

1290 Super Duke R

Art. no. 3206218en



KTM

INTRODUCTION

1

Read this repair manual carefully and thoroughly before beginning work.

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

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

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

All specifications are non-binding. KTM Sportmotorcycle GmbH specifically reserves the right to modify or delete technical specifications, prices, colors, forms, materials, services, designs, equipment, etc., without prior notice and without specifying reasons, to adapt these to local conditions, as well as to stop production of a particular model without prior notice. KTM accepts no liability for delivery options, deviations from illustrations and descriptions, misprints, and other errors. The models portrayed partly contain special equipment that does not belong to the regular scope of supply.

© 2017 KTM Sportmotorcycle GmbH, Mattighofen Austria

All rights reserved

Reproduction, even in part, as well as copying of all kinds, is permitted only with the express written permission of the copyright owner.



ISO 9001(12 100 6061)

According to the international quality management standard ISO 9001, KTM uses quality assurance processes that lead to the maximum possible quality of the products.

Issued by: TÜV Management Service

REG. NO. 12 100 6061

KTM Sportmotorcycle GmbH
5230 Mattighofen, Austria

This document is valid for the following models:

1290 Super Duke R EU (F990309, F990302)

1290 Super Duke R FR (F992309, F992302)

1290 Super Duke R AU (F996009, F996002)

1290 Super Duke R CN (F998709)

1290 Super Duke R US (F997509, F997502)



3206218en

01/2017

TABLE OF CONTENTS

2

1	MEANS OF REPRESENTATION	6	7	HANDLEBAR, CONTROLS.....	36
1.1	Symbols used	6	7.1	Adjusting the basic position of the clutch lever	36
1.2	Formats used.....	6	7.2	Adjusting the handlebar position	36
2	SAFETY ADVICE.....	7	7.3	Changing the throttle grip	36
2.1	Repair Manual	7	8	FRAME	39
2.2	Safety advice.....	7	8.1	Checking the frame	39
2.3	Degrees of risk and symbols.....	7	9	SHOCK ABSORBER, SWINGARM	40
2.4	Work rules.....	7	9.1	Adjusting the low-speed compression damping of the shock absorber	40
3	IMPORTANT NOTES.....	8	9.2	Adjusting the high-speed compression damping of the shock absorber	40
3.1	Manufacturer and implied warranty.....	8	9.3	Adjusting the rebound damping of the shock absorber.....	41
3.2	Operating and auxiliary substances	8	9.4	Adjusting the spring preload of the shock absorber.....	41
3.3	Spare parts, accessories	8	9.5	Removing the shock absorber	42
3.4	Figures	8	9.6	Installing the shock absorber.....	43
4	SERIAL NUMBERS	9	9.7	Servicing the shock absorber	46
4.1	Chassis number	9	9.8	Removing the spring.....	46
4.2	Type label	9	9.9	Disassembling the damper	47
4.3	Key number.....	10	9.10	Disassembling the piston rod	48
4.4	Engine number	10	9.11	Checking the damper	49
4.5	Fork part number	10	9.12	Removing the heim joint.....	50
4.6	Shock absorber article number	10	9.13	Installing the heim joint.....	50
4.7	Steering damper article number	10	9.14	Assembling the piston rod	51
5	MOTORCYCLE	11	9.15	Assembling the damper	52
5.1	Lifting the motorcycle with the front lifting gear	11	9.16	Bleeding and filling the damper	54
5.2	Taking the motorcycle from the front lifting gear	11	9.17	Filling the damper with nitrogen	56
5.3	Raising the motorcycle with the work stand (screw-in type).....	11	9.18	Installing the spring	57
5.4	Removing the motorcycle from the work stand (screw-in type)	12	9.19	Checking the swingarm.....	58
5.5	Raising the motorcycle with the work stand (inserted)	13	9.20	Checking the swingarm bearing	58
5.6	Removing the motorcycle from the work stand (inserted)	13	9.21	Removing the swingarm	59
5.7	Lifting the motorcycle with the rear lifting gear	14	9.22	Installing the swingarm	60
5.8	Removing the rear of motorcycle from the lifting gear	14	9.23	Changing the swingarm bearing	63
5.9	Starting.....	14	10	EXHAUST.....	67
5.10	Starting the motorcycle to check the function	15	10.1	Disassembling the main silencer	67
6	FORK, TRIPLE CLAMP	16	10.2	Installing the main silencer	67
6.1	Adjusting the compression damping of the fork	16	10.3	Removing the presilencer	68
6.2	Adjusting the rebound damping of the fork	16	10.4	Installing the presilencer	68
6.3	Cleaning the dust boots of the fork legs.....	17	10.5	Disassembling the manifold	69
6.4	Removing the fork legs	17	10.6	Installing the manifold	70
6.5	Installing the fork legs.....	18	11	AIR FILTER	73
6.6	Performing a fork service	20	11.1	Removing the upper part of the air filter box	73
6.7	Disassembling the fork legs.....	20	11.2	Changing the air filter, cleaning the air filter box	73
6.8	Removing the spring	22	11.3	Installing the upper part of the air filter box	74
6.9	Checking the fork legs	22	11.4	Removing the air filter box	75
6.10	Installing the spring	24	11.5	Installing the lower part of the air filter box	75
6.11	Assembling the fork legs	24	12	FUEL TANK, SEAT, TRIM	77
6.12	Checking the play of the steering head bearing	27	12.1	Removing the front rider's seat	77
6.13	Adjusting the steering head bearing play	28	12.2	Mounting the front rider's seat	77
6.14	Lubricating the steering head bearing	29	12.3	Removing the passenger seat	77
6.15	Removing the lower triple clamp.....	29	12.4	Mounting the passenger seat	77
6.16	Installing the lower triple clamp	30	12.5	Removing the spoiler	78
6.17	Changing the steering head bearing	34	12.6	Installing the spoiler	78
6.18	Changing the steering damper	35	12.7	Removing the fuel tank	78
			12.8	Installing the fuel tank	80
			12.9	Checking the fuel pressure	81
			12.10	Changing the fuel pump	83
			12.11	Changing the fuel filter	84

TABLE OF CONTENTS

3

13	MASK, FENDER, DECAL.....	90	16.3	Checking the brake fluid level of the front brake	138
13.1	Removing the front fender	90	16.4	Adding front brake fluid.....	138
13.2	Installing the front fender	90	16.5	Changing the front brake fluid	139
14	WHEELS	91	16.6	Bleeding the brake system	141
14.1	Checking the tire air pressure.....	91	16.7	Adjusting the basic position of the hand brake lever	142
14.2	Checking the tire condition	91	16.8	Checking the brake linings of the rear brake	142
14.3	Checking the wheel bearings	92	16.9	Changing the rear brake linings	142
14.4	Front wheel	92	16.10	Checking the rear brake fluid level.....	144
14.4.1	Removing the front wheel	92	16.11	Adding rear brake fluid	145
14.4.2	Installing the front wheel	93	16.12	Changing the rear brake fluid	146
14.4.3	Checking the brake discs.....	94	16.13	Setting the step plate of the foot brake lever....	147
14.4.4	Removing the brake discs of the front brake	94	16.14	Adjusting the basic position of the foot brake lever	147
14.4.5	Installing the brake discs of the front brake.....	95	16.15	Checking the wheel speed sensor spacing.....	148
14.4.6	Changing the front wheel bearing	95	17	LIGHTING SYSTEM, INSTRUMENTS	149
14.5	Rear wheel	97	17.1	Activating/deactivating the ignition key	149
14.5.1	Removing the rear wheel with the work stand	97	17.2	Checking the headlight setting	151
14.5.2	Installing the rear wheel with the work stand	97	17.3	Adjusting the headlight range.....	151
14.5.3	Removing the rear wheel	98	17.4	Changing the headlight bulb	152
14.5.4	Installing the rear wheel	99	17.5	Changing the turn signal bulb (US/CN).....	153
14.5.5	Checking that the rear wheel nut (right side) is tightened to the specified torque.....	100	17.6	Resetting the service display using the KTM diagnostic tool	153
14.5.6	Checking the brake discs	100	18	ENGINE	154
14.5.7	Removing the brake disc of the rear brake.....	101	18.1	Removing the engine	154
14.5.8	Installing the brake disc of the rear brake....	102	18.2	Installing the engine.....	159
14.5.9	Checking the chain tension	103	18.3	Preparing the engine for installation	165
14.5.10	Adjusting the chain tension	103	18.4	Preparing the engine for clamping in the engine assembly stand	166
14.5.11	Checking the chain, rear sprocket, engine sprocket, and chain guide.....	104	18.5	Setting the engine to ignition top dead center of the rear cylinder	166
14.5.12	Removing the rear sprocket carrier.....	105	18.6	Setting the engine to ignition top dead center of the front cylinder.....	167
14.5.13	Installing the rear sprocket carrier	106	18.7	Engine disassembly	167
14.5.14	Opening the chain	107	18.7.1	Clamping the engine into the engine assembly stand	167
14.5.15	Riveting the chain.....	107	18.7.2	Removing the engine bearer.....	167
14.5.16	Changing the drivetrain kit.....	108	18.7.3	Draining the engine oil	168
14.5.17	Cleaning the chain	109	18.7.4	Removing the front valve cover	168
14.5.18	Checking/changing the rear hub shock absorbers of the rear sprocket carrier	110	18.7.5	Removing the rear valve cover	168
14.5.19	Removing the rear hub	111	18.7.6	Setting the engine to ignition top dead center of the rear cylinder	168
14.5.20	Installing the rear hub	112	18.7.7	Removing the starter motor	169
14.5.21	Measuring the rear wheel bearing clearance	114	18.7.8	Removing the oil filler tube	169
14.5.22	Greasing rear wheel bearing	116	18.7.9	Removing the heat exchanger	169
14.5.23	Measuring the wheel bearing play and greasing the rear hub	117	18.7.10	Removing the rear timing chain tensioner....	170
14.5.24	Changing the rear wheel bearing.....	124	18.7.11	Removing the rear camshaft.....	170
15	WIRING HARNESS, BATTERY.....	127	18.7.12	Removing the rear cylinder head	171
15.1	Removing the battery	127	18.7.13	Removing the rear piston	171
15.2	Installing the battery	127	18.7.14	Setting the engine to ignition top dead center of the front cylinder	172
15.3	Disconnecting the negative (minus) cable of the battery	128	18.7.15	Removing the front timing chain tensioner.....	172
15.4	Connecting the negative cable of the battery....	129	18.7.16	Removing the front camshafts	172
15.5	Recharging the battery	130	18.7.17	Removing the front cylinder head	173
15.6	Changing the main fuse	131	18.7.18	Removing the front piston	173
15.7	Changing the fuses in the fuse box	133	18.7.19	Removing the alternator cover	174
15.8	Checking the charging voltage	134	18.7.20	Removing the ignition pulse generator	174
16	BRAKE SYSTEM	136	18.7.21	Removing the torque limiter and idler	174
16.1	Checking the front brake linings	136	18.7.22	Removing the rotor	174
16.2	Changing the front brake linings	136	18.7.23	Removing the idler and timing chain on the left	175

TABLE OF CONTENTS

4

18.7.24	Removing the oil filter.....	175
18.7.25	Removing the balancer shaft.....	176
18.7.26	Removing the drive wheel of the balancer shaft.....	176
18.7.27	Removing the gear position sensor.....	176
18.7.28	Removing the left suction pump.....	176
18.7.29	Removing the water pump wheel	177
18.7.30	Removing the clutch cover.....	178
18.7.31	Removing the clutch discs.....	178
18.7.32	Removing the clutch basket.....	179
18.7.33	Removing the idler and timing chain on the right.....	179
18.7.34	Removing the primary gear	179
18.7.35	Removing the force pump.....	180
18.7.36	Removing the shift shaft.....	181
18.7.37	Removing the shift drum locating	181
18.7.38	Removing the locking lever	181
18.7.39	Removing the left engine case.....	181
18.7.40	Removing the crankshaft	182
18.7.41	Removing the middle suction pump.....	182
18.7.42	Removing the transmission shaft	182
18.7.43	Removing the oil spray tube.....	183
18.7.44	Removing the timing chain rails of the right engine case section	184
18.7.45	Removing the timing chain rails of the left engine case section.....	184
18.8	Working on individual parts.....	184
18.8.1	Work on the right section of the engine case	184
18.8.2	Removing the right main bearing.....	186
18.8.3	Selecting the main bearing shells	187
18.8.4	Installing the right main bearing.....	187
18.8.5	Work on the left section of the engine case	188
18.8.6	Removing the left main bearing.....	189
18.8.7	Installing the left main bearing	190
18.8.8	Changing the conrod bearing.....	190
18.8.9	Work on the clutch cover	192
18.8.10	Changing the support bearing of the crankshaft.....	193
18.8.11	Checking the radial clearance of the bottom connecting rod bearing.....	194
18.8.12	Checking/measuring the cylinder	194
18.8.13	Checking/measuring the piston.....	195
18.8.14	Checking the piston ring end gap	196
18.8.15	Checking the piston/cylinder mounting clearance	196
18.8.16	Work on the cylinder head	197
18.8.17	Checking the cylinder head.....	199
18.8.18	Work on the right idler.....	201
18.8.19	Checking the timing assembly.....	201
18.8.20	Preparing the timing chain tensioner for installation	202
18.8.21	Checking the oil pressure regulator valve	202
18.8.22	Checking the lubrication system	203
18.8.23	Checking the clutch	204
18.8.24	Checking the shift mechanism	205
18.8.25	Preassembling the shift shaft.....	206
18.8.26	Disassembling the main shaft	207
18.8.27	Disassembling the countershaft.....	208
18.8.28	Checking the transmission	209
18.8.29	Assembling the main shaft.....	210
18.8.30	Assembling the countershaft	210
18.8.31	Measuring the main shaft axial play.....	211
18.8.32	Checking electric starter operation.....	212
18.8.33	Checking the free-wheel	212
18.9	Engine assembly	213
18.9.1	Installing the timing chain rails of the left engine case section.....	213
18.9.2	Installing the timing chain rails of the right engine case section	213
18.9.3	Installing the oil spray tube.....	213
18.9.4	Installing the transmission shaft.....	214
18.9.5	Installing the middle suction pump	215
18.9.6	Installing the crankshaft	215
18.9.7	Installing the left engine case	215
18.9.8	Installing the locking lever	216
18.9.9	Installing the shift drum locating.....	217
18.9.10	Installing the shift shaft	217
18.9.11	Installing the force pump.....	217
18.9.12	Installing the left suction pump.....	218
18.9.13	Setting the engine to ignition top dead center of the rear cylinder	219
18.9.14	Installing the primary gear	219
18.9.15	Installing the idler and timing chain on the right	219
18.9.16	Installing the clutch basket.....	219
18.9.17	Installing the clutch discs.....	220
18.9.18	Installing the clutch cover	221
18.9.19	Installing the water pump wheel.....	222
18.9.20	Installing the gear position sensor	222
18.9.21	Installing the drive wheel of the balancer shaft.....	222
18.9.22	Installing the balancer shaft.....	223
18.9.23	Installing the idler and timing chain on the left	223
18.9.24	Installing the oil filter.....	224
18.9.25	Installing the rotor	224
18.9.26	Installing the torque limiter and idler.....	224
18.9.27	Installing the ignition pulse generator	225
18.9.28	Installing the alternator cover	225
18.9.29	Rear piston assembly	225
18.9.30	Installing the rear cylinder head	227
18.9.31	Installing the rear camshafts	227
18.9.32	Installing the rear timing chain tensioner	228
18.9.33	Setting the engine to ignition top dead center of the front cylinder	228
18.9.34	Installing the front piston	228
18.9.35	Installing the front cylinder head	230
18.9.36	Installing the front camshafts	231
18.9.37	Installing the front timing chain tensioner	231
18.9.38	Installing the heat exchanger	232
18.9.39	Installing the starter motor	232
18.9.40	Checking the rear valve clearance	232
18.9.41	Adjusting the rear valve clearance	232
18.9.42	Checking the front valve clearance	233
18.9.43	Adjusting the front valve clearance	233
18.9.44	Installing the oil filler tube	234
18.9.45	Installing front valve cover	234
18.9.46	Installing rear valve cover	234
18.9.47	Installing the oil drain plug	235
18.9.48	Mounting the engine bearer	235
18.9.49	Removing the engine from the engine assembly stand	235

TABLE OF CONTENTS

5

19	SECONDARY AIR SYSTEM SAS.....	236	27.4.2	Coolant	279
19.1	Changing the secondary air system (SAS) membranes	236	27.4.3	Fuel	279
20	CLUTCH	237	27.5	Chassis	279
20.1	Checking/correcting the fluid level of the hydraulic clutch.....	237	27.6	Electrical system.....	280
20.2	Changing the hydraulic clutch fluid	237	27.7	Tires.....	280
21	SHIFT MECHANISM	238	27.8	Fork.....	280
21.1	Adjusting the basic position of the shift lever	238	27.9	Shock absorber.....	281
21.2	Changing the gear position sensor.....	238	27.10	Chassis tightening torques	281
21.3	Programming the gear position sensor	240	28	CLEANING/PROTECTIVE TREATMENT	284
22	WATER PUMP, COOLING SYSTEM	241	28.1	Cleaning motorcycle	284
22.1	Checking the coolant level in the compensating tank.....	241	28.2	Checks and maintenance steps for winter operation.....	285
22.2	Checking the coolant fill level and antifreeze ...	241	29	STORAGE	286
22.3	Draining the coolant.....	242	29.1	Storage	286
22.4	Adding coolant/bleeding the cooling system....	243	29.2	Preparing for use after storage.....	286
22.5	Correcting the coolant level in the compensating tank.....	245	30	SERVICE SCHEDULE	287
23	CYLINDER HEAD	246	30.1	Additional information	287
23.1	Checking the valve clearance	246	30.2	Required work	287
23.2	Checking the valve clearance (air filter and spark plugs removed)	250	30.3	Recommended work	288
23.3	Setting the valve clearance of the rear cylinder.....	253	31	WIRING DIAGRAM	290
23.4	Setting the valve clearance of the front cylinder.....	254	31.1	Page 1 of 11 (EU/AU/FR)	290
23.5	Disassembling the camshafts of the rear cylinder.....	254	31.2	Page 2 of 11 (EU/AU/FR)	292
23.6	Installing the camshafts of the rear cylinder	255	31.3	Page 3 of 11 (EU/AU/FR)	294
23.7	Disassembling the camshafts of the front cylinder.....	256	31.4	Page 4 of 11 (EU/AU/FR)	296
23.8	Installing the camshafts of the front cylinder ...	256	31.5	Page 5 of 11 (EU/AU/FR)	298
24	LUBRICATION SYSTEM.....	258	31.6	Page 6 of 11 (EU/AU/FR)	300
24.1	Oil circuit.....	258	31.7	Page 7 of 11 (EU/AU/FR)	302
24.2	Checking the engine oil level.....	259	31.8	Page 8 of 11 (EU/AU/FR)	304
24.3	Changing the engine oil and oil filter, cleaning the oil screens	259	31.9	Page 9 of 11 (EU/AU/FR)	306
24.4	Adding engine oil	261	31.10	Page 10 of 11 (EU/AU/FR)	308
24.5	Checking the engine oil pressure	262	31.11	Page 11 of 11 (EU/AU/FR)	310
24.6	Removing the oil nozzle for the clutch lubrication.....	263	31.12	Page 1 of 11 (US/CN)	312
24.7	Checking/cleaning the oil nozzle for clutch lubrication.....	263	31.13	Page 2 of 11 (US/CN)	314
24.8	Installing the oil nozzle for the clutch lubrication.....	264	31.14	Page 3 of 11 (US/CN)	316
25	IGNITION SYSTEM.....	265	31.15	Page 4 of 11 (US/CN)	318
25.1	Alternator - checking the stator winding	265	31.16	Page 5 of 11 (US/CN)	320
25.2	Changing spark plugs (air filter removed).....	267	31.17	Page 6 of 11 (US/CN)	322
26	THROTTLE VALVE BODY	271	31.18	Page 7 of 11 (US/CN)	324
26.1	Removing the throttle valve body	271	31.19	Page 8 of 11 (US/CN)	326
26.2	Installing the throttle valve body.....	272	31.20	Page 9 of 11 (US/CN)	328
26.3	Executing the initialization run.....	273	31.21	Page 10 of 11 (US/CN)	330
26.4	Resetting the engine electronics control unit ...	273	31.22	Page 11 of 11 (US/CN)	332
26.5	Checking the CO adjustment using the KTM diagnostics tool.....	274	32	SUBSTANCES	334
27	TECHNICAL DATA.....	275	33	AUXILIARY SUBSTANCES	336
27.1	Engine	275	34	SPECIAL TOOLS	338
27.2	Tolerance, engine wear limits	275	35	STANDARDS	353
27.3	Engine tightening torques	277	INDEX.....		354
27.4	Capacities	279			
27.4.1	Engine oil	279			

1 MEANS OF REPRESENTATION

6

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.

Underlined terms Refer to technical details of the vehicle or indicate technical terms, which are explained in the glossary.

2 SAFETY ADVICE

7

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 **IMPORTANT NOTES**

8

3.1 Manufacturer and implied warranty

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

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

3.2 Operating and auxiliary substances



Warning

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

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

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

3.3 Spare parts, accessories

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

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

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

3.4 Figures

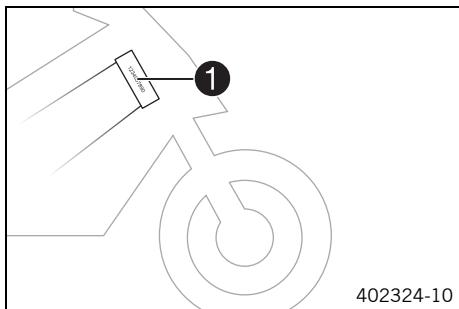
The figures contained in the manual may depict special equipment.

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

4 SERIAL NUMBERS

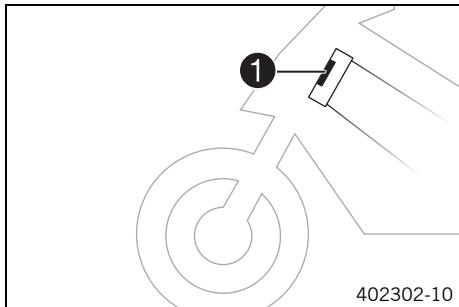
9

4.1 Chassis number



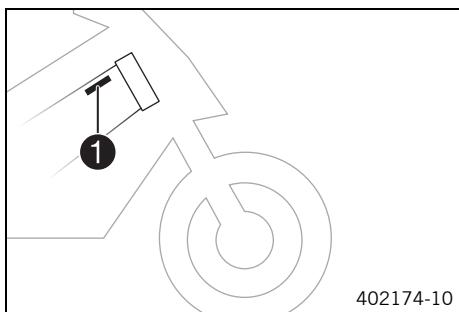
The chassis number ① is stamped on the right side of the steering head.
The chassis number is also shown on the type label.

4.2 Type label



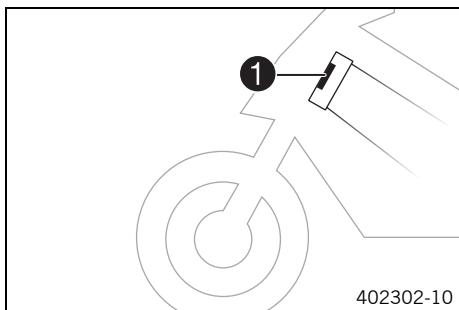
(EU/FR/CN)

The type label ① is located on the steering head.



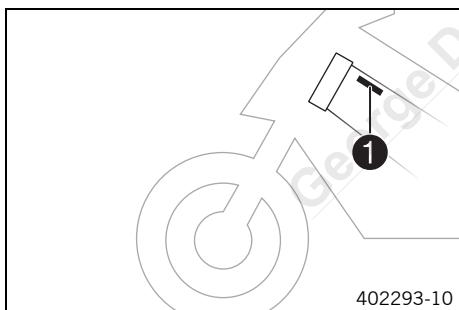
(AU)

The type label for Australia ① is located on the frame on the right.



(US)

The type label for the USA ① is located on the steering head.



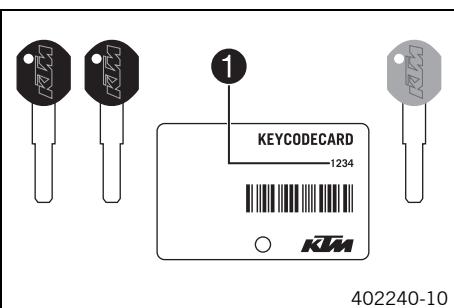
(US)

The type label for Canada ① is located on the frame on the left.

4 SERIAL NUMBERS

10

4.3 Key number



Key number **Code number 1** can be found on the **KEYCODECARD**.

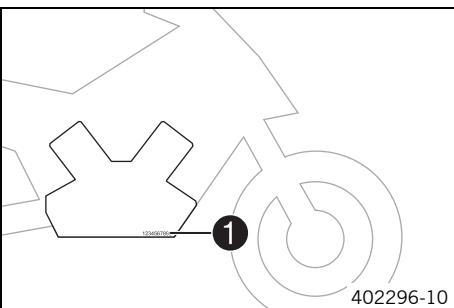


Info

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

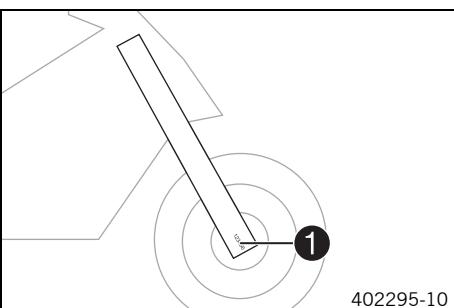
With the orange programming key, you can activate or deactivate the black ignition key. Keep the orange programming key in a safe location; it may only be used for learning and programming functions.

4.4 Engine number



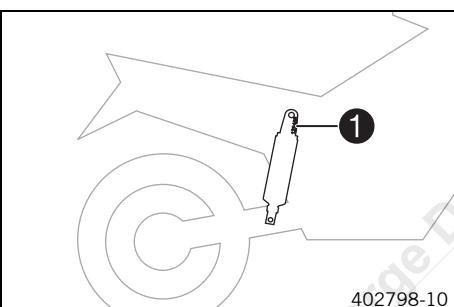
The engine number **1** is stamped on the right side of the engine.

4.5 Fork part number



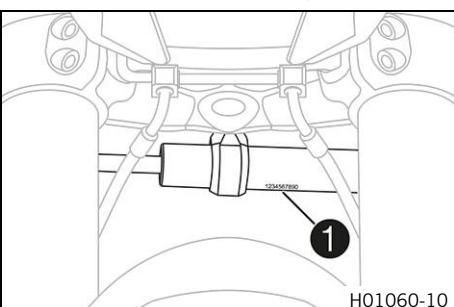
The fork part number **1** is stamped on the inside of the axle clamp.

4.6 Shock absorber article number



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

4.7 Steering damper article number



Steering damper item number **1** is embossed on the underside of the steering damper.

5.1 Lifting the motorcycle with the front lifting gear

Note

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

- Park the vehicle on a firm and level surface.

Preparatory work

- Lift the motorcycle with the rear lifting gear. (☞ p. 14)

Main work

- Move the handlebar to the straight-ahead position. Align the front lifting gear with the fork legs.

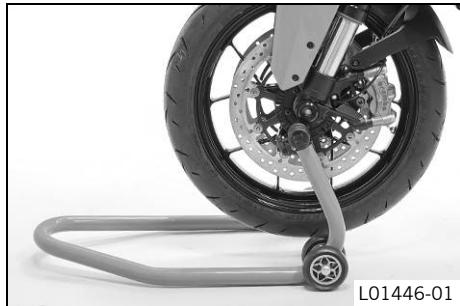
Front lifting gear (61129965000) (☞ p. 344)



Info

Always raise the motorcycle at the rear first.

- Raise the motorcycle at the front.



5.2 Taking the motorcycle from the front lifting gear

Note

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

- Park the vehicle on a firm and level surface.

- Secure the motorcycle against falling over.
- Remove the front lifting gear.



5.3 Raising the motorcycle with the work stand (screw-in type)

Note

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

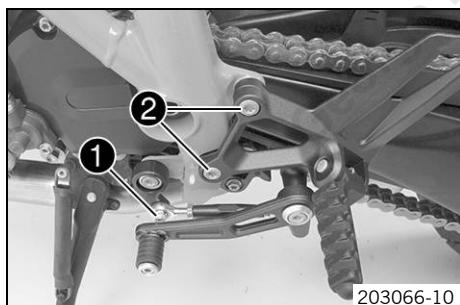
- Park the vehicle on a firm and level surface.

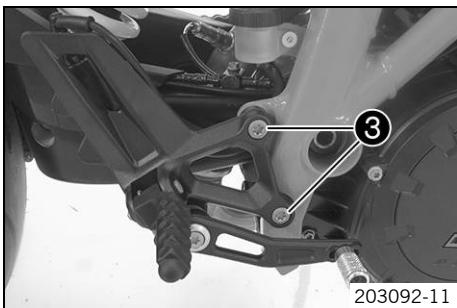
Preparatory work

- Disassemble the main silencer. (☞ p. 67)

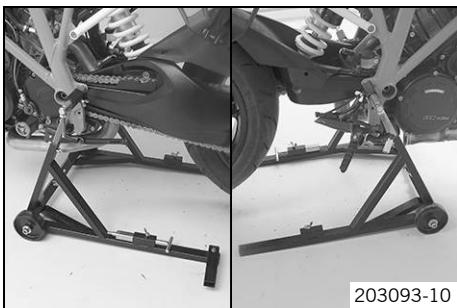
Main work

- Remove screw ①.
- Remove screws ②. Take off the footrest bracket.





- Remove screws ③. Hang the footrest bracket to the side.



- Screw the holder of the special tool all the way into the upper drill holes of the footrest brackets. Select the right height and width of the work stand.

Work stand (62529055100) (☞ p. 348)

- Raise the motorcycle.



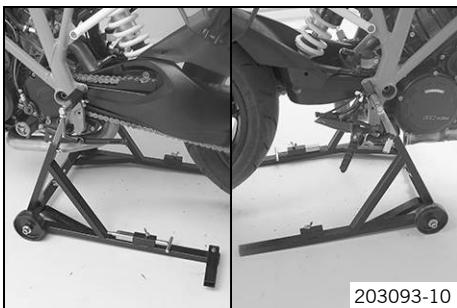
Check that the work stand is properly seated.

5.4 Removing the motorcycle from the work stand (screw-in type)

Note

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

- Park the vehicle on a firm and level surface.



Main work

- Remove the motorcycle from the work stand and rest it on the side stand.
- Remove the work stand.

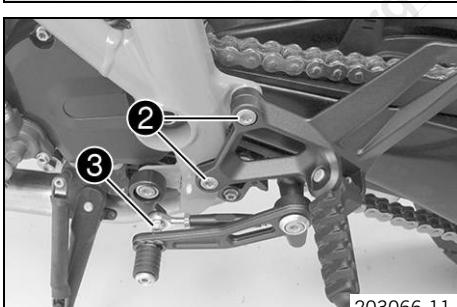
Work stand (62529055100) (☞ p. 348)



- Position the footrest bracket. Mount and tighten screws ①.

Guideline

Screw, front rider footrest bracket	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
-------------------------------------	----	------------------------	---------------



- Position the footrest bracket. Mount and tighten screws ②.

Guideline

Screw, front rider footrest bracket	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
-------------------------------------	----	------------------------	---------------

- Position the shift rod. Mount and tighten screw ③.

Guideline

Screw, shift rod	M6	5 Nm (3.7 lbf ft)	Loctite® 243™
------------------	----	----------------------	---------------

Finishing work

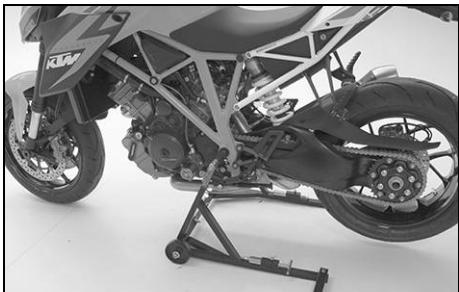
- Install the main silencer. (☞ p. 67)

5.5 Raising the motorcycle with the work stand (inserted)

Note

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

- Park the vehicle on a firm and level surface.



- The plastic bushing of the work stand should engage in the opening of the swingarm pivot. Select the right height and width of the work stand.

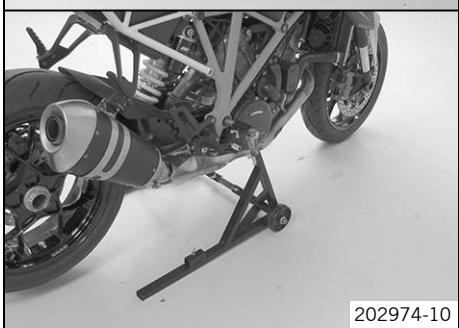
Work stand (62529055100) (☞ p. 348)

- Raise the motorcycle.



Info

Check that the work stand is properly seated.



202974-10

5.6 Removing the motorcycle from the work stand (inserted)

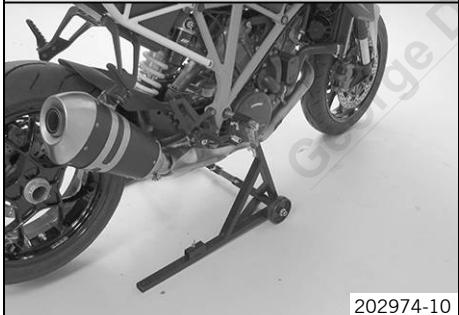
Note

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

- Park the vehicle on a firm and level surface.

- Remove the motorcycle from the work stand and rest it on the side stand.
- Remove the work stand.

Work stand (62529055100) (☞ p. 348)



202974-10

5.7 Lifting the motorcycle with the rear lifting gear

Note

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

- Park the vehicle on a firm and level surface.



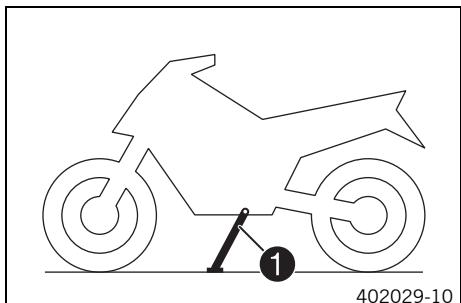
- Place the adapter into the rear lifting gear.
Lifting gear, rear (61329955000) (p. 348)
- Position the motorcycle upright, place the lifting gear in the axle, and raise the motorcycle.

5.8 Removing the rear of motorcycle from the lifting gear

Note

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

- Park the vehicle on a firm and level surface.



- Secure the motorcycle against falling over.
- Remove the rear wheel stand and lean the vehicle on side stand 1.

5.9 Starting



Danger

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

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



Caution

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

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

Note

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

- Always run the engine warm at a low speed.



- Press the emergency OFF switch to the position **ON**
- Switch on the ignition by turning the black ignition key to the position **ON**
 - ✓ After you switch on the ignition, you can hear the fuel pump working for about two seconds. The function check of the combination instrument is run at the same time.
 - ✓ The ABS warning lamp lights up and goes back out after starting off.
- Shift the transmission to idle **N**.
- ✓ The green idling speed indicator lamp **N** lights up.



- Press the electric starter button ⚡.

**Info**

Do not press the electric starter button until the combination instrument function check is finished.

When starting, **DO NOT** open the throttle. If you open the throttle during the starting procedure, fuel is not injected by the engine management system and the engine cannot start.

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

This motorcycle is equipped with a safety starting system. You can only start the engine if the transmission is in neutral or if the clutch lever is pulled when a gear is engaged. If the side stand is folded out and you shift into gear, the engine stops.

- Remove the motorcycle from the side stand.

5.10 Starting the motorcycle to check the function

**Danger**

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

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

**Info**

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



- Press the emergency OFF switch to the position **ON** Ⓛ.
- Switch on the ignition by turning the black ignition key to the position **ON** Ⓛ.
- Shift the transmission to idle **N**.
- Press the electric starter button ⚡.

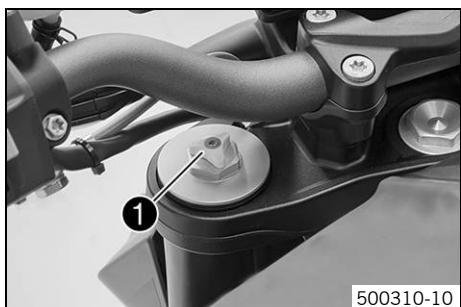
**Info**

Do not open the throttle.

6.1 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**

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	12 clicks
Sport	7 clicks
Full payload	7 clicks

**Info**

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

6.2 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**

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).

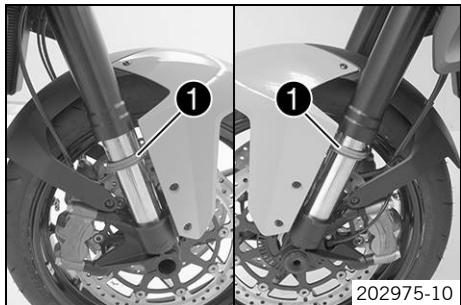
- Turn counterclockwise by the number of clicks corresponding to the fork type.
Guideline

Rebound damping	
Comfort	17 clicks
Standard	12 clicks
Sport	7 clicks
Full payload	7 clicks

**Info**

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

6.3 Cleaning the dust boots of the fork legs



- Push dust boots 1 of both fork legs downward.



Info

The dust boots should remove dust and coarse dirt particles from the 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 Oil or grease on the brake discs reduces the braking effect.

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

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

Universal oil spray (p. 337)

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

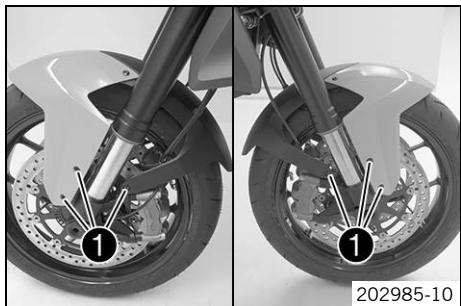
6.4 Removing the fork legs

Preparatory work

- Raise the motorcycle with the work stand (inserted). (p. 13)
- Clamp down the rear of the vehicle.

Main work

- Remove screws 1 on both sides. Take off the fender.



- Remove screws 2 from both brake calipers.
- Press back the brake linings with a light lateral tilting of the brake calipers on the brake disc. Pull the brake caliper carefully back from the brake discs and hang it to the side.



Info

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

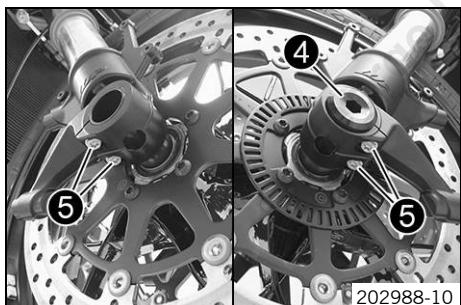
- Remove screw 3. Hang the wheel speed sensor to the side.
- Loosen screws 4 and 5.
- Unscrew screw 4 about six turns and press your hand on the screw to push the wheel spindle out of the axle clamp. Remove screw 4.

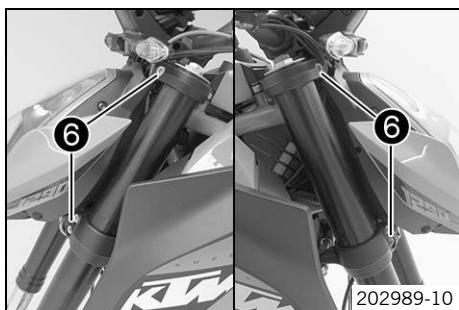


Warning

Danger of accidents Damaged brake discs reduce the braking effect.

- Always lay the wheel down in such a way that the brake discs are not damaged.
- Holding the front wheel, withdraw the wheel spindle. Take the front wheel out of the fork.





202989-10

- Loosen screws 6 on both sides. Remove the fork legs downward.

6.5 Installing the fork legs



Warning

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

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



202993-10

Main work

- Position the fork legs in the triple clamps.
- Align the fork leg in the desired position by means of the fork rings.

Guideline

Upper triple clamp flush with upper edge of fork legs	0 mm (0 in)
Upper triple clamp flush with 1st ring of fork legs	2.5 mm (0.098 in)
Upper triple clamp flush with 2nd ring of fork legs (standard)	5 mm (0.2 in)



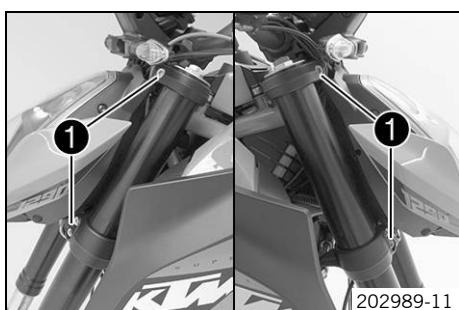
Info

The standard adjustment is the setting that provides the best vehicle handling. When the fork is compressed, the basic suspension setting changes, causing the vehicle to become more stable but also more difficult to handle.

- Tighten screws 1.

Guideline

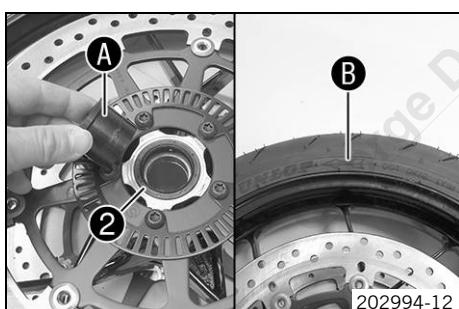
Screw, top triple clamp	M8	15 Nm (11.1 lbf ft)
Screw, bottom triple clamp	M8	12 Nm (8.9 lbf ft)



202989-11

- Check the wheel bearing for damage and wear.
 - » If the wheel bearing is damaged or worn:
 - Change the front wheel bearing. (p. 95)
- On both sides, clean and grease the shaft seal ring 2 and contact surface A of the spacers.

Long-life grease (p. 336)



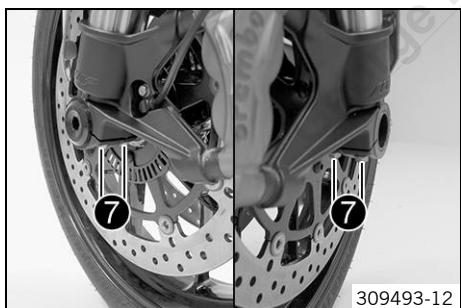
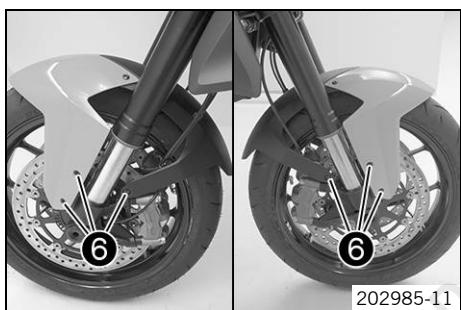
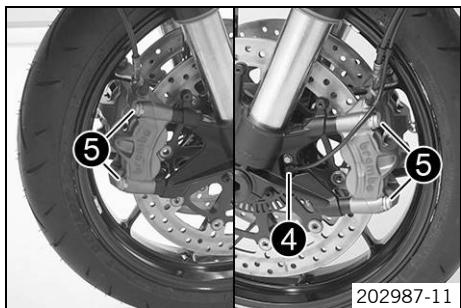
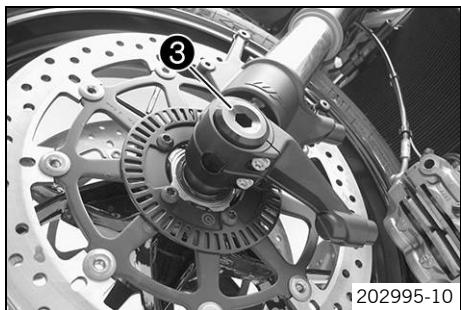
202994-12



Info

Insert the wide spacer on the left in the direction of travel.

The arrow B indicates the direction of travel of the front wheel.



Warning

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

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

- Clean screw ③ and the wheel spindle.
- Lift the front wheel into the fork, position it, and insert the wheel spindle.
- Mount and tighten screw ③.

Guideline

Bolt, front axle	M25x1.5	45 Nm (33.2 lbf ft)	Thread greased
------------------	---------	------------------------	----------------

- Position wheel speed sensor ④. Mount and tighten the screw.

Guideline

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

- Position the brake calipers and check that the brake linings are seated correctly.
- Mount screws ⑤ on both brake calipers but do not tighten yet.

Guideline

Screw, front brake caliper	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
----------------------------	-----	------------------------	---------------

- Operate the hand brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point. Fix the hand brake lever in the activated position.

✓ The brake calipers straighten.

- Tighten screws ⑤ on both brake calipers.

Guideline

Screw, front brake caliper	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
----------------------------	-----	------------------------	---------------

- Remove the fixation of the hand brake lever.
- Check the wheel speed sensor spacing. (p. 148)
- Release the rear of the vehicle.

- Position the fender. Mount and tighten screws ⑥.

Guideline

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

- Pull the front brake and compress the fork forcefully a few times.

✓ The fork legs straighten.

- Tighten screws ⑦.

Guideline

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

Finishing work

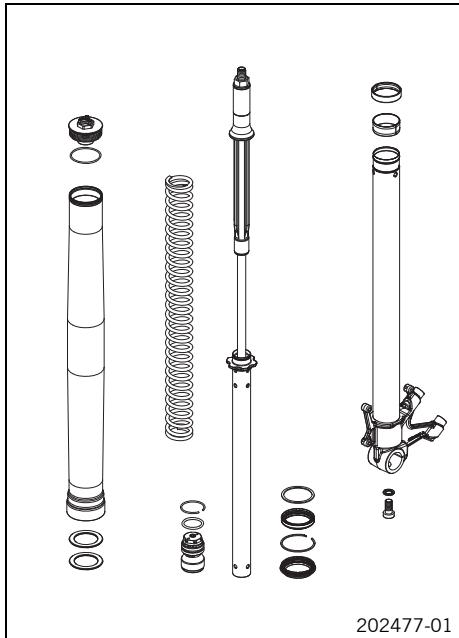
- Remove the motorcycle from the work stand (inserted). (p. 13)

6.6 Performing a fork service

Condition

The fork legs have been removed.

- Disassemble the fork legs. (☞ p. 20)
- Remove the spring. (☞ p. 22)
- Check the fork legs. (☞ p. 22)
- Install the spring. (☞ p. 24)
- Assemble the fork legs. (☞ p. 24)



6.7 Disassembling the fork legs



Info

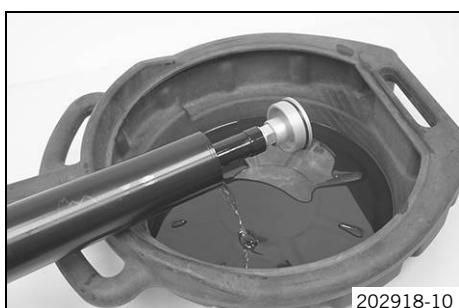
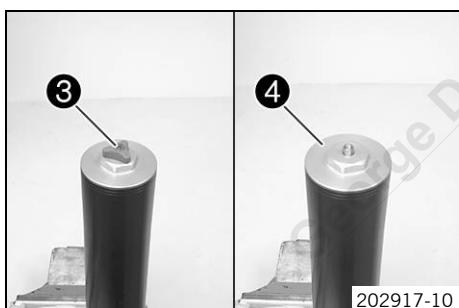
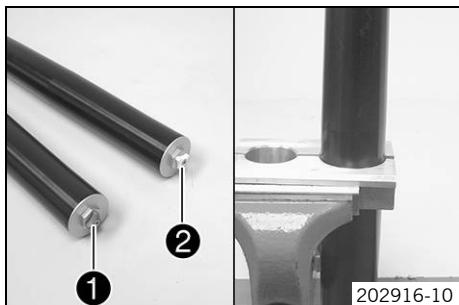
These operations are the same on both fork legs.

Condition

The fork legs have been removed.

- Note down the current state of the 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. 352)



- Remove adjuster ③.
- Release screw cap ④.

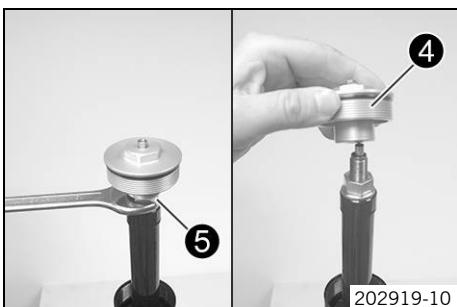


The screw cap cannot be removed yet.

- Unclamp the fork.
- Drain the fork oil.

6 FORK, TRIPLE CLAMP

21



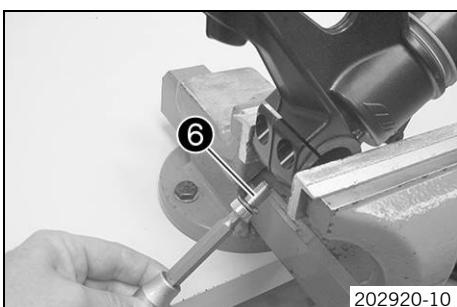
- Clamp the fork leg with the axle clamp.



Info

Use soft jaws.

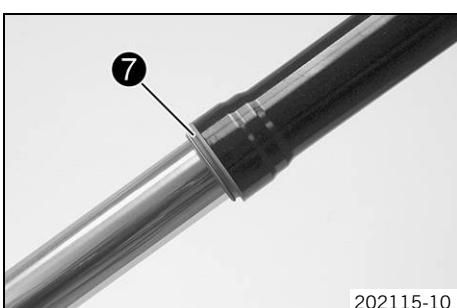
- Hold nut **5** and remove screw cap **4**.
- Remove the adjusting tube.



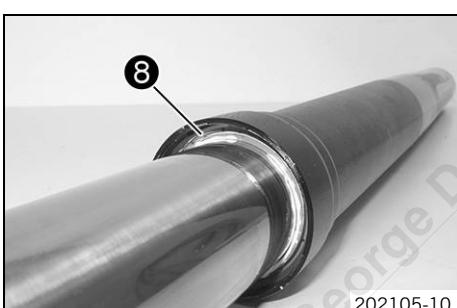
- Remove cartridge screw **6** with the washer.



- Remove the cartridge.



- Remove dust boot **7**.

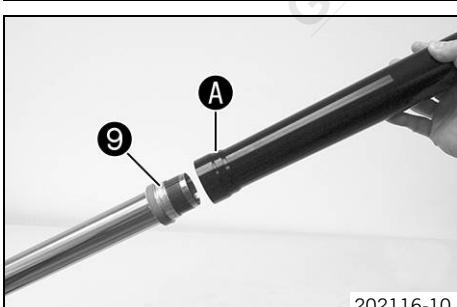


- Remove lock ring **8**.



Info

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



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

Guideline

50 °C (122 °F)

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

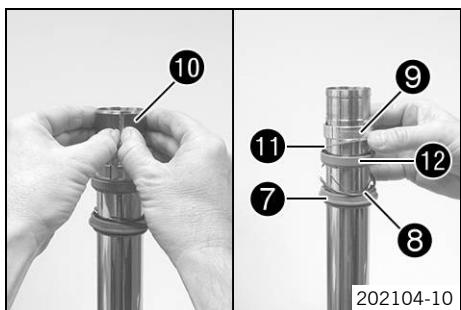


Info

The lower sliding bushing **9** must be pulled from its bearing seat.

6 FORK, TRIPLE CLAMP

22



- Remove the upper sliding bushing 10.



Info

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

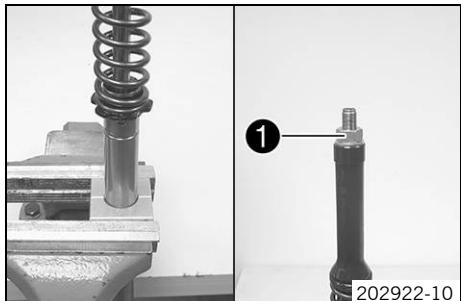
- Take off the lower sliding bushing 9.
- Take off support ring 11.
- Take off seal ring 12.
- Take off lock ring 8.
- Take off dust boot 7.
- Unclamp the fork leg.

6.8 Removing the spring



Info

These operations are the same on both fork legs.



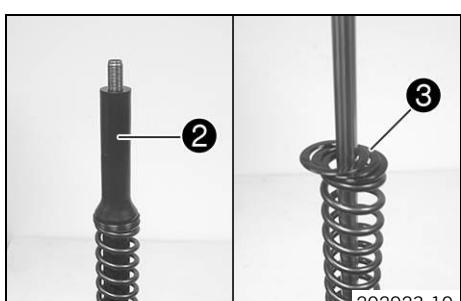
Preparatory work

- Disassemble the fork legs. (p. 20)

Main work

- Clamp the cartridge into a vise.
- Pull the spring down and remove nut 1 with the washer.

Clamping stand (T14015S) (p. 351)



- Remove spring guide 2 with preload spacer(s) 3.



- Remove the spring. Unclamp the cartridge.

6.9 Checking the fork legs

Condition

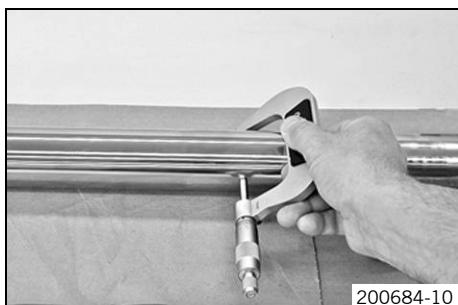
Fork disassembled.

6 FORK, TRIPLE CLAMP

23



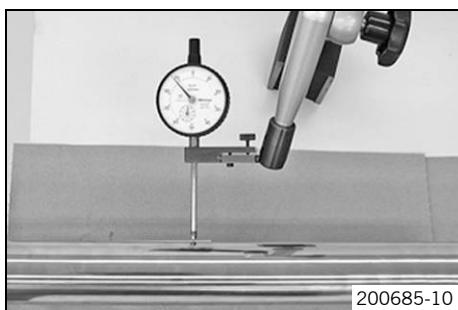
- Check the inner tube and axle clamp for damage.
 - » If there is damage:
 - Change the inner tube.



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

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

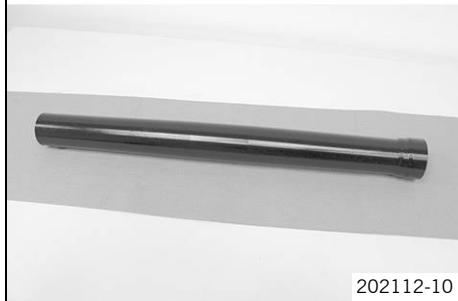
- » If the measured value is less than the specified value:
 - Change the inner tube.



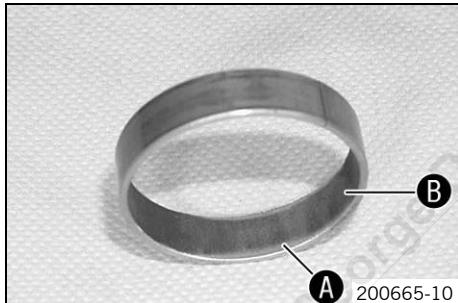
- Measure the run-out of the inner tube.

Run-out of inner tube	$\leq 0.20 \text{ mm} (\leq 0.0079 \text{ in})$
-----------------------	---

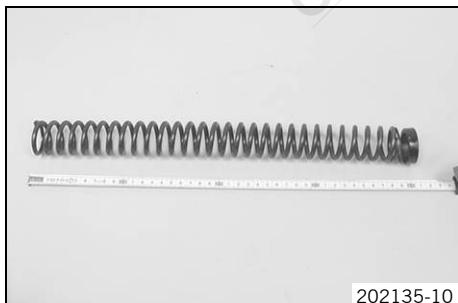
- » If the measured value is greater than the specified value:
 - Change the inner tube.



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



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



- Check the spring length.

Guideline

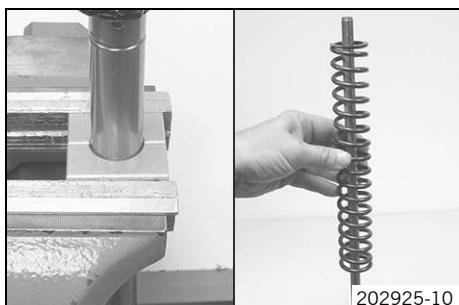
Spring length with preload spacer(s)	253 mm (9.96 in)
--------------------------------------	------------------

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

6.10 Installing the spring

**Info**

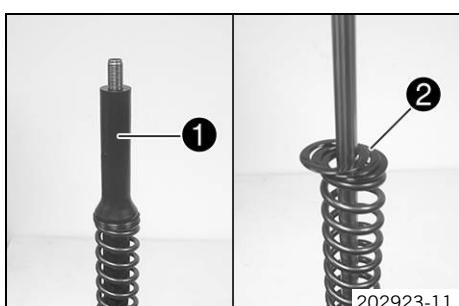
These operations are the same on both fork legs.



- Clamp the cartridge into a vise.

Clamping stand (T14015S) (☞ p. 351)

- Position the spring.



- Position spring guide ① with preload spacer(s) ②.



- Pull the spring down and mount nut ③ with the washer. Screw the nut all the way down.

- Unclamp the cartridge.

6.11 Assembling the fork legs

**Info**

The procedures are the same on both fork legs.

Preparatory work

- Check the fork legs. (☞ p. 22)
- Install the spring. (☞ p. 24)

Main work

- Clamp the inner tube with the axle clamp.

Guideline

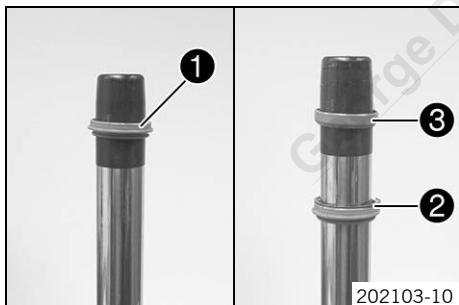
Use soft jaws.

- Mount the special tool.

Protecting sleeve (T1401) (☞ p. 351)

- Grease and push on dust boot ①.

Lubricant (T14034) (☞ p. 336)

**Info**

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

Mount the sealing lip with the spring expander facing down.

6 FORK, TRIPLE CLAMP

25

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

Lubricant (T14034) (☞ p. 336)



Info

Sealing lip downward, 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 the bushings.

Fork oil (SAE 4) (48601166S1) (☞ p. 335)

- 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.

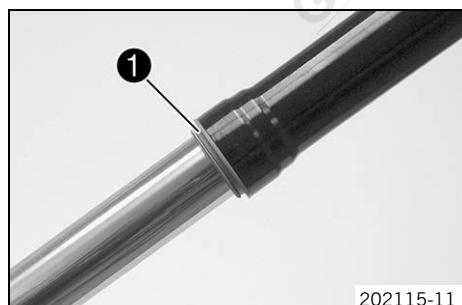
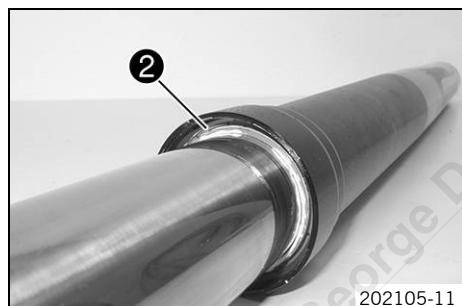
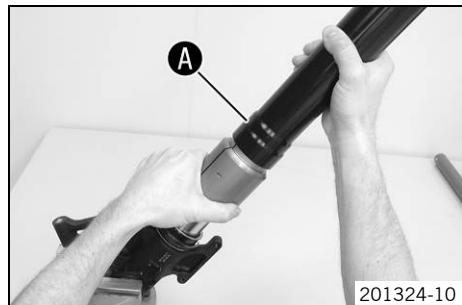
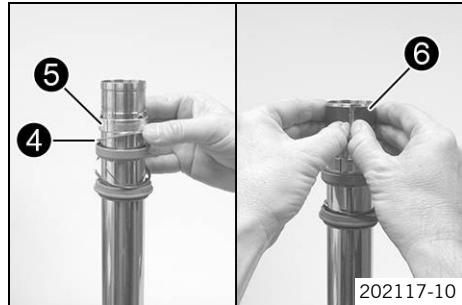
Guideline

50 °C (122 °F)

- Hold the lower sliding bushing with the longer side of the special tool.
- 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. 352)

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



- Mount lock ring ②.



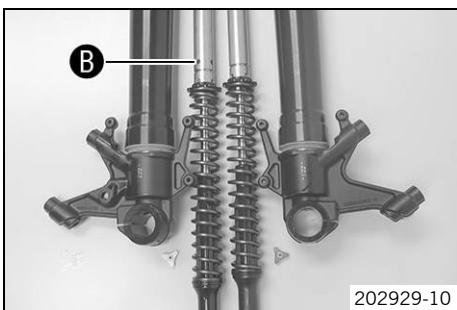
Info

The lock ring must engage audibly.

- Mount dust boot ①.

6 FORK, TRIPLE CLAMP

26



- Assemble the individual components that belong together.

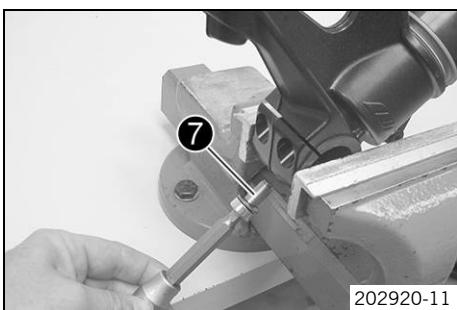
i Info

Compression damping side: cartridge with additional oil holes **B**, white adjuster, axle clamp marked **L**.

Rebound damping side: cartridge without additional oil holes, red adjuster, axle clamp marked **R**.



- Slide the cartridge into the inner tube.



- Mount and tighten cartridge screw **7** with the washer.

Guideline

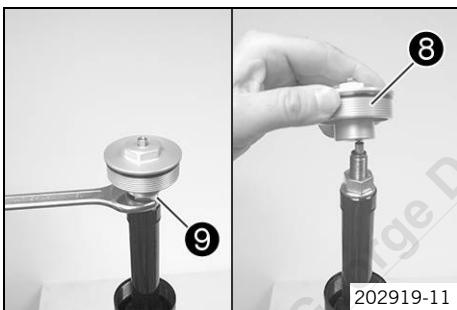
Screw, cartridge	M12x1	25 Nm (18.4 lbf ft)
------------------	-------	------------------------



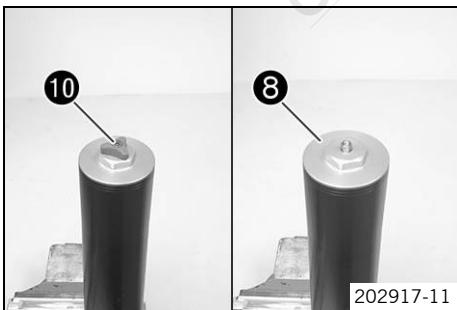
- Clamp the fork vertically.

- Fill with fork oil.

Fork oil per fork leg	660 ml (22.31 fl. oz.)	Fork oil (SAE 4) (48601166S1) (p. 335)
-----------------------	---------------------------	--



- Mount the adjusting tube.
- Screw on screw cap **8** all the way.
- Hold screw cap and tighten nut **9**.



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

Clamping stand (T1403S) (p. 352)

- Grease the O-ring of the screw cover.

Lubricant (T158) (p. 336)

- Screw on and tighten screw cap **8**.

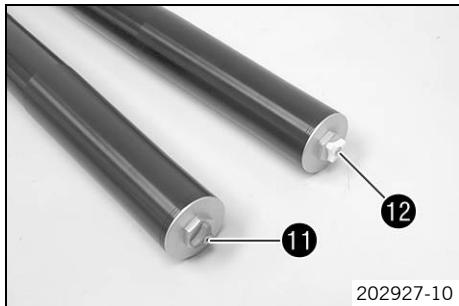
Guideline

Screw cover on outer tube	M47x1.5	40 Nm (29.5 lbf ft)
---------------------------	---------	------------------------

- Mount adjuster 10. Tighten the screw.

Guideline

Adapter	M4x0.5	1.5 Nm (1.11 lbf ft)
---------	--------	-------------------------



Alternative 1

- Turn the adjusting screw of rebound damping 11 and the adjusting screw of compression damping 12 clockwise as far as possible.
- Turn back counterclockwise by the number of clicks corresponding to the fork type.

Guideline

Rebound damping	
Comfort	17 clicks
Standard	12 clicks
Sport	7 clicks
Full payload	7 clicks
Compression damping	
Comfort	17 clicks
Standard	12 clicks
Sport	7 clicks
Full payload	7 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.

- Turn the adjusting screws to the position they were in before dismantling.

6.12 Checking the play of the steering head bearing



Warning

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

- Correct incorrect steering head bearing play immediately.



Info

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

Preparatory work

- Raise the motorcycle with the work stand (inserted). (☞ p. 13)

Main work

- Place a load on the rear of the vehicle.
- ✓ The front wheel is not in contact with the ground.
- Move the handlebar to the straight-ahead position. Move the fork legs back and forth in the direction of travel.

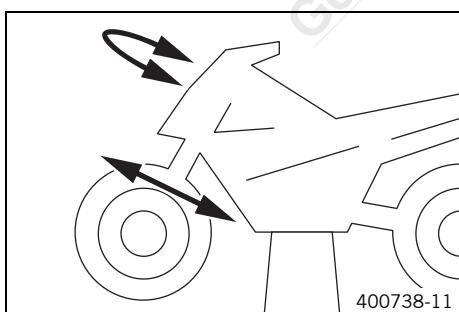
Play should not be detectable on the steering head bearing.

- » If there is detectable play:

- Adjust the steering head bearing play. (☞ p. 28)

- Move the handlebar back and forth over the entire steering range.

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



- » If detent positions are detected:
 - Adjust the steering head bearing play. (☞ p. 28)
 - Check the steering head bearing and adjust if necessary.

6.13 Adjusting the steering head bearing play

Preparatory work

- Raise the motorcycle with the work stand (inserted). (☞ p. 13)

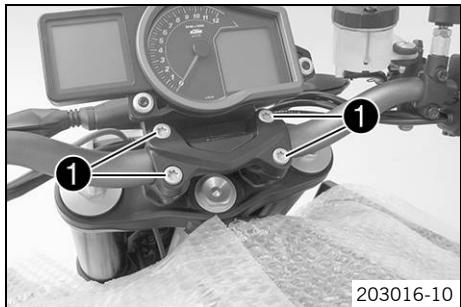
Main work

- Remove screws ① with the handlebar clamp.

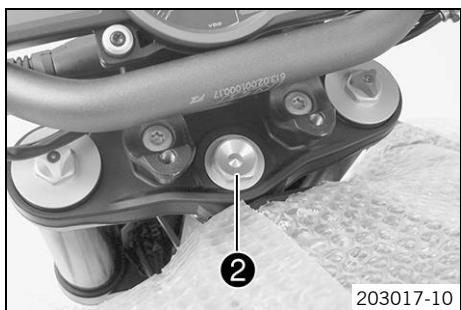


Info

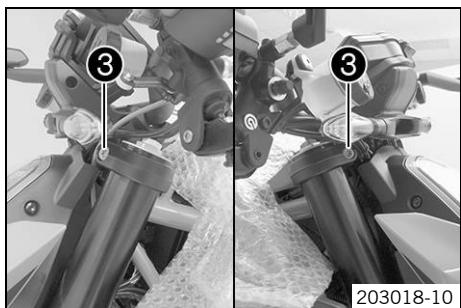
Protect the vehicle and components against damage.



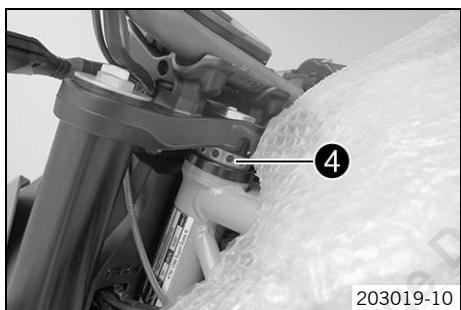
203016-10



203017-10



203018-10



203019-10

- Loosen screw ②.

- Loosen screws ③.

- Release nut ④ and tighten again.

Guideline

Nut, steering head	M28x1.0	Step 1 10 Nm (7.4 lbf ft) Step 2 (loosen, counterclockwise) 60°
--------------------	---------	---

Torque wrench with various accessories in set (58429094000) (☞ p. 341)

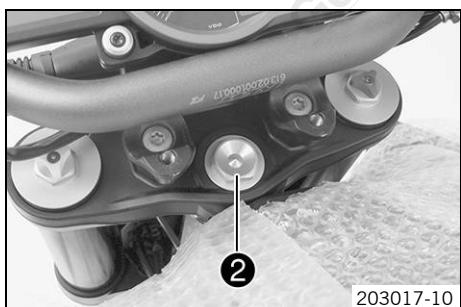
Mount for torque wrench (58429094100) (☞ p. 341)

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

- Tighten screw ②.

Guideline

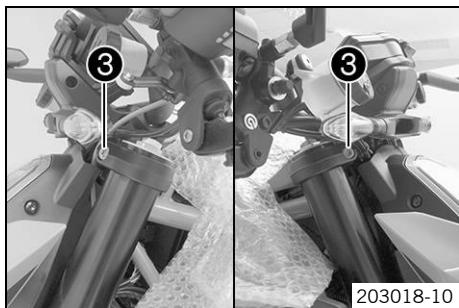
Screw, steering head, top	M22x1.5	50 Nm (36.9 lbf ft)
---------------------------	---------	------------------------



203017-10

6 FORK, TRIPLE CLAMP

29

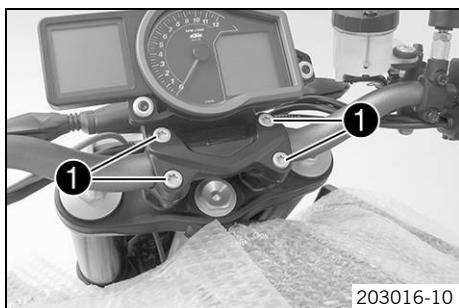


203018-10

- Tighten screws ③.

Guideline

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



203016-10

- Position the handlebar.
- Position the handlebar clamp. Mount and tighten screws ①.

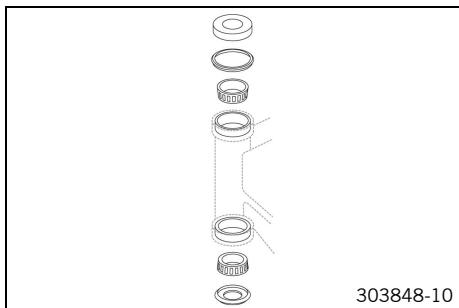
Guideline

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

Finishing work

- Check the play of the steering head bearing. (☞ p. 27)

6.14 Lubricating the steering head bearing



303848-10

- Remove the lower triple clamp. (☞ p. 29)
- Install the lower triple clamp. (☞ p. 30)

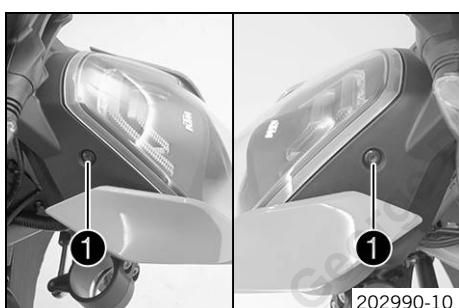
6.15 Removing the lower triple clamp

Preparatory work

- Raise the motorcycle with the work stand (inserted). (☞ p. 13)
- Clamp down the rear of the vehicle.
- Remove the fork legs. (☞ p. 17)

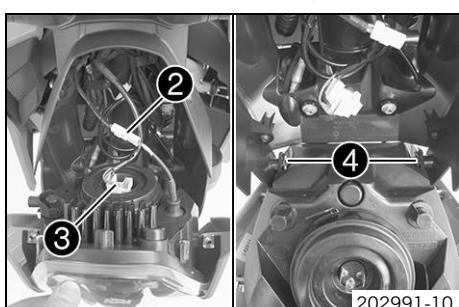
Main work

- Remove screws ①.
- Swing the headlight toward the front.



202990-10

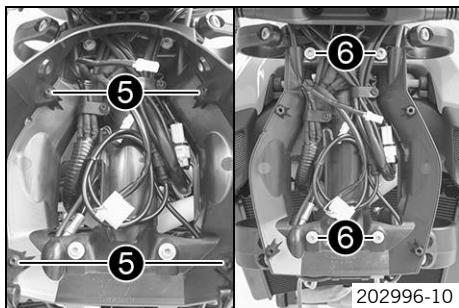
- Disconnect plug-in connector ②.
- Detach connector ③.
- Remove securing elements ④. Remove the headlight.
- Remove the headlight holding pin.



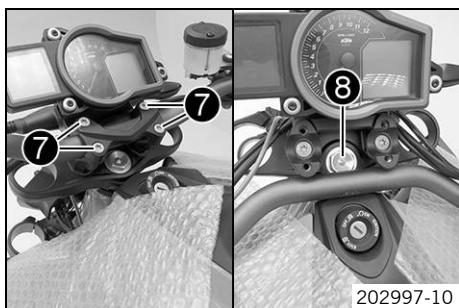
202991-10

6 FORK, TRIPLE CLAMP

30



- Remove screws 5. Remove the trim.
- Remove screws 6. Hang the brake line to the side.



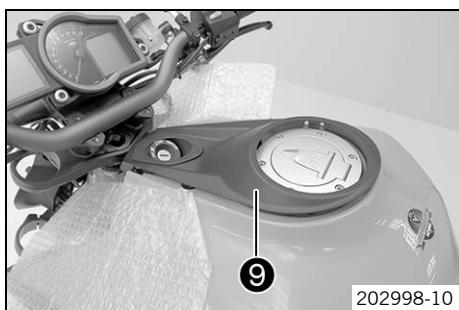
- Remove screws 7 with the handlebar clamp.



Info

Protect the vehicle and components against damage.

- Remove screw 8.



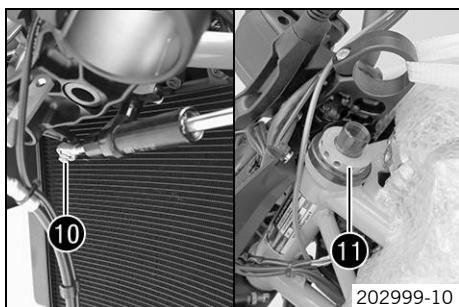
- Remove the fuel tank cover 9.

- Remove the upper triple clamp and hang it to the side.

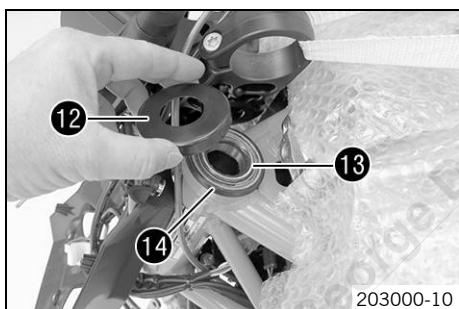


Info

Protect the vehicle and components against damage.



- Remove screw 10.
- Remove nut 11.
- Remove the lower triple clamp with the steering stem.



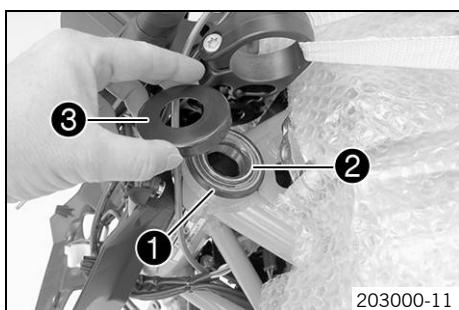
- Remove protective ring 12.
- Remove upper steering head bearing 13.
- Remove steering head seal 14.

6.16 Installing the lower triple clamp

Main work

- Grease the bearing, clean the sealing elements, and check for damage.

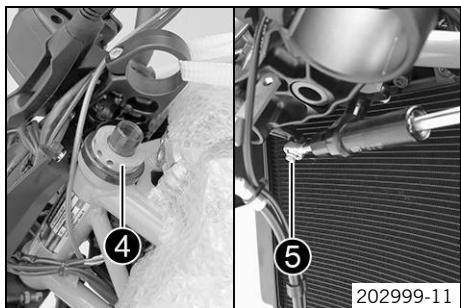
High viscosity grease (p. 336)



- Mount steering head seal 1.
- Position bearing 2 and protective ring 3.

6 FORK, TRIPLE CLAMP

31



- Insert the lower triple clamp with the steering stem.
- Mount and tighten nut 4.

Guideline

Nut, steering head	M28x1.0	Step 1 10 Nm (7.4 lbf ft) Step 2 (loosen, counterclockwise) 60°
--------------------	---------	--

Torque wrench with various accessories in set (58429094000) (☞ p. 341)

Mount for torque wrench (58429094100) (☞ p. 341)

- Mount and tighten screw 5 of the steering damper.

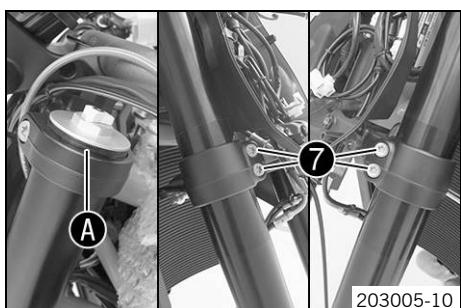
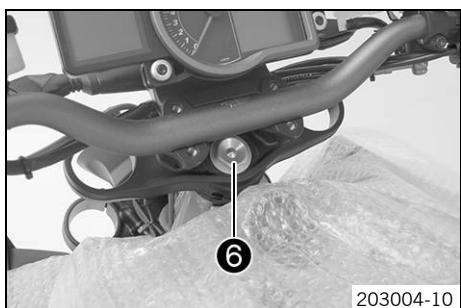
Guideline

Screw, steering damper on triple clamp	M8	8 Nm (5.9 lbf ft)	Loctite® 243™
--	----	-------------------	---------------

- Position the upper triple clamp.
- Mount screw 6 but do not tighten yet.

Guideline

Screw, steering head, top	M22x1.5	50 Nm (36.9 lbf ft)
---------------------------	---------	---------------------



- Position the fork legs in the triple clamps.
 - ✓ The left-hand fork leg has a white adjuster; the right-hand fork leg has a red adjuster.
- Align the fork legs in the specified position by means of fork rings A.

Guideline

Upper triple clamp flush with upper edge of fork legs	0 mm (0 in)
Upper triple clamp flush with 1st ring of fork legs	2.5 mm (0.098 in)
Upper triple clamp flush with 2nd ring of fork legs (standard)	5 mm (0.2 in)



Info

The standard adjustment is the setting that provides the best vehicle handling. When the fork is compressed, the basic suspension setting changes, causing the vehicle to become more stable but also more difficult to handle.

- Tighten screws 7.

Guideline

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

- Tighten screw 6.

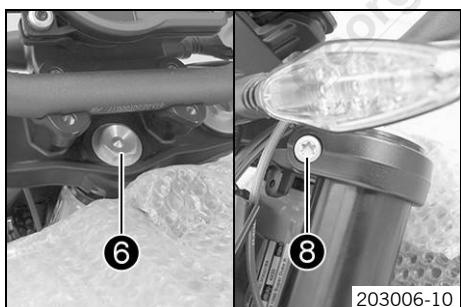
Guideline

Screw, steering head, top	M22x1.5	50 Nm (36.9 lbf ft)
---------------------------	---------	---------------------

- Using a plastic hammer, tap lightly on the upper triple clamp to avoid stresses.
- Tighten screws 8.

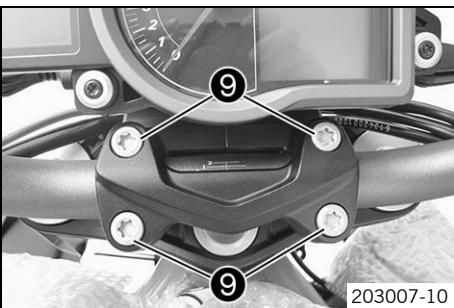
Guideline

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



6 FORK, TRIPLE CLAMP

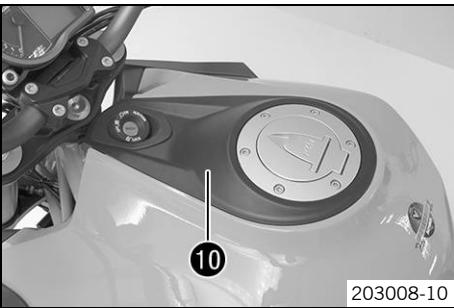
32



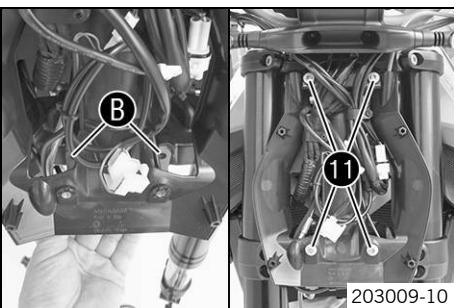
- Position the handlebar.
- Position the handlebar clamp. Mount and tighten screws 9.

Guideline

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



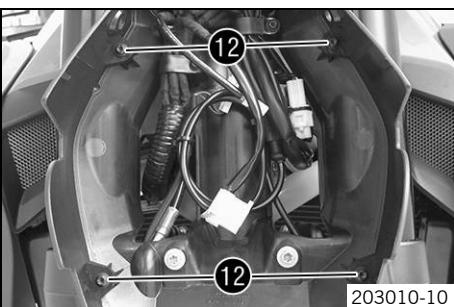
- Position fuel tank cover 10.



- Position holder B of brake lines and trim. Mount and tighten screws 11.

Guideline

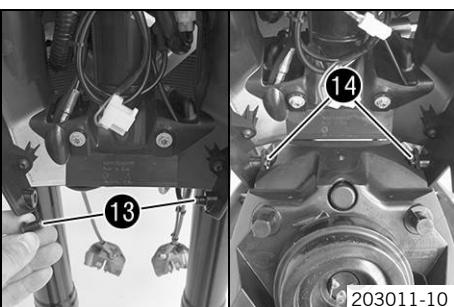
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)
---------------------------	----	--------------------



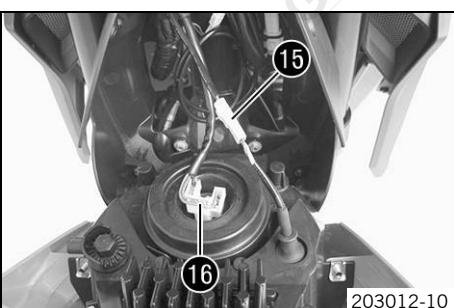
- Position the trim. Mount and tighten screws 12.

Guideline

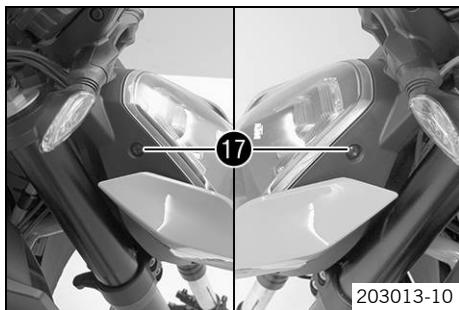
Remaining screws, chassis	M5	5 Nm (3.7 lbf ft)
---------------------------	----	-------------------



- Position headlight holding pin 13.
- Insert the headlight. Mount securing elements 14.



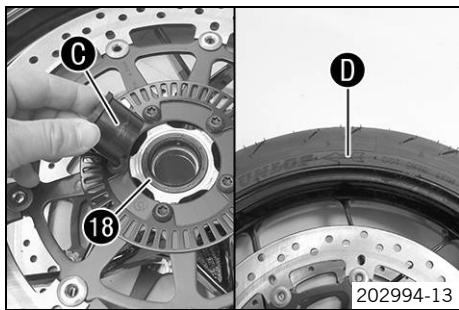
- Connect plug-in connector 15.
- Plug in connector 16.



- Swing up the headlight.
- Mount and tighten screws 17.

Guideline

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



- Check the wheel bearing for damage and wear.
 - » If the wheel bearing is damaged or worn:
 - Change the front wheel bearing. (p. 95)
- On both sides, clean and grease shaft seal ring 18 and contact surface C of the spacers.

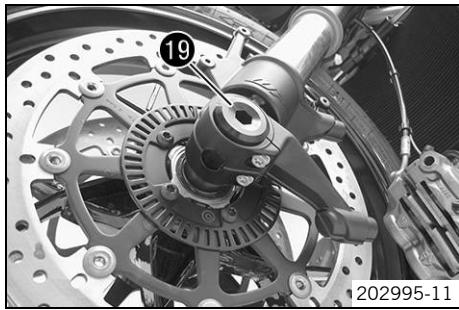
Long-life grease (p. 336)



Info

Insert the wide spacer on the left in the direction of travel.

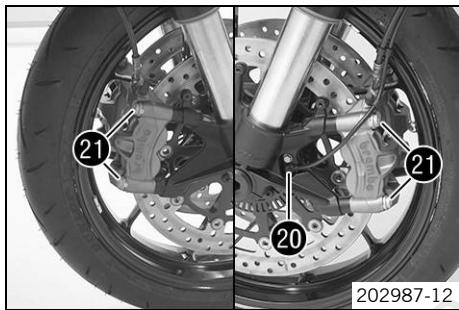
Arrow D indicates the direction of travel of the front wheel.



- Clean screw 19 and the wheel spindle.
- Lift the front wheel into the fork, position it, and insert the wheel spindle.
- Mount and tighten screw 19.

Guideline

Bolt, front axle	M25x1.5	45 Nm (33.2 lbf ft)	Thread greased
------------------	---------	------------------------	----------------



- Position wheel speed sensor 20. Mount and tighten the screw.

Guideline

Screw, wheel speed sensor, front	M6	4 Nm (3 lbf ft)
----------------------------------	----	-----------------

- Position the brake calipers and check that the brake linings are seated correctly.
- Mount screws 21 on both brake calipers but do not tighten yet.

Guideline

Screw, front brake caliper	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
----------------------------	-----	------------------------	---------------

- Operate the hand brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point. Fix the hand brake lever in the activated position.

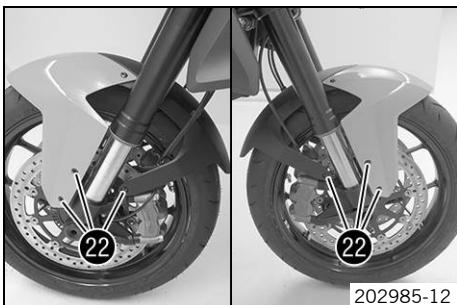
✓ The brake calipers straighten.

- Tighten screws 21 on both brake calipers.

Guideline

Screw, front brake caliper	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
----------------------------	-----	------------------------	---------------

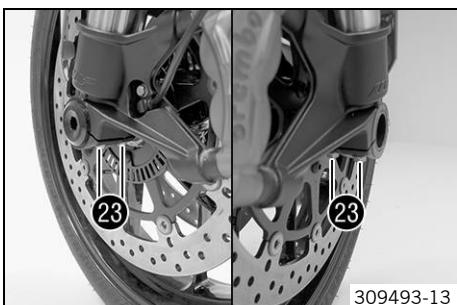
- Remove the locking piece of the hand brake lever.
- Check the wheel speed sensor spacing. (p. 148)
- Remove the load from the rear of the vehicle.



- Position the fender. Mount and tighten screws 22.

Guideline

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



- Operate the front brake and compress the fork a few times firmly.

✓ The fork legs straighten.

- Tighten screws 23.

Guideline

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

Finishing work

- Check the play of the steering head bearing. (☞ p. 27)
- Remove the motorcycle from the work stand (inserted). (☞ p. 13)

6.17 Changing the steering head bearing

Preparatory work

- Raise the motorcycle with the work stand (inserted). (☞ p. 13)
- Clamp down the rear of the vehicle.
- Remove the fork legs. (☞ p. 17)
- Remove the lower triple clamp. (☞ p. 29)

Main work

- Remove the lower bearing ring.

Tool bracket (58429089000) (☞ p. 340)

Press-out tool (58429092000) (☞ p. 340)

- Remove the upper bearing ring.

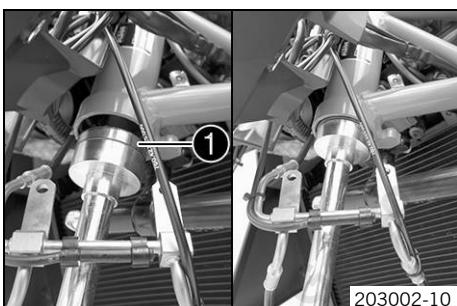
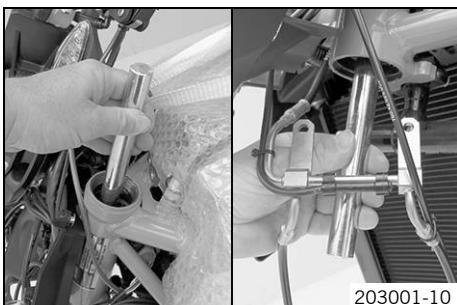
Tool bracket (58429089000) (☞ p. 340)

Press-out tool (58429092000) (☞ p. 340)

- Press in new lower bearing ring 1 as far as it will go.

Tool bracket (58429089000) (☞ p. 340)

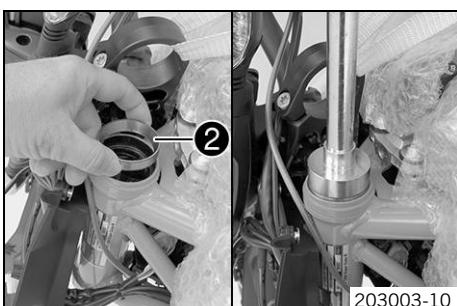
Press-in tool (58429091000) (☞ p. 340)



- Press in new upper bearing ring 2 as far as it will go.

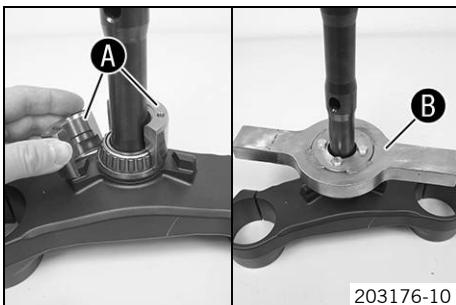
Tool bracket (58429089000) (☞ p. 340)

Press-in tool (58429091000) (☞ p. 340)



6 FORK, TRIPLE CLAMP

35



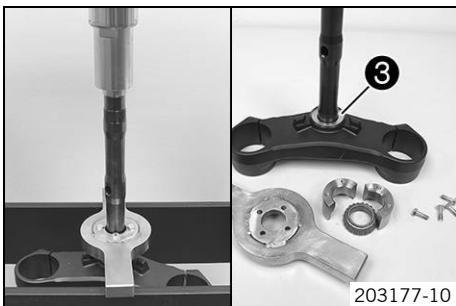
203176-10

- Position the half-shells of special tool **A** on the bearing.

Extractor for steering head bearing (61329005000) (p. 347)

- Position the holder of special tool **B**. Mount and tighten the screws.

Extractor for steering head bearing (61329005000) (p. 347)



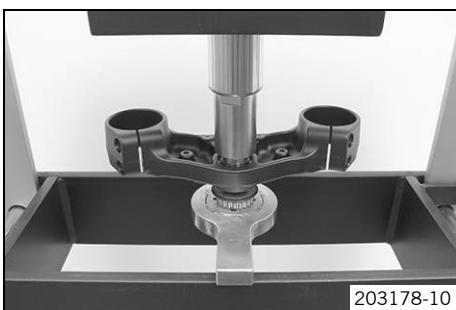
203177-10

- Position the pressure piece and press the steering stem out of the bearing.

Pressure piece (60029031000) (p. 343)

- Remove the special tools.

- Remove O-ring support **3**.



203178-10

- Position the new O-ring support and new bearing.

- Press in the bearing with the rear of the special tool and pressure piece as far as it will go.

Extractor for steering head bearing (61329005000) (p. 347)

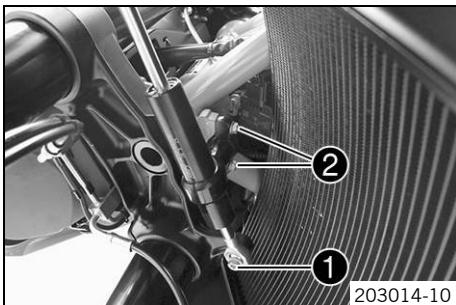
Pressure piece (60029031000) (p. 343)



Info

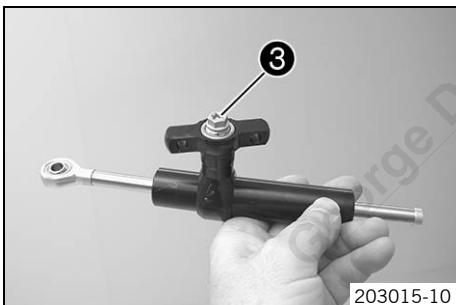
Only press the bearing in via the inner ring.

6.18 Changing the steering damper



203014-10

- Remove screw **1**.
- Remove screws **2**.
- Remove the steering damper.



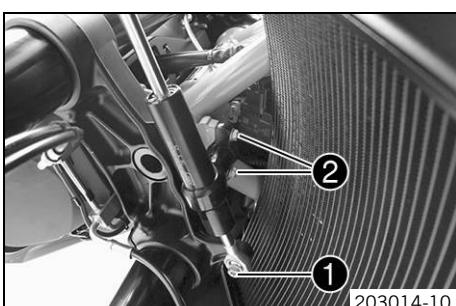
203015-10

- Remove screw **3**.
- Remove the holder.
- Position the holder on the new steering damper.
- Mount and tighten screw **3**.

Guideline

Screw, steering damper on holder	M8	8 Nm (5.9 lbf ft)	Loctite® 243™
----------------------------------	----	----------------------	---------------

- Position the steering damper.



203014-10

- Mount and tighten screws **2**.

Guideline

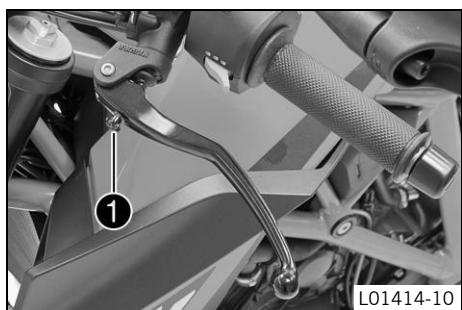
Screw, steering damper, holder, on frame	M6	8 Nm (5.9 lbf ft)	Loctite® 243™
--	----	----------------------	---------------

- Mount and tighten screw **1**.

Guideline

Screw, steering damper on triple clamp	M8	8 Nm (5.9 lbf ft)	Loctite® 243™
--	----	----------------------	---------------

7.1 Adjusting the basic position of the clutch lever



L01414-10

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



Info

Turn the adjusting screw clockwise to increase the distance between the clutch lever and the handlebar.
Turn the adjusting screw counterclockwise to decrease the distance between the clutch lever and the handlebar.
The range of adjustment is limited.
Only turn the adjusting screw by hand, and do not use force.
Push the clutch lever forward and turn the adjusting wheel.
Do not make any adjustments while riding.

7.2 Adjusting the handlebar position

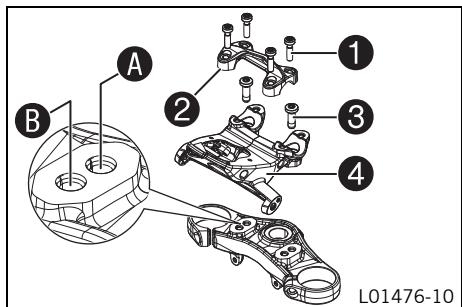


Warning

Danger of accidents A repaired handlebar poses a safety risk.

If the handlebar is bent or straightened, the material becomes fatigued. The handlebar may break as a result.

- Change the handlebar if the handlebar is damaged or bent.



L01476-10

- Remove screws ①. Take off handlebar clamp ②. Position the handlebar so that screws ③ are accessible.



Info

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

- Remove screws ③. Take off instrument support ④.
- Move the instrument support into the desired position **A** or **B**. Mount and tighten screws ③.

Guideline

Screw, instrument 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 clamp. Mount and evenly tighten screws ①.

Guideline

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

7.3 Changing the throttle grip

Preparatory work

- Remove the passenger seat. (☞ p. 77)
- Remove the front rider's seat. (☞ p. 77)
- Remove the spoiler. (☞ p. 78)
- Remove the fuel tank. (☞ p. 78)

Main work

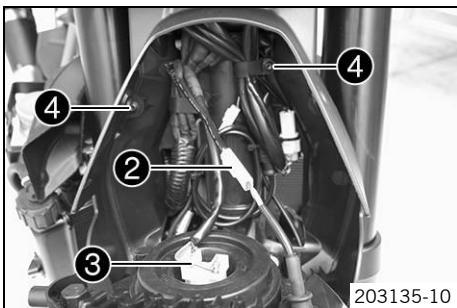
- Remove screw ① on both sides.
- Swing the headlight toward the front.



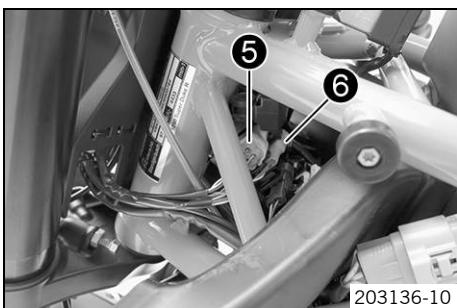
203134-10

7 HANDLEBAR, CONTROLS

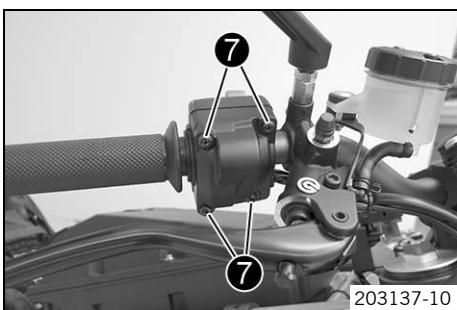
37



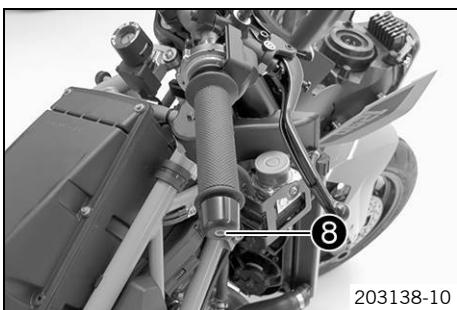
- Disconnect plug-in connector **2**.
- Detach connector **3**.
- Remove screws **4**. Remove the cable holder.



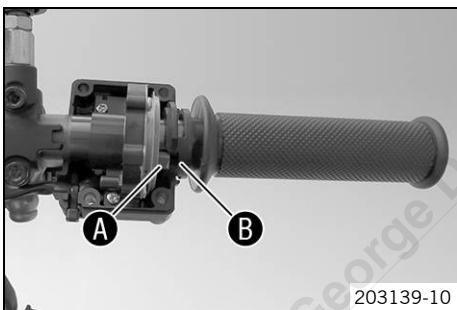
- Disconnect plug-in connectors **5** and **6**.
- Remove the cable binder. Maneuver the wiring harness out.



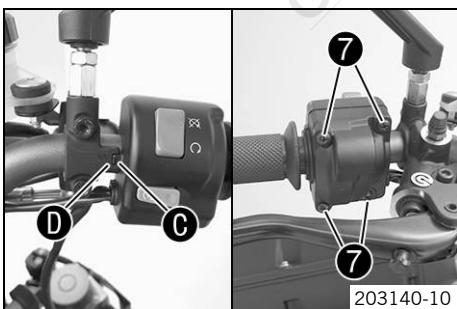
- Remove screws **7**. Remove the emergency OFF switch.



- Loosen screw **8**. Remove the handlebar weight.
- Pull the throttle grip and accelerator position sensor from the handlebar.



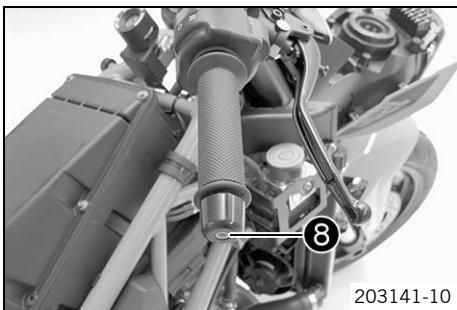
- Position the throttle grip and accelerator position sensor on the handlebar.
✓ Catch **A** engages in inner clutch hub **B**.



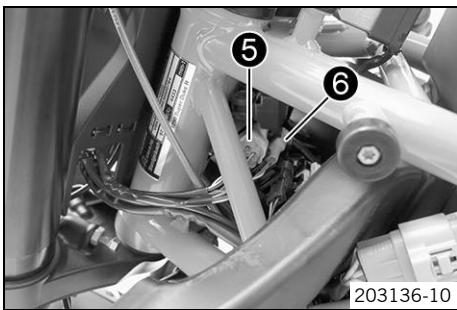
- Position the emergency OFF switch. Mount and tighten screws **7**.
Guideline

Screw for throttle grip	M5	3.5 Nm (2.58 lbf ft)
-------------------------	----	-------------------------

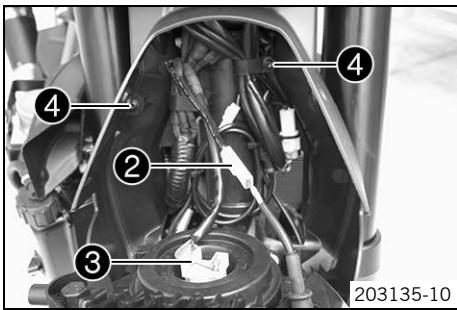
- ✓ Catch **C** engages in recess **D**.



- Mount the handlebar weight, tighten screw 8.



- Route the wiring harness of the accelerator position sensor so it is not under tension and secure with a cable binder.
- Connect plug-in connectors 5 and 6.

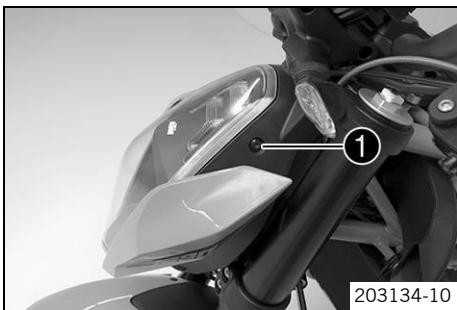


- Position the cable holder. Mount and tighten screws 4.

Guideline

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

- Join plug-in connector 2.
- Plug in connector 3.



- Swing the headlight upward.
- Mount and tighten screws 1 on both sides.

Guideline

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

Finishing work

- Install the fuel tank. (p. 80)
- Mount the front rider's seat. (p. 77)
- Mount the passenger seat. (p. 77)
- Install the spoiler. (p. 78)
- Reset the engine electronics control unit. (p. 273)
- Program the gear position sensor. (p. 240)

8.1 Checking the frame

R01990-10

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

**Info**

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

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



Caution

Risk of injury Parts of the shock absorber will fly off if the shock absorber is disassembled incorrectly.

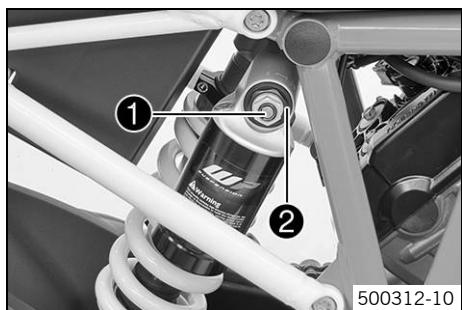
The shock absorber is filled with highly compressed nitrogen.

- Please follow 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	
Comfort	18 clicks
Standard	15 clicks
Sport	10 clicks
Full payload	10 clicks



Info

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

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



Caution

Risk of injury Parts of the shock absorber will fly off if the shock absorber is disassembled incorrectly.

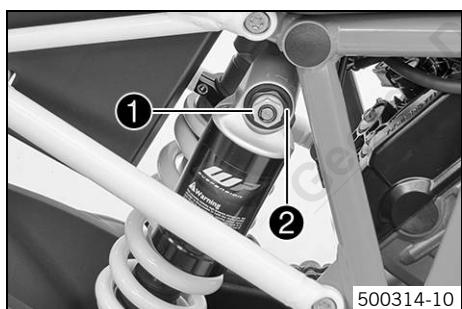
The shock absorber is filled with highly compressed nitrogen.

- Please follow 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	
Comfort	1.5 turns
Standard	1.5 turns
Sport	1 turn
Full payload	1 turn



Info

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

9.3 Adjusting the rebound damping of the shock absorber

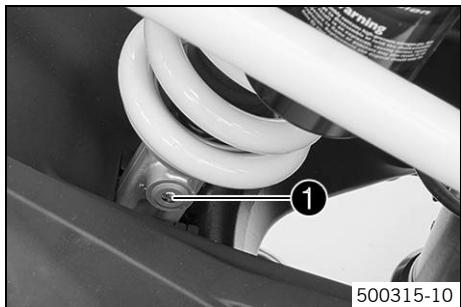


Caution

Risk of injury Parts of the shock absorber will fly off if the shock absorber is disassembled incorrectly.

The shock absorber is filled with highly compressed nitrogen.

- Please follow 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

Comfort	15 clicks
Standard	12 clicks
Sport	9 clicks
Full payload	9 clicks



Info

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

9.4 Adjusting the spring preload of the shock absorber



Warning

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

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



Info

The spring preload defines the initial situation of the spring process on the shock absorber.

The best spring preload setting is achieved when it is set for the weight of the rider and that of any luggage and a passenger, thus ensuring an ideal compromise between maneuverability and stability.

Preparatory work

Condition

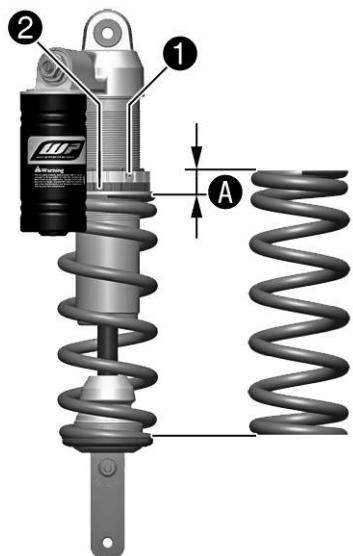
- The swingarm is unloaded.

Main work

- Loosen screw 1.
- Turn adjusting ring 2 counterclockwise with the hook wrench from the tool set until the spring is no longer under tension.

Hook wrench, shock absorber (61329083000)





402002-10

- Tighten the spring by turning adjusting ring **2** to the specified measurement **A**.
Guideline

Spring preload

Comfort	5 mm (0.2 in)
Standard	5 mm (0.2 in)
Sport	6 mm (0.24 in)
Full payload	7 mm (0.28 in)



Info

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

- Tighten screw **1**.

Guideline

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

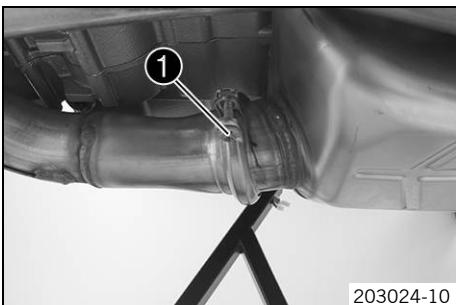
9.5 Removing the shock absorber

Preparatory work

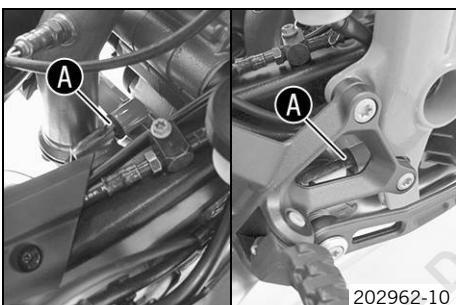
- Raise the motorcycle with the work stand (inserted). (☞ p. 13)
- Disassemble the main silencer. (☞ p. 67)
- Remove the rear wheel with the work stand. (☞ p. 97)

Main work

- Remove screw **1**.
- Remove the exhaust clamp.

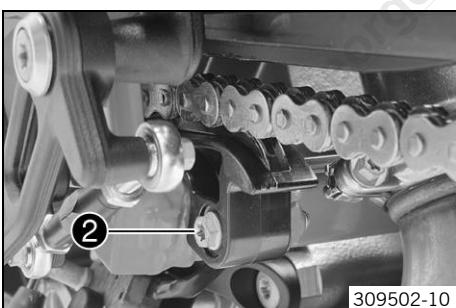


203024-10



202962-10

- Pull the presilencer backwards.
- ✓ Retaining dowels **A** are pulled out of the bushings.
- Take off the presilencer.

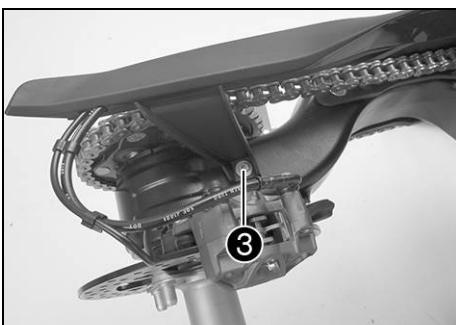


309502-10

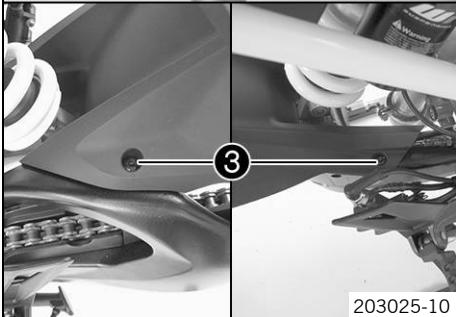
- Remove screw **2**.
- Take off the chain sliding piece.

9 SHOCK ABSORBER, SWINGARM

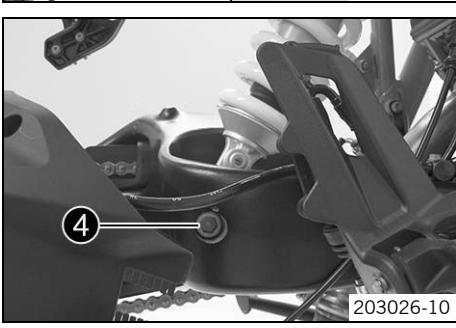
43



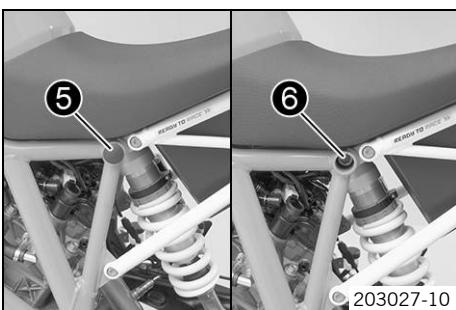
- Remove screws ③. Hang the splash protector to the side.



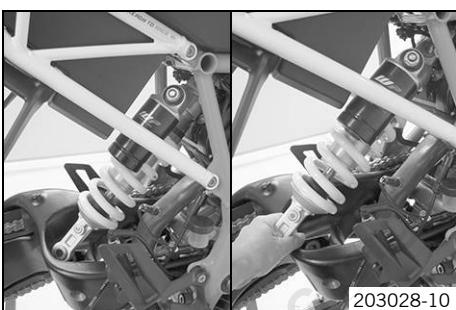
- Remove screw ④.
- Push the swingarm down and away from the shock absorber.



- Remove plug ⑤.
- Remove upper screw ⑥ of the shock absorber.
- Pull the shock absorber from its bracket.



- Push the swingarm down.
- Remove the shock absorber toward the rear.



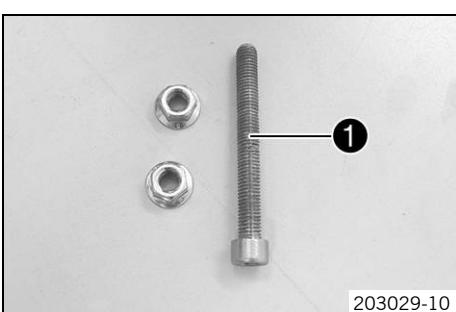
9.6 Installing the shock absorber

Procure tools (screw):

- Procure screw ① and 2 collar nuts.

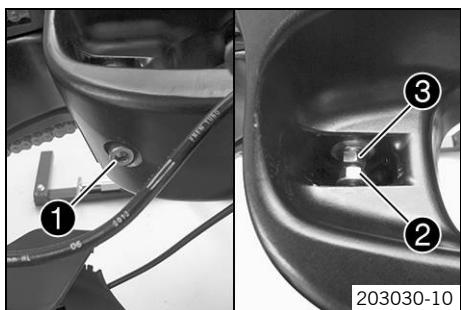
Guideline

Screw	M10
Length	$\geq 60 \text{ mm} (\geq 2.36 \text{ in})$

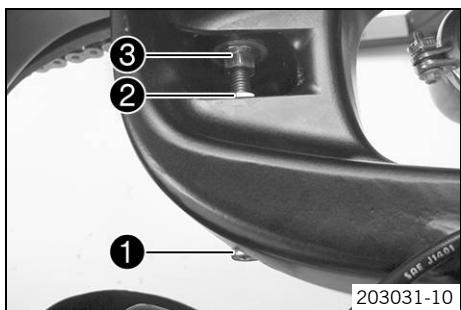


9 SHOCK ABSORBER, SWINGARM

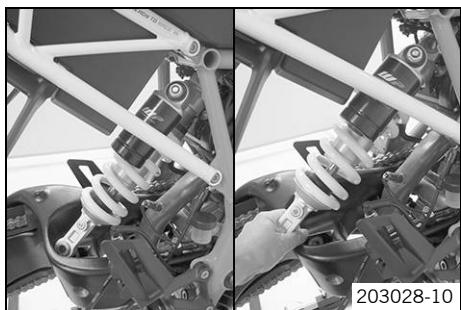
44



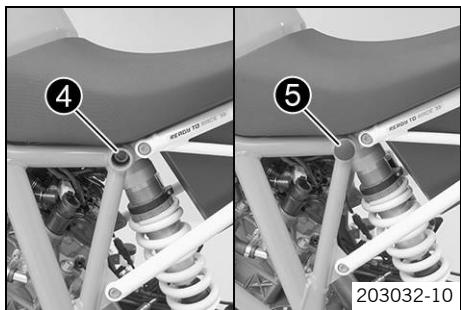
- Position screw ① in the drill hole of the swingarm. Mount both collar nuts ② and ③ with the collar facing out.



- Counterhold screw ①. Tighten collar nut ② until it is in contact with the swingarm.
 - ✓ Screw ① rests against the swingarm at collar nut ③.
 - ✓ The centering bushing of the shock absorber is pressed into the swingarm.
- Remove the screw and nuts.



- Position the shock absorber.

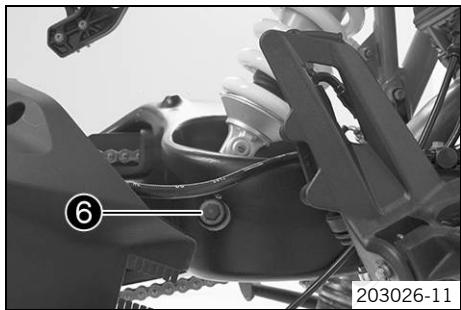


- Mount and tighten screw ④.

Guideline

Screw, top shock absorber	M14x1.5	80 Nm (59 lbf ft)	Thread greased
---------------------------	---------	----------------------	----------------

- Mount plug ⑤.



- Lift the swingarm.

- Mount and tighten screw ⑥.

Guideline

Screw, bottom shock absorber	M14x1.5	80 Nm (59 lbf ft)	Thread greased
------------------------------	---------	----------------------	----------------

9 SHOCK ABSORBER, SWINGARM

45



- Position the splash protector.

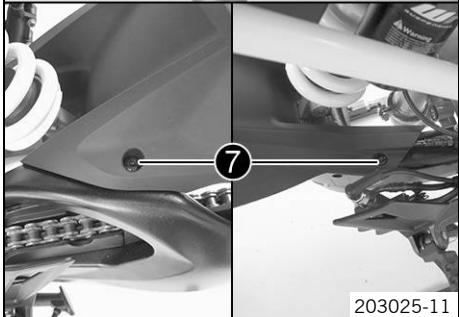


Info
Pay attention to the brake hose and cable of the wheel speed sensor.

- Mount and tighten screws 7.

Guideline

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

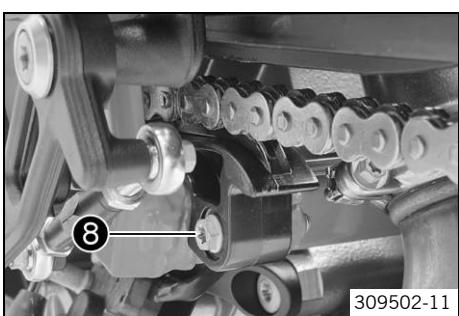


- Position the chain sliding piece.

- Mount and tighten screw 8.

Guideline

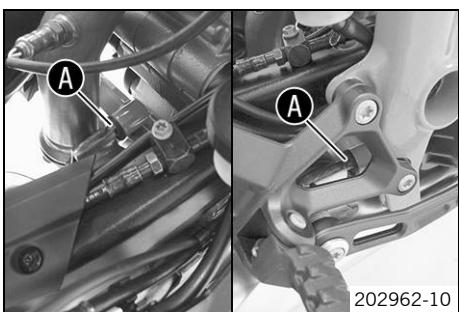
Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)
---------------------------	----	------------------------



309502-11

- Position the presilencer and slide it forwards.

✓ Retaining dowels A are pulled out of the bushings.



202962-10

- Position the exhaust clamp.

- Mount and tighten screw 9.

Guideline

Screw, exhaust clamp on manifold	M6	8 Nm (5.9 lbf ft)
----------------------------------	----	-------------------



203024-13

Finishing work

- Install the rear wheel with the work stand. (p. 97)
- Check the wheel speed sensor spacing. (p. 148)
- Remove the motorcycle from the work stand (inserted). (p. 13)
- Install the main silencer. (p. 67)

9.7 Servicing the shock absorber



Caution

Risk of injury Parts of the shock absorber will fly off if the shock absorber is disassembled incorrectly.

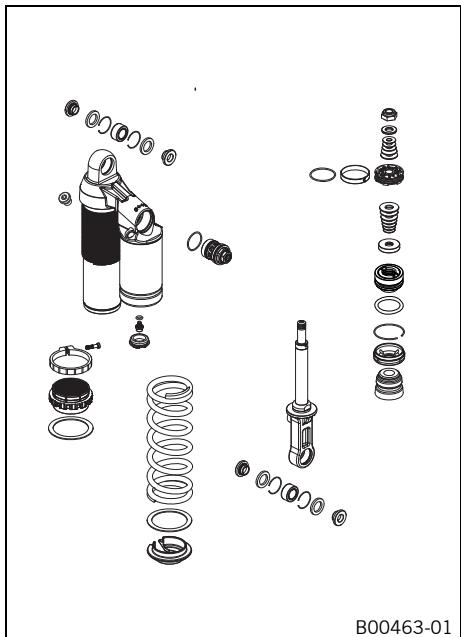
The shock absorber is filled with highly compressed nitrogen.

- Please follow the description provided.

Condition

The shock absorber has been removed.

- Remove the spring. (☞ p. 46)
- Disassemble the damper. (☞ p. 47)
- Disassemble the piston rod. (☞ p. 48)
- Check the damper. (☞ p. 49)
- Remove the heim joint. (☞ p. 50)
- Install the heim joint. (☞ p. 50)
- Assemble the piston rod. (☞ p. 51)
- Assemble the damper. (☞ p. 52)
- Bleed and fill the damper. (☞ p. 54)
- Fill the damper with nitrogen. (☞ p. 56)
- Install the spring. (☞ p. 57)



9.8 Removing the spring

Condition

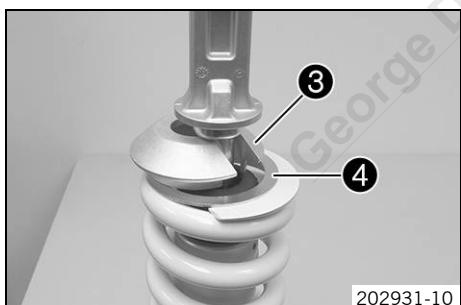
The shock absorber has been removed.

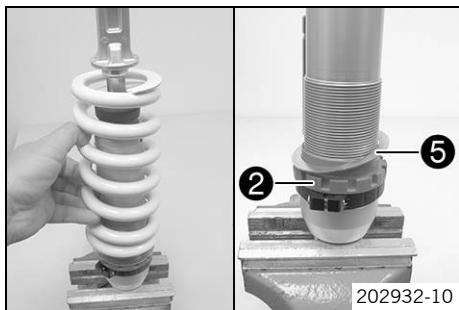
- Clamp the shock absorber into the vise with soft jaws.
- Measure and note down the spring length in the preloaded state.
- Loosen screw ①.
- Turn adjusting ring ② all the way up.

Hook wrench (T106S) (☞ p. 350)



- Remove spring retainer ③ and washer ④.





- Remove the spring.
- Turn adjusting ring ② with washer ⑤ upwards and remove it.

9.9 Disassembling the damper

Preparatory work

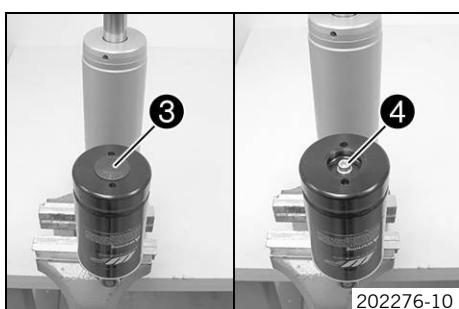
- Remove the spring. (☞ p. 46)

Main work

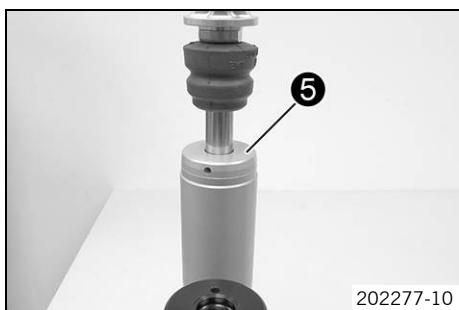
- Clamp the damper into the vise with soft jaws.
- Note down the current state of the rebound ① and compression damping ②.
- Open the adjusters of the rebound and compression damping completely.



- Remove rubber cap ③ of the reservoir.
- Slowly open screw ④.
- ✓ The nitrogen pressure dissipates.



- Remove locking cap ⑤.



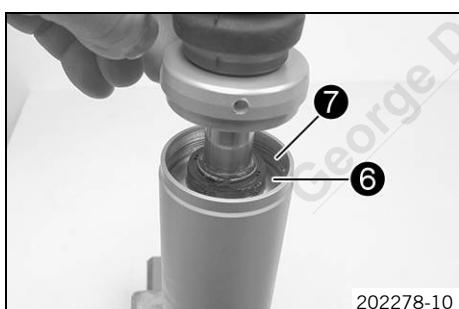
- Push in seal ring retainer ⑥.
- Remove lock ring ⑦.



Info

Do not scratch the inside surface.

- Unclamp the damper.



9 SHOCK ABSORBER, SWINGARM

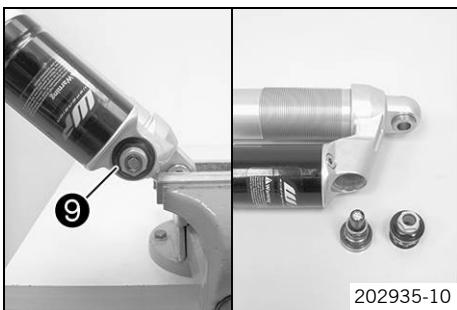
48



- Remove screw 8. Let the oil drain. Mount the screw again.



- Remove the piston rod. Drain the remaining oil.



- Remove compression adjuster 9. Remove the spring and piston.

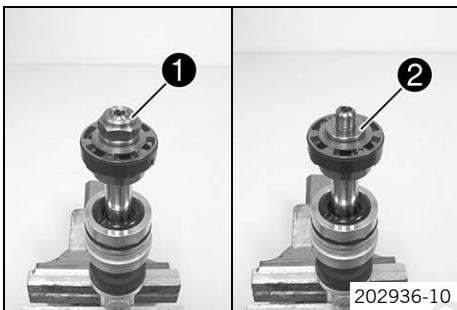
9.10 Disassembling the piston rod

Preparatory work

- Remove the spring. (p. 46)
- Disassemble the damper. (p. 47)

Main work

- Clamp the piston rod in a vise.
- Remove nut 1.
- Remove supporting plate 2.



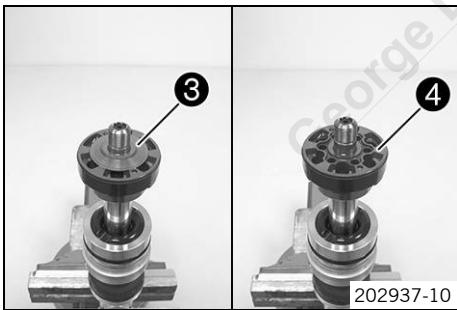
- Remove rebound shim stack 3.



Info

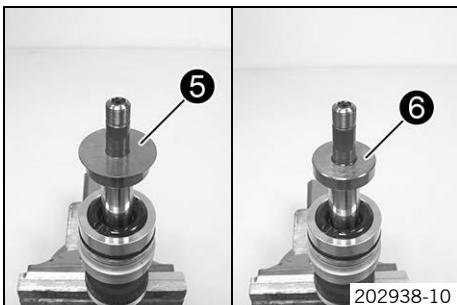
Slip the rebound shim stack onto a screwdriver and set the shims down together.

- Remove piston 4.



9 SHOCK ABSORBER, SWINGARM

49

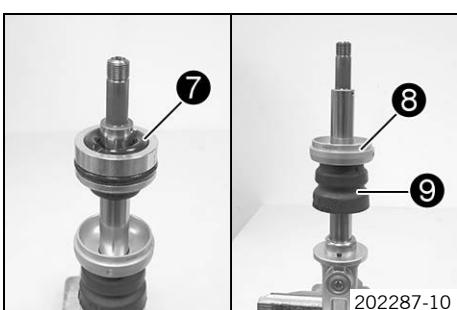


- Remove the compression shim stack 5.

i Info

Slip the compression shim stack onto a screwdriver and set the shims down together.

- Remove rebound washer 6.



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

9.11 Checking the damper

Condition

The damper has been disassembled.

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

Damper cartridge

Minimum diameter	46.10 mm (1.815 in)
------------------	---------------------

» If the measured value is greater than the specified value:

- Change the damper cartridge.

- Check the damper cartridge for damage and wear.

» If there is damage or wear:

- Change the damper cartridge.

- Check the heim joint for damage and wear.

» If there is damage or wear:

- Change the heim joint.

- Measure the diameter of the piston rod.

Piston rod

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

» If the specified value is not reached:

- Change the piston rod.

- Measure the run-out of the piston rod.

Piston rod

Run-out	$\leq 0.03 \text{ mm} (\leq 0.0012 \text{ in})$
---------	---

» 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.



9.12 Removing the heim joint



Info

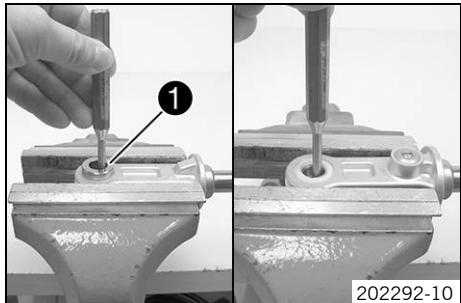
The operations are the same for the upper and lower heim joints.

Condition

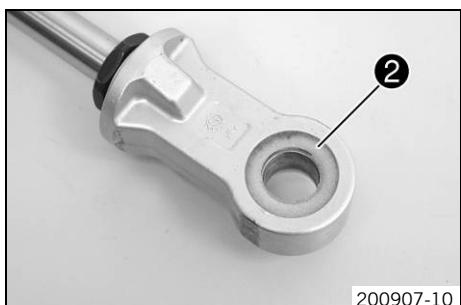
The shock absorber has been removed.

- Clamp the shock absorber into the vice with soft jaws.
- Remove both collar bushings ① of the heim joint with a drift.

Pin (T120) (☞ p. 350)

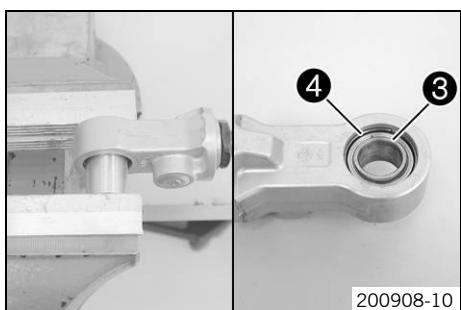


202292-10



200907-10

- Remove seal rings ② on both sides.



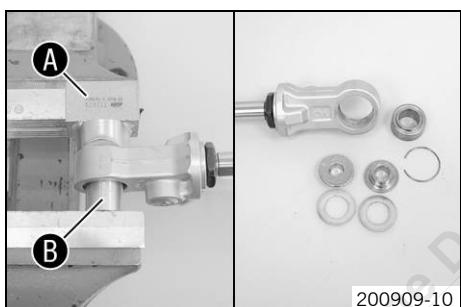
200908-10

- Press heim joint ③ aside.

Pressing tool (T1207S) (☞ p. 351)

✓ The heim joint is resting against one lock ring.

- Remove the other lock ring ④.



200909-10

- Place special tool A underneath and push out the heim joint with special tool B.

Pressing tool (T1207S) (☞ p. 351)

9.13 Installing the heim joint

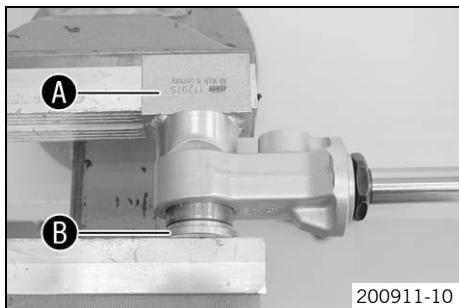


Info

The operations are the same for the upper and lower heim joints.

9 SHOCK ABSORBER, SWINGARM

51

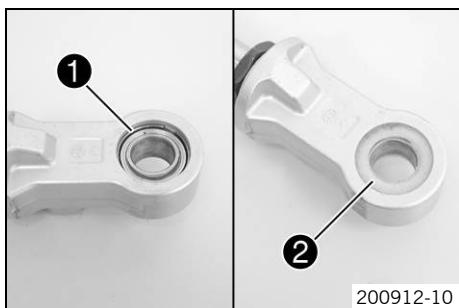


200911-10

- Place special tool **A** underneath and press in the heim joint as far as the lock ring using special tool **B**.

Pressing tool (T1207S) (p. 351)

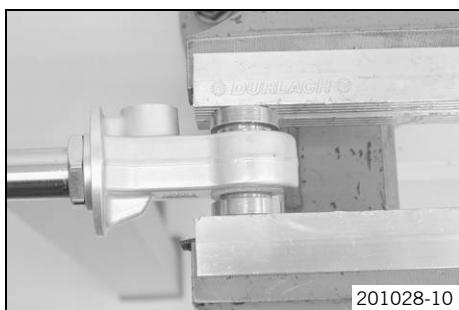
Pressing tool (T1206) (p. 351)



200912-10

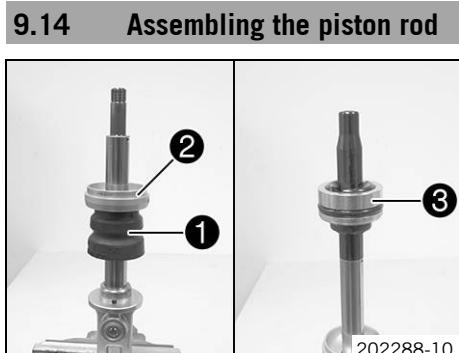
- Mount the second lock ring **1**.
- Mount and grease seal rings **2** on both sides.

Lubricant (T158) (p. 336)



201028-10

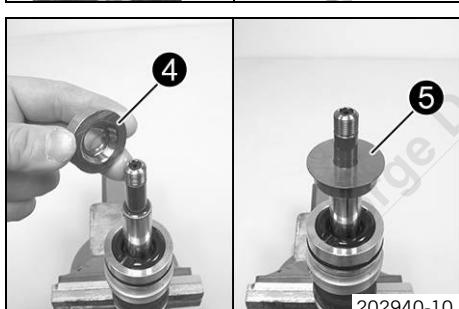
- Push in both collar bushings of the heim joint.



202288-10

- Clamp the piston rod with the fork in a bench vise.
- Mount rubber buffer **1** and locking cap **2**.
- Position the special tool on the piston rod.

Mounting sleeve (T1554) (p. 352)

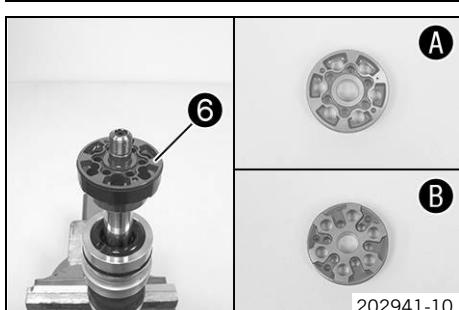


202940-10

- Grease the dust boot and slide the seal ring retainer **3** onto the piston rod.
- Lubricant (T625) (p. 336)
- Remove the special tool.

- Mount rebound washer **4** with cut-out facing down.

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



202941-10

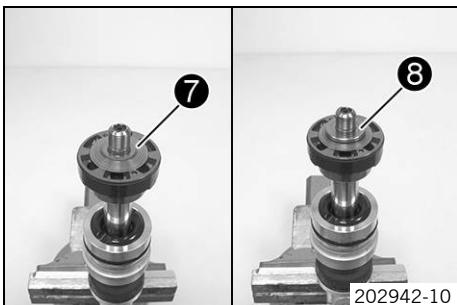
- Sand down piston **6** on both sides on a surface plate using 1200 grit sandpaper.
- Clean the piston.
- Mount the piston.

Guideline

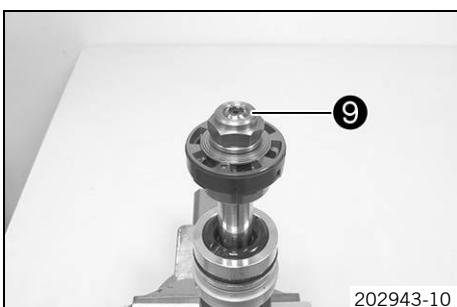
View A	of piston from above
View B	of piston from below

9 SHOCK ABSORBER, SWINGARM

52



- Mount rebound shim stack 7 with the smaller shims facing upward.
- Mount supporting plate 8.



- Mount and tighten nut 9.

Guideline

Nut, piston rod	M12x1	40 Nm (29.5 lbf ft)
-----------------	-------	------------------------

9.15 Assembling the damper

Preparatory work

- Assemble the piston rod. (☞ p. 51)

Main work

- Slide the spring and piston onto compression adjuster 1.
- Lubricate the O-rings.

Lubricant (T158) (☞ p. 336)

- Lubricate the thread.

Lubricant (T159) (☞ p. 336)

- Mount and tighten the compression adjuster.

Guideline

Compression damping adjuster	M31x1	35 Nm (25.8 lbf ft)
------------------------------	-------	------------------------

- Ensure that screw 2 is mounted but not yet tightened.



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

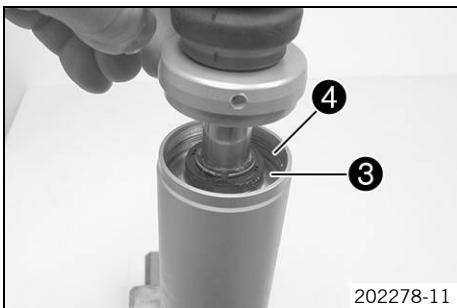
Lubricant (T158) (☞ p. 336)

- Fill the damper cartridge about half full.

Shock absorber fluid (SAE 2.5) (50180751S1) (☞ p. 335)

- Mount the piston rod carefully.



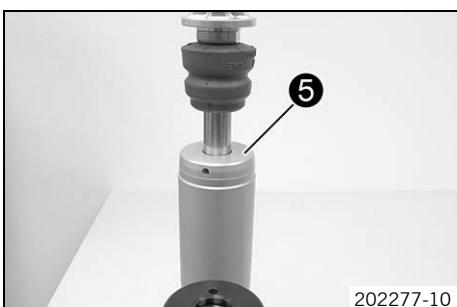


- Mount seal ring retainer **3** and slide it under the ring groove.
- Mount lock ring **4**.

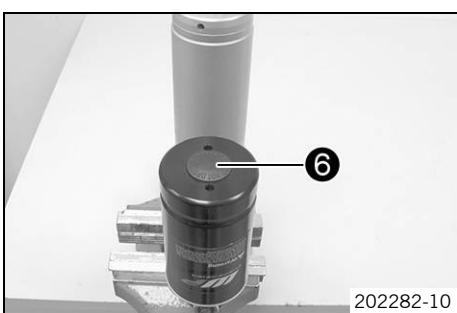
i Info

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 **5** of the damper cartridge.
- Bleed and fill the damper. (☞ p. 54)
- Fill the damper with nitrogen. (☞ p. 56)



- Mount rubber cap **6** of the reservoir.



Alternative 1

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

Guideline

Rebound damping	
Comfort	15 clicks
Standard	12 clicks
Sport	9 clicks
Full payload	9 clicks

- Turn adjusting screw **8** clockwise with a screwdriver as far as the last perceptible click.
- Turn counterclockwise by the number of clicks corresponding to the shock absorber type.

Guideline

Compression damping, low-speed	
Comfort	18 clicks
Standard	15 clicks
Sport	10 clicks
Full payload	10 clicks

- Turn adjusting screw **9** 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	1.5 turns
Standard	1.5 turns
Sport	1 turn
Full payload	1 turn

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.

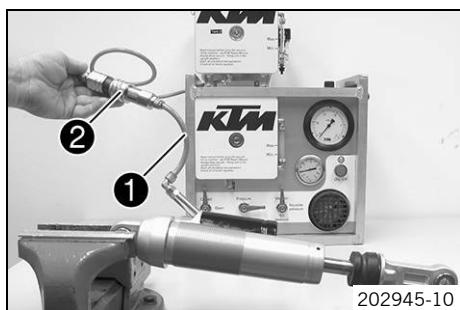
- Position adjusting screws 7, 8, and 9 in the location determined during disassembly.

9.16 Bleeding and filling the damper



Info

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



- Remove the filling port screw.
- Mount adapter 1 on the damper.



Info

Hand-tighten only without using a tool.

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

Vacuum pump (T1240S) (☞ p. 351)

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



Info

Clamp the damper only lightly.

The filling port must be located at the highest position.

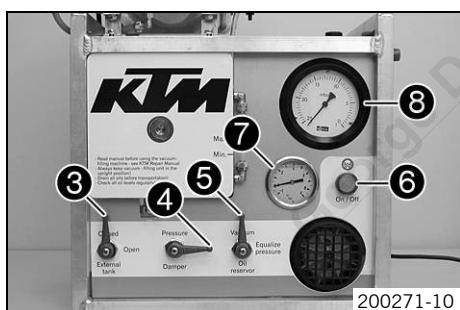
The piston rod moves in and out during filling; do not immobilize it by holding it with your hand.

- Position the control lever as shown in the photo.
- ✓ Control lever **External tank** 3 is set to **Closed**, Damper 4 is set to **Vacuum** and Oil reservoir 5 is set to **Vacuum**.
- Activate **On/Off** switch 6.
- ✓ The suction process begins.
- ✓ Pressure gauge 7 drops to the required value.

< 0 bar

- ✓ Vacuum gauge 8 drops to the required value.

4 mbar



9 SHOCK ABSORBER, SWINGARM

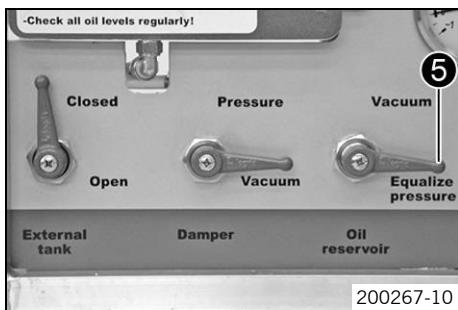
55



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

Depth micrometer (T107S) (p. 350)

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



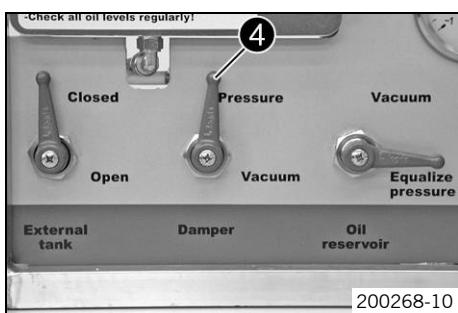
- When the vacuum gauge reaches the required value, turn control lever **Oil reservoir** **5** to **Equalize pressure**.

Guideline

4 mbar

- The pressure gauge increases to the required value.

0 bar



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

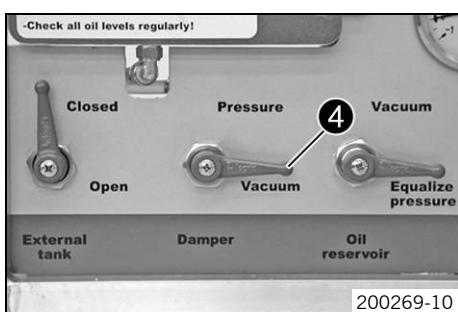
Guideline

0 bar

- Oil is pumped into the damper.

- The pressure gauge increases to the required value.

3 bar



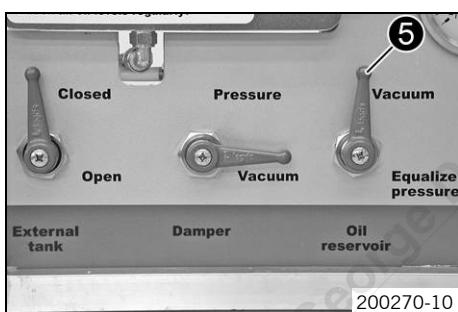
- When the pressure gauge reaches the required value, turn control lever **Damper** **4** to **Vacuum**.

Guideline

3 bar

- The pressure gauge drops to the required value.

0 bar



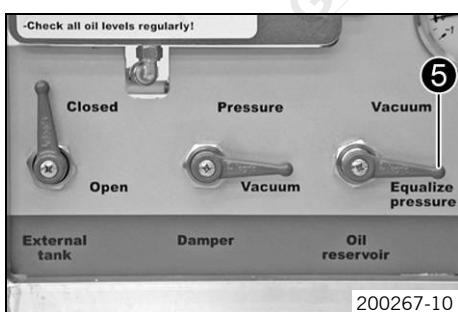
- When the pressure gauge reaches the required value, turn control lever **Oil reservoir** **5** to **Vacuum**.

Guideline

0 bar

- The vacuum gauge drops to the required value.

8 mbar



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

Guideline

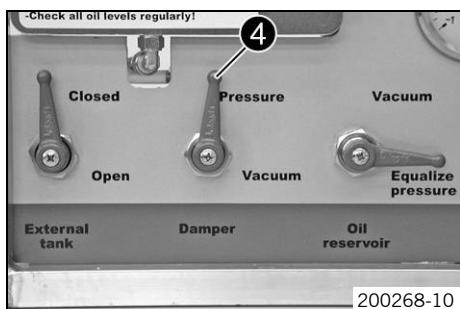
8 mbar

- The pressure gauge drops to the required value.

0 bar

9 SHOCK ABSORBER, SWINGARM

56



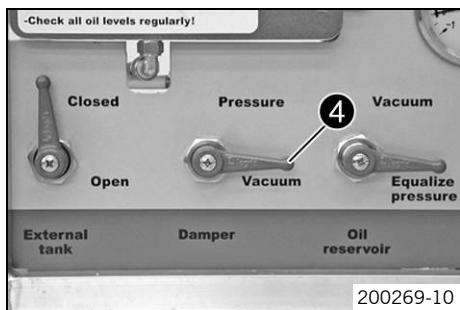
- When the pressure gauge reaches the required value, turn control lever **Damper 4** to **Pressure**.

Guideline

0 bar

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

3 bar



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

Guideline

3 bar

- ✓ The pressure gauge drops to the required value.

0 bar

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

Guideline

0 bar

- ✓ The vacuum pump is switched off.

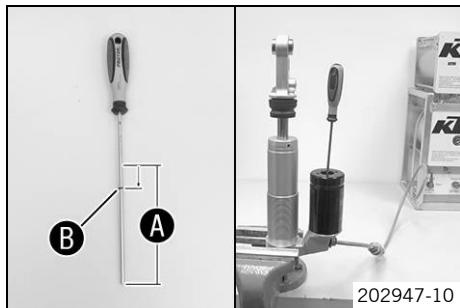
- Slide O-ring **B** to the end of the special tool by the specified value (distance **A** minus specified value).

Guideline

10 mm

Depth micrometer (T107S) (p. 350)

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



i Info

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

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

i Info

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

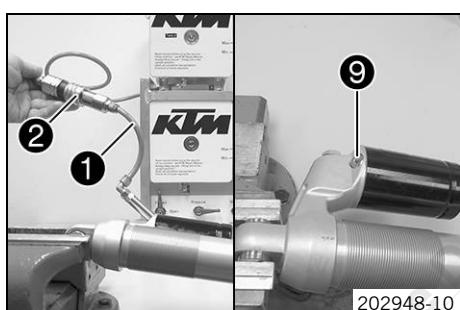
- Remove the adapter.
- Mount and tighten screw **9**.

Guideline

Screw, filling port

M10x1

14 Nm
(10.3 lbf ft)



9.17 Filling the damper with nitrogen



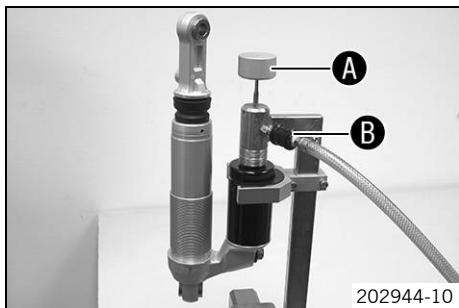
- Screw in screw **1** by approx. 2 turns but do not tighten.

i Info

The piston rod is fully extended.

9 SHOCK ABSORBER, SWINGARM

57



- Fix the special tool in the vise.
- | |
|---|
| Nitrogen filling tool (T170S1) (p. 352) |
|---|
- 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 **A** engages in the hexagon socket of the filling port screw.
- Open filler tap **B**.
- Fill the damper for at least 15 seconds.
- Guideline
- | | |
|--------------|------------------|
| Gas pressure | 10 bar (145 psi) |
|--------------|------------------|



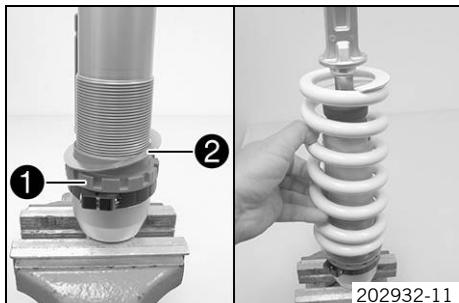
Info

Watch the pressure regulator dial.

Ensure that the damper is filled to the specified pressure.

- Close the filling port screw using tap handle **A**.
 - Close tap **B** and take the damper out of the special tool.
 - Tighten the filling port screw.
- Guideline
- | | | |
|--------------------------------|----|-------------------|
| Screw, filling port, reservoir | M5 | 3 Nm (2.2 lbf ft) |
|--------------------------------|----|-------------------|

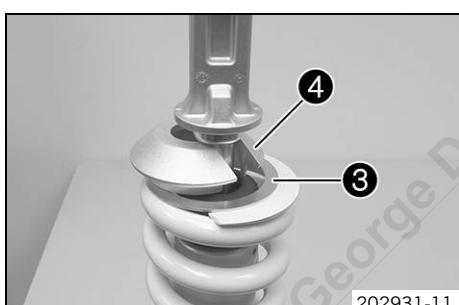
9.18 Installing the spring



- Mount adjusting ring **1** with washer **2** and screw it all the way down.
- Measure the overall spring length without a load.
- Position the spring.

Guideline

Spring rate	
Medium (standard)	170 N/mm (971 lb/in)



- Mount washer **3** and spring retainer **4**.



Alternative 1

- Tighten spring to the specified dimension by turning adjusting ring **1**.
- Guideline

Spring preload	
Comfort	5 mm (0.2 in)
Standard	5 mm (0.2 in)
Sport	6 mm (0.24 in)
Full payload	7 mm (0.28 in)

Hook wrench (T106S) (p. 350)

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.

- Adjust the spring to the value determined when it was removed by turning adjusting ring ①.

Hook wrench (T106S) (☞ p. 350)

- Tighten screw ⑤.

Guideline

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

9.19 Checking the swingarm



R01988-10

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



Info

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

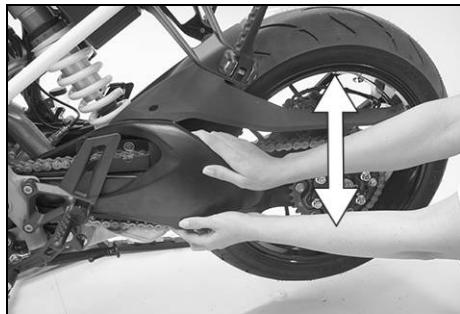
9.20 Checking the swingarm bearing

Preparatory work

- Raise the motorcycle with the work stand (inserted). (☞ p. 13)

Main work

- Move the swingarm up and down.
 - » If there is detectable play:
 - Change the swingarm bearing. (☞ p. 63)
- Move the swingarm from one side to the other.
 - » If there is detectable play:
 - Change the swingarm bearing. (☞ p. 63)



309865-10

Finishing work

- Remove the motorcycle from the work stand (inserted). (☞ p. 13)

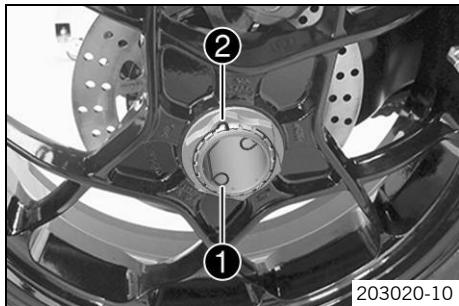
9.21 Removing the swingarm

Preparatory work

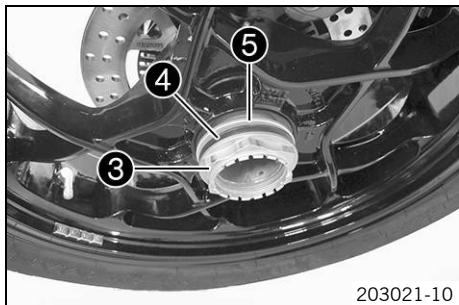
- Disassemble the main silencer. (☞ p. 67)
- Remove the presilencer. (☞ p. 68)
- Raise the motorcycle with the work stand (screw-in type). (☞ p. 11)

Main work

- Remove the inside locking wire ①.
- Remove the outside locking wire ②.



203020-10



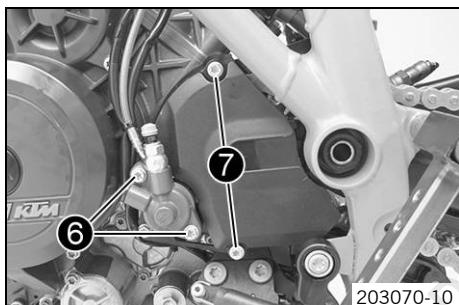
203021-10



203074-10

- Have an assistant operate the rear brake.
- Release nut ③ and remove with washer ④ and taper ring ⑤.

- Take off the rear wheel.



203070-10

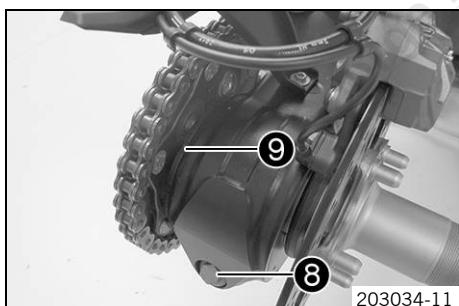
- Remove screws ⑥. Hang the slave cylinder of the clutch to the side.



Info

Do not operate the clutch lever when the clutch slave cylinder screw is disassembled.

- Remove screws ⑦. Remove the engine sprocket cover.



203034-11

- Loosen screw ⑧.

- Turn hub housing ⑨ clockwise.

Hook wrench (61329085000) (☞ p. 348)

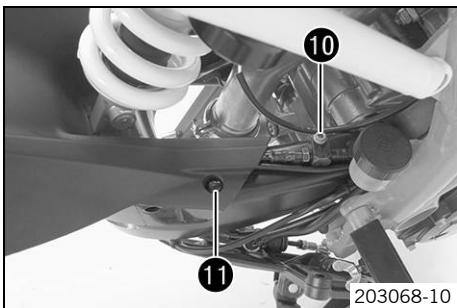
Handle for ring wrench (60012060000) (☞ p. 342)

✓ The chain is loosened.

- Open the chain. (☞ p. 107)
- Remove the chain.

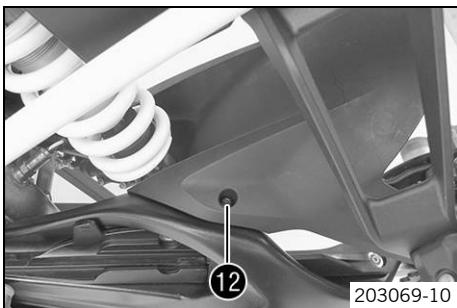
9 SHOCK ABSORBER, SWINGARM

60



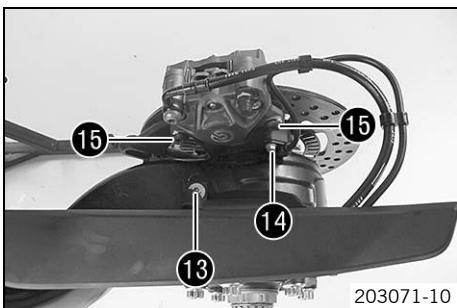
203068-10

- Remove screws 10 and 11.



203069-10

- Remove screw 12.



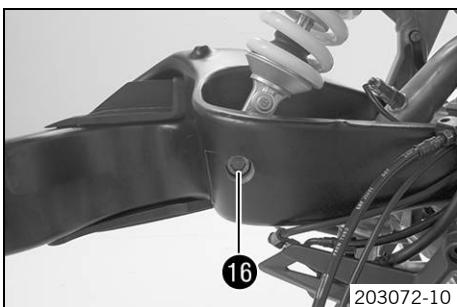
203071-10

- Remove screw 13.
- Remove screw 14 and pull off wheel speed sensor.
- Remove screws 15.
- Remove the brake caliper and hang it to the side with the splash protector.



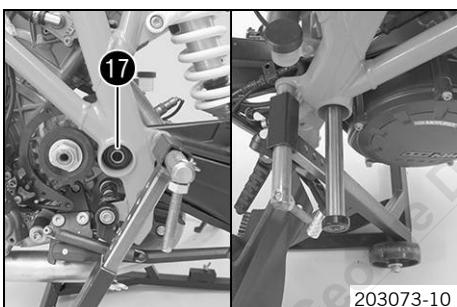
Info

Protect the swingarm and components from damage.



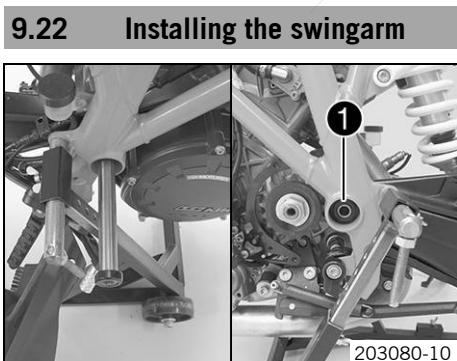
203072-10

- Remove screw 16.
- Push the swingarm down and away from the shock absorber. Prop up the swingarm at the rear.



203073-10

- Remove nut 17.
- Remove the swingarm pivot. Take off the swingarm.



203080-10

9.22 Installing the swingarm

Main work

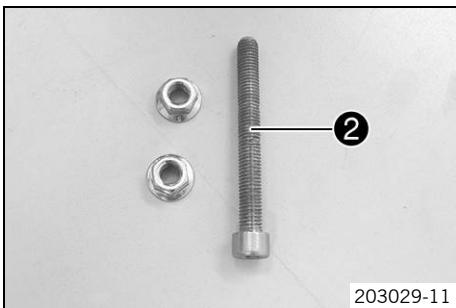
- Position the swingarm. Mount the swingarm pivot.
- Mount and tighten nut 1.

Guideline

Nut, swingarm pivot	M19x1.5	130 Nm (95.9 lbf ft)	Thread greased
---------------------	---------	-------------------------	----------------

9 SHOCK ABSORBER, SWINGARM

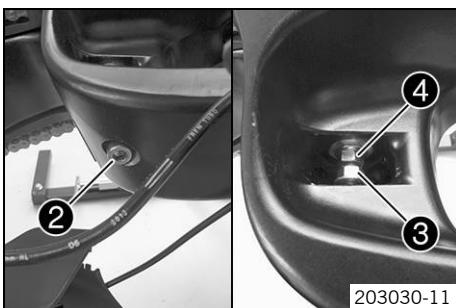
61



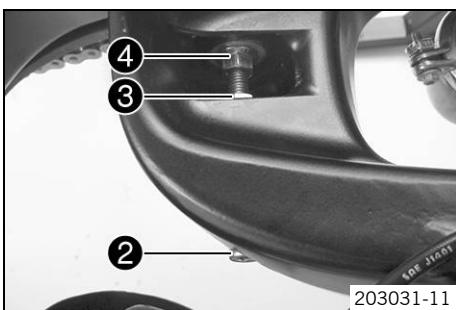
- Use a screw ② with 2 collar nuts.

Guideline

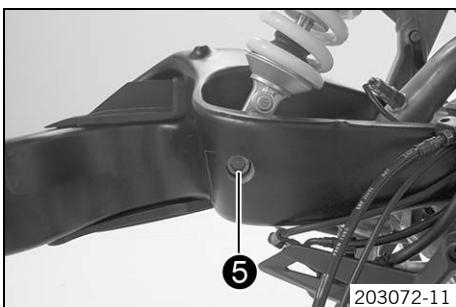
Screw	M10
Length	$\geq 60 \text{ mm} (\geq 2.36 \text{ in})$



- Position screw ② in the drill hole of the swingarm.
- Mount both collar nuts ③ and ④ with the collar facing out.



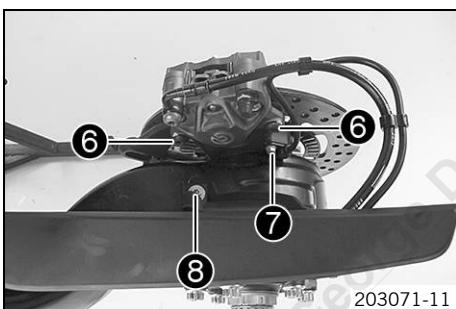
- Counterhold screw ②. Tighten collar nut ③ until it is in contact with the swingarm.
 - ✓ Screw ② rests against the swingarm at collar nut ④.
 - ✓ The centering bushing of the shock absorber is pressed into the swingarm.
- Remove the screw and nuts.



- Lift the swingarm and position the shock absorber.
- Mount and tighten screw ⑤.

Guideline

Screw, bottom shock absorber	M14x1.5	80 Nm (59 lbf ft)	Thread greased
------------------------------	---------	----------------------	----------------



- Position the splash protector.

i Info

Pay attention to the brake hose and cable of the wheel speed sensor.

- Position the brake caliper. Mount and tighten screws ⑥.

Guideline

Screw, rear brake caliper	M8	25 Nm (18.4 lbf ft)	Loctite® 2701™
---------------------------	----	------------------------	----------------

- Position the wheel speed sensor. Mount and tighten screw ⑦.

Guideline

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

- Check the wheel speed sensor spacing. (p. 148)

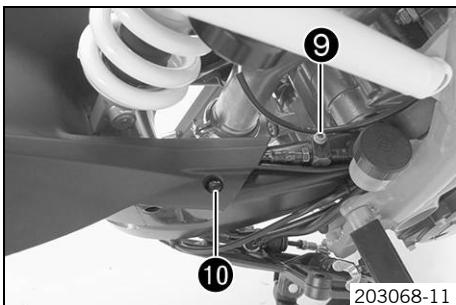
- Mount and tighten screw ⑧.

Guideline

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

9 SHOCK ABSORBER, SWINGARM

62



- Mount and tighten screw 9.

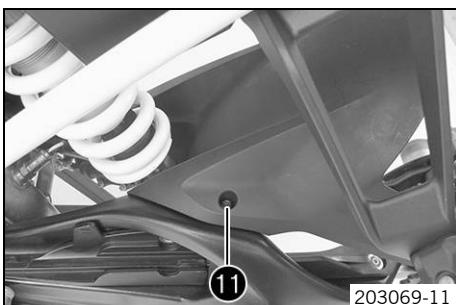
Guideline

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

- Mount and tighten screw 10.

Guideline

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



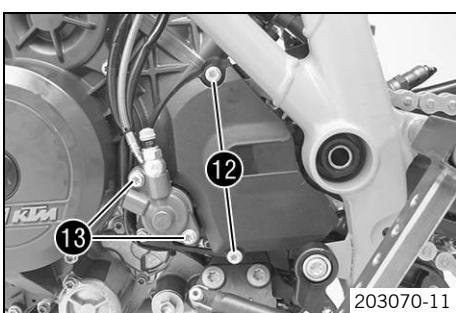
- Mount and tighten screw 11.

Guideline

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

- Mount the chain.

- Rivet the chain. (☞ p. 107)



- Position the engine sprocket cover. Mount and tighten screws 12.

Guideline

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

- Position the slave cylinder of the clutch. Mount and tighten screws 13.

Guideline

Clutch slave cylinder screw	M6	10 Nm (7.4 lbf ft)
-----------------------------	----	--------------------



- Check the rear wheel bearing for damage and wear.

» If the rear wheel bearing is damaged or worn:

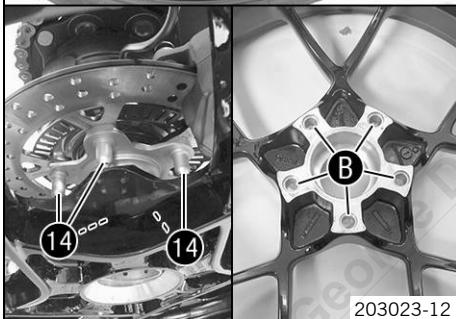
- Change the rear wheel bearing. (☞ p. 124)

- Clean and grease the threads of the wheel axle and axle nut.

Long-life grease (☞ p. 336)

- Slide the rear wheel onto the axle.

✓ Driving pins 14 engage in the drilled holes B of the rim.



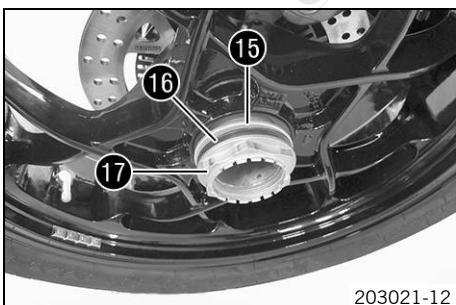
- Mount taper ring 15, washer 16, and nut 17.

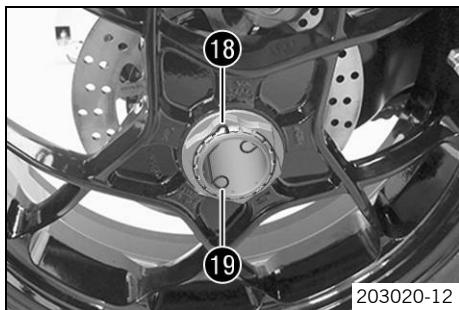
- Have an assistant operate the rear brake.

- Tighten nut 17.

Guideline

Nut, rear axle	M50x1.5	250 Nm (184.4 lbf ft)	Thread greased/lock locking wire with locking varnish
----------------	---------	--------------------------	--





203020-12

- Mount the outside locking wire 18.
- Mount the inside locking wire 19.
- ✓ The pins of the locking wires engage in the drilled holes of the wheel axle.
- Adjust the chain tension. (☞ p. 103)

Finishing work

- Remove the motorcycle from the work stand (inserted). (☞ p. 13)
- Install the presilencer. (☞ p. 68)
- Install the main silencer. (☞ p. 67)

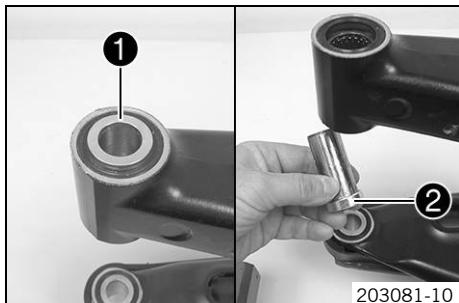
9.23 Changing the swingarm bearing

Preparatory work

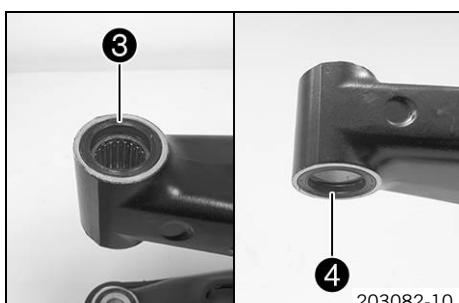
- Disassemble the main silencer. (☞ p. 67)
- Remove the presilencer. (☞ p. 68)
- Raise the motorcycle with the work stand (screw-in type). (☞ p. 11)
- Remove the swingarm. (☞ p. 59)

Right swingarm bearing

- Remove the outer collar bushing 1.
- Remove the inner collar bushing 2 together with the bushing.

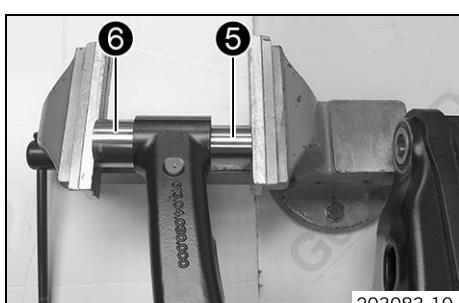


203081-10



203082-10

- Remove the shaft seal rings 3 and 4.



203083-10

- Position special tool 5 in the needle bearing from the inside.

Press drift, swingarm bearing (61329004100) (☞ p. 347)

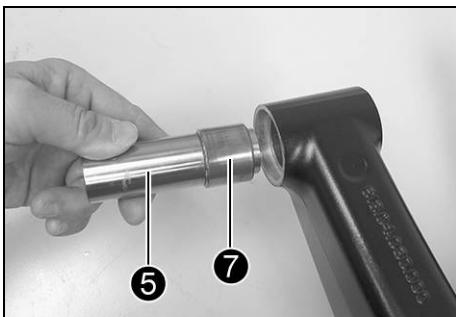
- Position special tool 6 on the swingarm from the outside.

Counterholder, swingarm bearing (61329004200) (☞ p. 347)

- Push out the needle bearing.

9 SHOCK ABSORBER, SWINGARM

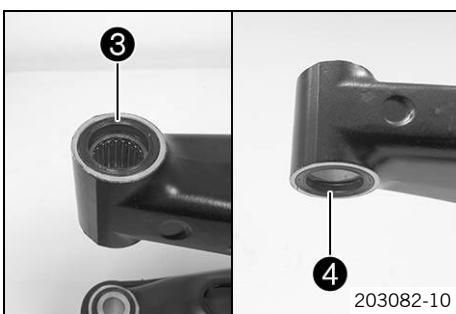
64



- Position the new needle bearing **7** on special tool **5**.

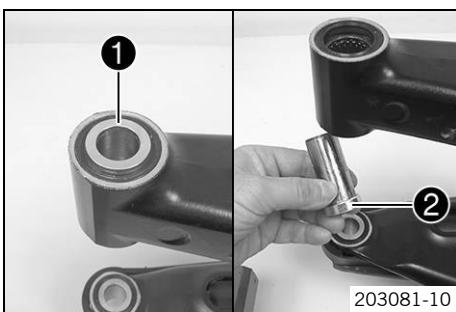
Press drift, swingarm bearing (61329004100) (☞ p. 347)

- Position the special tool with the bearing on the swingarm from the outside.
- Push in the needle bearing until it is flush.



- Grease shaft seal rings **3** and **4** and press in until flush.

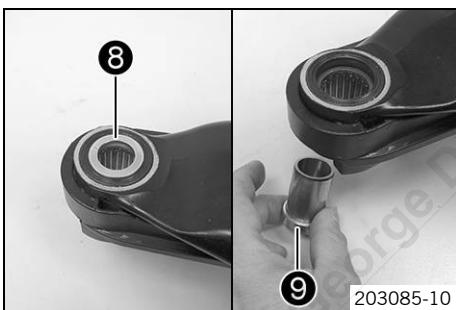
Long-life grease (☞ p. 336)



- Grease the needle bearing.

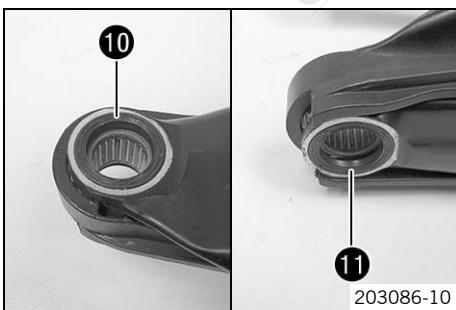
Long-life grease (☞ p. 336)

- Mount the inner collar bushing **2** together with the bushing.
- Mount the outer collar bushing **1**.



Left swingarm bearing

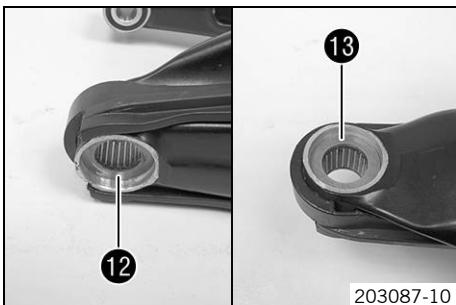
- Remove the inner collar bushing **8**.
- Remove the outer collar bushing **9** together with the bushing.



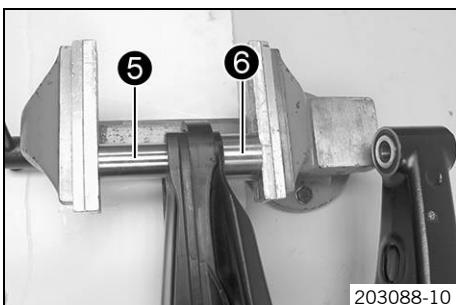
- Remove the shaft seal rings **10** and **11**.

9 SHOCK ABSORBER, SWINGARM

65



- Remove stop disks 12 and 13.



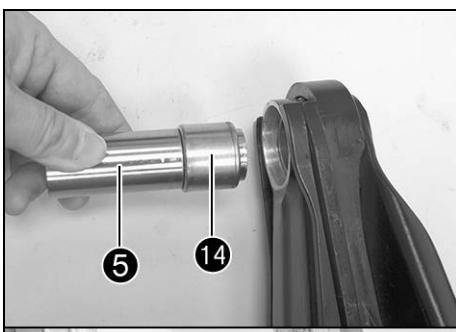
- Position special tool 5 in the needle bearing.

Press drift, swingarm bearing (61329004100) (☞ p. 347)

- Position special tool 6 in the swingarm.

Counterholder, swingarm bearing (61329004200) (☞ p. 347)

- Push out the needle bearing.



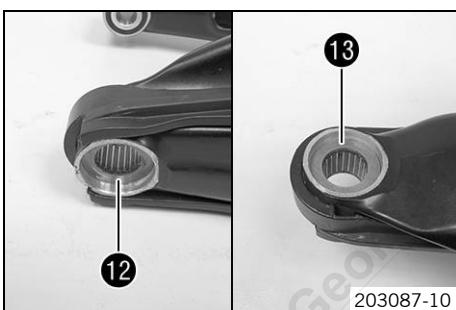
- Position the new needle bearing 14 on special tool 5.

Press drift, swingarm bearing (61329004100) (☞ p. 347)

- Position the special tool with the bearing on the swingarm.
- Push in the needle bearing until it is flush.

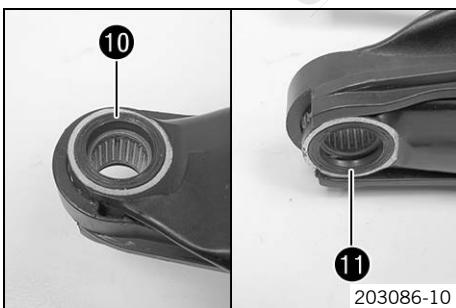


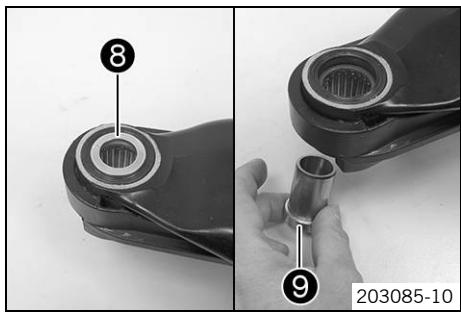
- Position stop disks 12 and 13.



- Grease shaft seal rings 10 and 11 and press in until flush.

Long-life grease (☞ p. 336)





- Grease the needle bearing.

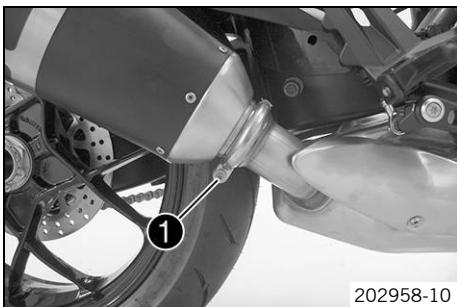
Long-life grease (☞ p. 336)

- Mount the inner collar bushing ⑧.
- Mount the outer collar bushing ⑨ together with the bushing.

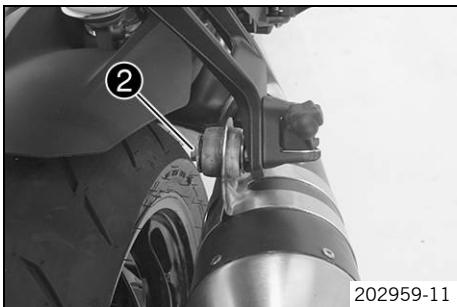
Finishing work

- Install the swingarm. (☞ p. 60)
- Remove the motorcycle from the work stand (inserted). (☞ p. 13)
- Install the presilencer. (☞ p. 68)
- Install the main silencer. (☞ p. 67)

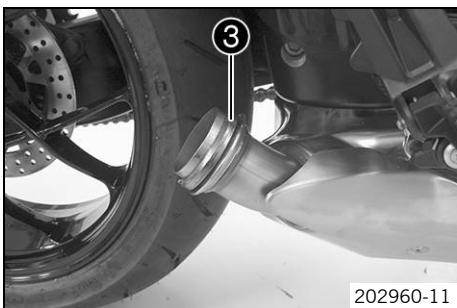
10.1 Disassembling the main silencer



- Remove screw ①.
- Remove the exhaust clamp.

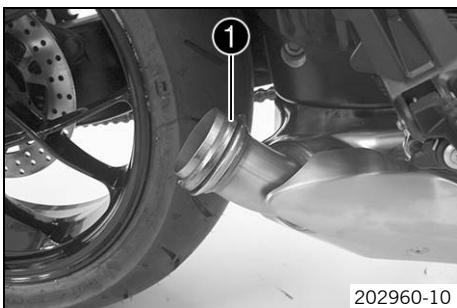


- Remove screw ② with the washer.
- Take off the main silencer.

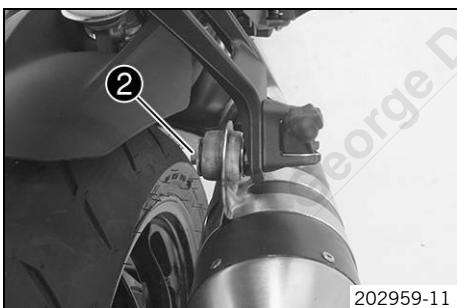


- Remove seal ring ③.

10.2 Installing the main silencer



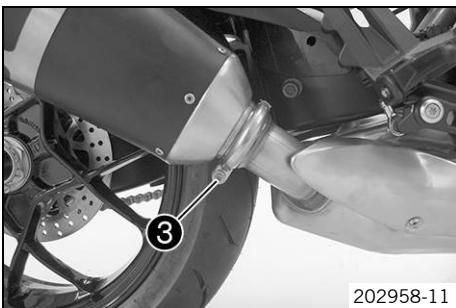
- Mount seal ring ①.



- Position the main silencer.
- Mount screw ② with the washer but do not tighten yet.

Guideline

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



- Position the exhaust clamp.
- Mount and tighten screw ③.

Guideline

Screw, exhaust clamp on main silencer	M6	8 Nm (5.9 lbf ft)
---------------------------------------	----	-------------------

- Tighten screw ②.

Guideline

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

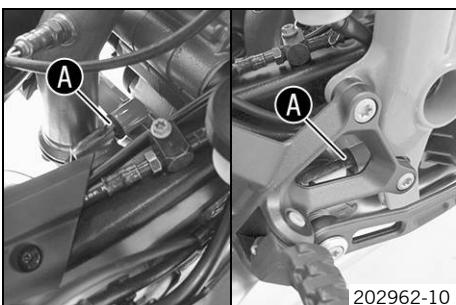
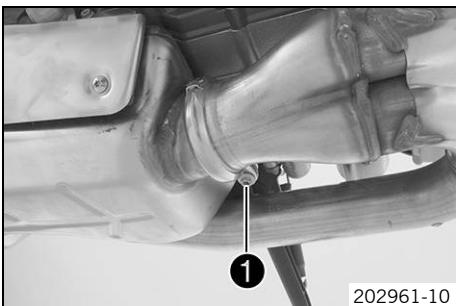
10.3 Removing the presilencer

Preparatory work

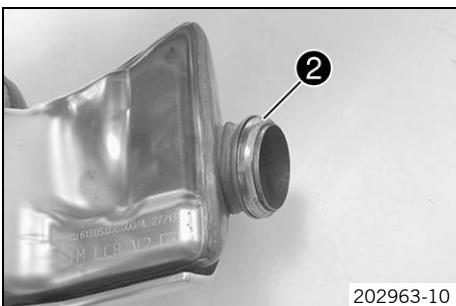
- Disassemble the main silencer. (☞ p. 67)

Main work

- Remove screw ①.
- Remove the exhaust clamp.



- Pull the presilencer backwards.
 - ✓ Retaining dowels A are pulled out of the bushings.
- Take off the presilencer.



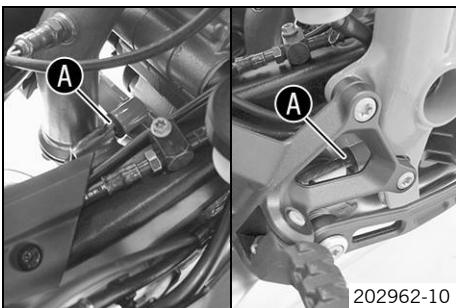
- Remove seal ring ②.

10.4 Installing the presilencer

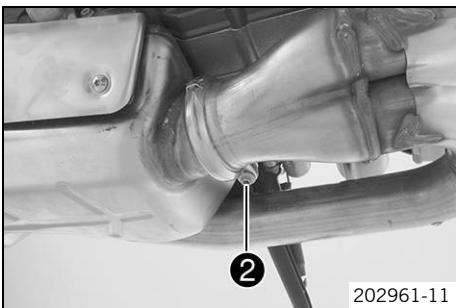
Main work

- Mount seal ring ①.





- Position presilencer and slide it forwards.
- ✓ Retaining dowels **A** engage in the bushings.



- Position the exhaust clamp.
- Mount and tighten screw **2**.

Guideline

Screw, exhaust clamp on manifold	M6	8 Nm (5.9 lbf ft)
----------------------------------	----	-------------------

Finishing work

- Install the main silencer. (☞ p. 67)

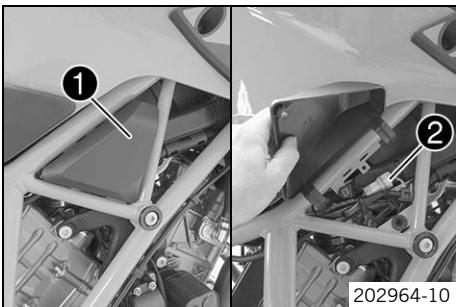
10.5 Disassembling the manifold

Preparatory work

- Disassemble the main silencer. (☞ p. 67)
- Remove the presilencer. (☞ p. 68)

Main work

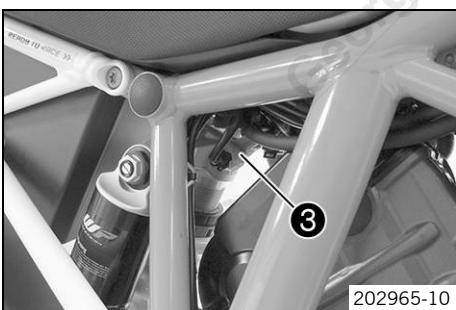
- Pull cover **1** out of the bushing at the bottom, swing it upward, and take it off.
- Disconnect plug-in connector **2**.
- Expose the cable.

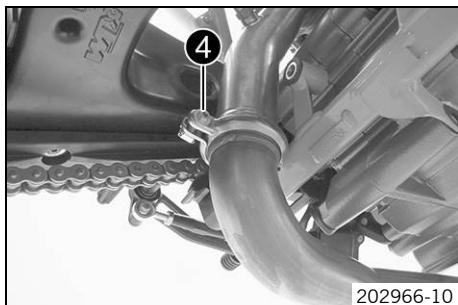


- Pull the cable binder from the frame and remove it.



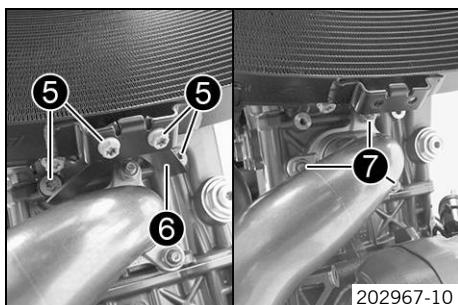
- Disconnect plug-in connector **3**.
- Expose the cable.





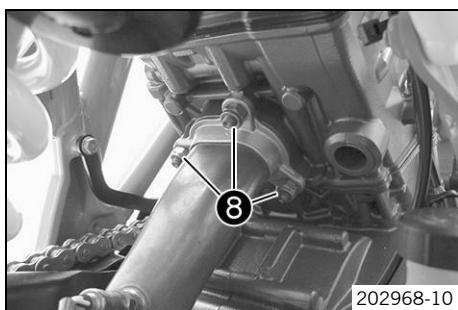
202966-10

- Remove screw 4.
- Remove the exhaust clamp.



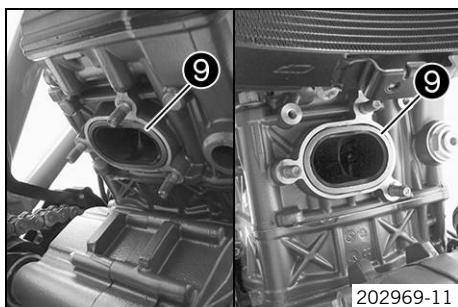
202967-10

- Remove screws 5.
- Swing the radiator carefully forwards. Take off retaining bracket 6.
- Remove nuts 7.



202968-10

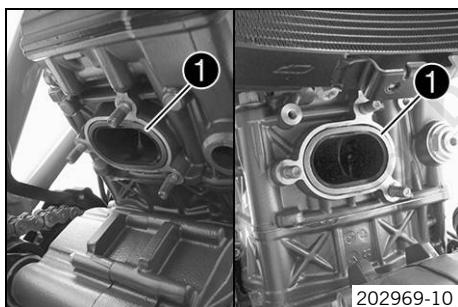
- Remove nuts 8.
- Remove both manifolds.



202969-11

- Remove exhaust gaskets 9.

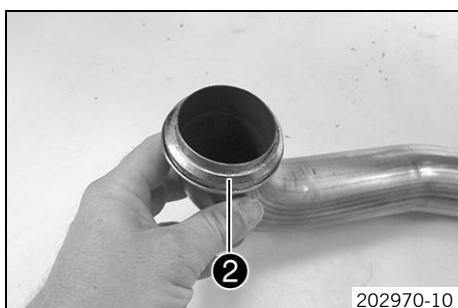
10.6 Installing the manifold



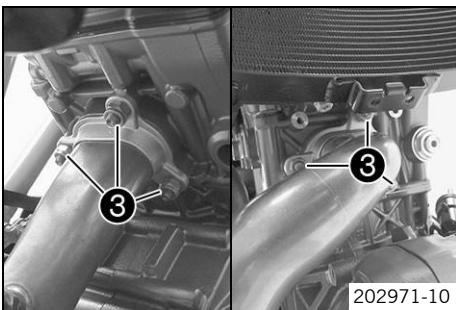
202969-10

Main work

- Position exhaust gaskets 1.
- Mount seal ring 2.



202970-10

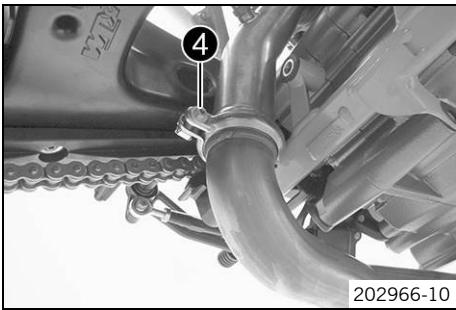


202971-10

- Position the manifold.
- Mount nuts **3** but do not tighten yet.

Guideline

Nut, manifold on cylinder head	M8	Tightening sequence: Tighten the nuts evenly. Do not warp the metal plate. 25 Nm (18.4 lbf ft)
--------------------------------	----	---



202966-10

- Position the exhaust clamp.
- Mount and tighten screw **4**.

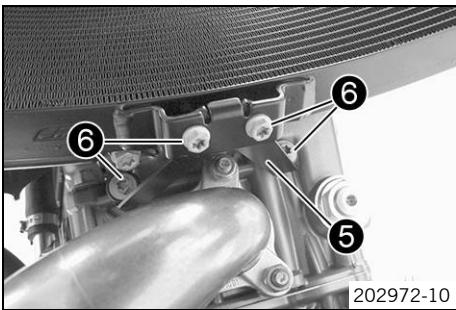
Guideline

Screw, exhaust clamp on manifold	M6	8 Nm (5.9 lbf ft)
----------------------------------	----	-------------------

- Tighten nuts **3**.

Guideline

Nut, manifold on cylinder head	M8	Tightening sequence: Tighten the nuts evenly. Do not warp the metal plate. 25 Nm (18.4 lbf ft)
--------------------------------	----	---

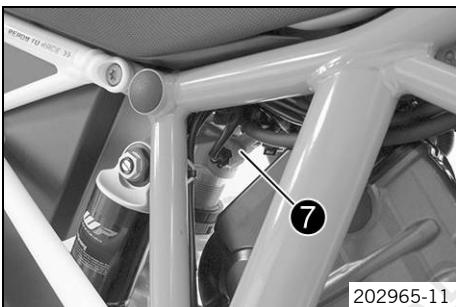


202972-10

- Swing the radiator carefully backwards. Position retaining bracket **5**.
- Mount and tighten screws **6**.

Guideline

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



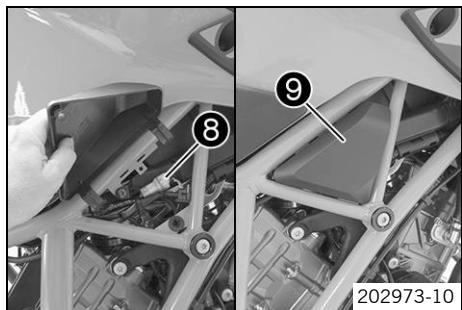
202965-11

- Route the cable so it is not under tension and secure with a cable binder.
- Join plug-in connector **7**.



309501-10

- Position the cable binder in the frame and secure the cable.



- Route the cable so it is not under tension.
- Connect plug-in connector **8**.
- Mount cover **9**.

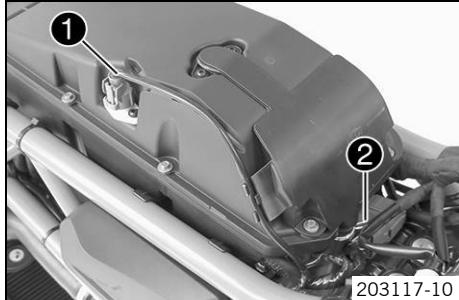
Finishing work

- Install the presilencer. (☞ p. 68)
- Install the main silencer. (☞ p. 67)

11.1 Removing the upper part of the air filter box

Preparatory work

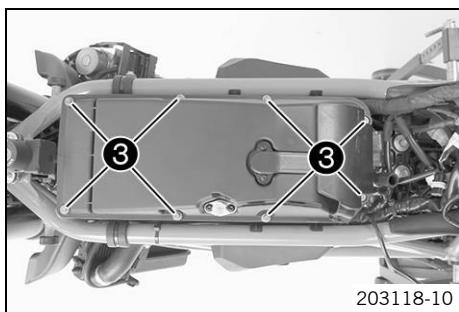
- Remove the passenger seat. (p. 77)
- Remove the front rider's seat. (p. 77)
- Remove the spoiler. (p. 78)
- Remove the fuel tank. (p. 78)



203117-10

Main work

- Detach connector 1. Expose the cable.
 - Push spring band clamp 2 back.
- Pliers for spring band clamp (60029057100) (p. 343)
- Pull off the vent hose.



203118-10

- Remove screws 3.
- Remove the upper part of the air filter box.

11.2 Changing the air filter, cleaning the air filter box

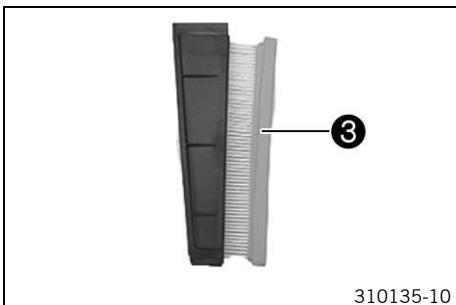
Preparatory work

- Remove the passenger seat. (p. 77)
- Remove the front rider's seat. (p. 77)
- Remove the spoiler. (p. 78)
- Remove the fuel tank. (p. 78)
- Remove the upper part of the air filter box. (p. 73)

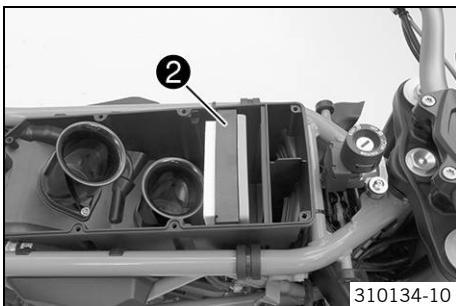
Main work

- Remove air filter clamping wedge 1 toward the top.
-
- 310133-10
- Remove air filter frame 2 with the air filter.

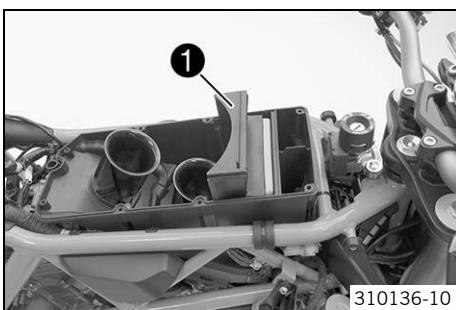
310134-10



310135-10



310134-10



310136-10

- Position the new air filter 3 in the air filter frame.

- Clean the air filter box.
- Position air filter frame 2 in the lower section of the air filter box together with the air filter.

✓ The broad side of the air filter frame faces the engine.

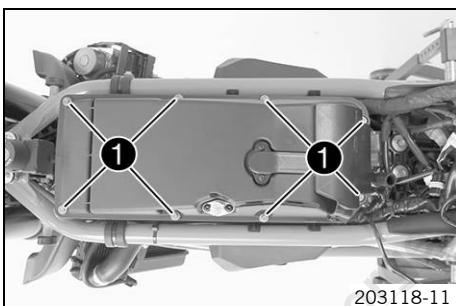
- Mount air filter clamping wedge 1.

✓ The narrow side of the air filter clamping wedge faces the engine.

Finishing work

- Install the upper part of the air filter box. (☞ p. 74)
- Install the fuel tank. (☞ p. 80)
- Mount the front rider's seat. (☞ p. 77)
- Mount the passenger seat. (☞ p. 77)
- Install the spoiler. (☞ p. 78)

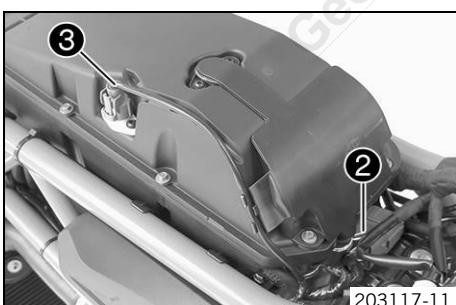
11.3 Installing the upper part of the air filter box



203118-11

Main work

- Position the upper part of the air filter box.
- Mount and tighten screws 1.



203117-11

- Mount the vent hose.
- Position spring band clamp 2.

Pliers for spring band clamp (60029057100) (☞ p. 343)

- Plug in connector 3.

Finishing work

- Install the fuel tank. (☞ p. 80)
- Mount the front rider's seat. (☞ p. 77)
- Mount the passenger seat. (☞ p. 77)

- Install the spoiler. (☞ p. 78)

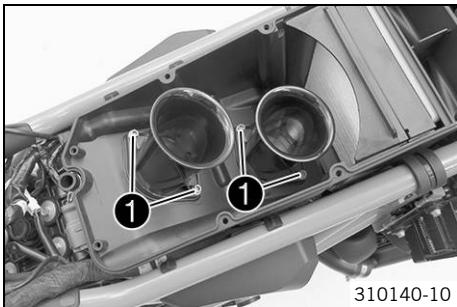
11.4 Removing the air filter box

Preparatory work

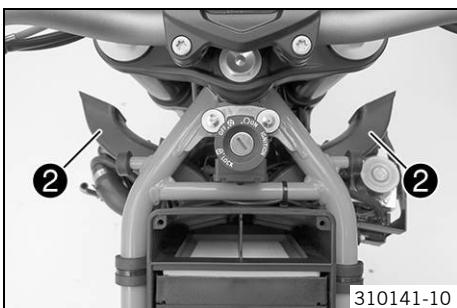
- Remove the passenger seat. (☞ p. 77)
- Remove the front rider's seat. (☞ p. 77)
- Remove the spoiler. (☞ p. 78)
- Remove the fuel tank. (☞ p. 78)
- Remove the upper part of the air filter box. (☞ p. 73)

Main work

- Remove screws 1.
- Remove the intake trumpet.

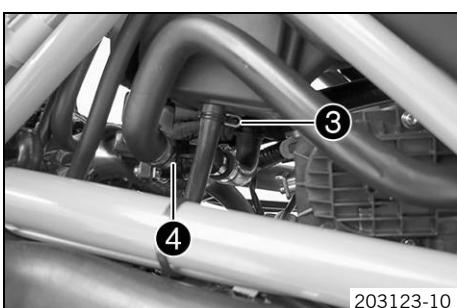


310140-10



310141-10

- Remove intake snorkel 2.

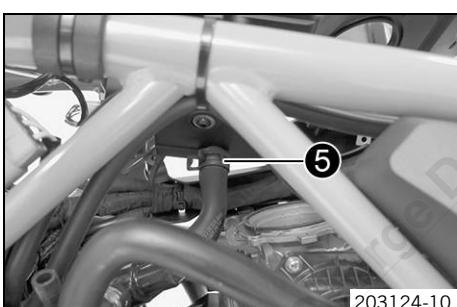


203123-10

- Lift the lower part of the air filter box slightly.
- Remove spring band clamp 3.

Pliers for spring band clamp (60029057100) (☞ p. 343)

- Pull off the vent hose.
- Remove SAS valve 4 from the holder.



203124-10

- Lift the lower part of the air filter box more.

- Remove spring band clamp 5.

Pliers for spring band clamp (60029057100) (☞ p. 343)

- Detach the SAS hose.
- Remove the lower part of the air filter box.

11.5 Installing the lower part of the air filter box

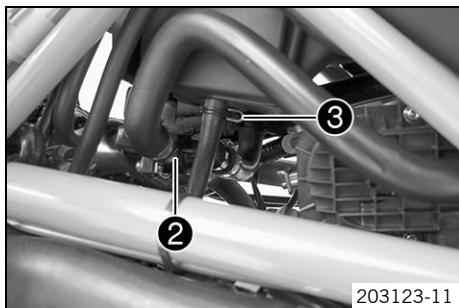
Main work

- Position the lower part of the air filter box in the frame.
- Mount the SAS hose.
- Mount spring band clamp 1.

Pliers for spring band clamp (60029057100) (☞ p. 343)



203124-11



- Mount SAS valve **2** on the holder.
- Mount the vent hose.
- Mount spring band clamp **3**.

Pliers for spring band clamp (60029057100) (☞ p. 343)

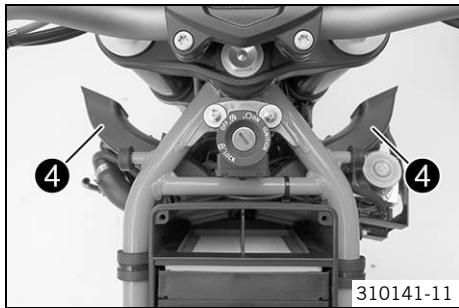
- Position the lower part of the air filter box at the throttle valve body.



Info

Pay attention to the gaskets of the throttle valve body.

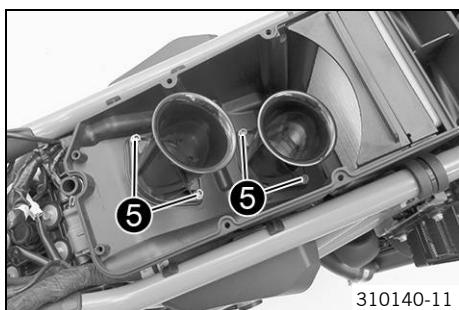
- Mount intake snorkel **4**.



- Position the intake trumpet.
- Mount and tighten screws **5**.

Guideline

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



Finishing work

- Install the upper part of the air filter box. (☞ p. 74)
- Install the fuel tank. (☞ p. 80)
- Mount the front rider's seat. (☞ p. 77)
- Mount the passenger seat. (☞ p. 77)
- Install the spoiler. (☞ p. 78)

12 FUEL TANK, SEAT, TRIM

77

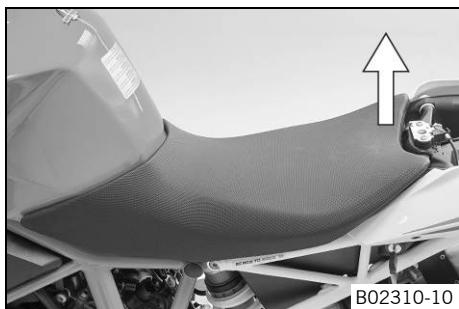
12.1 Removing the front rider's seat

Preparatory work

- Remove the passenger seat. (☞ p. 77)

Main work

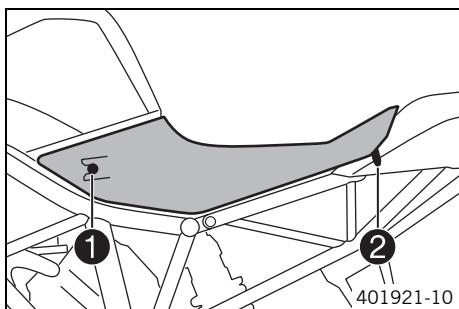
- Raise the rear of the front rider's seat.
- Detach the front of the front rider's seat and remove it.



12.2 Mounting the front rider's seat

Main work

- Attach recesses ① on the front rider's seat to the fuel tank and push the front rider's seat forward while lowering it.
 - ✓ Catch ② is located in the recess.
- Check that the front rider's seat is correctly mounted.

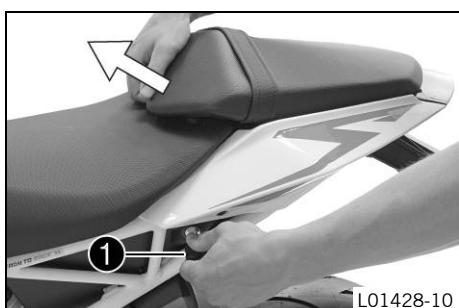


Finishing work

- Mount the passenger seat. (☞ p. 77)

12.3 Removing the passenger seat

- Insert the ignition key in seat lock ① and turn it clockwise.

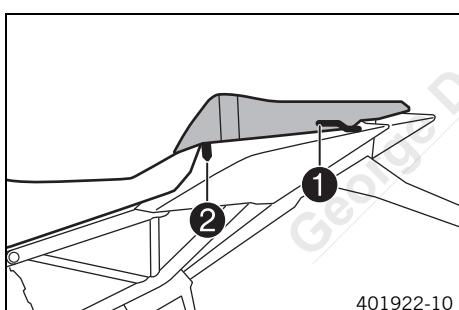


- Lift the passenger seat at the front and pull it out of the holder toward the front.
- Remove the passenger seat.

- Remove the ignition key.

12.4 Mounting the passenger seat

- Attach the recesses of the passenger seat in the guides ① and lower at the front while pushing it back.



- Position locking pin ② in the lock housing and push down the passenger seat at the front.

- ✓ The locking pin engages with an audible click.

- Check that the passenger seat is correctly mounted.

12.5 Removing the spoiler

**Info**

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

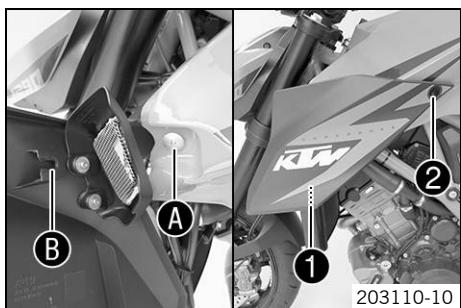


- Remove screws ① and ②.
- Remove the spoiler in a forward direction.

12.6 Installing the spoiler

**Info**

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



- Position the spoiler.
 - ✓ Screw A engages in bracket B.
- Mount and tighten screws ① and ②.

Guideline

Screw for spoiler	M5	3 Nm (2.2 lbf ft)
-------------------	----	-------------------

12.7 Removing the fuel tank

**Danger**

Fire hazard Fuel is highly flammable.

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

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

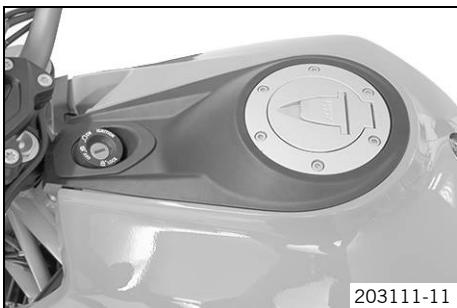
**Warning**

Danger of poisoning Fuel is poisonous and a health hazard.

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

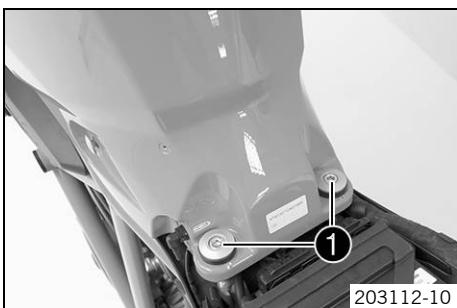
Preparatory work

- Remove the passenger seat. (☞ p. 77)
- Remove the front rider's seat. (☞ p. 77)
- Remove the spoiler. (☞ p. 78)

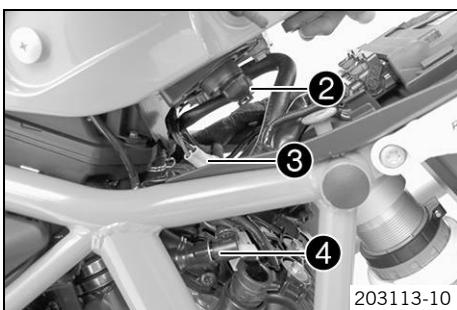


Main work

- Lift and remove the fuel tank cover at the front.



- Remove screws 1.



- Raise the fuel tank at the rear.
- Detach connector 2.
- Disconnect plug-in connector 3.
- Thoroughly clean the fuel hose connection 4 of the fuel line using compressed air.



Info

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

- Press the metal plate and disconnect the fuel hose connection.



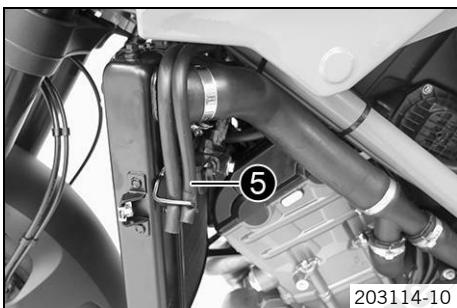
Info

Remaining fuel may flow out of the fuel hose.

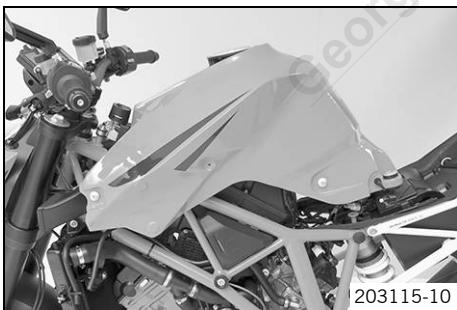
- Assemble the wash cap set.

Wash cap set (81212016000)

- Pull vent hose 5 from the bracket.



- Remove the fuel tank towards the rear.



12.8 Installing the fuel tank

Danger

Fire hazard Fuel is highly flammable.

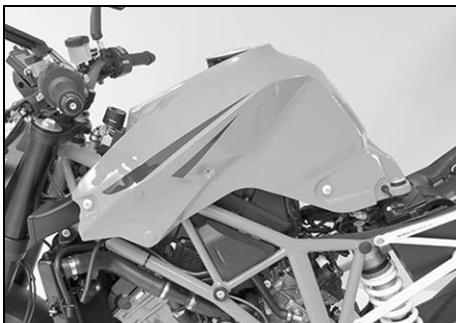
The fuel in the fuel tank expands when warm and can escape if overfilled.

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

Warning

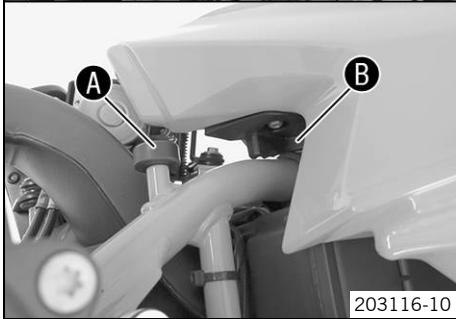
Danger of poisoning Fuel is poisonous and a health hazard.

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

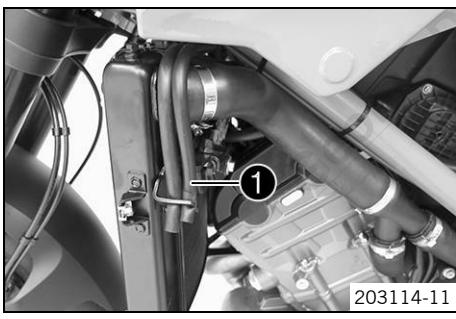


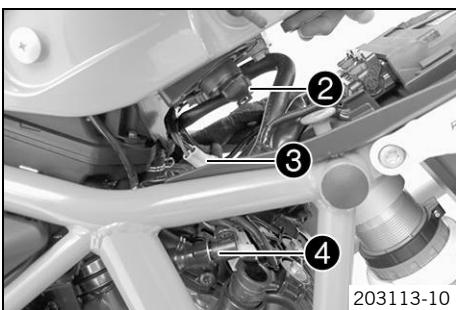
Main work

- Position the fuel tank.
 - ✓ Fuel tank fastener **A** engages in cut-out **B** on both sides.



- Mount vent hose **1** in the bracket.





- Plug in connector ②.
- Connect plug-in connector ③.
- Thoroughly clean the fuel hose connection of the fuel line using compressed air.

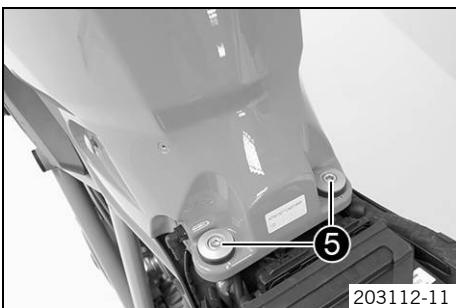
i Info

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

- Remove the wash cap set.
- Join fuel hose connection ④.
- Mount and tighten screws ⑤.

Guideline

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



- Mount the fuel tank cover.



Finishing work

- Mount the front rider's seat. (☞ p. 77)
- Mount the passenger seat. (☞ p. 77)
- Install the spoiler. (☞ p. 78)

12.9 Checking the fuel pressure



Danger

Fire hazard Fuel is highly flammable.

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

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



Warning

Danger of poisoning Fuel is poisonous and a health hazard.

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

Condition

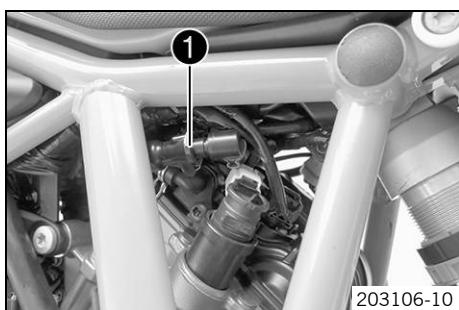
The fuel tank is completely full.

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

The ignition is off.

The diagnostics tool is connected.

- Thoroughly clean fuel hose connection ① of the fuel line using compressed air.



i Info

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

- Press the metal plate and disconnect the fuel hose connection.

i Info

Remaining fuel may flow out of the fuel hose.

- Mount special tool ②.

Pressure tester (61029094000) (p. 344)

- Mount special tool ③ with nozzle code 1,05.

Testing hose (61029093000) (p. 343)

- Position the hose end in a fuel can.

Guideline

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

- Start the diagnostics software.

- Perform the "Engine Electronics" > "Actuator Test" > "Function test of fuel pump control".

- Check the fuel pressure with the filler cap closed.

Fuel pressure

When the fuel pump is active	3.8... 4.2 bar (55... 61 psi)
------------------------------	-------------------------------

» If the specification is not reached:

- Open the filler cap.
- Check the tank air vent system.

- Check the fuel pressure with the filler cap open.

Fuel pressure

When the fuel pump is active	3.8... 4.2 bar (55... 61 psi)
------------------------------	-------------------------------

» If the specification is not reached:

- Check that the fuel line is clear.
- Change the fuel filter. (p. 84)
- Change the fuel pump. (p. 83)

- Finish the actuator test.

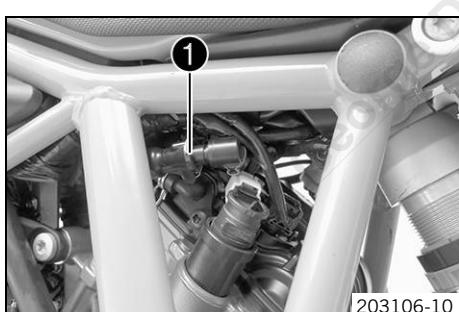
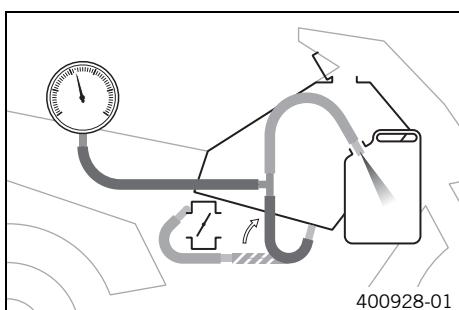
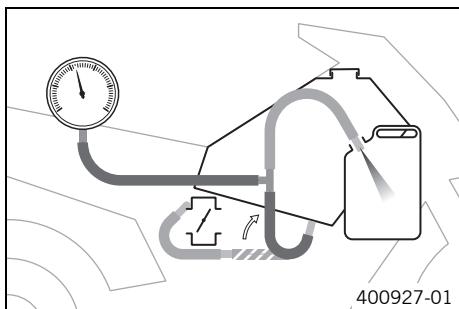
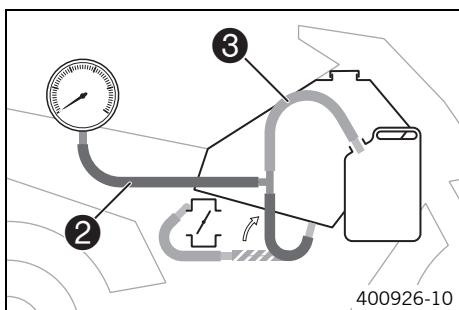
- Remove the special tools.

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

i Info

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

- Join fuel hose connection ①.



12.10 Changing the fuel pump

Danger

Fire hazard Fuel is highly flammable.

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

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

Warning

Danger of poisoning Fuel is poisonous and a health hazard.

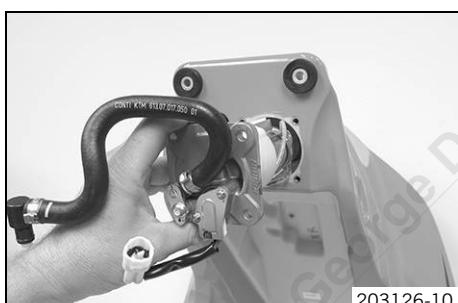
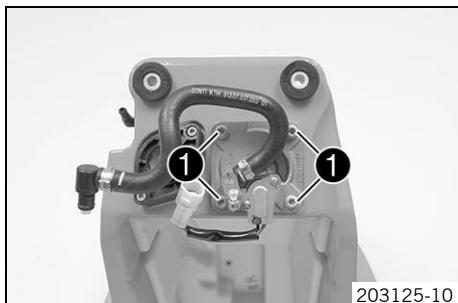
- Avoid skin, eye and clothing contact with fuel.
- Immediately consult a doctor if you swallow fuel.
- Do not inhale fuel vapors.
- In case of skin contact, rinse the affected area with plenty of water.
- Rinse the eyes thoroughly with water, and consult a doctor in case of fuel contact with the eyes.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

Preparatory work

- Remove the passenger seat. (☞ p. 77)
- Remove the front rider's seat. (☞ p. 77)
- Remove the spoiler. (☞ p. 78)
- Remove the fuel tank. (☞ p. 78)
- Drain the fuel from the fuel tank into a suitable container.

Main work

- Remove screws ①.

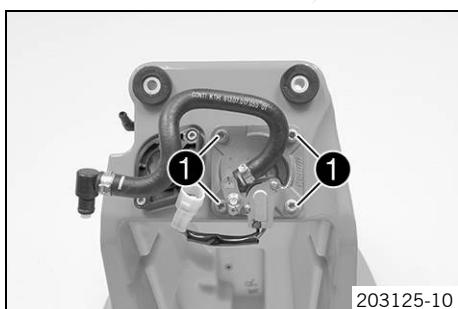


- Pull out the fuel pump.
- Position the new fuel pump with the gasket in the fuel tank.

- Mount and tighten screws ①.

Guideline

Screw, fuel pump	M6	6 Nm (4.4 lbf ft)
------------------	----	-------------------



Finishing work

- Install the fuel tank. (☞ p. 80)

- Mount the front rider's seat. (☞ p. 77)
- Mount the passenger seat. (☞ p. 77)
- Install the spoiler. (☞ p. 78)

12.11 Changing the fuel filter

Danger

Fire hazard Fuel is highly flammable.

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

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

Warning

Danger of poisoning Fuel is poisonous and a health hazard.

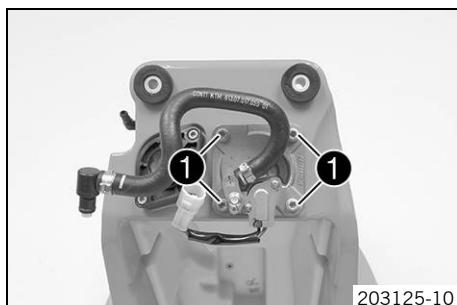
- Avoid skin, eye and clothing contact with fuel.
- Immediately consult a doctor if you swallow fuel.
- Do not inhale fuel vapors.
- In case of skin contact, rinse the affected area with plenty of water.
- Rinse the eyes thoroughly with water, and consult a doctor in case of fuel contact with the eyes.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

Preparatory work

- Remove the passenger seat. (☞ p. 77)
- Remove the front rider's seat. (☞ p. 77)
- Remove the spoiler. (☞ p. 78)
- Remove the fuel tank. (☞ p. 78)
- Drain the fuel from the fuel tank into a suitable container.

Main work

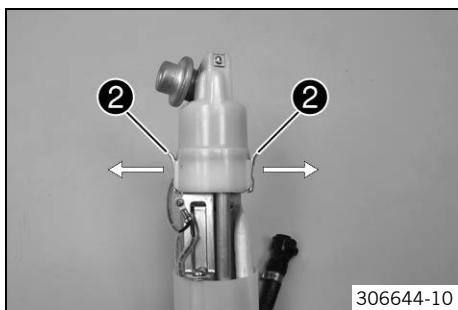
- Remove screws ①.



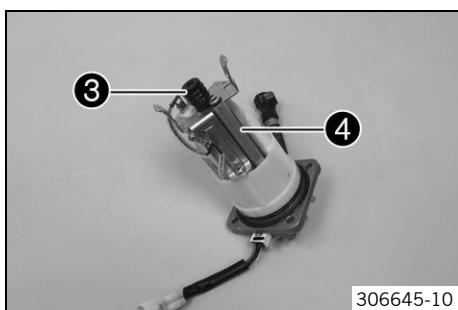
- Pull out the fuel pump.

12 FUEL TANK, SEAT, TRIM

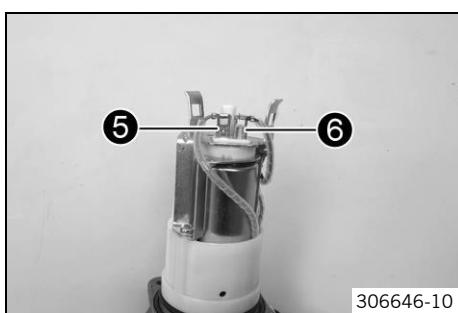
85



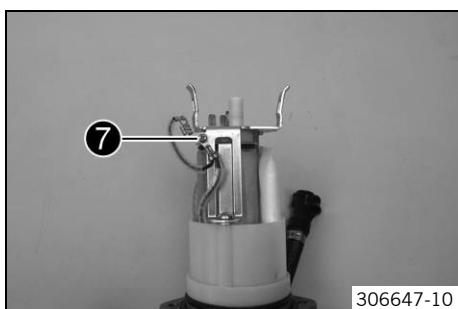
- Push clamps 2 outward.
- Take off the fuel filter housing.



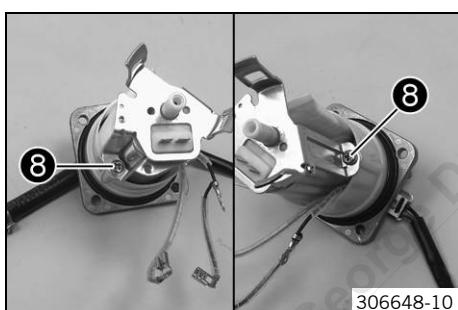
- Remove gasket 3.
- Take off fuel pipe 4.



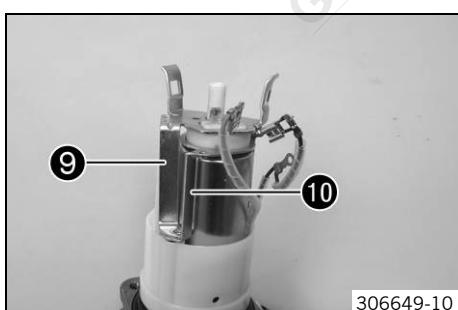
- Detach connectors 5 and 6.



- Remove screw 7 with the washer.



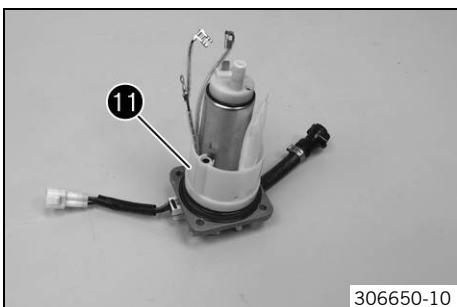
- Remove screws 8.



- Remove retaining brackets 9 and 10.

12 FUEL TANK, SEAT, TRIM

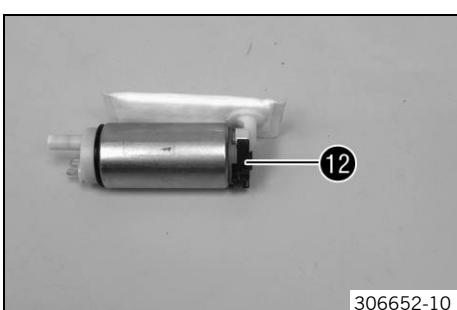
86



- Remove plastic housing 11 with the distance sleeves.



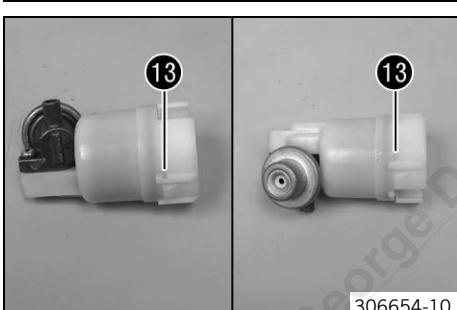
- Take the fuel pump out of the fuel pump cover.



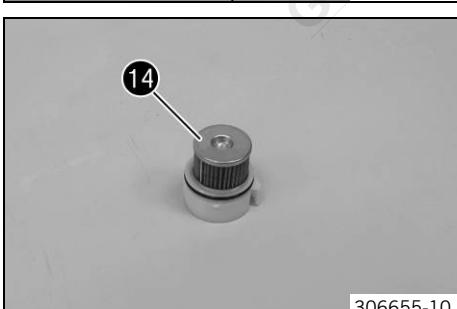
- Take off sealing element 12.



- Remove the fuel filter.
- Mount the new fuel filter.



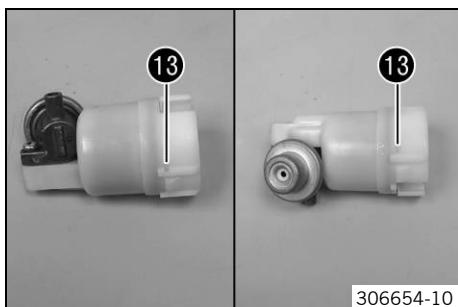
- Release latch 13.
- Pull off the outer fuel filter housing.



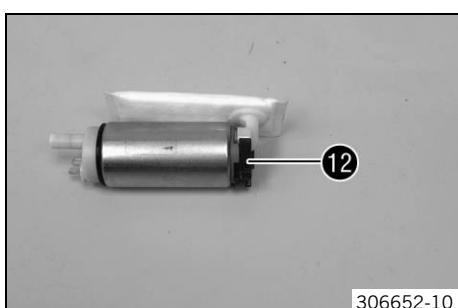
- Take off fuel filter 14.
- Mount the new fuel filter.

12 FUEL TANK, SEAT, TRIM

87



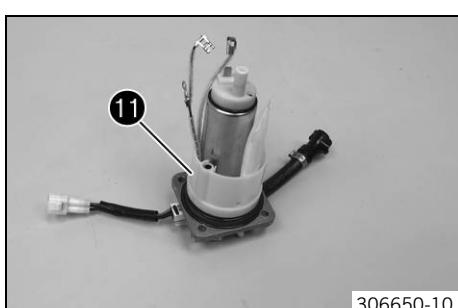
- Mount the outer fuel filter housing.
 - ✓ Locking mechanism 13 engages in the fuel filter housing.



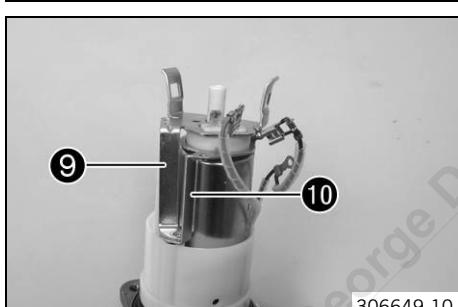
- Mount sealing element 12.



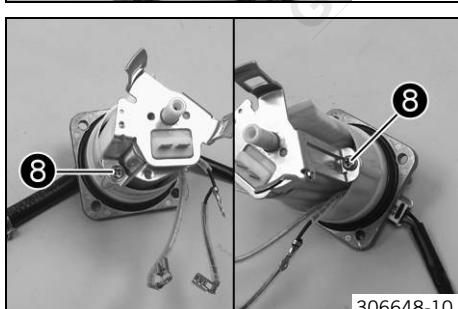
- Position the fuel pump in the fuel pump cover.



- Mount plastic housing 11 with the distance sleeves.
 - ✓ The lugs of the plastic housing engage in the holes of the fuel pump cover.



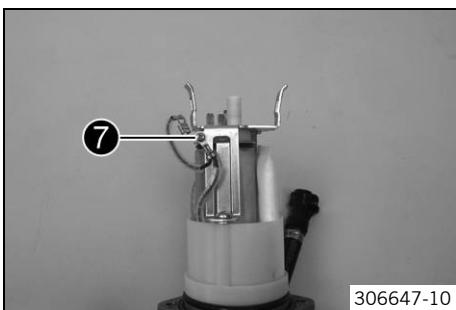
- Mount retaining brackets 9 and 10.



- Mount and tighten screws 8.

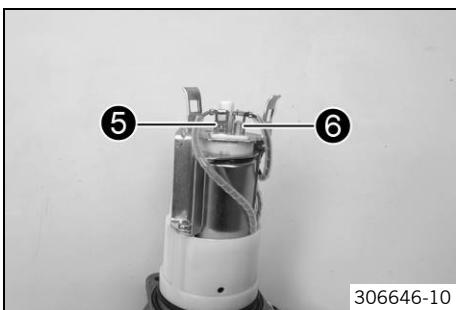
12 FUEL TANK, SEAT, TRIM

88



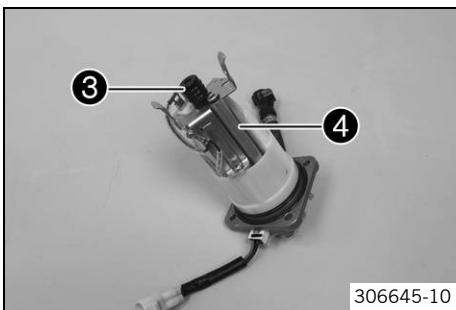
306647-10

- Mount and tighten screw 7 with the washer.



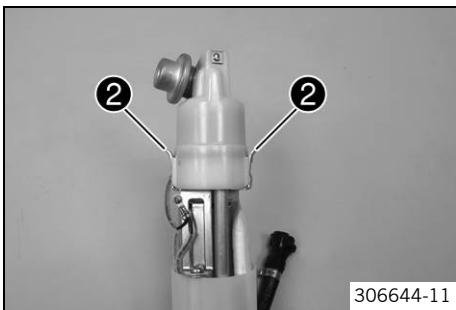
306646-10

- Plug in connectors 5 and 6.



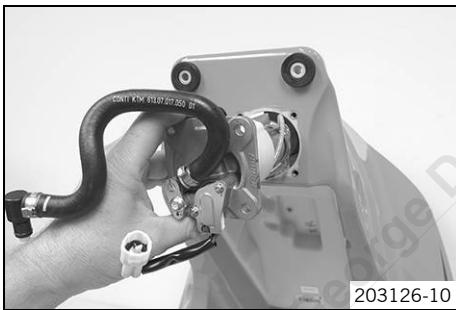
306645-10

- Mount gasket 3.
- Mount fuel pipe 4.



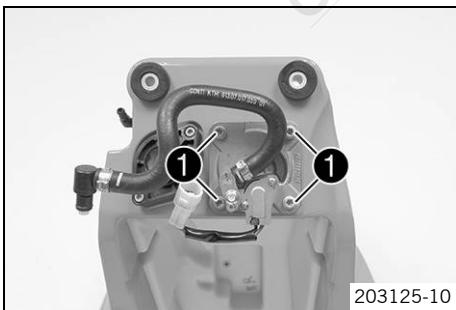
306644-11

- Mount the fuel filter housing.
 - ✓ Clamps 2 must engage.



203126-10

- Position the fuel pump with the gasket in the fuel tank.



203125-10

- Mount and tighten screws 1.

Guideline

Screw, fuel pump	M6	6 Nm (4.4 lbf ft)
------------------	----	-------------------

Finishing work

- Install the fuel tank. (☞ p. 80)
- Mount the front rider's seat. (☞ p. 77)

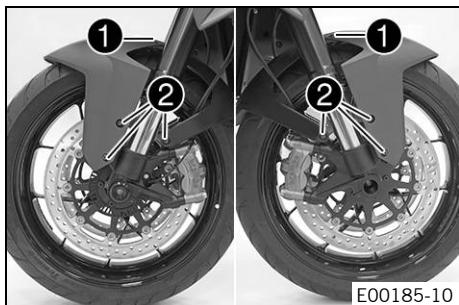
12 FUEL TANK, SEAT, TRIM

89

- Mount the passenger seat. (☞ p. 77)
- Install the spoiler. (☞ p. 78)

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

13.1 Removing the front fender

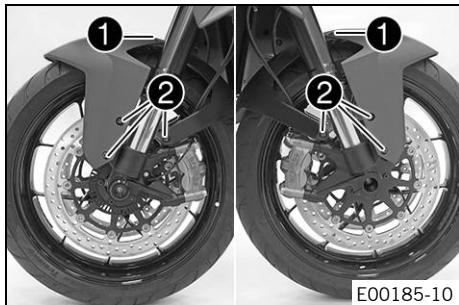


- Remove screws 1.
- Remove screws 2.
- Take off the fender.

**Info**

Pay attention to the brake lines.

13.2 Installing the front fender



- Position the fender.
- Mount and tighten screws 1.
Guideline

Screw, trim	M5x12	3.5 Nm (2.58 lbf ft)
-------------	-------	-------------------------
- Mount and tighten screws 2.
Guideline

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

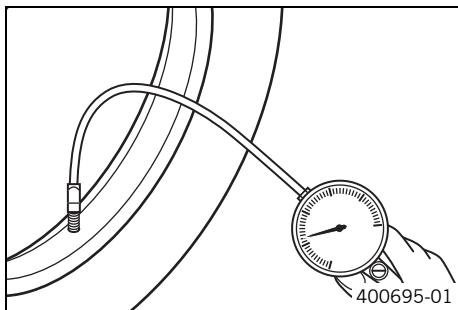
14.1 Checking the tire air pressure



Info

Low tire air pressure leads to abnormal wear and overheating of the tire.

Correct tire air pressure ensures optimal riding comfort and maximum tire service life.



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

Tire air pressure, solo/with passenger/full payload	
Front: with cold tires	2.5 bar (36 psi)
Rear: with cold tires	2.9 bar (42 psi)

Front: with cold tires 2.5 bar (36 psi)

Rear: with cold tires 2.9 bar (42 psi)

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

14.2 Checking the tire condition



Warning

Danger of accidents If a tire bursts while riding, the vehicle becomes uncontrollable.

- Ensure that damaged or worn tires are replaced immediately.



Warning

Danger of crashing Different tire tread patterns on the front and rear wheel impair the handling characteristic.

Different tire tread patterns can make the vehicle significantly more difficult to control.

- Make sure that only tires with a similar tire tread pattern are fitted to the front and rear wheel.



Warning

Danger of accidents Non-approved or non-recommended tires and wheels impact the handling characteristic.

- Only use tires/wheels approved by KTM with the corresponding speed index.



Warning

Danger of accidents New tires have reduced road grip.

The contact surface on new tires is not yet roughened.

- Run in new tires with moderate riding at alternating angles.

Running-in phase

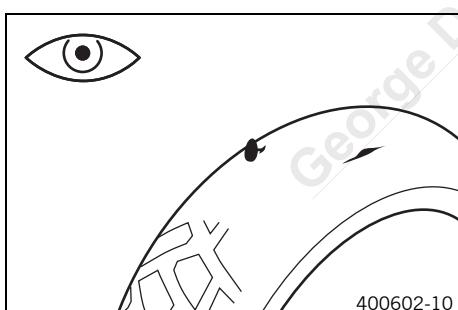
200 km (124 mi)



Info

Tire type, tire condition, and tire air pressure influence the braking and handling characteristics of the vehicle.

Worn tires are particularly unfavorable on wet surfaces.



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

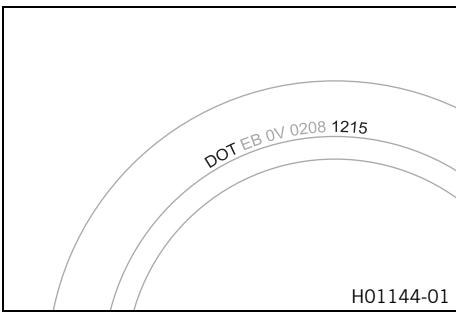


Info

Adhere to the legally required minimum tread depth.

Minimum tread depth	$\geq 2 \text{ mm} (\geq 0.08 \text{ in})$
---------------------	--

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



- Check the tire age.

i Info

The tire date of manufacture is usually contained in the tire label and is indicated by the last four digits of the **DOT** number. The first two digits indicate the week of manufacture and the last two digits the year of manufacture.

KTM recommends that the tires be changed after 5 years at the latest, regardless of the actual state of wear.

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

14.3 Checking the wheel bearings

Preparatory work

- Raise the motorcycle with the work stand (inserted). (☞ p. 13)
- Clamp down the rear of the vehicle.

Main work

- Move the front wheel from side to side.

i Info

Hold the fork leg to check it.

- » If there is detectable play:
 - Change the front wheel bearing. (☞ p. 95)

- Remove the load from the rear of the vehicle.
- Move the rear wheel from side to side.

i Info

Hold the swingarm to check it.

- » If there is detectable play:
 - Change the rear wheel bearing. (☞ p. 124)

Finishing work

- Remove the motorcycle from the work stand (inserted). (☞ p. 13)

14.4 Front wheel

14.4.1 Removing the front wheel

Preparatory work

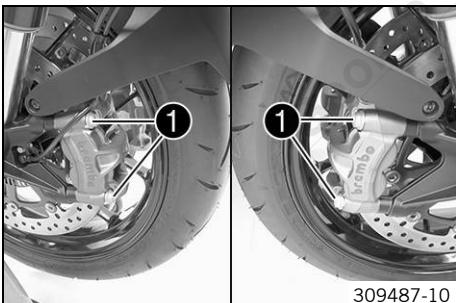
- Lift the motorcycle with the rear lifting gear. (☞ p. 14)
- Lift the motorcycle with the front lifting gear. (☞ p. 11)

Main work

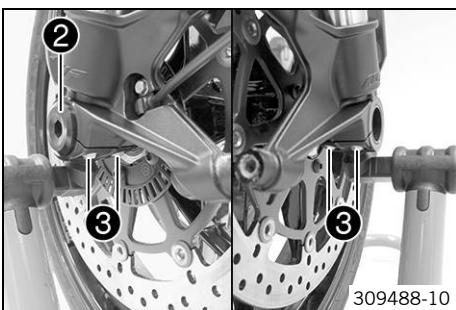
- Remove screws 1 from both brake calipers.
- Press back the brake linings with a light lateral tilting of the brake calipers on the brake disc. Pull the brake calipers carefully back from the brake discs and hang them to one side.

i Info

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



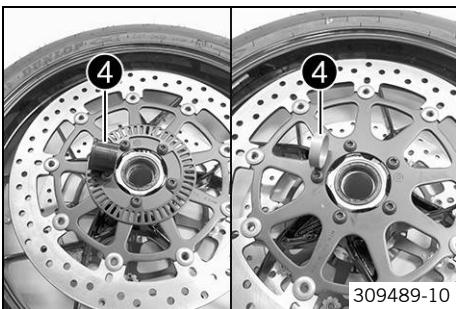
309487-10



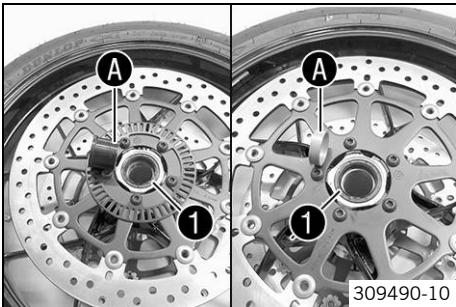
- Loosen screws ② and ③.
- Unscrew screw ② about six turns and press your hand on the screw to push the wheel spindle out of the axle clamp. Remove screw ②.

**Warning****Danger of accidents** Damaged brake discs reduce the braking effect.

- Always lay the wheel down in such a way that the brake discs are not damaged.

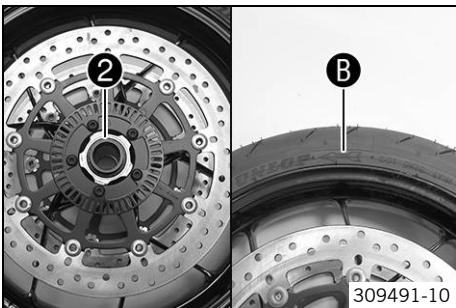


- Holding the front wheel, withdraw the wheel spindle. Take the front wheel out of the fork.
- Remove spacers ④.

14.4.2 Installing the front wheel

- Check the wheel bearing for damage and wear.
 - » If the wheel bearing is damaged or worn:
 - Change the front wheel bearing. (☞ p. 95)
- Clean and grease shaft seal rings ① and mating surfaces A of the spacers.

Long-life grease (☞ p. 336)

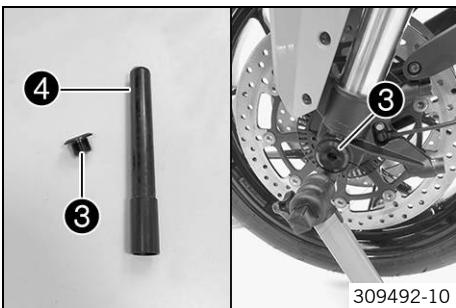


- Insert wide spacer ② on the left in the direction of travel.

**Info**

Arrow B indicates the direction of travel of the front wheel.
The ABS sensor wheel is on the left viewed in the direction of travel.

- Insert the narrow spacer on the right in the direction of travel.



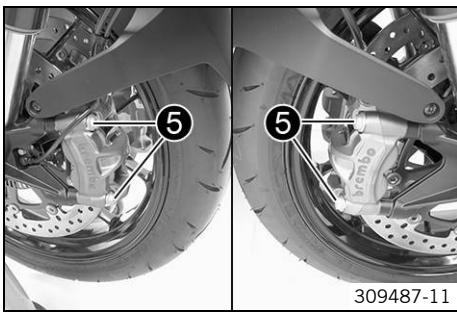
- Clean screw ③ and wheel spindle ④.
- Grease wheel spindle ④.

Long-life grease (☞ p. 336)

- Lift the front wheel into the fork, position it, and insert the wheel spindle.
- Mount and tighten screw ③.

Guideline

Bolt, front axle	M25x1.5	45 Nm (33.2 lbf ft)	Thread greased
------------------	---------	------------------------	----------------



- Position the brake calipers and check that the brake linings are seated correctly.
- Mount screws 5 on both brake calipers but do not tighten yet.
- Operate the hand brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point. Fix the hand brake lever in the activated position.
 - ✓ The brake calipers straighten.
- Tighten screws 5 on both brake calipers.

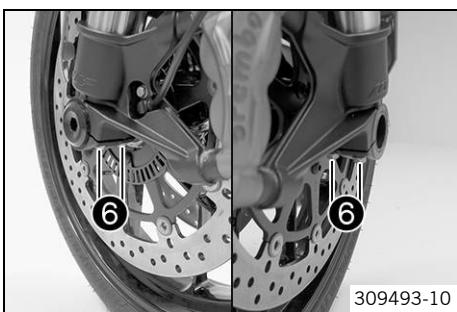
Guideline

Screw, front brake caliper	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
----------------------------	-----	------------------------	---------------

- Remove the locking piece of the hand brake lever.
- Take the motorcycle from the front lifting gear. (☞ p. 11)
- Remove the rear of the motorcycle from the lifting gear. (☞ p. 14)
- Operate the front brake and compress the fork a few times firmly.
 - ✓ The fork legs straighten.
- Tighten screws 6.

Guideline

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



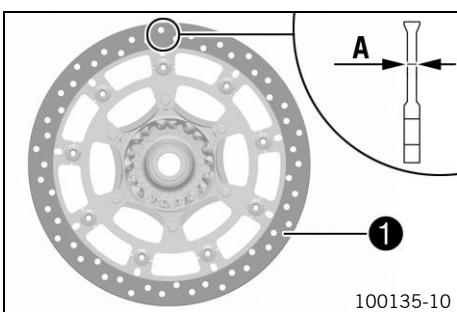
14.4.3 Checking the brake discs



Warning

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

- Make sure that worn-out brake discs are replaced immediately.



- Check the thickness of the front and rear brake discs at multiple points on each brake disc to ensure it is at least thickness A.



Info

Wear will reduce the thickness of the brake disc at the contact surface 1 of the brake linings.

Brake discs - wear limit

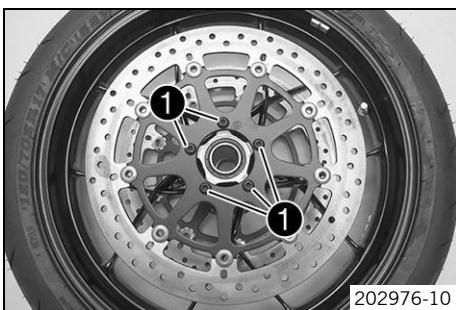
Front	4.5 mm (0.177 in)
Rear	4.5 mm (0.177 in)

- » 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.

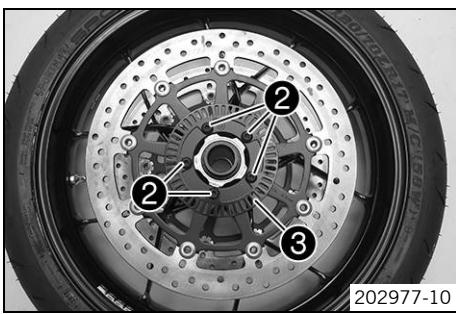
14.4.4 Removing the brake discs of the front brake

Preparatory work

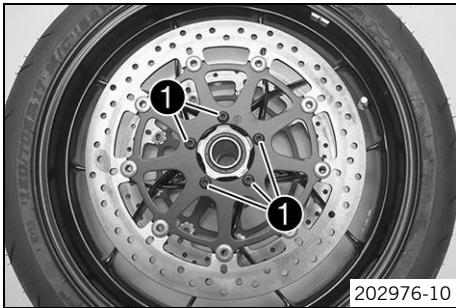
- Lift the motorcycle with the rear lifting gear. (☞ p. 14)
- Lift the motorcycle with the front lifting gear. (☞ p. 11)
- Remove the front wheel. (☞ p. 92)

**Right-hand side**

- Remove screws 1.
- Remove the brake disc.

**Left-hand side**

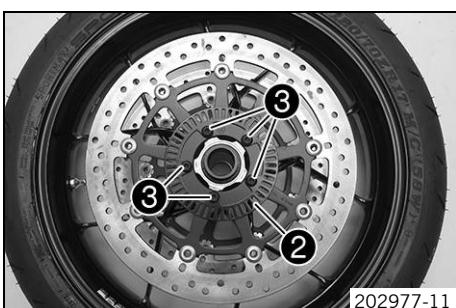
- Remove screws 2.
- Remove ABS sensor wheel 3.
- Remove the brake disc.

14.4.5 Installing the brake discs of the front brake**Right-hand side**

- Clean the contact surface of the brake disc.
- Position the brake disc with the label facing outward.
- Mount and tighten screws 1.

Guideline

Screw, front brake disc	M8	30 Nm (22.1 lbf ft)	Loctite® 2701™
-------------------------	----	------------------------	-----------------------

**Left-hand side**

- Clean the contact surface of the brake disc.
- Position the brake disc with the label facing outward.
- Position ABS sensor wheel 2.
- Mount and tighten screws 3.

Guideline

Screw, front brake disc	M8	30 Nm (22.1 lbf ft)	Loctite® 2701™
-------------------------	----	------------------------	-----------------------

Finishing work

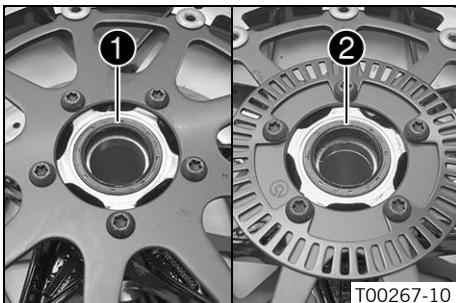
- Install the front wheel. (☞ p. 93)

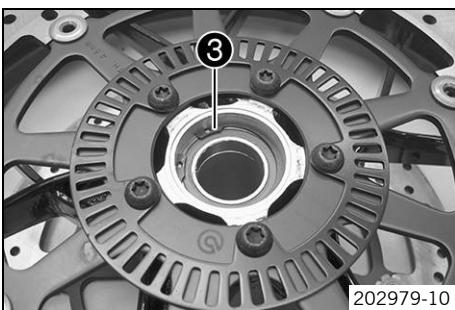
14.4.6 Changing the front wheel bearing**Preparatory work**

- Lift the motorcycle with the rear lifting gear. (☞ p. 14)
- Lift the motorcycle with the front lifting gear. (☞ p. 11)
- Remove the front wheel. (☞ p. 92)

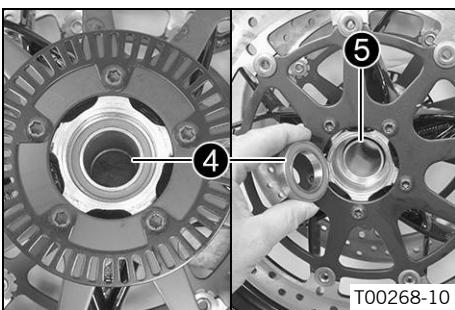
Main work

- Remove the right seal ring 1.
- Remove the left seal ring 2.





- Remove lock ring 3.

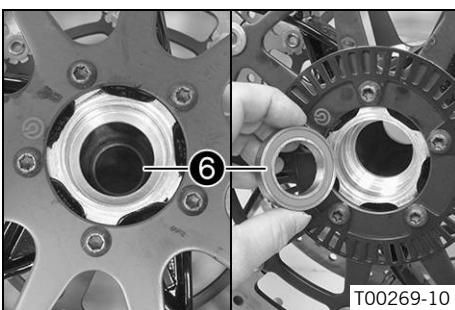


- Press out the right wheel bearing 4 with a suitable tool.

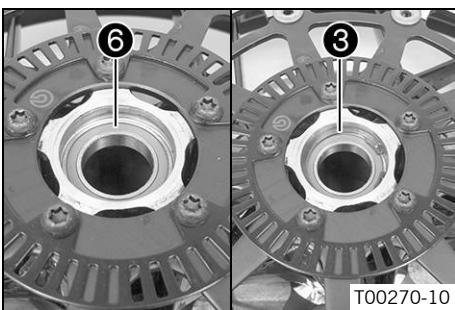
i Info

Spacing tube 5 can be pushed aside.

- Remove the spacing tube.



- Press out the left wheel bearing 6 with a suitable tool.

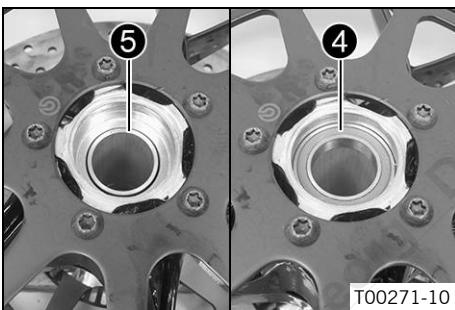


- Press in the new left wheel bearing 6 all the way with a suitable tool.

i Info

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

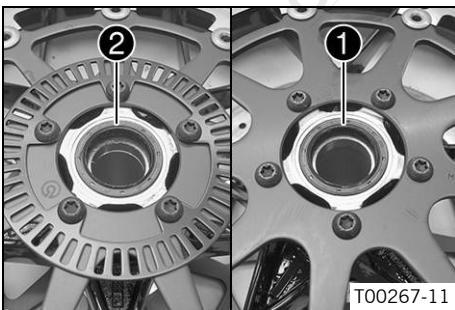
- Mount lock ring 3.



- Position spacing tube 5.
- Press in the new right wheel bearing 4 all the way using a suitable tool.

i Info

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



- Grease the new left seal ring 2 and press it in until it is flush.
- Grease the new right seal ring 1 and press it in until it is flush.

Long-life grease (p. 336)

Finishing work

- Install the front wheel. (p. 93)

14.5 Rear wheel

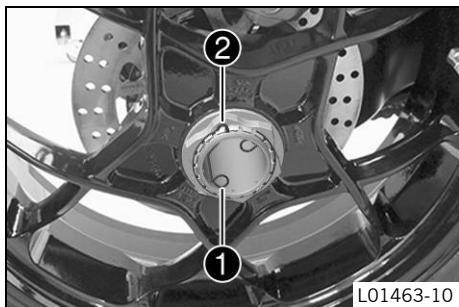
14.5.1 Removing the rear wheel with the work stand

Preparatory work

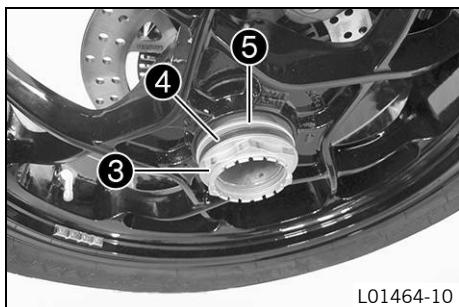
- Raise the motorcycle with the work stand (inserted). (☞ p. 13)
- Disassemble the main silencer. (☞ p. 67)

Main work

- Remove the inside locking wire ①.
- Remove the outside locking wire ②.



- Have an assistant operate the rear brake.
- Release nut ③ and remove with washer ④ and taper ring ⑤.



- Take off the rear wheel.



14.5.2 Installing the rear wheel with the work stand



Warning

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

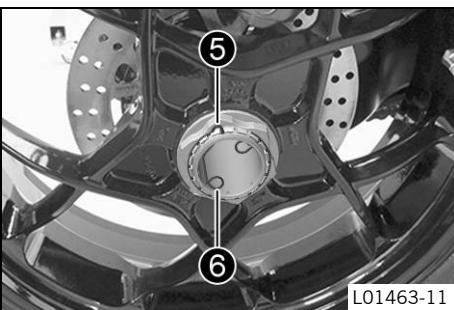
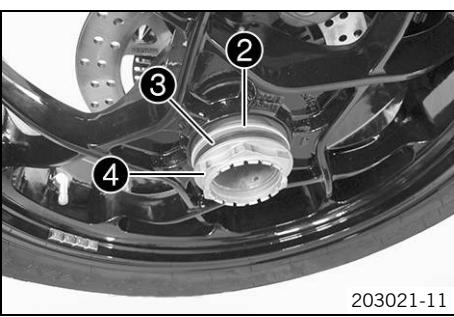
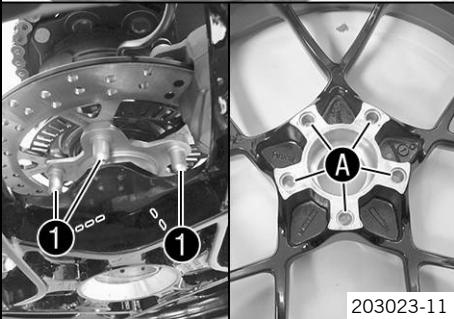
- Always keep the brake discs free of oil and grease.
- Clean the brake discs with brake cleaner when necessary.



Warning

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

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



Main work

- Check the rear wheel bearing for damage and wear.
» If the rear wheel bearing is damaged or worn:
 - Change the rear wheel bearing. (☞ p. 124)
- Clean and grease the threads of the wheel axle and axle nut.

Long-life grease (☞ p. 336)

- Slide the rear wheel onto the axle.

Driving pins **1** engage in drilled holes **A** of the rim.

- Mount taper ring **2**, washer **3**, and nut **4**.
- Have an assistant operate the rear brake.
- Tighten nut **4**.

Guideline

Nut, rear axle	M50x1.5	250 Nm (184.4 lbf ft)	Thread greased/lock locking wire with locking varnish
----------------	---------	--------------------------	--

- Mount the outside locking wire **5**.
- Mount the inside locking wire **6**.

The pins of the locking wires engage in the drilled holes of the wheel axle.

Finishing work

- Check the wheel speed sensor spacing. (☞ p. 148)
- Remove the motorcycle from the work stand (inserted). (☞ p. 13)
- Install the main silencer. (☞ p. 67)

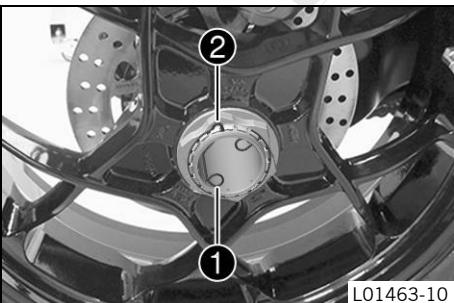
14.5.3 Removing the rear wheel

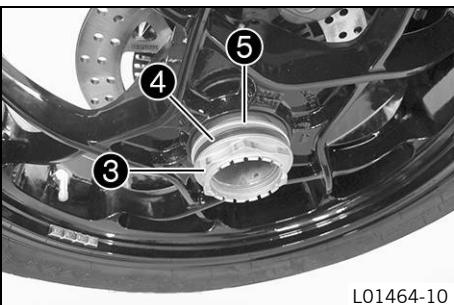
Preparatory work

- Lift the motorcycle with the rear lifting gear. (☞ p. 14)
- Disassemble the main silencer. (☞ p. 67)

Main work

- Remove the inside locking wire **1**.
- Remove the outside locking wire **2**.





- Have an assistant operate the rear brake.
- Release nut ③ and remove with washer ④ and taper ring ⑤.



- Take off the rear wheel.

14.5.4 Installing the rear wheel

Warning

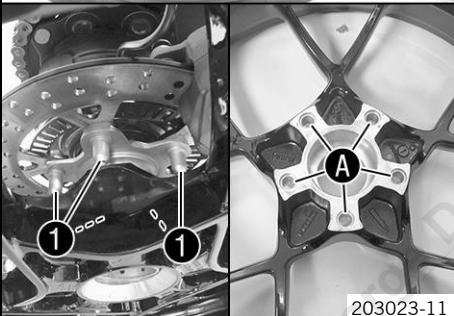
Danger of accidents Oil or grease on the brake discs reduces the braking effect.

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



Main work

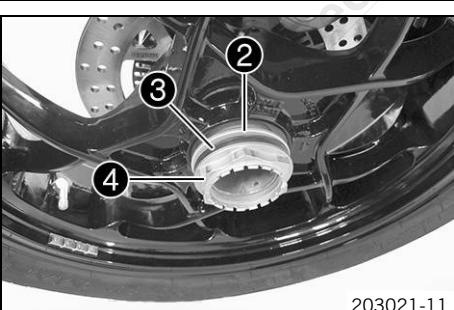
- Check the rear wheel bearing for damage and wear.
 - » If the rear wheel bearing is damaged or worn:
 - Change the rear wheel bearing. (p. 124)
- Clean and grease the threads of the wheel axle and axle nut.
Long-life grease (p. 336)
- Slide the rear wheel onto the axle.
 - ✓ Driving pins ① engage in drilled holes A of the rim.

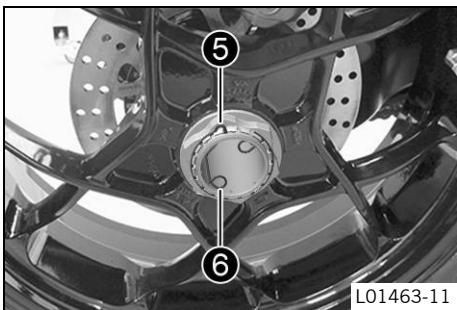


- Mount taper ring ②, washer ③, and nut ④.
- Have an assistant operate the rear brake.
- Tighten nut ④.

Guideline

Nut, rear axle	M50x1.5	250 Nm (184.4 lbf ft)	Thread greased/lock locking wire with locking varnish
----------------	---------	--------------------------	--





- Mount outside locking wire 5.
- Mount inside locking wire 6.
- ✓ The pins of the locking wires engage in the drilled holes of the wheel axle.

Finishing work

- Remove the rear of the motorcycle from the lifting gear. (☞ p. 14)
- Install the main silencer. (☞ p. 67)

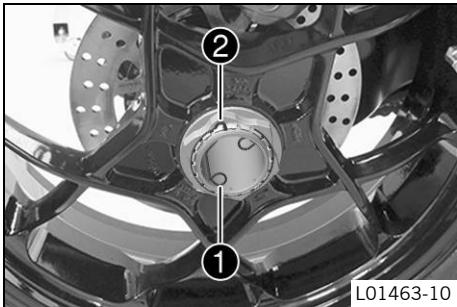
14.5.5 Checking that the rear wheel nut (right side) is tightened to the specified torque

Preparatory work

- Raise the motorcycle with the work stand (inserted). (☞ p. 13)

Main work

- Remove the inside locking wire 1.
- Remove the outside locking wire 2.



- Have an assistant operate the rear brake.

- Release nut 3 and remove with washer 4 and taper ring 5.
- Clean and grease the threads of the wheel axle and axle nut.

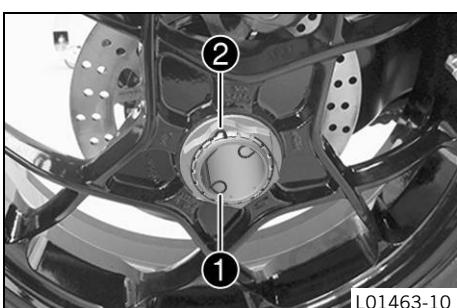
Long-life grease (☞ p. 336)

- Mount taper ring 5, washer 4, and nut 3.
- Have an assistant operate the rear brake.
- Tighten nut 3.

Guideline

Nut, rear axle	M50x1.5	250 Nm (184.4 lbf ft)	Thread greased/lock locking wire with locking varnish
----------------	---------	--------------------------	--

- Mount outside locking wire 2.
- Mount inside locking wire 1.
- ✓ The pins of the locking wires engage in the drilled holes of the wheel axle.



Finishing work

- Remove the motorcycle from the work stand (inserted). (☞ p. 13)

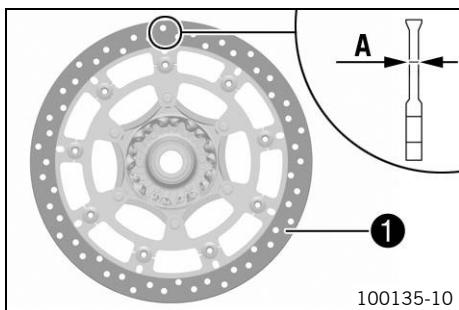
14.5.6 Checking the brake discs



Warning

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

- Make sure that worn-out brake discs are replaced immediately.



- Check the thickness of the front and rear brake discs at multiple points on each brake disc to ensure it is at least thickness **A**.

i **Info**

Wear will reduce the thickness of the brake disc at the contact surface **1** of the brake linings.

Brake discs - wear limit

Front	4.5 mm (0.177 in)
Rear	4.5 mm (0.177 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.

14.5.7 Removing the brake disc of the rear brake

Preparatory work

- Raise the motorcycle with the work stand (inserted). (☞ p. 13)
- Disassemble the main silencer. (☞ p. 67)
- Remove the rear wheel with the work stand. (☞ p. 97)
- Remove the rear sprocket carrier. (☞ p. 105)

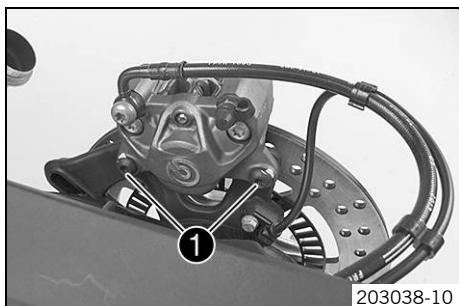
Main work

- Remove screws **1**.
- Hang the brake caliper to the side.

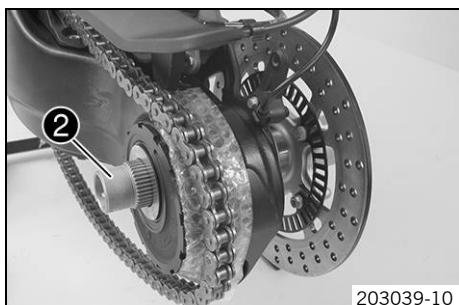
i **Info**

Protect the swingarm and components from damage.
Do not operate the foot brake when the brake caliper is disassembled.

- Remove axle **2** from the hub housing.

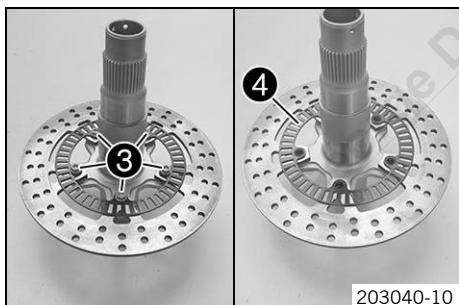


203038-10



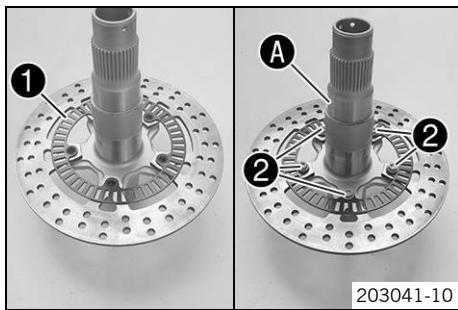
203039-10

- Remove screws **3**.
- Remove ABS sensor wheel **4**.
- Remove the brake disc.



203040-10

14.5.8 Installing the brake disc of the rear brake



Main work

- Clean the contact surface of the brake disc.
- Position the brake disc with the label facing the contact surface.
- Position ABS sensor wheel 1.
- Mount and tighten screws 2.

Guideline

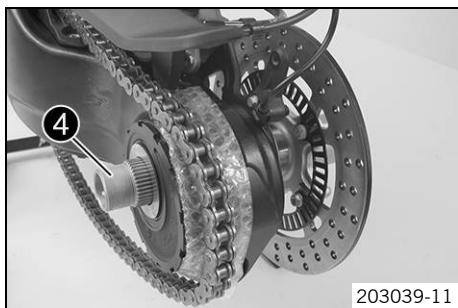
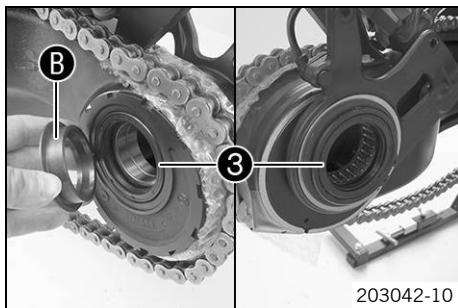
Screw, rear brake disc	M8	30 Nm (22.1 lbf ft)	Loctite® 243™
------------------------	----	------------------------	---------------

- Clean and grease pivot point A of the axle.

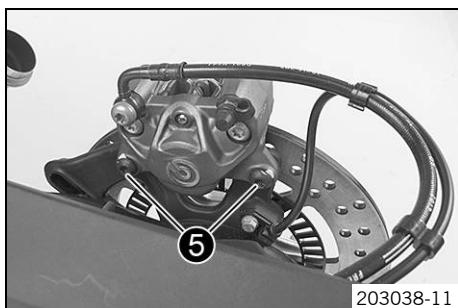
Long-life grease (p. 336)

- Clean and grease the shaft seal rings 3 and contact surface B of the spacer ring.

Long-life grease (p. 336)



- Position axle 4 in the bearing seat of the hub housing.



- Position the brake caliper. Mount and tighten screws 5.

Guideline

Screw, rear brake caliper	M8	25 Nm (18.4 lbf ft)	Loctite® 2701™
---------------------------	----	------------------------	----------------

- 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

- Install the rear sprocket carrier. (p. 106)
- Install the rear wheel with the work stand. (p. 97)
- Check the wheel speed sensor spacing. (p. 148)
- Remove the motorcycle from the work stand (inserted). (p. 13)
- Install the main silencer. (p. 67)
- Adjust the chain tension. (p. 103)

14.5.9 Checking the chain tension

Warning

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

If the chain is tensioned too much, the chain, engine sprocket, rear sprocket, transmission and rear wheel bearings wear more quickly. Some components may break if overloaded.

If the chain is too loose, the chain may fall off the engine sprocket or the rear sprocket. As a result, the rear wheel locks or the engine will be damaged.

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

Preparatory work

- Lift the motorcycle with the rear lifting gear. (☞ p. 14)

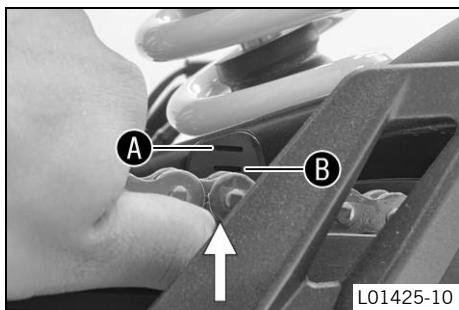
Main work

- Shift the transmission to idle **N**.
- At the chain sliding guard in the area of markings **A** and **B**, push the chain upward and determine the chain tension.

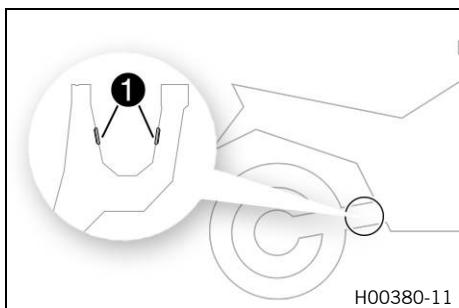
i Info

The lower chain section must be taut.

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



L01425-10



H00380-11

Finishing work

- Remove the rear of the motorcycle from the lifting gear. (☞ p. 14)

14.5.10 Adjusting the chain tension

Warning

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

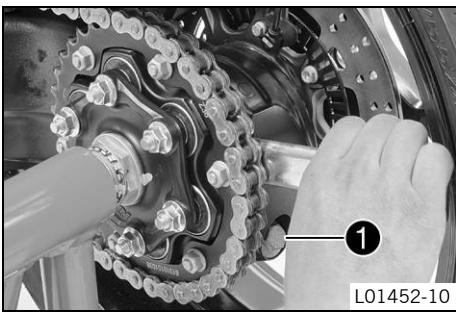
If the chain is tensioned too much, the chain, engine sprocket, rear sprocket, transmission and rear wheel bearings wear more quickly. Some components may break if overloaded.

If the chain is too loose, the chain may fall off the engine sprocket or the rear sprocket. As a result, the rear wheel locks or the engine will be damaged.

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

Preparatory work

- Lift the motorcycle with the rear lifting gear. (☞ p. 14)
- Check the chain tension. (☞ p. 103)

**Main work**

- Loosen screw 1.
- Set the chain tension by turning the hub housing.

Hook wrench (61329085000) (☞ p. 348)

Handle for ring wrench (60012060000) (☞ p. 342)

**Info**

Turn clockwise to increase the chain tension; turn counterclockwise to reduce the chain tension.

The tool required is in the tool set.

- Check the chain tension. (☞ p. 103)
- ✓ The chain tension matches the specified value.

**Info**

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

- Tighten screw 1.

Guideline

Screw, eccentric

M16

70 Nm
(51.6 lbf ft)

- Remove the rear of the motorcycle from the lifting gear. (☞ p. 14)

14.5.11 Checking the chain, rear sprocket, engine sprocket, and chain guide**Preparatory work**

- Lift the motorcycle with the rear lifting gear. (☞ p. 14)

Main work

- Check the rear sprocket and engine sprocket for wear.
 - » If the rear sprocket or engine sprocket is worn:
 - Change the drivetrain kit. (☞ p. 108)

**Info**

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

- Shift the transmission to idle N.

- Pull the lower chain section with specified weight A.

Guideline

Weight, chain wear measurement

15 kg (33 lb.)

- Measure distance B of 18 chain rollers in the lower chain section.

**Info**

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

Maximum distance B at the longest chain section

272 mm (10.71 in)

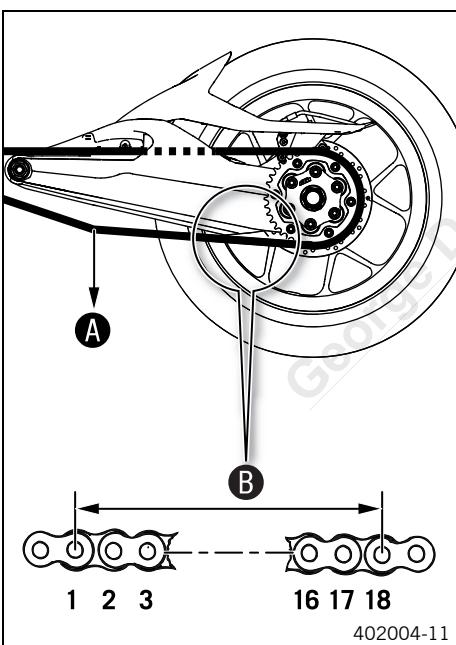
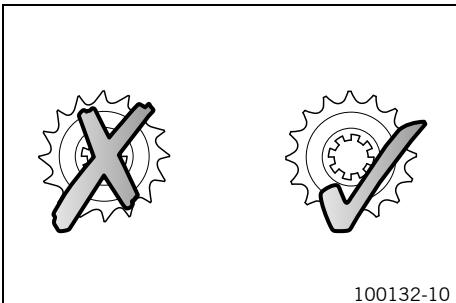
- » If distance B is greater than the specified measurement:
 - Change the drivetrain kit. (☞ p. 108)

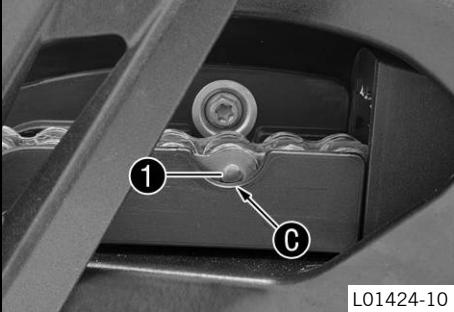
**Info**

When the chain is replaced, the rear sprocket and engine sprocket should also be changed.

New chains wear out faster on an old, worn rear sprocket or engine sprocket.

For safety reasons, the chain has no chain joint.



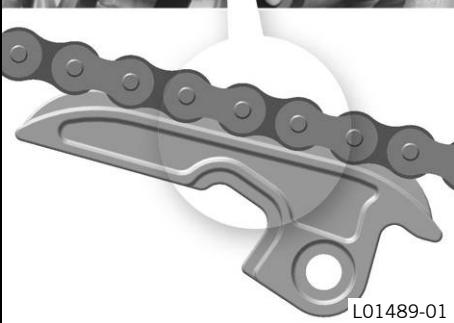


L01424-10

- Check the chain sliding guard for wear at the recess.
 - » If chain rivet ① is no longer visible at bottom edge ② of the recess of 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	M5	5 Nm (3.7 lbf ft)
----------------------------	----	----------------------



L01489-01

- Check the chain sliding piece for wear.
 - » If the lower edge of the chain 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

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

Finishing work

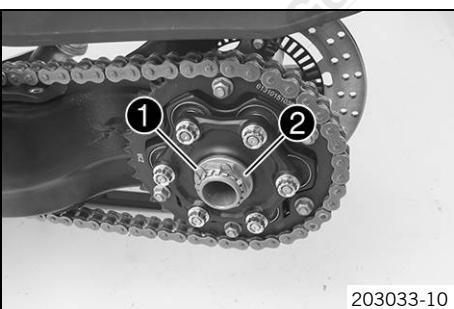
- Remove the rear of the motorcycle from the lifting gear. (☞ p. 14)

14.5.12 Removing the rear sprocket carrier**Preparatory work**

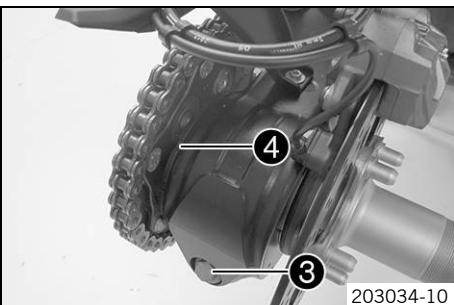
- Raise the motorcycle with the work stand (inserted). (☞ p. 13)
- Disassemble the main silencer. (☞ p. 67)
- Remove the rear wheel with the work stand. (☞ p. 97)

Main work

- Remove locking wire ①.
- Have an assistant operate the rear brake.
- Loosen nut ②.



203033-10

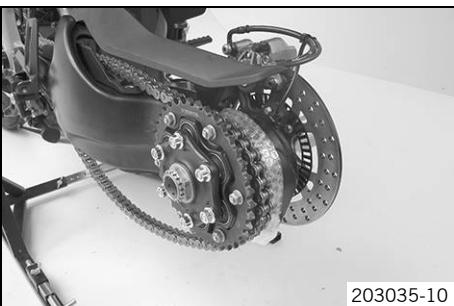


- Loosen screw 3.
- Turn hub housing 4 clockwise.

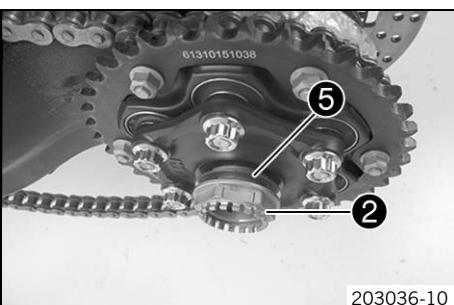
Hook wrench (61329085000) (☞ p. 348)

Handle for ring wrench (60012060000) (☞ p. 342)

✓ The chain is loosened.



- Protect the components against damage by covering them.
- Remove the chain from the rear sprocket.

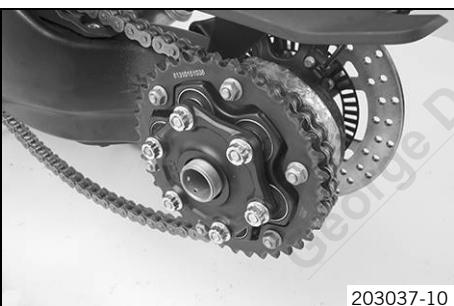


- Remove nut 2 with washer 5.



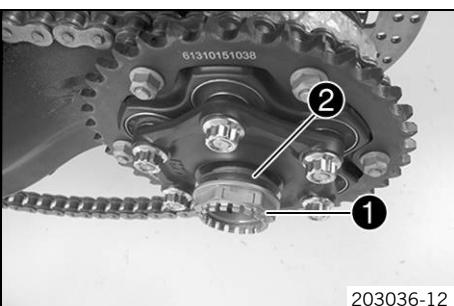
- Remove the rear sprocket carrier with the rear sprocket.

14.5.13 Installing the rear sprocket carrier



Main work

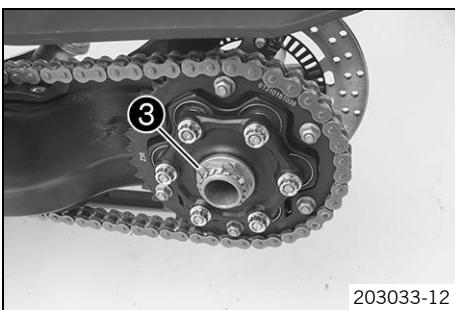
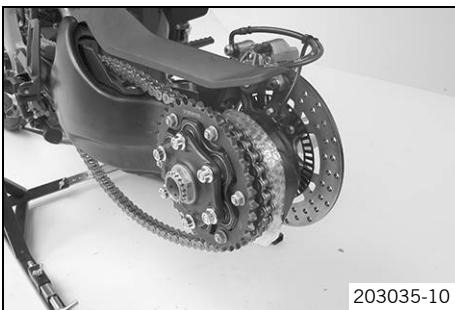
- Position the rear sprocket carrier with the rear sprocket.



- Have an assistant operate the rear brake.
- Mount and tighten nut 1 with washer 2.

Guideline

Nut, rear axle, shock absorber side	M35x1.5	200 Nm (147.5 lbf ft)	Loc-tite® 262™/lock the locking wire with locking varnish
-------------------------------------	---------	--------------------------	---

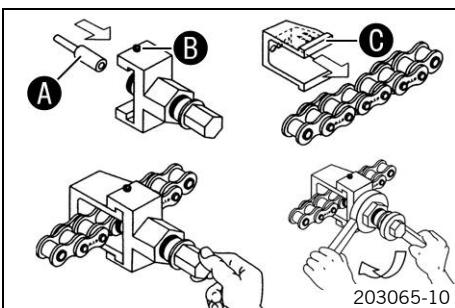


- Position the chain on the rear sprocket.
- ✓ The center of the wheel axle bearing is above the center of the hub housing.
- Mount locking wire ③.
- ✓ The pin of the locking wire engages in one of the drilled holes of the axle.

Finishing work

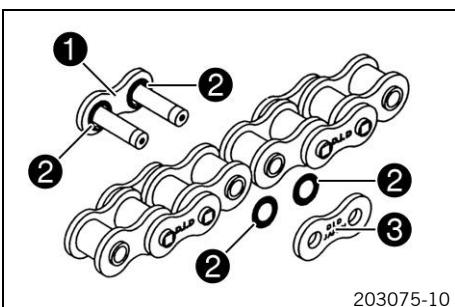
- Install the rear wheel with the work stand. (☞ p. 97)
- Check the wheel speed sensor spacing. (☞ p. 148)
- Remove the motorcycle from the work stand (inserted). (☞ p. 13)
- Install the main silencer. (☞ p. 67)
- Adjust the chain tension. (☞ p. 103)

14.5.14 Opening the chain

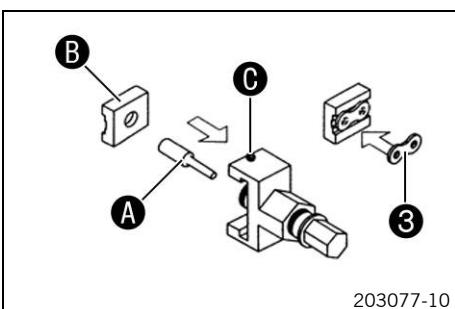


- Mount press drift ① with the larger diameter in the spindle of the special tool. Turn the spindle counterclockwise.
- Chain rivet tool (60029020000) (☞ p. 342)
- Make the connecting link of the chain accessible. Fret the riveting point.
 - Position the special tool with the press drift on one of the 2 pins of the connecting link of the chain.
 - ✓ Locking screw ② points upwards.
 - Position retaining clamp ③ of the special tool on the chain from the rear.
 - ✓ Markings ① and ② point upwards.
 - Slide retaining clamp ③ of the special tool into the pressing tool.
 - ✓ The arrow of marking ① points to locking screw ②.
 - Screw the locking screw hand-tight as far as it will go.
 - ✓ The retaining clamp is fixed.
 - Hold the special tool and screw in the spindle.
 - ✓ The chain pin is pressed out through the retaining clamp drill hole.
 - Unscrew the locking screw and remove the special tool.
 - Repeat the process on the second pin of the chain link.

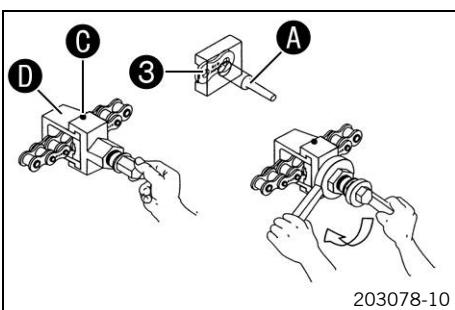
14.5.15 Riveting the chain



- Grease new connecting link ① and position an X-ring ② on each pin.
- Connect the chain ends with a connecting link.
- Position another X-ring ② on each pin.



- Mount press drift **A** with the smaller diameter in the spindle of the special tool. Turn the spindle counterclockwise.
- Chain rivet tool (60029020000) (p. 342)
- Position press plate **B** of the special tool on the press drift.
- Position chain joint plate **3** in the press plate.



- Position the special tool on the chain.
- Locking screw **C** points upwards.
- Position retaining clamp **D** of the special tool on the chain from the rear.
- Markings **A** and **B** point upwards.
- Slide retaining clamp **D** of the special tool into the pressing tool.
- The arrow of marking **A** points to locking screw **C**.
- Screw the locking screw hand-tight as far as it will go.
- The retaining clamp is fixed.
- Hold the special tool and screw in the spindle.
- Press drift **A** of the special tool presses against the center of the chain joint plate **3**.
- The chain joint plate is pressed on.
- Unscrew the locking screw and remove the special tool.
- Rivet the two pins of the connecting link with special tool.

Chain rivet tool (60029020000) (p. 342)

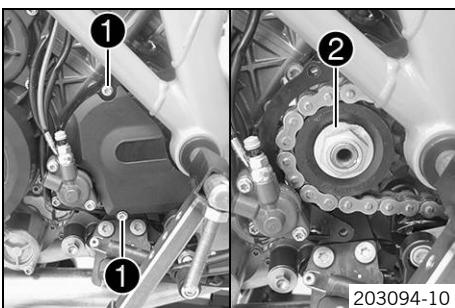
14.5.16 Changing the drivetrain kit

Preparatory work

- Raise the motorcycle with the work stand (inserted). (p. 13)

Main work

- Remove screws **1**. Remove the engine sprocket cover.
- Bend open lock washer **2**.
- Have an assistant operate the rear brake.
- Remove nut with lock washer.

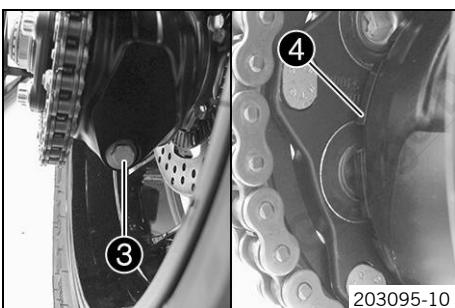


- Loosen screw **3**.
- Turn hub housing **4** clockwise.

Hook wrench (61329085000) (p. 348)

Handle for ring wrench (60012060000) (p. 342)

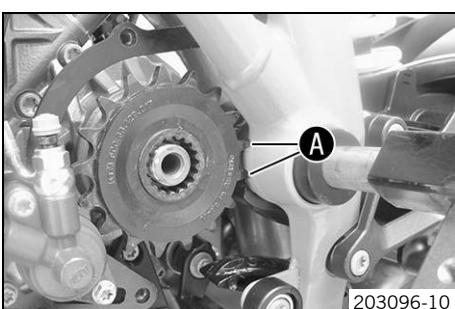
- The chain is loosened.
- Open the chain. (p. 107)



- Remove the chain.
- Remove the engine sprocket.

Info

The frame has 2 recesses **A** for disassembly.

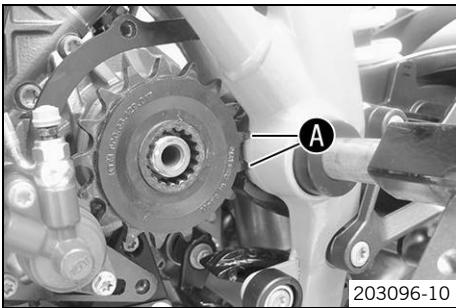




- Have an assistant operate the rear brake.
- Remove nuts **5** and take off the screws. Remove the rear sprocket.
- Position the new rear sprocket with the screws. Mount and tighten the nuts.

Guideline

Nut, rear sprocket	M8	36 Nm (26.6 lbf ft)
--------------------	----	------------------------



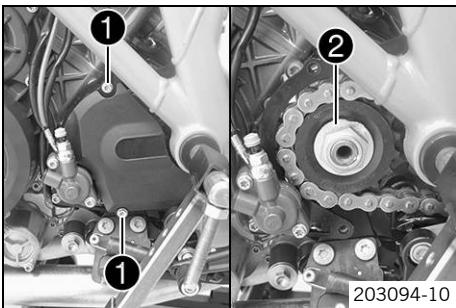
- Mount the engine sprocket.



Info

The frame has 2 recesses **A** for assembly.

- Put the chain on.
- ✓ The center of the wheel axle bearing is above the center of the hub housing.
- Rivet the chain. (☞ p. 107)



- Have an assistant operate the rear brake.
- Mount and tighten nut with lock washer **2**.

Guideline

Nut of engine sprocket	M20x1.5	100 Nm (73.8 lbf ft)	Loctite® 243™
------------------------	---------	-------------------------	---------------

- Secure the nut with the lock washer.
- Position the engine sprocket cover. Mount and tighten screws **1**.

Guideline

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

- Adjust the chain tension. (☞ p. 103)

Finishing work

- Remove the motorcycle from the work stand (inserted). (☞ p. 13)

14.5.17 Cleaning the chain

Warning

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

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

Warning

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

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

Warning

Environmental hazard Hazardous substances cause environmental damage.

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

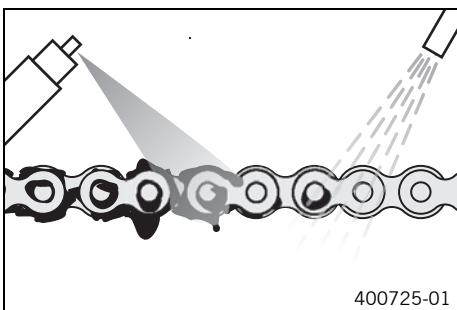
Info

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

Regular cleaning increases the service life of the chain.

Preparatory work

- Lift the motorcycle with the rear lifting gear. (☞ p. 14)

**Main work**

- Rinse off loose dirt with a soft jet of water.
- Remove old grease residue with chain cleaner.
Chain cleaner (p. 336)
- After drying, apply chain spray.
Chain lube for road use (p. 336)

Finishing work

- Remove the rear of the motorcycle from the lifting gear. (p. 14)

14.5.18 Checking/changing the rear hub shock absorbers of the rear sprocket carrier**Info**

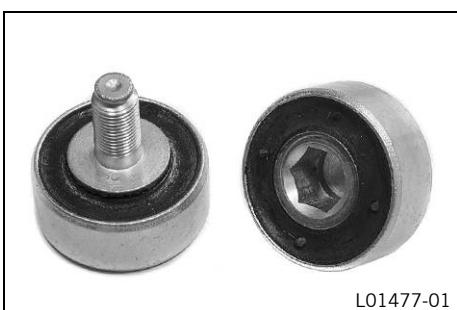
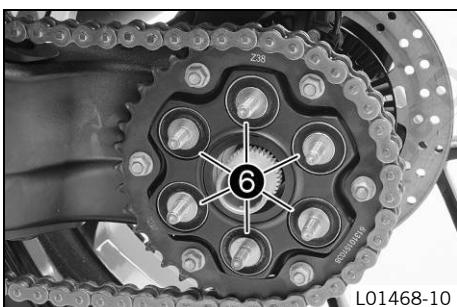
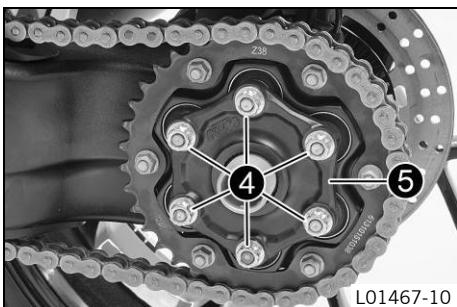
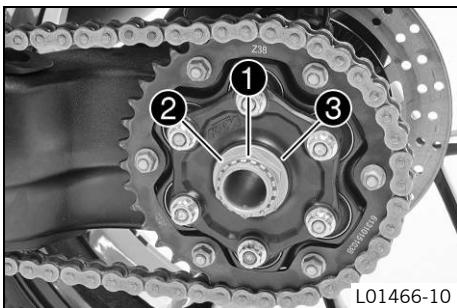
The engine power is transmitted from the rear sprocket to the rear wheel via 6 rear hub shock absorbers. The rear hub shock absorbers wear out during operation. If the shock absorbers are not changed in time, the rear sprocket carrier and shock absorber carrier will become damaged.

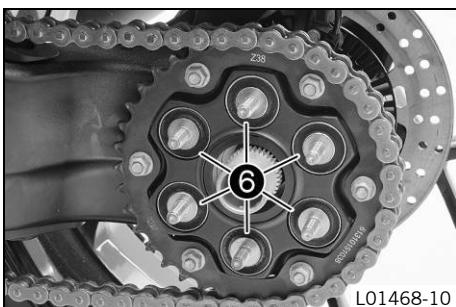
Preparatory work**Condition**

- The swingarm is unloaded.

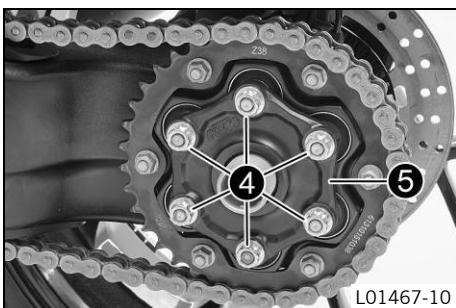
Main work

- Remove locking wire ①.
- Have an assistant operate the rear brake.
- Remove nut ② with washer ③.
- Remove nuts ④.
- Take off rear hub shock absorber carrier ⑤.
- Remove rear hub shock absorbers ⑥ of the rear sprocket carrier.
- Check the rear hub shock absorbers of the rear sprocket carrier on both sides for damage and wear.
 - » If the rear hub shock absorbers of the rear sprocket carrier are damaged or worn:
 - Install new rear hub shock absorbers.





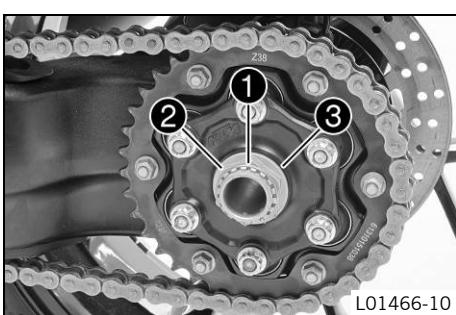
- Position rear hub shock absorbers 6 of the rear sprocket carrier.



- Position rear hub shock absorbers 5.
- Mount nuts 4 and tighten in a crisscross pattern.

Guideline

Nut, rear hub shock absorber carrier	M10x1.25	45 Nm (33.2 lbf ft)	Loctite® 243™
--------------------------------------	----------	------------------------	----------------------



- Mount nut 2 with washer 3.
- Have an assistant operate the rear brake.
- Tighten nut 2.

Guideline

Nut, rear axle, shock absorber side	M35x1.5	200 Nm (147.5 lbf ft)	Loc-tite® 262™/lock the locking wire with locking varnish
-------------------------------------	---------	--------------------------	--

- Mount locking wire 1.
- ✓ The pin of the locking wire engages in one of the drilled holes of the axle.

14.5.19 Removing the rear hub

Preparatory work

- Raise the motorcycle with the work stand (inserted). (p. 13)
- Disassemble the main silencer. (p. 67)
- Remove the rear wheel with the work stand. (p. 97)
- Remove the rear sprocket carrier. (p. 105)

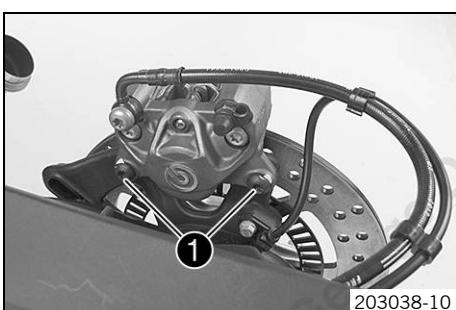
Main work

- Remove screws 1.
- Hang the brake caliper to the side.

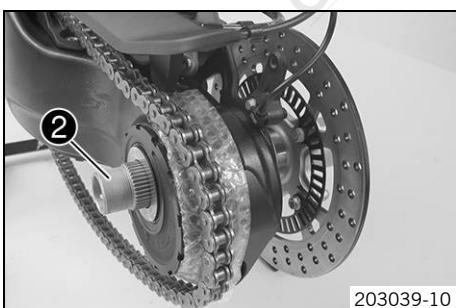


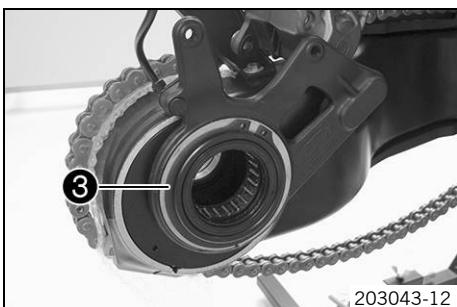
Info

Protect the swingarm and components from damage.
Do not operate the foot brake when the brake caliper is disassembled.

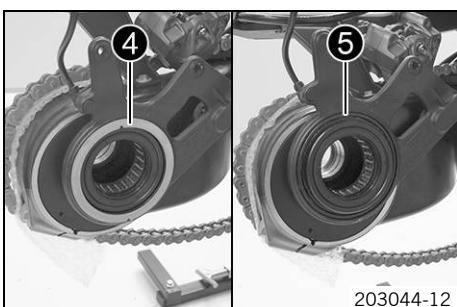


- Remove axle 2 from the hub housing.

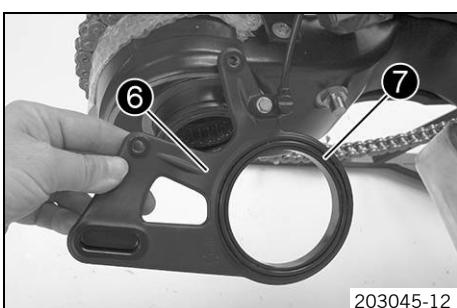




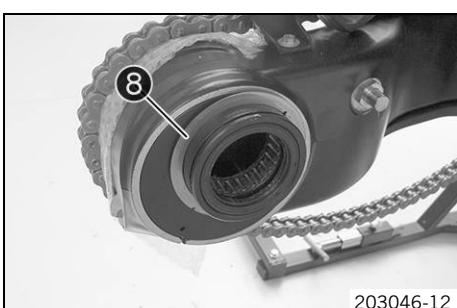
- Remove lock ring 3.



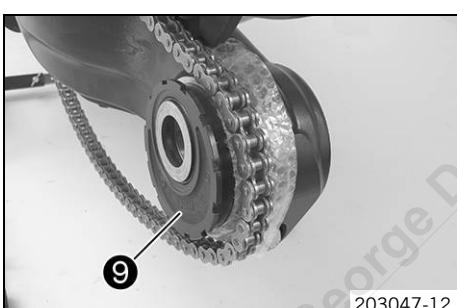
- Remove washer 4 and O-ring 5.



- Remove brake caliper support 6. Remove O-ring 7.
- Hang the brake caliper support to the side.

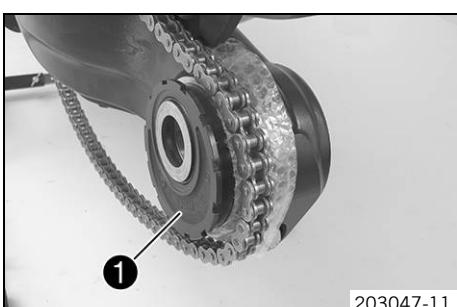


- Remove washer 8.



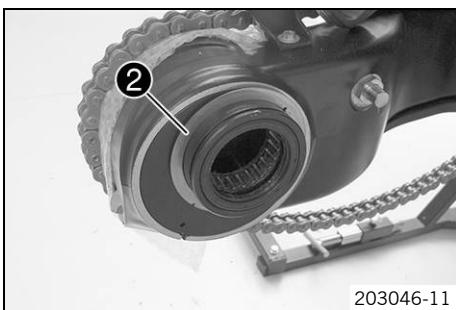
- Remove hub housing 9 from the swingarm.

14.5.20 Installing the rear hub

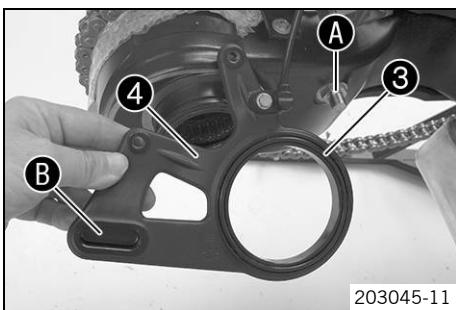


Main work

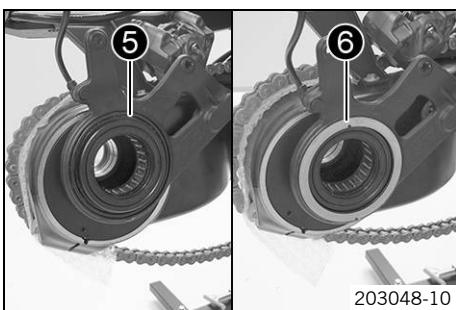
- Position hub housing 1 in the swingarm.
 - ✓ The center of the wheel axle bearing is above the center of the hub housing.



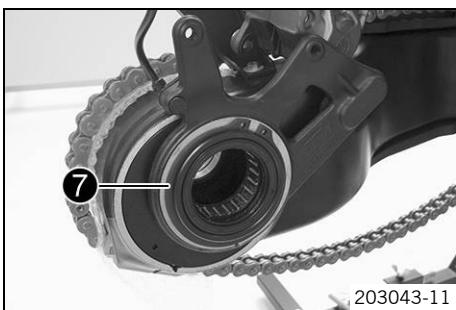
- Position washer ②.



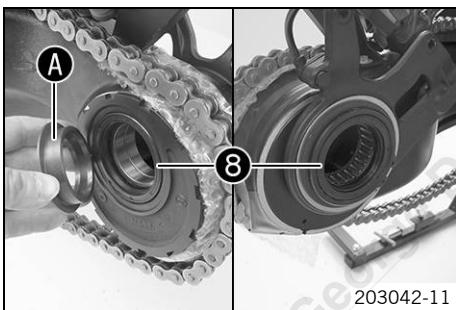
- Mount and grease O-ring ③ in the brake caliper support ④.
Long-life grease (p. 336)
- Position the brake caliper support on the swingarm.
✓ Pin A engages in slotted hole B.



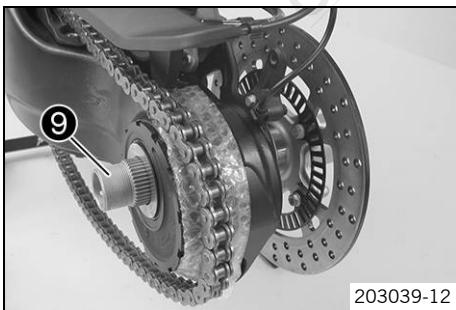
- Mount and grease O-ring ⑤ in the brake caliper support.
Long-life grease (p. 336)
- Position washer ⑥.



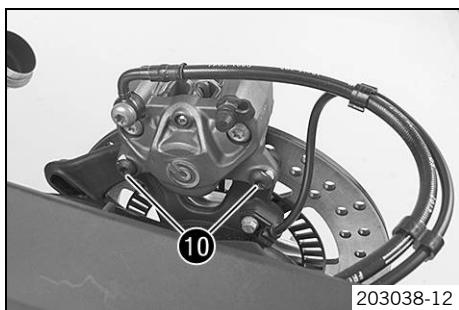
- Mount lock ring ⑦.
✓ The lock ring engages audibly.



- Clean and grease the shaft seal rings ⑧ and contact surface A of the spacer ring.
Long-life grease (p. 336)



- Position axle ⑨ in the bearing seat of the hub housing.



- Position the brake caliper. Mount and tighten screws 10.

Guideline

Screw, rear brake caliper	M8	25 Nm (18.4 lbf ft)	Loctite® 2701™
---------------------------	----	------------------------	----------------

- 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

- Install the rear sprocket carrier. (☞ p. 106)
- Install the rear wheel with the work stand. (☞ p. 97)
- Check the wheel speed sensor spacing. (☞ p. 148)
- Remove the motorcycle from the work stand (inserted). (☞ p. 13)
- Install the main silencer. (☞ p. 67)
- Adjust the chain tension. (☞ p. 103)

14.5.21 Measuring the rear wheel bearing clearance

Preparatory work

- Raise the motorcycle with the work stand (inserted). (☞ p. 13)

Main work

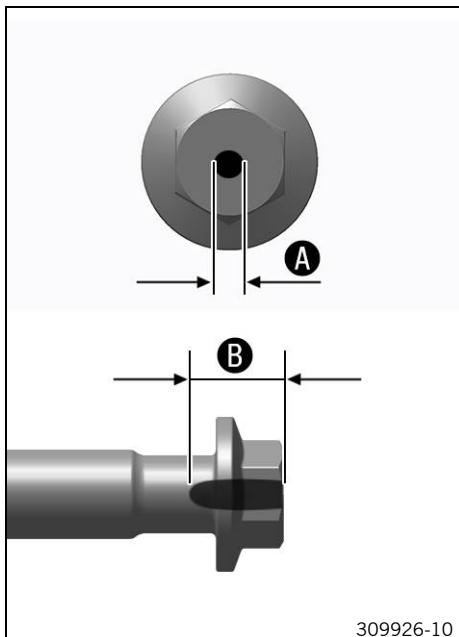
- Produce the special tool.

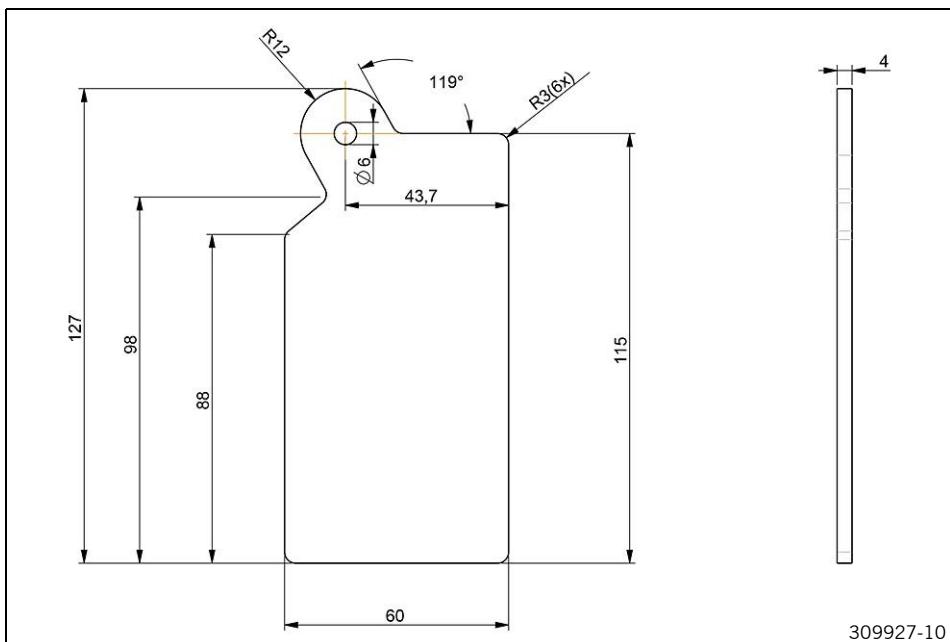
Hex collar screw (61310021000)

- Drill the hole and cut the thread.

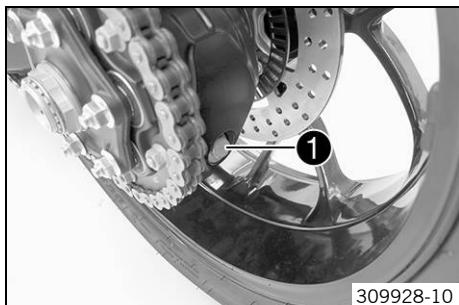
Guideline

Diameter A	M 6
Depth B	20 mm (0.79 in)

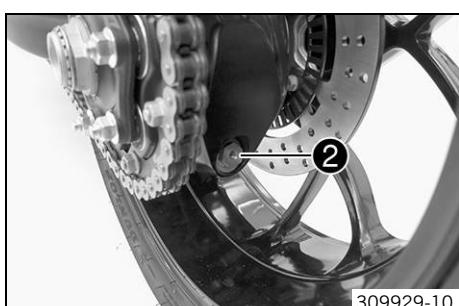




- Produce the special tool.



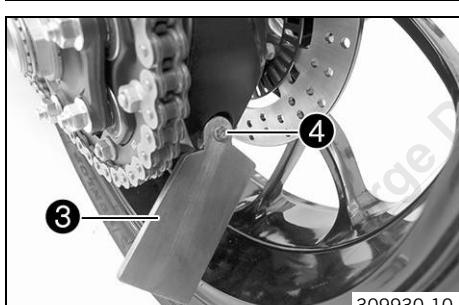
- Remove screw 1.



- Mount and tighten special tool 2.

Guideline

Screw, eccentric	M16	70 Nm (51.6 lbf ft)
------------------	-----	------------------------

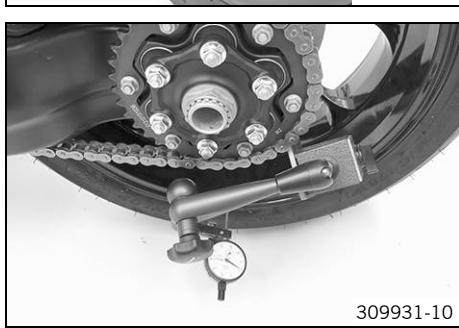


- Position special tool 3.

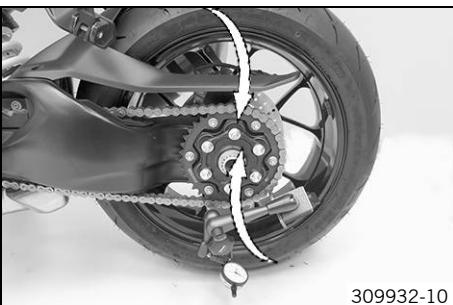
- Mount and tighten screw 4.

Guideline

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



- Mount the dial gauge with the dial gage support.



- Move the rear wheel from side to side.

i Info

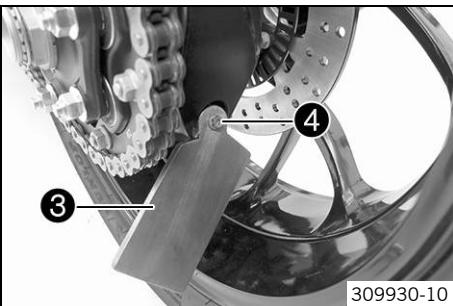
Measure the wheel bearing play when cold.

Values measured while the bearing or wheel axle is warm are implausible.

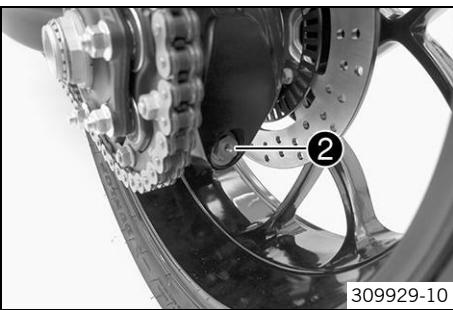
Wheel bearing play at rim flange	$\leq 0.30 \text{ mm} (\leq 0.0118 \text{ in})$
----------------------------------	---

- If the specified value is not reached:
 - Change the rear wheel bearing. (p. 124)
 - Change the rear wheel axle.

- Remove screw ④.
- Take off special tool ③.



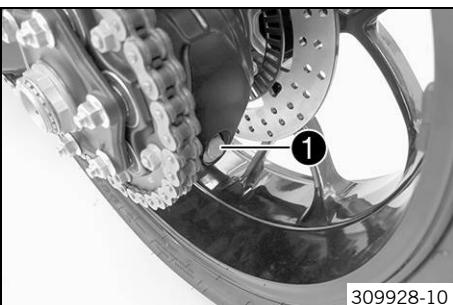
- Remove special tool ②.



- Mount and tighten screw ①.

Guideline

Screw, eccentric	M16	70 Nm (51.6 lbf ft)
------------------	-----	------------------------



Finishing work

- Remove the motorcycle from the work stand (inserted). (p. 13)
- Check the chain tension. (p. 103)
- Remove the rear of the motorcycle from the lifting gear. (p. 14)

14.5.22 Greasing rear wheel bearing

Preliminary work

- Raise the motorcycle with the work stand (inserted). (p. 13)
- Disassemble the main silencer. (p. 67)
- Remove the rear wheel with the work stand. (p. 97)
- Remove the rear sprocket carrier. (p. 105)

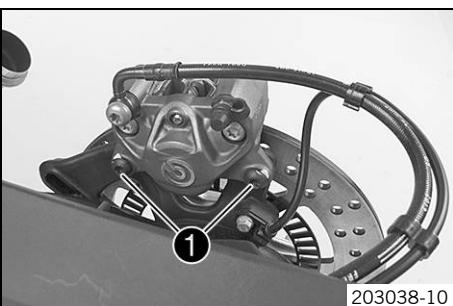
Main work

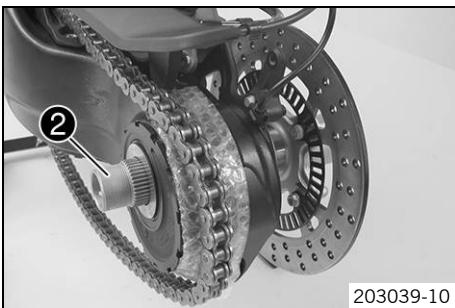
- Remove screws ①.
- Hang the brake caliper to the side.

i Info

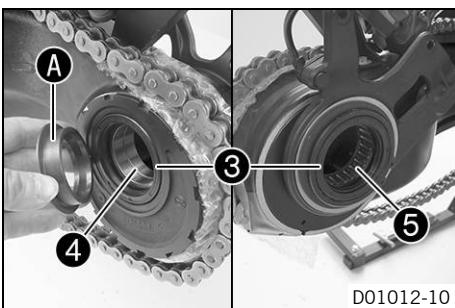
Protect the swingarm and components from damage.

Do not operate the foot brake when the brake caliper is disassembled.





- Remove axle 2 from the hub housing.

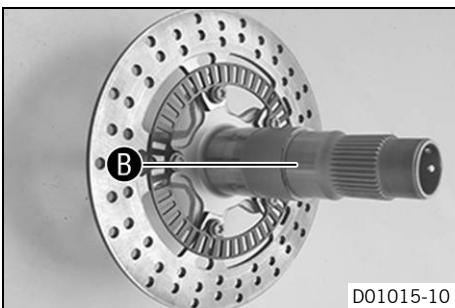


- Check the wheel bearing for damage and wear.
» If there is damage or wear:
 - Change the rear wheel bearing. (p. 124)
- Clean and grease the shaft seal rings 3 and contact surface A of the spacer ring.
- Clean and grease the contact surfaces 4 of the bearing.
- Grease the needle bearing 5.

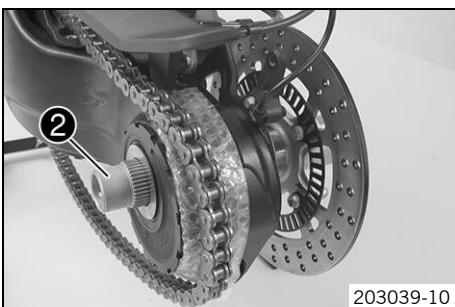
Long-life grease (p. 336)

- Clean axle and grease in area B.

Long-life grease (p. 336)



- Position axle 2 in the bearing seat of the hub housing.
- Turn the axle and check for smooth operation.
» If the axle is stiff:
 - Change the rear wheel bearing. (p. 124)

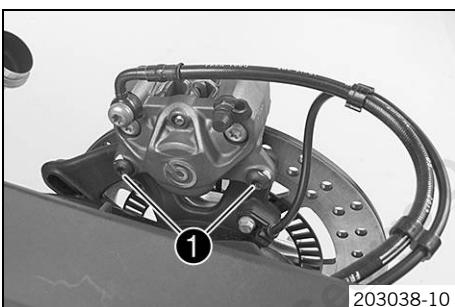


- Position the brake caliper. Mount and tighten screws 1.

Guideline

Screw, rear brake caliper	M8	25 Nm (18.4 lbf ft)	Loctite® 2701™
---------------------------	----	------------------------	----------------

- Operate the foot brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point.



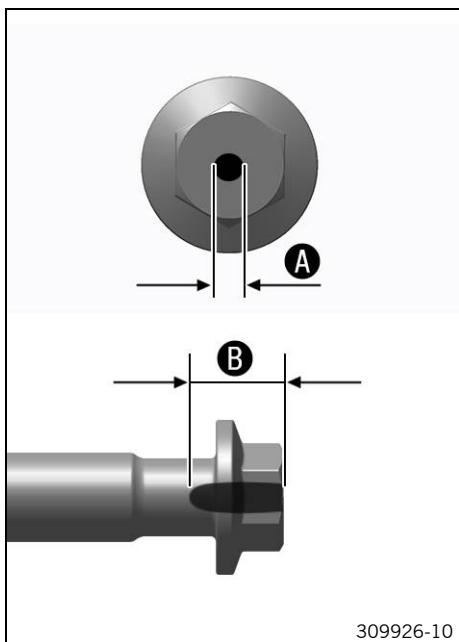
Final steps

- Install the rear sprocket carrier. (p. 106)
- Install the rear wheel with the work stand. (p. 97)
- Check the wheel speed sensor spacing. (p. 148)
- Remove the motorcycle from the work stand (inserted). (p. 13)
- Install the main silencer. (p. 67)
- Adjust the chain tension. (p. 103)

14.5.23 Measuring the wheel bearing play and greasing the rear hub

Preliminary work

- Raise the motorcycle with the work stand (inserted). (p. 13)

**Main work**

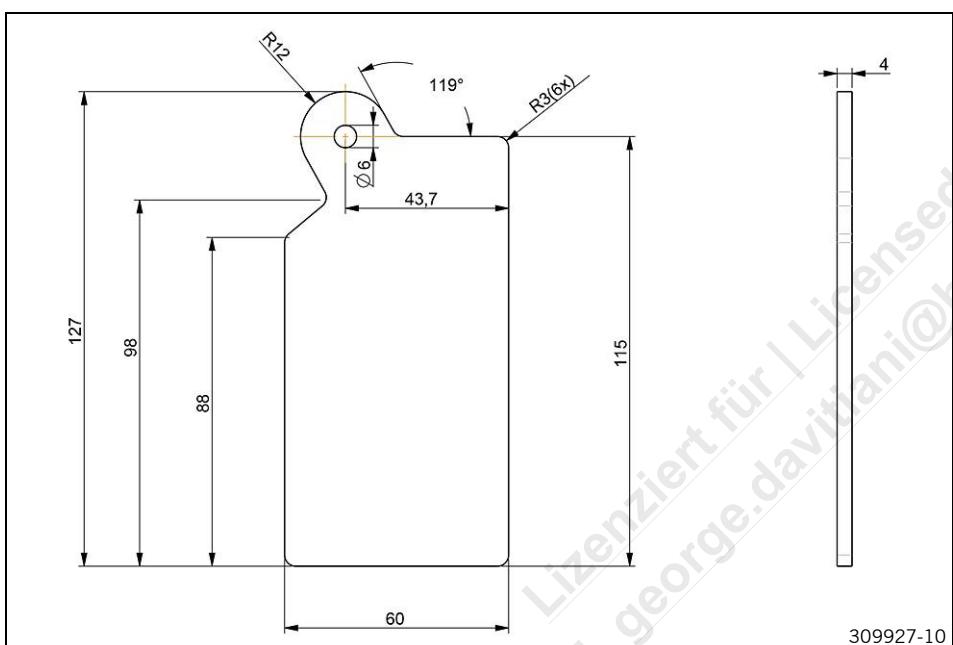
- Produce the special tool.

Hex collar screw (61310021000)

- Drill the hole and cut the thread.

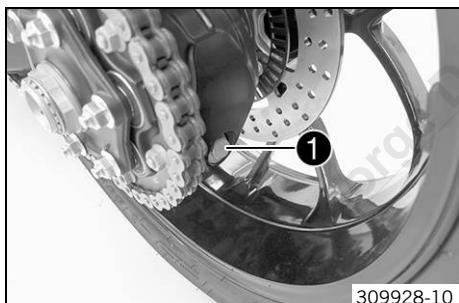
Guideline

Diameter A	M 6
Depth B	20 mm (0.79 in)



- Produce the special tool.

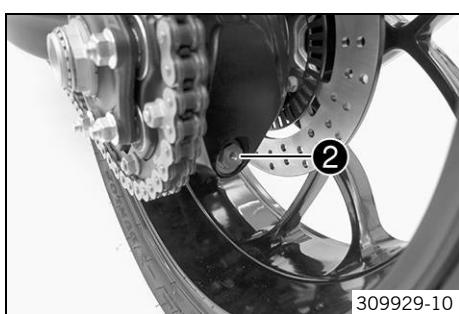
- Remove screw **1**.

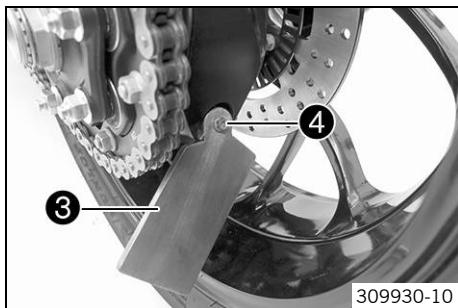


- Mount and tighten special tool **2**.

Guideline

Screw, eccentric	M16	70 Nm (51.6 lbf ft)
------------------	-----	------------------------





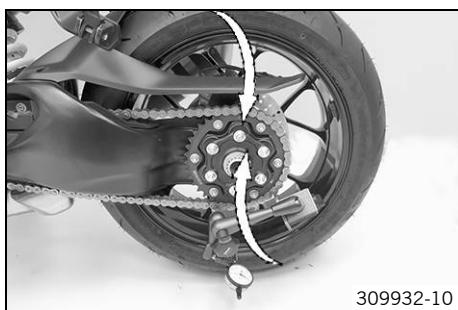
- Position special tool 3.
- Mount and tighten screw 4.

Guideline

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



- Mount the dial gauge with the dial gage support.



- Move the rear wheel from side to side.



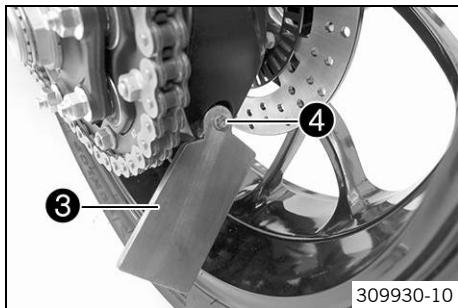
Info

Measure the wheel bearing play when cold.

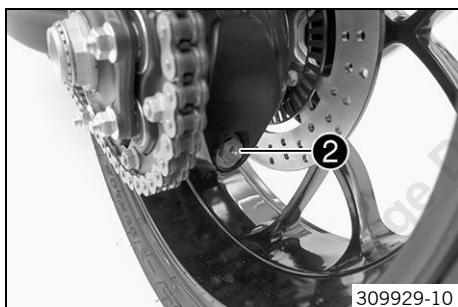
Values measured while the bearing or wheel axle is warm are implausible.

Wheel bearing play at rim flange	$\leq 0.30 \text{ mm} (\leq 0.0118 \text{ in})$
----------------------------------	---

- » If the specified value is not reached:
 - Change the rear wheel bearing. (p. 124)
 - Change the rear wheel axle.
- Remove screw 4.
- Take off special tool 3.



- Remove special tool 2.

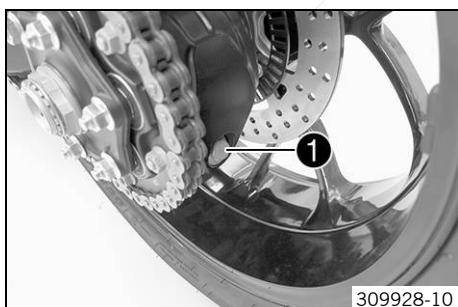


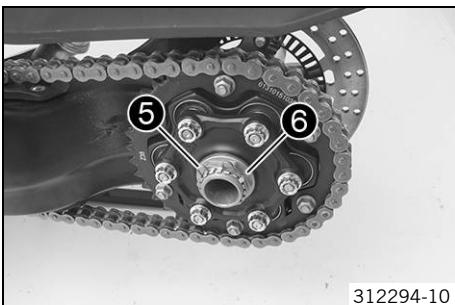
- Mount and tighten screw 1.

Guideline

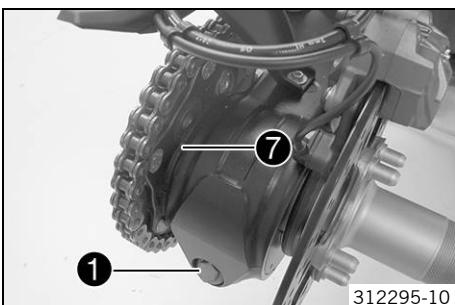
Screw, eccentric	M16	70 Nm (51.6 lbf ft)
------------------	-----	------------------------

- Remove the rear wheel with the work stand. (p. 97)





- Remove locking wire 5.
- Have an assistant operate the rear brake.
- Loosen nut 6.

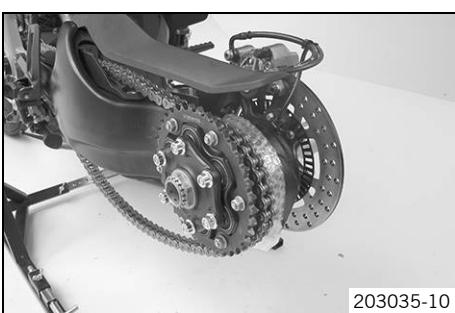


- Loosen screw 1.
- Turn hub housing 7 clockwise.

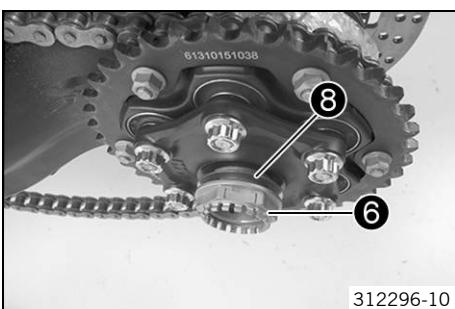
Hook wrench (61329085000) (☞ p. 348)

Handle for ring wrench (60012060000) (☞ p. 342)

✓ The chain is loosened.



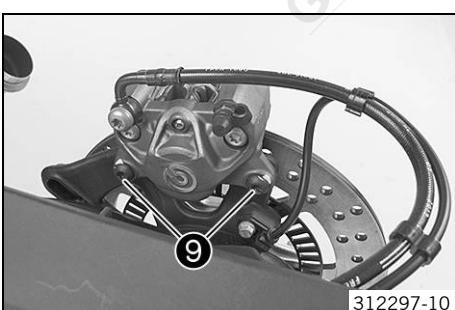
- Protect the components against damage by covering them.
- Remove the chain from the rear sprocket.



- Remove nut 6 with washer 8.



- Remove the rear sprocket carrier with the rear sprocket.



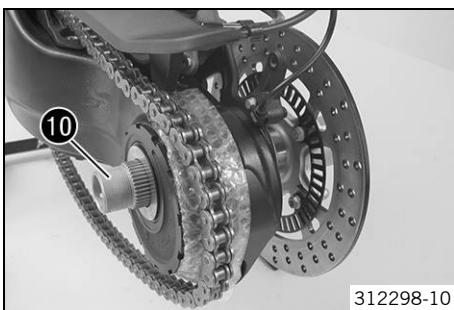
- Remove screws 9.
- Hang the brake caliper to the side.



Info

Protect the swingarm and components from damage.

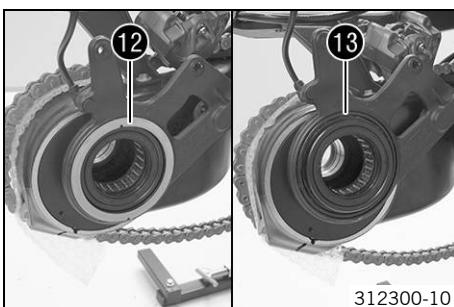
Do not operate the foot brake when the brake caliper is disassembled.



- Remove axle 10 from the hub housing.



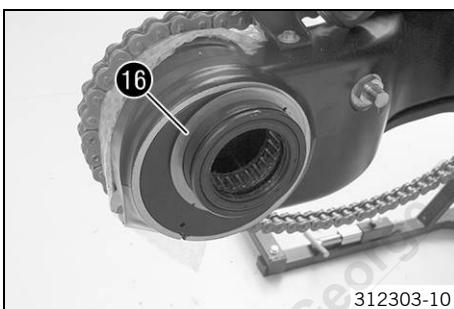
- Remove lock ring 11.



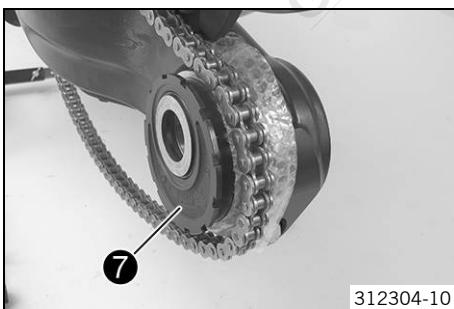
- Remove washer 12 and O-ring 13.



- Remove brake caliper support 14. Remove O-ring 15.
- Hang the brake caliper support to the side.



- Remove washer 16.

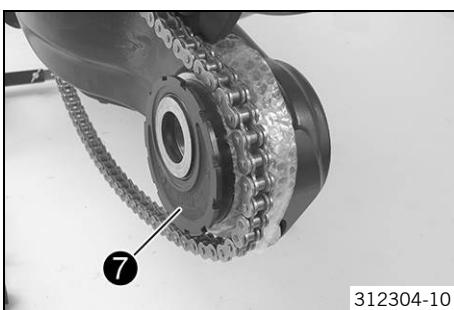


- Remove hub housing 7 from the swingarm.



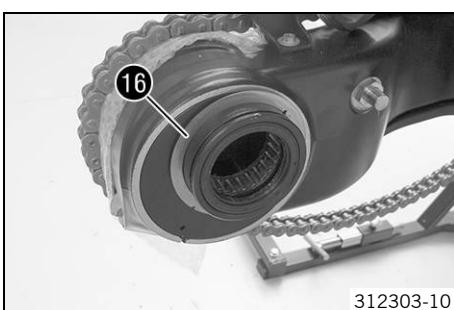
- Clean and grease hub.

Long-life grease (p. 336)

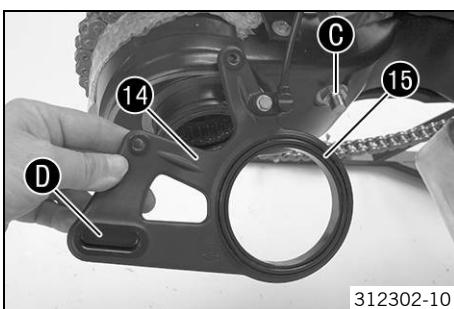


- Position hub housing 7 in the swingarm.

✓ The center of the wheel axle bearing is above the center of the hub housing.



- Position washer 16.

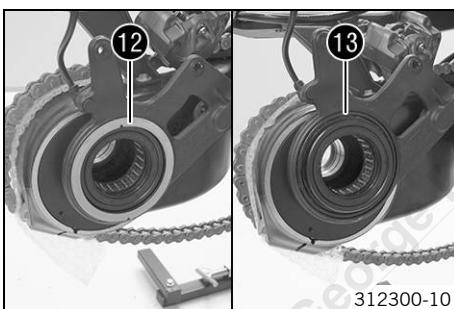


- Mount and grease O-ring 15 in the brake caliper support 14.

Long-life grease (p. 336)

- Position the brake caliper support on the swingarm.

✓ Pin C engages in slotted hole D.



- Mount and grease O-ring 13 in the brake caliper support.

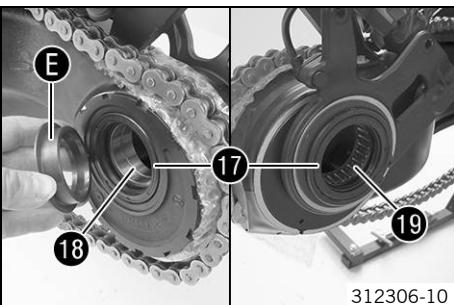
Long-life grease (p. 336)

- Position washer 12.



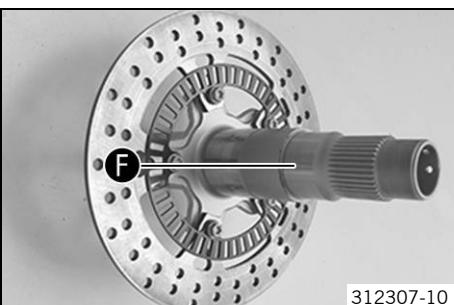
- Mount lock ring 11.

✓ The lock ring engages audibly.



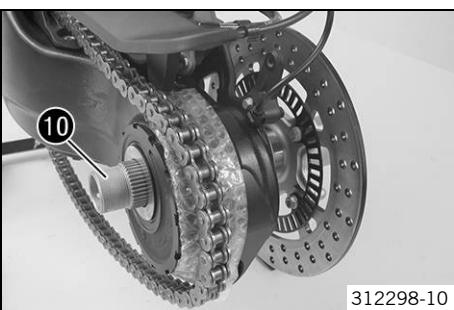
- Check the wheel bearing for damage and wear.
 - » If there is damage or wear:
 - Change the rear wheel bearing. (☞ p. 124)
- Clean and grease the shaft seal rings 17 and contact surface E of the spacer ring.
- Clean and grease the contact surfaces 18 of the bearing.
- Grease the needle bearing 19.

Long-life grease (☞ p. 336)

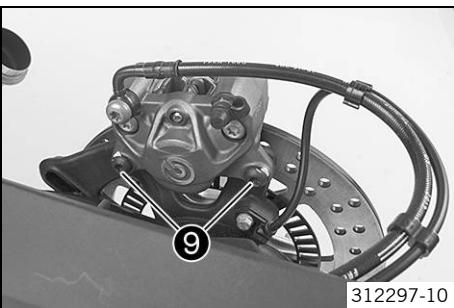


- Clean axle and grease in area F.

Long-life grease (☞ p. 336)



- Position axle 10 in the bearing seat of the hub housing.
- Turn the axle and check for smooth operation.
 - » If the axle is stiff:
 - Change the rear wheel bearing. (☞ p. 124)



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

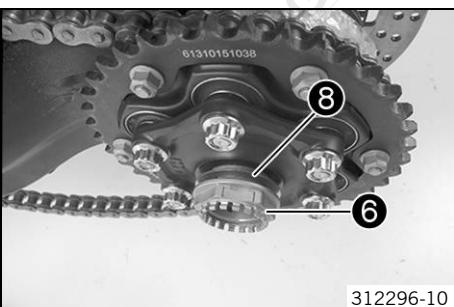
Guideline

Screw, rear brake caliper	M8	25 Nm (18.4 lbf ft)	Loctite® 2701™
---------------------------	----	------------------------	----------------

- Operate the foot brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point.



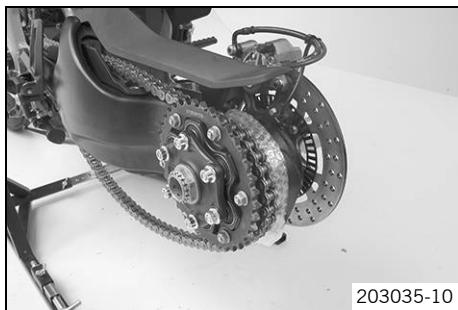
- Position the sprocket wheel support with the rear sprocket.



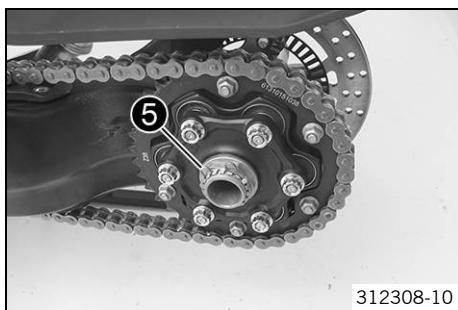
- Have an assistant operate the rear brake.
- Mount and tighten nut 6 with washer 8.

Guideline

Nut, rear axle, shock absorber side	M35x1.5	200 Nm (147.5 lbf ft)	Loc-tite® 262™/lock the locking wire with locking varnish
-------------------------------------	---------	--------------------------	---



- Position the chain on the rear sprocket.
- ✓ The center of the wheel axle bearing is above the center of the hub housing.



- Mount locking wire 5.
- ✓ The pin of the locking wire engages in one of the drilled holes of the axle.

Final steps

- Install the rear wheel with the work stand. (☞ p. 97)
- Check the wheel speed sensor spacing. (☞ p. 148)
- Remove the motorcycle from the work stand (inserted). (☞ p. 13)
- Install the main silencer. (☞ p. 67)
- Check the chain tension. (☞ p. 103)
- Remove the rear of the motorcycle from the lifting gear. (☞ p. 14)

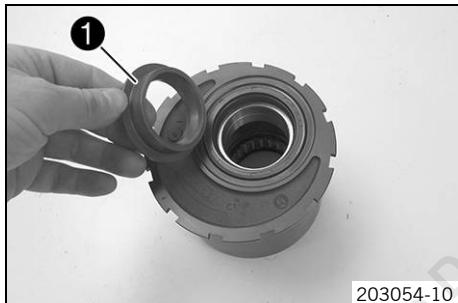
14.5.24 Changing the rear wheel bearing

Preparatory work

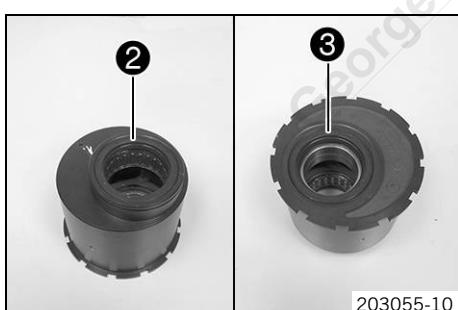
- Raise the motorcycle with the work stand (inserted). (☞ p. 13)
- Disassemble the main silencer. (☞ p. 67)
- Remove the rear wheel with the work stand. (☞ p. 97)
- Remove the rear sprocket carrier. (☞ p. 105)
- Remove the rear hub. (☞ p. 111)

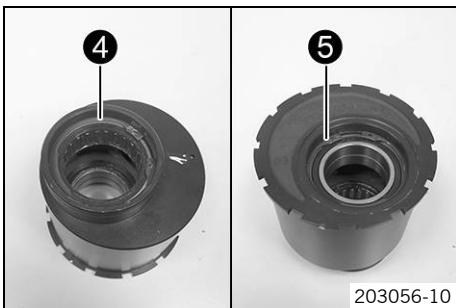
Main work

- Remove spacer ring 1.



- Remove shaft seal ring 2.
- Remove shaft seal ring 3.





- Remove lock ring 4.
- Remove lock ring 5.



- Press out bearings 6 from the inside to the outside.



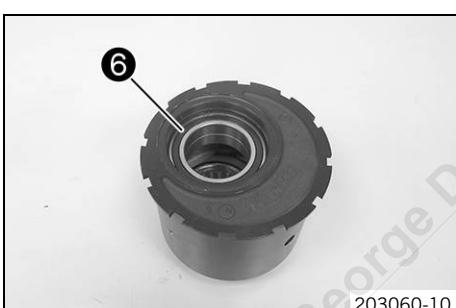
- Press out bearing 7 from the inside to the outside.



- Press in new bearing 7 from the outside all the way to the inside.

**Info**

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



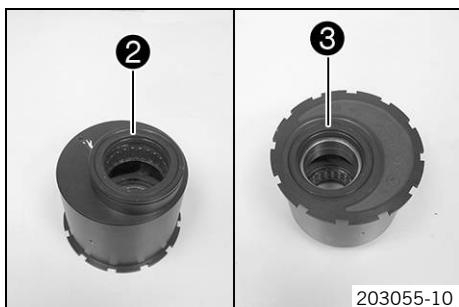
- Press in new bearings 6 from the outside all the way to the inside.

**Info**

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

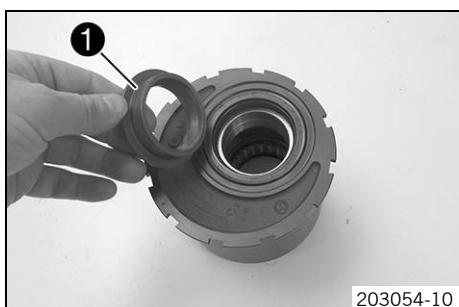


- Mount lock ring 4.
 - ✓ The lock ring engages audibly.
- Mount lock ring 5.
 - ✓ The lock ring engages audibly.



- Grease new shaft seal ring **2** and press it in until it is flush.
- Grease new shaft seal ring **3** and press it in until it is flush.

Long-life grease (☞ p. 336)



- Clean, grease, and mount spacer ring **1**.

Long-life grease (☞ p. 336)

Finishing work

- Install the rear sprocket carrier. (☞ p. 106)
- Install the rear wheel with the work stand. (☞ p. 97)
- Check the wheel speed sensor spacing. (☞ p. 148)
- Remove the motorcycle from the work stand (inserted). (☞ p. 13)
- Install the main silencer. (☞ p. 67)
- Adjust the chain tension. (☞ p. 103)

15.1 Removing the battery



Warning

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

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



Caution

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

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

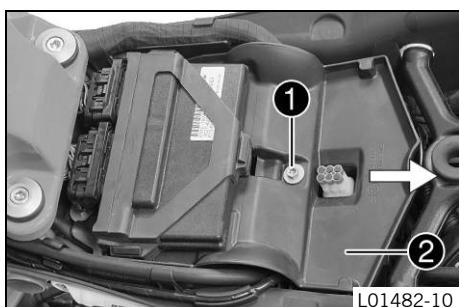
Preparatory work

- Switch off all power consumers and switch off the engine.
- Remove the passenger seat. (☞ p. 77)
- Remove the front rider's seat. (☞ p. 77)

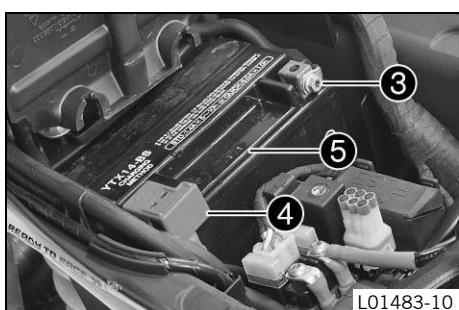
Main work

- Remove screw ①.
- Lift cover ② at the rear and pull toward the rear.
- Fold up the cover.

- Disconnect negative cable ③ of the battery.
- Remove positive terminal cover ④ and disconnect the positive cable from the battery.
- Take the battery ⑤ out of the battery compartment.



L01482-10



L01483-10

15.2 Installing the battery



Warning

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

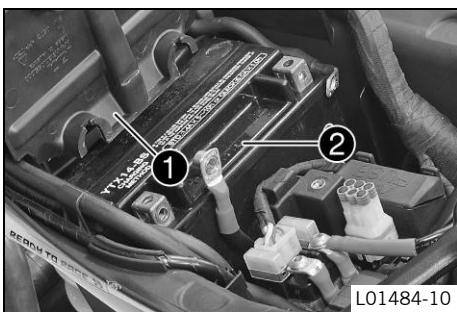
- Keep batteries out of the reach of children.
- Wear suitable protective clothing and safety glasses.
- Avoid contact with battery acid and battery gases.
- Keep sparks or open flames away from the battery.
- Only charge batteries in well-ventilated rooms.
- Rinse the affected area immediately with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



Caution

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

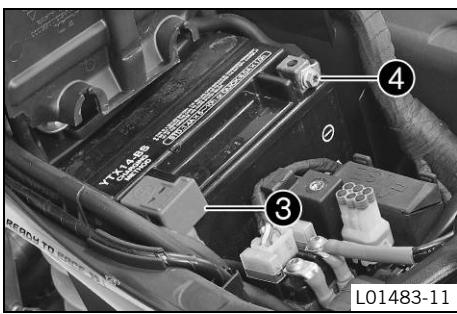
- Never operate the vehicle with a discharged battery or without a battery.



Main work

- Fold up cover 1.
- Place battery 2 in the battery compartment.

Battery (YTX14-BS) (p. 280)



- Position the positive cable and mount and tighten the screw.

Guideline

Screw, battery terminal	M6	4.5 Nm (3.32 lbf ft)
-------------------------	----	-------------------------

- Mount positive terminal cover 3.

- Position negative cable 4; mount and tighten the screw.

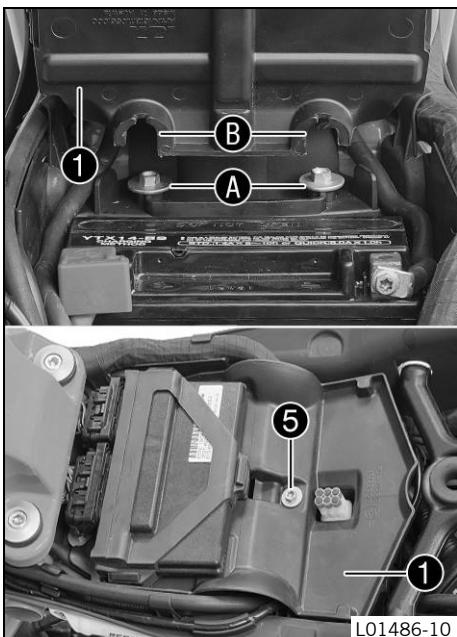
Guideline

Screw, battery terminal	M6	4.5 Nm (3.32 lbf ft)
-------------------------	----	-------------------------

- Position cover 1.

✓ Screw heads A engage in recesses B.

- Mount and tighten screw 5.



Finishing work

- Mount the front rider's seat. (p. 77)
- Mount the passenger seat. (p. 77)
- Set the time and date.

15.3 Disconnecting the negative (minus) cable of the battery



Warning

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

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



Caution

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

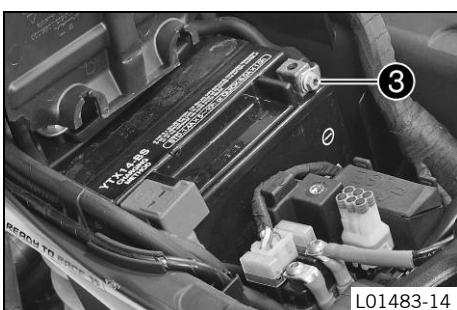
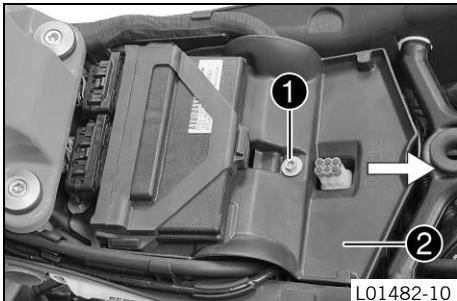
- Never operate the vehicle with a discharged battery or without a battery.

Preparatory work

- Switch off all power consumers and switch off the engine.
- Remove the passenger seat. (☞ p. 77)
- Remove the front rider's seat. (☞ p. 77)

Main work

- Remove screw ①.
- Lift cover ② at the rear and pull toward the rear.
- Fold up the cover.
- Disconnect negative cable ③ of the battery.



15.4 Connecting the negative cable of the battery



Warning

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

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



Caution

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

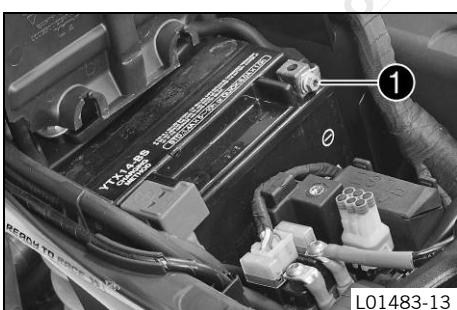
- Never operate the vehicle with a discharged battery or without a battery.

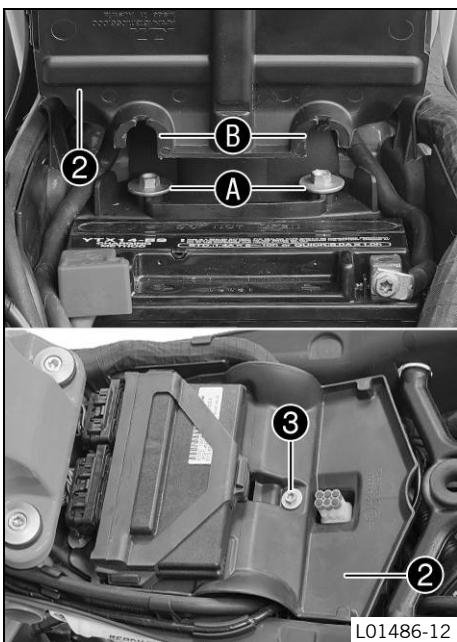
Main work

- Position negative cable ① and mount and tighten the screw.

Guideline

Screw, battery terminal	M6	4.5 Nm (3.32 lbf ft)
-------------------------	----	-------------------------





- Position cover ②.
- ✓ Screw heads A engage in recesses B.
- Mount and tighten screw ③.

Finishing work

- Mount the front rider's seat. (p. 77)
- Mount the passenger seat. (p. 77)
- Set the time and date.

15.5 Recharging the battery

Warning

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

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



Warning

Environmental hazard Batteries contain environmentally-hazardous materials.

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



Warning

Environmental hazard Hazardous substances cause environmental damage.

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



Info

Even when there is no load on the battery, it discharges steadily.

The charging level and the method of charging are very important for the service life of the battery.

Rapid recharging with a high charging current shortens the service life of the battery.

If the charging current, charging voltage, and charging time are exceeded, the battery will be destroyed.

If the battery is depleted from starting the vehicle repeatedly, the battery must be charged immediately.

If the battery is left in a discharged state for an extended period, it will become over-discharged and sulfated, destroying the battery.

The battery is maintenance-free, i.e., the acid level does not have to be checked.

Preparatory work

- Switch off all power consumers and switch off the engine.
- Remove the passenger seat. (p. 77)
- Remove the front rider's seat. (p. 77)
- Disconnect the negative (minus) cable of the battery. (p. 128)

Main work

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

Alternative 1

Battery charger XCharge-professional EU (00029095050) (p. 338)

Alternative 2

Battery charger XCharge-professional US (00029095051) (p. 338)

Alternative 3

Battery charger XCharge-professional GB (00029095052) (p. 339)

Alternative 4

Battery charger XCharge-professional CH (00029095053) (p. 339)



Info

Follow the instructions of the charger and the manual.

- Disconnect the battery charger after charging the battery.

Guideline

The charging current, charging voltage, and charging time must not be exceeded.

Charge the battery regularly when the motorcycle is not in use	3 months
--	----------

Finishing work

- Connect the negative cable of the battery. (p. 129)
- Mount the front rider's seat. (p. 77)
- Mount the passenger seat. (p. 77)
- Set the time and date.

15.6 Changing the main fuse



Warning

Fire hazard Incorrect fuses overload the electrical system.

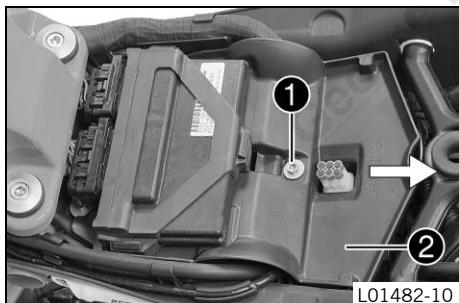
- Only use fuses with the required ampere value.
- Do not bypass or repair fuses.

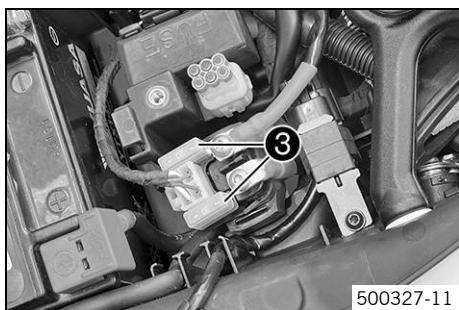
Preparatory work

- Switch off all power consumers and switch off the engine.
- Remove the passenger seat. (p. 77)
- Remove the front rider's seat. (p. 77)

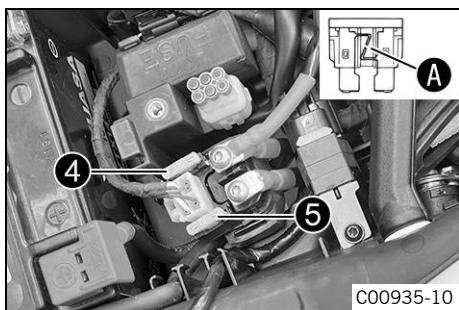
Main work

- Remove screw ①.
- Lift cover ② at the rear and pull toward the rear.
- Fold up the cover.





- Remove protection caps ③.



- Remove the faulty main fuse ④.

i Info

A defective fuse is indicated by a burned-out fuse wire ⑤.

A spare fuse ⑤ is located in the starter relay.

The main fuse protects all power consumers of the vehicle.

- Install a new main fuse.

Fuse (58011109130) (☞ p. 280)

- Check that the electrical equipment is functioning properly.

- Mount the protection caps.

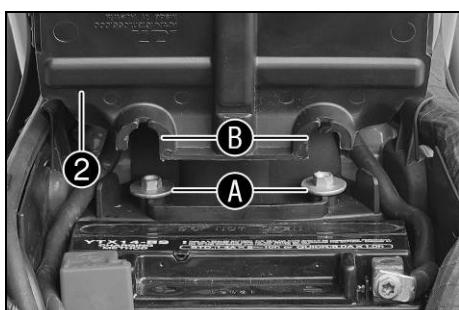
i Tip

Insert a new spare fuse into the starter relay to have it available when needed.

- Position cover ②.

✓ Screw heads ① engage in recesses ②.

- Mount and tighten screw ①.



Finishing work

- Mount the front rider's seat. (☞ p. 77)
- Mount the passenger seat. (☞ p. 77)
- Set the time and date.

15.7 Changing the fuses in the fuse box



Warning

Fire hazard Incorrect fuses overload the electrical system.

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



Info

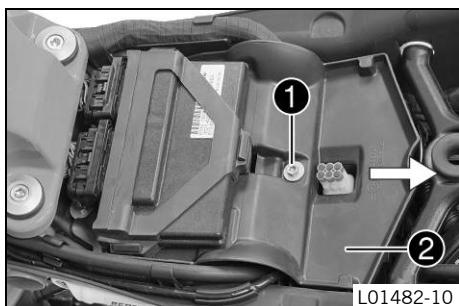
The fuse box containing the fuses of individual power consumers is located under the seat.

Preparatory work

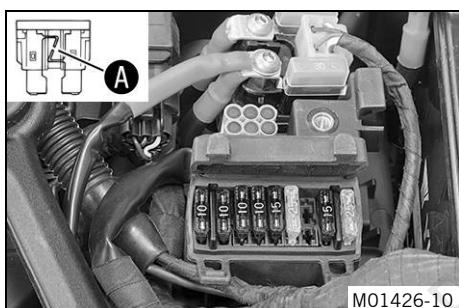
- Switch off all power consumers and switch off the engine.
- Remove the passenger seat. (☞ p. 77)
- Remove the front rider's seat. (☞ p. 77)

Main work

- Remove screw ①.
- Lift cover ② at the rear and pull toward the rear.
- Fold up the cover.



- Open fuse box cover ③.



- Check the fuses.



Info

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

- Remove the defective fuse.

Guideline

Fuse **res** - 10 A - spare fuses

Fuse **1** - 10 A - power supply for control units and components

Fuse **2** - 10 A - permanent positive for auxiliary equipment (ACC1)

Fuse **3** - 15 A - ABS hydraulic unit

Fuse **4** - 25 A - ABS return pump

Fuse **5** - not used

Fuse **res** - 15 A - spare fuse

Fuse **res** - 25 A - spare fuse

- Use spare fuses with the correct rating only.

Fuse (58011109110) (☞ p. 280)

Fuse (58011109115) (☞ p. 280)

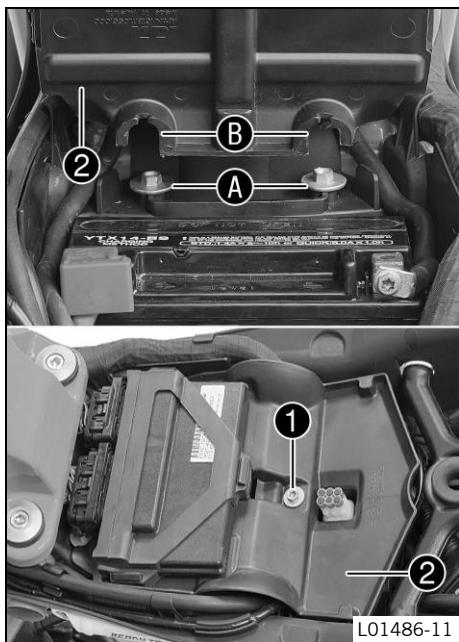
Fuse (58011109125) (☞ p. 280)



Tip

Insert a spare fuse so that it is available if needed.

- Check that the power consumer is functioning properly.
- Close the fuse box cover.
- Position cover ②.
- ✓ Screw heads A engage in recesses B.
- Mount and tighten screw ①.



Finishing work

- Mount the front rider's seat. (☞ p. 77)
- Mount the passenger seat. (☞ p. 77)

15.8 Checking the charging voltage

Condition

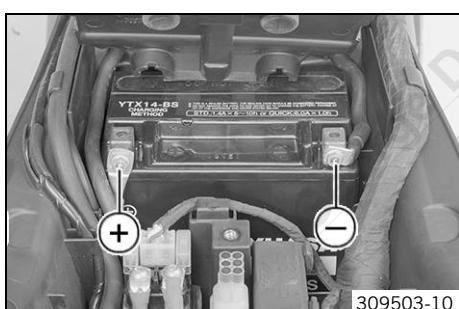
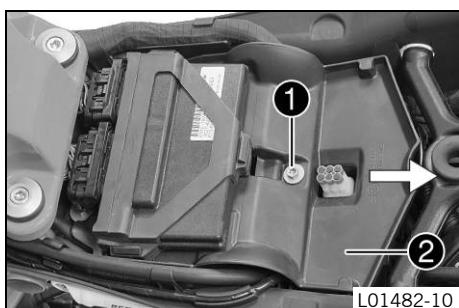
The battery must be fully functional and completely charged.

Preparatory work

- Remove the passenger seat. (☞ p. 77)
- Remove the front rider's seat. (☞ p. 77)

Main work

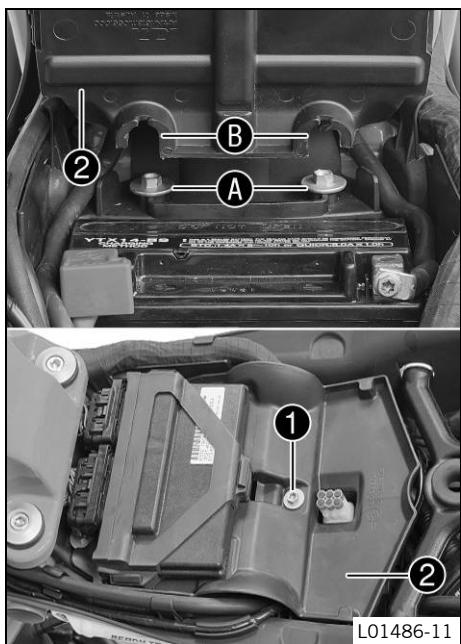
- Remove screw ①.
- Lift cover ② at the rear and pull toward the rear.
- Fold up the cover.
- Remove positive terminal cover.
- Start the motorcycle to check the function. (☞ p. 15)



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

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

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



- Mount the positive terminal cover.
- Position cover **2**.
- ✓ Screw heads **A** engage in recesses **B**.
- Mount and tighten screw **1**.

Finishing work

- Mount the front rider's seat. (☞ p. 77)
- Mount the passenger seat. (☞ p. 77)

16.1 Checking the front brake linings



Warning

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

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

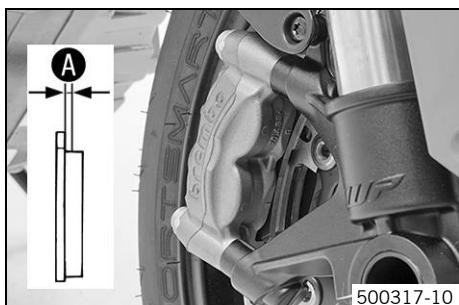


Warning

Danger of accidents Damaged brake discs reduce the braking effect.

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

- Check the brake linings regularly.



- Check all brake linings on both brake calipers to ensure they have minimum thickness **A**.

Minimum thickness	$\geq 1 \text{ mm} (\geq 0.04 \text{ in})$
-------------------	--

- » If the minimum thickness is less than specified:

- Change the front brake linings. (☞ p. 136)

- Check all brake linings on both brake calipers for damage and cracking.

- » If there is damage or cracking:

- Change the front brake linings. (☞ p. 136)

16.2 Changing the front brake linings



Warning

Skin irritation Brake fluid causes skin irritation.

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



Warning

Danger of accidents Old brake fluid reduces the braking effect.

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



Warning

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

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



Warning

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

Not all brake linings are tested and approved for KTM motorcycles. The structure and friction coefficient of the brake linings, and thus their brake power, may vary greatly from that of original brake linings.

If brake linings are used that differ from the original equipment, compliance with the original homologation is not guaranteed. In this case, the vehicle no longer corresponds to its condition at delivery and the warranty shall be void.

- Only use brake linings approved and recommended by KTM.



Warning

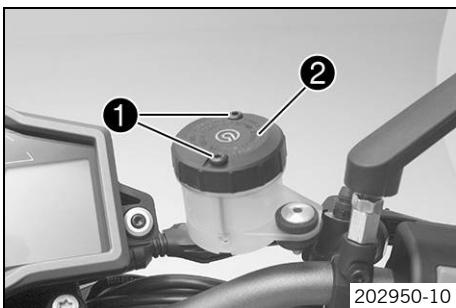
Environmental hazard Hazardous substances cause environmental damage.

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

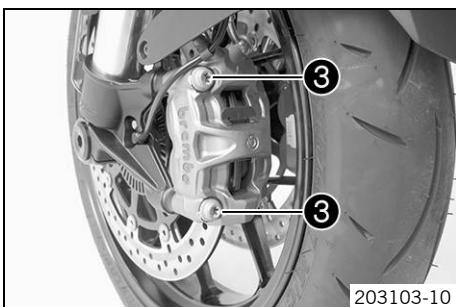
i **Info**

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.

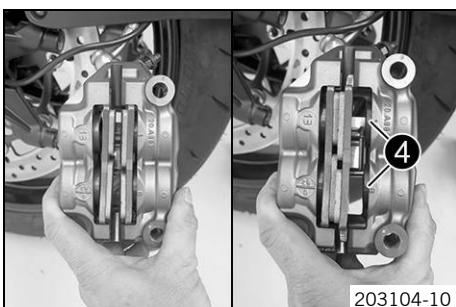
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint.
Only use clean brake fluid from a sealed container.



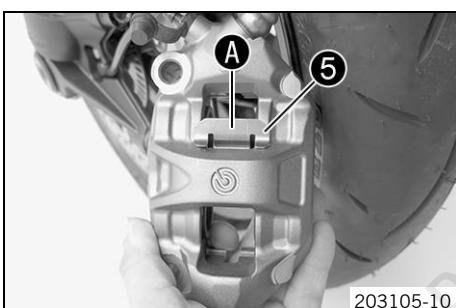
- Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
- Cover painted parts.
- Remove screws ①.
- Take off cover ② with the membrane.
- Press the brake piston back into the basic position and ensure that brake fluid does not flow out of the brake fluid reservoir, if necessary extract excess.



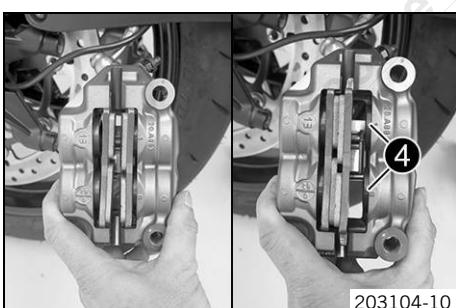
- Remove screws ③.
- Expose the cable of the wheel speed sensor.
- Take off the brake caliper.



- Push the brake linings away from pistons ④ and remove.
- Clean the brake caliper.



- Position retaining bracket ⑤.
- ✓ Arrow A faces in the direction of travel.



- Position brake linings and push in the direction of pistons ④.

i **Info**

Always change the brake linings in pairs and on both sides.



203103-10

- Position the brake caliper. Mount screws ③ but do not tighten yet.
Guideline

Screw, front brake caliper	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
----------------------------	-----	------------------------	---------------
- Repeat these steps on the opposite side.
- Operate the hand brake lever repeatedly until the brake linings are in contact with the brake disc and there is a pressure point. Fix the hand brake lever in the activated position.
✓ The brake calipers straighten.
- Tighten screws ③ on both brake calipers.
Guideline

Screw, front brake caliper	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
----------------------------	-----	------------------------	---------------
- Route the cable of the wheel speed sensor so it is not under tension and secure with a cable tie.
- Remove the locking piece of the hand brake lever.
- Fill brake fluid up to the **MAX** marking.

Brake fluid DOT 4 / DOT 5.1 (p. 334)

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



Info

Clean up overflowed or spilled brake fluid immediately with water.

16.3 Checking the brake fluid level of the front brake



Warning

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

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

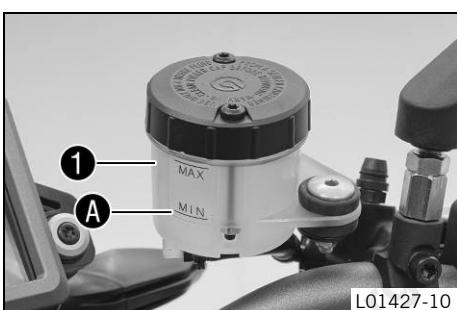
- Check the brake system and do not continue riding until the problem is eliminated.



Warning

Danger of accidents Old brake fluid reduces the braking effect.

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



L01427-10

- Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
- Check the brake fluid level in the brake fluid reservoir ①.
» If the brake fluid has dropped below marking **MIN A**:
 - Add front brake fluid. (p. 138)

16.4 Adding front brake fluid



Warning

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

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

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



Warning

Skin irritation Brake fluid causes skin irritation.

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



Warning

Danger of accidents Old brake fluid reduces the braking effect.

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



Warning

Environmental hazard Hazardous substances cause environmental damage.

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

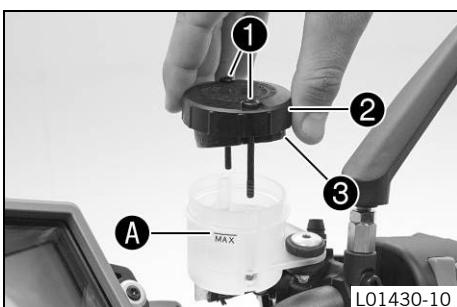


Info

Never use DOT 5 brake fluid! It is silicone-based and purple in color. Oil seals and brake lines are not designed for DOT 5 brake fluid.

Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!

Use only clean brake fluid from a sealed container.



Preparatory work

- Check the front brake linings. (p. 136)

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 the MAX mark A.
 - Brake fluid DOT 4 / DOT 5.1 (p. 334)
- Position cover 2 with membrane 3.
- Mount and tighten screws 1.



Info

Clean up overflowed or split brake fluid immediately with water.

16.5 Changing the front brake fluid



Warning

Skin irritation Brake fluid causes skin irritation.

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



Warning

Environmental hazard Hazardous substances cause environmental damage.

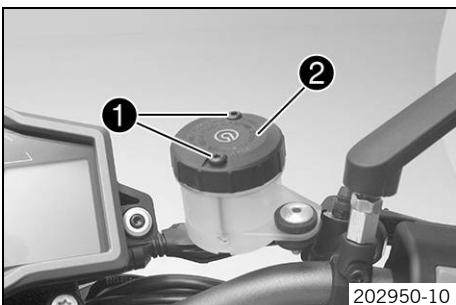
- Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.

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.

Only use clean brake fluid from a sealed container.



- Move the brake fluid reservoir mounted on the handlebar to a horizontal position.
- Cover painted parts.
- Remove screws ①.
- Take off cover ② with the membrane.
- Draw the old brake fluid out of the brake fluid reservoir using a syringe and fill with fresh brake fluid.

Bleed syringe (50329050000) (☞ p. 339)

Brake fluid DOT 4 / DOT 5.1 (☞ p. 334)

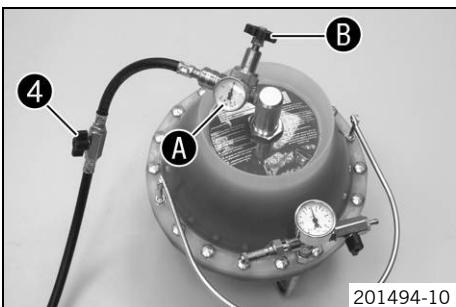


- Mount corresponding bleeder cover ③ from the special tool set.

Bleeder cover (00029013002) (☞ p. 338)

- Connect the bleeding device.

Bleeding device (00029013100) (☞ p. 338)



- Open shut-off valve ④.

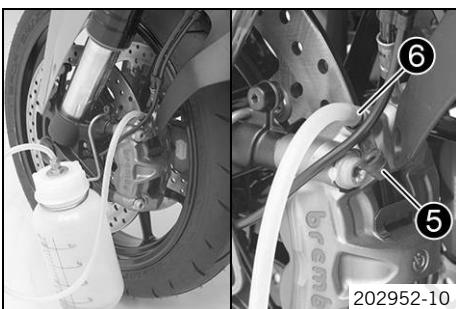
i Info

Follow the bleeding device operating instructions.

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

Guideline

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



- Pull protection cap ⑤ off of the bleeder screw of the left brake caliper. Connect the hose of the bleeder bottle.

Bleeding device (00029013100) (☞ p. 338)

- Open bleeder screw ⑥ by approx. one half turn.

i Info

Drain until the fresh brake fluid emerges from the hose of the bleeder bottle without bubbles.

- Tighten the bleeder screw. Remove the hose of the bleeder bottle. Attach the protection cap.

- Pull protection cap ⑦ off of the bleeder screw of the right brake caliper. Connect the hose of the bleeder bottle.

Bleeding device (00029013100) (☞ p. 338)

- Open bleeder screw ⑧ by approx. one half turn.

i Info

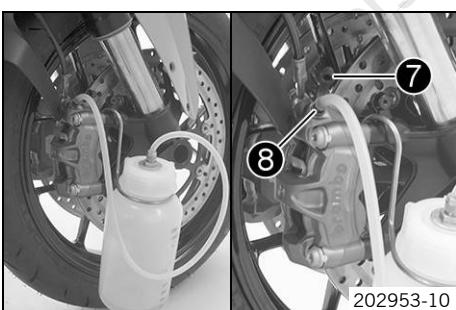
Drain until the fresh brake fluid emerges from the hose of the bleeder bottle without bubbles.

- Tighten the bleeder screw.

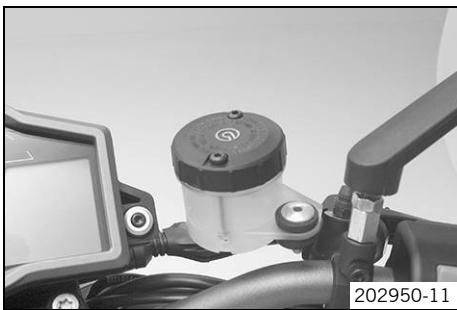
- Close shut-off valve ④.

- Open the bleeder screw again until brake fluid stops emerging.

✓ Overfilling of the brake fluid reservoir is prevented.



- Tighten the bleeder screw. Remove the hose of the bleeder bottle. Attach the protection cap.
- Disconnect the bleeding device. Remove the bleeder cover.
- Remove the protection cap of the hand brake cylinder bleeder screw. Connect the hose of the bleeder bottle.
- Open bleeder screw ⑨ by approx. one half turn. Operate the hand brake lever repeatedly until fresh brake fluid emerges from the hose of the bleeder bottle without bubbles. Tighten the bleeder screw.
- Remove the hose of the bleeder bottle. Attach the protection cap.



- Correct the brake fluid to the **MAX** marking.

Brake fluid DOT 4 / DOT 5.1 (☞ p. 334)

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



Info

Clean up overflowed or spilled brake fluid immediately with water.

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

16.6 Bleeding the brake system



Warning

Skin irritation Brake fluid causes skin irritation.

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



Warning

Environmental hazard Hazardous substances cause environmental damage.

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



Info

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

Condition

The diagnostics tool is connected and running.

- Execute "**Brake electronics**" > "**Functions**" > "**Bleed brake system**".
- Follow the instructions in the diagnostics tool.



16.7 Adjusting the basic position of the hand brake lever



- Adjust the basic position of the hand brake lever to your hand size by turning adjusting wheel 1.



Info

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

16.8 Checking the brake linings of the rear brake



Warning

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

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

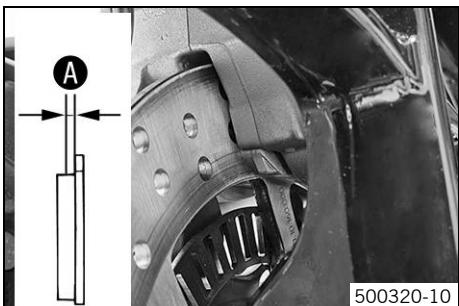


Warning

Danger of accidents Damaged brake discs reduce the braking effect.

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

- Check the brake linings regularly.



- Check the brake linings for minimum thickness A.

Minimum thickness A	$\geq 1 \text{ mm} (\geq 0.04 \text{ in})$
---------------------	--

- » If the minimum thickness is less than specified:
 - Change the rear brake linings. (p. 142)
- Check the brake linings for damage and cracking.
 - » If there is damage or cracking:
 - Change the rear brake linings. (p. 142)

16.9 Changing the rear brake linings



Warning

Skin irritation Brake fluid causes skin irritation.

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



Warning

Danger of accidents Old brake fluid reduces the braking effect.

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



Warning

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

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



Warning

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

Not all brake linings are tested and approved for KTM motorcycles. The structure and friction coefficient of the brake linings, and thus their brake power, may vary greatly from that of original brake linings.

If brake linings are used that differ from the original equipment, compliance with the original homologation is not guaranteed. In this case, the vehicle no longer corresponds to its condition at delivery and the warranty shall be void.

- Only use brake linings approved and recommended by KTM.



Warning

Environmental hazard Hazardous substances cause environmental damage.

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

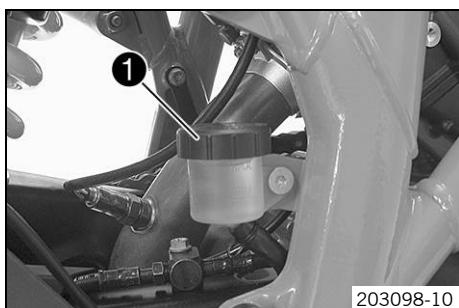


Info

Never use DOT 5 brake fluid. It is silicone-based and purple in color. Oil seals and brake lines are not designed for DOT 5 brake fluid.

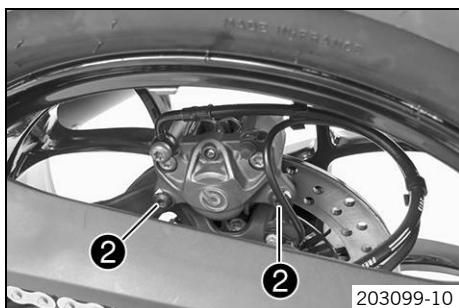
Avoid contact between brake fluid and painted parts. Brake fluid attacks paint.

Only use clean brake fluid from a sealed container.



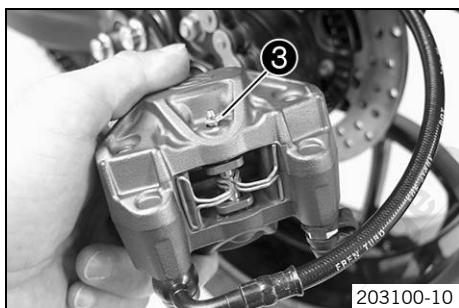
203098-10

- Stand the vehicle upright.
- Remove screw cap 1 with the membrane.



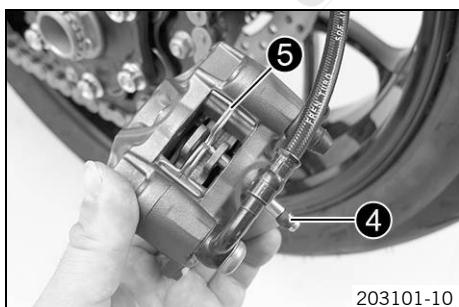
203099-10

- Remove screws 2.
- Take off the brake caliper and pull the brake line out of the holders.
- Press the brake piston back into the basic position and ensure that brake fluid does not flow out of the brake fluid reservoir, sucking it away if necessary.



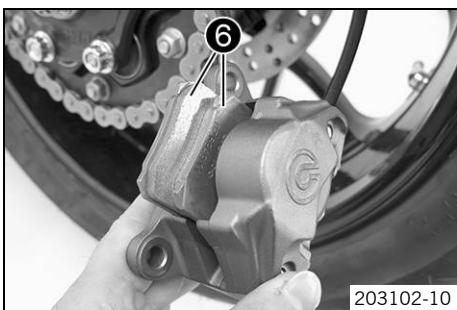
203100-10

- Remove lock ring 3.



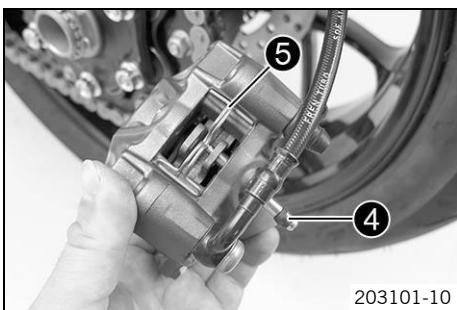
203101-10

- Remove pin 4.
- Remove spring 5.



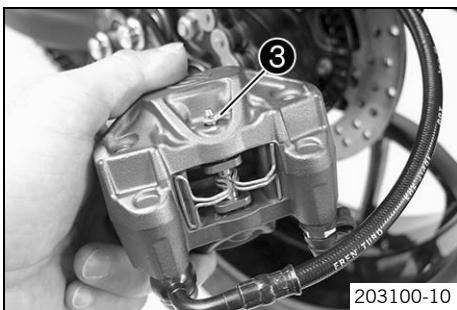
203102-10

- Remove brake linings 6.
- Clean the brake caliper.



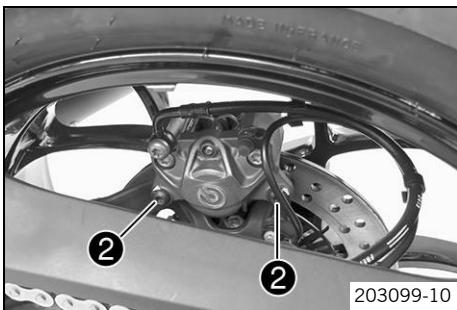
203101-10

- Position the new brake linings and spring 5.
- Mount pin 4.



203100-10

- Mount lock ring 3.



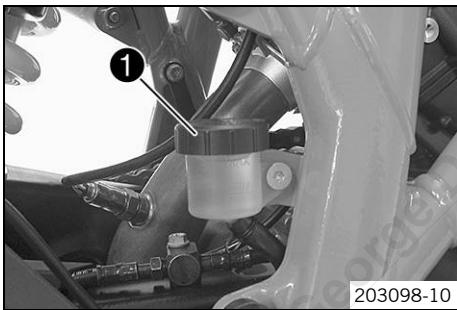
203099-10

- Position the brake caliper.
- Mount and tighten screws 2.

Guideline

Screw, rear brake caliper	M8	25 Nm (18.4 lbf ft)	Loctite® 2701™
---------------------------	----	------------------------	----------------

- Attach the brake line to the holders.



203098-10

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

Brake fluid DOT 4 / DOT 5.1 (☞ p. 334)

- Mount and tighten screw cap 1 with the membrane.



Info

Clean up overflowed or spilled brake fluid immediately with water.

16.10 Checking the rear brake fluid level



Warning

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

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

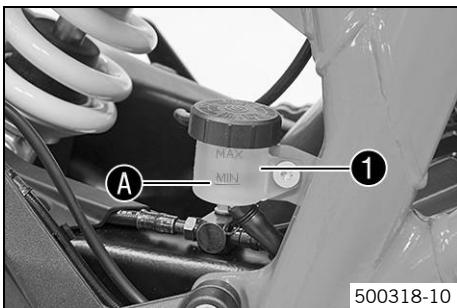
- Check the brake system and do not continue riding until the problem is eliminated.



Warning

Danger of accidents Old brake fluid reduces the braking effect.

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



- Stand the vehicle upright.
- Check the brake fluid level in the brake fluid reservoir 1.
- » If the fluid level reaches the **MIN** marking A:
 - Add rear brake fluid. (p. 145)

16.11 Adding rear brake fluid

Warning

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

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

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

Warning

Skin irritation Brake fluid causes skin irritation.

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

Warning

Danger of accidents Old brake fluid reduces the braking effect.

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

Warning

Environmental hazard Hazardous substances cause environmental damage.

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

Info

Never use DOT 5 brake fluid! It is silicone-based and purple in color. Oil seals and brake lines are not designed for DOT 5 brake fluid.

Avoid contact between brake fluid and painted parts. Brake fluid attacks paint!

Use only clean brake fluid from a sealed container.

Preparatory work

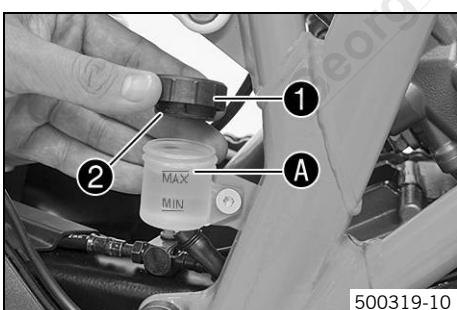
- Check the brake linings of the rear brake. (p. 142)

Main work

- Stand the vehicle upright.
 - Remove screw cap 1 with membrane 2.
 - Add brake fluid to the **MAX** mark A.
- Brake fluid DOT 4 / DOT 5.1 (p. 334)
- Mount and tighten screw cap 1 with membrane 2.

i Info

Clean up overflowed or split brake fluid immediately with water.



16.12 Changing the rear brake fluid



Warning

Skin irritation Brake fluid causes skin irritation.

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



Warning

Environmental hazard Hazardous substances cause environmental damage.

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

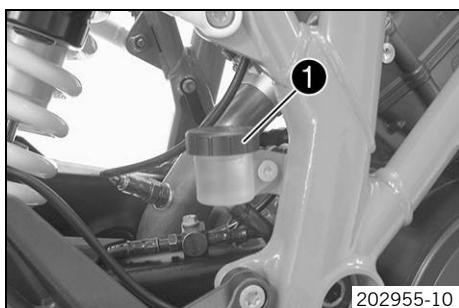


Info

Never use DOT 5 brake fluid. It is silicone-based and purple in color. Oil seals and brake lines are not designed for DOT 5 brake fluid.

Avoid contact between brake fluid and painted parts. Brake fluid attacks paint.

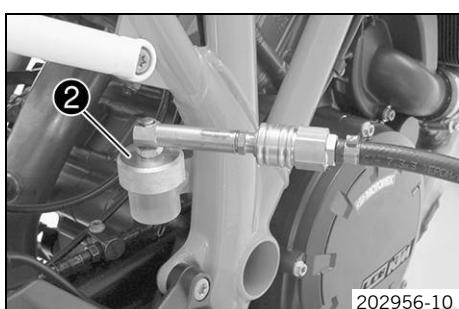
Only use clean brake fluid from a sealed container.



- Cover painted parts.
- Remove screw cap ① 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. 339)

Brake fluid DOT 4 / DOT 5.1 (☞ p. 334)



- Mount bleeder cover ②.
- Connect the bleeding device.

Bleeder cover (00029013004) (☞ p. 338)

- Open shut-off valve ③.



Info

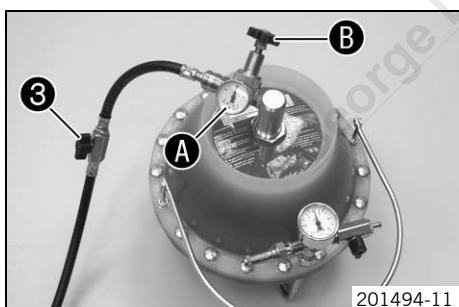
Follow the bleeding device operating instructions.

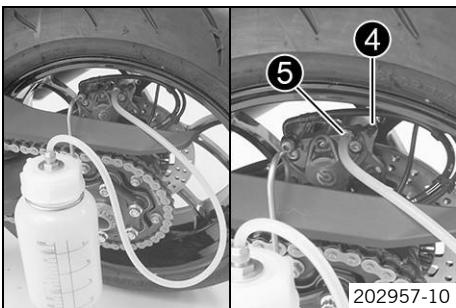
- Ensure that the filling pressure is set on pressure gauge A. Correct the filling pressure on pressure regulator B if necessary.

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. 338)

- Open bleeder screw 5 by approx. one half turn.

i Info

Drain until the fresh brake fluid emerges from the hose of the bleeder bottle without bubbles.

- Tighten the bleeder screw.
- Close shut-off valve 3.
- Open the bleeder screw again until brake fluid stops emerging.
✓ Overfilling of the brake fluid reservoir is prevented.
- Tighten the bleeder screw. Remove the hose of the bleeder bottle. Attach the protection cap.
- Disconnect the bleeding device. Remove the bleeder cover.
- Correct the brake fluid to the **MAX** marking.

Brake fluid DOT 4 / DOT 5.1 (☞ p. 334)

- Mount and tighten the screw cap with the membrane.

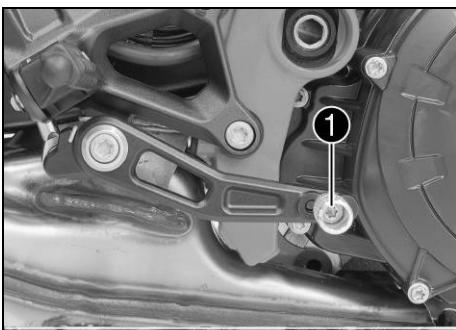
i Info

Clean up overflowed or spilled brake fluid immediately with water.

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



16.13 Setting the step plate of the foot brake lever



- Remove screw 1 together with the step plate of the foot brake lever.
- To adjust the length of the foot brake lever, position the step plate of the foot brake lever using screw 1 in a drill hole 2.

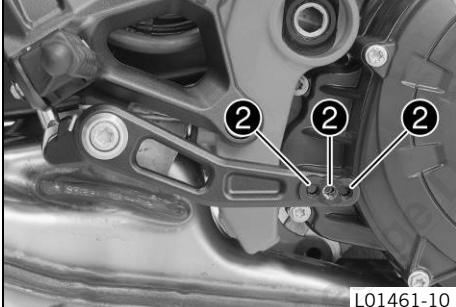
Guideline

Standard	Middle hole
----------	-------------

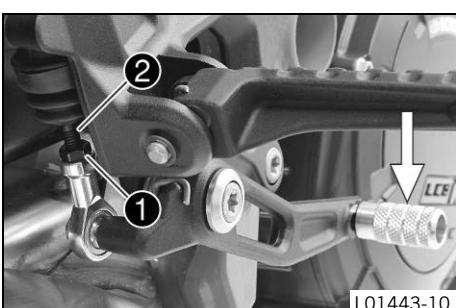
- Tighten screw 1.

Guideline

Screw, step plate for foot brake lever	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
---	----	-----------------------	---------------



16.14 Adjusting the basic position of the foot brake lever



- Loosen nut 1.
- Press the foot brake lever down to be able to turn push rod 2 more easily.
- Turn the push rod until the foot brake lever is in the desired position.

i Info

The range of adjustment is limited.

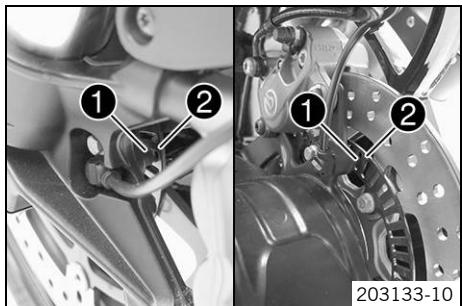
The screw must be screwed into the ball joint by at least five turns.

- Lock nut ①.

16.15 Checking the wheel speed sensor spacing

**Info**

The following work steps apply to the front and rear wheel speed sensors.



203133-10

- Check the spacing between wheel speed sensor ① and ABS sensor wheel ② with the special tool.

Guideline

Wheel speed sensor spacing	0.5... 1.8 mm (0.02... 0.071 in)
----------------------------	----------------------------------

Feeler gauge (59029041100) (☞ p. 341)

- » If the distance does not meet specifications:

- Mount the spacing plate under the wheel speed sensor.

Spacer plate (61342023000)

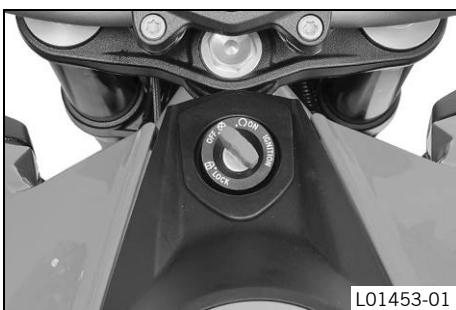
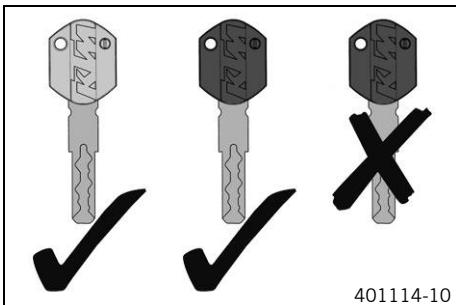
17.1 Activating/deactivating the ignition key

i Info

The orange programming key must only be used for activating and deactivating!

If a black ignition key is lost or needs to be replaced, the individual black ignition keys need to be enabled or disabled using the orange programming key. This prevents the vehicle from being operated with the lost black ignition key.

You can activate or deactivate up to four black ignition keys. Only the black ignition keys programmed during an activation procedure are valid. All black ignition keys not programmed during the activation procedure are invalid, but can be reprogrammed in a further activation procedure.



Loss of a black ignition key (additional black ignition keys are available):

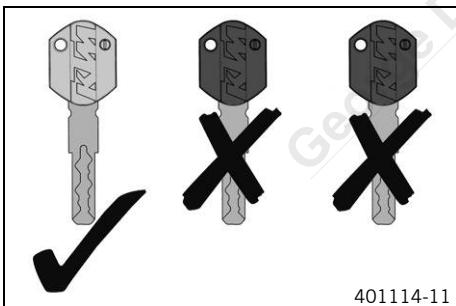
The following procedure deactivates all activated black ignition keys that are not included in the procedure.

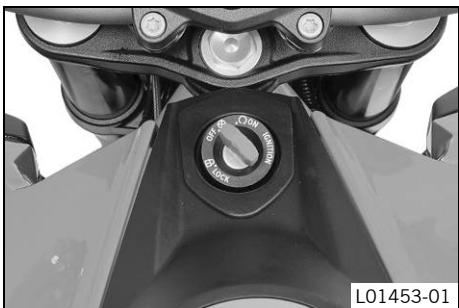
- Press the emergency OFF switch to the position **ON**
- Insert the orange programming key in the ignition lock.
- Switch on the ignition by turning the orange programming key to the position **ON** .
 - ✓ Immobilizer indicator lamp lights up.
- Switch off the ignition by turning the orange programming key to the position **OFF**
- Pull out the orange programming key.
- Insert the black ignition key in the ignition lock.
- Switch on the ignition by turning the black ignition key to the position **ON** .
- ✓ Immobilizer indicator lamp lights up.
- Switch off the ignition by turning the black ignition key to the position **OFF**
- Remove the black ignition key.
- Insert the orange programming key in the ignition lock.
- Switch on the ignition by turning the orange programming key to the position **ON** .
- ✓ The immobilizer indicator lamp flashes according to the number of functional black ignition keys including the orange programming key. In this case, it flashes twice.
- Switch off the ignition by turning the orange programming key to the position **OFF**
- Pull out the orange programming key.
- ✓ The lost black ignition key is deactivated.
- ✓ The existing black ignition key is reactivated.

Loss of all black ignition keys (no black ignition keys are available):

This procedure is important to prevent misuse of the lost black ignition key.

- Press the emergency OFF switch to the position **ON**





- Insert the orange programming key in the ignition lock.
- Switch on the ignition by turning the orange programming key to the position **ON**
- ✓ Immobilizer indicator lamp lights up.
- Switch off the ignition by turning the orange programming key to the position **OFF**
- Switch on the ignition by turning the orange programming key to the position **ON**
- ✓ The immobilizer indicator lamp flashes according to the number of functional black ignition keys including the orange programming key. In this case, it flashes once since all black ignition keys are deactivated.
- Switch off the ignition by turning the orange programming key to the position **OFF**
- Pull out the orange programming key.
- ✓ All black ignition keys are deactivated.
- Order a new black ignition key according to the key number on the **KEYCODECARD** and activate it.

To activate up to three black ignition keys:

- Press the emergency OFF switch to the position **ON**
- Insert the orange programming key in the ignition lock.
- Switch on the ignition by turning the orange programming key to the position **ON**
- ✓ Immobilizer indicator lamp lights up.
- Switch off the ignition by turning the orange programming key to the position **OFF**
- Pull out the orange programming key.
- Insert the black ignition key in the ignition lock.
- Switch on the ignition by turning the black ignition key to the position **ON**
- ✓ Immobilizer indicator lamp lights up.
- Switch off the ignition by turning the black ignition key to the position **OFF**
- Remove the black ignition key.
- If two other black ignition keys are to be activated, repeat the last steps with the respective ignition key.
- If the last black ignition key was activated, insert the orange programming key into the ignition lock.
- Switch on the ignition by turning the orange programming key to the position **ON**
- ✓ The immobilizer indicator lamp flashes according to the number of functional black ignition keys including the orange programming key.
- Switch off the ignition by turning the orange programming key to the position **OFF**
- Pull out the orange programming key.



Info

Activation of the ignition key is finished.

To activate four black ignition keys:

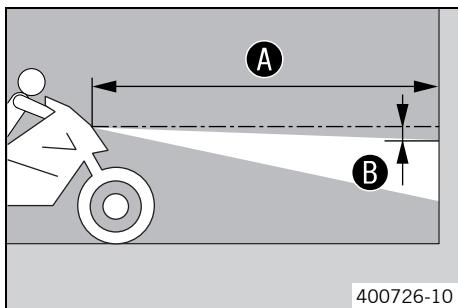
- Press the emergency OFF switch to the position **ON**
- Insert the orange programming key in the ignition lock.
- Switch on the ignition by turning the orange programming key to the position **ON**
- ✓ Immobilizer indicator lamp lights up.
- Switch off the ignition by turning the orange programming key to the position **OFF**
- Pull out the orange programming key.
- Insert the black ignition key in the ignition lock.
- Switch on the ignition by turning the black ignition key to the position **ON**
- ✓ Immobilizer indicator lamp lights up.

- Switch off the ignition by turning the black ignition key to the position **OFF** .
- Remove the black ignition key.
- If three other black ignition keys are to be activated, repeat the last steps with the respective ignition key.

**Info**

After the fourth black ignition key has been activated, programming is finished.

17.2 Checking the headlight setting



- Park the vehicle on a horizontal surface in front of a light-colored wall and make a mark at the height of the center of the low beam headlight.

- Make another mark at a distance **B** under the first mark.

Guideline

Distance B	5 cm (2 in)
-------------------	-------------

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

Guideline

Distance A	5 m (16 ft)
-------------------	-------------

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

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

- » If the boundary between light and dark does not meet specifications:

- Adjust the headlight range. ( p. 151)

17.3 Adjusting the headlight range

Preparatory work

- Check the headlight setting. ( p. 151)

Main work

- Using the cross-head screwdriver **1** from the tool set, adjust the headlight range of the headlight.

Cross-head screwdriver (53012024100)

**Info**

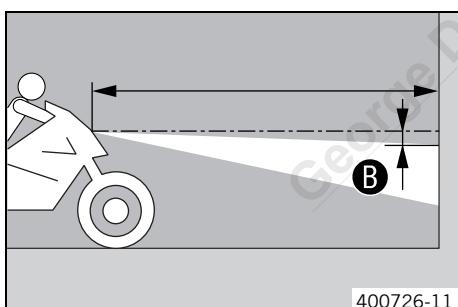
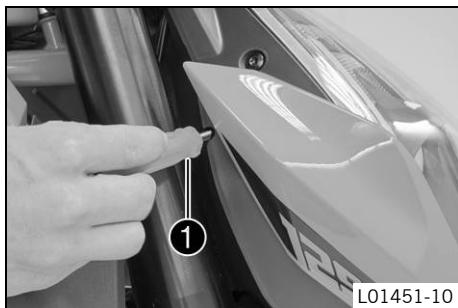
Turn clockwise to increase the headlight range; turn counterclockwise to reduce the headlight range.

If you have a payload, you may have to correct the headlight range.

- Set the headlight to marking **B**.

Guideline

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



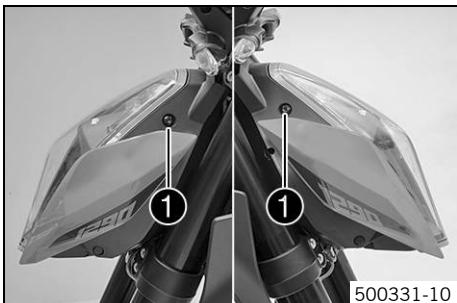
17.4 Changing the headlight bulb

Note

Damage to reflector Grease on the reflector reduces the brightness.

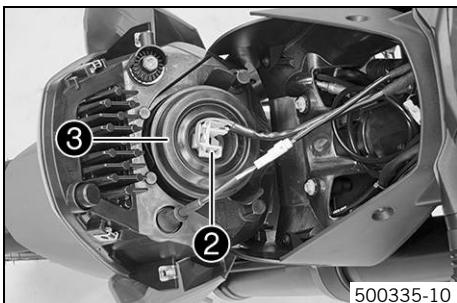
Grease on the bulb will evaporate due to the heat and be deposited on the reflector.

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



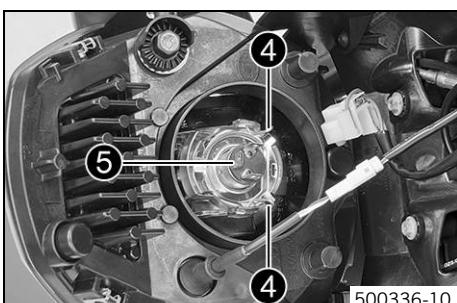
500331-10

- Remove screws 1.
- Fold the headlight mask forward.



500335-10

- Detach connector 2.
- Take off rubber cap 3.



500336-10

- Detach retaining clamp 4.
- Remove bulb 5.
- Position the new bulb in the headlight housing.

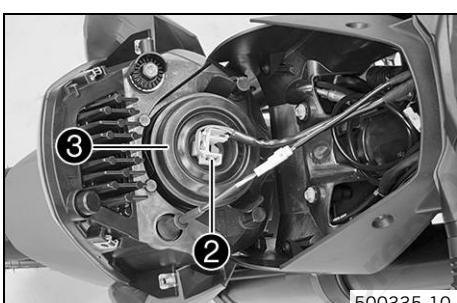
Low beam/high beam (H4/socket U37R) (☞ p. 280)



Info

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

- Attach retaining clamp 4.
- Mount rubber cap 3.
- Plug in connector 2.

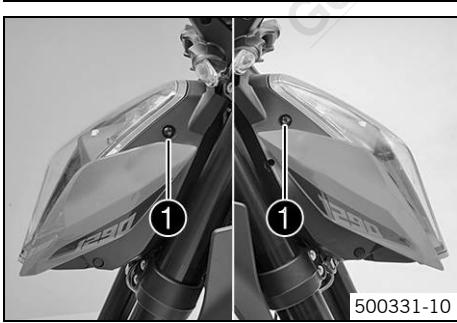


500335-10

- Fold the headlight mask up.
- Mount and tighten screws 1.

Guideline

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



500331-10

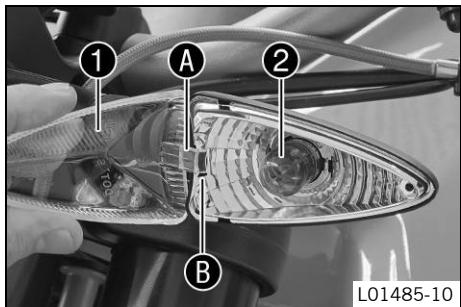
17.5 Changing the turn signal bulb (US/CN)

Note

Damage to reflector Grease on the reflector reduces the brightness.

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

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



- Remove the screw on the front of the turn signal housing.
- Carefully take off diffuser ①.
- Push bulb ② lightly into the socket, turn approx. 30° counterclockwise, and pull it out of the socket.



Info

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

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

Turn signal (RY10W / socket BAU15s) (☞ p. 280)

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



Info

Insert catch A into recess B.

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

17.6 Resetting the service display using the KTM diagnostic tool

Condition

The diagnostics tool is connected and running.

- Select "Combination instrument" > "Functions" > "Service interval".
- Enter the distance until the next service is due.
- Select the unit for the distance.
- Quit the process using "Execute".



18.1 Removing the engine

Preparatory work

- Switch off all power consumers and switch off the engine.
- Remove the passenger seat. (☞ p. 77)
- Remove the front rider's seat. (☞ p. 77)
- Disconnect the negative (minus) cable of the battery. (☞ p. 128)
- Remove the spoiler. (☞ p. 78)

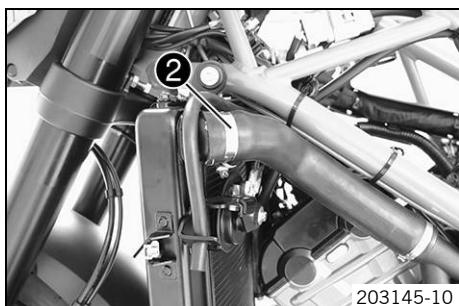
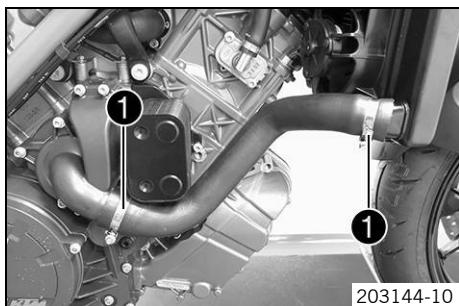


Only disassemble the right-hand side.

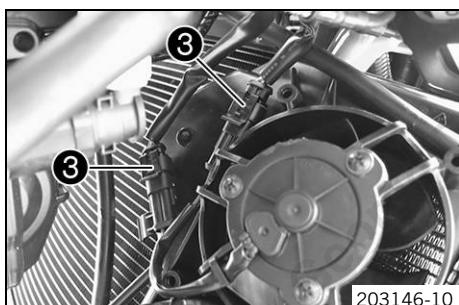
- Drain the coolant. (☞ p. 242)
- Disassemble the main silencer. (☞ p. 67)
- Remove the presilencer. (☞ p. 68)
- Disassemble the manifold. (☞ p. 69)
- Remove the fuel tank. (☞ p. 78)
- Remove the upper part of the air filter box. (☞ p. 73)
- Remove the air filter box. (☞ p. 75)
- Remove the throttle valve body. (☞ p. 271)

Main work

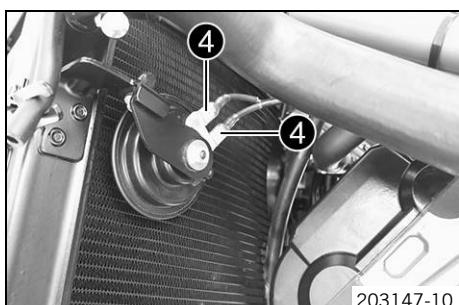
- Loosen hose clips 1.
- Remove the radiator hose on the right.



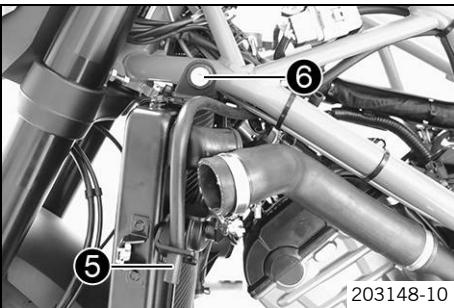
- Loosen hose clip 2.
- Pull off the radiator hose from the radiator on the left.



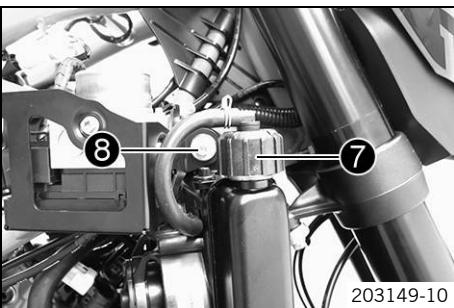
- Remove and separate the two plug-in connectors 3 from the holder.



- Detach both connectors 4.



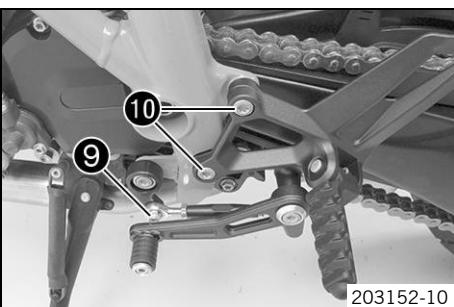
- Remove hose 5 from the bracket.
- Remove screw 6.



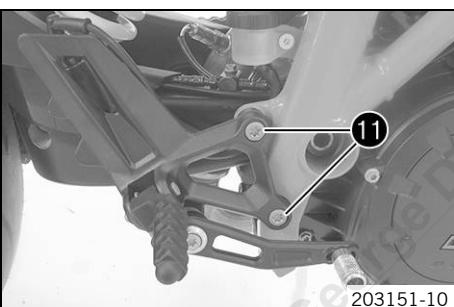
- Remove radiator cap 7.
- Remove screw 8.



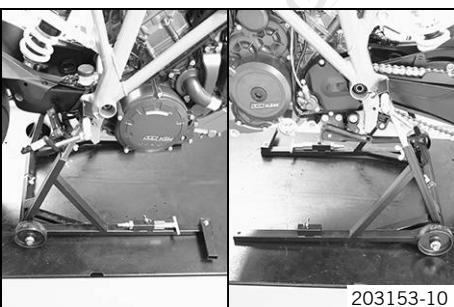
- Pull the radiator to the right and detach it.
- Pull the radiator to the left and remove it in a downwards direction.



- Remove screw 9.
- Remove screws 10. Take off the footrest bracket.



- Remove screws 11. Hang the footrest bracket to the side.



- Screw the holder of the special tool all the way into the upper drill holes of the footrest brackets. Select the right height and width of the work stand.

Guideline

Mount the special tool with the open side forwards.

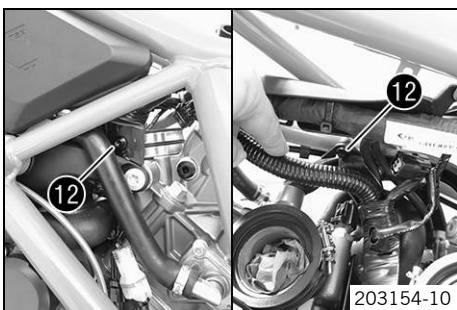
Work stand (62529055100) (p. 348)

- Raise the motorcycle.

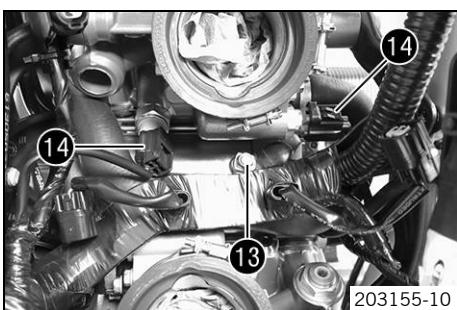


Info

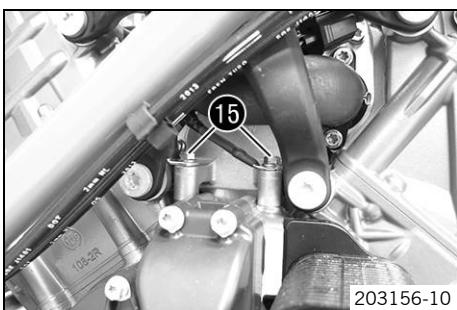
Check that the work stand is properly seated.



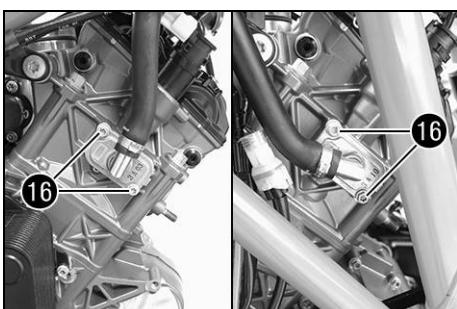
- Remove screws 12.



- Remove nut 13.
- Hang the positive cable of the starter motor to the side.
- Detach connector 14.



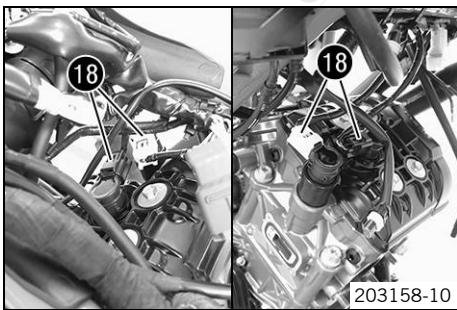
- Remove screws 15.
- Hang the two ground wires to the side.

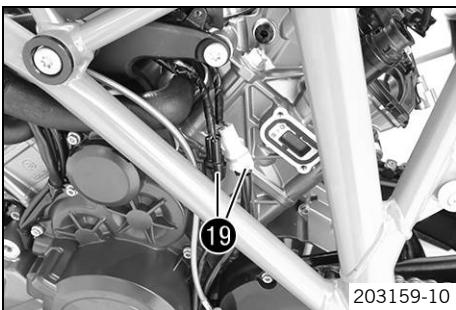


- Remove screws 16.
- Remove the cable tie(s).
- Disconnect plug-in connector 17 of the SAS valve.
- Remove the SAS valve with hoses.

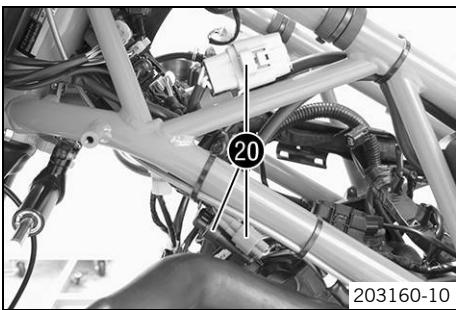


- Disconnect connectors 18 of the ignition coils.

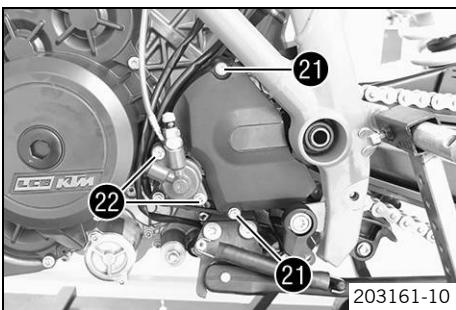




- Disconnect plug-in connectors 19.



- Remove the cable tie(s).
- Disconnect plug-in connectors 20.
- Expose the cable.

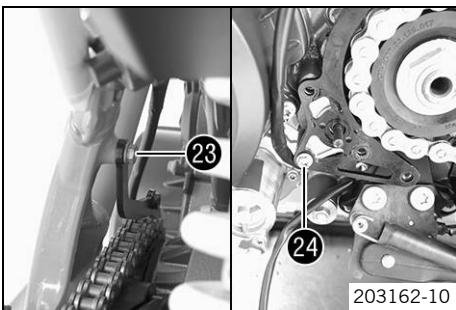


- Remove screws 21.
- Take off the engine sprocket cover.
- Remove screws 22.
- Take off the slave cylinder of the clutch and hang it to one side.

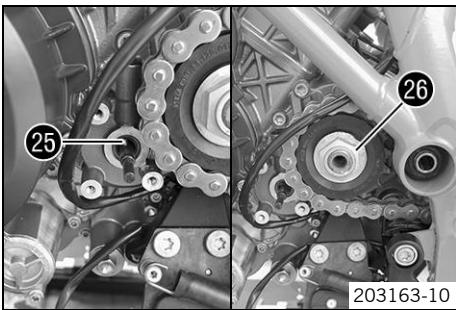
i Info

Do not activate the clutch lever while the slave cylinder of the clutch is removed.

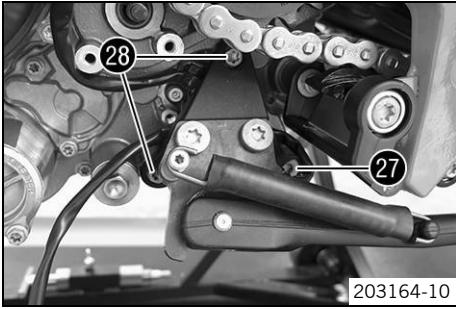
Do not kink the clutch line.



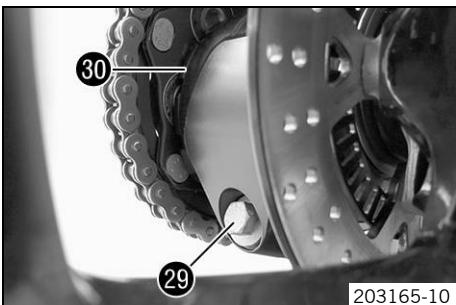
- Remove the spacer with sleeves.
- Remove screw 23.
- Remove screw 24.
- Remove the chain securing guide with the spacer.



- Remove pin 25.
- Bend up the lock washer.
- Have an assistant operate the rear brake.
- Loosen nut 26.



- Remove screw 27.
- Remove screws 28.
- Remove the side stand bracket.

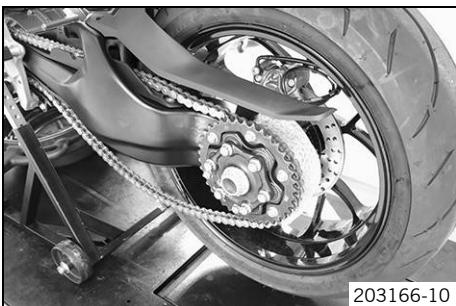


- Loosen screw 29.
- Turn hub housing 30 clockwise.

Hook wrench (61329085000) (☞ p. 348)

Handle for ring wrench (60012060000) (☞ p. 342)

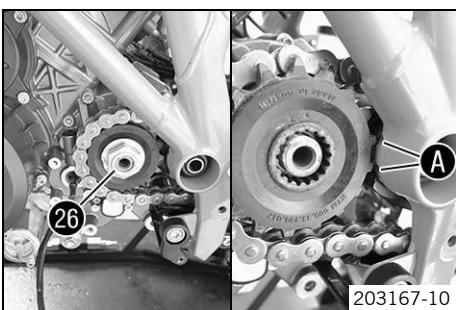
✓ The chain is loosened.



- Remove the chain from the rear sprocket.



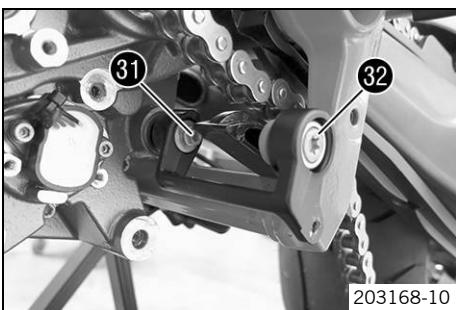
Protect the swingarm against damage.



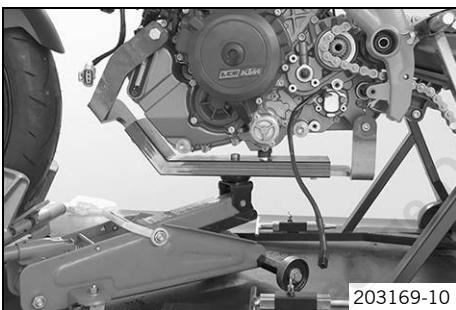
- Remove nut 26 with lock washer.
- Remove the engine sprocket.



The frame has 2 recesses A for disassembly.



- Remove screw 31 with washer.
- Remove screw 32 with bearing.
- Take off the shift shaft deflector.

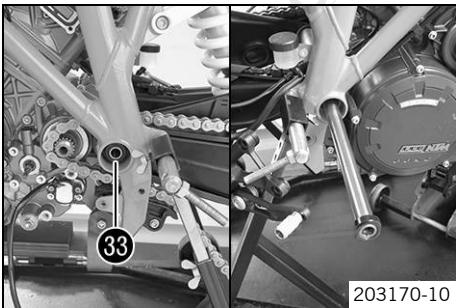


- Position the floor jack with the special tool.

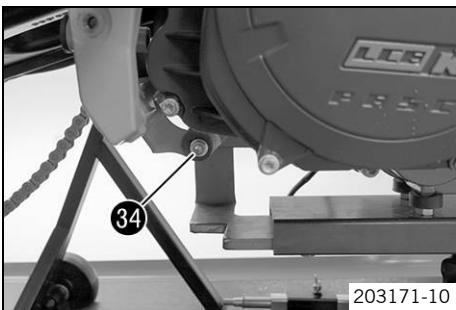
Floor jack attachment (61329055000) (☞ p. 348)



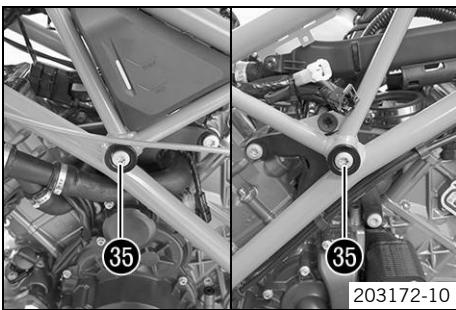
It is a good idea to have assistance when carrying out the following procedures.



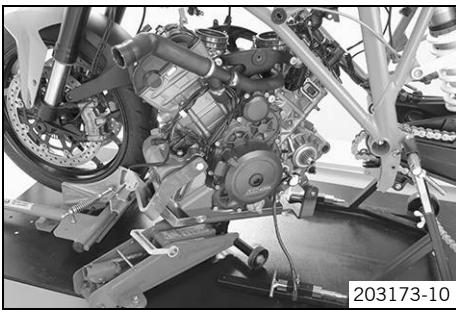
- Mount the floor jack on the engine with appropriate screws.
- Remove nut 33.
- Pull the swingarm pivot out far enough to release the engine.



- Remove screw 34.



- Remove screws 35 with bearing.



- Pull the engine forward slightly and lower carefully.


Info

The help of an assistant is useful in this step.

18.2 Installing the engine

Preparatory work

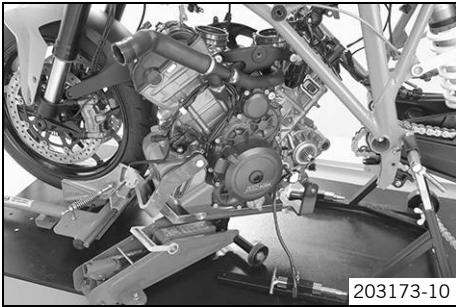
- Prepare the engine for installation. (☞ p. 165)

Main work

- Position the engine on a floor jack under the vehicle.


Info

It is a good idea to have assistance when carrying out the following procedures.

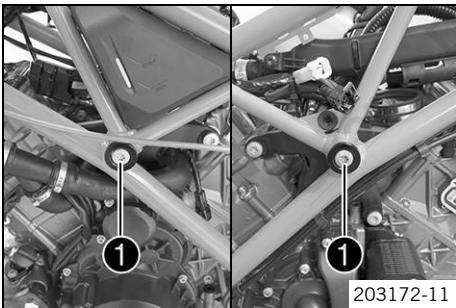


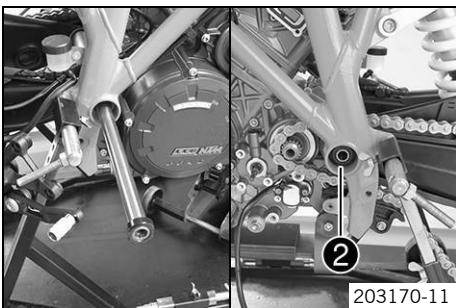
- Position the engine in the frame.

- Mount screws 1 with bearing, but do not tighten yet.

Guideline

Screw, engine bearer	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
----------------------	-----	------------------------	----------------------

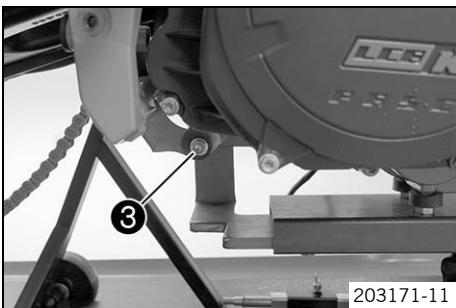




- Mount the swingarm pivot.
- Mount nut ②, but do not tighten it yet.

Guideline

Nut, swingarm pivot	M19x1.5	130 Nm (95.9 lbf ft)	Thread greased
---------------------	---------	-------------------------	----------------



- Mount screw ③ but do not tighten yet.

Guideline

Screw, engine bearer	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
----------------------	-----	------------------------	---------------

- Tighten screws ①.

Guideline

Screw, engine bearer	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
----------------------	-----	------------------------	---------------

- Tighten nut ②.

Guideline

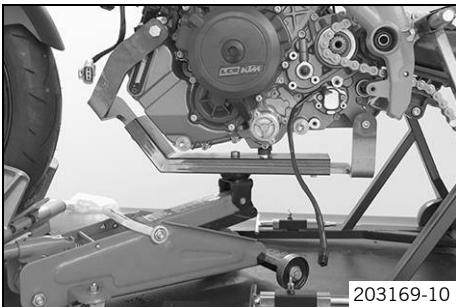
Nut, swingarm pivot	M19x1.5	130 Nm (95.9 lbf ft)	Thread greased
---------------------	---------	-------------------------	----------------

- Tighten screw ③.

Guideline

Screw, engine bearer	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
----------------------	-----	------------------------	---------------

- Remove the floor jack.



- Position the shift shaft deflector.

- Mount and tighten screw ④ with washer.

Guideline

Screw, shift shaft deflector on shift shaft	M6	18 Nm (13.3 lbf ft)	Loctite® 243™
---	----	------------------------	---------------

- Mount and tighten screw ⑤ with bearing.

Guideline

Screw, shift shaft deflector on frame	M8	10 Nm (7.4 lbf ft)	Loctite® 243™
---------------------------------------	----	-----------------------	---------------

- Mount the engine sprocket.



Info

The frame has 2 recesses A for assembly.

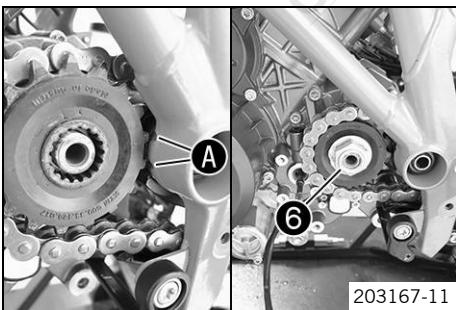
- Lay a chain over the engine sprocket.

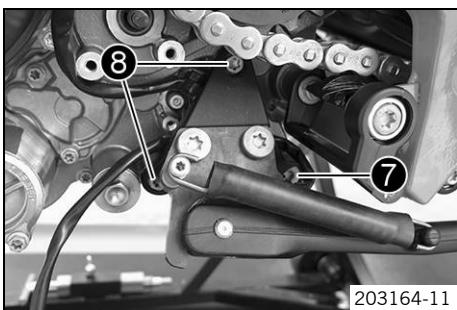
✓ The center of the wheel axle bearing is above the center of the hub housing.

- Mount nut ⑥ with the lock washer, but do not tighten yet.

Guideline

Nut of engine sprocket	M20x1.5	100 Nm (73.8 lbf ft)	Loctite® 243™
------------------------	---------	-------------------------	---------------





- Position the side stand bracket.
- Mount screw 7 but do not tighten yet.

Guideline

Screw, side stand bracket	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
---------------------------	-----	------------------------	---------------

- Mount and tighten screws 8.

Guideline

Screw, side stand bracket	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
---------------------------	----	------------------------	---------------

- Tighten screw 7.

Guideline

Screw, side stand bracket	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
---------------------------	-----	------------------------	---------------

- Lay a chain over the rear sprocket.

✓ The center of the wheel axle bearing is above the center of the hub housing.

- Have an assistant operate the rear brake.

- Tighten nut 6.

Guideline

Nut of engine sprocket	M20x1.5	100 Nm (73.8 lbf ft)	Loctite® 243™
------------------------	---------	-------------------------	---------------

- Secure the nut with lock washer 9.

- Mount pin 10.

- Mount the chain securing guide with the spacer.

- Mount and tighten screw 11.

Guideline

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

- Mount and tighten screw 12.

Guideline

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

- Mount the clutch slave cylinder screw with spacer and sleeves.

- Route the clutch line without kinks.

- Mount and tighten screws 13.

Guideline

Clutch slave cylinder screw	M6	10 Nm (7.4 lbf ft)
-----------------------------	----	--------------------

- Position the engine sprocket cover.

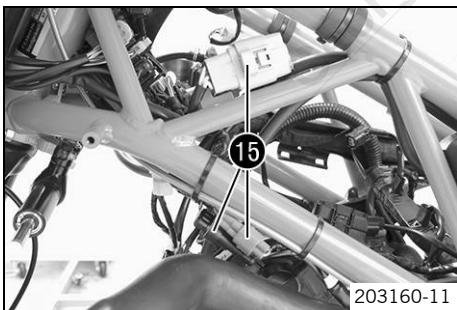
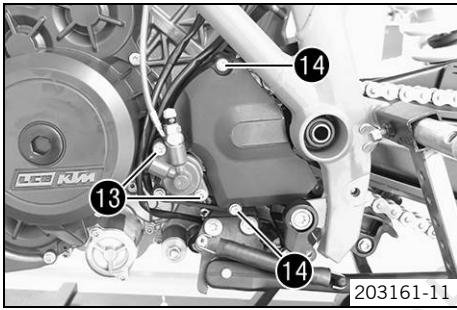
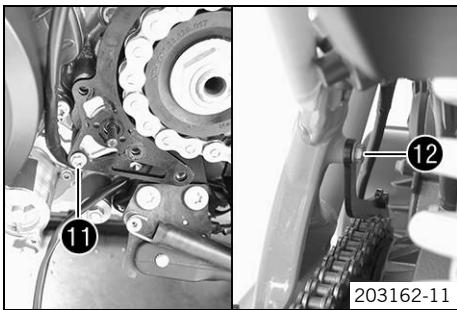
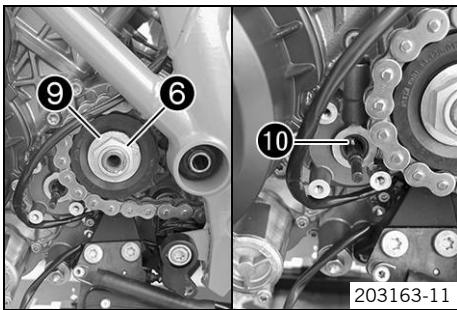
- Mount and tighten screws 14.

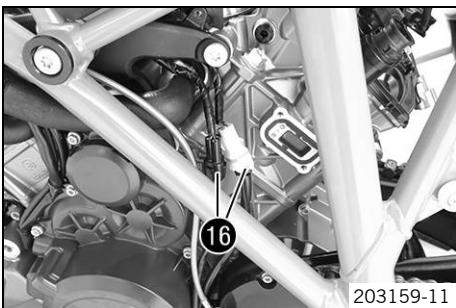
Guideline

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

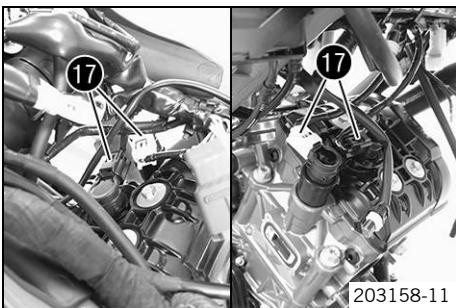
- Connect plug-in connectors 15.

- Route the cable without tension and secure with cable tie(s).

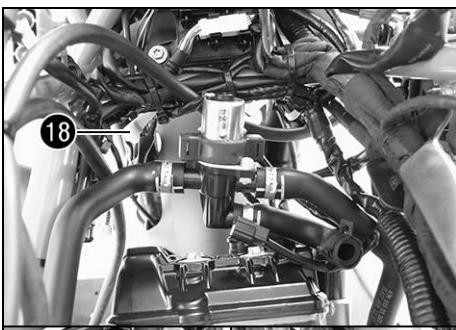




- Connect plug-in connectors 16.



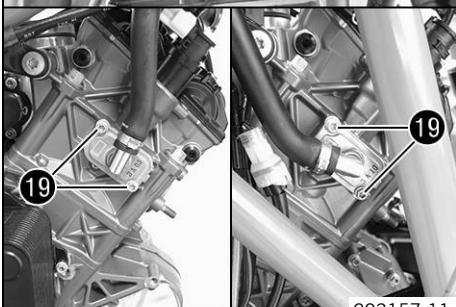
- Plug in connectors 17 of the ignition coils.
✓ The cables with the white plugs are plugged into the outer ignition coils.



- Position the SAS valve with hoses.
- Connect plug-in connector 18 and secure with the cable tie.
- Position the two SAS covers.
- Mount and tighten screws 19.

Guideline

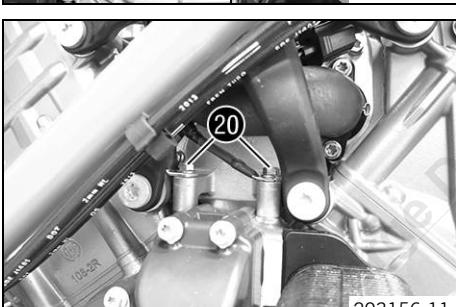
Remaining screws, engine	M6	10 Nm (7.4 lbf ft)
--------------------------	----	--------------------



- Position the two ground wires.
- Mount and tighten screws 20.

Guideline

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

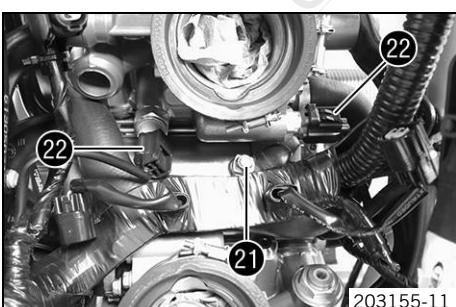


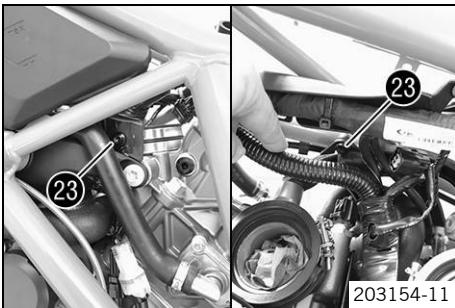
- Position the positive cable on the starter motor.
- Mount and tighten nut 21.

Guideline

Nut, cable on starter motor	M6	4 Nm (3 lbf ft)
-----------------------------	----	-----------------

- Plug in both plugs 22.

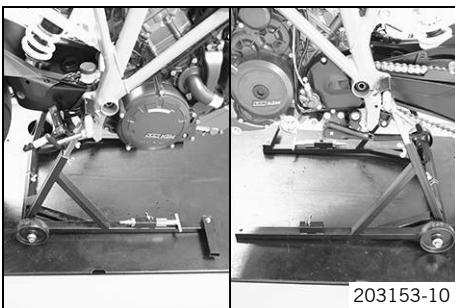




- Position the cable holder.
- Mount and tighten screws 23.

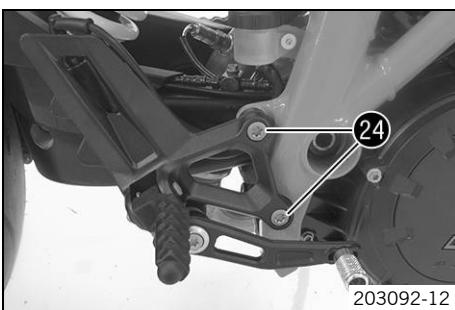
Guideline

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



- Remove the motorcycle from the work stand and rest it on the side stand.
- Remove the work stand.

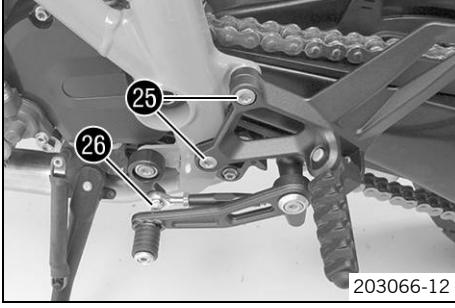
Work stand (62529055100) (☞ p. 348)



- Position the footrest bracket. Mount and tighten screws 24.

Guideline

Screw, front rider footrest bracket	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
-------------------------------------	----	------------------------	---------------



- Position the footrest bracket. Mount and tighten screws 25.

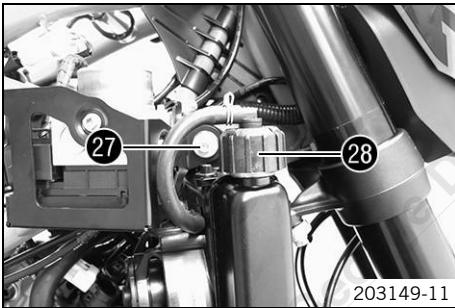
Guideline

Screw, front rider footrest bracket	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
-------------------------------------	----	------------------------	---------------

- Position the shift rod. Mount and tighten screw 26.

Guideline

Screw, shift rod	M6	5 Nm (3.7 lbf ft)	Loctite® 243™
------------------	----	----------------------	---------------



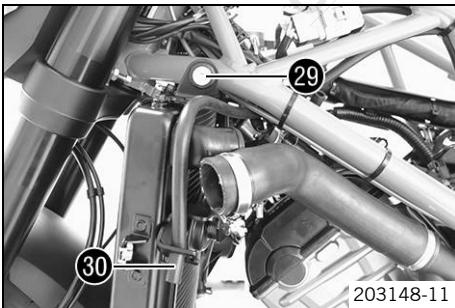
- Insert the radiator on both sides.

- Mount and tighten screw 27.

Guideline

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

- Mount radiator cap 28 but do not tighten.

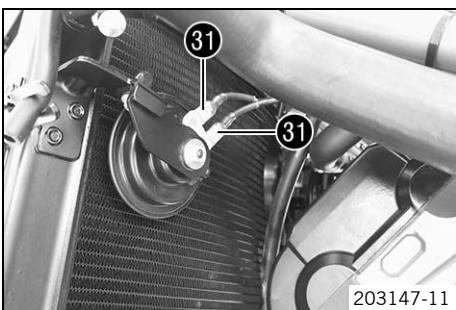


- Mount and tighten screw 29.

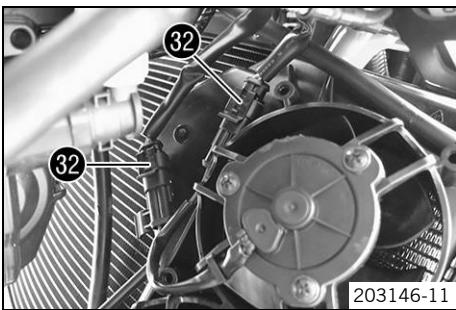
Guideline

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

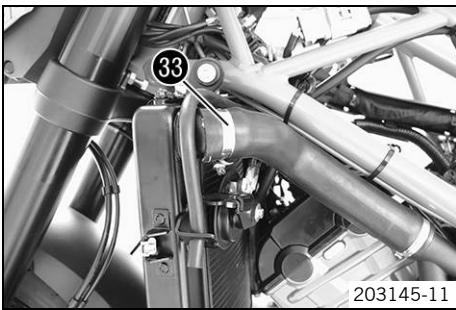
- Mount hose 30 in the bracket.



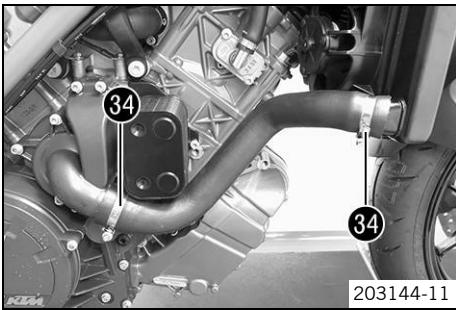
- Plug in both plugs 31.



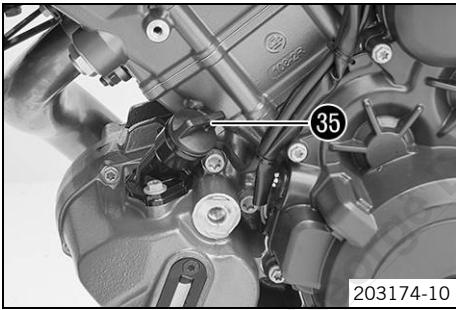
- Connect both plug-in connectors 32 and position them in the holder.



- Mount the radiator hose.
- Position and tighten hose clip 33.



- Mount the radiator hose.
- Position and tighten hose clips 34.



- The oil must be added in two steps.

Engine oil	3.50 l (3.7 qt.)	Outside temperature: $\geq 0^\circ\text{C}$ ($\geq 32^\circ\text{F}$)	Engine oil (SAE 10W/50) (p. 334)
		Outside temperature: $< 0^\circ\text{C}$ ($< 32^\circ\text{F}$)	Engine oil (SAE 5W/40) (p. 334)

- Remove screw plug 35 and fill in engine oil.

Engine oil (1st quantity), approx.	3.0 l (3.2 qt.)	Outside temperature: $\geq 0^\circ\text{C}$ ($\geq 32^\circ\text{F}$)	Engine oil (SAE 10W/50) (p. 334)
		Outside temperature: $< 0^\circ\text{C}$ ($< 32^\circ\text{F}$)	Engine oil (SAE 5W/40) (p. 334)

- Mount screw plug 35.

Finishing work

- Install the throttle valve body. (p. 272)
- Install the lower part of the air filter box. (p. 75)
- Install the upper part of the air filter box. (p. 74)
- Install the manifold. (p. 70)
- Install the presilencer. (p. 68)

- Install the main silencer. (☞ p. 67)
- Install the fuel tank. (☞ p. 80)
- Connect the negative cable of the battery. (☞ p. 129)
- Mount the front rider's seat. (☞ p. 77)
- Mount the passenger seat. (☞ p. 77)
- Set the time and date.
- Adjust the chain tension. (☞ p. 103)
- Program the gear position sensor. (☞ p. 240)
- Add coolant/bleed the cooling system. (☞ p. 243)
- Install the spoiler. (☞ p. 78)

**Danger**

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

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

- Start the engine.
- Remove the screw plug and add the remaining engine oil up to the upper marking on the engine oil level viewer.
- Mount the screw plug.
- Execute the initialization run. (☞ p. 273)
- Check the lubrication system for leaks.
- Check the cooling system for leaks.
- Go for a short test ride.
- Read out the fault memory using the KTM diagnostics tool.
- Check the engine oil level. (☞ p. 259)
- Check the coolant level in the compensating tank. (☞ p. 241)

18.3 Preparing the engine for installation



- Position both radiator hoses. Position and tighten the hose clips.
- Position the bleeder hoses.
- Remove engine fixing arm ①.

Engine fixing arm (69003006000)

203143-10

18.4 Preparing the engine for clamping in the engine assembly stand



- Remove the hose clips.
- Remove both radiator hoses.
- Remove the bleeder hoses.
- Mount the engine fixing arm 1.

Engine fixing arm (61230066100)

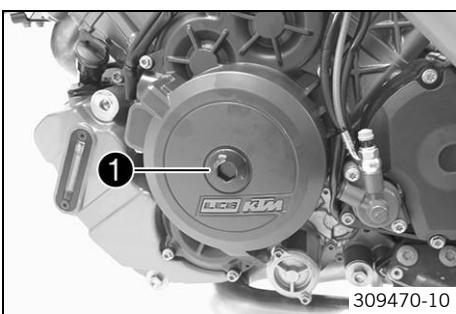


18.5 Setting the engine to ignition top dead center of the rear cylinder

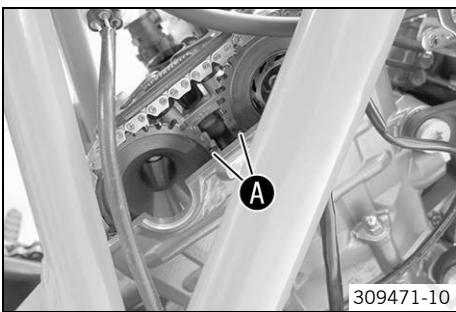
Condition

The valve cover has been removed.

- Remove screw 1 of the alternator cover.

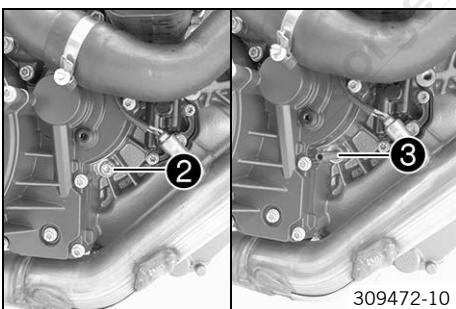


- Turn the crankshaft counterclockwise until markings A are flush with the edge of the cylinder head.



- Remove screw 2.
- Look through the hole to check that the position notch of the crankshaft is visible.
- Screw in special tool 3.

Engine blocking screw (61229015000) (see p. 345)



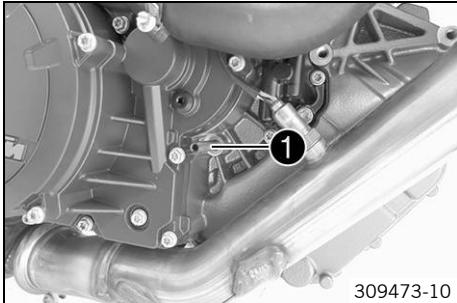
18.6 Setting the engine to ignition top dead center of the front cylinder

Condition

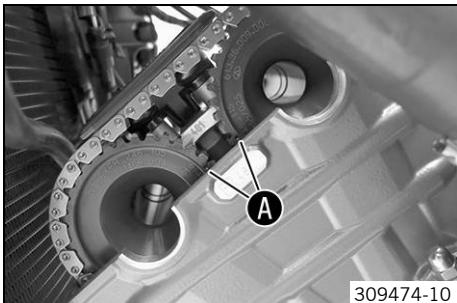
The engine is positioned at ignition top dead center of the rear cylinder.

- Loosen special tool ① by several turns.

Engine blocking screw (61229015000) (☞ p. 345)



309473-10



309474-10

- Keep turning the crankshaft counterclockwise until markings A are flush with the edge of the cylinder head.
- Screw special tool ① back in.

18.7 Engine disassembly

18.7.1 Clamping the engine into the engine assembly stand

Preparatory work

- Prepare the engine for clamping in the engine assembly stand. (☞ p. 166)

Main work

- Mount special tool ① on engine work stand ②.

Engine assembly stand (61229001000) (☞ p. 344)

Engine fixing arm (61229002000) (☞ p. 344)

- Mount the engine on special tool ①.



Have an assistant help you or use a crane.

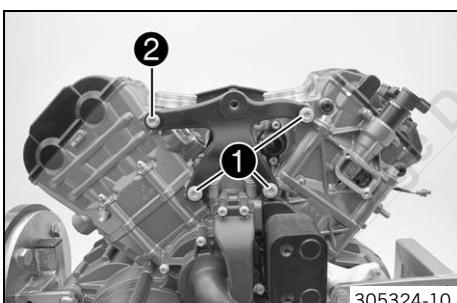


306981-10

18.7.2 Removing the engine bearer

- Remove screws ①.

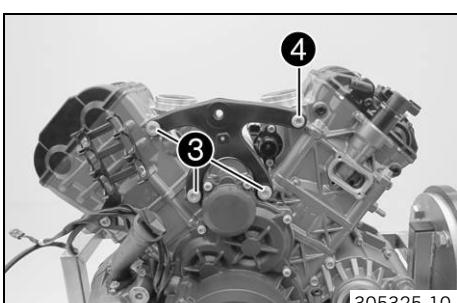
- Remove screw ② and take off the engine bearer.



305324-10

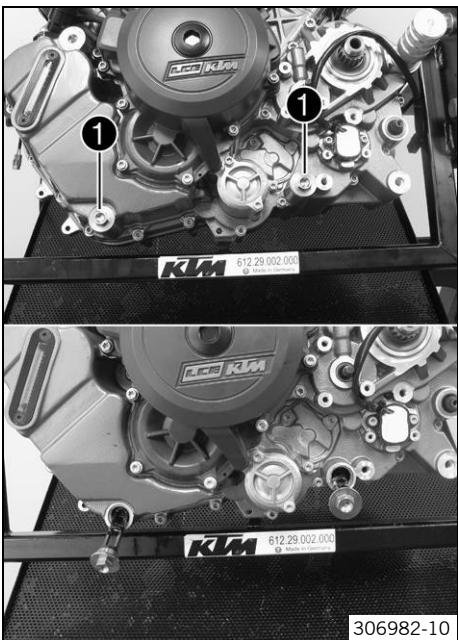
- Remove screws ③.

- Remove screw ④ and take off the engine bearer.



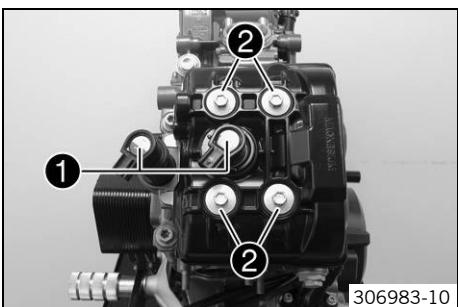
305325-10

18.7.3 Draining the engine oil



- Remove oil drain plug 1 with the magnet, O-rings and oil screen.
- Completely drain the engine oil.

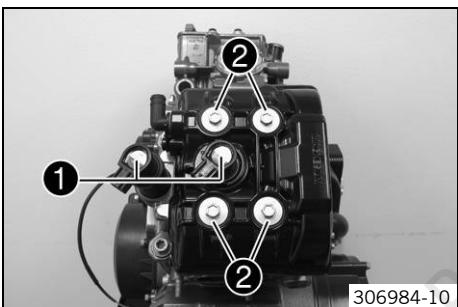
18.7.4 Removing the front valve cover



- Remove ignition coils 1.
- Remove screws 2. Take off the valve cover with the valve cover seal.
- Remove the spark plugs using the special tool.

Spark plug wrench (75029172000) (p. 349)

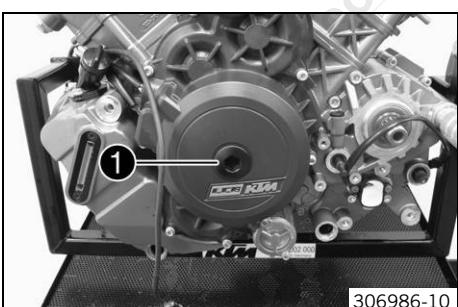
18.7.5 Removing the rear valve cover



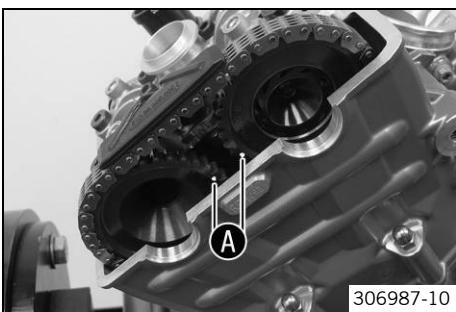
- Remove ignition coils 1.
- Remove screws 2. Take off the valve cover with the valve cover seal.
- Remove the spark plugs using the special tool.

Spark plug wrench (75029172000) (p. 349)

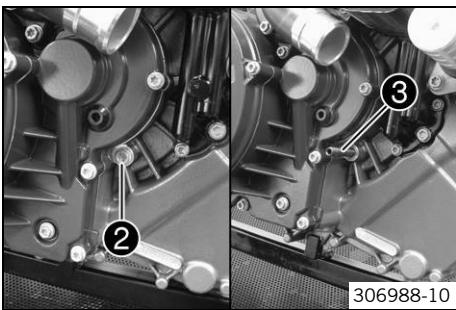
18.7.6 Setting the engine to ignition top dead center of the rear cylinder



- Remove screw 1 of the alternator cover.



- Turn the crankshaft counterclockwise until markings **A** of the rear camshafts are flush with the edge of the cylinder head.



- Remove screw **2**.
- Look through the hole to check that the position notch of the crankshaft is visible.
- Screw in special tool **3**.

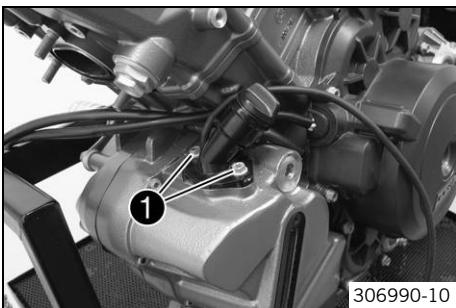
Engine blocking screw (61229015000) (☞ p. 345)

18.7.7 Removing the starter motor



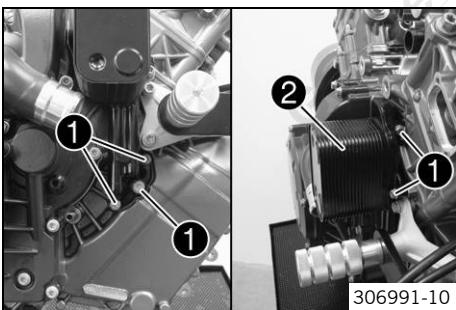
- Take off the starter motor.

18.7.8 Removing the oil filler tube

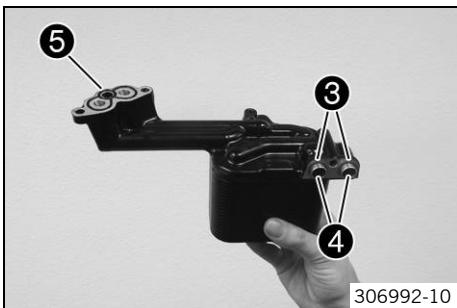


- Remove screws **1**.
- Remove the oil filler tube with the O-ring.

18.7.9 Removing the heat exchanger



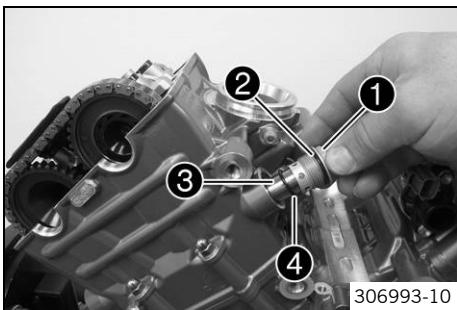
- Remove screws **1** of heat exchanger **2**.
- Remove the heat exchanger.



- Remove O-rings ③ and sleeves ④.
- Remove seal ⑤.

306992-10

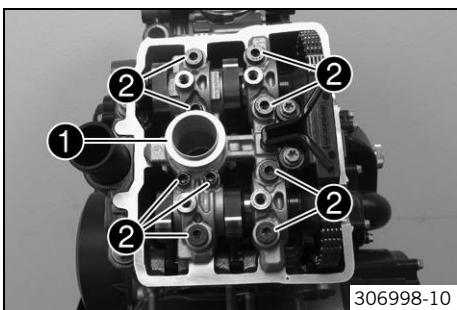
18.7.10 Removing the rear timing chain tensioner



- Remove screw ① with O-ring ②.
- Remove timing chain tensioner ③ with O-ring ④.

306993-10

18.7.11 Removing the rear camshaft

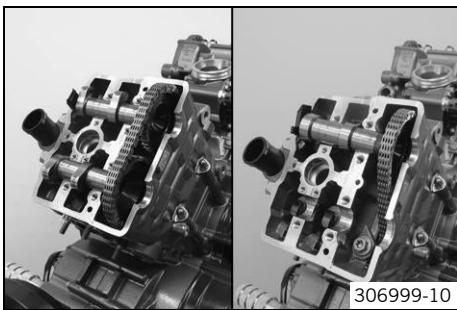


- Remove spark plug shaft insert ①.
- Loosen and remove screws ② from the outside to the inside.

**Info**

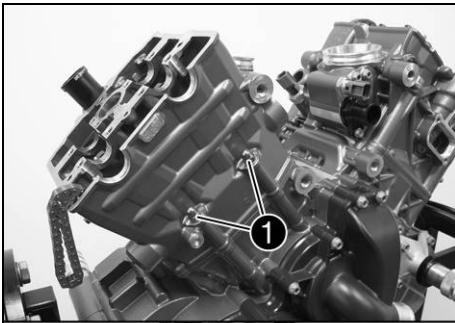
The cams should not activate the valves.

- Remove the camshaft bearing bridge.
- Raise the camshaft at the rear and take the timing chain off of the rear sprocket. Remove the camshaft.

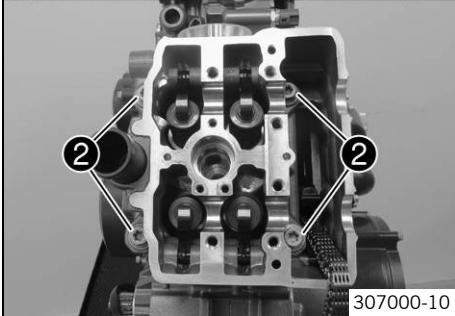


306999-10

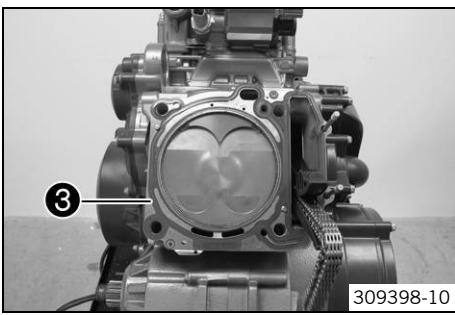
18.7.12 Removing the rear cylinder head



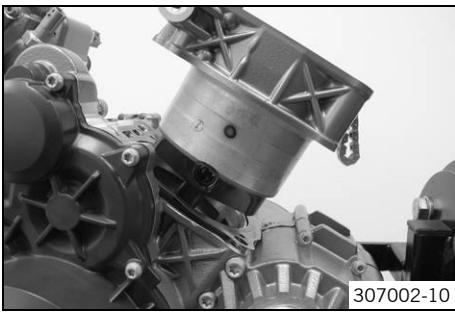
- Remove nuts 1 with the washers.
- Alternately loosen screws 2 and remove them.
- Take off the cylinder head.



- Remove cylinder head gasket 3.



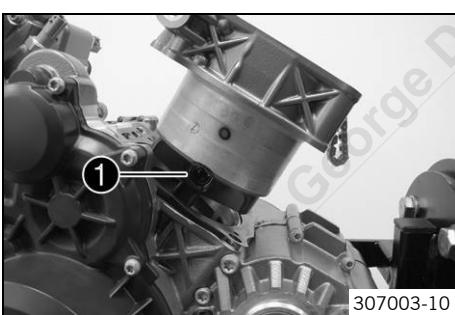
18.7.13 Removing the rear piston



- Push the cylinder up.


Info

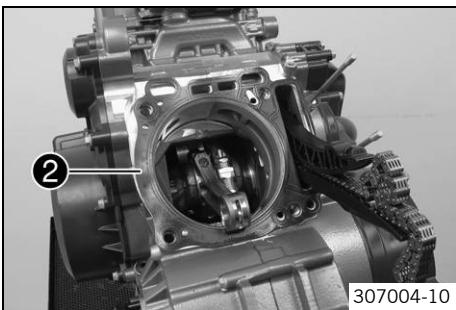
Push the cylinder up until the piston pin can be removed.
Make sure that the two pins remain in place.



- Remove piston pin retainer 1.
- Remove the piston pin.
- Remove the cylinder with the piston.
- Push the piston upward out of the cylinder.

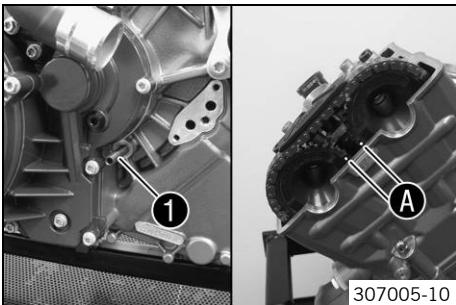

Info

If no additional work needs to be performed on the cylinder and piston, the piston can remain in the cylinder.



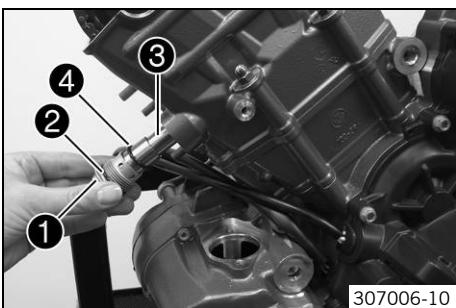
- Remove cylinder base gasket ②.

18.7.14 Setting the engine to ignition top dead center of the front cylinder



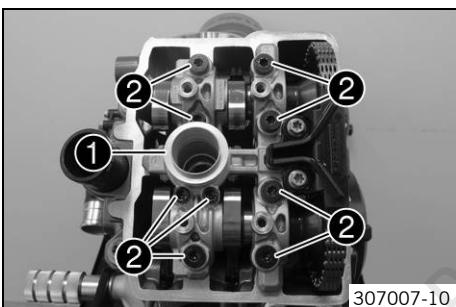
- Loosen special tool ① by several turns.
Engine blocking screw (61229015000) (☞ p. 345)
- Keep the timing chain taut. Hold the connecting rod in the center of the drill hole.
- Keep turning the crankshaft counterclockwise until markings ④ of the front camshafts are flush with the edge of the cylinder head.
- Screw special tool ① back in.

18.7.15 Removing the front timing chain tensioner

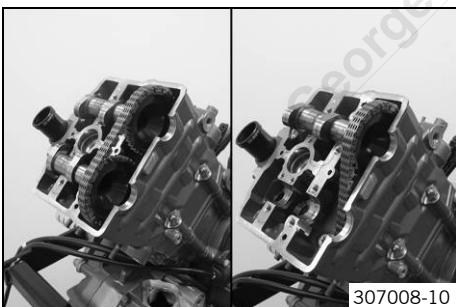


- Remove screw ① with O-ring ②.
- Remove timing chain tensioner ③ with O-ring ④.

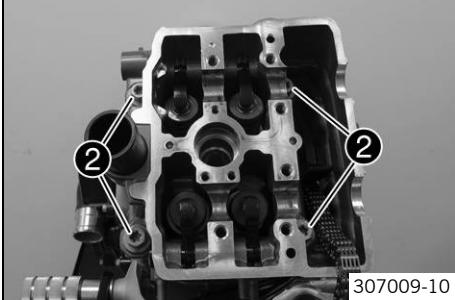
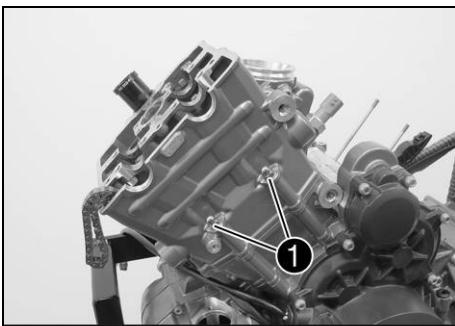
18.7.16 Removing the front camshafts



- Remove spark plug shaft insert ①.
 - Loosen and remove screws ② from the outside to the inside.
-
- Info**
The cams should not activate the valves.
-
- Remove the camshaft bearing bridge.
-
- Raise the camshaft at the rear and take the timing chain off of the rear sprocket. Remove the camshaft.



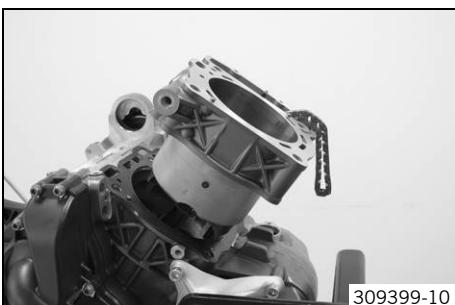
18.7.17 Removing the front cylinder head



307009-10

- Remove nuts 1 with the washers.
- Alternately loosen screws 2 and remove them.
- Take off the cylinder head. Remove the cylinder head gasket.

18.7.18 Removing the front piston

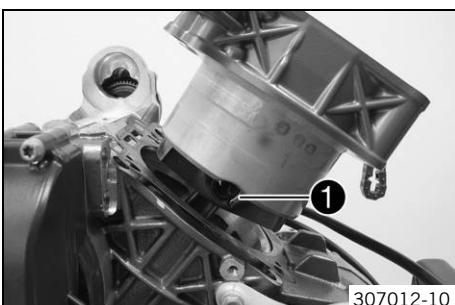


309399-10

- Push the cylinder up.

**Info**

Push the cylinder up until the piston pin can be removed.
Make sure that the two pins remain in place.

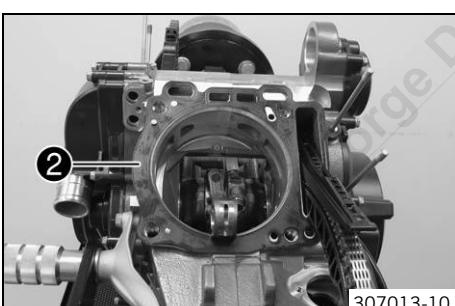


307012-10

- Remove piston pin retainer 1.
- Remove the piston pin.
- Remove the cylinder with the piston.
- Push the piston upward out of the cylinder.

**Info**

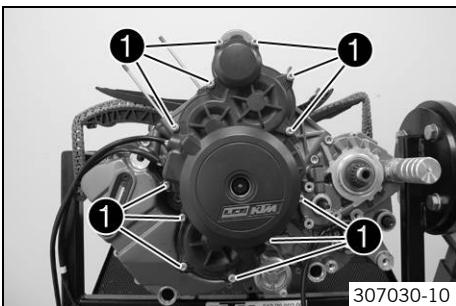
If no additional work needs to be performed on the cylinder and piston, the piston can remain in the cylinder.



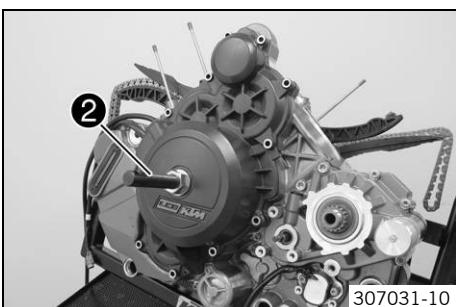
307013-10

- Remove cylinder base gasket 2.

18.7.19 Removing the alternator cover



- Remove screws 1.



- Screw in special tool 2 and pull off the alternator cover.

Extractor (61229010000) (see p. 345)

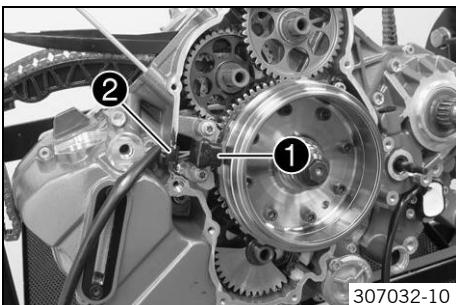


Info

Strike the alternator cover lightly with a rubber mallet to prevent strain.

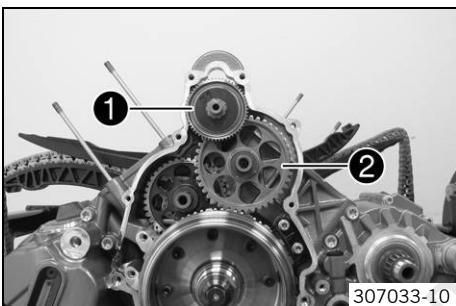
- Take off the alternator cover seal. Take off the dowels.

18.7.20 Removing the ignition pulse generator



- Remove the screws of ignition pulse generator 1.
- Pull cable support sleeve 2 out of the engine case. Take off the ignition pulse generator.

18.7.21 Removing the torque limiter and idler



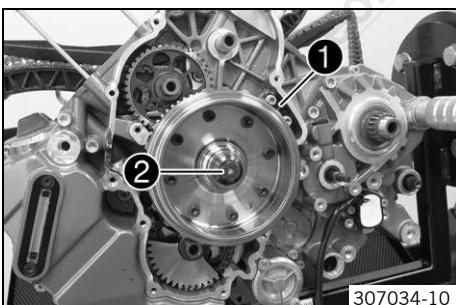
- Take off torque limiter 1.
- Remove idler 2 with the washers and needle bearing.



Info

The idler has one disk at the front and one at the rear; the front washer usually sticks to the alternator cover.

18.7.22 Removing the rotor

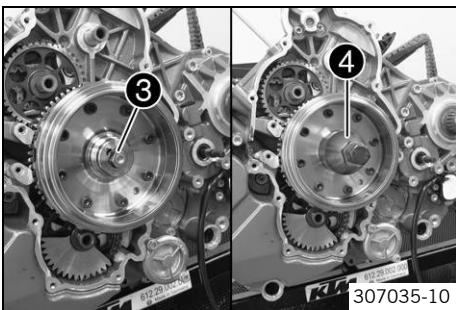


- Remove the screws and take off freewheel holder 1.
- Loosen and remove screw 2 of the rotor.

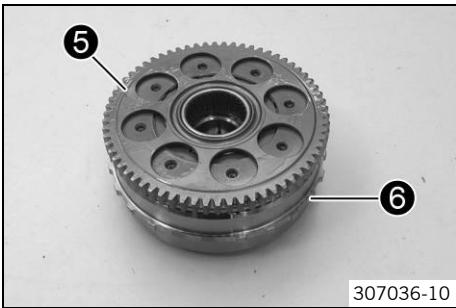


Info

The crankshaft must be blocked.

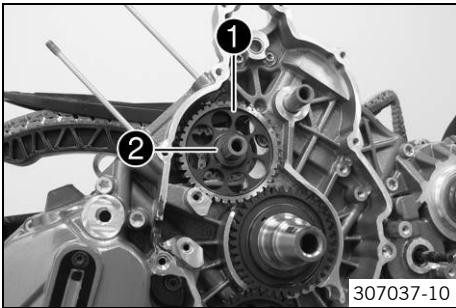


- Screw special tool ③ into the crankshaft.
- Pressure piece (61229008100) (p. 345)
- Mount special tool ④ on the rotor, apply counterpressure, and pull off the rotor by screwing in the screw.
- Extractor (75029021000) (p. 349)
- Remove the special tools.

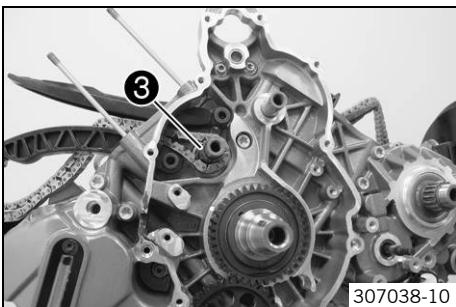


- Take freewheel gear ⑤ from rotor ⑥.

18.7.23 Removing the idler and timing chain on the left



- Take off idler ① with washer ②.

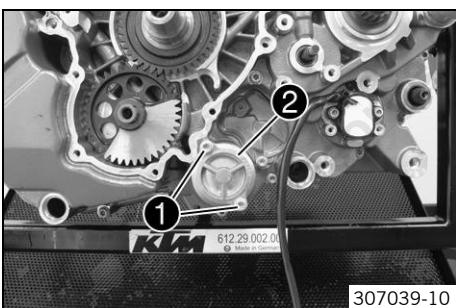


- Remove the timing chain, needle bearing ③ and the washer lying behind it.

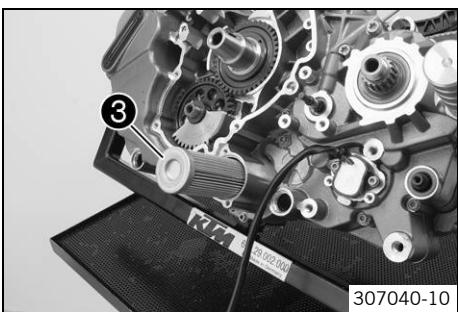
i Info

If the timing chain is to be used again, note the direction of travel and the cylinder on which it was used.

18.7.24 Removing the oil filter



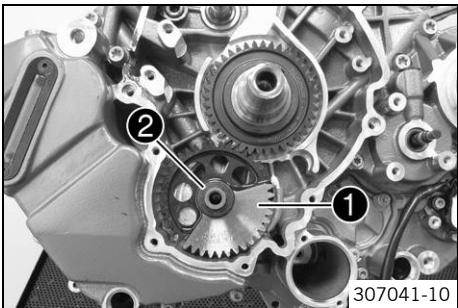
- Remove screws ①. Take off oil filter cover ② with the O-ring.



- Pull oil filter ③ out of the oil filter housing.

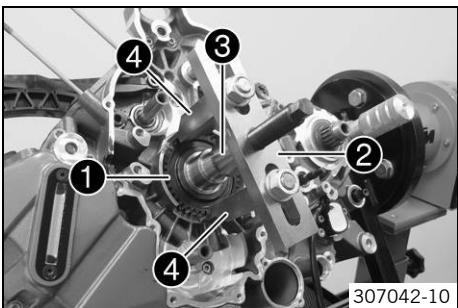
Circlip pliers reverse (51012011000) (p. 340)

18.7.25 Removing the balancer shaft



- Remove balancer shaft ① with washer ②.
- Mount the needle bearing and the rear washer.

18.7.26 Removing the drive wheel of the balancer shaft



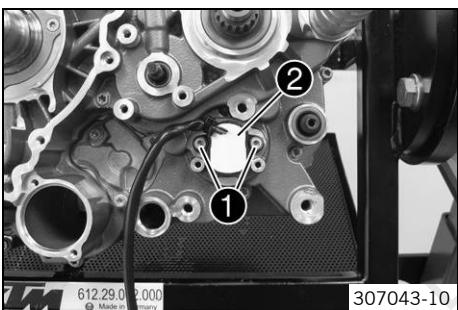
- Remove drive wheel ① of the balancer shaft with special tool ②, ③ and ④.

Puller, 2-arm (78029033100) (p. 350)

Pressure piece (61229018000) (p. 346)

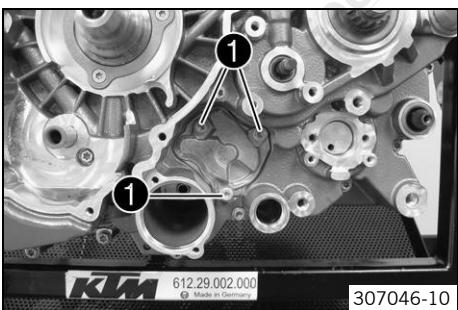
Arms for extractor 78029033100 (61229017000) (p. 346)

18.7.27 Removing the gear position sensor

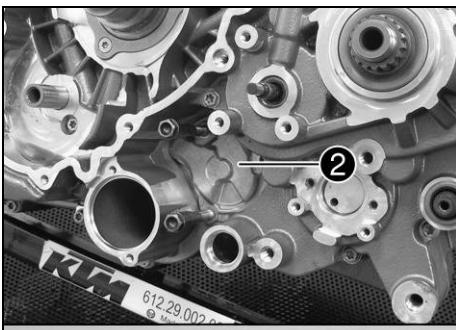


- Remove screws ① with the washers.
- Remove gear position sensor ② with the O-ring.

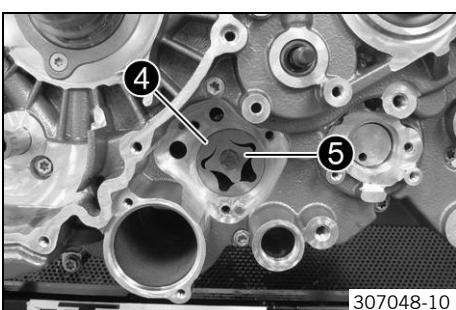
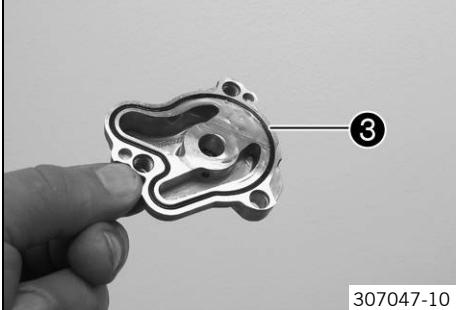
18.7.28 Removing the left suction pump



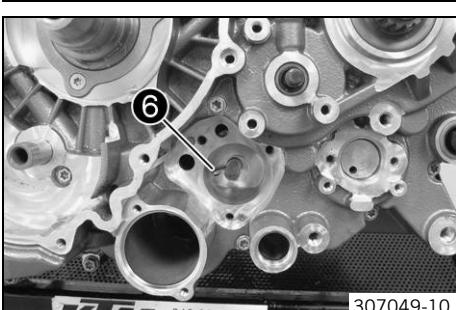
- Remove screws ①.



- Screw suitable screws into the oil pump cover.
- Remove the oil pump cover by screwing in the screws.
- Remove oil pump cover ②.
- Remove gasket ③.

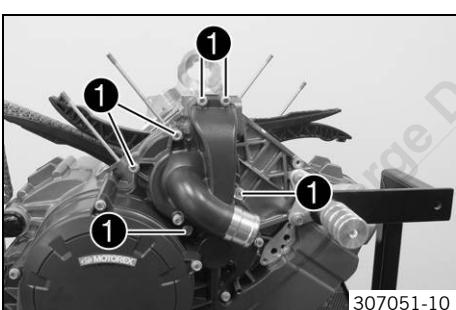


- Remove external rotor ④ and internal rotor ⑤.

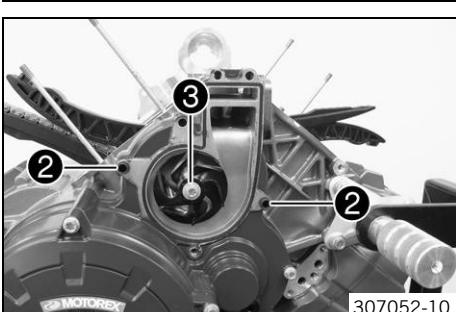


- Remove pin ⑥.

18.7.29 Removing the water pump wheel

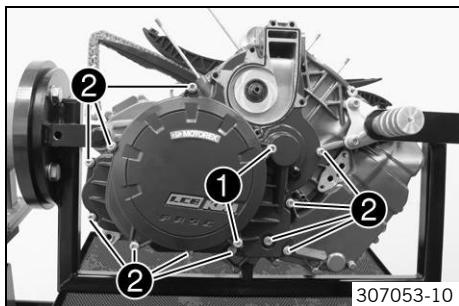


- Remove screws ①.
- Take off the water pump cover.

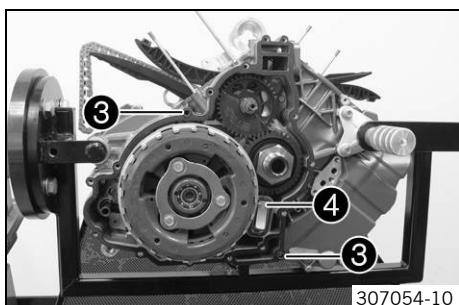


- Remove dowels ②.
- Remove screw ③. Take off the water pump wheel with the washer below it.

18.7.30 Removing the clutch cover

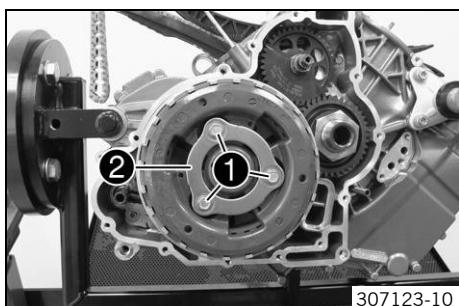


- Loosen screws 1 of the outer clutch cover.
- Remove screws 2.
- Take off the clutch cover.

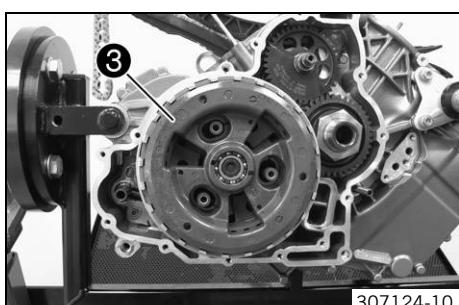


- Take off dowels 3. Remove the clutch cover seal.
- Remove check valve 4.

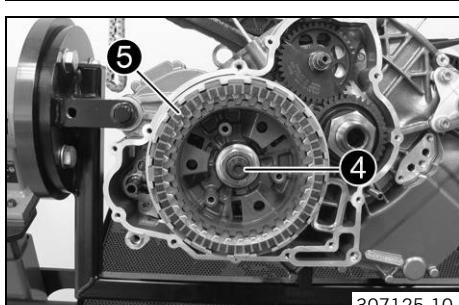
18.7.31 Removing the clutch discs



- Remove screws 1.
- Take off clutch center 2 and the springs.

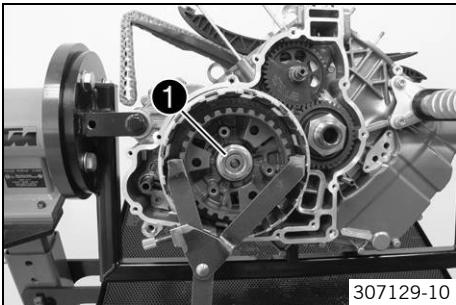


- Remove clutch pressure cap 3.



- Remove push rod 4.
- Remove clutch discs 5, support ring, and pretension ring.

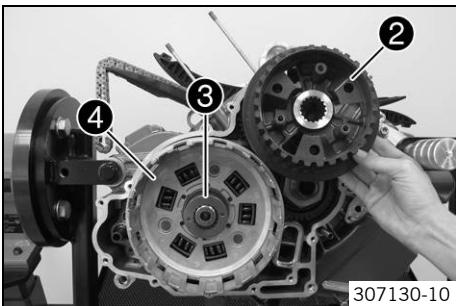
18.7.32 Removing the clutch basket



- Hold the inner clutch hub with the special tool.

Clutch holder (51129003000) (see p. 340)

- Remove nut ① with the washer.



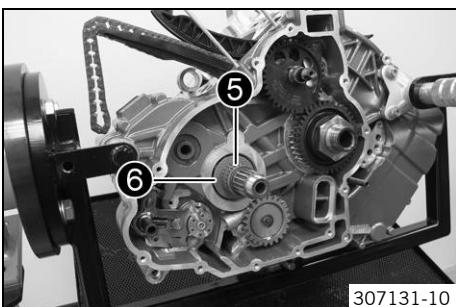
- Take off inner clutch hub ② and washer ③.



Info

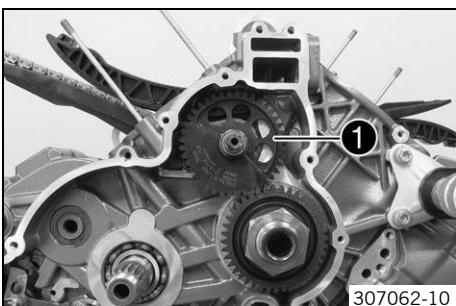
The washer usually sticks to the inner clutch hub.

- Take off clutch basket ④.



- Remove needle bearing ⑤ and washer ⑥.

18.7.33 Removing the idler and timing chain on the right



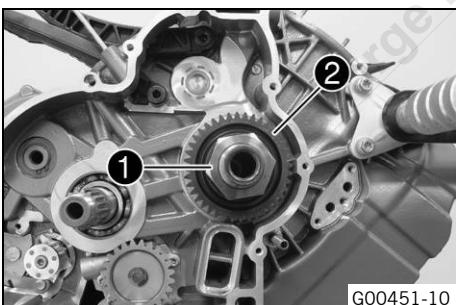
- Remove idler ①.
- Take off the timing chain.



Info

If the timing chain is to be used again, note the direction of travel and the cylinder on which it was used.

18.7.34 Removing the primary gear



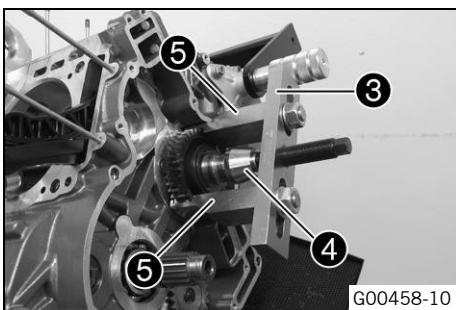
- Remove nut ① of primary gear ② with the washer.



Info

Left-handed thread!

Make sure that the crankshaft is blocked.

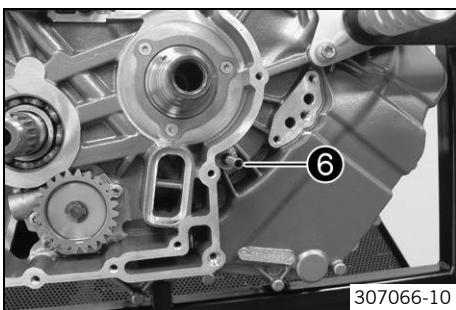


- Remove the primary gear with special tool ③, ④ and ⑤.

Puller, 2-arm (78029033100) (p. 350)

Pressure piece (61229018000) (p. 346)

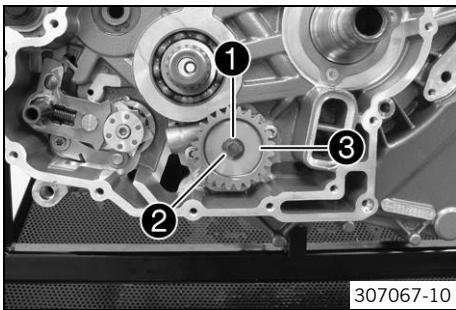
Arms for extractor 78029033100 (61229017000) (p. 346)



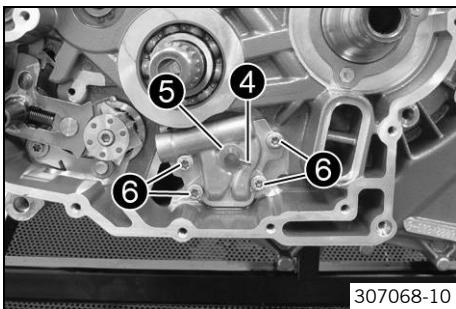
- Remove special tool ⑥.

Engine blocking screw (61229015000) (p. 345)

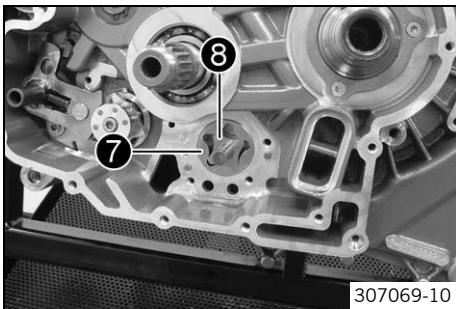
18.7.35 Removing the force pump



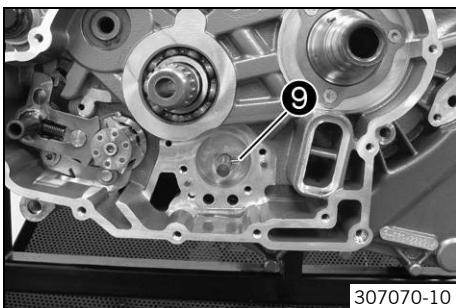
- Remove lock washer ① and washer ②.
- Remove oil pump gear wheel ③.



- Remove pin ④ and washer ⑤.
- Remove screws ⑥.
- Remove the oil pump cover.

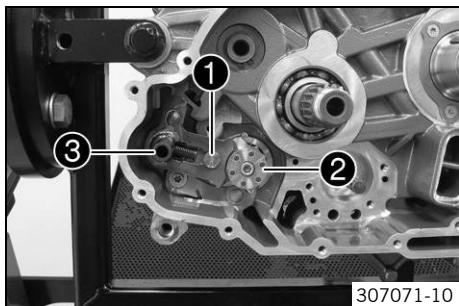


- Remove external rotor ⑦ and internal rotor ⑧.



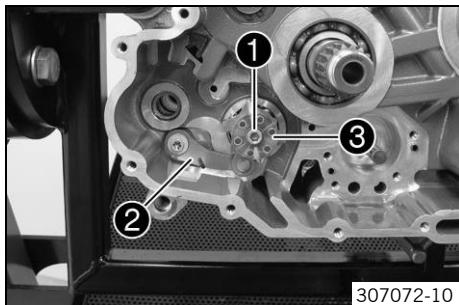
- Remove pin ⑨.

18.7.36 Removing the shift shaft



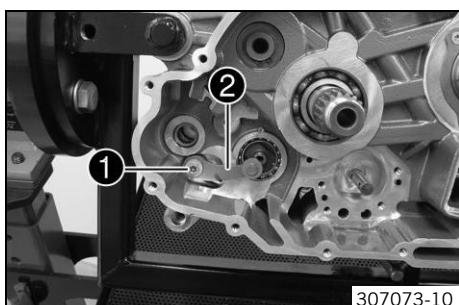
- Push sliding plate 1 away from the shift drum locating 2. Remove shift shaft 3 with the washer.

18.7.37 Removing the shift drum locating



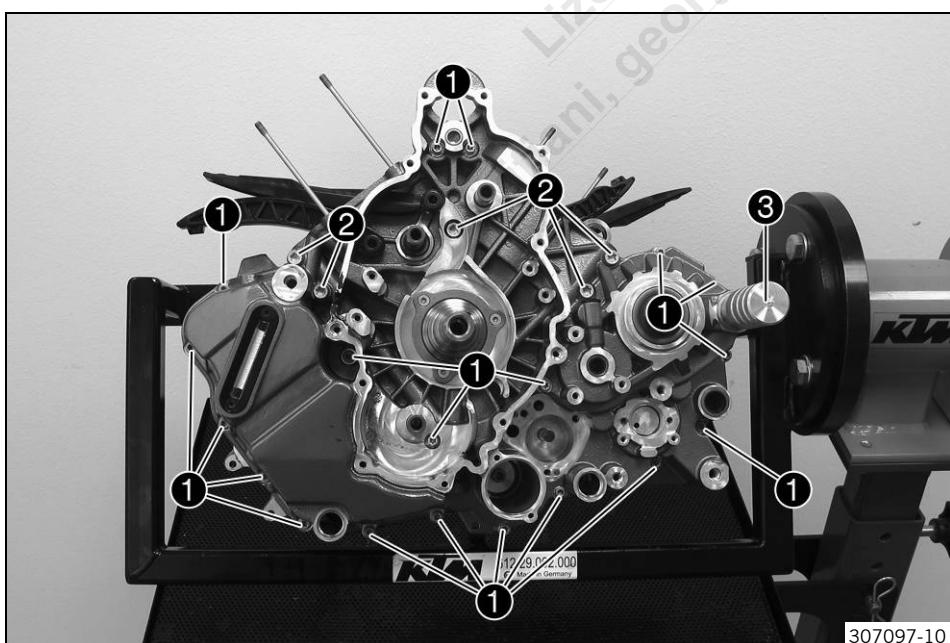
- Remove screw 1.
- Press locking lever 2 away from shift drum locating 3 and take off the shift drum locating.
- Release the locking lever.

18.7.38 Removing the locking lever



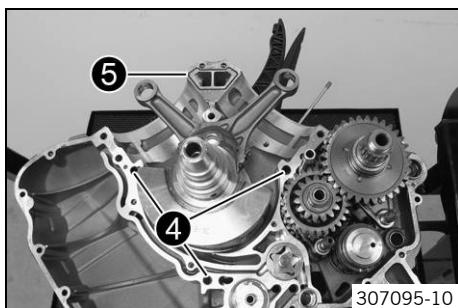
- Remove screw 1.
- Take off locking lever 2 with the sleeve and spring.

18.7.39 Removing the left engine case



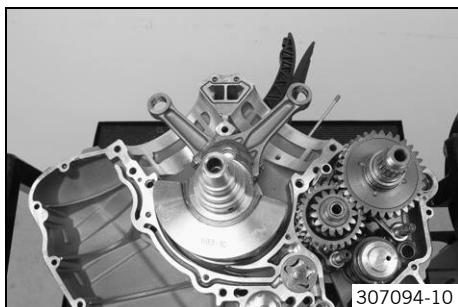
- Remove screws 1 and 2.

- Swing the left section of the engine case upward. Remove screw ③.
- Loosen the left section of the engine case by striking it lightly with a plastic hammer and remove it.



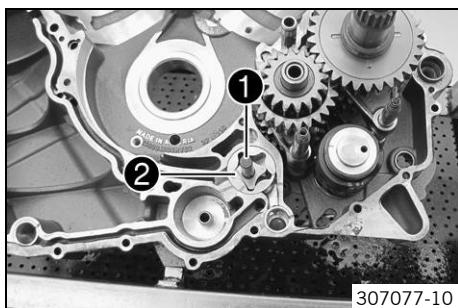
- Remove dowels ④.
- Remove seal ⑤.

18.7.40 Removing the crankshaft

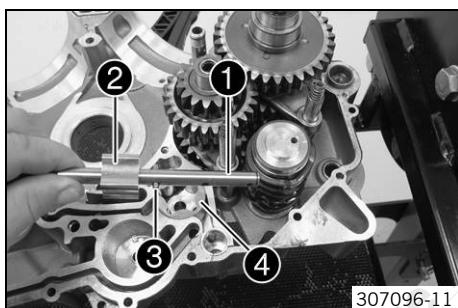


- Remove the crankshaft.

18.7.41 Removing the middle suction pump

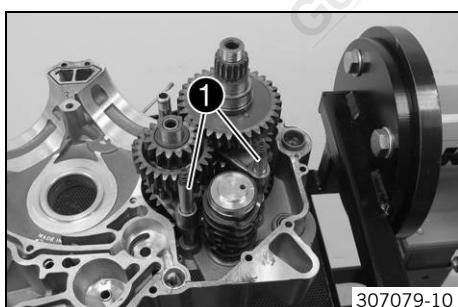


- Take off oil pump shaft ① with internal rotor ②.

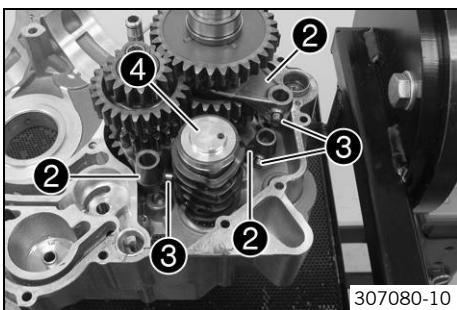


- Remove internal rotor ② and pin ③ from the oil pump shaft ①.
- Remove external rotor ④.

18.7.42 Removing the transmission shaft



- Remove shift rails ① with the springs.

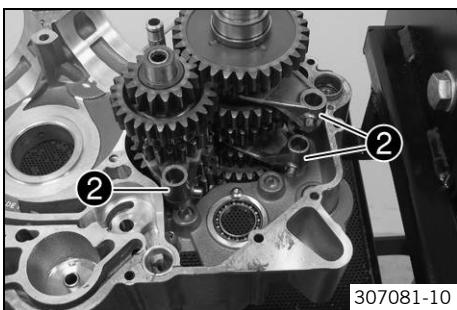


- Swing shift forks ② to one side.

i Info

Make sure not to misplace shift rollers ③.

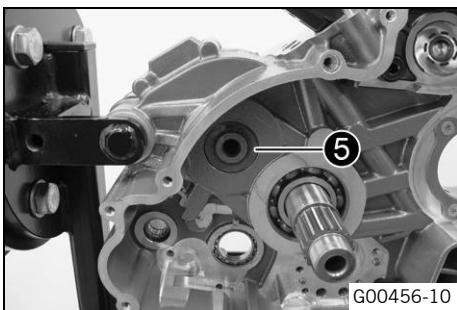
- Remove shift drum ④.



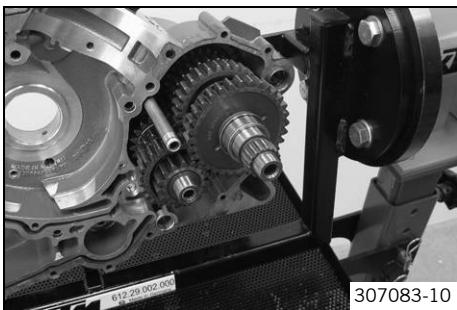
- Remove shift forks ②.

i Info

Make sure not to misplace the shift rollers.

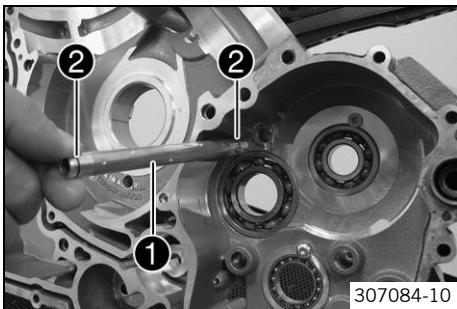


- Place the engine in an upright position.
- Remove lock ring ⑤ and the stop disk.



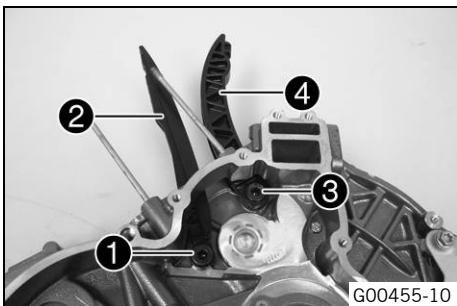
- Pull both transmission shafts out of the bearing seats together.

18.7.43 Removing the oil spray tube



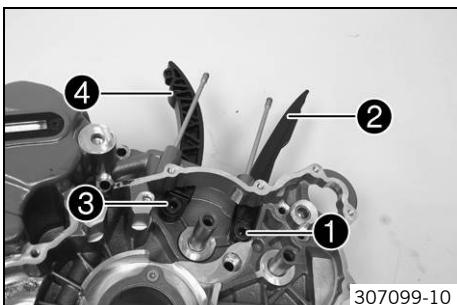
- Remove oil spray tube ①. Remove O-rings ②.

18.7.44 Removing the timing chain rails of the right engine case section



- Remove screw ①. Remove timing chain guide rail ②.
- Remove screw ③. Remove timing chain tensioning rail ④.

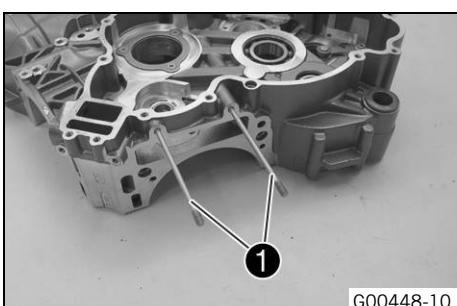
18.7.45 Removing the timing chain rails of the left engine case section



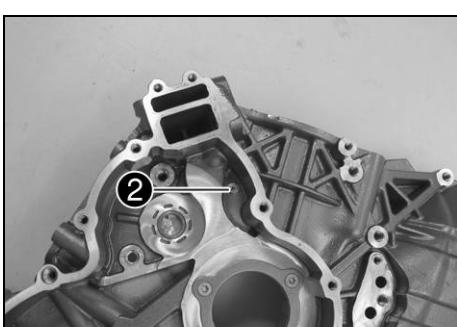
- Remove screw ①. Remove timing chain guide rail ②.
- Remove screw ③. Remove timing chain tensioning rail ④.

18.8 Working on individual parts

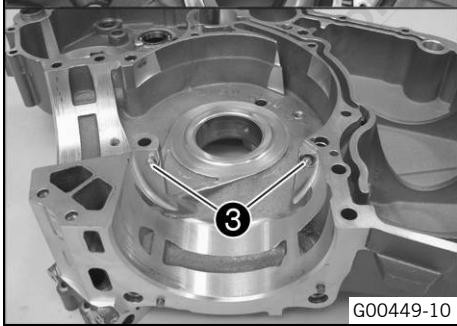
18.8.1 Work on the right section of the engine case

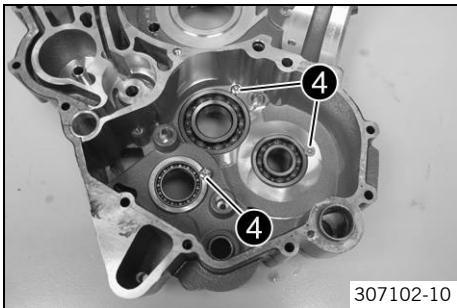


- Remove studs ①.



- Remove nozzle ②.
- Remove oil nozzles ③.





- Remove bearing retainers ④.
- Remove the dowels.
- Remove any sealing mass remnants and clean the engine case section thoroughly.
- Warm the engine case section in an oven.

Guideline

130 °C (266 °F)

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

i Info

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

- Warm the engine case section again.

Guideline

130 °C (266 °F)

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

i Info

When pressing the bearing in, ensure that the engine case section is level to prevent damage.

Only press the bearings in via the outer bearing race; otherwise, the bearings will be damaged when they are pressed in.

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

i Info

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

- Mount and tighten bearing retainers ④.

Guideline

Screw, bearing retainer	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
-------------------------	----	----------------------	---------------

- Mount and tighten nozzle ②.

Guideline

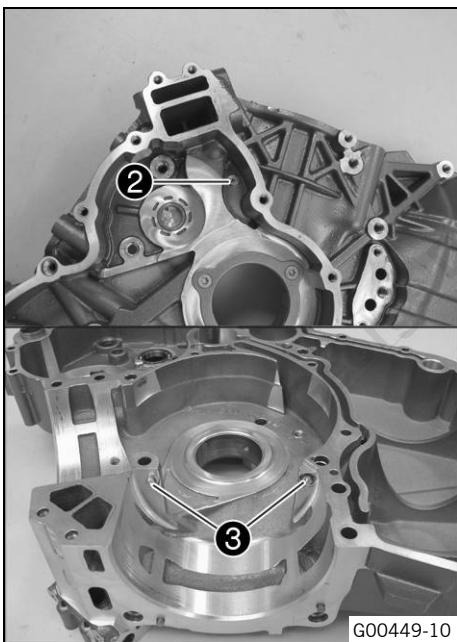
Nozzle 100	M6x0.75	4 Nm (3 lbf ft)	Loctite® 243™
------------	---------	--------------------	---------------

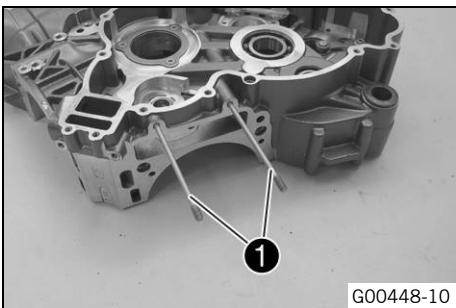
- Mount and tighten oil nozzles ③.

Guideline

Oil nozzle	M5	2 Nm (1.5 lbf ft)	Loctite® 243™
------------	----	----------------------	---------------

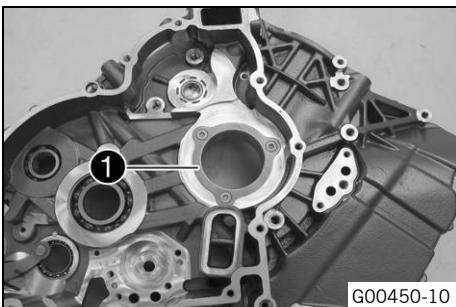
- Mount the dowels.



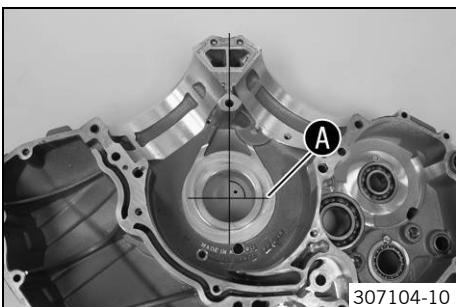


- Mount studs **1**.
- | Guideline | |
|-------------------|----|
| Stud, chain shaft | M6 |
| 8 Nm (5.9 lbf ft) | |
- Blow compressed air through all oil channels and check that they are clear.

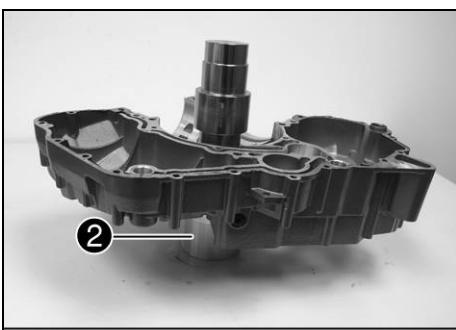
18.8.2 Removing the right main bearing



- Remove the screws and take off bearing shell bracket **1**.

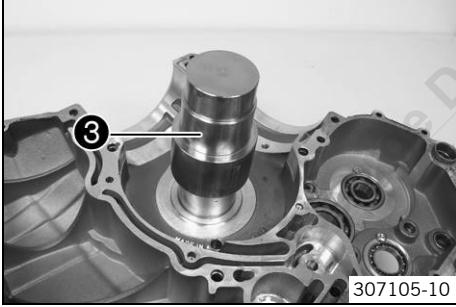


- Mark face **A** of the main bearing shells as shown in the figure.



- Place the engine case section on special tool **2**.

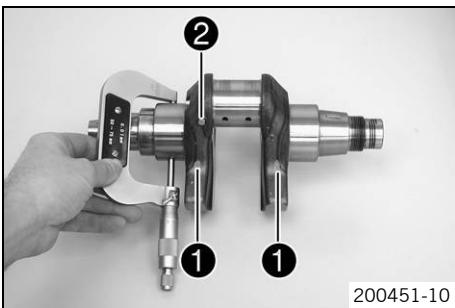
Press sleeve (61229045000) (☞ p. 347)



- Place special tool **3** with the smaller diameter on the bearing shells and press from the inside to the outside.

Press drift/press sleeve (61229044000) (☞ p. 347)

18.8.3 Selecting the main bearing shells



200451-10

New crankshaft

- Select the new bearing shells according to color marking ①.



Info

Color marking ② refers to the conrod bearing.

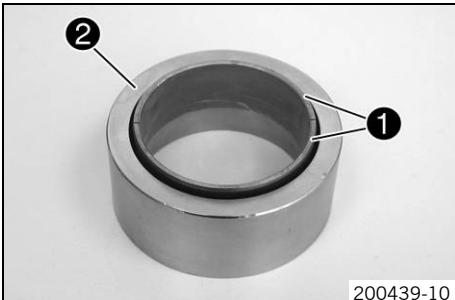
Used crankshaft

- Measure both pivot points and select the new bearing shells accordingly.

Guideline

Crankshaft - main bearing diameter	
Yellow	52.965... 52.975 mm (2.08523... 2.08563 in)
Blue	52.976... 52.985 mm (2.08567... 2.08602 in)
Red	52.986... 52.995 mm (2.08606... 2.08641 in)

18.8.4 Installing the right main bearing



200439-10

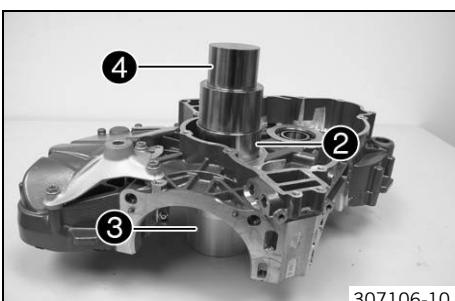
Preparatory work

- Select the main bearing shells. (p. 187)

Main work

- Center the new main bearing shells ① using special tool ②.

Press drift/press sleeve (61229044000) (p. 347)



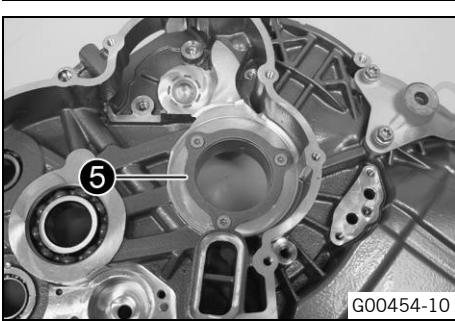
307106-10

- Place the inside of the engine case section on special tool ③.

Press sleeve (61229045000) (p. 347)

- Align the face of the new bearing shell with the marking made when it was disassembled.
- Press the bearing shells with the stepped side of special tool ④ through press sleeve ② from the outside to the inside, all the way to the stop.

Press drift/press sleeve (61229044000) (p. 347)



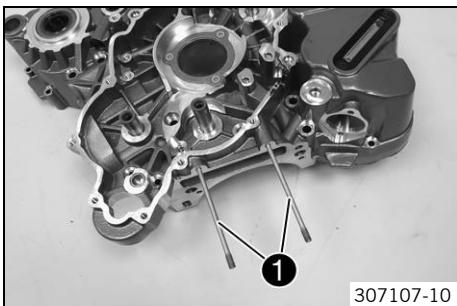
G00454-10

- Position bearing shell bracket ⑤. Mount and tighten the screws.

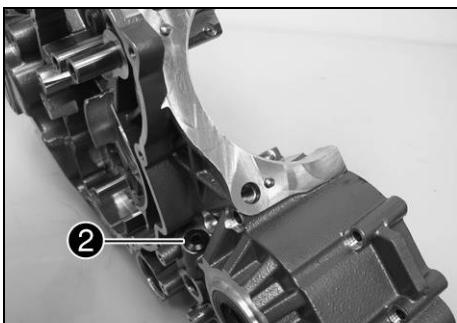
Guideline

Screw, bearing retainer	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
-------------------------	----	----------------------	---------------

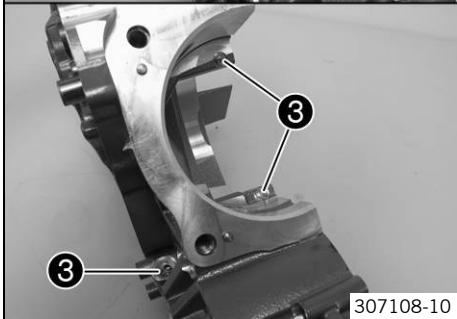
18.8.5 Work on the left section of the engine case



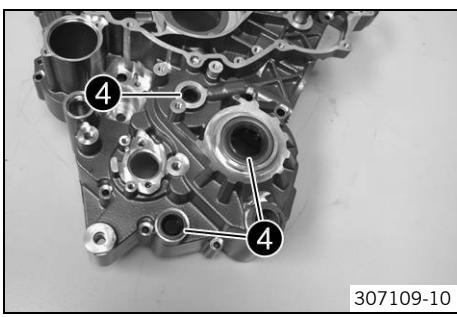
- Remove studs 1.



- Remove screw 2.
- Remove oil nozzles 3.



- Remove shaft seal rings 4.
- Remove any sealing mass remnants and clean the engine case section thoroughly.
- Warm the engine case section in an oven.
Guideline
130 °C (266 °F)
- Knock the engine case section against a level wooden plate. This will cause the bearings to drop out of the bearing seats.



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

- Warm the engine case section again.

Guideline

130 °C (266 °F)

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

i Info

When pressing the bearing in, ensure that the engine case section is level to prevent damage.

Only press the bearings in via the outer bearing race; otherwise, the bearings will be damaged when they are pressed in.

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

i Info

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

- Mount oil nozzles ③.

Guideline

Oil nozzle	M5	2 Nm (1.5 lbf ft)	Loctite® 243™
------------	----	----------------------	---------------

- Mount oil nozzle ⑥.

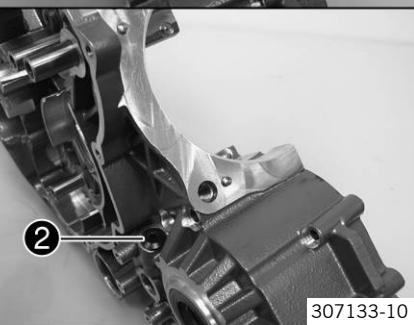
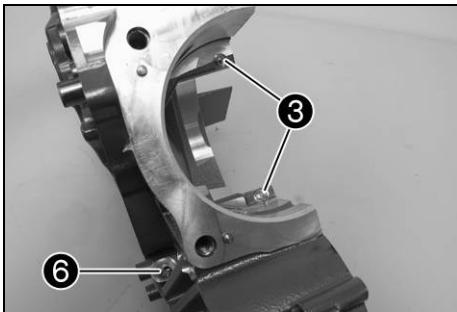
Guideline

Oil nozzle for clutch lubrication	M6x0.75	4 Nm (3 lbf ft)
-----------------------------------	---------	-----------------

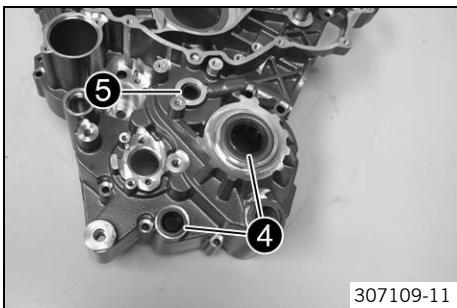
- Mount and tighten screw ②.

Guideline

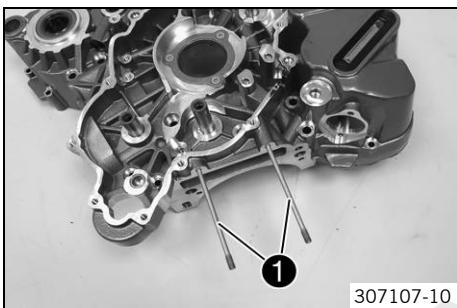
Plug, clutch lubrication	M10x1	10 Nm (7.4 lbf ft)
--------------------------	-------	--------------------



307133-10



307109-11



307107-10

- Press in shaft seal rings ④ until they are flush.

- Press in the shaft seal ring of push rod ⑤.

Press drift (61229013000) (see p. 345)

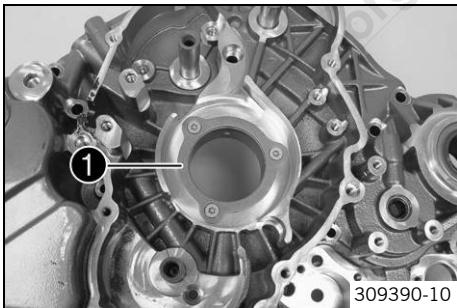
- Mount studs ①.

Guideline

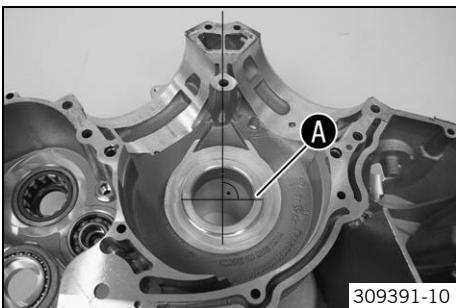
Stud, chain shaft	M6	8 Nm (5.9 lbf ft)
-------------------	----	-------------------

- Blow compressed air through all oil channels and check that they are clear.

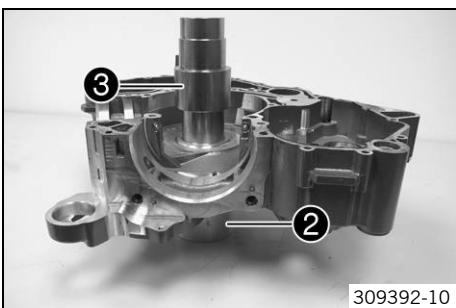
18.8.6 Removing the left main bearing



- Remove the screws and take off bearing shell bracket ①.



- Mark joint **A** of the main bearing shells as shown in the figure.



- Place the engine case section on special tool **2**.
Press sleeve (61229045000) (p. 347)
- Place special tool **3** with the smaller diameter on the bearing shells and press from the inside to the outside.
Press drift/press sleeve (61229044000) (p. 347)

18.8.7 Installing the left main bearing

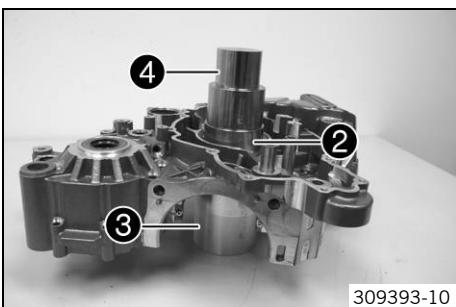
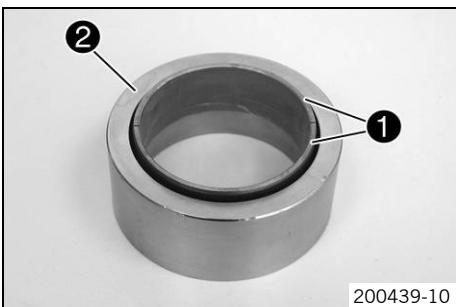
Preparatory work

- Select the main bearing shells. (p. 187)

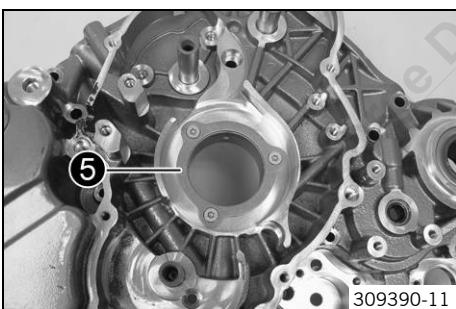
Main work

- Center the new main bearing shells **1** using special tool **2**.

Press drift/press sleeve (61229044000) (p. 347)



- Place the inside of the engine case section on special tool **3**.
Press sleeve (61229045000) (p. 347)
- Align the face of the new bearing shell with the marking made when it was disassembled.
- Press the bearing shells with the stepped side of special tool **4** through press sleeve **2** from the outside to the inside, all the way to the stop.
Press drift/press sleeve (61229044000) (p. 347)



- Position bearing shell bracket **5**. Mount and tighten the screws.

Guideline

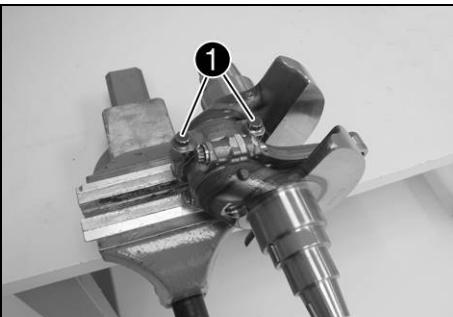
Screw, bearing retainer	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
-------------------------	----	----------------------	---------------

18.8.8 Changing the conrod bearing



Info

Perform the operation on both connecting rods.



- Clamp each connecting rod separately using soft jaws.

- Remove screws 1.

Multi-tooth wrench socket 10 mm; ½" drive (60029075000) (p. 343)

- Take off the bearing cap and connecting rod. Remove the bearing shells.

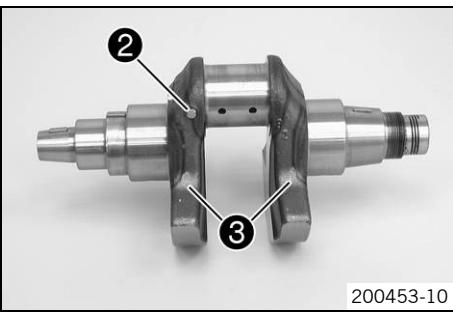


Info

Mark the connecting rod bearing cap and connecting rod to ensure that each connecting rod bearing cap will be mounted on the same connecting rod.



305503-10



200453-10

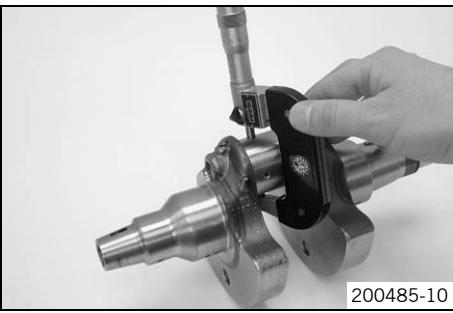
New crankshaft

- Select the new bearing shells according to color marking 2.



Info

Color marking 3 refers to the crankshaft bearing.



200485-10

Used crankshaft

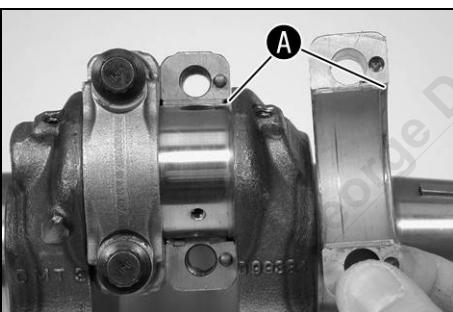
- Measure the crank pin diameter and select the new bearing shells accordingly.
- Guideline

Crankshaft - crank pin diameter

Yellow	41.978... 41.989 mm (1.65267... 1.65311 in)
Blue	41.990... 42.000 mm (1.65315... 1.65354 in)
Red	42.001... 42.011 mm (1.65358... 1.65397 in)

- Check the radial clearance of the bottom connecting rod bearing. (p. 194)
- Oil the bearing shells.
- Position the connecting rod bearing cap according to the markings made when they were disassembled. Mount the new connecting rod screws and tighten them using the special tool.

Guideline



Screw, conrod bearing

M10x1

Step 1
25 Nm
(18.4 lbf ft)
Step 2
30 Nm
(22.1 lbf ft)
Step 3
90°



305504-10

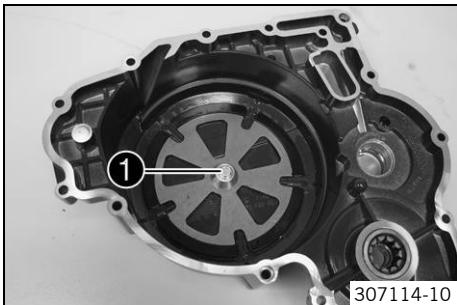
Multi-tooth wrench socket 10 mm; ½" drive (60029075000) (p. 343)

Graduated disc (60029010000) (p. 342)

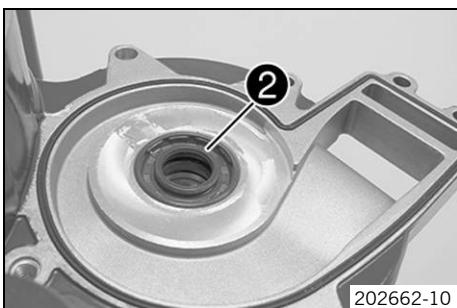
i Info

The conrod bearing shells are positioned laterally offset in the connecting rod to make space for radius **A** of the crank shaft. If mounted in reverse, the bearing shells push on the radius and the connecting rods block.

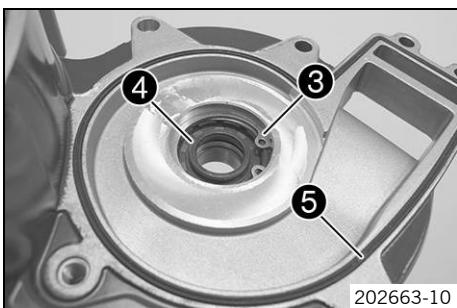
18.8.9 Work on the clutch cover



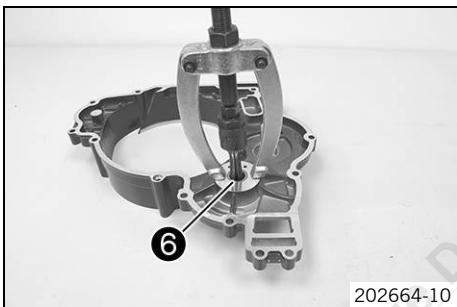
- Remove screw **1** with the bushing.
- Remove the damping plate.



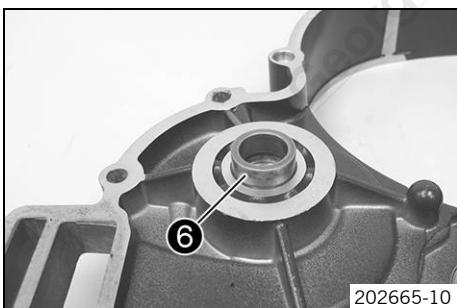
- Remove the outer shaft seal ring **2**.



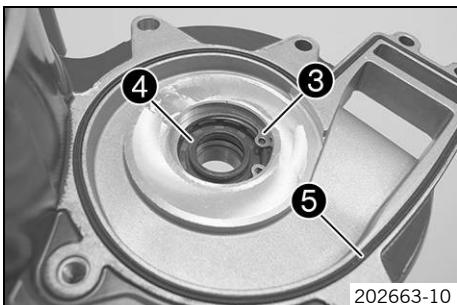
- Remove lock ring **3**.
- Remove the inner shaft seal ring **4**.
- Remove water pump cover seal **5**.



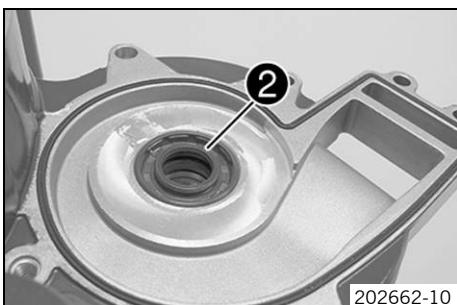
- Remove bearing bush **6**.
- | |
|--|
| Bearing puller (15112017000) (p. 339) |
| Internal bearing puller (15112018100) (p. 339) |
- Change the support bearing of the crankshaft. (p. 193)



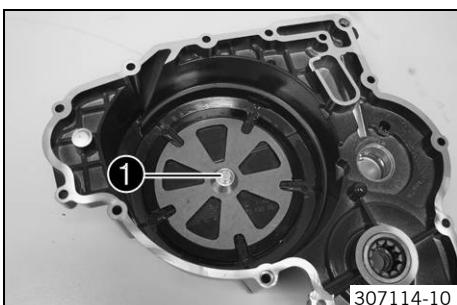
- Press bearing bush **6** in flush with a suitable press drift.



- Insert water pump cover seal 5.
- Press in the inner shaft seal ring 4 with the closed side to the bearing bush as far as it will go.
- Mount lock ring 3.



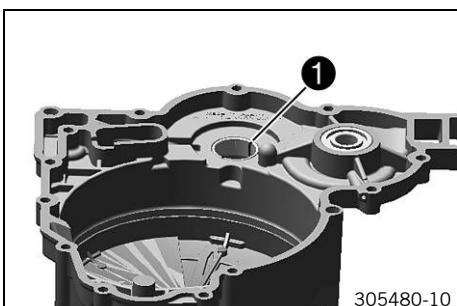
- Press in the outer shaft seal ring 2, with the open side flush and facing outwards.



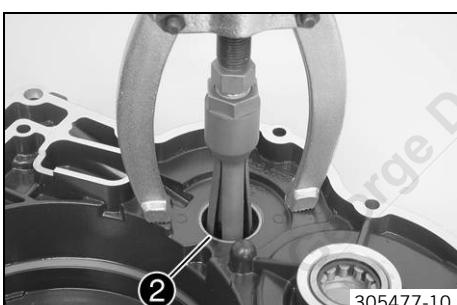
- Position the damping plate.
 - Mount and tighten screw 1 with the bushing.
- Guideline

Screw, damping plate	EJOT ALtracs® M6x14	10 Nm (7.4 lbf ft)	Loctite® 243™
----------------------	------------------------	-----------------------	---------------

18.8.10 Changing the support bearing of the crankshaft



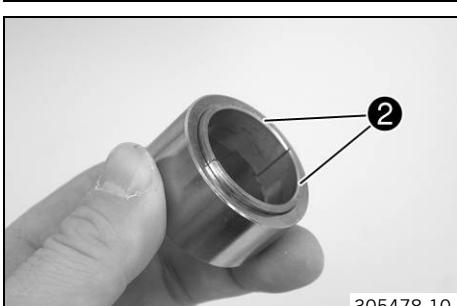
- Mark the position of bearing joint 1.



- Pull out support bearing shells 2 with the special tool.

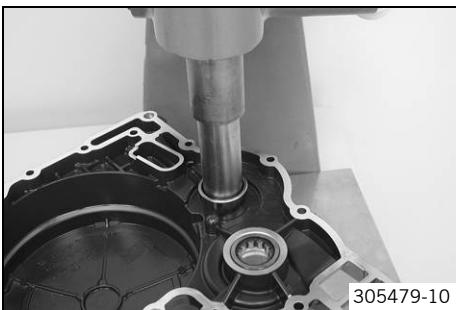
Bearing puller (15112017000) (☞ p. 339)

Internal bearing puller (60029018000) (☞ p. 342)



- Center the new support bearing shells 2 with the special tool.

Step bearing tool (60029046128) (☞ p. 343)



- Support the clutch cover directly under the support bearing. Press in the support bearing shells using the special tool until they are flush.

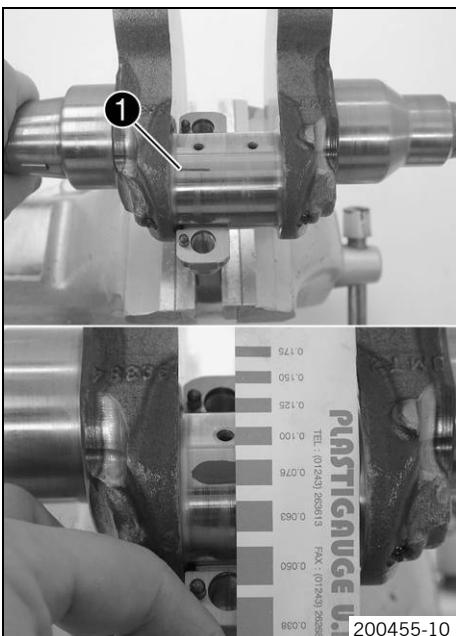
Step bearing tool (60029046128) (p. 343)

18.8.11 Checking the radial clearance of the bottom connecting rod bearing



Info

Perform the operation on both connecting rods.



- Position the bearing shells. Insert the **Plastigauge** measuring strips ① offset by 90° from the bearing joint.

Plastigauge clearance gauge (60029012000) (p. 342)

- Position the connecting rod bearing cap. Mount and tighten the screws.

Guideline

Screw, conrod bearing	M10x1	Step 1 25 Nm (18.4 lbf ft) Step 2 30 Nm (22.1 lbf ft) Step 3 90°
-----------------------	-------	---



Info

Do not twist the connecting rod.

- Remove the connecting rod bearing cap again. Compare the **Plastigauge** measuring strip with the specifications on the packaging.

Guideline

Connecting rod - radial clearance of lower conrod bearing	
New condition	0.030... 0.060 mm (0.00118... 0.00236 in)
Wear limit	0.080 mm (0.00315 in)

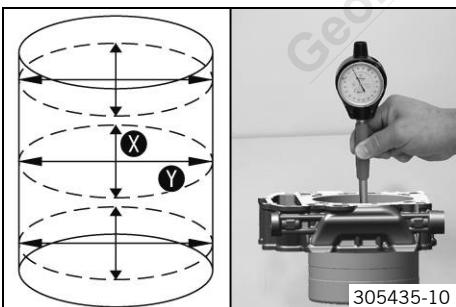


Info

The width of the **Plastigauge** measuring strips indicates the bearing play.

- Clean the parts.

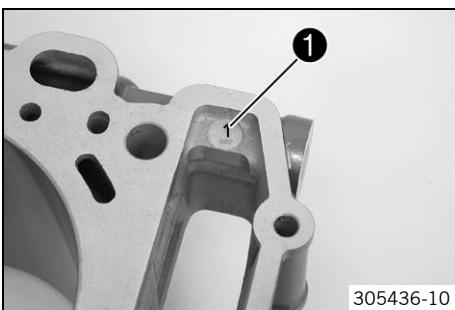
18.8.12 Checking/measuring the cylinder



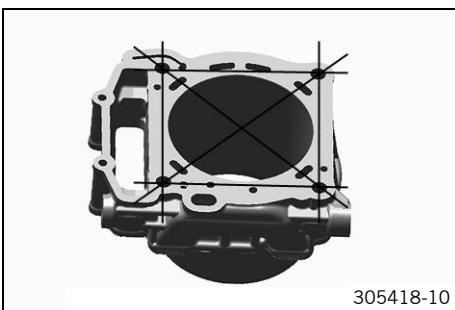
- Check the cylinder bearing surface for damage.
 - » If the cylinder bearing surface is damaged:
 - Change the cylinder and piston.
- Measure the cylinder diameter at several places on the contact surface in the **X** and **Y** axes using a micrometer to check for oval wear.

Guideline

Cylinder - bore diameter	
Size I	108.000... 108.012 mm (4.25196... 4.25243 in)
Size II	108.012... 108.025 mm (4.25243... 4.25294 in)



- The cylinder size ① is labeled on the side of the cylinder.



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

Feeler gauge (59029041100) (☞ p. 341)

Cylinder/cylinder head - sealing area distortion	$\leq 0.05 \text{ mm} (\leq 0.002 \text{ in})$
--	--

- If the measured value does not equal the specified value:
 - Change the cylinder.

18.8.13 Checking/measuring the piston



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



Tip

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

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



Info

Mount the piston ring with the marking facing upward.

- Use the special tool to measure clearance A of the piston rings in the piston ring groove.

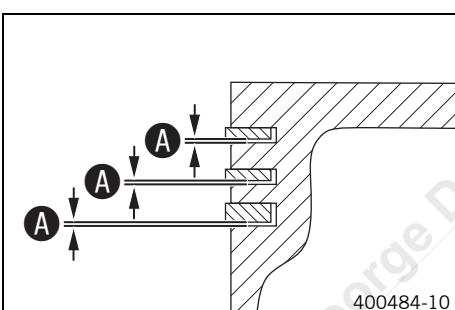
Guideline

Piston ring - groove clearance

First ring (rectangular ring)	$\leq 0.08 \text{ mm} (\leq 0.0031 \text{ in})$
Second ring (lower compression ring)	$\leq 0.08 \text{ mm} (\leq 0.0031 \text{ in})$
Oil scraper ring	$\leq 0.06 \text{ mm} (\leq 0.0024 \text{ in})$

Feeler gauge (59029041100) (☞ p. 341)

- If clearance A is larger than the specified value:
 - Change the piston and piston rings.
 - Check/measure the cylinder. (☞ p. 194)
- Check the piston pin for discoloration or signs of wear.
 - If the piston pin has strong discoloration/signs of wear:
 - Change the piston pin.
- Insert the piston pin into the connecting rod and check the bearing for play.
 - If the piston pin bearing has too much play:
 - Change the connecting rod and the piston pin.

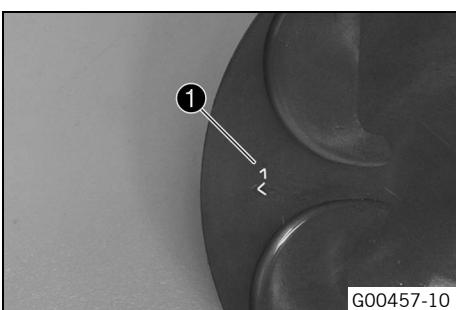




- Measure the piston at the piston skirt, at right angles to the piston pin, at a distance **B**.

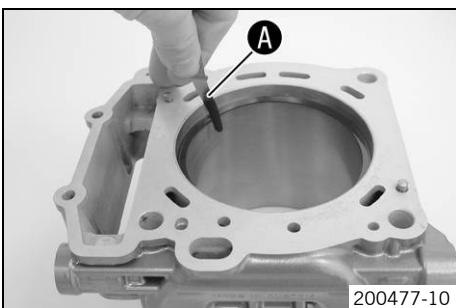
Guideline

Piston - diameter	
Size I	107.960... 107.990 mm (4.25039... 4.25157 in)
Size II	107.970... 108.000 mm (4.25078... 4.25196 in)
Distance B	6 mm (0.24 in)



- Piston size **1** is marked on the piston head.

18.8.14 Checking the piston ring end gap



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

Guideline

Under the upper edge of the cylinder	10 mm (0.39 in)
--------------------------------------	-----------------

- Measure the end gap with special tool **A**.

Guideline

Piston ring end gap	
First ring (rectangular ring)	≤ 0.50 mm (≤ 0.0197 in)
Second ring (lower compression ring)	≤ 0.60 mm (≤ 0.0236 in)
Oil scraper ring	≤ 0.60 mm (≤ 0.0236 in)

Feeler gauge (59029041100) (☞ p. 341)

- » If the end gap is greater than the specified value:
 - Check/measure the cylinder. (☞ p. 194)
 - If the cylinder wear is within the tolerance range:
 - Change the piston ring.
- Mount the piston ring with the marking facing toward the piston head.

18.8.15 Checking the piston/cylinder mounting clearance



- Check/measure the cylinder. (☞ p. 194)
- Check/measure the piston. (☞ p. 195)
- The smallest piston/cylinder mounting clearance is the result of the smallest cylinder bore diameter minus the largest piston diameter. The largest piston/cylinder mounting clearance is the result of the largest cylinder bore diameter minus the smallest piston diameter.

Guideline

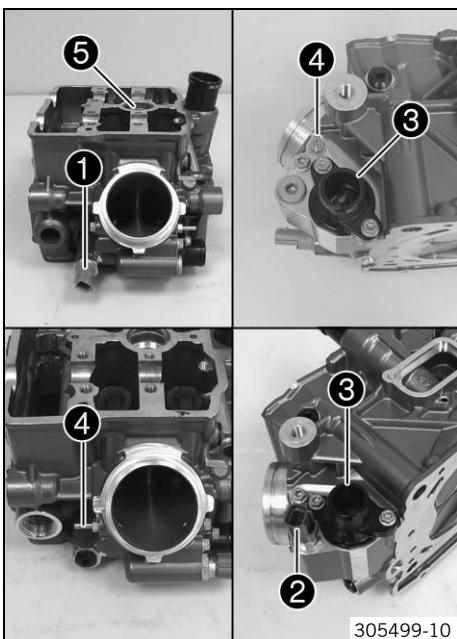
Piston/cylinder - mounting clearance	
Size I	0.010... 0.042 mm (0.00039... 0.00165 in)
Size II	0.012... 0.052 mm (0.00047... 0.00205 in)
Wear limit	0.10 mm (0.0039 in)

18.8.16 Work on the cylinder head



Info

The following operations apply to both cylinder heads.



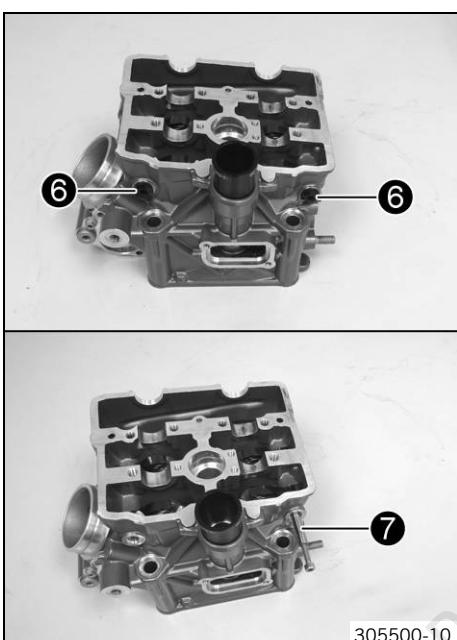
- Remove oil pressure switch 1.



Info

This only applies to the front cylinder head!

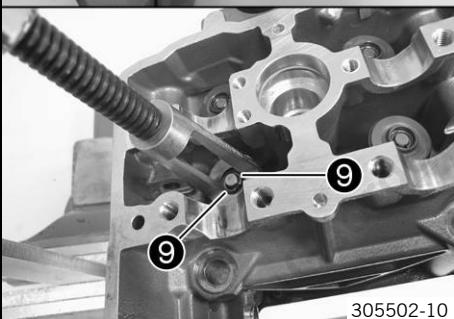
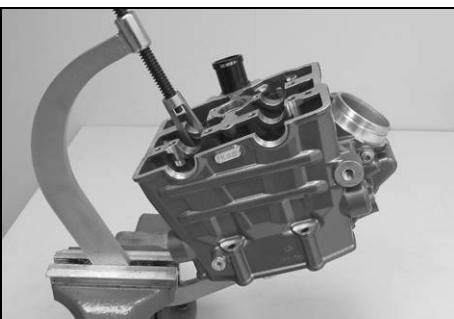
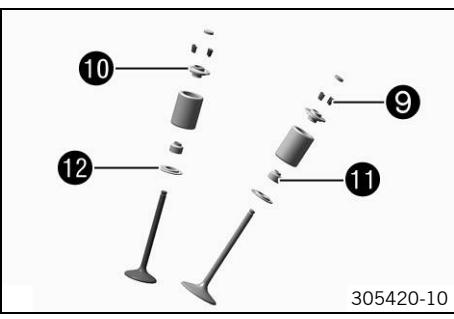
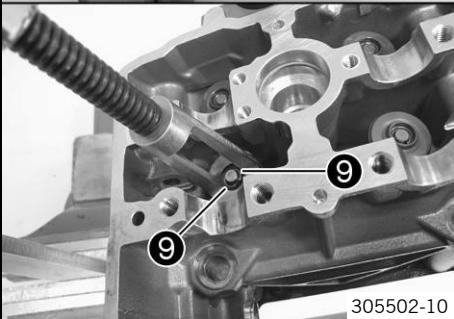
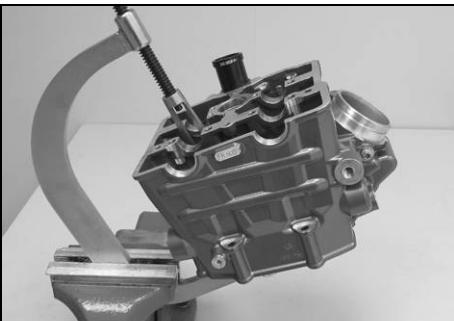
- Remove engine coolant temperature sensor 2.
- Remove screws.
- Remove thermostat case 3 and the thermostat.
- Remove vacuum connection 4.
- Remove O-rings 5.



- Remove plugs 6 with the O-ring.
- Pull out cam lever shafts 7 with a suitable M5 screw and remove the cam lever.



- Remove shims 8 and label the normal built-in position.

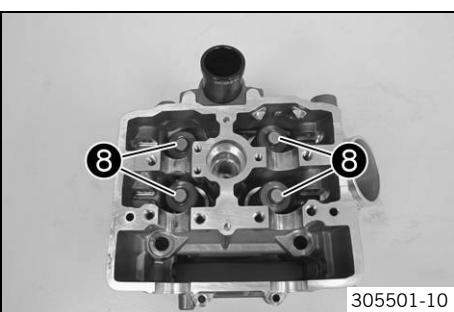


- Tension the valve spring with a special tool.

Valve spring mounter (59029019000) (☞ p. 341)

Insert for valve spring lever (78029060000) (☞ p. 350)
--

- Remove valve keys 9 and release tension on the valve spring.



- Remove valve spring retainer 10, valve spring, valve stem seals 11 and valve spring seats 12.


Info

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

- Check the cylinder head. (☞ p. 199)
- Mount valve spring seats 12 and new valve stem seals 11.
- Mount valve spring and valve spring retainer 10.

✓ The tight winding of the valve spring is at the bottom.

- Tension the valve spring with a special tool.

Valve spring mounter (59029019000) (☞ p. 341)

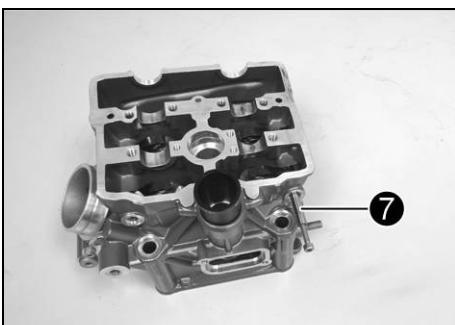
Insert for valve spring lever (78029060000) (☞ p. 350)
--

- Mount valve keys 9. Release the tension on the valve spring.


Info

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

- Place shims 8 into the valve spring retainer according to their normal built-in position.

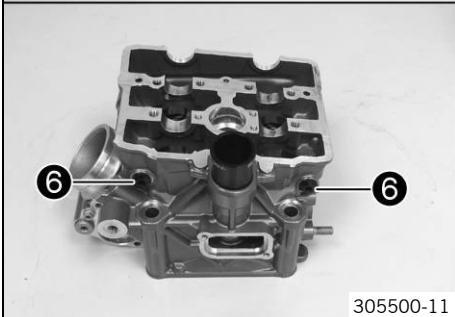


- Position the cam lever and mount cam lever shafts 7.

- Mount plugs 6 with new O-rings.

Guideline

Plug, cam lever axis	M10x1	15 Nm (11.1 lbf ft)
----------------------	-------	------------------------



305500-11

- Mount oil pressure sensor 1.

Guideline

Oil pressure sensor	M10x1	10 Nm (7.4 lbf ft)
---------------------	-------	--------------------



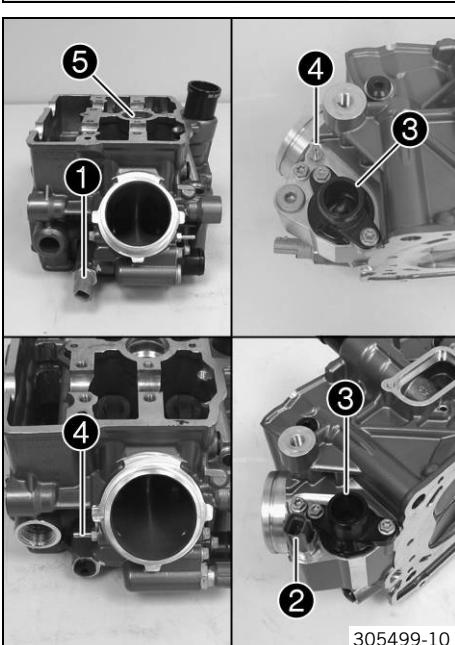
Info

This only applies to the front cylinder head!

- Mount engine coolant temperature sensor 2.

Guideline

Coolant temperature sensor	M12x1.5	12 Nm (8.9 lbf ft)
----------------------------	---------	--------------------



305499-10

- Mount the thermostat and thermostat case 3.

- Mount and tighten screw.

Guideline

Screw, thermostat case	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
------------------------	----	-----------------------	---------------

- Mount vacuum connection 4.

Guideline

Vacuum connection	M6	2.5 Nm (1.84 lbf ft)	Loctite® 243™
-------------------	----	-------------------------	---------------

- Mount and grease O-rings 5.

18.8.17 Checking the cylinder head



305433-10

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

» If there is wear or tearing:

- Change the cylinder head.

- Check the valve guides using the special tool.

Limit plug gauge (59029026006) (p. 341)

Valve guide - diameter

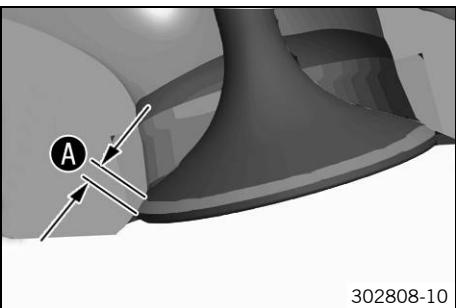
New condition	6.004... 6.016 mm (0.23638... 0.23685 in)
---------------	--

Wear limit

Wear limit	6.150 mm (0.24213 in)
------------	-----------------------

» If the special tool is easy to insert into the valve guide:

- Change the valve guide and valve.



- Check sealing seat **A** of the valves.

Valve - sealing seat width

Intake: New condition	0.90 mm (0.0354 in)
Intake: Wear limit	1.5 mm (0.059 in)
Exhaust: New condition	1.0 mm (0.039 in)
Exhaust: Wear limit	2.0 mm (0.079 in)

» If the measured value does not equal the specified value:

- Machine the valve seat.

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

Feeler gauge (59029041100) (☞ p. 341)

Cylinder/cylinder head - sealing area distortion	$\leq 0.05 \text{ mm} (\leq 0.002 \text{ in})$
» If the measured value does not equal the specified value:	

- Change the cylinder head.

- Check the pivot points of the camshafts in the cylinder head and in the camshaft bearing bridge for damage and wear.

» If there is damage or wear:

- Change the cylinder head with the camshaft bearing bridge.

- Check valve **1** for damage and wear.

» If there is damage or wear:

- Change the valve.

- Check the valve for run-out.

Valve - run-out

Intake: on the valve plate	$\leq 0.03 \text{ mm} (\leq 0.0012 \text{ in})$
Exhaust: on the valve plate	$\leq 0.03 \text{ mm} (\leq 0.0012 \text{ in})$

» If the measured value does not equal the specified value:

- Change the valve.

- Check the valve stem diameter.

Valve – valve stem diameter

Exhaust	5.956... 5.970 mm (0.23449... 0.23504 in)
Intake	5.966... 5.980 mm (0.23488... 0.23543 in)

» If the measured value does not equal the specified value:

- Change the valve.

- Check valve spring **2** for damage and wear.

» If there is damage or wear:

- Change the valve spring.

- Measure the valve spring lengths.

Valve spring - length

New condition	42.70 mm (1.6811 in)
Wear limit	41.8 mm (1.646 in)

» If the measured value does not equal the specified value:

- Change the valve springs.

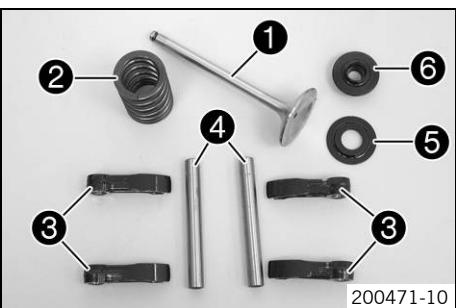
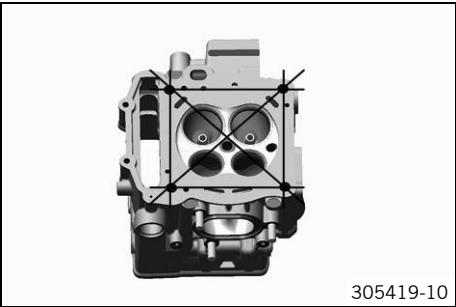
- Check cam lever **3** for damage and wear.

» If there is damage or wear:

- Change the cam lever.

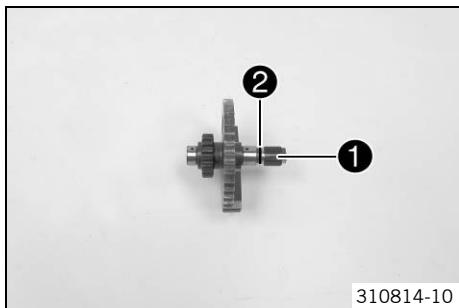
- Check cam lever shaft **4** for damage and wear.

» If there is damage or wear:



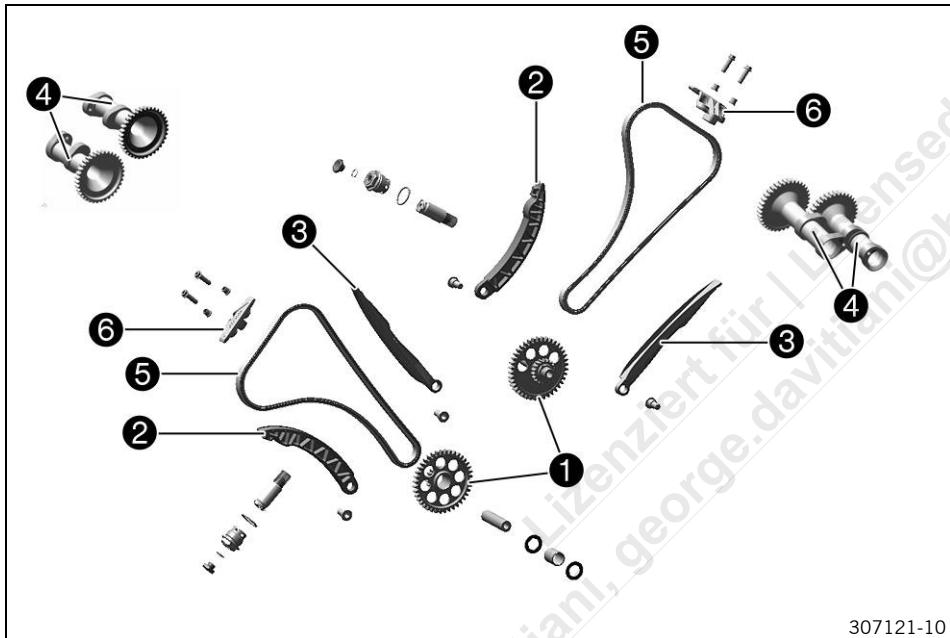
- Change the cam lever shaft.
- Check valve spring support **5** for damage and wear.
 - » If there is damage or wear:
 - Change the valve spring seat.
- Check valve spring retainer **6** for damage and wear.
 - » If there is damage or wear:
 - Change the valve spring retainer.

18.8.18 Work on the right idler



- Remove bushing **1**.
- Remove O-ring **2**.
- Mount new O-ring **2**.
- Mount the new bushing **1**.

18.8.19 Checking the timing assembly



- Clean all parts well.
- Check idler **1** for damage and wear.
 - » If there is damage or wear:
 - Change the idler.
- Check timing chain tensioning rail **2** for damage and wear.
 - » If there is damage or wear:
 - Change the timing chain tensioning rail.
- Check timing chain guide rail **3** for damage and wear.
 - » If there is damage or wear:
 - Change the timing chain guide rail.
- Check camshaft **4** for damage and wear.
 - » If there is damage or wear:
 - Change the camshaft.
 - If the cam surface is damaged, check the oil supply to the camshaft and cam lever.

- Check timing chain ⑤ for damage and wear.
 - » If there is damage or wear:
 - Change the timing chain.
- Check that the timing chain links move easily. Let the timing chain hang down freely.
 - » If the chain links no longer straighten out:
 - Change the timing chain.
- Check guide rail ⑥ for damage and wear.
 - » If there is damage or wear:
 - Change the guide rail.

18.8.20 Preparing the timing chain tensioner for installation



- Fully compress the timing chain tensioner.


Info

This requires considerable force since the oil has to be pressed out.

- Release the timing chain tensioner.
 - ✓ Without pressure, the timing chain tensioner expands fully.



- Place two compensating disks or similar aids next to the timing chain tensioner piston. This should ensure that when pushed down, the piston does not fully withdraw.

Guideline

Thickness of the compensating disks	2... 2.5 mm (0.08... 0.098 in)
-------------------------------------	--------------------------------

- Release the timing chain tensioner.

- ✓ The latching system locks and the piston stops moving.

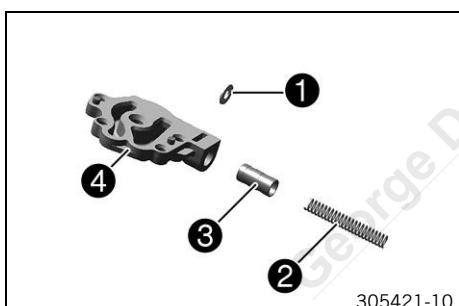
End position of piston after latching	3 mm (0.12 in)
---------------------------------------	----------------


Info

This position is necessary for installation.

If the timing chain tensioner is now pressed in once more (while it is installed) and then pulled out no more than halfway (preventing it from coming out fully), the latching system locks and the timing chain tensioner can no longer be compacted; this function is necessary to ensure sufficient tension of the timing chain, even at low oil pressure.

18.8.21 Checking the oil pressure regulator valve



- Remove supporting plate ① and spring ②.
- Measure the length of spring ②.

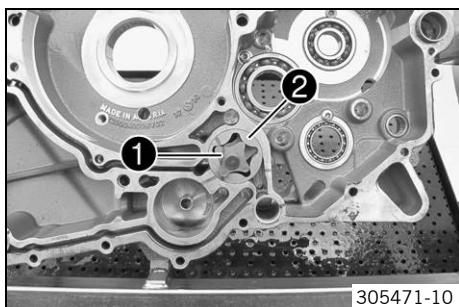
Oil pressure regulator valve - minimum spring length	39 mm (1.54 in)
--	-----------------

- » If the measured length is less than the specified value:
 - Change the spring.
- Check control piston ③ for damage and wear.
 - » If there is damage or wear:
 - Change the control piston.
- Check the control piston hole in oil pump cover ④ for damage and wear.
 - » If there is damage or wear:
 - Change the oil pump cover.
- Oil control piston ③ and spring ② well and mount them.
- Mount supporting plate ①.

18.8.22 Checking the lubrication system

i Info

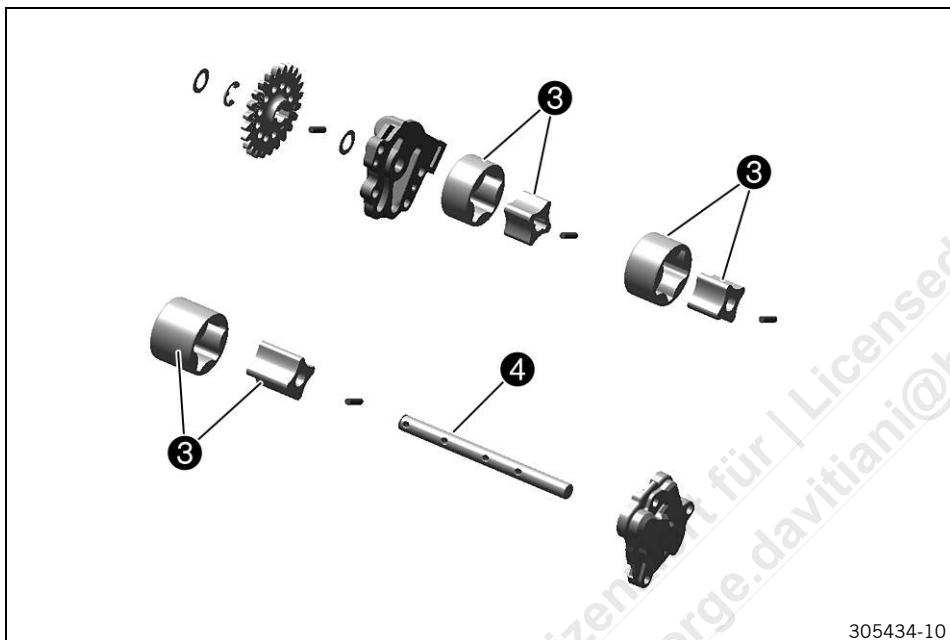
The following operations apply to all three oil pumps.



- Check the clearance between internal rotor 1 and external rotor 2 and between the external rotor and the engine case.

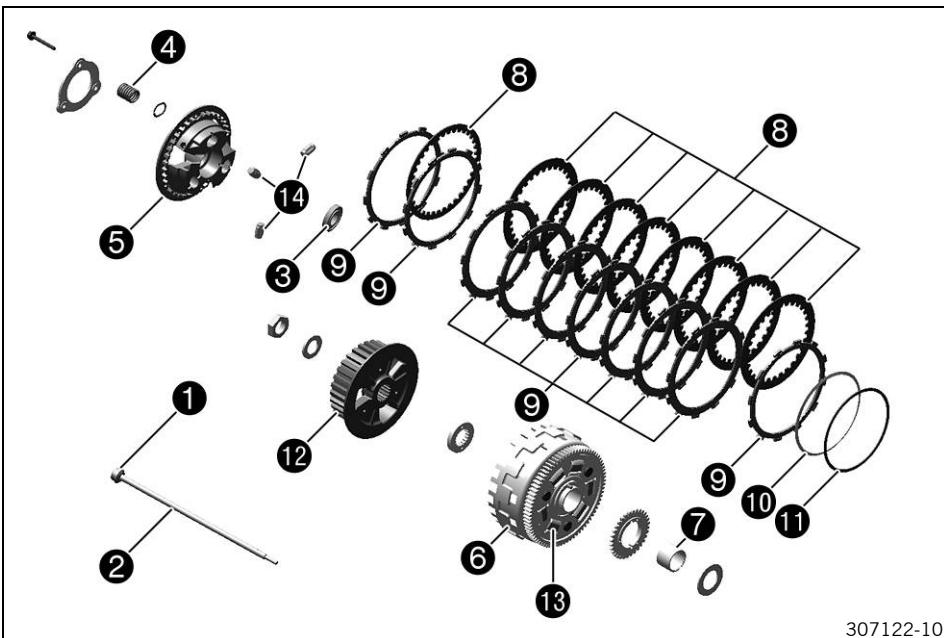
Oil pumps	
Clearance between external rotor and engine case	0.20... 0.40 mm (0.0079... 0.0157 in)
Clearance between external rotor and internal rotor	0.10... 0.25 mm (0.0039... 0.0098 in)
Axial clearance	0.04... 0.25 mm (0.0016... 0.0098 in)

- » If the clearance exceeds the specifications:
 - Change the oil pump and, if necessary, the engine case.



- Check the internal rotor and external rotor of oil pumps 3 for damage and wear.
 - » If there is damage or wear:
 - Change the oil pumps.
- Check oil pump shaft 4 for damage and wear.
 - » If there is damage or wear:
 - Change the oil pump shaft.
- Check the oil pump cover for damage and wear.
 - » If there is damage or wear:
 - Change the oil pump cover.

18.8.23 Checking the clutch



- Check pressure piece **1** for damage and wear.
 - » If there is damage or wear:
 - Change the push rod.
- Place push rod **2** on a level surface and check it for run-out.
 - » If there is run-out:
 - Change the push rod.
- Check axial bearing **3** for damage and wear.
 - » If there is damage or wear:
 - Change the axial bearing.
- Check the length of clutch springs **4**.

Clutch spring - length	$\geq 43.5 \text{ mm} (\geq 1.713 \text{ in})$
------------------------	--

- » If the clutch spring length is less than the specified value:
 - Change all clutch springs.

- Check the contact surface of clutch pressure cap **5** for damage and wear.
 - » If there is damage or wear:
 - Change the clutch pressure cap.
- Check the thrust surfaces of the clutch facing discs in clutch basket **6** for wear.

Clutch basket - thrust surface of clutch facing discs	
Wear limit	0.5 mm (0.02 in)

- » If the thrust surface is very worn:
 - Change the clutch pack and clutch basket.
- Check needle bearing **7** for damage and wear.
 - » If there is damage or wear:
 - Change the needle bearing.
- Check the intermediate clutch discs **8** for damage and wear.
 - » If the intermediate clutch discs are not level and have pittings:
 - Change the clutch pack.
- Check clutch facing discs **9** for discoloration and scoring.
 - » If there is discoloration or scoring:
 - Change the clutch pack.
- Check the thickness of the clutch pack.

Clutch pack - thickness	
New condition	48.00... 47.2 mm (1.8898... 1.858 in)

Wear limit	46.00 mm (1.811 in)
------------	---------------------

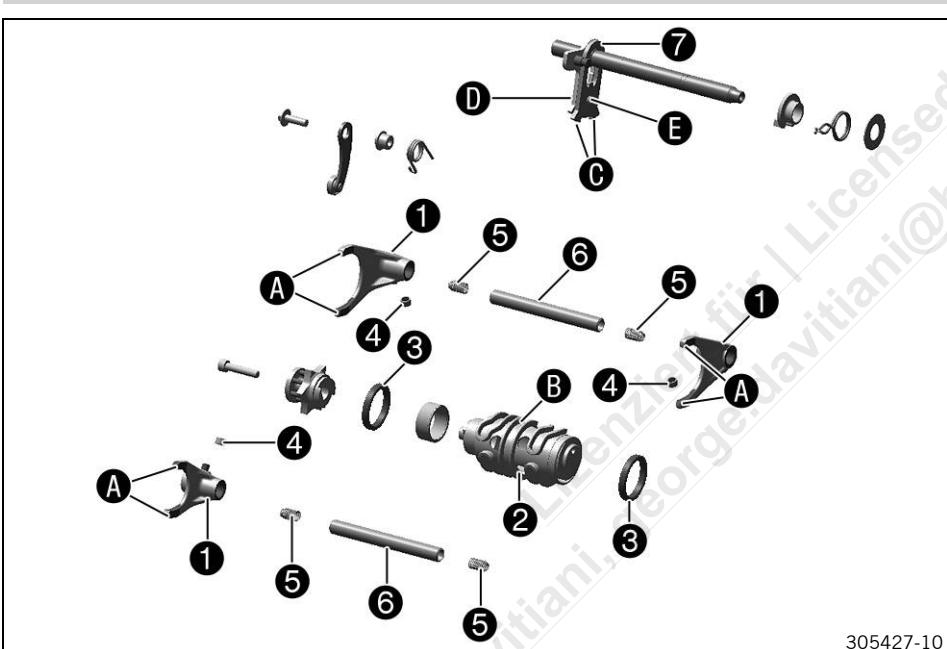
- » If the clutch pack does not meet specifications:
 - Change the clutch pack.
- Check pretension ring 10 and support ring 11 for damage and wear.
 - » If there is damage or wear:
 - Change the pretension ring and support ring.
- Check inner clutch hub 12 for damage and wear.
 - » If there is damage or wear:
 - Change the inner clutch hub.
- Check springs 13 of the clutch basket for damage and wear.
 - » If there is damage, wear or play in the direction of rotation:
 - Change the clutch basket.
- Check damper 14 for damage and wear.

**Info**

If the clutch pressure cap can be mounted without resistance from the damper, the dampers are too hard and are worn out.

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

18.8.24 Checking the shift mechanism



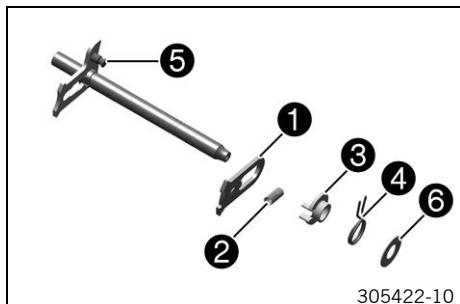
- Check shift forks 1 at leaf A for wear.

Shift fork	
Thickness at leaf	4.85... 4.95 mm (0.1909... 0.1949 in)
Clearance in the sliding gear groove: New condition	0.35... 0.55 mm (0.0138... 0.0217 in)
Clearance in the sliding gear groove: Wear limit	0.70 mm (0.0276 in)

- » If the measured value does not equal the specified value:
 - 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 seat of the shift drum in bearings 3.
 - » If the shift drum is not seated correctly:
 - Change the shift drum and/or the bearing.

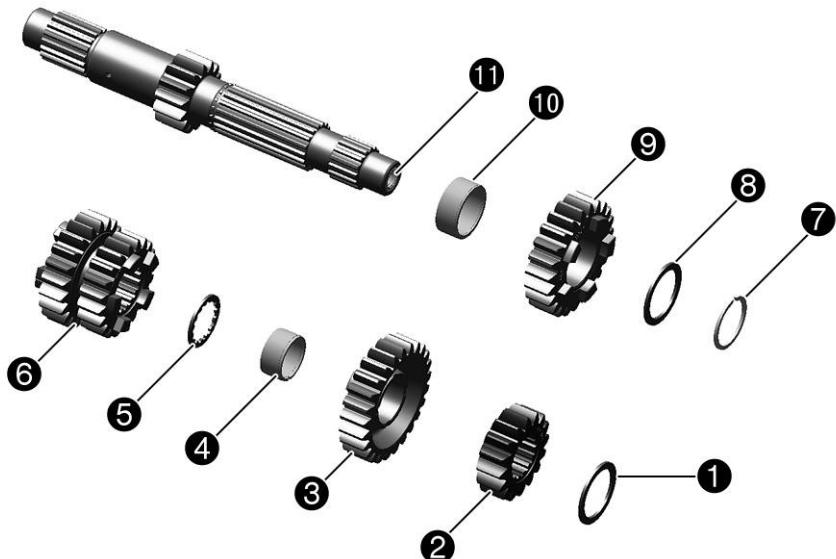
- Check bearing ③ for stiffness and wear.
 - » If the bearings do not move freely or are worn:
 - Change the bearings.
- Check shift drums ④ for ovality, surface damage and cracking.
 - » If the shift drum is oval, or shows signs of surface damage or cracks:
 - Change the shift drum.
- Check springs ⑤ of the shift rails for damage and wear.
 - » If the spring is broken or worn:
 - Change the spring of the shift rail.
- Check the shift rails ⑥ on a flat surface for run-out.
 - » If there is run-out:
 - Change the shift rail.
- Check shift rails for scoring, signs of corrosion and stiffness in the shift fork.
 - » If there is scoring or corrosion, or if the shift fork is stiff:
 - Change the shift rail.
- Check sliding plate ⑦ in contact areas ⑧ for wear.
 - » If the sliding plate is worn:
 - Change the sliding plate.
- Check return surface ⑨ on the sliding plate for wear.
 - » If deep notches are present:
 - Change the sliding plate.
- Check guide pin ⑩ for looseness and wear.
 - » If the guide pin is loose and/or worn:
 - Change the sliding plate.

18.8.25 Preassembling the shift shaft



- Fix the short end of the shift shaft in a vise.
- Guideline
- Use soft jaws.
- Mount sliding plate ① with the guide pin facing down and attach the guide pin to the shift quadrant.
 - Mount preload spring ②.
 - Push on spring guide ③, push return spring ④ over the spring guide with the offset end facing upward and lift the offset end over abutment bolt ⑤.
 - Mount stop disk ⑥.

18.8.26 Disassembling the main shaft



305428-10

- Secure the main shaft with the toothed end facing downward in the bench vise.

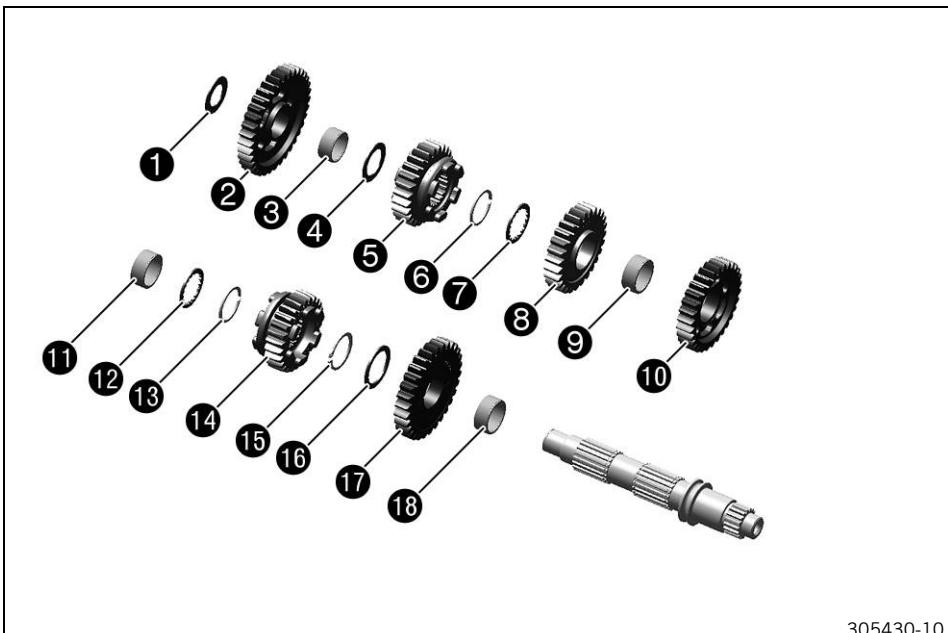
Guideline

Use soft jaws.

- Remove stop disk 1 and second-gear fixed gear 2.
- Remove sixth-gear idler gear 3.
- Remove needle bearing 4 and stop disk 5.
- Remove third/fourth-gear sliding gear 6.
- Remove lock ring 7.
- Remove stop disk 8 and fifth-gear idler gear 9.
- Remove needle bearing 10.
- Remove needle bushing 11 with a suitable tool.

**Info**

Only needs to be removed in case of wear.

18.8.27 Disassembling the countershaft

305430-10

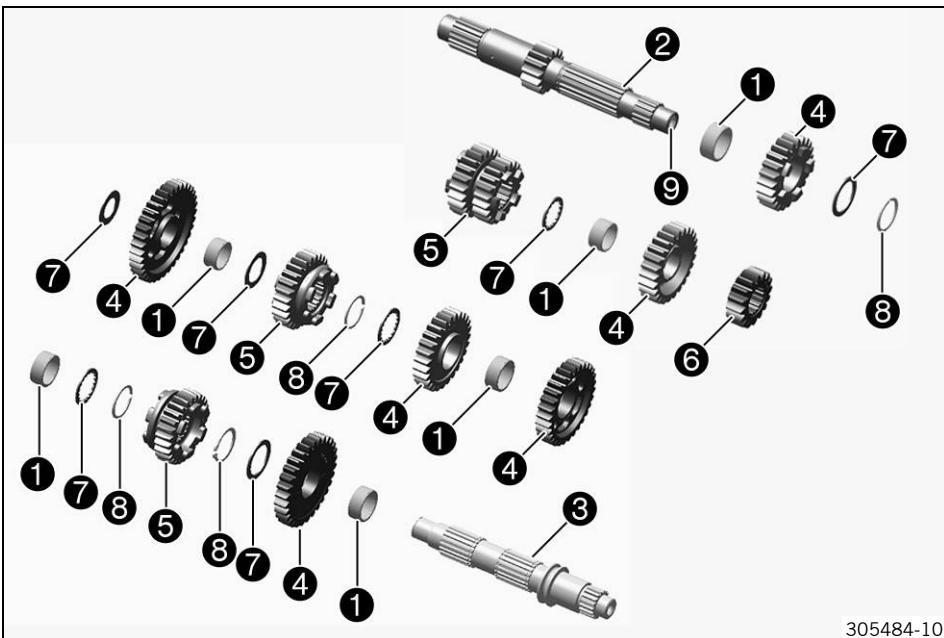
- Secure the countershaft with the toothed end facing downward in the bench vise.

Guideline

Use soft jaws

- Remove stop disk 1 and first-gear idler gear 2.
- Remove needle bearing 3 and stop disk 4.
- Remove the fifth-gear sliding gear 5 and lock ring 6.
- Remove stop disk 7 and fourth-gear idler gear 8.
- Remove needle bearing 9 and third-gear idler gear 10.
- Remove needle bearing 11 and stop disk 12.
- Remove lock ring 13 and sixth-gear sliding gear 14.
- Remove lock ring 15 and stop disk 16.
- Remove second-gear idler gear 17 and needle bearing 18.

18.8.28 Checking the transmission



- 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 gear ⑤ for smooth operation in the profile of main shaft ②.
 - » If the solid 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 solid 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.
- Check stop disks ⑨ for damage and wear.

- » If there is damage or wear:
 - Change the needle bushing.

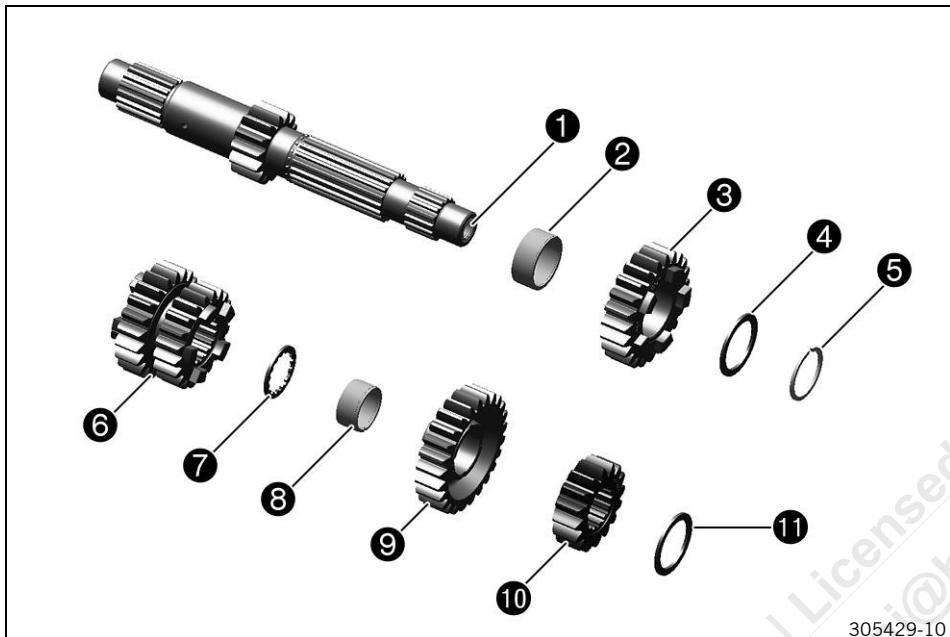
18.8.29 Assembling the main shaft

**Info**

Use new lock rings with every repair.

Preparatory work

- Oil all parts carefully before assembling.
- Check the transmission. (☞ p. 209)

**Main work**

- Secure the main shaft with the toothed end facing downward in the bench vise.

Guideline

Use soft jaws

- If removed, mount the new needle bushing ① with suitable tools.
- Mount needle bearing ② and mount fifth-gear idler gear ③ with the shift dogs facing up.
- Mount stop disk ④ and lock ring ⑤.
- Mount third/fourth-gear sliding gear ⑥ with the small gear wheel facing up.
- Mount stop disk ⑦ and needle bearing ⑧.
- Attach sixth gear idler gear ⑨ with the shift dog facing downward.
- Attach second-gear fixed gear ⑩ with the collar facing downward and stop disk ⑪.
- Finally, check all gear wheels for smooth operation.

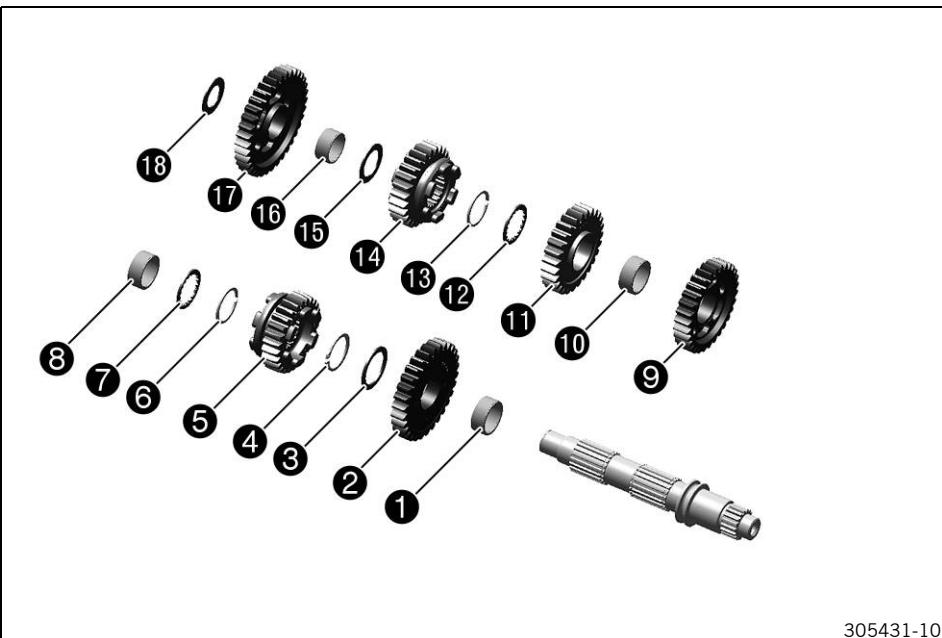
18.8.30 Assembling the countershaft

**Info**

Use new lock rings with every repair.

Preparatory work

- Oil all parts carefully before assembling.
- Check the transmission. (☞ p. 209)

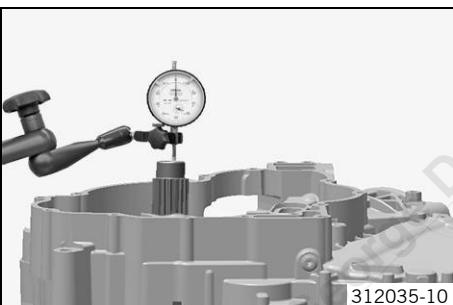
**Main work**

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

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 sixth-gear sliding gear ⑤ with the shift groove facing up.
- Mount the new lock ring ⑥ and stop disk ⑦.
- Mount needle bearing ⑧ and the third-gear idler gear ⑨ with the collar facing up.
- Mount needle bearing ⑩ and the fourth-gear idler gear ⑪ with the collar facing down.
- Mount stop disk ⑫ and new lock ring ⑬.
- Mount fifth-gear sliding gear ⑭ with the shift groove facing down and mount stop disk ⑮.
- Mount needle bearing ⑯, first-gear idler gear ⑰ with the recess facing down, and stop disk ⑱.
- Finally, check all gear wheels for smooth operation.

18.8.31 Measuring the main shaft axial play

- Mount transmission in the right section of the engine case.

i Info

Do not forget the dowels.

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

Guideline

Screw, engine case	M8	18 Nm (13.3 lbf ft)
Screw, engine case	M6	10 Nm (7.4 lbf ft)

- Mount the dial gauge support on the engine case and measure and note down the main shaft axial play.

Guideline

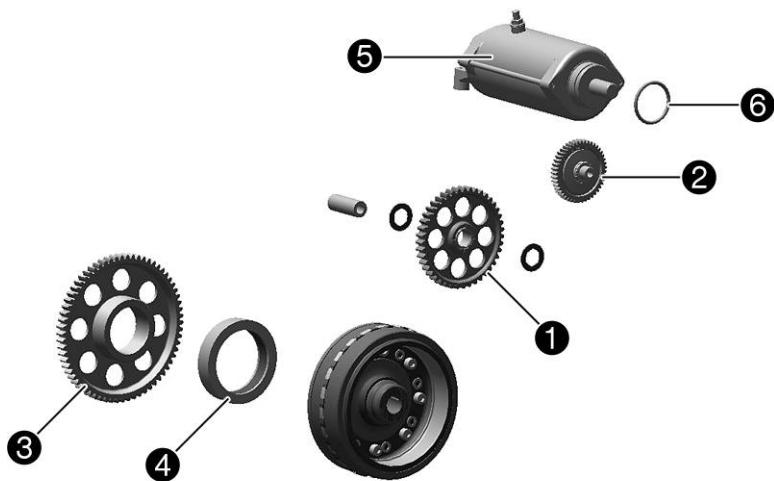
Main shaft axial clearance	0.02... 0.15 mm (0.0008... 0.0059 in)
----------------------------	---------------------------------------

» If the measured value does not meet specifications:

- Calculate the thickness of the stop disk.
- Remove screws and take off section of the engine case.

- Mount corresponding stop disk on the main shaft.

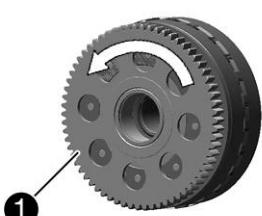
18.8.32 Checking electric starter operation



305432-10

- Check the gear mesh and bearing of starter idler gear ① for damage and wear.
 - » If there is damage or wear:
 - Change the starter idler gear.
- Check the gear mesh and bearing of torque limiter ② for damage and wear.
 - » If there is damage or wear:
 - Change the torque limiter.
- Check the gear mesh and bearing of freewheel gear ③ for damage and wear.
 - » If there is damage or wear:
 - Change the free-wheel-gear and/or the bearing.
- Check freewheel ④ for damage and wear.
 - » If there is damage or wear:
 - Change the freewheel.
- Checking the gear mesh of starter motor ⑤ for damage and wear
 - » If there is damage or wear:
 - Change the starter motor.
- Change O-ring ⑥ of the starter motor.
- Connect the negative cable of a 12 volt power supply to the housing of the starter motor. Connect the positive cable of the power supply briefly with connector of the starter motor.
 - » If the starter motor does not turn when the circuit is closed:
 - Change the starter motor.

18.8.33 Checking the free-wheel

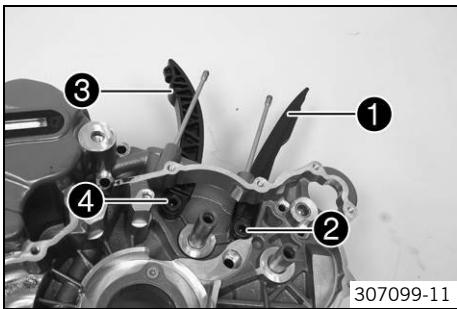


305469-10

- Insert freewheel gear ① into the freewheel hub while turning the freewheel gear counterclockwise; do not wedge it.
- Check the locking action of free-wheel-gear ①.
 - » The freewheel gear cannot be turned counterclockwise and does not block clockwise:
 - Change the freewheel.

18.9 Engine assembly

18.9.1 Installing the timing chain rails of the left engine case section



- Position timing chain guide rail ①. Mount and tighten screw ②.

Guideline

Screw, timing chain guide rail	M8	15 Nm (11.1 lbf ft)	Loctite® 243™
--------------------------------	----	------------------------	---------------



Info

Ensure that there is no thread locker on the collar of the screw; otherwise, the timing chain guide rail may block and brake.

- Position timing chain tensioning rail ③. Mount and tighten screw ④.

Guideline

Timing chain tensioning rail screw	M8	15 Nm (11.1 lbf ft)	Loctite® 243™
------------------------------------	----	------------------------	---------------

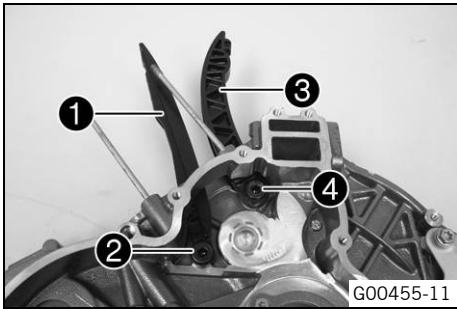


Info

Ensure that there is no thread locker on the collar of the screw; otherwise, the timing chain tensioning rail may block and brake.

- Check both timing chain rails for freedom of motion.

18.9.2 Installing the timing chain rails of the right engine case section



- Position timing chain guide rail ①. Mount and tighten screw ②.

Guideline

Screw, timing chain guide rail	M8	15 Nm (11.1 lbf ft)	Loctite® 243™
--------------------------------	----	------------------------	---------------



Info

Ensure that there is no thread locker on the collar of the screw; otherwise, the timing chain guide rail may block and brake.

- Position timing chain tensioning rail ③. Mount and tighten screw ④.

Guideline

Timing chain tensioning rail screw	M8	15 Nm (11.1 lbf ft)	Loctite® 243™
------------------------------------	----	------------------------	---------------

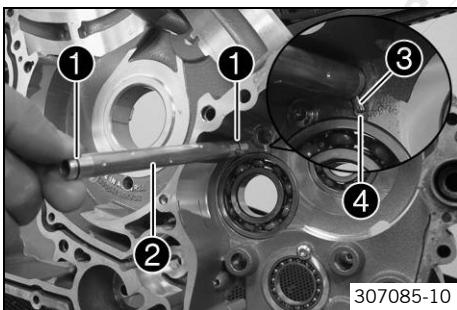


Info

Ensure that there is no thread locker on the collar of the screw; otherwise, the timing chain tensioning rail may block and brake.

- Check both timing chain rails for freedom of motion.

18.9.3 Installing the oil spray tube

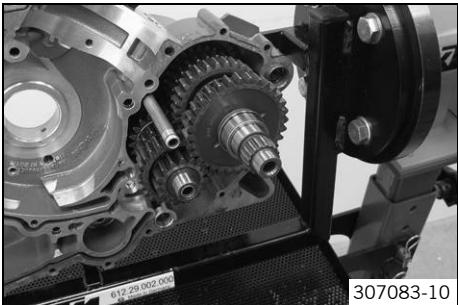


- Mount new O-rings ① on oil spray tube ②.

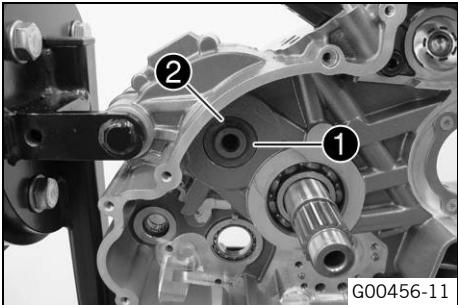
- Mount the oil spray tube.

✓ Pin ③ must engage in recess ④.

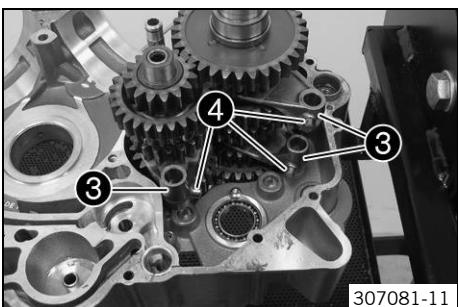
18.9.4 Installing the transmission shaft



- Clamp the right section of the engine case.
- | |
|--|
| Engine assembly stand (61229001000) (p. 344) |
| Engine fixing arm (61229002000) (p. 344) |
- Assemble the two transmission shafts and slide them into the bearing seats together.



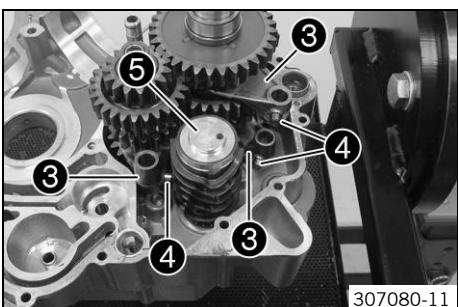
- Mount stop disk 1 and lock ring 2 of the countershaft.



- Tilt the engine.
- Mount shift forks 3 with shift rollers 4.


Info

Use a small amount of grease to fix the shift rollers to the shift forks.

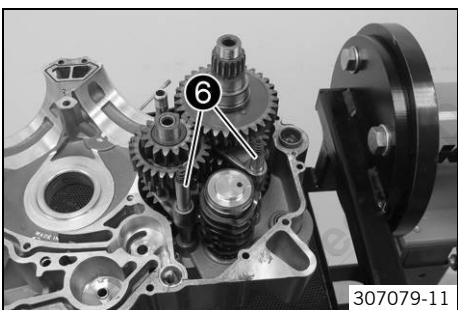


- Swing shift forks 3 to one side.


Info

Watch out for the shift rollers 4.

- Insert shift drum 5 into the bearing seat.
- Let the shift forks engage in the shift grooves.



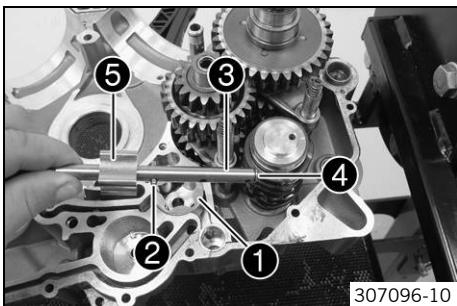
- Mount shift rails 6 with the springs.


Info

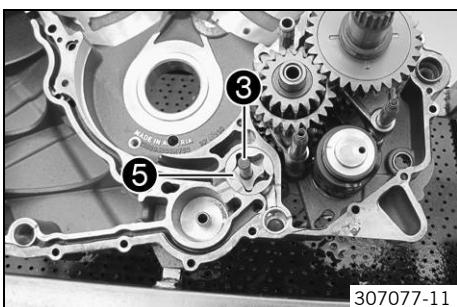
Affix the springs to the shift rails with grease.

- Check the transmission for smooth operation.

18.9.5 Installing the middle suction pump

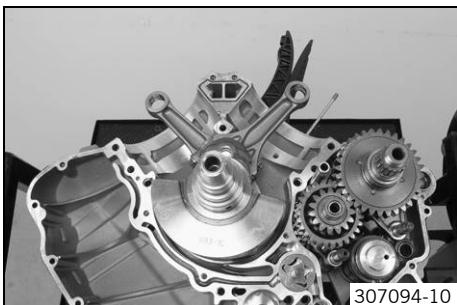


- Mount external rotor **1**.
- ✓ The rounded side of the external rotor must face the engine case.
- Mount pin **2** into the third hole of oil pump shaft **3** after shaft keyway **4**.
- Slide internal rotor **5** over the pin.



- Mount oil pump shaft **3** with internal rotor **5**.
- Oil the parts.

18.9.6 Installing the crankshaft

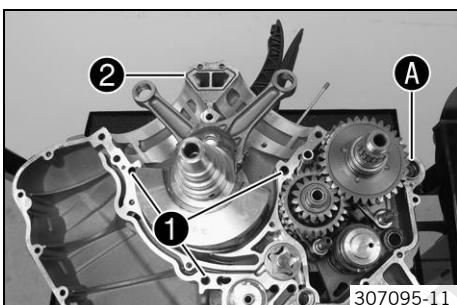


- Oil the bearing shells.
- Slide the crankshaft into the bearing seat.

i **Info**

Position the connecting rod as shown in the photo.

18.9.7 Installing the left engine case



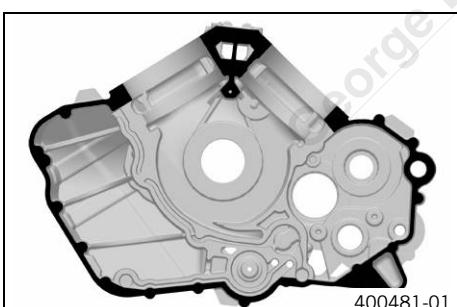
- Mount dowels **1**.
- Mount gasket **2**.
- Check that dowel **A** is correctly seated.

- Degrease the sealing area and coat thinly with sealant.

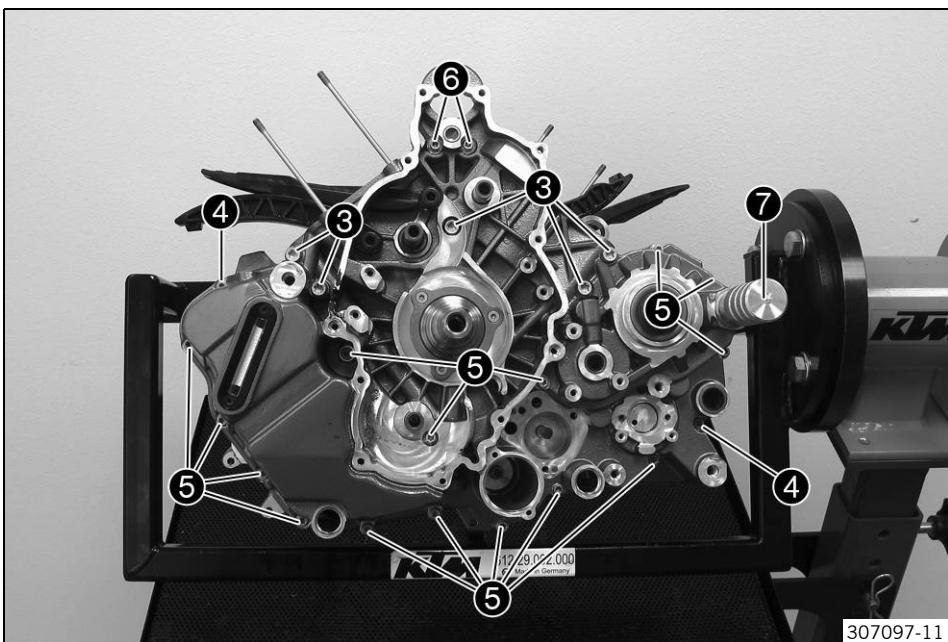
Loctite® 5910

i **Info**

Only coat the sealing area around the outside (see figure).



400481-01



- Attach the left engine case, using a plastic hammer if necessary to seat it properly.

**Info**

Do not tighten the engine case sections using the screws.

- Mount and tighten screws ③.

Guideline

Screw, engine case	M8	18 Nm (13.3 lbf ft)
--------------------	----	---------------------

- Mount and tighten screws ④.

Guideline

Screw, engine case	M6x60	10 Nm (7.4 lbf ft)
--------------------	-------	--------------------

- Mount and tighten screws ⑤.

Guideline

Screw, engine case	M6x80	10 Nm (7.4 lbf ft)
--------------------	-------	--------------------

- Mount and tighten screws ⑥.

Guideline

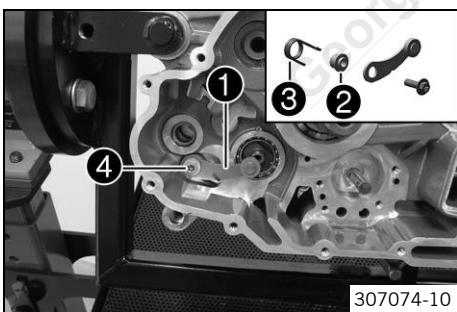
Screw, engine case	M6x90	10 Nm (7.4 lbf ft)
--------------------	-------	--------------------

**Info**

Screws ⑥ must always be replaced with new screws.

- Mount screw ⑦.

18.9.8 Installing the locking lever

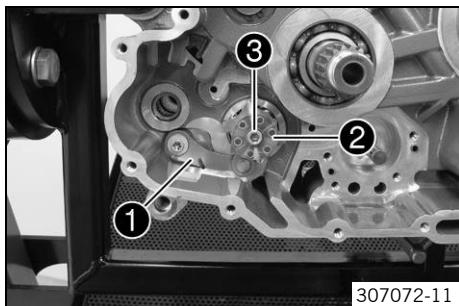


- Position locking lever ① with sleeve ② and spring ③.
- Mount and tighten screw ④.

Guideline

Screw, locking lever	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
----------------------	----	-----------------------	---------------

18.9.9 Installing the shift drum locating



307072-11

- Press locking lever 1 down and position shift drum locating 2.

**Info**

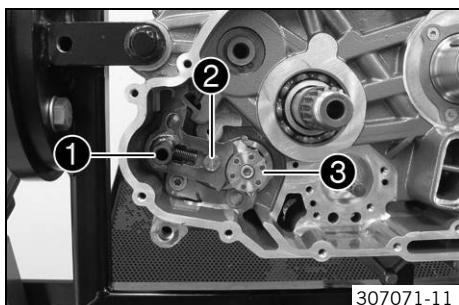
The flat surfaces of the shift drum locating unit are not symmetric.

- Release the locking lever.
- Mount and tighten screw 3.

Guideline

Screw, shift drum locating	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
----------------------------	----	-----------------------	----------------------

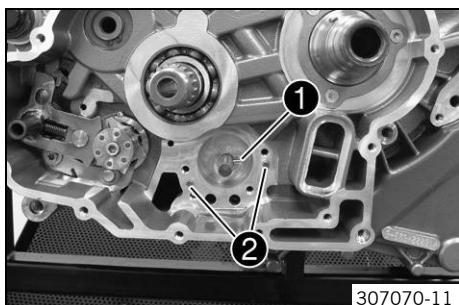
18.9.10 Installing the shift shaft



307071-11

- Slide shift shaft 1 with the washer into the bearing seat.
- Push sliding plate 2 away from the shift drum locating 3.
- Insert the shift shaft all the way.
- Let the sliding plate engage in the shift drum locating.
- Shift through the transmission.

18.9.11 Installing the force pump

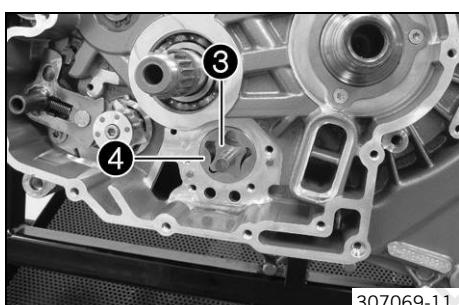


307070-11

- Mount pin 1.

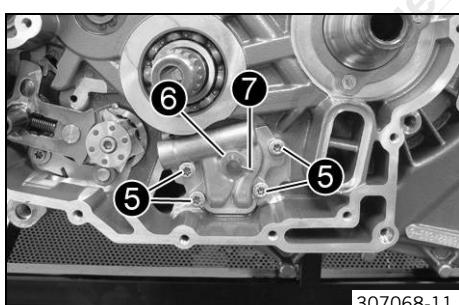
**Info**

Ensure that pins 2 are seated correctly.



307069-11

- Mount internal rotor 3 and external rotor 4.
- ✓ The rounded side of the external rotor must face the engine case.
- Oil the parts.



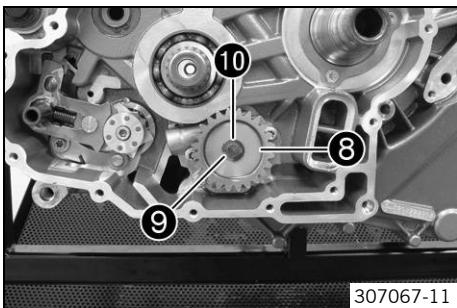
307068-11

- Position the oil pump cover. Mount and tighten screws 5.

Guideline

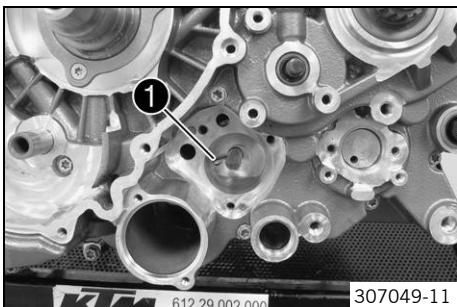
Screw, oil pump cover	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
-----------------------	----	-----------------------	----------------------

- Mount washer 6 and pin 7.

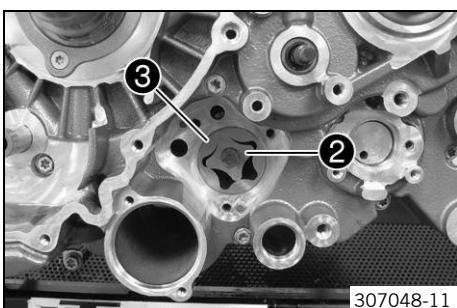


- Mount oil pump gear wheel 8, washer 9 and lock washer 10.

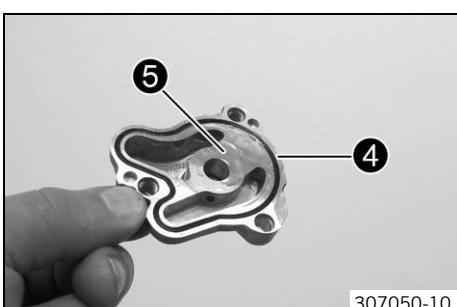
18.9.12 Installing the left suction pump



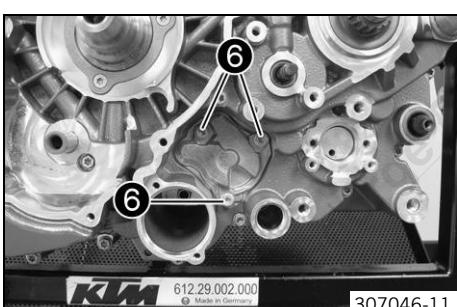
- Mount pin 1.



- Mount internal rotor 2 and external rotor 3.
✓ The rounded side of the external rotor must face the engine case.
- Oil the parts.



- Insert new gasket 4 into the oil pump cover.
- Position the oil pump cover 5.



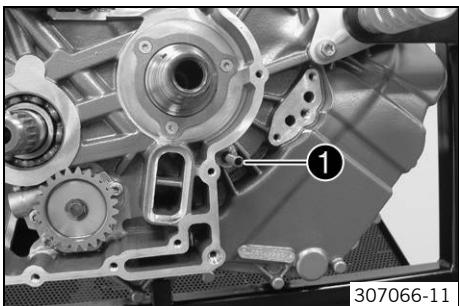
- Mount and tighten screws 6.

Guideline

Screw, oil pump cover	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
-----------------------	----	-----------------------	---------------

- Turn the oil pump gear wheel and check the oil pumps for smooth operation.

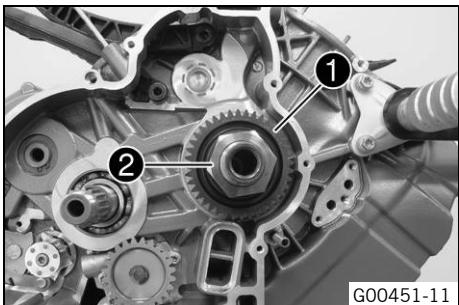
18.9.13 Setting the engine to ignition top dead center of the rear cylinder



- Set the crankshaft to top dead center of the rear cylinder.
- ✓ The position notch of the crankshaft is visible in the hole.
- Screw in special tool 1.

Engine blocking screw (61229015000) (see p. 345)

18.9.14 Installing the primary gear

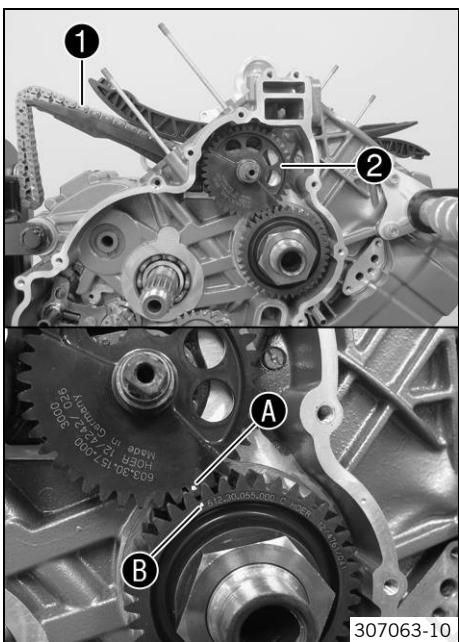


- Ensure that the woodruff key is seated properly.
- Mount primary gear 1.
- Mount the washer and nut 2 and tighten the nut.

Guideline

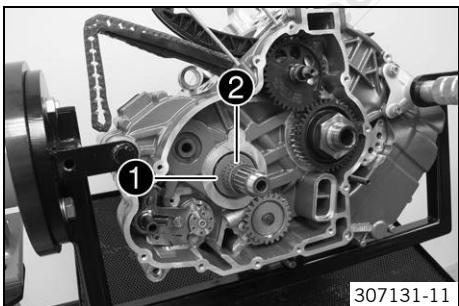
Nut, primary gear	M33LHx1.5	130 Nm (95.9 lbf ft)	Loctite® 243™
-------------------	-----------	-------------------------	---------------

18.9.15 Installing the idler and timing chain on the right

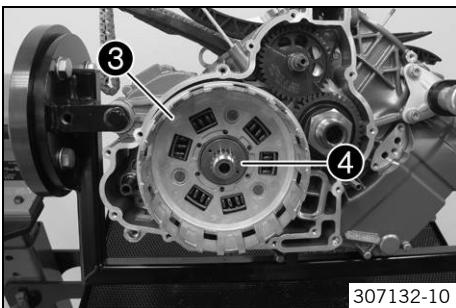


- Position timing chain 1 according to the direction of travel.
- Place the timing chain over the toothed side of idler 2. Align markings A and B.
- Slide on the idler.

18.9.16 Installing the clutch basket



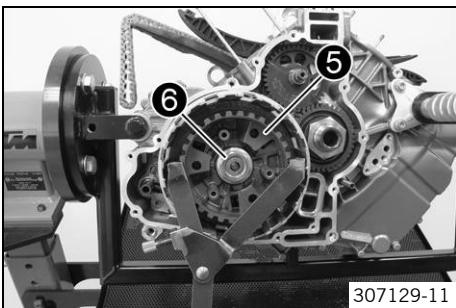
- Mount washer 1 and needle bearing 2.



- Mount clutch basket ③ and washer ④.

i Info

Turn the clutch basket and oil pump gear wheel backwards and forwards slightly to help them mesh more easily.



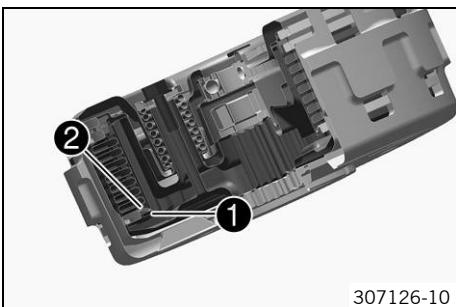
- Mount inner clutch hub ⑤.
- Mount nut ⑥ with the washer.
- Tighten the nut, holding the inner clutch hub with a special tool.

Guideline

Nut, inner clutch hub	M22x1.5	120 Nm (88.5 lbf ft)	Loctite® 243™
-----------------------	---------	-------------------------	---------------

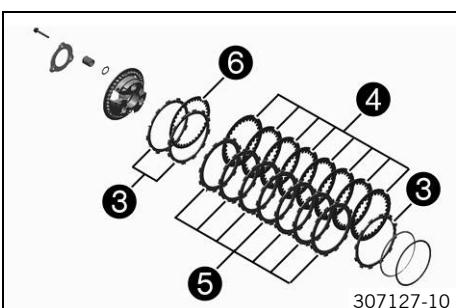
Clutch holder (51129003000) (p. 340)

18.9.17 Installing the clutch discs

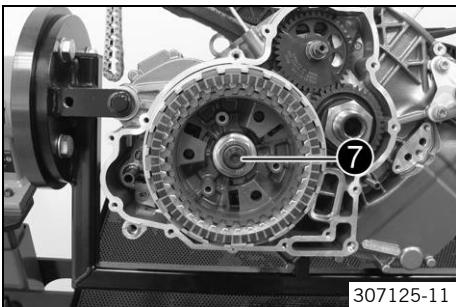


- Mount support ring ① and pretension ring ②.

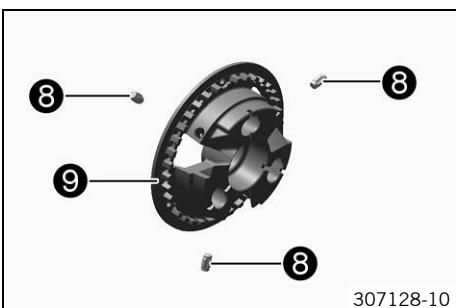
✓ The pretension ring rests against the support ring on the inside and the outside faces away from the support ring.



- Thoroughly oil the clutch facing discs.
- Mount a clutch facing disc ③ with a larger inside diameter.
- Alternately mount 8 intermediate clutch discs ④ and 7 of the same clutch facing discs ⑤.
- Alternately mount 2 clutch facing discs ③ and an intermediate clutch disc ⑥ with a larger inside diameter.
- The outer clutch facing disc must be mounted offset by one mesh.



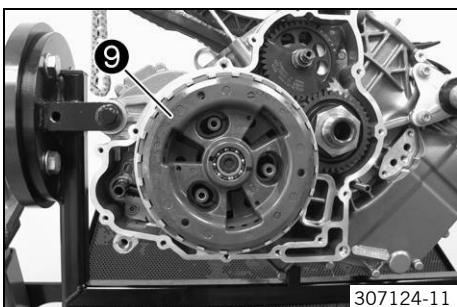
- Mount push rod ⑦.



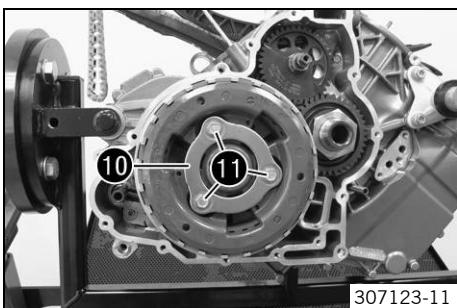
- Mount damper ⑧ in the clutch pressure cap ⑨.

i Info

When changing the clutch discs, always renew the damper.



- Position clutch pressure cap **9**.
- ✓ The teeth of the outer intermediate clutch disc engages in the clutch pressure cap.
- ✓ The clutch pressure cap rests flush against the outer lining disc.

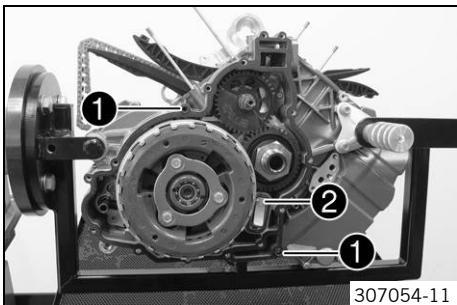


- Position clutch center **10** and the springs.
- Mount and tighten screws **11**.

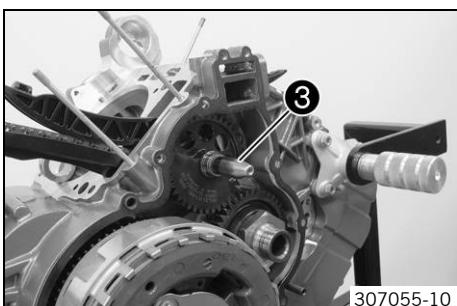
Guideline

Screw, clutch spring	M6	12 Nm (8.9 lbf ft)
----------------------	----	--------------------

18.9.18 Installing the clutch cover

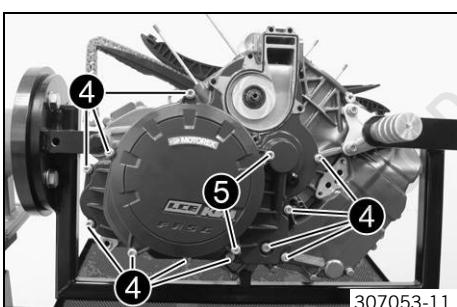


- Mount dowels **1** and position the clutch cover gasket.
- Mount check valve **2**.



- Slide special tool **3** onto the water pump shaft.

Protection cap (61229005100) (☞ p. 344)



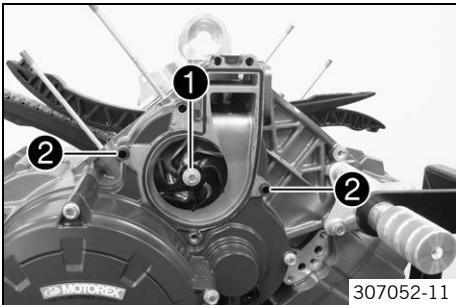
- Mount the clutch cover. Mount and tighten screws **4** and **5**.

Guideline

Screw, clutch cover	M6	10 Nm (7.4 lbf ft)
---------------------	----	--------------------

- Remove the special tool.

18.9.19 Installing the water pump wheel



- Mount the washer and water pump wheel.

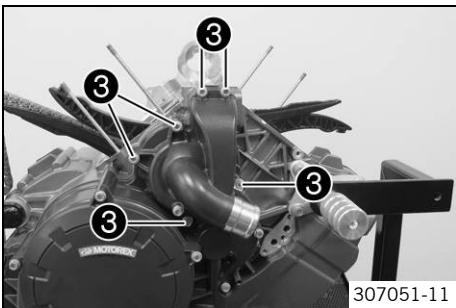
- Mount and tighten screw ①.

Guideline

Screw, water pump wheel	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
-------------------------	----	-----------------------	---------------

- Mount dowels ②.

- Replace the seal.



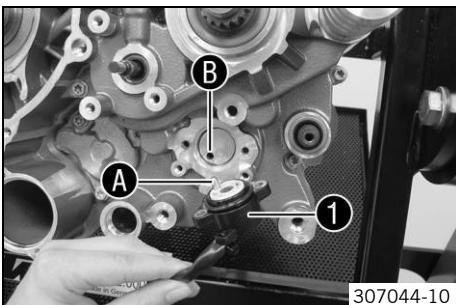
- Mount the water pump cover.

- Mount and tighten screws ③.

Guideline

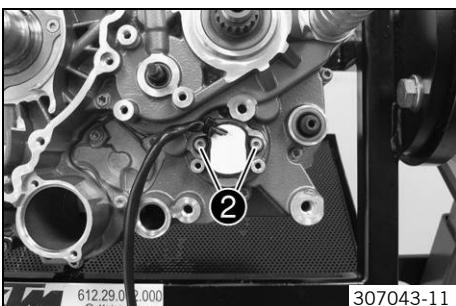
Screw, water pump cover	M6	10 Nm (7.4 lbf ft)
-------------------------	----	--------------------

18.9.20 Installing the gear position sensor



- Mount gear position sensor ① with the O-ring.

✓ Pin A engages in hole B.

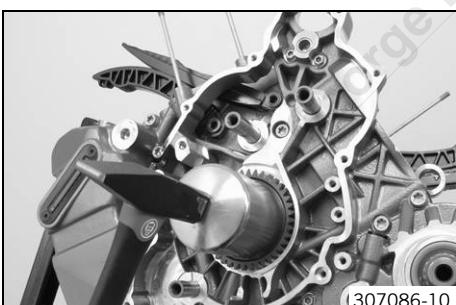


- Mount and tighten screws ② with the washers.

Guideline

Screw, gear sensor	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
--------------------	----	----------------------	---------------

18.9.21 Installing the drive wheel of the balancer shaft



- Heat the drive wheel of the balancer shaft.

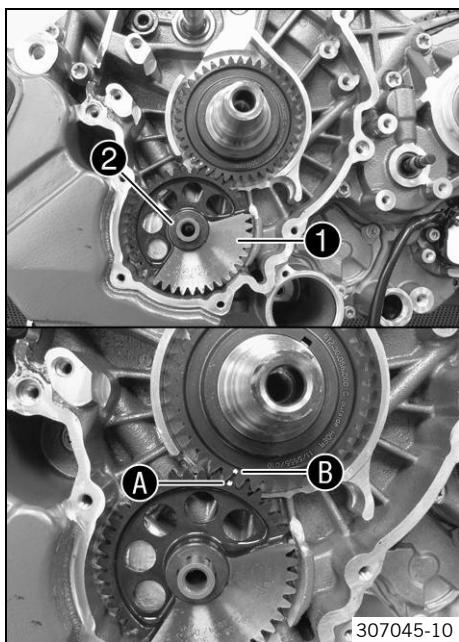
Guideline

200 °C (392 °F)

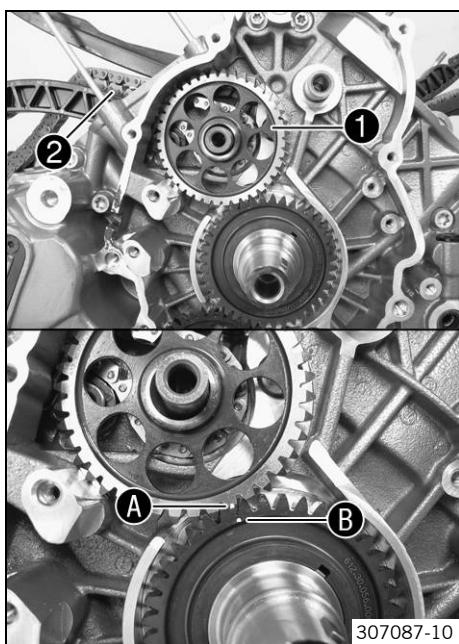
- Ensure that the woodruff key is seated properly. Mount the drive wheel of the balancer shaft with the beveled edge facing forward.

Pressure bell (61229016000) (p. 345)

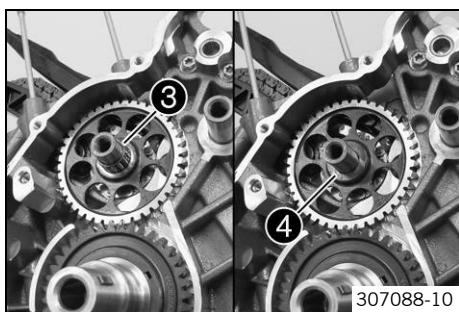
✓ The markings are visible after mounting.

18.9.22 Installing the balancer shaft

- Mount the rear washer and needle bearing.
- Mount balancer shaft ①.
- ✓ Markings A and B are aligned.
- Mount washer ②.

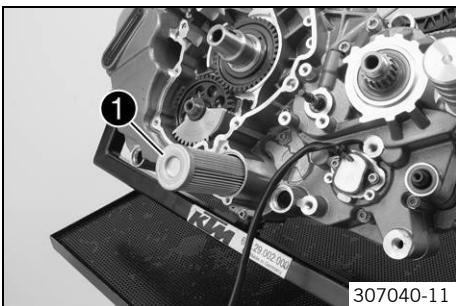
18.9.23 Installing the idler and timing chain on the left

- Mount the rear washer.
- Mount idle gear ① with timing chain ② in accordance with the direction of travel.
- ✓ Markings A and B are aligned.

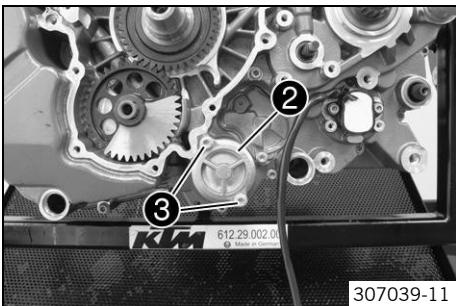


- Mount needle bearing ③.
- Mount washer ④.

18.9.24 Installing the oil filter



- Tilt the engine sideways and fill the oil filter housing to about $\frac{1}{3}$ full with engine oil.
- Insert oil filter ①.

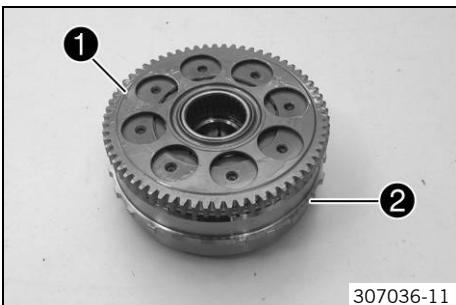


- Lubricate the O-ring of oil filter cover ②. Mount the oil filter cover.
- Mount and tighten screws ③.

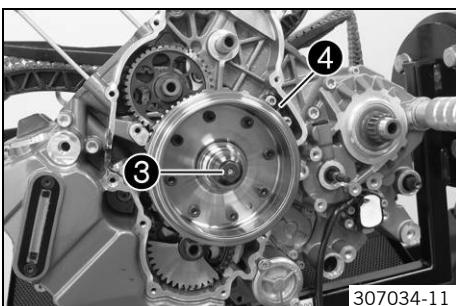
Guideline

Remaining engine screws	M5	6 Nm (4.4 lbf ft)
-------------------------	----	-------------------

18.9.25 Installing the rotor



- Turn the freewheel gear ① counterclockwise and mount it in rotor ②.



- Mount the rotor with the freewheel gear.



Info

Ensure that the woodruff key is seated properly.

- Thoroughly clean the oil nozzle of the rotor screw and blow it out with compressed air.

- Mount and tighten rotor screw ③.

Guideline

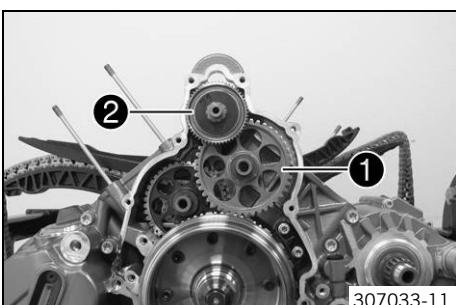
Rotor screw	M12x1.5	90 Nm (66.4 lbf ft)
-------------	---------	------------------------

- Position freewheel holder ④. Mount and tighten the screws.

Guideline

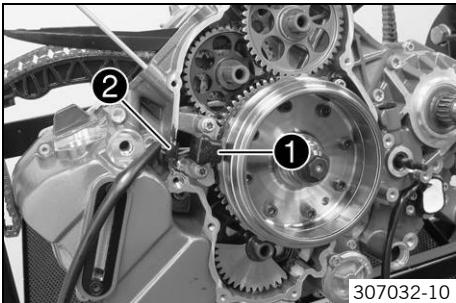
Screw, freewheel holder	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
-------------------------	----	-----------------------	---------------

18.9.26 Installing the torque limiter and idler



- Mount the rear washer, needle bearing, idler ① and front washer.
- Mount torque limiter ② with the rear washer.

18.9.27 Installing the ignition pulse generator



307032-10

- Position the ignition pulse generator 1.

- Mount and tighten the screws.

Guideline

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

- Position the cable, thinly coat cable support sleeve 2 with the sealing compound and insert it in the engine case.

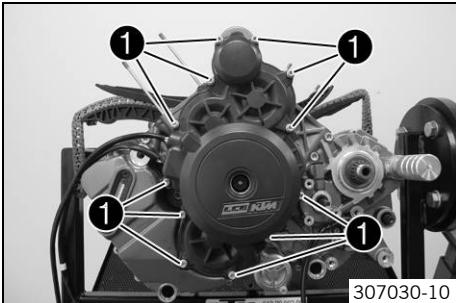
Loctite® 5910

- Check the distance between the ignition pulse generator and rotor.

Guideline

Crankshaft position sensor/rotor - gap	0.40 mm (0.0157 in)
--	---------------------

18.9.28 Installing the alternator cover



307030-10

- Mount the new alternator cover seal and dowels.
- Position the alternator cover.
- Mount and tighten screws 1.

Guideline

Remaining engine screws	M6	10 Nm (7.4 lbf ft)
-------------------------	----	--------------------

18.9.29 Rear piston assembly



309394-10

- Adjust impact of the piston rings by 120°.
- Mount oiled piston in the special tool.

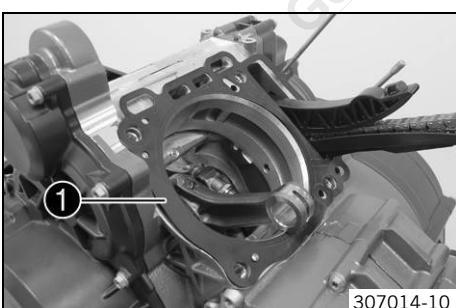
Piston assembly ring (61329015108) (p. 348)



309395-10

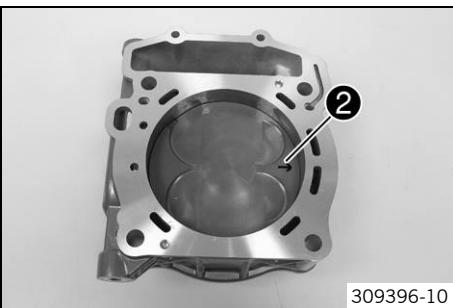
- Position the special tool on the cylinder with the piston.
- Slide the piston carefully into the cylinder.

✓ The piston rings may not be left hanging, as they may be damaged.

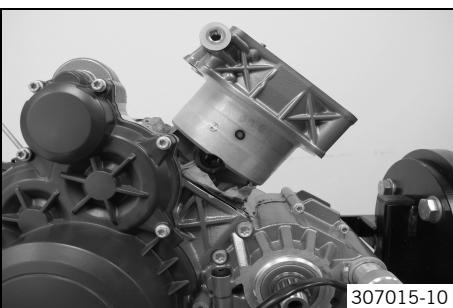


307014-10

- Place the new cylinder base gasket 1 into position.



- Ensure that piston marking ② faces the exhaust side.



- Cover the engine case opening with a cloth. Thread the timing chain through the timing chain shaft. Mount the piston pin.



- Position the new piston ring lock.

**Info**

For purposes of illustration, the following operations are shown on the deinstalled piston.

- Insert the special tool and press it with force towards the piston.
- Turn the special tool counterclockwise and, in doing so, press the piston ring lock into the groove.

Insertion tool for piston ring lock (75029035000) (☞ p. 349)

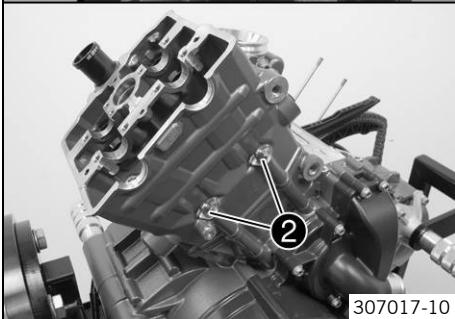
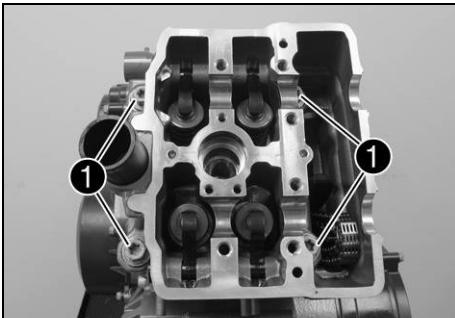
- Ensure that the piston ring lock is in the correct position on both sides.



- Remove the cloth.
- Keep the timing chain taut. Press the cylinder down carefully and bring dowel pins into contact.



18.9.30 Installing the rear cylinder head



307017-10

- Mount the new cylinder head gasket.
- Position the cylinder head and mount and tighten the new cylinder head screws ① with washers.

Guideline

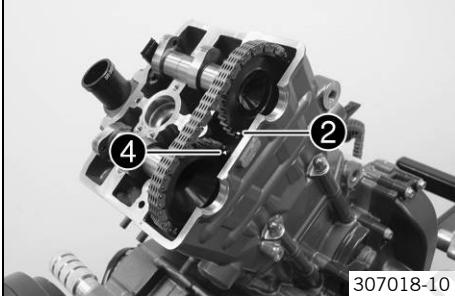
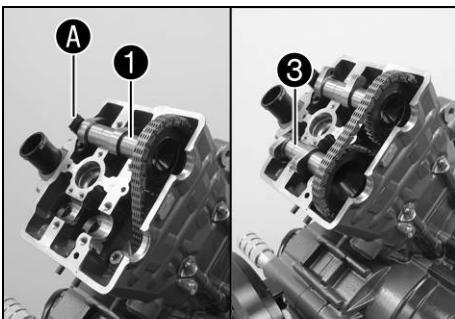
Cylinder head screw	M11x1.5	Tightening sequence: Using a criss-cross pattern Step 1 15 Nm (11.1 lbf ft) Step 2 30 Nm (22.1 lbf ft) Step 3 90° Step 4 90°	Lubricated with engine oil
---------------------	---------	---	----------------------------

- Mount and tighten nuts ② with the washers.

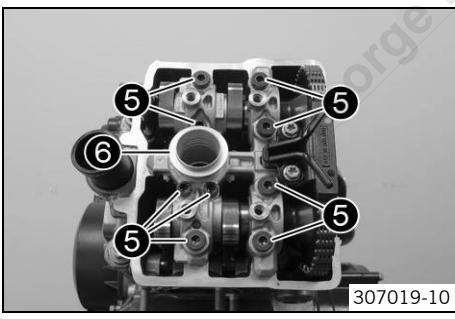
Guideline

Nut, cylinder head	M6	9 Nm (6.6 lbf ft)
--------------------	----	-------------------

18.9.31 Installing the rear camshafts



307018-10



307019-10

- Pull up the timing chain and insert intake camshaft ①.

**Info**The intake camshaft is labeled with **eh**.

- Place the timing chain over the rear sprocket of the intake camshaft.
- ✓ Marking ② is aligned.
- Ensure that bleeder A is seated correctly.
- Position exhaust camshaft ③.

**Info**The exhaust camshaft is labeled with **ah**.

- Place the timing chain over the rear sprocket and position the camshaft in the bearing seat.
- ✓ Marking ④ is aligned.

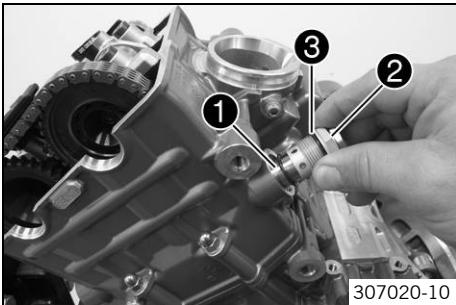
- Thoroughly clean all oil nozzles and blow them out with compressed air.
- Position the camshaft bearing bridge.
- Mount screws ⑤ and tighten them from the inside to the outside.

Guideline

Screw, camshaft bearing support	M6 – 10.9	10 Nm (7.4 lbf ft)
Screw, camshaft bearing support	M8 – 10.9	Step 1 10 Nm (7.4 lbf ft) Step 2 18 Nm (13.3 lbf ft)

- Grease the O-rings and mount spark plug shaft insert ⑥.

18.9.32 Installing the rear timing chain tensioner

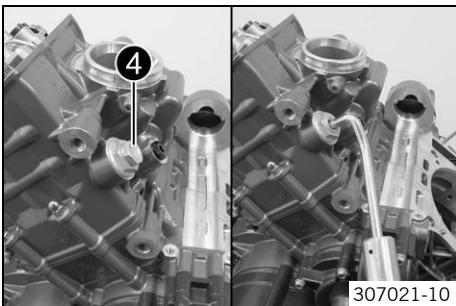


307020-10

- After it has been positioned in the installation location, insert timing chain tensioner ① with a new O-ring.
- Mount and tighten screw plug ② with new O-ring ③.

Guideline

Plug, timing-chain tensioner	M24x1.5	25 Nm (18.4 lbf ft)
------------------------------	---------	------------------------



307021-10

- Remove screw ④ with O-ring and use the special tool to push the timing chain tensioner toward the timing chain.

Release device for timing chain tensioner (61229021000) (p. 346)

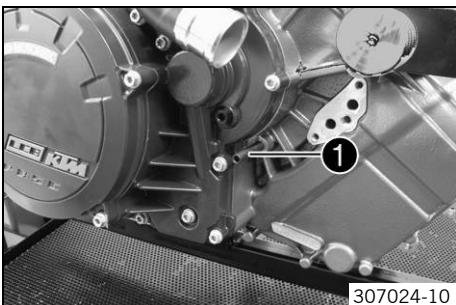
✓ The timing chain tensioner unlocks.

- Mount and tighten screw ④ with new O-ring.

Guideline

Screw, timing chain tensioner release	M10x1	10 Nm (7.4 lbf ft)
---------------------------------------	-------	--------------------

18.9.33 Setting the engine to ignition top dead center of the front cylinder

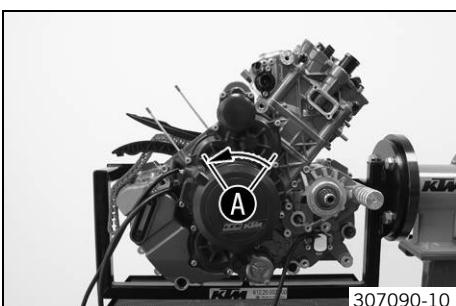


307024-10

- Remove special tool ①.
- Keep the timing chain tensioned.
- Turn the crankshaft counterclockwise by the specified value.

Guideline

1 turn



307090-10

- Turn the crankshaft counterclockwise by the specified value ④.

Guideline

75°

✓ The position notch of the crankshaft is visible in the hole.

- Screw in special tool ①.

Engine blocking screw (61229015000) (p. 345)

18.9.34 Installing the front piston



309394-10

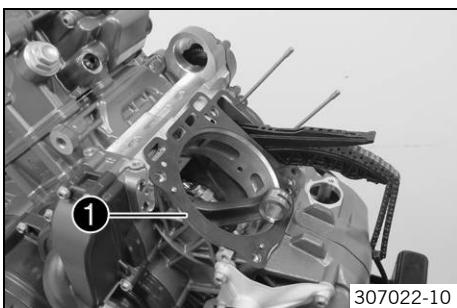
- Shift the joint of the piston rings by 120°.
- Mount the oiled piston in the special tool.

Piston assembly ring (61329015108) (p. 348)

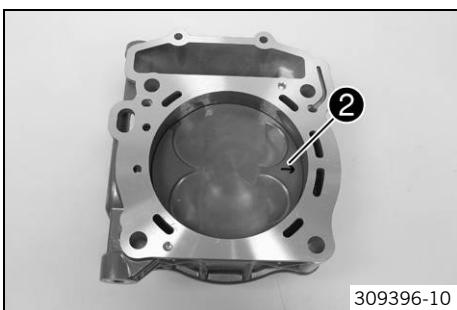


- Position the special tool on the cylinder with the piston.
- Slide the piston carefully into the cylinder.

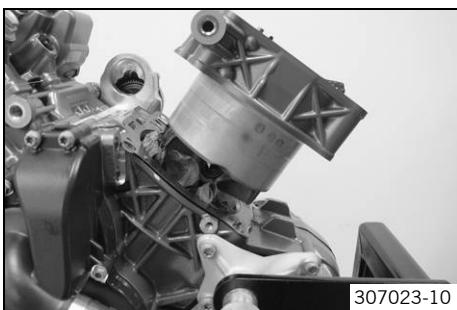
✓ The piston rings should not become caught; otherwise, they may be damaged.



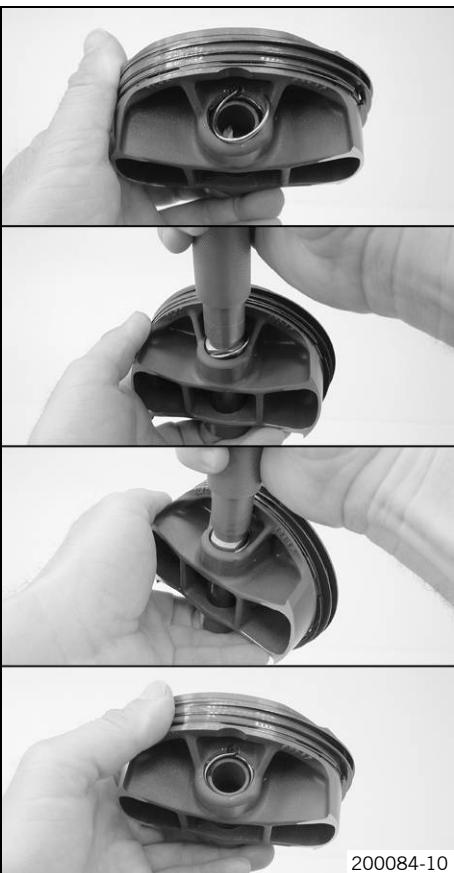
- Position the new cylinder base gasket ①.



- Ensure that piston marking ② faces the outfeed side.



- Cover the engine case opening with a cloth. Thread the timing chain through the timing chain shaft. Mount the piston pin.



200084-10

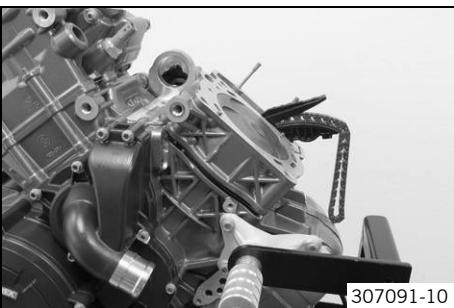
- Position the new piston pin retainer.

i Info

For clarity, the following steps are illustrated using a disassembled piston.

- Insert the special tool and firmly press it toward the piston.
- Turn the special tool counterclockwise, thereby pressing the piston pin retainer into the groove.
- Ensure that the piston pin retainer is correctly seated on both sides.

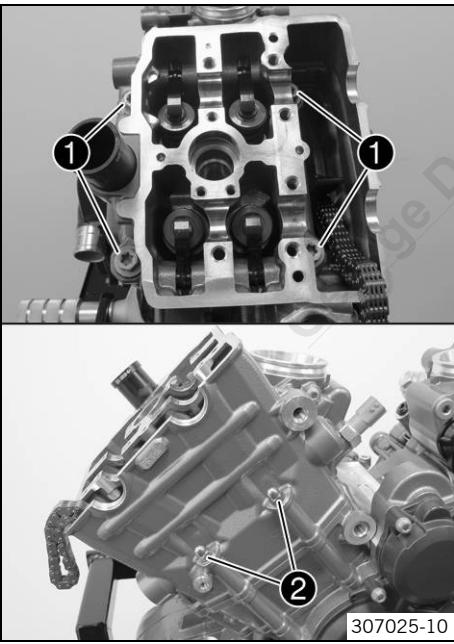
Insertion tool for piston ring lock (75029035000) (p. 349)



307091-10

- Remove the cloth.
- Keep the timing chain tensioned. Push the cylinder down carefully and let the dowel pins engage.

18.9.35 Installing the front cylinder head



307025-10

- Mount the new cylinder head gasket.
- Mount the cylinder head. Mount and tighten the new cylinder head screws 1 with washers.

Guideline

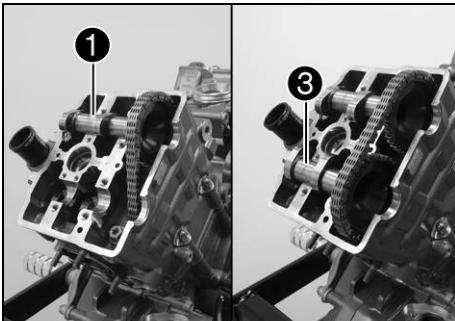
Cylinder head screw	M11x1.5	Tightening sequence: Using a criss-cross pattern Step 1 15 Nm (11.1 lbf ft) Step 2 30 Nm (22.1 lbf ft) Step 3 90° Step 4 90°	Lubricated with engine oil
---------------------	---------	---	-------------------------------

- Mount and tighten nuts 2 with the washers.

Guideline

Nut, cylinder head	M6	9 Nm (6.6 lbf ft)
--------------------	----	-------------------

18.9.36 Installing the front camshafts



- Pull up the timing chain and insert intake camshaft ①.


Info

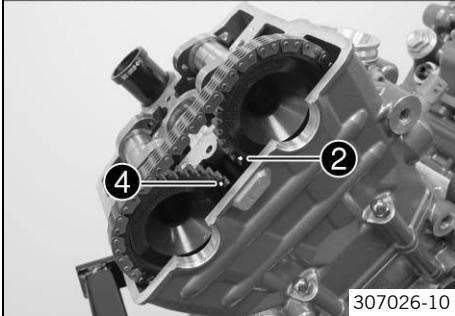
The intake camshaft is labeled with **ev**.

- Place the timing chain over the rear sprocket of the intake camshaft.
✓ Marking ② is aligned.
- Position exhaust camshaft ③.

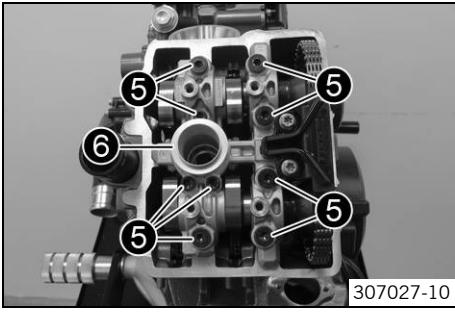

Info

The exhaust camshaft is labeled with **av**.

- Place the timing chain over the rear sprocket and position the camshaft in the bearing seat.
✓ Marking ④ is aligned.



307026-10



307027-10

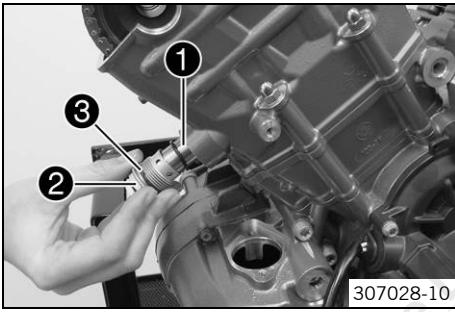
- Thoroughly clean all oil nozzles and blow them out with compressed air.
- Position the camshaft bearing bridge.
- Mount screws ⑤ and tighten them from the inside to the outside.

Guideline

Screw, camshaft bearing support	M6 – 10.9	10 Nm (7.4 lbf ft)
Screw, camshaft bearing support	M8 – 10.9	Step 1 10 Nm (7.4 lbf ft) Step 2 18 Nm (13.3 lbf ft)

- Grease the O-rings and mount spark plug shaft insert ⑥.

18.9.37 Installing the front timing chain tensioner

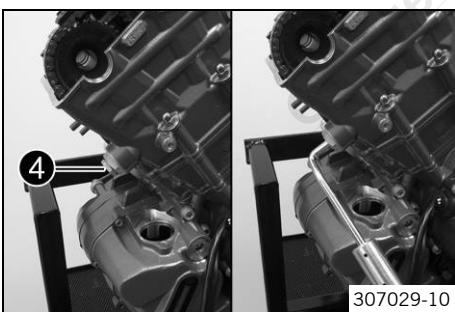


307028-10

- After it has been positioned in the installation location, insert timing chain tensioner ① with a new O-ring.

- Mount and tighten screw plug ② with new O-ring ③.
Guideline

Plug, timing-chain tensioner	M24x1.5	25 Nm (18.4 lbf ft)
------------------------------	---------	------------------------



307029-10

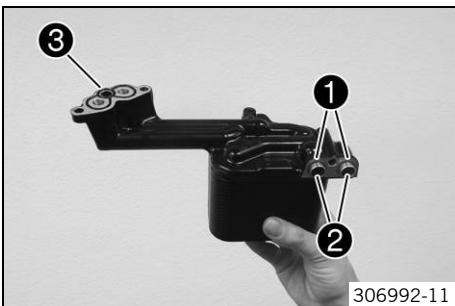
- Remove screw ④ with O-ring and use the special tool to push the timing chain tensioner toward the timing chain.

Release device for timing chain tensioner (61229021000) (p. 346)

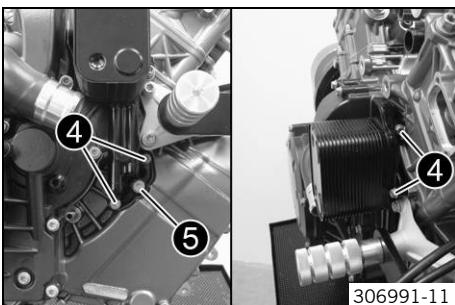
- ✓ The timing chain tensioner is unlocked.
- Mount and tighten screw ④ with new O-ring.
Guideline

Screw, timing chain tensioner release	M10x1	10 Nm (7.4 lbf ft)
---------------------------------------	-------	--------------------

18.9.38 Installing the heat exchanger



- Oil and mount O-rings ①.
- Mount sleeves ②.
- Mount gasket ③.



- Position the heat exchanger.
- Mount and tighten screws ④.

Guideline

Remaining engine screws	M6	10 Nm (7.4 lbf ft)
-------------------------	----	--------------------

- Mount and tighten screw ⑤.

Guideline

Screw, heat exchanger	M8	15 Nm (11.1 lbf ft)
-----------------------	----	------------------------

18.9.39 Installing the starter motor



- Grease the O-ring. Position the starter motor.

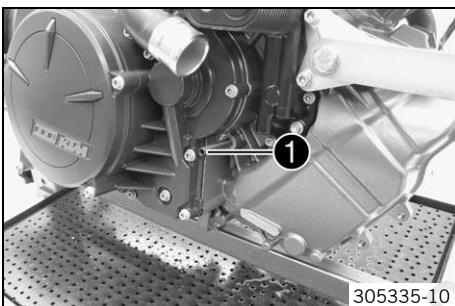
Long-life grease (p. 336)



Info

The screws are mounted only in the vehicle.

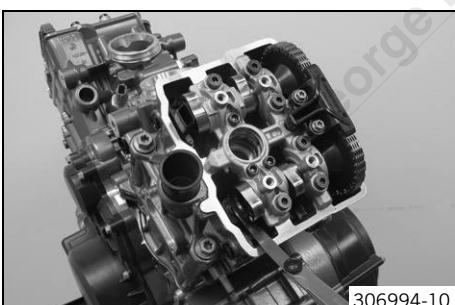
18.9.40 Checking the rear valve clearance



- Remove special tool ①.

Engine blocking screw (61229015000) (p. 345)

- Crank the engine several times.
- Set the engine to ignition top dead center of the rear cylinder. (p. 168)



- On all valves, check the valve clearance between the camshaft and cam lever.

Guideline

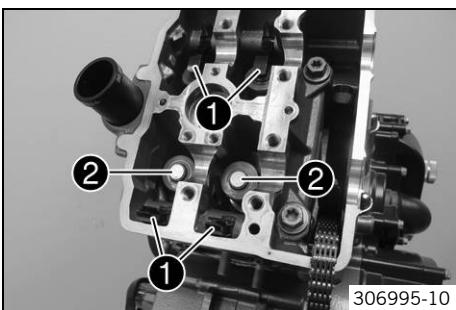
Valve clearance	
Exhaust at: 20 °C (68 °F)	0.25... 0.30 mm (0.0098... 0.0118 in)
Intake at: 20 °C (68 °F)	0.10... 0.15 mm (0.0039... 0.0059 in)

Feeler gauge (59029041100) (p. 341)

- » If valve clearance does not meet specifications:
 - Adjust the rear valve clearance. (p. 232)

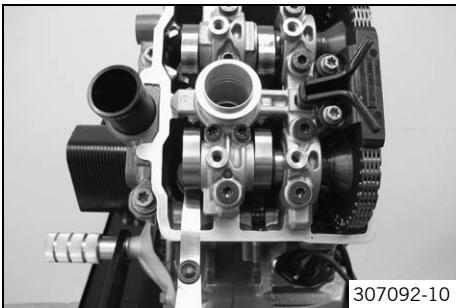
18.9.41 Adjusting the rear valve clearance

- Remove the rear timing chain tensioner. (p. 170)
- Remove the rear camshaft. (p. 170)



- Swing up cam lever ①.
- Remove shims ② and set them down according to the installation position.
- Correct the shims as indicated by the results of the valve clearance check.
- Insert suitable shims.
- Install the rear camshaft. (☞ p. 227)
- Install the rear timing chain tensioner. (☞ p. 228)
- Check the rear valve clearance. (☞ p. 232)

18.9.42 Checking the front valve clearance



- Remove the special tool.
- Engine blocking screw (61229015000) (☞ p. 345)
- Crank the engine several times.
 - Set the engine to ignition top dead center of the front cylinder. (☞ p. 172)
 - On all valves, check the valve clearance between the camshaft and cam lever.

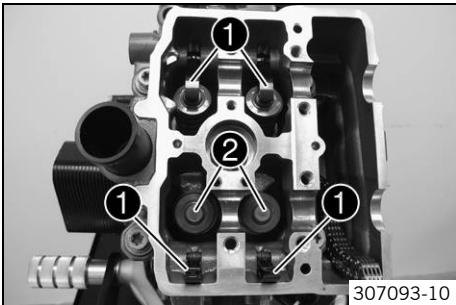
Guideline

Valve clearance	
Exhaust at: 20 °C (68 °F)	0.25... 0.30 mm (0.0098... 0.0118 in)
Intake at: 20 °C (68 °F)	0.10... 0.15 mm (0.0039... 0.0059 in)

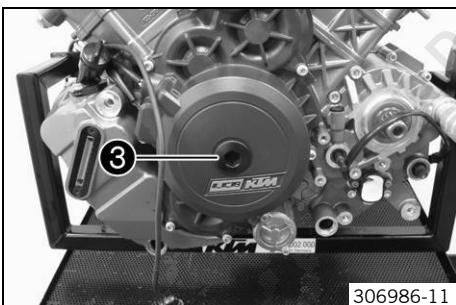
Feeler gauge (59029041100) (☞ p. 341)

- » If valve clearance does not meet specifications:
 - Adjust the front valve clearance. (☞ p. 233)

18.9.43 Adjusting the front valve clearance



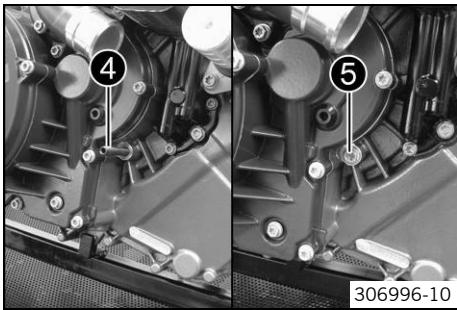
- Remove the front timing chain tensioner. (☞ p. 172)
- Remove the front camshafts. (☞ p. 172)
- Swing up cam lever ①.
- Remove shims ② and set them down according to the installation position.
- Correct the shims as indicated by the results of the valve clearance check.
- Insert suitable shims.
- Install the front camshafts. (☞ p. 231)
- Install the front timing chain tensioner. (☞ p. 231)
- Check the front valve clearance. (☞ p. 233)



- Mount and tighten the screw of alternator cover ③.

Guideline

Screw in alternator cover	M24x1.5	8 Nm (5.9 lbf ft)
---------------------------	---------	-------------------

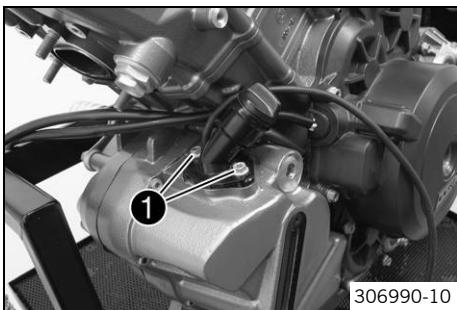


- Remove special tool 4. Mount and tighten screw 5.

Guideline

Plug, crankshaft retainer	M8	15 Nm (11.1 lbf ft)
---------------------------	----	------------------------

18.9.44 Installing the oil filler tube



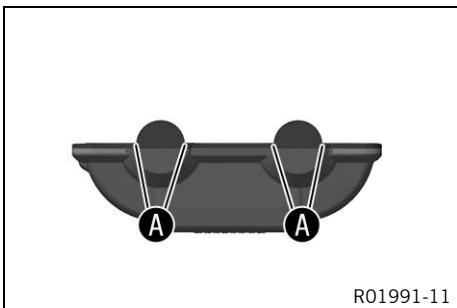
- Mount the oil filler tube with the O-ring.

- Mount and tighten screws 1.

Guideline

Remaining engine screws	M6	10 Nm (7.4 lbf ft)
-------------------------	----	--------------------

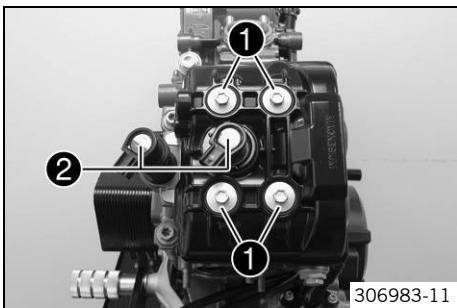
18.9.45 Installing front valve cover



- Clean and degrease the valve cover seal.

- Apply a thin layer of sealant to area A.

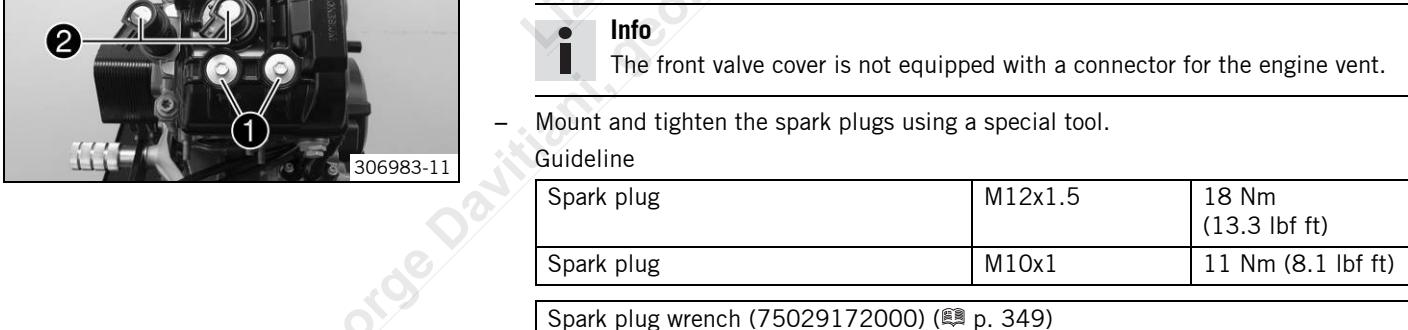
Loctite® 5910



- Put the valve cover in place with the gasket. Mount and tighten screws 1.

Guideline

Screw, valve cover	M6	10 Nm (7.4 lbf ft)
--------------------	----	--------------------



- Mount and tighten the spark plugs using a special tool.

Guideline

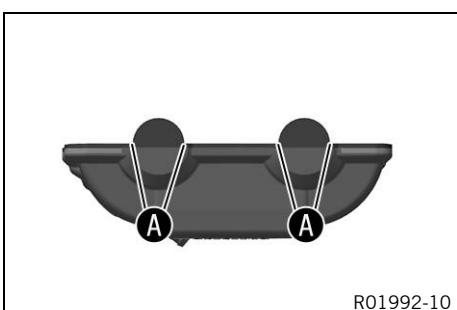
Spark plug	M12x1.5	18 Nm (13.3 lbf ft)
------------	---------	------------------------

Spark plug	M10x1	11 Nm (8.1 lbf ft)
------------	-------	--------------------

Spark plug wrench (75029172000) (p. 349)

- Mount ignition coils 2.

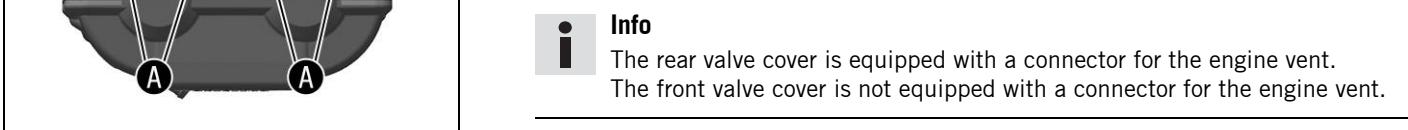
18.9.46 Installing rear valve cover

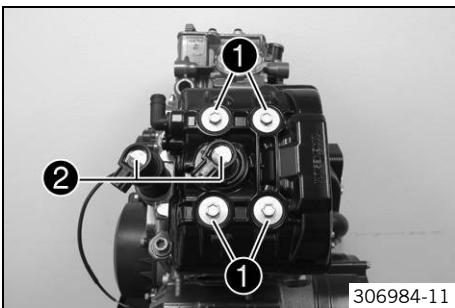


- Clean and degrease the valve cover seal.

- Apply a thin layer of sealant to area A.

Loctite® 5910





- Put the valve cover in place with the gasket. Mount and tighten screws ①.

Guideline

Screw, valve cover	M6	10 Nm (7.4 lbf ft)
--------------------	----	--------------------

- Mount and tighten the spark plugs using a special tool.

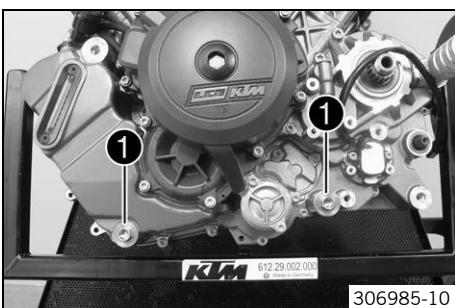
Guideline

Spark plug	M12x1.5	18 Nm (13.3 lbf ft)
Spark plug	M10x1	11 Nm (8.1 lbf ft)

Spark plug wrench (75029172000) (☞ p. 349)

- Mount ignition coils ②.

18.9.47 Installing the oil drain plug



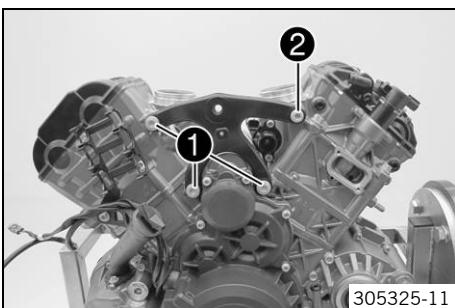
- Mount the new O-rings.

- Mount and tighten oil drain plug ① with the magnet, O-rings and oil screen.

Guideline

Oil drain plug	M20x1.5	20 Nm (14.8 lbf ft)
----------------	---------	------------------------

18.9.48 Mounting the engine bearer

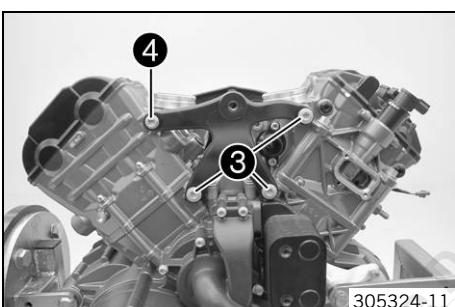


- Position the engine bearer.

- Mount and tighten screws ① and ②.

Guideline

Screw, engine bearer	M10	45 Nm (33.2 lbf ft)
----------------------	-----	------------------------



- Position the engine bearer.

- Mount and tighten screws ③ and ④.

Guideline

Screw, engine bearer	M10	45 Nm (33.2 lbf ft)
----------------------	-----	------------------------

18.9.49 Removing the engine from the engine assembly stand



- Remove the screw connections.

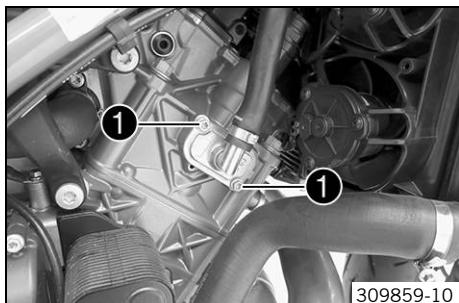
- Remove the engine from the engine assembly stand.



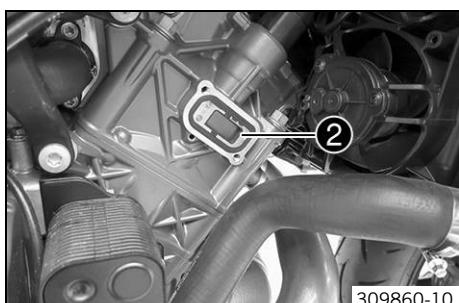
Info

Have an assistant help you or use a crane.

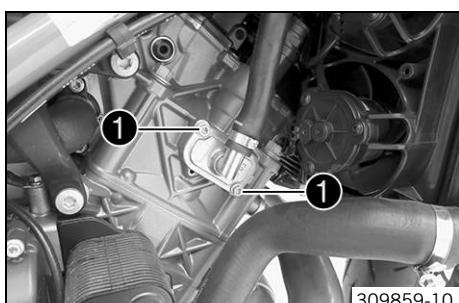
19.1 Changing the secondary air system (SAS) membranes



- Remove screws 1.
- Pull off the cover and hang it to one side.



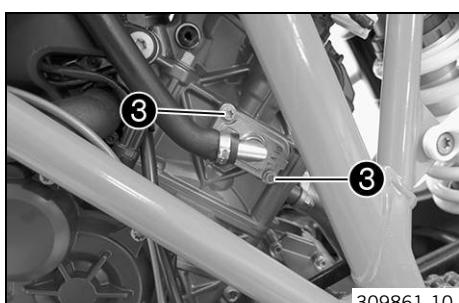
- Remove SAS membrane 2.
 - Mount the new SAS membrane.
- ✓ The SAS membrane is positioned flush in the cylinder.



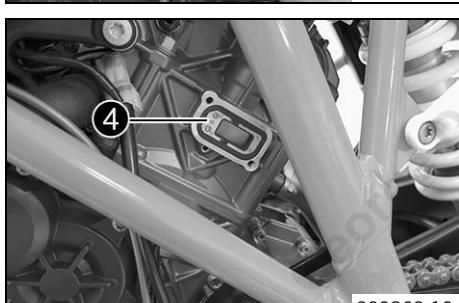
- Position the cover.
- Mount and tighten screws 1.

Guideline

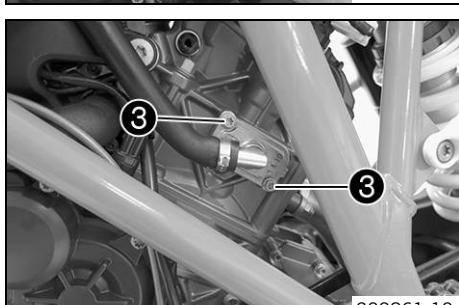
Remaining screws, engine	M6	10 Nm (7.4 lbf ft)
--------------------------	----	--------------------



- Remove screws 3.
- Pull off the cover and hang it to one side.



- Remove SAS membrane 4.
 - Mount the new SAS membrane.
- ✓ The SAS membrane is positioned flush in the cylinder.



- Position the cover.
- Mount and tighten screws 3.

Guideline

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

20.1 Checking/correcting the fluid level of the hydraulic clutch


Info

The fluid level rises with increasing wear of the clutch facing discs.
Do not use brake fluid.



L01457-01

- Move the clutch fluid reservoir mounted on the handlebar to a horizontal position.
- Check the fluid level.

Guideline
The fluid level must be between the **MIN** and **MAX** markings.

- » If the coolant level does not meet specifications:

- Remove the screw cap with the membrane.
- Correct the fluid level of the hydraulic clutch.

Hydraulic fluid (15) (p. 335)

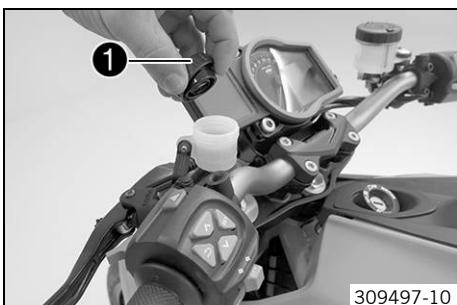
- Refit the screw cap with the membrane.

20.2 Changing the hydraulic clutch fluid


Warning

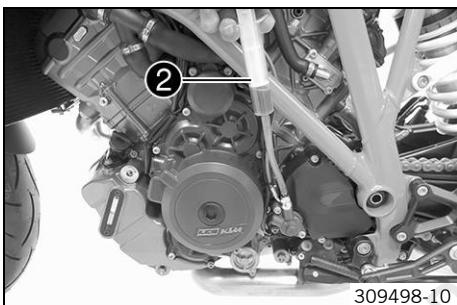
Environmental hazard Hazardous substances cause environmental damage.

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



309497-10

- Move the clutch fluid reservoir mounted on the handlebar to a horizontal position.
- Remove screw cap **1** with membrane.



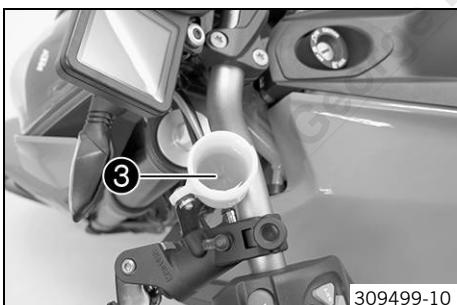
309498-10

- Fill bleeding syringe **2** with the appropriate hydraulic fluid.

Bleed syringe (50329050000) (p. 339)

Hydraulic fluid (15) (p. 335)

- On the slave cylinder, remove bleeder screw and mount bleeding syringe **2**.



309499-10

- Inject the liquid into the system until it escapes from hole **3** of the master cylinder without bubbles.

- To prevent overflow, occasionally draw fluid out of the master cylinder reservoir.

- Remove the bleeding syringe. Mount and tighten the bleeder screw.

- Correct the fluid level.

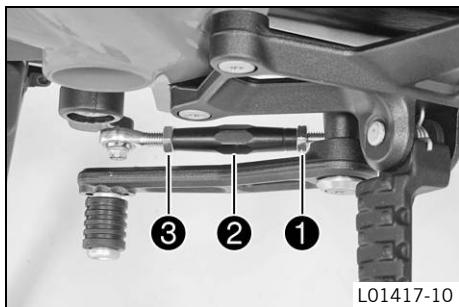
Guideline

The fluid level must be between the **MIN** and **MAX** markings.

Hydraulic fluid (15) (p. 335)

- Mount and tighten the screw cap with the membrane.

21.1 Adjusting the basic position of the shift lever



- Loosen nut **1**, holding the threaded rod **2**.



Info

Nut **1** has a left-handed thread.

- Loosen nut **3**, holding the threaded rod **2**.
- Turn threaded rod **2** to adjust the shift lever.



Info

The range of adjustment is limited.

The shift lever must not come into contact with any other vehicle components during the shift procedure.

- Tighten nut **3**, holding the threaded rod **2**.

Guideline

Nut, shift rod	M8	12 Nm (8.9 lbf ft)
----------------	----	--------------------

- Tighten nut **1**, holding the threaded rod **2**.

Guideline

Nut, shift rod	M8LH	12 Nm (8.9 lbf ft)
----------------	------	--------------------

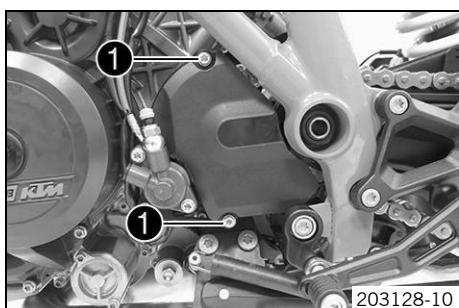
21.2 Changing the gear position sensor

Preparatory work

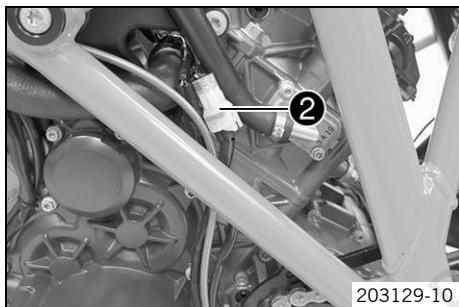
- Lift the motorcycle with the rear lifting gear. (☞ p. 14)

Main work

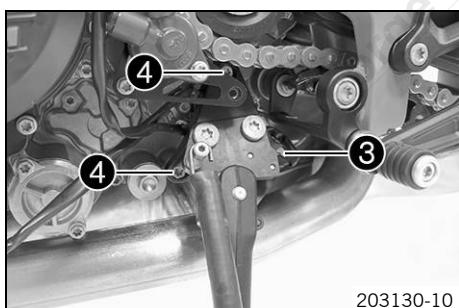
- Remove screws **1**.
- Remove the engine sprocket cover.

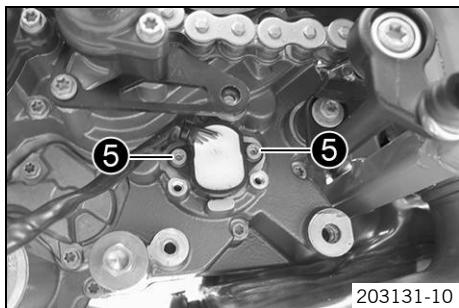


- Disconnect plug-in connector **2**.
- Expose the cable.

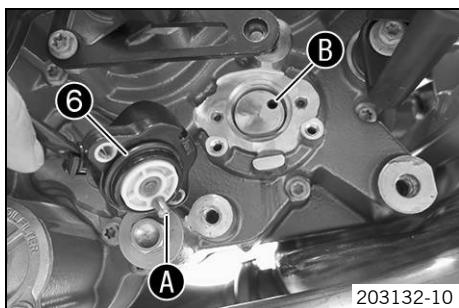


- Remove screw **3**.
- Remove screws **4**.
- Remove the side stand bracket and hang it to one side.



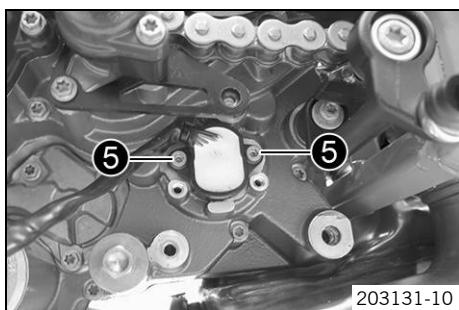


- Remove screws 5 with the washers.
- Remove the gear position sensor.



- Lubricate O-ring 6 of the new gear position sensor.
- Position the gear position sensor.

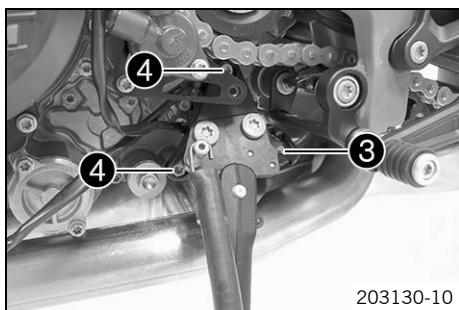
✓ Pin A engages in drilled hole B.



- Mount and tighten screws 5 with the washers.

Guideline

Screw, gear sensor	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
--------------------	----	----------------------	---------------



- Position the side stand bracket.
- Mount screw 3 but do not tighten yet.

Guideline

Screw, side stand bracket	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
---------------------------	-----	------------------------	---------------

- Mount and tighten screws 4.

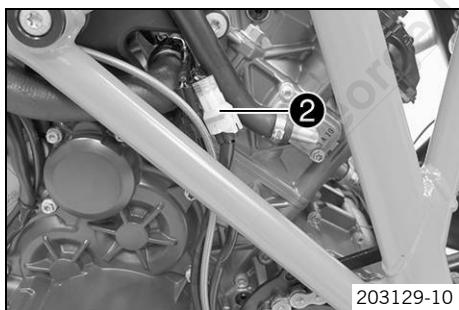
Guideline

Screw, side stand bracket	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
---------------------------	----	------------------------	---------------

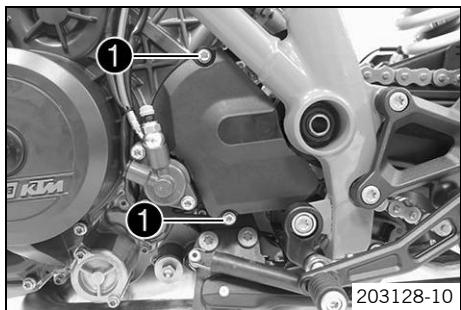
- Tighten screw 3.

Guideline

Screw, side stand bracket	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
---------------------------	-----	------------------------	---------------



- Join plug-in connector 2.
- Route the cable so it is not under tension and secure with a cable binder.



- Position the engine sprocket cover.
- Mount and tighten screws 1.

Guideline

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

Finishing work

- Program the gear position sensor. (☞ p. 240)
- Remove the rear of the motorcycle from the lifting gear. (☞ p. 14)

21.3 Programming the gear position sensor

Condition

The diagnostics tool is connected and running.

- Execute "Engine electronics" > "Functions" > "Program the gear position sensor".
- Switch off the ignition and switch it on again.

✓ The green idling speed indicator lamp N lights up.



22.1 Checking the coolant level in the compensating tank



Warning

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

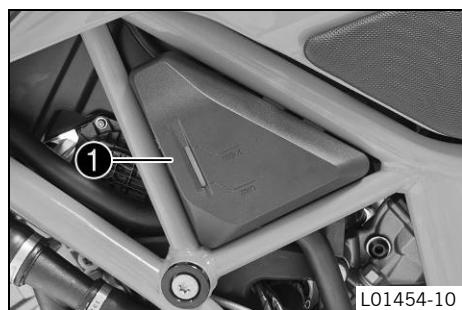
- Do not open the radiator, the radiator hoses or other cooling system components if the engine or the cooling system are at operating temperature.
- Allow the cooling system and the engine to cool down before you open the radiator, the radiator hoses or other components of the cooling system.
- In the event of scalding, rinse the area affected immediately with lukewarm water.



Warning

Danger of poisoning Coolant is toxic and a health hazard.

- Keep coolant out of the reach of children.
- Do not allow coolant to come into contact with the skin, the eyes and clothing.
- Consult a doctor immediately if coolant is swallowed.
- Rinse the affected area immediately with plenty of water in the event of contact with the skin.
- Rinse eyes thoroughly with water and consult a doctor immediately if coolant gets into the eyes.
- Change clothing if coolant spills onto your clothing.



Condition

The engine is cold.

The radiator is completely full.

- Park the motorcycle on a horizontal surface.
- Check the coolant level in the compensating tank ①.

The coolant level must be between **MIN** and **MAX**.

- » If there is no coolant in the compensating tank:

- Check the cooling system for leaks.



Info

Do not start up the motorcycle!

- » Add coolant/bleed the cooling system. (p. 243)
- » If the coolant in the compensating tank is not at the required level, but the tank is not empty:
 - Correct the coolant level in the compensating tank. (p. 245)

22.2 Checking the coolant fill level and antifreeze



Warning

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

- Do not open the radiator, the radiator hoses or other cooling system components if the engine or the cooling system are at operating temperature.
- Allow the cooling system and the engine to cool down before you open the radiator, the radiator hoses or other components of the cooling system.
- In the event of scalding, rinse the area affected immediately with lukewarm water.



Warning

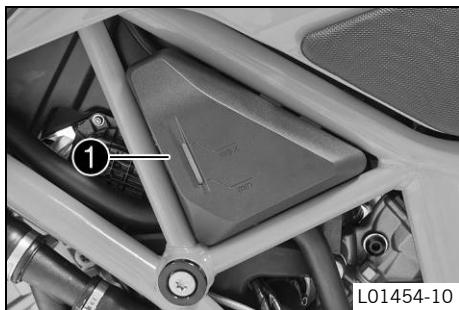
Danger of poisoning Coolant is toxic and a health hazard.

- Keep coolant out of the reach of children.
- Do not allow coolant to come into contact with the skin, the eyes and clothing.
- Consult a doctor immediately if coolant is swallowed.
- Rinse the affected area immediately with plenty of water in the event of contact with the skin.
- Rinse eyes thoroughly with water and consult a doctor immediately if coolant gets into the eyes.
- Change clothing if coolant spills onto your clothing.

Condition

The engine is cold.

The radiator is completely full.



- Park the motorcycle on a horizontal surface.
- Check the coolant level in the compensating tank ①.

The coolant level must be between **MIN** and **MAX**.

- » If there is no coolant in the compensating tank:
- Check the cooling system for leaks.



Info

Do not start up the motorcycle!

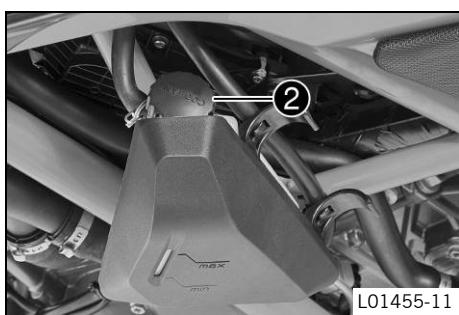
- Add coolant/bleed the cooling system. (☞ p. 243)
- » If the coolant in the compensating tank is not at the required level, but the tank is not empty:
 - Correct the coolant level in the compensating tank. (☞ p. 245)
- Pull off the compensating tank toward the bottom and maneuver it out.



- Remove cover ② of the compensating tank.
- Check the antifreeze in the coolant.

-25... -45 °C (-13... -49 °F)

- » If the antifreeze in the coolant does not equal the specified value:
 - Correct the antifreeze in the coolant.
- Mount the cover of the compensating tank.
- Mount the compensating tank.



22.3 Draining the coolant



Warning

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

- Do not open the radiator, the radiator hoses or other cooling system components if the engine or the cooling system are at operating temperature.
- Allow the cooling system and the engine to cool down before you open the radiator, the radiator hoses or other components of the cooling system.
- In the event of scalding, rinse the area affected immediately with lukewarm water.



Warning

Danger of poisoning Coolant is toxic and a health hazard.

- Keep coolant out of the reach of children.
- Do not allow coolant to come into contact with the skin, the eyes and clothing.
- Consult a doctor immediately if coolant is swallowed.
- Rinse the affected area immediately with plenty of water in the event of contact with the skin.
- Rinse eyes thoroughly with water and consult a doctor immediately if coolant gets into the eyes.
- Change clothing if coolant spills onto your clothing.

Condition

The engine is cold.

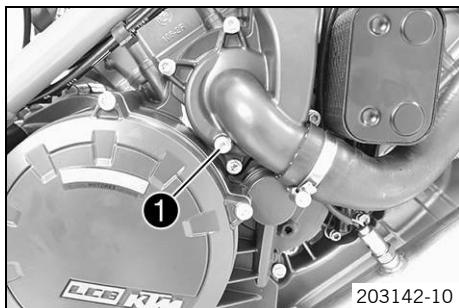
Preparatory work

- Remove the spoiler. (☞ p. 78)



Info

Only disassemble the right-hand side.

**Main work**

- Place a suitable container under the engine.
- Remove screw ①.
- Remove the radiator cap.
- Completely drain the coolant.
- Mount screw ① with a new seal ring and tighten it.

Guideline

Screw, water pump cover

M6

10 Nm (7.4 lbf ft)

22.4 Adding coolant/bleeding the cooling system**Warning****Danger of poisoning** Coolant is toxic and a health hazard.

- Keep coolant out of the reach of children.
- Do not allow coolant to come into contact with the skin, the eyes and clothing.
- Consult a doctor immediately if coolant is swallowed.
- Rinse the affected area immediately with plenty of water in the event of contact with the skin.
- Rinse eyes thoroughly with water and consult a doctor immediately if coolant gets into the eyes.
- Change clothing if coolant spills onto your clothing.

Preparatory work

- Remove the spoiler. (☞ p. 78)

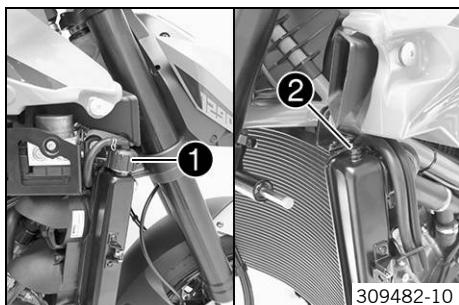
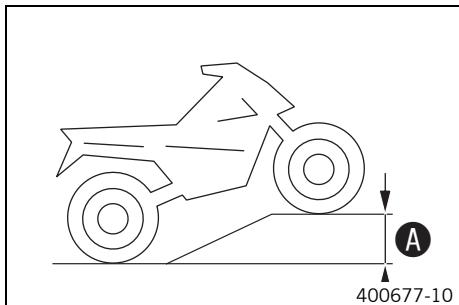
Main work

- Position the vehicle as shown and secure it against rolling. Height difference A must be reached.

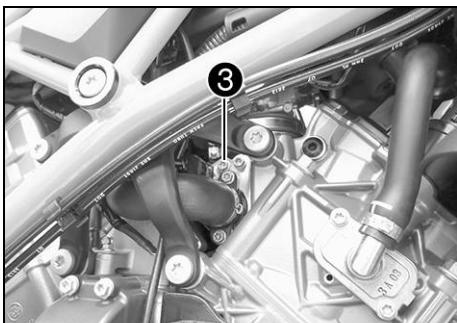
Guideline

Height difference A

50 cm (19.7 in)



- Remove radiator cap ① and bleeder screw ② of the radiator.



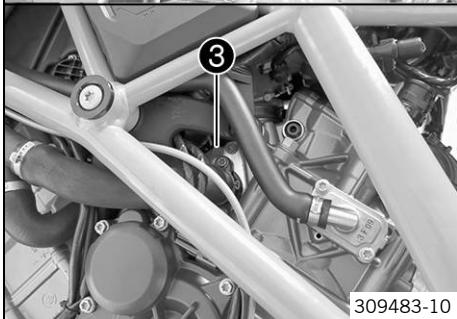
- Remove bleeder screws 3 of the cylinder heads.
- Add coolant until it exits from the vent hole without bubbles.

Coolant	3.20 l (3.38 qt.)	Coolant (p. 334)
---------	-------------------	------------------

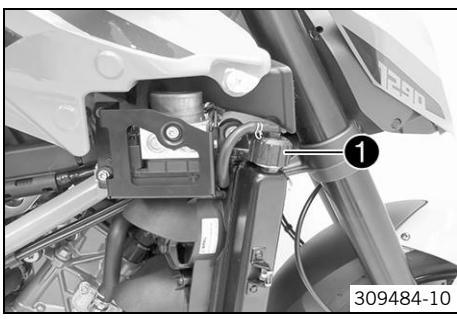
- Mount and tighten the bleeder screws with the seal rings.

Guideline

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



309483-10



309484-10

- Completely fill the radiator with coolant and close it with radiator cap 1.

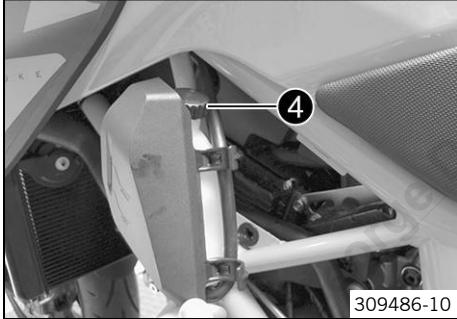


- Position the vehicle on a level surface.
- Pull off the compensating tank toward the bottom and maneuver it out.
- Remove cover 4 of the compensating tank.
- Add coolant to the compensating tank until the coolant reaches the specified level.

Guideline

The coolant level must be between MIN and MAX.

- Mount the cover of the compensating tank.
- Mount the compensating tank.



309486-10

Finishing work

- Install the spoiler. (p. 78)

22.5 Correcting the coolant level in the compensating tank



Warning

Danger of scalding During motorcycle operation, the coolant gets very hot and is under pressure.

- Do not open the radiator, the radiator hoses or other cooling system components if the engine or the cooling system are at operating temperature.
- Allow the cooling system and the engine to cool down before you open the radiator, the radiator hoses or other components of the cooling system.
- In the event of scalding, rinse the area affected immediately with lukewarm water.



Warning

Danger of poisoning Coolant is toxic and a health hazard.

- Keep coolant out of the reach of children.
- Do not allow coolant to come into contact with the skin, the eyes and clothing.
- Consult a doctor immediately if coolant is swallowed.
- Rinse the affected area immediately with plenty of water in the event of contact with the skin.
- Rinse eyes thoroughly with water and consult a doctor immediately if coolant gets into the eyes.
- Change clothing if coolant spills onto your clothing.

Condition

The engine is cold.

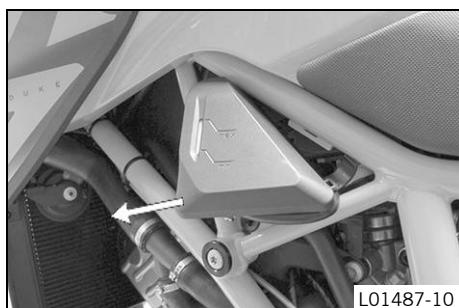
The radiator is completely full.

Preparatory work

- Check the coolant level in the compensating tank. (☞ p. 241)

Main work

- Pull off the compensating tank toward the bottom and maneuver it out.



- Remove cover 1 of the compensating tank.
- Add coolant to the MAX marking.

Coolant (☞ p. 334)

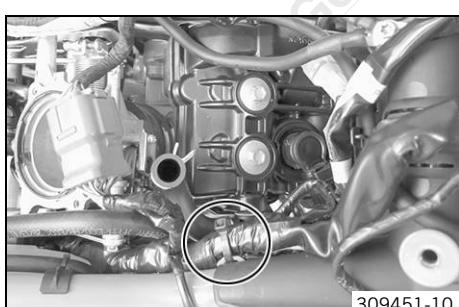
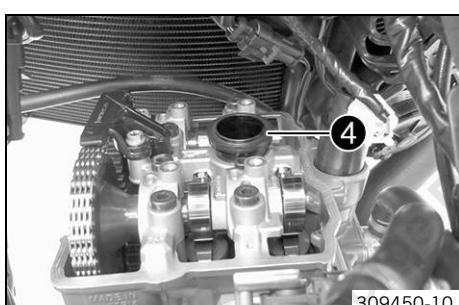
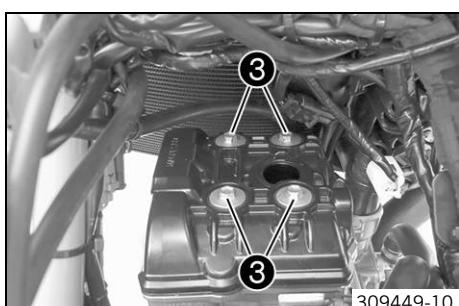
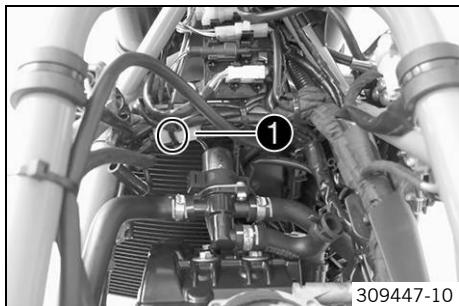
- Mount the cover of the compensating tank.
- Mount the compensating tank.

23.1 Checking the valve clearance**Preparatory work**

- Remove the passenger seat. (☞ p. 77)
- Remove the front rider's seat. (☞ p. 77)
- Remove the spoiler. (☞ p. 78)
- Remove the fuel tank. (☞ p. 78)
- Remove the upper part of the air filter box. (☞ p. 73)
- Remove the air filter box. (☞ p. 75)

Main work

- Remove the cable tie(s).
- Disconnect plug-in connector ①.
- Pull the SAS valve back and fix it into position.



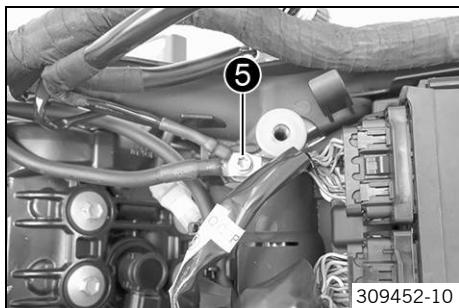
- Detach connector ② of the ignition coil.
- Remove the ignition coil.
- Remove the spark plug using the special tool.

Spark plug wrench (75029172000) (☞ p. 349)

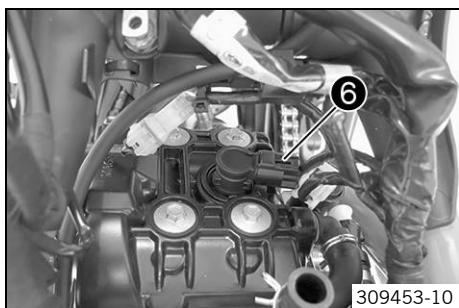
- Remove screws ③.
- Remove the valve cover with the gasket.

- Remove gasket ④.

- Remove the cable tie(s).

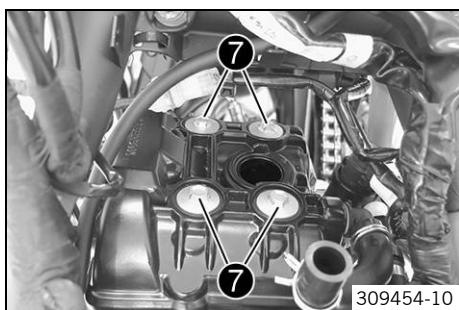


- Remove screw 5 with washer.

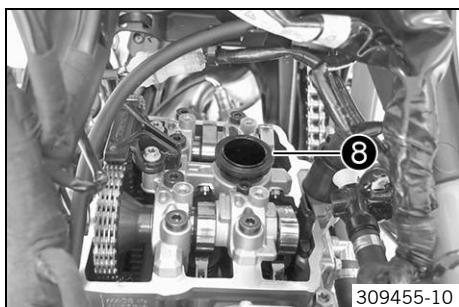


- Detach connector 6 of the ignition coil.
- Remove the ignition coil.
- Remove the spark plug using the special tool.

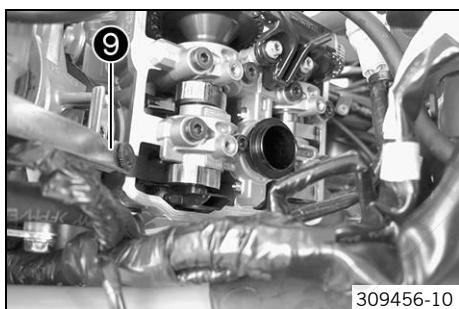
Spark plug wrench (75029172000) (☞ p. 349)



- Remove screws 7.
- Remove the valve cover with the gasket.



- Remove gasket 8.
- Set the engine to ignition top dead center of the rear cylinder. (☞ p. 166)



- On all valves, check the valve clearance between the camshaft and cam lever with special tool 9.

Guideline

Valve clearance	
Exhaust at: 20 °C (68 °F)	0.25... 0.30 mm (0.0098... 0.0118 in)
Intake at: 20 °C (68 °F)	0.10... 0.15 mm (0.0039... 0.0059 in)

Feeler gauge (59029041100) (☞ p. 341)

- » If the valve clearance does not meet specifications:
 - Set the valve clearance of the rear cylinder. (☞ p. 253)
- Set the engine to ignition top dead center of the front cylinder. (☞ p. 167)



- On all valves, check the valve clearance between the camshaft and cam lever with the special tool.

Guideline

Valve clearance	
Exhaust at: 20 °C (68 °F)	0.25... 0.30 mm (0.0098... 0.0118 in)
Intake at: 20 °C (68 °F)	0.10... 0.15 mm (0.0039... 0.0059 in)

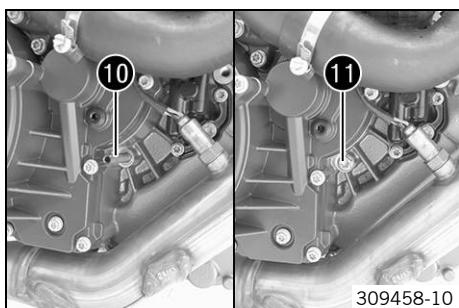
Feeler gauge (59029041100) (☞ p. 341)

- » If the valve clearance does not meet specifications:
 - Set the valve clearance of the front cylinder. (☞ p. 254)

- Remove special tool 10.
- Crank the engine several times. Check the valve clearance and correct it if necessary.
- Remove special tool 10 and mount and tighten screw 11.

Guideline

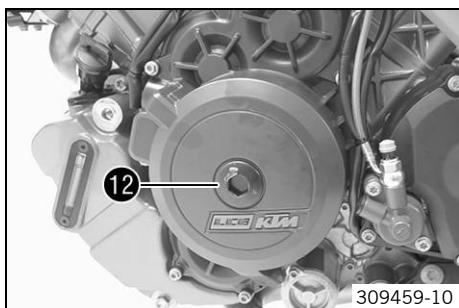
Plug, crankshaft retainer	M8	15 Nm (11.1 lbf ft)
---------------------------	----	------------------------



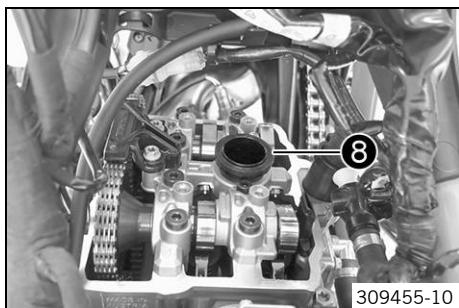
- Mount and tighten screw 12 of the alternator cover.

Guideline

Screw in alternator cover	M24x1.5	8 Nm (5.9 lbf ft)
---------------------------	---------	-------------------



- Mount gasket 8.



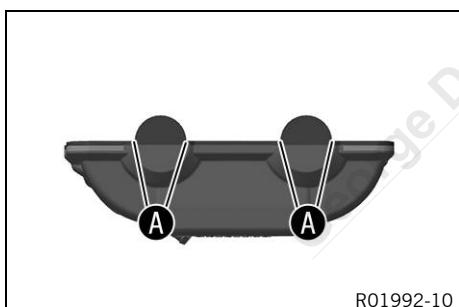
- Clean and degrease the valve cover seal.
- Apply a thin layer of sealant to area A.

Loctite® 5910



Info

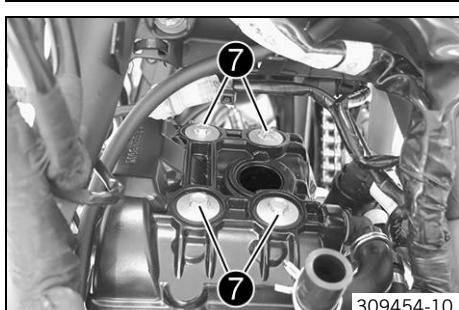
The rear valve cover is equipped with a connector for the engine vent.
The front valve cover is not equipped with a connector for the engine vent.

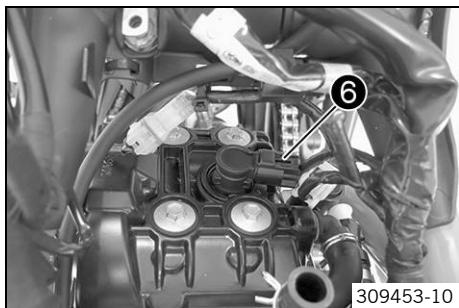


- Put the valve cover in place with the gasket. Mount and tighten screws 7.

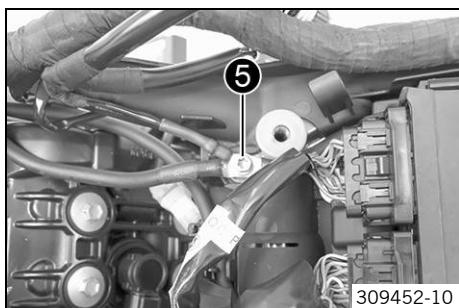
Guideline

Screw, valve cover	M6	10 Nm (7.4 lbf ft)
--------------------	----	--------------------





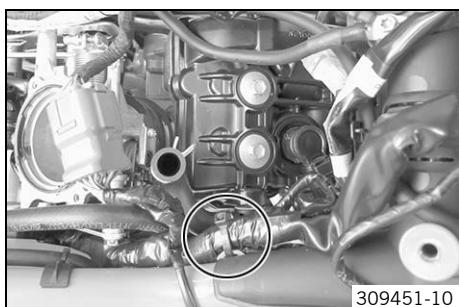
- Mount and tighten the spark plug using the special tool.
Spark plug wrench (75029172000) (see p. 349)
- Mount the ignition coil.
- Attach connector 6 of the ignition coil.
✓ The cable with the white marking is connected to the outer ignition coil.



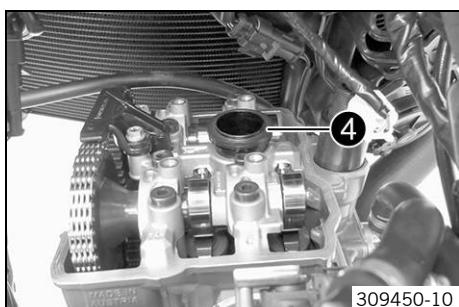
- Mount and tighten screw 5 with washer.

Guideline

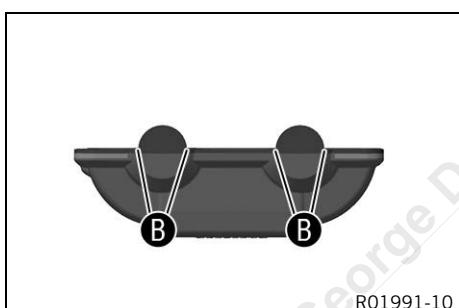
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)
---------------------------	----	--------------------



- Mount the cable tie(s).



- Position gasket 4.

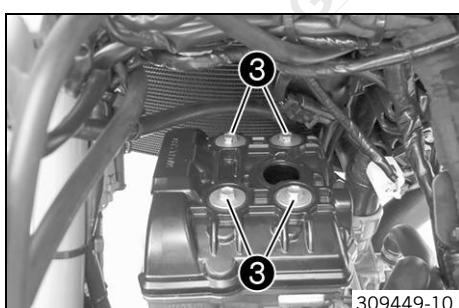


- Clean and degrease the valve cover seal.
- Apply a thin layer of sealant to area B.

Loctite® 5910



Info
The rear valve cover is equipped with a connector for the engine vent.
The front valve cover is not equipped with a connector for the engine vent.



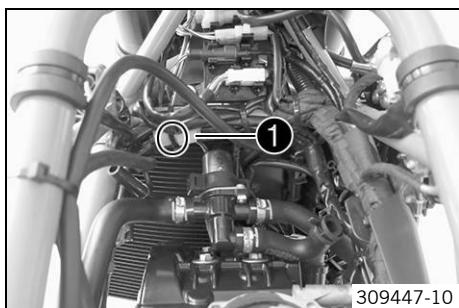
- Put the valve cover in place with the gasket. Mount and tighten screws 3.

Guideline

Screw, valve cover	M6	10 Nm (7.4 lbf ft)
--------------------	----	--------------------



- Mount and tighten the spark plug using the special tool.
- Spark plug wrench (75029172000) (☞ p. 349)
- Mount the ignition coil.
 - Attach connector ② of the ignition coil.
- ✓ The cable with the white marking is connected to the outer ignition coil.



- Position SAS valve.
- Join plug-in connector ①.
- Mount the cable tie(s).

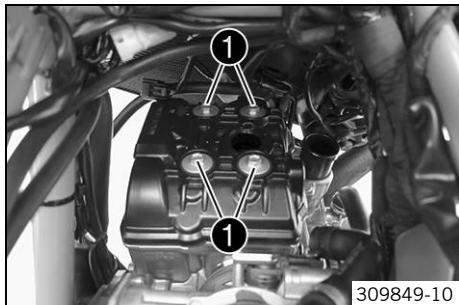
Finishing work

- Install the lower part of the air filter box. (☞ p. 75)
- Install the upper part of the air filter box. (☞ p. 74)
- Install the fuel tank. (☞ p. 80)
- Mount the front rider's seat. (☞ p. 77)
- Mount the passenger seat. (☞ p. 77)
- Install the spoiler. (☞ p. 78)

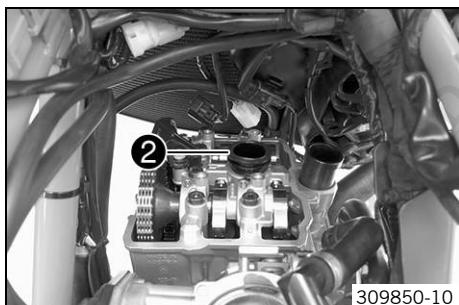
23.2 Checking the valve clearance (air filter and spark plugs removed)

Condition

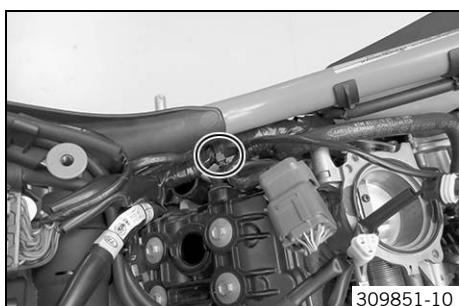
The air filter and spark plugs are removed.



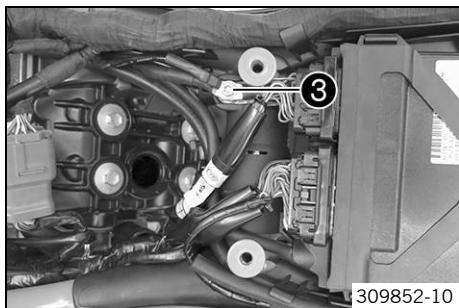
- Remove screws ①.
- Remove the valve cover with the gasket.



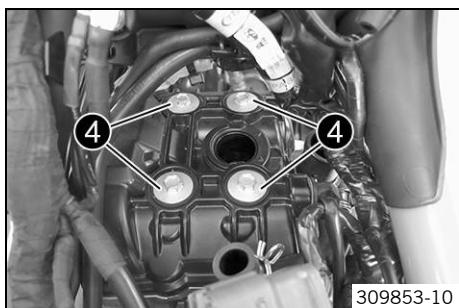
- Remove gasket ②.



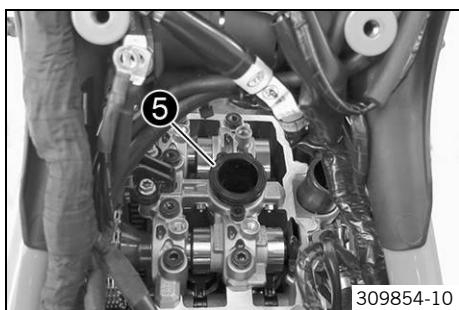
- Remove the cable tie(s).



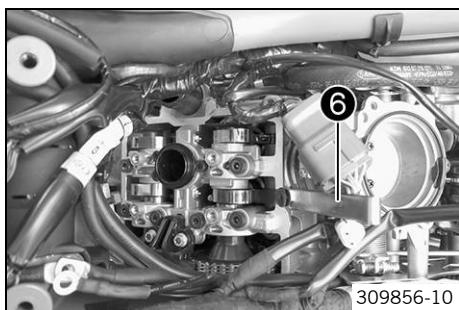
- Remove screw 3 with washer.



- Remove screws 4.
- Remove the valve cover with the gasket.



- Remove gasket 5.
- Set the engine to ignition top dead center of the rear cylinder. (☞ p. 166)



- On all valves, check the valve clearance between the camshaft and cam lever with special tool 6.

Guideline

Valve clearance	
Exhaust at: 20 °C (68 °F)	0.25... 0.30 mm (0.0098... 0.0118 in)
Intake at: 20 °C (68 °F)	0.10... 0.15 mm (0.0039... 0.0059 in)

Feeler gauge (59029041100) (☞ p. 341)

- » If the valve clearance does not meet specifications:
 - Set the valve clearance of the rear cylinder. (☞ p. 253)
- Set the engine to ignition top dead center of the front cylinder. (☞ p. 167)
- On all valves, check the valve clearance between the camshaft and cam lever with the special tool.

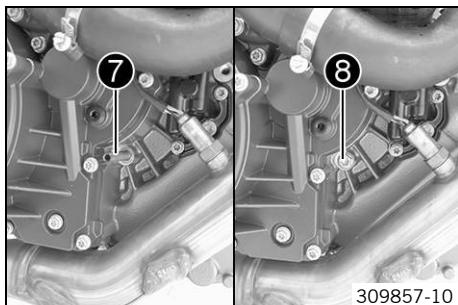
Guideline

Valve clearance	
Exhaust at: 20 °C (68 °F)	0.25... 0.30 mm (0.0098... 0.0118 in)
Intake at: 20 °C (68 °F)	0.10... 0.15 mm (0.0039... 0.0059 in)

Feeler gauge (59029041100) (☞ p. 341)

- » If the valve clearance does not meet specifications:
 - Set the valve clearance of the front cylinder. (☞ p. 254)

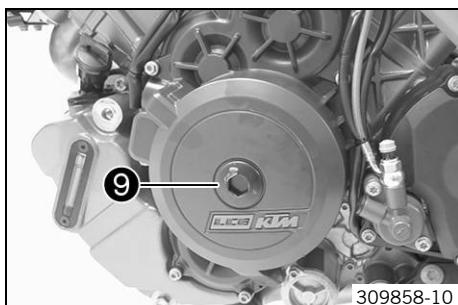




- Remove special tool 7.
- Crank the engine several times. Check the valve clearance and correct it if necessary.
- Remove special tool 7 and mount and tighten screw 8.

Guideline

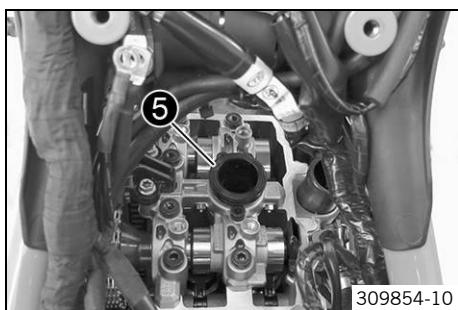
Plug, crankshaft retainer	M8	15 Nm (11.1 lbf ft)
---------------------------	----	------------------------



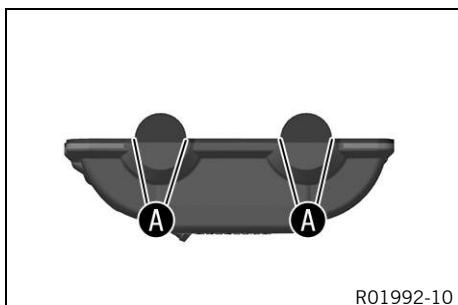
- Mount and tighten screw 9 of the alternator cover.

Guideline

Screw in alternator cover	M24x1.5	8 Nm (5.9 lbf ft)
---------------------------	---------	-------------------



- Mount gasket 5.



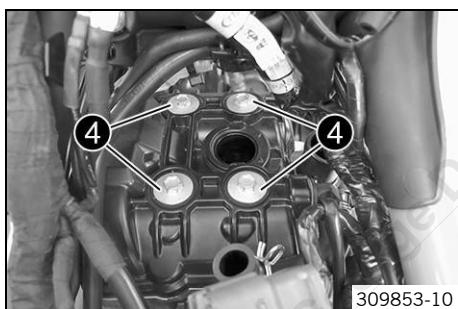
- Clean and degrease the valve cover seal.
- Apply a thin layer of sealant to area A.

Loctite® 5910



Info

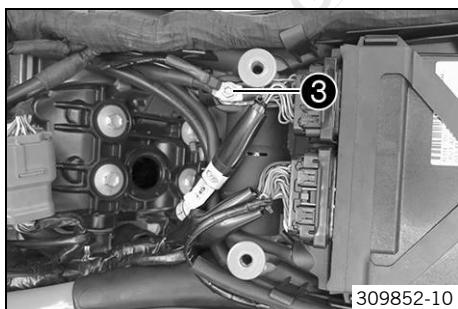
The rear valve cover is equipped with a connector for the engine vent.
The front valve cover is not equipped with a connector for the engine vent.



- Put the valve cover in place with the gasket. Mount and tighten screws 4.

Guideline

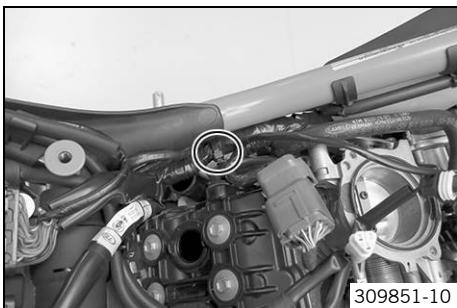
Screw, valve cover	M6	10 Nm (7.4 lbf ft)
--------------------	----	--------------------



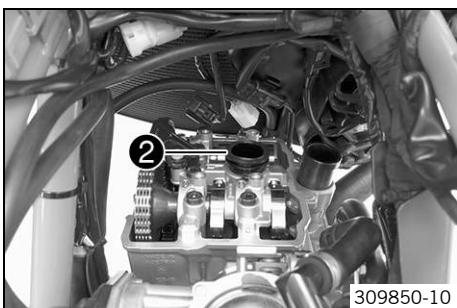
- Mount and tighten screw 3 with the washer.

Guideline

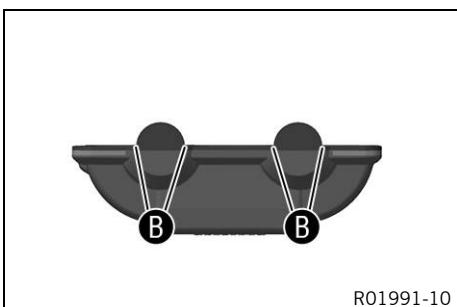
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)
---------------------------	----	--------------------



- Mount the cable tie(s).



- Position gasket 2.

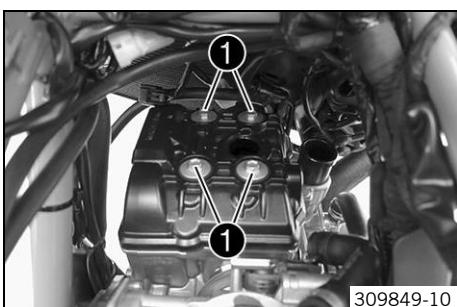


- Clean and degrease the valve cover seal.
- Apply a thin layer of sealant to area B.

Loctite® 5910



The rear valve cover is equipped with a connector for the engine vent.
The front valve cover is not equipped with a connector for the engine vent.



- Put the valve cover in place with the gasket. Mount and tighten screws 1.
- Guideline

Screw, valve cover	M6	10 Nm (7.4 lbf ft)
--------------------	----	--------------------

23.3 Setting the valve clearance of the rear cylinder



Info

For purposes of illustration, the following operations are shown with the engine deinstalled.
Removal is not necessary.

Condition

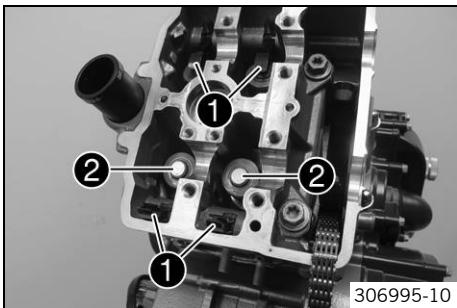
The engine is positioned at ignition top dead center of the rear cylinder

Preparatory work

- Disassemble the camshafts of the rear cylinder. (☞ p. 254)

Main work

- Lift cam lever 1.
- Remove shims 2 and set them down according to the installation position.
- Correct and insert the shims as indicated by the results of the valve clearance check.



Finishing work

- Install the camshafts of the rear cylinder. (☞ p. 255)

23.4 Setting the valve clearance of the front cylinder

**Info**

For purposes of illustration, the following operations are shown with the engine deinstalled.
Removal is not necessary.

Condition

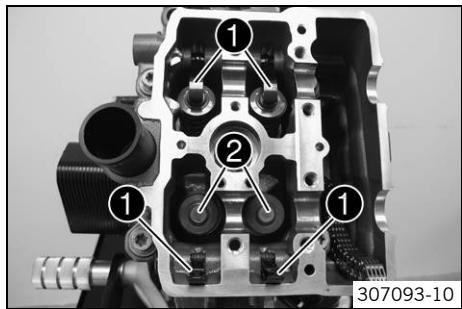
The engine is positioned at ignition top dead center of the front cylinder

Preparatory work

- Disassemble the camshafts of the front cylinder. (☞ p. 256)

Main work

- Lift cam lever ①.
- Remove shims ② and set them down according to the installation position.
- Correct and insert the shims as indicated by the results of the valve clearance check.

**Finishing work**

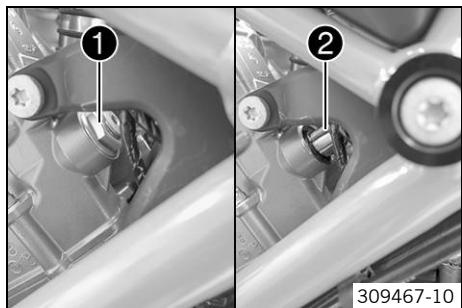
- Install the camshafts of the front cylinder. (☞ p. 256)

23.5 Disassembling the camshafts of the rear cylinder

Condition

The engine is positioned at ignition top dead center of the rear cylinder

- Remove screw ① with the O-ring.
- Pull out timing chain tensioner ②.



- Remove spark plug shaft insert ③.

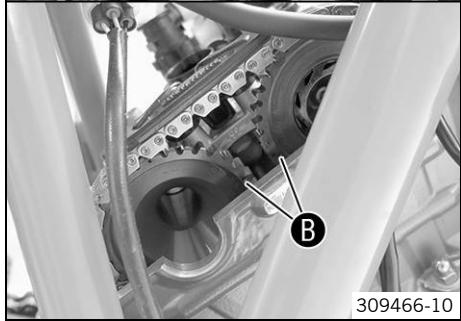
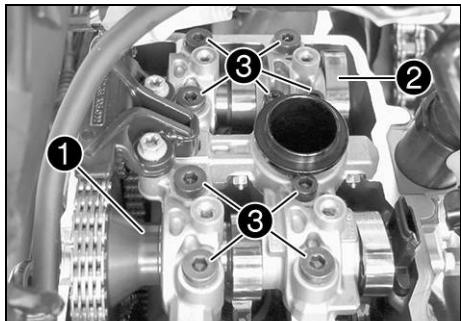
- Loosen and remove screws ④ from the outside to the inside.

**Info**

The cams should not activate the valves.

- Remove the camshaft bearing bridge.
- Remove the timing chain from the rear sprocket. Remove the camshafts.

23.6 Installing the camshafts of the rear cylinder



309466-10

- Pull up the timing chain and insert intake camshaft 1.



Info

The intake camshaft is labeled with **eh**.

- Place the timing chain over the rear sprocket of the intake camshaft.
- Ensure that the bleeder is seated correctly.
- Position exhaust camshaft 2.



Info

The exhaust camshaft is labeled with **ah**.

- Place the timing chain over the rear sprocket and position the camshaft in the bearing seat.
- ✓ Markings **B** must be flush with the edge of the cylinder head.
- Position the camshaft bearing bridge.
- Mount screws 3 and tighten them from the inside to the outside.

Guideline

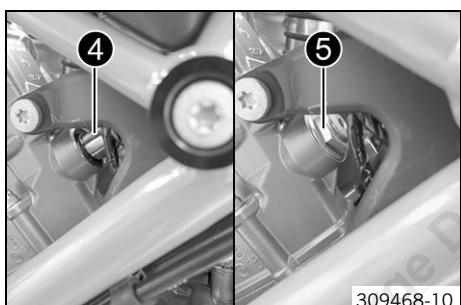
Screw, camshaft bearing support	M6 – 10.9	10 Nm (7.4 lbf ft)	-
Screw, camshaft bearing support	M8 – 10.9	Step 1 10 Nm (7.4 lbf ft) Step 2 18 Nm (13.3 lbf ft)	-
Screw, camshaft bearing support	M8 – 10.9	Step 1 8.5 Nm (6.27 lbf ft) Step 2 14.5 Nm (10.7 lbf ft)	Only applies when using: Hex key bit (61229025000) (p. 346)

Hex key bit (61229025000) (p. 346)

- Grease the O-rings and mount the spark plug shaft insert.
- Prepare the timing chain tensioner for installation. (p. 202)
- After it has been positioned in the installation location, insert timing chain tensioner 4 with a new O-ring.
- Mount and tighten screw plug 5 with a new seal ring.

Guideline

Plug, timing-chain tensioner	M24x1.5	25 Nm (18.4 lbf ft)
------------------------------	---------	------------------------



309468-10

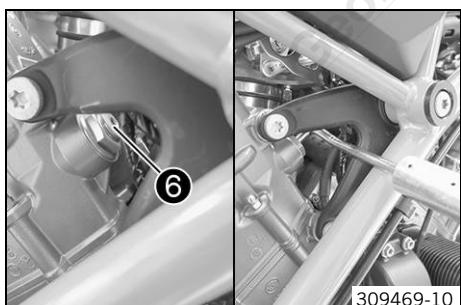
- Remove screw 6 and use the special tool to push the timing chain tensioner toward the timing chain.

Release device for timing chain tensioner (61229021000) (p. 346)

- ✓ The timing chain tensioner unlocks.
- Mount and tighten screw 6.

Guideline

Screw, timing chain tensioner release	M10x1	10 Nm (7.4 lbf ft)
---------------------------------------	-------	--------------------



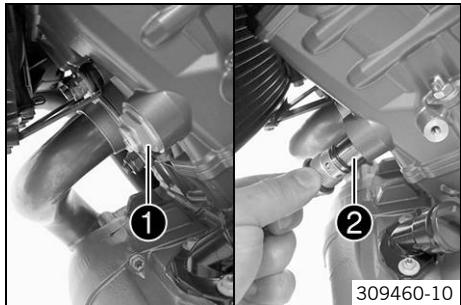
309469-10

23.7 Disassembling the camshafts of the front cylinder

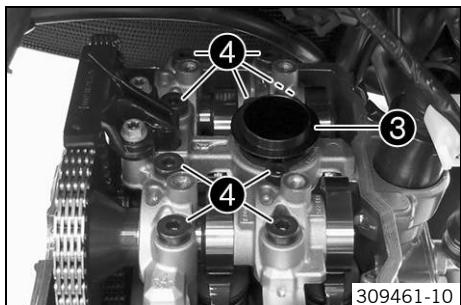
Condition

The engine is positioned at ignition top dead center of the front cylinder

- Remove screw 1 with the O-ring.
- Pull out timing chain tensioner 2.



309460-10



309461-10

- Remove spark plug shaft insert 3.
- Loosen and remove screws 4 from the outside to the inside.
- Remove the camshaft bearing bridge.
- Remove the timing chain from the rear sprocket. Remove the camshafts.

i Info

The cams should not activate the valves.

23.8 Installing the camshafts of the front cylinder

- Pull up the timing chain and insert intake camshaft 1.

i Info

The intake camshaft is labeled with **ev**.

- Place the timing chain over the rear sprocket of the intake camshaft.
- Position exhaust camshaft 2.

i Info

The exhaust camshaft is labeled with **av**.

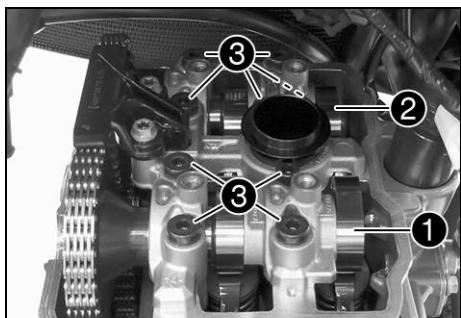
- Place the timing chain over the rear sprocket and position the camshaft in the bearing seat.
- ✓ Markings A must be flush with the edge of the cylinder head.
- Position the camshaft bearing bridge.
- Mount screws 3 and tighten them from the inside to the outside.

Guideline

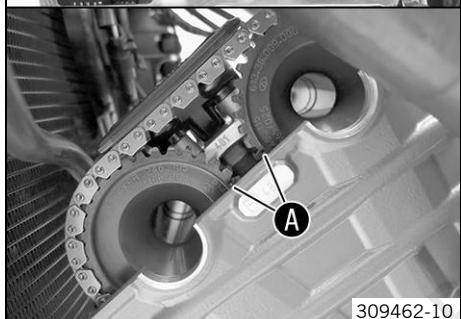
Screw, camshaft bearing support	M6 – 10.9	10 Nm (7.4 lbf ft)	–
Screw, camshaft bearing support	M8 – 10.9	Step 1 10 Nm (7.4 lbf ft) Step 2 18 Nm (13.3 lbf ft)	–
Screw, camshaft bearing support	M8 – 10.9	Step 1 8.5 Nm (6.27 lbf ft) Step 2 14.5 Nm (10.7 lbf ft)	Only applies when using: Hex key bit (61229025000) (p. 346)

Hex key bit (61229025000) (p. 346)

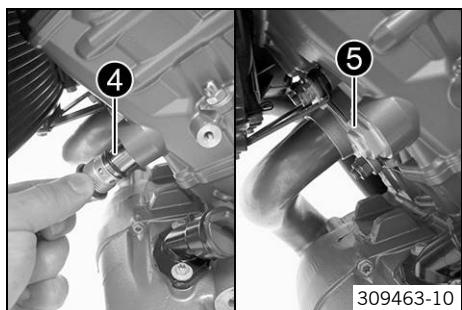
- Grease the O-rings and mount the spark plug shaft insert.
- Prepare the timing chain tensioner for installation. (p. 202)



309462-10



309462-10

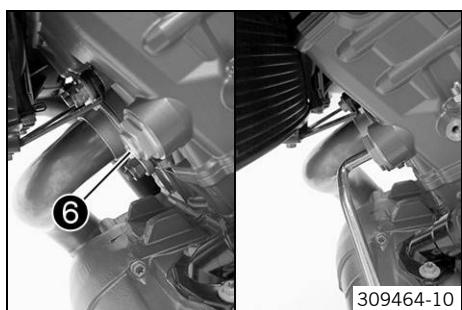


- After it has been positioned in the installation location, insert timing chain tensioner ④ with a new O-ring.

- Mount and tighten screw plug ⑤ with a new seal ring.

Guideline

Plug, timing-chain tensioner	M24x1.5	25 Nm (18.4 lbf ft)
------------------------------	---------	------------------------



- Remove screw ⑥ and use the special tool to push the timing chain tensioner toward the timing chain.

Release device for timing chain tensioner (61229021000) (☞ p. 346)

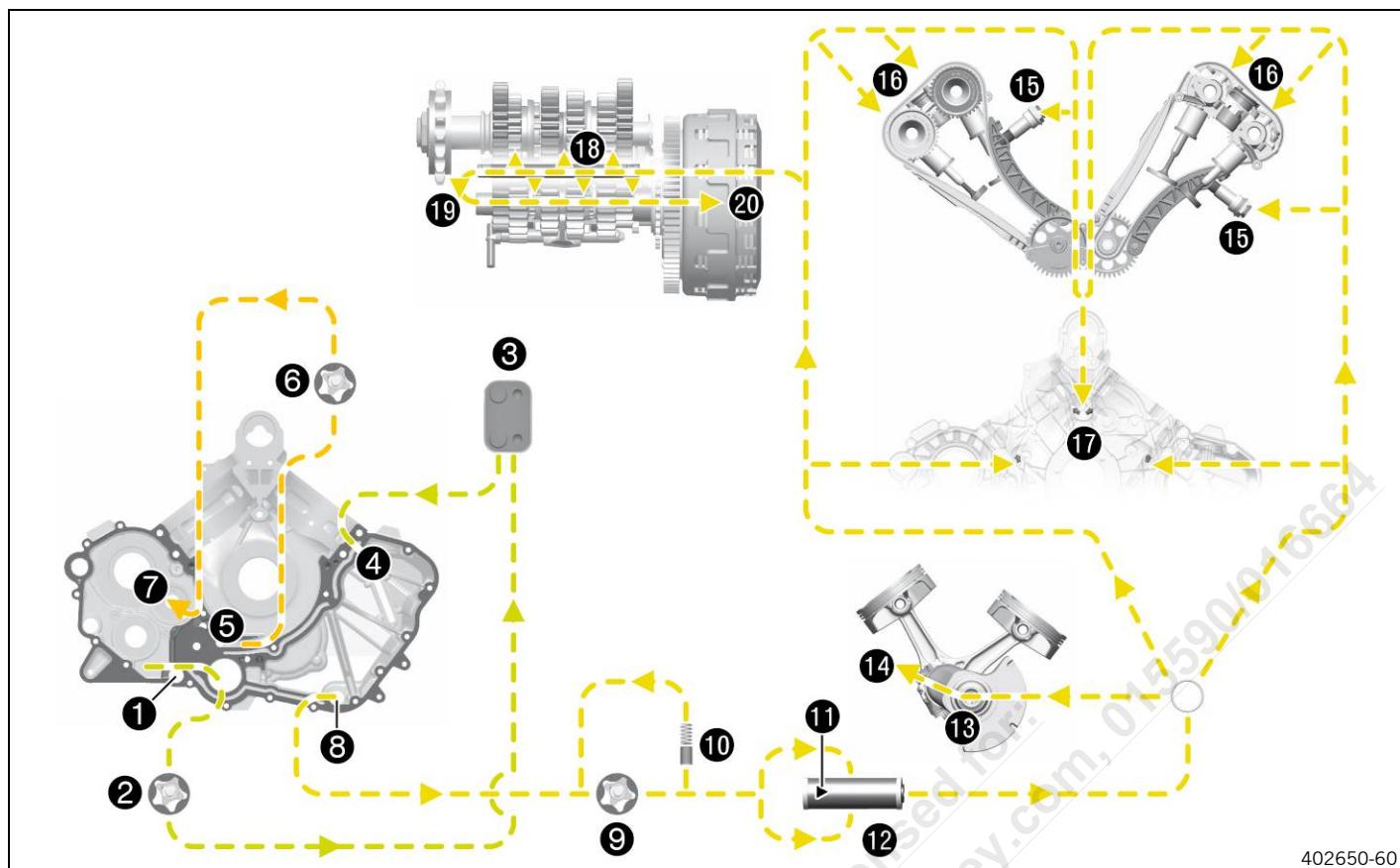
- ✓ The timing chain tensioner is unlocked.

- Mount and tighten screw ⑥.

Guideline

Screw, timing chain tensioner release	M10x1	10 Nm (7.4 lbf ft)
---------------------------------------	-------	--------------------

24.1 Oil circuit



402650-60

Oil circuit of middle suction pump

- 1 Oil screen of oil drain plug in gearbox
- 2 Middle suction pump
- 3 Heat exchanger
- 4 Oil exit in oil tank

Oil circuit of left suction pump

- 5 Crankcase
- 6 Left suction pump
- 7 Lubricating slots in gearbox

Oil circuit of force pump

- 8 Oil screen of oil drain plug in oil tank
- 9 Force pump
- 10 Oil pressure regulator valve
- 11 Bypass valve
- 12 Oil filter
- 13 Crankshaft
- 14 Oil nozzle for alternator cooling
- 15 Timing chain tensioner
- 16 Camshaft lubrication/oil nozzles for valve gear lubrication
- 17 Oil nozzles for piston cooling
- 18 Oil spray tube
- 19 Oil nozzle for clutch lubrication
- 20 Clutch

24.2 Checking the engine oil level

**Info**

Oil consumption depends on the riding style and the operating conditions.

Condition

The engine is at operating temperature.

Preparatory work

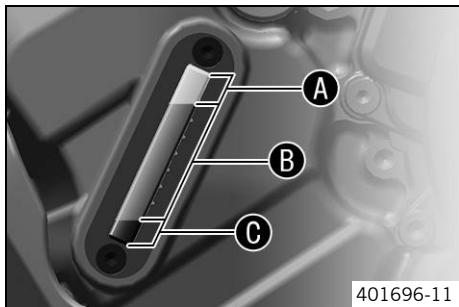
- Stand the motorcycle upright on a horizontal surface.

Main work

- Check the engine oil level in the engine oil level viewer.

**Info**

After switching off the engine, wait one minute before checking the level.



The engine oil level should be in the upper area **B** of the engine oil level viewer.

- » When the engine oil level is in area **A** of the engine oil level viewer:
 - Do not add engine oil.
- » When the engine oil level is in area **B** of the engine oil level viewer:
 - Engine oil can be added.
- » When the engine oil level is in area **C** of the engine oil level viewer:
 - Add engine oil. (☞ p. 261)

24.3 Changing the engine oil and oil filter, cleaning the oil screens

**Warning**

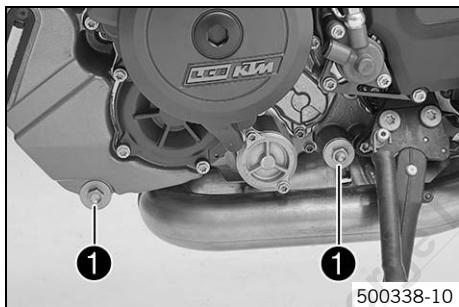
Danger of scalding Engine and gear oil get very hot when the motorcycle is ridden.

- Wear suitable protective clothing and safety gloves.
- In the event of scalding, rinse the area affected immediately with lukewarm water.

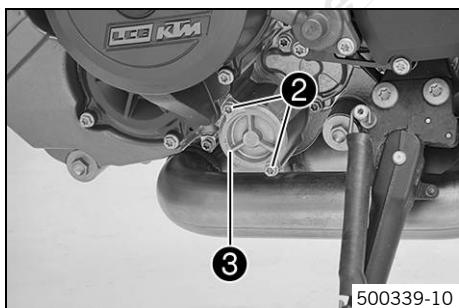
**Warning**

Environmental hazard Hazardous substances cause environmental damage.

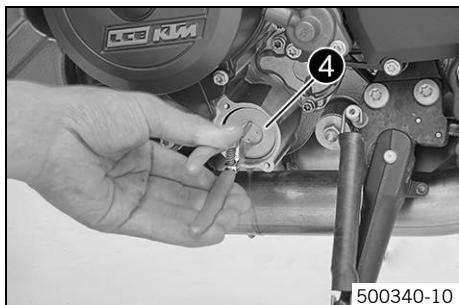
- Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.

**Main work**

- Stand the motorcycle on its side stand on a horizontal surface.
- Place a suitable container under the engine.
- Remove oil drain plugs **1** with the magnet, O-rings, and oil screen.



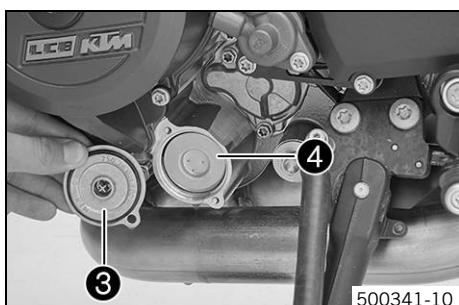
- Remove screws **2**. Remove oil filter cover **3** with the O-ring.



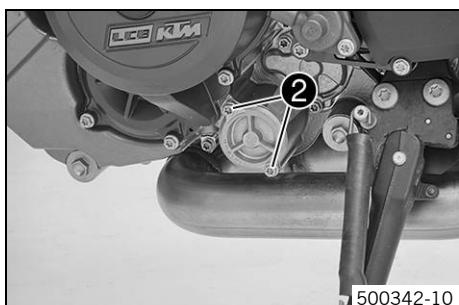
- Pull oil filter 4 out of the oil filter housing.

Circlip pliers reverse (51012011000) (☞ p. 340)

- Completely drain the engine oil.
- Thoroughly clean the parts and sealing surface.



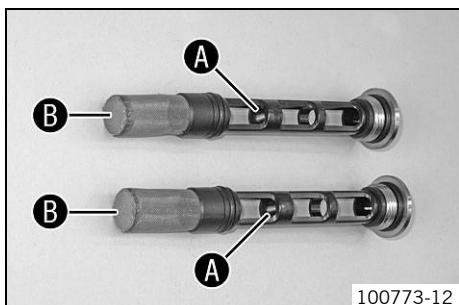
- Insert new oil filter 4.
- Lubricate the O-ring of the oil filter cover. Mount oil filter cover 3.



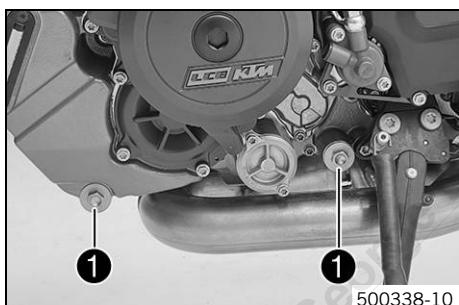
- Mount and tighten screws 2.

Guideline

Remaining engine screws	M5	6 Nm (4.4 lbf ft)
-------------------------	----	-------------------



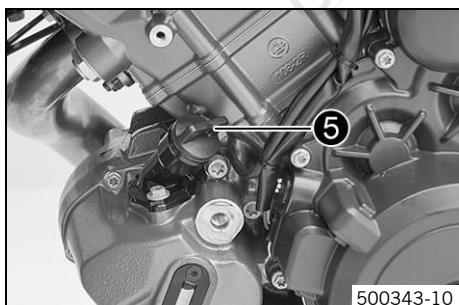
- Thoroughly clean magnet A and oil screen B of the oil drain plugs.



- Mount and tighten the oil drain plugs 1 with the magnet, O-rings, and oil screen.

Guideline

Oil drain plug	M20x1.5	20 Nm (14.8 lbf ft)
----------------	---------	------------------------



- Add the oil quantity in two separate operations.

Engine oil	3.50 l (3.7 qt.)	Outside temperature: $\geq 0^\circ\text{C}$ ($\geq 32^\circ\text{F}$)	Engine oil (SAE 10W/50) (☞ p. 334)
		Outside temperature: $< 0^\circ\text{C}$ ($< 32^\circ\text{F}$)	Engine oil (SAE 5W/40) (☞ p. 334)

- Remove screw plug 5 and fill in engine oil.

Engine oil (1st quantity), approx.	3.0 l (3.2 qt.)	Outside temperature: $\geq 0^\circ\text{C}$ ($\geq 32^\circ\text{F}$)	Engine oil (SAE 10W/50) (☞ p. 334)
------------------------------------	-----------------	--	--

Engine oil (1st quantity), approx.	3.0 l (3.2 qt.)	Outside temperature: < 0 °C (< 32 °F)	Engine oil (SAE 5W/40) (p. 334)
------------------------------------	-----------------	---------------------------------------	---------------------------------

- Mount screw plug 5.

**Danger**

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

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

- Start the engine and check that it is oil-tight.

- Remove the screw plug and add the remaining engine oil to the upper marking A on the engine oil level viewer.

- Mount the screw plug.

**Danger**

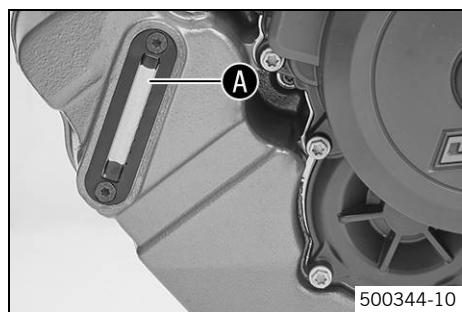
Danger of poisoning Exhaust gases are toxic and inhaling them may result in unconsciousness and death.

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

- Start the engine and check that it is oil-tight.

Finishing work

- Check the engine oil level. (p. 259)



500344-10

24.4 Adding engine oil

**Info**

Too little engine oil or poor-quality engine oil results in premature wear to the engine.
The engine may be damaged if the engine oil level is too high.

Condition

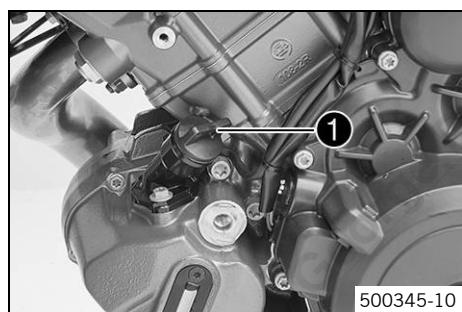
The engine is at operating temperature.

Preparatory work

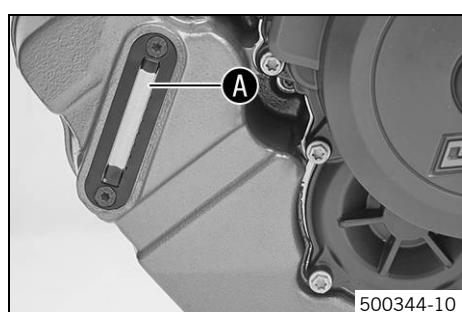
- Stand the motorcycle upright on a horizontal surface.
- Check the engine oil level. (p. 259)

Main work

- Remove screw plug 1.



500345-10



500344-10

- Add engine oil to the upper marking A on the engine oil level viewer.

Condition

Outside temperature: $\geq 0^{\circ}\text{C}$ ($\geq 32^{\circ}\text{F}$)

Engine oil (SAE 10W/50) (p. 334)

Condition

Outside temperature: $< 0^{\circ}\text{C}$ ($< 32^{\circ}\text{F}$)

Engine oil (SAE 5W/40) (p. 334)

**Info**

In order to achieve optimal engine performance, it is not advisable to mix different engine oils.

KTM recommends changing the engine oil.

- Mount the screw plug.

**Danger**

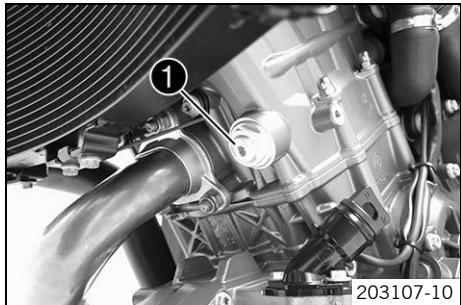
Danger of poisoning Exhaust gases are toxic and inhaling them may result in unconsciousness and death.

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

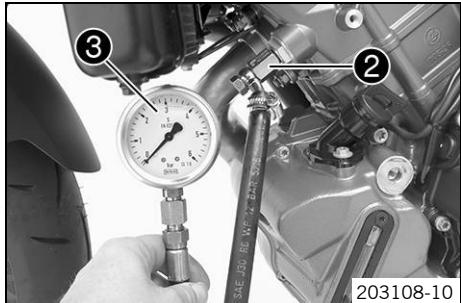
- Start the engine and check that it is oil-tight.

Finishing work

- Check the engine oil level. (☞ p. 259)

24.5 Checking the engine oil pressure

203107-10



203108-10

- Check the engine oil level. (☞ p. 259)
- Remove screw 1.

- Mount and tighten special tool 2.

Guideline

Oil pressure adapter	M10x1	10 Nm (7.4 lbf ft)
----------------------	-------	--------------------

Oil pressure adapter (77329006000) (☞ p. 349)

- Connect pressure tester 3 without the t-plate on the special tool.

Pressure tester (61029094000) (☞ p. 344)
--

**Danger**

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

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

- Start the engine and let it warm up.

- Check the engine oil pressure.

Engine oil pressure	
Coolant temperature: $\geq 60^{\circ}\text{C}$ $(\geq 140^{\circ}\text{F})$ Idle	2.0... 4.8 bar (29... 70 psi)

» If the specification is not reached:

- Check the oil pumps for wear. Check all oil holes for free flow.
- Switch off the engine.

**Warning**

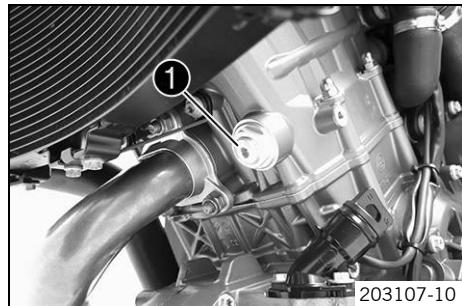
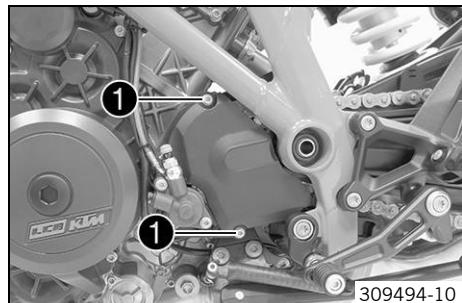
Danger of burns Some vehicle components get very hot when the machine is driven.

- Wear appropriate protective clothing and safety gloves. In case of burns, rinse immediately with lukewarm water.

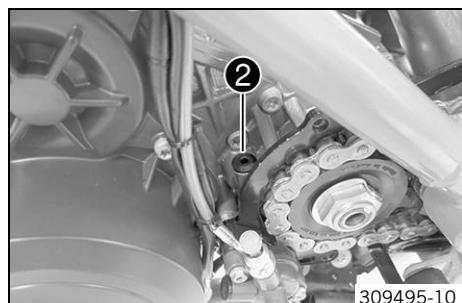
- Remove the special tools.
- Mount and tighten screw ①.

Guideline

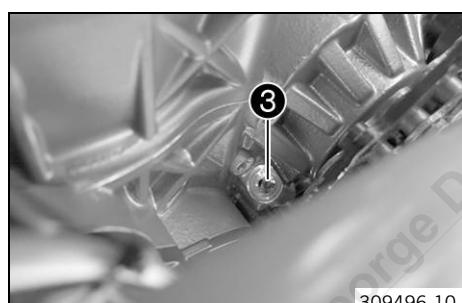
Screw, timing chain tensioner release	M10x1	10 Nm (7.4 lbf ft)
---------------------------------------	-------	--------------------

**24.6 Removing the oil nozzle for the clutch lubrication**

- Remove screws ①.
- Remove the engine sprocket cover.



- Remove screw plug ② with O-ring.



- Remove oil nozzle ③.

Oil nozzle assembly tool (61229035000) (p. 346)

24.7 Checking/cleaning the oil nozzle for clutch lubrication**Preparatory work**

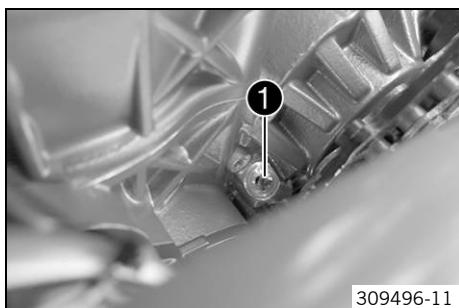
- Remove the oil nozzle for the clutch lubrication. (p. 263)

**Main work**

- Check that the oil nozzle for clutch lubrication is not blocked.
 - » If the oil nozzle is blocked:
 - Clean the oil nozzle and change as necessary.

Finishing work

- Install the oil nozzle for the clutch lubrication. (☞ p. 264)

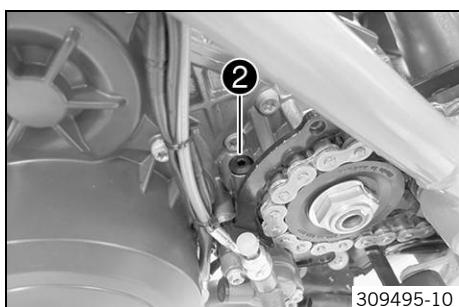
24.8 Installing the oil nozzle for the clutch lubrication

- Mount and tighten oil nozzle 1.

Guideline

Oil nozzle for clutch lubrication	M6x0.75	4 Nm (3 lbf ft)
-----------------------------------	---------	-----------------

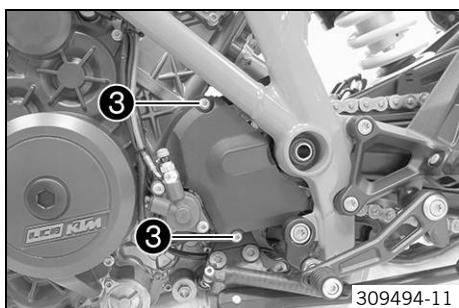
Oil nozzle assembly tool (61229035000) (☞ p. 346)



- Mount and tighten screw plug 2 with the O-ring.

Guideline

Plug, clutch lubrication	M10x1	10 Nm (7.4 lbf ft)
--------------------------	-------	--------------------



- Position the engine sprocket cover.

- Mount and tighten screws 3.

Guideline

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

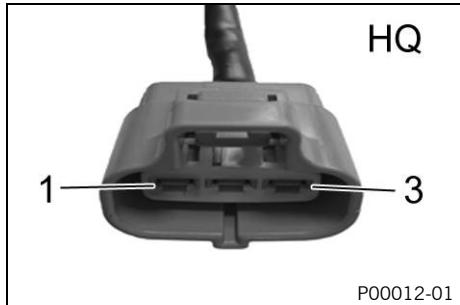
25.1 Alternator - checking the stator winding

Condition

The stator is disconnected.

Stator winding measurement I - check the resistance.

-  Measure the resistance between the specified points.
Stator, connector HQ pin 1 – Stator, connector HQ pin 2



Alternator

Stator winding resistance at: 20 °C (68 °F)	0.15... 0.30 Ω
--	----------------

- » If the indicated value does not correspond to the setpoint value:
 - Change the stator.

Stator winding measurement II - check the resistance.

-  Measure the resistance between the specified points.
Stator, connector HQ pin 1 – Stator, connector HQ pin 3

Alternator

Stator winding resistance at: 20 °C (68 °F)	0.15... 0.30 Ω
--	----------------

- » If the indicated value does not correspond to the setpoint value:
 - Change the stator.

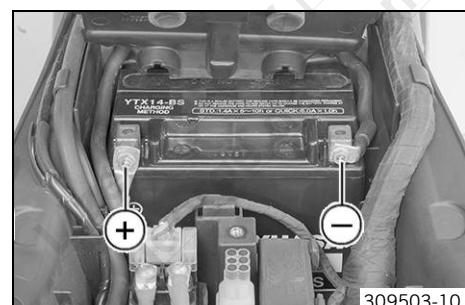
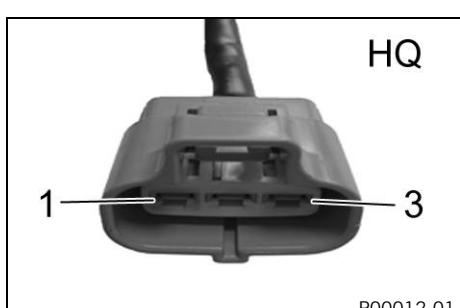
Stator winding measurement III - check the resistance.

-  Measure the resistance between the specified points.
Stator, connector HQ pin 2 – Stator, connector HQ pin 3

Alternator

Stator winding resistance at: 20 °C (68 °F)	0.15... 0.30 Ω
--	----------------

- » If the indicated value does not correspond to the setpoint value:
 - Change the stator.

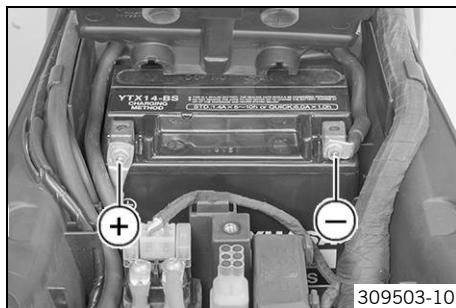
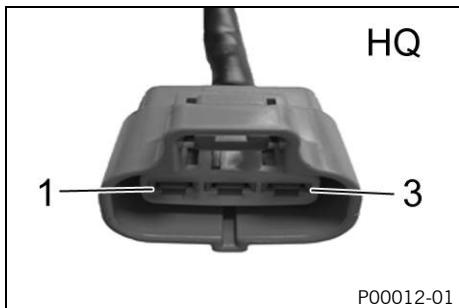


Stator winding I - check short circuit to ground (terminal 31).

-  Measure the resistance between the specified points.
Stator, connector HQ pin 1 – Measuring point Ground(–)

Resistance	$\infty \Omega$
------------	-----------------

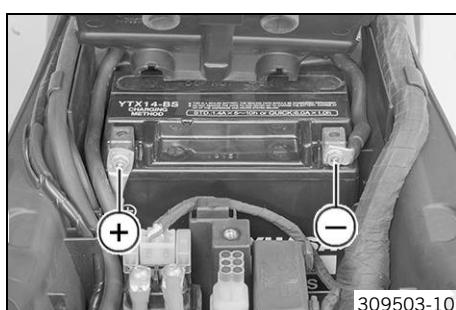
- » If the indicated value does not correspond to the setpoint value:
 - Change the stator.

**Stator winding II - check short circuit to ground (terminal 31).**

- Measure the resistance between the specified points.
Stator, connector **HQ** pin 2 – Measuring point **Ground(–)**

Resistance	$\infty \Omega$
------------	-----------------

- » If the indicated value does not correspond to the setpoint value:
 - Change the stator.

**Stator winding III - check short circuit to ground (terminal 31).**

- Measure the resistance between the specified points.
Stator, connector **HQ** pin 3 – Measuring point **Ground(–)**

Resistance	$\infty \Omega$
------------	-----------------

- » If the indicated value does not correspond to the setpoint value:
 - Change the stator.

- Start the motorcycle to check the function. (p. 15)

**Stator winding measurement I - check the voltage.**

- Measure the voltage between the specified points.
Stator, connector **HQ** pin 1 – Stator, connector **HQ** pin 2



Info
The results of the measurements on the individual coils must not deviate noticeably from each other.

AC generator

Alternating voltage stator winding at 4000 rpm: 20 °C (68 °F)	$\geq 50 \text{ V}$
--	---------------------

- » If the indicated value does not correspond to the setpoint value:
 - Change the stator.

Stator winding measurement II - check the voltage.

- Measure the voltage between the specified points.
Stator, connector **HQ** pin 1 – Stator, connector **HQ** pin 3



Info
The results of the measurements on the individual coils must not deviate noticeably from each other.

AC generator

Alternating voltage stator winding at 4000 rpm: 20 °C (68 °F)	$\geq 50 \text{ V}$
--	---------------------

- » If the indicated value does not correspond to the setpoint value:
 - Change the stator.

Stator winding measurement III - check the voltage.

- **V** Measure the voltage between the specified points.
Stator, connector **HQ** pin 2 – Stator, connector **HQ** pin 3



Info

The results of the measurements on the individual coils must not deviate noticeably from each other.

AC generator

Alternating voltage stator winding at 4000 rpm: 20 °C (68 °F)	≥ 50 V
--	--------

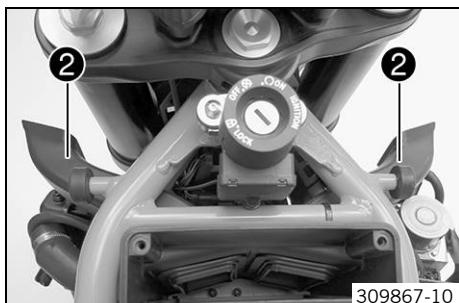
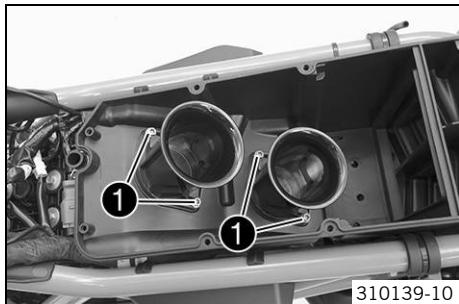
- » If the indicated value does not correspond to the setpoint value:
 - Change the stator.

25.2 Changing spark plugs (air filter removed)

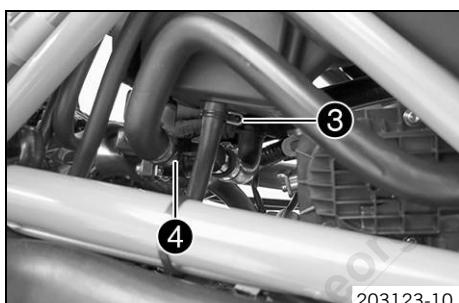
Condition

The air filter is removed.

- Remove screws **1**.
- Remove the intake trumpet.



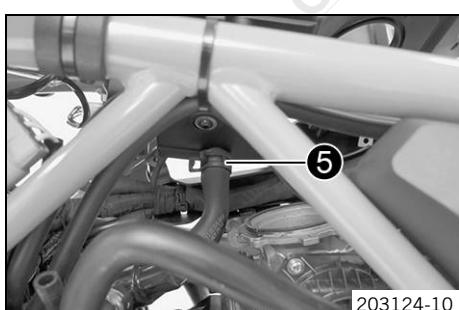
- Remove intake snorkel **2**.



- Lift the lower part of the air filter box slightly.
- Remove spring band clamp **3**.

Pliers for spring band clamp (60029057100) (p. 343)

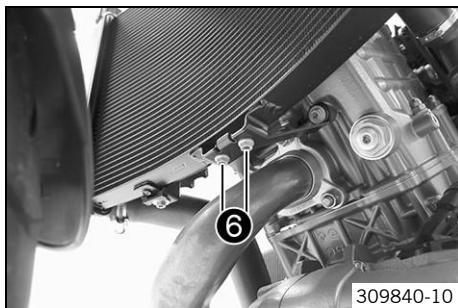
- Pull off the air release hose.
- Remove SAS valve **4** from the holder.



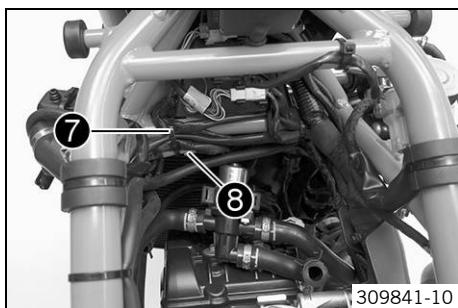
- Lift the lower part of the air filter box more.
- Remove spring band clamp **5**.

Pliers for spring band clamp (60029057100) (p. 343)

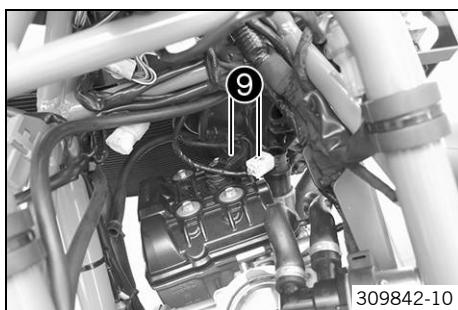
- Detach the SAS hose.
- Take off the lower part of the air filter box.



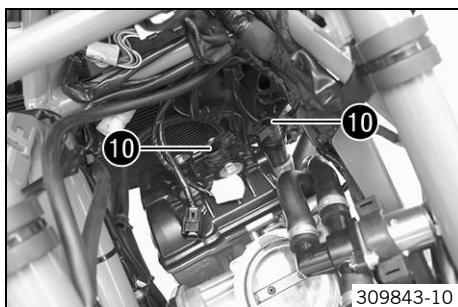
- Remove screws 6.
- Swing the radiator forward slightly.



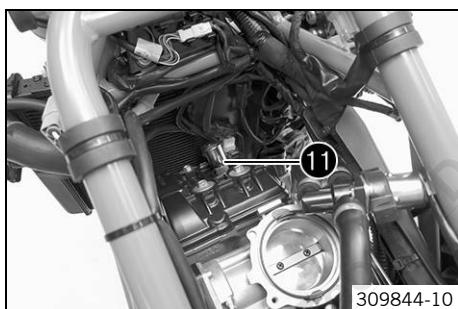
- Remove cable tie(s) 7.
- Disconnect plug-in connector 8.
- Pull the SAS valve back and fix it into position.



- Disconnect connectors 9 of the ignition coils.



- Remove ignition coils 10.



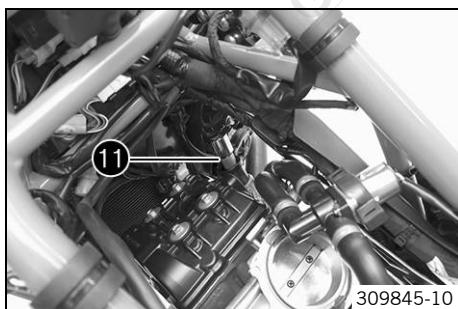
- Remove the spark plug with special tool 11.

Spark plug wrench (77229172000) (☞ p. 349)

- Mount and tighten the new spark plug using the special tool.

Guideline

Spark plug	M12x1.5	18 Nm (13.3 lbf ft)
------------	---------	------------------------



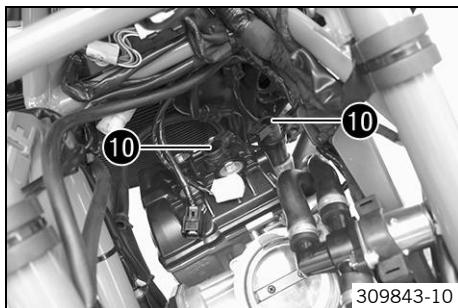
- Remove the spark plug with special tool 11.

Spark plug wrench (77229172000) (☞ p. 349)

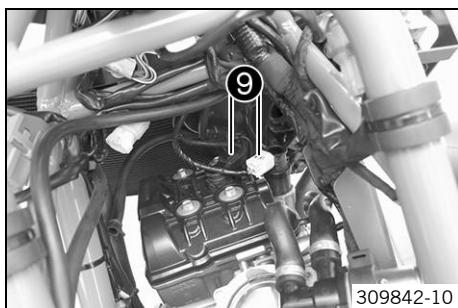
- Mount and tighten the new spark plug using the special tool.

Guideline

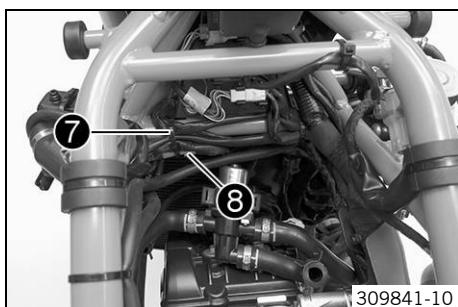
Spark plug	M10x1	11 Nm (8.1 lbf ft)
------------	-------	--------------------



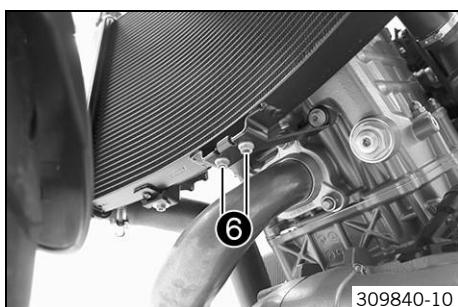
- Mount ignition coils 10.



- Plug in connectors 9 of the ignition coils.
✓ The cable with the white marking is connected to the outer ignition coil.

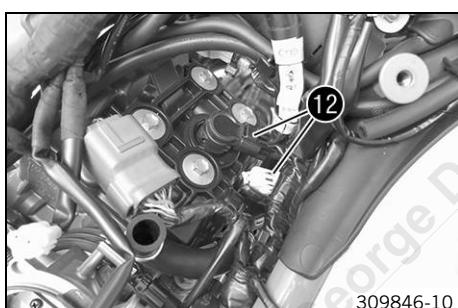


- Position SAS valve.
- Join plug-in connector 8.
- Mount cable tie(s) 7.

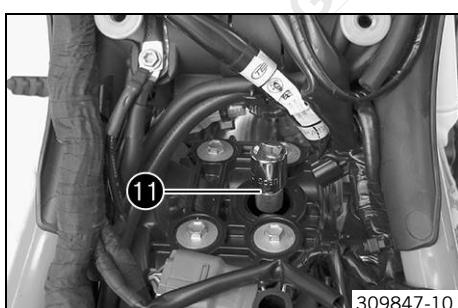


- Position the radiator.
- Mount and tighten screws 6.

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



- Disconnect connectors 12 of the ignition coils.
- Remove the ignition coils.

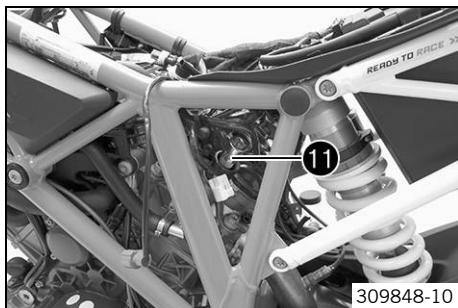


- Remove the spark plug with special tool 11.

Spark plug wrench (77229172000) (see p. 349)

- Mount and tighten the new spark plug using the special tool.

Spark plug	M12x1.5	18 Nm (13.3 lbf ft)
------------	---------	------------------------



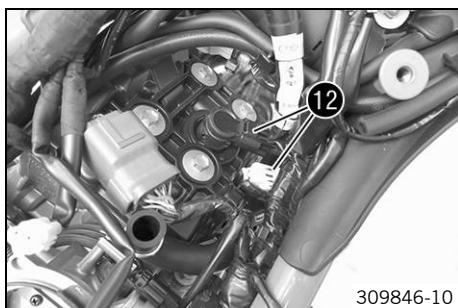
- Remove the spark plug with special tool 11.

Spark plug wrench (77229172000) (p. 349)
--

- Mount and tighten the new spark plug using the special tool.

Guideline

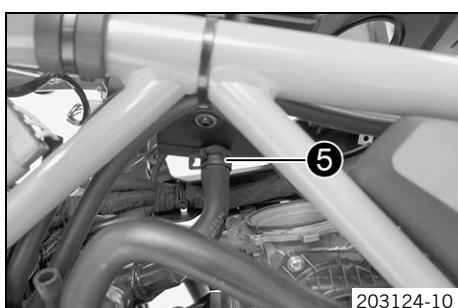
Spark plug	M10x1	11 Nm (8.1 lbf ft)
------------	-------	--------------------



- Mount the ignition coils.

- Plug in connectors 12 of the ignition coils.

✓ The cable with the white marking is connected to the outer ignition coil.

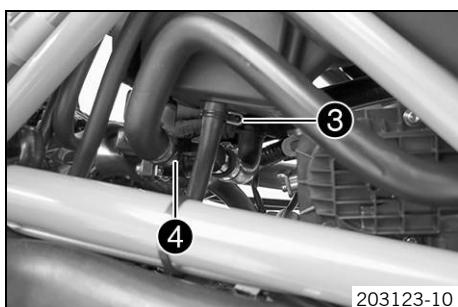


- Position the lower part of the air filter box in the frame.

- Mount the SAS hose.

- Mount spring band clamp 5.

Pliers for spring band clamp (60029057100) (p. 343)



- Mount SAS valve 4 on the holder.

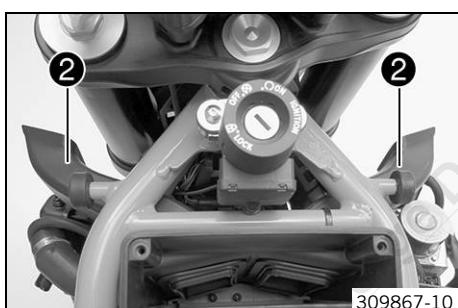
- Mount the vent hose.

- Mount spring band clamp 3.

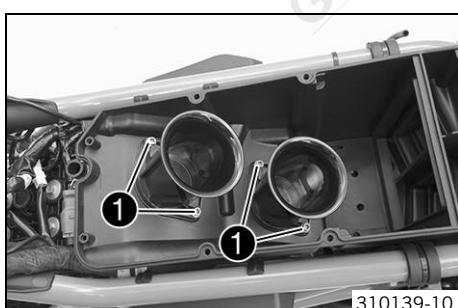
Pliers for spring band clamp (60029057100) (p. 343)

- Pay attention to the gaskets of the throttle valve body.

- Position the lower part of the air filter box at the throttle valve body.



- Mount intake snorkel 2.



- Position the intake trumpet.

- Mount and tighten screws 1.

Guideline

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

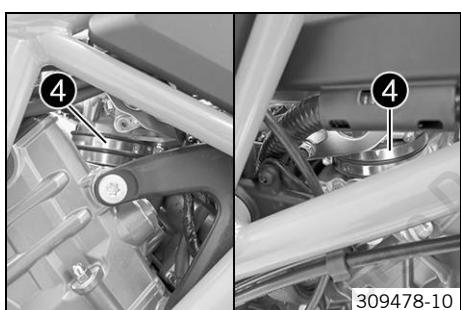
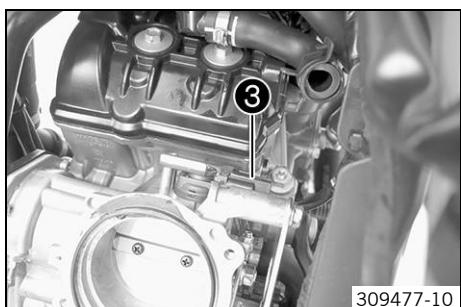
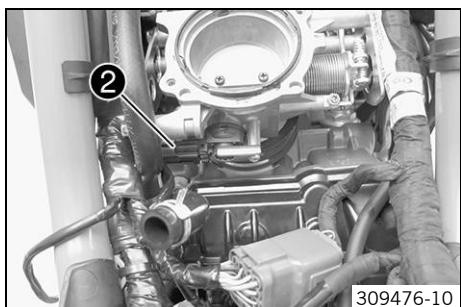
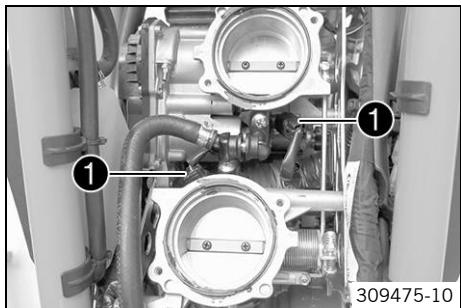
26.1 Removing the throttle valve body

Preparatory work

- Remove the passenger seat. (☞ p. 77)
- Remove the front rider's seat. (☞ p. 77)
- Remove the spoiler. (☞ p. 78)
- Remove the fuel tank. (☞ p. 78)
- Remove the upper part of the air filter box. (☞ p. 73)
- Remove the air filter box. (☞ p. 75)

Main work

- Detach connector 1.



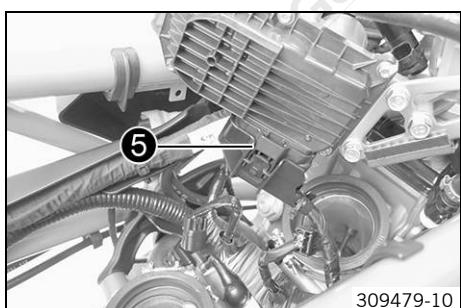
- Detach connector 2.

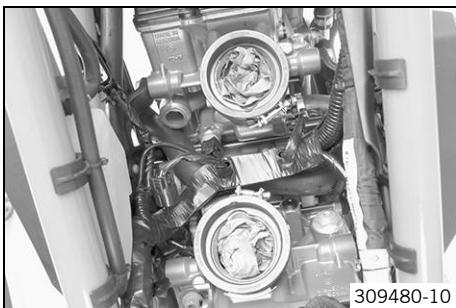
- Detach connector 3.

- Loosen clamps 4.

- Lift the throttle valve body.

- Detach connectors 5 and remove the throttle valve body.





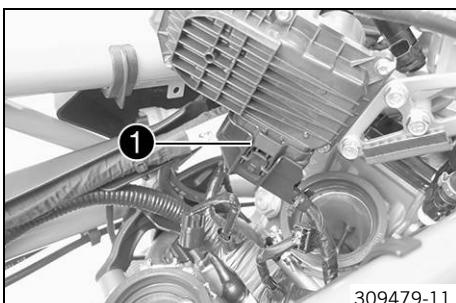
- Cover the intake duct with a cloth.

26.2 Installing the throttle valve body

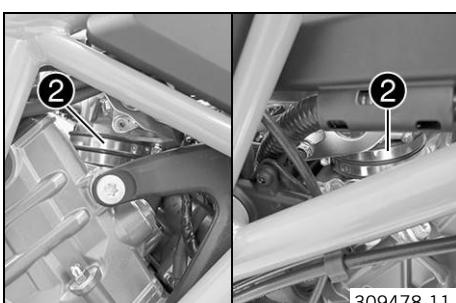


Main work

- Remove the cloth from the intake duct.



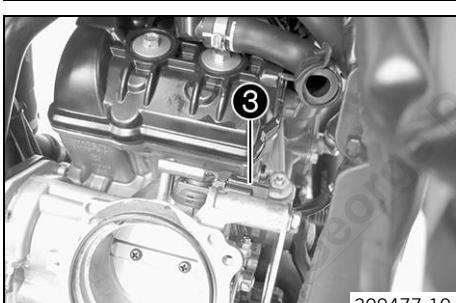
- Plug in connector 1.
- Position the throttle valve body.



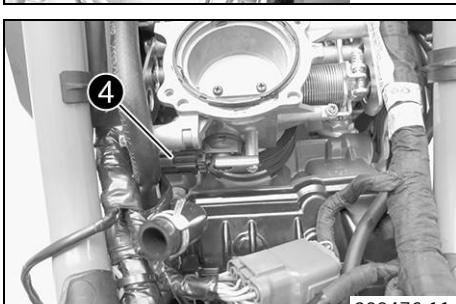
- Position and tighten clamps 2.

Guideline

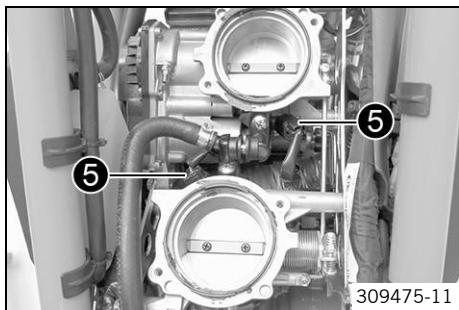
Hose clip, intake flange	M4	1.5 Nm (1.11 lbf ft)
--------------------------	----	-------------------------



- Plug in connector 3.



- Plug in connector 4.



- Plug in connector 5.

Finishing work

- Install the lower part of the air filter box. (p. 75)
- Install the upper part of the air filter box. (p. 74)
- Install the fuel tank. (p. 80)
- Mount the front rider's seat. (p. 77)
- Mount the passenger seat. (p. 77)
- Install the spoiler. (p. 78)
- Execute the initialization run. (p. 273)

26.3 Executing the initialization run

Condition

The diagnostics tool is connected and running.

- Execute "Engine electronics" > "Functions" > "Deleting adaption figures".
 - ✓ The adaption figures are deleted.
- Switch off the ignition.
- Exit the diagnostics tool.



Danger

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

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

- Start the engine without operating the throttle grip.

Guideline

Coolant temperature

< 25 °C (< 77 °F)

- Let the engine idle for at least 10 minutes (600 seconds).



Info

Do not operate the throttle grip during the initialization process.

- After 10 minutes (600 seconds), switch off the ignition.



Info

If the initialization is not completed or the initialization process is interrupted, the entire process must be restarted.

26.4 Resetting the engine electronics control unit

Condition

The diagnostics tool is connected and running.



Main work

- Execute "Engine electronics" > "Functions" > "Delete adaptation values".

Finishing work

- Program the gear position sensor. (☞ p. 240)

26.5 Checking the CO adjustment using the KTM diagnostics tool

Condition

The diagnostics tool is connected and running.



- Select "Engine electronics" > "Functions" > "CO adjustment when idling".
- Confirm the warning note using "Next".
- Check the position of the bars in the measurement range for both cylinders.
 - » The bars are in the middle of the green area of the measurement range.
 - Quit the function using "Cancel".
 - » The bars are not in the middle of the green area of the measurement range.
 - Select "cylinder 1" or "cylinder 2".
 - Using the + button or – button to position to bars in the middle of the measurement range.
 - Quit the function using "Save".
- Quit the process using "Execute".

27.1 Engine

Design	2-cylinder 4-stroke Otto engine, 75° V arrangement, water-cooled
Displacement	1,301 cm ³ (79.39 cu in)
Stroke	71 mm (2.8 in)
Bore	108 mm (4.25 in)
Compression ratio	13.2:1
Control	DOHC, 4 valves per cylinder, chain-driven
Valve - valve plate diameter	
Intake	42 mm (1.65 in)
Exhaust	34 mm (1.34 in)
Valve clearance	
Exhaust at: 20 °C (68 °F)	0.25... 0.30 mm (0.0098... 0.0118 in)
Intake at: 20 °C (68 °F)	0.10... 0.15 mm (0.0039... 0.0059 in)
Crankshaft bearing	Sleeve bearing
Conrod bearing	Sleeve bearing
Piston pin bearing	No bearing bushes - DLC-coated piston pins
Piston	Forged light alloy
Piston ring	1 upper compression (rectangular) ring, 1 lower compression ring, 1 oil scraper ring
Engine lubrication	Dry sump lubrication system with three rotor pumps
Primary transmission	40:76
Clutch	Antihopping clutch in oil bath/hydraulically operated
Transmission	6-speed claw gears
Transmission ratio	
1st gear	12:35
2nd gear	15:32
3rd gear	18:30
4th gear	20:27
5th gear	24:27
6th gear	27:26
Mixture preparation	Electronically controlled fuel injection
Ignition system	Contactless controlled fully electronic ignition with digital ignition adjustment
Alternator	12 V, 450 W
Spark plug	
Inside spark plug	NGK LKAR9BI9
Outside spark plug	NGK LMAR7A-9
Electrode gap, spark plug	0.9 mm (0.035 in)
Cooling	Water cooling, permanent circulation of coolant by water pump
Cold start device	Electric starter

27.2 Tolerance, engine wear limits

Camshaft bearing - radial clearance	
New condition	0.020... 0.054 mm (0.00079... 0.00213 in)
Wear limit	0.065 mm (0.00256 in)
Valve guide - diameter	
New condition	6.004... 6.016 mm (0.23638... 0.23685 in)
Wear limit	6.150 mm (0.24213 in)
Valve - sealing seat width	
Intake: New condition	0.90 mm (0.0354 in)
Intake: Wear limit	1.5 mm (0.059 in)

Exhaust: New condition	1.0 mm (0.039 in)
Exhaust: Wear limit	2.0 mm (0.079 in)
Valve - run-out	
Intake: on the valve plate	≤ 0.03 mm (≤ 0.0012 in)
Exhaust: on the valve plate	≤ 0.03 mm (≤ 0.0012 in)
Valve – valve stem diameter	
Exhaust	5.956... 5.970 mm (0.23449... 0.23504 in)
Intake	5.966... 5.980 mm (0.23488... 0.23543 in)
Valve spring - length	
New condition	42.70 mm (1.6811 in)
Wear limit	41.8 mm (1.646 in)
Cylinder head - bearing hole of camshaft	24.000... 24.021 mm (0.94488... 0.94571 in)
Cylinder/cylinder head - sealing area distortion	≤ 0.05 mm (≤ 0.002 in)
Cylinder - bore diameter	
Size I	108.000... 108.012 mm (4.25196... 4.25243 in)
Size II	108.012... 108.025 mm (4.25243... 4.25294 in)
Piston - diameter	
Size I	107.960... 107.990 mm (4.25039... 4.25157 in)
Size II	107.970... 108.000 mm (4.25078... 4.25196 in)
Piston/cylinder - mounting clearance	
Size I	0.010... 0.042 mm (0.00039... 0.00165 in)
Size II	0.012... 0.052 mm (0.00047... 0.00205 in)
Wear limit	0.10 mm (0.0039 in)
Piston - piston pin hole diameter	20.010... 20.020 mm (0.78779... 0.78819 in)
Piston ring	
Width, first ring (rectangular ring)	1.170... 1.200 mm (0.04606... 0.04724 in)
Width, second ring (lower compression ring)	1.170... 1.200 mm (0.04606... 0.04724 in)
Width, oil scraper ring	1.970... 2.000 mm (0.07756... 0.07874 in)
Piston ring - groove clearance	
First ring (rectangular ring)	≤ 0.08 mm (≤ 0.0031 in)
Second ring (lower compression ring)	≤ 0.08 mm (≤ 0.0031 in)
Oil scraper ring	≤ 0.06 mm (≤ 0.0024 in)
Piston ring end gap	
First ring (rectangular ring)	≤ 0.50 mm (≤ 0.0197 in)
Second ring (lower compression ring)	≤ 0.60 mm (≤ 0.0236 in)
Oil scraper ring	≤ 0.60 mm (≤ 0.0236 in)
Piston pin - diameter	19.995... 20.000 mm (0.7872... 0.7874 in)
Connecting rod - diameter of upper conrod eye	20.007... 20.013 mm (0.78768... 0.78791 in)
Connecting rod - axial clearance of lower conrod bearing	
New condition	0.15... 0.35 mm (0.0059... 0.0138 in)
Wear limit	0.40 mm (0.0157 in)
Connecting rod - radial clearance of lower conrod bearing	
New condition	0.030... 0.060 mm (0.00118... 0.00236 in)
Wear limit	0.080 mm (0.00315 in)
Connecting rod - large end width	20.950... 21.000 mm (0.8248... 0.82677 in)
Crankshaft - axial clearance	
New condition	0.10... 0.40 mm (0.0039... 0.0157 in)
Wear limit	1.00 mm (0.0394 in)
Crankshaft - crank pin width	42.100... 42.150 mm (1.65748... 1.65945 in)
Crankshaft - crank pin diameter	
Yellow	41.978... 41.989 mm (1.65267... 1.65311 in)
Blue	41.990... 42.000 mm (1.65315... 1.65354 in)

Red	42.001... 42.011 mm (1.65358... 1.65397 in)
Crankshaft - main bearing diameter	
Yellow	52.965... 52.975 mm (2.08523... 2.08563 in)
Blue	52.976... 52.985 mm (2.08567... 2.08602 in)
Red	52.986... 52.995 mm (2.08606... 2.08641 in)
Crankshaft - radial clearance of main bearing	
New condition	0.025... 0.055 mm (0.00098... 0.00217 in)
Wear limit	0.10 mm (0.0039 in)
Crankshaft - step bearing diameter	27.985... 28.000 mm (1.10177... 1.10236 in)
Crankshaft - radial clearance of step bearing	
New condition	0.030... 0.070 mm (0.00118... 0.00276 in)
Wear limit	0.090 mm (0.00354 in)
Clutch discs - thickness of total package	
New condition	47.20... 48.00 mm (1.8583... 1.8898 in)
Wear limit	46.50 mm (1.8307 in)
Clutch spring - length	≥ 43.5 mm (≥ 1.713 in)
Clutch basket - thrust surface of clutch facing discs	
Wear limit	0.5 mm (0.02 in)
Oil pressure regulator valve - minimum spring length	39 mm (1.54 in)
Oil pumps	
Clearance between external rotor and engine case	0.20... 0.40 mm (0.0079... 0.0157 in)
Clearance between external rotor and internal rotor	0.10... 0.25 mm (0.0039... 0.0098 in)
Axial clearance	0.04... 0.25 mm (0.0016... 0.0098 in)
Engine oil pressure	
Coolant temperature: ≥ 60 °C (≥ 140 °F) Idle	2.0... 4.8 bar (29... 70 psi)
Oil consumption	
After the vehicle is run-in	≤ 0.4 l/1.000 km (≤ 0.4 qt./600 mi)
i Info Oil consumption depends on the riding style and the operating conditions.	
Shift fork	
Thickness at leaf	4.85... 4.95 mm (0.1909... 0.1949 in)
Clearance in the sliding gear groove: New condition	0.35... 0.55 mm (0.0138... 0.0217 in)
Clearance in the sliding gear groove: Wear limit	0.70 mm (0.0276 in)
Shift shaft - play in sliding plate/shift quadrant	0.40... 0.80 mm (0.0157... 0.0315 in)
Sliding gear - width of shift fork groove	5.30... 5.40 mm (0.2087... 0.2126 in)
Transmission shaft - axial clearance	0.05... 0.15 mm (0.002... 0.0059 in)

27.3 Engine tightening torques

Screw, damping plate	EJOT ALtracs® M6x14	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, retaining bracket, valve cover, rear	EJOT ALtracs® M6x10	10 Nm (7.4 lbf ft)	–
Hose clip, intake flange	M4	1.5 Nm (1.11 lbf ft)	–
Oil nozzle	M5	2 Nm (1.5 lbf ft)	Loctite® 243™
Remaining engine screws	M5	6 Nm (4.4 lbf ft)	–
Screw, bearing retainer	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Screw, bearing shells retaining bracket	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Screw, engine oil level viewer	M5	4 Nm (3 lbf ft)	–
Screw, gear sensor	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Screw, pulse generator	M5	6 Nm (4.4 lbf ft)	Loctite® 243™
Bleeder screw, water pump cover	M6	10 Nm (7.4 lbf ft)	–

Freewheel ring bolt	M6 – 10.9	15 Nm (11.1 lbf ft)	Loctite® 648™
Nut, cylinder head	M6	9 Nm (6.6 lbf ft)	–
Plug, vacuum connection	M6	5 Nm (3.7 lbf ft)	Loctite® 243™
Remaining engine screws	M6	10 Nm (7.4 lbf ft)	–
Screw, camshaft bearing support	M6 – 10.9	10 Nm (7.4 lbf ft)	–
Screw, clutch cover	M6	10 Nm (7.4 lbf ft)	–
Screw, clutch spring	M6	12 Nm (8.9 lbf ft)	–
Screw, coolant connection on cylinder head	M6	10 Nm (7.4 lbf ft)	–
Screw, engine case	M6x60	10 Nm (7.4 lbf ft)	–
Screw, engine case	M6x80	10 Nm (7.4 lbf ft)	–
Screw, engine case	M6x90	10 Nm (7.4 lbf ft)	–
Screw, freewheel holder	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, locking lever	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, oil pump cover	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	18 Nm (13.3 lbf ft)	Loctite® 243™
Screw, starter motor	M6	10 Nm (7.4 lbf ft)	–
Screw, stator	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, valve cover	M6	10 Nm (7.4 lbf ft)	–
Screw, water pump cover	M6	10 Nm (7.4 lbf ft)	–
Screw, water pump wheel	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Stud, chain shaft	M6	8 Nm (5.9 lbf ft)	–
Vacuum connection	M6	2.5 Nm (1.84 lbf ft)	Loctite® 243™
Nozzle 100	M6x0.75	4 Nm (3 lbf ft)	Loctite® 243™
Plug, crankshaft retainer	M8	15 Nm (11.1 lbf ft)	–
Screw, camshaft bearing support	M8 – 10.9	Step 1 10 Nm (7.4 lbf ft) Step 2 18 Nm (13.3 lbf ft)	–
Screw, engine case	M8	18 Nm (13.3 lbf ft)	–
Screw, timing chain guide rail	M8	15 Nm (11.1 lbf ft)	Loctite® 243™
Stud, exhaust flange	M8	10 Nm (7.4 lbf ft)	–
Timing chain tensioning rail screw	M8	15 Nm (11.1 lbf ft)	Loctite® 243™
Screw, engine bearer	M10	45 Nm (33.2 lbf ft)	–
Oil pressure sensor	M10x1	10 Nm (7.4 lbf ft)	–
Plug, cam lever axis	M10x1	15 Nm (11.1 lbf ft)	–
Plug, clutch lubrication	M10x1	10 Nm (7.4 lbf ft)	–
Screw plug, spreading transmission lock	M10x1	12 Nm (8.9 lbf ft)	–
Screw, conrod bearing	M10x1	Step 1 25 Nm (18.4 lbf ft) Step 2 30 Nm (22.1 lbf ft) Step 3 90°	–
Screw, timing chain tensioner release	M10x1	10 Nm (7.4 lbf ft)	–
Spark plug	M10x1	11 Nm (8.1 lbf ft)	–

Cylinder head screw	M11x1.5	Tightening sequence: Using a crisscross pattern Step 1 15 Nm (11.1 lbf ft) Step 2 30 Nm (22.1 lbf ft) Step 3 90° Step 4 90°	Lubricated with engine oil
Coolant temperature sensor	M12x1.5	12 Nm (8.9 lbf ft)	-
Rotor screw	M12x1.5	90 Nm (66.4 lbf ft)	-
Spark plug	M12x1.5	18 Nm (13.3 lbf ft)	-
Nut of engine sprocket	M20x1.5	100 Nm (73.8 lbf ft)	Loctite® 243™
Oil drain plug	M20x1.5	20 Nm (14.8 lbf ft)	-
Nut, inner clutch hub	M22x1.5	120 Nm (88.5 lbf ft)	Loctite® 243™
Plug, timing-chain tensioner	M24x1.5	25 Nm (18.4 lbf ft)	-
Screw in alternator cover	M24x1.5	8 Nm (5.9 lbf ft)	-
Nut, primary gear	M33LHx1.5	130 Nm (95.9 lbf ft)	Loctite® 243™

27.4 Capacities

27.4.1 Engine oil

Engine oil	3.50 l (3.7 qt.)	Outside temperature: $\geq 0^{\circ}\text{C}$ ($\geq 32^{\circ}\text{F}$)	Engine oil (SAE 10W/50) (p. 334)
		Outside temperature: $< 0^{\circ}\text{C}$ ($< 32^{\circ}\text{F}$)	Engine oil (SAE 5W/40) (p. 334)

27.4.2 Coolant

Coolant	3.20 l (3.38 qt.)	Coolant (p. 334)
---------	-------------------	-------------------

27.4.3 Fuel

Total fuel tank capacity, approx.	18 l (4.8 US gal)	Super unleaded (ROZ 95/RON 95/PON 91) (p. 335)
Fuel reserve, approx.	3.5 l (3.7 qt.)	

27.5 Chassis

Frame	Lattice frame made of chrome molybdenum steel tubing, powder-coated
Fork	WP Performance Systems 4860 ROTA SPLIT
Shock absorber	WP Performance Systems 4618 BAVP DCC
Suspension travel	
Front	125 mm (4.92 in)
Rear	156 mm (6.14 in)
Brake system	
Front	Double disc brake with radially mounted four-pot brake calipers, floating brake discs
Rear	Single disc brake with dual-piston brake caliper, fixed brake disc
Brake discs - diameter	
Front	320 mm (12.6 in)
Rear	240 mm (9.45 in)
Brake discs - wear limit	
Front	4.5 mm (0.177 in)
Rear	4.5 mm (0.177 in)

Tire air pressure, solo/with passenger/full payload	
Front: with cold tires	2.5 bar (36 psi)
Rear: with cold tires	2.9 bar (42 psi)
Secondary drive ratio	17:38
Chain	5/8 x 5/16" (525) X-ring
Steering head angle	65.1°
Wheelbase	1,482 mm (58.35 in)
Seat height unloaded	835 mm (32.87 in)
Ground clearance unloaded	141 mm (5.55 in)
Weight without fuel approx.	189 kg (417 lb.)
Maximum permissible front axle load	160 kg (353 lb.)
Maximum permissible rear axle load	260 kg (573 lb.)
Maximum permissible overall weight	406 kg (895 lb.)

27.6 Electrical system

Battery	YTX14-BS	Battery voltage: 12 V Nominal capacity: 12 Ah Maintenance-free
Fuse	58011109110	10 A
Fuse	58011109115	15 A
Fuse	58011109125	25 A
Fuse	58011109130	30 A
Low beam/high beam	H4/socket U37R	12 V 60/55 W
Parking light	LED	
Instrument lights and indicator lamps	LED	
Turn signal (EU/AU/FR)	LED	
Turn signal (US/CN)	RY10W / socket BAU15s	12 V 10 W
Tail light	LED	
Brake light	LED	
License plate lamp	LED	

27.7 Tires

Front tires	Rear tires
120/70 ZR 17 M/C 58W TL Dunlop Sportmax Sportsmart ²	190/55 ZR 17 M/C 75W TL Dunlop Sportmax Sportsmart ²
The tires specified represent one of the possible series production tires. Additional information is available in the Service section under: http://www.ktm.com	

27.8 Fork

Fork part number	14.18.8N.22
Fork	WP Performance Systems 4860 ROTA SPLIT
Compression damping	
Comfort	17 clicks
Standard	12 clicks
Sport	7 clicks
Full payload	7 clicks
Rebound damping	
Comfort	17 clicks
Standard	12 clicks
Sport	7 clicks

Full payload	7 clicks
Spring length with preload spacer(s)	253 mm (9.96 in)
Spring rate	
Medium (standard)	9.5 N/mm (54.2 lb/in)
Air chamber length	110 ⁺¹⁰ ₋₃₀ mm (4.33 ^{+0.39} _{-1.18} in)
Fork length	776 mm (30.55 in)
Fork oil per fork leg	660 ml (22.31 fl. oz.)
	Fork oil (SAE 4) (48601166S1) (see p. 335)

27.9 Shock absorber

Shock absorber article number	15.18.70.22
Shock absorber	WP Performance Systems 4618 BAVP DCC
Compression damping, low-speed	
Comfort	18 clicks
Standard	15 clicks
Sport	10 clicks
Full payload	10 clicks
Compression damping, high-speed	
Comfort	1.5 turns
Standard	1.5 turns
Sport	1 turn
Full payload	1 turn
Rebound damping	
Comfort	15 clicks
Standard	12 clicks
Sport	9 clicks
Full payload	9 clicks
Spring preload	
Comfort	5 mm (0.2 in)
Standard	5 mm (0.2 in)
Sport	6 mm (0.24 in)
Full payload	7 mm (0.28 in)
Spring rate	
Medium (standard)	170 N/mm (971 lb/in)
Spring length	185 mm (7.28 in)
Gas pressure	10 bar (145 psi)
Riding sag	45 mm (1.77 in)
Static sag (standard)	24 mm (0.94 in)
Static sag (race track operation)	18 mm (0.71 in)
Fitted length	383 mm (15.08 in)
Shock absorber fluid (see p. 335)	SAE 2.5

27.10 Chassis tightening torques

Remaining screws, chassis	EJOT PT® K50x12	1 Nm (0.7 lbf ft)	-
Remaining screws, chassis	EJOT PT® K50x14	1 Nm (0.7 lbf ft)	-
Remaining screws, chassis	EJOT PT® K50x16	2 Nm (1.5 lbf ft)	-
Remaining screws, chassis	EJOT PT® K50x18	2 Nm (1.5 lbf ft)	-
Screw, fuel tank cover, quick connect nipple	EJOT PT® K60	2 Nm (1.5 lbf ft)	-
Screw, tail light	EJOT PT® K50x14	2.5 Nm (1.84 lbf ft)	-
Screw, combination switch, left	M4	2.5 Nm (1.84 lbf ft)	-
Screw, side stand switch	M4	2 Nm (1.5 lbf ft)	-

Remaining nuts, chassis	M5	5 Nm (3.7 lbf ft)	-
Remaining screws, chassis	M5	5 Nm (3.7 lbf ft)	-
Screw, cable channel	M5	5 Nm (3.7 lbf ft)	-
Screw, chain sliding guard	M5	5 Nm (3.7 lbf ft)	-
Screw, combination switch, right	M5	3.5 Nm (2.58 lbf ft)	-
Screw, filler cap	M5	3 Nm (2.2 lbf ft)	-
Screw, fuel level indicator	M5	3 Nm (2.2 lbf ft)	-
Screw, shock absorber adjusting ring	M5	5 Nm (3.7 lbf ft)	-
Screw, trim	M5x12	3.5 Nm (2.58 lbf ft)	-
Ground fitting on frame	M6	10 Nm (7.4 lbf ft)	-
Nut, ABS unit attachment	M6	5 Nm (3.7 lbf ft)	-
Nut, cable on starter motor	M6	4 Nm (3 lbf ft)	-
Remaining nuts, chassis	M6	10 Nm (7.4 lbf ft)	-
Remaining screws, chassis	M6	10 Nm (7.4 lbf ft)	-
Screw, ball joint of push rod on foot brake cylinder	M6	5 Nm (3.7 lbf ft)	Loctite® 243™
Screw, battery terminal	M6	4.5 Nm (3.32 lbf ft)	-
Screw, clutch assembly	M6	5 Nm (3.7 lbf ft)	Loctite® 243™
Screw, connecting piece, rear brake line	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, cooler retaining bracket	M6	7 Nm (5.2 lbf ft)	-
Screw, exhaust clamp on main silencer	M6	8 Nm (5.9 lbf ft)	-
Screw, exhaust clamp on manifold	M6	8 Nm (5.9 lbf ft)	-
Screw, foot brake cylinder	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, fuel pump	M6	6 Nm (4.4 lbf ft)	-
Screw, headlight mask, rear wall	M6	5 Nm (3.7 lbf ft)	-
Screw, license plate holder on lower rear panel	M6	12 Nm (8.9 lbf ft)	-
Screw, sensor box	M6	6 Nm (4.4 lbf ft)	Loctite® 243™
Screw, shift lever stub	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, shift rod	M6	5 Nm (3.7 lbf ft)	Loctite® 243™
Screw, shift shaft deflector on shift shaft	M6	18 Nm (13.3 lbf ft)	Loctite® 243™
Screw, side stand stub	M6	6 Nm (4.4 lbf ft)	Loctite® 243™
Screw, steering damper, holder, on frame	M6	8 Nm (5.9 lbf ft)	Loctite® 243™
Screw, step plate for foot brake lever	M6	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, wheel speed sensor, front	M6	4 Nm (3 lbf ft)	-
Screw, wheel speed sensor, rear	M6	4 Nm (3 lbf ft)	-
Nut, rear sprocket	M8	36 Nm (26.6 lbf ft)	-
Nut, shift rod	M8	12 Nm (8.9 lbf ft)	-
Nut, shift rod	M8LH	12 Nm (8.9 lbf ft)	-
Nut, valve, angled	M8	4 Nm (3 lbf ft)	-
Remaining nuts, chassis	M8	25 Nm (18.4 lbf ft)	-
Remaining screws, chassis	M8	25 Nm (18.4 lbf ft)	-
Screw, axle clamp	M8	15 Nm (11.1 lbf ft)	-
Screw, bottom triple clamp	M8	12 Nm (8.9 lbf ft)	-
Screw, foot brake lever	M8	20 Nm (14.8 lbf ft)	Loctite® 243™
Screw, front brake disc	M8	30 Nm (22.1 lbf ft)	Loctite® 2701™
Screw, handlebar clamp	M8	20 Nm (14.8 lbf ft)	-
Screw, ignition lock (tamper-proof screw)	M8	25 Nm (18.4 lbf ft)	-
Screw, rear brake disc	M8	30 Nm (22.1 lbf ft)	Loctite® 243™
Screw, shift lever on footrest bracket	M8	20 Nm (14.8 lbf ft)	Loctite® 243™

Screw, shift shaft deflector on frame	M8	10 Nm (7.4 lbf ft)	Loctite® 243™
Screw, side stand bracket	M8	25 Nm (18.4 lbf ft)	Loctite® 243™
Screw, side stand spring	M8	15 Nm (11.1 lbf ft)	Loctite® 2701™
Screw, steering damper on holder	M8	8 Nm (5.9 lbf ft)	Loctite® 243™
Screw, steering damper on triple clamp	M8	8 Nm (5.9 lbf ft)	Loctite® 243™
Screw, top triple clamp	M8	15 Nm (11.1 lbf ft)	–
Remaining nuts, chassis	M10	45 Nm (33.2 lbf ft)	–
Remaining screws, chassis	M10	45 Nm (33.2 lbf ft)	–
Screw, engine bearer	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
Screw, front brake caliper	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
Screw, instrument support	M10	40 Nm (29.5 lbf ft)	Loctite® 243™
Screw, side stand	M10	35 Nm (25.8 lbf ft)	Loctite® 243™
Screw, side stand bracket	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
Screw, side stand retaining plate	M10	45 Nm (33.2 lbf ft)	Loctite® 243™
Banjo bolt, brake line	M10x1	25 Nm (18.4 lbf ft)	–
Banjo bolt, brake line, connecting piece, rear	M10x1	15 Nm (11.1 lbf ft)	–
Nut, rear hub shock absorber carrier	M10x1.25	45 Nm (33.2 lbf ft)	Loctite® 243™
Lambda sensor	M12x1.25	25 Nm (18.4 lbf ft)	–
Screw, bottom shock absorber	M14x1.5	80 Nm (59 lbf ft)	Thread greased
Screw, top shock absorber	M14x1.5	80 Nm (59 lbf ft)	Thread greased
Screw, eccentric	M16	70 Nm (51.6 lbf ft)	–
Nut, swingarm pivot	M19x1.5	130 Nm (95.9 lbf ft)	Thread greased
Nut, seat lock	M22x1.5	6 Nm (4.4 lbf ft)	–
Screw, steering head, top	M22x1.5	50 Nm (36.9 lbf ft)	–
Bolt, front axle	M25x1.5	45 Nm (33.2 lbf ft)	Thread greased
Nut, steering head	M28x1.0	Step 1 10 Nm (7.4 lbf ft) Step 2 (loosen, counter-clockwise) 60°	–
Nut, rear axle, shock absorber side	M35x1.5	200 Nm (147.5 lbf ft)	Loctite® 262™/lock the locking wire with locking varnish
Nut, rear axle	M50x1.5	250 Nm (184.4 lbf ft)	Thread greased/lock locking wire with locking varnish

28.1 Cleaning motorcycle

Note

Material damage Components become damaged or destroyed if a pressure cleaner is used incorrectly.

The high pressure forces water into the electrical components, connectors, throttle cables, and bearings, etc.

Pressure which is too high causes malfunctions and destroys components.

- Do not direct the water jet directly on to electrical components, connectors, throttle cables or bearings.

- Maintain a minimum distance between the nozzle of the pressure cleaner and the component.

Minimum clearance

60 cm (23.6 in)



Warning

Environmental hazard Hazardous substances cause environmental damage.

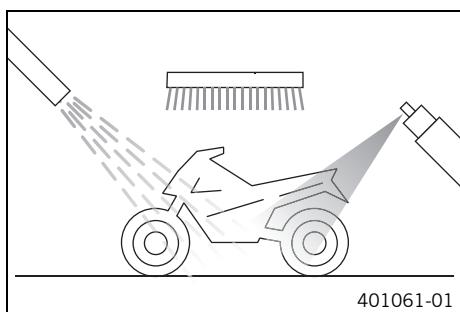
- Dispose of oils, grease, filters, fuel, cleaning agents, brake fluid, etc., correctly and in compliance with the applicable regulations.



Info

If you clean the motorcycle regularly, its value and appearance will be maintained over a long period.

Avoid direct sunshine on the motorcycle during cleaning.



- Close off the exhaust system to keep water from entering.
- First remove coarse dirt particles with a gentle spray of water.
- Spray very dirty areas with a normal motorcycle cleaner and then clean with a brush.

Motorcycle cleaner (☞ p. 336)



Info

Use warm water containing normal motorcycle cleaner and a soft sponge. Never apply motorcycle cleaner to a dry vehicle; always rinse the vehicle with water first.

If the vehicle was operated in road salt, clean it with cold water. Warm water would enhance the corrosive effects of salt.

- After rinsing the motorcycle with a gentle spray of water, allow it to dry thoroughly.
- Remove the closure of the exhaust system.



Warning

Danger of accidents Moisture and dirt impair the brake system.

- Brake carefully several times to dry out and remove dirt from the brake linings and the brake discs.
- After cleaning, ride the vehicle a short distance until the engine warms up.



Info

The heat produced causes water at inaccessible locations in the engine and on the brake system to evaporate.

- Push back the protection caps of the handlebar controls to allow any water that has penetrated to evaporate.
- After the motorcycle has cooled off, lubricate all moving parts and bearings.
- Clean the chain. (☞ p. 109)
- Treat bare metal parts (except for brake discs and exhaust system) with corrosion inhibitor.

Preserving materials for paints, metal and rubber (☞ p. 337)

- Treat the painted parts with a mild paint polish.

Perfect Finish and high gloss polish for paints (☞ p. 337)



Info

Do not polish plastic parts that are matte when the vehicle is delivered as this would seriously impair the material quality.

- Treat the 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. 337)
- Oil the ignition/steering lock, tank lock, and seat lock.

Universal oil spray (p. 337)

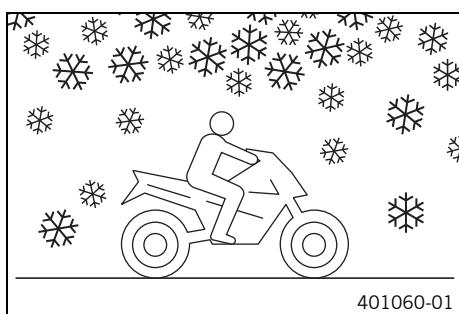
28.2 Checks and maintenance steps for winter operation



Info

If you use the motorcycle in winter, you must expect salt on the roads. You should therefore take precautions against aggressive road salt.

If the vehicle was operated in road salt, clean it with cold water after riding. Warm water would enhance the corrosive effects of salt.



- Clean the motorcycle. (p. 284)
- Clean the brakes.



Info

After **EVERY** trip on salted roads, thoroughly wash the brake calipers and brake linings with cold water and dry carefully. This should be done after the parts are cooled down and while they are installed.

After riding on salted roads, thoroughly wash the motorcycle with cold water and dry it well.

- Treat the engine, the swingarm, and all other bare or galvanized parts (except brake discs) with a wax-based corrosion inhibitor.



Info

Corrosion inhibitor must not come into contact with the brake discs. This would severely lower the braking effect.

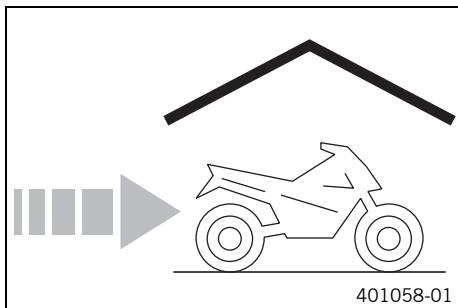
- Clean the chain. (p. 109)

29.1 Storage

**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.



401058-01

- When refueling for the last time before taking the motorcycle out of service, add fuel additive.

Fuel additive (p. 336)

- Refuel.
- Clean the motorcycle. (p. 284)
- Change the engine oil and oil filter and clean the oil screens. (p. 259)
- Check the coolant fill level and antifreeze. (p. 241)
- Check the tire air pressure. (p. 91)
- Remove the battery. (p. 127)

Guideline

Storage temperature of battery without direct sunshine	0... 35 °C (32... 95 °F)
--	--------------------------

- Recharge the battery.
- Store the vehicle in a dry location that is not subject to large fluctuations in temperature.

**Info**

KTM recommends jacking up the motorcycle.

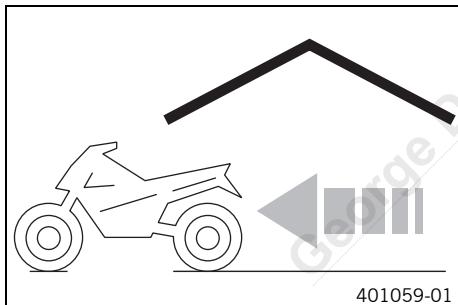
- Lift the motorcycle with the rear lifting gear. (p. 14)
- Lift the motorcycle with the front lifting gear. (p. 11)
- Cover the vehicle with a tarp or similar cover that is permeable to air.

**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. Since the engine cannot warm up properly, the water vapor produced during combustion condenses and causes valves and the exhaust system to rust.

29.2 Preparing for use after storage



401059-01

- Take the motorcycle from the front lifting gear. (p. 11)
- Remove the rear of the motorcycle from the lifting gear. (p. 14)
- Install the battery. (p. 127)

**Info**

If the battery has been removed, the time and date must be set.

- Perform checks and maintenance measures when preparing for use.
- Take a test ride.

30.1 Additional information

Any further work that results from the required work or from the recommended work must be ordered separately and invoiced separately.

Different service intervals may apply in your country, depending on the local operating conditions.

30.2 Required work

	every 2 years	every year	every 30,000 km (18,600 mi)	every 15,000 km (9,300 mi)	after 1,000 km (620 mi)
Read out the fault memory using the KTM diagnostics tool.	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the fuel pressure. (☞ p. 81)			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check that the electrical equipment is functioning properly.	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Change the engine oil and oil filter and clean the oil screens. (☞ p. 259)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the brake discs. (☞ p. 100)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the front brake linings. (☞ p. 136)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the brake linings of the rear brake. (☞ p. 142)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the tire condition. (☞ p. 91)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the tire air pressure. (☞ p. 91)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the rear brake fluid level. (☞ p. 144)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the shock absorber and fork for leaks. Perform a fork service and shock absorber service as needed and depending on how the vehicle is used.	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Clean the dust boots of the fork legs. (☞ p. 17)			<input checked="" type="radio"/>	<input checked="" type="radio"/>	
Check the chain, rear sprocket, engine sprocket, and chain guide. (☞ p. 104)			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the chain tension. (☞ p. 103)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the brake lines for damage and leakage.	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the brake fluid level of the front brake. (☞ p. 138)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	
Measure the wheel bearing play and grease the rear hub. (☞ p. 117)					<input checked="" type="radio"/>
Check that the rear wheel nut (right side) is tightened to the specified torque. (☞ p. 100)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the coolant level in the compensating tank. (☞ p. 241)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check that the radiator fan is functioning properly.	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Change the air filter, clean the air filter box. (☞ p. 73)			<input checked="" type="radio"/>	<input checked="" type="radio"/>	
Check the cables for damage and routing without sharp bends (fuel tank removed).			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Change the spark plugs (air filter removed). (☞ p. 267)					<input checked="" type="radio"/>
Check the valve clearance (air filter and spark plugs removed). (☞ p. 250)					<input checked="" type="radio"/>
Change the secondary air system membranes. (☞ p. 236)					<input checked="" type="radio"/>
Change the front brake fluid. (☞ p. 139)					<input checked="" type="radio"/>
Change the rear brake fluid. (☞ p. 146)					<input checked="" type="radio"/>
Check the play of the steering head bearing. (☞ p. 27)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the headlight setting. (☞ p. 151)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>		
Final check: Check the vehicle is roadworthy and take a test ride.	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Read out the error memory after the test ride using the KTM diagnostics tool.	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Check the CO adjustment using the KTM diagnostics tool. (☞ p. 274)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>		
Reset the service display using the KTM diagnostic tool. (☞ p. 153)	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Make the service entry in the KTM Dealer.net and in the Service and Warranty Booklet.	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

- One-time interval
- Periodic interval

30.3 Recommended work

	every 30,000 km (18,600 mi)	every 15,000 km (9,300 mi)	after 1,000 km (620 mi)	every year	Every two years	Every four years
Check the frame. (☞ p. 39)				●		
Check the swingarm. (☞ p. 58)				●		
Check/clean the oil nozzle for clutch lubrication. (☞ p. 263)	○	●	●			
Check the swingarm bearing. (☞ p. 58)		●	●			
Check the wheel bearings. (☞ p. 92)		●	●			
Grease all moving parts (e.g., side stand, hand lever, chain, ...) and check for smooth operation.	○	●	●	●	●	●
Empty the drainage hoses. (US/CN)	○	●	●	●	●	●
Check all hoses (e.g. fuel, cooling, bleeder, drainage, etc.) and sleeves for cracking, leaks, and incorrect routing.		●	●	●	●	●
Check the antifreeze.	○	●	●	●	●	●
Check/rectify the fluid level of the hydraulic clutch. (☞ p. 237)		●	●	●		
Change the hydraulic clutch fluid. (☞ p. 237)				●	●	
Check the screws and nuts for tightness.	○	●	●	●	●	●
Change the coolant.						●

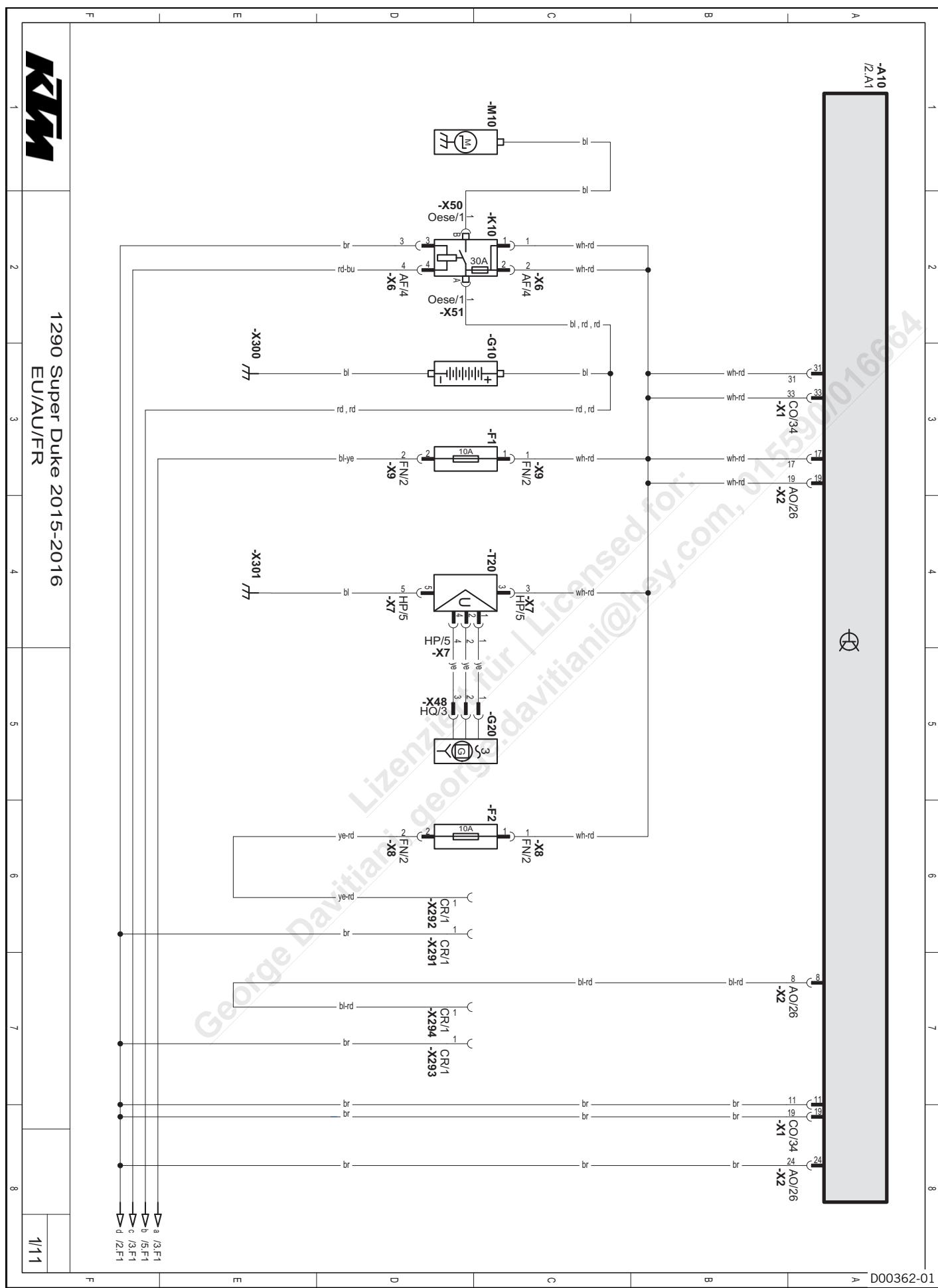
- One-time interval
- Periodic interval

George Davitiani, george.davitiani@hey.com, 015590/016664
Lizenziert für | Licensed for:

31 WIRING DIAGRAM

290

31.1 Page 1 of 11 (EU/AU/FR)



31 WIRING DIAGRAM

291

Components:

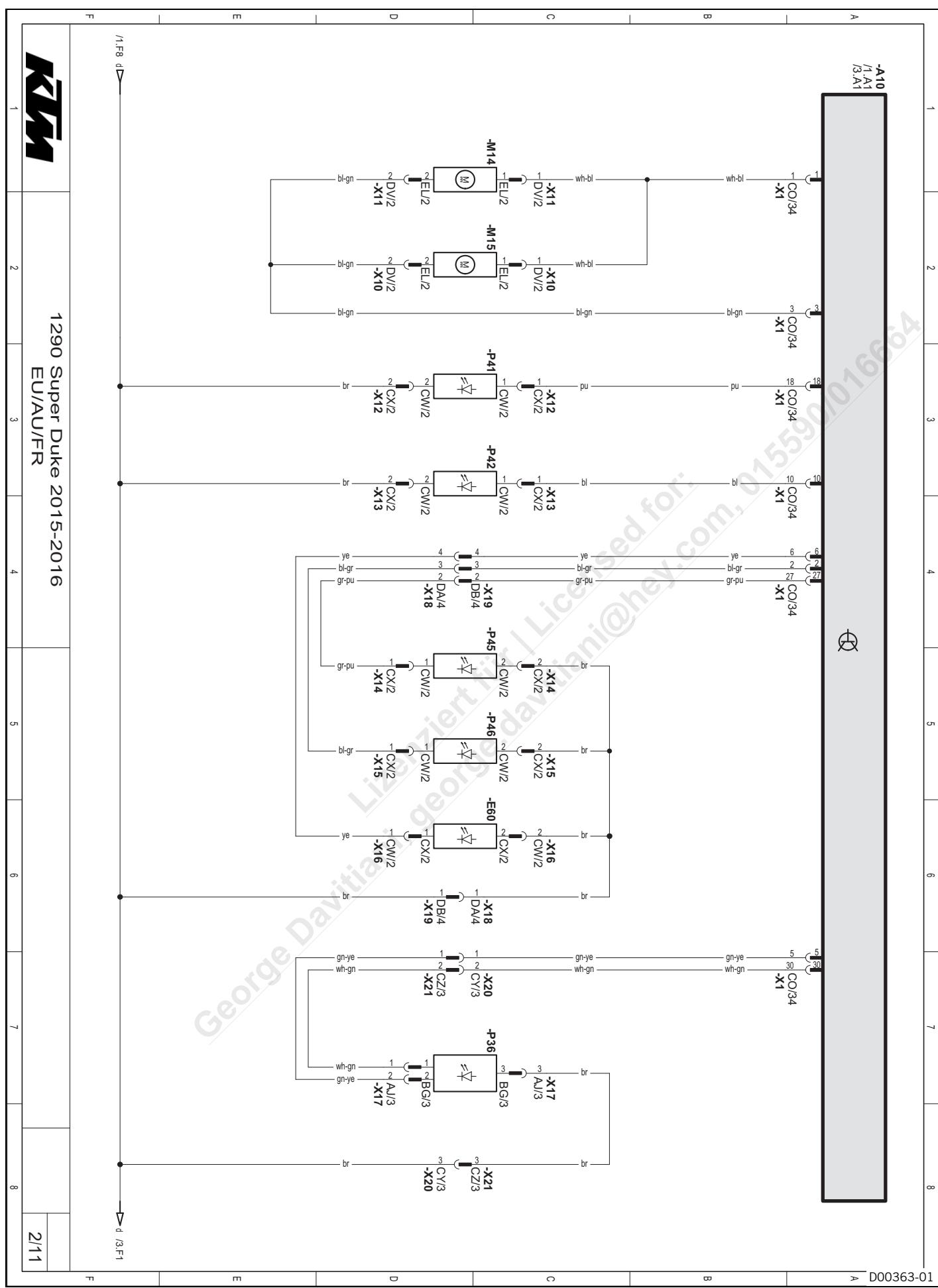
A10	Central electronics control unit
F1	Fuse
F2	Fuse
G10	Battery
G20	Alternator
K10	Starter relay with main fuse
M10	Starter motor
T20	Voltage regulator
X291	Connector for accessory ground ACC 1 (not assigned)
X292	Connector for accessory plus (terminal 30) ACC 1 (not assigned)
X293	Connector for accessory ground ACC 2 (not assigned)
X294	Connector for accessory plus (terminal 15) ACC 2 (not assigned)

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

292

31.2 Page 2 of 11 (EU/AU/FR)



Components:

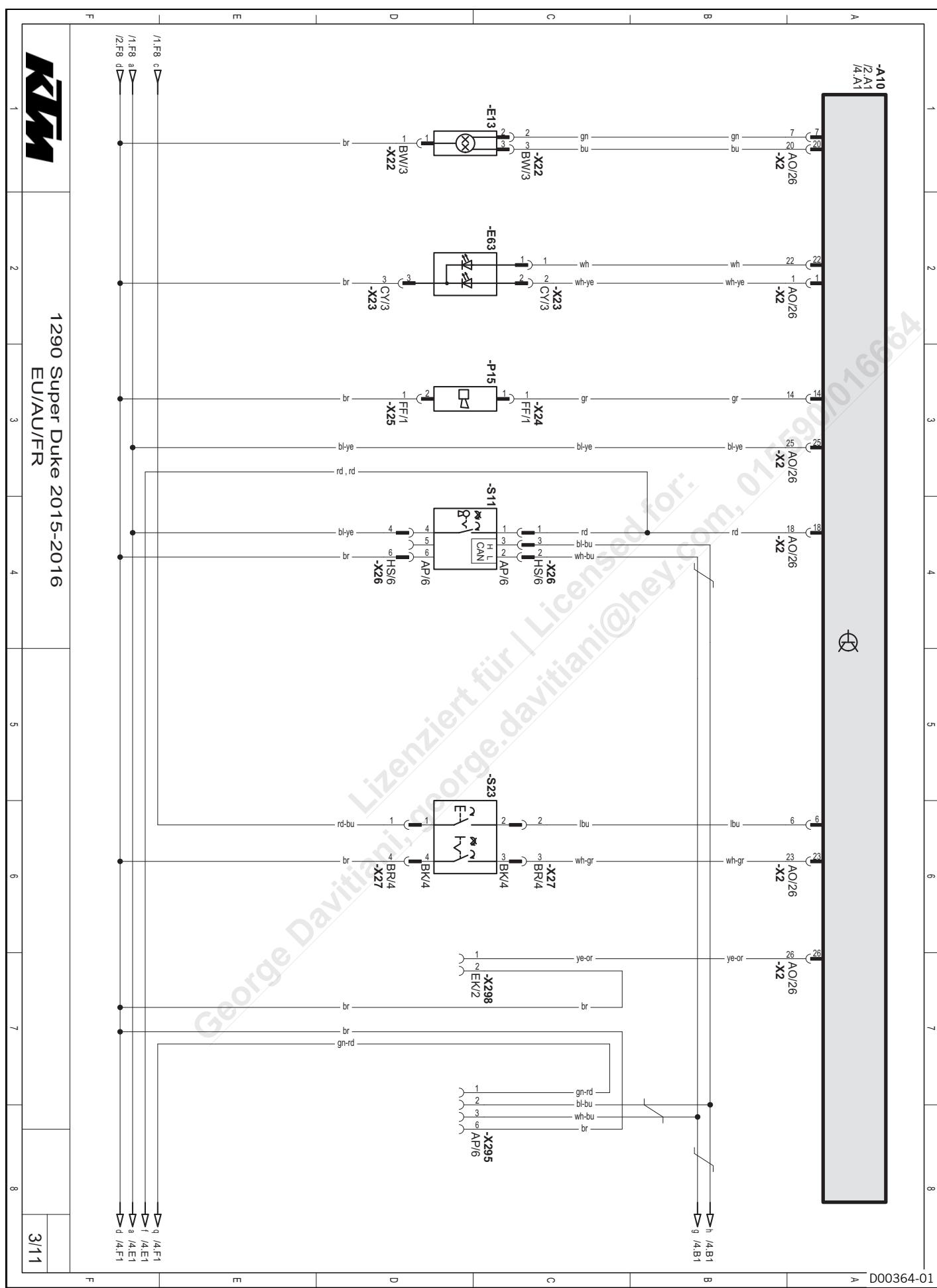
A10	Central electronics control unit
E60	License plate lamp
M14	Radiator fan 1
M15	Radiator fan 2
P36	Brake/tail light
P41	Front left turn signal
P42	Front right turn signal
P45	Rear left turn signal
P46	Rear right turn signal

George Davitiani, george.davitiani@hey.com, 015590/016664
Lizenziert für | Licensed for:

31 WIRING DIAGRAM

294

31.3 Page 3 of 11 (EU/AU/FR)



Components:

A10 Central electronics control unit

E13 Low beam, high beam

E63 Parking light, daytime running light

P15 Horn

S11 Ignition/handlebar lock, immobilizer control unit

S23 Emergency OFF switch, electric starter button

X295 Diagnostics connector

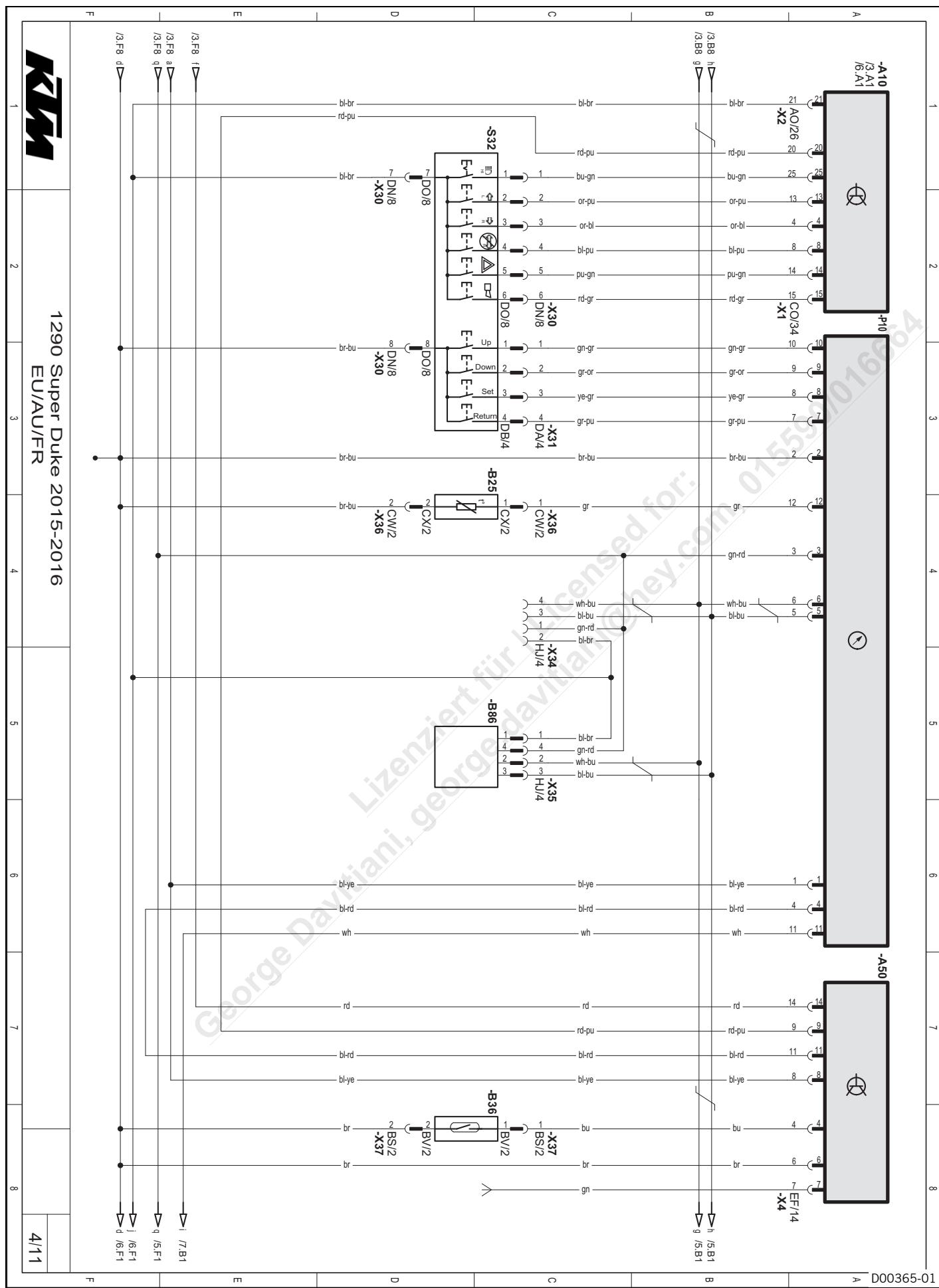
X298 Heated grip connector

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

296

31.4 Page 4 of 11 (EU/AU/FR)



31 WIRING DIAGRAM

297

Components:

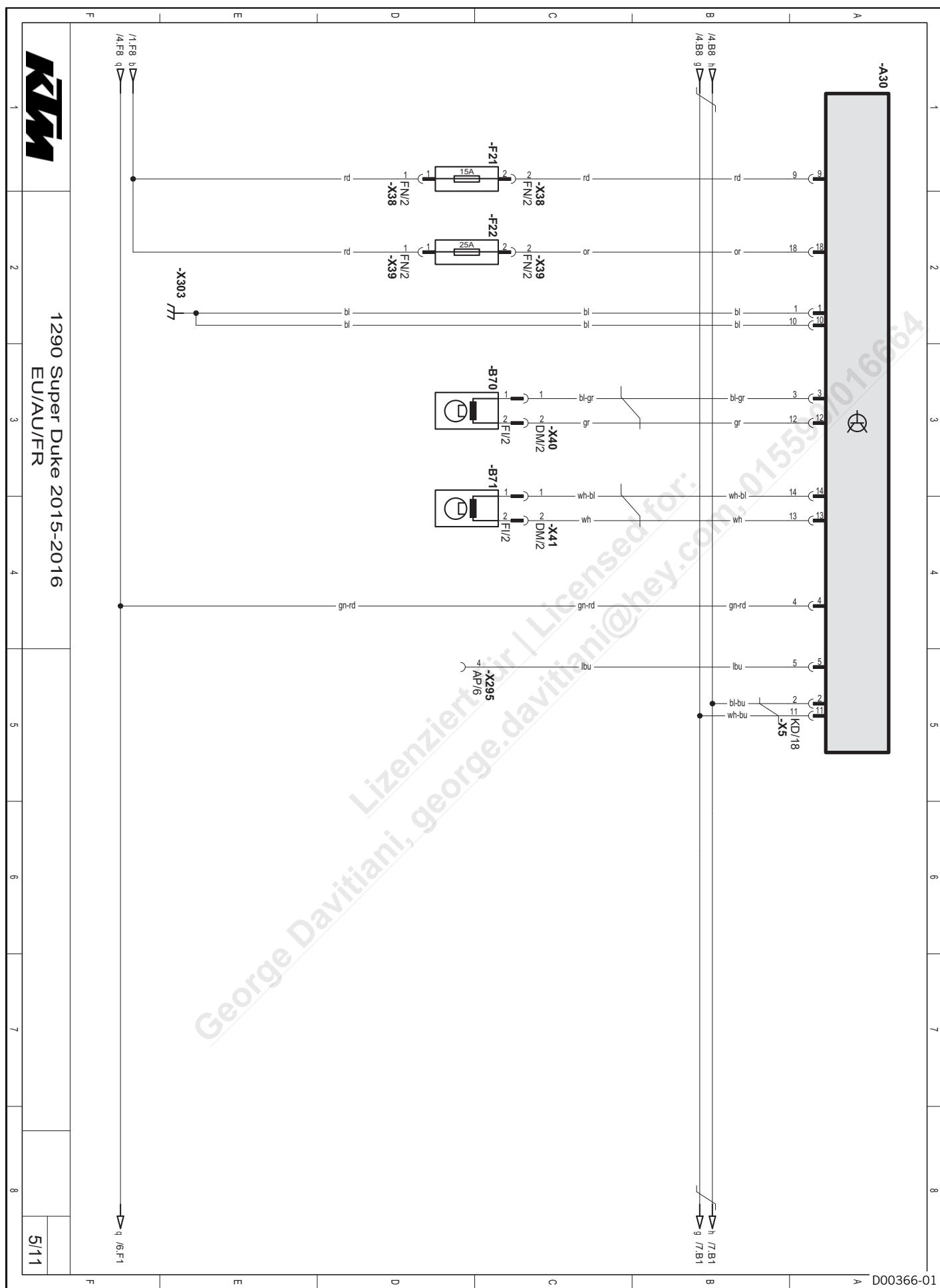
A10	Central electronics control unit
A50	Alarm system
B25	Ambient air temperature sensor
B36	Alarm system switch
B86	Angle sensor
P10	Combination instrument
S32	Combination steering switch

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

298

31.5 Page 5 of 11 (EU/AU/FR)



31 WIRING DIAGRAM

299

Components:

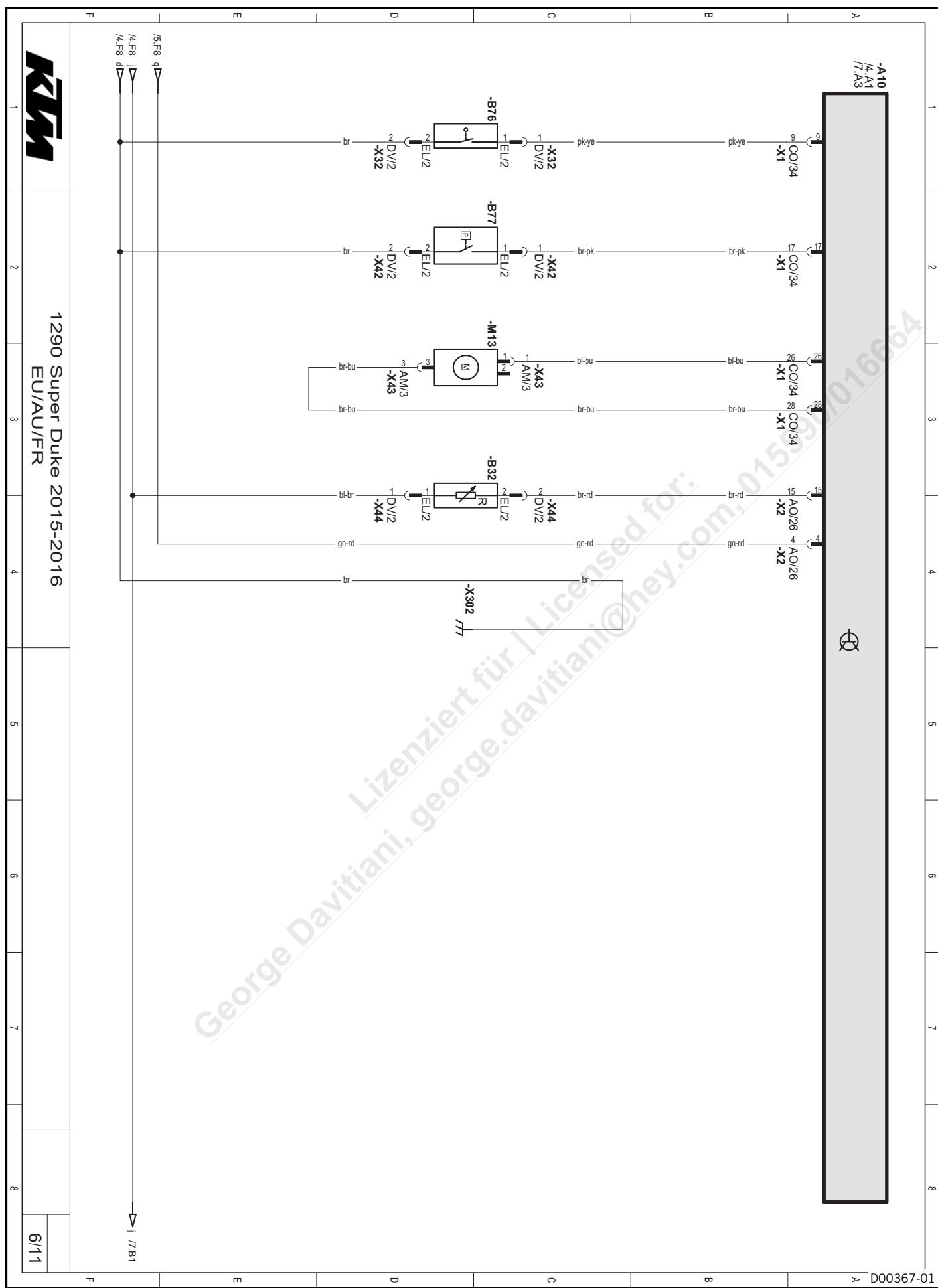
A30	ABS control unit
B70	Front wheel speed sensor
B71	Wheel speed sensor, rear
F21	ABS fuse
F22	ABS fuse
X295	Diagnostics connector
X303	Ground point

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

300

31.6 Page 6 of 11 (EU/AU/FR)



Components:

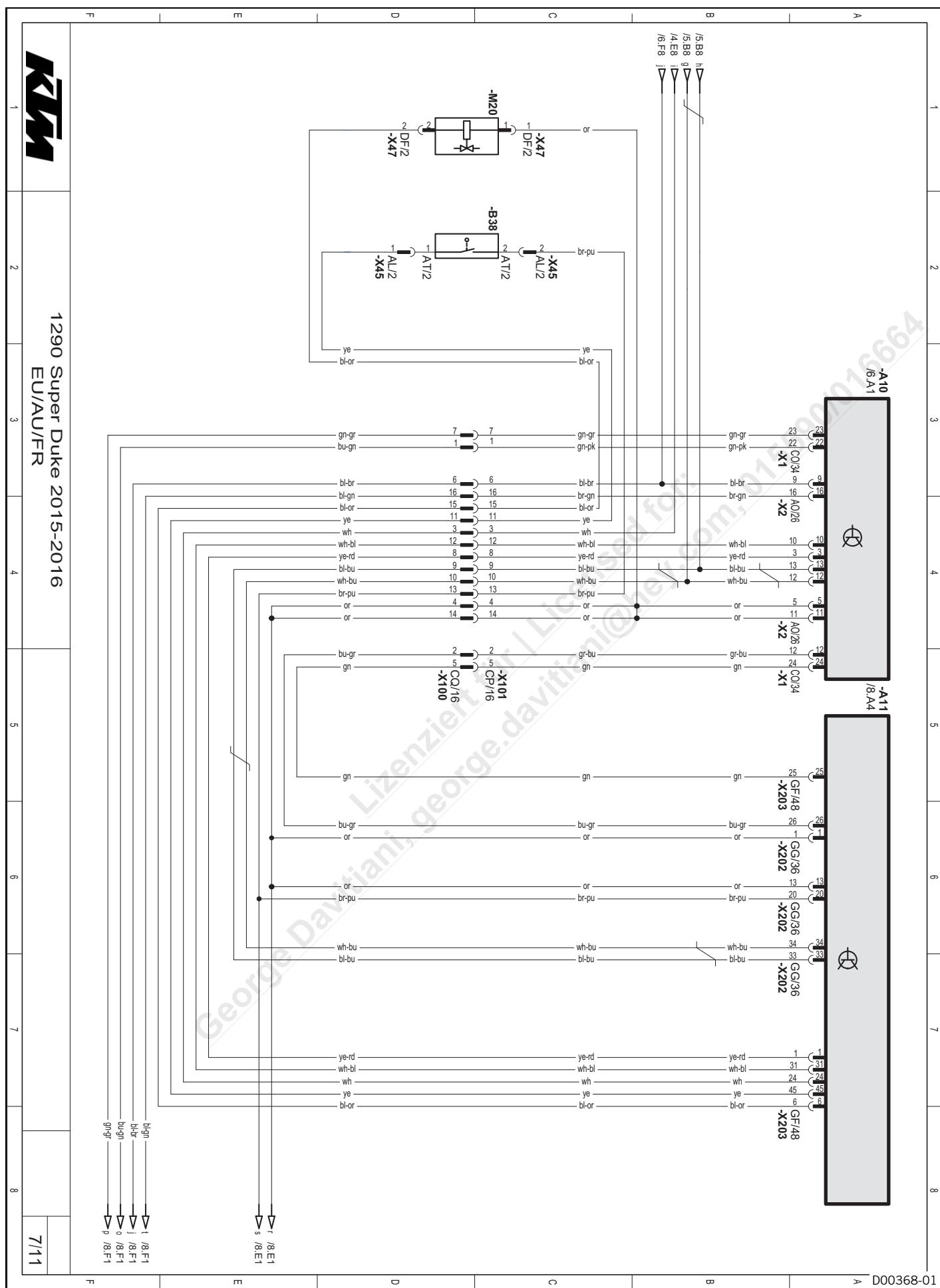
A10	Central electronics control unit
B32	Fuel level sensor
B76	Front brake light switch
B77	Rear brake light switch
M13	Fuel pump
X302	Ground point

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

302

31.7 Page 7 of 11 (EU/AU/FR)



Components:

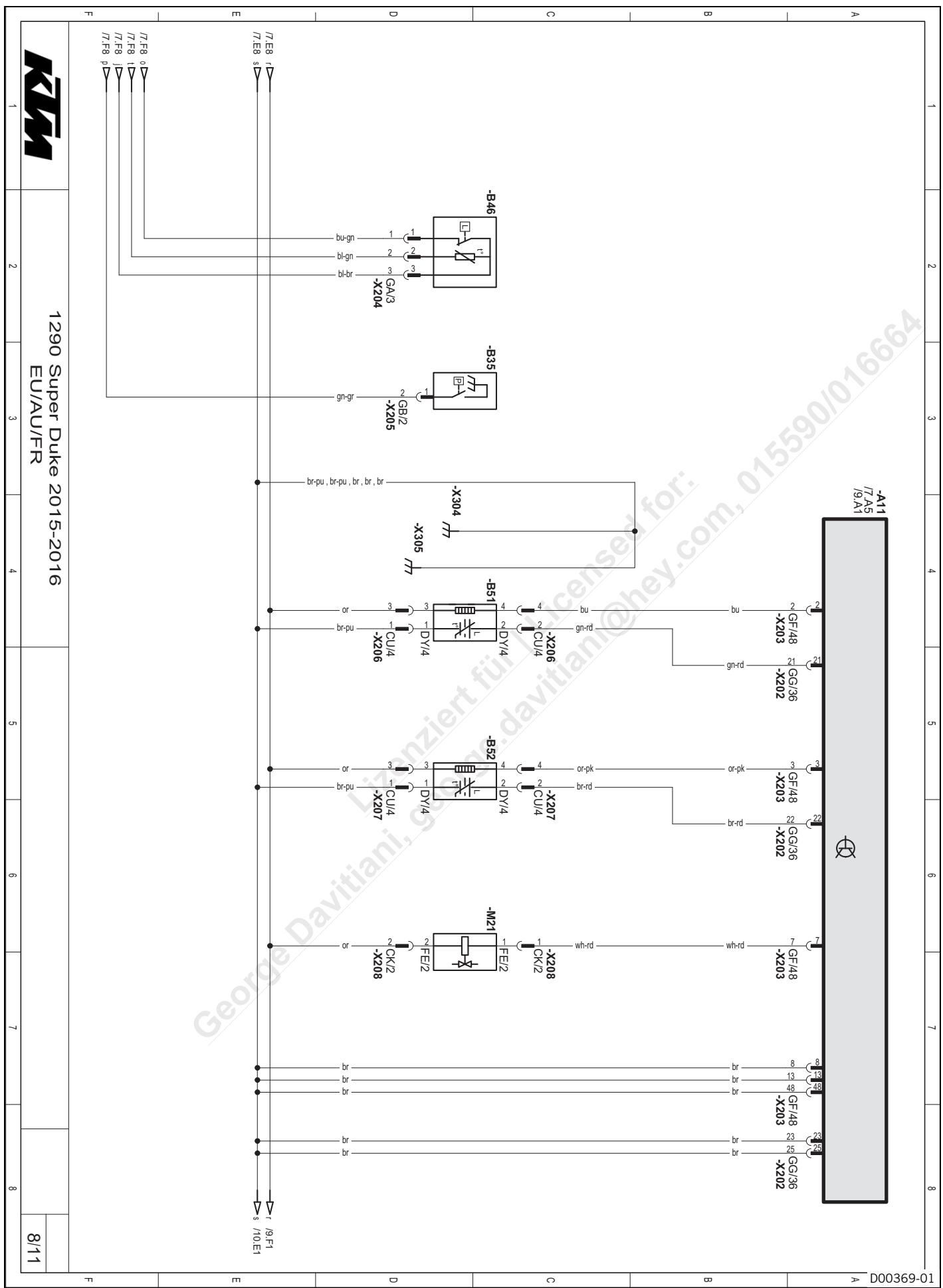
A10	Central electronics control unit
A11	Engine electronics control unit
B38	Clutch switch
M20	Fuel evaporation valve (optional)

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

304

31.8 Page 8 of 11 (EU/AU/FR)



Components:

A11 Engine electronics control unit

B35 Oil pressure sensor

B46 Oil level sensor and oil temperature sensor

B51 Lambda sensor (cylinder 1)

B52 Lambda sensor (cylinder 2)

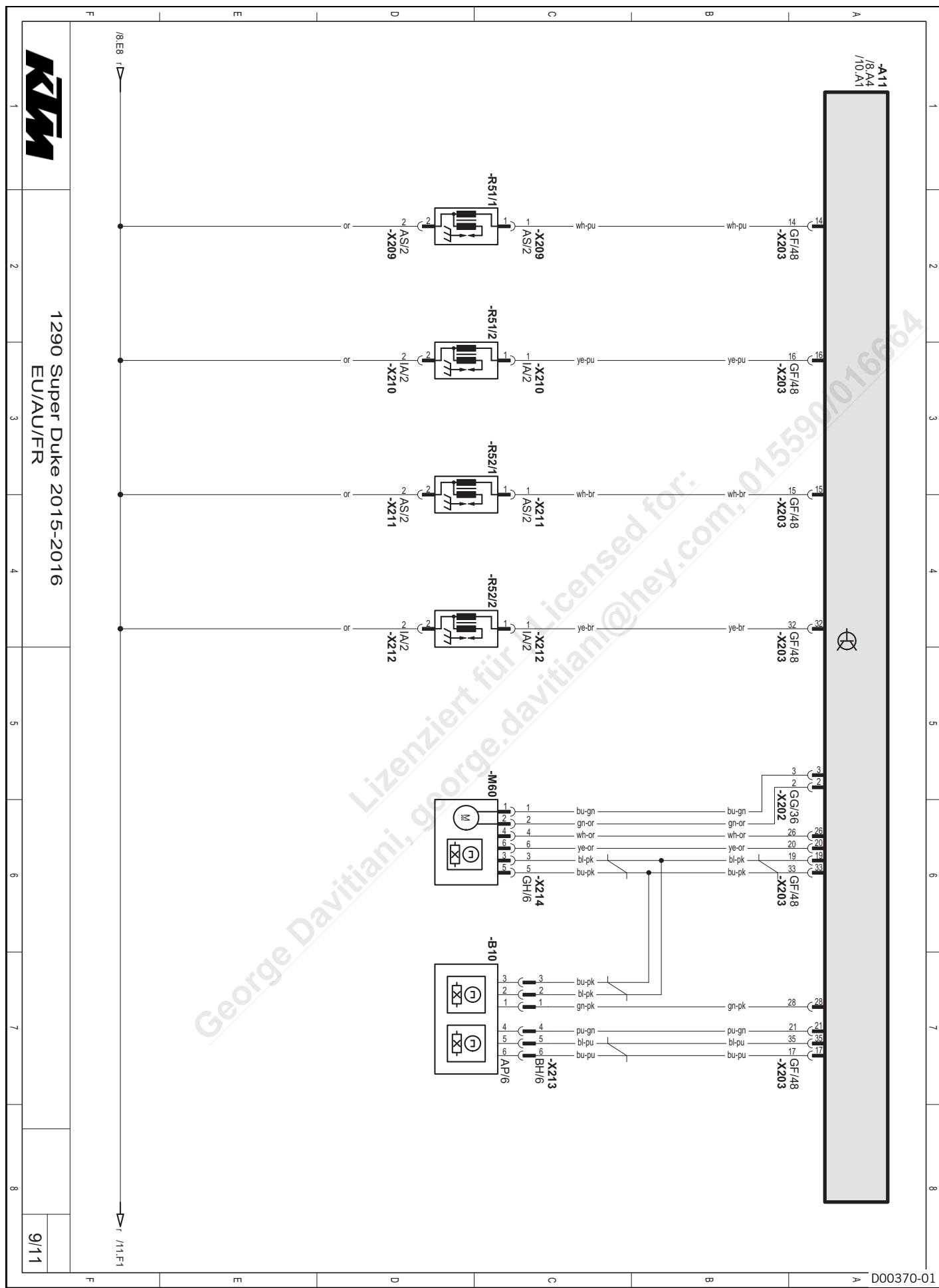
M21 Secondary air valve

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

306

31.9 Page 9 of 11 (EU/AU/FR)



Components:

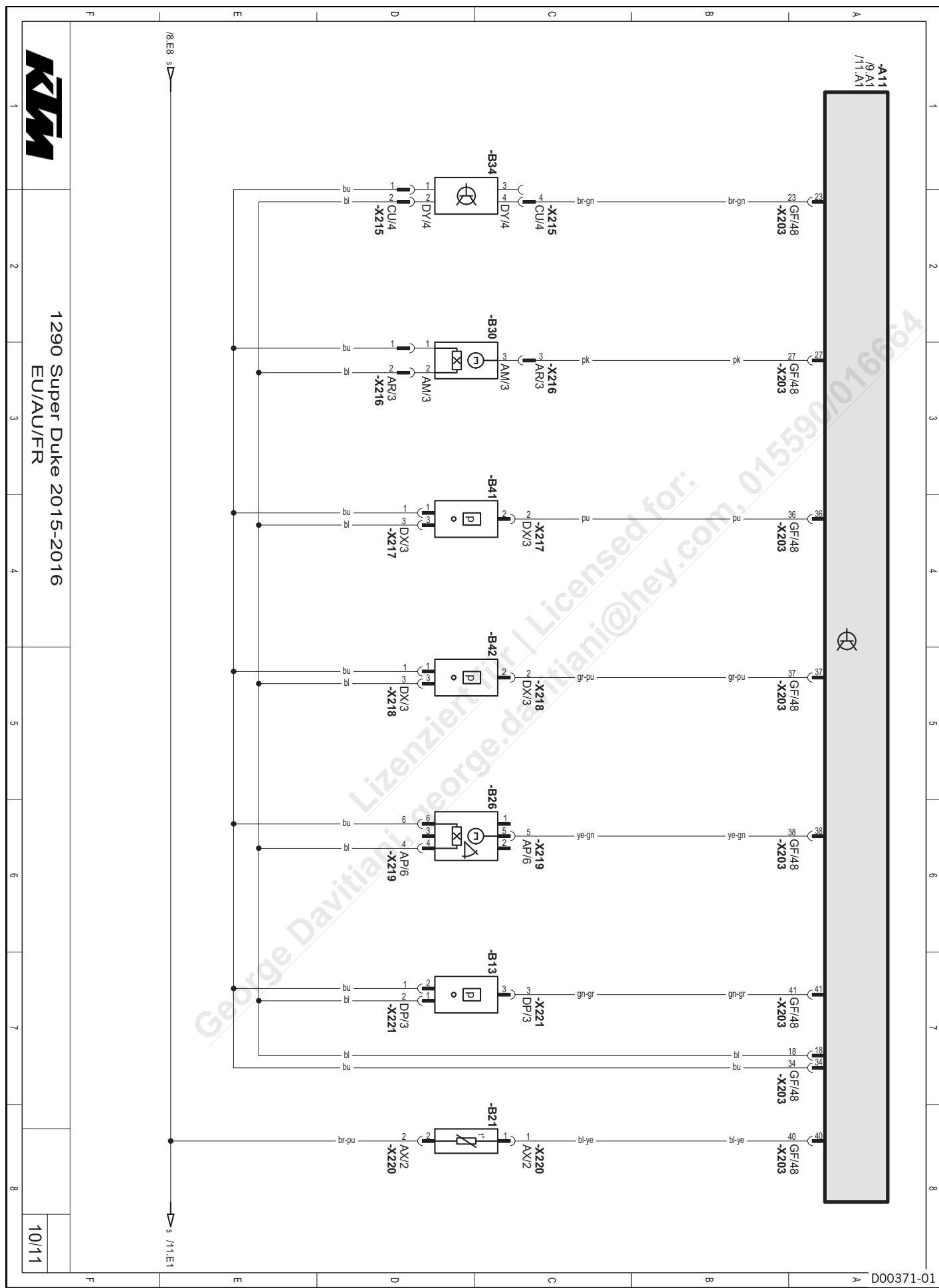
A11	Engine electronics control unit
B10	Accelerator position sensor circuit A/B
M60	Throttle stepper motor/throttle position sensor circuit A/B
R51/1	Ignition coil 1, cylinder 1
R51/2	Ignition coil 2, cylinder 1
R52/1	Ignition coil 1, cylinder 2
R52/2	Ignition coil 2, cylinder 2

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

308

31.10 Page 10 of 11 (EU/AU/FR)



Components:

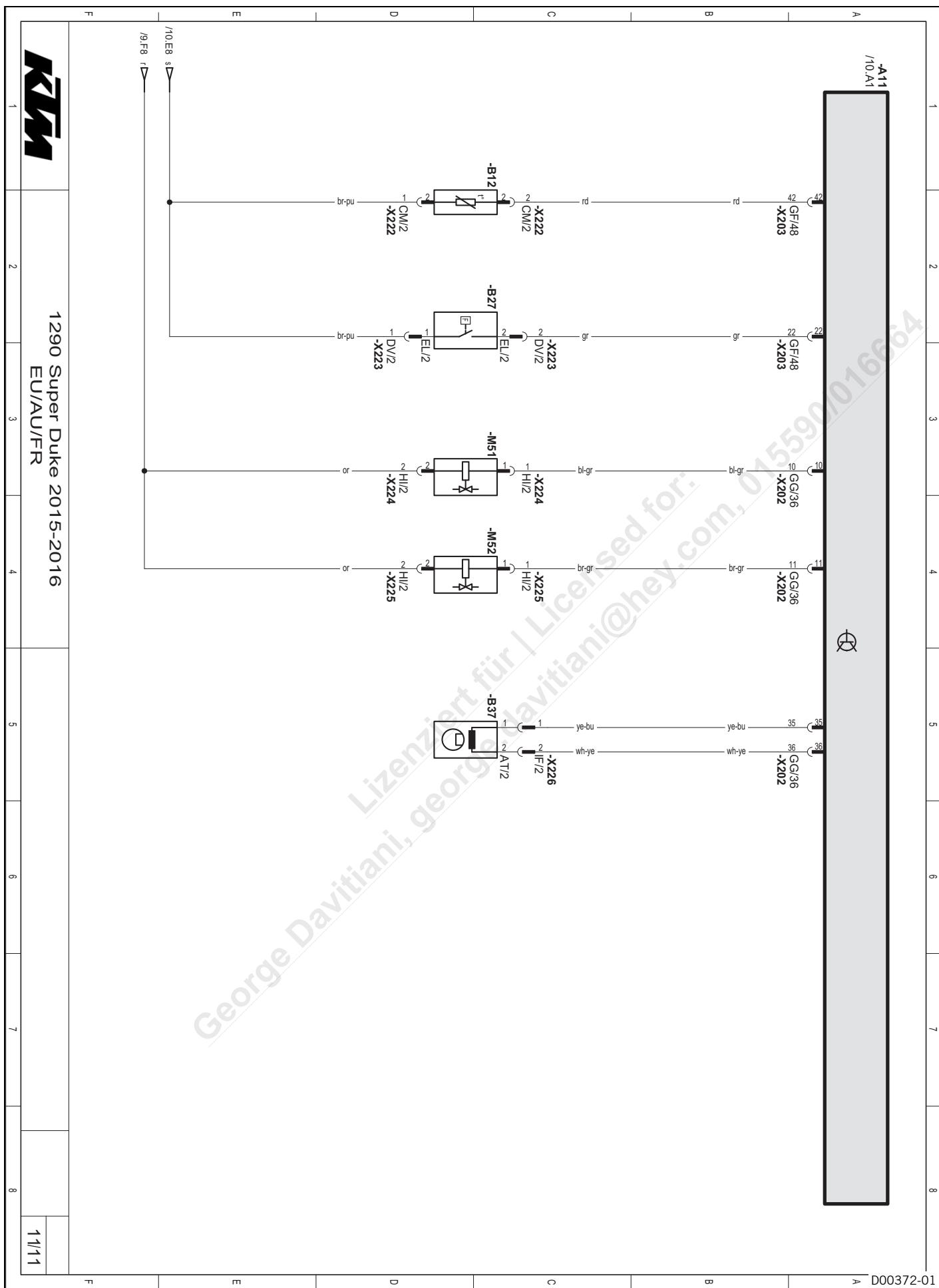
A11	Engine electronics control unit
B13	Ambient air pressure sensor
B21	Coolant temperature sensor, cylinder 1
B26	Rollover sensor
B30	Side stand switch
B34	Gear position sensor
B41	Manifold pressure sensor cylinder 1
B42	Manifold pressure sensor cylinder 2

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

310

31.11 Page 11 of 11 (EU/AU/FR)



Components:

A11	Engine electronics control unit
B12	Intake air temperature sensor
B27	Quick shifter (optional)
B37	Crankshaft position sensor
M51	Injection valve cylinder 1
M52	Injection valve cylinder 2

Cable colors:

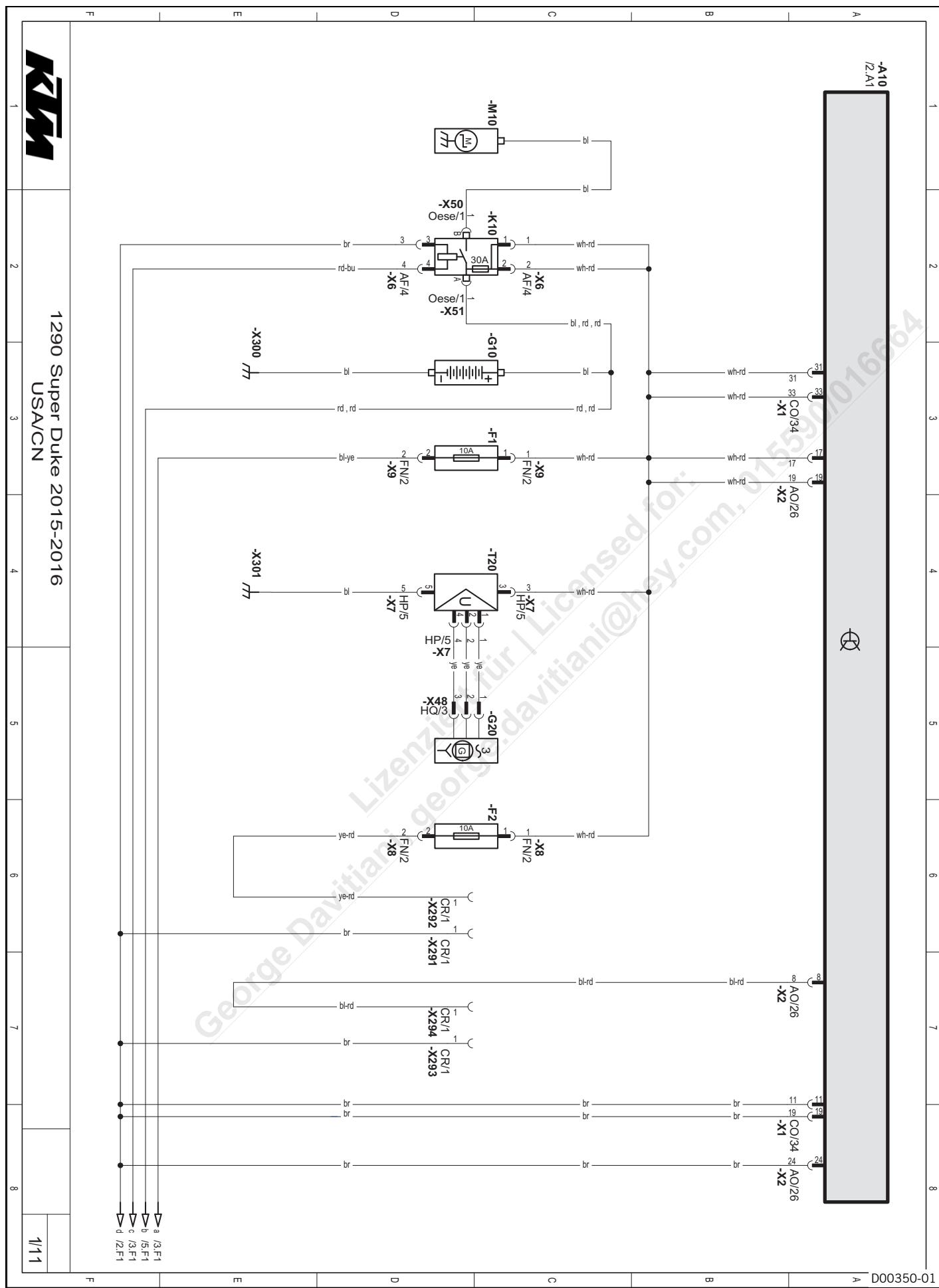
bl	Black
br	Brown
bu	Blue
gn	Green
gr	Gray
lbu	Light blue
or	Orange
pk	Pink
pu	Violet
rd	Red
wh	White
ye	Yellow

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 6755901666

31 WIRING DIAGRAM

312

31.12 Page 1 of 11 (US/CN)



Components:

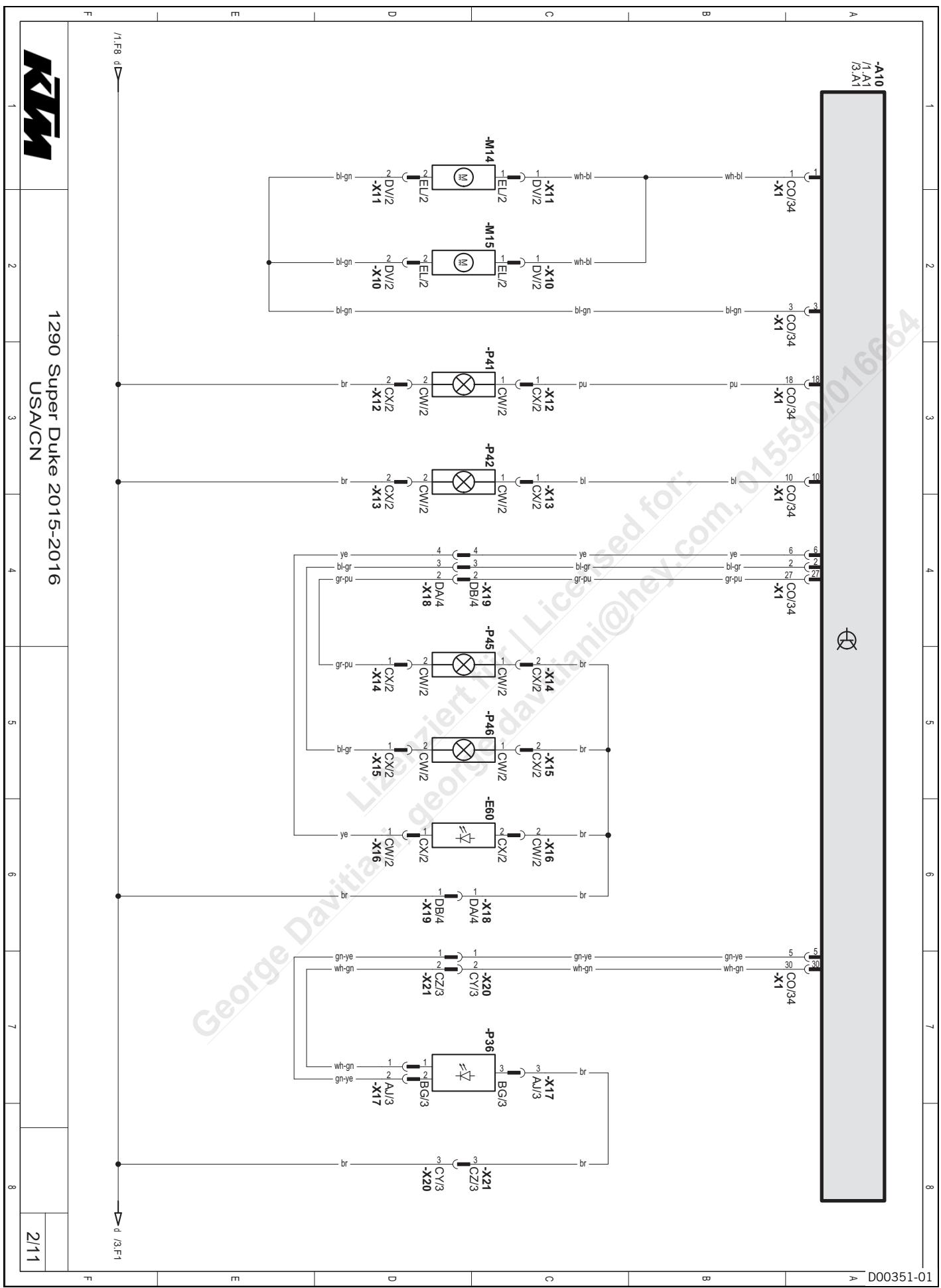
A10	Central electronics control unit
F1	Fuse
F2	Fuse
G10	Battery
G20	Alternator
K10	Starter relay with main fuse
M10	Starter motor
T20	Voltage regulator
X291	Connector for accessory ground ACC 1 (not assigned)
X292	Connector for accessory plus (terminal 30) ACC 1 (not assigned)
X293	Connector for accessory ground ACC 2 (not assigned)
X294	Connector for accessory plus (terminal 15) ACC 2 (not assigned)

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

314

31.13 Page 2 of 11 (US/CN)



KTM

1290 Super Duke 2015-2016
USA/CN

2/11

D00351-01

Components:

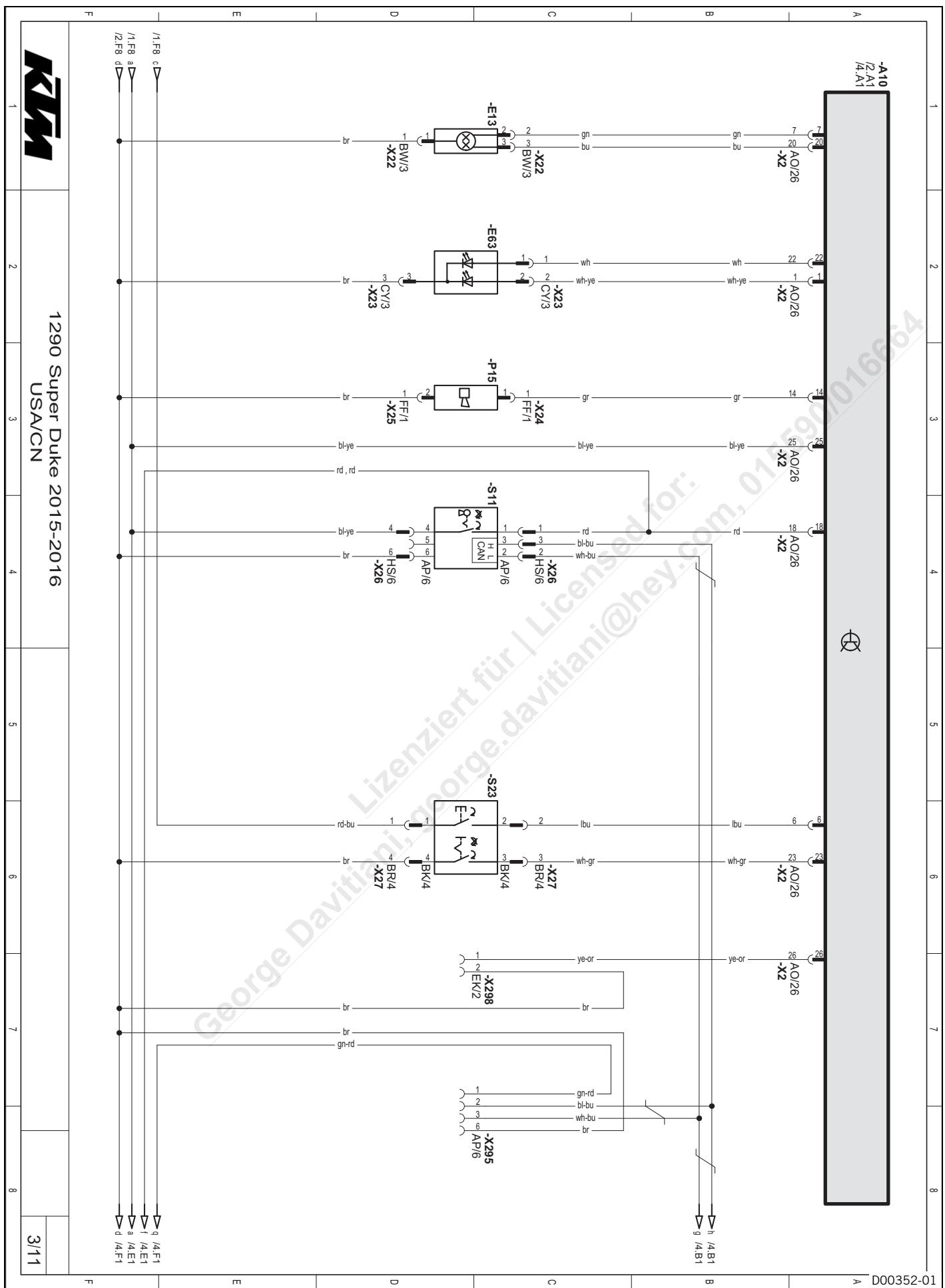
A10	Central electronics control unit
E60	License plate lamp
M14	Radiator fan 1
M15	Radiator fan 2
P36	Brake/tail light
P41	Front left turn signal
P42	Front right turn signal
P45	Rear left turn signal
P46	Rear right turn signal

George Davitiani, george.davitiani@hey.com, 015590/016664
Lizenziert für | Licensed for:

31 WIRING DIAGRAM

316

31.14 Page 3 of 11 (US/CN)



Components:

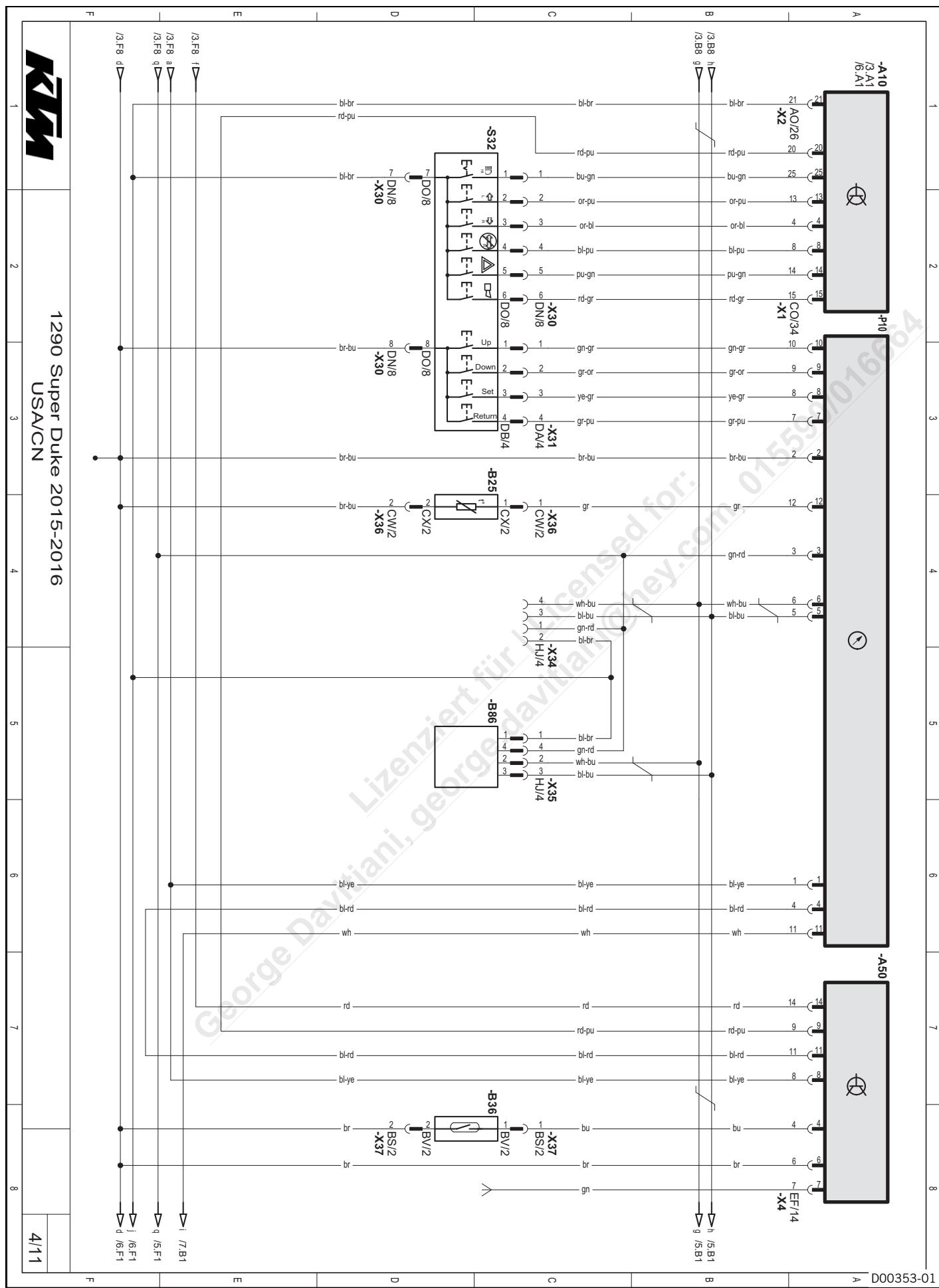
A10	Central electronics control unit
E13	Low beam, high beam
E63	Parking light, daytime running light
P15	Horn
S11	Ignition/handlebar lock, immobilizer control unit
S23	Emergency OFF switch, electric starter button
X295	Diagnostics connector
X298	Heated grip connector

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

318

31.15 Page 4 of 11 (US/CN)



31 WIRING DIAGRAM

319

Components:

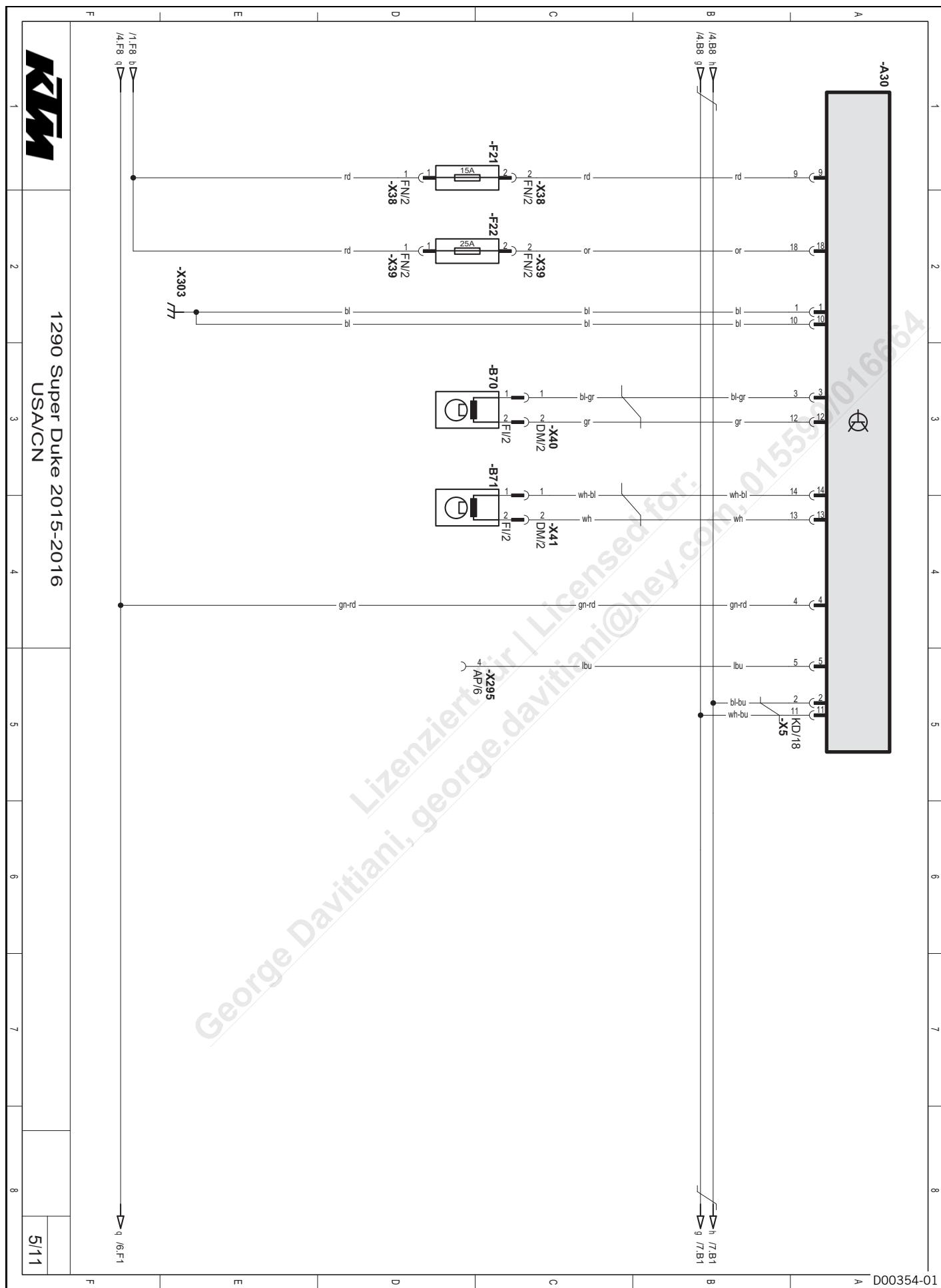
A10	Central electronics control unit
A50	Alarm system
B25	Ambient air temperature sensor
B36	Alarm system switch
B86	Angle sensor
P10	Combination instrument
S32	Combination steering switch

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

320

31.16 Page 5 of 11 (US/CN)



Components:

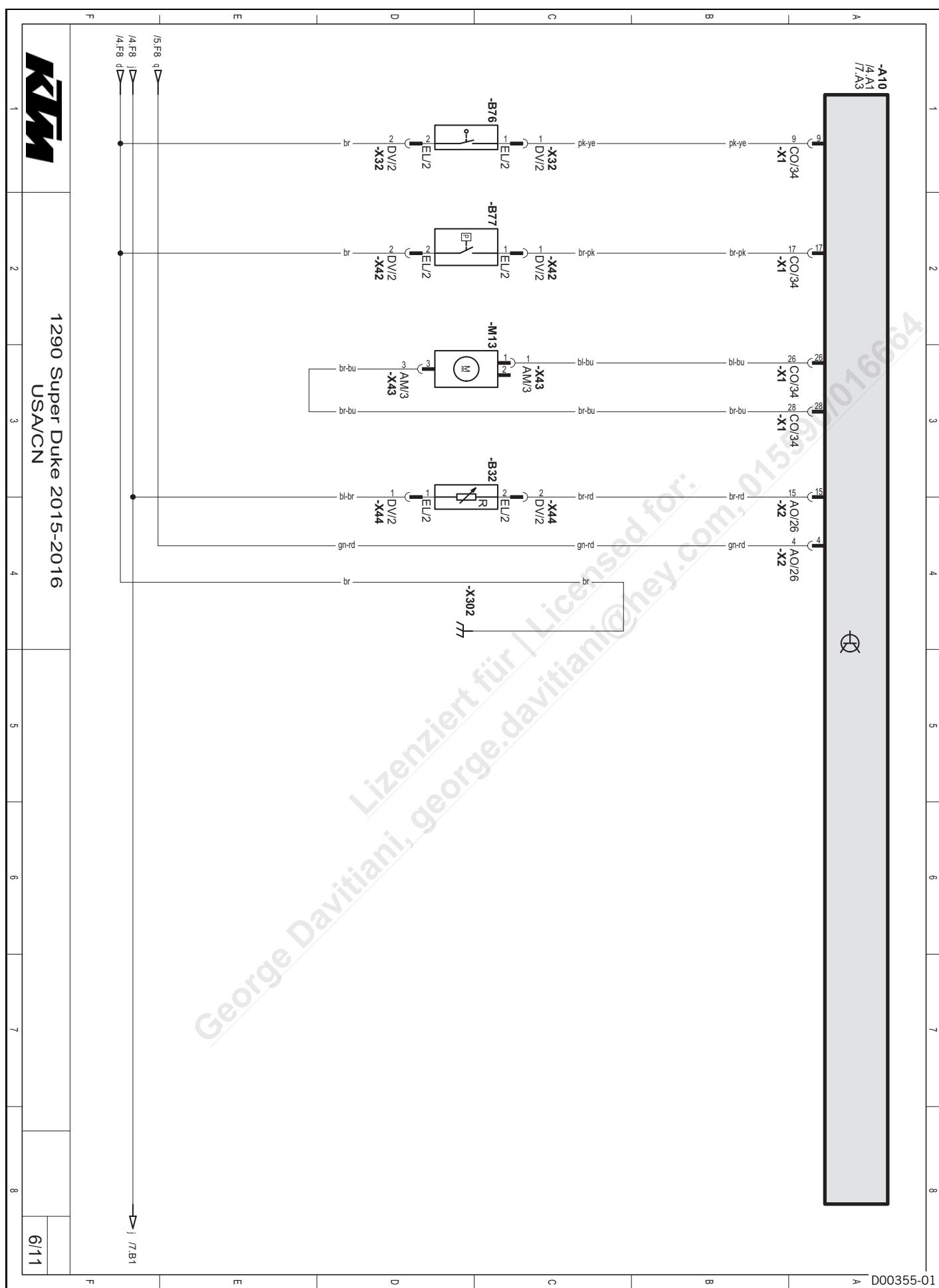
A30	ABS control unit
B70	Front wheel speed sensor
B71	Wheel speed sensor, rear
F21	ABS fuse
F22	ABS fuse
X295	Diagnostics connector
X303	Ground point

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

322

31.17 Page 6 of 11 (US/CN)



Components:

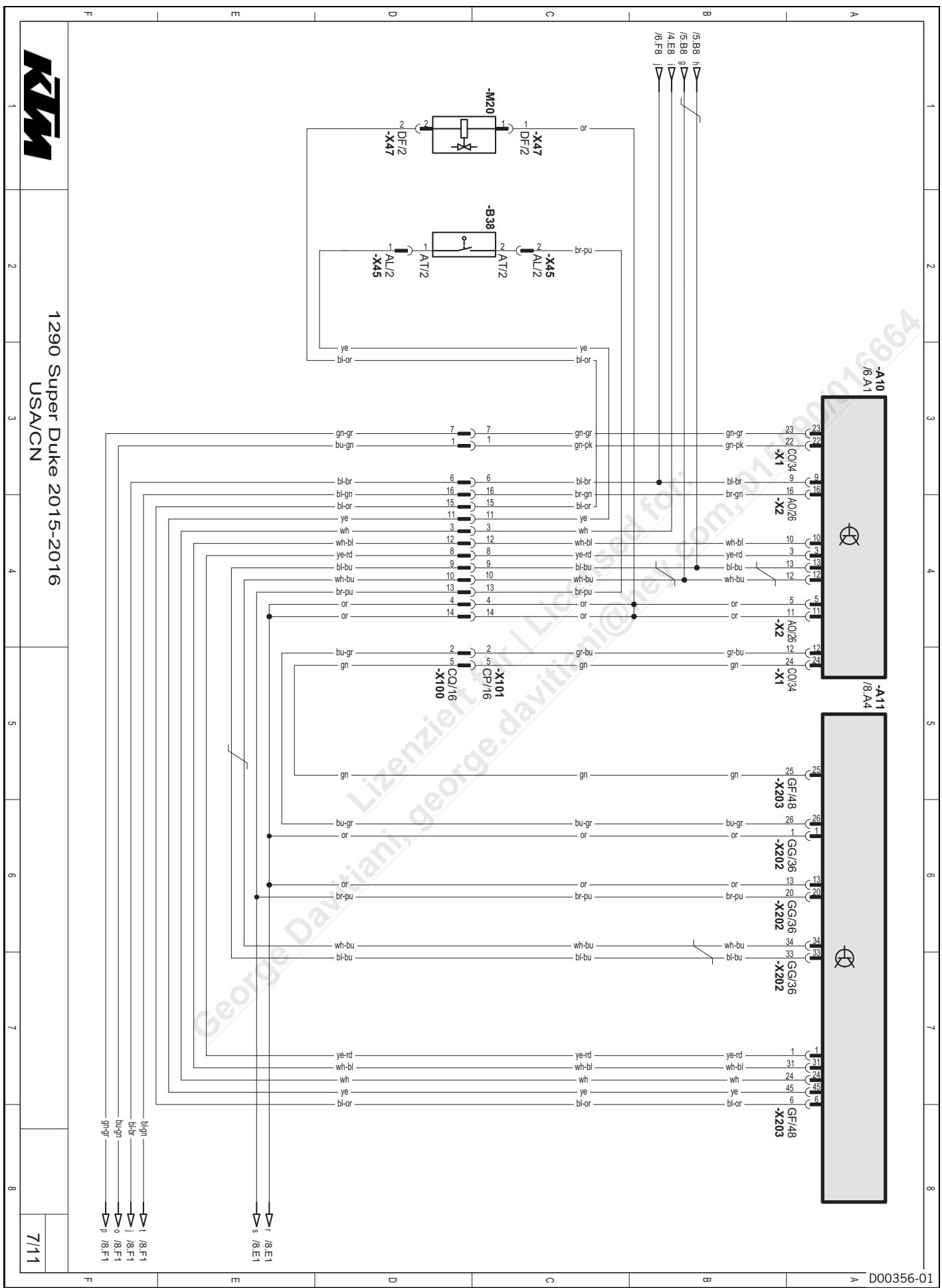
A10	Central electronics control unit
B32	Fuel level sensor
B76	Front brake light switch
B77	Rear brake light switch
M13	Fuel pump
X302	Ground point

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

324

31.18 Page 7 of 11 (US/CN)

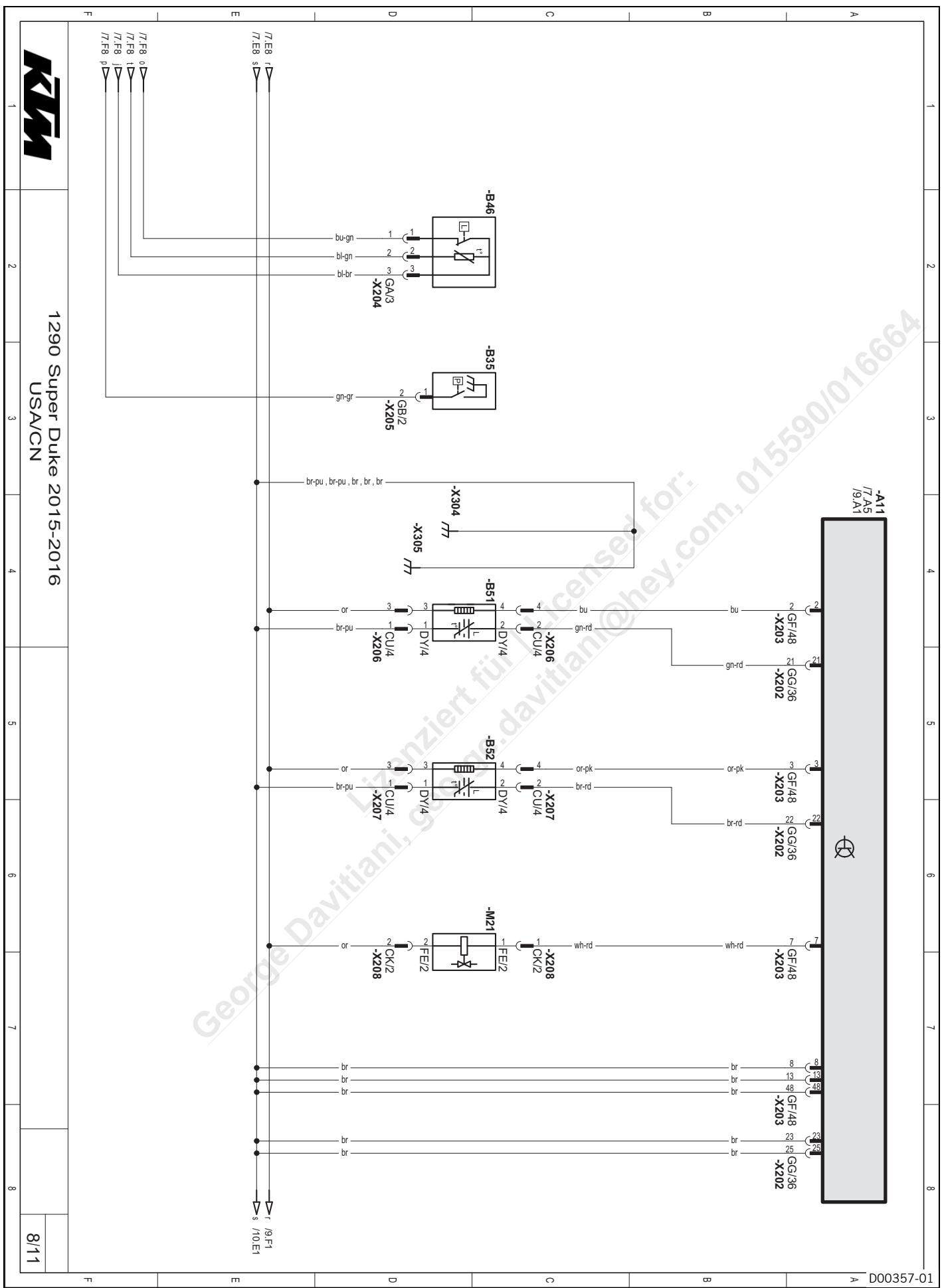


Components:

A10	Central electronics control unit
A11	Engine electronics control unit
B38	Clutch switch
M20	Fuel evaporation valve (optional)

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31.19 Page 8 of 11 (US/CN)



Components:

A11 Engine electronics control unit

B35 Oil pressure sensor

B46 Oil level sensor and oil temperature sensor

B51 Lambda sensor (cylinder 1)

B52 Lambda sensor (cylinder 2)

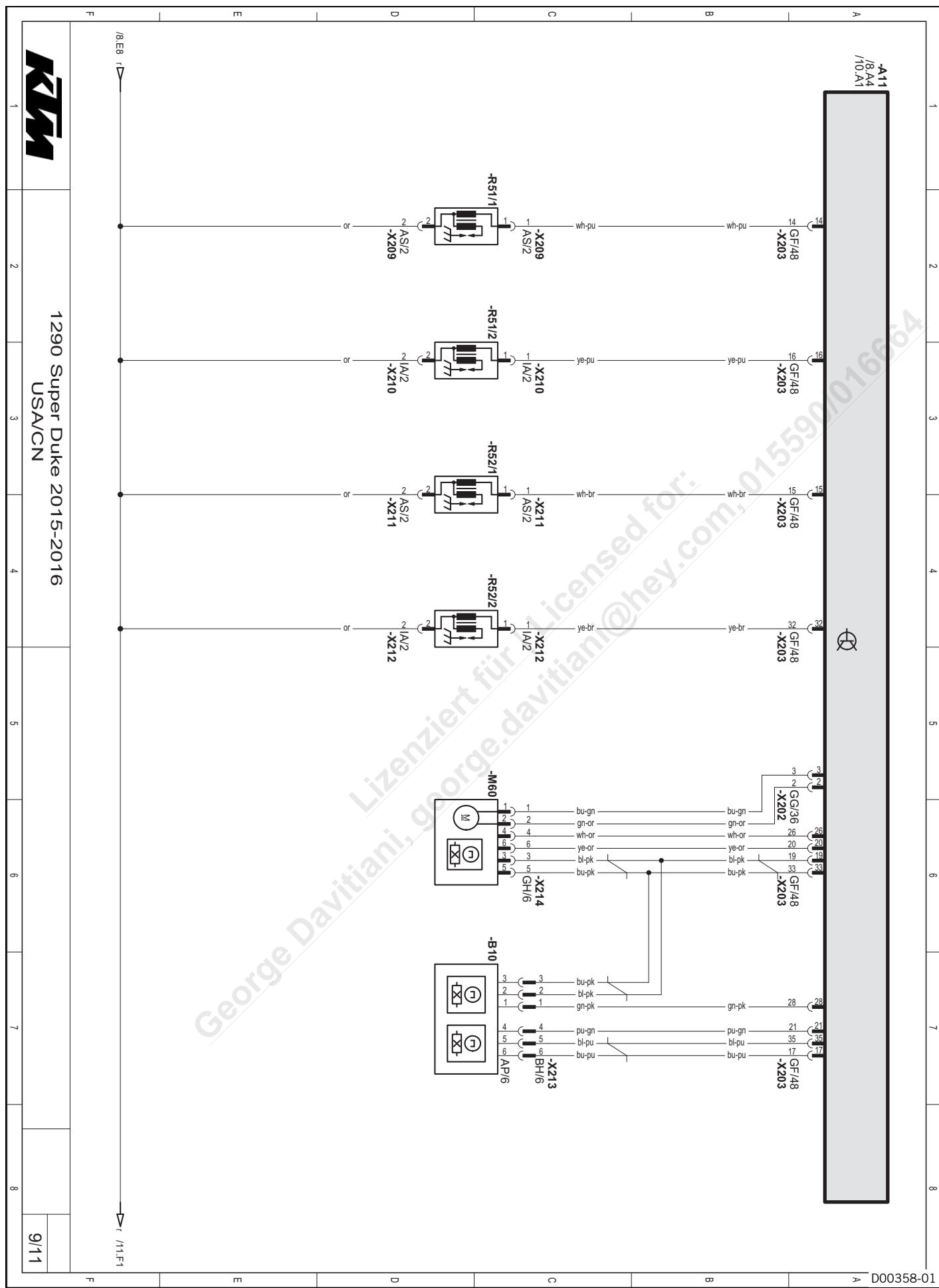
M21 Secondary air valve

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

328

31.20 Page 9 of 11 (US/CN)



Components:

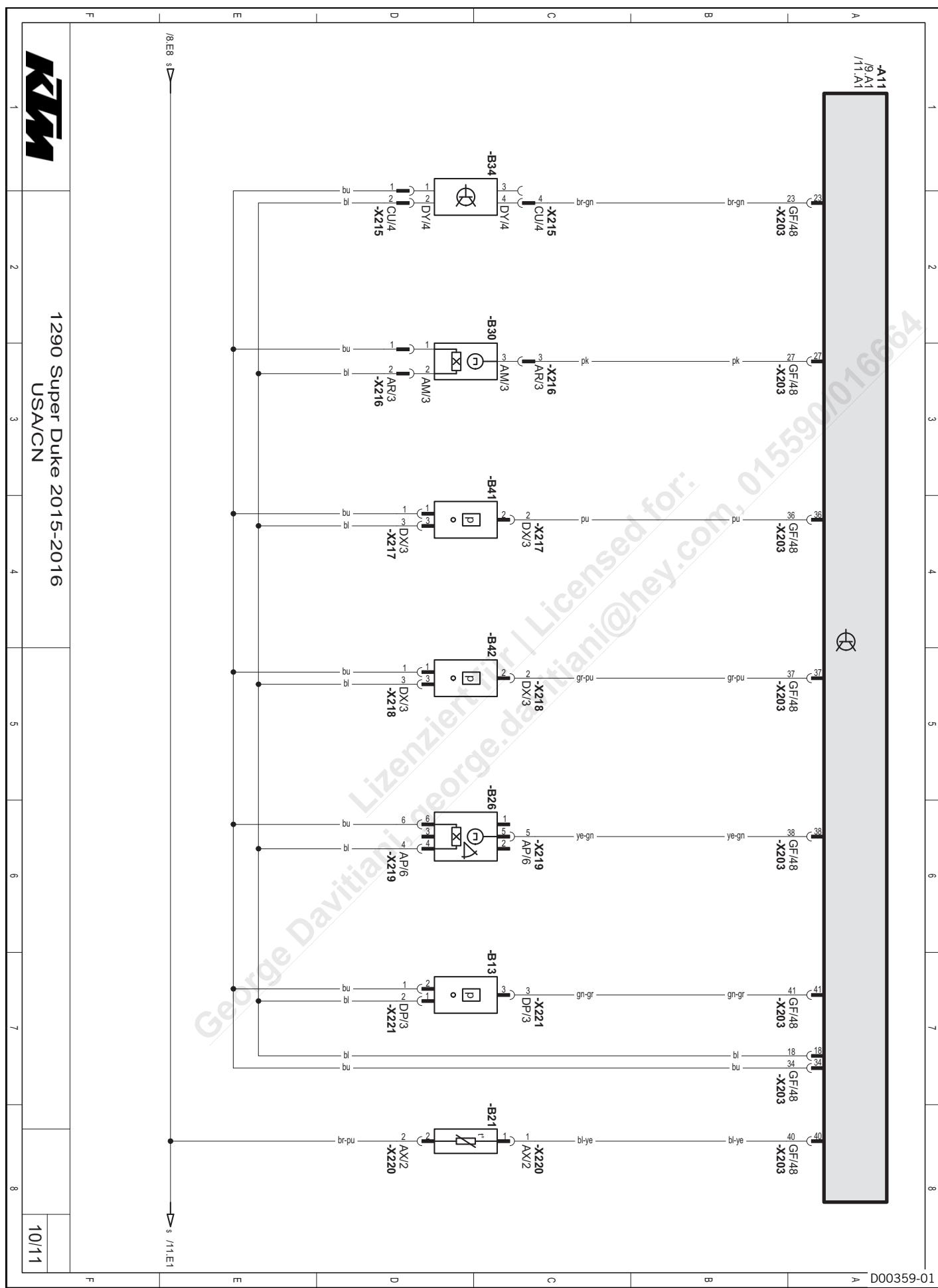
A11	Engine electronics control unit
B10	Accelerator position sensor circuit A/B
M60	Throttle stepper motor/throttle position sensor circuit A/B
R51/1	Ignition coil 1, cylinder 1
R51/2	Ignition coil 2, cylinder 1
R52/1	Ignition coil 1, cylinder 2
R52/2	Ignition coil 2, cylinder 2

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

330

31.21 Page 10 of 11 (US/CN)



Components:

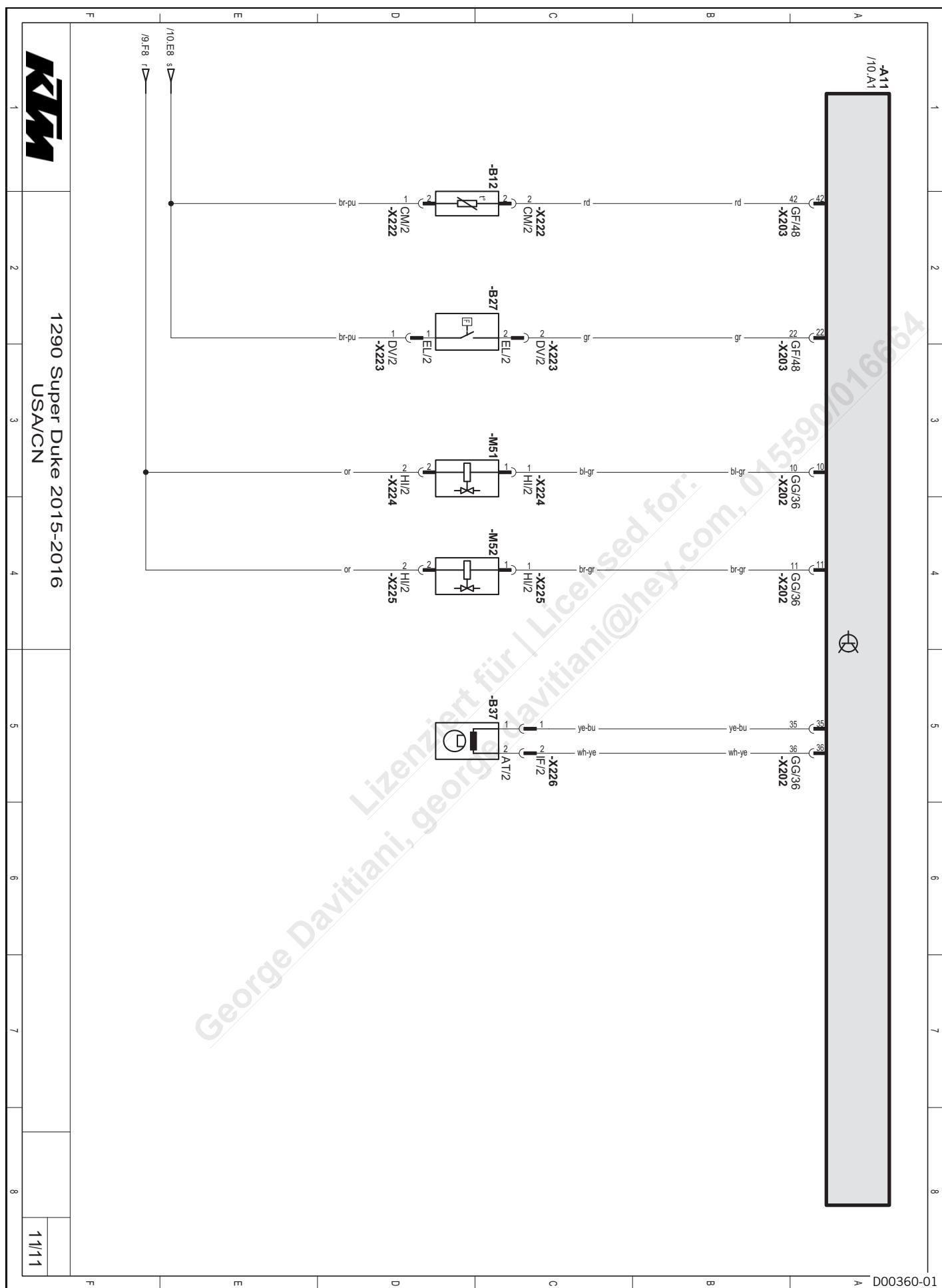
A11	Engine electronics control unit
B13	Ambient air pressure sensor
B21	Coolant temperature sensor, cylinder 1
B26	Rollover sensor
B30	Side stand switch
B34	Gear position sensor
B41	Manifold pressure sensor cylinder 1
B42	Manifold pressure sensor cylinder 2

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

31 WIRING DIAGRAM

332

31.22 Page 11 of 11 (US/CN)



Components:

A11	Engine electronics control unit
B12	Intake air temperature sensor
B27	Quick shifter (optional)
B37	Crankshaft position sensor
M51	Injection valve cylinder 1
M52	Injection valve cylinder 2

Cable colors:

bl	Black
br	Brown
bu	Blue
gn	Green
gr	Gray
lbu	Light blue
or	Orange
pk	Pink
pu	Violet
rd	Red
wh	White
ye	Yellow

Brake fluid DOT 4 / DOT 5.1

Standard/classification

- DOT

Guideline

- Use only brake fluid that complies with the specified standard (see specifications on the container) and that exhibits the corresponding properties.

Recommended supplier

Castrol

- REACT PERFORMANCE DOT 4

Motorex®

- Brake Fluid DOT 5.1

Coolant

Guideline

- Only use high-grade, silicate-free coolant with corrosion inhibitor additive for aluminum motors. Low grade and unsuitable antifreeze causes corrosion, deposits and frothing.
- Do not use pure water as only coolant is able to meet the requirements needed in terms of corrosion protection and lubrication properties.
- Only use coolant that complies with the requirements stated (see specifications on the container) and that has the relevant properties.

Antifreeze protection to at least	-25 °C (-13 °F)
-----------------------------------	-----------------

The mixture ratio must be adjusted to the necessary antifreeze protection. Use distilled water if the coolant needs to be diluted.

The use of premixed coolant is recommended.

Observe the coolant manufacturer specifications for antifreeze protection, dilution and miscibility (compatibility) with other coolants.

Recommended supplier

Motorex®

- COOLANT M3.0

Engine oil (SAE 10W/50)

Standard/classification

- JASO T903 MA (☞ p. 353)
- SAE (☞ p. 353) (SAE 10W/50)

Guideline

- Use only engine oils that comply with the specified standards (see specifications on the container) and that possess the corresponding properties.

Fully synthetic engine oil

Recommended supplier

Motorex®

- Power Synt 4T

Engine oil (SAE 5W/40)

Standard/classification

- JASO T903 MA (☞ p. 353)
- SAE (☞ p. 353) (SAE 5W/40)

Guideline

- Use only engine oils that comply with the specified standards (see specifications on the container) and that possess the corresponding properties.

Synthetic engine oil

Recommended supplier

Motorex®

- Power Synt 4T

Fork oil (SAE 4) (48601166S1)

Standard/classification

- SAE (p. 353) (SAE 4)

Guideline

- Use only oils that comply with the specified standards (see specifications on the container) and that exhibit the corresponding properties.

Hydraulic fluid (15)

Standard/classification

- ISO VG (15)

Guideline

- Use only hydraulic oil that complies with the specified standard (see specifications on the container) and that possesses the corresponding properties.

Recommended supplier

Motorex®

- Hydraulic Fluid 75

Shock absorber fluid (SAE 2.5) (50180751S1)

Standard/classification

- SAE (p. 353) (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 95/RON 95/PON 91)

Standard/classification

- DIN EN 228 (ROZ 95/RON 95/PON 91)

Guideline

- Only use unleaded super fuel that matches or is equivalent to the specified fuel grade.
- Fuel with an ethanol content of up to 10 % (E10 fuel) is safe to use.

**Info**

Do **not** use fuel containing methanol (e. g. M15, M85, M100) or more than 10 % ethanol (e. g. E15, E25, E85, E100).

Chain cleaner

Recommended supplier

Motorex®

- Chain Clean

Chain lube for road use

Guideline

Recommended supplier

Motorex®

- Chainlube Road

Fuel additive

Recommended supplier

Motorex®

- Fuel Stabilizer

High viscosity grease

Recommended supplier

SKF®

- LGHB 2

Long-life grease

Recommended supplier

Motorex®

- Bike Grease 2000

Lubricant (T14034)

Recommended supplier

"WP Performance Systems"

- Fuchs® IPR 2

Lubricant (T158)

Recommended supplier

Lubcon®

- Turmogrease® PP 300

Lubricant (T625)

Recommended supplier

Molykote®

- 33 Medium

Lubricant (T159)

Recommended supplier

Bel-Ray®

- MC-11®

Motorcycle cleaner

Recommended supplier

Motorex®

- Moto Clean

Perfect Finish and high gloss polish for paints

Recommended supplier

Motorex®

- Moto Polish & Shine

Preserving materials for paints, metal and rubber

Recommended supplier

Motorex®

- Moto Protect

Special cleaner for glossy and matte paint finishes, metal and plastic surfaces

Recommended supplier

Motorex®

- Quick Cleaner

Universal oil spray

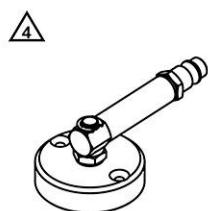
Recommended supplier

Motorex®

- Joker 440 Synthetic

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

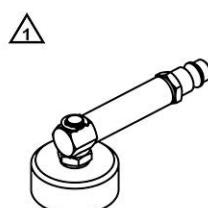
Bleeder cover



00029013002

H00501-01

Art. no.: 00029013002

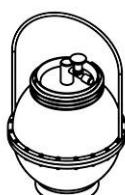


00029013004

H00503-01

Art. no.: 00029013004

Bleeding device

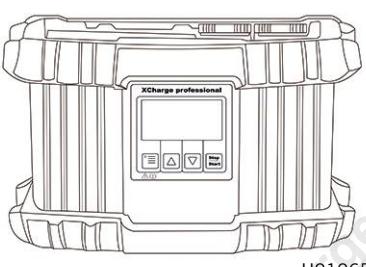


00029013100

H00518-01

Art. no.: 00029013100

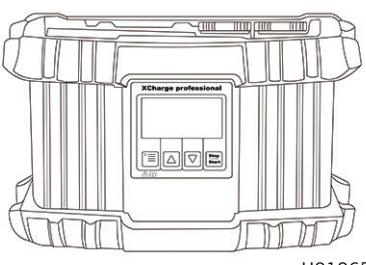
Battery charger XCharge-professional EU



H01065-01

Art. no.: 00029095050

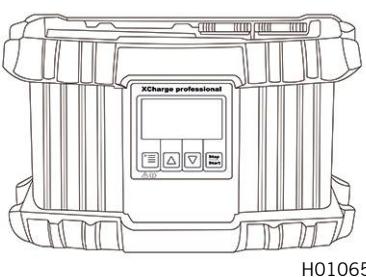
Battery charger XCharge-professional US



H01065-01

Art. no.: 00029095051

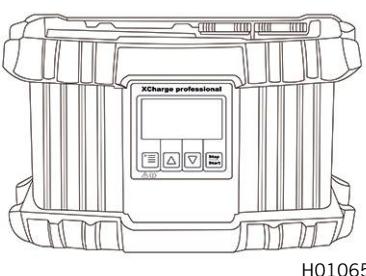
Battery charger XCharge-professional GB



H01065-01

Art. no.: 00029095052

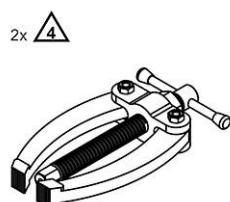
Battery charger XCharge-professional CH



H01065-01

Art. no.: 00029095053

Bearing puller



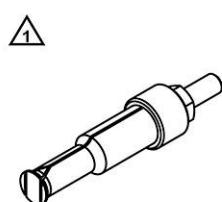
15112017000

H00520-01

2x 4

Art. no.: 15112017000

Internal bearing puller



15112018100

H00522-01

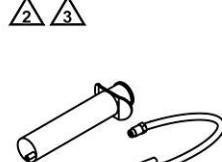
A

Art. no.: 15112018100

Feature

18... 23 mm (0.71... 0.91 in)

Bleed syringe



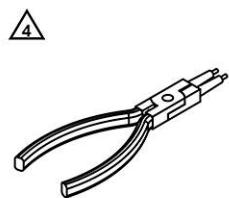
50329050000

H00565-01

2 3

Art. no.: 50329050000

Circlip pliers reverse

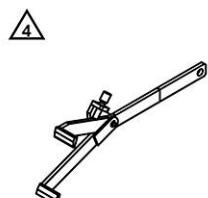


51012011000

H00572-01

Art. no.: 51012011000

Clutch holder

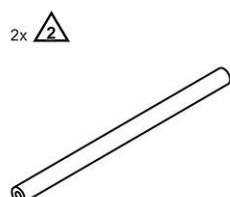


51129003000

H00575-01

Art. no.: 51129003000

Tool bracket

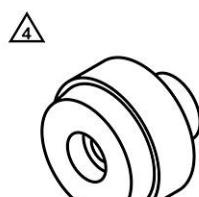


58429089000

H00603-01

Art. no.: 58429089000

Press-in tool



58429091000

H00604-01

Art. no.: 58429091000

Press-out tool

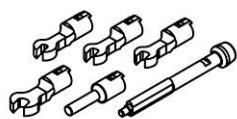


58429092000

H00605-01

Art. no.: 58429092000

Torque wrench with various accessories in set

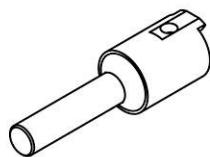


Art. no.: 58429094000

58429094000

H00606-01

Mount for torque wrench

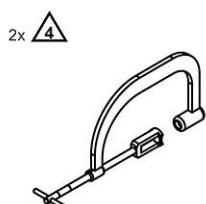


Art. no.: 58429094100

58429094100

H00607-01

Valve spring mounter

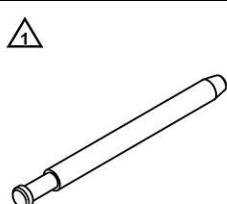


Art. no.: 59029019000

59029019000

H00610-01

Limit plug gauge

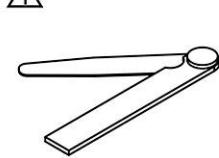


Art. no.: 59029026006

59029026006

H00612-01

Feeler gauge

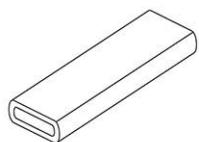


Art. no.: 59029041100

59029041100

H00616-01

Handle for ring wrench

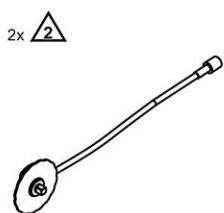


60012060000

H00951-01

Art. no.: 60012060000

Graduated disc

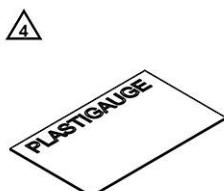


60029010000

H00625-01

Art. no.: 60029010000

Plastigauge clearance gauge

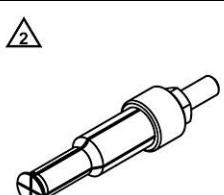


60029012000

H00627-01

Art. no.: 60029012000

Internal bearing puller



60029018000

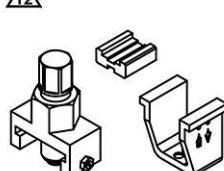
H00630-01

Art. no.: 60029018000

Feature

23... 28 mm (0.91... 1.1 in)

Chain rivet tool

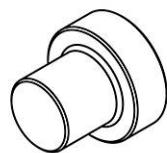


60029020000

H00631-01

Art. no.: 60029020000

Pressure piece



60029031000

H00632-01

Art. no.: 60029031000

Step bearing tool

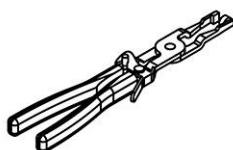


60029046128

H01087-01

Art. no.: 60029046128

Pliers for spring band clamp

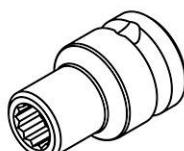


60029057100

H00651-01

Art. no.: 60029057100

Multi-tooth wrench socket 10 mm; ½" drive

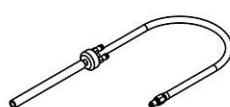


60029075000

H00654-01

Art. no.: 60029075000

Testing hose

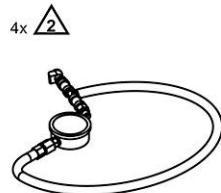


61029093000

H00659-01

Art. no.: 61029093000

Pressure tester

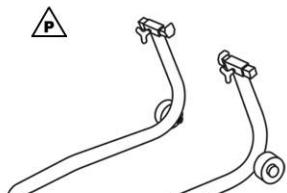


61029094000

H00660-01

Art. no.: 61029094000

Front lifting gear

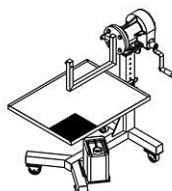


61129965000

H01865-01

Art. no.: 61129965000

Engine assembly stand

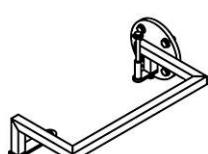


61229001000

H00662-01

Art. no.: 61229001000

Engine fixing arm

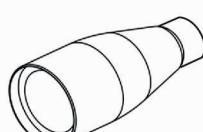


61229002000

H00663-01

Art. no.: 61229002000

Protection cap

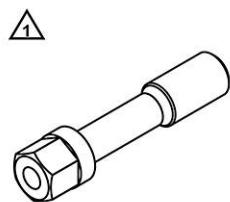


61229005100

H01835-01

Art. no.: 61229005100

Pressure piece



61229008100

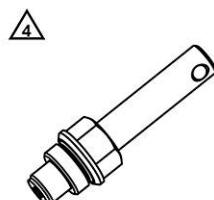
H00667-01

Art. no.: 61229008100

Feature

30... 20 mm (1.18... 0.79 in)

Extractor

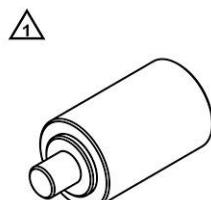


61229010000

H00668-01

Art. no.: 61229010000

Press drift

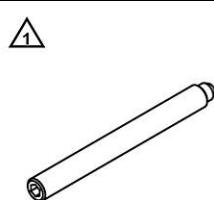


61229013000

H00669-01

Art. no.: 61229013000

Engine blocking screw

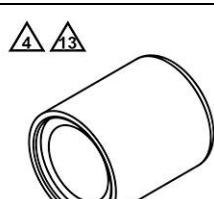


61229015000

H00670-01

Art. no.: 61229015000

Pressure bell

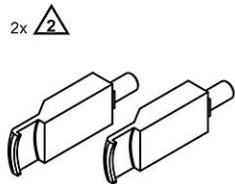


61229016000

H00671-01

Art. no.: 61229016000

Arms for extractor 78029033100

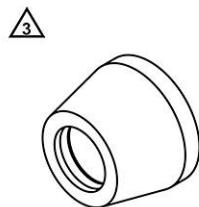


61229017000

H00672-01

Art. no.: 61229017000

Pressure piece

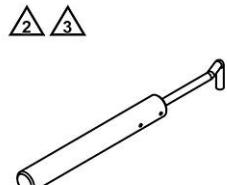


61229018000

H00673-01

Art. no.: 61229018000

Release device for timing chain tensioner

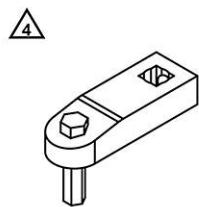


61229021000

H00675-01

Art. no.: 61229021000

Hex key bit

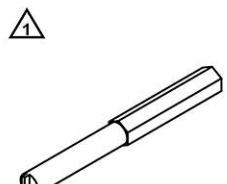


61229025000

H00676-01

Art. no.: 61229025000

Oil nozzle assembly tool

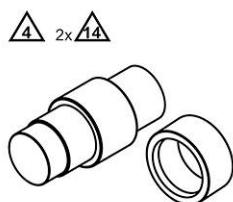


61229035000

H00678-01

Art. no.: 61229035000

Press drift/press sleeve

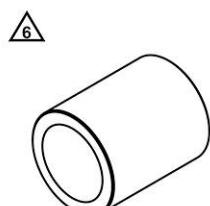


61229044000

H00679-01

Art. no.: 61229044000

Press sleeve

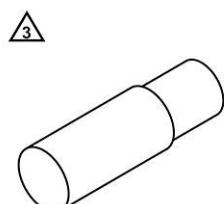


61229045000

H00680-01

Art. no.: 61229045000

Press drift, swingarm bearing

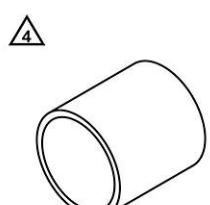


61329004100

H00685-01

Art. no.: 61329004100

Counterholder, swingarm bearing

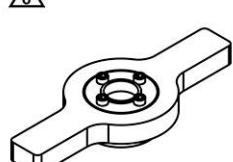


61329004200

H00686-01

Art. no.: 61329004200

Extractor for steering head bearing

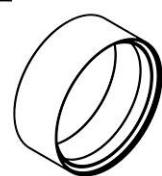


61329005000

H00687-01

Art. no.: 61329005000

Piston assembly ring

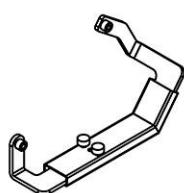


61329015108

H00688-01

Art. no.: 61329015108

Floor jack attachment

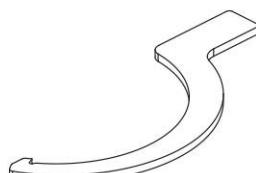


61329055000

H00691-01

Art. no.: 61329055000

Hook wrench

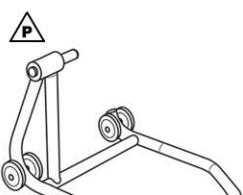


61329085000

H01811-01

Art. no.: 61329085000

Lifting gear, rear



61329955000

H00979-01

Art. no.: 61329955000

Work stand

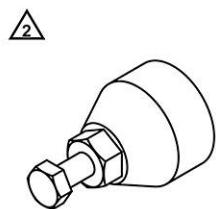


62529055100

H00693-01

Art. no.: 62529055100

Extractor

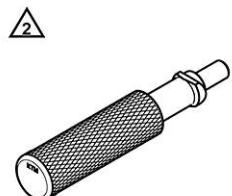


75029021000

H00707-01

Art. no.: 75029021000

Insertion tool for piston ring lock

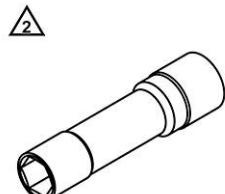


75029035000

H00710-01

Art. no.: 75029035000

Spark plug wrench

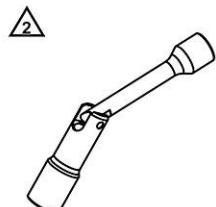


75029172000

H00729-01

Art. no.: 75029172000

Spark plug wrench

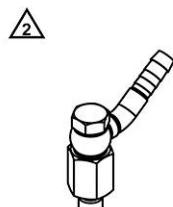


77229172000

H00761-01

Art. no.: 77229172000

Oil pressure adapter

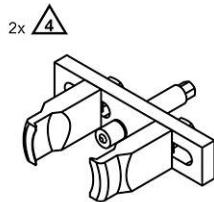


77329006000

H00764-01

Art. no.: 77329006000

Puller, 2-arm

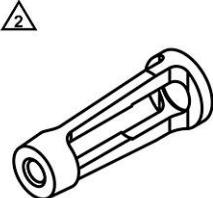


78029033100

H00788-01

Art. no.: 78029033100

Insert for valve spring lever

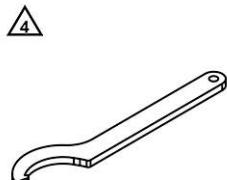


78029060000

H00795-01

Art. no.: 78029060000

Hook wrench

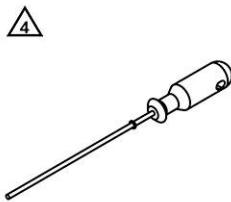


T106S

H00841-01

Art. no.: T106S

Depth micrometer

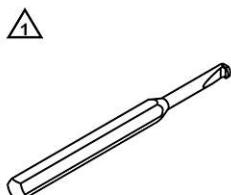


T107S

H00842-01

Art. no.: T107S

Pin



T120

H00844-01

Art. no.: T120

Pressing tool

⚠
1



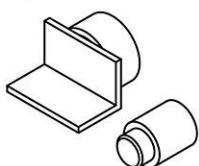
T1206

H00880-01

Art. no.: T1206

Pressing tool

⚠
1
3

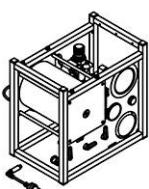


T1207S

H00881-01

Art. no.: T1207S

Vacuum pump



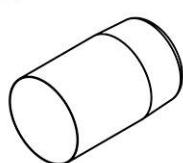
T1240S

H00890-01

Art. no.: T1240S

Protecting sleeve

⚠
4

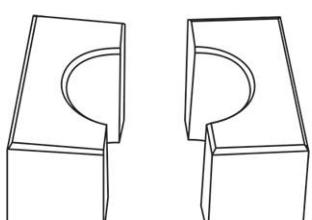


T1401

H00894-01

Art. no.: T1401

Clamping stand

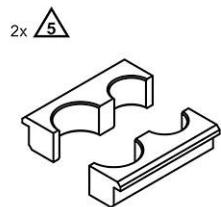


T14015S

H01035-01

Art. no.: T14015S

Clamping stand



T1403S

H00896-01

Art. no.: T1403S

Mounting tool

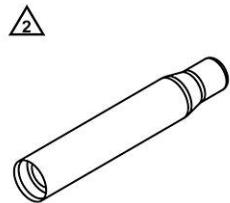


T14040S

H00922-01

Art. no.: T14040S

Mounting sleeve

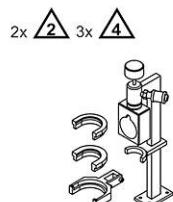


T1554

H00903-01

Art. no.: T1554

Nitrogen filling tool



T170S1

H00855-01

Art. no.: T170S1

JASO T903 MA

Different technical development directions required a separate 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, the focus for motorcycle engines is on high performance at high engine speeds.

In most motorcycle engines, the transmission and the clutch are lubricated with the same oil.

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.

Lizenziert für | Licensed for:
George Davitiani, george.davitiani@hey.com, 015590/016664

A

Accessories 8

Air filter

changing 73

Alternator

stator winding, checking 265

Antifreeze

checking 241

Assembling the engine

alternator cover, installing 225

balancer shaft, installing 223

clutch basket, installing 219

clutch discs, installing 220

crankshaft, installing 215

engine bracket, mounting 235

engine, removing from the engine assembly stand 235

force pump, installing 217

front camshafts, installing 231

front cylinder head, installing 230

front piston, installing 228

front valve clearance, adjusting 233

front valve clearance, checking 233

gear position sensor, installing 222

heat exchanger, installing 232

idler and timing chain on the left, installing 223

idler and timing chain on the right, installing 219

ignition pulse generator, installing 225

ignition top dead center of the front cylinder, setting 228

ignition top dead center of the rear cylinder, setting 219

left engine case, installing 215

left suction pump, installing 218

locking lever, installing 216

middle suction pump, installing 215

oil drain plug, installing 235

oil filler tube, installing 234

oil filter, installing 224

oil spray tube, installing 213

rear camshafts, installing 227

rear cylinder head, installing 227

rear piston, assembling 225

rear valve clearance, adjusting 232

rear valve clearance, checking 232

shift drum locating, installing 217

shift shaft, installing 217

starter motor, installing 232

timing chain rails of the left engine case section, installing 213

timing chain rails of the right engine case section, installing 213

torque limiter and idler, installing 224

transmission shaft, installing 214

water pump wheel, installing 222

Auxiliary substances 8

B**Battery**

connecting 129

disconnecting 128

installing 127

recharging 130
removing 127

Brake disc of the rear brake

installing 102
removing 101

Brake discs

checking 94, 100

Brake discs of the front brake

installing 95
removing 94

Brake fluid

front brake, adding 138
of front brake, changing 139
of rear brake, changing 146
rear brake, adding 145

Brake fluid level

front brake, checking 138
rear brake, checking 144

Brake linings

front brake, checking 136
of front brake, changing 136
of rear brake, changing 142
rear brake, checking 142

Brake system

bleeding 141

C**Camshafts**

of the front cylinder, disassembling 256
of the front cylinder, installing 256
of the rear cylinder, disassembling 254
of the rear cylinder, installing 255

Capacity

Coolant 244, 279
engine oil 164, 260, 279
fuel 279

Chain

checking 104
cleaning 109
opening 107
riveting 107

Chain guide

checking 104

Chain tension

adjusting 103
checking 103

Charging voltage

checking 134

Chassis number 9**Clutch**

fluid level, checking/correcting 237
fluid, changing 237

Clutch lever

adjusting 36

CO adjustment

checking 274

Coolant

- draining 242
- refilling 243

Coolant level

- checking 241
- compensating tank, checking 241
- compensating tank, correcting 245

Cooling system

- bleeding 243

D

Disassembling the engine

- alternator cover, removing 174
- balancer shaft, removing 176
- clutch basket, removing 179
- clutch cover, removing 178
- clutch discs, removing 178
- crankshaft, removing 182
- drive wheel of the balancer shaft, removing 176
- engine bracket, removing 167
- engine oil, draining 168
- engine, clamping into the engine assembly stand 167
- force pump, removing 180
- front camshafts, removing 172
- front cylinder head, removing 173
- front piston, removing 173
- front timing chain tensioner, removing 172
- gear position sensor, removing 176
- heat exchanger, removing 169
- idler and timing chain on the left, removing 175
- idler and timing chain on the right, removing 179
- ignition pulse generator, removing 174
- ignition top dead center of the front cylinder, setting 172
- ignition top dead center of the rear cylinder, setting the engine 168
- left engine case, removing 181
- left suction pump, removing 176
- locking lever, removing 181
- middle suction pump, removing 182
- oil filler tube, removing 169
- oil filter, removing 175
- oil spray tube, removing 183
- primary gear, removing 179
- rear camshaft, removing 170
- rear cylinder head, removing 171
- rear piston, removing 171
- rear timing chain tensioner, removing 170
- shift drum locating, removing 181
- shift shaft, removing 181
- starter motor, removing 169
- timing chain rails of the left engine case section, removing 184
- timing chain rails of the right engine case section, removing 184
- torque limiter and idler, removing 174
- transmission shaft, removing 182
- valve cover, front, removing 168
- valve cover, rear, removing 168
- water pump wheel, removing 177

Drivetrain kit

- changing 108

E

Engine

- ignition top dead center of the front cylinder, setting 167
- ignition top dead center of the rear cylinder, setting 166
- installing 159
- preparing for clamping in the engine assembly stand 166
- preparing for installation 165
- removing 154

Engine - Work on individual parts

- clutch cover 192
- clutch, checking 204
- conrod bearing 190
- countershaft, assembling 210
- countershaft, disassembling 208
- cylinder head 197
- cylinder head, checking 199
- cylinder, checking/measuring 194
- electric starter drive, checking 212
- freewheel, checking 212
- left engine case section 188
- left main bearing, installing 190
- left main bearing, removing 189
- lubrication system, checking 203
- main bearing shells, selecting 187
- main bearing, right, removing 186
- main shaft, assembling 210
- main shaft, disassembling 207
- oil pressure regulator valve, checking 202
- piston ring end gap, checking 196
- piston, checking/measuring 195
- piston/cylinder mounting clearance, checking 196
- radial clearance of the bottom connecting rod bearing, checking 194
- right engine case section 184
- right main bearing, installing 187
- shift mechanism, checking 205
- shift shaft, preassembling 206
- timing assembly, checking 201
- timing chain tensioner for installation, preparing 202
- transmission, checking 209

Engine – work on the individual parts

- crankshaft, support bearing, changing 193
- main shaft axial play, measuring 211

Engine – working on the individual parts

- right idler 201

Engine assembly

- clutch cover, installing 221
- drive wheel of the balancer shaft, installing 222
- front valve cover, installing 234
- Installing the front timing chain tensioner 231
- Installing the rear timing chain tensioner 228
- primary gear, installing 219
- rear valve cover, installing 234
- rotor, installing 224

Engine disassembly

- rotor, removing 174

Engine electronics control unit

- resetting 273

Engine number

Engine oil

- adding 261
- changing 259

Engine oil level

- checking 259

Engine oil pressure

- checking 262

Engine sprocket

- checking 104

F**Figures** 8**Foot brake lever**

- basic position, adjusting 147
- Setting the step plate 147

Fork

- compression damping, setting 16
- rebound, adjusting 16

Fork legs

- assembling 24
- checking 22
- disassembling 20
- dust boots, cleaning 17
- fork service, performing 20
- installing 18
- removing 17

Fork part number 10**Fork service, performing** 20**Frame**

- checking 39

Front fender

- installing 90
- removing 90

Front rider's seat

- mounting 77
- removing 77

Front wheel

- installing 93
- removing 92

Fuel filter

- changing 84

Fuel pressure

- checking 81

Fuel pump

- changing 83

Fuel tank

- installing 80
- removing 78

Fuses

- in fuse box, changing 133

G**Gear position sensor**

- changing 238
- programming 240

H**Hand brake lever**

- basic position, adjusting 142

Handlebar position

- setting 36

Headlight

- headlight range, adjusting 151

Headlight adjustment

- checking 151

Headlight bulb

- changing 152

I**Ignition key**

- activating/deactivating 149

Implied warranty 8**Initialization run**

- executing 273

K**Key number** 10**L****Lower part of the air filter box**

- installing 75
- removing 75

Lower triple clamp

- installing 30
- removing 29

M**Main fuse**

- changing 131

Main silencer

- installing 67
- removing 67

Manifold

- disassembling 69
- installing 70

Motorcycle

- cleaning 284
- lifting with front lifting gear 11
- lifting with rear lifting gear 14
- raising with work stand (inserted) 13
- raising with work stand (screw-in type) 11
- removing from the work stand (inserted) 13
- removing from the work stand (screw-in type) 12
- removing the rear from the lifting gear 14
- taking from the front lifting gear 11

O**Oil circuit** 258**Oil filter**

- changing 259

Oil nozzle for clutch lubrication

- checking/cleaning 263
- installing 264
- removing 263

Oil screens		10
cleaning	259	
Operating substances	8	8
P		
Passenger seat		
mounting	77	78
removing	77	
Preparing for use		
after storage	286	
Presilencer		
installing	68	14
removing	68	15
R		
Rear hub		
installing	112	10
removing	111	22
Rear hub shock absorbers of the rear sprocket carrier		
checking	110	24
Rear sprocket		
checking	104	29
Rear sprocket carrier		
installing	106	34
removing	105	35
Rear wheel		
installing	97, 99	58
removing	97-98	60
Rear wheel bearing clearance		
measuring	114	59
Rear wheel nut (right side)		
torque, checking	100	63
S		
Secondary air system membranes		
changing	236	58
Service schedule	287-288	59
Servicing the shock absorber	46	60
Shift lever		
basic position, adjusting	238	61
Shock absorber		
bleeding and filling	54	62
damper, assembling	52	63
damper, checking	49	64
damper, dismantling	47	65
heim joint, installing	50	66
heim joint, removing	50	67
high-speed compression damping, setting	40	68
installing	43	69
low speed compression damping, setting	40	70
nitrogen, filling damper with	56	71
piston rod, assembling	51	72
piston rod, disassembling	48	73
rebound damping, adjusting	41	74
removing	42	75
shock absorber, servicing	46	76
spring preload, adjusting	41	77
spring, installing	57	78
spring, removing	46	79
Shock absorber article number		10
Spare parts		8
Spark plugs		
changing	267	
Spoiler		
installing	78	
removing	78	
Spring		
installing	24	
removing	22	
Starting		
for checking the function	15	
Steering damper article number		10
Steering dampers		
changing	35	
Steering head bearing		
changing	34	
lubricating	29	
Steering head bearing play		
adjusting	28	
checking	27	
Storage		
Swingarm		
checking	58	
installing	60	
removing	59	
Swingarm bearing		
changing	63	
checking	58	
T		
Technical data		
capacities	279	
chassis	279	
chassis tightening torques	281	
electrical system	280	
engine	275	
engine - tolerance, wear limits	275	
engine tightening torques	277	
fork	280	
shock absorber	281	
tires	280	
Throttle grip		
changing	36	
Throttle valve body		
installing	272	
removing	271	
Tire air pressure		
checking	91	
Tire condition		
checking	91	
Turn signal bulb		
changing	153	
Type label		9

U

Upper part of the air filter box

- installing 74
- removing 73

V

Valve clearance

- checking 246
- checking (air filter and spark plugs removed) 250
- of the front cylinder, setting 254
- of the rear cylinder, setting 253

W

Warranty

..... 8

Wheel bearing

- checking 92
- measuring the wheel bearing play and greasing the rear hub 117
- of the front wheel, changing 95
- of the rear wheel, changing 124
- rear wheel, greasing 116

Wheel speed sensor spacing

- checking 148

Winter operation

- checks and maintenance steps 285

Wiring diagram

- Page 01 of 11 290, 333
- Page 02 of 11 290, 312
- Page 03 of 11 292, 314
- Page 04 of 11 294, 316
- Page 05 of 11 296, 318
- Page 06 of 11 298, 320
- Page 07 of 11 300, 322
- Page 08 of 11 302, 324
- Page 09 of 11 304, 326
- Page 10 of 11 306, 328
- Page 11 of 11 308, 330
- Page 11 of 11 310, 332

Work rules

..... 7



3206218en

01/2017



KTM

KTM Sportmotorcycle GmbH
5230 Mattighofen/Austria
<http://www.ktm.com>



KTM Group Partner



Photo: Mitterbauer/KTM