

**350 EXC-F EU
350 EXC-F AUS
350 EXC-F SIX DAYS EU
350 XCF-W USA
350 EXC-F USA**

Art. no. 3206148en



KTM

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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).



Indicates information with more details or tips.



Indicates the result of a testing step.



Denotes a voltage measurement.



Denotes a current measurement.



Denotes a resistance measurement.

1.2 Formats used

The typographical formats used in this document are explained below.

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

Read this Repair Manual carefully and thoroughly before beginning work. It contains useful information and tips that will help you repair and maintain your vehicle.

This manual assumes that the necessary special KTM tools and KTM workplace and workshop equipment are available.

2.2 Safety advice

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



Info

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

2.3 Degrees of risk and symbols



Danger

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



Warning

Identifies a danger that is likely to lead to fatal or serious injury if the appropriate measures are not taken.



Caution

Identifies a danger that may lead to minor injuries if the appropriate measures are not taken.

Note

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



Warning

Identifies a danger that will lead to environmental damage if the appropriate measures are not taken.

2.4 Work rules

Special tools are necessary for certain tasks. The tools are not contained in the vehicle but can be ordered under the number in parentheses. E.g.: bearing puller (15112017000)

During assembly, non-reusable parts (e.g. self-locking screws and nuts, seals and seal rings, O-rings, pins, lock washers) must be replaced by new parts.

In some instances, a thread locker (e.g. **Loctite**®) is required. The manufacturer instructions for use must be followed.

After disassembly, clean the parts that are to be reused and check them for damage and wear. Change damaged or worn parts.

After you complete the repair or service work, check the operating safety of the vehicle.

3.1 Guarantee, warranty

The work prescribed in the service schedule must be carried out by an authorized KTM workshop only and confirmed in the customer's service record and in the **KTM dealer.net**; otherwise, all warranty claims will be void. No warranty claims can be considered for damage resulting from manipulations and/or alterations to the vehicle.

Additional information on the guarantee or warranty and the procedures involved can be found in the service record.

3.2 Operating and auxiliary substances



Warning

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

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

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

3.3 Spare parts, accessories

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

The current **KTM PowerParts** for your vehicle can be found on the KTM website.

International KTM Website: <http://www.ktm.com>

3.4 Figures

The figures contained in the manual may depict special equipment.

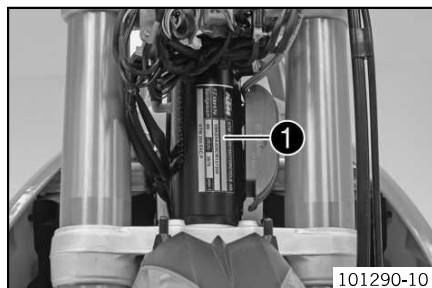
In the interest of clarity, some components may be shown disassembled or may not be shown at all. It is not always necessary to disassemble the component to perform the activity in question. Please follow the instructions in the text.

4.1 Chassis number



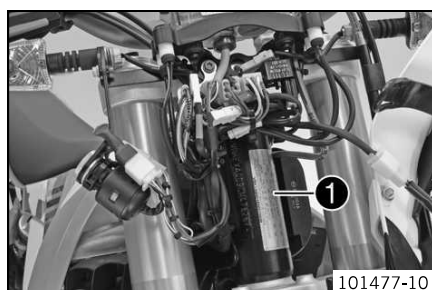
The chassis number ❶ is stamped on the steering head on the right.

4.2 Type label



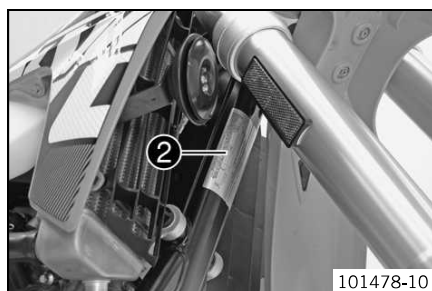
(XCF-W, EXC-F EU/AUS, EXC-F SIX DAYS)

The type label ❶ is fixed to the front of the steering head.



(EXC-F USA)

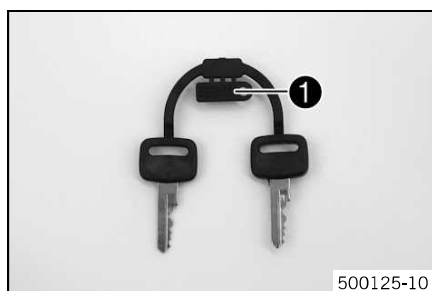
The type label USA ❶ is fixed to the front of the steering head.



(EXC-F USA)

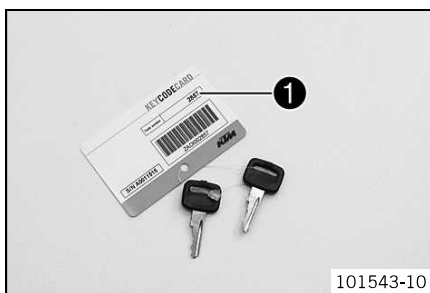
The type label Canada ❷ is fixed to the front of the front pipe.

4.3 Key number (All EXC-F models)



(EXC-F EU/AUS, EXC-F SIX DAYS)

The key number ❶ for the steering lock is stamped onto the key connector.



(EXC-F USA)

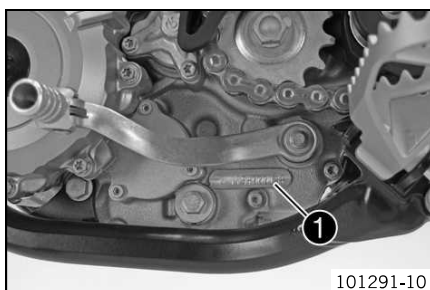
Key number ❶ for the ignition and steering lock is indicated on the **KEYCODECARD**.



Info

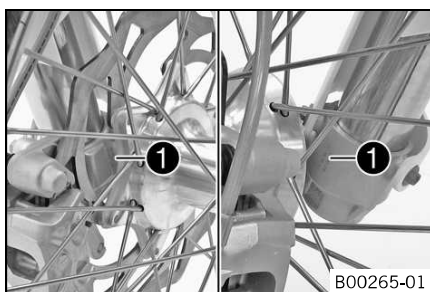
You need the key number to order a replacement key. Keep the **KEYCODECARD** in a safe place.

4.4 Engine number



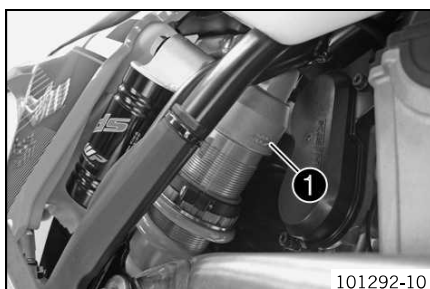
The engine number ❶ is stamped on the left side of the engine under the engine sprocket.

4.5 Fork part number



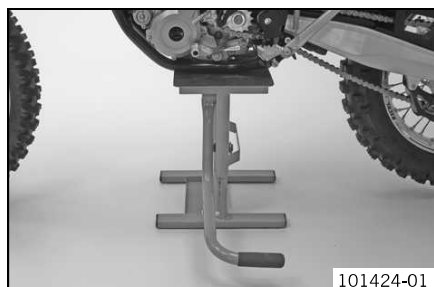
The fork part number ❶ is stamped on the inner side of the fork stub.

4.6 Shock absorber part number



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

5.1 Raising the motorcycle with the lift stand



Note

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

- Always place the vehicle on a firm and even surface.
- Raise the motorcycle at the frame underneath the engine.

Lift stand (54829055000) (🔧 p. 293)

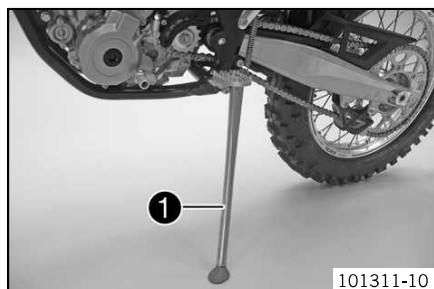
- ✓ The wheels should no longer touch the ground.
- Secure the motorcycle against falling over.

5.2 Removing the motorcycle from the lift stand

Note

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

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



- Remove the motorcycle from the lift stand.
- Remove the lift stand.
- To park the motorcycle, press the side stand ❶ to the ground with your foot and lean the motorcycle on it.

Info

When you are riding, the side stand must be folded up and secured with the rubber band.

5.3 Starting



Danger

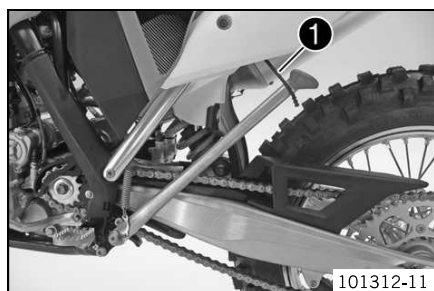
Danger of poisoning Exhaust gases are toxic and inhaling them may result in unconsciousness and/or death.

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

Note

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

- Always warm up the engine at low engine speeds.



- Raise the motorcycle off of the stand and secure the stand with the rubber band ❶.
- Shift transmission to neutral.

(EXC-F USA)

- Turn the key in the ignition lock to the position 0.
- Turn the emergency OFF switch to the position 0.

(EXC-F AUS)

- Turn the emergency OFF switch to the position 0.

Condition

Ambient temperature: < 20 °C (< 68 °F)

- Pull the idle speed adjusting screw all the way out.
- Press the electric starter button or press the kick starter robustly through its full range.

Info

Press the electric starter button for at most 5 seconds. Wait for a least 5 seconds before trying again.

Warning lamp FI lights up briefly as a functional control when starting.



400733-01

5.4 Starting the motorcycle for a check



Danger

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

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





Info


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

- Shift transmission to neutral.

(EXC-F USA)

- Turn the key in the ignition lock to the position .
- Turn the emergency OFF switch to the position .

(EXC-F AUS)

- Turn the emergency OFF switch to the position .
- Press the electric starter button or press the kickstarter robustly through its full range.



Info

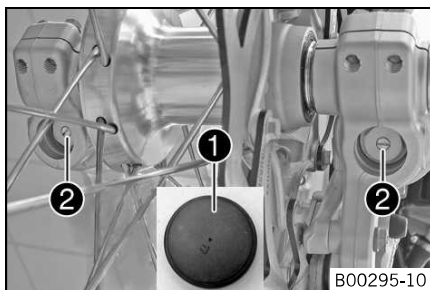
Do not open the throttle.

6.1 EXC-F EU/AUS/USA, XCF-W

6.1.1 Adjusting the compression damping of the fork

i Info

The hydraulic compression damping determines the fork suspension behavior.



- Remove protection caps ❶.
- Turn adjusting screws ❷ clockwise all the way.

i Info

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

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

Guideline

Compression damping	
Comfort	22 clicks
Standard	20 clicks
Sport	18 clicks

i Info

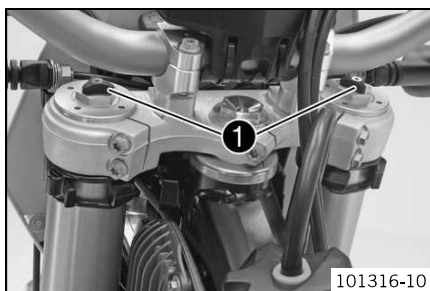
Turn clockwise to increase damping; turn counterclockwise to reduce damping.

- Mount protection covers ❶.

6.1.2 Adjusting the rebound damping of the fork

i Info

The hydraulic rebound damping determines the fork suspension behavior.



- Turn adjusting screws ❶ clockwise all the way.

i Info

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

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

Guideline

Rebound damping	
Comfort	20 clicks
Standard	18 clicks
Sport	16 clicks

i Info

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

6.1.3 Adjusting the spring preload of the fork



- Turn the adjusting screws counterclockwise all the way.

i Info

Make the same adjustment on both fork legs.

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

Guideline

Spring preload - Preload Adjuster	
Comfort	1 turn
Standard	2 turns
Sport	2 turns

**Info**

Turn clockwise to increase spring preload; turn counterclockwise to reduce spring preload.

Adjusting the spring preload has no influence on the absorption setting of the rebound damping.

Basically, however, you should set the rebound damping higher with a higher spring preload.

6.1.4 Bleeding fork legs**Preparatory work**

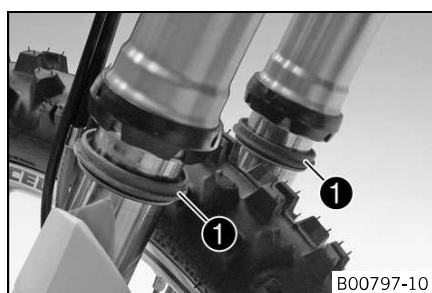
- Raise the motorcycle with the lift stand. (🔧 p. 11)

Main work

- Release bleeder screws ❶.
- ✓ Any excess pressure escapes from the interior of the fork.
- Mount and tighten bleeder screws.

Finishing work

- Remove the motorcycle from the lift stand. (🔧 p. 11)

6.1.5 Cleaning the dust boots of the fork legs**Preparatory work**

- Raise the motorcycle with the lift stand. (🔧 p. 11)
- Loosen the fork protector. (🔧 p. 15)

Main work

- Push dust boot ❶ down on both fork leg.

**Info**

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

**Warning**

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

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

- Clean and lubricate the dust boot and inside fork tube on both fork legs.

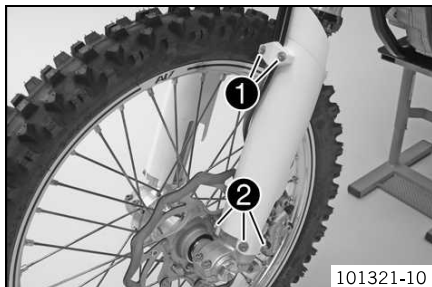
Universal oil spray (🔧 p. 291)

- Press the dust boots back into the installation position.
- Remove excess oil.

Finishing work

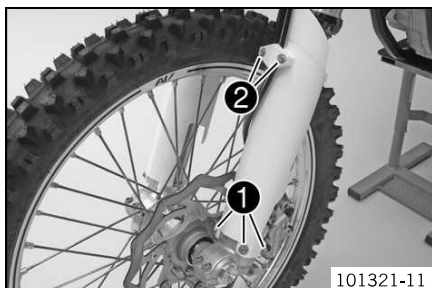
- Position the fork protection. (🔧 p. 15)
- Remove the motorcycle from the lift stand. (🔧 p. 11)

6.1.6 Loosening the fork protector



- Remove screws ❶ and remove the clamp.
- Remove screws ❷ on the left fork leg. Push the fork protector downwards.
- Remove the screws on the right fork leg. Push the fork protector downwards.

6.1.7 Positioning the fork protection



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

Guideline

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

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

Guideline

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

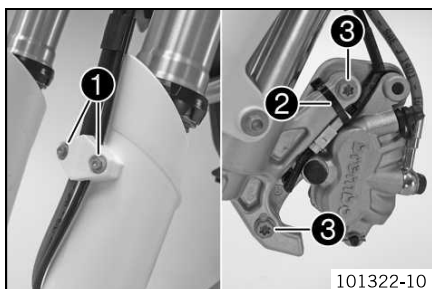
6.1.8 Removing the fork legs

Preparatory work

- Remove the headlight mask with the headlight. (☛ p. 97)
- Raise the motorcycle with the lift stand. (☛ p. 11)
- Remove the front wheel. (☛ p. 101)

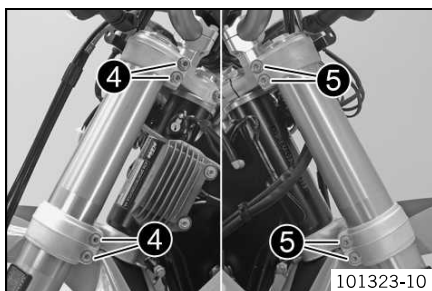
Main work

- Remove screws ❶ and take off the clamp.
- Remove cable binder ❷.
- Remove screws ❸ and take off the brake caliper.
- Allow the brake caliper and brake line to hang tension-free to the side.



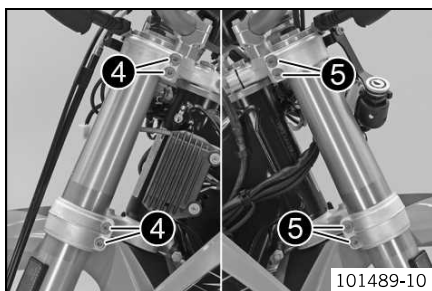
(XCF-W, EXC-F EU/AUS)

- Release screws ❹. Take out the left fork leg.
- Release screws ❺. Take out the right fork leg.



(EXC-F USA)

- Release screws ❹. Take out the left fork leg.
- Release screws ❺. Take out the right fork leg.



6.1.9 Installing the fork legs

**Main work**
(XCF-W, EXC-F EU/AUS)

- Position the fork legs.

**Info**

Grooves are milled into the side of the upper end of the fork legs. The second milled groove (from the top) must be flush with the top edge of the upper triple clamp.

Position bleeder screws ❶ toward the front.

- Tighten screws ❷.

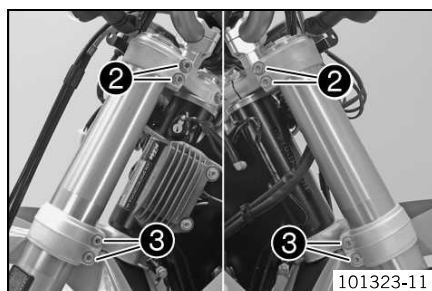
Guideline

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

- Tighten screws ❸.

Guideline

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



(EXC-F USA)

- Position the fork legs.

**Info**

Grooves are milled into the side of the upper end of the fork legs. The second milled groove (from the top) must be flush with the top edge of the upper triple clamp.

Position bleeder screws ❶ toward the front.

- Tighten screws ❷.

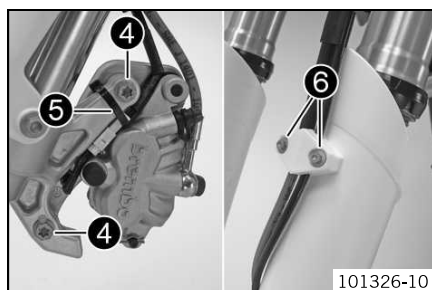
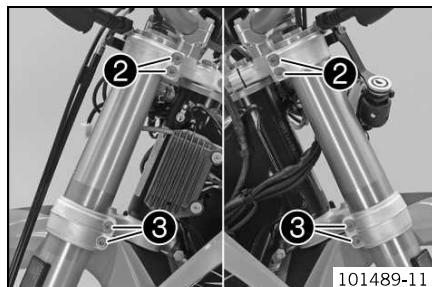
Guideline

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

- Tighten screws ❸.

Guideline

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



- Position the brake caliper and mount and tighten screws ❹.

Guideline

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

- Mount cable binder ❺.
- Position the brake line, wiring harness and clamp. Mount and tighten screws ❻.

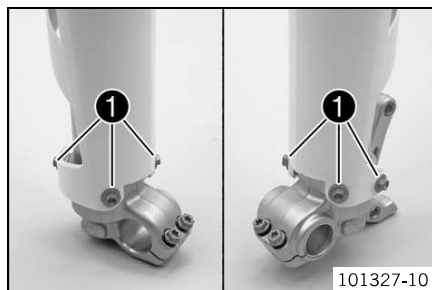
Finishing work

- Install the front wheel. (☛ p. 101)
- Refit the headlight mask with the headlight. (☛ p. 97)
- Check the headlight setting. (☛ p. 127)

6.1.10 Removing the fork protector

Preparatory work

- Remove the headlight mask with the headlight. (☛ p. 97)
- Raise the motorcycle with the lift stand. (☛ p. 11)
- Remove the front wheel. (☛ p. 101)

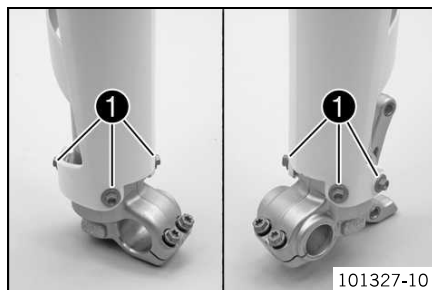


- Remove the fork legs. (☛ p. 15)

Main work

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

6.1.11 Installing the fork protector



Main work

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

Guideline

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

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

Guideline

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

Finishing work

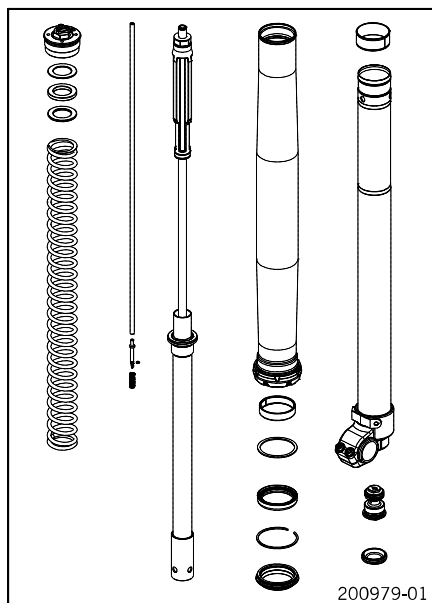
- Install the fork legs. (☛ p. 16)
- Install the front wheel. (☛ p. 101)
- Refit the headlight mask with the headlight. (☛ p. 97)
- Check the headlight setting. (☛ p. 127)

6.1.12 Performing a fork service



Info

These operations are the same on both fork legs.



Condition

The fork legs have been removed.

- Disassemble the fork legs. (☛ p. 17)
- Disassemble the cartridge. (☛ p. 20)
- Check the fork legs. (☛ p. 22)
- Assemble the cartridge. (☛ p. 24)
- Assemble the fork legs. (☛ p. 26)

6.1.13 Disassembling the fork legs



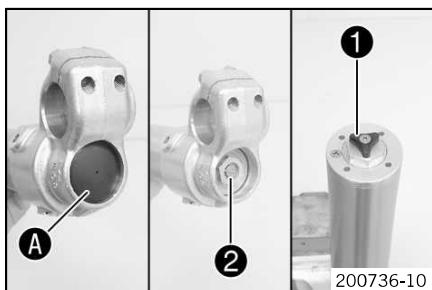
Info

The steps are identical for both fork legs.

Condition

The fork legs are disassembled.

- Remove protective cover **A**.
- Note down the present state of rebound damping **1** and compression damping **2**.
- Note down of the present state of the spring preload.
- Completely open the adjusters of the rebound damping and compression damping.



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

Clamping stand (T1403S) (☛ p. 303)



- Loosen **Preload Adjuster 3**.

Pin wrench (T103) (☛ p. 300)



Info

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

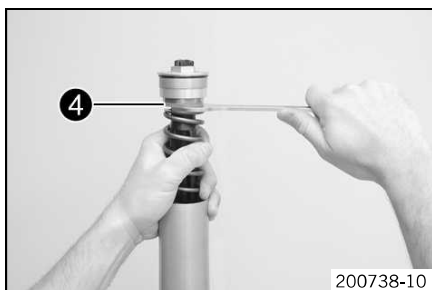


- Take out the fork leg and clamp with the axle clamp.



Info

Use soft jaws.



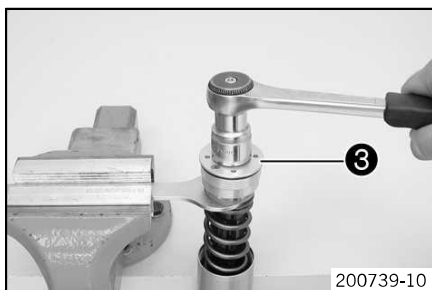
- Push the outer tube downward.
- Pull the spring downward. Place the special tool on the hexagonal part.

Open-end wrench (T14032) (☛ p. 303)

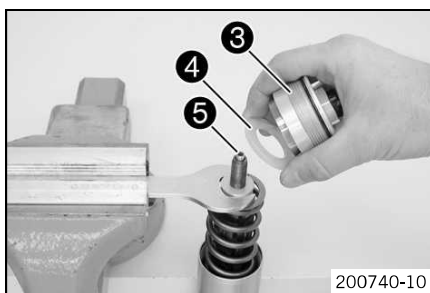


Info

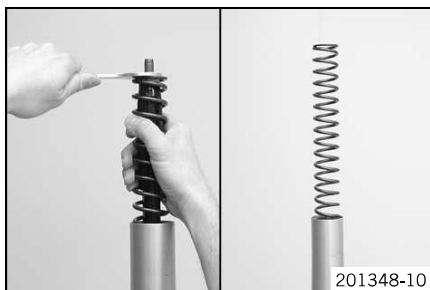
The preload spacers **4** should be above the special tool.



- Clamp the special tool in the bench vise. Loosen **Preload Adjuster 3**.



- Remove **Preload Adjuster** ③ with preload spacers ④.
- Remove adjustment tube ⑤.



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

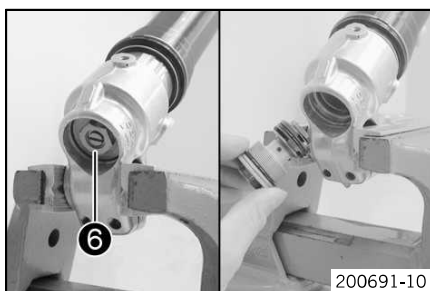


- Drain the fork oil.



Info

Pull out and push in the piston rod a few times to empty the cartridge.



- Clamp the fork leg with the axle clamp.

Guideline

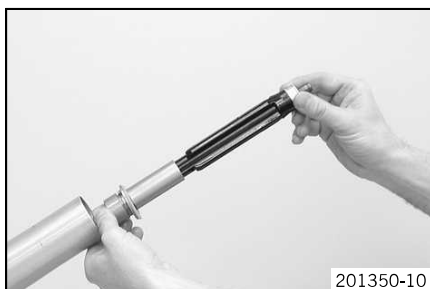
Use soft jaws.

- Unscrew and remove the compression damping fitting ⑥.

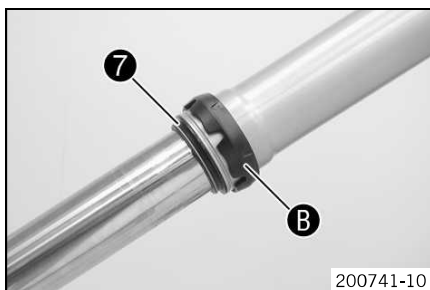


Info

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



- Remove the cartridge.

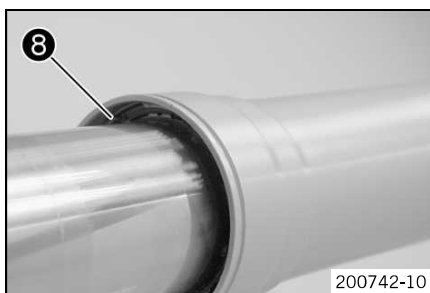


- Remove dust boot ⑦.
- Remove fork protector ring ⑧.



Info

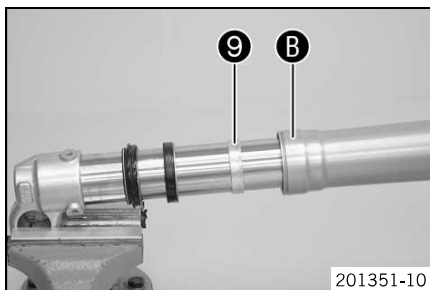
The fork protector ring does not necessarily need to be disassembled for the further repair.



- Remove lock ring **8**.


Info

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



- Warm up the outer tube in area **B** of the lower sliding bushing.

Guideline

50 °C (122 °F)

- Jerk the outer tube out of the inner tube.


Info

The lower sliding bushing **9** must be pulled out of its bearing seat when doing this.



- Remove upper sliding bushing **10**.


Info

Gently pull them apart without using any tool.



- Take off the lower sliding bushing **9**.
- Take off support ring **11**.
- Take off seal ring **12**.
- Take off lock ring **8**.
- Take off dust boot **7**.
- Take out the fork leg.

6.1.14 Cartridge disassembly


Info

The steps are identical for both fork legs.

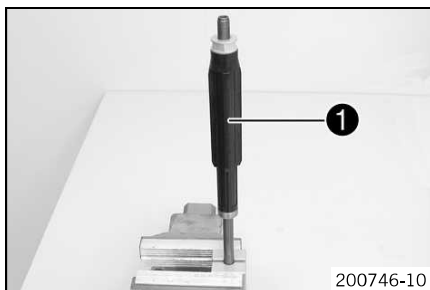
Preparatory work

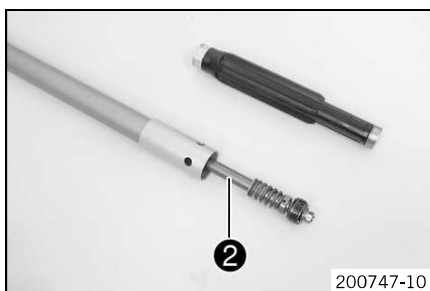
- Disassemble the fork legs. (☛ p. 17)

Main work

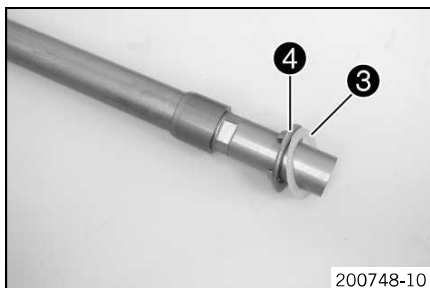
- Remove fluid barrier **1** from the piston rod.

Clamping stand (T14016S) (☛ p. 302)

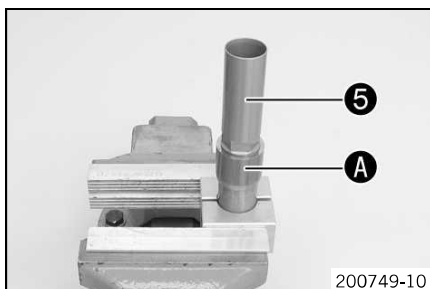




- Remove piston rod ② from the cartridge.



- Remove washer ③ and spring seat ④ from the cartridge.



- Degrease the cartridge and clamp using the special tool.

Clamping stand (T14015S) (☛ p. 302)

- Warm up the cartridge in the area of ①.

Guideline

50 °C (122 °F)

- Unscrew and remove screwsleeve ⑤.

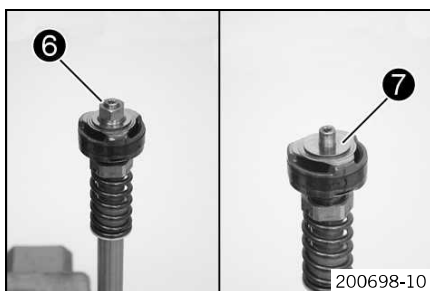
Info

This step is unnecessary for the further disassembly.

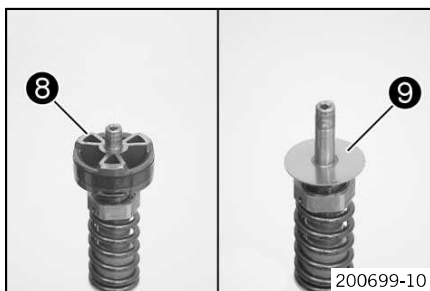


- Degrease the piston rod.
- Clamp the piston rod with the special tool.

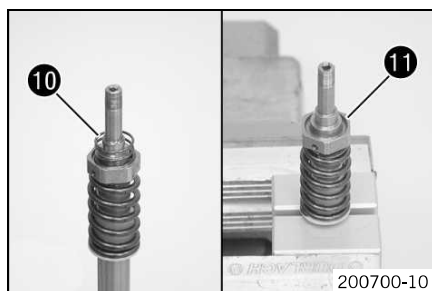
Clamping stand (T14016S) (☛ p. 302)



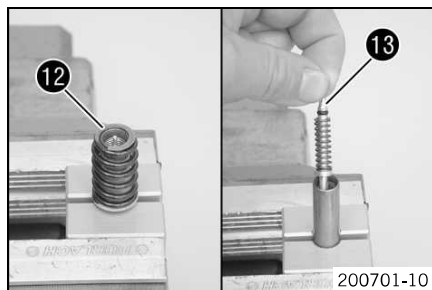
- Remove nut ⑥.
- Remove shim stack ⑦ completely.



- Remove piston ⑧.
- Remove shim stack ⑨ completely.



- Remove spring 10.
- Remove tap rebound 11.



- Remove spring 12.
- Remove valve 13 of the rebound damping together with the spring.
- Take out the piston rod.

6.1.15 Disassembling the compression damping fitting



Info

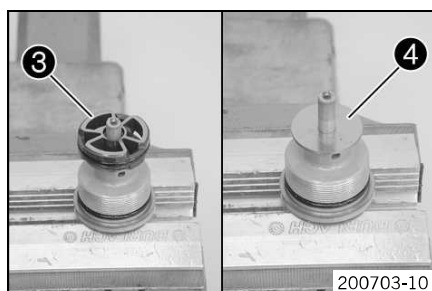
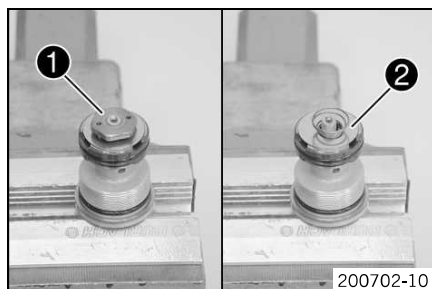
The steps are identical for both fork legs.

Preparatory work

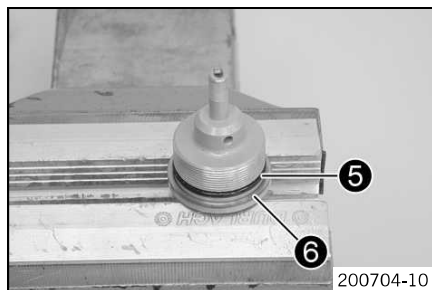
- Disassemble the fork legs. (☛ p. 17)

Main work

- Clamp the compression damping fitting in a bench vise using soft jaws.
- Remove nut 1.
- Remove the spring.
- Remove washer 2.



- Remove piston 3.
- Remove shim stack 4.



- Remove O-ring 5 and seal ring 6 from the compression damping fitting.
- Extract the compression damping fitting.

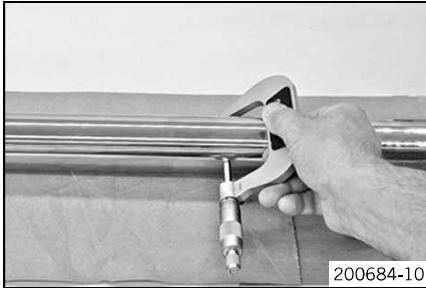
6.1.16 Checking the fork legs

Condition

The fork legs must be disassembled.



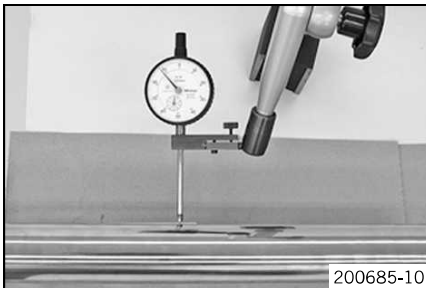
- Check the inner tube and axle clamp for damage.
 - » If there is damage:
 - Change the inner tube.



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

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

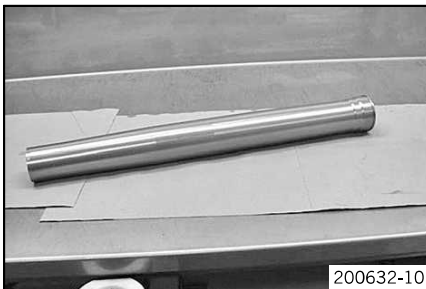
- » If the measured value is below the specified value:
 - Change the inner tube.



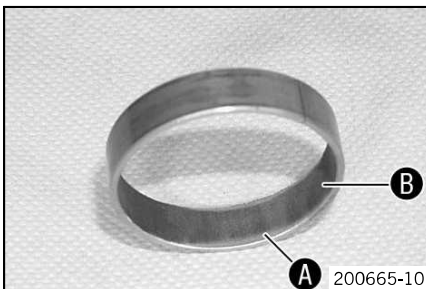
- Measure the run-out of the inner tube.

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

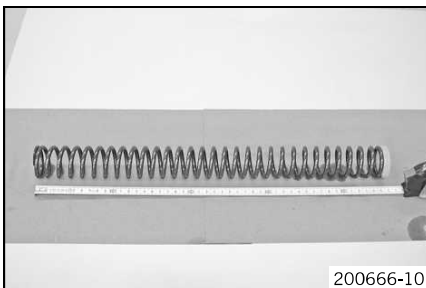
- » If the measured value is greater than the specified value:
 - Change the inner tube.



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



- Check the surface of the sliding bushing.
 - » If the bronze-colored layer **A** under the sliding layer **B** is visible:
 - Replace the sliding bushing.



- Check the spring length.

Guideline

Spring length with preload spacer(s)	
Weight of rider: 65... 75 kg (143... 165 lb.)	513 mm (20.2 in)
Weight of rider: 75... 85 kg (165... 187 lb.)	513 mm (20.2 in)
Weight of rider: 85... 95 kg (187... 209 lb.)	513 mm (20.2 in)

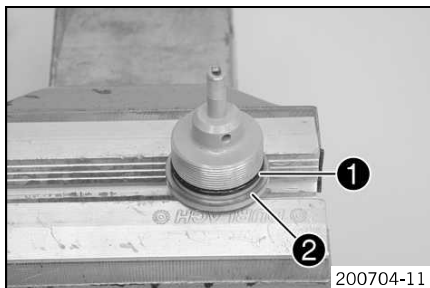
- » If the measured value is greater than the specified value:
 - Reduce the thickness of the preload spacer.
- » If the measured value is less than the specified value:
 - Increase the thickness of the preload spacer.

6.1.17 Assembling the compression damping fitting



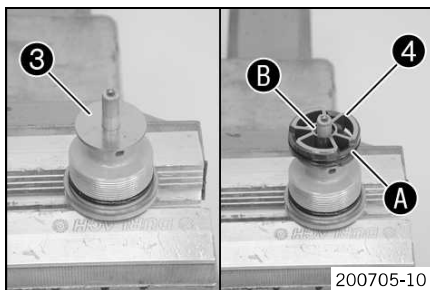
Info

The steps are identical for both fork legs.



- Clamp the compression damping fitting in a bench vise using soft jaws.
- Mount O-ring ① and seal ring ②.
- Grease the O-ring.

Lubricant (T158) (☛ p. 290)



- Mount shim stack ③.



Info

Mount the smaller shims below.

- Mount pistons ④ with O-ring ①.

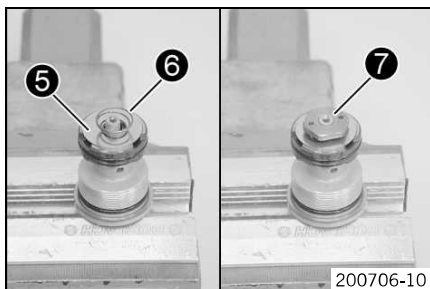


Info

The side with the largest inside diameter ③ faces upward.

- Grease the piston O-ring.

Fork oil (SAE 4) (48601166S1) (☛ p. 289)



- Mount washer ⑤.
- Mount spring ⑥ with the tighter coil facing downward.
- Mount and tighten nut ⑦.

Guideline

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



Info

The washer ⑤ must have freedom of movement relative to the spring force.

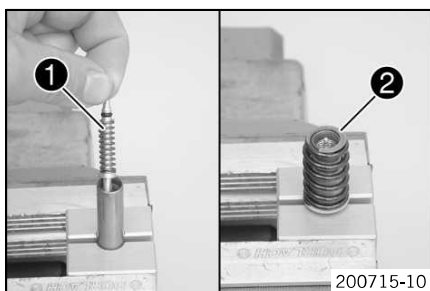
- Secure the nut by locking.
- Extract the compression damping fitting.

6.1.18 Assembling the cartridge



Info

The steps are identical for both fork legs.



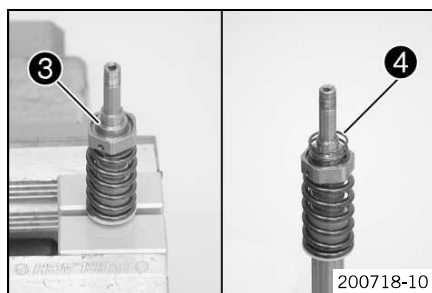
- Clamp in the piston rod.

Clamping stand (T14016S) (☛ p. 302)

- Mount valve ① of the rebound damping, with the spring and O-ring.
- Grease the O-ring.

Lubricant (T158) (☛ p. 290)

- Mount spring ②.



- Grease tap rebound ③ O-ring.

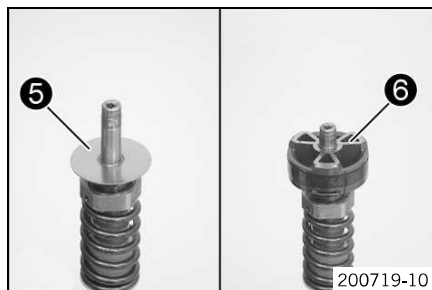
Lubricant (T158) (☛ p. 290)

- Mount and tighten the tap rebound.

Guideline

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

- Position spring ④.



- Mount shim stack ⑤.



Info

Mount the smaller shims below.

- Press the shim stack downward against the spring force.



Info

The shim stack must be pressed downward over the collar.

- Mount piston ⑥ with the piston ring.



Info

The side with the largest inside diameter faces downward.

- Mount shim stack ⑦.



Info

Align the triangular plate exactly with the piston opening.

- Mount and tighten nut ⑧.

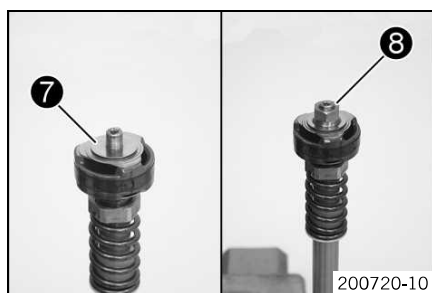
Guideline

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



Info

Mount the nut with the collar facing downward.



- Secure the nut by locking.

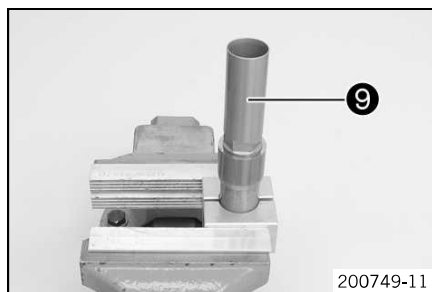
- Degrease the cartridge and clamp using the special tool.

Clamping stand (T14015S) (☛ p. 302)

- Mount and tighten screwsleeve ⑨.

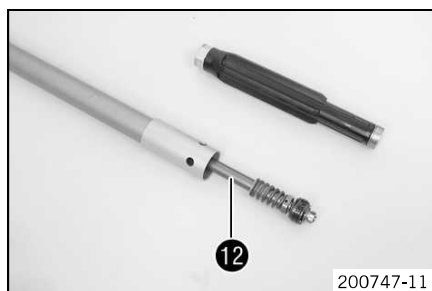
Guideline

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

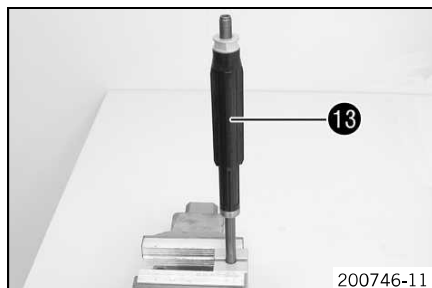


- Mount washer ⑩ and spring seat ⑪.





- Push piston rod 12 into the cartridge.



- Screw on fluid barrier 13 to the stop.



Info

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

6.1.19 Assembling the fork legs



Info

The steps are identical for both fork legs.

Preparatory work

- Check the fork legs. (☛ p. 22)
- Assemble the cartridge. (☛ p. 24)
- Assemble the compression damping fitting. (☛ p. 24)

Main work

- Clamp in the inner tube with the axle clamp.

Guideline

Use soft jaws.

- Install the special tool.

Protecting sleeve (T1401) (☛ p. 302)

- Grease and slide on dust boot 1.

Lubricant (T511) (☛ p. 290)



Info

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

- Slide on lock ring 2.
- Grease and slide on seal ring 3.

Lubricant (T511) (☛ p. 290)



Info

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

- Slide on support ring 4.
- Remove the special tool.





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

Fork oil (SAE 4) (48601166S1) (☛ p. 289)

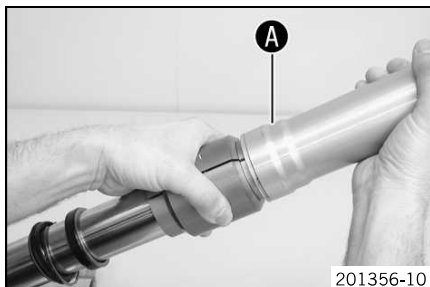


- Slide on lower sliding bushing 5.
- Mount upper sliding bushing 6.



Info

Gently pull them apart without using any tool.



- Slide on the outer tube.
- Warm up the outer tube in the lower sliding bushing area of A.

Guideline

50 °C (122 °F)

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

Assembly tool (T1402S) (☛ p. 303)

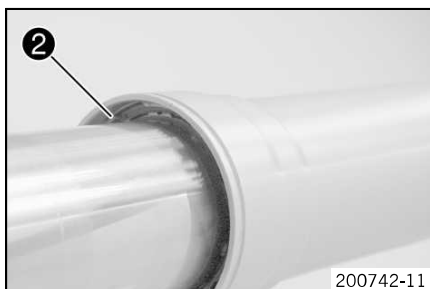
- Press the outer tube all the way in.



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

Assembly tool (T1402S) (☛ p. 303)

- Press the outer tube all the way in.

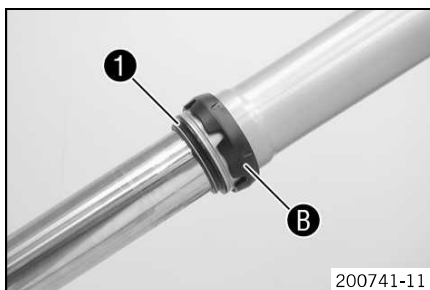


- Mount lock ring 2.

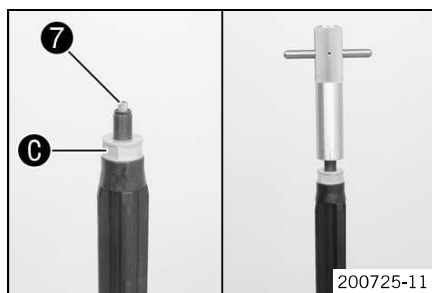


Info

The lock ring must audibly lock into place.



- Install dust boot 1.
- Mount fork protector ring B.



- Mount adjustment tube **7** of the rebound damping in the cartridge.
 - ✓ The adjustment tube extends 5 mm (0.197 in) out from the cartridge and can be pressed inward against the spring force.
 - ✗ The adjustment tube extends more than 7 mm (0.276 in) out from the cartridge and cannot be pressed inward against the spring force.
- Screw on water excluder **C** to the stop.



Info

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

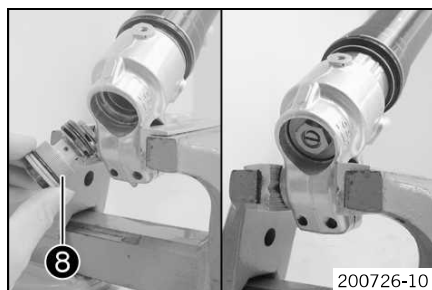
- Mount the special tool on the cartridge.

Gripping tool (T14026S1) (☛ p. 303)



Info

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



- Push the cartridge into the inner tube.
- Mount and tighten compression damping fitting **8**.

Guideline

Compression damping fitting	M29x1	35 Nm (25.8 lbf ft)
-----------------------------	-------	------------------------



Info

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



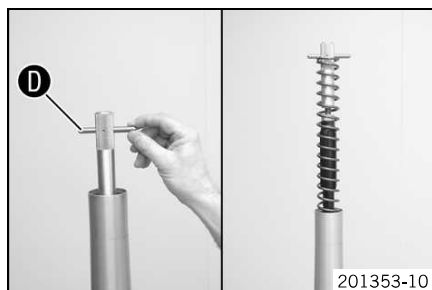
- Clamp in the fork vertically.
- Fill with fork oil.

Fork oil per fork leg	620 ml (20.96 fl. oz.)	Fork oil (SAE 4) (48601166S1) (☛ p. 289)
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Info

Pull out the piston rod and push back in a number of times to bleed the cartridge.



- Remove pin **D** of the special tool.
- Pull out the piston rod. Install the spring. Reinstall the pin.

Gripping tool (T14026S1) (☛ p. 303)

Guideline

Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	4.0 N/mm (22.8 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	4.2 N/mm (24 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	4.4 N/mm (25.1 lb/in)

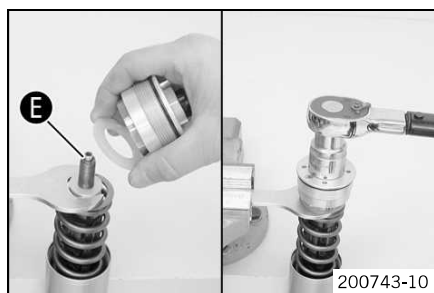
- Pull the spring downward. Place the special tool on the hexagonal part.

Open-end wrench (T14032) (☛ p. 303)

- Remove the special tool.

Gripping tool (T14026S1) (☛ p. 303)





- Clamp the special tool in the bench vise.
- Grease the thread of the piston rod.

Lubricant (T159) (☛ p. 291)

- Grease the upper edge **E** of the piston rod.

Lubricant (T158) (☛ p. 290)

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



Info

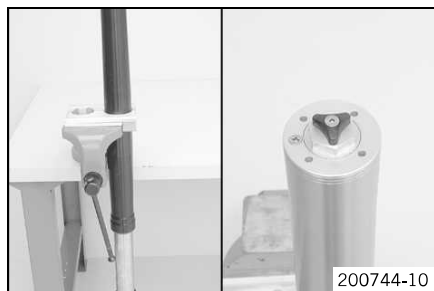
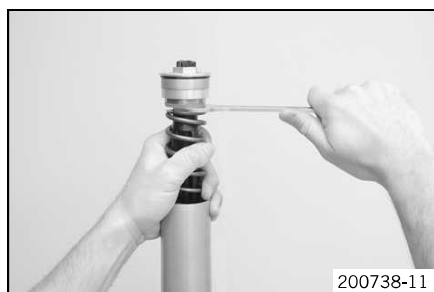
The **Preload Adjuster** must be screwed in all the way before the piston rod also begins to turn. In case of tight piston rod threads, it must be held to keep it from turning. If the **Preload Adjuster** is not screwed in all the way, the rebound adjustment will not function.

- Tighten the **Preload Adjuster**.

Guideline

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

- Take pressure off of the special tool. Pull the spring downward and remove the special tool.



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

Clamping stand (T1403S) (☛ p. 303)

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

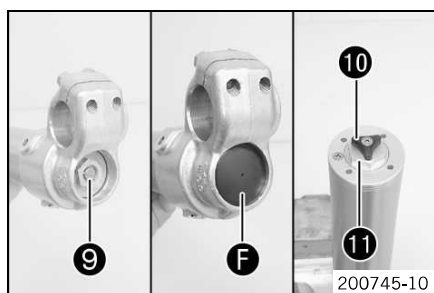
Lubricant (T158) (☛ p. 290)

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

Guideline

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

Pin wrench (T103) (☛ p. 300)



Alternative 1

- Turn adjusting screw of compression damping **9** and adjusting screw of rebound damping **10** clockwise all the way.
- Turn back counterclockwise by the number of clicks corresponding to the fork type.

Guideline

Rebound damping	
Comfort	20 clicks
Standard	18 clicks
Sport	16 clicks
Compression damping	
Comfort	22 clicks
Standard	20 clicks
Sport	18 clicks

- Turn the adjusting screw of spring preload **11** counterclockwise all the way.
- Turn back clockwise the number of turns corresponding to the fork type.

Guideline

Spring preload - Preload Adjuster	
Comfort	1 turn
Standard	2 turns
Sport	2 turns

Alternative 2

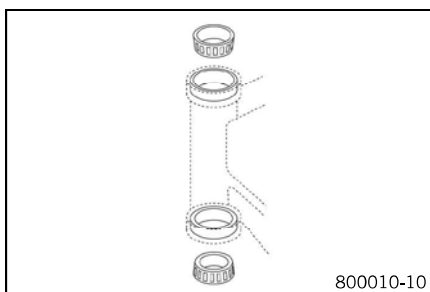
**Warning**

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

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

- Set the adjusting screws to the position determined before removal.
- Mount protective cover ❶.

6.1.20 Greasing the steering head bearing



- Remove the lower triple clamp. (☛ p. 30)
- Install the lower triple clamp. (☛ p. 31)

6.1.21 Removing the lower triple clamp

Preparatory work

- Remove the headlight mask with the headlight. (☛ p. 97)
- Raise the motorcycle with the lift stand. (☛ p. 11)
- Remove the front wheel. (☛ p. 101)
- Remove the fork legs. (☛ p. 36)
- Remove the front fender. (☛ p. 97)
- Remove the handlebar cushion.

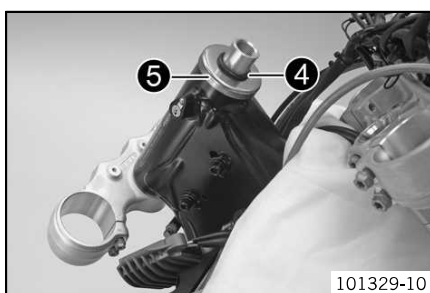
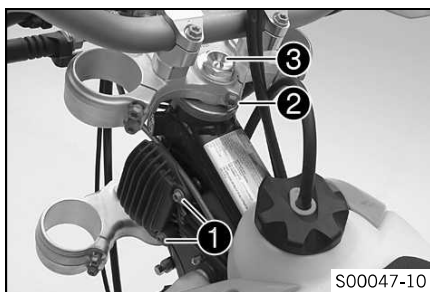
Main work

- Open the cable holder in front of the right radiator and detach the wiring harness.
- Remove screws ❶ and hang the voltage regulator to one side.
- Release screw ❷ and remove screw ❸. Take off the upper triple clamp with the handlebar and set it aside.

**Info**

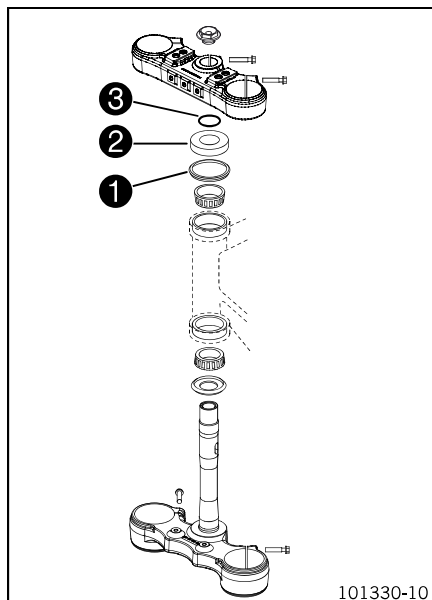
Protect the motorcycle and its attachments against damage by covering them.

Do not bend the cables and lines.



- Remove O-ring ❹. Remove protective ring ❺.
- Take out the lower triple clamp with the steering stem.
- Take out the upper steering head bearing.

6.1.22 Installing the lower triple clamp

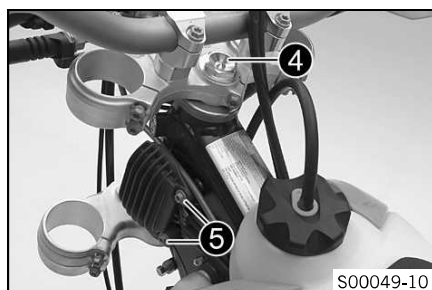


Main work

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

High viscosity grease (☛ p. 290)

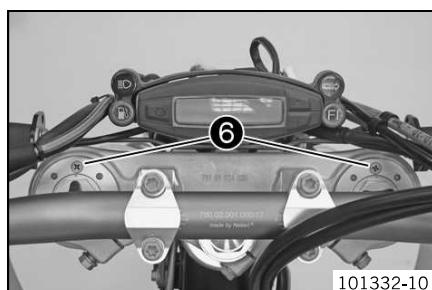
- Insert the lower triple clamp with the steering stem. Mount the upper steering head bearing.
- Check whether the top steering head seal ❶ is correctly positioned.
- Slide on protective ring ❷ and O-ring ❸.



- Position the upper triple clamp with the steering.
- Mount screw ❹ but do not tighten yet.
- Position the clutch line, wiring harness, and voltage regulator. Mount and tighten screws ❺.

Guideline

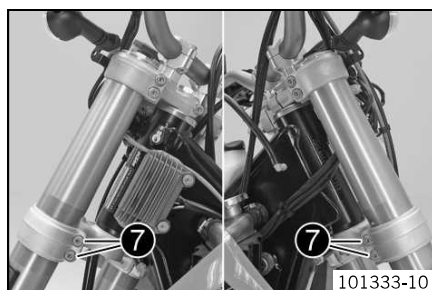
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)
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- Position the fork legs.

i Info

Grooves are milled into the side of the upper end of the fork legs. The second milled groove (from the top) must be flush with the top edge of the upper triple clamp.
Position bleeder screws ❻ toward the front.

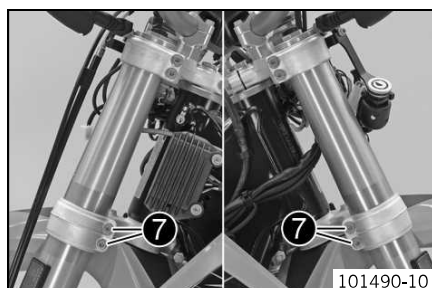


(XCF-W, EXC-F EU/AUS)

- Tighten screws ❷.

Guideline

Screw, bottom triple clamp	M8	15 Nm (11.1 lbf ft)
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(EXC-F USA)

- Tighten screw ❷.

Guideline

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



- Tighten screw ④.

Guideline

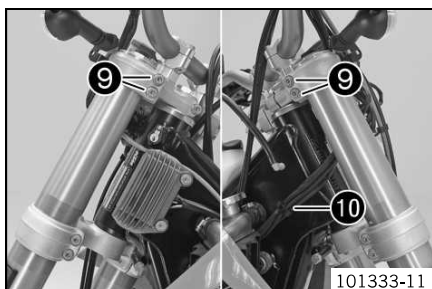
Screw, top steering head	M20x1.5	12 Nm (8.9 lbf ft)
--------------------------	---------	--------------------



- Tighten screw ⑧.

Guideline

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



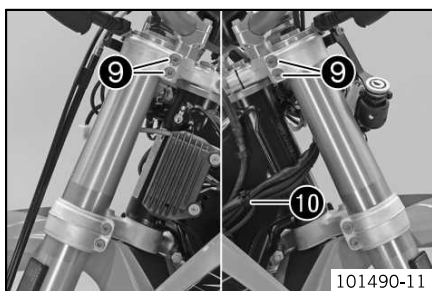
(XCF-W, EXC-F EU/AUS)

- Tighten screws ⑨.

Guideline

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

- Secure the wiring harness with cable holder ⑩.



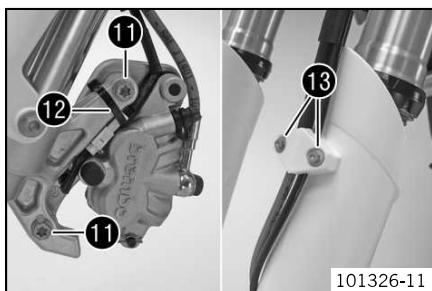
(EXC-F USA)

- Tighten screws ⑨.

Guideline

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

- Secure the wiring harness with cable holder ⑩.



- Position the brake caliper. Mount and tighten screws ⑪.

Guideline

Screw, front brake caliper	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
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- Mount cable binder ⑬.
- Position the brake line, wiring harness, and clamp. Mount and tighten screws ⑬.

Finishing work

- Mount the handlebar cushion.
- Install the front fender. (☞ p. 97)
- Install the front wheel. (☞ p. 101)
- Refit the headlight mask with the headlight. (☞ p. 97)
- Check that the wiring harness, cables, and brake and clutch lines can move freely and are routed correctly.
- Check the steering head bearing play. (☞ p. 33)
- Remove the motorcycle from the lift stand. (☞ p. 11)
- Check the headlight setting. (☞ p. 127)

6.1.23 Checking the steering head bearing play

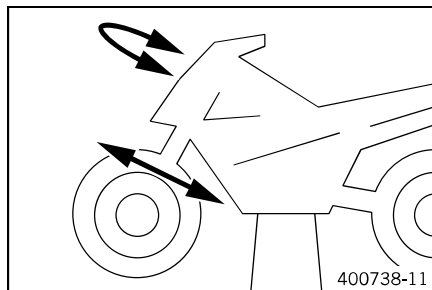
**Warning**

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

- Adjust the steering head bearing play without delay.

**Info**

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

**Preparatory work**

- Raise the motorcycle with the lift stand. (🔧 p. 11)

Main work

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

No play should be noticeable in the steering head bearing.

» If there is noticeable play present:

- Adjust the play of the steering head bearing. (🔧 p. 33)
- Move the handlebar to and fro over the entire steering range.

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

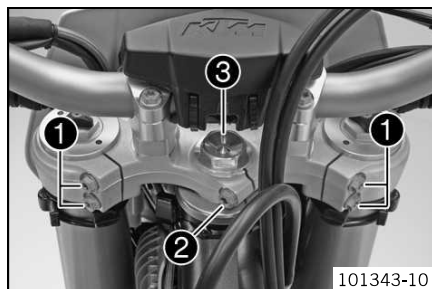
» If click positions are noticeable:

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

Finishing work

- Remove the motorcycle from the lift stand. (🔧 p. 11)

6.1.24 Adjusting the play of the steering head bearing

**Preparatory work**

- Raise the motorcycle with the lift stand. (🔧 p. 11)

Main work

- Loosen screws ❶ and ❷.
- Loosen and retighten screw ❸.

Guideline

Screw, top steering head	M20x1.5	12 Nm (8.9 lbf ft)
--------------------------	---------	--------------------

- Using a plastic hammer, tap lightly on the upper triple clamp to avoid strains.
- Tighten screws ❶.

Guideline

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

- Tighten screw ❷.

Guideline

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

Finishing work

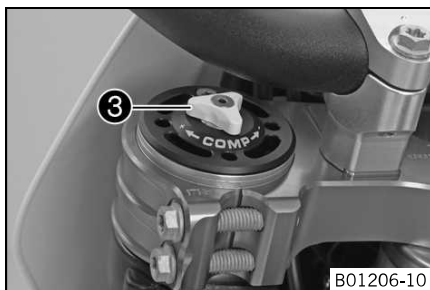
- Check the steering head bearing play. (🔧 p. 33)
- Remove the motorcycle from the lift stand. (🔧 p. 11)

6.2 EXC-F SIX DAYS

6.2.1 Adjusting the compression damping of the fork

i Info

The hydraulic compression damping determines the fork suspension behavior.



- Turn the white adjusting screw ③ all the way clockwise.

i Info

Adjusting screw ③ is located at the upper end of the left fork leg. The compression damping is located in the left fork leg (white adjusting screw). The rebound damping is located in the right fork leg (red adjusting screw).

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

Guideline

Compression damping	
Comfort	24 clicks
Standard	22 clicks
Sport	16 clicks

i Info

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

6.2.2 Adjusting the rebound damping of the fork

i Info

The hydraulic rebound damping determines the fork suspension behavior.



- Turn the red adjusting screw ② all the way clockwise.

i Info

Adjusting screw ② is located at the upper end of the right fork leg. The rebound damping is located in the right fork leg (red adjusting screw). The compression damping is located in the left fork leg (white adjusting screw).

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

Guideline

Rebound damping	
Comfort	23 clicks
Standard	21 clicks
Sport	21 clicks

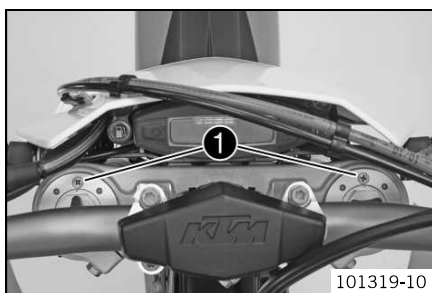
i Info

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

6.2.3 Bleeding fork legs

Preparatory work

- Raise the motorcycle with the lift stand. (🔧 p. 11)



Main work

- Release bleeder screws ❶.
- ✓ Any excess pressure escapes from the interior of the fork.
- Mount and tighten bleeder screws.

Finishing work

- Remove the motorcycle from the lift stand. (🔧 p. 11)

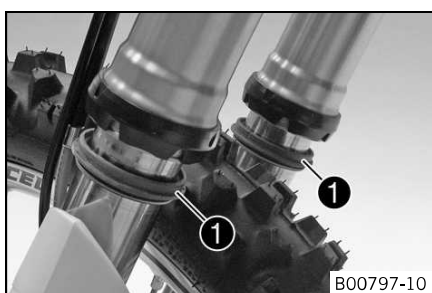
6.2.4 Cleaning the dust boots of the fork legs

Preparatory work

- Raise the motorcycle with the lift stand. (🔧 p. 11)
- Loosen the fork protector. (🔧 p. 35)

Main work

- Push dust boot ❶ down on both fork leg.



Info

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



Warning

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

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

- Clean and lubricate the dust boot and inside fork tube on both fork legs.

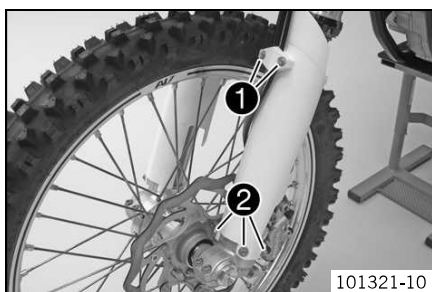
Universal oil spray (🔧 p. 291)

- Press the dust boots back into the installation position.
- Remove excess oil.

Finishing work

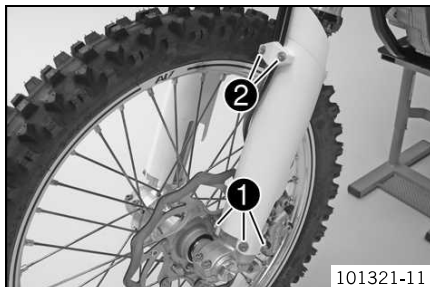
- Position the fork protection. (🔧 p. 36)
- Remove the motorcycle from the lift stand. (🔧 p. 11)

6.2.5 Loosening the fork protector



- Remove screws ❶ and remove the clamp.
- Remove screws ❷ on the left fork leg. Push the fork protector downwards.
- Remove the screws on the right fork leg. Push the fork protector downwards.

6.2.6 Positioning the fork protection



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

Guideline

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

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

Guideline

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

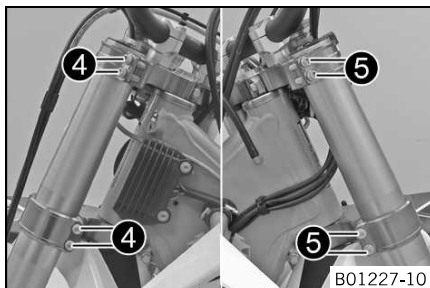
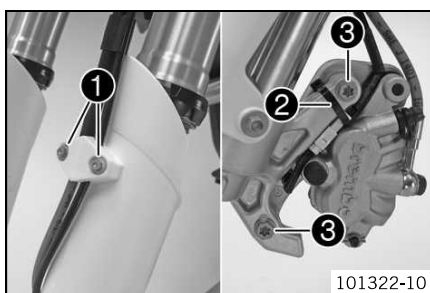
6.2.7 Removing the fork legs

Preparatory work

- Remove the headlight mask with the headlight. (☛ p. 97)
- Raise the motorcycle with the lift stand. (☛ p. 11)
- Remove the front wheel. (☛ p. 101)

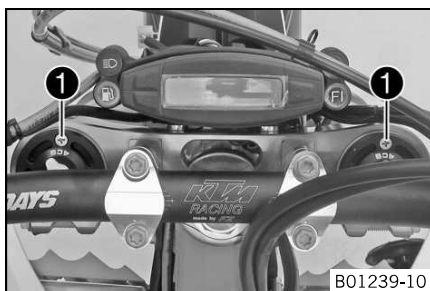
Main work

- Remove screws ❶ and take off the clamp.
- Remove cable binder ❷.
- Remove screws ❸ and take off the brake caliper.
- Allow the brake caliper and brake line to hang tension-free to the side.



- Release screws ❹. Take out the left fork leg.
- Release screws ❺. Take out the right fork leg.

6.2.8 Installing the fork legs



Main work

- Position the fork legs.

i Info

The rebound damping is located in the right fork leg (red adjusting screw). The compression damping is located in the left fork leg (white adjusting screw).

Grooves are milled into the side of the upper end of the fork legs. The second milled groove (from the top) must be flush with the top edge of the upper triple clamp.

Position bleeder screws ❶ toward the front.

- Tighten screws ❷.

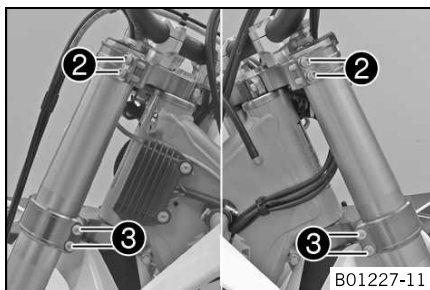
Guideline

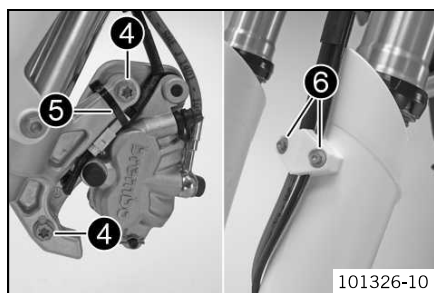
Screw, top triple clamp	M8	17 Nm (12.5 lbf ft)
-------------------------	----	---------------------

- Tighten screws ❸.

Guideline

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





- Position the brake caliper and mount and tighten screws ❹.

Guideline

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

- Mount cable binder ❺.
- Position the brake line, wiring harness and clamp. Mount and tighten screws ❻.

Finishing work

- Install the front wheel. (☛ p. 101)
- Refit the headlight mask with the headlight. (☛ p. 97)
- Check the headlight setting. (☛ p. 127)

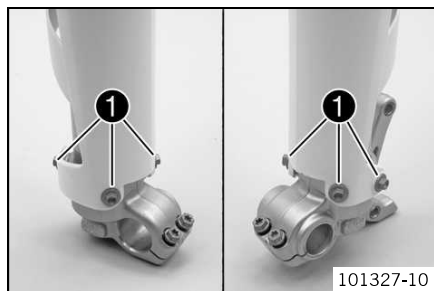
6.2.9 Removing the fork protector

Preparatory work

- Remove the headlight mask with the headlight. (☛ p. 97)
- Raise the motorcycle with the lift stand. (☛ p. 11)
- Remove the front wheel. (☛ p. 101)
- Remove the fork legs. (☛ p. 36)

Main work

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



6.2.10 Installing the fork protector

Main work

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

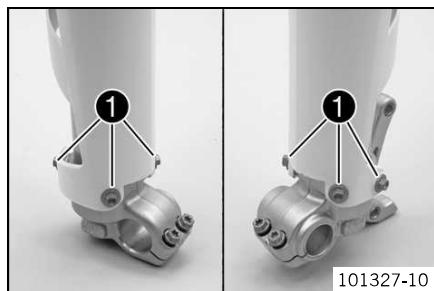
Guideline

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

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

Guideline

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



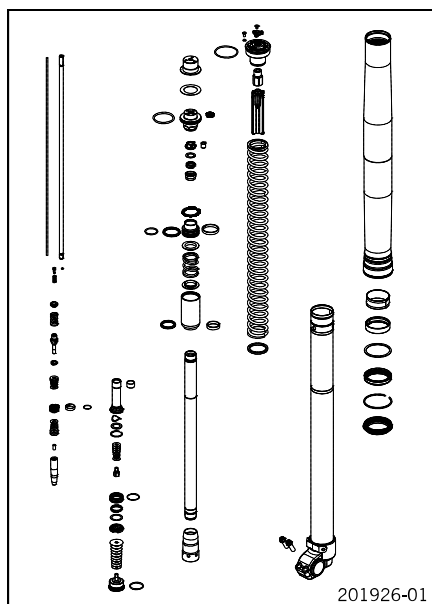
Finishing work

- Install the fork legs. (☛ p. 36)
- Install the front wheel. (☛ p. 101)
- Refit the headlight mask with the headlight. (☛ p. 97)
- Check the headlight setting. (☛ p. 127)

6.2.11 Performing a fork service

Condition

The fork legs have been removed.



- Disassemble the fork legs. (☛ p. 38)
- Remove the spring. (☛ p. 40)
- Disassemble the cartridge. (☛ p. 41)
- Disassemble the piston rod. (☛ p. 42)
- Disassemble the hydrostop unit. (☛ p. 43)
- Disassemble the seal ring retainer. (☛ p. 43)
- Check the fork legs. (☛ p. 44)
- Assemble the seal ring retainer. (☛ p. 45)
- Assemble the hydrostop unit. (☛ p. 45)
- Assemble the piston rod. (☛ p. 46)
- Assemble the cartridge. (☛ p. 47)
- Assemble the fork legs. (☛ p. 48)

6.2.12 Disassembling the fork legs



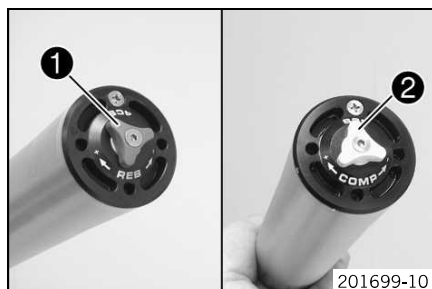
Info

The steps are identical for both fork legs.

Condition

The fork legs have been removed.

- Note down the current state of rebound damping **1 REB** (red adjuster of right fork leg).
- Note down the current state of compression damping **2 COMP** (white adjuster of left fork leg).
- Fully open the adjusters of the rebound and compression damping.



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

Clamping stand (T1403S) (☛ p. 303)

- Remove screw . Remove adjuster **3**.



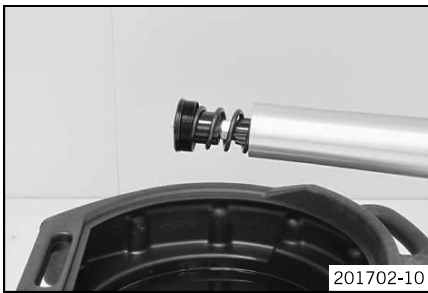
- Release screw cap **4**.

Special socket (T14047) (☛ p. 304)

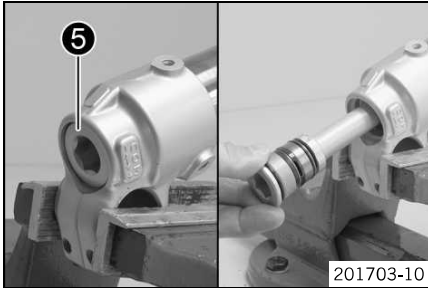


Info

The cartridge cannot be taken off yet.



- Unclamp the fork leg.
- Push the outer tube down. Drain the fork oil.

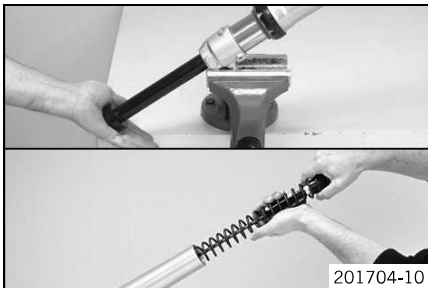


- Clamp the fork leg with the axle clamp.
- Release hydrostop unit 5 and remove it.



Info

Do not use an impact wrench.
Place a pan underneath since oil will run out.



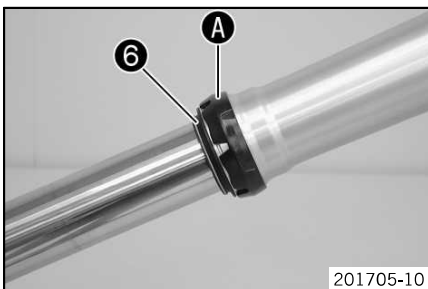
- Remove the cartridge from the fork leg.

Press-out tool (T14051) (☛ p. 304)



Info

Removing the O-ring seat from the cartridge usually requires the application of force.

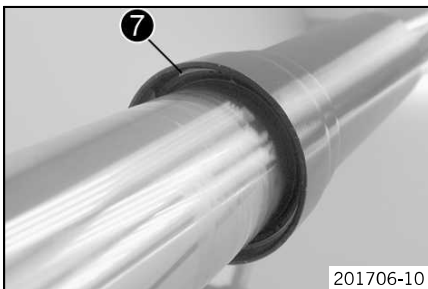


- Remove dust boot 6.
- Remove fork protection ring A.



Info

The fork protection ring does not necessarily need to be removed for repair work.

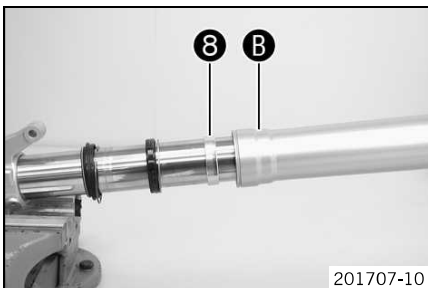


- Remove lock ring 7.



Info

The lock ring has a ground end against which a screwdriver can be positioned.



- Warm the outer tube in area 8 of the lower sliding bushing.

Guideline

50 °C (122 °F)

- Pull the outer tube forcefully off of the inner tube.



Info

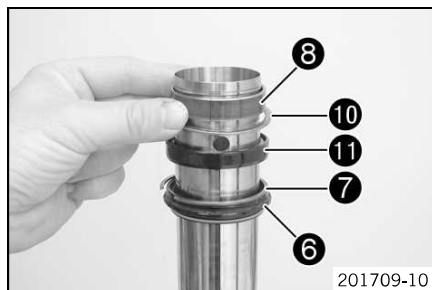
The lower sliding bushing 8 must be pulled out of its bearing seat.



- Remove the upper sliding bushing 9.


Info

Do not use a tool; pull the ends apart slightly by hand.



- Take off the lower sliding bushing 8.
- Take off support ring 10.
- Take off seal ring 11.
- Take off lock ring 7.
- Take off dust boot 6.
- Unclamp the fork leg.

6.2.13 Removing the spring


Info

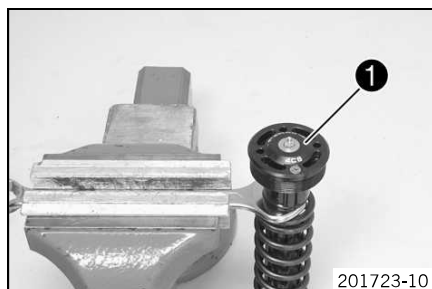
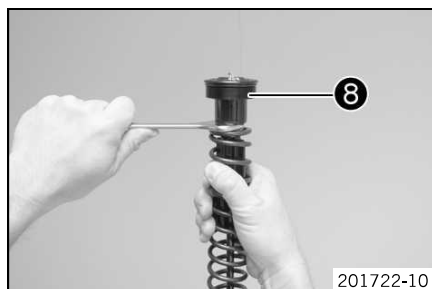
The steps are identical for both fork legs.

Preparatory work

- Disassemble the fork legs. (☛ p. 38)

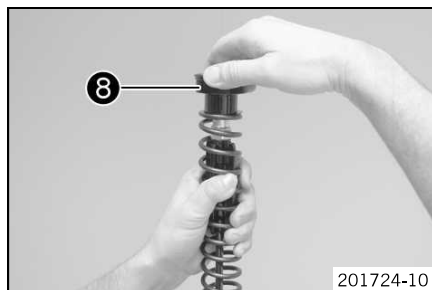
Main work

- Pull the spring down. Mount the open end wrench on the hexagonal part.



- Clamp the open end wrench in the vise. Release screw cap 1 but do not remove it yet.

Special socket (T14047) (☛ p. 304)



- Pull the spring down. Remove the open end wrench.
- Remove the screw cap.
- Remove spring.

6.2.14 Disassembling the cartridge



Info

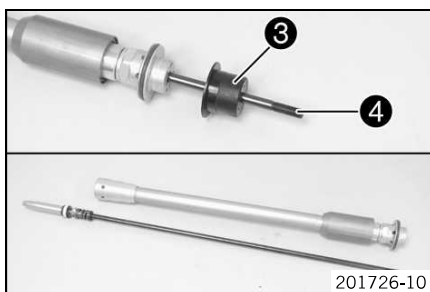
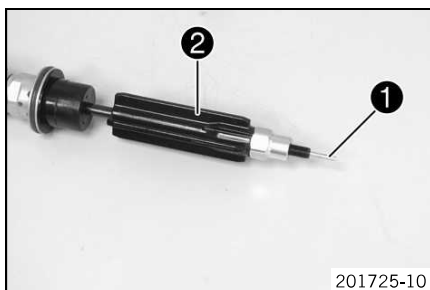
The steps are identical for both fork legs.

Preparatory work

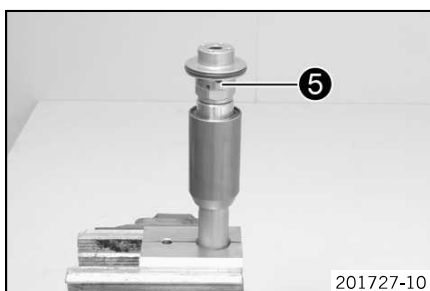
- Disassemble the fork legs. (☛ p. 38)
- Remove the spring. (☛ p. 40)

Main work

- Remove adjusting tube ❶. Unscrew spring guide ❷.



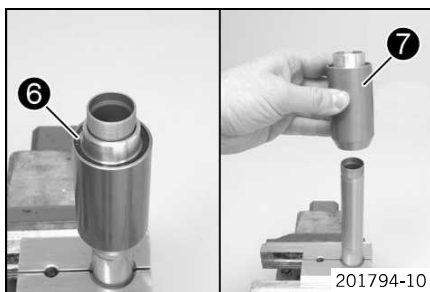
- Remove spring seat ❸.
- Pull piston rod ❹ out of the cartridge.



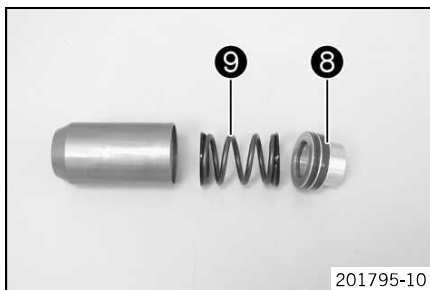
- Clamp the tube of the cartridge into a vise.

Clamping stand (T14049S) (☛ p. 304)

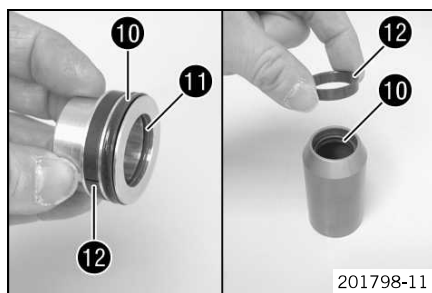
- Release and remove seal ring retainer ❺.



- Remove lock ring ❻.
- Pull reservoir ❼ off of the tube.



- Pull sleeve ❽ out of the reservoir.
- Remove spring ❾.



- Remove seal rings 10 and O-ring 11.
- Remove pilot bushings 12.

6.2.15 Disassembling the piston rod



Info

The steps are identical for both fork legs, except for the hydrostop needle and valve.

Preparatory work

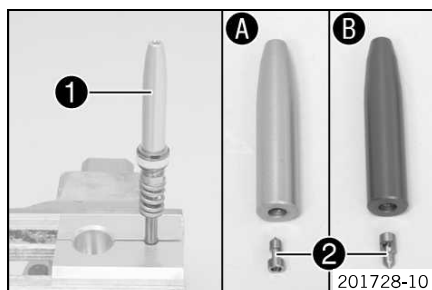
- Disassemble the fork legs. (☛ p. 38)
- Remove the spring. (☛ p. 40)
- Disassemble the cartridge. (☛ p. 41)

Main work

- Degrease the piston rod.
- Clamp the piston rod with the special tool as far up as possible.

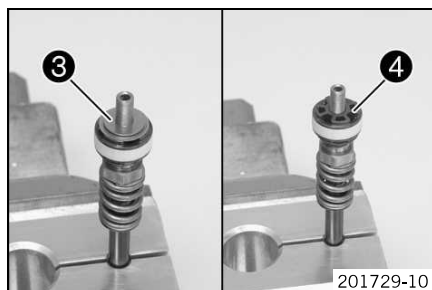
Clamping stand (T14049S) (☛ p. 304)

- Release hydrostop needle 1 and remove it from the piston rod.
- ✓ The valve 2 usually remains in the hydrostop needle.

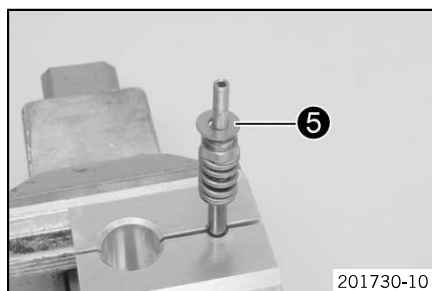


Info

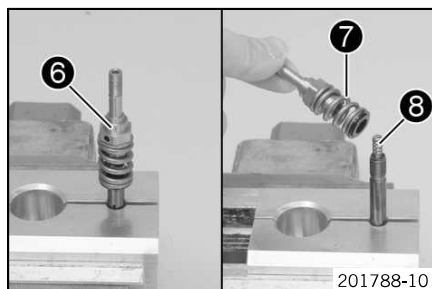
- Ⓐ – silver hydrostop needle on compression damping side.
- Ⓑ – red hydrostop needle on rebound damping side.



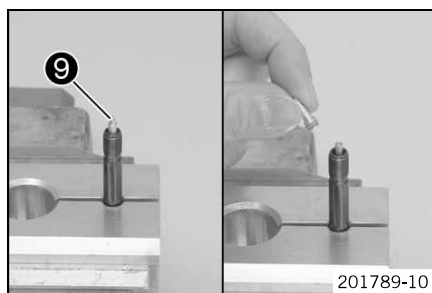
- Remove the rebound shim stack 3.
- Remove piston 4.



- Remove the compression shim stack 5.
- Remove spring.



- Remove adapter 6 with spring 7 and washer.
- Remove spring 8.



- Remove valve needle 9 from the piston rod.



Info

The adjusting tube can be used for this.

6.2.16 Disassembling the hydrostop unit



Info

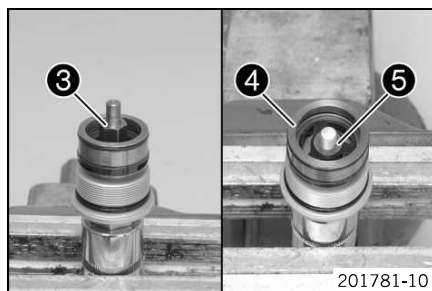
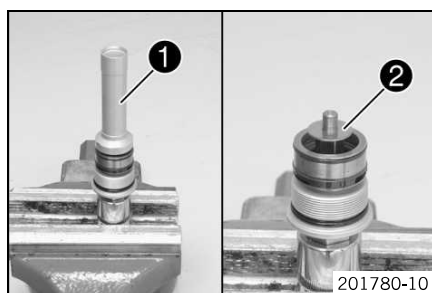
The steps are identical for both fork legs.

Preparatory work

- Disassemble the fork legs. (☛ p. 38)

Main work

- Mount the hydrostop unit on a fitting hexagon socket and clamp into a vice.
- Remove sleeve 1.
- Remove shim stack 2.



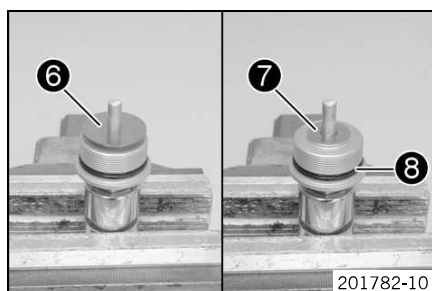
- Remove adapter 3.
- Remove hub 4 with washers 5.



Info

It is possible that only one washer or no washer is present.

- Remove the O-ring from the hub.



- Remove shim stack 6.
- Remove washer 7.
- Remove O-ring 8.

6.2.17 Disassembling the seal ring retainer

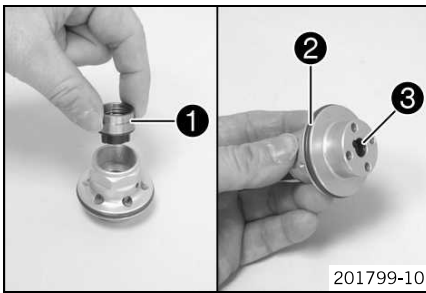


Info

The steps are identical for both fork legs.

Preparatory work

- Disassemble the fork legs. (☛ p. 38)
- Remove the spring. (☛ p. 40)
- Disassemble the cartridge. (☛ p. 41)



Main work

- Remove pilot bushing support ❶.
- Remove O-ring ❷ and seal ring ❸.

6.2.18 Checking the fork legs

Condition

The fork legs have been disassembled.

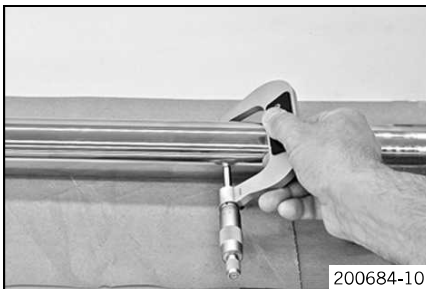
- Check the inner tube and axle clamp for damage.
 - » If there is damage:
 - Change the inner tube.



- Measure the outside diameter at multiple locations of the inner tube.

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

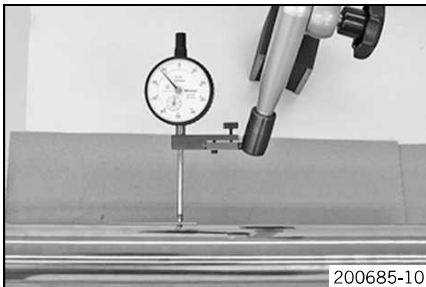
- » If the measured value is smaller than the specified value:
 - Change the inner tube.



- Measure the run-out of the inner tube.

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

- » If the measured value is larger than the specified value:
 - Change the inner tube.



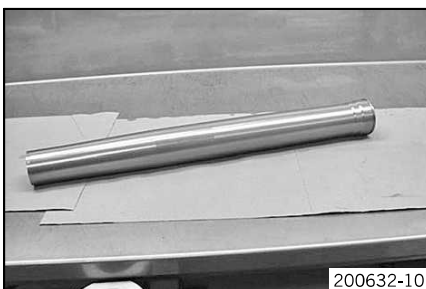
- Measure the inside diameter at multiple locations of the outer tube.

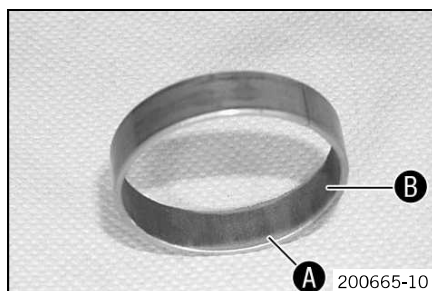
Inside diameter of outer tube	≤ 49.20 mm (≤ 1.937 in)
-------------------------------	-------------------------

- » If the measured value is larger than the specified value:
 - Change the outer tube.

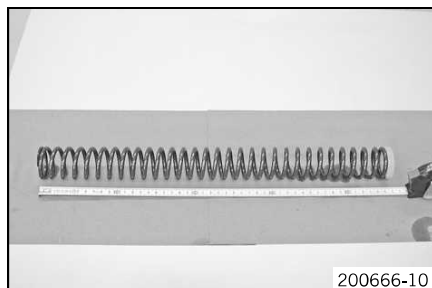
- Check the outer tube for damage.

- » If there is damage:
 - Change the outer tube.





- Check the surface of the sliding bushings.
 - » If the bronze-colored layer **A** under sliding layer **B** is visible or the surface is rough:
 - Change the sliding bushings.



- Check the spring length.

Guideline

Spring length with preload spacer(s)	470 mm (18.5 in)
--------------------------------------	------------------

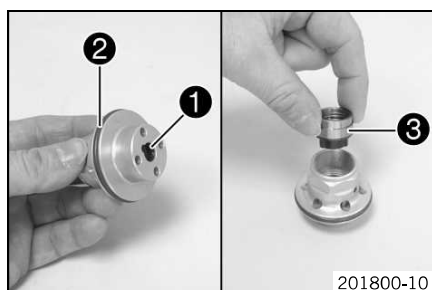
- » If the measured value is larger than the specified value:
 - Reduce the thickness of the preload spacers.
- » If the measured value is smaller than the specified value:
 - Increase the thickness of the preload spacers.

6.2.19 Assembling the seal ring retainer



Info

The steps are identical for both fork legs.



- Mount and grease seal ring **1**.

Lubricant (T158) (☛ p. 290)

- Mount and grease O-ring **2**.

Lubricant (T158) (☛ p. 290)

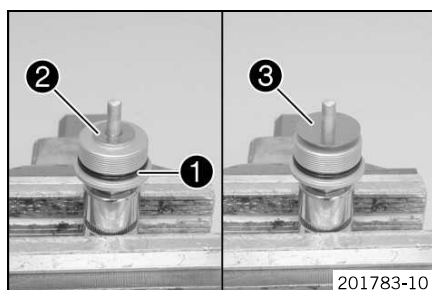
- Position pilot bushing support **3**.

6.2.20 Assembling the hydrostop unit



Info

The steps are identical for both fork legs.

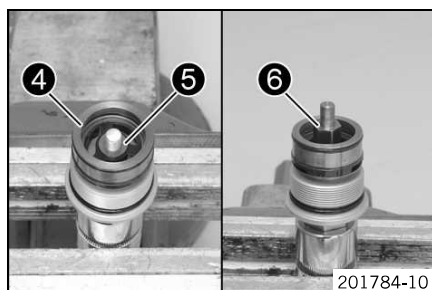


- Mount and grease O-ring **1**.

Lubricant (T158) (☛ p. 290)

- Mount washer **2**.

- Mount shim stack **3** with the smaller washers facing downward.



- Mount the new O-ring on hub **4**.

- Mount the hub with washers **5**.



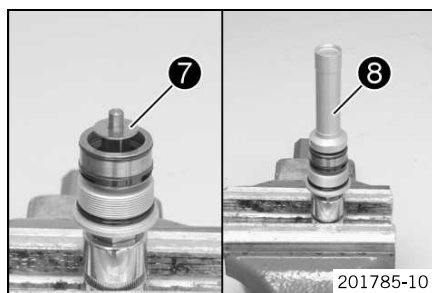
Info

It is possible that only one or no washer is present.

- Mount and tighten adapter **6**.

Guideline

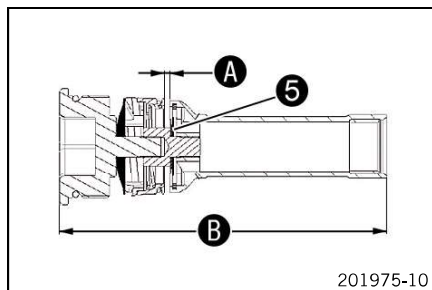
Hydrostop unit adapter	M6x0.5	7 Nm (5.2 lbf ft)
------------------------	--------	-------------------



- Mount shim stack 7 with the smaller washers facing downward.
- Mount and tighten sleeve 8.

Guideline

Hydrostop unit sleeve	M6x0.5	7 Nm (5.2 lbf ft)
-----------------------	--------	-------------------



- Check distance A and total length B of the hydrostop.

Guideline

Hydrostop distance	$\geq 1.5 \text{ mm } (\geq 0.059 \text{ in})$
Hydrostop length	108.5... 109.5 mm (4.272... 4.311 in)

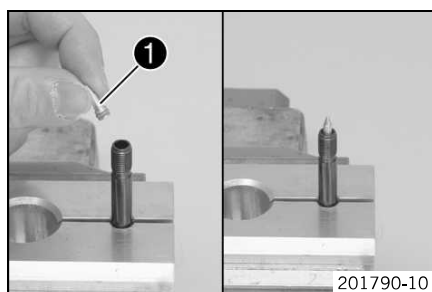
- » If the dimensions are out of tolerance:
 - Add or remove washers 5.

6.2.21 Assembling the piston rod



Info

The steps are identical for both fork legs, except for the hydrostop needle and valve.

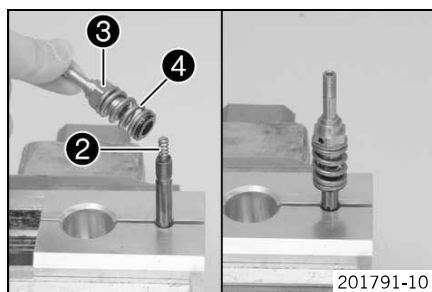


- Degrease the piston rod.
- Clamp the piston rod with the special tool.

Clamping stand (T14049S) (☛ p. 304)

- Lubricate the O-ring. Mount valve needle 1 in the piston rod.

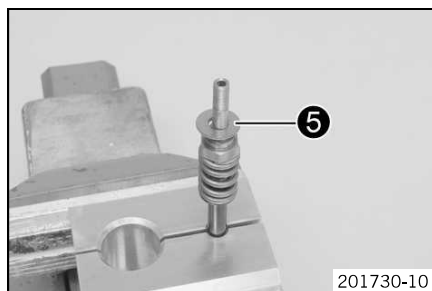
Lubricant (T158) (☛ p. 290)



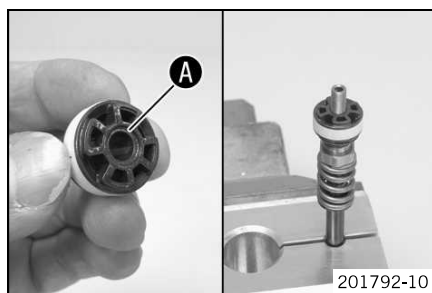
- Mount spring 2.
- Mount and tighten adapter 3 with spring 4 and washer.

Guideline

Adapter of piston rod	M6x0.5	12 Nm (8.9 lbf ft)
-----------------------	--------	--------------------



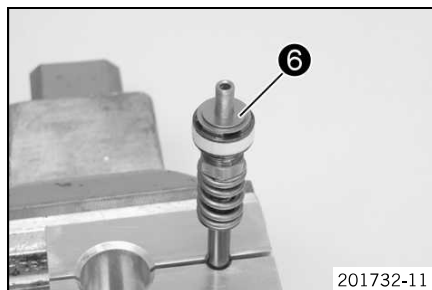
- Position the spring.
- Mount the compression shim stack 5 with the smaller washers facing downward.



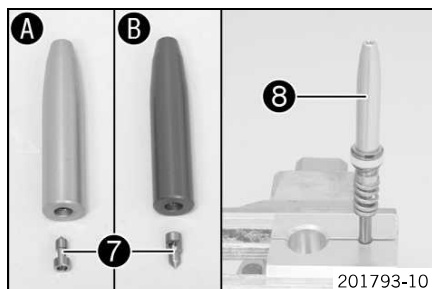
- Grind the piston on both sides on a surfacing plate using 1200 grit sandpaper.
- Clean the piston.
- Lubricate the piston ring.

Fork oil (SAE 4) (48601166S1) (☛ p. 289)

- Mount the piston with chamfer **A** facing down.



- Mount the rebound shim stack **6** with the smaller washers facing upward.



- Press the piston downward against the spring.
✓ The piston should not squeeze the shims.
- Position valve **7** in the hydrostop needle **8**. Mount and tighten the hydrostop needle.

Guideline

Hydrostop needle on piston rod	M6x0.5	7 Nm (5.2 lbf ft)
--------------------------------	--------	-------------------



Info

- A** – silver hydrostop needle on compression damping side.
- B** – red hydrostop needle on rebound damping side.

- Unclamp the piston rod.

6.2.22 Assembling the cartridge



Info

The steps are identical for both fork legs.

Preparatory work

- Assemble the seal ring retainer. (☛ p. 45)
- Assemble the piston rod. (☛ p. 46)

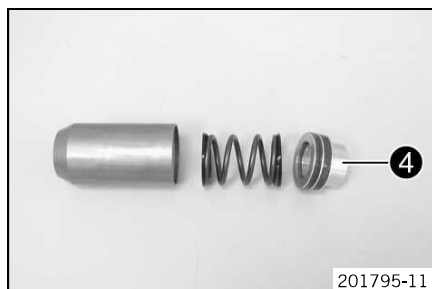
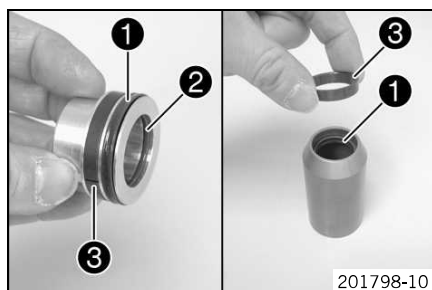
Main work

- Mount and grease seal rings **1** and O-ring **2**.

Lubricant (T158) (☛ p. 290)

- Mount and lubricate pilot bushings **3**.

Fork oil (SAE 4) (48601166S1) (☛ p. 289)



- Check the length of the reservoir spring.

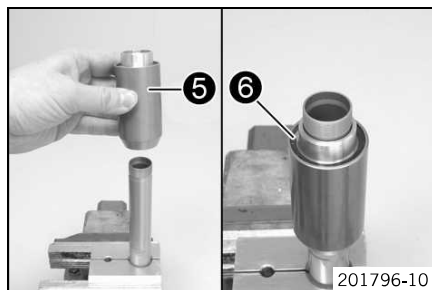
Guideline

Reservoir spring length with preload spacer	46 mm (1.81 in)
---	-----------------

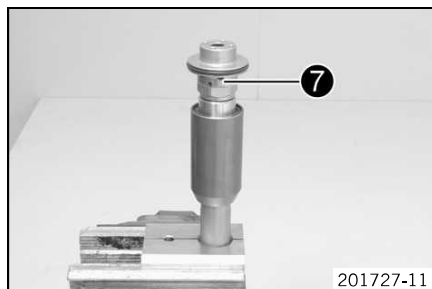
» If the length is out of tolerance:

- Correct the preload spacers.

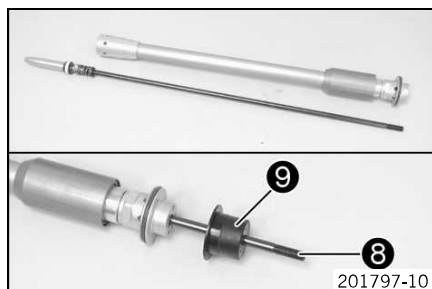
- Position the spring with the preload spacers in the reservoir.



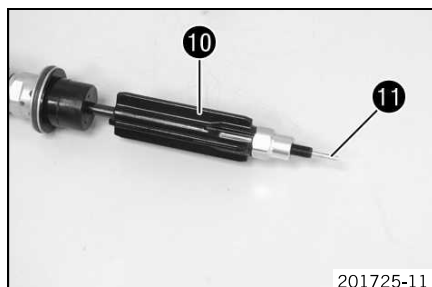
201796-10



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201725-11

- Position sleeve ④ in the reservoir.
- Clamp the tube of the cartridge into a vise.

Clamping stand (T14049S) (☛ p. 304)

- Slide reservoir ⑤ onto the tube.

**Info**

Hold the sleeve in the reservoir to prevent it from sliding out.

- Mount lock ring ⑥.

- Mount and tighten seal ring retainer ⑦.

Guideline

Seal ring retainer	M23.5x0.75	46 Nm (33.9 lbf ft)	Loctite® 2701
--------------------	------------	------------------------	---------------

- Unclamp the cartridge.

- Slide piston rod ⑧ into the cartridge.

**Info**

Ensure that the piston ring is seated correctly.

- Mount spring seat ⑨.

- Screw spring guide ⑩ all the way on.

**Info**

The nut must be screw tightly against the stop. Do not use a tool.

- Mount adjusting tube ⑪.

6.2.23 Assembling the fork legs**Info**

When assembling, ensure that the right cartridge is mounted in the corresponding inner tube and the right adjuster is mounted on the corresponding screw cap.

Compression damping side – screw cap with mark **COMP**, brake caliper holder, white adjuster.

Rebound damping side – screw cap with mark **REB**, no brake caliper holder, red adjuster.

Preparatory work

- Assemble the hydrostop unit. (☛ p. 45)

Main work

- Clamp the inner tube with the axle clamp.

Guideline

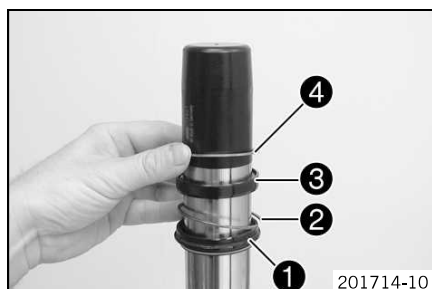
Use soft jaws.

- Mount special tool.

Protecting sleeve (T1401) (☛ p. 302)

- Lubricate and mount dust boot ①.

Lubricant (T511) (☛ p. 290)



201714-10



Info

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

- Slide on lock ring ②.
- Lubricate and slide on seal ring ③.

Lubricant (T511) (☛ p. 290)



Info

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

- Slide on support ring ④.
- Remove the special tool.
- Grind the edges of the sliding bushings with sandpaper grit 600, clean the bushings and lubricate them.

Fork oil (SAE 4) (48601166S1) (☛ p. 289)

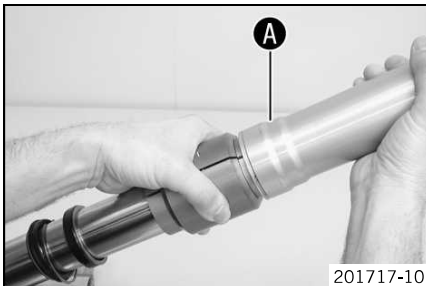


- Slide on the lower sliding bushing ⑤.
- Mount the upper sliding bushing ⑥.



Info

Do not use a tool; pull the ends apart slightly by hand.



- Warm the outer tube in area A of the lower sliding bushing.

Guideline

50 °C (122 °F)

- Slide the outer tube onto the inner tube.
- Hold the lower sliding bushing with the longer section of the special tool.

Mounting tool (T14040S) (☛ p. 303)

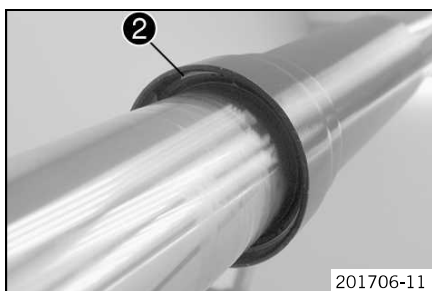
- Push the sliding bushing all the way into the outer tube.



- Position the support ring.
- Hold the seal ring with the shorter section of the special tool.

Mounting tool (T14040S) (☛ p. 303)

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

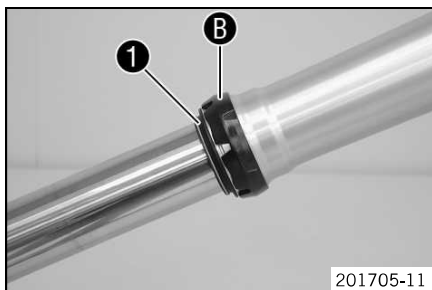


- Mount lock ring ②.

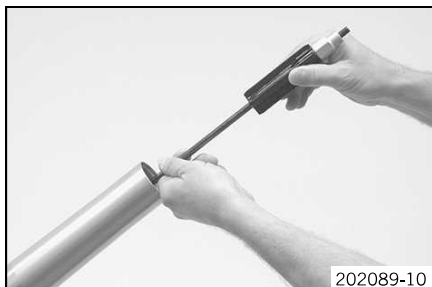


Info

The lock ring must engage audibly.



- Mount dust boot ①.
- Mount fork protection ring ③.



- Lubricate the O-ring. Slide the cartridge all the way into the fork leg.

Fork oil (SAE 4) (48601166S1) (☛ p. 289)



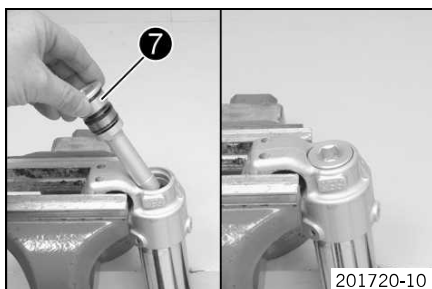
- Turn the fork. Have the entire filling quantity of fork oil available.

Oil capacity per fork leg	607 ml (20.52 fl. oz.)	Fork oil (SAE 4) (48601166S1) (☛ p. 289)
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- Add some of the fork oil while pulling out and pushing in the piston rod numerous times.

Guideline

Fork oil quantity	510 ml (17.24 fl. oz.)
-------------------	------------------------



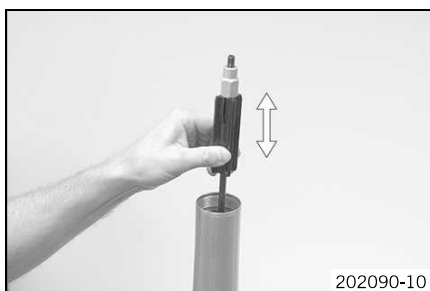
- Mount and tighten hydrostop unit ⑦.

Guideline

Hydrostop unit	M30x1	40 Nm (29.5 lbf ft)
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- Clamp the fork vertically.
- Add the remaining quantity of fork oil.

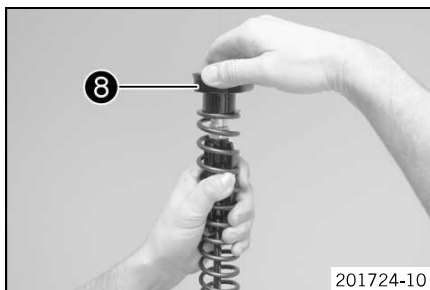


- Pull out the piston rod and push it back in numerous times while pressing it to one side slightly.
 - ✓ Air bubbles emerge and the cartridge is bled.
- Keep bleeding until no more air bubbles emerge.
 - ✓ The piston rod moves out automatically to the middle of the total stroke distance.



Info

When fully bled, the correct air chamber length is achieved automatically.



- Position spring.
- Pull the spring down. Mount screw cap 8.

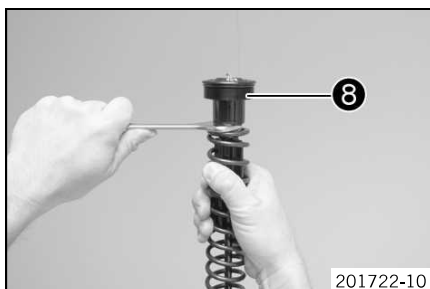


Info

When assembling, ensure that the screw caps are correctly mounted according to the hydrostop needles.

Rebound damping side – red hydrostop needle, screw cap with mark **REB**.

Compression damping side – silver hydrostop needle, screw cap with mark **COMP**.



- Pull the spring down. Mount the open end wrench on the hexagonal part.
- Hold the open end wrench. Tighten screw cap 8.

Guideline

Screw cap on piston rod	M8x0.75	18 Nm (13.3 lbf ft)
Special socket (T14047) (☛ p. 304)		



- Push the outer tube up.
- Clamp the outer tube in the area of the lower triple clamp.

Clamping stand (T1403S) (☛ p. 303)

- Tighten screw cap 8.

Guideline

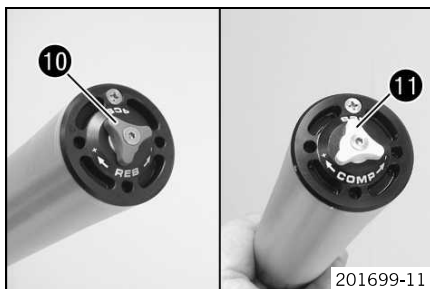
Cartridge on outer tube	M51x1.5	40 Nm (29.5 lbf ft)
Special socket (T14047) (☛ p. 304)		



- Mount the adjuster. Mount and tighten screw 9.

Guideline

Screw, adjuster	M4x0.5	2.5 Nm (1.84 lbf ft)
-----------------	--------	-------------------------



Alternative 1

- Turn the adjuster of compression damping 10 (mark **COMP**) and the adjuster of rebound damping 11 (mark **REB**) all the way clockwise.

Guideline

Rebound damping	
Comfort	23 clicks
Standard	21 clicks
Sport	21 clicks
Compression damping	
Comfort	24 clicks
Standard	22 clicks
Sport	16 clicks

- Turn counterclockwise by the number of click specified for the fork type.

Alternative 2

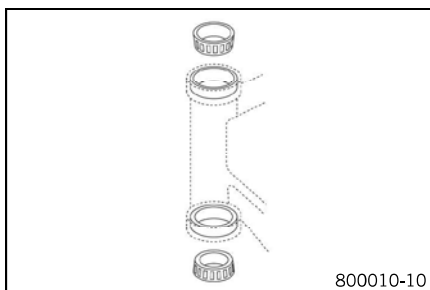
**Warning**

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

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

- Set the adjusters to the positions determined upon removal.

6.2.24 Greasing the steering head bearing



- Remove the lower triple clamp. (☛ p. 52)
- Install the lower triple clamp. (☛ p. 53)

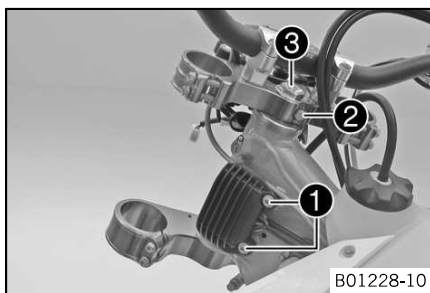
6.2.25 Removing the lower triple clamp

Preparatory work

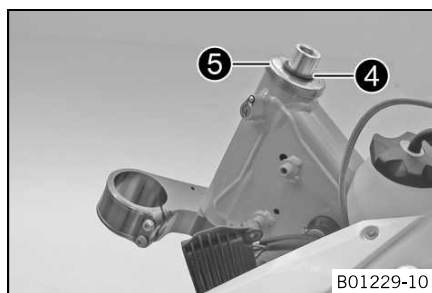
- Remove the headlight mask with the headlight. (☛ p. 97)
- Raise the motorcycle with the lift stand. (☛ p. 11)
- Remove the front wheel. (☛ p. 101)
- Remove the fork legs. (☛ p. 36)
- Remove the front fender. (☛ p. 97)
- Remove the handlebar cushion.

Main work

- Open the cable holder in front of the right radiator and detach the wiring harness.
- Remove screws ❶ and hang the voltage regulator to the side.
- Remove screw ❷. Remove screw ❸, take off the upper triple clamp with the handlebar and set it aside.

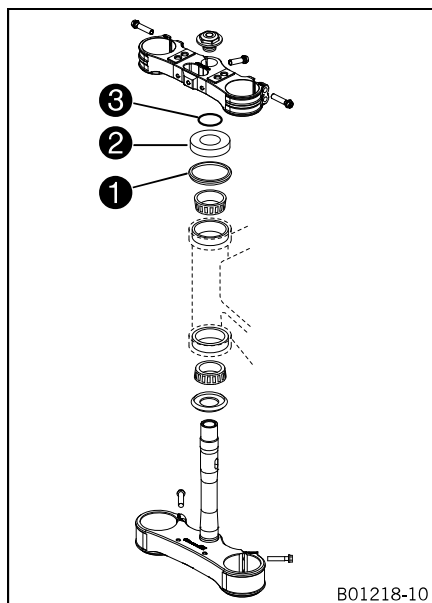
**Info**

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



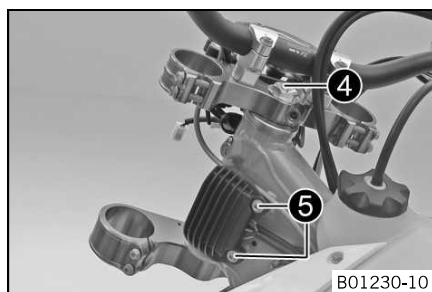
- Remove O-ring ④. Remove protective ring ⑤.
- Take out the lower triple clamp with the steering stem.
- Take out the upper steering head bearing.

6.2.26 Installing the lower triple clamp



Main work

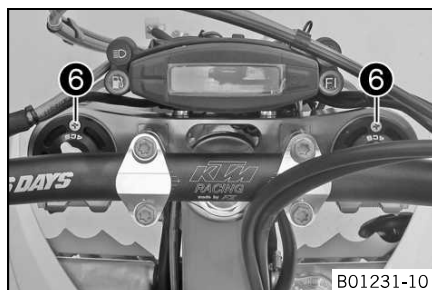
- Clean the bearing and sealing elements, check for damage, and grease.
- | |
|----------------------------------|
| High viscosity grease (☛ p. 290) |
|----------------------------------|
- Insert the lower triple clamp with the steering stem. Mount the upper steering head bearing.
 - Check whether the top steering head seal ① is correctly positioned.
 - Slide on protective ring ② and O-ring ③.



- Position the upper triple clamp with the steering.
- Mount screw ④ but do not tighten yet.
- Position the clutch line, wiring harness, and voltage regulator. Mount and tighten screws ⑤.

Guideline

Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)
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- Position the fork legs.

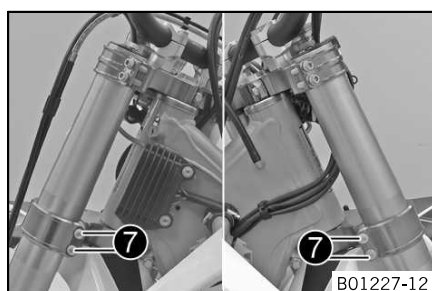
i Info

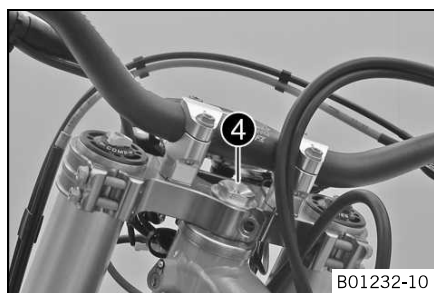
The rebound damping is located in the right fork leg (red adjusting screw). The compression damping is located in the left fork leg (white adjusting screw). Grooves are milled into the side of the upper end of the fork legs. The second milled groove (from the top) must be flush with the top edge of the upper triple clamp. Position bleeder screws ⑥ toward the front.

- Tighten screws ⑦.

Guideline

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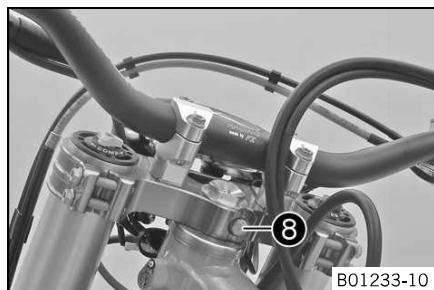




- Tighten screw 4.

Guideline

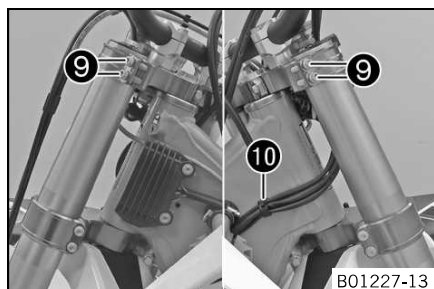
Screw, top steering head	M20x1.5	12 Nm (8.9 lbf ft)
--------------------------	---------	--------------------



- Mount and tighten screw 8.

Guideline

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

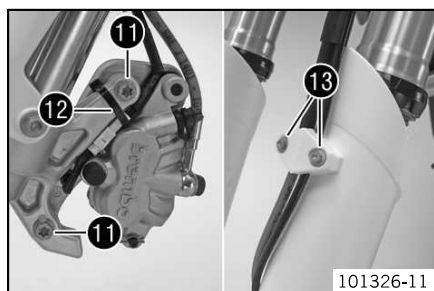


- Tighten screws 9.

Guideline

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

- Secure the wiring harness with cable holder 10.



- Position the brake caliper. Mount and tighten screws 11.

Guideline

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

- Mount cable binder 12.
- Position the brake line, wiring harness and clamp. Mount and tighten screws 13.

Finishing work

- Mount the handlebar cushion.
- Install the front fender. (☛ p. 97)
- Install the front wheel. (☛ p. 101)
- Refit the headlight mask with the headlight. (☛ p. 97)
- Check that the wiring harness, throttle cables and brake and clutch lines can move freely and are routed correctly.
- Check the steering head bearing play. (☛ p. 54)
- Remove the motorcycle from the lift stand. (☛ p. 11)
- Check the headlight setting. (☛ p. 127)

6.2.27 Checking the steering head bearing play



Warning

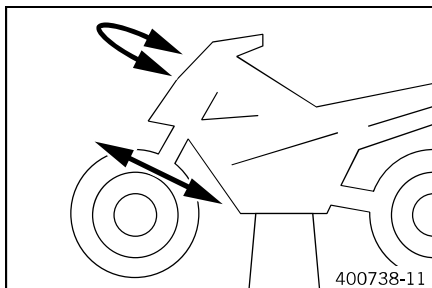
Danger of accidents Unstable vehicle handling from incorrect steering head bearing play.

- Adjust the steering head bearing play without delay.



Info

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

**Preparatory work**

- Raise the motorcycle with the lift stand. (🔧 p. 11)

Main work

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

No play should be noticeable in the steering head bearing.

» If there is noticeable play present:

- Adjust the play of the steering head bearing. (🔧 p. 55)

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

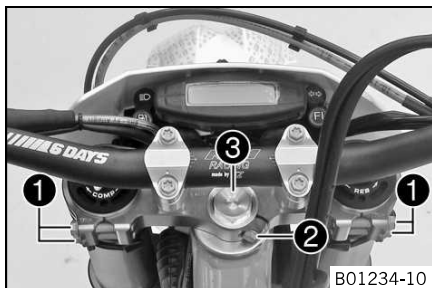
The handlebar must be able to move easily over the entire steering range. No resting locations should be noticeable.

» If click positions are noticeable:

- Adjust the play of the steering head bearing. (🔧 p. 55)
- Check the steering head bearing and replace if required.

Finishing work

- Remove the motorcycle from the lift stand. (🔧 p. 11)

6.2.28 Adjusting the play of the steering head bearing**Preparatory work**

- Raise the motorcycle with the lift stand. (🔧 p. 11)

Main work

- Loosen screws ❶. Remove screw ❷.
- Loosen and retighten screw ❸.

Guideline

Screw, top steering head	M20x1.5	12 Nm (8.9 lbf ft)
--------------------------	---------	--------------------

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

Guideline

Screw, top triple clamp	M8	17 Nm (12.5 lbf ft)
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- Mount and tighten screw ❷.

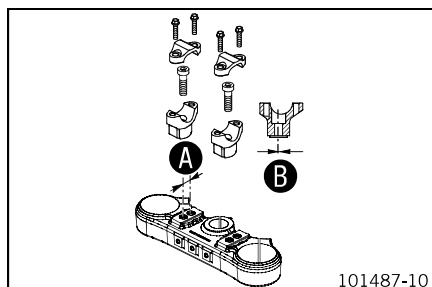
Guideline

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

Finishing work

- Check the steering head bearing play. (🔧 p. 54)
- Remove the motorcycle from the lift stand. (🔧 p. 11)

7.1 Handlebar position



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

Hole distance A	15 mm (0.59 in)
------------------------	-----------------

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

Hole distance B	3.5 mm (0.138 in)
------------------------	-------------------

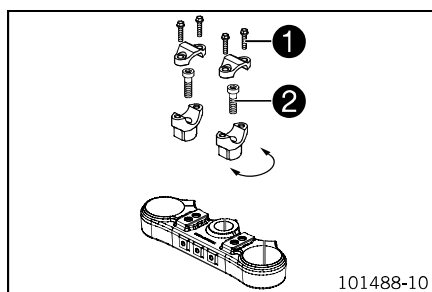
The handlebar supports can be mounted in four different positions.

7.2 Adjusting handlebar position

**Warning**

Danger of accidents Handlebar breakage.

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



- Remove the four screws **1**. Remove the handlebar clamps. Remove the handlebar and lay it to one side.

**Info**

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

- Remove the two screws **2**. Remove the handlebar supports.
- Place the handlebar supports in the required position. Fit and tighten the two screws **2**.

Guideline

Screw, handlebar holder	M10	40 Nm (29.5 lbf ft)	Loctite® 243™
-------------------------	-----	------------------------	---------------

**Info**

Position the left and right handlebar supports evenly.

- Position the handlebar.

**Info**

Make sure cables and wiring are positioned correctly.

- Position the handlebar clamps. Fit and evenly tighten the four screws **1**.

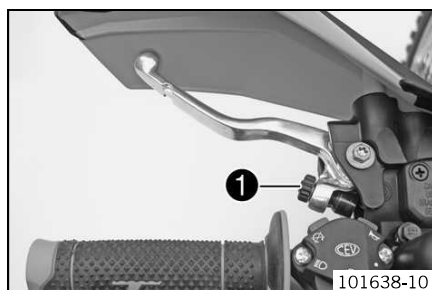
Guideline

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

**Info**

Make sure the gap width is even.

7.3 Adjusting the basic position of the clutch lever



- Adjust the basic setting of the clutch lever to your hand size by turning adjusting screw **1**.

**Info**

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

7.4 Checking the throttle cable routing

Preparatory work

- Remove the seat. (☛ p. 88)
- Remove the fuel tank. (☛ p. 89)

Main work

(XCF-W, EXC-F EU/AUS, EXC-F SIX DAYS)

- Check the throttle cable routing.

Both throttle cables must be routed side by side behind the handlebars and above the fuel tank bearing to the throttle valve body.

- » If the throttle cable is not routed as specified:
 - Correct the throttle cable routing.



(EXC-F USA)

- Check the throttle cable routing.

Both throttle cables must be routed side by side behind the handlebars and above the fuel tank bearing to the throttle valve body.

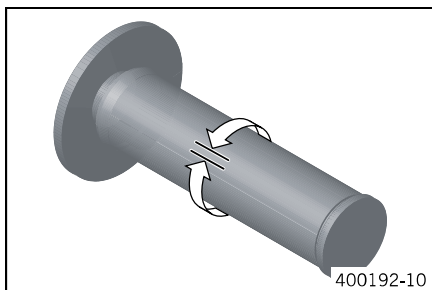
- » If the throttle cable is not routed as specified:
 - Correct the throttle cable routing.



Finishing work

- Install the fuel tank. (☛ p. 90)
- Mount the seat. (☛ p. 89)

7.5 Checking the play in the throttle cable



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

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

- » If the throttle cable play does not meet specifications:
 - Adjust the play in the throttle cable. (☛ p. 58)

**Danger**

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

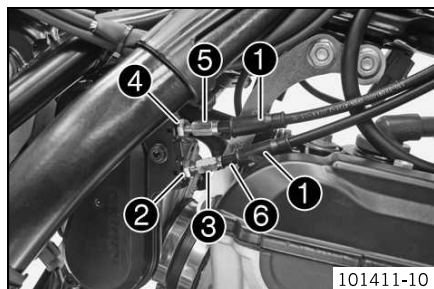
- When running the engine, always make sure there is sufficient ventilation, and do not start or run the engine in an enclosed space without an effective exhaust extraction system.

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

The idle speed must not change.

- » If the idle speed changes:
 - Adjust the play in the throttle cable. (🔧 p. 58)

7.6 Adjusting the play in the throttle cable

**Preparatory work**

- Remove the seat. (🔧 p. 88)
- Remove the fuel tank. (🔧 p. 89)
- Check the throttle cable routing. (🔧 p. 57)

Main work

- Move the handlebar to the straight-ahead position.
- Push back sleeves ①.
- Loosen nut ②. Turn adjusting screw ③ in as far as possible.
- Loosen nut ④. Turn adjusting screw ⑤ so that there is play in the throttle cable at the throttle grip.

Guideline

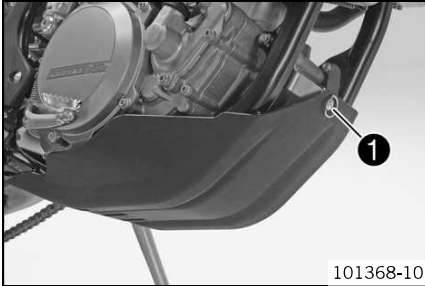
Play in throttle cable	3... 5 mm (0.12... 0.2 in)
------------------------	----------------------------

- Tighten nut ④.
- Press and hold the throttle grip in the closed setting. Turn adjusting screw ③ out until there is no play in throttle cable ⑥.
- Tighten nut ②.
- Push sleeves ① on. Check the throttle grip for smooth operation.

Finishing work

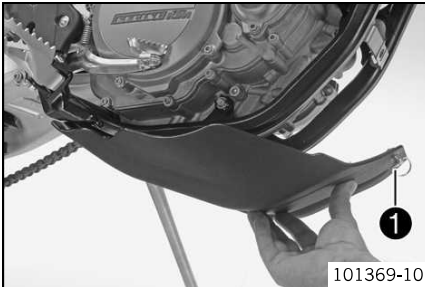
- Install the fuel tank. (🔧 p. 90)
- Mount the seat. (🔧 p. 89)
- Check the play in the throttle cable. (🔧 p. 57)

8.1 Removing the engine guard (EXC-F AUS, EXC-F SIX DAYS)



- Turn quick release ❶ counterclockwise until it disengages. Remove the engine guard.

8.2 Installing the engine guard (EXC-F AUS, EXC-F SIX DAYS)



- Attach the engine guard on the frame at the rear and swing up at the front.
- Turn quick release ❶ clockwise all the way.

9.1 Adjusting the high-speed compression damping of the shock absorber



Caution

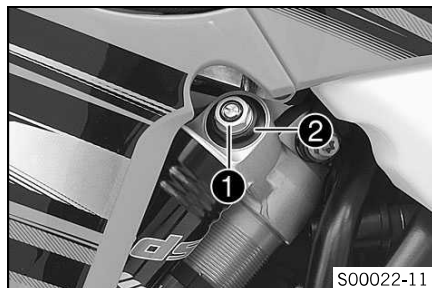
Danger of accidents Disassembly of pressurized parts can lead to injury.

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



Info

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



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



Info

Do not loosen nut ❷!

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

Guideline

Compression damping, high-speed	
Comfort	2 turns
Standard	1.5 turns
Sport	1.25 turns



Info

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

9.2 Adjusting the low-speed compression damping of the shock absorber



Caution

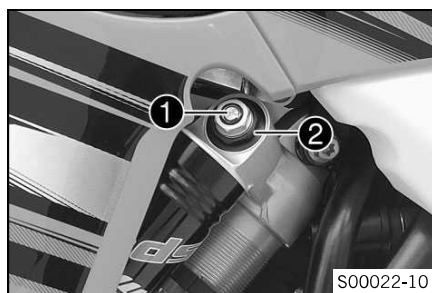
Danger of accidents Disassembly of pressurized parts can lead to injury.

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



Info

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



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



Info

Do not loosen nut ❷!

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

Guideline

Compression damping, low-speed	
Comfort	25 clicks
Standard	20 clicks
Sport	15 clicks



Info

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

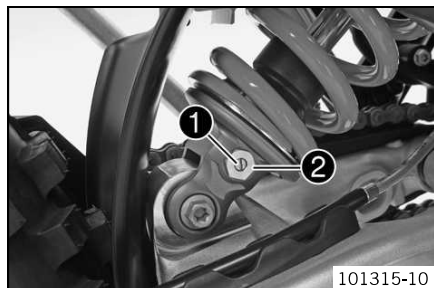
9.3 Adjusting the rebound damping of the shock absorber



Caution

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

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



- Turn adjusting screw **1** clockwise up to the last perceptible click.



Info

Do not loosen nut **2**!

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

Guideline

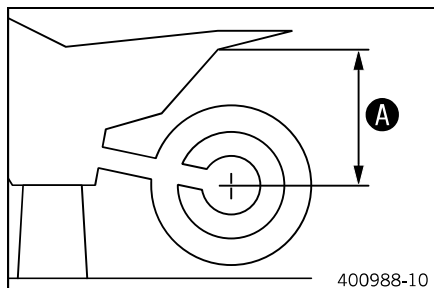
Rebound damping	
Comfort	28 clicks
Standard	24 clicks
Sport	22 clicks



Info

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

9.4 Measuring rear wheel sag unloaded



Preparatory work

- Raise the motorcycle with the lift stand. (☛ p. 11)

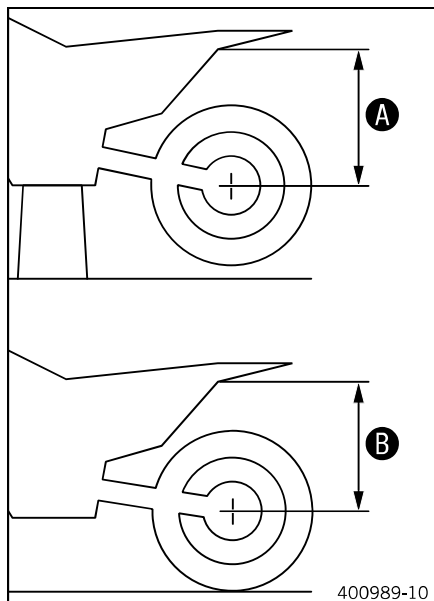
Main work

- Measure the distance – as vertically as possible – between the rear axle and a fixed point such as a mark on the side cover.
- Make note of the value as measurement **A**.

Finishing work

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

9.5 Checking the static sag of the shock absorber



- Measure distance **A** of rear wheel unloaded. (☛ p. 61)
- 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**.

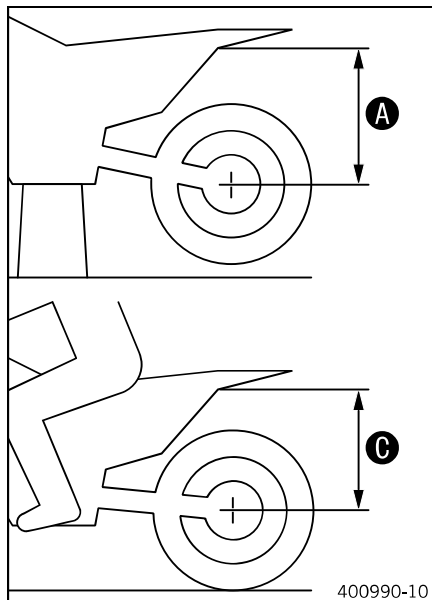
- Check the static sag.

Static sag	33... 35 mm (1.3... 1.38 in)
------------	------------------------------

» If the static sag is less or more than the specified value:

- Adjust the spring preload of the shock absorber. (☛ p. 62)

9.6 Checking the riding sag of the shock absorber



- Measure distance **A** of rear wheel unloaded. (🔧 p. 61)
- With another person holding the motorcycle, the rider, wearing full protective clothing, sits on the seat in a normal sitting position (feet on footrests) and bounces up and down a few times.
 - ✓ The rear wheel suspension levels out.
- Another person now measures the distance between the rear axle and a fixed point.
- Note down the value as dimension **C**.



Info

The riding sag is the difference between measurements **A** and **C**.

- Check the riding sag.

Riding sag	105... 115 mm (4.13... 4.53 in)
------------	---------------------------------

» If the riding sag differs from the specified measurement:

- Adjust the riding sag. (🔧 p. 63)

9.7 Adjusting the spring preload of the shock absorber



Caution

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

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



Info

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

Preparatory work

- Raise the motorcycle with the lift stand. (🔧 p. 11)
- Remove shock absorber. (🔧 p. 63)
- After removing the shock absorber, clean it thoroughly.

Main work

- Loosen screw **1**.
- Turn adjusting ring **2** until the spring is no longer under tension.

Hook wrench (T106S) (🔧 p. 300)

- Measure the overall spring length while the spring is not under tension.
- Tighten the spring by turning adjusting ring **2** to measurement **A**.

Guideline

Spring preload	8 mm (0.31 in)
----------------	----------------



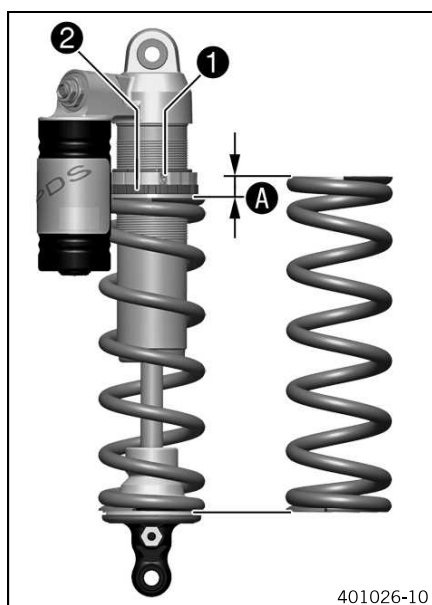
Info

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

- Tighten screw **1**.

Guideline

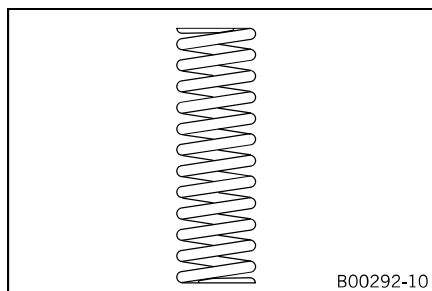
Screw, shock absorber adjusting ring	M5	5 Nm (3.7 lbf ft)
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Finishing work

- Install the shock absorber. (🔧 p. 63)
- Remove the motorcycle from the lift stand. (🔧 p. 11)

9.8 Adjusting the riding sag



Preparatory work

- Raise the motorcycle with the lift stand. (☛ p. 11)
- Remove shock absorber. (☛ p. 63)
- After removing the shock absorber, clean it thoroughly.

Main work

- Choose and mount a suitable spring.

Guideline

Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	66 N/mm (377 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	69 N/mm (394 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	72 N/mm (411 lb/in)



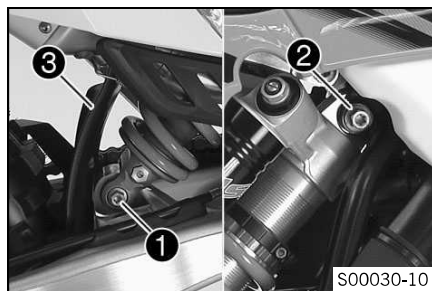
Info

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

Finishing work

- Install the shock absorber. (☛ p. 63)
- Remove the motorcycle from the lift stand. (☛ p. 11)
- Check the static sag of the shock absorber. (☛ p. 61)
- Check the riding sag of the shock absorber. (☛ p. 62)
- Adjust the rebound damping of the shock absorber. (☛ p. 61)

9.9 Removing the shock absorber



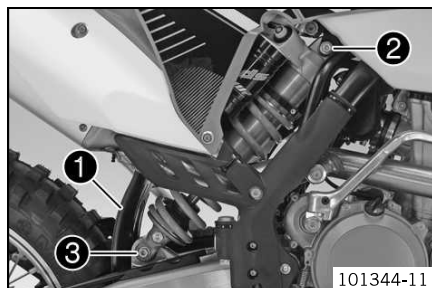
Preparatory work

- Raise the motorcycle with the lift stand. (☛ p. 11)

Main work

- Remove screw ① and lower the rear wheel with the swing arm as far as possible without blocking the rear wheel. Fix the rear wheel in this position.
- Remove screw ②, push splash protector ③ to the side, and remove the shock absorber.

9.10 Installing the shock absorber



Main work

- Push splash protector ① to the side and position the shock absorber. Mount and tighten screw ②.

Guideline

Screw, top shock absorber	M12	80 Nm (59 lbf ft)	Loctite® 2701
---------------------------	-----	----------------------	---------------

- Mount and tighten screw ③.

Guideline

Screw, bottom shock absorber	M12	80 Nm (59 lbf ft)	Loctite® 2701
------------------------------	-----	----------------------	---------------



Info

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

Finishing work

- Remove the motorcycle from the lift stand. (🔧 p. 11)

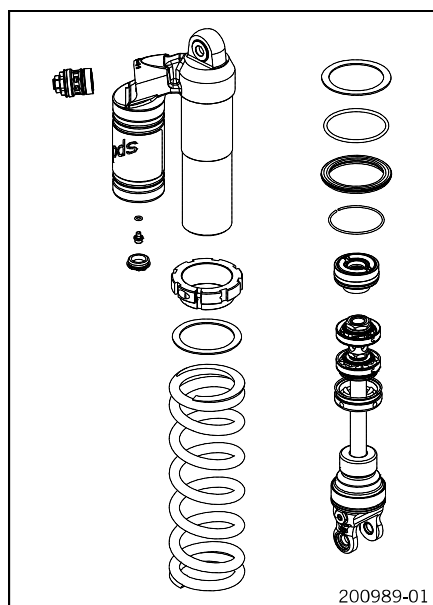
9.11 Servicing the shock absorber



Caution

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

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



Condition

The shock absorber has been removed.

- Remove the spring. (🔧 p. 64)
- Disassemble the damper. (🔧 p. 65)
- Disassemble the piston rod. (🔧 p. 66)
- Disassemble the seal ring retainer. (🔧 p. 67)
- Check the damper. (🔧 p. 69)
- Disassemble the rebound adjuster. (🔧 p. 69)
- Remove the heim joint. (🔧 p. 70)
- Install the heim joint. (🔧 p. 71)
- Assemble the rebound adjuster. (🔧 p. 72)
- Assemble the seal ring retainer. (🔧 p. 72)
- Assemble the piston rod. (🔧 p. 73)
- Assemble the damper. (🔧 p. 74)
- Install the spring. (🔧 p. 80)

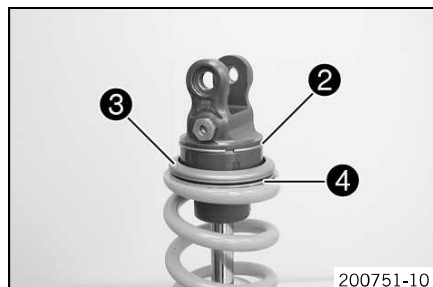
9.12 Removing the spring

Condition

The shock absorber has been demounted.

- Clamp the shock absorber in a bench vise using soft jaws.
- Measure and note down the spring length in a preloaded state.
- Loosen screw ❶.
- Turn the adjusting ring until the spring is no longer under tension.

Hook wrench (T106S) (🔧 p. 300)



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

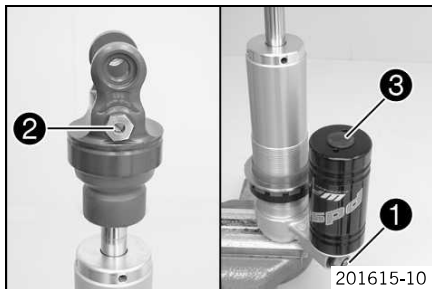
9.13 Disassembling the damper

Preparatory work

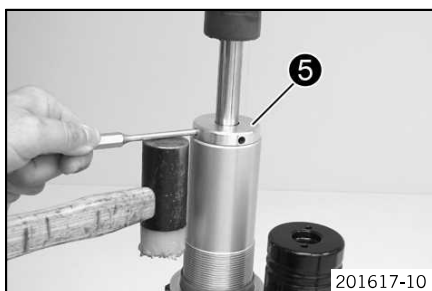
- Remove the spring. (➡ p. 64)

Main work

- Note down the present state of rebound damping ❶ and compression damping ❷.
- Completely open the adjustment elements of the rebound damping and compression damping.
- Remove rubber cap ❸ of the reservoir.



- Slowly unscrew screw ❹.
✓ The pressurized nitrogen is bled off.



- Remove locking cap ❺.



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

Disassembly tool (T1216) (➡ p. 302)

- Remove lock ring ❼.

i Info
Do not scratch the inner surface.

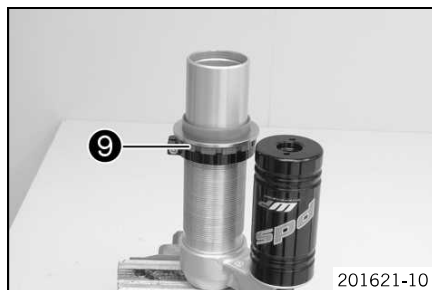
- Take out the damper.



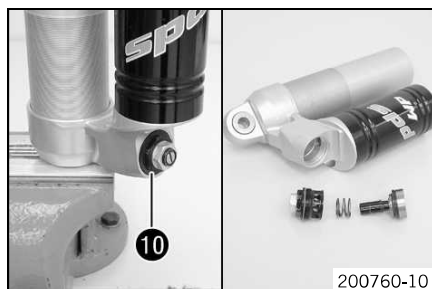
- Remove screw ❽. Drain the oil.



- Remove the piston rod. Drain the remaining oil.



- Remove adjusting ring 9 with the intermediate washer.



- Remove compression adjuster 10. Remove the spring and piston.

9.14 Disassembling the piston rod

Preparatory work

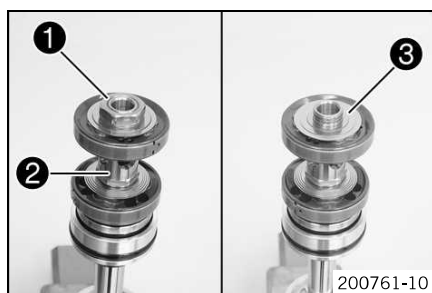
- Remove the spring. (☛ p. 64)
- Disassemble the damper. (☛ p. 65)

Main work

- Clamp the piston rod with the fork in a bench vise.

Guideline

Use soft jaws.



- Remove nut 1.



Info

If mount 2 is loosened, apply counteractive force.

- Remove rebound damping shim stack 3.



Info

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

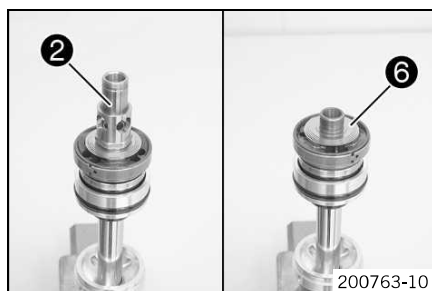


- Remove piston 4.
- Remove compression damping shim stack 5.



Info

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



- Unscrew and remove mount ②.
- Remove rebound damping shim stack ⑥.



Info

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

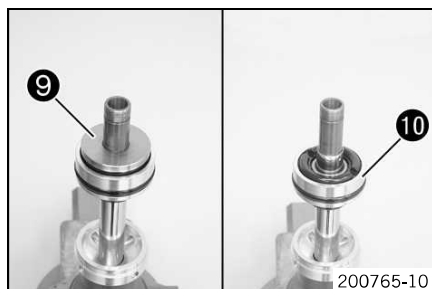


- Remove piston ⑦.
- Remove compression damping shim stack ⑧.

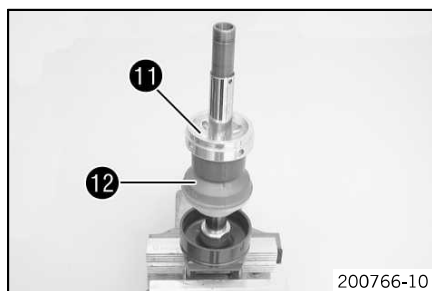


Info

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



- Remove rebound damping washer ⑨.
- Remove seal ring retainer ⑩.



- Remove locking cap ⑪ and bump rubber ⑫.

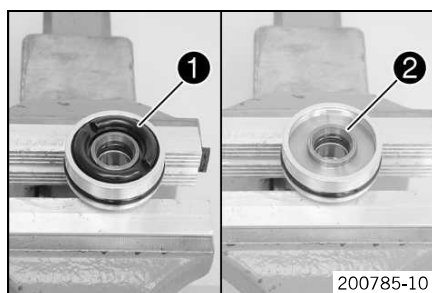
9.15 Disassembling the seal ring retainer

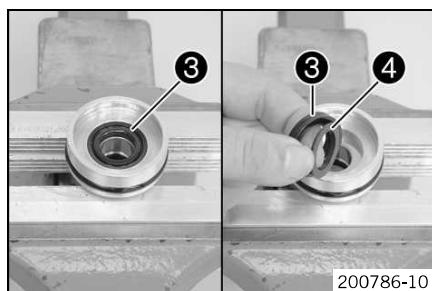
Preparatory work

- Remove the spring. (☛ p. 64)
- Disassemble the damper. (☛ p. 65)
- Disassemble the piston rod. (☛ p. 66)

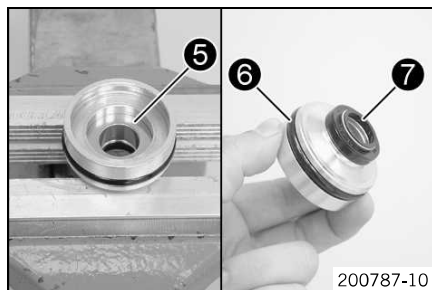
Main work

- Remove rebound rubber ①.
- Remove centering disk ②.





- Remove seal ring ③.
- Remove washer ④ from seal ring ③.



- Remove washer ⑤.
- Remove O-ring ⑥.
- Remove dust boot ⑦.

9.16 Replacing the pilot bushing

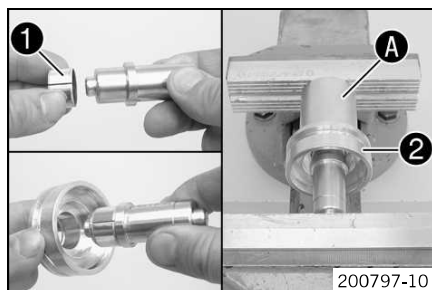
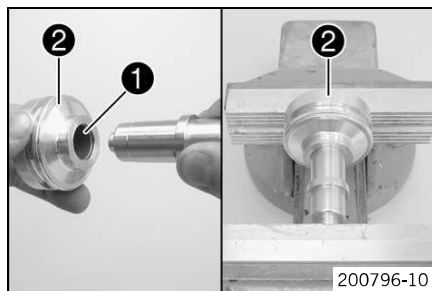
Preparatory work

- Remove the spring. (☛ p. 64)
- Disassemble the damper. (☛ p. 65)
- Disassemble the piston rod. (☛ p. 66)
- Disassemble the seal ring retainer. (☛ p. 67)

Main work

- Press pilot bushing ① out of seal ring retainer ② using the special tool.

Press drift (T1504) (☛ p. 304)



- Slide the new pilot bushing ① onto the special tool.

Press drift (T1504) (☛ p. 304)

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

Press drift (T1504) (☛ p. 304)

- Support seal ring retainer ② with the sleeve A of the special tool. Press the pilot bushing all the way in.

Assembly tool (T150S) (☛ p. 304)

- Lubricate the special tool.

Shock absorber oil (SAE 2.5) (50180342S1) (☛ p. 289)

Calibration pin (T1205) (☛ p. 301)

- Support seal ring retainer ② with the sleeve A of the special tool.

Assembly tool (T150S) (☛ p. 304)

- Press the special tool through the new pilot bushing.

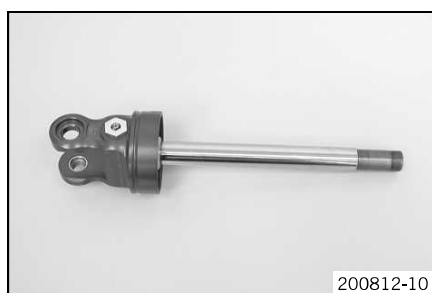
Calibration pin (T1205) (☛ p. 301)

✓ The pilot bushing is to be calibrated.

Finishing work

- Assemble the seal ring retainer. (☛ p. 72)

9.17 Checking the damper



Condition

The damper has been disassembled.

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

Damper cartridge	
Diameter	50.08 mm (1.9716 in)

- » If the measured value is greater than the specified value:
 - Replace the damper cartridge.
- Check the damper cartridge for damage and wear.
 - » If there is damage or wear:
 - Replace the damper cartridge.
- Check the heim joint for damage and wear.
 - » If there is damage or wear:
 - Replace the heim joint.
- Measure the diameter of the piston rod.

Piston rod	
Diameter	17.95 mm (0.7067 in)

- » If the measured value is smaller than the specified value:
 - Replace the piston rod.
- Measure the run-out of the piston rod.

Piston rod	
Run-out	0.02 mm (0.0008 in)

- » If the measured value is greater than the specified value:
 - Replace the piston rod.
- Check the piston rod for damage and wear.
 - » If there is damage or wear:
 - Replace the piston rod.
- Check the piston rings for damage and wear.
 - » If damage or a bronze-colored surface is visible:
 - Replace the piston rings.

9.18 Disassembling the rebound adjuster

Preparatory work

- Remove the spring. (☛ p. 64)
- Disassemble the damper. (☛ p. 65)
- Disassemble the piston rod. (☛ p. 66)

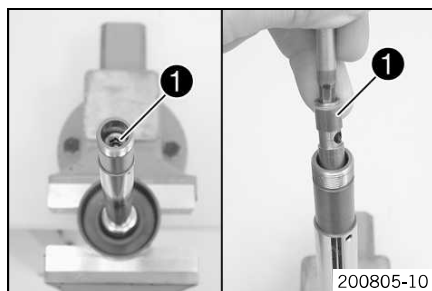
Main work

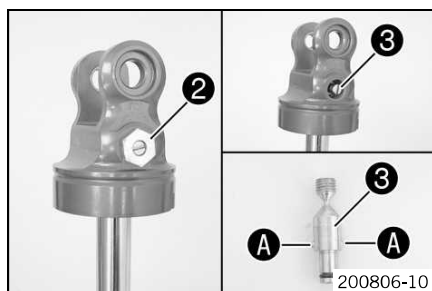
- Warm up the piston rod in the area of the rebound damping valve seat.

Guideline

80 °C (176 °F)

- Remove rebound damping valve seat ❶.



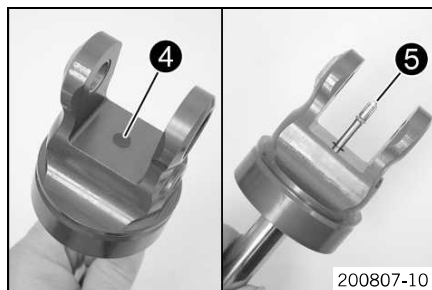


- Remove screwsleeve ②.
- Remove adjusting screw ③.



Info

Do not lose balls ① and spring.



- Remove rubber plug ④.
- From the opposite side, press rebound needle ⑤ out of the piston rod.

9.19 Removing the heim joint

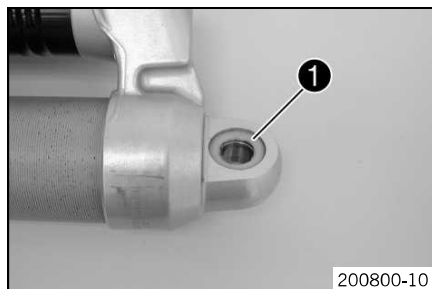
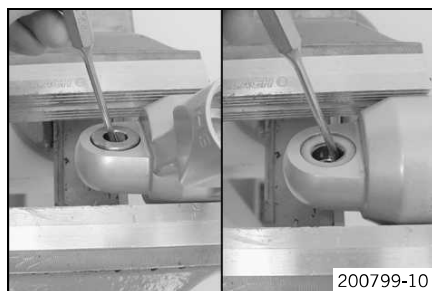
Condition

The shock absorber has been demounted.

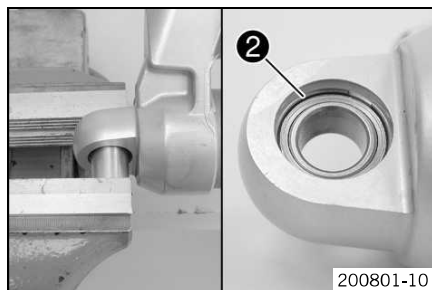
- Clamp the shock absorber in a vise using soft jaws.
- Remove the collar bushing of the heim joint.

Pin (T120) (☛ p. 300)

- Turn the shock absorber around and remove the second heim joint collar bushing.



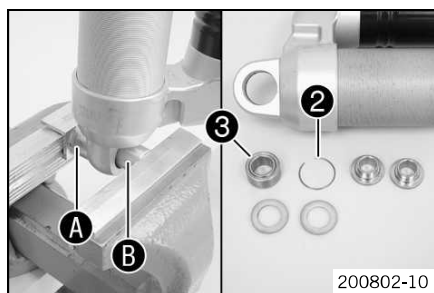
- Remove seal ring ① on both sides.



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

Pressing tool (T1207S) (☛ p. 301)

- Remove the second lock ring ②.



- Place special tool **A** underneath and press out heim joint **B** using special tool **C**.

Pressing tool (T1207S) (☛ p. 301)

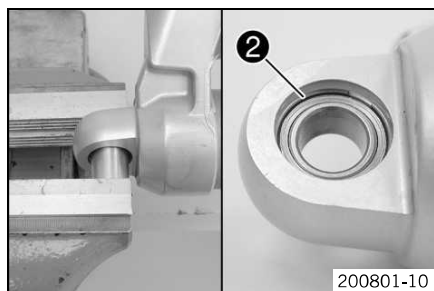
9.20 Installing the heim joint



- Position new heim joint **1** and special tool.

Pressing tool (T1206) (☛ p. 301)

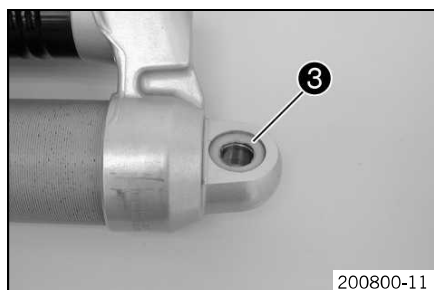
- Press in the heim joint all the way.



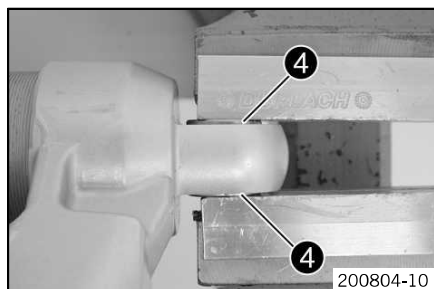
- Press the heim joint against the lock ring using the special tool.

Pressing tool (T1207S) (☛ p. 301)

- Mount the second lock ring **2**.

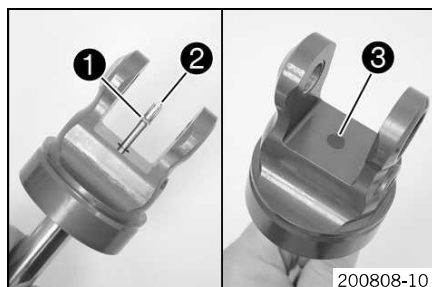


- Mount seal ring **3** on both sides.



- Position both collar bushings **4** and press in.

9.21 Assembling the rebound adjuster



- Grease O-ring ❶ of the rebound needle.

Lubricant (T158) (☛ p. 290)

- Mount rebound needle ❷ in the piston rod.



Info

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

- Mount rubber plug ❸.

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

Lubricant (T159) (☛ p. 291)

- Screw in the rebound damping adjusting screw ❻ all the way.

- Mount and tighten screw sleeve ❼.

Guideline

Screw sleeve	M14x1	18 Nm (13.3 lbf ft)
--------------	-------	------------------------

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

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

Lubricant (T159) (☛ p. 291)

- Mount and tighten rebound damping valve seat ❸.

Guideline

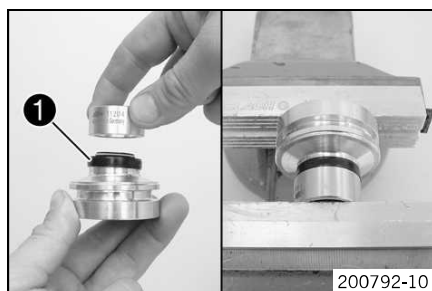
Rebound damping valve seat	M8x1	6 Nm (4.4 lbf ft)	Loctite® 2701
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Info

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

9.22 Assembling the seal ring retainer

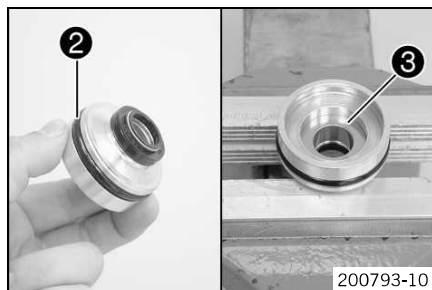


- Mount dust boot ❶ with the special tool.

Mounting sleeve (T1204) (☛ p. 300)

- Grease the sealing lip of the dust boot.

Lubricant (T625) (☛ p. 291)

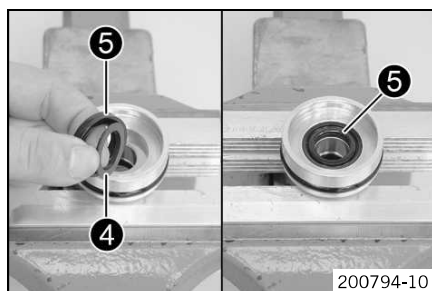


- Grease the O-ring groove.

Lubricant (T158) (☛ p. 290)

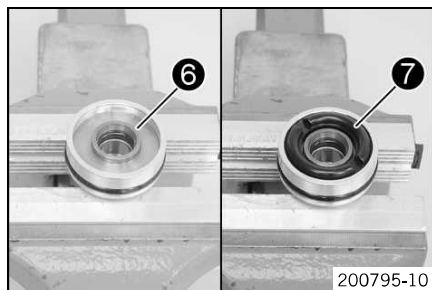
- Mount O-ring ❷.

- Mount washer ❸.



- Position washer 4 on seal ring 5.
- Grease the seal ring and mount with the washer facing downward.

Lubricant (T511) (☛ p. 290)



- Mount centering disk 6.
- Mount rebound rubber 7.

9.23 Assembling the piston rod

Preparatory work

- Assemble the seal ring retainer. (☛ p. 72)
- Assemble the rebound adjuster. (☛ p. 72)

Main work

- Clamp the piston rod with the fork in a bench vise.

Guideline

Use soft jaws.

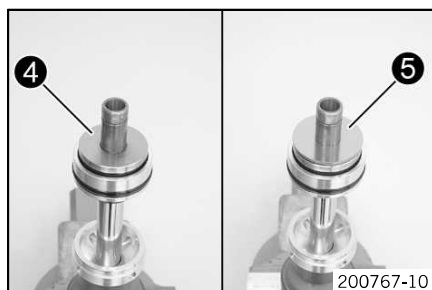
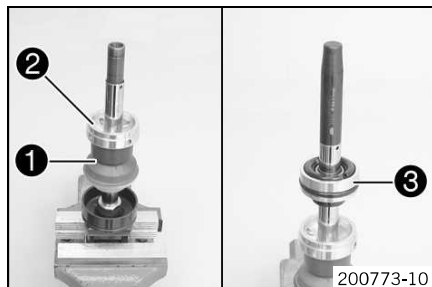
- Mount bump rubber 1 and locking cap 2.
- Position the special tool on the piston rod.

Mounting sleeve (T1215) (☛ p. 301)

- Grease the dust boot and slide seal ring retainer 3 onto the piston rod.

Lubricant (T625) (☛ p. 291)

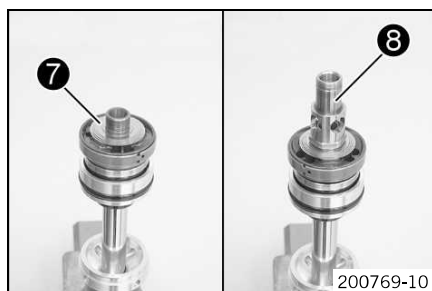
- Remove the special tool.
- Mount rebound damping washer 4.
- Mount the compression shim stack 5 with the smaller shims facing downward.



- Grind piston 6 on both sides, using 1200 grit sandpaper on a surfacing plate.
- Clean the piston.
- Mount the piston.

Guideline

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



- Mount rebound damping shim stack 7 with the smaller shims at the top.
- Apply thread locker to the threads of the piston rod.

Loctite® 2701

- Screw on mount 8 to the point where the piston can still be turned.



- Mount the compression shim stack 9 with the smaller shims facing downward.



- Grind piston 10 on both sides on a surface plate using 1200 grit sandpaper.
- Clean the piston.
- Mount the piston.

Guideline

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



- Mount rebound damping shim stack 11 with the smaller shims facing upward.
- Grease the threads of the mount.

Lubricant (T152) (☛ p. 291)

- Mount nut 12, but do not tighten it yet.



- Align both pistons using the special tool.

Centering sleeve (T1214) (☛ p. 301)

- Tighten the nut.

Guideline

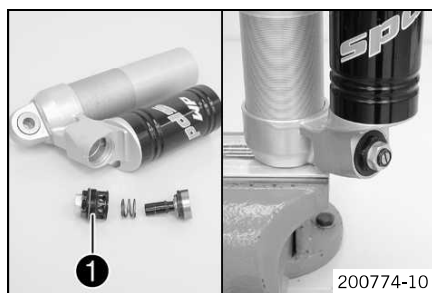
Piston rod nut	M16x1	40 Nm (29.5 lbf ft)
----------------	-------	------------------------

- Remove the special tool.

9.24 Assembling the damper

Preparatory work

- Assemble the seal ring retainer. (☛ p. 72)
- Assemble the rebound adjuster. (☛ p. 72)
- Assemble the piston rod. (☛ p. 73)



Main work

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

Lubricant (T158) (☛ p. 290)

- Grease the threads.

Lubricant (T159) (☛ p. 291)

- Mount and tighten the compression adjuster.

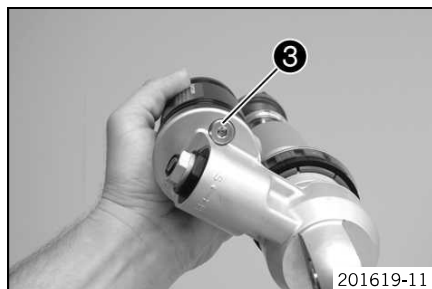
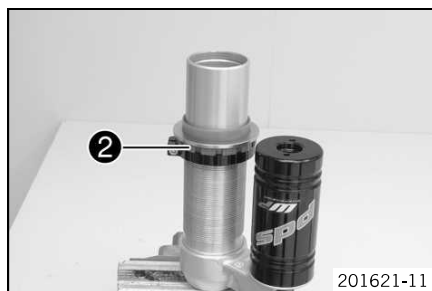
Guideline

Compression adjuster	M31x1	50 Nm (36.9 lbf ft)
----------------------	-------	------------------------

- Install adjusting ring ❷ with an intermediate washer.

Info

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



- Mount screw ❸ but do not tighten yet.



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

Lubricant (T158) (☛ p. 290)

- Fill the damper cartridge approximately half way.

Shock absorber oil (SAE 2.5) (50180342S1) (☛ p. 289)

- Carefully mount the piston rod.



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

Info

Do not scratch the inner surface.

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



- Mount locking cap ❻ of the damper cartridge.
- Bleed and fill the damper. (☛ p. 77)
- Fill the damper with nitrogen. (☛ p. 79)



- Mount rubber cap 7 of the reservoir.
- Turn adjusting ring 8 completely down toward the bottom.



Alternative 1

- Turn adjusting screw 9 clockwise with a screwdriver up to the last perceptible click.
- Turn back counterclockwise by the number of clicks corresponding to the shock absorber type.

Guideline

Compression damping, low-speed	
Comfort	25 clicks
Standard	20 clicks
Sport	15 clicks

- Turn adjusting screw 10 clockwise with an open end wrench until it stops.
- Turn back counterclockwise by the number of turns corresponding to the shock absorber type.

Guideline

Compression damping, high-speed	
Comfort	2 turns
Standard	1.5 turns
Sport	1.25 turns

- Turn adjusting screw 11 clockwise up to the last perceptible click.
- Turn back counterclockwise by the number of clicks corresponding to the shock absorber type.

Guideline

Rebound damping	
Comfort	28 clicks
Standard	24 clicks
Sport	22 clicks

Alternative 2



Warning

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

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

- Mount adjusting screws 9, 10 and 11 in the positions determined when disassembling.

9.25 Bleeding and filling the damper



Info

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



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



Info

Hand-tighten only without using a tool.

- Connect adapter ❶ to connector ❷ of the vacuum pump.

Vacuum pump (T1240S) (☞ p. 302)

- Clamp the damper with soft jaws or hold it as shown in the photo.

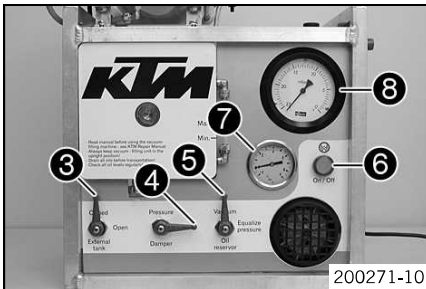


Info

Clamp the damper only lightly.

The filling port must be located at the highest point.

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



- Position the control lever as shown in the photo.
- ✓ Control lever **External tank** ❸ is set to **Closed**; **Damper** ❹ is set to **Vacuum**; and **Oil reservoir** ❺ is set to **Vacuum**.

- Activate **On/Off** switch ❻.

✓ The suction process begins.

✓ Pressure gauge ❼ drops to the required value.

< 0 bar

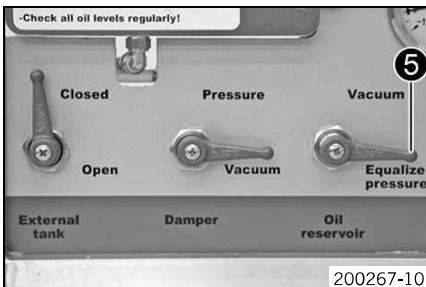
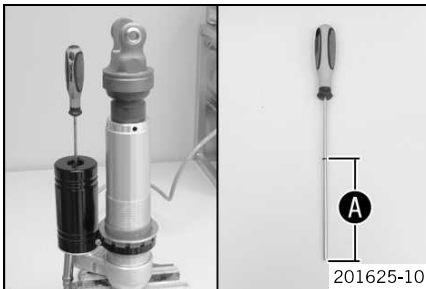
✓ Vacuum gauge ❸ drops to the required value.

4 mbar

- Determine distance ❶ between the floating piston and reservoir hole with the special tool.

Depth micrometer (T107S) (☞ p. 300)

✓ The floating piston is positioned in the lowermost position.



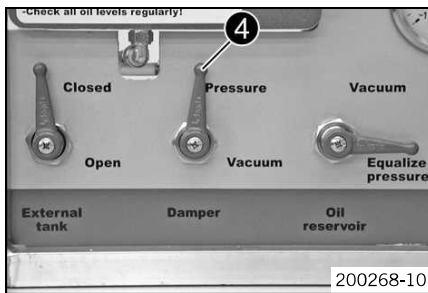
- When the vacuum gauge reaches the required value, turn control lever **Oil reservoir** ❺ to **Equalize pressure**.

Guideline

4 mbar

✓ The pressure gauge increases to the required value.

0 bar



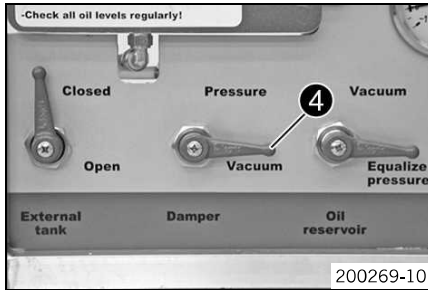
- When the pressure gauge reaches the required value, turn control lever **Damper 4** to **Pressure**.

Guideline

0 bar

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

3 bar



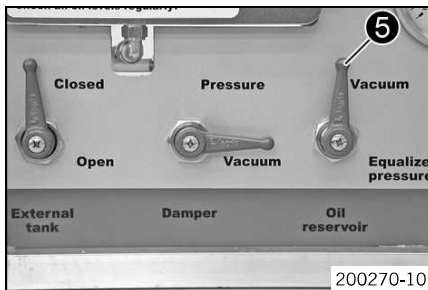
- When the pressure gauge reaches the required value, turn control lever **Damper 4** to **Vacuum**.

Guideline

3 bar

- ✓ The pressure gauge drops to the required value.

0 bar



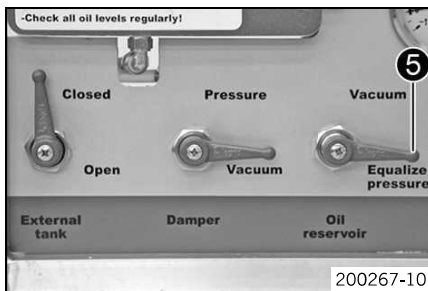
- When the pressure gauge reaches the required value, turn control lever **Oil reservoir 5** to **Vacuum**.

Guideline

0 bar

- ✓ The vacuum gauge drops to the required value.

8 mbar



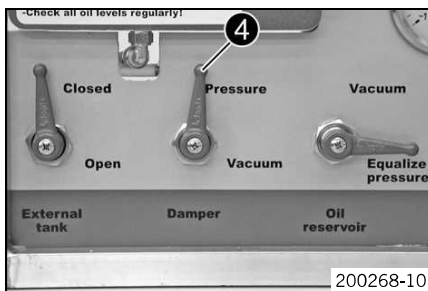
- When the vacuum gauge reaches the required value, turn control lever **Oil reservoir 5** to **Equalize Pressure**.

Guideline

8 mbar

- ✓ The pressure gauge drops to the required value.

0 bar



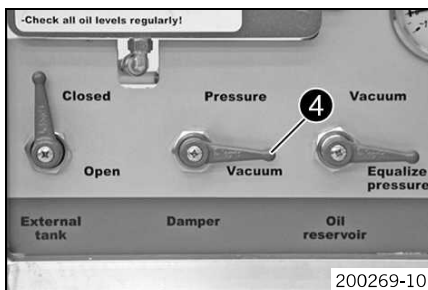
- When the pressure gauge reaches the required value, turn control lever **Damper 4** to **Pressure**.

Guideline

0 bar

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

3 bar



- When the pressure gauge reaches the required value, turn control lever **Damper 4** to **Vacuum**.

Guideline

3 bar

- ✓ The pressure gauge drops to the required value.

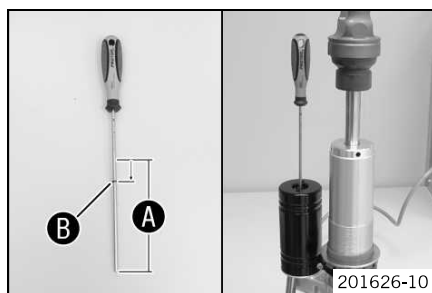
0 bar

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

Guideline

0 bar

- ✓ The vacuum pump is switched off.



- Slide O-ring **B** to the end of the special tool by the specified value (distance **A** minus specified value).

Guideline

10 mm

Depth micrometer (T107S) (☛ p. 300)

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



Info

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

- Remove the special tool.
- Remove adapter **1** from connector **2** of the vacuum pump.



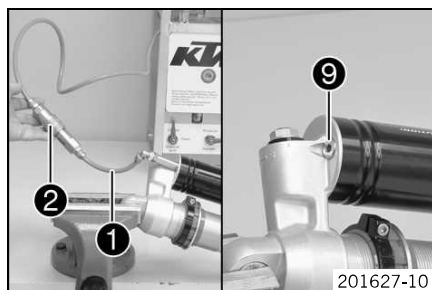
Info

Hold the damper so that the filling port is at the highest point.

- Remove the adapter.
- Mount and tighten screw **9**.

Guideline

Filling port screw	M10x1	14 Nm (10.3 lbf ft)
--------------------	-------	------------------------



9.26 Filling the damper with nitrogen

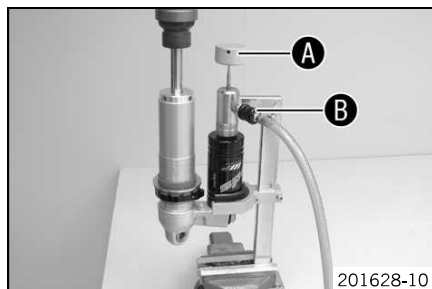


- Screw in the screw **1** approx. two turns, but do not tighten.



Info

The piston rod is completely extended.



- Keep the special tool in place in the bench vise.

Nitrogen filling tool (T170S1) (☛ p. 305)

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

Filling gas - nitrogen

- Adjust the pressure regulator.

Guideline

Gas pressure	10 bar (145 psi)
--------------	------------------

- Position the shock absorber in the special tool.

- ✓ The hexagonal part of tap handle **A** engages in the hexagon socket of the screw of the filling port.

- Open spigot **B**.
- Fill the shock absorber for at least 15 seconds.

Guideline

Gas pressure	10 bar (145 psi)
--------------	------------------



Info

Monitor the pressure control valve indicator.
Ensure that the shock absorber has been filled to the specified pressure.

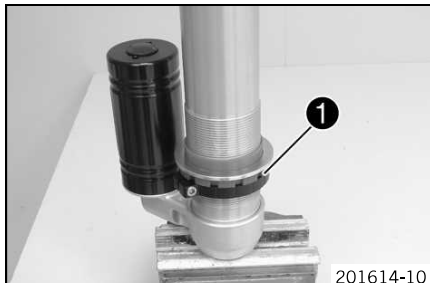
- Screw the filling port shut with tap handle **A**.

- Close spigot ❸ and remove the damper from the special tool.
- Tighten the screw of the filling port.

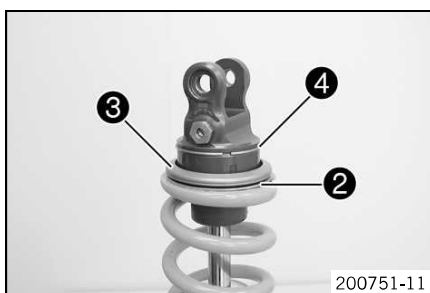
Guideline

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

9.27 Installing the spring



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



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

Guideline

Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	66 N/mm (377 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	69 N/mm (394 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	72 N/mm (411 lb/in)

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

Alternative 1

- Tighten the spring by turning adjusting ring to measurement.

Guideline

Spring preload	8 mm (0.31 in)
Hook wrench (T106S) (☛ p. 300)	

Alternative 2



Warning

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

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

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

Hook wrench (T106S) (☛ p. 300)

- Tighten screw ❺.

Guideline

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



9.28 Changing the heim joint

Preparatory work

- Raise the motorcycle with the lift stand. (🔧 p. 11)

Main work

- Remove screw ❶ and lower the rear wheel with the swingarm as far as possible without blocking the rear wheel. Fix the rear wheel in this position.



Info

Raise the wheel slightly to make it easier to remove the screw.

- Swing back the shock absorber.

- Remove spacers ❷ on both sides.

- Remove shaft seal rings ❸ on both sides.

- Mount special tool ❹.

Mounting tool, heim joint (50329000044) (🔧 p. 292)

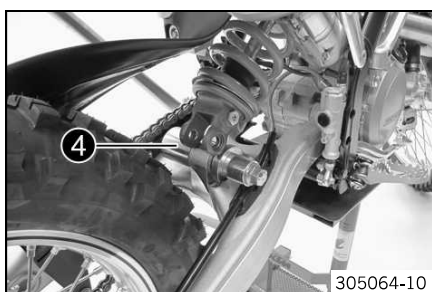
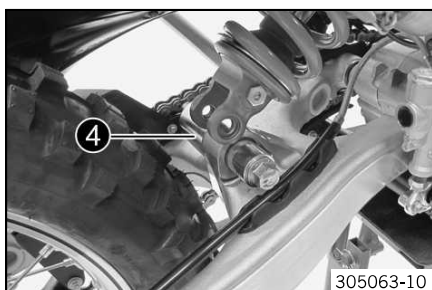
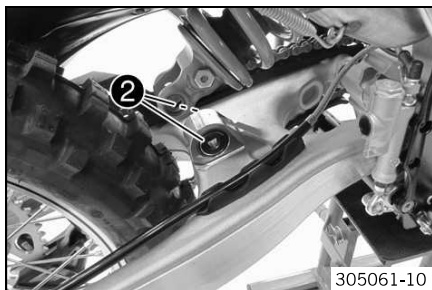
- Press out the heim joint by screwing in the screw.

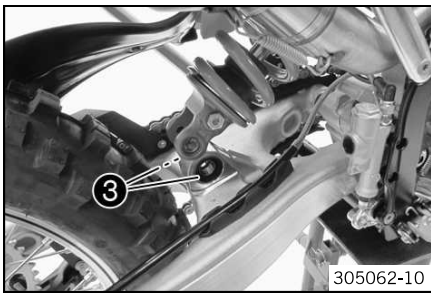
- Position the new heim joint.

- Mount special tool ❹.

Mounting tool, heim joint (50329000044) (🔧 p. 292)

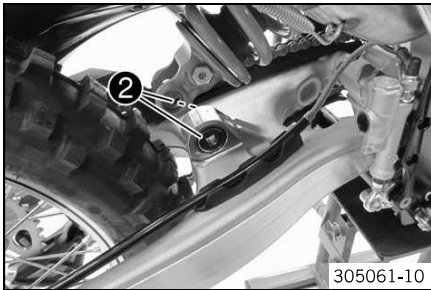
- Press in the heim joint by screwing in the screw.



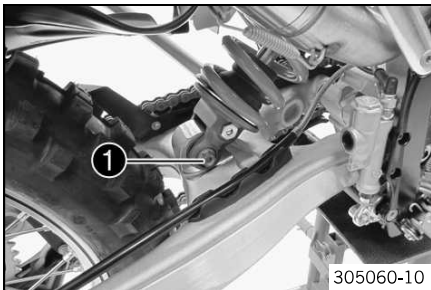


- Press in shaft seal rings ③ on both sides with the open side facing inward.

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



- Mount spacers ② on both sides.



- Position the shock absorber.
- Mount and tighten screw ①.

Guideline

Screw, bottom shock absorber	M12	80 Nm (59 lbf ft)	Loctite® 2701
------------------------------	-----	----------------------	---------------

i Info
Raise the wheel slightly to make it easier to mount the screw.

Finishing work

- Remove the motorcycle from the lift stand. (🔧 p. 11)

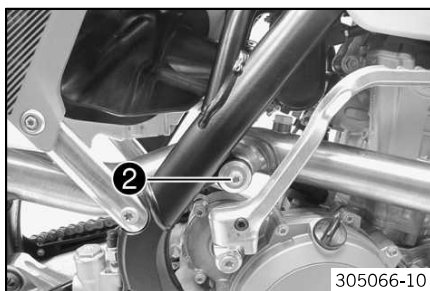
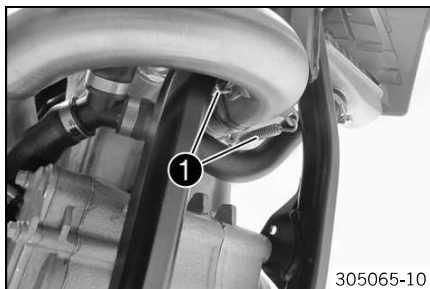
10.1 Removing the manifold

Preparatory work

- Raise the motorcycle with the lift stand. (🔧 p. 11)
- Remove shock absorber. (🔧 p. 63)
- Remove the main silencer. (🔧 p. 84)

Main work

- Remove springs ❶.



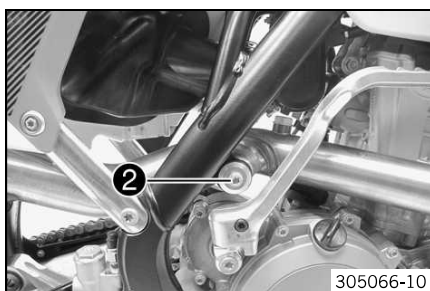
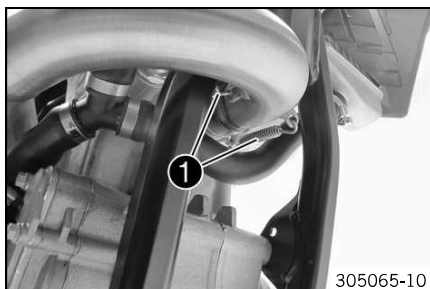
- Remove screw ❷ and take off the manifold.

10.2 Installing the manifold

Main work

- Position the manifold and mount springs ❶.

Spring hooks (50305017000) (🔧 p. 292)



- Mount and tighten screw ❷.

Guideline

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

Finishing work

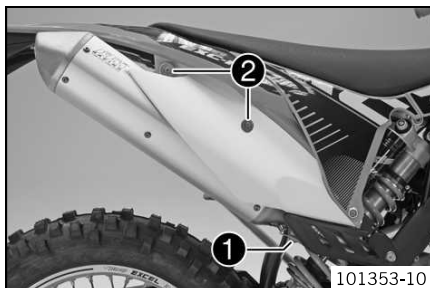
- Install the main silencer. (🔧 p. 84)
- Install the shock absorber. (🔧 p. 63)
- Remove the motorcycle from the lift stand. (🔧 p. 11)

10.3 Removing main silencer

**Warning**

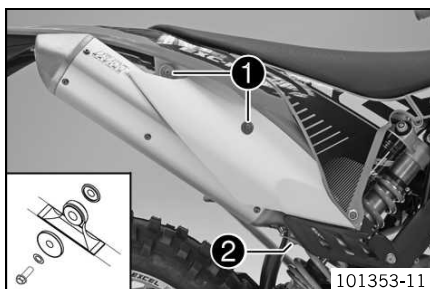
Danger of burns The exhaust system gets very hot when the vehicle is driven.

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



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

10.4 Installing the main silencer



- Mount the main silencer. Mount screws ❶ but do not tighten yet.
- Reconnect spring ❷.
- Tighten screws ❶.

Guideline

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

10.5 Changing the glass fiber yarn filling of the main silencer

**Warning**

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

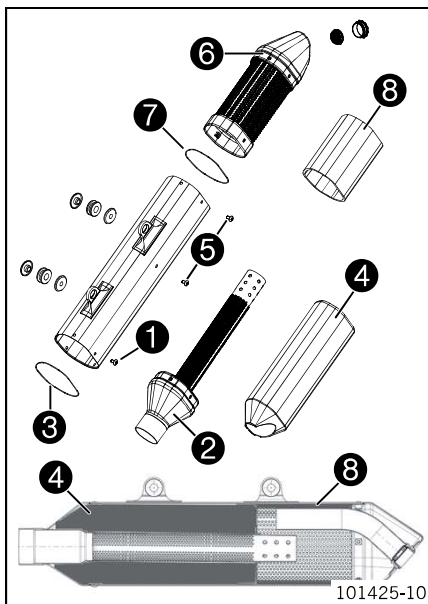
- Allow the exhaust system to cool down. Do not touch hot components.

**Info**

Over time, the fibers of the glass fiber yarn escape and the damper "burns" out. Not only is the noise level higher, the performance characteristic changes.

Preparatory work

- Remove the main silencer. (🔧 p. 84)



Main work

(EXC-F EU/AUS, EXC-F SIX DAYS)

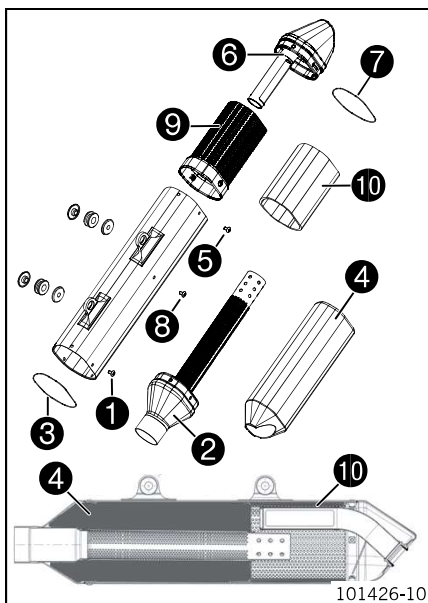
- Remove screws ① of connecting cap ②.
- Take off the connecting cap with the perforated pipe, O-ring ③, and glass fiber yarn filling ④.
- Remove screws ⑤ and take off silencer cap ⑥ with O-ring ⑦ and stuffing yarn ⑧.
- Clean the parts that need to be reinstalled and check for damage.
- Mount the O-ring on the silencer cap.
- Mount the new stuffing yarn on the silencer cap and fasten with adhesive tape.
- Position the silencer cap. Mount and tighten the screws.
- Mount the O-ring on the connecting cap.
- Slide the new glass fiber yarn filling over the perforated pipe.
- Mount the connecting cap with the glass fiber yarn filling in the main silencer.



Info

Slide the glass fiber yarn filling into the main silencer with a blunt tool.

- Mount and tighten the screws.



(XCF-W, EXC-F USA)

- Remove screws ① of connecting cap ②.
- Take off the connecting cap with the perforated pipe, O-ring ③ and glass fiber yarn filling ④.
- Remove screws ⑤ and silencer cap ⑥ with O-ring ⑦.
- Remove screw ⑨ and remove insert ⑨ together with stuffing yarn ⑧.
- Clean the parts that need to be reinstalled and check for damage.
- Mount the new stuffing yarn on the insert and fasten with adhesive tape.
- Slide the insert with the stuffing yarn into the main silencer and fasten with the screw.
- Mount the O-ring on the connecting cap.
- Slide the new glass fiber yarn filling over the perforated pipe.
- Mount the connecting cap with the glass fiber yarn filling in the main silencer.



Info

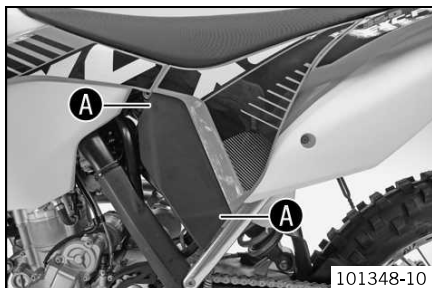
Slide the glass fiber yarn filling into the main silencer with a blunt tool.

- Mount and tighten the screws.
- Mount the O-ring on the silencer cap.
- Position the silencer cap. Mount and tighten the screws.

Finishing work

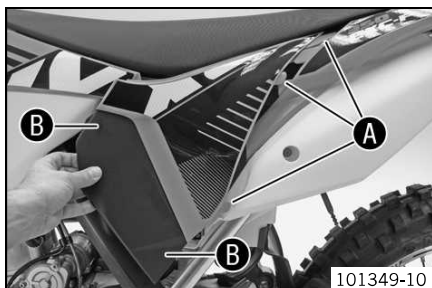
- Install the main silencer. (☛ p. 84)

11.1 Removing the air filter box lid



- Pull off the air filter box lid in area **A** to the side and remove to the front.

11.2 Installing the air filter box lid



- Insert the air filter box lid into the rear area **A** and clip it into the front area **B**.

11.3 Removing the air filter

Note

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

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



Warning

Environmental hazard Hazardous substances cause environmental damage.

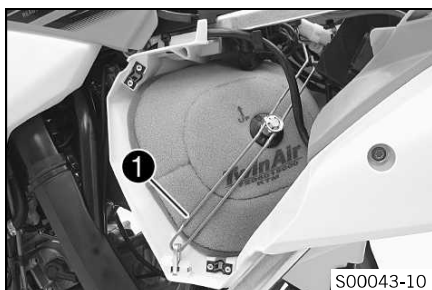
- Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

Preparatory work

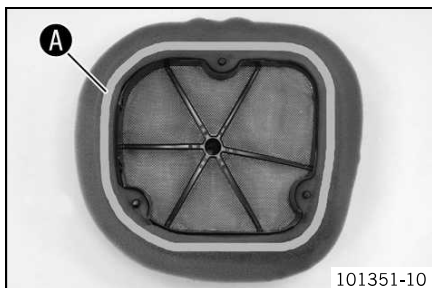
- Remove the air filter box lid. (☛ p. 86)

Main work

- Detach air filter holder **1** at the bottom and swing it to one side. Remove the air filter with the air filter support.
- Remove the air filter from the air filter support.



11.4 Installing the air filter



Main work

- Mount the clean air filter on the air filter support.
- Grease the air filter in area **A**.

Long-life grease (☛ p. 290)



- Insert both parts together, position them and fasten them using air filter holder ①.
- ✓ The arrow of marking **UP** faces up.



Info

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

Finishing work

- Install the air filter box lid. (☛ p. 86)

11.5 Cleaning the air filter and air filter box



Warning

Environmental hazard Hazardous substances cause environmental damage.

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



Info

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



Preparatory work

- Remove the air filter box lid. (☛ p. 86)
- Remove the air filter. (☛ p. 86)

Main work

- Wash the air filter thoroughly in special cleaning liquid and allow it to dry properly.

Air filter cleaner (☛ p. 290)



Info

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

- Oil the dry air filter with a high quality filter oil.

Oil for foam air filter (☛ p. 291)

- Clean the air filter box.
- Check the intake flange for damage and firm seating.

Finishing work

- Install the air filter. (☛ p. 86)
- Install the air filter box lid. (☛ p. 86)

12.1 Opening filler cap



Danger

Fire hazard Fuel is highly flammable.

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



Warning

Danger of poisoning Fuel is poisonous and a health hazard.

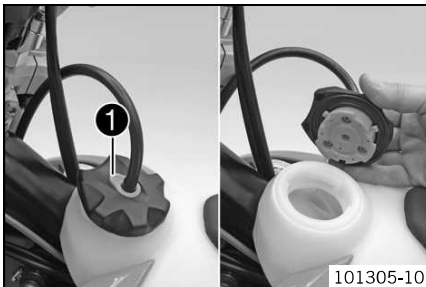
- Avoid contact between fuel and skin, eyes and clothing. Do not inhale fuel vapors. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If fuel is swallowed, contact a doctor immediately. Change clothing that has come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



Warning

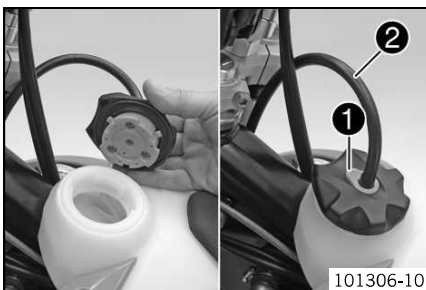
Environmental hazard Improper handling of fuel is a danger to the environment.

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



- Press release button **1**, turn filler cap counterclockwise and lift it upwards and remove.

12.2 Closing filler cap



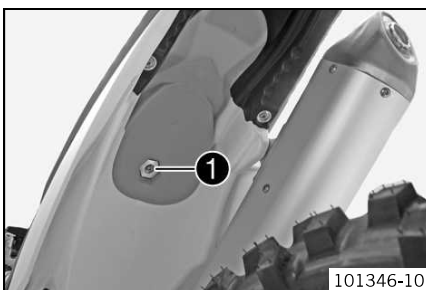
- Replace the filler cap and turn clockwise until the release button **1** locks in place.



Info

Route the fuel tank breather hose **2** without kinking.

12.3 Removing the seat



- Remove screw **1**.
- Lift up the seat at the rear, pull it back and then remove it from above.

12.4 Mounting the seat



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

Guideline

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

12.5 Removing the fuel tank

**Danger****Fire hazard** Fuel is highly flammable.

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

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

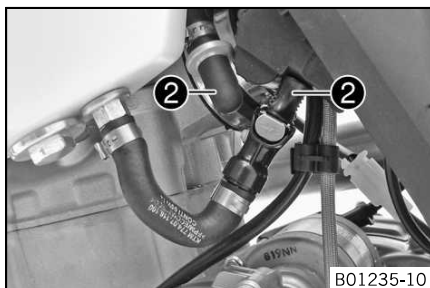
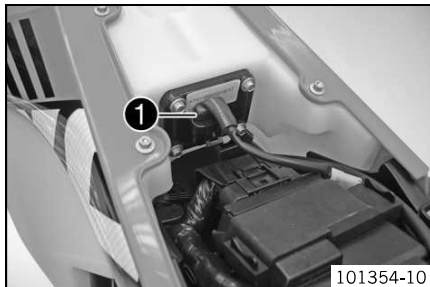
- Avoid contact between fuel and skin, eyes and clothing. Do not inhale fuel vapors. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If fuel is swallowed, contact a doctor immediately. Change clothing that has come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

Preparatory work

- Remove the seat. (➡ p. 88)

Main work

- Disconnect electric plug-in connection ❶ of the fuel pump.
- Remove the tube from the fuel tank breather.



- Thoroughly clean the plug-in connection of the fuel line using compressed air.

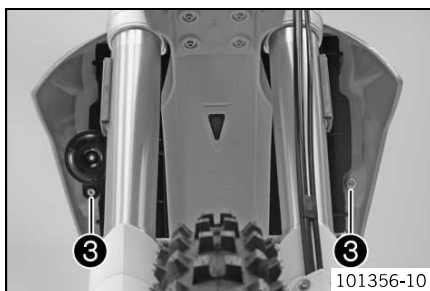
**Info**

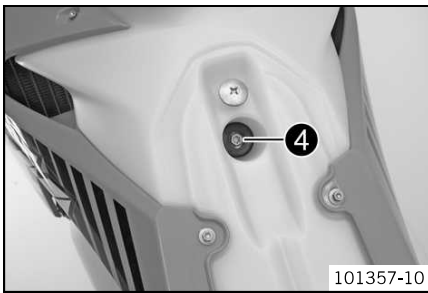
Under no circumstances should dirt enter into the fuel line. Dirt in the fuel line clogs the injection valve.

- Disconnect the plug-in connection of the fuel line.
- Mount wash cap set ❷.

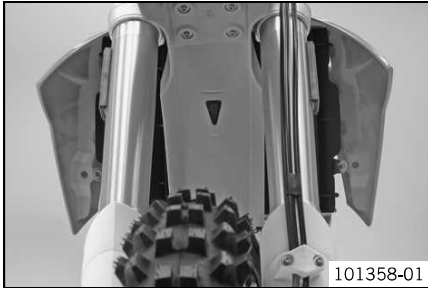
Wash cap set (81212016100)

- Remove screws ❸ with the collar bushings and horn.





- Remove screw ④ with the rubber bushing.



- Pull both spoilers off of the sides of the radiator bracket and lift off the fuel tank.

12.6 Installing the fuel tank



Danger

Fire hazard Fuel is highly flammable.

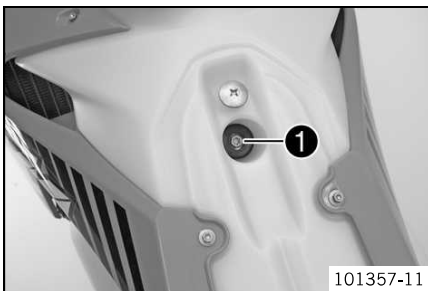
- Never refuel the vehicle near open flames or burning cigarettes, and always switch off the engine first. Be careful that no fuel is spilt, especially on hot vehicle components. Clean up spilt fuel immediately.
- Fuel in the fuel tank expands when warm and can escape if the tank is overfilled. See the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



Warning

Danger of poisoning Fuel is poisonous and a health hazard.

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

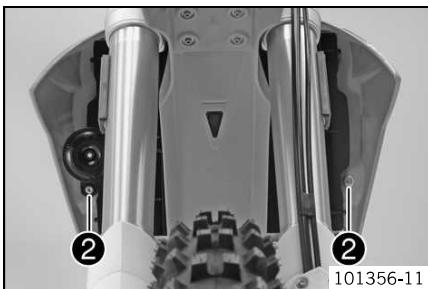


Main work

- Check the throttle cable routing. (☛ p. 57)
- Position the fuel tank and fit the two spoilers to the sides of the radiator bracket.
- Make sure that no cables are trapped or damaged.
- Mount the fuel tank breather.
- Mount and tighten screw ① with the rubber bushing.

Guideline

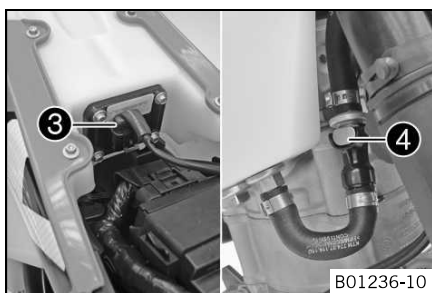
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)
---------------------------	----	--------------------



- Position the horn, and fit and tighten screws ② with collar bushings.

Guideline

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



- Connect the electrical plug-in connection ③.
- Remove the wash cap set.
- Thoroughly clean the plug-in connection of the fuel line using compressed air.



Info

Never let dirt enter the fuel line. Dirt in the fuel line clogs the injection valve.

- Lubricate the O-ring and connect plug-in connection ④ of the fuel line.



Info

Route the cable and fuel line at a safe distance from the exhaust system.

Finishing work

- Mount the seat. (🔧 p. 89)

12.7 Changing the fuel screen



Danger

Fire hazard Fuel is highly flammable.

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



Warning

Danger of poisoning Fuel is poisonous and a health hazard.

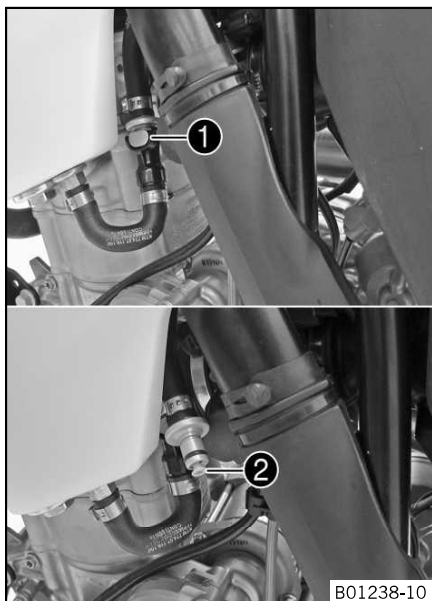
- Avoid contact of the fuel with skin, eyes and clothing. Do not inhale fuel vapors. If fuel gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If fuel is swallowed, contact a doctor immediately. Change clothing that has come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



Warning

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

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



- Clean the plug-in connection ① of the fuel line thoroughly with compressed air.



Info

Under no circumstances should dirt enter into the fuel line. Dirt in the fuel line clogs the injection valve.

- Disconnect the plug-in connection ① of the fuel line.
- Pull fuel screen ② out of the connecting piece.
- Insert the new fuel screen all the way into the connecting piece.
- Lubricate the O-ring and connect plug-in connection of the fuel line.



Danger

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

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

12.8 Changing the fuel filter



Danger

Fire hazard Fuel is highly flammable.

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



Warning

Danger of poisoning Fuel is poisonous and a health hazard.

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



Warning

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

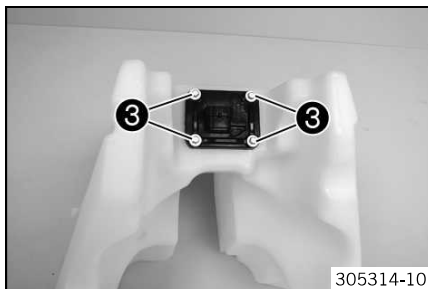
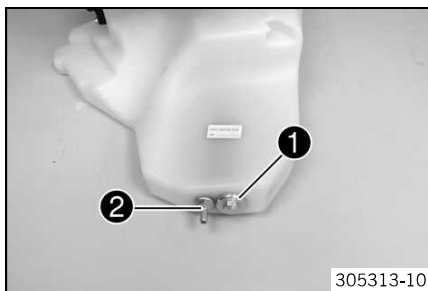
- Do not allow fuel to get into the ground water, the ground, or the sewage system.

Preparatory work

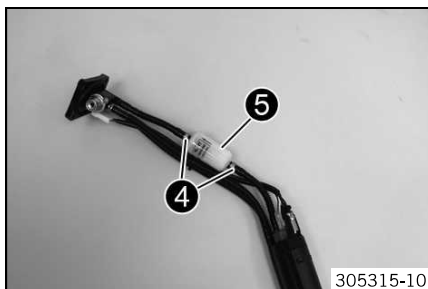
- Drain the fuel from the fuel tank into a suitable container.
- Remove the seat. (➡ p. 88)
- Remove the fuel tank. (➡ p. 89)

Main work

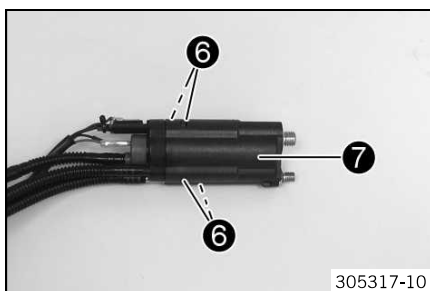
- Remove nut ❶ with the gasket.
- Remove fuel connection ❷ with the gasket.



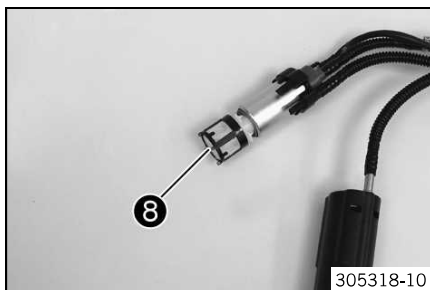
- Remove screws ❸.
- Pull out the fuel pump.



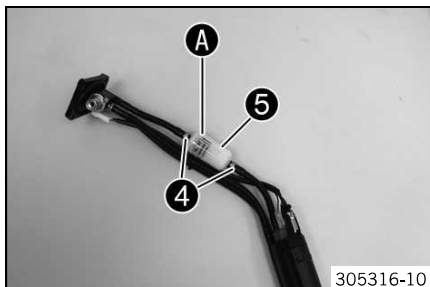
- Remove hose clamps ❹.
- Remove fuel filter ❺.



- Press lock ⑥.
- Pull back fuel pump housing ⑦.

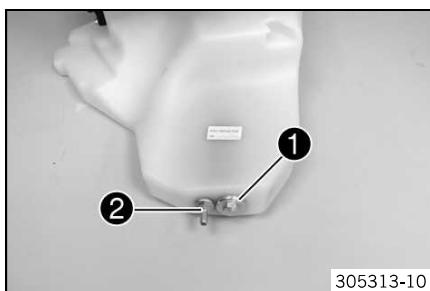


- Change fuel screen ⑧.
- Mount the fuel pump housing.



- Mount fuel filter ⑤.
- ✓ Arrow A points away from the fuel pump.
- Mount hose clamps ④.

Hose clamp pliers (60029057000) (☛ p. 295)



- Position the fuel pump.
- Mount fuel connection ② with the gasket but do not tighten yet.

Guideline

Fuel connection on fuel pump	M8	10 Nm (7.4 lbf ft)
------------------------------	----	--------------------

- Mount and tighten nut ① with the gasket.

Guideline

Nut, fuel pump fixation	M12	15 Nm (11.1 lbf ft)
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- Tighten fuel connection ②.

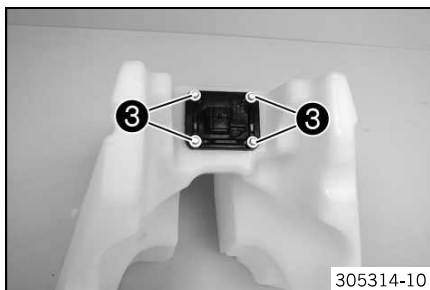
Guideline

Fuel connection on fuel pump	M8	10 Nm (7.4 lbf ft)
------------------------------	----	--------------------

- Mount and tighten screws ③.

Guideline

Screw, fuel pump	EJOT PT®	3 Nm (2.2 lbf ft)
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Finishing work

- Install the fuel tank. (☛ p. 90)
- Mount the seat. (☛ p. 89)

12.9 Changing the fuel pump

**Danger****Fire hazard** Fuel is highly flammable.

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

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

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

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

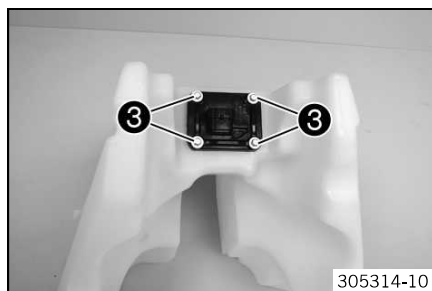
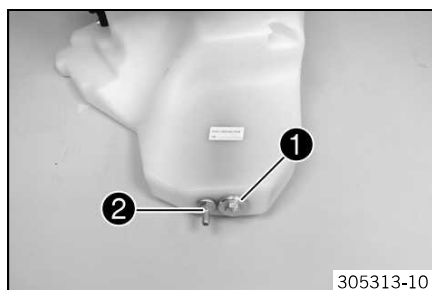
- Do not allow fuel to get into the ground water, the ground, or the sewage system.

Preparatory work

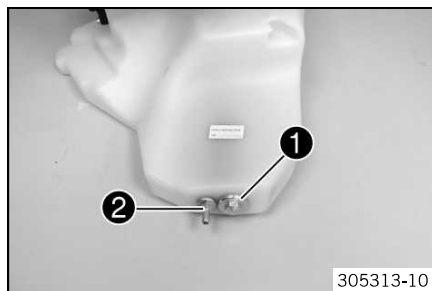
- Drain the fuel from the fuel tank into a suitable container.
- Remove the seat. (➡ p. 88)
- Remove the fuel tank. (➡ p. 89)

Main work

- Remove nut ❶ with the gasket.
- Remove fuel connection ❷ with the gasket.



- Remove screws ❸.
- Pull out the fuel pump.



- Position the fuel pump.
- Mount fuel connection ❷ with the gasket but do not tighten yet.

Guideline

Fuel connection on fuel pump	M8	10 Nm (7.4 lbf ft)
------------------------------	----	--------------------

- Mount and tighten nut ❶ with the gasket.

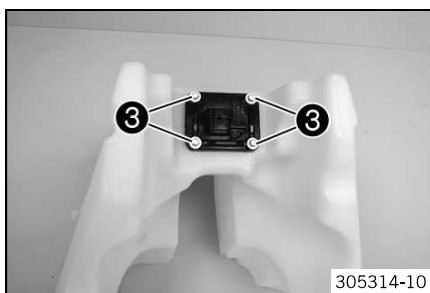
Guideline

Nut, fuel pump fixation	M12	15 Nm (11.1 lbf ft)
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- Tighten fuel connection ❷.

Guideline

Fuel connection on fuel pump	M8	10 Nm (7.4 lbf ft)
------------------------------	----	--------------------



- Mount and tighten screws ③.

Guideline

Screw, fuel pump	EJOT PT®	3 Nm (2.2 lbf ft)
------------------	----------	-------------------

12.10 Checking the fuel pressure



Danger

Fire hazard Fuel is highly flammable.

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



Warning

Danger of poisoning Fuel is poisonous and a health hazard.

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

Condition

The fuel tank is full.

Ensure that the battery voltage does not drop below 12.5 V.

The diagnostics tool is disconnected.

- Thoroughly clean the plug-in connection of the fuel line using compressed air.



Info

Under no circumstances should dirt enter into the fuel line. Dirt in the fuel line clogs the injection valve.

- Press on the small metal plate and disconnect fuel hose connection ①.



Info

Remaining fuel may flow out of the fuel hose.

- Mount special tool ②.

Pressure testing tool (61029094000) (☞ p. 295)

- Mount special tool ③ with nozzle label 0,60.

Testing hose (61029093000) (☞ p. 295)

- Position the hose end in a fuel cannister.

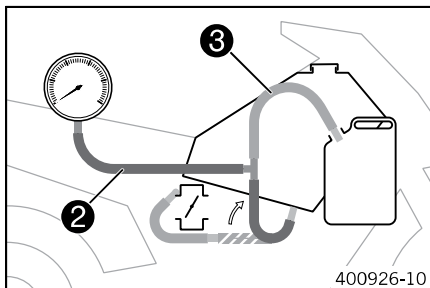
Guideline

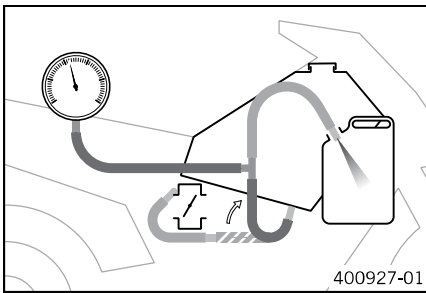
Minimum size of fuel cannister	10 l (2.6 US gal)
--------------------------------	-------------------

- Connect the diagnostics tool and start it.
- Select the **"Function test of fuel pump control"** actuator test.

Guideline

Maximum duration of the actuator test	3 min
---------------------------------------	-------

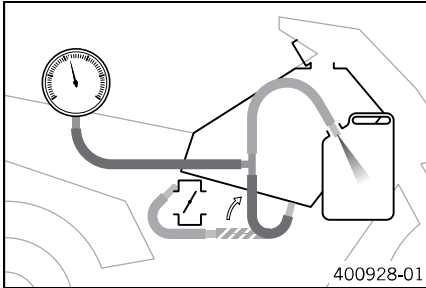




- Check the fuel pressure with the filler cap closed.

Fuel pressure	
When the fuel pump is active	3.35... 3.65 bar (48.6... 52.9 psi)

- » If the specification is not reached:
 - Open the filler cap. (☛ p. 88)
 - Check the tank air vent system.

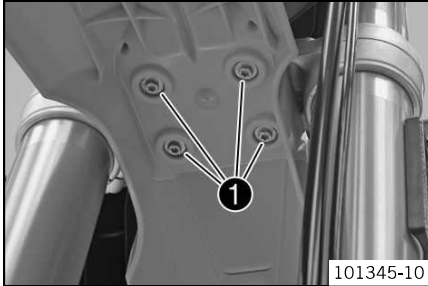


- Check the fuel pressure with the filler cap open.

Fuel pressure	
When the fuel pump is active	3.35... 3.65 bar (48.6... 52.9 psi)

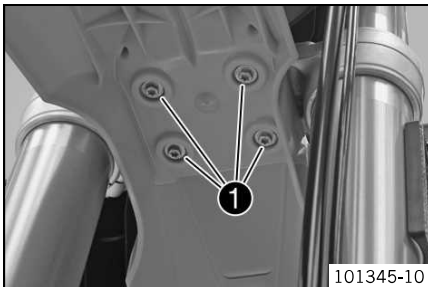
- » If the specification is not reached:
 - Check that the fuel line is clear.
 - Change the fuel filter. (☛ p. 92)
 - Change the fuel pump. (☛ p. 94)
- Stop the **"Function test of fuel pump control"** actuator test by pressing the **"Quit"** button.
- Remove the special tools.
- Join the fuel hose connection.

13.1 Removing the front fender



- Remove screws ❶. Remove the front fender.
- Make sure the spacers remain in place.

13.2 Installing the front fender



- Ensure that the spacers are mounted in the fender.
- Position the front fender. Mount and tighten screws ❶.

Guideline

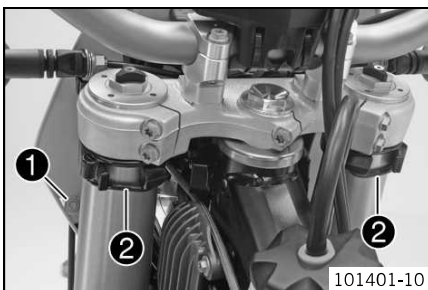
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)
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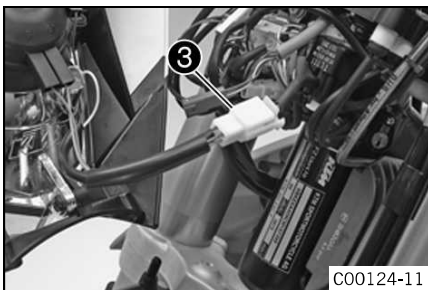
Info

Make sure the holding lugs engage in the start number plate or headlight mask.

13.3 Removing headlight mask with headlight

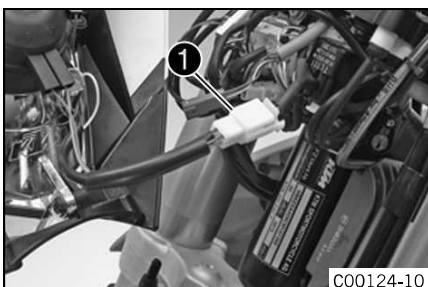


- Switch off all electrical equipment.
- Remove screw ❶ and take off clamp.
- Loosen the rubber band ❷. Push up the headlight mask and swing it forwards.



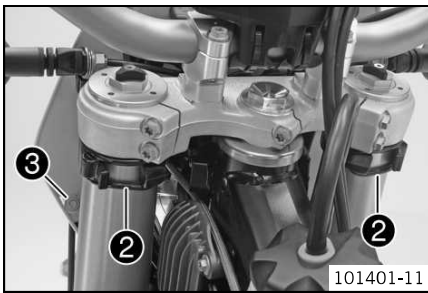
- Pull out the electric plug connector ❸ and remove the headlight mask with the headlight.

13.4 Refitting the headlight mask with the headlight



Main work

- Connect the electric plug connector ❶.



- Position the headlight mask and fix it with the rubber band ②.

**Info**

Ensure that the retaining lugs engage in the fender.

- Position the brake line and wiring harness. Put the clamp on, mount and tighten screw ③.

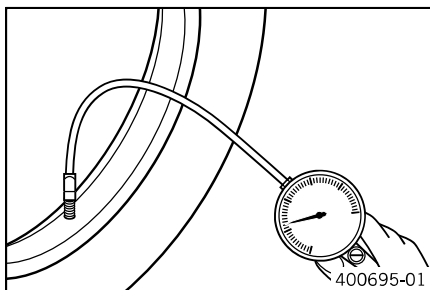
Finishing work

- Check the headlight setting. (🔧 p. 127)

14.1 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 protection cap.
- Check the tire air pressure when the tires are cold.

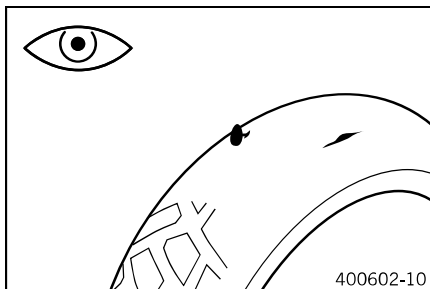
Tire air pressure off road	
Front	1.0 bar (15 psi)
Rear	1.0 bar (15 psi)
Road tire pressure (All EXC-F models)	
Front	1.5 bar (22 psi)
Rear	1.5 bar (22 psi)

- » If the tire air pressure does not meet specifications:
 - Correct the tire air pressure.
- Mount protection cap.

14.2 Checking the tire condition

**Info**

Only mount tires approved and/or recommended by KTM.
Other tires could have a negative effect on handling characteristics.
The type, condition, and air pressure of the tires all have a significant impact on the handling characteristics of the motorcycle.
The tires mounted on the front and rear wheels must have a similar profile.
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 tire exhibits cuts, run-in objects, or other damage:
 - Change the tire.
- Check the depth of the tread.

**Info**

Note local national regulations concerning the minimum tread depth.

Minimum tread depth	≥ 2 mm (≥ 0.08 in)
---------------------	--------------------

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

**Info**

The tire's date of manufacture is usually part of the tire markings and is indicated by the last four digits of the **DOT** marking. The first two digits indicate the week of manufacture and the last two digits the year of manufacture.

KTM recommends that the tires be changed after 5 years at the latest, regardless of the actual state of wear.

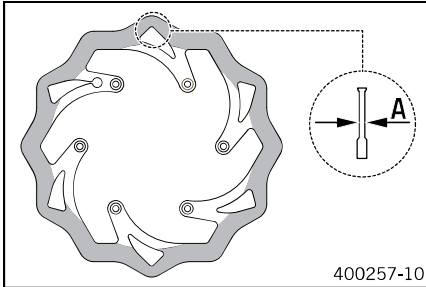
- » If the tire is older than five years:
 - Change the tire.

14.3 Checking the brake discs

**Warning**

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

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



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

**Info**

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

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

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

14.4 Checking spoke tension

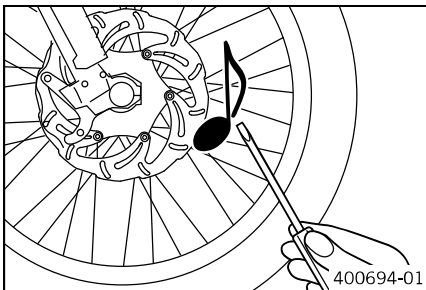
**Warning**

Danger of accidents Instable handling due to incorrect spoke tension.

- Ensure that the spoke tension is correct.

**Info**

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



- Tap each spoke with a screwdriver.

**Info**

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

You should hear a high note.

- » If the spoke tension varies:
 - Correct the spoke tension.
- Check the spoke torque.

Guideline

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

Torque wrench with various accessories in set (58429094000) (☛ p. 294)

14.5 Front wheel

14.5.1 Removing the front wheel

**Preparatory work**

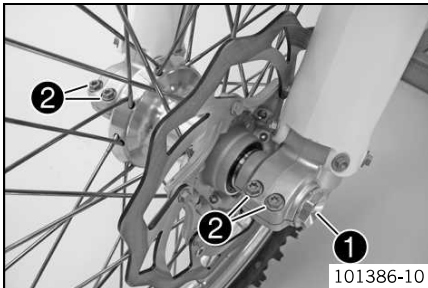
- Raise the motorcycle with the lift stand. (🔧 p. 11)

Main work

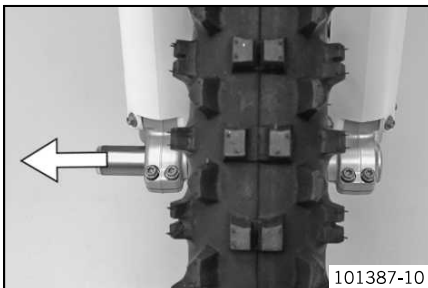
- Press the brake caliper onto the brake disc by hand in order to push back the brake pistons.

**Info**

Make sure when pushing back the brake pistons that you do not press the brake caliper against the spokes.



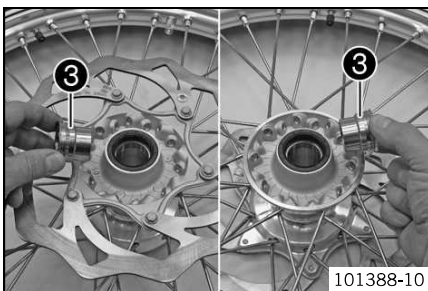
- Remove screw ❶.
- Release screws ❷.



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

**Info**

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



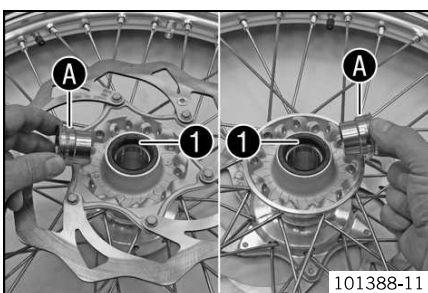
- Remove spacers ❸.

14.5.2 Installing the front wheel

**Warning**

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

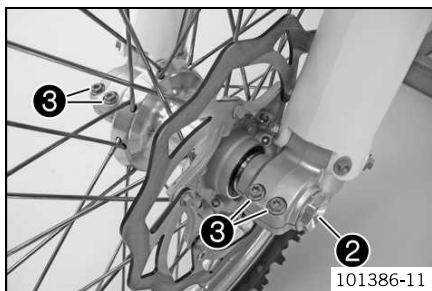
- Always keep the brake discs free of oil and grease, and clean them with brake cleaner when necessary.



- 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 bearing surface A of the spacers.

Long-life grease (🔧 p. 290)

- Insert the spacers.



- Position the front wheel and insert the wheel spindle.
✓ The brake linings are correctly positioned.
- Mount and tighten screw ②.

Guideline

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

- Activate the hand brake lever multiple times until the brake linings are in contact with the brake disc.
- Remove the motorcycle from the lift stand. (☛ p. 11)
- Pull the front wheel brake and push down hard on the fork several times to align the fork legs.
- Fully tighten screw ③.

Guideline

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

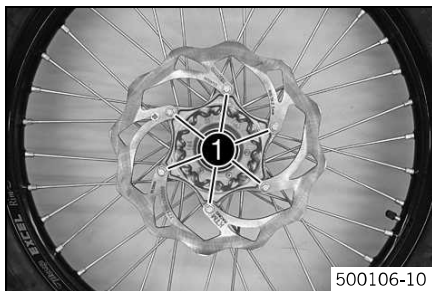
14.5.3 Removing the front brake disc

Preparatory work

- Raise the motorcycle with the lift stand. (☛ p. 11)
- Remove the front wheel. (☛ p. 101)

Main work

- Remove screws ①. Take off the brake disc.



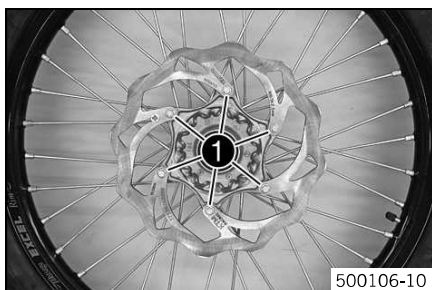
14.5.4 Installing the front brake disc

Main work

- Clean the contact surface of the brake disc.
- Position the brake disc with the label facing outward. Mount and tighten screws ①.

Guideline

Screw, front brake disc	M6	14 Nm (10.3 lbf ft)	Loctite® 243™
-------------------------	----	------------------------	---------------



Finishing work

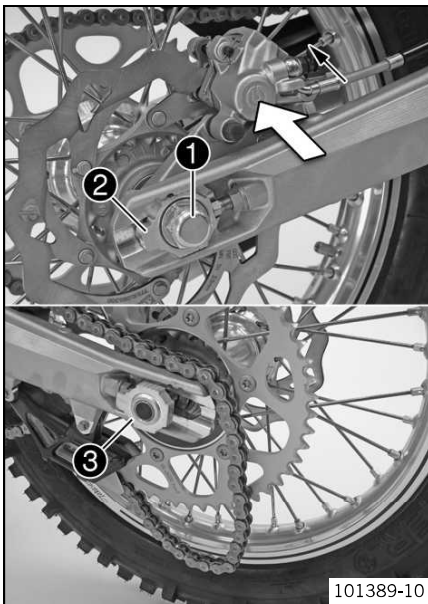
- Install the front wheel. (☛ p. 101)

14.6 Rear wheel

14.6.1 Removing the rear wheel

Preparatory work

- Raise the motorcycle with the lift stand. (☛ p. 11)

**Main work**

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

**Info**

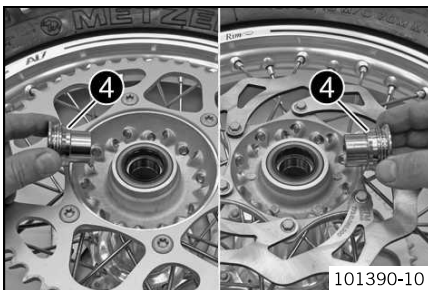
Make sure when pushing back the brake piston that you do not press the brake caliper against the spokes.

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

**Info**

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

- Remove spacers ❹.

**14.6.2 Installing the rear wheel****Warning**

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

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

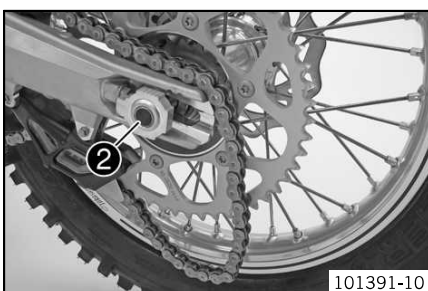
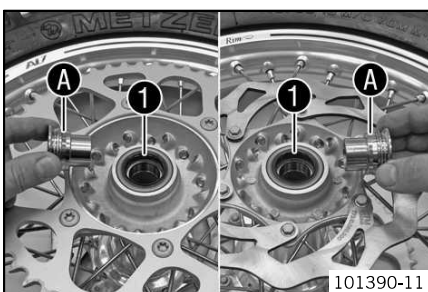
Main work

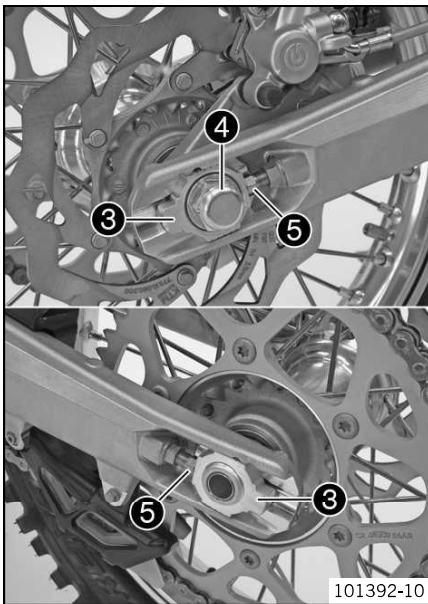
- Check the wheel bearing for damage and wear.
 - » If the wheel bearing is damaged or worn:
 - Change the wheel bearing.
- Clean and grease shaft seal rings ❶ and bearing surface ❶ of the spacers.

Long-life grease (☛ p. 290)

- Insert the spacers.

- Position the rear wheel and insert wheel spindle ❷.
 - ✓ The brake linings are correctly positioned.
- Attach the chain.





- Position chain adjuster ③. Mount nut ④ but do not tighten it yet.
- Make sure that chain adjusters ③ are fitted correctly on adjusting screws ⑤.
- Check the chain tension. (☛ p. 105)
- Tighten nut ④.

Guideline

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



Info

The wide adjustment range of the chain adjusters (32 mm (1.26 in)) enables different secondary ratios with the same chain length. Chain adjusters ③ can be turned by 180°.

- Operate the foot brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point.

Finishing work

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

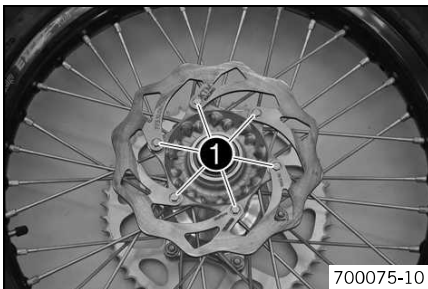
14.6.3 Removing the rear brake disc

Preparatory work

- Raise the motorcycle with the lift stand. (☛ p. 11)
- Remove the rear wheel. (☛ p. 102)

Main work

- Remove screws ①. Take off the brake disc.



14.6.4 Installing the rear brake disc

Main work

- Clean the contact surface of the brake disc.
- Position the brake disc with the label facing outward. Mount and tighten screws ①.

Guideline

Screw, rear brake disc	M6	14 Nm (10.3 lbf ft)	Loctite® 243™
------------------------	----	------------------------	---------------



Finishing work

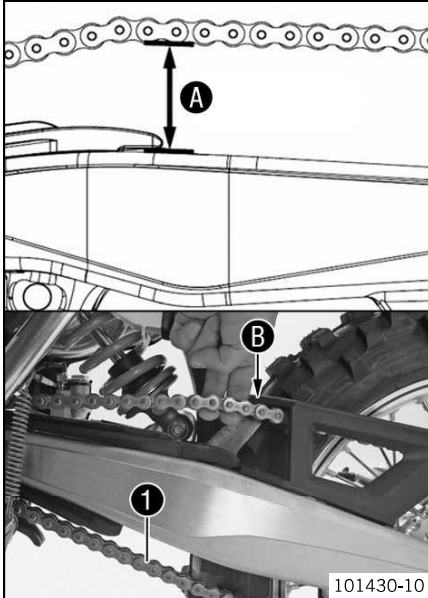
- Install the rear wheel. (☛ p. 103)
- Remove the motorcycle from the lift stand. (☛ p. 11)

14.6.5 Checking the chain tension

**Warning**

Danger of accidents Danger caused by incorrect chain tension.

- If the chain tension is too high, the components of the secondary power train (chain, engine sprocket, rear sprocket, bearings in transmission and rear wheel) are under additional load. Apart from premature wear, in extreme cases the chain can rupture or the countershaft of the transmission can break. On the other hand, if the chain is loose, it can fall off the engine sprocket or the rear sprocket and block the rear wheel or damage the engine. Check the chain tension and correct if necessary.

**Preparatory work**

- Raise the motorcycle with the lift stand. (☛ p. 11)

Main work

- Push the chain at the end of the chain sliding component upwards to measure the chain tension **A**.

**Info**

The lower chain section **1** must be taut.

When the chain guard is mounted, it must be possible to pull up the chain at least to the point where it makes contact with chain guard **B**.

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

Chain tension	55... 58 mm (2.17... 2.28 in)
---------------	-------------------------------

- » If the chain tension does not meet specifications:
 - Adjust the chain tension. (☛ p. 105)

Finishing work

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

14.6.6 Adjusting the chain tension

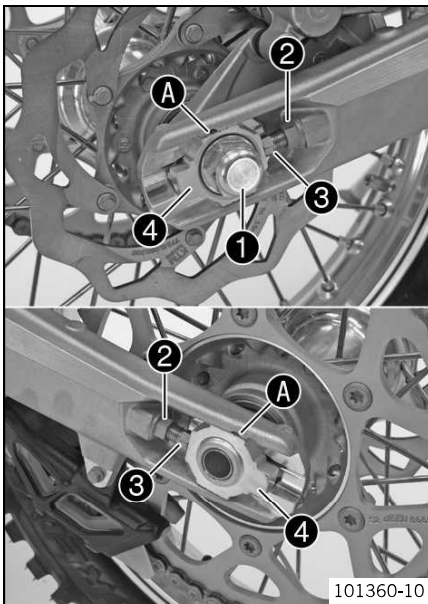
**Warning**

Danger of accidents Danger caused by incorrect chain tension.

- If the chain tension is too high, the components of the secondary power train (chain, engine sprocket, rear sprocket, bearings in transmission and rear wheel) are under additional load. Apart from premature wear, in extreme cases the chain can rupture or the countershaft of the transmission can break. On the other hand, if the chain is loose, it can fall off the engine sprocket or the rear sprocket and block the rear wheel or damage the engine. Check the chain tension and correct if necessary.

Preparatory work

- Raise the motorcycle with the lift stand. (☛ p. 11)
- Check the chain tension. (☛ p. 105)

**Main work**

- Loosen nut ①.
- Loosen nuts ②.
- Adjust the chain tension by turning adjusting screws ③ left and right.

Guideline

Chain tension	55... 58 mm (2.17... 2.28 in)
Turn adjusting screws ③ on the left and right so that the markings on the left and right chain adjusters are in the same position relative to the reference marks ④. The rear wheel is then correctly aligned.	

- Tighten nuts ②.
- Make sure that the chain adjusters ④ are fitted correctly on the adjusting screws ③.
- Tighten nut ①.

Guideline

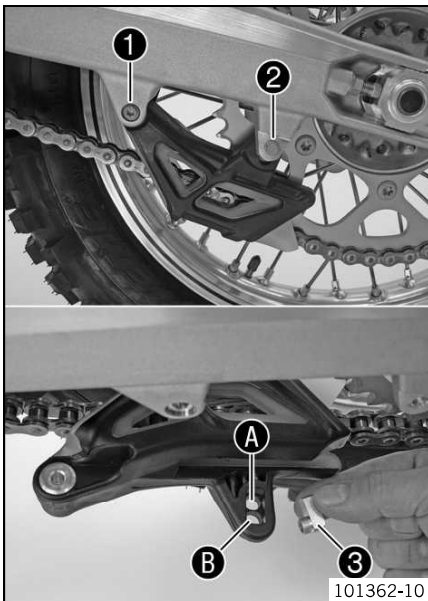
Nut, rear wheel spindle	M20x1.5	80 Nm (59 lbf ft)
-------------------------	---------	-------------------

**Info**

The wide adjustment range of the chain adjusters (32 mm (1.26 in)) enables different secondary ratios with the same chain length. Chain adjusters ④ can be turned by 180°.

Finishing work

- Remove the motorcycle from the lift stand. (🔧 p. 11)

14.6.7 Adjusting the chain guide

- Remove the nut of screw ①.
- Remove screws ① and ②. Take off the chain guide.

Condition

Number of teeth: ≤ 44 teeth

- Insert nut ③ in hole ④. Position the chain guide.
- Mount and tighten screws ① and ②.

Guideline

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

- Mount the nut on screw ① and tighten.

Guideline

Remaining nuts, chassis	M6	10 Nm (7.4 lbf ft)
-------------------------	----	--------------------

Condition

Number of teeth: ≥ 45 teeth

- Insert nut ③ in hole ⑤. Position the chain guide.
- Mount and tighten screws ① and ②.

Guideline

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

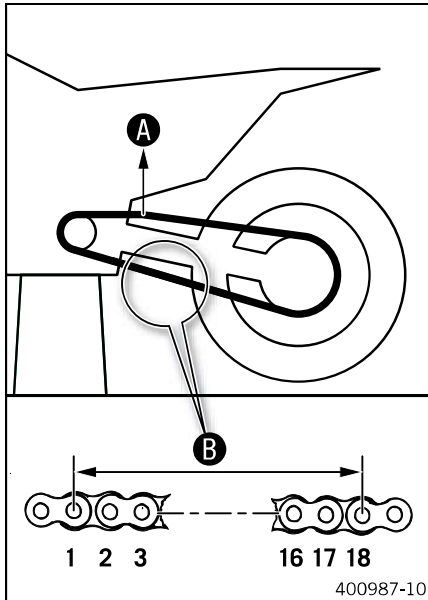
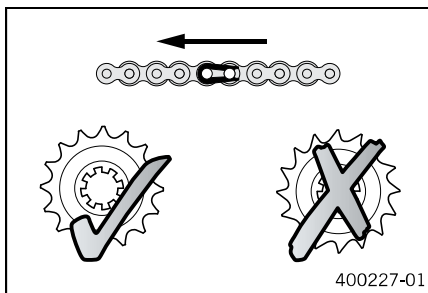
- Mount the nut on screw ① and tighten.

Guideline

Remaining nuts, chassis	M6	10 Nm (7.4 lbf ft)
-------------------------	----	--------------------

14.6.8 Checking the chain, rear sprocket, engine sprocket and chain guide**Preparatory work**

- Raise the motorcycle with the lift stand. (🔧 p. 11)

**Main work**

- Shift gear to neutral.
- Check the rear sprocket and engine sprocket for wear.
 - » If the rear sprocket or engine sprocket is worn:
 - Change the power set.

**Info**

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

- Pull on the upper part of the chain with the specified weight **A**.

Guideline

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

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

**Info**

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

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

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

**Info**

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

- Check the chain sliding guard for wear.
 - » If the bottom edge of the chain bolt is in line with or below the chain sliding guard:
 - Change the chain sliding guard.
- Check that the chain sliding guard is firmly seated.
 - » If the chain sliding guard is loose:
 - Tighten the chain sliding guard.

Guideline

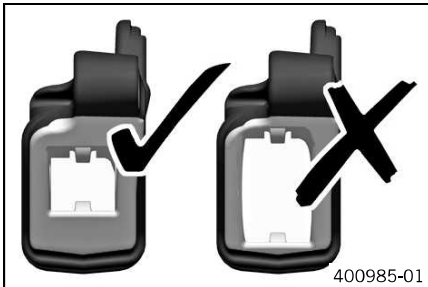
Screw, chain sliding guard	M6	6 Nm (4.4 lbf ft)	Loctite® 243™
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- Check the chain sliding piece for wear.
 - » If the bottom edge of the chain bolt is in line with or below the chain sliding piece:
 - Change the chain sliding piece.
- Check that the chain sliding piece is firmly seated.
 - » If the chain sliding piece is loose:
 - Tighten the chain sliding piece.

Guideline

Screw, chain sliding piece	M8	15 Nm (11.1 lbf ft)
----------------------------	----	------------------------

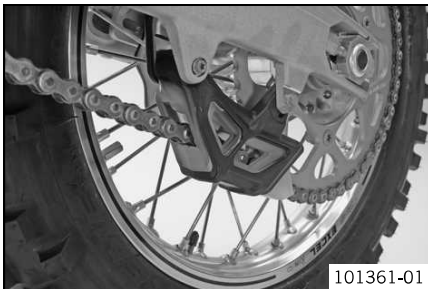


- Check the chain guide for wear.

**Info**

Wear is visible on the front of the chain guide.

- » If the light part of the chain guide is worn:
 - Change the chain guide.



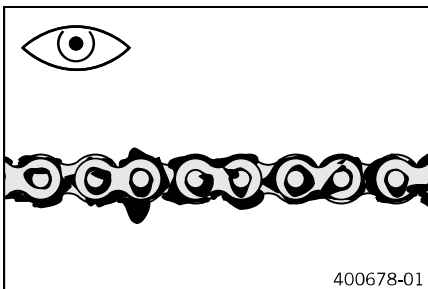
- Check that the chain guide is firmly seated.
 - » If the chain guide is loose:
 - Tighten the chain guide.

Guideline

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

Finishing work

- Remove the motorcycle from the lift stand. (🔧 p. 11)

14.6.9 Checking for chain dirt accumulation

- Check the chain for coarse dirt accumulation.
 - » If the chain is very dirty:
 - Clean the chain. (🔧 p. 108)

14.6.10 Cleaning the chain**Warning**

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

- Remove oil and grease with a suitable cleaning material.



Warning

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

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



Warning

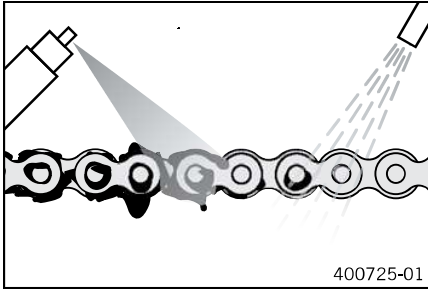
Environmental hazard Hazardous substances cause environmental damage.

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



Info

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



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

Chain cleaner (☛ p. 290)

Off-road chain spray (☛ p. 291)

15.1 Removing the main fuse

Preparatory work

- Switch off all power consumers and switch off the engine.
- Remove the air filter box lid. (➡ p. 86)

Main work

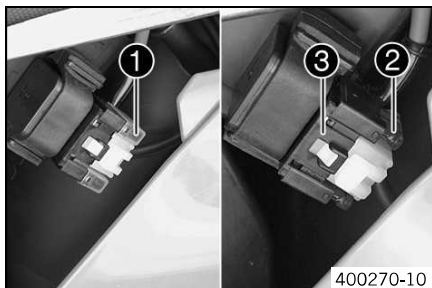
- Remove the protection cover ❶.



Info

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

- Remove main fuse ❷.



400270-10

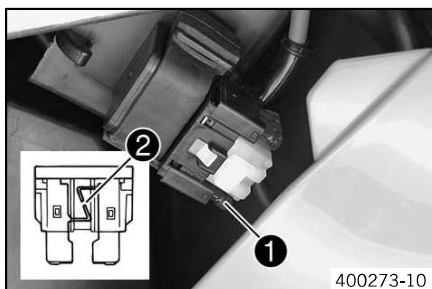
15.2 Installing the main fuse



Warning

Fire hazard The electrical system can be overloaded if the wrong fuses are used.

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



400273-10

- Insert the main fuse.

Fuse (58011109110) (➡ p. 216)



Info

A reserve fuse ❶ is located in the starter relay.

Replace a burned-out fuse ❷ only by an equivalent fuse.

- Replace the protection cover.
- Install the air filter box lid. (➡ p. 86)

15.3 Changing the fuses of individual power consumers



Info

The fuse box containing the fuses of individual power consumers is located under the seat.

Preparatory work

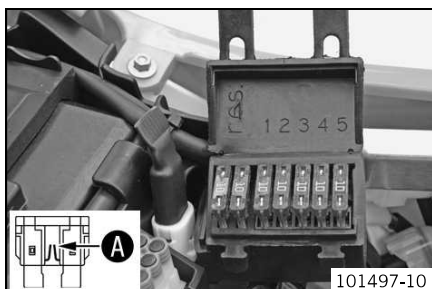
- Switch off all power consumers and switch off the engine.
- Remove the seat. (➡ p. 88)

Main work

- Open fuse box cover ❶.



101398-10



101497-10

- Remove the defective fuse.

Guideline

Fuse ❶ - 10 A - EFI control unit

Fuse ❷ - 10 A - fuel pump

Fuse ❸ - 10 A - high beam, low beam, parking light, tail light, license plate lamp

Fuse ❹ - 10 A - horn, brake light, turn signal, radiator fan (optional)

(XCF-W, EXC-F EU/AUS, EXC-F SIX DAYS)

Fuse ❺ - not used

(EXC-F USA)

Fuse 5 - 10 A - ignition

Fuses res - 10 A - spare fuses

**Info**

A defective fuse can be identified by the burned-out fuse wire ④.

**Warning****Fire hazard** The electrical system can be overloaded if the wrong fuses are used.

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

- Use spare fuses with the correct rating only.

Fuse (58011109110) (☛ p. 216)

**Tip**

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

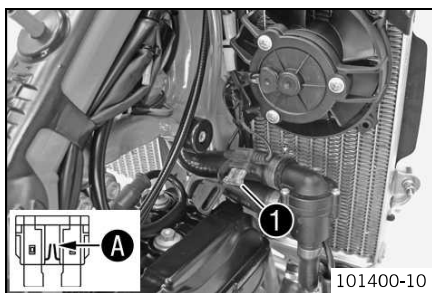
- Check that the power consumer is functioning properly.
- Close the fuse box cover.

Finishing work

- Mount the seat. (☛ p. 89)

15.4 Changing the fuse of the radiator fan (EXC-F SIX DAYS)**Warning****Fire hazard** The electrical system can be overloaded if the wrong fuses are used.

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

**Preparatory work**

- Remove the seat. (☛ p. 88)
- Remove the fuel tank. (☛ p. 89)

Main work

- Remove protection.

**Info**

The radiator fan fuse ① is in the area of the right-hand radiator.

- Remove the defective fuse.
- Insert a new fuse.

Fuse (58011109105) (☛ p. 216)

**Info**

Replace a faulty fuse by an equivalent fuse only.

- Mount protection cap.

Finishing work

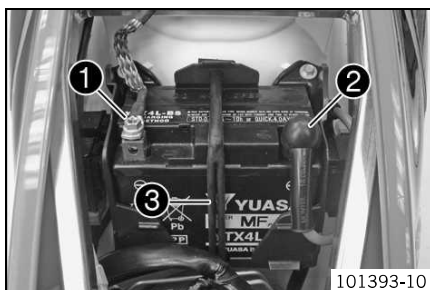
- Install the fuel tank. (☛ p. 90)
- Mount the seat. (☛ p. 89)

15.5 Removing the battery

**Warning**

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

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

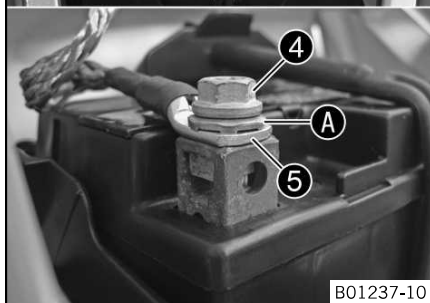
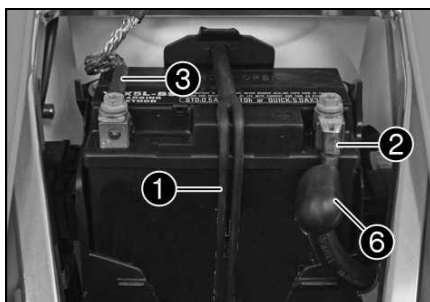
**Preparatory work**

- Switch off all power consumers and switch off the engine.
- Remove the seat. (☛ p. 88)

Main work

- Disconnect negative cable ❶ of the battery.
- Pull back the positive terminal cover ❷ and disconnect the positive (plus) cable of the battery.
- Detach rubber band ❸ at the bottom.
- Lift the battery up and out.

15.6 Installing the battery

**Main work**

- Insert battery into the battery compartment with the terminals facing to the front.

Battery (YTX4L-BS) (☛ p. 216)

- Reconnect rubber band ❶.
- Connect positive cable ❷.

Guideline

Screw, battery terminal	M5	2.5 Nm (1.84 lbf ft)
-------------------------	----	-------------------------

**Info**

Contact disk ❸ must be mounted between screw ❹ and cable socket ❺ with the claws facing down.

- Slide positive terminal cover ❸ over the positive terminal.
- Connect negative cable ❹.

Guideline

Screw, battery terminal	M5	2.5 Nm (1.84 lbf ft)
-------------------------	----	-------------------------

**Info**

Contact disk ❸ must be mounted between screw ❹ and cable socket ❺ with the claws facing down.

Finishing work

- Mount the seat. (☛ p. 89)

15.7 Charging the battery

**Warning**

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

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

**Warning**

Environmental hazard The battery contains elements that are harmful to the environment.

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

**Warning**

Environmental hazard Hazardous substances cause environmental damage.

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

**Info**

Even when there is no load on the battery, it still loses power steadily.

The charge state and the type of charge are very important for the service life of the battery.

Rapid recharging with a high charging current shortens the battery's service life.

If the charging current, charging voltage and charging time are exceeded, electrolyte escapes through the safety valves. This reduces the battery capacity.

If the battery is depleted from starting the vehicle repeatedly, the battery must be charged immediately.

If the battery is left in a discharged state for an extended period, it will become over-discharged and sulfate, destroying the battery.

The battery is maintenance-free, which means that the acid level does not need to be checked.

**Preparatory work**

- Switch off all power consumers and switch off the engine.
- Remove the seat. (🔧 p. 88)
- Disconnect the negative cable of the battery to avoid damage to the onboard electronics.

Main work

- Connect the battery charger to the battery. Switch on the battery charger.

Battery charger (58429074000)

You can also use the battery charger to test the open-circuit voltage and starting voltage of the battery, and to test the alternator. With this device, you cannot over-charge the battery.

**Info**

Never remove lid ❶.

Charge the battery with a maximum of 10% of the capacity specified on battery housing ❷.

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

Guideline

The charge current, charge voltage, and charge time must not be exceeded.

Charge the battery regularly when the motorcycle is not in use	3 months
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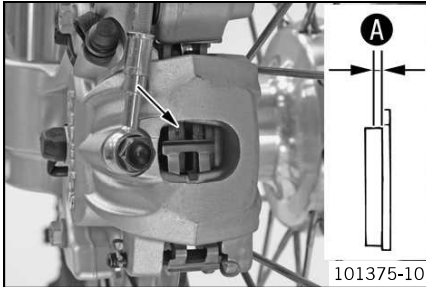
Finishing work

- Mount the seat. (🔧 p. 89)

16.1 Checking the front brake linings

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

- Change worn brake linings immediately.



- Check the brake linings for minimum thickness **A**.

Minimum thickness A	$\geq 1 \text{ mm } (\geq 0.04 \text{ in})$
----------------------------	---

- » If the minimum thickness is less than specified:

- Change the front brake linings. (🔧 p. 114)

- Check the brake linings for damage and cracking.

- » If damage or cracking is visible:

- Change the front brake linings. (🔧 p. 114)

16.2 Changing the front brake linings

**Warning****Danger of accident** Brake system failure.

- Maintenance work and repairs must be carried out professionally.

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

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

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

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

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

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

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

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

**Warning****Environmental hazard** Hazardous substances cause environmental damage.

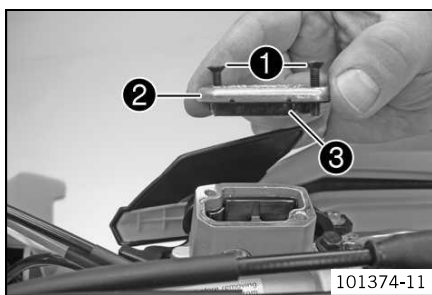
- Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

**Info**

Never use DOT 5 brake fluid! This is based on silicone oil and is colored purple. Oil seals and brake lines are not designed for DOT 5 brake fluid.

Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!

Use only clean brake fluid from a sealed container.

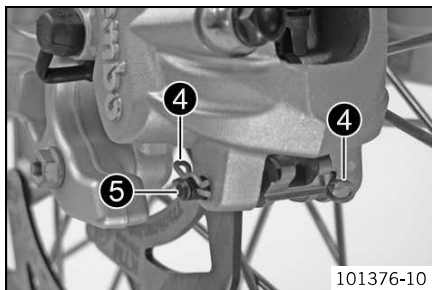


- Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
- Remove screws ①.
- Remove cover ② with membrane ③.
- Manually press the brake caliper toward the brake disc to push back the brake pistons. Ensure that brake fluid does not flow out of the brake fluid reservoir, extracting it by suction if it does.

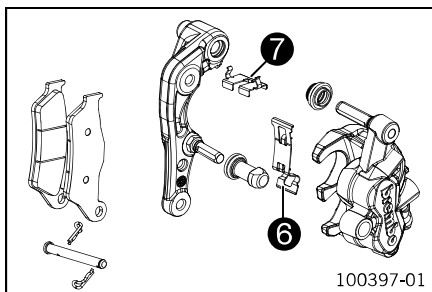


Info

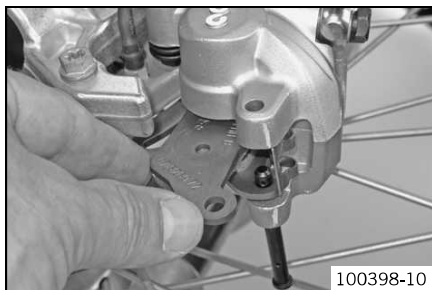
Make sure when pushing back the brake pistons that you do not press the brake caliper against the spokes.



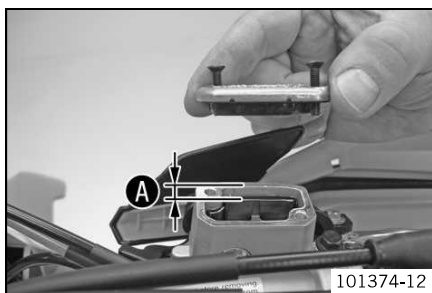
- Remove cotter pin ④, pull out pin ⑤, and remove the brake linings.
- Clean the brake caliper and brake caliper support.



- Check that leaf spring ⑥ in the brake caliper and sliding plate ⑦ in the brake caliper support are seated correctly.



- Insert the brake linings, insert the pin, and mount the cotter pin.
- Operate the hand brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point.



- Correct the brake fluid quantity to level ④.

Guideline

Dimension ④ (brake fluid level below top edge of container)	5 mm (0.2 in)
Brake fluid DOT 4 / DOT 5.1 (☛ p. 288)	

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



Info

Clean up overflowed or spilt brake fluid immediately with water.

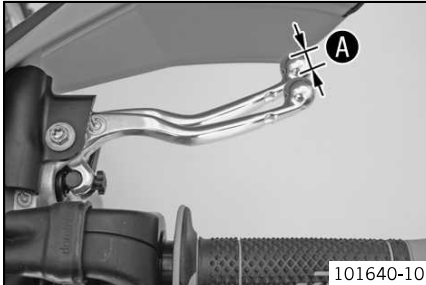
16.3 Checking free travel of hand brake lever



Warning

Danger of accidents Brake system failure.

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

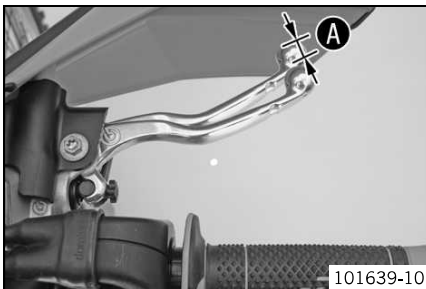


(All EXC-F models)

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

Free travel of hand brake lever	$\geq 3 \text{ mm } (\geq 0.12 \text{ in})$
---------------------------------	---

- » If the free travel does not meet specifications:
 - Adjust the free travel of the hand brake lever. (☛ p. 116)



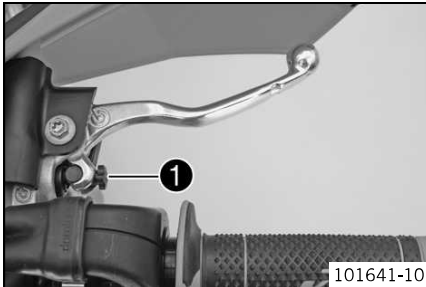
(XCF-W)

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

Free travel of hand brake lever	$\geq 3 \text{ mm } (\geq 0.12 \text{ in})$
---------------------------------	---

- » If the free travel does not meet specifications:
 - Adjust the basic position of the hand brake lever. (☛ p. 116)

16.4 Adjusting the basic position of the hand brake lever (XCF-W)



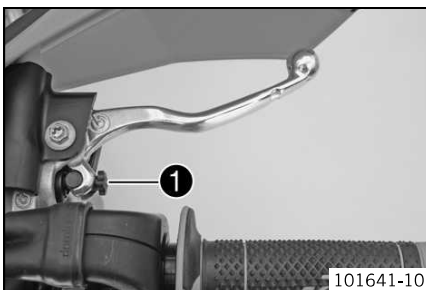
- Check the free travel of the hand brake lever. (☛ p. 116)
- Adjust the basic setting of the hand brake lever to your hand size by turning adjusting screw **1**.



Info

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

16.5 Adjusting free travel of hand brake lever (All EXC-F models)



- Check the free travel of the hand brake lever. (☛ p. 116)
- Adjust the free travel of the hand brake lever with adjusting screw **1**.



Info

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

16.6 Checking the front brake fluid level



Warning

Danger of accidents Failure of the brake system.

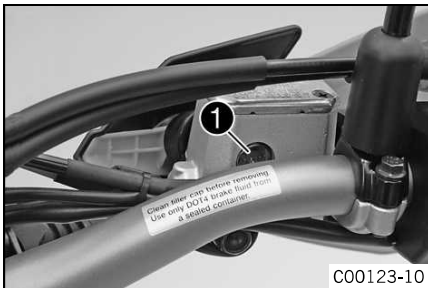
- If the brake fluid level falls below the **MIN** mark, this indicates a leakage in the brake system or worn-out brake linings. Check the brake system and do not continue riding.



Warning

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

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



- Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
- Check the brake fluid level in the viewer **1**.
 - » When the brake fluid level drops below the **MIN** mark:
 - Add front brake fluid. (➔ p. 117)

16.7 Adding front brake fluid



Warning

Danger of accidents Failure of the brake system.

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



Warning

Skin irritation Brake fluid can cause skin irritation on contact.

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



Warning

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

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



Warning

Environmental hazard Hazardous substances cause environmental damage.

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



Info

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!

Use only clean brake fluid from a sealed container.

Preparatory work

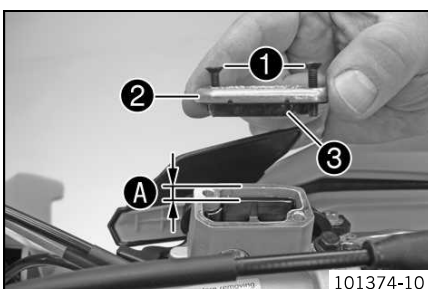
- Check the front brake linings. (➔ p. 114)

Main work

- Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
- Remove screws **1**.
- Remove cover **2** with membrane **3**.
- Add brake fluid to level **A**.

Guideline

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



Brake fluid DOT 4 / DOT 5.1 (☛ p. 288)

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



Info

Clean up overflowed or spilt brake fluid immediately with water.

16.8 Changing the front brake fluid



Warning

Skin irritation Brake fluid can cause skin irritation on contact.

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



Warning

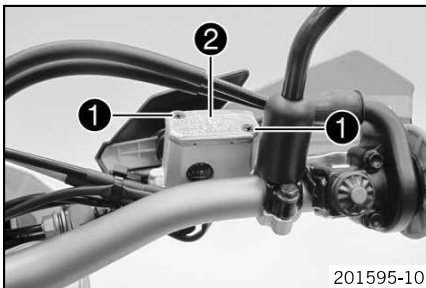
Environmental hazard Hazardous substances cause environmental damage.

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



Info

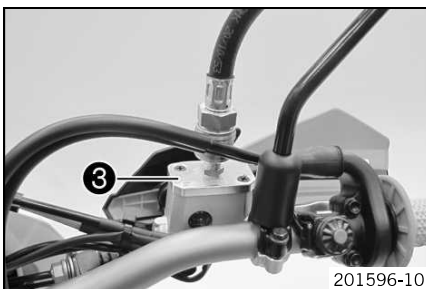
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!
Use only clean brake fluid from a sealed container.



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

Bleed syringe (50329050000) (☛ p. 293)

Brake fluid DOT 4 / DOT 5.1 (☛ p. 288)

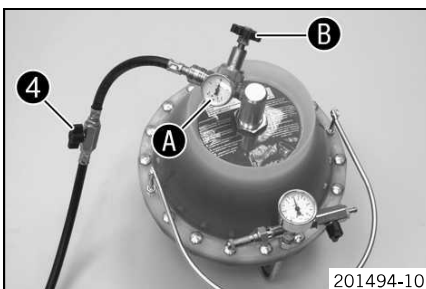


- Mount bleeder cover ❸.

Bleeder cover (00029013005) (☛ p. 292)

- Connect the bleeding device.

Bleeding device (00029013100) (☛ p. 292)



- Open shut-off valve ❹.



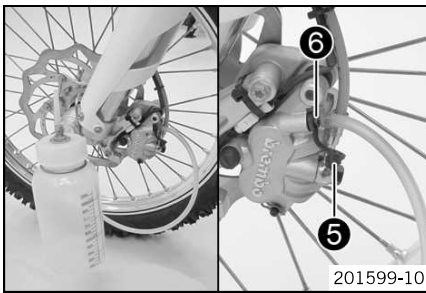
Info

Follow the operating instructions of the bleeding device.

- Ensure that the filling pressure is correctly set at pressure gauge ❶. If necessary, adjust the filling pressure at pressure regulator ❷.

Guideline

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



- Pull off protection cap **5** of the brake caliper bleeder screw. Connect the hose of the bleeder bottle.

Bleeding device (00029013100) (☛ p. 292)

- Open bleeder screw **6** by approx. one-half turn.



Info

Bleed until fresh brake fluid emerges from the bleeder bottle hose without bubbles.

- Tighten the bleeder screw.
- Close shut-off valve **4**.
- Open the bleeder screw again until no more brake fluid emerges.



Info

This prevents overfilling of the brake fluid reservoir.

- Tighten the bleeder screw. Remove the hose of the bleeder bottle. Mount the protection cap.
- Disconnect the bleeding device. Remove the bleeder cover.
- Add brake fluid to level **A**.

Guideline

Measurement of **A** 5 mm (0.2 in)

Brake fluid DOT 4 / DOT 5.1 (☛ p. 288)

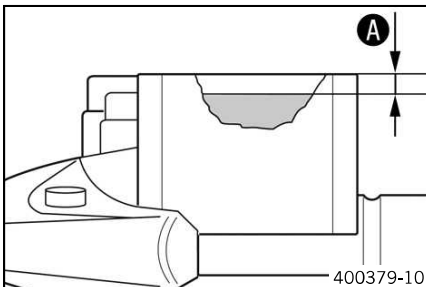
- Position the cover with the membrane. Mount and tighten the screws.



Info

Clean up overflowed or spilt brake fluid immediately with water.

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



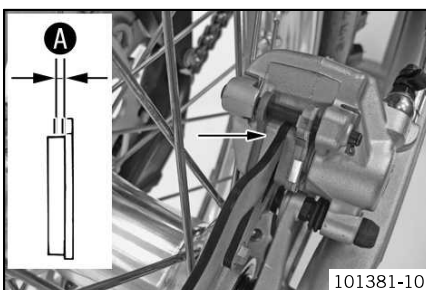
16.9 Checking the rear brake linings



Warning

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

- Change worn brake linings immediately.



- Check the brake linings for minimum thickness **A**.

Minimum thickness **A** $\geq 1 \text{ mm } (\geq 0.04 \text{ in})$

» If the minimum thickness is less than specified:

- Change the rear brake linings. (☛ p. 119)

- Check the brake linings for damage and cracking.

» If damage or cracking is visible:

- Change the rear brake linings. (☛ p. 119)

16.10 Changing the rear brake linings



Warning

Danger of accident Brake system failure.

- Maintenance work and repairs must be carried out professionally.



Warning

Skin irritation Brake fluid can cause skin irritation on contact.

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

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

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

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

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

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

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

**Warning****Environmental hazard** Hazardous substances cause environmental damage.

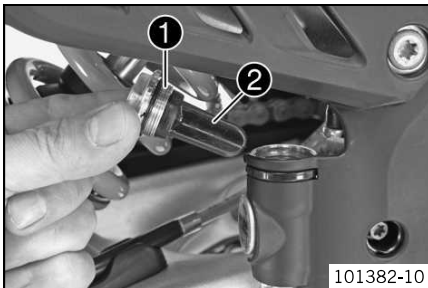
- Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

**Info**

Never use DOT 5 brake fluid! This is based on silicone oil and is colored purple. Oil seals and brake lines are not designed for DOT 5 brake fluid.

Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!

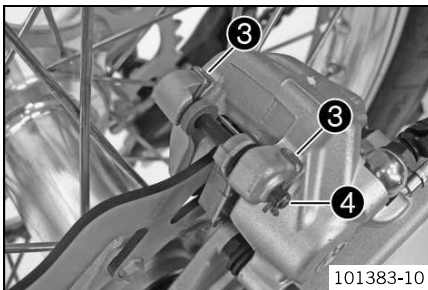
Use only clean brake fluid from a sealed container.



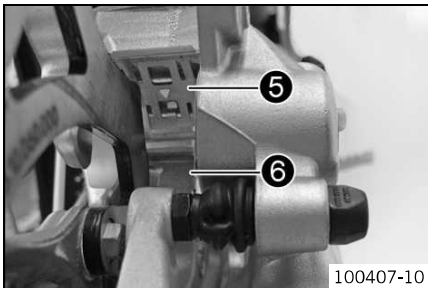
- Stand the vehicle upright.
- Remove screw cap ❶ with membrane ❷ and the O-ring.
- Press the brake piston back to its basic position and make sure that no brake fluid overflows from the brake fluid reservoir.

**Info**

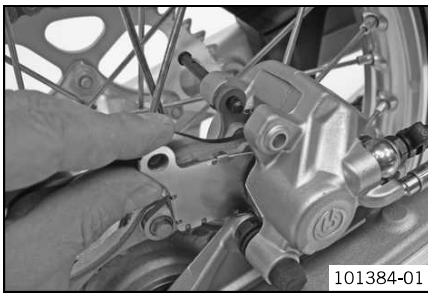
Make sure when pushing back the brake piston that you do not press the brake caliper against the spokes.



- Remove cotter pin ❸, pull out pin ❹, and remove the brake linings.
- Clean the brake caliper and brake caliper support.



- Check that leaf spring ❺ in the brake caliper and sliding plate ❻ in the brake caliper support are seated correctly.



- Insert the brake linings, insert the pin, and mount the cotter pin.
- 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 level **A**.

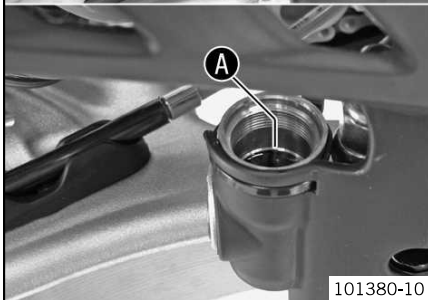
Brake fluid DOT 4 / DOT 5.1 (☛ p. 288)

- Mount screw cap **1** with membrane **2** and the O-ring.



Info

Clean up overflowed or spilt brake fluid immediately with water.



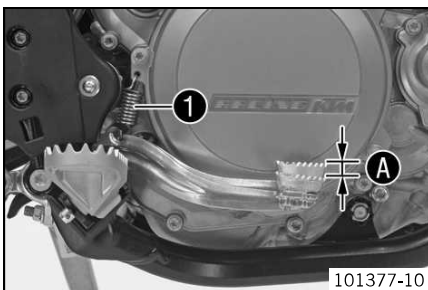
16.11 Checking the free travel of foot brake lever



Warning

Danger of accidents Brake system failure.

- If there is no free travel on the foot brake lever, pressure builds up on the rear brake circuit. The rear brake can fail due to overheating. Adjust the free travel on foot brake lever according to specifications.



- Disconnect spring **1**.
- 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 **A**.

Guideline

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

- » If the free travel does not meet specifications:
 - Adjust the basic position of the foot brake lever. (☛ p. 121)
- Reconnect spring **1**.

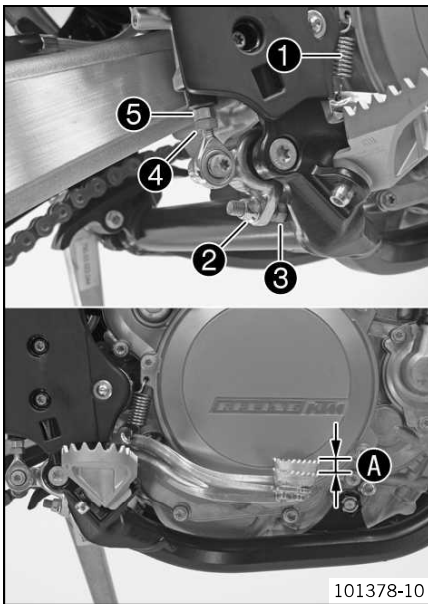
16.12 Adjusting the basic position of the foot brake lever



Warning

Danger of accidents Brake system failure.

- If there is no free travel on the foot brake lever, pressure builds up on the rear brake circuit. The rear brake can fail due to overheating. Adjust the free travel on foot brake lever according to specifications.



- Disconnect spring ①.
- Loosen nut ④ and, with push rod ⑤, turn it back until you have maximum free travel.
- To adjust the basic position of the foot brake lever individually, loosen nut ② and turn screw ③ accordingly.



Info

The range of adjustment is limited.

- Turn push rod ⑤ accordingly until you have free travel ①. If necessary, adjust the basic position of the foot brake lever.

Guideline

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

- Hold screw ③ and tighten nut ②.

Guideline

Nut, foot brake lever stop	M8	20 Nm (14.8 lbf ft)
----------------------------	----	------------------------

- Hold push rod ⑤ and tighten nut ④.

Guideline

Remaining nuts, chassis	M6	10 Nm (7.4 lbf ft)
-------------------------	----	--------------------

- Reconnect spring ①.

16.13 Checking the rear brake fluid level



Warning

Danger of accidents Failure of the brake system.

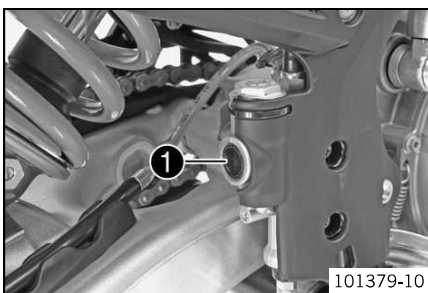
- If the brake fluid level falls below the **MIN** mark, this indicates a leakage in the brake system or worn-out brake linings. Check the brake system and do not continue riding.



Warning

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

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



- Stand the vehicle upright.
- Check the brake fluid level in the viewer ①.
 - » When in the viewer ① an air bubble is visible:
 - Add brake fluid to the rear brake circuit. (p. 122)

16.14 Adding brake fluid to the rear brake circuit



Warning

Danger of accidents Failure of the brake system.

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



Warning

Skin irritation Brake fluid can cause skin irritation on contact.

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



Warning

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

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

**Warning**

Environmental hazard Hazardous substances cause environmental damage.

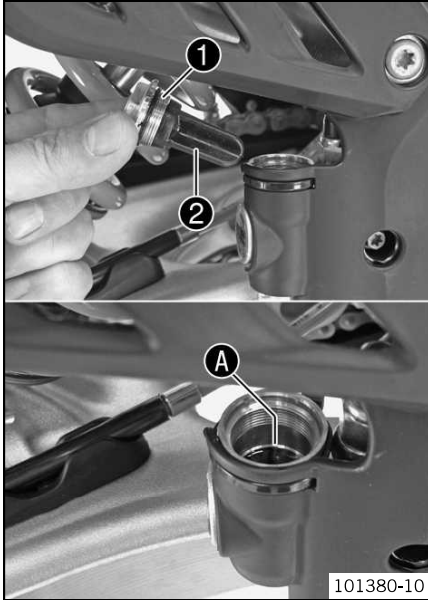
- Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

**Info**

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!

Use only clean brake fluid from a sealed container.

**Preparatory work**

- Check the rear brake linings. (🔧 p. 119)

Main work

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

Brake fluid DOT 4 / DOT 5.1 (🔧 p. 288)
--

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

**Info**

Clean up overflowed or spilt brake fluid immediately with water.

16.15 Changing the rear brake fluid

**Warning**

Skin irritation Brake fluid can cause skin irritation on contact.

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

**Warning**

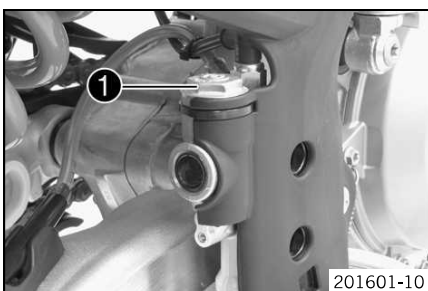
Environmental hazard Hazardous substances cause environmental damage.

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

**Info**

Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!

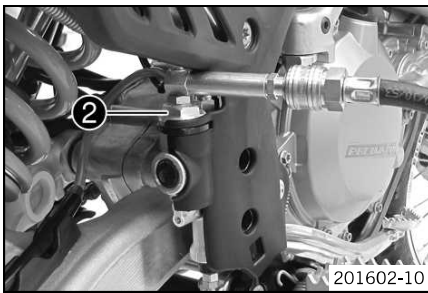
Use only clean brake fluid from a sealed container.



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

Bleed syringe (50329050000) (🔧 p. 293)
--

Brake fluid DOT 4 / DOT 5.1 (🔧 p. 288)
--

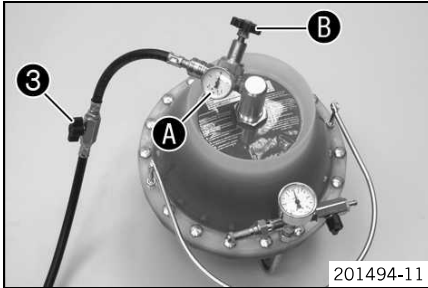


- Mount bleeder cover ②.

Bleeder cover (00029013006) (☛ p. 292)

- Connect the bleeding device.

Bleeding device (00029013100) (☛ p. 292)



- Open shut-off valve ③.

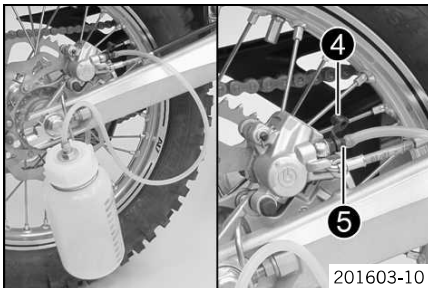
Info

Follow the operating instructions of the bleeding device.

- Ensure that the filling pressure is correctly set at pressure gauge ①. If necessary, adjust the filling pressure at pressure regulator ②.

Guideline

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



- Pull off protection cap ④ of the bleeder screw. Connect the hose of the bleeder bottle.

Bleeding device (00029013100) (☛ p. 292)

- Open bleeder screw ⑤ by approx. one-half turn.

Info

Bleed until new brake fluid emerges from the bleeder bottle hose without bubbles.

- Tighten the bleeder screw.
- Close shut-off valve ③.
- Open the bleeder screw again until no more brake fluid emerges.

Info

This prevents overfilling of the brake fluid reservoir.

- Tighten the bleeder screw. Remove the hose of the bleeder bottle. Mount the protection cap.
- Disconnect the bleeding device. Remove the bleeder cover.
- Stand the vehicle upright.
- Top up the brake fluid to level ①.

Brake fluid DOT 4 / DOT 5.1 (☛ p. 288)

- Fit and tighten plug with oil screen and O-ring.

Info

Clean up overflowed or spilt brake fluid immediately with water.

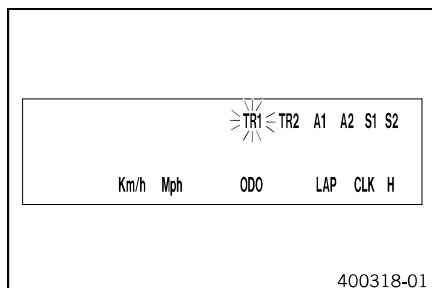
- Check the foot brake lever for a firm pressure point.



17.1 Adjusting the speedometer functions

**Info**

When the vehicle is delivered, only the **SPEED/H** and **SPEED/ODO** display modes are activated.

**Condition**

The motorcycle is stationary.

- Press the button briefly and repeatedly until **H** appears at the bottom right of the display.
- Press the button for 3 - 5 seconds.
 - ✓ The Setup menu is displayed and the activated functions are shown.
- Change to the desired function by pressing the button briefly.
 - ✓ The selected function flashes.

Activating a function

- Press the button .
- ✓ The symbol remains on the screen and the display changes to the next function.

Deactivating the function

- Press the button .
- ✓ The symbol on the screen goes out and the display changes to the next function.
- All desired functions are activated or deactivated accordingly.
- Press the button for 3 - 5 seconds.
 - ✓ The settings are stored and the Setup menu is closed.

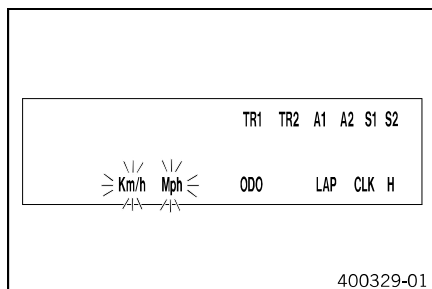
**Info**

If no button is pressed for 20 seconds, or if no impulse comes from the wheel speed sensor, the settings are automatically saved and the Setup menu is closed.

17.2 Setting kilometers or miles

**Info**

If you change the unit of measure, the **ODO** value is retained and converted accordingly. The values **TR1**, **TR2**, **A1**, **A2** and **S1** are cleared when the unit of measure is changed.

**Condition**

The motorcycle is stationary.

- Press the button briefly and repeatedly until **H** appears at the bottom right of the display.
- Press the button for 3 - 5 seconds.
 - ✓ The Setup menu is displayed and the active functions are shown.
- Press the button repeatedly until the **Km/h/Mph** display flashes.

Adjusting Km/h

- Press the button .

Adjusting Mph

- Press the button .
- Press the button for 3 - 5 seconds.
 - ✓ The settings are stored and the Setup menu is closed.

**Info**

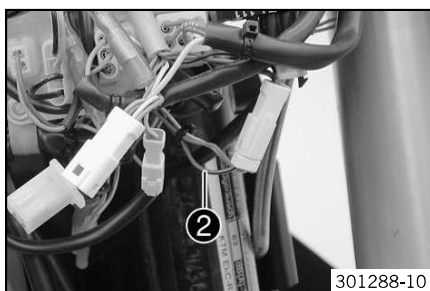
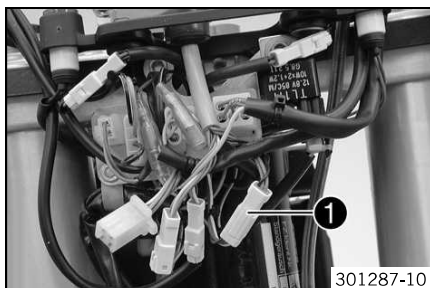
If no button is pressed for 20 seconds, or if no impulse comes from the wheel speed sensor, the settings are automatically saved and the Setup menu is closed.

17.3 Activating the additional functions

**Danger**

Voiding of the government approval for road use and the insurance coverage The vehicle is only authorized for operation on public roads in the homologated version.

- If the vehicle is modified in any way, it may only be used on designated tracks away from public roads. Advise the vehicle owner and rider of this.
- If you undertake any modifications, please insist on receiving a signed workshop order from your customer in which you inform the customer in writing that these modifications are performed at the customer's own risk and that the vehicle will no longer be approved for use on public roads once modified.

**Preparatory work**

- Remove the headlight mask with the headlight. (🔧 p. 97)

Main work

- Expose connector **CZ 1**.

- Sever the black/brown cable **2**.
- Insulate both cable ends.

Finishing work

- Refit the headlight mask with the headlight. (🔧 p. 97)
- Check the headlight setting. (🔧 p. 127)

17.4 Setting the wheel circumference

Condition

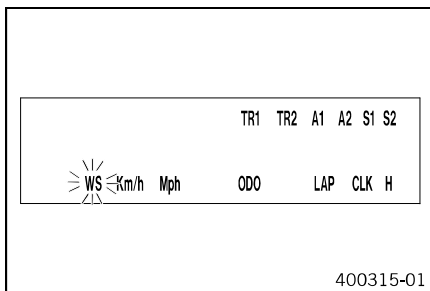
The motorcycle is stationary.

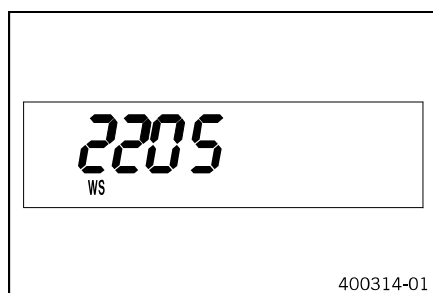
Preparatory work

- Remove the headlight mask with the headlight. (🔧 p. 97)
- Activate the additional functions. (🔧 p. 126)

Main work

- Press the button briefly and repeatedly until **H** appears at the bottom right of the display.
- Press the button for 3 - 5 seconds.
 - ✓ The setup menu is displayed and the active functions shown.
- Press the button until the **WS** indicator blinks.





- Press the button .
- ✓ The wheel circumference is displayed in millimeters.

Enlarging the wheel circumference

- Press the button .

Reducing the wheel circumference

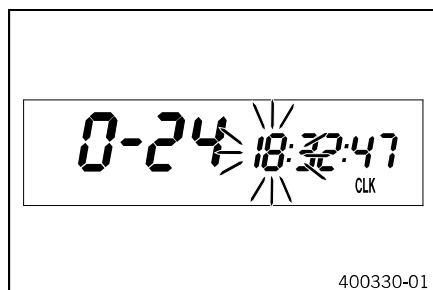
- Press the button .
- Press the button briefly.
- Press the button for 3 - 5 seconds.
- ✓ The settings are stored and the setup menu is closed.



Info

If no button is pressed for 20 seconds, or if no impulse comes from the wheel speed sensor, the settings are automatically saved and the Setup menu is closed.

17.5 Setting the clock



Condition

The motorcycle is stationary.

- Press the button briefly and repeatedly until **CLK** appears at the bottom right of the display.
- Press the button for 3 - 5 seconds.
- ✓ The hour display flashes.
- Set the hour display with the button and/or button .
- Press the button briefly.
- ✓ The next segment of the display flashes and can be set.
- You can set the following segments in the same way as the hours by pressing the button and the button .



Info

The seconds can only be set to zero.

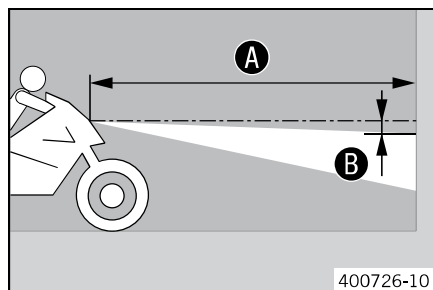
- Press the button for 3 - 5 seconds.
- ✓ The settings are stored and the Setup menu is closed.



Info

If no button is pressed for 20 seconds, or if no impulse comes from the wheel speed sensor, the settings are automatically saved and the Setup menu is closed.

17.6 Checking the headlight setting



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

Guideline

Distance B	5 cm (2 in)
-------------------	-------------

- Position the vehicle vertically a distance **A** away from the wall.

Guideline

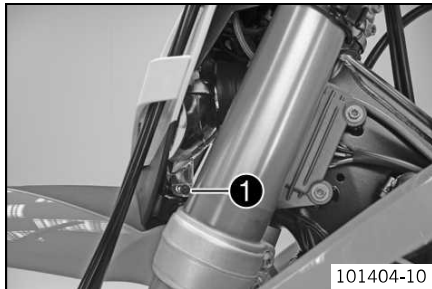
Distance A	5 m (16 ft)
-------------------	-------------

- The rider now sits down on the motorcycle.
- Switch on the low beam.
- Check the headlight setting.

The boundary between light and dark must be exactly on the lower mark for a motorcycle with driver.

- » If the light-dark border does not meet specifications:
 - Adjust the headlight range. (☛ p. 128)

17.7 Adjusting the headlight range



Preparatory work

- Check the headlight setting. (👉 p. 127)

Main work

- Loosen screw ❶.
- Adjust the headlight range of the headlight by moving it up or down.

Guideline

The boundary between light and dark must be exactly on the lower mark for a motorcycle with driver (instructions on how to apply the mark: Checking the headlight setting).



Info

A change in weight on the vehicle may require a correction of the headlight range.

- Tighten screw ❶.

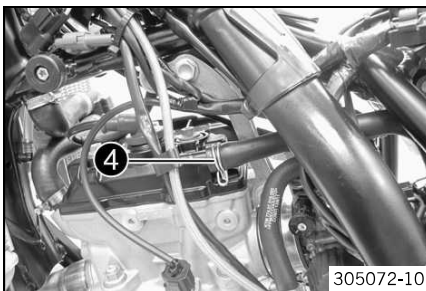
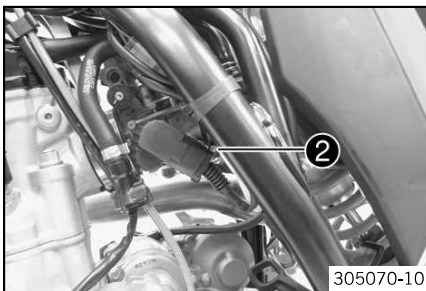
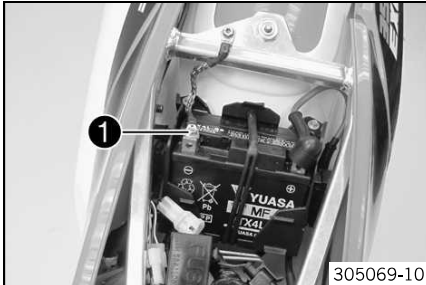
18.1 Removing the engine

Preparatory work

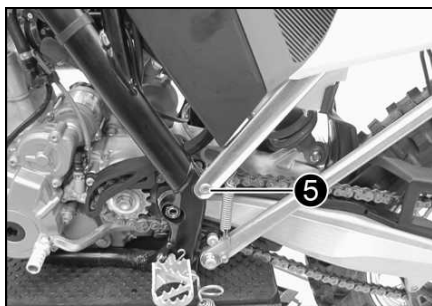
- Drain the coolant. (☛ p. 199)
- Raise the motorcycle with the lift stand. (☛ p. 11)
- Remove the main silencer. (☛ p. 84)
- Remove the seat. (☛ p. 88)
- Remove the fuel tank. (☛ p. 89)

Main work

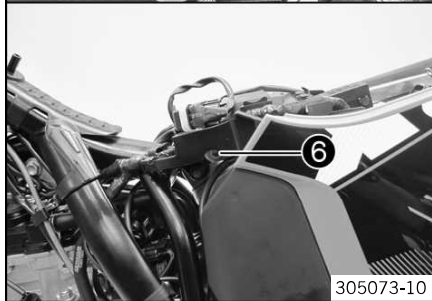
- Remove screw ❶.
- Disconnect the negative cable from the battery.



- Loosen hose clip ❷.
- Detach connector ❸.
- Push back hose clamp ❹.
- Pull off the vent hose.



- Remove screw 5.
- Loosen screw 6.
- Repeat the operation on the opposite side.

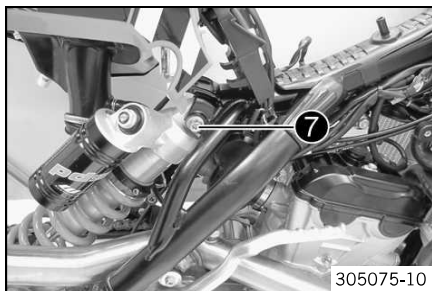


305073-10



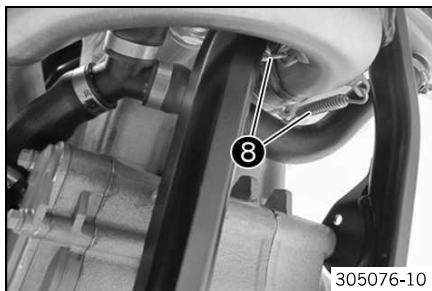
305074-10

- Swing up the subframe and secure it.



305075-10

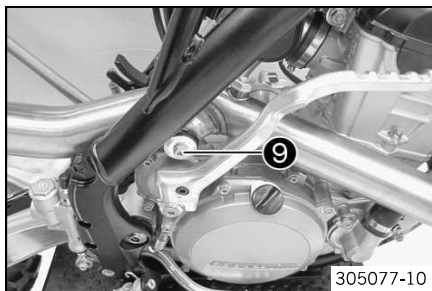
- Remove screw 7.
- Swing back the shock absorber.



305076-10

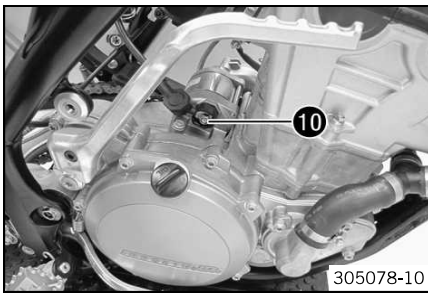
- Remove springs 8.

Spring hooks (50305017000) (☛ p. 292)

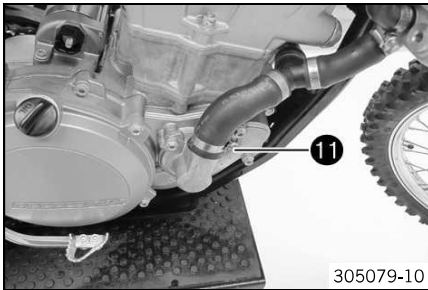


305077-10

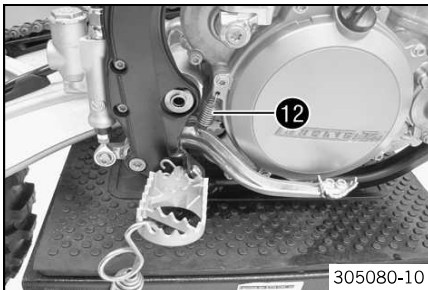
- Remove screw 9.
- Remove the manifold.



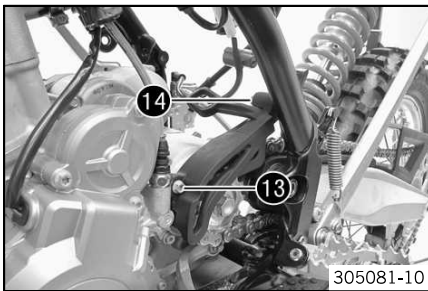
- Slide back cover.
- Remove nut 10.
- Detach the cable.



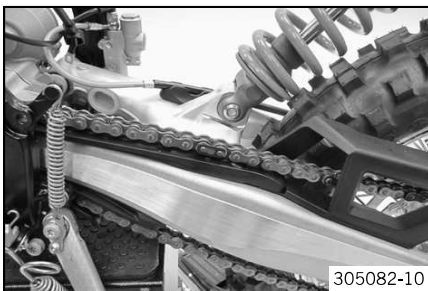
- Loosen hose clip 11.
- Take off the radiator hose.



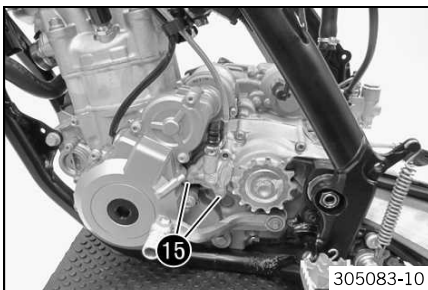
- Disconnect spring 12.



- Remove screw 13.
- Remove screw 14.
- Take off the engine sprocket cover.



- Remove the connecting link of the chain.
- Take off the chain.

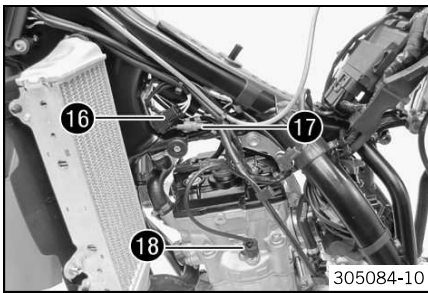


- Remove screws 15.
- Take off the clutch slave cylinder and hang it to the side.

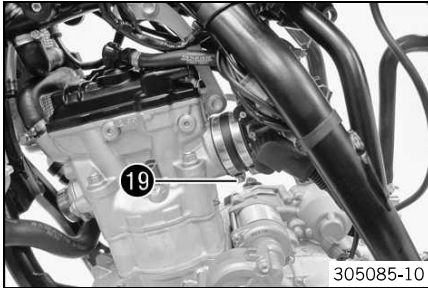


Info

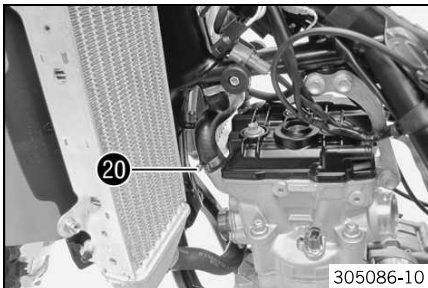
Do not kink the clutch line.
Do not activate the clutch lever if the clutch slave cylinder has been removed.



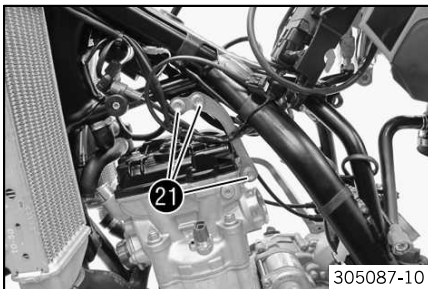
- Detach connector 16.
- Detach connector 17.
- Detach connector 18.
- Pull off the spark plug connector.



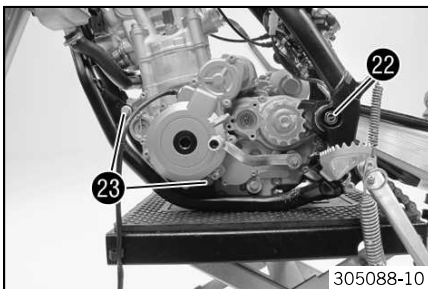
- Loosen hose clip 19.
- Pull off the throttle valve body from the rear.



- Loosen hose clip 20.
- Take off the radiator hose.



- Remove screw connections 21.
- Remove the engine braces.



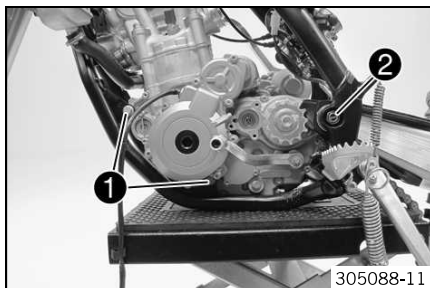
- Remove nut 22.
- Remove the swingarm pivot.
- Pull the swingarm slightly toward the rear.
- Remove screws 23.
- Lift out the engine from the side.



Info

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

18.2 Installing the engine

**Main work**

- Position the engine in the frame.
- Mount screws ❶ but do not tighten yet.

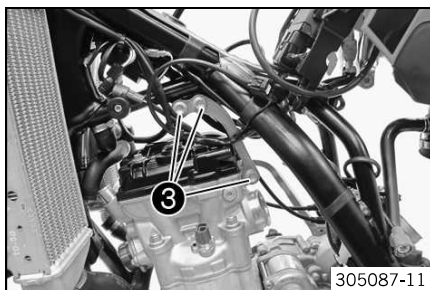
Guideline

Engine attachment bolt	M10	60 Nm (44.3 lbf ft)
------------------------	-----	------------------------

- Position the swingarm.
- Mount the swingarm pivot.
- Mount nut ❷ but do not tighten it yet.

Guideline

Nut, swingarm pivot	M16x1.5	100 Nm (73.8 lbf ft)
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- Position the engine braces.
- Mount and tighten screw caps ❸.

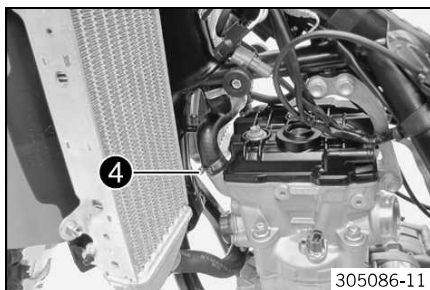
Guideline

Screw, engine brace	M8	33 Nm (24.3 lbf ft)
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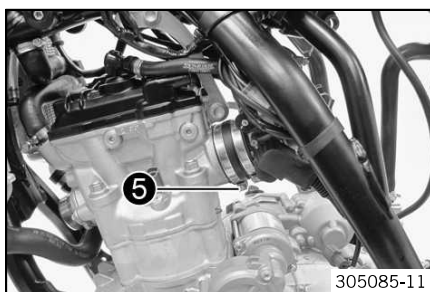
- Tighten screws ❶ and nut ❷.

Guideline

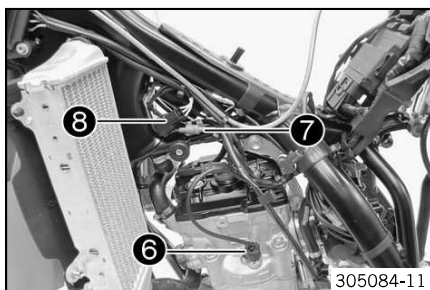
Engine attachment bolt	M10	60 Nm (44.3 lbf ft)
Nut, swingarm pivot	M16x1.5	100 Nm (73.8 lbf ft)



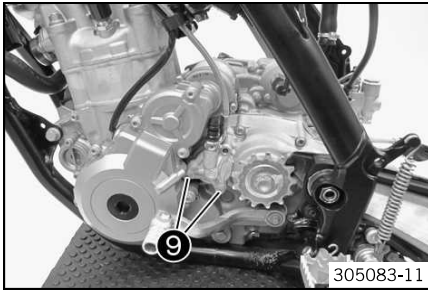
- Mount the radiator hose.
- Position and tighten hose clip ❹.



- Mount the throttle valve body.
- Position and tighten hose clip ❺.



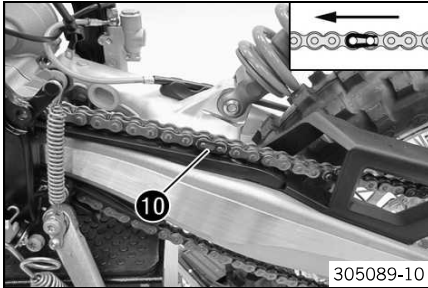
- Plug in connector ❻.
- Plug in connector ❼.
- Plug in connector ❽.
- Mount the spark plug connector.



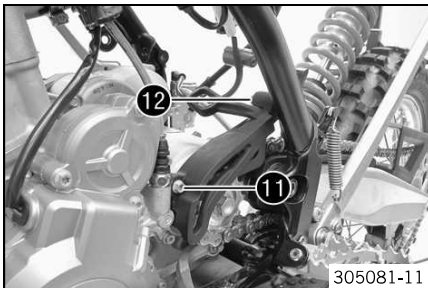
- Position the clutch slave cylinder with the gasket.
- Mount and tighten screws 9.

Guideline

Screw, clutch slave cylinder	M6	10 Nm (7.4 lbf ft)
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- Mount the chain.
- Connect the chain with connecting link 10.



- Position the engine sprocket cover.
- Mount and tighten screw 11.

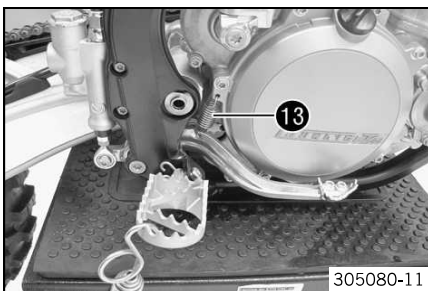
Guideline

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

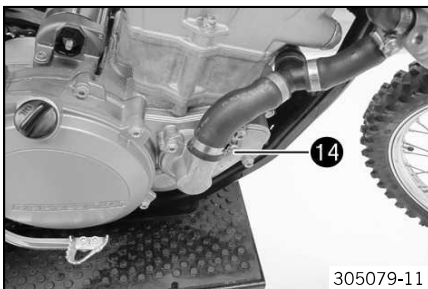
- Mount and tighten screw 12.

Guideline

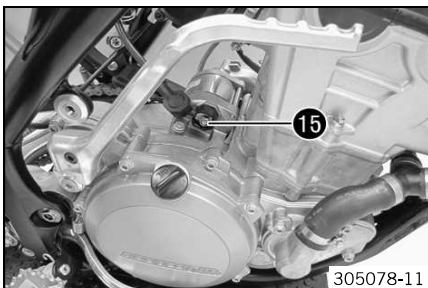
Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)
---------------------------	----	---------------------



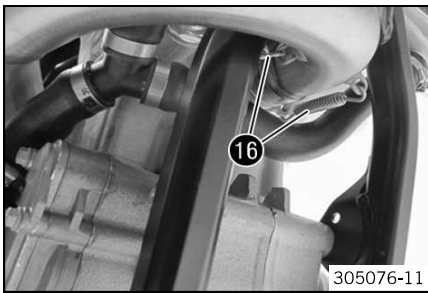
- Mount spring 13.



- Mount the radiator hose.
- Position and tighten hose clip 14.

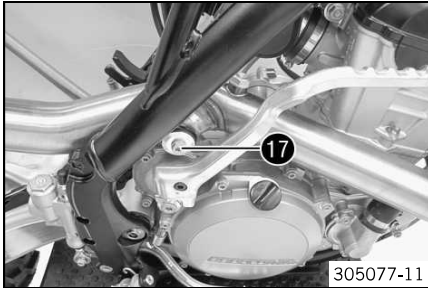


- Position the cable.
- Mount and tighten nut 15.
- Position the cover.



- Position the manifold and mount springs 16.

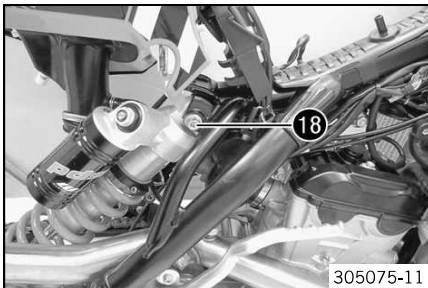
Spring hooks (50305017000) (☛ p. 292)



- Mount and tighten screw 17.

Guideline

Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)	
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- Position the shock absorber.
- Mount and tighten screw 18.

Guideline

Screw, top shock absorber	M12	80 Nm (59 lbf ft)	Loctite® 2701
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- Remove the fixation and position the subframe.



Info

Watch out for the intake flange.

- Mount and tighten screw 19.

Guideline

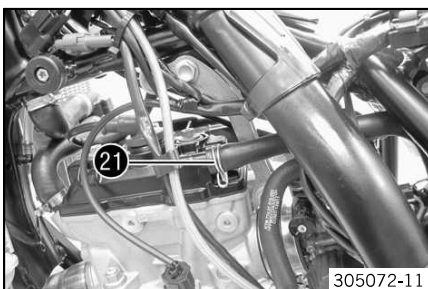
Screw, subframe	M8	35 Nm (25.8 lbf ft)	Loctite® 2701
-----------------	----	------------------------	---------------

- Remove screw 20.
- Mount and tighten screw 20.

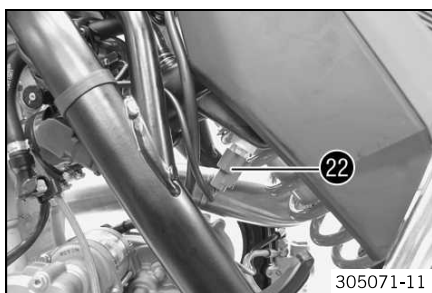
Guideline

Screw, subframe	M8	35 Nm (25.8 lbf ft)	Loctite® 2701
-----------------	----	------------------------	---------------

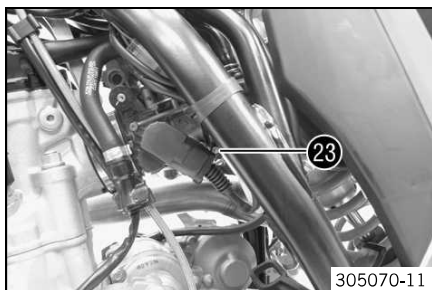
- Repeat the operation on the opposite side.



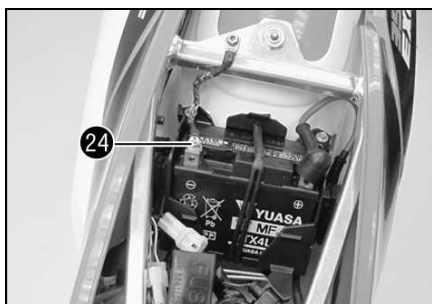
- Mount the vent hose.
- Position hose clamp 21.



- Plug in connector 22.



- Position and tighten hose clip 23.



- Connect negative cable 24 of the battery.

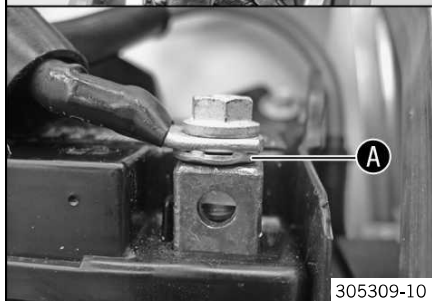
Guideline

Screw, battery terminal	M5	2.5 Nm (1.84 lbf ft)
-------------------------	----	-------------------------

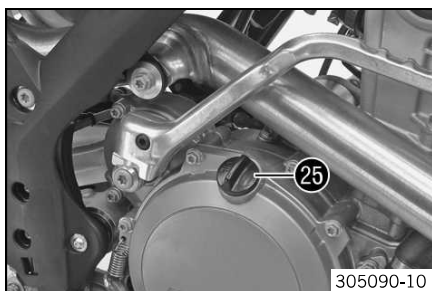


Info

Contact disk A must be mounted between battery terminal and cable socket with the claws facing up.



- Refill the coolant. (☛ p. 200)
- Install the main silencer. (☛ p. 84)
- Remove the motorcycle from the lift stand. (☛ p. 11)
- Install the fuel tank. (☛ p. 90)
- Mount the seat. (☛ p. 89)



- Remove screw connection 25 on the clutch cover and fill up with engine oil.

Engine oil	1.20 l (1.27 qt.)	Engine oil (SAE 10W/50) (☛ p. 288)	
		Alternative engine oil for harsh operating conditions and increased performance	Engine oil (SAE 10W/60) (00062010035) (☛ p. 288)

- Mount and tighten screw connection 25.



Danger

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

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

- Start the engine and check that it is oil-tight.
- Switch off the engine.
- Check the engine oil level. (☛ p. 201)
- Check the coolant level. (☛ p. 199)

Finishing work

- Take a test ride.

- Read out the fault memory using the KTM diagnostics tool.
- Check the engine for leakage.
- Check the engine oil level. (☛ p. 201)
- Check the coolant level. (☛ p. 199)

18.3 Engine disassembly

18.3.1 Preparations



- Mount the special tool on the engine mounting block.

Engine fixing arm (77229002000) (☛ p. 296)

Engine assembly stand (61229001000) (☛ p. 295)

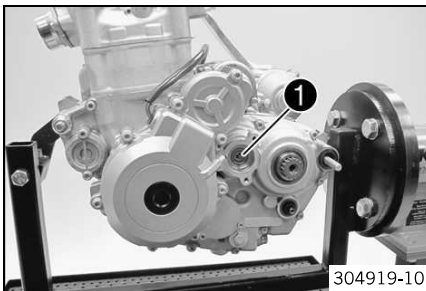
- Mount the engine on the special tool.



Info

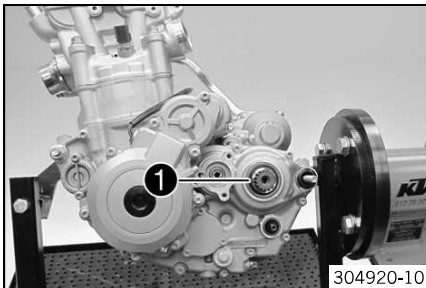
Work with an assistant or a motorized hoist.

18.3.2 Removing the clutch push rod



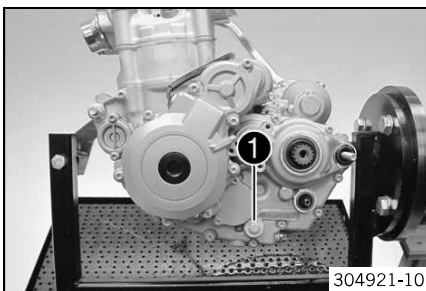
- Remove clutch push rod ❶.

18.3.3 Removing the spacer

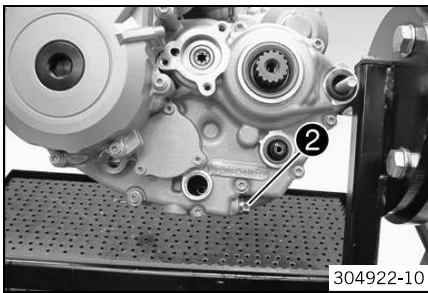


- Remove spacer ❶ of the countershaft.
- Remove O-ring.

18.3.4 Draining the engine oil

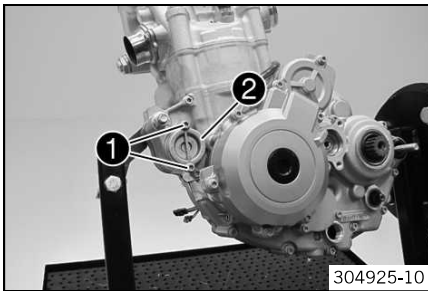


- Remove plug ❶ with oil screen and the O-rings.

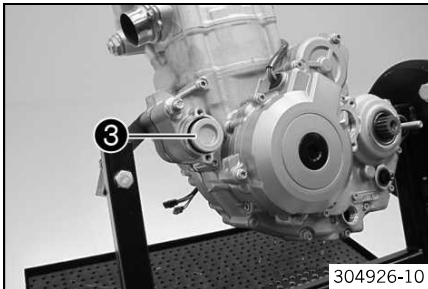


- Remove oil drain plug ② with the magnet.
- Completely drain the engine oil.

18.3.5 Removing the oil filter



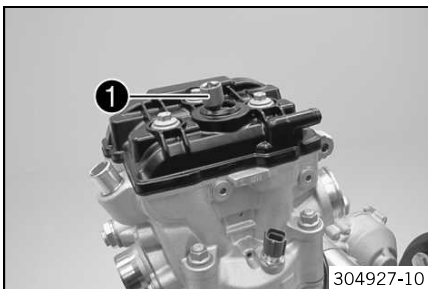
- Remove screws ①. Remove the oil filter cover ② with the O-ring.



- Pull oil filter ③ out of the oil filter housing.

Circlip pliers reverse (51012011000) (☛ p. 293)

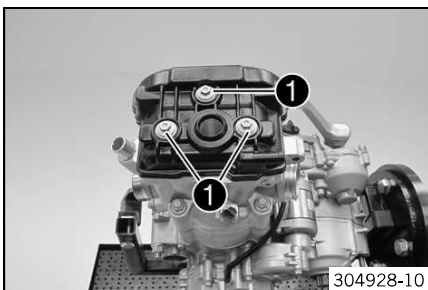
18.3.6 Removing the spark plug



- Remove the spark plug using special tool ①.

Spark plug wrench (77229072000) (☛ p. 299)

18.3.7 Removing the valve cover

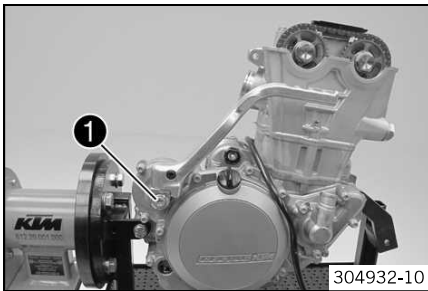


- Remove screws ①.
- Remove the valve cover with the valve cover seal.

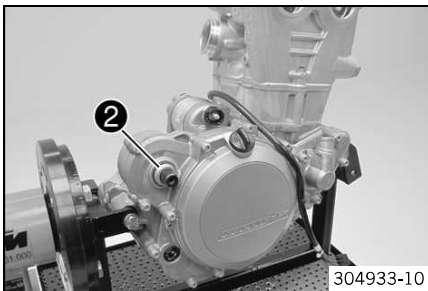


- Remove the spark plug shaft insert.

18.3.8 Removing the kick starter

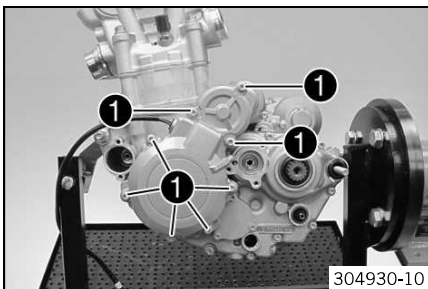


- Remove screw ❶ with the washer.
- Take off the kick starter.

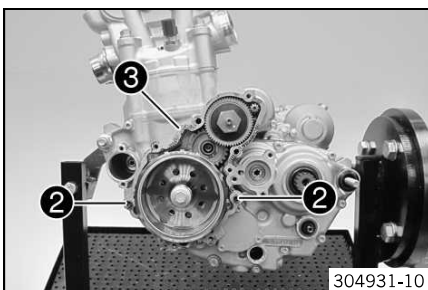


- Remove distance sleeve ❷.

18.3.9 Removing the alternator cover

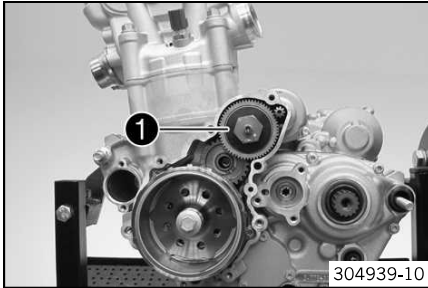


- Remove screws ❶.
- Remove the alternator cover.



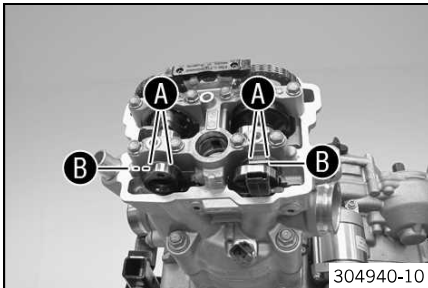
- Take off the alternator cover gasket ❸.
- ✓ Dowels ❷ remain in the engine case.

18.3.10 Removing the torque limiter

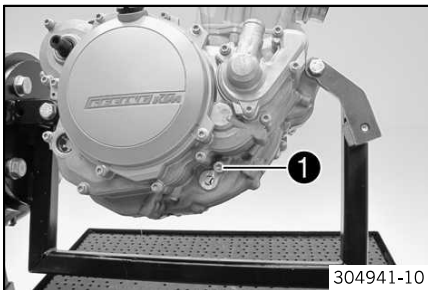


- Remove torque limiter **1**.

18.3.11 Positioning the engine at ignition top dead center



- Turn the crankshaft counterclockwise until markings **A** on the cylinder head are located flush above the flat areas **B** of the camshafts.



- Remove screw **1** with the washer.

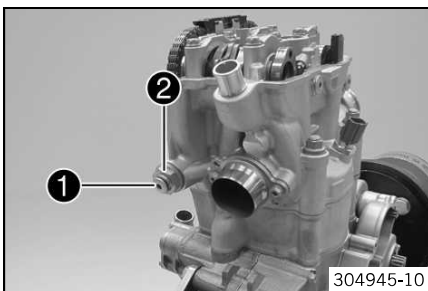


Info

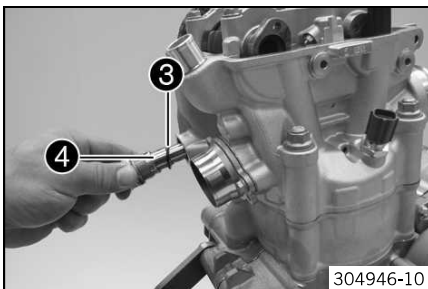
Check through the hole whether the position notch of the crankshaft is visible.

- Mount and tighten screw **1** without the washer.

18.3.12 Removing the timing chain tensioner

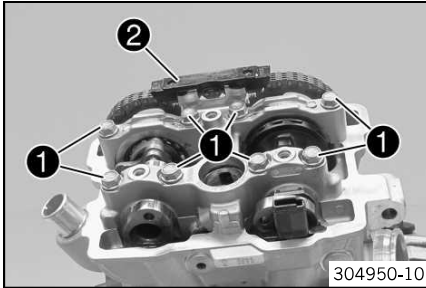


- Loosen screw **1**.
- Remove screw **2** with the seal ring.

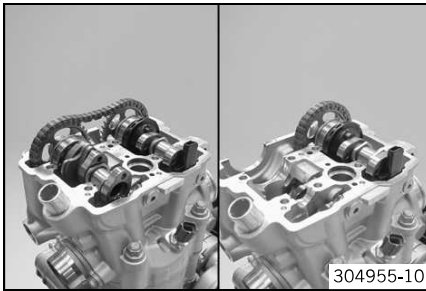


- Pull out timing chain tensioner **3**. Remove O-ring **4**.

18.3.13 Removing the camshaft

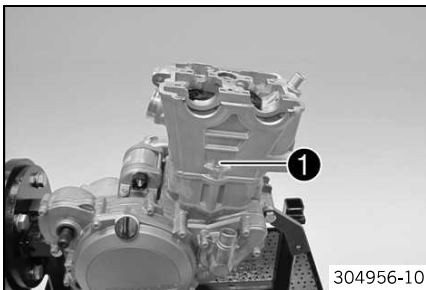


- Loosen screws ❶ from the outside to the inside and remove.
- Take off guide rail ❷.
- Take off the camshaft bearing bridge.

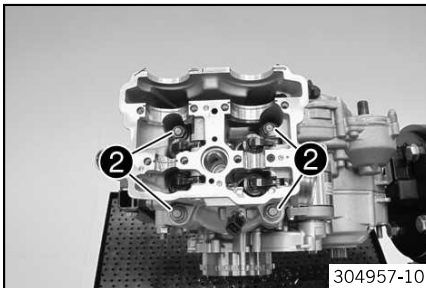


- Take the timing chain off the camshaft gear.
- Remove the camshafts.

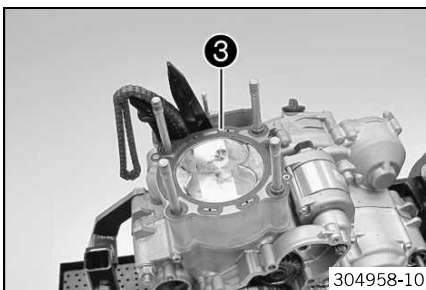
18.3.14 Removing the cylinder head



- Remove nut ❶ with the washer.

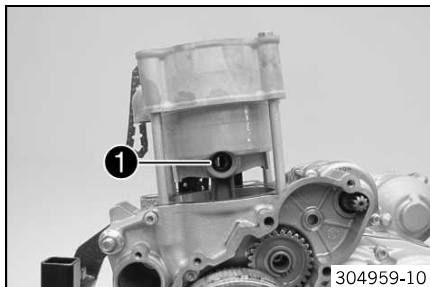


- Loosen nuts ❷ in a crisscross pattern and remove them with the washers.
- Remove the cylinder head.



- Remove cylinder head gasket ❸.

18.3.15 Removing the piston



- Push the cylinder upward.



Info

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

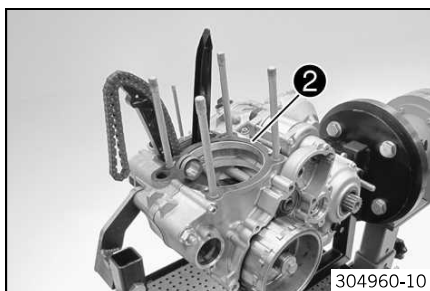
- Remove the piston pin retainer ①.
- Remove the piston pin.
- Take off the cylinder and piston.
- Push the piston upward out of the cylinder.



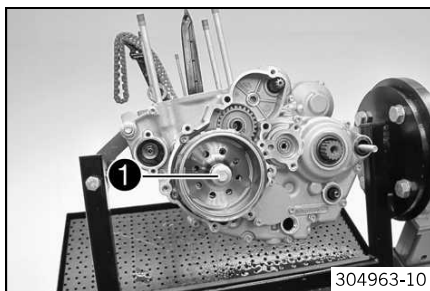
Info

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

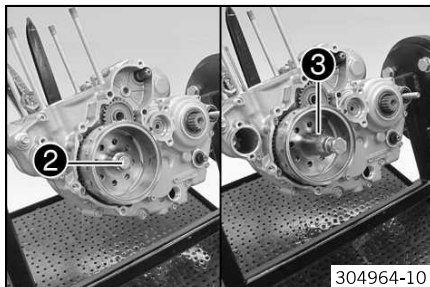
- Take off cylinder base gasket ②.



18.3.16 Removing the starter drive



- Remove screw ①.



- Insert special tool ② in the crankshaft.

Protection cover (75029090000) (☛ p. 296)

- Attach special tool ③ to the rotor. Hold the special tool and pull off the rotor by turning in the screw.

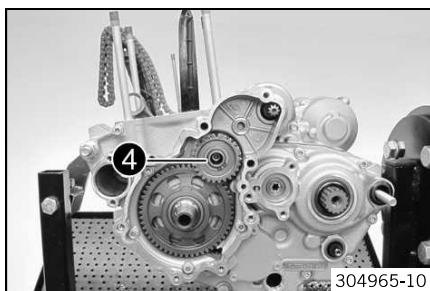
Extractor (58012009000) (☛ p. 293)

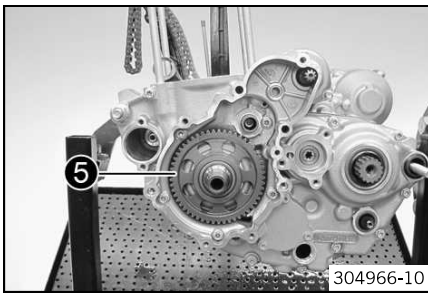


Info

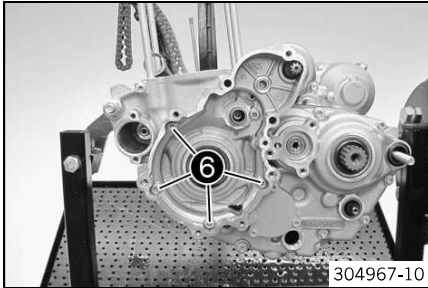
Ensure that the spring washers remain in place.

- Remove lock ring ④.
- Take off the starter idler gear with the washer.

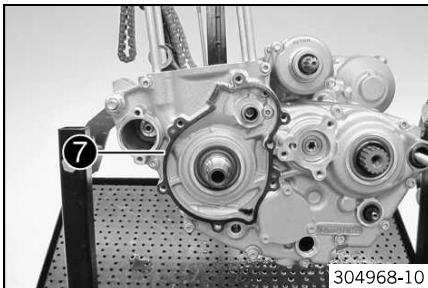




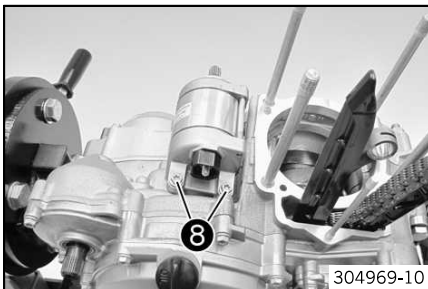
- Remove freewheel gear ⑤.



- Remove screws ⑥.
- Remove the inside alternator cover.

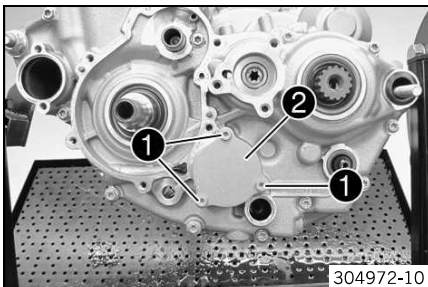


- Take off gasket ⑦.

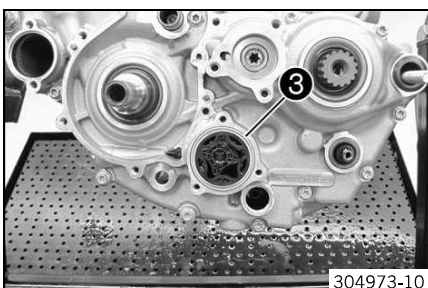


- Remove screws ⑧.
- Take off the starter motor.

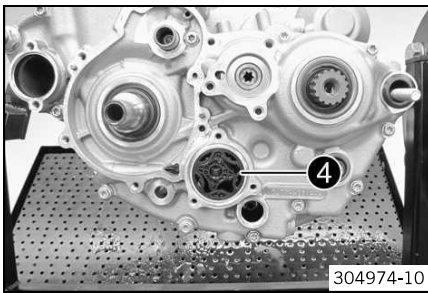
18.3.17 Removing the suction pump



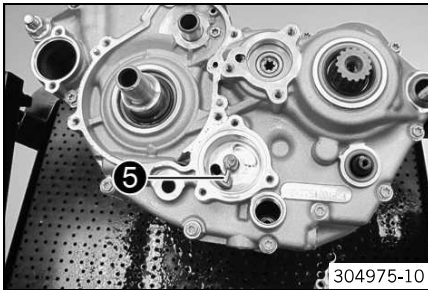
- Remove screws ①.
- Take off oil pump cover ②.



- Remove O-ring ③.

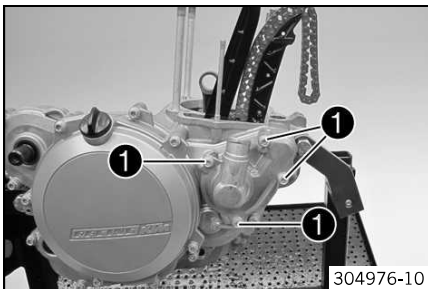


- Remove suction pump ④.

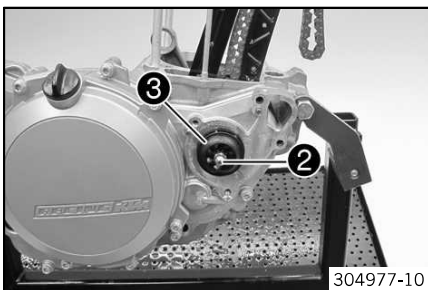


- Remove needle roller ⑤.

18.3.18 Removing the water pump wheel

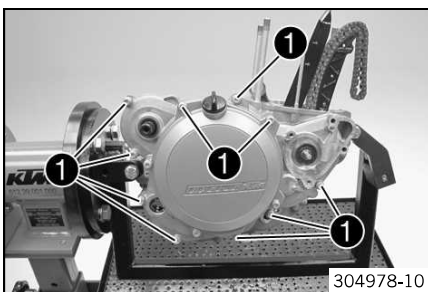


- Remove screws ①. Take off the water pump cover.



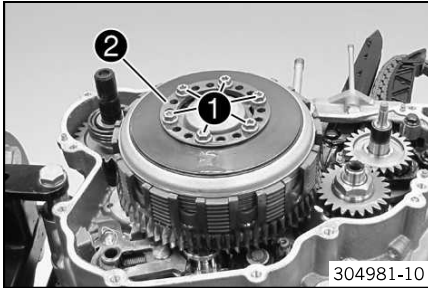
- Remove nut ②.
- Take off the two-part water pump impeller ③.

18.3.19 Removing the clutch cover

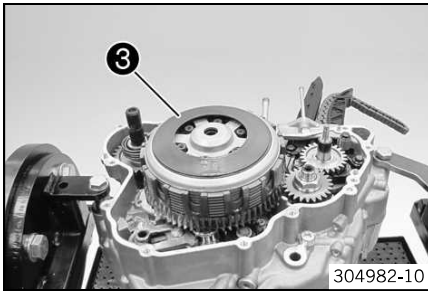


- Remove screws ①.
- Take off the clutch cover.
- Remove the clutch cover seal.

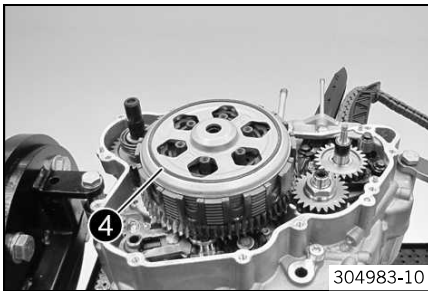
18.3.20 Removing the clutch discs



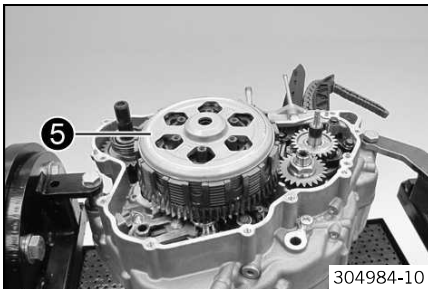
- Remove screws ❶.
- Take off spring retainer ❷.



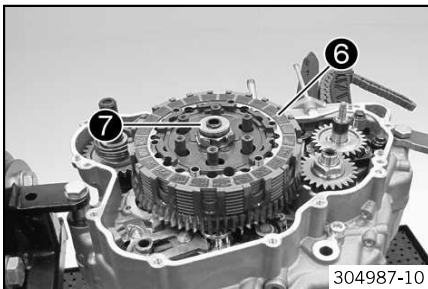
- Take off spring washer ❸.



- Take off pretension ring ❹.

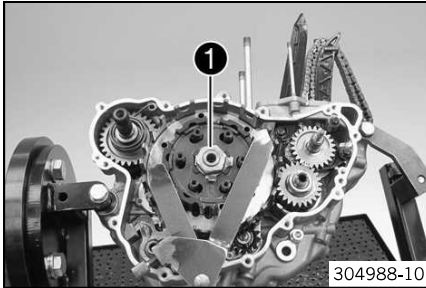


- Take off pressure cap ❺.



- Completely remove clutch disc pack ❻.
- Remove clutch pressure piece ❼.

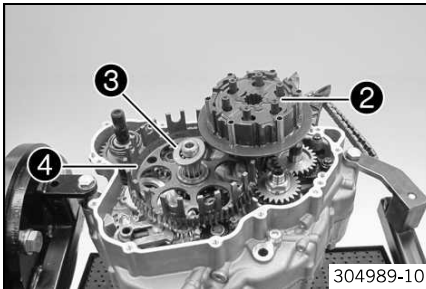
18.3.21 Removing the outer clutch hub



- Bend up the lock washer.
- Hold the inner clutch hub with the special tool. Loosen nut 1.

Clutch holder (51129003000) (p. 293)

- Remove the nut with the lock washer. Dispose of the lock washer.

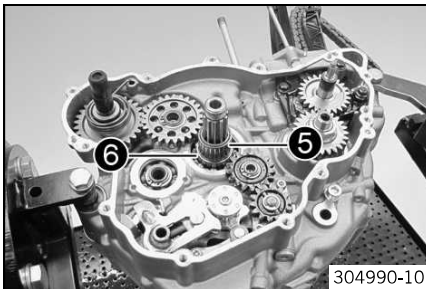


- Take off inner clutch hub 2 and washer 3.

Info

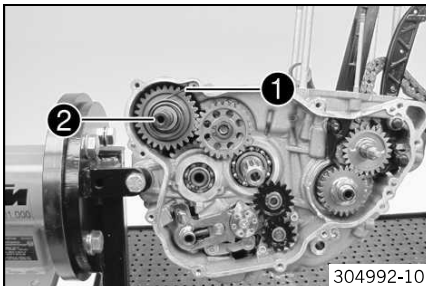
The washer usually sticks to the inner clutch hub.

- Take off 4.



- Take off needle bearing 5 and collar sleeve 6.

18.3.22 Removing the intermediate kick starter gear

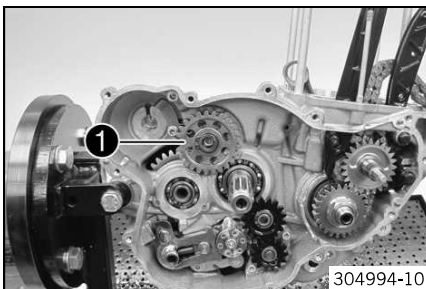


- Detach kick starter spring 1.
- Turn kick starter shaft 2 counterclockwise and pull it out.

Info

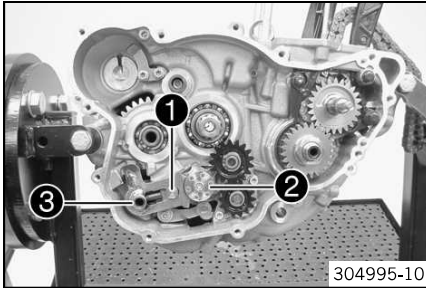
The stop disk of the kick starter shaft usually sticks to the bearing.

18.3.23 Removing the intermediate kick starter gear



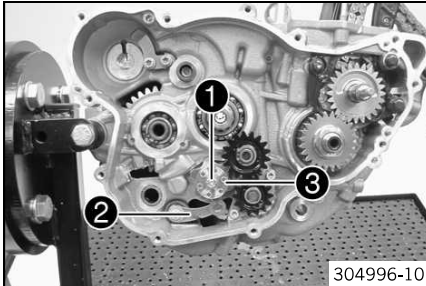
- Remove the lock ring. Take off the washer.
- Take off intermediate kick starter gear 1.

18.3.24 Removing the shift shaft



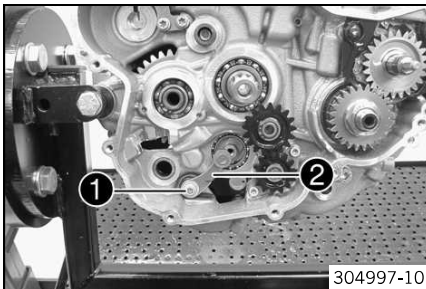
- Push sliding plate ① away from the shift drum locating unit ②. Remove shift shaft ③ with the washer.

18.3.25 Removing the shift drum locating unit



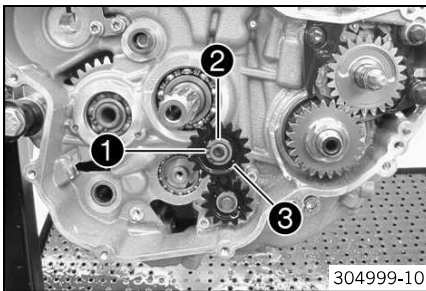
- Remove screw ①.
- Push away locking lever ② from shift drum locating unit ③ and remove the shift drum locating unit.
- Relieve tension from the locking lever.

18.3.26 Removing the locking lever

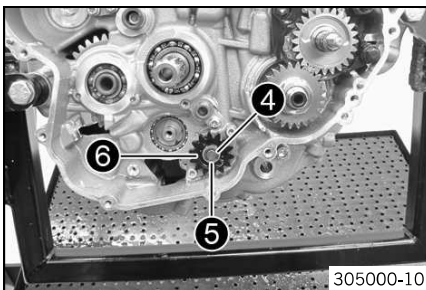


- Unscrew ① and remove together with locking lever ②, washer, sleeve and spring.

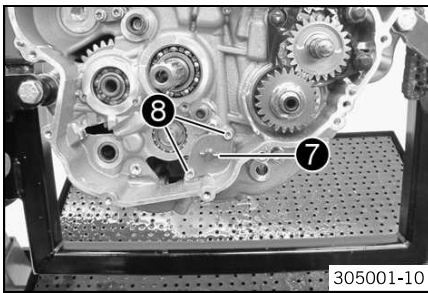
18.3.27 Removing the force pump



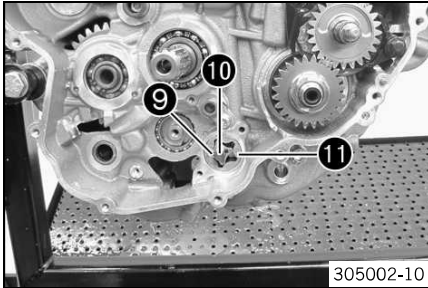
- Remove lock ring ①.
- Take off washer ②.
- Take off oil pump idler gear ③ with the washer.



- Remove lock ring ④.
- Take off washer ⑤.
- Take off oil pump gear wheel ⑥.

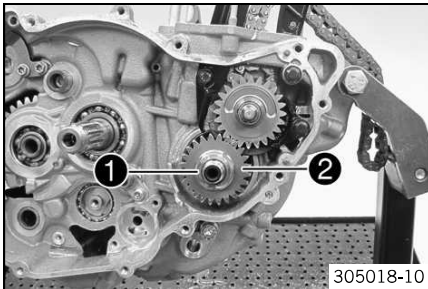


- Remove pin 7.
- Remove screws 8.
- Take off the oil pump cover.



- Remove pin 9.
- Push oil pump shaft 10 inward and take it out of the engine from the alternator side.
- Remove force pump 11.

18.3.28 Removing the primary gear



- Remove nut 1.

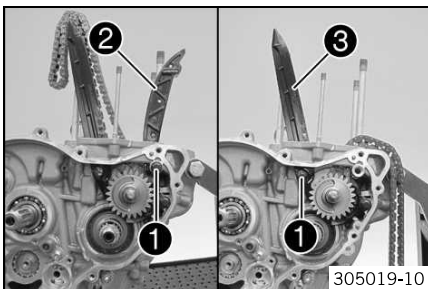


Info

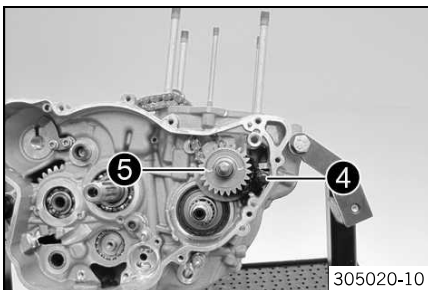
Left-handed thread!

- Take off primary gear 2.

18.3.29 Removing the timing chain



- Remove screws 1.
- Remove the timing chain tensioning rail 2.
- Remove the timing chain guide rail 3.



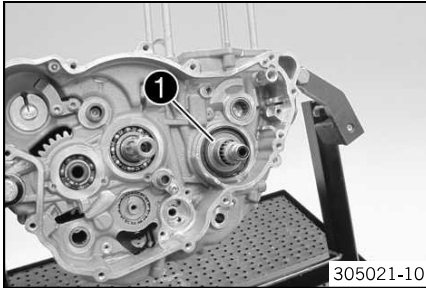
- Remove screw 4.
- Take off balancer shaft 5 with the timing chain and timing chain securing guide.



Info

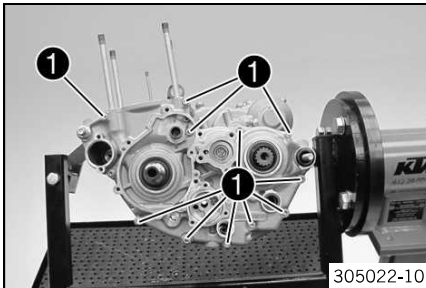
If the timing chain is going to be used again, mark its direction of travel.

18.3.30 Removing the spacer

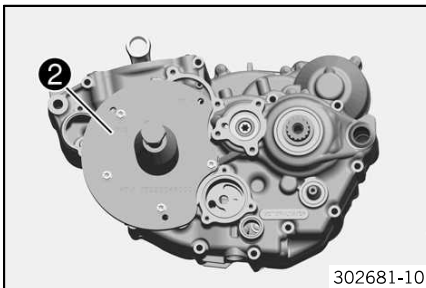


- Remove spacer ❶ of the crankshaft.

18.3.31 Removing the left section of the engine case



- Remove screws ❶.
- Tilt the left section of the engine case upward and remove the screw connections of the engine fixing arm.



- Insert the special tool into the crankshaft.

Protection cover (75029090000) (☞ p. 296)

- Mount special tool ❷ with the appropriate screws.

Puller (77229048000) (☞ p. 298)



Info

Use the drill hole marked with **772**.

- Take off the section of the engine case.

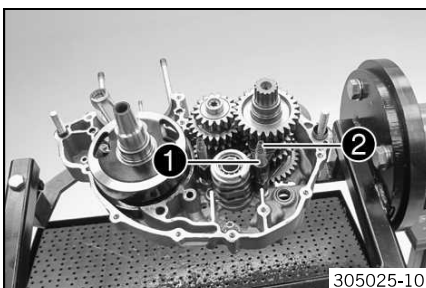


Info

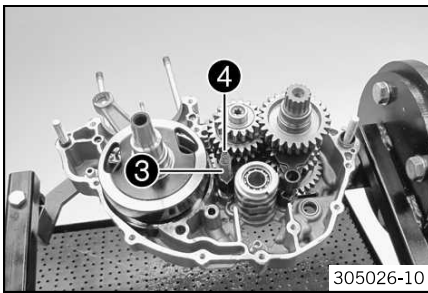
Do not subject the section of the engine case to any stress.
The washer of the main shaft usually adheres to the bearing.

- Take off the left section of the engine case.
- Remove the dowels.
- Remove the special tools.

18.3.32 Removing the shift rails

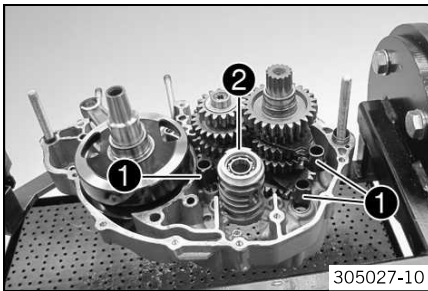


- Remove shift rail ❶ together with upper spring ❷.



- Remove shift rail **3** together with upper spring **4** and the lower spring.

18.3.33 Removing the shift drum



- Tilt shift forks **1** to the side.

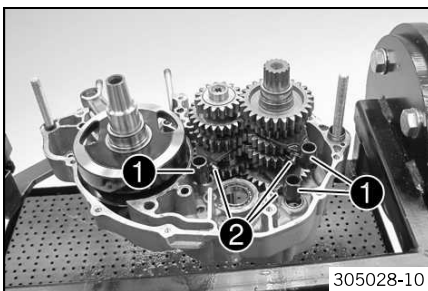


Info

Do not misplace the shift rollers.

- Remove shift drum **2**.

18.3.34 Removing the shift forks



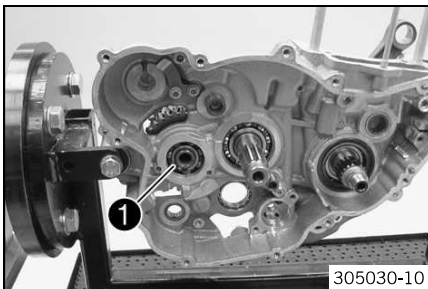
- Remove shift forks **1**.



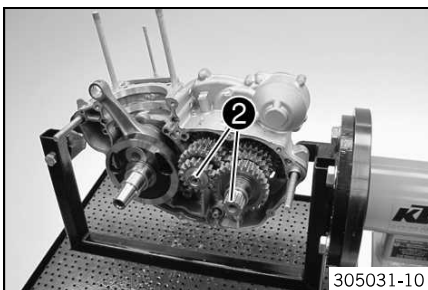
Info

Do not misplace shift rollers **2**.

18.3.35 Removing the transmission shafts

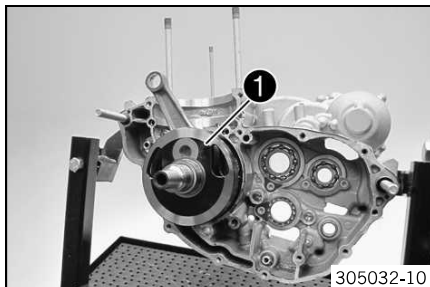


- Remove lock ring **1**.



- Pull both transmission shafts **2** out of the bearing seats together.

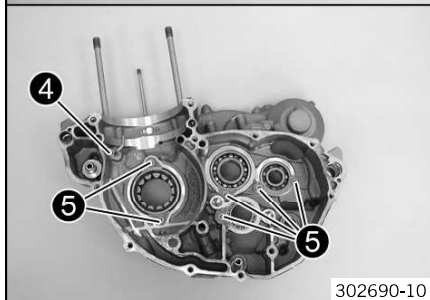
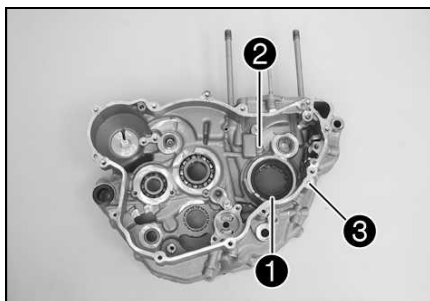
18.3.36 Removing the crankshaft



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

18.4 Work on individual parts

18.4.1 Work on the right section of the engine case



- Remove all dowels.
- Remove shaft seal ring ❶ of the crankshaft.
- Remove jet ❷.
- Remove oil jet ❸ for conrod bearing lubrication.
- Remove screw ❹.
- Remove the oil jet for piston cooling.
- Remove screws ❺. Remove the bearing retainers.
- Remove any sealing mass remnants and clean the engine case section thoroughly.
- Warm the engine case section in an oven.

Guideline

150 °C (302 °F)

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

i Info

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

- Blow out oil jet ❸ with compressed air and check that it is clear.

Guideline

Oil jet for balancer shaft lubrication	M4	2 Nm (1.5 lbf ft)	Loctite® 243™
--	----	----------------------	---------------

- 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.

i Info

When pressing the bearing in, ensure that the engine case section is level to prevent damage.

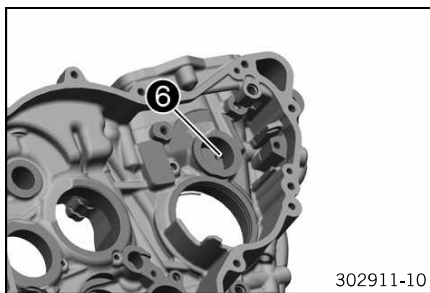
Only press the bearings in via the outer bearing race; otherwise, the bearings will be damaged when they are pressed in.

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

i 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 ❶ of the crankshaft with the open side facing out so it is flush.
- Mount and tighten jet ❷.



Guideline

Jet, crank chamber ventilation	M4	2 Nm (1.5 lbf ft)	Loctite® 243™
--------------------------------	----	----------------------	---------------

- Mount and tighten the oil jet ③.

Guideline

Oil nozzle for conrod bearing lubrication	M4	2 Nm (1.5 lbf ft)	Loctite® 243™
---	----	----------------------	---------------

- Mount the oil jet for piston cooling.
- Mount and tighten screw ④.

Guideline

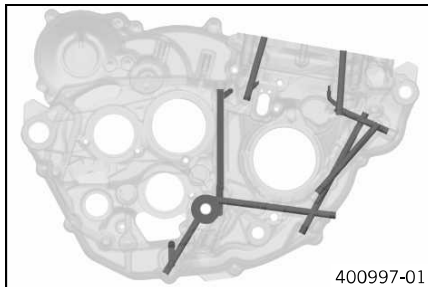
Screw, oil jet for piston cooling	M4	2 Nm (1.5 lbf ft)	Loctite® 243™
-----------------------------------	----	----------------------	---------------

- Position all bearing locks.
- Mount and tighten screws ⑤.

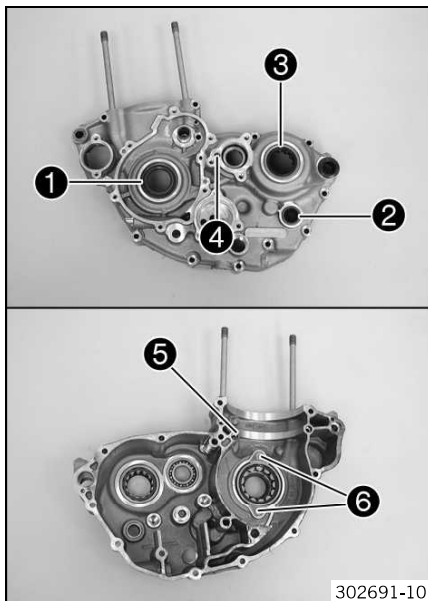
Guideline

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

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



18.4.2 Working on the left section of the engine case



- Remove all dowels.
- Remove shaft seal ring ① of the crankshaft, ② shift shaft and ③ countershaft.
- Remove oil jet ④ for coupling lubrication.
- Remove oil jet ⑤ for piston cooling.
- Remove screws ⑥. Remove the bearing retainers.
- Remove any sealing mass remnants and clean the engine case section thoroughly.
- Warm the engine case section in an oven.

Guideline

150 °C (302 °F)

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

i 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.

i Info

When pressing the bearing in, ensure that the engine case section is level to prevent damage.

Only press the bearings in via the outer bearing race; 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.

i 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 ❶ of the crankshaft with the open side facing out so it is flush.
- Press in shaft seal ring ❷ of the shift shaft so it is flush with the open side facing in.
- Press in shaft seal ring ❸ of the countershaft so it is flush with the open side facing in.
- Mount and tighten oil jet ❹.

Guideline

Oil jet for clutch lubrication	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
--------------------------------	----	----------------------	---------------

- Mount and tighten oil jet ❺.

Guideline

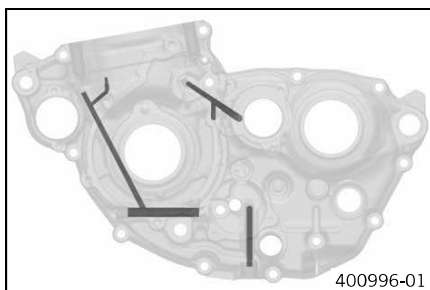
Oil jet, piston cooling	M5	2 Nm (1.5 lbf ft)	Loctite® 243™
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- Position all bearing locks.
- Mount and tighten screws ❻.

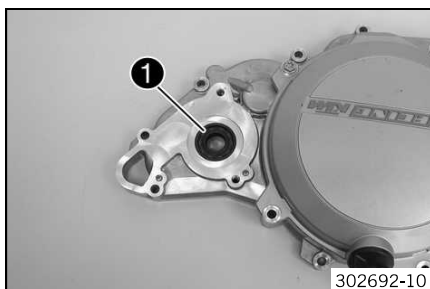
Guideline

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

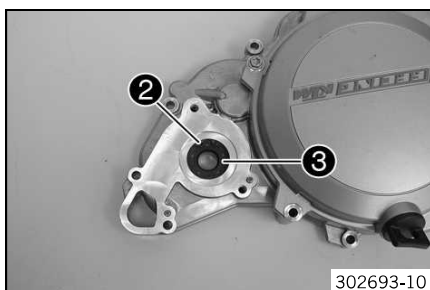
- Blow out the oil channel with compressed air and check that it is clear.



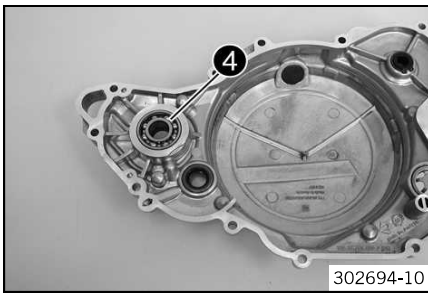
18.4.3 Work on the clutch cover



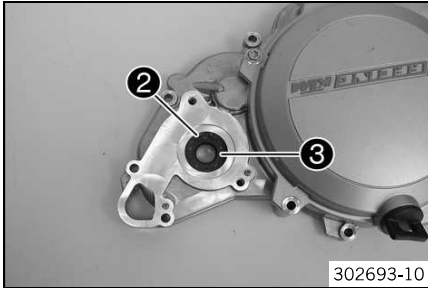
- Remove shaft seal ring ❶.



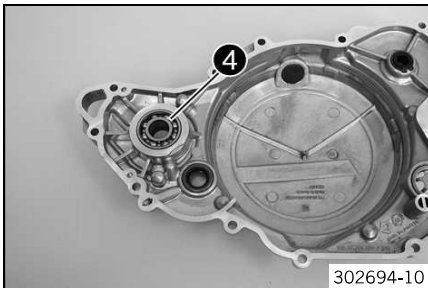
- Remove lock ring ❷.
- Remove shaft seal ring ❸.



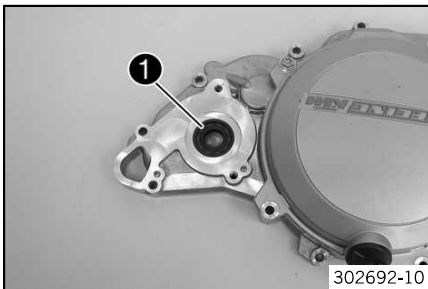
- Press out bearing 4 toward the inside.



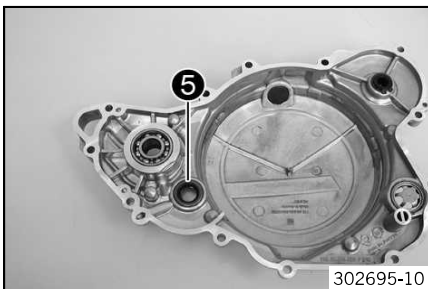
- Mount lock ring 2.
- Press the shaft seal ring 3 all the way in from the inside to the outside with the open side facing in.



- Press the new bearing 4 all the way in from the inside to the outside using a suitable tool.



- Press in shaft seal ring 1 all the way, with the open side facing outward.



- Remove shaft seal ring 5 of the crankshaft.
- Press a new shaft seal ring all the way in with the open side facing inward.

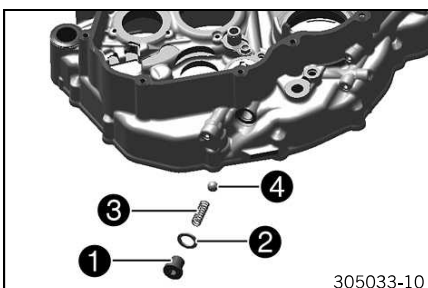


Info

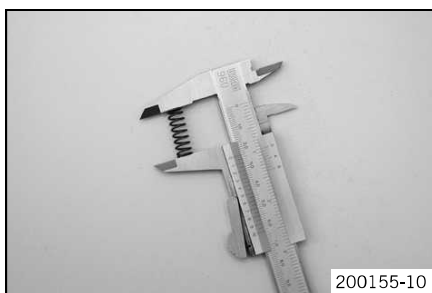
Provide suitable support for the clutch cover while pressing in.

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

18.4.4 Checking the oil pressure regulator valve



- Remove screw plug 1 with sealing washer 2.
- Remove pressure spring 3 and ball 4.



- Measure the spring length of the oil pressure regulator valve.

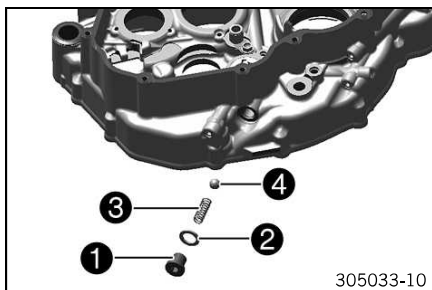
Oil pressure regulator valve	
Minimum length of pressure spring	23.5 mm (0.925 in)

- » If the measured value does not meet specifications:

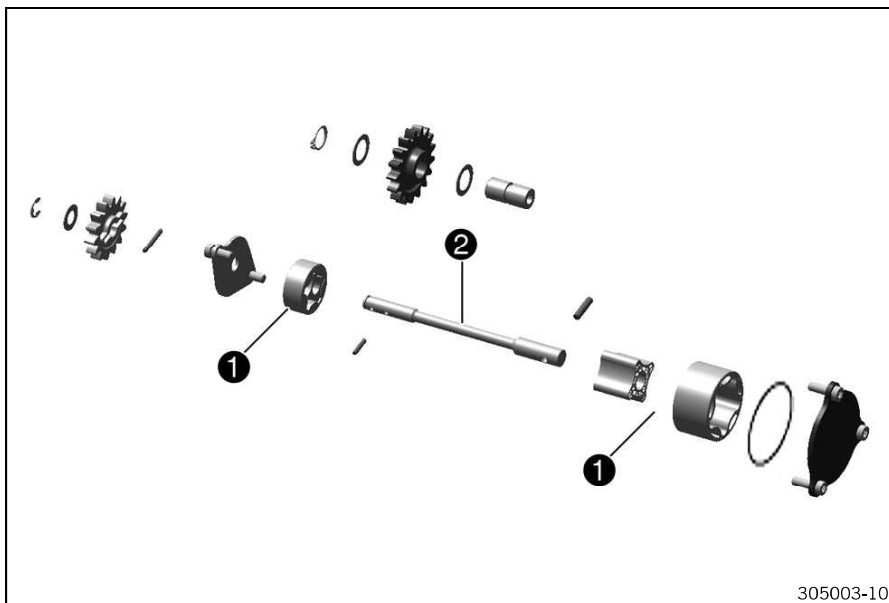
- Change the spring.
- Check ball ④ and the sealing seat.
 - » If there is damage or wear:
 - Change the ball and machine the sealing seat.
- Install ball ④ and pressure spring ③.
- Mount and tighten screw plug ① with sealing washer ②.

Guideline

Plug, oil pressure regulator valve	M12x1.5	20 Nm (14.8 lbf ft)
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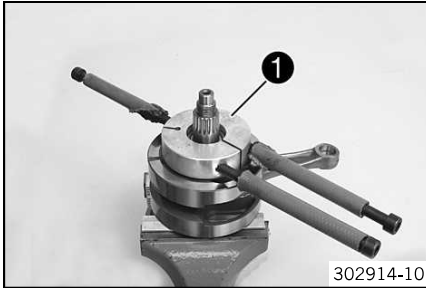


18.4.5 Checking the lubrication system



- Check the internal rotor and external rotor of oil pumps ① for damage and wear.
 - » If there is damage or wear:
 - Change the oil pumps.
- Check oil pump shaft ② for damage and wear.
 - » If there is damage or wear:
 - Change the oil pump shaft.
- Check the oil pump cover for damage and wear.
 - » If there is damage or wear:
 - Change the oil pump cover.

18.4.6 Removing the crankshaft bearing inner race



- Fix the crankshaft in the vise.



Info

Use soft jaws.

- Warm up special tool ①.

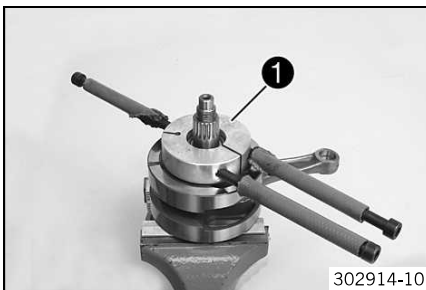
Guideline

150 °C (302 °F)

Tool for inner bearing race (58429037037) (☛ p. 294)

- Push the warmed up special tool ① onto the crankshaft bearing inner race, press firmly together and pull jointly from the crankshaft.
- Take off the compensating disk.
- Repeat the operation on the opposite side.

18.4.7 Installing the crankshaft bearing inner race



- Fix the crankshaft in the vise.



Info

Use soft jaws.

- Slide on the compensating disk.
- Heat the crankshaft bearing inner race in special tool ① and mount together.

Guideline

120 °C (248 °F)

Tool for inner bearing race (58429037037) (☛ p. 294)

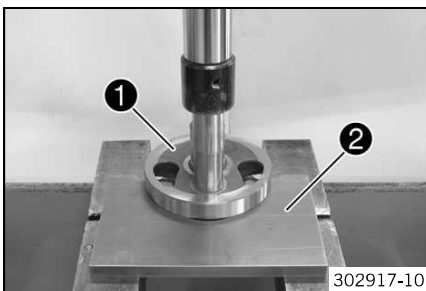
- Repeat the operation on the opposite side.
- Ensure that the new crankshaft bearing inner race is flush.



Info

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

18.4.8 Changing the connecting rod, conrod bearing and crank pin



Main work

- Position crankshaft ① in the press using special tool ②.

Extrude plate, base (77229009000) (☛ p. 297)

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

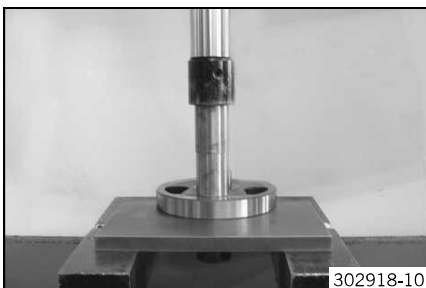
Pressing device for crankshaft, complete (75029047000) (☛ p. 296)

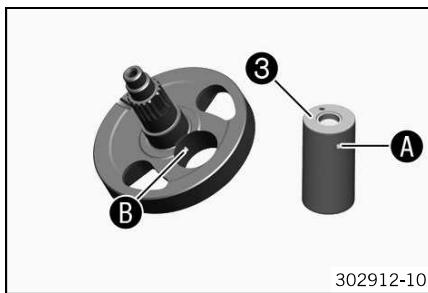


Info

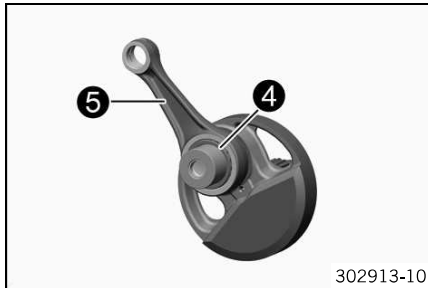
Hold the lower crank web.

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





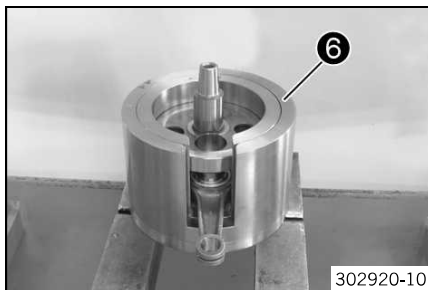
- Press in the new crank pin ③ as far as possible.
 - ✓ Oil hole ④ is aligned with oil hole ⑤.
 - ✗ If the oil holes are not correctly aligned, the conrod bearing will not be supplied with oil.
- Blow compressed air through the oil channel to check that it is clear.



- Mount the new bearing ④ and connecting rod ⑤.

**Info**

Thoroughly oil the bearing.

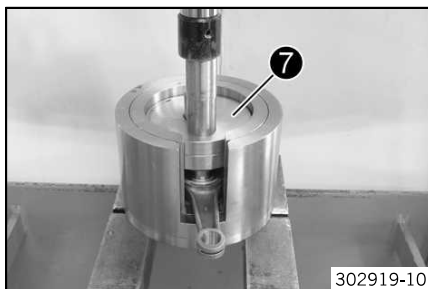


- Position special tool ⑥ on the press.

Pressing device for crankshaft, complete (75029047000) (☛ p. 296)

Insert for crankshaft pressing tool (77229008000) (☛ p. 297)

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



- Position special tool ⑦ with the heel pointing down.

Insert for crankshaft pressing tool (77229008000) (☛ p. 297)

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

**Info**

The press mandrel must be positioned over the crank pin.

- Take the crankshaft out of the special tool and check that the connecting rod can move freely.

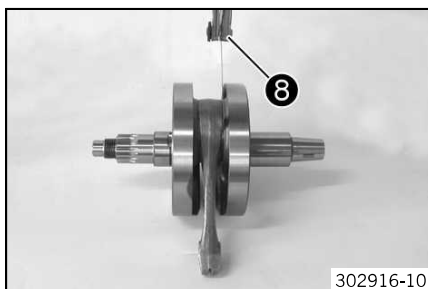
- Measure the axial play between the connecting rod and the crank webs with special tool ⑧.

Feeler gauge (59029041100) (☛ p. 294)

Connecting rod - axial play of lower conrod bearing	0.30... 0.45 mm (0.0118... 0.0177 in)
---	---------------------------------------

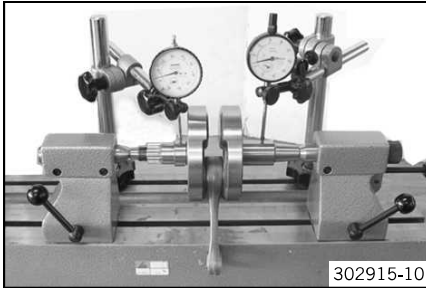
» If the specification is not reached:

- Correct it so the dimension is equal to the specified value.

**Finishing work**

- Check the crankshaft run-out at the bearing pin. (☛ p. 158)

18.4.9 Checking the crankshaft run-out at the bearing pin

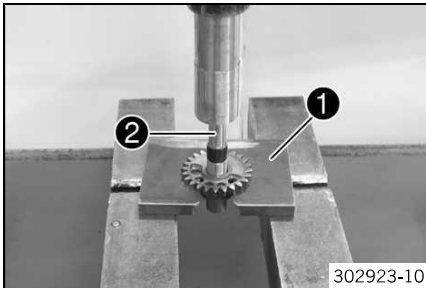


- Position the crankshaft on a roller block.
- Turn the crankshaft slowly.
- Check the crankshaft run-out on both bearing pins.

Crankshaft - run-out at bearing pin	$\leq 0.03 \text{ mm } (\leq 0.0012 \text{ in})$
-------------------------------------	--

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

18.4.10 Removing the drive wheel of the balancer shaft



- Position the balancer shaft in the press with special tool ①.

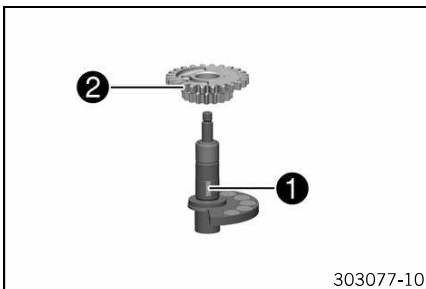
Separator plate (77229032000) (☛ p. 298)

- Mount special tool ②.

Protection cap (77229031000) (☛ p. 298)

- Press out the drive wheel of the balancer shaft.

18.4.11 Installing the drive wheel of the balancer shaft



- Ensure that spring washer ① is seated properly.
- Warm drive wheel ② of the balancer shaft and push it onto the balancer shaft.

Guideline

100 °C (212 °F)

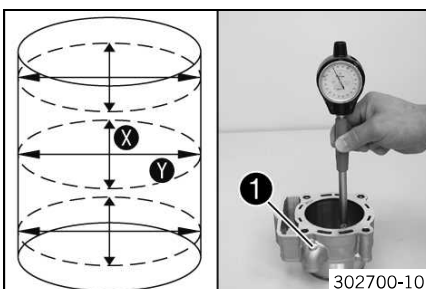
18.4.12 Cylinder - Nikasil® coating



Nikasil® is a surface protection layer for a coating procedure developed by Mahle. The name is derived from the two materials used in this procedure - a layer of nickel into which is embedded the particularly hard silicone carbide.

The most important advantages of the **Nikasil®** coating are very good heat conductivity, resulting in much improved performance, low wear, and a lightweight cylinder.

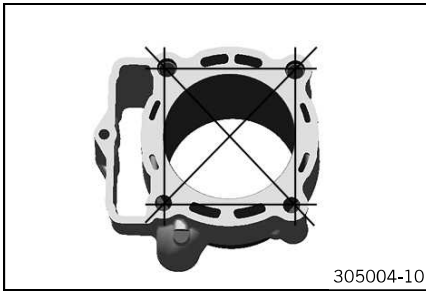
18.4.13 Checking/measuring the cylinder



- 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 locations on the X- and Y-axes using a micrometer to identify oval wear.

Guideline

Cylinder - drill hole diameter	
Size I	88.000... 88.012 mm (3.46456... 3.46503 in)
Size II	88.012... 88.025 mm (3.46503... 3.46554 in)



i Info

The cylinder size ❶ is marked on the cylinder collar.

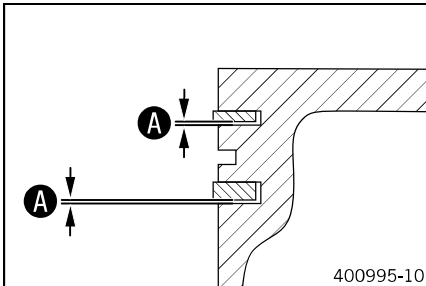
- Using a straightedge and the special tool, check the sealing area of the cylinder head for distortion.

Feeler gauge (59029041100) (☛ p. 294)

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

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

18.4.14 Checking/measuring the piston



- Use the special tool to measure clearance ❶ of the piston rings in the piston ring groove.

Guideline

Piston ring - groove clearance	≤ 0.08 mm (≤ 0.0031 in)
--------------------------------	-------------------------

Feeler gauge (59029041100) (☛ p. 294)

- » If play ❶ is larger than the specified value:
 - Change the piston and piston rings.
 - Check/measure the cylinder. (☛ p. 158)
- Check the piston sliding surface for damage.
 - » If the piston sliding surface is damaged:
 - Replace the piston and, if necessary, the cylinder.
- Check that the piston rings move easily in the piston ring grooves.
 - » If the piston ring is stiff:
 - Clean the piston ring groove.

i Tip

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

- Check the piston rings for damage.
 - » If the piston ring is damaged:
 - Replace the piston ring.

i Info

Mount the piston ring with the marking facing upward.

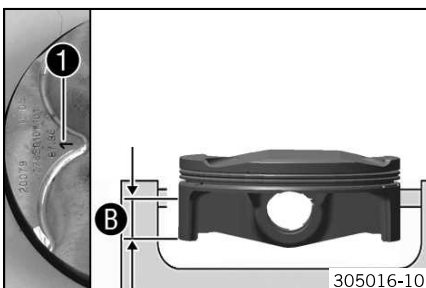
- Check the piston pins for discoloration or signs of wear.
 - » If the piston pin shows severe discoloration/signs of wear:
 - Change the piston pin.
- Place the piston pin in the connecting rod and check the seating for play.
 - » If the piston pin seating has excessive play:
 - Change the connecting rod and piston pin.
- Measure the piston at the piston skirt, at right angles to the piston pin, at a distance ❷.

Guideline

Distance ❷	27 mm (1.06 in)
Piston - diameter	
Size I	87.965... 87.975 mm (3.46318... 3.46358 in)
Size II	87.976... 87.985 mm (3.46362... 3.46397 in)

i Info

Piston dimensions ❶ are marked on the piston head.



18.4.15 Measuring the piston/cylinder mounting clearance

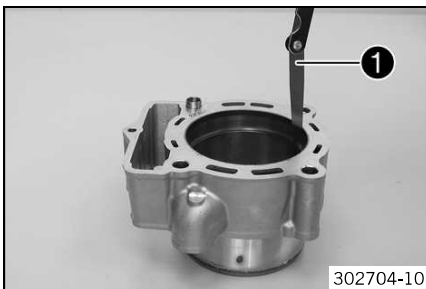


- Check/measure the cylinder. (☛ p. 158)
- Check/measure the piston. (☛ p. 159)
- The smallest piston/cylinder mounting clearance equals the smallest cylinder bore diameter minus the largest piston diameter. The largest piston/cylinder mounting clearance equals the largest cylinder bore diameter minus the smallest piston diameter.

Guideline

Piston/cylinder - mounting clearance	
Size I	0.025... 0.047 mm (0.00098... 0.00185 in)
Size II	0.027... 0.049 mm (0.00106... 0.00193 in)
Wear limit	0.070 mm (0.00276 in)

18.4.16 Checking the piston ring end gap



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

Guideline

Below the upper edge of the cylinder	20 mm (0.79 in)
--------------------------------------	-----------------

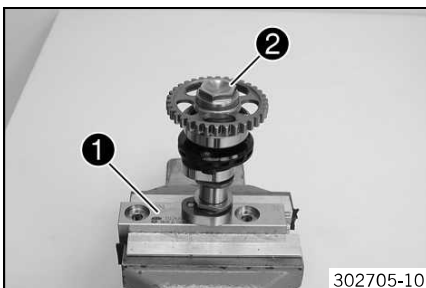
- Measure the end gap with feeler gauge **A**.

Guideline

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

- » If the end gap is greater than the specified measurement:
 - Check/measure the cylinder. (☛ p. 158)
- » If cylinder wear lies within the specified tolerance:
 - Change the piston ring.
- Mount the piston ring with the marking facing toward the piston head.

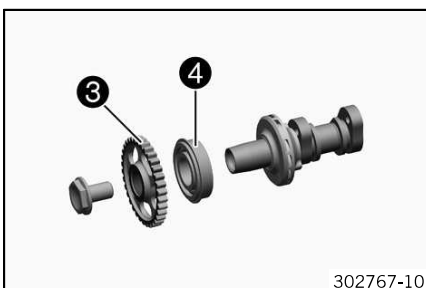
18.4.17 Changing the camshaft bearing



- Clamp special tool **1** into a vise.

Adjustment bush bridge (77229050044) (☛ p. 298)

- Mount the camshaft on the special tool.
- Remove screw **2**.



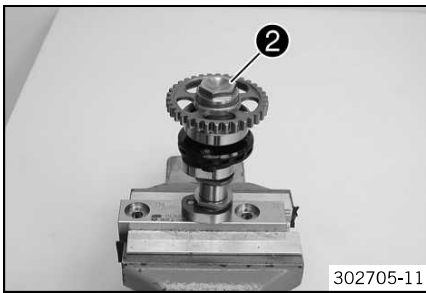
- Pull camshaft gear **3** off of the camshaft.

Extractor, camshaft gear (77229001044) (☛ p. 296)

- Remove bearing **4**.
- Oil the new bearing **4** and push it onto the camshaft.

Lubricated with engine oil

- Degrease the cone of the camshaft and camshaft gear.
- Mount camshaft gear **3**.



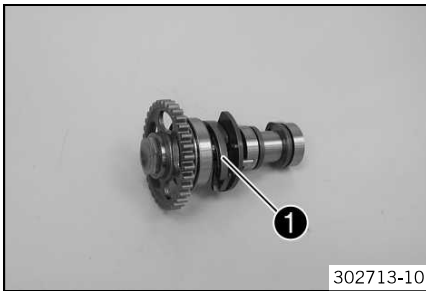
- Mount screw ② but do not tighten yet.

Guideline

Screw, camshaft drive sprocket	M12x1	70 Nm (51.6 lbf ft)	Loc-tite® 243™/cone degreased
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- Repeat these steps for the second camshaft.

18.4.18 Checking the camshafts

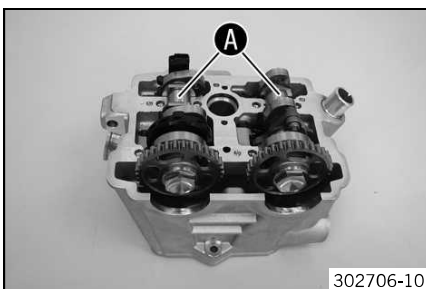


- Check the camshaft for damage and wear.
 - » If there is damage or wear:
 - Change the camshaft.
 - If the surface of the cams is damaged, check the oil supply to the camshaft and cam lever.
- Check the autodecompressor for damage and wear.
 - » If there is damage or wear:
 - Change the exhaust camshaft.
- Slide the camshaft bearing to the camshaft gear.
- Pull lever ① away from camshaft and release it.
 - » If the lever does not return to its original position:
 - Change the exhaust camshaft.

18.4.19 Checking the pivot points of the camshafts

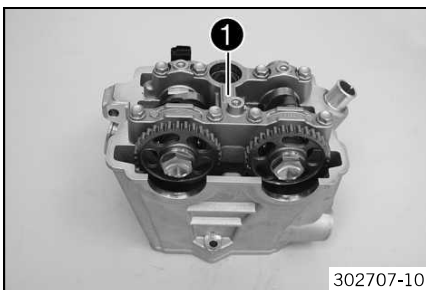


- Check the pivot points of the camshafts.
 - » If there is damage or wear:
 - Change the cylinder head with the camshaft bearing bridge.



- Position the camshafts.
 - ✓ The valves are not activated.
- Insert the **Plastigauge** clearance gauge in area ①.

Plastigauge measuring strips (60029012000) (☛ p. 294)



- Position camshaft bearing bridge ①. Mount and tighten the screws.

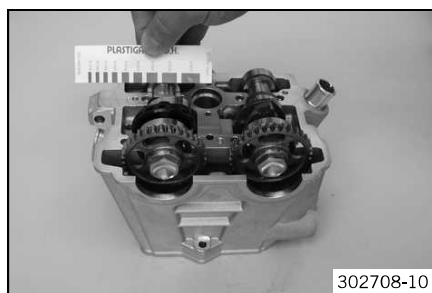
Guideline

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



Info

Ensure that the dowel pins are seated properly.
Do not turn the camshaft.



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

Guideline

Camshaft bearing - sleeve bearing	
Radial clearance	0.020... 0.054 mm (0.00079... 0.00213 in)
Wear limit	0.065 mm (0.00256 in)



Info

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

- Take off the camshafts and clean the parts.

18.4.20 Removing the valves



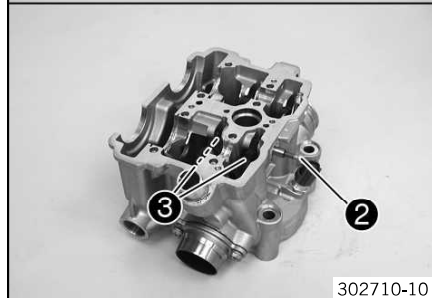
- Remove screw plugs ❶ with the O-ring.
- Screw appropriate screw ❷ into the cam lever shaft.
- Hold cam levers ❸ and remove the cam lever shaft.



Info

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

- Take the shims out of the valve spring retainers and lay them to one side according to their normal built-in position.

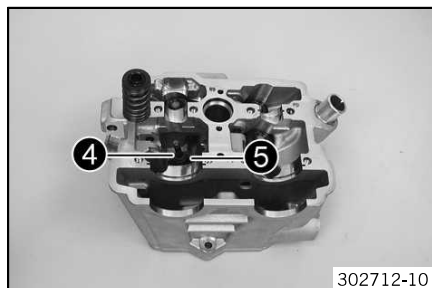


- Pre-tension the valve spring using the special tool.

Valve spring compressor (59029019000) (☛ p. 294)

Insert for valve spring lever (77229060000) (☛ p. 299)

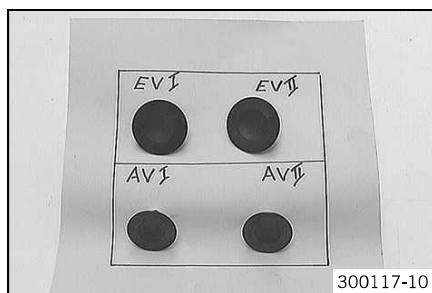
- Remove the valve keys and unload the valve spring.



- Remove the valve spring retainer and valve springs.
- Pull the valve down out of the valve guide.
- Remove valve stem seal ❹ with the special tool.

Pliers for valve stem seals (77229010000) (☛ p. 297)

- Remove valve spring seat ❺.



- Mark the valves according to their normal built-in position.

**Info**

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

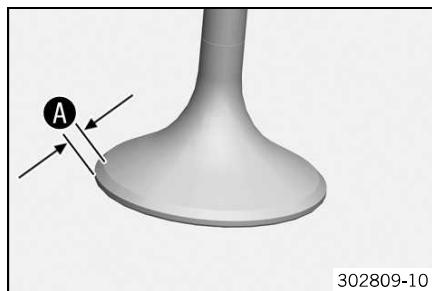
18.4.21 Checking the valves

- Check the valve plate for run-out.

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

» If the measured value does not meet specifications:

- Change the valve.



- Check sealing seat **A** on the valve.

Valve - sealing seat width	
Intake	1.40 mm (0.0551 in)

Valve - sealing seat width	
Exhaust	1.40 mm (0.0551 in)

» If the sealing seat is not centered on the valve seat or deviates from the specification:

- Rework the valve seat.

18.4.22 Checking the valve springs

- Check the valve springs for breakage and wear (visual check).

» If the valve spring is broken or worn:

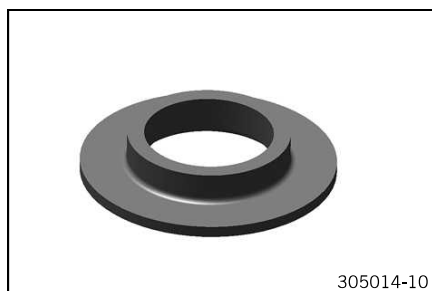
- Change the valve spring.

- Measure the length of the valve springs.

Valve spring	
Minimum length	41.10 mm (1.6181 in)

» If the measured value does not meet specifications:

- Change the valve springs.

18.4.23 Checking the valve spring seat

- Check the valve spring seat for breakage and wear (visual check).

» If the valve spring seat is broken or worn:

- Change the valve spring seat.

- Measure the thickness of the valve spring seat.

Valve spring seat - thickness	0.90... 1.10 mm (0.0354... 0.0433 in)
-------------------------------	---------------------------------------

» If the measured value does not meet specifications:

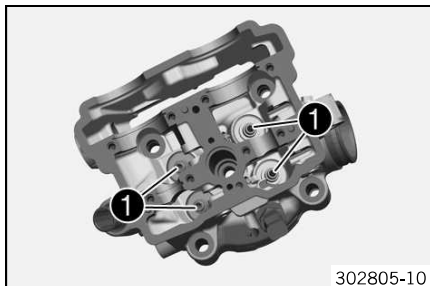
- Change the valve spring seat.

18.4.24 Checking the cam levers



- Check the cam levers and cam lever shafts for damage and wear.
 - » If there is damage or wear:
 - Change the cam levers and/or cam lever shafts.

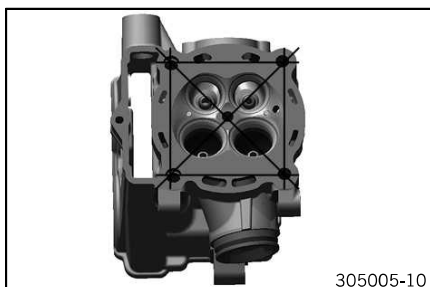
18.4.25 Checking the cylinder head



- Check valve guides ❶ using the special tool.

Limit plug gauge (77229026000) (☛ p. 297)

- » If the special tool is easy to insert in the valve guide:
 - Change the valve guide and valve.
- Check the sealing area of the spark plug thread and the valve seats from damage and cracking.
 - » If there is damage or cracking:
 - Change the cylinder head.

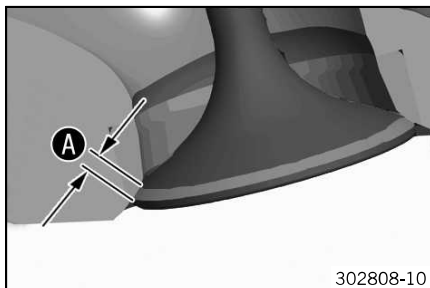


- Using a straightedge and the special tool, check the sealing area of the cylinder for distortion.

Feeler gauge (59029041100) (☛ p. 294)

Cylinder/cylinder head - distortion of sealing area	$\leq 0.10 \text{ mm } (\leq 0.0039 \text{ in})$
---	--

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



- Check sealing seat ❶ of the valves.

Valve - sealing seat width	
----------------------------	--

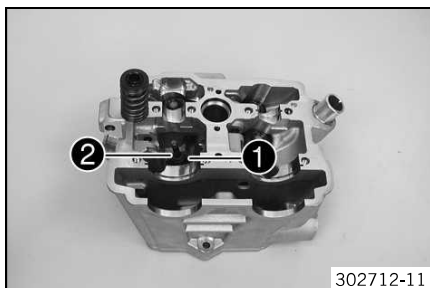
Intake	1.40 mm (0.0551 in)
--------	---------------------

Valve - sealing seat width	
----------------------------	--

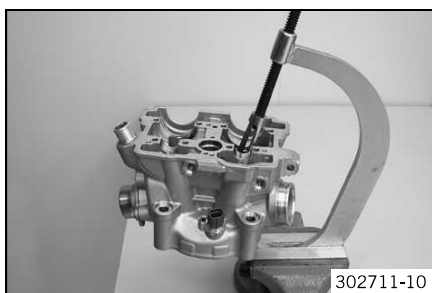
Exhaust	1.40 mm (0.0551 in)
---------	---------------------

- » If the measured value does not meet specifications:
 - Rework the valve seat.
- Blow compressed air through all oil channels and check that they are clear.

18.4.26 Installing the valves



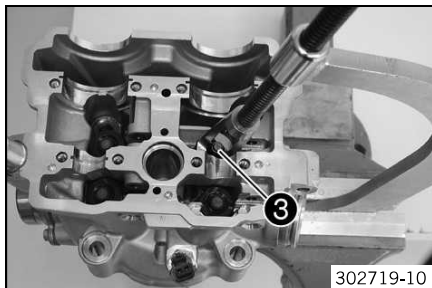
- Position valve spring seat ❶. Mount valve stem seal ❷.
- Mount the valve corresponding to its installation position.
- Mount the valve spring with the tighter coil facing downward.
- Mount the valve spring retainers.



- Pre-tension the valve spring using the special tool.

Valve spring compressor (59029019000) (☛ p. 294)

Insert for valve spring lever (77229060000) (☛ p. 299)

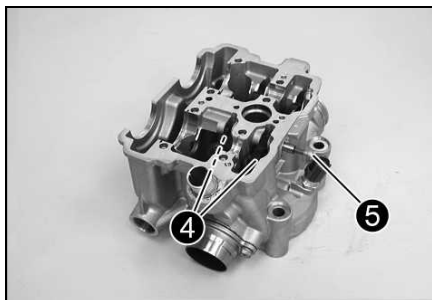


- Mount valve keys 3.



Info

When mounting the valve keys, ensure that they are seated properly; it is recommended to adhere the valve keys to the valves with a small amount of grease.



- Position cam levers 4 in the positions they had before they were removed.
- Mount the cam lever shafts.
- Remove screw 5.
- Mount and tighten screw plugs 6.

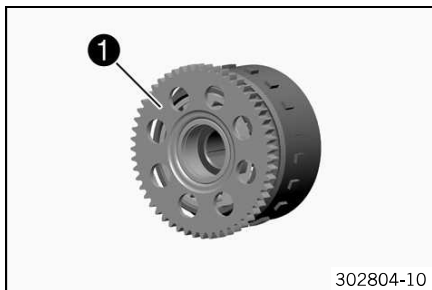
Guideline

Screw plug, cam lever axis	M10x1	10 Nm (7.4 lbf ft)
----------------------------	-------	--------------------

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

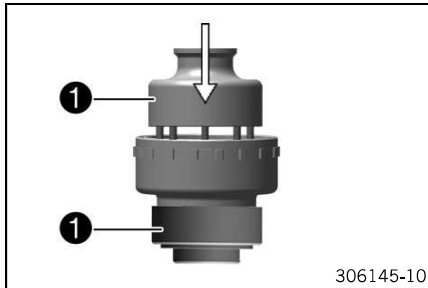


18.4.27 Checking the freewheel



- Insert freewheel gear 1 into the freewheel hub, turning the freewheel gear clockwise; do not wedge.
- Check the locking action of starter wheel 1.
 - » If the freewheel gear does not turn clockwise or if it does not lock counterclockwise:
 - Change the free wheel.

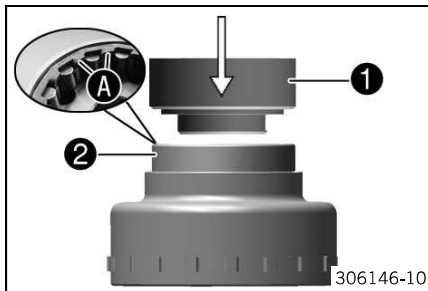
18.4.28 Changing the free wheel



- Position the rotor in the press with special tool 1.

Pressing tool for freewheel (77829083044) (p. 299)

- Press out the freewheel.



- Position the new freewheel 2 in the rotor.

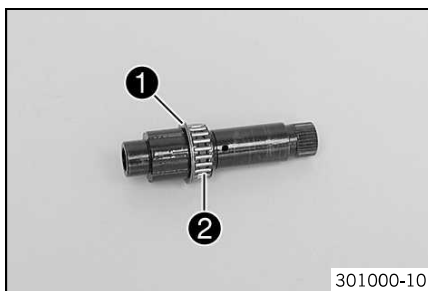
✓ Shift dogs A face upward.

- Position the rotor in the press with the freewheel and special tool 1.

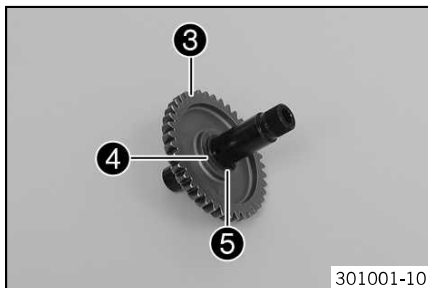
Pressing tool for freewheel (77829083044) (p. 299)

- Press the freewheel all the way in.

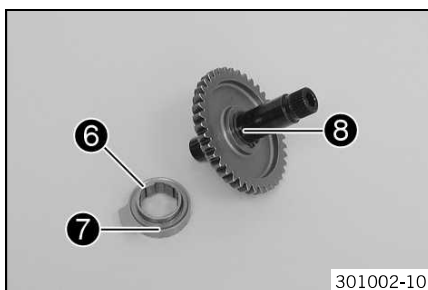
18.4.29 Preassembling the kick starter shaft



- Mount washer 1 and needle bearing 2.

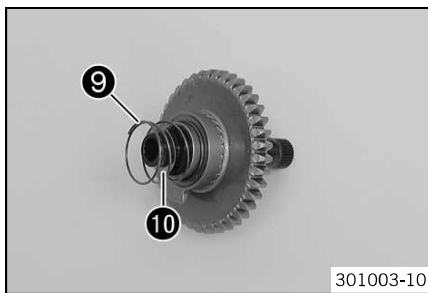


- Mount starter wheel 3.
- Mount washer 4 and lock ring 5.

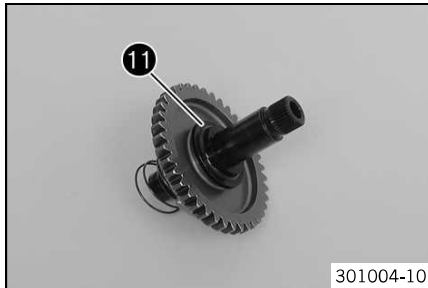


- Mount kick starter ratchet wheel 6.

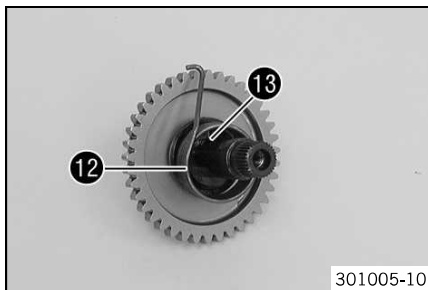
✓ Marking 7 points to drill hole 8.



- Position spring 9 and mount washer 10.

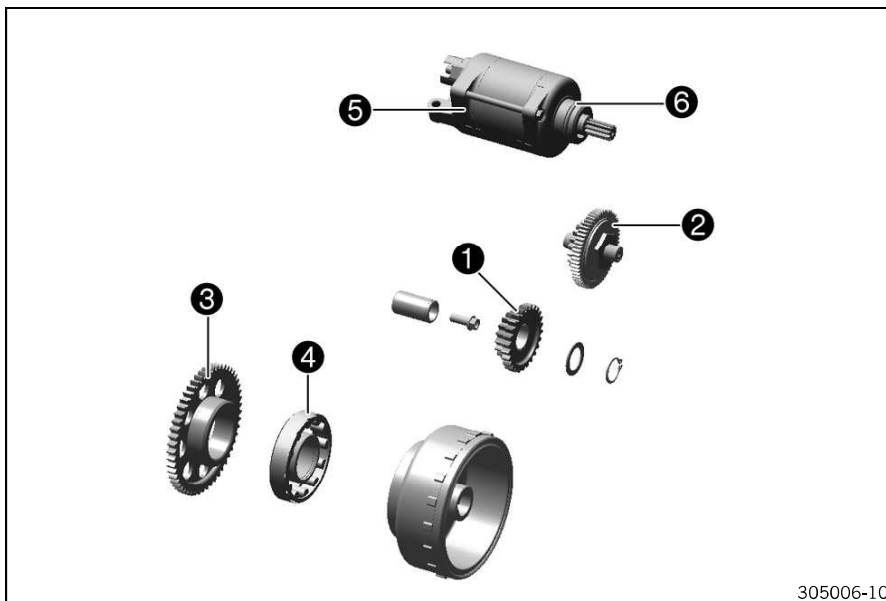


- Mount driving hub 11.



- Position kick starter spring 12 and hook it into drill hole 13.

18.4.30 Checking the electric starter drive

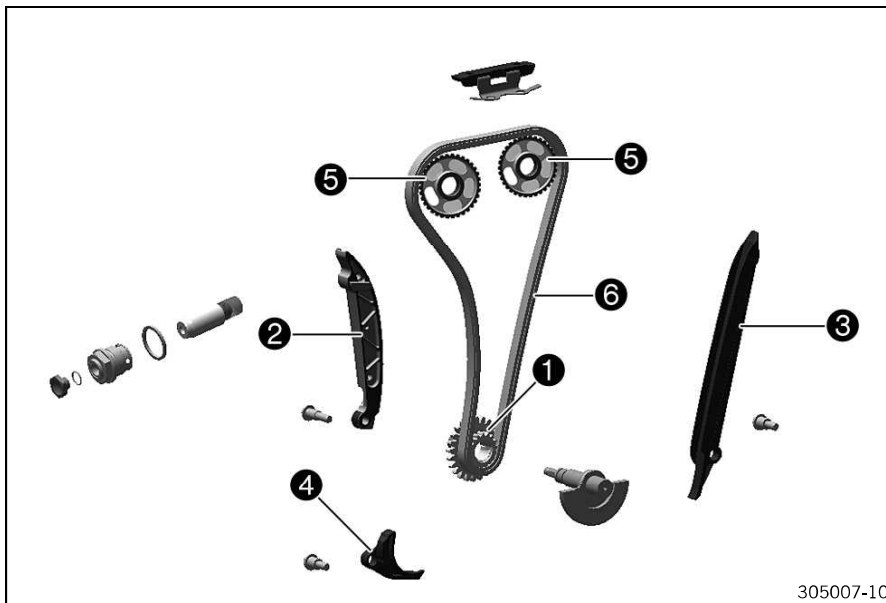


305006-10

- Check the gear mesh and bearing of starter idler gear 1 for damage and wear.
 - » If there is damage or wear:
 - Change the starter idler gear.
- Check the gear mesh and bearing of torque limiter 2 for damage and wear.
 - » If there is damage or wear:
 - Change the torque limiter.
- Check the gear mesh and bearing of freewheel gear 3 for damage and wear.

- » If there is damage or wear:
 - Change the freewheel gear or bearing.
- Check freewheel ④ for damage and wear.
 - » If there is damage or wear:
 - Change the free wheel.
- Check the gear mesh of starter motor ⑤ for damage and wear.
 - » If there is damage or wear:
 - Change the starter motor.
- Change O-ring ⑥ of the starter motor.
- Connect the negative cable of a 12 volt power supply to the housing of the starter motor. Connect the positive cable of the power supply briefly with the connector of the starter motor.
 - » If the starter motor does not turn when the circuit is closed:
 - Change the starter motor.

18.4.31 Checking the timing assembly



305007-10

- Check timing chain sprocket ① for damage and wear.
 - » If there is damage or wear:
 - Change the timing chain sprocket.
- Check the timing chain tensioning rail ② for damage and wear.
 - » If there is damage or wear:
 - Replace the timing chain tensioning rail.
- Check the timing chain guide rail ③ for damage and wear.
 - » If there is damage or wear:
 - Replace the timing chain guide rail.
- Check the timing chain securing guide ④ for damage and wear.
 - » If there is damage or wear:
 - Replace the timing chain securing guide.
- Check camshaft gears ⑤ for damage and wear.
 - » If there is damage or wear:
 - Change the camshaft gears.
- Check timing chain ⑥ for damage and wear.
 - » If there is damage or wear:
 - Replace the timing chain.
- Let the timing chain hang down freely. Check the timing chain links for smooth operation.
 - » The chain links no longer align in a straight line:

- Replace the timing chain.

18.4.32 Preparing the timing chain tensioner for installation



200171-10



200172-10

- Press the timing chain tensioner together completely.



Info

This requires some force, as the oil must be pressed out.

- Release the timing chain tensioner.
 - ✓ Without pressure, the timing chain tensioner expands fully.

- Place two compensating disks or similar aids next to the timing chain tensioner piston. This ensures that, when pressed in, the piston cannot go in all the way.

Guideline

Thickness of the compensating disks	2... 2.5 mm (0.08... 0.098 in)
-------------------------------------	--------------------------------

- Release the timing chain tensioner.
 - ✓ The detent mechanism engages and the piston remains in place.

Final position of the piston after engagement	3 mm (0.12 in)
---	----------------

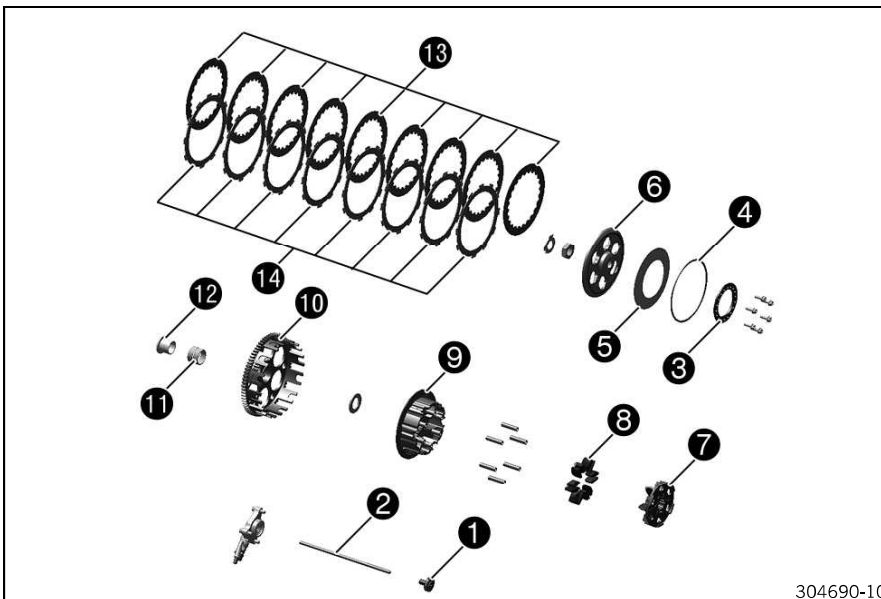


Info

This position is necessary for installation.

If the timing chain tensioner is now pressed again and is only extended a maximum of half way (it is prevented from extending completely). This locks the detent mechanism and the timing chain tensioner can no longer be squeezed together. This function is necessary in order to ensure sufficient timing chain tension even at low oil pressures.

18.4.33 Checking the clutch



304690-10

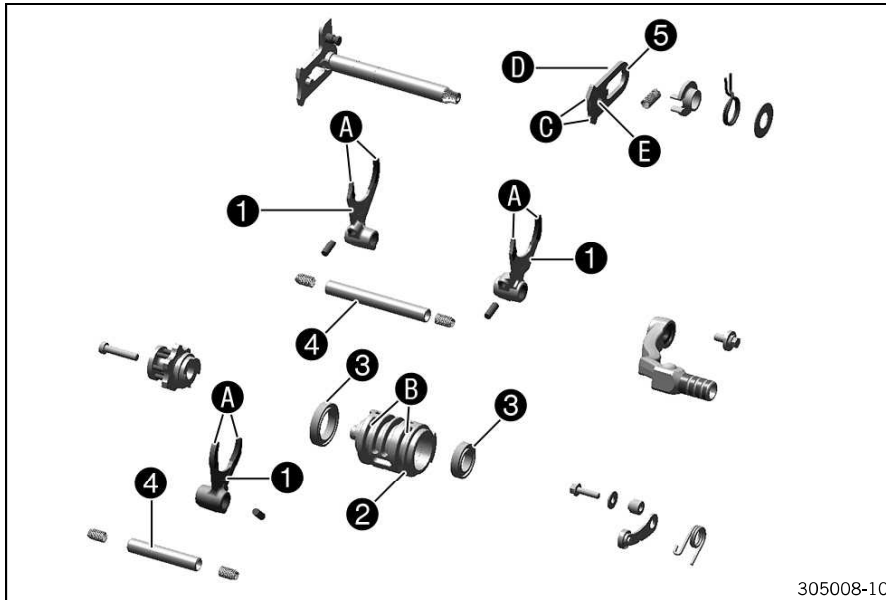
- Check the pressure piece ❶ for damage and wear.
 - » If there is damage or wear:
 - Change the pressure piece.
- Place push rod ❷ on a level surface and check for run-out.
 - » If there is run-out:
 - Change the push rod.

- Check spring retainer ③ for damage and wear.
 - » If there is damage or wear:
 - Change the spring retainer.
- Check the pretension ring ④ for damage and wear.
 - » If there is damage or wear:
 - Change the pretension ring.
- Check spring washer ⑤ for damage and wear.
 - » If there is damage or wear:
 - Change the spring washer.
- Check the thrust face of pressure cap ⑥ for damage and wear.
 - » If there is damage or wear:
 - Change the pressure cap.
- Check clutch center ⑦ for damage and wear.
 - » If there is damage or wear:
 - Change the clutch center.
- Check damping rubber ⑧ for damage and wear.
 - » If there is damage or wear:
 - Change the damping rubbers.
- Check the inner clutch hub ⑨ for damage and wear.
 - » If there is damage or wear:
 - Change the inner clutch hub.
- Check the contact surfaces of the clutch facing discs in outer clutch hub ⑩ for damage and wear.
 - » If there is damage or wear:
 - Change the clutch facing discs and the outer clutch hub.
- Check needle bearing ⑪ and collar sleeve ⑫ for damage and wear.
 - » If there is damage or wear:
 - Change the needle bearing and collar sleeve.
- Check the intermediate clutch discs ⑬ for damage and wear.
 - » If the intermediate discs are not flat or have punctiform outbreaks:
 - Change all intermediate discs.
- Check clutch facing discs ⑭ for discoloration and scoring.
 - » If there is discoloration or scoring:
 - Change all clutch facing discs.
- Check the thickness of clutch facing discs ⑭.

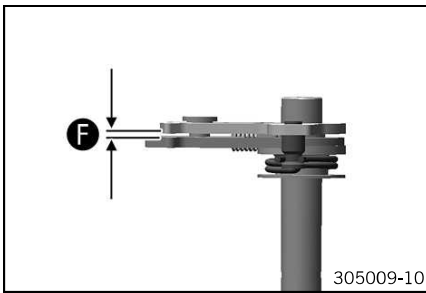
Clutch facing discs - thickness of total package	≥ 26.4 mm (≥ 1.039 in)
--	------------------------

- » If the clutch facing disc does not meet specifications:
 - Change all clutch facing discs.

18.4.34 Checking the shift mechanism



- Check shift forks **1** on disc **A** for damage and wear (visual check).
 - » If there is damage or wear:
 - Change the shift fork.
- Check shift grooves **B** of shift drum **2** for wear.
 - » If the shift groove is worn:
 - Change the shift drum.
- Check the seating of the shift drum in the grooved ball bearings **3**.
 - » If the shift drum is not correctly seated:
 - Change the shift drum and/or the grooved ball bearing.
- Check grooved ball bearing **3** for smooth operation and wear.
 - » If the grooved ball bearings are stiff or worn:
 - Change the grooved ball bearing.
- Check the shift rollers for damage and wear.
 - » If there is damage or wear:
 - Change the shift rollers.
- Check the springs of shift rails **4** for damage and wear.
 - » If the spring is damaged or worn:
 - Change the spring of the shift rail.
- Check the shift rails **4** for run-out on a flat surface.
 - » If there is run-out:
 - Change the shift rail.
- Check the shift rails for scoring, wear and smooth operation in the shift forks.
 - » If scoring or wear is present or of the shift fork is stiff:
 - Change the shift rail.
- Check sliding plate **5** for wear on contact areas **C**.
 - » If the sliding plate is worn:
 - Change the sliding plate.
- Check return surface **D** on the sliding plate for wear.
 - » If there is severe grooving:
 - Change the sliding plate.
- Check guide bolts **E** for firm seating and wear.
 - » If the guide bolts are loose or worn:
 - Change the sliding plate.

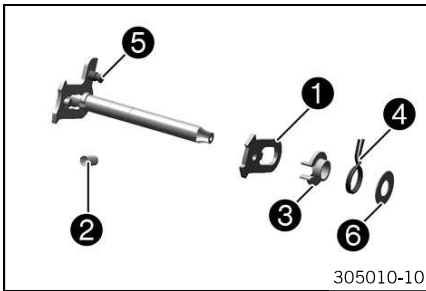


- Preassemble the shift shaft. (☛ p. 172)
- Check clearance **F** between the sliding plate and the shift quadrant.

Shift shaft - sliding plate/shift quadrant clearance	0.40... 0.80 mm (0.0157... 0.0315 in)
--	---------------------------------------

- » If the measured value does not meet specifications:
 - Change the sliding plate.

18.4.35 Preassembling the shift shaft



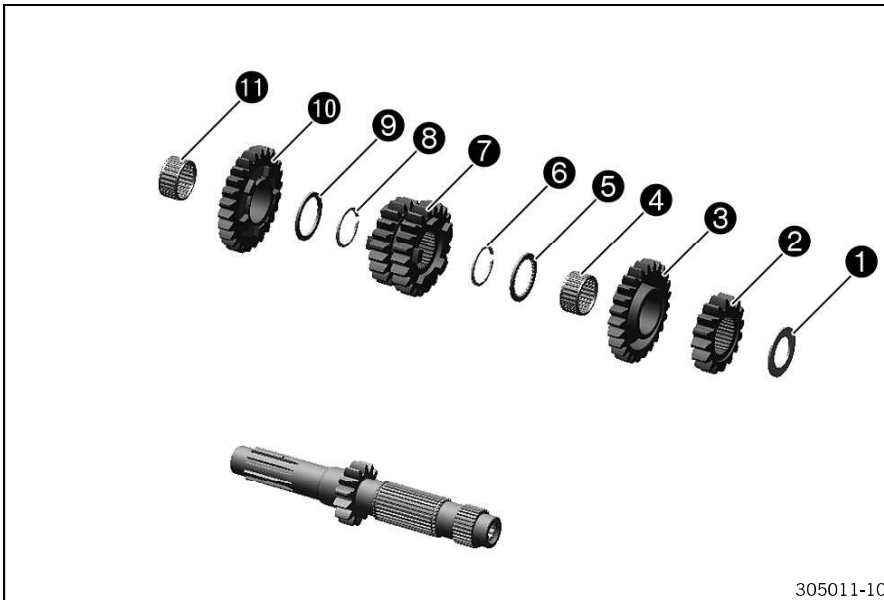
- Secure the short end of the shift shaft in the bench vise.

Guideline

Use soft jaws.

- Mount sliding plate **1** with the guide pin facing downward and put the guide pin on the shift quadrant.
- Mount pressure spring **2**.
- Slide on spring guide **3**, push return spring **4**, with the offset end facing upward, over the spring guide and lift the offset end over abutment bolt **5**.
- Mount washer **6**.

18.4.36 Disassembling the main shaft



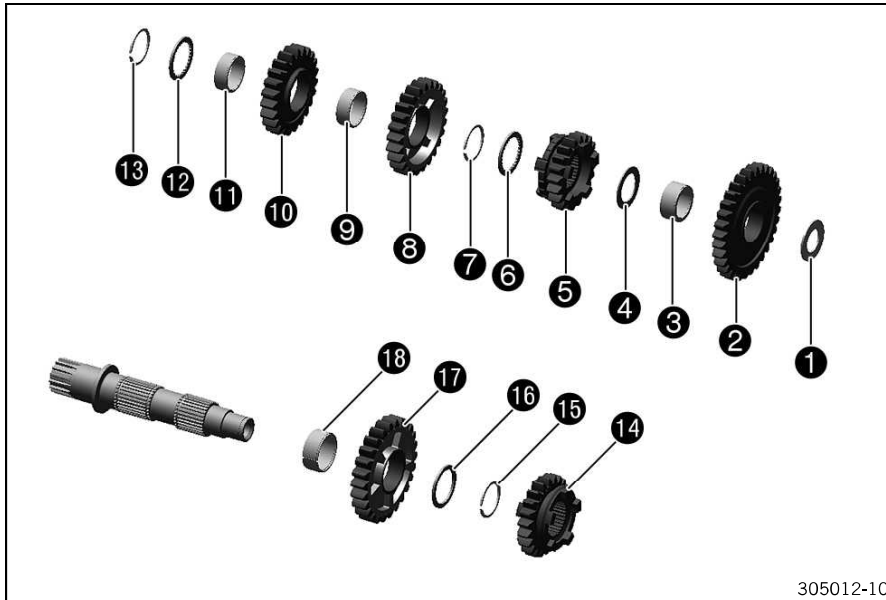
- Secure the main shaft with the toothed end facing downward in the vise.

Guideline

Use soft jaws.

- Remove stop disk **1** and 2nd-gear fixed gear **2**.
- Remove 5th-gear idler gear **3** and needle bearing **4**.
- Remove stop disk **5**.
- Remove lock ring **6**.
- Remove 3rd/4th-gear sliding gear **7**.
- Remove lock ring **8**.
- Remove stop disk **9**.
- Remove 6th-gear idler gear **10**.
- Remove needle bearing **11**.

18.4.37 Disassembling the countershaft



305012-10

- Fix the countershaft in the vice with the toothed end facing downward.

Guideline

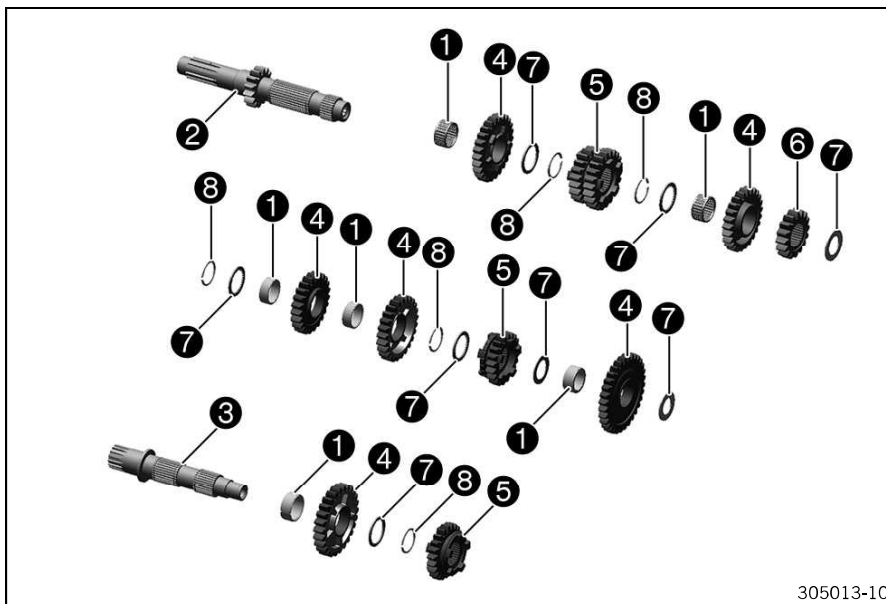
Use soft jaws

- Remove stop disk ① and 1st-gear idler gear ②.
- Remove needle bearing ③.
- Remove stop disk ④.
- Remove 6th-gear sliding gear ⑤.
- Remove stop disk ⑥.
- Remove lock ring ⑦.
- Remove 3rd-gear idler gear ⑧.
- Remove needle bearing ⑨.
- Remove 4th-gear idler gear ⑩.
- Remove needle bearing ⑪.
- Remove stop disk ⑫ and lock ring ⑬.
- Remove 5th-gear sliding gear ⑭.
- Remove lock ring ⑮.
- Remove stop disk ⑯.
- Remove the 2nd-gear idler gear ⑰.
- Remove needle bearing ⑱.

18.4.38 Checking the transmission

Condition

The transmission has been disassembled.



305013-10

- Check needle bearings ❶ for damage and wear.
 - » If there is damage or wear:
 - Change the needle bearings.
- 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 freely:
 - 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 freely:
 - Change the sliding gear or the countershaft.
- Check stop disks ❼ for damage and wear.
 - » If there is damage or wear:
 - Change the stop disks.
- Use new lock rings ❽ with every repair.

18.4.39 Assembling the main shaft

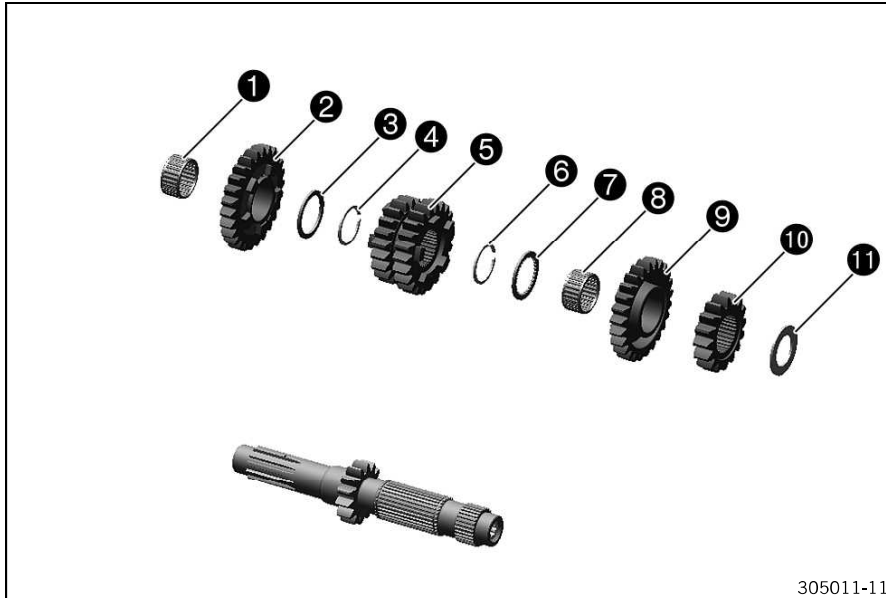


Info

Use new lock rings with every repair.

Preparatory work

- Carefully lubricate all parts before assembling.
- Check the transmission. (🔧 p. 173)



305011-11

Main work

- Secure the main shaft with the toothed end facing downward in the vise.

Guideline

Use soft jaws

- Mount needle bearing ❶.
- Mount 6th-gear idler gear ❷.
- Mount stop disk ❸ and lock ring ❹.
- Mount 3rd/4th-gear sliding gear ❺ with the small gear wheel facing downward.
- Mount lock ring ❻.
- Mount stop disk ❼.
- Mount needle bearing ❸.
- Mount 5th-gear idler gear ❾.
- Mount 2nd-gear fixed gear ❿ and stop disk ⓫.
- Finally, check all gear wheels for smooth operation.

18.4.40 Assembling the countershaft

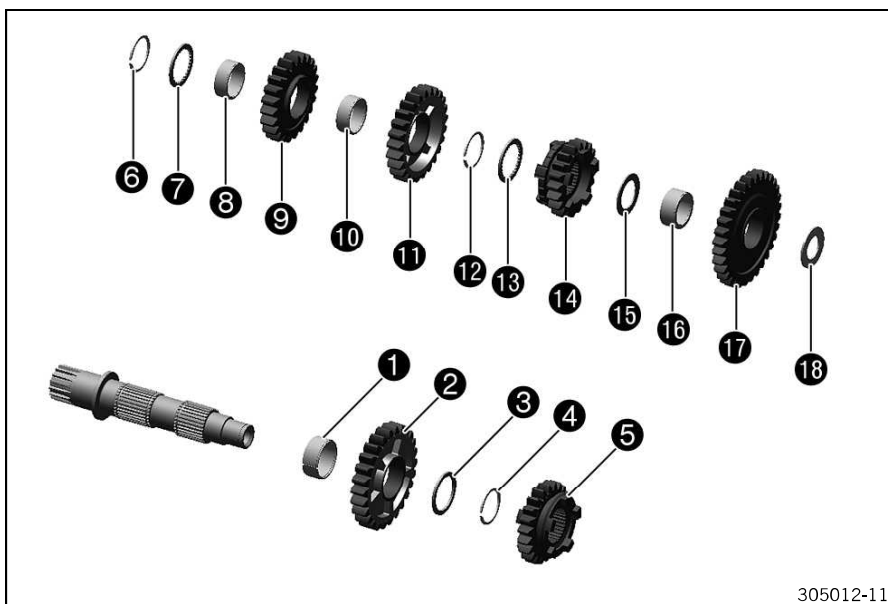


Info

Use new lock rings with every repair.

Preparatory work

- Carefully lubricate all parts before assembling.
- Check the transmission. (🔧 p. 173)



305012-11

Main work

- Fix the countershaft in the vice with the toothed end facing downward.

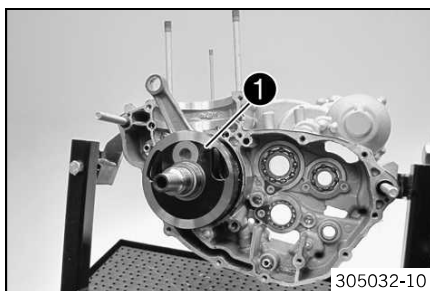
Guideline

Use soft jaws

- Mount needle bearing ①.
- Mount 2nd-gear idler gear ②.
- Mount stop disk ③ and lock ring ④.
- Mount 5th-gear sliding gear ⑤ with the shift groove facing up.
- Mount lock ring ⑥ and stop disk ⑦.
- Mount needle bearing ⑧.
- Mount 4th-gear idler gear ⑨.
- Mount needle bearing ⑩.
- Mount 3rd-gear idler gear ⑪.
- Mount lock ring ⑫ and stop disk ⑬.
- Mount 6th-gear sliding gear ⑭ with the shift groove facing downward.
- Mount stop disk ⑮.
- Mount needle bearing ⑯.
- Mount 1st-gear idler gear ⑰.
- Mount stop disk ⑱.
- Finally, check all gear wheels for smooth operation.

18.5 Engine assembly

18.5.1 Installing the crankshaft



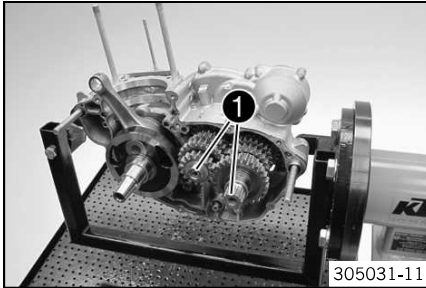
305032-10

- Position the right section of the engine case in the engine work stand.
- Oil the bearing.

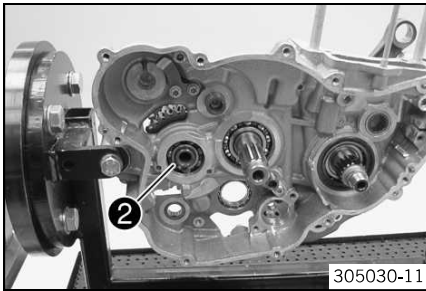
Engine oil (SAE 10W/50) (☛ p. 288)

- Push crankshaft ① into the bearing seat.

18.5.2 Installing the transmission shafts

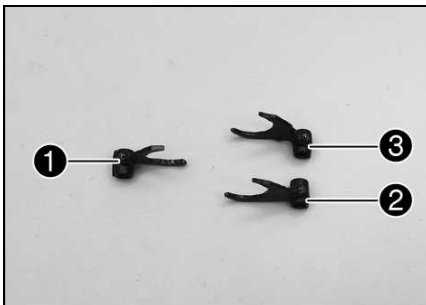


- Oil the bearing.
- Slide both transmission shafts ❶ into the bearing seats together.



- Mount lock ring ❷.

18.5.3 Installing the shift forks

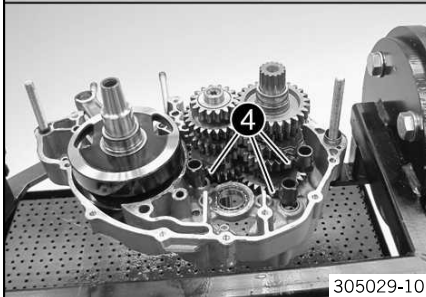


- Shift fork ❶ has a smaller inside diameter; mount this in the shift groove of the main shaft.
- Mount shift fork ❷ in the lower shift groove of the countershaft.
- Mount shift fork ❸ in the upper shift groove of the countershaft.
- Slide on shift rollers ❹.

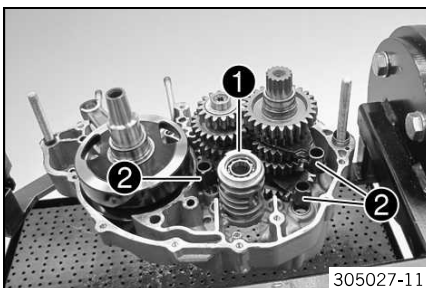


Tip

Fix the shift rollers in the shift forks with grease.



18.5.4 Installing the shift drum



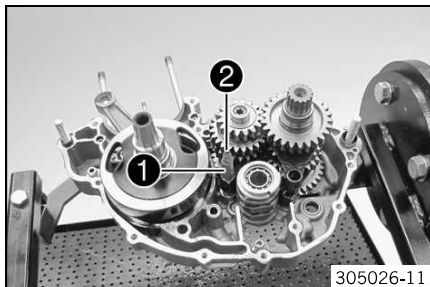
- Push shift drum ❶ into the bearing seat.
- Put shift forks ❷ in the shift drum.



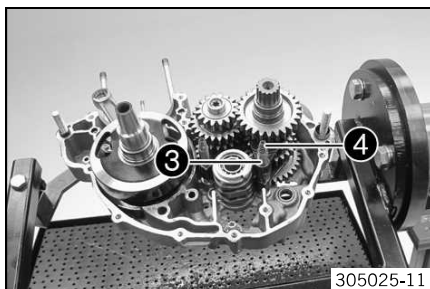
Info

Do not misplace the shift rollers.

18.5.5 Installing the shift rails

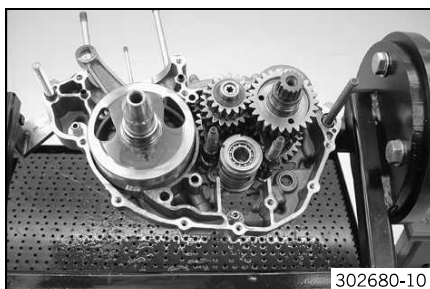


- Install shift rail ❶ together with upper spring ❷ and the lower spring.



- Install shift rail ❸ together with upper spring ❹.

18.5.6 Installing the left engine case

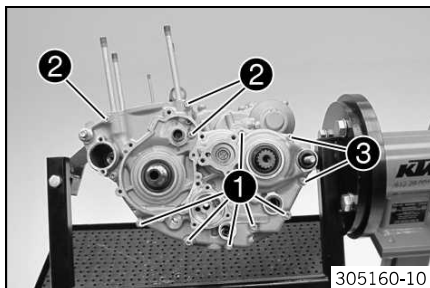


- Mount the dowels.
- Degrease the sealing area. Apply the sealing compound to the left section of the engine case.

Loctite® 5910

- Mount the special tool on the crankshaft.

Mounting sleeve (77229005000) (☛ p. 296)



- Mount the left section of the engine case. If necessary, strike it lightly with a rubber mallet and turn the transmission shafts.

**Info**

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

- Mount screws ❶ but do not tighten yet.

Guideline

Screw, engine case	M6x55	10 Nm (7.4 lbf ft)
--------------------	-------	--------------------

- Mount screws ❷ but do not tighten them yet.

Guideline

Screw, engine case	M6x65	10 Nm (7.4 lbf ft)
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- Mount screws ❸ but do not tighten them yet.

Guideline

Screw, engine case	M6x85	10 Nm (7.4 lbf ft)
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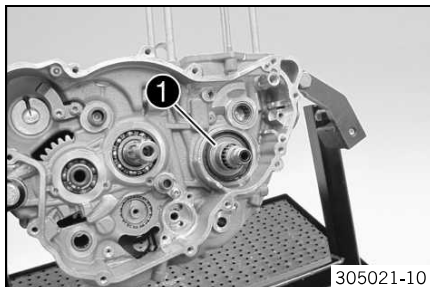
- Tighten screws ❶, ❷, and ❸.

Guideline

Screw, engine case	M6	10 Nm (7.4 lbf ft)
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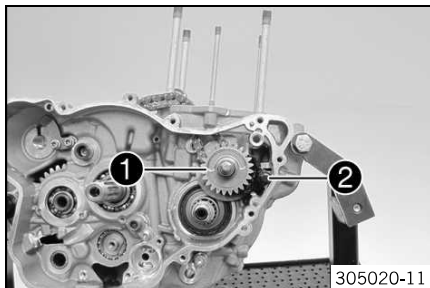
- Mount the screw connection of the engine fixing arm.

18.5.7 Installing the spacer



- Grease the shaft seal ring.
Long-life grease (☛ p. 290)
- Mount spacer ①.

18.5.8 Installing the timing chain



- Mount balancer shaft ① with the timing chain and timing chain securing guide.

i Info

If the timing chain was used before, ensure it is running in the correct direction.

- Mount and tighten screw ②.

Guideline

Screw, timing chain securing guide	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
------------------------------------	----	-----------------------	---------------

- Position timing chain guide rail ③.
- Mount and tighten screw ④.

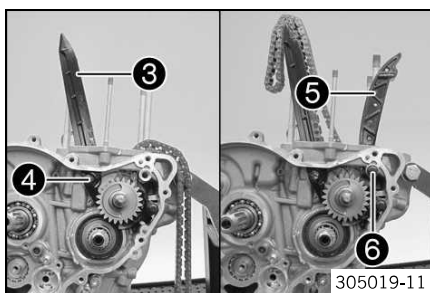
Guideline

Screw, timing chain guide rail	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
--------------------------------	----	-----------------------	---------------

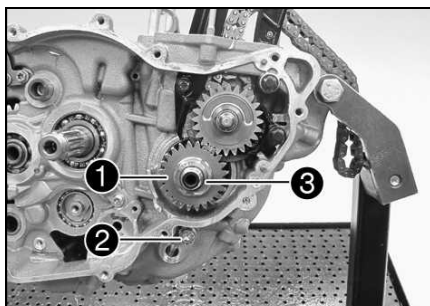
- Position timing chain tensioning rail ⑤.
- Mount and tighten screw ⑥.

Guideline

Screw, timing chain tensioning rail	M8	15 Nm (11.1 lbf ft)	Loctite® 243™
-------------------------------------	----	------------------------	---------------



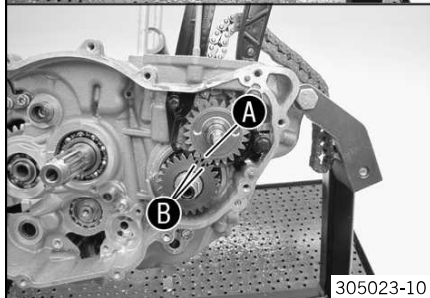
18.5.9 Installing the primary gear



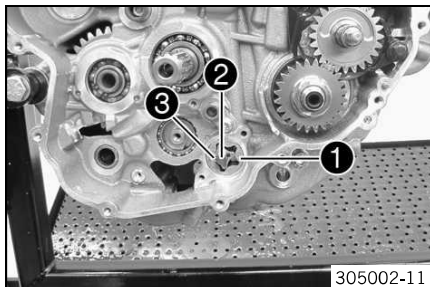
- Position primary gear ①.
 - ✓ The wide tooth of the primary gear engages in the wide recess of the crankshaft.
 - ✓ Markings A and B are aligned.
- Set the crankshaft to top dead center and lock it with screw ②.
- Mount and tighten nut ③.

Guideline

Nut, primary gear	M18LHx1.5	100 Nm (73.8 lbf ft)	Loctite® 243™
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18.5.10 Installing the force pump

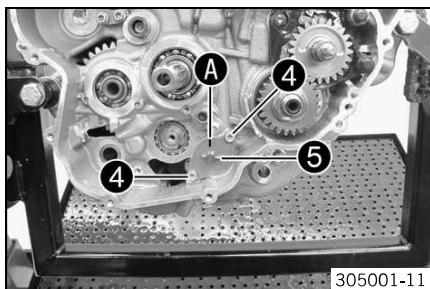


- Oil the oil pump shaft, internal rotor and external rotor before assembly.
- Position force pump ①.

**Info**

The rounded side of the force pump faces the engine case.

- Mount oil pump shaft ② from below.
- Mount pin ③.

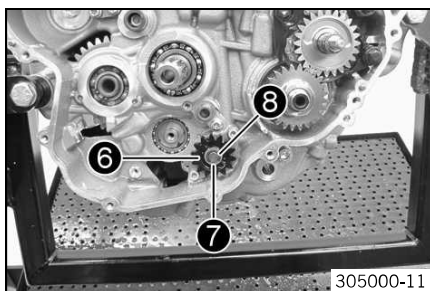


- Position the oil pump cover.
- ✓ Marking A faces upward.
- Mount and tighten screws ④.

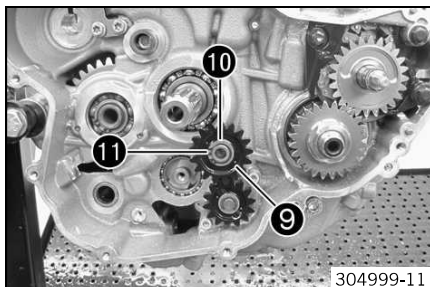
Guideline

Screw, oil pump cover	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
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- Insert pin ⑤.

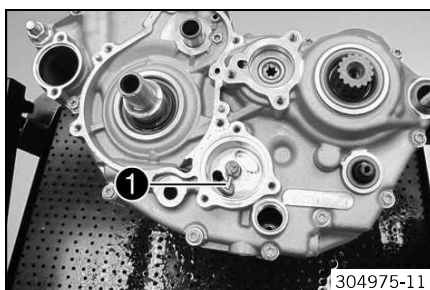


- Position oil pump gear wheel ⑥.
- Mount washer ⑦.
- Mount lock ring ⑧.
- Crank the oil pump gear wheel and ensure that it can move easily.

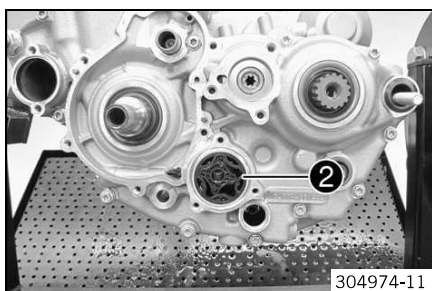


- Mount oil pump idler gear ⑨ with the washer.
- Mount washers ⑩.
- Mount lock ring ⑪.

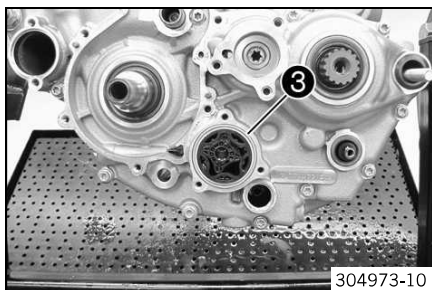
18.5.11 Installing the suction pump



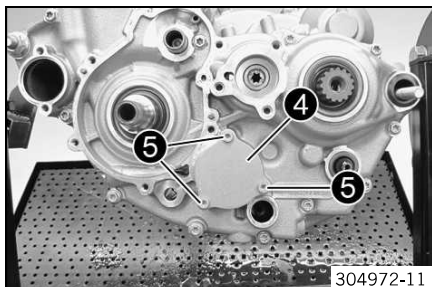
- Insert needle roller ①.



- Position suction pump ②.
- Crank the oil pump gear wheel and ensure that it can move easily.



- Mount O-ring ③.

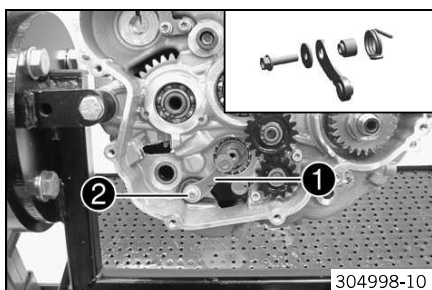


- Position oil pump cover ④.
- Mount and tighten screws ⑤.

Guideline

Screw, oil pump cover	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
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18.5.12 Installing the locking lever

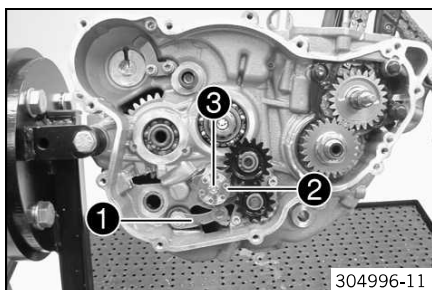


- Mount locking lever ① with the washer, sleeve and spring.
- Mount and tighten screw ②.

Guideline

Screw, locking lever	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
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18.5.13 Installing the shift drum locating unit



- Push away locking lever ① from the shift drum locating unit and position the shift drum locating unit ②.



Info

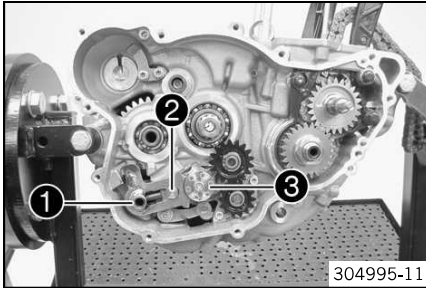
The flat areas of the shift drum locating unit are not symmetric.

- Relieve tension from the locking lever.
- Mount and tighten screw ③.

Guideline

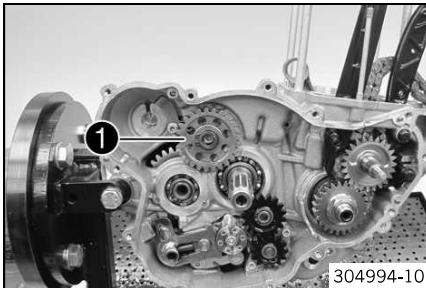
Screw, shift drum locating	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
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18.5.14 Installing the shift shaft



- Slide shift shaft ① with the washer into the bearing seat.
- Push sliding plate ② away from the shift drum locating unit ③. Insert the shift shaft all the way.
- Let the sliding plate engage in the shift drum locating unit.
- Shift through the transmission.

18.5.15 Installing the intermediate kick starter gear



- Slide on intermediate kick starter gear ① with the collar facing the engine case.
- Position the washer and mount the lock ring.

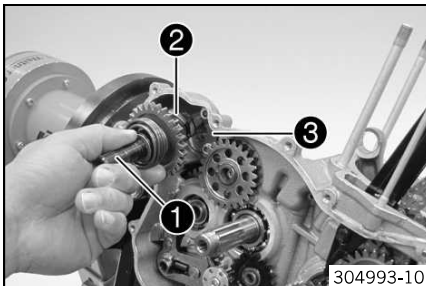
18.5.16 Installing the kick starter shaft

Preparatory work

- Preassemble the kick starter shaft. (☛ p. 166)

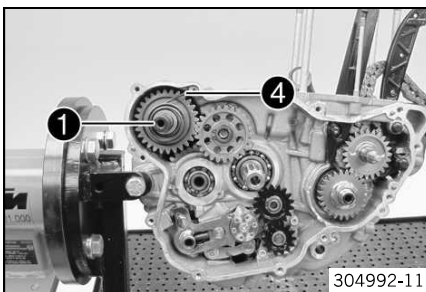
Main work

- Slide the premounted kick starter shaft ① into the bearing seat.



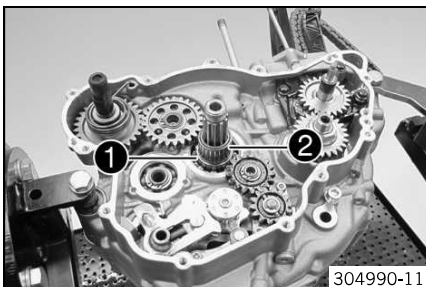
Info

The kick starter ratchet wheel ② should not be in contact with stop plate ③.

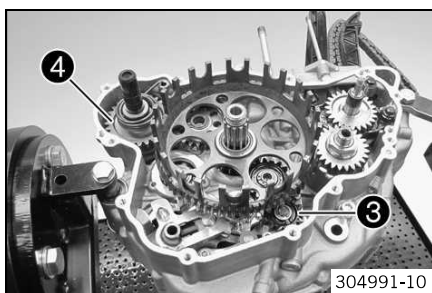


- Turn kick starter shaft ① clockwise all the way.
- Tension kick starter spring ④ and attach.

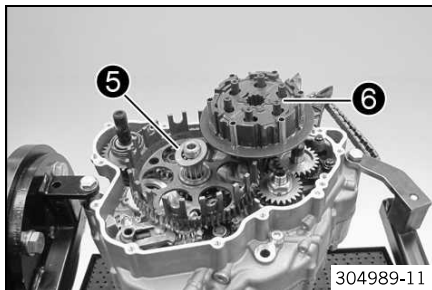
18.5.17 Installing the outer clutch hub



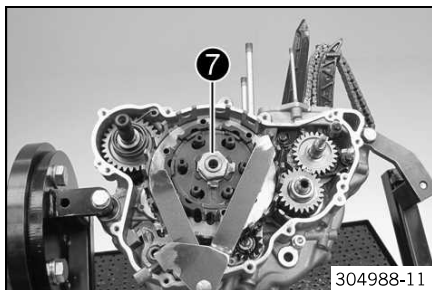
- Mount collar sleeve ① and both needle bearings ②.



- Slide the outer clutch hub onto the gearbox main shaft. Turn oil pump gear ③ and kick starter gear ④ until the teeth of the outer clutch hub mesh.



- Slide on washer ⑤ and inner clutch hub ⑥.



- Position the new lock washer and mount nut ⑦. Tighten the nut, holding the inner clutch hub with a special tool.

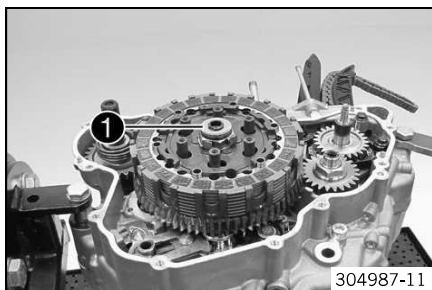
Guideline

Nut, inner clutch hub	M18x1.5	100 Nm (73.8 lbf ft)	Loctite® 243™
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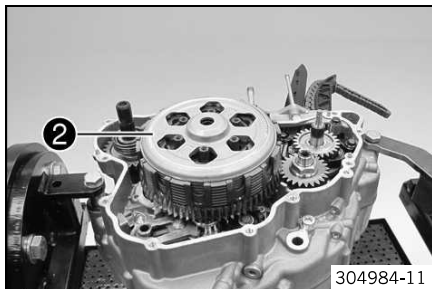
Clutch holder (51129003000) (☛ p. 293)

- Secure the nut with the lock washer.

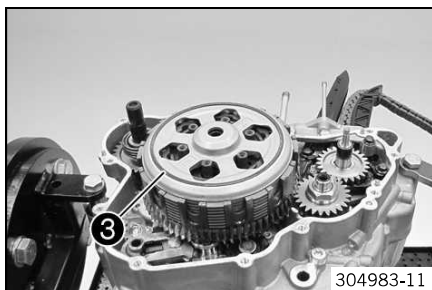
18.5.18 Installing the clutch discs



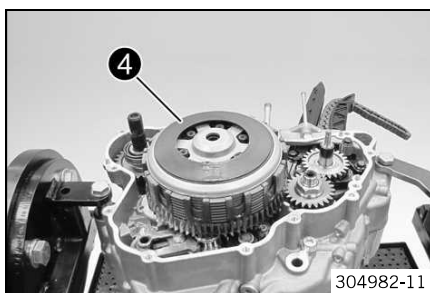
- Thoroughly oil the clutch facing discs.
- Beginning with an intermediate clutch disc, alternately insert all other clutch facing discs and intermediate clutch discs into the clutch basket.
- Mount pressure piece ①.



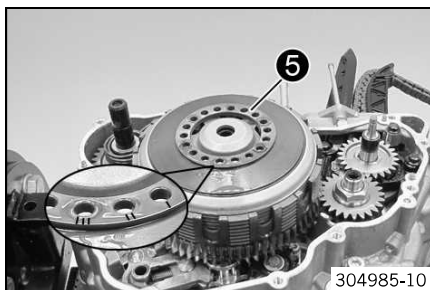
- Position pressure cap ②.



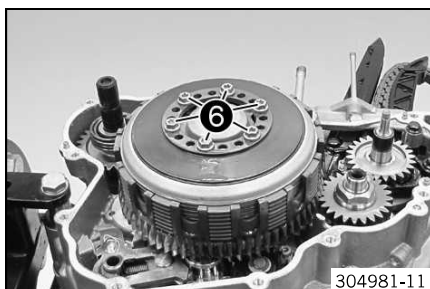
- Mount pretension ring ③ with the **Top** marking facing up.



- Position spring washer ④.



- Position spring retainer ⑤ with the I marking.



- Install the screws ⑥ and tighten them diagonally.

Guideline

Screw, clutch spring	M5	6 Nm (4.4 lbf ft)
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- Using a straightedge and the special tool, check the spring washer for distortion.

Feeler gauge (59029041100) (☛ p. 294)

Spring washer distortion	0... 0.10 mm (0... 0.0039 in)
--------------------------	-------------------------------

» If the specified value is not reached:

- Remove screws ⑥ and mount spring retainer with marking II.

- Using a straightedge and the special tool, check the spring washer for distortion.

Feeler gauge (59029041100) (☛ p. 294)

Spring washer distortion	0... 0.10 mm (0... 0.0039 in)
--------------------------	-------------------------------

» If the specified value is not reached:

- Remove screws ⑥ and mount spring retainer with marking III.

- Using a straightedge and the special tool, check the spring washer for distortion.

Feeler gauge (59029041100) (☛ p. 294)

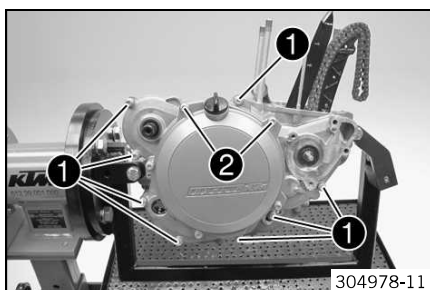
Spring washer distortion	0... 0.10 mm (0... 0.0039 in)
--------------------------	-------------------------------

» If the specified value is not reached:

- Change the clutch facing discs.



18.5.19 Installing the clutch cover



- Put on the clutch cover gasket.



Info

Ensure that the dowel pins are seated properly.

- Position the clutch cover.
- Mount screws ① but do not tighten yet.

Guideline

Screw, clutch cover	M6x25	10 Nm (7.4 lbf ft)
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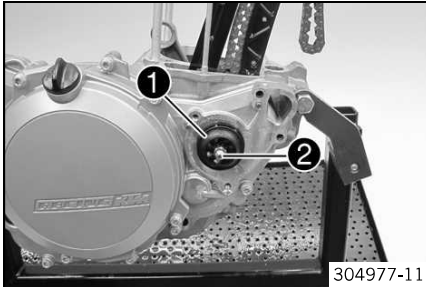
- Mount screws ❷ but do not tighten them yet.

Guideline

Screw, clutch cover	M6x40	10 Nm (7.4 lbf ft)
---------------------	-------	--------------------

- Tighten all screws in a crisscross pattern.

18.5.20 Installing the water pump cover

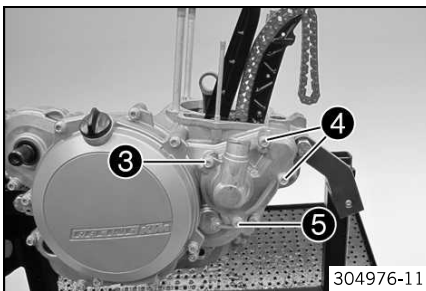


- Mount the two-part water pump impeller ❶.

- Mount and tighten nut ❷.

Guideline

Nut, water-pump wheel	M6	6 Nm (4.4 lbf ft)	Loctite® 243™
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- Mount the water pump cover with the seal ring.



Info

Ensure that the dowel pins are seated properly.

- Mount screw ❸ but do not tighten yet.

Guideline

Screw, water pump cover	M6x25	10 Nm (7.4 lbf ft)
-------------------------	-------	--------------------

- Mount screws ❹ but do not tighten them yet.

Guideline

Screw, water pump cover	M6x40	10 Nm (7.4 lbf ft)
-------------------------	-------	--------------------

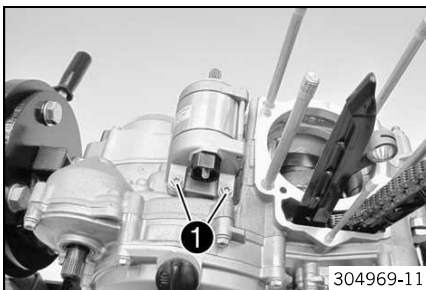
- Mount screw ❺ with the washer but do not tighten yet.

Guideline

Screw, water pump cover	M6x25	10 Nm (7.4 lbf ft)
-------------------------	-------	--------------------

- Tighten all screws in a crisscross pattern.

18.5.21 Installing the starter drive



- Grease the O-ring of the starter motor.

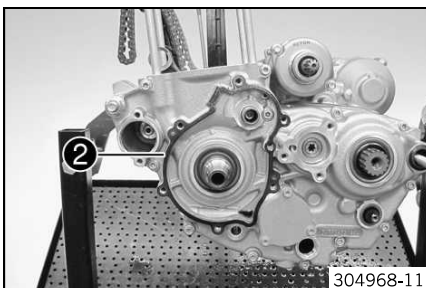
Long-life grease (☛ p. 290)

- Position the starter motor.

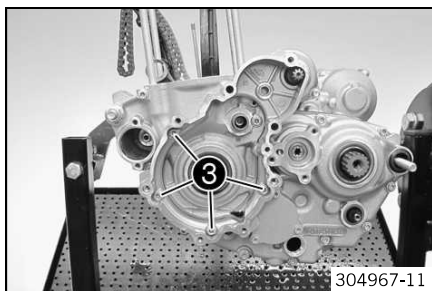
- Mount screws ❶ but do not tighten yet.

Guideline

Screw, starter motor	M6	10 Nm (7.4 lbf ft)
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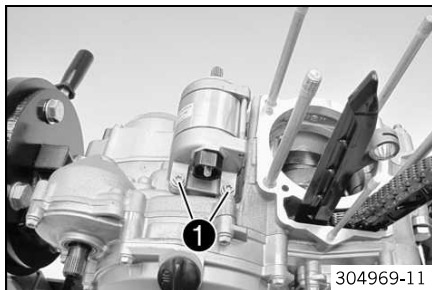
- Put on gasket ❷.



- Position the inside alternator cover.
- Mount and tighten screws ③.

Guideline

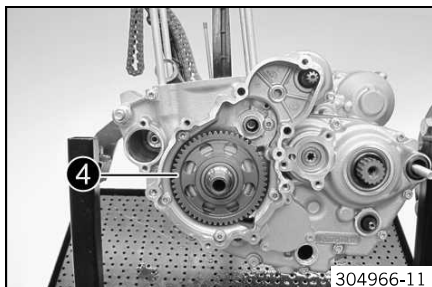
Screw, inside alternator cover	M6	6 Nm (4.4 lbf ft)
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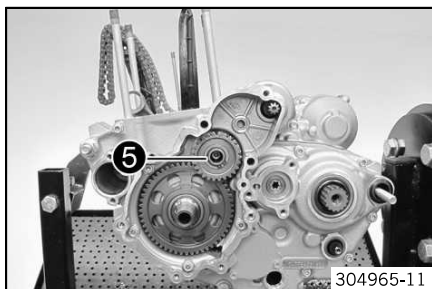
- Mount screws ① but do not tighten yet.

Guideline

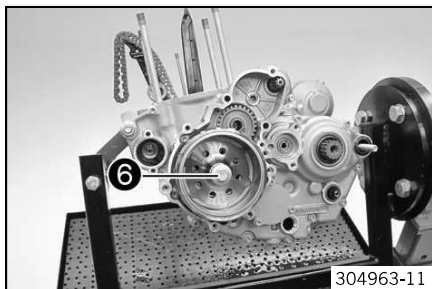
Screw, starter motor	M6	10 Nm (7.4 lbf ft)
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- Position freewheel gear ④.



- Mount the starter idler gear with the washer.
- Mount lock ring ⑤.



- Position the rotor.



Info

Ensure that the spring washer is seated properly.

- Mount and tighten screw ⑥.

Guideline

Rotor screw	M10x1	70 Nm (51.6 lbf ft)	Thread, oiled with engine oil/cone degreased
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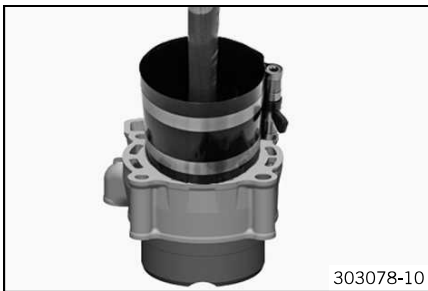
18.5.22 Installing the piston



- Shift the joint of the piston rings by 120°.
- Place the special tool on the oiled piston. Compress the piston rings using the special tool.

Piston ring mounting tool (60029015000) (☛ p. 295)

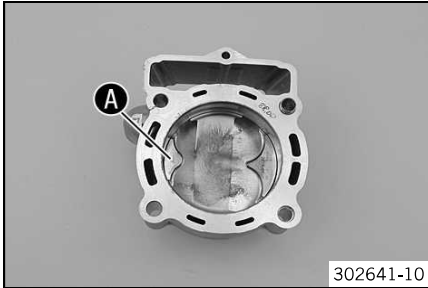
- ✓ The piston rings are pushed together all the way.



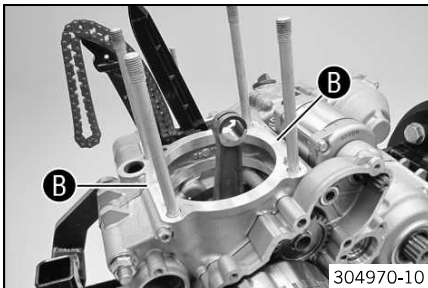
- Position the piston on the cylinder using the special tool.
- Push the piston carefully into the cylinder from above.


Info

The piston rings should not catch or they will be damaged.



- Ensure that piston mark **A** faces the exhaust side.



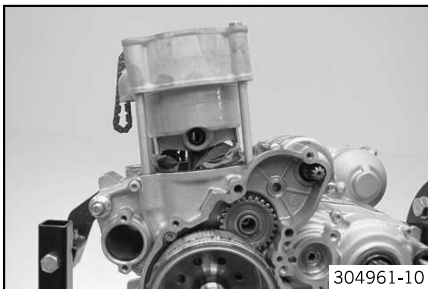
- Apply a thin layer of sealing compound in area **B**.

Loctite® 5910

- Place the cylinder base gasket on.


Info

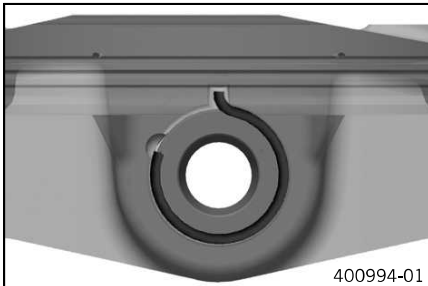
Ensure that the dowel pins are seated properly.



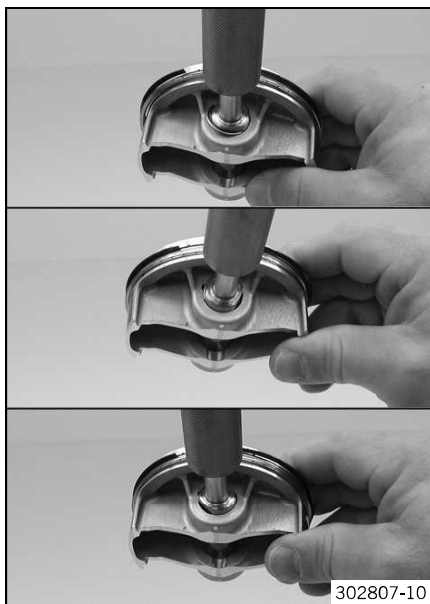
- Cover the engine case opening with a cloth. Thread the timing chain through the chain shaft. Mount the piston pin.


Info

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



- Position the piston pin retainer.



302807-10

- Insert the special tool and press it forcefully to the piston.
- Turn the special tool clockwise, thereby pushing the piston pin retainer into the groove.

Insertion for piston ring lock (77229030000) (☛ p. 297)

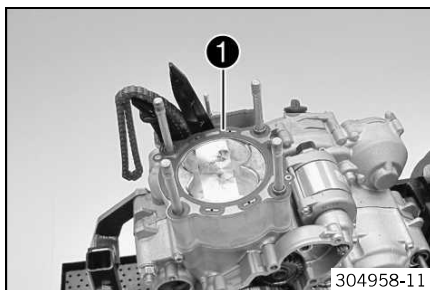
- Ensure that the piston pin retainer is seated properly on both sides.



304962-10

- Remove the cloth.
- Keep the timing chain taut. Push the cylinder down carefully and let the dowel pins engage.

18.5.23 Installing the cylinder head



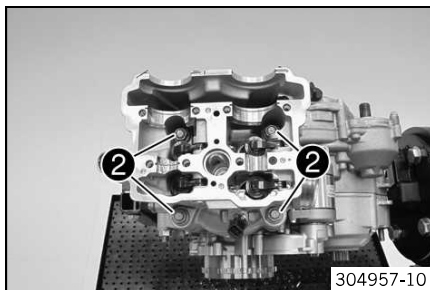
304958-11

- Position cylinder head gasket ❶.

i Info

Ensure that the dowels are seated properly.

- Put the cylinder head in place.

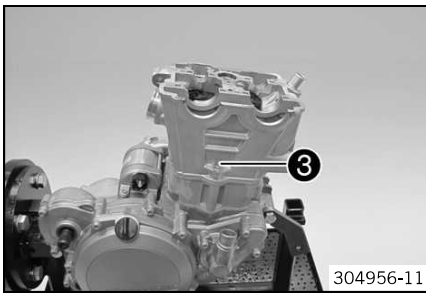


304957-10

- Mount nut ❷ with the washers and tighten in a crisscross pattern.

Guideline

Nut, cylinder head	M10x1.25	Tightening sequence: Tighten diagonally. 1st tightening stage 10 Nm (7.4 lbf ft) 2nd tightening stage 30 Nm (22.1 lbf ft) 3rd tightening stage 50°	Thread, oiled with engine oil/cone greased
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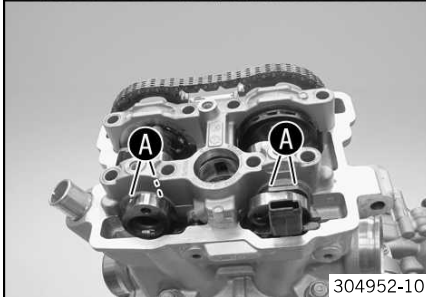
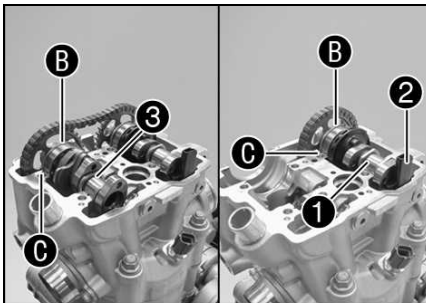


- Mount and tighten nut ③ with the washer.

Guideline

Nut, cylinder head	M6	10 Nm (7.4 lbf ft)	Lubricated with engine oil
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18.5.24 Installing the camshafts

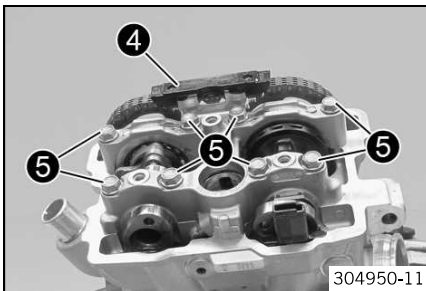


- Pull up the timing chain and insert intake camshaft ①.
- Place the timing chain over the camshaft gear of the intake camshaft.
 - ✓ Markings ① are aligned with the flat areas of the camshaft.
 - ✓ Lock ring ② engages in groove ③.
- Ensure that bleeder ② are seated properly.
- Slip in exhaust camshaft ③.
- Place the timing chain over the camshaft gear and position the camshaft in the bearing seat.
- Clean all oil jets thoroughly and blow out with compressed air.
- Mount the camshaft bearing bridge.
 - ✓ Markings ① are aligned with the flat areas of the camshaft.
 - ✓ Lock ring ② engages in groove ③.



Info

Ensure that the dowel pins are seated properly.

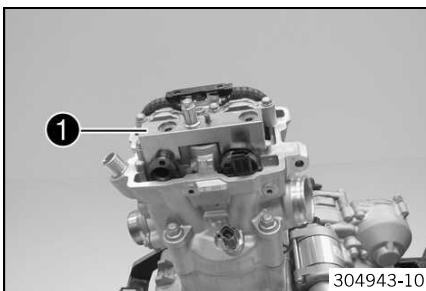


- Position guide rail ④.
- Mount screws ⑤ and tighten from the outside to the inside.

Guideline

Screw, camshaft bearing bridge	M7x1	14 Nm (10.3 lbf ft)	Lubricated with engine oil
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18.5.25 Checking the valve timing



Condition

Camshaft gears were not loosened.

- Mount the special tool and tension the timing chain.

Insert, timing chain tensioner (77229035000) (☞ p. 298)

- Position special tool ①.

Adjustment bush bridge (77229050044) (☞ p. 298)

- Check the valve timing.

The special tool must be in full contact with the flat areas.

» If the special tool is not in full contact:

- Take off the special tool.
- Remove the camshaft. (☞ p. 141)
- Pull the camshaft gears off the camshafts.
- Adjust the valve timing. (☞ p. 190)

- Remove the special tool.

Adjustment bush bridge (77229050044) (☛ p. 298)

Insert, timing chain tensioner (77229035000) (☛ p. 298)

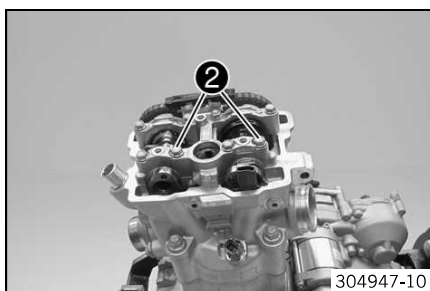
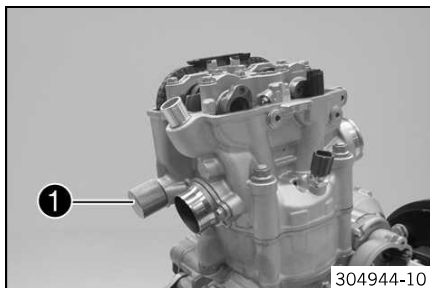
18.5.26 Adjusting the valve timing

Condition

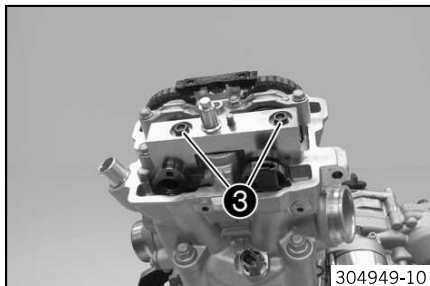
Camshaft gears were loosened.

- Mount special tool ❶ and tension the timing chain.

Insert, timing chain tensioner (77229035000) (☛ p. 298)



- Remove screws ❷.



- Position the special tool.

Adjustment bush bridge (77229050044) (☛ p. 298)

- ✓ The valves are not activated.
- ✓ The special tool must be in full contact with the flat areas of the cam shafts.

- Mount and tighten screws ❹.

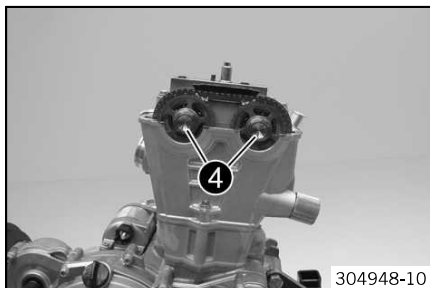
Guideline

Screw, special tool, adjustment bush bridge	M7x1	10 Nm (7.4 lbf ft)	Lubricated with engine oil
---	------	-----------------------	----------------------------



Info

Tighten the screws of the exhaust camshaft first.



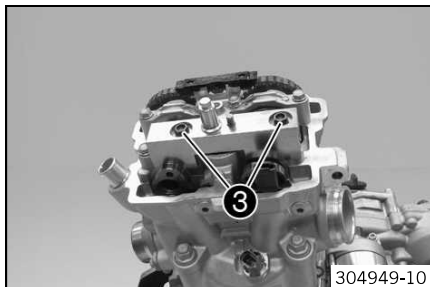
- Tighten screws ❹.

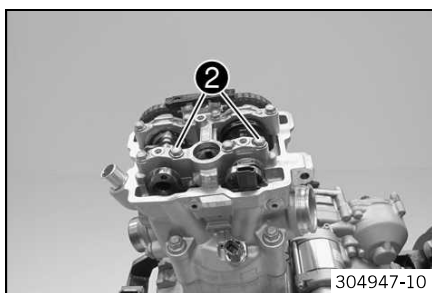
Guideline

Screw, camshaft drive sprocket	M12x1	70 Nm (51.6 lbf ft)	Loc-tite® 243™ /cone degreased
--------------------------------	-------	------------------------	---------------------------------------

- Remove screws ❸.
- Remove the special tool.

Adjustment bush bridge (77229050044) (☛ p. 298)

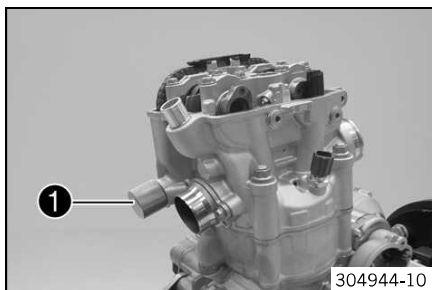




- Mount and tighten screws ②.

Guideline

Screw, camshaft bearing bridge	M7x1	14 Nm (10.3 lbf ft)	Lubricated with engine oil
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- Remove special tool ①.

Insert, timing chain tensioner (77229035000) (☛ p. 298)

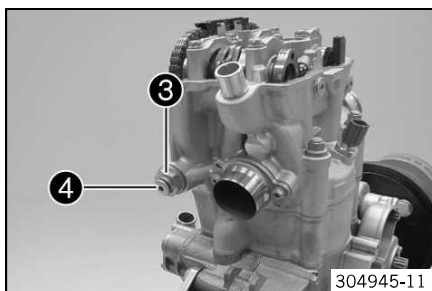
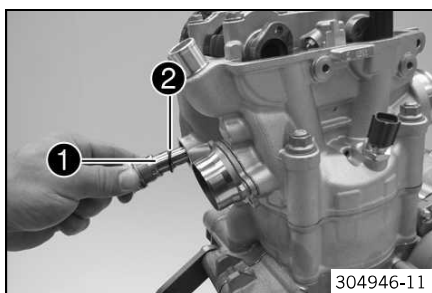
18.5.27 Installing the timing chain tensioner

Preparatory work

- Prepare the timing chain tensioner for installation. (☛ p. 169)

Main work

- Position timing chain tensioner ① and insert it with new O-ring ②.

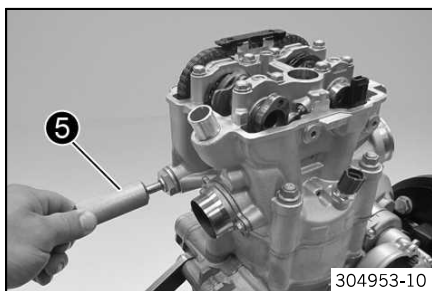


- Mount and tighten screw plug ③ with the seal ring.

Guideline

Plug, timing chain tensioner	M24x1.5	25 Nm (18.4 lbf ft)
------------------------------	---------	------------------------

- Remove screw ④.



- Press the timing chain tensioner toward the timing chain using special tool ⑤.

Release device for timing chain tensioner (77329051000) (☛ p. 299)

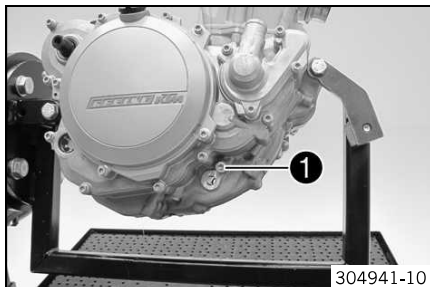
✓ The timing chain tensioner unlocks.

- Mount and tighten screw ④.

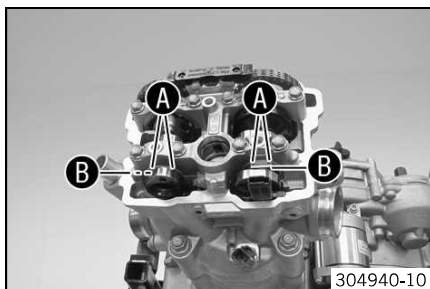
Guideline

Screw, unlocking of timing chain tensioner	M10x1	10 Nm (7.4 lbf ft)
--	-------	--------------------

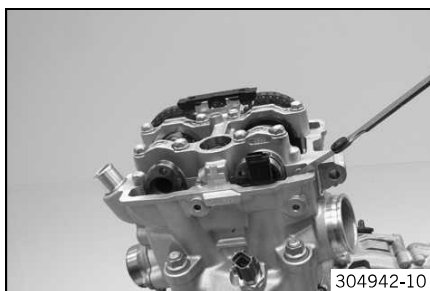
18.5.28 Checking the valve clearance



- Remove screw ❶.
- Crank over the engine repeatedly.



- Position the engine at ignition top dead center.
- ✓ Markings A on the cylinder head are flush above the flat areas B of the camshafts.



- Check the valve clearance at all valves between the camshaft and cam levers.

Guideline

Valve clearance	
Intake at: 20 °C (68 °F)	0.10... 0.15 mm (0.0039... 0.0059 in)
Exhaust at: 20 °C (68 °F)	0.13... 0.18 mm (0.0051... 0.0071 in)

Feeler gauge (59029041100) (☛ p. 294)

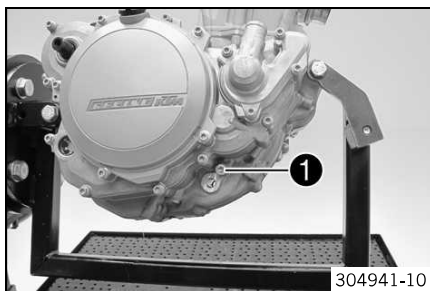
» If the valve clearance does not meet specifications:

- Adjust the valve clearance. (☛ p. 192)

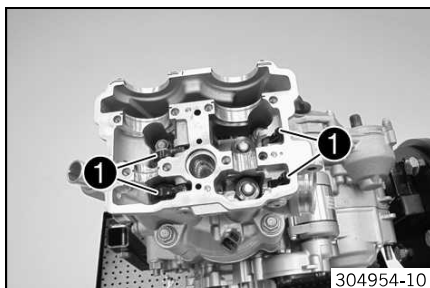
- Mount and tighten screw ❶ with the washer.

Guideline

Screw plug, crankshaft location	M8	10 Nm (7.4 lbf ft)
---------------------------------	----	--------------------



18.5.29 Adjusting the valve clearance



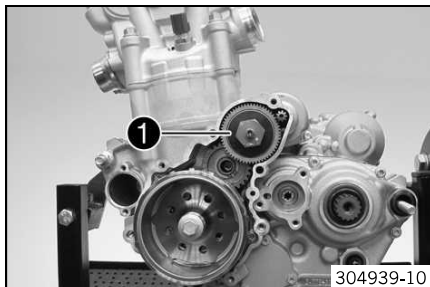
Main work

- Remove the timing chain tensioner. (☛ p. 140)
- Remove the camshaft. (☛ p. 141)
- Raise cam levers ❶.
- Correct the shims according to the findings from checking the valve clearance.
- Install the camshafts. (☛ p. 189)
- Install the timing chain tensioner. (☛ p. 191)

Finishing work

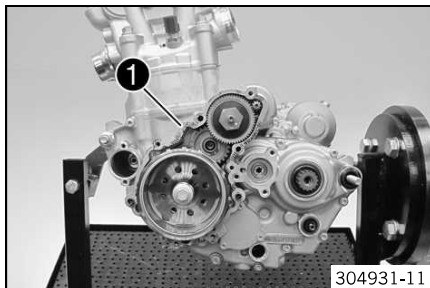
- Check the valve clearance. (☛ p. 192)

18.5.30 Installing the torque limiter

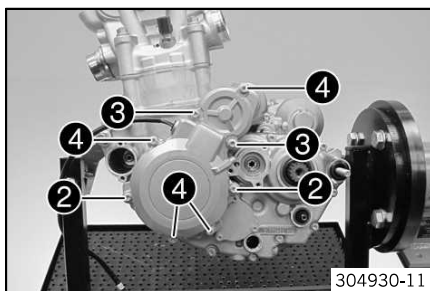


- Position torque limiter **1**.

18.5.31 Installing the alternator cover



- Position alternator cover gasket **1**.



- Position the alternator cover. Mount screws **2** and tighten once all of the alternator cover screws have been mounted.

Guideline

Screw, alternator cover	M6x30	6 Nm (4.4 lbf ft)
-------------------------	-------	-------------------

- Mount screws **3** and tighten once all of the alternator cover screws have been mounted.

Guideline

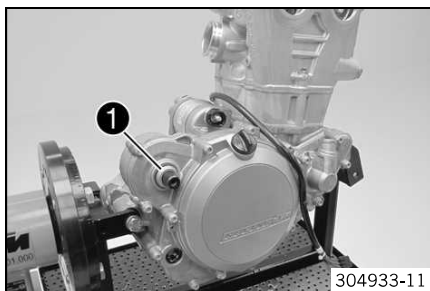
Screw, alternator cover	M6x50	6 Nm (4.4 lbf ft)
-------------------------	-------	-------------------

- Mount screw **4** with the seal ring and tighten all screws in a crisscross pattern.

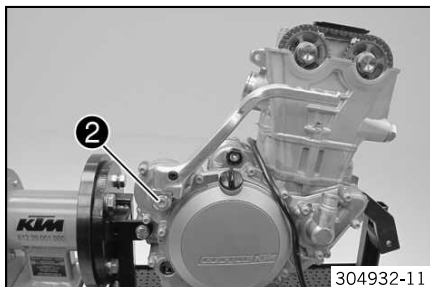
Guideline

Screw, alternator cover	M6x25	6 Nm (4.4 lbf ft)
-------------------------	-------	-------------------

18.5.32 Installing the kick starter



- Mount distance sleeve **1**.

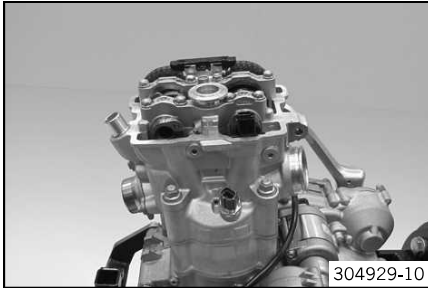


- Position the kick starter. Mount and tighten screw **2**.

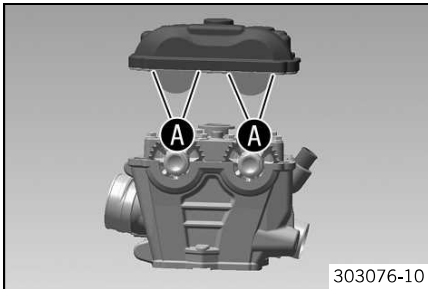
Guideline

Screw, kick starter	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
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18.5.33 Installing the valve cover

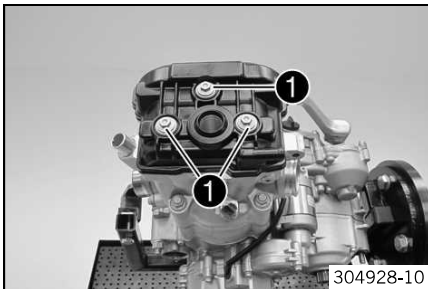


- Grease the O-rings and mount the spark plug shaft insert.



- Apply a thin layer of sealing compound in area **A**.

Loctite® 5910

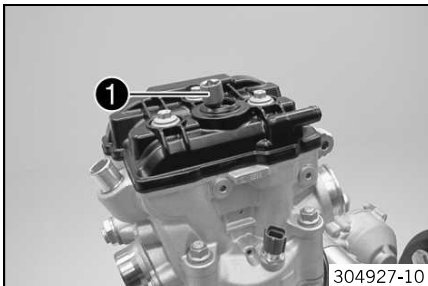


- Position the valve cover with the gasket.
- Mount and tighten screws **1**.

Guideline

Screw, valve cover	M6	8 Nm (5.9 lbf ft)
--------------------	----	-------------------

18.5.34 Installing the spark plug



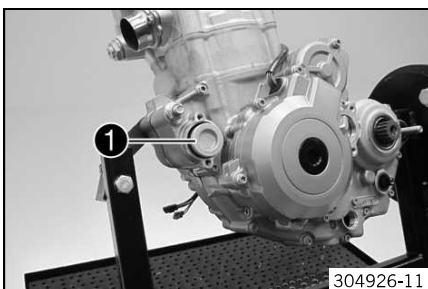
- Mount and tighten the spark plug with special tool **1**.

Guideline

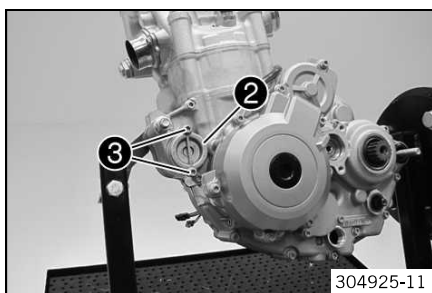
Spark plug	M10x1	10... 12 Nm (7.4... 8.9 lbf ft)
------------	-------	------------------------------------

Spark plug wrench (77229072000) (☛ p. 299)

18.5.35 Installing the oil filter



- Tilt the motorcycle to one side and fill the oil filter housing to about 1/3 full with engine oil.
- Insert oil filter **1** into the oil filter housing.

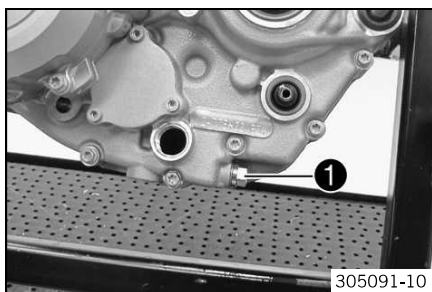


- Oil the O-ring of the oil filter cover.
- Mount oil filter cover ②.
- Mount and tighten screws ③.

Guideline

Screw, oil filter cover	M6	10 Nm (7.4 lbf ft)
-------------------------	----	--------------------

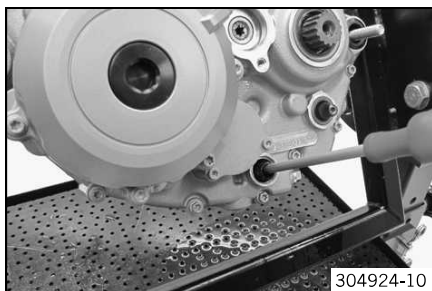
18.5.36 Installing the oil screen



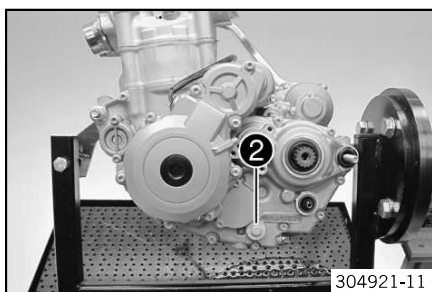
- Mount and tighten the oil drain plug ① with the magnet and the new seal ring.

Guideline

Oil drain plug with magnet	M12x1.5	20 Nm (14.8 lbf ft)
----------------------------	---------	------------------------



- Push the oil screen with O-rings onto a pin wrench.
- Push the pin wrench through the opening into the drill hole of the opposite engine case wall and push the oil screen as far as possible into the engine case.

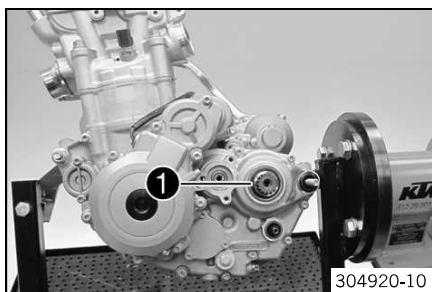


- Mount and tighten screw plug ② with the O-ring.

Guideline

Screw plug, oil screen	M20x1.5	15 Nm (11.1 lbf ft)
------------------------	---------	------------------------

18.5.37 Installing the spacer

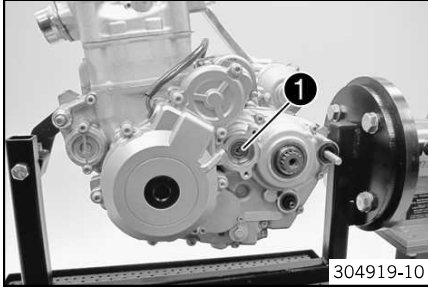


- Grease the shaft seal ring before mounting.

Long-life grease (☛ p. 290)

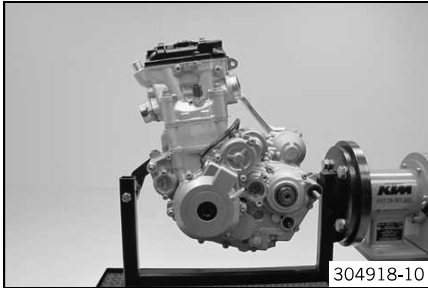
- Position the O-ring. Mount spacer ① with the bevel facing inward.

18.5.38 Installing the clutch push rod



- Mount clutch push rod ❶.

18.5.39 Removing the engine from the engine assembly stand



- Remove the screw connection from the special tool.

Engine fixing arm (77229002000) (☛ p. 296)

- Remove the engine from the engine assembly stand.



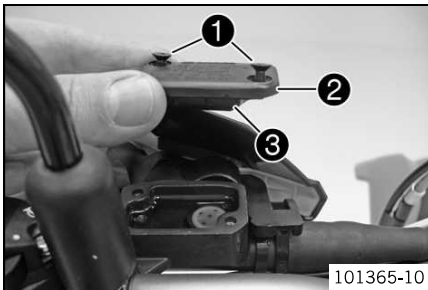
Info

Work with an assistant or a motorized hoist.

19.1 Checking/correcting the fluid level of the hydraulic clutch

**Info**

The fluid level rises with increased wear of the clutch lining discs.



- Move the clutch fluid reservoir mounted on the handlebar to a horizontal position.
- Remove screws 1.
- Remove cover 2 with membrane 3.
- Check the fluid level.

Fluid level below container rim	4 mm (0.16 in)
---------------------------------	----------------

» If the fluid level does not meet specifications:

- Correct the fluid level of the hydraulic clutch.

Brake fluid DOT 4 / DOT 5.1 (☛ p. 288)
--

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

**Info**

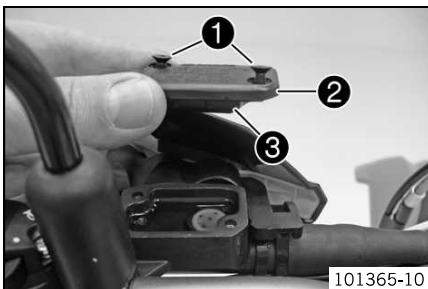
Clean up overflowed or spilt brake fluid immediately with water.

19.2 Changing the hydraulic clutch fluid

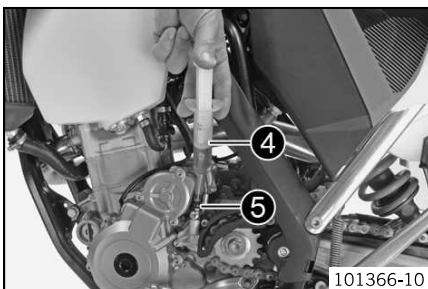
**Warning**

Environmental hazard Hazardous substances cause environmental damage.

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



- Move the clutch fluid reservoir mounted on the handlebar to a horizontal position.
- Remove screws 1.
- Remove cover 2 with membrane 3.

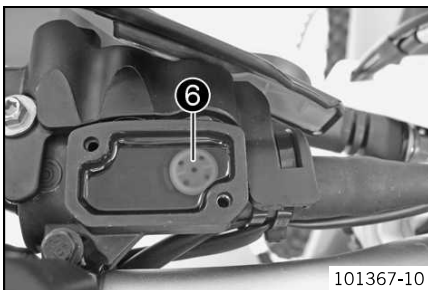


- Fill bleeding syringe 4 with the appropriate hydraulic fluid.

Bleed syringe (50329050000) (☛ p. 293)
--

Brake fluid DOT 4 / DOT 5.1 (☛ p. 288)
--

- On the slave cylinder of the clutch, remove bleeder screw 5 and mount bleeding syringe 4.



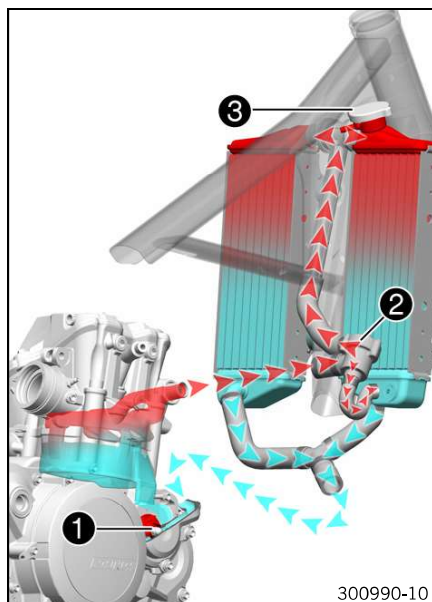
- Inject the liquid into the system until it escapes from openings 6 of the master cylinder without bubbles.
- To prevent overflow, drain fluid occasionally from the master cylinder reservoir.
- Remove the bleeding syringe. Mount and tighten screws bleeder screw.
- Correct the fluid level of the hydraulic clutch.

Guideline

Fluid level below container rim	4 mm (0.16 in)
---------------------------------	----------------

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

20.1 Cooling system



Water pump ❶ in the engine circulates the coolant.

The water flow through the radiator is controlled as a function of the coolant temperature. The cooling system is divided into two circuits. In the warming-up phase of the engine, the coolant flows through the small cooling circuit. This heats up the engine quickly. The thermostat ❷ warms up and opens the opening to the radiator (large cooling circuit). This keeps the engine temperature constant.

The pressure resulting from the warming of the cooling system is regulated by a valve in radiator cap ❸. This ensures that operating the vehicle at the specified coolant temperature will not result in a risk of malfunctions.

120 °C (248 °F)

Cooling is effected by the air stream.

The lower the speed, the less the cooling effect. Dirty cooling fins also reduce the cooling effect.

(EXC-F SIX DAYS)

The radiator fan provides extra cooling. It is controlled by a thermoswitch.

20.2 Checking the antifreeze and coolant level

**Warning**

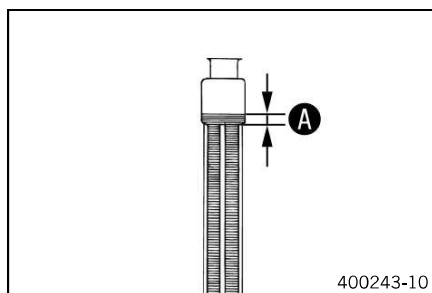
Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

- Do not remove the radiator cap, radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. In case of scalding, rinse immediately with lukewarm water.

**Warning**

Danger of poisoning Coolant is poisonous and a health hazard.

- Avoid contact between coolant and skin, eyes and clothing. If it gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If coolant is swallowed, contact a doctor immediately. Change clothes that have come into contact with coolants. Keep coolant out of the reach of children.

**Condition**

The engine is cold.

- Stand the motorcycle upright on a horizontal surface.
- Remove the radiator cap.
- Check antifreeze of coolant.

–25... –45 °C (–13... –49 °F)

» If the antifreeze of the coolant does not meet specifications:

- Correct the antifreeze of the coolant.

- Check the coolant level in the radiator.

Coolant level ❶ above radiator fins. 10 mm (0.39 in)

» If the coolant level does not meet specifications:

- Correct the coolant level.

Alternative 1

Coolant (☞ p. 288)

Alternative 2

Coolant (mixed ready to use) (☞ p. 288)

- Mount the radiator cap.

20.3 Checking the coolant level



Warning

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

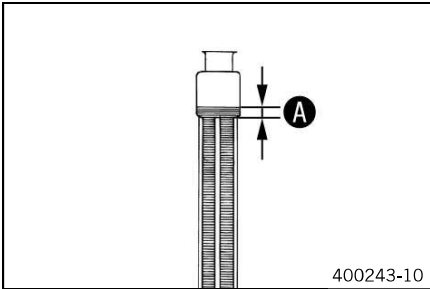
- Do not remove the radiator cap, radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. In case of scalding, rinse immediately with lukewarm water.



Warning

Danger of poisoning Coolant is poisonous and a health hazard.

- Avoid contact between coolant and skin, eyes and clothing. If it gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If coolant is swallowed, contact a doctor immediately. Change clothes that have come into contact with coolants. Keep coolant out of the reach of children.



Condition

The engine is cold.

- Stand the motorcycle upright on a horizontal surface.
- Remove the radiator cap.
- Check the coolant level in the radiator.

Coolant level A above radiator fins.	10 mm (0.39 in)
---	-----------------

» If the coolant level does not meet specifications:

- Correct the coolant level.

Alternative 1

Coolant (☛ p. 288)

Alternative 2

Coolant (mixed ready to use) (☛ p. 288)

- Mount the radiator cap.

20.4 Draining the coolant



Warning

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

- Do not remove the radiator cap, radiator hoses or other cooling system components when the engine is hot. Allow the engine and cooling system to cool down. In case of scalding, rinse immediately with lukewarm water.



Warning

Danger of poisoning Coolant is poisonous and a health hazard.

- Avoid contact between coolant and skin, eyes and clothing. If it gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If coolant is swallowed, contact a doctor immediately. Change clothes that have come into contact with coolants. Keep coolant out of the reach of children.

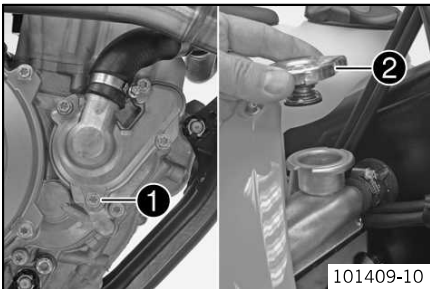
Condition

The engine is cold.

- Position the motorcycle upright.
- Place a suitable container under the water pump cover.
- Remove screw **1**. Take off radiator cap **2**.
- Completely drain the coolant.
- Mount and tighten screw **1** with a new seal ring.

Guideline

Screw, water pump cover	M6	10 Nm (7.4 lbf ft)
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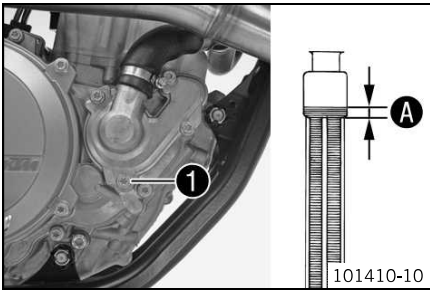
20.5 Refilling coolant



Warning

Danger of poisoning Coolant is poisonous and a health hazard.

- Avoid contact between coolant and skin, eyes and clothing. If it gets into your eyes, rinse immediately with water and contact a doctor. Wash affected skin areas immediately with soap and water. If coolant is swallowed, contact a doctor immediately. Change clothes that have come into contact with coolants. Keep coolant out of the reach of children.



Main work

- Make sure that the screw ❶ is tightened.
- Stand the vehicle upright.
- Pour coolant in up to measurement ❷ above the radiator fins.

Guideline

10 mm (0.39 in)

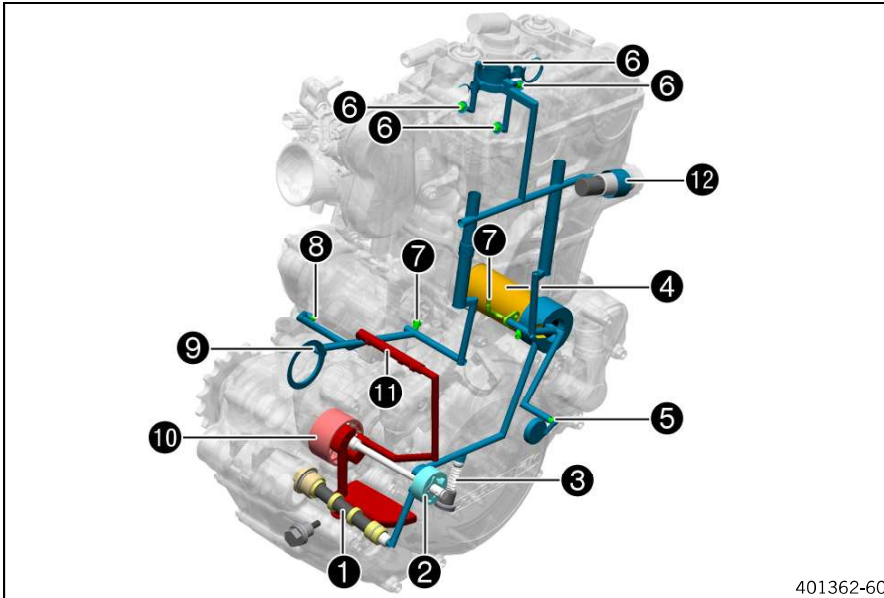
Coolant	1.2 l (1.3 qt.)	Coolant (☛ p. 288)
		Coolant (mixed ready to use) (☛ p. 288)

- Refit the radiator cap.

Finishing work

- Take a short test ride.
- Check the coolant level. (☛ p. 199)

21.1 Oil circuit



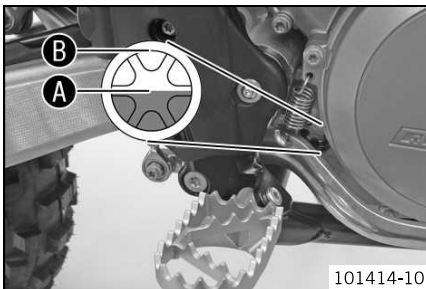
401362-60

1	Oil screen
2	Force pump
3	Oil pressure regulator valve
4	Oil filter
5	Oil jet, conrod lubrication
6	Oil jet for cam lever lubrication
7	Oil jet, piston cooling
8	Oil jet for alternator cooling
9	Oil jet for clutch lubrication
10	Suction pump
11	Oil channel, transmission lubrication
12	Timing chain tensioner

21.2 Checking the engine oil level

i Info

The engine oil level can be checked when the engine is cold or warm.



101414-10

Preparatory work

- Stand the motorcycle upright on a horizontal surface.

Condition

The engine is cold.

- Check the engine oil level.

The engine oil level is up to the middle **A** of the level viewer.

- » If the engine oil is not up to the middle of the level viewer:
 - Add engine oil. (➔ p. 204)

Condition

The engine is at operating temperature.

- Check the engine oil level.

i Info

After switching off the engine, wait one minute before checking the level.

The engine oil is at a level between the middle **A** and upper edge **B** of the level viewer.

- » If the engine oil is not up to the middle **A** of the level viewer:
 - Add engine oil. (🔧 p. 204)

21.3 Changing the engine oil and oil filter, cleaning the oil screen



Warning

Danger of scalding Engine oil and gear oil get very hot when the motorcycle is ridden.

- Wear appropriate protective clothing and safety gloves. In case of burns, rinse immediately with lukewarm water.



Warning

Environmental hazard Hazardous substances cause environmental damage.

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



Info

Drain the engine oil only when the engine is warm.

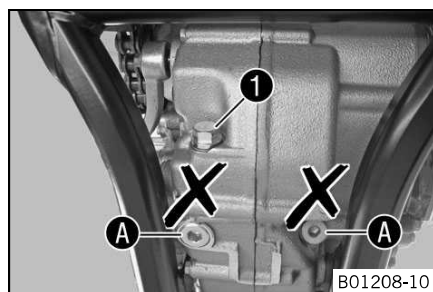
Preparatory work

(EXC-F AUS, EXC-F SIX DAYS)

- Remove the engine guard. (🔧 p. 59)
- Park the motorcycle on a level surface.

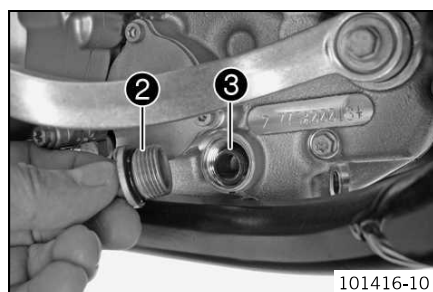
Main work

- Place a suitable container under the engine.
- Remove oil drain plug **1** with the magnet and seal ring.

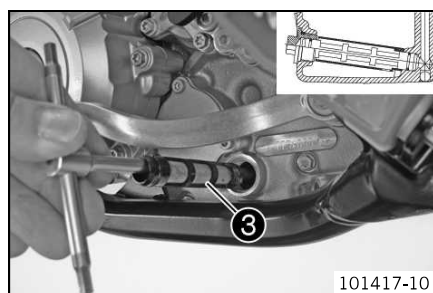


Info

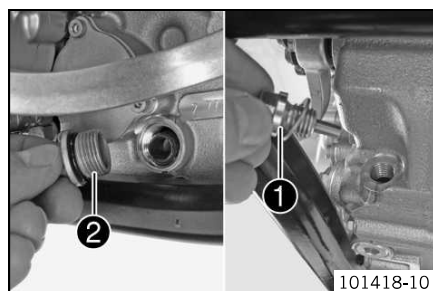
Do not remove screws **A** on both sides.



- Remove plug **2** with oil screen **3** and the O-rings.
- Completely drain the engine oil.
- Thoroughly clean the parts and sealing surfaces.



- Push the oil screen with O-rings onto a pin wrench.
- Push the pin wrench through the opening into the drill hole of the opposite engine case wall and push the oil screen as far as possible into the engine case.



- Mount and tighten screw plug **2** with the O-ring.

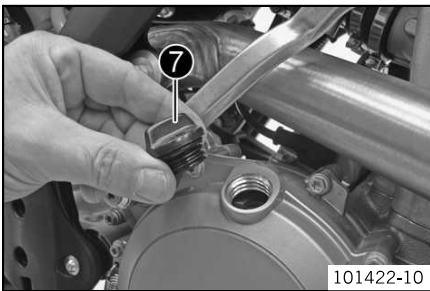
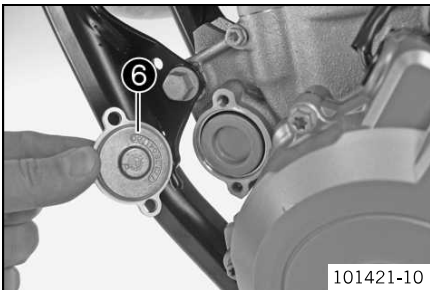
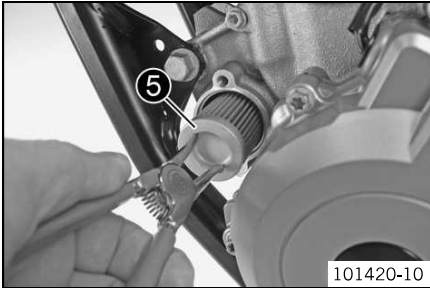
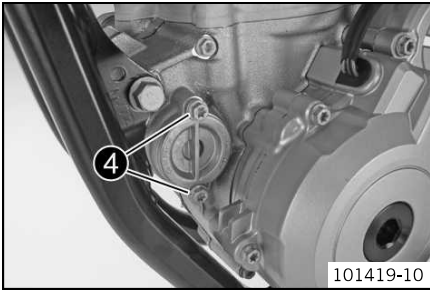
Guideline

Screw plug, oil screen	M20x1.5	15 Nm (11.1 lbf ft)
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- Mount and tighten the oil drain plug **1** with the magnet and a new seal ring.

Guideline

Oil drain plug with magnet	M12x1.5	20 Nm (14.8 lbf ft)
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– Remove screws ❹. Remove the oil filter cover with the O-ring.

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

Circlip pliers reverse (51012011000) (🔧 p. 293)

- Completely drain the engine oil.
- Thoroughly clean the parts and sealing area.

- Lay the motorcycle on its side and fill the oil filter housing to about ⅓ full with engine oil.
- Fill the oil filter with engine oil and place it in the oil filter housing.
- Oil the O-ring of the oil filter cover and mount it with the oil filter cover ❻.
- Mount and tighten the screws.

Guideline

Screw, oil filter cover	M6	10 Nm (7.4 lbf ft)
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– Stand the motorcycle upright.

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

Engine oil	1.20 l (1.27 qt.)	Engine oil (SAE 10W/50) (🔧 p. 288)	
		Alternative engine oil for harsh operating conditions and increased performance	Engine oil (SAE 10W/60) (00062010035) (🔧 p. 288)



Info
Too little engine oil or poor-quality engine oil results in premature wear to the engine.

– 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/or death.

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

– Start the engine and check that it is oil-tight.

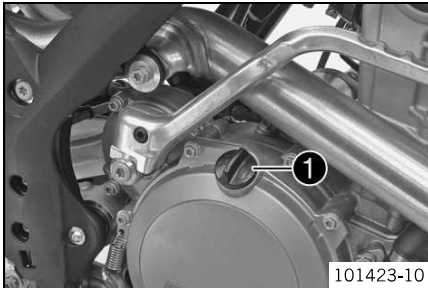
Finishing work
(EXC-F AUS, EXC-F SIX DAYS)

- Install the engine guard. (🔧 p. 59)
- Check the engine oil level. (🔧 p. 201)

21.4 Adding engine oil

**Info**

Too little engine oil or poor-quality engine oil results in premature wear to the engine.



- Remove the oil filler plug ❶ with the O-ring from the clutch cover.
- Add the same engine oil that was used when the motor was changed.

Engine oil (SAE 10W/50) (☛ p. 288)

Alternative 1

Engine oil (SAE 10W/60) (00062010035) (☛ p. 288)
--

**Info**

For optimal performance of the engine oil, do not mix different types of engine oil.
If appropriate, change the engine oil.

- Install and tighten the oil filler plug with O-ring.

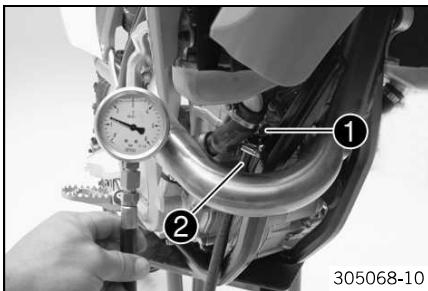
**Danger**

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

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

- Start the engine and check that it is oil-tight.

21.5 Checking the engine oil pressure



- Check the engine oil level. (☛ p. 201)
- Remove the chain adjuster release screw.
- Mount and tighten special tool ❶.

Guideline

Oil pressure adapter	M10x1	10 Nm (7.4 lbf ft)
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Oil pressure adapter (77329006000) (☛ p. 299)

- Connect pressure gauge ❷ without the t-plate to the special tool.

Pressure testing tool (61029094000) (☛ p. 295)
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**Danger**

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

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

- Start the engine and let it warm up.
- Check the engine oil pressure.

Engine oil pressure

Engine oil temperature: 80 °C (176 °F) Engine speed: 1,600 rpm	0.9 bar (13 psi)
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Engine oil temperature: 80 °C (176 °F) Engine speed: 6,000 rpm	2.5 bar (36 psi)
--	------------------

» If the measured value is less than the specification:

- Check the oil pump for wear. Check all oil holes for free flow.
- Switch off the engine.



Warning

Danger of burns Some vehicle components get very hot when the machine is driven.

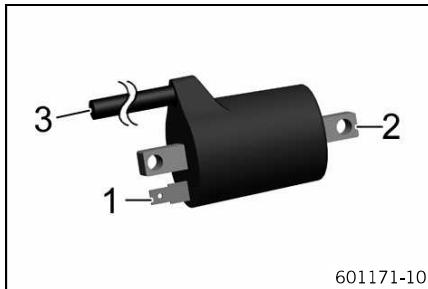
- Wear appropriate protective clothing and safety gloves. In case of burns, rinse immediately with lukewarm water.

- Remove the special tools.
- Mount and tighten the chain adjuster release screw.

Guideline

Screw, unlocking of timing chain tensioner	M10x1	10 Nm (7.4 lbf ft)
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22.1 Ignition coil - checking the secondary winding




Condition

Ignition coil cylinder 1 is disconnected.

Spark plug connector cylinder 1 has been removed.

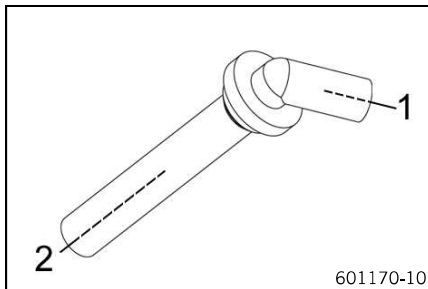
Ignition coil cylinder 1 - check the secondary winding resistance

-  Measure the resistance between the specified points.
Ignition coil cylinder 1 pin **2** (-) – Ignition coil cylinder 1 pin **3**

Ignition coil	
Secondary winding resistance at: 20 °C (68 °F)	10.8... 16.2 kΩ


- » If the displayed value does not correspond to specifications:
 - Change the ignition coil.

22.2 Checking the spark plug connector



Condition

Spark plug connector cylinder 1 has been removed.

-  Measure the resistance between the specified points.
Measuring point 1 – Measuring point 2

Spark plug connector	
Resistance at: 20 °C (68 °F)	3.75... 6.25 kΩ

- » If the specification is not reached:
 - Change the spark plug connector.

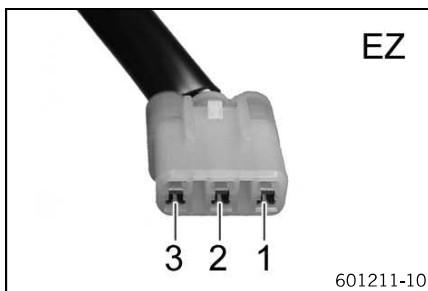
22.3 Alternator - checking the stator winding

Condition

The stator is disconnected.


Preparatory work

- Remove the seat. (🔧 p. 88)



Main work


Stator winding, measurement I - check the resistance

-  Measure the resistance between the specified points.
Stator, connector **EZ** pin **1** – Stator, connector **EZ** pin **2**

Alternator	
Resistance of stator winding at: 20 °C (68 °F)	0.368... 0.552 Ω

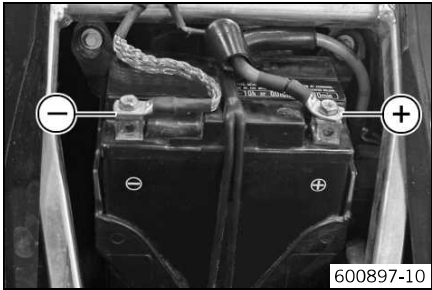
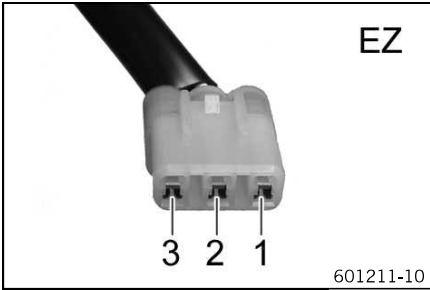
- » If the value displayed does not meet specifications:
 - Change the stator.

Stator winding, measurement II - check the resistance


-  Measure the resistance between the specified points.
Stator, connector **EZ** pin **1** – Stator, connector **EZ** pin **3**

Alternator	
Resistance of stator winding at: 20 °C (68 °F)	0.368... 0.552 Ω

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



Stator winding - check for a short circuit to ground (terminal 31)

-  Measure the resistance between the specified points.
Stator, connector **EZ** pin **1** – Measuring point **Ground (-)**

Resistance	$\infty \Omega$
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- » If the value displayed does not meet specifications:
 - Change the stator.

22.4 Removing the stator and ignition pulse generator

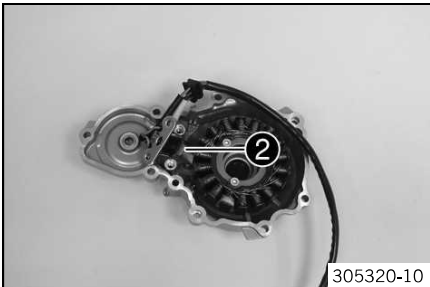
Condition

The alternator cover has been removed.

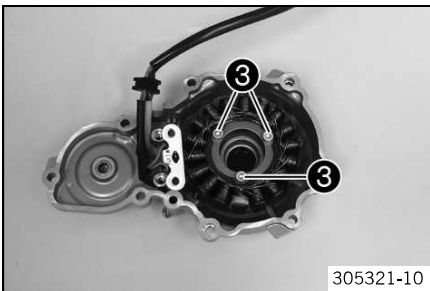
- Remove screw **1**.
- Remove the retaining bracket.



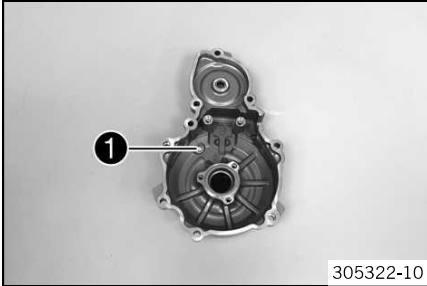
- Pull the cable sleeve from the alternator cover.
- Take off cable retainer plate **2**.



- Remove screws **3**.
- Remove the stator and ignition pulse generator from the alternator cover.



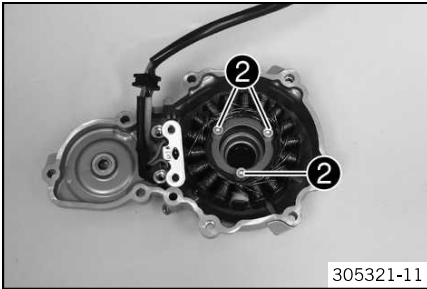
22.5 Installing the stator and ignition pulse generator



- Blow out oil jet ❶ with compressed air and check that it is clear.

Guideline

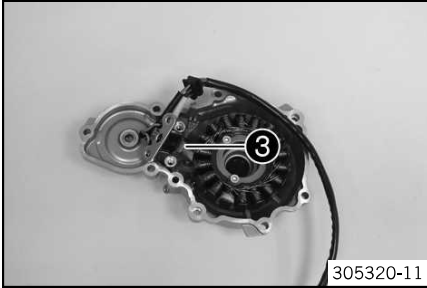
Oil jet for alternator cooling	M4	2 Nm (1.5 lbf ft)	Loctite® 243™
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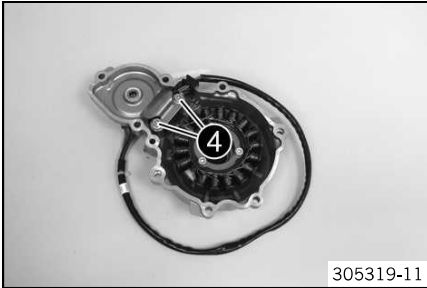
- Position the stator in the alternator cover.
- Mount and tighten screws ❷.

Guideline

Screw, stator	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
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- Position cable retainer plate ❸.
- Position cable support sleeve in the alternator cover.



- Position the ignition pulse generator with the cable retainer plate in the alternator cover.
- Position the retaining bracket.
- Mount and tighten screws ❹.

Guideline

Screw, crankshaft position sensor	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
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23.1 Checking the starter motor

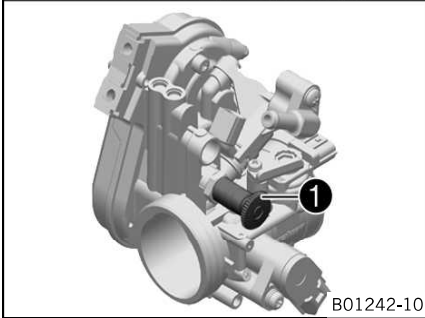
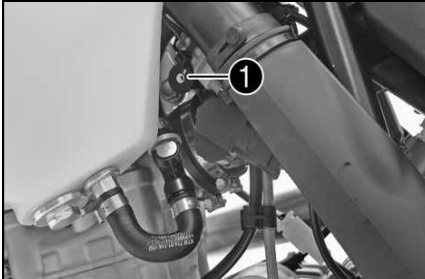
Condition

The starter motor has been removed.

- Connect the negative cable of a 12 volt power supply to the housing of the starter motor. Connect the positive cable of the power supply briefly to connector ❶ of the starter motor.
 - » If the starter motor does not turn when the circuit is closed:
 - Change the starter motor.



24.1 Adjusting the idle speed



- Run the engine warm and push the idle speed adjusting screw ❶ all the way in.
- Set the desired idle speed by turning the idle speed adjusting screw.

Guideline

Idle speed	1,950... 2,050 rpm
------------	--------------------



Info

Turn counterclockwise to increase the idle speed.
Turn clockwise to decrease the idle speed.

24.2 Throttle position sensor circuit A - checking the basic settings

Condition

The diagnostics tool is connected and running.

- "Select the measured values" > "Throttle position sensor voltage circuit (THAD)" and "Throttle position sensor signal circuit (ATP)".

Throttle position sensor circuit A	
Basic position - voltage "THAD"	0.601±0.004 V
Throttle position sensor circuit A	
Signal "ATP"	0 %

- » If the displayed value does not correspond to specifications:
 - Throttle position sensor - adjust the basic settings. (☛ p. 210)

24.3 Throttle position sensor - adjusting the basic settings

Condition

The diagnostics tool is connected and running.

- "Select the measured values" > "Throttle position sensor voltage circuit (THAD)" and "Throttle position sensor signal circuit (ATP)".
- Push back protection cap ❶.
- Loosen screw ❷.
- Set "Throttle position sensor voltage circuit A (THAD)" to the setpoint value. Tighten screw ❷.



Info

The value of "Throttle position sensor signal circuit A (ATP)" must equal the setpoint value.

Throttle position sensor circuit A	
Basic position - voltage "THAD"	0.601±0.004 V
Throttle position sensor circuit A	
Signal "ATP"	0 %

- » If the displayed value is equal to the setpoint value:
 - Open and close the throttle grip fully ten times.
 - Check the measured values of "Throttle position sensor voltage circuit A (THAD)" and "Throttle position sensor signal circuit A (ATP)" again.



- Mount protection cap ❶.
- "Read trouble code" selected.
- Select "Delete trouble codes".



Danger

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

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

- Start the engine and perform an initialization run.

Guideline

Initialization run	5 min
--------------------	-------

25.1 engine

Design	1-cylinder 4-stroke engine, water-cooled
Displacement	349.7 cm ³ (21.34 cu in)
Stroke	57.5 mm (2.264 in)
Bore	88 mm (3.46 in)
Compression ratio	12.3:1
Idle speed	1,950... 2,050 rpm
Control	DOHC, four valves controlled via cam lever, drive via timing chain
Valve diameter, intake	36.3 mm (1.429 in)
Valve diameter, exhaust	29.1 mm (1.146 in)
Valve clearance	
Intake at: 20 °C (68 °F)	0.10... 0.15 mm (0.0039... 0.0059 in)
Exhaust at: 20 °C (68 °F)	0.13... 0.18 mm (0.0051... 0.0071 in)
Crankshaft bearing	2 cylinder bearings
Conrod bearing	Needle bearing
Piston pin bearing	Not a bearing bush - DLC-plated piston pins
Pistons	Forged light alloy
Piston rings	1 compression ring, 1 oil scraper ring
Engine lubrication	Pressure circulation lubrication with two Eaton pumps
Primary transmission	24:73
Clutch	Multidisc clutch in oil bath/hydraulically activated
Transmission ratio	
1st gear	14:32
2nd gear	16:26
3rd gear	20:25
4th gear	22:23
5th gear	25:22
6th gear	26:20
Alternator	12 V, 168 W
Ignition	Contactless controlled fully electronic ignition with digital ignition adjustment
Spark plug	NGK LMAR9AI-8
Spark plug electrode gap	0.8 mm (0.031 in)
Cooling	Water cooling, permanent circulation of coolant by water pump
Starting aid	Kick starter and electric starter

25.2 Engine tolerance, wear limits

Valve - run-out	
At the valve plate	≤ 0.05 mm (≤ 0.002 in)
At the valve stem	≤ 0.05 mm (≤ 0.002 in)
Valve spring	
Minimum length	41.10 mm (1.6181 in)
Valve - sealing seat width	
Intake	1.40 mm (0.0551 in)
Exhaust	1.40 mm (0.0551 in)
Valve spring	
Minimum length	41.10 mm (1.6181 in)
Valve spring seat - thickness	0.90... 1.10 mm (0.0354... 0.0433 in)
Camshaft bearing - sleeve bearing	
Radial clearance	0.020... 0.054 mm (0.00079... 0.00213 in)
Wear limit	0.065 mm (0.00256 in)

Cylinder/cylinder head - distortion of sealing area	≤ 0.10 mm (≤ 0.0039 in)
Piston - diameter	
Size I	87.965... 87.975 mm (3.46318... 3.46358 in)
Size II	87.976... 87.985 mm (3.46362... 3.46397 in)
Cylinder - drill hole diameter	
Size I	88.000... 88.012 mm (3.46456... 3.46503 in)
Size II	88.012... 88.025 mm (3.46503... 3.46554 in)
Piston/cylinder - mounting clearance	
Size I	0.025... 0.047 mm (0.00098... 0.00185 in)
Size II	0.027... 0.049 mm (0.00106... 0.00193 in)
Wear limit	0.070 mm (0.00276 in)
Piston ring - end gap	
Compression ring	≤ 0.40 mm (≤ 0.0157 in)
Oil scraper ring	≤ 0.80 mm (≤ 0.0315 in)
Connecting rod - axial play of lower conrod bearing	0.30... 0.45 mm (0.0118... 0.0177 in)
Crankshaft - run-out at bearing pin	≤ 0.03 mm (≤ 0.0012 in)
Clutch facing discs - thickness of total package	≥ 26.4 mm (≥ 1.039 in)
Oil pressure regulator valve	
Minimum length of pressure spring	23.5 mm (0.925 in)
Shift shaft - sliding plate/shift quadrant clearance	0.40... 0.80 mm (0.0157... 0.0315 in)
Engine oil consumption	≤ 20 ml/h (≤ 0.68 fl. oz./hr)

25.3 Engine tightening torques

Jet, crank chamber ventilation	M4	2 Nm (1.5 lbf ft)	Loctite® 243™
Oil jet for alternator cooling	M4	2 Nm (1.5 lbf ft)	Loctite® 243™
Oil jet for balancer shaft lubrication	M4	2 Nm (1.5 lbf ft)	Loctite® 243™
Oil nozzle for conrod bearing lubrication	M4	2 Nm (1.5 lbf ft)	Loctite® 243™
Screw, oil jet for piston cooling	M4	2 Nm (1.5 lbf ft)	Loctite® 243™
Locking screw for bearing	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Oil jet for cam lever lubrication	M5	3 Nm (2.2 lbf ft)	Loctite® 243™
Oil jet for clutch lubrication	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Oil jet, piston cooling	M5	2 Nm (1.5 lbf ft)	Loctite® 243™
Screw cap, oil channel in alternator cover	M5	3 Nm (2.2 lbf ft)	Loctite® 243™
Screw, clutch spring	M5	6 Nm (4.4 lbf ft)	—
Screw, crankshaft position sensor	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Screw, locking lever	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Screw, oil pump cover	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Screw, stator	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Nut, cylinder head	M6	10 Nm (7.4 lbf ft)	Lubricated with engine oil
Nut, water-pump wheel	M6	6 Nm (4.4 lbf ft)	Loctite® 243™
Screw, alternator cover	M6	6 Nm (4.4 lbf ft)	—
Screw, clutch cover	M6	10 Nm (7.4 lbf ft)	—
Screw, clutch slave cylinder	M6	10 Nm (7.4 lbf ft)	—
Screw, engine case	M6	10 Nm (7.4 lbf ft)	—
Screw, exhaust flange	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, kick starter stop	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, oil filter cover	M6	10 Nm (7.4 lbf ft)	—
Screw, shift drum locating	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, shift lever	M6	14 Nm (10.3 lbf ft)	Loctite® 243™
Screw, starter motor	M6	10 Nm (7.4 lbf ft)	—

Screw, timing chain guide rail	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, timing chain securing guide	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, valve cover	M6	8 Nm (5.9 lbf ft)	–
Screw, water pump cover	M6	10 Nm (7.4 lbf ft)	–
Stud, cylinder head	M6	10 Nm (7.4 lbf ft)	–
Screw, camshaft bearing bridge	M7x1	14 Nm (10.3 lbf ft)	Lubricated with engine oil
Screw plug, crankshaft location	M8	10 Nm (7.4 lbf ft)	–
Screw, kick starter	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
Screw, timing chain tensioning rail	M8	15 Nm (11.1 lbf ft)	Loctite® 243™
Screw, engine sprocket	M10	60 Nm (44.3 lbf ft)	Loctite® 2701
Plug, oil channel	M10x1	15 Nm (11.1 lbf ft)	Loctite® 243™
Rotor screw	M10x1	70 Nm (51.6 lbf ft)	Thread, oiled with engine oil/cone degreased
Screw plug, cam lever axis	M10x1	10 Nm (7.4 lbf ft)	–
Screw, unlocking of timing chain tensioner	M10x1	10 Nm (7.4 lbf ft)	–
Spark plug	M10x1	10... 12 Nm (7.4... 8.9 lbf ft)	–
Nut, cylinder head	M10x1.25	Tightening sequence: Tighten diagonally. 1st tightening stage 10 Nm (7.4 lbf ft) 2nd tightening stage 30 Nm (22.1 lbf ft) 3rd tightening stage 50°	Thread, oiled with engine oil/cone greased
Stud, cylinder head	M10x1.25	20 Nm (14.8 lbf ft)	Loctite® 243™
Screw, camshaft drive sprocket	M12x1	70 Nm (51.6 lbf ft)	Loctite® 243™/cone degreased
Engine coolant temperature sensor	M12x1.5	12 Nm (8.9 lbf ft)	–
Oil drain plug with magnet	M12x1.5	20 Nm (14.8 lbf ft)	–
Plug, oil pressure regulator valve	M12x1.5	20 Nm (14.8 lbf ft)	–
Oil drain plug	M14x1.5	15 Nm (11.1 lbf ft)	–
Nut, inner clutch hub	M18x1.5	100 Nm (73.8 lbf ft)	Loctite® 243™
Nut, primary gear	M18LHx1.5	100 Nm (73.8 lbf ft)	Loctite® 243™
Screw plug, oil screen	M20x1.5	15 Nm (11.1 lbf ft)	–
Plug, timing chain tensioner	M24x1.5	25 Nm (18.4 lbf ft)	–
Screw, alternator cover	M24x1.5	18 Nm (13.3 lbf ft)	–

25.4 Capacities

25.4.1 Engine oil

Engine oil	1.20 l (1.27 qt.)	Engine oil (SAE 10W/50) (☛ p. 288)	
		Alternative engine oil for harsh operating conditions and increased performance	Engine oil (SAE 10W/60) (00062010035) (☛ p. 288)

25.4.2 Coolant

Coolant	1.2 l (1.3 qt.)	Coolant (☛ p. 288)	
		Coolant (mixed ready to use) (☛ p. 288)	

25.4.3 Fuel

Total fuel tank capacity, approx. (EXC-F EU/AUS, EXC-F SIX DAYS)	9 l (2.4 US gal)	Super unleaded (ROZ 95/RON 95/PON 91) (☛ p. 289)
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Total fuel tank capacity, approx. (XCF-W, EXC-F USA)	8.5 l (2.25 US gal)	Super unleaded (ROZ 95/RON 95/PON 91) (🔧 p. 289)
Fuel reserve, approx.	1.5 l (1.6 qt.)	

25.5 Chassis

Frame	Central tube frame made of chrome molybdenum steel tubing
Fork (EXC-F EU/AUS/USA, XCF-W)	WP Suspension Up Side Down 4860 MXMA PA
Fork (EXC-F SIX DAYS)	WP Suspension Up Side Down 4860 4CS
Suspension travel (EXC-F EU/AUS/USA, XCF-W)	
Front	300 mm (11.81 in)
Suspension travel (EXC-F SIX DAYS)	
Front	292 mm (11.5 in)
Suspension travel	
Rear	335 mm (13.19 in)
Fork offset	20 mm (0.79 in)
Shock absorber	WP Suspension PDS 5018 DCC
Brake system	Disc brakes, brake calipers on floating bearings
Brake discs - diameter	
Front	260 mm (10.24 in)
Rear	220 mm (8.66 in)
Brake discs - wear limit	
Front	2.5 mm (0.098 in)
Rear	3.5 mm (0.138 in)
Tire air pressure off road	
Front	1.0 bar (15 psi)
Rear	1.0 bar (15 psi)
Road tire pressure (All EXC-F models)	
Front	1.5 bar (22 psi)
Rear	1.5 bar (22 psi)
Final drive (EXC-F EU/AUS, EXC-F SIX DAYS)	14:52 (13:52)
Final drive (XCF-W)	13:52
Final drive (EXC-F USA)	14:45
Chain	5/8 x 1/4"
Rear sprockets available	38, 40, 42, 45, 48, 49, 50, 51, 52
Steering head angle	63.5°
Wheelbase	1,482±10 mm (58.35±0.39 in)
Seat height unloaded	970 mm (38.19 in)
Ground clearance unloaded	345 mm (13.58 in)
Weight without fuel, approx. (EXC-F EU/AUS, EXC-F SIX DAYS)	108.5 kg (239.2 lb.)
Weight without fuel, approx. (XCF-W)	107 kg (236 lb.)
Weight without fuel, approx. (EXC-F USA)	109.5 kg (241.4 lb.)
Maximum permissible front axle load	145 kg (320 lb.)
Maximum permissible rear axle load	190 kg (419 lb.)
Maximum permissible overall weight	335 kg (739 lb.)

25.6 Electrical system

Battery	YTX4L-BS	Battery voltage: 12 V Nominal capacity: 3 Ah Maintenance-free
Speedometer battery	CR 2430	Battery voltage: 3 V
Fuse	58011109105	5 A
Fuse	58011109110	10 A
Fuse	58011109120	20 A
Headlight	S2 / socket BA20d	12 V 35/35 W
Parking light	W5W / socket W2.1x9.5d	12 V 5 W
Indicator lamps	W2.3W / socket W2x4.6d	12 V 2.3 W
Turn signal (EXC-F EU/AUS, EXC-F SIX DAYS)	R10W / socket BA15s	12 V 10 W
Turn signal (EXC-F USA)	RY10W / socket BAU15s	12 V 10 W
Brake/tail light	LED	
License plate lamp (All EXC-F models)	W5W / socket W2.1x9.5d	12 V 5 W

25.7 Tires

Validity	Front tires	Rear tires
(All EXC-F models)	80/100 - 21 M/C 51M TT MAXXIS MAXX CROSS SI	140/80 - 18 M/C 70R TT MAXXIS MAXX ENDURO
(XCF-W)	80/100 - 21 51M TT Dunlop GEOMAX MX51	110/100 - 18 64M TT Dunlop GEOMAX MX51
Additional information is available in the Service section under: http://www.ktm.com		

25.8 fork**25.8.1 EXC-F EU/AUS/USA, XCF-W**

Fork part number	14.18.7L.67
Fork	WP Suspension Up Side Down 4860 MXMA PA
Compression damping	
Comfort	22 clicks
Standard	20 clicks
Sport	18 clicks
Rebound damping	
Comfort	20 clicks
Standard	18 clicks
Sport	16 clicks
Spring preload - Preload Adjuster	
Comfort	1 turn
Standard	2 turns
Sport	2 turns
Spring length with preload spacer(s)	
Weight of rider: 65... 75 kg (143... 165 lb.)	513 mm (20.2 in)
Weight of rider: 75... 85 kg (165... 187 lb.)	513 mm (20.2 in)
Weight of rider: 85... 95 kg (187... 209 lb.)	513 mm (20.2 in)
Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	4.0 N/mm (22.8 lb/in)

Weight of rider: 75... 85 kg (165... 187 lb.)	4.2 N/mm (24 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	4.4 N/mm (25.1 lb/in)
Fork length	940 mm (37.01 in)
Air chamber length	110 ⁺¹⁰ ₋₂₀ mm (4.33 ^{+0.39} _{-0.79} in)
Fork oil per fork leg	620 ml (20.96 fl. oz.)
Fork oil (SAE 4) (48601166S1) (☛ p. 289)	

25.8.2 EXC-F SIX DAYS

Fork part number	24.18.7M.67
Fork	WP Suspension Up Side Down 4860 4CS
Compression damping	
Comfort	24 clicks
Standard	22 clicks
Sport	16 clicks
Rebound damping	
Comfort	23 clicks
Standard	21 clicks
Sport	21 clicks
Spring length with preload spacer(s)	470 mm (18.5 in)
Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	4.2 N/mm (24 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	4.4 N/mm (25.1 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	4.6 N/mm (26.3 lb/in)
Fork length	932 mm (36.69 in)
Air chamber length	110 mm (4.33 in)
Fork oil per fork leg	607 ml (20.52 fl. oz.)
Fork oil (SAE 4) (48601166S1) (☛ p. 289)	

25.9 Shock absorber

Shock absorber part number	12.18.7L.67
Shock absorber	WP Suspension PDS 5018 DCC
Compression damping, low-speed	
Comfort	25 clicks
Standard	20 clicks
Sport	15 clicks
Compression damping, high-speed	
Comfort	2 turns
Standard	1.5 turns
Sport	1.25 turns
Rebound damping	
Comfort	28 clicks
Standard	24 clicks
Sport	22 clicks
Spring preload	8 mm (0.31 in)
Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	66 N/mm (377 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	69 N/mm (394 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	72 N/mm (411 lb/in)
Spring length	250 mm (9.84 in)
Gas pressure	10 bar (145 psi)
Static sag	33... 35 mm (1.3... 1.38 in)
Riding sag	105... 115 mm (4.13... 4.53 in)
Fitted length	417 mm (16.42 in)

Damper oil	Shock absorber oil (SAE 2.5) (50180342S1) (🔧 p. 289)
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25.10 chassis tightening torques

Spoke nipple, front wheel	M4.5	5... 6 Nm (3.7... 4.4 lbf ft)	–
Spoke nipple, rear wheel	M4.5	5... 6 Nm (3.7... 4.4 lbf ft)	–
Screw, battery terminal	M5	2.5 Nm (1.84 lbf ft)	–
Screw, intake air temperature sensor	M5	2 Nm (1.5 lbf ft)	–
Screw, shock absorber adjusting ring	M5	5 Nm (3.7 lbf ft)	–
Screw, spoiler on fuel tank (XCF-W, EXC-F USA)	M5x12	1.5 Nm (1.11 lbf ft)	–
Remaining nuts, chassis	M6	10 Nm (7.4 lbf ft)	–
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)	–
Screw, ball joint of push rod on foot brake cylinder	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, chain sliding guard	M6	6 Nm (4.4 lbf ft)	Loctite® 243™
Screw, front brake disc	M6	14 Nm (10.3 lbf ft)	Loctite® 243™
Screw, rear brake disc	M6	14 Nm (10.3 lbf ft)	Loctite® 243™
Fuel connection on fuel pump	M8	10 Nm (7.4 lbf ft)	–
Nut, foot brake lever stop	M8	20 Nm (14.8 lbf ft)	–
Nut, rear sprocket screw	M8	35 Nm (25.8 lbf ft)	Loctite® 2701
Nut, rim lock	M8	10 Nm (7.4 lbf ft)	–
Remaining nuts, chassis	M8	25 Nm (18.4 lbf ft)	–
Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)	–
Screw, bottom triple clamp (EXC-F SIX DAYS)	M8	12 Nm (8.9 lbf ft)	–
Screw, bottom triple clamp (EXC-F EU/AUS/USA, XCF-W)	M8	15 Nm (11.1 lbf ft)	–
Screw, chain sliding piece	M8	15 Nm (11.1 lbf ft)	–
Screw, engine brace	M8	33 Nm (24.3 lbf ft)	–
Screw, fork stub	M8	15 Nm (11.1 lbf ft)	–
Screw, front brake caliper	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
Screw, handlebar clamp	M8	20 Nm (14.8 lbf ft)	–
Screw, side stand attachment	M8	45 Nm (33.2 lbf ft)	Loctite® 2701
Screw, subframe	M8	35 Nm (25.8 lbf ft)	Loctite® 2701
Screw, top steering stem (EXC-F SIX DAYS)	M8	17 Nm (12.5 lbf ft)	Loctite® 243™
Screw, top steering stem (EXC-F EU/AUS/USA, XCF-W)	M8	20 Nm (14.8 lbf ft)	–
Screw, top triple clamp (EXC-F SIX DAYS)	M8	17 Nm (12.5 lbf ft)	–
Screw, top triple clamp (EXC-F EU/AUS/USA, XCF-W)	M8	20 Nm (14.8 lbf ft)	–
Engine attachment bolt	M10	60 Nm (44.3 lbf ft)	–
Remaining nuts, chassis	M10	45 Nm (33.2 lbf ft)	–
Remaining screws, chassis	M10	45 Nm (33.2 lbf ft)	–
Screw, handlebar holder	M10	40 Nm (29.5 lbf ft)	Loctite® 243™
Nut, fuel pump fixation	M12	15 Nm (11.1 lbf ft)	–
Screw, bottom shock absorber	M12	80 Nm (59 lbf ft)	Loctite® 2701
Screw, top shock absorber	M12	80 Nm (59 lbf ft)	Loctite® 2701
Nut, seat fixing	M12x1	20 Nm (14.8 lbf ft)	–
Nut, swingarm pivot	M16x1.5	100 Nm (73.8 lbf ft)	–
Nut, rear wheel spindle	M20x1.5	80 Nm (59 lbf ft)	–
Screw, top steering head	M20x1.5	12 Nm (8.9 lbf ft)	–
Screw-in nozzles, cooling system	M20x1.5	12 Nm (8.9 lbf ft)	Loctite® 243™

Screw, front wheel spindle	M24x1.5	45 Nm (33.2 lbf ft)	–
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26.1 Cleaning the motorcycle**Note**

Material damage Damage and destruction of components by high-pressure cleaning equipment.

- When cleaning the vehicle with a pressure cleaner, do not point the water jet directly onto electrical components, connectors, cables, bearings, etc. Maintain a minimum distance of 60 cm between the nozzle of the pressure cleaner and the component. Excessive pressure can cause malfunctions or destroy these parts.

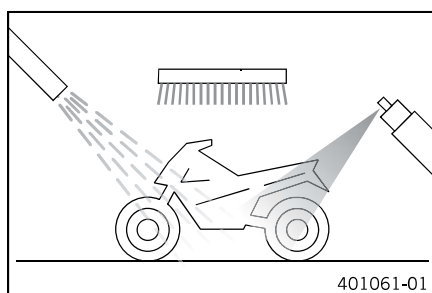
**Warning**

Environmental hazard Hazardous substances cause environmental damage.

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

**Info**

If you clean the motorcycle regularly, its value and appearance will be maintained over a long period.
Avoid direct sunshine on the motorcycle during cleaning.



- Close off the exhaust system to prevent water from entering.
- First remove coarse dirt particles with a gentle spray of water.
- Spray very dirty areas with a normal motorcycle cleaner and then clean with a paintbrush.

Motorcycle cleaner (☛ p. 291)

**Info**

Use warm water containing normal motorcycle cleaner and a soft sponge.
Never apply motorcycle cleaner to the dry vehicle; always rinse with water first.

- After rinsing the motorcycle with a gentle spray of water, allow it to dry thoroughly.
- Remove the plug from the exhaust system.

**Warning**

Danger of accidents Reduced braking efficiency due to a wet or dirty brake system.

- Clean or dry a dirty or wet brake system by riding and braking gently.

- After cleaning, ride a short distance until the engine reaches operating temperature.

**Info**

The heat produced causes water at inaccessible locations in the engine and brake system to evaporate.

- After the motorcycle has cooled off, lubricate all moving parts and bearings.
- Clean the chain. (☛ p. 108)
- Treat bare metal parts (except for brake discs and exhaust system) with anti-corrosion materials.

Cleaning and preserving materials for metal, rubber and plastic (☛ p. 290)

- Treat all plastic parts and powder-coated parts with a mild cleaning and care product.

Paint cleaner and polish for high-gloss and matte finishes, bare metal and plastic surfaces (☛ p. 291)

(EXC-F USA)

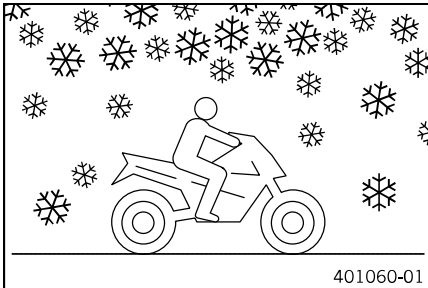
- Lubricate the ignition switch.

Universal oil spray (☛ p. 291)

26.2 Checks and maintenance steps for winter operation**Info**

If the motorcycle is used in the winter, salt can be expected on the roads. Precautions need to be taken against road salt corrosion.

If the vehicle was operated in road salt, clean it with cold water after riding. Warm water would enhance the corrosive effects of salt.



- Clean the motorcycle. (🔧 p. 220)
- Clean the brake system.

**Info**

After **EVERY** trip on salted roads, thoroughly wash the brake calipers and brake linings with cold water and dry carefully. This should be done after the parts are cooled down and while they are installed.

After riding on salted roads, thoroughly wash the motorcycle with cold water and dry it well.

- Treat the engine, swingarm, and all other bright and zinc-plated parts (except for the brake discs) with a wax-based corrosion inhibitor.

**Info**

Corrosion inhibitor is not permitted to come in contact with the brake discs as this would greatly reduce the braking force.

- Clean the chain. (🔧 p. 108)

27.1 Storage



Warning

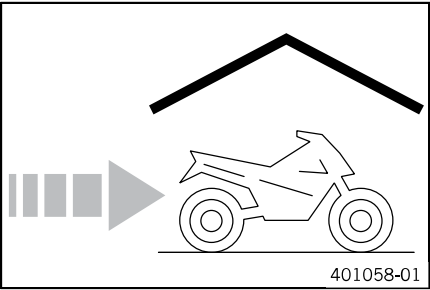
Danger of poisoning Fuel is poisonous and a health hazard.

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



Info

If you want to garage the motorcycle for a longer period, take the following 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.



- Clean the motorcycle. (🔧 p. 220)
- Change the engine oil and oil filter, clean the oil screen. (🔧 p. 202)
- Check the antifreeze and coolant level. (🔧 p. 198)
- When refueling for the last time before taking the motorcycle out of service, add fuel additive.

Fuel additive (🔧 p. 290)

- Check the tire air pressure. (🔧 p. 99)
- Remove the battery. (🔧 p. 112)
- Charge the battery. (🔧 p. 113)

Guideline

Storage temperature of battery without direct sunlight	0... 35 °C (32... 95 °F)
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- Store the vehicle in a dry location that is not subject to large fluctuations in temperature.



Info

KTM recommends raising the motorcycle.

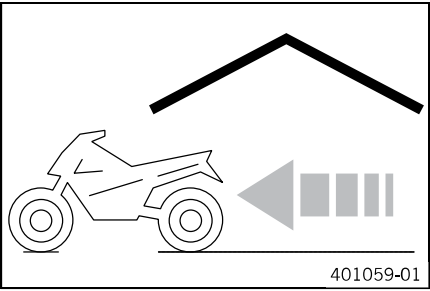
- Raise the motorcycle with the lift stand. (🔧 p. 11)
- Cover the motorcycle with a porous sheet or blanket. Do not use non-porous materials since they prevent humidity from escaping, thus causing corrosion.



Info

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.

27.2 Preparing for use after storage



- Remove the motorcycle from the lift stand. (🔧 p. 11)
- Install the battery. (🔧 p. 112)
- Refuel.
- Perform checks and maintenance work when preparing the vehicle for use.
- Take a test ride.

28.1 Service schedule

	S1N	S15A	S30A
Read out the fault memory using the KTM diagnostics tool.	•	•	•
Check that the electrical equipment is functioning properly.	•	•	•
Check and charge the battery.		•	•
Check the front brake linings. (🔧 p. 114)		•	•
Check the rear brake linings. (🔧 p. 119)		•	•
Check the brake discs. (🔧 p. 100)		•	•
Check the brake lines for damage and leakage.		•	•
Check the rear brake fluid level. (🔧 p. 122)		•	•
Check the free travel of the foot brake lever. (🔧 p. 121)		•	•
Check the frame and swingarm.		•	•
Check the swingarm bearing.			•
Check the heim joints at the top and bottom of the shock absorber.		•	•
Check the tire condition. (🔧 p. 99)	•	•	•
Check the tire air pressure. (🔧 p. 99)	•	•	•
Check the wheel bearing for play.		•	•
Check the wheel hubs.		•	•
Check the rim run-out.	•	•	•
Check the spoke tension. (🔧 p. 100)	•	•	•
Check the chain, rear sprocket, engine sprocket and chain guide. (🔧 p. 106)		•	•
Check the chain tension. (🔧 p. 105)	•	•	•
Grease all moving parts (e.g., side stand, hand lever, chain, ...) and check for smooth operation.		•	•
Check/correct the fluid level of the hydraulic clutch. (🔧 p. 197)		•	•
Check the front brake fluid level. (🔧 p. 117)		•	•
Check the free travel of the hand brake lever. (🔧 p. 116)		•	•
Check the steering head bearing play. (🔧 p. 54)	•	•	•
Check the valve clearance.	•		•
Check the clutch.			•
Change the shaft seal rings of the water pump.			•
Change the engine oil and oil filter, clean the oil screen. (🔧 p. 202)	•	•	•
Check all hoses (e. g., fuel, cooling, bleeding, drainage) and sleeves for cracking, leaks, and incorrect routing.	•	•	•
Check the antifreeze and coolant level. (🔧 p. 198)	•	•	•
Check the cables for damage and routing without sharp bends.		•	•
Check that the cables are undamaged, routed without sharp bends and set correctly.	•	•	•
Clean the air filter and air filter box.		•	•
Change the glass fiber yarn filling of the main silencer. (🔧 p. 84)			•
Check the screws and nuts for tightness.	•	•	•
Check the headlight setting. (🔧 p. 127)	•	•	•
Change the fuel screen. (🔧 p. 91)	•	•	•
Check the fuel pressure. (🔧 p. 95)		•	•
Adjust the idle speed. (🔧 p. 210)	•	•	•
Check that the radiator fan is functioning properly. (EXC-F SIX DAYS)	•	•	•
Final check: Check the vehicle for roadworthiness and take a test ride.	•	•	•
Read out the fault memory using the KTM diagnostics tool after a test ride.	•	•	•
Make the service entry in KTM DEALER.NET and in the service record.	•	•	•

S1N: Once after 1 operating hour**S15A:** Every 15 operating hours**S30A:** Every 30 operating hours/after every race

28.2 Service work (as additional order)

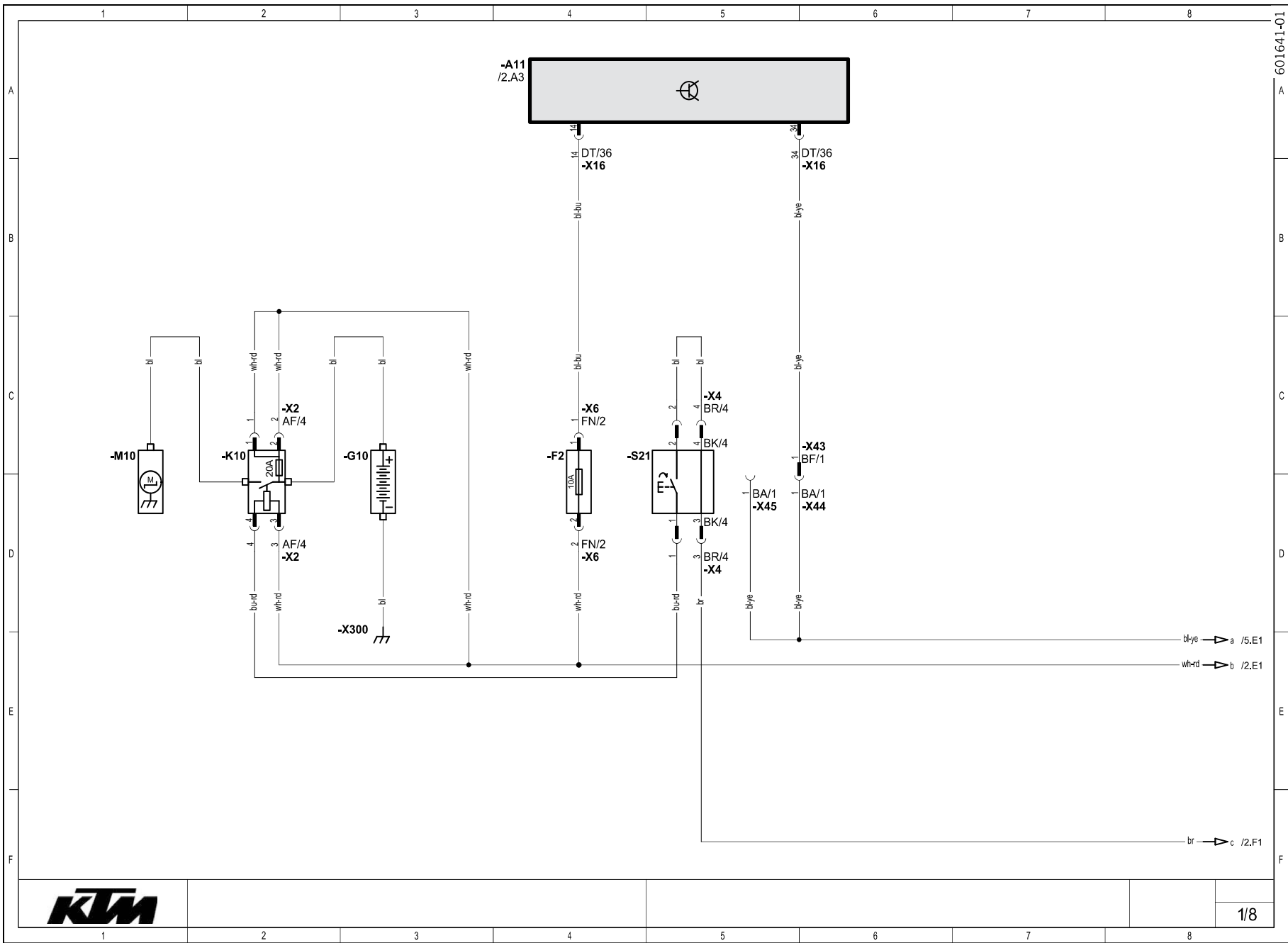
	S15N	S45A	S105A	J1A
Change the front brake fluid. (☛ p. 118)				•
Change the rear brake fluid. (☛ p. 123)				•
Change the hydraulic clutch fluid. (☛ p. 197)				•
Grease the steering head bearing. (☛ p. 52)				•
Clean the spark arrestor. (XCF-W, EXC-F USA)				•
Perform a fork service. (EXC-F SIX DAYS) (☛ p. 37)	•	•		
Perform a fork service. (EXC-F EU/AUS/USA, XCF-W) (☛ p. 17)	•	•		
Service the shock absorber. (☛ p. 64)		•		
Change the spark plug and spark plug connector.			•	
Change the piston.			•	
Check/measure the cylinder.			•	
Check the cylinder head.			•	
Change the valves, valve springs and valve spring seats.			•	
Check the camshaft and cam lever.			•	
Change the connecting rod, conrod bearing and crank pin.			•	
Check the transmission and shift mechanism.			•	
Check the oil pressure regulator valve.			•	
Change the suction pump.			•	
Check the pressure pump and lubrication system.			•	
Replace the timing chain.			•	
Check the timing assembly.			•	
Change all engine bearings.			•	

S15N: Once after 15 operating hours

S45A: Every 45 operating hours

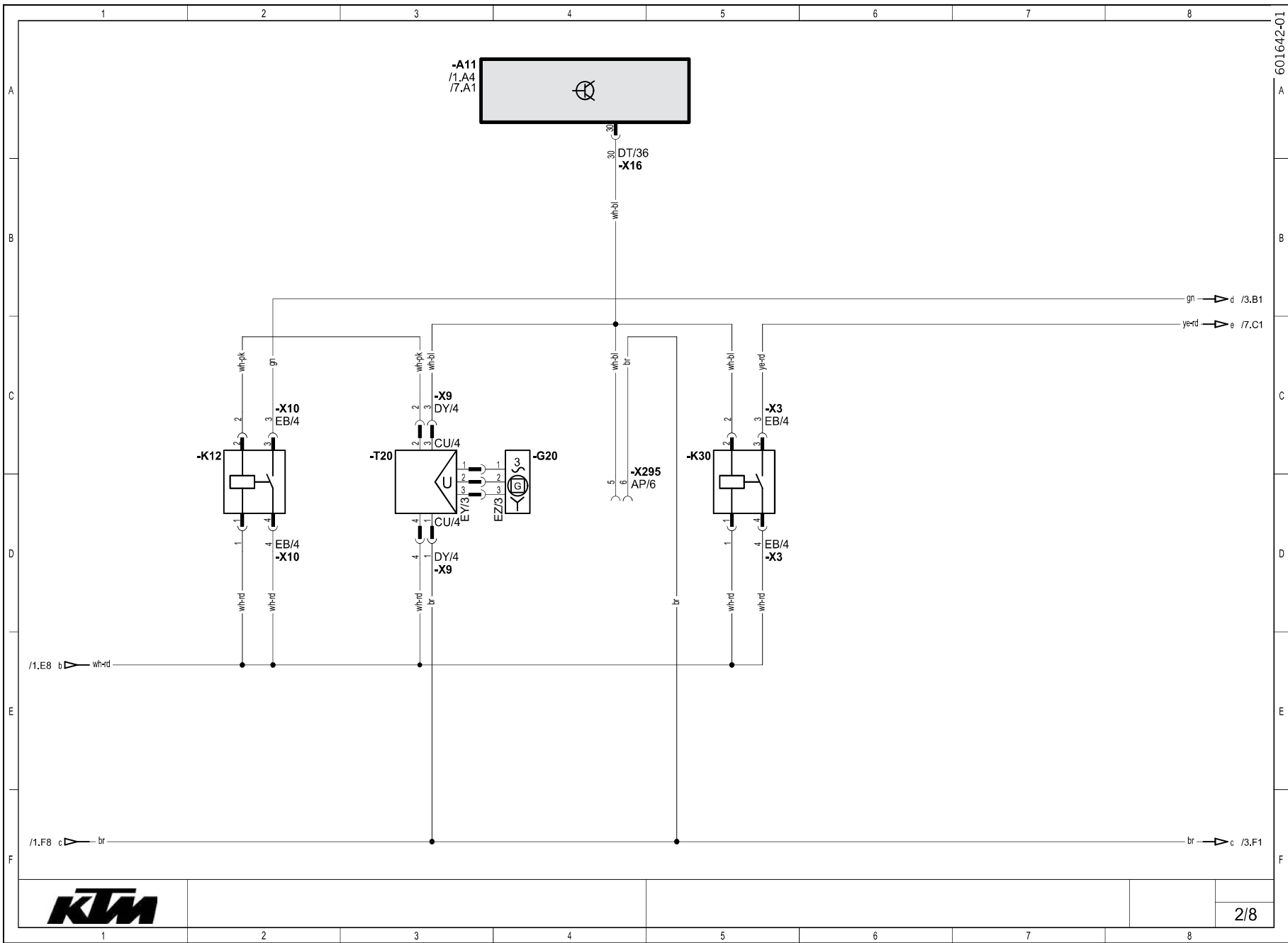
S105A: Every 105 operating hours/every 50 operating hours when used for motorsports

J1A: Annually



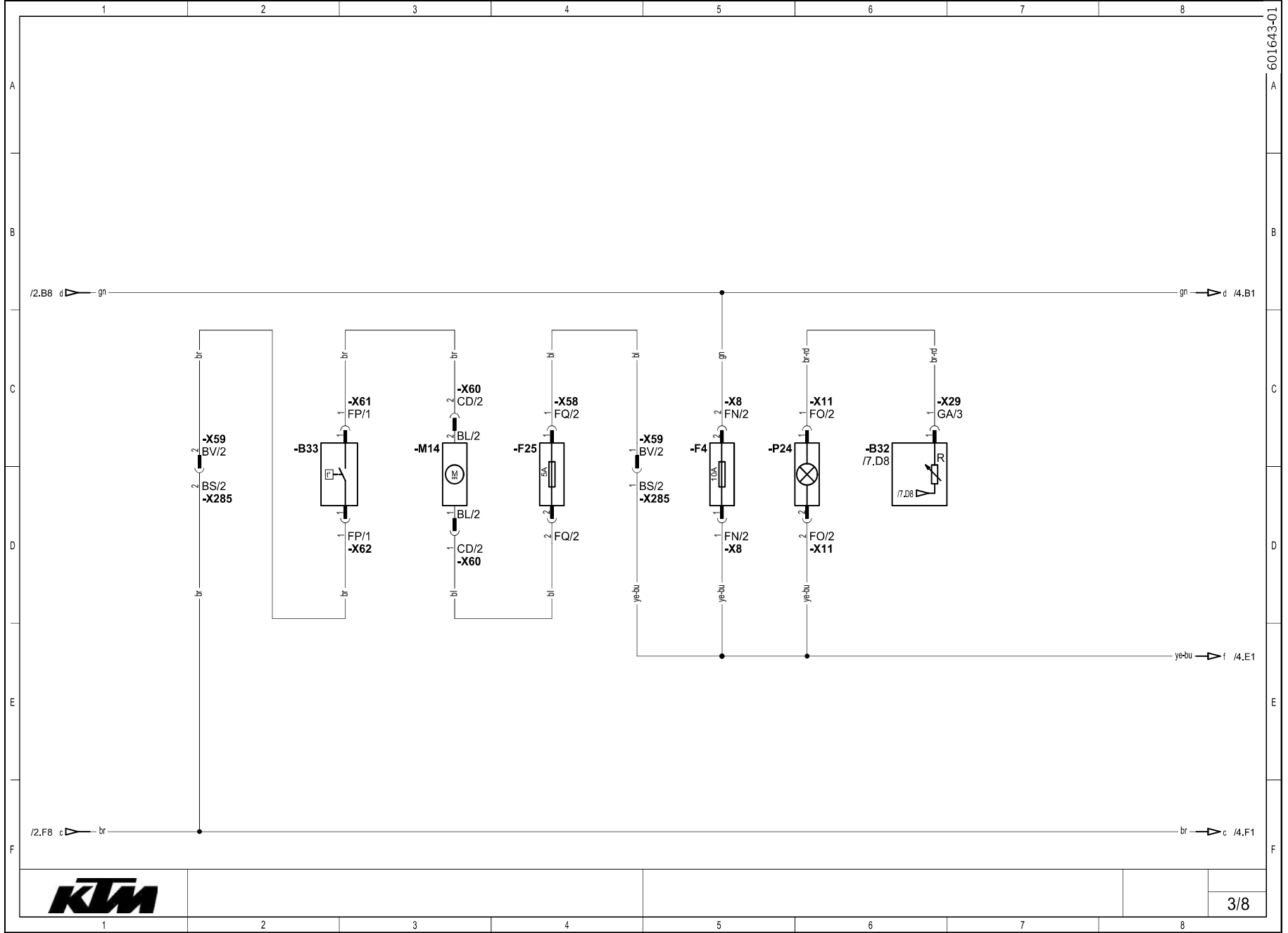
Components:

A11	EFI control unit
F2	Fuse
G10	Battery
K10	Starter relay with main fuse
M10	Starter motor
S21	Electric starter button



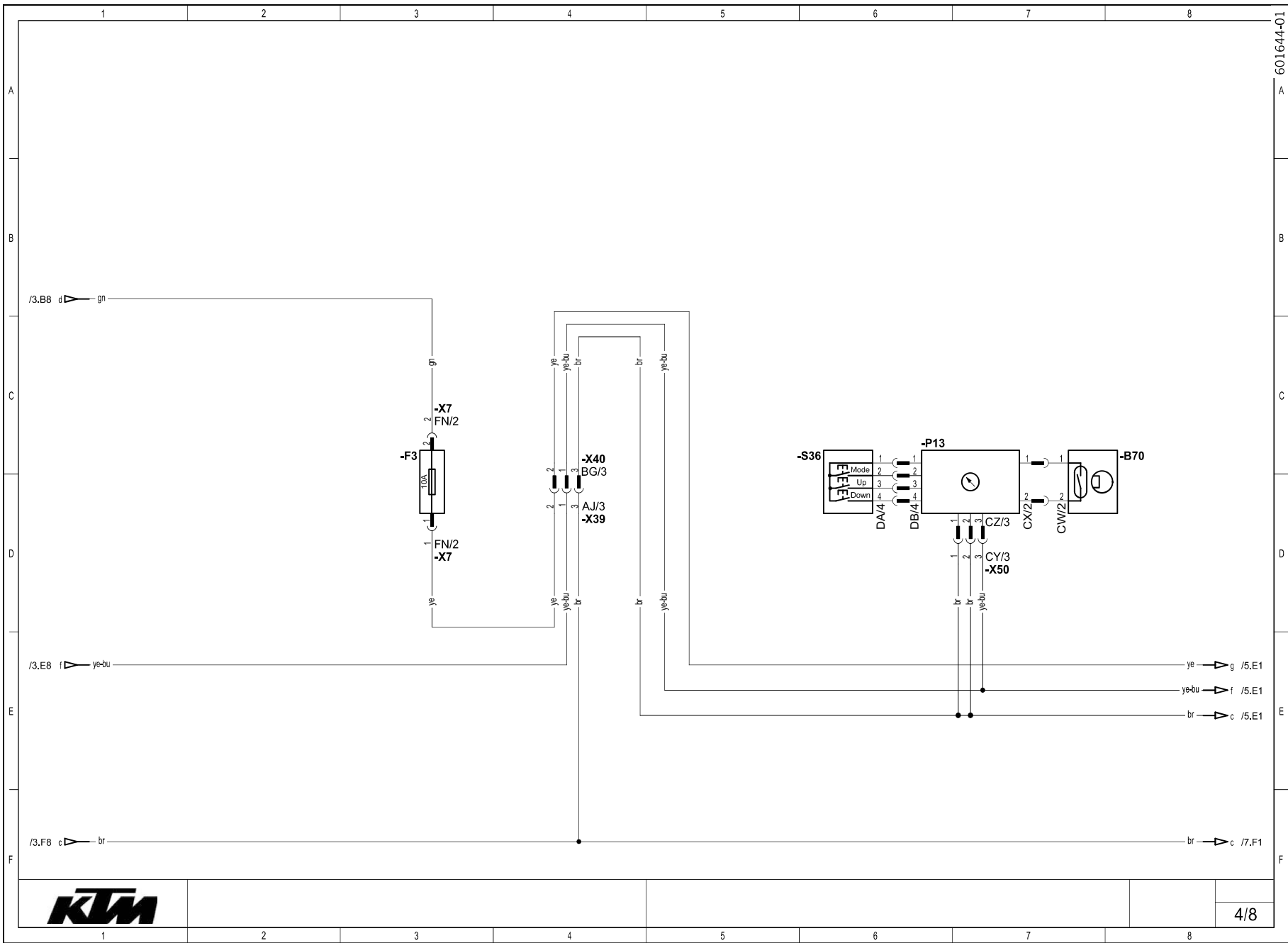
Components:

A11	EFI control unit
G20	Alternator
K12	Light relay
K30	Power relay
T20	Voltage regulator
X295	Diagnostics connector



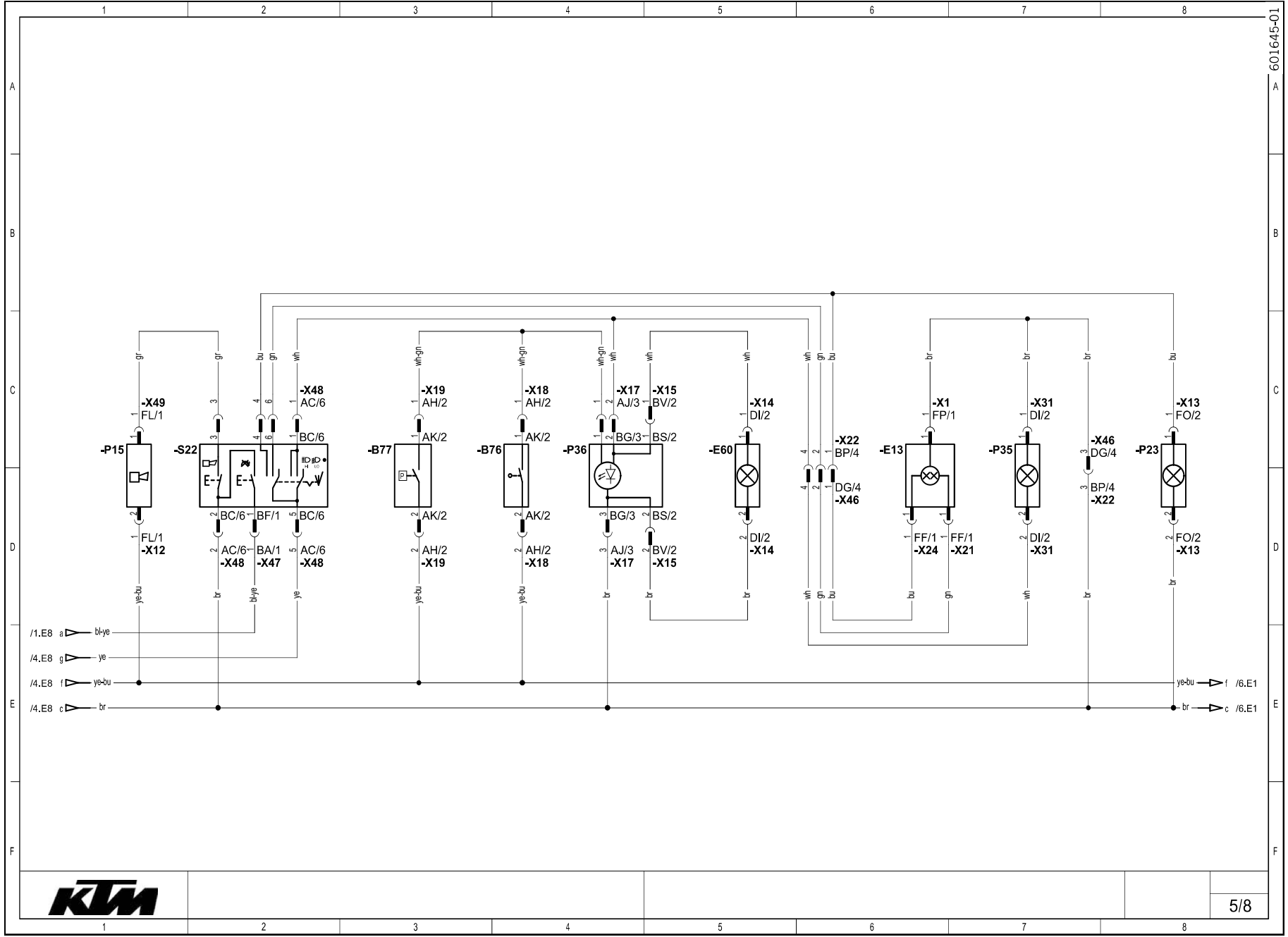
Components:

B32	Fuel tank sensor
B33	Temperature switch for radiator fan (optional)
F4	Fuse
F25	Fuse (optional)
M14	Radiator fan (optional)
P24	Low fuel warning lamp
X285	Connector for radiator fan (optional)



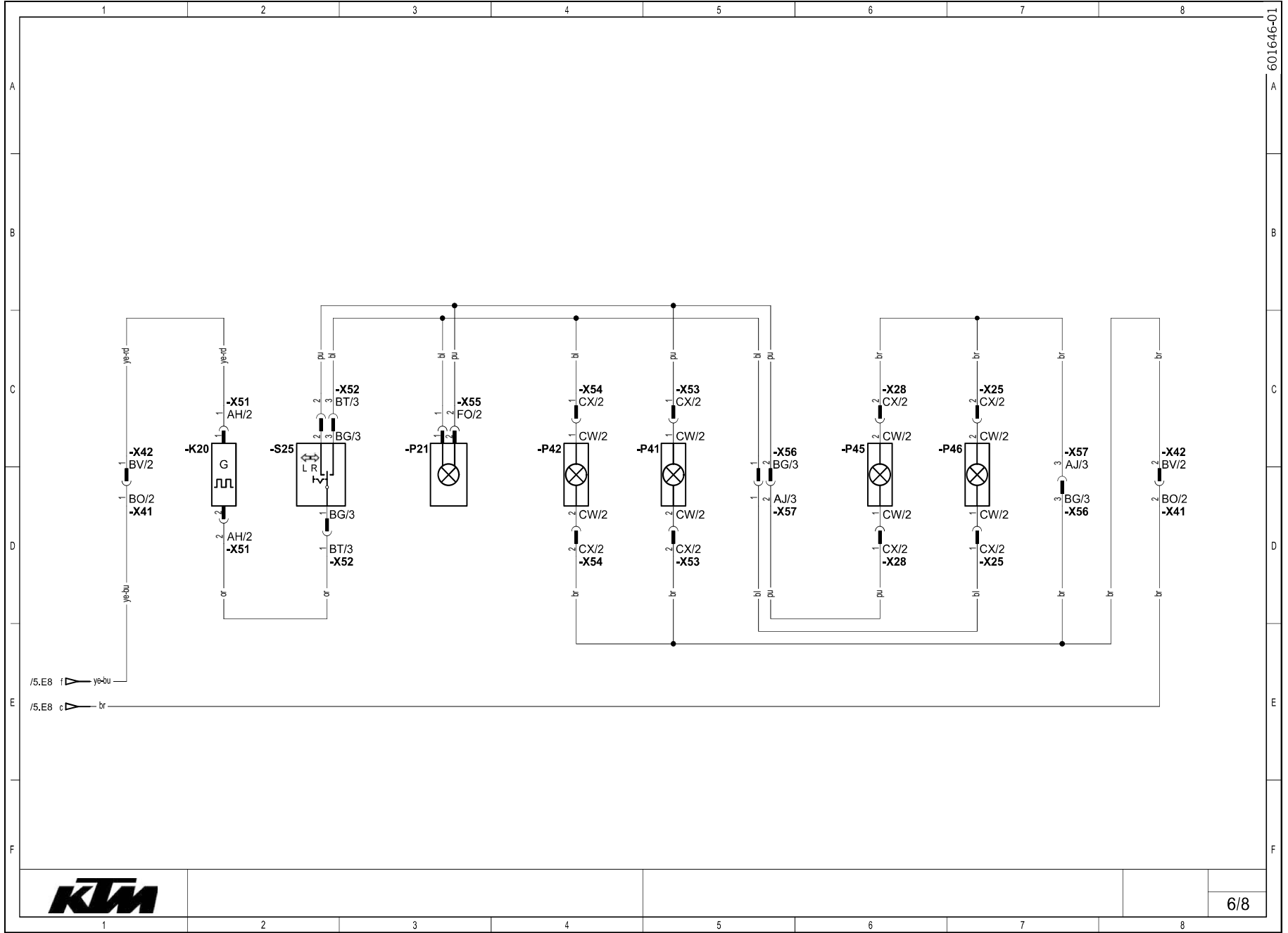
Components:

B70	Wheel speed sensor, front
F3	Fuse
P13	Speedometer
S36	Tripmaster switch (optional)



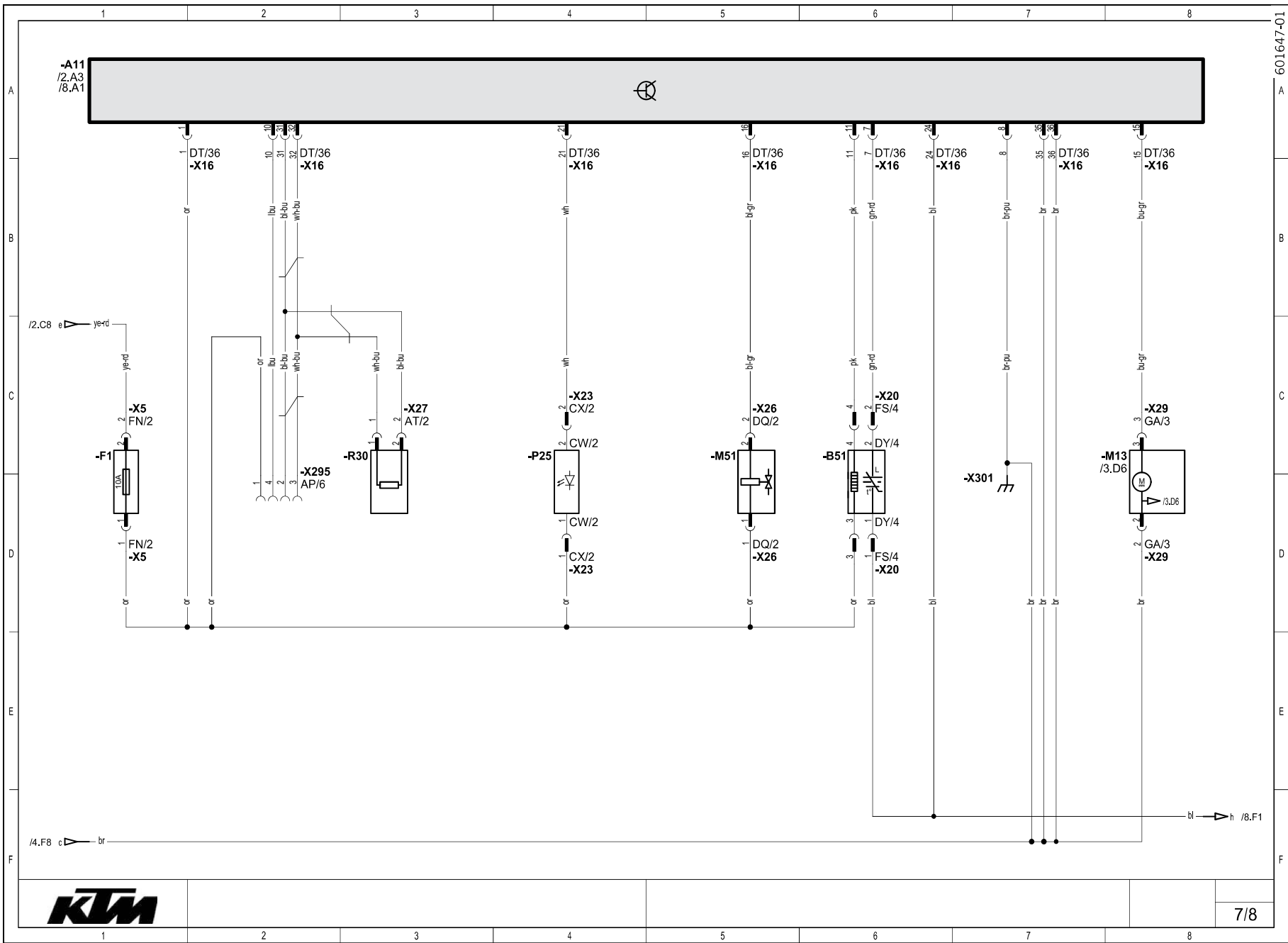
Components:

B76	Brake light switch, front
B77	Brake light switch, rear
E13	Low beam, high beam
E60	License plate lamp
P15	Horn
P23	High beam indicator light
P35	Parking light
P36	Brake/tail light
S22	Light switch, horn button, kill switch



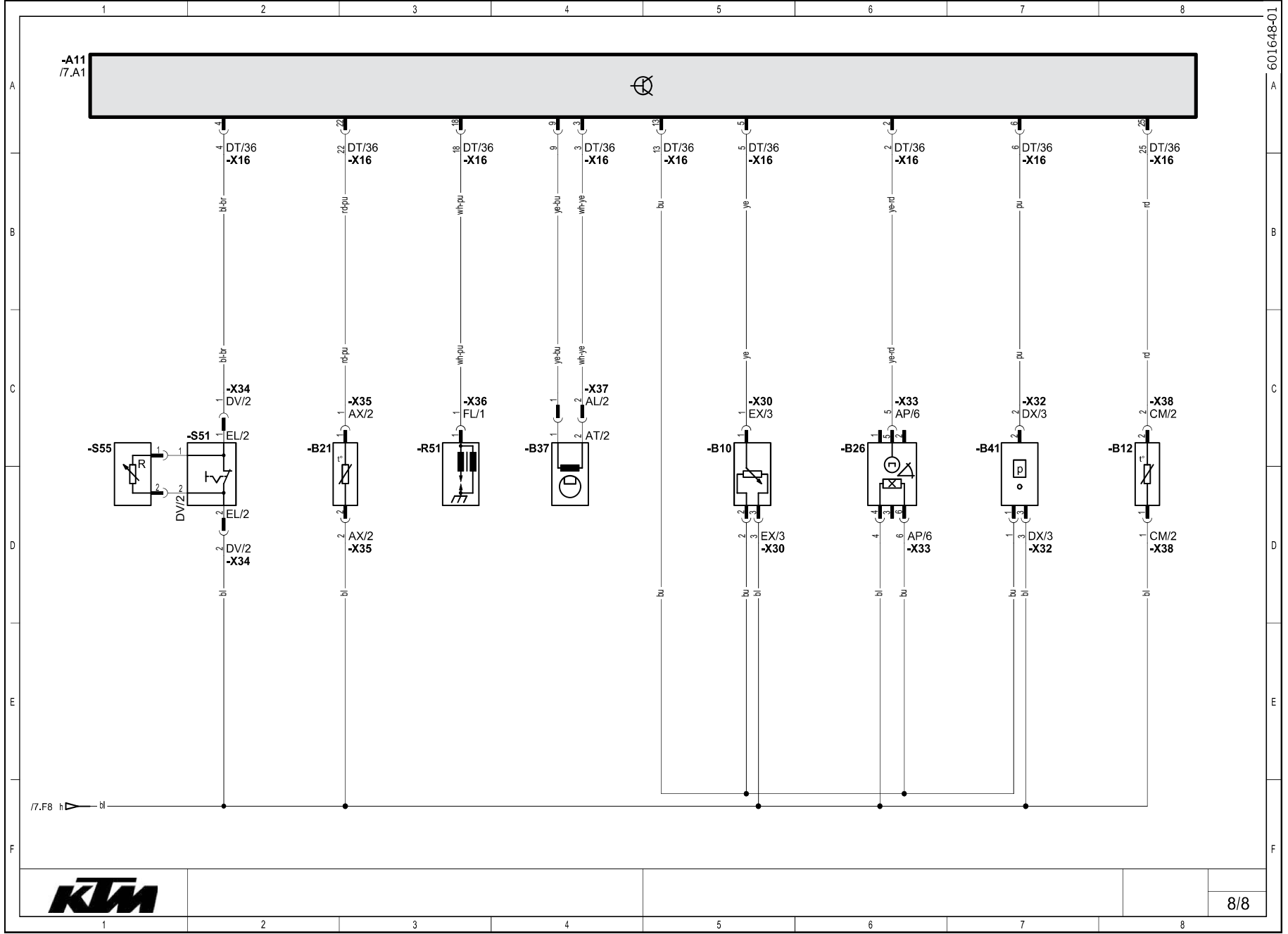
Components:

K20	Turn signal relay
P21	Turn signal indicator light
P41	Turn signal, front left
P42	Turn signal, front right
P45	Turn signal, rear left
P46	Turn signal, rear right
S25	Turn signal switch



Components:

A11	EFI control unit
B51	Lambda sensor (cylinder 1)
F1	Fuse
M13	Fuel pump
M51	Injector (cylinder 1)
R30	CAN-bus terminating resistor 1
P25	FI warning lamp (MIL)
X295	Diagnostics connector

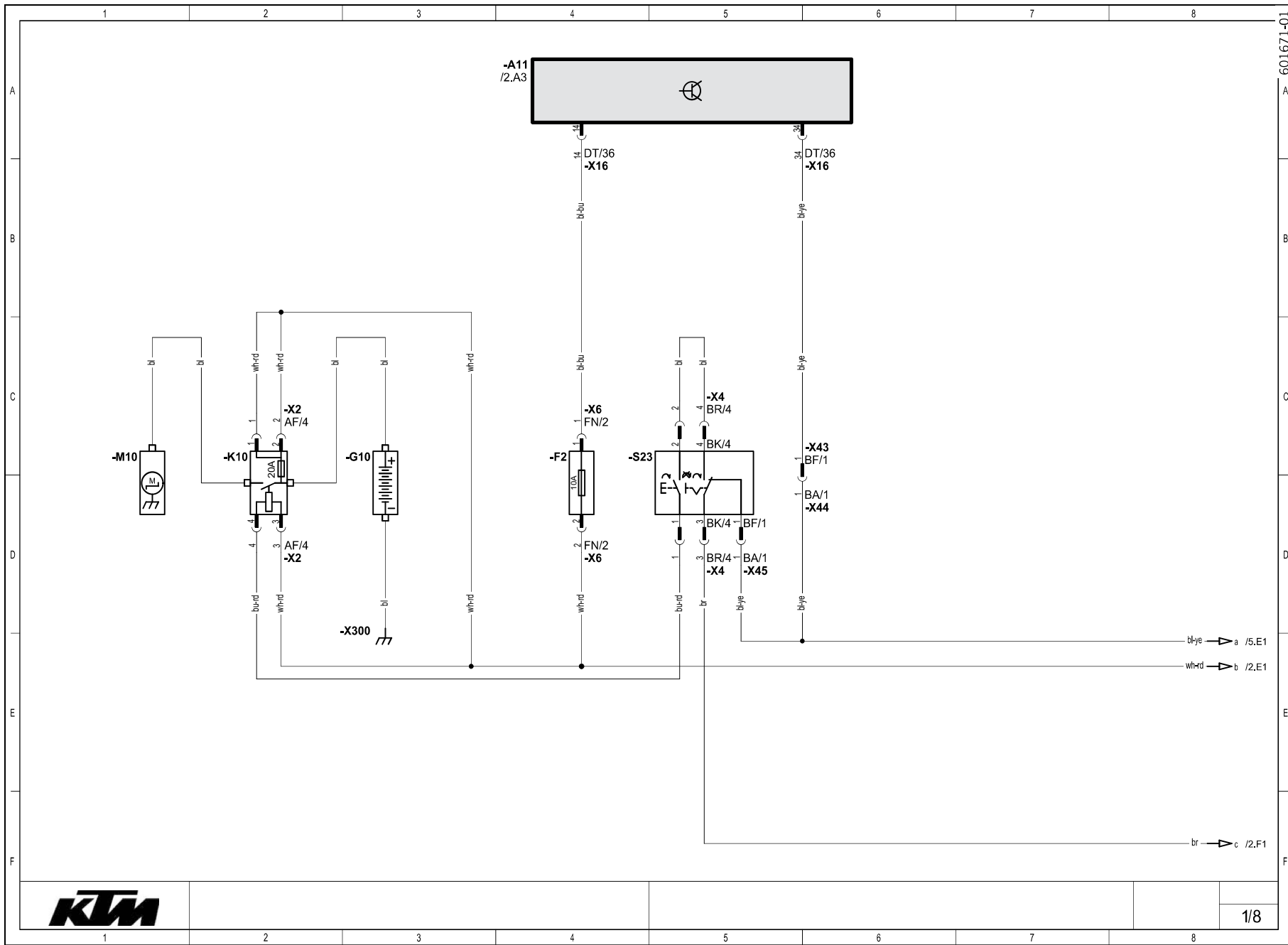


Components:

A11	EFI control unit
B10	Throttle position sensor circuit A
B12	Intake air temperature sensor
B21	Engine coolant temperature sensor (cylinder 1)
B26	Rollover sensor
B37	Ignition pulse generator
B41	Manifold absolute pressure sensor (cylinder 1)
R51	Ignition coil (cylinder 1)
S51	Map-Select switch for riding mode (optional)
S55	Map-Select switch for basic setting (optional)

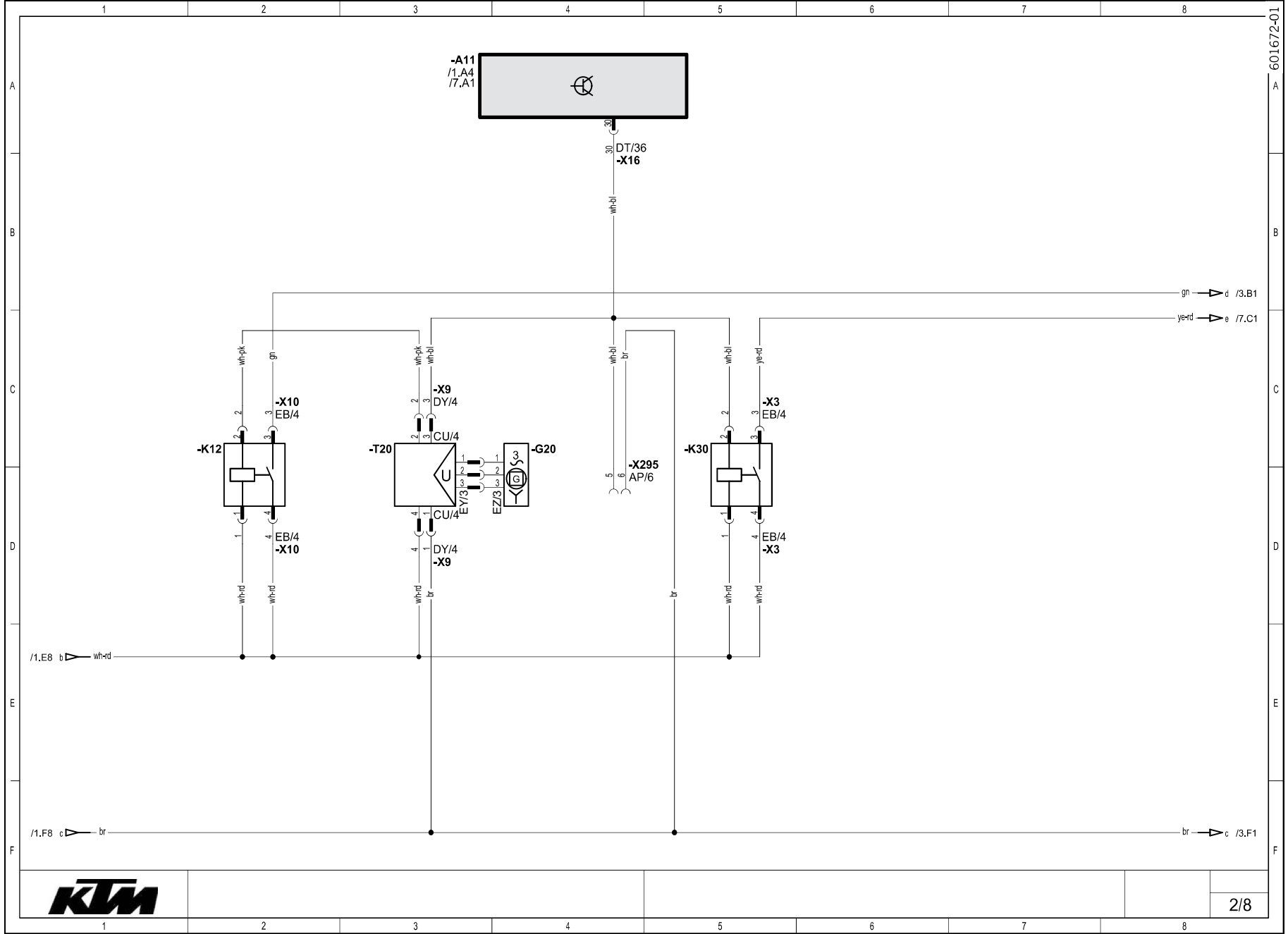
Cable colors:

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



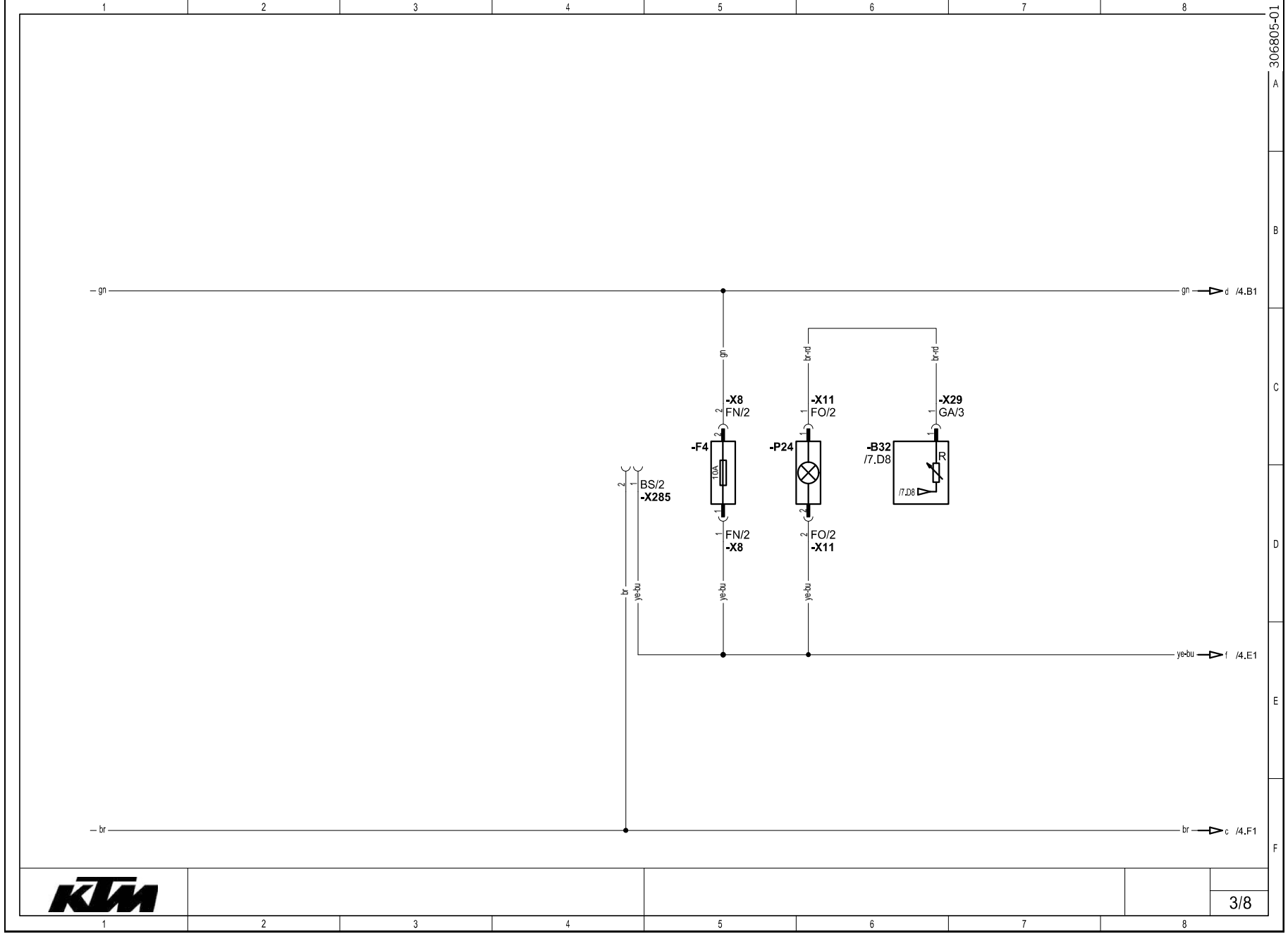
Components:

A11	EFI control unit
F2	Fuse
G10	Battery
K10	Starter relay with main fuse
M10	Starter motor
S23	Emergency OFF switch, electric starter button



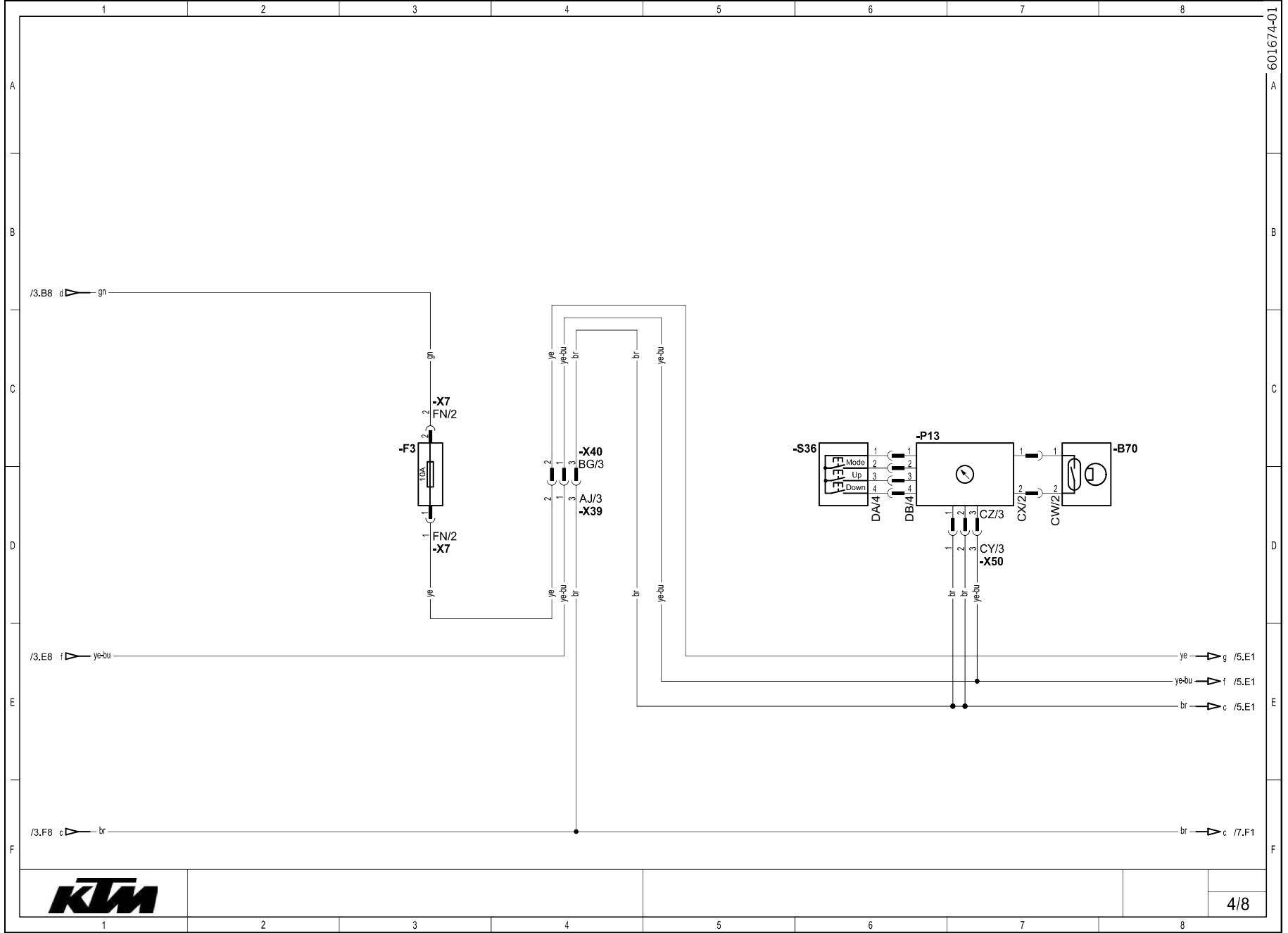
Components:

A11	EFI control unit
G20	Alternator
K12	Light relay
K30	Power relay
T20	Voltage regulator
X295	Diagnostics connector



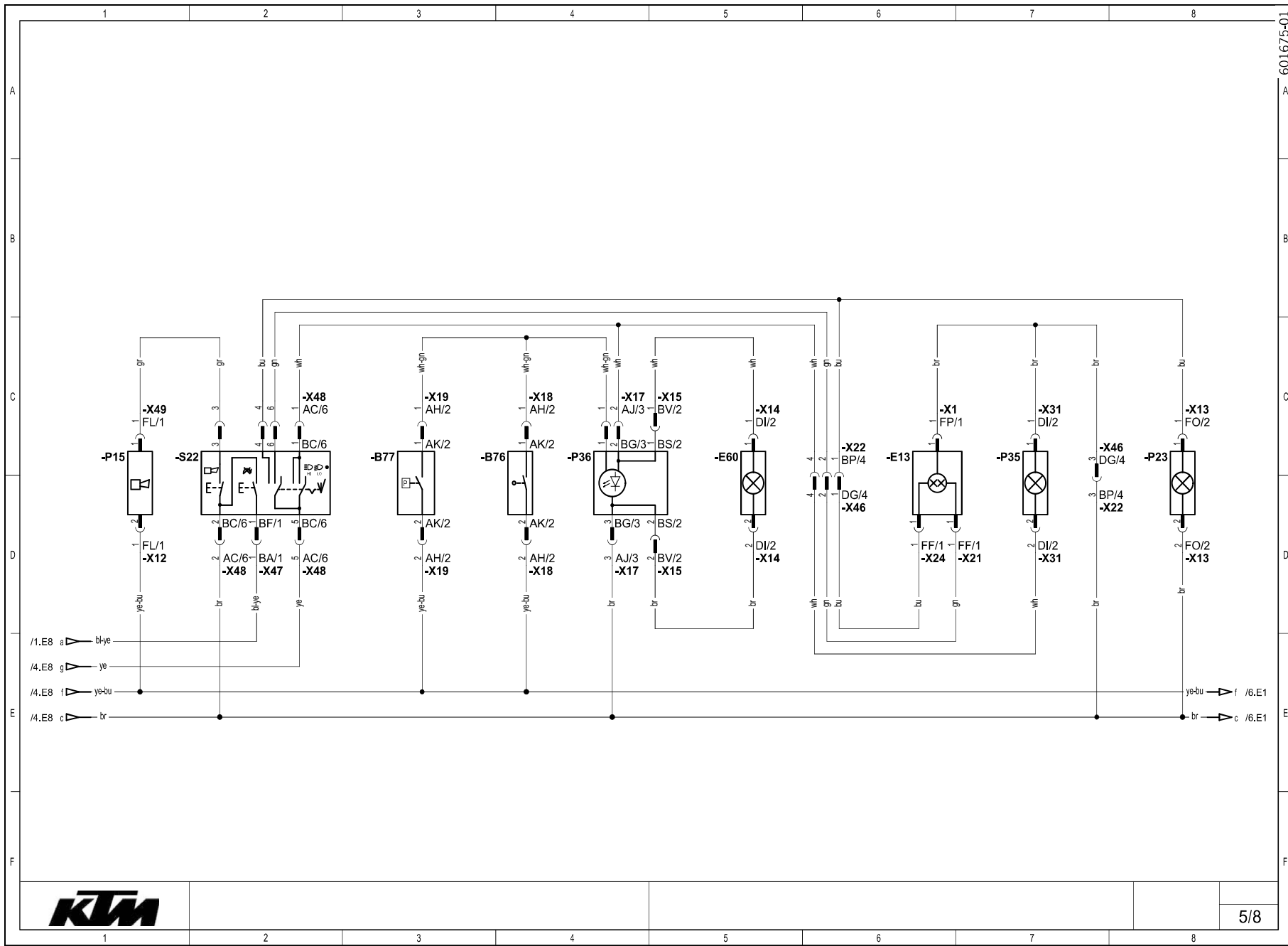
Components:

B32	Fuel tank sensor
F4	Fuse
P24	Low fuel warning lamp
X285	Connector for radiator fan (optional)



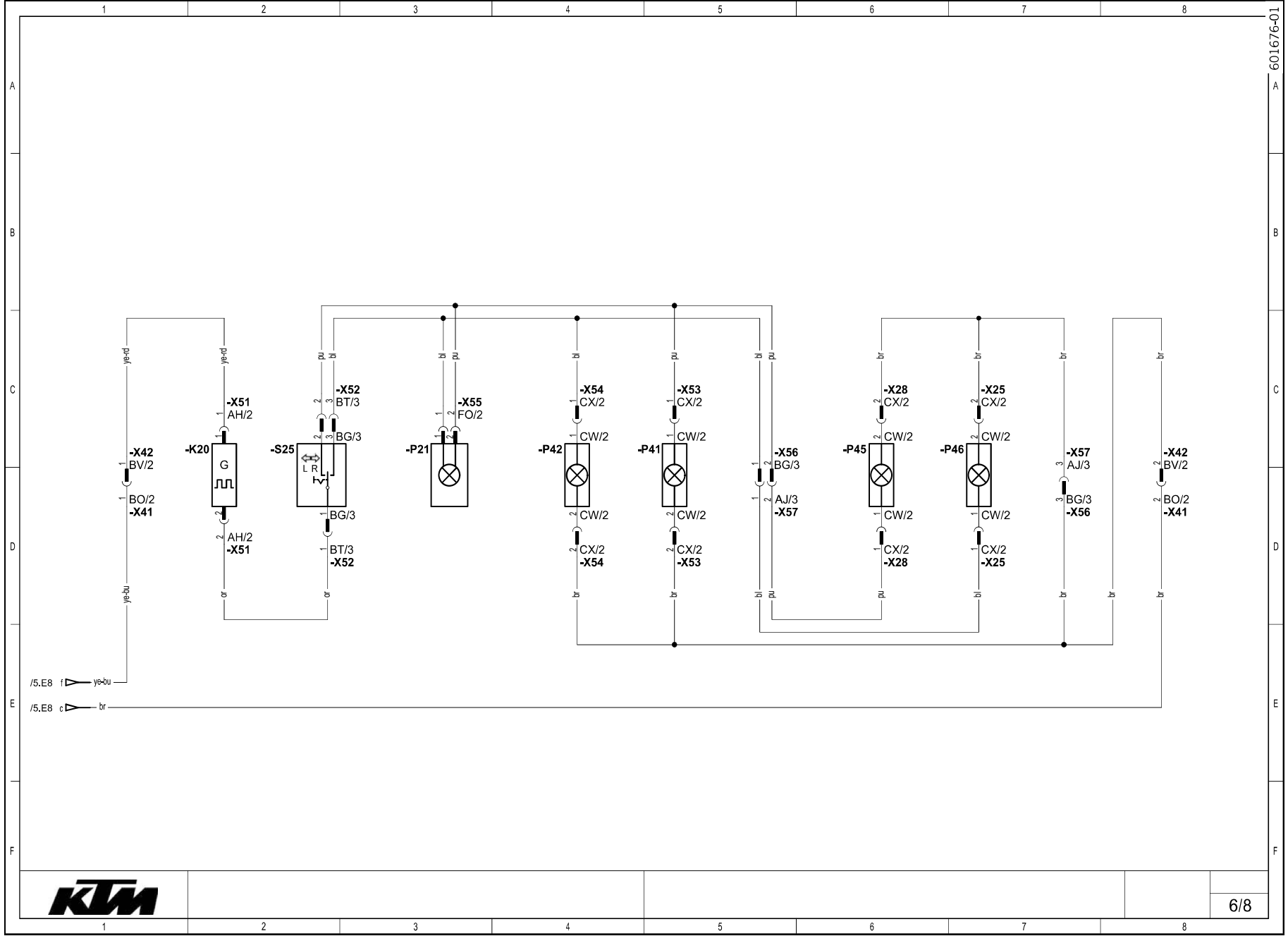
Components:

B70	Wheel speed sensor, front
F3	Fuse
P13	Speedometer
S36	Tripmaster switch (optional)



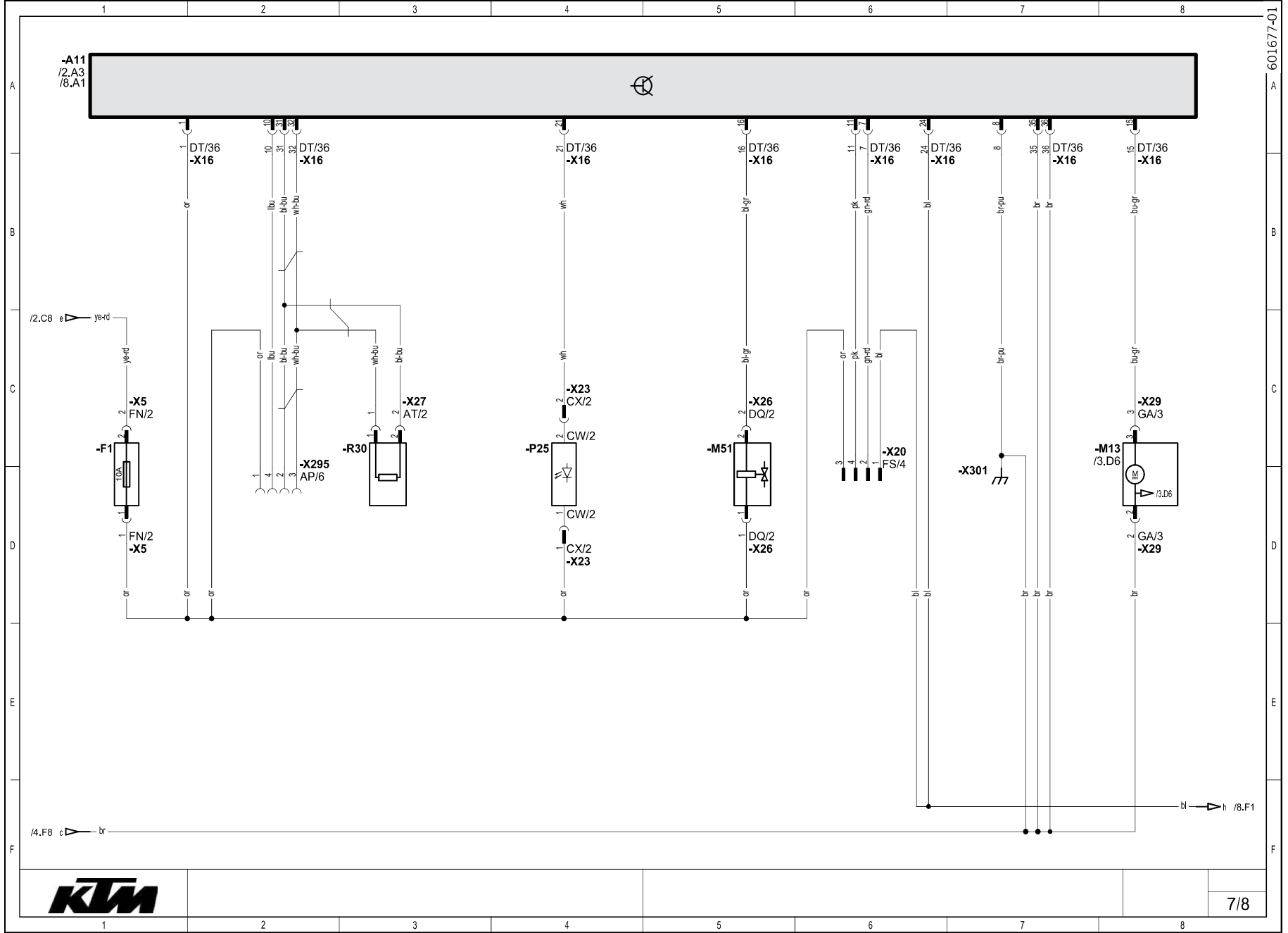
Components:

B76	Brake light switch, front
B77	Brake light switch, rear
E13	Low beam, high beam
E60	License plate lamp
P15	Horn
P23	High beam indicator light
P35	Parking light
P36	Brake/tail light
S22	Light switch, horn button, kill switch



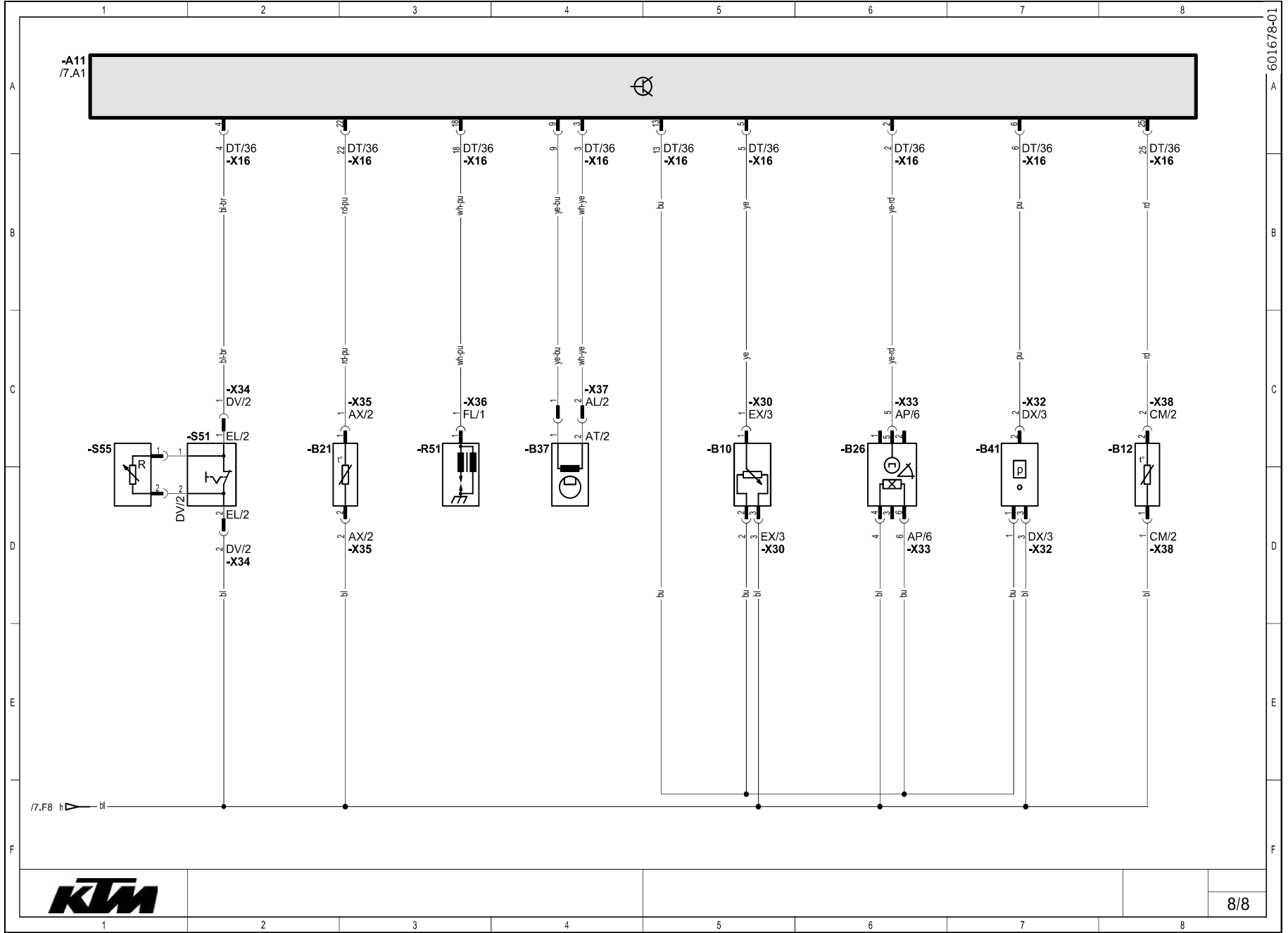
Components:

K20	Turn signal relay
P21	Turn signal indicator light
P41	Turn signal, front left
P42	Turn signal, front right
P45	Turn signal, rear left
P46	Turn signal, rear right
S25	Turn signal switch



Components:

A11	EFI control unit
F1	Fuse
M13	Fuel pump
M51	Injector (cylinder 1)
R30	CAN-bus terminating resistor 1
P25	FI warning lamp (MIL)
X295	Diagnostics connector

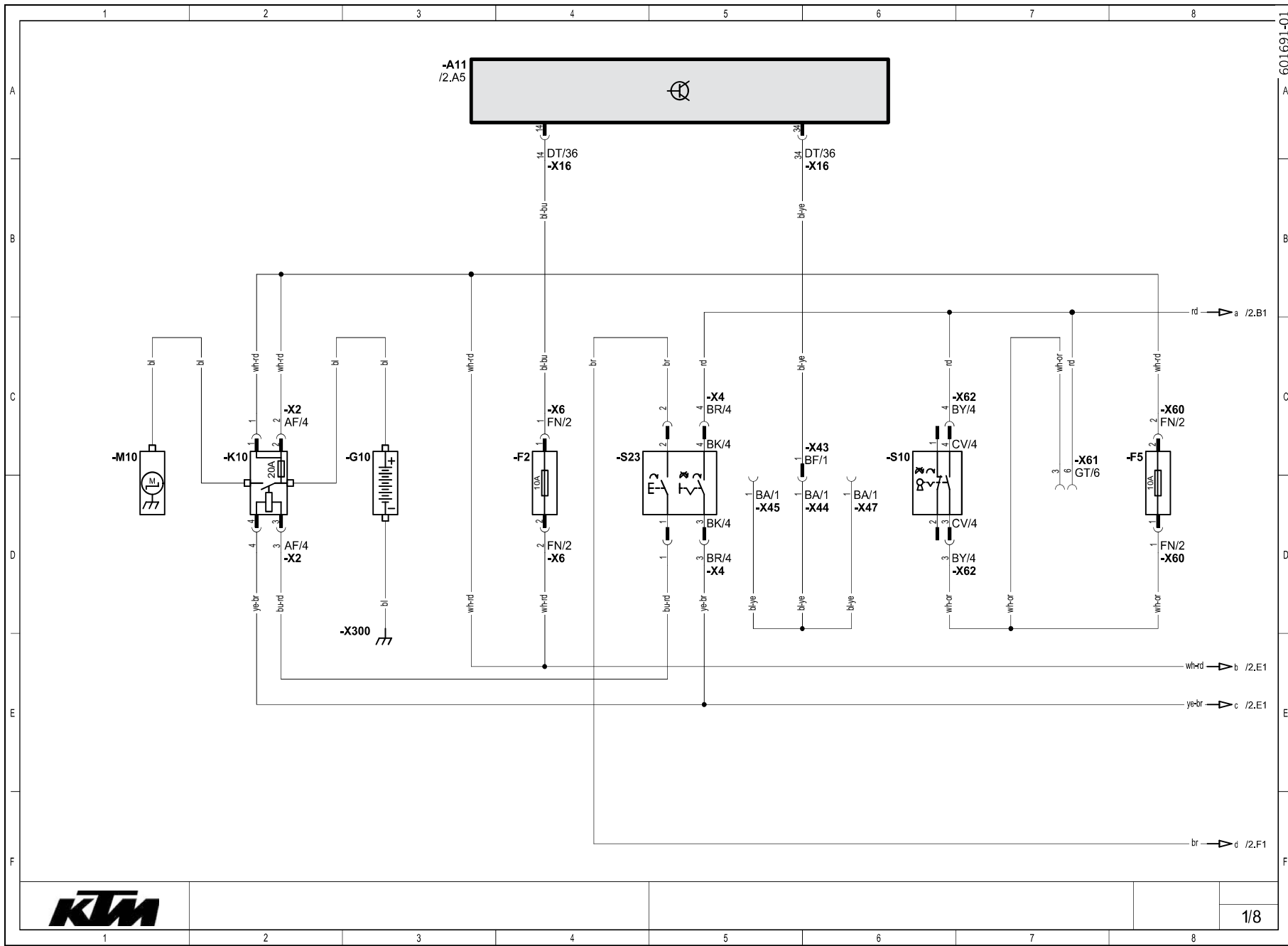


Components:

A11	EFI control unit
B10	Throttle position sensor circuit A
B12	Intake air temperature sensor
B21	Engine coolant temperature sensor (cylinder 1)
B26	Rollover sensor
B37	Ignition pulse generator
B41	Manifold absolute pressure sensor (cylinder 1)
R51	Ignition coil (cylinder 1)
S51	Map-Select switch for riding mode (optional)
S55	Map-Select switch for basic setting (optional)

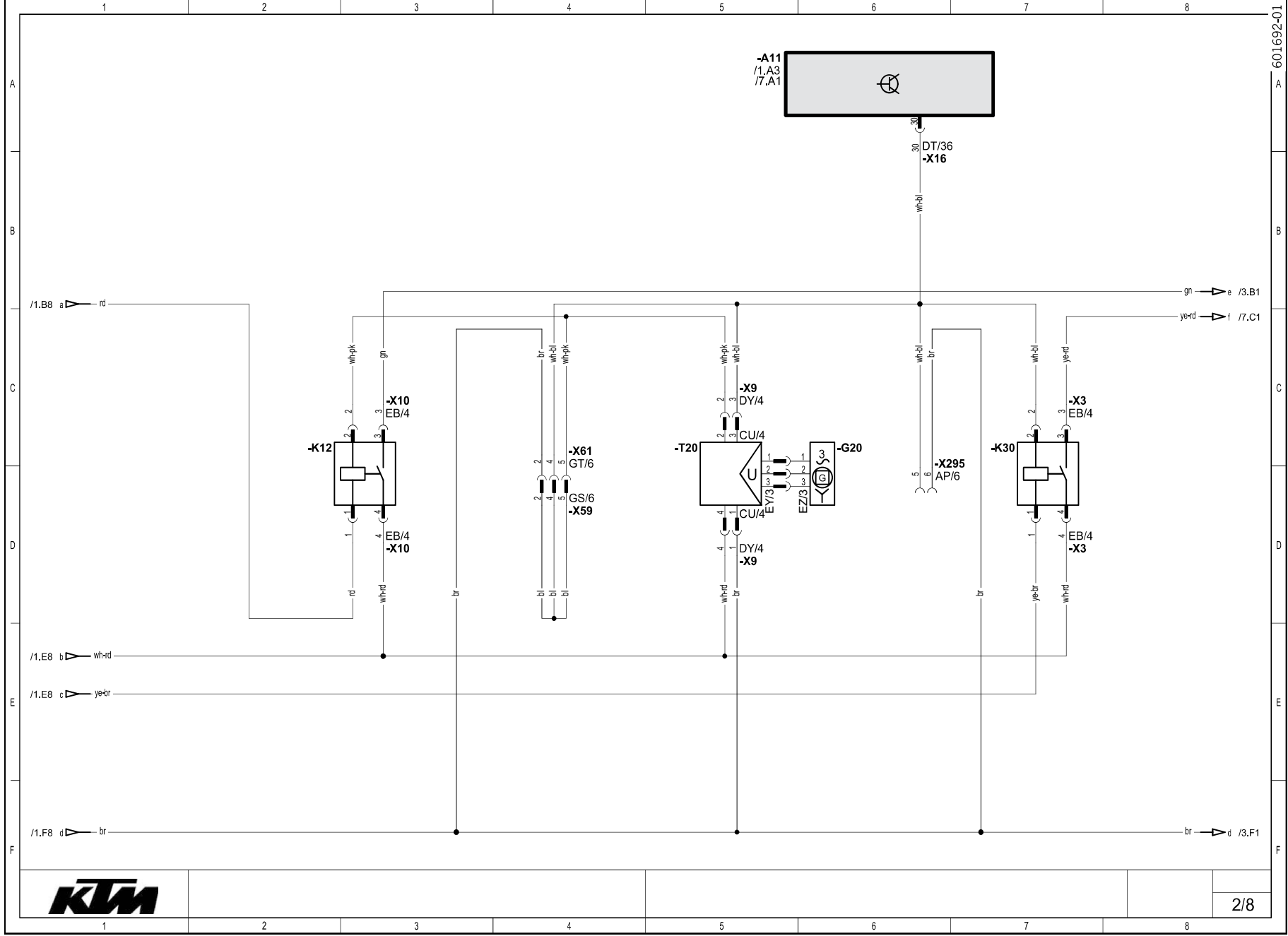
Cable colors:

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



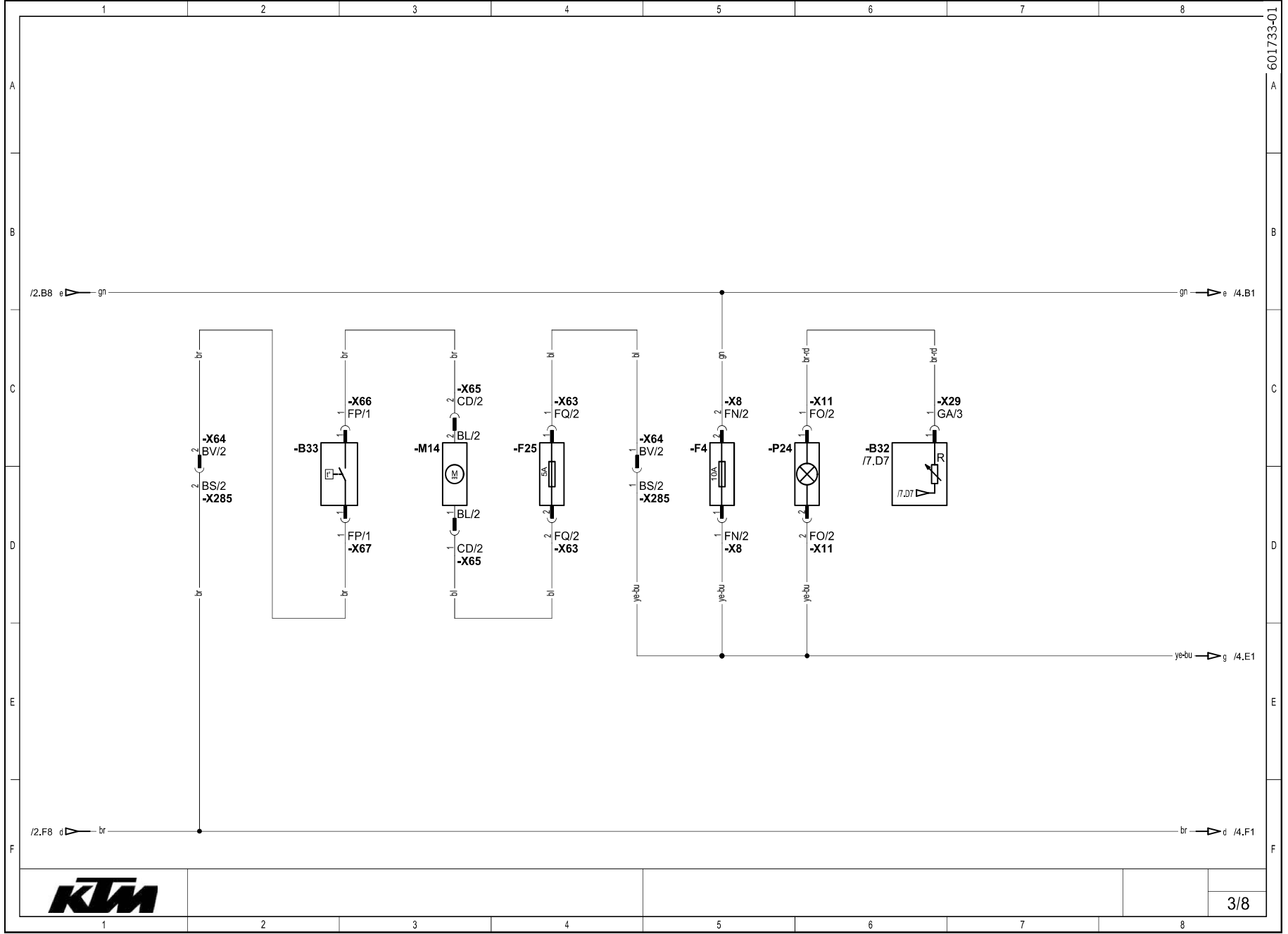
Components:

A11	EFI control unit
F2	Fuse
F5	Fuse
G10	Battery
K10	Starter relay with main fuse
M10	Starter motor
S10	Ignition lock
S23	Emergency OFF switch, electric starter button



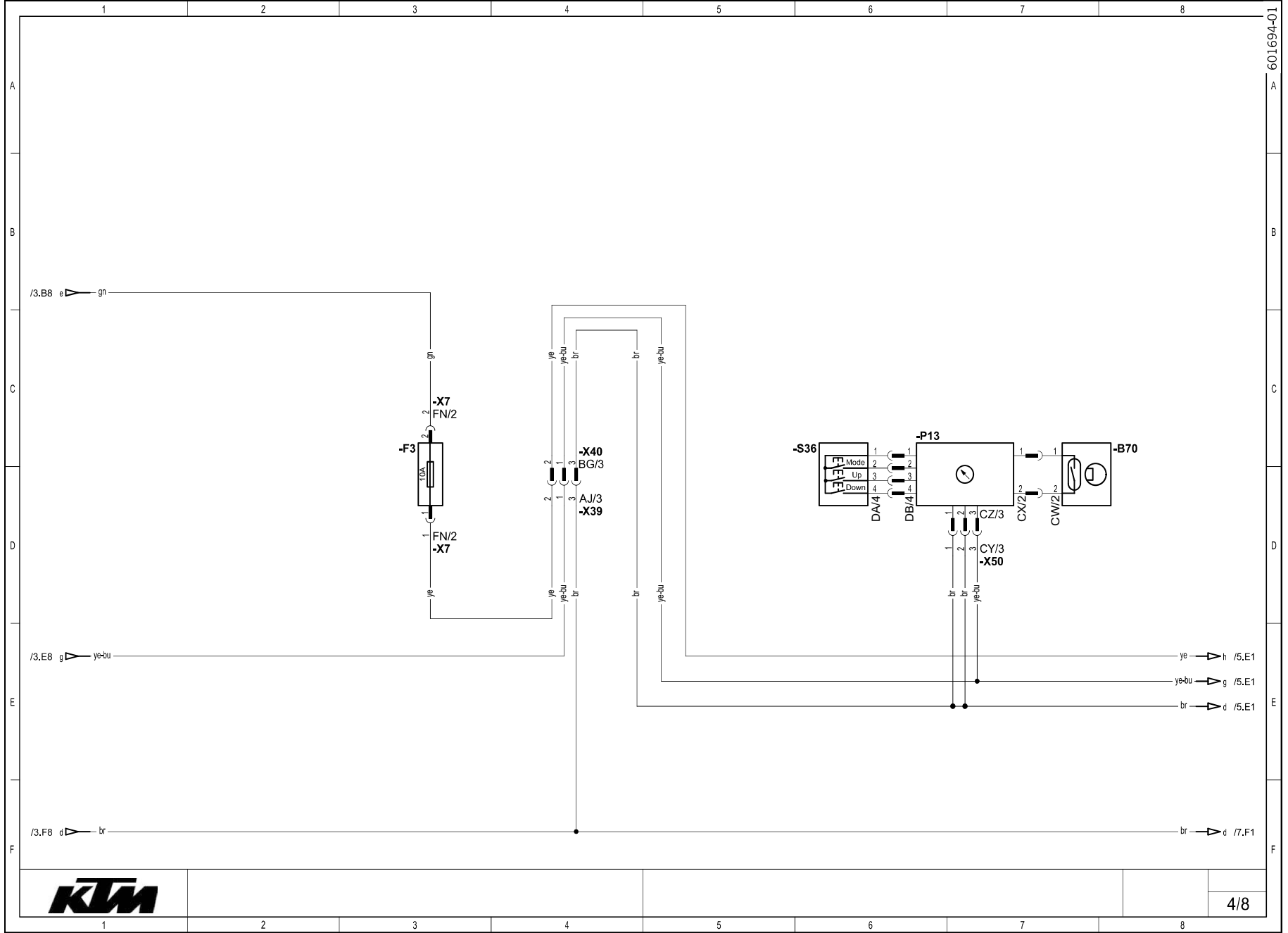
Components:

A11	EFI control unit
G20	Alternator
K12	Light relay
K30	Power relay
T20	Voltage regulator
X295	Diagnostics connector



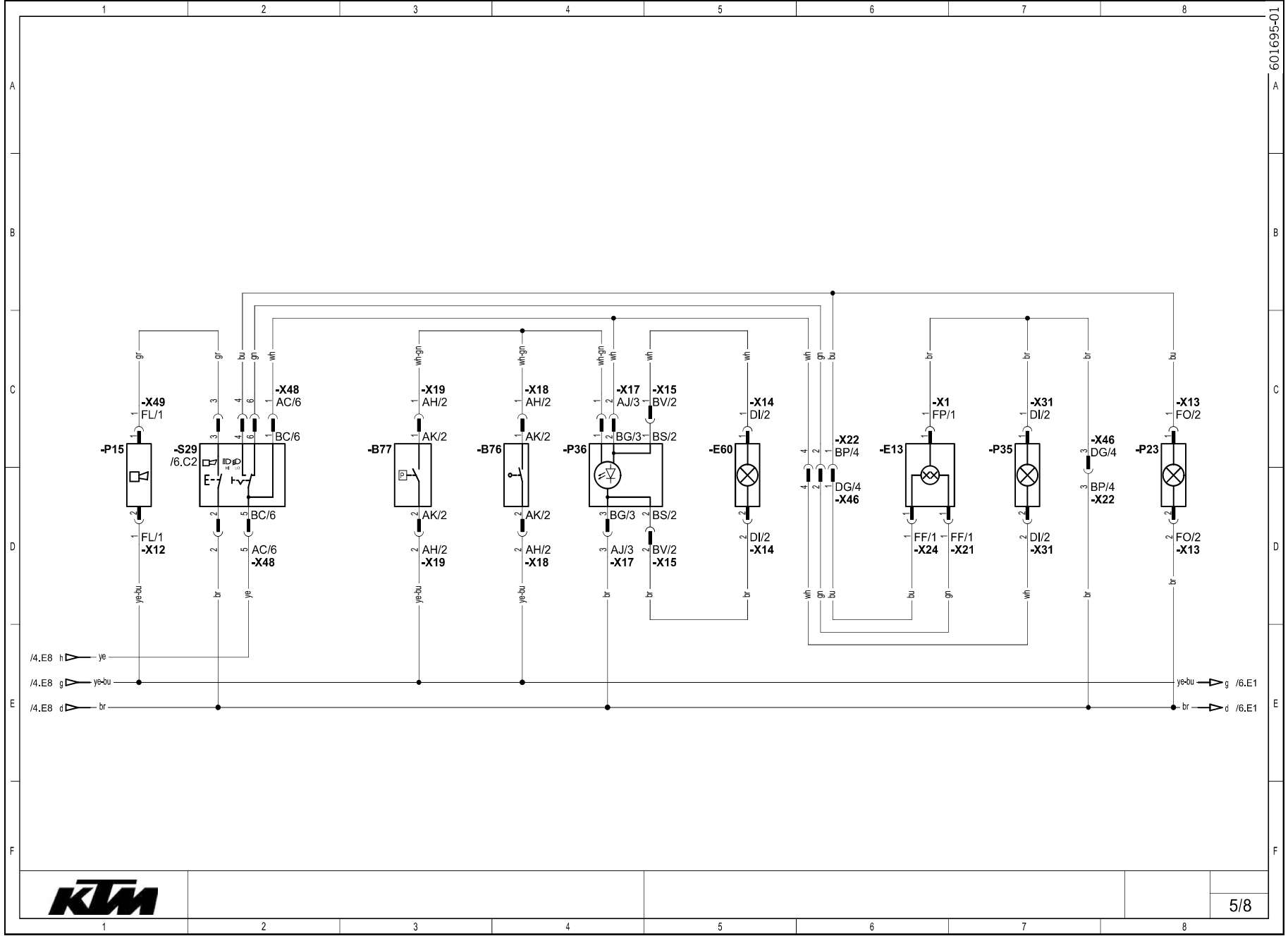
Components:

B32	Fuel tank sensor
B33	Temperature switch for radiator fan (optional)
F4	Fuse
F25	Fuse (optional)
M14	Radiator fan (optional)
P24	Low fuel warning lamp
X285	Connector for radiator fan (optional)



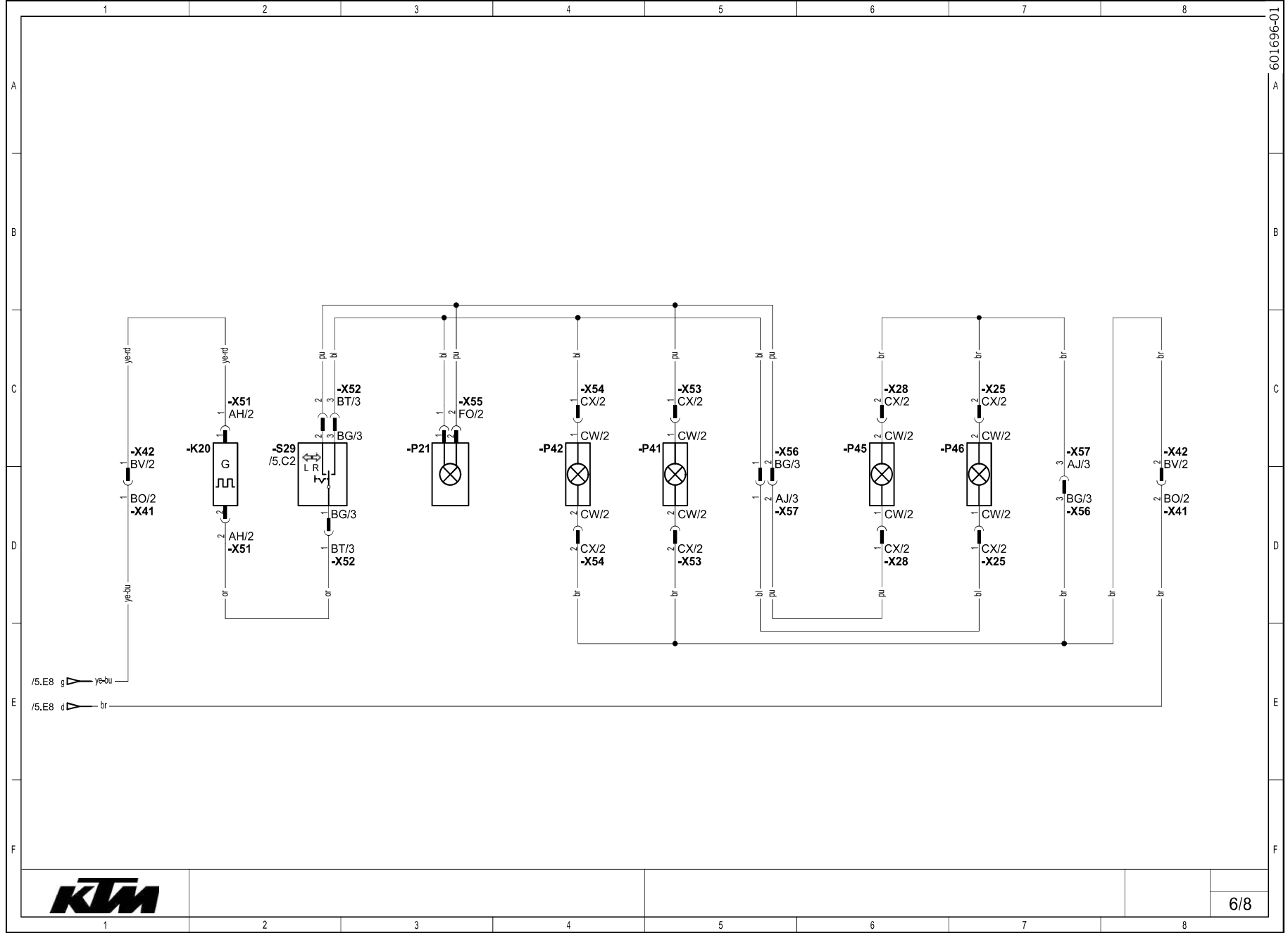
Components:

B70	Wheel speed sensor, front
F3	Fuse
P13	Speedometer
S36	Tripmaster switch (optional)



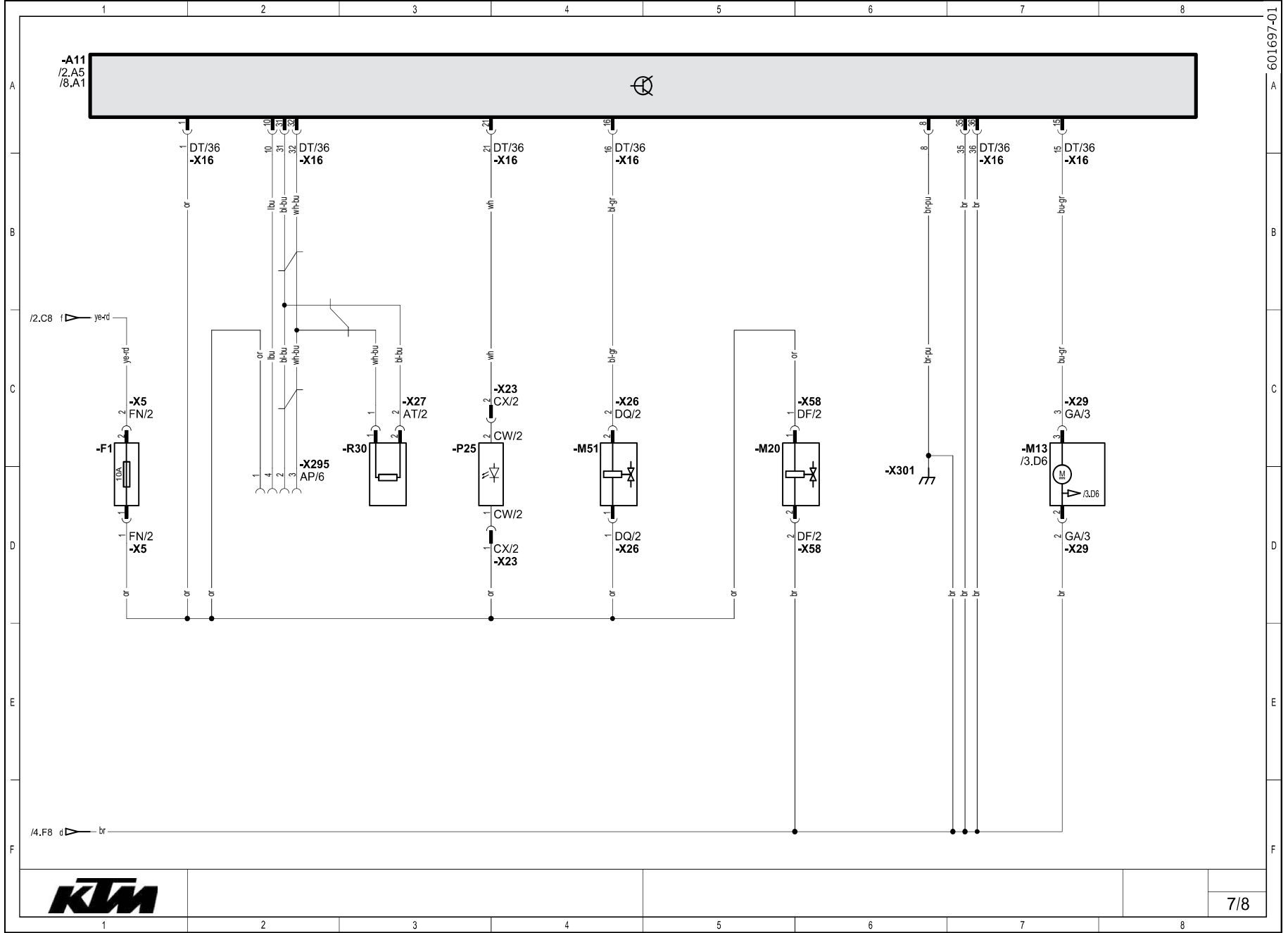
Components:

B76	Brake light switch, front
B77	Brake light switch, rear
E13	Low beam, high beam
E60	License plate lamp
P15	Horn
P23	High beam indicator light
P35	Parking light
P36	Brake/tail light
S29	Light switch, horn button, turn signal switch



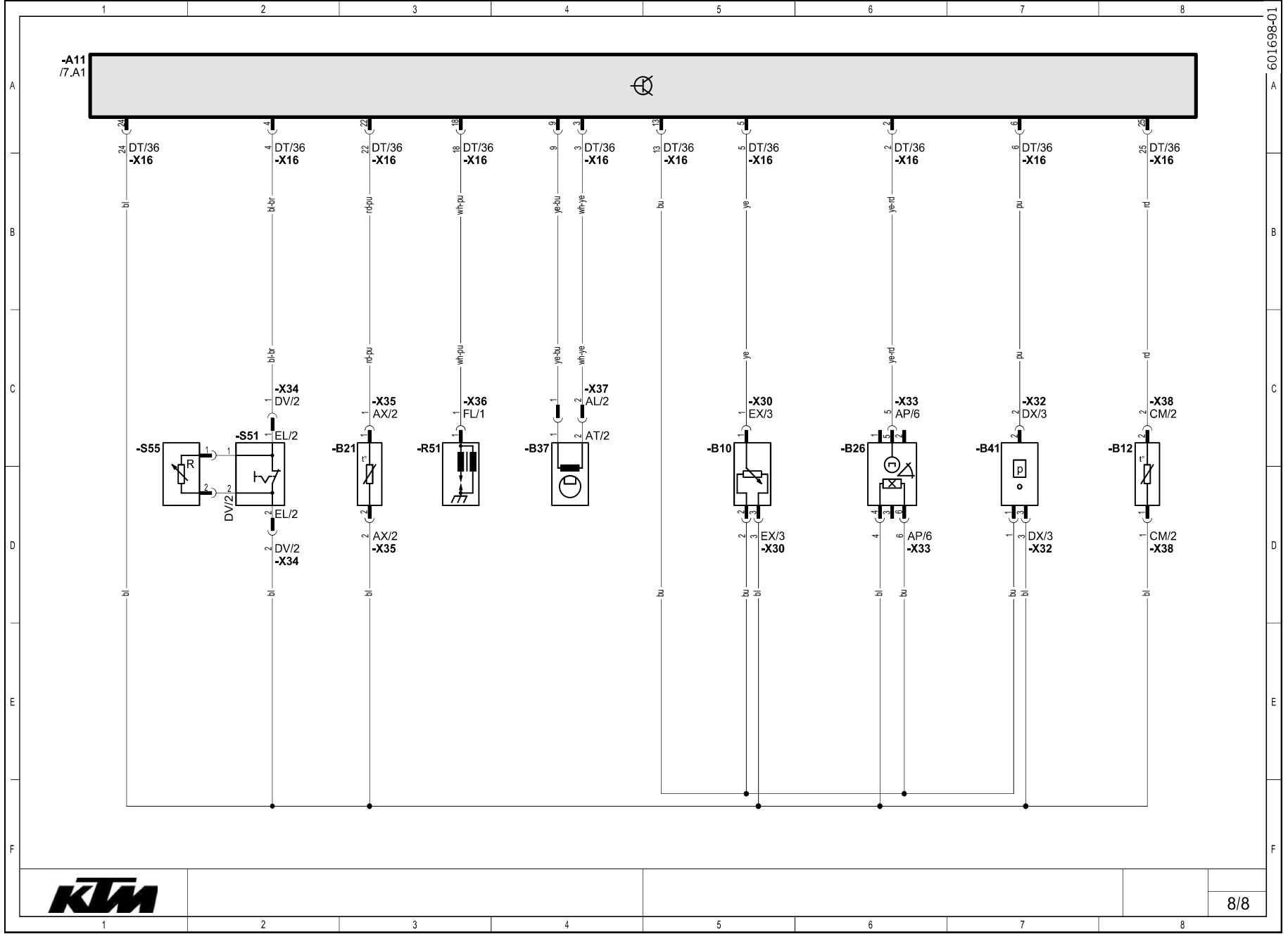
Components:

K20	Turn signal relay
P21	Turn signal indicator light
P41	Turn signal, front left
P42	Turn signal, front right
P45	Turn signal, rear left
P46	Turn signal, rear right
S29	Light switch, horn button, turn signal switch



Components:

A11	EFI control unit
F1	Fuse
M13	Fuel pump
M20	Fuel evaporation valve
M51	Injector (cylinder 1)
R30	CAN-bus terminating resistor 1
P25	FI warning lamp (MIL)
X295	Diagnostics connector

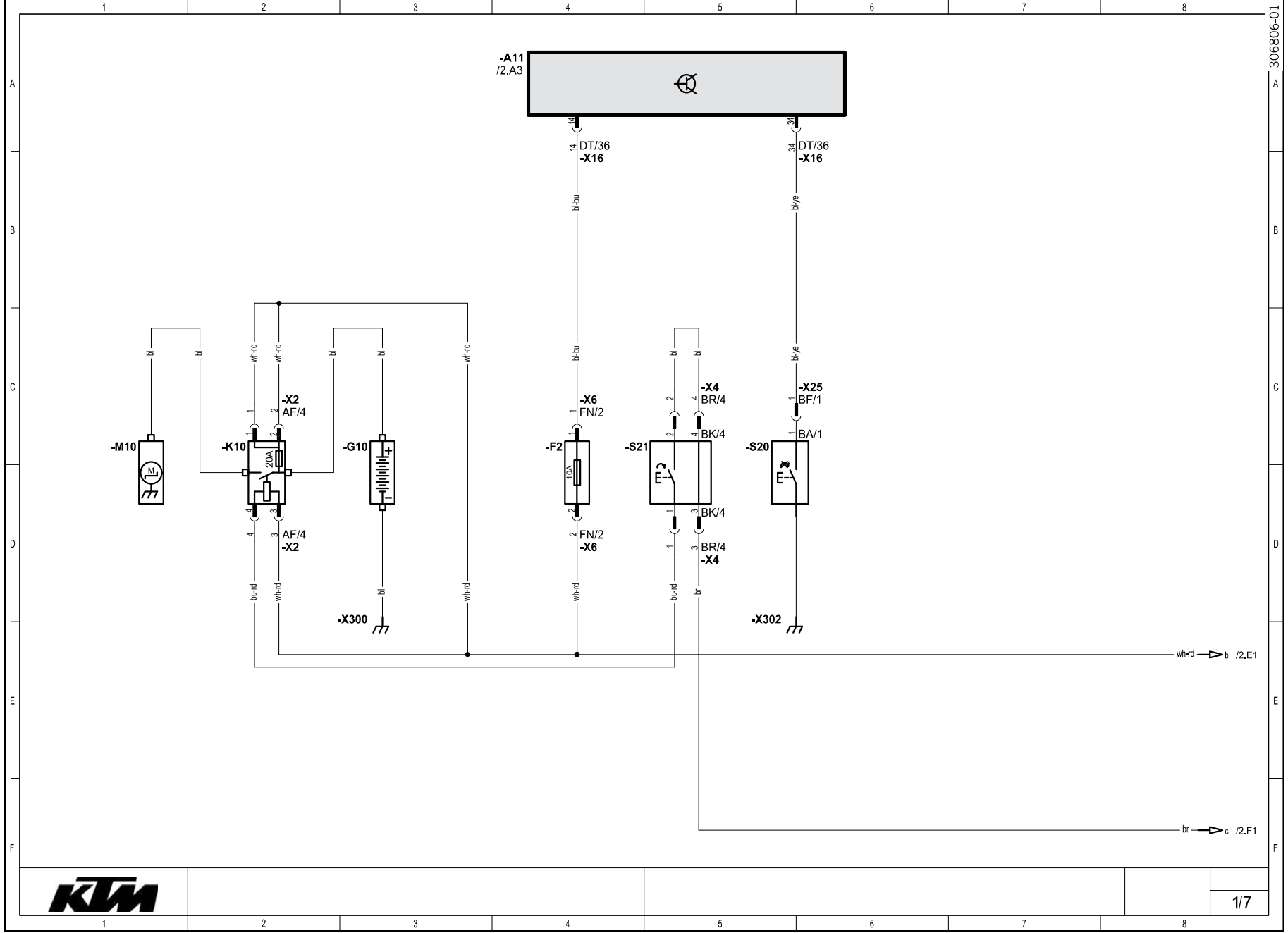


Components:

A11	EFI control unit
B10	Throttle position sensor circuit A
B12	Intake air temperature sensor
B21	Engine coolant temperature sensor (cylinder 1)
B26	Rollover sensor
B37	Ignition pulse generator
B41	Manifold absolute pressure sensor (cylinder 1)
R51	Ignition coil (cylinder 1)
S51	Map-Select switch for riding mode (optional)
S55	Map-Select switch for basic setting (optional)

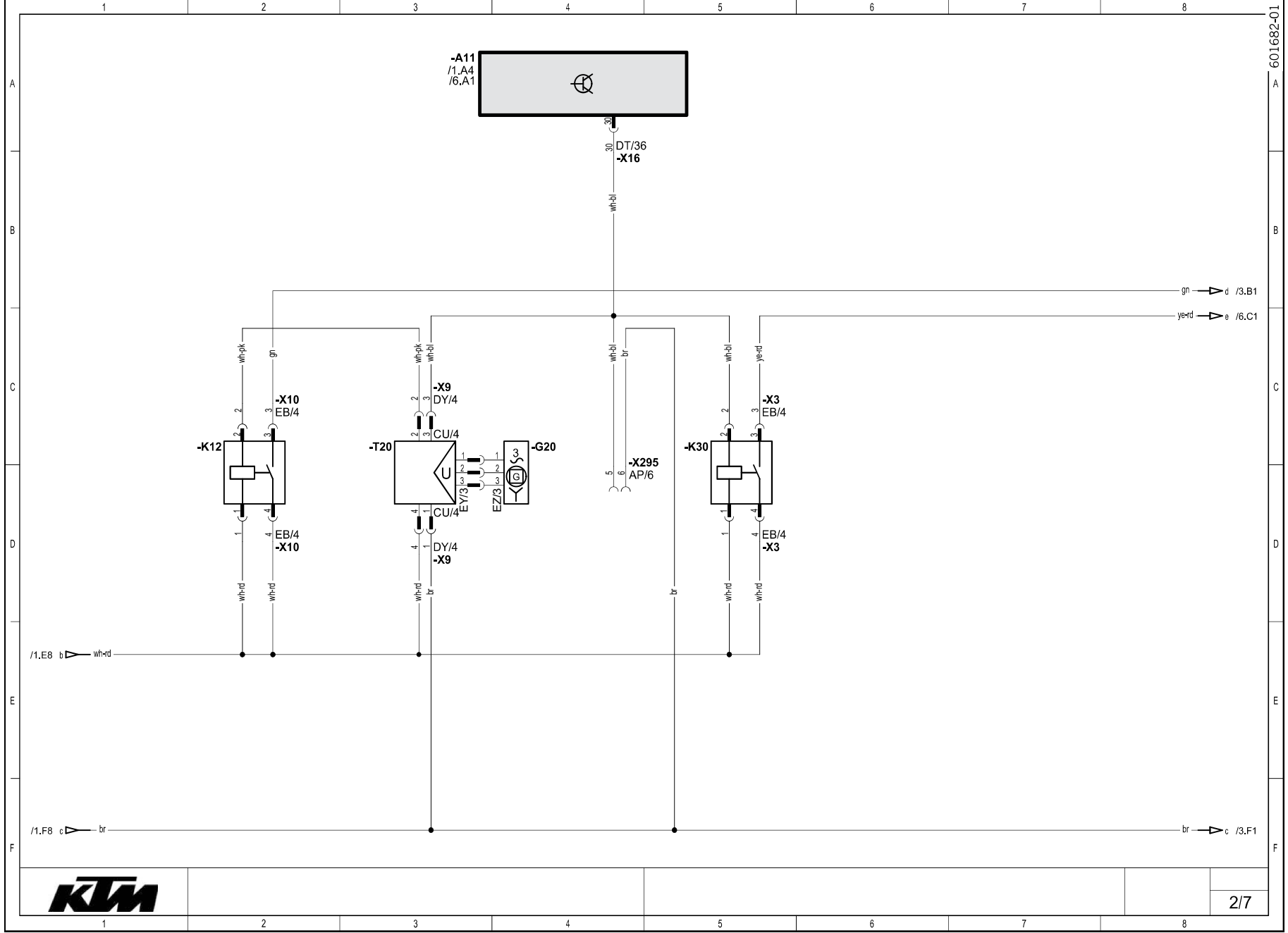
Cable colors:

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



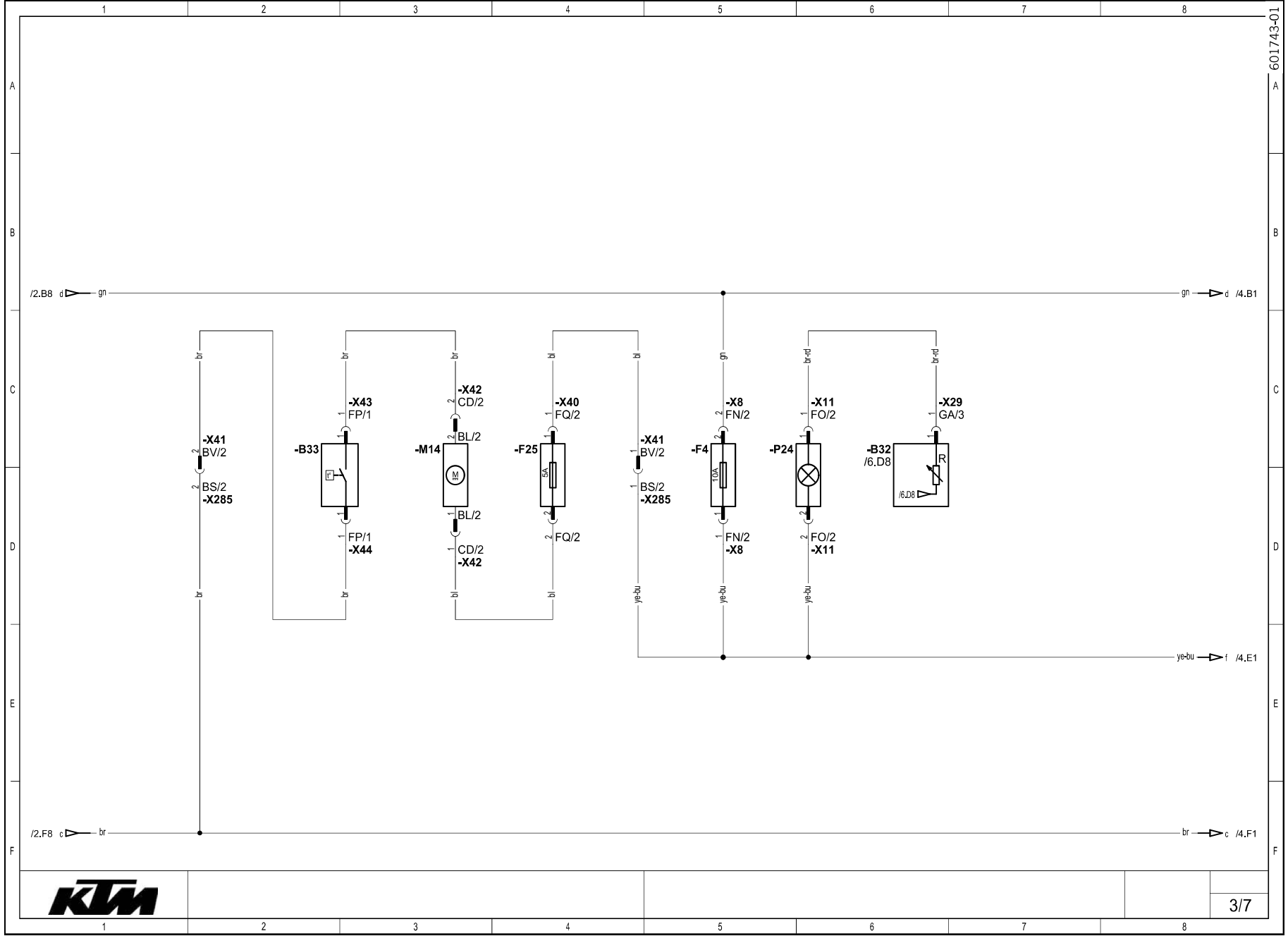
Components:

A11	EFI control unit
F2	Fuse
G10	Battery
K10	Starter relay with main fuse
M10	Starter motor
S20	Kill switch
S21	Electric starter button



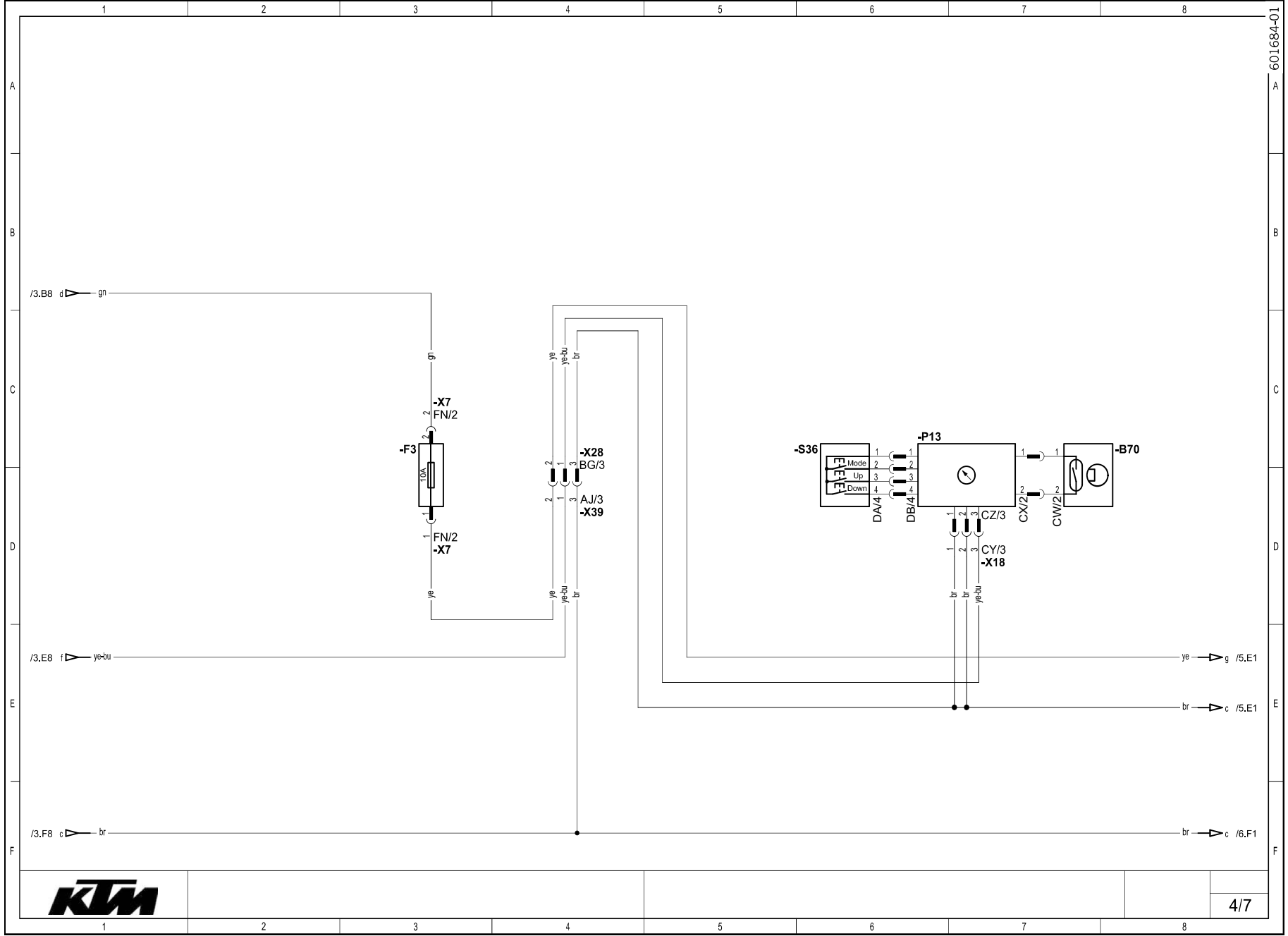
Components:

A11	EFI control unit
G20	Alternator
K12	Light relay
K30	Power relay
T20	Voltage regulator
X295	Diagnostics connector



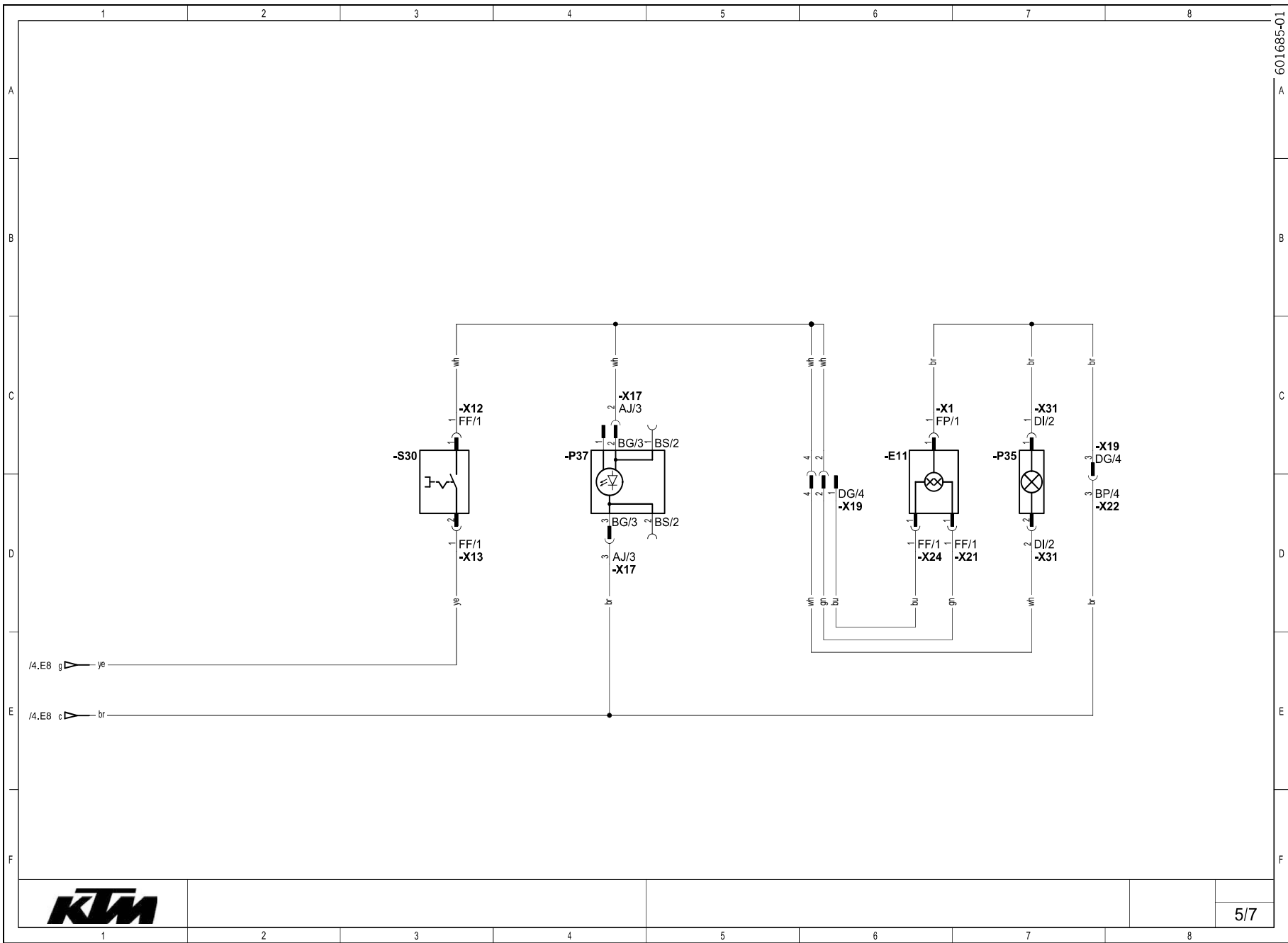
Components:

B32	Fuel tank sensor
B33	Temperature switch for radiator fan (optional)
F4	Fuse
F25	Fuse (optional)
M14	Radiator fan (optional)
P24	Low fuel warning lamp
X285	Connector for radiator fan (optional)



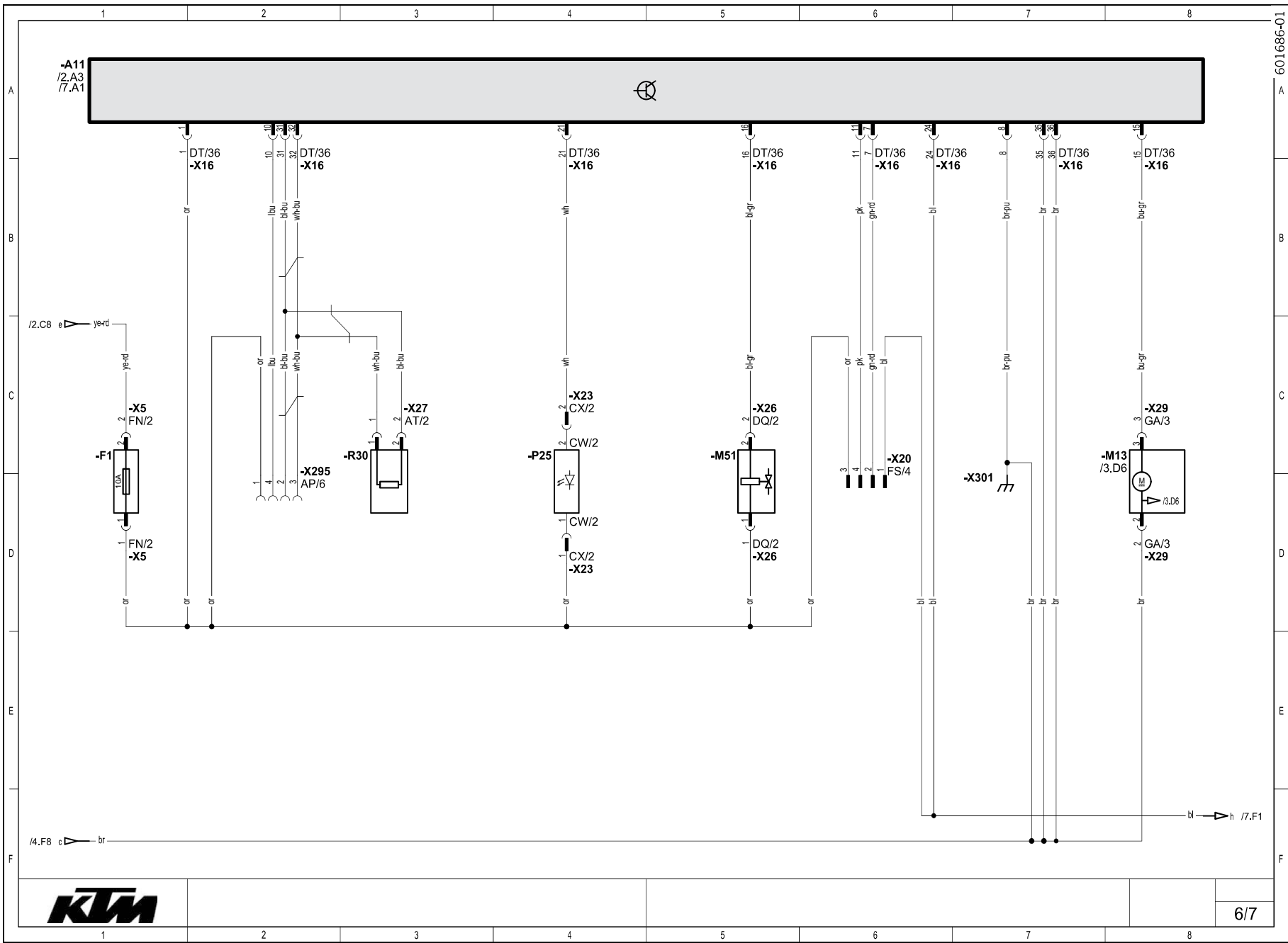
Components:

B70	Wheel speed sensor, front
F3	Fuse
P13	Speedometer
S36	Tripmaster switch (optional)



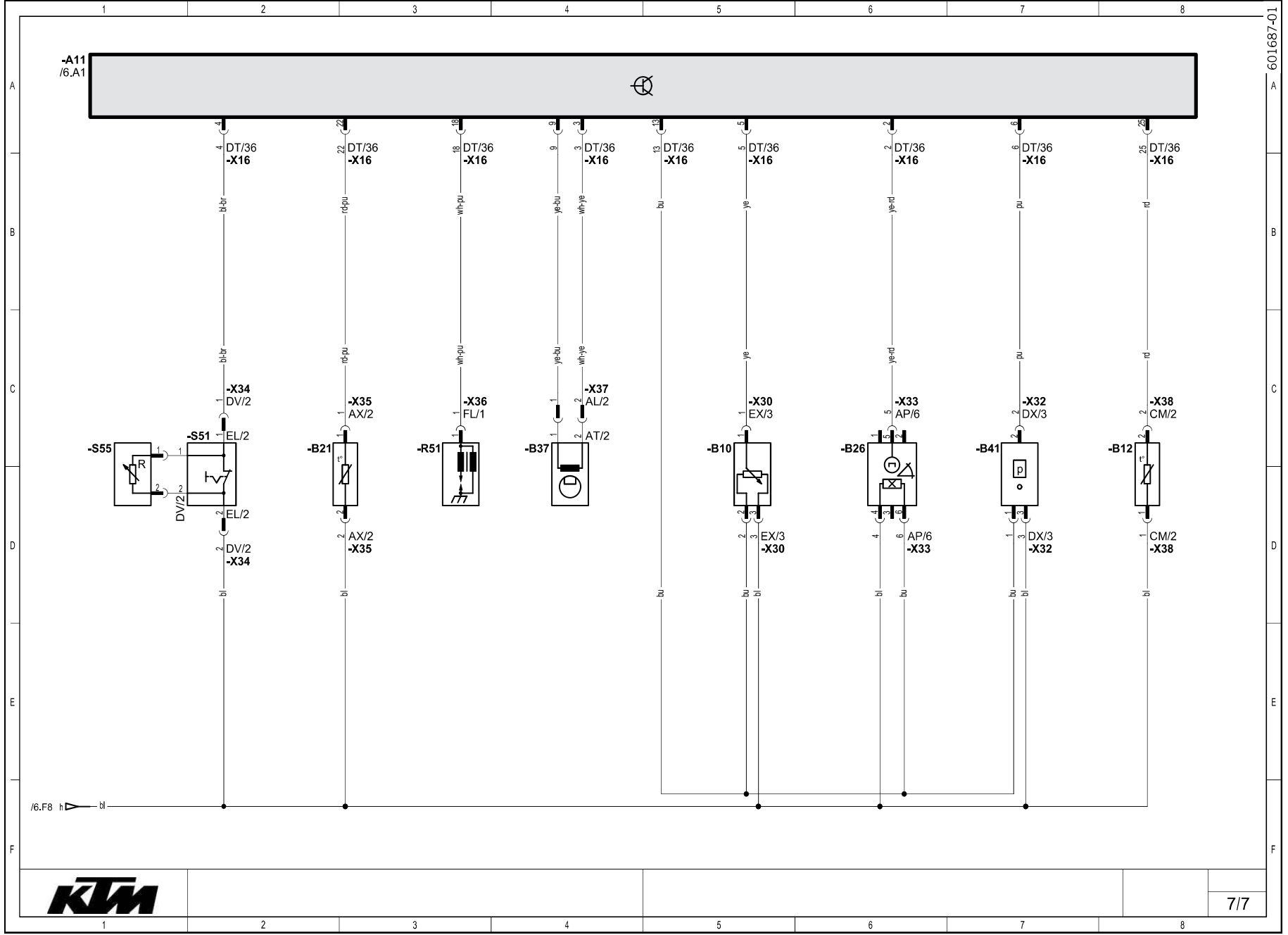
Components:

E11	Low beam
P35	Parking light
P37	Tail light
S30	Light switch



Components:

A11	EFI control unit
F1	Fuse
M13	Fuel pump
M51	Injector (cylinder 1)
R30	CAN-bus terminating resistor 1
P25	FI warning lamp (MIL)
X295	Diagnostics connector



Components:

A11	EFI control unit
B10	Throttle position sensor circuit A
B12	Intake air temperature sensor
B21	Engine coolant temperature sensor (cylinder 1)
B26	Rollover sensor
B37	Ignition pulse generator
B41	Manifold absolute pressure sensor (cylinder 1)
R51	Ignition coil (cylinder 1)
S51	Map-Select switch for riding mode (optional)
S55	Map-Select switch for basic setting (optional)

Cable colors:

bl	Black
br	Brown
bu	Blue
gn	Green
gr	Gray
lbu	Light blue
or	Orange
pk	Pink
pu	Violet
rd	Red
wh	White
ye	Yellow

Brake fluid DOT 4 / DOT 5.1**According to**

- DOT

Guideline

- Use only brake fluid that complies with the specified standard (see specifications on the container) and that possesses the corresponding properties. KTM recommends **Castrol** and **Motorex®** products.

Supplier**Castrol**

- **RESPONSE BRAKE FLUID SUPER DOT 4**

Motorex®

- **Brake Fluid DOT 5.1**

Coolant**Guideline**

- Use only suitable coolant (also in countries with high temperatures). Use of low-quality antifreeze can lead to corrosion and foaming. KTM recommends **Motorex®** products.

Mixture ratio

Antifreeze protection: -25... -45 °C (-13... -49 °F)	50 % corrosion inhibitor/antifreeze 50 % distilled water
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Coolant (mixed ready to use)

Antifreeze	-40 °C (-40 °F)
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Supplier**Motorex®**

- **COOLANT G48**

Engine oil (SAE 10W/50)**According to**

- JASO T903 MA (☛ p. 306)
- SAE (☛ p. 306) (SAE 10W/50)

Guideline

- Use only engine oils that comply with the specified standards (see specifications on the container) and that possess the corresponding properties. KTM recommends **Motorex®** products.

Synthetic engine oil

Supplier**Motorex®**

- **Cross Power 4T**

Engine oil (SAE 10W/60) (00062010035)**According to**

- JASO T903 MA (☛ p. 306)
- SAE (☛ p. 306) (SAE 10W/60)
- KTM LC4 2007+

Guideline

- Use only engine oils that comply with the specified standards (see specifications on the container) and that possess the corresponding properties. KTM recommends **Motorex®** products.

Synthetic engine oil

Supplier**Motorex®**

- **Cross Power 4T**

Fork oil (SAE 4) (48601166S1)**According to**

- SAE (☛ p. 306) (SAE 4)

Guideline

- Use only oils that comply with the specified standards (see specifications on the container) and that possess the corresponding properties.

Shock absorber oil (SAE 2.5) (50180342S1)**According to**

- SAE (☛ p. 306) (SAE 2.5)

Guideline

- Use only oils that comply with the specified standards (see specifications on the container) and that possess the corresponding properties.

Super unleaded (ROZ 95/RON 95/PON 91)**According to**

- DIN EN 228 (ROZ 95/RON 95/PON 91)

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).

Air filter cleaner

Guideline

- KTM recommends **Motorex®** products.

Supplier

Motorex®

- **Twin Air Dirt Bio Remover**

Chain cleaner

Guideline

- KTM recommends **Motorex®** products.

Supplier

Motorex®

- **Chain Clean**

Cleaning and preserving materials for metal, rubber and plastic

Guideline

- KTM recommends **Motorex®** products.

Supplier

Motorex®

- **Protect & Shine**

Fuel additive

Guideline

- KTM recommends **Motorex®** products.

Supplier

Motorex®

- **Fuel Stabilizer**

High viscosity grease

Guideline

- KTM recommends **SKF®** products.

Supplier

SKF®

- **LGHB 2**

Long-life grease

Guideline

- KTM recommends **Motorex®** products.

Supplier

Motorex®

- **Bike Grease 2000**

Lubricant (T158)

Guideline

- KTM recommends **Lubcon®** products.

Supplier

Lubcon®

- **Turmogrease® PP 300**

Lubricant (T511)

Guideline

- KTM recommends **Lubcon®** products.

Supplier

Lubcon®

- **Turmsilon® GTI 300 P**

Lubricant (T159)

Guideline

- KTM recommends **Bel-Ray®** products.

Supplier

Bel-Ray®

- **MC-11®**

Lubricant (T625)

Guideline

- KTM recommends **Molykote®** products.

Supplier

Molykote®

- **33 Medium**

Lubricant (T152)

Guideline

- KTM recommends **Bel-Ray®** products.

Supplier

Bel-Ray®

- **Molylube® Anti-Seize**

Motorcycle cleaner

Guideline

- KTM recommends **Motorex®** products.

Supplier

Motorex®

- **Moto Clean 900**

Off-road chain spray

Guideline

- KTM recommends **Motorex®** products.

Supplier

Motorex®

- **Chainlube Offroad**

Oil for foam air filter

Guideline

- KTM recommends **Motorex®** products.

Supplier

Motorex®

- **Twin Air Liquid Bio Power**

Paint cleaner and polish for high-gloss and matte finishes, bare metal and plastic surfaces

Guideline

- KTM recommends **Motorex®** products.

Supplier

Motorex®

- **Clean & Polish**

Universal oil spray

Guideline

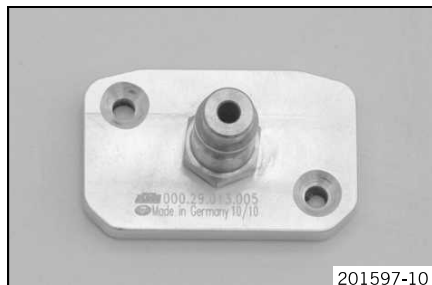
- KTM recommends **Motorex®** products.

Supplier

Motorex®

- **Joker 440 Synthetic**

Bleeder cover



201597-10

Art. no.: 00029013005

Bleeder cover



201598-10

Art. no.: 00029013006

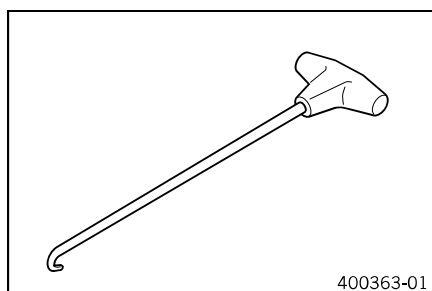
Bleeding device



201491-10

Art. no.: 00029013100

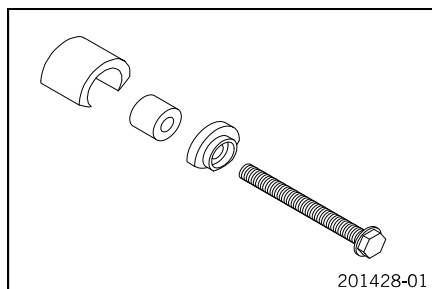
Spring hooks



400363-01

Art. no.: 50305017000

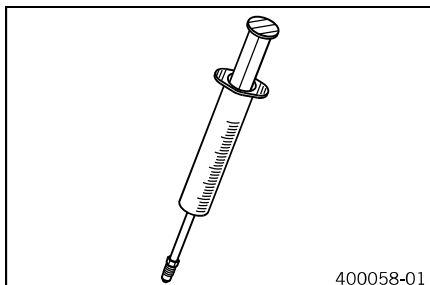
Mounting tool, heim joint



201428-01

Art. no.: 50329000044

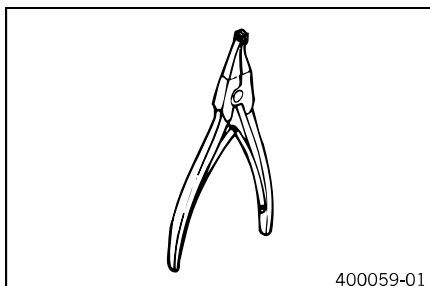
Bleed syringe



400058-01

Art. no.: 50329050000

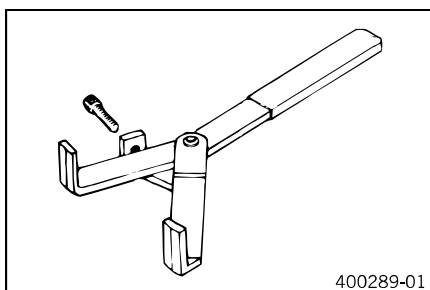
Circlip pliers reverse



400059-01

Art. no.: 51012011000

Clutch holder



400289-01

Art. no.: 51129003000

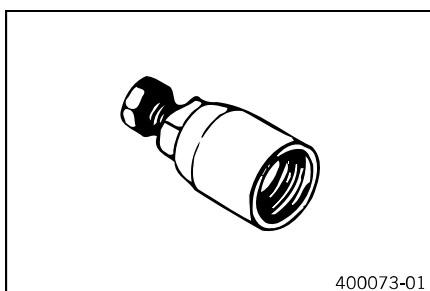
Lift stand



500071-01

Art. no.: 54829055000

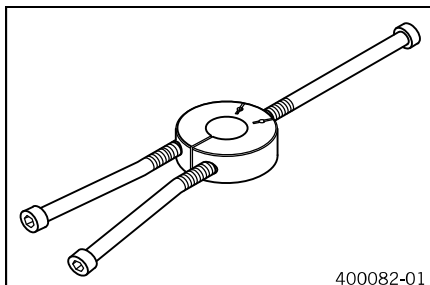
Extractor



400073-01

Art. no.: 58012009000

Tool for inner bearing race



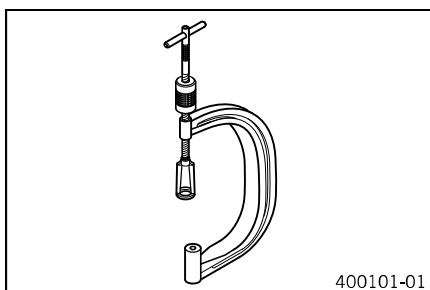
Art. no.: 58429037037

Torque wrench with various accessories in set



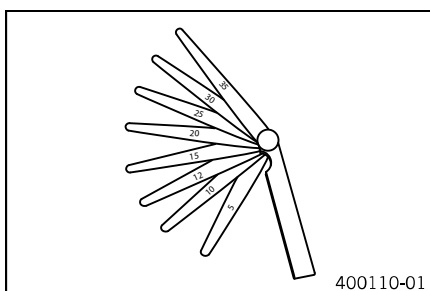
Art. no.: 58429094000

Valve spring compressor



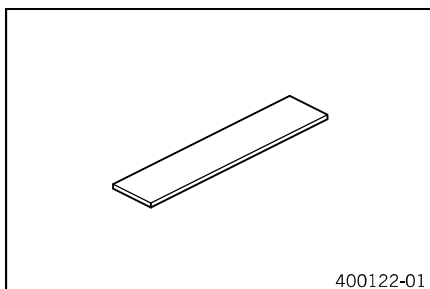
Art. no.: 59029019000

Feeler gauge



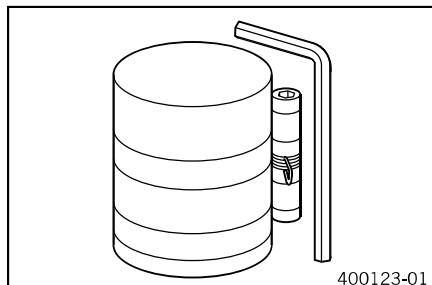
Art. no.: 59029041100

Plastigauge measuring strips



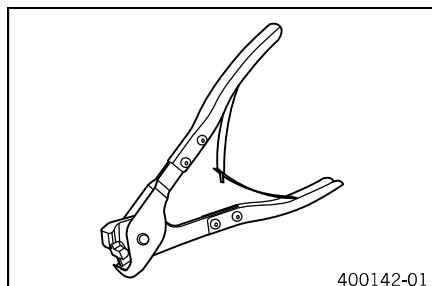
Art. no.: 60029012000

Piston ring mounting tool



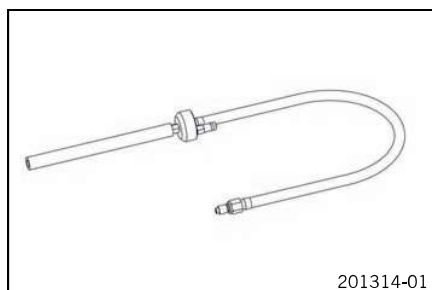
Art. no.: 60029015000

Hose clamp pliers



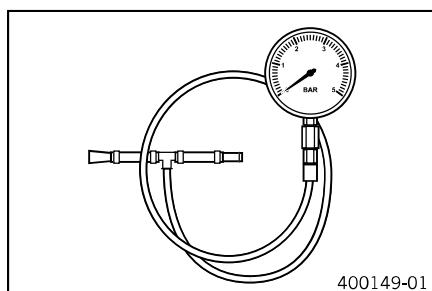
Art. no.: 60029057000

Testing hose



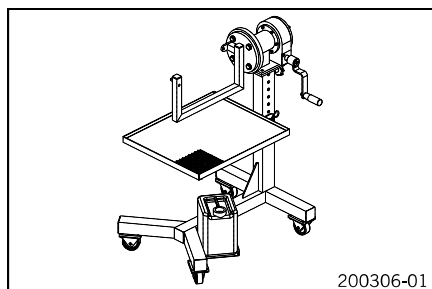
Art. no.: 61029093000

Pressure testing tool



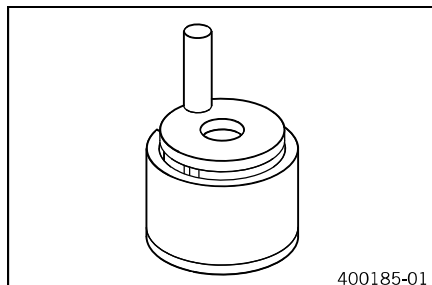
Art. no.: 61029094000

Engine assembly stand



Art. no.: 61229001000

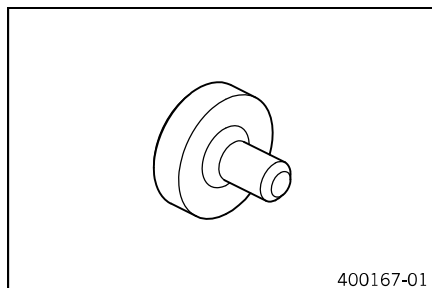
Pressing device for crankshaft, complete



400185-01

Art. no.: 75029047000

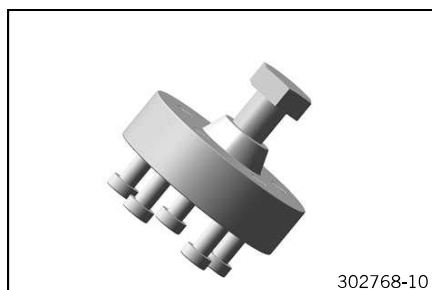
Protection cover



400167-01

Art. no.: 75029090000

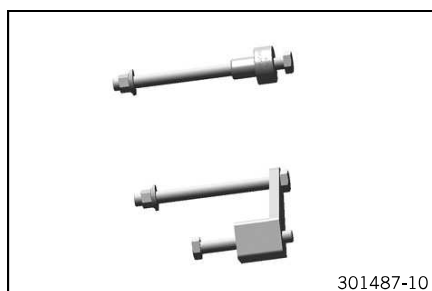
Extractor, camshaft gear



302768-10

Art. no.: 77229001044

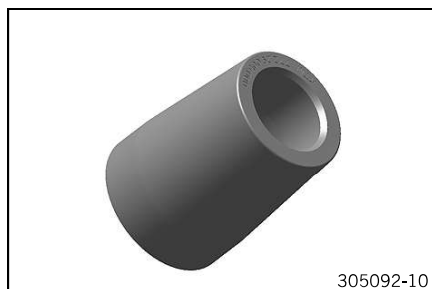
Engine fixing arm



301487-10

Art. no.: 77229002000

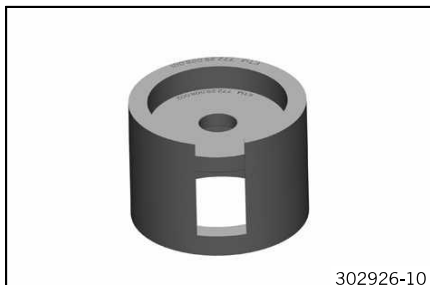
Mounting sleeve



305092-10

Art. no.: 77229005000

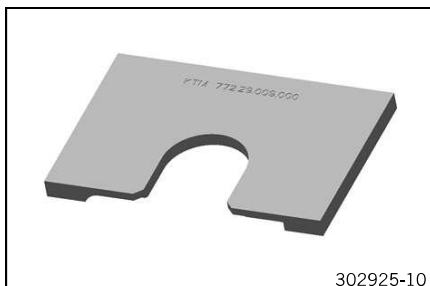
Insert for crankshaft pressing tool



302926-10

Art. no.: 77229008000

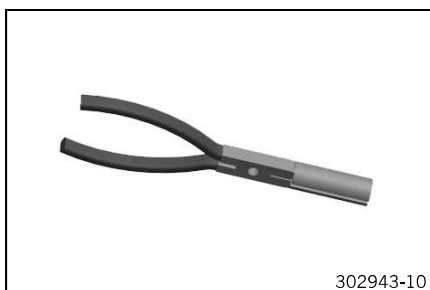
Extrude plate, base



302925-10

Art. no.: 77229009000

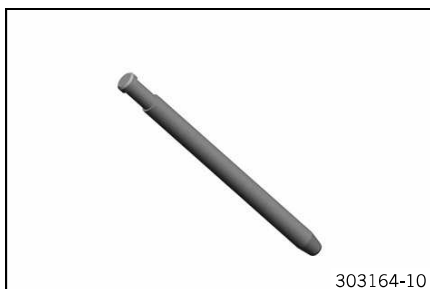
Pliers for valve stem seals



302943-10

Art. no.: 77229010000

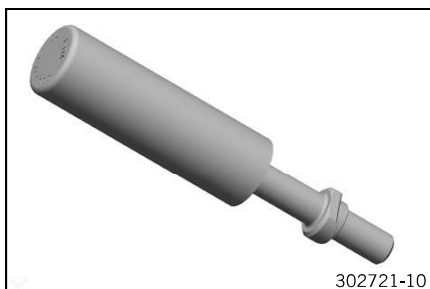
Limit plug gauge



303164-10

Art. no.: 77229026000

Insertion for piston ring lock



302721-10

Art. no.: 77229030000

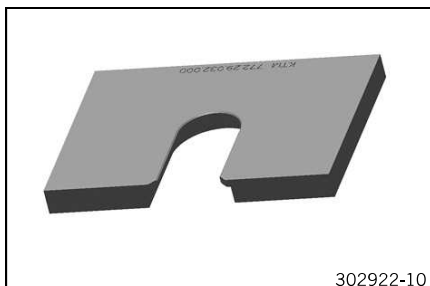
Protection cap



302921-10

Art. no.: 77229031000

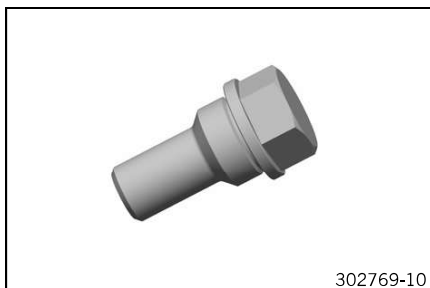
Separator plate



302922-10

Art. no.: 77229032000

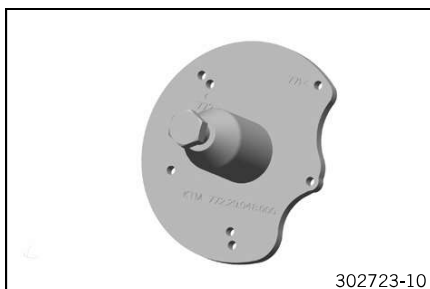
Insert, timing chain tensioner



302769-10

Art. no.: 77229035000

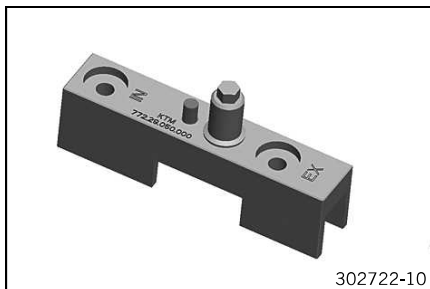
Puller



302723-10

Art. no.: 77229048000

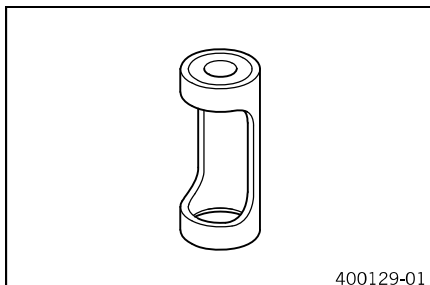
Adjustment bush bridge



302722-10

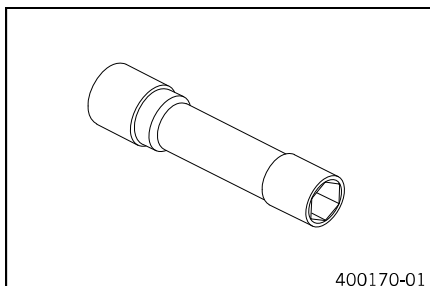
Art. no.: 77229050044

Insert for valve spring lever



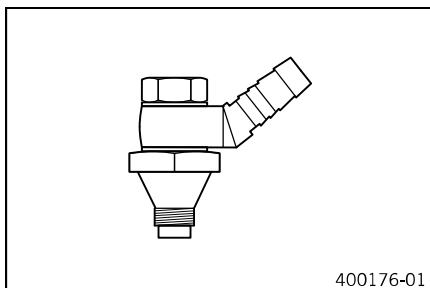
Art. no.: 77229060000

Spark plug wrench



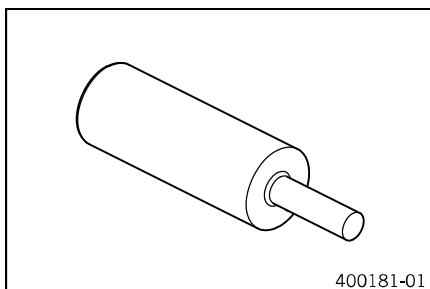
Art. no.: 77229072000

Oil pressure adapter



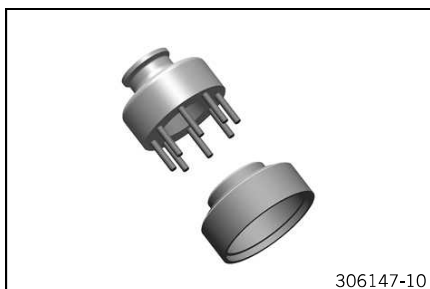
Art. no.: 77329006000

Release device for timing chain tensioner



Art. no.: 77329051000

Pressing tool for freewheel



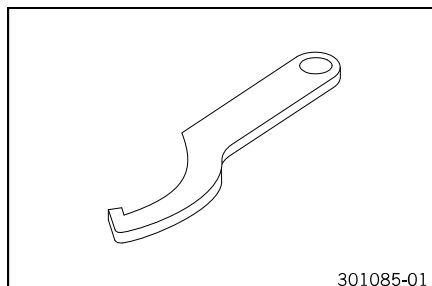
Art. no.: 77829083044

Pin wrench



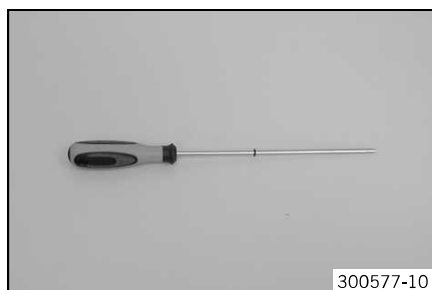
Art. no.: T103

Hook wrench



Art. no.: T106S

Depth micrometer



Art. no.: T107S

Pin



Art. no.: T120

Mounting sleeve



Art. no.: T1204

Calibration pin



Art. no.: T1205

Pressing tool



Art. no.: T1206

Pressing tool



Art. no.: T1207S

Centering sleeve



Art. no.: T1214

Mounting sleeve



Art. no.: T1215

Disassembly tool



Art. no.: T1216

200816-10

Vacuum pump



Art. no.: T1240S

200273-10

Protecting sleeve



Art. no.: T1401

200635-10

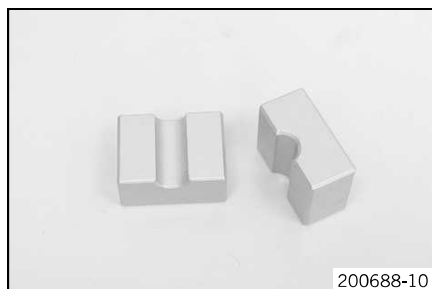
Clamping stand



Art. no.: T14015S

200733-10

Clamping stand



Art. no.: T14016S

200688-10

Gripping tool



Art. no.: T14026S1

Assembly tool



Art. no.: T1402S

Open-end wrench



Art. no.: T14032

Clamping stand



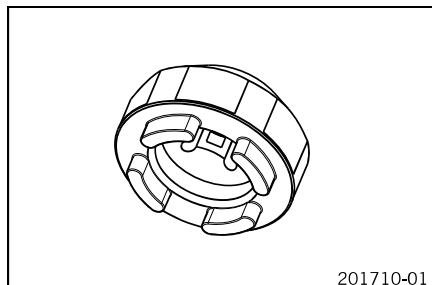
Art. no.: T1403S

Mounting tool



Art. no.: T14040S

Special socket



201710-01

Art. no.: T14047

Clamping stand



200637-10

Art. no.: T14049S

Press-out tool



201779-10

Art. no.: T14051

Press drift



200789-10

Art. no.: T1504

Assembly tool

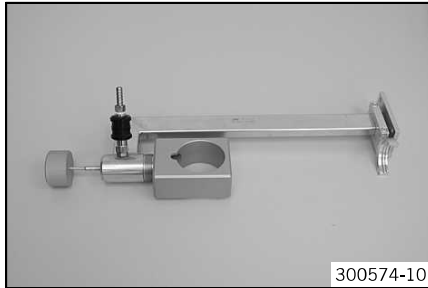


200791-10

Art. no.: T150S

Nitrogen filling tool

Art. no.: T170S1



JASO T903 MA

Different technical development directions required a new specification for 4-stroke motorcycles – the JASO T903 MA Standard. Earlier, engine oils from the automobile industry were used for 4-stroke motorcycles because there was no separate motorcycle specification. Whereas long service intervals are demanded for automobile engines, high performance at high engine speeds are in the foreground for motorcycle engines. In most motorcycles, the gearbox and the clutch are lubricated with the same oil as the engine. The JASO MA Standard meets these special requirements.

SAE

The SAE viscosity classes were defined by the Society of Automotive Engineers and are used for classifying oils according to their viscosity. The viscosity describes only one property of oil and says nothing about quality.

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