

125 SX
150 SX

Art. no. 3206251en



KTm

Read this repair manual carefully and thoroughly before beginning work.

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

This repair manual was written to correspond to the latest state of this model series. We reserve the right to make changes in the interest of technical advancement without updating this repair manual at the same time.

We shall not provide a description of general workshop methods. Likewise, safety rules that apply in a workshop are not specified here. It is assumed that the repair work will be performed by a fully trained mechanic.

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KTM Sportmotorcycle GmbH

5230 Mattighofen, Austria

This document is valid for the following models:

125 SX EU (F6101P0)

125 SX US (F6175P0)

150 SX EU (F6101P1)

150 SX US (F6175P1)



3206251en

07/2015

1	MEANS OF REPRESENTATION	6	6.2.7	Removing the fork protector	39
1.1	Symbols used	6	6.2.8	Installing the fork protector	40
1.2	Formats used	6	6.2.9	Performing a fork service	40
2	SAFETY ADVICE	7	6.2.10	Disassembling the fork legs	40
2.1	Repair Manual	7	6.2.11	Removing the spring	42
2.2	Safety advice	7	6.2.12	Disassembling the cartridge	43
2.3	Degrees of risk and symbols	7	6.2.13	Disassembling the piston rod	44
2.4	Work rules	7	6.2.14	Disassembling the hydrostop unit	45
3	IMPORTANT NOTES	8	6.2.15	Disassembling the seal ring retainer	46
3.1	Guarantee, warranty	8	6.2.16	Checking the fork legs	46
3.2	Operating and auxiliary substances	8	6.2.17	Assembling the seal ring retainer	47
3.3	Spare parts, accessories	8	6.2.18	Assembling the hydrostop unit	47
3.4	Figures	8	6.2.19	Assembling the piston rod	48
4	SERIAL NUMBERS	9	6.2.20	Assembling the cartridge	49
4.1	Chassis number	9	6.2.21	Assembling the fork legs	51
4.2	Type label	9	6.2.22	Greasing the steering head bearing	54
4.3	Engine number	9	6.2.23	Removing the lower triple clamp	54
4.4	Fork part number	9	6.2.24	Installing the lower triple clamp	55
4.5	Shock absorber article number	9	6.2.25	Checking the play of the steering head bearing	57
5	MOTORCYCLE	10	6.2.26	Adjusting the steering head bearing play	57
5.1	Raising the motorcycle with a lift stand	10	6.2.27	Changing the steering head bearing	57
5.2	Removing the motorcycle from the lift stand	10	7	HANDLEBAR, CONTROLS	60
5.3	Starting	10	7.1	Handlebar position	60
5.4	Starting the motorcycle for checking	11	7.2	Adjusting the handlebar position	60
6	FORK, TRIPLE CLAMP	12	7.3	Adjusting basic position of clutch lever	61
6.1	All EU models	12	7.4	Checking the routing of the throttle cable	61
6.1.1	Air suspension AER 48	12	7.5	Checking the play in the throttle cable	61
6.1.2	Checking the basic setting of the fork	12	7.6	Adjusting the play in the throttle cable	62
6.1.3	Adjusting the fork air pressure	12	8	SHOCK ABSORBER, SWINGARM	63
6.1.4	Adjusting the compression damping of the fork	13	8.1	Adjusting the high-speed compression damping of the shock absorber	63
6.1.5	Adjusting the rebound damping of the fork	13	8.2	Adjusting the low-speed compression damping of the shock absorber	63
6.1.6	Bleeding the fork legs	14	8.3	Adjusting the rebound damping of the shock absorber	64
6.1.7	Cleaning the dust boots of the fork legs	14	8.4	Measuring the rear wheel sag unloaded	64
6.1.8	Removing the fork legs	15	8.5	Checking the static sag of the shock absorber	65
6.1.9	Installing the fork legs	15	8.6	Checking the riding sag of the shock absorber	65
6.1.10	Removing the fork protector	16	8.7	Adjusting the spring preload of the shock absorber	65
6.1.11	Installing the fork protector	16	8.8	Adjusting the riding sag	66
6.1.12	Servicing the fork	16	8.9	Removing the shock absorber	67
6.1.13	Disassembling the fork legs	16	8.10	Installing the shock absorber	68
6.1.14	Disassembling the air cartridge	20	8.11	Checking the shock absorber linkage	69
6.1.15	Disassembling the shock absorber cartridge	21	8.12	Servicing the shock absorber	71
6.1.16	Checking the fork legs	23	8.13	Removing the spring	72
6.1.17	Assembling the shock absorber cartridge	24	8.14	Disassembling the damper	72
6.1.18	Assembling the air cartridge	25	8.15	Disassembling the piston rod	73
6.1.19	Assembling the fork legs	27	8.16	Disassembling the seal ring retainer	74
6.1.20	Greasing the steering head bearing	32	8.17	Changing the pilot bushing	75
6.1.21	Removing the lower triple clamp	32	8.18	Checking the damper	76
6.1.22	Installing the lower triple clamp	33	8.19	Removing the heim joint	76
6.1.23	Checking the play of the steering head bearing	34	8.20	Installing the heim joint	77
6.1.24	Adjusting the steering head bearing play	35	8.21	Assembling the seal ring retainer	78
6.1.25	Changing the steering head bearing	35	8.22	Assembling the piston rod	78
6.2	All US models	37	8.23	Assembling the damper	80
6.2.1	Adjusting the compression damping of the fork	37	8.24	Bleeding and filling the damper	81
6.2.2	Adjusting the rebound damping of the fork	37	8.25	Filling the damper with nitrogen	84
6.2.3	Bleeding the fork legs	37	8.26	Installing the spring (All EU models)	85
6.2.4	Cleaning the dust boots of the fork legs	38	8.27	Installing the spring (All US models)	86
6.2.5	Removing the fork legs	38	8.28	Checking the swingarm bearing for play	87
6.2.6	Installing the fork legs	39			

TABLE OF CONTENTS

3

8.29	Removing the swingarm.....	87	15.6	Adding front brake fluid.....	121
8.30	Installing the swingarm.....	89	15.7	Changing the front brake fluid.....	122
8.31	Changing the swingarm bearing.....	91	15.8	Checking the rear brake linings.....	123
9	EXHAUST.....	93	15.9	Changing the rear brake linings.....	123
9.1	Disassembling the main silencer.....	93	15.10	Checking the free travel of foot brake lever.....	124
9.2	Installing the main silencer.....	93	15.11	Adjusting the basic position of the foot brake lever.....	125
9.3	Changing the glass fiber yarn filling in the main silencer.....	93	15.12	Checking the rear brake fluid level.....	125
10	AIR FILTER.....	95	15.13	Adding rear brake fluid.....	126
10.1	Removing the air filter box cover.....	95	15.14	Changing the rear brake fluid.....	127
10.2	Installing the air filter box cover.....	95	16	ENGINE.....	129
10.3	Removing the air filter.....	95	16.1	Removing the engine.....	129
10.4	Installing the air filter.....	96	16.2	Installing the engine.....	133
10.5	Cleaning the air filter and air filter box.....	96	16.3	Engine disassembly.....	137
10.6	Sealing the air filter box.....	97	16.3.1	Clamping the engine into the engine work stand.....	137
10.7	Securing the air filter box cover.....	97	16.3.2	Draining the gear oil.....	138
11	FUEL TANK, SEAT, TRIM.....	98	16.3.3	Removing the clutch push rod.....	138
11.1	Opening the filler cap.....	98	16.3.4	Removing the shift lever.....	138
11.2	Closing the filler cap.....	98	16.3.5	Removing the engine sprocket.....	138
11.3	Removing the seat.....	98	16.3.6	Removing the spacer.....	139
11.4	Mounting the seat.....	99	16.3.7	Removing the alternator cover.....	139
11.5	Removing the fuel tank.....	99	16.3.8	Removing the kick starter.....	139
11.6	Installing the fuel tank.....	100	16.3.9	Removing the spark plug.....	139
12	MASK, FENDER.....	101	16.3.10	Removing the cylinder head.....	140
12.1	Removing the front fender.....	101	16.3.11	Removing the cylinder.....	140
12.2	Installing the front fender.....	101	16.3.12	Removing the piston.....	141
12.3	Removing the start number plate.....	101	16.3.13	Removing the water pump cover.....	142
12.4	Installing the start number plate.....	101	16.3.14	Removing the clutch cover.....	142
13	WHEELS.....	102	16.3.15	Removing the clutch discs.....	142
13.1	Checking the tire air pressure.....	102	16.3.16	Removing the clutch basket.....	143
13.2	Checking the tire condition.....	102	16.3.17	Removing the primary gear.....	143
13.3	Checking the wheel bearing for play.....	102	16.3.18	Removing the kick starter shaft.....	144
13.4	Checking the brake discs.....	103	16.3.19	Removing the intermediate kick starter gear.....	144
13.5	Checking the spoke tension.....	103	16.3.20	Removing the shift shaft.....	144
13.6	Front wheel.....	104	16.3.21	Removing the shift drum locating unit.....	144
13.6.1	Removing the front wheel.....	104	16.3.22	Removing the locking lever.....	145
13.6.2	Installing the front wheel.....	105	16.3.23	Removing the rotor.....	145
13.6.3	Changing the front brake discs.....	105	16.3.24	Removing the reed valve housing.....	146
13.6.4	Changing the front wheel bearing.....	106	16.3.25	Removing the left engine case section.....	146
13.7	Rear wheel.....	107	16.3.26	Removing the shift rails.....	147
13.7.1	Removing the rear wheel.....	107	16.3.27	Removing the shift drum.....	147
13.7.2	Installing the rear wheel.....	107	16.3.28	Removing the shift forks.....	147
13.7.3	Changing the rear brake discs.....	108	16.3.29	Removing the transmission shafts.....	147
13.7.4	Changing the rear wheel bearing.....	108	16.3.30	Removing the crankshaft.....	147
13.7.5	Checking the chain for dirt.....	110	16.4	work on individual parts.....	148
13.7.6	Cleaning the chain.....	110	16.4.1	Working on the right section of the engine case.....	148
13.7.7	Checking the chain tension.....	111	16.4.2	Working on the left section of the engine case.....	149
13.7.8	Checking the chain, rear sprocket, engine sprocket, and chain guide.....	111	16.4.3	Removing the crankshaft bearing inner race.....	150
13.7.9	Adjusting the chain tension.....	113	16.4.4	Installing the crankshaft bearing inner race.....	150
13.7.10	Changing the drivetrain kit.....	114	16.4.5	Changing the connecting rod, conrod bearing, and crank pin.....	150
14	WIRING HARNESS, BATTERY.....	117	16.4.6	Checking the crankshaft run-out at the bearing pin.....	151
14.1	Ignition curve plug-in connector.....	117	16.4.7	Checking/measuring the cylinder.....	152
14.2	Checking the capacitor.....	117	16.4.8	Removing the exhaust control.....	152
15	BRAKE SYSTEM.....	118	16.4.9	Checking the exhaust control.....	154
15.1	Checking the front brake linings.....	118	16.4.10	Installing the exhaust control.....	154
15.2	Changing the front brake linings.....	118			
15.3	Checking the free travel of the hand brake lever.....	120			
15.4	Adjusting the basic position of the hand brake lever.....	120			
15.5	Checking the front brake fluid level.....	120			

16.4.11	Cylinder - Nikasil® coating	156	17.6	Checking/adjusting the carburetor components.....	193
16.4.12	Checking/measuring the piston.....	157	17.7	Disassembling the carburetor	194
16.4.13	Checking the piston ring end gap	157	17.8	Checking the choke slide	195
16.4.14	Measuring the piston/cylinder mounting clearance.....	158	17.9	Checking the jet needle.....	195
16.4.15	Disassembling the reed valve housing	158	17.10	Checking the throttle slide	196
16.4.16	Checking the reed valve housing, reed valve, and intake flange.....	159	17.11	Checking the float needle valve	196
16.4.17	Assembling the reed valve housing	159	17.12	Assembling the carburetor	196
16.4.18	Working on the clutch cover.....	161	17.13	Checking/adjusting the float level	197
16.4.19	Checking the clutch	166	18	CLUTCH	198
16.4.20	Preassembling the shift shaft.....	167	18.1	Checking/correcting the fluid level of the hydraulic clutch.....	198
16.4.21	Checking the shift mechanism	167	18.2	Changing the hydraulic clutch fluid	198
16.4.22	Disassembling the main shaft	168	19	WATER PUMP, COOLING SYSTEM	199
16.4.23	Disassembling the countershaft.....	169	19.1	Cooling system	199
16.4.24	Checking the transmission.....	169	19.2	Checking the antifreeze and coolant level.....	199
16.4.25	Assembling the main shaft.....	170	19.3	Checking the coolant level	199
16.4.26	Assembling the countershaft.....	171	19.4	Draining the coolant.....	200
16.4.27	Checking the kick starter	173	19.5	Refilling with coolant	200
16.4.28	Preassembling the kick starter shaft	173	20	LUBRICATION SYSTEM.....	202
16.5	Engine assembly.....	174	20.1	Changing the gear oil.....	202
16.5.1	Installing the crankshaft	174	20.2	Draining the gear oil.....	202
16.5.2	Installing the transmission shafts	175	20.3	Refilling with gear oil	203
16.5.3	Installing the shift forks.....	175	20.4	Checking the gear oil level	203
16.5.4	Installing the shift drum	175	20.5	Adding gear oil	203
16.5.5	Installing the shift rails	175	21	IGNITION SYSTEM.....	205
16.5.6	Installing the left engine case section	176	21.1	Checking the ignition system.....	205
16.5.7	Installing the reed valve housing	176	21.2	Ignition coil - checking the primary winding.....	205
16.5.8	Installing the rotor	176	21.3	Ignition coil - checking the secondary winding.....	206
16.5.9	Installing the locking lever.....	177	21.4	Checking the spark plug connector	206
16.5.10	Installing the shift drum locating unit	178	21.5	Alternator - checking the charging coil of the ignition	207
16.5.11	Installing the shift shaft	178	21.6	Checking the ignition pulse generator	207
16.5.12	Installing the intermediate kick starter gear.....	178	22	TECHNICAL DATA.....	209
16.5.13	Installing the kick starter shaft.....	178	22.1	Engine.....	209
16.5.14	Installing the primary gear	179	22.1.1	All 125 models.....	209
16.5.15	Installing the clutch basket.....	179	22.1.2	All 150 models.....	209
16.5.16	Installing the clutch discs.....	180	22.2	Engine tolerance, wear limits	210
16.5.17	Installing the clutch cover	181	22.3	engine tightening torques	210
16.5.18	Installing the water pump cover.....	181	22.4	capacities	211
16.5.19	Installing the piston	181	22.4.1	Gear oil.....	211
16.5.20	Installing the cylinder.....	182	22.4.2	Coolant.....	211
16.5.21	Checking the X-distance	183	22.4.3	Fuel	211
16.5.22	Adjusting the X-distance.....	183	22.5	Chassis	211
16.5.23	Adjusting the Z-distance.....	184	22.6	Tires.....	212
16.5.24	Installing the cylinder head.....	185	22.7	Fork.....	212
16.5.25	Installing the spark plug	186	22.7.1	All EU models	212
16.5.26	Installing the kick starter	186	22.7.2	All US models	212
16.5.27	Installing the alternator cover.....	186	22.8	shock absorber	213
16.5.28	Installing the spacer.....	186	22.8.1	All EU models	213
16.5.29	Installing the engine sprocket	187	22.8.2	All US models	213
16.5.30	Installing the shift lever.....	187	22.9	chassis tightening torques.....	214
16.5.31	Installing the clutch push rod	187	22.10	carburetor	215
16.5.32	gear oil drain plug, installing.....	187	22.10.1	All 125 models.....	215
16.5.33	Removing the engine from the engine work stand.....	188	22.10.2	Carburetor - basic setting for sandy surfaces (All 125 models).....	215
17	CARBURETOR	189	22.10.3	All 150 models.....	215
17.1	Choke	189	22.10.4	Carburetor - basic setting for sandy surfaces (All 150 models).....	216
17.2	Carburetor - adjusting the idle speed	189	22.11	carburetor tuning.....	217
17.3	Emptying the carburetor float chamber	190	22.11.1	Carburetor tuning (All 125 models)	217
17.4	Removing the carburetor.....	190			
17.5	Installing the carburetor	192			

TABLE OF CONTENTS

22.11.2	Carburetor tuning (All 150 models)	218
22.11.3	General carburetor tuning	219
23	CLEANING, CARE	220
23.1	Cleaning the motorcycle	220
24	STORAGE	221
24.1	Storage	221
24.2	Preparing for use after storage	221
25	SERVICE SCHEDULE	222
25.1	Service schedule	222
25.2	Service work (as additional order)	223
26	WIRING DIAGRAM	224
26.1	Page 1 of 1	224
27	SUBSTANCES	226
28	AUXILIARY SUBSTANCES	228
29	SPECIAL TOOLS	230
30	STANDARDS	240
31	LIST OF ABBREVIATIONS	241
	INDEX	242

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.
Name®	Identifies a protected name.
Brand™	Identifies a trademark.
<u>Underlined terms</u>	Refer to technical details of the vehicle or indicate technical terms, which are explained in the glossary.

2.1 Repair Manual

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

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

2.2 Safety advice

A number of safety instructions need to be followed to operate the 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

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



Warning

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



Caution

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

Note

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



Warning

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

2.4 Work rules

Special tools are necessary for certain tasks. The tools are not 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 & Warranty Booklet and in the **KTM Dealer.net**; otherwise, all warranty claims will be void. No warranty claims can be considered for damage resulting from manipulations and/or alterations to the vehicle.

Additional information on the guarantee or warranty and the procedures involved can be found in the Service & Warranty Booklet.

3.2 Operating and auxiliary substances



Warning

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

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

Use operating and auxiliary substances (such as fuel and lubricants) as specified in the Owner's 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.

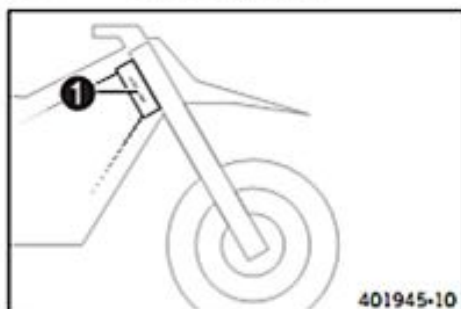
International KTM Website: <http://www.ktm.com>

3.4 Figures

The figures contained in the manual may depict special equipment.

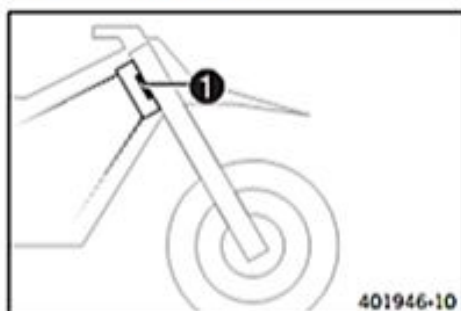
In the interest of clarity, some components may be shown disassembled or may not be shown at all. It is not always necessary to disassemble the component to perform the activity in question. Please follow the instructions in the text.

4.1 Chassis number



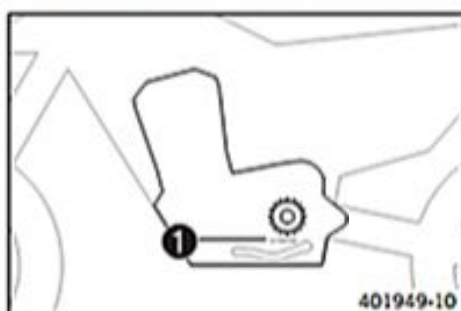
The chassis number ① is stamped on the right side of the steering head.

4.2 Type label



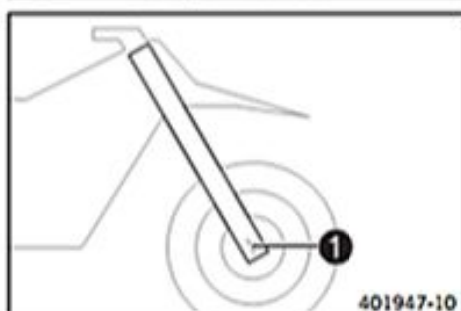
The type label ① is fixed to the front of the steering head.

4.3 Engine number



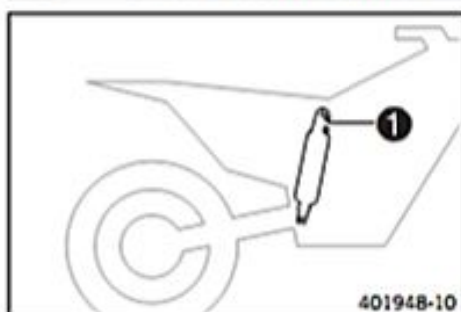
The engine number ① is stamped on the left side of the engine under the engine sprocket.

4.4 Fork part number



The fork part number ① is stamped on the inner side of the fork stub.

4.5 Shock absorber article number



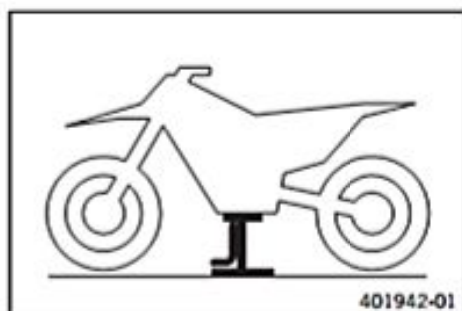
The shock absorber part number ① is stamped on the top of the shock absorber above the adjusting ring towards the engine side.

5.1 Raising the motorcycle with a lift stand

Note

Material damage The vehicle may be damaged by incorrect procedure when parking.
Significant damage may be caused if the vehicle rolls away or falls over.
The components for parking the vehicle are designed only for the weight of the vehicle.

- Park the vehicle on a firm and level surface.
- Ensure that nobody sits on the vehicle when the vehicle is parked on a stand.



- Raise the motorcycle at the frame underneath the engine.

Lift stand (78129955100) (☞ p. 235)

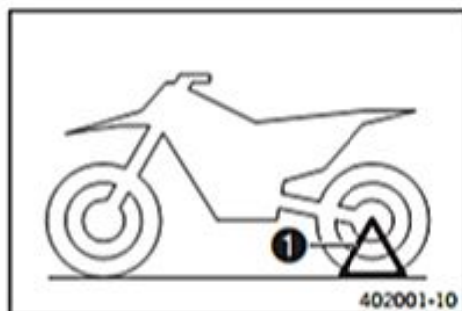
- ✓ Neither wheel is in contact with the ground.
- Secure the motorcycle against falling over.

5.2 Removing the motorcycle from the lift stand

Note

Material damage The vehicle may be damaged by incorrect procedure when parking.
Significant damage may be caused if the vehicle rolls away or falls over.
The components for parking the vehicle are designed only for the weight of the vehicle.

- Park the vehicle on a firm and level surface.
- Ensure that nobody sits on the vehicle when the vehicle is parked on a stand.



- Remove the motorcycle from the lift stand.
- Remove the lift stand.
- To park the motorcycle, insert plug-in stand ① into the left side of the wheel spindle.



Info

Remove the plug-in stand before riding.

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.



Info

If the motorcycle is unwilling to start, the cause can be old fuel in the float chamber. The flammable elements of the fuel evaporate after a long time of standing.
If the float chamber is filled with fresh fuel, the engine starts immediately.

The motorcycle has been out of use for more than 1 week

- Empty the carburetor float chamber. (☞ p. 190)

- Turn handle ❶ of the fuel tap to the **ON** position.
 - ✓ Fuel can flow from the fuel tank to the carburetor.
- Remove the plug-in stand.
- Shift gear to neutral.

The engine is cold

- Pull the choke lever out as far as possible.
- Press the kick starter robustly through its full range.



Info

Do not open the throttle.

5.4 Starting the motorcycle for checking



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.
-
- Shift gear to neutral.
 - Press the kick starter forcefully through its full range.



Info

Do not open the throttle.

6.1 All EU models

6.1.1 Air suspension AER 48

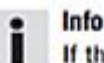


Air suspension WP Performance Systems AER 48 is used in the fork.

In this system, suspension is located in the left fork leg and damping in the right fork leg.

As fork springs are no longer required, a significant weight advantage is achieved when compared to conventional forks. The response on slightly uneven surfaces is significantly improved.

In normal driving mode, suspension is provided exclusively by an air cushion. A steel spring is located in the left fork leg as an end stop.

**Info**

If the fork is frequently overloaded, then the air pressure in the fork must be increased to avoid damage to the fork and frame.

The air pressure in the fork can be quickly adjusted for the rider's weight, surface conditions and the rider's preference using a fork pump. The fork does not have to be detached. The time consuming mounting of harder or softer fork springs is not required.

**Info**

A suitable fork pump is available within our **KTM PowerParts** range.

If the air chamber loses air due to a damaged seal, the fork will still not sag. In this case the air is retained in the fork. The suspension travel is maintained as far as possible. The damping becomes harder and the riding comfort reduces.

As with a conventional fork, the damping can be adjusted in rebound and compression stages.

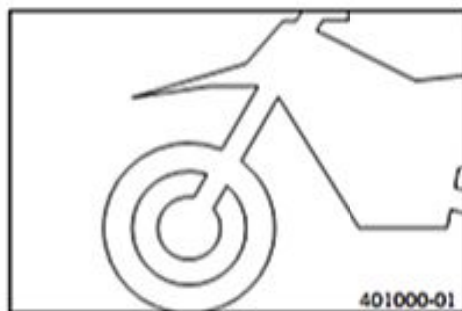
The rebound adjuster is located at the lower end of the right fork leg.

The compression adjuster is located at the upper end of the right fork leg.

6.1.2 Checking the basic setting of the fork

**Info**

For various reasons, no exact riding sag can be determined for the fork.



- Smaller differences in the rider's weight can be compensated for by the fork air pressure.
- However, if the fork frequently bottoms out (hard end stop on compression), the fork air pressure must be increased to avoid damage to the fork and frame.

6.1.3 Adjusting the fork air pressure

**Warning**

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

Extreme modifications to the suspension setting may cause a serious deterioration in the handling characteristic and overload components.

- Only make adjustments within the recommended range.
- Ride slowly to start with after making adjustments to get the feel of the new handling characteristic.

**Info**

Check or adjust the air pressure at the earliest 5 minutes after switching off the engine.

The air suspension is located in the left fork leg. The pressure and rebound damping is located in the right fork leg.

Preparatory work

- Raise the motorcycle with a lift stand. (➔ p. 10)

**Main work**

- Remove protection cap ①.
- Push fork pump ② together fully.

Fork pump (79412966000) (☛ p. 235)

- Connect the fork pump to the left fork leg.
 - ✓ The fork pump indicator switches on automatically.
 - ✓ A little air escapes from the fork leg when connecting.

**Info**

This is due to the volume of the hose and not due to a defect in the fork pump or the fork.
Read the accompanying **KTM PowerParts** instructions.

- Adjust the air pressure as specified.

Guideline

Air pressure	8.2 bar (119 psi)
Gradual changing of the air pressure in steps of	0.2 bar (3 psi)
Minimum air pressure	7 bar (102 psi)
Maximum air pressure	15 bar (218 psi)

**Info**

Never set the air pressure to a value outside the stated range.

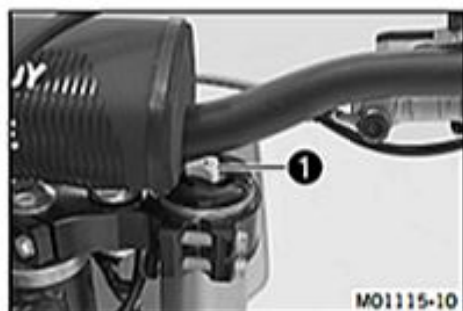
- Disconnect the fork pump from the left fork.
 - ✓ When disconnecting, excess pressure will escape from the tube – the fork leg does not lose any air.
 - ✓ The fork pump indicator switches off automatically after 80 seconds.
- Mount the protection cap.

Finishing work

- Remove the motorcycle from the lift stand. (☛ p. 10)

6.1.4 Adjusting the compression damping of the fork**Info**

The hydraulic compression damping determines the fork suspension behavior.



- Turn adjusting screw ① clockwise all the way.

**Info**

The adjusting screw ① is located at the upper end of the right fork leg.

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

Guideline

Compression damping	
Comfort	20 clicks
Standard	17 clicks
Sport	12 clicks

**Info**

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

6.1.5 Adjusting the rebound damping of the fork**Info**

The hydraulic rebound damping determines the fork suspension behavior.



- Remove protection cap **1**.
- Turn adjusting screw **2** clockwise all the way.



Info

The adjusting screw **2** is located at the lower end of the right fork leg.

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

Guideline

Rebound damping	
Comfort	20 clicks
Standard	17 clicks
Sport	12 clicks

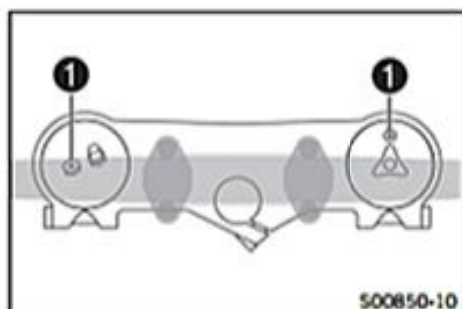


Info

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

- Mount protection cap **1**.

6.1.6 Bleeding the fork legs



Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)

Main work

- Release bleeder screws **1**.
✓ Any excess pressure escapes from the interior of the fork.
- Tighten the bleeder screws.

Finishing work

- Remove the motorcycle from the lift stand. (☞ p. 10)

6.1.7 Cleaning the dust boots of the fork legs

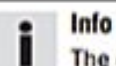


Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the fork protector. (☞ p. 16)

Main work

- Push dust boots **1** of both fork legs downward.



Info

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



Warning

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

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

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

Universal oil spray (☞ p. 229)

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

Finishing work

- Install the fork protector. (☞ p. 16)
- Remove the motorcycle from the lift stand. (☞ p. 10)

6.1.8 Removing the fork legs



Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the front wheel. (☞ p. 104)

Main work

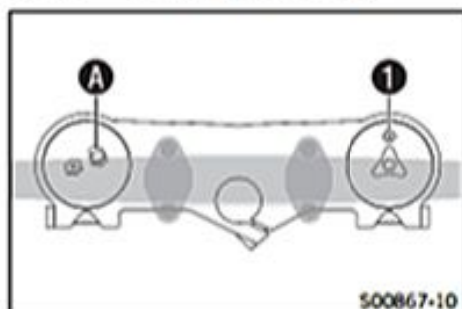
- Remove screws ① and take off the clamp.
- Remove screws ② and take off the brake caliper.
- Allow the brake caliper and brake line to hang tension-free to the side.

Info

Do not activate the hand brake lever while the front wheel is removed.

- Unscrew screws ③. Take out the left fork leg.
- Unscrew screws ④. Take out the right fork leg.

6.1.9 Installing the fork legs

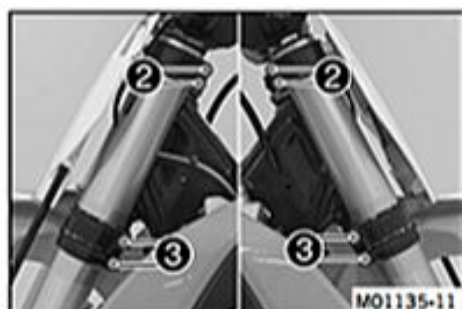


Main work

- Position the fork legs.
 - ✓ The air release screw ① of the right fork leg is positioned to the front.
 - ✓ The left fork leg valve A is offset by approx. 20° to the front.

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. The air suspension is located in the left fork leg. The pressure and rebound damping is located in the right fork leg.



- Tighten screws ②.

Guideline

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

- Tighten screws ③.

Guideline

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



- Position the brake caliper. Mount and tighten screws ④.

Guideline

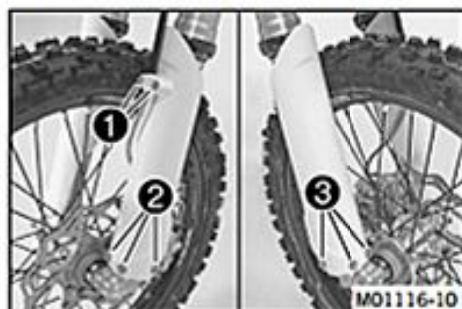
Screw, front brake caliper	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
----------------------------	----	------------------------	---------------

- Position the brake line and clamp. Mount and tighten screws ⑤.

Finishing work

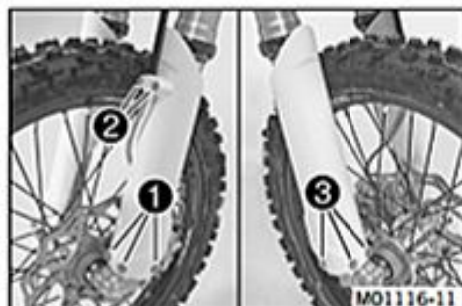
- Install the front wheel. (☞ p. 105)

6.1.10 Removing the fork protector



- Remove screws **1**. Remove the clamp.
- Remove screws **2**. Take off the left fork protector.
- Remove screws **3**. Take off the right fork protector.

6.1.11 Installing the fork protector



- Position the fork protection on the left fork leg. Mount and tighten screws ①.

Guideline

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

- Position the brake line and clamp. Mount and tighten screws ②.
- Position the fork protector on the right fork leg. Mount and tighten screws ③.

Guideline

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

6.1.12 Servicing the fork



Caution

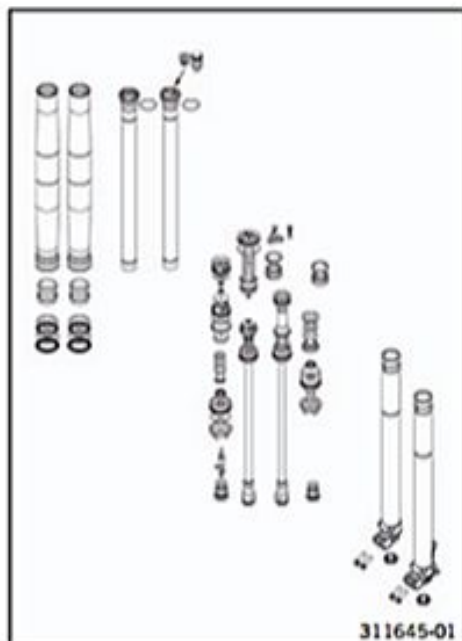
Danger of accidents Disassembling pressurized parts can cause injuries.

- The fork is filled with compressed air. Please follow the description provided.

Condition

The fork legs have been removed.

- Disassemble the fork legs. (☞ p. 16)
- Disassemble the air cartridge. (☞ p. 20)
- Disassemble the shock absorber cartridge. (☞ p. 21)
- Check the fork legs. (☞ p. 23)
- Assemble the shock absorber cartridge. (☞ p. 24)
- Assemble the air cartridge. (☞ p. 25)
- Assemble the fork legs. (☞ p. 27)



6.1.13 Disassembling the fork legs



Caution

Danger of accidents Disassembling pressurized parts can cause injuries.

- The fork is filled with compressed air. Please follow the description provided.

Condition

The fork legs have been removed.



Left fork leg

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

Clamping stand (T1403S) (☛ p. 238)

- Release cartridge (1) using special tool (2).

Ring wrench (T14017) (☛ p. 237)



Info

The cartridge cannot be taken off yet.

- Unclamp the fork leg.
- Drain the fork oil.

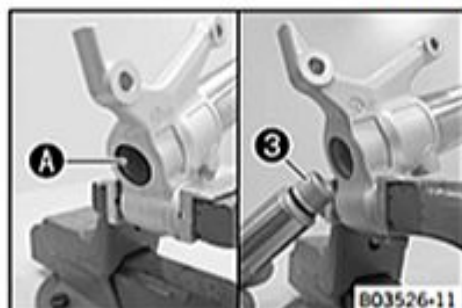


- Clamp the fork leg with the axle clamp.

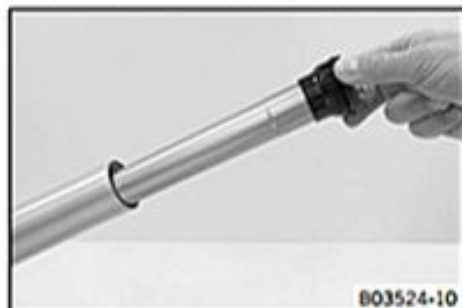
Guideline

Use soft jaws.

- Remove protection cap (A).
- Remove screw (3).



- Remove the cartridge.

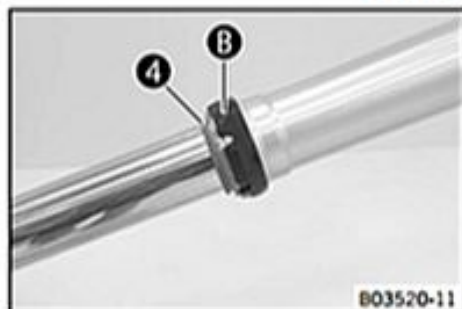


- Remove dust boot (4).
- Remove fork protector ring (B).



Info

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

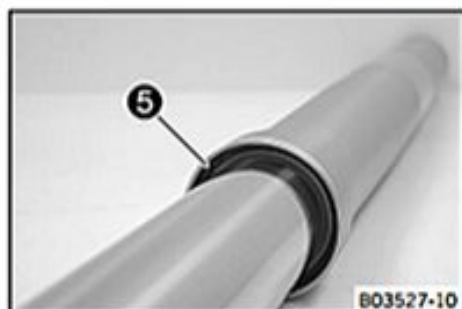


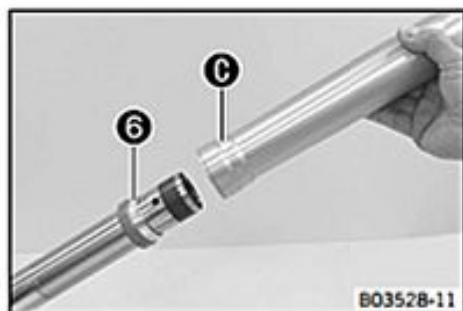
- Remove lock ring (5).



Info

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





- Warm up outer tube in **6** of the lower sliding bushing.

Guideline

50 °C (122 °F)

- Pull the outer tube from the inner tube with a jerk.



Info

Lower sliding bushing **6** must be pulled from its bearing seat.



- Remove upper sliding bushing **7**.



Info

Without using a tool, pull the stack slightly apart by hand.

- Take off lower sliding bushing **6**.
- Take off support ring **8**.
- Take off seal ring **9**.
- Take off lock ring **5**.
- Take off dust boot **4**.
- Unclamp the fork leg.

Right fork leg

- Remove protection cap **A**.
- Make a note of the present state of rebound **1** and compression damping **2**.
- Open the adjusters of the rebound and compression damping completely.



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

Clamping stand (T1403S) (☛ p. 238)



- Remove the screw. Remove adjuster **3** on compression damping.



- Loosen cartridge **4**.

Ring wrench (T14017) (☛ p. 237)



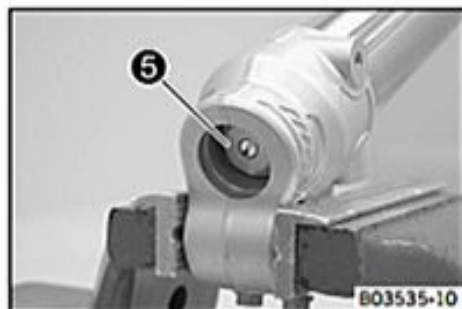
Info

The cartridge cannot be taken off yet.





- Unclamp the fork leg.
- Drain the fork oil.



- Clamp the fork leg with the axle clamp.

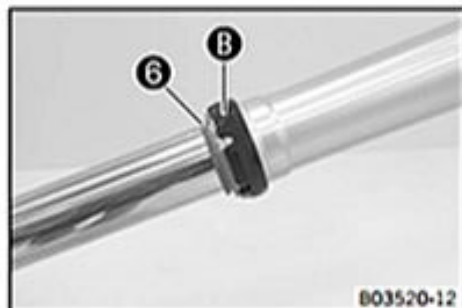
Guideline

Use soft jaws.

- Remove rebound adjuster 5.



- Remove the cartridge.

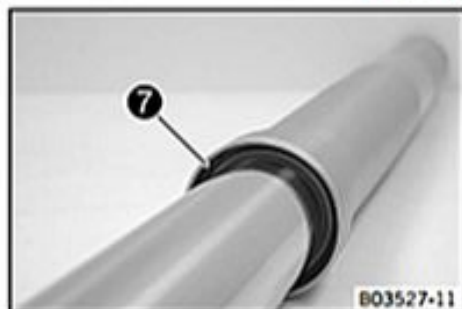


- Remove dust boot 6.
- Remove fork protector ring B.



Info

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

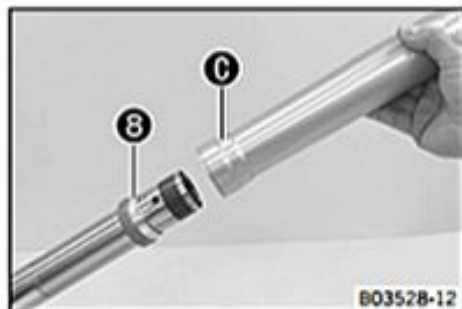


- Remove lock ring 7.



Info

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



- Warm up outer tube in C of the lower sliding bushing.

Guideline

50 °C (122 °F)

- Pull the outer tube from the inner tube with a jerk.



Info

Lower sliding bushing 8 must be pulled from its bearing seat.



- Remove upper sliding bushing ⑨.

**Info**

Without using a tool, pull the stack slightly apart by hand.

- Take off 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.

6.1.14 Disassembling the air cartridge

**Caution**

Danger of accidents Disassembling pressurized parts can cause injuries.

- The fork is filled with compressed air. Please follow the description provided.

Preparatory work

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

Main work

- Remove valve cap ①.
- Slowly release the pressure from the air cartridge.

**Info**

Hold the piston rod in extended position to allow the air pressure to balance between the positive air chamber and the negative air chamber.

- Remove valve core ②.

- Clamp the air cartridge.

Clamping stand (T14072) (☛ p. 239)

- Remove lock ring ③.
- Remove fluid barrier ④.

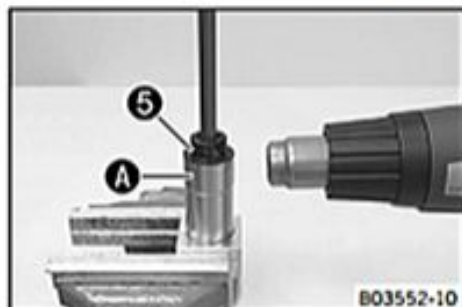
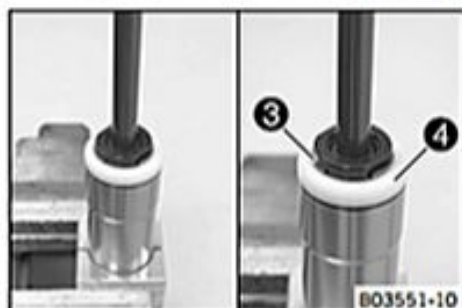
- Heat up thread area of air cartridge ⑤.

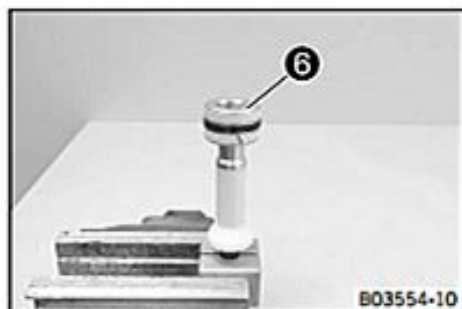
Guideline

50 °C (122 °F)

- Loosen gasket support ⑤.

- Remove the piston rod with the seal ring retainer.

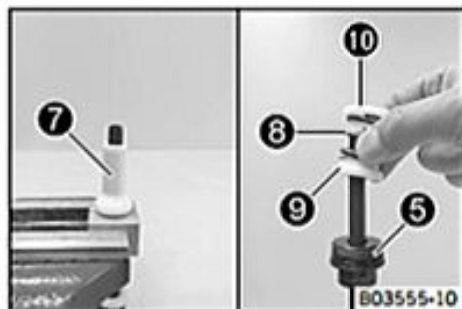




- Degrease and clamp the top of the piston rod.

Clamping stand (T14016S) (☛ p. 237)

- Remove piston 6.



- Remove end stop 7.
- Remove spring 8 with spring support 9 and spring support 10.
- Remove seal ring retainer 5.

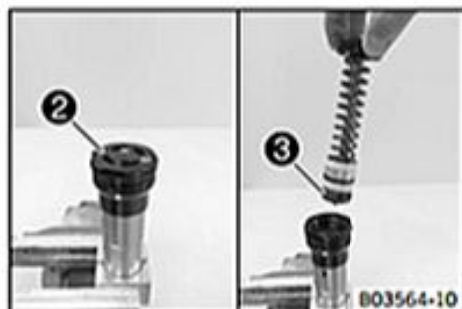
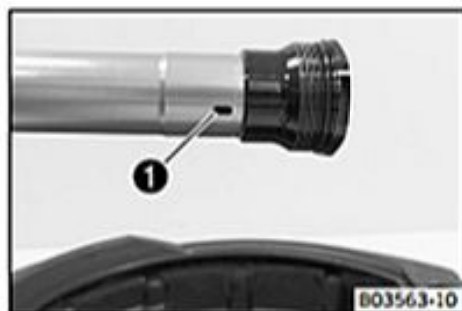
6.1.15 Disassembling the shock absorber cartridge

Preparatory work

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

Main work

- Allow oil to drain from breathing hole 1.



- Degrease and clamp the top of the shock absorber cartridge.

Clamping stand (T14072) (☛ p. 239)

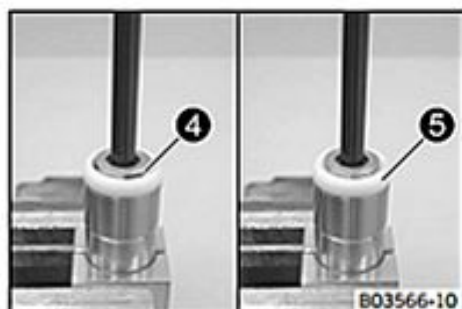
- Loosen screw cap 2.

Special socket (T14047) (☛ p. 238)

- Remove screw cap with shock absorber unit 3.



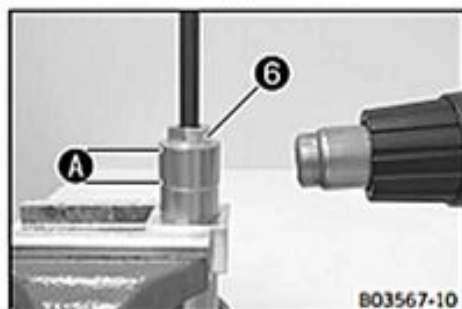
- Drain the shock absorber cartridge.



- Turn the shock absorber cartridge, degrease and clamp at the bottom.

Clamping stand (T14072) (☞ p. 239)

- Remove lock ring (4).
- Remove fluid barrier (5).



- Heat up thread area of shock absorber cartridge (A).

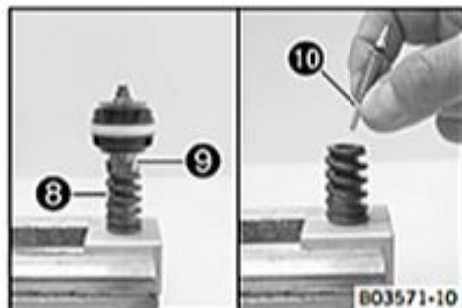
Guideline

50 °C (122 °F)

- Loosen seal ring retainer (6).



- Remove piston rod with seal ring retainer and shock absorber unit (7).



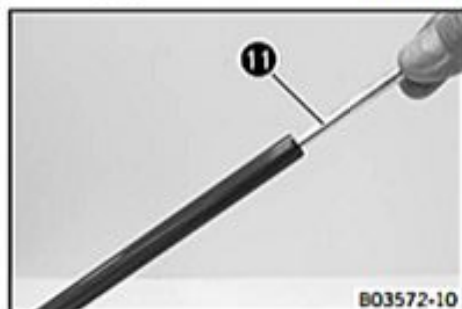
- Degrease piston rod and clamp underneath spring (8).

Clamping stand (T14016S) (☞ p. 237)

- Remove piston retainer (9) with the shock absorber unit.
- Remove adjustment valve (10) with the spring from the piston rod.
- Remove spring (8) with the spring seat.



- Remove the seal ring retainer from the piston rod.



- Remove adjusting tube (11) from the piston rod.

6.1.16 Checking the fork legs

Condition

The fork legs have been disassembled.

- Check the inner tube and the axle clamp for damage.

- If damage is found:
 - Change the inner tube.



B03581-10

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

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

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

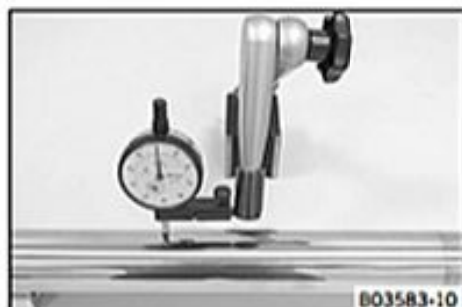


B03582-10

- Measure the run-out of the inner tube.

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

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



B03583-10

- 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 greater than the specified value:
 - Change the outer tube.

- Check the outer tube for damage.

- If damage is found:
 - Change the outer tube.



B03584-10

- Check the surface of the sliding bushings.

- If bronze-colored layer **A** under sliding layer **B** is visible or the surface is rough:

- Change the sliding bushings.



200665-10



- Check the piston rod for damage.
 - If damage is found:
 - Replace the piston rod.
- Measure the outside diameter of the piston rod at several locations.

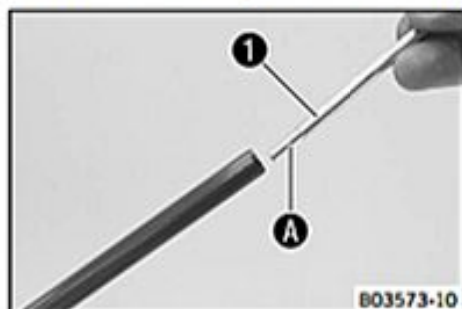
Outside diameter of the piston rod	$\geq 11.965 \text{ mm } (\geq 0.47106 \text{ in})$
------------------------------------	---

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

Run-out of the piston rod	$\leq 0.40 \text{ mm } (\leq 0.0157 \text{ in})$
---------------------------	--

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

6.1.17 Assembling the shock absorber cartridge



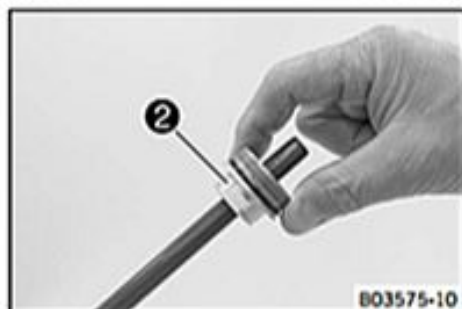
- Lubricate and mount adjusting tube ①.

Fork oil (SAE 4) (48601166S1) (☞ p. 226)
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Info

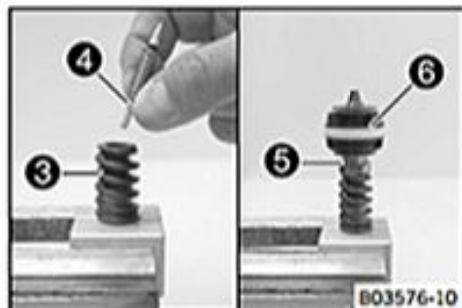
Mount detached end A at the bottom.



- Lubricate seals on seal ring retainer ②.

Lubricant (T511) (☞ p. 228)

- Push the seal ring retainer onto the piston rod.
 - ✓ The thread faces upward.



- Degrease and clamp the top of the piston rod.

Clamping stand (T14016S) (☞ p. 237)

- Mount spring ③.



Info

Mount the spring retainer at the bottom.

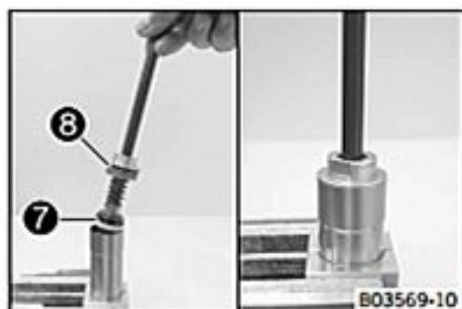
- Mount adjusting valve ④ in the piston rod with spring and new O-ring.
 - ✓ The tip faces upward.
- Lubricate O-ring of adjustment valve.

Lubricant (T158) (☞ p. 228)

- Mount and tighten piston retainer ⑤ with shock absorber unit ⑥.

Guideline

Piston retainer on piston rod	M9x1	20 Nm (14.8 lbf ft)	Loctite® 2701™
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- Clamp the shock absorber cartridge at the bottom.

Clamping stand (T14072) (☛ p. 239)

- Lubricate friction ring ⑦ on the shock absorber cartridge.

Fork oil (SAE 4) (48601166S1) (☛ p. 226)

- Push the piston rod into the shock absorber cartridge.
- Lubricate O-ring ⑧ of the seal ring retainer.

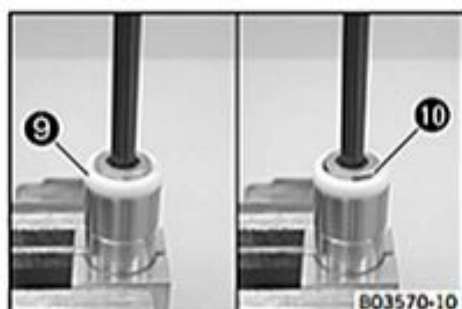
Lubricant (T158) (☛ p. 228)

- Mount and tighten the seal ring retainer.

Guideline

Seal ring retainer on cartridge	M35.5x0.8	40 Nm (29.5 lbf ft)	Loctite® 2701™
---------------------------------	-----------	------------------------	----------------

- Position fluid barrier ⑨.
- Mount lock ring ⑩.



- Turn the shock absorber cartridge around and clamp at top.

Clamping stand (T14016S) (☛ p. 237)

- Fill it with fork oil.

Oil capacity, right cartridge	380 ml (12.85 fl. oz.)	Fork oil (SAE 4) (48601166S1) (☛ p. 226)
-------------------------------	---------------------------	---



Info

To bleed the oil, move the piston rod up and down multiple times until air bubbles stop rising.

- Lubricate seals ⑪ and friction rings ⑫.

Fork oil (SAE 4) (48601166S1) (☛ p. 226)

- Lubricate O-ring ⑬ on the screw cover.

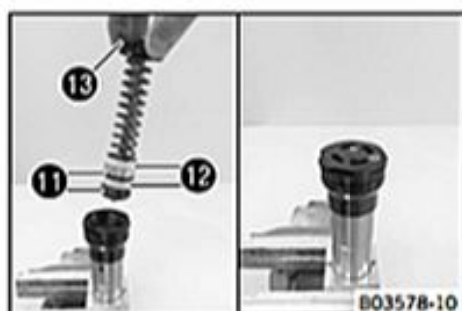
Lubricant (T158) (☛ p. 228)

- Mount the screw cover with pressure stage unit; tighten with special tool.

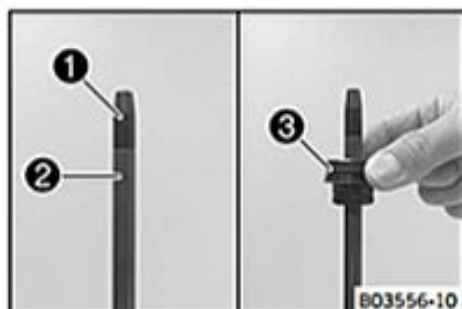
Guideline

Pressure stage unit on shock absorber cartridge	M44x1	40 Nm (29.5 lbf ft)
---	-------	------------------------

Special socket (T14047) (☛ p. 238)



6.1.18 Assembling the air cartridge



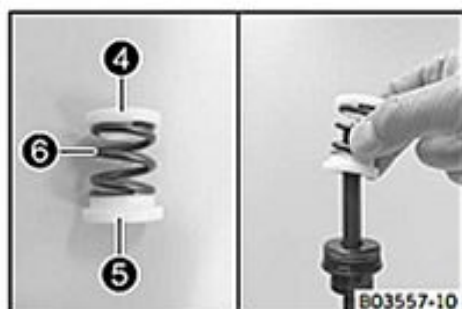
- Slot special tool ① over thread on piston rod ②.

Protecting sleeve (T14073) (☛ p. 239)

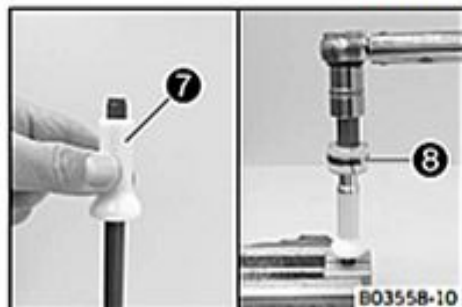
- Lubricate inner seals on seal ring retainer ③.

Lubricant (T511) (☛ p. 228)

- Mount the seal ring retainer.
- ✓ The thread faces upward.



- Push spring guide ④ and spring guide ⑤ onto spring ⑥.
- Mount the spring.
 - ✓ The narrow spring guide is located at the top.
 - ✓ The wide spring guide is located at the bottom.



- Slot end stop ⑦ onto piston rod.
 - ✓ The cone points downward.
- Clamp the piston rod underneath the end stop.

Clamping stand (T14016S) (☛ p. 237)

- Mount and tighten piston ⑧.

Guideline

Piston on piston rod	M12x1	20 Nm (14.8 lbf ft)	Loctite® 2701™
----------------------	-------	------------------------	----------------



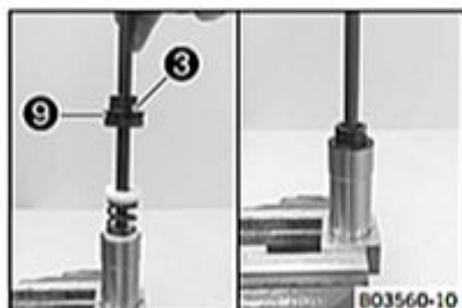
- Lubricate piston in area of A and inside of the cartridge.

Grease capacity, left cartridge	11 ml (0.37 fl. oz.)	Multi-purpose grease (00062010051) (☛ p. 227)
---------------------------------	-------------------------	--

- Clamp the air cartridge.

Clamping stand (T14072) (☛ p. 239)

- Push the piston rod into the air cartridge.



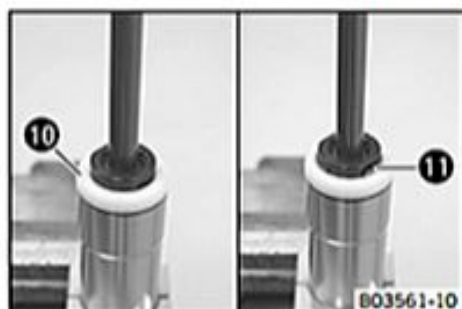
- Lubricate O-ring ⑨ of seal ring retainer ③.

Lubricant (T158) (☛ p. 228)

- Mount and tighten the seal ring retainer.

Guideline

Seal ring retainer on cartridge	M35.5x0.8	40 Nm (29.5 lbf ft)	Loctite® 2701™
---------------------------------	-----------	------------------------	----------------



- Position fluid barrier ⑩.
- Mount lock ring ⑪.



- Mount and tighten valve core ⑫.
- Fill the cartridge with air.

Info
Maximum 14 bar!

- Adjust air pressure with special tool ⑬ as per specifications.

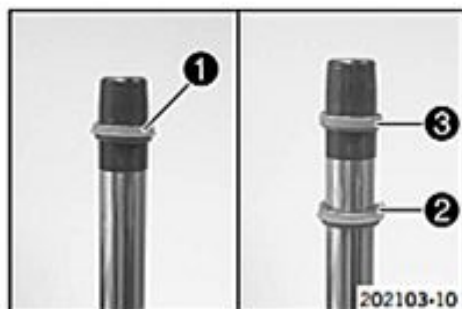
Guideline

Air pressure	8.2 bar (119 psi)
--------------	-------------------

Fork pump (79412966000) (☛ p. 235)

- Mount protection cap 14.

6.1.19 Assembling the fork legs



Preparatory work

- Check the fork legs. (☞ p. 23)

Left fork leg

- Clamp the inner tube with the axle clamp.

Guideline

Use soft jaws.

- Mount the special tool.

Protecting sleeve (T1401) (☞ p. 237)

- Grease and push on dust boot 1.

Lubricant (T511) (☞ p. 228)

✓ The sealing lip is mounted with the spring expander facing down.



Info

Always replace the dust boot, seal ring, lock ring, and support ring.

- Push on lock ring 2.

- Grease and push on seal ring 3.

Lubricant (T511) (☞ p. 228)

✓ The sealing lip points downward, the open side upward.

- Remove the special tool.

- Push on support ring 4.

- Sand the edges of the sliding bushings with 600-grit sandpaper, then clean and grease them.

Fork oil (SAE 4) (48601166S1) (☞ p. 226)

- Push on lower sliding bushing 5.

- Mount upper sliding bushing 6.



Info

Without using a tool, pull the stack slightly apart by hand.

- Heat up outer tube in area A of the lower sliding bushings.

Guideline

50 °C (122 °F)

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

Mounting tool (T14040S) (☞ p. 238)

- Push on the outer tube.

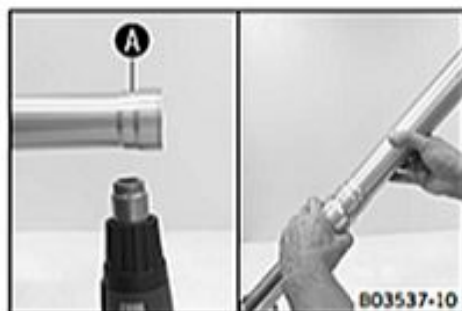
- Press the sliding bushing all the way into the outer tube.

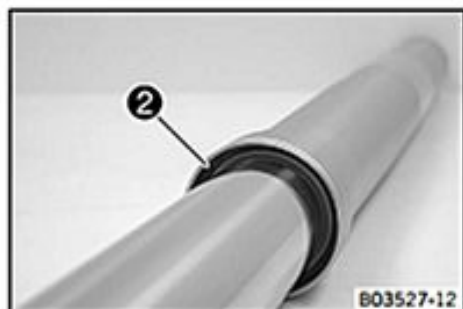
- Position the support ring.

- Hold the seal ring with the shorter side of the special tool.

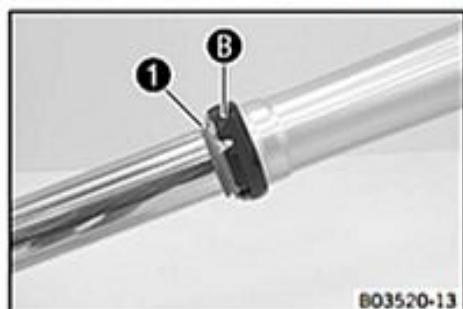
Mounting tool (T14040S) (☞ p. 238)

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





- Mount lock ring **2**.
- ✓ The lock ring engages audibly.



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



- Assemble the individual components that belong together.



Info

Air cartridge (left fork leg): cartridge with blue adapter **C**, axle clamp with brake mount and outer tube with warning label **D**, screw cartridge **E**.



- Slide the cartridge into the inner tube.



- Lubricate O-ring **7**.

Lubricant (T158) (☞ p. 228)

- Mount and tighten the screw.

Guideline

Screw, air cartridge on axle clamp	M20x1	45 Nm (33.2 lbf ft)
------------------------------------	-------	------------------------

- Clamp the left fork leg vertically.

Guideline

Use soft jaws.

- Fill it with fork oil.

Oil capacity external mechanism left	200 ± 3 ml (6.76 ± 0.22 fl. oz.)	Fork oil (SAE 4) (48601166S1) (☞ p. 226)
--------------------------------------	-------------------------------------	---





- Lubricate O-ring **8** on the air cartridge.

Lubricant (T158) (☞ p. 228)

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

Clamping stand (T1403S) (☞ p. 238)



- Tighten air cartridge **9**.

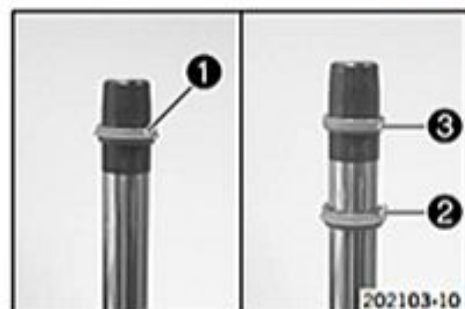
Guideline

Damper cartridge on outer tube

M51x1.5

50 Nm
(36.9 lbf ft)

Ring wrench (T14017) (☞ p. 237)



Right fork leg

- Clamp the inner tube with the axle clamp.

Guideline

Use soft jaws.

- Mount the special tool.

Protecting sleeve (T1401) (☞ p. 237)

- Grease and push on dust boot **1**.

Lubricant (T511) (☞ p. 228)

- ✓ The sealing lip is mounted with the spring expander facing down.



Info

Always replace the dust boot, seal ring, lock ring, and support ring.

- Push on lock ring **2**.
- Grease and push on seal ring **3**.

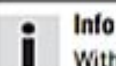
Lubricant (T511) (☞ p. 228)

- ✓ The sealing lip points downward, the open side upward.

- Remove the special tool.
- Push on support ring **4**.
- Sand the edges of the sliding bushings with 600-grit sandpaper, then clean and grease them.

Fork oil (SAE 4) (48601166S1) (☞ p. 226)

- Push on lower sliding bushing **5**.
- Mount upper sliding bushing **6**.



Info

Without using a tool, pull the stack slightly apart by hand.

- Heat up outer tube in area **A** of the lower sliding bushings.

Guideline

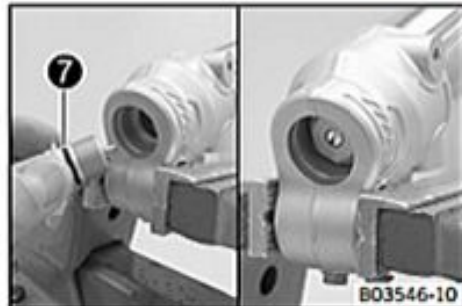
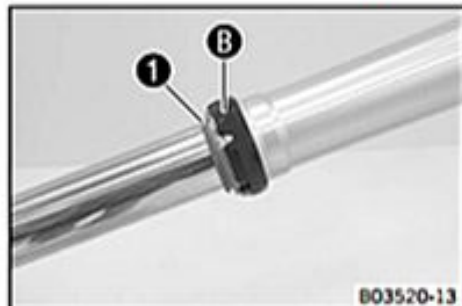
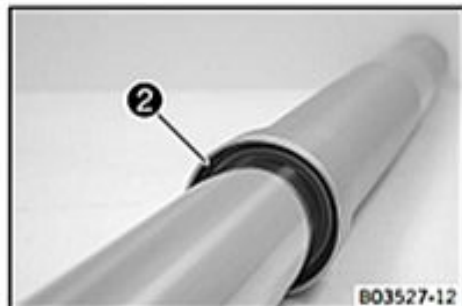
50 °C (122 °F)

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

Mounting tool (T14040S) (☞ p. 238)

- Push on the outer tube.





- Press the sliding bushing all the way into the outer tube.
- Position the support ring.
- Hold the seal ring with the shorter side of the special tool.

Mounting tool (T14040S) (☞ p. 238)

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

- Mount lock ring (2).
- ✓ The lock ring engages audibly.

- Mount dust boot (1).
- Mount fork protector ring (B).

- Assemble the individual components that belong together.



Info

Shock absorber cartridge (right fork leg): cartridge with silver adapter (C), axle clamp without brake mount, and outer tube without warning label, rebound adjuster (D).

- Slide shock absorber cartridge into inner tube.

- Lubricate O-ring (7) on the rebound adjuster.

Lubricant (T158) (☞ p. 228)

- Mount and tighten the rebound adjuster.

Guideline

Rebound adjuster on the axle clamp	M20x1	45 Nm (33.2 lbf ft)
------------------------------------	-------	------------------------



- Clamp the left fork leg vertically.

Guideline

Use soft jaws.

- Fill it with fork oil.

Oil capacity external mechanism right	200 $\pm$ 3 ml (6.76 $\pm$ 0.22 fl. oz.)	Fork oil (SAE 4) (48601166S1) (☛ p. 226)
---	---	---

- Lubricate O-ring 8 on the shock absorber cartridge.

Lubricant (T158) (☛ p. 228)

- Push the outer tube up and screw in the shock absorber cartridge.
- Clamp the outer tube in the area of the lower triple clamp.

Clamping stand (T1403S) (☛ p. 238)

- Tighten the shock absorber cartridge.

Guideline

Damper cartridge on outer tube	M51x1.5	50 Nm (36.9 lbf ft)
--------------------------------	---------	------------------------

Ring wrench (T14017) (☛ p. 237)

- Mount adjuster 9 of the compression damping. Mount and tighten the screw.

Guideline

Screw, compression adjuster	M4x0.5	1.5 Nm (1.11 lbf ft)
-----------------------------	--------	-------------------------

Condition

Value not determined on removal:

- Turn compression damping adjusting screw 10 and rebound damping adjusting screw 11 clockwise all the way.
- Turn counterclockwise by the number of clicks corresponding to the fork type.

Guideline

Compression damping	
Comfort	20 clicks
Standard	17 clicks
Sport	12 clicks
Rebound damping	
Comfort	20 clicks
Standard	17 clicks
Sport	12 clicks

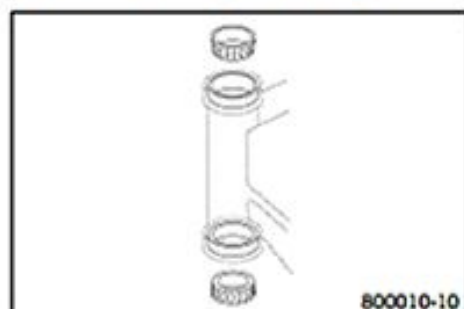
- Mount protection cap 12.

Condition

Value determined on removal:

- Turn compression damping adjusting screw 10 and rebound damping adjusting screw 11 clockwise all the way.
- Turn the adjusting screws to the position they were in before dismantling.
- Mount protection cap 12.

6.1.20 Greasing the steering head bearing



- Remove the lower triple clamp. (☛ p. 32)
- Install the lower triple clamp. (☛ p. 33)

6.1.21 Removing the lower triple clamp

Preparatory work

- Raise the motorcycle with a lift stand. (☛ p. 10)
- Remove the front wheel. (☛ p. 104)
- Remove the fork legs. (☛ p. 38)
- Remove the start number plate. (☛ p. 101)
- Remove the front fender. (☛ p. 101)
- Remove the handlebar cushion.

Main work

- Remove screw ①.
- Remove screw ②.
- Pull off the upper triple clamp with the handlebar and hang to the side.



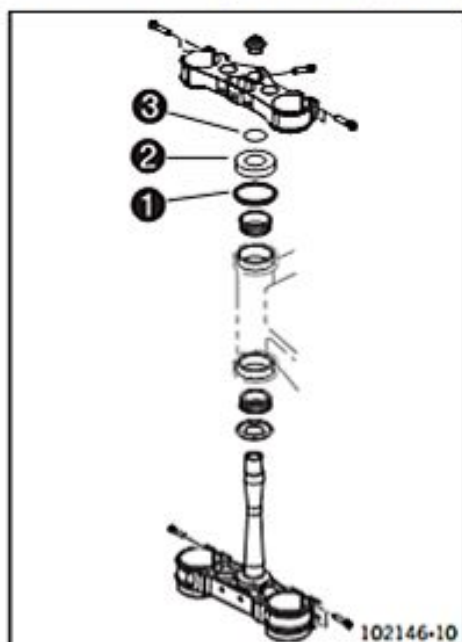
Info

Protect the components against damage by covering them.
Do not kink the cables and lines.



- Remove O-ring ③. Remove protective ring ④.
- Take off the lower triple clamp with the steering stem.
- Remove the upper steering head bearing.

6.1.22 Installing the lower triple clamp



Main work

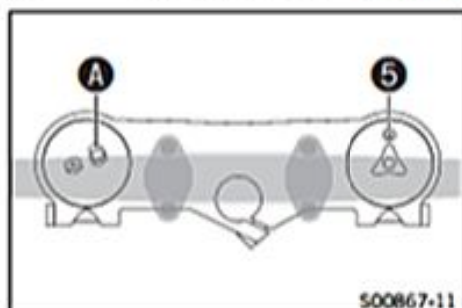
- Clean the bearing and sealing elements, check for damage, and grease.

High viscosity grease (☞ p. 228)

- Insert the lower triple clamp with the steering stem. Mount the upper steering head bearing.
- Check whether the upper steering head seal ① is correctly positioned.
- Slide on protective ring ② and O-ring ③.



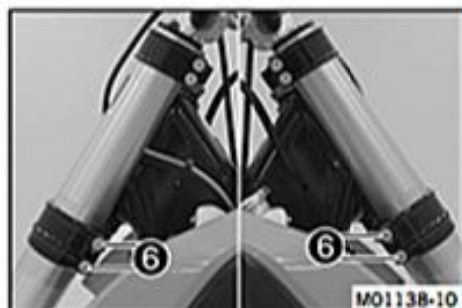
- Position the upper triple clamp with the handlebar.
- Mount screw ④ but do not tighten yet.



- Position the fork legs.
 - ✓ The air release screw ⑤ of the right fork leg is positioned to the front.
 - ✓ The left fork leg valve ① is offset by approx. 20° to the front.

i Info

The air suspension AER valve is located in the left fork leg. 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.



- Tighten screws ⑥.

Guideline

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



- Tighten screw ④.

Guideline

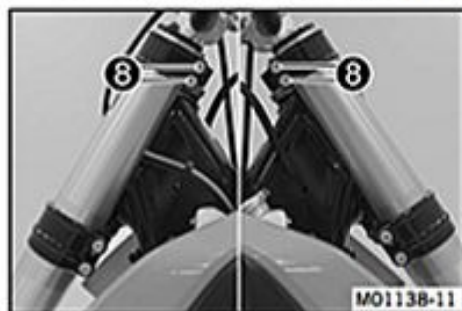
Screw, top steering head	M20x1.5	12 Nm (8.9 lbf ft)
--------------------------	---------	--------------------



- Mount and tighten screw 7.

Guideline

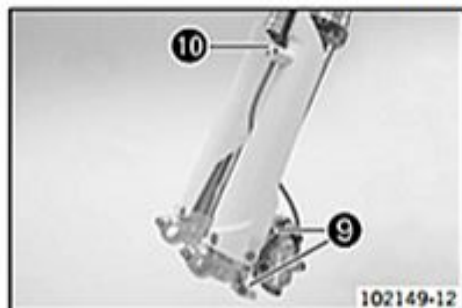
Screw, top steering stem	M8	20 Nm (14.8 lbf ft)	Loctite® 243™
--------------------------	----	------------------------	---------------



- Tighten screws 8.

Guideline

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



- Position the brake caliper. Mount and tighten screws 9.

Guideline

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

- Position the brake line and clamp. Mount and tighten screws 10.

Finishing work

- Check that the wiring harness, throttle cables, and brake and clutch lines can move freely and are routed correctly.
- Install the front fender. (☛ p. 101)
- Install the front wheel. (☛ p. 105)
- Check the play of the steering head bearing. (☛ p. 34)
- Remove the motorcycle from the lift stand. (☛ p. 10)
- Install the start number plate. (☛ p. 101)
- Mount the handlebar cushion.

6.1.23 Checking the play of the steering head bearing



Warning

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

- Adjust the steering head bearing play without delay.

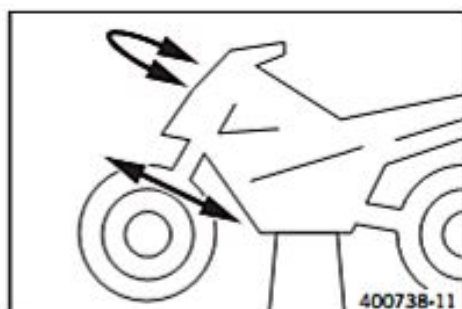


Info

If the bike is 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 a lift stand. (☛ p. 10)

**Main work**

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

No play should be noticeable in the steering head bearing.

- If there is noticeable play present:
 - Adjust the steering head bearing play. (☛ p. 35)
- Move the handlebar to and fro over the entire steering range.

The handlebar must be able to move easily over the entire steering range. There should be no perceptible detent positions.

- If detent positions are noticeable:
 - Adjust the steering head bearing play. (☛ p. 35)
 - Check the steering head bearing and replace if required.

Finishing work

- Remove the motorcycle from the lift stand. (☛ p. 10)

6.1.24 Adjusting the steering head bearing play**Preparatory work**

- Raise the motorcycle with a lift stand. (☛ p. 10)
- Remove the handlebar cushion.

Main work

- Loosen screws ①. Remove screw ②.
- Loosen and retighten screw ③.

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 ①.

Guideline

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

- Locate and tighten screw ②.

Guideline

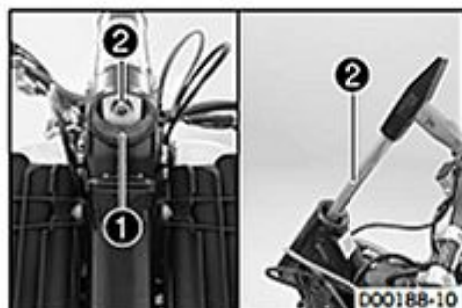
Screw, top steering stem	M8	20 Nm (14.8 lbf ft)	Loctite® 243™
--------------------------	----	---------------------	---------------

Finishing work

- Check the play of the steering head bearing. (☛ p. 34)
- Remove the motorcycle from the lift stand. (☛ p. 10)
- Mount the handlebar cushion.

6.1.25 Changing the steering head bearing**Preparatory work**

- Raise the motorcycle with a lift stand. (☛ p. 10)
- Remove the front wheel. (☛ p. 104)
- Remove the fork legs. (☛ p. 38)
- Remove the start number plate. (☛ p. 101)
- Remove the front fender. (☛ p. 101)
- Remove the handlebar cushion.
- Remove the lower triple clamp. (☛ p. 32)

**Main work**

- Remove lower bearing ring **1** with special tool **2**.

Tool bracket (58429089000) (☞ p. 233)

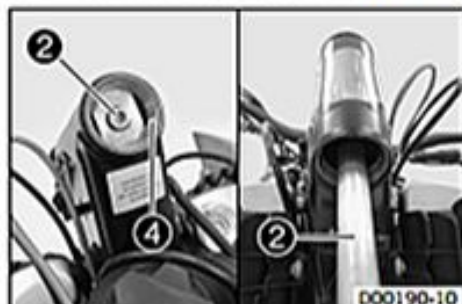
Press-out tool (58429092000) (☞ p. 234)



- Press the new bearing ring up to the stop with special tool **3**.

Tool bracket (58429089000) (☞ p. 233)

Press-in tool (58429091000) (☞ p. 234)
--



- Remove upper bearing ring **4** with special tool **2**.

Tool bracket (58429089000) (☞ p. 233)

Press-out tool (58429092000) (☞ p. 234)

- Remove the seal ring.



- Press the new bearing ring up to the stop with special tool **3**.

Tool bracket (58429089000) (☞ p. 233)

Press-in tool (58429091000) (☞ p. 234)
--

- Grease and mount the new seal ring.



- Remove lower steering head bearing **5**.
- Remove the seal ring retainer.
- Remove the O-ring.
- Grease the new O-ring and mount with the seal ring retainer.
- Press on the new bearing with a suitable tube as far as it will go.

**Info**

Only press the bearing in via the inner ring.

Finishing work

- Install the lower triple clamp. (☞ p. 33)
- Check that the wiring harness, throttle cables, and brake and clutch lines can move freely and are routed correctly.
- Install the front fender. (☞ p. 101)
- Install the front wheel. (☞ p. 105)
- Check the play of the steering head bearing. (☞ p. 34)
- Remove the motorcycle from the lift stand. (☞ p. 10)
- Install the start number plate. (☞ p. 101)

- Mount the handlebar cushion.

6.2 All US models

6.2.1 Adjusting the compression damping of the fork



Info

The hydraulic compression damping determines the fork suspension behavior.



- Turn the white adjusting screw **1** all the way clockwise.



Info

The adjusting screw **1** is located at the upper end of the left fork leg. The compression damping is located in the left fork leg **COMP** (white adjusting screw). The rebound damping is located in the right fork leg **REB** (red adjusting screw).

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

Guideline

Compression damping	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks



Info

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

6.2.2 Adjusting the rebound damping of the fork



Info

The hydraulic rebound damping determines the fork suspension behavior.



- Turn the red adjusting screw **1** all the way clockwise.



Info

The adjusting screw **1** is located at the upper end of the right fork leg. The rebound damping is located in the right fork leg **REB** (red adjusting screw). The compression damping is located in the left fork leg **COMP** (white adjusting screw).

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

Guideline

Rebound damping	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks



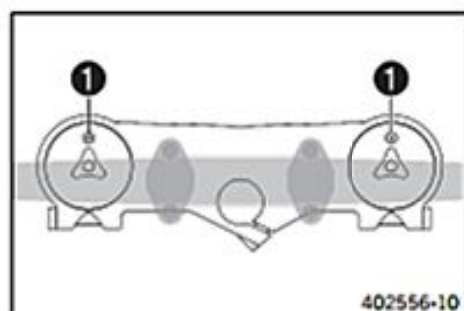
Info

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

6.2.3 Bleeding the fork legs

Preparatory work

- Raise the motorcycle with a lift stand. (☛ p. 10)



Main work

- Release bleeder screws 1.
- ✓ Any excess pressure escapes from the interior of the fork.
- Tighten the bleeder screws.

Finishing work

- Remove the motorcycle from the lift stand. (☞ p. 10)

6.2.4 Cleaning the dust boots of the fork legs

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the fork protector. (☞ p. 39)

Main work

- Push dust boots 1 of both fork legs downward.



Info

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



Warning

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

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

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

Universal oil spray (☞ p. 229)

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

Finishing work

- Install the fork protector. (☞ p. 40)
- Remove the motorcycle from the lift stand. (☞ p. 10)

6.2.5 Removing the fork legs

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the front wheel. (☞ p. 104)

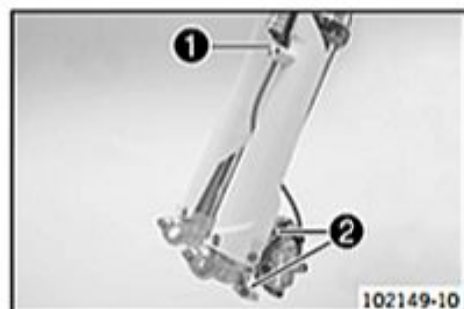
Main work

- Remove screws 1 and take off the clamp.
- Remove screws 2 and take off the brake caliper.
- Allow the brake caliper and brake line to hang tension-free to the side.



Info

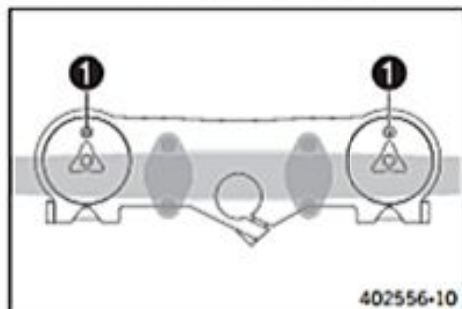
Do not activate the hand brake lever while the front wheel is removed.





- Unscrew screws ③. Take out the left fork leg.
- Unscrew screws ④. Take out the right fork leg.

6.2.6 Installing the fork legs



Main work

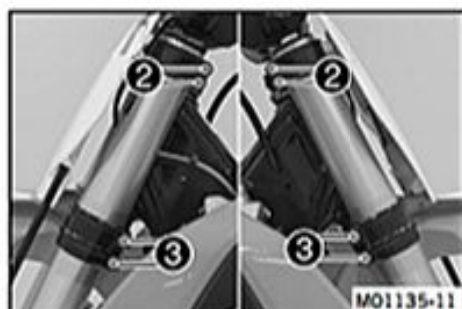
- Position the fork legs.
- ✓ Bleeder screws ① are positioned toward the front.



Info

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



- Tighten screws ②.

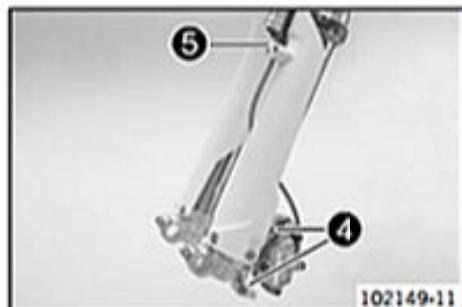
Guideline

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

- Tighten screws ③.

Guideline

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



- Position the brake caliper. Mount and tighten screws ④.

Guideline

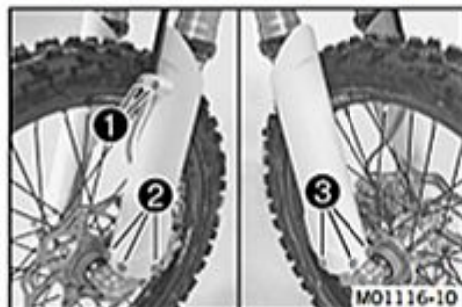
Screw, front brake caliper	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
----------------------------	----	------------------------	---------------

- Position the brake line and clamp. Mount and tighten screws ⑤.

Finishing work

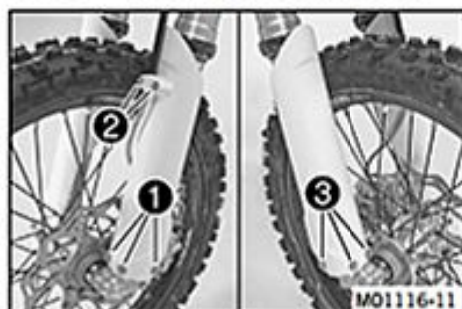
- Install the front wheel. (☛ p. 105)

6.2.7 Removing the fork protector



- Remove screws ①. Remove the clamp.
- Remove screws ②. Take off the left fork protector.
- Remove screws ③. Take off the right fork protector.

6.2.8 Installing the fork protector



- Position the fork protection on the left fork leg. Mount and tighten screws **1**.

Guideline

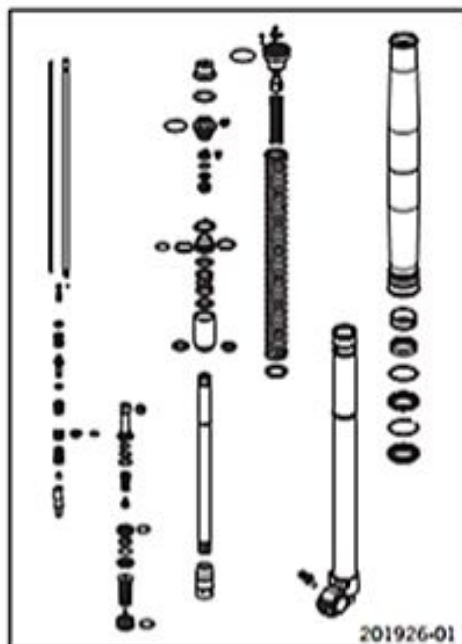
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)
---------------------------	----	--------------------

- Position the brake line and clamp. Mount and tighten screws **2**.
- Position the fork protector on the right fork leg. Mount and tighten screws **3**.

Guideline

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

6.2.9 Performing a fork service



Condition

The fork legs have been removed.

- Disassemble the fork legs. (p. 40)
- Remove the spring. (p. 42)
- Disassemble the cartridge. (p. 43)
- Disassemble the piston rod. (p. 44)
- Disassemble the hydrostop unit. (p. 45)
- Disassemble the seal ring retainer. (p. 46)
- Check the fork legs. (p. 46)
- Assemble the seal ring retainer. (p. 47)
- Assemble the hydrostop unit. (p. 47)
- Assemble the piston rod. (p. 48)
- Assemble the cartridge. (p. 49)
- Assemble the fork legs. (p. 51)

6.2.10 Disassembling the fork legs

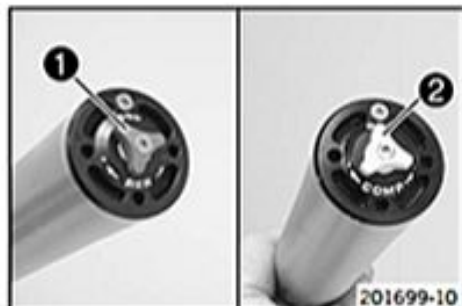


Info

The steps are identical for both fork legs.

Condition

The fork legs are disassembled.



- 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. 238)

- Remove the screw. Remove adjuster (3).



- Release screw cap (4).

Special socket (T14047) (☛ p. 238)

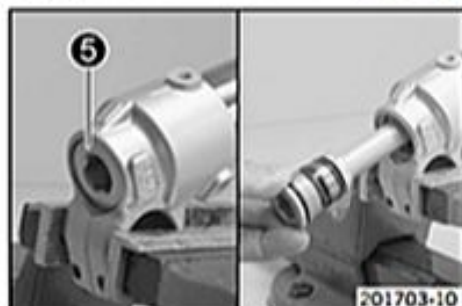


Info

The cartridge cannot be taken off yet.



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

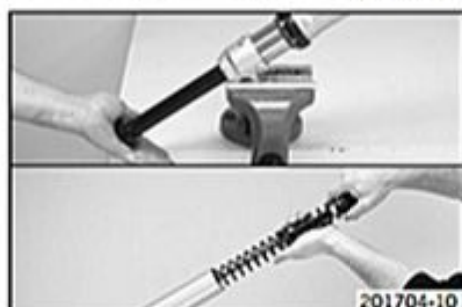


- Clamp the fork leg with the axle clamp.
- Release hydrostop unit (5) and remove it.



Info

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



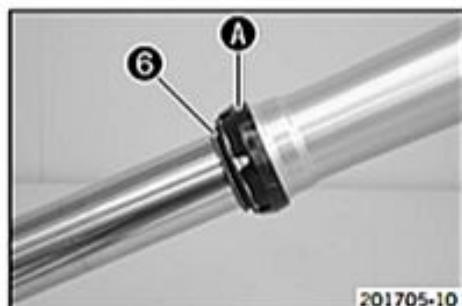
- Remove the cartridge from the fork leg.

Press-out tool (T14051) (☛ p. 238)



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

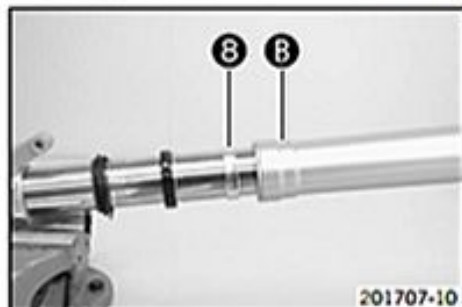
The fork protection ring does not necessarily need to be removed for repair work.



- 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.

6.2.11 Removing the spring


Info

The steps are identical for both fork legs.

Preparatory work

- Disassemble the fork legs. (☛ p. 40)

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. 238)



- Pull the spring down. Remove the open end wrench.
- Remove the screw cap.
- Remove the spring with the preload spacer(s).

6.2.12 Disassembling the cartridge



Info

The steps are identical for both fork legs.

Preparatory work

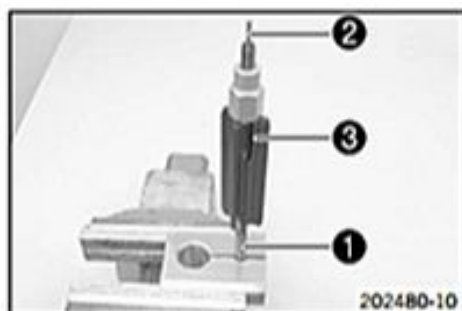
- Disassemble the fork legs. (☞ p. 40)
- Remove the spring. (☞ p. 42)

Main work

- Degrease piston rod **1** and clamp it in the vise.

Clamping stand (T14049S) (☞ p. 238)

- Remove adjusting tube **2**. Unscrew spring guide **3**.



- Remove spring seat **4**.
- Pull the piston rod out of the cartridge.

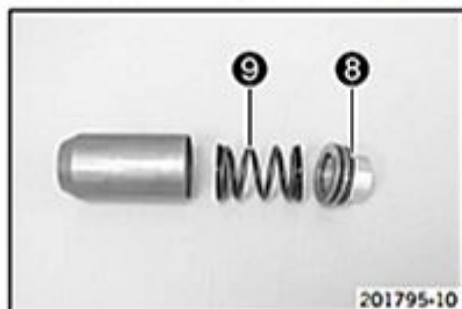


- Clamp the tube of the cartridge into a vise.
- Release seal ring retainer **5** and remove with the washer.

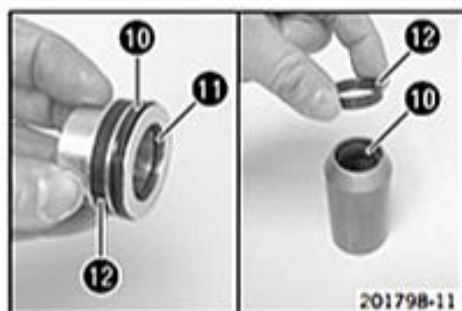
Clamping stand (T14049S) (☞ p. 238)



- Remove lock ring **6**.
- Pull reservoir **7** off of the tube.



- Pull sleeve **8** out of the reservoir.
- Remove spring **9**.



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

6.2.13 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. 40)
- Remove the spring. (☞ p. 42)
- Disassemble the cartridge. (☞ p. 43)

Main work

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

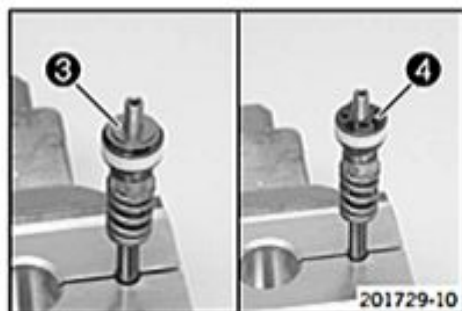
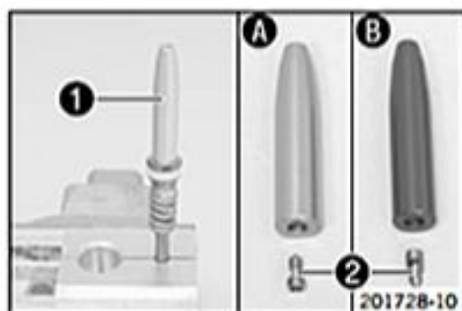
Clamping stand (T14049S) (☞ p. 238)

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

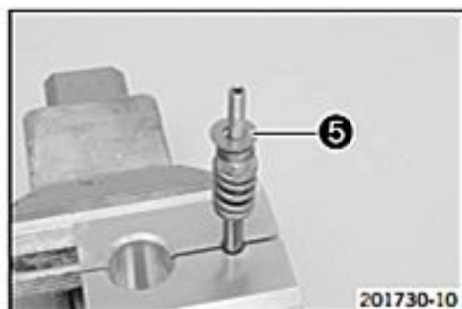


Info

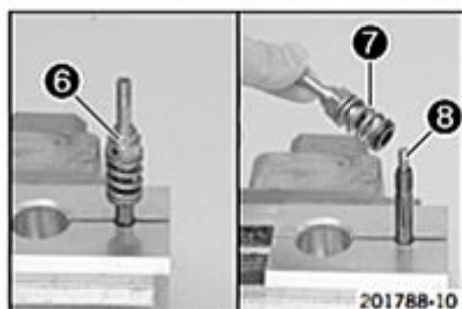
- A** – silver hydrostop needle on compression damping side.
- B** – red hydrostop needle on rebound damping side.



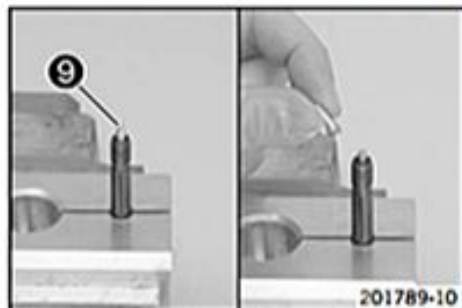
- Remove the rebound shim stack **3**.
- Remove piston **4**.



- 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.

6.2.14 Disassembling the hydrostop unit


Info

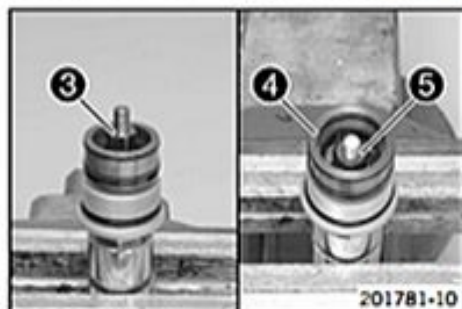
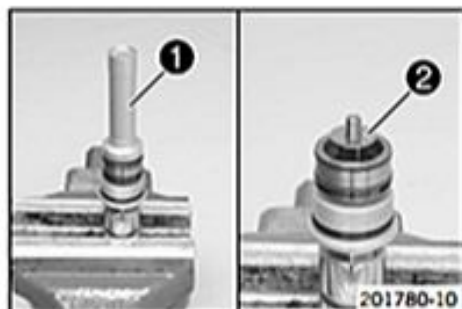
The steps are identical for both fork legs.

Preparatory work

- Disassemble the fork legs. (☛ p. 40)

Main work

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

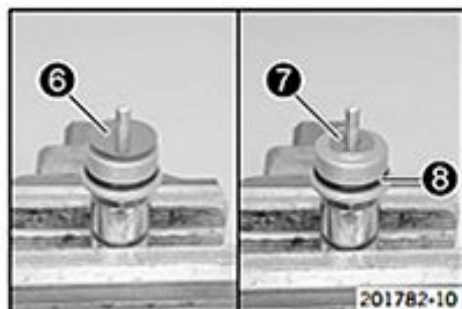


- Remove adapter (3).
- Remove hub (4) with washers (5).


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.

6.2.15 Disassembling the seal ring retainer



Info

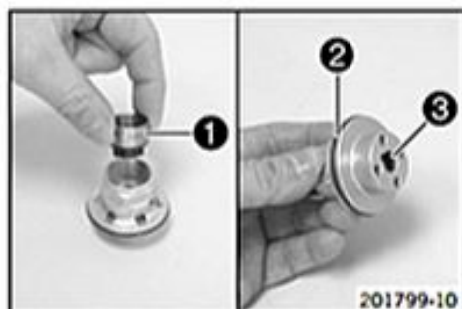
The steps are identical for both fork legs.

Preparatory work

- Disassemble the fork legs. (☛ p. 40)
- Remove the spring. (☛ p. 42)
- Disassemble the cartridge. (☛ p. 43)

Main work

- Remove pilot bushing support ①.
- Remove O-ring ② and seal ring ③.

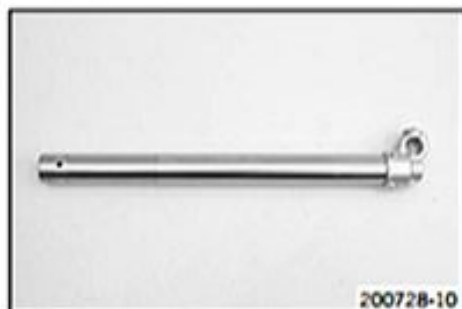


6.2.16 Checking the fork legs

Condition

The fork legs have been disassembled.

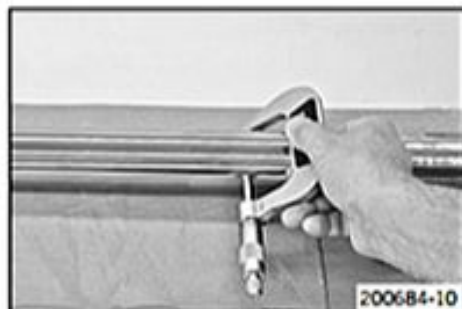
- Check the inner tube and axle clamp for damage.
 - If there is damage:
 - Change the inner tube.

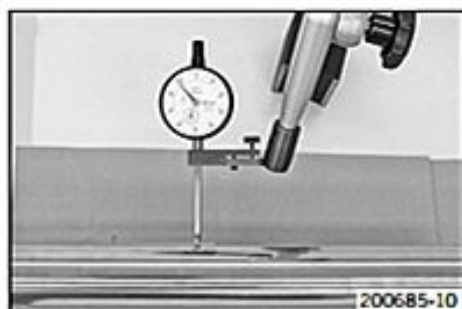


- Measure the outside diameter at multiple locations of the inner tube.

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.

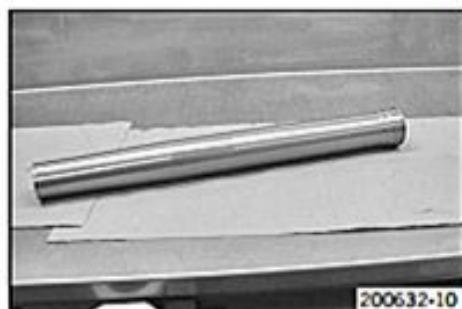




- Measure the run-out of the inner tube.

Inner tube run-out	$\leq 0.20 \text{ mm } (\leq 0.0079 \text{ in})$
--------------------	--

- 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	$\leq 49.20 \text{ mm } (\leq 1.937 \text{ in})$
-------------------------------	--

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

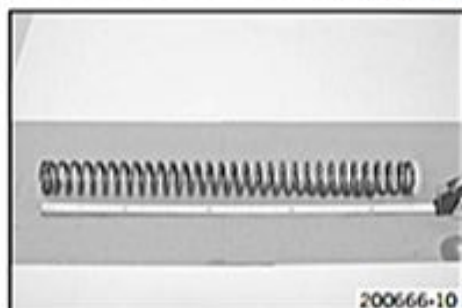
- Check the outer tube for damage.

- 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)	475 mm (18.7 in)
--------------------------------------	------------------

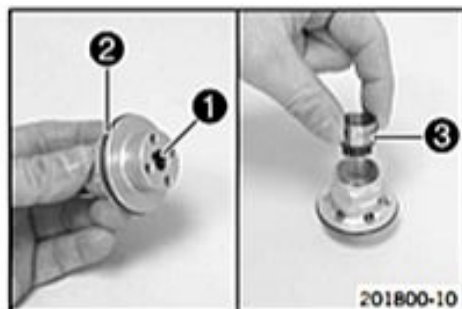
- If the measured value is larger than the specified value:
 - Reduce the thickness of the preload spacers.
- If the measured value is smaller than the specified value:
 - Increase the thickness of the preload spacers.

6.2.17 Assembling the seal ring retainer



Info

The steps are identical for both fork legs.



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

Lubricant (T158) (☛ p. 228)

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

Lubricant (T158) (☛ p. 228)

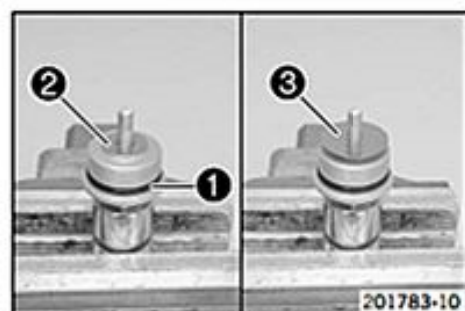
- Position pilot bushing support **3**.

6.2.18 Assembling the hydrostop unit



Info

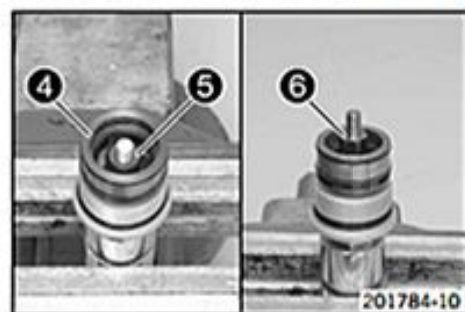
The steps are identical for both fork legs.



- Mount and grease O-ring ①.

Lubricant (T158) (☞ p. 228)

- 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.

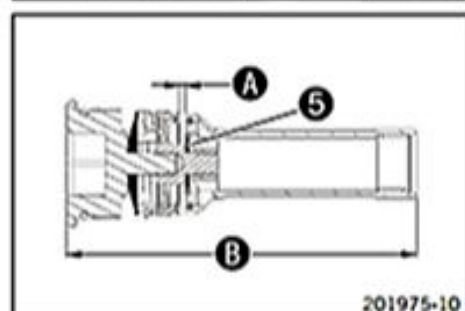
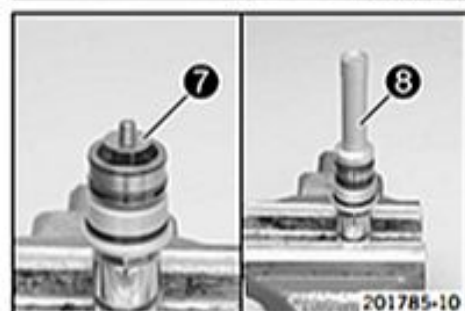
Guideline

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

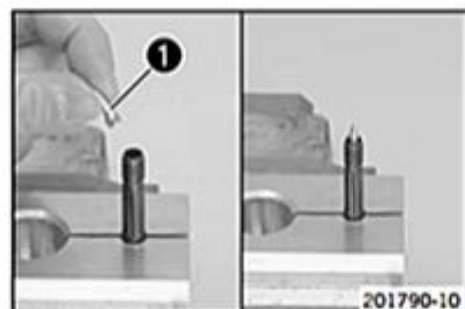
Guideline

Hydrostop distance	≥ 1.5 mm (≥ 0.059 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.

6.2.19 Assembling the piston rod**Info**

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

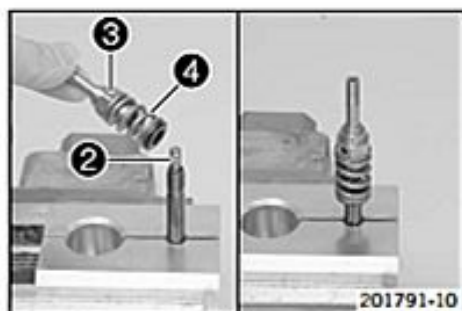


- Degrease the piston rod.
- Clamp the piston rod with the special tool.

Clamping stand (T14049S) (☞ p. 238)

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

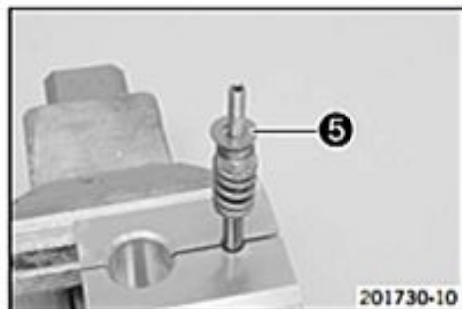
Lubricant (T158) (☞ p. 228)



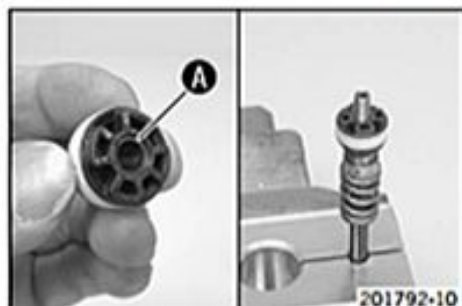
- Mount spring 2.
- Mount and tighten adapter 3 with spring 4 and washer.

Guideline

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



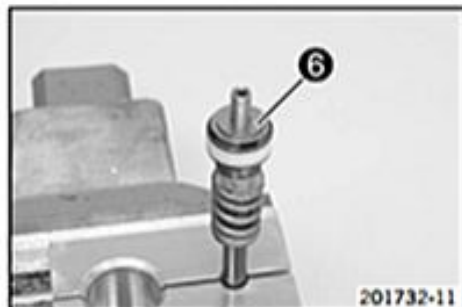
- Position the spring.
- Mount the compression shim stack 5 with the smaller washers facing downward.



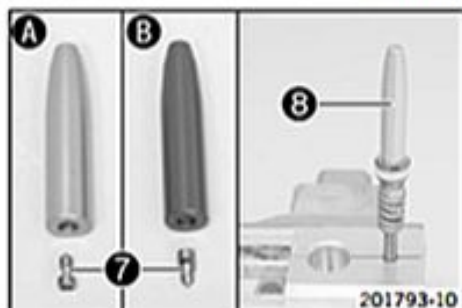
- Grind the piston on both sides on a surfacing plate using 1200 grit sandpaper.
- Clean the piston.
- Lubricate the piston ring.

Fork oil (SAE 4) (48601166S1) (☞ p. 226)

- 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.

6.2.20 Assembling the cartridge

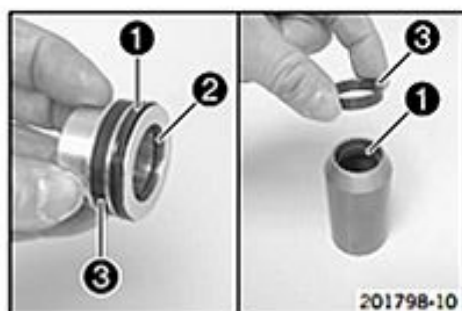


Info

The steps are identical for both fork legs.

Preparatory work

- Assemble the seal ring retainer. (☞ p. 47)
- Assemble the piston rod. (☞ p. 48)



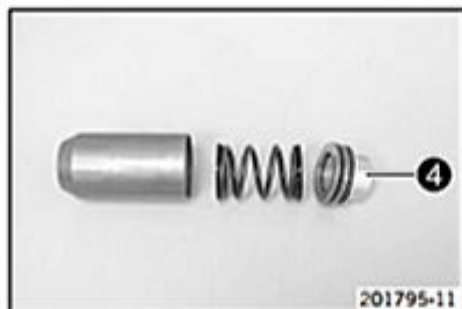
Main work

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

Lubricant (T158) (☞ p. 228)

- Mount and lubricate pilot bushings 3.

Fork oil (SAE 4) (48601166S1) (☞ p. 226)



- Check the length of the reservoir spring.

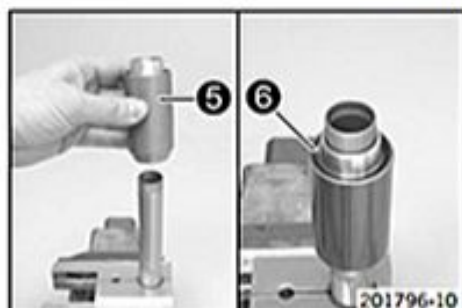
Guideline

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.
- Position sleeve 4 in the reservoir.



- Clamp the tube of the cartridge into a vise.

Clamping stand (T14049S) (☞ p. 238)

- Slide reservoir 5 onto the tube.



Info

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

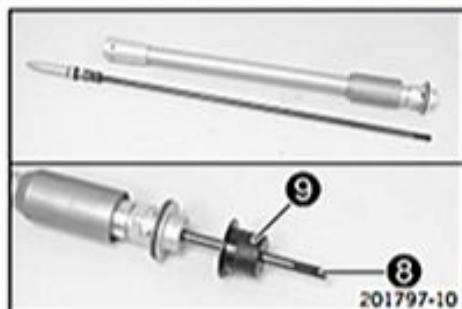
- Mount lock ring 6.

- Mount seal ring retainer 7 with the washer and tighten.

Guideline

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



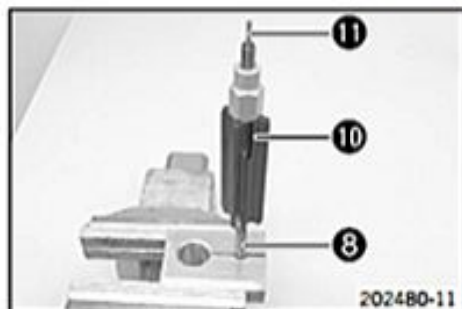
- Slide piston rod 8 into the cartridge.



Info

Ensure that the piston ring is seated correctly.

- Mount spring seat 9.



- Degrease piston rod 8 and clamp in the vise.

Clamping stand (T14049S) (☞ p. 238)

- Screw spring guide 10 all the way on.



Info

The nut must be firmly tightened against the stop by hand. Do not use a tool.

- Mount adjusting tube 11.

- Unclamp the piston rod. Mount the preload spacer(s).

6.2.21 Assembling the fork legs

- i 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. 47)

Main work

- Clamp the inner tube with the axle clamp.

Guideline

Use soft jaws.

- Mount special tool.

Protecting sleeve (T1401) (☛ p. 237)

- Lubricate and mount dust boot ①.

Lubricant (T511) (☛ p. 228)

**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. 228)

**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.

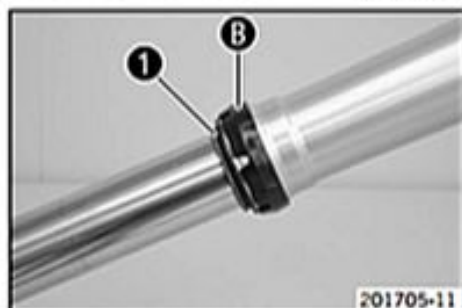
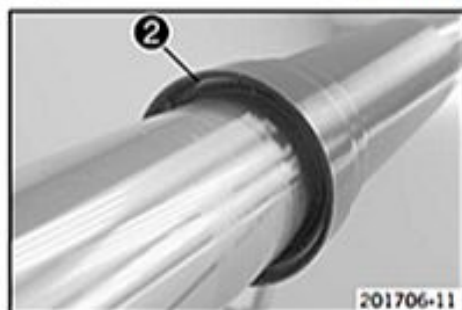
Fork oil (SAE 4) (48601166S1) (☛ p. 226)



- 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. 238)

- 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. 238)

- 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 **B**.

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

Fork oil (SAE 4) (48601166S1) (☞ p. 226)
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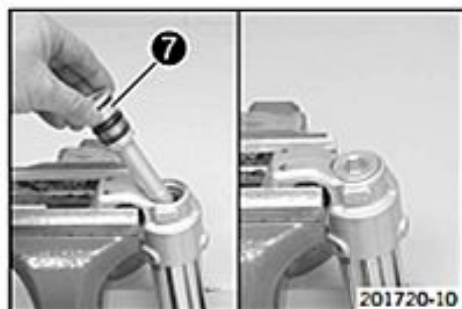
- Turn the fork. Have the entire filling quantity of fork oil available.

Oil capacity per fork leg	685 ml (23.16 fl. oz.)	Fork oil (SAE 4) (48601166S1) (☞ p. 226)
---------------------------	------------------------	--

- 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.)
-------------------	------------------------



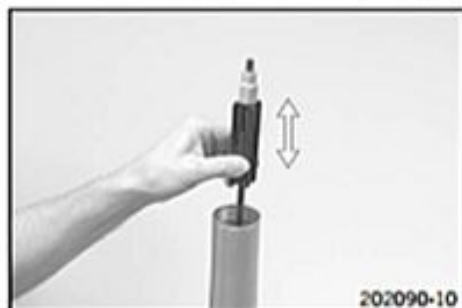
- Mount and tighten hydrostop unit 7.

Guideline

Hydrostop unit	M30x1	40 Nm (29.5 lbf ft)
----------------	-------	------------------------



- Clamp the fork vertically.
- Add the remaining quantity of fork oil.

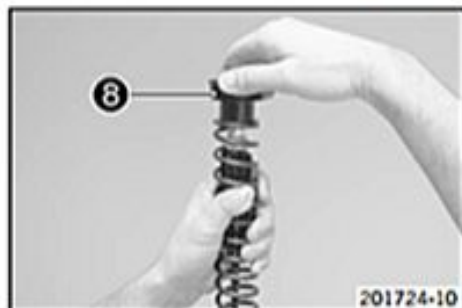


- Pull out the piston rod and push it back in numerous times while pressing it to one side slightly.
 - ✓ Air bubbles emerge and the cartridge is bled.
- Keep bleeding until no more air bubbles emerge.
 - ✓ The piston rod moves out automatically to the middle of the total stroke distance.



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**.

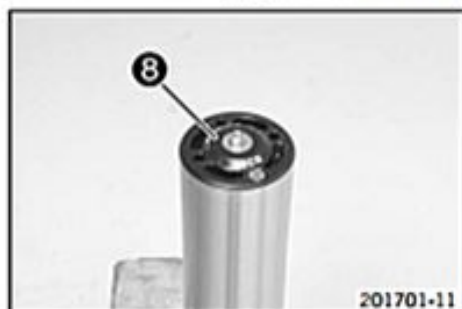


- Pull the spring down. Mount the open end wrench on the hexagonal part.
- Hold the open end wrench. Tighten screw cap 8.

Guideline

Screw cap on piston rod	M8x0.75	18 Nm (13.3 lbf ft)
-------------------------	---------	------------------------

Special socket (T14047) (☛ p. 238)



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

Clamping stand (T1403S) (☛ p. 238)

- Tighten screw cap 8.

Guideline

Cartridge on outer tube	M51x1.5	40 Nm (29.5 lbf ft)
-------------------------	---------	------------------------

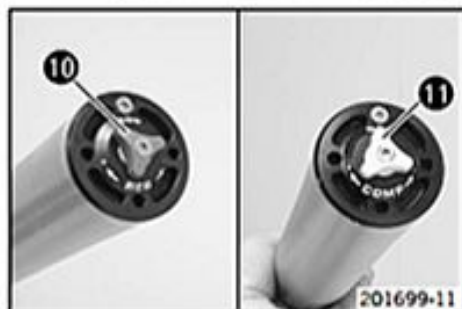
Special socket (T14047) (☛ p. 238)



- 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	17 clicks
Standard	15 clicks
Sport	13 clicks
Compression damping	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks

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

Alternative 2

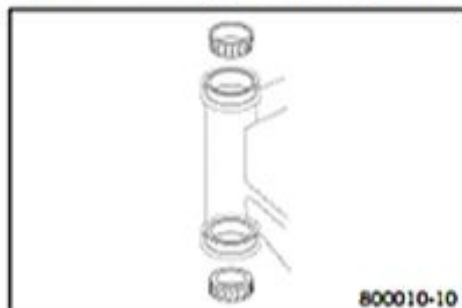
**Warning**

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

Extreme modifications to the suspension setting may cause a serious deterioration in the handling characteristic and overload components.

- Only make adjustments within the recommended range.
 - Ride slowly to start with after making adjustments to get the feel of the new handling characteristic.
-
- Set the adjusters to the positions determined upon removal.

6.2.22 Greasing the steering head bearing



- Remove the lower triple clamp. (☞ p. 54)
- Install the lower triple clamp. (☞ p. 55)

6.2.23 Removing the lower triple clamp

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the front wheel. (☞ p. 104)
- Remove the fork legs. (☞ p. 38)
- Remove the start number plate. (☞ p. 101)
- Remove the front fender. (☞ p. 101)
- Remove the handlebar cushion.



Main work

- Remove screw 1.
- Remove screw 2.
- Pull off the upper triple clamp with the handlebar and hang to the side.



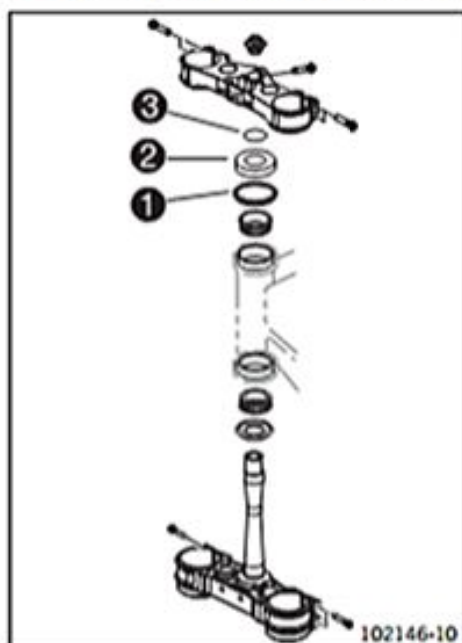
Info

Protect the components against damage by covering them.
Do not kink the cables and lines.



- Remove O-ring 3. Remove protective ring 4.
- Take off the lower triple clamp with the steering stem.
- Remove the upper steering head bearing.

6.2.24 Installing the lower triple clamp



Main work

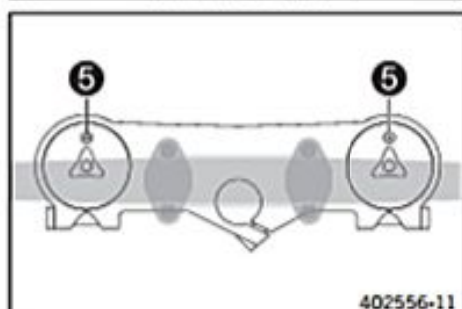
- Clean the bearing and sealing elements, check for damage, and grease.

High viscosity grease (☛ p. 228)

- Insert the lower triple clamp with the steering stem. Mount the upper steering head bearing.
- Check whether the upper steering head seal 1 is correctly positioned.
- Slide on protective ring 2 and O-ring 3.



- Position the upper triple clamp with the handlebar.
- Mount screw 4 but do not tighten yet.



- Position the fork legs.
✓ Bleeder screws 5 are positioned toward the front.



Info

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



- Tighten screws 6.

Guideline

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



- Tighten screw 4.

Guideline

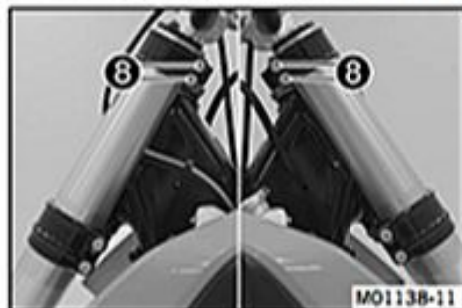
Screw, top steering head	M20x1.5	12 Nm (8.9 lbf ft)
--------------------------	---------	--------------------



- Mount and tighten screw 7.

Guideline

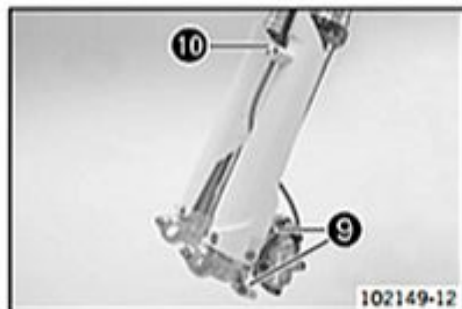
Screw, top steering stem	M8	20 Nm (14.8 lbf ft)	Loctite® 243™
--------------------------	----	---------------------	---------------



- Tighten screws 8.

Guideline

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



- Position the brake caliper. Mount and tighten screws 9.

Guideline

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

- Position the brake line and clamp. Mount and tighten screws 10.

Finishing work

- Check that the wiring harness, throttle cables, and brake and clutch lines can move freely and are routed correctly.
- Install the front fender. (☛ p. 101)
- Install the front wheel. (☛ p. 105)
- Check the play of the steering head bearing. (☛ p. 57)
- Remove the motorcycle from the lift stand. (☛ p. 10)
- Install the start number plate. (☛ p. 101)
- Mount the handlebar cushion.

6.2.25 Checking the play of the steering head bearing

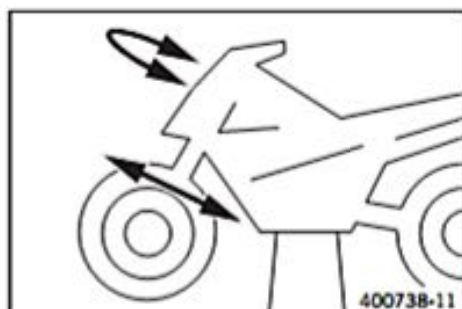
**Warning**

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

- Adjust the steering head bearing play without delay.

**Info**

If the bike is 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 a lift stand. (☞ p. 10)

Main work

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

No play should be noticeable in the steering head bearing.

- If there is noticeable play present:
 - Adjust the steering head bearing play. (☞ p. 57)
- Move the handlebar to and fro over the entire steering range.

The handlebar must be able to move easily over the entire steering range. There should be no perceptible detent positions.

- If detent positions are noticeable:
 - Adjust the steering head bearing play. (☞ p. 57)
 - Check the steering head bearing and replace if required.

Finishing work

- Remove the motorcycle from the lift stand. (☞ p. 10)

6.2.26 Adjusting the steering head bearing play

**Preparatory work**

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the handlebar cushion.

Main work

- Loosen screws ①. Remove screw ②.
- Loosen and retighten screw ③.

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 ①.

Guideline

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

- Locate and tighten screw ②.

Guideline

Screw, top steering stem	M8	20 Nm (14.8 lbf ft)	Loctite® 243™
--------------------------	----	---------------------	---------------

Finishing work

- Check the play of the steering head bearing. (☞ p. 57)
- Remove the motorcycle from the lift stand. (☞ p. 10)
- Mount the handlebar cushion.

6.2.27 Changing the steering head bearing

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the front wheel. (☞ p. 104)
- Remove the fork legs. (☞ p. 38)

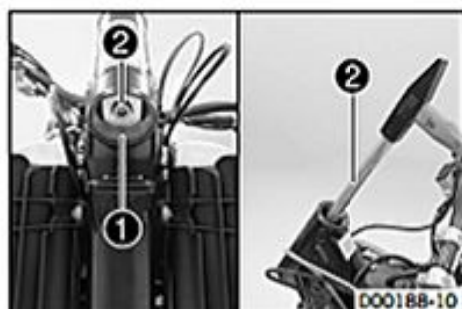
- Remove the start number plate. (☛ p. 101)
- Remove the front fender. (☛ p. 101)
- Remove the handlebar cushion.
- Remove the lower triple clamp. (☛ p. 54)

Main work

- Remove lower bearing ring ① with special tool ②.

Tool bracket (58429089000) (☛ p. 233)

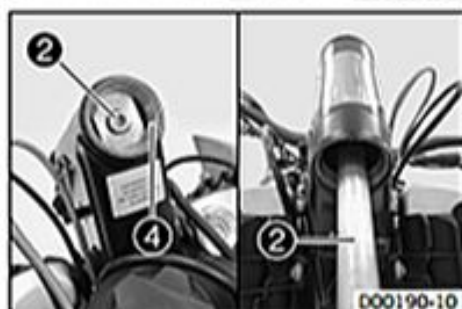
Press-out tool (58429092000) (☛ p. 234)



- Press the new bearing ring up to the stop with special tool ③.

Tool bracket (58429089000) (☛ p. 233)

Press-in tool (58429091000) (☛ p. 234)



- Remove upper bearing ring ④ with special tool ②.

Tool bracket (58429089000) (☛ p. 233)

Press-out tool (58429092000) (☛ p. 234)

- Remove the seal ring.



- Press the new bearing ring up to the stop with special tool ③.

Tool bracket (58429089000) (☛ p. 233)

Press-in tool (58429091000) (☛ p. 234)

- Grease and mount the new seal ring.



- Remove lower steering head bearing ⑤.
- Remove the seal ring retainer.
- Remove the O-ring.
- Grease the new O-ring and mount with the seal ring retainer.
- Press on the new bearing with a suitable tube as far as it will go.



Info

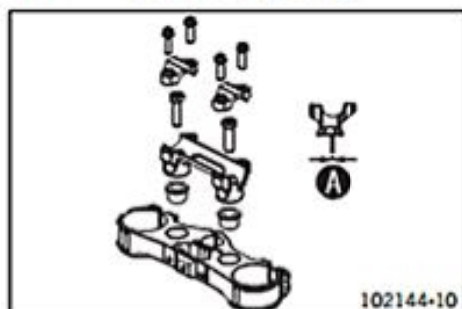
Only press the bearing in via the inner ring.

Finishing work

- Install the lower triple clamp. (☛ p. 55)
- Check that the wiring harness, throttle cables, and brake and clutch lines can move freely and are routed correctly.
- Install the front fender. (☛ p. 101)
- Install the front wheel. (☛ p. 105)
- Check the play of the steering head bearing. (☛ p. 57)
- Remove the motorcycle from the lift stand. (☛ p. 10)

- Install the start number plate. (☛ p. 101)
- Mount the handlebar cushion.

7.1 Handlebar position



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

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

The handlebar can be mounted in 2 different positions. In this way, the handlebar can be mounted in the position that is most comfortable for the rider.

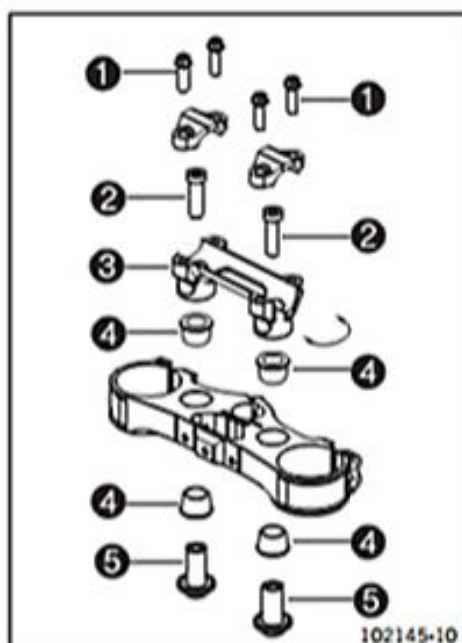
7.2 Adjusting the handlebar position



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.



Preparatory work

- Remove the handlebar cushion.

Main work

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



Info

Cover the components to protect them against damage. Do not kink the cables and lines.

- Remove screws **2**. Remove handlebar support **3**.
- Position rubber bushings **4** and push through nuts **5** from below.
- Place the handlebar support in the required position. Mount and tighten screws **2**.

Guideline

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

- Position the handlebar.



Info

Make sure the cables and wiring are positioned correctly.

- Position the handlebar clamps.
- Mount screws **1**, but do not tighten yet.
- Screw the handlebar clamps so that both parts touch at the front and tighten all of the screws.

Guideline

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

Finishing work

- Mount the handlebar cushion.

7.3 Adjusting basic position of clutch lever



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

i Info

Turn the adjusting screw counterclockwise to decrease the distance between the clutch lever and the handlebar.
 Turn the adjusting screw clockwise to increase 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 routing of the throttle cable

Preparatory work

- Remove the seat. (☞ p. 98)
- Turn handle **1** of the fuel tap to the **OFF** position.
- Remove the fuel tank. (☞ p. 99)

Main work

- Check the routing of the throttle cable.

The throttle cable must be routed along the back of the handlebar, to the right of the frame, below the fuel tank bracket, and to the carburetor. The throttle cable must be fixed on the fuel tank bracket with a rubber band.

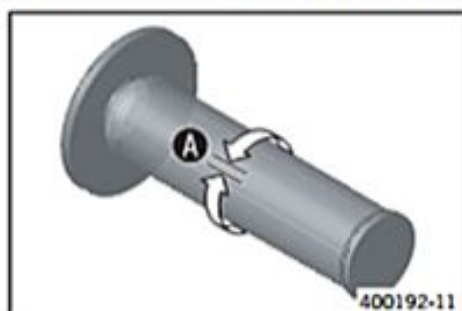
- If the throttle cable is not routed as specified:
 - Correct the throttle cable routing.



Finishing work

- Install the fuel tank. (☞ p. 100)
- Mount the seat. (☞ p. 99)

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 back and forth slightly to determine the play in throttle cable **A**.

Play in throttle cable	2... 3 mm (0.08... 0.12 in)
------------------------	-----------------------------

- If the throttle cable play does not meet specifications:
 - Adjust the play in the throttle cable. (☞ p. 62)

**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. 62)

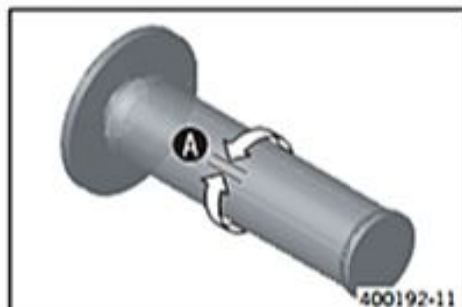
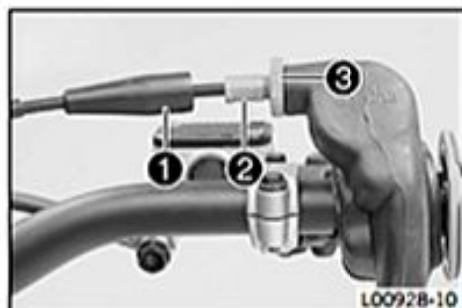
7.6 Adjusting the play in the throttle cable

Preparatory work

- Remove the seat. (☞ p. 98)
- Turn handle ❶ of the fuel tap to the **OFF** position.
- Remove the fuel tank. (☞ p. 99)
- Check the routing of the throttle cable. (☞ p. 61)

Main work

- Move the handlebar to the straight-ahead position.
- Push back sleeve ❶.
- Ensure that the throttle cable sleeve is pushed all the way into barrel adjuster ❷.
- Loosen nut ❸.



- Turn adjusting screw ❷ in such a way there is throttle cable play A in the throttle grip.

Guideline

Play in throttle cable	2... 3 mm (0.08... 0.12 in)
------------------------	-----------------------------

- Tighten nut ❸.
- Slide on sleeve ❶.

Finishing work

- Check the throttle grip for smooth operation.
- Install the fuel tank. (☞ p. 100)
- Mount the seat. (☞ p. 99)
- Check the play in the throttle cable. (☞ p. 61)

8.1 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 effect of the high-speed setting can be seen in fast compression of the shock absorber.



- Turn adjusting screw **1** all the way clockwise with a socket wrench.

**Info**

Do not loosen fitting **2**!

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

Guideline

Compression damping, high-speed (All EU models)	
Comfort	2.5 turns
Standard	2 turns
Sport	1.5 turns
Compression damping, high-speed (All US models)	
Comfort	2.5 turns
Standard	2 turns
Sport	1.5 turns

**Info**

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

8.2 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 effect of the low-speed setting can be seen in slow to normal compression of the shock absorber.



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

**Info**

Do not loosen fitting **2**!

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

Guideline

Compression damping, low-speed (All EU models)	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks
Compression damping, low-speed (All US models)	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks

**Info**

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

8.3 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.
- Turn counterclockwise by the number of clicks corresponding to the shock absorber type.

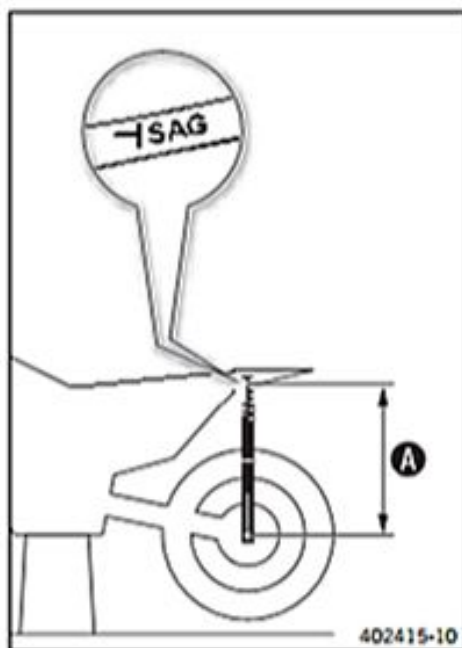
Guideline

Rebound damping (All EU models)	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks
Rebound damping (All US models)	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks

**Info**

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

8.4 Measuring the rear wheel sag unloaded

**Preparatory work**

- Raise the motorcycle with a lift stand. (☛ p. 10)

Main work

- Position the sag gauge in the rear axle and measure the distance to marking **SAG** on the rear fender.

Sag gauge (00029090000)

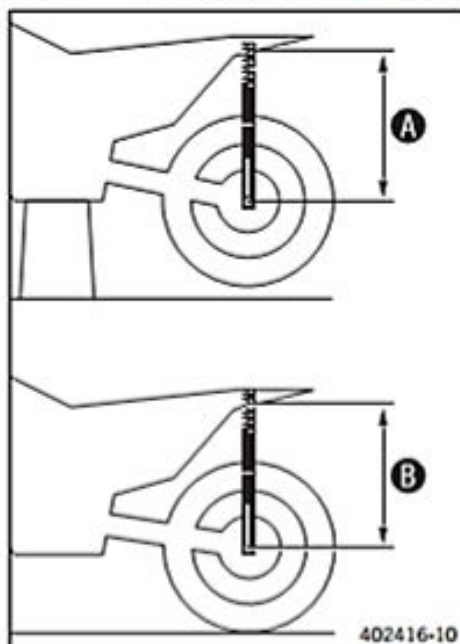
Pin for sag gauge (00029990010)

- Note down the value as dimension **A**.

Finishing work

- Remove the motorcycle from the lift stand. (☛ p. 10)

8.5 Checking the static sag of the shock absorber



- Measure distance **A** of rear wheel unloaded. (☞ p. 64)
- Hold the motorcycle upright with the aid of an assistant.
- Again measure the distance between the rear axle and marking **SAG** on the rear fender using the sag gauge.
- Note down the value as dimension **B**.

**Info**

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

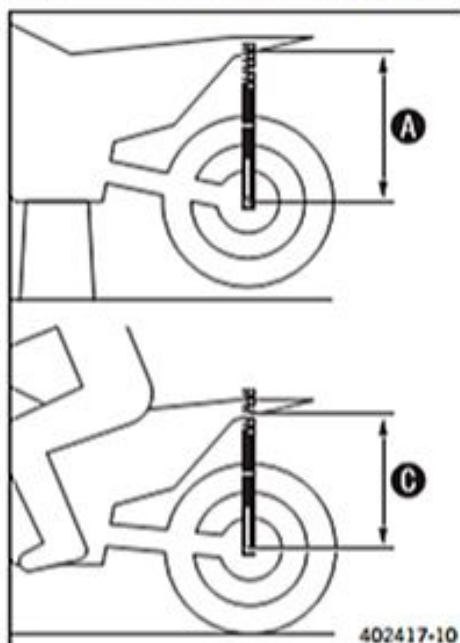
- Check the static sag.

Static sag (All EU models)	35 mm (1.38 in)
----------------------------	-----------------

Static sag (All US models)	40 mm (1.57 in)
----------------------------	-----------------

- If the static sag is less or more than the specified value:
 - Adjust the spring preload of the shock absorber. (☞ p. 65)

8.6 Checking the riding sag of the shock absorber



- Measure distance **A** of rear wheel unloaded. (☞ p. 64)
- 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 again measures the distance between the rear axle and marking **SAG** on the rear fender using the sag gauge.
- 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 (All EU models)	105 mm (4.13 in)
----------------------------	------------------

Riding sag (All US models)	110 mm (4.33 in)
----------------------------	------------------

- If the riding sag differs from the specified measurement:
 - Adjust the riding sag. (☞ p. 66)

8.7 Adjusting the spring preload of the shock absorber

**Caution**

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

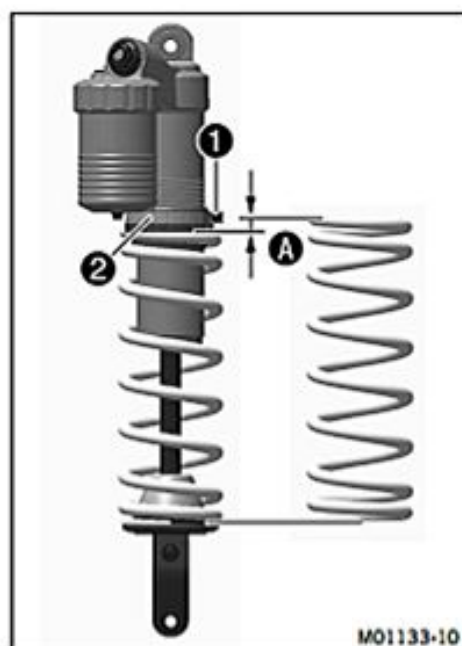
- The shock absorber is filled with high density nitrogen. Adhere to the description provided.

**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 a lift stand. (☞ p. 10)
- Disassemble the main silencer. (☞ p. 93)
- Remove the shock absorber. (☞ p. 67)



- After removing the shock absorber, clean it thoroughly.

Main work

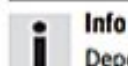
- Loosen screw ①.
- Turn adjusting ring ② until the spring is no longer under tension.

Hook wrench (T106S) (☞ p. 235)

- 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 (All EU models)	5 mm (0.2 in)
Spring preload (All US models)	7 mm (0.28 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.

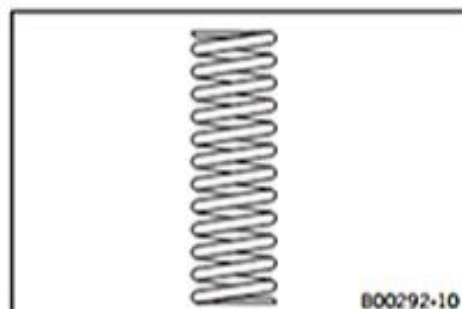
Guideline

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

Finishing work

- Install the shock absorber. (☞ p. 68)
- Install the main silencer. (☞ p. 93)
- Remove the motorcycle from the lift stand. (☞ p. 10)

8.8 Adjusting the riding sag



Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Disassemble the main silencer. (☞ p. 93)
- Remove the shock absorber. (☞ p. 67)
- After removing the shock absorber, clean it thoroughly.

Main work

- Choose and mount a suitable spring.

Guideline

Spring rate (All EU models)	
Weight of rider: 65... 75 kg (143... 165 lb.)	39 N/mm (223 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	42 N/mm (240 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	45 N/mm (257 lb/in)
Spring rate (All US models)	
Weight of rider: 65... 75 kg (143... 165 lb.)	39 N/mm (223 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	42 N/mm (240 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	45 N/mm (257 lb/in)



Info

The spring rate is shown on the outside of the spring.

Finishing work

- Install the shock absorber. (☞ p. 68)
- Install the main silencer. (☞ p. 93)
- Remove the motorcycle from the lift stand. (☞ p. 10)
- Check the static sag of the shock absorber. (☞ p. 65)
- Check the riding sag of the shock absorber. (☞ p. 65)

- Adjust the rebound damping of the shock absorber. (☛ p. 64)

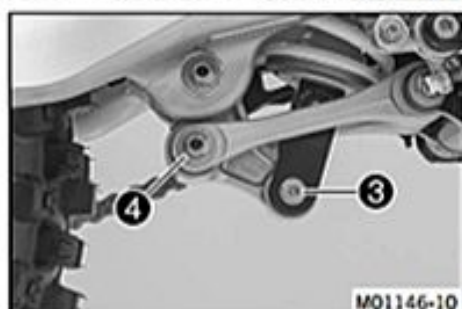
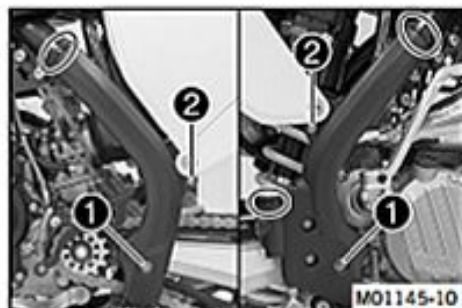
8.9 Removing the shock absorber

Preparatory work

- Raise the motorcycle with a lift stand. (☛ p. 10)
- Disassemble the main silencer. (☛ p. 93)

Main work

- Remove screws ① and ② with the washers.
- Remove the cable ties and remove the frame protectors on the left and right.

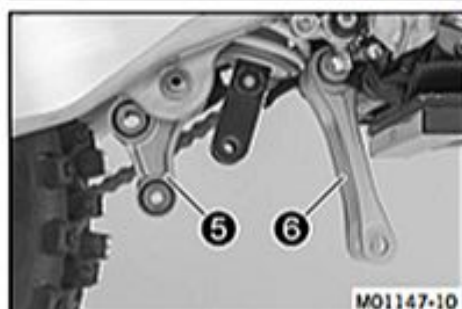


- Remove screw ③.
- Remove fitting ④.



Info

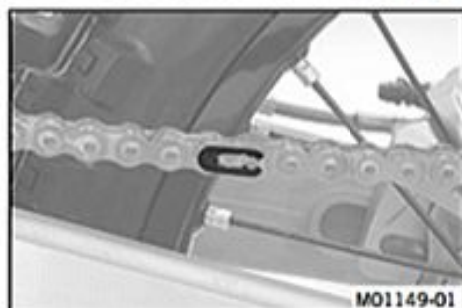
Raise the wheel slightly to be able to remove the screws more easily.



- Press angle lever ⑤ toward the rear.
- Press linkage lever ⑥ downward.



- Remove screws ⑦.



- Remove the connecting link of the chain.
- Take off the chain.



- Remove nut 8 and pull out the swingarm pivot.
- Push the swingarm back and secure it against falling over.



- Hold the shock absorber and remove screw 9.



- Carefully take the shock absorber out of the vehicle toward the bottom.

8.10 Installing the shock absorber



Main work

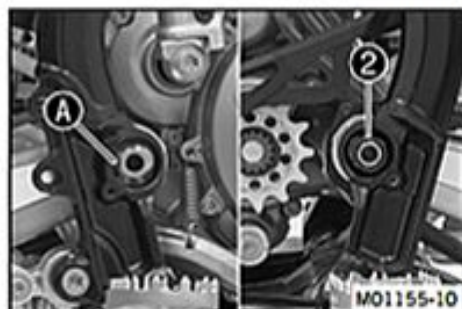
- Carefully position the shock absorber into the vehicle from the bottom.



- Mount and tighten screw 1.

Guideline

Screw, top shock absorber	M10	60 Nm (44.3 lbf ft)	Loctite® 2701™
---------------------------	-----	------------------------	----------------



- Position the swingarm and mount the swingarm pivot.



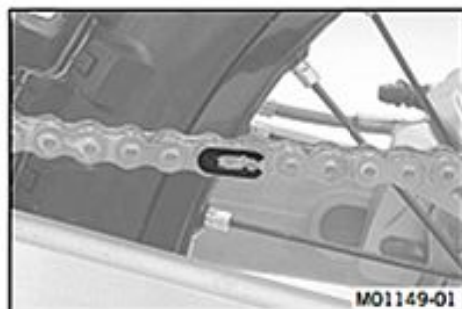
Info

Pay attention to the flat area A.

- Mount and tighten nut 2.

Guideline

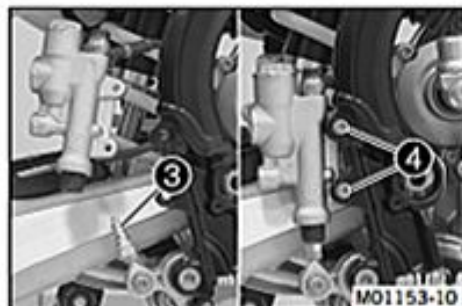
Nut, swingarm pivot	M16x1.5	100 Nm (73.8 lbf ft)
---------------------	---------	-------------------------



- Mount the chain.
- Connect the chain with the connecting link.

Guideline

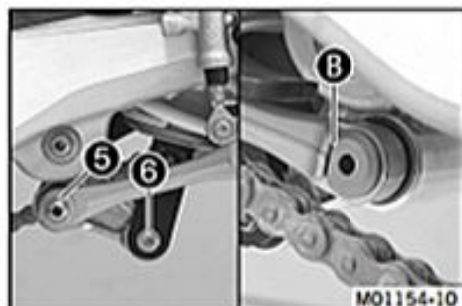
The closed side of the chain joint lock must face in the direction of travel.



- Position the foot brake cylinder.
 - ✓ Push rod (3) engages in the foot brake cylinder.
 - ✓ The dust boot is correctly positioned.
- Mount and tighten screws (4).

Guideline

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



- Position the angle lever and linkage lever.
- Mount and tighten screw cap (5).

Guideline

Nut, linkage lever to angle lever	M14x1.5	80 Nm (59 lbf ft)
-----------------------------------	---------	-------------------



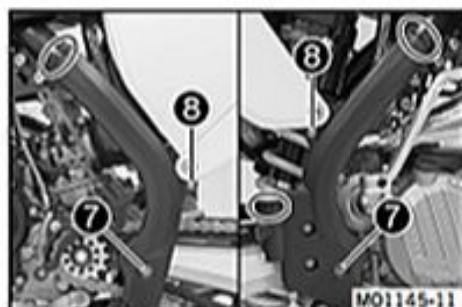
Info

Pay attention to the flat area (8).

- Mount and tighten screw (6).

Guideline

Screw, bottom shock absorber	M10	60 Nm (44.3 lbf ft)	Loctite® 2701™
------------------------------	-----	---------------------	----------------



- Position the frame protector on the left and right.
- Mount and tighten screws (7) and (8).

Guideline

Screw, frame protector	M5	3 Nm (2.2 lbf ft)
------------------------	----	-------------------

- Mount the cable tie(s).

Finishing work

- Install the main silencer. (☞ p. 93)
- Remove the motorcycle from the lift stand. (☞ p. 10)

8.11 Checking the shock absorber linkage

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)

Main work

- Remove screw (1).
- Remove fitting (2).



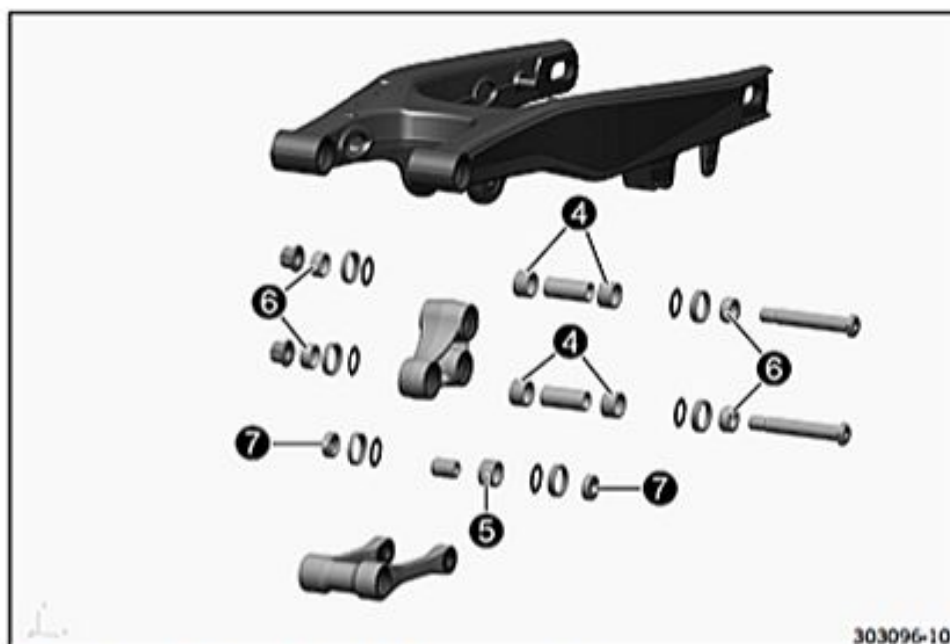
Info

Raise the wheel slightly to be able to remove the screws more easily.

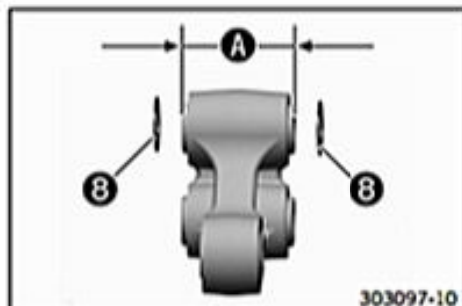




- Remove fitting **3**.
- Take off the angle lever.



- Check needle bearings **4** and **5** for damage and wear.
 - If there is damage or wear:
 - Change the needle bearings.
- Check spacers **6** and **7** for damage and wear.
 - If there is damage or wear:
 - Change the spacers.
- Check the shaft seal rings for damage and wear.
 - If there is damage or wear:
 - Change the shaft seal rings.



- Check dimension **A**.

54.91... 55.00 mm (2.1618... 2.1654 in)

- If dimension **A** is below the specified value:
 - Add the necessary spacing washers **8**.



- Position the angle lever.
- Mount fitting **3** but do not tighten yet.

Guideline

Nut, linkage lever on swingarm	M14x1.5	80 Nm (59 lbf ft)
--------------------------------	---------	-------------------



- Mount screw ① but do not tighten yet.

Guideline

Screw, bottom shock absorber	M10	60 Nm (44.3 lbf ft)	Loctite® 2701™
------------------------------	-----	---------------------	----------------



Info

Raise the wheel slightly to be able to mount the screw more easily.



- Position the linkage lever.
- Mount and tighten fitting ②.

Guideline

Nut, linkage lever to angle lever	M14x1.5	80 Nm (59 lbf ft)	
-----------------------------------	---------	-------------------	--



Info

Raise the wheel slightly to be able to mount the screw more easily.

- Tighten screw ①.

Guideline

Screw, bottom shock absorber	M10	60 Nm (44.3 lbf ft)	Loctite® 2701™
------------------------------	-----	---------------------	----------------

- Tighten fitting ③.

Guideline

Nut, linkage lever on swingarm	M14x1.5	80 Nm (59 lbf ft)	
--------------------------------	---------	-------------------	--

8.12 Servicing the shock absorber



Caution

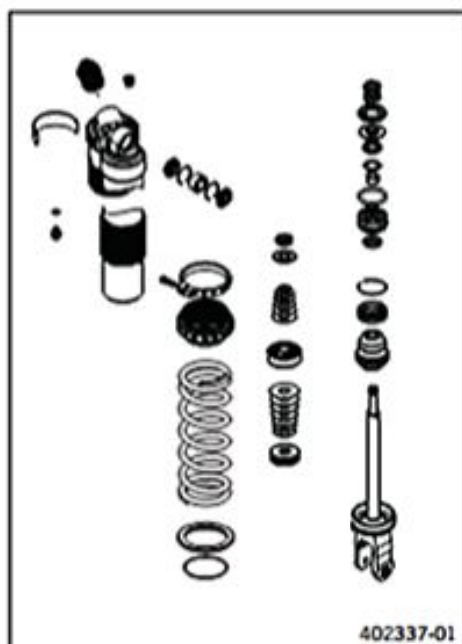
Danger of accidents Disassembly of pressurized parts can lead to injury.

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

Condition

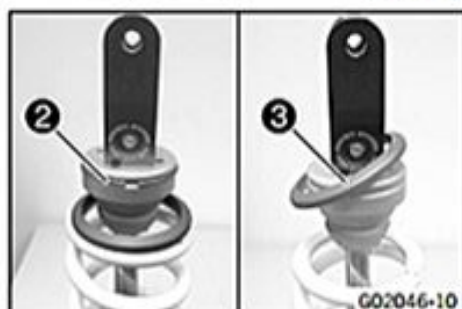
The shock absorber has been removed.

- Remove the spring. (☛ p. 72)
- Disassemble the damper. (☛ p. 72)
- Disassemble the piston rod. (☛ p. 73)
- Disassemble the seal ring retainer. (☛ p. 74)
- Check the damper. (☛ p. 76)
- Remove the heim joint. (☛ p. 76)
- Install the heim joint. (☛ p. 77)
- Assemble the seal ring retainer. (☛ p. 78)
- Assemble the piston rod. (☛ p. 78)
- Assemble the damper. (☛ p. 80)
- Install the spring. (☛ p. 85)



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8.13 Removing the spring



Condition

The shock absorber has been removed.

- Clamp the shock absorber into the vise with soft jaws.
- Measure and note down the spring length in the preloaded state.
- Loosen screw ①.
- Turn the adjusting ring until the spring is completely without tension.

Hook wrench (T106S) (☛ p. 235)

- Remove ring ②.
- Remove spring retainer ③.
- Remove the spring.

8.14 Disassembling the damper

Preparatory work

- Remove the spring. (☛ p. 72)

Main work

- Make a note of the present state of rebound ① and compression damping ②.
- Open the adjusters of the rebound and compression damping completely.



- Slowly open screw ③.
✓ The nitrogen pressure dissipates.

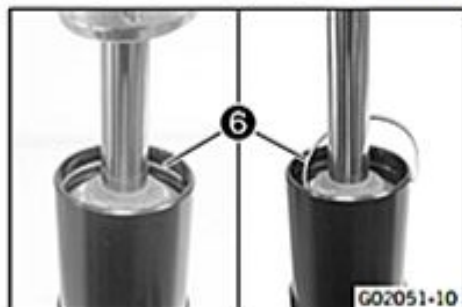


- Remove locking cap ④.



- Press in seal ring retainer **5** using the special tool.

Disassembly tool (T1216) (☞ p. 237)



- Remove lock ring **6**.



Info

Check inner surface; do not scratch. Remove any burrs with sandpaper if needed.



- Remove the piston rod.



- Remove adjusting ring **7** with the intermediate washer.
- Drain the oil.



- Remove compression adjuster **8**. Remove the spring and piston.

8.15 Disassembling the piston rod

Preparatory work

- Remove the spring. (☞ p. 72)
- Disassemble the damper. (☞ p. 72)



Main work

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

Guideline

Use soft jaws.

- Remove nut 1.
- Remove washer 2.



- Remove rebound shim stack 3.



Info

Place the rebound shim stack onto a screwdriver and set it down as a unit.

- Remove piston 4.



- Remove compression shim stack 5.



Info

Place the compression shim stack onto a screwdriver and set it down as a unit.

- Remove rebound washer 6.



- Remove seal ring retainer 7.
- Remove locking cap 8 and rubber buffer 9.

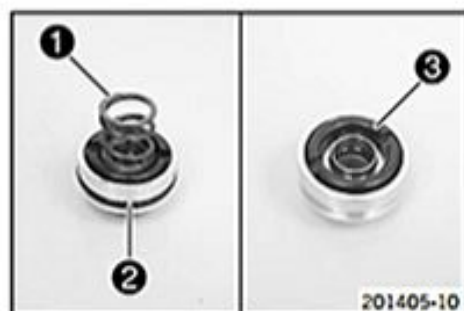
8.16 Disassembling the seal ring retainer

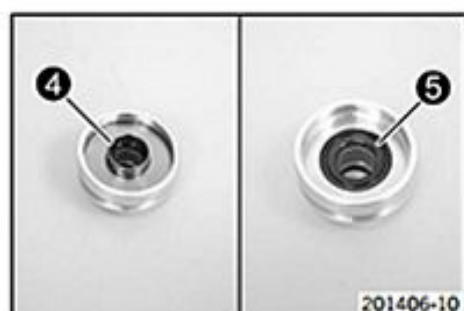
Preparatory work

- Remove the spring. (☞ p. 72)
- Disassemble the damper. (☞ p. 72)
- Disassemble the piston rod. (☞ p. 73)

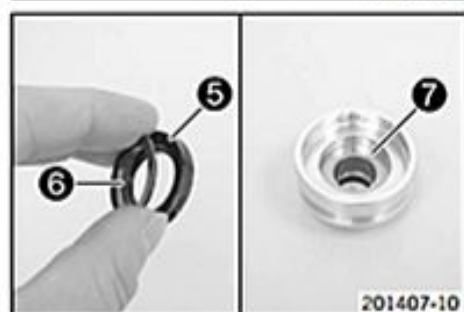
Main work

- Remove spring 1.
- Remove O-ring 2.
- Remove rebound rubber 3.





- Remove centering disk **4**.
- Remove seal ring **5**.



- Remove washer **6** for seal ring **5**.
- Remove washer **7**.
- Remove dust boot.

8.17 Changing the pilot bushing

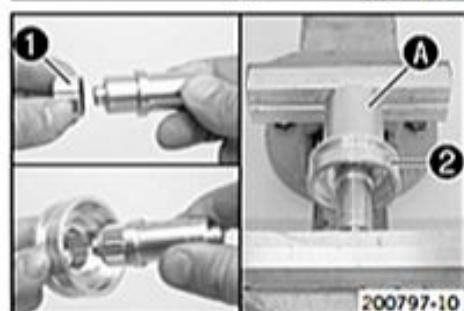
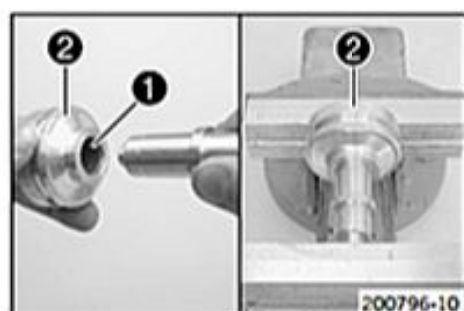
Preparatory work

- Remove the spring. (☞ p. 72)
- Disassemble the damper. (☞ p. 72)
- Disassemble the piston rod. (☞ p. 73)
- Disassemble the seal ring retainer. (☞ p. 74)

Main work

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

Press drift (T1504) (☞ p. 239)



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

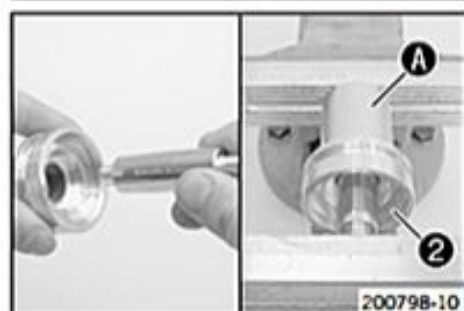
Press drift (T1504) (☞ p. 239)

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

Press drift (T1504) (☞ p. 239)

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

Assembly tool (T150S) (☞ p. 239)



- Lubricate the special tool.

Shock absorber fluid (SAE 2.5) (50180751S1) (☞ p. 227)

Calibration pin (T1205) (☞ p. 236)

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

Assembly tool (T150S) (☞ p. 239)

- Press the special tool through the new pilot bushing.

Calibration pin (T1205) (☞ p. 236)

✓ The pilot bushing is calibrated.

Finishing work

- Assemble the seal ring retainer. (☞ p. 78)

8.18 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	$\leq 50.08 \text{ mm } (\leq 1.9716 \text{ in})$

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

Piston rod	
Diameter	$\geq 17.95 \text{ mm } (\geq 0.7067 \text{ in})$

- If the measured value is less than the specified value:
 - Change the piston rod.
- Measure the run-out of the piston rod.

Piston rod	
Run-out	$\leq 0.02 \text{ mm } (\leq 0.0008 \text{ in})$

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



8.19 Removing the heim joint

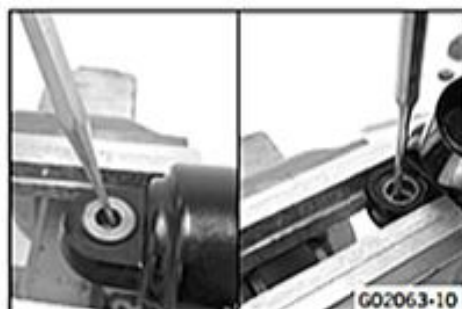
Condition

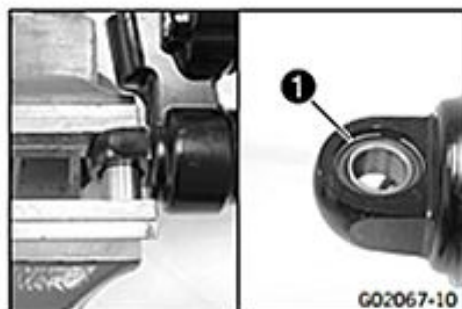
The shock absorber has been removed.

- Clamp the shock absorber into the vise with soft jaws.
- Remove the collar bushing of the heim joint.

Pin (T120) (☞ p. 235)

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





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

Pressing tool (T1207S) (☞ p. 236)

- Remove second lock ring (1).



- Place special tool (A) underneath and press out heim joint (2) using special tool (B).

Pressing tool (T1207S) (☞ p. 236)

8.20 Installing the heim joint



- Position the new heim joint (1) and the special tool in the bench vise.

Guideline

Use soft jaws.

Pressing tool (T1206) (☞ p. 236)

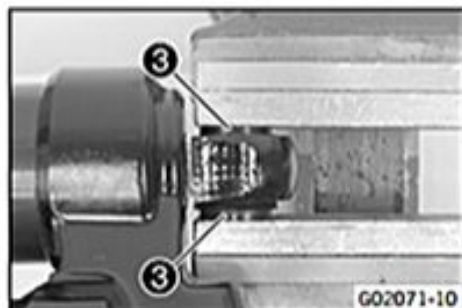
- Press the heim joint all the way in.



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

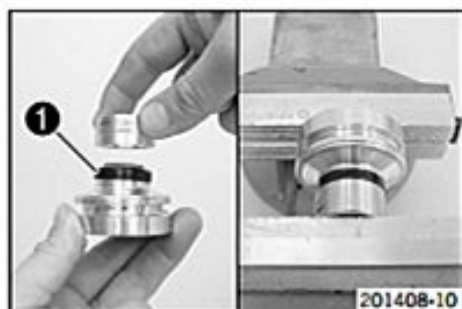
Pressing tool (T1207S) (☞ p. 236)

- Mount second lock ring (2).



- Position both collar bushings (3) and press in.

8.21 Assembling the seal ring retainer



- Mount dust boot **1** using the special tool.

Mounting sleeve (T1204) (☞ p. 236)

- Lubricate the sealing lip of the dust boot.

Lubricant (T625) (☞ p. 228)



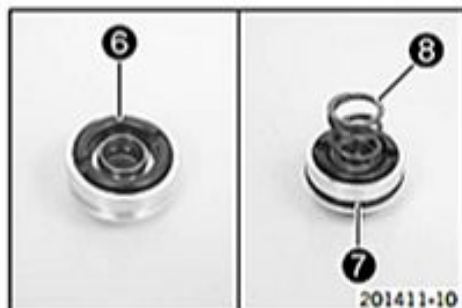
- Mount washer **2**.
- Position washer **3** on seal ring **4**.



- Grease seal ring **4** and mount with the washer facing downward.

Lubricant (T511) (☞ p. 228)

- Mount centering disk **5**.



- Mount rebound rubber **6**.
- Lubricate the groove of the O-ring.

Lubricant (T158) (☞ p. 228)

- Mount O-ring **7**.
- Mount spring **8**.

8.22 Assembling the piston rod



Preparatory work

- Assemble the seal ring retainer. (☞ p. 78)

Main work

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

Guideline

Use soft jaws.

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

Mounting sleeve (T1215) (☞ p. 236)

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

Lubricant (T625) (☞ p. 228)

- Remove the special tool.



- Mount rebound washer (4) with the cut-out facing downward.



- Mount the compression shim stack (5) with the smaller shims facing downward.



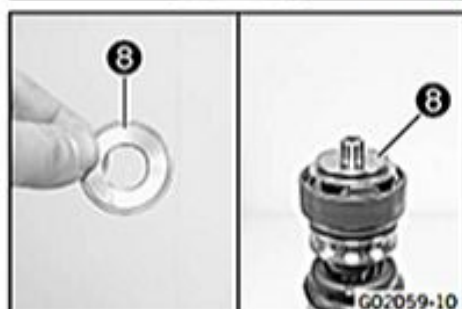
- Sand both sides of piston (6) on a surface plate using 1200-grit sandpaper.
- Clean the piston.
- Assemble the piston.

Guideline

View A	Piston from above
View B	Piston from below



- Mount the rebound shim stack (7) with the smaller shims facing upward.



- Mount washer (8) with the collar facing downward.



- Grease the thread of the piston rod.

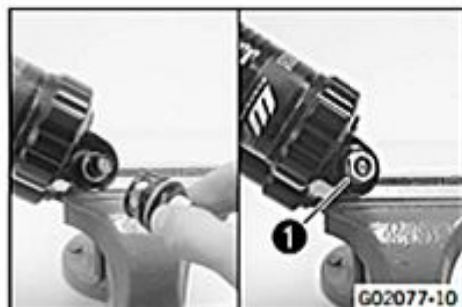
Lubricant (T152) (☛ p. 228)

- Mount and tighten nut (9).

Guideline

Nut, piston rod	M16x1	45 Nm (33.2 lbf ft)
-----------------	-------	------------------------

8.23 Assembling the damper



Preparatory work

- Assemble the seal ring retainer. (☞ p. 78)
- Assemble the piston rod. (☞ p. 78)

Main work

- Lubricate the O-rings of the compression adjuster.

Lubricant (T158) (☞ p. 228)

- Lubricate the thread.

Lubricant (T159) (☞ p. 228)

- Mount the piston with the spring.
- Mount and tighten compression adjuster ①.

Guideline

Compression adjuster	M31x1	45 Nm (33.2 lbf ft)
----------------------	-------	------------------------

- Clamp the damper in a bench vise.

Guideline

Use soft jaws.

- Mount adjusting ring ② with the intermediate washer.



Info

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



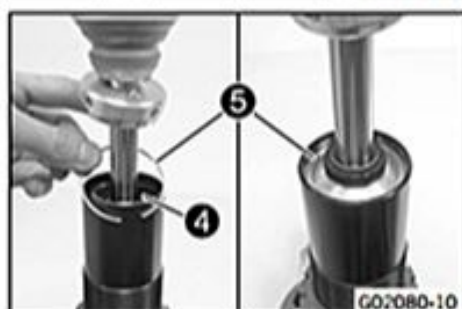
- Fill the damper cartridge about half full.

Shock absorber fluid (SAE 2.5) (50180751S1) (☞ p. 227)

- Lubricate O-ring ③ of the seal ring retainer.

Lubricant (T158) (☞ p. 228)

- Mount the piston rod carefully.



- Mount seal ring retainer ④ and slide it under the ring groove.
- Mount lock ring ⑤.



Info

Do not scratch the inside surface.

- Pull out the piston rod until the seal ring retainer is flush with the lock ring.



- Mount locking cap ⑥ of the damper cartridge.
- Bleed and fill the damper. (☞ p. 81)
- Fill the damper with nitrogen. (☞ p. 84)



Alternative 1

- Turn adjusting screw 7 clockwise with a screwdriver up to the last perceptible click.
- Turn counterclockwise by the number of clicks corresponding to the shock absorber type.

Guideline

Compression damping, low-speed	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks

- Turn adjusting screw 8 all the way clockwise with a socket wrench.
- Turn counterclockwise by the number of turns corresponding to the shock absorber type.

Guideline

Compression damping, high-speed	
Comfort	2.5 turns
Standard	2 turns
Sport	1.5 turns

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

Guideline

Rebound damping	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks

Alternative 2



Warning

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

Extreme modifications to the suspension setting may cause a serious deterioration in the handling characteristic and overload components.

- Only make adjustments within the recommended range.
 - Ride slowly to start with after making adjustments to get the feel of the new handling characteristic.
-
- Position adjusting screws 7, 8, and 9 in the location determined during disassembly.

8.24 Bleeding and filling the damper



Info

Before working with the vacuum pump, be sure to read the operating instructions carefully. Completely open the adjusters of the rebound and compression damping.



- Remove the screw of the filling port.
- Install adapter 1 on the damper.



Info

Tighten only hand-tight, without the use of tools.

- Connect the adapter 1 to connector 2 of the vacuum pump.

Vacuum pump (T1240S) (p. 237)

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



Info

Clamp the damper only lightly.

The filling port must be at the highest point.

The piston rod slides in and out during filling - do not hold it tight with your hand!



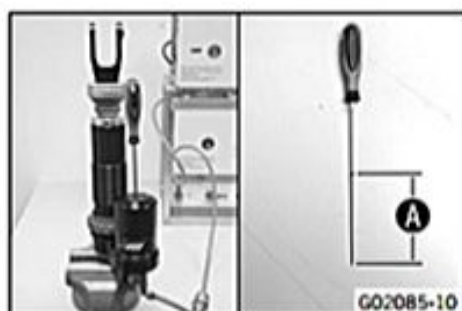
200271-10

- Clamp the control lever as shown in the figure.
- ✓ The **External tank** 3 control lever is on **Closed**, **Damper** 4 on **Vacuum**, and **Oil reservoir** 5 on **Vacuum**.
- Operate the **On/Off** switch 6.
- ✓ The vacuum pump process starts.
- ✓ Pressure gauge 7 drops to the specified value.

- ✓ The vacuum gauge 8 falls to the specified value.

- Measure distance A between the floating piston and reservoir hole with the special tool.

- ✓ The floating piston is positioned all the way at the bottom.



G02085-10

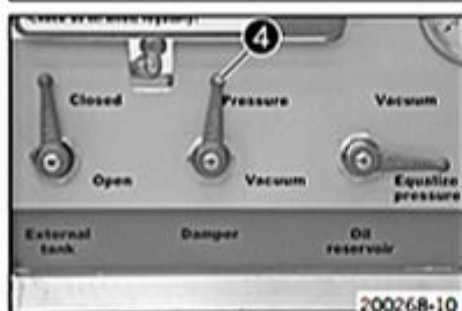


200267-10

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

Guideline

- ✓ The pressure gauge increases to the specified value.

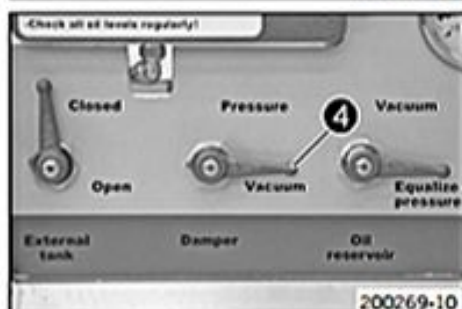


200268-10

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

Guideline

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

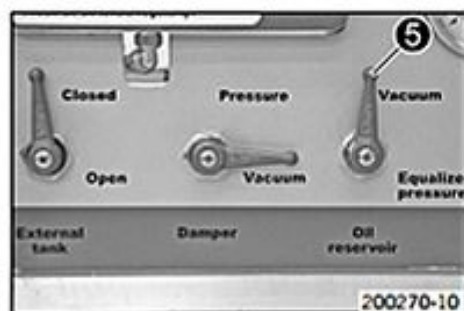


200269-10

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

Guideline

- ✓ The pressure gauge drops to the specified value.



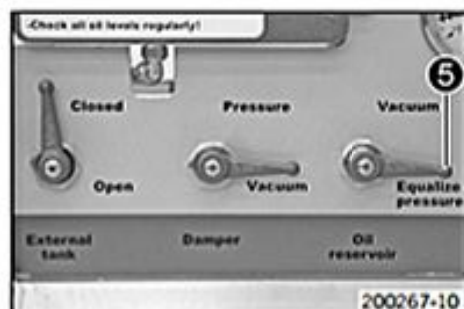
- When the pressure gauge reaches the specified value, turn the **Oil reservoir** **5** control lever to **Vacuum**.

Guideline

0 bar

- ✓ The vacuum gauge falls to the specified value.

8 mbar



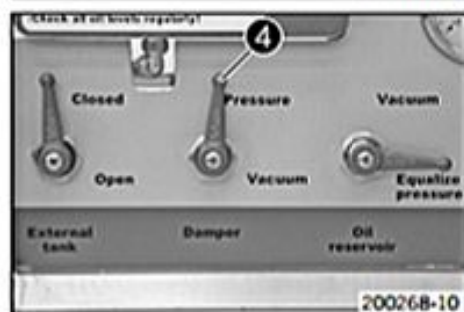
- When the vacuum pressure gauge reaches the specified value, turn the **Oil reservoir** control lever **5** to **Equalize Pressure**.

Guideline

8 mbar

- ✓ The pressure gauge drops to the specified value.

0 bar



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

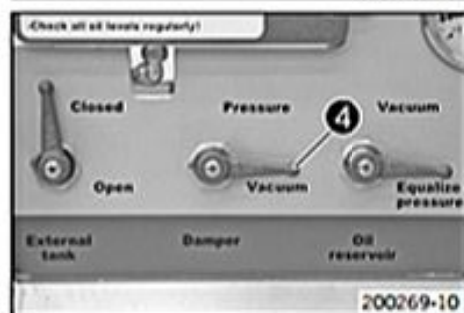
Guideline

0 bar

- ✓ Oil is pumped into the damper.

- ✓ The pressure gauge increases to the specified value.

3 bar



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

Guideline

3 bar

- ✓ The pressure gauge drops to the specified value.

0 bar

- When the pressure gauge reaches the specified value, operate the **On/Off** switch.

Guideline

0 bar

- ✓ The vacuum pump is switched off.

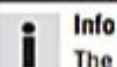
- Slide O-ring **B** to the end of the special tool by the specified value (distance **A** minus specified value).

Guideline

10 mm

Depth micrometer (T107S) (p. 235)

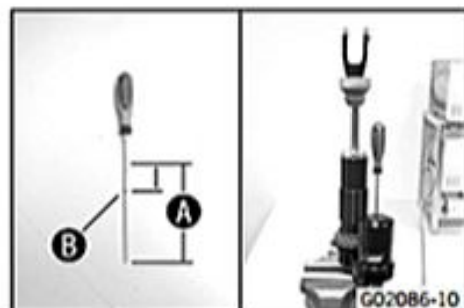
- Slide the floating piston into the reservoir to the shortened position using the special tool.

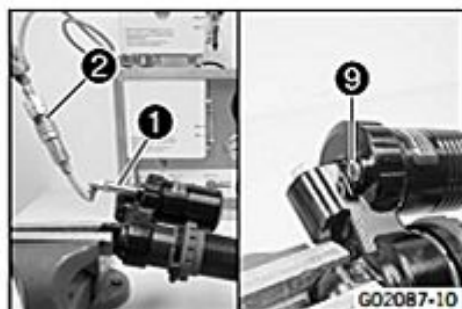


Info

The floating piston must be positioned at exactly this point when the rod is fully extended; otherwise, damage will occur during compression of the shock absorber.

- Remove the special tool.





- Remove adapter ① from connection 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

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

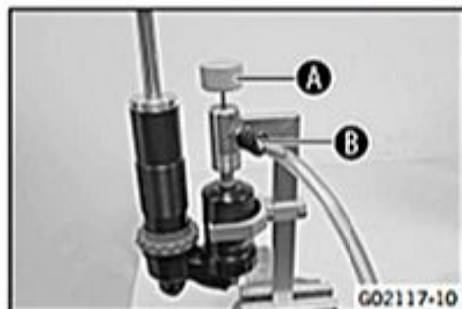
8.25 Filling the damper with nitrogen



- Screw in screw ① by approx. 2 rotations but do not tighten.

**Info**

The piston rod is fully extended.



- Clamp the special tool in the vise.

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

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

Filling gas - nitrogen

- Adjust the pressure regulator.

Guideline

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

- Position the damper in the special tool.

✓ The hexagonal part of the tap handle ① engages in the hexagon socket of the filling port screw.

- Open filler tap ②.
- Fill the damper for at least 15 seconds.

Guideline

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

**Info**

Watch the pressure regulator dial.
Make sure that the damper is filled to the specified pressure.

- Close the filling port screw using tap handle ①.
- Close spigot ② and take the damper out of the special tool.
- Tighten the filling port screw.

Guideline

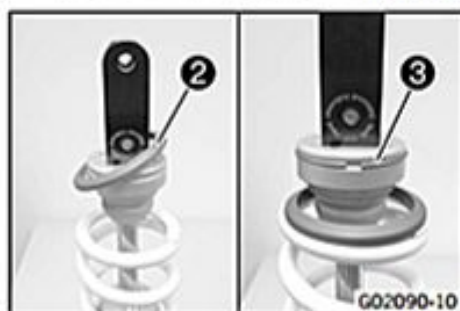
Screw, reservoir filling port	M5	3 Nm (2.2 lbf ft)
-------------------------------	----	-------------------

8.26 Installing the spring (All EU models)



G02089-10

- Ensure that adjusting ring **1** is screwed on with the intermediate washer.



G02090-10

- Measure the overall spring length while the spring is not under tension.
- Position the spring.

Guideline

Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	39 N/mm (223 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	42 N/mm (240 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	45 N/mm (257 lb/in)

- Mount spring retainer **2**.
- Mount ring **3**.

Alternative 1

- Tension the spring by turning the adjusting ring to the prescribed value.

Guideline

Spring preload	5 mm (0.2 in)
Hook wrench (T106S) (☞ p. 235)	

Alternative 2



Warning

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

Extreme modifications to the suspension setting may cause a serious deterioration in the handling characteristic and overload components.

- Only make adjustments within the recommended range.
- Ride slowly to start with after making adjustments to get the feel of the new handling characteristic.

- Tension the spring to the length measured during disassembly by turning the adjusting ring.

Hook wrench (T106S) (☞ p. 235)

- Tighten screw **4**.

Guideline

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

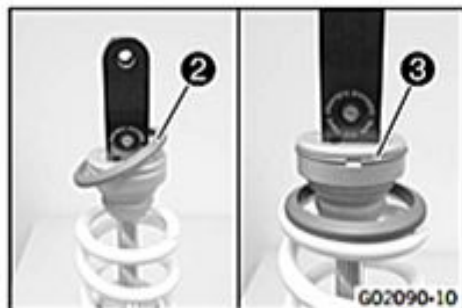


G02091-10

8.27 Installing the spring (All US models)



G02089-10



G02090-10

- Ensure that adjusting ring ① is screwed on with the intermediate washer.

- Measure the overall spring length while the spring is not under tension.
- Position the spring.

Guideline

Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	39 N/mm (223 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	42 N/mm (240 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	45 N/mm (257 lb/in)

- Mount spring retainer ②.
- Mount ring ③.

Alternative 1

- Tension the spring by turning the adjusting ring to the prescribed value.

Guideline

Spring preload	7 mm (0.28 in)
Hook wrench (T106S) (☛ p. 235)	

Alternative 2



Warning

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

Extreme modifications to the suspension setting may cause a serious deterioration in the handling characteristic and overload components.

- Only make adjustments within the recommended range.
- Ride slowly to start with after making adjustments to get the feel of the new handling characteristic.

- Tension the spring to the length measured during disassembly by turning the adjusting ring.

Hook wrench (T106S) (☛ p. 235)

- Tighten screw ④.

Guideline

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



G02091-10

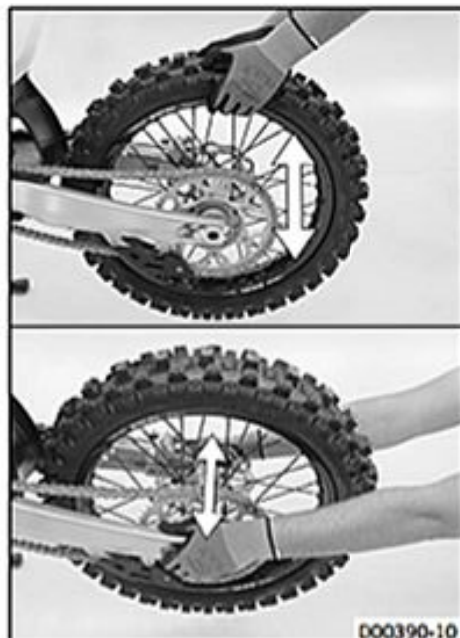
8.28 Checking the swingarm bearing for play

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Place a load on the front of the vehicle.
- ✓ The rear wheel is not in contact with the ground.

Main work

- Move the swingarm up and down.
 - If there is detectable play:
 - Change the swingarm bearing. (☞ p. 91)
- Move the swingarm from one side to the other.
 - If there is detectable play:
 - Change the swingarm bearing. (☞ p. 91)



Finishing work

- Remove the motorcycle from the lift stand. (☞ p. 10)

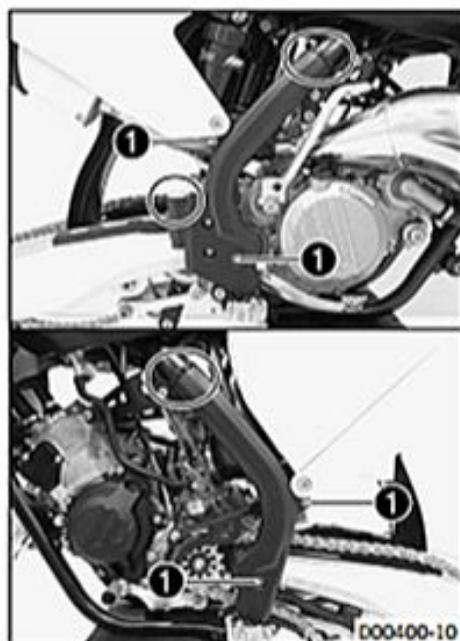
8.29 Removing the swingarm

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the rear wheel. (☞ p. 107)

Main work

- Remove screws ① with the washer.
- Remove the cable tie(s).
- Take off the frame protector on both sides.





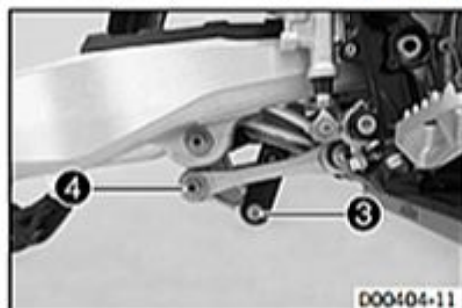
- Take the brake line out of the guide.



- Push the brake caliper forward, remove it, and hang it to the side.



- Remove connecting link 2 of the chain.
- Take off the chain.



- Remove screw 3.
- Remove fitting 4.



Info

Raise the link fork slightly to be able to remove the screws more easily.



- Remove fitting 5.
- Take off the angle lever.



- Remove nut 6.



- Remove the swingarm pivot. Take off the swingarm.

8.30 Installing the swingarm



Main work

- Position the swingarm. Mount the swingarm pivot.



- Mount and tighten nut 1.

Guideline

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



- Position the angle lever.
- Mount fitting 2 but do not tighten yet.

Guideline

Nut, linkage lever on swingarm	M14x1.5	80 Nm (59 lbf ft)
--------------------------------	---------	-------------------



- Mount screw 3 but do not tighten yet.

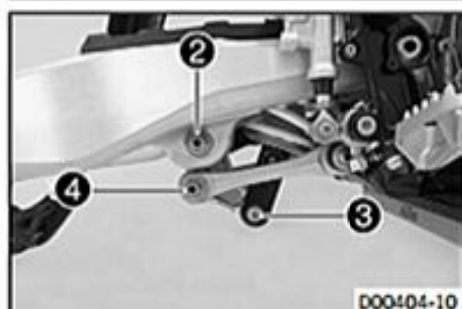
Guideline

Screw, bottom shock absorber	M10	60 Nm (44.3 lbf ft)	Loctite® 2701™
------------------------------	-----	------------------------	----------------



Info

Raise the link fork slightly to be able to mount the screw more easily.



- Position the linkage lever.
- Mount and tighten fitting 4.

Guideline

Nut, linkage lever to angle lever	M14x1.5	80 Nm (59 lbf ft)
-----------------------------------	---------	-------------------



Info

Raise the link fork slightly to be able to mount the screw more easily.

- Tighten screw ③.

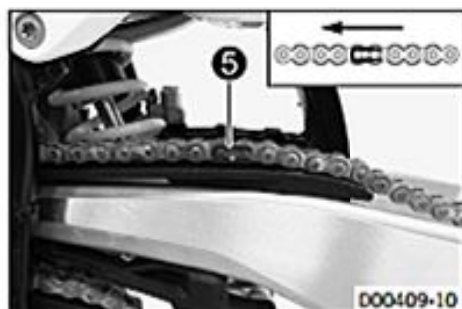
Guideline

Screw, bottom shock absorber	M10	60 Nm (44.3 lbf ft)	Loctite® 2701™
------------------------------	-----	---------------------	----------------

- Tighten fitting ②.

Guideline

Nut, linkage lever on swingarm	M14x1.5	80 Nm (59 lbf ft)	
--------------------------------	---------	-------------------	--



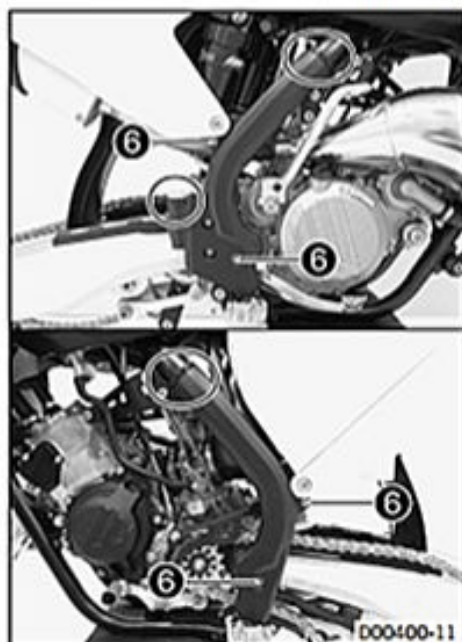
- Mount the chain.
- Connect the chain with connecting piece ⑤.



- Position the brake caliper.



- Position the brake line in the guide.



- Position the frame protector on the left and right.
- Mount and tighten screws ⑥ with the washers.

Guideline

Screw, frame protector	M5	3 Nm (2.2 lbf ft)	
------------------------	----	-------------------	--

- Mount the cable tie(s).

Finishing work

- Install the rear wheel. (☛ p. 107)
- Check the chain tension. (☛ p. 111)

- Remove the motorcycle from the lift stand. (☛ p. 10)

8.31 Changing the swingarm bearing



Info

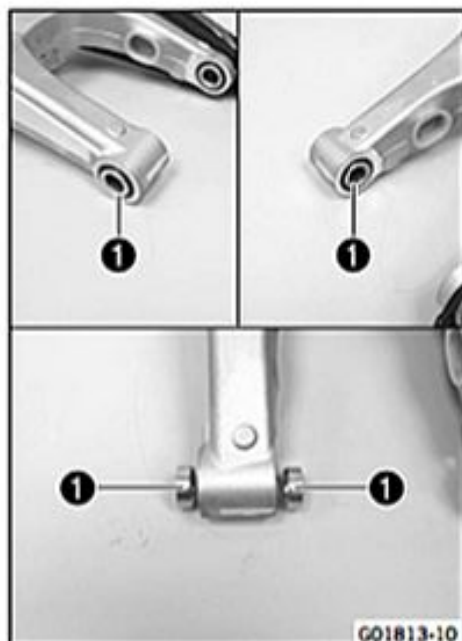
These operations are the same on both swingarm bearings.

Preparatory work

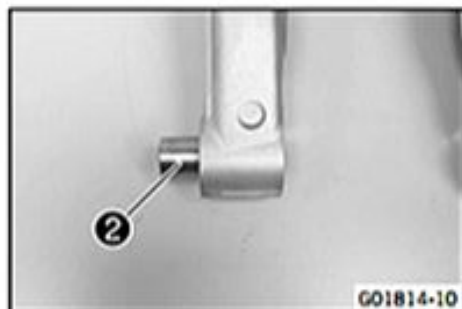
- Raise the motorcycle with a lift stand. (☛ p. 10)
- Remove the rear wheel. (☛ p. 107)
- Remove the swingarm. (☛ p. 87)

Main work

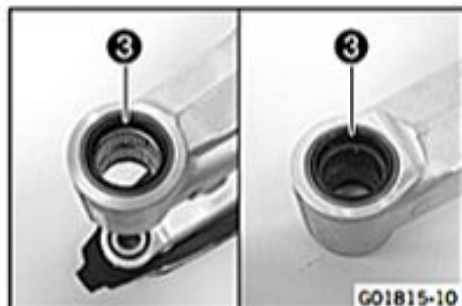
- Remove the outer collar bushings ①.



- Remove bushing ②.



- Remove shaft seal rings ③ using a suitable tool.



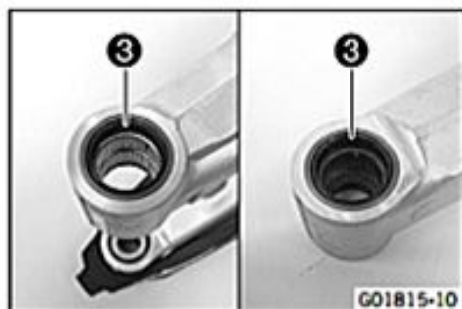
- Press out the bearing with a suitable tool.





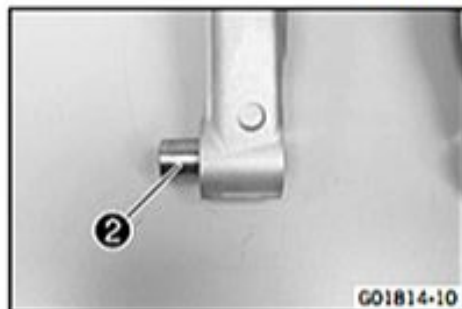
G01818-10

- Press in the new bearing until it is flush using a suitable tool.



G01815-10

- Press in shaft seal rings (3).



G01814-10

- Mount bushing (2).



G01819-10

- Grease the shaft seal rings.

Long-life grease (☛ p. 228)

- Position collar bushings (1) with the shoulder facing inward.

Finishing work

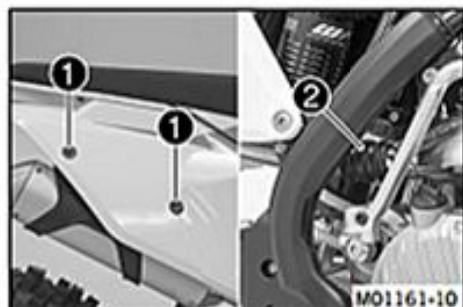
- Install the swingarm. (☛ p. 89)
- Install the rear wheel. (☛ p. 107)
- Check the chain tension. (☛ p. 111)
- Remove the motorcycle from the lift stand. (☛ p. 10)

9.1 Disassembling the main silencer

**Warning**

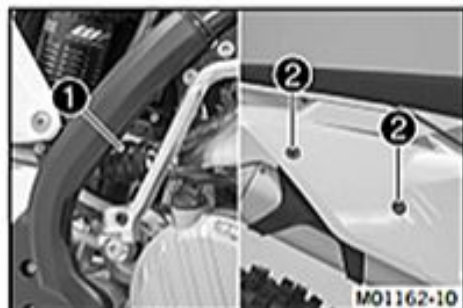
Danger of burns The exhaust system gets very hot when the vehicle is driven.

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



- Remove screws **1** with the washers.
- Pull off the main silencer from the manifold at rubber sleeve **2**.

9.2 Installing the main silencer



- Position the main silencer with rubber sleeve **1**.
- Mount and tighten screws **2** with the washers.

Guideline

Remaining screws, chassis	M6	10 Nm (7,4 lbf ft)
---------------------------	----	--------------------

9.3 Changing the glass fiber yarn filling in the main silencer

**Warning**

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

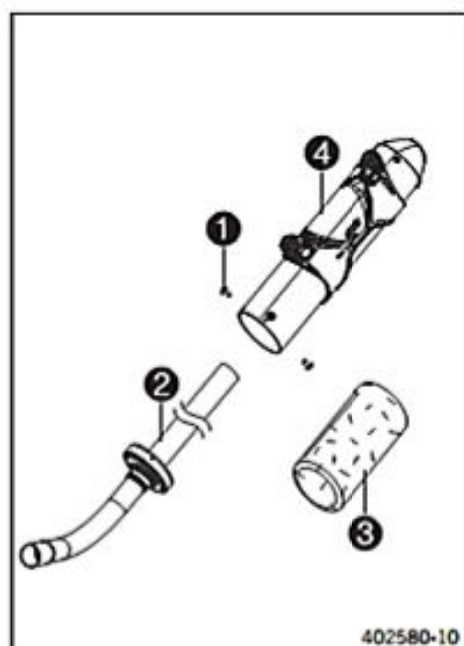
- Allow the exhaust system to cool down. Do not touch hot components.

**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

- Disassemble the main silencer. (☛ p. 93)



Main work

- Remove screws ①. Pull out inner tube ②.
- Remove the glass fiber yarn filling ③ from the inner tube.
- Clean the parts that need to be reinstalled and check for damage.
- Fit the new glass fiber yarn filling ③ into the inner tube.
- Slide outer tube ④ over the inner tube with the new glass fiber yarn filling.
- Mount and tighten all screws ①.

Guideline

Screws on the main silencer	M5	7 Nm (5.2 lbf ft)
-----------------------------	----	-------------------

Finishing work

- Install the main silencer. (☛ p. 93)

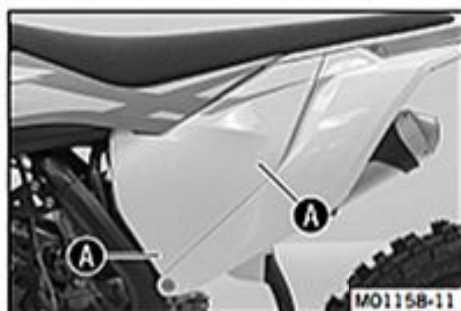
10.1 Removing the air filter box cover



Condition

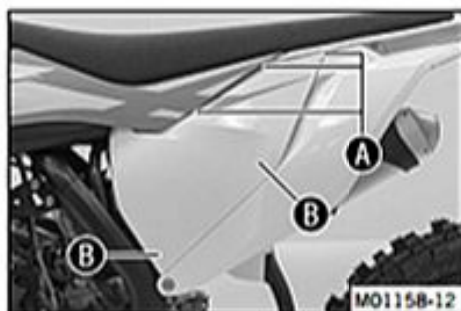
The air filter box cover is secured.

- Remove screw 1.



- Pull off the air filter box cover in area A sideways and remove it toward the front.

10.2 Installing the air filter box cover



- Insert the air filter box cover in area A and clip it into area B.



Condition

The air filter box cover is secured.

- Mount and tighten screw 1.

Guideline

Screw, air filter box cover	EJOT PT® K60x20-Z	3 Nm (2.2 lbf ft)	EJOT PT screw (0017060204)
-----------------------------	----------------------	----------------------	-------------------------------

10.3 Removing the air filter

Note

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

- Never operate the vehicle without an air filter as dust and dirt will enter the engine and lead to 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

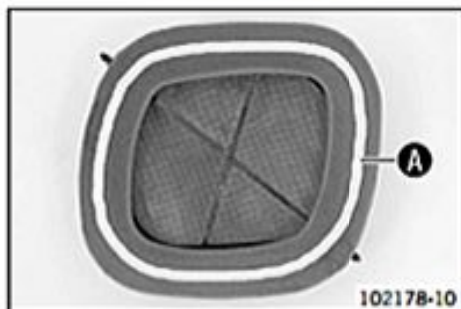
- Remove the air filter box cover. (☛ p. 95)



Main work

- Detach ① retaining tab. Remove air filter with air filter support.
- Take off air filter from air filter support.

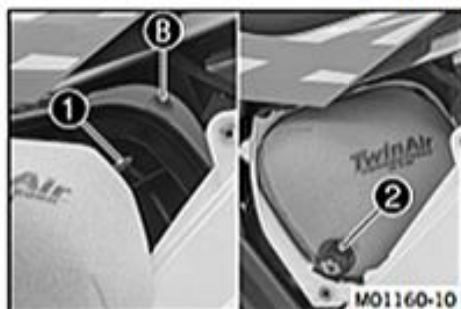
10.4 Installing the air filter



Main work

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

Long-life grease (☛ p. 228)



- Insert the air filter and position the top retaining pin ① in bushing B.
- ✓ The air filter is correctly positioned.
- Fix the bottom retaining pin with holding tab ②.



Info

If the air filter is not mounted correctly, dust and dirt may enter the engine and result in damage.

Finishing work

- Install the air filter box cover. (☛ p. 95)

10.5 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 cover. (☛ p. 95)
- Remove the air filter. (☛ p. 95)

Main work

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

Air filter cleaner (☛ p. 228)



Info

Only squeeze 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. 229)

- Clean the air filter box.



- Clean the intake flange and check it for damage and tightness.

Finishing work

- Install the air filter. (☛ p. 96)
- Install the air filter box cover. (☛ p. 95)

10.6 Sealing the air filter box



Preparatory work

- Remove the air filter box cover. (☛ p. 95)

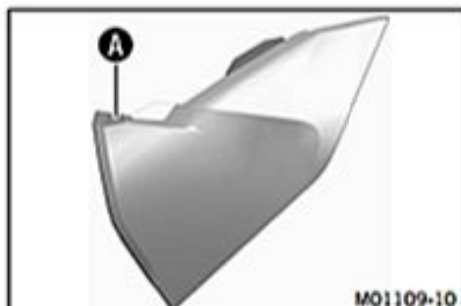
Main work

- Seal the air filter box in the marked area **A**.

Finishing work

- Install the air filter box cover. (☛ p. 95)

10.7 Securing the air filter box cover



Preparatory work

- Remove the air filter box cover. (☛ p. 95)

Main work

- Drill a hole at marking **A**.

Guideline

Diameter	6 mm (0.24 in)
----------	----------------

Finishing work

- Install the air filter box cover. (☛ p. 95)

11.1 Opening the filler cap



Danger

Fire hazard Fuel is highly flammable.

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



Warning

Danger of poisoning Fuel is poisonous and a health hazard.

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



Warning

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

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



- Turn filler cap **1** counterclockwise and lift it off.

11.2 Closing the filler cap



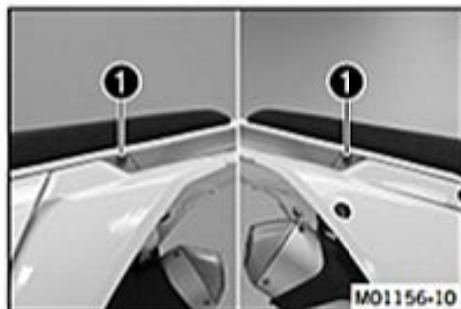
- Mount filler cap **1** and turn it clockwise until the fuel tank is tightly closed.



Info

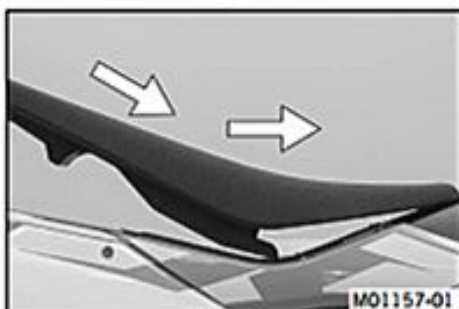
Run the fuel tank breather hose **2** without kinks.

11.3 Removing the seat



- Remove screws **1**.
- Raise the rear of the seat, pull the seat back, and lift it off.

11.4 Mounting the seat



- Mount the front seat on to the collar bushing 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 screws ①.

Guideline

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

11.5 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.
- The fuel in the fuel tank expands when warm and may emerge if overfilled. Follow the instructions on refueling.

**Warning**

Danger of poisoning Fuel is poisonous and a health hazard.

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

Preparatory work

- Remove the seat. (➔ p. 98)
- Turn handle ① of the fuel tap to the **OFF** position.

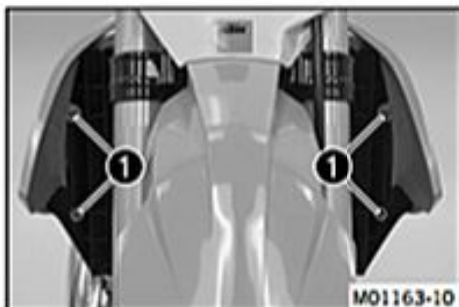
Main work

- Pull off the fuel hose.

**Info**

Remaining fuel may flow out of the fuel hose.

- Remove screws ①.



- Remove screw ② with the rubber bushing.
- Pull the hose off the fuel tank breather on the tank lid.



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

11.6 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.
- The fuel in the fuel tank expands when warm and may emerge if overfilled. Follow the instructions on refueling.



Warning

Danger of poisoning Fuel is poisonous and a health hazard.

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

Main work

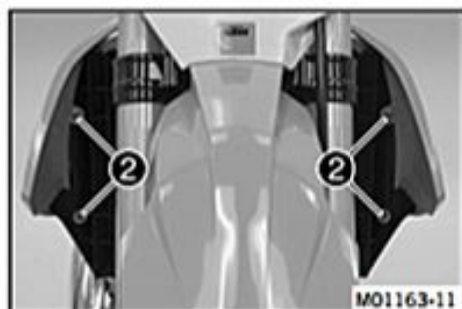
- Check the routing of the throttle cable. (☛ p. 61)
- Position the fuel tank and fit the two spoilers to the sides of the radiator bracket.
- Make sure that no cables are trapped or damaged.



- 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)
---------------------------	----	--------------------



- Mount and tighten screws 2.

Guideline

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

- Connect the fuel hose.

Finishing work

- Mount the seat. (☛ p. 99)

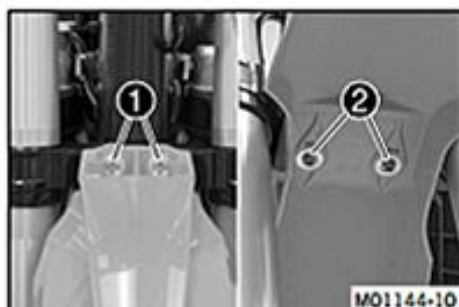
12.1 Removing the front fender

Preparatory work

- Remove the start number plate. (☞ p. 101)

Main work

- Remove screws ① and ②. Remove the front fender.



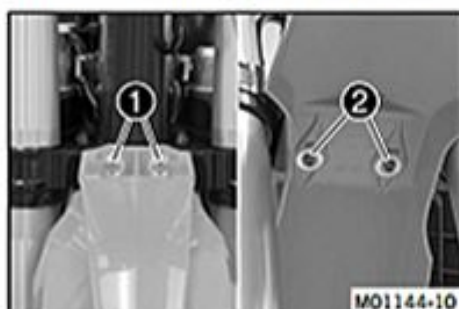
12.2 Installing the front fender

Main work

- Position the front fender. Mount and tighten screws ① and ②.

Guideline

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



Finishing work

- Install the start number plate. (☞ p. 101)

12.3 Removing the start number plate

- Remove screw ①.
- Disconnect the brake line at the start number plate. Take off the start number plate.



12.4 Installing the start number plate

- Connect the brake line at the start number plate.
- Position the start number plate.
- ✓ The holding lugs engage in the fender.
- Mount and tighten screw ①.

Guideline

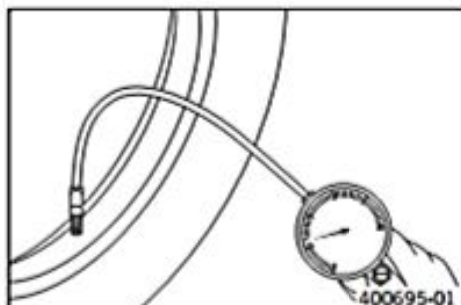
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)
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13.1 Checking the tire air pressure

**Info**

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



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

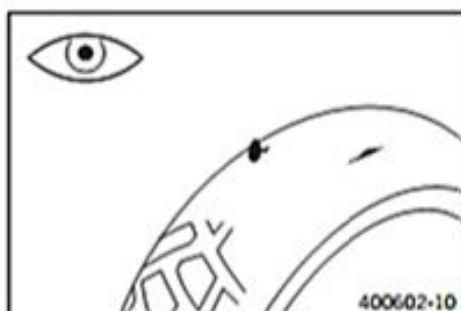
Tire air pressure off road	
Front	1.0 bar (15 psi)
Rear	1.0 bar (15 psi)

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

13.2 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 an important impact on the handling characteristics of the motorcycle.
The front and rear wheels must be mounted with tires with similar profiles.
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 are changed at the latest after 5 years, regardless of the actual state of wear.

- If the tire is older than five years:
 - Change the tire.

13.3 Checking the wheel bearing for play

Preparatory work

- Raise the motorcycle with a lift stand. (↖ p. 10)
- Place a load on the rear of the vehicle.
- ✓ The front wheel is not in contact with the ground.

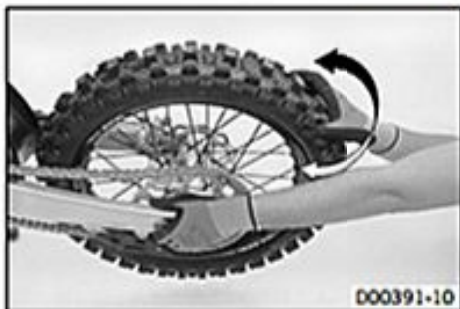
**Main work**

- Move the front wheel from side to side.

**Info**

Hold the fork leg to check it.

- If there is detectable play:
 - Change the front wheel bearing. (☞ p. 106)



- Place a load on the front of the vehicle.
 - ✓ The rear wheel is not in contact with the ground.
- Move the rear wheel from side to side.

**Info**

Hold the swingarm to check it.

- If there is detectable play:
 - Change the rear wheel bearing. (☞ p. 108)

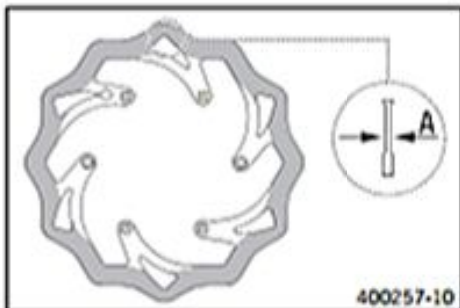
Finishing work

- Remove the motorcycle from the lift stand. (☞ p. 10)

13.4 Checking the brake discs**Warning**

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

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



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

**Info**

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

Brake discs - wear limit

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

- If the brake disc thickness is less than the specified value:
 - Change the brake disc.
- Check the front and rear brake discs for damage, cracking and deformation.
 - If the brake disc exhibits damage, cracking or deformation:
 - Change the brake disc.

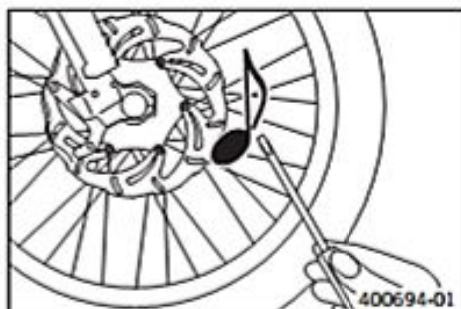
13.5 Checking the spoke tension**Warning**

Danger of accidents Instable handling due to incorrect spoke tension.

- Ensure that the spoke tension is correct.

**Info**

A loose spoke causes wheel imbalance and rapidly leads to more loose spokes. If the spokes are too tight, they can break due to local overload. Check the spoke tension regularly, especially on a new motorcycle.



- Briefly strike each spoke with the tip of a screwdriver.

**Info**

The tone frequency depends on the length of the spoke and the spoke diameter.

If you hear different tone frequencies from different spokes of equal length and diameter, this is an indication of 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	6 Nm (4.4 lbf ft)
Spoke nipple, rear wheel	M4.5	6 Nm (4.4 lbf ft)

Torque wrench with various accessories in set (58429094000) (☛ p. 234)

13.6 Front wheel**13.6.1 Removing the front wheel****Preparatory work**

- Raise the motorcycle with a lift stand. (☛ p. 10)

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.



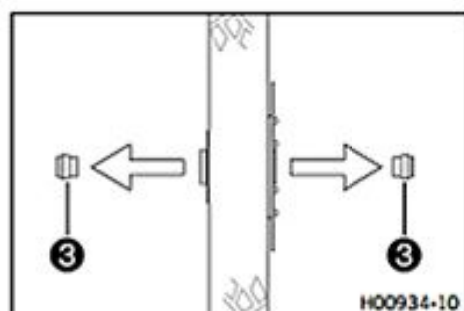
- Loosen screw ① by several rotations.
- Loosen screws ②.
- Press on screw ① to push the wheel spindle out of the axle clamp.
- Remove screw ①.



- 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 (3).

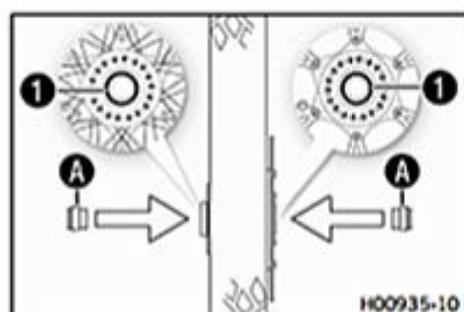
13.6.2 Installing the front wheel



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 front wheel bearing. (☞ p. 106)
- Clean and grease shaft seal rings (1) and contact surface (A) of the spacers.

Long-life grease (☞ p. 228)

- Insert the spacers.



- Lift the front wheel into the fork, position it, and insert the wheel spindle.
 - ✓ The brake linings are correctly positioned.
- Mount and tighten screw (2).

Guideline

Screw, front wheel spindle	M20x1.5	35 Nm (25.8 lbf ft)
----------------------------	---------	------------------------

- Operate the hand brake lever several times until the brake linings are lying correctly against the brake disc.
- Remove the motorcycle from the lift stand. (☞ p. 10)
- Operate the front brake and compress the fork a few times firmly.
 - ✓ The fork legs straighten.
- Tighten screws (3).

Guideline

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

13.6.3 Changing the front brake discs

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the front wheel. (☞ p. 104)

Main work

- Remove screws (1). Remove the brake disc.
- Clean the contact surface of the brake disc.
- Position the new 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™
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Finishing work

- Install the front wheel. (☞ p. 105)

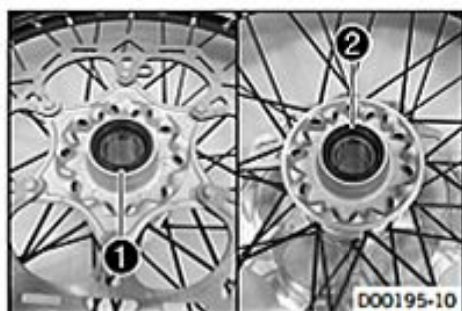
13.6.4 Changing the front wheel bearing

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the front wheel. (☞ p. 104)

Main work

- Remove shaft seal rings ① and ②.



- Press out bearing ③ using a suitable tool.



Info

Spacing tube ④ can be pushed aside.

- Remove spacing tube ④.

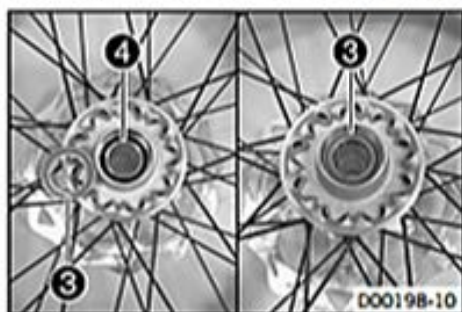


- Press out bearing ⑤ using a suitable tool.
- Press in the new bearing ⑤ all the way using a suitable tool.



Info

Only press the bearing in via the outer ring; otherwise, the bearing will be damaged when it is pressed in.

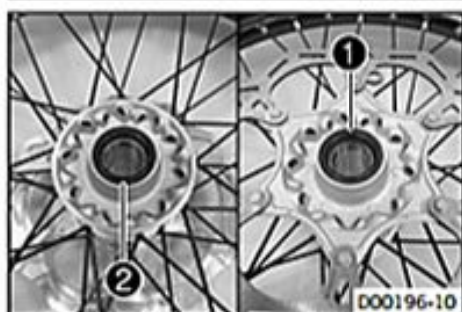


- Position spacing tube ④.
- Press in the new bearing ③ all the way using a suitable tool.



Info

Only press the bearing in via the outer ring; otherwise, the bearing will be damaged when it is pressed in.



- Grease the new shaft seal rings ② and ① and press in until they are flush.

Finishing work

- Install the front wheel. (☞ p. 105)

13.7 Rear wheel

13.7.1 Removing the rear wheel



Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)

Main work

- Press the brake caliper onto the brake disc by hand in order to push 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 1.
- Remove chain adjuster 2. Withdraw wheel spindle 3 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.



Info

Cover the components to protect them against damage.

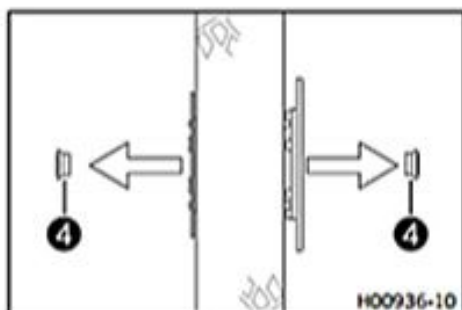
- Holding the rear wheel, withdraw the wheel spindle. Take the rear wheel out of the swingarm.



Info

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

- Remove spacers 4.



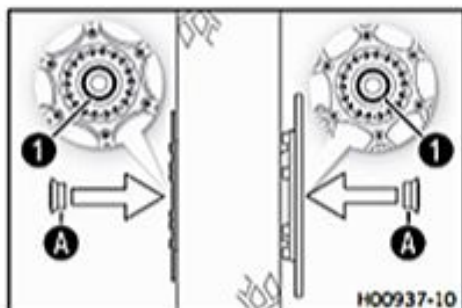
13.7.2 Installing the rear wheel



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 rear wheel bearing. (☞ p. 108)
- Clean and grease shaft seal rings 1 and contact surface A of the spacers.

Long-life grease (☞ p. 228)
- Insert the spacers.



- Position the rear wheel and insert wheel spindle ②.
- ✓ The brake linings are correctly positioned.
- Mount 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. 111)
- Tighten nut ④.

Guideline

Nut, rear wheel spindle	M25x1.5	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. 10)

13.7.3 Changing the rear brake discs

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the rear wheel. (☞ p. 107)

Main work

- Remove screws ①. Remove the brake disc.
- Clean the contact surface of the brake disc.
- Position the new 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™
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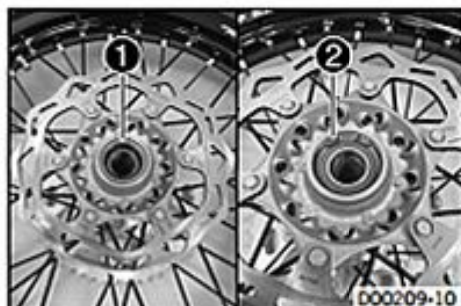
Finishing work

- Install the rear wheel. (☞ p. 107)
- Remove the motorcycle from the lift stand. (☞ p. 10)

13.7.4 Changing the rear wheel bearing

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the rear wheel. (☞ p. 107)

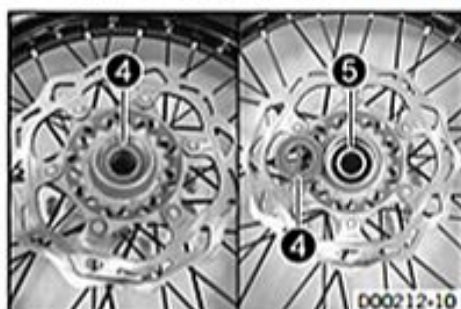


Main work

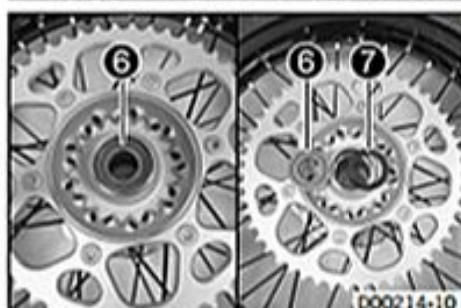
- Remove shaft seal ring ①.
- Remove lock ring ②.



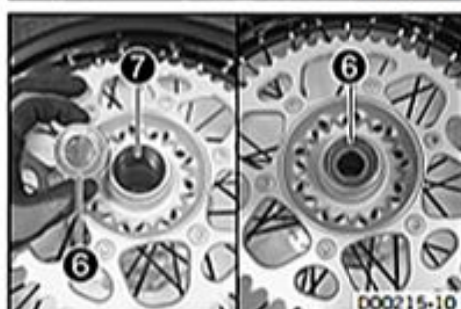
- Remove shaft seal ring ③.



- Using a suitable tool, press bearing ④ out from the inside to the outside.
- Remove spacing tube ⑤.



- Using a suitable tool, press bearing ⑥ out from the inside to the outside.
- Check spacer washer ⑦ for damage and wear.
 - If the spacer washer is damaged or worn:
 - Replace the spacer washer.

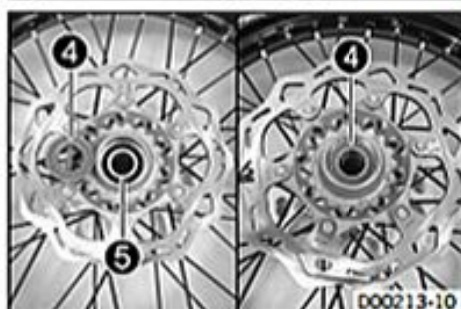


- Position spacer washer ⑦.
- Press the new bearing ⑥ all the way in from the outside to the inside.



Info

Only press the bearing in via the outer ring; otherwise, the bearing will be damaged when it is pressed in.



- Clean, grease, and mount spacing tube ⑤.

Long-life grease (☛ p. 228)

- Press the new bearing ④ all the way in from the outside to the inside.

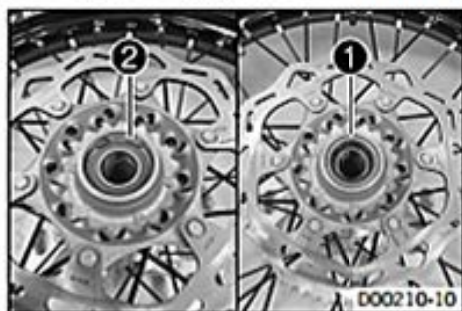


Info

Only press the bearing in via the outer ring; otherwise, the bearing will be damaged when it is pressed in.



- Grease the new shaft seal ring ③ and press it in until it is flush.

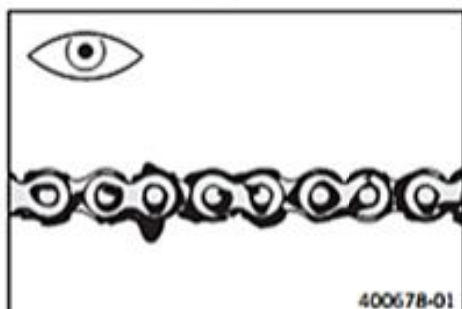


- Mount lock ring ②.
✓ The lock ring engages audibly.
- Grease the new shaft seal ring ① and press it in until it is flush.

Finishing work

- Install the rear wheel. (☞ p. 107)
- Remove the motorcycle from the lift stand. (☞ p. 10)

13.7.5 Checking the chain for dirt



- Check the chain for heavy soiling.
 - If the chain is very dirty:
 - Clean the chain. (☞ p. 110)

13.7.6 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.

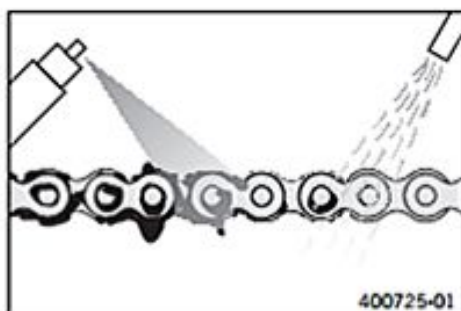


Info

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

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)

**Main work**

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

Chain cleaner (☛ p. 228)

Off-road chain spray (☛ p. 229)

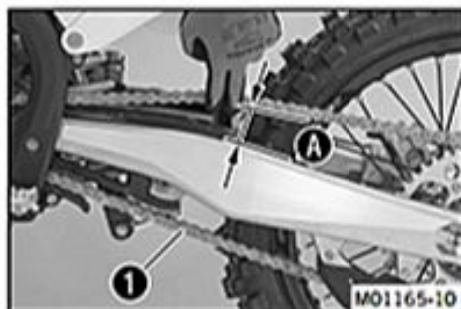
Finishing work

- Remove the motorcycle from the lift stand. (☛ p. 10)

13.7.7 Checking the chain tension**Warning**

Danger of accidents Danger caused by incorrect chain tension.

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

**Preparatory work**

- Raise the motorcycle with a lift stand. (☛ p. 10)

Main work

- Pull the chain at the end of the chain sliding piece upward to measure chain tension **A**.

Guideline

The lower chain section 1 must be taut.
--

**Info**

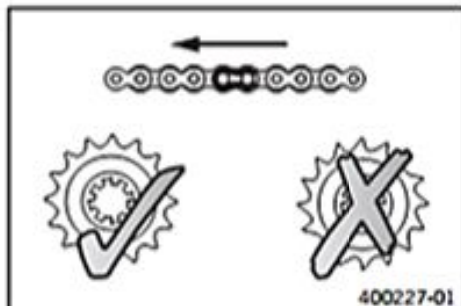
Chain wear is not always even, so you should repeat this measurement at different chain positions.

Chain tension	55... 58 mm (2.17... 2.28 in)
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- If the chain tension does not meet the specification:
 - Adjust the chain tension. (☛ p. 113)

Finishing work

- Remove the motorcycle from the lift stand. (☛ p. 10)

13.7.8 Checking the chain, rear sprocket, engine sprocket, and chain guide**Preparatory work**

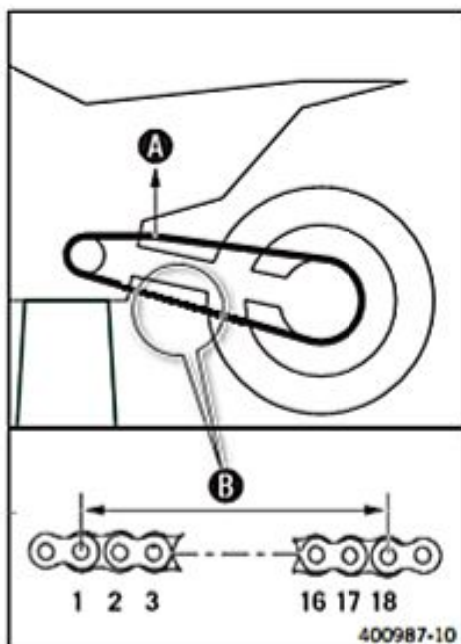
- Raise the motorcycle with a lift stand. (☛ p. 10)

Main work

- Shift the transmission to idle.
- Check the rear sprocket and engine sprocket for wear.
 - If the rear sprocket and engine sprocket are worn:
 - Change the drivetrain kit. (☛ p. 114)

**Info**

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



- Pull at the top part of the chain with the specified weight **A**.

Guideline

Weight, 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 drivetrain kit. (☛ p. 114)



Info

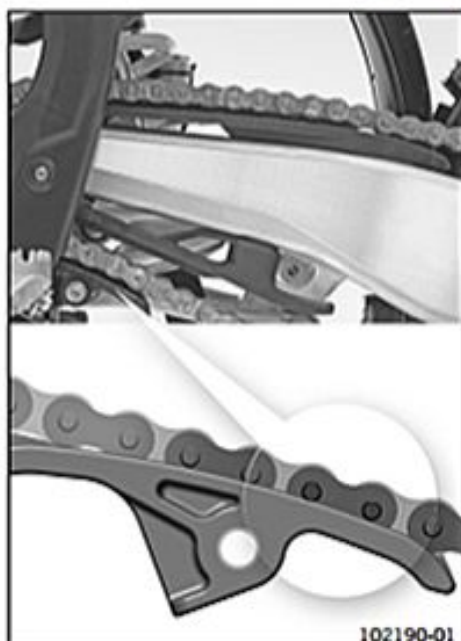
When the chain is replaced, the rear sprocket and engine sprocket should also be changed.
New chains wear out faster on old, worn sprockets.



- Check the chain sliding guard for wear.
 - If the lower edge of the chain pin is at the level of 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 screws on 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 lower edge of the chain pins 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 screw on the chain sliding piece.

Guideline

Screw, chain sliding piece	M8	15 Nm (11.1 lbf ft)
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- Check the chain guide for wear.

**Info**

Wear can be seen 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 screws on 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. 10)

13.7.9 Adjusting the chain tension**Warning**

Danger of accidents Danger caused by incorrect chain tension.

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

**Preparatory work**

- Raise the motorcycle with a lift stand. (☛ p. 10)
- Check the chain tension. (☛ p. 111)

Main work

- Loosen nut ①.
- Loosen nuts ②.
- Adjust the chain tension by turning adjusting screws ③ to the 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 reference marks A. The rear wheel is now correctly aligned.	

- Tighten nuts ②.
- Make sure that chain adjusters ④ are fitted correctly on adjusting screws ③.
- Tighten nut ①.

Guideline

Nut, rear wheel spindle	M25x1.5	80 Nm (59 lbf ft)
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**Info**

The wide adjustment range of the chain adjusters (32 mm) 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. 10)

13.7.10 Changing the drivetrain kit

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the air filter box cover. (☞ p. 95)

Main work

- Remove screw ①.
- Remove screw ②.
- Take the engine sprocket cover off to the front.



- Remove lock ring ③.



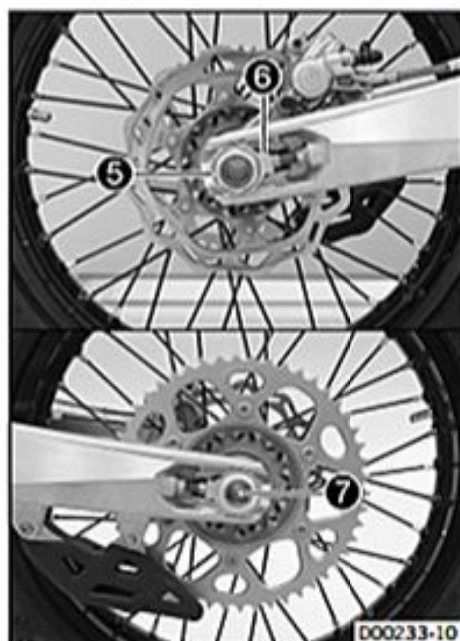
- Remove connecting link ④ of the chain.



Info

Cover the components to protect them against damage.

- Take off the chain.



- Remove nut ⑤.
- Remove chain adjuster ⑥.
- Hold the rear wheel and remove the wheel spindle ⑦.
- Take the rear wheel out of the swingarm.



Info

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



- Remove engine sprocket 8.



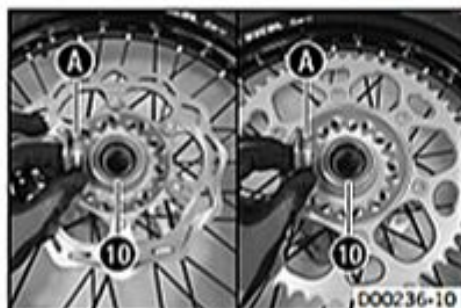
- Remove fittings 9. Remove the rear sprocket.
- Position the new rear sprocket. Mount and tighten fittings.

Guideline

Nut, rear sprocket screw	M8	35 Nm (25.8 lbf ft)	Loctite® 2701™
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- Slide the new engine sprocket 8 onto the countershaft.



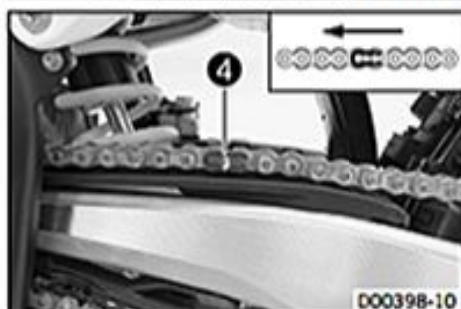
- Check the wheel bearing for damage and wear.
 - If the wheel bearing is damaged or worn:
 - Change the rear wheel bearing. (☛ p. 108)
- Remove the spacers.
- Clean and grease shaft seal rings 10 and contact surface A of the spacers.

Long-life grease (☛ p. 228)

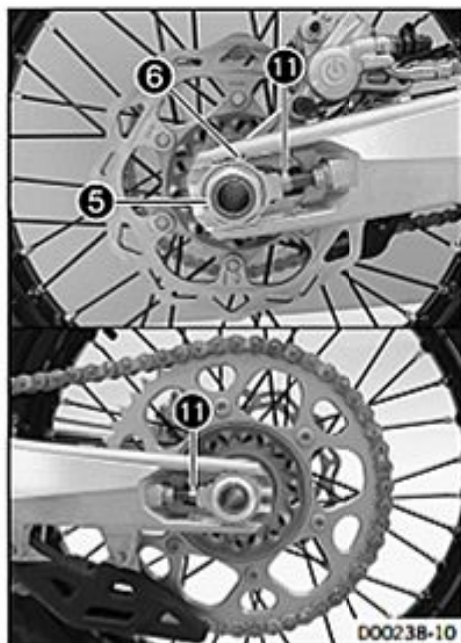
- Insert the spacers.



- Position the rear wheel.
 - ✓ The brake linings are correctly positioned.
- Insert wheel spindle 7.



- Mount the new chain.
- Connect the chain with connecting link 4.



- Position chain adjuster (6). Mount nut (5), but do not tighten it yet.
- Make sure that chain adjusters (6) are fitted correctly on adjusting screws (11).
- Check the chain tension. (☞ p. 111)
- Tighten nut (5).

Guideline

Nut, rear wheel spindle	M25x1.5	80 Nm (59 lbf ft)
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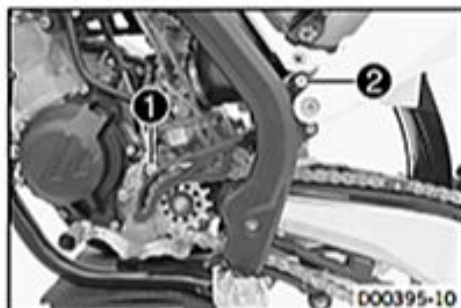
Info

The wide adjustment range of the chain adjusters enables different secondary ratios with the same chain length.
Chain adjusters (6) can be turned by 180°.

- Operate the rear brake lever several times until the brake linings are in contact with the brake disc and there is a pressure point.



- Mount lock ring (3).



- Position the engine sprocket cover and mount it in the holder.
- Mount and tighten screw (1).

Guideline

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

- Mount and tighten screw (2).

Guideline

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

Finishing work

- Install the air filter box cover. (☞ p. 95)
- Remove the motorcycle from the lift stand. (☞ p. 10)

14.1 Ignition curve plug-in connector

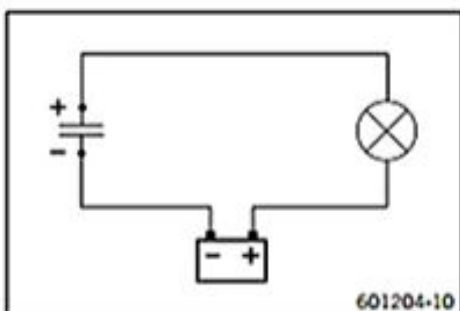


The plug-in connector ① is located on the frame under the fuel tank.

Possible states

- Soft – The plug-in connection of the ignition timing map is disconnected to achieve better rideability.
- Performance – The plug-in connector of the ignition timing map is connected to achieve higher performance.

14.2 Checking the capacitor



- Remove the capacitor.
- Discharge the capacitor by bridging the two contacts.
- Connect the capacitor to a 12 V test lamp on one connector and connect to the battery as shown.



Info

As the capacitor charge increases, the test lamp becomes dimmer.

- The lamp lights up for: 0.5... 2.0 s
The capacitor is OK.
- The lamp lights up for: < 0.5 s
Change the capacitor.
- The lamp lights up for: > 2.0 s
Change the capacitor.

- Discharge the capacitor with a 12 V test lamp, as shown in the figure.

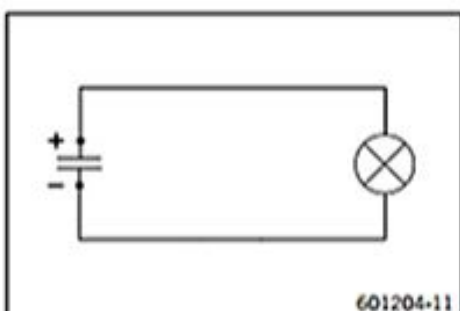


Info

As the capacitor charge decreases, the test lamp becomes dimmer.

- The lamp lights up for: 0.5... 2.0 s
The capacitor is OK.
- The lamp lights up for: < 0.5 s
Change the capacitor.
- The lamp lights up for: > 2.0 s
Change the capacitor.

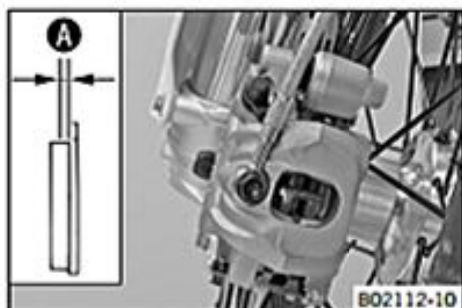
- Install the capacitor.



15.1 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. 118)
- Check the brake linings for damage and cracking.
 - » If damage or cracking is visible:
 - Change the front brake linings. (☛ p. 118)

15.2 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! 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!

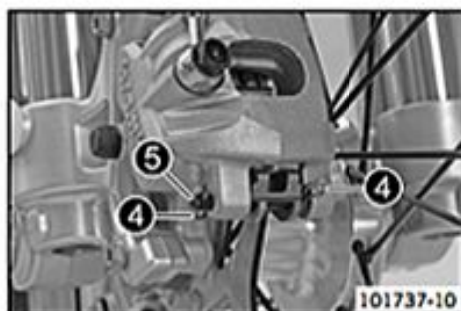
Use only clean brake fluid from a sealed container!



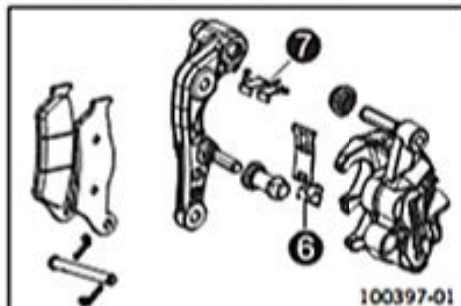
- Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
- Remove screws ①.
- Remove cover ② with membrane ③.
- Manually press the brake caliper toward the brake disc to push back the brake pistons. Ensure that brake fluid does not flow out of the brake fluid reservoir, extracting it by suction if it does.

**Info**

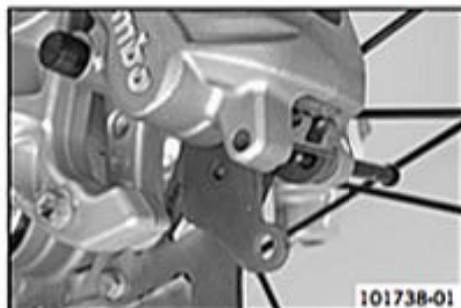
Make sure when pushing back the brake pistons that you do not press the brake caliper against the spokes.



- Remove cotter pins 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 new brake linings, insert the pin, and mount the cotter pins.

**Info**

Always change the full set of brake linings.

- Operate the hand brake lever several times until the brake linings are lying correctly against the brake disc and there is a pressure point.



- Correct the brake fluid quantity to level ①.

Guideline

Dimension ① (brake fluid level below top edge of container)	5 mm (0.2 in)
---	---------------

Brake fluid DOT 4 / DOT 5.1 (☞ p. 226)
--

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

**Info**

Wash off overflowed or spilled brake fluid immediately with water.

15.3 Checking the free travel of the hand brake lever

- Warning**
Danger of accidents Brake system failure.
- If there is no free travel on the hand brake lever, pressure builds up on the front brake circuit. The front brake can fail due to overheating. Adjust the free travel on hand brake lever according to specifications.

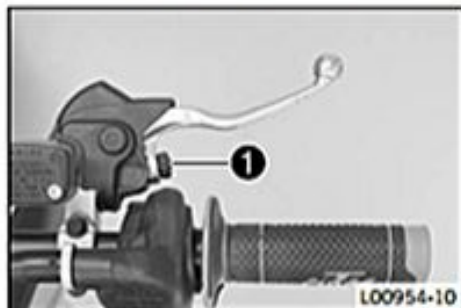


- Push the hand brake lever forward and check free travel **A**.

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. 120)

15.4 Adjusting the basic position of the hand brake lever



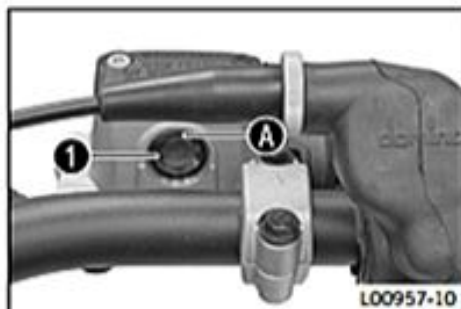
- Check the free travel of the hand brake lever. (☞ p. 120)
- Adjust the basic setting of the hand brake lever to your hand size by turning adjusting screw **1**.

i Info

When the adjusting screw is turned clockwise, the hand brake lever moves away from the handlebar.
 When the adjusting screw is turned counterclockwise, the hand brake lever moves closer to 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!

15.5 Checking the front brake fluid level

- Warning**
Danger of accidents Brake system failure.
- If the brake fluid level drops below the specified marking or the specified value, this is an indication that the brake system is leaking or that the brake linings are completely worn down. 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.



Preparatory work

- Check the front brake linings. (☞ p. 118)

Main work

- Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
- Check the brake fluid level in the viewer **1**.
 - If the brake fluid level is below the **A** marking:
 - Add front brake fluid. (☞ p. 121)

15.6 Adding front brake fluid

**Warning****Danger of accidents** Brake system failure.

- If the brake fluid level drops below the specified marking or the specified value, this is an indication that the brake system is leaking or that the brake linings are completely worn down. 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.

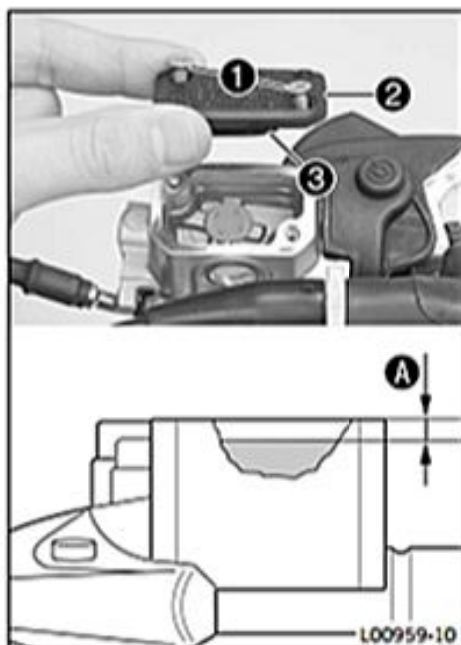
- Oil, grease, filters, fuel, cleaners, brake fluid, etc., should be disposed of as stipulated in applicable regulations.

**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. 118)

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. 226)

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

**Info**

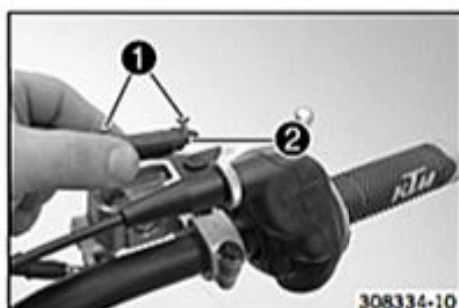
Clean up overflowed or spilled brake fluid immediately with water.

15.7 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 ①.
- Remove cover ② with membrane.
- Draw the old brake fluid out of the brake fluid reservoir using a syringe and fill with fresh brake fluid.

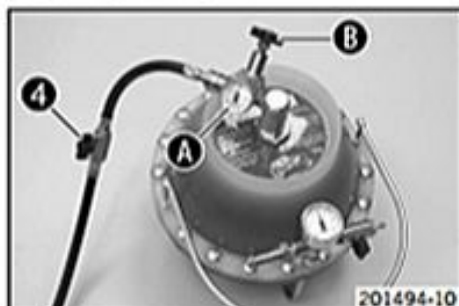
Bleed syringe (50329050000) (☞ p. 231)

Brake fluid DOT 4 / DOT 5.1 (☞ p. 226)



- Mount bleeder cover ③.
- Connect the bleeding device.

Bleeding device (00029013100) (☞ p. 230)



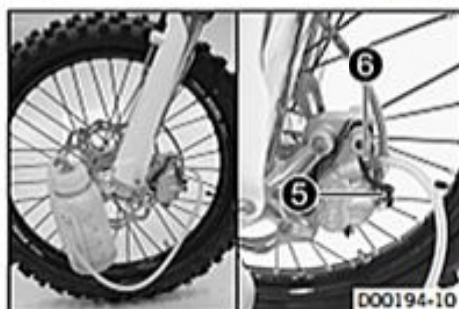
- Open shut-off valve ④.

- Info**
 Follow the operating instructions of the bleeding device.

- Ensure that the filling pressure is correctly set at pressure gauge A. If necessary, adjust the filling pressure at pressure regulator B.

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. 230)

- 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 brake fluid stops emerging.

**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 **C**.

Guideline

Level C	5 mm (0.2 in)
----------------	---------------

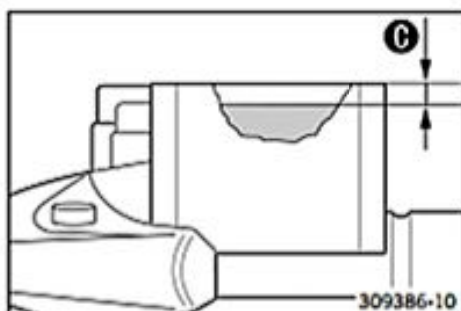
Brake fluid DOT 4 / DOT 5.1 (☞ p. 226)
--

- 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.

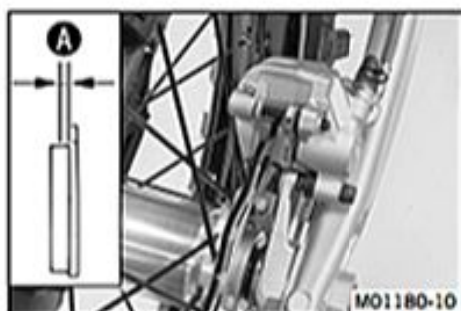


15.8 Checking the rear brake linings

**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. 123)
- Check the brake linings for damage and cracking.
 - If damage or cracking is visible:
 - Change the rear brake linings. (☞ p. 123)

15.9 Changing the rear brake linings

**Warning**

Skin irritation Brake fluid can cause skin irritation on contact.

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

**Warning**

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

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

**Warning**

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**

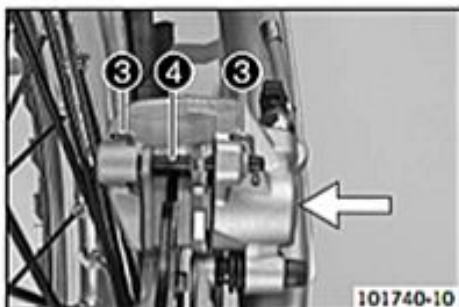
Never use DOT 5 brake fluid! It is silicone-based and purple in color. Oil seals and brake lines are not designed for DOT 5 brake fluid.

Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!

Use only clean brake fluid from a sealed container.



- Stand the vehicle upright.
- Remove screw cap 1 with membrane 2 and the O-ring.



- Manually press the brake caliper to the brake disc to push back the brake piston. Ensure that brake fluid does not flow out of the brake fluid reservoir, extracting it by suction if it does.

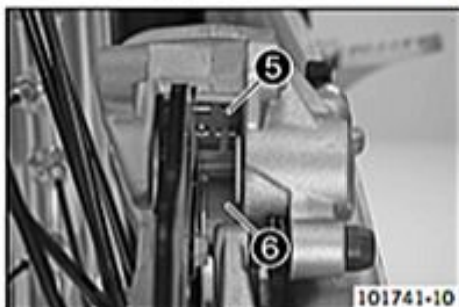
**Info**

Make sure when pushing back the brake piston that you do not press the brake caliper against the spokes.

- Remove cotter pins 3, pull out pin 4, and remove the brake linings.
- Clean the brake caliper and brake caliper support.
- Check that leaf spring 5 in the brake caliper and sliding plate 6 in the brake caliper support are seated correctly.

**Info**

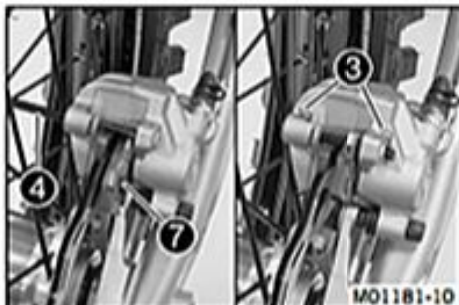
The arrow on the leaf spring points in the rotation direction of the brake disc.



- Insert the new brake linings, insert pin 4, and mount cotter pins 3.

**Info**

Always change the brake linings in pairs.
Make sure that decoupling plate 7 is mounted on the piston side brake lining.



- Operate the foot brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point.

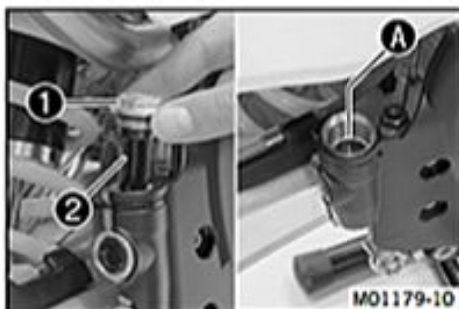
- Add brake fluid to level A.

Brake fluid DOT 4 / DOT 5.1 (☞ p. 226)

- Mount and tighten screw cap 1 with membrane 2 and the O-ring.

**Info**

Clean up overflowed or spilled brake fluid immediately with water.

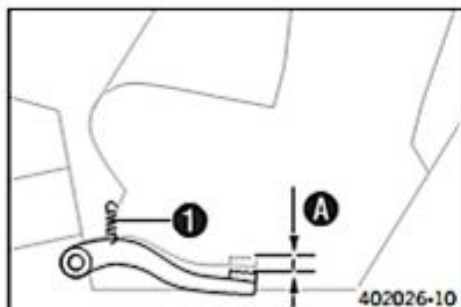


15.10 Checking the free travel of foot brake lever

**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. 125)
- Reconnect spring ①.

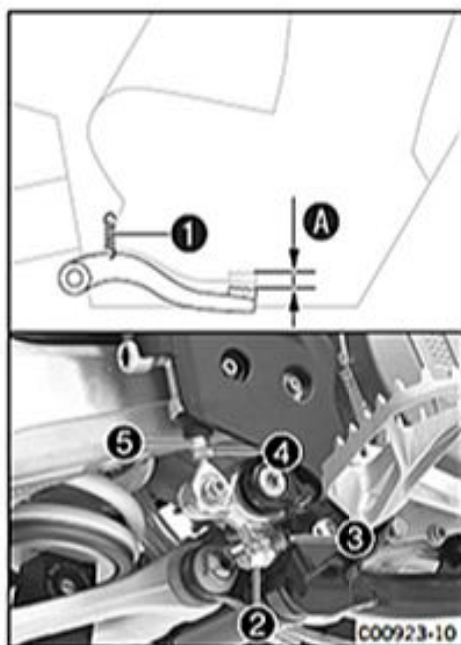
15.11 Adjusting the basic position of the foot brake lever



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 ② and, with push rod ③, turn it back until you have maximum free travel.
- To adjust the basic position of the foot brake lever to individual requirements, loosen nut ④ and turn screw ⑤ accordingly.



Info

The range of adjustment is limited.

- Turn push rod ③ accordingly until you have free travel A. 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 ⑤ and tighten nut ④.

Guideline

Nut, foot brake lever stop	M8	20 Nm (14.8 lbf ft)
----------------------------	----	------------------------

- Hold push rod ③ and tighten nut ②.

Guideline

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

- Attach spring ①.

15.12 Checking the rear brake fluid level



Warning

Danger of accidents Brake system failure.

- If the brake fluid level drops below the specified marking or the specified value, this is an indication that the brake system is leaking or that the brake linings are completely worn down. 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.

Preparatory work

- Check the rear brake linings. (☛ p. 123)

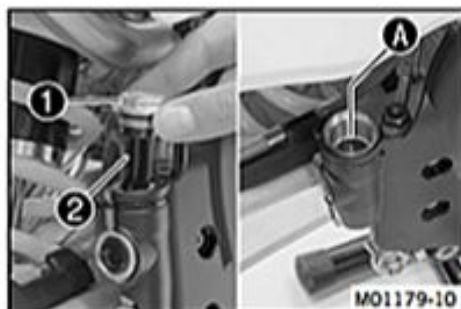
**Main work**

- Stand the vehicle upright.
- Check the brake fluid level in level viewer **1**.
 - If the brake fluid has dropped below marking **A**:
 - Add rear brake fluid. (☞ p. 126)

15.13 Adding rear brake fluid

- Warning**
Danger of accidents Brake system failure.
- If the brake fluid level drops below the specified marking or the specified value, this is an indication that the brake system is leaking or that the brake linings are completely worn down. 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.

- i 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. 123)

Main work

- Stand the vehicle upright.
- Remove screw cap **1** with membrane **2** and the O-ring.
- Add brake fluid to level **A**.

Brake fluid DOT 4 / DOT 5.1 (☞ p. 226)

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

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

15.14 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 ① 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. 231)

Brake fluid DOT 4 / DOT 5.1 (☞ p. 226)

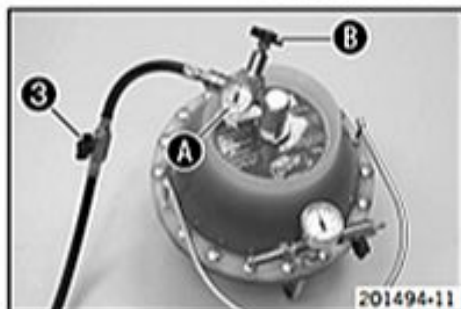


- Mount bleeder cover ②.

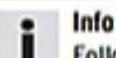
Bleeder cover (00029013006) (☞ p. 230)

- Connect the bleeding device.

Bleeding device (00029013100) (☞ p. 230)



- 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 A. If necessary, adjust the filling pressure at pressure regulator B.

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. 230)

- Open bleeder screw ⑤ 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 ③.

- Open the bleeder screw again until brake fluid stops emerging.


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.
- Add brake fluid to level **C**.

Brake fluid DOT 4 / DOT 5.1 (☞ p. 226)

- Fit and tighten the screw cap with the membrane and O-ring.


Info

Clean up overflowed or spilt brake fluid immediately with water.

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



16.1 Removing the engine

Preparatory work

- Raise the motorcycle with a lift stand. (☞ p. 10)
- Remove the seat. (☞ p. 98)
- Turn handle ❶ of the fuel tap to the **OFF** position.
- Remove the fuel tank. (☞ p. 99)
- Drain the coolant. (☞ p. 200)
- Disassemble the main silencer. (☞ p. 93)

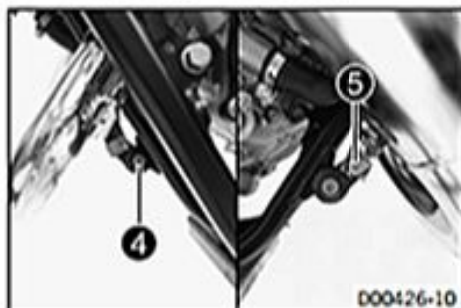
Main work

- Remove springs ❶.

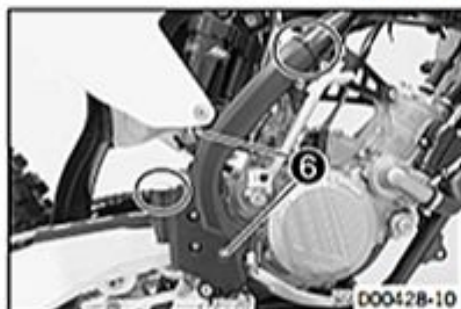
Spring hook (50305017000) (☞ p. 231)



- Loosen screw ❷.
- Remove screw ❸.



- Loosen screw ❹.
- Remove screw ❺.
- Take off the exhaust manifold.



- Remove screws ❻ with the washer.
- Remove the cable tie(s).
- Take off the frame protector.



- Remove screws ❼ with the washer.
- Remove the cable tie(s).
- Take off the frame protector.



- Pull off the air filter box lid in area **A** sideways and remove it toward the front.



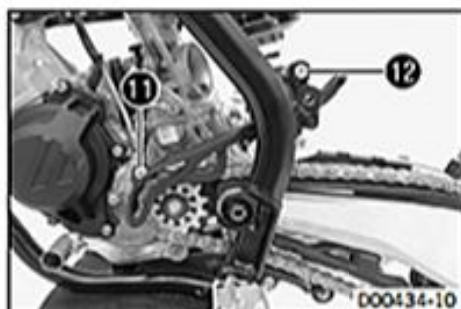
- Loosen screw **8**.
- Remove screw **9**.
- Repeat these steps on the opposite side.



- Remove hose clip **10**.



- Pivot up the subframe and secure it.



- Remove screw **11**.
- Remove screw **12**.
- Take off the engine sprocket cover.



- Remove the cable tie(s) and expose the cable.



- Remove screws 13.
- Take off the slave cylinder of the clutch and hang it to one side.



Info

Do not kink the clutch line.

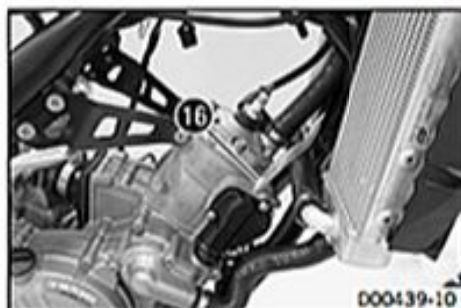
Do not activate the clutch lever while the slave cylinder of the clutch is removed.



- Remove connecting link 14 of the chain.
- Take off the chain.



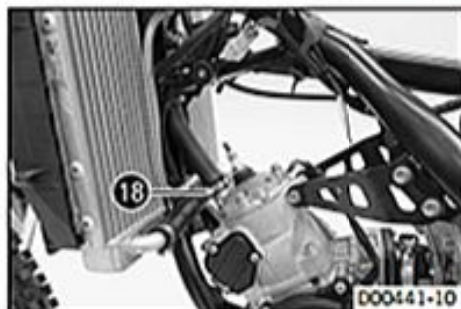
- Pull off spark plug connector 15.



- Detach vent hose 16.



- Disconnect plug-in connector 17.



- Loosen hose clip 18.
- Pull off the radiator hose.



- Loosen hose clip 19.
- Pull off the radiator hose.



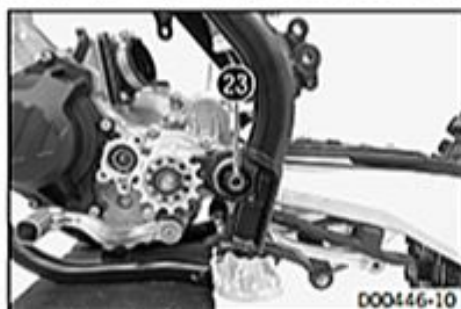
- Remove spring 20.



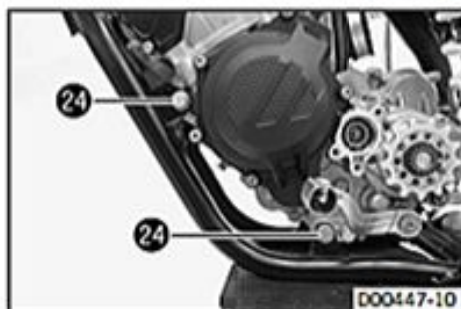
- Remove fittings 21.
- Take off the engine braces.



- Loosen hose clip 22.
- Pull the carburetor rearward out of the intake flange and hang it to one side.



- Remove nut 23.
- Remove the swingarm pivot.
- Pull the swingarm slightly toward the rear.



- Remove screws 24.



- Lift out the engine sideways.

**Info**

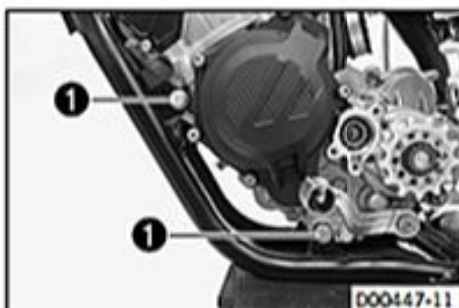
The help of an assistant is useful in this step.
Make sure that the engine is sufficiently secured against falling over.
Protect the frame and attachments against damage.

16.2 Installing the engine**Main work**

- Position the engine in the frame.

**Info**

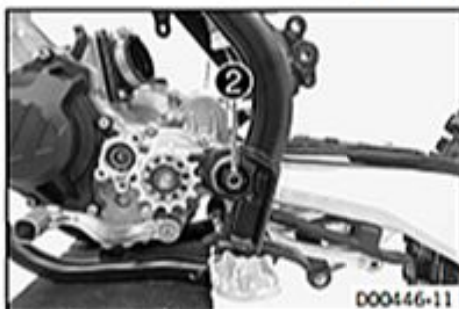
The help of an assistant is useful in this step.
Make sure that the engine is sufficiently secured against falling over.
Protect the frame and attachments against damage.



- Mount screws **1**, but do not tighten yet.

Guideline

Engine bracket screw	M10	60 Nm (44.3 lbf ft)
----------------------	-----	------------------------



- Position the swingarm.
- Mount the swingarm pivot.
- Mount nut **2**, but do not tighten it yet.

Guideline

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



- Mount the carburetor in the intake flange.
- Position and tighten hose clip **3**.



- Position the engine braces.
- Mount and tighten fittings **4**.

Guideline

- Tighten screws **1** and nut **2**.

Guideline

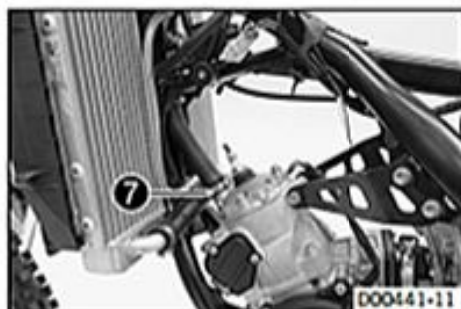
Engine bracket screw	M10	60 Nm (44.3 lbf ft)
Nut, swingarm pivot	M16x1.5	100 Nm (73.8 lbf ft)



- Mount spring 5.



- Mount the radiator hose.
- Position and tighten hose clip 6.



- Mount the radiator hose.
- Position and tighten hose clip 7.



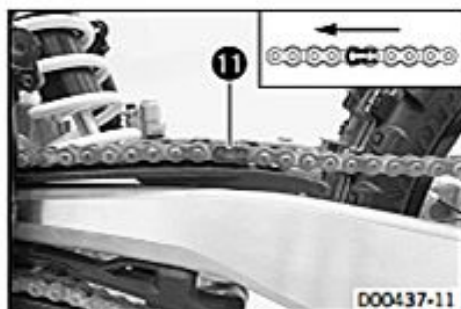
- Connect plug-in connector 8.



- Mount vent hose 9.



- Mount spark plug connector 10.



- Mount the chain.
- Connect the chain with connecting link 11.



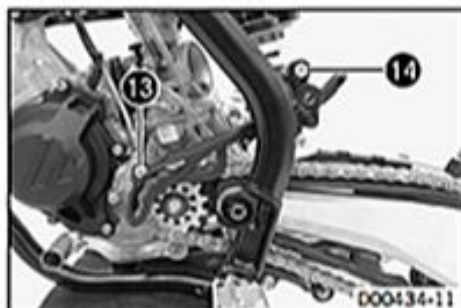
- Position the clutch slave cylinder with the gasket.
- Mount and tighten screws 12.

Guideline

Clutch slave cylinder screw	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
-----------------------------	----	-----------------------	---------------



- Route the cable without tension and secure with cable tie(s).



- Position the engine sprocket cover.
- Mount and tighten screw 13.

Guideline

Clutch slave cylinder screw	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
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- Mount and tighten screw 14.

Guideline

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



- Mount hose clip 15.



- Remove the fixation and position the subframe.



Info

Watch out for the intake flange.

- Mount and tighten screw 16.

Guideline

Screw, subframe	M8	35 Nm (25.8 lbf ft)	Loctite® 2701™
-----------------	----	------------------------	----------------

- Remove screw 17.
- Mount and tighten screw 17.

Guideline

Screw, subframe	M8	35 Nm (25.8 lbf ft)	Loctite® 2701™
-----------------	----	------------------------	----------------

- Repeat these steps on the opposite side.
- Insert the air filter box lid into rear area A and clip it into front area B.

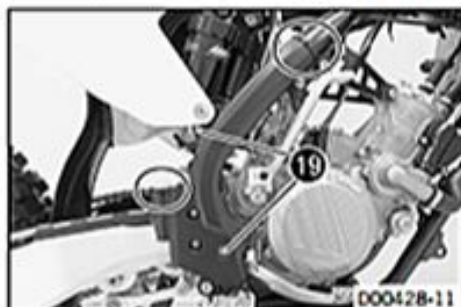


- Position the frame protector.
- Mount and tighten screw 18 with the washer.

Guideline

Screw, frame protector	M5	3 Nm (2.2 lbf ft)
------------------------	----	-------------------

- Mount the cable tie(s).



- Position the frame protector.
- Mount and tighten screw 19 with the washer.

Guideline

Screw, frame protector	M5	3 Nm (2.2 lbf ft)
------------------------	----	-------------------

- Mount the cable tie(s).



- Position and tighten hose clip 15.



- Position the exhaust manifold.
- Mount springs 20.

Spring hook (50305017000) (☞ p. 231)



- Mount and tighten screw 21.

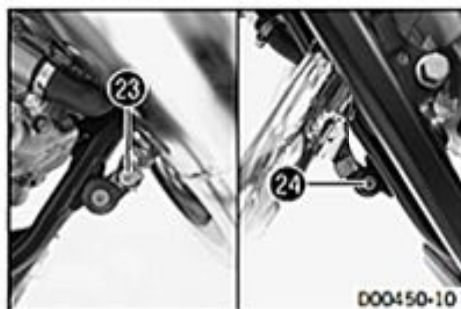
Guideline

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

- Tighten screw 22.

Guideline

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



- Mount and tighten screw 23.

Guideline

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

- Tighten screw 24.

Guideline

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

- Install the main silencer. (☞ p. 93)

- Install the fuel tank. (☞ p. 100)

- Remove screw cap 25 and fill up with gear oil.

Gear oil	0.80 l (0.85 qt.)	Engine oil (15W/50) (☞ p. 226)
----------	-------------------	--------------------------------

- Mount and tighten screw cap 25.

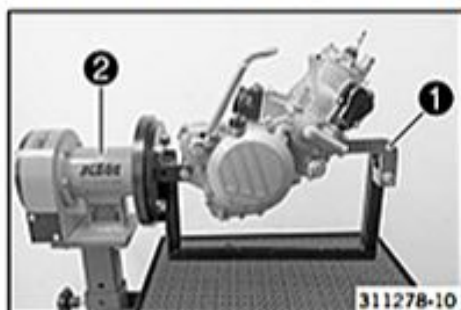


Finishing work

- Remove the motorcycle from the lift stand. (☞ p. 10)
- Refill with coolant. (☞ p. 200)
- Go for a short test ride.
- Check the engine for leak tightness.
- Check the gear oil level. (☞ p. 203)
- Check the coolant level. (☞ p. 199)

16.3 Engine disassembly

16.3.1 Clamping the engine into the engine work stand

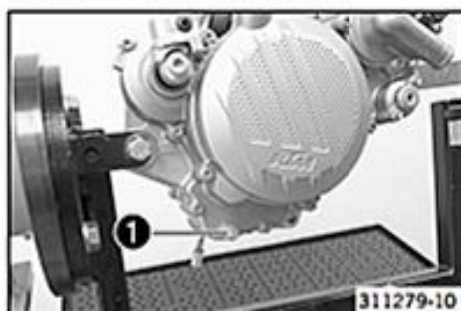


- Mount special tool 1 on engine work stand 2.

Engine assembly stand (61229001000) (☞ p. 234)
Engine fixing arm (50429002020) (☞ p. 231)

- Mount the engine on special tool 1.

16.3.2 Draining the gear oil

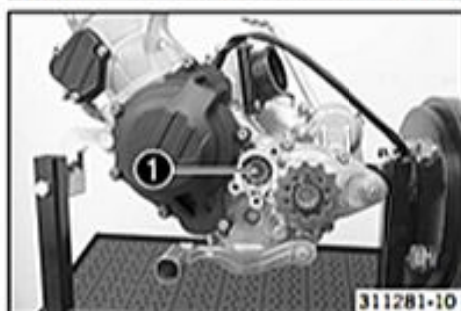


- Remove gear oil drain plug **1** with the seal ring.



- Remove gear oil drain plug **2** with the magnet and seal ring.
- Let the gear oil drain fully.

16.3.3 Removing the clutch push rod



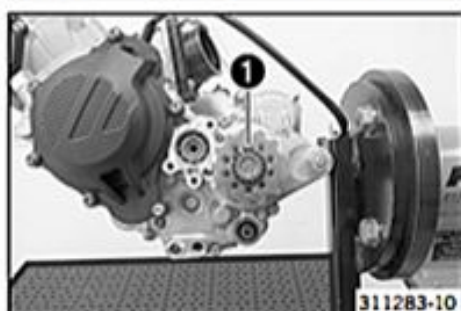
- Remove clutch push rod **1**.

16.3.4 Removing the shift lever



- Remove screw **1** with the washers. Take off the shift lever.

16.3.5 Removing the engine sprocket

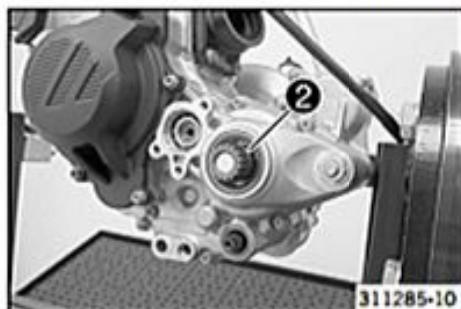


- Remove lock ring **1**. Take off the engine sprocket.

16.3.6 Removing the spacer

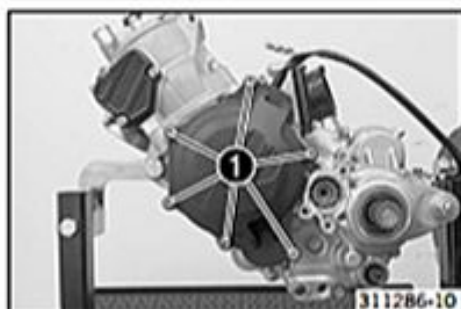


- Remove spacer **1**.



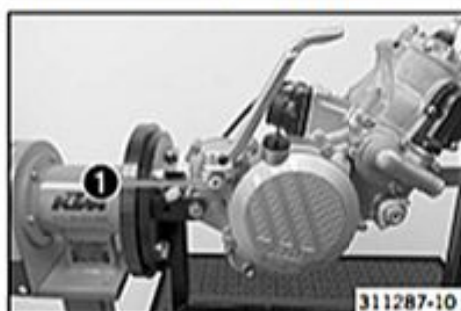
- Take off O-ring **2**.

16.3.7 Removing the alternator cover



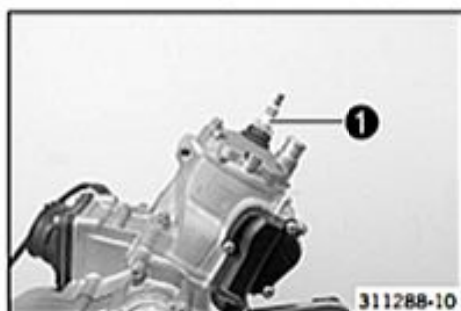
- Remove screws **1**. Take off the alternator cover.

16.3.8 Removing the kick starter



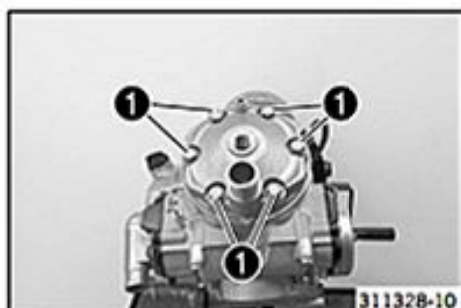
- Remove screw **1** with the washer.
- Remove the kick starter.

16.3.9 Removing the spark plug

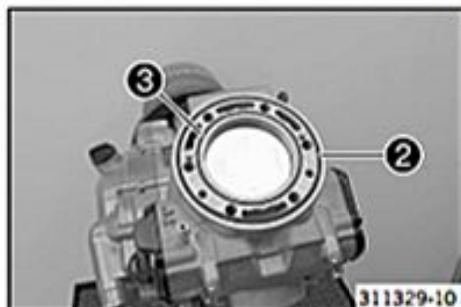


- Remove spark plug **1**.

16.3.10 Removing the cylinder head

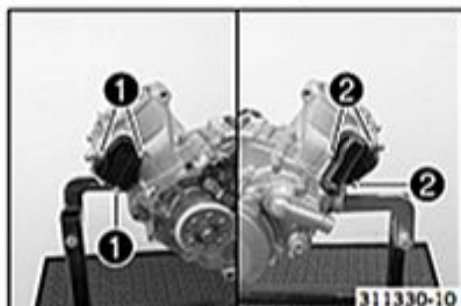


- Alternately loosen screws 1 and remove them.
- Take off the cylinder head and combustion chamber liner.

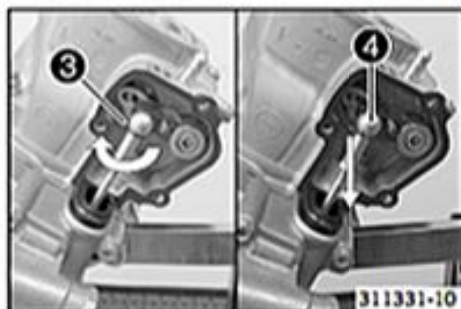


- Remove O-rings 2 and 3.

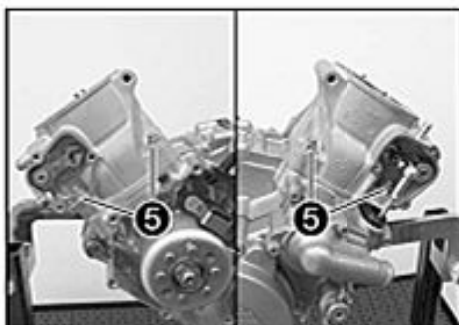
16.3.11 Removing the cylinder



- Remove screws 1 and 2.
- Take off both covers.



- Remove retainer 3 of ball socket 4.
- Pull off the ball socket.
- Remove the gaskets on both sides.

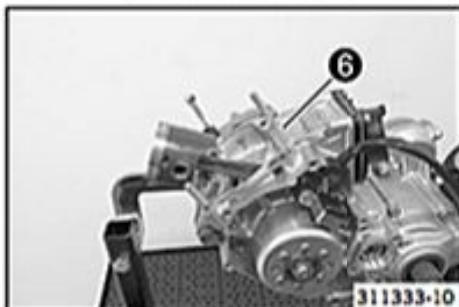


- Remove nuts ⑤.

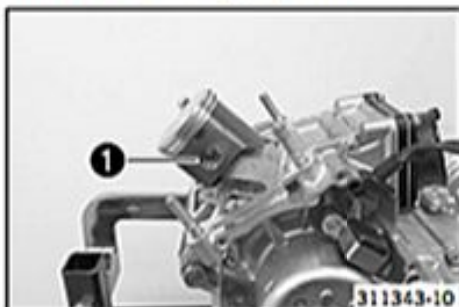
**Info**

Raise the cylinder slightly to be able to remove the front nuts.

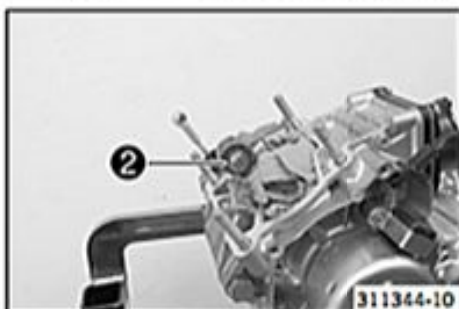
- Carefully slide the cylinder up and take it off.



- Take off gasket ⑥.

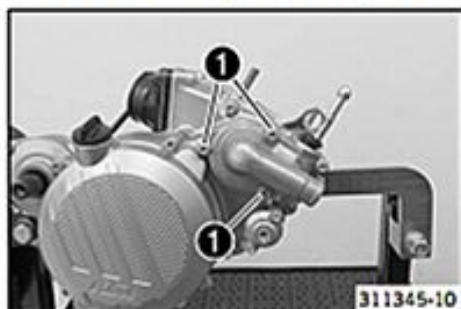
16.3.12 Removing the piston

- Uncover the crankcase.
- Remove piston ring lock ①.
- Remove the piston pin.
- Take off the piston.



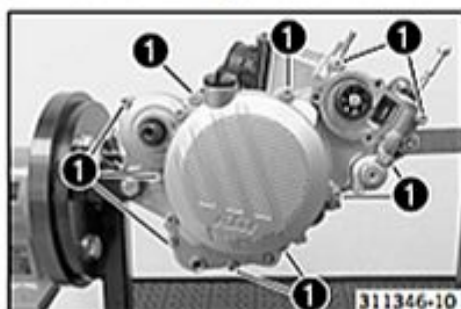
- Remove upper conrod bearing ②.

16.3.13 Removing the water pump cover



- Remove screws ①.
- Take off the water pump cover.
- Remove the form ring.

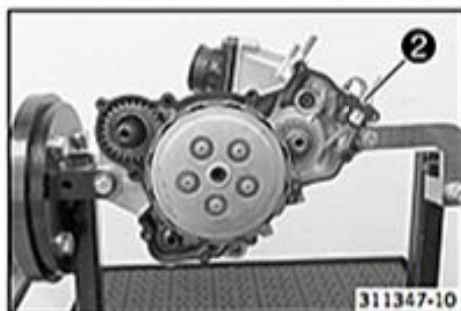
16.3.14 Removing the clutch cover



- Remove screws ①. Take off the clutch cover.

**Info**

Ensure that the kick starter shaft remains in the engine case.

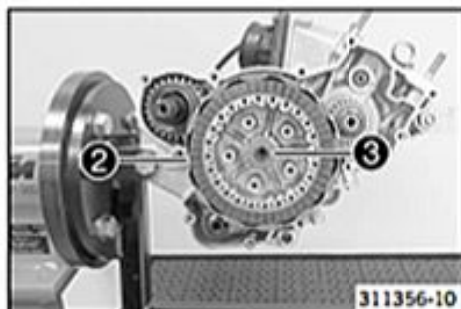


- Remove the dowels and clutch cover gasket ②.

16.3.15 Removing the clutch discs

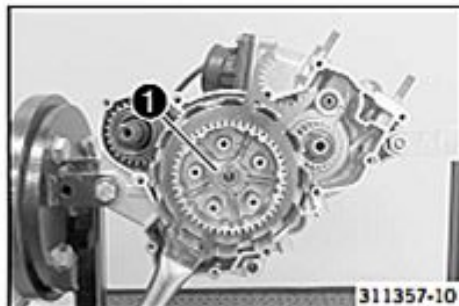


- Loosen screws ① in a crisscross pattern and remove with the washers and springs.
- Take off the pressure cap.



- Completely remove clutch discs ②.
- Remove pressure piece ③.

16.3.16 Removing the clutch basket



- Bend up the lock washer.
- Hold the inner clutch hub with the special tool. Loosen nut **1**.

Clutch holder/primary gear holder (50429003000) (☞ p. 232)

- Remove the nut with the lock washer.

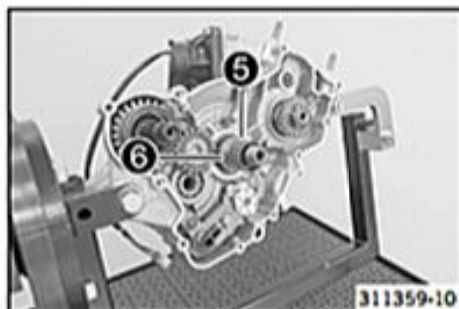


- Take off inner clutch hub **2** and washer **3**.

**Info**

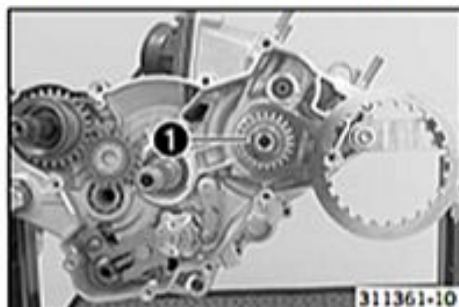
The washer usually sticks to the inner clutch hub.

- Take off clutch basket **4**.



- Take off needle bearing **5** and collar bushing **6**.

16.3.17 Removing the primary gear



- Position the special tool.
- Hold the primary gear using the special tool.

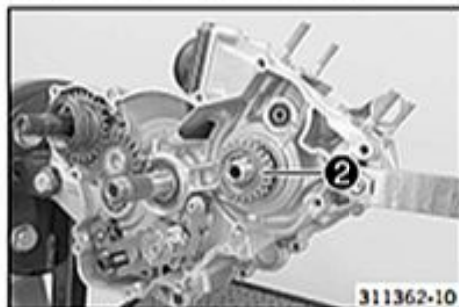
Clutch holder/primary gear holder (50429003000) (☞ p. 232)

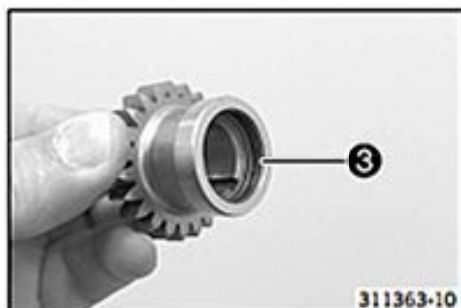
- Remove nut **1** with the washer.

**Info**

Left-handed thread!

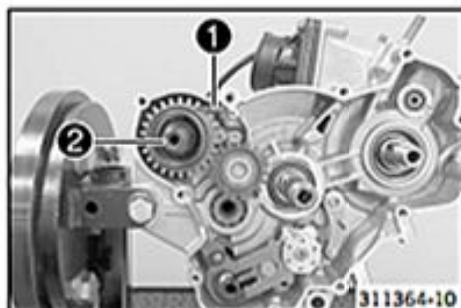
- Remove primary gear **2**.





- Remove O-ring ③.

16.3.18 Removing the kick starter shaft



- Detach kick starter spring ①.
- Remove kick starter shaft ②.



Info

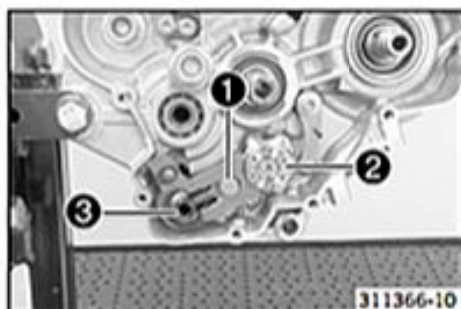
Turn the kick starter shaft slightly to the left.

16.3.19 Removing the intermediate kick starter gear



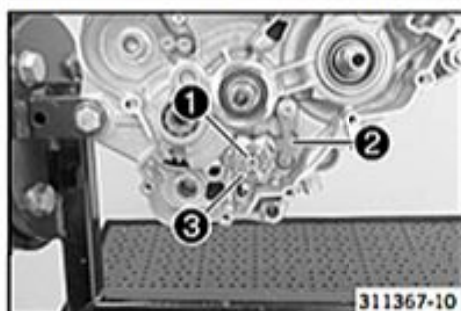
- Remove intermediate kick starter gear ①.

16.3.20 Removing the shift shaft



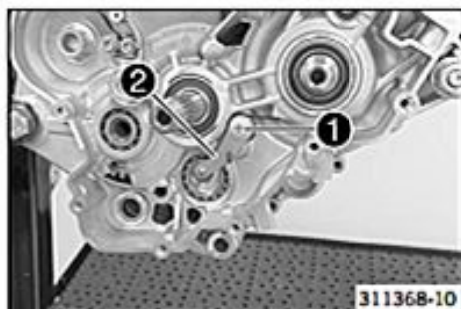
- Push sliding plate ① away from the shift drum locating unit ②. Remove shift shaft ③ with the washer.

16.3.21 Removing the shift drum locating unit



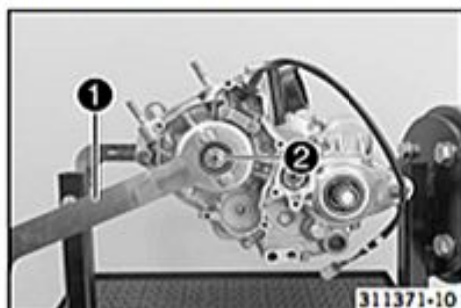
- Remove screw ①.
- Push away locking lever ② from shift drum locating unit ③ and remove the shift drum locating unit.
- Relieve tension from the locking lever.

16.3.22 Removing the locking lever

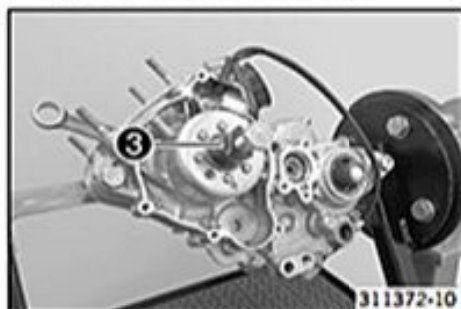


- Remove screw ①.
- Take off locking lever ② with the sleeve and spring.

16.3.23 Removing the rotor



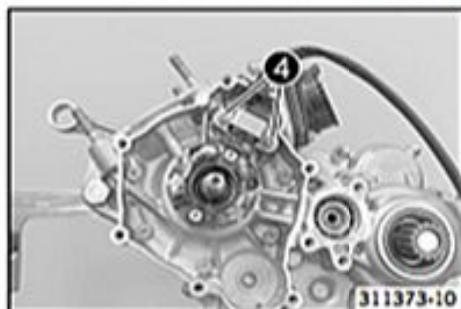
- Hold the rotor with special tool ①.
- Holding spanner (54629012200) (☛ p. 233)
- Remove nut ② and washer.



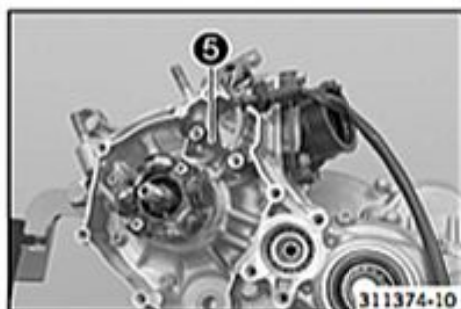
- Mount special tool ③, apply counterpressure, and pull off the rotor by screwing in the screw.

Extractor (54629009044) (☛ p. 233)

i Info
Left-handed thread!



- Remove screws ④.
- Take off the holding bracket.
- Pull the cable sleeve out of the engine case.
- Hang the crankshaft position sensor to one side.

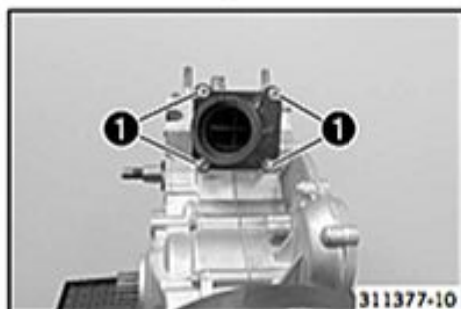


- Take off spacer element ⑤.



- Remove screws ⑥.
- Take off the stator with the crankshaft position sensor.

16.3.24 Removing the reed valve housing

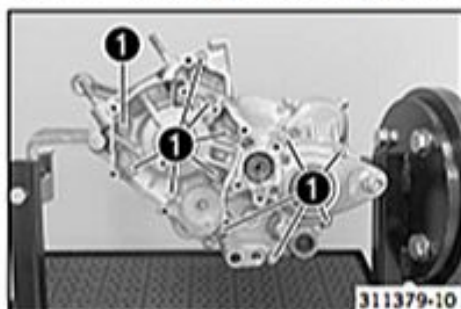


- Remove screws ①.
- Take off intake flange and gasket.



- Remove reed valve housing ②.
- Take off the gasket.

16.3.25 Removing the left engine case section

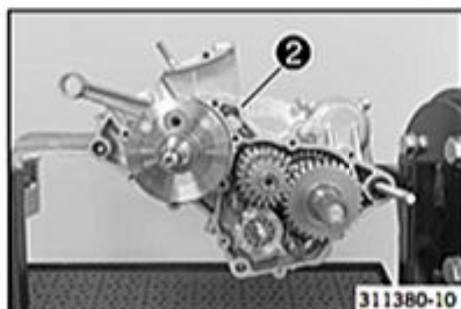


- Remove screws ①.
- Tilt the left section of the engine case upward and remove the fitting of the engine fixing arm.
- Loosen the left section of the engine case by striking it lightly with a plastic hammer and remove it.



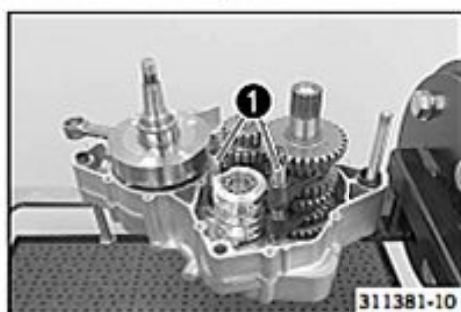
Info

Do not pry it apart with screwdrivers since the sealing areas are easily damaged.



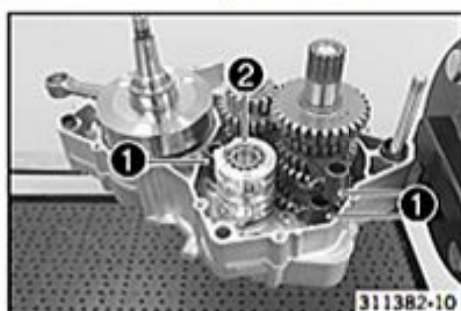
- Remove engine case gasket ②.

16.3.26 Removing the shift rails



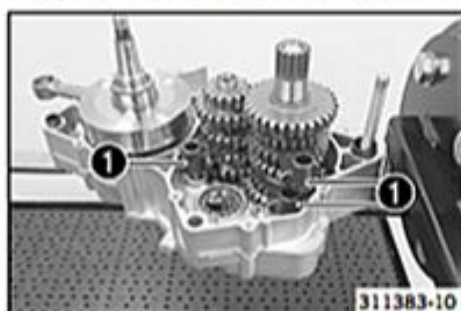
- Remove shift rails **1** with the springs.

16.3.27 Removing the shift drum



- Tilt shift forks **1** to the side.
- Remove shift drum **2**.

16.3.28 Removing the shift forks

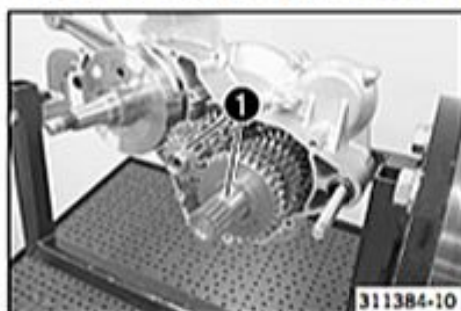


- Remove shift forks **1**.

**Info**

Do not misplace the shift rollers.

16.3.29 Removing the transmission shafts

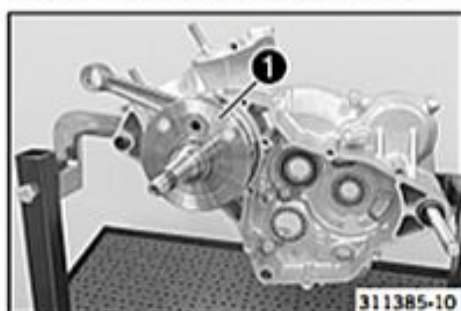


- Pull both transmission shafts **1** out of the bearing seats together.

**Info**

The stop disks of the transmission shafts usually stick to the bearings.

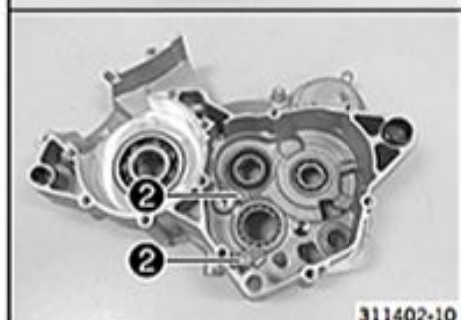
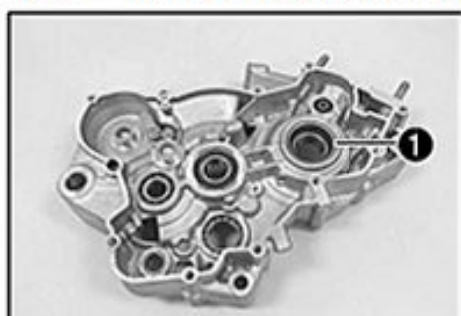
16.3.30 Removing the crankshaft



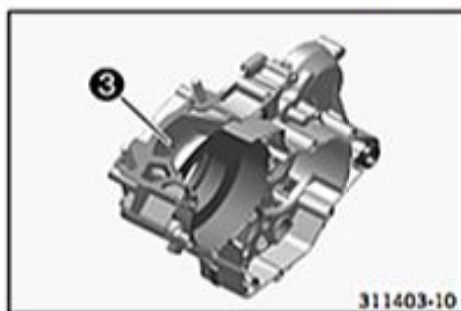
- Take out crankshaft **1**.

16.4 work on individual parts

16.4.1 Working on the right section of the engine case

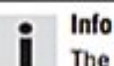


311402-10



311403-10

- Remove all dowels.
- Remove shaft seal ring **1** of the crankshaft.
- Remove screws **2**. Remove the bearing retainers.
- Clean the engine case section thoroughly.

**Info**

The gearbox main shaft is a lifetime bearing.

When cleaning the right housing half, the gearbox main shaft must be replaced as lubrication cannot be guaranteed due to cleaning agent ingress.

- Warm the engine case section in an oven.

Guideline

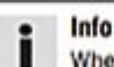
180 °C (356 °F)

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

**Info**

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

- Blow out lubrication bore **3** with compressed air and check that it is clear.
- Insert the new cold bearings in the bearing seats of the heated section of the engine case; if necessary, use a suitable press drift to push them all the way in and make them flush.

**Info**

When pressing the bearing in, ensure that the engine case section is level to prevent damage.

Only press the bearings in via the outer ring; otherwise, the bearings will be damaged when they are pressed in.

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

**Info**

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

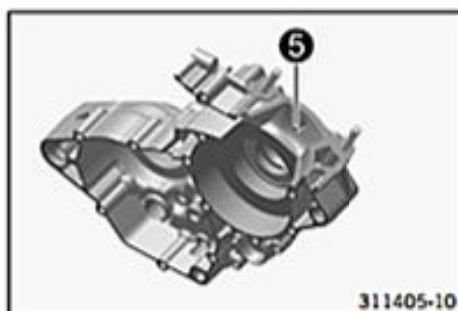
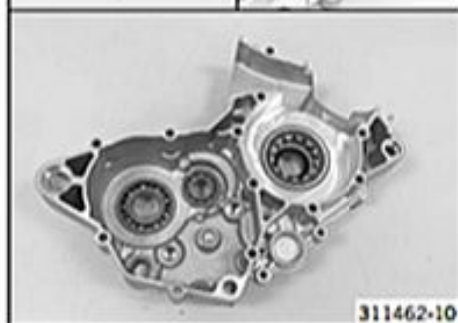
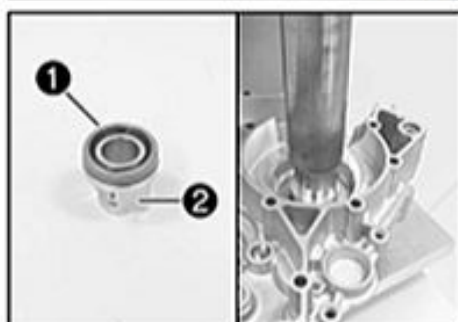
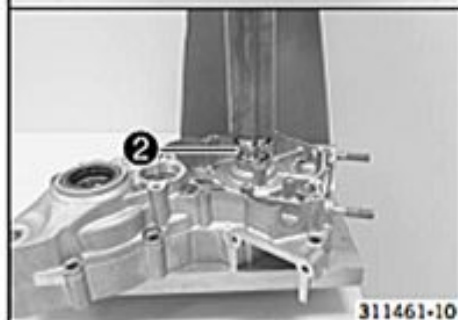
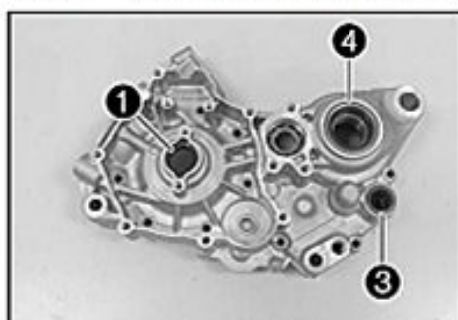
- Press in shaft seal ring **1** of the crankshaft so it is flush with the open side facing in.
- Mount and tighten screws **2** with the bearing retainers.

Guideline

Screw, bearing retainer	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
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- Mount the dowels.

16.4.2 Working on the left section of the engine case



- Remove all dowels.
- Press shaft seal ring 1 of the crankshaft from the outside to the inside using special tool 2.

Pressing tool, shaft seal ring on crankshaft (50429005000) (p. 232)

- Remove shaft seal ring 3 of the shift shaft and 4 of the countershaft.
- Clean the engine case section thoroughly.
- Warm the engine case section in an oven.

Guideline

180 °C (356 °F)

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



Info

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

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



Info

When pressing the bearing in, ensure that the engine case section is level to prevent damage.

Only press the bearings in via the outer ring; otherwise, the bearings will be damaged when they are pressed in.

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



Info

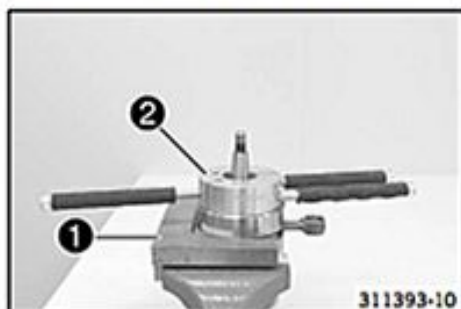
If the bearings are not firmly seated after cooling, it is likely that they will rotate in the engine case when warm. In this case, the engine case must be renewed.

- Position shaft seal ring 1 of the crankshaft on special tool 2.

Pressing tool, shaft seal ring on crankshaft (50429005000) (p. 232)

- Press the shaft seal ring on the crankshaft from the inside toward the outside, with the open side facing inward.
- Press in shaft seal ring 3 of the shift shaft so it is flush with the open side facing in.
- Press in shaft seal ring 4 of the countershaft so it is flush with the open side facing in.
- Blow out lubrication bore 5 with compressed air and check that it is clear.
- Mount the dowels.

16.4.3 Removing the crankshaft bearing inner race



- Fixate the crankshaft in the vice with special tool ①.

Press-out plate (50329047051) (☞ p. 231)

**Info**

Use soft jaws.

- Warm up special tool ②.

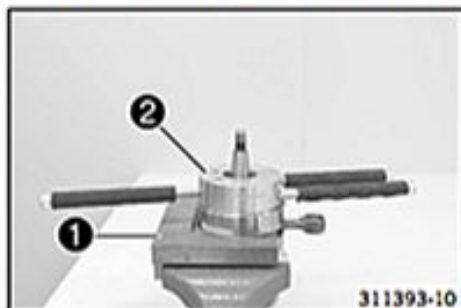
Guideline

180 °C (356 °F)

Tool for inner bearing race (58429037040) (☞ p. 233)

- Push the warmed up special tool ② onto the crankshaft bearing inner race, press firmly together, and pull jointly from the crankshaft.

16.4.4 Installing the crankshaft bearing inner race



- Fixate the crankshaft in the vice with special tool ①.

Press-out plate (50329047051) (☞ p. 231)

**Info**

Use soft jaws.

- Heat the crankshaft bearing inner race in special tool ② and mount together.

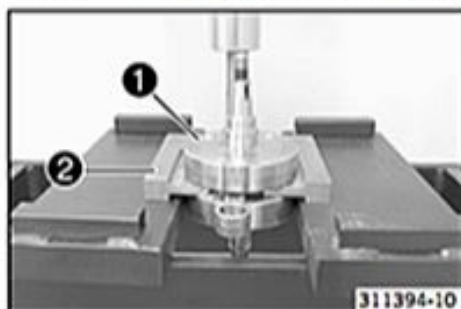
Guideline

120 °C (248 °F)

Tool for inner bearing race (58429037040) (☞ p. 233)

- Ensure that the new crankshaft bearing inner race is flush.

16.4.5 Changing the connecting rod, conrod bearing, and crank pin

**Main work**

- Position crankshaft ① in the press using special tool ②.

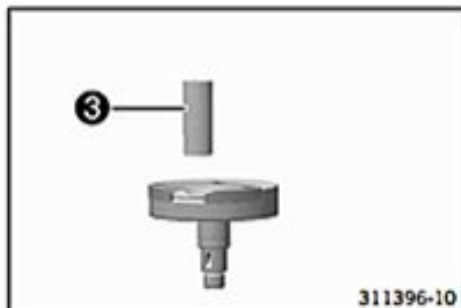
Press-out plate (50329047051) (☞ p. 231)

- Press the crank pin out of the upper crankweb with a suitable tool.

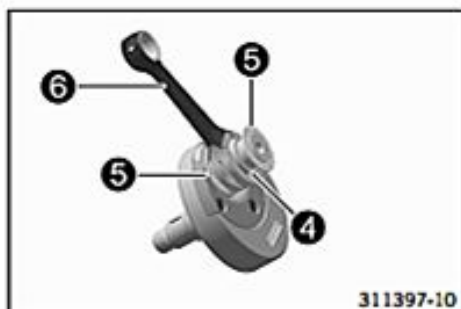
**Info**

Hold the lower crankweb.

- Remove the connecting rod and bearing.
- Press the crank pin out of the lower crankweb.



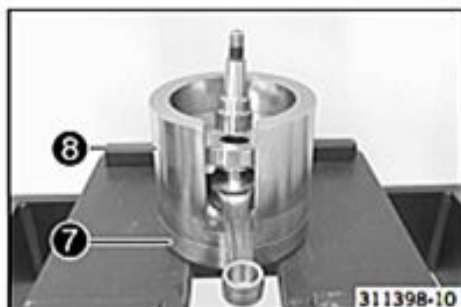
- Lubricate the new crank pin ③ and push in up to the stop.



- Mount new bearing 4 with washers 5 and connecting rod 6.

**Info**

Thoroughly oil the bearing.

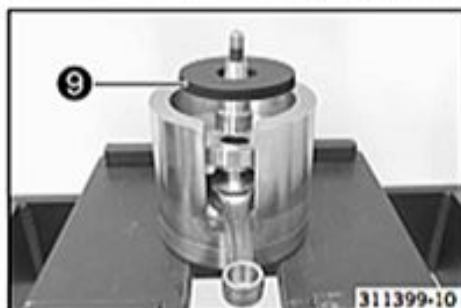


- Mount anchor plate 7 on special tool 8, and position on the press.

Pressing device, crankshaft, complete (50329047000) (☞ p. 231)

Bushing, crankshaft pressing device (50429047001) (☞ p. 232)

- Insert the crankweb with the connecting rod and bearing. Position the second crankweb.



- Position special tool 9 with the heel pointing down.

Cover, crankshaft pressing device (50429047003) (☞ p. 232)

- Press in the upper crankweb as far as possible.

**Info**

The press mandrel must be positioned over the crank pin.

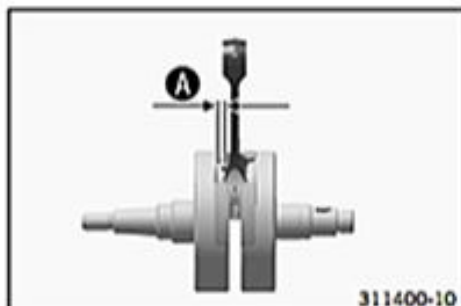
- Take the crankshaft out of the special tool and check that the connecting rod can move freely.

- Measure axial play A between the connecting rod and the crankwebs using the special tool.

Feeler gauge (59029041100) (☞ p. 234)

Connecting rod - axial play of lower conrod bearing	0.45... 0.75 mm (0.0177... 0.0295 in)
---	---------------------------------------

- If the measured value is less than the specification:
 - Correct it so the dimension is equal to the specified value.

**Finishing work**

- Check the crankshaft run-out at the bearing pin. (☞ p. 151)

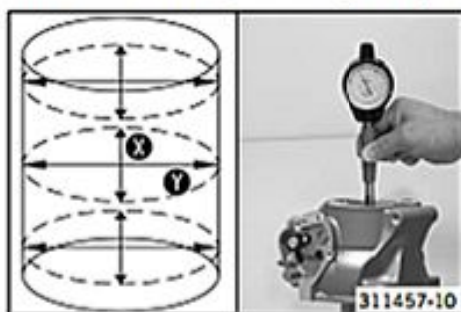
16.4.6 Checking the crankshaft run-out at the bearing pin

- 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	≤ 0.03 mm (≤ 0.0012 in)
-------------------------------------	-------------------------

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

16.4.7 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.

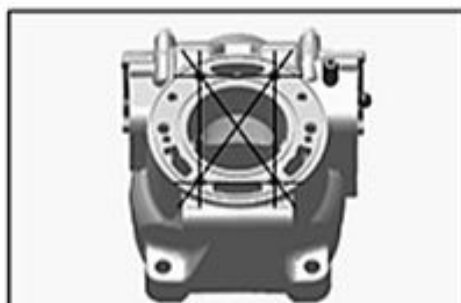
Guideline

Cylinder - drill hole diameter (All 125 models)	
Size I	54.000... 54.012 mm (2.12598... 2.12645 in)
Size II	54.012... 54.025 mm (2.12645... 2.12696 in)
Cylinder - drill hole diameter (All 150 models)	
Size I	56.000... 56.012 mm (2.20472... 2.20519 in)
Size II	56.012... 56.025 mm (2.20519... 2.2057 in)



Info

The cylinder size **1** is labeled on the back of the cylinder.



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

Feeler gauge (59029041100) (☞ p. 234)

Cylinder/cylinder head - distortion of sealing area	≤ 0.10 mm (≤ 0.0039 in)
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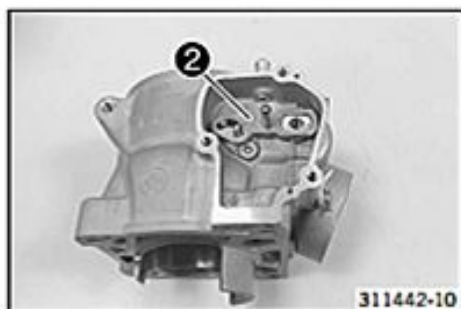
- If the measured value does not meet specifications:
 - Change the cylinder.



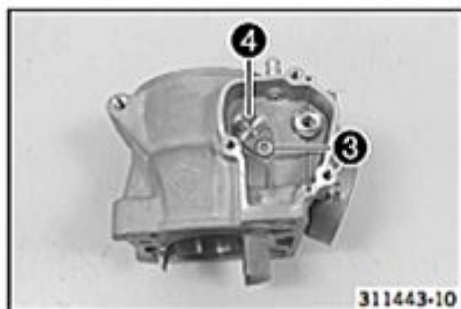
16.4.8 Removing the exhaust control



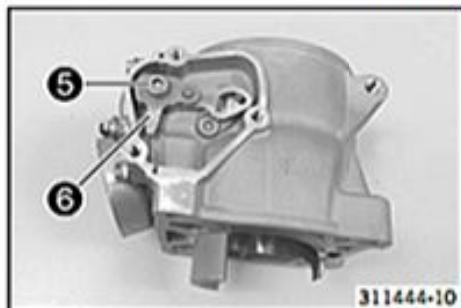
- Remove screw **1** with bushing, spring, and washer.
- Take off the adjusting lever.



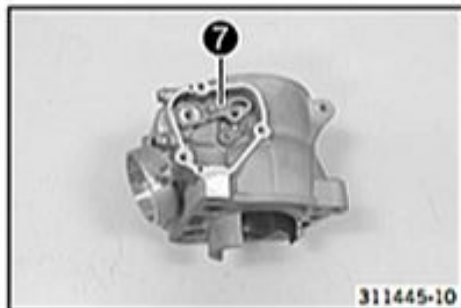
- Remove control gate 2.



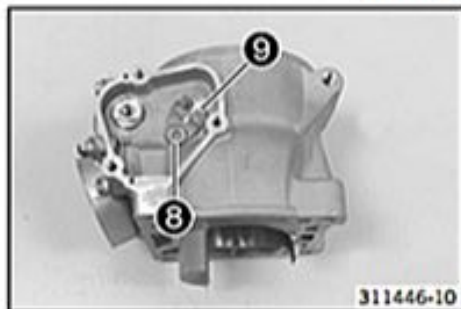
- Remove screw 3 and take off retaining bracket.
- Remove control shaft 4.



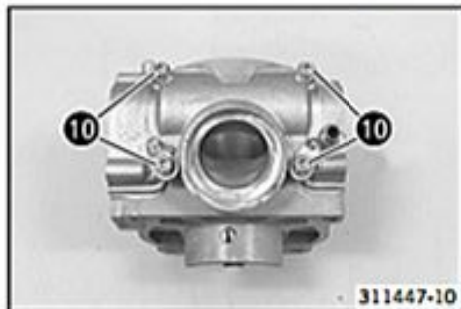
- Remove screw 5.
- Take off stop plate 6.



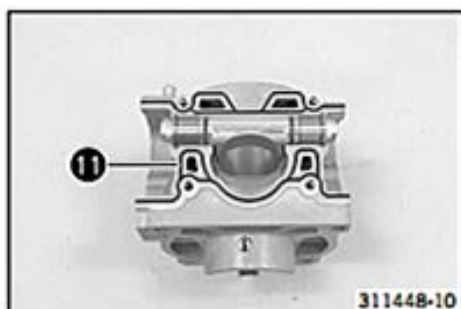
- Take off control gate 7.



- Remove screws 8.
- Remove control shaft 9.

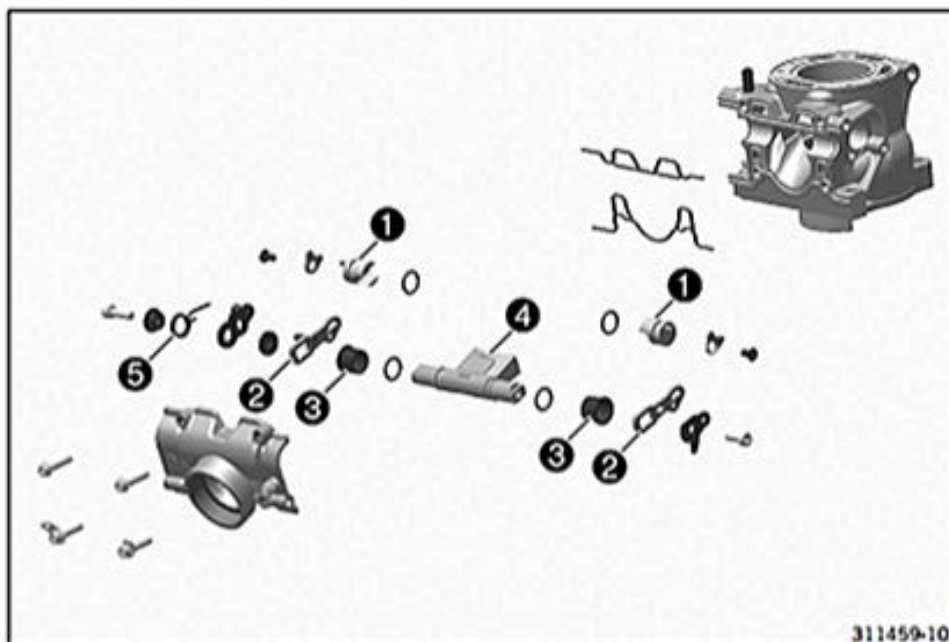


- Remove screws 10.
- Take off the exhaust flange.



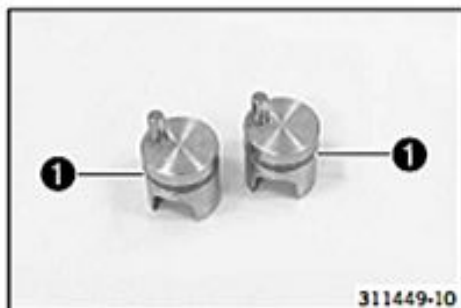
- Remove form ring **11**.
- Take off the control flap.

16.4.9 Checking the exhaust control



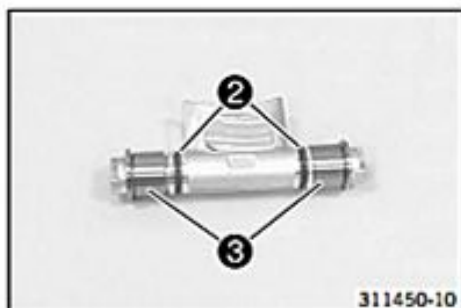
- Check control shafts **1** for damage and wear.
 - If there is damage or wear:
 - Change the control shaft.
- Check control gate **2** for damage and wear.
 - If there is damage or wear:
 - Change the gear segments.
- Check bearing sleeves **3** for damage and wear.
 - If there is damage or wear:
 - Change the bearing sleeves.
- Check control flap **4** for damage and wear.
 - If there is damage or wear:
 - Change the control flap.
- Check spring **5** for damage and wear.
 - If there is damage or wear:
 - Change the spring.

16.4.10 Installing the exhaust control



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

Long-life grease (☛ p. 228)



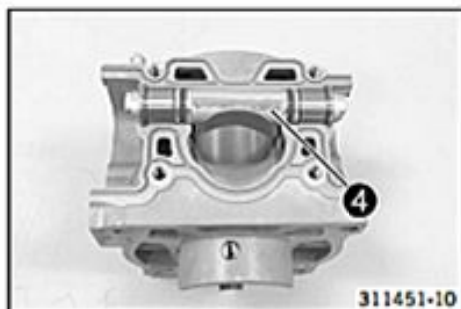
311450-10

- Mount and grease O-rings ②.

Long-life grease (☛ p. 228)

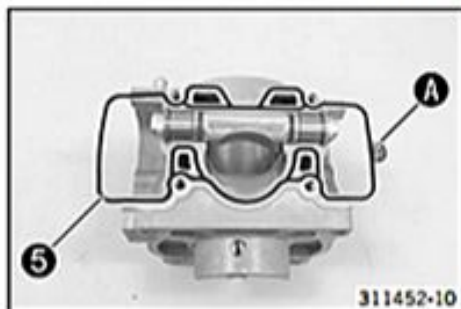
- Mount and grease bearing sleeves ③.

Long-life grease (☛ p. 228)



311451-10

- Position control flap ④.



311452-10

- Mount form ring ⑤.

✓ The TOP marking A faces the front.



311453-10

- Position the exhaust flange.

- Mount and tighten screws ⑥.

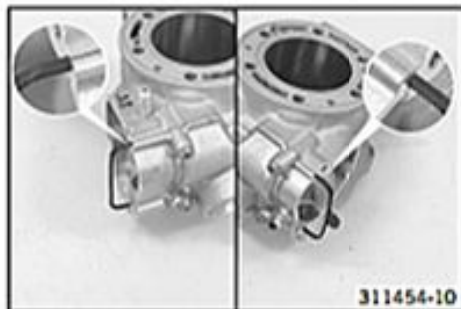
Guideline

Screw, exhaust flange	M6	10 Nm (7.4 lbf ft)
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Info

Do not forget the spring hangers.



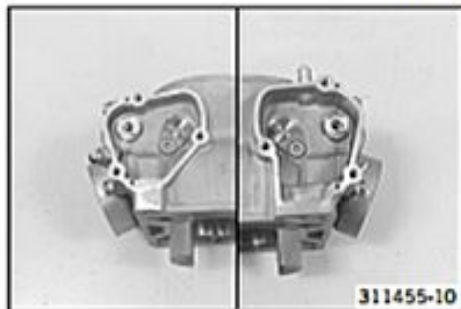
311454-10

- Cut off the form ring at the sealing surfaces.



Info

Do not pull on the form ring as the form ring will otherwise be too short. The form ring should protrude by approx. 1 millimeter after cutting. Use cable cutters for cutting.



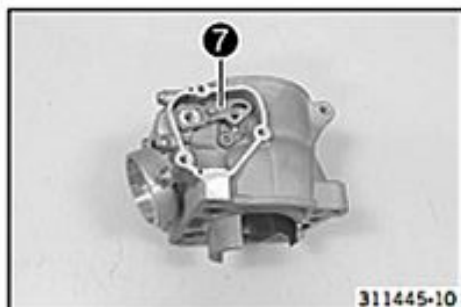
311455-10

- Mount the control shafts.

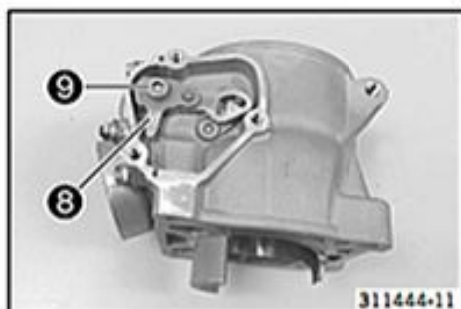
- Position the retaining brackets; mount and tighten the screws.

Guideline

Screw, retaining bracket, rotary valve	M5	6 Nm (4.4 lbf ft)
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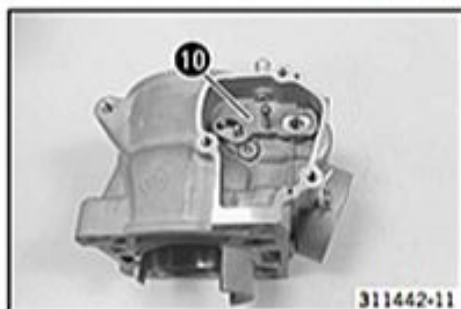
- Position control gate 7.



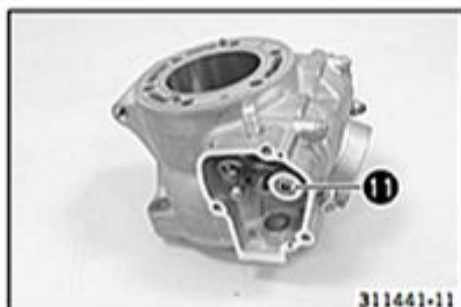
- Position stop plate 8.
- Mount and tighten screw 9.

Guideline

Screw, stop plate of exhaust control	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
--------------------------------------	----	-----------------------	---------------



- Position control gate 10.



- Position the adjusting lever.
- Position the spring with the short leg toward the outside.
- Mount screw 11 with the bushing, spring, and washer, but do not tighten yet.

Guideline

Screw, control flap, exhaust control	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
--------------------------------------	----	-----------------------	---------------

- Attach the spring to the cylinder pin.
- Tighten the screw.

Guideline

Screw, control flap, exhaust control	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
--------------------------------------	----	-----------------------	---------------

16.4.11 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.

16.4.12 Checking/measuring the piston



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

**Tip**

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

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

**Info**

Mount the piston ring with the marking facing upward.

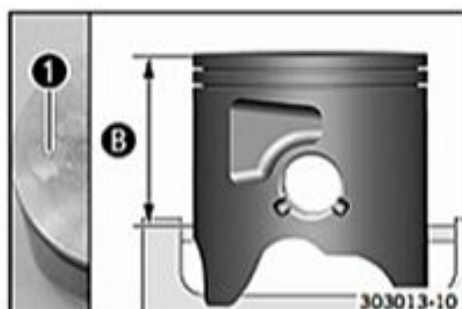
- Check the piston pins for discoloration or signs of wear.
 - If the piston pin shows severe discoloration/signs of wear:
 - Change the piston pin.
- Place the upper conrod bearing and piston pin in the connecting rod and check the seating for play.
 - If the piston pin seating has excessive play:
 - Change the connecting rod, conrod bearing, and crank pin.
- Measure the piston at the piston skirt, at right angles to the piston pin, at a distance **B**.

Guideline

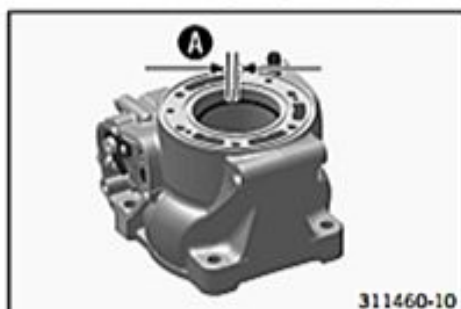
Distance B	50 mm (1.97 in)
Piston - diameter (All 125 models)	
Size I	53.935... 53.945 mm (2.12342... 2.12381 in)
Size II	53.945... 53.955 mm (2.12381... 2.12421 in)
Piston - diameter (All 150 models)	
Size I	55.935... 55.945 mm (2.20216... 2.20255 in)
Size II	54.945... 54.955 mm (2.16318... 2.16358 in)

**Info**

Piston dimensions **1** are marked on the piston head.



16.4.13 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 end gap **A** with a feeler gauge.

Guideline

Piston ring - end gap	
Ring 1	≤ 0.40 mm (≤ 0.0157 in)
Ring 2	≤ 0.40 mm (≤ 0.0157 in)

- If the end gap is greater than the specified value:
 - Check/measure the cylinder. (☛ p. 152)

- If cylinder wear lies within the specified tolerance:
 - Change the piston ring.
- Mount the piston ring with the marking facing toward the piston head.

16.4.14 Measuring the piston/cylinder mounting clearance



- Check/measure the cylinder. (☛ p. 152)
- Check/measure the piston. (☛ p. 157)
- 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.

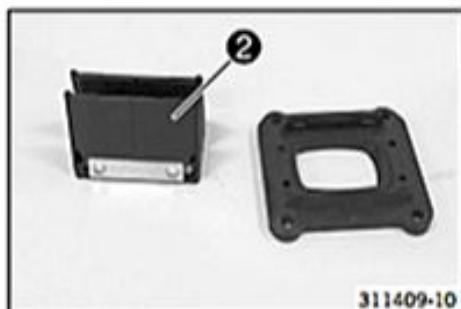
Guideline

Piston/cylinder - mounting clearance (All 125 models)	
New condition	0.050... 0.080 mm (0.00197... 0.00315 in)
Wear limit	0.10 mm (0.0039 in)
Piston/cylinder - mounting clearance (All 150 models)	
New condition	0.050... 0.085 mm (0.00197... 0.00335 in)
Wear limit	0.10 mm (0.0039 in)

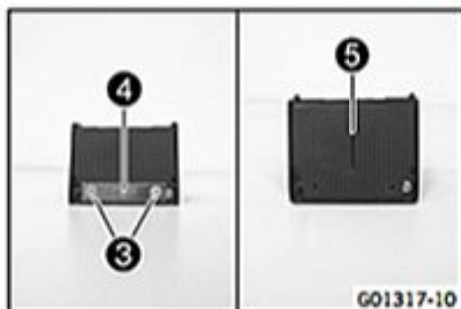
16.4.15 Disassembling the reed valve housing



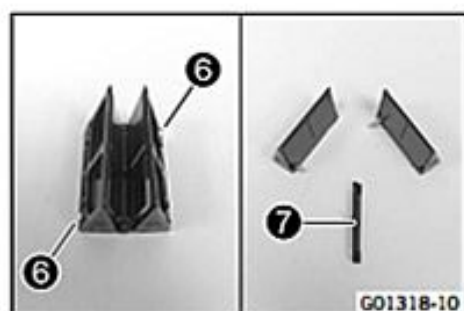
- Remove screws ①.



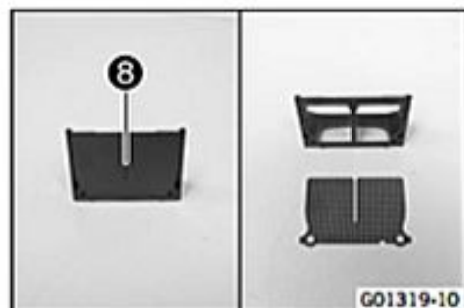
- Remove the reed valve housing ② from the support plate.



- Remove screws ③ on both sides.
- Take off clamping plate ④ on both sides.
- Remove the outer reed valve ⑤ on both sides.

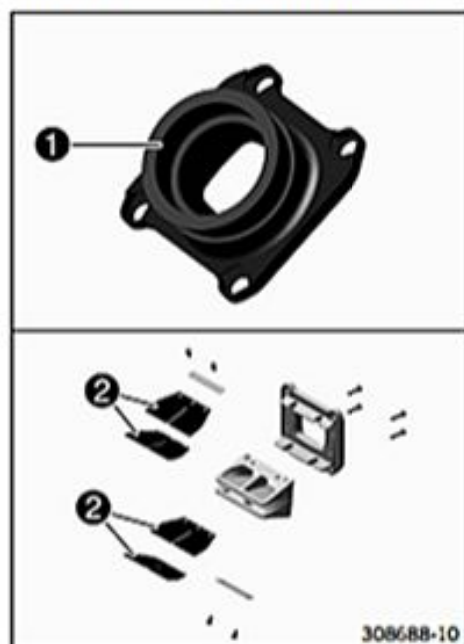


- Remove screws **6**.
- Separate the reed valve holders. Remove holding strip **7**.



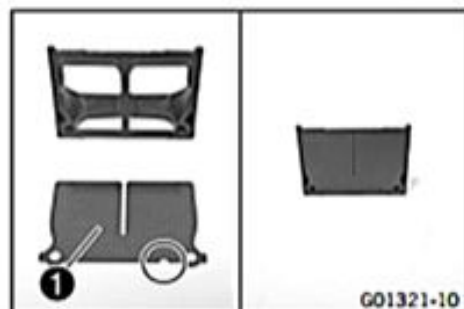
- Take off the inner reed valve **8** from both reed valve holders.

16.4.16 Checking the reed valve housing, reed valve, and intake flange



- Check intake flange **1** for damage and wear.
 - If there is damage or wear:
 - Change the intake flange.
- Check membrane **2** for damage and wear.
 - If there is damage or wear:
 - Change the membrane.
- Check reed valve housing for damage and wear.
 - If there is damage or wear:
 - Change the reed valve housing.

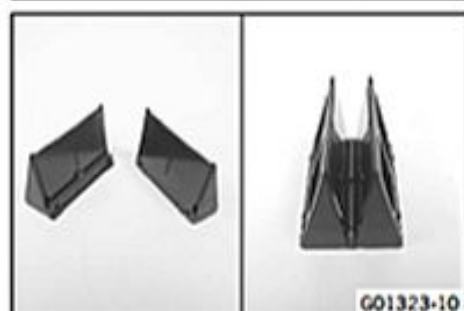
16.4.17 Assembling the reed valve housing



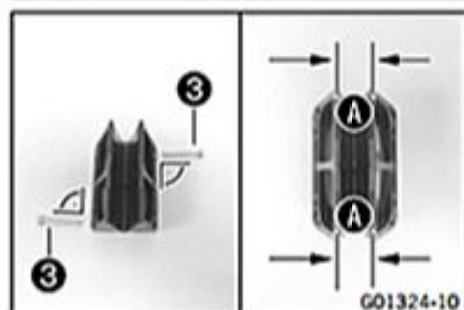
- Position the inner reed valve **1** on both reed valve holders.
 - ✓ The recesses are located on the right side.



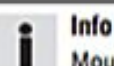
- Position holding strip **2**.
- ✓ The pins engage in the drilled holes.



- Position the reed valve holders.



- Mount screws **3** and screw in all the way.

**Info**

Mount the screws at right angles to prevent damage.

- Loosen screws **3** and tighten again.

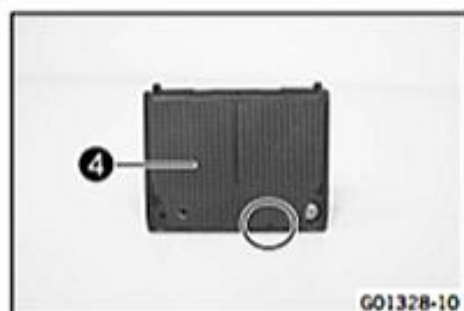
Guideline

Screw, inner membrane sheets	EJOT DELTA PT® 35x25	1 Nm (0.7 lbf ft)
------------------------------	--------------------------------	-------------------

- ✓ Distance **A** is equal on both sides.

- Position the outer reed valve **4** on both sides.

- ✓ The recesses are located on the right side.



- Position the clamping plates on both sides.
- ✓ After installation, the **TOP** marking must be visible as shown.
- Mount screws **5** on both sides and screw in all the way.
- Loosen screws **5** and tighten again.

Guideline

Screw, outer membrane sheets	EJOT DELTA PT® 30x6	1 Nm (0.7 lbf ft)
------------------------------	-------------------------------	-------------------



311410-10

- Position gasket 6.



311407-11

- Position the reed valve housing in the support plate.
- ✓ The outer recess is located on the right in the direction of travel when installed.
- Mount and tighten screws 7.

Guideline

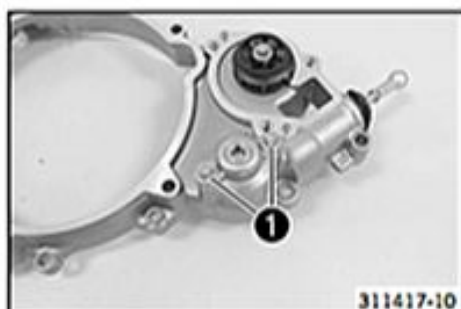
Screw, membrane core plate	EJOT DELTA PT® 30x12	1 Nm (0.7 lbf ft)
----------------------------	-------------------------	-------------------

16.4.18 Working on the clutch cover



Info

Remove the outer clutch cover to avoid damage.



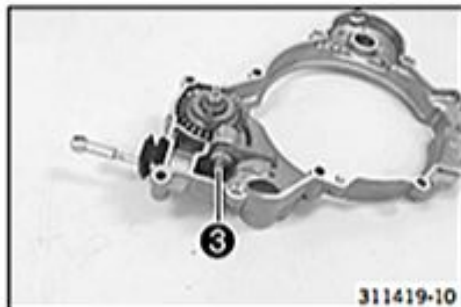
311417-10

- Remove screws 1.
- Remove the cap.



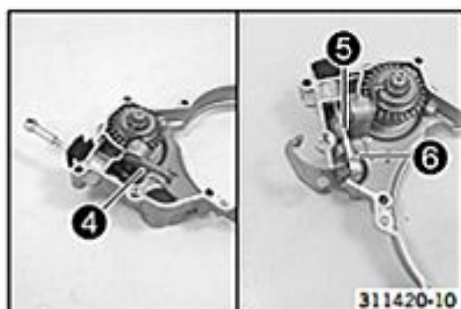
311418-10

- Remove adjusting spring 2, the auxiliary spring, and the spring insert.

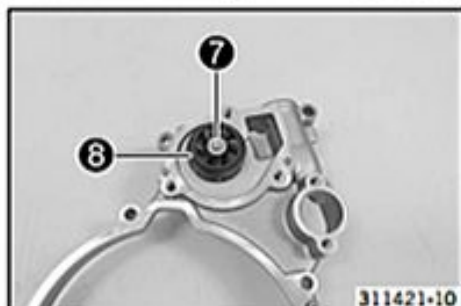


311419-10

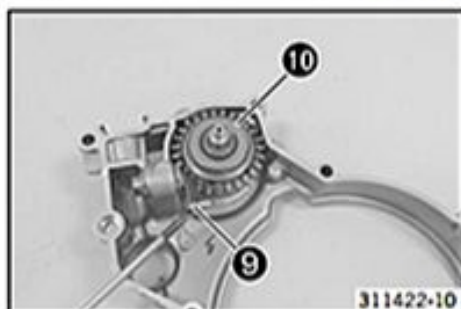
- Remove screw 3 with the washer.



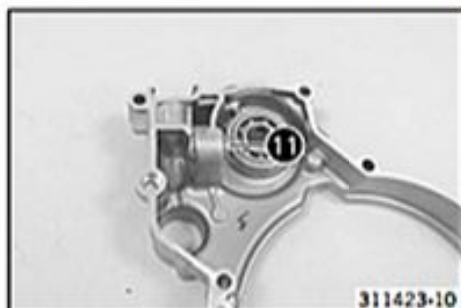
- Pull off angle lever 4.
- Push linkage 5 downward.
- Remove lock 6 and pull off ball socket.
- Remove the linkage and angle lever.



- Remove screw 7.
- Take off water pump impeller 8.



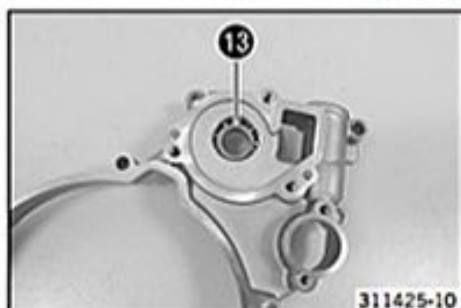
- Position control lever 9 as shown.
- Remove centrifugal timer 10.
- Take off the control lever.



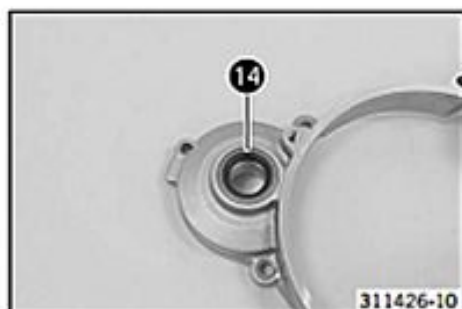
- Press out both needle bearings 11.



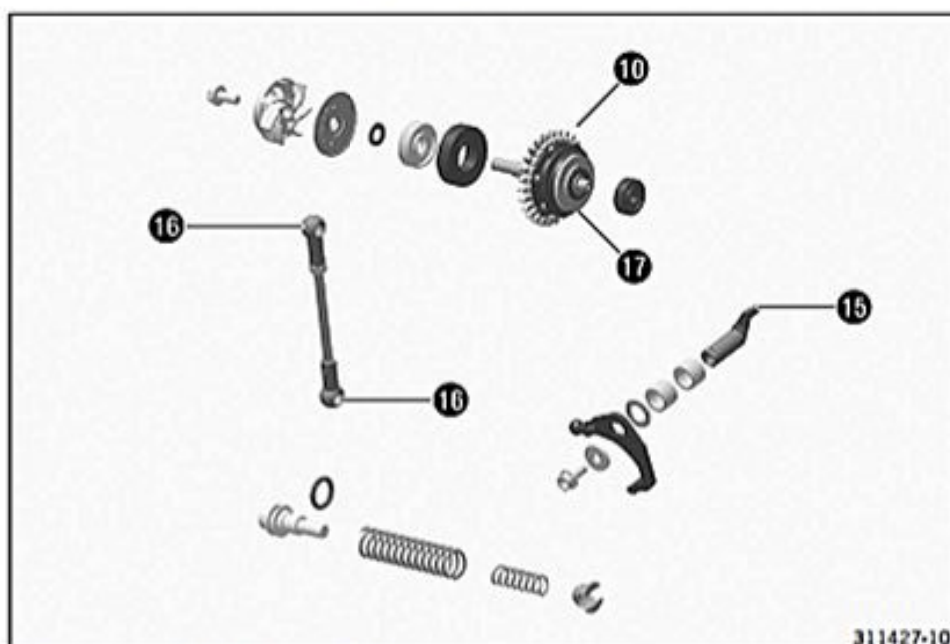
- Remove shaft seal ring 12.



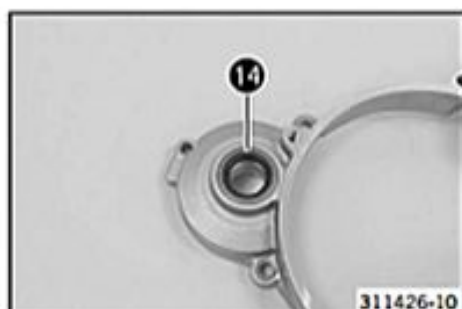
- Press out bearing 13 toward the inside.



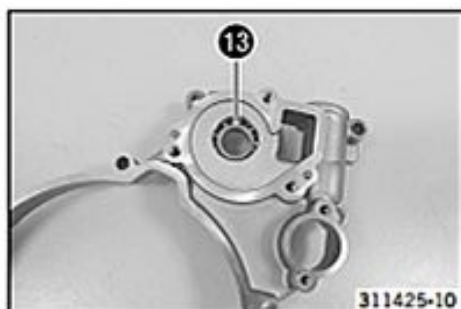
- Remove shaft seal ring **14**.



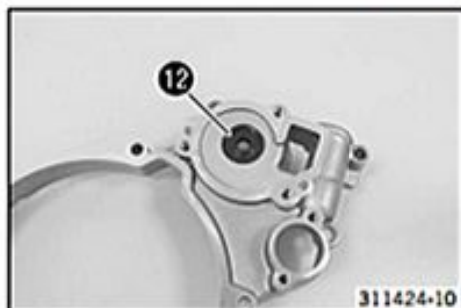
- Check pins **15** of the control lever for damage and wear.
 - If there is damage or wear:
 - Change the control lever.
- Check ball head **16** on the linkage for damage and wear.
 - If there is damage or wear:
 - Change the linkage.
- Check centrifugal timer **10** for damage and wear.
 - If there is damage or wear:
 - Change the centrifugal timer.
- Check axial bearing **17** for damage and wear.
 - If there is damage or wear:
 - Change the axial bearing.



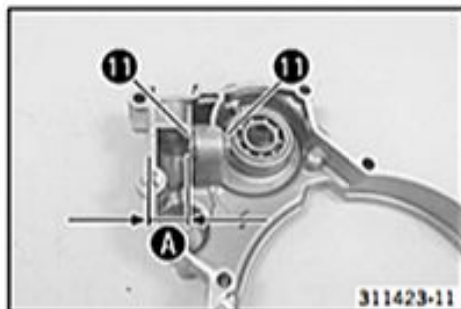
- Press shaft seal ring **14** all the way in.



- Press bearing 13 all the way in to the stop from the inside.



- Press shaft seal ring 12 so it is flush.
- Ensure that the bearing can turn freely and does not touch the shaft seal ring.



- Press in both needle bearings 11.

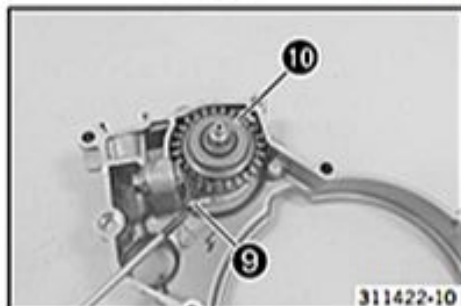
Guideline

Distance A to clutch cover outer edge	19 mm (0.75 in)
---------------------------------------	-----------------

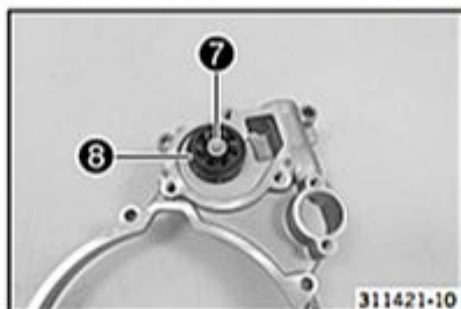


Info

The needle bearing on the angle lever must be precisely measured and set to avoid collision between the centrifugal timer and the control lever.



- Mount control lever 9 with the washer; position as shown.
- Mount centrifugal timer 10.

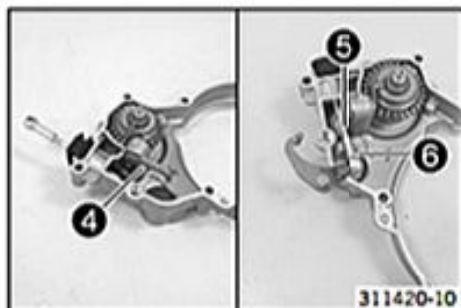


- Mount washer and water pump impeller 8.
- Mount and tighten screw 7.

Guideline

Screw, water pump wheel	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
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- Turn the water pump impeller all the way around to ensure that it can move easily.



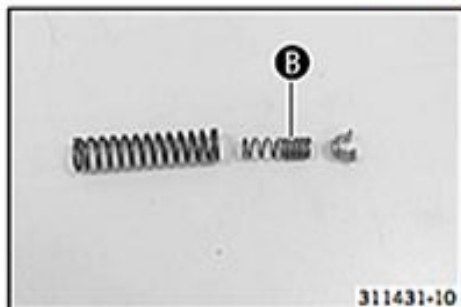
- Position linkage 5.
- Mount angle lever 4 in the ball socket.
- Mount retainer 6.
- Mount angle lever 4 on the control lever.



- Mount and tighten screw ③ with the washer.

Guideline

Screw, control lever, exhaust control	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
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- Mount the spring insert in the auxiliary spring.
- ✓ The tight coil ⑧ points toward the spring insert.



- Mount adjusting spring ② with the auxiliary spring and spring insert.

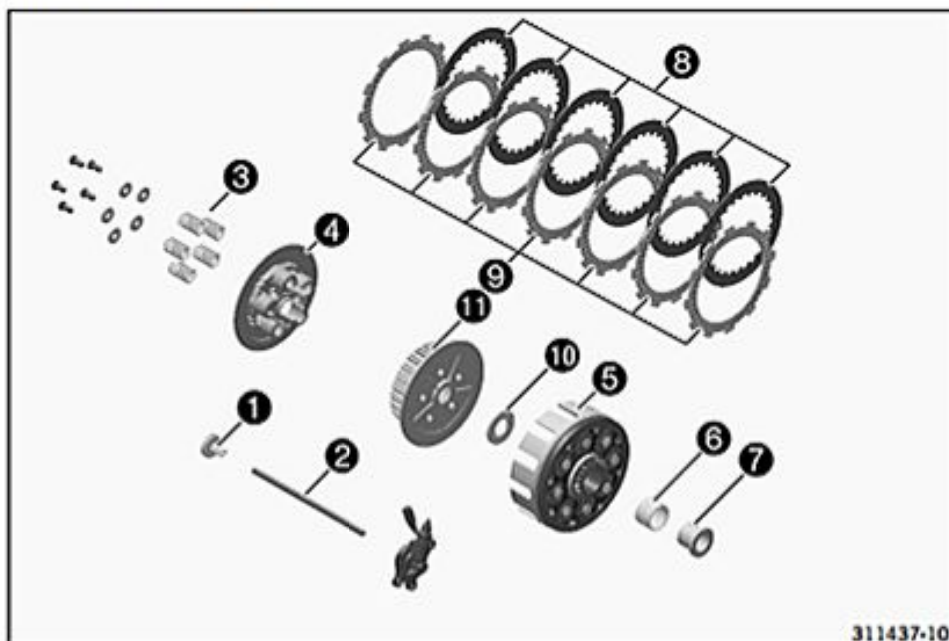


- Position the cap.
- Mount and tighten screws ①.

Guideline

Screw, exhaust control cover	M5	6 Nm (4.4 lbf ft)	
------------------------------	----	-------------------	--

16.4.19 Checking the clutch



311437-10

- Check pressure piece **1** for damage and wear.
 - If there is damage or wear:
 - Change the pressure piece.
- Place push rod **2** on a level surface and check for run-out.
 - If there is run-out:
 - Change the push rod.
- Check the length of clutch springs **3**.

Clutch spring - length	$\geq 39.0 \text{ mm } (\geq 1.535 \text{ in})$
------------------------	---

- If the clutch spring length is shorter than specified:
 - Change all clutch springs.
- Check the contact surface of pressure cap **4** for damage and wear.
 - If there is damage or wear:
 - Change the pressure cap.
- Check the thrust surfaces of the clutch facing discs in clutch basket **5** for wear.

Contact surface of clutch facing discs in outer clutch hub	$\leq 0.5 \text{ mm } (\leq 0.02 \text{ in})$
--	---

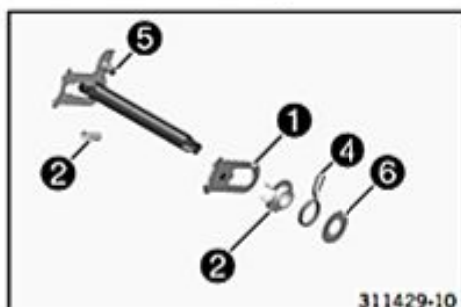
- If the thrust surface exhibits excessive wear:
 - Change the clutch facing discs and the clutch basket.
- Check needle bearing **6** and collar bushing **7** for damage and wear.
 - If there is damage or wear:
 - Change the needle bearing and collar bushing.
- Check intermediate discs **8** for damage and wear.
 - If the intermediate discs are not flat or have punctiform outbreaks:
 - Change all intermediate discs.
- Check clutch facing discs **9** for discoloration and scoring.
 - If there is discoloration or scoring:
 - Change all clutch facing discs.
- Check the thickness of clutch facing discs **9**.

Clutch facing disc - thickness	$\geq 2.9 \text{ mm } (\geq 0.114 \text{ in})$
--------------------------------	--

- If the clutch facing disc does not meet specifications:
 - Change all clutch facing discs.
- Check washer **10** for damage and wear.

- If there is damage or wear:
 - Change the washer.
- Check inner clutch hub **11** for damage and wear.
 - If there is damage or wear:
 - Change the inner clutch hub.

16.4.20 Preassembling the shift shaft



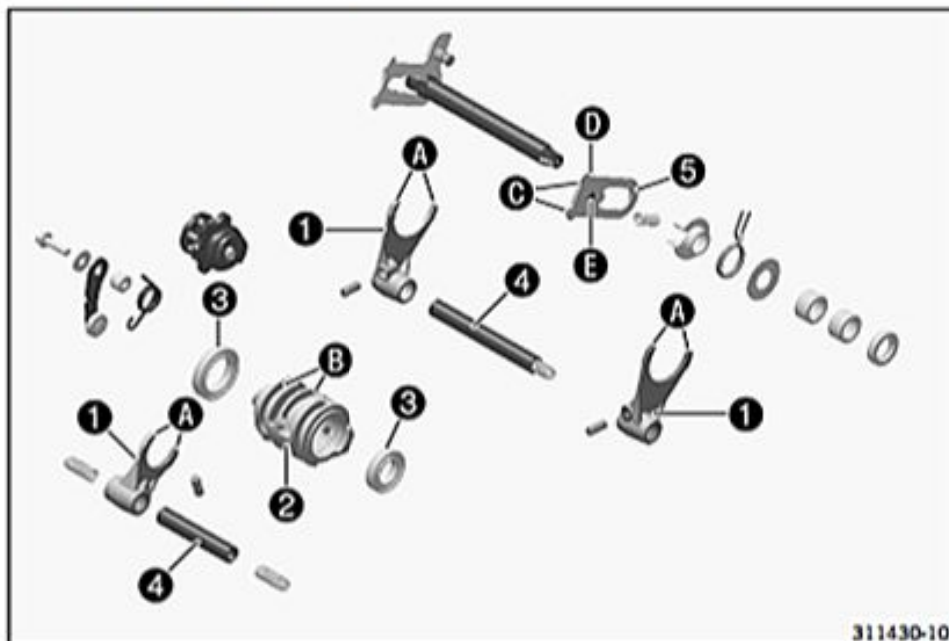
- Secure the short end of the shift shaft in the bench vise.

Guideline

Use soft jaws.

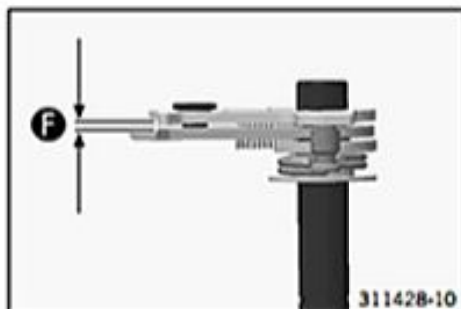
- Mount sliding plate **1** with the guide pin facing downward and put the guide pin on the shift quadrant.
- Mount pressure spring **2**.
- Slide on spring guide **3**, push return spring **4**, with the offset end facing upward, over the spring guide and lift the offset end over abutment bolt **5**.
- Mount stop disk **6**.

16.4.21 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 and gear wheel pair.
- 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 bearings **3**.
 - If the shift drum is not correctly seated:
 - Change the shift drum and/or bearings.
- Check bearings **3** for smooth operation and wear.
 - If the bearings are stiff or worn:
 - Change the bearings.
- 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 if the shift fork is stiff:
 - Change the shift rail.
- Check sliding plate **5** for wear on contact areas **6**.
 - If the sliding plate is worn:
 - Change the sliding plate.
- Check return surface **10** 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.

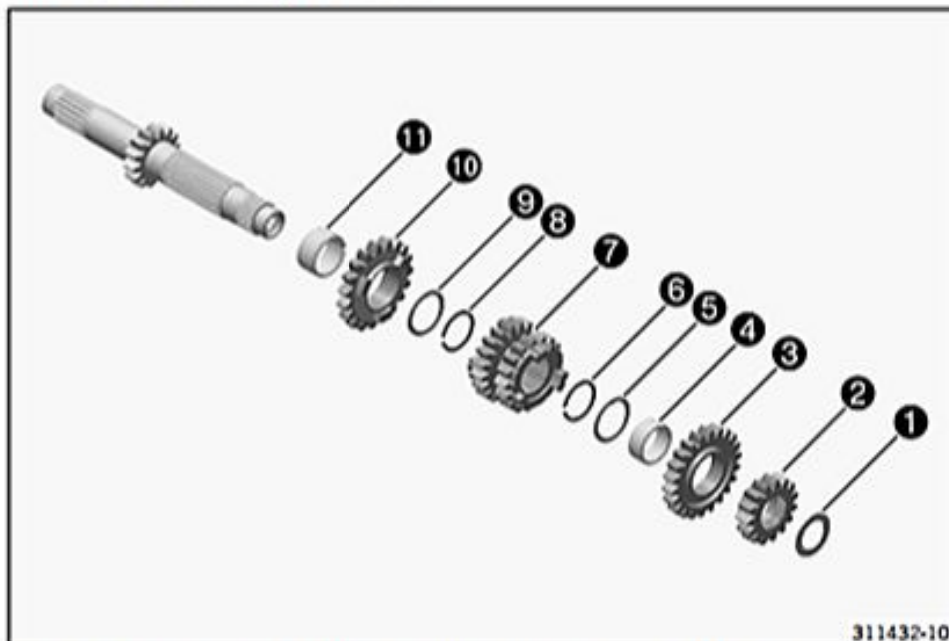


- Preassemble the shift shaft. (☛ p. 167)
- Check clearance **F** between the sliding plate and the shift quadrant.

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.

16.4.22 Disassembling the main shaft



- Secure the main shaft with the toothed end facing downward in the vice.

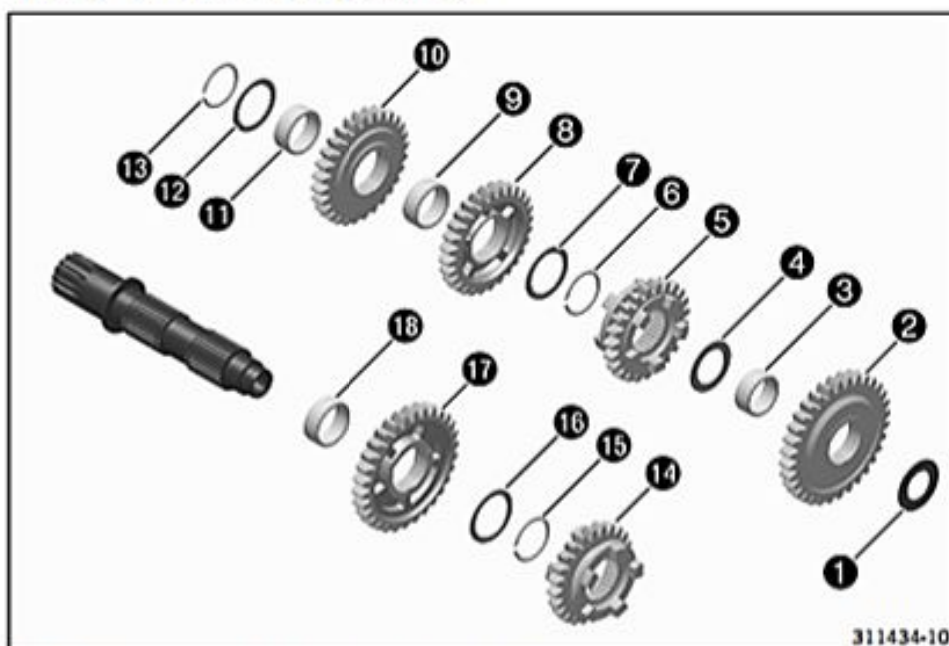
Guideline

Use soft jaws.

- Remove stop disk **1** and second-gear fixed gear **2**.
- Remove fifth-gear idler gear **3** and needle bearing **4**.
- Remove stop disk **5**.

- Remove lock ring **6**.
- Remove third/fourth-gear sliding gear **7**.
- Remove lock ring **8**.
- Remove stop disk **9**.
- Remove sixth-gear idler gear **10**.
- Remove needle bearing **11**.

16.4.23 Disassembling the countershaft



- Fix the countershaft in the vice with the toothed end facing downward.

Guideline

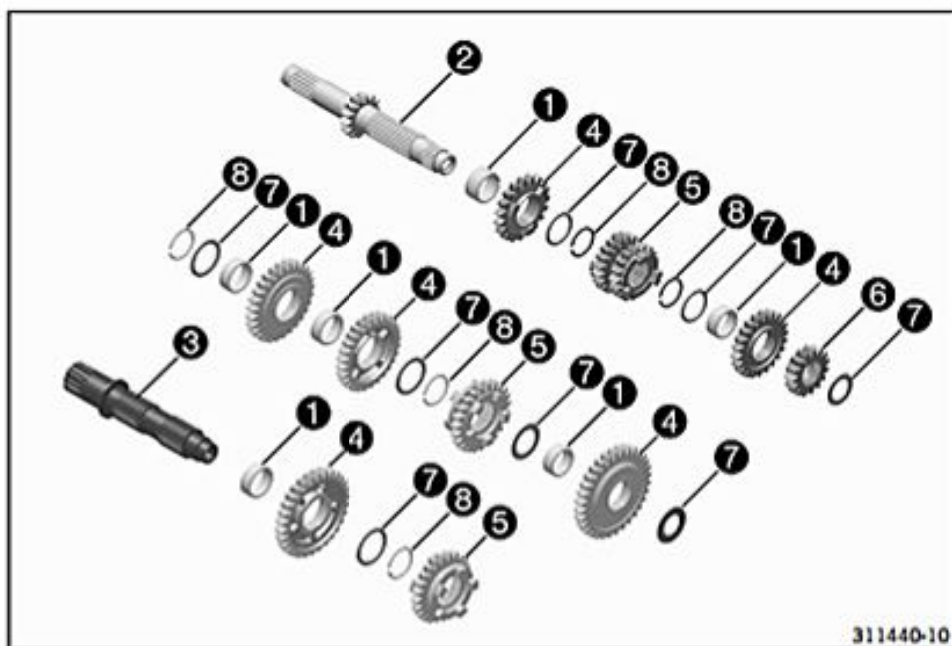
Use soft jaws.

- Remove stop disk **1** and first-gear idler gear **2**.
- Remove needle bearing **3** and stop disk **4**.
- Remove sixth-gear sliding gear **5**.
- Remove lock ring **6**.
- Remove stop disk **7**.
- Remove third-gear idler gear **8** and needle bearing **9**.
- Remove fourth-gear idler gear **10**.
- Remove needle bearing **11**.
- Remove stop disk **12** and lock ring **13**.
- Remove fifth-gear sliding gear **14**.
- Remove lock ring **15**.
- Remove stop disk **16**.
- Remove second-gear idler gear **17** and needle bearing **18**.

16.4.24 Checking the transmission

Condition

The transmission has been disassembled.



311440-10

- Check needle bearings **1** for damage and wear.
 - If there is damage or wear:
 - Change the needle bearing.
- Check the pivot points of main shaft **2** and countershaft **3** for damage and wear.
 - If there is damage or wear:
 - Change the main shaft and/or countershaft.
- Check the tooth profiles of main shaft **2** and countershaft **3** for damage and wear.
 - If there is damage or wear:
 - Change the main shaft and/or countershaft.
- Check the pivot points of idler gears **4** for damage and wear.
 - If there is damage or wear:
 - Change the gear wheel pair.
- Check the shift dogs of idler gears **4** and sliding gears **5** for damage and wear.
 - If there is damage or wear:
 - Change the gear wheel pair.
- Check the tooth faces of idler gears **4**, sliding gears **5**, and fixed gear **6** for damage and wear.
 - If there is damage or wear:
 - Change the gear wheel pair.
- Check the tooth profiles of sliding gears **5** for damage and wear.
 - If there is damage or wear:
 - Change the gear wheel pair.
- Check sliding gears **5** for smooth operation in the profile of main shaft **2**.
 - If the sliding gear does not move freely:
 - Change the sliding gear or the main shaft.
- Check sliding gears **5** for smooth operation in the profile of countershaft **3**.
 - If the sliding gear does not move freely:
 - Change the sliding gear or the countershaft.
- Check stop disks **7** for damage and wear.
 - If there is damage or wear:
 - Change the stop disks.
- Use new lock rings **8** with every repair.

16.4.25 Assembling the main shaft

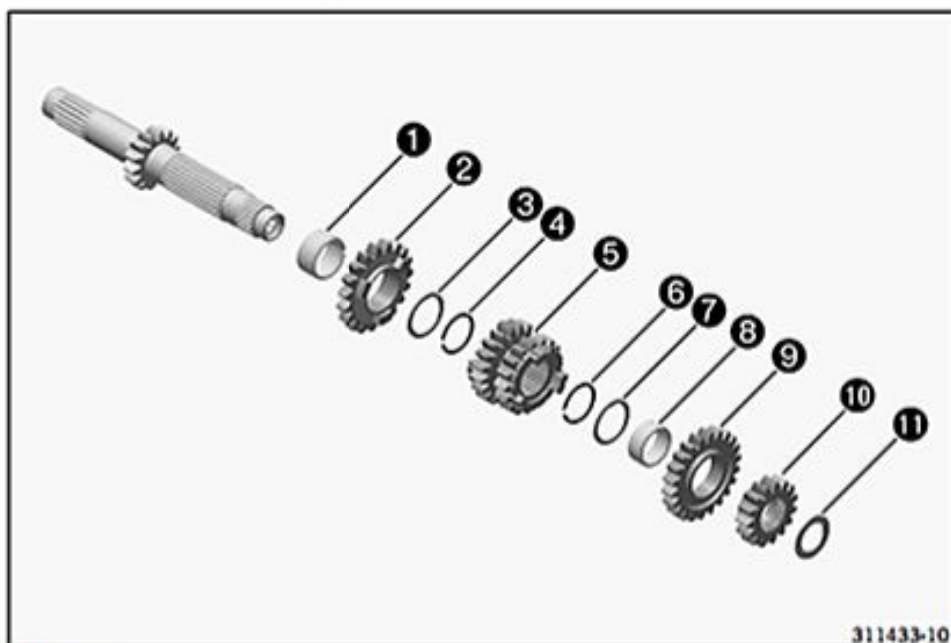


Info

Use new lock rings with every repair.

Preparatory work

- Carefully lubricate all parts before assembling.
- Check the transmission. (☛ p. 169)



311433-10

Main work

- Secure the main shaft with the toothed end facing downward in the vice.

Guideline

Use soft jaws.

- Mount needle bearing 1.
- Mount sixth-gear idler gear 2.
- Mount stop disk 3 and lock ring 4.
- Mount third/fourth-gear sliding gear 5 with the small gear wheel facing downward.
- Mount lock ring 6 and stop disk 7.
- Mount needle bearing 8.
- Mount fifth-gear idler gear 9.
- Mount second-gear fixed gear 10 and stop disk 11.
- Finally, check all gear wheels for smooth operation.

16.4.26 Assembling the countershaft

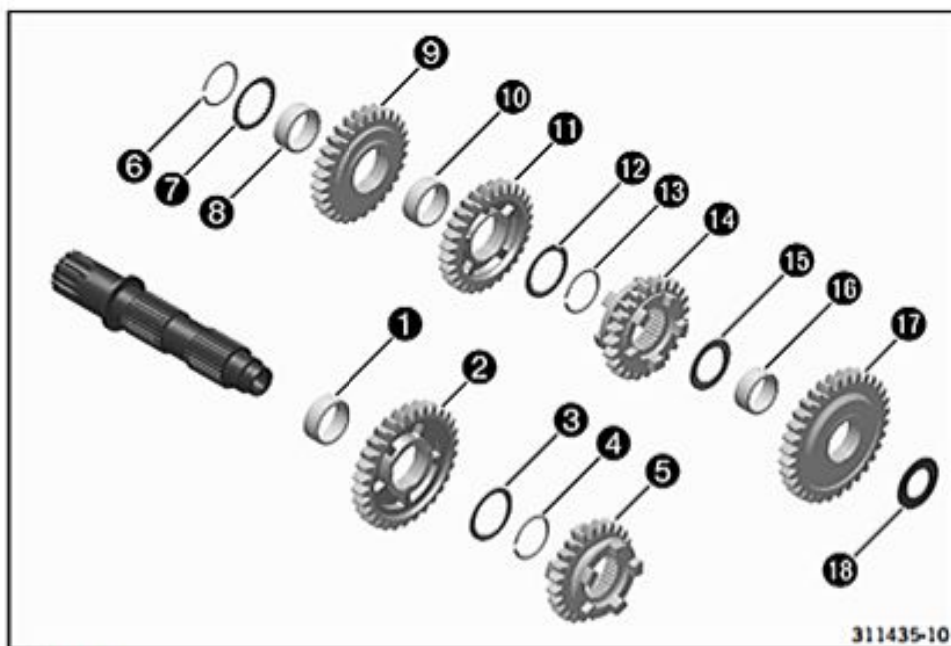


Info

Use new lock rings with every repair.

Preparatory work

- Carefully lubricate all parts before assembling.
- Check the transmission. (☛ p. 169)

**Main work**

- Fix the countershaft in the vice with the toothed end facing downward.

Guideline

Use soft jaws.

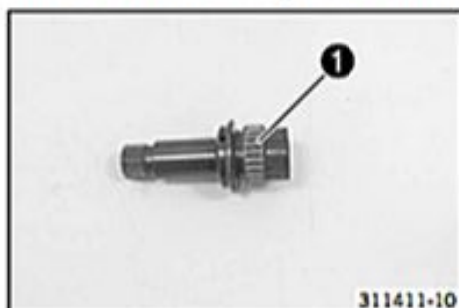
- Mount needle bearing 1 and second-gear idler gear 2 onto the countershaft with the protruding collar facing downward.
- Mount stop disk 3 and lock ring 4.
- Mount fifth-gear sliding gear 5 with the shift groove facing up.
- Mount lock ring 6 and stop disk 7.
- Mount needle bearing 8 and fourth-gear idler gear 9.
- Mount needle bearing 10.
- Mount third-gear idler gear 11.
- Mount stop disk 12 and lock ring 13.
- Mount sixth-gear sliding gear 14 with the shift groove facing downward.
- Mount stop disk 15.
- Mount needle bearing 16 and first-gear idler gear 17.
- Mount stop disk 18.
- Finally, check all gear wheels for smooth operation.

16.4.27 Checking the kick starter

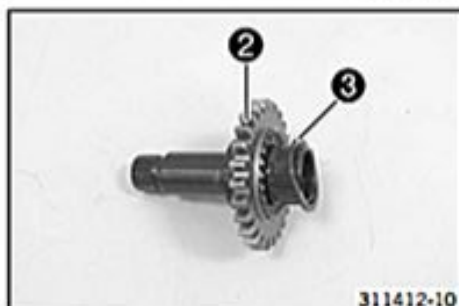


- Check the gear mesh and bearing of kick starter gear **1** for damage and wear.
 - If there is damage or wear:
 - Change the kick starter gear.
- Check the gear mesh and bearing of intermediate kick starter gear **2** for damage and wear.
 - If there is damage or wear:
 - Change the intermediate kick starter gear.
- Check the gear mesh and contact surface of kick starter ratchet wheel **3** for damage and wear.
 - If there is damage or wear:
 - Change the kick starter ratchet wheel.
- Check the gear mesh and bearing of kick starter shaft **4** for damage and wear.
 - If there is damage or wear:
 - Change the kick starter shaft.

16.4.28 Preassembling the kick starter shaft



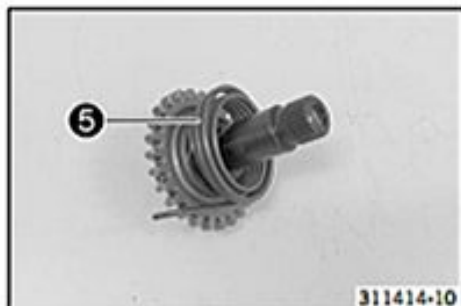
- Mount bearing **1**.



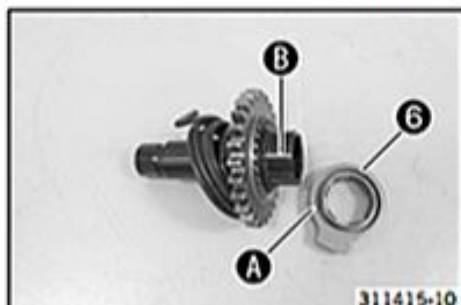
- Mount kick starter gear **2** with washer **3**.



- Mount lock ring 4.



- Mount kick starter spring 5.
- ✓ The end of the kick starter spring engages in the hole.



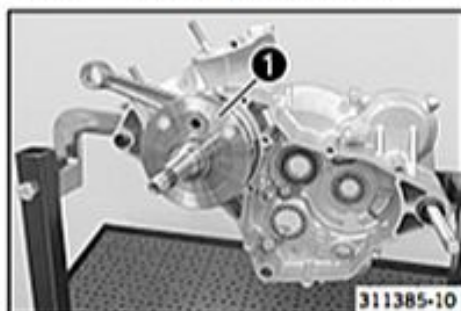
- Mount kick starter ratchet wheel 6.
- ✓ Align markings A and B.



- Mount spring 7.

16.5 Engine assembly

16.5.1 Installing the crankshaft



- Position the right section of the engine case in the engine work stand.

Engine assembly stand (61229001000) (☞ p. 234)

Engine fixing arm (50429002020) (☞ p. 231)

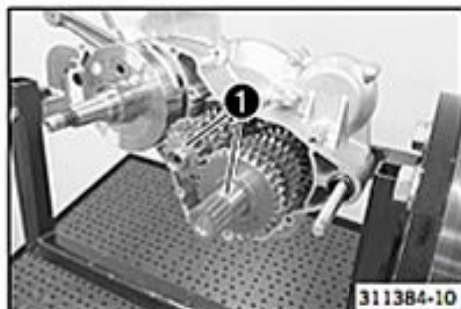
- Warm up the crankshaft bearing.

Guideline

100 °C (212 °F)

- Slide crankshaft 2 all the way into the bearing seat of the right section of the engine case.

16.5.2 Installing the transmission shafts



- Oil all bearings.

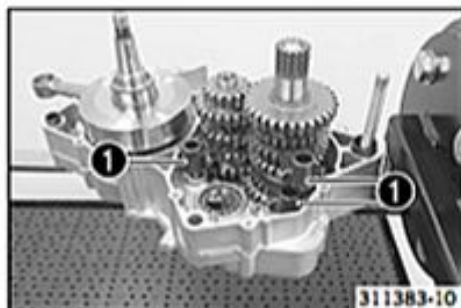
Engine oil (15W/50) (☛ p. 226)

- Assemble the two transmission shafts ① and slide them into the bearing seats together.

16.5.3 Installing the shift forks

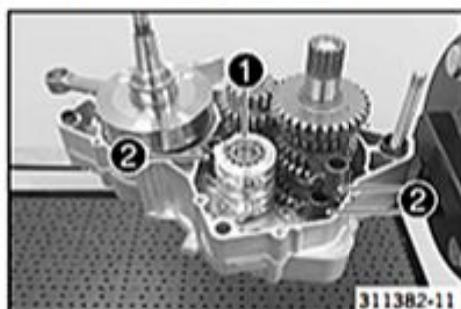


- Arrange the shift forks as shown.



- Position shift forks ① in the shift grooves.

16.5.4 Installing the shift drum

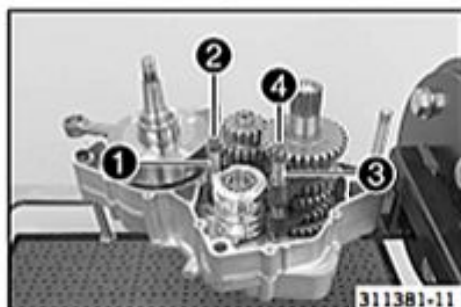


- Push shift drum ① into the bearing seat.
- Attach shift forks ② to the shift drum.

**Info**

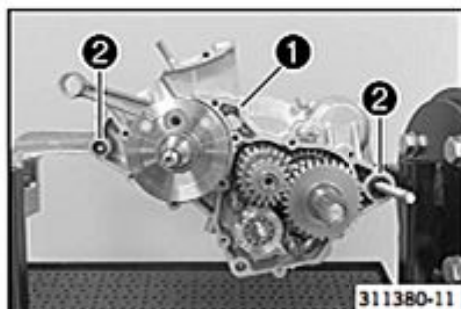
Do not misplace the shift rollers.

16.5.5 Installing the shift rails

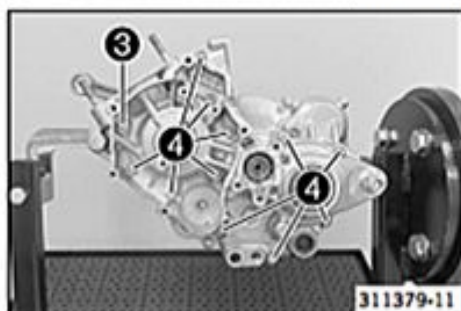


- Install shift rail ① together with upper spring ② and the lower spring.
- Install shift rail ③ together with upper spring ④.

16.5.6 Installing the left engine case section



- Coat the sealing area thinly with grease.
- Mount engine case gasket **1**.
- Check that dowels **2** are seated correctly.



- Mount the left section of the engine case.

**Info**

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

- Mount screw **3** and, once all screws of the left section of the engine case have been mounted, tighten.

Guideline

Screw, engine case	M6x60	10 Nm (7.4 lbf ft)
--------------------	-------	--------------------

- Mount screws **4** and, once all screws of the left section of the engine case have been mounted, tighten.

Guideline

Screw, engine case	M6x50	10 Nm (7.4 lbf ft)
--------------------	-------	--------------------

- Fix the engine in the engine work stand.
- Remove the excess lengths of the engine case gasket in the area of the cylinder support and the reed valve housing.

16.5.7 Installing the reed valve housing



- Position the gasket.
- Position reed valve housing **1** in the engine case opening.



- Position the intake flange with the gasket.
- Mount and tighten screws **2**.

Guideline

Screw, intake flange/reed valve housing	M6	10 Nm (7.4 lbf ft)
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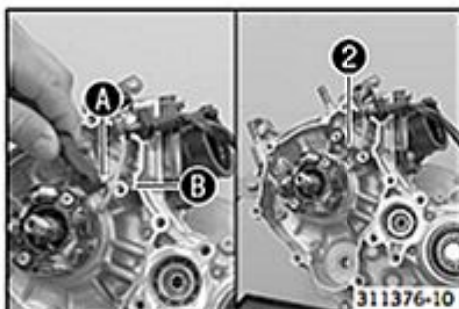
16.5.8 Installing the rotor



- Position the stator with the crankshaft position sensor.
- Mount and tighten screws **1**.

Guideline

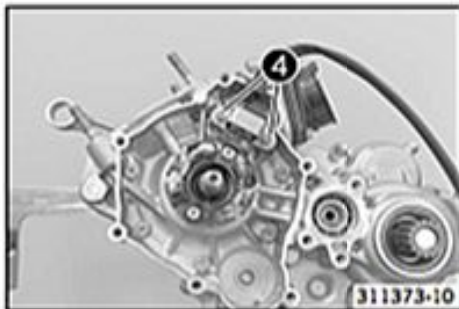
Screw, stator	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
---------------	----	-------------------	---------------



- Position spacer element ②.
- ✓ The catch ① engages in housing web ③.



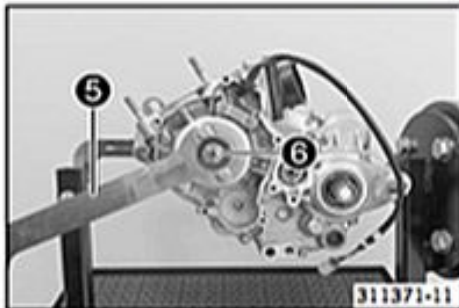
- Position crankshaft position sensor ③.
- Position the cable sleeve in the engine case.



- Position the holding bracket; mount and tighten screws ④.

Guideline

Screw, crankshaft position sensor	M5	6 Nm (4.4 lbf ft)	Loctite® 222™
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- Ensure that the woodruff key is seated properly.
- Grease the cone.
- Mount the rotor and hold it with special tool ⑤.

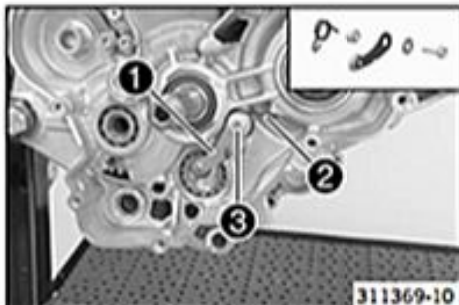
Holding spanner (54629012200) (☛ p. 233)

- Mount washer and nut ⑥. Tighten the nut.

Guideline

Nut, rotor	M12x1	60 Nm (44.3 lbf ft)	
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16.5.9 Installing the locking lever

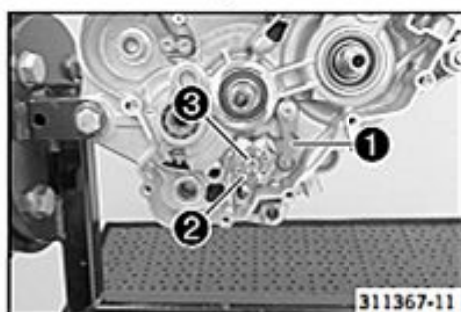


- Position locking lever ① with the sleeve and spring ②.
- Mount and tighten screw ③.

Guideline

Screw, shift drum locating	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
----------------------------	----	-----------------------	---------------

16.5.10 Installing the shift drum locating unit



- Press locking lever **1** to the right and position shift drum locating unit **2**.

**Info**

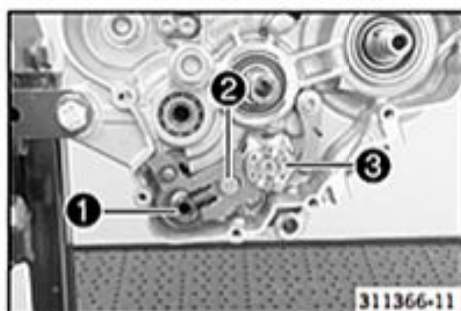
The flat surfaces of the shift drum locating unit are not symmetric.

- 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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16.5.11 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.

16.5.12 Installing the intermediate kick starter gear



- Mount intermediate kick starter gear **1**.

16.5.13 Installing the kick starter shaft

Preparatory work

- Preassemble the kick starter shaft, (☛ p. 173)

Main work

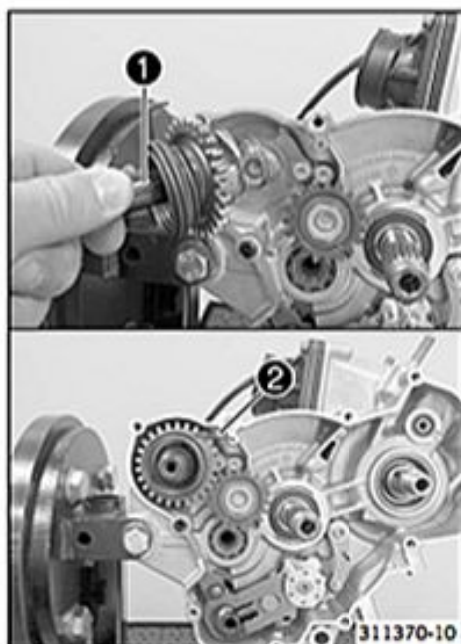
- Mount preassembled kick starter shaft **1**.
- Tension and attach kick starter spring **2**.

Guideline

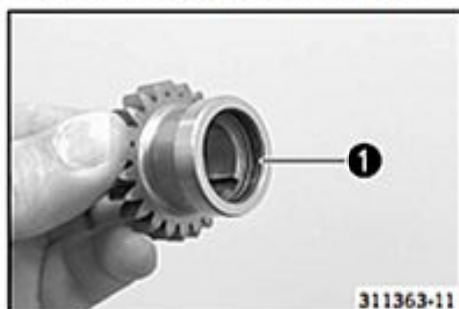
Screw, kick starter spring	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
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**Info**

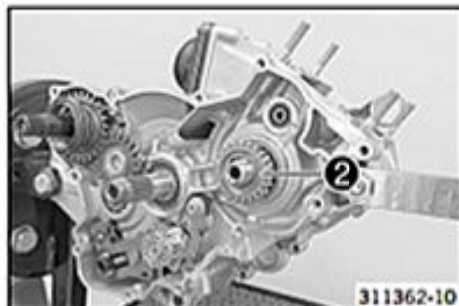
Ensure that the distance from the kick starter spring to the kick starter shaft is the same all around.



16.5.14 Installing the primary gear



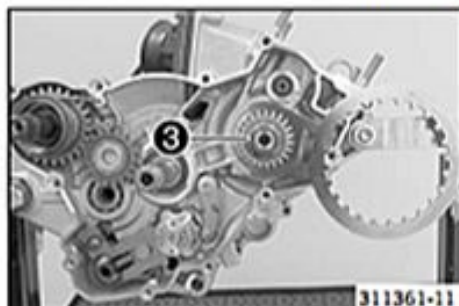
- Mount and lightly grease O-ring ①.



- Mount primary gear ②.

**Info**

Do not damage the shaft seal ring.



- Hold the primary gear using the special tool.

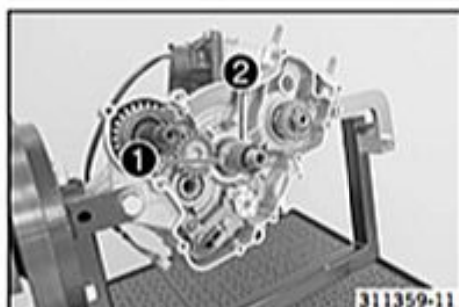
Clutch holder/primary gear holder (50429003000) (☞ p. 232)

- Mount and tighten nut ③ with the washer.

Guideline

Nut, primary gear	M16LHx1.5	130 Nm (95.9 lbf ft)	Loctite® 243™
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16.5.15 Installing the clutch basket



- Mount collar bushing ①.
- Oil and mount needle bearing ②.

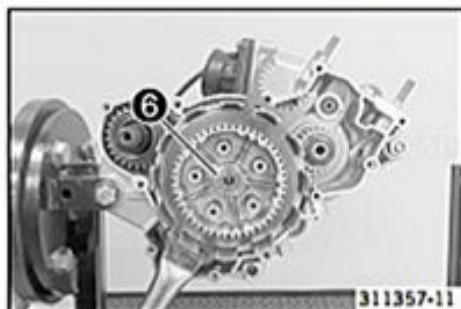
Engine oil (15W/50) (☞ p. 226)



- Slide clutch basket ③ onto the gearbox main shaft.



- Slide on washer ④ and inner clutch hub ⑤.



- Position the new lock washer and mount nut ⑥. Tighten the nut, holding the inner clutch hub with a special tool.

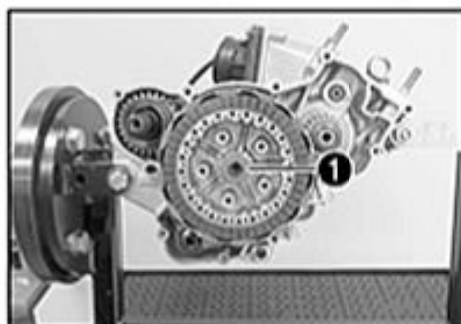
Guideline

Nut, inner clutch hub	M18x1.5	100 Nm (73.8 lbf ft)	Loctite® 243™
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Clutch holder/primary gear holder (50429003000) (☞ p. 232)

- Secure the nut with the lock washer.

16.5.16 Installing the clutch discs



- Thoroughly oil the clutch facing discs.

Engine oil (15W/50) (☞ p. 226)

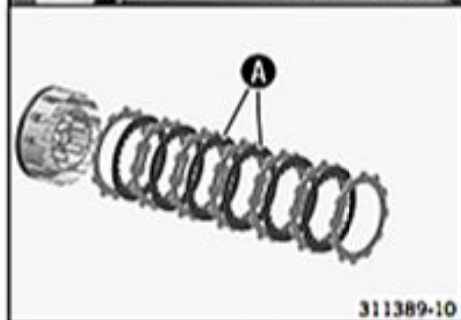
- Beginning with a clutch facing disc, alternately insert all other intermediate discs and clutch facing discs into the clutch basket.



Info

Position the two intermediate discs made of steel A in the center of the clutch pack.
The last disc must be a clutch facing disc.

- Mount pressure piece ①.



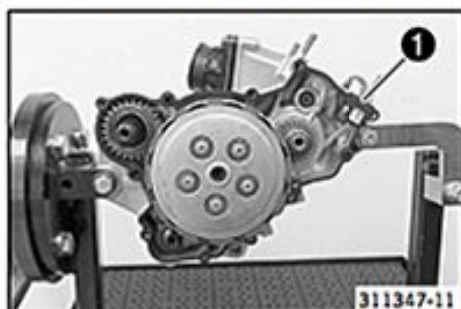
- Position the pressure cap. Mount screws ② with the washers and springs.
- Tighten the screws in a crisscross pattern.

Guideline

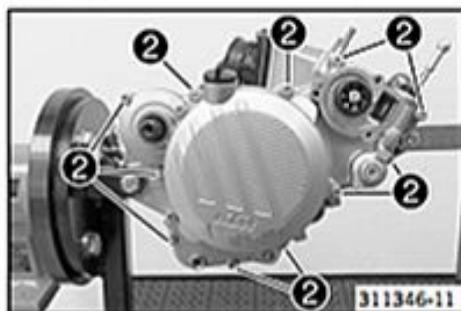
Screw, clutch spring retainer	M6	10 Nm (7.4 lbf ft)
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16.5.17 Installing the clutch cover



- Mount the dowels.
- Mount clutch cover gasket **1**.

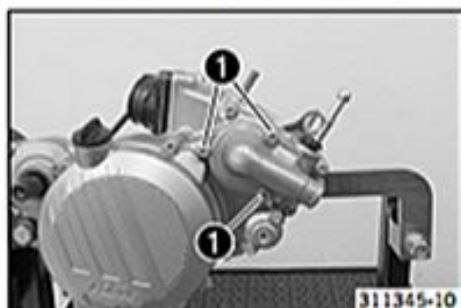


- Position the clutch cover. Mount and tighten screws **2**.

Guideline

Screw, clutch cover	M6	10 Nm (7.4 lbf ft)
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16.5.18 Installing the water pump cover



- Mount the form ring.



Info

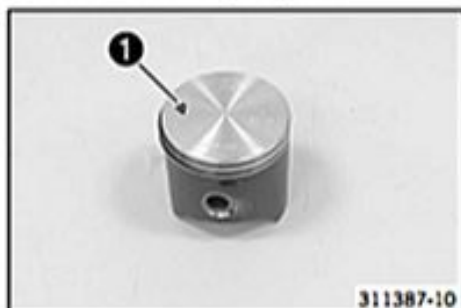
Ensure that the dowels are seated properly.

- Position the water pump cover.
- Mount and tighten screws **1**.

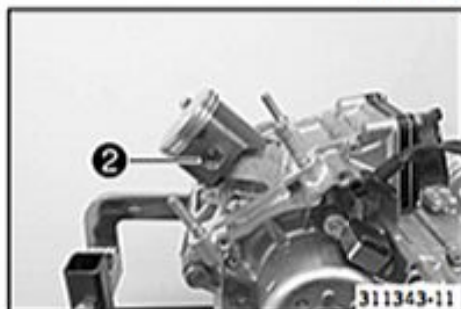
Guideline

Screw, water pump cover	M6	10 Nm (7.4 lbf ft)
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16.5.19 Installing the piston



- Oil the upper conrod bearing and position it in the connecting rod.
- Position the piston.
 - ✓ Piston marking **1** must face the exhaust side.

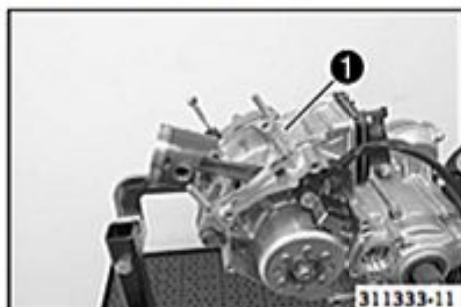


- Slide piston pin **2** into the connecting rod by hand.



- Cover the engine case opening with a cloth.
- Position the piston pin retainer in the 6 o'clock or 12 o'clock position.
- Ensure that the piston ring lock is in the correct position on both sides.
- Remove the cloth.

16.5.20 Installing the cylinder

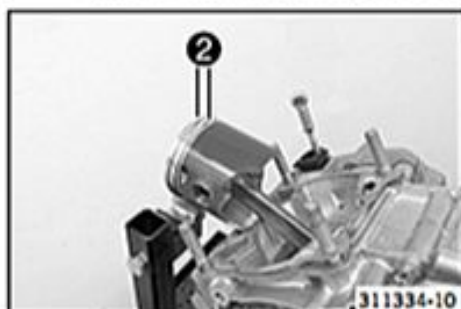


- Place the new cylinder base gasket **1** into position.

i Info

If neither the piston, cylinder, crankshaft, or engine case need to be changed, the same gasket thickness can be used as before.

- Oil the cylinder and piston.



- Position the piston ring.
- ✓ The anti-rotation lock engages in piston ring end **2**.



- Slide the cylinder over the piston.
- Push the cylinder down carefully.

i Info

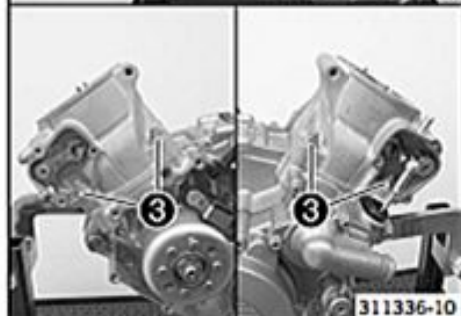
Ensure that the locating pins are seated properly.



- Mount nuts **3** on both sides and tighten in a crisscross pattern.

Guideline

Nut, cylinder base	M8	23 Nm (17 lbf ft)
--------------------	----	-------------------



16.5.21 Checking the X-distance

- i Info**
The X-distance is the distance defined for the piston protrusion, when the cylinder is clamped down and the piston is at top dead center.
The X-distance must be checked very carefully. If the X-distance is too large, the compression decreases and the engine loses power. If the X-distance is too small, the engine knocks and overheats.



- Position the special tool on the cylinder.

Measurement cap (50429031000) (☞ p. 232)

Dial gauge support (50112030000) (☞ p. 230)

Dial gauge (50112013000) (☞ p. 230)

- i Info**
Ensure that the pins are seated correctly.

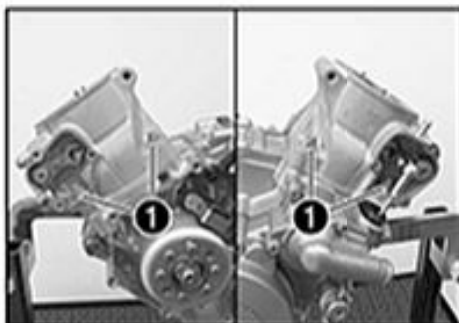
- Position the piston at top dead center.
- Check the X-distance.

X (upper edge of piston to upper edge of cylinder)	0... 0.10 mm (0... 0.0039 in)
--	-------------------------------

- If the specified value is not reached:
 - Adjust the X-distance. (☞ p. 183)

16.5.22 Adjusting the X-distance

- i Info**
The X-distance is adjusted by inserting cylinder base gaskets of various thicknesses.

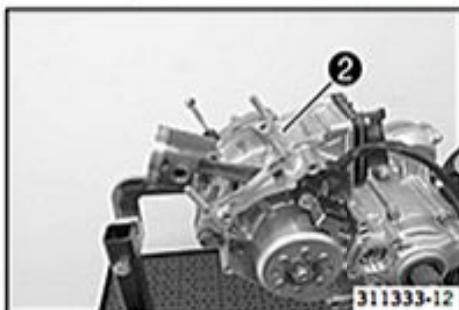


Preparatory work

- Check the X-distance. (☞ p. 183)

Main work

- Remove nuts 1.
- Carefully slide the cylinder up and take it off.



- Replace cylinder base gasket 2 with a cylinder base gasket of the required X-distance.

- i Info**
Multiple cylinder base gaskets can be combined.

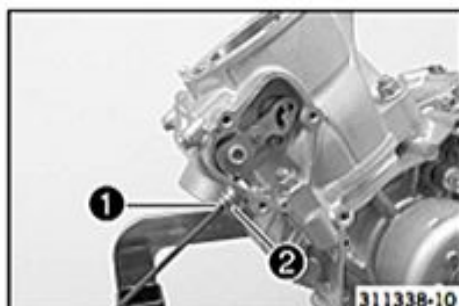
Finishing work

- Install the cylinder. (☛ p. 182)

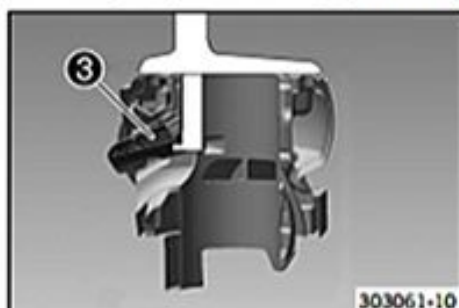
16.5.23 Adjusting the Z-distance

i Info

The Z-distance is the distance from the lower edge of the control flap to the upper edge of the cylinder, measured in the middle of the exhaust port.



- Counterhold screw **1** and loosen nut **2**.

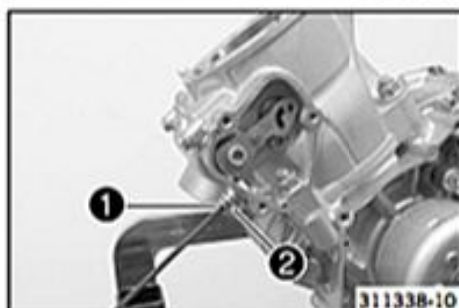


- Adjust the Z-distance using the depth gauge.

Guideline

Z (height of control flap)	36.5 mm (1.437 in)
----------------------------	--------------------

- Move control flap **3** up and position the depth gauge.



- Adjust the Z-distance by turning screw **1**.

- Hold screw **1** and tighten nut **2**.

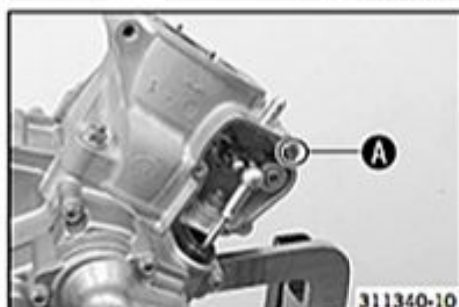
Guideline

Nut, adjusting screw, power valve	M6	8 Nm (5.9 lbf ft)
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- Check the Z-distance.

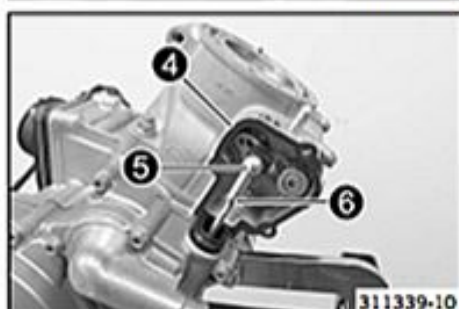
Guideline

Z (height of control flap)	36.5 mm (1.437 in)
----------------------------	--------------------



- Thinly apply sealing compound to area **A**.

Loctite® 5910



- Mount gasket **4**.

- Push the control flap down all the way to the stop.

- Grease and mount ball socket **5**.

Long-life grease (☛ p. 228)

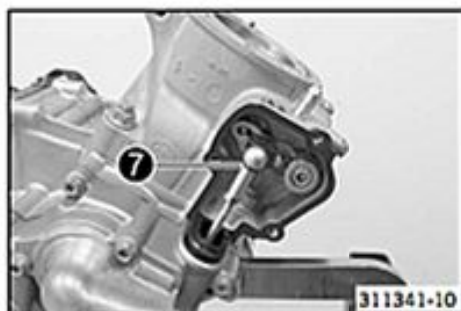
i Info

The linkage may only be pulled upward slightly.
The control flap must not be swung upward.

- Check the movement of the linkage.

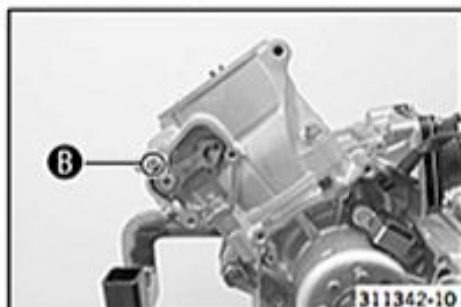
Guideline

≤ 1 mm (≤ 0.04 in)



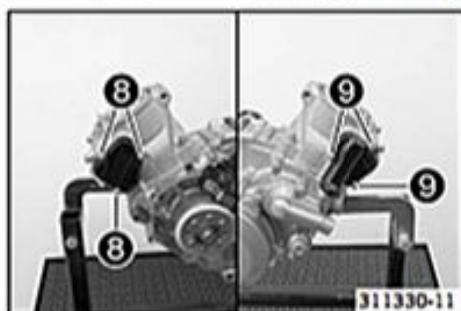
- If the linkage is pulled up further:
 - Loosen lock nut ⑥.
 - Turn the ball socket until the linkage reaches the right length.
 - Tighten the lock nut.

- Mount retainer ⑦.



- Thinly apply sealing compound to area ⑧.

Loctite® 5910



- Position the gasket.
- Position both covers.
- Mount and tighten screws ⑧ and ⑨.

Guideline

Screw, exhaust control cover	M5	6 Nm (4.4 lbf ft)
------------------------------	----	-------------------

16.5.24 Installing the cylinder head



- Mount O-rings ① and ②.



Info

Ensure that the pins are seated correctly.



- Mount the O-ring on the combustion chamber liner.



- Position the combustion chamber liner and cylinder head.
- Mount screws 3 with the washers and tighten them in a crisscross pattern.

Guideline

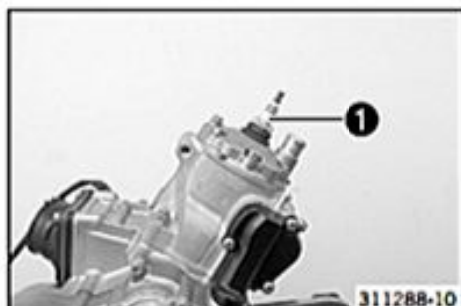
Screw, cylinder head	M7	18 Nm (13.3 lbf ft)
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Info

Use new washers.

16.5.25 Installing the spark plug

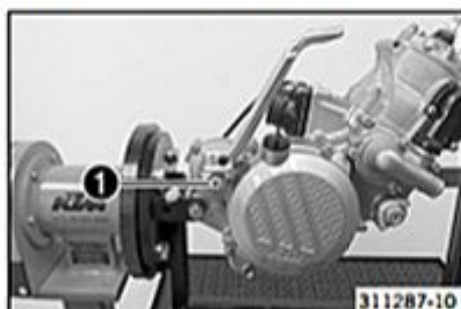


- Mount and tighten spark plug 1.

Guideline

Spark plug	M14x1.25	25 Nm (18.4 lbf ft)
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16.5.26 Installing the kick starter

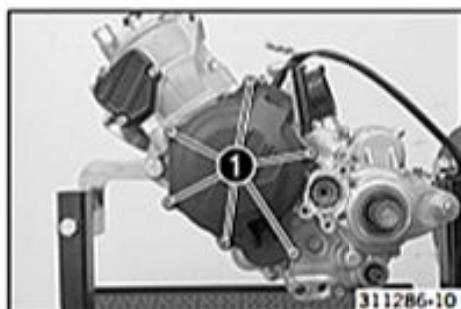


- Position the kick starter. Mount and tighten screw 1.

Guideline

Screw, kick starter	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
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16.5.27 Installing the alternator cover

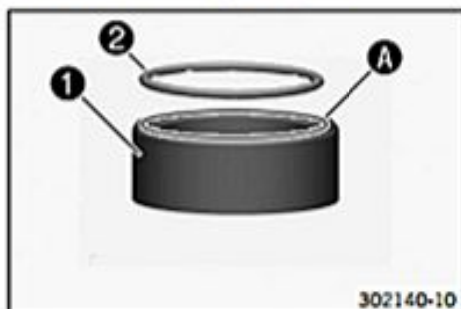


- Position the alternator cover.
- Mount and tighten screws 1.

Guideline

Screw, alternator cover	M5	5 Nm (3.7 lbf ft)
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16.5.28 Installing the spacer



- Before mounting, grease spacer 1 in area A and O-Ring 2.

Long-life grease (☛ p. 228)

- Position the O-ring in the cut-out of the spacer.

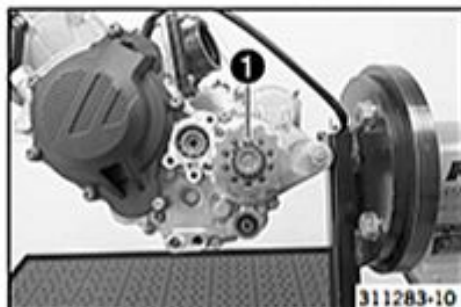


- Grease the shaft seal ring.

Long-life grease (☛ p. 228)

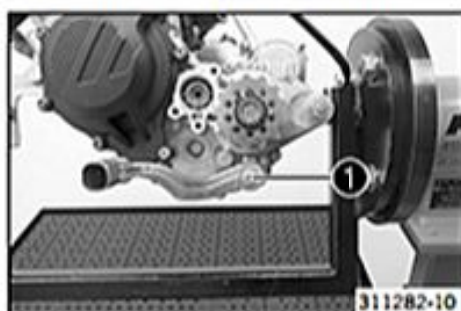
- Push spacer **1** with the O-ring onto the countershaft with a twisting motion.
 - ✓ The cut-out with the O-ring must face inward.
 - ✓ The shaft seal ring rests against the spacer along its entire circumference.

16.5.29 Installing the engine sprocket



- Slide on the engine sprocket with the collar facing the engine. Mount lock ring **1**.

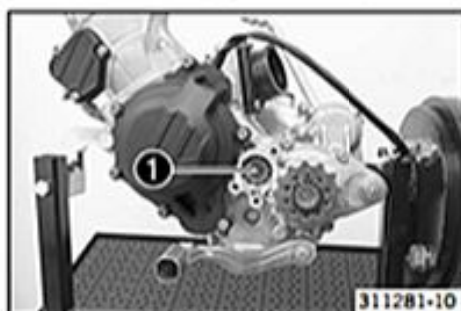
16.5.30 Installing the shift lever



- Position the shift lever. Mount and tighten screw **1** with the washers.
- Guideline

Screw, shift lever	M6	14 Nm (10.3 lbf ft)	Loctite® 243™
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16.5.31 Installing the clutch push rod



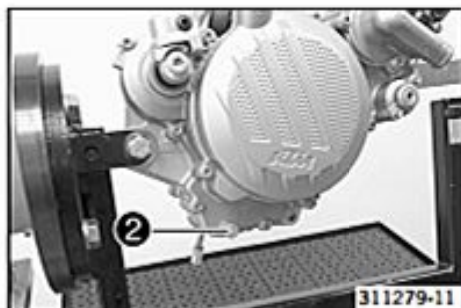
- Mount clutch push rod **1**.

16.5.32 gear oil drain plug, installing



- Mount and tighten gear oil drain plug **1** with the magnet and the new seal ring.
- Guideline

Gear oil drain plug with magnet	M12x1.5	20 Nm (14.8 lbf ft)
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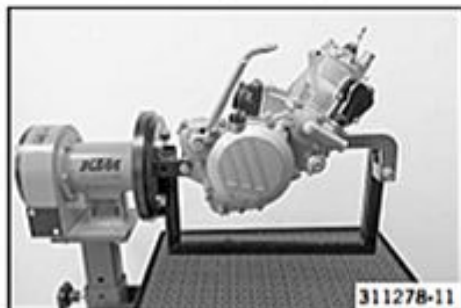


- Mount gear oil drain plug ② with the new seal ring and tighten.

Guideline

Gear oil drain plug	M10x1	15 Nm (11.1 lbf ft)
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- Activate the kick starter several times to check whether the engine turns over freely.

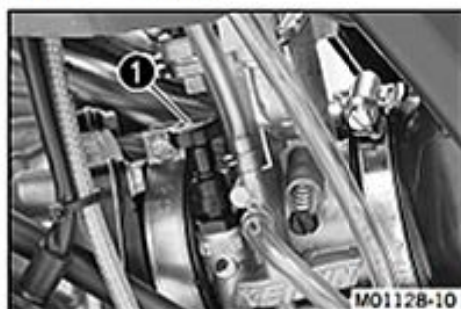
16.5.33 Removing the engine from the engine work stand

- Remove the fitting from the special tool.

Engine fixing arm (50429002020) (☛ p. 231)
--

- Remove the engine from the engine work stand.

17.1 Choke



Choke ① is fitted on the left side of the carburetor.

Activating the choke function frees a drill hole in the carburetor through which the engine can draw extra fuel. This results in a richer fuel-air mixture, which is needed for a cold start.

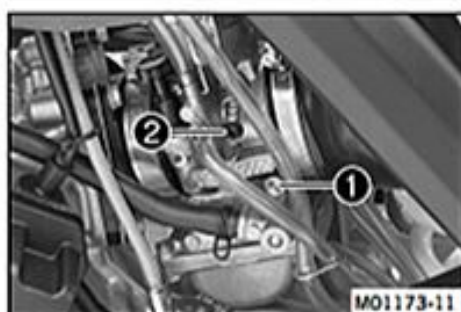
**Info**

If the engine is warm, the choke function must be deactivated.

Possible states

- Choke function activated – The choke lever is pulled out to the stop.
- Choke function deactivated – The choke lever is pushed in to the stop.

17.2 Carburetor – adjusting the idle speed



- Screw in idle air adjusting screw ① all the way and turn it to the specified basic position.

Guideline

Idle air adjusting screw (All 125 models)	
Open	2 turns
Idle air adjusting screw (All 150 models)	
Open	1 turn

- Run the engine until warm.

Guideline

Warm-up time	≥ 5 min
--------------	---------

**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.

- Adjust the idle speed with adjusting screw ②.

Guideline

Choke function deactivated – The choke lever is pushed in to the stop. (☞ p. 189)	
Idle speed	1,400... 1,500 rpm

- Turn idle air adjusting screw ① slowly in a clockwise direction until the idle speed begins to fall.
- Note the position and turn the idle air adjusting screw slowly counterclockwise until the idle speed again begins to fall.
- Adjust to the point between these two positions with the highest idle speed.

**Info**

If there is a big engine speed rise, reduce the idle speed to a normal level and repeat the above steps.

If the procedure described here does not lead to satisfactory results, the cause may be a wrongly dimensioned idling jet.

If you can turn the idle air adjusting screw to the end without any change of engine speed, mount a smaller idling jet.

After changing the jet, start from the beginning with the adjusting steps.

Following extreme air temperature or altitude changes, adjust the idle speed again.

17.3 Emptying the carburetor float chamber

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

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

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

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

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

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

**Info**

Carry out this work with a cold engine.
Water in the float chamber results in malfunctioning.

**Preparatory work**

- Turn handle ❶ of the fuel tap to the **OFF** position.
- ✓ Fuel no longer flows from the fuel tank to the carburetor.

Main work

- Place a cloth under the carburetor to capture the draining fuel.
- Remove screw plug ❶.
- Fully drain the fuel.
- Mount and tighten the screw plug.

17.4 Removing the carburetor

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

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

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

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

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

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

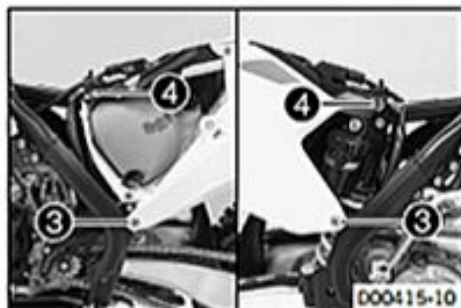
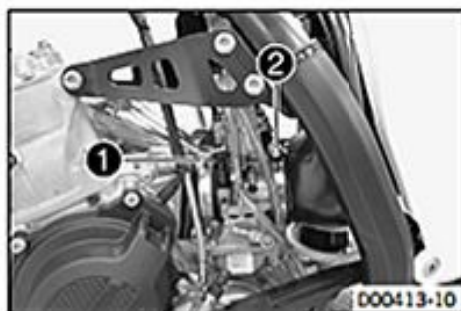
Preparatory work

- Remove the seat. (☛ p. 98)

- Turn handle ❶ of the fuel tap to the **OFF** position.
- Remove the fuel tank. (☛ p. 99)
- Disassemble the main silencer. (☛ p. 93)

Main work

- Loosen hose clip ❶.
- Loosen hose clip ❷.
- Remove the air filter box cover. (☛ p. 95)



- Remove screws ❸.
- Loosen screws ❹.



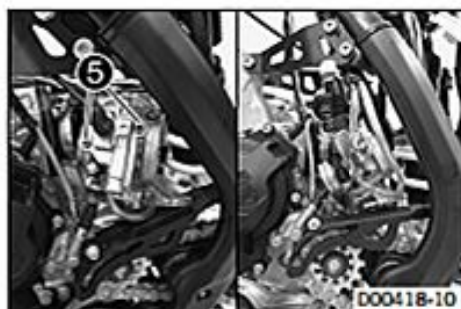
- Remove hose clip ❷.



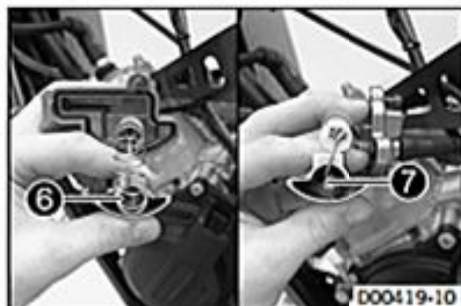
- Pivot up the subframe and secure it.



- Pull the carburetor out of the intake flange toward the rear.

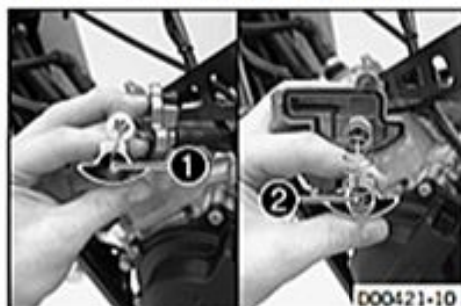


- Remove screws **5**.
- Take off the throttle slide cover and pull the throttle slide out of the carburetor.
- Drain the remaining fuel.



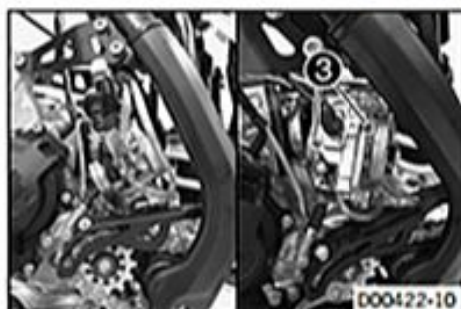
- Pull back the throttle slide spring and plastic retainer **6**.
- Detach throttle cable **7**.
- Take off the throttle slide.

17.5 Installing the carburetor



Main work

- Attach throttle cable **1**.
- Position plastic retainer **2**.
- ✓ The catch of the plastic retainer engages in the cut-out of the jet needle screw.



- Position the throttle slide and throttle slide cover.
- Mount and tighten screws **3**.

Guideline

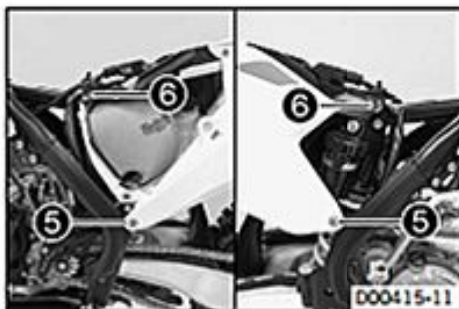
Screw, throttle slide cover	M5	3 Nm (2.2 lbf ft)
-----------------------------	----	-------------------



- Position the carburetor in the intake flange.



- Position hose clip **4**.



- Remove the fixation and position the subframe.

**Info**

Watch out for the intake flange.

- Mount and tighten screw 5.

Guideline

Screw, subframe	M8	35 Nm (25.8 lbf ft)	Loctite® 2701™
-----------------	----	------------------------	----------------

- Remove screw 6.
- Mount and tighten screw 6.

Guideline

Screw, subframe	M8	35 Nm (25.8 lbf ft)	Loctite® 2701™
-----------------	----	------------------------	----------------

- Install the air filter box cover. (☛ p. 95)
- Position and tighten hose clip 7.
- Tighten hose clip 4.

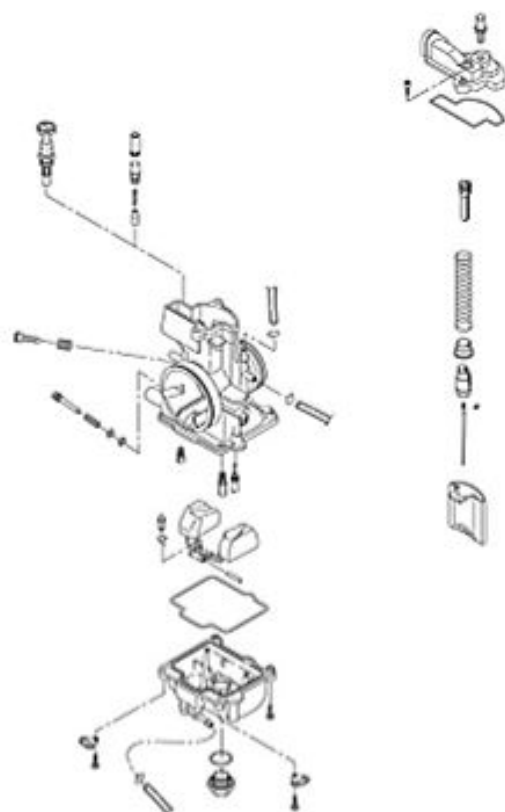
**Finishing work**

- Install the fuel tank. (☛ p. 100)
- Mount the seat. (☛ p. 99)
- Install the main silencer. (☛ p. 93)
- Check the play in the throttle cable. (☛ p. 61)
- Carburetor – adjust the idle speed. (☛ p. 189)

17.6 Checking/adjusting the carburetor components

Condition

The carburetor has been removed.



303400-10

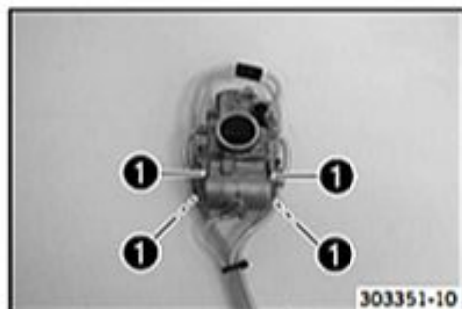
- Disassemble the carburetor. (☛ p. 194)
- Check the choke slide. (☛ p. 195)
- Check the jet needle. (☛ p. 195)
- Check the throttle slide. (☛ p. 196)
- Check the float needle valve. (☛ p. 196)
- Assemble the carburetor. (☛ p. 196)

17.7 Disassembling the carburetor

Condition

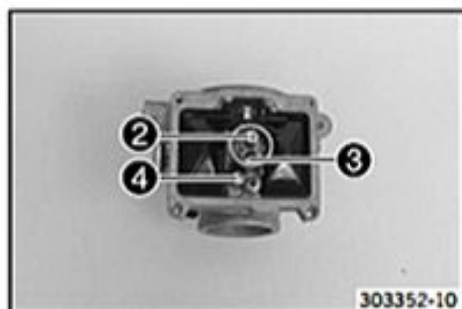
The carburetor has been removed.

- Remove screws ①.
- Remove the float chamber.
- Pull the hoses off of the carburetor.

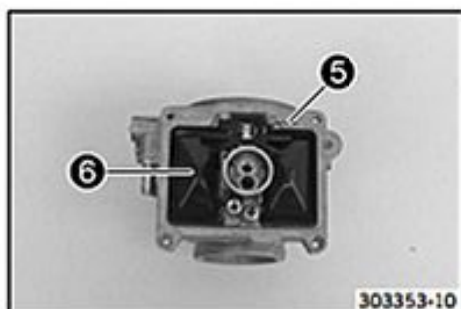


303351-10

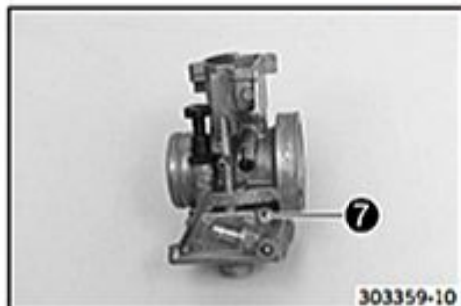
- Remove main jet ②.
- Remove idling jet ③.
- Remove cold start jet ④.



303352-10



- Remove fulcrum pin 5.
- Remove float 6 and the float needle valve.

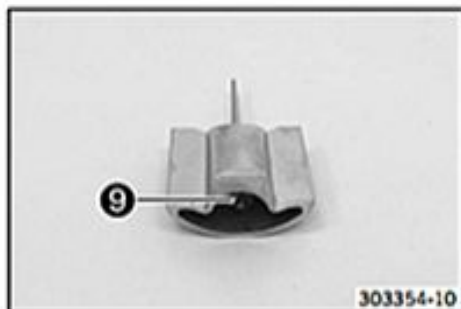


- Note the setting of the idle air adjusting screw 7.
- Remove the idle air adjusting screw with the O-ring.



Info

Make sure not to misplace the spring.



- Remove needle screw cap 9.
- Pull the jet needle out of the throttle slide.

17.8 Checking the choke slide

Condition

The choke slide has been removed.

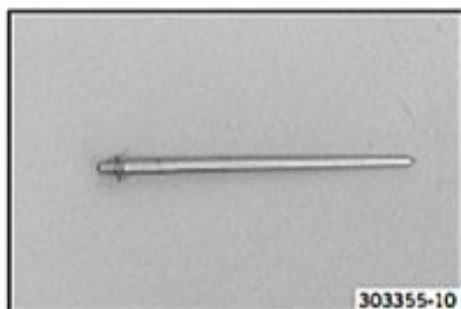


- Check the choke slide for smooth operation.
 - If the choke slide is difficult to move or is dirty:
 - Clean the choke slide and check its activation.
- Check the piston of the choke slide for damage and wear.
 - If the piston of the choke slide is damaged or worn:
 - Change the choke slide.
- Check the rubber sleeve and lock.
 - If the rubber sleeve is damaged or brittle, or if the lock is not functioning:
 - Change the choke slide.

17.9 Checking the jet needle

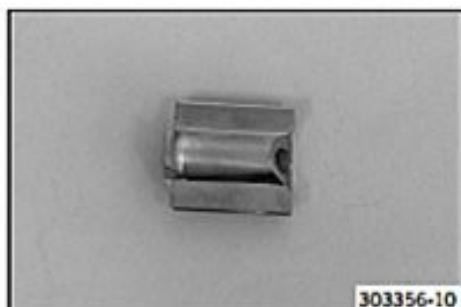
Condition

The jet needle has been removed.



- Check the jet needle for bending and wear of the coating.
 - If the jet needle is bent, or the coating is damaged or worn:
 - Change the jet needle.
- Check the needle clip for tightness.
 - If the needle clip is loose:
 - Change the needle clip or jet needle.

17.10 Checking the throttle slide

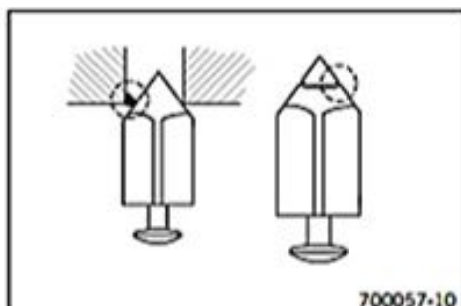


Condition

The throttle slide has been removed.

- Check the throttle slide for damage and wear.
 - If the throttle slide is damaged or worn:
 - Change the throttle slide.
- Check the coating of the throttle slide for damage and wear.
 - If the coating is broken or worn:
 - Change the throttle slide.

17.11 Checking the float needle valve



Condition

The float needle valve has been removed.

- Check the float needle valve including the valve seat for deposits.
 - If there are deposits:
 - Clean the valve seat. Clean or change the float needle valve.
- Check the float needle valve for wear and the sealing area for notches.
 - If the sealing area is damaged or worn:
 - Change the float needle valve.

17.12 Assembling the carburetor

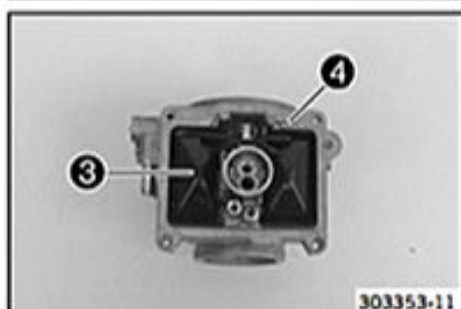


Alternative 1

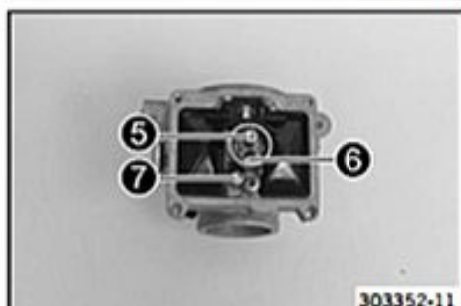
- Mount idle air adjusting screw (2) with the spring and O-ring.
- Set the idle air adjusting screw to the specified value.

Alternative 2

- Set the idle air adjusting screw to the value determined when it was disassembled.



- Position the float needle valve and float (3).
- Mount fulcrum pin (4).



- Mount and tighten main jet (5).

Guideline

Main jet	M5x0.75	2 Nm (1.5 lbf ft)
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- Mount and tighten idling jet (6).

Guideline

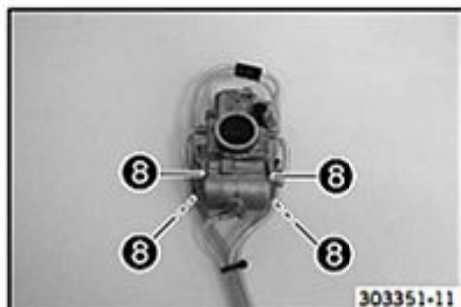
Idling jet	M5	2 Nm (1.5 lbf ft)
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- Mount and tighten cold start jet (7).

Guideline

Cold start jet	M5	2 Nm (1.5 lbf ft)
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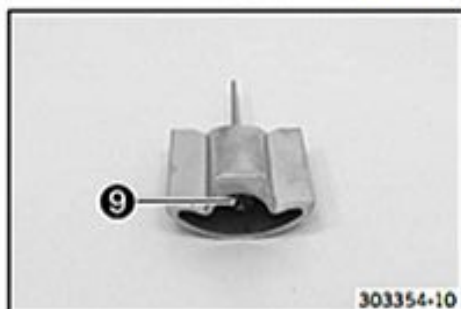
- Check/adjust the float level. (☞ p. 197)



- Mount the hoses on the carburetor.
- Position the float chamber.
- Mount and tighten screws 8.

Guideline

Other screws, carburetor	M4	2 Nm (1.5 lbf ft)
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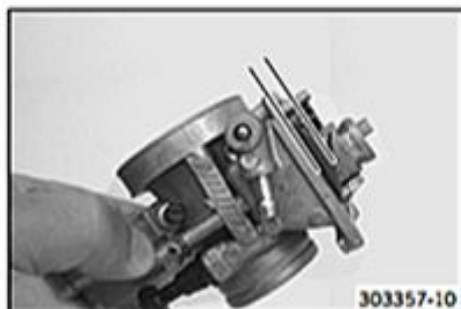


- Position the jet needle in the throttle slide.
- Mount and tighten needle screw cap 9.

Guideline

Needle screw cap	M8	3.5 Nm (2.58 lbf ft)
------------------	----	-------------------------

17.13 Checking/adjusting the float level



Condition

The carburetor and float chamber have been removed.

- Tilt the carburetor sideways, preventing the fulcrum pin from falling out.
- Tilt the carburetor until the float is resting against the float needle valve, but the float needle valve is not being pressed together.

60°

- If the edge of the float is not parallel (max. 1° deviation upwards) to the sealing area of the float housing in this position:
 - Adjust the float level by bending the float lever.

18.1 Checking/correcting the fluid level of the hydraulic clutch



Info

The fluid level rises with increasing wear of the clutch facing 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 level of the fluid does not meet specifications:

- Correct the fluid level of the hydraulic clutch.

Brake fluid DOT 4 / DOT 5.1 (☞ p. 226)
--

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



Info

Clean up overflowed or spilled brake fluid immediately with water.

18.2 Changing the hydraulic clutch fluid



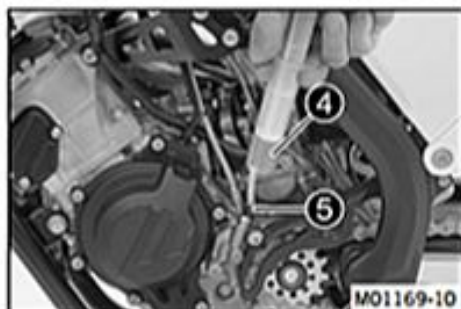
Warning

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.

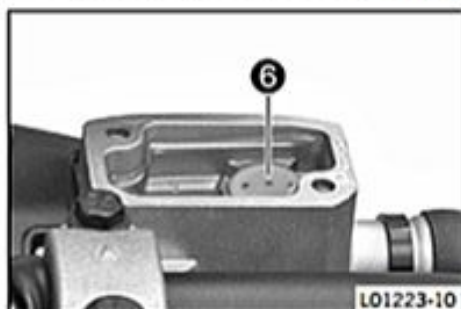


- Fill bleeding syringe ④ with the appropriate hydraulic fluid.

Bleed syringe (50329050000) (☞ p. 231)
--

Brake fluid DOT 4 / DOT 5.1 (☞ p. 226)
--

- On the clutch slave cylinder, remove bleeder screw ⑤ and mount bleeding syringe ④.



- Inject the liquid into the system until it escapes from drill hole ⑥ of the master cylinder without bubbles.
- Drain fluid occasionally from the master cylinder reservoir, to prevent overflow.
- 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.

19.1 Cooling system



Water pump ① in the engine ensures forced circulation of the coolant. The pressure resulting from the warming of the cooling system is regulated by a valve in radiator cap ②. 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.

19.2 Checking the antifreeze and coolant level

**Warning**

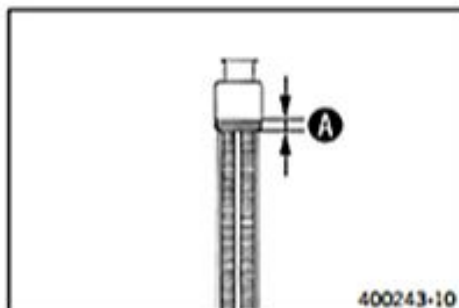
Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

- 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.

- Coolant must not come into contact with the skin, eyes, or clothing. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If fuel is swallowed, contact a physician immediately. Change clothing that is contaminated with coolant. Keep coolant out of reach of children.

**Condition**

The engine is cold.

- Stand the motorcycle upright on a horizontal surface.
- Remove the radiator cap.
- Check the coolant antifreeze.

-25... -45 °C (-13... -49 °F)

- If the antifreeze in the coolant does not match the specified value:
 - Correct the coolant antifreeze.
- Check the coolant level in the radiator.

Coolant level ① above the radiator fins 10 mm (0.39 in)

- If the coolant level does not match the specified value:
 - Correct the coolant level.

Coolant (☛ p. 226)

- Mount the radiator cap.

19.3 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.

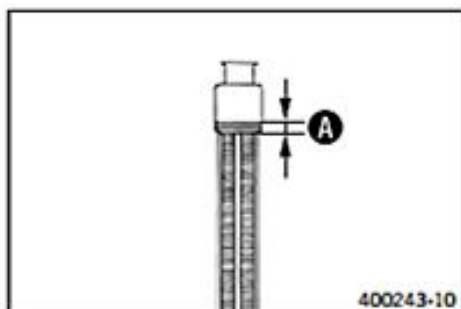
**Warning**

Danger of poisoning Coolant is poisonous and a health hazard.

- Coolant must not come into contact with the skin, eyes, or clothing. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If fuel is swallowed, contact a physician immediately. Change clothing that is contaminated with coolant. Keep coolant out of reach of children.

Condition

The engine is cold.



- Stand the motorcycle upright on a horizontal surface.
- Remove the radiator cap.
- Check the coolant level in the radiator.

Coolant level A above the radiator fins	10 mm (0.39 in)
--	-----------------

- If the coolant level does not match the specified value:
 - Correct the coolant level.

Coolant (↖ p. 226)

- Mount the radiator cap.

19.4 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.

- Coolant must not come into contact with the skin, eyes, or clothing. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If fuel is swallowed, contact a physician immediately. Change clothing that is contaminated with coolant. Keep coolant out of reach of children.

Condition

The engine is cold.

- 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

Drain plug, water pump cover	M6	8 Nm (5.9 lbf ft)
------------------------------	----	-------------------



19.5 Refilling with coolant



Warning

Danger of poisoning Coolant is poisonous and a health hazard.

- Coolant must not come into contact with the skin, eyes, or clothing. If contact occurs with the eyes, rinse with water immediately and contact a physician. Immediately clean contaminated areas on the skin with soap and water. If fuel is swallowed, contact a physician immediately. Change clothing that is contaminated with coolant. Keep coolant out of reach of children.



- Make sure that screw **1** is tightened.



- Position the motorcycle upright.
- Completely fill the radiator with coolant.

Coolant	1.2 l (1.3 qt.)	Coolant (☛ p. 226)
---------	-----------------	--------------------

- Mount radiator cap 2.

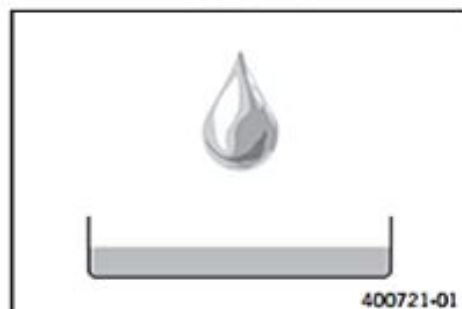


Danger

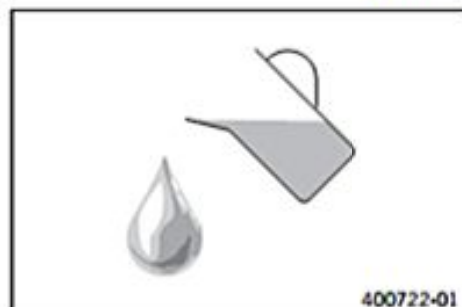
Danger of poisoning Exhaust gases are toxic and inhaling them may result in unconsciousness and/or death.

- 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.
-
- Allow the engine to warm up and cool down again.
 - Check the coolant level. (☛ p. 199)

20.1 Changing the gear oil



- Drain the gear oil. (☛ p. 202)



- Refill with gear oil. (☛ p. 203)

20.2 Draining the gear oil

**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 gear oil while the engine is warm.

Preparatory work

- Park the motorcycle on a level surface.
- Place a suitable container under the engine.

Main work

- Remove the gear oil drain plug with magnet ①.
- Remove gear oil drain plug ②.
- Let the gear oil drain fully.
- Clean the gear oil drain plug thoroughly.
- Clean the sealing surface on the engine.
- Mount and tighten gear oil drain plug with magnet ① and seal ring.

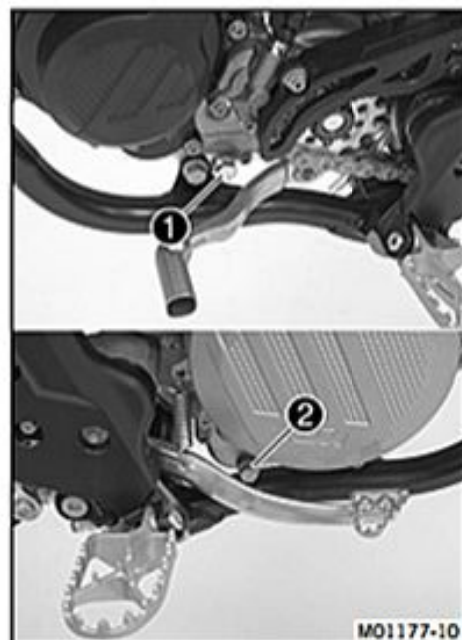
Guideline

Gear oil drain plug with magnet	M12x1.5	20 Nm (14.8 lbf ft)
---------------------------------	---------	------------------------

- Mount gear oil drain plug ② with the seal ring and tighten.

Guideline

Gear oil drain plug	M10x1	15 Nm (11.1 lbf ft)
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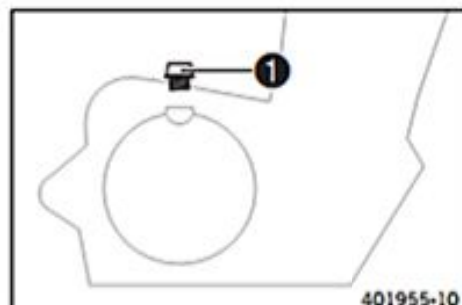


20.3 Refilling with gear oil



Info

Too little gear oil or poor-quality oil results in premature wear of the transmission.



Main work

- Remove filler plug **1** and fill up with gear oil.

Gear oil	0.80 l (0.85 qt.)	Engine oil (15W/50) (☛ p. 226)
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- Mount and tighten the oil filler plug.



Danger

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

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

- Start the engine and check that it is oil-tight.

Finishing work

- Check the gear oil level. (☛ p. 203)

20.4 Checking the gear oil level



Info

The gear oil level must be checked when the engine is cold.



Preparatory work

- Stand the motorcycle upright on a horizontal surface.

Main work

- Remove the gear oil monitoring screw **1**.
- Check the gear oil level.

A small quantity of gear oil must run out of the drilled hole.

- If no gear oil runs out:
 - Add gear oil. (☛ p. 203)
- Mount and tighten the gear oil monitoring screw.

Guideline

Screw, gear oil level check	M6	8 Nm (5.9 lbf ft)
-----------------------------	----	-------------------

20.5 Adding gear oil



Info

Too little gear oil or poor-quality gear oil results in premature wear to the transmission. Gear oil must only be topped up when the engine is cold.

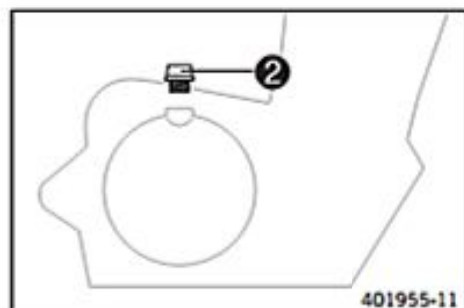


Preparatory work

- Park the motorcycle on a level surface.

Main work

- Remove the gear oil monitoring screw **1**.



- Remove filler plug ②.
- Fill in gear oil until it emerges from the drilled hole of the gear oil monitoring screw.

Engine oil (15W/50) (☛ p. 226)

- Mount and tighten the gear oil monitoring screw.

Guideline

Screw, gear oil level check	M6	8 Nm (5.9 lbf ft)
-----------------------------	----	-------------------

- Mount and tighten filler plug ②.

Finishing work



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.

21.1 Checking the ignition system

- Warning**
Risk of injury The ignition system is under high voltage.
- To avoid the danger of an electric shock, do not touch metal parts and the ends of the connection cable during and immediately after measuring.



- Shift gear to neutral.
- Pull off the spark plug connector and remove the spark plug connector from the ignition wire.
- Remove the spark plug.
- Hold the free end of the ignition wire at a distance **A** from ground.

Guideline

Distance A	5 mm (0.2 in)
-------------------	---------------

- Press the kick starter forcefully through its full range.



Info

Do not open the throttle.

- Check the ignition spark.
 - If no ignition spark is visible:
 - Check the kill switch.
 - Check the ground connection of the CDI controller and ignition coil.
 - Check the cable from the CDI controller to the ignition coil.



Info

The CDI controller cannot be tested using simple methods but only using an ignition test stand.

- Ignition coil - check the primary winding. (☞ p. 205)
- Ignition coil - check the secondary winding. (☞ p. 206)
- Check the ignition pulse generator. (☞ p. 207)
- Alternator - check the charging coil of the ignition. (☞ p. 207)
- Fit the spark plug connector on the ignition cable again. Insert the spark plug into the spark plug connector. Hold the spark plug to ground.
- Press the kick starter forcefully through its full range.



Info

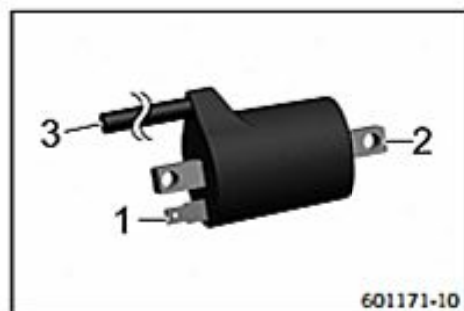
Do not open the throttle.

- Check the ignition spark.
 - If no ignition spark is visible:
 - Check the spark plug connector. (☞ p. 206)
 - Change the spark plug.



21.2 Ignition coil - checking the primary winding

- Warning**
Risk of injury The ignition system is under high voltage.
- To avoid the danger of an electric shock, do not touch metal parts and the ends of the connection cable during and immediately after measuring.



Condition

Ignition coil cylinder 1 is disconnected.

Ignition coil cylinder 1 - check the primary winding resistance

- Measure the resistance between the specified points.
Ignition coil pin 1 (+) – Ignition coil pin 2 (-)

Ignition coil

Primary winding resistance at: 20 °C (68 °F)	0.255... 0.345 Ω
---	------------------

- If the displayed value does not correspond to the nominal value:
 - Change the ignition coil.

Condition

Ignition coil cylinder 1 is connected.

- Connect the special tool to the multimeter.

Peak voltage adapter (58429042000) (☛ p. 233)



Info

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

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

Ignition coil cylinder 1 - check the primary winding voltage

- Measure the voltage between the specified points.
Ignition coil pin 1 (+) – Ignition coil pin 2 (-)



Info

Connect the black measuring lead to pin 1 and the red measuring lead to pin 2 of the ignition coil.

Ignition coil

Voltage, primary winding	120... 160 V
--------------------------	--------------

- If the displayed value does not correspond to the nominal value:
 - Change the ignition coil.

21.3 Ignition coil - checking the secondary winding

Condition

Ignition coil cylinder 1 is disconnected.

Spark plug connector cylinder 1 has been removed.

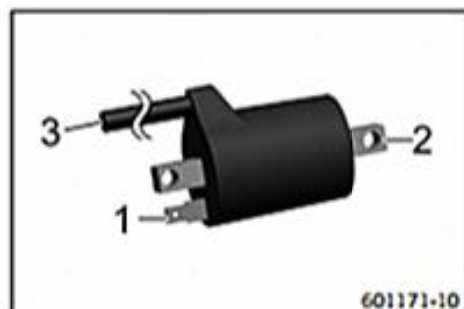
Ignition coil cylinder 1 - check the secondary winding resistance

- Measure the resistance between the specified points.
Ignition coil pin 2 (-) – Ignition coil pin 3

Ignition coil

Secondary winding resistance at: 20 °C (68 °F)	5.04... 7.56 kΩ
---	-----------------

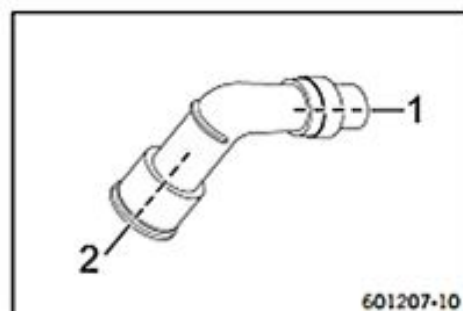
- If the displayed value does not correspond to the nominal value:
 - Change the ignition coil.



21.4 Checking the spark plug connector

Condition

Spark plug connector cylinder 1 has been removed.



- Ω Measure the resistance between the specified points.
Measuring point 1 – Measuring point 2

Spark plug connector

Resistance at: 20 °C (68 °F) 4.3... 5.7 k Ω

- If the specification is not reached:
 - Change the spark plug connector.

21.5 Alternator - checking the charging coil of the ignition

Condition

The alternator has been disconnected.

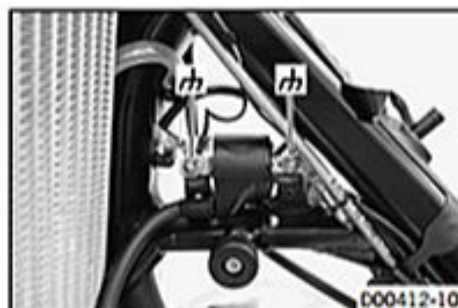
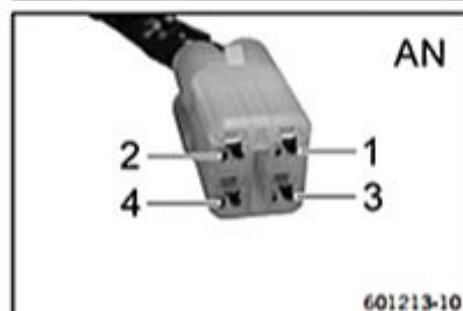


- Ω Measure the resistance between the specified points.
Alternator, charging coil/ignition pulse generator, connector **AN** pin 1 –
Alternator, charging coil/ignition pulse generator, connector **AN** pin 2

Alternator

Resistance of ignition charging coil at: 20 °C (68 °F) 20... 28 Ω

- The specifications have not been met:
 - Replace the stator.



- Ω Measure the resistance between the specified points.
Alternator, charging coil/ignition pulse generator, connector **AN** pin 1 – Measuring point Ground, wiring harness/frame

Resistance

$\infty \Omega$

- The specifications have not been met:
 - Replace the stator.

21.6 Checking the ignition pulse generator

Condition

The crankshaft position sensor is disconnected.

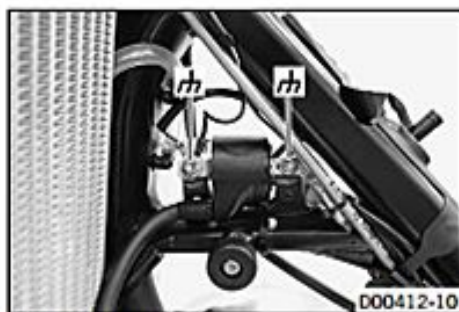


- Ω Measure the resistance between the specified points.
Alternator, charging coil/ignition pulse generator, connector **AN** pin 3 –
Alternator, charging coil/ignition pulse generator, connector **AN** pin 4

Crankshaft position sensor

Resistance at: 20 °C (68 °F) 80... 120 Ω

- The specifications have not been met:
 - Change the ignition pulse generator.



- Measure the resistance between the specified points.
Alternator, charging coil/ignition pulse generator, connector **AN** pin **3** – Measuring point Ground, wiring harness/frame

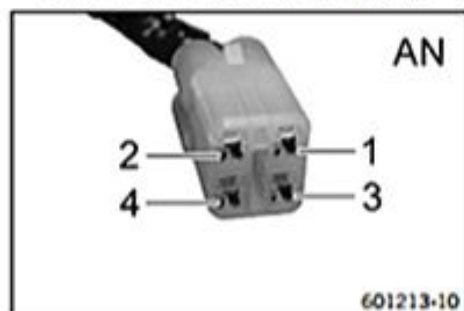
Resistance	$\infty \Omega$
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- The specifications have not been met:
 - Change the ignition pulse generator.
- Connect the special tool to the multimeter.

Peak voltage adapter (58429042000) (☞ p. 233)

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

- Start the motorcycle for checking. (☞ p. 11)



Check the ignition pulse generator voltage

- Measure the voltage between the specified points.
Alternator, charging coil/ignition pulse generator, connector **AN** pin **3** –
Alternator, charging coil/ignition pulse generator, connector **AN** pin **4**

Crankshaft position sensor	
Voltage at: 20 °C (68 °F)	2... 4 V

- The specifications have not been met:
 - Change the ignition pulse generator.

22.1 Engine**22.1.1 All 125 models**

Design	1-cylinder 2-stroke engine, water-cooled, with reed intake and exhaust control
Displacement	124.8 cm ³ (7.616 cu in)
Stroke	54.5 mm (2.146 in)
Bore	54 mm (2.13 in)
Crankshaft bearing	1 grooved ball bearing/1 roller bearing
Conrod bearing	Needle bearing
Piston pin bearing	Needle bearing
Pistons	Cast aluminum
Piston rings	2 half keystone rings
X (upper edge of piston to upper edge of cylinder)	0... 0.10 mm (0... 0.0039 in)
Z (height of control flap)	36.5 mm (1.437 in)
Primary transmission	23:73
Clutch	Multidisc clutch in oil bath/hydraulically activated
Gearbox	6-gear, claw shifted
Transmission ratio	
First gear	14:32
Second gear	15:30
Third gear	17:28
Fourth gear	20:28
Fifth gear	19:23
Sixth gear	22:24
Ignition	Contactless controlled fully electronic ignition with digital ignition adjustment, type Kokusan
Spark plug	NGK BR9 ECMVX
Spark plug electrode gap	0.60 mm (0.0236 in)
Starting aid	Kick starter

22.1.2 All 150 models

Design	1-cylinder 2-stroke engine, water-cooled, with reed intake and exhaust control
Displacement	144 cm ³ (8.79 cu in)
Stroke	54.5 mm (2.146 in)
Bore	58 mm (2.28 in)
Crankshaft bearing	1 grooved ball bearing/1 roller bearing
Conrod bearing	Needle bearing
Piston pin bearing	Needle bearing
Pistons	Forged aluminum
Piston rings	1 rectangular ring, 1 half keystone ring
X (upper edge of piston to upper edge of cylinder)	0... 0.10 mm (0... 0.0039 in)
Z (height of control flap)	36.5 mm (1.437 in)
Primary transmission	23:73
Clutch	Multidisc clutch in oil bath/hydraulically activated
Gearbox	6-gear, claw shifted
Transmission ratio	
First gear	14:32
Second gear	15:30
Third gear	17:28
Fourth gear	20:28
Fifth gear	19:23

Sixth gear	22:24
Ignition	Contactless controlled fully electronic ignition with digital ignition adjustment, type Kokusan
Spark plug	NGK BR9 ECMVX
Spark plug electrode gap	0.60 mm (0.0236 in)
Starting aid	Kick starter

22.2 Engine tolerance, wear limits

Piston - diameter (All 125 models)	
Size I	53.935... 53.945 mm (2.12342... 2.12381 in)
Size II	53.945... 53.955 mm (2.12381... 2.12421 in)
Piston - diameter (All 150 models)	
Size I	55.935... 55.945 mm (2.20216... 2.20255 in)
Size II	54.945... 54.955 mm (2.16318... 2.16358 in)
Cylinder - drill hole diameter (All 125 models)	
Size I	54.000... 54.012 mm (2.12598... 2.12645 in)
Size II	54.012... 54.025 mm (2.12645... 2.12696 in)
Cylinder - drill hole diameter (All 150 models)	
Size I	56.000... 56.012 mm (2.20472... 2.20519 in)
Size II	56.012... 56.025 mm (2.20519... 2.2057 in)
Piston/cylinder - mounting clearance (All 125 models)	
New condition	0.050... 0.080 mm (0.00197... 0.00315 in)
Wear limit	0.10 mm (0.0039 in)
Piston/cylinder - mounting clearance (All 150 models)	
New condition	0.050... 0.085 mm (0.00197... 0.00335 in)
Wear limit	0.10 mm (0.0039 in)
Piston ring - end gap	
Ring 1	≤ 0.40 mm (≤ 0.0157 in)
Ring 2	≤ 0.40 mm (≤ 0.0157 in)
Cylinder/cylinder head - distortion of sealing area	≤ 0.10 mm (≤ 0.0039 in)
Connecting rod - axial play of lower conrod bearing	0.45... 0.75 mm (0.0177... 0.0295 in)
Crankshaft - run-out at bearing pin	≤ 0.03 mm (≤ 0.0012 in)
Clutch facing disc - thickness	≥ 2.9 mm (≥ 0.114 in)
Clutch spring - length	≥ 39.0 mm (≥ 1.535 in)
Contact surface of clutch facing discs in outer clutch hub	≤ 0.5 mm (≤ 0.02 in)
Shift shaft - sliding plate/shift quadrant clearance	0.40... 0.80 mm (0.0157... 0.0315 in)

22.3 engine tightening torques

Screw, inner membrane sheets	EJOT DELTA PT® 35x25	1 Nm (0.7 lbf ft)	–
Screw, membrane core plate	EJOT DELTA PT® 30x12	1 Nm (0.7 lbf ft)	–
Screw, outer membrane sheets	EJOT DELTA PT® 30x6	1 Nm (0.7 lbf ft)	–
Screw, control lever, exhaust control	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Screw, crankshaft position sensor	M5	6 Nm (4.4 lbf ft)	Loctite® 222™
Screw, exhaust control cover	M5	6 Nm (4.4 lbf ft)	–
Screw, locking lever	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Screw, retaining bracket, rotary valve	M5	6 Nm (4.4 lbf ft)	–
Screw, stator	M5	6 Nm (4.4 lbf ft)	Loctite® 222™
Screw, water pump wheel	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Bleeder screw, cylinder head	M6	8 Nm (5.9 lbf ft)	–
Clutch slave cylinder screw	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Drain plug, water pump cover	M6	8 Nm (5.9 lbf ft)	–
Nut, adjusting screw, power valve	M6	8 Nm (5.9 lbf ft)	–

Screw, alternator cover	M6	8 Nm (5.9 lbf ft)	–
Screw, bearing retainer	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, clutch cover	M6	10 Nm (7.4 lbf ft)	–
Screw, clutch spring retainer	M6	10 Nm (7.4 lbf ft)	–
Screw, control lever, exhaust control	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, engine case	M6	10 Nm (7.4 lbf ft)	–
Screw, exhaust flange	M6	10 Nm (7.4 lbf ft)	–
Screw, gear oil level check	M6	8 Nm (5.9 lbf ft)	–
Screw, intake flange/reed valve housing	M6	10 Nm (7.4 lbf ft)	–
Screw, kick starter stop plate	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, shift drum locating	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, shift lever	M6	14 Nm (10.3 lbf ft)	Loctite® 243™
Screw, stop plate of exhaust control	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, water pump cover	M6	10 Nm (7.4 lbf ft)	–
Screw, cylinder head	M7	18 Nm (13.3 lbf ft)	–
Nut, cylinder base	M8	23 Nm (17 lbf ft)	–
Screw, cylinder base	M8	20 Nm (14.8 lbf ft)	–
Screw, kick starter	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
Gear oil drain plug	M10x1	15 Nm (11.1 lbf ft)	–
Nut, rotor	M12x1	60 Nm (44.3 lbf ft)	–
Gear oil drain plug with magnet	M12x1.5	20 Nm (14.8 lbf ft)	–
Spark plug	M14x1.25	25 Nm (18.4 lbf ft)	–
Nut, primary gear	M16LHx1.5	130 Nm (95.9 lbf ft)	Loctite® 243™
Nut, inner clutch hub	M18x1.5	100 Nm (73.8 lbf ft)	Loctite® 243™

22.4 capacities

22.4.1 Gear oil

Gear oil	0.80 l (0.85 qt.)	Engine oil (15W/50) (☛ p. 226)
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22.4.2 Coolant

Coolant	1.2 l (1.3 qt.)	Coolant (☛ p. 226)
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22.4.3 Fuel

Total fuel tank capacity, approx.	7.5 l (1.98 US gal)	Super unleaded (98 octane) mixed with 2-stroke engine oil (1:40) (☛ p. 227)
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22.5 Chassis

Frame	Central tube frame made of chrome molybdenum steel tubing
Fork (All EU models)	WP Performance Systems Upside down AER 48
Fork (All US models)	WP Performance Systems Up Side Down 4860 MXMA 4CS
Suspension travel	
Front	300 mm (11.81 in)
Suspension travel	
Rear	300 mm (11.81 in)
Fork offset	22 mm (0.87 in)
Shock absorber (All EU models)	WP Performance Systems 5018 DCC Link
Shock absorber (All US models)	WP Performance Systems 5018 DCC Link
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)
Secondary ratio (All 125 models)	13:50
Secondary ratio (All 150 models)	13:48
Chain	5/8 x 1/4"
Rear sprockets available	48, 50, 52
Steering head angle	63.9°
Wheelbase	1,480±10 mm (58.27±0.39 in)
Seat height unloaded	960 mm (37.8 in)
Ground clearance unloaded	375 mm (14.76 in)
Weight without fuel, approx. (All EU models)	87.8 kg (193.6 lb.)
Weight without fuel, approx. (All US models)	89.2 kg (196.7 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.)

22.6 Tires

Front tires	Rear tires
80/100 - 21 51M TT Dunlop Geomax MX 32 F	100/90 - 19 57M TT Dunlop Geomax MX 32
Additional information is available in the Service section under: http://www.ktm.com	

22.7 Fork

22.7.1 All EU models

Fork part number	34.18.8P.01
Fork	WP Performance Systems Upside down AER 48
Compression damping	
Comfort	20 clicks
Standard	17 clicks
Sport	12 clicks
Rebound damping	
Comfort	20 clicks
Standard	17 clicks
Sport	12 clicks
Air pressure	8.2 bar (119 psi)
Fork length	950 mm (37.4 in)
Oil capacity external mechanism left	200±25 ml (6.76±0.85 fl. oz.)
Oil capacity external mechanism right	200±25 ml (6.76±0.85 fl. oz.)
Grease capacity, left cartridge	11 ml (0.37 fl. oz.)
Oil capacity, right cartridge	380 ml (12.85 fl. oz.)
Fork oil (SAE 4) (48601166S1) (☞ p. 226)	
Fork oil (SAE 4) (48601166S1) (☞ p. 226)	
Multi-purpose grease (00062010051) (☞ p. 227)	
Fork oil (SAE 4) (48601166S1) (☞ p. 226)	

22.7.2 All US models

Fork part number	24.18.7P.51
Fork	WP Performance Systems Up Side Down 4860 MXMA 4CS

Compression damping		
Comfort		17 clicks
Standard		15 clicks
Sport		13 clicks
Rebound damping		
Comfort		17 clicks
Standard		15 clicks
Sport		13 clicks
Spring length with preload spacer(s)		475 mm (18.7 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)
Oil capacity per fork leg	685 ml (23.16 fl. oz.)	Fork oil (SAE 4) (48601166S1) (☛ p. 226)

22.8 shock absorber

22.8.1 All EU models

Shock absorber article number	18.18.7P.01
Shock absorber	WP Performance Systems 5018 DCC Link
Compression damping, low-speed	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks
Compression damping, high-speed	
Comfort	2.5 turns
Standard	2 turns
Sport	1.5 turns
Rebound damping	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks
Spring preload	5 mm (0.2 in)
Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	39 N/mm (223 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	42 N/mm (240 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	45 N/mm (257 lb/in)
Spring length	247 mm (9.72 in)
Gas pressure	10 bar (145 psi)
Static sag	35 mm (1.38 in)
Riding sag	105 mm (4.13 in)
Fitted length	477 mm (18.78 in)
Shock absorber fluid (☛ p. 227)	SAE 2.5

22.8.2 All US models

Shock absorber article number	18.18.7P.51
Shock absorber	WP Performance Systems 5018 DCC Link
Compression damping, low-speed	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks

Compression damping, high-speed	
Comfort	2.5 turns
Standard	2 turns
Sport	1.5 turns
Rebound damping	
Comfort	17 clicks
Standard	15 clicks
Sport	13 clicks
Spring preload	7 mm (0.28 in)
Spring rate	
Weight of rider: 65... 75 kg (143... 165 lb.)	39 N/mm (223 lb/in)
Weight of rider: 75... 85 kg (165... 187 lb.)	42 N/mm (240 lb/in)
Weight of rider: 85... 95 kg (187... 209 lb.)	45 N/mm (257 lb/in)
Spring length	247 mm (9.72 in)
Gas pressure	10 bar (145 psi)
Static sag	40 mm (1.57 in)
Riding sag	110 mm (4.33 in)
Fitted length	477 mm (18.78 in)
Shock absorber fluid (☛ p. 227)	SAE 2.5

22.9 chassis tightening torques

Spoke nipple, front wheel	M4.5	6 Nm (4.4 lbf ft)	–
Spoke nipple, rear wheel	M4.5	6 Nm (4.4 lbf ft)	–
Remaining nuts, chassis	M5	5 Nm (3.7 lbf ft)	–
Remaining screws, chassis	M5	5 Nm (3.7 lbf ft)	–
Screw, shock absorber adjusting ring	M5	5 Nm (3.7 lbf ft)	–
Screws on the main silencer	M5	7 Nm (5.2 lbf ft)	–
Remaining nuts, chassis	M6	10 Nm (7.4 lbf ft)	–
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)	–
Screw, absorbing element on frame	M6	6 Nm (4.4 lbf ft)	–
Screw, absorbing element on manifold	M6	6 Nm (4.4 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™
Screw, throttle grip	M6	5 Nm (3.7 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	12 Nm (8.9 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	M8	12 Nm (8.9 lbf ft)	–
Screw, chain sliding piece	M8	15 Nm (11.1 lbf ft)	–
Screw, engine brace	M8	25 Nm (18.4 lbf ft)	Loctite® 2701™
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, subframe	M8	35 Nm (25.8 lbf ft)	Loctite® 2701™
Screw, top steering stem	M8	20 Nm (14.8 lbf ft)	Loctite® 243™
Screw, top triple clamp	M8	17 Nm (12.5 lbf ft)	–
Engine bracket screw	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, bottom shock absorber	M10	60 Nm (44.3 lbf ft)	Loctite® 2701™
Screw, handlebar support	M10	40 Nm (29.5 lbf ft)	Loctite® 243™
Screw, top shock absorber	M10	60 Nm (44.3 lbf ft)	Loctite® 2701™
Nut, frame on linkage lever	M14x1.5	80 Nm (59 lbf ft)	–
Nut, linkage lever on swingarm	M14x1.5	80 Nm (59 lbf ft)	–
Nut, linkage lever to angle lever	M14x1.5	80 Nm (59 lbf ft)	–
Nut, swingarm pivot	M16x1.5	100 Nm (73.8 lbf ft)	–
Screw, front wheel spindle	M20x1.5	35 Nm (25.8 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™
Nut, rear wheel spindle	M25x1.5	80 Nm (59 lbf ft)	–

22.10 carburetor

22.10.1 All 125 models

Carburetor type	KEIHIN PWK 38S AG
Carburetor identification number	BS5_0
Needle position	2nd position from top
Jet needle	N1EF (N1EE, N1EG)
Main jet	182 (180, 185)
Idling jet	50 (48, 52)
Starting jet	85
Idle air adjusting screw	
Open	2 turns
Throttle slide	7 with cut-out

22.10.2 Carburetor - basic setting for sandy surfaces (All 125 models)

Idle air adjusting screw	
Open	1 turn
Idling jet	52
Jet needle	N1EE
Needle position	4th position from top
Main jet	192



Info

If the engine is not running smoothly, use a smaller main jet.

22.10.3 All 150 models

Carburetor type	KEIHIN PWK 38S AG
Carburetor identification number	BS6_0
Needle position	1st position from top
Jet needle	N0ZG (N0ZE, N0ZF)
Main jet	180 (182, 185)
Idling jet	45 (48, 50)
Starting jet	85
Idle air adjusting screw	
Open	1 turn
Throttle slide	7 with cut-out

22.10.4 Carburetor - basic setting for sandy surfaces (All 150 models)

Idle air adjusting screw	
Open	1 turn
Idling jet	52
Jet needle	NOZE
Needle position	4th position from top
Main jet	190

**Info**

If the engine is not running smoothly, use a smaller main jet.

22.11 carburetor tuning

22.11.1 Carburetor tuning (All 125 models)

KEIHIN PWK 38S AG							
M/FT ASL ↓	TEMP →	-20°C ... -7°C -2°F ... 20°F	-6°C ... 5°C 19°F ... 41°F	6°C ... 15°C 42°F ... 60°F	16°C ... 24°C 61°F ... 78°F	25°C ... 36°C 79°F ... 98°F	37°C ... 49°C 99°F ... 120°F
3,000 m 10,000 ft ↑ 2,301 m 7,501 ft	ASO IJ NDL POS MJ	2 50 N1E F 3 182	2 48 N1E F 3 182	2 48 N1E G 3 180	2 45 N1E G 3 178	2 45 N1E G 2 178	
2,300 m 7,500 ft ↑ 1,501 m 5,001 ft	ASO IJ NDL POS MJ	2 52 N1E F 3 185	2 50 N1E F 3 182	2 48 N1E F 3 182	2 48 N1E G 3 180	2 45 N1E G 3 178	2 45 N1E G 2 178
1,500 m 5,000 ft ↑ 751 m 2,501 ft	ASO IJ NDL POS MJ	2 52 N1E F 4 185	2 52 N1E F 3 185	2 50 N1E F 3 182	2 48 N1E F 3 182	2 48 N1E G 3 180	2 45 N1E G 3 178
750 m 2,500 ft ↑ 301 m 1,001 ft	ASO IJ NDL POS MJ	2 52 N1E E 4 188	2 52 N1E F 4 185	2 52 N1E F 3 185	2 50 N1E F 3 182	2 48 N1E F 3 182	2 48 N1E G 3 180
300 m 1,000 ft ↑ 0 m 0 ft	ASO IJ NDL POS MJ	1 52 N1E E 4 190	2 52 N1E E 4 188	2 52 N1E F 4 185	2 52 N1E F 3 185	2 50 N1E F 3 182	2 48 N1E F 3 182

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M/FT ASL	Sea level
TEMP	Temperature
ASO	Idle air adjusting screw open
IJ	Idling jet
NDL	Needle
POS	Needle position from above
MJ	Main jet



Info
Not for sandy surfaces

22.11.2 Carburetor tuning (All 150 models)

KEIHIN PWK 38S AG							
M/FT ASL ↓	TEMP →	-20°C ... -7°C -2°F ... 20°F	-6°C ... 5°C 19°F ... 41°F	6°C ... 15°C 42°F ... 60°F	16°C ... 24°C 61°F ... 78°F	25°C ... 36°C 79°F ... 98°F	37°C ... 49°C 99°F ... 120°F
3,000 m 10,000 ft ↑ 2,301 m 7,501 ft	ASO IJ NDL POS MJ	1 48 NOZ F 3 182	1 45 NOZ G 3 180	2 45 NOZ G 3 180	2 45 NOZ H 3 178	2 45 NOZ H 2 178	
2,300 m 7,500 ft ↑ 1,501 m 5,001 ft	ASO IJ NDL POS MJ	1,5 50 NOZ F 4 182	1 48 NOZ F 3 182	1 45 NOZ G 3 180	2 45 NOZ G 3 180	2 45 NOZ H 3 178	2 45 NOZ H 2 178
1,500 m 5,000 ft ↑ 751 m 2,501 ft	ASO IJ NDL POS MJ	1 50 NOZ E 4 185	1,5 50 NOZ F 4 182	1 48 NOZ F 3 182	1 45 NOZ G 3 180	2 45 NOZ G 3 180	2 45 NOZ H 3 178
750 m 2,500 ft ↑ 301 m 1,001 ft	ASO IJ NDL POS MJ	1 52 NOZ E 4 188	1 50 NOZ E 4 185	1,5 50 NOZ F 4 182	1 48 NOZ F 3 182	1 45 NOZ G 3 180	2 45 NOZ G 3 180
300 m 1,000 ft ↑ 0 m 0 ft	ASO IJ NDL POS MJ	1 52 NOZ E 5 188	1 52 NOZ E 4 188	1 50 NOZ E 4 185	1,5 50 NOZ F 4 182	1 48 NOZ F 3 182	1 45 NOZ G 3 180

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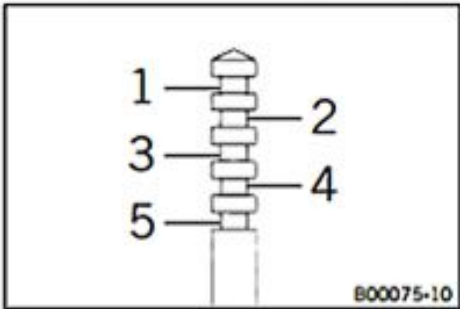
M/FT ASL	Sea level
TEMP	Temperature
ASO	Idle air adjusting screw open
IJ	Idling jet
NDL	Needle
POS	Needle position from top
MJ	Main jet



Info

Not for sandy surfaces

22.11.3 General carburetor tuning



1... 5	Needle position from top
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The five possible needle positions are shown here.
The carburetor tuning depends on the defined ambient and operating conditions.

23.1 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

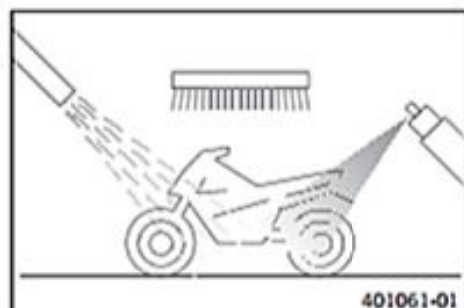
Environmental hazard Hazardous substances cause environmental damage.

- 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 sunlight on the motorcycle during cleaning.



- Close off the exhaust system to prevent water from entering.
- Remove coarse dirt particles by spraying gently with water.
- Spray very dirty areas with a normal motorcycle cleaner and then clean with a soft brush.

Motorcycle cleaner (☞ p. 228)



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 water spray, allow it to dry thoroughly.
- Empty the carburetor float chamber. (☞ p. 190)
- 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, take a short ride 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. 110)
- Treat bare metal parts (except for brake discs and exhaust system) with anti-corrosion materials.

Preserving materials for paints, metal and rubber (☞ p. 229)

- Treat all plastic parts and powder-coated parts with a mild cleaning and care product.

Special cleaner for glossy and matte paint finishes, metal and plastic surfaces (☞ p. 229)

24.1 Storage

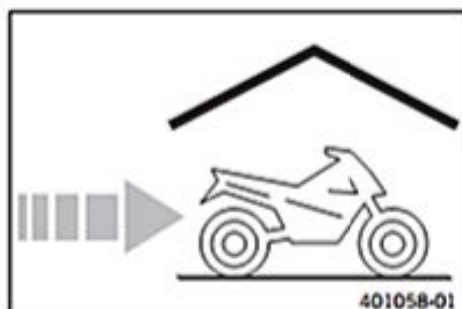
**Warning**

Danger of poisoning Fuel is poisonous and a health hazard.

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

**Info**

If you plan to garage the motorcycle for a longer period, perform the following steps or have them performed. Before storing the motorcycle, check all parts for function and wear. If service, repairs, or replacements are necessary, you should do this during the storage period (less workshop overload). In this way, you can avoid long workshop waiting times at the start of the new season.



- When refueling for the last time before taking the motorcycle out of service, add fuel additive. (☛ p. 228)

Fuel additive (☛ p. 228)

- Refuel.
- Clean the motorcycle. (☛ p. 220)
- Change the gear oil. (☛ p. 202)
- Check the antifreeze and coolant level. (☛ p. 199)
- Empty the carburetor float chamber. (☛ p. 190)
- Check the tire air pressure. (☛ p. 102)
- Store the vehicle in a dry location that is not subject to large fluctuations in temperature.

**Info**

KTM recommends jacking up the motorcycle.

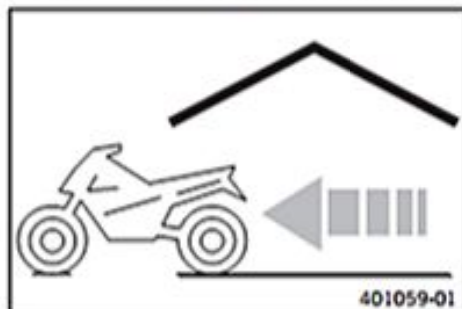
- Raise the motorcycle with a lift stand. (☛ p. 10)
- Cover the vehicle with a tarp or similar cover that is permeable to air.

**Info**

Do not use non-porous materials since they prevent humidity from escaping, thus causing corrosion.

Avoid running the engine for a short time only. Because the engine will not warm up sufficiently, the water vapor produced during combustion will condense, causing engine parts and the exhaust system to rust.

24.2 Preparing for use after storage



- Remove the motorcycle from the lift stand. (☛ p. 10)
- Perform checks and maintenance work when preparing the vehicle for use.
- Make a test ride.

25.1 Service schedule

	Every 20 operating hours	
	Every 10 operating hours/after every race	
Change the gear oil.	•	•
Check the front brake linings. (☞ p. 118)	•	•
Check the rear brake linings. (☞ p. 123)	•	•
Check the brake discs. (☞ p. 103)	•	•
Check the brake lines for damage and leakage.	•	•
Check the rear brake fluid level. (☞ p. 125)	•	•
Check the free travel of the foot brake lever. (☞ p. 124)	•	•
Check the frame and swingarm.	•	•
Check the swingarm bearing.	•	•
Check the shock absorber linkage.	•	•
Check the tire condition. (☞ p. 102)	•	•
Check the tire air pressure. (☞ p. 102)	•	•
Check the wheel bearing for play.	•	•
Check the wheel hubs.	•	•
Check the rim run-out.	•	•
Check the spoke tension. (☞ p. 103)	•	•
Check the chain, rear sprocket, engine sprocket, and chain guide. (☞ p. 111)	•	•
Check the chain tension. (☞ p. 111)	•	•
Grease all moving parts (e.g., hand lever, chain, ...) and check for smooth operation.	•	•
Check/rectify the fluid level of the hydraulic clutch. (☞ p. 198)	•	•
Check the front brake fluid level. (☞ p. 120)	•	•
Check the free travel of the hand brake lever. (☞ p. 120)	•	•
Check the play of the steering head bearing. (☞ p. 57)	•	•
Change the piston and check the cylinder and Z dimension.	•	•
Change the piston and check the cylinder and Z dimension. (under difficult operating conditions)	•	•
Change the spark plug and spark plug connector.	•	•
Check the inlet membrane.	•	•
Check the exhaust control for functioning and smooth operation.	•	•
Check the clutch.	•	•
Check all hoses (e.g. fuel, cooling, bleeder, drainage, etc.) and sleeves for cracking, leaks, and incorrect routing.	•	•
Check the antifreeze and coolant level. (☞ p. 199)	•	•
Check the cables for damage and routing without sharp bends.	•	•
Check that the throttle cables are undamaged, routed without sharp bends, and set correctly.	•	•
Clean the air filter and air filter box. (☞ p. 96)	•	•
Change glass fiber yarn filling in the main silencer. (☞ p. 93)	•	•
Check the screws and nuts for tightness.	•	•
Check idle.	•	•
Final check: Check the vehicle for safe operation and take a test ride.	•	•
Make the service entry in the KTM Dealer.net and in the Service and Warranty Booklet.	•	•

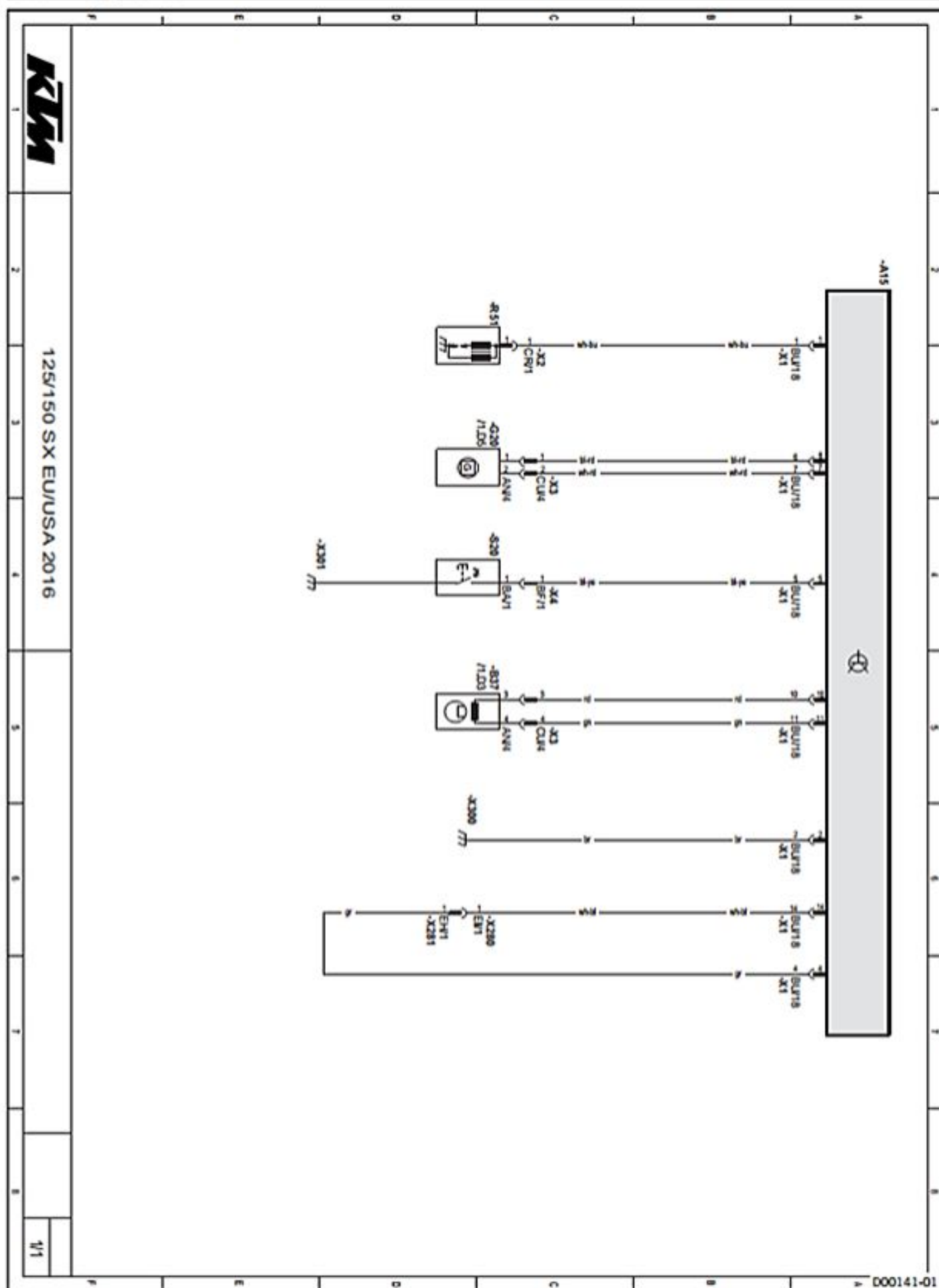
- Periodic interval

25.2 Service work (as additional order)

	Annually			
	Every 40 operating hours			
	Every 30 operating hours			
	Once after 20 operating hours			
	Every 10 operating hours/after every race			
	Once after 10 operating hours			
Change the front brake fluid. (☛ p. 122)				•
Change the rear brake fluid. (☛ p. 127)				•
Change the hydraulic clutch fluid. (☛ p. 198)				•
Grease the steering head bearing. (☛ p. 54)				•
Check/adjust the carburetor components.				• •
Perform a fork service. (All US models) (☛ p. 40)	○			•
Service the fork. (All EU models) (☛ p. 16)	○			•
Service the shock absorber. (☛ p. 71)		○		•
Change the connecting rod, conrod bearing, and crank pin.				•
Check the transmission and shift mechanism.				•
Change all engine bearings.				•

○ One-time interval

• Periodic interval



Components:

A15	CDI controller
B37	Crankshaft position sensor
G20	Alternator
R51	Ignition coil (cylinder 1)
S20	Kill switch
X280	Connector, ignition curve
X281	Connector, ignition curve

Cable colors:

bl	Black
br	Brown
bu	Blue
gn	Green
gr	Gray
lbu	Light blue
or	Orange
pk	Pink
pu	Violet
rd	Red
wh	White
ye	Yellow

Brake fluid DOT 4 / DOT 5.1**Standard/classification**

- DOT

Guideline

- Use only brake fluid that complies with the specified standard (see specifications on the container) and that exhibits the corresponding properties.

Recommended supplier**Castrol**

- RESPONSE BRAKE FLUID SUPER DOT 4

Motorex®

- Brake Fluid DOT 5.1

Coolant**Guideline**

- Only use high quality coolant with corrosion inhibitor for aluminum motors (even in countries with high temperatures). Using inferior antifreeze can result in corrosion and foaming.

Mixture ratio

Antifreeze protection: -25... -45 °C (-13... -49 °F)	anti-corrosion/antifreeze distilled water
---	--

Recommended supplier**Motorex®**

- COOLANT M3.0

Engine oil (15W/50)**Standard/classification**

- JASO T903 MA (☛ p. 240)
- SAE (☛ p. 240) (15W/50)

Guideline

- Use only engine oils that comply with the specified standards (see specifications on the container) and that possess the corresponding properties.

Recommended supplier**Motorex®**

- Top Speed 4T

Engine oil, 2-stroke**Standard/classification**

- JASO FD (☛ p. 240)

Guideline

- Only use high grade 2-stroke engine oil of a reputable brand.

Fully synthetic

Recommended supplier**Motorex®**

- Cross Power 2T

Fork oil (SAE 4) (48601166S1)**Standard/classification**

- SAE (☛ p. 240) (SAE 4)

Guideline

- Use only oils that comply with the specified standards (see specifications on the container) and that exhibit the corresponding properties.

Multi-purpose grease (00062010051)

Recommended supplier

Klüber Lubrication®

- CENTOPLEX 2 EP

Shock absorber fluid (SAE 2.5) (50180751S1)

Standard/classification

- SAE (☛ p. 240) (SAE 2.5)

Guideline

- Use only oils that comply with the specified standards (see specifications on the container) and that exhibit the corresponding properties.

Super unleaded (ROZ 98 / RON 98 / PON 94)

Standard/classification

- DIN EN 228 (ROZ 98 / RON 98 / PON 94)

Super unleaded (98 octane) mixed with 2-stroke engine oil (1:40)

Standard/classification

- DIN EN 228
- JASO FD (☛ p. 240) (1:40)

Mixture ratio

1:40	Engine oil, 2-stroke (☛ p. 226) Super unleaded (ROZ 98 / RON 98 / PON 94) (☛ p. 227)
------	---

Recommended supplier

Motorex®

- Cross Power 2T

Air filter cleaner

Recommended supplier

Motorex®

- Racing Bio Dirt Remover

Chain cleaner

Recommended supplier

Motorex®

- Chain Clean

Fuel additive

Recommended supplier

Motorex®

- Fuel Stabilizer

High viscosity grease

Recommended supplier

SKF®

- LGHB 2

Long-life grease

Recommended supplier

Motorex®

- Bike Grease 2000

Lubricant (T511)

Recommended supplier

Lubcon®

- Turmsilon® GTI 300 P

Lubricant (T158)

Recommended supplier

Lubcon®

- Turmogrease® PP 300

Lubricant (T625)

Recommended supplier

Molykote®

- 33 Medium

Lubricant (T152)

Recommended supplier

Bel-Ray®

- Molylube® Anti-Seize

Lubricant (T159)

Recommended supplier

Bel-Ray®

- MC-11®

Motorcycle cleaner

Recommended supplier

Motorex®

- Moto Clean

Off-road chain spray

Recommended supplier

Motorex®

- Chainlube Offroad

Oil for foam air filter

Recommended supplier

Motorex®

- Racing Bio Liquid Power

Preserving materials for paints, metal and rubber

Recommended supplier

Motorex®

- Moto Protect

Special cleaner for glossy and matte paint finishes, metal and plastic surfaces

Recommended supplier

Motorex®

- Quick Cleaner

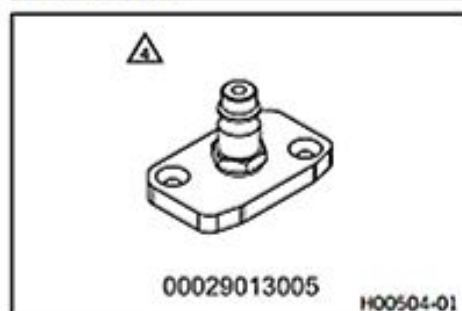
Universal oil spray

Recommended supplier

Motorex®

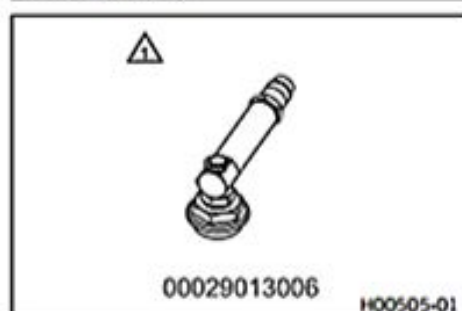
- Joker 440 Synthetic

Bleeder cover



Art. no.: 00029013005

Bleeder cover



Art. no.: 00029013006

Bleeding device



Art. no.: 00029013100

Dial gauge



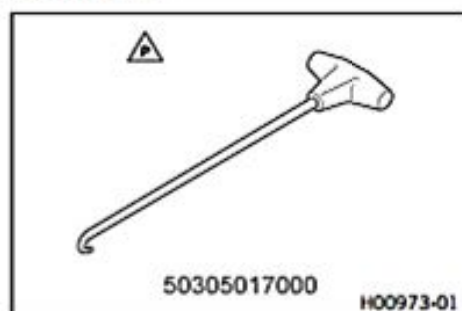
Art. no.: 50112013000

Dial gauge support



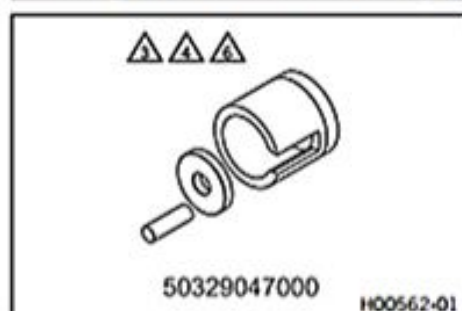
Art. no.: 50112030000

Spring hook



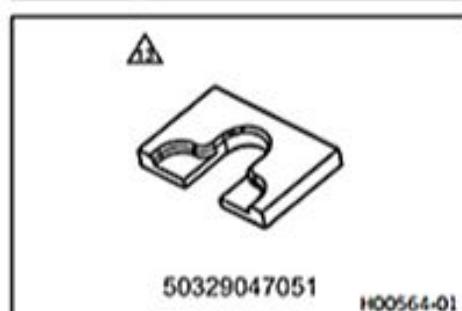
Art. no.: 50305017000

Pressing device, crankshaft, complete



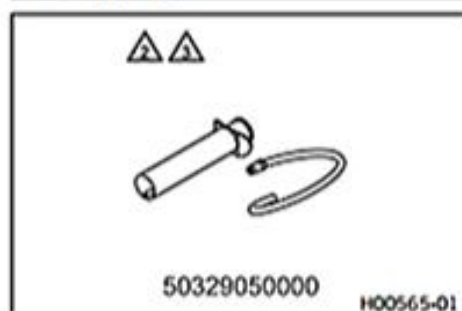
Art. no.: 50329047000

Press-out plate



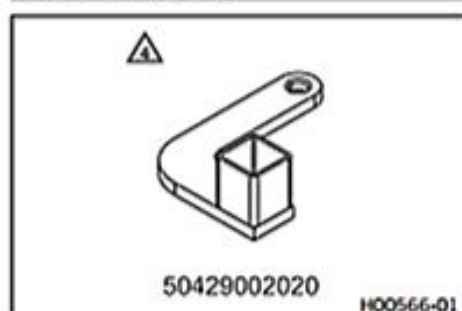
Art. no.: 50329047051

Bleed syringe



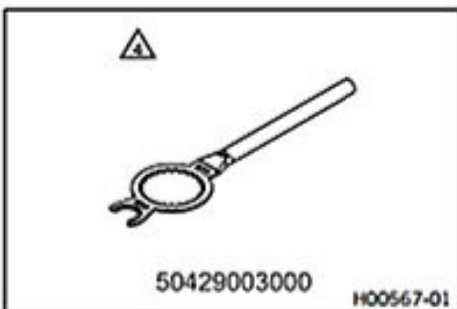
Art. no.: 50329050000

Engine fixing arm



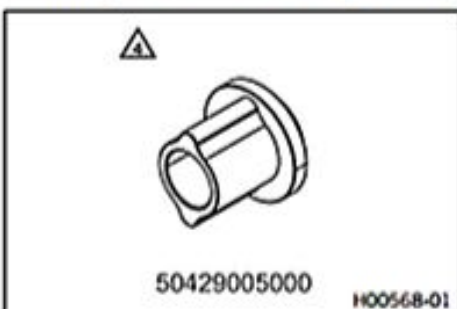
Art. no.: 50429002020

Clutch holder/primary gear holder



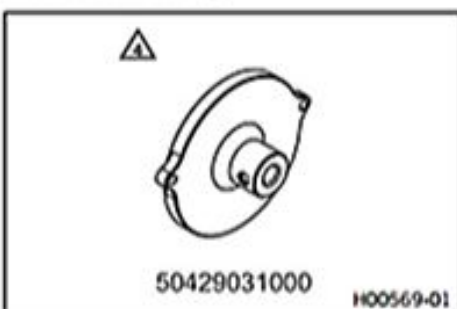
Art. no.: 50429003000

Pressing tool, shaft seal ring on crankshaft



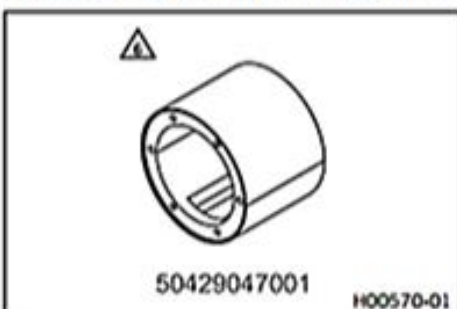
Art. no.: 50429005000

Measurement cap



Art. no.: 50429031000

Bushing, crankshaft pressing device



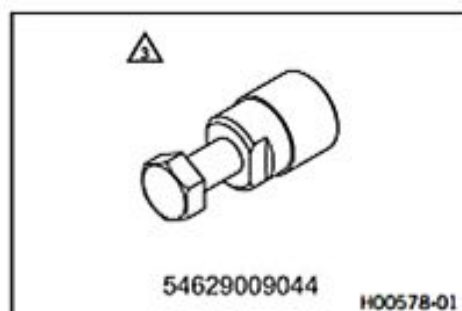
Art. no.: 50429047001

Cover, crankshaft pressing device



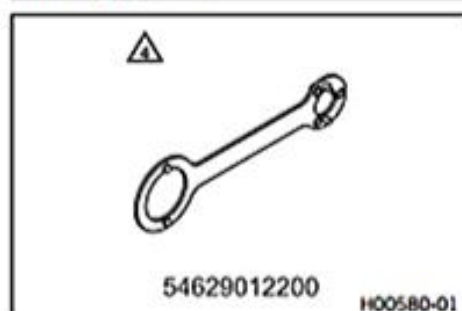
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Extractor



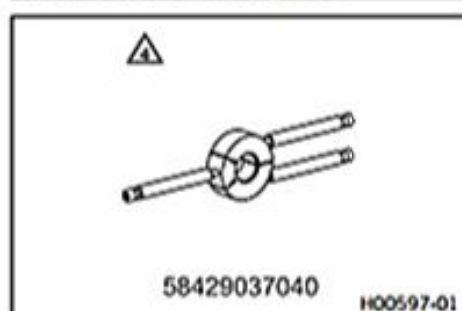
Art. no.: 54629009044

Holding spanner



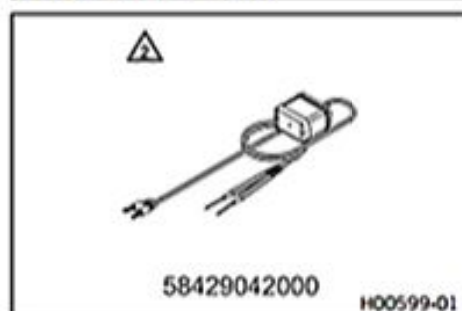
Art. no.: 54629012200

Tool for inner bearing race



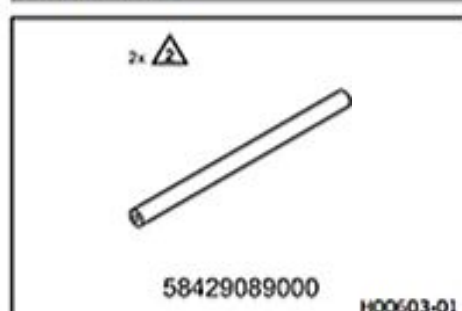
Art. no.: 58429037040

Peak voltage adapter



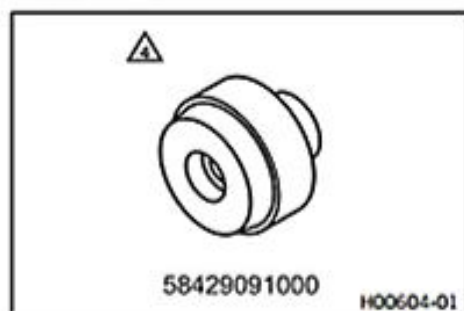
Art. no.: 58429042000

Tool bracket



Art. no.: 58429089000

Press-in tool



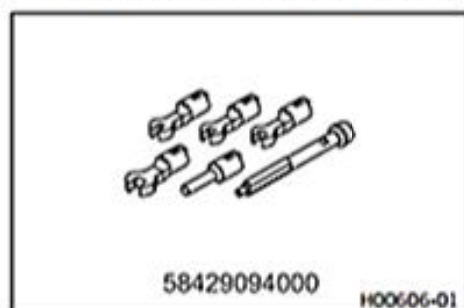
Art. no.: 58429091000

Press-out tool



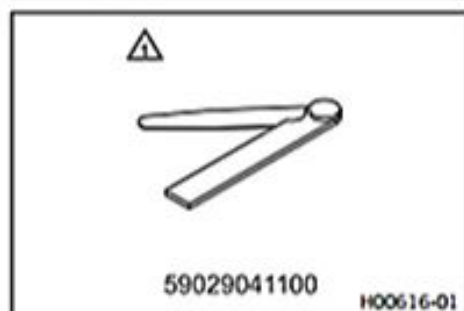
Art. no.: 58429092000

Torque wrench with various accessories in set



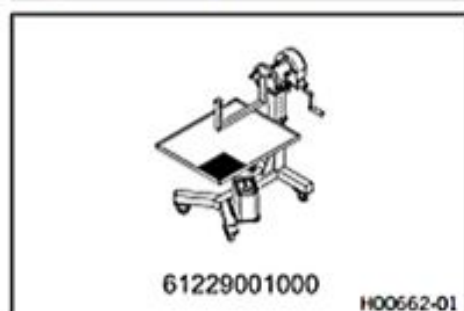
Art. no.: 58429094000

Feeler gauge



Art. no.: 59029041100

Engine assembly stand



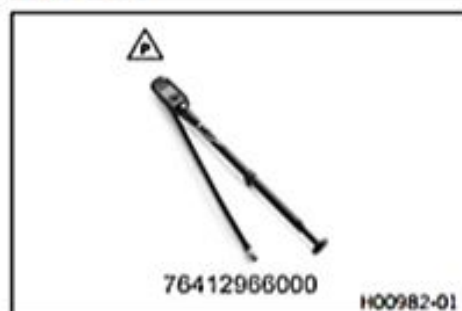
Art. no.: 61229001000

Lift stand



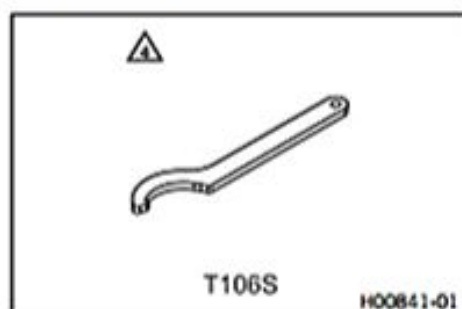
Art. no.: 78129955100

Fork pump



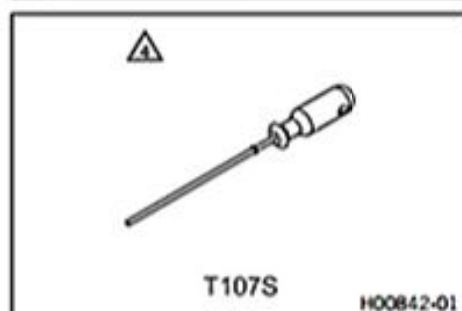
Art. no.: 79412966000

Hook wrench



Art. no.: T106S

Depth micrometer



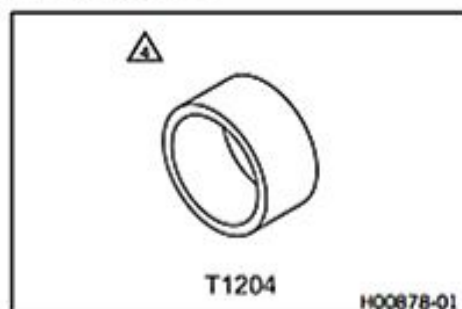
Art. no.: T107S

Pin



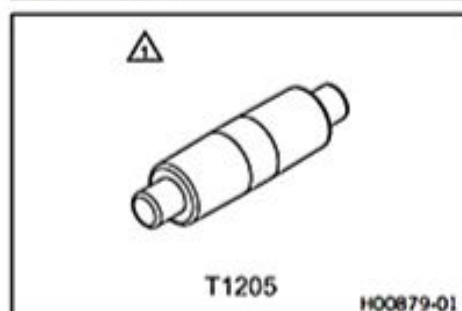
Art. no.: T120

Mounting sleeve



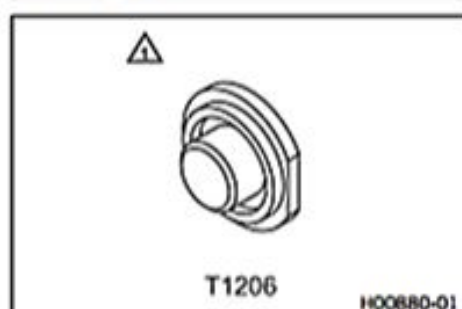
Art. no.: T1204

Calibration pin



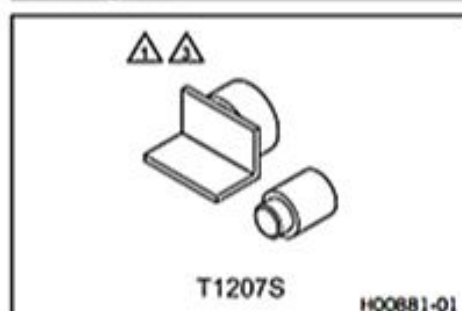
Art. no.: T1205

Pressing tool



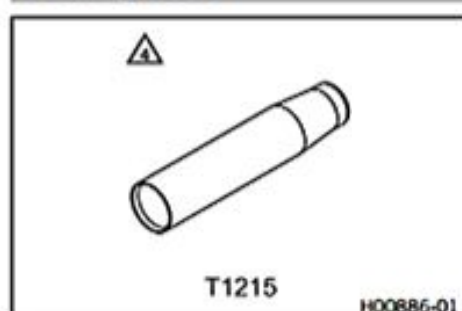
Art. no.: T1206

Pressing tool



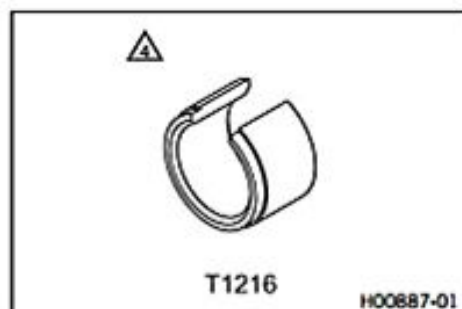
Art. no.: T1207S

Mounting sleeve



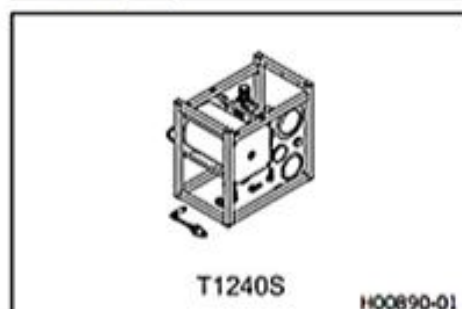
Art. no.: T1215

Disassembly tool



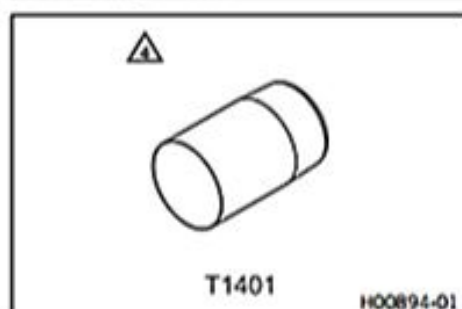
Art. no.: T1216

Vacuum pump



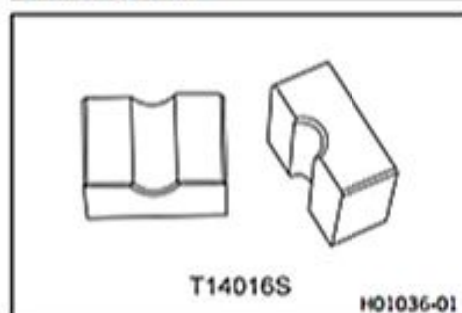
Art. no.: T1240S

Protecting sleeve



Art. no.: T1401

Clamping stand



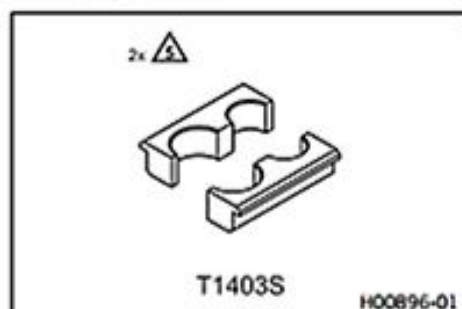
Art. no.: T14016S

Ring wrench



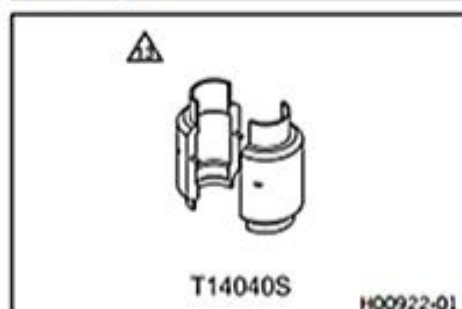
Art. no.: T14017

Clamping stand



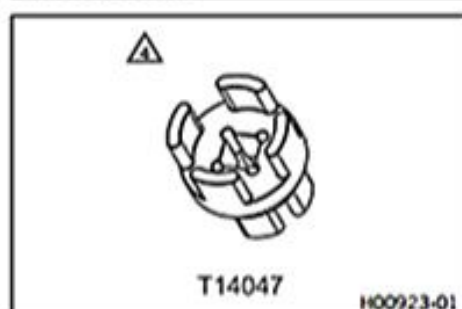
Art. no.: T1403S

Mounting tool



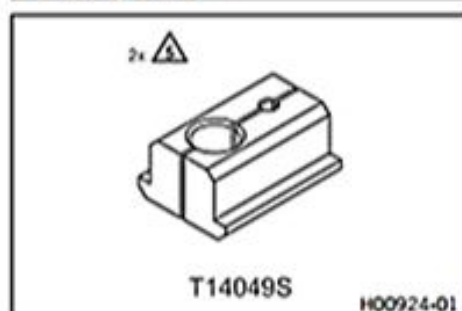
Art. no.: T14040S

Special socket



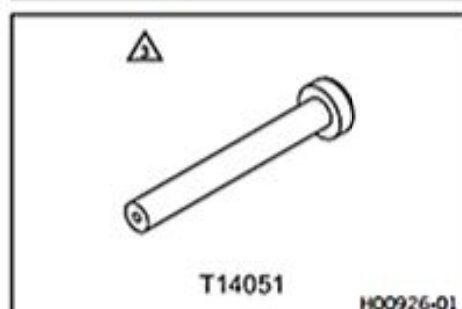
Art. no.: T14047

Clamping stand



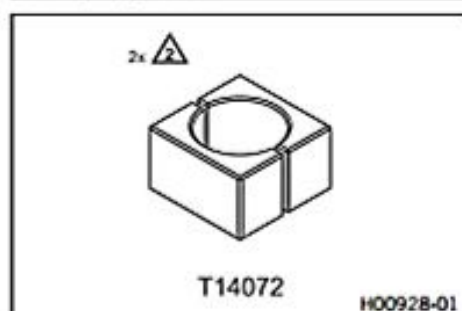
Art. no.: T14049S

Press-out tool



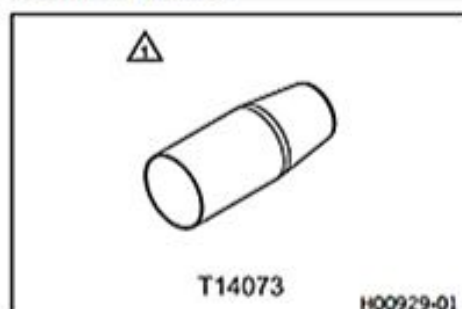
Art. no.: T14051

Clamping stand



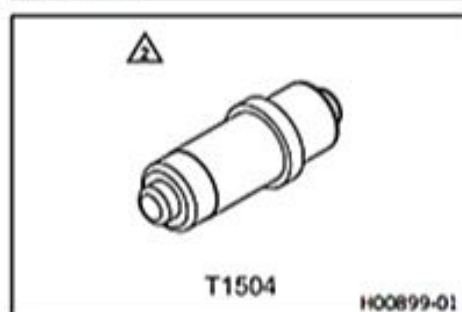
Art. no.: T14072

Protecting sleeve



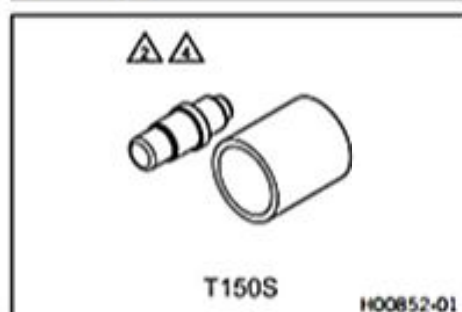
Art. no.: T14073

Press drift



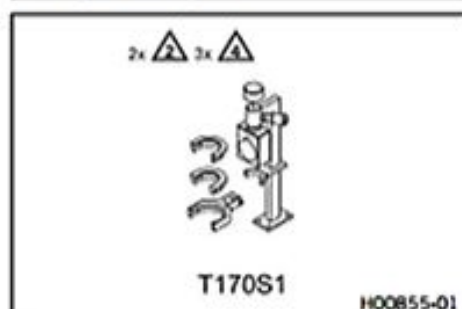
Art. no.: T1504

Assembly tool



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.

JASO FD

JASO FD is a classification for a 2-stroke engine oil that was specifically developed for the extreme demands of racing. Thanks to first rate synthetic esters and specially designed additives, superb combustion is achieved even under extreme operating conditions.

Art. no.	Article number
ca.	circa
cf.	compare
e.g.	for example
etc.	et cetera
i.a.	inter alia
no.	number
poss.	possibly

A	
Accessories	8
Air cartridge	
of fork legs, assembling	25
of fork legs, disassembling	20
Air filter	
cleaning	96
installing	96
removing	95
Air filter box	
cleaning	96
sealing	97
Air filter box cover	
installing	95
removing	95
securing	97
Air suspension AER 48	12
Alternator	
charging coil of the ignition, checking	207
Antifreeze	
checking	199
Auxiliary substances	8
B	
Brake disc	
front brake, removing	105
rear brake, changing	108
Brake discs	
checking	103
Brake fluid	
front brake, adding	121
front brake, changing	122
rear brake, adding	126
rear brake, changing	127
Brake fluid level	
front brake, checking	120
rear brake, checking	125
Brake linings	
front brake, changing	118
front brake, checking	118
rear brake, changing	123
rear brake, checking	123
C	
Capacitor	
checking	117
Capacity	
coolant	201, 211
gear oil	137, 203, 211
Carburetor	
assembling	196
disassembling	194
float chamber, emptying	190
idle speed, adjusting	189
installing	192
removing	190
technical data, carburetor	215

Carburetor - work on individual parts	
choke slide, checking	195
float level, checking/adjusting	197
float needle valve, checking	196
jet needle, checking	195
throttle slide, checking	196
Carburetor components	
checking/adjusting	193
Cartridge	
fork legs, assembling	49
fork legs, disassembling	43
Chain	
checking	111
cleaning	110
Chain guide	
checking	111
Chain tension	
adjusting	113
checking	111
Chassis number	9
Choke	189
Clutch	
fluid level, checking/correcting	198
fluid, changing	198
Clutch lever	
basic position, adjusting	61
Compression damping	
fork, adjusting	13, 37
Compression damping, high-speed	
shock absorber, adjusting	63
Compression damping, low-speed	
shock absorber, adjusting	63
Coolant	
draining	200
refilling	200
Coolant level	
checking	199
Cooling system	
	199
Crankshaft position sensor	
checking	207
Cylinder - Nikasil® coating	156
E	
Engine	
assembling	174
disassembling	137
installing	133
removing	129
technical data - engine	209
work on individual parts	148
Engine - work on the individual parts	
cylinder - Nikasil® coating	156
intake flange, checking	159
kick starter, checking	173
membrane, checking	159
piston ring end gap, checking	157
reed valve housing, assembling	159

reed valve housing, checking	159
reed valve housing, disassembling	158
shift mechanism, checking	167
shift shaft, preassembling	167
Engine — work on the individual parts	
clutch cover	161
clutch, checking	166
connecting rod, conrod bearing, and crank pin, changing	150
countershaft, assembling	171
countershaft, disassembling	169
crankshaft bearing inner race, installing	150
crankshaft bearing inner race, removing	150
crankshaft run-out at the bearing pin, checking	151
cylinder, checking/measuring	152
exhaust control, checking	154
exhaust control, installing	154
exhaust control, removing	152
left engine case section	149
main shaft, assembling	170
main shaft, disassembling	168
piston, checking	157
piston, measuring	157
piston/cylinder, measuring the mounting clearance	158
right engine case section	148
transmission, checking	169
Engine assembly	
alternator cover, installing	186
clutch basket, installing	179
clutch discs, installing	180
clutch push rod, installing	187
crankshaft, installing	174
cylinder head, installing	185
cylinder, installing	182
engine sprocket, installing	187
engine, removing from the engine work stand	188
gear oil drain plug, installing	187
installing the clutch cover	181
intermediate kick starter gear, installing	178
kick starter shaft, installing	178
kick starter shaft, preassembling	173
kick starter, installing	186
left engine case section, installing	176
locking lever, installing	177
piston, installing	181
primary gear, installing	179
reed valve housing, installing	176
rotor, installing	176
shift drum locating unit, installing	178
shift drum, installing	175
shift forks, installing	175
shift lever, installing	187
shift rails, installing	175
shift shaft, installing	178
spacer, installing	186
spark plug, installing	186
transmission shafts, installing	175
water pump cover, installing	181
X-distance, adjusting	183
X-distance, checking	183
Z-distance, setting	184

Engine disassembly	
alternator cover, removing	139
clutch cover, removing	142
clutch discs, removing	142
clutch push rod, removing	138
crankshaft, removing	147
cylinder head, removing	140
cylinder, removing	140
engine sprocket, removing	138
engine, clamping into the engine work stand	137
gear oil, draining	138
intermediate kick starter gear, removing	144
kick starter shaft, removing	144
kick starter, removing	139
left engine case section, removing	146
locking lever, removing	145
piston, removing	141
primary gear, removing	143
reed valve housing, removing	146
removing the clutch basket	143
rotor, removing	145
shift drum locating unit, removing	144
shift drum, removing	147
shift forks, removing	147
shift lever, removing	138
shift rails, removing	147
shift shaft, removing	144
spacer, removing	139
spark plug, removing	139
transmission shafts, removing	147
water pump cover, removing	142
Engine number	9
Engine sprocket	
checking	111
F	
Figures	8
Filler cap	
closing	98
opening	98
Foot brake lever	
basic position, adjusting	125
free travel, checking	124
Fork	
air pressure, adjusting	12
basic setting, checking	12
Fork legs	
air cartridge, assembling	25
air cartridge, disassembling	20
assembling	27, 51
bleeding	14, 37
cartridge, assembling	49
cartridge, disassembling	43
checking	23, 46
disassembling	16, 40
dust boots, cleaning	14, 38
fork service, performing	40
fork, servicing	16
hydrostop unit, assembling	47
hydrostop unit, disassembling	45

installing	15, 39
piston rod, assembling	48
piston rod, disassembling	44
removing	15, 38
seal ring retainer, assembling	47
seal ring retainer, disassembling	46
shock absorber cartridge, assembling	24
shock absorber cartridge, disassembling	21
spring, removing	42

Fork part number	9
-------------------------	---

Fork protector	
installing	16, 40
removing	16, 39

Fork service, performing	40
---------------------------------	----

Front fender	
installing	101
removing	101

Front wheel	
installing	105
removing	104

Front wheel bearing	
changing	106

Fuel tank	
installing	100
removing	99

G

Gear oil	
adding	203
changing	202
draining	202
refilling	203

Gear oil level	
checking	203

H

Hand brake lever	
basic position, adjusting	120
free travel, checking	120

Handlebar position	60
adjusting	60

Hydrostop unit	
fork legs, assembling	47
fork legs, disassembling	45

I

Ignition coil	
primary winding, checking	205
secondary winding, checking	206

Ignition system	
checking	205

Ignition timing map	
plug-in connector	117

L

Lower triple clamp	
installing	33, 55
removing	32, 54

M

Main silencer	
disassembling	93
glass fiber yarn filling, changing	93
installing	93

Motorcycle	
cleaning	220
lift stand, raising with	10
lift stand, removing from	10

O

Operating substances	8
-----------------------------	---

P

Piston rod	
fork legs, assembling	48
fork legs, disassembling	44

Preparing for use	
after storage	221

R

Rear sprocket	
checking	111

Rear wheel	
installing	107
removing	107

Rear wheel bearing	
changing	108

Rebound damping	
fork, adjusting	13, 37
shock absorber, adjusting	64

Riding sag	
adjusting	66

S

Seal ring retainer	
fork legs, assembling	47
fork legs, disassembling	46

Seat	
mounting	99
removing	98

Service schedule	222-223
-------------------------	---------

Servicing the fork	16
---------------------------	----

Servicing the shock absorber	71
-------------------------------------	----

Shock absorber	
damper, assembling	80
damper, bleeding and filling	81
damper, checking	76
damper, disassembling	72
damper, filling with nitrogen	84
heim joint, installing	77
heim joint, removing	76
installing	68
pilot bushing, changing	75
piston rod, assembling	78
piston rod, disassembling	73
removing	67
riding sag, checking	65
seal ring retainer, assembling	78
seal ring retainer, disassembling	74

shock absorber, servicing	71
spring preload, adjusting	65
spring, installing	85-86
spring, removing	72
static sag, checking	65
Shock absorber article number	9
Shock absorber cartridge	
of fork legs, assembling	24
of fork legs, disassembling	21
Shock absorber linkage	
checking	69
Spare parts	8
Spark plug connector	
checking	206
Spoke tension	
checking	103
Spring	
fork legs, removing	42
Start number plate	
installing	101
removing	101
Starting	10-11
Steering head bearing	
changing	35, 57
greasing	32, 54
Steering head bearing play	
adjusting	35, 57
checking	34, 57
Storage	221
Swingarm	
installing	89
removing	87
Swingarm bearing	
changing	91
checking	87

T

Technical data	
Capacities	211
carburetor tuning	217
chassis	211
Chassis tightening torques	214
engine - tolerance, wear limits	210
Engine tightening torques	210
Fork	212
shock absorber	213
Tires	212
Throttle cable play	
adjusting	62
checking	61
Throttle cable routing	
checking	61
Tire air pressure	
checking	102
Tire condition	
checking	102
Type label	9

W

Warranty	8
Wheel bearing	
checking	102
Wiring diagram	224-225
page 1 of 1	224
Work rules	7



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