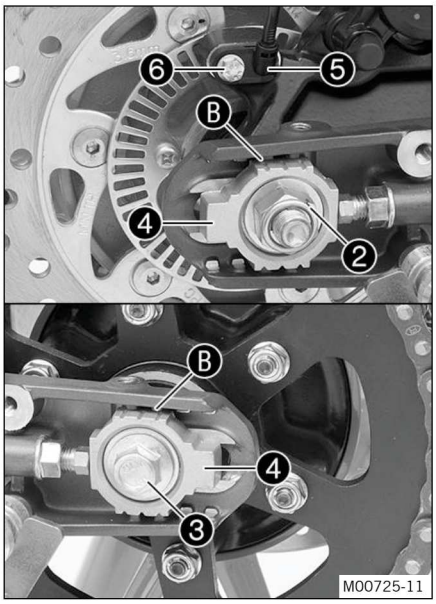
– Check the wheel bearing for damage and wear.
  » If the wheel bearing is damaged or worn:
    – Change the wheel bearing.
– Clean and grease shaft seal rings ❶ and contact surfaces Ⓐ of the spacers.

Long-life grease (📖 p. 258)

– Clean the thread of the wheel spindle and axle nut.
– Clean and grease wheel spindle.

Long-life grease (📖 p. 258)

– Clean the contact areas of the brake caliper support and swingarm.
– Mount the rubber damper and rear sprocket carrier on the rear wheel.
– Insert the spacers.
– Position the rear wheel.
  ✔ The brake linings are correctly positioned.
– Push the rear wheel forward as far as possible and lay the chain on the rear sprocket.



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

  Guideline

Mount 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 in contact with 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 reference markings Ⓑ.

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

– Position wheel speed sensor ❺ in the drill hole.
– Mount and tighten screw ❻.

  Guideline

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

Finishing work

– Remove the rear of the motorcycle from the lifting gear. (p. 11)
– Check the chain tension. (p. 76)

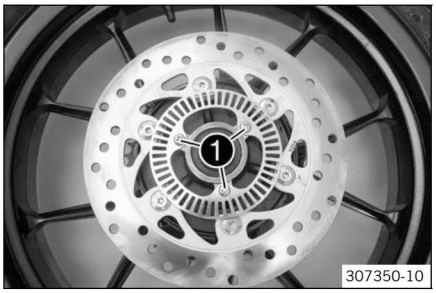
13.5.3 Changing the rear brake disc

Info

If the brake discs are changed, the brake linings must also be changed.

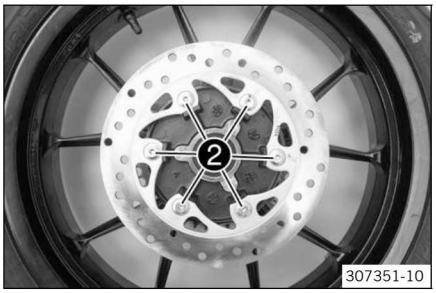
Preparatory work

– Raise the motorcycle with the rear lifting gear. (p. 11)
– Remove the rear wheel. (p. 73)



Main work

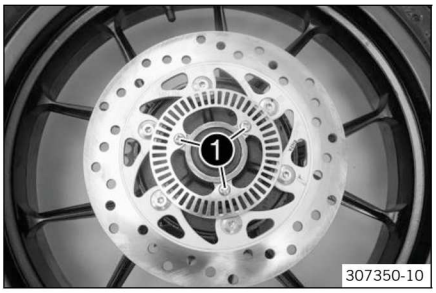
– Remove screws ❶.
– Take off the ABS sensor wheel.



– Remove screws ❷.
– Take off the brake disc.
– Clean the contact surface of the brake disc and the ABS sensor wheel.
– Position the new brake disc with the label facing outward.
– Mount and tighten screws ❷.

Guideline

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



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

Guideline

Screw, rear ABS sensor wheel	M6	8 Nm (5.9 lbf ft) **Loctite®243™**

Finishing work

– Install the rear wheel. (p. 73)
– Remove the rear of the motorcycle from the lifting gear. (p. 11)
– Check the chain tension. (p. 76)

13.5.4 Checking the chain tension

Warning

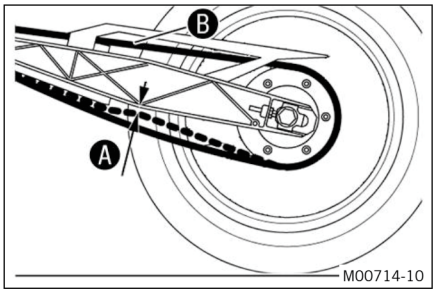
Danger of accidents Incorrect chain tension damages components and results in accidents.

If the chain is tensioned too much, the chain, engine sprocket, rear sprocket, transmission and rear wheel bearings wear more quickly. Some components may break if overloaded.
If the chain is too loose, the chain may fall off the engine sprocket or the rear sprocket. As a result, the rear wheel locks or the engine will be damaged.

- Check the chain tension regularly.
- Set the chain tension in accordance with the specification.

Preparatory work

- Raise the motorcycle with the rear lifting gear. (p. 11)



Main work

- Shift gear to neutral.
- In the area of the chain sliding guard, press the chain upward toward the swingarm and determine chain tension A.

Info

Upper chain section B 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 the specification:
  - Adjust the chain tension. (p. 76)

- Remove the rear of the motorcycle from the lifting gear. (p. 11)

13.5.5 Adjusting the chain tension

Warning

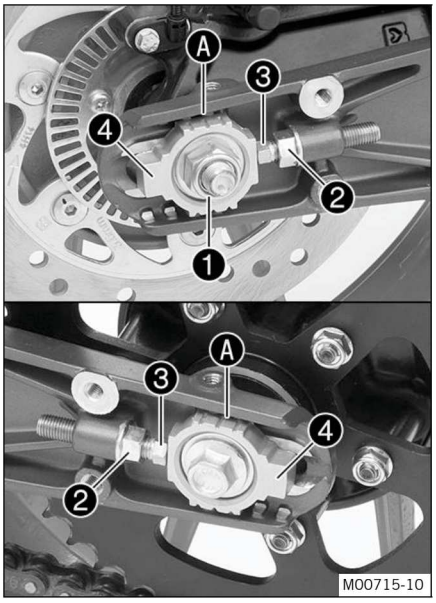
Danger of accidents Incorrect chain tension damages components and results in accidents.

If the chain is tensioned too much, the chain, engine sprocket, rear sprocket, transmission and rear wheel bearings wear more quickly. Some components may break if overloaded.
If the chain is too loose, the chain may fall off the engine sprocket or the rear sprocket. As a result, the rear wheel locks or the engine will be damaged.

- Check the chain tension regularly.
- Set the chain tension in accordance with the specification.

Preparatory work

- Raise the motorcycle with the rear lifting gear. (p. 11)
- Check the chain tension. (p. 76)



Main work

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

  Guideline

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

Info
The upper part of the chain 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)

Finishing work

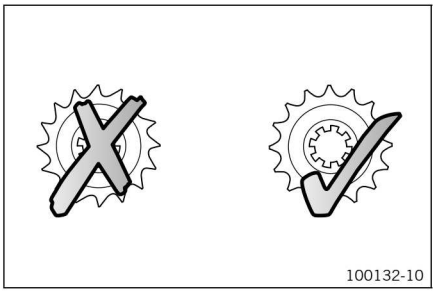
- Remove the rear of the motorcycle from the lifting gear. (📖 p. 11)

◀

13.5.6 Checking the chain, rear sprocket, and engine sprocket

Preparatory work

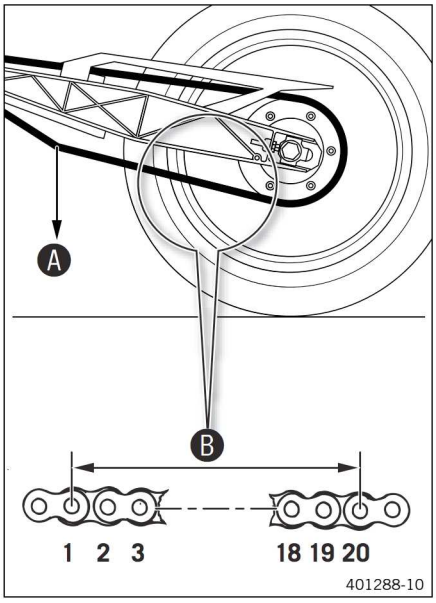
- Raise the motorcycle with the rear lifting gear. (📖 p. 11)



Main work

- 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 Ⓐ.

Guideline

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

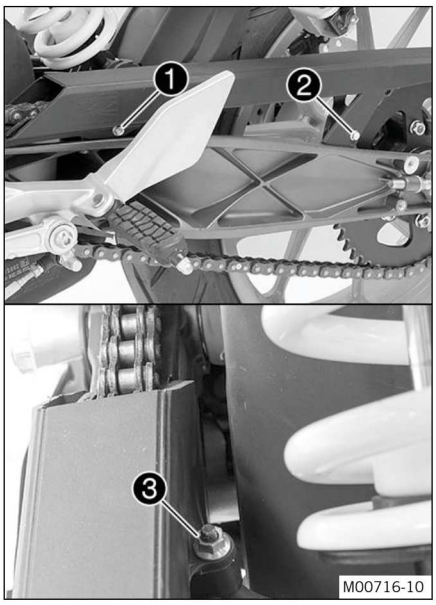
– Measure distance Ⓑ of 20 chain rollers in the lower chain section.

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

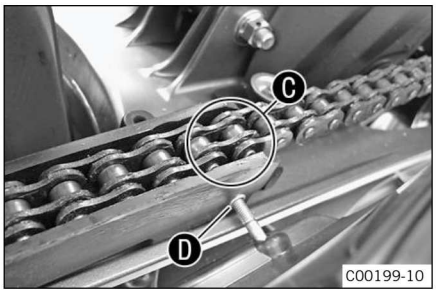
Maximum distance Ⓑ at the longest chain section	301.6 mm (11.874 in)

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

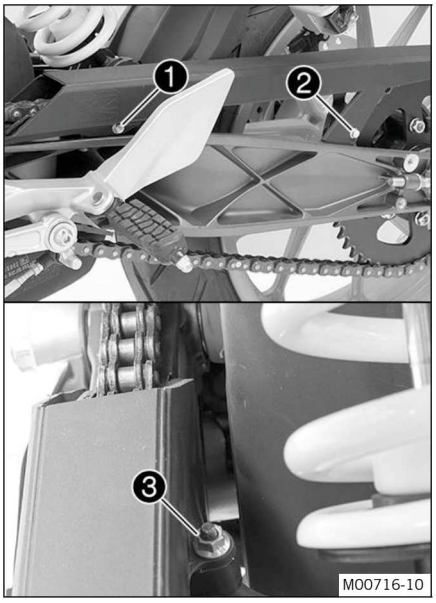
Info
When a new chain is mounted, the rear sprocket and engine sprocket should also be changed. New chains wear out faster on old, worn sprockets.



– Loosen screw ❶.
– Remove screw ❷.
– Remove nut ❸.
– Push the chain guard aside.



– Check the chain sliding guard for wear.
» If the chain sliding guard has lost material due to wear to the extent that, in area Ⓒ, drilled hole Ⓓ is visible from above:
– Change the chain sliding guard.
– Check that the chain sliding guard is firmly seated.
» If the chain sliding guard is loose:
– Tighten the screws on the chain sliding guard.



– Position the chain guard and tighten screw ❶.

Guideline

Screw, chain guard	**EJOT PT®** K60x20	4 Nm (3 lbf ft)

– Mount and tighten screw ❷.

Guideline

Screw, chain guard	**EJOT PT®** K60x20	4 Nm (3 lbf ft)

– Mount and tighten nut ❸.

Guideline

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

Finishing work

– Remove the rear of the motorcycle from the lifting gear. (📖 p. 11)

◀

13.5.7 Cleaning the chain

Warning

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

– Remove the lubricant from the tires using a suitable cleaning agent.

Warning

Danger of accidents Oil or grease on the brake discs reduces the braking effect.

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

Note

Environmental hazard Hazardous substances cause environmental damage.

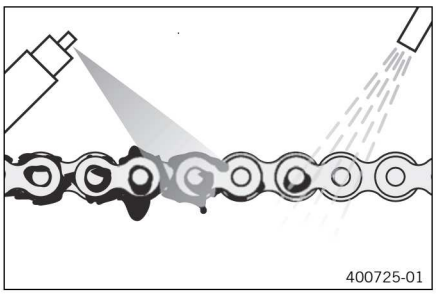
– Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.

Info

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

Preparatory work

– Raise the motorcycle with the rear lifting gear. (📖 p. 11)



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

Chain cleaner (📖 p. 258)

- After drying, apply chain spray.

Street chain spray (📖 p. 259)

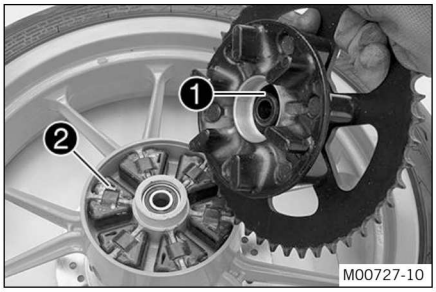
Finishing work
- Remove the rear of the motorcycle from the lifting gear. (📖 p. 11)

◀

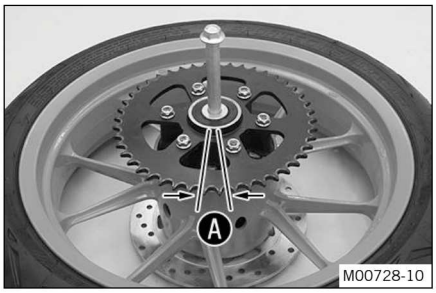
13.5.8 Checking the rear hub rubber dampers

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 lifting gear. (📖 p. 11)
- Remove the rear wheel. (📖 p. 73)



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.



- 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. 73)
- Remove the rear of the motorcycle from the lifting gear. (📖 p. 11)
- Check the chain tension. (📖 p. 76)

◀

14.1 Removing the battery

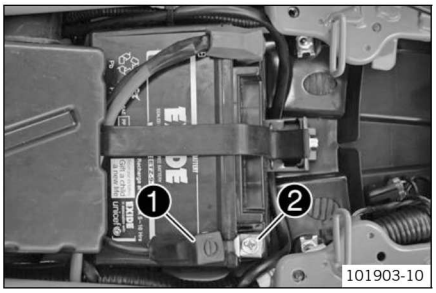
Warning

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 safety glasses.
- Avoid contact with battery acid and battery gases.
- Keep sparks or open flames away from the battery.
- Only charge batteries in well-ventilated rooms.
- Rinse the affected area immediately with plenty of water in the event of contact with the skin.
- Rinse eyes with water for at least 15 minutes and consult a doctor immediately if battery acid and battery gases get into the eyes.

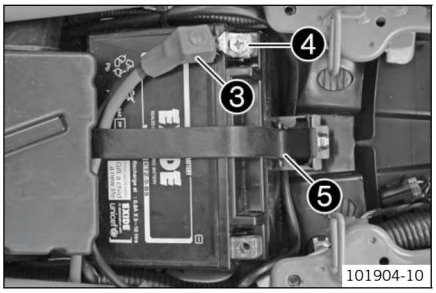
Preparatory work

- Switch off the ignition by turning the ignition key to the position ⊠.
- Remove the passenger seat. (📖 p. 52)
- Remove the seat. (📖 p. 51)



Main work

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

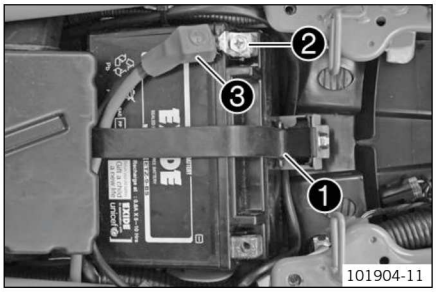


- Pull back positive terminal cover ❸.
- Disconnect positive cable ❹ from the battery.
- Detach rubber band ❺.
- Pull the battery up and out of the battery holder.

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 will therefore no longer be roadworthy.

14.2 Installing the battery



Main work

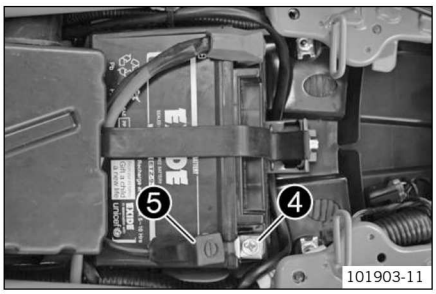
– Position the battery in the battery holder.

Guideline

The terminals of the battery must face upwards.

Battery (ETZ-9-BS) (📖 p. 210)

– Reconnect rubber band ❶.
– Position the positive cable ❷ and mount and tighten the screw.
– Position positive terminal cover ❸.



– Position the negative cable ❹ and mount and tighten the screw.
– Position the negative terminal cover ❺.

Finishing work

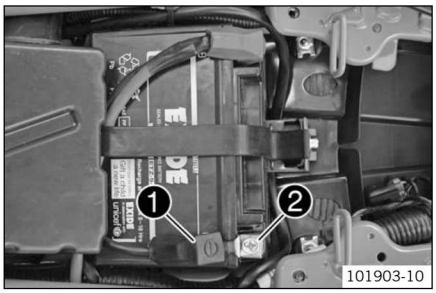
– Mount the seat. (📖 p. 51)
– Mount the passenger seat. (📖 p. 52)
– Set the clock. (📖 p. 104)

◀

14.3 Disconnecting the negative cable of the battery

Preparatory work

– Switch off the ignition by turning the ignition key to the position ⊠.
– Remove the passenger seat. (📖 p. 52)
– Remove the seat. (📖 p. 51)

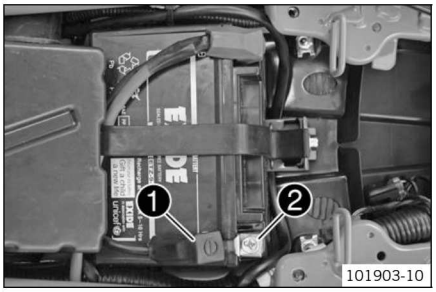


Main work

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

◀

14.4 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. 51)
- Mount the passenger seat. (📖 p. 52)
- Set the clock. (📖 p. 104)

14.5 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 safety glasses.
- Avoid contact with battery acid and battery gases.
- Keep sparks or open flames away from the battery.
- Only charge batteries in well-ventilated rooms.
- Rinse the affected area immediately with plenty of water in the event of contact with the skin.
- Rinse eyes with water for at least 15 minutes and consult a doctor immediately if battery acid and battery gases get into the eyes.

Note

Environmental hazard Batteries contain environmentally-hazardous materials.

- Do not dispose of batteries as household waste.
- Dispose of batteries at a collection point for used batteries.

Note

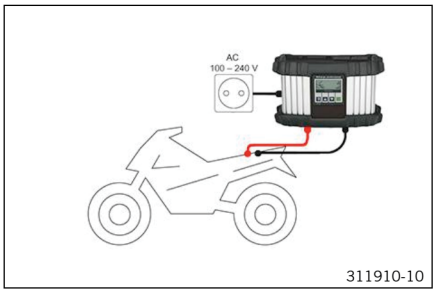
Environmental hazard Hazardous substances cause environmental damage.

- Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.

Info

Even when there is no load on the battery, it discharges steadily.
The charging level and the method of charging are very important for the service life of the battery.
Rapid recharging with a high charging current shortens the service life of the battery.
If the charging current, charging voltage, and charging time are exceeded, the battery will be destroyed.
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 sulfated, destroying the battery.
The battery is maintenance-free, i.e., the acid level does not have to be checked.

Preparatory work
- Switch off the ignition by turning the ignition key to the position ⊠.
- Remove the passenger seat. (p. 52)
- Remove the seat. (p. 51)
- Disconnect the negative cable of the battery. (p. 82)



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Main work
- Connect the battery charger to the battery. Set the battery charger.

EU battery charger **XCharge-professional** (00029095050) (p. 260)

Alternative 1

US battery charger **XCharge-professional** (00029095051) (p. 261)

Alternative 2

UK battery charger **XCharge-professional** (00029095052) (p. 261)

Alternative 3

CH battery charger **XCharge-professional** (00029095053) (p. 261)

Info
Follow the instructions of the charger and the manual.

- Disconnect the battery charger after charging the battery.

Guideline

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

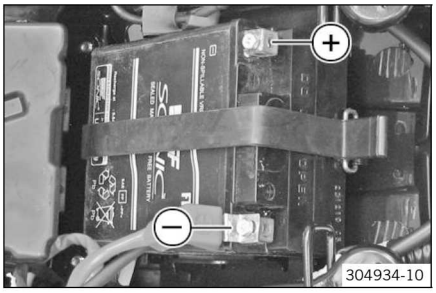
Finishing work
- Reconnect the negative cable of the battery. (p. 83)
- Mount the seat. (p. 51)
- Mount the passenger seat. (p. 52)
- Set the clock. (p. 104)

14.6 Checking the charging voltage

Condition
The battery must be fully functional and completely charged.

Preparatory work
- Remove the passenger seat. (p. 52)
- Remove the seat. (p. 51)

Main work
- Start the motorcycle to make checks. (p. 15)



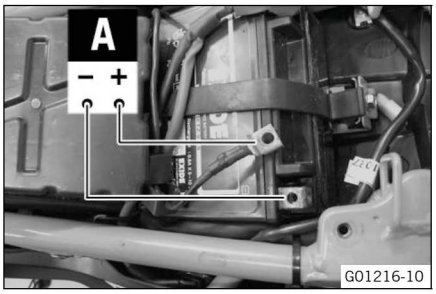
– V Measure the voltage between the specified points.
Measuring point **Plus (+)** – Measuring point **Ground (−)**

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. 203)
» If the displayed value is greater than the specified value:
  – Change the voltage regulator.

14.7 Checking the open-circuit current

Preparatory work
– Switch off the ignition by turning the ignition key to the position ⊠.
– Remove the passenger seat. (p. 52)
– Remove the seat. (p. 51)



Main work
– Disconnect the negative cable of the battery.
– Measure the current between battery ground (−) and the negative cable.

Info
The value of the open-circuit current only applies to vehicles in their original state without additional power consumers.

Maximum open-circuit current	< 1.0 mA

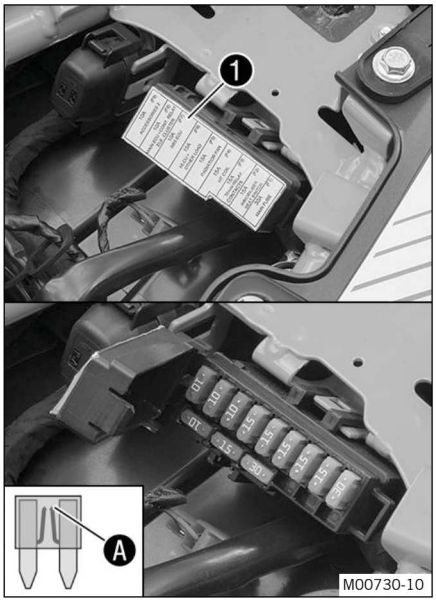
» If the measured value is greater than the specified value:
  – Disconnect the voltage regulator from the wiring harness and perform the measurement again.

Finishing work
– Mount the seat. (p. 51)
– Mount the passenger seat. (p. 52)

14.8 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 the ignition by turning the ignition key to the position ⊠.
– Remove the passenger seat. (p. 52)



Main work

– Open fuse box cover 1.
– Remove the faulty fuse.

Guideline

Fuse **1** - 30 A - main fuse
Fuse **2** - 15 A - combination instrument, alarm system (optional)
Fuse **3** - 15 A - EFI control unit, fuel pump
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 faulty fuse has a burned-out fuse wire A.

Warning

Fire hazard Incorrect fuses overload the electrical system.

– Only use fuses with the required ampere value.
– Do not bypass or repair fuses.

– Insert spare fuses with the correct rating only.

Fuse (75011088010) (p. 210)
Fuse (75011088015) (p. 210)
Fuse (75011088030) (p. 210)

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 1.

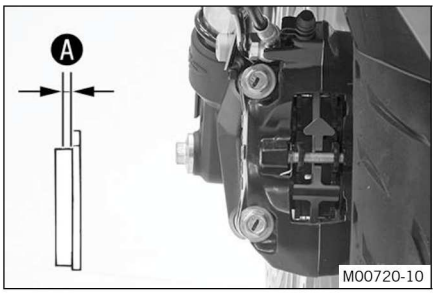
Finishing work

– Mount the passenger seat. (p. 52)

15.1 Checking the front brake linings

Warning
Danger of accidents Worn-out brake linings reduce the braking effect.
– Ensure that worn-out brake linings are replaced immediately.

Warning
Danger of accidents Damaged brake discs reduce the braking effect.
If the brake linings are not changed in time, the brake lining carriers grind against the brake disc. As a consequence, the braking effect is greatly reduced and the brake discs are destroyed.
– Check the brake linings regularly.



– Check the brake linings for minimum thickness A.

Minimum thickness A	≥ 1 mm (≥ 0.04 in)

» If the minimum thickness is less than specified:
– Change the front brake linings. (📖 p. 87)
– Check the brake linings for damage and cracking.
» If there is wear or tearing:
– Change the front brake linings. (📖 p. 87)

15.2 Changing the front brake linings

Warning
Skin irritation Brake fluid causes skin irritation.
– Keep brake fluid out of the reach of children.
– Wear suitable protective clothing and safety glasses.
– Do not allow brake fluid to come into contact with the skin, the eyes or clothing.
– Consult a doctor immediately if brake fluid has been swallowed.
– Rinse the affected area with plenty of water in the event of contact with the skin.
– Rinse eyes thoroughly with water immediately and consult a doctor if brake fluid comes into contact with the eyes.
– If brake fluid spills on to your clothing, change the clothing.

Warning
Danger of accidents Old brake fluid reduces the braking effect.
– Make sure that brake fluid for the front and rear brake is changed in accordance with the service schedule.

Warning
Danger of accidents Oil or grease on the brake discs reduces the braking effect.
– Always keep the brake discs free of oil and grease.
– Clean the brake discs with brake cleaner when necessary.

Warning

Danger of accidents Brake linings which have not been approved alter the braking efficiency.

Not all brake linings are tested and approved for KTM motorcycles. The structure and friction coefficient of the brake linings, and thus their brake power, may vary greatly from that of original brake linings.
If brake linings are used that differ from the original equipment, compliance with the original homologation is not guaranteed. In this case, the vehicle no longer corresponds to its condition at delivery and the warranty shall be void.

– Only use brake linings approved and recommended by KTM.

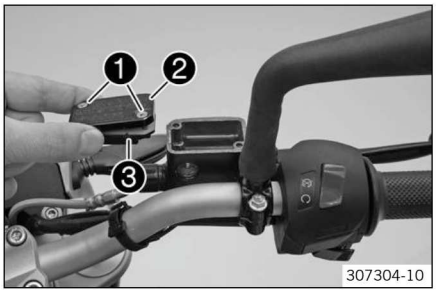
Note

Environmental hazard Hazardous substances cause environmental damage.

– Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.

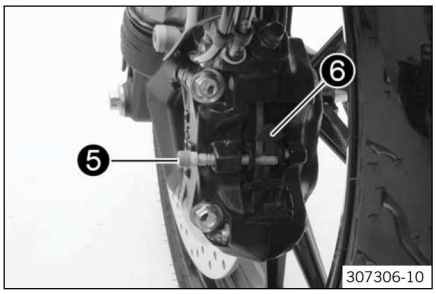
Info

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

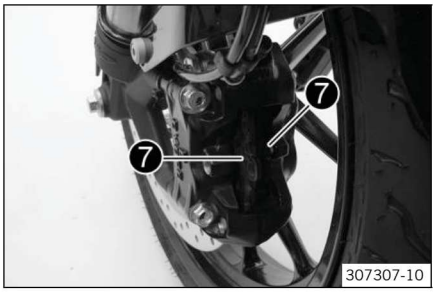


– Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
– Remove screws 1.
– Take off cover 2 with membrane 3.

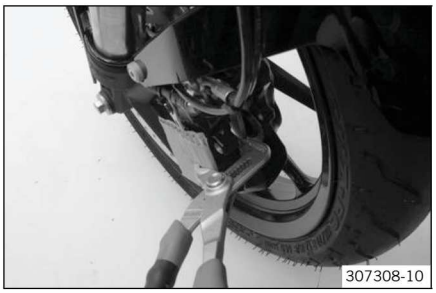
– Remove locking clip 4.



– Remove pin 5.
– Take off spring 6.

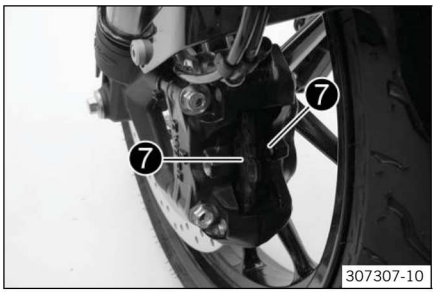


- Remove brake linings ❼.
- Clean the brake caliper.



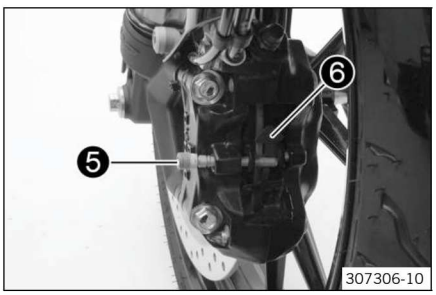
- Press the brake piston back to its basic position and make sure that no brake fluid overflows from the brake fluid reservoir, extracting it if necessary.

Info
Protect the components against damage.



- Position new brake linings ❼.

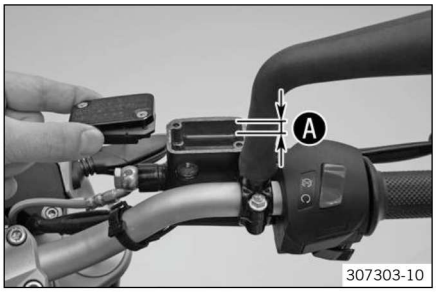
Info
Always change the brake linings in pairs.



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

Info
Make sure the springs are seated correctly.

- Mount locking clip ❹.
- Activate the hand brake lever until you reach a firm pressure point.



– Add brake fluid up to level Ⓐ.

Guideline

Dimension Ⓐ	5 mm (0.2 in)

Brake fluid DOT 4 / DOT 5.1 (📖 p. 256)

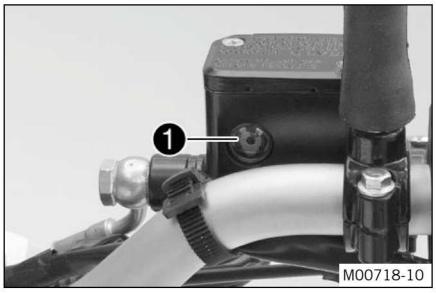
– Position the cover with the membrane. Mount and tighten the screws.

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

15.3 Checking the brake fluid level of the front brake

Warning
Danger of accidents An insufficient brake fluid level will cause the brake system to fail.
If the brake fluid level drops below the **MIN** marking, the brake system is leaking or the brake linings are worn down.
– Check the brake system and do not continue riding until the problem is eliminated.

Warning
Danger of accidents Old brake fluid reduces the braking effect.
– Make sure that brake fluid for the front and rear brake is changed in accordance with 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 level is below the **MIN**marking:
– Add front brake fluid. (📖 p. 90)

15.4 Adding front brake fluid

Warning
Danger of accidents An insufficient brake fluid level will cause the brake system to fail.
If the brake fluid level drops below the **MIN** marking, the brake system is leaking or the brake linings are worn down.
– Check the brake system and do not continue riding until the problem is eliminated.

Warning

Skin irritation Brake fluid causes skin irritation.

- Keep brake fluid out of the reach of children.
- Wear suitable protective clothing and safety glasses.
- Do not allow brake fluid to come into contact with the skin, the eyes or clothing.
- Consult a doctor immediately if brake fluid has been swallowed.
- Rinse the affected area with plenty of water in the event of contact with the skin.
- Rinse eyes thoroughly with water immediately and consult a doctor if brake fluid comes into contact with the eyes.
- If brake fluid spills on to your clothing, change the clothing.

Warning

Danger of accidents Old brake fluid reduces the braking effect.

- Make sure that brake fluid for the front and rear brake is changed in accordance with the service schedule.

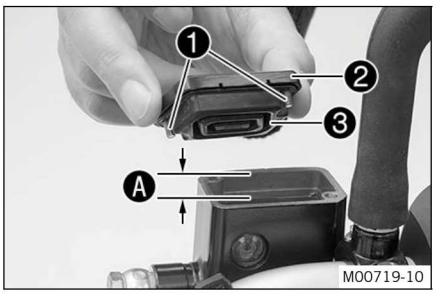
Note

Environmental hazard Hazardous substances cause environmental damage.

- Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.

Info

Never use DOT 5 brake fluid. It is silicone-based and purple in color. Oil seals and brake lines are not designed for DOT 5 brake fluid.
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint.
Only use clean brake fluid from a sealed container.



Preparatory work

- Check the front brake linings. (p. 87)

Main work

- 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. 256)

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

Info

Clean up overflowed or spilled brake fluid immediately with water.

15.5 Changing the front brake fluid

Warning

Skin irritation Brake fluid causes skin irritation.

- Keep brake fluid out of the reach of children.
- Wear suitable protective clothing and safety glasses.
- Do not allow brake fluid to come into contact with the skin, the eyes or clothing.
- Consult a doctor immediately if brake fluid has been swallowed.
- Rinse the affected area with plenty of water in the event of contact with the skin.
- Rinse eyes thoroughly with water immediately and consult a doctor if brake fluid comes into contact with the eyes.
- If brake fluid spills on to your clothing, change the clothing.

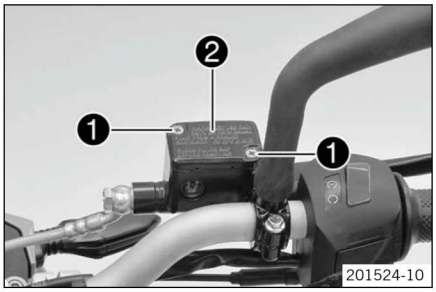
Note

Environmental hazard Hazardous substances cause environmental damage.

- Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.

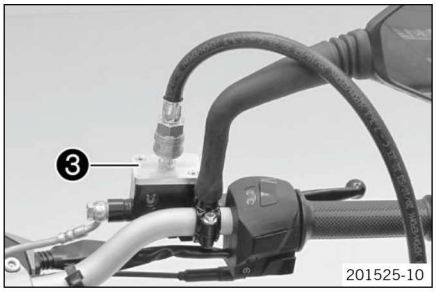
Info

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.
- Take off 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.

Syringe (50329050000) (p. 261)
Brake fluid DOT 4 / DOT 5.1 (p. 256)

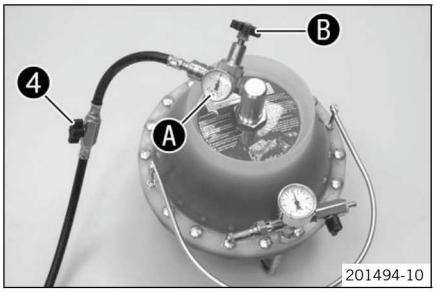


- Mount bleeder cover ❸.

Bleeder cover (00029013009) (p. 260)

- Connect the bleeding device.

Bleeding device (00029013100) (p. 260)



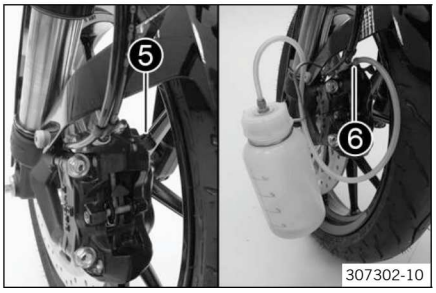
– Open shut-off valve ❹.

Info
Follow the instructions in the Owner's Manual 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 on the brake caliper. Connect the bleeder bottle hose.

Bleeding device (00029013100) (📖 p. 260)

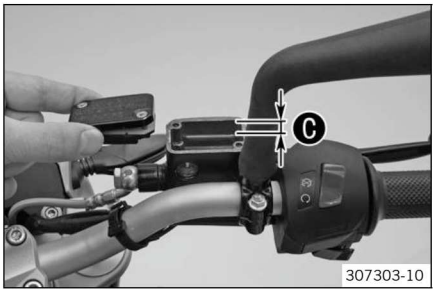
– Open bleeder screw ❻ by approximately one half turn.

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 brake fluid stops emerging.

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.



– Add brake fluid up to level Ⓒ.

Guideline

Dimension Ⓒ	5 mm (0.2 in)

Brake fluid DOT 4 / DOT 5.1 (📖 p. 256)

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

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

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

◆

15.6 Checking the rear brake linings

Warning

Danger of accidents Worn-out brake linings reduce the braking effect.

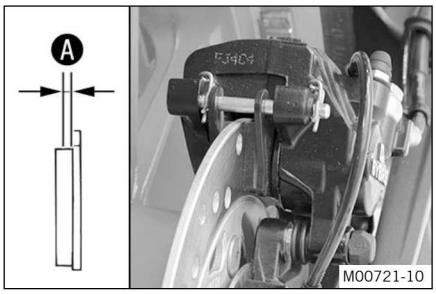
– Ensure that worn-out brake linings are replaced immediately.

Warning

Danger of accidents Damaged brake discs reduce the braking effect.

If the brake linings are not changed in time, the brake lining carriers grind against the brake disc. As a consequence, the braking effect is greatly reduced and the brake discs are destroyed.

– Check the brake linings regularly.



– Check the brake linings for minimum thickness A.

Minimum thickness A	≥ 1 mm (≥ 0.04 in)

» If the minimum thickness is less than specified:
  – Change the rear brake linings. (p. 94)

– Check the brake linings for damage and cracking.

» If there is wear or tearing:
  – Change the rear brake linings. (p. 94)

15.7 Changing the rear brake linings

Warning

Skin irritation Brake fluid causes skin irritation.

– Keep brake fluid out of the reach of children.
– Wear suitable protective clothing and safety glasses.
– Do not allow brake fluid to come into contact with the skin, the eyes or clothing.
– Consult a doctor immediately if brake fluid has been swallowed.
– Rinse the affected area with plenty of water in the event of contact with the skin.
– Rinse eyes thoroughly with water immediately and consult a doctor if brake fluid comes into contact with the eyes.
– If brake fluid spills on to your clothing, change the clothing.

Warning

Danger of accidents Old brake fluid reduces the braking effect.

– Make sure that brake fluid for the front and rear brake is changed in accordance with the service schedule.

Warning

Danger of accidents Oil or grease on the brake discs reduces the braking effect.

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

Warning

Danger of accidents Brake linings which have not been approved alter the braking efficiency.

Not all brake linings are tested and approved for KTM motorcycles. The structure and friction coefficient of the brake linings, and thus their brake power, may vary greatly from that of original brake linings.
If brake linings are used that differ from the original equipment, compliance with the original homologation is not guaranteed. In this case, the vehicle no longer corresponds to its condition at delivery and the warranty shall be void.

– Only use brake linings approved and recommended by KTM.

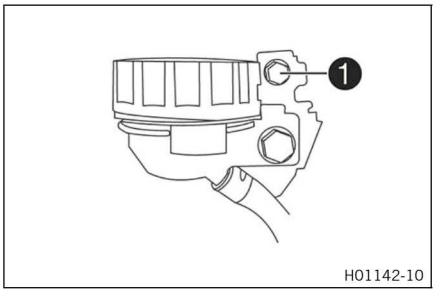
Note

Environmental hazard Hazardous substances cause environmental damage.

– Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.

Info

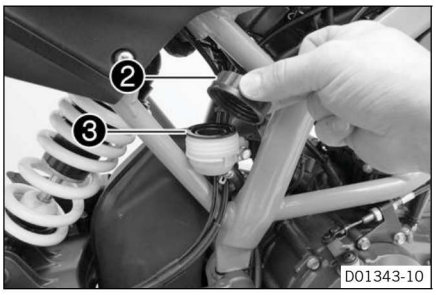
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container.



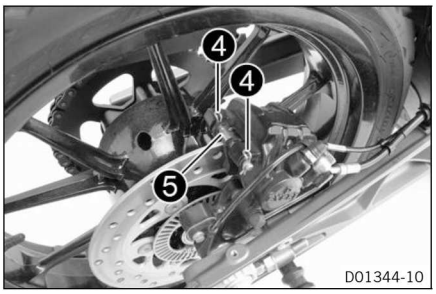
Condition

The screw cap is locked.

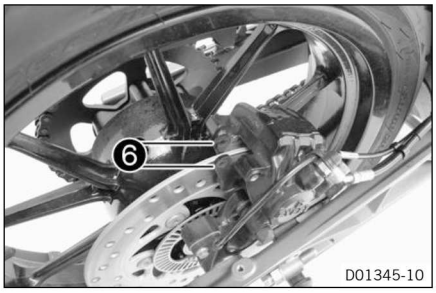
– Remove screw 1 and take off the screw cap lock.



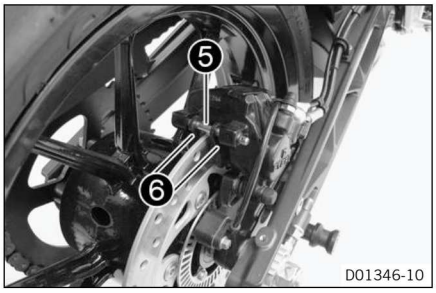
– Stand the vehicle upright.
– Remove screw cap 2 with membrane 3.
– Press the brake caliper onto the brake disc by hand to push back the brake piston and ensure that brake fluid does not flow out of the brake fluid reservoir, extract it if necessary.



– Remove locking clips 4.
– Remove pin 5.



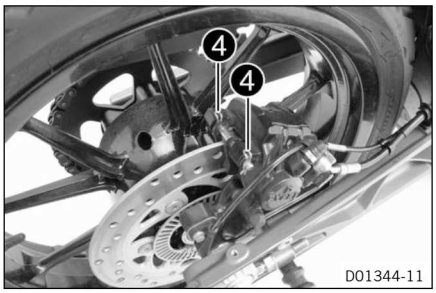
– Remove brake linings ❻.
– Clean the brake caliper.



– Position new brake linings ❻.

Info
Always change the brake linings in pairs.

– Mount pin ❺.



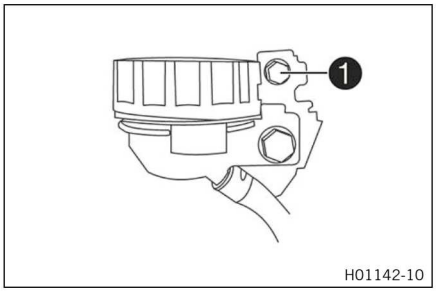
– Mount locking clips ❹.

– 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. 256)

– Mount screw cap with membrane.

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



Condition
The screw cap is locked.

– Position the screw cap lock and mount and tighten screw ❶.

Guideline

Screw, compensating tank cap lock, rear brake	M5	7 Nm (5.2 lbf ft)

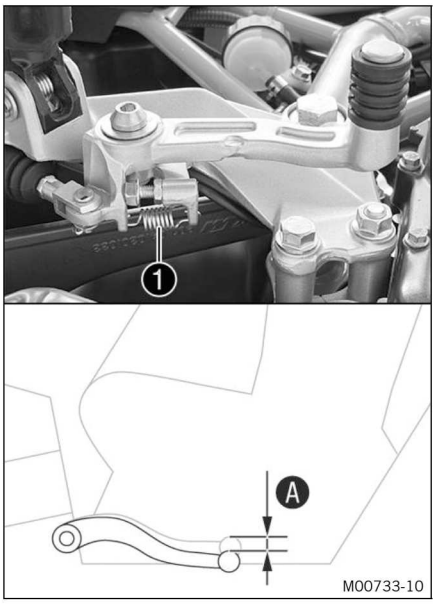
15.8 Checking the free travel of foot brake lever

Warning

Danger of accidents The brake system fails in the event of overheating.

If there is no free travel on the foot brake lever, pressure builds up in the brake system on the rear brake.

– Set the free travel on the foot brake lever in accordance with the specification.



– 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. 97)
– Reconnect spring ❶.

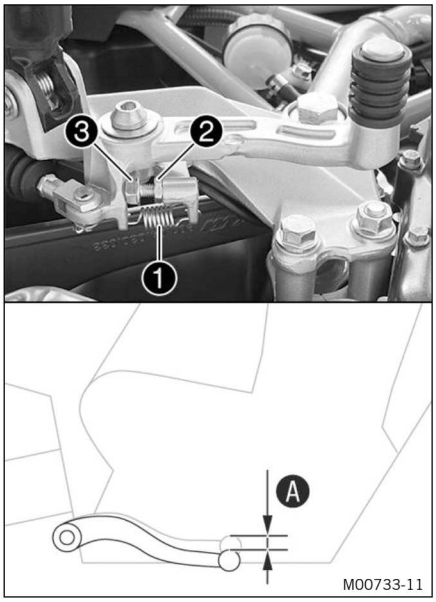
15.9 Adjusting the free travel of the foot brake lever

Warning

Danger of accidents The brake system fails in the event of overheating.

If there is no free travel on the foot brake lever, pressure builds up in the brake system on the rear brake.

– Set the free travel on the foot brake lever in accordance with the specification.



– Detach 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)

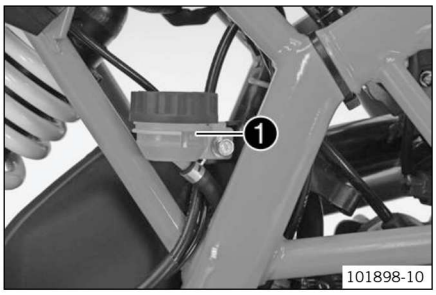
Info
The range of adjustment is limited.

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

15.10 Checking the rear brake fluid level

Warning
Danger of accidents An insufficient brake fluid level will cause the brake system to fail.
If the brake fluid level drops below the **MIN** marking, the brake system is leaking or the brake linings are worn down.
– Check the brake system and do not continue riding until the problem is eliminated.

Warning
Danger of accidents Old brake fluid reduces the braking effect.
– Make sure that brake fluid for the front and rear brake is changed in accordance with 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. 99)

15.11 Adding rear brake fluid

Warning

Danger of accidents An insufficient brake fluid level will cause the brake system to fail.

If the brake fluid level drops below the **MIN** marking, the brake system is leaking or the brake linings are worn down.

– Check the brake system and do not continue riding until the problem is eliminated.

Warning

Skin irritation Brake fluid causes skin irritation.

– Keep brake fluid out of the reach of children.
– Wear suitable protective clothing and safety glasses.
– Do not allow brake fluid to come into contact with the skin, the eyes or clothing.
– Consult a doctor immediately if brake fluid has been swallowed.
– Rinse the affected area with plenty of water in the event of contact with the skin.
– Rinse eyes thoroughly with water immediately and consult a doctor if brake fluid comes into contact with the eyes.
– If brake fluid spills on to your clothing, change the clothing.

Warning

Danger of accidents Old brake fluid reduces the braking effect.

– Make sure that brake fluid for the front and rear brake is changed in accordance with the service schedule.

Note

Environmental hazard Hazardous substances cause environmental damage.

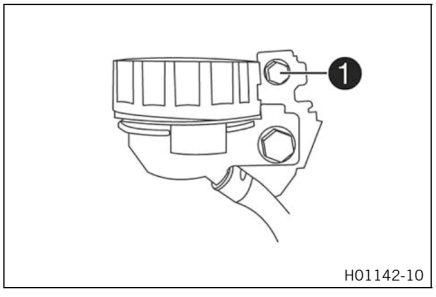
– Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.

Info

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

Preparatory work

– Check the rear brake linings. (p. 94)

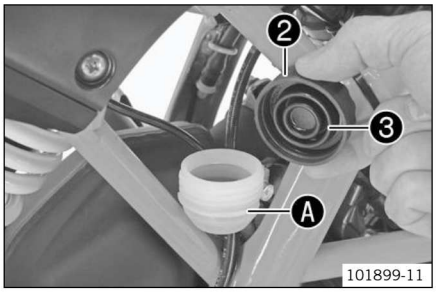


Main work

Condition

The screw cap is locked.

– Remove screw ❶ and take off the screw cap lock.

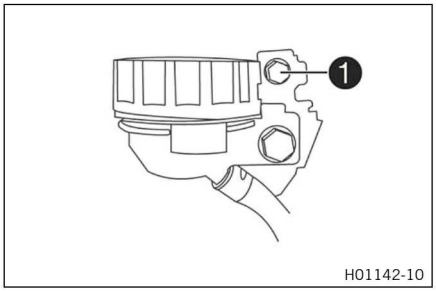


– Stand the vehicle upright.
– Remove screw cap ❷ with membrane ❸.
– Add brake fluid to level Ⓐ.

Brake fluid DOT 4 / DOT 5.1 (p. 256)

– Mount screw cap with membrane.

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



Condition
The screw cap is locked.

– Position the screw cap lock and mount and tighten screw ❶.

Guideline

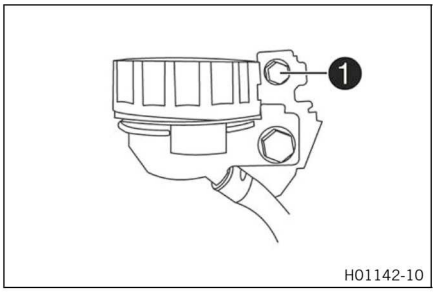
Screw, compensating tank cap lock, rear brake	M5	7 Nm (5.2 lbf ft)

15.12 Changing the rear brake fluid

Warning
Skin irritation Brake fluid causes skin irritation.
– Keep brake fluid out of the reach of children.
– Wear suitable protective clothing and safety glasses.
– Do not allow brake fluid to come into contact with the skin, the eyes or clothing.
– Consult a doctor immediately if brake fluid has been swallowed.
– Rinse the affected area with plenty of water in the event of contact with the skin.
– Rinse eyes thoroughly with water immediately and consult a doctor if brake fluid comes into contact with the eyes.
– If brake fluid spills on to your clothing, change the clothing.

Note
Environmental hazard Hazardous substances cause environmental damage.
– Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.

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



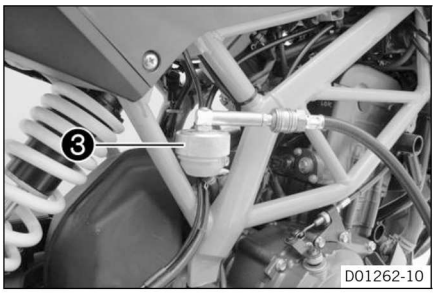
Condition

The screw cap is locked.

– Remove screw ❶ and take off the screw cap lock.

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

Syringe (50329050000) (📖 p. 261)
Brake fluid DOT 4 / DOT 5.1 (📖 p. 256)

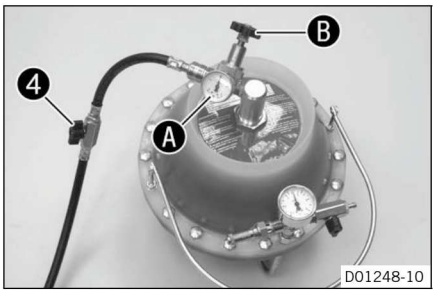


– Mount bleeder cover ❸.

Bleeder cover (00029013014) (📖 p. 260)

– Connect the bleeding device.

Bleeding device (00029013100) (📖 p. 260)



– Open shut-off valve ❹.

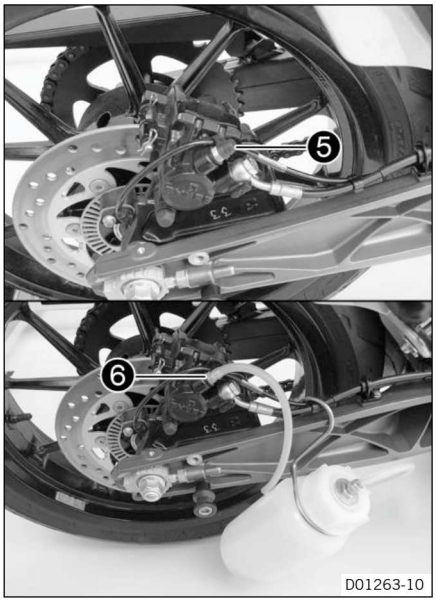
Info

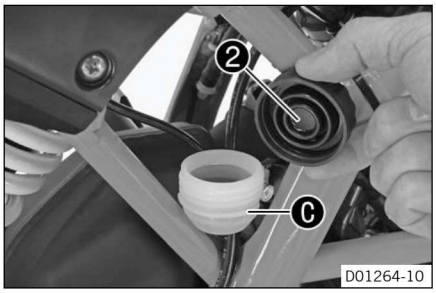
Follow the instructions in the Owner's Manual of the bleeding device.

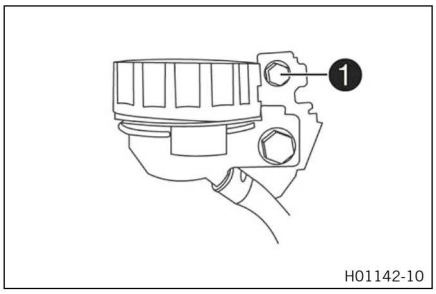
– Ensure that the filling pressure is set on pressure gauge Ⓐ. Correct the filling pressure on pressure regulator Ⓑ if necessary.

Guideline

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







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

Bleeding device (00029013100) (📖 p. 260)

– 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 brake fluid stops emerging.

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 marking Ⓒ.

Brake fluid DOT 4 / DOT 5.1 (📖 p. 256)

– Mount screw cap ❷ with the membrane.

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

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

Condition
The screw cap is locked.

– Position the screw cap lock and mount and tighten screw ❶.

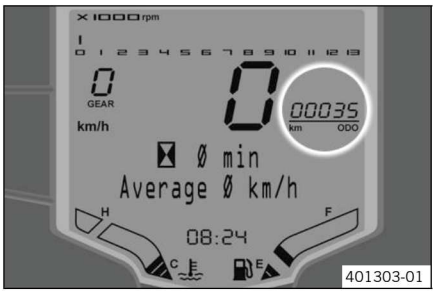
Guideline

Screw, compensating tank cap lock, rear brake	M5	7 Nm (5.2 lbf ft)

16.1 Setting kilometers or miles

Info
Make the country-specific setting.

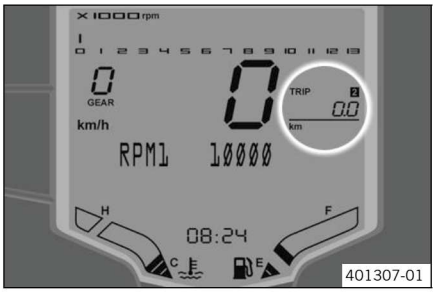
Condition
The ignition is on.
The motorcycle is stationary.



– 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**.

16.2 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 flashing.

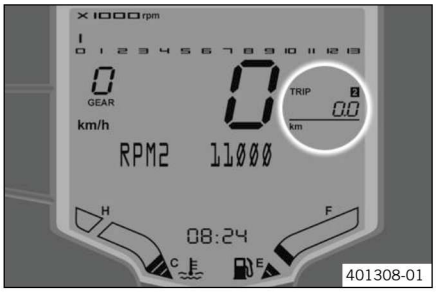
– Set the speed with the **MODE** and **SET** buttons.

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.

16.3 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**.

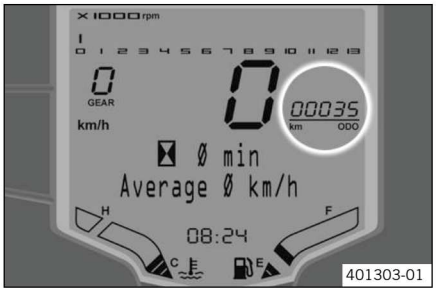
– Set the speed with the **MODE** and **SET** buttons.

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.

16.4 Setting the time

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.

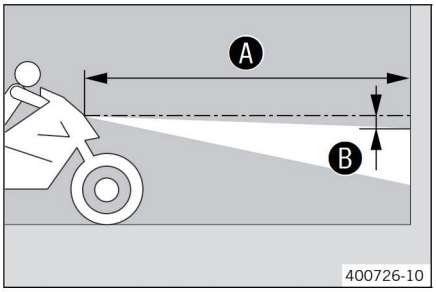
16.5 Resetting the service interval display

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

– Press the **SET** button for at least 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.

16.6 Checking the headlight setting



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

Guideline

Distance Ⓑ	5 cm (2 in)

– Position the vehicle perpendicular to the wall at a distance Ⓐ from the wall and switch on the low beam.

Guideline

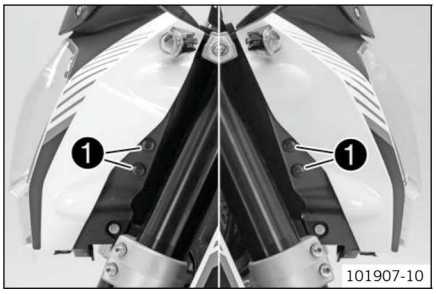
Distance Ⓐ	5 m (16 ft)

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

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

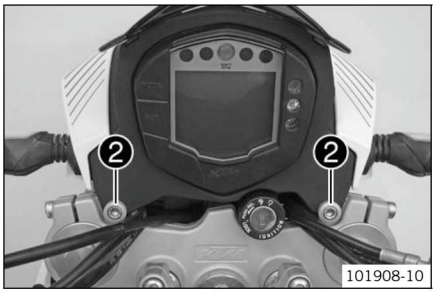
» If the light-dark border does not meet specifications:
– Adjust the headlight range. (p. 105)

16.7 Adjusting the headlight range

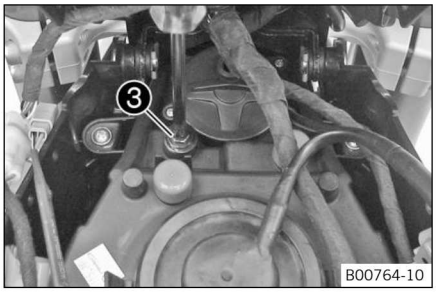


Main work

– Remove expanding rivets ❶.



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

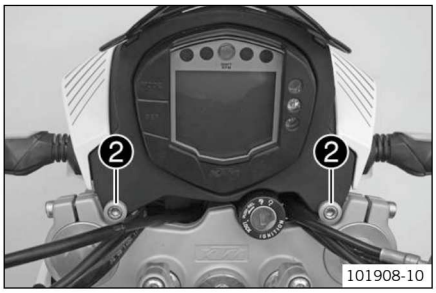


– Adjust the beam headlight range by turning screw ❸.

Guideline

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

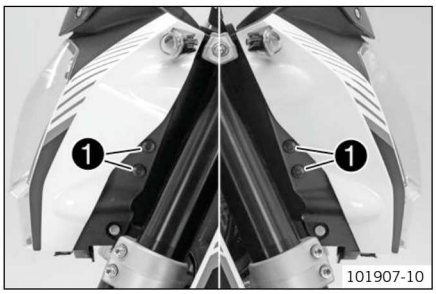
Info
Turn clockwise to reduce the headlight range; turn counterclockwise to increase the headlight range.



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

Guideline

Screw, headlight mask	M6	9 Nm (6.6 lbf ft) **Loctite®243™**



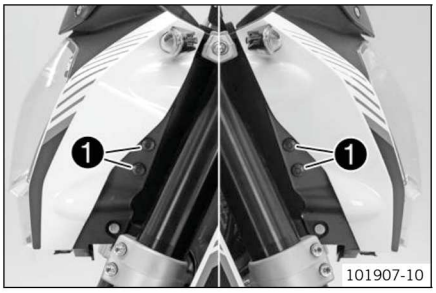
– Mount expanding rivets ❶ on both sides.

Finishing work
– Check the headlight setting. (📖 p. 105)

16.8 Changing the parking light bulb

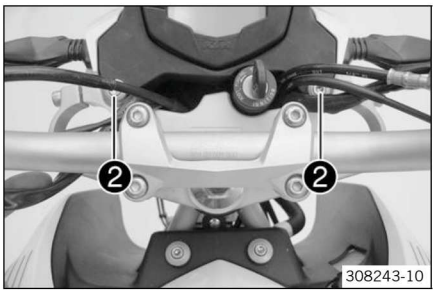
Note
Damage to reflector Grease on the reflector reduces the brightness.
Grease on the bulb will evaporate due to the heat and be deposited on the reflector.
– Clean and degrease the bulbs before mounting.
– Do not touch the bulbs with your bare hands.

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

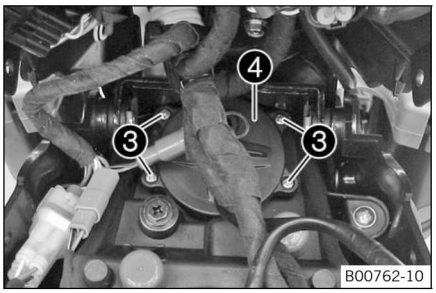


Main work

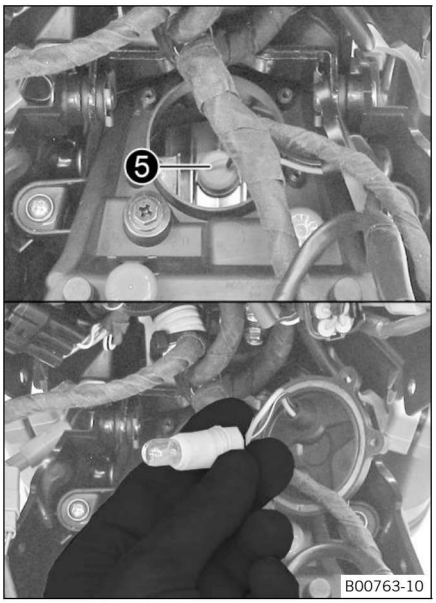
– Remove expanding rivets ❶.



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



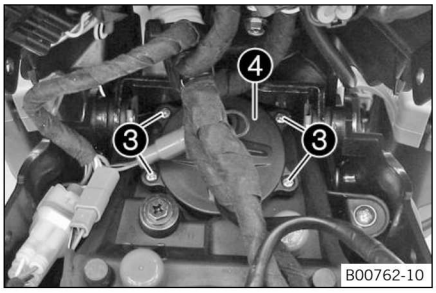
– Remove screws ❸.
– Remove cover ❹.



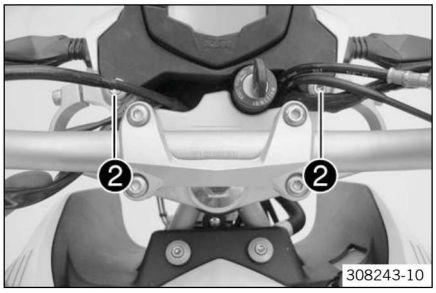
– Pull the socket with bulb ❺ out of the housing.
– Remove the bulb.
– Position a new light bulb in the socket.

Position light (W5W / socket W2.1x9.5d) (📖 p. 210)

– Position the socket with bulb ❺ in the housing.



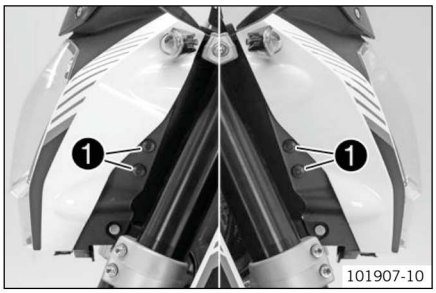
– Position cover ❹.
– Mount and tighten screws ❸.



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

Guideline

Screw, head-light mask	M6	9 Nm (6.6 lbf ft) **Loctite®243™**



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

16.9 Changing the headlight bulb

Note

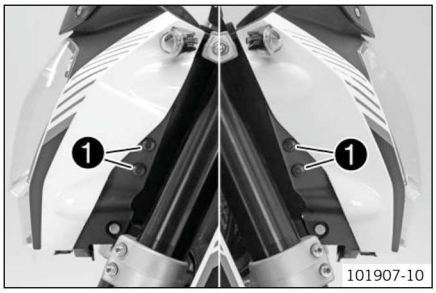
Damage to reflector Grease on the reflector reduces the brightness.

Grease on the bulb will evaporate due to the heat and be deposited on the reflector.

– Clean and degrease the bulbs before mounting.
– Do not touch the bulbs with your bare hands.

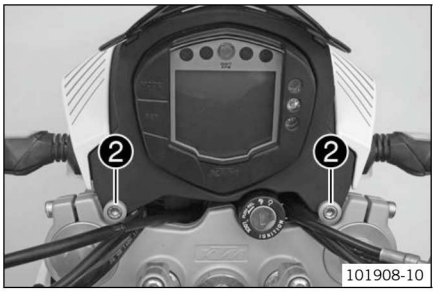
Preparatory work

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

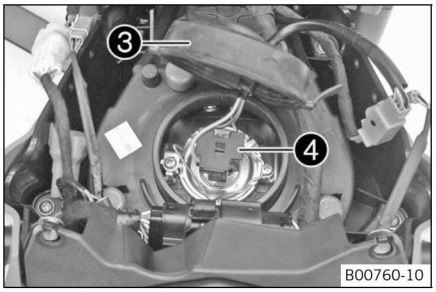


Main work

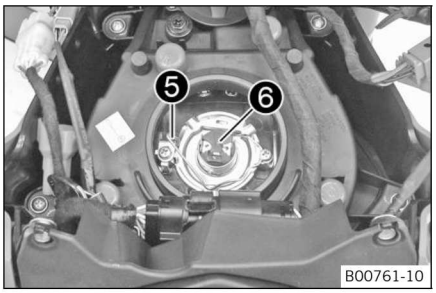
– Remove expanding rivets ❶.



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



- Remove protection cap ❸.
- Unplug connector ❹.



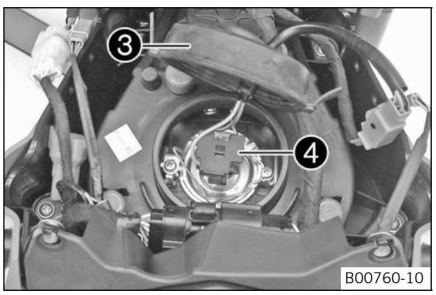
- Detach retaining clamp ❺.
- Remove headlight bulb ❻.
- Position the new headlight bulb in the headlight housing.

  Guideline

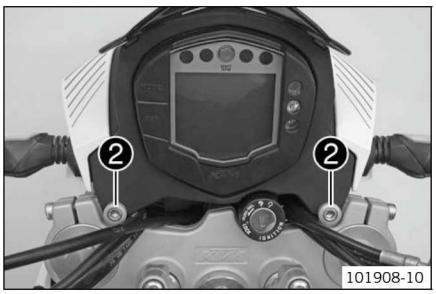
Insert the headlight bulb so that the catches latch into the recesses.

Headlight (H4/socket P43t) (📖 p. 210)

- Attach retaining clamp ❺.



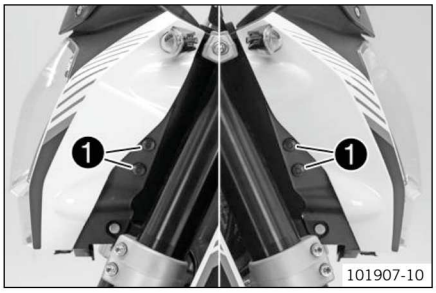
- Plug in connector ❹.
- Mount protection cap ❸.



- Swivel the headlight mask up.
- Mount and tighten screws ❷.

  Guideline

Screw, head-light mask	M6	9 Nm (6.6 lbf ft) **Loctite®243™**



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

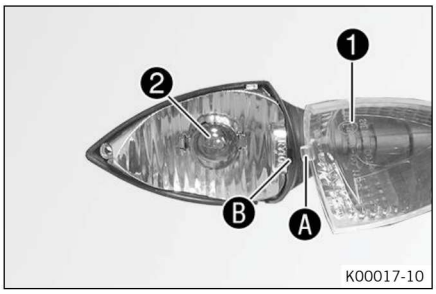
16.10 Changing the turn signal bulb (US)

Note

Damage to reflector Grease on the reflector reduces the brightness.

Grease on the bulb will evaporate due to the heat and be deposited on the reflector.

– Clean and degrease the bulbs before mounting.
– Do not touch the bulbs with your bare hands.



– Remove the screw on the rear of the turn signal housing.
– Carefully remove diffuser ❶.
– Push bulb ❷ lightly into the socket, turn approx. 30° counterclockwise, and pull it out of the socket.

Info
Do not touch the reflector with your fingers and keep it free from grease.

– Lightly push the new lamp into the socket and turn all the way clockwise.

Turn signal (RY10W / socket BAU15s) (📖 p. 210)

– Check that the turn signal is functioning properly.
– Position the diffuser.

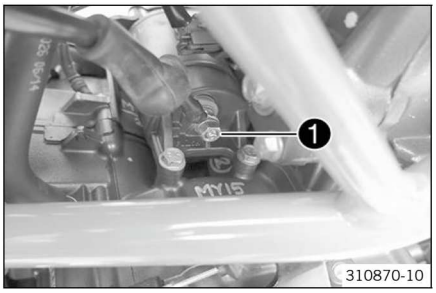
Info
Insert catch Ⓐ into recess Ⓑ.

– Insert the screw and first turn counterclockwise until it engages in the thread with a small jerk. Tighten the screw lightly.

17.1 Removing the engine

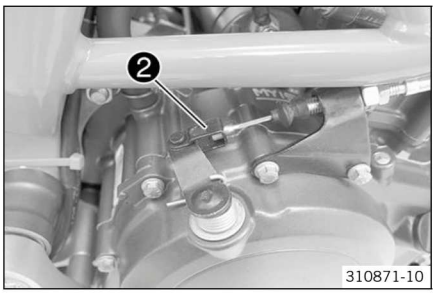
Preparatory work

- Raise the motorcycle with the rear lifting gear. (p. 11)
- Remove the front spoiler. (p. 61)
- Remove the passenger seat. (p. 52)
- Remove the seat. (p. 51)
- Switch off the ignition by turning the ignition key to the position ⊠.
- Disconnect the negative cable of the battery. (p. 82)
- Drain the coolant. (p. 191)
- Remove the exhaust manifold. (p. 43)

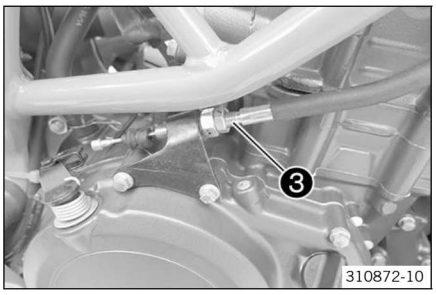


Main work

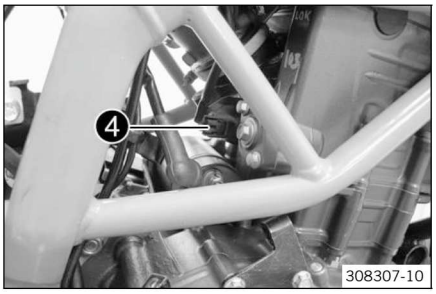
- Push back the rubber cap.
- Remove nut ❶ with washers.
- Hang the cable to the side.



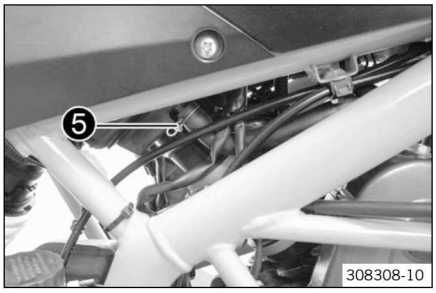
- Bend up lock washer ❷.
- Detach the inner clutch cable.



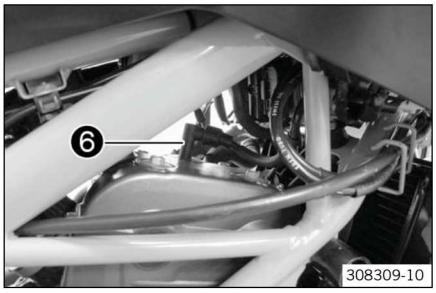
- Detach clutch cable ❸.



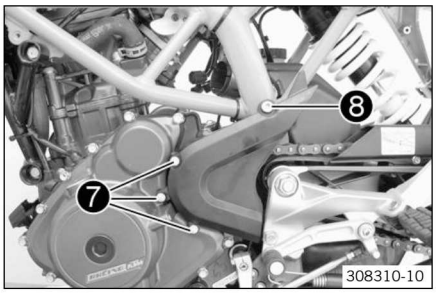
- Unplug connector ❹.



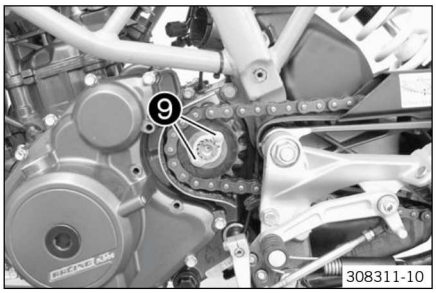
- Push back hose clamp ❺.
- Pull off the air release hose.



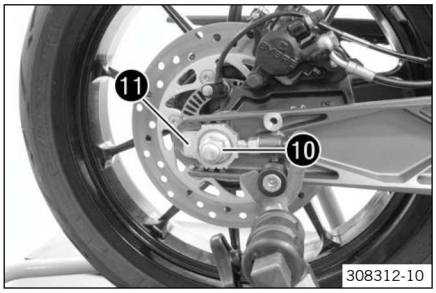
- Disconnect spark plug connector ❻.



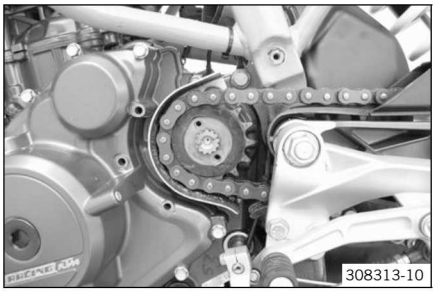
- Remove screws ❼.
- Remove screw ❽.
- Take off the engine sprocket cover.



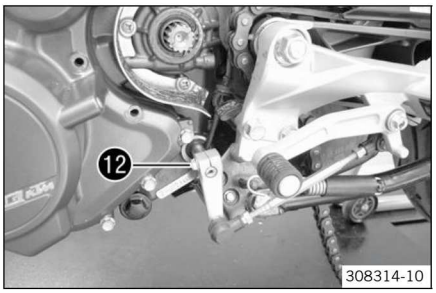
- Remove screws ❾ and take off the lock washer.



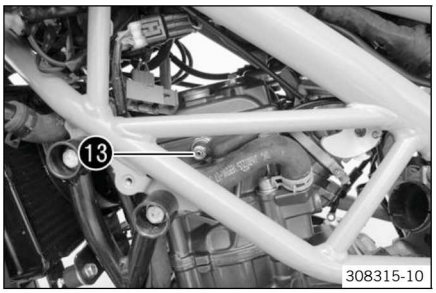
- Remove nut ❿ with the washer.
- Remove chain adjuster ⓫.
- Push the rear wheel into the foremost position.



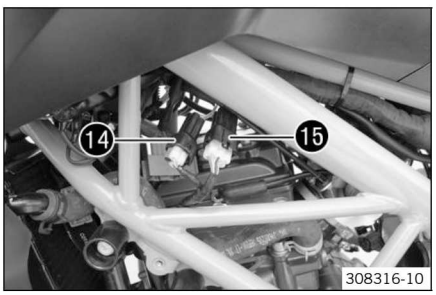
– Pull the engine sprocket off of the countershaft and remove it.



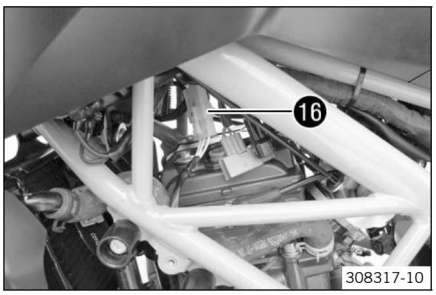
– Remove screw ⓬.
– Pull off the shift linkage and hang it to one side.



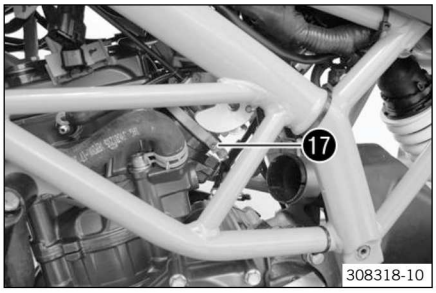
– Push back the rubber cap.
– Remove nut ⓭ with the washer.



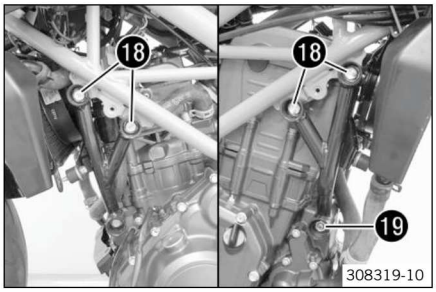
– Expose the cable and unplug connectors ⓮ and ⓯.



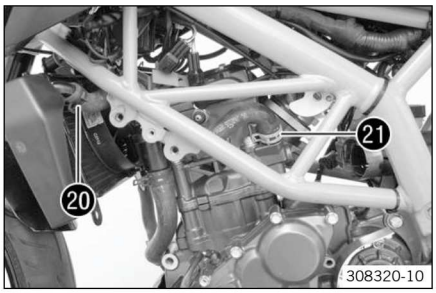
– Expose the cable and unplug connector ⓰.



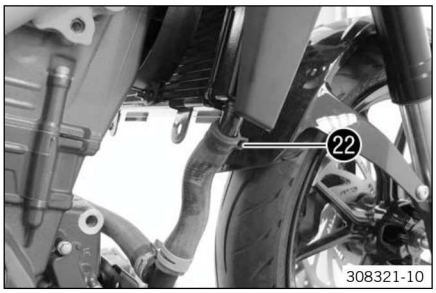
- Loosen hose clip 17.
- Push the throttle valve body upward out of the intake flange.



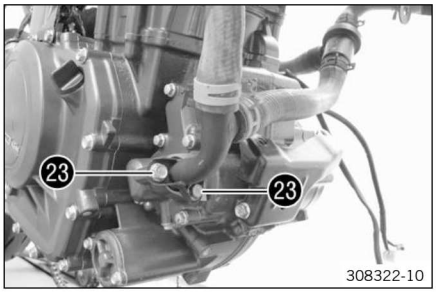
- Remove screws 18.
- Remove fitting 19.
- Remove both engine fixing arms.



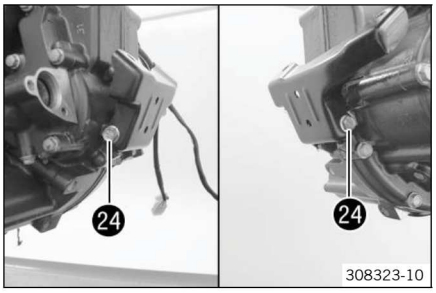
- Push back hose clamps 20 and 21.
- Pull off the radiator hoses.



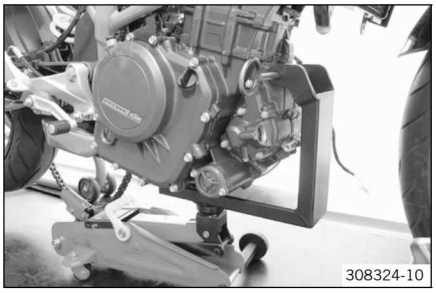
- Push back hose clamp 22.
- Pull off the radiator hose.



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

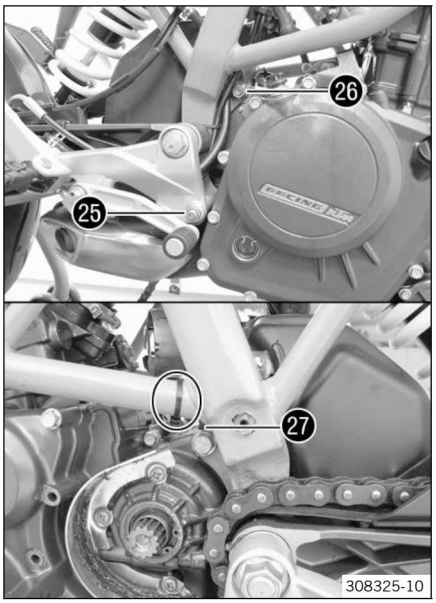


– Remove screws 24.
– Take off the retaining bracket.

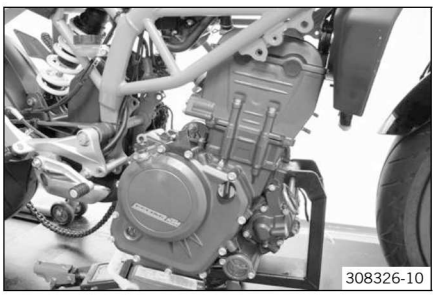


– Position the floor jack under the engine and secure using the special tool.

Floor jack attachment (75029055000) (📖 p. 265)



– Remove fitting 25.
– Remove fitting 26.
– Remove the cable tie(s).
– Hang ground wire 27 to the side.



– Lower the engine.

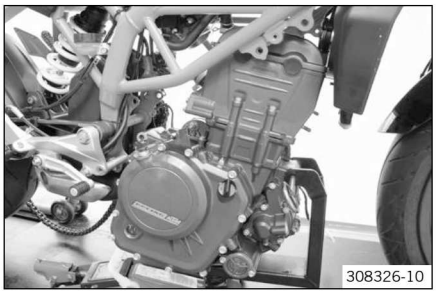
Info
The help of an assistant is useful in this step.
Make sure that the engine is sufficiently secured against falling over.
Protect the frame and attachments against damage.

17.2 Installing the engine

Preparatory work

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

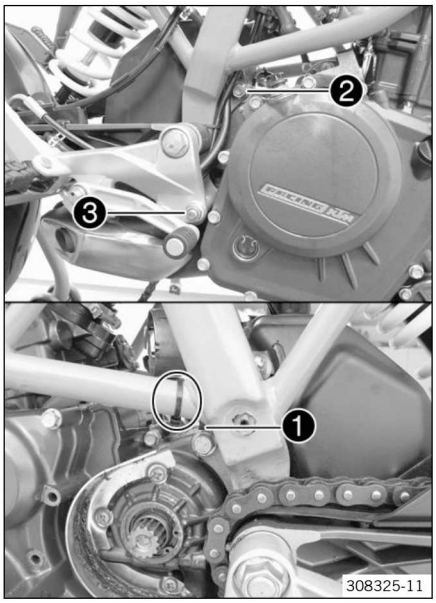
Floor jack attachment (75029055000) (📖 p. 265)



Main work

– Position the engine in the frame.

> **Info**
> The help of an assistant is useful in this step.
> Protect the frame and attachments against damage.



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

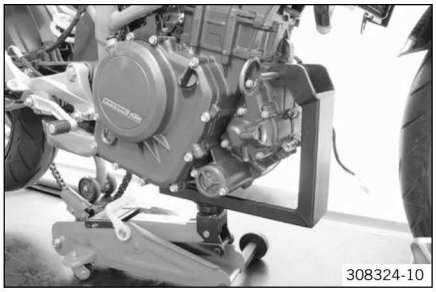
Guideline

Fitting, engine mounting bracket	M10	45 Nm (33.2 lbf ft)

– Mount fitting ❸ but do not tighten yet.

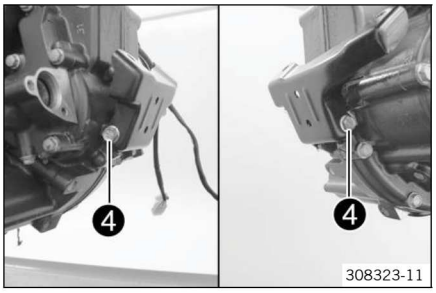
Guideline

Fitting, engine mounting bracket	M10	45 Nm (33.2 lbf ft)



– Remove the floor jack with the special tool.

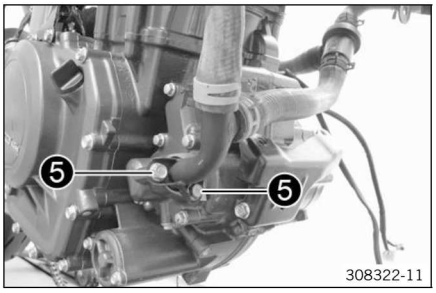
Floor jack attachment (75029055000) (📖 p. 265)



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

Guideline

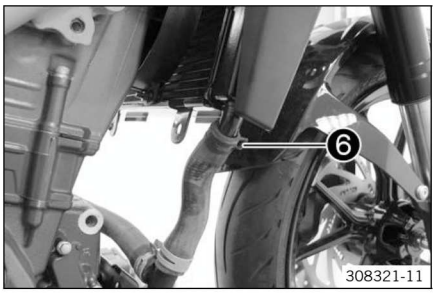
Remaining screws, chassis	M6	9 Nm (6.6 lbf ft)



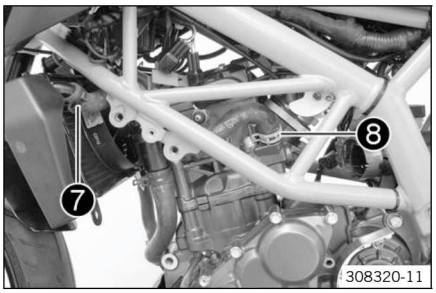
– Mount the radiator pipe with the O-ring.
– Mount and tighten screws ❺.

Guideline

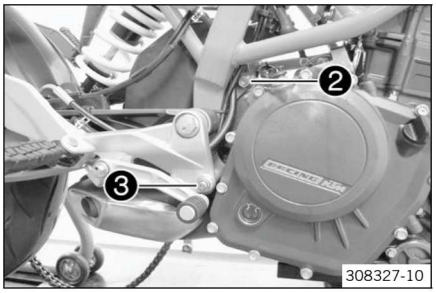
Remaining screws, chassis	M6	9 Nm (6.6 lbf ft)



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



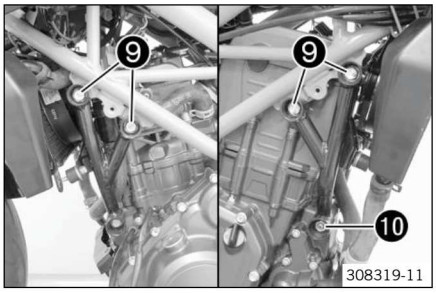
– Mount the radiator hoses.
– Position hose clamps ❼ and ❽.



– Tighten fittings ❷ and ❸.

Guideline

Fitting, engine mounting bracket	M10	45 Nm (33.2 lbf ft)

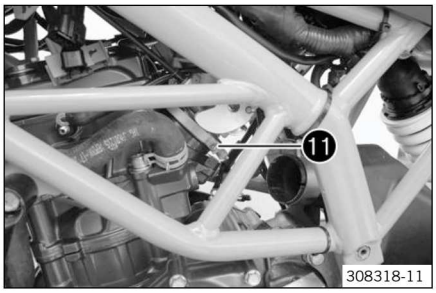


– Position both engine fixing arms.
– Mount and tighten screws 9.
Guideline

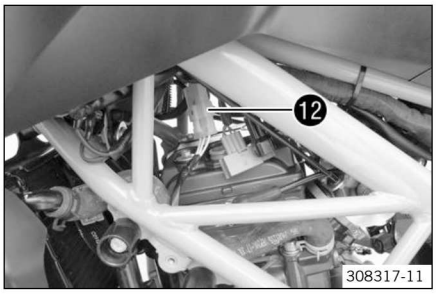
Screw, engine bearer on engine	M8	25 Nm (18.4 lbf ft)

– Mount and tighten fitting 10.
Guideline

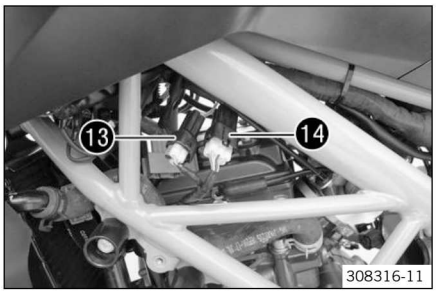
Fitting, engine mounting bracket	M10	45 Nm (33.2 lbf ft)



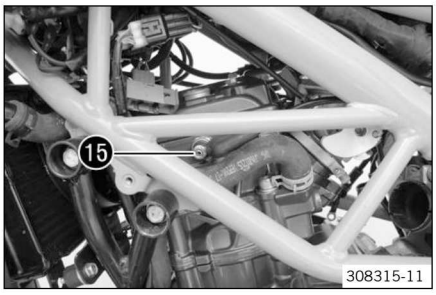
– Position the throttle valve body in the intake flange.
– Tighten hose clip 11.



– Plug in connector 12.
– Position the cable and secure with a cable tie.



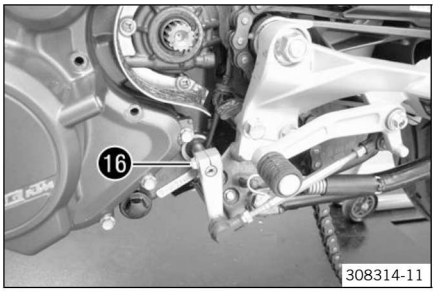
– Plug in connectors 13 and 14.
– Position the cable and secure with a cable tie.



– Mount and tighten nut 15 with the washer.
Guideline

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

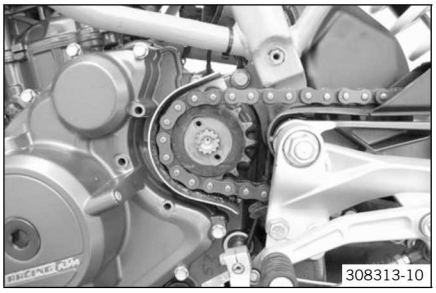
– Position the rubber cap.



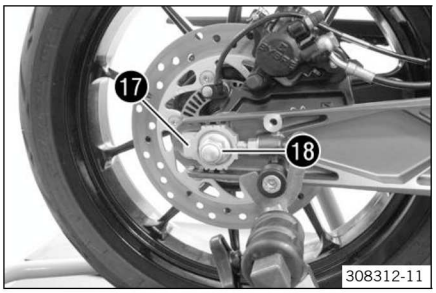
– Position the shift linkage.
– Mount and tighten screw 16.

Guideline

Screw, shift lever linkage	M6	9 Nm (6.6 lbf ft) **Loctite®243™**



– Position the engine sprocket in the chain and mount on the countershaft.

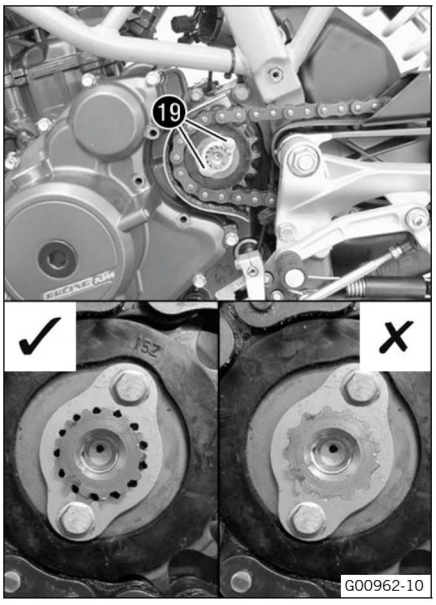


– Pull the rear wheel back.
– Mount chain adjuster 17.
– Mount and tighten nut 18 with the washer.

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.

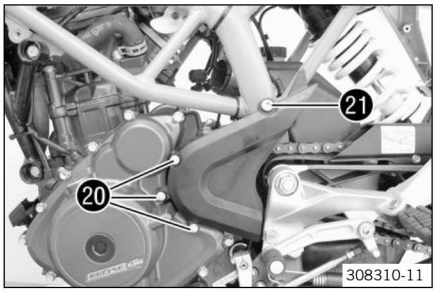
Nut, rear wheel spindle	M14x1.5	90 Nm (66.4 lbf ft)



– Mount the lock washer and turn it slightly.
  ✓ The lock washer engages in the gear teeth of the countershaft.
– Mount and tighten screws 19.

Guideline

Screw, lock washer, engine sprocket	M6	12 Nm (8.9 lbf ft) **Loctite®243™**



– Position the engine sprocket cover.
– Mount and tighten screws 20.

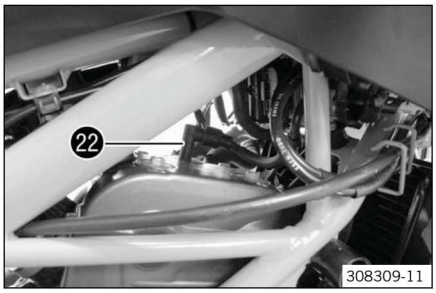
Guideline

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

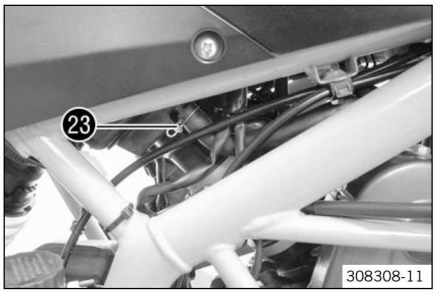
– Mount and tighten screw 21.

Guideline

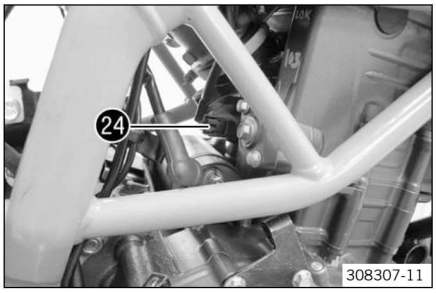
Remaining nuts, chassis	M6	15 Nm (11.1 lbf ft)



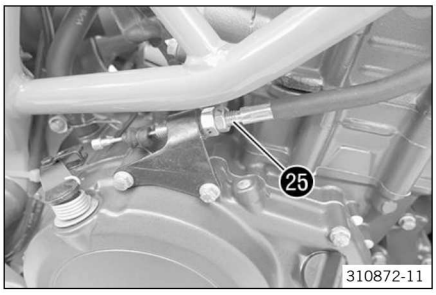
– Plug in spark plug connector 22.



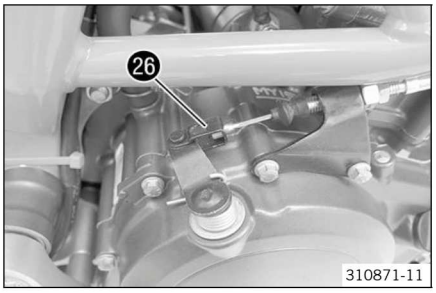
– Mount the vent hose.
– Position hose clamp 23.



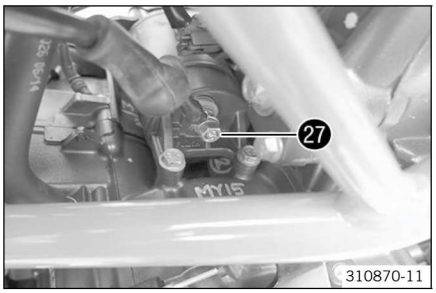
– Plug in connector 24.



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



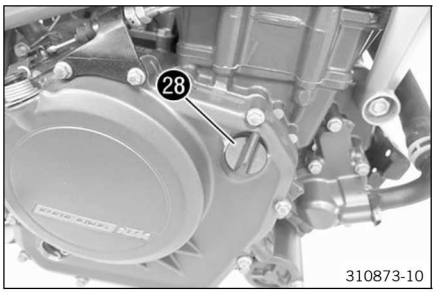
– Attach the inner clutch cable.
– Secure the inner clutch cable with lock washer 26.



– 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 a cable tie.



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

Engine oil	1.7 l (1.8 qt.)	Engine oil (SAE 15W/50) (📖 p. 256)

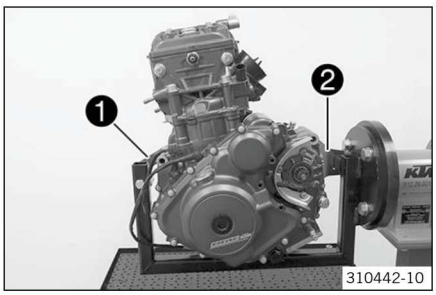
– Mount and tighten the filler plug together with the O-ring.

Finishing work
– Install the exhaust manifold. (📖 p. 44)
– Reconnect the negative cable of the battery. (📖 p. 83)
– Set the clock. (📖 p. 104)
– Mount the seat. (📖 p. 51)
– Mount the passenger seat. (📖 p. 52)
– Remove the rear of the motorcycle from the lifting gear. (📖 p. 11)
– Fill/bleed the cooling system. (📖 p. 191)
– Fit the front spoiler. (📖 p. 62)
– Go for 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. 197)
– Check the coolant level. (📖 p. 194)

◀

17.3 Engine disassembly

17.3.1 preparations



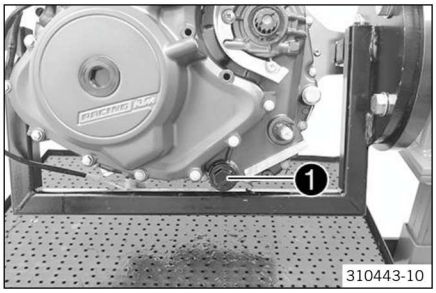
– Mount special tools ❶ and ❷ on the engine assembly stand.

Holder and fitting for work stand (90129002000) (p. 267)
Engine work stand (61229001000) (p. 264)

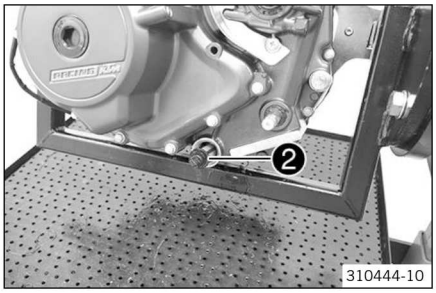
– Mount the engine on the special tool.

Info
Work with an assistant or a motorized hoist.

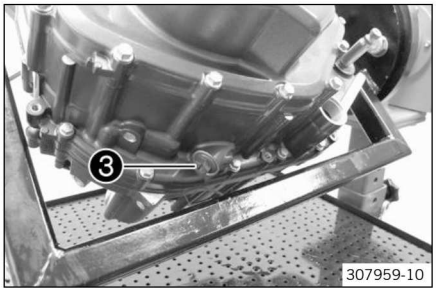
17.3.2 Draining the engine oil



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

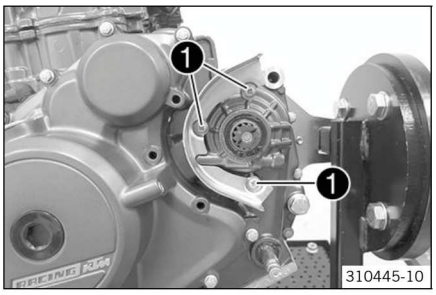


– Remove oil screen ❷ with the O-ring.
– Completely drain the engine oil.



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

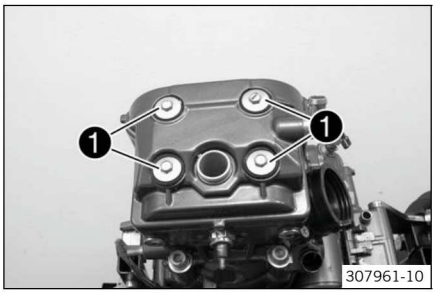
17.3.3 Removing the chain securing guide



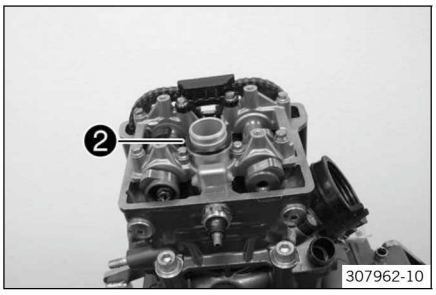
– Remove screws ❶.
– Take off the chain securing guide.

◀

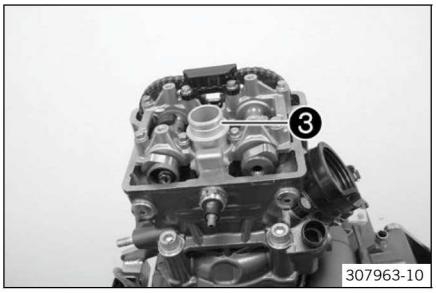
17.3.4 Removing the valve cover



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



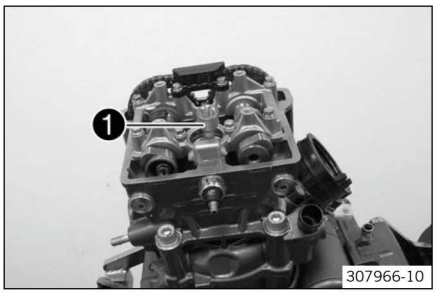
– Take off gasket ❷.



– Remove the spark plug shaft insert ❸.

◀

17.3.5 Removing the spark plug

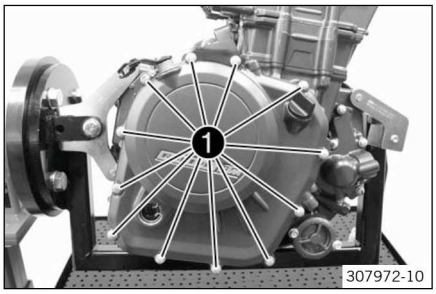


– Remove the spark plug using special tool ❶.

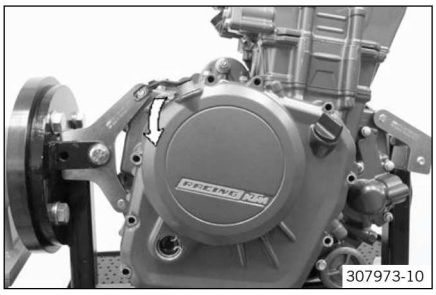
Spark plug wrench with link (77229172000) (📖 p. 266)

◀

17.3.6 Removing the clutch cover

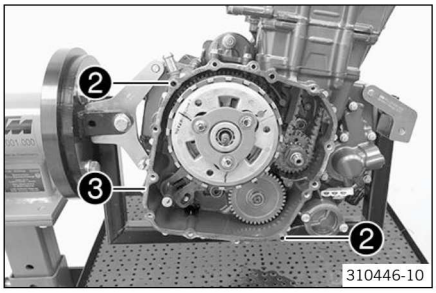


– Remove screws ❶.



– Take off the clutch cover.

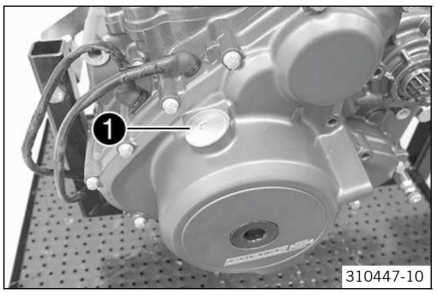
Info
Pull the clutch lever forward slightly.



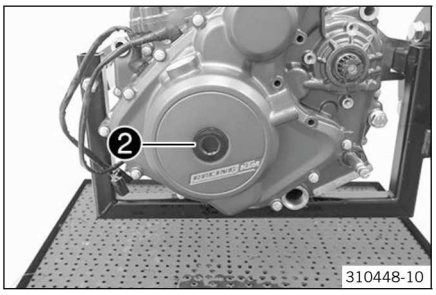
– Remove dowels ❷.
– Take off clutch cover gasket ❸.

◀

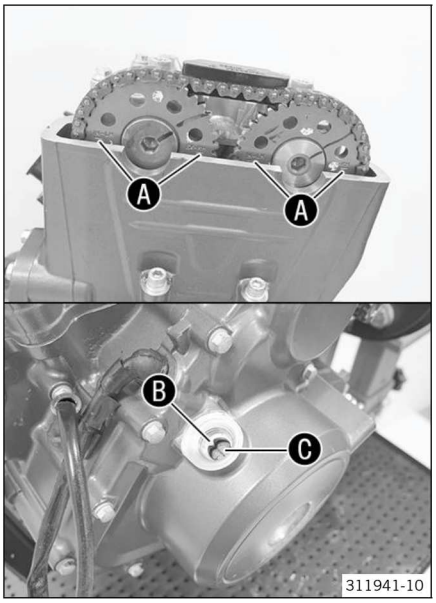
17.3.7 Setting the engine to ignition top dead center



– Remove screw plug ❶.

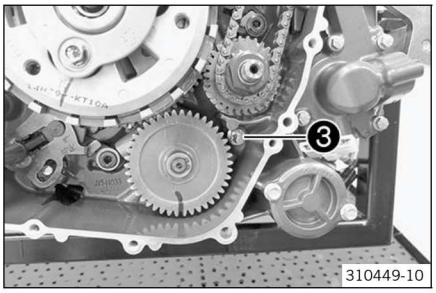


– Remove screw plug ❷.

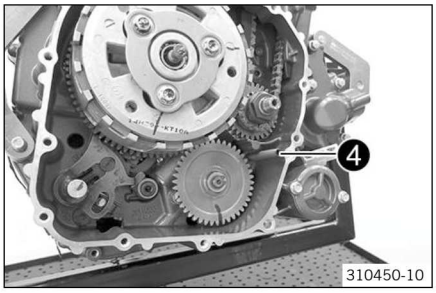


– Turn the crankshaft counterclockwise until markings Ⓐ align with the edge of the cylinder head.

  ✔ Markings Ⓑ and Ⓒ align.



– Remove screw ❸.

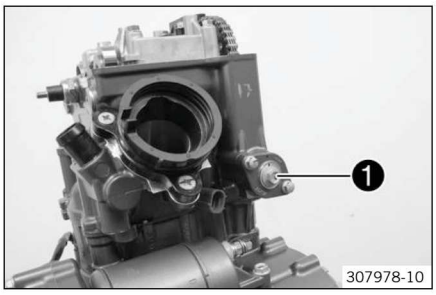


– Mount special tool ❹.

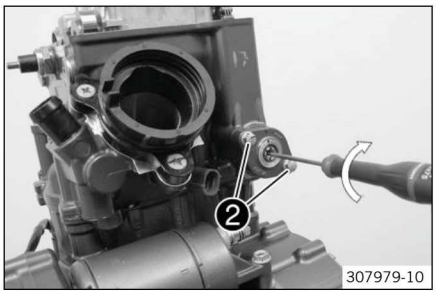
Locking screw (61229015000) (📖 p. 264)

◀

17.3.8 Removing the timing chain tensioner



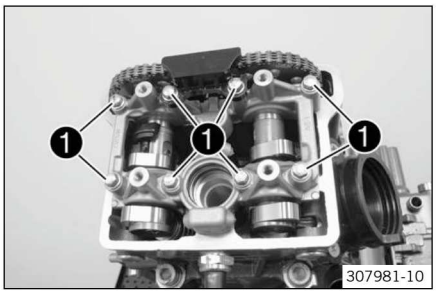
– Remove screw ❶ with the O-ring.



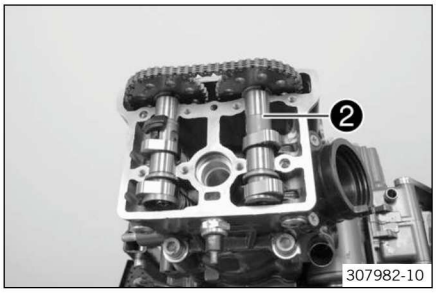
– Turn the timing chain tensioner screw clockwise.
  ✔ The timing chain tensioner is locked.
– Remove screw ❷.
– Remove the timing chain tensioner with the gasket.

◀

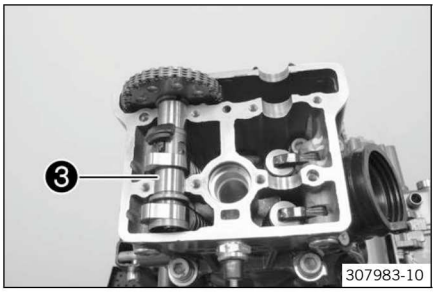
17.3.9 Removing the camshaft



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

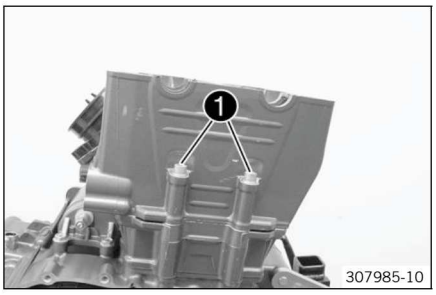


– Remove intake camshaft ❷.

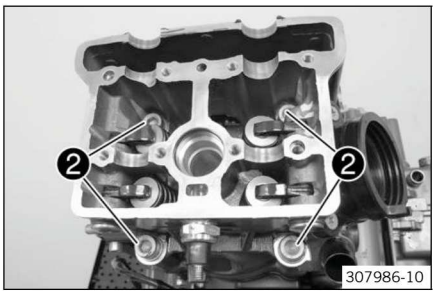


– Remove exhaust camshaft ❸.

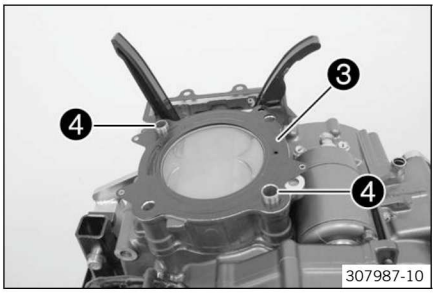
17.3.10 Removing the cylinder head



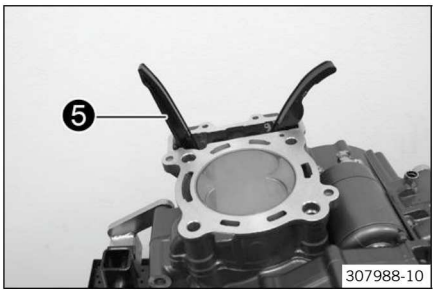
– Remove screws ❶.



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

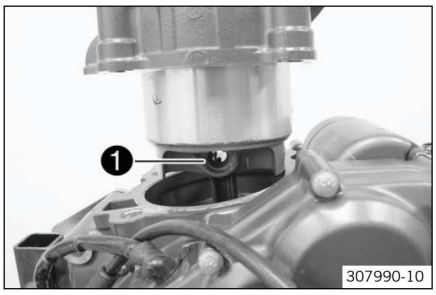


– Take off the cylinder head gasket ❸.
– Remove dowels ❹.



– Remove timing chain guide rail ❺.

17.3.11 Removing the piston

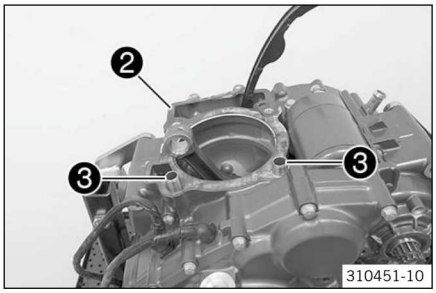


– Push the cylinder upward.

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

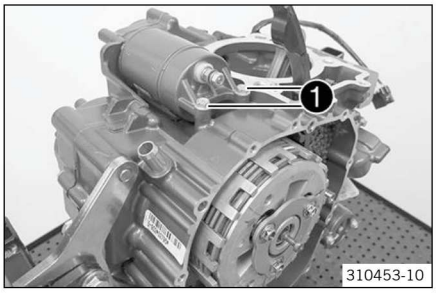
– Remove piston pin retainer 1.
– Remove the piston pin.
– Take off the cylinder with the piston.
– Push the piston upward out of the cylinder.

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



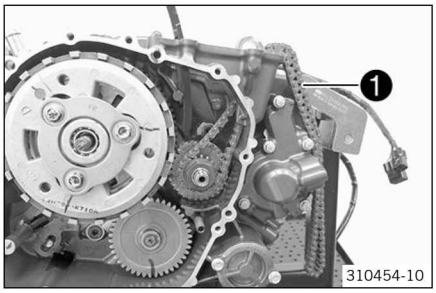
– Take off cylinder base gasket 2.
– Remove dowels 3.

17.3.12 Removing the starter motor



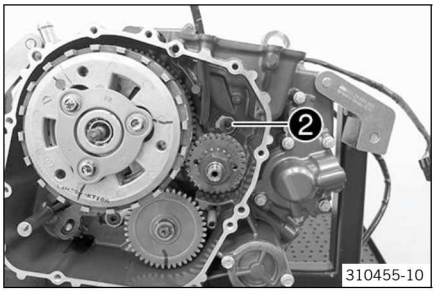
– Remove screws 1.
– Take off the starter motor.

17.3.13 Removing the timing chain



– Feed out timing chain 1.

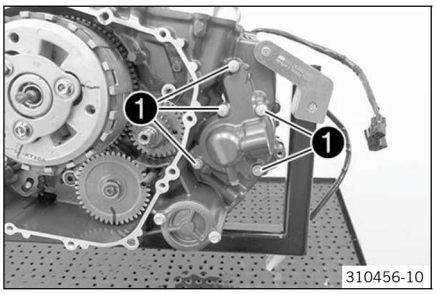
Info
If the timing chain is to be reused, mark the direction of travel.



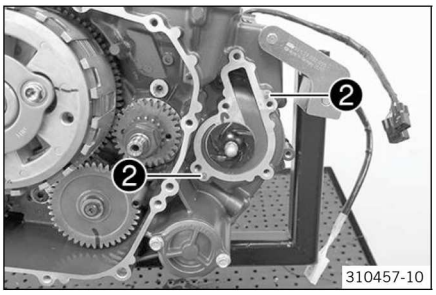
– Remove screw ❷.
– Take off the timing chain tensioning rail toward the top.

◀

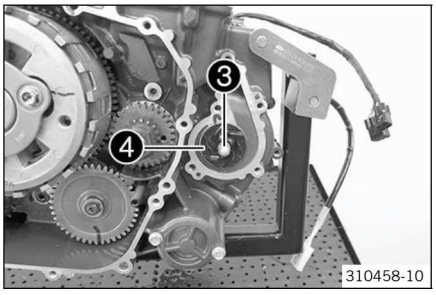
17.3.14 Removing the water pump wheel



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



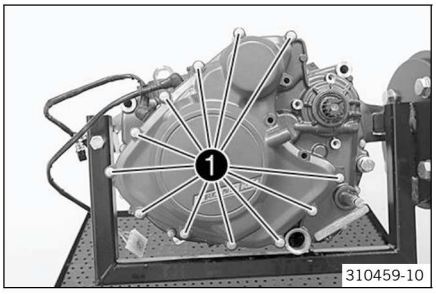
– Remove locating pins ❷.



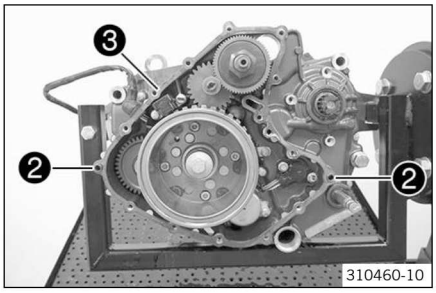
– Remove nut ❸ with washer.
– Take off the water pump impeller ❹.

◀

17.3.15 Removing the alternator cover

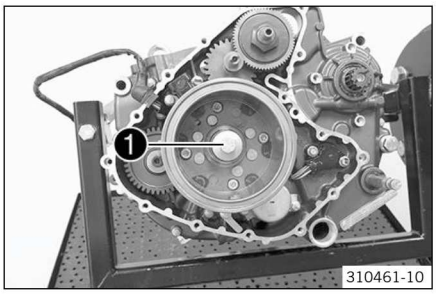


– Remove screws ❶.
– Take off the alternator cover.

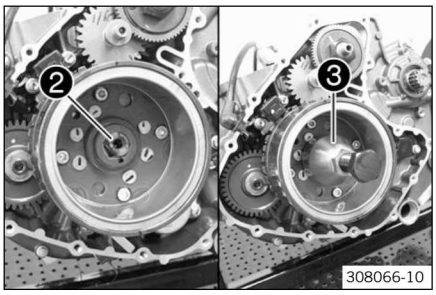


– Remove dowels ❷.
– Take off alternator cover gasket ❸.

17.3.16 rotor, removing



– Remove screw ❶ with the washer.



– Position the special tool ❷ in the crankshaft.

Pressing tool (90129020000) (p. 267)

– Mount special tool ❸ on the rotor.

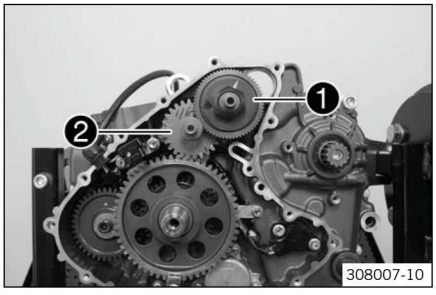
Info
Left-handed thread!

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

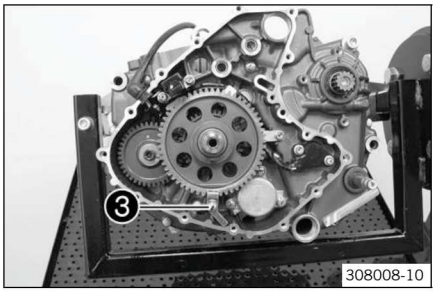
Puller (90229009000) (p. 269)

– Remove the woodruff key.

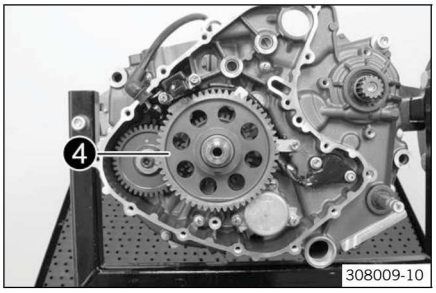
17.3.17 Removing the starter drive



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



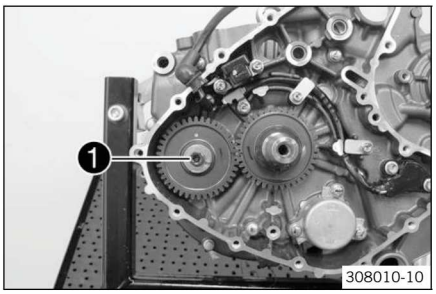
– Remove screw ❸.
– Remove the retaining bracket.



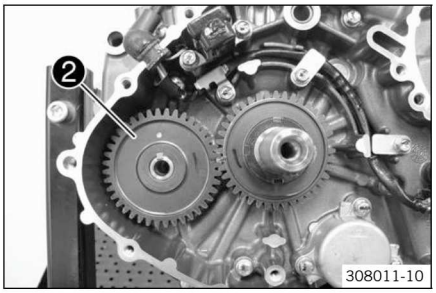
– Remove freewheel gear ❹.

◀

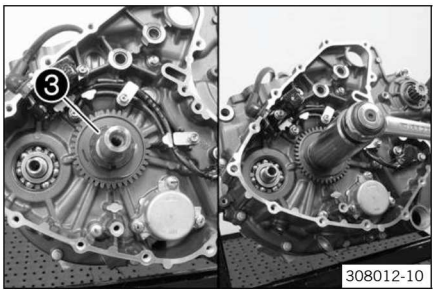
17.3.18 Removing the drive wheel of the balancer shaft



– Remove screw ❶ with the washer.



– Remove balancer shaft gear ❷ with a wedge.



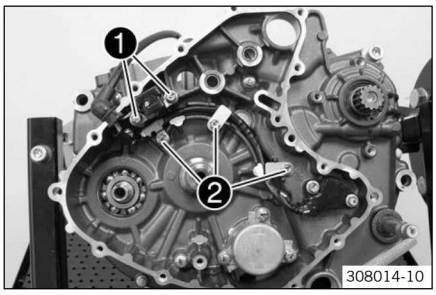
– Remove nut ❸ with washers.

Groove nut wrench (90129022000) (p. 268)

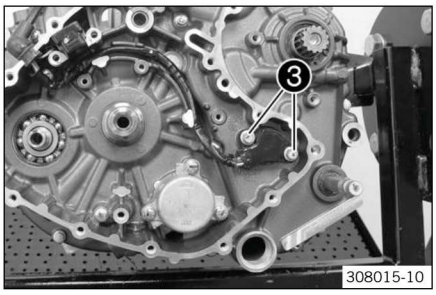
– Take off drive wheel of the balancer shaft.
– Remove the woodruff key.

◀

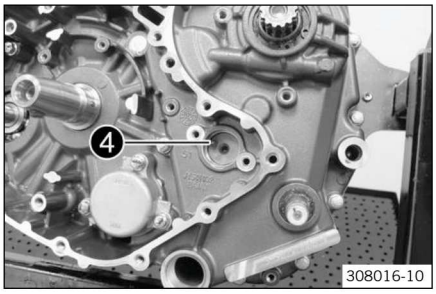
17.3.19 gear position sensor, removing



- Remove screws 1.
- Take off the retaining bracket.
- Remove screws 2.
- Pull off the ignition pulse generator.

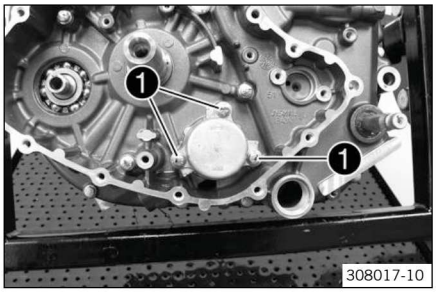


- Remove screws 3.
- Take off the gear position sensor and ignition pulse generator with the cable.

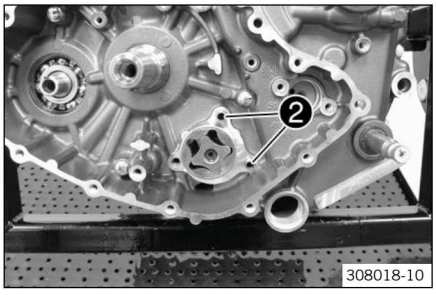


- Remove contact pin 4 and the contact spring.

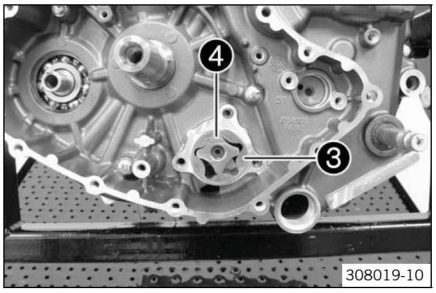
17.3.20 Removing the suction pump



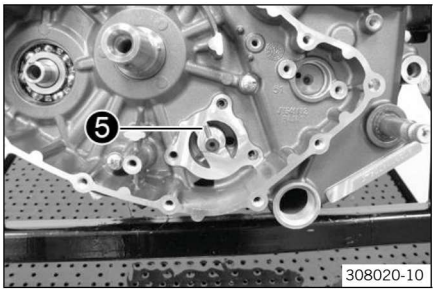
- Remove screws 1.
- Take off the oil pump housing of the suction pump.



- Remove dowels 2.

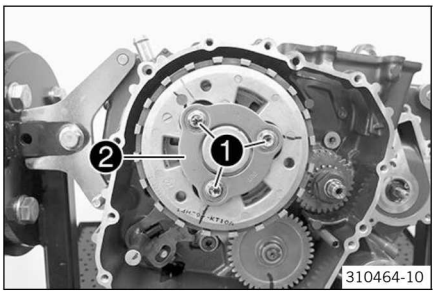


– Remove external rotor ❸ and internal rotor ❹.

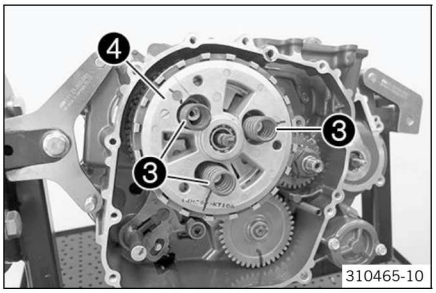


– Take off pin ❺.

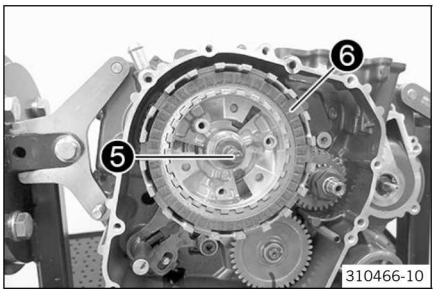
17.3.21 Removing the clutch cage



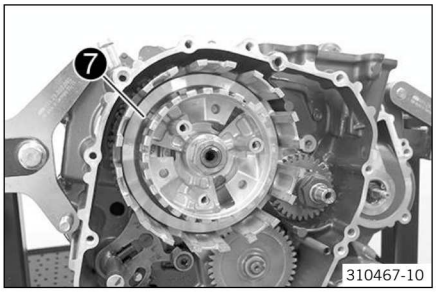
– Remove screws ❶.
– Take off pressure cap ❷.



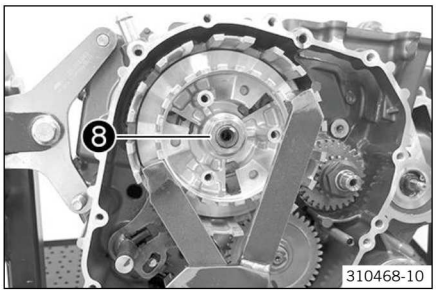
– Remove springs ❸.
– Take off pressure cap ❹.



– Remove pull rod ❺.
– Remove clutch disks ❻.



– Take off support ring and pretension ring ❼.

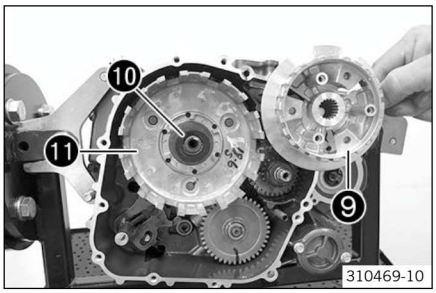


– Hold the clutch basket using the special tool.

Holding wrench (51129003000) (📖 p. 262)

– Remove nut ❽ with washer.

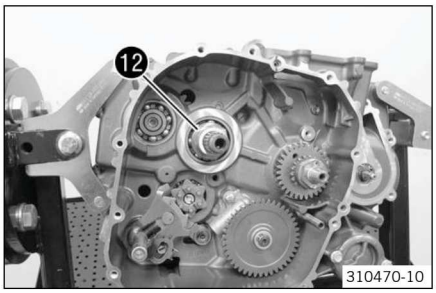
Info
Left-handed thread!



– Take off inner clutch hub ❾ and washer ❿.

Info
The washer usually sticks to the inner clutch hub.

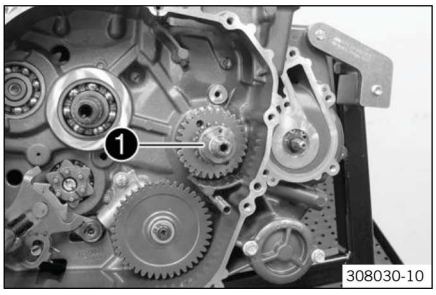
– Take off clutch basket ⓫.



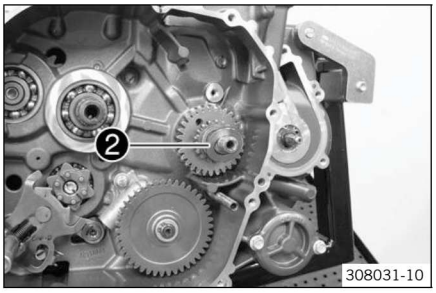
– Remove collar sleeve ⓬.

◀

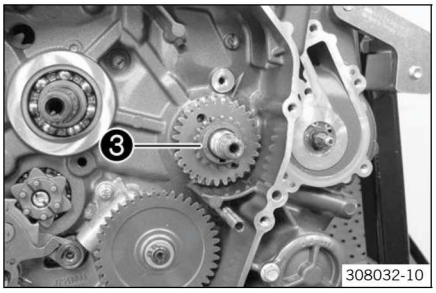
17.3.22 Removing the primary gear



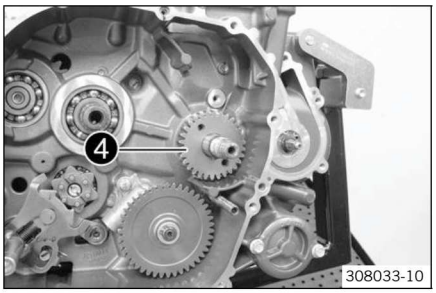
– Remove nut ❶ with the washer.



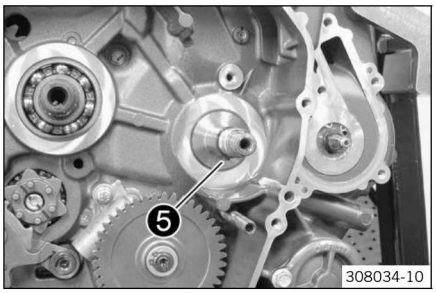
– Remove washer ❷.



– Remove the timing chain sprocket ❸.



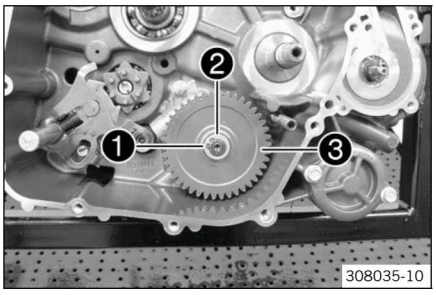
– Remove primary gear ❹.



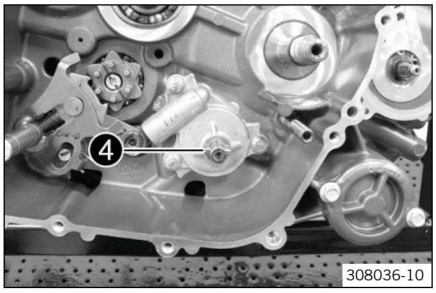
– Remove woodruff key ❺.

◀

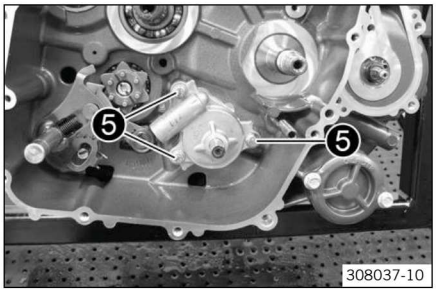
17.3.23 Removing the force pump



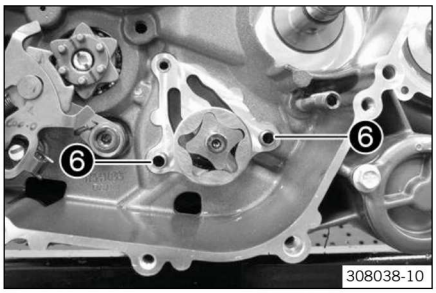
– Remove lock ring ❶.
– Take off washer ❷.
– Remove the oil pump gear ❸.



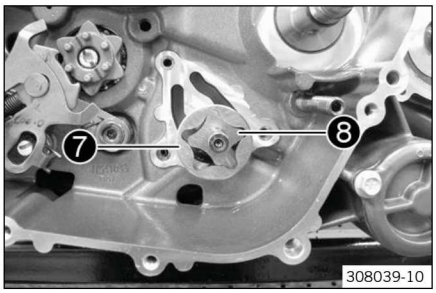
- Remove pin ❹.
- Take off the washer.



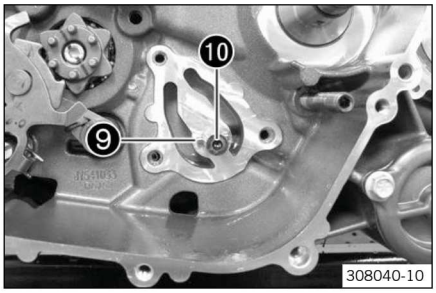
- Remove screws ❺.
- Take off the pressure pump housing.



- Remove dowels ❻.

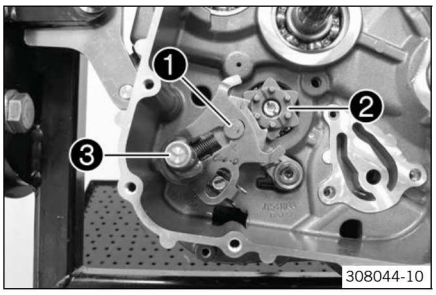


- Remove external rotor ❼.
- Remove internal rotor ❽.



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

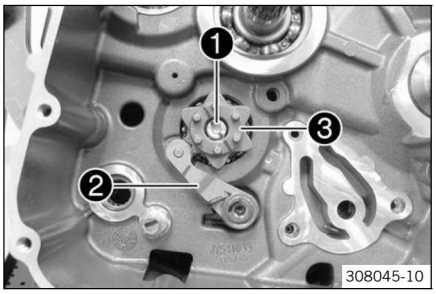
17.3.24 Removing the shift shaft



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

◀

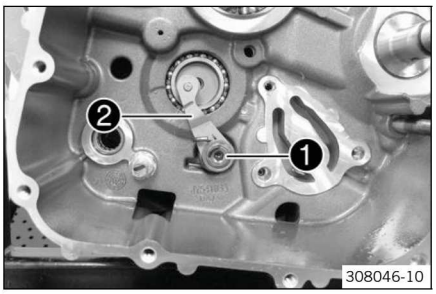
17.3.25 Removing the shift drum locating



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

◀

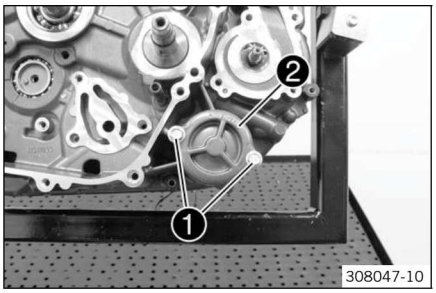
17.3.26 Removing the locking lever



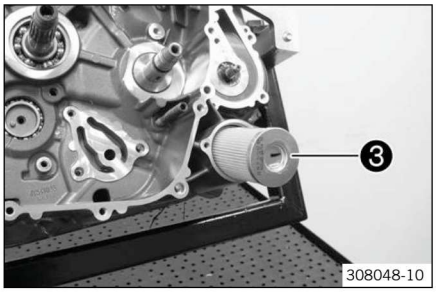
– Remove screw ❶.
– Take off locking lever ❷ together with the washers and spring.

◀

17.3.27 Removing the oil filter

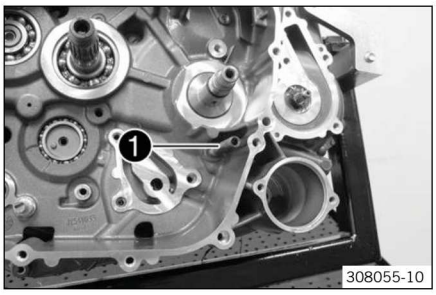


– Remove screws ❶.
– Remove oil filter cover ❷ with the O-ring.



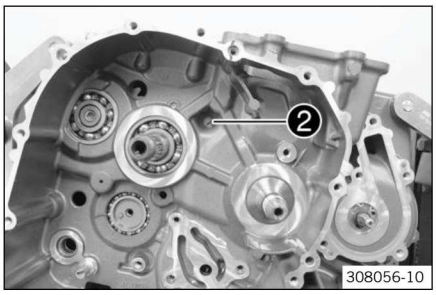
– Pull oil filter ❸ out of the oil filter housing.

17.3.28 Removing the left engine case

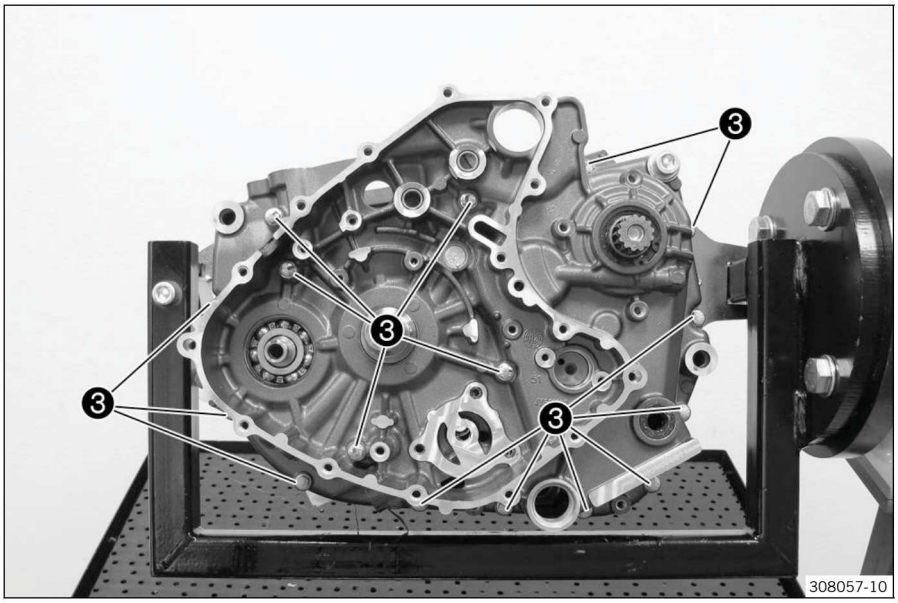


– Remove special tool ❶.

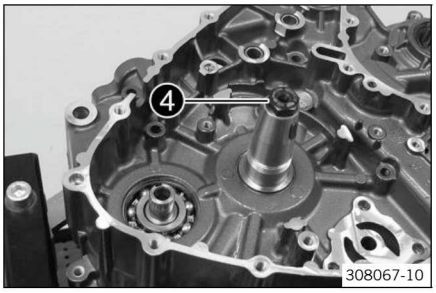
Locking screw (61229015000) (📖 p. 264)



– Remove screw ❷.

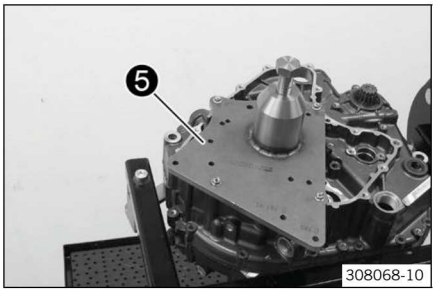


– Remove screws ❸.
– Swing the left section of the engine case up and remove the fitting of the engine fixing arm.



– Mount special tool ❹.

Pressing tool (90129020000) (📖 p. 267)



– Mount special tool ❺ with suitable screws.

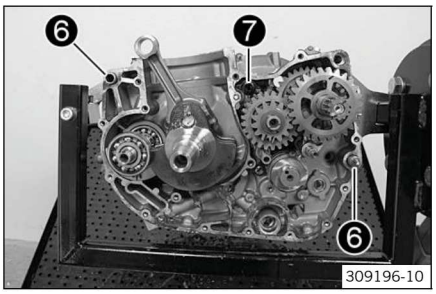
Puller (90129048100) (📖 p. 268)

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.

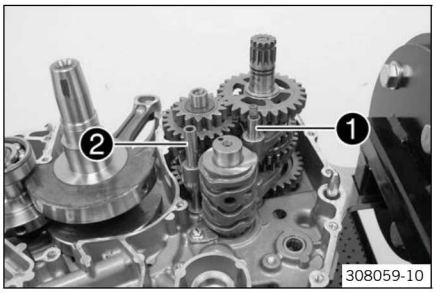
– Take off the left section of the engine case.
– Remove the special tool.
– Remove spacer of the countershaft.



– Remove dowels ❻.
– Remove oil spray tube ❼.

◀

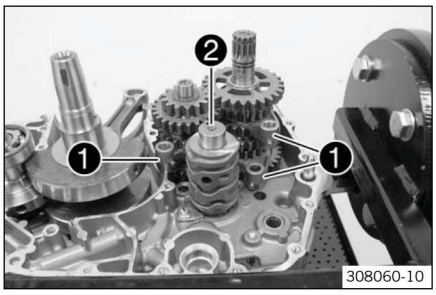
17.3.29 Removing the shift rails



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

◀

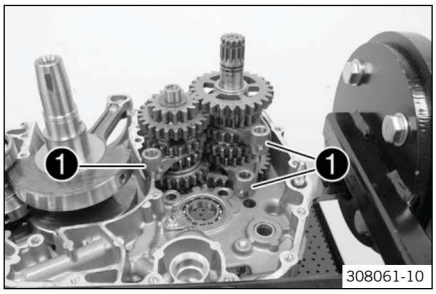
17.3.30 Removing the shift drum



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

◀

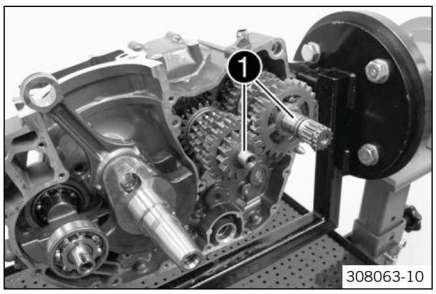
17.3.31 Removing the shift forks



- Remove shift forks ❶.

◀

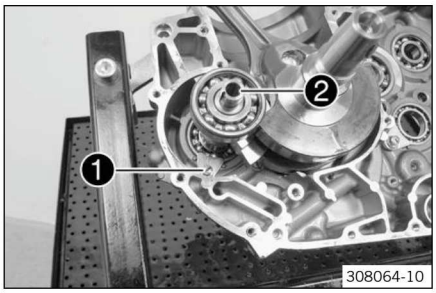
17.3.32 Removing the transmission shafts



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

◀

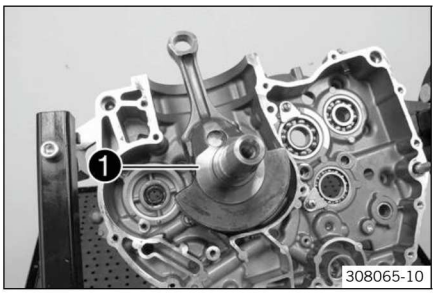
17.3.33 Removing the balancer shaft



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

◀

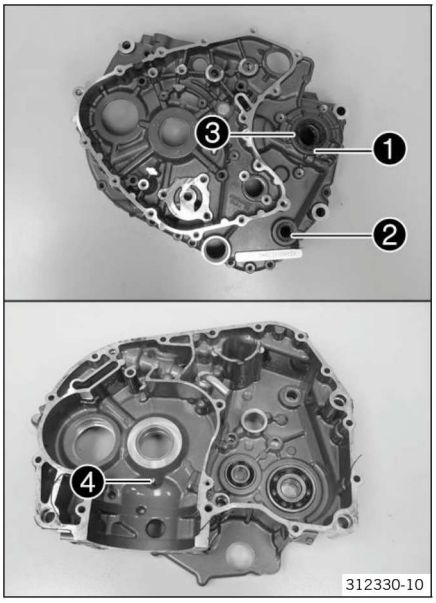
17.3.34 Removing the crankshaft



– Remove crankshaft ❶.

17.4 Working on individual parts

17.4.1 Working 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 remnants of sealing compound and clean the section of the engine case thoroughly.
– Warm the section of the engine case in an oven.

  Guideline

150 °C (302 °F)

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

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

– Insert the new cold bearings in the bearing seat of the heated section of the engine case; if necessary, use a suitable press drift to push them all the way in and make them flush.

  ✔ The closed side of the transmission output bearing points towards the engine sprocket.

Info
When pressing in, ensure that the section of the engine case lies flat in order prevent damage.
Only press the bearings in via the outer ring; otherwise, the bearings will be damaged when they are pressed in.

– After the section of the engine case 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.

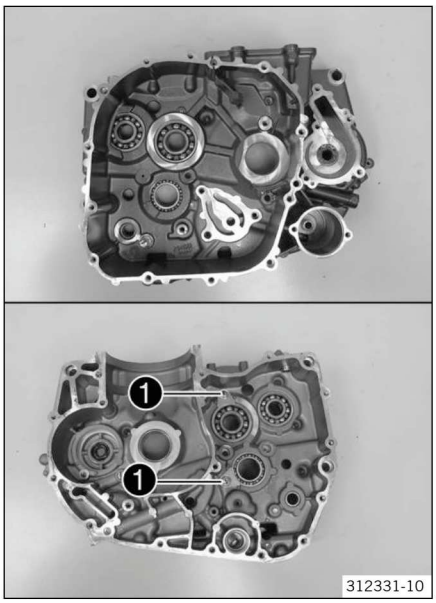
- Press in shaft seal ring ❷ of the shift shaft so it is flush with the open side facing inward.
- Press in shaft seal ring ❸ of the countershaft so it is flush with the open side facing in.
- Mount lock ring ❶.
- Mount and tighten oil nozzle ❹.

  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.

17.4.2 Working on the right section of the engine case



- Remove all dowels.
- Remove screws ❶. Remove the bearing retainers.
- Remove any remnants of sealing compound and clean the section of the engine case thoroughly.
- Warm the engine case section in an oven.

  Guideline

150 °C (302 °F)

- Knock the engine case section against a level wooden board. 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 in the bearing seats of the heated section of the engine case; if necessary, use a suitable press drift to push them all the way in and make them flush.

Info
When pressing the bearings 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.

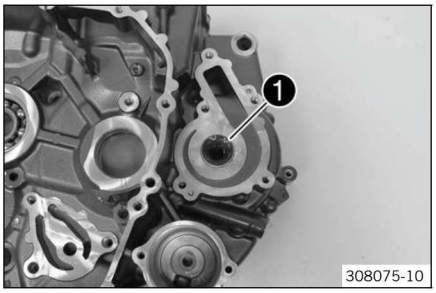
- Mount the dowels.
- Position all bearing retainers.
- Mount and tighten screws ❶.

Guideline

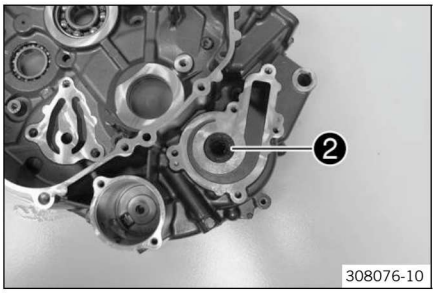
Screw, bearing retainer	M6	12 Nm (8.9 lbf ft) **Loctite®243™**

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

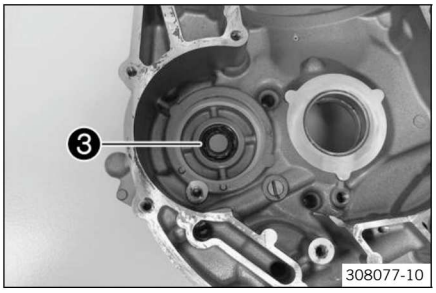
17.4.3 Changing the shaft seal ring of the water pump



– Remove lock ring ❶.

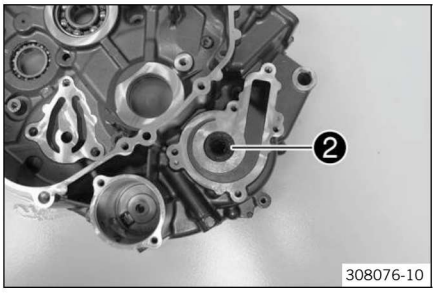


– Remove shaft seal ring ❷.



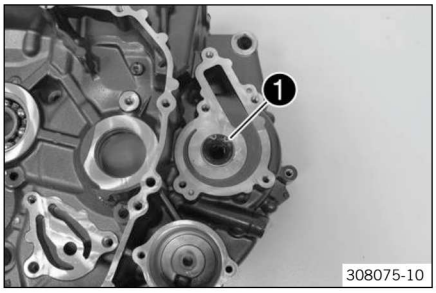
– Remove shaft seal ring ❸.
– Grease new shaft seal ring ❸ and press in all the way with the open side facing inwards.

High viscosity grease (📖 p. 258)
Pressing tool (90129043000) (📖 p. 268)



– Grease new shaft seal ring ❷ and press in all the way with the open side facing outwards.

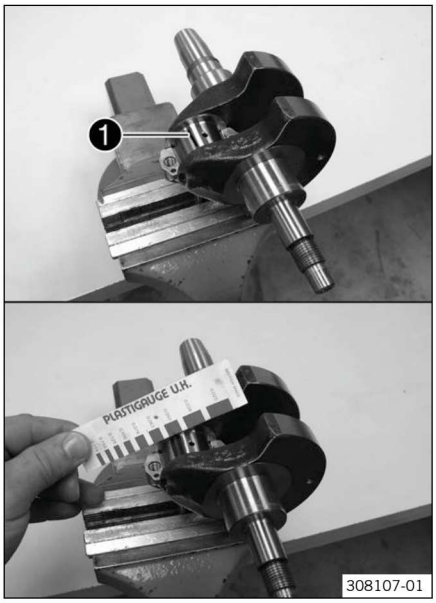
High viscosity grease (📖 p. 258)
Pressing tool (90129043000) (📖 p. 268)



– Mount lock ring 1.

17.4.4 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 1 offset by 90° to the bearing face.

Plastigauge clearance gauge (60029012000) (📖 p. 263)

– 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

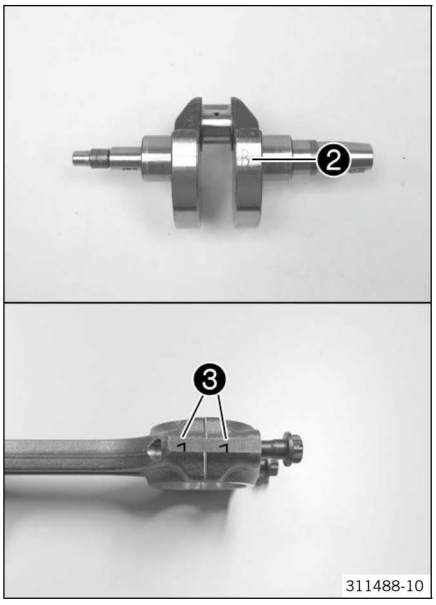
Connecting rod - radial play of lower conrod bearing	
New condition	0.045 ... 0.068 mm (0.00177 ... 0.00268 in)
Wear limit	0.080 mm (0.00315 in)

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

– Clean the parts.

17.4.5 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.



New crankshaft

– Select new bearing shells according to the crankshaft classification and connecting rod classification.

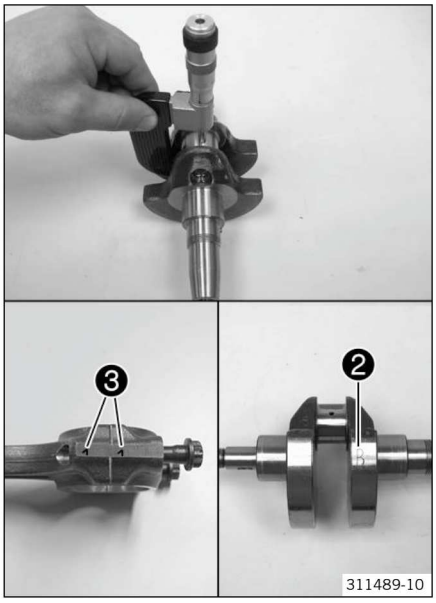
Guideline

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)
Color coding for conrod bearing shell	
Green	Crankshaft classification **B** and connecting rod classification **1**
None	Crankshaft classification **B** and connecting rod classification **2**
None	Crankshaft classification **A** and connecting rod classification **1**
Blue	Crankshaft classification **A** and connecting rod classification **2**

Info

The crankshaft classification is indicated by marking ❷.
The connecting rod classification is indicated by marking ❸.

– Check the radial play of the lower conrod bearing.
(📖 p. 144)



Used crank shaft

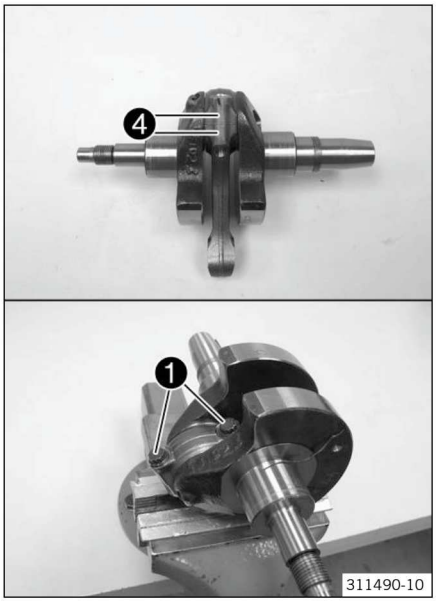
– Measure the crank pin diameter and select the new bearing shells according to the crankshaft classification and the connecting rod classification.

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)
Color coding for conrod bearing shell	
Green	Crankshaft classification **B** and connecting rod classification **1**
None	Crankshaft classification **B** and connecting rod classification **2**
None	Crankshaft classification **A** and connecting rod classification **1**
Blue	Crankshaft classification **A** and connecting rod classification **2**

Info
The crankshaft classification is indicated by marking ❷.
The connecting rod classification is indicated by marking ❸.

– Check the radial play of the lower conrod bearing. (📖 p. 144)



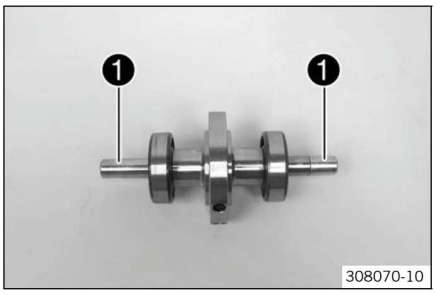
– Position and oil the bearing shells.
– Position the connecting rod and conrod bearing cover according to markings ❹.
– Mount and tighten screws ❶.

Guideline

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

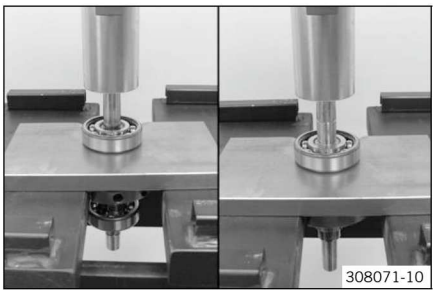
Info
Always replace the conrod bearing screws.

17.4.6 Changing the balancer shaft bearing

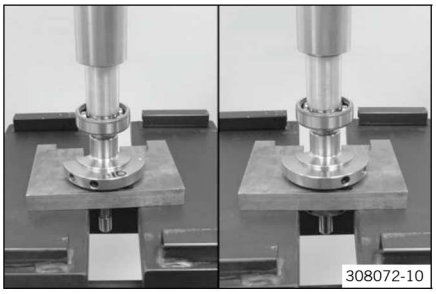


– Mount special tools ❶.

Pressing tool (90129056000) (p. 269)



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

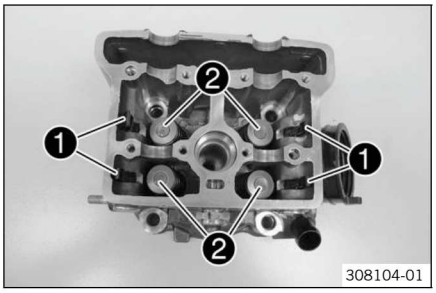


– Press on the balancer shaft bearing with a suitable tool.
– Remove the special tools.

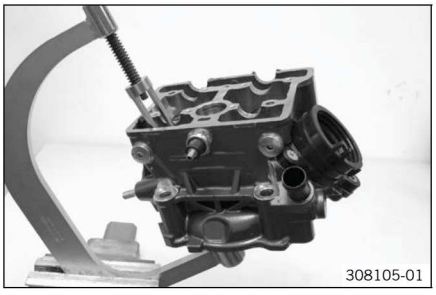
Pressing tool (90129056000) (p. 269)

◀

17.4.7 Work on the cylinder head

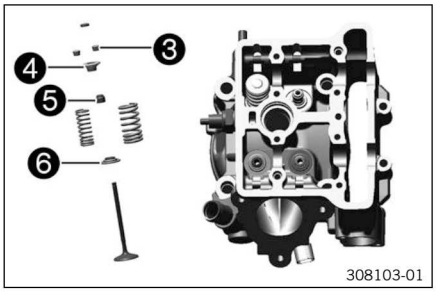


– Fold cam lever ❶ up.
– Take the shims ❷ out of the valve spring retainers and lay them to one side according to their normal built-in position.



– Tension the valve spring with a special tool.

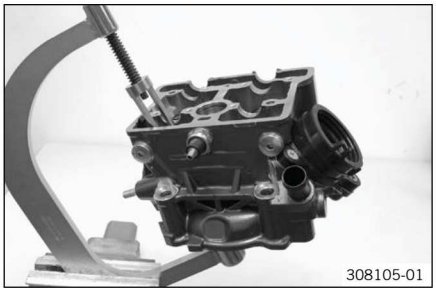
Valve spring mounter (59029019000) (p. 262)
Insert for valve spring lever (77029041200) (p. 266)



- Remove valve keys ❸ and release tension on the valve spring.
- Remove valve spring retainer ❹.
- Remove valve spring, valve stem seal ❺, and valve spring seat ❻.

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

- Check the cylinder head. (p. 148)
- Mount valve spring seat ❻ and the new valve stem seal ❺.
- Mount the valve spring.
- Mount valve spring retainer ❹.



- Tension the valve spring with a special tool.

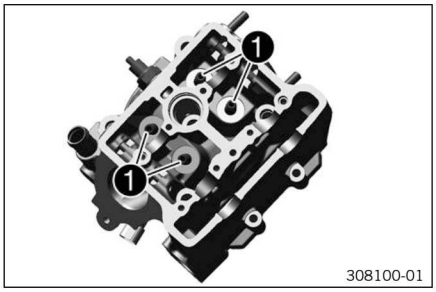
Valve spring mounter (59029019000) (p. 262)
Insert for valve spring lever (77029041200) (p. 266)

- Mount the valve keys. Release the tension on 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 the shims in the valve spring retainers corresponding to their installation position.

17.4.8 Checking the cylinder head



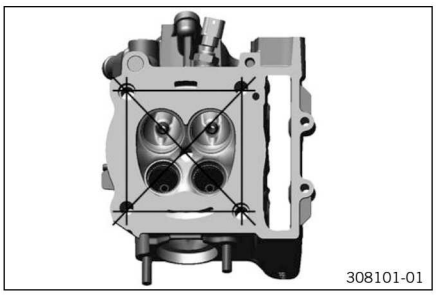
- Check valve guides ❶ with the special tool.

Limit plug gauge (77029026000) (p. 266)

» 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.

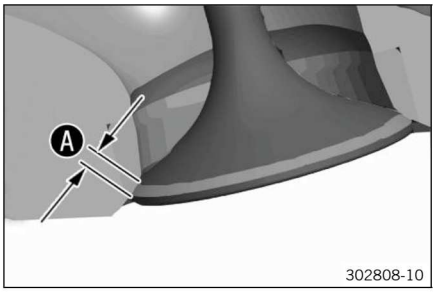


- Check the sealing area of the cylinder for distortion using a straight edge and the special tool.

Feeler gauge (59029041100) (p. 262)

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.

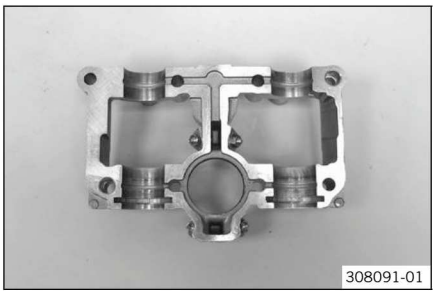
Valve - sealing seat width	
Intake	0.90 ... 1.10 mm (0.0354 ... 0.0433 in)

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

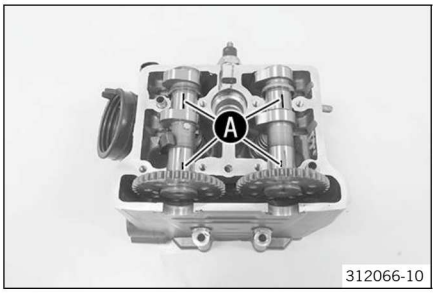
» If the measured value does not equal the specified value:
  – Machine the valve seat.
– Blow compressed air through all oil holes and check that they are clear.

◀

17.4.9 Checking the pivot point of the camshafts

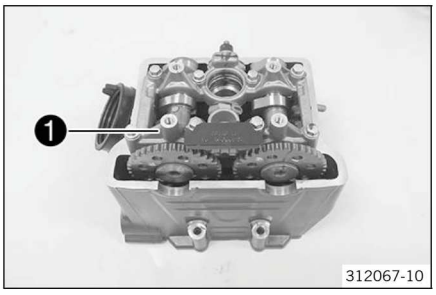


– Check the pivot points of the camshafts.
» If there is damage or wear:
  – Change the cylinder head with the camshaft bearing bridge.



– Position the camshafts.
✓ The valves are not actuated.
– Insert the **Plastigauge** clearance gauge in area Ⓐ.

Plastigauge clearance gauge (60029012000) (📖 p. 263)

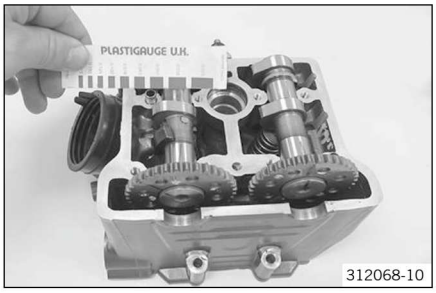


– Position camshaft bearing bridge Ⓐ.
– Mount the screws and tighten in a crisscross pattern from the inside to the outside.

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.

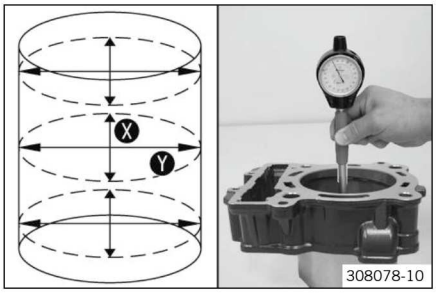
Guideline

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.

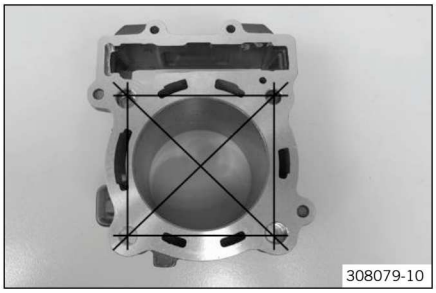
17.4.10 Checking/measuring the cylinder



– 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)



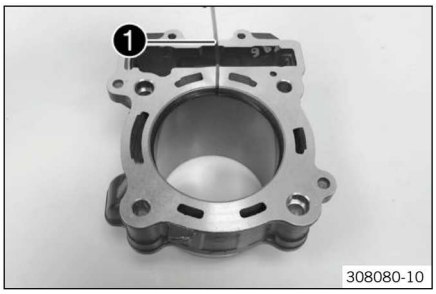
– Check the sealing area of the cylinder head for distortion using a straight edge and the special tool.

Feeler gauge (59029041100) (📖 p. 262)

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.

17.4.11 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)

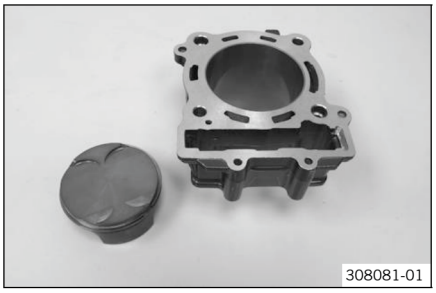
Feeler gauge (59029041100) (📖 p. 262)

» If the end gap is more than the specified value:
– Check/measure the cylinder. (📖 p. 150)
» 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.

◀

17.4.12 Checking/measuring the piston



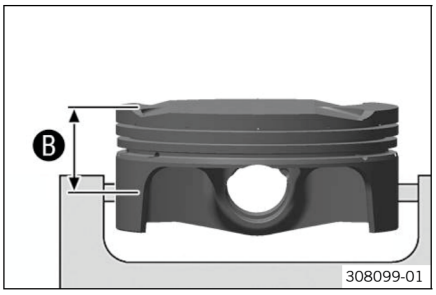
– Check the piston bearing surface for damage.
» If the piston bearing surface is damaged:
– Replace the piston and, if necessary, the cylinder.
– Check that the piston rings move easily in the piston ring grooves.
» If the piston ring is stiff:
– Clean the piston ring groove.

Tip
An old piston ring can be used to clean the piston ring groove.

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

Info
Mount the piston ring with the marking facing upward.

– Check the piston pins for discoloration or signs of wear.
» If the piston pin shows severe discoloration/signs of wear:
– Change the piston pin.
– Place the piston pin in the connecting rod and check the seating for play.
» If the piston pin seating has excessive play:
– Change the connecting rod and piston pin.

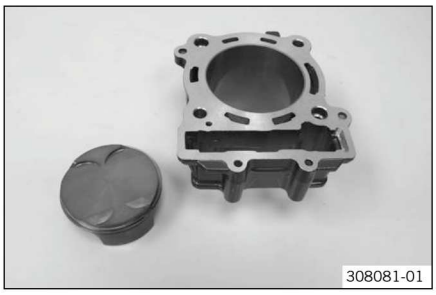


– Measure the piston at the piston skirt, at right angles to the piston pin, at a distance Ⓑ.
Guideline

Distance Ⓑ	30 mm (1.18 in)
Piston - diameter	88.931 ... 88.949 mm (3.50121 ... 3.50192 in)

◀

17.4.13 Checking the piston/cylinder mounting clearance



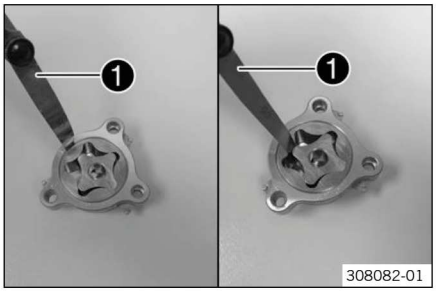
- Check/measure the cylinder. (p. 150)
- Check/measure the piston. (p. 151)
- The piston/cylinder mounting clearance is the result of the cylinder bore diameter minus the piston diameter.

  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)

17.4.14 Checking the oil pump

Info
The following operations apply to both oil pumps.



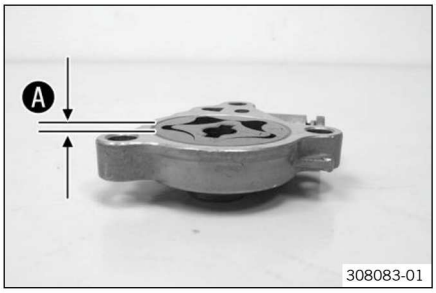
- With special tool 1, check the play between the internal rotor and external rotor and between the external rotor and the oil pump housing.

Feeler gauge (59029041100) (p. 262)

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.

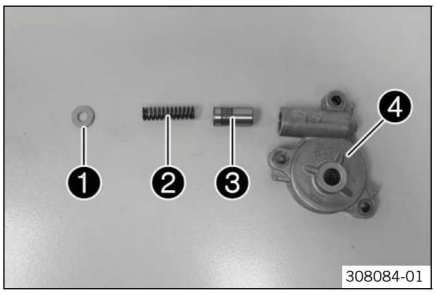


- Check axial play A of the oil pump.

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.

17.4.15 Checking the oil pressure regulator valve

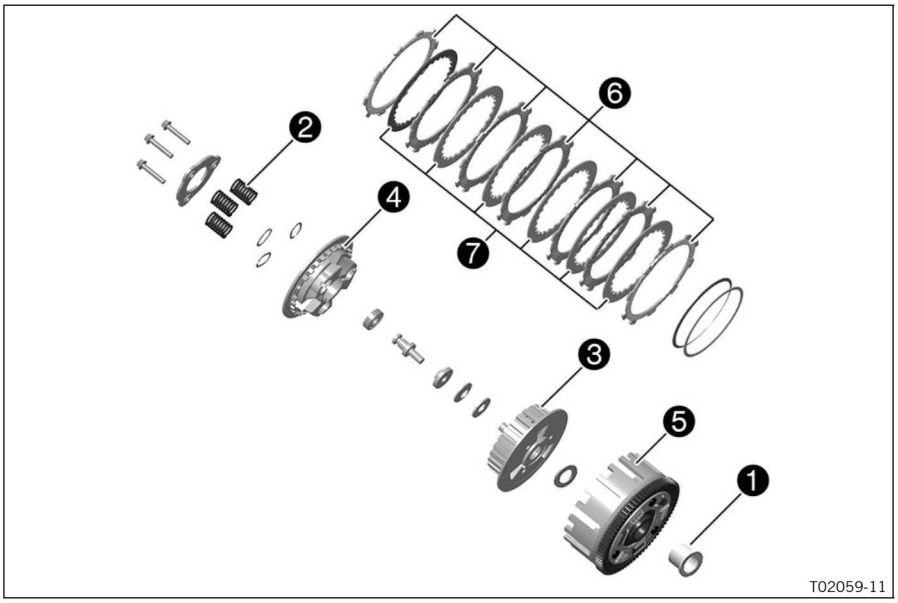


- Remove washer 1.
- Remove spring 2.
- Measure the length of spring 2.

Oil pressure regulator valve - minimum spring length	30.00 mm (1.1811 in)

  - » If the measured length is less than the specified value:
    - Change the spring.
- Check control piston 3 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 4 for damage and wear.
  - » If there is damage or wear:
    - Change the pressure pump housing.
- Oil control piston 3 and spring 2 well and mount them.
- Mount washer 1.

17.4.16 Checking the clutch



- Check collar sleeve 1 for damage and wear.
  - » If there is damage or wear:
    - Change the collar sleeve.
- Check the length of clutch springs 2.

Clutch spring - length	≥ 50 mm (≥ 1.97 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.

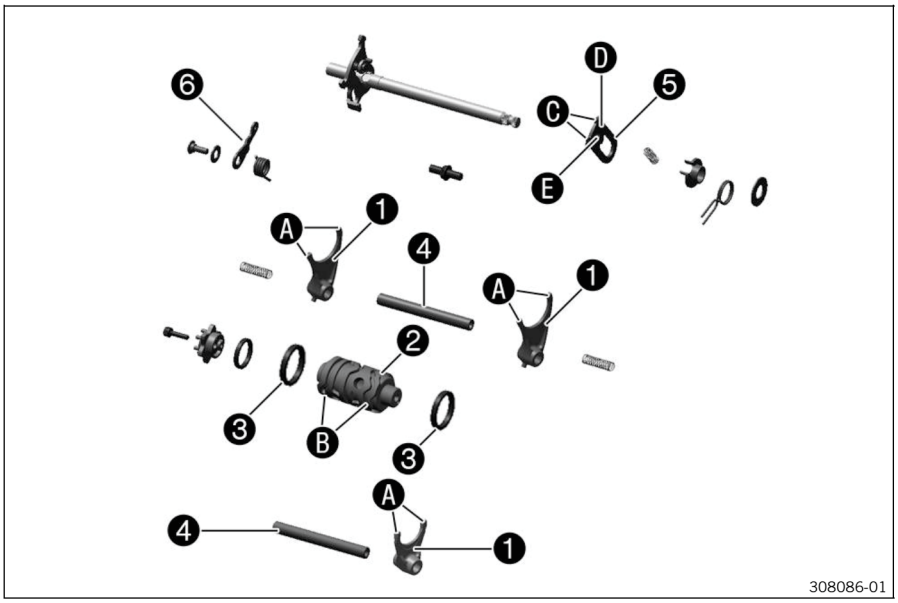
– Check the thickness of clutch facing discs ❻ and intermediate discs ❼.

Thickness of overall package	≥ 32.00 mm (≥ 1.2598 in)

» If the clutch facing discs do not meet specifications:
– Change all clutch facing discs.

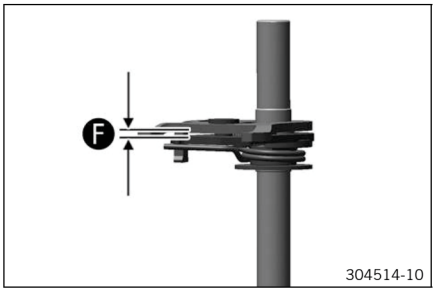
– Check intermediate discs ❼ for damage and wear.
» If the intermediate discs are not level or are pitted:
– Replace all intermediate discs.

17.4.17 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.
- Check locking lever ❻ for damage and wear.
  - » When the locking lever is damaged or worn:
    - – Change the locking lever.



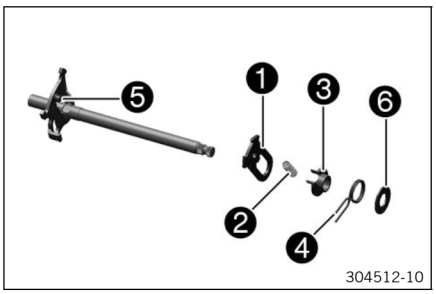
- Preassemble the shift shaft. (📖 p. 155)
- Check the play Ⓕ between the sliding plate and the shift quadrant.

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.

◀

17.4.18 Preassembling the shift shaft



- Fix the short end of the shift shaft in a vise.

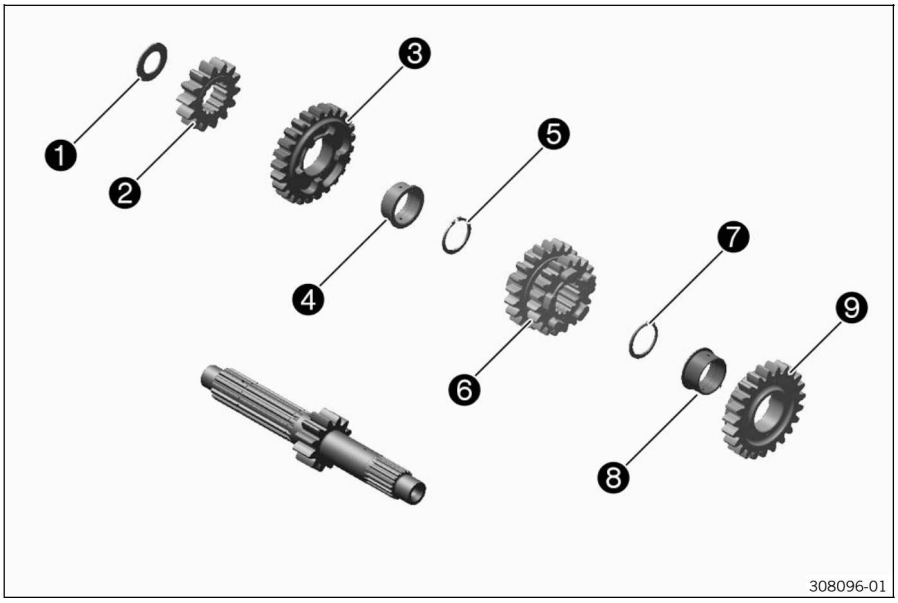
  Guideline

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.

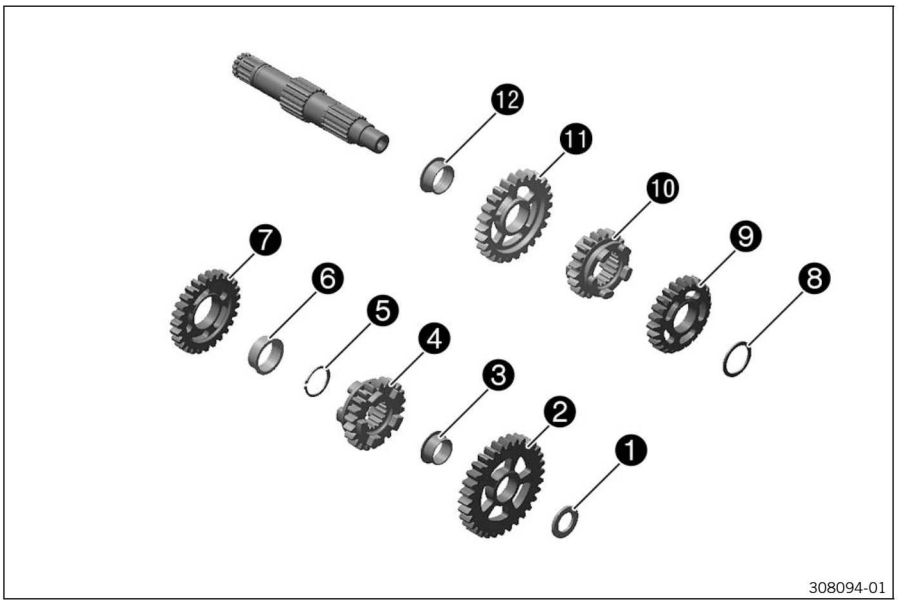
– Push on spring guide ❸, push return spring ❹ over the spring guide with the offset end facing upward and lift the offset end over abutment bolt ❺.
– Mount washer ❻.

17.4.19 Disassembling the main shaft



– Secure the main shaft in the vise with the gear teeth facing downward.
  Guideline
Use soft jaws.
– Remove stop disk ❶ and second-gear fixed gear ❷.
– Remove sixth-gear idler gear ❸.
– Remove collar bushing ❹.
– Remove lock ring ❺.
– Remove third/fourth-gear sliding gear ❻.
– Remove lock ring ❼.
– Remove collar bushing ❽.
– Remove fifth-gear idler gear ❾.

17.4.20 Disassembling the countershaft



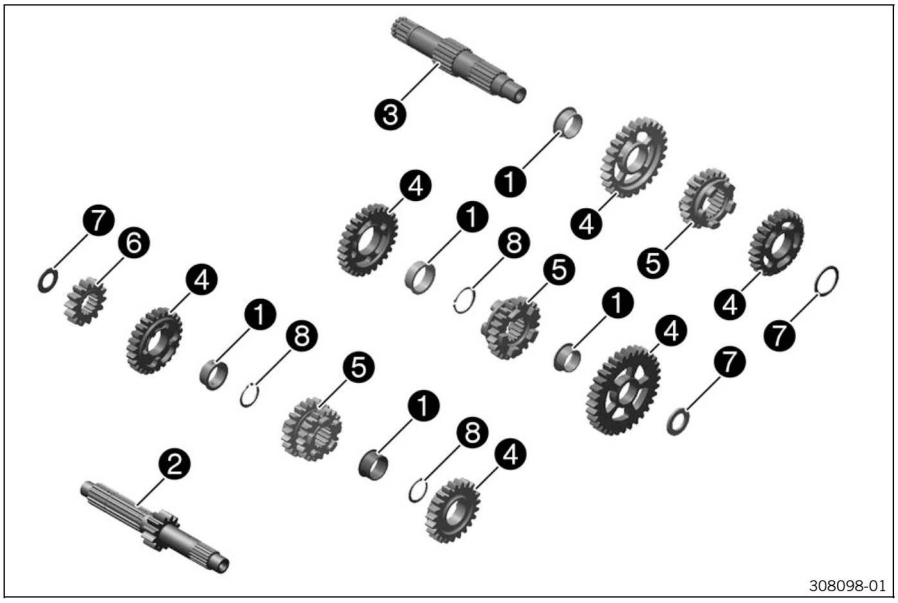
– Secure the countershaft in the bench vise with the toothed end facing downward.
  Guideline

Use soft jaws.

– Remove stop disk ❶ and first-gear idler gear ❷.
– Remove collar bushing ❸.
– Remove sixth-gear sliding gear ❹.
– Remove lock ring ❺.
– Remove collar bushing ❻.
– Remove third-gear idler gear ❼.
– Remove washer ❽.
– Remove fourth-gear idler gear ❾.
– Remove fifth-gear sliding gear ❿.
– Remove the second-gear idler gear ⓫.
– Remove collar bushing ⓬.

17.4.21 Checking the transmission

Condition
The transmission has been disassembled.



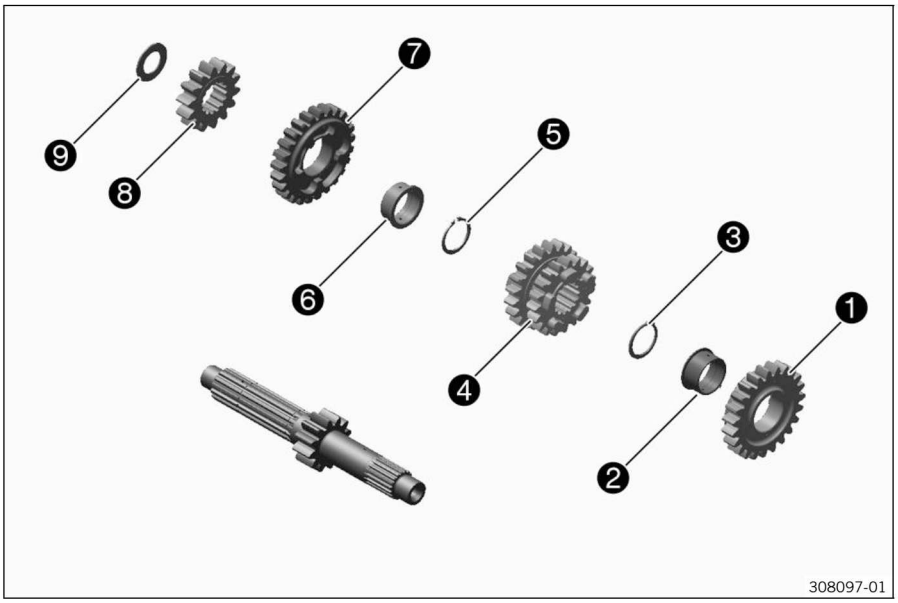
- Check collar bushings ❶ for damage and wear.
  - » If there is damage or wear:
    - – Change the collar bushings.
- Check the pivot points of main shaft ❷ and countershaft ❸ for damage and wear.
  - » If there is damage or wear:
    - – Change the main shaft and/or countershaft.
- Check the tooth 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.

17.4.22 Assembling the main shaft

Info
Use new lock rings with every repair.

Preparatory work
– Carefully lubricate all parts before assembling.
– Check the transmission. (p. 157)



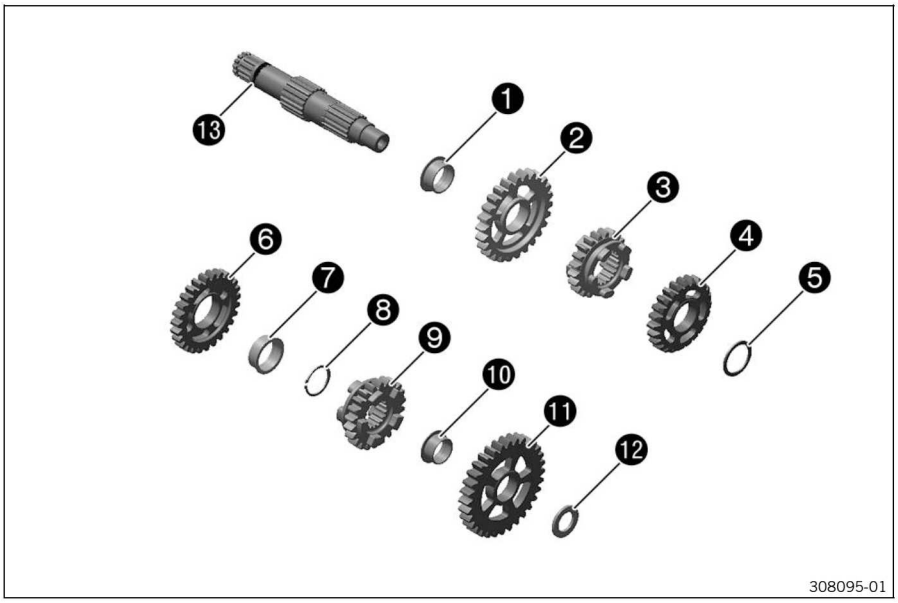
Main work
– Secure the main shaft in the vise with the gear teeth facing downward.
Guideline
Use soft jaws.
– Mount fifth-gear idler gear ❶.
– Mount collar bushing ❷.
– Mount lock ring ❸.
– Mount third/fourth-gear sliding gear ❹ with the small gear wheel facing downward.
– Mount lock ring ❺.
– Mount collar bushing ❻.
– Mount sixth-gear idler gear ❼.
– Mount second-gear fixed gear ❽ and stop disk ❾.
– Finally, check all the gear wheels for smooth operation.

17.4.23 Assembling the countershaft

Info
Use new lock rings with every repair.

Preparatory work

– Carefully lubricate all parts before assembling.
– Check the transmission. (📖 p. 157)



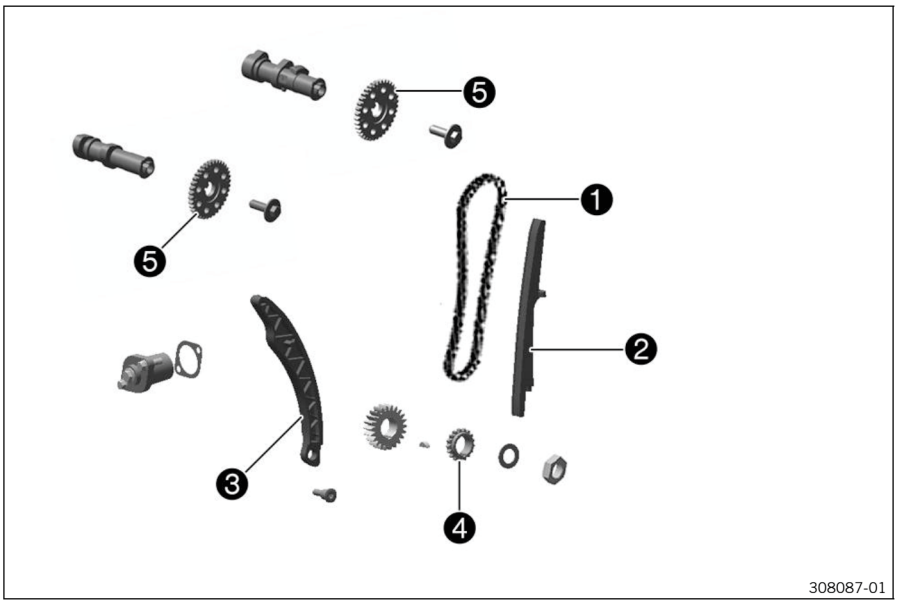
Main work

– Secure the countershaft in the bench vise with the toothed end facing downward.
  Guideline

Use soft jaws.

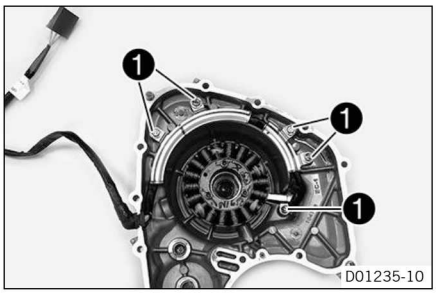
– Mount collar bushing ❶.
– Mount second-gear idler gear ❷.
– Mount fifth-gear sliding gear ❸ with the shift groove facing up.
– Mount fourth-gear idler gear ❹.
– Mount washer ❺.
– Mount third-gear idler gear ❻.
– Mount collar bushing ❼.
– Mount lock ring ❽.
– Mount sixth-gear sliding gear ❾ with the 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 the gear wheels for smooth operation.

17.4.24 Checking the timing assembly

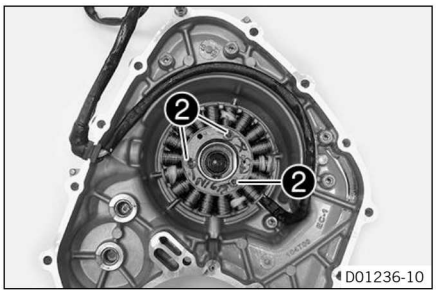


- Check timing chain ❶ for damage and wear.
  - » If there is damage or wear:
    - – Change the timing chain.
- Check that the chain links of the timing chain can move easily.
  - » If the timing chain is stiff:
    - – Change the timing chain.
- Let the timing chain hang down freely. Check that the 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.

17.4.25 Changing the stator



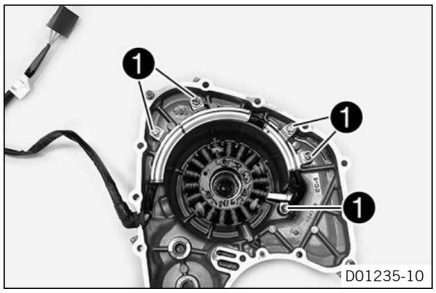
- Remove screws ❶.
- Remove the cable retainer.



- 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™**

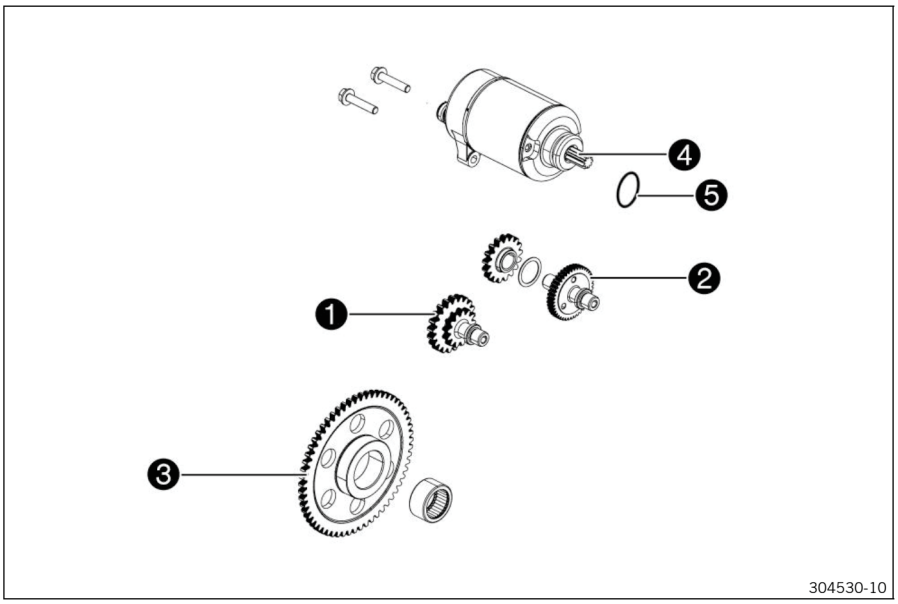


- Position the cable guide in the alternator cover.
- Position the cable retainer.
- Mount and tighten screws ❶.

Guideline

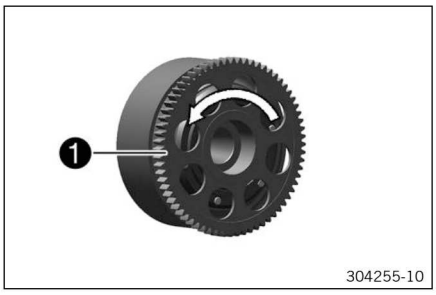
Screw, retaining bracket, stator cable	M5	8 Nm (5.9 lbf ft) **Loctite®243™**

17.4.26 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.

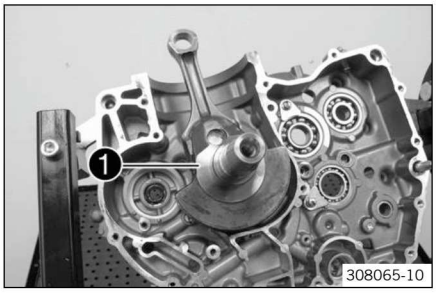
17.4.27 freewheel, checking



- Insert freewheel gear ❶ into the freewheel hub, turning the freewheel gear clockwise; do not wedge.
- Check the locking action of the freewheel gear.
  - » The freewheel gear cannot be turned clockwise and does not block counterclockwise:
    - Change the freewheel.

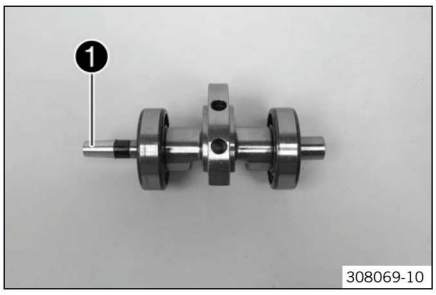
17.5 Engine assembly

17.5.1 Installing the crankshaft



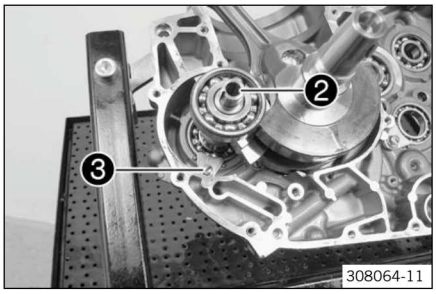
- Oil the bearing.
- Slide crankshaft ❶ into the bearing seat.

17.5.2 Installing the balancer shaft



- Mount special tool ❶.

Protection cap (90129005000) (📖 p. 267)



- Mount balancer shaft ❷ with the bearing.

Info
If necessary, heat the engine case.

- Position the retaining bracket.
- Mount and tighten screw ❸.

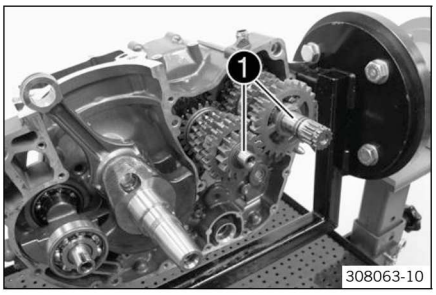
Guideline

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

- Remove the special tool.

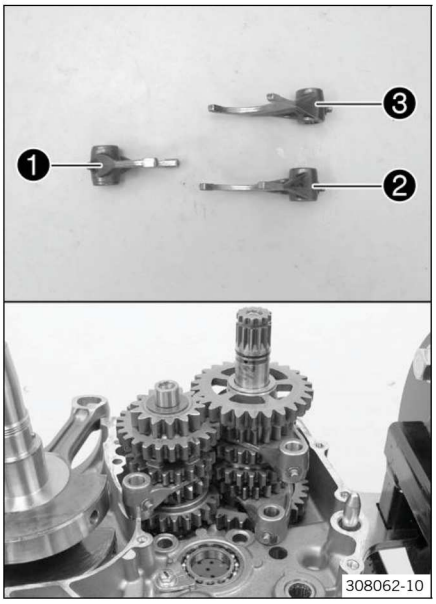
Protection cap (90129005000) (📖 p. 267)

17.5.3 Installing the transmission shafts



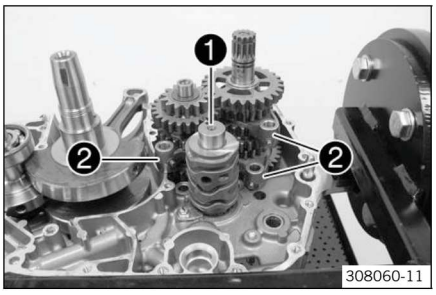
– Oil the bearing.
– Slide both transmission shafts ❶ into the bearing seats together.

17.5.4 Installing the shift forks



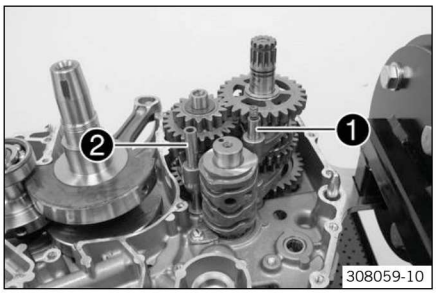
– Oil all parts carefully before assembling.
– Shift fork ❶ has a smaller inside diameter; mount it in the shift groove of the main shaft.
– Mount shift fork ❷ in the lower shift groove of the countershaft.
– Mount shift fork ❸ in the upper shift groove of the countershaft.

17.5.5 Installing the shift drum



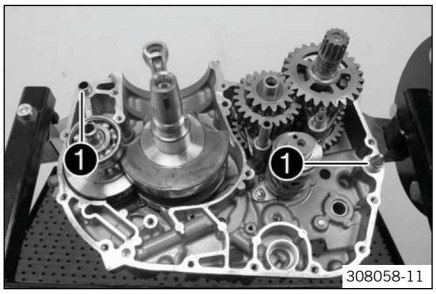
– Slide shift drum ❶ into the bearing seat.
– Hang shift forks ❷ into the shift drum.

17.5.6 Installing the shift rails

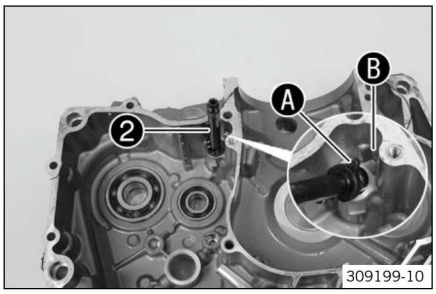


- Oil all parts carefully before assembling.
- Mount shift rail ❶ together with upper spring and the lower spring.
- Mount shift rail ❷.

17.5.7 Installing the left engine case



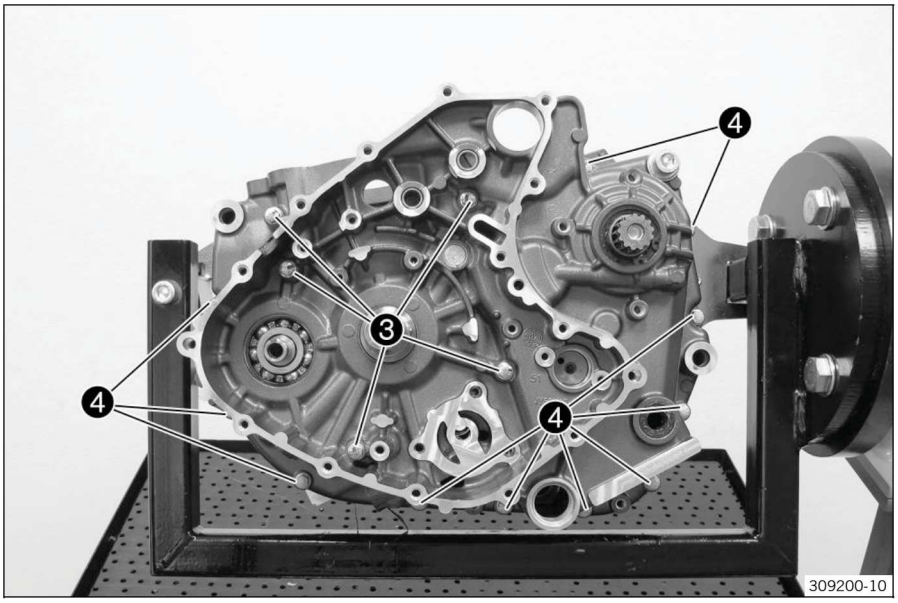
- Clean the sealing areas.
- Mount dowels ❶.



- 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 section of the engine case. If necessary, tap lightly with a rubber mallet while turning the transmission shafts.

Info
Do not use the screws to pull the two sections of the engine case together.

– Mount screws ❸ but do not tighten yet.

Guideline

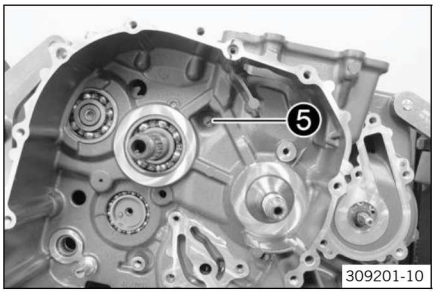
Screw, engine case	M6x75	12 Nm (8.9 lbf ft) **Loctite®243™**

– Mount screws ❹ and tighten all screws in a crisscross pattern.

Guideline

Screw, engine case	M6x35	12 Nm (8.9 lbf ft)
Screw, engine case	M6x75	12 Nm (8.9 lbf ft) **Loctite®243™**

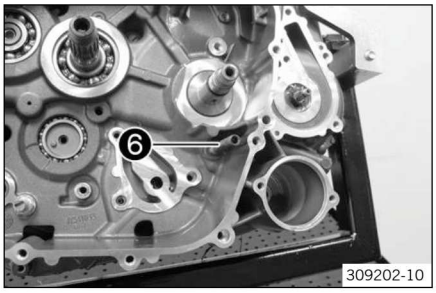
– Mount the screw cap of the engine fixing arm.



– Mount and tighten screw ❺.

Guideline

Screw, engine case	M6x35	12 Nm (8.9 lbf ft)

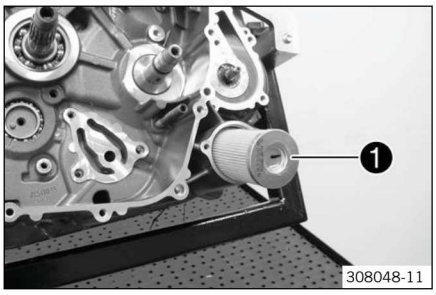


– Position crankshaft to TDC and lock with special tool ❻.

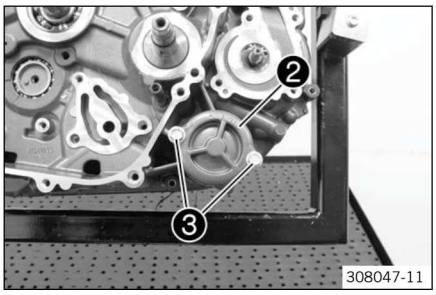
Locking screw (61229015000) (📖 p. 264)

◀

17.5.8 Installing the oil filter



– Tilt the motorcycle to one side and fill the oil filter housing to about ⅓ full with engine oil.
– Fill oil filter ❶ with engine oil and place it in the oil filter housing.



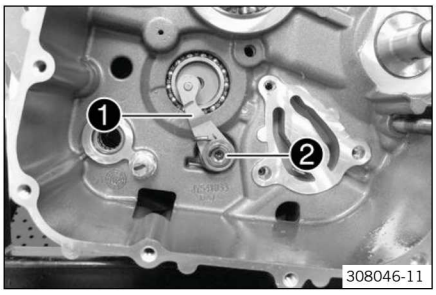
– Lubricate the O-ring of the oil filter cover.
– Mount the oil filter cover ❷.
– Mount and tighten screws ❸.

Guideline

Screw, oil filter cover	M5	8 Nm (5.9 lbf ft)
Screw, oil filter cover	M6	12 Nm (8.9 lbf ft)

◀

17.5.9 Installing the locking lever



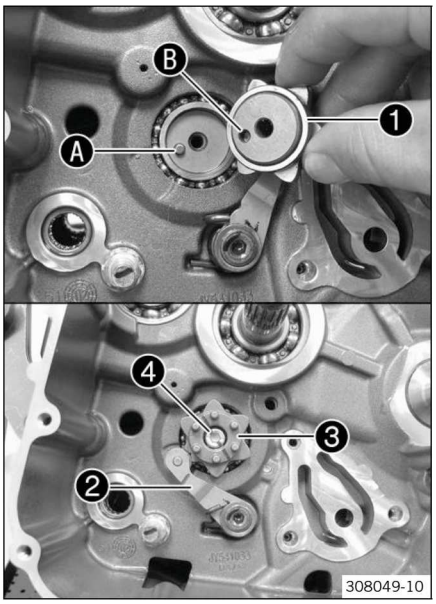
– Mount locking lever ❶ with the sleeve, washers and spring.
– Mount and tighten screw ❷ with the washer.

Guideline

Screw, locking lever	M6	12 Nm (8.9 lbf ft) **Loctite®243™**

◀

17.5.10 Installing the shift drum locating

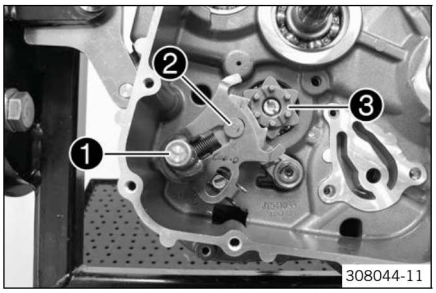


- Mount spacer ring ❶ on the shift drum locating unit.
- Press locking lever ❷ away from the shift drum locating and position the shift drum locating ❸.
  ✓ Pins Ⓐ engage in hole Ⓑ.
- Release the locking lever.
- Mount and tighten screw ❹.

  Guideline

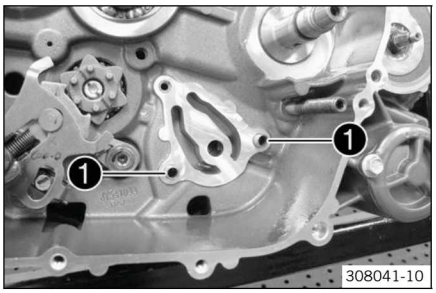
Screw, shift drum locating	M6	12 Nm (8.9 lbf ft) **Loctite®243™**

17.5.11 Installing the shift shaft

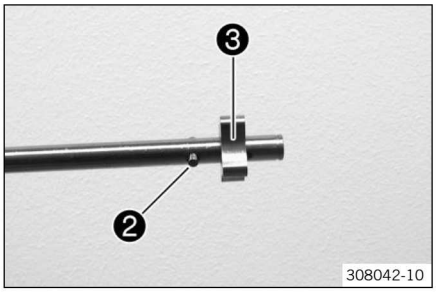


- Slide shift shaft ❶ with the washer into the bearing seat.
- Push sliding plate ❷ away from the shift drum locating ❸. Insert the shift shaft all the way.
- Let the sliding plate engage in the shift drum locating.
- Shift through the transmission.

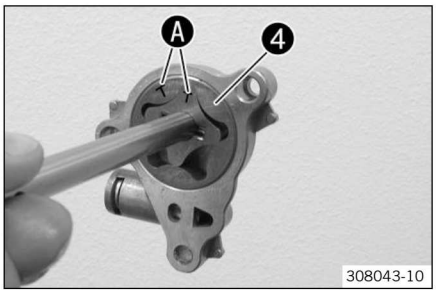
17.5.12 Installing the oil pump



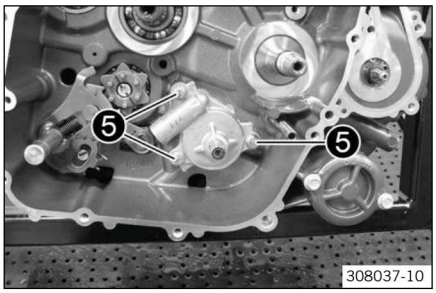
- Mount dowels ❶.



– Position pin ❷ and internal rotor ❸ on the oil pump shaft.



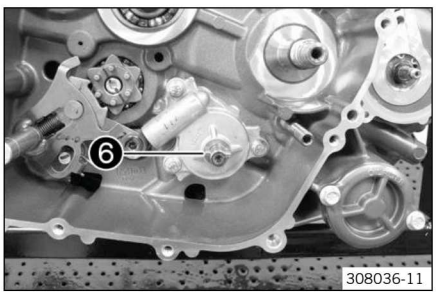
– Position the oil pump shaft with the internal rotor in the pressure pump housing.
– Position external rotor ❹ in the pressure pump housing.
  ✔ Markings Ⓐ are visible after assembly.



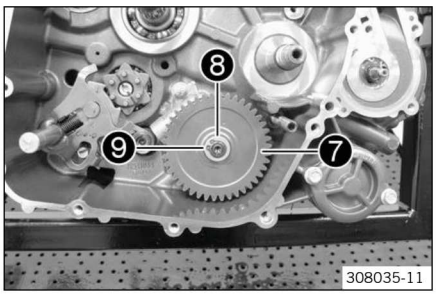
– Check that the oil holes are clear and fill with a small amount of oil.
– Position the oil pump.
– Mount and tighten screws ❺.

Guideline

Screw, oil pump	M6	12 Nm (8.9 lbf ft) **Loctite®243™**



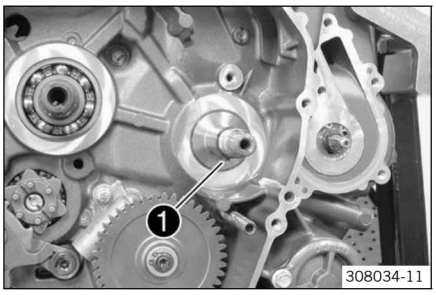
– Position the washer.
– Position pin ❻.



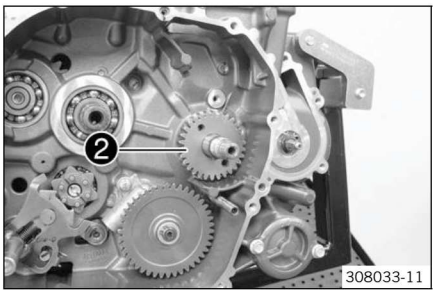
– Position the oil pump gear ❼.
– Position washer ❽.
– Mount lock ring ❾.
– Crank the oil pump gear and check for stiffness.

◀

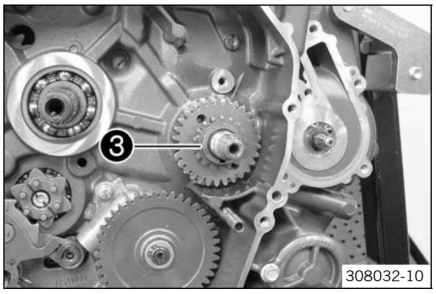
17.5.13 Installing the primary gear



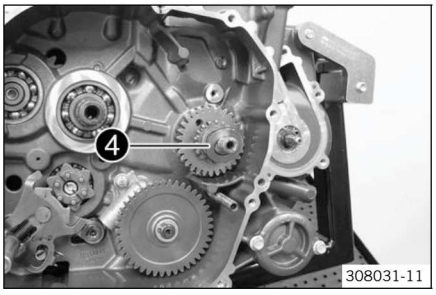
– Mount woodruff key ❶.



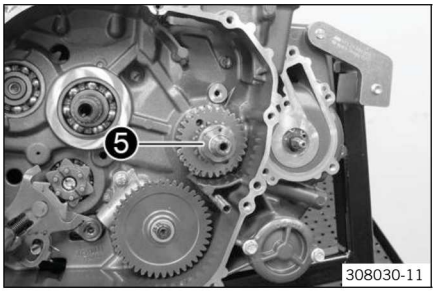
– Mount primary gear ❷.



– Mount timing chain sprocket ❸.



– Mount washer ❹.

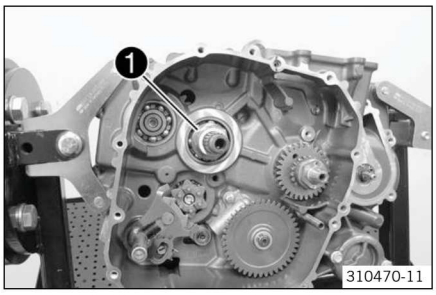


– Mount and tighten nut ❺ with the washer.

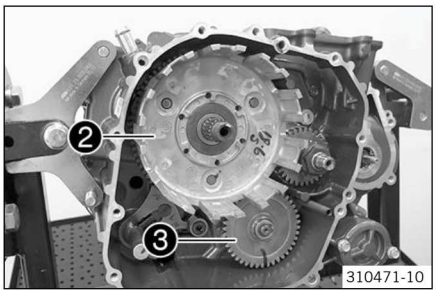
Guideline

Nut, primary gear/timing chain sprocket	M16x1.5	120 Nm (88.5 lbf ft) **Loctite®243™**

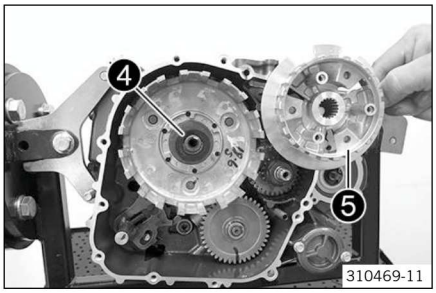
17.5.14 Installing the clutch basket



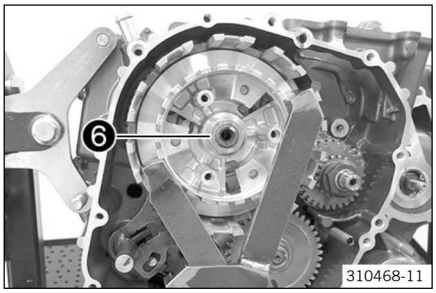
– Mount collar sleeve ❶.



– 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.

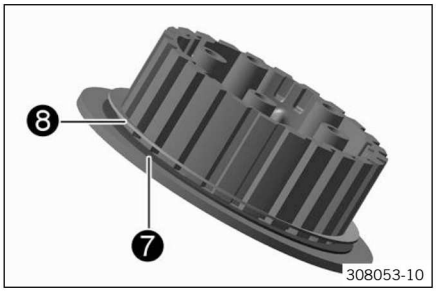


– Mount nut ❻ with the washers. Tighten the nut, holding the inner clutch hub with a special tool.

Guideline

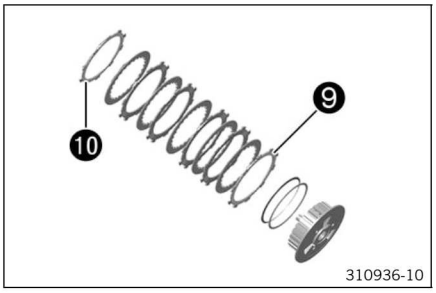
Nut, inner clutch hub	M16LHx1.5	120 Nm (88.5 lbf ft) **Loctite®243™**

Holding wrench (51129003000) (p. 262)

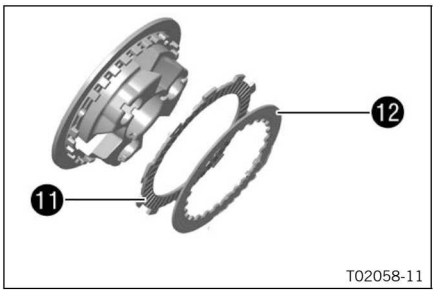


– Mount support ring ❼ and pretension ring ❽.

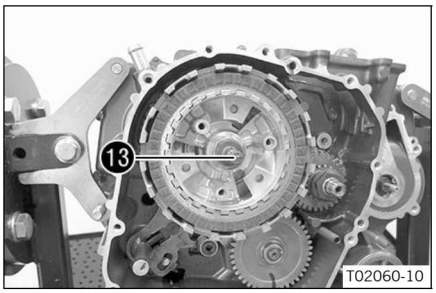
✓ The pretension ring rests against the support ring on the inside and the outside faces away from the support ring.



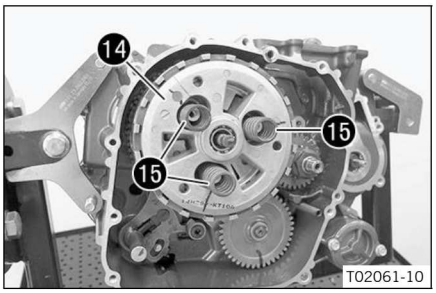
– Thoroughly oil the clutch facing discs.
– Mount the clutch facing disk ❾ with the largest inside diameter.
– Alternately mount all of the other intermediate clutch discs and clutch facing discs.
– Mount the clutch facing disk ❿ with the largest inside diameter.



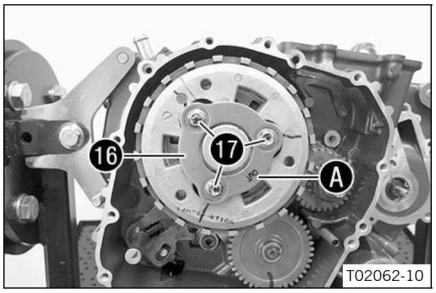
– Mount the clutch facing disk ⓫ with the largest inside diameter on the pressure cap.
– Mount the intermediate clutch disk ⓬ with the largest inside diameter on the pressure cap.



– Mount pull rod ⓭.



– Position pressure cap ⓮ with clutch disks.
  ✓ The uppermost clutch facing disc is offset by one tooth.
– Position springs ⓯.

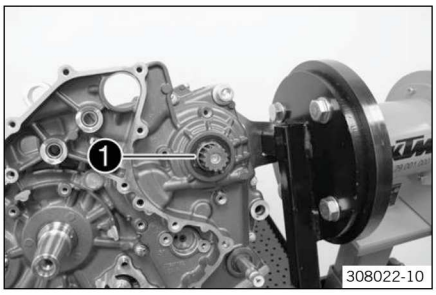


– Position pressure cap ⓰.
  ✓ The marking Ⓐ points outward.
– Mount and tighten screws ⓱.
  Guideline

Screw, clutch spring	M6	10 Nm (7.4 lbf ft)

◀

17.5.15 Installing the spacer

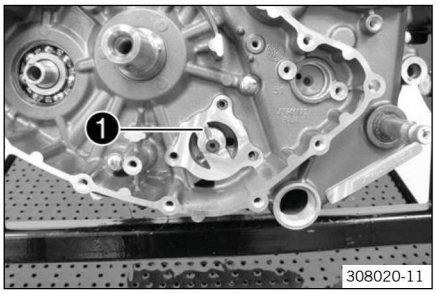


– Grease the shaft seal ring of the countershaft before mounting.

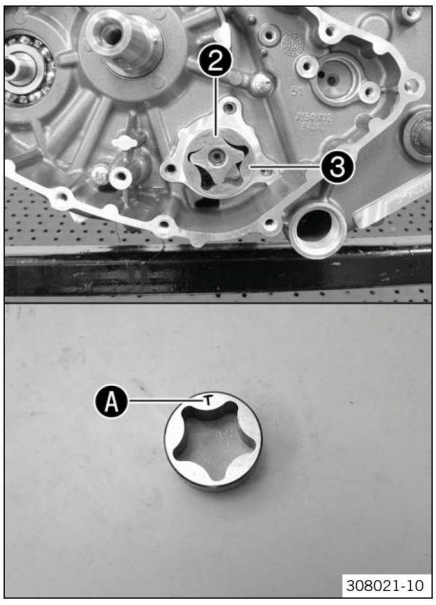
Long-life grease (p. 258)

– Mount spacer ❶.

17.5.16 Installing the suction pump

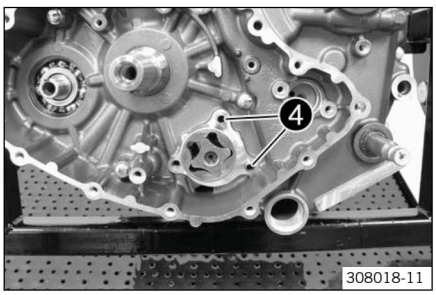


– Position pin ❶.

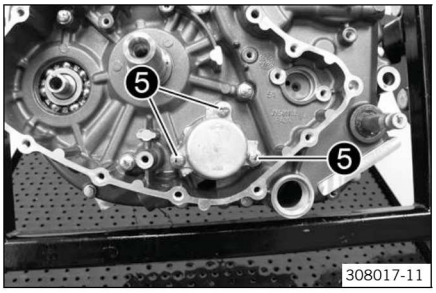


– Mount internal rotor ❷ and external rotor ❸.

✓ Marking Ⓐ of the external rotor is not visible after assembly.



– Mount dowels ❹.

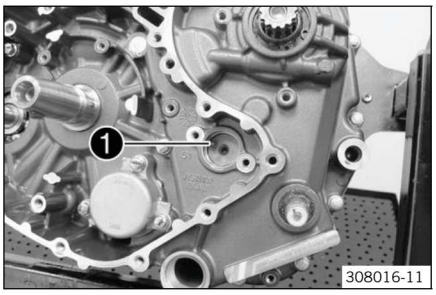


– Oil the oil pump.
– Position the oil pump housing.
– Mount and tighten screws ❺.

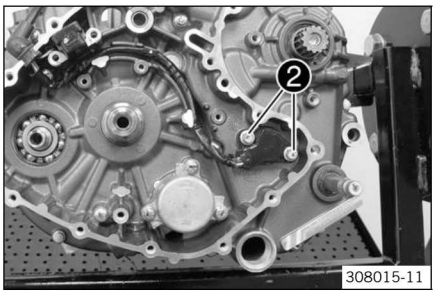
Guideline

Screw, oil pump	M6	12 Nm (8.9 lbf ft) **Loctite®243™**

17.5.17 gear position sensor, installing



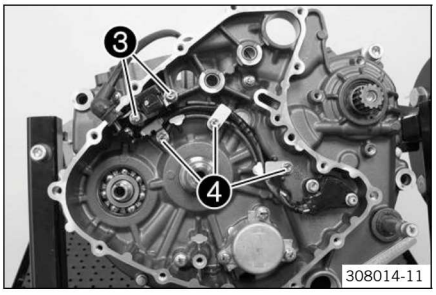
– Mount the contact spring and contact pin ❶.
✓ The rounded sides of the contact pins face the sensor.



– 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 crankshaft position sensor.
– Mount and tighten screws ❸.

Guideline

Screw, ignition pulse generator	M5	6 Nm (4.4 lbf ft) **Loctite®243™**

– Position the retaining bracket.

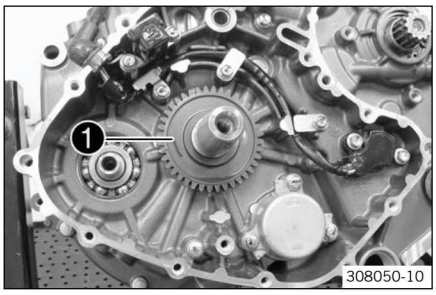
Info
Ensure that the cable is correctly routed.

– Mount and tighten screws ❹.

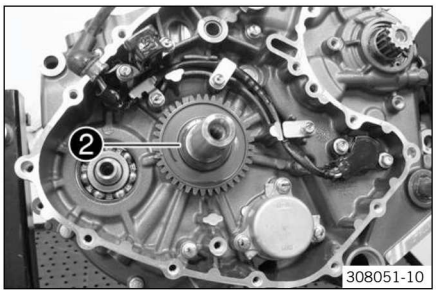
Guideline

Screw, retaining bracket	M5	6 Nm (4.4 lbf ft) **Loctite®243™**
Screw, retaining bracket	M6	12 Nm (8.9 lbf ft) **Loctite®243™**

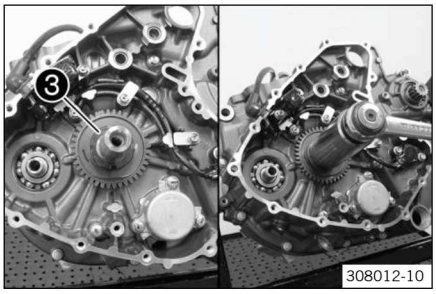
17.5.18 Installing the balancer shaft drive wheel



– Mount the woodruff key.
– Mount drive wheel ❶ of the balancer shaft.



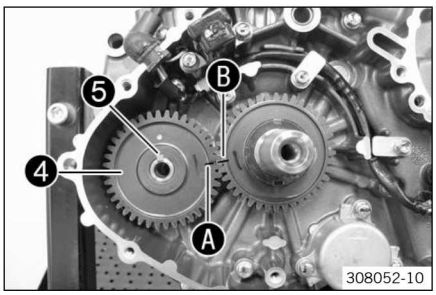
– Mount washer ❷.
✓ The outer side of the washer is in contact with the drive wheel and the inside faces away from the drive wheel.



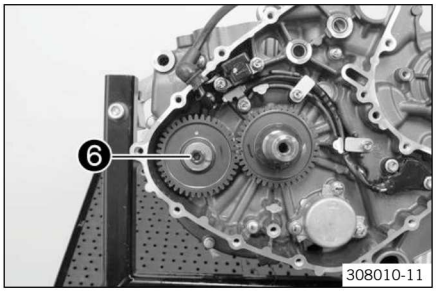
– Mount and tighten nut ❸ with the washer.
Guideline

Nut, drive wheel for balancer shaft	M28	60 Nm (44.3 lbf ft)

Groove nut wrench (90129022000) (📖 p. 268)



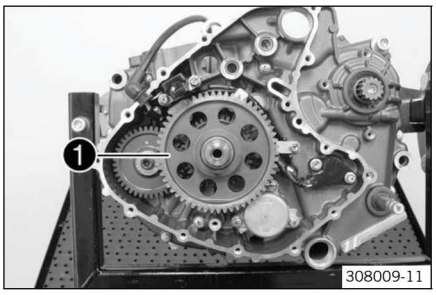
– Position balancer shaft gear ❹.
✓ Markings Ⓐ and Ⓑ align.
– Mount wedge ❺.



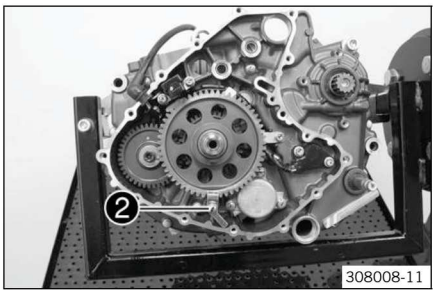
– Mount and tighten screw ❻.
Guideline

Screw, balancer shaft gear	M8	25 Nm (18.4 lbf ft) **Loctite®243™**

17.5.19 Installing the starter drive



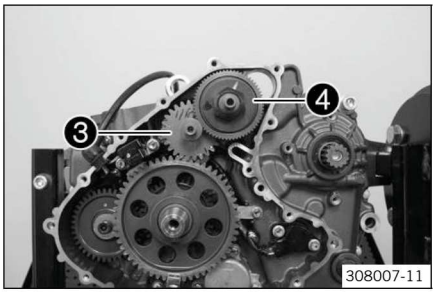
– Position freewheel gear ❶.



– Position the retaining bracket.
– Mount and tighten screw ❷.

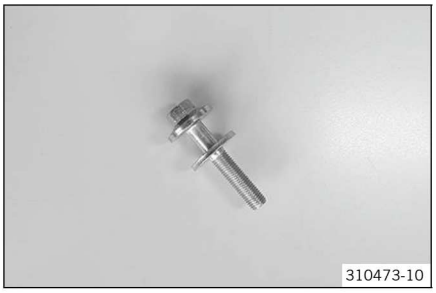
Guideline

Screw, freewheel gear retaining bracket	M6	12 Nm (8.9 lbf ft) **Loctite®243™**



– Mount starter idler gear ❸.
– Mount torque limiter ❹.

17.5.20 Installing the rotor

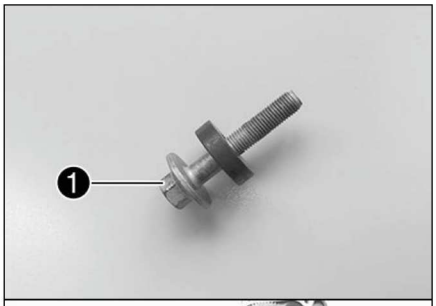


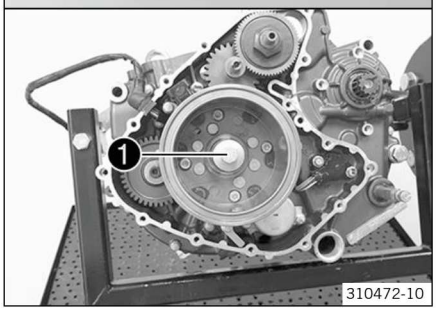
Rotor screw with thin washer

– Remove screw and washer.

Guideline

Screw	J021100003
Washer	J025100509S





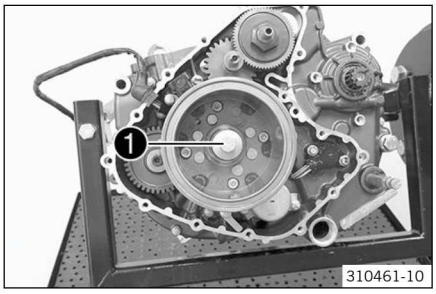
– Mount the woodruff key.
– Mount the rotor.

Info
Turn the freewheel gear counterclockwise to simplify assembly.

– Mount and tighten screw 1 with washer.

Guideline

Screw with washer		90239005050
Rotor screw	M10	110 Nm (81.1 lbf ft) **Loctite®243™**



Rotor screw (strength class 12.9) with thick washer

– Mount the woodruff key.
– Mount the rotor.

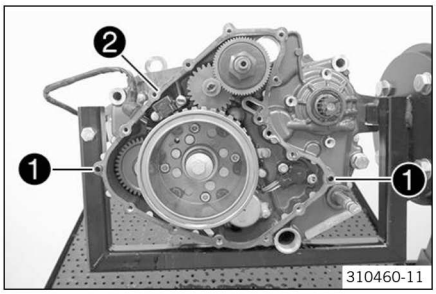
Info
Turn the freewheel gear counterclockwise to simplify assembly.

– Mount and tighten screw 1 with washer.

Guideline

Rotor screw	M10	110 Nm (81.1 lbf ft) **Loctite®243™**

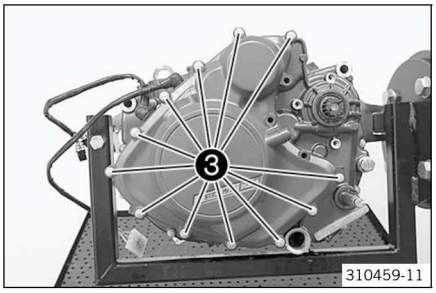
17.5.21 alternator cover, installing



– Mount dowels 1.
– Seal the cable guide.

Loctite® 5910

– Position alternator cover gasket 2.



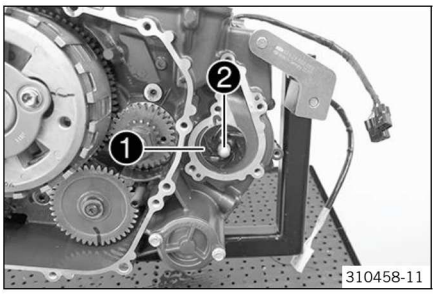
– Blow out the oil channel with compressed air and check that it is clear.
– Position the alternator cover.
– Mount screws ❸ and tighten in a crisscross pattern.

Guideline

Screw, alternator cover	M6	12 Nm (8.9 lbf ft)

◀

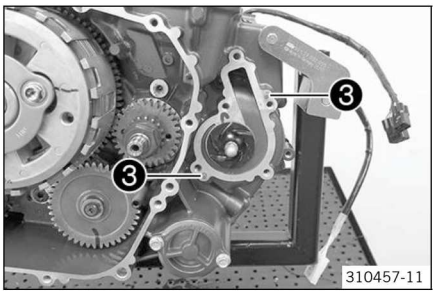
17.5.22 Installing the water pump cover



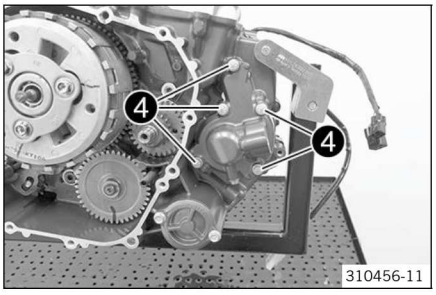
– Mount water pump impeller ❶.
– Mount and tighten nut ❷ with the washer.

Guideline

Nut, water pump impeller	M6	10 Nm (7.4 lbf ft) **Loctite®243™**



– Mount locating pins ❸.



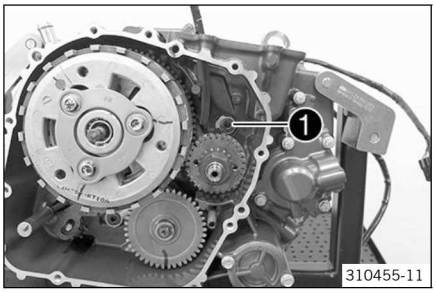
– Mount the water pump cover with the seal ring.
– Mount screws ❹ and tighten them in a crisscross pattern.

Guideline

Screw, water pump cover	M6	12 Nm (8.9 lbf ft)

◀

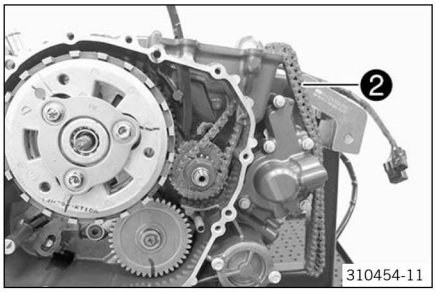
17.5.23 Installing the timing chain



– Feed in the timing chain tensioning rail from above.
– Mount and tighten screw ❶.

Guideline

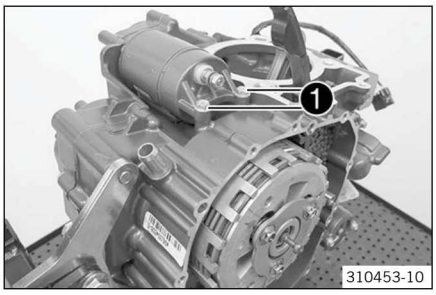
Screw, timing chain tensioning rail	M6	12 Nm (8.9 lbf ft) **Loctite®243™**



– Position timing chain ❷ in the engine case according to the direction of travel.

◀

17.5.24 Installing the starter motor



– Grease the O-ring. Position the starter motor.

Long-life grease (📖 p. 258)

– Mount and tighten screws ❶.

Guideline

Screw, starter motor	M6	12 Nm (8.9 lbf ft)

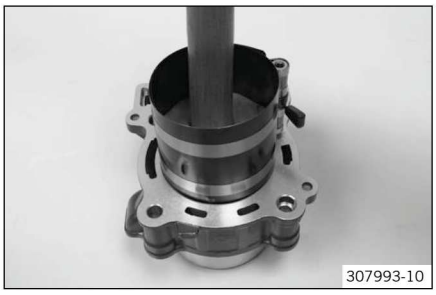
◀

17.5.25 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.

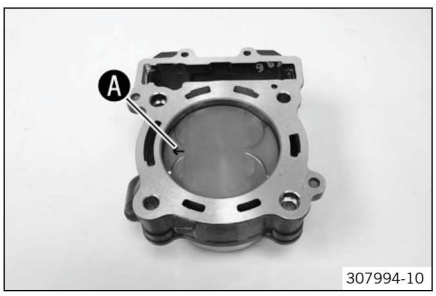
Piston ring mounting tool (60029015000) (📖 p. 263)

✔ The piston ring are squeezed together fully.

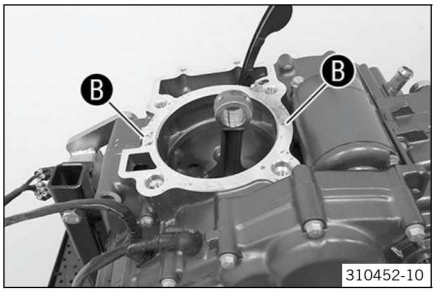


– Position the piston with the special tool on the cylinder.
– Carefully slide the piston into the cylinder from the top.

Info
The piston rings should not become caught; otherwise, they may be damaged.



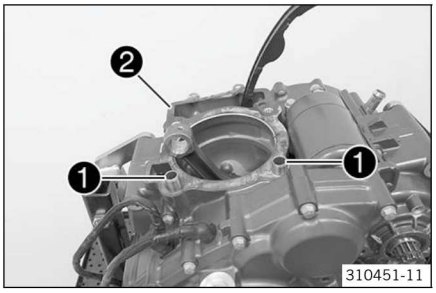
– Ensure that piston marking Ⓐ faces the outfeed side.



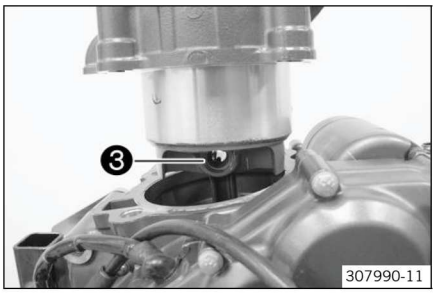
– Thinly apply sealing compound to area Ⓑ.

Loctite® 5910

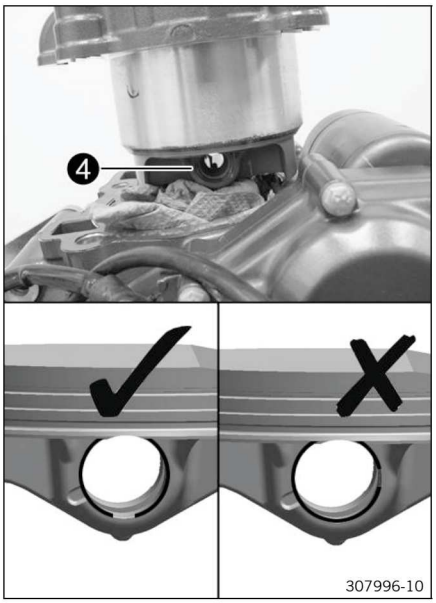
– Position the cylinder base gasket.



– Mount dowels ❶ and position the cylinder base gasket ❷.



– Feed the timing chain through the chain shaft. Mount piston pin ❸.



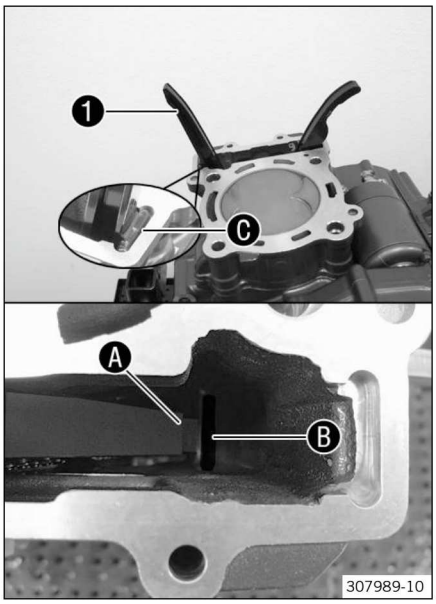
– Cover the engine case opening with a cloth.
– Position piston ring lock ❹.
  ✔ 6-o'clock position.
– Insert the special tool and firmly press it toward the piston.

Insertion for piston ring lock (77329030100) (📖 p. 267)

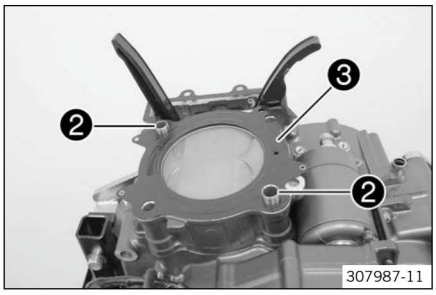
– Turn the special tool clockwise, thereby pressing the piston pin retainer into the groove.
– Make sure that the piston pin retainer is seated correctly on both sides.
– Remove the cloth.
– Keep the timing chain tensioned. Push the cylinder down carefully and let the dowels engage.

◆

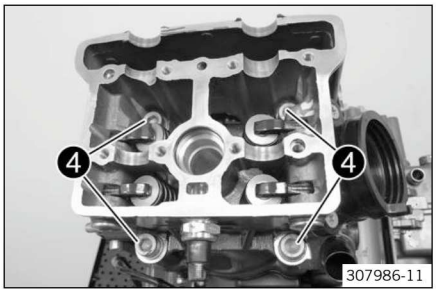
17.5.26 Installing the cylinder head



– Position timing chain guide rail ❶.
  ✔ Pins Ⓐ engage in recess Ⓑ.
  ✔ The timing chain guide rail engages in recess Ⓒ.



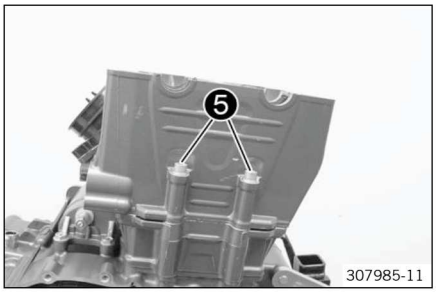
– Mount dowels ❷.
– Put on cylinder head gasket ❸.
– Mount the cylinder head.



– 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



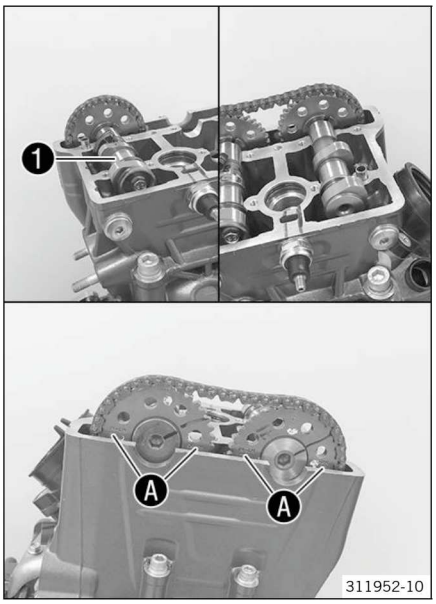
– Mount and tighten screws ❺.

Guideline

Cylinder head screw	M6	12 Nm (8.9 lbf ft)

◀

17.5.27 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.

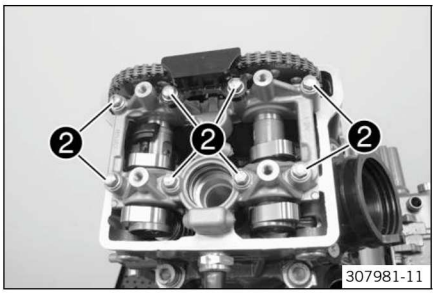
Info
The exhaust camshaft is labeled with **EX**.

- Slip in the intake camshaft.

Info
The intake camshaft is labeled with **IN**.

- Place the timing chain over the camshaft gear of the intake camshaft.

✔ Markings Ⓐ of the camshafts align with the edge of the cylinder head.



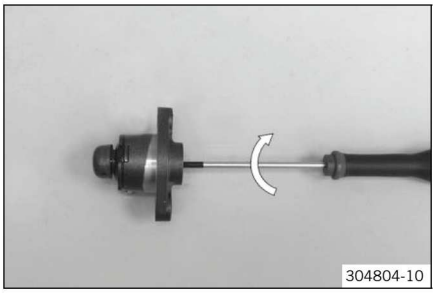
- Clean all oil nozzles thoroughly and blow out with compressed air.
- Mount the dowels.
- Position the camshaft bearing bridge.
- Mount screws ❷ and tighten them from the inside to the outside.

Guideline

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

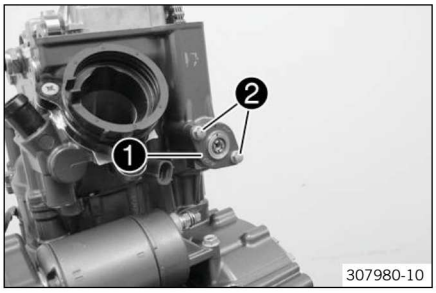
◀

17.5.28 Installing the timing chain tensioner



- Turn the timing chain tensioner screw clockwise.

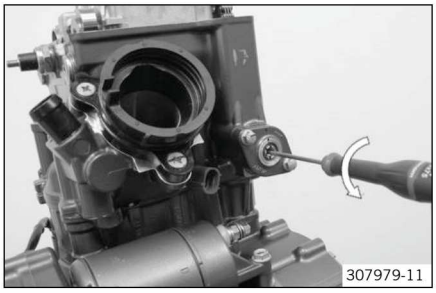
✔ The timing chain tensioner is locked.



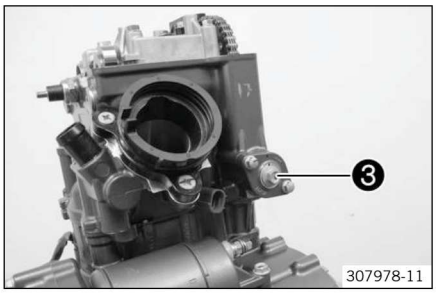
– Holding it with the correct orientation, mount the timing chain tensioner ❶ with the gasket.
– Mount and tighten screws ❷.

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	6 Nm (4.4 lbf ft)

◀

17.5.29 Checking the valve clearance

– Remove the special tool.

Locking screw (61229015000) (📖 p. 264)

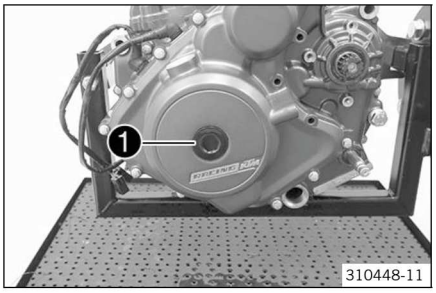
– Crank the engine several times.
– Set the engine to ignition top dead center. (📖 p. 125)
– Check the valve clearance at all valves between the camshaft and cam lever.

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. 262)

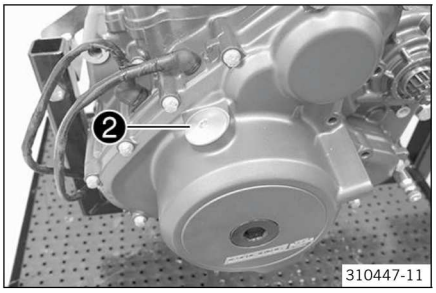
» If the valve clearance does not meet specifications:
  – Adjust the valve clearance. (📖 p. 185)



– Mount and tighten screw plug ❶.

Guideline

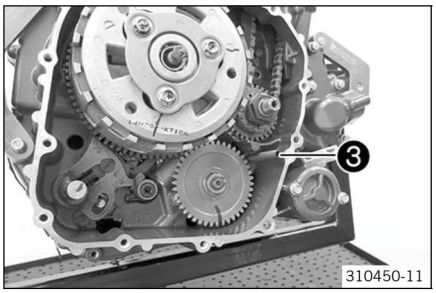
Screw plug, alternator cover	M18x1.5	10 Nm (7.4 lbf ft)



– Mount and tighten screw plug ❷.

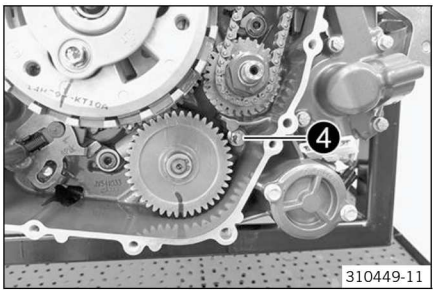
Guideline

Screw plug, alternator cover	M24x1.5	10 Nm (7.4 lbf ft)



– Remove special tool ❸.

Locking screw (61229015000) (📖 p. 264)



– Mount and tighten screws ❹.

Guideline

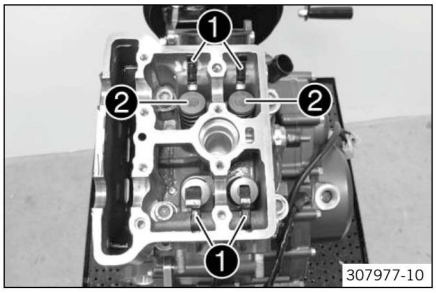
Screw plug	M8	12 Nm (8.9 lbf ft) **Loctite®243™**

◀

17.5.30 Adjusting the valve clearance

Preparatory work

– Remove the timing chain tensioner. (📖 p. 126)
– Remove the camshaft. (📖 p. 126)



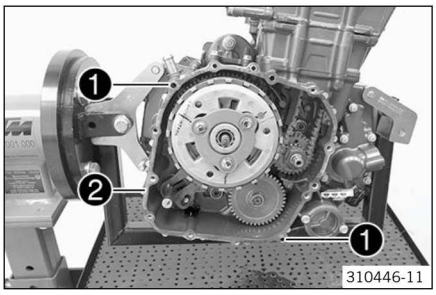
Main work

– Swing up cam lever ❶.
– Correct the shims ❷ as indicated by the results of the valve clearance check.

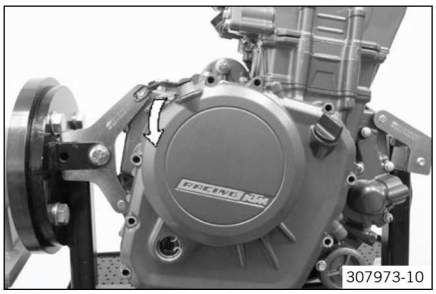
Finishing work

– Install the camshafts. (📖 p. 183)
– Install the timing chain tensioner. (📖 p. 183)
– Check the valve clearance. (📖 p. 184)

17.5.31 Installing the clutch cover

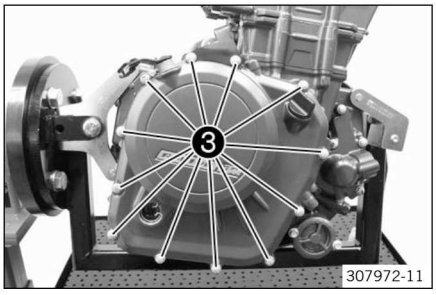


– Mount dowel ❶ and clutch cover gasket ❷.



– Position the clutch cover.

> **Info**
> Pivot the clutch lever.

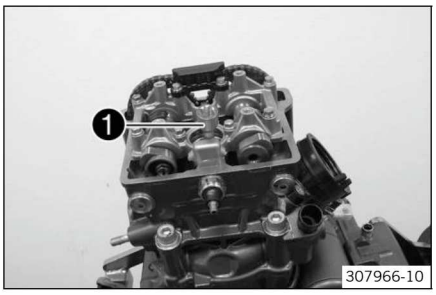


– Mount and tighten screws ❸.

Guideline

Screw, clutch cover	M6	12 Nm (8.9 lbf ft)

17.5.32 Installing the spark plug



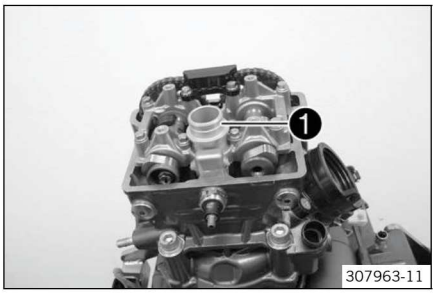
– Mount and tighten the spark plug using special tool ❶.

Guideline

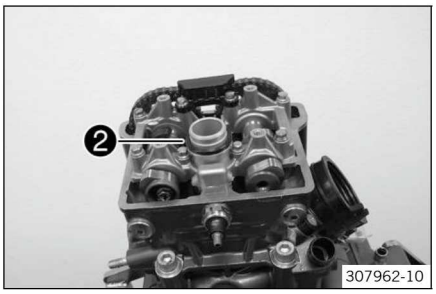
Spark plug	M12	15 Nm (11.1 lbf ft)

Spark plug wrench with link (77229172000) (📖 p. 266)

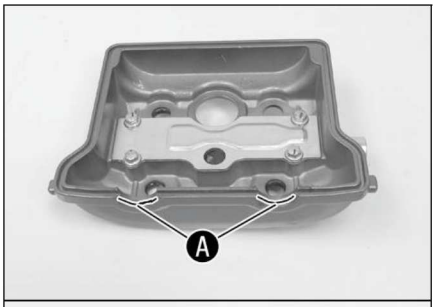
17.5.33 Installing the valve cover

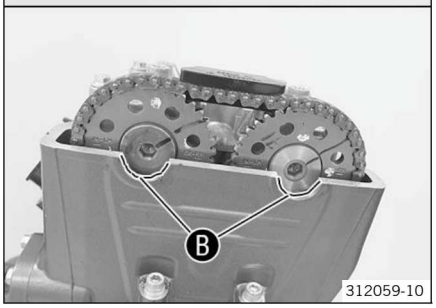


– Grease the O-rings and mount spark plug shaft insert ❶.



– Mount gasket ❷.

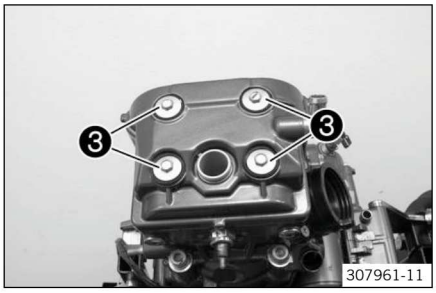




– Degrease the sealing areas and thinly coat with sealant in areas Ⓐ and Ⓑ.

Loctite® 5910

– Position the gasket in the valve cover.

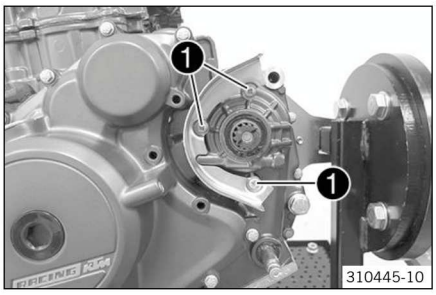


– Position the valve cover with the gasket.
– Mount and tighten screws ❸ with the gaskets.
Guideline

Screw, valve cover	M6	12 Nm (8.9 lbf ft)

◀

17.5.34 Installing the chain securing guide

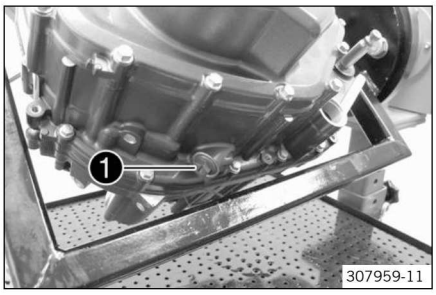


– Position the chain securing guide.
– Mount and tighten screws ❶.
Guideline

Screw, chain securing guide	M6	11 Nm (8.1 lbf ft) **Loctite®243™**

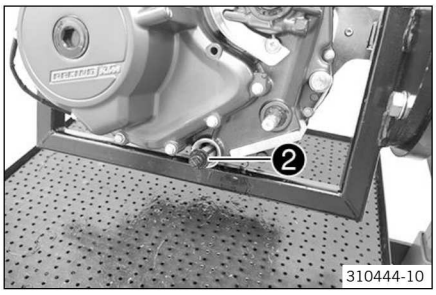
◀

17.5.35 Installing the oil screen

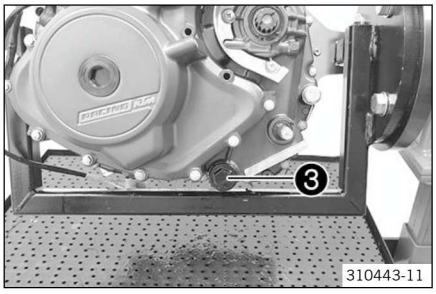


– Mount and tighten screw plug ❶ with the O-ring and oil screen.
Guideline

Oil screen screw plug, small	M17x1.5	12 Nm (8.9 lbf ft)



– Mount oil screen ❷ with the O-ring.

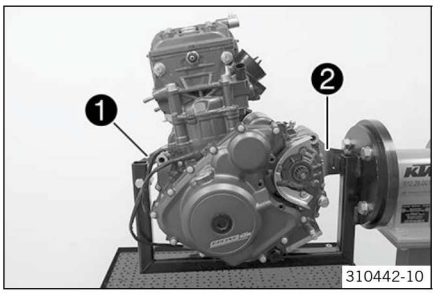


– Mount and tighten oil drain plug ❸ with the O-ring.
Guideline

Oil drain plug	M24x1.5	15 Nm (11.1 lbf ft)

◀

17.5.36 engine, removing from the engine assembly stand



– Remove the fitting from special tools ❶ and ❷.

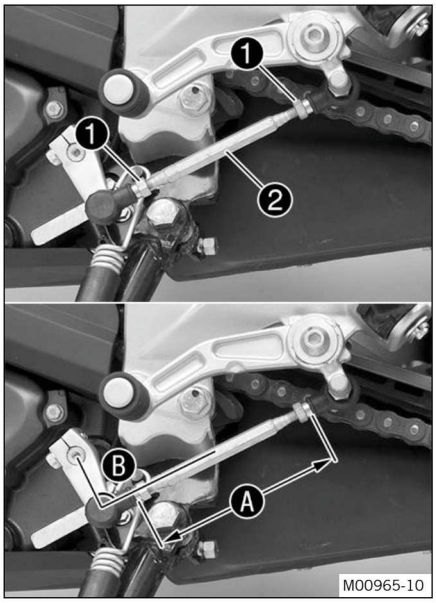
Holder and fitting for work stand (90129002000)
(📖 p. 267)

– Remove the motor from the motor assembly stand.

Info
Work with an assistant or a motorized hoist.

18.1 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	90°

– 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.

19.1 Draining the coolant

Warning

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

- Do not open the radiator, the radiator hoses or other cooling system components if the engine or the cooling system are at operating temperature.
- Allow the cooling system and the engine to cool down before you open the radiator, the radiator hoses or other components of the cooling system.
- In the event of scalding, rinse the area affected immediately with lukewarm water.

Warning

Danger of poisoning Coolant is toxic and a health hazard.

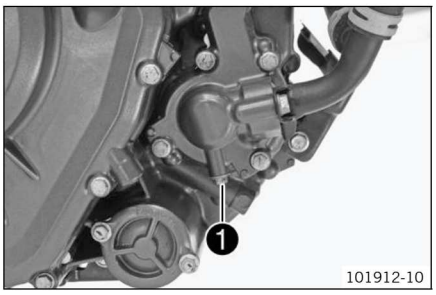
- Keep coolant out of the reach of children.
- Do not allow coolant to come into contact with the skin, the eyes and clothing.
- Consult a doctor immediately if coolant is swallowed.
- Rinse the affected area immediately with plenty of water in the event of contact with the skin.
- Rinse eyes thoroughly with water and consult a doctor immediately if coolant gets into the eyes.
- Change clothing if coolant spills onto your clothing.

Condition

The engine is cold.

Preparatory work

- Remove the front spoiler. (p. 61)



Main work

- Position the motorcycle upright.
- Place a suitable container under the engine.
- Remove screw 1.
- Remove the radiator cap.
- Completely drain the coolant.
- Mount and tighten screw 1 with a new seal ring.

  Guideline

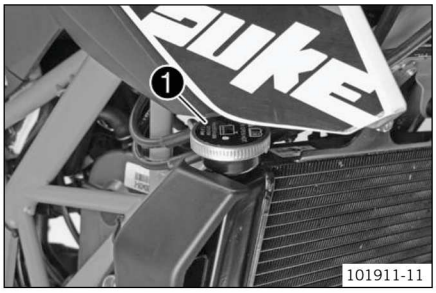
Plug, water pump drain hole	M6	8 Nm (5.9 lbf ft)

19.2 Filling/bleeding the cooling system

Warning

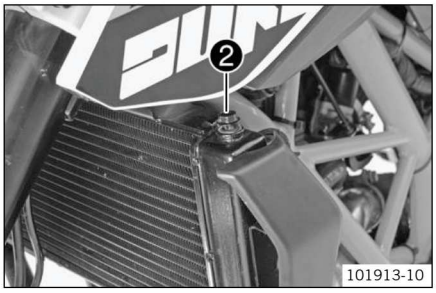
Danger of poisoning Coolant is toxic and a health hazard.

- Keep coolant out of the reach of children.
- Do not allow coolant to come into contact with the skin, the eyes and clothing.
- Consult a doctor immediately if coolant is swallowed.
- Rinse the affected area immediately with plenty of water in the event of contact with the skin.
- Rinse eyes thoroughly with water and consult a doctor immediately if coolant gets into the eyes.
- Change clothing if coolant spills onto your clothing.



Main work

– Remove radiator cap ❶.



– Loosen bleeder screw ❷.

  Guideline

3 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.

Coolant (📖 p. 256)

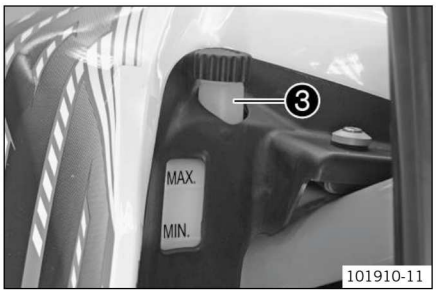
– Completely fill the radiator with coolant. Mount the radiator cap.
– Rest the vehicle on the side stand.

Danger

Danger of poisoning Exhaust gases are toxic and inhaling them may result in unconsciousness and death.

– Always make sure there is sufficient ventilation when running the engine.
– Use an effective exhaust extraction system when starting or running the engine in an enclosed space.

– Start the engine and let it warm up.



– 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 compensating tank ❸ and top up the coolant level up to the **MAX** marking.
– Mount the cap of the compensating tank.

Finishing work

– Fit the front spoiler. (📖 p. 62)

19.3 Checking the antifreeze and coolant level

Warning

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

- Do not open the radiator, the radiator hoses or other cooling system components if the engine or the cooling system are at operating temperature.
- Allow the cooling system and the engine to cool down before you open the radiator, the radiator hoses or other components of the cooling system.
- In the event of scalding, rinse the area affected immediately with lukewarm water.

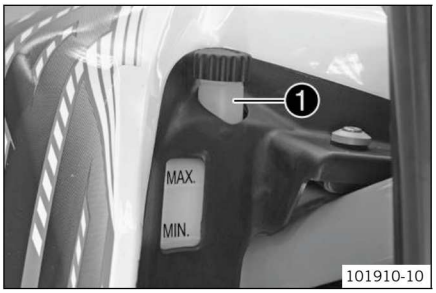
Warning

Danger of poisoning Coolant is toxic and a health hazard.

- Keep coolant out of the reach of children.
- Do not allow coolant to come into contact with the skin, the eyes and clothing.
- Consult a doctor immediately if coolant is swallowed.
- Rinse the affected area immediately with plenty of water in the event of contact with the skin.
- Rinse eyes thoroughly with water and consult a doctor immediately if coolant gets into the eyes.
- Change clothing if coolant spills onto your clothing.

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 antifreeze in the coolant does not match the specified value:
  - Correct the coolant antifreeze.

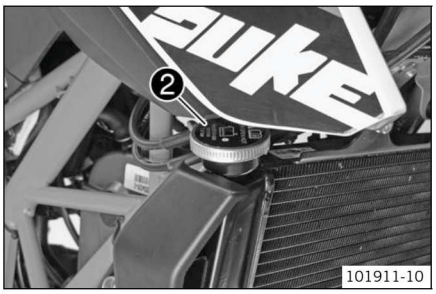
- Check the coolant level in the compensating tank.

The coolant level must be between **MIN** and **MAX**.

» If the coolant level does not match the specified value:
  - Correct the coolant level.

Coolant (📖 p. 256)

- Mount the cap of the compensating tank.



- Remove radiator cap ❷.
- Check the coolant antifreeze.

−25 ... −45 °C (−13 ... −49 °F)

» If the antifreeze in the coolant does not match the specified value:
  - Correct the coolant antifreeze.

- Check the coolant level in the radiator.

The radiator must be completely filled.

» If the coolant level does not match the specified value:
  - Correct the coolant level and find out the cause of the loss.

Coolant (📖 p. 256)

» If you had to add more coolant than the specified amount: > 0.20 l (> 0.21 qt.)
  – Fill/bleed the cooling system. (📖 p. 191)

– Mount the radiator cap.

19.4 Checking the coolant level

Warning

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

– Do not open the radiator, the radiator hoses or other cooling system components if the engine or the cooling system are at operating temperature.
– Allow the cooling system and the engine to cool down before you open the radiator, the radiator hoses or other components of the cooling system.
– In the event of scalding, rinse the area affected immediately with lukewarm water.

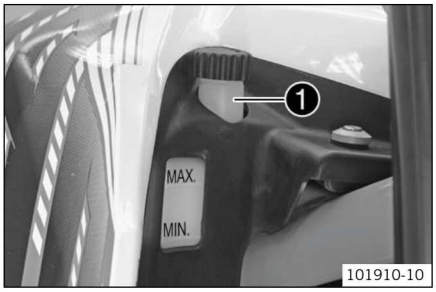
Warning

Danger of poisoning Coolant is toxic and a health hazard.

– Keep coolant out of the reach of children.
– Do not allow coolant to come into contact with the skin, the eyes and clothing.
– Consult a doctor immediately if coolant is swallowed.
– Rinse the affected area immediately with plenty of water in the event of contact with the skin.
– Rinse eyes thoroughly with water and consult a doctor immediately if coolant gets into the eyes.
– Change clothing if coolant spills onto your clothing.

Condition

The motor is cold.

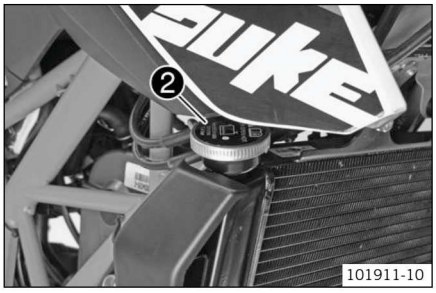


– Stand the motorcycle upright on a horizontal surface.
– Check the coolant level in the compensating tank ❶.

The coolant level must be between **MIN** and **MAX**.

» If the coolant level does not match the specified value:
  – Correct the coolant level.

Coolant (📖 p. 256)



– Remove radiator cap ❷ and check the coolant level in the radiator.

The radiator must be filled completely.

» If the coolant level does not match the specified value:
  – Check the coolant level and the reason for the loss.

Coolant (📖 p. 256)

» If you had to add more coolant than the specified amount: > 0.20 l (> 0.21 qt.)
  – Fill/bleed the cooling system. (📖 p. 191)

– Mount the radiator cap.

19.5 Changing the coolant

Warning

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

- Do not open the radiator, the radiator hoses or other cooling system components if the engine or the cooling system are at operating temperature.
- Allow the cooling system and the engine to cool down before you open the radiator, the radiator hoses or other components of the cooling system.
- In the event of scalding, rinse the area affected immediately with lukewarm water.

Warning

Danger of poisoning Coolant is toxic and a health hazard.

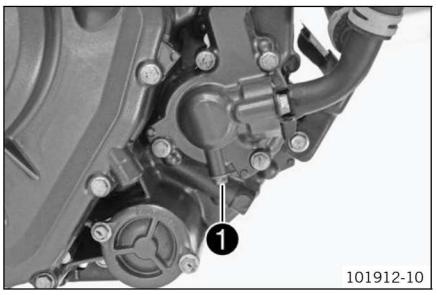
- Keep coolant out of the reach of children.
- Do not allow coolant to come into contact with the skin, the eyes and clothing.
- Consult a doctor immediately if coolant is swallowed.
- Rinse the affected area immediately with plenty of water in the event of contact with the skin.
- Rinse eyes thoroughly with water and consult a doctor immediately if coolant gets into the eyes.
- Change clothing if coolant spills onto your clothing.

Condition

The engine is cold.

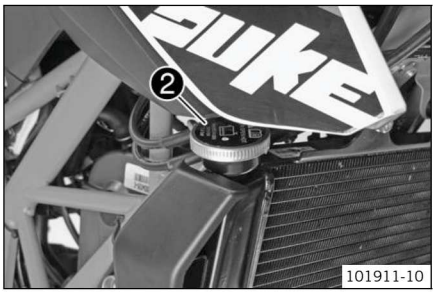
Preparatory work

- Remove the front spoiler. (p. 61)



Main work

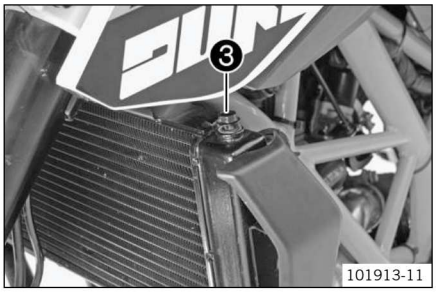
- Position the motorcycle upright.
- Place a suitable container under the engine.
- Remove screw 1.



- Remove radiator cap 2.
- Completely drain the coolant.
- Mount and tighten screw 1 with a new seal ring.

  Guideline

Plug, water pump drain hole	M6	8 Nm (5.9 lbf ft)



– Loosen bleeder screw ❸.

Guideline

3 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.

Coolant (📖 p. 256)

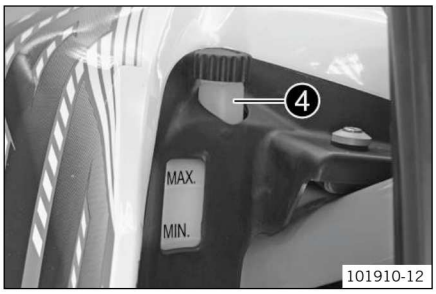
– Completely fill the radiator with coolant. Mount the radiator cap.
– Rest the vehicle on the side stand.

Danger

Danger of poisoning Exhaust gases are toxic and inhaling them may result in unconsciousness and death.

– Always make sure there is sufficient ventilation when running the engine.
– Use an effective exhaust extraction system when starting or running the engine in an enclosed space.

– Start the engine and let it warm up.

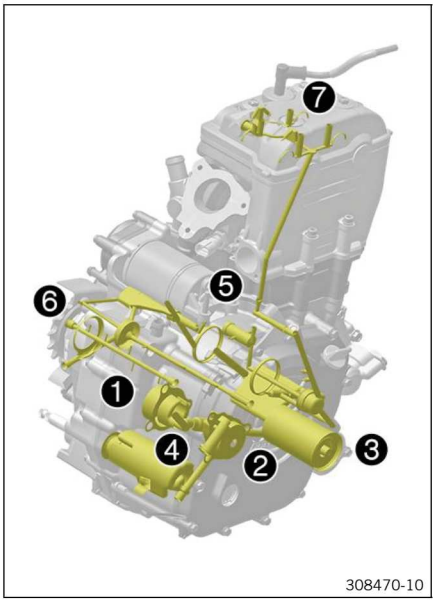


– Stop the engine and allow it to cool down.
– When the engine is cool, check the coolant level in the radiator and, if necessary, add coolant.
– Remove the cap of compensating tank ❹ and top up the coolant level up to the **MAX** marking.
– Mount the cap of the compensating tank.

Finishing work

– Fit the front spoiler. (📖 p. 62)

20.1 Oil circuit

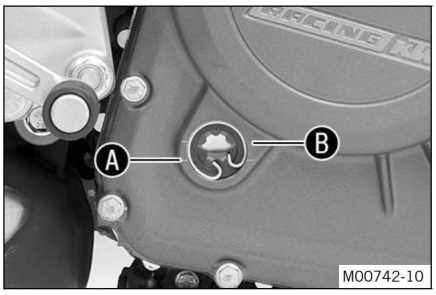


1. Suction pump
2. Force pump
3. Oil filter
4. Oil pressure regulator valve
5. Oil jet for piston cooling
6. Oil spray tube
7. Oil jet for cam follower lubrication

20.2 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 A and B markings .

» When the engine oil level is below the A marking:
  – Add the engine oil. (p. 201)
» When the engine oil level is above the B marking:
  – Correct the engine oil level.

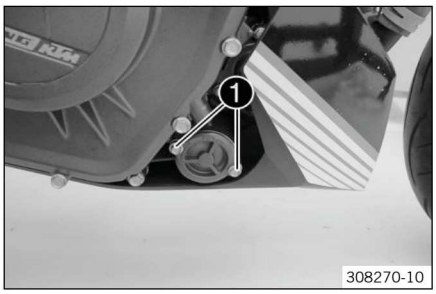
20.3 Checking the engine oil pressure

Warning
Danger of scalding Engine and gear oil get very hot when the motorcycle is ridden.
– Wear suitable protective clothing and safety gloves.
– In the event of scalding, rinse the area affected immediately with lukewarm water.

Note

Environmental hazard Hazardous substances cause environmental damage.

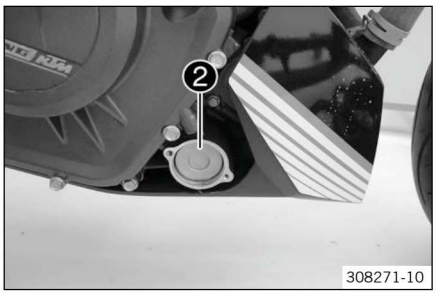
– Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.



Main work

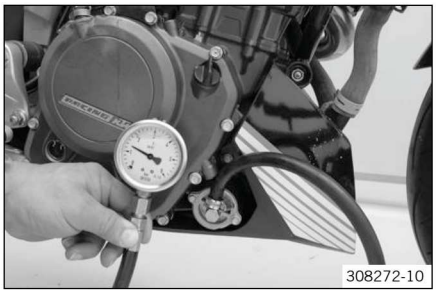
– Place a suitable container under the engine.

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



– Remove oil filter ❷.

Lock ring plier (51012011000) (📖 p. 262)



Condition

M5 screw, oil filter

– 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. 266)

– Connect the pressure tester to the special tool without the T-plate.

Pressure testing tool (61029094000) (📖 p. 263)

Condition

M6 screw, oil filter

– Position the special tool with the O-ring. Mount and tighten the screws.

Guideline

Screw, oil filter cover	M6	12 Nm (8.9 lbf ft)

Oil pressure adapter (90129094000) (📖 p. 269)

– Connect the pressure tester to the special tool without the T-plate.

Pressure testing tool (61029094000) (📖 p. 263)

Danger

Danger of poisoning Exhaust gases are toxic and inhaling them may result in unconsciousness and death.

– Always make sure there is sufficient ventilation when running the engine.
– Use an effective exhaust extraction system when starting or running the engine in an enclosed space.

– 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 the 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.
– Lubricate 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)
Screw, oil filter cover	M6	12 Nm (8.9 lbf ft)

Finishing work

– Check the engine oil level. (📖 p. 197)

20.4 Changing the engine oil and oil filter, cleaning the oil screens

Warning

Danger of scalding Engine and gear oil get very hot when the motorcycle is ridden.

– Wear suitable protective clothing and safety gloves.
– In the event of scalding, rinse the area affected immediately with lukewarm water.

Note

Environmental hazard Hazardous substances cause environmental damage.

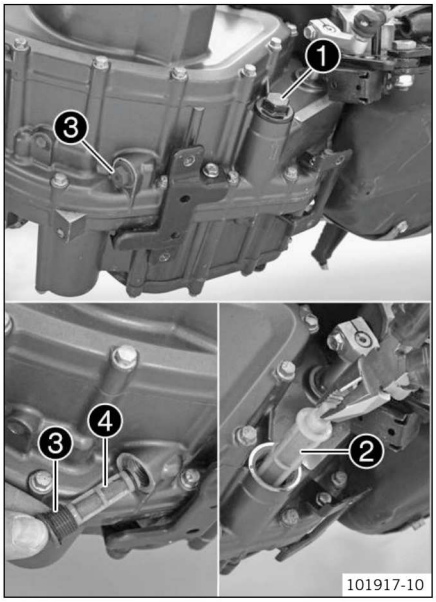
– Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.

Info

Drain the engine oil only when the engine is warm.

Preparatory work

– Remove the front spoiler. (p. 61)
– Stand the motorcycle on its side stand on a horizontal surface.



Main work

– Place a suitable container under the engine.
– Remove 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.

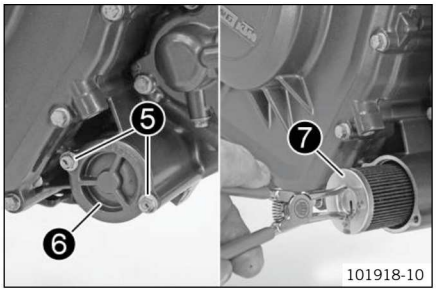
Guideline

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

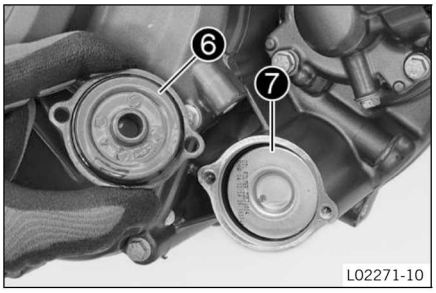
Oil screen screw plug, small	M17x1.5	12 Nm (8.9 lbf ft)



– Remove screws ❺. Remove oil filter cover ❻ with the O-ring.
– Pull oil filter ❼ out of the oil filter housing.

Lock ring plier (51012011000) (p. 262)

– Completely drain the engine oil.
– Thoroughly clean the parts and sealing surface.

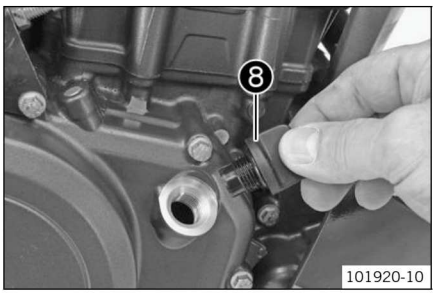


– Insert oil filter ❼.
– Lubricate the O-ring of the oil filter cover. Mount oil filter cover ❻.
– Mount and tighten the screws.

Guideline

Screw, oil filter cover	M5	8 Nm (5.9 lbf ft)
Screw, oil filter cover	M6	12 Nm (8.9 lbf ft)

Info
Too little engine oil or poor-quality engine oil results in premature wear of the engine.



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

Engine oil	1.7 l (1.8 qt.)	Engine oil (SAE 15W/50) (📖 p. 256)

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

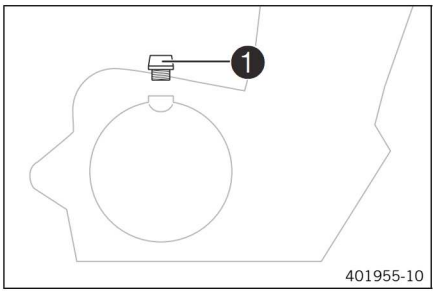
Danger
Danger of poisoning Exhaust gases are toxic and inhaling them may result in unconsciousness and death.
– Always make sure there is sufficient ventilation when running the engine.
– Use an effective exhaust extraction system when starting or running the engine in an enclosed space.

– Start the engine and check that it is oil-tight.

Finishing work
– Fit the front spoiler. (📖 p. 62)
– Check the engine oil level. (📖 p. 197)

20.5 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. 256)

Info
In order to achieve optimal engine performance, it is not advisable to mix different engine oils.
We recommended changing the engine oil when necessary.

– 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 death.

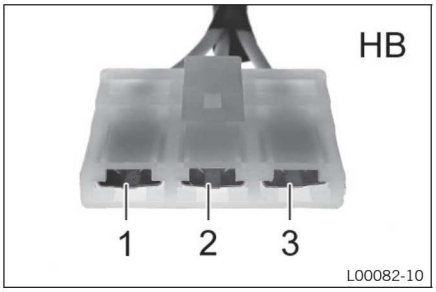
– Always make sure there is sufficient ventilation when running the engine.
– Use an effective exhaust extraction system when starting or running the engine in an enclosed space.

– Start the engine and check that it is oil-tight.

Finishing work

– Check the engine oil level. (📖 p. 197)

21.1 Alternator - checking the stator winding



Stator winding measurement I - check the resistance.

– Ω 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 indicated value does not correspond to the setpoint value:

– Change the stator.

Stator winding measurement II - check the resistance.

– Ω 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 indicated value does not correspond to the setpoint value:

– Change the stator.

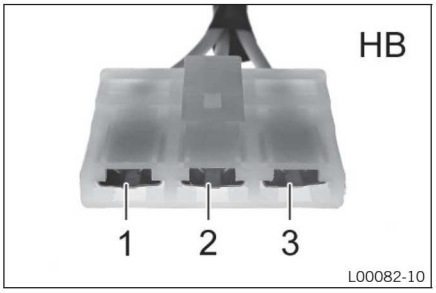
Stator winding measurement III - check resistance.

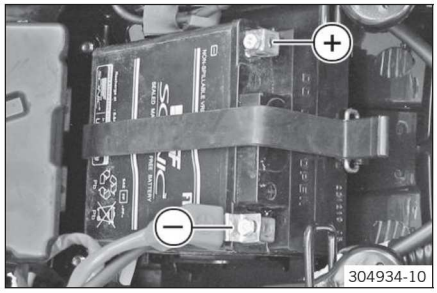
– Ω Measure the resistance between the specified points.
Stator, connector **HB** pin **2** – Stator, connector **HB** pin **3**

Alternator	
Resistance of stator winding at: 20 °C (68 °F)	≤ 1 Ω

» If the indicated value does not correspond to the setpoint value:

– Change the stator.





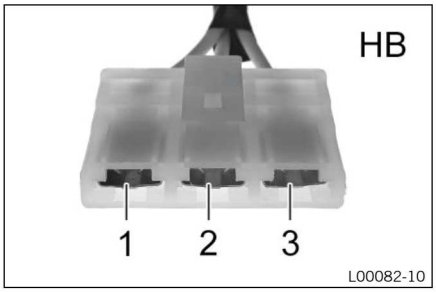
Stator winding I - check short circuit to ground (terminal 31).

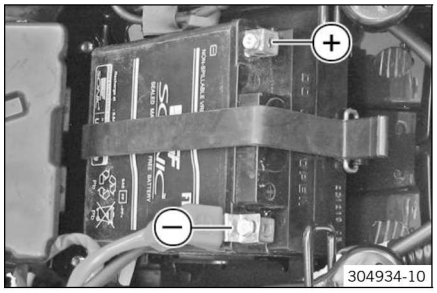
– Ω Measure the resistance between the specified points.
Stator, connector **HB** pin **1** – Measuring point **Ground (–)**

Resistance	∞ Ω

» If the indicated value does not correspond to the setpoint value:

– Change the stator.



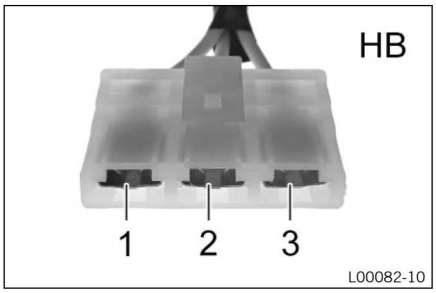


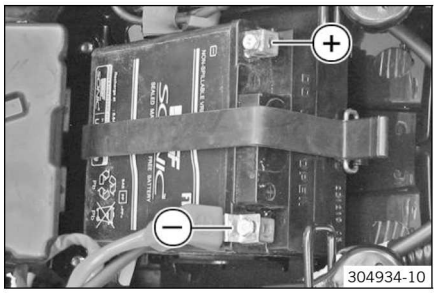
Stator winding II - check short circuit to ground (terminal 31).

– Measure the resistance between the specified points.
Stator, connector **HB** pin **2** – Measuring point **Ground (–)**

Resistance	∞ Ω

» If the indicated value does not correspond to the setpoint value:
– Change the stator.





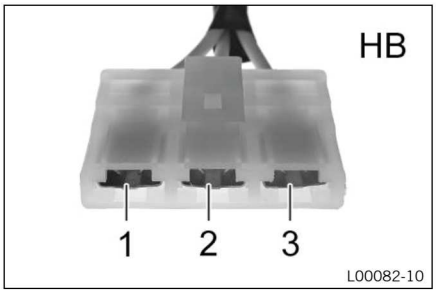
Stator winding III - check short circuit to ground (terminal 31).

– Measure the resistance between the specified points.
Stator, connector **HB** pin **3** – Measuring point **Ground (–)**

Resistance	∞ Ω

» If the indicated value does not correspond to the setpoint value:
– Change the stator.

– Start the motorcycle to make checks. (📖 p. 15)



Stator winding measurement I - check voltage.

– Measure the voltage between the specified points.
Stator, connector **HB** pin **1** – Stator, connector **HB** pin **2**

Info
The results of the measurements on the individual coils must not deviate noticeably from each other.

AC generator	
Alternating voltage stator winding at 4000 rpm: 20 °C (68 °F)	≥ 50 V

» If the indicated value does not correspond to the setpoint value:
– Change the stator.

Stator winding measurement II - check voltage.

– Measure the voltage between the specified points.
Stator, connector **HB** pin **1** – Stator, connector **HB** pin **3**

Info

The results of the measurements on the individual coils must not deviate noticeably from each other.

AC generator	
Alternating voltage stator winding at 4000 rpm: 20 °C (68 °F)	≥ 50 V

» If the indicated value does not correspond to the setpoint value:

– Change the stator.

Stator winding measurement III - check voltage.

– Measure the voltage between the specified points.
Stator, connector **HB** pin **2** – Stator, connector **HB** pin **3**

Info

The results of the measurements on the individual coils must not deviate noticeably from each other.

AC generator	
Alternating voltage stator winding at 4000 rpm: 20 °C (68 °F)	≥ 50 V

» If the indicated value does not correspond to the setpoint value:

– Change the stator.

22 TECHNICAL DATA

22.1 Engine

Design	1-cylinder 4-stroke engine, water-cooled
Displacement	373 cm^3 (22.76 cu in)
Stroke	60 mm (2.36 in)
Bore	89 mm (3.5 in)
Compression ratio	12.9:1
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, 225 W
Spark plug	BOSCH Super R6 VR 5 NE
Spark plug electrode gap	0.8 mm (0.031 in)
Spark plug	**BOSCHVR5NEU**
Spark plug electrode gap	1 mm (0.04 in)
Cooling	Water cooling, permanent circulation of coolant by water pump
Idle speed	1,550 ... 1,650 rpm
Starting aid	Electric starter

22.2 Tolerance, engine 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	≥ 50 mm (≥ 1.97 in)
Contact surface, clutch facing discs in clutch basket	≤ 0.5 mm (≤ 0.02 in)
Oil pressure regulator valve - minimum spring length	30.00 mm (1.1811 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)

22.3 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	M6x35	12 Nm (8.9 lbf ft)
Screw, engine case	M6x75	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	6 Nm (4.4 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	25 Nm (18.4 lbf ft) **Loctite®243™**
Screw, return spring, quick shifter	M8	20 Nm (14.8 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	110 Nm (81.1 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, 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)

22.4 Capacities

22.4.1 Engine oil

Engine oil	1.7 l (1.8 qt.)	Engine oil (SAE 15W/50) (📖 p. 256)

22.4.2 Coolant

Coolant	1.2 l (1.3 qt.)	Coolant (📖 p. 256)

22.4.3 Fuel

Total fuel tank capacity, approx.	11 l (2.9 US gal)	Super unleaded (ROZ 95/RON 95/PON 91) (📖 p. 257) (EU/AU/JP/AR, ASIA/CN/MY, TH/US; CO 2017)
Total fuel tank capacity, approx.		Super unleaded, type C (ROZ 95/RON 95/PON 91) (📖 p. 257) (390 Duke 2017 BR)

Fuel reserve, approx.	1.5 l (1.6 qt.)

22.5 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-pot 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) X-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	170 mm (6.69 in)
Weight without fuel, approx.	142 kg (313 lb.)
Maximum permissible front axle load	125 kg (276 lb.)
Maximum permissible rear axle load	210 kg (463 lb.)
Maximum permissible overall weight	335 kg (739 lb.)

22.6 Electrical system

Battery	ETZ-9-BS	Battery voltage: 12 V Nominal capacity: 8 Ah Maintenance-free
Fuse	75011088010	10 A
Fuse	75011088015	15 A
Fuse	90111088025	25 A
Fuse	75011088030	30 A
Headlight	H4/socket P43t	12 V 60/55 W
Position light	W5W / socket W2.1x9.5d	12 V 5 W
Instrument lights and indicator lamps	LED	
Turn signal	LED	
Turn signal (US)	RY10W / socket BAU15s	12 V 10 W
Brake/tail light	LED	
License plate lamp	LED	

22.7 Tires

Front tire	Rear tire
110/70 R 17 M/C 54H TL Metzeler Sportec M5 Interact	**150/60 R 17 M/C 66H TL** Metzeler Sportec M5 Interact
The tires specified represent one of the possible series production tires. Additional information is available in the Service section under: http://www.ktm.com	

22.8 Fork

Fork part number	90101000044
Fork	**WP Suspension**
Fork length	736 mm (28.98 in)

Fork oil	440 ml (14.88 fl. oz.)	Fork oil (SAE 4) (48601166S1) (📖 p. 257)

22.9 Shock absorber

Shock absorber article number	90104010100
Shock absorber	**WP Suspension**
Spring preload	
Comfort	1 click
Standard	3 clicks
Sport	6 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)

22.10 Chassis tightening torques

Exhaust clamp	-	20 Nm (14.8 lbf ft)
Screw, chain guard	**EJOT PT®** K60x20	4 Nm (3 lbf ft)
Screw, headlight	**EJOT PT®** K50x12	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	5 Nm (3.7 lbf ft)
Remaining nuts, chassis	M5	5 Nm (3.7 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	5 Nm (3.7 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	5 Nm (3.7 lbf ft)
Screw, rollover sensor	M5	5 Nm (3.7 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)
Screw, windshield	M5	3 Nm (2.2 lbf ft)
Nut, foot brake lever adjustment	M6	9 Nm (6.6 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	9 Nm (6.6 lbf ft)
Screw, air filter box cover	M6	3 Nm (2.2 lbf ft)
Screw, brake fluid reservoir of rear brake	M6	8 Nm (5.9 lbf ft) Loctite®243™
Screw, cable holder, side stand switch	M6	9 Nm (6.6 lbf ft) Loctite®243™
Screw, chain sliding guard	M6	8 Nm (5.9 lbf ft)
Screw, compensating tank	M6	9 Nm (6.6 lbf ft)
Screw, foot brake cylinder	M6	9 Nm (6.6 lbf ft) Loctite®243™
Screw, front fender	M6	9 Nm (6.6 lbf ft)
Screw, front seat fixing	M6	6 Nm (4.4 lbf ft)
Screw, fuel tank	M6	9 Nm (6.6 lbf ft)
Screw, headlight holder	M6	9 Nm (6.6 lbf ft)
Screw, headlight mask	M6	9 Nm (6.6 lbf ft) Loctite®243™
Screw, ignition coil	M6	9 Nm (6.6 lbf ft)
Screw, license plate holder	M6	9 Nm (6.6 lbf ft) Loctite®243™
Screw, lower rear panel	M6	7 Nm (5.2 lbf ft)
Screw, magnetic holder on side stand	M6	5 Nm (3.7 lbf ft) Loctite®243™
Screw, main silencer	M6	9 Nm (6.6 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	9 Nm (6.6 lbf ft)
Screw, seat	M6	9 Nm (6.6 lbf ft)
Screw, shift lever linkage	M6	9 Nm (6.6 lbf ft) Loctite®243™
Screw, voltage regulator	M6	9 Nm (6.6 lbf ft)
Screw, voltage regulator holder	M6	9 Nm (6.6 lbf ft)
Nut, rear sprocket	M8	27 Nm (19.9 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 engine	M8	25 Nm (18.4 lbf ft)
Screw, foot brake lever	M8	16 Nm (11.8 lbf ft) Loctite®243™
Screw, fork stub	M8	15 Nm (11.1 lbf ft)
Screw, front brake disc	M8	25 Nm (18.4 lbf ft) Loctite®243™
Screw, front wheel spindle	M8	25 Nm (18.4 lbf ft)
Screw, handlebar clamp	M8	21 Nm (15.5 lbf ft) Loctite®243™
Screw, handrail	M8	25 Nm (18.4 lbf ft)
Screw, horn	M8	21 Nm (15.5 lbf ft)

Screw, main silencer	M8	24 Nm (17.7 lbf ft)
Screw, passenger foot pegs bracket	M8	25 Nm (18.4 lbf ft) **Loctite®243™**
Screw, rear brake disc	M8	25 Nm (18.4 lbf ft) **Loctite®243™**
Screw, shift lever	M8	16 Nm (11.8 lbf ft) **Loctite®243™**
Screw, top triple clamp	M8	11 Nm (8.1 lbf ft)
Screw, front brake caliper	M8x1	25 Nm (18.4 lbf ft) **Loctite® 204™**
Fitting side stand	M10	35 Nm (25.8 lbf ft) **Loctite®243™**
Fitting, engine mounting bracket	M10	45 Nm (33.2 lbf ft)
Remaining nuts, chassis	M10	50 Nm (36.9 lbf ft)
Remaining screws, chassis	M10	45 Nm (33.2 lbf ft)
Fitting, bottom shock absorber	M10x1.25	45 Nm (33.2 lbf ft)
Fitting, handlebar support	M10x1.25	21 Nm (15.5 lbf ft)
Nut, mirror, left	M10x1.25	16 Nm (11.8 lbf ft)
Nut, turn signal	M10x1.25	6 Nm (4.4 lbf ft)
Screw, front footrest bracket / engine bearer	M10x1.25	45 Nm (33.2 lbf ft)
Screw, side stand bracket	M10x1.25	25 Nm (18.4 lbf ft) **Loctite®243™**
Screw, top shock absorber	M10x1.25	45 Nm (33.2 lbf ft) **Loctite®243™**
Nut, rear wheel spindle	M14x1.5	90 Nm (66.4 lbf ft)
Nut, swingarm pivot	M14x1.5	100 Nm (73.8 lbf ft)
Screw, top steering head	M16x1.5	53 Nm (39.1 lbf ft) **Loctite®243™**
Lambda sensor	M18x1.5	19 Nm (14 lbf ft)
Nut, steering head	M30x1	5 Nm (3.7 lbf ft)

23 CLEANING/PROTECTIVE TREATMENT

23.1 Cleaning the motorcycle

Note

Material damage Components become damaged or destroyed if a pressure cleaner is used incorrectly.

The high pressure forces water into the electrical components, connectors, throttle cables, and bearings, etc. Pressure which is too high causes malfunctions and destroys components.

– Do not direct the water jet directly on to electrical components, connectors, throttle cables or bearings.
– Maintain a minimum distance between the nozzle of the pressure cleaner and the component.

Minimum clearance	60 cm (23.6 in)

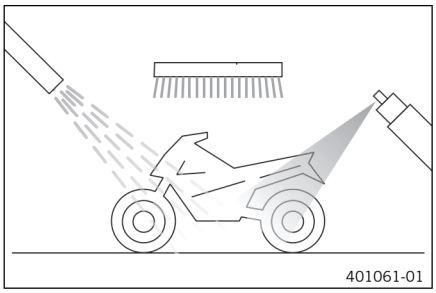
Note

Environmental hazard Hazardous substances cause environmental damage.

– Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.

Info

Clean the motorcycle regularly to maintain its value and appearance over a long period.
Avoid direct sunshine when cleaning the motorcycle.



– Close off the exhaust system to keep water from entering.
– Remove loose dirt first with a soft jet of water.
– Spray heavily soiled parts with a normal commercial motorcycle cleaner and then brush off with a soft brush.

Motorcycle cleaner (📖 p. 258)

Info

Use warm water containing normal motorcycle cleaner and a soft sponge.
Never apply motorcycle cleaner to a dry motorcycle; always rinse the vehicle with water first.
Clean the motorcycle with cold water if it has been used on salted roads. Warm water enhances 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 Moisture and dirt impair the brake system.

– Brake carefully several times to dry out and remove dirt from the brake linings and the brake discs.

– 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 pivot points.
– Clean the chain. (p. 79)
– Treat bare metal (except for brake discs and the exhaust system) with a corrosion inhibitor.

Preserving materials for paints, metal and rubber (p. 258)

– Treat all painted parts with a mild paint care product.

Perfect Finish and high gloss polish for paints (p. 258)

Info
Do not polish parts that were matte when delivered as this would strongly impair the material quality.

– Treat all plastic parts and powder-coated parts with a mild cleaning and care product.

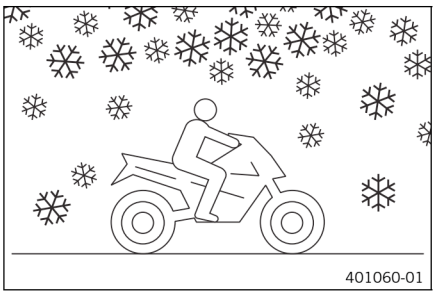
Special cleaner for glossy and matte paint finishes, metal and plastic surfaces (p. 258)

– Oil the ignition/steering lock.

Universal oil spray (p. 259)

23.2 Checks and maintenance steps for winter operation

Info
If you use the motorcycle in winter, you must expect salt on the roads. You should therefore take precautions against aggressive road salt.
Clean the motorcycle with cold water if it has been used on salted roads. Warm water enhances the corrosive effects of salt.


401060-01

– Clean the motorcycle. (p. 214)
– Clean the brakes.

Info
After **EVERY** trip on salted roads, thoroughly clean the motorcycle and, in particular, the brake calipers and brake linings while cooled and installed with cold water and dry carefully.

– Treat the engine, the swingarm, and all other bare or zinc plated parts (except brake discs) with a wax-based corrosion inhibitor.

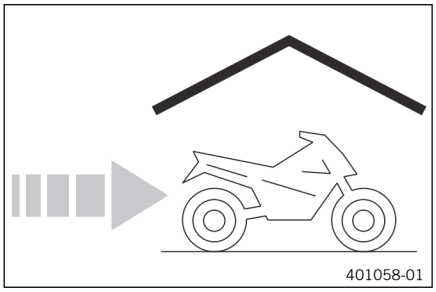
Info
Corrosion inhibitor is not permitted to come in contact with the brake discs as this would greatly reduce the braking force.

– Clean the chain. (p. 79)

24 STORAGE

24.1 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.



- When refueling for the last time before taking the motorcycle out of service, add fuel additive.

Fuel additive (📖 p. 258)

- Refuel.
- Clean the motorcycle. (📖 p. 214)
- Change the engine oil and oil filter and clean the oil screens. (📖 p. 200)
- Check the antifreeze and coolant level. (📖 p. 193)
- Check the tire air pressure. (📖 p. 69)
- Remove the battery. (📖 p. 81)
- Recharge the battery.

  Guideline

Storage temperature of battery without direct sunlight	0 ... 35 °C (32 ... 95 °F)

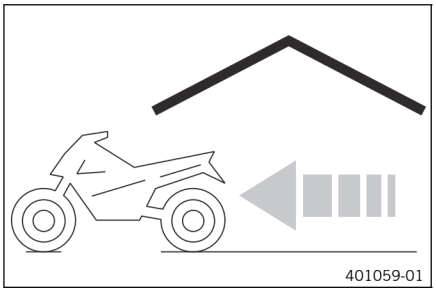
- Store the vehicle in a dry location that is not subject to large fluctuations in temperature.

Info
KTM recommends jacking up the motorcycle.

- Raise the motorcycle with the rear lifting gear. (📖 p. 11)
- Lift the motorcycle with the front lifting gear. (📖 p. 11)
- 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.

24.2 Preparing for use after storage



- Take the motorcycle off the front lifting gear. (p. 12)
- Remove the rear of the motorcycle from the lifting gear. (p. 11)
- Install the battery. (p. 82)
- Set the clock. (p. 104)
- Perform checks and maintenance measures when preparing for use.
- Take a test ride.

25 SERVICE SCHEDULE

25.1 Additional information

Any further work that results from the compulsory work or from the recommended work must be ordered separately and invoiced separately.
Different service intervals may apply in your country, depending on the local operating conditions.
Individual service intervals and scopes may change in the course of technical developments. The most up-to-date service schedule can always be found on KTM Dealer.net. Your authorized KTM dealer will be happy to advise you.

25.2 Required work

	after 1,000 km (620 mi)	every 7,500 km (4,650 mi)	every 15,000 km (9,300 mi)	Every year	Every two years
Read out the fault memory using the KTM diagnostics tool.	○	●	●	●	●
Check that the electrical system is functioning properly.	○	●	●	●	●
Change the engine oil and oil filter and clean the oil screens. (📖 p. 200)	○	●	●	●	●
Check the brake discs. (📖 p. 70)	○	●	●	●	●
Check the front brake linings. (📖 p. 87)	○	●	●	●	●
Check the rear brake linings. (📖 p. 94)	○	●	●	●	●
Check the tire condition. (📖 p. 69)	○	●	●	●	●
Check the tire air pressure. (📖 p. 69)	○	●	●	●	●
Check the brake lines for damage and leakage.	○	●	●	●	●
Check the brake fluid level of the front brake. (📖 p. 90)	○	●	●	●	
Check the rear brake fluid level. (📖 p. 98)	○	●	●	●	
Check the shock absorber and fork for leaks.	○	●	●	●	●
Clean the dust boots of the fork legs. (📖 p. 17)		●	●		
Check the chain, rear sprocket, and engine sprocket. (📖 p. 77)		●	●	●	●
Check the chain tension. (📖 p. 76)	○	●	●	●	●
Check the coolant level. (📖 p. 194)	○	●	●	●	●
Check that the radiator fan is functioning properly.	○	●	●	●	●
Change the air filter. Clean the air filter box.		●	●		
Check that the throttle cables are undamaged, routed without sharp bends, and set correctly.	○	●	●	●	●
Check the cables for damage and routing without sharp bends.	○	●	●	●	●
Check the valve clearance. (📖 p. 184)	○				
Check the valve clearance, change the spark plugs.			●		
Change the front brake fluid. (📖 p. 92)					●
Change the rear brake fluid. (📖 p. 100)					●
Check the play of the steering head bearing. (📖 p. 32)	○	●	●	●	●
Check the headlight setting. (📖 p. 105)	○	●	●		
Final check: Check the vehicle for roadworthiness and take a test ride.	○	●	●	●	●
Read out the error memory after the test ride using the KTM diagnostics tool.	○	●	●	●	●
Reset the service interval display. (📖 p. 104)	○	●	●	●	●
Make the service entry in the **KTM Dealer.net** and in the Service and Warranty Booklet.	○	●	●	●	●

○ One-time interval

● Periodic interval

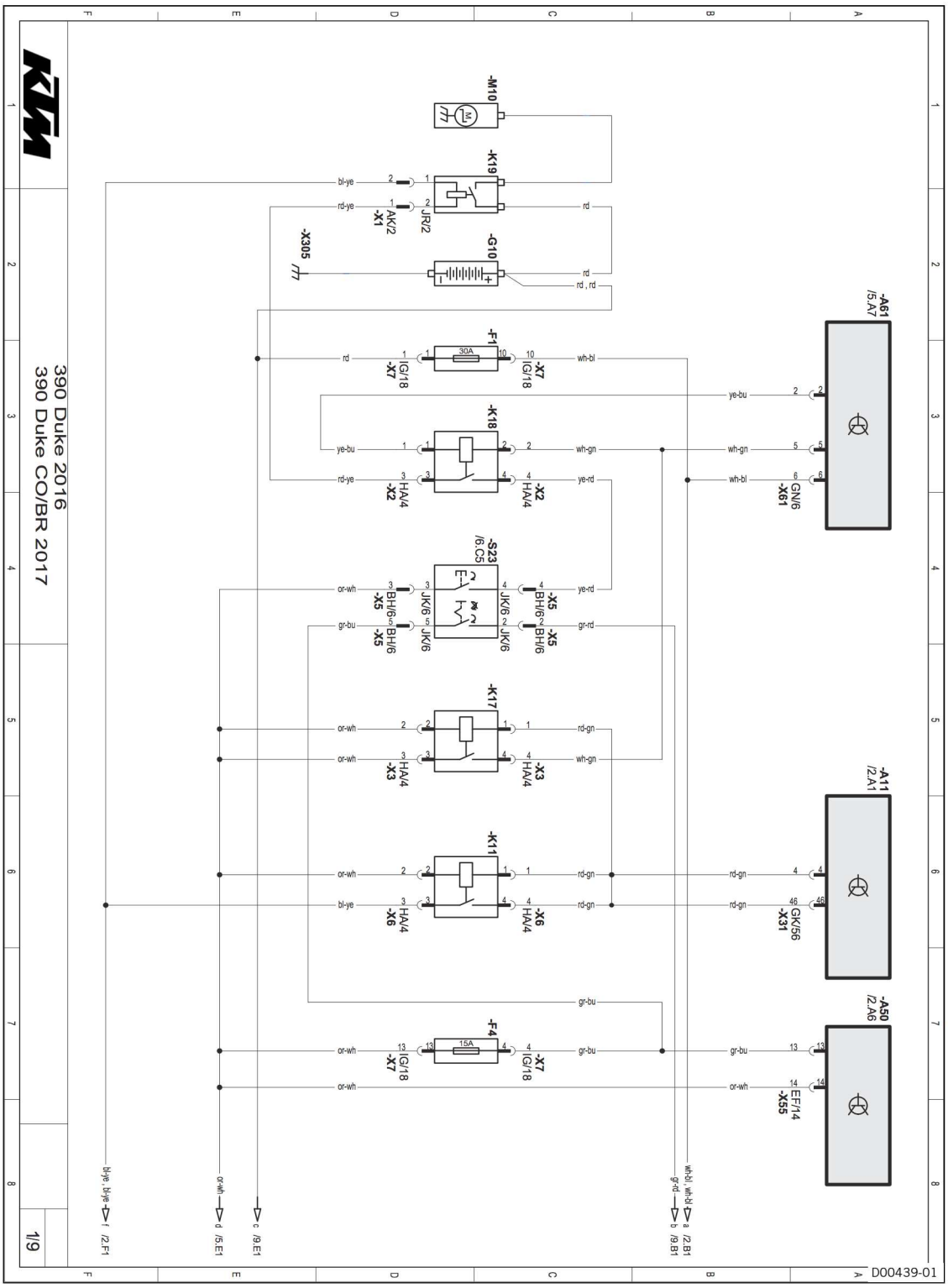
25.3 Recommended work

	after 1,000 km (620 mi)	every 7,500 km (4,650 mi)	Every year	Every four years
Check the antifreeze.	○	●	●	
Change the coolant. (📖 p. 195)				●
Grease all moving parts (e.g., side stand, hand lever, chain, ...) and check for smooth operation.	○	●	●	●
Check all hoses (e.g. fuel, coolant, bleeder, drainage, etc.) and sleeves for cracking, leaks, and incorrect routing.	○	●	●	●
Check the swingarm bearing.		●		
Check the wheel bearing for play.		●		
Check the screws and nuts for tightness.	○	●	●	●

○ One-time interval

● Periodic interval

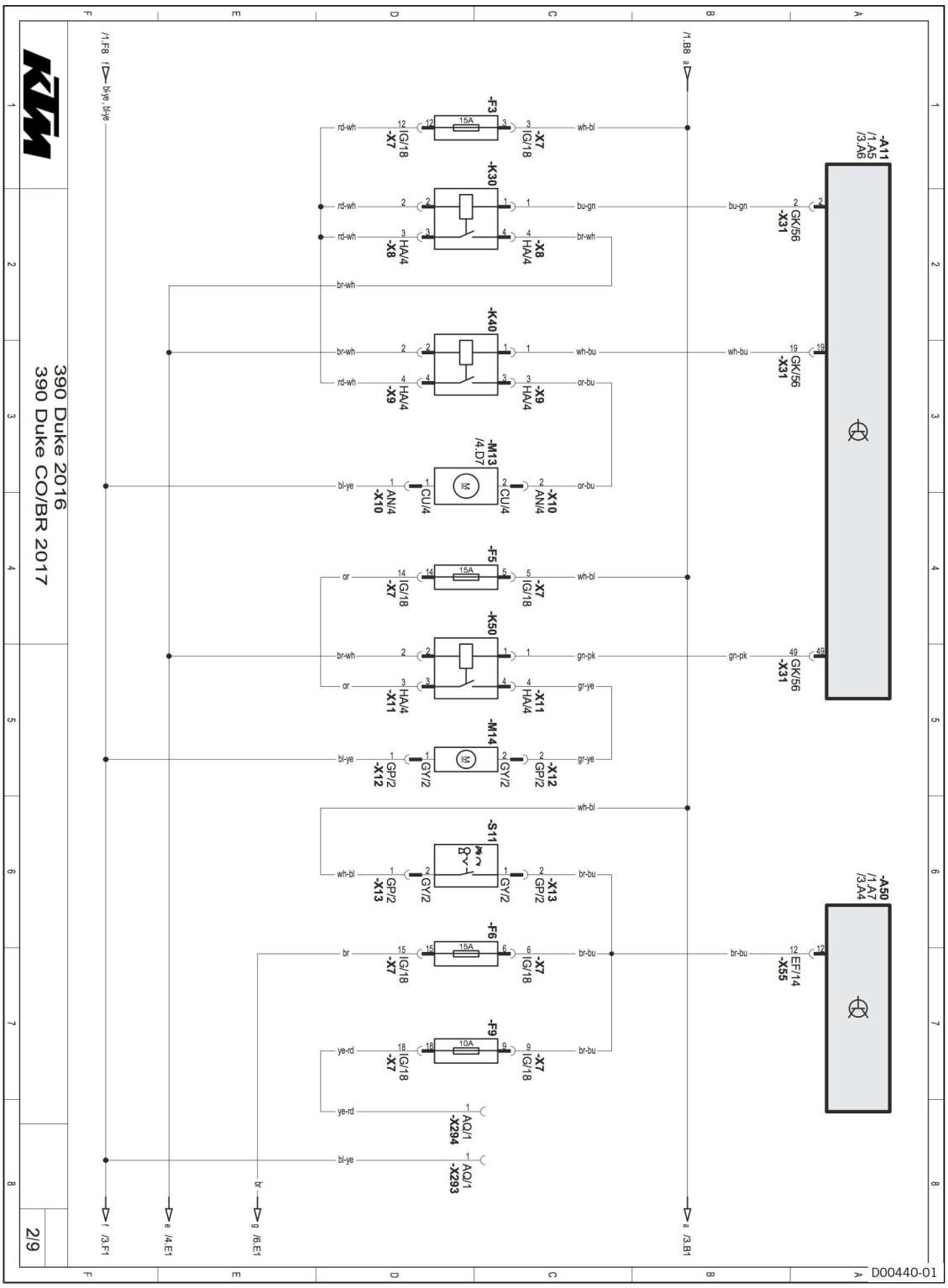
26.1 Page 1 of 9 (EU/AU/JP/AR, ASIA/CN/MY/TH; BR/CO 2017)



Components:

A11	EFI control unit
A50	Alarm system (optional)
A61	Start OK 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	Electric starter system
S23	Emergency OFF switch, electric starter button

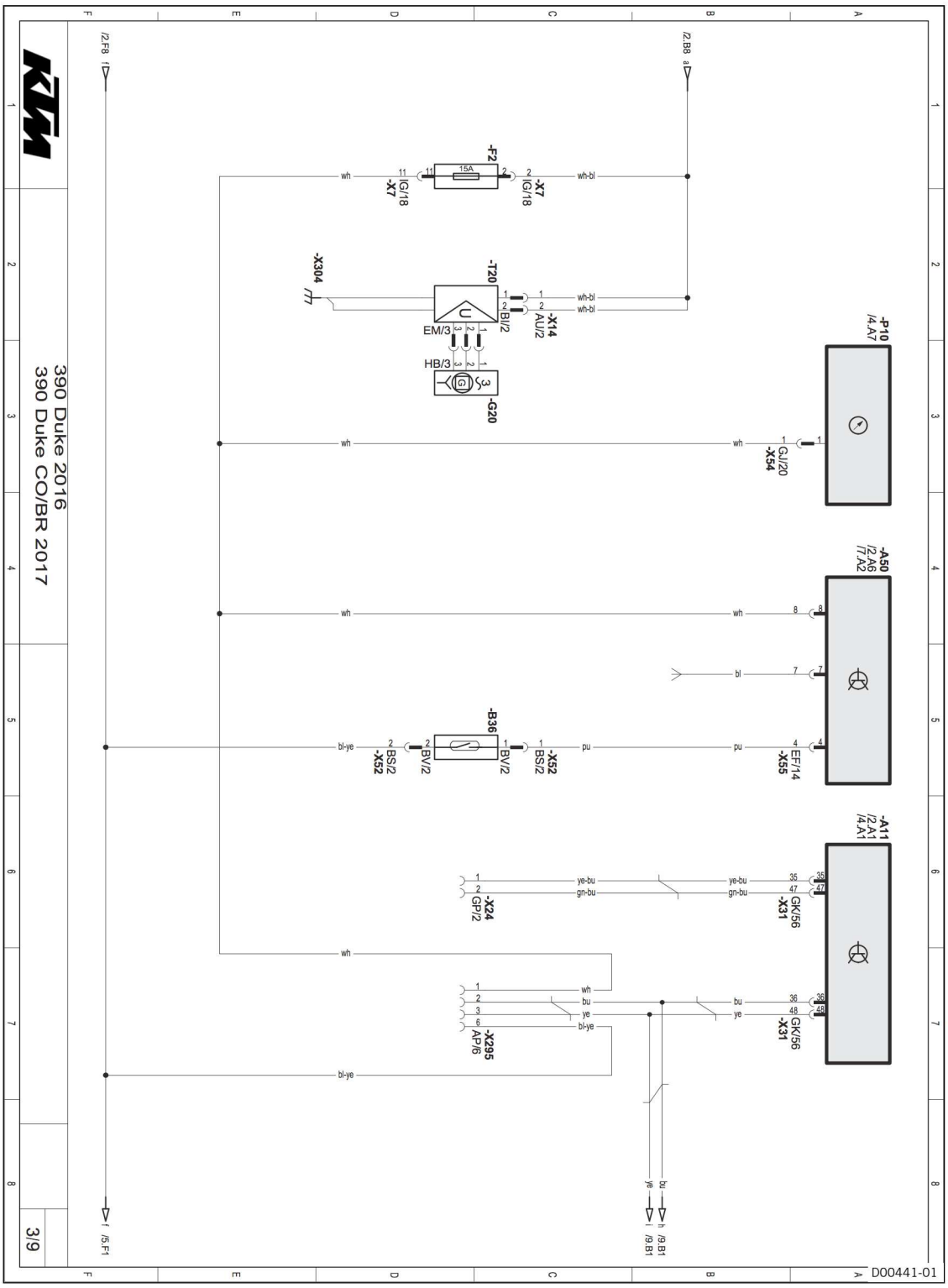
26.2 Page 2 of 9 (EU/AU/JP/AR, ASIA/CN/MY/TH; BR/CO 2017)



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 and steering lock
X293	Connector for accessory ground ACC 2 (not assigned)
X294	Connector for accessory plus (terminal 15) ACC 2 (not assigned)

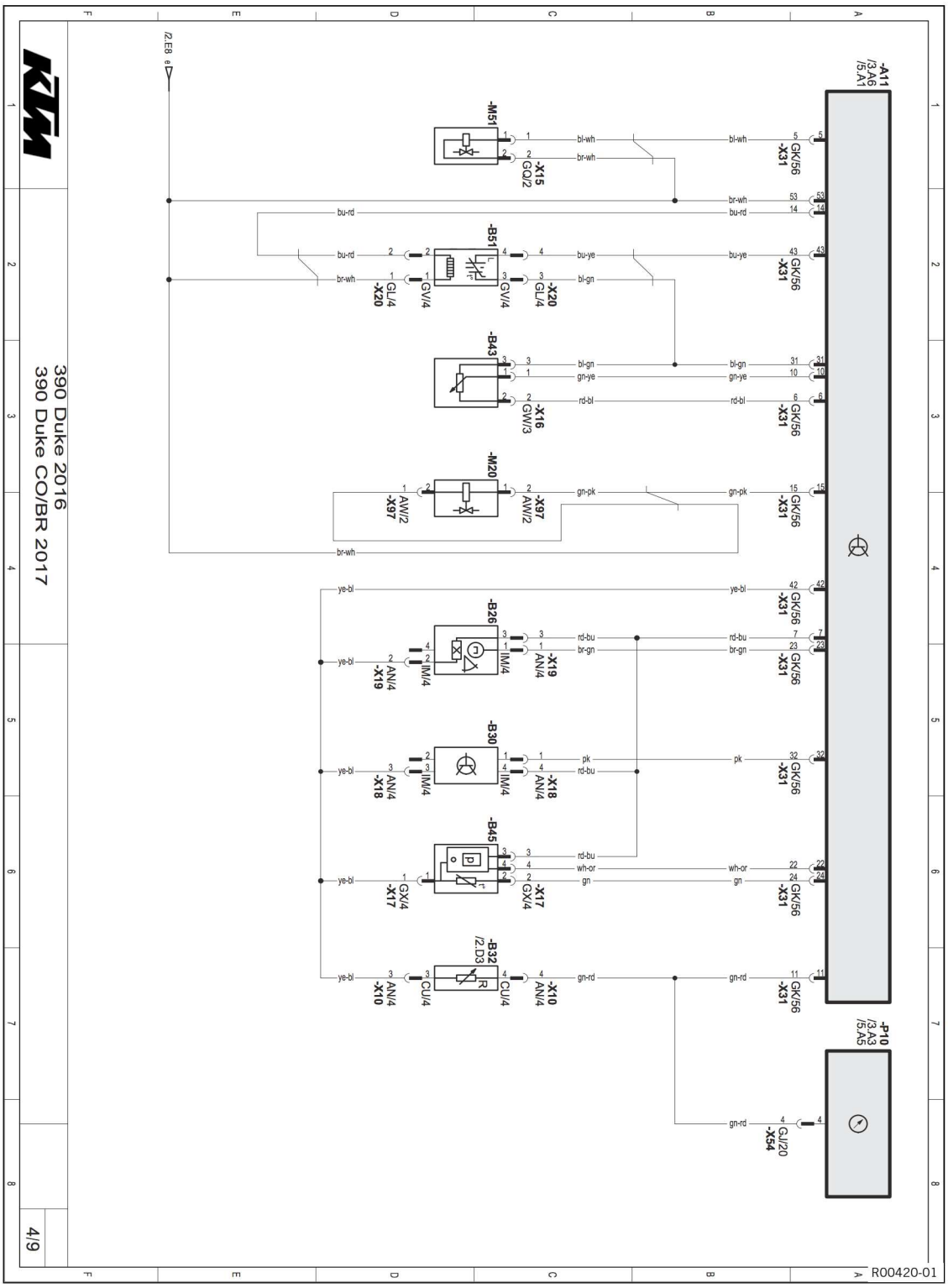
26.3 Page 3 of 9 (EU/AU/JP/AR, ASIA/CN/MY/TH; BR/CO 2017)



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

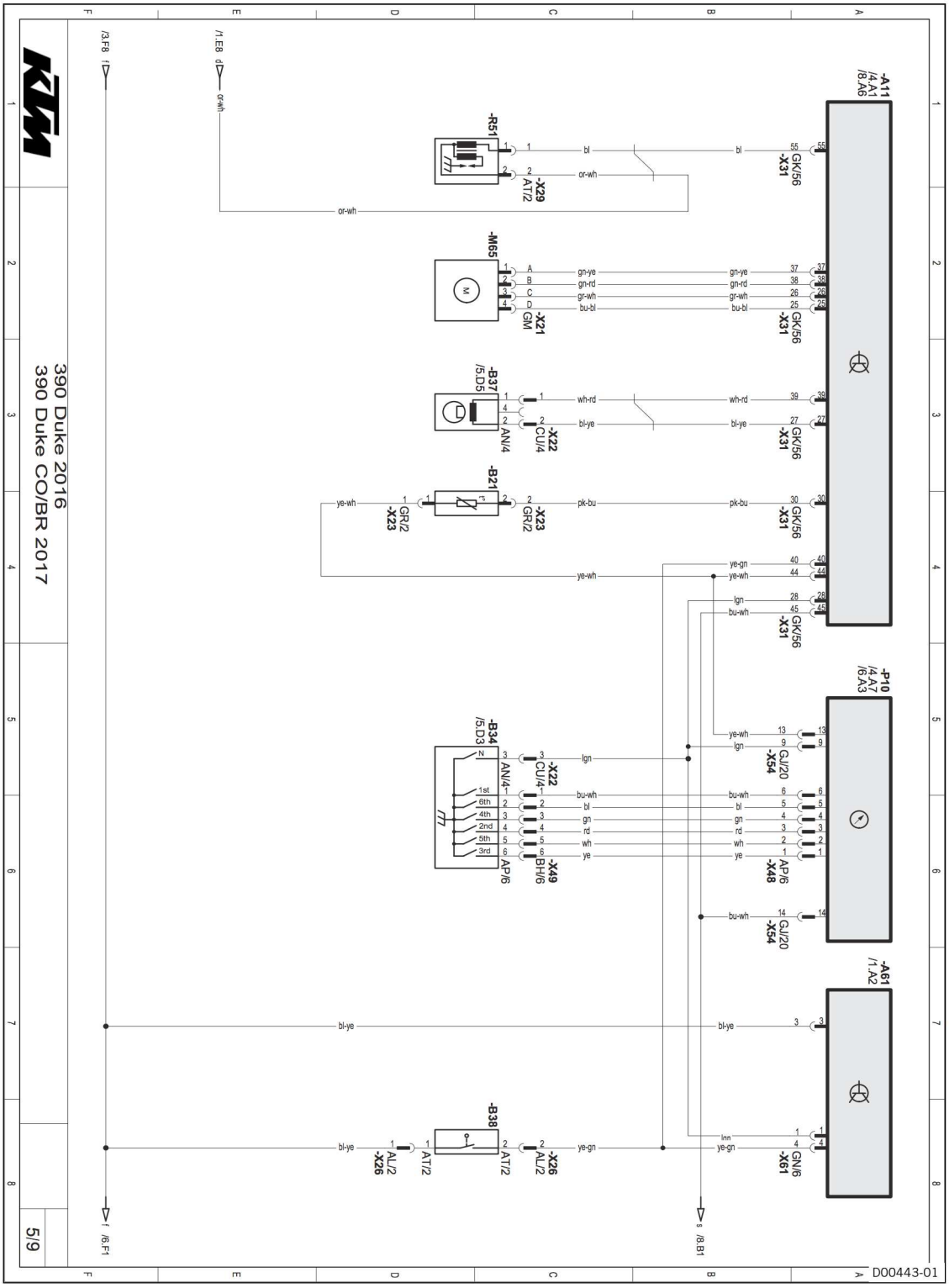
26.4 Page 4 of 9 (EU/AU/JP/AR, ASIA/CN/MY/TH; BR/CO 2017)



Components:

A11	EFI control unit
B43	Throttle valve position sensor
B26	Rollover sensor
B30	Side stand sensor
B32	Fuel level sensor
B45	Manifold temperature and pressure sensor
B51	Lambda sensor
M20	Evaporate emission control valve
M51	Injection valve
P10	Combination instrument

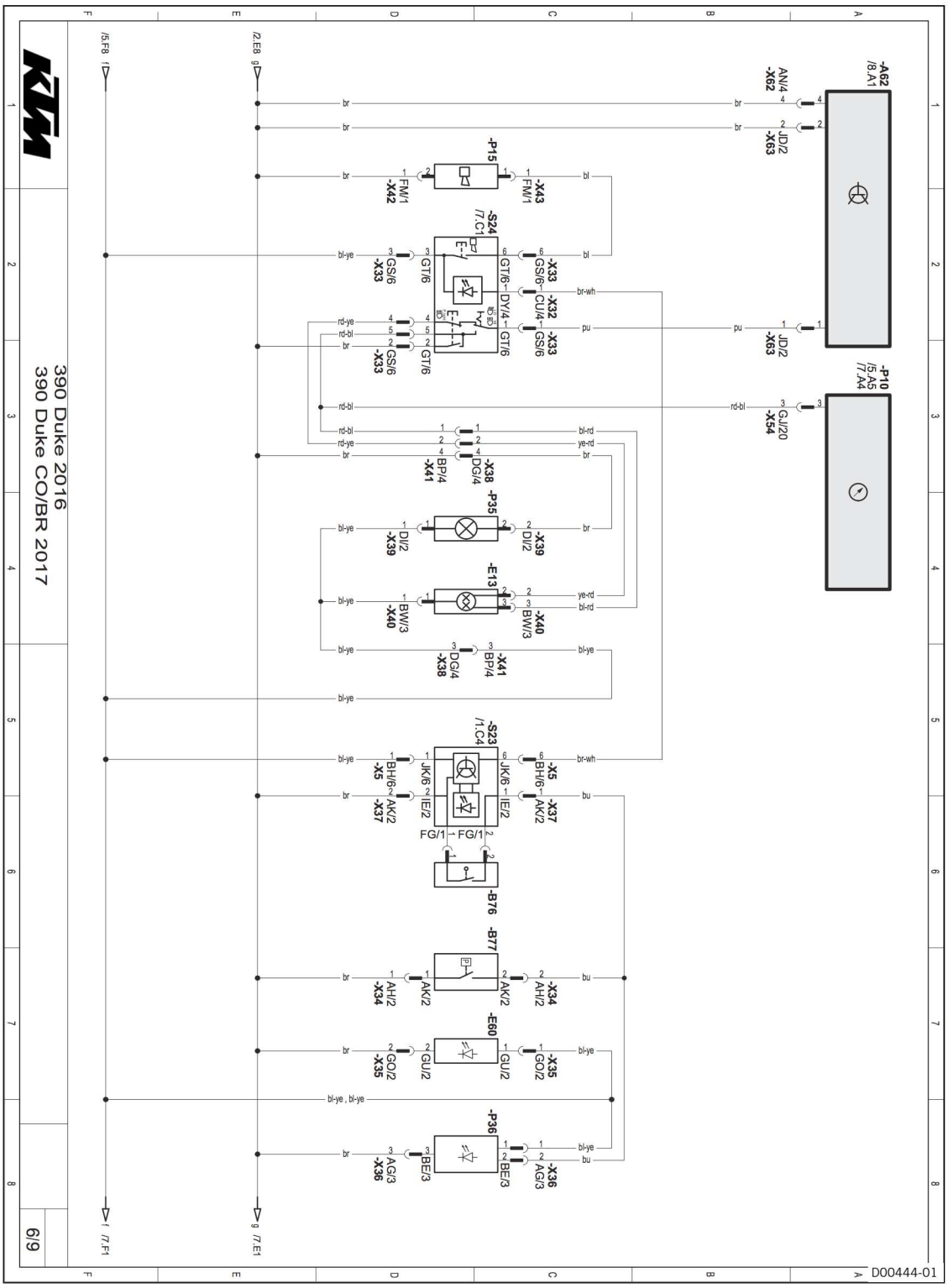
26.5 Page 5 of 9 (EU/AU/JP/AR, ASIA/CN/MY/TH; BR/CO 2017)



Components:

A11	EFI control unit
A61	Start OK control unit
B21	Engine coolant temperature sensor
B34	Gear position sensor
B37	Crankshaft position sensor
B38	Clutch switch
M65	Idle speed actuator
P10	Combination instrument
R51	Ignition coil

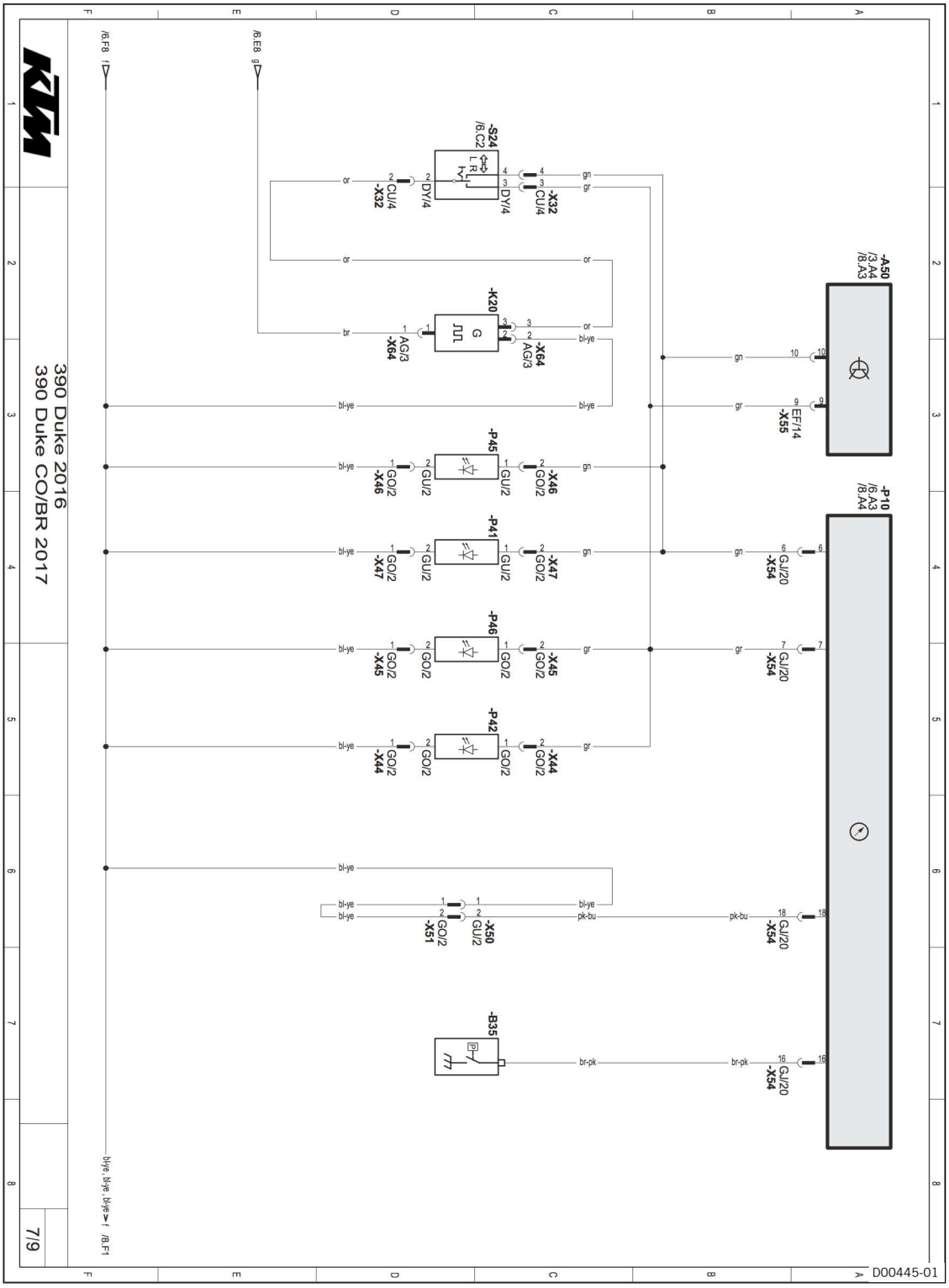
26.6 Page 6 of 9 (EU/AU/JP/AR, ASIA/CN/MY/TH; BR/CO 2017)



Components:

A62	Headlight control unit
B76	Front brake light switch
B77	Rear brake light switch
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

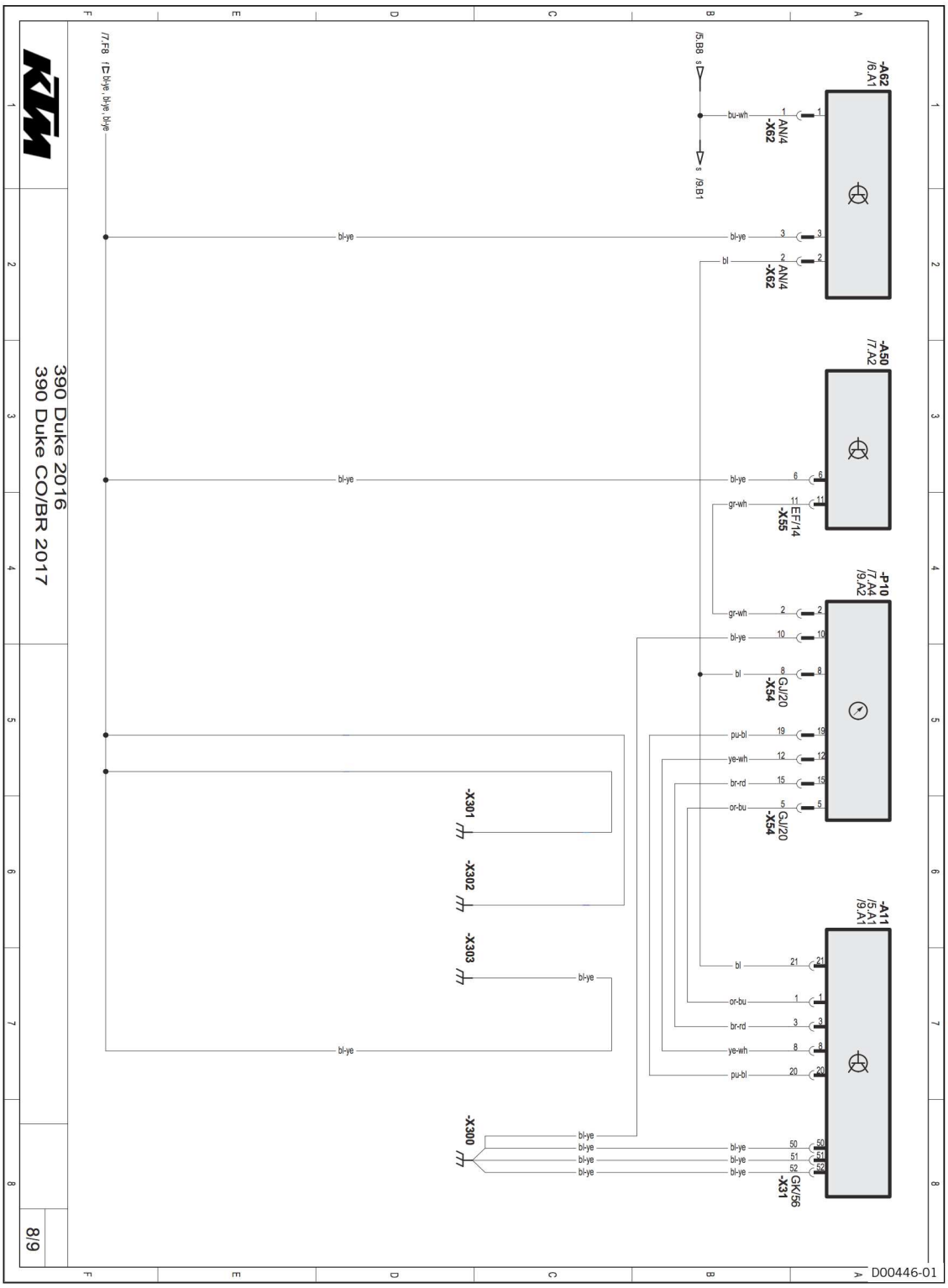
26.7 Page 7 of 9 (EU/AU/JP/AR, ASIA/CN/MY/TH; BR/CO 2017)



Components:

A50	Alarm system (optional)
B35	Oil pressure sensor
K20	Turn signal relay
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

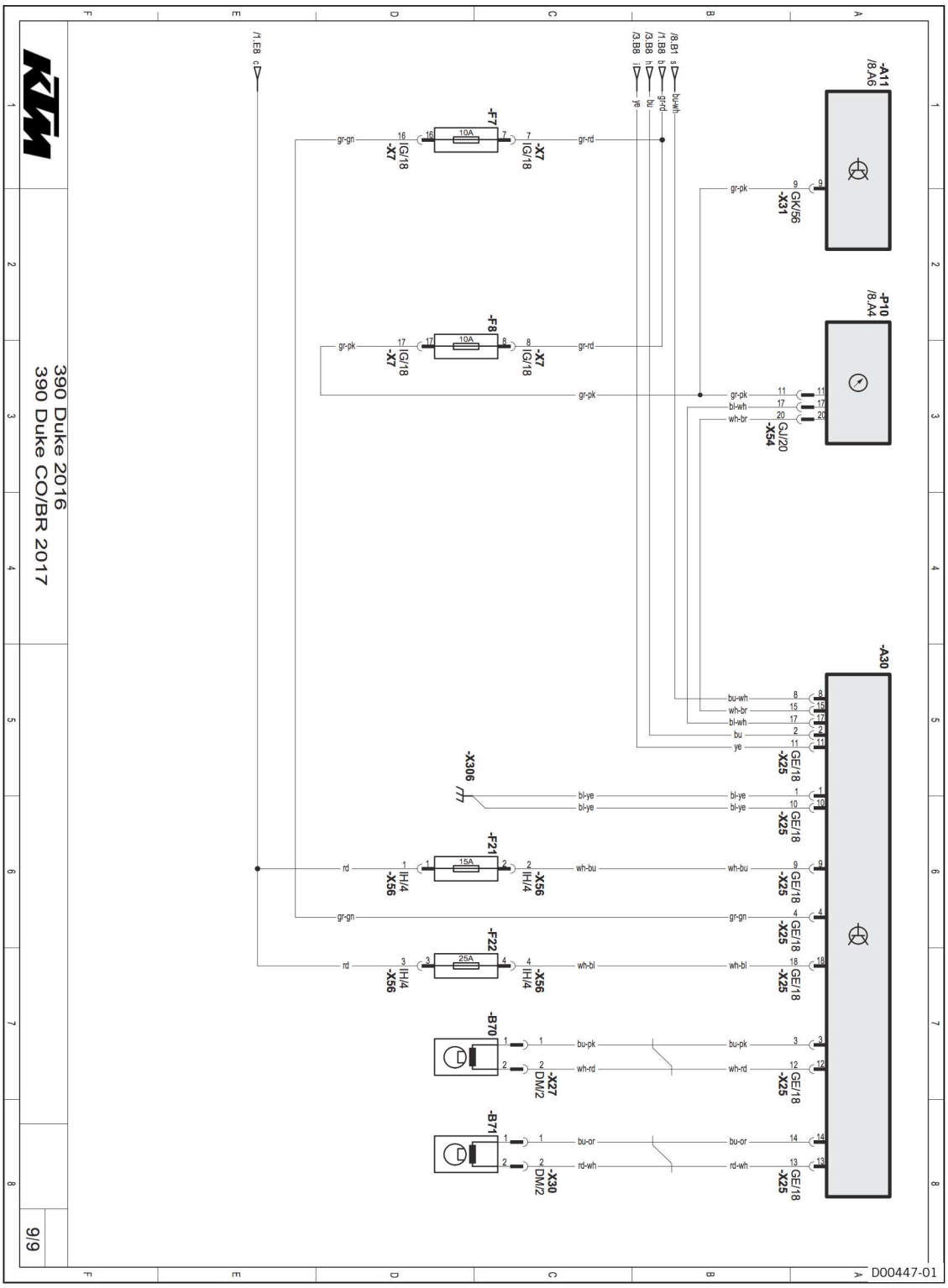
26.8 Page 8 of 9 (EU/AU/JP/AR, ASIA/CN/MY/TH; BR/CO 2017)



Components:

A11	EFI control unit
A50	Alarm system (optional)
A62	Headlight control unit
P10	Combination instrument

26.9 Page 9 of 9 (EU/AU/JP/AR, ASIA/CN/MY/TH; BR/CO 2017)



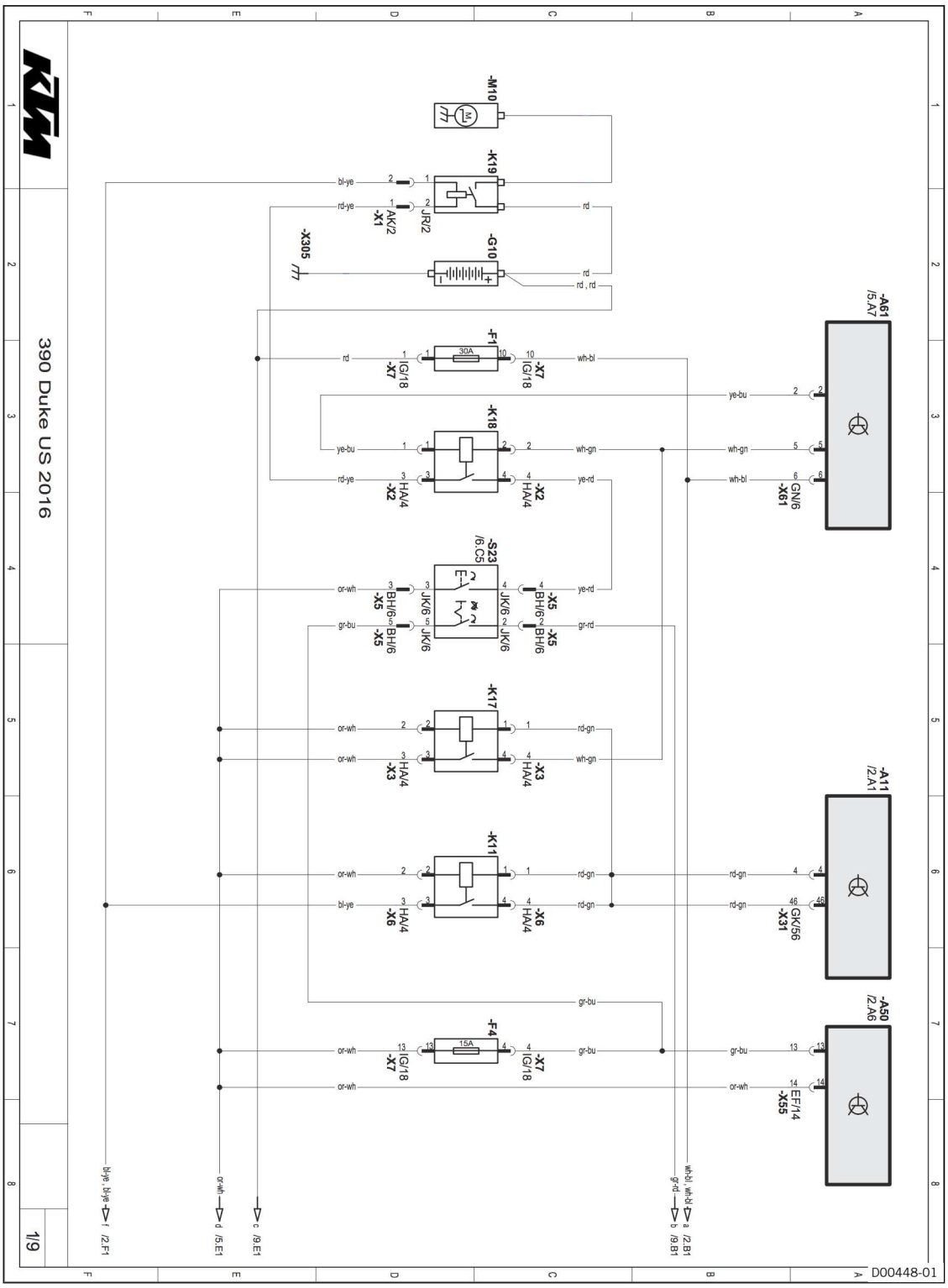
Components:

A11	EFI control unit
A30	ABS control unit
B70	Front wheel speed sensor
B71	Rear wheel speed sensor
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

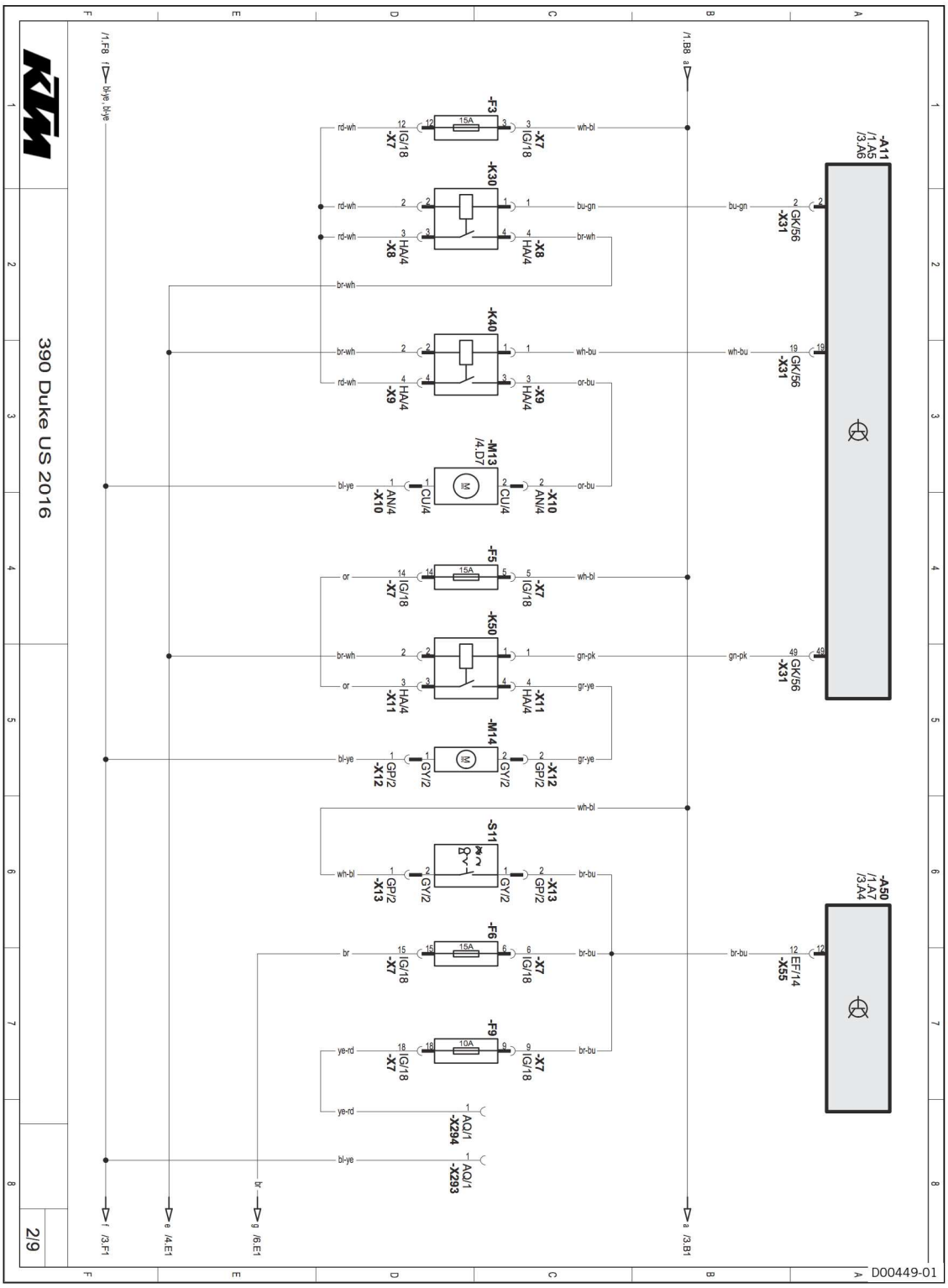
26.10 Page 1 of 9 (US)



Components:

A11	EFI control unit
A50	Alarm system (optional)
A61	Start OK 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	Electric starter system
S23	Emergency OFF switch, electric starter button

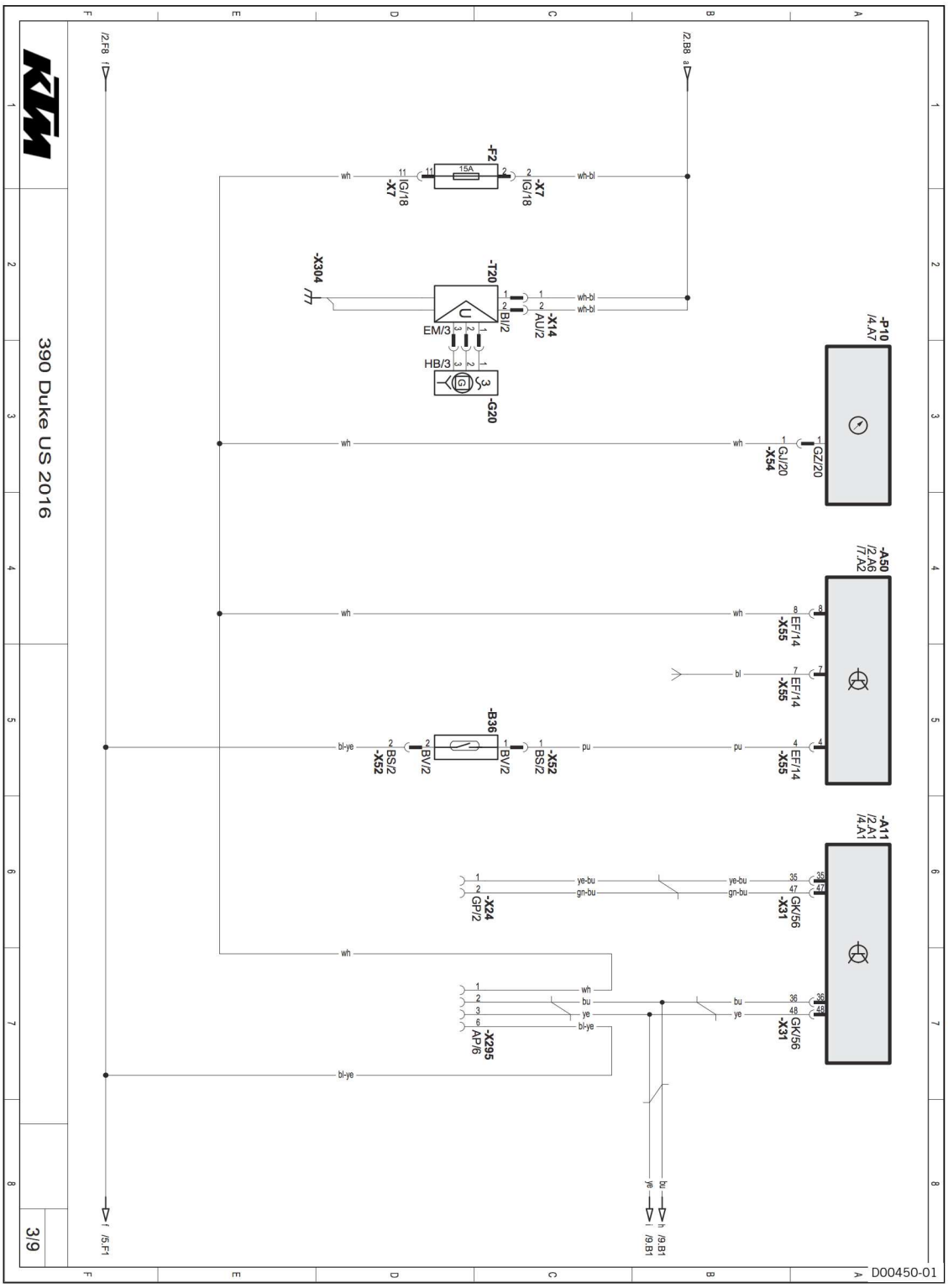
26.11 Page 2 of 9 (US)



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 plus (terminal 15) ACC 2 (not assigned)

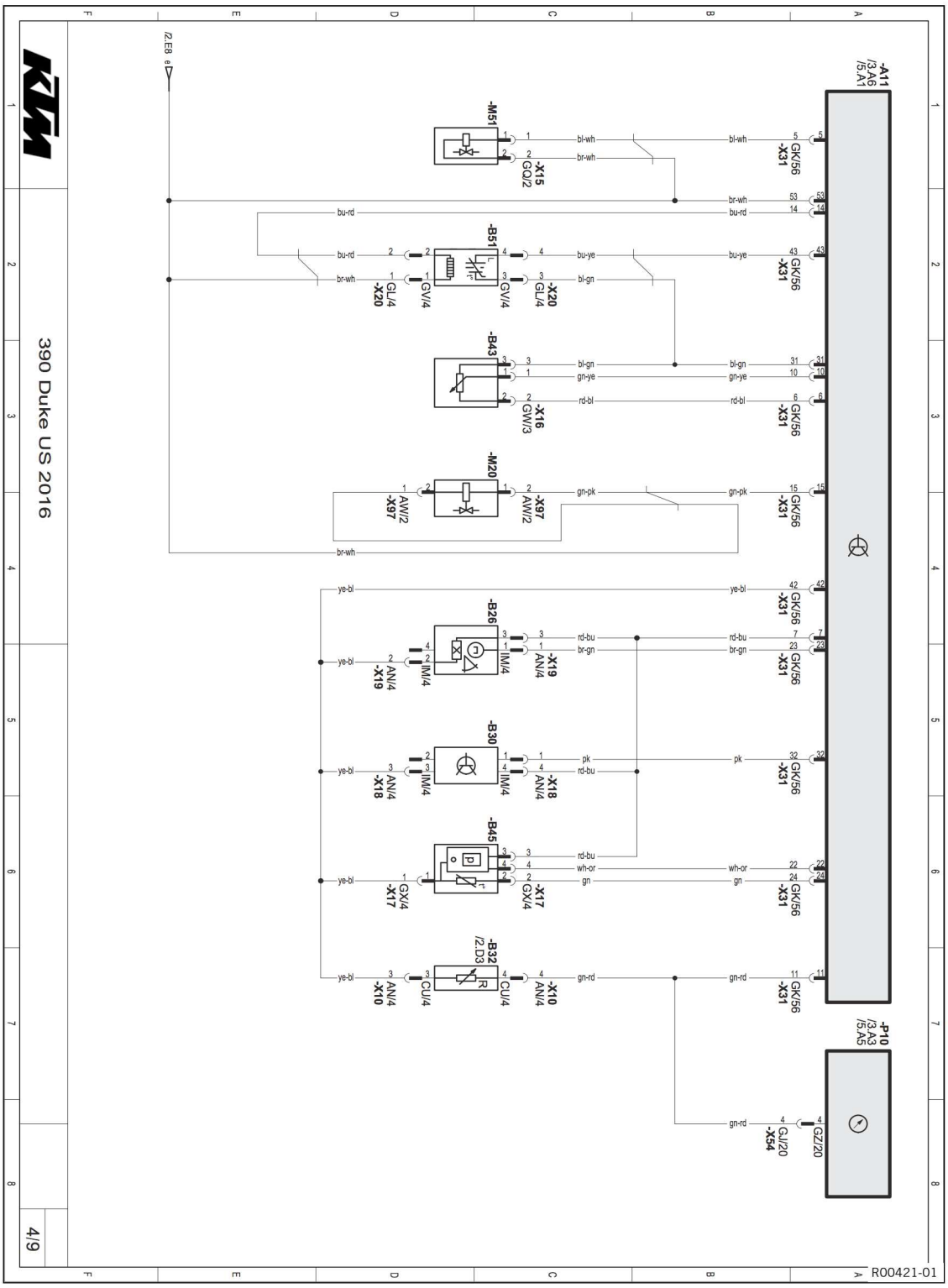
26.12 Page 3 of 9 (US)



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

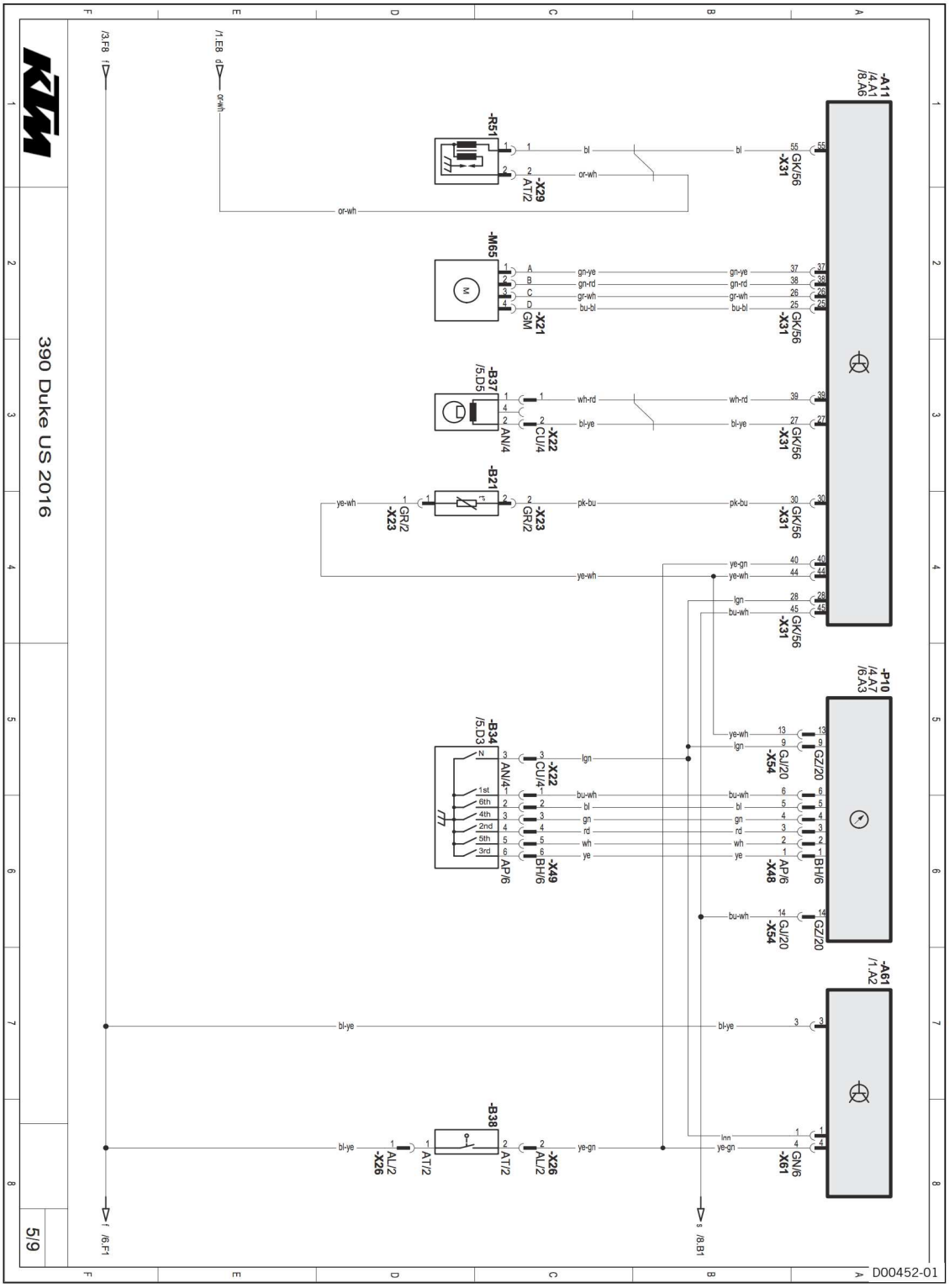
26.13 Page 4 of 9 (US)



Components:

A11	EFI control unit
B43	Throttle valve position sensor
B26	Rollover sensor
B30	Side stand sensor
B32	Fuel level sensor
B45	Manifold temperature and pressure sensor
B51	Lambda sensor
M20	Evaporate emission control valve
M51	Injection valve
P10	Combination instrument

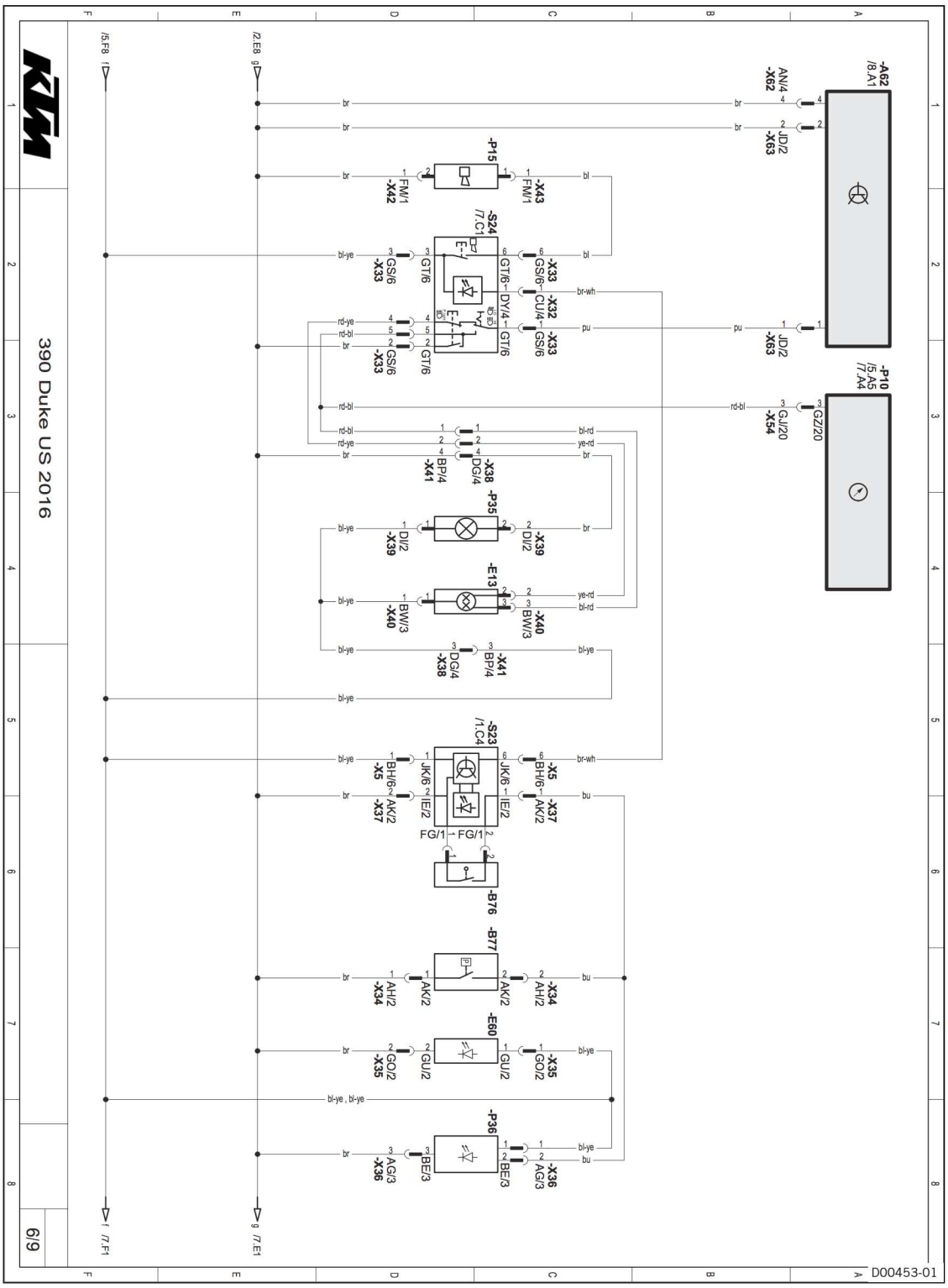
26.14 Page 5 of 9 (US)



Components:

A11	EFI control unit
A61	Start OK control unit
B21	Engine coolant temperature sensor
B34	Gear position sensor
B37	Crankshaft position sensor
B38	Clutch switch
M65	Idle speed actuator
P10	Combination instrument
R51	Ignition coil

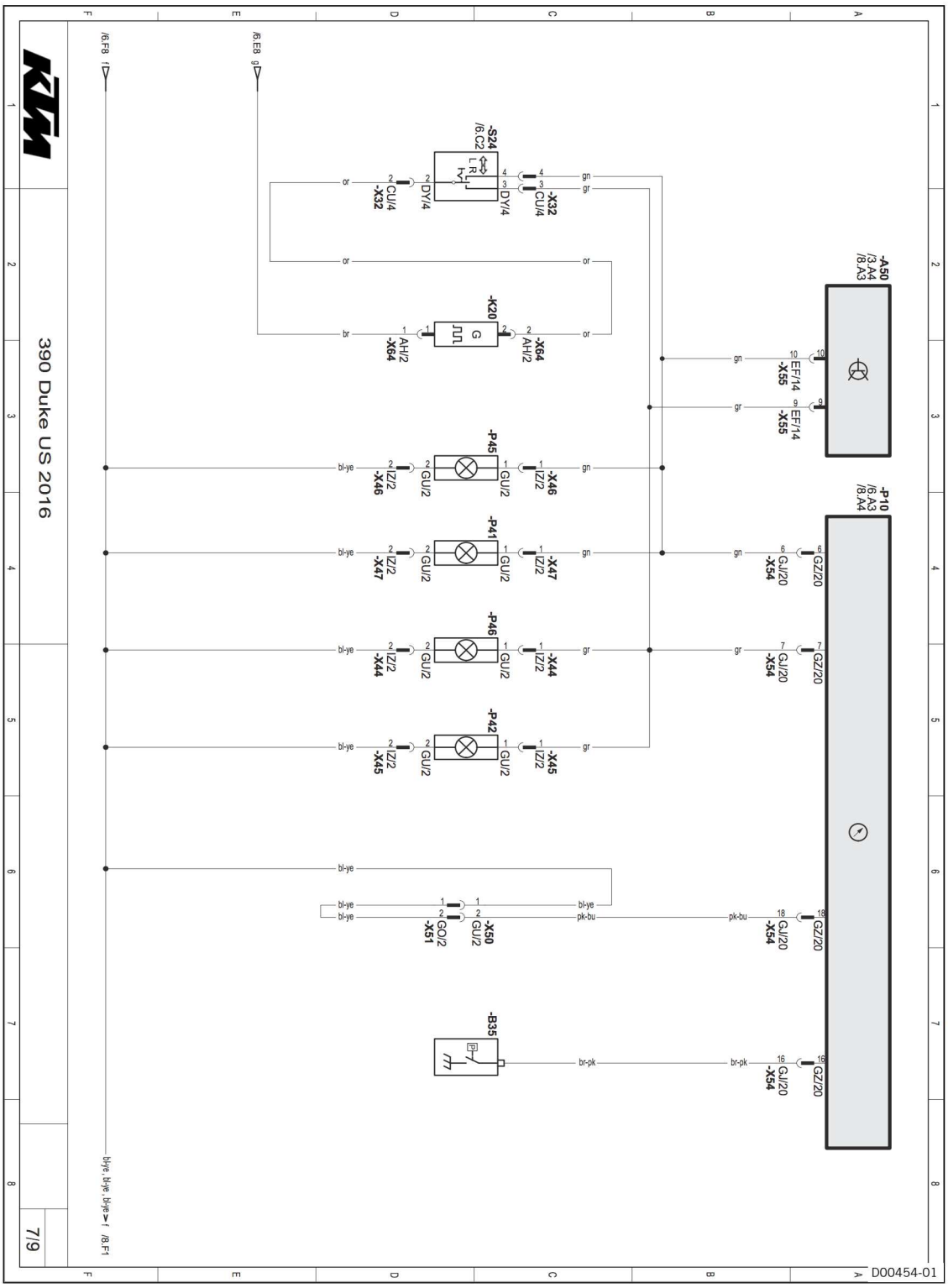
26.15 Page 6 of 9 (US)



Components:

A62	Headlight control unit
B76	Front brake light switch
B77	Rear brake light switch
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

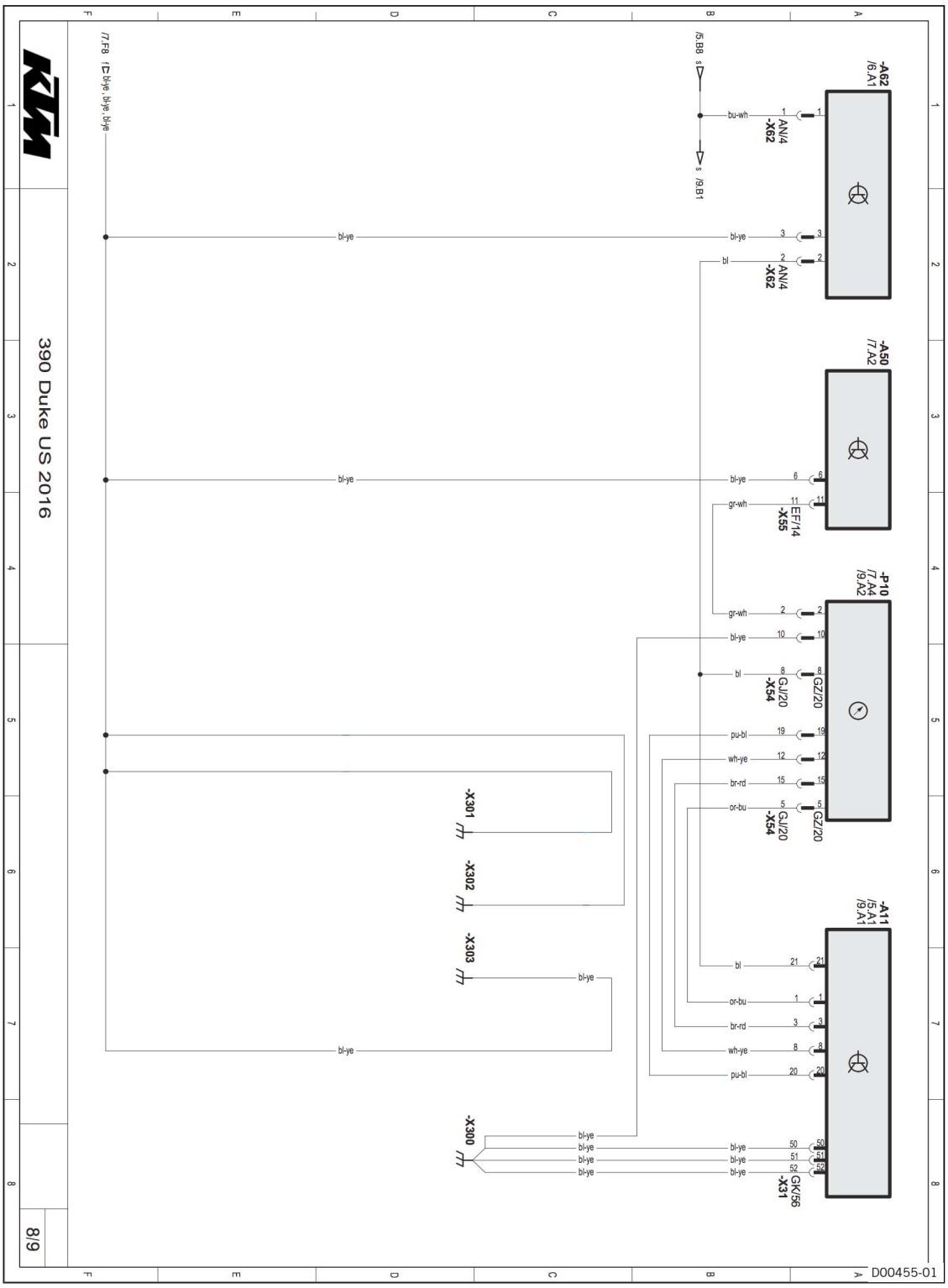
26.16 Page 7 of 9 (US)



Components:

A50	Alarm system (optional)
B35	Oil pressure sensor
K20	Turn signal relay
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

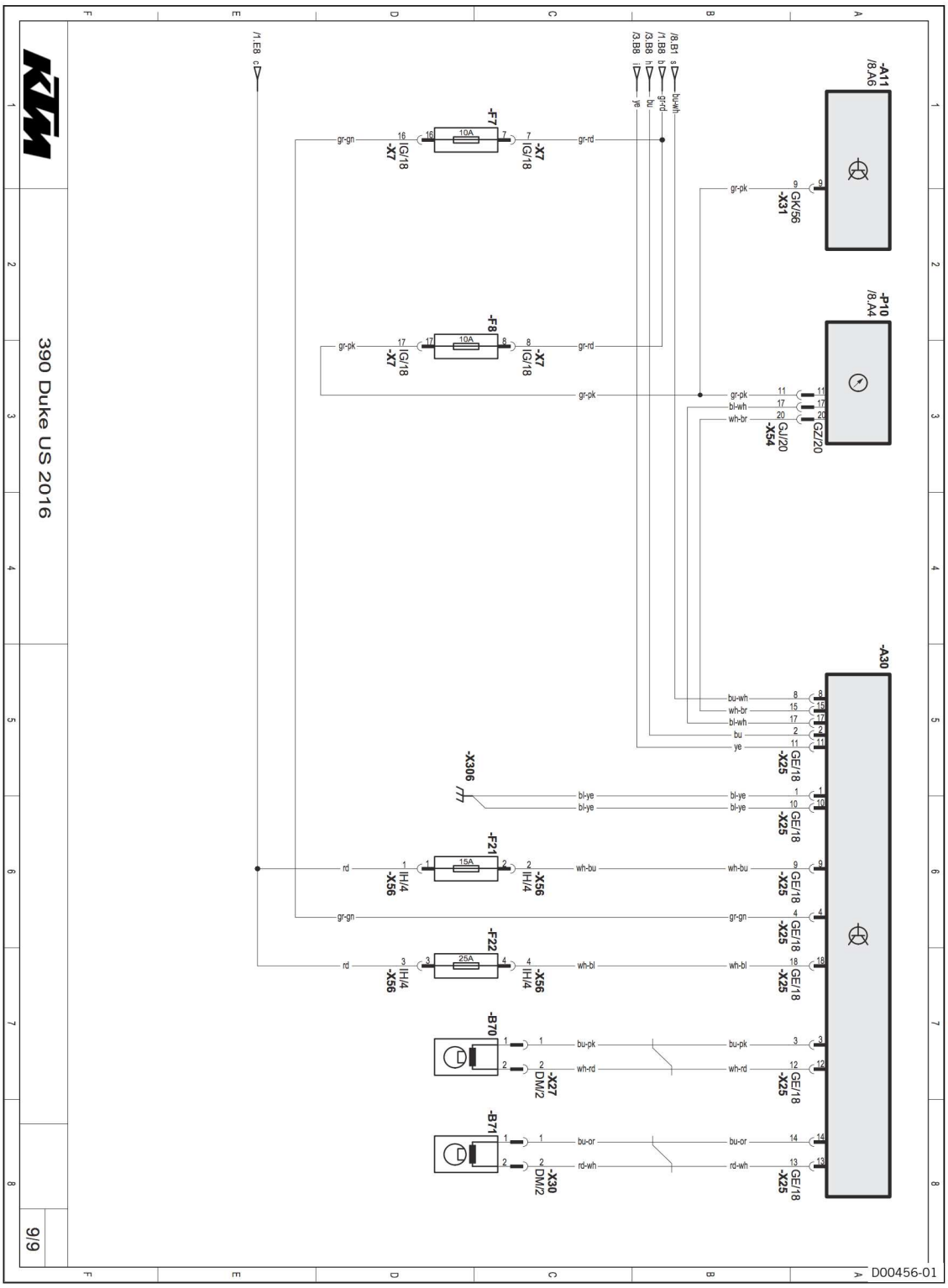
26.17 Page 8 of 9 (US)



Components:

A11	EFI control unit
A50	Alarm system (optional)
A62	Headlight control unit
P10	Combination instrument

26.18 Page 9 of 9 (US)



Components:

A11	EFI control unit
A30	ABS control unit
B70	Front wheel speed sensor
B71	Rear wheel speed sensor
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

Standard/classification
– DOT

Guideline
– Use only brake fluid that complies with the specified standard (see specifications on the container) and that exhibits the corresponding properties.

Recommended supplier
Castrol
– **REACT PERFORMANCE DOT 4**

Motorex®
– **Brake Fluid DOT 5.1**

Coolant

Guideline
– Only use high-grade, silicate-free coolant with corrosion inhibitor additive for aluminum motors. Low grade and unsuitable antifreeze causes corrosion, deposits and frothing.
– Do not use pure water as only coolant is able to meet the requirements needed in terms of corrosion protection and lubrication properties.
– Only use coolant that complies with the requirements stated (see specifications on the container) and that has the relevant properties.

Antifreeze protection to at least	−25 °C (−13 °F)

The mixture ratio must be adjusted to the necessary antifreeze protection. Use distilled water if the coolant needs to be diluted.

The use of premixed coolant is recommended.

Observe the coolant manufacturer specifications for antifreeze protection, dilution and miscibility (compatibility) with other coolants.

Recommended supplier
Motorex®
– **COOLANT M3.0**

Engine oil (SAE 15W/50)

Standard/classification
– JASO T903 MA2 (p. 273)
– SAE (p. 273) (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.

Semi-synthetic engine oil

Recommended supplier
Motorex®
– **Formula 4T**

Fork oil (SAE 4) (48601166S1)

Standard/classification

– SAE (📖 p. 273) (SAE 4)

Guideline

– Use only oils that comply with the specified standards (see specifications on the container) and that exhibit the corresponding properties.

Super unleaded (ROZ 95/RON 95/PON 91)

Standard/classification

– 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).

Super unleaded, type C (ROZ 95/RON 95/PON 91)

Standard/classification

– ANP (Agência Nacional do Petróleo) #57 (ROZ 95/RON 95/PON 91)

Guideline

– Only use super unleaded fuel that matches or is equivalent to the following specifications.

– Super unleaded fuel with an ethanol content of 19 to 27 % is permissible.

Info

Do **not** use fuel made of methanol (e. g. M15, M85, M100).
Do **not** use fuel with less than 19 % ethanol (e. g. E10).
Do **not** use fuel with more than 27 % ethanol (e. g. E30, E85, E100).

Chain cleaner

Recommended supplier
Motorex®
– Chain Clean

Fuel additive

Recommended supplier
Motorex®
– Fuel Stabilizer

High viscosity grease

Recommended supplier
SKF®
– LGHB 2

Long-life grease

Recommended supplier
Motorex®
– Bike Grease 2000

Lubricant (T14034)

Recommended supplier
WP Performance Systems
– WP Racing Grease IPR 2

Motorcycle cleaner

Recommended supplier
Motorex®
– Moto Clean

Perfect Finish and high gloss polish for paints

Recommended supplier
Motorex®
– Moto Shine

Preserving materials for paints, metal and rubber

Recommended supplier
Motorex®
– Moto Protect

Special cleaner for glossy and matte paint finishes, metal and plastic surfaces

Recommended supplier
Motorex®
– Quick Cleaner

Street chain spray

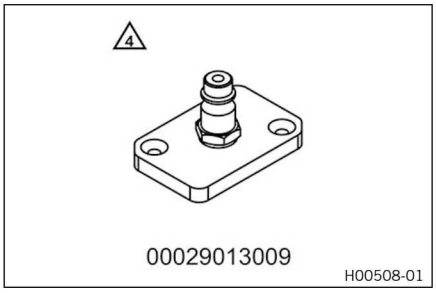
Guideline

Recommended supplier
Motorex®
– **Chainlube Road Strong**

Universal oil spray

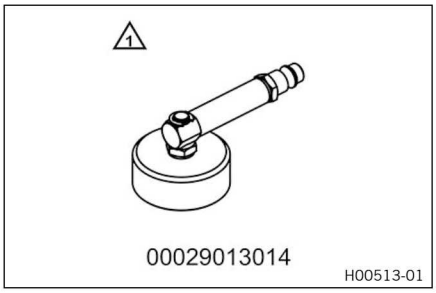
Recommended supplier
Motorex®
– **Joker 440 Synthetic**

Bleeder cover



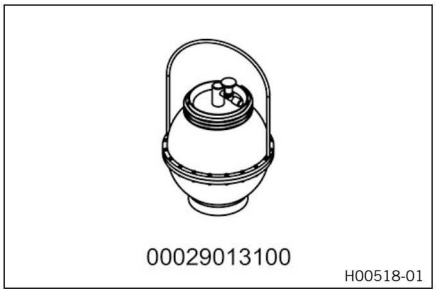
Art. no.: 00029013009

Bleeder cover



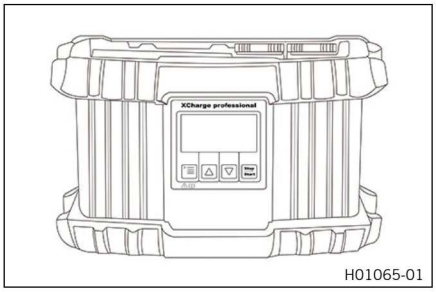
Art. no.: 00029013014

Bleeding device



Art. no.: 00029013100

EU battery charger XCharge-professional

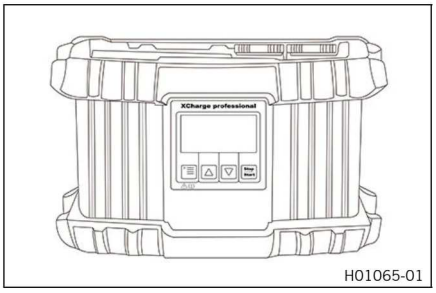


Art. no.: 00029095050

Feature

EU safety plug	
Nominal voltage	230 V
Mains fuse	16 A
Power cable length approx.	5 m (16 ft)
Charger cable length approx.	5 m (16 ft)

US battery charger XCharge-professional

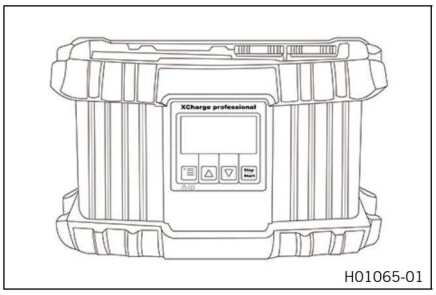


Art. no.: 00029095051

Feature

US plug	
Nominal voltage	120 V
Mains fuse	32 A
Power cable length approx.	5 m (16 ft)
Charger cable length approx.	5 m (16 ft)

UK battery charger XCharge-professional

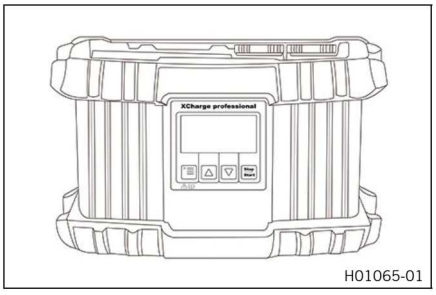


Art. no.: 00029095052

Feature

UK safety plug	
Nominal voltage	230 V
Mains fuse	16 A
Power cable length approx.	5 m (16 ft)
Charger cable length approx.	5 m (16 ft)

CH battery charger XCharge-professional

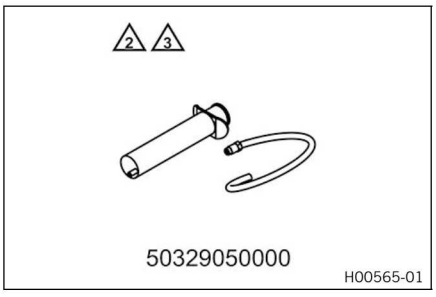


Art. no.: 00029095053

Feature

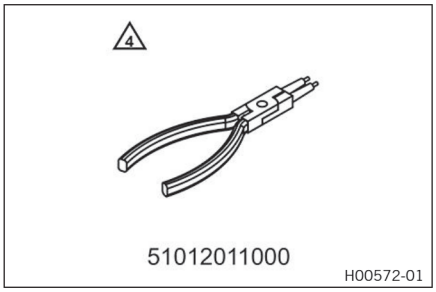
CH plug	
Nominal voltage	230 V
Mains fuse	16 A
Power cable length approx.	5 m (16 ft)
Charger cable length approx.	5 m (16 ft)

Syringe



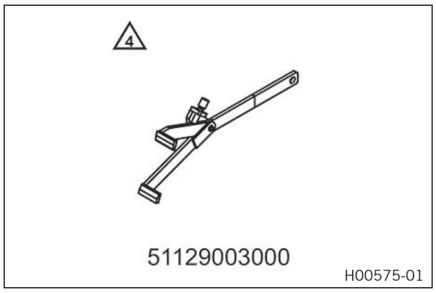
Art. no.: 50329050000

Lock ring plier



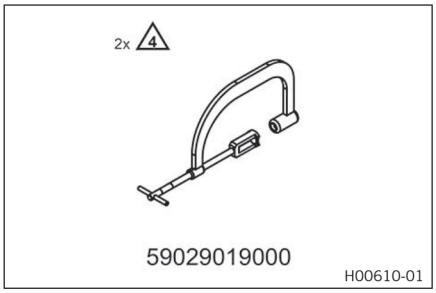
Art. no.: 51012011000

Holding wrench



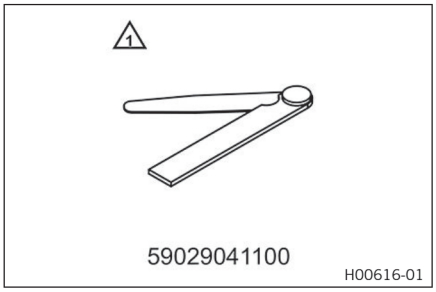
Art. no.: 51129003000

Valve spring mounter



Art. no.: 59029019000

Feeler gauge

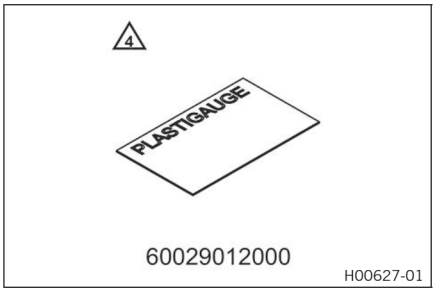


Art. no.: 59029041100

Feature

5 piece	0.10 ... 0.25 mm (0.0039 ... 0.0098 in)

Plastigauge clearance gauge

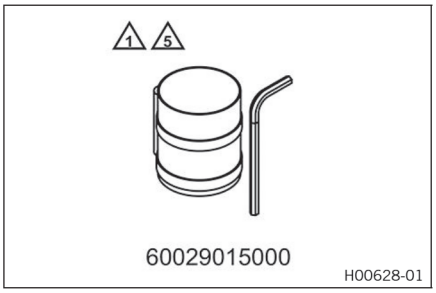


Art. no.: 60029012000

Feature

0.025 ... 0.175 mm (0.00098 ... 0.00689 in)

Piston ring mounting tool

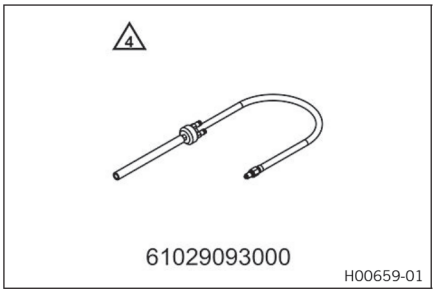


Art. no.: 60029015000

Feature

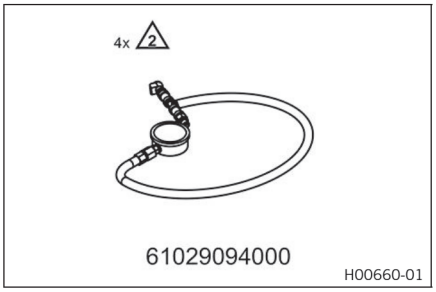
Height	80 mm (3.15 in)
Diameter	57 ... 125 mm (2.24 ... 4.92 in)

Testing hose



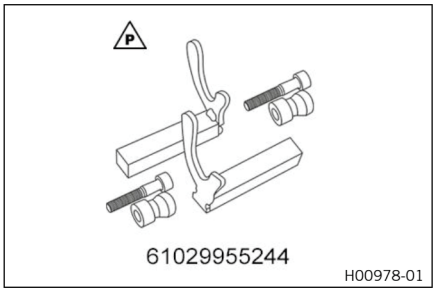
Art. no.: 61029093000

Pressure testing tool



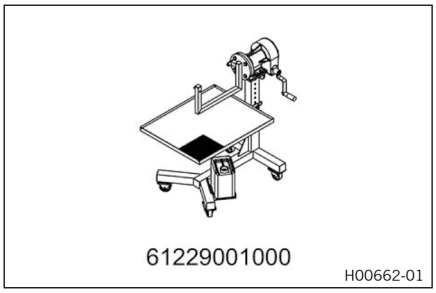
Art. no.: 61029094000

Universal V adapter with bushings



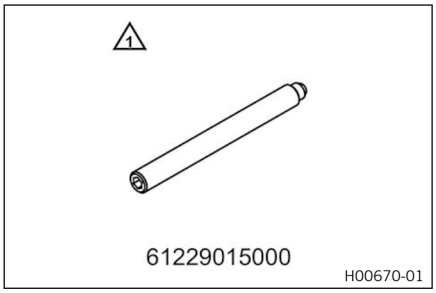
Art. no.: 61029955244

Engine work stand



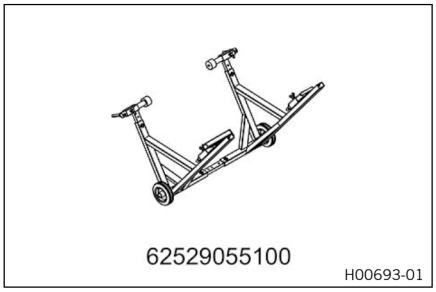
Art. no.: 61229001000

Locking screw



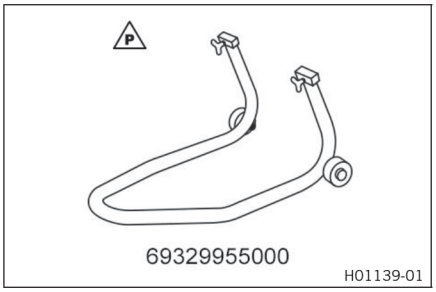
Art. no.: 61229015000

Work stand



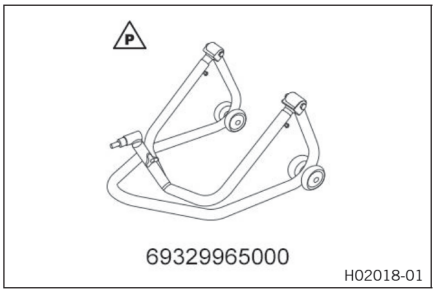
Art. no.: 62529055100

Rear wheel work stand



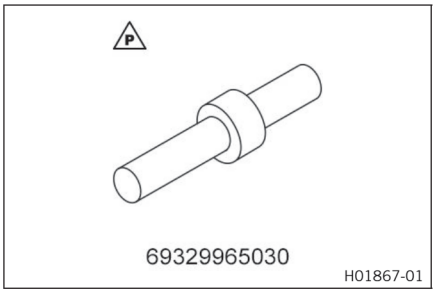
Art. no.: 69329955000

Front wheel work stand, large



Art. no.: 69329965000

Mounting pin

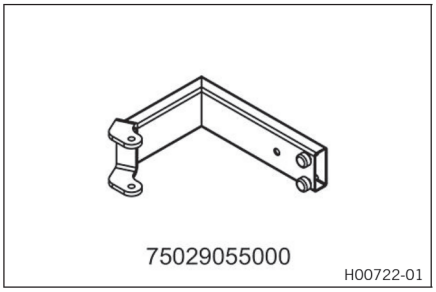


Art. no.: 69329965030

Feature

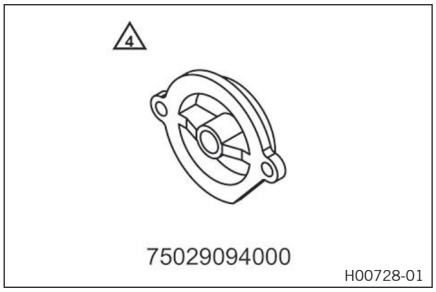
Diameter	19 mm (0.75 in)

Floor jack attachment



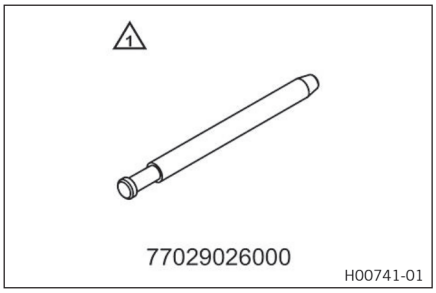
Art. no.: 75029055000

Oil pressure adapter



Art. no.: 75029094000

Limit plug gauge

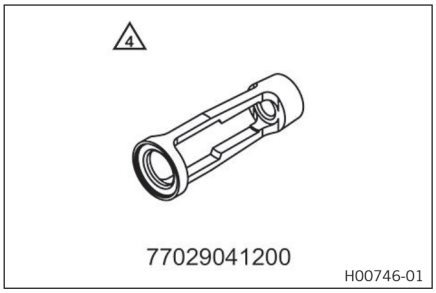


Art. no.: 77029026000

Feature

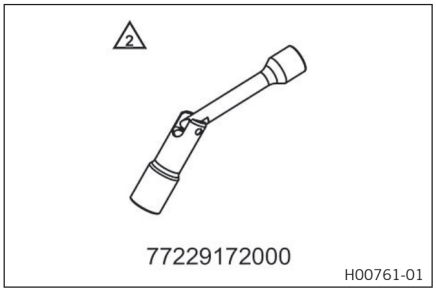
Diameter	5.05 mm (0.1988 in)

Insert for valve spring lever



Art. no.: 77029041200

Spark plug wrench with link

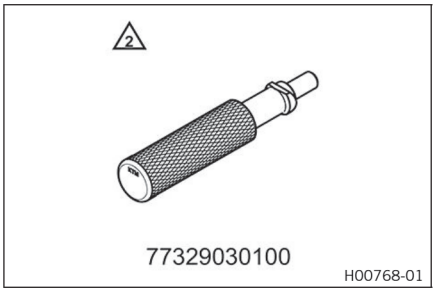


Art. no.: 77229172000

Feature

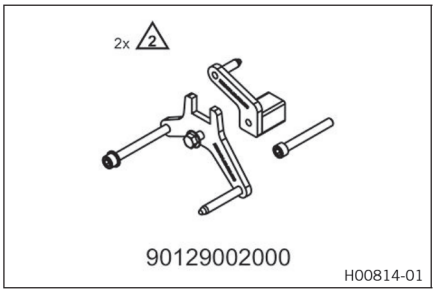
Drive	3/8 in
Hexagonal part	14 mm (0.55 in)
Length	130 mm (5.12 in)

Insertion for piston ring lock



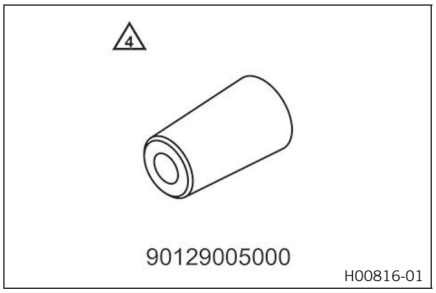
Art. no.: 77329030100

Holder and fitting for work stand



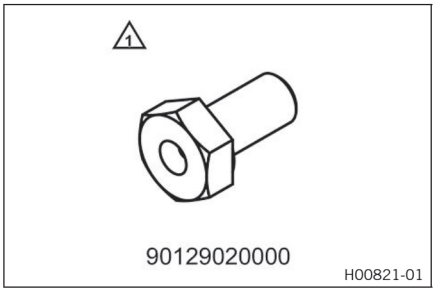
Art. no.: 90129002000

Protection cap



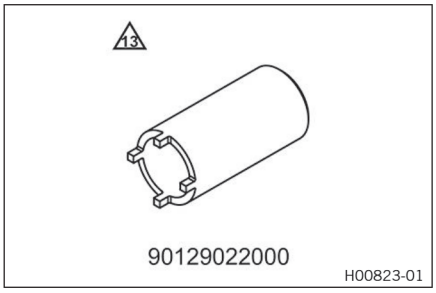
Art. no.: 90129005000

Pressing tool



Art. no.: 90129020000

Groove nut wrench

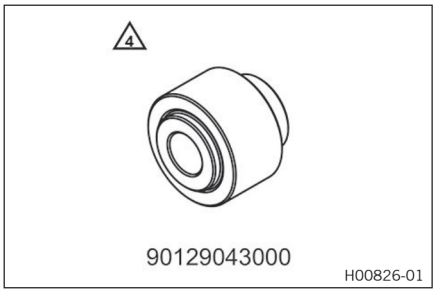


Art. no.: 90129022000

Feature

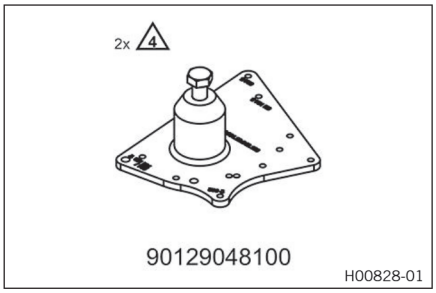
Drive	1/2 in
Outside diameter	43 mm (1.69 in)
Length	92 mm (3.62 in)

Pressing tool



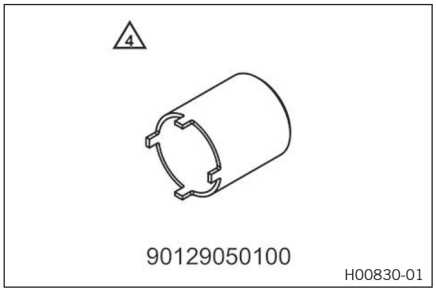
Art. no.: 90129043000

Puller



Art. no.: 90129048100

Groove nut wrench

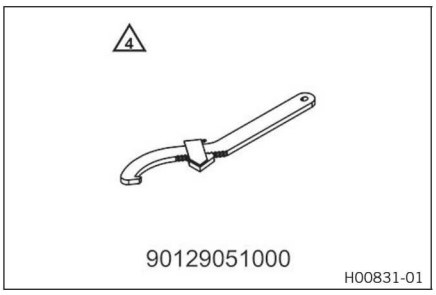


Art. no.: 90129050100

Feature

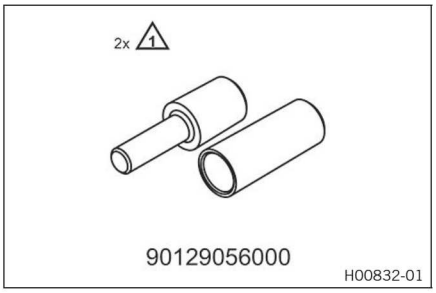
Drive	1/2 in
Outside diameter	51 mm (2.01 in)
Length	60 mm (2.36 in)

Holding wrench



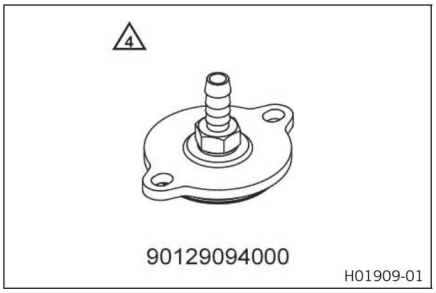
Art. no.: 90129051000

Pressing tool



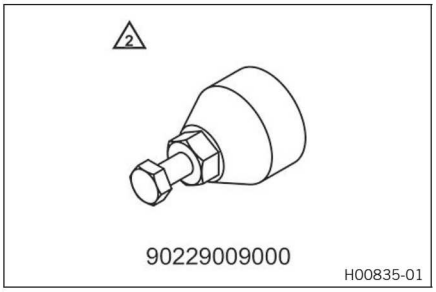
Art. no.: 90129056000

Oil pressure adapter



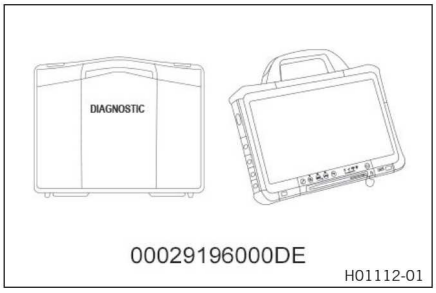
Art. no.: 90129094000

Puller



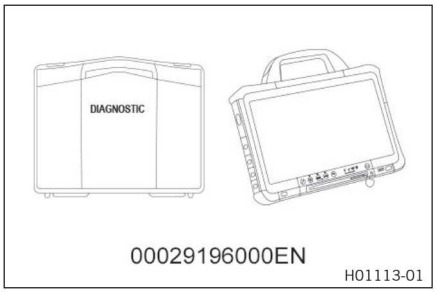
Art. no.: 90229009000

XC_1 NG DE



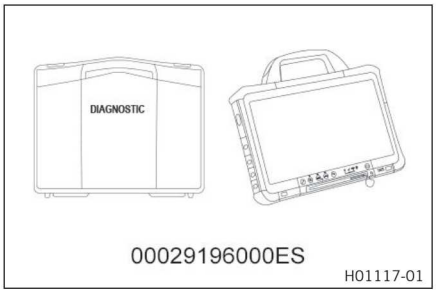
Art. no.: 00029196000DE

XC_1 NG EN



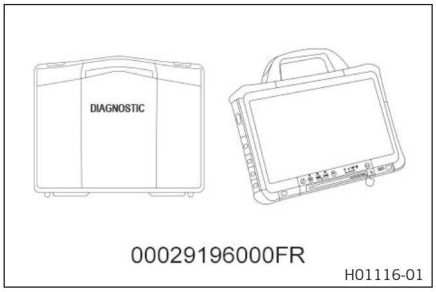
Art. no.: 00029196000EN

XC_1 NG ES



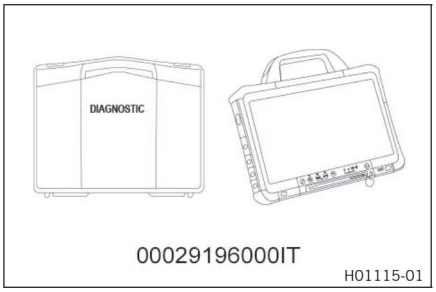
Art. no.: 00029196000ES

XC_1 NG FR



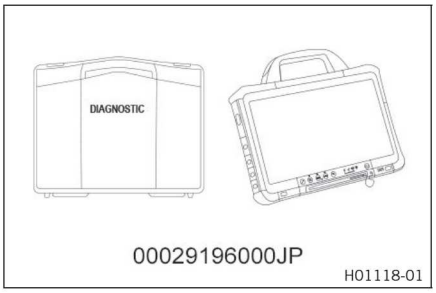
Art. no.: 00029196000FR

XC_1 NG IT



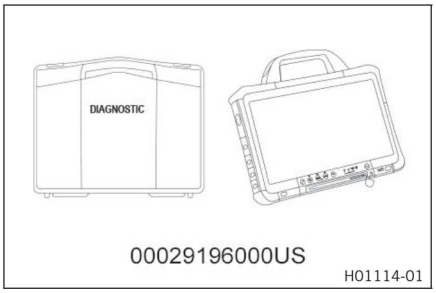
Art. no.: 00029196000IT

XC_1 NG JP



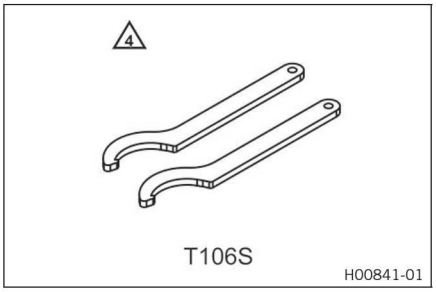
Art. no.: 00029196000JP

XC_1 NG US



Art. no.: 00029196000US

Hook wrench

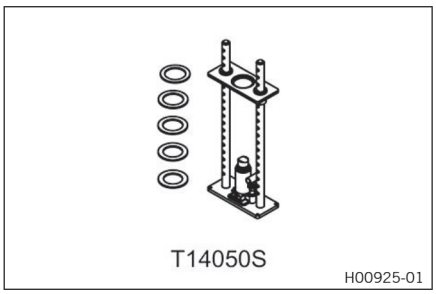


Art. no.: T106S

Feature

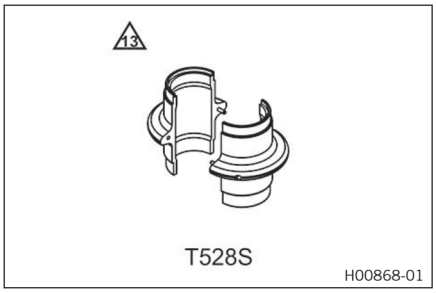
Diameter	68 ... 75 mm (2.68 ... 2.95 in)

Spring compressor



Art. no.: T14050S

Mounting tool

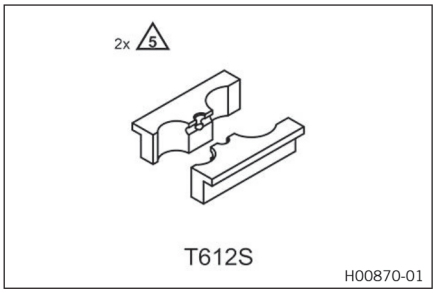


Art. no.: T528S

Feature

Diameter	43 mm (1.69 in)

Clamping stand

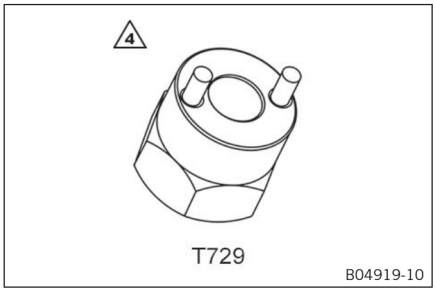


Art. no.: T612S

Feature

Diameter	40 mm (1.57 in)
Diameter	54 mm (2.13 in)

Socket



Art. no.: T729

Feature

Hexagonal part	32 mm (1.26 in)
Hole diameter	14 mm (0.55 in)
Pin diameter	3.8 mm (0.15 in)

JASO T903 MA2

Different technical development directions required a separate specification for motorcycles – the **JASO T903 MA2** standard.
Earlier, engine oils from the automobile industry were used for motorcycles because there was no separate motorcycle specification.
Whereas long service intervals are demanded for automobile engines, the focus for motorcycle engines is on high performance at high engine speeds.
In most motorcycle engines, the transmission and clutch are lubricated with the same oil.
The **JASO T903 MA2** 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.

ABS	ABS	Safety system that prevents locking of the wheels when driving straight ahead without the influence of lateral forces

Art. no.	Article number
ca.	circa
cf.	compare
e.g.	for example
etc.	et cetera
i.a.	inter alia
no.	number
poss.	possibly

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