

# Repair Manual



**K 1200RS**

**BMW AG Motorcycle Division  
After Sales**

Published by BMW AG Motorcycle Division  
After Sales  
UX-VS-2

All rights reserved. Not to be reprinted, translated or duplicated either wholly or in part without prior written permission.  
Errors and omissions excepted; subject to technical amendment.

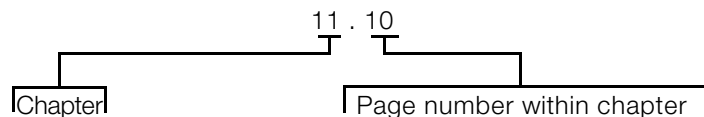
Produced in Germany

# Introduction

This repair manual will help you to perform all the main maintenance and repair work correctly and efficiently. If it is consulted regularly by workshop personnel it will form a useful addition to the theoretical and practical knowledge acquired at the BMW Training Centre. It is a contribution towards achieving even higher Service quality.

All information in both text and illustrations refers to motorcycles in standard condition or with genuine BMW accessories installed, and not to motorcycles which have been modified in any way to depart from the manufacturer's specification.

- The repair manual is structured in the logical sequence of the work to be performed: Removal, Disassembly, Repair, Assembly, Installation.
- The entire contents are divided into individual chapters, corresponding to the Construction Groups.



- Work to be performed during an Inspection is described in Group "00". The various inspection routines are numbered I, II, III and IV. This numbering is repeated in the work descriptions which follow, so that work can take place without interruption.
- Use of the BMW special tools needed for certain tasks is described in the work instructions.

If the need arises, repair instructions are also issued in the form of Service Information. This information is of course incorporated into the next issue of the repair manual. We also recommend, as an additional source of information, the Electronic Parts Catalogue (ETC), which contains clear and easy-to-follow illustrations.

If the work described here is restricted to a particular equipment specification, for instance if a specific optional extra (OE) is fitted, this is stated in square brackets at the start of the item concerned, e.g. **[LT]**.

Please refer to the following pages as well for a description of other symbols used and how to work with it.

BMW AG Motorcycle Division  
After Sales

Published by:                      BMW AG Motorcycle Division  
   After Sales  
   UX-VS-2

D - 80788 München

All rights reserved. Not to be reprinted, translated or duplicated either wholly or in part without prior written permission.

Errors and omissions excepted; subject to technical amendment.

Produced in Germany

## Usage

Each chapter starts with the list of contents.

The list of contents is followed by the Technical Data table.

Chapter 00 "Maintenance and general instructions" details the handover checklist and lists all tightening torques and operating fluids.

## Key to symbols

In this Workshop Manual for the K 1200 model, the following symbols are used; their meanings are explained in the table.

Special instructions aimed at improving the work procedures



**Note:**

Specific information on operating, inspecting and adjusting work for the motorcycle as well as maintenance procedures.

---



**Caution:**

Instructions and precautions specifically intended to prevent damage to the motorcycle. Failure to comply with them could invalidate the warranty.

---



**Caution:**

This symbol stands for precautions and measures which are essential in order to protect the rider or other persons from possibly severe or fatal injury.

---

## Contents

Headlines for the work described in the chapter..... with the relevant page number

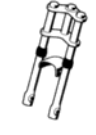
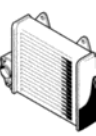
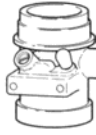


**Tightening torques:**

Values are stated if they differ from DIN EN 24 014 or DIN 912 ISO industrial standards.

# Contents

Group	Chapter	Page
00	Maintenance and General Information .....	00.1
11	Engine .....	11.1
12	Engine electrical system .....	12.1
13	Fuel preparation and control .....	13.1
16	Fuel tank and lines .....	16.1
17	Cooling .....	17.1
18	Exhaust system .....	18.1
21	Clutch .....	21.1
23	Gearbox.....	23.1
31	Front fork .....	31.1
32	Steering .....	32.1



# Contents

Group	Chapter	Page
33	Rear wheel drive .....	33.1
34	Brakes .....	34.1
36	Wheels and tyres .....	36.1
46	Frame .....	46.1
51	Equipment .....	51.1
61	General electrical system.....	61.1
62	Instruments.....	62.1
63	Lights.....	63.1



## **00 Maintenance and General Information**

# Contents

Page

<b>Tightening torques</b> .....	5
<b>Table of operating fluids</b> .....	14
<b>Key to maintenance intervals</b> .....	15
<b>Changing engine oil, renewing oil filter element</b> .....	16
(Inspections I, II, III IV)	
<b>Gearbox oil change</b> .....	17
(Inspection III)	
<b>Rear wheel drive oil change (every 40,000 km/24,000 miles)</b> .....	17
(Inspections I, III)	
<b>Checking valve clearances, adjusting if necessary</b> .....	18
(Inspection III)	
Checking valve clearances .....	18
Adjusting valve clearances .....	18
<b>Renewing spark plugs</b> .....	20
(Inspection III)	
<b>Renewing fuel filter (every 40,000 km/24,000 miles)</b> .....	21
(Inspection III)	
Removing the fuel pump unit .....	21
Removing and installing fuel filter .....	22
Removing/installing fuel pump .....	22
Installing fuel pump unit .....	22
<b>Checking hose unions on fuel system</b> .....	23
Check hose unions on fuel system for leaks and take up any slack at hose clips (Inspections I, III)	
<b>Checking hose unions on the cooling system</b> .....	23
Check the hose unions on the cooling system for leaks and if necessary take up slack at hose clips (Inspections I, III) Check cooling system for leaks	
<b>Renewing coolant</b> .....	24
(Inspection IV)	
Draining coolant .....	24
Adding coolant .....	24





# Contents

Page



<b>Battery</b> .....	25
(Inspections III, IV) Check battery acid level and add distilled water if necessary; inspect battery terminal posts and clean and grease them if necessary	
Removing/installing battery .....	25
Topping up with distilled water .....	25
<b>Renewing intake air cleaner</b> .....	26
(Inspections II, III)	
<b>Brake system</b> .....	26
Checking operation of brake system and freedom from leaks, repairing/renewing if necessary (Inspection III)	
<b>Brake pads/brake discs</b> .....	27
Check brake pads and discs for wear and renew if necessary (Inspections II, III)	
Checking brake pads for wear .....	27
Front brake pads Rear brake pads	
Checking brake disc for wear .....	27
Renewing brake pads .....	28
Front brake Rear brake	
<b>Checking brake fluid level/topping up</b> .....	29
Check brake fluid level at front and rear, and top up if necessary [⇒ BMW SI 00 027 95 (716)] (Inspections I, II, III)	
Front brake .....	29
Rear brake .....	29
<b>Renewing brake fluid and bleeding brake system</b> .....	30
Renew the brake fluid at least once a year (Inspection IV)	
Front brake .....	30
Additional preliminary work	
Rear brake .....	32
Additional preliminary work	
<b>Bleeding the brakes</b> .....	34
Front brake .....	34
Rear brake .....	35
<b>Checking operation of side (prop) stand switch</b> .....	36
(Inspections I, II, III)	
<b>Greasing the side (prop) stand</b> .....	36
(Inspections II, III)	

# Contents

Page

<b>Checking main (centre) stand, greasing if necessary</b> .....	36
(Inspections II, III, IV)	
Checking main (centre) stand .....	36
Lubricating main (centre) stand .....	37
<b>Checking clutch fluid level, correcting if necessary</b> .....	38
(Inspections I, II, III)	
<b>Checking tightness of rear wheel studs</b> .....	38
(Inspection I)	
<b>Cleaning the inductive sensor at the rear wheel</b> .....	38
(Inspections I, III)	
<b>Reading out MoDiTeC fault memory</b> .....	39
(Inspections II, III)	
<b>Checking throttle cable play, adjusting if necessary</b> .....	39
(Inspections I, III)	
<b>Final inspection with road safety and functional check</b> .....	39
(Inspections I, II, III, IV)	





## Tightening torques

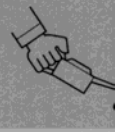
Model	K 1200 RS	
Connection	Nm	
<b>11 Engine</b>		
<b>Engine block</b>		
Shouldered bearing	40	
Needle roller bearing	18	
Lower part of crankcase	10	
Oil mesh strainer	10	
Oil filter	11	
Oil sump	10	
Oil filter cover	10	
Oil drain plug	30	
<b>Freewheel</b>		
Cover plate	10	
<b>Intermediate flange</b>		
Thrust plate at intermediate flange	9	Loctite 243
Intermediate flange at crankcase	9	
<b>Clutch housing</b>		
Clutch housing to output shaft		
Tighten to	140	
Slacken off		
Tighten to	50	
Wrench angle	° 60	
<b>Crankshaft</b>		
Rotor flange at crankshaft	50	
Main bearings	50	
Crankcase cover	9	
<b>Connecting rod</b>		
Big end bearings	30	
Wrench angle	° 80	
<b>Cylinder head</b>		
Cylinder head bolts	20	
Tightening angle, stage 1	° 76	
Tightening angle, stage 2	° 74	
Temperature sensor	30	
Coolant stub pipe	9	
Cylinder head cover	9	
Shield plate	9	





<b>Model</b>	<b>K 1200 RS</b>
<b>Connection</b>	<b>Nm</b>
<b>Camshaft</b>	
Bearing cap	9
Chain sprockets	56
<b>Timing chain</b>	
Slider rail at camshaft bearing cap	9
<b>Timing case cover</b>	
Chain tensioner	9
Screw plug for chain tensioner	9
Timing case cover	9
<b>Oil/water pump</b>	
Oil pressure switch to oil pump intermediate flange	35
Water pump temperature sensor	9
Screw plug, M 12	20
Oil pressure relief valve screw plug	35
Water pump impeller	33
Pump housing to crankcase	10
Pump housing cover	10
<b>12 Engine electrical system</b>	
<b>Connection</b>	<b>Nm</b>
Spark plugs	20
Ignition coil	9
<b>Ignition signal transmitter</b>	
Rotor	4
Magnetic gate	6
Ignition transmitter cover	9
<b>Alternator</b>	
Alternator to intermediate flange	22
Driver	50
<b>Starter motor</b>	
Starter motor to gearbox	20
Positive lead to starter motor	15
Earth (ground) lead to cross-tube	6

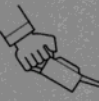
<b>Model</b>	<b>K 1200 RS</b>
<b>Connection</b>	<b>Nm</b>
<b>13 Fuel preparation and control</b>	
<b>Connection</b>	<b>Nm</b>
Temperature sensor to intake air silencer	15
Hose clips at throttle stub pipe	4
Screw for fuel injection rail at engine block	9
Hose clips for fuel line	4
Hose clip at intake stub pipe	9
Intake stub pipe	9
Retaining clip (fastening clips) at engine	9
Screws at throttle butterfly positioner	5
Screws at throttle potentiometer	2
<b>16 Fuel tank and lines</b>	
<b>Connection</b>	<b>Nm</b>
Rubber mountings to frame	22
Tank cover to frame	3
Fuel tank to frame	22
Pump unit to fuel tank	5
Filler pipe to fuel tank	4
Immersed fuel level sensor to fuel tank	5
<b>17 Radiator</b>	
<b>Connection</b>	<b>Nm</b>
Level equalising tank to frame	6
Fan to radiator	hand-tight
Coolant hose clips	2
<b>18 Exhaust system</b>	
<b>Connection</b>	<b>Nm</b>
Exhaust system to cylinder head	24
Retaining hoop at silencer (muffler)	13
Retaining hoop at frame	24
Oxygen sensor	40
Retaining plate to silencer (muffler)	11
Retaining hoop to holder	13
Cover	8





<b>Model</b>	<b>K 1200 RS</b>	
<b>Connection</b>	<b>Nm</b>	
<b>21 Clutch</b>		
<b>Connection</b>	<b>Nm</b>	
Clutch housing to output shaft		
Tighten to	140	
Slacken off		
Tighten to	50	
Wrench angle	° 60	
Housing cover to clutch housing	19	
Slave cylinder to gearbox	9	
Hollow screws at slave cylinder	6	
<b>23 Transmission</b>		
Oil drain plug	55	
Oil filler plug	23	
Cover screws at housing		
Selector shaft to selector drum		
<b>31 Front fork</b>		
Oil drain plug, telescopic fork	13	
Leading link to slider tube bridge	130	Loctite 2701
Leading link to frame	107	
Leading link to clamping sleeve	21	
Steering damper to leading link	21	
Steering damper to slider tube bridge	21	
Screw plug	20	
Handlebar holder to mount	9	
Handlebar holder clamp	21	Loctite 2701
Fork bridge clamp	21	
Fork bridge to frame	130	Precote 85
Handlebar holder to fork bridge	9	
Ball joint to fork bridge	230	Never Seez
Ball joint to fork slider bridge	230	Never Seez
Spring strut to frame	43	
Spring strut to leading link	60	
Slider tube bridge to telescopic fork	21	Precote 85

<b>Model</b>	<b>K 1200 RS</b>
<b>Connection</b>	<b>Nm</b>
<b>32 Steering</b>	
Fastening for brake lever fitting	7
Fastening for clutch lever fitting	7
Line to fitting	18
Cover for cable guide	7
Mirrors	20
<b>33 Rear wheel drive</b>	
Housing cover to housing	35
Threaded ring	118
Nut for input bevel pinion	200
Housing cover	35
Fixed bearing journal	160
Free bearing journal	7
Locknut	41
Reaction link to rear wheel drive	43
Oil filler/drain plug	23
<b>Swinging arm to frame</b>	
Bearing journal, left/right	160
Threaded ring, right	200
Threaded ring, left	10
Lock ring	160
Suspension strut to swinging arm	47
Spring strut to frame	43



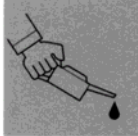


Model	K 1200 RS	
Connection	Nm	
<b>34 Brakes</b>		
<b>Front brake</b>		
Brake caliper to fork tube	40	
Brake disc to front wheel	21	Loctite 2701
ABS sensor mount	4	
Brake hose/line	15	
Brake fluid distributor at holder	9	
Holder at slider tube	4	Precote 80
Bleed screw	12	
<b>Rear brake</b>		
Brake caliper to rear wheel drive	40	
Brake disc to rear wheel drive	21	Tuflok
ABS sensor mount	4	
Retaining bracket at brake caliper	8	Precote 80
Master cylinder to footrest assembly	7	
Brake hose/line	15	
Bleed screw	12	
<b>ABS control unit</b>		
Brake line at ABS control unit	15	
Bleed screw	10	
ABS control unit to battery carrier	4	
Battery carrier to frame	6	
Battery carrier to cross-tube	6	
Battery carrier to footrest plate	18	
<b>36 Wheels and tyres</b>		
<b>Front wheel</b>		
Quick-release axle	30	
Quick-release axle clamp screws	20	
Brake caliper at fork slider tube	39	
<b>Rear wheel</b>		
Wheel studs	105	



Model	K 1200 RS
Connection	Nm
<b>46 Frame</b>	
Front mudguard (rear section) to slider tube bridge	4
Front mudguard, front (with rear section) to upper slider tube	9
Front mudguard, front, to lower slider tube	3
Splash guard	3
Rear section, left/right, to frame	3
Rear section, bottom, to frame	3
Rear carrier section, front, to battery carrier	3
Rear carrier section, front, with rear section of rear carrier, to frame	3
Rear side section of fairing to tank cover	3
Side section of fairing to rear of frame	3
Rear side section of fairing to frame	3
Side section of fairing to engine spoiler	3
Front side section of fairing to fairing holder	3
Front side section of fairing to inner cover	3
Front side section of fairing to tank cover	3
Air guide for oil cooler	3
Intake air guide at left radiator	hand-tight
Intake air guide for left radiator at fairing holder	3
Intake air pipe to fairing holder	10
Oil cooler	9
Air outlet guide at radiator surround	3
Engine spoiler to holder, bottom	9
Engine spoiler to holder, front left	3
Engine spoiler to fairing	3
Lower engine spoiler holder at sump	22
Front left holder for engine spoiler at frame	9
Rear side section	3
Inner cover	3
Windshield mount	6
Upper section of fairing	3
Instrument cluster	9
Fairing holder, left/right, to frame	30
Centre fairing holder to frame	22
Heat shield at gearbox	22
Heat shield at coil	9
Grab handle	9
Pannier case holder, front, to frame	22





Model	K 1200 RS	
Connection	Nm	
Pannier case holder to luggage rack	3	
Pannier case holder to grab handle	3	
Luggage rack to pannier case carrier	3	
Luggage rack to grab handle	3	
Lock mount	9	
Pivot mount to gearbox	41	
Side (prop) stand to pivot mount	41	Loctite 243
Main (centre) stand to pivot mount	41	Loctite 243
Footrest plate to frame	21	
Brake pedal stop	7	
Brake pedal	41	Precote 80
Master brake cylinder	7	
Footrest rubber to footrest	4	
Brake light switch	5	
Rear footrest holder to frame	21	
Rear of frame to main frame, top	41	
Rear of frame to main frame, bottom	21	
Battery carrier to rear of frame, right	6	
Fuse box holder	9	
Seat tray support	6	
Lower cross-tube at frame	41	
Footrest assembly, left	21	
Footrest assembly, right	21	
Cross-member, left/right, to frame	74	
Cross-member to engine, left	41	
Cross-member to engine, right	41	
Gearbox to frame	82	
Leading link to frame	107	
Leading link to clamping sleeve	21	

<b>Model</b>	<b>K 1200 RS</b>
<b>Connection</b>	<b>Nm</b>
<b>51 Equipment</b>	
Fuel filler pipe to fuel tank	5
Serrated screw, ignition switch/steering lock	15
<b>61 General electrical equipment</b>	
Battery retaining plate at battery holder	4
Positive and negative leads to battery	4
Combined switch to handlebar fitting	1
Nut, power socket	3
Inductive signal transmitter to rear wheel	4
Temperature sensor at cylinder head	30
Side (prop) stand switch mount	6
Brake light switch to footrest plate	5
<b>62 Instruments</b>	
Instrument cluster to fairing holder	9
<b>63 Lights</b>	
Headlight to upper section of fairing	3



## Table of operating fluids

Item	Use	Order number	Quantity
<b>Lubricant</b>			
Optimoly MP 3	High-performance lubricating paste	07 55 9 062 476	100 g tube
Optimoly TA	High-temperature assembly paste	18 21 9 062 599	100 g tube
Never Seez	Lubricating paste	83 23 9 407 830	100 g tube
Shell Retinax EP2	(Taper) roller bearing grease	83 23 9 407 845	100 g tube
Contact spray	Contact spray	81 22 9 400 208	300 ml aerosol
<b>Sealants</b>			
Three-Bond 1209	Surface sealant	07 58 9 062 376	30 g tube
<b>Adhesives and retaining agents</b>			
Loctite 648	Structural adhesive, ultra-high speed	07 58 9 067 732	5 g bottle
Loctite 243	Thread retainer, medium-strength	07 58 9 056 031	10 ml bottle
Loctite 270	Thread retainer, strong	81 22 9 400 086	10 ml bottle
Loctite 2701	Thread retainer	33 17 2 331 095	10 ml bottle
<b>Cleaner</b>			
Brake cleaner	Brake cleaner	81 22 9 407 704	600 ml aerosol



## Key to maintenance intervals

Maintenance intervals consist of the first Inspection (after the first 1000 km/app. 600 miles), the BMW Service, BMW Inspection and BMW Annual Service.

### Inspection 1000 km/600 miles

BMW Running-in Check after the first 1000 km/600 miles.

### BMW Service

After the first 10,000 km/6000 miles and each additional 20,000 km/12,000 miles (at 30,000 km ... 50,000 km ... 70,000 km/18,000 miles ... 30,000 miles ... 42,000 miles).

### BMW Inspection

After the first 20,000 km/12,000 miles and each additional 20,000 km/12,000 miles (at 40,000 km ... 60,000 km ... 80,000 km/24,000 miles ... 36,000 miles ... 48,000 miles).

### BMW Annual Service

Certain items of maintenance work depend on elapsed time as well as the distance the bike has covered. They should therefore be carried out at least once a year (e.g. renewing brake fluid). If these items cannot be carried out during a Service or an Inspection, an Annual Service must be performed.

In this Workshop Manual, the individual maintenance intervals are shown by the following codes:

- Inspection at 1000 km (600 miles) ..... I
- BMW Service at 10,000 km (6000 miles) ..... II
- BMW Inspection at 20,000 km (12,000 miles) ... III
- BMW Annual Service ..... IV



# Changing engine oil, renewing oil filter element

(Inspections I, II, III IV)



**Note:**

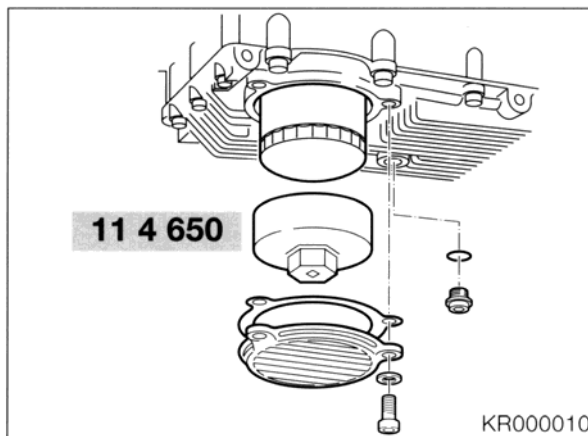
Change the oil and renew the oil filter at least every 6 months. If ridden only for short distances or at outside temperatures below 0 °C, perform this work every 3 months or at least every 3,000 km/ 1,800 miles).



**Caution:**

Note the precautions which must be taken if the engine is run in an enclosed space. If an engine failure occurs, the oil tank and feed line must be cleaned with the material used for this purpose in the workshop, and then blown through with compressed air.

- Drain the engine oil only when it is at regular operating temperature.
- Place the motorcycle on its main (centre) stand, in a horizontal position.
- Remove the engine spoiler (→ 46.12).



- Take out the oil filler plug.
- Remove the oil drain plug from the engine.
- Drain the oil completely.
- Take out the screws (2) holding the oil filter cover.
- Unscrew the oil filter with special wrench (3), **BMW No. 11 4 650**.
- Unscrew and remove the oil filter.



**Note:**

Always install the oil drain plug with a new sealing ring.

- Screw the oil drain plug in with a new sealing ring, and tighten.
- Coat the sealing rings on the new oil filter with oil.
- Screw the oil filter in hand-tight; note the instructions on the filter.
- Renew the seal in the oil filter cover if necessary.
- Install in the reverse order of work.
- Add oil at the oil filler plug.
- Screw in and tighten the oil filler plug.



**Caution:**

Never add engine oil above the MAX mark in the oil level sight glass.

- Check oil level only at least 10 minutes after completing a trial run/test drive and stopping the engine; check the oil level and correct it if necessary.

**Operating fluids:**

Brand-name HD oil, API classification SF, SG or SH; the CD or CE suffixes are permissible; alternatively, brand-name HD oil of CCMC classification G4 or G5; suffix PD2 is permissible.

**Engine oil content:**

With filter change ..... 3.75 l (6.6 Imp. pints)  
 Without filter change ..... 3.50 l (6.2 Imp. pints)  
 Oil volume between  
 MIN and MAX marks ..... 0.50 l (0.88 Imp. pint)



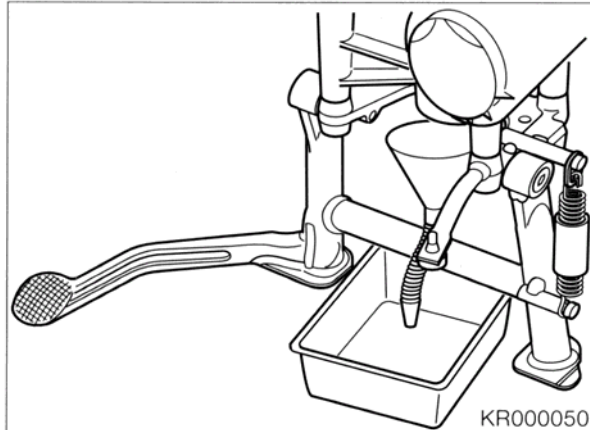
**Tightening torques:**

Oil drain plug ..... 30 Nm  
 Oil filter cover fastening ..... 10 Nm  
 Oil filter ..... 11 Nm

## Gearbox oil change

### (Inspection III)

- Drain the oil from the gearbox only at regular operating temperature.
- Place the motorcycle on its main (centre) stand in a horizontal position.
- Unscrew the oil filler plug.
- Loosen the oil drain plug.
- Place a suitable vessel under the gearbox to trap the oil and hold a funnel under the drain plug.
- Unscrew the oil drain plug by hand and allow the oil to drain through the funnel into the vessel.



- Drain the oil out completely.
- Screw the oil drain plug back in with a new sealing ring.
- Add fresh gear oil.
- Screw the oil filler plug back in with a new sealing ring.

#### Tightening torques:

Oil drain plug .....	55 Nm
Oil filler plug .....	23 Nm

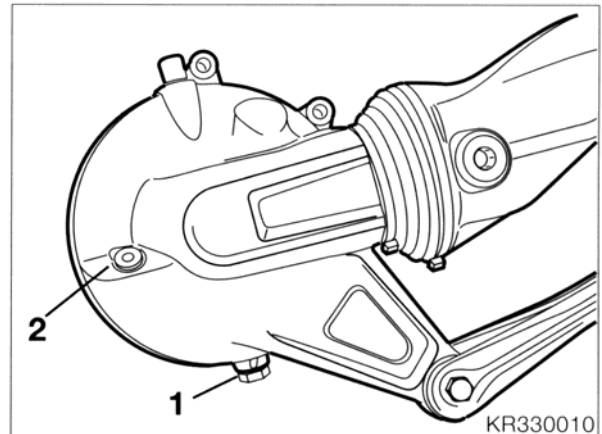
#### Quantities:

Initial filling..... app. 0.8 l (1.4 Imp. pints)  
 During oil changes add oil up to lower edge of filler hole.

## Rear wheel drive oil change (every 40,000 km/24,000 miles)

### (Inspections I, III)

- Drain the oil only when it is at regular operating temperature.
- Place the motorcycle on its main (centre) stand, in a horizontal position.
- Take out the oil filler (2) and drain (1) plugs.



- Drain the oil out completely.
- Screw in oil drain plug (1) with a new sealing ring.
- Add oil to the rear wheel drive.
- Screw in oil filler plug (2) with a new sealing ring.

#### Tightening torques:

Oil drain plug .....	23 Nm
Oil filler plug .....	23 Nm

#### Quantities:

Initial filling .....	0.25 l (0.44 Imp. pint)
During oil changes .....	0.23 l (0.41 Imp. pint)

#### Oil grade for rear wheel drive:

Brand-name hypoid gear oil, SAE 90, API class GL 5.



## Checking valve clearances, adjusting if necessary

(Inspection III)



### Note:

Renew the facing on the chain tensioner rail and the chain guide rail every 60,000 km/36,000 miles.

## Checking valve clearances



### Caution:

Never unscrew the spark plugs before measuring valve clearances. Particles of oily soot could become lodged behind the exhaust valve head and falsify the measurement.

- Remove left side section of fairing.
- Remove the cylinder head cover.
- Turn the engine over by means of the rear wheel.
- Measure valve clearance with feeler gauge.
- Max. engine temperature 35 °C.
- Make a nominal-actual comparison to determine size of replacement tappets.

### Valve clearances:

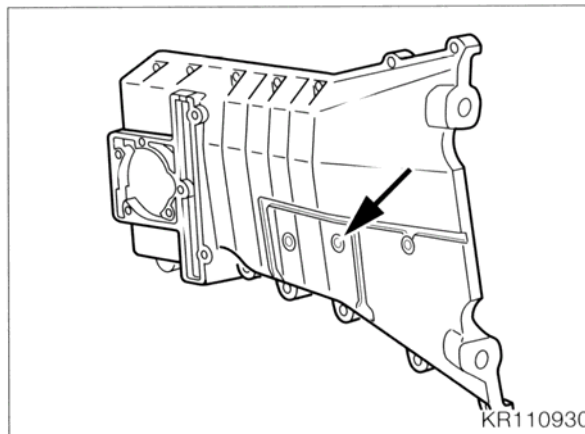
Inlet ..... 0.15...0.20 mm (0.006...0.008 in)  
Exhaust ..... 0.25...0.30 mm (0.010...0.012 in)

## Adjusting valve clearances



### Note:

The camshafts must be removed before the bucket-type tappets can be renewed.



- Remove the screw plug (arrow) for the chain tensioner in the timing case cover.
- Prevent the chain tensioner from moving in the timing case cover with chain tensioner pin, **BMW No. 11 6 740**.



### Note:

Turn or press the camshaft in the normal direction of rotation (for app. 20 to 30 seconds if the engine is cold), until the oil has been forced out of the chain tensioner and the pin can inserted fully.



### Caution:

Set the piston to the centre of the cylinder (cylinder 1 app. 90° before top dead centre), to avoid damage to the valves and piston.

- Unscrew the slide rail.
- Loosen the chain sprockets, holding the camshaft at the hexagon.
- Take off the chain sprockets and slide rail.



### Note:

Secure the timing chain with a cable strap.

- Turn the camshafts until the tops of the cams are exposed.
- Remove the thrust bearing cap first in order to prevent tilting.
- Release the radial bearing caps uniformly and remove them.
- Take out the camshafts.
- Using rubber suction device, **BMW No. 11 3 251**, pull the bucket-type tappets out of the cylinder head as necessary and renew them.
- Oil the camshafts at their bearing points.



**Note:**

Note correct identification of camshafts.

Inlet side: one groove after thrust bearing  
 Exhaust side: no grooves after thrust bearing

The camshaft bearing caps are also marked.

Inlet side: odd numbers  
 Exhaust side: even numbers

The numbers increase from the front (timing end) to the rear.

- Insert the camshafts so that the tops of the cams are exposed.
- Install the inner bearing caps first.
- Tighten the bearing caps uniformly, working from the inside outwards.
- Install the thrust bearing (timing end) with slide rail last and do not tighten it until the chain sprockets have been installed.

**Tightening torque:**

Bearing cap..... 9 Nm

- Turn the camshafts so that the grooves at the rear (opposite end from timing end) are vertical in relation to the cylinder head.
- The grooves at the timing end must face towards the crankshaft.
- Attach aligning device, **BMW No. 11 3 700**, and secure tightly to camshaft bearing caps.



**Caution:**

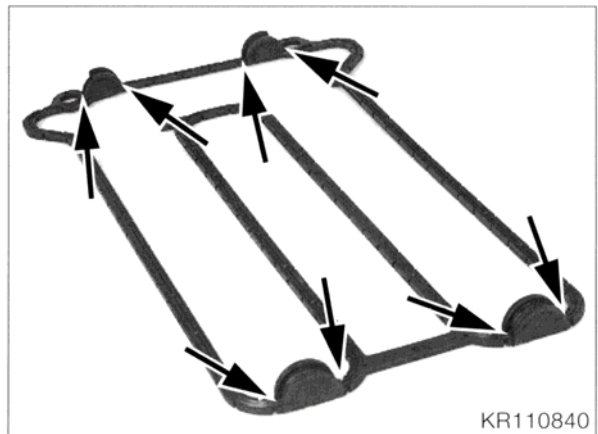
When turning the crankshaft, make sure that the timing chain does not come away from the crankshaft sprocket.

- Turn the crankshaft through a further 90° (note correct direction of rotation), the piston in cylinder 1 must move up to top dead centre (cylinder 1 = at timing end).
- Install the inlet camshaft chain sprocket so that the timing chain is as taut as possible at the guide rail.
- Insert the screw as far as possible.
- Install the exhaust camshaft chain sprocket so that the timing chain is as taut as possible between the sprockets (in the slide rail).
- Insert the screw as far as possible.
- Tighten the bearing cap with guide rail.
- Remove the aligning device, **BMW No. 11 3 700**.
- Tighten the chain sprockets, holding the hexagon on the camshaft to prevent it from turning.
- Remove the chain tensioner clamping tool and tighten the screw plug.

**Tightening torque:**

Bearing cap ..... 9 Nm  
 Chain sprockets..... 56 Nm  
 Screw plug for chain tensioner pin..... 9 Nm

- Turn the engine over and check the relative positions of the camshaft chain sprockets and the crankshaft (at TDC).
- Install the cylinder head cover gasket with the half-moon cutouts first. The marks at the front and rear of the gasket and the cylinder head cover must coincide.



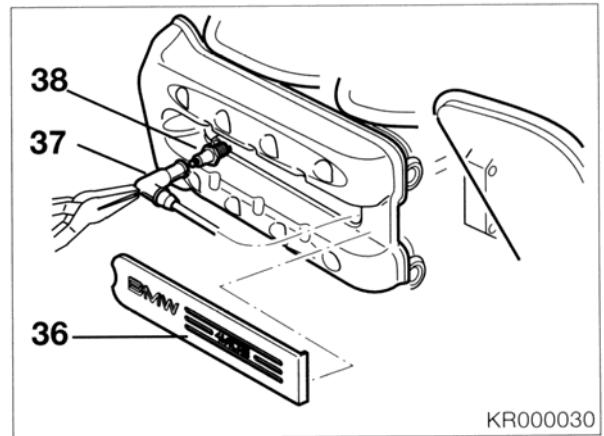
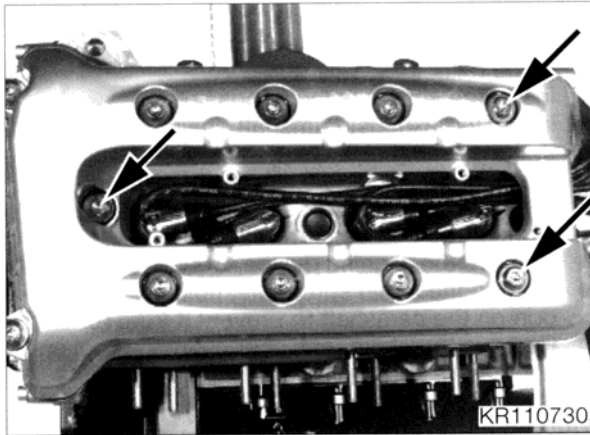
KR110840

- Apply a thin coat of **Three Bond 1209** at the areas where the cylinder head, timing case cover and cylinder head cover meet and at the half-moon cutouts (arrows).



## Renewing spark plugs

(Inspection III)



- Attach the cylinder head cover. Insert the front centre screw (timing end, arrow) and both rear screws (arrows) in order to locate the gasket.



### Note:

Do not forget the contact spring.

- Screw all bolts in fully.
- Tighten the bolts in a crosswise pattern, working from the inside outwards.

### Tightening torque

Cylinder head cover ..... 9 Nm

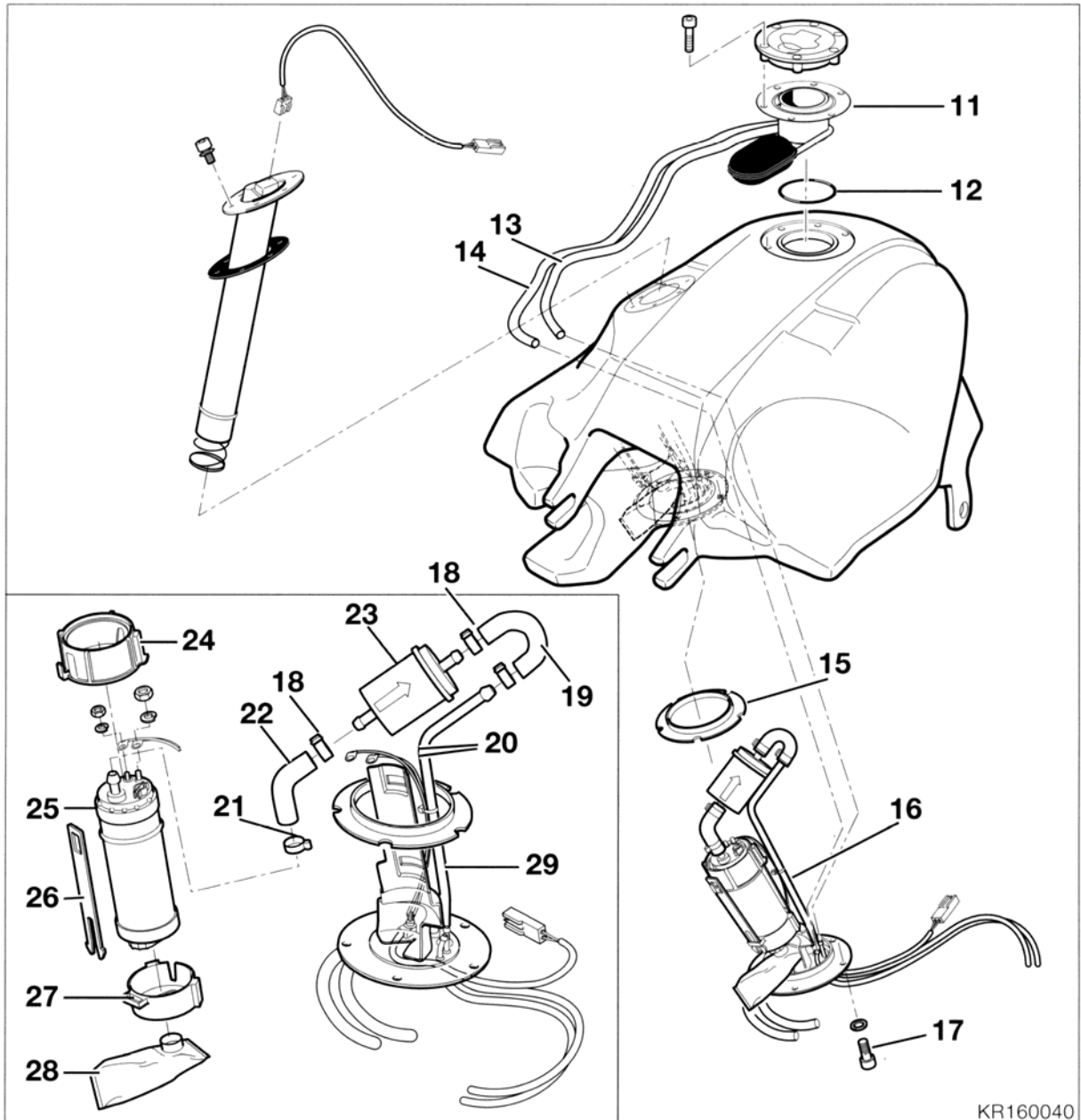
- Attach engine spoiler.
- Attach the left side section of the fairing.

- Remove left side section of fairing. (→ 46.10)
- Take off push-fit screen panel (36).
- Pull off spark plug caps (37) with flat pliers.
- Unscrew and remove spark plugs (38) with spark plug wrench, **BMW No. 12 3 500**.
- Install in the reverse order of work.



### Tightening torque:

Spark plugs ..... 20 Nm



KR160040

### Renewing fuel filter (every 40,000 km/24,000 miles)

#### (Inspection III)



**Note:**

If the fuel is of poor quality, renew the fuel filter every 20,000 km/12,000 miles.

- Remove fuel tank. (→ 16.5)



**Warning:**

Comply with safety precautions when handling or working with fuel.

- Drain fuel tank.

### Removing the fuel pump unit

- Take out screws (17).
- Pull fuel pump unit (16) far enough out of the fuel tank to enable the clips on drain hose (13) and vent hose (14) to be undone with pliers.
- Pull off the hoses.
- Remove fuel pump unit (16) completely, with gasket (15).

## Removing and installing fuel filter

- Open fastenings (18) with pliers.
- Pull fuel hoses (22) and (19) off fuel filter (23).



### Caution:

Note correct direction of flow through fuel filter.



- Attach fuel hoses to new fuel filter.
- Close fastenings (18) with pliers, **BMW No. 13 1 500**.

## Installing fuel pump unit

- Insert fuel pump unit (16) with gasket (15) into fuel tank.
- Attach drain hose (13) and vent hose (14). Close fastenings with pliers, **BMW No. 13 1 500**.
- Insert and tighten fastenings (17).



### Tightening torque:

Pump unit to fuel tank ..... 5 Nm

## Removing/installing fuel pump

- Take off connecting wire (20).
- Open hose clip (21) with pliers and pull off the hose.
- Release holder (26).
- Pull off vibration damper (24) at pump outlet.
- Pull fuel pump (25) with pump inlet vibration damper (27) off holder (29).
- Pull pump inlet vibration damper (27) off fuel pump (25).
- Lever off suction-side filter (28).



### Caution:

When installing, note correct position of suction-side filter (28) and do not damage it.

- Offer up the new suction-side filter and secure it with pliers, **BMW No. 13 1 500**.
- Further installation is in the reverse order of work.



### Tightening torque:

Pump unit to fuel tank ..... 5 Nm

## Checking hose unions on fuel system

**Check hose unions on fuel system for leaks and take up any slack at hose clips (Inspections I, III)**

- Make a visual check on the hoses and hose unions.
- The connections must be tight, with no points of leakage on the fuel system.



### **Warning:**

Defective or porous hoses and faulty hose unions must be renewed immediately.

## Checking hose unions on the cooling system

**Check the hose unions on the cooling system for leaks and if necessary take up slack at hose clips (Inspections I, III)**



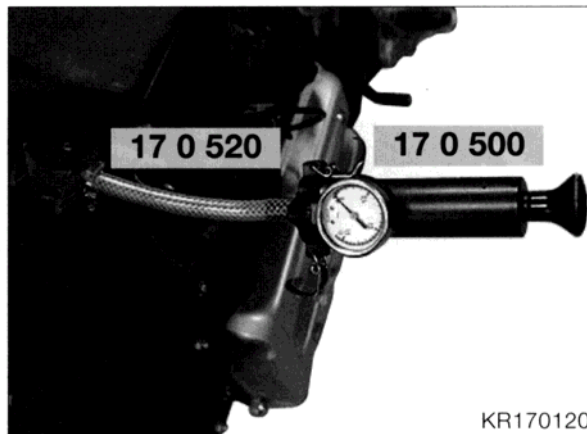
### **Caution:**

To avoid corrosion in the cooling system, fill the coolant circuit completely before laying the motorcycle out of use for a lengthy period, and add the specified antifreeze and corrosion inhibitor.

- Make a visual check on the hoses, hose unions and radiators.
- The unions must be tight and the cooling system should not exhibit any leaks.
- If necessary, remove foreign bodies from the radiator fins and straighten fins that have become bent.
- Check coolant level and concentration; add coolant if necessary.

### **Check cooling system for leaks**

- Take off the left side section of the fairing. (→ 46.10)
- Unscrew the filler cap.



- Screw pump, **BMW No. 17 0 500**, with adapter and threaded stub pipe, **BMW No. 17 0 520**, on to the filler pipe.
- Pressure-test the cooling system; the pressure must remain unchanged for at least 5 minutes.

### **Adjusting value:**

Test pressure..... 1.5 bar

- Attach the cap.

## Renewing coolant

### (Inspection IV)



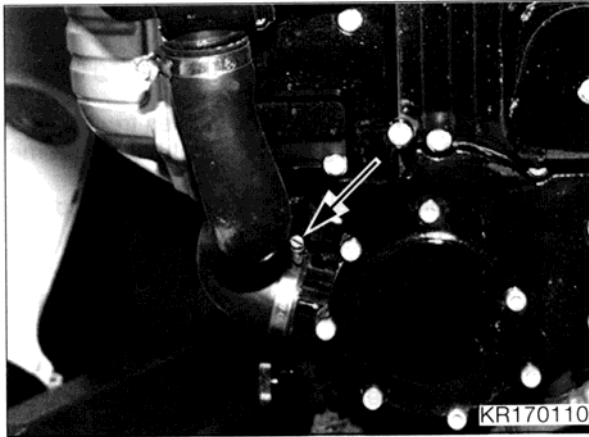
#### Note:

Renew the coolant at least every 2 years

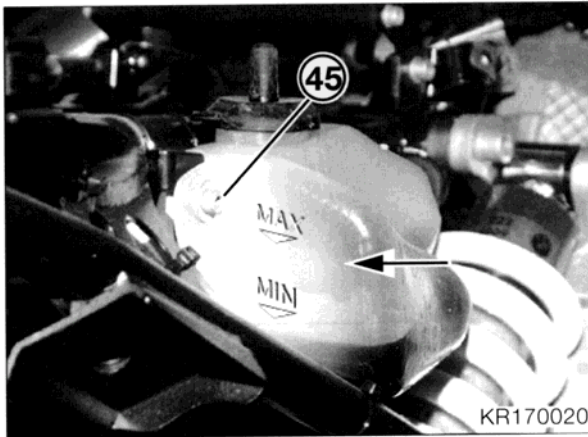


### Draining coolant

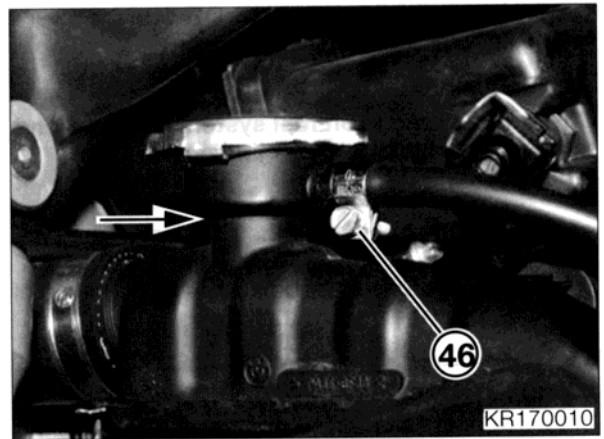
- Take off the left and right side and right rear side sections of fairing and also the engine spoiler. (→ 46.10)
- Open the filler cap on the left radiator.



- Detach the coolant hose (arrow) at the oil/water pump and drain the coolant.



- Release fastening (45) and detach and empty the level equalising tank.



- Loosen fastening (46) for vent hose.
- Pull off the vent hose, raise the level equalising tank and drain the vent hose completely.
- Attach the vent hose again.

### Adding coolant

- Attach the level equalising tank and tighten screw (45).
- Attach coolant hose to oil/water pump. Position the clip screw (arrow) at the front and tighten it.
- Add coolant up to the lower edge of the filler pipe (arrow). Attach the cap.
- Fill the level equalising tank up to the MAX mark (arrow).

Filling capacity ..... 2.5 l (4.4 Imp. pints)  
In level equalising tank ..... + 0.6 l (1.1 Imp. pints)

#### Antifreeze

Use only long-life antifreeze and corrosion inhibitor free from nitrides.

#### Concentration

Antifreeze ..... 40 %  
Water ..... 60 %

- Turn the engine over with the starter and at the same time squeeze the hose between the water pump and the right-hand radiator.
- If necessary, add coolant up to the MAX mark.
- Attach the fairing sections and the engine spoiler.



#### Tightening torque:

Level equalising tank to frame ..... 6 Nm

## Battery

(Inspections III, IV)

**Check battery acid level and add distilled water if necessary; inspect battery terminal posts and clean and grease them if necessary**



### Warning:

Battery acid is highly caustic. Protect the eyes, face and hands and also paintwork and clothing.

- Place the motorcycle on its main (centre) stand.
- Remove the dualseat.
  - Take out the tool wallet. Remove the tool tray.
- Take off the right-hand rear section (remove 3 screws).
- Check battery acid level from the right, removing the battery if necessary.

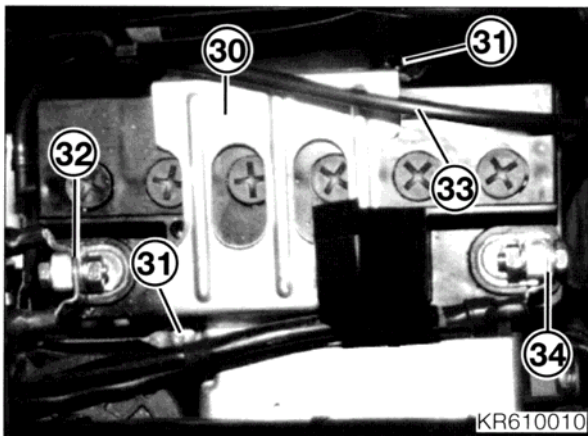
## Removing/installing battery



### Caution:

Avoid damage to fuel tank, wiring and hoses. Disconnect the battery only when the ignition is switched off.

To avoid short-circuits: Disconnect **negative** battery lead (-) first, then **positive** (+) lead.



- Detach negative (-) lead (32) from battery and insulate it.
- Swing up the cap covering the positive battery terminal.
- Detach positive (+) battery lead (34) from the battery and swing it up out of the cable guide.
- Unscrew fastenings (31) for battery retaining plate (30). Take off battery retaining plate (30).
- Lift the battery with its vent hose (33) out of the holder.
- Pull off battery vent hose (33).



### Caution:

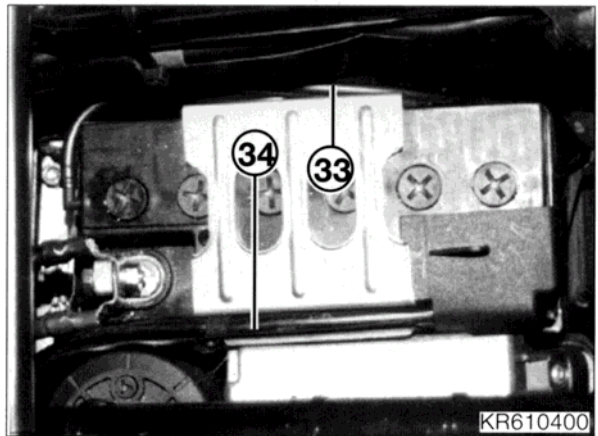
Reconnect the battery only when the ignition is switched off. To avoid a short-circuit: Connect the **positive** battery lead (+) first, close the protective cap over the positive battery terminal, then connect the **negative** battery lead (-). Make sure that the battery vent hose is not kinked or blocked.

- Clean the battery terminal posts and apply battery acid protection grease to them.



### Caution:

Install the positive (+) battery lead (34) only in the position illustrated. The motorcycle may only be operated with the cap closed and the tool tray in position.



- Install in the reverse order of work.

## Topping up with distilled water

- Remove the battery.
- Set the battery down on a horizontal surface.
- Using a screwdriver to remove the six battery cell plugs.
- Add distilled water up to the MAX mark.
- Seal the cells tightly with the cell plugs.
- Install in the reverse order of work.



### Tightening torque:

Battery retaining plate to battery holder ..... 4 Nm



## Renewing intake air cleaner

(Inspections II, III)



### Note:

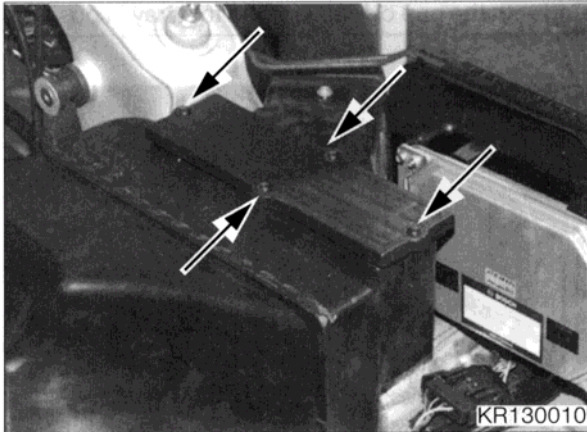
If severe dirt and dust are encountered, renew the intake air cleaner every 10,000 km (6,000 miles) or even more frequently.



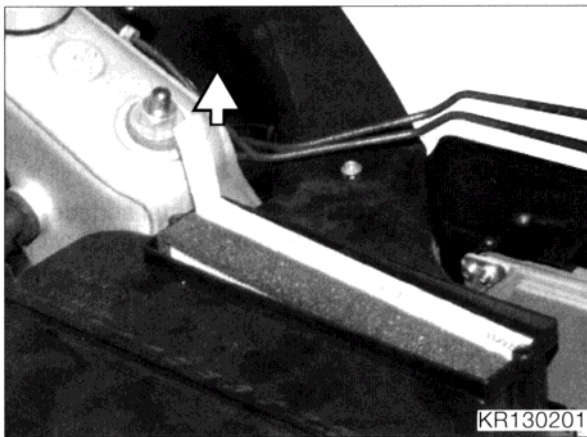
### Warning:

Comply with safety precautions when handling or working with fuel, and note that the fuel lines are pressurised.

- Remove fuel tank.  
(→ 16.5)



- Remove fastenings (arrows) and take off cover.



- Take out air cleaner insert.
- Install in the reverse order of work.

## Brake system

Checking operation of brake system and freedom from leaks, repairing/renewing if necessary (Inspection III)

- Check all brake lines for damage and correct positioning.
- Wipe down all threaded unions on the brake lines and check them.
- Apply the brake firmly and hold it on for a short time.
- After this, inspect the brake lines for points of leakage.



### Warning:

If defective, all lines and threaded unions on the brake system must be renewed without delay.

## Brake pads/brake discs

Check brake pads and discs for wear and renew if necessary

(Inspections II, III)

Checking brake pads for wear



### Warning:

Brake pad thickness must not fall below the minimum value.  
Always renew pads as a complete set.

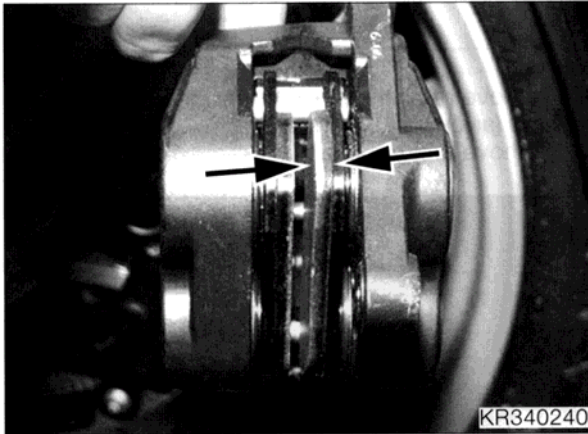
### Front brake pads



### Caution:

Do not scratch the wheel rim; if necessary mask off the brake caliper.

- Take off the brake caliper.

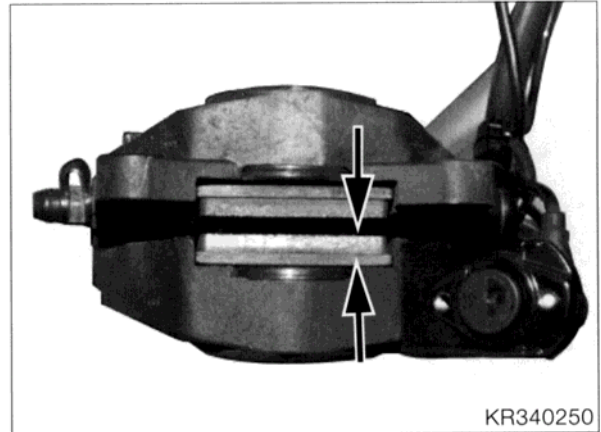


- Measure brake pad thickness (arrows).

**Minimum pad thickness** ..... 1.0 mm (0.04 in)

### Rear brake pads

- Remove rear wheel. (→ 36.8)
- Take off the brake caliper.

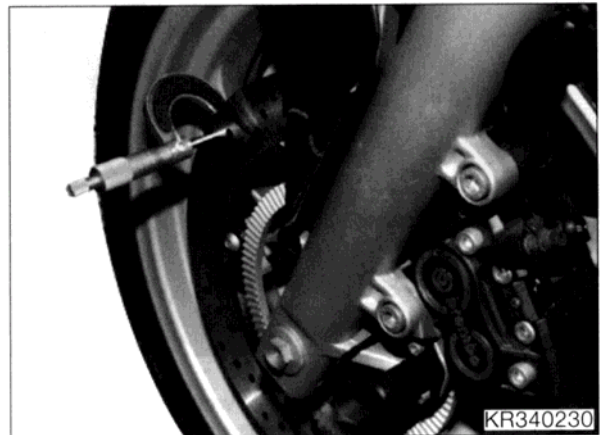


- Measure brake pad thickness (arrows).

**Minimum pad thickness** ..... 1.0 mm (0.04 in)

Checking brake disc for wear

- Examine the brake disc carefully for cracks, damage, distortion or score-marks.




- Measure the brake disc with a micrometer.

### Brake disc wear limits

Front brake discs ..... 4.5 mm (0.177 in)  
Rear brake disc ..... 4.5 mm (0.177 in)

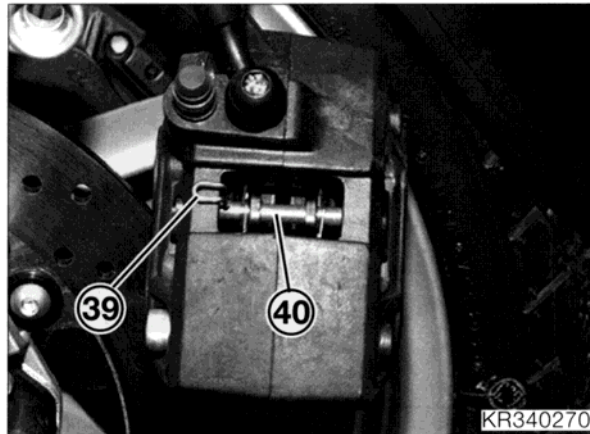
# Renewing brake pads

## Front brake

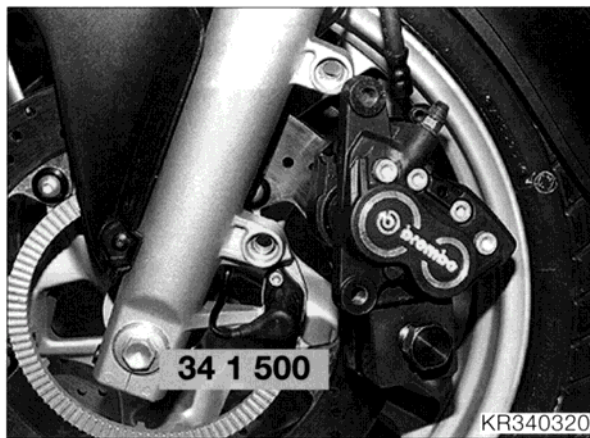
 **Caution:**  
Do not scratch the wheel rim; if necessary, mask off the brake caliper.



- Take off the brake caliper.



- Remove the split-pin keeper (39) from the retaining pin (40).
- Remove retaining pin (40).
- Remove brake pads by pulling downwards.

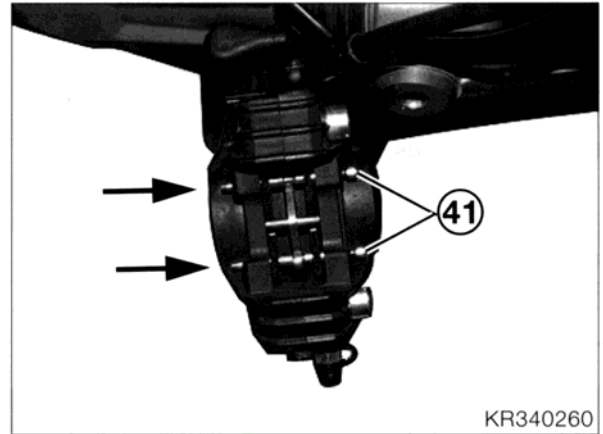


- Install in the reverse order of work, noting the following activities in particular.
- Before installing the brake caliper, force the pistons fully back with resetting tool, **BMW No. 34 1 500**.

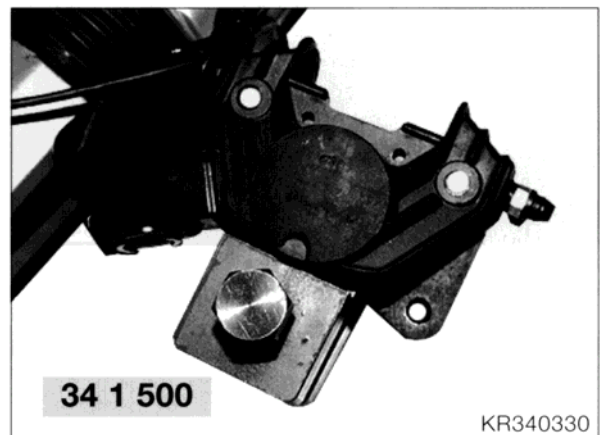
 **Tightening torque:**  
Brake caliper to fork tube ..... 40 Nm

## Rear brake


- Remove rear wheel. (→ 36.8)
- Take off the brake caliper.
- Remove cap from brake caliper.



- Remove retaining pin (41) from the wheel side (arrow).
- Remove brake pads.



- Install in the reverse order of work, noting the following activities in particular.
- Before installing the brake caliper, force the pistons fully back with resetting tool, **BMW No. 34 1 500**.

 **Tightening torque:**  
Brake caliper to rear wheel drive ..... 40 Nm

## Checking brake fluid level/topping up

Check brake fluid level at front and rear, and top up if necessary [➔ BMW SI 00 027 95 (716)] (Inspections I, II, III)

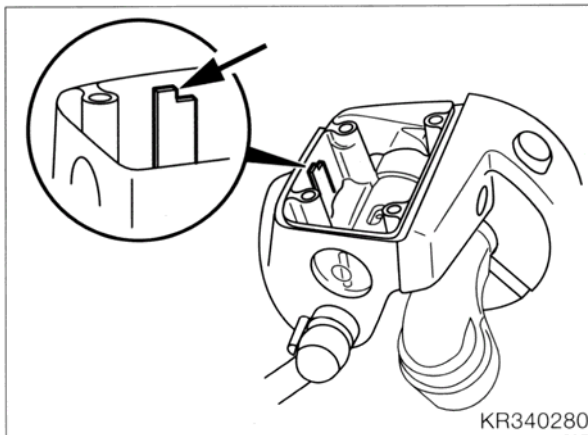
### Front brake

- Place the motorcycle on its main (centre) stand.
- Remove/install windshield. (➔ 46.15)
- Turn steering fully to left.

**⚠ Caution:**

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Take off reservoir cover with rubber diaphragm.



**⚠ Caution:**

When adding brake fluid, do not allow it to enter the holes for the reservoir lid screws.

- Add brake fluid up to the MAX mark (arrow).
- Place the reservoir cover back in position with the rubber diaphragm.
- Screw the reservoir cover on hand-tight.

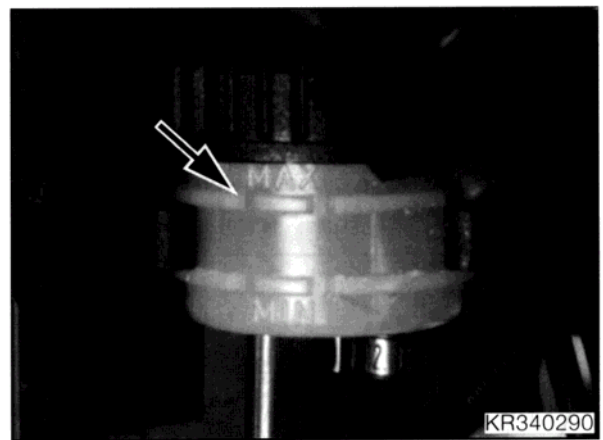
**Brake fluid grade** ..... DOT 4

### Rear brake

- Place the motorcycle on its main (centre) stand.
- Remove/install right rear side section. (➔ 46.13)

**⚠ Caution:**

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.



- Take off the reservoir cover.
- Add brake fluid up to the MAX mark (arrow).
- Screw the reservoir cover on hand-tight.

**Brake fluid grade** ..... DOT 4

## Renewing brake fluid and bleeding brake system

Renew the brake fluid at least once a year (Inspection IV)

### Front brake



- If necessary, carry out the additional preliminary work stated below.
- Place the motorcycle on its main (centre) stand.
- Remove/install windshield. (→ 46.15)

#### ⚠ Caution:

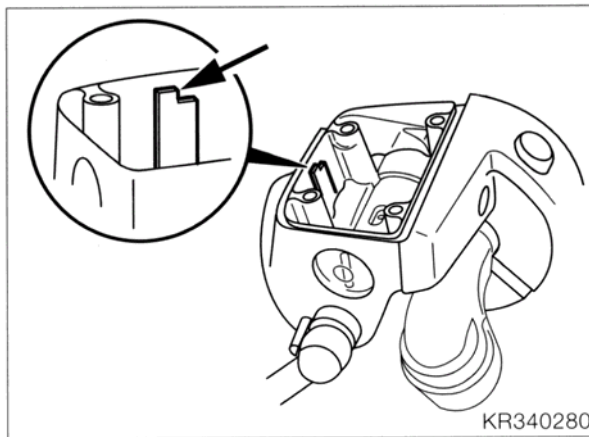
When bleeding the brake system, always begin on the left side of the motorcycle.

- Turn the steering to the left.

#### ⚠ Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Take off the reservoir cover with rubber diaphragm.



#### ⚠ Caution:

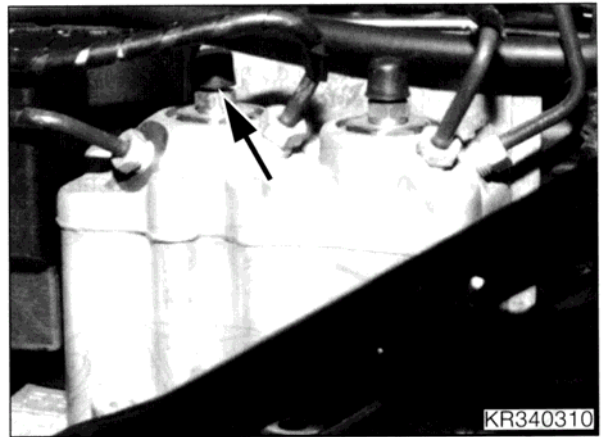
When adding brake fluid, do not allow it to enter the holes for the reservoir lid screws.

- Add brake fluid up to the MAX mark (arrow).
- Connect the brake bleeding device to the bleed screw on the **left** brake caliper.
- Open the bleed screw by half a turn.

#### ⚠ Caution:

Make quite sure during bleeding that the fluid replenishing bore is always covered by the brake fluid, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

- Draw off brake fluid until it emerges clear and free from air bubbles.
- Close the bleed screw on the left brake caliper.



- Connect the brake bleeding device to the bleed screw on the pressure modulator for the **front brake** (arrow).

#### ⚠ Caution:

Make quite sure during bleeding that the fluid replenishing bore is always covered by the brake fluid, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

- Open the bleed screw by half a turn.
- Draw off brake fluid until it emerges clear and free from air bubbles.
- Close the bleed screw.
- Carry out the bleeding procedure at the **right** brake caliper in exactly the same way as on the left.
- If necessary, repeat the left/right bleeding procedure.

Brake fluid grade..... DOT 4

#### ⚠ Tightening torque:

Bleed screw..... 10 Nm

## Additional preliminary work

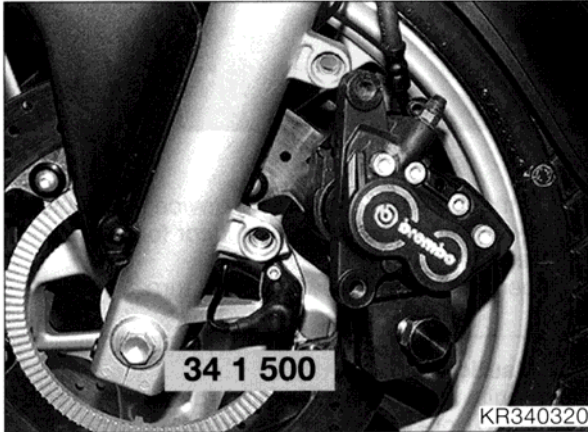


### Caution:

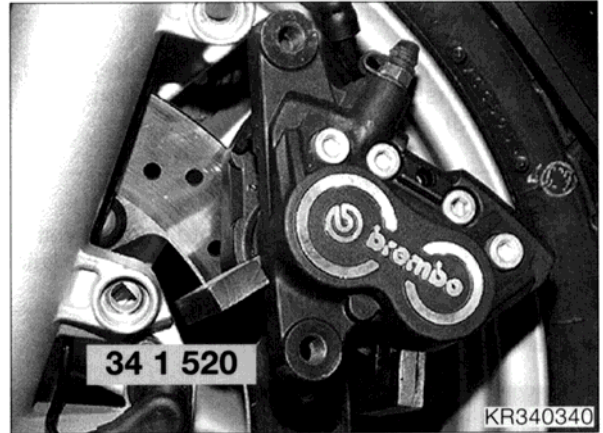
The following work must be carried out before bleeding if the brake system was previously opened or drained.

Do not scratch the wheel rim; if necessary mask off the brake caliper.

- Take off the brake caliper.
- Remove the brake pads.



- Force the pistons fully back with resetting tool, **BMW No. 34 1 500**.

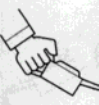


- Take out the resetting tool and insert spacer, **BMW No. 34 1 520**, in its place.
- In the second brake caliper, press the pistons back but do not remove the resetting tool afterwards.
- Apply handbrake lever several times until brake pressure can be detected.
- Fill and bleed the front brake circuit.
- Install in the reverse order of work.



### Tightening torque:

Brake caliper to fork tube..... 40 Nm



## Rear brake

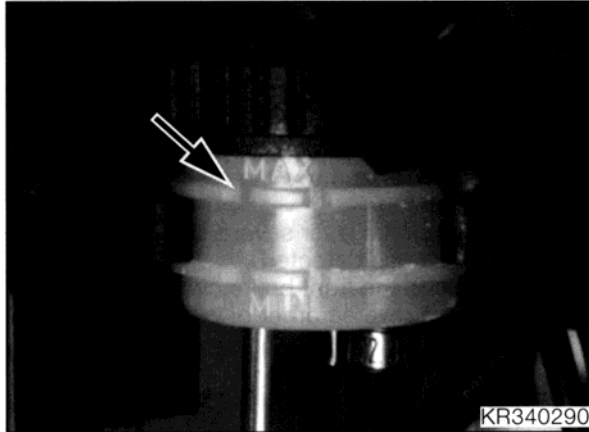
- If necessary, carry out additional preliminary work.
- Place the motorcycle on its main (centre) stand.
- Remove/install the right rear side section. (→ 46.13)



### **Caution:**

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Take off the reservoir cover.

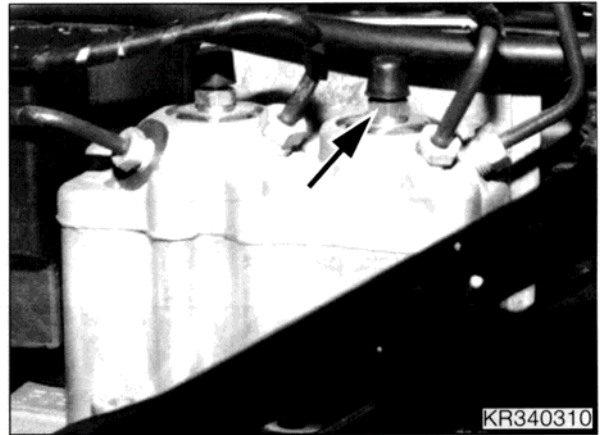


- Add brake fluid up to the MAX mark (arrow).
- Connect the brake bleeding device to the bleed screw on the brake caliper.
- Open the bleed screw by half a turn.

### **Caution:**

Make quite sure during bleeding that the fluid replenishing bore is always covered by the brake fluid, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

- Draw off brake fluid until it emerges clear and free from air bubbles.
- Close the bleed screw.



- Connect the brake bleeding device to the bleed screw on the pressure modulator for the **rear brake** (arrow).
- Open the bleed screw by half a turn.

### **Caution:**

Make quite sure during bleeding that the fluid replenishing bore is always covered by the brake fluid, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

- Draw off brake fluid until it emerges clear and free from air bubbles.
- Close the bleed screw.
- If necessary, repeat the bleeding procedure.

**Brake fluid grade**..... DOT 4

### **Tightening torque:**

Bleed screw ..... 10 Nm

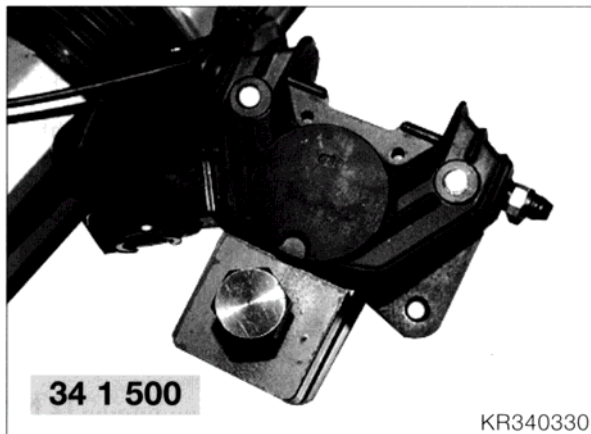
## Additional preliminary work



### Caution:

The following work must be carried out before bleeding if the brake system was previously opened or drained.

- Take off the brake caliper.
- Remove the brake pads.



- Using resetting tool, **BMW No. 34 1 500**, force the pistons back fully.
- Apply handbrake lever several times until brake pressure can be detected.
- Fill the rear brake circuit and bleed it.
- Install in the reverse order of work.



### Tightening torque:

Brake caliper to rear wheel drive ..... 40 Nm





## Bleeding the brakes

### Front brake

- Place the motorcycle on its main (centre) stand.
- Remove/install windshield.  
(→ 46.15)



#### Caution:

When bleeding the brakes, always begin on the left side of the motorcycle.

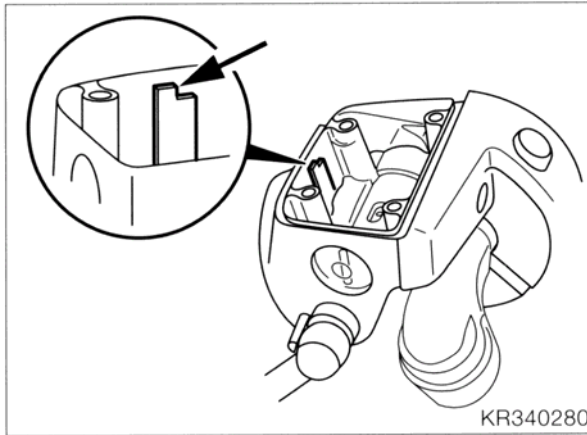
- Turn the steering to the left.



#### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Take off the reservoir cover with rubber diaphragm.



#### Caution:

When adding brake fluid, do not allow it to enter the holes for the reservoir lid screws.

- Add brake fluid up to the MAX mark (arrow).
- Connect the brake bleeding device to the bleed screw on the **left** brake caliper.
- Open the bleed screw by half a turn.



#### Caution:

Make quite sure during bleeding that the fluid replenishing bore is always covered by the brake fluid, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

- Draw off brake fluid until it emerges clear and free from air bubbles.
- Close the bleed screw on the left brake caliper.
- Carry out the bleeding procedure at the **right** brake caliper in exactly the same way as on the left side of the motorcycle.
- If necessary, repeat the left/right bleeding procedure.

**Brake fluid grade**..... DOT 4



#### Tightening torque:

Bleed screw ..... 12 Nm

## Rear brake

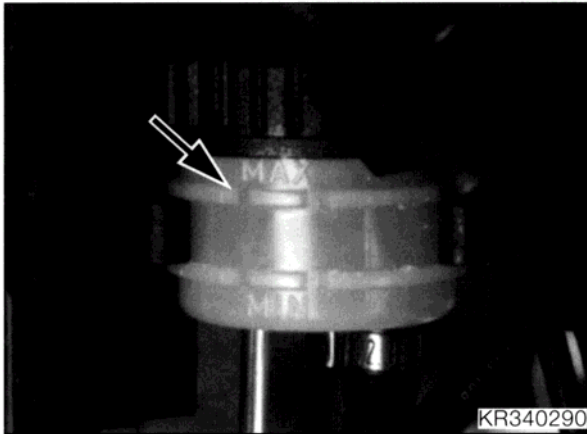
- Place the motorcycle on its main (centre) stand.
- Remove/install the right rear side section.  
(→ 46.13)



### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Take off the reservoir cover.



- Add brake fluid up to the MAX mark (arrow).
- Connect the brake bleeding device to the bleed screw on the brake caliper.
- Open the bleed screw by half a turn.



### Caution:

Make quite sure during bleeding that the fluid replenishing bore is always covered by the brake fluid, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

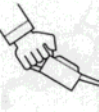
- Draw off the brake fluid until it emerges clear and free from air bubbles.
- Close the bleed screw on the brake caliper.
- If necessary, repeat the bleeding procedure.

**Brake fluid grade** ..... DOT 4



### Tightening torque:

Bleed screw ..... 12 Nm



## Checking operation of side (prop) stand switch

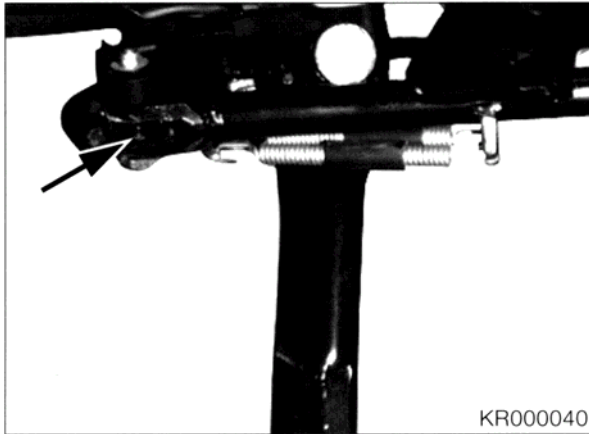
(Inspections I, II, III)

- Switch off the engine.
- Support the motorcycle on its side (prop) stand.
- Select a gear and switch on the ignition.
- Slowly extend the side (prop) stand and watch the neutral indicator light.
- As the stand is extended, the neutral indicator light should come on briefly.



## Greasing the side (prop) stand

(Inspections II, III)



- Check that the side (prop) stand moves freely, and grease it if necessary.
- Grease the pivot bushing (arrow).

### Lubricant:

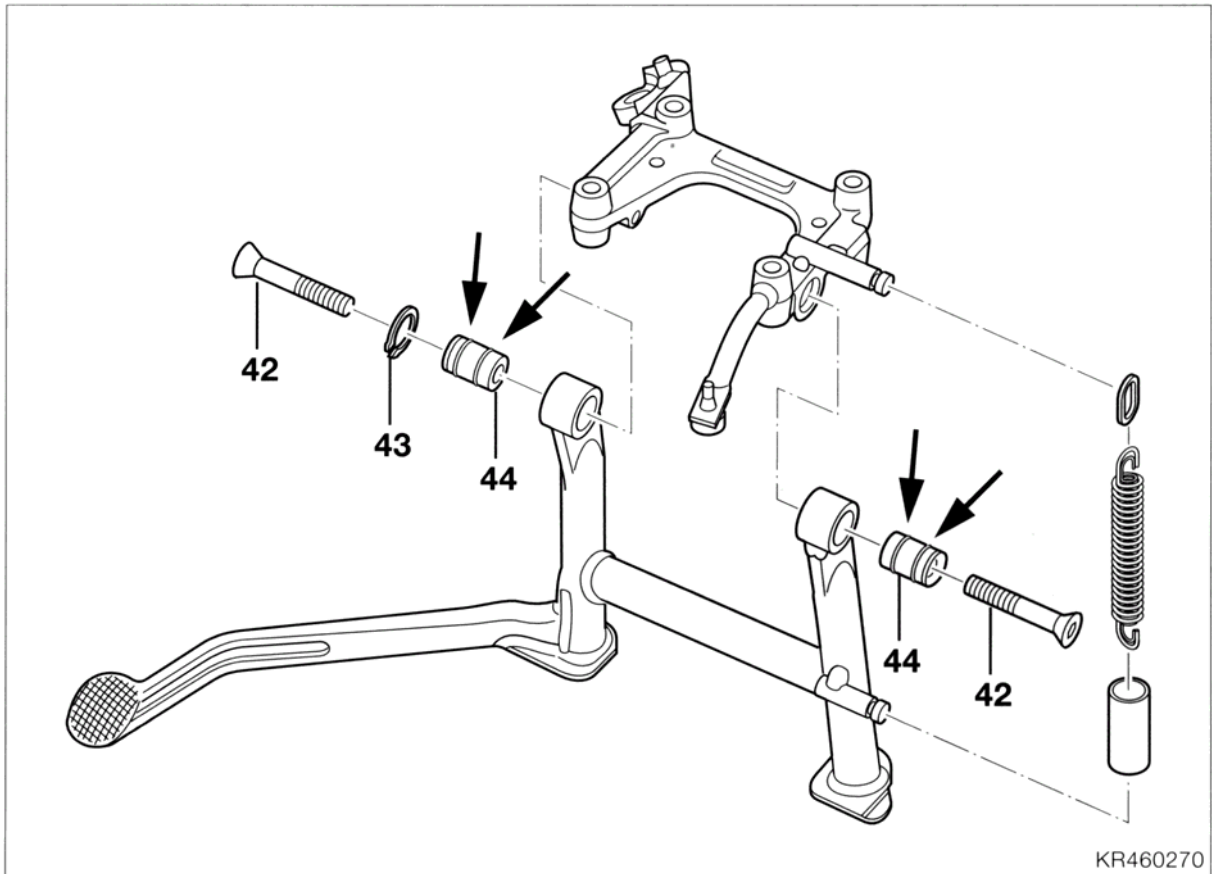
For pivot bushing ..... Shell Retinax EP2

## Checking main (centre) stand, greasing if necessary

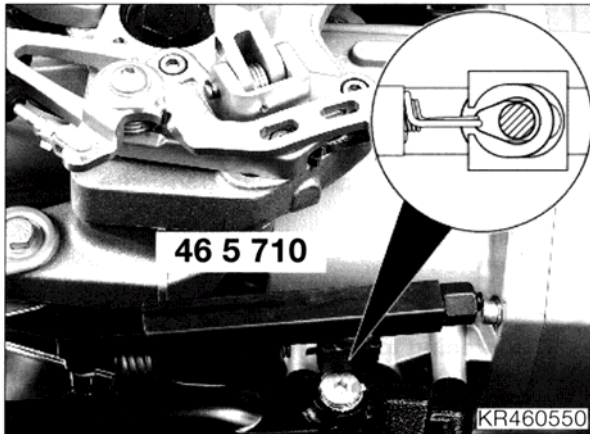
(Inspections II, III, IV)

### Checking main (centre) stand

- Remove engine spoiler.  
(→ 46.12)
- Remove engine spoiler holder
- Attach engine hoist.
- Check that the main (centre) stand folds up by itself.
- If the main (centre) stand does not fold up by itself, it must be lubricated.
- To lubricate the main (centre) stand, remove it.



### Lubricating main (centre) stand



- Using spring tensioner, **BMW No. 46 5 710**, tension the springs until they can be detached from the pivot mount (arrow).



**Note:**

Fold up the main (centre) stand.

- Release the spring tensioner and take off the plate with the springs.



**Caution:**

The fastening is secured with a thread retaining agent.

- Remove screw (42) at left and right.
- Take off circlip (43) at the left.
- Press out sleeve (44) at left and right.
- Check O-rings (arrows) and renew if necessary.
- Install in the reverse order of work, noting the following points in particular.



**Note:**

The screws are of the micro-encapsulated type and therefore cannot be re-used. Clean the threads and holes, and insert the screws with **Loctite 243**.

**Lubricant:**

For sleeves .....Staburags NBU 30 PTM

**Tightening torque:**

Main (centre) stand to pivot mount  
(clean thread + Loctite 243) .....41 Nm

## Checking clutch fluid level, correcting if necessary

(Inspections I, II, III)

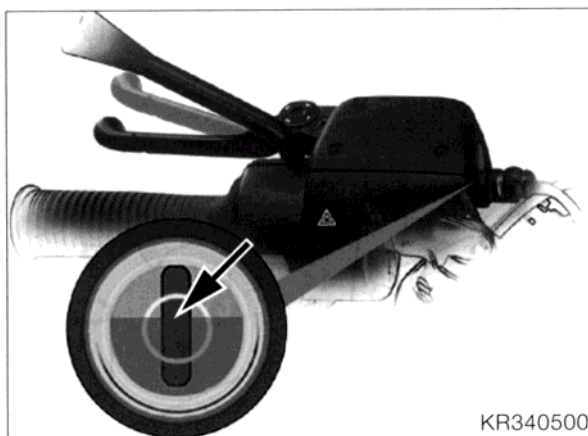


### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.



- Place the motorcycle on its main (centre) stand.
- Turn the steering to the right.



### Caution:

The fluid level (arrow) must be app. 2.5 mm (0.1 in) below the upper edge of the ring mark, not higher.

- If necessary, take off reservoir cover with insert.
- Correct the brake fluid level.
- Re-attach the reservoir cover with insert.
- Tighten the reservoir cover without using force.

### Brake fluid grade

Use only brake fluid complying with the "SL" quality specification.

## Checking tightness of rear wheel studs

(Inspection I)

- Place the motorcycle on its main (centre) stand.
- Tighten the rear wheel studs with a torque wrench.

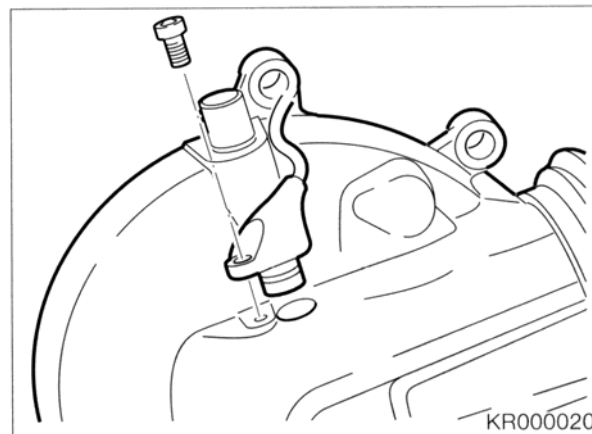


### Tightening torque:

Rear wheel studs ..... 105 Nm

## Cleaning the inductive sensor at the rear wheel

(Inspections I, III)



- Remove the screw (arrow).
- Lever out the inductive signal transmitter and clean with a cloth.
- Install by following the above work instructions in the reverse order.



### Tightening torque:

Inductive signal transmitter mount ..... 4 Nm

## Reading out MoDiTeC fault memory

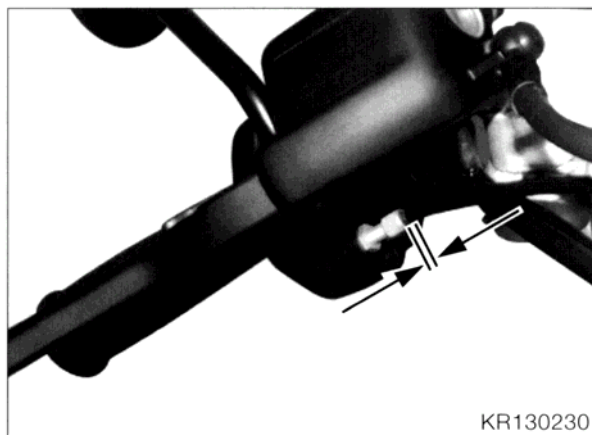
(Inspections II, III)

- Connect the diagnostic unit (tester) to the diagnostic plug.
- Read out the fault memory.
- Perform any repair work indicated.

## Checking throttle cable play, adjusting if necessary

(Inspections I, III)

- With the steering turned to various angles, open the throttle twistgrip fully and allow it to close again.
- When released, the twistgrip must return to the closed position by itself.



- Preset throttle cable play with the engine cold to 1.5 mm (0.06 in).
- Warm the engine up to its regular operating temperature (radiator fan starts to run).
- Adjust throttle cable play to 0.5 mm (0.02 in).

### Adjusting value:

Initial throttle cable play setting  
(engine cold) ..... 1.5 mm (0.06 in)  
Throttle cable play (engine warm) ... 0.5 mm (0.02 in)

## Final inspection with road safety and functional check

(Inspections I, II, III, IV)

### Road safety check

- Check wheels and tyres.
- Check tyre pressures and correct if necessary.

### Tyre pressures

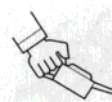
Solo/with pillion/with load

Front ..... 2.5 bar (35.5 psi)

Rear ..... 2.9 bar (41.2 psi)

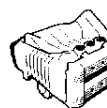
### Roadworthiness check

- Clutch
- Gear shift
- Steering
- Hand- and foot brake, ABS
- Lights and signalling equipment
- Telltale and warning lights
- Instruments
- Horn
- Special equipment
- Test ride if necessary

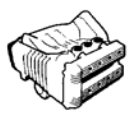


## **11 Engine**

<b>Preparatory work with engine installed</b> .....	11
...for removal of combined oil/water pump .....	11
...for removal of timing case cover, removal of timing chain .....	11
...for removal of cylinder head, removal of piston with conrod .....	11
...for removal of crankshaft .....	11
...for removal of intermediate flange, removal of output shaft .....	11
...for checking valve clearances, adjusting valve clearances .....	11
<b>Removing engine</b> .....	11
<b>Dismantling engine</b> .....	12
Removing, stripping down and assembling the combined oil/water pump .....	12
Removing the oil/water pump .....	12
Stripping down the oil/water pump .....	12
Removing the slirping seal and shaft sealing ring .....	12
Removing the oil pressure relief valve .....	12
Installing the oil pressure relief valve .....	12
Removing the oil pressure switch and regulating element .....	13
Installing oil pressure switch and regulating element .....	13
Install the pump shaft with shaft sealing ring and slirping seal. ....	13
Installing water pump impeller .....	13
Removing timing chain cover .....	14
Remove the crankcase cover. ....	14
Removing cylinder head cover .....	14
Removing ignition transmitter .....	14
Removing the timing case cover .....	14
Removing and installing sealing ring in timing case cover .....	15
Removing the timing chain .....	16
Removing camshaft chain sprockets .....	16
Removing chain tensioner rail .....	16
Removing chain guide rail .....	16
Renewing tensioning strap for chain tensioner rail .....	16
Removing, stripping down and assembling cylinder head .....	17
Removing camshafts .....	17
Removing cylinder head .....	17
Removing bucket-type tappets .....	17
Removing valves .....	17
Remachining valve seat .....	18
Installing valve and valve stem seal .....	18
Removing crankshaft .....	19
Removing big end bearings .....	19
Removing main bearings (engine installed) .....	19
Removing main bearings (engine removed) .....	19







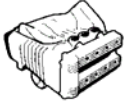
Removing pistons with conrods, stripping down and re-assembling .....	20
Removing piston with conrod .....	20
Dismantling piston .....	20
Checking piston dimensions .....	20
Assembling pistons .....	21
Checking cylinder dimensions .....	21
Checking that conrod bores are parallel .....	21
Assembling pistons and conrods .....	21
Removing and installing crankshaft sprocket and rotor flange .....	22
Removing intermediate flange .....	22
Removing driver .....	22
Removing clutch housing .....	23
Removing intermediate flange .....	23
Stripping down and re-assembling intermediate flange .....	24
Removing the driver bearing .....	24
Installing driver bearing .....	24
Removing and installing shaft sealing ring for driver .....	25
Removing countershaft and layshaft with freewheel .....	25
Dismantling and assembling freewheel .....	26
Stripping down freewheel .....	26
Assembling freewheel .....	27
Removing and installing layshaft needle roller bearing and shaft sealing ring in crankcase .....	27
Removing bearing .....	27
Removing shaft sealing ring .....	27
Installing shaft sealing ring .....	27
Installing bearing .....	27
Removing output shaft .....	28
Removing oil sump .....	28
Removing the oil mesh strainer and oil filter .....	28
Removing lower part of crankcase .....	28
Removing and installing oil level sight glass .....	28
Stripping and assembling output shaft .....	29
Stripping down output shaft .....	29
Stripping down tensioning gear .....	29
Assembling tensioning gear .....	30
Installing damper .....	30
<b>Assembling engine</b> .....	<b>31</b>
Installing output shaft .....	31
Assembling the crankcase .....	31
Installing oil mesh strainer .....	32
Installing oil filter .....	32
Installing oil sump .....	32
Installing intermediate flange .....	33
Installing freewheel .....	33
Installing countershaft .....	33
Installing intermediate flange .....	33
Installing output shaft sealing ring .....	33
Installing clutch housing .....	33
Installing driver .....	34

# Contents

Page

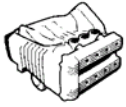
Installing crankshaft .....	34
Measuring crankshaft bearing play .....	34
Measuring radial play .....	34
Measuring endplay .....	35
Checking dimensions of crankshaft .....	35
Installing piston with conrod .....	35
Installing big end bearing .....	36
Measuring big end bearing play .....	36
Installing cylinder head .....	37
Installing camshafts .....	38
Installing timing chain .....	39
Installing timing case cover .....	41
Checking valve clearances .....	41
Installing ignition transmitter .....	42
Installing ignition transmitter cover .....	42
Installing combined oil/water pump .....	43
Installing crankcase cover .....	43
Installing cylinder head cover .....	44
<b>Installing engine</b> .....	44
<b>Checking/adjusting valve clearances</b> .....	45
Checking valve clearances .....	45
Adjusting valve clearances .....	45





<b>Technical data</b>		<b>K 1200 RS (72 kW)</b>	<b>K 1200 RS (90 kW)</b>
<b>Engine, general</b>			
Engine design	Inline four-stroke engine installed longitudinally, with double overhead camshafts, liquid cooling and electronic fuel injection.		
Location of engine number	At lower rear right of engine block		
Cylinder bore	mm	70.5	
Stroke	mm	75	
Number of cylinders	4		
Effective displacement	cm <sup>3</sup>	1171	
Compression ratio	11.5 : 1		11.5 : 1
Power output	kW	72	96
Max. torque	Nm	118	117
Permissible maximum engine speed	min <sup>-1</sup>	9400	
Idle speed	min <sup>-1</sup>	900	
Direction of rotation	Counter-clockwise, looking at ignition system		
Compression test pressure			
good	bar	above 10.0	
normal	bar	8.5...10.0	
poor	bar	below 8.5	
<b>Lubrication system</b>			
Engine lubrication	Pressurised oil circuit		
Oil filter	Full-flow type		
Differential pressure to open bypass valve	bar	1.5	
Oil pressure warning light comes on below	bar	0.2...0.5	
Pressure relief valve opens at	bar	5.4	
Oil content			
with filter change	l	3,5	
min/max	l	0,5	
Permissible oil consumption	l/1000 km	1.0	





Technical data	K 1200 RS (72 kW)	K 1200 RS (90 kW)
<b>Oil pump</b>		
Oil pump	Gear-type	
<b>Valves</b>		
Included angle between valves		
Inlet	°	20.5
Exhaust	°	19.5
Valve clearances with engine cold (max. 35 °C)		
Inlet valve	mm	0.15...0.20
Exhaust valve	mm	0.25...0.30
Valve timing		
Inlet opens	at 5/100 preload and 3 mm lift	
Inlet closes	3° before TDC	
Exhaust opens	27° after BDC	
Exhaust closes	31° before BDC	
	1° before TDC	
Valve head dia.		
Inlet	mm	26.45
Exhaust	mm	22.95
Stem dia.		
Inlet	mm	4.966...4.980
Wear limit	mm	4.946
Exhaust	mm	4.956...4.970
Wear limit	mm	4.954
Max. runout of valve head at valve seat		
Inlet, exhaust	mm	0.02

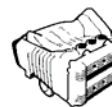
Technical data		K 1200 RS (72 kW)	K 1200 RS (90 kW)
<b>Valve seat</b>			
Valve seat angle			
Inlet		°	45
Exhaust		°	45
Valve seat width			
Inlet	mm		0.95...1.25
Wear limit	mm		2.5
Exhaust	mm		1.15...1.45
Wear limit	mm		3.0
Valve seat extl. dia. (dimension for machining seat)			
Inlet	mm		25.60...26.00
Exhaust	mm		22.15...22.55
Seat ring dia. (oversize +0.2 mm)			
Inlet	mm		27.59...27.72
Exhaust	mm		25.09...25.22
Seat dia. in cylinder head (oversize +0.2 mm)			
Inlet	mm		27.70...27.91
Exhaust	mm		25.20...25.41
<b>Valve guide</b>			
Length of valve guide			
Inlet	mm		45
Exhaust	mm		57.5
Valve guide	Extl. dia.	mm	11.533...11.544
Bore in cylinder head		mm	11.500...11.518
Overlap		mm	0.015...0.044
Repair stage			
Oversize valve guide	Extl. dia.	mm	11.700...11.718
Valve guide			
Intl. dia.	mm		5.000...5.012
Wear limit	mm		5.1
<b>Valve spring</b>			
	Extl. dia.	mm	21.3
	Wire Ø	mm	3.05
Spring length, off-load		mm	42.6
	Wear limit	mm	41.1



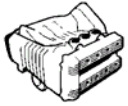


Technical data		K 1200 RS (72 kW)	K 1200 RS (90 kW)
<b>Camshaft</b>			
Inlet camshaft	°	284	
Exhaust camshaft	°	284	
Guide bearing dia.	mm	29.970...30.000	
Wear limit	mm	29.95	
Guide bearing bore	mm	30.020...30.041	
Camshaft bearing bore	mm	24.020...24.041	
Radial clearance			
Guide bearing	mm	0.020...0.071	
Camshaft bearing	mm	0.020...0.071	
Cam base circle	∅ mm	30	
Cam height, inlet and exhaust	mm	38.824...38.886	
Wear limit	mm	38.550	
<b>Tappets</b>			
Extl. dia.	mm	25.980...25.993	
Wear limit	mm	25.970	
Bore ∅ in cylinder head	mm	26.065...26.086	
Wear limit	mm	26.170	
Radial clearance	mm	0.072...0.106	
Wear limit	mm	0.200	
<b>Timing chain</b>			
Version		Pre-stretched, endless single roller chain with 128 links	
<b>Crankshaft</b>			
Main bearing and crankpin markings			
no colour spot		Grinding stage 0	
with colour spot		Grinding stage 1 (-0.25 mm)	
Main bearing dia.			
Grinding stage 0	mm	44.976...45.000	
Grinding stage 1	mm	44.726...44.750	
Main bearing radial play	mm	0.020...0.056	
Wear limit	mm	0.130	
Guide bearing width	mm	23.020...23.053	
Axial play	mm	0.080...0.183	
Wear limit	mm	0.250	
Crankpin dia.			
Grinding stage 0	mm	37.976...38.000	
Grinding stage 1	mm	37.726...37.750	

Technical data	K 1200 RS (72 kW)	K 1200 RS (90 kW)
<b>Connecting rod</b>		
Big end bearing with bearing shell		
Radial clearance	mm	0.030...0.066
Wear limit	mm	0.130
Piston pin bore Ø with bushing	mm	17.000...17.021
Distance between centers	mm	130.9...131.1
Permissible weight difference	g	± 4
<b>Cylinders</b>		
Bore		
A	mm	70.495...70.505
Wear limit	mm	+0.05
B	mm	70.505...70.515
Wear limit	mm	+0.05
Total wear clearance of piston and cylinder	mm	0.130
Permitted out-of-roundness of cylinder bore at 20 mm from the top edge	mm	0.05
<b>Pistons</b>		
Piston dia.	Make: KS	(Measuring plane A: see piston and cylinder check)
A	mm	70.466...70.480
Wear limit	mm	0.080
B	mm	70.476...70.490
Wear limit	mm	0.080
Installed clearance	mm	0.015...0.039
Wear limit	mm	0.130
Weight classes		
Weight group identification		2 groups, stamped + or -
Weight difference in one group	g	6
Direction of installation		Arrow on piston crown points forward







Technical data		K 1200 RS (72 kW)	K 1200 RS (90 kW)
<b>Piston rings</b>			
1st groove	Rectangular-section		
Height		mm	0.975...0.990
Wear limit		mm	0.90
Gap clearance		mm	0.20...0.40
Wear limit		mm	1.50
Side clearance		mm	0.040...0.075
Wear limit		mm	0.20
2nd groove	Micro-chamfer		
Height		mm	0.975...0.990
Wear limit		mm	0.90
Gap clearance		mm	0.10...0.30
Wear limit		mm	1.50
Side clearance		mm	0.030...0.065
Wear limit		mm	0.20
3rd groove	U-Flex, with spring		
Height		mm	1,960...1,990
Wear limit		mm	1,90
Side clearance		mm	0,020...0,070
Wear limit		mm	–
Installed direction of piston rings		Top marking uppermost	
<b>Piston pin</b>			
Piston pin dia.		mm	16.995...17.000
Wear limit		mm	16.96
Radial play at conrod		mm	0.006...0.021
Wear limit		mm	0.060

## Preparatory work with engine installed

...for removal of combined oil/water pump

- Remove right side section of fairing. (→ 46.10)
- Remove engine spoiler. (→ 46.12)
- Drain coolant. (→ 17.7)

...for removal of timing case cover, removal of timing chain



### Caution:

Detach and insulate earth lead at battery.

- Remove left and right side sections of fairing. (→ 46.10)
- Remove the engine spoiler. (→ 46.12)
- Detach the radiator from its mountings at left and right, and press it forwards.

...for removal of cylinder head, removal of piston with conrod



### Caution:

Detach and insulate earth lead at battery.

- Remove left and right side sections of fairing. (→ 46.10)



### Warning:

Comply with safety regulations; fuel lines are under pressure.

- Remove fuel tank. (→ 16.5)
- Remove the engine spoiler. (→ 46.12)
- Remove exhaust system. (→ 18.5)
- Remove fuel injection rail. (→ 13.7)
- Remove throttle butterfly rail together with intake air silencer.
- Detach the engine at the front left cross-member.
- Detach the temperature sensor connector at the cylinder head and run the wire through downwards.
- Remove radiator with fan at left and right. (→ 17.8)
- Detach the coolant hoses from the coolant stub pipes.

...for removal of crankshaft

- Remove right side section of fairing. (→ 46.10)

...for removal of intermediate flange, removal of output shaft

- Remove engine.

...for checking valve clearances, adjusting valve clearances

- Remove left side section of fairing. (→ 46.10)

## Removing engine

(→ 51.3)



### Caution:

Disconnect the negative battery terminal first, then the positive one.

- Remove the battery.



### Warning:

Comply with safety regulations; fuel lines are under pressure.

- Remove fuel tank.
- Drain engine oil.
- Remove radiator with fan at left and right.
- Attach hoist, **BMW No. 00 1 510**, to oil sump.
- Remove exhaust system.
- Remove rear swinging fork.
- Remove rear cross-tube.
- Remove fuel injection rail.
- Remove throttle butterfly rail complete with intake air silencer.
- Detach or separate the wires and connectors for the engine and gearbox.

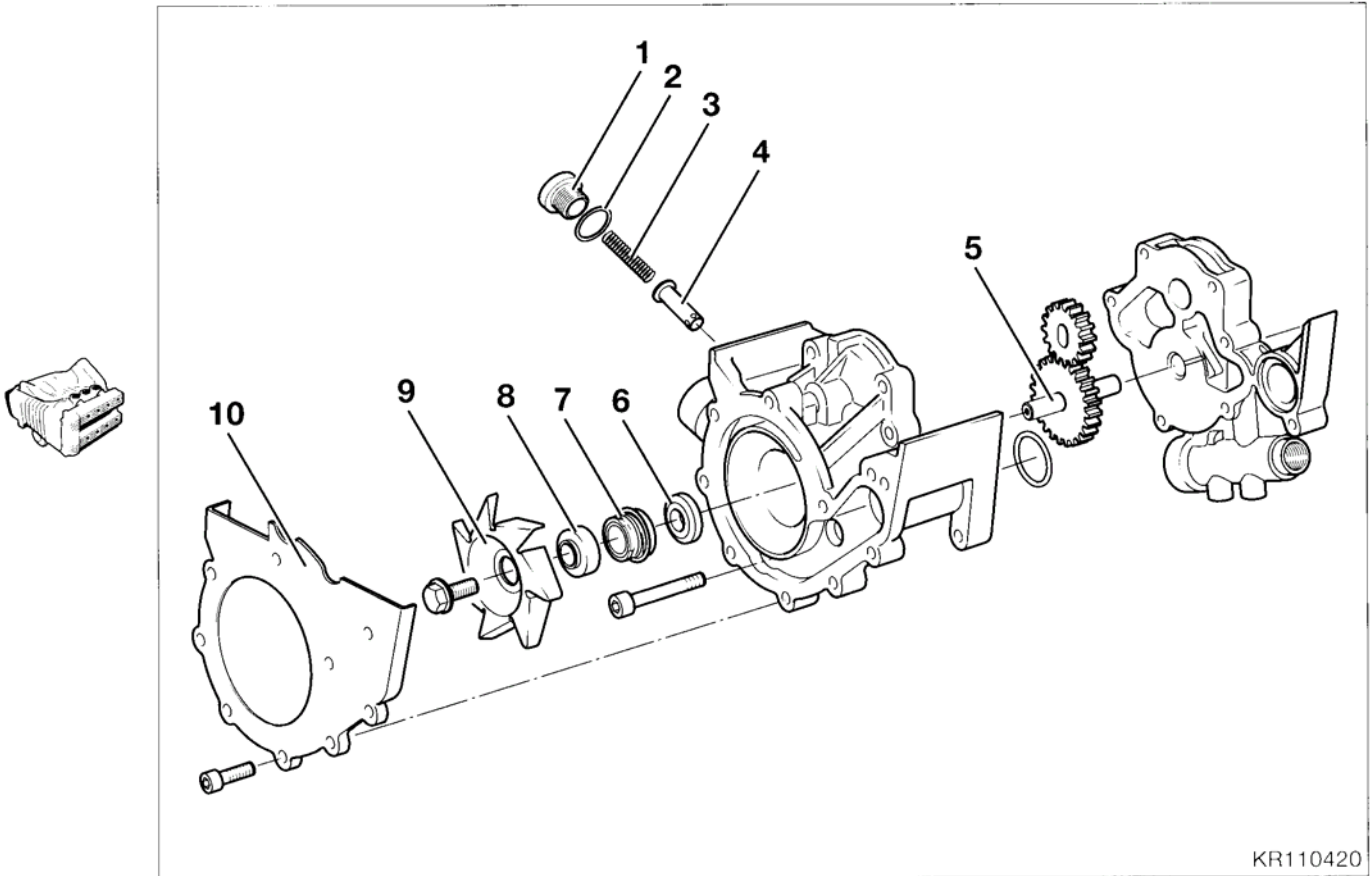


### Caution:

Make sure that the correct clearance is present between gearbox and frame at the right. Mask off the timing case cover in the area of the front engine spoiler mounting, to prevent scratches.

- Raise the frame.
- Remove the fuel lines at the engine block.
- Remove the starter motor and alternator.
- Remove the gearbox.
- Transfer engine to assembly frame.





## Dismantling engine

### Removing, stripping down and assembling the combined oil/water pump

#### Removing the oil/water pump

- Pull off oil pressure warning and water pump temperature sensor wires at switch.
- Pull wires out through hole in pump housing.
- Remove pump housing cover (10) and loosen the gasket with light blows of a plastic-faced hammer.
- Remove the housing and loosen the gasket with light blows of a plastic-faced hammer.
- Pull off the oil pump gearwheel and the oil pump intermediate flange.

#### Stripping down the oil/water pump

- Clamp the pump housing into a vise at the sealing faces, using soft jaws.
- Remove water pump impeller (9), holding pump shaft (5) to prevent it from turning.

- Take off the water pump impeller with spacing bushing (8).
- Press out pump shaft (5).
- Examine the pump housing for damage.

#### Removing the slipping seal and shaft sealing ring

- Drive out slipping seal (7) and shaft sealing ring (6) with a drift, **BMW No. 11 6 721**.

#### Removing the oil pressure relief valve

- Unscrew plug (1) and take out spring (3).
- Pull valve piston (4) out with a magnet and examine it for damage.

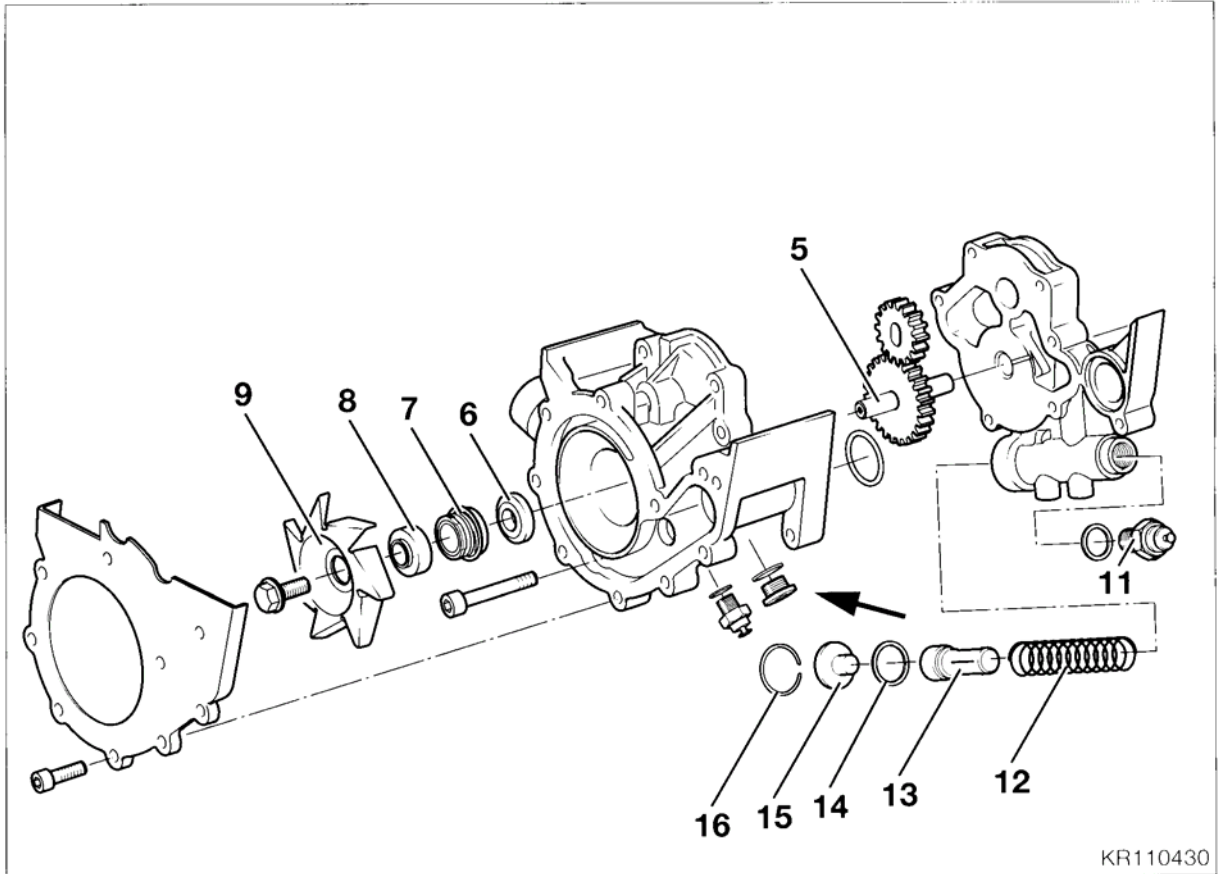
#### Installing the oil pressure relief valve

- Oil valve piston (4) lightly before installing.
- Insert spring (3) and tighten the screw plug with a new seal (2).



#### Tightening torque:

Oil pressure relief valve screw plug.....35 Nm



KR110430

### Removing the oil pressure switch and regulating element

- Remove oil pressure switch (11).

#### **Caution:**

To avoid damage to the sealing face of the oil pressure switch, insert an M 12 screw plug (arrow).

- Clamp the cover of thermostat housing (15) and remove the snap ring (16).

#### **Note:**

Place a suitable pressure block on the cover.

- Take out sealing ring (14), regulating element (13) and coil spring (12).

### Installing oil pressure switch and regulating element

- Insert the coil spring, regulating element (oiled lightly) and a new sealing ring.
- Attach and clamp the thermostat housing cover and insert the snapping.
- Remove the M 12 screw plug and install oil pressure switch (11).

#### **Tightening torque:**

Oil pressure switch to oil pump intermediate flange	35 Nm
Water pump temperature sensor	9 Nm
Screw plug, M 12	20 Nm

### Install the pump shaft with shaft sealing ring and slipping seal.

#### **Note:**

Clean the sealing ring seats.

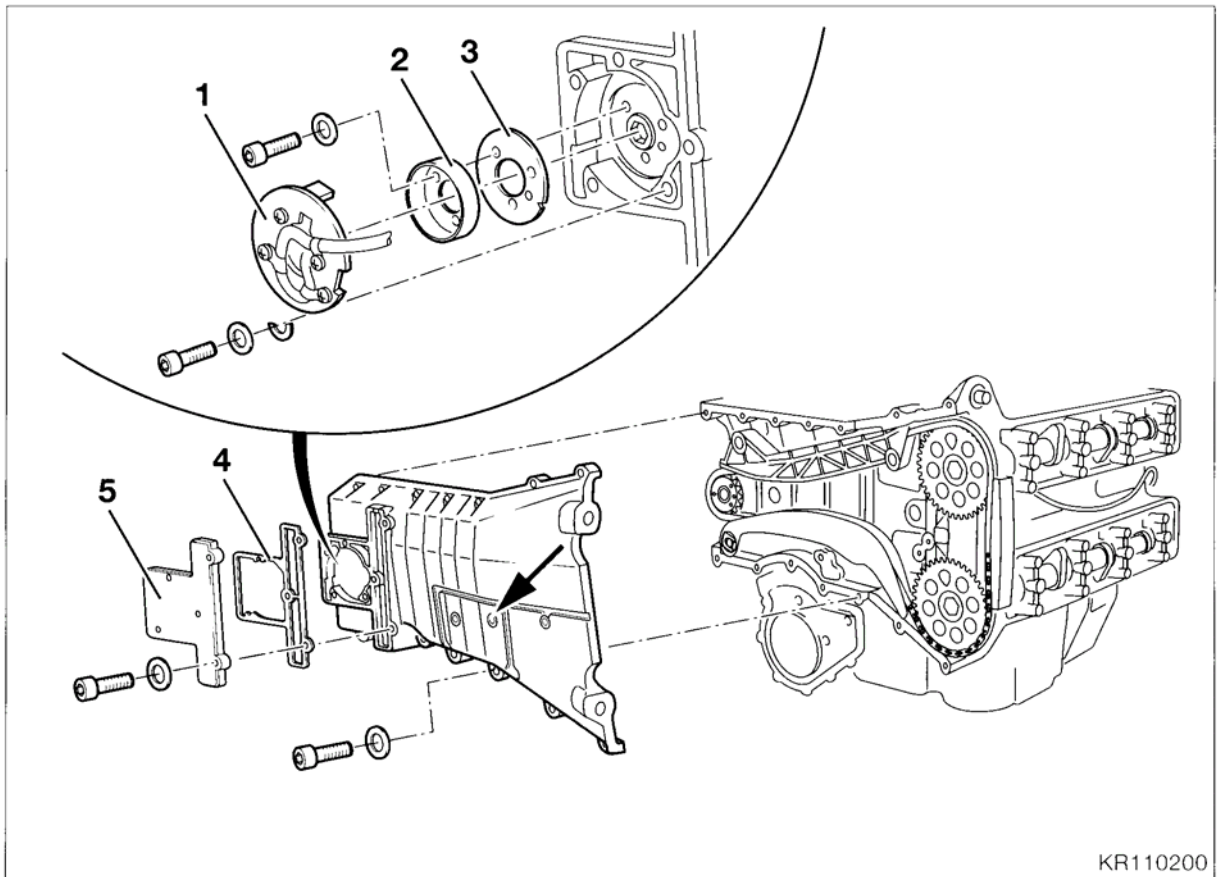
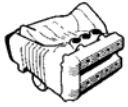
- Insert pump shaft (5) (lightly oiled) into the housing.
- Place sliding sleeve, **BMW No. 11 6 722**, on pump shaft.
- Insert shaft sealing ring (6) into the guide sleeve of pressing-in tool, **BMW No. 11 6 723**, and press in with the open side facing inwards.
- Take off the sliding sleeve.
- Press in slipping seal (7) (free of grease) with pressing-in tool, **BMW No. 11 6 724**.

### Installing water pump impeller

- Attach water pump impeller (9) with spacing bushing (8). When tightening, hold the pump shaft to prevent it from turning.

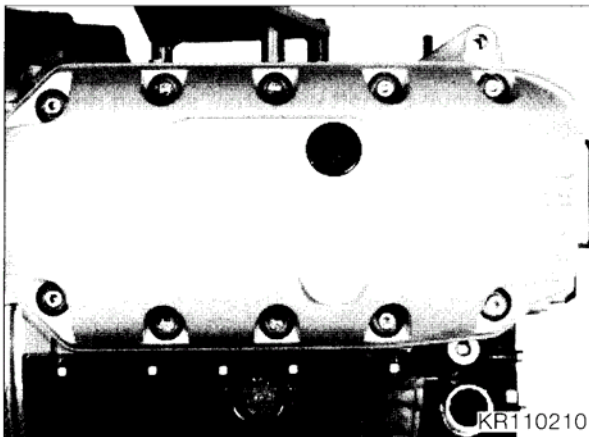
#### **Tightening torque:**

Water pump impeller	33 Nm
---------------------	-------



## Removing timing chain cover

### Remove the crankcase cover.



### Removing cylinder head cover

- Remove the screen plate.
- Remove the ignition leads.  
(⇒ 12.7)
- Remove the spark plugs.  
(⇒ 12.7)
- Remove the cylinder head cover.

### Removing ignition transmitter

- Remove cover (5).
- Take off gasket (4).
- Remove magnetic gate (1), noting the presence of semi-circular shims.



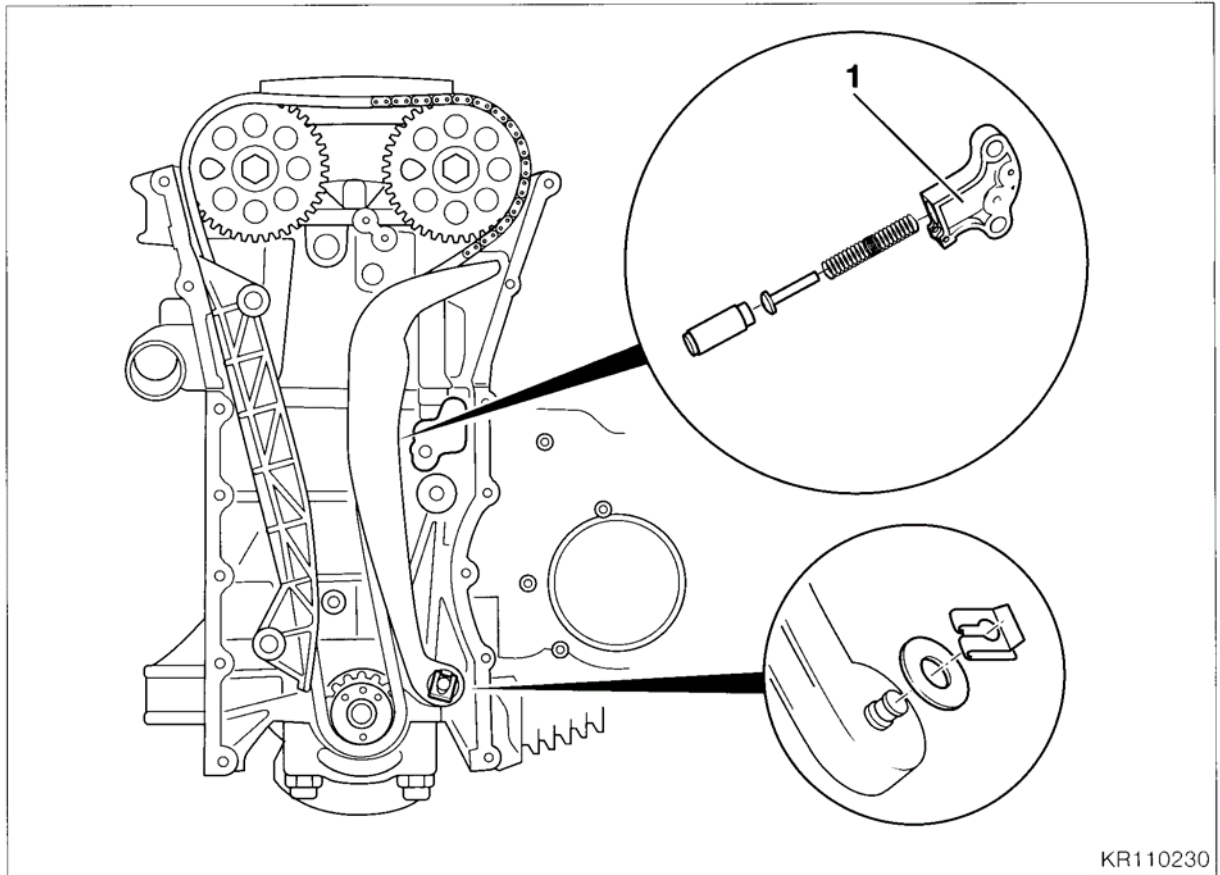
#### Note:

Mark the position of the magnetic gate in relation to the engine block, or remove it in the top dead centre (TDC) position.

- Remove rotor (2) and take off adjusting disc (3).

### Removing the timing case cover

- Remove the screw plug (arrow) for the pin in the timing case cover.



- Prevent chain tensioner (1) from moving with pin, **BMW No. 11 6 740**.



**Note:**

Turn or press the camshaft in the normal direction of rotation (for about 20 to 30 seconds if the engine is cold) until the oil is forced out of the chain tensioner and the pin can be inserted fully.

- Take out the screws, loosen the timing case cover with light blows of a plastic-faced hammer and take it off.
- Release the tension at the chain tensioner and remove it from the timing case cover.

**Removing and installing sealing ring in timing case cover**

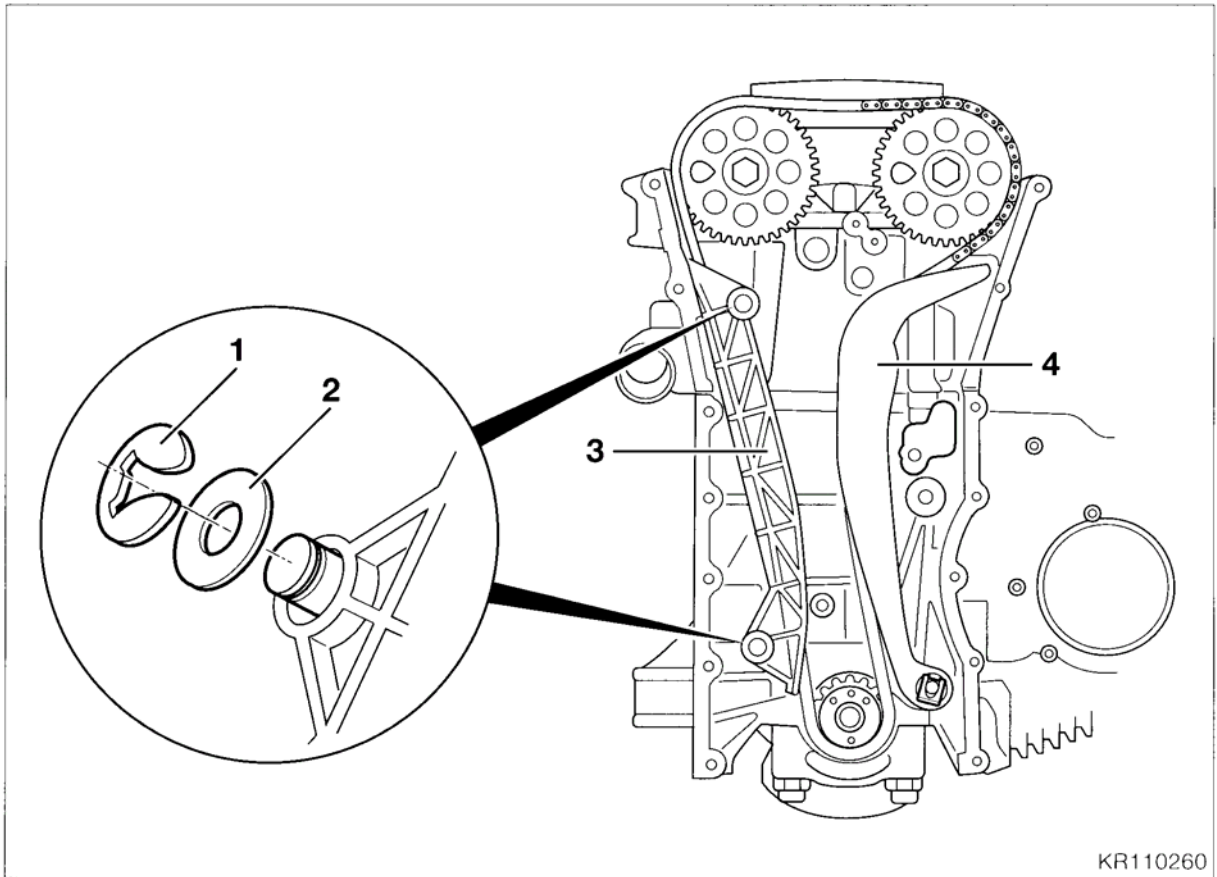
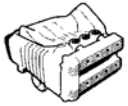
- Drive the sealing ring out with a suitable drift.



**Note:**

Clean the sealing ring seat.

- Press the sealing ring in from the inside using pressing-in tool, **BMW No. 11 1 610**, and handle, **BMW No. 00 5 500**.



KR110260

**Removing the timing chain**

**⚠ Caution:**

Set the piston to the centre of the cylinder (cylinder 1 app. 90° before top dead centre), to avoid damage to the valves and piston.

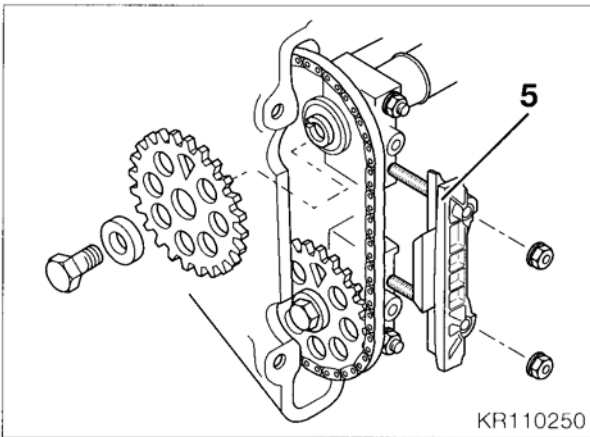
**Removing chain tensioner rail**

- Remove the keeper and washer.
- Take off tensioner rail (4).

**Removing chain guide rail**

- Remove keepers (1) and washers (2) at pivot pins.
- Take off guide rail (3) with bushing and timing chain.

**Removing camshaft chain sprockets**



KR110250

- Take off slide rail (5).
- Loosen the chain sprockets, holding the camshaft at the hexagon.
- Take off the chain sprockets and slide rail.

**Renewing tensioning strap for chain tensioner rail**



KR110790

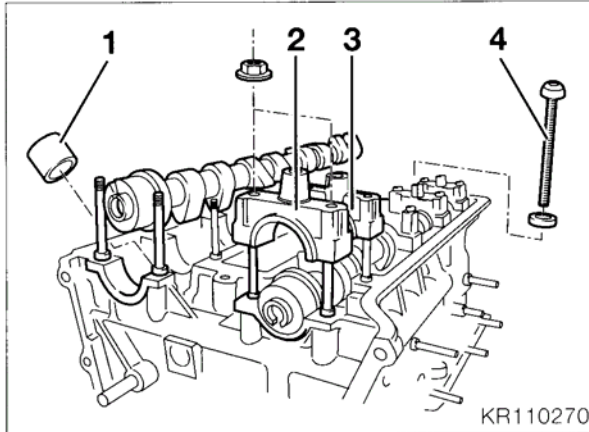
- Unclip the tensioning strap from the tensioner rail.

## Removing, stripping down and assembling cylinder head

- Remove the coolant stub pipe.
- Remove the air intake stub pipe.  
(⇒ 13.10)
- Remove the temperature sensor.  
(⇒ 61.15)

### Removing camshafts

- Turn the camshafts until the tops of the cams are exposed.



- Remove the bearing caps (2) for the thrust bearings first, to prevent tilting.
- Release tension uniformly at radial bearing caps (3) and remove them.
- Take out the camshafts.

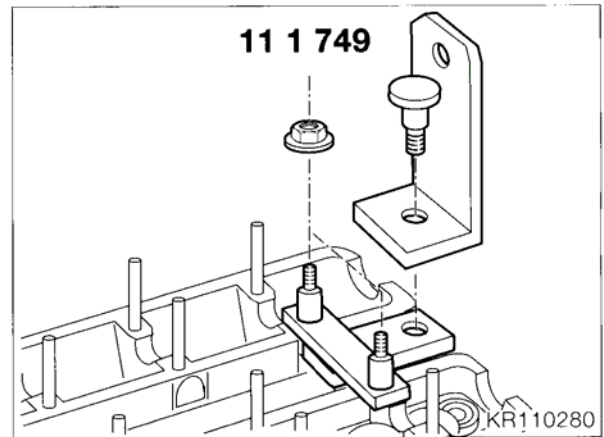
### Removing cylinder head

- Unscrew the cylinder head bolts (4) with Torx insert, **BMW No. 00 2 630**.
- Loosen the cylinder head with light blows of a plastic-faced hammer and take it off.

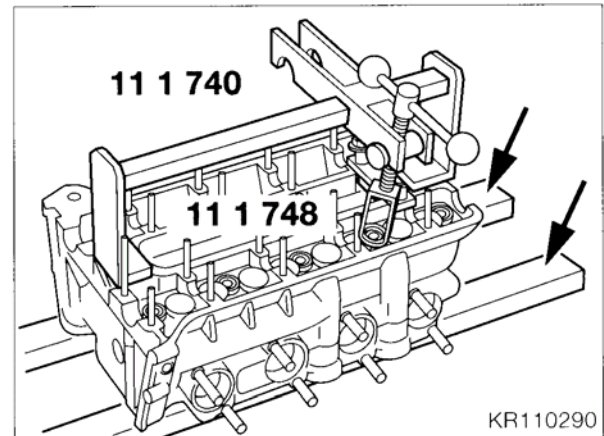
### Removing bucket-type tappets

- Use the rubber suction device, **BMW No. 11 3 251**, to pull the bucket-type tappets (1) out of the cylinder head.
- Make a note of which tappet belongs to which valve.

## Removing valves



- Attach support plate, **BMW No. 11 1 749**, for the valve spring clamping device at the rear of the cylinder head (not the timing side).



- Attach the valve spring clamping device, **BMW No. 11 1 740**.
- Use pressure cage, **BMW No. 11 1 748**.

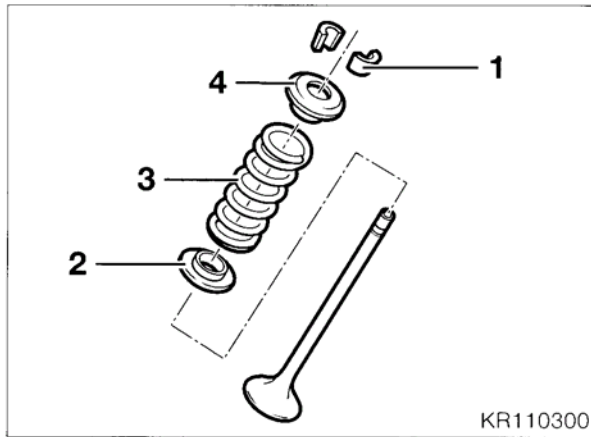
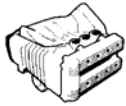


### Caution:

Centre the pressure cage in order to avoid damaging the tappet bores.

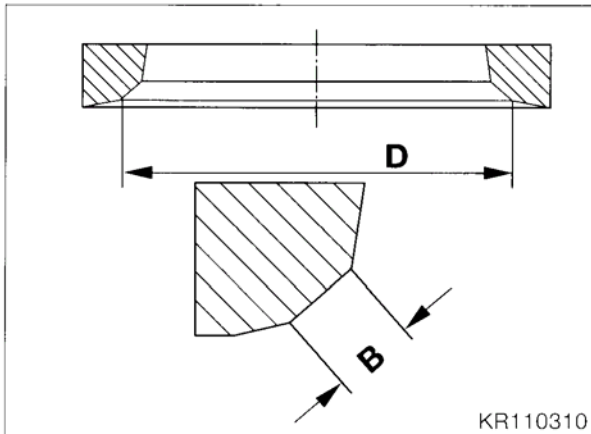
- Place the cylinder head on a suitable underlay surface, so that the valves can move freely.
- Loosen the valve collets with light, sharp hammer-blows.
- Clamp the valve spring.





- Pull out valve collets (1) with a magnetised screwdriver.
- Release valve spring clamp (3) and take out upper spring plate (4), valve spring and lower spring plate (2).
- Take out the valve stem seal with special pliers, **BMW No. 11 1 250**.

### Remachining valve seat



D = valve diameter  
B = valve seat width

- When remachining, the correct width of the valve seat must always be maintained.



**Note:**  
Machine the valve seat with turning tool, **BMW No. 11 0 500**.

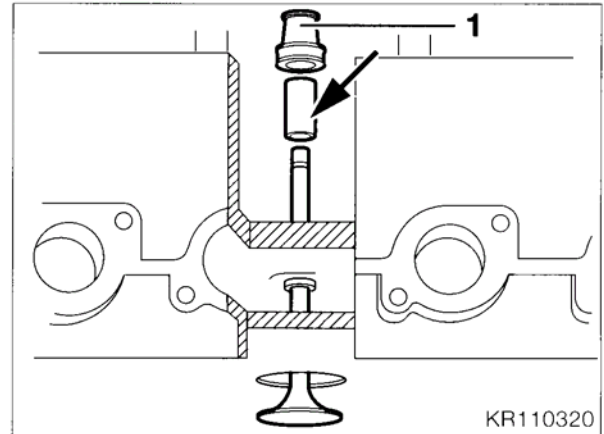
- If the valve seat has been remachined, a new valve must be installed.

### Installing valve and valve stem seal



**Note:**  
If a valve is removed, the valve stem seal must be renewed.

- Oil the stem when installing the valve.
- Insert the lower spring plate.



- Place a shrink-fit tube app. 20 mm long, on the valve stem and heat it up.
- Drive in valve stem seal (1) with the assembly tool, **BMW No. 11 1 950**, until resistance is felt.



**Caution:**  
Remove the shrink-fit sleeve from the valve stem.

- Insert the valve spring.
- Install the upper spring plate.



**Caution:**  
Centre the pressure cage to prevent damage to the tappet bores.

- Clamp the valve spring, lightly oil the valve collets and insert them, then release the spring.
- Clean and oil the bucket-type tappet before inserting.

## Removing crankshaft

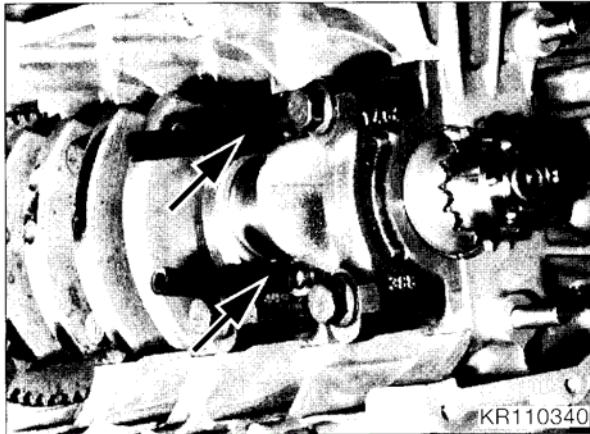


### Note:

Remove the driver first if the intermediate flange is also to be removed after the crankshaft.  
(→ 11.22)

### Removing big end bearings

- Move the piston in cylinders 1 and 4 to the bottom dead centre (BDC) position.



- Remove the big end bearing caps.

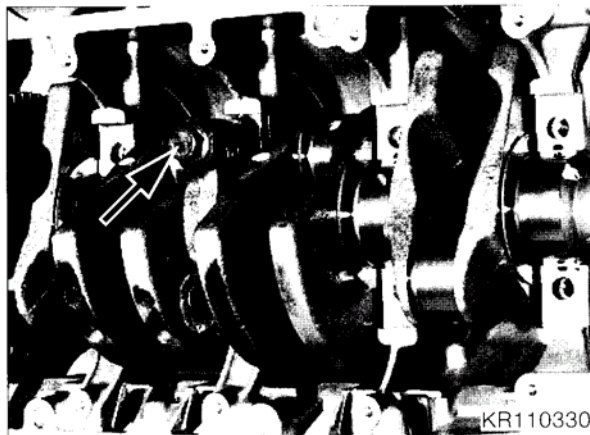


### Note:

Push protective tubes app. 50 mm long (arrows) on to the big end bolts.

- Repeat the work sequence at cylinders 2 and 3.

### Removing main bearings (engine installed)



- Loosen all but one (arrow) of the main bearing bolts.
- Take off the bearing caps.
- Remove the final bolt.
- Take off the bearing cap, pressing the crankshaft in towards the housing while doing so.

### Removing main bearings (engine removed)

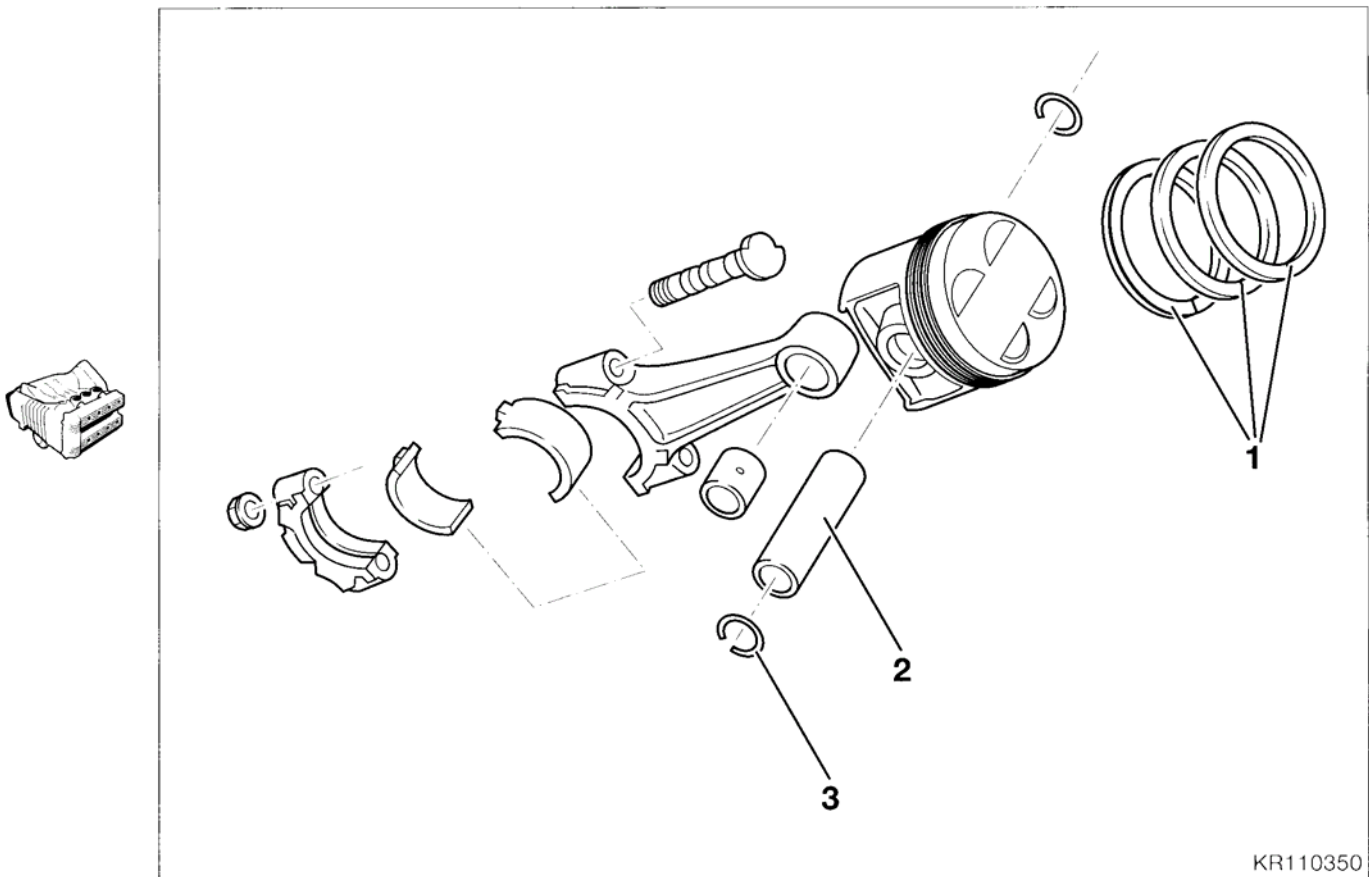
- Remove all main bearing bolts and take off the bearing caps and the crankshaft.



### Note:

Bearing caps 1 - 3 are marked for identification. Bearing 4 (thrust bearing) and bearing 5 are not marked. Cylinder 1 = timing end of engine.





KR110350

### Removing pistons with conrods, stripping down and re-assembling

#### Removing piston with conrod

- Press the piston with conrod out from the crankshaft side.

#### Dismantling piston

- Remove the circlip (3) at one side.
- Press out piston pin (2) with pressing-out tool, **BMW No. 11 6 710**.
- Carefully remove piston rings (1) with piston-ring pliers.

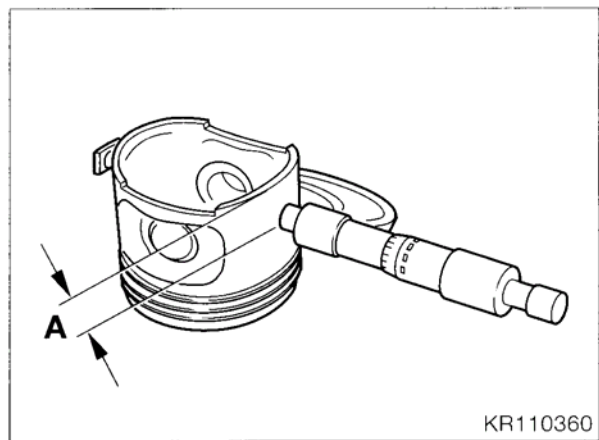


#### Note:

Note the correct installed positions.

- Clean the piston.

### Checking piston dimensions



KR110360

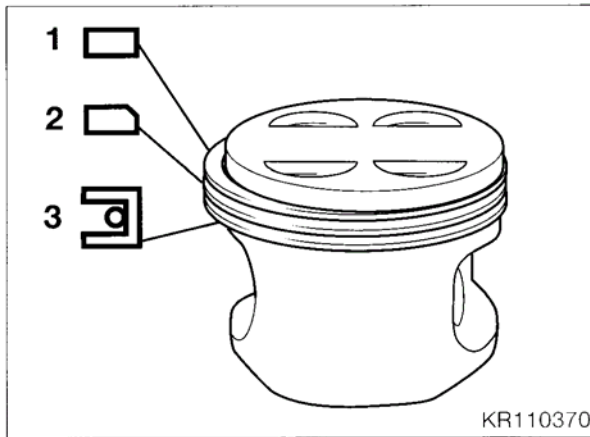
- Measure piston diameter with a micrometer at distance "A".

Dimension "A" ..... 10 mm

- Measure piston ring side-flank clearance with feeler gauges.
- Measure the piston ring end gap in the cylinder.

For correct side clearance and end gap, see Technical Data.

### Assembling pistons



- Install piston rings, using piston-ring pliers.



**Note:**

The Top inscription is uppermost or according to the installed position previously noted.

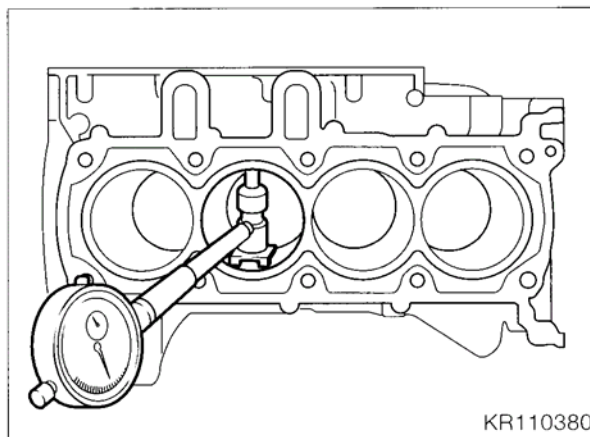
- 1st groove: rectangular-section ring.
- 2nd groove: micro-chamfer ring; note pin for ring gap.
- 3rd groove: U-Flex ring with spring.



**Note:**

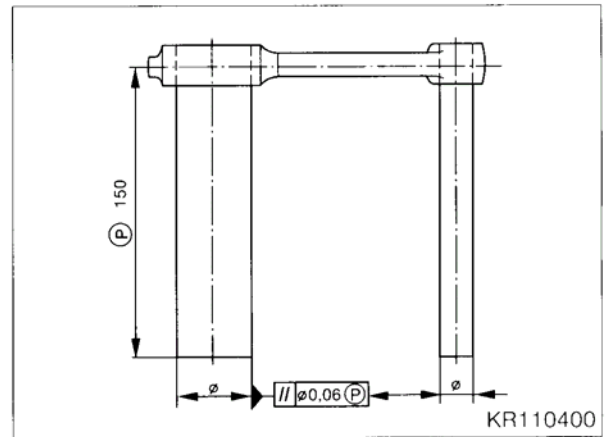
The gap in the spring must be offset through 180° in relation to the Flex ring gap.

### Checking cylinder dimensions



- Set the internal micrometer to the nominal cylinder bore diameter.
- Measure the cylinder bore at three heights and in a crosswise pattern: in the direction of forward travel and at a right angle to it.

### Checking that conrod bores are parallel



- The difference over the measured length "P" must not exceed 0.06 mm.

Measured length "P" ..... 150 mm

### Assembling pistons and conrods



**Caution:**

It should be possible to push the piston pin through the small end bushing with only slight pressure.

- Comply with conrod weight tolerances.

Weight tolerance ..... ± 4 g



**Note:**

The oil bore in the conrod eye is on top in the installed position. The arrow marking on the piston crown must point in the forward-travel direction.

- Assemble piston and conrod.
- Only install pistons of the same weight group.

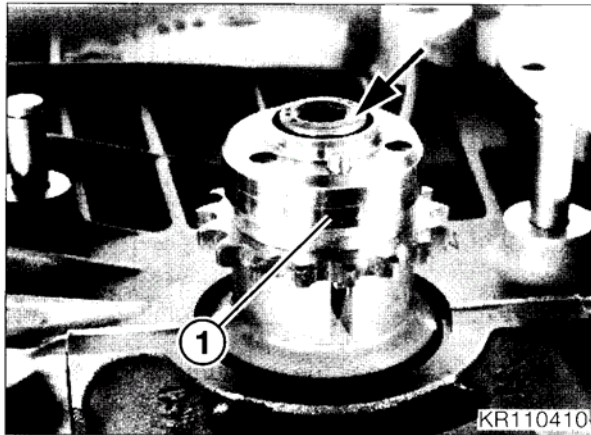
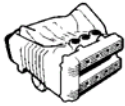


**Caution:**

Renew the piston pin circlip each time it is removed.

## Removing and installing crankshaft sprocket and rotor flange

- Prevent from turning with retainer, **BMW No. 11 2 800**, (see right).



- Remove the screw (arrow) for the crankshaft sprocket and the rotor flange.
- Pull off rotor flange (1) with light hammer-blows, and take off the sprocket.
- Install the crankshaft sprocket first, then tighten the rotor flange.

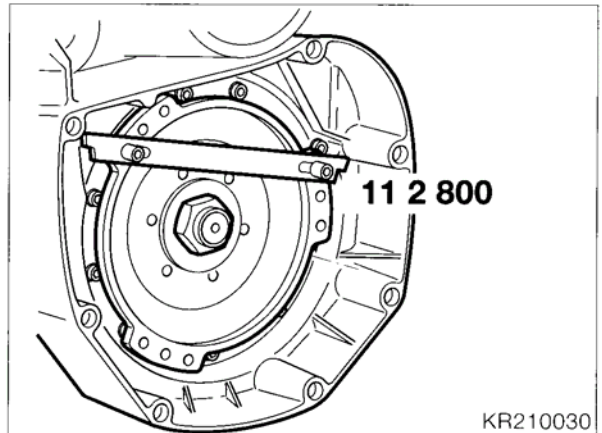


### ! Tightening torque:

Rotor flange ..... 50 Nm

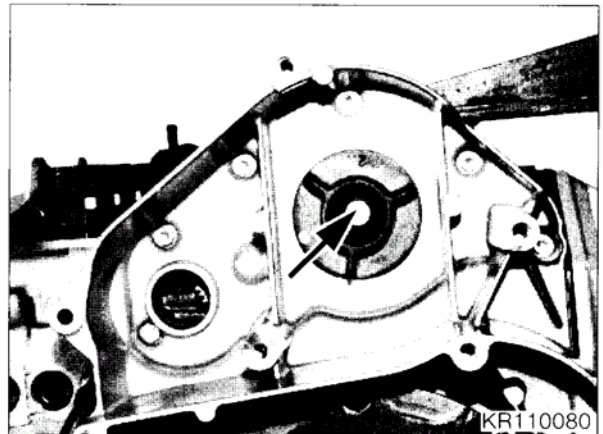
## Removing intermediate flange

- Remove the ignition coil. (→ 12.9)
- Remove the clutch. (→ 21.5)

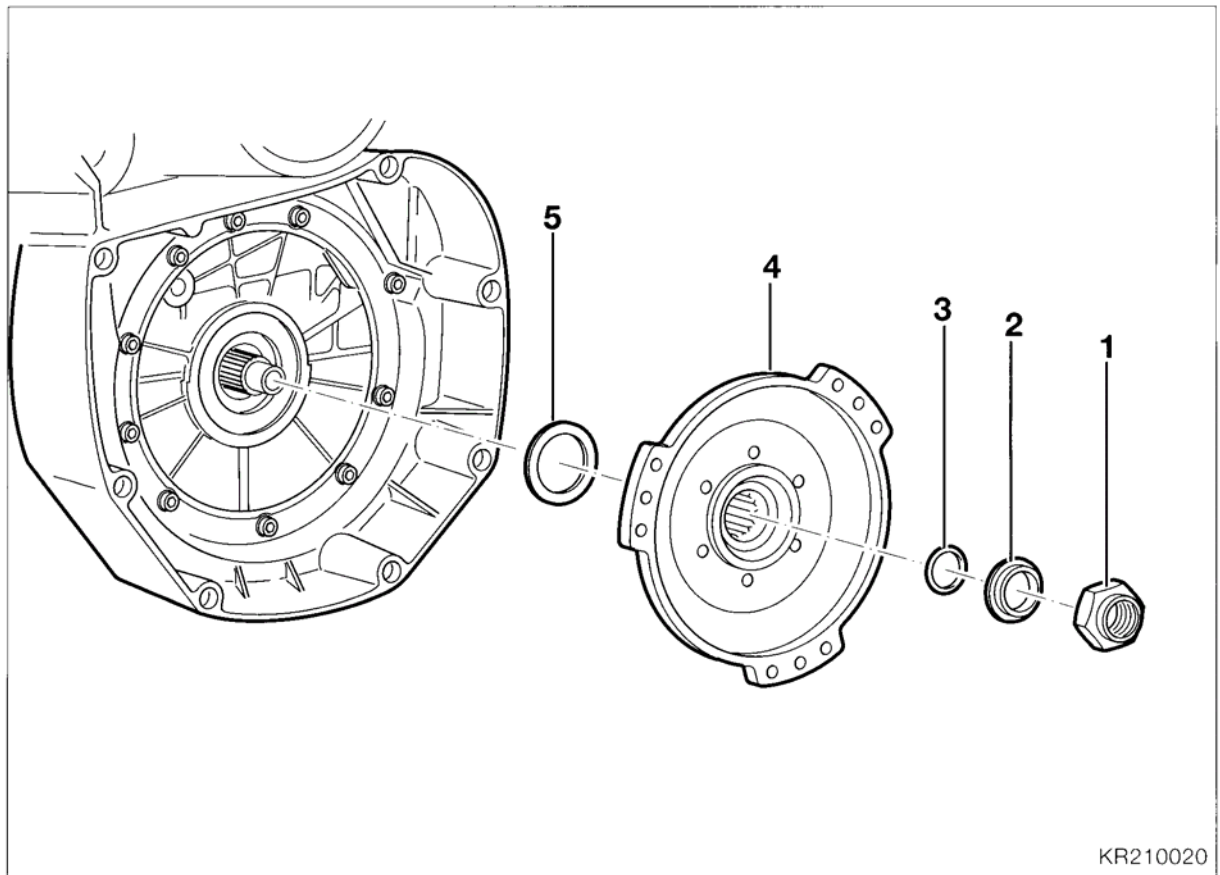


- Install the retaining device (arrow), **BMW No. 11 2 800**, in the position illustrated.

## Removing driver



- Take out screw (arrow).
- Pull the driver off by hand.
- If necessary, use a puller, **BMW No. 00 8 400**, with the pressure head from puller-separator, **BMW No. 00 7 500**.



KR210020

### Removing clutch housing

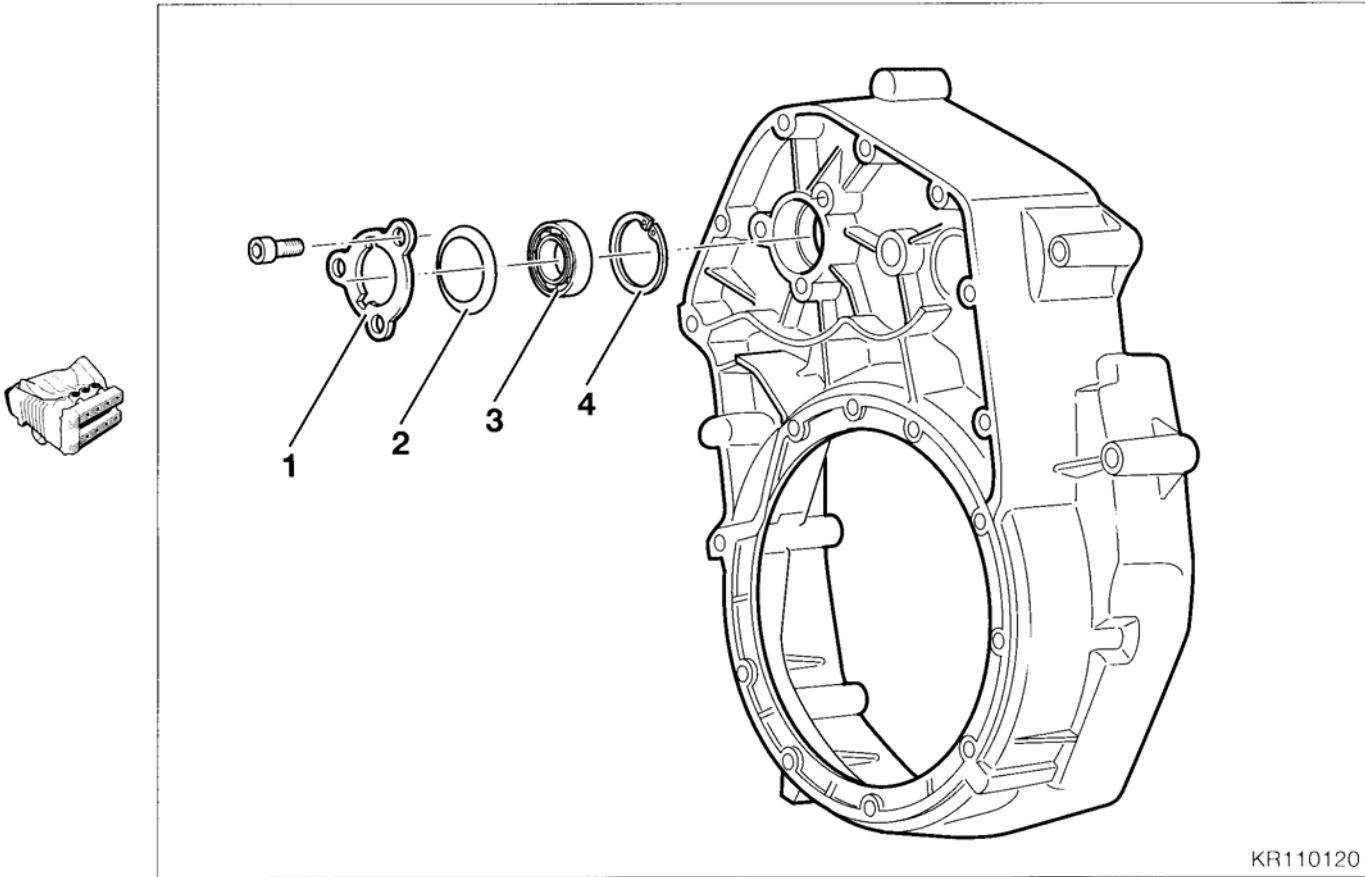
**⚠ Caution:**

After unscrewing nut (1), do not strike the output shaft or turn the engine over, so that output shaft endplay cannot cause damage to the crankcase or pump housing.

- Unscrew nut (1) and take off thrust ring (2).
- Move the clutch housing to and fro until O-ring (3) is accessible, then remove it.
- Pull off clutch housing (4), noting the presence of thrust washer (5).

### Removing intermediate flange

- Loosen the screws with the Torx insert, **BMW No. 00 2 600**, and pull off the intermediate flange.



KR110120

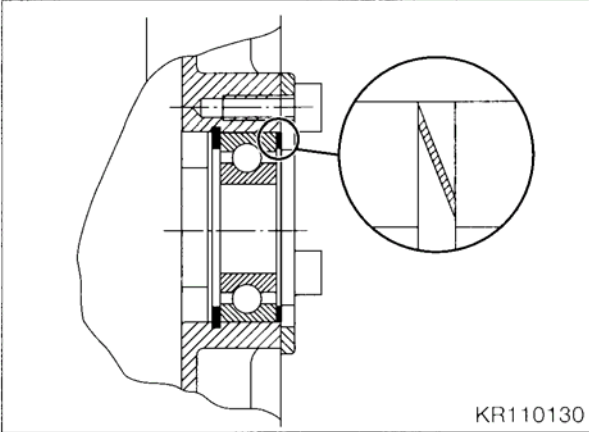
Stripping down and re-assembling intermediate flange

**Removing the driver bearing**

- Remove thrust plate (1).
- Take off cup spring (2).
- Remove ball bearing (3) with puller, **BMW No. 00 8 570**, and internal puller 21/3, **BMW No. 00 8 574**.
- Remove retaining ring (4).

**Installing driver bearing**

- Heat the intermediate flange at the bearing seat to app. 120 °C.
- Press the ball bearing on as far as the circlip.



KR110130

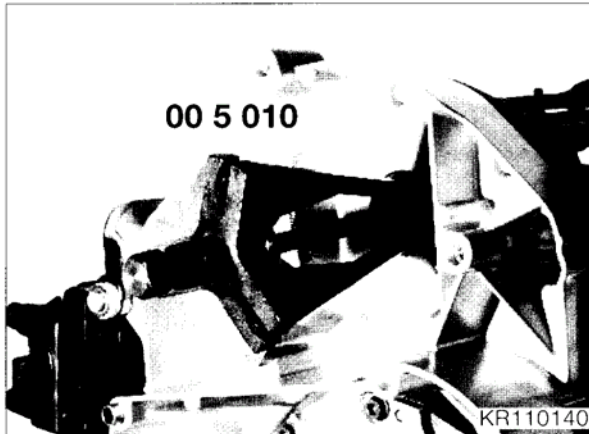
- Insert the cup spring with the larger diameter facing the bearing.
- Install the thrust plate with the large cutout at the top.

**! Caution:**  
Install screws with **Loctite 243**.

**! Tightening torque:**  
Thrust plate.....9 Nm

### Removing and installing shaft sealing ring for driver

- With the intermediate flange removed, lever out the sealing ring.



- With the intermediate flange installed, remove the sealing ring with an internal puller, **BMW No. 00 5 010**, and the small pressure head from the puller-separator, **BMW No. 00 7 500**.

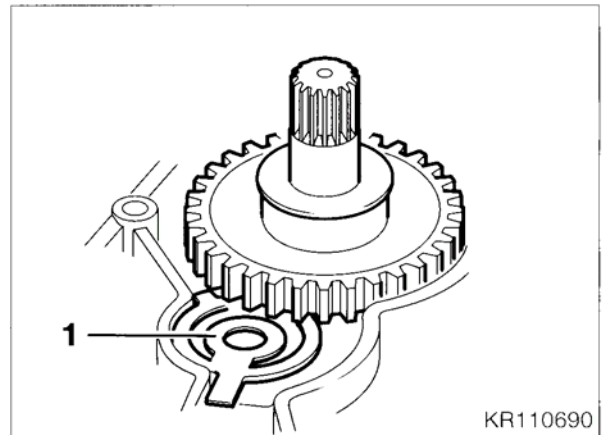


#### Note:

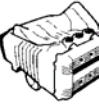
Clean the sealing ring seat.

- Pre-shape the sealing ring with the thumbs and drive it in (in a dry condition) with a drift, **BMW No. 11 1 620**, and handle, **BMW No. 00 5 500**.

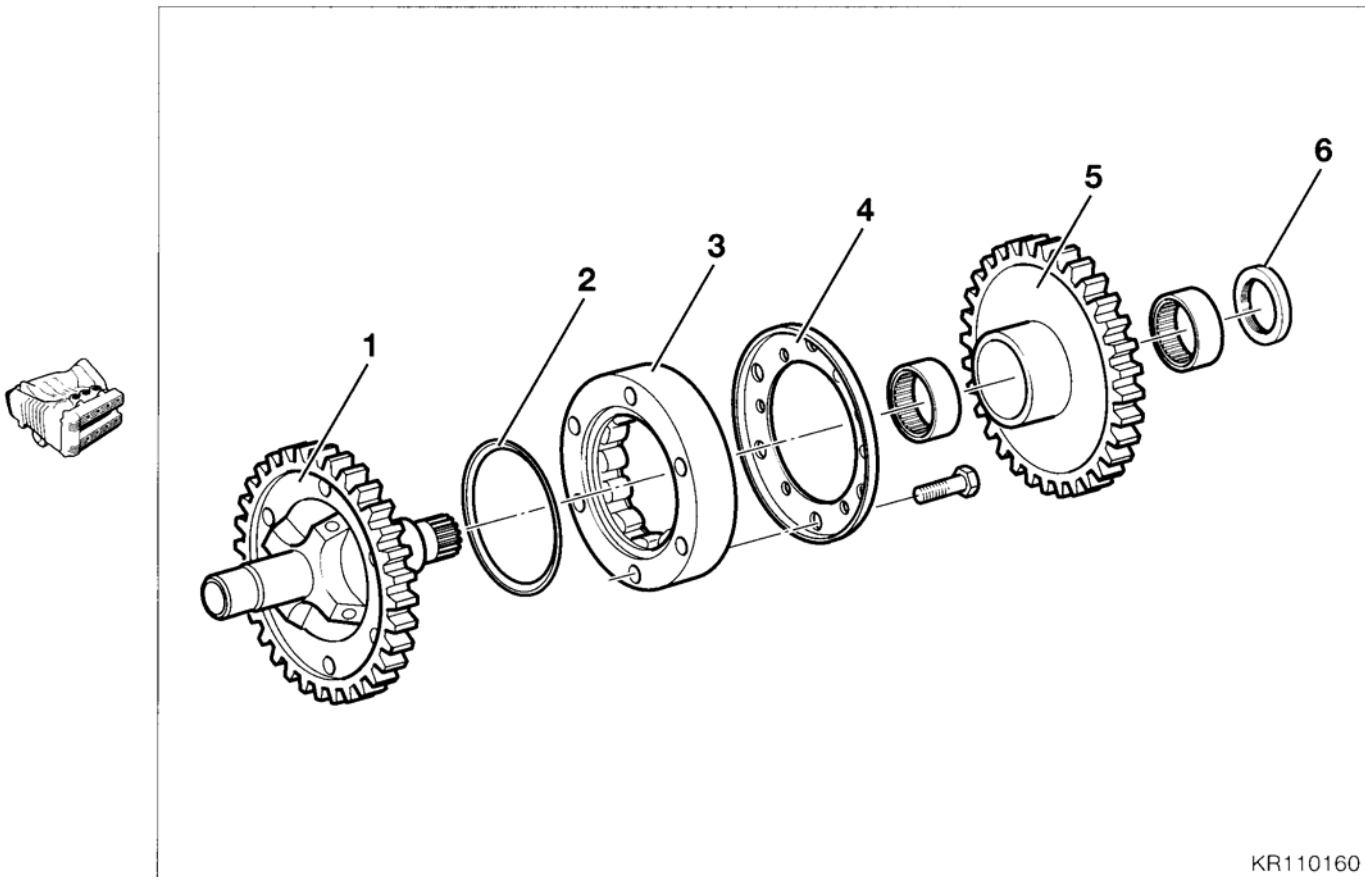
### Removing countershaft and layshaft with freewheel



- Pull the countershaft and layshaft out of the crankcase together.
- Note flat spring (1).





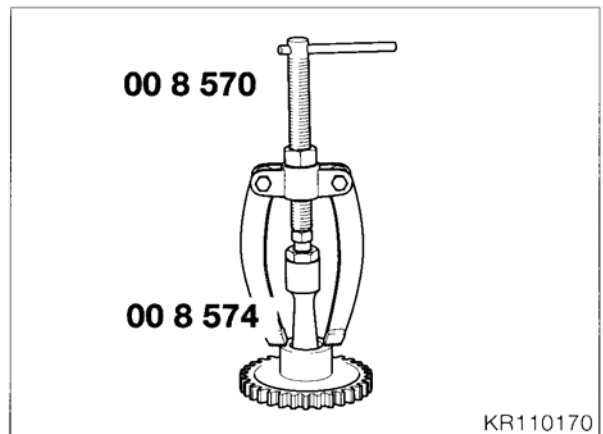


KR110160

### Dismantling and assembling freewheel

#### Stripping down freewheel

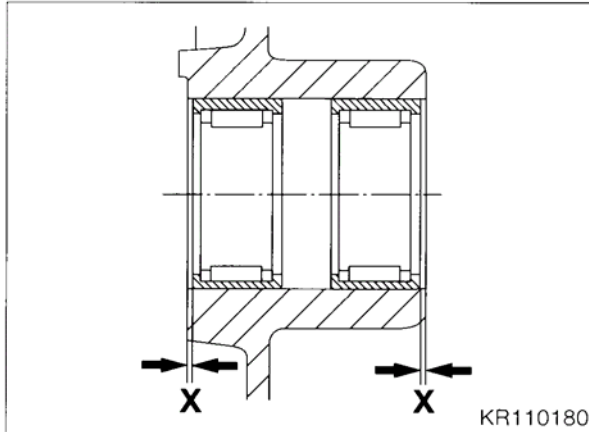
- Pull disc (6) and freewheel gear (5) off the layshaft (1).
- Clamp the layshaft into a vise with soft jaws (smooth side down).
- Remove cover plate (4).
- Pull off freewheel cage (3).
- Take out cup spring (2).



KR110170

- Pull needle roller bearing out of freewheel gear with a puller, **BMW No. 00 8 570**, and internal puller 21/3, **BMW No. 00 8 574**.

## Assembling freewheel



- The inscription on the needle roller bearing faces down.
- Press the needle roller bearing into the freewheel gear so that distance (x) is the same at both sides.

Distance "X" ..... 0.2...0.6 mm

- Install the cup spring with the larger diameter facing the layshaft.
- Insert the freewheel (oiled with engine oil) into the outer race.
- Install the outer race (with clamp block facing cover plate); the cup spring must snap into the outer race.
- Install the cover plate.



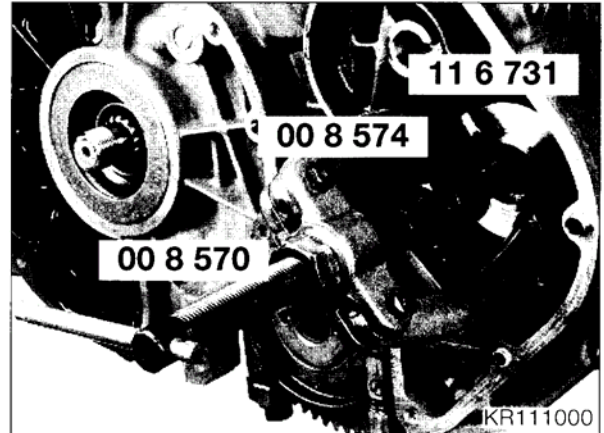
### Tightening torque:

Cover plate ..... 10 Nm

- Push the freewheel gear on to the layshaft while turning it clockwise.
- Push the thrust washer on to the layshaft.

## Removing and installing layshaft needle roller bearing and shaft sealing ring in crankcase

### Removing bearing



- Place support ring, **BMW No. 11 6 731**, in position and remove bearing with puller, **BMW No. 00 8 570**, and internal puller 21/3, **BMW No. 00 8 574**.
- If a defective bearing cannot be pulled out, carefully cut through the needle roller race (with a grinder).

### Removing shaft sealing ring

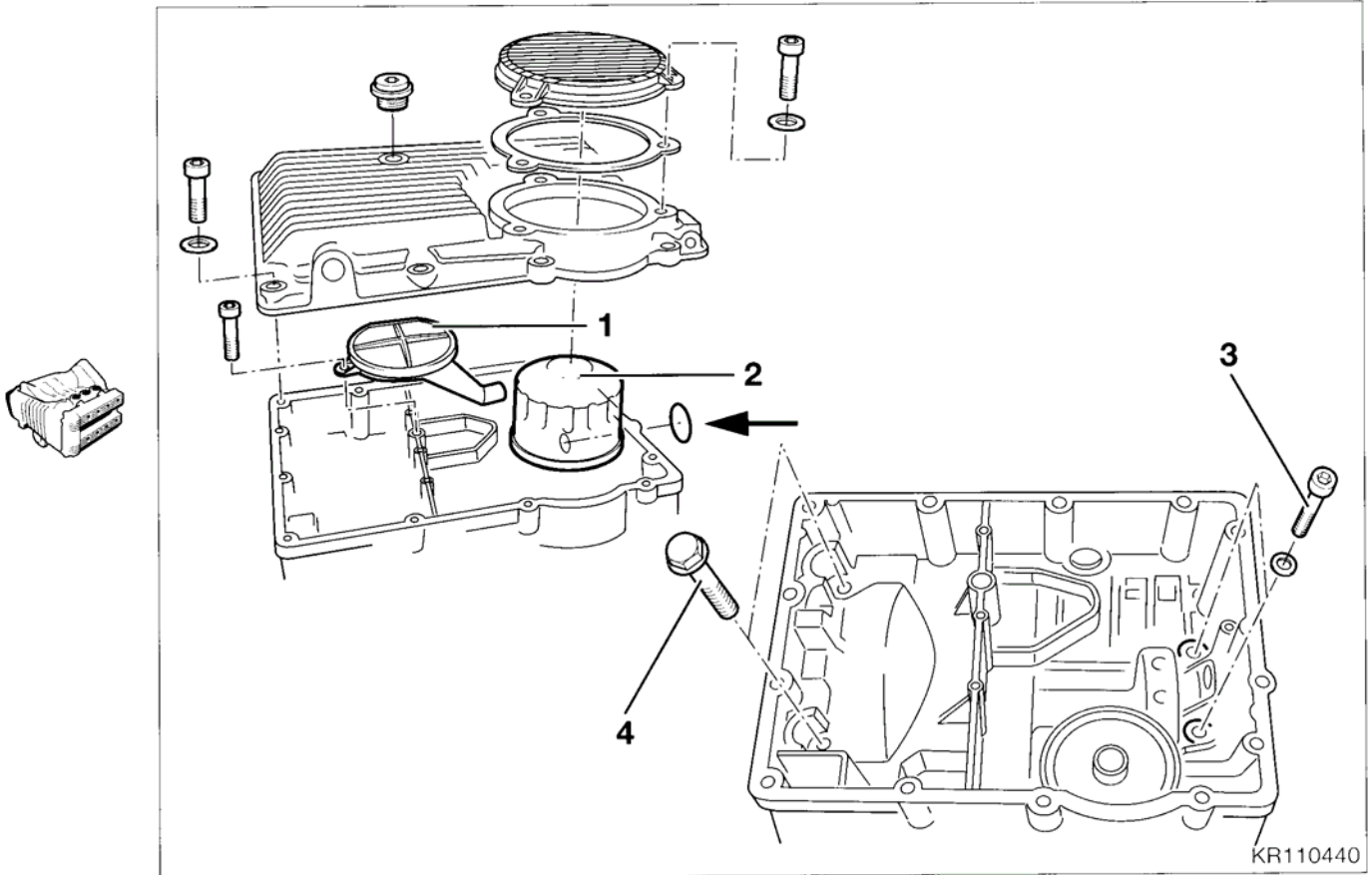
- Lever out the shaft sealing ring.

### Installing shaft sealing ring

- Drive in the new shaft sealing ring with a drift, **BMW No. 11 6 732**.

### Installing bearing

- The inscription on the needle roller bearing faces outwards.
- Drive the bearing in with a drift, **BMW No. 11 6 733**.



## Removing output shaft

### Removing oil sump

- Take out the screws.
- Loosen the gasket with light blows of a plastic-faced hammer and take off the oil sump.

### Removing the oil mesh strainer and oil filter

- Take out the screw and pull off oil mesh strainer (1).
- Remove the O-ring for the oil mesh strainer (arrow) from the lower part of the crankcase.
- Unscrew oil filter (2) with the oil filter wrench, **BMW No. 11 4 650**.

### Removing lower part of crankcase

- Remove the screws securing the lower part of the crankcase.
- Remove screws (4) for the shouldered bearing and screws (3) for the needle roller bearing.
- Loosen the gasket with light blows of a plastic-faced hammer, and take off the lower part of the crankcase. Note the O-rings for the water and oil passages.
- Carefully lift out the output shaft; the needle roller bearing and circlip are loose on the shaft.

### Removing and installing oil level sight glass

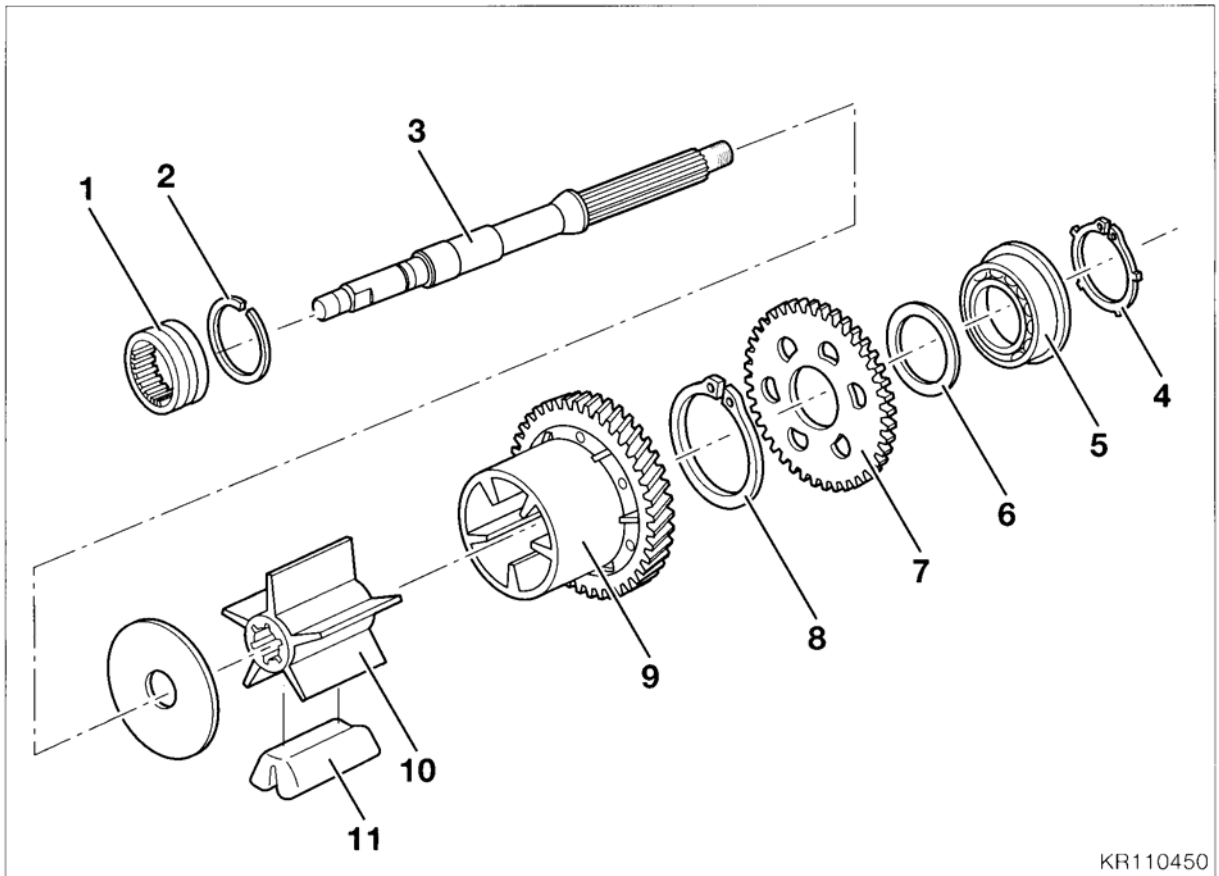
- Using a large screwdriver, pierce the plastic window and lever out the oil level sight glass.



#### Note:

Clean the sealing face.

- Coat the outer diameter of the oil level sight glass with engine oil.
- Drive in the oil level sight glass with a drift, **BMW No. 00 5 550**.



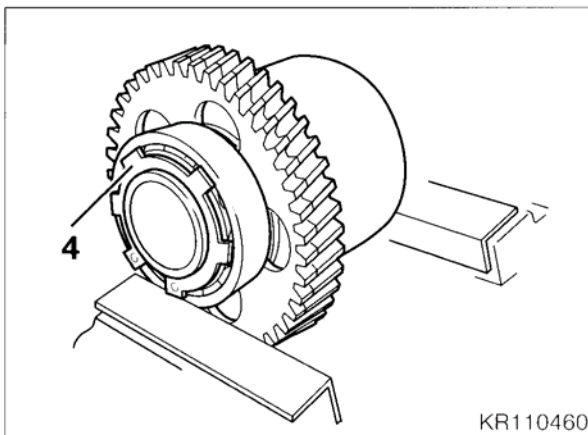
## Stripping and assembling output shaft

### Stripping down output shaft

- Take off needle roller race (1) and circlip (2).
- Pull output shaft (3) out of damper housing (9) and take off rubber damping elements (11).
- Drive the output shaft out of the inner section of the damper (10) with a plastic-faced hammer.

- Remove circlip (4) with suitable pliers.
- Insert a puller, **BMW No. 00 8 400**, in the opposite cutout of the gearwheel and pull ball bearing (5) off with pressure block, **BMW No. 33 1 307**.
- Take off spacing ring (6), turn tensioning gearwheel (7) clockwise with counter-holder, **BMW No. 12 4 600**, and pull upwards.
- Remove tensioning spring (8).

### Stripping down tensioning gear



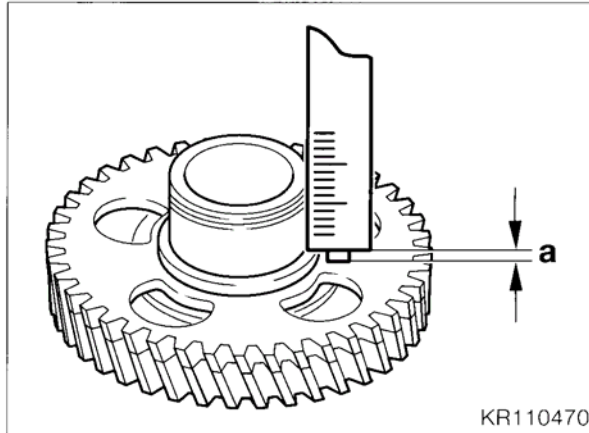
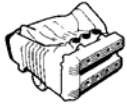
### Note:

Inspect all parts for damage or wear.

- Clamp the damper housing into a vise with soft jaws, to take the load off circlip (4).

### Assembling tensioning gear

- Insert the tensioning spring.
- Attach the tensioning spring to the pin in the tensioning gear and turn it clockwise with the counter-holder, **BMW No. 12 4 600**, until the pin of the tensioning gear engages in the hole in the gearwheel.
- Clamp the tensioning gear with damper housing together into a vise with soft jaws.

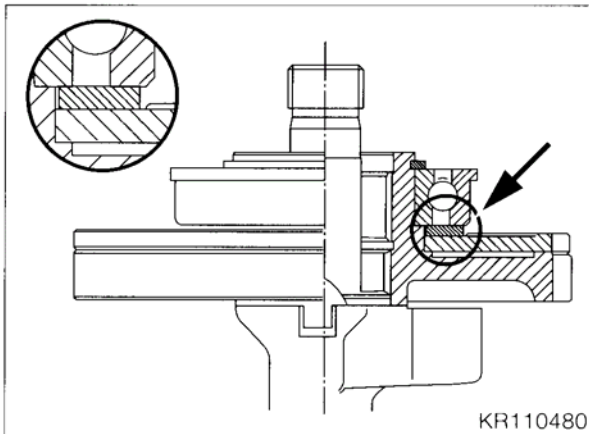


KR110470

- Measure distance "a" from the base of the ball bearing seat to the tensioning gear.

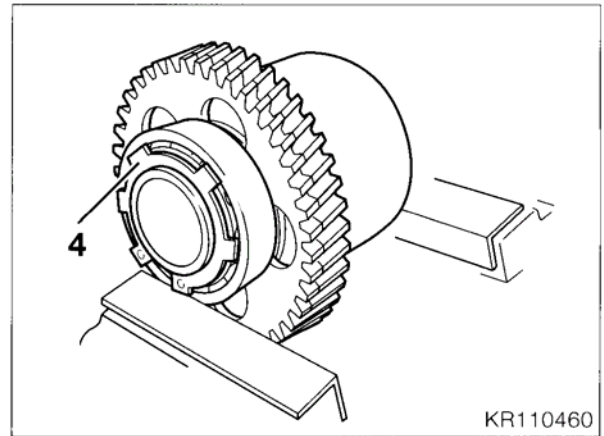
### ⚠ Caution:

The thickness of the spacing washer must never exceed this measurement.



KR110480

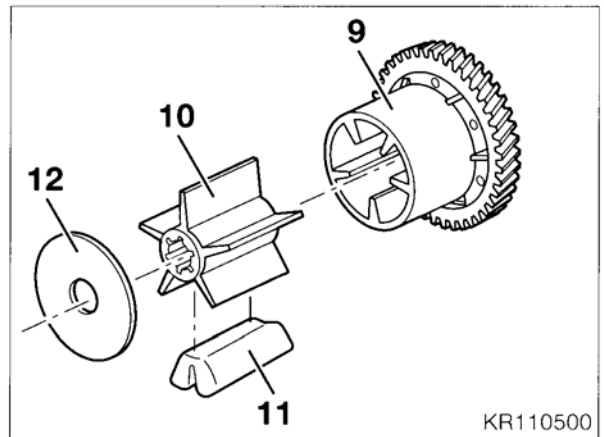
- Place a suitable spacing washer (arrow) on the tensioning gear.
- Heat the ball bearing to app. 80 °C and place it in position (with shoulder uppermost).



KR110460

- Clamp the damper housing and the ball bearing together in the vise (with soft jaws).
- Insert circlip (4) with suitable pliers in the groove in front of the bearing.
- The circlip must snap completely into the groove.

### Installing damper



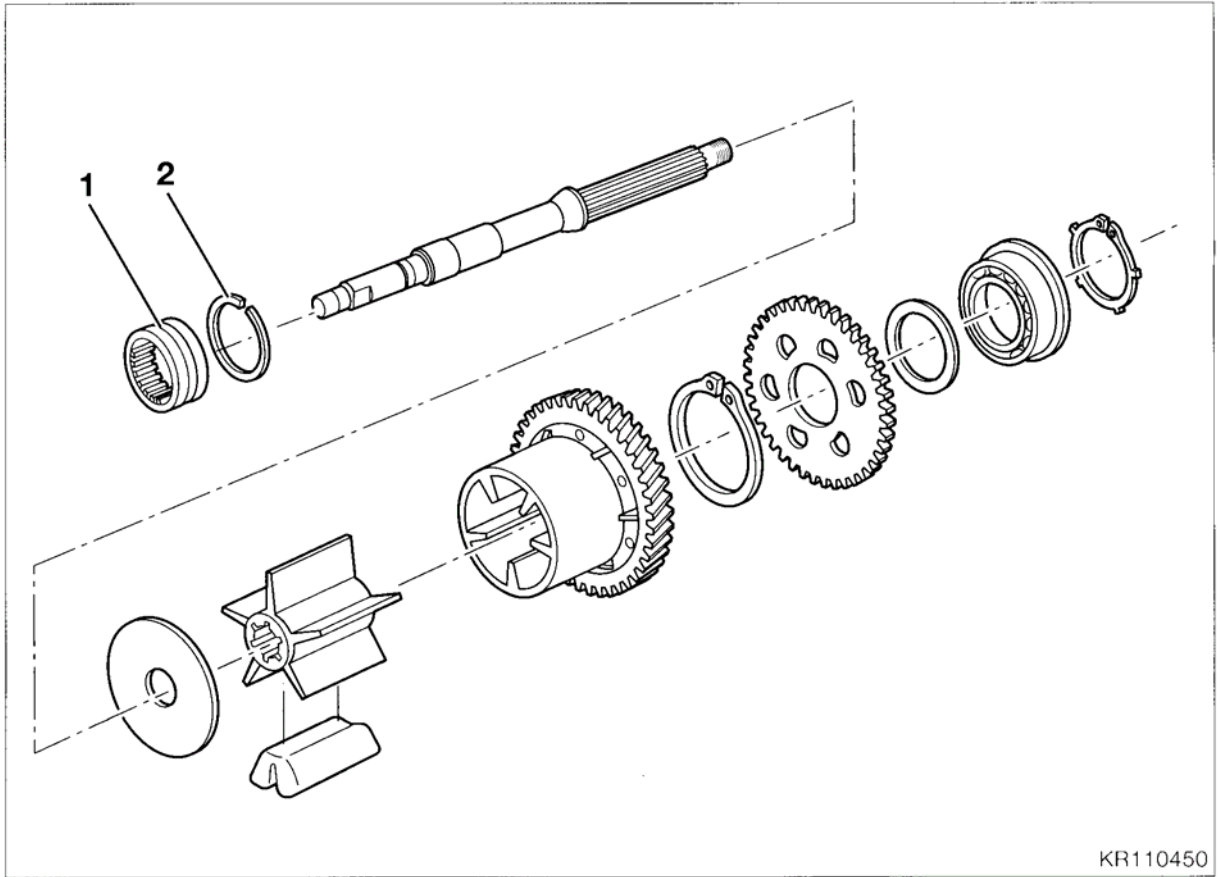
KR110500

- Insert damper rubbers (11) into damper housing (9).

### 📌 Note:

New parts must be oiled lightly.

- Push retaining plate (12) on to output shaft, heat the inner section of the damper (10) slightly and press it on.
- Push the damper housing on to the output shaft.

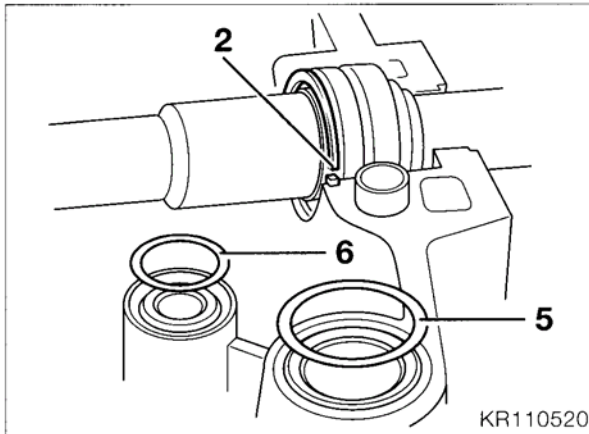


KR110450

## Assembling engine

### Installing output shaft

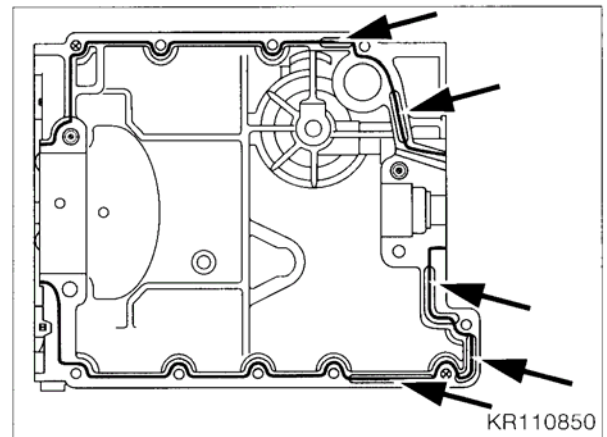
- Push on circlip (2) and needle roller race (1).
- Place the output shaft in the crankcase.



- The end gap of circlip (2) must be precisely on the housing joint line.
- Install O-rings (5, 6) for the water and oil passages.

KR110520

## Assembling the crankcase



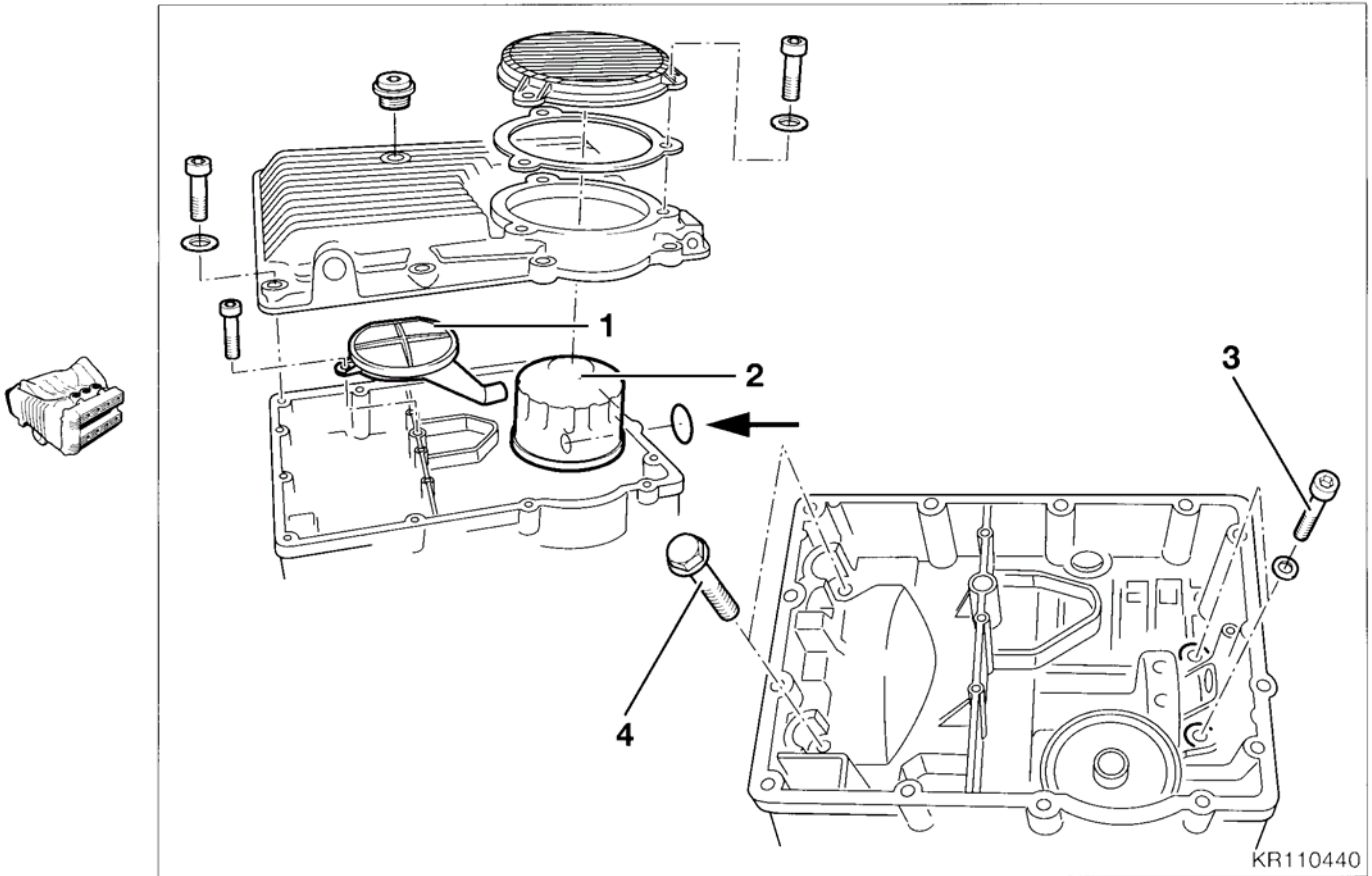
KR110850

- Coat the joint face (which must be free from oil and grease) lightly with **Three Bond 1209**; apply it along the line on the grey-shaded sealing face in the drawing.
- Fill the compensating groove (arrow) with the sealant.



### Note:

Scrape off excess sealant with a spatula.



- Place the two halves of the housing together.
- Insert screws (4) for shouldered bearing and screws (3) for needle roller bearing, and tighten alternately.
- Tighten the screws for the lower part of the crankcase.

**⚠ Tightening torque:**

Shouldered bearing .....	40 Nm
Needle roller bearing .....	18 Nm
Lower part of crankcase.....	10 Nm

**Installing oil mesh strainer**

- Install a new O-ring (arrow) and place oil mesh strainer (1) in position.

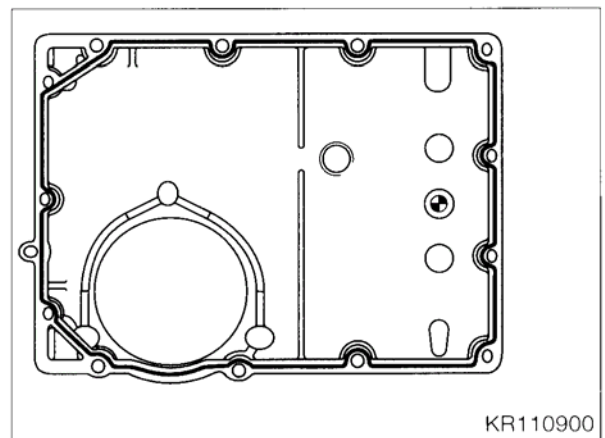
**Installing oil filter**

- Coat the oil filter sealing ring with oil.
- Tighten oil filter (2) with the special oil filter wrench, **BMW No. 11 4 650**, by not more than half a turn once it has made contact.

**⚠ Tightening torque:**

Oil mesh strainer .....	10 Nm
Oil filter.....	11 Nm

**Installing oil sump**



- Coat the sealing face (which must be free from oil and grease) lightly with **Three Bond 1209** along the line shown against the grey-shaded sealing surface in the drawing.
- Install the sump and the oil filter cover.

**⚠ Tightening torque:**

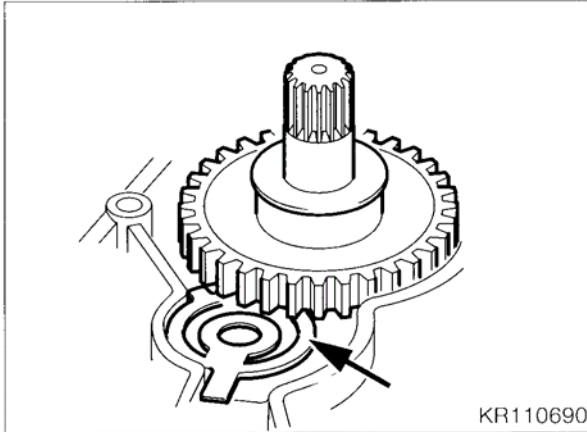
Oil sump .....	10 Nm
Oil filter cover.....	10 Nm
Oil drain plug .....	30 Nm

## Installing intermediate flange

### Installing freewheel

- Oil the needle roller bearing well.
- Insert the freewheel into the crankcase with the helical-cut gear leading.

### Installing countershaft

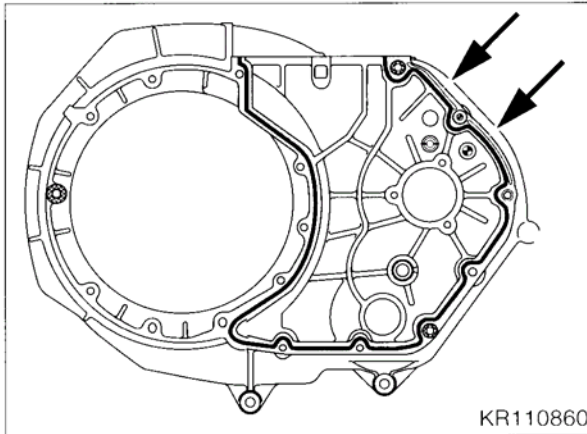


### ⚠ Caution:

Insert the spring so that the large external diameter (arrow) projects upwards and is pre-loaded against the freewheel gear.

- Insert the countershaft into the crankcase with the small gearwheel facing down.

### Installing intermediate flange



- Apply a light coat of **Three Bond 1209** to the sealing face (which must be free from oil or grease) along the line on the grey-shaded sealing surface shown in the drawing.
- Fill the compensating groove (arrow) with the sealant.



### Note:

Scrape off excess sealant with a spatula.

- Attach the intermediate flange (with locating sleeves).
- Tighten the screws with Torx insert, **BMW No. 00 2 600**.



### Tightening torque:

Intermediate flange ..... 9 Nm

### Installing output shaft sealing ring



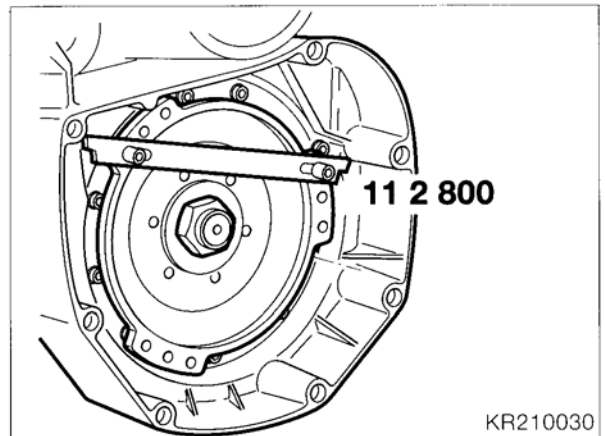
### Note:

Clean the seat for the sealing ring. Oil the sealing ring and push it over the guide first.

- Drive in shaft sealing ring with drift, **BMW No. 11 1 630**, and handle, **BMW No. 00 5 500**.

### Installing clutch housing

- Push on the thrust washer between the output shaft and the intermediate flange, holding it in position if necessary with a small amount of grease.



- Install the clutch housing with the holding device (arrow), **BMW No. 11 2 800**, in the position illustrated here.



### Caution:

Secure with new nuts.

- Insert a new O-ring and thrust ring, and tighten the nut.



### Tightening torque

1. Clutch housing nut..... 140 Nm
2. Slacken off.....
3. Retighten to ..... 50 Nm
4. Wrench angle..... 60°



## Installing driver



### Note:

Only possible if crankshaft is installed.

- Push driver on to layshaft.



### Tightening torque:

Driver ..... 50 Nm



- Take off the holding device.
- Install the clutch.  
(→ 21.8)

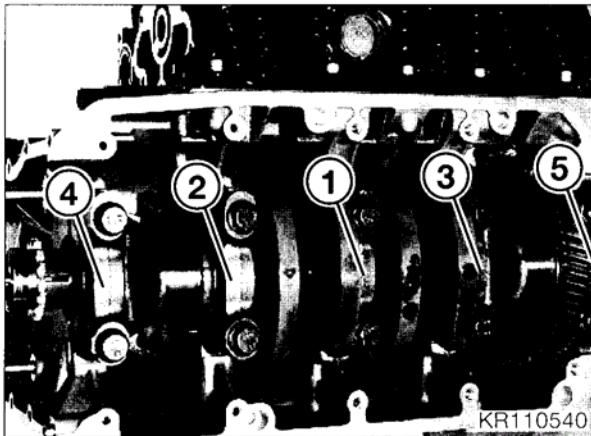
## Installing crankshaft

- Crankshaft bearing points must be clean and lightly oiled.
- Place the crankshaft in the crankcase and install the bearing caps so that the joint lines are aligned.



### Note:

Bearing caps 1 - 3 are marked for identification; bearing 4 (thrust bearing) and bearing 5 are not marked.



- Tighten the bearings in the order shown, starting from the centre and working outwards.



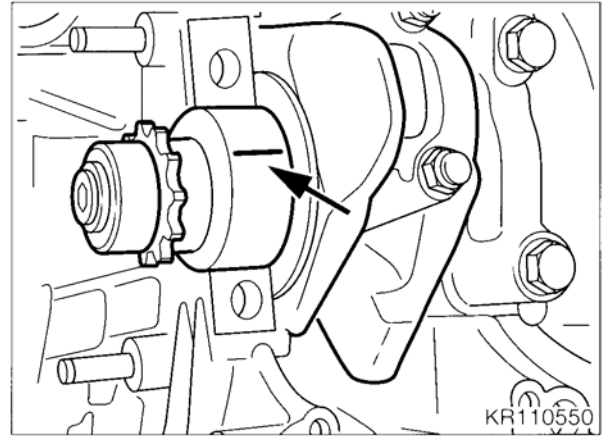
### Tightening torque:

Main bearings ..... 50 Nm

## Measuring crankshaft bearing play

### Measuring radial play

- Turn the crankshaft to top dead centre at the bearing to be measured.
- Take off the bearing cap.
- Wipe off oil at the bearing journal and bearing shell.
- Measure bearing play with Plastigage, **BMW No. 00 2 590**.



- Place the Plastigage strip (arrow) over the full width of the bearing, 6 to 8 mm away from the centre.
- Attach and tighten the bearing cap.



### Tightening torque:

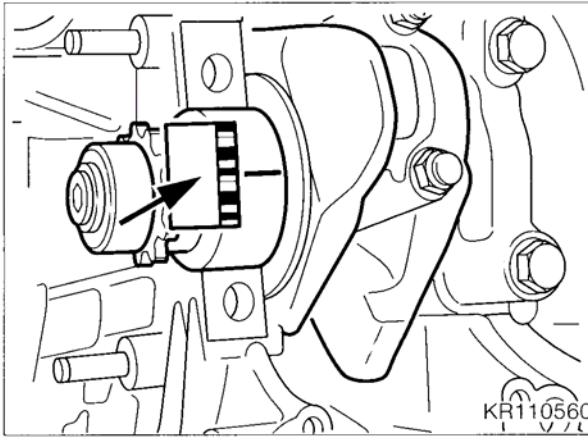
Main bearing ..... 50 Nm



### Note:

Do not turn the crankshaft any more.

- Remove bearing cap.



## Checking dimensions of crankshaft

- If measured bearing play was too large, the dimensions of the crankshaft must be checked. Regrinding stages "0" and "1" are available; the crankshaft is marked with the appropriate number of paint spots at the bearing point. If there are no paint spots, this indicates regrinding stage "0".

Crankshaft dimensions ..... see Technical Data

## Installing piston with conrod



### Note:

Push protective tubes app. 50 mm long on to big end bolts.

- Turn the relevant crankpin to bottom dead centre.
- Make sure that the pistons are in the same weight category.

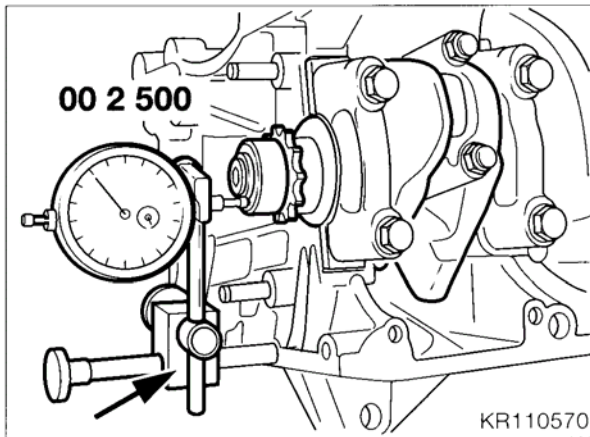
- Compare the width of the strip with the scale (arrow) in order to determine bearing play.

Radial clearance ..... 0.020...0.056 mm

Wear limit ..... 0.110 mm

### Measuring endplay

- Install the crankshaft.



### Caution:

Note the pin for the 2nd piston ring gap.

- The piston ring gaps must be offset by app. 120° in each case.
- Oil the piston rings, piston skirt and cylinder wall thoroughly.
- Insert the piston into the sliding sleeve, **BMW No. 11 6 700**.
- The arrow on the piston crown must point towards the timing end of the engine (cylinder 1).
- Insert the piston with conrod into the cylinder until the sliding sleeve is touching the crankcase.
- Carefully push the piston by hand out of the sleeve and into the cylinder.

- Screw dial gauge holder, **BMW No. 00 2 500**, with dial gauge attached into the tapped hole for the timing case cover.
- Move the crankshaft from one limit to the other and take the dial gauge reading.

Axial play ..... 0.080...0.183 mm

Wear limit ..... 0.250 mm

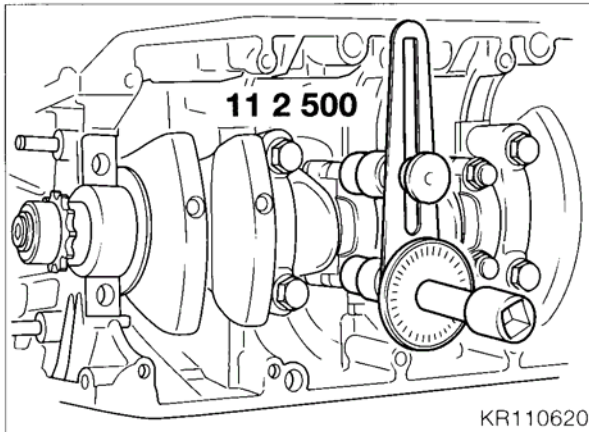
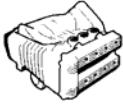


## Installing big end bearing

- Turn the crankpin of the relevant cylinder to bottom dead centre.
- Oil the crankpin and attach the conrod.
- Pull the protective tubes off the bolts.
- Attach the bearing caps with the joint lines aligned, and tighten them.

### **Tightening torque:**

Big end bearings ..... 30 Nm



- Use an angle gauge, **BMW No. 11 2 500**, to tighten the big end bearings.

### **Tightening torque:**

Wrench angle ..... 80°

- Attach the bearing cap so that the joints are aligned, and tighten.

### **Tightening torque:**

Big end bearing ..... 30 Nm

### **Note:**

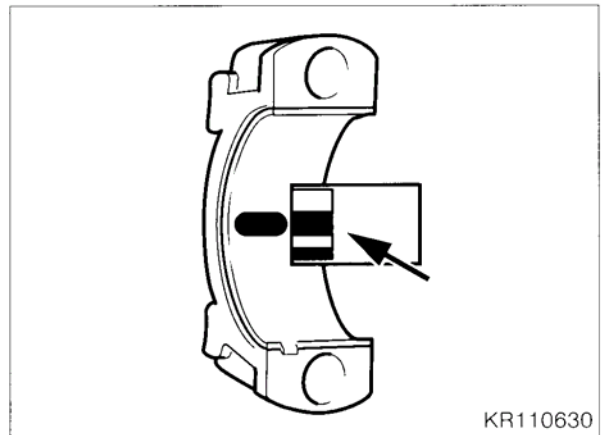
The crankshaft must not be turned any more.

- Using angle gauge (1), **BMW No. 11 2 500**, tighten the big end bearing.

### **Tightening torque:**

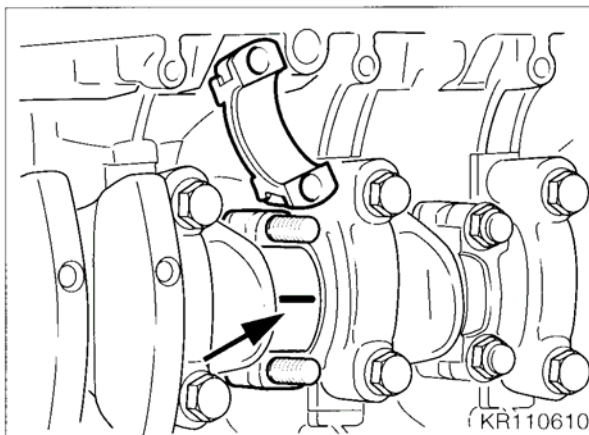
Wrench angle ..... 80°

- Unscrew the big end cap again and remove it.



## Measuring big end bearing play

- Unscrew and remove the bearing cap and clean the crankpin and bearing cap to remove oil.
- Measure bearing play with Plastigage, **BMW No. 00 2 590**.



- Place the Plastigage strip (arrow) over the entire bearing width and 6 to 8 mm away from the centre of the crankpin.

- Use the comparison scale (arrow) to determine bearing play.

Bearing play ..... 0.030...0.066 mm  
Wear limit ..... 0.130 mm

- When renewing the bearing shells, make sure that the same colour marks are present on the crankpin and on the big end bearing.
- Regrinding stages "0" and "1" are available; the crankpins are marked with a corresponding number of paint spots.
- If there are no paint spots, this indicates regrinding stage "0".

### **Note:**

The crankshaft can only be reground in stage "0", and must be hardened and finished afterwards.

## Installing cylinder head



### Caution:

When installing a new cylinder head, make sure that there are no burrs present on the sealing face, particularly in the half-moon areas; machine them away if necessary.

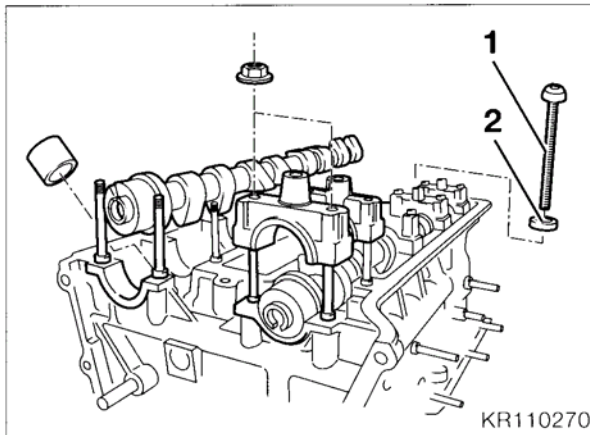
- Set the piston in cylinder 1 to app. 90° before top dead centre (cylinder 1 = at timing end of engine).



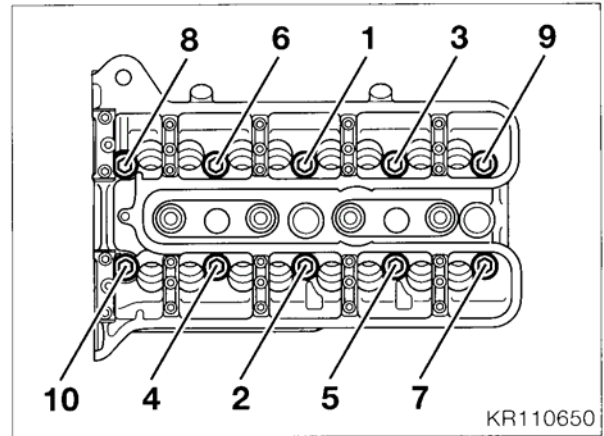
### Note:

Clean the cylinder head bolts and the threads in the engine block. The bolts must enter the tapped holes easily when screwed in by hand; if necessary recut the threads.

- The sealing faces must be clean, flat and undamaged.
- Place the cylinder head gasket in position; no holes or passages must be obstructed.
- Place the cylinder head in position, noting the locating sleeves.



- Oil bolts (1) and washers (2) and screw them in as far as possible.



- Tighten the cylinder head bolts in the order shown.



### Tightening torque:

Cylinder head bolts ..... 20 Nm

- Attach angle gauge, **BMW No. 11 2 500**, using two Torx inserts, **BMW No. 00 2 630**.
- Tighten the cylinder head bolts in 2 stages, to the specified torque and angle, as specified.



### Tightening torque:

First stage ..... 76°  
Second stage ..... 74°

- Install the temperature sensor. (→ 61.15)
- Install the air intake stub pipe. (→ 13.10)
- Install the coolant stub pipe.



### Tightening torque

Temperature sensor ..... 30 Nm  
Intake stub pipe ..... 9 Nm  
Coolant stub pipe ..... 9 Nm

## Installing camshafts



### Note:

Note correct identification of camshafts.

Inlet side: one groove after thrust bearing  
Exhaust side: no grooves after thrust bearing

The camshaft bearing caps are also marked.

Inlet side: odd numbers  
Exhaust side: even numbers



The numbers increase from the front (timing end) to the rear.



### Caution:

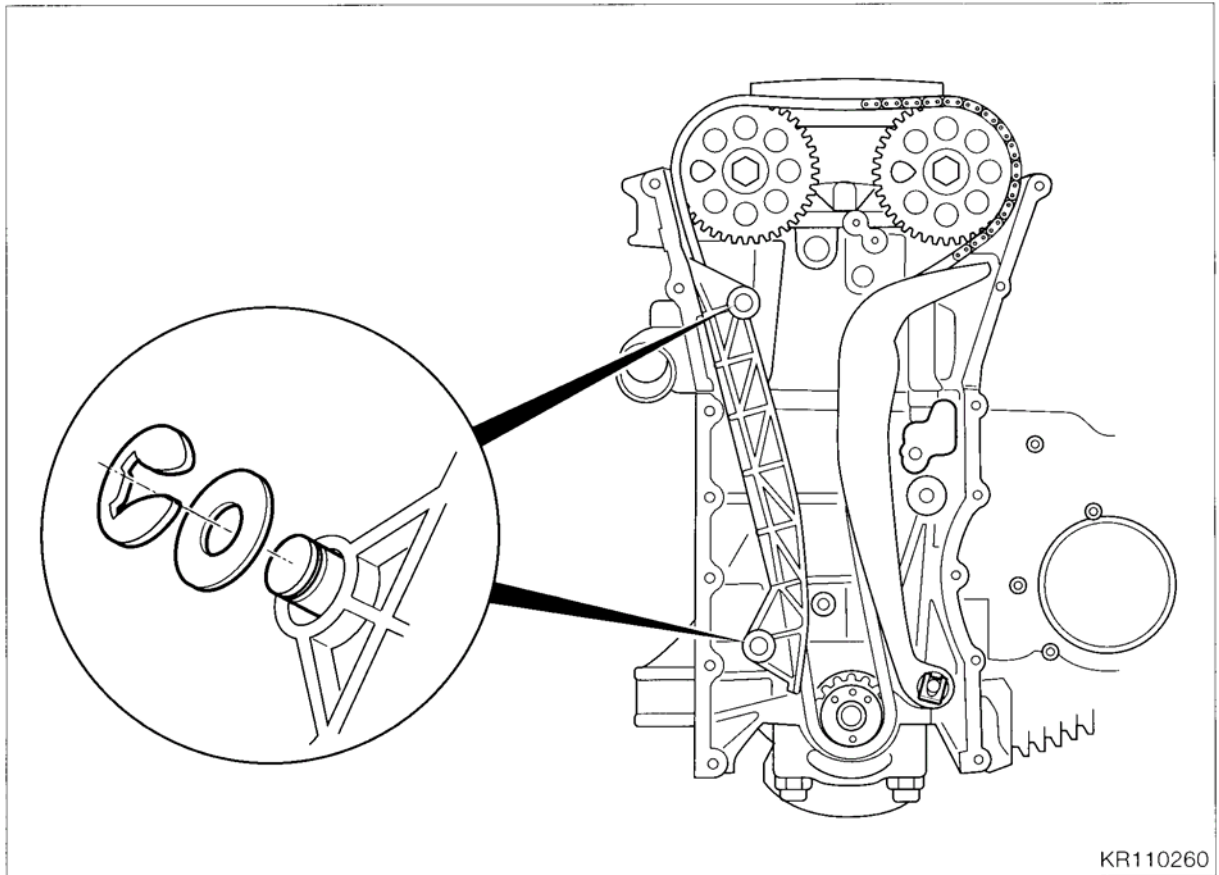
Set the piston in the centre of the cylinder (cylinder 1 app. 90° before top dead centre), to avoid damaging the valves and piston.

- Oil the camshafts at their bearing points.
- Insert the camshafts so that the tops of the cams are exposed.
- Install the inner bearing caps first.
- Tighten the bearing caps uniformly, working from the inside outwards.
- Install the thrust bearing (timing end) with slide rail last and do not tighten it until the chain sprockets have been installed.



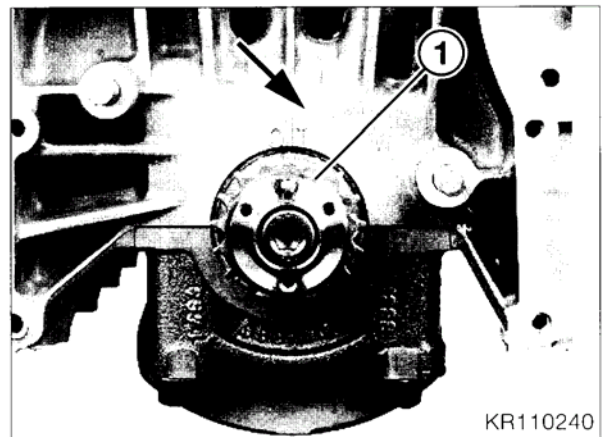
### Tightening torque:

Bearing cap..... 9 Nm

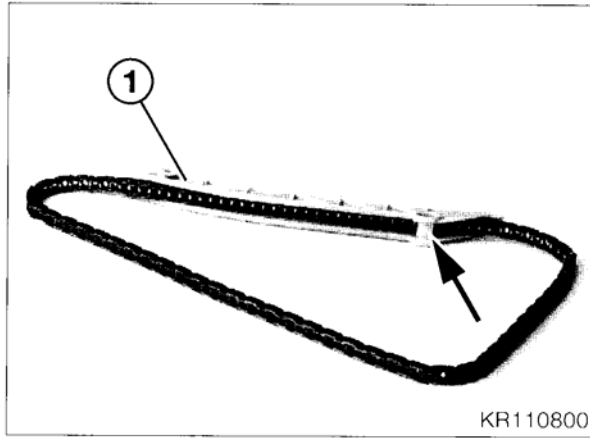
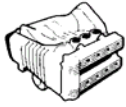


### Installing timing chain

- Turn the camshafts so that the rear grooves (opposite end to timing end) are vertical in relation to the cylinder head.
- The grooves at the timing end must face towards the crankshaft.
- Attach aligning device, **BMW No. 11 3 700**, and secure tightly to camshaft bearing caps.



- Turn the crankshaft through a further 90° (note correct direction of rotation), the piston in cylinder 1 must move up to top dead centre (cylinder 1 = at timing end). The pin (1) on the crankshaft is aligned with the mark (arrow) on the crankcase.



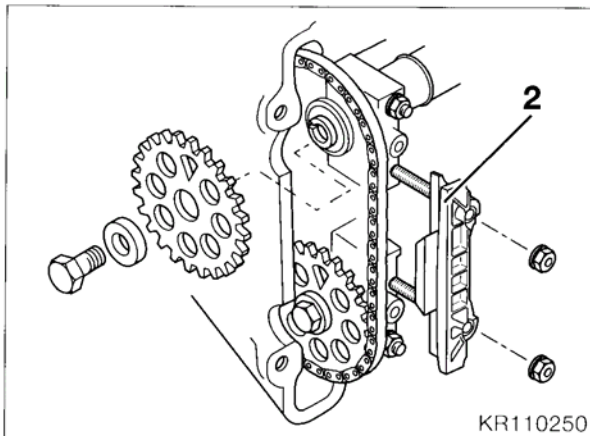
- Place the timing chain in guide rail (1).
- Insert bushing (arrow) between slots of guide rail.
- Press the guide rail with timing chain and bushing on to the pivot pin.



**Note:**

When installing the guide rail, do not allow the timing chain to mesh with the crankshaft chain sprocket.

- Install the guide rail keeper and washer at both pivot pins.



- Attach guide rail (2).
- Install the inlet camshaft chain sprocket so that the timing chain is as taut as possible at the guide rail.
- Insert the screw as far as possible.
- Push the tensioner rail on to the pivot pin and install the washer and keeper.

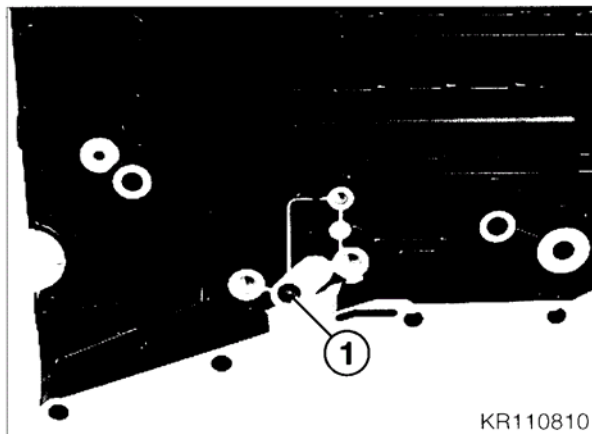
- Install the exhaust camshaft chain sprocket so that the timing chain is as taut as possible between the sprockets.
- Insert the screw as far as possible.
- Tighten the bearing cap with guide rail.
- Remove the aligning device, **BMW No. 11 3 700**.
- Tighten the chain sprockets, holding the hexagon on the camshaft to prevent it from turning.



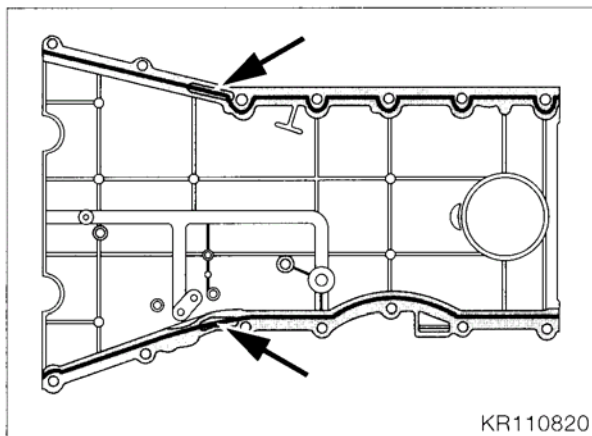
**Tightening torque:**

Bearing cap .....	9 Nm
Chain sprockets.....	56 Nm

## Installing timing case cover



- Insert O-ring (1) for chain tensioner into timing case cover.
- Install chain tensioner in timing case cover.
- Prevent chain tensioner from moving with pin, **BMW No. 11 6 740**.



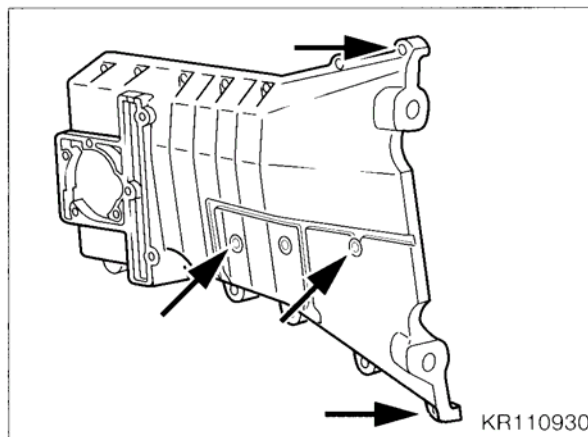
- Apply a thin coat of **Three Bond 1209** to the sealing face (which must be free from oil and grease) and also in the area of the holes (2) stated above, along the line shown on the grey-shaded area of the sealing face in the drawing.
- Fill the compensating groove (arrow) with the sealant.



### Note:

Scrape off excess sealant with a spatula.

- Lead the wires for the oil pressure telltale and water pump temperature sensor through the cable duct.



- Attach and tighten the timing case cover, noting the correct positions of the long bolts (arrows).
- Remove the chain tensioner pin and tighten the screw plug.
- Turn the engine over and check the relative positions of the camshaft sprockets and the sprocket on the crankshaft.

### Tightening torque:

Chain tensioner.....	9 Nm
Timing case cover.....	9 Nm
Screw plug for pin.....	9 Nm

### Checking valve clearances

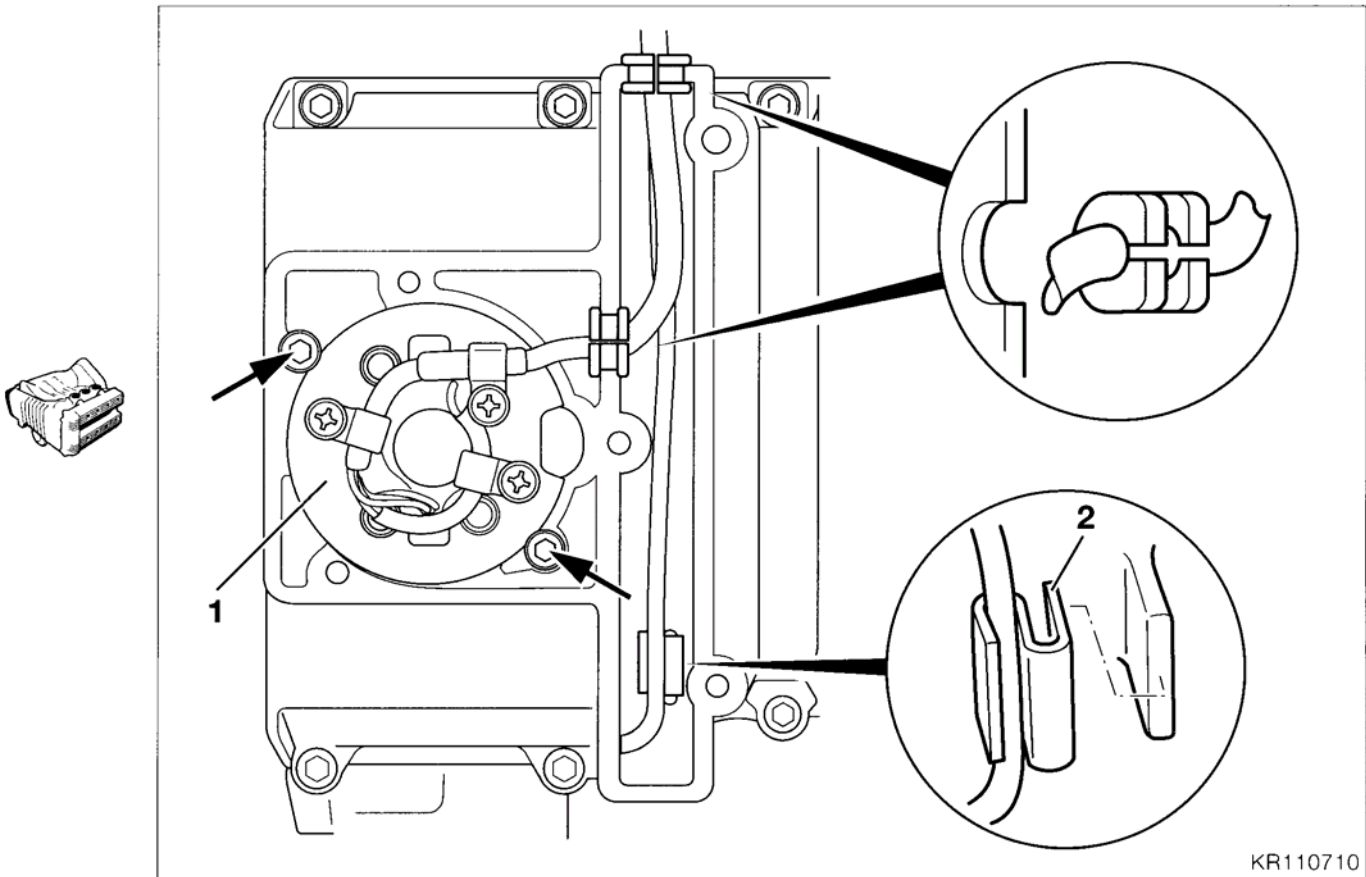
- Turn the engine over at the crankshaft (counter-clockwise).
- Measure valve clearance with feeler gauge.

### Valve clearances:

Inlet.....	0.15...0.20 mm
Exhaust.....	0.25...0.30 mm


- If valve clearances have to be corrected, remove the camshaft again.
- Fit the correct bucket-type tappets.






### Installing ignition transmitter

- Attach adjusting disc and rotor to crankshaft, and tighten.
- Attach magnetic gate (1) in the position originally marked.
- Tighten screws (arrow) with washer and semi-circular shim.

 **Tightening torque:**

Rotor.....	4 Nm
Magnetic gate .....	6 Nm

 **Caution:**  
Correct the ignition timing.

### Installing ignition transmitter cover

- Run the wire to the ignition transmitter through a rubber grommet in the timing case cover.
- Secure the wires for the oil pressure telltale and water pump temperature sensor with clip (2).
- Install the cover with gasket.

 **Tightening torque:**

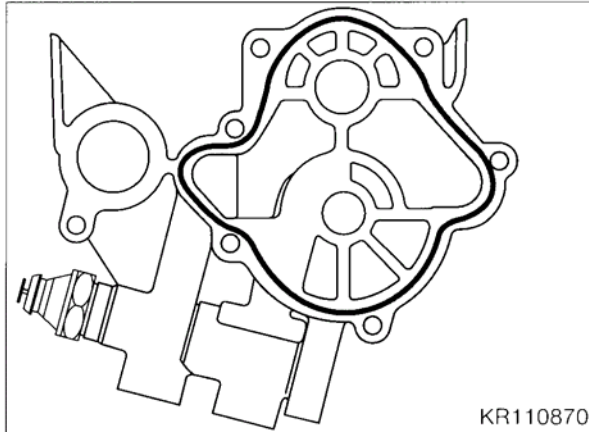
Ignition transmitter cover .....	9 Nm
----------------------------------	------

## Installing combined oil/water pump

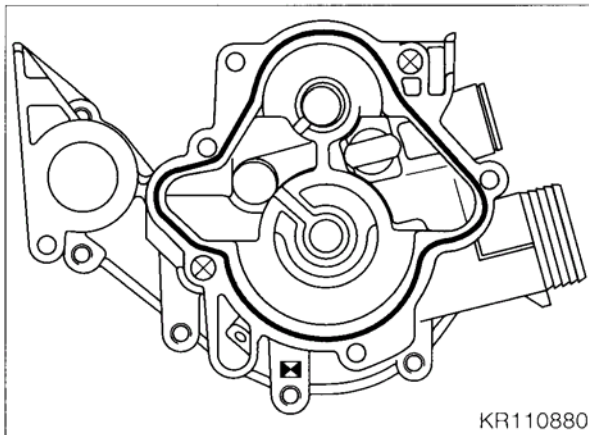


### Caution:

Tighten the clutch housing before installing the oil/water pump, so that the output shaft cannot damage the pump housing.



- Coat the sealing face on the intermediate oil pump flange (which must be free from oil and grease) lightly with **Three Bond 1209** along the line shown on the grey shaded area of the sealing face in the drawing.
- Place O-ring on water passage.
- Attach the intermediate oil pump flange.



- Coat the sealing face on the pump housing (which must be free from oil and grease) lightly with **Three Bond 1209** along the line shown on the grey shaded area of the sealing face in the drawing.
- Place the O-ring on the water passage.
- Attach the drive pinion to the output shaft.
- Attach the pump housing and insert the screws loosely at first.



### Note:

Turn the crankshaft to centre the gearwheels, tightening the screws further at the same time.

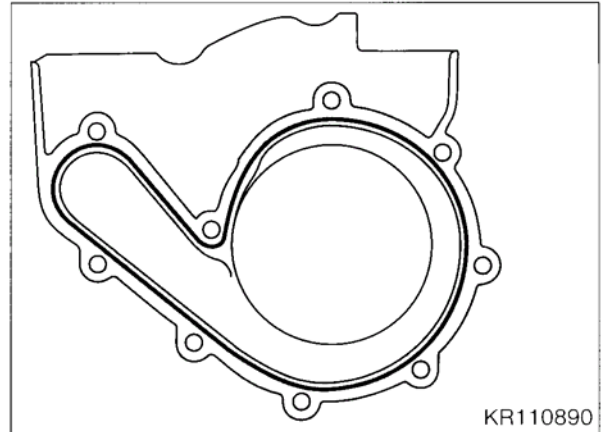
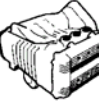
- Tighten the screws finally.
- Check for any noticeable play at any position of the water pump gearwheel.



### Tightening torque:

Pump housing to crankcase ..... 10 Nm

- Run the wires for the oil pressure telltale and water pump temperature sensor through the hole in the pump housing and connect them.



- Coat the sealing face on the pump housing cover (which must be free of oil or grease) lightly with **Three Bond 1209** along the line shown on the grey shaded surface of the sealing face.
- Attach and tighten the pump housing cover.



### Tightening torque:

Pump housing cover ..... 10 Nm

## Installing crankcase cover

- Apply a thin coat of **Three Bond 1209** at the areas where the crankcase, intermediate flange and crankcase cover meet, and to the sealing faces on the crankcase, timing case cover and crankcase cover.
- Attach the crankcase cover with gasket.
- Screw all bolts in fully.
- Tighten the bolts in a crosswise pattern, working from the inside outwards.



### Tightening torque:

Crankcase cover ..... 9 Nm

## Installing cylinder head cover

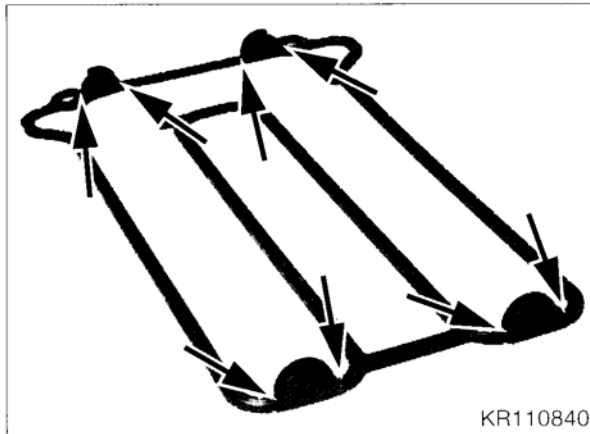
- Install the spark plugs.  
(⇒ 12.7)
- Install the ignition coil.  
(⇒ 12.9)

### Tightening torque

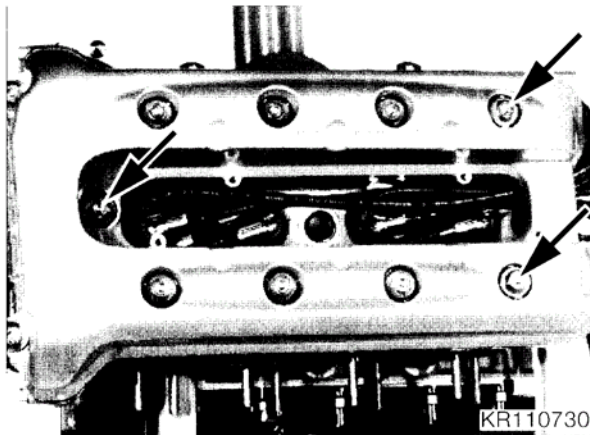
Spark plug..... 20 Nm  
Ignition coil..... 9 Nm



- Install the ignition leads.  
(⇒ 12.7)
- Install the cylinder head cover gasket with the half-moon cutouts first. The marks at the front and rear of the gasket and the cylinder head cover must coincide.



- Apply a thin coat of **Three Bond 1209** at the areas where the cylinder head, timing case cover and cylinder head cover meet and at the half-moon cutouts (arrows).



- Attach the cylinder head cover. Insert the front centre screw (timing end, arrow) and both rear screws (arrows) in order to locate the gasket.



### Note:

Do not forget the contact spring.

- Tighten all screws until they make contact.
- Tighten the screws finally in a crosswise pattern, working from the inside outwards.
- Attach the screen plate to the cylinder head cover.



### Tightening torque

Cylinder head cover..... 9 Nm

## Installing engine

(⇒ 51.6)

- Place the engine on the hoist with lifting fixture, **BMW No. 00 1 510**.
- Install the gearbox.
- Install the starter motor and alternator.
- Install the fuel lines on the engine block.



### Caution:

When lowering the frame, make sure that the necessary clearance is present at the right between frame and gearbox.

- Bolt engine and gearbox into frame.
- Connect wires and connectors for engine and gearbox, and secure them with cable straps.
- Install throttle butterfly rail complete with intake air silencer.
- Install fuel injection rail.
- Install lower cross-tube.
- Install rear swinging arm.
- Install exhaust system.
- Install radiator with fan at left and right.
- Fill engine with oil.
- Attach engine spoiler.
- Install fuel tank.
- Attach left and right side sections of fairing.



### Caution:

Attach and tighten the positive battery terminal first, then the negative one.

- Install the battery.

## Checking/adjusting valve clearances

### Checking valve clearances



#### Caution:

Never unscrew the spark plugs before measuring valve clearances. Particles of oily soot could become lodged behind the exhaust valve head and falsify the measurement.

- Remove left side section of fairing. (→ 46.10)
- Remove cylinder head cover.
- Turn the engine over by means of the rear wheel.
- Measure valve clearance with feeler gauge.
- Max. engine temperature 35 °C.
- Make a nominal-actual comparison to determine size of replacement tappets.

#### Valve clearance:

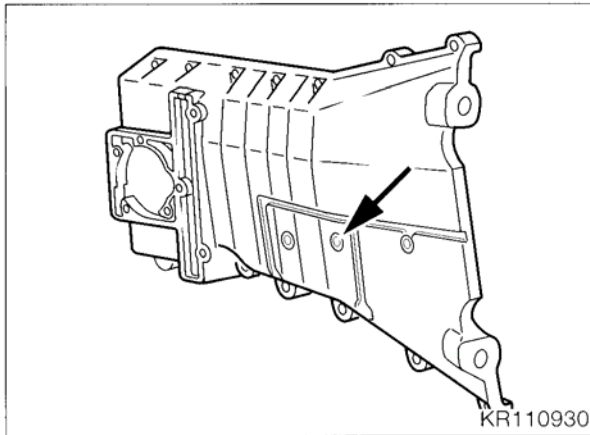
Inlet ..... 0.15...0.20 mm  
Exhaust ..... 0.25...0.30 mm

### Adjusting valve clearances



#### Note:

To renew the bucket-type tappets, the camshafts must be removed.



- Remove the screw plug (arrow) for the pin in the timing case cover.
- Prevent the chain tensioner from moving in the timing case cover with pin, **BMW No. 11 6 740**.



#### Note:

Turn or press the camshaft in the normal direction of rotation (for app. 20 to 30 seconds if the engine is cold) until the oil is forced out of the chain tensioner and the pin can be inserted fully.



#### Caution:

Position the piston in the centre of the cylinder (cylinder 1 app. 90° before top dead centre) in order to avoid damaging the valves and pistons.

- Unscrew the slide rail.
- Unscrew the chain sprockets, holding the camshaft at the hexagon to prevent it from turning.
- Take off the chain sprockets and slide rail.



#### Note:

Secure the timing chain with a cable strap.

- Turn the camshafts until the tops of the cams are exposed.
- Remove the thrust bearing cap first in order to prevent tilting.
- Release the radial bearing caps uniformly and remove them.
- Take out the camshafts.
- Using rubber suction device, **BMW No. 11 3 251**, pull the bucket-type tappets out of the cylinder head as necessary and renew them.
- Oil the camshafts at their bearing points.



#### Note:

Note the markings on the camshafts.

Inlet side: one groove after the thrust bearing  
Exhaust side: no groove after the thrust bearing

The camshaft bearing caps are also marked.

Inlet side: odd numbers  
Exhaust side: even numbers

The numbers are in ascending order from the front (timing end) to the rear.

- Insert the camshafts so that the tops of the cams are exposed.
- Install the inner bearing caps first.
- Tighten the bearing caps uniformly, starting from the inside and working outwards.
- Install the thrust bearing (timing end) with slide rail last, and do not tighten it until the chain sprockets have been installed.



#### Tightening torque:

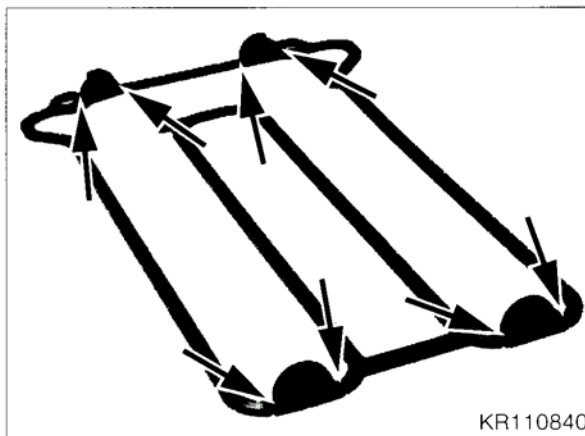
Bearing caps ..... 9 Nm



- Turn the camshafts so that the grooves at the rear (opposite end from timing end) are vertical in relation to the cylinder head.
- The grooves at the timing end must point towards the crankshaft.
- Attach the aligning device, **BMW No. 11 3 700**, and secure it to the camshaft bearing caps.

**⚠ Caution:**

When turning the crankshaft, make sure that the timing chain does not come away from the crankshaft sprocket.

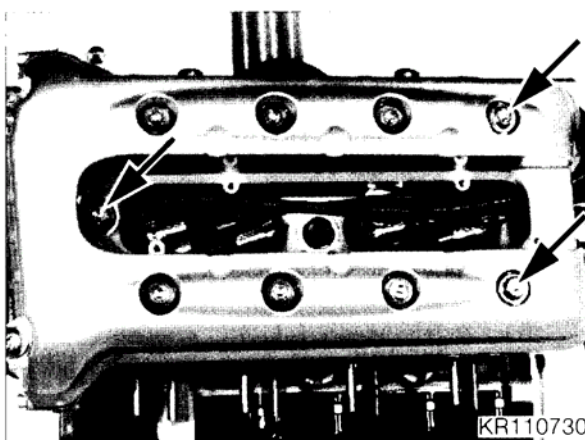


KR110840



- Turn the crankshaft through a further 90°; the piston in cylinder 1 must then be at top dead centre (cylinder 1 = timing end of engine).
- Install the inlet camshaft chain sprocket so that the timing chain is as taut as possible at the guide rail.
- Insert the screw fully.
- Install the exhaust camshaft chain sprocket so that the timing chain is as taut as possible between the sprockets (in the slide rail).
- Insert the screw fully.
- Tighten the bearing cap with slide rail.
- Remove the aligning device, **BMW No. 11 3 700**.
- Tighten the chain sprockets, holding the hexagon on the camshaft to prevent it from turning.
- Remove pin for chain tensioner and tighten screw plug.

- Apply a thin coat of **Three Bond 1209** to the joint areas where the cylinder head, timing case cover and cylinder head cover meet and in the half-moon areas (arrows).



KR110730

**⚠ Tightening torque:**

Bearing caps .....	9 Nm
Chain sprockets .....	56 Nm
Screw plug for pin .....	9 Nm

- Install the cylinder head cover. Insert the front centre screw (timing end, arrow) and the two rear screws (arrows) in order to locate the gasket.

**📄 Note:**

Do not forget the contact spring.

- Insert all screws fully.
- Tighten the screws in a crosswise pattern, working from the inside outwards.

**⚠ Tightening torque**

Cylinder head cover .....	9 Nm
---------------------------	------

- Attach the engine spoiler.  
(⇒ 46.12)
- Attach the left side section of the fairing.  
(⇒ 46.10)

## **12 Engine electrical system**

# Contents

Page

<b>Renewing Hall-effect transmitter</b> .....	5
Removing cover from Hall-effect sensor .....	5
Removing magnetic gate .....	5
Installing the magnetic gate .....	6
Install the cover of the Hall-effect transmitter .....	6
<b>Renewing spark plugs/ignition leads</b> .....	7
Removing/installing spark plugs .....	7
Removing/installing ignition leads .....	7
<b>Timing the ignition</b> .....	8
<b>Removing/installing coils</b> .....	9
<b>Renewing alternator</b> .....	10
Removing alternator .....	10
Stripping down alternator .....	11
Removing/installing drive housing .....	11
Removing/installing voltage regulator .....	11
Installing alternator .....	12
<b>Renewing starter motor</b> .....	13
Removing starter motor .....	13
Stripping and re-assembling starter motor .....	14
Removing/installing brush holder .....	14
Renewing carbon brushes .....	14
Installing starter motor .....	15



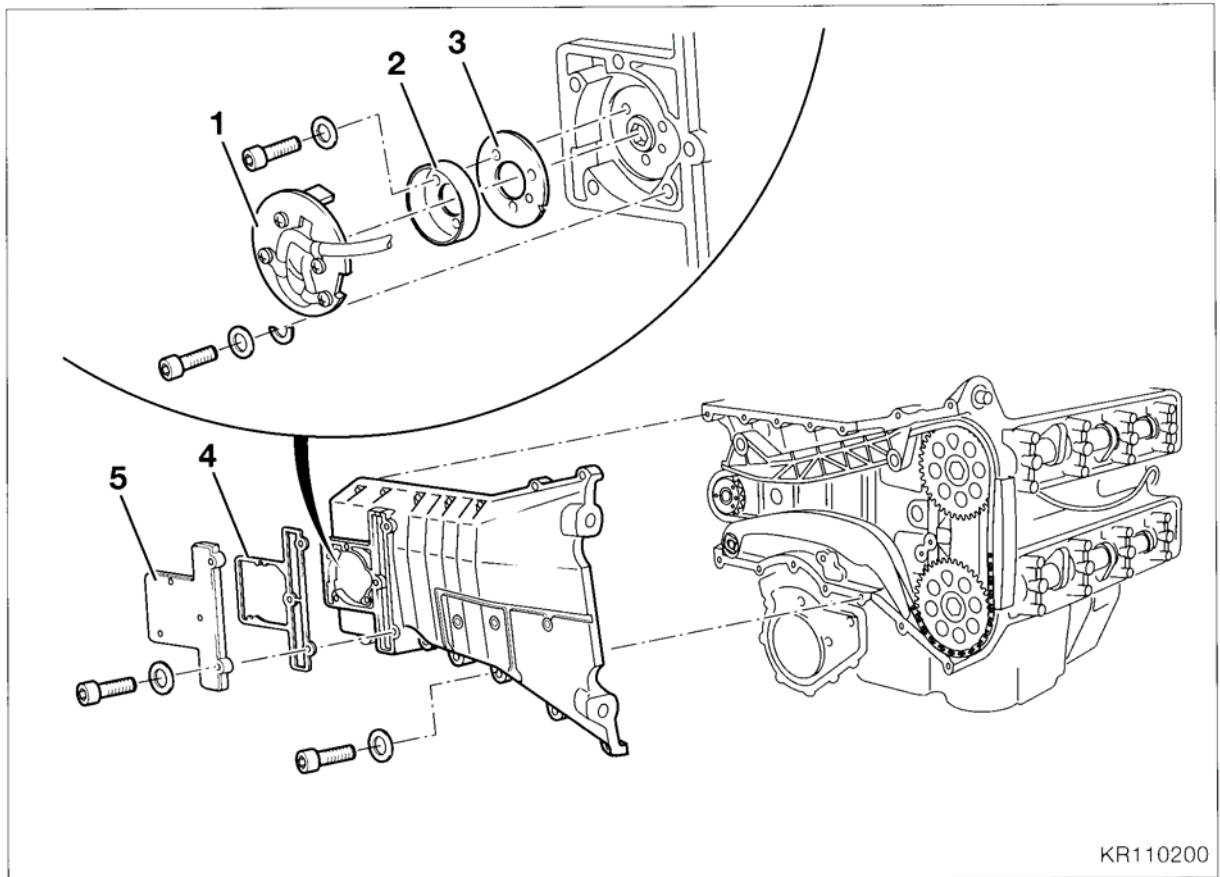




Technical data		K 1200 RS
<b>Starter motor</b>		
Type		Permanent-magnet motor
Gear ratios		27:1
Power rating	kW	0.7
<b>Alternator</b>		
Type		Three-phase AC generator
Gear ratios		1:1.5
Drive		direct
Maximum output rating	W/V	840/14
Maximum current	A	60
Alternator speed for start of charge	min <sup>-1</sup>	1400
Max. operating speed	min <sup>-1</sup>	18000
<b>Spark plugs</b>		
Bosch		XR 7 LDC
Thread	metric	M 12 x 1.25
<b>Ignition</b>		
Ignition system		Motronic (mapped characteristic control)
Ignition trigger		Two magnetic gates operated from crankshaft (Hall-effect)
Static ignition timing	°CS	6° = 0.24 mm bTDC
Speed governing	min <sup>-1</sup>	9400
<b>Ignition coil</b>		
Twin coils		
Resistance: Primary	Ω	0,5
Secondary	kΩ	13,3







KR110200

## Renewing Hall-effect transmitter

- Remove right side section of fairing.  
(→ 46.10)
- Remove engine spoiler.  
(→ 46.12)

### Removing cover from Hall-effect sensor

- Remove cover (5).
- Take off gasket (4).

### Removing magnetic gate

- Remove fuel tank.  
(→ 16.5)

### **Caution:**

Switch off ignition; disconnect earth (ground) lead at battery and insulate it.

- Open lid of electronic equipment box.
- Detach right-hand radiator from holder and press it forwards.



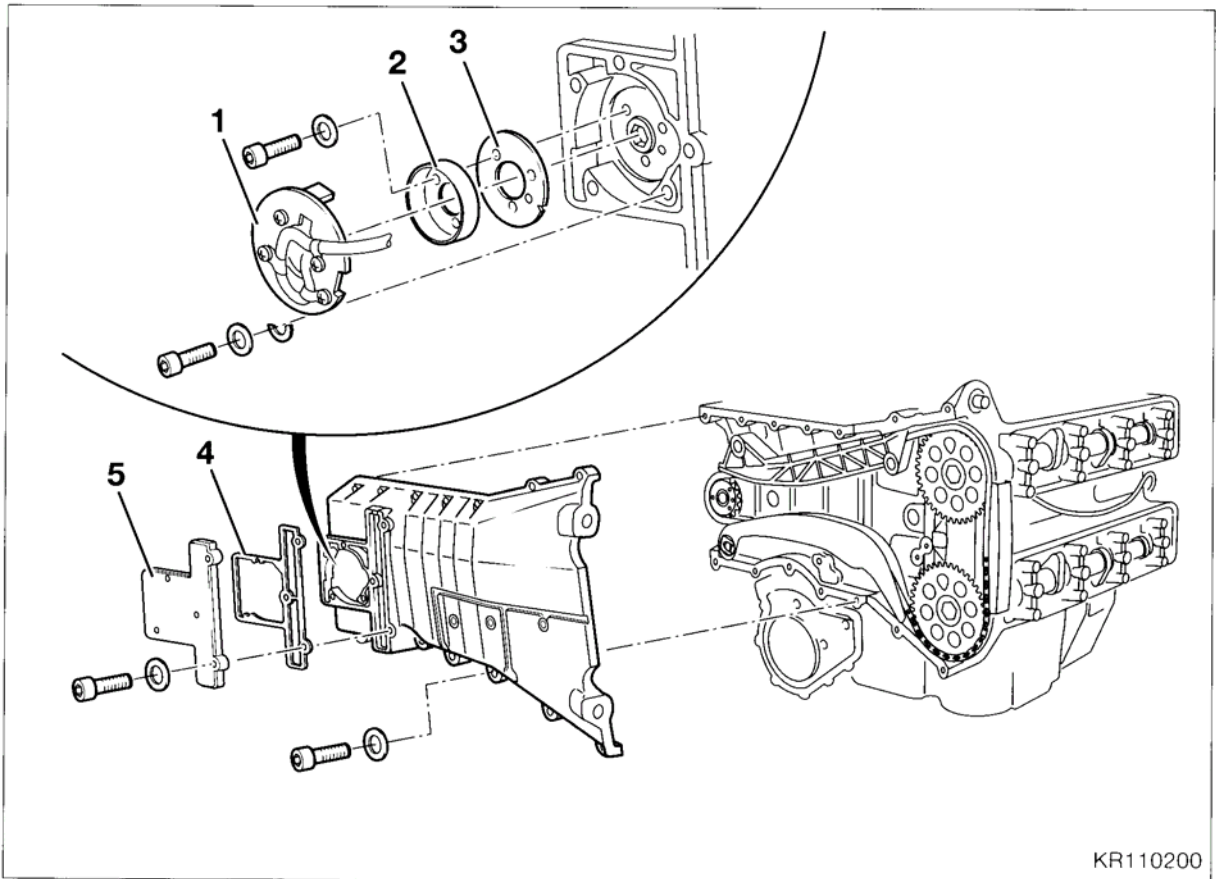
KR120050



### **Note:**

Mark the position of the magnetic gate in relation to the engine block, or remove it in the top dead centre (TDC) position.

- Remove magnetic gate (1), noting the presence of semi-circular shims.
- Remove rotor (2) and take off adjusting disc (3).
- Separate the plug connector (6) in the electronic equipment box.



KR110200

### Installing the magnetic gate

- Place adjusting disc (3) and rotor (2) on crankshaft, and tighten.
- Install magnetic gate (1) in the same position as previously marked.
- Secure with washer and semi-circular washers, and tighten.
- Reconnect the plug connector in the electronic equipment box.

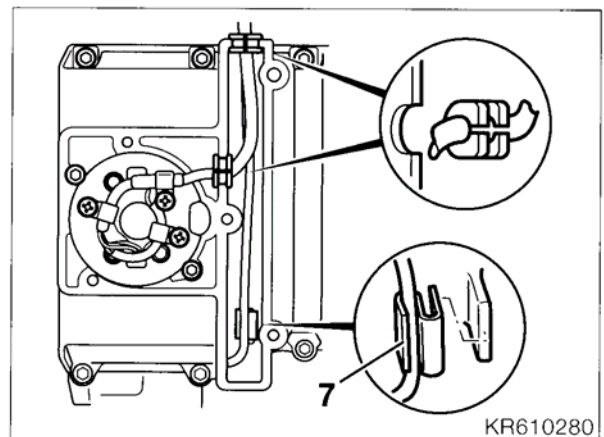
#### Tightening torques:

Rotor .....	4 Nm
Magnetic gate .....	6 Nm



**Caution:**  
Correct the ignition timing.

### Install the cover of the Hall-effect transmitter



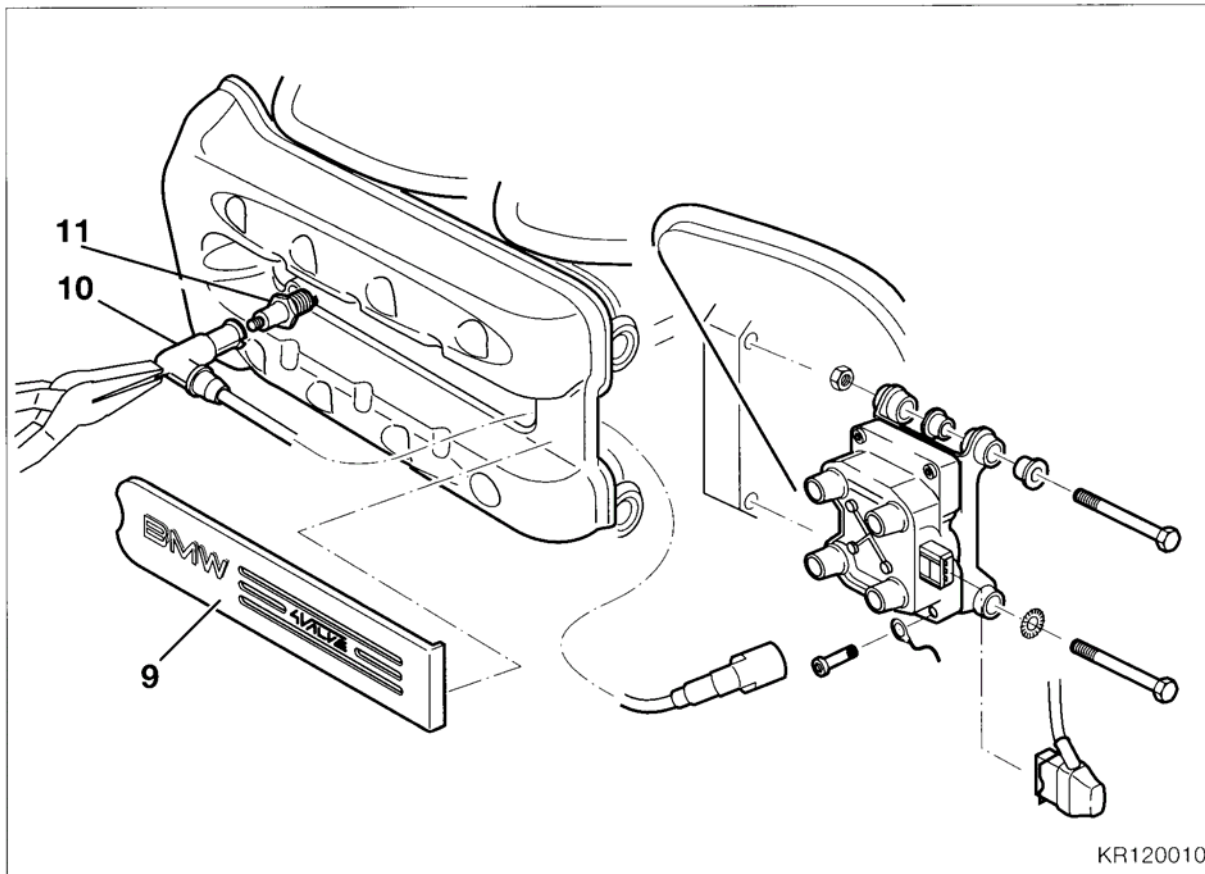
KR610280

- Run the wire to the magnetic gate through the timing case cover with a rubber sleeve.
- Secure the wires for the oil pressure telltale and temperature display with clip (7).
- Install cover (5) with gasket (4).
- Continue installation in the reverse order of work.



#### **Tightening torque:**

Hall-effect transmitter cover ..... 9 Nm



KR120010

### Renewing spark plugs/ignition leads

- Remove left side section of fairing.  
(→ 46.10)
- Detach the screen plate (9).
- Pull off the spark plug caps (10) with flat pliers.

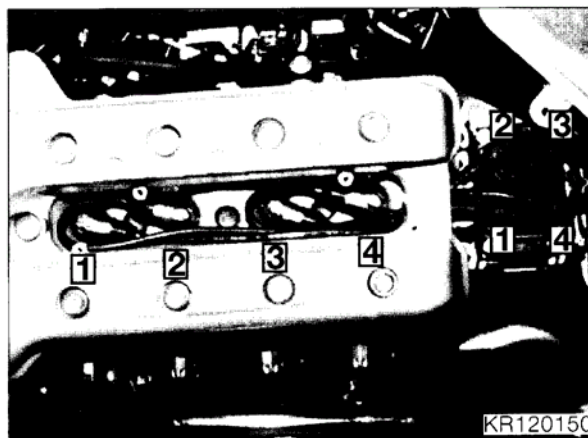
### Removing/installing spark plugs

- Unscrew and remove spark plugs (11) with spark plug wrench, **BMW No. 12 3 500**.
- Install in the reverse order of work.

**Tightening torque:**  
Spark plugs..... 20 Nm

### Removing/installing ignition leads

- Detach plugs at coil.
- Remove ignition leads.



KR120150



**Note:**

When installing, make sure that the ignition leads run correctly.

- Install in the reverse order of work.

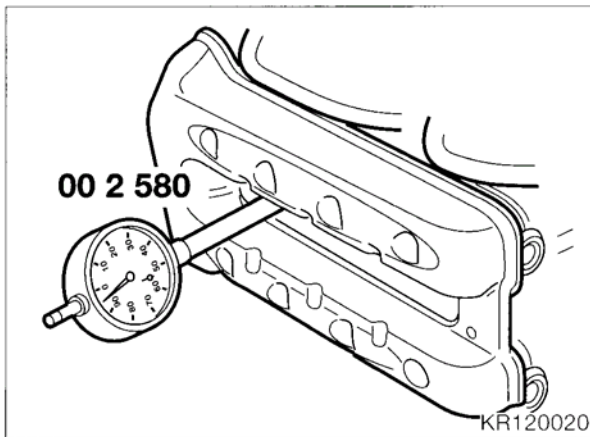
## Timing the ignition



### Caution:

Disconnect earth (ground) lead from battery.  
Insulate earth (ground) lead.

- Remove the spark plugs.
- Remove the cover from the Hall-effect transmitter.
- [with Motronic] Remove the left side section of the fairing.
- [without Motronic] Remove the fuel tank.
- [without Motronic] Open the lid of the electronic equipment box.



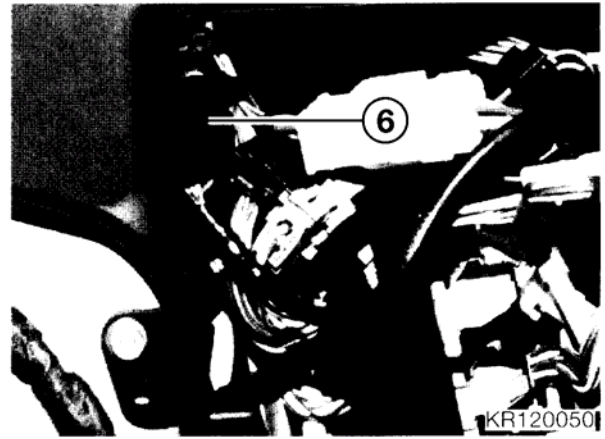
- Screw dial gauge, **BMW No. 00 2 580**, with extension into cylinder 1.
- Set the piston to TDC.
- Set the dial gauge scale ring to "0".
- Turn the engine back in a clockwise direction (normal direction of engine rotation is anti-clockwise) until the piston position at which ignition takes place is reached.

### Adjusting value:

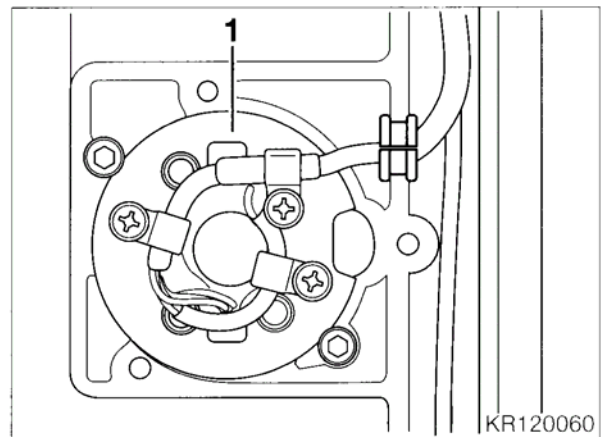
Ignition

timing ..... 6° before TDC = 0.24 mm before TDC

- [with Motronic] Connect **BMW MoDiTeC** to diagnosis plug.



- [without Motronic] Connect **BMW MoDiTeC** to plug connector (6) on the Hall-effect transmitter.
- Start the "Timing ignition" program at the **BMW MoDiTeC**.



- Loosen the fastenings at magnetic gate (1) and turn it to the left or right until the **BMW MoDiTeC** displays the correct ignition firing point.

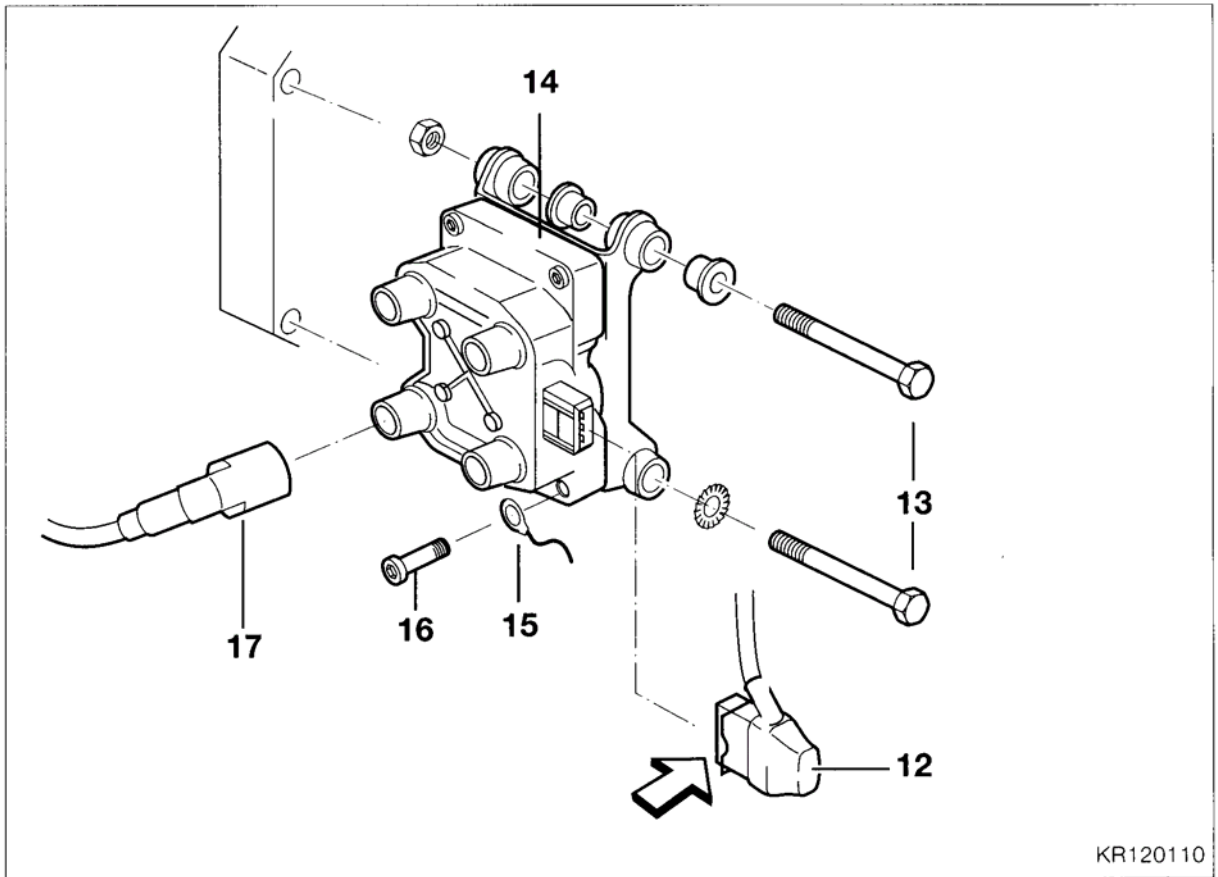
### Procedure for retiming ignition:

Turned anticlockwise ..... retard ignition  
Turned clockwise ..... advance ignition

- Retighten magnetic gate (1).
- Check that ignition timing is correct.
  - Turn the engine in its normal direction of rotation. With the piston at 0.24 mm before TDC, the **BMW MoDiTeC** must display the correct ignition firing point.
- Install in the reverse order of work.

### Tightening torques:

Magnetic gate ..... 6 Nm  
Spark plugs ..... 20 Nm



KR120110

### Removing/installing coils



**Caution:**

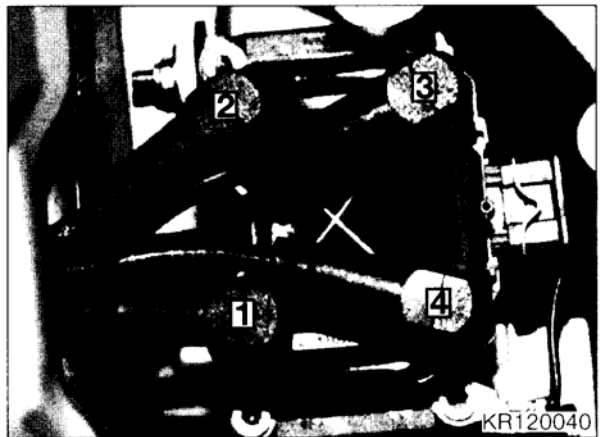
Note positions of ignition leads at coil.



**Caution:**

Switch off the ignition and disconnect and insulate the earth (ground) lead at the battery.

- Remove left side section of fairing. (→ 46.10)
- Pull the ignition lead plugs (17) off at the coil.
- At plug (12), press in the clip (in the direction shown by the arrow) and pull the plug off.
- Release the fastening (16) for the earth (ground) line (15).
- Release fastenings (13).
- Take off the coil (14).



KR120040

- Install in the reverse order of work.



**Tightening torque:**

Coil to intermediate flange ..... 9 Nm

## Renewing alternator

### Removing alternator



#### Note:

For further information on the work described below, see brief version of gearbox removal procedure (→ 51.3) or full description in the relevant chapters.

- Remove the dualseat.
- Remove the left and right and the rear left/right side sections of the fairing.



#### Caution:

Disconnect the negative battery terminal first, then the positive one.

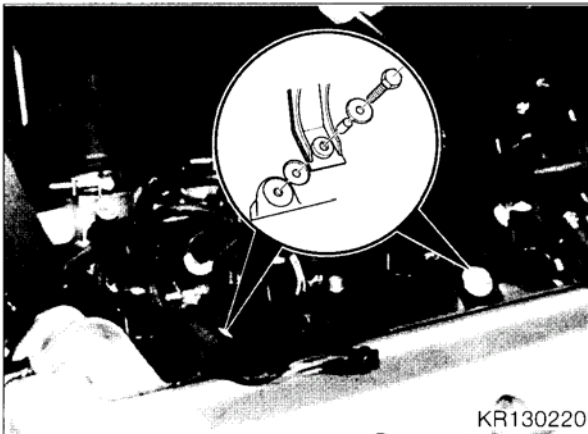
- Remove the battery.



#### Warning:

Comply with safety precautions when handling or working with fuel; note that the fuel lines are pressurised.

- Remove fuel tank.
- Remove intake air silencer.



KR130220

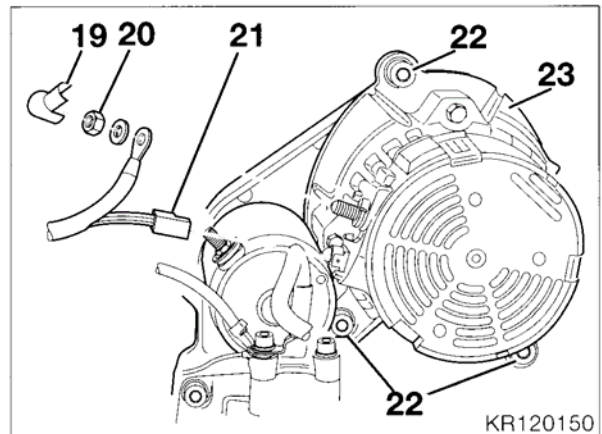
- Injection rail: take out the screws and remove the fastenings.
- Pull the injection rail with the injectors out of the intake stub pipe.
- Attach the hoist to the engine's sump.
- Remove rear wheel drive assembly.
- Remove swinging arm and gearbox.
- Detach the cross-tube at the bottom.
- Press the left/right radiator with fan out of the holder.
- Cut through the cable strap for the clutch breather at the frame.



#### Caution:

Unscrew the three fastenings uniformly and alternately.

- Remove the clutch slave cylinder and guide the clutch line upwards.
- Separate the plug connector for the gear indicator and guide the cable through downwards.
- Separate the plug connector for the water temperature sensor at the cylinder head and guide the cable through downwards.
- Separate the plug connector for the side (prop) stand switch and guide the cable through downwards.
- Separate the plug connector for the oxygen sensor (lambda probe), and guide the cable through downwards.
- Detach the cable from the starter motor.
- Detach the earth (ground) wire from the upper cross-tube.

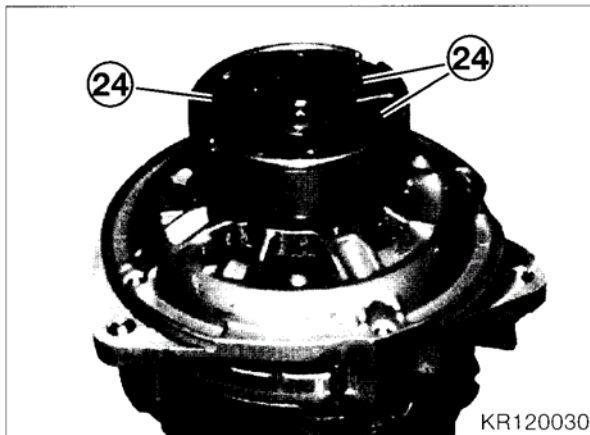


- Pull off cap (19).
- Detach connection (20) from alternator lead.
- Take off alternator lead.
- Pull off flat plug (21).
- Raise the frame.
- Remove the three fastenings (22).
- Pull the alternator (23) off the intermediate flange.

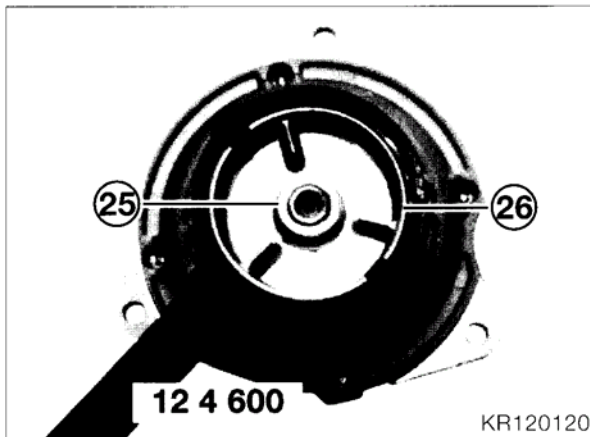


## Stripping down alternator

### Removing/installing drive housing



- Take out rubber dampers (24).



- Hold drive housing (26) with retaining device, **BMW No. 12 4 600**, to prevent it from turning, release fastening (25) and take it off together with the spring washer.
- Take off the drive housing (26).
- Install in the reverse order of work.



#### ! Tightening torque:

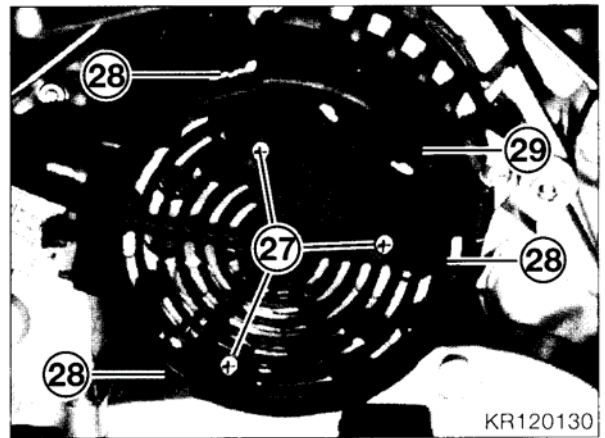
Drive housing ..... 50 Nm

### Removing/installing voltage regulator

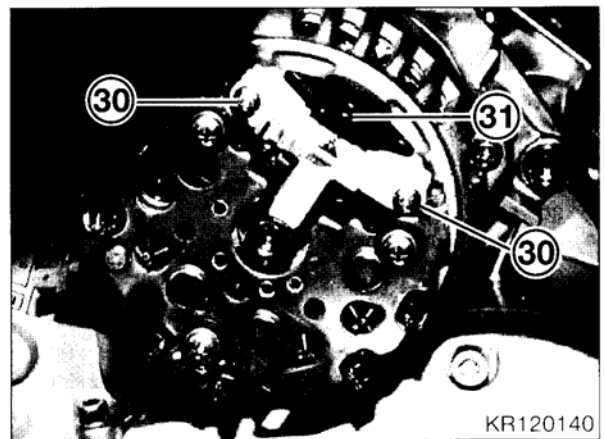


#### Note:

The regulator can also be removed/installed without removing the alternator.



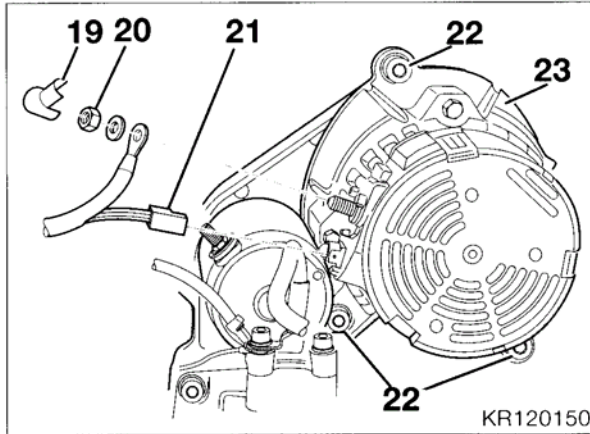
- Release the fastenings (27).
- Unlock the clips (28) and take off the housing cover (29).



- Release fastenings (30).
- Remove voltage regulator with carbon brushes (31).
- Install in the reverse order of work.



## Installing alternator



- Offer the alternator (23) up to the intermediate flange.
- Tighten the three fastenings (22).
- Lower the frame.
- Attach the flat plug (21).
- Attach the alternator cable. Tighten nut (20) and attach cap (19).
- Connect the cable to the starter motor.
- Connect the earth (ground) lead to the upper cross-tube.
- Join the plug connector for the side (prop) stand switch.
- Attach the plug connector for the oxygen sensor (lambda probe).
- Join the plug connector for the temperature sensor at the cylinder head.
- Join the plug connector for the gear indicator switch.



### Caution:

Tighten the three fastenings at the clutch slave cylinder alternately and uniformly, with the bleed line open at the bleed screw.

- Install the clutch slave cylinder.
- Secure the cable straps.
- Run the clutch bleed line along the frame and secure it in position.

- Install the left/right radiators with fans.
- Install the lower cross-tube.
- Install the swinging arm and drive shaft.
- Install the rear wheel drive.
- Detach hoist from engine sump.
- Install fuel injection rail.
- Install intake air silencer.



### Warning:

Comply with safety precautions when working with fuel.

- Install fuel tank.



### Caution:

Attach and tighten the positive battery terminal first, then the negative one. Note correct installed position of positive terminal.

- Install the battery.
- Install the complete fairing.
- Install the dualseat.



### Tightening torque:

Alternator to intermediate flange ..... 20 Nm

## Renewing starter motor

### Removing starter motor



#### Note:

For further information on the work described below, see brief version of gearbox removal procedure (→ 51.3) or full description in the relevant chapters.

- Remove the dalseat.
- Remove the left right and rear left/right sections of the fairing.



#### Caution:

Disconnect the negative battery terminal first, then the positive one.

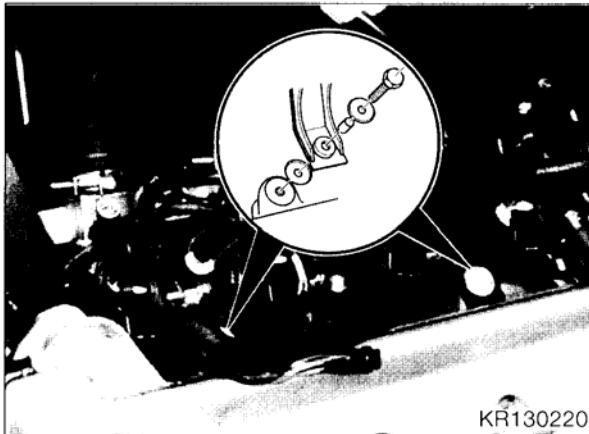
- Remove the battery.



#### Warning:

Comply with safety precautions when working with fuel; the fuel lines are pressurised.

- Remove fuel tank.
- Remove the intake air silencer.



KR130220

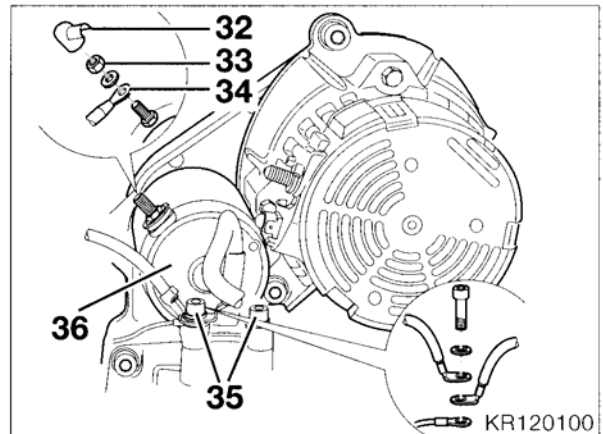
- Fuel injection rail: take out screws and remove fastenings.
- Pull the fuel injection rail with injectors out of the intake stub pipe.
- Attach hoist the engine sump.
- Remove rear wheel drive assembly.
- Remove swinging arm and drive shaft.
- Detach lower cross-tube.
- Press left/right radiators with fans out of their holders.
- Cut through the cable strap for the clutch bleed pipe at the frame.



#### Caution:

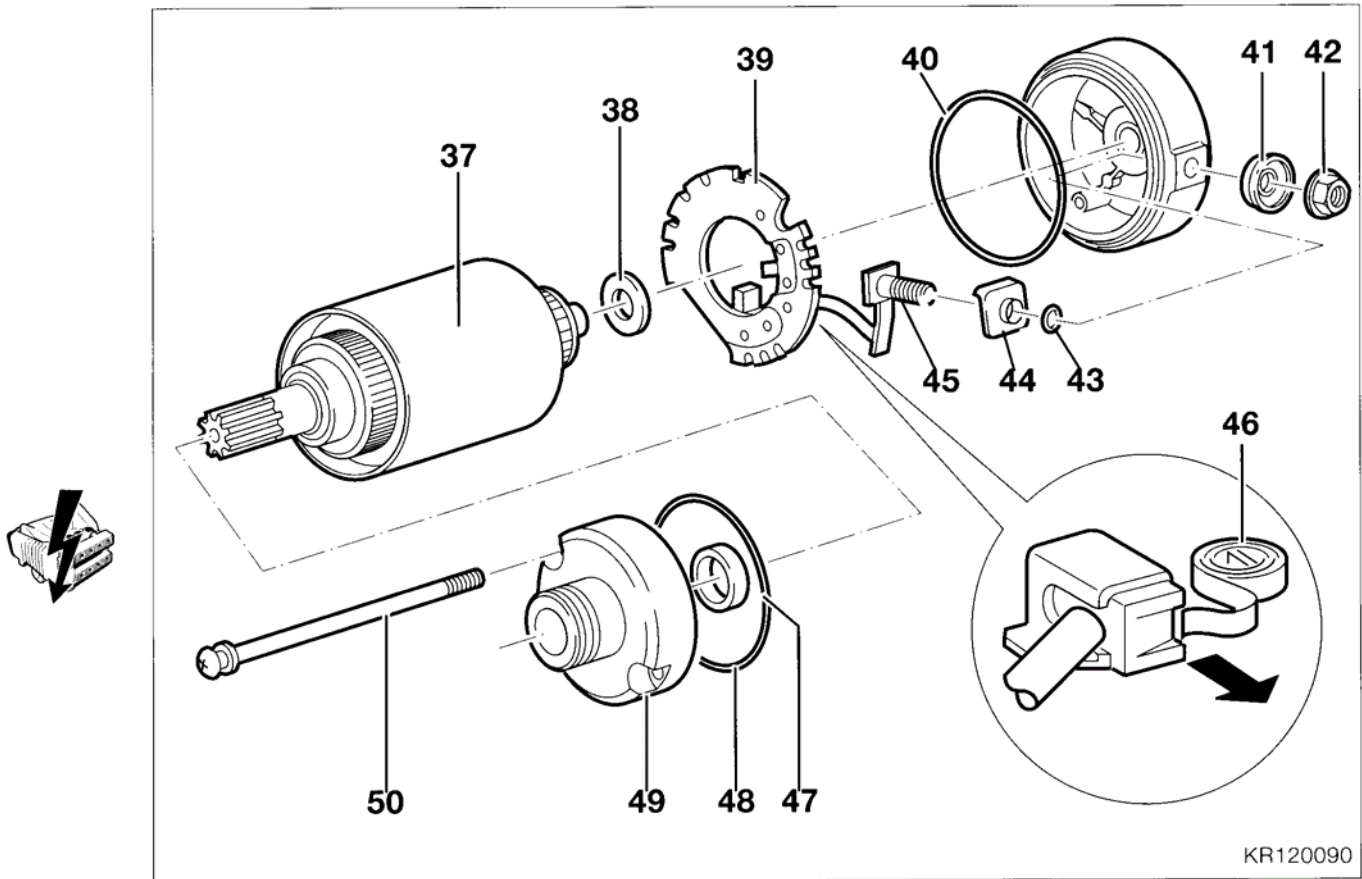
Unscrew the three fastenings alternately and uniformly.

- Remove the clutch slave cylinder and guide the clutch line through upwards.
- Separate the plug connector for the gear indicator switch and guide the cable through downwards.
- Separate the plug connector for the water temperature sensor at the cylinder head and guide the cable through downwards.
- Separate the plug connector for the side (prop) stand switch and guide the cable through downwards.
- Separate the plug connector for the oxygen sensor (lambda probe) and guide the cable through downwards.
- Detach cables from alternator.
- Detach earth (ground) lead from cross-tube.



- Take off cap (32).
- Detach fastening (33) for positive lead (34).
- Take off the positive lead.
- Raise the frame.
- Unscrew fastenings (35) for the starter motor (36).
- Pull the starter motor off rearwards.





KR120090

### Stripping and re-assembling starter motor

- Clamp the starter motor in the vise (with soft jaws) at its retaining lugs.
- Unscrew tie-rods (50).
- Pull off bearing cap (49).
- Take off seal (47) and O-ring (48), and inspect them for damage.
- Pull out armature (37).
- Take off spacing washer (38).
- Install in the reverse order of work.

### Removing/installing brush holder

- Unscrew hex nut (42).
- Take off outer insulating washer (41).
- Take off brush holder plate (39) with carbon brush holder (45), inner insulator (44) and O-ring (43).
- Install in the reverse order of work.

### Renewing carbon brushes

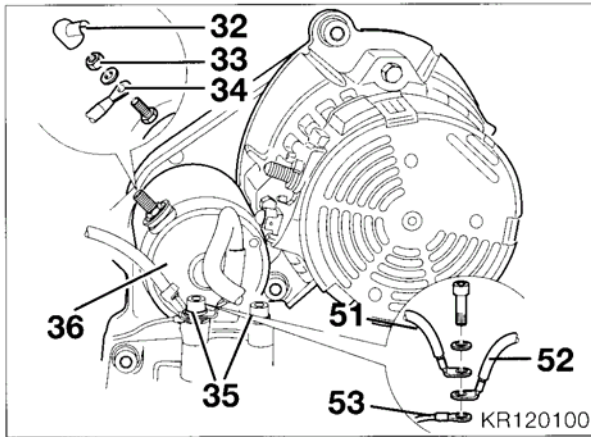
- Using a small screwdriver, raise spring (46) and pull the carbon brush out in the direction of the arrow.



#### Note:

Insert the carbon brush with the angled side towards the spring.

## Installing starter motor



- Place the starter motor (36) against the intermediate flange.
- Attach and tighten the earth (ground) lead at the cross-tube (51), the battery earth (ground) lead (52) and the earth (ground) lead at the coil (53) with fastenings (35).
- Lower the frame.
- Attach positive lead (34). Tighten nut (33) and attach cap (32).
- Connect cables to alternator.
- Attach earth (ground) lead to upper cross-tube.
- Join plug connector for side (prop) stand switch.
- Join plug connector for oxygen sensor (lambda probe).
- Join plug connector for temperature sensor at cylinder head.
- Join plug connector for gear indicator switch.

### **Caution:**

Tighten the three fastenings at the clutch slave cylinder alternately and uniformly, with the bleed line opened at the bleed screw.

- Install the clutch slave cylinder.
- Secure the cable straps.
- Run the clutch bleed line along the frame and secure it in position.

- Attach the left/right radiators with fans.
- Join the plug connectors and attach the leads for the engine and gearbox.
- Install lower cross-tube.
- Install swinging arm and drive shaft.
- Install rear wheel drive.
- Detach hoist from sump.
- Install fuel injection rail.
- Install intake air silencer.



### **Warning:**

Comply with safety precautions when handling fuel.

- Install fuel tank.



### **Caution:**

Attach and tighten the positive battery terminal first, then the negative one.

Note correct installed position of positive terminal.

- Install the battery.
- Install the complete fairing.
- Install the dualseat.



### **Tightening torques:**

Starter motor to intermediate flange..... 20 Nm  
 Positive lead to starter motor ..... 15 Nm  
 Earth (ground) lead to cross-tube ..... 6 Nm



## **16 Fuel tank and lines**

# Contents

Page

<b>Removing and installing fuel tank</b> .....	5
<b>Removing/installing fuel pump assembly, fuel filter and fuel pump</b> .....	6
Remove the fuel pump assembly .....	6
Removing and installing fuel filter .....	7
Removing/installing fuel pump .....	7
Installing fuel pump assembly .....	7
<b>Removing/installing fuel filler pipe</b> .....	7
<b>Removing/installing fuel tank vent</b> .....	7
<b>Removing/installing immersed level sensor</b> .....	8
<b>Renewing front left/right rubber mounting</b> .....	8



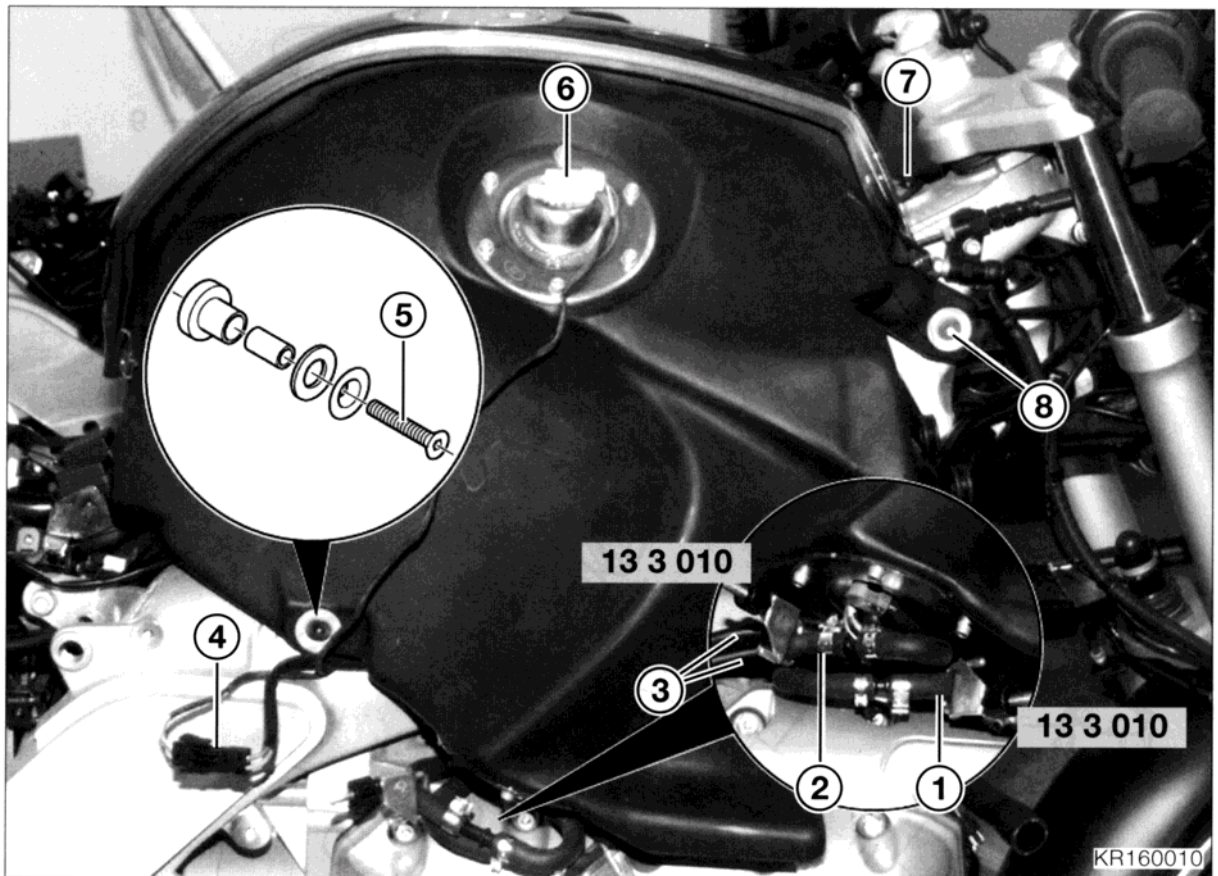




<b>Technical data</b>	<b>K 1200 RS</b>
Tank capacity	l 21
including reserve of	l 4
<b>Fuel pump</b>	
Type	Gear-type
Operating voltage	V 12
Fuel pressure	bar 3.5
Delivery volume	l/h 110







## Removing and installing fuel tank

- Remove left/right side sections of fairing. (→ 46.10)

### **Caution:**

Switch off ignition; disconnect ground (earth) lead at battery and insulate it.

### **Warning:**

Comply with safety precautions when handling fuel; fuel lines are pressurised.

- Detach the feed (1) and return (2) fuel lines with hose clips, **BMW No. 13 3 010**.
- Loosen the hose clips and pull off the fuel hoses.
- Separate the plug connector for the fuel pump (4).
- Release the fastening (7) for the tank cover at the frame.

- Separate the plug connector for the immersed fuel level sensor (6).
- Release the fastenings (5) at the left and right of the fuel tank. Pull the fuel tank to the rear, away from rubber mounting (8).

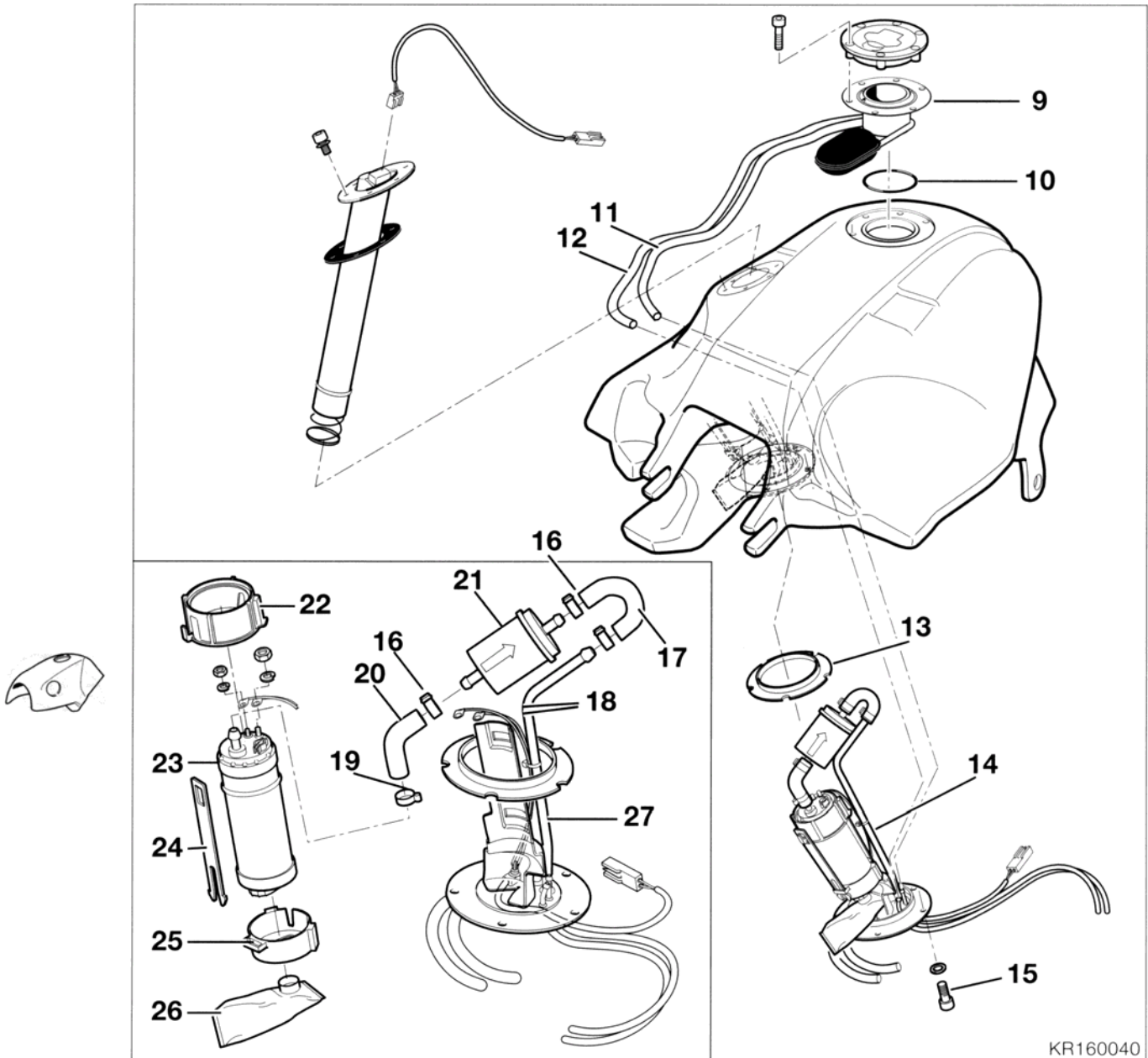
### **Note:**

The vent hoses (3) remain on the fuel tank when it is removed.

- Install in the reverse order of work.

### **Tightening torques:**

Fuel tank cover to frame ..... 3 Nm  
 Fuel tank to frame ..... 22 Nm



KR160040

### Removing/installing fuel pump assembly, fuel filter and fuel pump

- Remove fuel tank.



**Warning:**  
Comply with safety precautions when handling or working with fuel.

- Drain fuel tank.

### Remove the fuel pump assembly

- Remove screws (15).
- Pull the fuel pump assembly (14) far enough out of the fuel tank to enable the clips on the drain hose (11) and vent hose (12) to be undone with pliers.
- Pull off the hoses.
- Remove the fuel pump assembly (14) completely, with seal (13).

## Removing and installing fuel filter

- Release fastenings (16) with pliers.
- Pull fuel hoses (20) and (17) off the fuel filter (21).



### Caution:

Note correct direction of flow through fuel filter.

- Attach the fuel hoses to the new fuel filter.
- Close fastenings (16) with pliers,  
**BMW No. 13 1 500.**

## Removing/installing fuel pump

- Detach connecting cable (18) from fuel pump.
- Open hose clip (19) with pliers and pull off the hose.
- Release the holder (24).
- Pull off the vibration damper (22) at the pump outlet.
- Pull the fuel pump (23) with pump inlet vibration damper (25) away from the holder (27).
- Pull the vibration damper at the pump inlet (25) off the fuel pump (23).
- Lever off the suction-side filter (26).



### Caution:

When installing, note correct position of suction-side filter (26) and avoid damaging it.

- Install in the reverse order of work.



### Tightening torque:

Pump assembly to fuel tank ..... 5 Nm

## Installing fuel pump assembly



### Caution:

When installing, note correct position of suction-side filter (26) in fuel tank (arrow).

- Insert the fuel pump assembly (14) with seal (13) into the fuel pump.
- Attach the outlet hose (11) and the vent hose (12). Close the fastenings with pliers,  
**BMW No. 13 1 500.**
- Install and tighten the fastenings (15).



### Tightening torque:

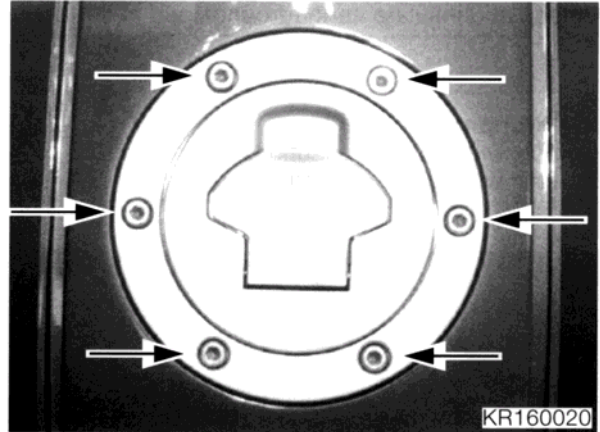
Pump assembly to fuel tank ..... 5 Nm

## Removing/installing fuel filler pipe



### Warning:

Comply with safety precautions when handling or working with fuel.



- Release the retaining screws (arrows).
- Take off the fuel filler pipe.
- Install in the reverse order of work.



### Tightening torque:

Fuel filler pipe to fuel tank ..... 4 Nm

## Removing/installing fuel tank vent

- Remove the fuel filler pipe.
- Remove the fuel pump assembly until the clips can be released on the outlet hose (11) and vent hose (12).
- Remove the fuel tank vent (9) with seal (10) from the fuel tank.
- Install in the reverse order of work.

## Removing/installing immersed level sensor

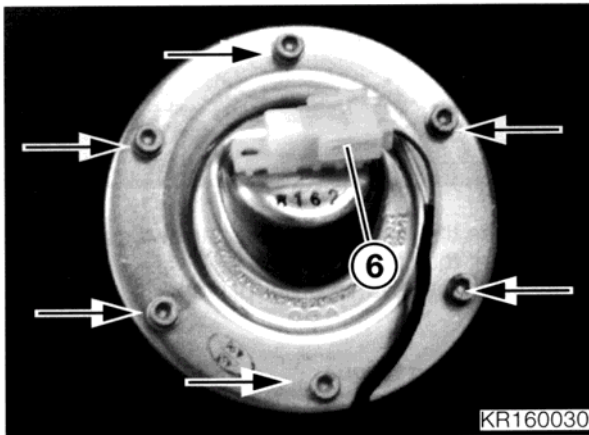
- Remove right side section of fairing.  
(→ 46.10)



**Caution:**  
Detach and insulate earth (ground) lead at battery.



**Warning:**  
Comply with safety precautions when handling or working with fuel.

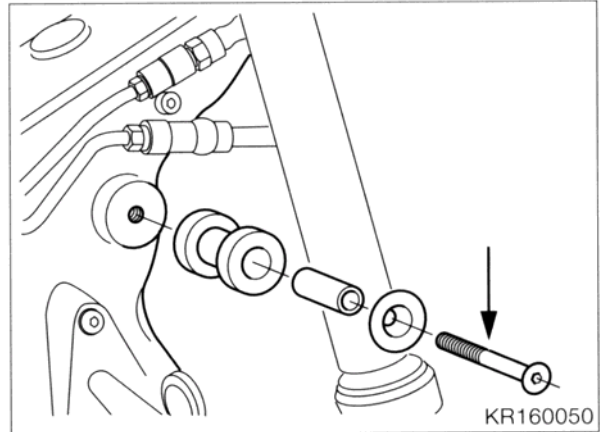


- Separate the plug connector for the immersed level sensor (6).
- Remove the retaining screws (arrows).
- Take off the immersed level sensor with gasket.
- Install in the reverse order of work.



**Tightening torque:**  
Immersed level sensor to fuel tank ..... 5 Nm

## Renewing front left/right rubber mounting



- Remove the retaining screw (arrow) and take off the rubber mounting.
- Insert mounting retaining screw and tighten it.



**Tightening torque:**  
Rubber mounting to frame ..... 22 Nm

## **13 Fuel preparation and control**

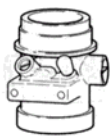
# Contents

Page

<b>Removing and installing air cleaner element</b> .....	5
<b>Renewing air temperature sensor</b> .....	5
<b>Removing and installing intake air silencer</b> .....	6
<b>Removing and installing fuel injection rail</b> .....	7
<b>Removing and installing injectors</b> .....	8
<b>Removing and installing pressure regulator</b> .....	8
<b>Removing and installing throttle rail</b> .....	9
<b>Removing and installing the intake pipe</b> .....	10
<b>Renewing fuel hoses</b> .....	11
<b>Removing and installing throttle positioner</b> .....	12
<b>Exchanging and adjusting the throttle potentiometer</b> .....	13
<b>Basic throttle cable setting</b> .....	13
<b>Removing and installing Motronic control unit</b> .....	14
<b>Checking fuel pressure</b> .....	15
<b>Trouble-shooting</b> .....	16

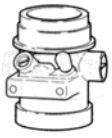






Technical data	K 1200 RS
Fuel grade	Super (premium), unleaded, 95 octane (RON)
Mixture preparation	Motronic MA 2.4
Fuel pressure	bar 3.5
Throttle stub pipe intl. dia.	mm 38
Air cleaner	Multi-layer paper element





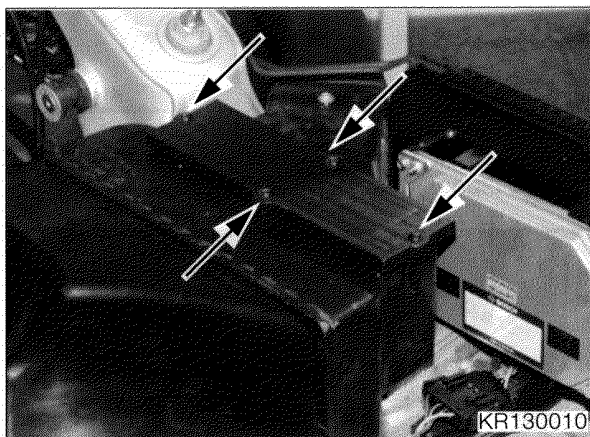
## Removing and installing air cleaner element



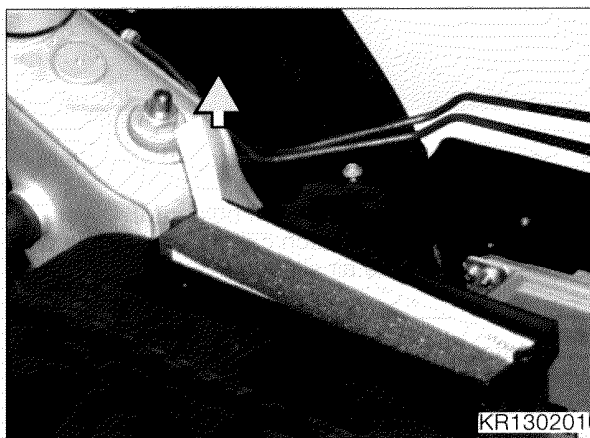
### Warning:

Observe safety precautions when handling fuel, and note that fuel lines are pressurised.

- Remove the fuel tank.  
(⇒ 16.5)



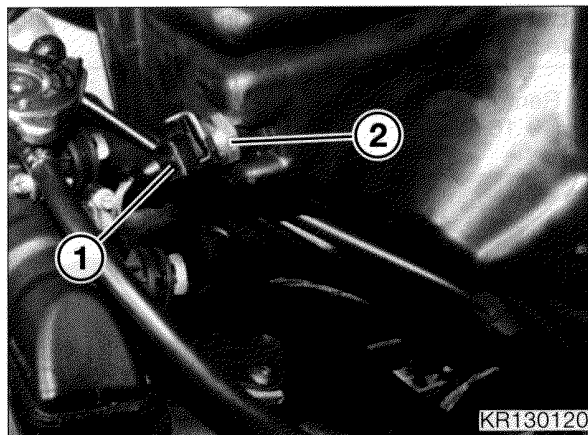
- Slacken off retainers (arrows) and take off the cover.



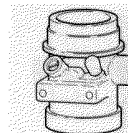
- Take out the air cleaner element.
- Install in the opposite order of work.

## Renewing air temperature sensor

- Detach left side section of fairing.  
(⇒ 46.10)



- Detach the temperature sensor from its plug connector (1).
- Remove temperature sensor (2).
- Install temperature sensor in intake air silencer, and tighten it.



### ! Tightening torque:

Temperature sensor in intake air silencer..... 15 Nm

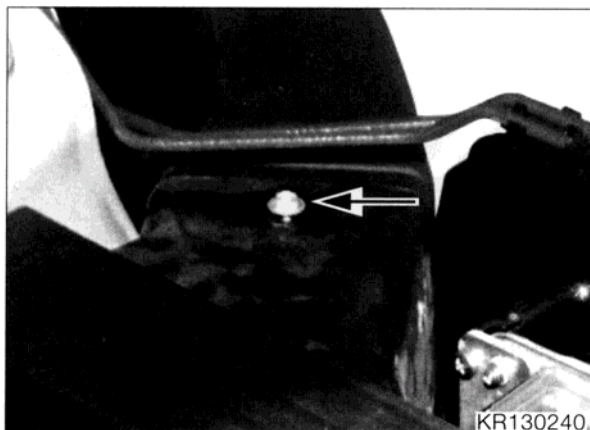
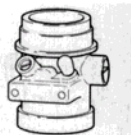
## Removing and installing intake air silencer



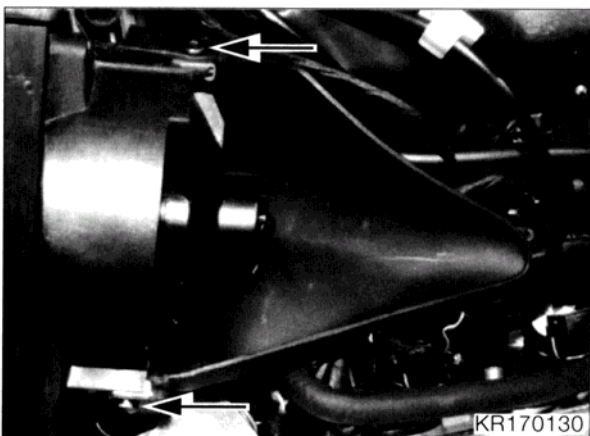
### Warning:

Observe safety precautions when handling fuel, and note that fuel lines are pressurised.

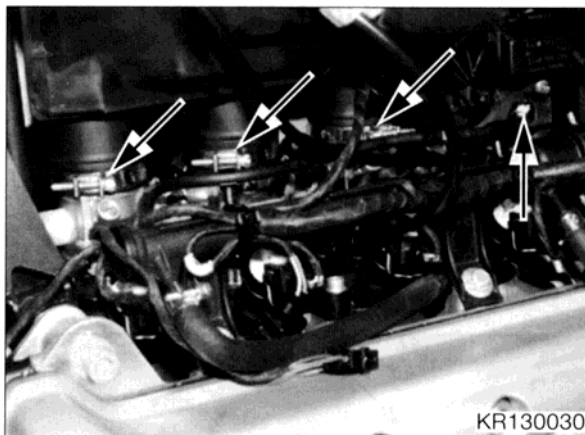
- Removing fuel tank.  
(→ 16.5)



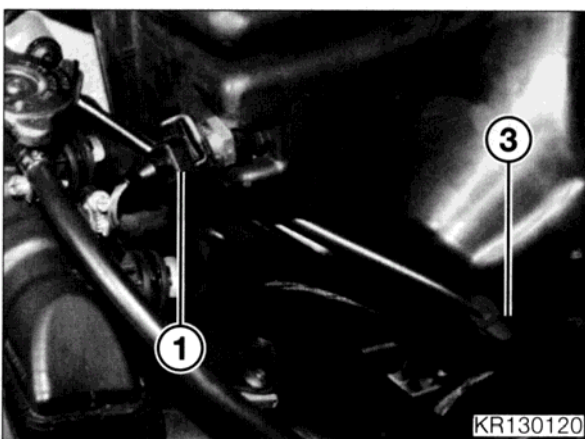
- Detach mounting (arrow) from suction pipe.



- Slacken off mountings (arrows). Detach air outlet guide from radiator.



- Slacken off the hose clips (arrows) at the throttle stub pipes.



- Separate the air plug connector (1) at the temperature sensor.
- Remove throttle cable from holder (2).
- Move throttle and clutch cables to one side and pull off the intake air silencer.



### Note:

When installing, note the positions of the hose clips on the throttle stub pipes.

- Install in the reverse order of work.

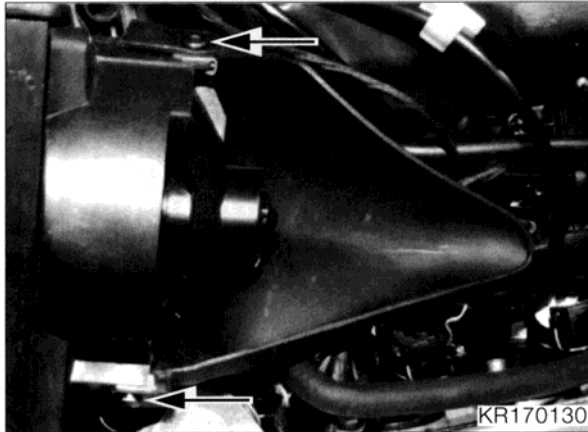


### Tightening torque:

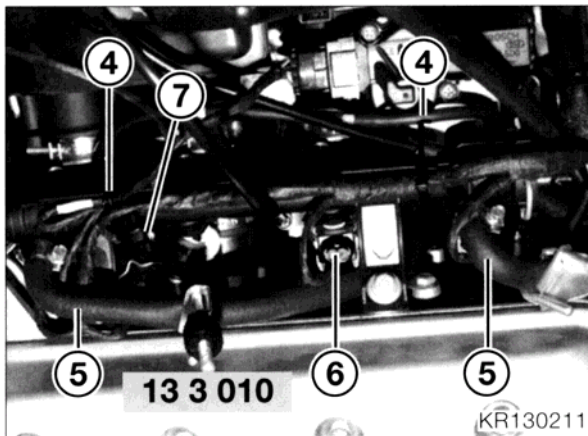
Hose clips at throttle stub pipes ..... 4 Nm

## Removing and installing fuel injection rail

- Take off the left side section of the fairing. (→ 46.10)



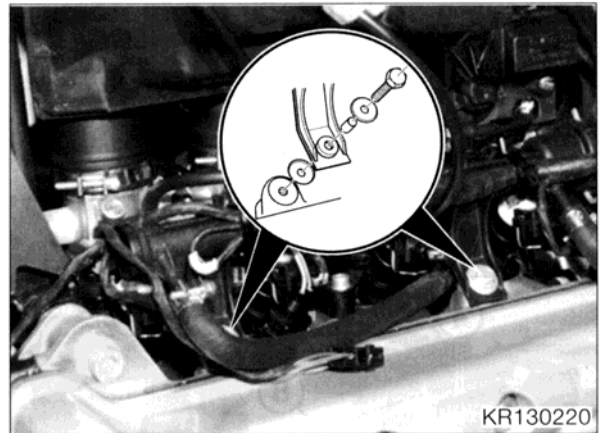
- Remove air outlet guide for left radiator.



### Warning:

Observe safety precautions when handling fuel, and note that fuel lines are pressurised.

- Disconnect the fuel lines (5) with hose clips, **BMW No. 13 3 010**.
- Detach the hose clips from the fuel hoses (5). Pull off the fuel hoses.
- Disconnect the vacuum hose from the cable strap (4). Detach the cable strap.
- Separate the four lug connectors for the injectors (6).



- Undo the screws and take off the fastenings.
- Pull the fuel injection rail with the injectors out of the intake pipe.



### Note:

Make sure that the O-ring at the injector is in good condition. Grease O-rings lightly.



### Note:

**[US]** Note position of plug on tank vent valve (7).

- Install in the reverse order of work.



### Tightening torque:

Fuel injection rail screw at engine block ..... 9 Nm  
 Fuel line hose clips ..... 4 Nm

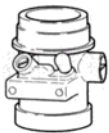
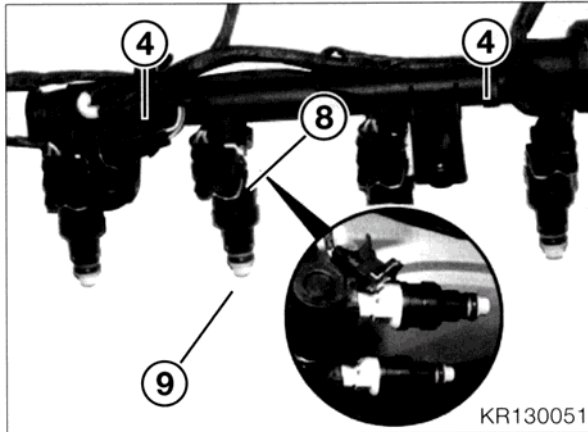
## Removing and installing injectors



### Note:

When removing the injector rail the cable straps (4) need not be undone.

- Remove the injector rail.



- Release the clip (8) at the injector (9) and pull the injector out.



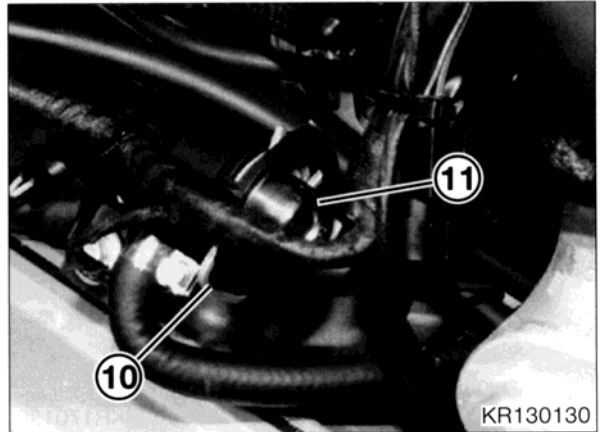
### Note:

Make sure that the O-ring at the injector is in good condition.  
Note the correct installed position of the injectors.

- Install in the reverse order of work.

## Removing and installing pressure regulator

- Take off the left side section of the fairing. (→ 46.10)



- Lever out the clamp hoop (10).
- Pull the pressure regulator (11) out with pliers.
- Install in the reverse order of work.

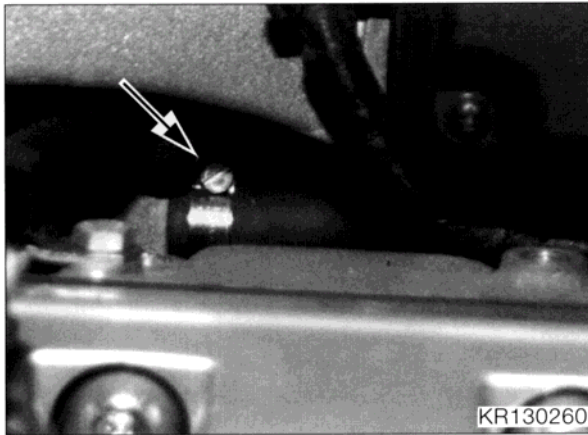


### Note:

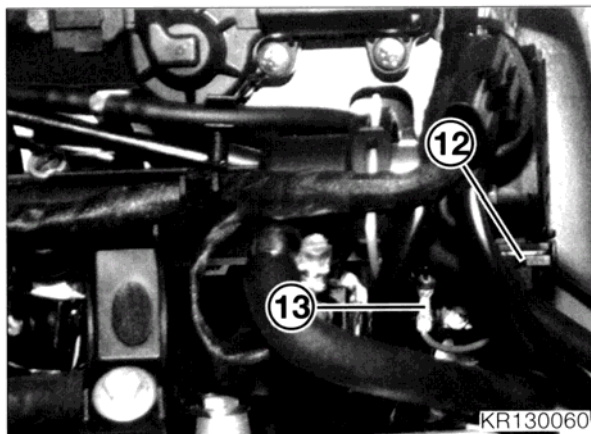
Before installing, coat the sealing rings with clean engine oil (silicone-free) or rub them with Vaseline.

## Removing and installing throttle rail

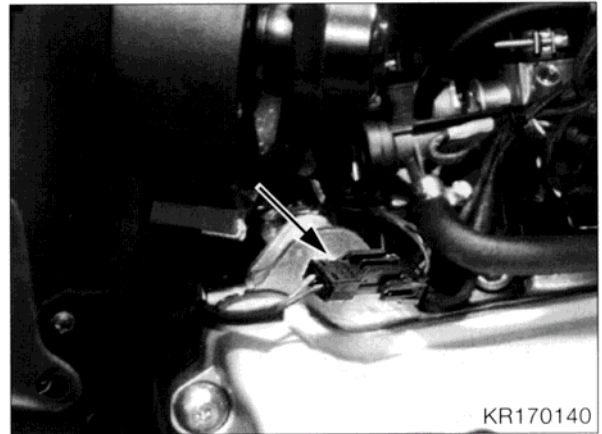
- Take off the right side section of the fairing. (→ 46.10)



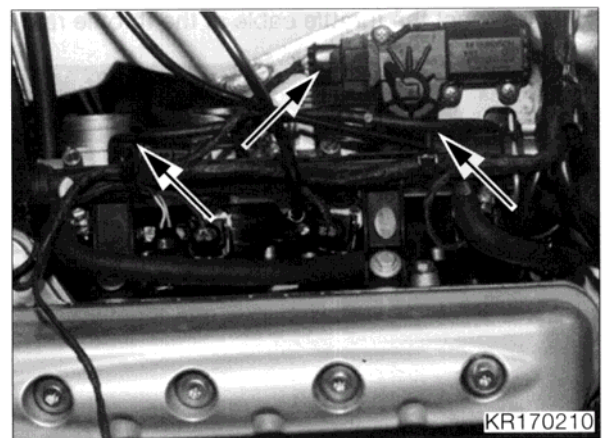
- Disconnect the hose clip (arrow) for the crankcase breather from the right, under the frame.
- Pull off the hose.
- Remove the intake air slencer.



- Disconnect the throttle position potentiometer plug connector (12).
- Disconnect the earth (ground) wire (13) at the throttle rail.



- Separate the plug connector (arrow) for the fan.



- Separate the plug connector (arrow) for the throttle positioner.



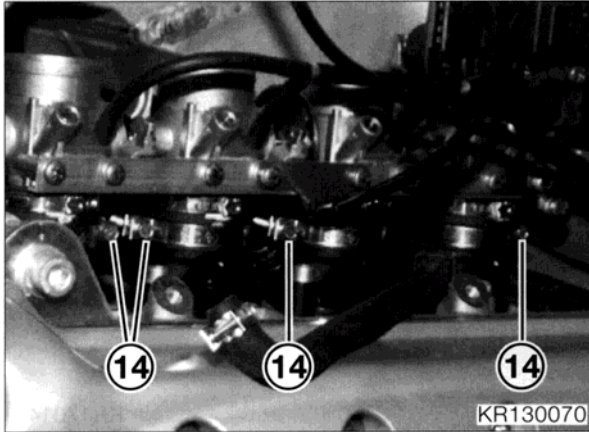
### Note:

When the fuel injection rail is removed, the cable straps (arrow) need not be released.

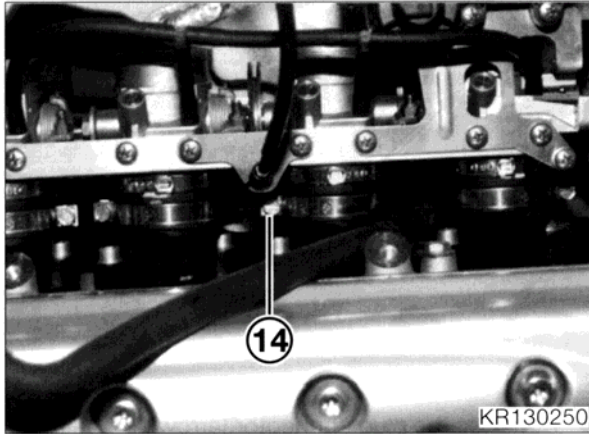
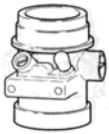
- Remove the fuel injection rail (→ 13.7) and secure it to the frame together with the wiring harness.










- Release hose clips (14) at the intake pipes.
- Pull the throttle rail out of the intake pipe.
- Disconnect the throttle cable at the throttle rail.



 **Note:**  
When installing, note correct positions of hose clips (14).

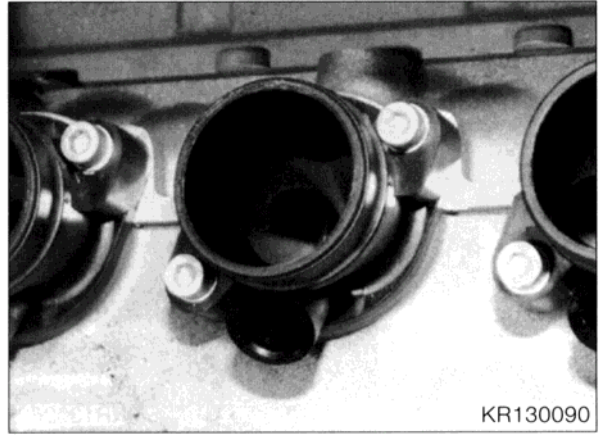
 **Caution:**  
After installing, check that cam disc (25) moves freely at the throttle stub pipe.


- Install in the reverse order of work.


 **Tightening torque:**  
Hose clip at intake pipe..... 4 Nm

## Removing and installing the intake pipe

- Remove the throttle rail.

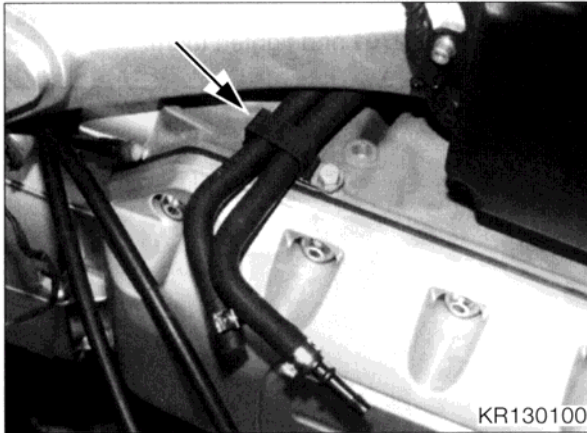


 **Note:**  
When installing the rear intake pipe, do not forget the clip for the fuel hose.

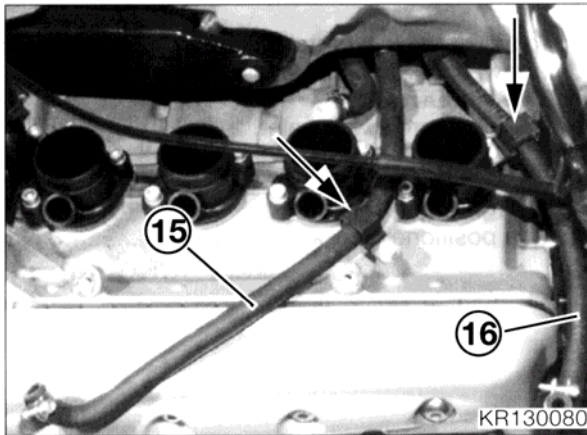
 **Tightening torque:**  
Intake pipe..... 9 Nm

## Renewing fuel hoses

- Remove the throttle rail.



- Open the retaining clip (arrow).



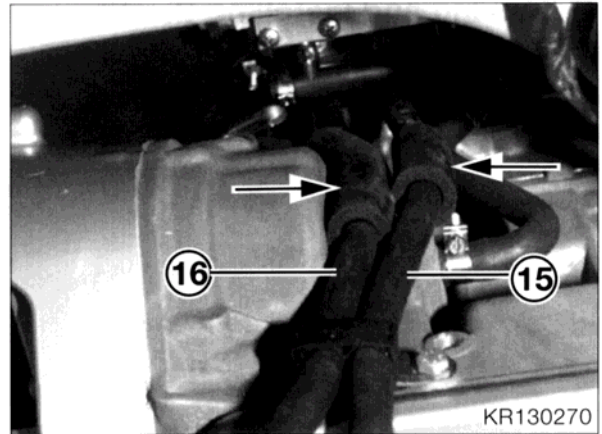
- Open the retaining clip (arrow) for the fuel feed (15) and return (16) hoses.



### Warning:

Comply with safety precautions when handling or working with fuel.

- Renew the fuel hose.



### Caution:

Make sure that the fuel hoses and protective sleeves are run correctly between the frame and the engine.

- Insert the fuel hoses in the retaining clips.



### Note:

Renew retaining clips if necessary.



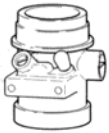
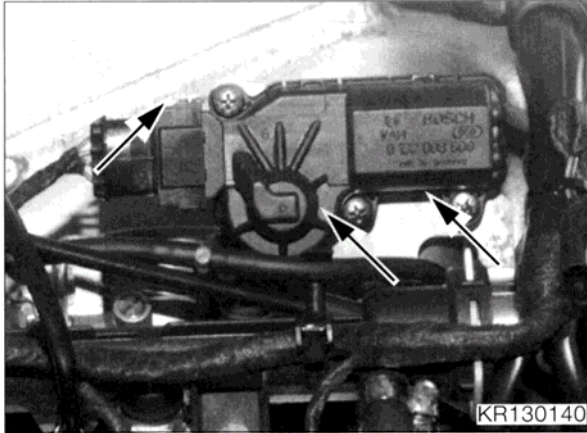
### Tightening torque:

Screw to intake pipe ..... 9 Nm  
Retaining clip at engine ..... 9 Nm



## Removing and installing throttle positioner

- Remove the intake air silencer.



### **Caution:**

When releasing the retaining bracket for the throttle positioner, do not bend it.

- Release the fastenings (arrows).
- Remove the throttle positioner.

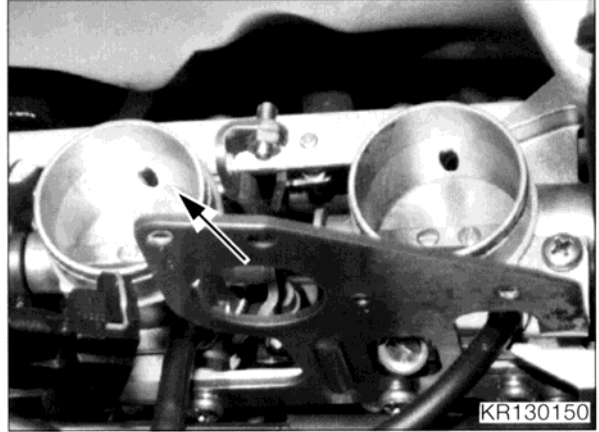
### **Caution:**

The throttle positioner operates from the 5 Volt control-unit supply. It must not be run from the motorcycle's 12 Volt circuit.

### **Caution:**

When a new throttle positioner is installed, the idle switching point is not correctly adjusted.

- Attach the throttle positioner. Insert the screws with **Loctite 2701** and tighten them.



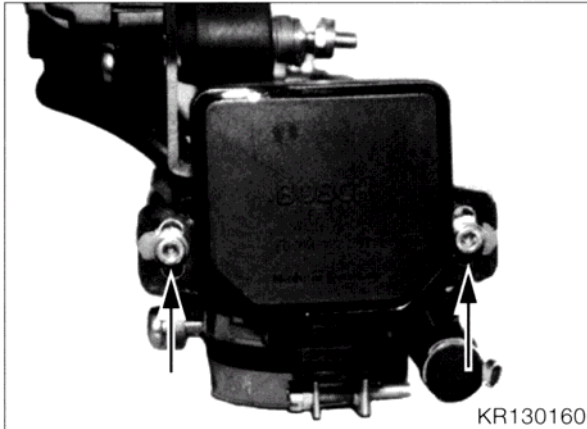
- To adjust the idle switching point, turn the screw (arrow) according to the display on the **BMW MoDiTeC**.
- Mark the screw with paint.

### **Tightening torque:**

Throttle positioner screw ..... 5 Nm

## Exchanging and adjusting the throttle potentiometer

- Remove the throttle rail.
- Remove the throttle positioner.



- Undo the fasteners (arrows). Remove the throttle position potentiometer.
- Install the new throttle position potentiometer.
- Reset the throttle position potentiometer until the **BMW MoDiTeC** shows a correct value.
- Tighten the throttle position potentiometer fastenings.
- Apply sealing lacquer to the fastenings.



### Caution:

When tightening the retaining bracket for the throttle positioner, do not bend it.

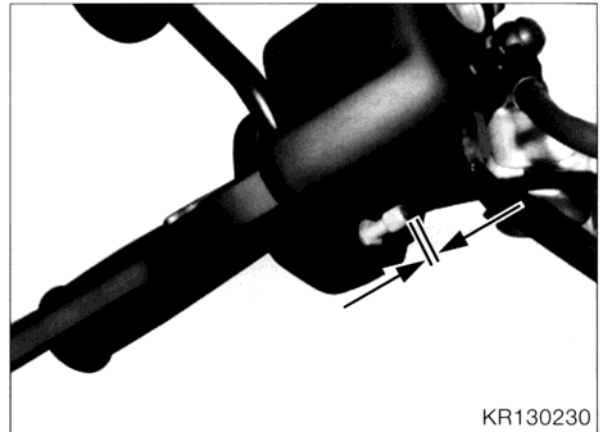
- Attach the throttle positioner (→ 13.12).
- Install the throttle rail.



### Tightening torque:

Throttle potentiometer screws..... 2 Nm

## Basic throttle cable setting



- Preset throttle cable play to 1.5 mm with the engine cold.
- Warm the engine up to regular operating temperature (radiator fan starts to run).
- Set throttle cable play to 0.5 mm.

### Settings:

Preset throttle cable play (engine cold) ..... 1.5 mm  
Throttle cable play (engine warm)..... 0.5 mm



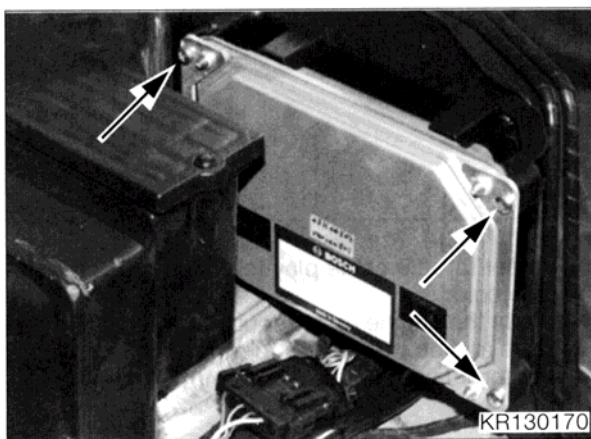
## Removing and installing Motronic control unit



### Warning:

Observe safety precautions when handling fuel, and note that fuel lines are pressurised.

- Remove the fuel tank.  
(→ 16.5)



### Caution:

Switch off ignition; disconnect earth (ground) lead at battery and insulate it.

- Remove fastenings (arrows).
- Pull Motronic control unit out of central plug.



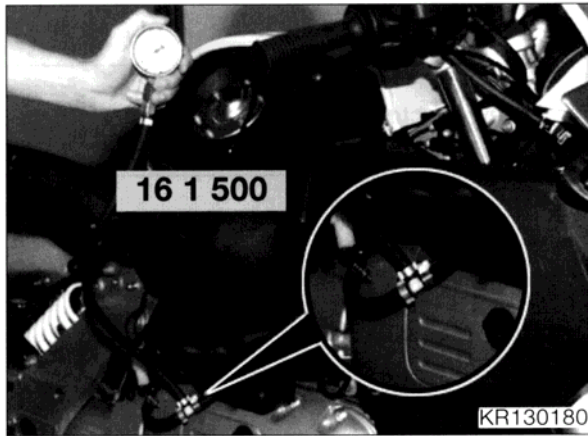
### Note:

Make sure that the seal at the central plug is correctly seated.

- Install in the reverse order of work.

## Checking fuel pressure

- Take off the right side section of the fairing.  
(⇒ 46.10)



### Warning:

Comply with safety precautions when handling or working with fuel; note that the fuel lines are pressurised.

- Connect a test pressure gauge, **BMW No. 16 1 500**, at the pressure side (lower line).
- Run engine at idle speed.

### Fuel pressure:

Nominal value .....3.5 bar

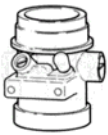
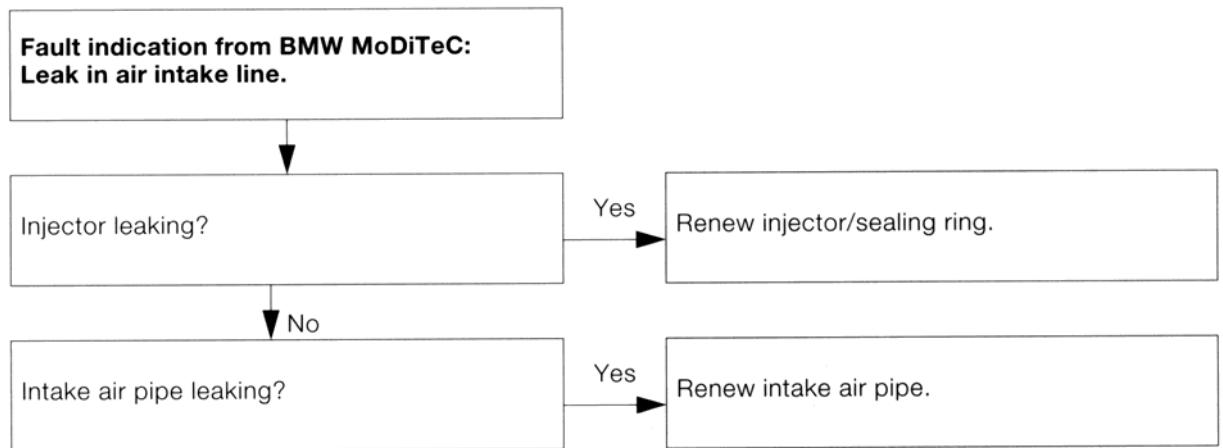


### Note:

If fuel pressure is lower than this, check the fuel pump, fuel filter, pressure regulator and lines.



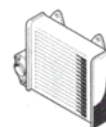
## Trouble-shooting

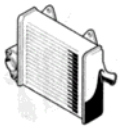


## **17 Cooling**

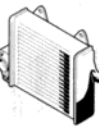


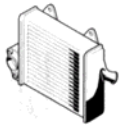
<b>Contents</b>	<b>Page</b>
<b>Coolant circuit</b> .....	5
<b>Renewing coolant</b> .....	7
Draining coolant .....	7
Adding coolant .....	7
<b>Removing and installing radiator with fan</b> .....	8
Removing and installing left radiator .....	8
Removing and installing right radiator .....	9
<b>Removing and installing fan</b> .....	10
Removing and installing left fan .....	10
Removing the right fan .....	10
<b>Removing and installing coolant hoses</b> .....	11
<b>Removing and installing thermostat</b> .....	12
Checking thermostat .....	12
<b>Checking cooling system for leaks</b> .....	12
<b>Trouble-shooting</b> .....	13



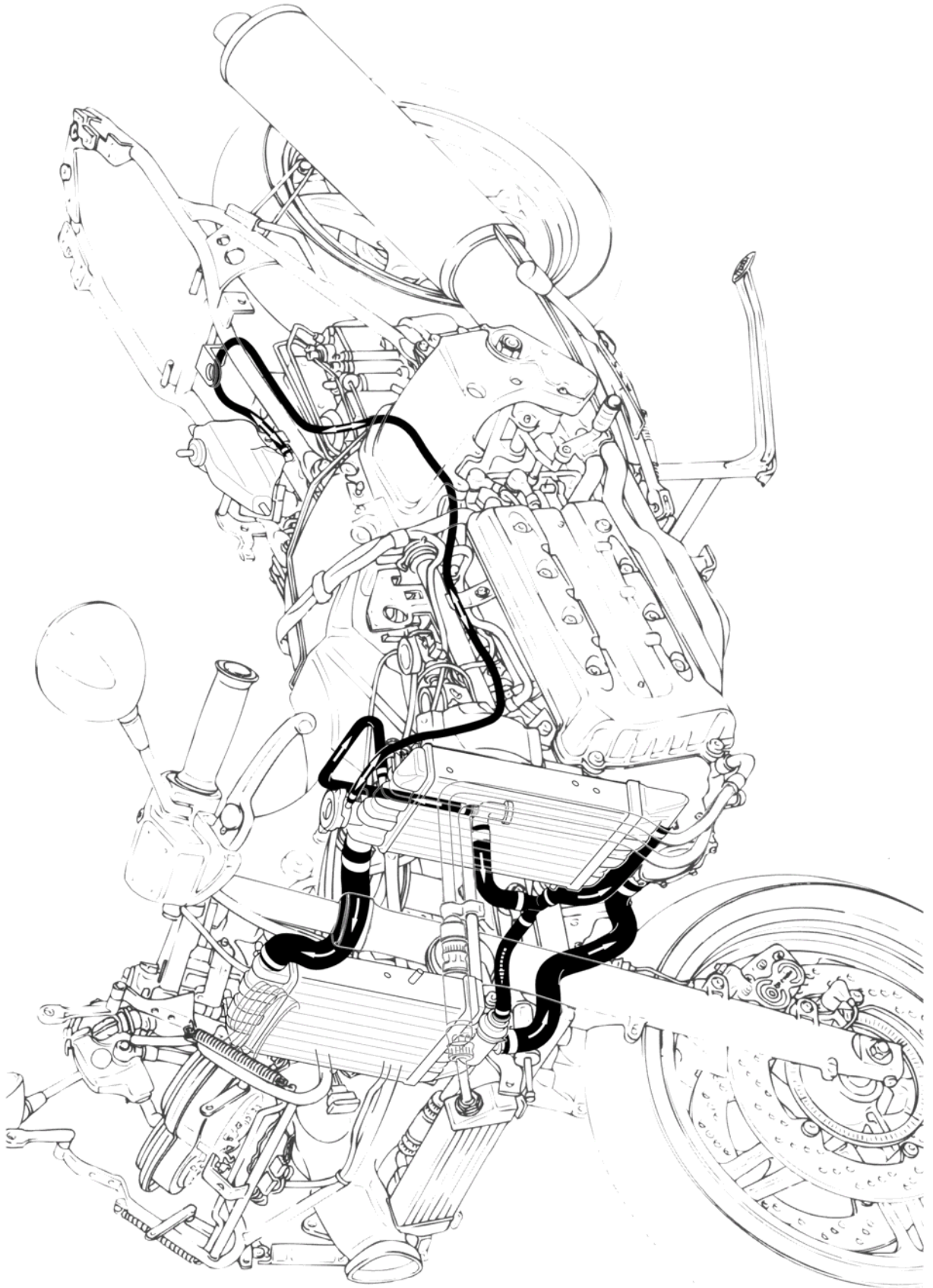


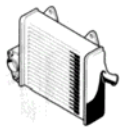
Technical data	K 1200 RS	
Cooling system content	3,1	
Coolant	Use only long-life antifreeze and corrosion inhibitor free from nitrides	
Thermostat opening temperature	°C	85
Fan cut-in temperature	°C	105
Cut-in temperature for coolant warning light	°C	115
Pressure relief valve in end cover opens at	bar	1.5 <sup>+0.2</sup>





## Coolant circuit

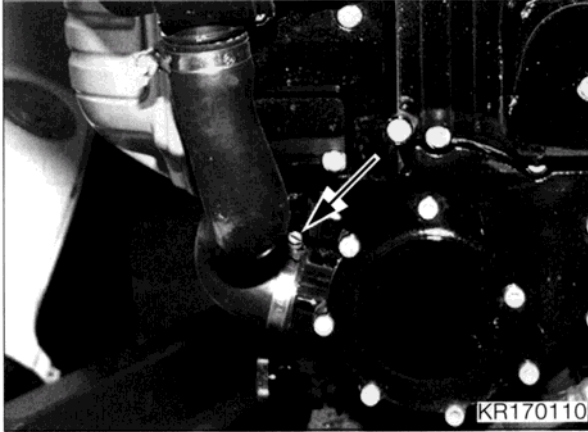




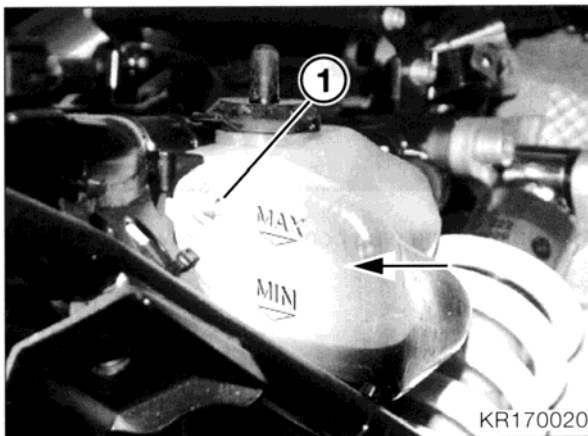
## Renewing coolant

### Draining coolant

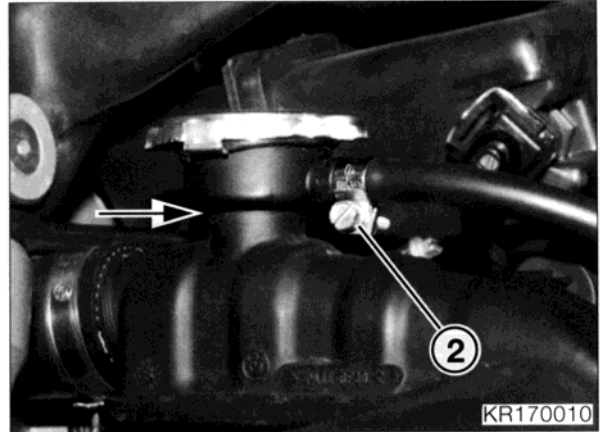
- Take off left and right side sections and right rear section of fairing and engine spoiler. (→ 46.9)
- Open the cap on the left radiator filler pipe.



- Detach the coolant hose (arrow) from the oil/water pump and drain the coolant.



- Undo fastening (1), take off the level equalising tank and drain it.



- Loosen fastening (2) for vent hose.
- Pull off the vent hose, raise the level equalising tank and drain the vent hose completely.
- Attach the vent hose again.

### Adding coolant

- Attach the level equalising tank and tighten its fastener (1).
- Attach the coolant hose to the oil/water pump. Position the hose clip screw (arrow) at the front and tighten it.
- Add coolant to the lower edge of the filler pipe (arrow). Attach the cap.
- Fill the level equalising tank up to the maximum level mark (arrow).

Filling capacity ..... 2,5 l  
in level equalising tank ..... 0,6 l

#### Composition

Use only long-life antifreeze and corrosion inhibitor free from nitrides

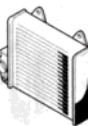
#### Concentration

Antifreeze ..... 40 %  
Water ..... 60 %

- Turn the engine over with the starter and squeeze the hose between the water pump and the right radiator.
- If necessary, top up the coolant as far as the maximum level mark.
- Attach the fairing sections and the engine spoiler.

#### Tightening torque:

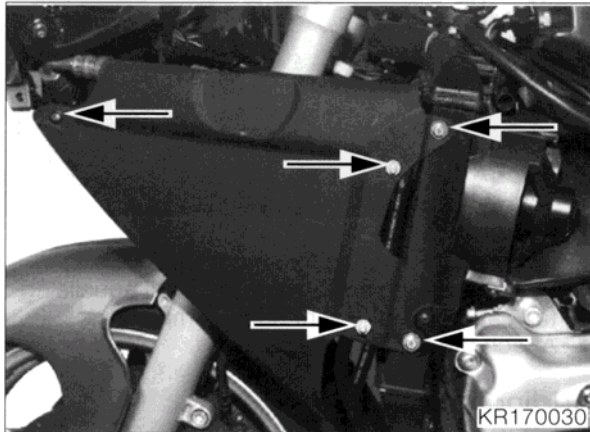
Level equalising tank to frame ..... 6 Nm



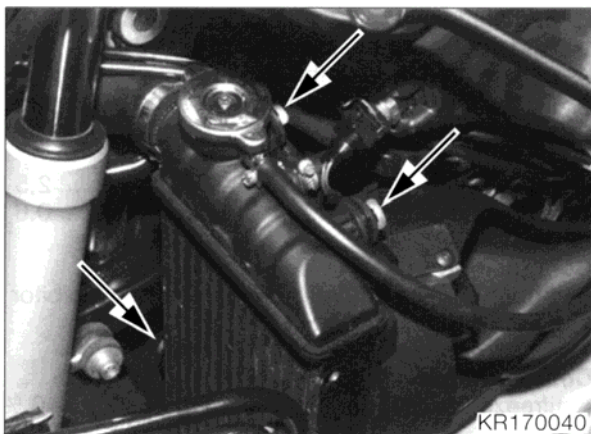
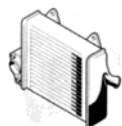
## Removing and installing radiator with fan

### Removing and installing left radiator

- Drain the coolant.



- Remove the fastenings (arrows). Take off the radiator air inlet guide.

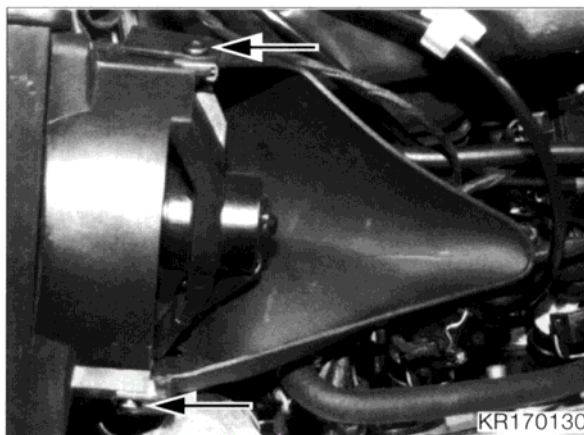


- Remove retaining clip with washer (arrows) for radiator.

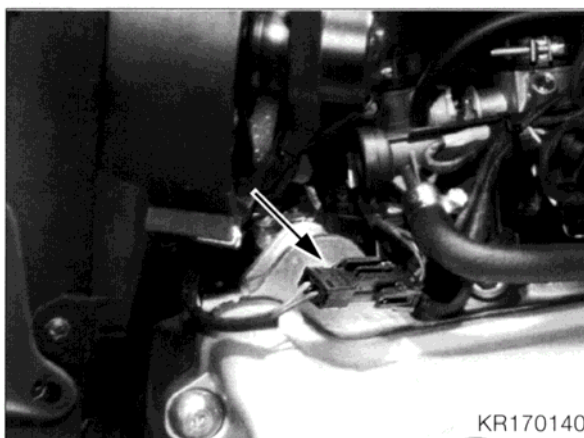


**Note:**

Press the radiator out of the holder at the top.

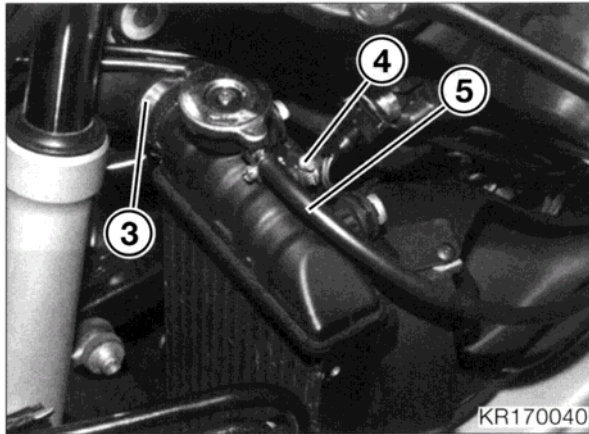


- Loosen the fasteners (arrows). Take off the radiator air outlet guide.



- Separate the plug connector (arrow) for the fan.



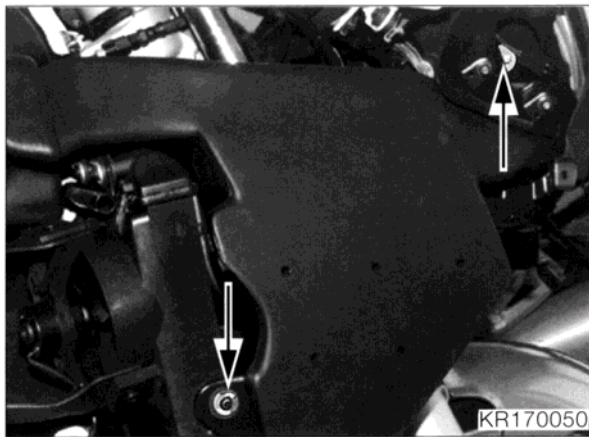


- Detach connecting hose (3) to the right radiator, vapour release hose (4) and vent hose (5) at the top of the radiator.
- Detach the coolant hose at the bottom of the radiator.
- Pull the radiator with fan out of the lower holder.
- Install in the reverse order of work.

**Tightening torque:**  
 Air inlet guide to radiator ..... 1 Nm

### Removing and installing right radiator

- Remove the right hand guard.  
 (→ 46.9)
- Drain the coolant.



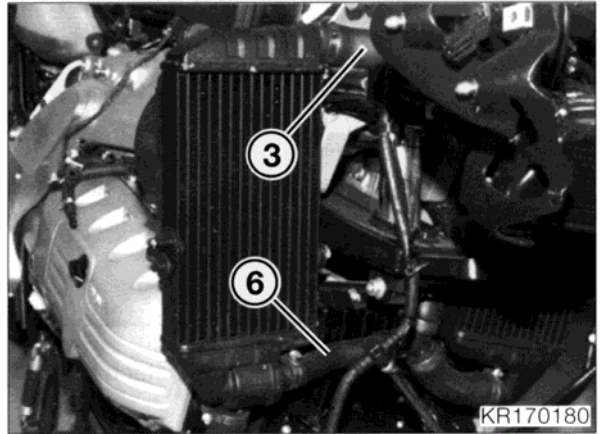
- Loosen the fastenings (arrows).

**Note:**  
 If necessary, remove the intake air pipe. ?????

**Note:**

Illustrations for the following work:  
 ■ Remove left radiator.

- Remove retaining clips with washers for radiator.
- Loosen air outlet guide mountings. Take off air outlet guide.
- Separate plug connector for fan.



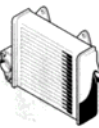
- Detach coolant hose for coolant stub pipe (6) at bottom of right radiator.
- Detach connecting hose (3) to left radiator at top of radiator.

**Note:**

First detach radiator from holder at left, then separate from intake air pipe.

- Pull radiator with fan away from holder.
- Install in the reverse order of work.

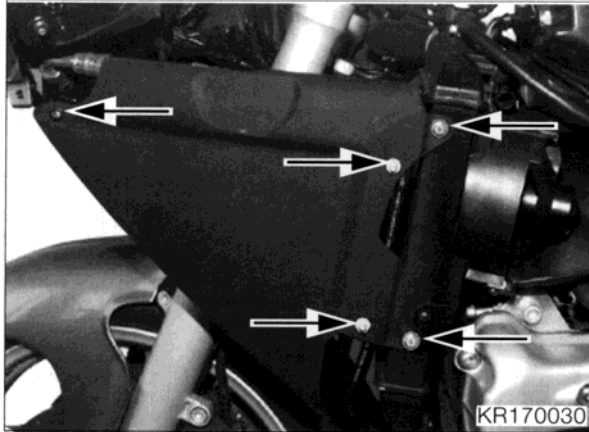
**Tightening torque:**  
 Air intake pipe to holder on fairing..... 10 Nm



## Removing and installing fan

### Removing and installing left fan

- Take off the left side section of the fairing. (⇒ 46.10)



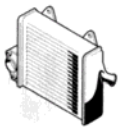
- Release the fastenings (arrows). Detach the air inlet guide to the radiator.



#### Note:

Illustrations for the following work:  
 ⇒ Remove left radiator.

- Remove retaining clips with washers for radiator.
- Loosen mountings for air outlet guide. Take off the air outlet guide.
- Separate the plug connector for the fan.



- Release the fastenings (arrows) for the fan at the radiator.
- Take off the fan.
- Install in the reverse order of work.

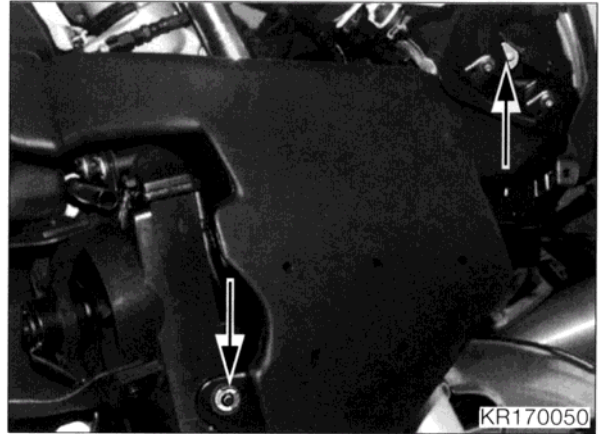


#### Tightening torque:

Fan to radiator ..... hand-tight

### Removing the right fan

- Detach air guide to oil cooler. (⇒ 46.10)
- Remove right side section of fairing. (⇒ 46.10)
- Remove the right hand guard. (⇒ 46.9)



- Loosen the mountings (arrow).



#### Note:

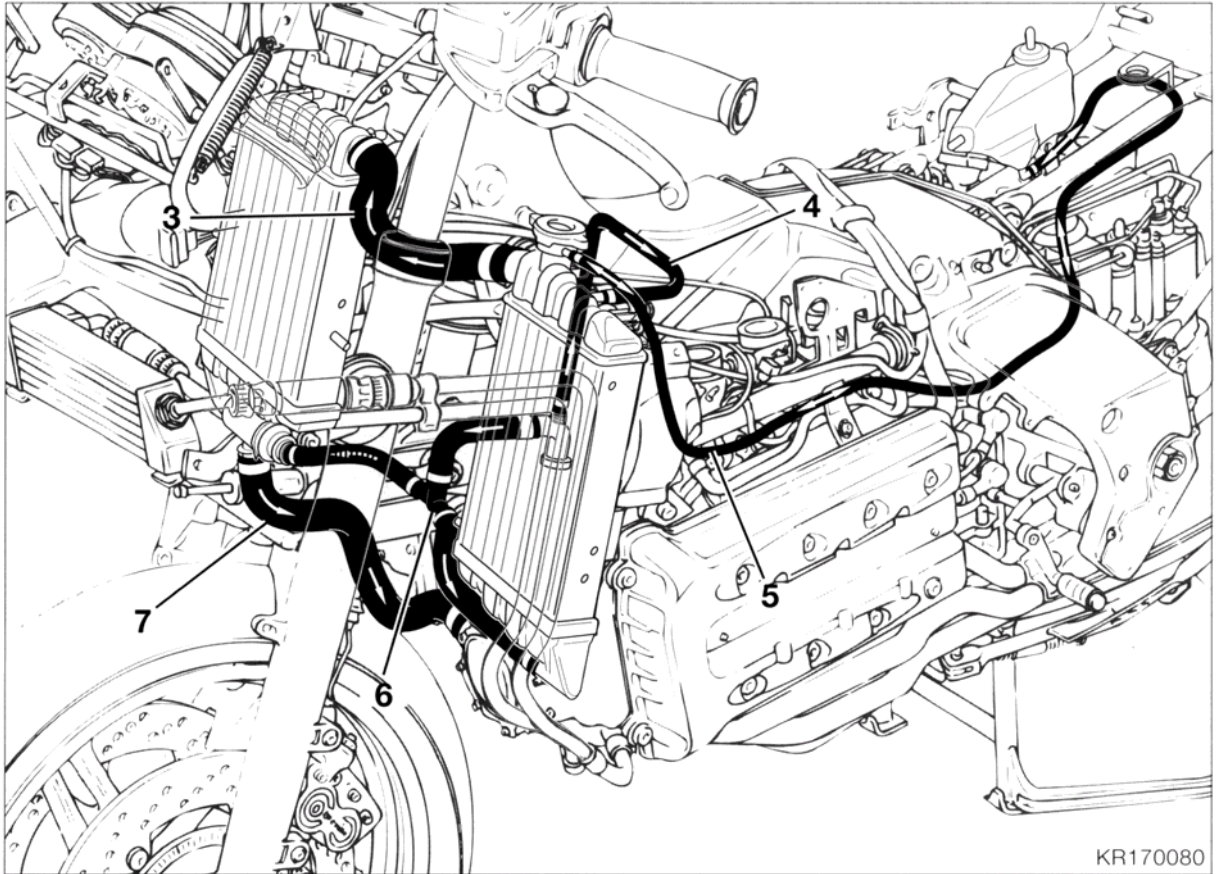
Illustrations for the following work:  
 ⇒ Removing left radiator.

- Removing retaining clips with washers for radiator.
- Release fastenings for air outlet guide. Take off air outlet guide.
- Separate plug connection for fan.
- Release fastenings for fan.
- Take off the fan.
- Install in the reverse order of work.



#### Tightening torque:

Fan to radiator ..... hand-tight



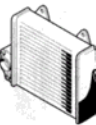
KR170080

## Removing and installing coolant hoses

- Drain the coolant.
- Remove the corresponding coolant hose.
  - Take off the connecting hose (3) between the left and right radiators.
  - Vapour release hose (4)
  - Vent hose (5) to equalising tank
  - Coolant hose to coolant stub pipe (6)
  - Coolant hose (7) to oil/water pump

- Install in the reverse order of work.

**! Tightening torque:**  
Coolant hose clips ..... 2 Nm

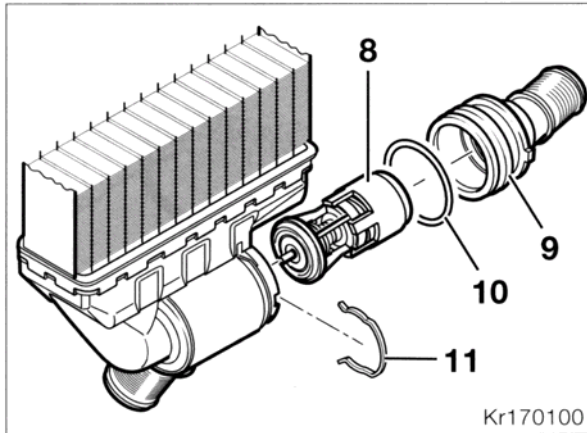


### Note:

After removing the left radiator, take off the coolant hose to the coolant stub pipe (6) and the vapour release hose (4).

## Removing and installing thermostat

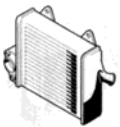
- Drain the coolant.




- Remove the retaining hoop (11).
- Lever off the cover (9) at the lug.
- Remove the thermo-element (8).
- Inspect the O-ring (10) for damage.
- Install in the reverse order of work.

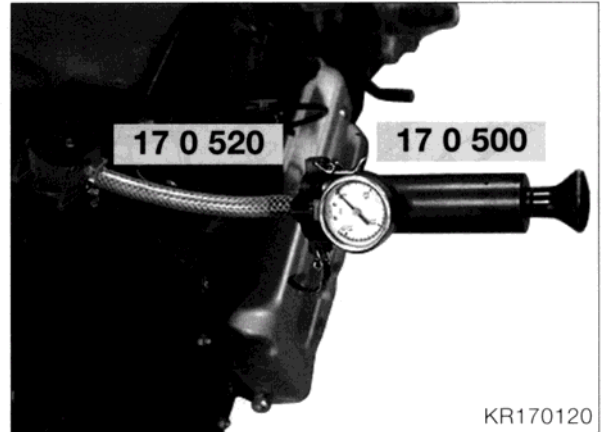
## Checking thermostat

See "Trouble-shooting" on page 17.13



## Checking cooling system for leaks

- Detach the left side section of the fairing.  

- Unscrew the cap from the filler pipe.



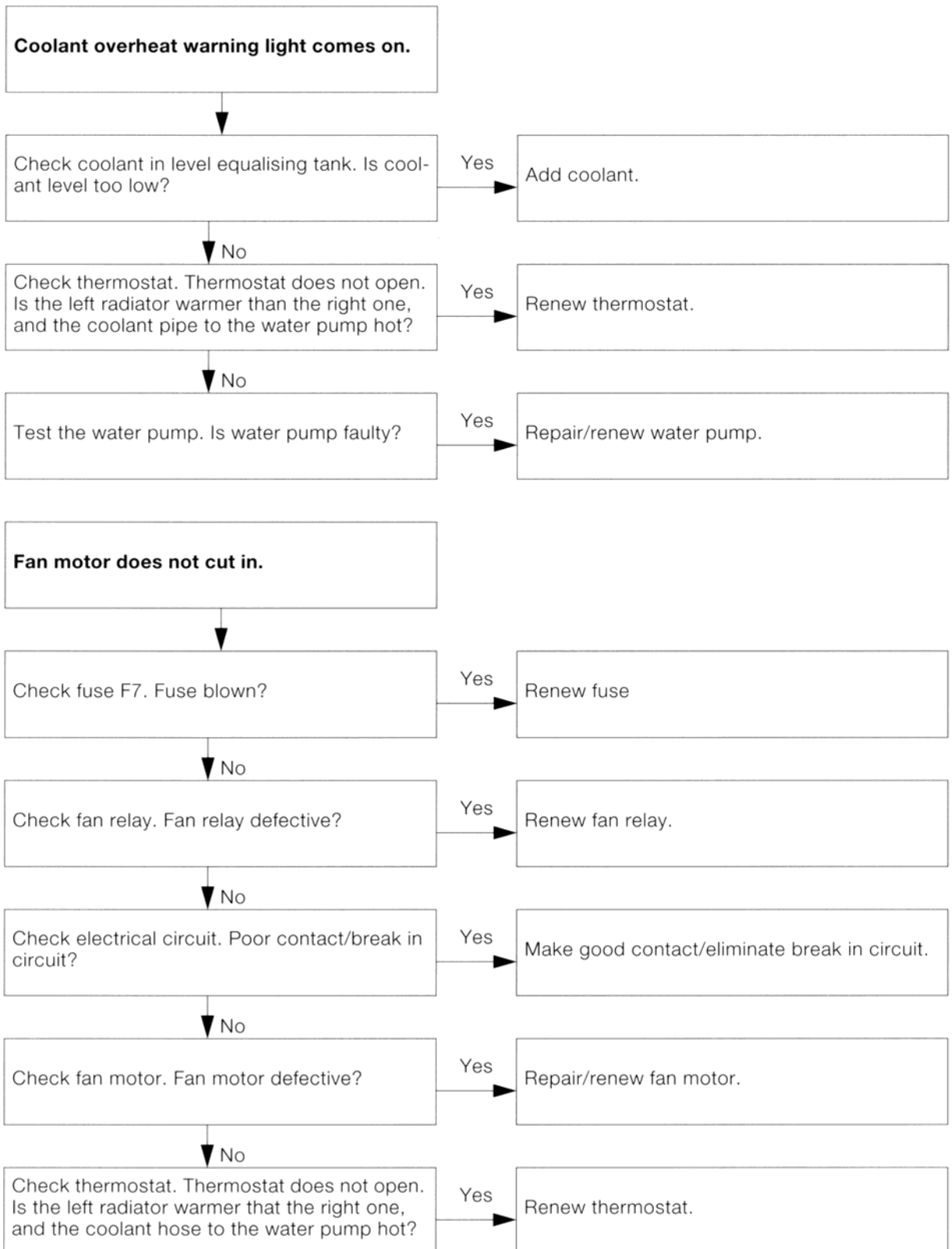
- Screw pump, **BMW No. 17 0 500**, with adapter and threaded stub pipe, **BMW No. 17 0 520**, to the filler pipe.
- Pressure-test the cooling system; pressure must be maintained unchanged for at least 5 minutes.

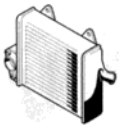
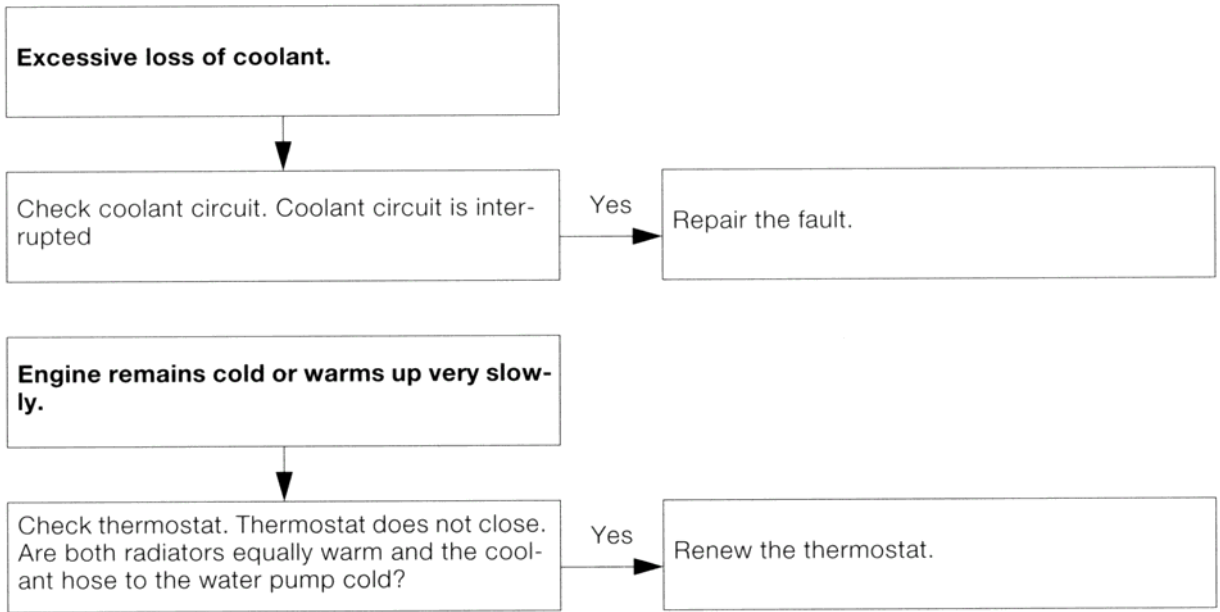
### Setting:

Test pressure..... 1.5 bar

- Attach cap.

## Trouble-shooting





## **18 Exhaust system**

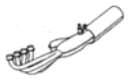
# Contents

Page

<b>Removing and installing exhaust system</b> .....	5
Removing/installing oxygen sensor .....	5
<b>Removeing installing exhaust system sleeve</b> .....	6







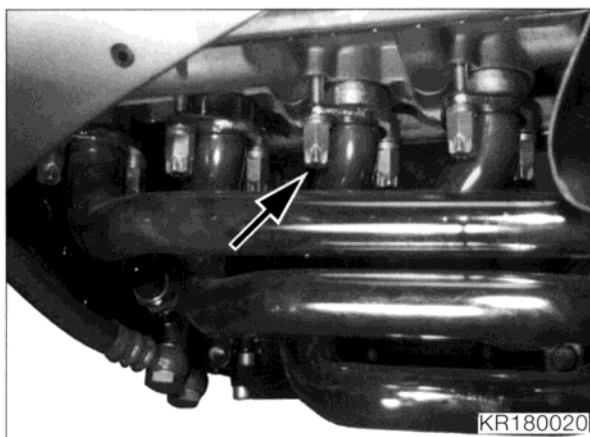
<b>Technical data</b>	<b>K 1200 RS</b>
<b>Exhaust system</b>	
Silencer (muffler)	Closed-loop catalytic converter





## Removing and installing exhaust system

- Place the motorcycle on its main (centre) stand.
- Remove the engine spoiler.
- Remove the dualseat.
- Release the cable strap for the oxygen sensor (lambda probe).
- Separate the plug connector for the oxygen sensor.
- Pull the oxygen sensor cable out downwards.



- Unscrew the eight fastenings (arrow) for the exhaust system at the cylinder head.



- Unscrew the retaining hoop (arrow) at the silencer.
- Unfold the side (prop) stand.
- Take the exhaust system off downwards.

- Install in the reverse order of work, noting the following operations in particular.



### Caution:

When installing, note correct cable positions and attachment points,



### Note:

Renew the O-rings at the cylinder head.

- Install in the reverse order of work.

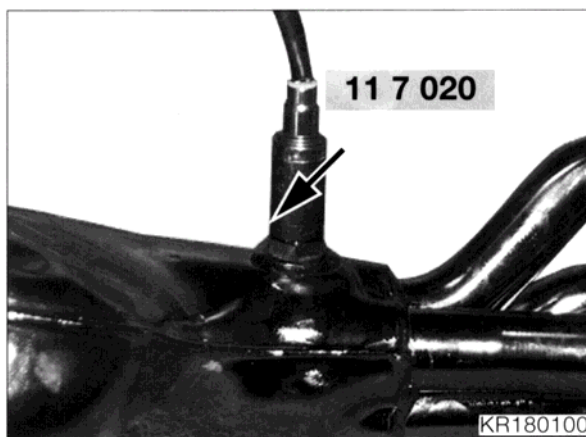


### Tightening torques:

Mountings

Exhaust system to cylinder head.....	24 Nm
Retaining hoop at silencer .....	13 Nm
Retaining hoop to frame.....	24 Nm

## Removing/installing oxygen sensor



- Unscrew the oxygen sensor at the hexagon (arrow).



### Note:

Before installing, lightly oil the thread on the oxygen sensor.

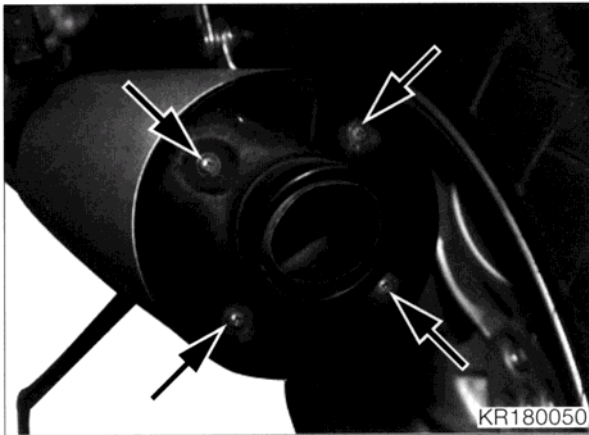
- Tighten the oxygen sensor at the hexagon with socket wrench insert, **BMW No. 11 7 020**.



### Tightening torque:

Oxygen sensor.....	40 Nm
--------------------	-------

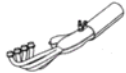
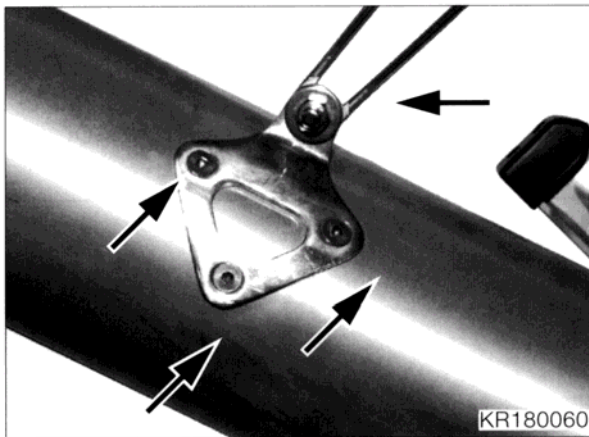
## Removing installing exhaust system sleeve



- Remove fastenings (arrows) for cover.



- Pull the exhaust system sleeve away from the silencer with a turning movement (arrows).



- Unscrew the retaining hoop (arrow) at the silencer.
- Remove the fastenings (arrows) for the retaining plate.



### Note:

When installing, push the sleeve on to the silencer with a turning movement, making sure that the holes in the sleeve and the silencer are aligned.

- Install in the reverse order of work.



### Tightening torques:

Retaining plate to silencer.....	11 Nm
Retaining hoop to holder.....	13 Nm
Cover.....	8 Nm

## **21 Clutch**

# Contents

Page

<b>Removing and installing clutch</b> .....	5
Removing clutch .....	5
Removing clutch housing .....	6
Installing clutch housing .....	7
Installing clutch .....	8
Removing/installing clutch slave cylinder and clutch release rod .....	9
Removing and installing clutch slave cylinder .....	9
Removing/installing clutch release rod .....	10
Removing/installing clutch lines .....	11
Removing/installing clutch pressure line .....	11
Removing/installing vent line .....	12



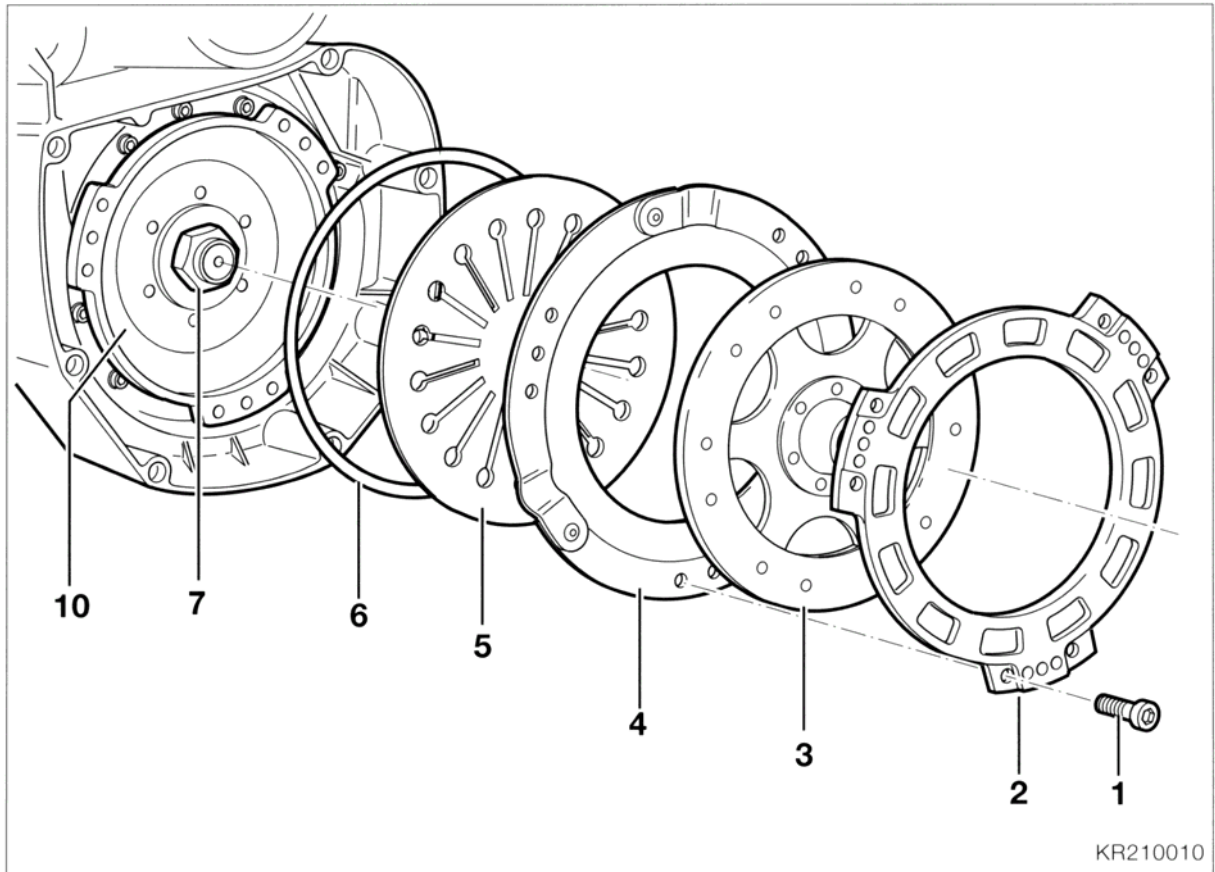




Technical data	K 1200 RS	
<b>Clutch</b>		
Type	Single dry plate clutch (asbestos-free)	
Operation	hydraulic	
Clutch plate dia.	mm	180
Wear limit: Minimum clutch plate thickness	mm	4,5







KR210010

## Removing and installing clutch

- Remove the dualseat (→ 46.6).
- Remove the complete fairing (→ 46.9)
- Remove the battery (→ 61.5)
- Remove the rear wheel (→ 36.8).
- Remove the speedometer sensor (→ 61.15).
- Remove the brake caliper/secure it together with the speedometer sensor with a cable strap to the rear frame (→ 34.6).



### Caution:

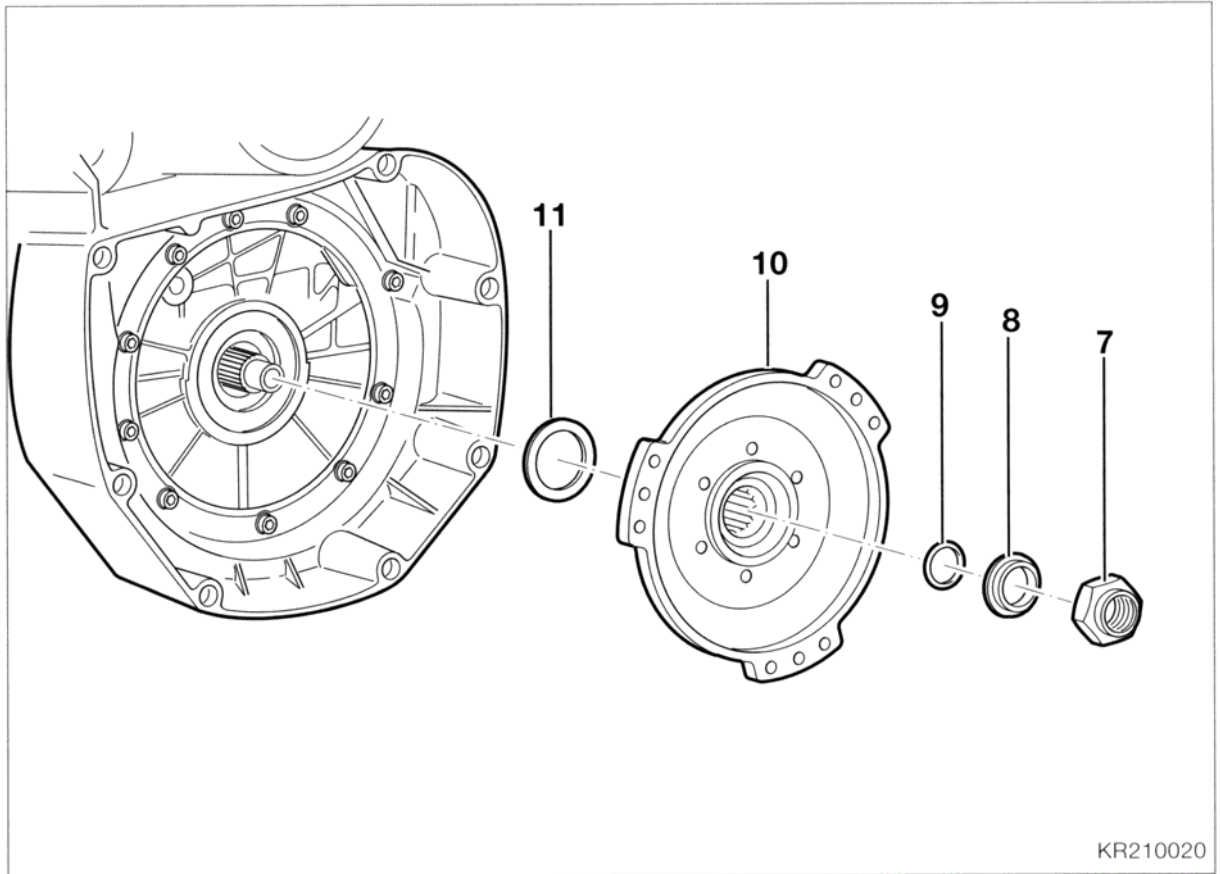
If the rear wheel drive contains oil, never lay it on its side before installing (oil will escape when the bike is ridden (suction effect)).

- Remove the rear wheel drive (→ 33.6)
- Remove the front section of the rear frame (→ 46.8)
- Remove the swinging arm (→ 33.19)
- Remove the front drive shaft (→ 33.21)
- Remove the cross-tube (→ 46.25)
- Remove the starter motor (→ 12.13)
- Remove the gearbox (→ 23.7)

## Removing clutch

- Take out the six retaining screws (1).
- Take the clutch housing cover (2), clutch plate (3), pressure plate (4) and diaphragm spring (5), wire ring (6) out of the clutch housing (10).

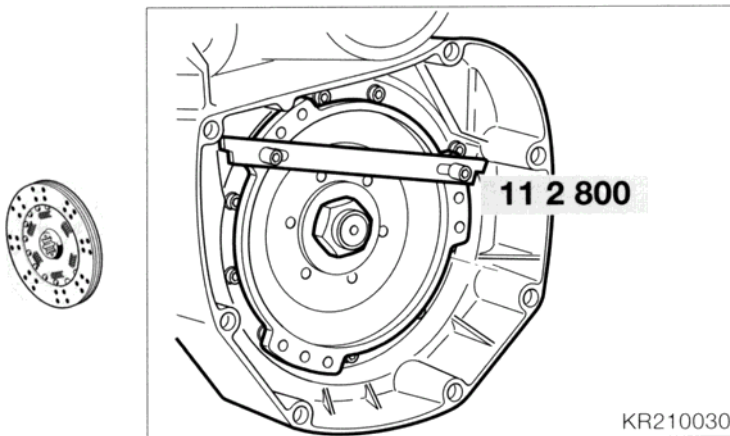




KR210020

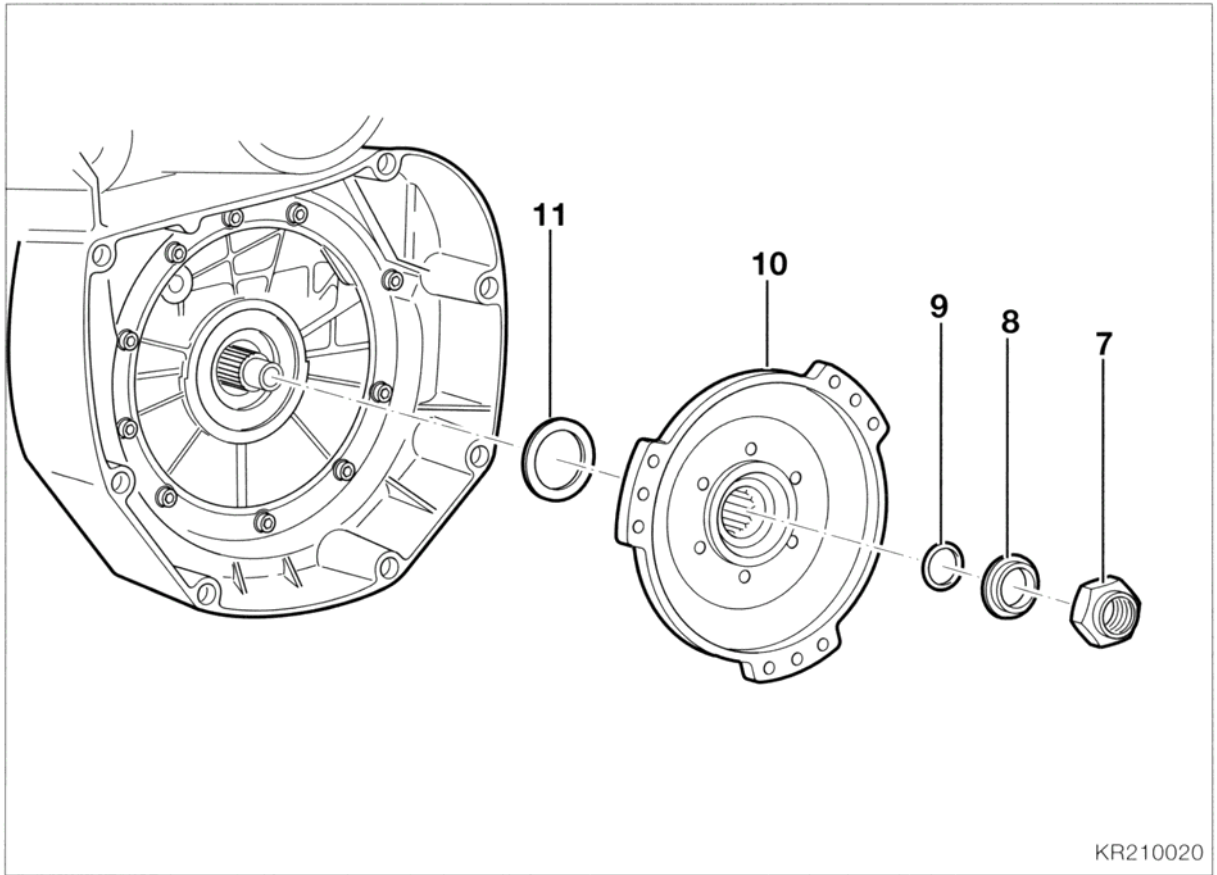
### Removing clutch housing

- Unscrew hex nut (7).
- Remove thrust ring (8).
- Move clutch housing (9) to and fro until O-ring (8) can be seen.
- Cut through O-ring (9).
- Pull off the clutch housing (10).
- Take off thrust washer (11).



KR210030

- Attach holder, **BMW No. 11 2 800**, as illustrated.



KR210020

### Installing clutch housing

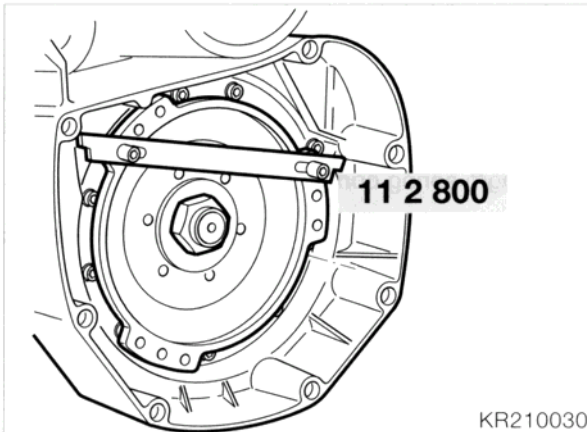
- Grease the spline tracks in clutch housing (10) with Optimoly MP 3.
- Install clutch housing (10) with thrust washer (11) in the correct position.
- Oil the new O-ring (9) lightly.
- Install the thrust ring (8) with a new O-ring (9).



#### Caution:

Each time it is removed, the hex nut (7) must be renewed.

- Tighten hex nut (6) with the shoulder facing outwards.
- Remove the retaining fixture, **BMW No. 11 2 800**.



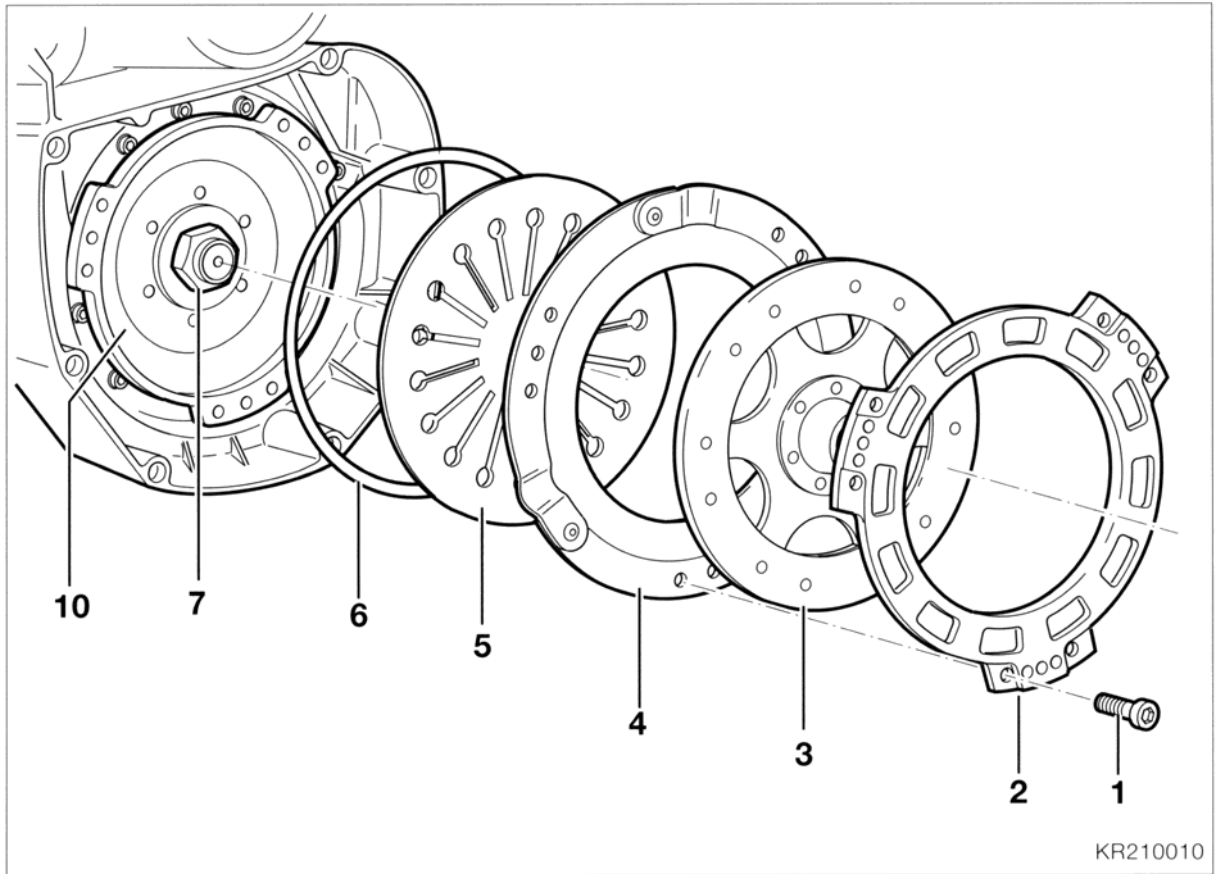
KR210030

- Secure the retaining fixture, **BMW No. 11 2 800**, to clutch housing (10).

#### Tightening torques:

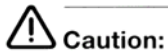
1. Clutch housing nut ..... 140 Nm
2. Loosen
3. Retighten ..... 50 Nm
4. Tightening angle ..... 60°





KR210010

## Installing clutch



### Caution:

Always use new screws.

- Grease all lubrication points with **Optimoly MO 3**.



### Note:

Install diaphragm spring (5) with the convex side towards pressure plate (4).

- Insert diaphragm spring (5) into clutch housing (10).



### Caution:

The paint marks on the clutch housing (10), pressure plate (4) and clutch housing cover (2) should be offset through 120°.

- Insert wire ring (6), diaphragm spring (5), pressure plate (4), clutch plate (3) and clutch housing cover (2) into clutch housing (9).
- Secure clutch with fastening screws (1).

### Lubrication points:

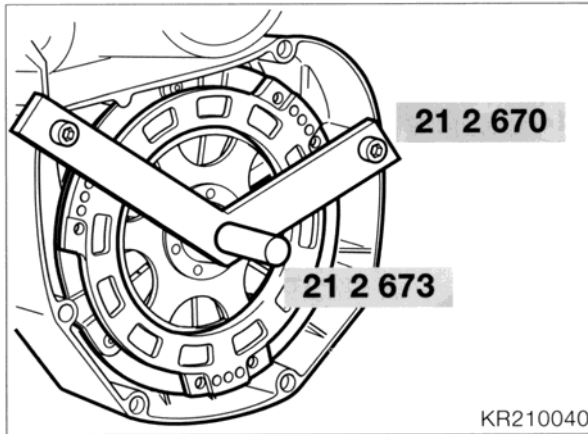
Splines on clutch plate and input shaft.

Diaphragm spring contact surface on clutch housing.

Diaphragm spring contact surface on pressure plate.

..... **Optimoly MP3 paste**





- Centre clutch plate (3) with centering pin, **BMW No. 21 3 680**.
- Tighten retaining screws (1) in succession, in a crosswise pattern.

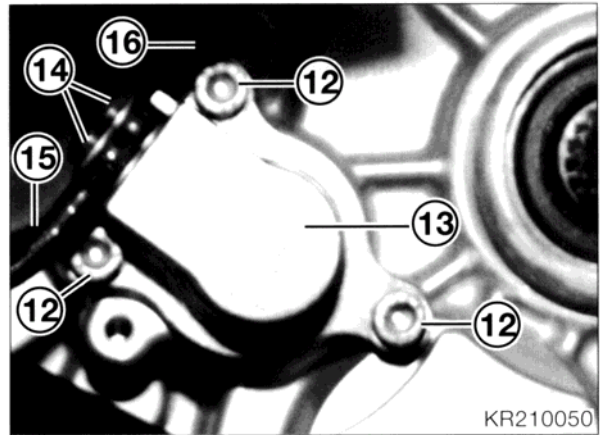
**! Tightening torque:**  
 Housing cover to flywheel ..... 19 Nm

- Install the gearbox (→ 23.27)
- Install the starter motor (→ 12.15)
- Install the cross-tube (→ 46.25)
- Install the front universal joint (→ 33.21)
- Install the swinging arm (→ 33.22)
- Install the rear wheel drive (→ 33.18)
- Install the brake caliper (→ 34.6).
- Install the speedometer signal transmitter (→ 61.15).
- Install the rear wheel (→ 36.8)

## Removing/installing clutch slave cylinder and clutch release rod

### Removing and installing clutch slave cylinder

- Remove rear wheel (→ 36.8)
- Remove speedometer signal transmitter (→ 61.15).
- Remove brake caliper/tie up to rear frame with cable strap, together with speedometer signal transmitter (→ 34.6).
- Remove rear wheel drive (→ 33.6)
- Remove front section of rear frame (→ 46.8)
- Remove swinging arm (→ 33.19)



### **! Caution:**

Prevent the clutch slave cylinder (12) from tilting. Unscrew the retaining screws (11) alternately and uniformly.

- Take out retaining screws (12).
- Pull clutch slave cylinder (13) away from gearbox.
- Undo hollow screws (14), and take off pressure line (15) and vent line (16).



- Install in the reverse order of work, noting the following operations in particular.

**⚠ Caution:**

Before installing, loosen the screw plug on the vent line.

To prevent the clutch slave cylinder (13) from tilting, tighten retaining screws (12) alternately and uniformly.

**📄 Note:**

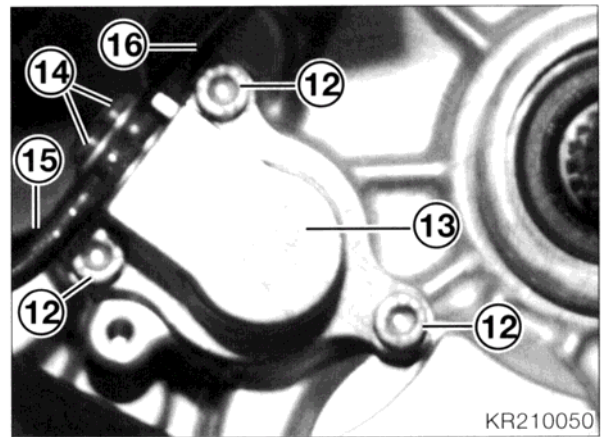
Use new sealing rings when installing hollow screws (14).

- Bleed the clutch (➡ 32.13)

**🔧 Tightening torques:**

Slave cylinder to gearbox ..... 9 Nm  
 Hollow screws to slave cylinder ..... 6 Nm

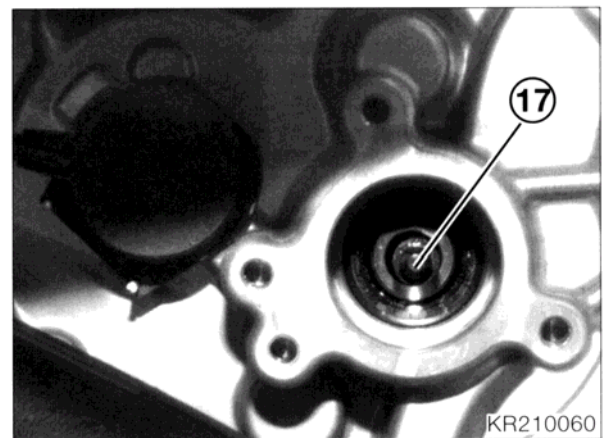
**Removing/installing clutch release rod**



**📄 Note:**

Pressure line (15) and vent line (16) remain on the clutch slave cylinder (13).

- Remove the clutch slave cylinder (13).



- Pull clutch release rod (17) out to the rear.
- Install in the reverse order of work, noting the following operations in particular.

**⚠ Caution:**

Before installing the clutch slave cylinder (13), undo the screw plug at the vent line.

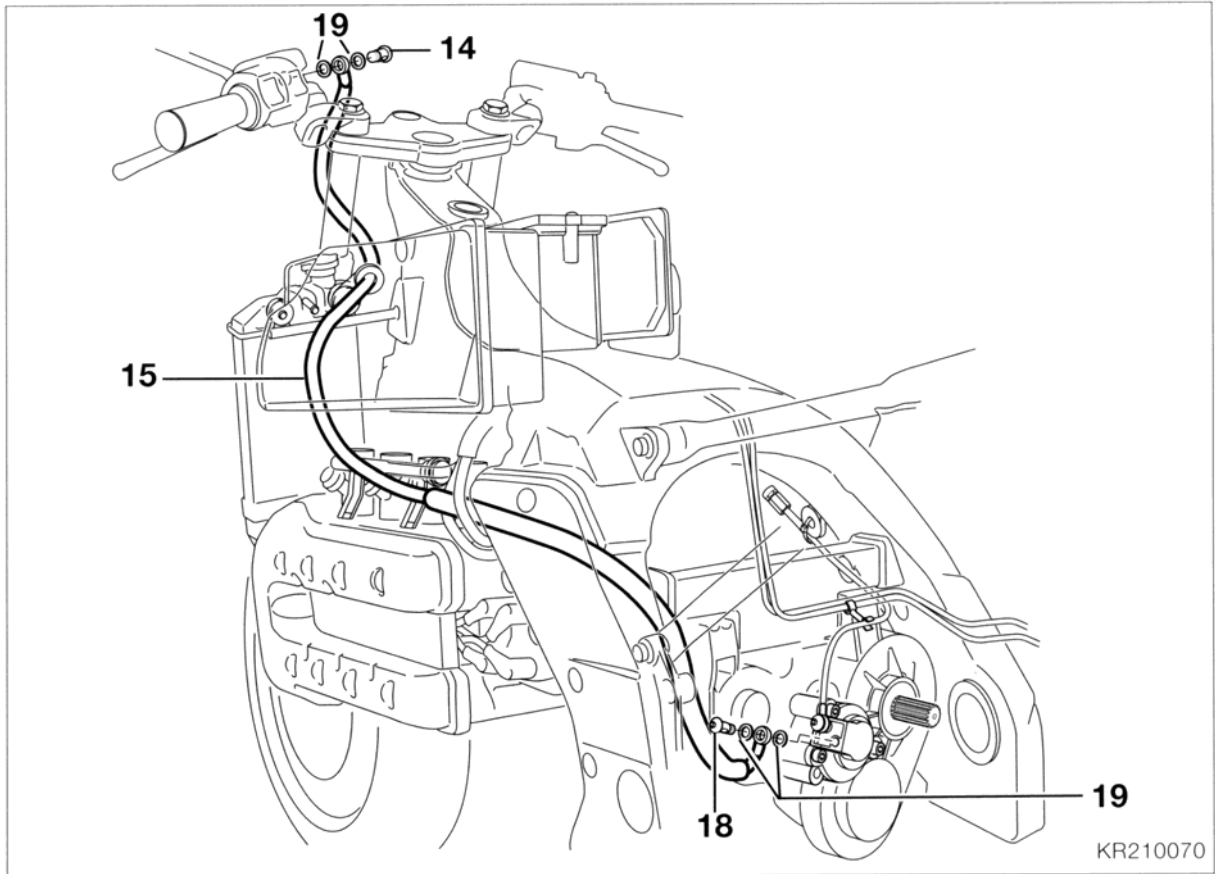
To prevent the clutch slave cylinder (13) from tilting, tighten the retaining screws (12) alternately and uniformly.

**🔧 Tightening torques:**

Clutch slave cylinder to gearbox ..... 9 Nm







## Removing/installing clutch lines

### Removing/installing clutch pressure line

- Take off the left side section of the fairing (→ 46.10)
- Remove the front section of the rear frame (→ 46.8)
- Cut through cable strap between fuel injection rail and frame.
- Take out hollow screw (14) and remove sealing rings (19).
- Drain brake fluid from the reservoir and pressure line (15) into a suitable vessel and dispose of it in an environmentally acceptable manner.
- Take out hollow screw (18) and detach the pressure line (15).

- Install in the reverse order of work, noting the following operations in particular.



### Note:

Run the clutch pressure line as illustrated. Always use new sealing rings (19).

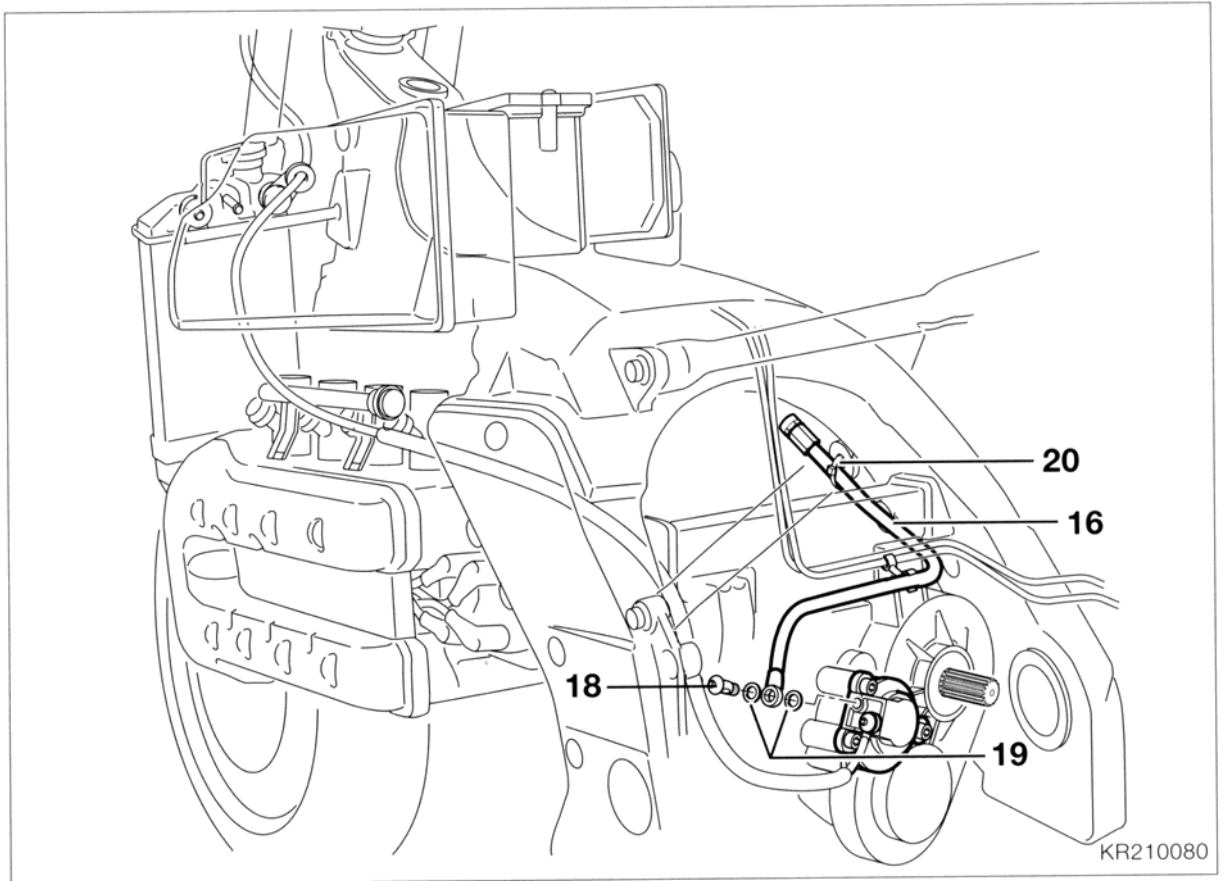
- Fill the clutch system with brake fluid (→ 32.13)
- Bleed the clutch (→ 32.13)
- Install the left side section of the fairing (→ 46.10)
- Install the front section of the rear frame (→ 46.8)



### Tightening torques:

Hollow screws ..... 6 Nm





### Removing/installing vent line

- Remove front section of rear frame (→ 46)
- Cut through cable strap (20) at frame.
- Remove hollow screw (18), take off sealing rings (19), trap brake fluid in a suitable vessel and dispose of it in an environmentally acceptable manner.
- Take off sealing rings (19) and cable strap (20).
- Install in the reverse order of work, noting the following operations in particular.



#### Note:

Position cable strap (20) as illustrated.  
Always use new sealing rings (19).

- Fill the clutch system with brake fluid (→ 32.13)
- Bleed/adjust the clutch (→ 32.13)
- Attach front section of rear frame (→ 46.8)



#### Tightening torques:

Hollow screws..... 6 Nm

## **23 Gearbox**

# Contents

Page

<b>Gearbox - sectioned drawing</b> .....	5
<b>Removing gearbox</b> .....	7
<b>Dismantling gearbox</b> .....	9
Removing gearbox housing .....	9
Removing selector drum .....	10
Dismantling/assembling selector shaft .....	10
Removing gearbox shafts .....	11
Renew the deep-groove ball bearings for the intermediate shaft .....	11
Dismantling/assembling input shaft .....	12
Dismantling input shaft .....	12
Assembling input shaft .....	13
Dismantling/reassembling output shaft .....	14
Stripping down output shaft .....	14
Assembling output shaft .....	15
Checking endplay .....	16
Renewing the shaft sealing rings in the gearbox housing and gearbox cover .....	17
Renewing input shaft sealing ring at input side .....	17
Renewing output shaft sealing ring .....	17
Renewing input shaft sealing ring at output side .....	18
Renewing shaft sealing ring for selector drum .....	18
Renewing shaft sealing ring for selector shaft .....	18
Checking/adjusting fully-compressed length of selector drum .....	18
Checking/adjusting fully-compressed lengths of gearbox shafts .....	19
Checking/adjusting fully-compressed length of intermediate shaft .....	19
Checking/adjusting fully-compressed length of output shaft .....	20
Checking/adjusting fully-compressed length of input shaft .....	21
<b>Reassembling gearbox</b> .....	22
Installing gearbox shafts .....	22
Installing input, output and intermediate shaft .....	22
Shimming selector shaft .....	23
Installing selector shaft .....	23
Installing selector drum .....	24
Installing gearbox housing .....	25
Installing gearbox .....	27



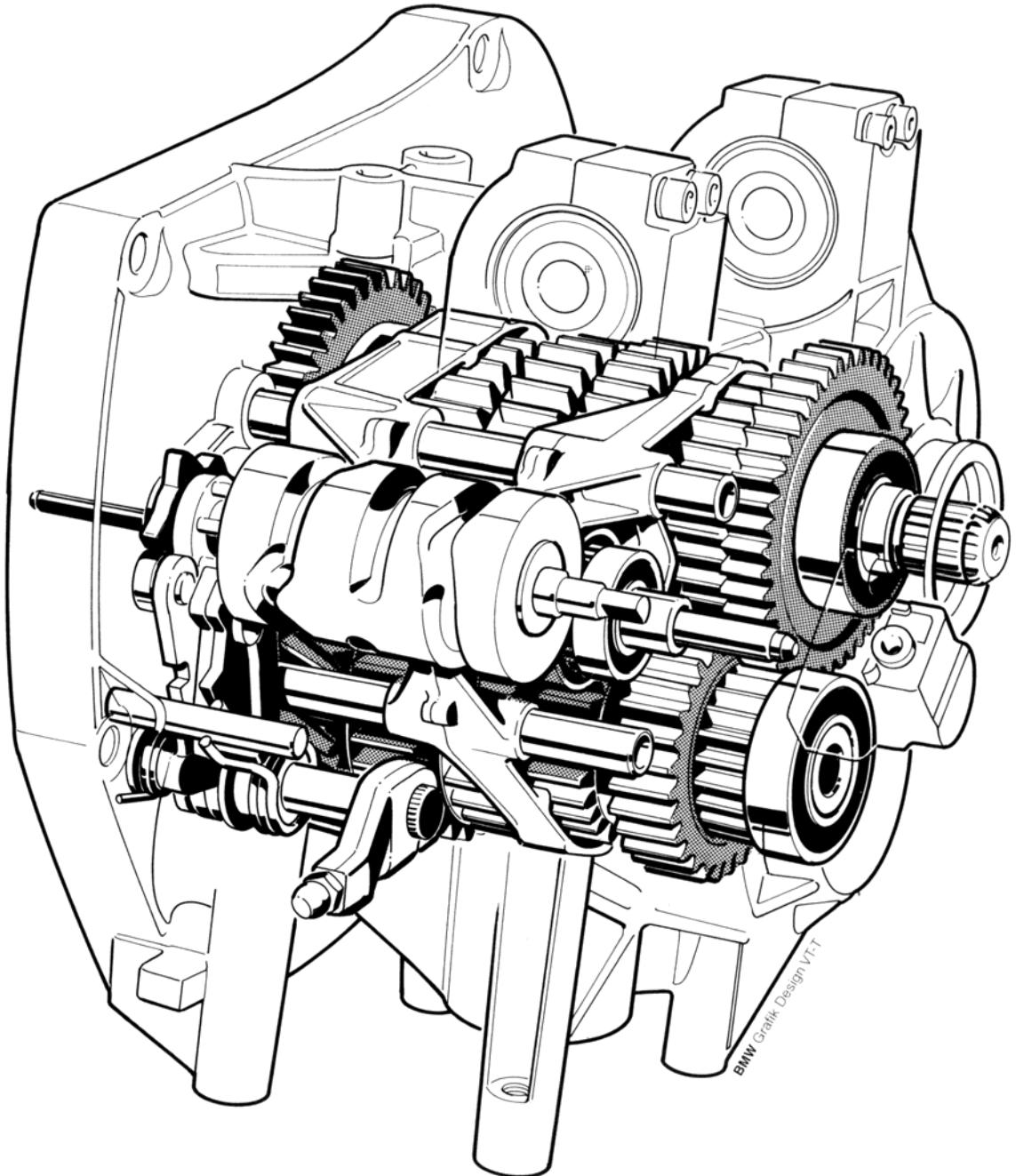


Technical data		K 1200 RS
Type of gearbox		6-speed with sports ratios, claw shift and integrated shock damper acting in all gears
Gear shift type		Adjustable shift pedal, selector drum with overrun protection
Gear ratios	1st gear 2nd gear 3rd gear 4th gear 5th gear 6th gear	3.864 3.022 2.393 1.962 1.7 1.511
Total spread of gear ratios		2.557
Oil grade (all the year round)		Brand-name SAE 90 hypoid gear oil, API Class GL 5
Filling capacity	cc	800 ... 950
Length of intermediate shaft, fully compressed	mm (in)	198.95 ... 199.00 (7.833 ... 7.835)
Length of output shaft, fully compressed	mm (in)	192.95 ... 193.00 (7.596 ... 7.598)
Length of input shaft, fully compressed	mm (in)	138.60 ... 138.55 (5.457 ... 5.455)
Length of selector drum, fully compressed	mm (in)	111.80 ... 111.90 (4.402 ... 4.406)
Selector shaft endplay	mm (in)	0.1 ... 0.3 (0.004 ... 0.012)
Output shaft endplay values		
Free gearwheel, 1st gear	mm (in)	0.1 ... 0.33 (0.004 ... 0.013)
Free gearwheel, 2nd gear	mm (in)	0.1 ... 0.33 (0.004 ... 0.013)
Free gearwheels, 3rd and 4th gears (total play)	mm (in)	0.1 ... 0.67 (0.004 ... 0.026)
Intermediate shaft endplay		
Free gearwheel, 5th gear	mm (in)	0.1 ... 0.46 (0.004 ... 0.018)
Free gearwheel, 6th gear	mm (in)	0.1 ... 0.46 (0.004 ... 0.018)
Stroke of spring segment on input shaft	mm (in)	0.4 ... 0.6 (0.016 ... 0.024)



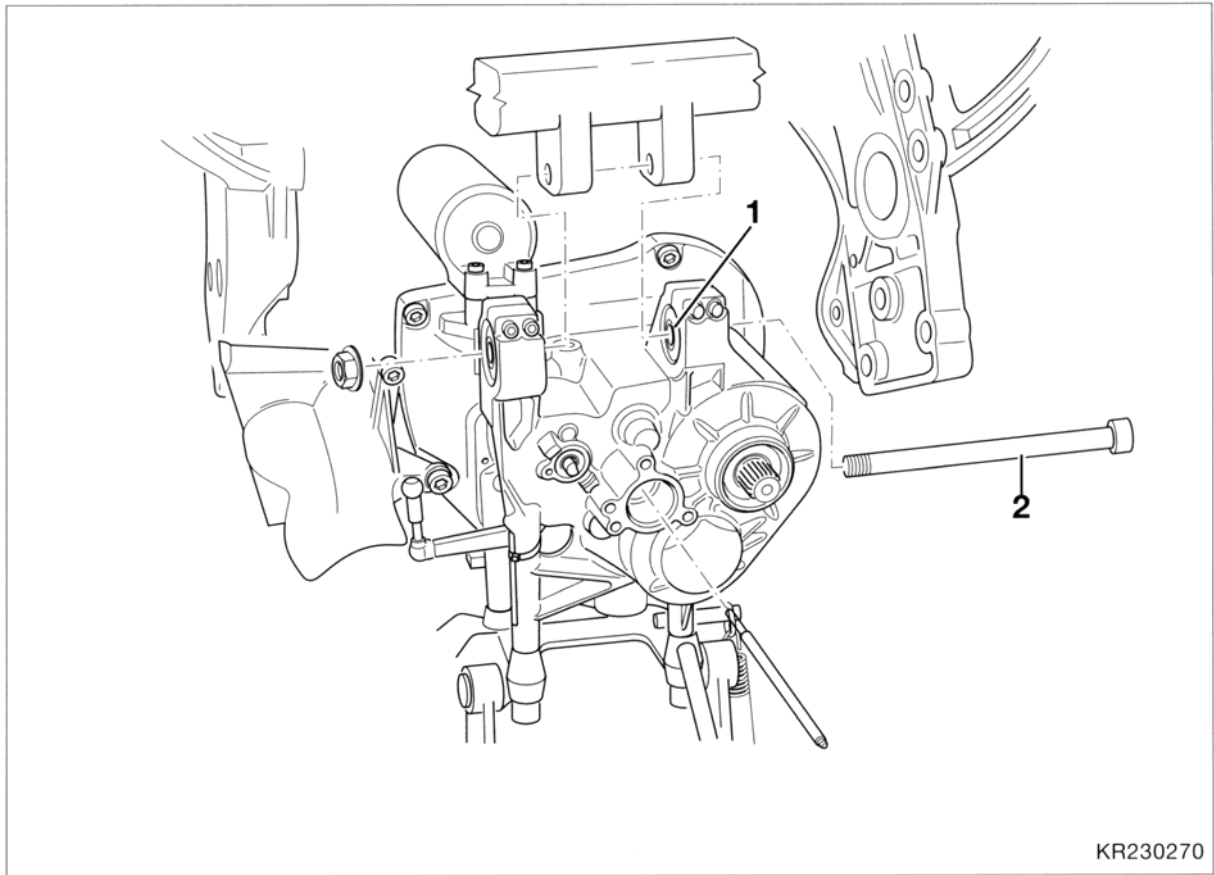


**Gearbox - sectioned drawing**









KR230270

## Removing gearbox

- Remove the dualseat. (→ 46.6)
- Remove the left/right side sections of the fairing at the front and rear (→ 46.9).
- Remove the engine spoiler and its holder.



### Caution:

Disconnect the negative battery terminal first, then the positive one.

- Remove the battery (→ 61.5).
- Remove the rear wheel (→ 36.8).
- Remove the speedometer signal transmitter (→ 61.15).
- Remove brake caliper/secure with a cable strap to the rear section of the frame, together with the speedometer signal transmitter (→ 34.6).

- Remove the rear wheel drive (→ 33.6).
- Remove the front section of the rear carrier (→ 46.8).
- Remove the swinging arm (→ 33.19).
- Remove the front drive shaft joint (→ 33.21).
- Remove the cross-tube (→ 46.25).
- Separate or detach plug connectors and wires at engine and gearbox (→ 51.4).
- Press out the left/right radiator with fan (→ 51.4).
- If the gearbox is to be fully dismantled, remove the main (centre) stand (→ 46.19).

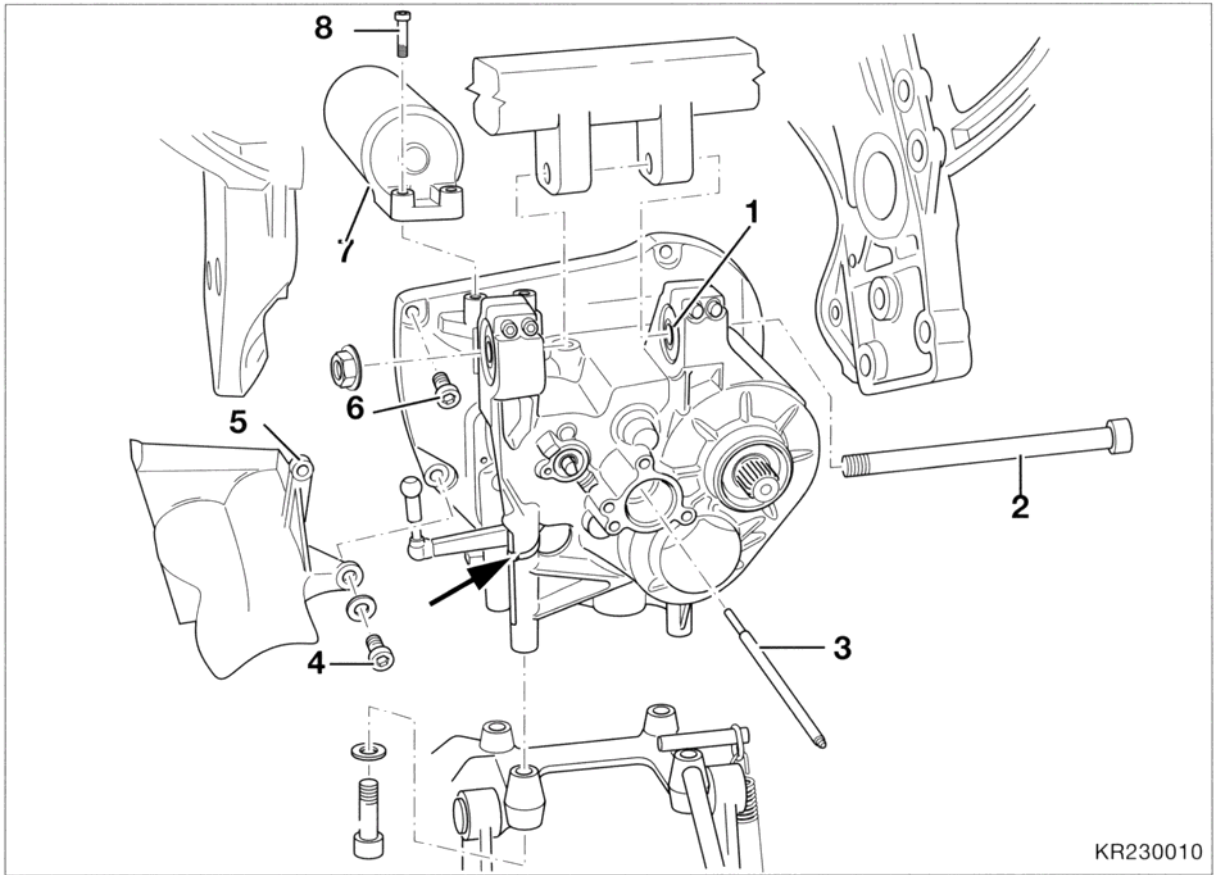


### Caution:

Do not undo the clamp at the right rubber mounting (1) or else a new basic adjustment procedure will have to be carried out.

- Remove screw (2) securing the gearbox to the frame.
- Loosen the left/right engine mountings at the cross-member.
- Raise the frame.





KR230010

- Cut through the cable strap (arrow) and take off the wire for the side (prop) stand switch.
- Remove clutch release rod (2) from the gearbox.
- Undo fastenings (4, 5) and remove the heat shield.
- Remove the 2 screws (8) and take off the starter motor (7).

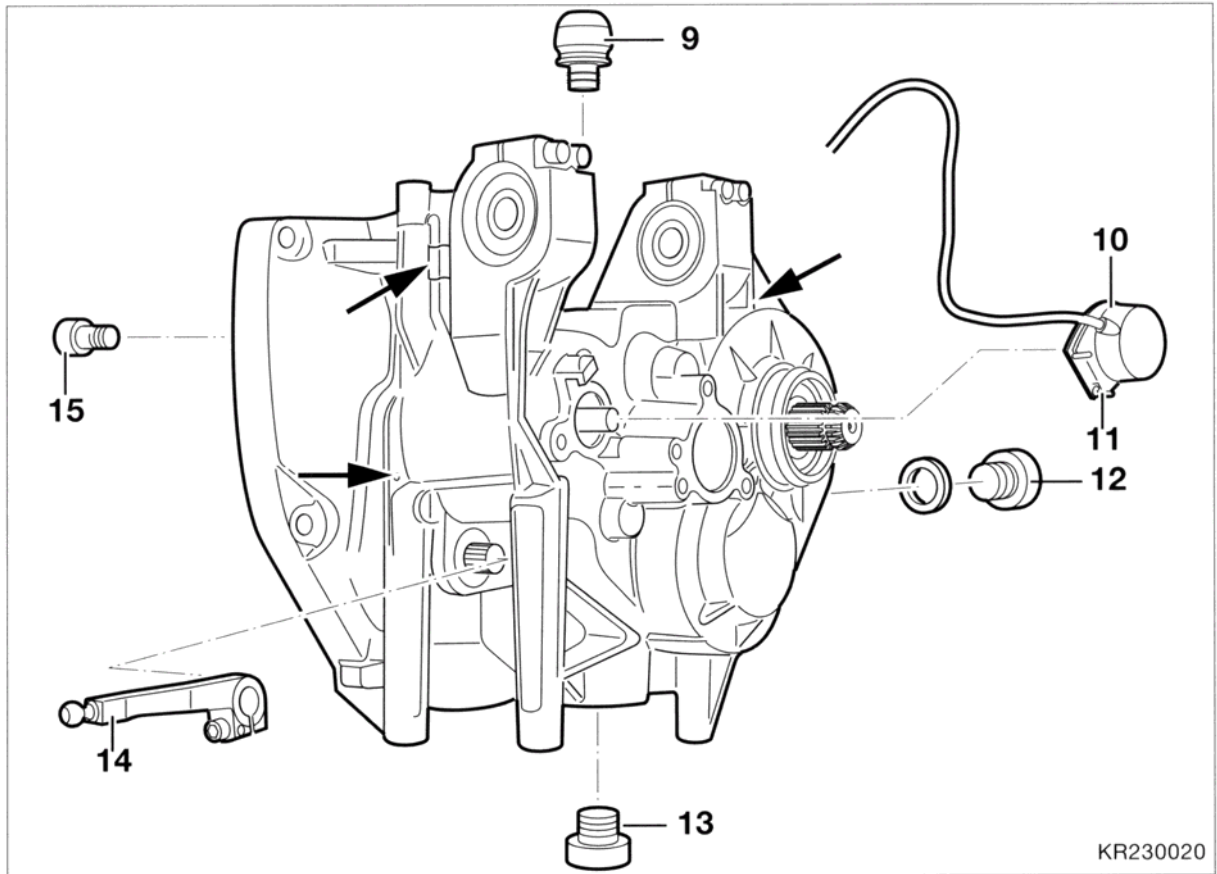


**Note:**

If not removed, the main (centre) stand must be folded up when the gearbox is removed.

- Undo the 6 fastenings (6) holding the gearbox to the intermediate flange.
- Pull the gearbox out of the intermediate flange until the input shaft journal is free, then remove the gearbox.



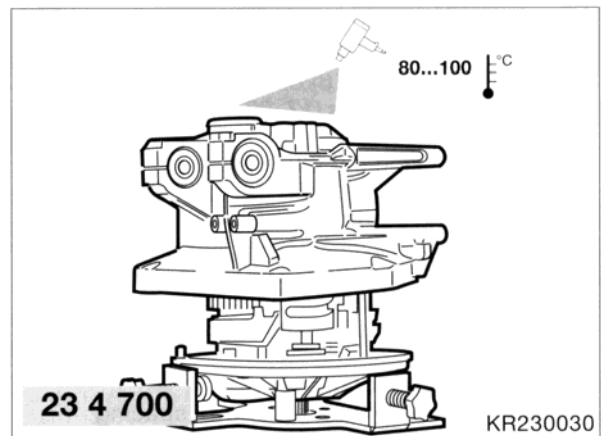


KR230020

## Dismantling gearbox

### Removing gearbox housing

- Take out oil filler/level check screw (12).
- Take out oil drain plug (13) and drain the oil out of the gearbox into a suitable tray.
- Remove breather (9).
- Unclip wire (arrow) for gear indicator switch (10).
- Press spring (11) together and take off gear indicator switch (10).
- Remove selector lever (14).
- Carefully press back centering pins (arrows), working from the back of the gearbox.
- Remove the nine screws (15) securing the cover to the housing.



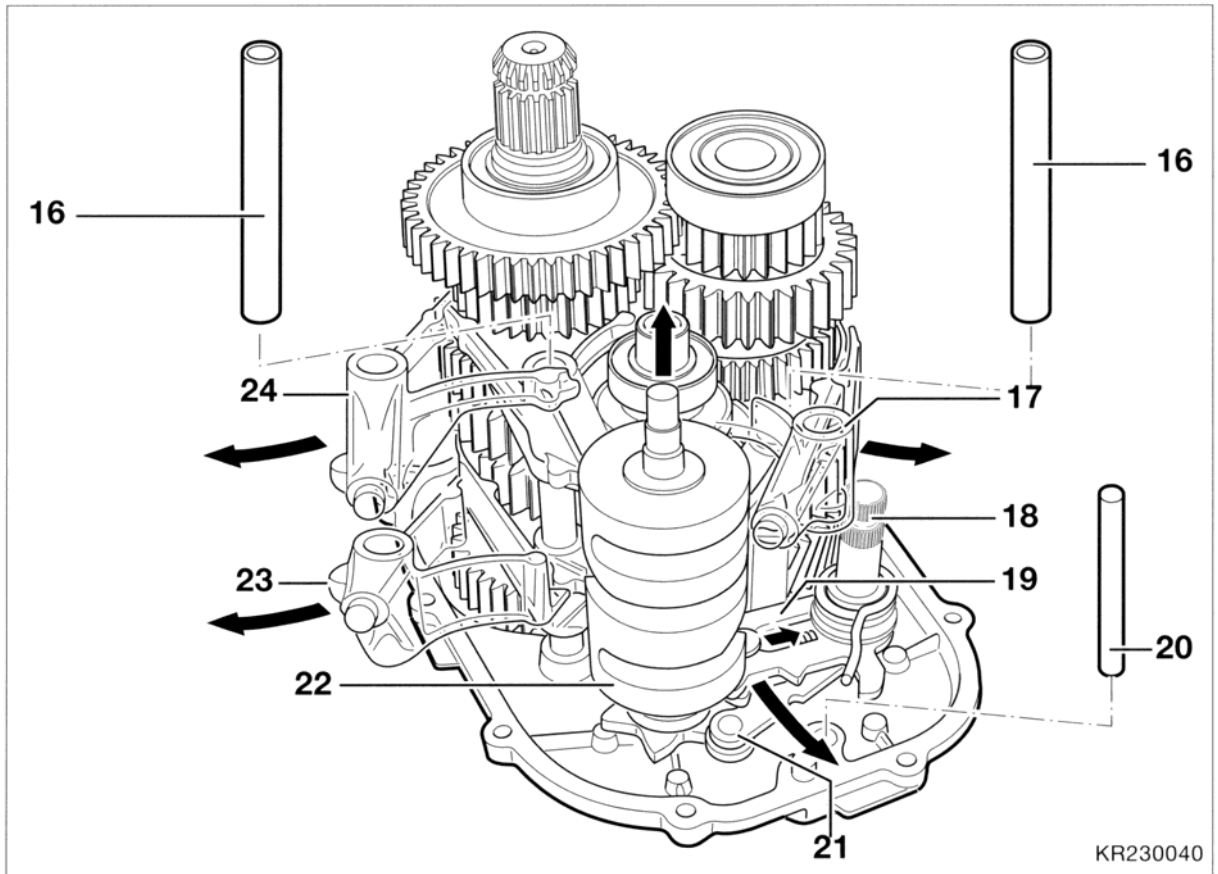
KR230030

- Insert gearbox into mount, **BMW No. 23 4 700**.

**!** Avoid damage to the housing cover and painted surfaces.

- Heat the bearing points in the housing to 80 °C... 100 °C.
- Strike the housing cover lightly with a plastic-faced hammer to loosen it.





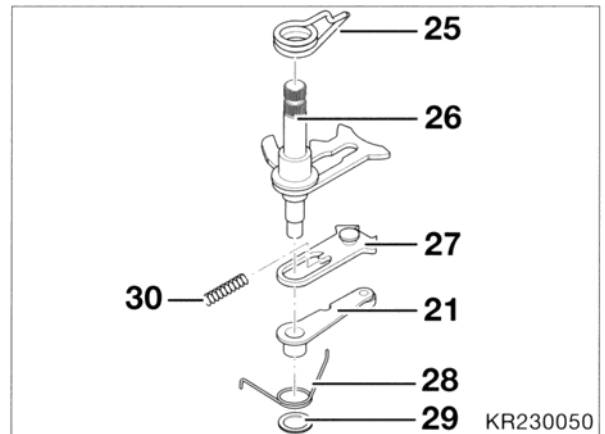
KR230040

### Removing selector drum

- Pull selector rails (16) out of selector forks.
- Swing selector forks (17, 23, 24) out towards the edge of the cover.
- Remove locking pin (20).
- Press guide plate (19) in the opposite direction to the spring loading (arrow).
- Swing locking lever (21) out towards the edge of the cover, hold it there and pull out selector drum (22), turning it slightly at the same time.
- Remove the thrust washers and spacing washer.
- Release the locking lever (21).
- Remove selector shaft (18) with spacing washer (29).
- Remove selector forks (17, 23, 24).

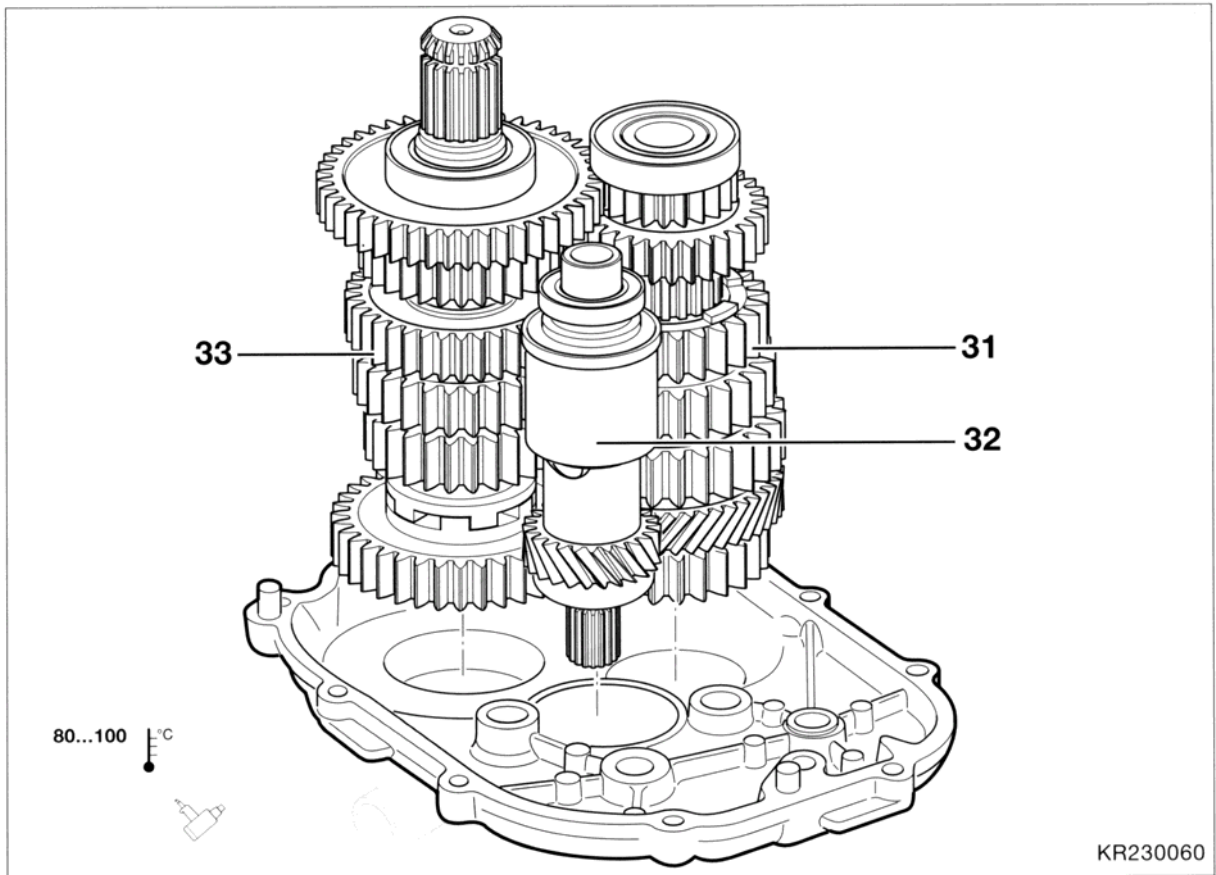


### Dismantling/assembling selector shaft



KR230050

- Remove torsion spring (29) with locking lever (21) from selector shaft (26).
- Remove torsion spring (25).
- Remove coil spring (30) with sliding plate (27).
- Assemble in the opposite order of work.



### Removing gearbox shafts

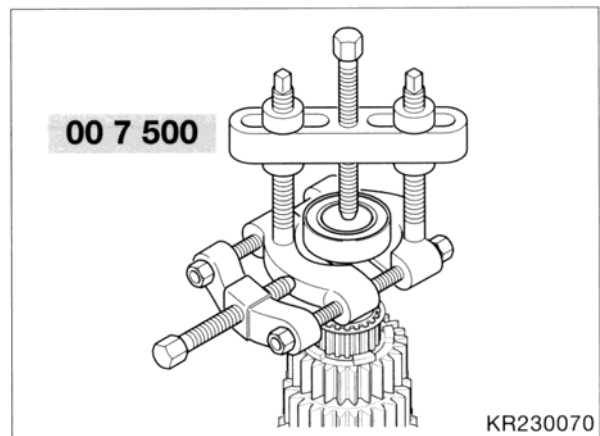
- Heat bearing points in gearbox cover to 80 °C ... 100 °C.
- Remove input shaft (32), output shaft (33) and intermediate shaft (31) from the cover together.

### Renew the deep-groove ball bearings for the intermediate shaft

#### **Caution:**

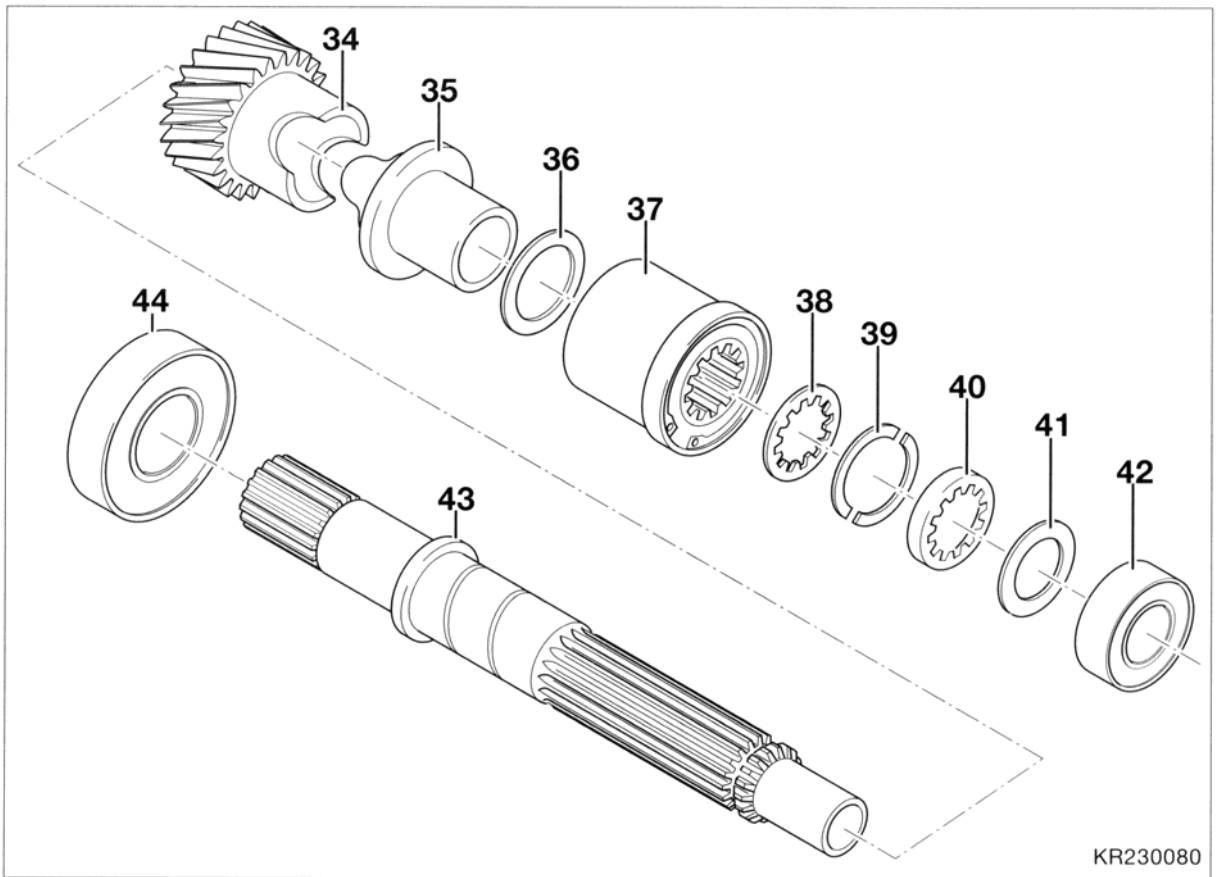
Apart from the deep-groove ball bearings, the intermediate shaft must always be renewed as a complete unit.

If the deep-groove ball bearings are renewed, the fully-compressed length must be re-adjusted.



- Pull off the deep-groove ball bearings with a universal puller, **BMW No. 00 7 500**.
- Press the output-side deep-groove ball bearing on to the intermediate shaft.
- Check/adjust the fully-compressed length (→ 23.19).
- Place the spacing washer of the determined thickness in position and press on the input-side deep-groove ball bearing.





KR230080

## Dismantling/assembling input shaft

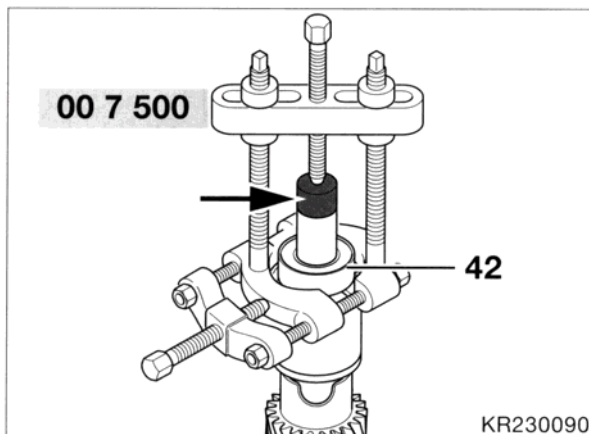
### Dismantling input shaft



#### Note:

Note the thickness of spacing washer (38).

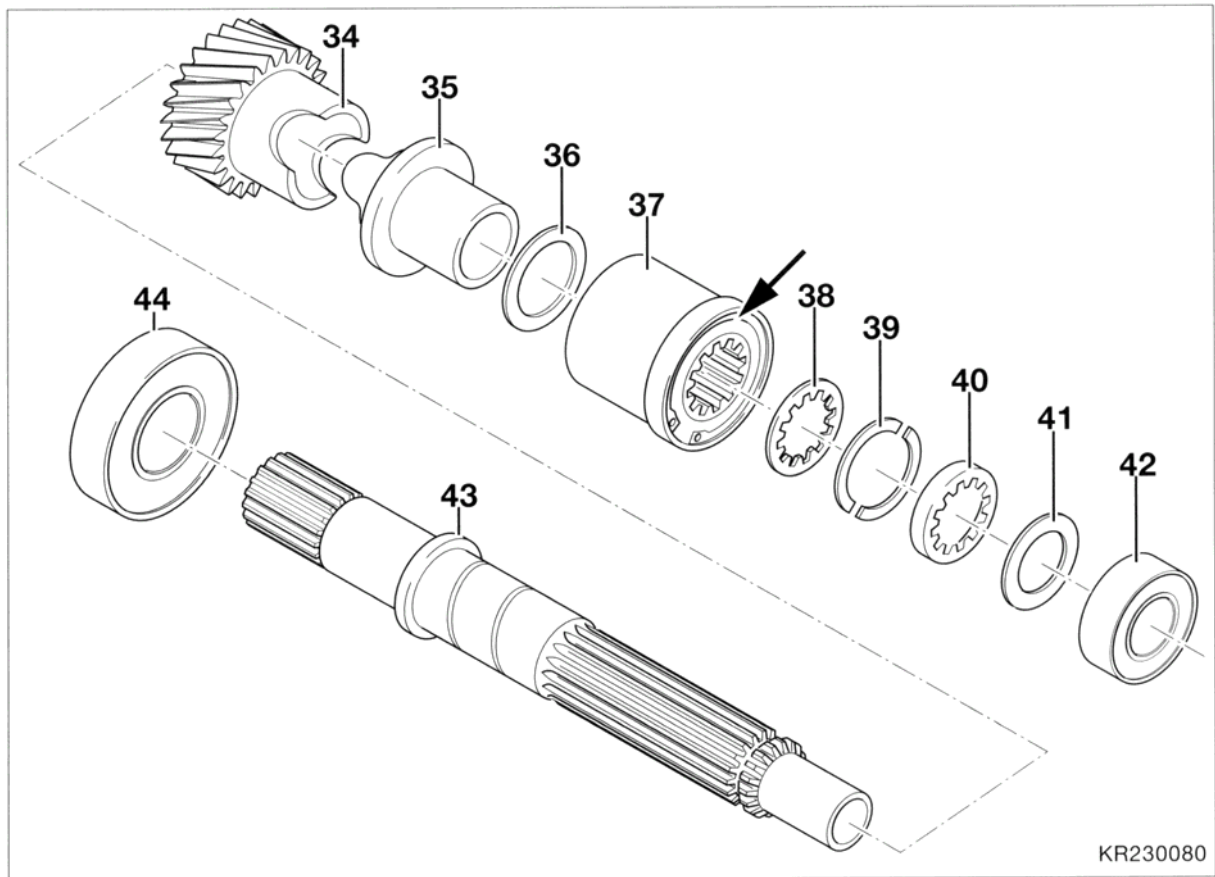
- Remove retaining sleeve (40), split segment washer (39), support washer (38), spring segment (37), corrugated washer (36), thrust block (35) and constant-speed gear (34).
- Transfer input shaft (43) to a different position.
- Use universal puller, **BMW No. 00 7 500**, and pressure head (arrow) to pull off deep-groove ball bearing (44).



KR230090

- Clamp input shaft (43) into the vise, using soft jaws.
- Use universal puller, **BMW No. 00 7 500**, and pressure head (arrow) to pull off deep-groove ball bearing (42) with spacing washer (41).





#### Assembling input shaft

- Oil the bearing surface for constant-speed gear (34) lightly on input shaft (43), and install the constant-speed gear.
  - Oil the splines in thrust block (35) lightly and install it.
  - Place corrugated washer (36) on thrust block (35).
  - Place spring segment (37) and circlip (arrow) facing upwards on corrugated washer (36).
  - Install a support washer (38) of the same thickness as the one previously removed.
  - Compress spring segment (37) and insert split segment washer (39) into ring groove.
  - Install retaining sleeve (40) with the shoulder facing over segment washer (39).
- Check the fully-compressed length and adjust if necessary. (→ 23.20)
  - Install spacing washer (41) of the determined thickness, and press on deep-groove ball bearing (42).

#### Caution:

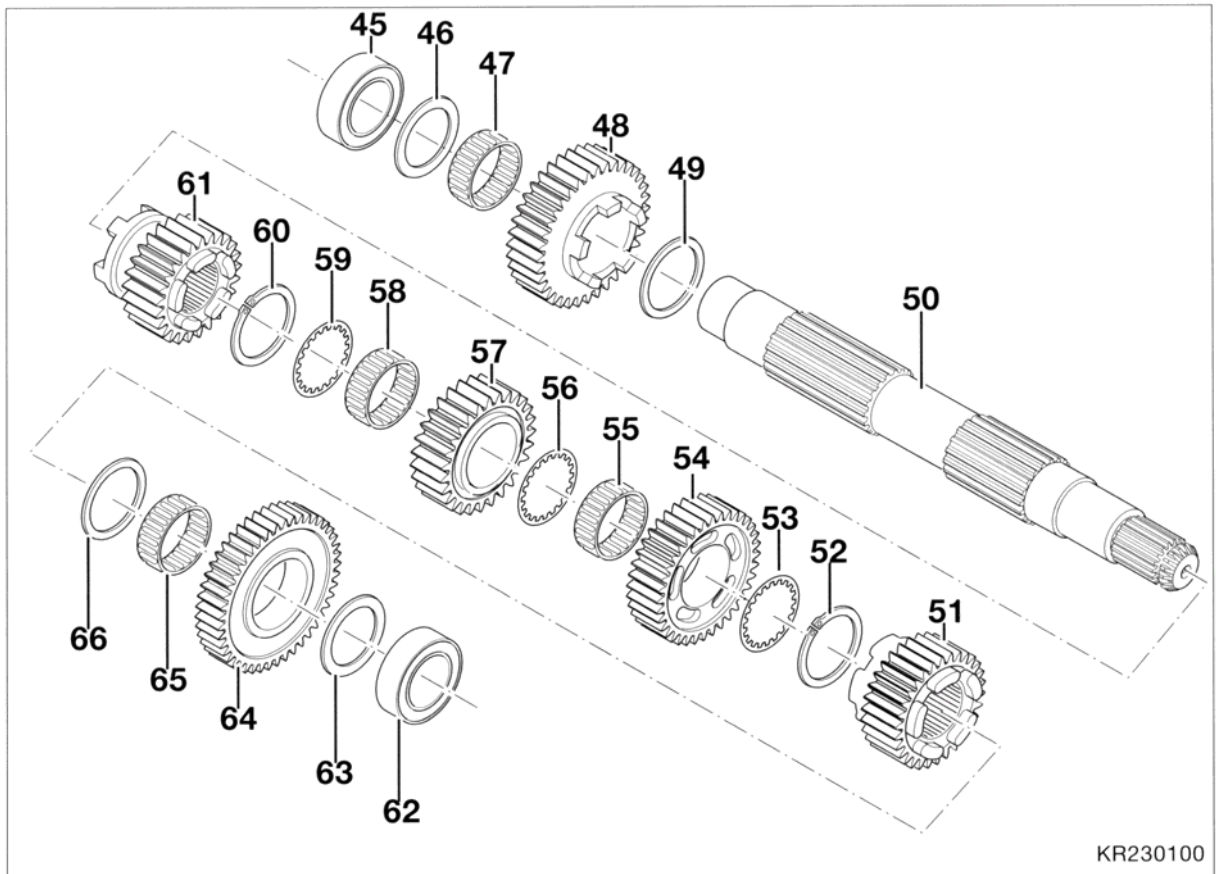
Check endplay at the spring segment. If endplay is greater than the tolerance limit, the cause may be wear or incorrect assembly.

#### Endplay:

Spring segment on shaft ...0.4...0.6 mm (0.016...0.024 in)







KR230100

## Dismantling/reassembling output shaft

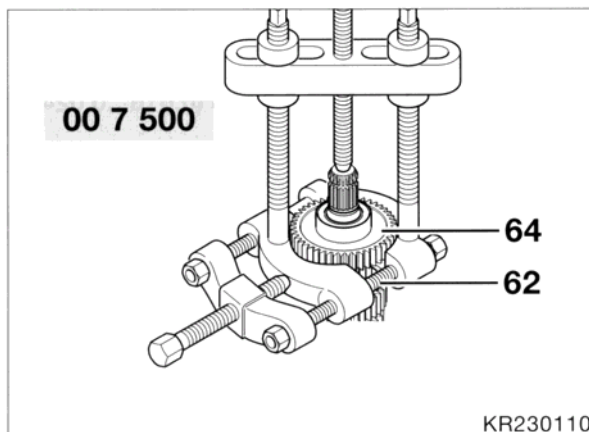
### Stripping down output shaft



#### Caution:

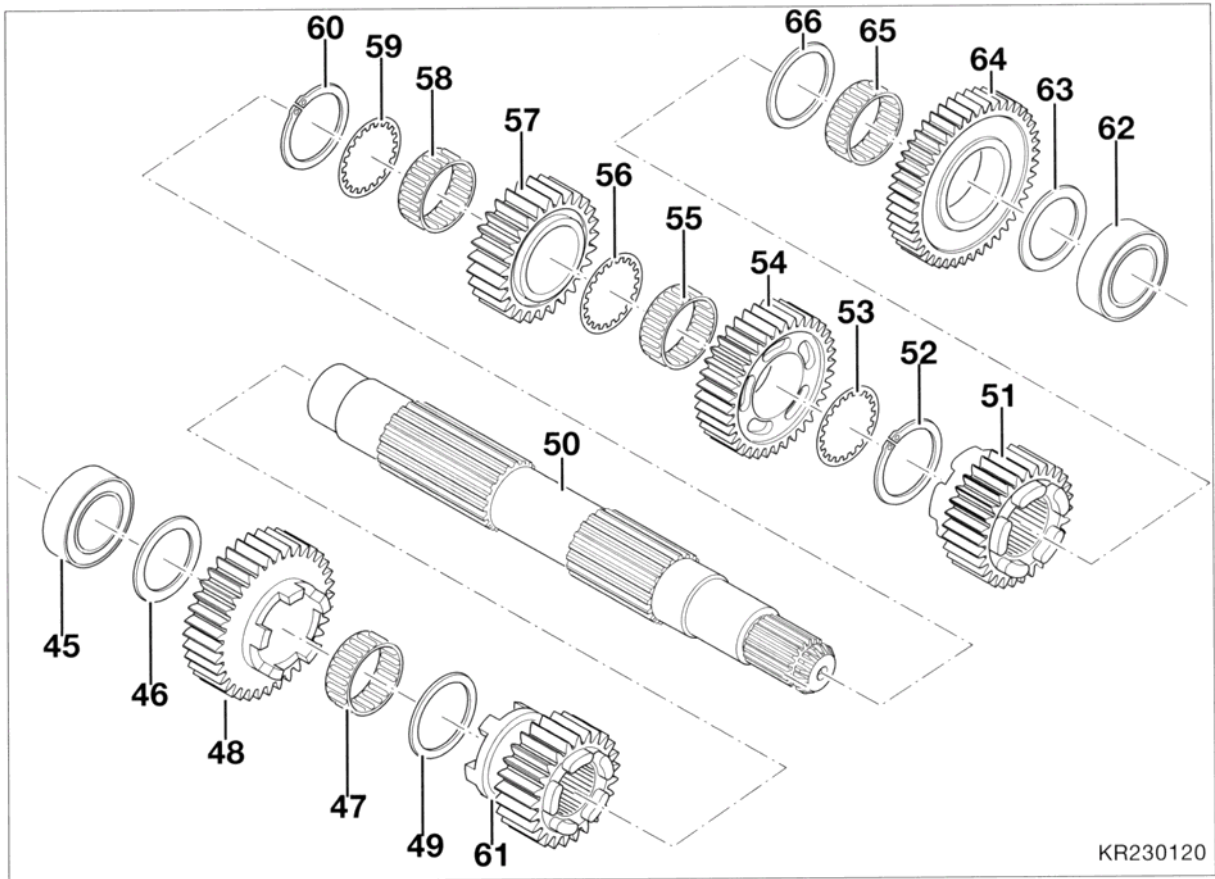
To avoid damaging the needle roller bearing at the splines, open it out carefully at the joint line before removing.

- Remove spacing washer (63), 1st gear shift wheel (64), needle roller bearing (65) and spacing washer (66).
- Remove the sliding gearwheel for 5th gear (51).
- Remove circlip (52), support washer (53), shift gearwheel for 3rd gear (54) and needle roller bearing (55).
- Remove support washer (56), shift gearwheel for 4th gear (57), needle roller bearing (58) and support washer (59).
- Remove circlip (60) and sliding gearwheel for 6th gear (61).
- Turn output shaft (50) and clamp into the vise with soft jaws.
- Use universal puller, **BMW No. 00 7 500**, to pull off deep-groove ball bearing (45).
- Remove shim washer (46), needle roller bearing (47), shift gearwheel for 2nd gear (48) and thrust washer (49).



KR230110

- Use universal puller, **BMW No. 00 7 500**, to pull off 1st gear shift wheel (64) together with deep-groove ball bearing (62).



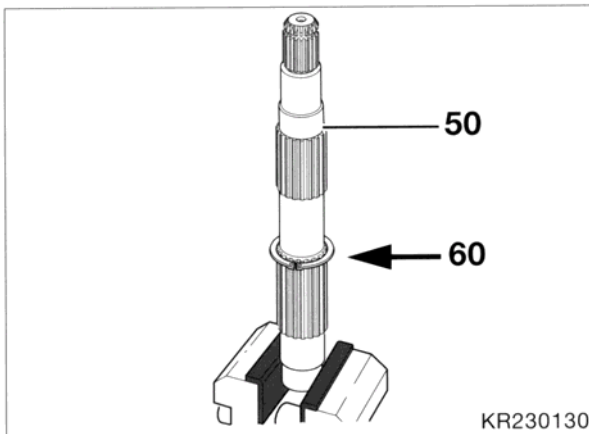
KR230120

### Assembling output shaft



**Note:**

Assembly starts at the shift gearwheel for 4th gear (57). Before assembly, oil all running surfaces lightly with gear oil.



- Clamp the output shaft into the vise with soft jaws and with the splines facing upwards.
- Install circlip (60/arrow).
- Install support washer (59).

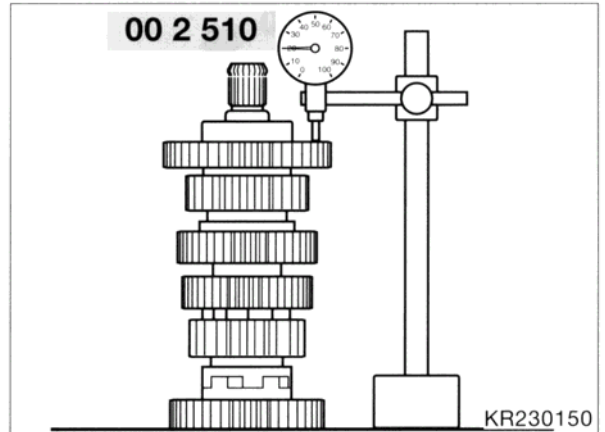
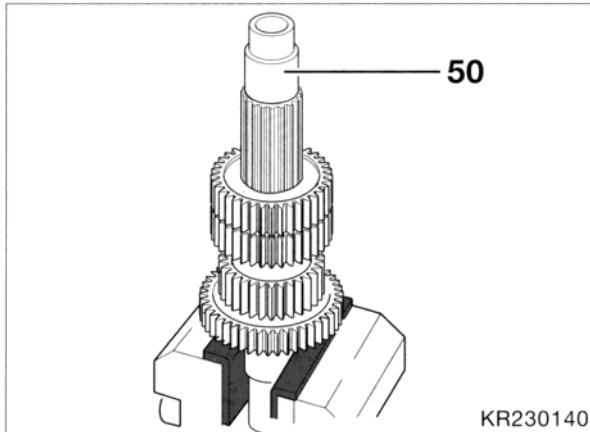


**Caution:**

To avoid damaging the needle roller bearing at the splines when installing, open it up carefully at the joint line.

- Install needle roller bearing (58).
- Install shift wheel for 4th gear (57) with the pockets facing circlip (60).
- Install support washer (56) and needle roller (55).
- Install shift wheel for 3rd gear (54) with pockets facing away from the 4th gear shift wheel (57).
- Install support washer (53) and circlip (52).
- After installing, measure endplay at 3rd and 4th gear shift wheels.
- Install shift wheel for 5th gear (51) with recess for shift fork facing towards the 3rd gear shift wheel (54).
- Install support washer (66) and needle roller bearing (65).
- Install shift wheel for 1st gear (64) with the pockets facing towards the 5th gear shift wheel (51).
- Install spacing washer (63) and deep-groove ball bearing (62).
- After installing, check endplay at 1st gear shift wheel (→ 23.16).





- Transfer output shaft (50) to new position in vise.
- Install shift wheel for 6th gear (61) with the recess for the selector fork facing the 2nd gear shift wheel (48).
- Install support washer (49) and needle roller bearing (47).
- Install the shift wheel for 2nd gear (48) with the dogs facing the 6th gear shift wheel (61).
- Check/adjust fully-compressed length. (→ 23.20)
- Install a spacing washer (46) of the determined thickness and press on deep-groove ball bearing (45).
- Check 2nd gear endplay.

### Checking endplay

- Attach dial gauge, **BMW No. 00 2 510**, to dial gauge stand.
- Apply feeler of dial gauge, to the edge of the shift gear which is to be checked, and check endplay.



#### Caution:

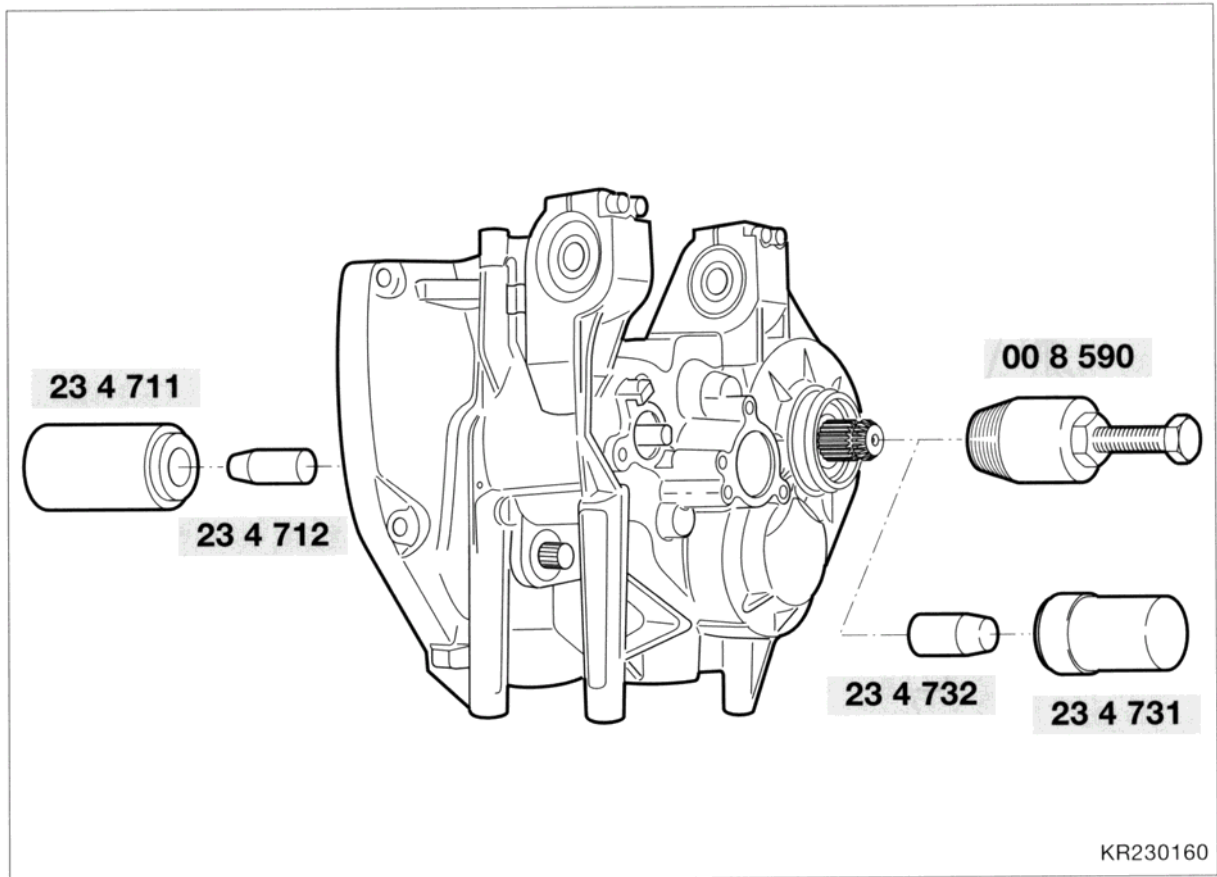
If endplay is beyond the permitted tolerances, this indicates either an assembly error or wear in the needle roller bearings, the support or spacing washers or the shift gear.

Check for wear and renew the affected parts.

#### Endplay values:

Endplay, 1st gear ..0.1...0.33 mm (0.004...0.013 in)  
 Endplay, 2nd gear .0.1...0.33 mm (0.004...0.013 in)  
 Endplay, 3rd/4th gear  
 (total play) ..... 0.1...0.67 mm (0.004...0.026 in)





## Renewing the shaft sealing rings in the gearbox housing and gearbox cover



### Note:

All shaft sealing rings can be renewed with the gearbox installed, apart from the input-side shaft sealing ring on the input shaft. If the gearbox is dismantled completely, all shaft sealing rings must be renewed. Before installing shaft sealing rings, oil their sealing lips lightly.

### Renewing input shaft sealing ring at input side

- Lever the shaft sealing ring out with a screwdriver.
- Drive the new sealing ring in with the sealing lips facing inwards, using slip-over sleeve, **BMW No. 23 4 712**, and drift, **BMW No. 23 7 711**.

### Renewing output shaft sealing ring

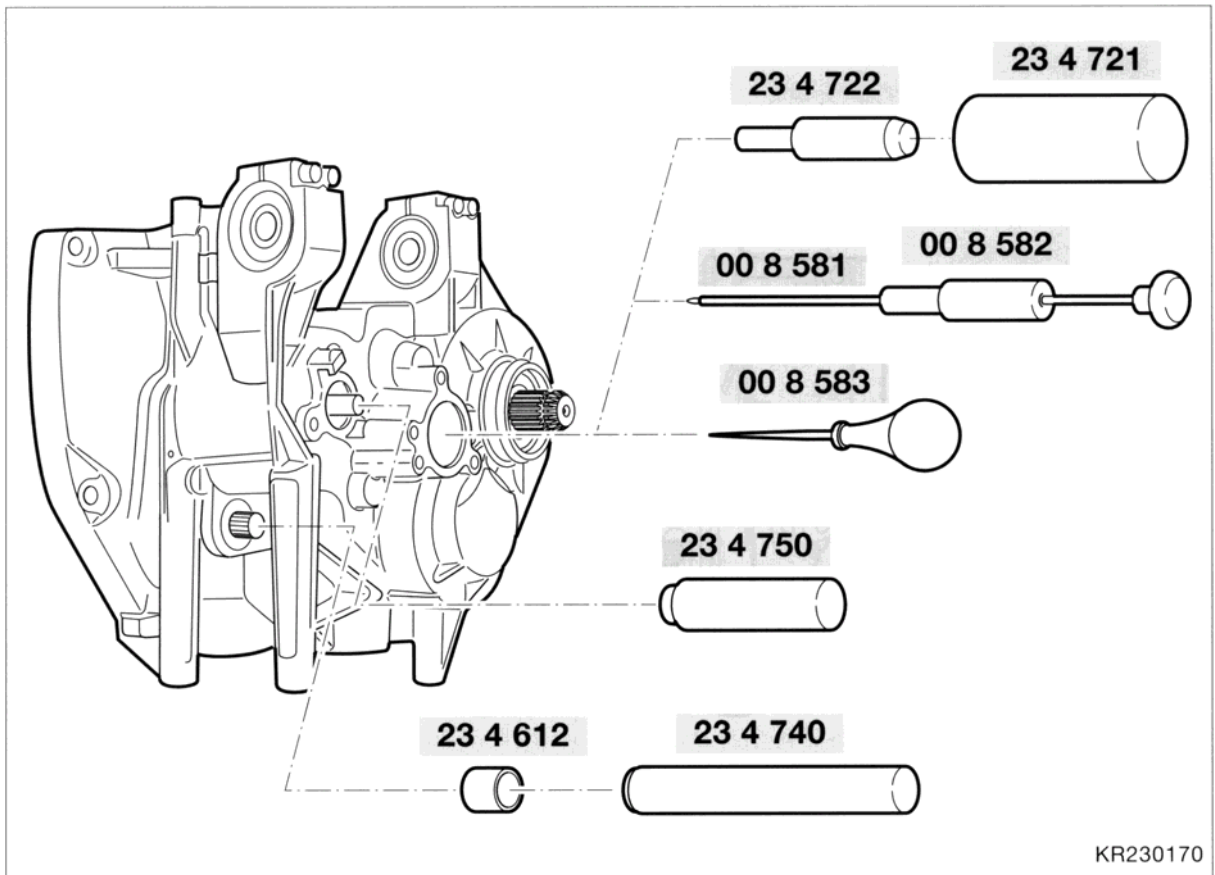


#### Caution:

Do not press the output shaft sealing ring out with a screwdriver, or the plastic disc behind it may be damaged.

- Screw puller, **BMW No. 00 8 590**, into shaft sealing ring and turn the hex bolt to remove the shaft sealing ring.
- Install the sealing ring with the sealing lips facing inwards, using, **BMW No. 23 4 732**, and drift, **BMW No. 23 4 731**.





KR230170

#### Renewing input shaft sealing ring at output side

- Pierce the shaft sealing ring with pin **BMW No. 00 8 583**.
- Screw pull rod, **BMW No. 00 8 581**, in to cutout and remove the shaft sealing ring by operating the weight **BMW No. 00 8 581**.
- Install the new sealing ring with the sealing lips facing inwards, using slip-over sleeve, **BMW No. 23 4 722**, and drift, **BMW No. 23 4 721**.

#### Renewing shaft sealing ring for selector drum

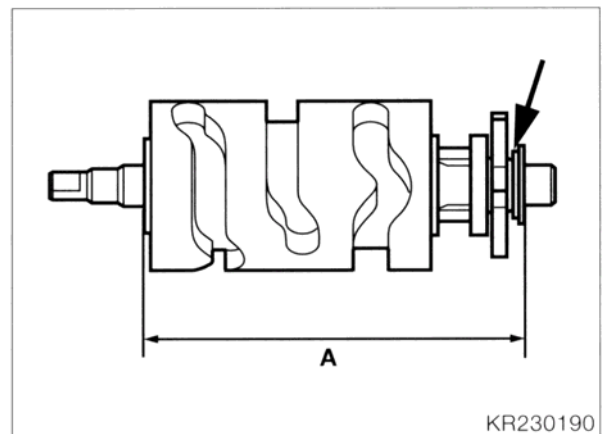
- Lever the shaft sealing ring out with a screwdriver.
- Install the new sealing ring with the sealing lips facing inwards, using drift, **BMW No. 23 4 750**.



#### Renewing shaft sealing ring for selector shaft

- Lever the shaft sealing ring out with a screwdriver.
- Install the new sealing ring with the sealing lips facing inwards, using slip-over sleeve, **BMW No. 23 4 612**, and drift, **BMW No. 23 4 740**.

#### Checking/adjusting fully-compressed length of selector drum

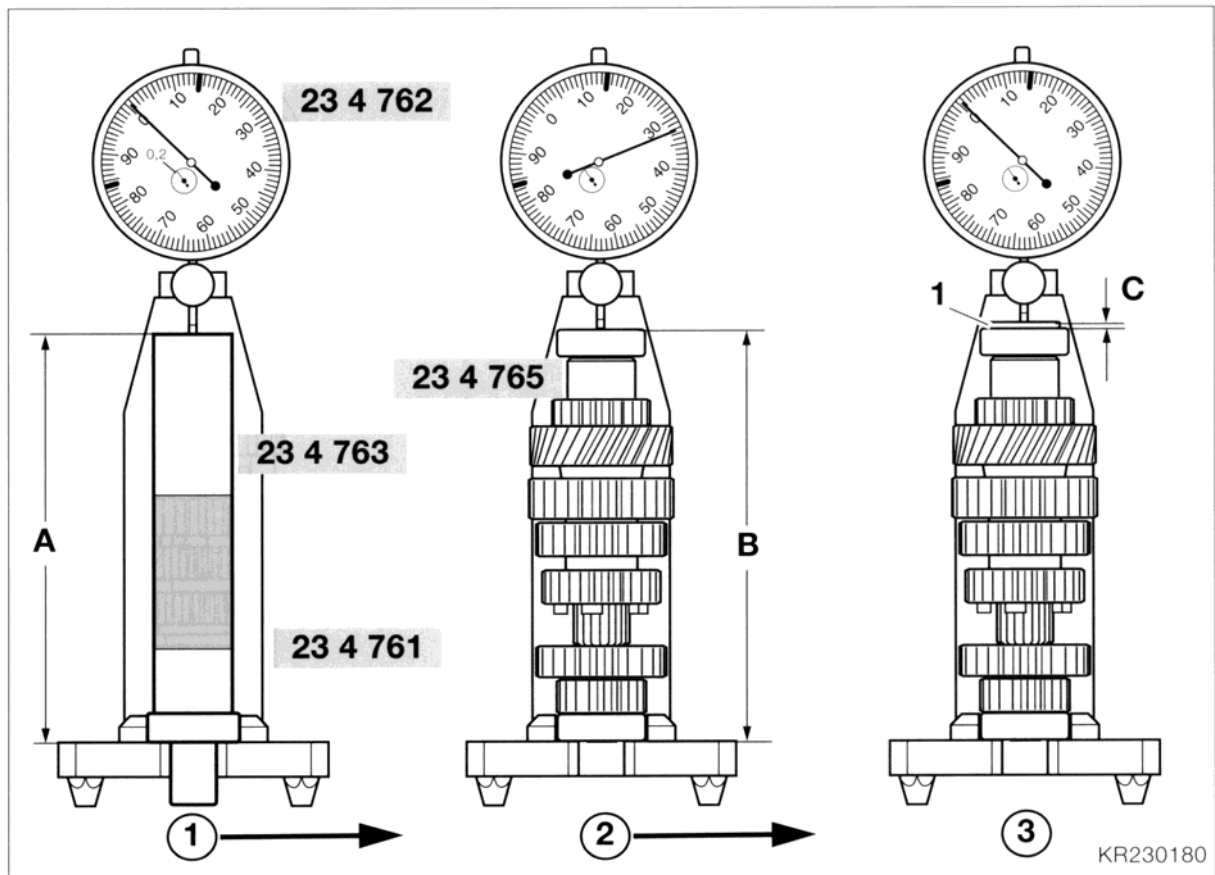


KR230190

- Place spacing washer and both thrust washers on the selector drum.
- Use depth gauge to determine fully-compressed length "A".
- If necessary, adjust fully-compressed length "A" with the shim washer (arrow).

#### Fully-compressed lengths:

Selector drum..... 111.80...111.90 mm (4.402...4.406 in)



## Checking/adjusting fully-compressed lengths of gearbox shafts

### Checking/adjusting fully-compressed length of intermediate shaft

#### ⚠ Caution:

When checking and adjusting the fully-compressed length, deviation from zero must be measured as described below, and compensated for with a shim washer.

Before each measurement, even if installation of the shaft is not carried out, make sure that the deep-groove ball bearing is fully compressed.

- Pull off the input-side deep-groove ball bearing with universal puller, **BMW No. 00 7 500**.
- Take off the spacing washer.
- Mount dial gauge, **BMW No. 23 4 762**, in the rear mounting hole on the measuring fixture, **BMW No. 23 4 761**, and set to 0.2 mm (0.008 in) preload.
- Set the dial gauge to zero on dimension "A" of the zeroing gauge, **BMW No. 23 4 763**.
- Place measuring disc, **BMW No. 23 4 765**, on the intermediate shaft.
- Place the deep-groove ball bearing on the measuring disc.
- Insert the intermediate shaft into the measuring fixture.

- Use the dial gauge to determine deviation from zero of dimension "B" at the inner bearing race. The deviation from zero represents thickness "C" of spacing washer (1).
- Place a spacing washer (1) of the determined thickness on the inner bearing race and check deviation from zero.

$$A = B + C$$

#### ⚠ Caution:

Maximum deviation from zero must not be exceeded.

- Remove the intermediate shaft from the measuring fixture.
- Take off the spacing washer, deep-groove ball bearing and measuring disc.
- Place a spacing washer (1) of the determined thickness on the intermediate shaft and press the deep-groove ball bearing on.

#### Adjusting dimension for intermediate shaft:

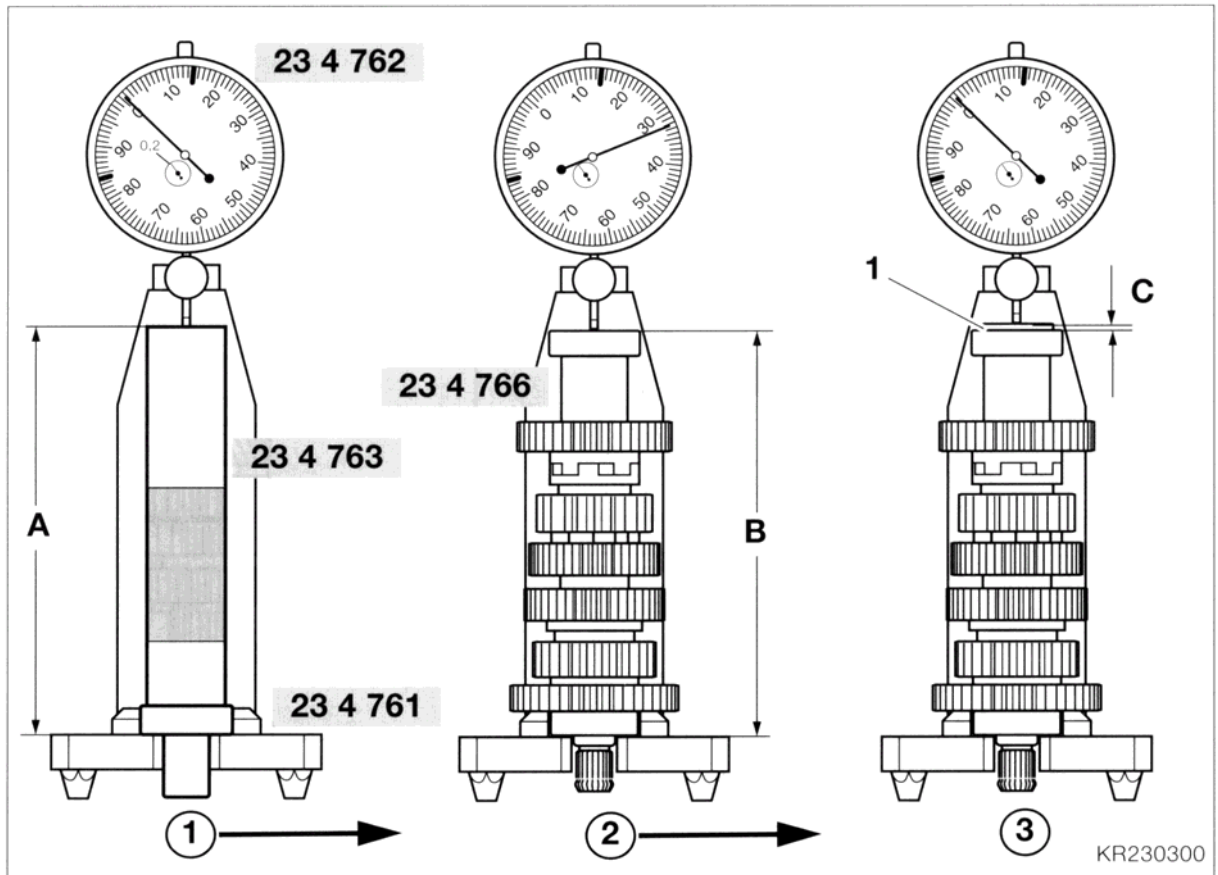
Maximum deviation

from zero ..... -0.05...0.00 mm (-0.002...0.00 in)

Fully-compressed

length ..... 198.95...199.00 mm (7.833...7.835 in)





### Checking/adjusting fully-compressed length of output shaft

#### ⚠ Caution:

When checking and adjusting the fully-compressed length, deviation from zero must be measured as described below, and compensated for with a shim washer.

Before each measurement, even if installation of the shaft is not carried out, make sure that the deep-groove ball bearing is fully compressed.

- Pull off output-side deep-groove ball bearing with universal puller, **BMW No. 00 7 500**.
- Take off the spacing washer.
- Mount dial gauge, **BMW No. 23 4 762**, in the rear mounting hole on the measuring fixture, **BMW No. 23 4 761**, and set it to 0.2 mm (0.008 in) preload.
- Set the dial gauge to zero on dimension "A" of the zeroing gauge, **BMW No. 23 4 763**.
- Place measuring disc, **BMW No. 23 4 766**, on the output shaft.
- Place the deep-groove ball bearing on the measuring disc.
- Insert the output shaft in the measuring fixture.



- Use the dial gauge to measure deviation from zero of dimension "B" at the inner bearing race. Deviation from zero represents thickness "C" of spacing washer (1).

- Place spacing washer (1) of the determined thickness on the inner bearing race and check deviation from zero.

$$A = B + C$$

#### ⚠ Caution:

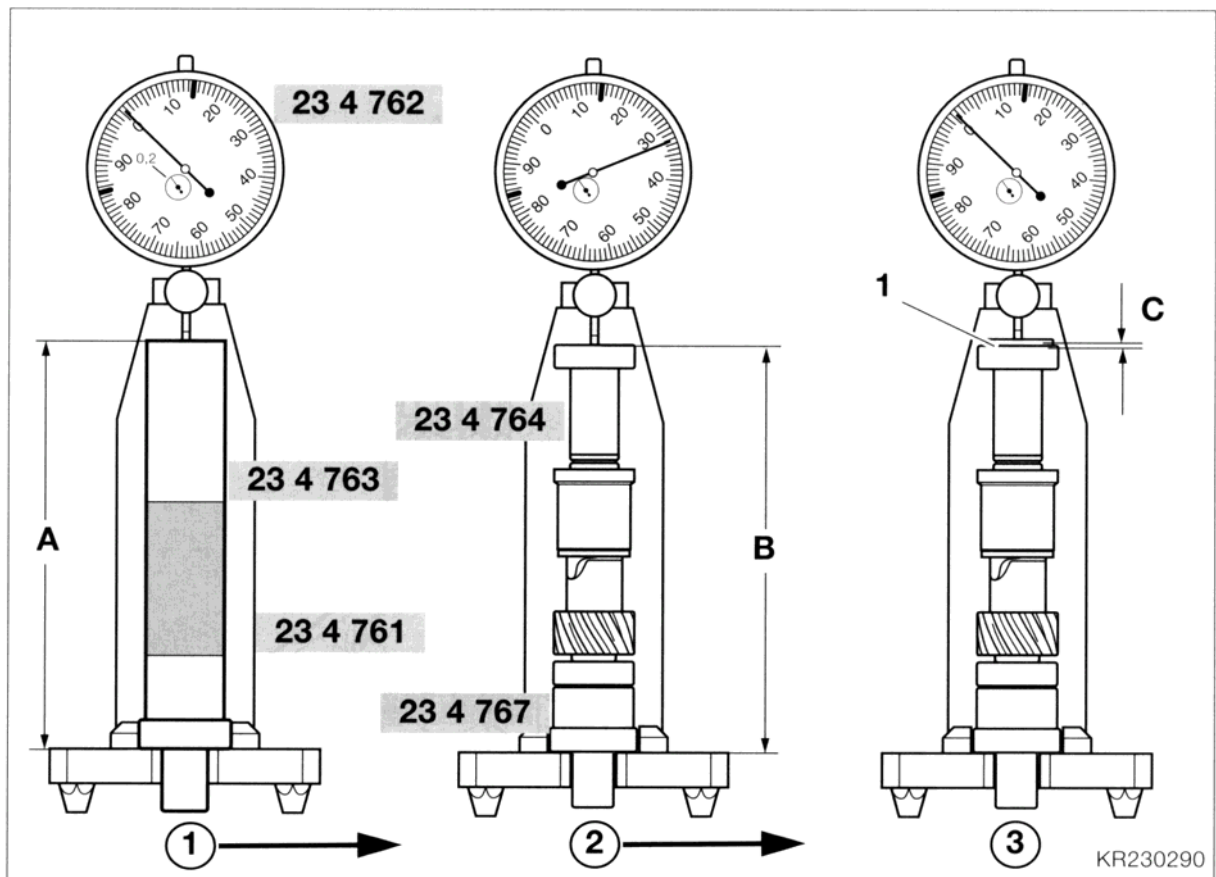
Maximum deviation from zero must not be exceeded.

- Take off spacing washer, deep-groove ball bearing and measuring disc.
- Place a spacing washer (1) of the determined thickness on the output shaft and press the deep-groove ball bearing on.

#### Adjusting dimensions for output shaft:

Maximum deviation from zero ..... -0.05 ... 0.00 mm (-0.002 ... 0.00 in)  
Fully-compressed length ..... 192.95...193.00 mm (7.596...7.598 in)

KR230300



### Checking/adjusting fully-compressed length of input shaft

#### ⚠ Caution:

When checking and adjusting the fully-compressed length, deviation from zero must be measured as described below, and compensated for with a shim washer.

Before each measurement, even if installation of the shaft is not carried out, make sure that the deep-groove ball bearing is fully compressed.

- Pull off output-side deep-groove ball bearing with universal puller, **BMW No. 00 7 500**.
- Take off the spacing washer.
- Mount dial gauge, **BMW No. 23 4 762**, in the front mounting hole on the measuring fixture, **BMW No. 23 4 761**, and set to 0.2 mm (0.008 in) preload.
- Set the dial gauge to zero on dimension "A" of the zeroing gauge, **BMW No. 23 4 763**.
- Place measuring disc, **BMW No. 23 4 764**, on the input shaft.
- Place the deep-groove ball bearing on the measuring disc.
- Insert the input shaft with adapter disc, **BMW No. 23 4 767**, in the measuring fixture.

- Use the dial gauge to measure the deviation from zero at dimension "B" of the inner bearing race. The deviation from zero represents thickness "C" of spacing washer (1).
- Place spacing washer (1) of the determined thickness on the inner bearing race and check deviation from zero.

$$A = B + C$$

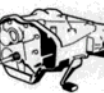
#### ⚠ Caution:

Maximum deviation from zero must not be exceeded.

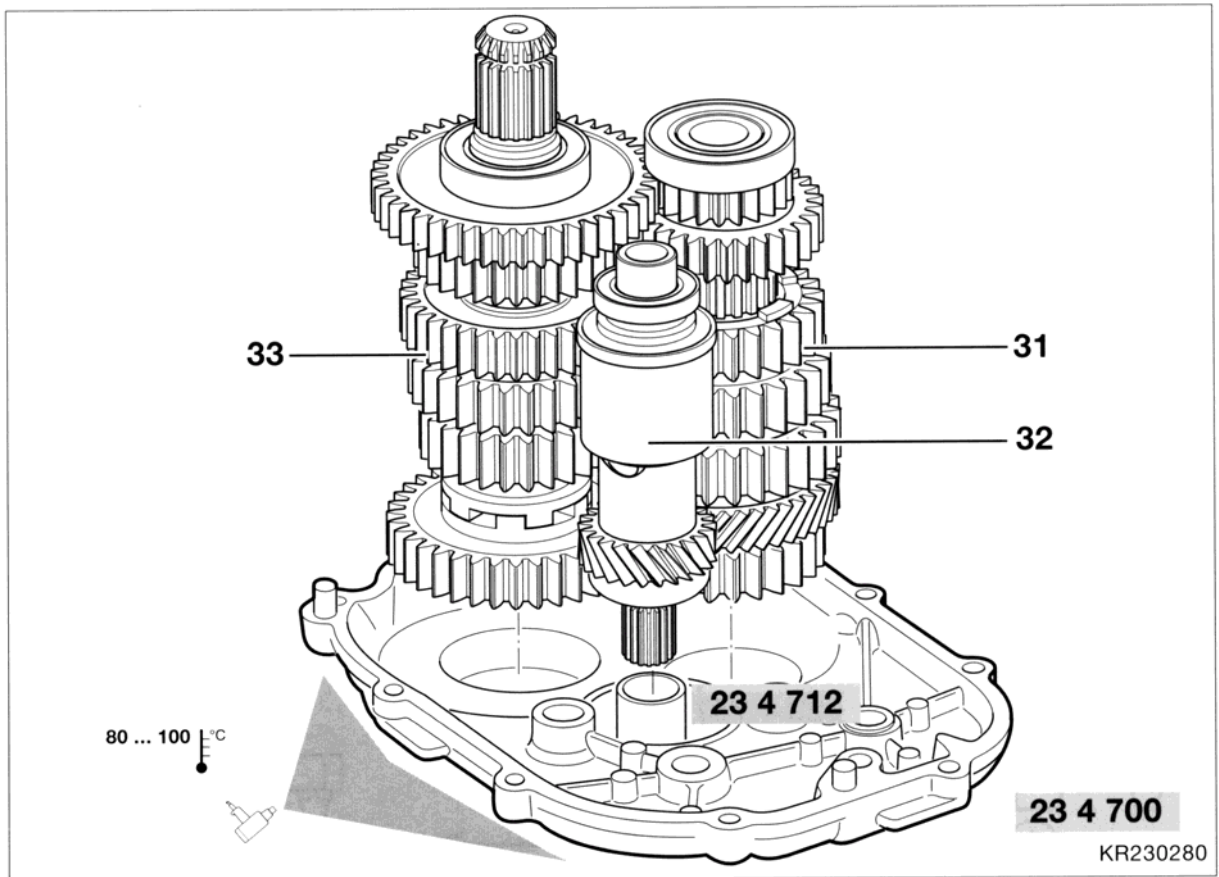
- Take the input shaft out of the measuring fixture.
- Take off the adapter disc, spacing washer, deep-groove ball bearing and measuring disc.
- Place a spacing washer (1) of the determined thickness in position and press the deep-groove ball bearing on.

#### Adjusting dimension for input shaft:

Maximum deviation  
from zero ..... -0.05 ... 0.00 mm (-0.002 ... 0.00 in)  
Fully-compressed  
length ..... 138.55...138.60 mm (5.455...5.457 in)







## Reassembling gearbox

### Installing gearbox shafts

#### Installing input, output and intermediate shaft

#### **Caution:**

Before installing, the gearbox shafts, housing and cover must be thoroughly cleaned and examined for damage. All shaft sealing rings must be renewed.

Check that the gearbox shafts are correctly seated.



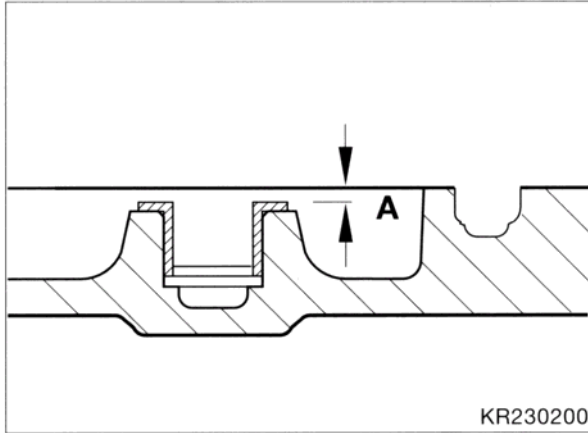
- Insert the cover into gearbox mount, **BMW No. 23 4 700**.
- Align the input, output and intermediate shafts so that their gearwheels mesh.
- Insert slip-over sleeve for input shaft, **BMW No. 23 4 712**, into cover.
- Heat bearing points in cover to 80 ... 100 °C.
- Insert input shaft (32), output shaft (33) and intermediate shaft (31) together, at the same time.
- Install the selector forks.

## Shimming selector shaft

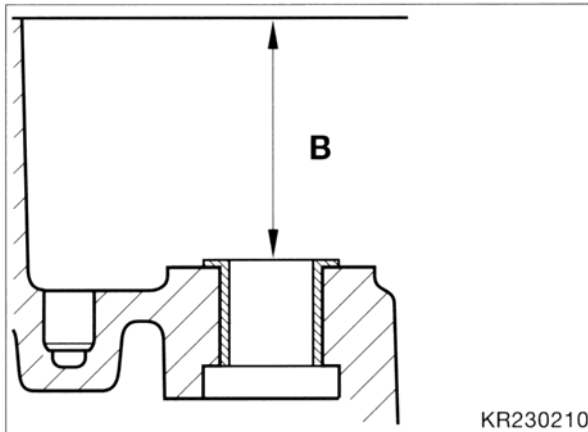


### Caution:

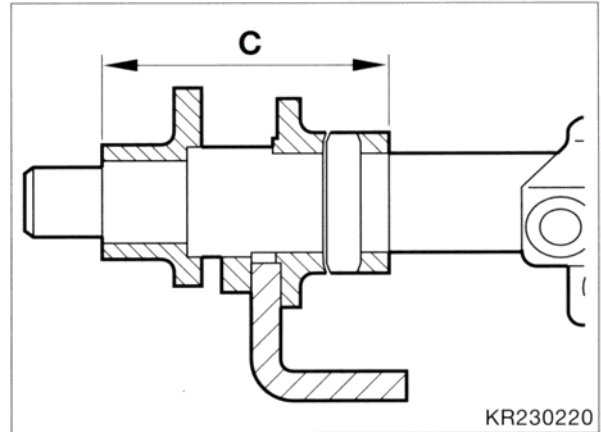
The selector shaft does not have to be shimmed before installation unless the bearing bushings, the housing or the complete selector shaft were renewed.



- Measure distance "A" from the shouldered bushing to the cover joint face.



- Measure distance "B" from the shouldered bushing to the housing joint face.



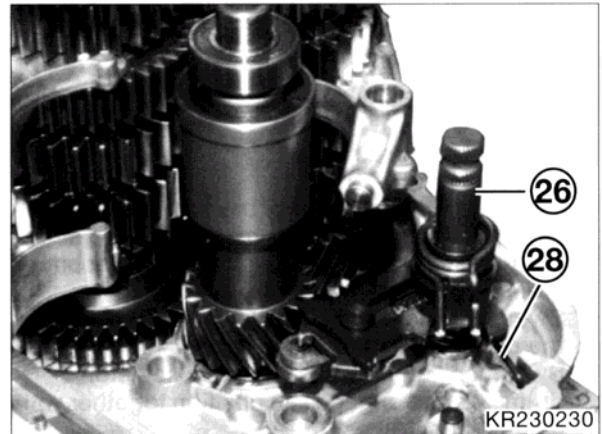
- Measure distance "C" from the shoulder on the selector shaft to the back of the sleeve.
- Determine endplay as follows:

Distance "A" + distance "B" = distance "D"

Distance "D" - distance "C" = distance "E"

Distance "E" - thickness of spacing washer = endplay.

## Installing selector shaft

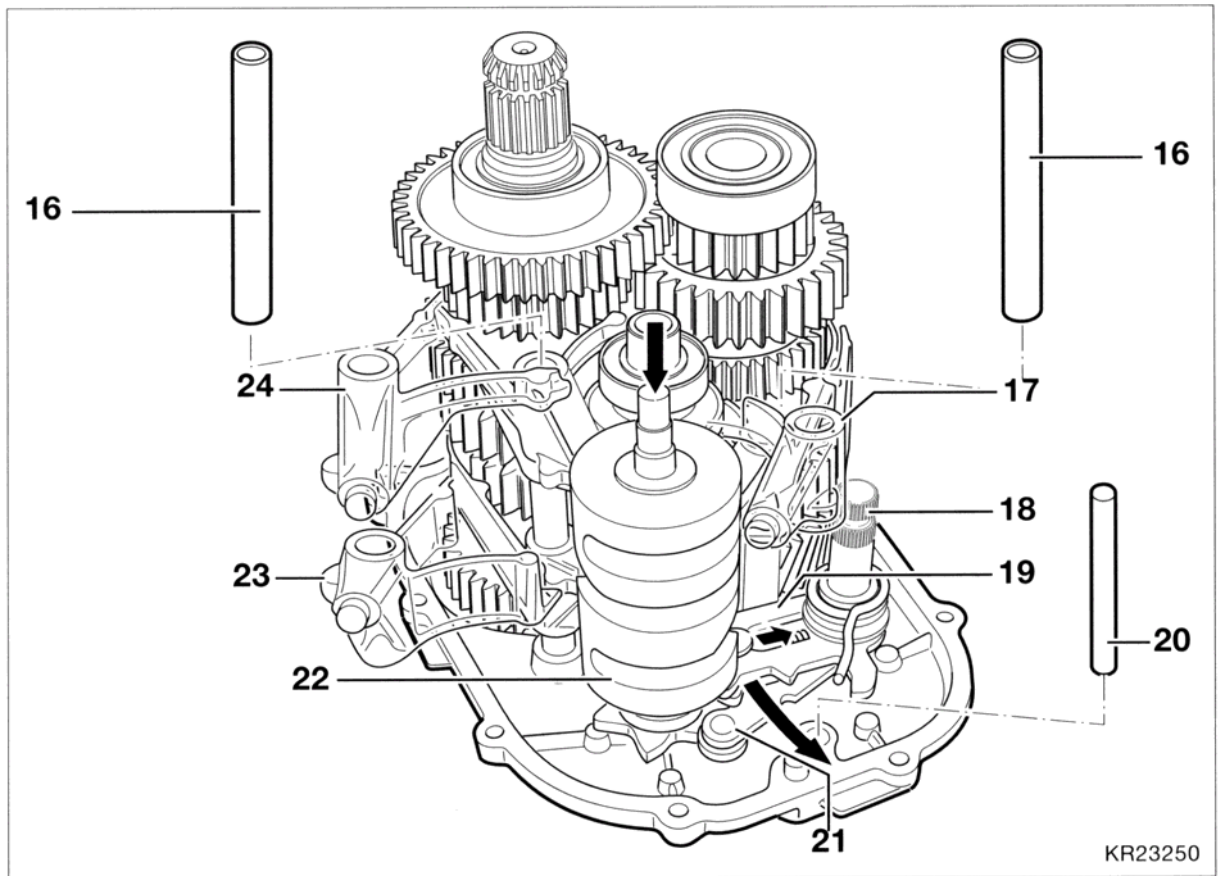


- Place a spacing washer of the determined thickness in position and install selector shaft (26).
- Engage torsion spring (28) in position.

### Endplay:

Selector shaft in housing..... 0.1...0.3 mm (0.004...0.012 in)

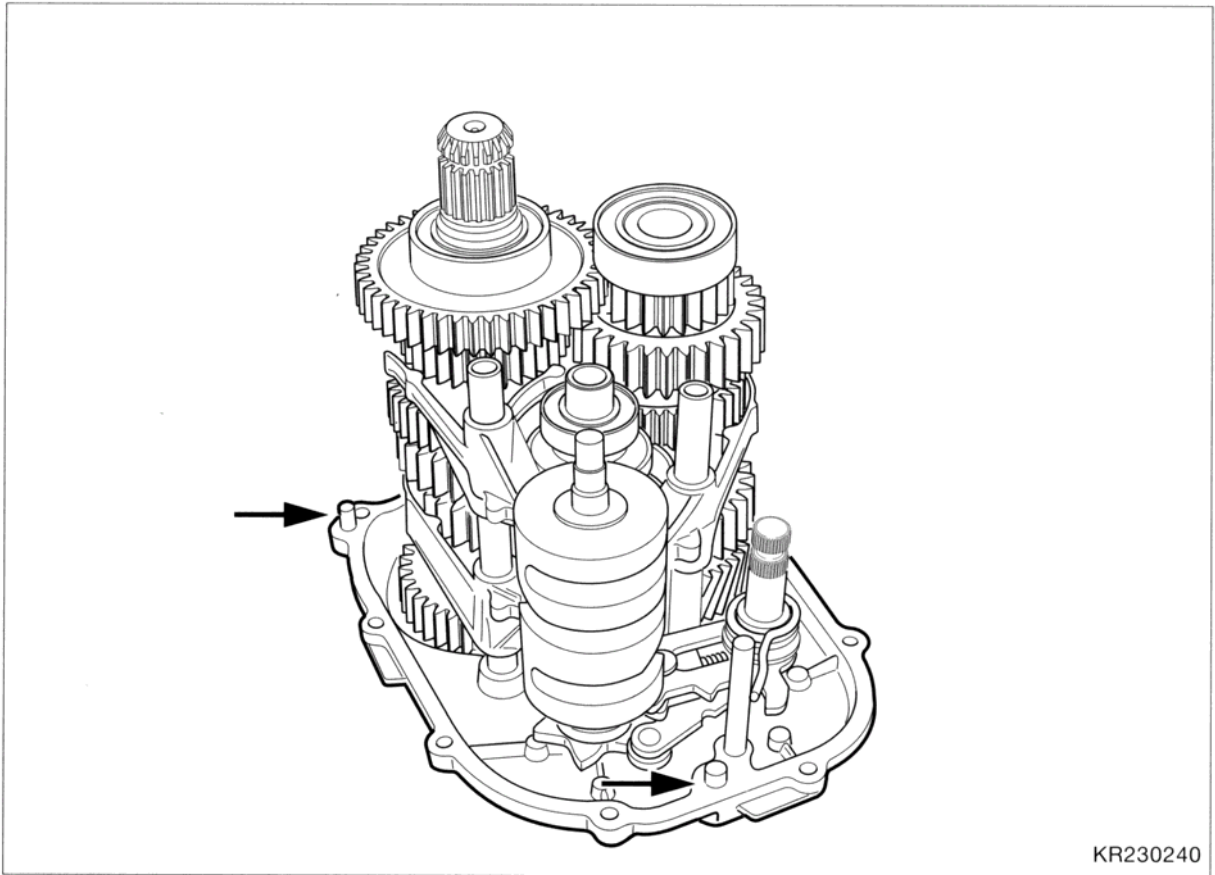




### Installing selector drum

- Place a spacing washer of the determined thickness and the input-side thrust washer on selector drum (22) and secure with a small amount of grease.
- Swing locking lever (21) out towards the edge of the cover and install the selector drum.
- Swing locking lever (21) towards selector drum (22) and engage it in position together with guide plate (19).
- Place shift forks (17, 23, 24) in the guide tracks.
- Install selector rails (16).
- Install locking pin (20).
- Place thrust washer on selector drum.





### Installing gearbox housing

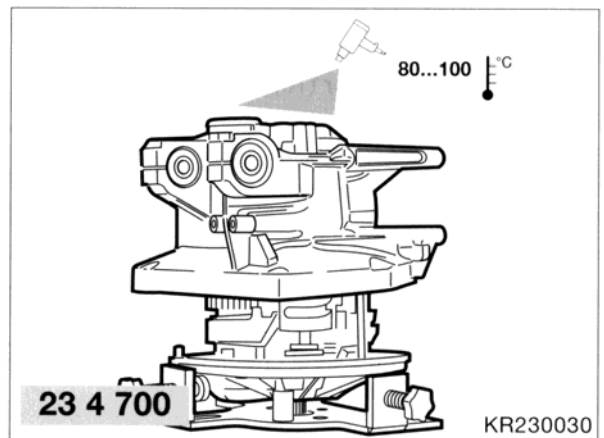
- Install reamed pins (arrows) in cover.



**Caution:**

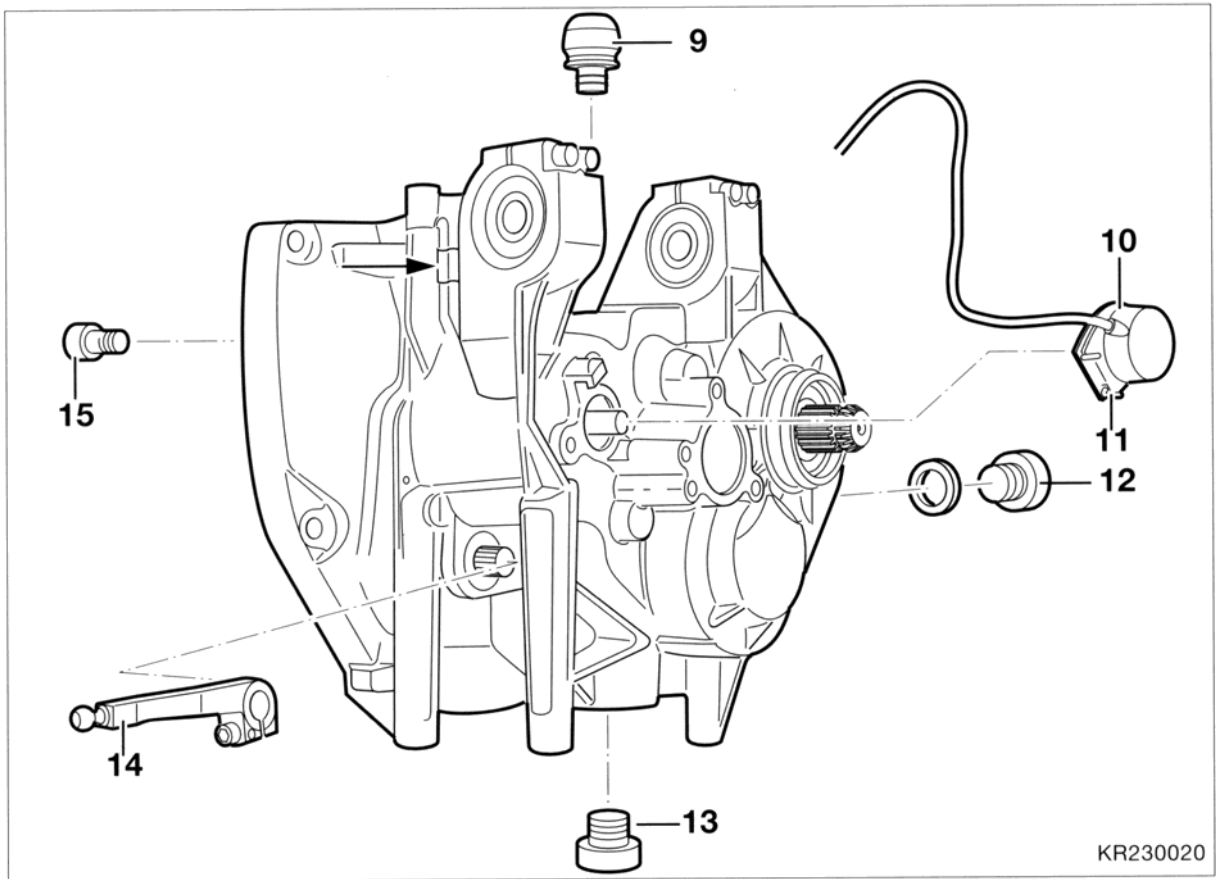
The sealing faces must be free from oil or grease. The sealing material sets within 30 minutes; within this time, place the housing in position and screw it down.

- Apply **Loctite 5203** sealing material to the cover joint face with a gun.
- Place slip-over sleeve, **BMW No. 23 4 732**, on the output shaft.
- Place slip-over sleeve, **BMW No. 23 4 712**, on the input shaft.
- Place slip-over sleeve, **BMW No. 23 4 612**, on the selector shaft.



- Heat the bearing seats in the housing to 80 ... 100 °C and place the housing on the cover.





KR230020

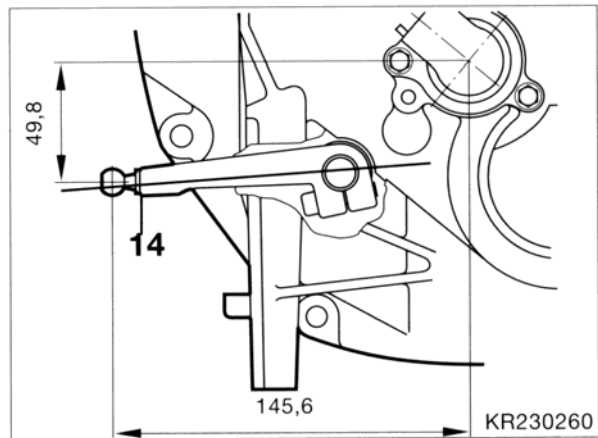
- Insert screws (15) and tighten in a cross-wise pattern.
- Install gear indicator (10) and clip wire (arrow) into position.
- Install breather (9).



**Caution:**

Clean metal particles off the magnet in drain plug (13).

- Insert oil drain plug (13).
- Insert oil filler and level check plug (12) with a new sealing ring.



KR230260

- Install shift lever (14) in the correct position.

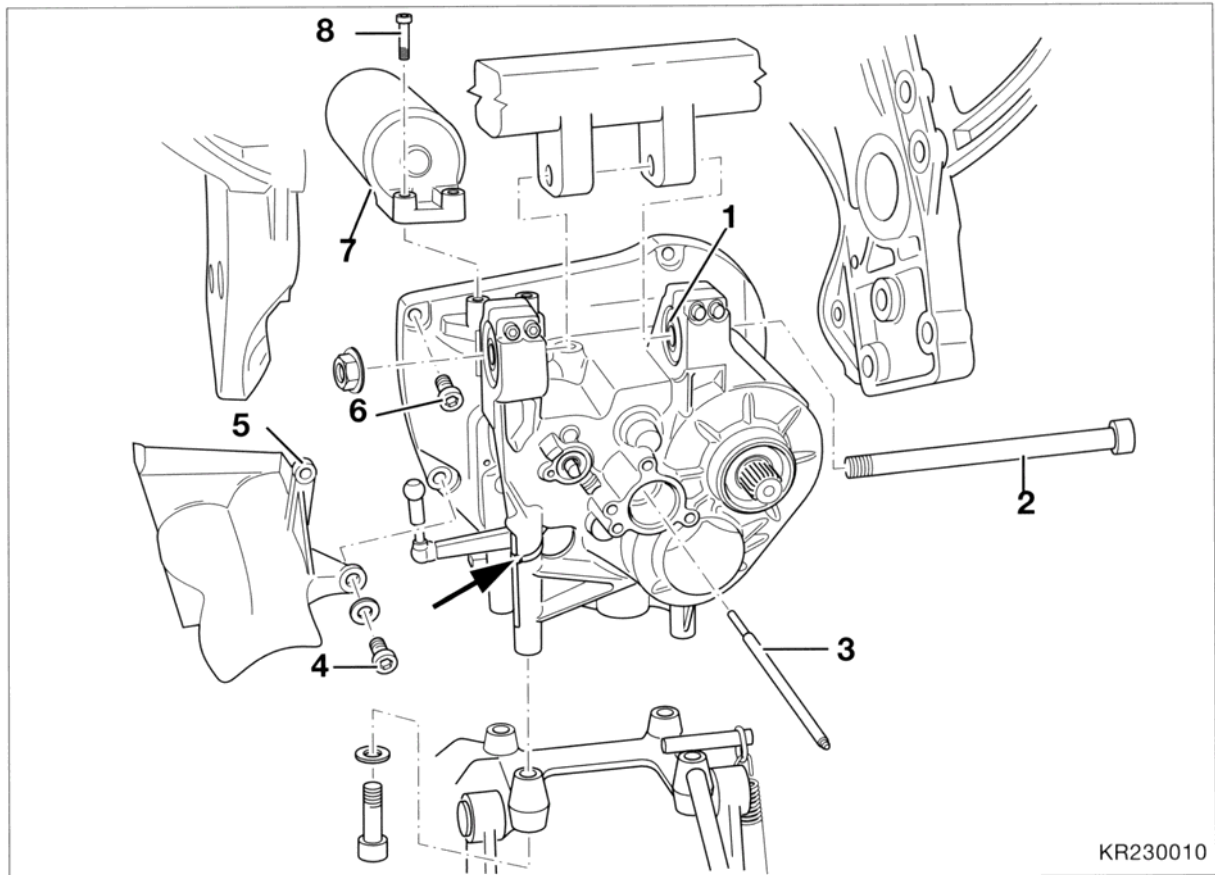


**Note:**

In its correct position the lever points slightly downwards (see illustration).

After assembling the gearbox, perform a functional check.





## Installing gearbox

- Insert gearbox into intermediate flange and push on to reamed sleeves.



### Note:

At one screw (6), the heat shield is also attached when installing.

- Tighten the six screws (6) holding the gearbox to the intermediate flange.
- Install starter motor (7) with wiring.
- Install heat shield with fastenings (4, 5).
- Insert clutch release rod (3) into gearbox, noting correct installed position.
- Connect wire for side (prop) stand switch to gearbox with cable strap (arrow).



### Caution:

The right-hand rubber mounting (1) is preset at the factory; do not loosen its clamp. This rubber mounting must only be re-aligned if the gearbox or the frame is renewed.

- Unscrew the left clamp.
- Lower the frame.
- Tighten screw (2) holding gearbox to frame.



### Caution:

To avoid damaging the spacing plate in the clamp slot, tighten the left and right screws of the left clamp in successive stages.

- Tighten the left clamp.
- Tighten the screws in successive stages
- Screw the left/right engine mountings to the cross-member.
- If the main (centre) stand was removed, install it again (→ 46.19).



- Install left/right radiator with fan in holders (⇒ 46.19).
- Join plug connectors and attach wires at engine and gearbox (⇒ 51.4).
- Install cross-tube (⇒ 46.25).
- Install front drive shaft (⇒ 33.21).
- Install swinging arm (⇒ 33.22).
- Install front section of rear carrier (⇒ 46.8).
- Install rear wheel drive (⇒ 33.18).
- Install brake caliper (⇒ 34.6).
- Install speedometer signal transmitter (⇒ 61.15).
- Install rear wheel (⇒ 36.8).

Filling capacity



**Caution:**

Attach and tighten the positive battery terminal first, then the negative one.

- Install the battery (⇒ 61.5).
- Install the left/right rear and front sections of the fairing (⇒ 46.9).
- Install the dualseat (⇒ 46.6).
- Add oil to the gearbox

**Oil capacity:**

New filling ..... 0.8 l

Oil change ..... fill up to lower edge of filling bore

**Tightening torques:**

Cover to housing.....	9 Nm
Oil drain plug.....	55 Nm
Oil filler/level check plug.....	23 Nm
Selector lever to selector shaft .....	9 Nm
Gearbox to intermediate flange .....	22 Nm
Starter motor to gearbox.....	9 Nm
Gearbox to frame .....	82 Nm
Clamp for left rubber mounting.....	9 Nm
Engine to front of frame, left/right .....	41 Nm
Main (centre) stand to gearbox .....	41 Nm



## **31 Front fork**



# Contents

Page

<b>Removing and installing telescopic fork</b> .....	5
Removing telescopic fork .....	5
Installing telescopic fork .....	7
<b>Removing and installing fork bridge</b> .....	9
Renewing ball joint .....	10
<b>Removing and installing slider tube bridge</b> .....	11
Removing and installing ball joint .....	12
<b>Dismantling/reassembling telescopic fork</b> .....	13
Dismantling telescopic fork .....	13
Assembling telescopic fork .....	14
<b>Measuring telescopic fork</b> .....	14
Check slider tube bridge .....	14
Check the fixed fork tube for runout .....	14
<b>Removing and installing front suspension strut</b> .....	15
<b>Removing/installing steering damper</b> .....	17
Checking the steering damper .....	17
<b>Removing and installing leading link</b> .....	18
Removing leading link .....	18
Installing leading link .....	19
Removing left leading link pivot mount .....	20
Installing left leading link pivot mount .....	20
<b>Measuring the leading link</b> .....	21

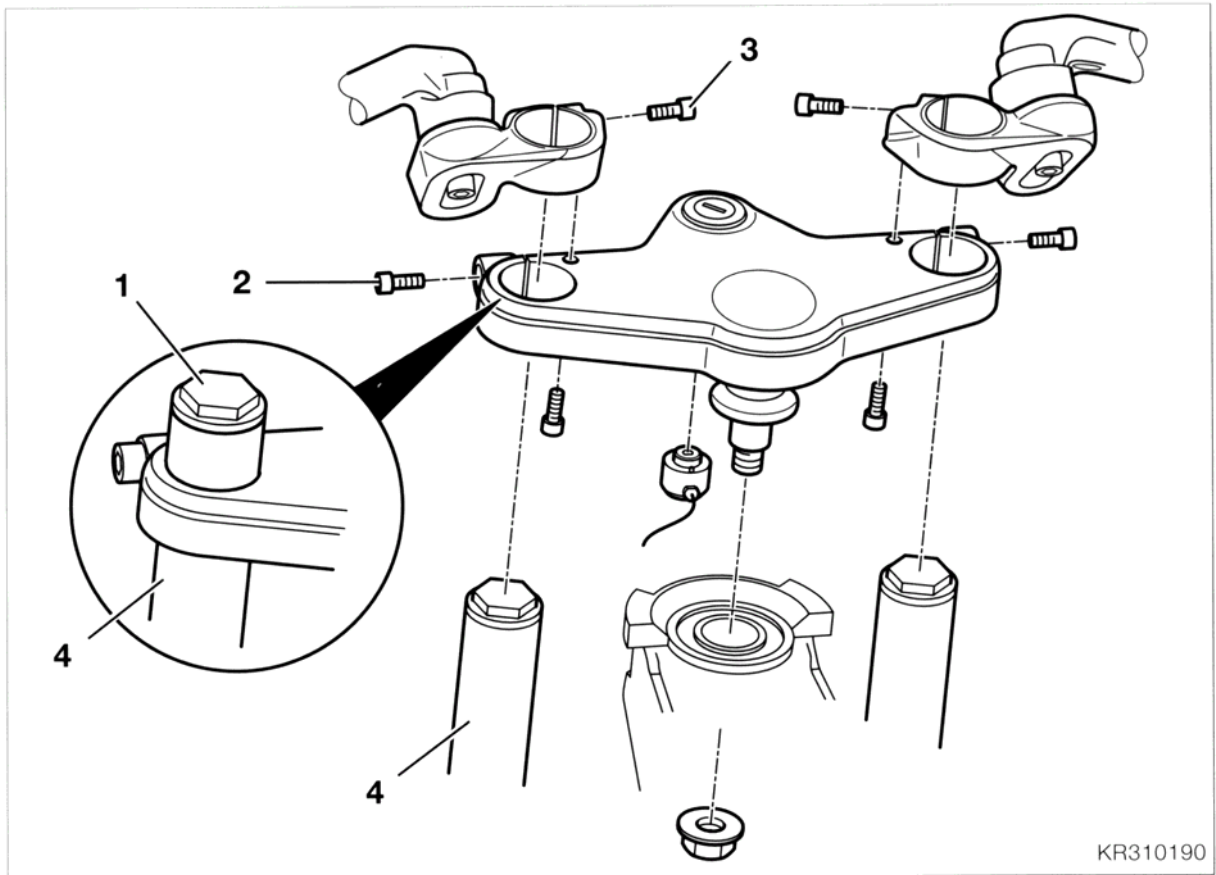




<b>Technical data</b>	<b>K 1200 RS</b>
<b>Front suspension</b>	
Type	Telelever with leading link pivoted centrally on main frame.
<b>Telescopic fork</b>	
Fixed fork tube surface	Hard chrome plated
Fixed tube extl. dia.	mm 34.96 f8
Maximum permissible fixed fork tube runout	mm 0.4
Castor in normal-load position	mm 124
Steering head angle at unladen weight	° 62.75
Total suspension travel at wheel	mm 115
at suspension strut	mm 63
Telescopic fork oil - approved grades	BMW telescopic fork oil
Fill quantity in each fork leg	l 0.5
<b>Front suspension element</b>	
Type	Gas-filled strut, non-adjustable







KR310190

## Removing and installing telescopic fork

### Removing telescopic fork

- Remove the engine spoiler and holder.  
(→ 46.13)
- Attach hoist, **BMW No. 00 1 510**, to oil sump.

#### **Caution:**

Do not operate the handbrake lever when the brake calipers have been removed.  
Protect painted parts from scratching: apply adhesive masking tape if necessary.

- Remove front wheel.  
(→ 36.5)
- Remove the left /right side section of the fairing.  
(→ 46.10)
- Remove the rear section of the front mudguard.  
(→ 46.7)
- Detach the ABS sensor and wire from the telescopic fork.

#### **Note:**

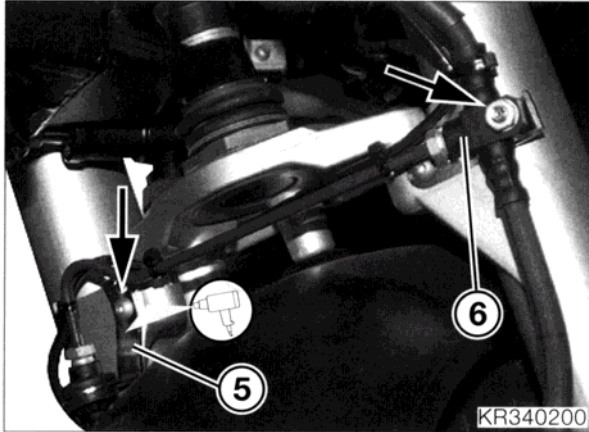
If the telescopic fork is to be dismantled, loosen end screw (1) on fixed fork tube (4) at left/right.

#### **Caution:**

The fastening is secured with a thread retaining agent..

- Loosen the left/right handlebar holder clamp (3).
- Loosen the left/right fork bridge clamp (2).

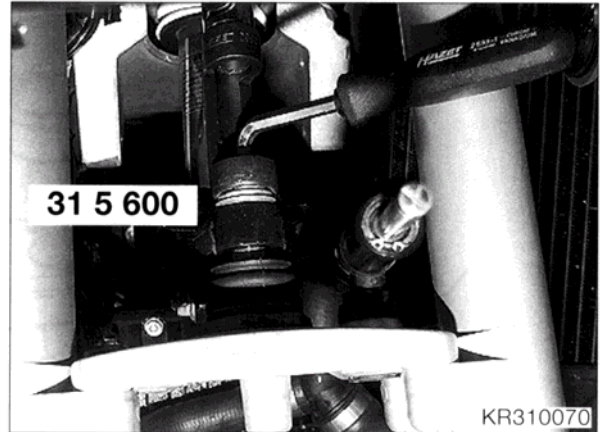




**⚠ Caution:**

The fastening is secured with a thread retaining agent. Carefully heat the fastening (arrow) and avoid damage to the internal hexagon when unscrewing.

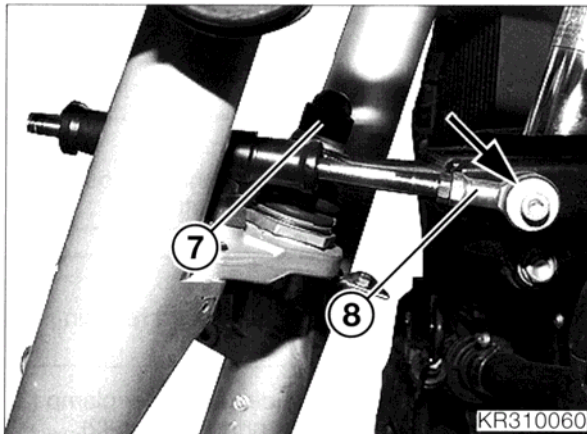
- Unscrew the fastening (arrow) for the left brake line holder (5) at the telescopic fork.
- Unscrew the fastening (arrow) for the brake distributor (6) in the right brake line at the mounting on the telescopic fork.



**⚠ Caution:**

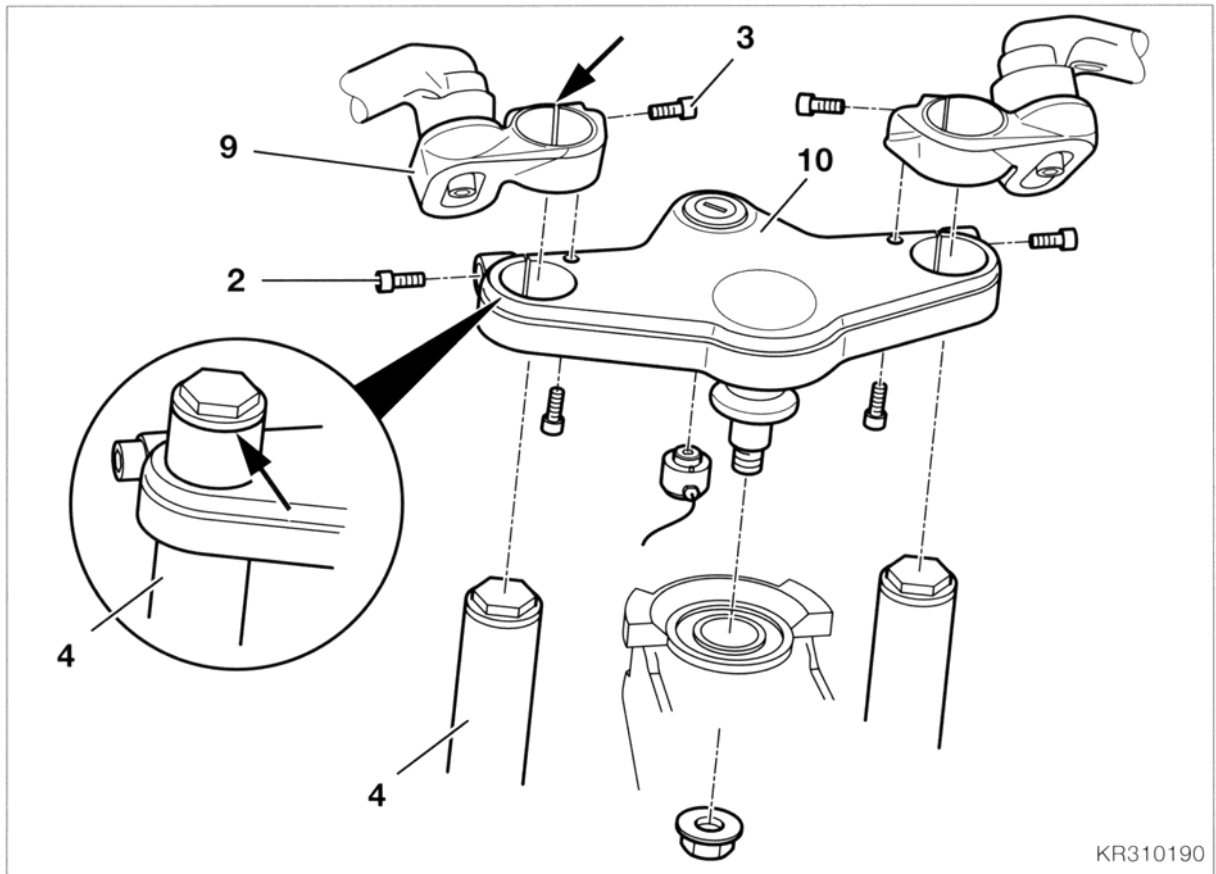
The fastening is secured with a thread retaining agent.

- Unscrew the fastening for the leading link at the fork slider tube bridge, using socket wrench insert and internal hexagon, **BMW No. 31 5 600**.
- Pull the telescopic fork out downwards.

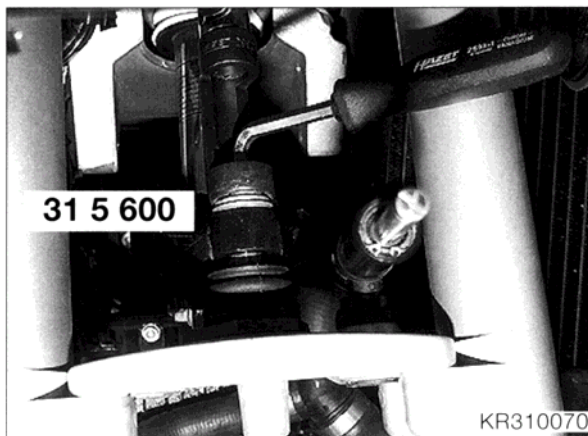


- Unscrew the fastening (arrow) for steering damper (8) at the leading link.
- Take off protective cap (7).





### Installing telescopic fork



- Secure the leading link mounting to fork slider tube bridge (14), using socket wrench insert and internal hexagon, **BMW No. 31 5 600**, and tighten.

#### **⚠ Caution:**

Pre-assemble the telescopic fork without trapped stresses, then attach and tighten to the specified torques.

- Insert fixed fork tube (4) at left and right into fork bridge (10).
- Fixed fork tube (4) at left and right must be flush with the upper edge of handlebar holder (9) (arrows).

#### **⚠ Caution:**

Insert the screw with **Loctite 2701**.

- Screw handlebar holder clamp (3) together at left and right, and tighten.
- Screw fork bridge clamp (2) at left and right together, and tighten.
- Compress the telescopic fork.





**Note:**

If the telescopic fork was dismantled, add oil.

**Oil content of each fixed fork tube** ..... 0.5 l

**Telescopic fork oil grade** ..... BMW telescopic fork oil



**Tightening torque:**

Oil drain plug ..... 13 Nm

- Installation continues in the reverse order of work to that described for removal, noting the following points in particular.



**Caution:**

When installing, use a new screw.

- Check that the system moves freely by compressing/extending the suspension in the straight-ahead position and with the steering turned to the full lock positions.
- Check/adjust the ABS sensor gap.  
(→ 34.9)

**ABS sensor gap, front** .....0.45...0.55 mm



**Tightening torques:**

Leading link to fork slider tube bridge ..... 130 Nm

Steering damper to leading link ..... 21 Nm

Screw plug ..... 20 Nm

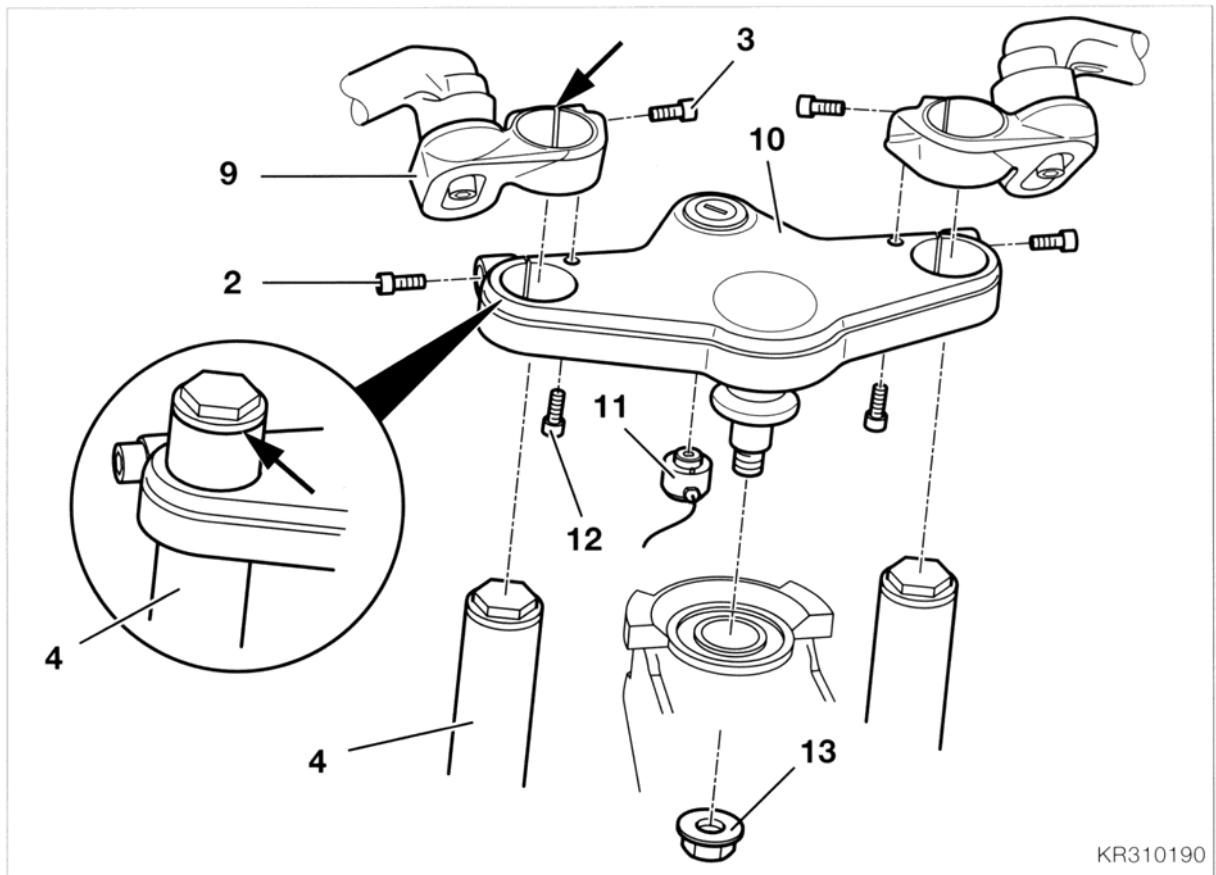
Distributor to holder ..... 9 Nm

Handlebar holder clamp ..... 21 Nm

Fork bridge clamp ..... 21 Nm

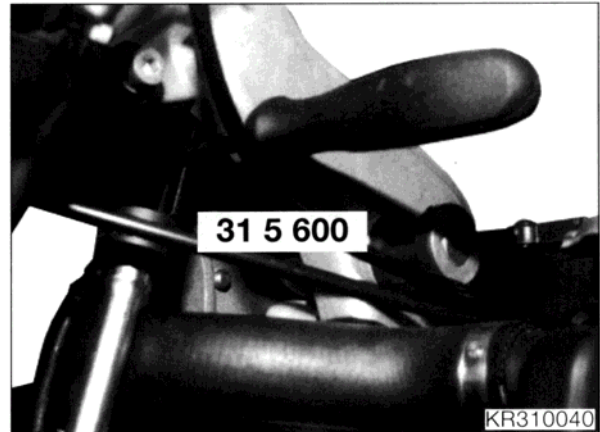






## Removing and installing fork bridge

- Remove left/right side section of fairing. (→ 46.10)
- Remove ignition switch/steering lock plug (11).
- Loosen the left/right handlebar holder clamps (3).
- Loosen the left/right fork bridge clamps (2).
- Undo the handlebar holder fastening (12) at fork bridge (10).

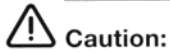


### Caution:

The fastening is secured with a thread retaining agent.

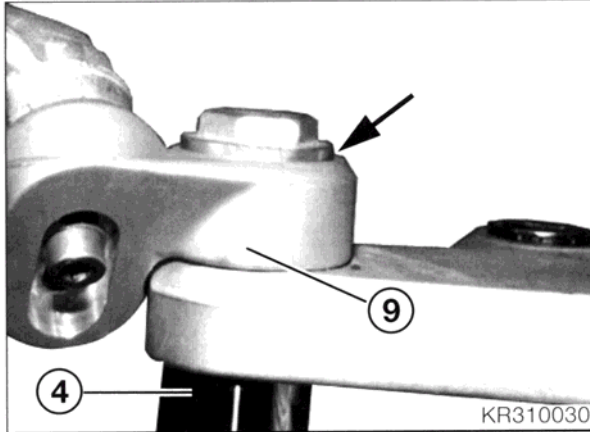
- Undo the fork bridge fastening (13) at the frame with socket wrench insert and internal hexagon, **BMW No. 31 5 600**.
- Take off fork bridge (10).
- Install in the reverse order of work, noting the following operations in particular.



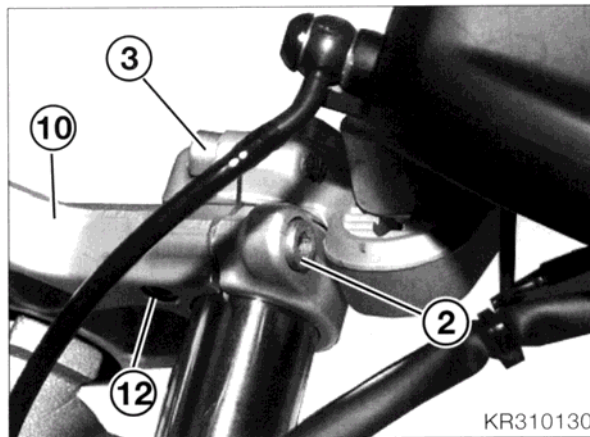


**Caution:**  
When installing, use a new nut.

- Tighten the fork bridge (13) mounting on the frame with a socket wrench and internal hexagon, **BMW No. 31 5 600**.



- Fixed fork tube (4) must be flush with the upper edge of handlebar holder (9) (arrow).



- Attach handlebar holder mounting (12) to fork bridge (10) at left and right, and tighten.
- Tighten fork bridge clamp (2) at left and right.



**Caution:**  
Insert the screw with **Loctite 2701**.

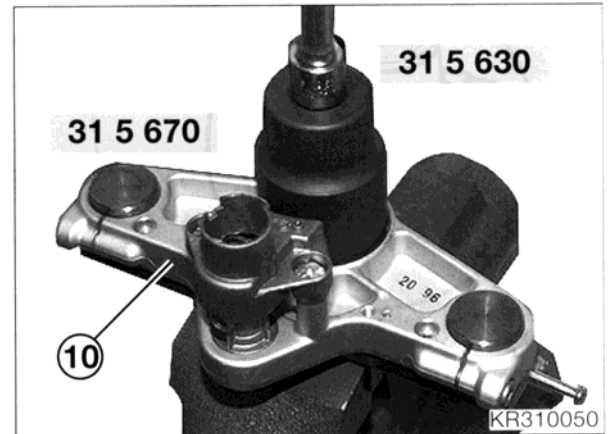
- Tighten handlebar holder clamp (3) at left and right.



**Tightening torques:**

Fork bridge to frame .....	130 Nm
Handlebar holder to fork bridge .....	8.5 Nm
Screw plug.....	20 Nm
Handlebar holder clamp.....	21 Nm
Fork bridge clamp.....	21 Nm

Renewing ball joint



- Mount fork bridge (10) in retaining fixture, **BMW No. 31 5 670**.



**Warning:**

Note that high torque has to be applied to loosen the ball joint fastening.

- Release the ball joint fastening with the 46 mm socket wrench insert, **BMW No. 31 5 630**.
- Install in the reverse order of work, noting the following operations in particular.
- Coat the ball joint fastening with **Never-Seez** and secure it to the fork bridge with 46 mm socket wrench insert, **BMW No. 31 5 630**.



**Tightening torque:**

Ball joint to fork bridge .....	230 Nm
---------------------------------	--------

## Removing and installing slider tube bridge

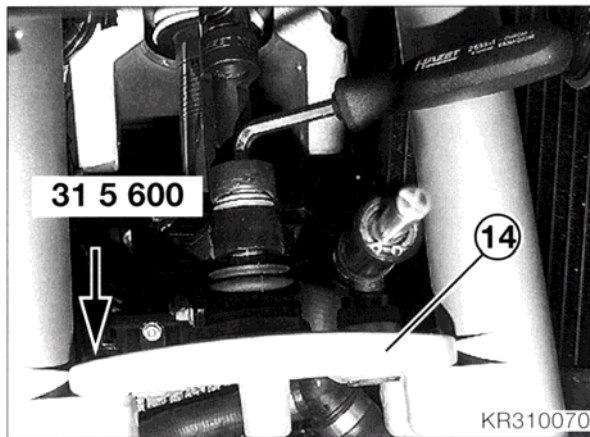
- Remove engine spoiler and holder.  
(→ 46.12)
- Attach hoist, **BMW No. 00 1 510**, to sump.



### Caution:

Do not operate the handbrake when the brake calipers have been removed.  
Protect painted parts from scratching: apply adhesive masking tape if necessary.

- Remove front wheel.  
(→ 36.5)
- Remove left/right side section of fairing.  
(→ 46.10)
- Remove front mudguard.  
(→ 46.7)
- Remove/install steering damper.  
(→ 31.17)
- Remove protective cap from handlebar mounting.



### Caution:

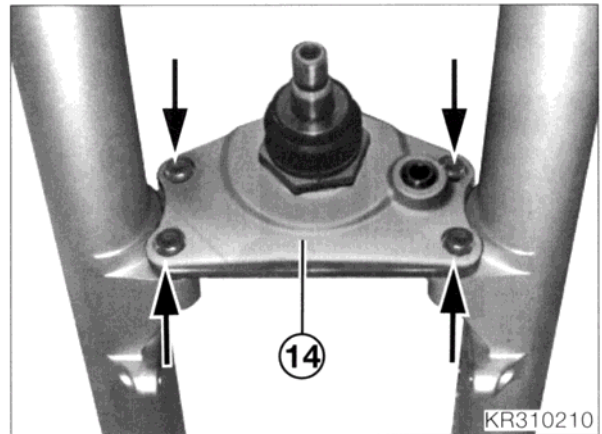
Fastening is secured with a thread retaining agent.



### Note:

Support the slider tubes.

- Release the fastening for the leading link at slider tube bridge (14) with the socket wrench insert and internal hexagon, **BMW No. 31 5 600**.



### Caution:

The fastening is secured with a thread retaining agent.

- Undo the fastenings (arrows) at slider tube bridge (14).



### Caution:

When the telescopic fork is extended, note the brake line and front sensor wire.  
Support the slider tubes.

- Extend the telescopic fork.
- Remove slider tube bridge (14).
- Install in the reverse order of work, noting the following operations in particular.



### Caution:

When installing, use a new screw.

- Tighten the fastenings (arrows) for slider tube bridge (14).



### Caution:

When installing, use a new nut.

- Secure leading link fastening to slider tube bridge (14) using socket wrench insert and internal hexagon, **BMW No. 31 5 600**, and tighten.
  - Check/adjust the front ABS sensor gap.  
(→ 34.9)

**ABS sensor gap, front**..... 0.45...0.55 mm

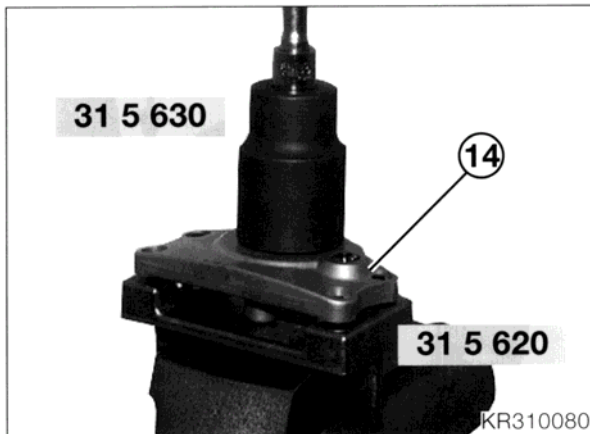


### Tightening torques:

Leading link to slider tube bridge ..... 130 Nm  
Steering damper to leading link ..... 21 Nm  
Slider tube bridge to telescopic fork ..... 21 Nm  
Distributor to holder ..... 9 Nm



## Removing and installing ball joint



- Secure slider tube bridge (14) in retaining fixture, **BMW No. 31 5 620**.



### **Warning:**

Note that a high torque is needed to loosen the ball joint fastening.

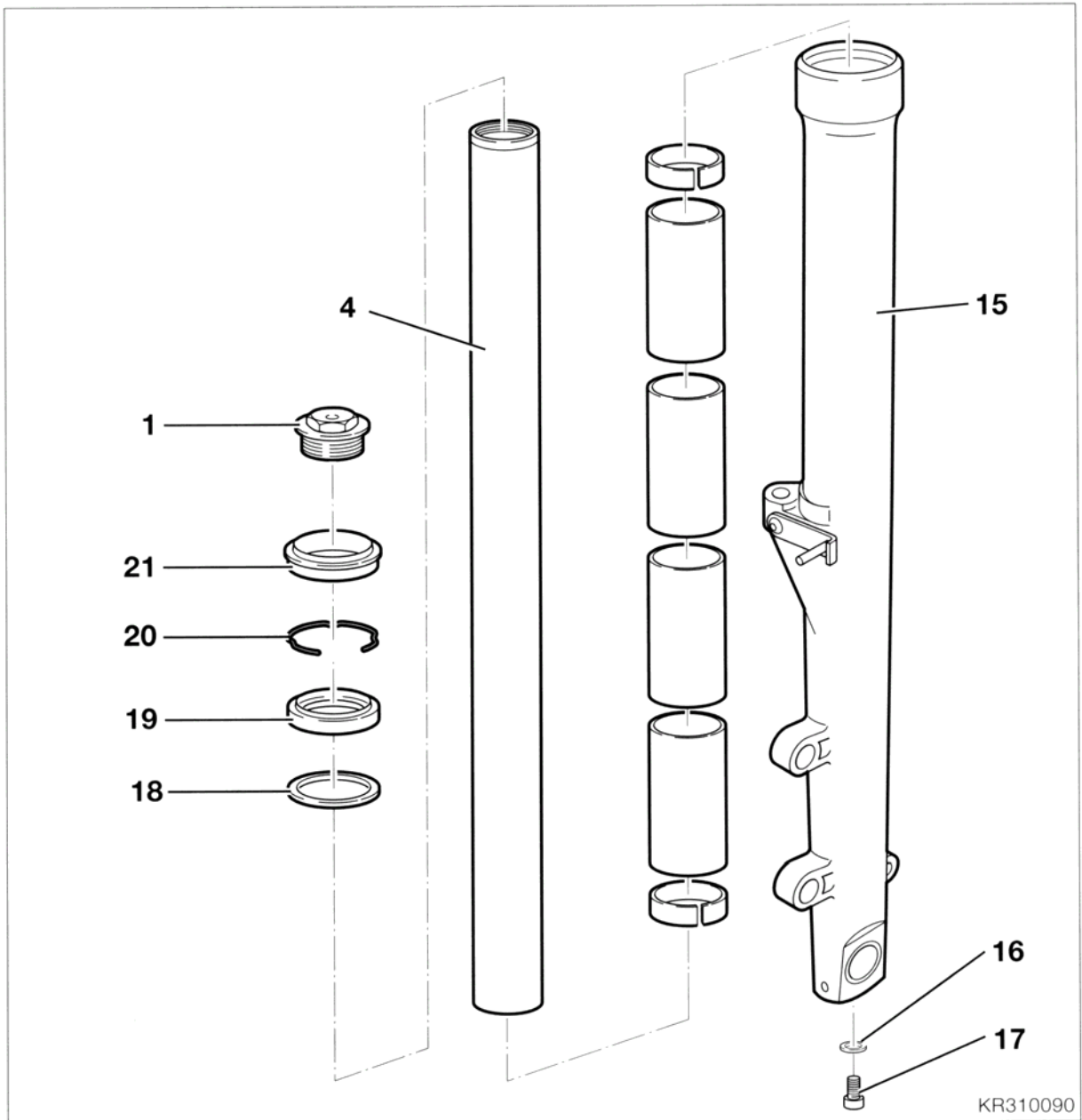
- Unscrew the ball joint fastening with the 46 mm socket wrench, **BMW No. 31 5 630**.
- Coat the ball joint fastening with **Never-Seez**, secure it with the 46 mm socket wrench insert, **BMW No. 31 5 630**, to slider tube bridge (14) and tighten it.



### **Tightening torques:**

Ball joint to fork bridge ..... 230 Nm  
Steering damper to slider tube bridge ..... 21 Nm





## Dismantling/reassembling telescopic fork

- Before removing the telescopic fork, undo the end plug (1).
- Remove the telescopic fork.

- Remove dust sleeve (21).
- Remove retaining ring (20).
- Lever out shaft seal (19).
- Remove washer (18).

### Dismantling telescopic fork

- Remove oil drain plug (17).
- Drain the oil.

**⚠ Caution:**  
Avoid damage to fixed fork tube (4).

- Remove fixed fork tube (4).



## Assembling telescopic fork



### Caution:

Make sure that the copper washer is correctly seated.

- Install the oil drain plug with a new copper washer.
- Fill with oil.

**Oil content of each fixed fork tube** ..... 0.5 l

**Telescopic fork oil grade** ..... BMW telescopic fork oil



### Tightening torque:

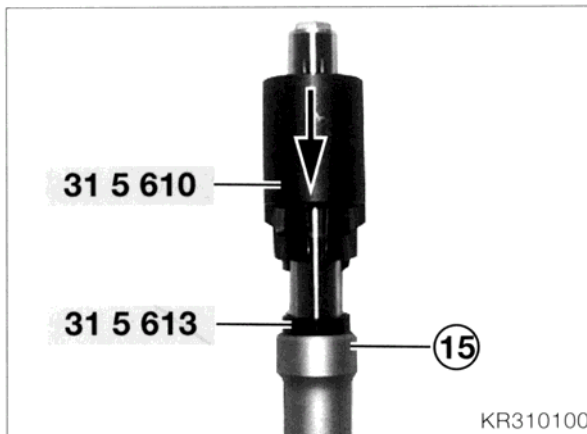
Oil drain plug ..... 13 Nm



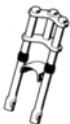
### Note:

No routine maintenance is needed, and therefore the fork oil does not have to be changed during Inspections.

- Install the washer.



- Oil the shaft sealing ring lightly and push it fully up to the stop on slider tube (15), using the weight of drift, **BMW No. 31 5 610**, and reducing adapter, **BMW No. 31 5 613**, (arrow).
- Install the circlip.
- Install the fixed fork tube.
- Insert the dust sleeve.



## Measuring telescopic fork



### Warning:

After an accident, always examine the telescopic fork for cracks and signs of damage.

## Check slider tube bridge

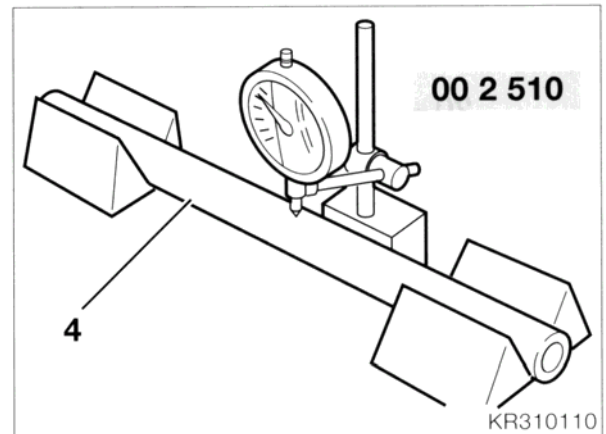


### Caution:

Renew slider tube bridge if distorted.

- Check that the slider tube bridge is flat.

## Check the fixed fork tube for runout



- Place both ends of fixed fork tube (4) in Vee guides.
- Turn fixed fork tube (4) slowly and measure it with a dial gauge, **BMW No. 00 2 510**.



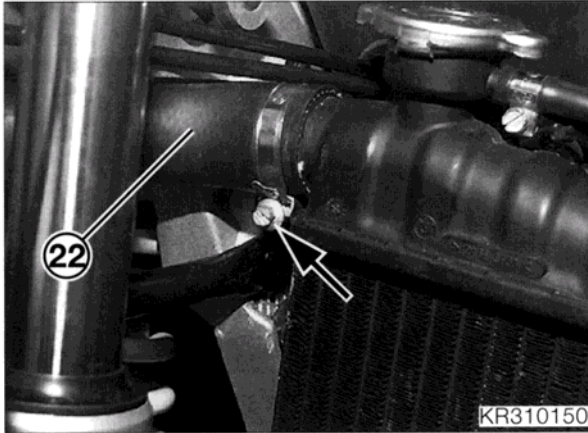
### Caution:

Renew bent fixed fork tubes (4); they must not be straightened.

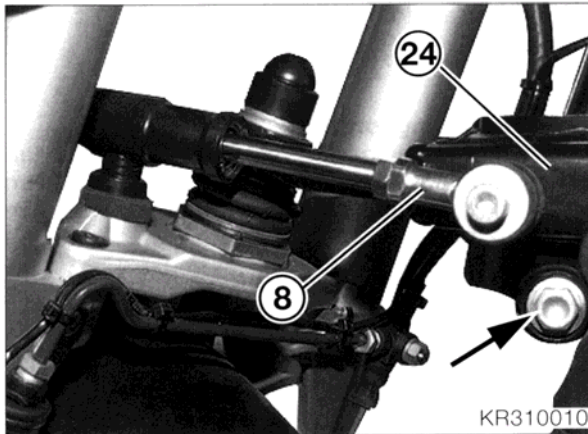
**Permissible runout** ..... 0.4 mm

## Removing and installing front suspension strut

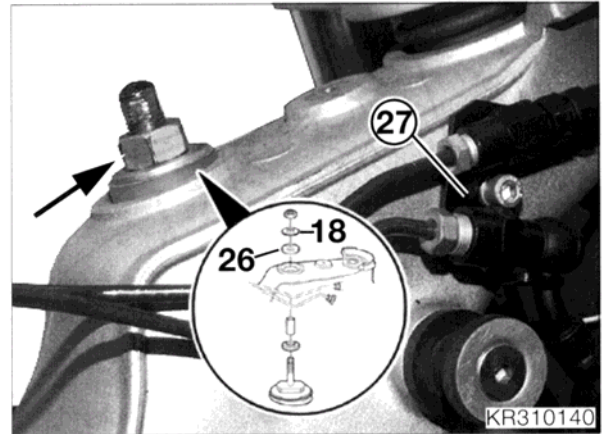
- Remove engine spoiler and holder.  
(→ 46.13)
- Attach hoist, **BMW No. 00 1 510**, to sump.
- Remove fuel tank.  
(→ 16.5)



- Drain the coolant until connecting hose (22) is empty.  
(→ 17.7)
- Loosen the fastening (arrow) at the left connecting hose (22).
- Pull connecting hose (22) off the radiator and set it down at the right.



- If necessary, detach steering damper (8) from leading link (24).
- Undo suspension strut pivot (arrow) at leading link (24).



- Unscrew fastening (arrow) for suspension strut on frame.
- Take off washer (18) and plastic washer (26).



### Caution:

Before removing the suspension strut, mask off its thread with adhesive tape to protect it.

- Unscrew brake line holder (27) from the frame.



### Caution:

When extending the telescopic fork, note the brake pipe and the front sensor wire. If necessary, detach the brake pipe and sensor wire from the telescopic fork (→ 34.19).

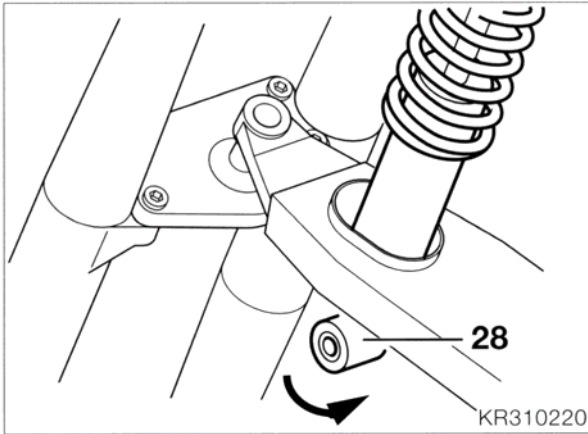


### Note:

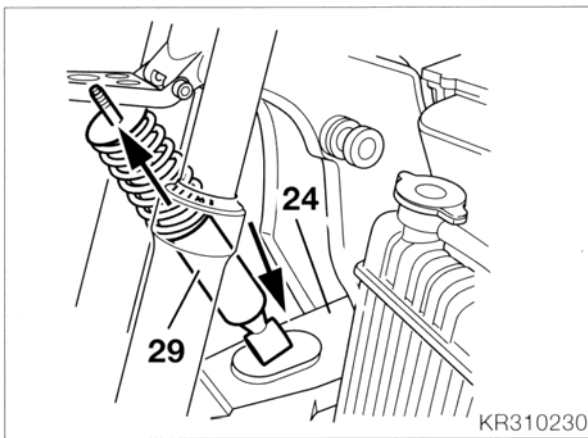
Note the extent of suspension travel.

- Extend the telescopic fork.





- Turn the lower suspension strut mount (28) through 90° (arrow).

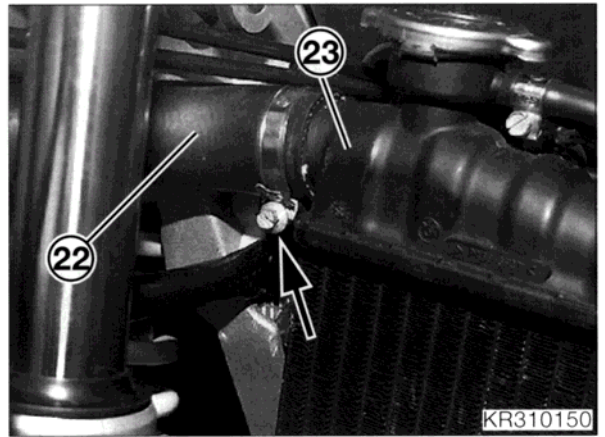


**Note:**  
Before removing, take the plastic washer and bushing off suspension strut (29).

- Lift suspension strut (29) forwards and to the left (arrow) out of leading link (24).
- Pull suspension strut (29) out downwards and to the right (arrow), past leading link (24).

- Install in the reverse order of work, noting the following points in particular.

**Note:**  
If the telescopic fork was extended too far, loosen the fixed fork tube clamps and push the fixed tube into the fork tube, turning it at the same time. Note the correct projecting amount when securing the fixed fork tube.



**Caution:**  
When installing connecting hose (22), make sure that the fastening (arrow) is a sufficient distance away from the radiator.

- Add coolant to the correct level.  
(→ 17.7)

**Tightening torques:**

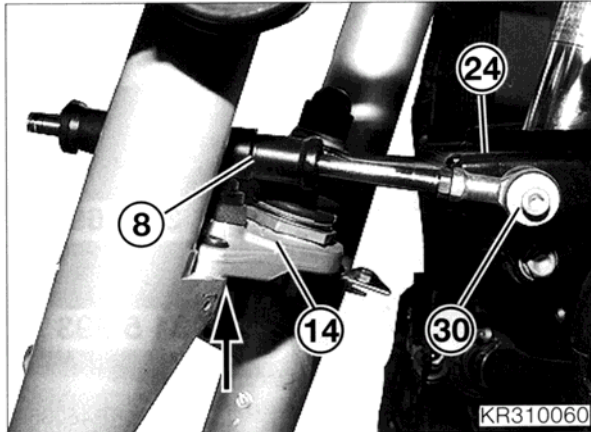
Spring strut to frame .....	43 Nm
Spring strut to leading link .....	60 Nm
Steering damper to leading link .....	21 Nm
Holder to frame .....	9 Nm





## Removing/installing steering damper

- Remove front wheel.  
(→ 36.5)
- Remove left side section of fairing.  
(→ 46.10)
- Remove the rear section of the front mudguard.  
(→ 46.7)



- Undo the steering damper (30) pivot at leading link (24).
- Take out the end plug (arrow) at the bottom of slider tube bridge (14).



### Note:

The fastening (arrow) for steering damper (8) at the slider tube bridge (14) is a multiple-spline screw, secured with a thread retaining agent.

- Undo the fastening (arrow) for steering damper (8) at slider tube bridge (14).
- Take steering damper (8) off slider tube bridge (14) with the sleeve and washer.
- Install in the reverse order of work, noting the following operations in particular.



### Caution:

Use only new original screws, since the steering damper could be damaged beyond repair if the screws are of the wrong length.

- Secure steering damper (8) to slider tube bridge (14) and tighten.



### Tightening torques:

Steering damper to leading link..... 21 Nm  
Steering damper to slider tube bridge ..... 21 Nm

## Checking the steering damper

- With the steering turned to the left, move the front end of the piston rod radially to and fro and check that there is no play.
- Check the ball head for freedom from play.
- Check the piston rod for freedom from play.



## Removing and installing leading link

### Removing leading link

#### **Caution:**

Disconnect the negative battery terminal first, then the positive one.

- Detach and insulate earth (ground) lead at battery.

#### **Warning:**

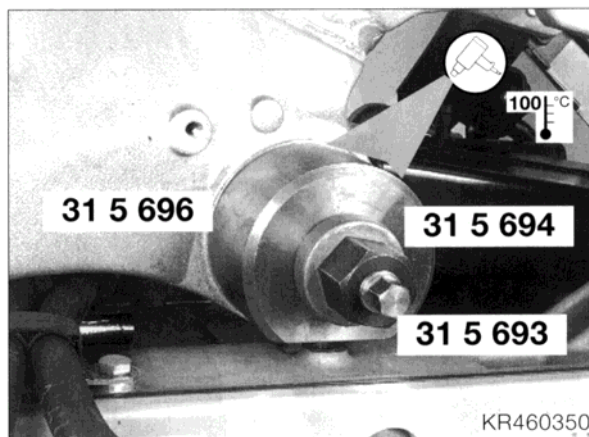
Comply with safety precautions when handling or working with fuel; note that the fuel lines are pressurised.

- Remove fuel tank.  
(⇒ 16.5)
- Remove engine spoiler and holder.  
(⇒ 46.12)
- Attach hoist, **BMW No. 00 1 510**, to sump.
- Remove the right air intake pipe.  
(⇒ 46.11)
- Detach the right radiator from its holder and press it forwards.
- Detach the brake line holder at the front right of the frame.
- Detach the front brake line at the fairing holder and the slider tube bridge.
- Detach the steering damper from the leading link.
- Loosen the front suspension strut at the top and detach it at the bottom from the leading link.
- Detach the leading link from the slider tube bridge.
- Remove the lid of the electronic equipment box.
- Remove Motronic control unit.  
(⇒ 13.14)
- Detach the electronic equipment box and wiring harness from the frame.
- Pull the wiring harness out of the electronic equipment box.
- Take off the electronic equipment box.
- Tie up the wiring harness.

#### **Caution:**

Always replace the ball thrust bearing and the deep-groove ball bearing together.

- Detach the leading link at the clamp sleeve.
- Undo the leading link pivot at the frame.
- Heat the frame to approx. 100 °C at the right pivot bearing seat.



- Pull out deep-groove ball bearing and clamp sleeve using M 14 puller spindle, **BMW No. 31 5 693**, M 14 nut with bearing, **BMW No. 31 5 694**, and puller support, **BMW No. 31 5 696**.
- Push the leading link to the left and remove it forwards.



#### **Note:**

Extend the telescopic fork and press the suspension strut forwards.



## Installing leading link

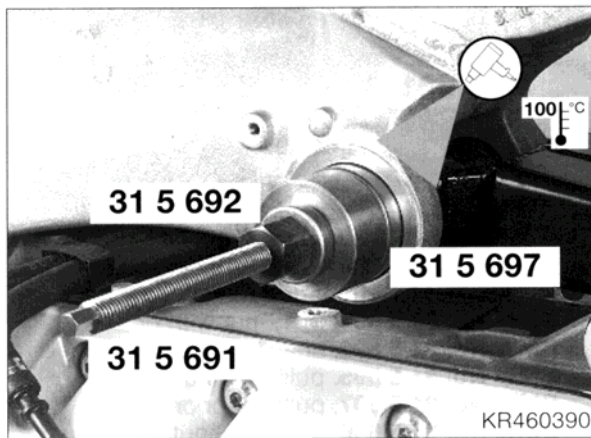
- Press the outer clamp sleeve flush into the deep-groove ball bearing.
- Cool the clamp sleeve and deep-groove ball bearing down to at least -10 °C.
- Push the leading link on to the shoulder of the spacing sleeve.



### Note:

Extend the telescopic fork and press the suspension strut forwards.

- Heat the frame at the right pivot bearing seat to approx. 100 °C.
- Coat the outside surface of the deep-groove ball bearing with assembly grease.

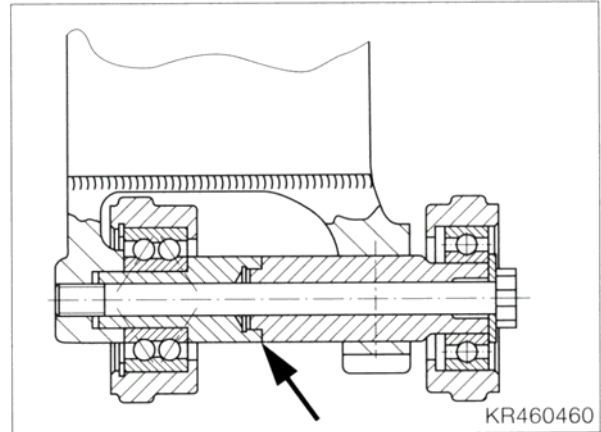


- Pull the deep-groove bearing and clamp sleeve with M 12 threaded rod, **BMW No. 31 5 691**, M 12 nut with bearing, **BMW No. 31 5 692**, and pulling-in bushing, **BMW No. 31 5 697**, into the frame, screwing the M 12 threaded rod into the leading link at the left.



### Note:

The cutout on the pulling-in bushing must face outwards.



### Note:

Pull the clamp sleeve and spacing sleeve together so that there is no gap between them (arrow).

- Tighten the leading link pivot mounts to the frame.



### Note:

Insert the bolt for the front suspension strut.

- Tighten the leading link at the clamp sleeve.

### Tightening torques:

Leading link to frame ..... 107 Nm  
 Leading link at clamp sleeve ..... 21 Nm

- Run the wiring harness into the electronic equipment box.
- Secure the electronic equipment box and wiring harness to the frame.
- Install the Motronic control unit. (→ 13.14)
- Fit the lid to the electronic equipment box.
- Secure the leading link to the slider tube bridge, and tighten.
- Tighten the front suspension strut.
- Secure the steering damper to the leading link, and tighten.
- Attach the front brake pipe to the fairing holder and the slider tube bridge.
- Secure the holder for the brake lines to the frame at the front right.
- Install the right-hand radiator.
- Install the right air intake pipe. (→ 46.11)
- Detach the hoist, **BMW No. 00 1 510**, from the sump.
- Install the engine spoiler holder. (→ 46.13)
- Attach engine spoiler. (→ 46.12)
- Install fuel tank. (→ 16.5)



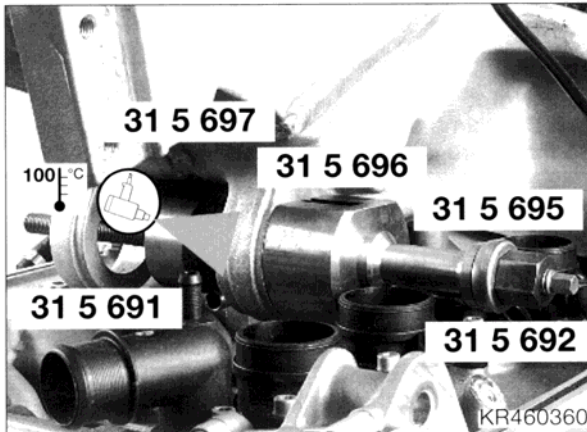
### Caution:

Attach and tighten the positive battery terminal first, then the negative one.

- Connect the earth (ground) lead to the battery.

## Removing left leading link pivot mount

- Remove the leading link.  
(→ 31.18)
- Remove the air guide at the left radiator.
- Detach the left radiator from its holder and press it forwards.
- Remove the fuel injection rail and secure it to the frame with the wiring harness.
- Remove throttle butterfly rail together with intake air silencer.
- Remove circlip for ball thrust bearing.
- Heat the frame at the left pivot bearing seat to approx. 100 °C.



- Pull the ball thrust bearing and spacing sleeve out with M 12 threaded rod, **BMW No. 31 5 691**, M 12 nut with bearing, **BMW No. 31 5 692**, spacing bushing, **BMW No. 31 5 695**, puller support, **BMW No. 31 5 696**, pulling-in bushing, **BMW No. 31 5 697**, and M 12 nut.



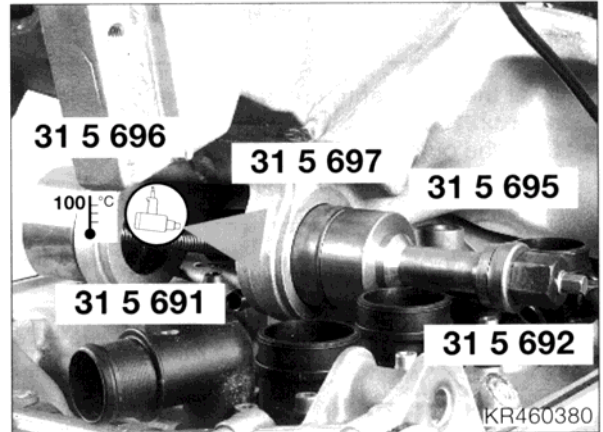
### Note:

The cutout in the pulling-in bushing faces the spacing sleeve.

- Press the spacing bushing out of the ball thrust bearing.

## Installing left leading link pivot mount

- Press the spacing sleeve fully into the ball thrust bearing.
- Cool the spacing sleeve with ball thrust bearing down to at least -10 °C.
- Heat the frame at the left bearing point to approx. 100 °C.
- Apply assembly grease to the outside diameter of the ball thrust bearing.



- Pull ball thrust bearing and spacing sleeve into frame with M 12 threaded rod, **BMW No. 31 5 691**, M 12 nut with bearing, **BMW No. 31 5 692**, spacing bushing, **BMW No. 31 5 695**, pulling-in bushing, **BMW No. 31 5 697**, puller support, **BMW No. 31 5 696**, and M 12 nut.
- Install the circlip.
- Install throttle butterfly rail complete with intake air silencer.
- Install fuel injection rail.
- Install the left radiator.
- Install the air guide for the left radiator.
- Install the leading link.



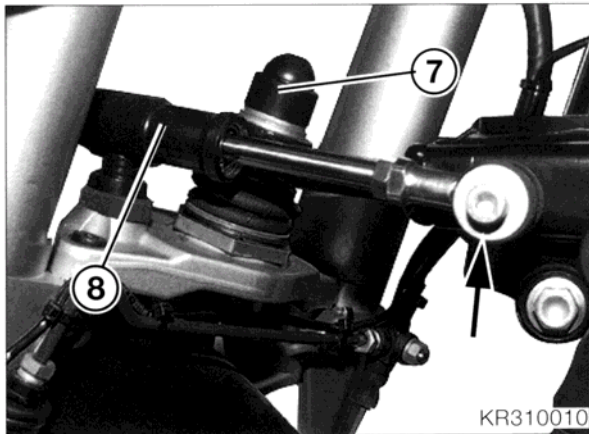
## Measuring the leading link

- Remove the left/right side section of the fairing. (→ 46.10)



### Warning:

The leading link must be measured after an accident which could have damaged or distorted it.



- Undo the fastening (arrow) for the steering damper (8) at the leading link.
- Take off the protective cap (7) for the leading link pivot.



### Caution:

The fastening is secured with a thread retaining agent.

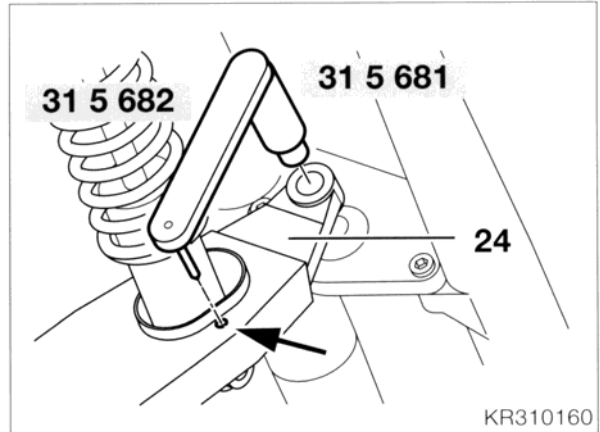
- Undo the leading link fastening at the slider tube bridge, using socket wrench insert and internal hexagon, **BMW No. 31 5 600**.



### Caution:

When extending the telescopic fork, avoid damage to the brake line and front sensor wire.

- Extend the telescopic fork.



- Insert test pin, **BMW No. 31 5 681**, with distance gauge, **BMW No. 31 5 682**, into leading link (24).
- The measuring point of distance gauge, **BMW No. 31 5 682**, must be located in the center punch mark (arrow) on the leading link at the right.
- Install in the reverse order of work, noting the following operations in particular.



### Caution:

When installing, use a new nut.

- Tighten leading link fastening at the slider tube bridge with socket wrench insert and internal hexagon, **BMW No. 31 5 600**.



### Tightening torques:

Leading link to slider tube bridge ..... 130 Nm  
 Steering damper to leading link ..... 21 Nm  
 Slider tube bridge to telescopic fork ..... 21 Nm



## **32 Steering**

# Contents

Page

<b>Removing/installing left grip tube</b> .....	5
<b>Removing/installing right grip tube</b> .....	6
<b>Removing/installing clutch lever fitting</b> .....	7
<b>Removing/installing brake lever fitting</b> .....	8
<b>Removing/installing left handlebar tube</b> .....	9
<b>Removing/installing right handlebar tube</b> .....	10
<b>Removing/installing throttle cable</b> .....	11
<b>Removing/installing left and right handlebar levers</b> .....	12
<b>Renewing brake fluid for clutch operation / bleeding clutch operating system</b> .....	13
<b>Renewing brake fluid / bleeding brake system</b> .....	14



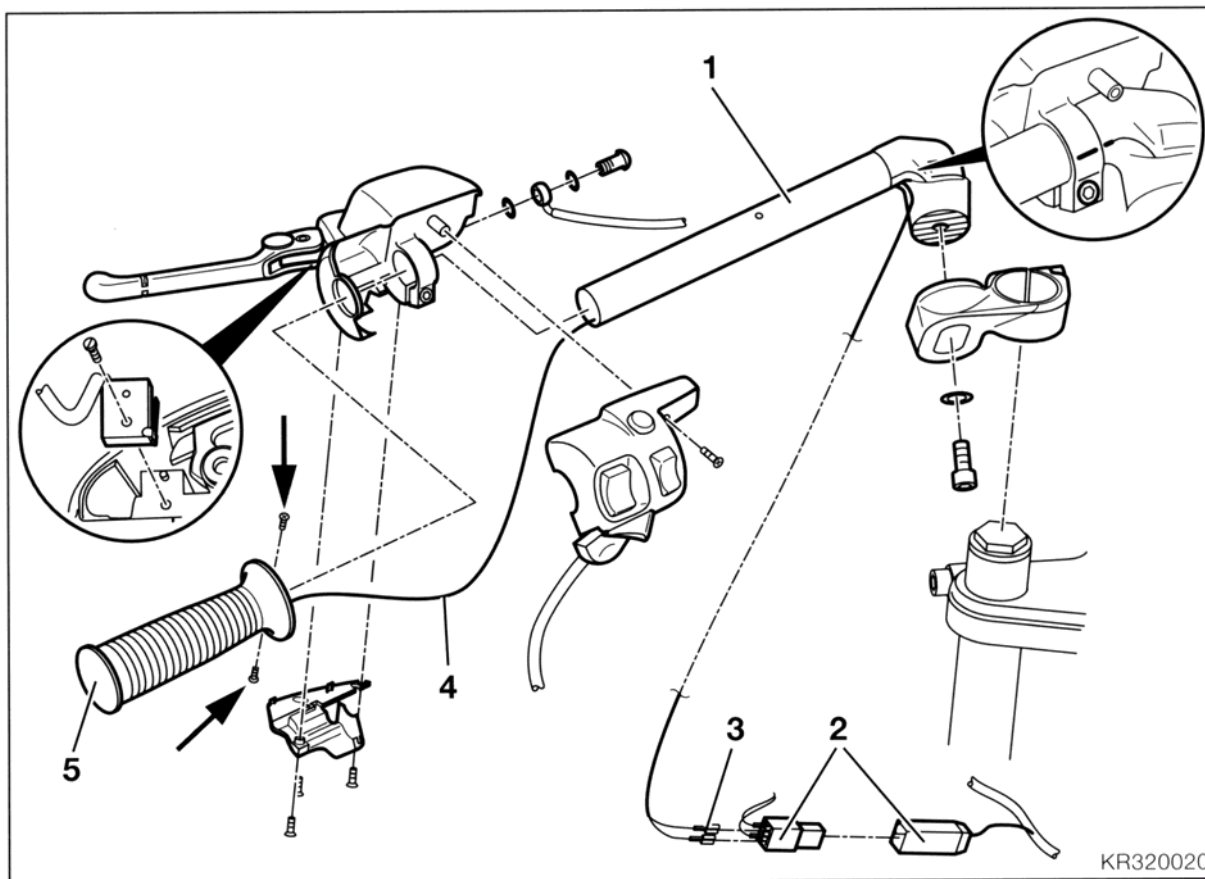




Technical data	K 1200 RS	
Type	Single piece forged stub handlebars, adjustable from lower front to upper rear position; without anti-vibration weights	
Handlebar tube diameter	mm	22
Steering lock angle	°	32
Handlebar width with grip tube	mm	720







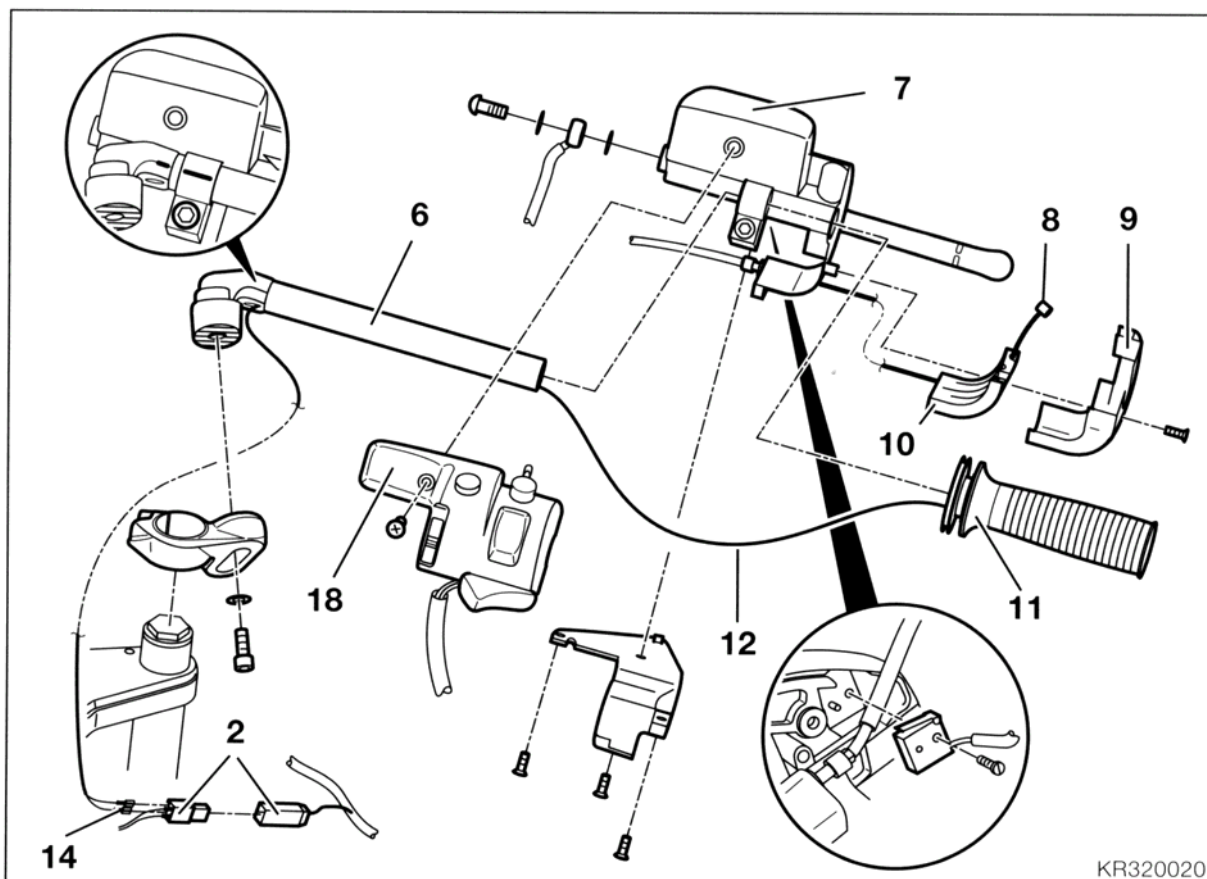
## Removing/installing left grip tube

- **[OE with heated grip]** Remove left side section of fairing.  
(⇒ 46.10)
- **[OE with heated grip]** Undo cable strap.
- **[OE with heated grip]** Separate plug connector (2) for the heated grip.
- **[OE with heated grip]** Release cable shoes (3) from plug connector (2).
- Undo fastenings (arrows) for grip tube (5).
- Pul grip tube (5) off handlebar tube (1).
- **[OE with heated grip]** Pull grip tube (5) with wire (4) off handlebar tube (1).
  
- Install in the reverse order of work, noting the following operations in particular.



### Caution:

Insert the screw with **Loctite 2701**.



KR320020

## Removing/installing right grip tube

- [OE with heated grip] Remove right side section of fairing.  
(⇒ 46.10)
- [OE with heated grip] Release cable strap.
- [OE with heated grip] Separate plug connector (2) for heated grip.
- [OE with heated grip] Release cable shoes (14) from plug connector (2).
- Take off cover for cable guide (9).
- Detach combined switch (18) from brake fitting (7).
- Disconnect wire cable (8) at cam disc of grip tube (11).
- Take off wire cable guide (10).

- Install in the reverse order of work.
- Basic throttle cable setting.  
(⇒ 13.13)

### Adjusting values:

Initial throttle cable play (engine cold) ..... 1.5 mm  
Throttle cable play (engine warm)..... 0.5 mm

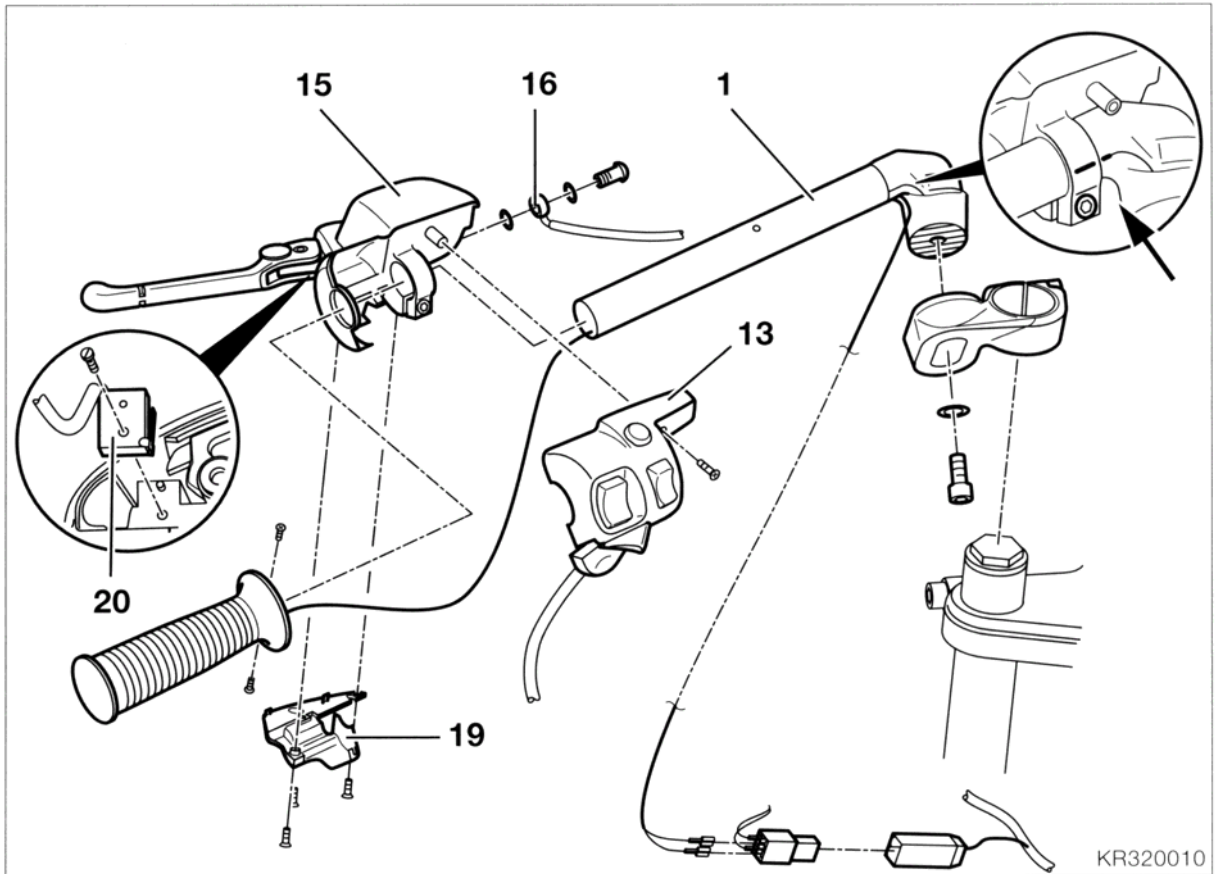


### Note:

Turn grip tube (11) fully forwards.

- Pull grip tube (11) off handlebar tube (6).
- [OE with heated grip] Pull grip tube (11) with wire (12) off handlebar tube (6).





## Removing/installing clutch lever fitting

- Take off the mirror.
- Remove the grip tube.  
(→ 32.5)

### **Caution:**

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Drain the clutch operating system.
- Detach clutch line (16) from clutch lever fitting (15).
- Detach combined switch (13) from clutch lever fitting (15).
- Detach cover (19) from clutch lever fitting (15).
- Remove clutch switch (20) from clutch lever fitting (15).
- Loosen fastening (arrow) for clutch lever fitting (15) on handlebar tube (1).
- Pull clutch lever fitting (15) off handlebar tube (1).

- Install in the reverse order of work, noting the following operations in particular.

### **Caution:**

Make quite sure that lines and wires are run in the correct positions.

### **Note:**

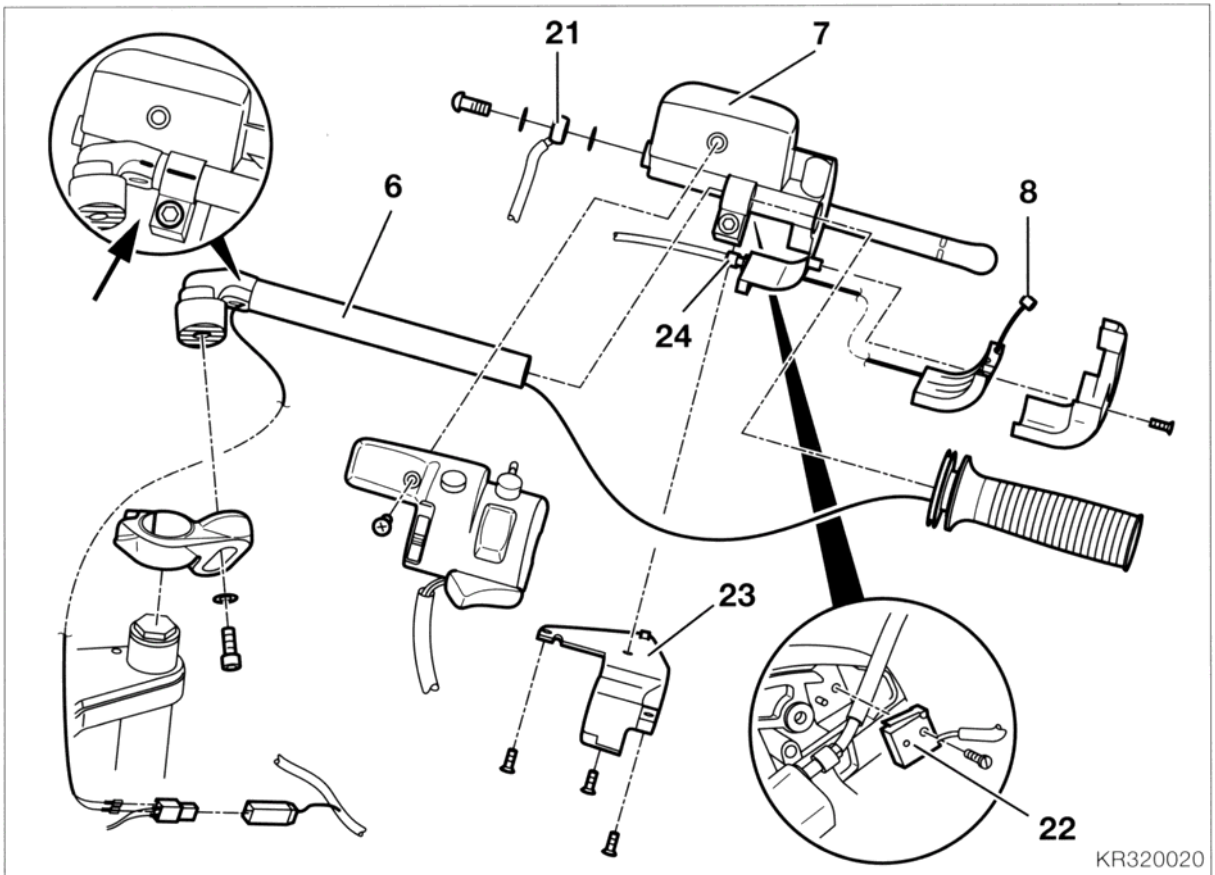
Note correct installed position of clutch switch (20).

- The marks on the clutch lever fitting (15) and handlebar tube (1) must be aligned (arrow).
- Tighten the clutch lever fitting (15).
- Add brake fluid and bleed.

### **Tightening torques:**

Brake lever fitting .....	7 Nm
Line to fitting .....	18 Nm
Mirror .....	20 Nm





## Removing/installing brake lever fitting

- Take off the mirror.
- Remove the grip tube.  
(→ 32.6)

### ⚠ Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Drain fluid from brake system.
- Detach brake line (21) from brake lever fitting (7).
- Disconnect wire cable (8) at adjusting screw (24) on brake lever fitting (7).
- Detach cover (23) from brake lever fitting (7).
- Remove brake light switch (22) from brake lever fitting (7).
- Loosen fastening (arrow) for brake lever fitting (7) at handlebar tube (6).
- Pull brake lever fitting (7) off handlebar tube (6).

- Install in the reverse order of work, noting the following operations in particular.

### ⚠ Caution:

Make quite sure that lines and wires are run in the correct positions.

### 📄 Note:

Note correct installed position of brake light switch (22).

- The marks on the brake lever fitting (7) and the handlebar tube (1) must be aligned (arrow).
- Tighten the brake lever fitting (7).
  - Add brake fluid and bleed.
  - Basic setting of throttle cable  
(→ 13.13)

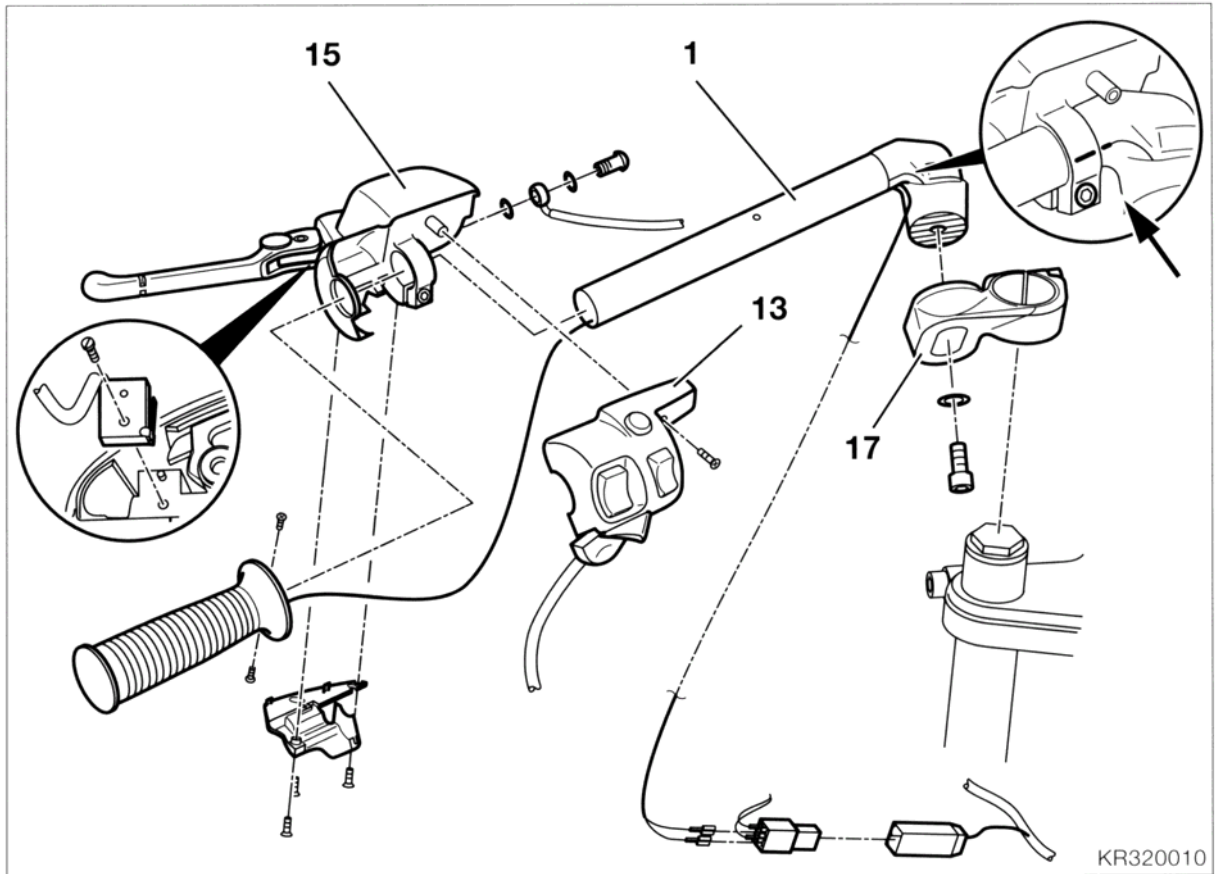
### Adjusting values:

Initial throttle cable play (cold engine) ..... 1.5 mm  
Throttle cable play (warm engine)..... 0.5 mm

### 🔧 Tightening torques:

Brake lever fitting ..... 7 Nm  
Line to fitting ..... 18 Nm  
Mirror ..... 20 Nm





## Removing/installing left handlebar tube

- Remove the grip tube.  
(→ 32.5)
- Detach combined switch (13) from clutch lever fitting (15).
- Loosen the fastening (arrow) for clutch lever fitting (15) at handlebar tube (1).
- Pull clutch lever fitting (15) off the handlebar tube (1).



### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Set the clutch lever fitting (15) down, securing it if necessary.
- Detach handlebar tube (1) from handlebar holder (17).

- Install in the reverse order of work, noting the following operations in particular.



### Caution:

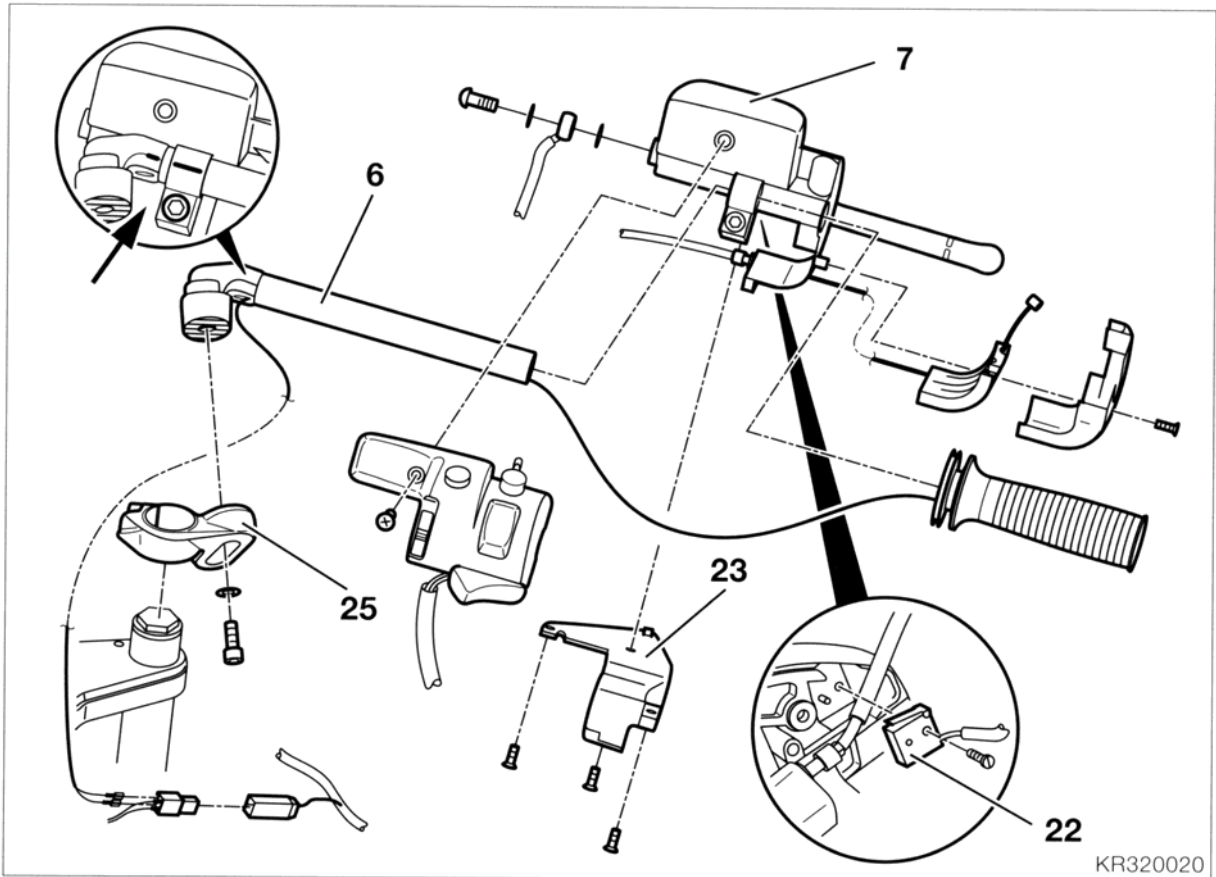
Check brake fluid/if necessary, bleed the clutch system.  
Make sure that lines and wires run correctly.

- The marks on clutch lever fitting (15) and handlebar tube (1) must be aligned (arrow).
- Tighten clutch lever fitting (15).



### Tightening torque:

Clutch lever fitting ..... 7 Nm



## Removing/installing right handlebar tube

- Remove the grip tube.  
(⇒ 32.6)
- Detach cover (23) from brake lever fitting (7).
- Detach brake light switch (22) from brake lever fitting (7).
- Loosen fastening (arrow) for brake lever fitting (7) at handlebar tube (6).
- Remove handlebar tube (6) from handlebar holder (25).
- Pull handlebar tube (6) out of brake lever fitting (7).

### **Caution:**

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Set brake lever fitting (7) down and secure it if necessary.

- Install in the reverse order of work, noting the following operations in particular.

### **Caution:**

Check brake fluid, bleed if necessary.  
Make sure that the lines and wires are run correctly.

- The marks on brake lever fitting (7) and handlebar tube (1) must be aligned (arrow).
- Tighten brake lever fitting (7).
  - Basic throttle cable setting.  
(⇒ 13.13)

### **Adjusting values:**

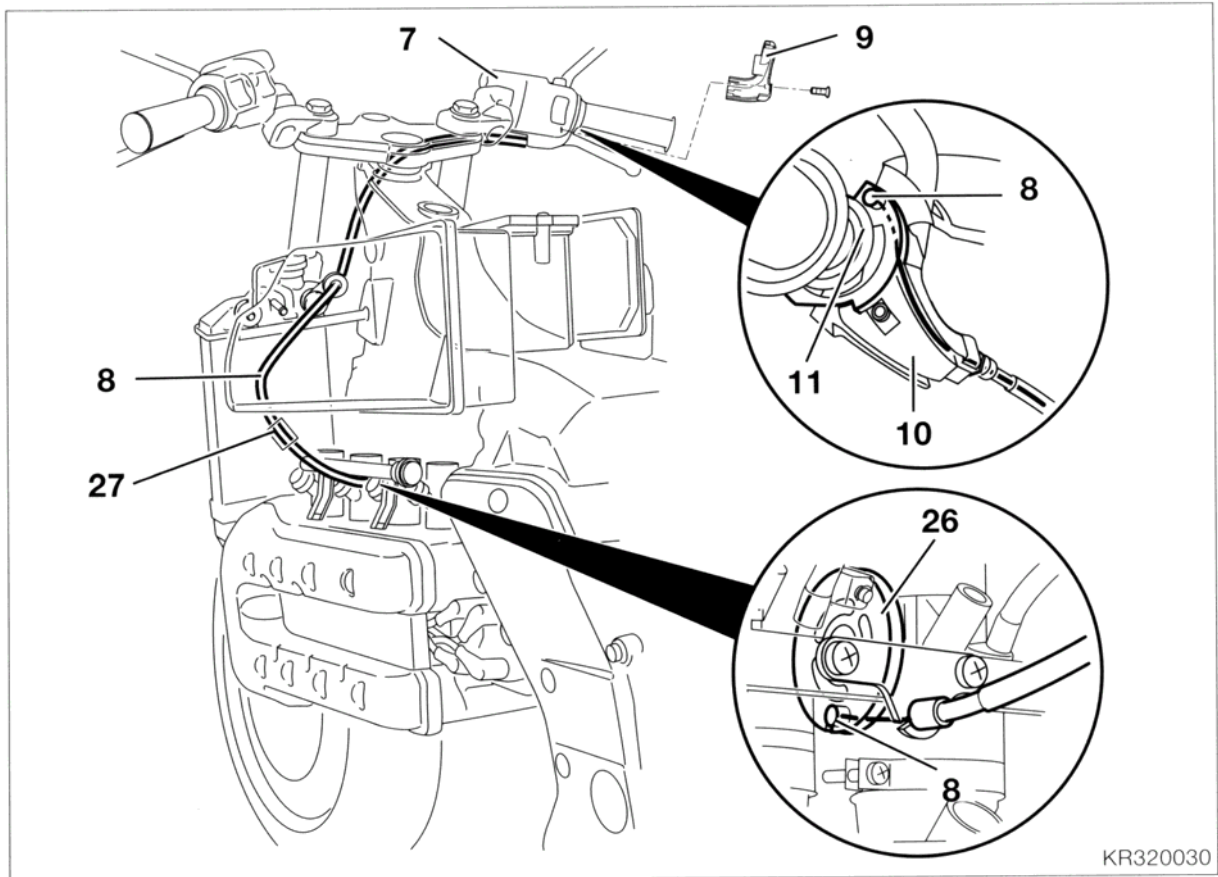
Initial throttle cable play (cold engine) ..... 1.5 mm  
Throttle cable play (warm engine)..... 0.5 mm

### **Tightening torque:**

Brake lever fitting ..... 7 Nm







KR320030

## Removing/installing throttle cable

- Take off cover for cable guide (9) at brake lever fitting (7).
- Disconnect wire cable (8) from cam disc at grip tube (11).
- Take off throttle cable guide (10).
- Detach wire cable (8) from brake lever fitting (7).
  - Take off the left side section of the fairing. (⇒ 46.9)
- Disconnect wire cable (8) from holder (27) on the air outlet guide for the left radiator.
- Turn cam disc (26) inwards at the throttle butterfly stub pipe and disconnect wire cable (8).
- Install in the reverse order of work, noting the following operations in particular.

### **Caution:**

Do not kink wire cable (8) when installing. After installing, check that cam disc (26) moves freely at the throttle stub pipe.

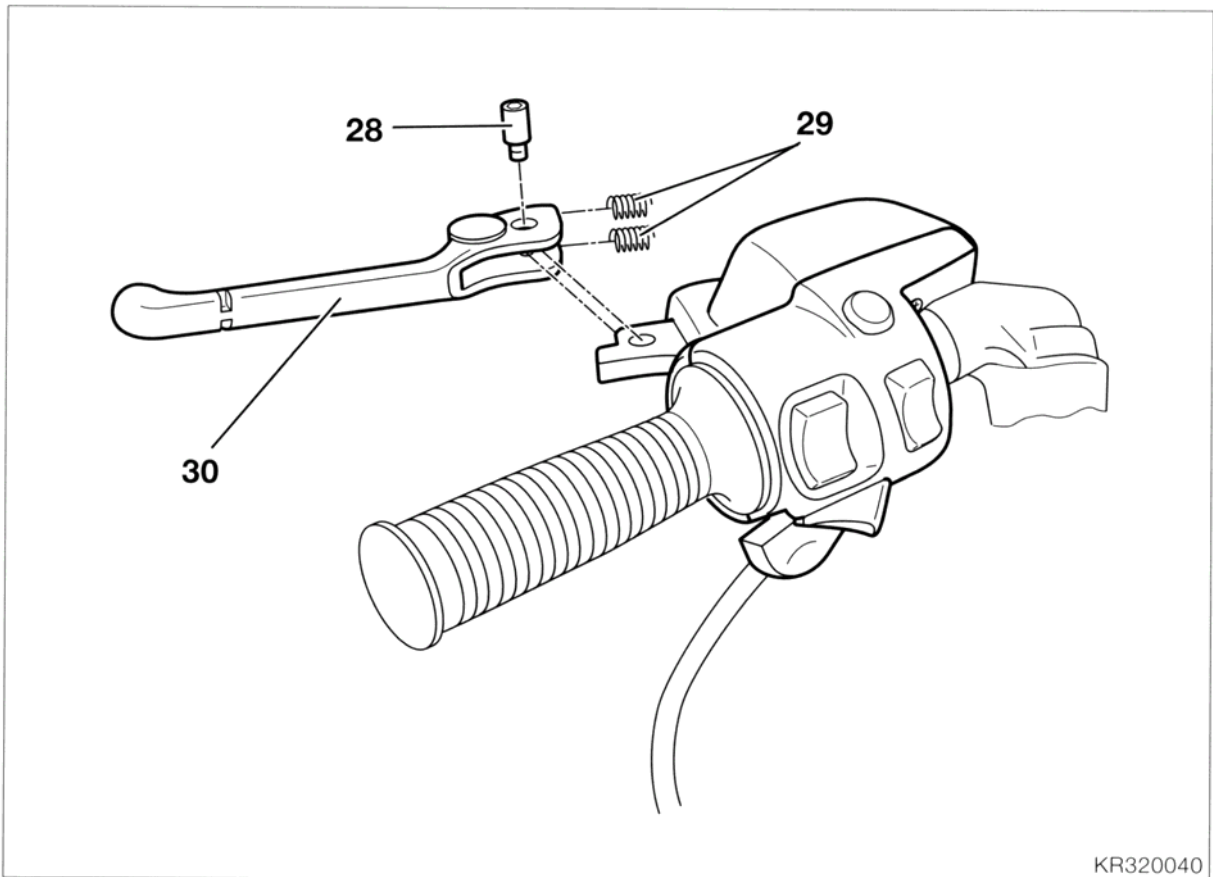
- Basic throttle cable setting. (⇒ 13.13)

### **Adjusting values:**

Initial throttle cable play (cold engine) ..... 1.5 mm  
 Throttle cable play (warm engine)..... 0.5 mm

### **Tightening torque:**

Cable guide cover..... 7 Nm



## Removing/installing left and right handlebar levers



### Caution:

The fastening is secured with a thread retaining agent.



### Note:

When removing/installing, note spring (29).

- Remove fastening (28) from left/right handlebar lever (30).



### Caution:

Insert the screw with **Loctite 2701**.

- Install fastening (28) and tighten.



## Renewing brake fluid for clutch operation / bleeding clutch operating system

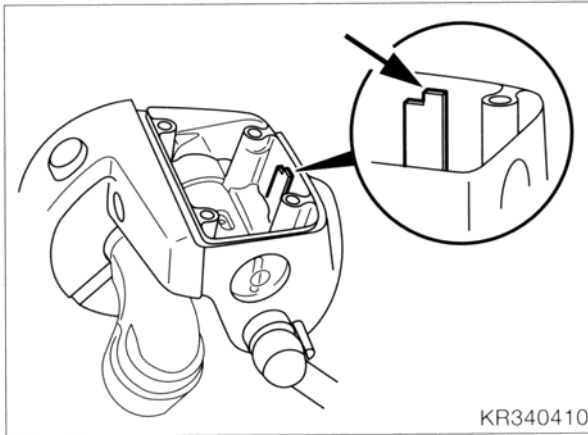
- Place motorcycle on main (centre) stand.
- Remove the windshield.  
(→ 46.15)
- Take off the right side section of the fairing.  
(→ 46.10)
- Turn the handlebar fully to the right.



### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Take off reservoir cover with rubber diaphragm.



### Caution:

When adding brake fluid, make sure that it does not enter the retaining holes for the reservoir cover. During the bleeding process, brake fluid level must not drop below the "MIN" mark, or else air will be drawn into the clutch operating system. If this occurs, repeat the bleeding operation.

- Add brake fluid up to the "MAX" mark (arrow).



### Note:

The bleed union is on the right side of the motorcycle.

- Connect the brake circuit bleeding device to the bleed line.
- Open the bleed screw by half a turn.
- Draw off brake fluid until it is clear and free from air bubbles.
- Add brake fluid up to the "MAX" mark.
- Close the bleed screw.
- Repeat the bleeding operation if necessary.
- Assemble in the reverse order of work.

### Operating materials

Brake fluid..... DOT 4



### Tightening torque:

Bleed screw..... 18 Nm



## Renewing brake fluid / bleeding brake system

- Place the motorcycle on its main (centre) stand.
- Remove the windshield.  
(⇒ 46.15)



### Caution:

When bleeding the brakes, always start on the left side of the motorcycle.

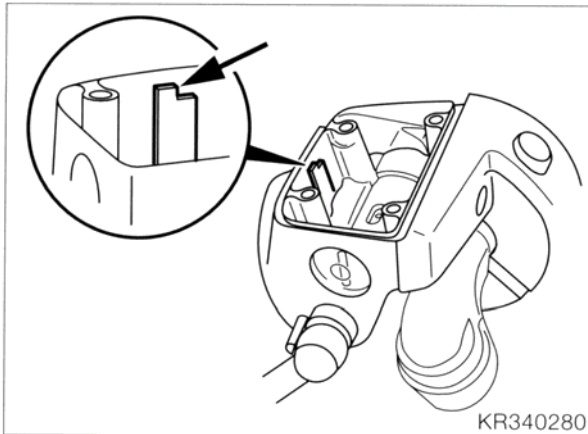
- Turn the handlebar fully to the left.



### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Take off the reservoir cover with rubber diaphragm.



### Caution:

When adding brake fluid, make sure that it does not enter the retaining holes for the reservoir cover. During the bleeding process, brake fluid level must not drop below the "MIN" mark, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

- Add brake fluid up to the "MAX" mark (arrow).

- Connect the brake bleeding device to the bleed screw on the **left** brake caliper.
- Open the bleed screw by half a turn.
- Draw off brake fluid until it is clear and free from air bubbles.
- Close the bleed screw on the left brake caliper.
- Perform the bleeding process at the **right** brake caliper in exactly the same way as for the left caliper.
- If necessary repeat the bleeding process at the left or right.
  
- Assemble in the reverse order of work.

### Operating materials

Brake fluid..... DOT 4

### Tightening torque:

Bleed screw..... 18 Nm



## **33 Rear wheel drive**

# Contents

Page

<b>Rear wheel drive - sectional drawing</b> .....	5
<b>Removing, dismantling, reassembling and installing rear wheel drive</b> .....	6
Removing rear wheel drive .....	6
Renewing taper roller bearing in rear wheel drive .....	6
Removing input bevel pinion .....	7
Disassembling input bevel pinion .....	9
Removing needle roller bearing for input bevel pinion .....	10
Installing needle roller bearing for input bevel pinion .....	10
Assembling input bevel pinion .....	10
Installing input bevel pinion .....	11
Removing crown wheel .....	13
Installing crown wheel .....	14
Checking/adjusting backlash .....	15
Checking tooth contact pattern .....	16
Shimming housing cover .....	17
Installing housing cover .....	17
Installing rear drive shaft .....	17
Installing rear wheel drive .....	18
<b>Removing, dismantling, reassembling and installing rear swinging arm</b> ...	19
Removing rear swinging arm .....	19
Removing and installing flexible gaiter .....	20
Removing/installing threaded ring bearings .....	20
Removing bearing from left/right threaded ring .....	20
Installing bearing in left/right threaded ring .....	20
Removing drive shaft .....	21
Checking universal joint for wear .....	21
Installing drive shaft .....	21
Installing rear swinging arm .....	22
Removing and installing suspension strut .....	23





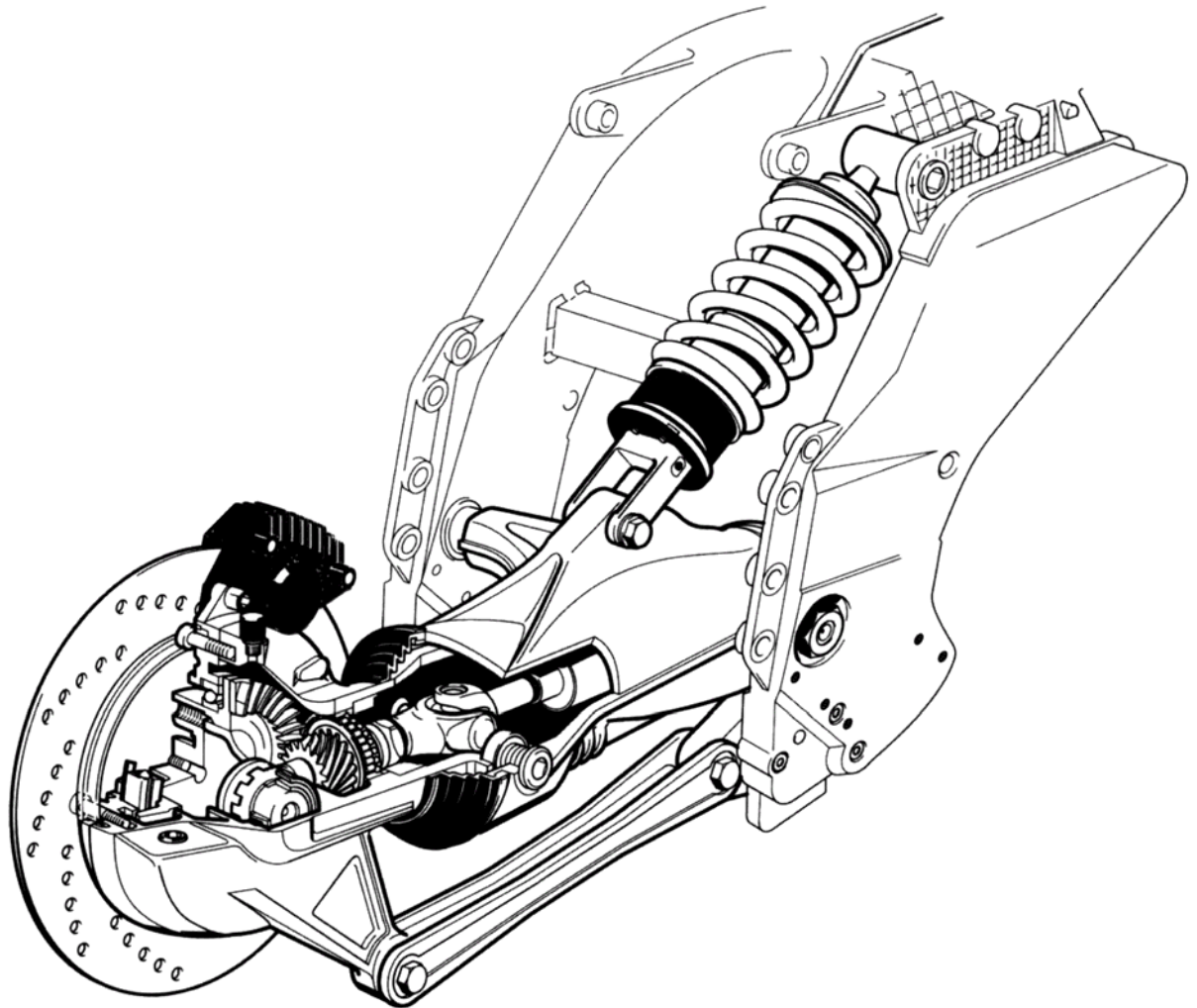
Technical data		K 1200 RS
<b>Rear wheel drive</b>		
Gear tooth pattern		Klingelberg-Paloid spiral bevel
Gear ratios		2.75 : 1
Number of teeth		33 : 12
Backlash	mm	0.07...0.016
Taper roller bearing preload	mm	0.05...0.1
Oil grades		Hypoid gear oil, SAE 90 API-GL-5
Filling capacity		
Initial filling	cm <sup>3</sup>	240...250
During oil changes	cm <sup>3</sup>	230
<b>Drive shaft</b>		
Layout		2-section double drive shaft with integral torsional vibration damper in hollow swinging arm (BMW PARALEVER), universal joints at both ends, with sliding joint at rear wheel drive end.
<b>Swinging arm</b>		
Type		Paralever, new swinging arm with suspension strut attached off-centre; kinematic progressive rate.
Swinging arm length	mm	320
<b>Rear suspension</b>		
Suspension strut		Gas-filled strut with variable rebound stage damping and mechanical spring preload adjustment
Suspension travel	mm	150 at wheel
	mm	57 at suspension strut







## Rear wheel drive - sectional drawing

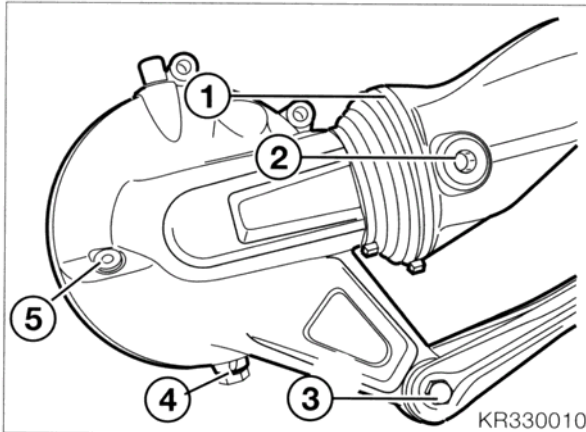


## Removing, dismantling, reassembling and installing rear wheel drive

- Remove rear wheel (→ 33.6).
- Remove speedometer signal transmitter (→ 61.15).
- Remove brake caliper and tie up to rear frame together with speedometer signal transmitter (→ 34.6).
- Remove brake disc (→ 34.7).



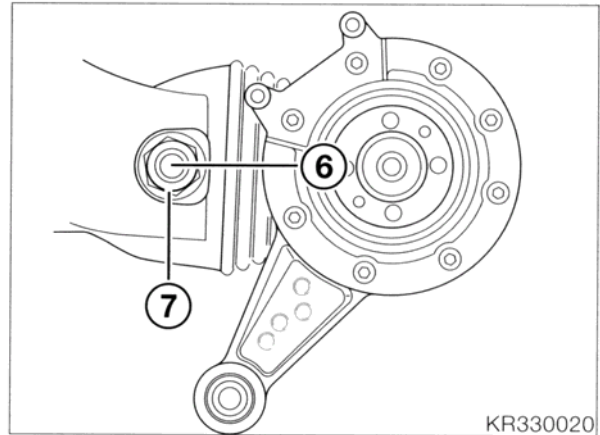
### Removing rear wheel drive



#### **Caution:**

Never lay the rear drive on its side before installation if it contains oil, or else oil will leak out when the motorcycle is ridden (suction effect).

- Unscrew the oil filler plug (5).
- Remove oil drain plug (4) and drain oil into a suitable vessel.
- Loosen reaction link (3) at the rear wheel drive.
- Release clamping strap (1).



- Loosen free bearing journal (6) and locknut (7).
- Loosen fixed bearing journal (2).
- Unscrew and remove free (6) and fixed (2) bearing journals.

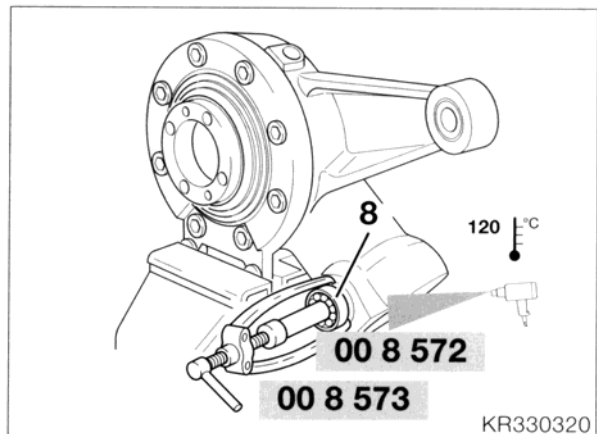


#### **Warning:**

Note inner races of needle bearings.

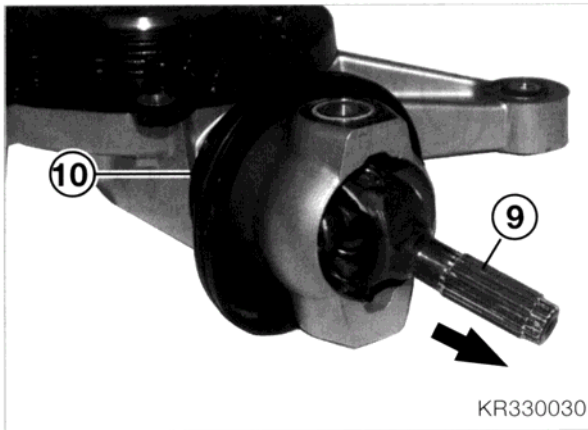
- Detach reaction link (3) at rear wheel drive.
- Disconnect rear wheel drive from drive shaft.

### Renewing taper roller bearing in rear wheel drive

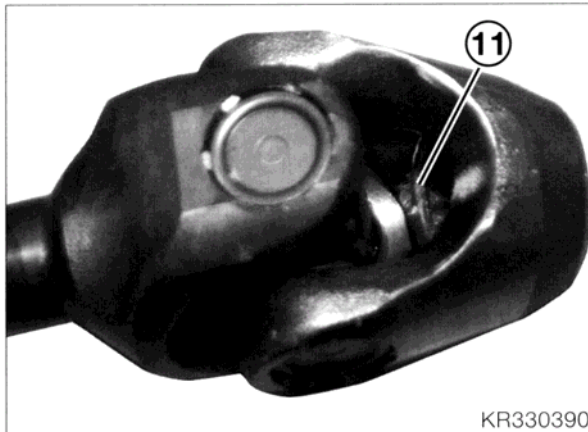


- Pull out needle roller bearing (8) with reaction support, **BMW No. 00 8 572**, and internal puller, **BMW No. 00 8 573**.
- Heat neck of housing to 120 °C.
- Press in needle roller bearing (8) with the inner race on driver, **BMW No. 36 3 700**.

## Removing input bevel pinion



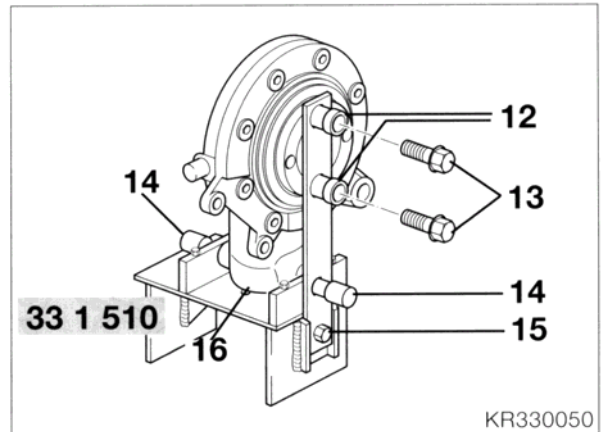
- Use a tyre lever or similar tool to force off the rear drive shaft (9).
- Unscrew tensioning strap (10) and pull off the flexible gaiter.



### Note:

Note circlip (11) at rear drive shaft.

- Renew circlip (11) if necessary.



- Screw rear wheel drive centrally to holder, **BMW No. 33 1 510**, using bearing journal (14).
- Screw locking arm (15) on firmly.
- Move threaded sockets (12) up to rear wheel drive.
- Tighten with wheel studs (13).

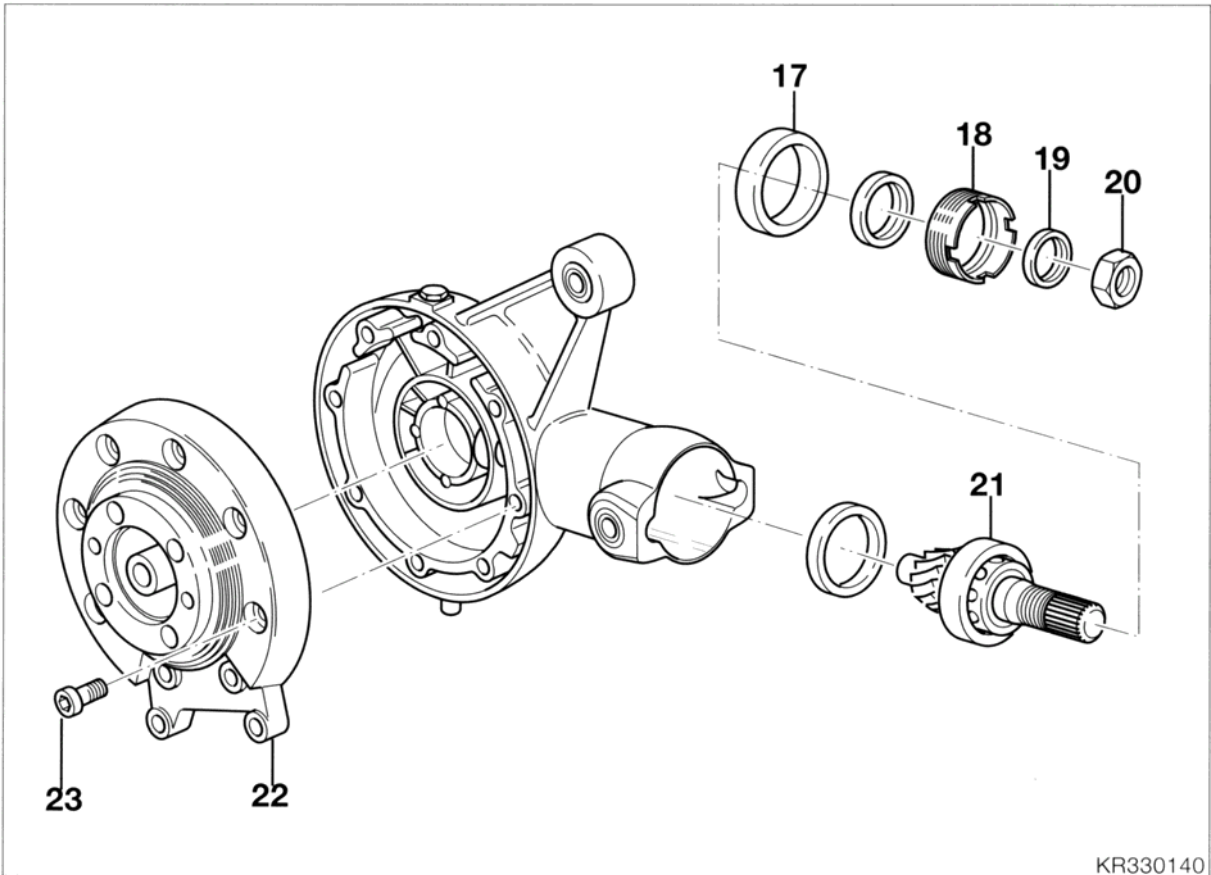


### Caution:

The grub screws must not project, or the neck of the housing could be damaged.

- Tighten grub screws (16) until they make contact.





KR330140

**⚠ Caution:**

Never use a hammer when slackening off hex nut (20), or else the splines may be damaged.

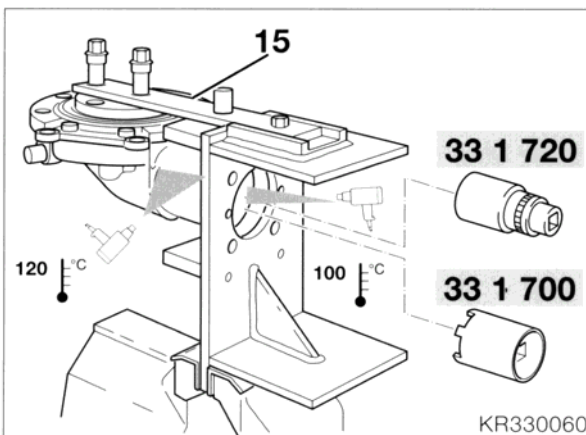
**🚫 Warning:**

Hex nut (20) requires a high torque to loosen it.

- Heat hex nut (20) on the input bevel pinion (21) to 100 °C and unscrew with a 36 mm socket wrench insert and reducing adapter, **BMW No. 33 1 720**.
- Remove thrust ring (19).

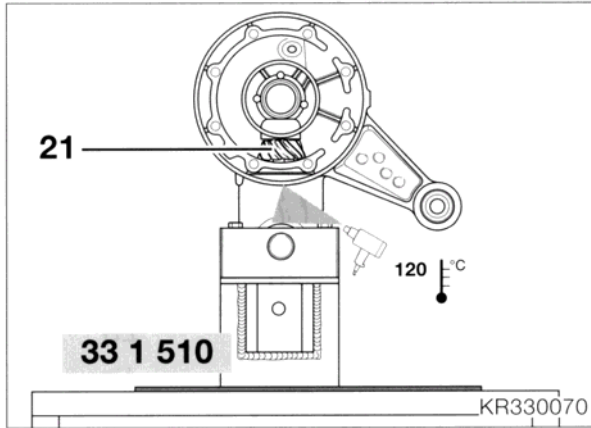
**🚫 Warning:**

Threaded ring (18) requires a high torque to loosen it.



KR330060

- Heat the housing neck to 120 °C and unscrew threaded ring (18) with pin wrench, **BMW No. 33 1 700**.
- Remove outer bearing race (17).
- Detach locking arm (15).
- Slacken off mountings (23).
- Remove housing cover (22).



- Position the rear wheel drive vertically with retaining fixture, **BMW No. 33 1 510**.

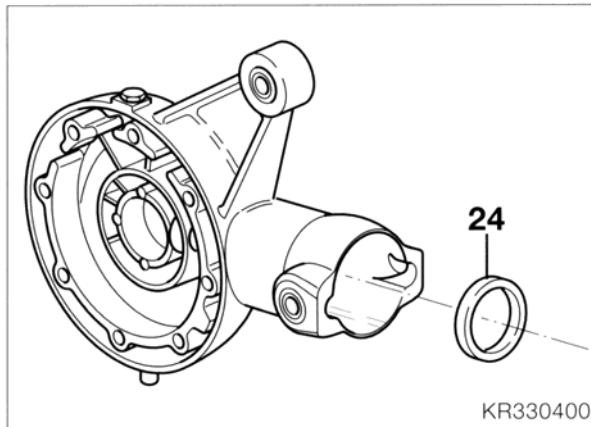
**Caution:**

To prevent the input bevel pinion (21) from being damaged if it falls out, use a soft underlay.

- Heat bearing seat to 120 °C.
- Remove input bevel pinion (21).

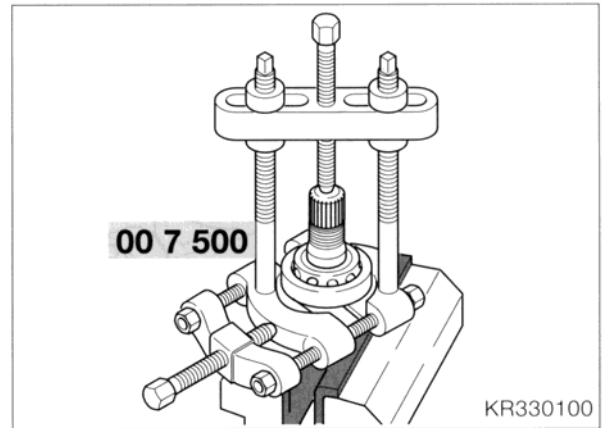
**Note:**

If necessary, release input bevel pinion (21) by striking lightly.

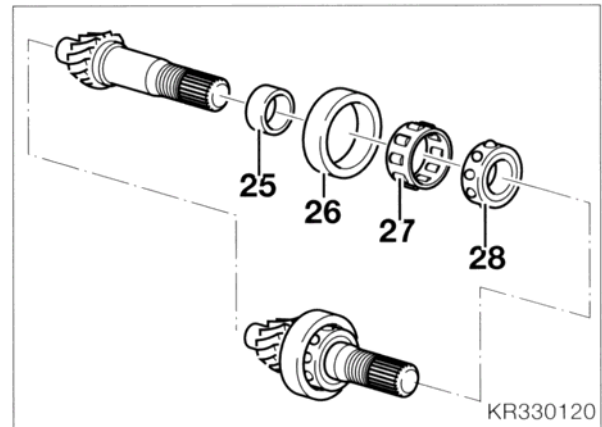


- Take off thrust washer (24).

## Disassembling input bevel pinion

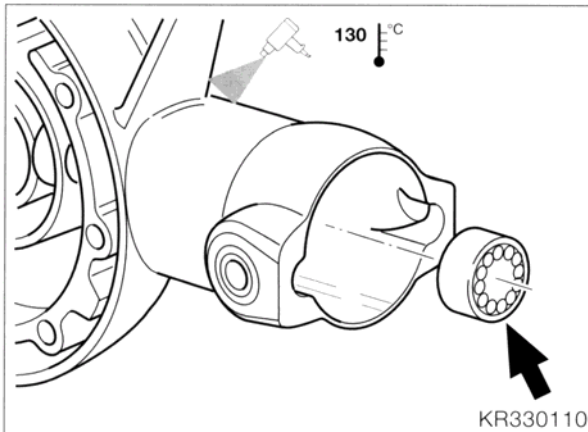


- Clamp input bevel pinion (21) into vise with protective jaws (splines facing upwards).
- Using puller, **BMW No. 00 7 500**, pull off both bearings at the same time.

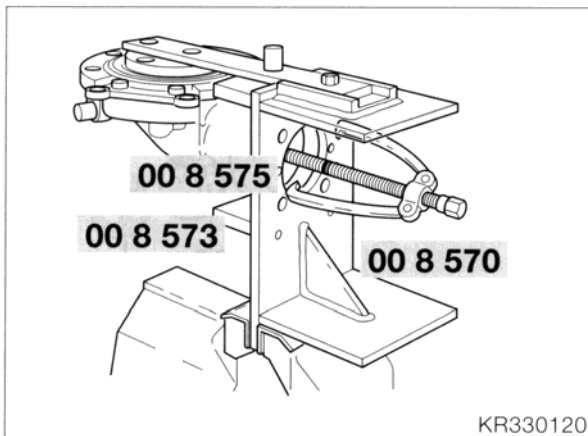


- Take off radial-thrust bearing (28), roller bearing cage (27), outer race (26) and inner race (25).

### Removing needle roller bearing for input bevel pinion



- Break or cut open the inner race of the needle roller bearing.
- Heat the housing to 130 °C.

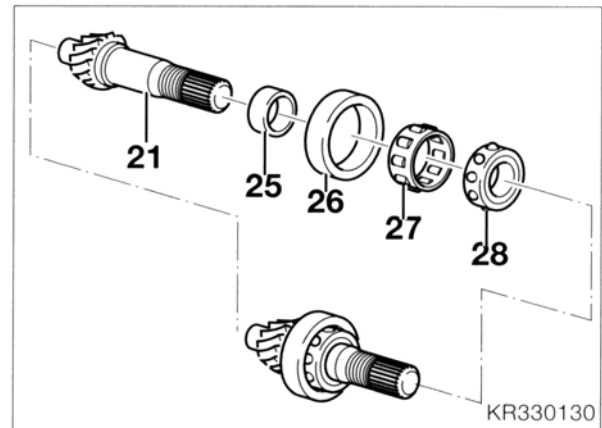


- Pull out the outer race of the needle roller bearing using internal puller, **BMW No. 00 8 573**, extension, **BMW No. 00 8 575**, and reaction support, **BMW No. 00 8 570**.

### Installing needle roller bearing for input bevel pinion

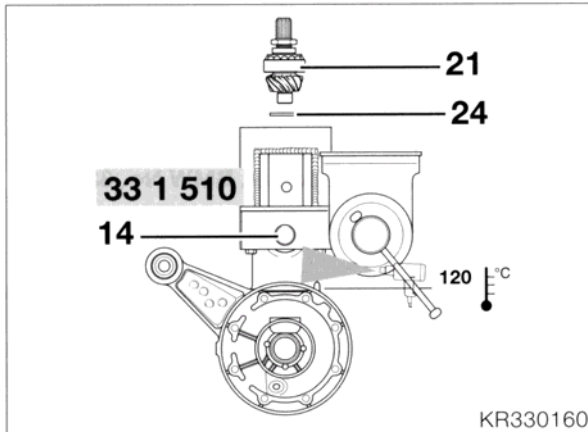
- Heat the needle roller bearing seat to 100 °C.
- Press in needle roller bearing using drift or the input bevel pinion.

### Assembling input bevel pinion



- Heat the inner race (25) to 100 °C and push onto input bevel pinion (21) as far as the stop.
- Slide outer race (26) together with roller cage (27) onto inner race (25).
- Heat ball thrust bearing (28) to 100 °C and push onto input bevel pinion (21) as far as the stop.
- Allow input bevel pinion (21) to cool.

## Installing input bevel pinion



- Secure the housing centrally in holder, **BMW No. 33 1 510**, using bearing journal (14).

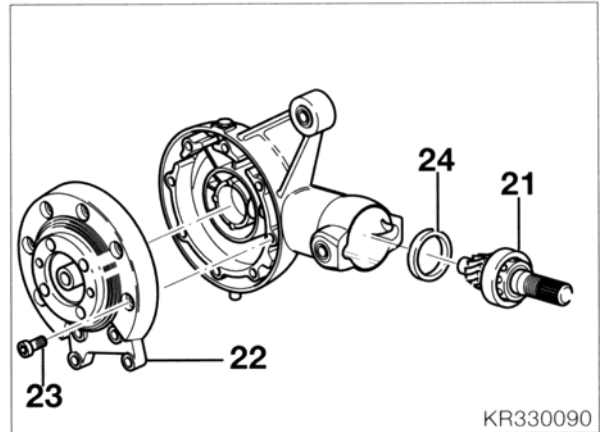
### **Caution:**

The grub screws must not project, or the neck of the housing could be damaged.

- Tighten grub screws (16) until they make contact.
- Using holder, **BMW No. 33 1 510**, clamp the housing into position vertically as illustrated.
- Insert shim (24) into neck of housing.
- Heat bearing seat to 120 °C.

### **Note:**

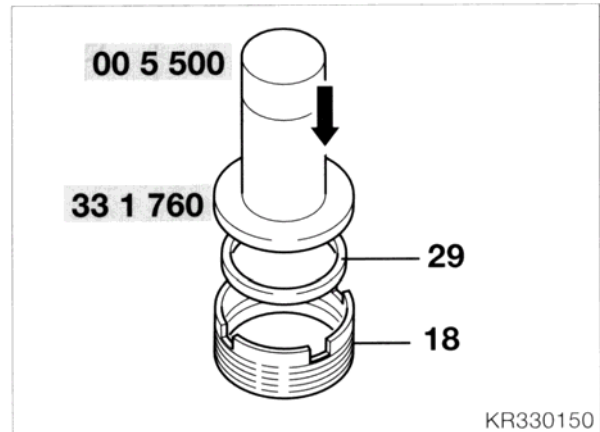
When inserting input bevel pinion (21), make sure that it is not tilted.



- Insert input bevel pinion (21) into housing.
- Install housing cover (22).
- Tighten fastenings (23) in a cross-wise pattern.

### **Tightening torque:**

Housing cover to housing .....35 Nm



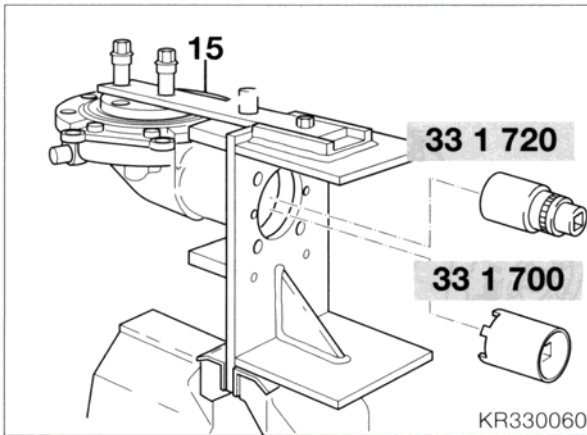
- Clean the threads in the neck of the housing and on threaded ring (18).

### **Caution:**

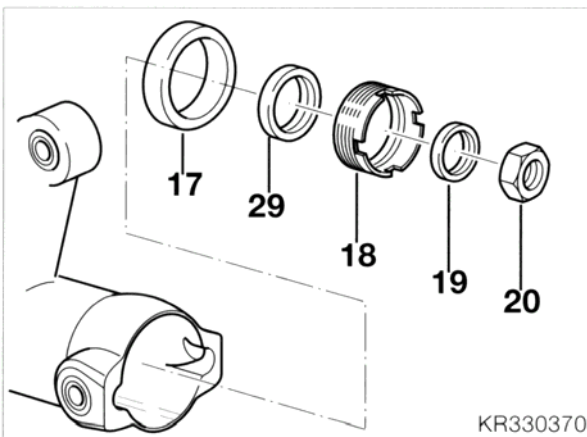
Install shaft sealing ring (29) with the sealing lips facing the input bevel pinion.

- Oil shaft sealing ring (29) lightly and drive into threaded ring (18) with drift, **BMW No. 33 1 760**, and handle, **BMW No. 00 5 550**.






- Attach locking arm (15).
- Insert outer race (17).



- Coat threaded ring (18) with **Hylomar SQ 32 M**.
- Tighten threaded ring (18) with pin wrench, **BMW No. 33 1 700**.
- Oil thrust ring (19) lightly and place in position.

 Ensure that the lip of the shaft seal is perfectly aligned on the thrust ring.

- Clean the threads of hex nut (20) and input bevel pinion (21).
- Coat the thread of hex nut (20) with **Loctite 638**.



**Caution:**

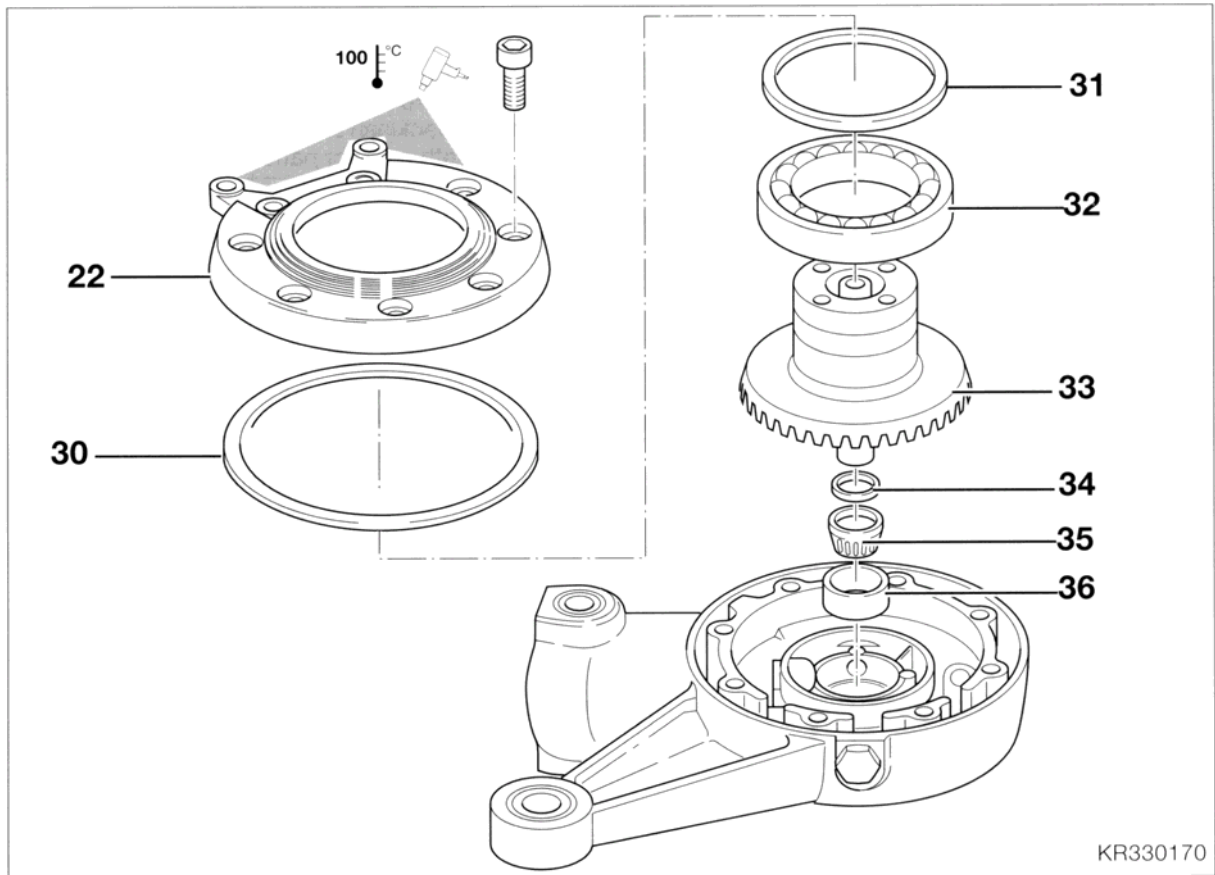
The nut must not damage shaft sealing ring (29).

- Tighten hex nut (20) with 36 mm socket wrench insert and reducing adapter, **BMW No. 33 1 720**.



**Tightening torques:**

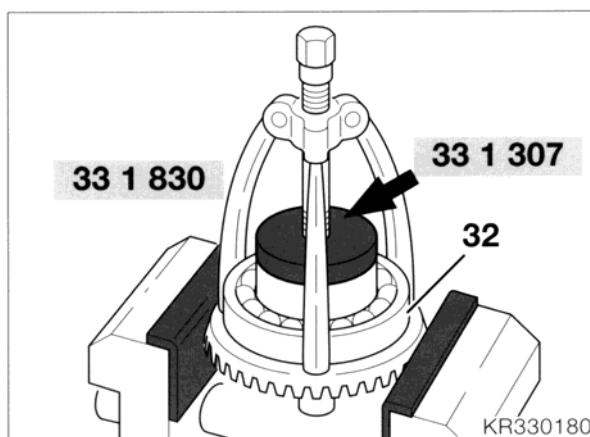
Threaded ring (thread cleaned) .....	118 Nm
Nut for input bevel pinion (thread cleaned) .....	200 Nm
Housing cover .....	35 Nm



KR330170

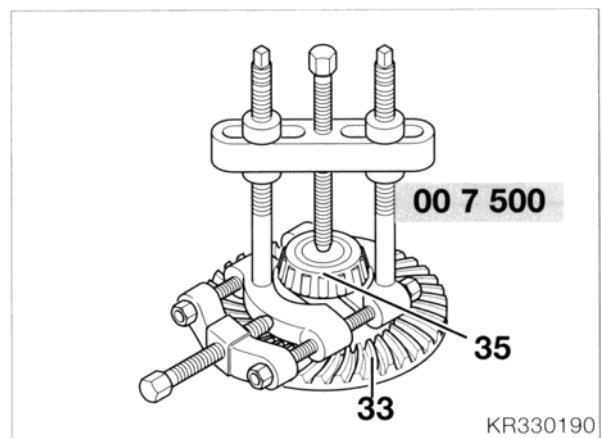
## Removing crown wheel

- Remove housing cover (22).
- Remove cord ring seal (30).
- Heat housing cover (22) to 100 °C and pull off crown wheel (33).
- Drive shaft sealing ring (31) from the inside out of housing cover (22) with a suitable drift.



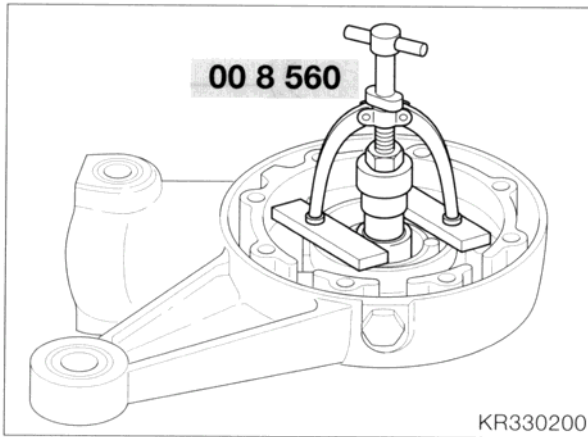
KR330180

- Clamp crown wheel (33) into vise with soft jaws.
- Insert thrust block (arrow), **BMW No. 33 1 307**.
- Using puller, **BMW No. 33 1 830**, pull off deep-groove ball bearing (32).



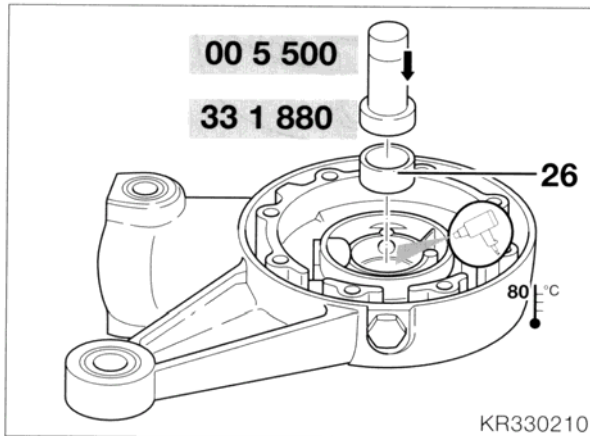
KR330190

- Pull taper roller bearing (35) off crown wheel (33) using puller, **BMW No. 00 7 500**.



- Pull out the outer race (36) with internal puller, **BMW No. 00 8 560**.


### Installing crown wheel

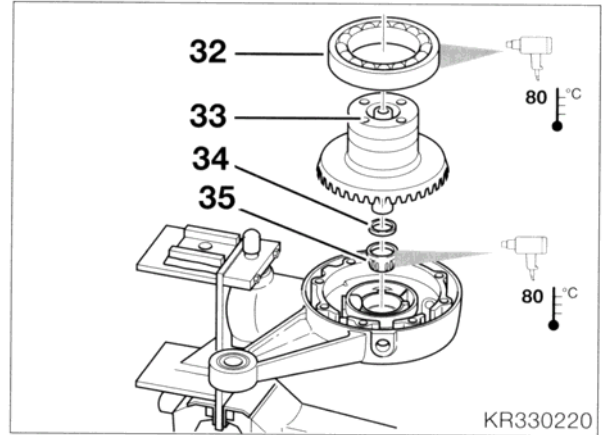


- Heat the housing to 80 °C.
- Insert outer race (36) into bearing seat with drift, **BMW No. 33 1 880**, and handle, **BMW No. 00 5 500**.
- Check that outer race is correctly fitted by striking it gently.



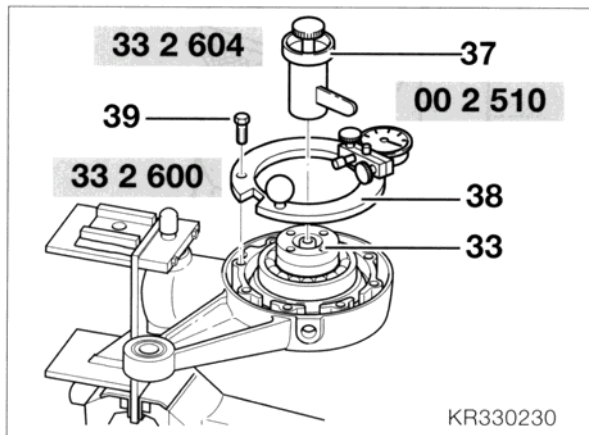
### Note:

If new parts were installed (e.g. taper roller bearing), check tooth backlash and adjust again if necessary;  adjust tooth contact pattern.

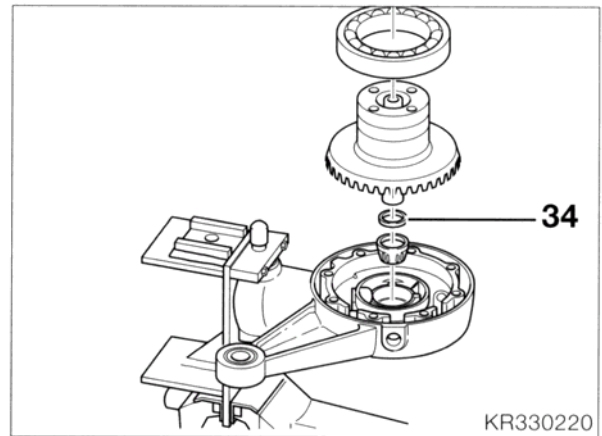


- Attach the existing shim washer (34) to crown wheel (33) with grease.
- Heat taper roller bearing (35) to 80 °C and push it on.
- Install crown wheel (33).
- Heat deep-groove ball bearing (32) to 80 °C and place it in position.

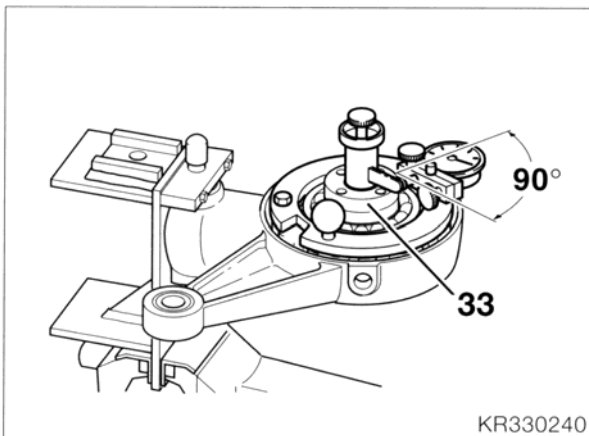
## Checking/adjusting backlash



- Attach measuring fixture (38), **BMW No. 33 2 600**, with dial gauge, **BMW No. 00 2 510**, to crown wheel (33) and secure to the housing with knurled screw (39).
- Attach measuring arm (37), **BMW No. 33 2 604**, centrally to crown wheel (33).



- Compensate for excessive tooth backlash by inserting a thinner shim washer (34) or insert a thicker one if tooth backlash is insufficient.



### Note:

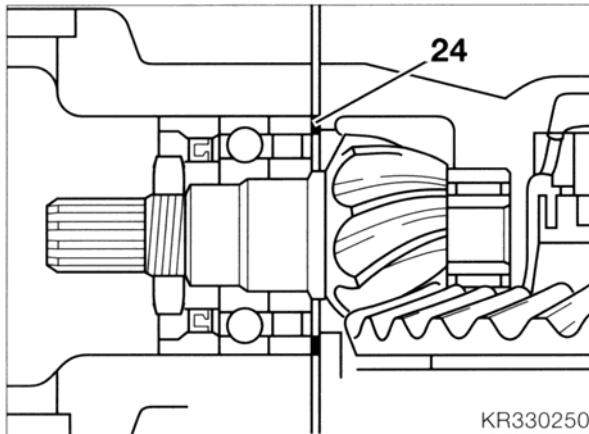
Check tooth backlash at three points 120 degrees apart; turn the bevel pinion with the crown wheel.

- Press the crown wheel (33) into the housing with the palm of the hand and turn to and fro to check tooth backlash.

### Backlash:

(adjust without oil) ..... 0.07...0.16 mm

## Checking tooth contact pattern



KR330250

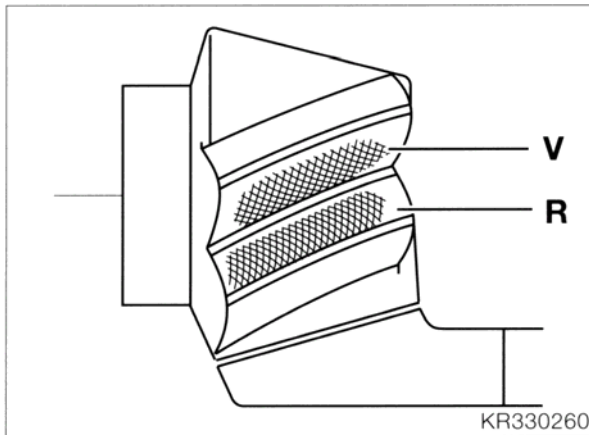


### Note:

The tooth contact pattern must be checked if the gear set, housing or input bevel pinion bearing have been renewed.

The contact pattern is adjusted at the shim washer (24) on the input bevel pinion.

- Grease the tooth flanks on the crown wheel and pinion and apply **engineer's blue** to them.
- Insert the crown wheel, press into housing with the palm of the hands and turn to and fro.



KR330260



### Caution:

Teeth should never make contact at the smaller diameter.

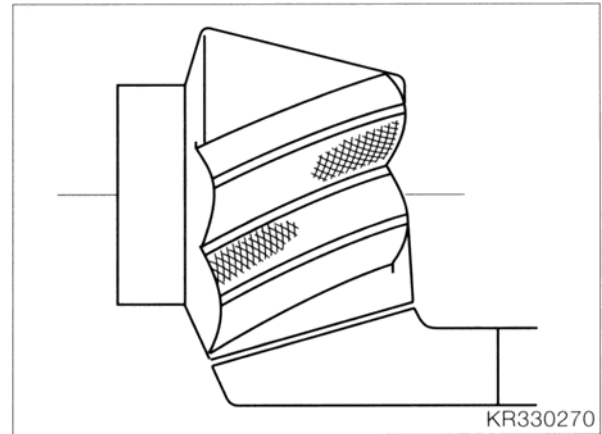
- If the correct spacer disc is installed, the following contact pattern appears with no load applied.



### Note:

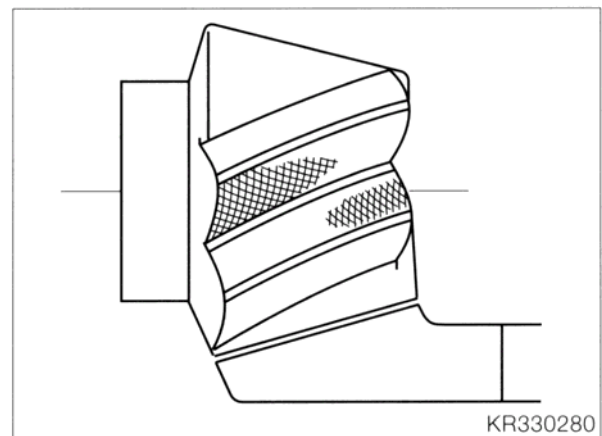
The contact point is central on front flank V.

The contact point is closer to the larger diameter on back flank R.



KR330270

- If this contact pattern is obtained, a thinner shim washer must be installed.

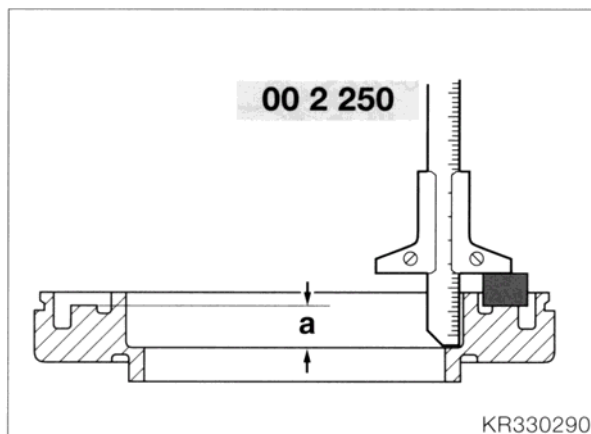


KR330280

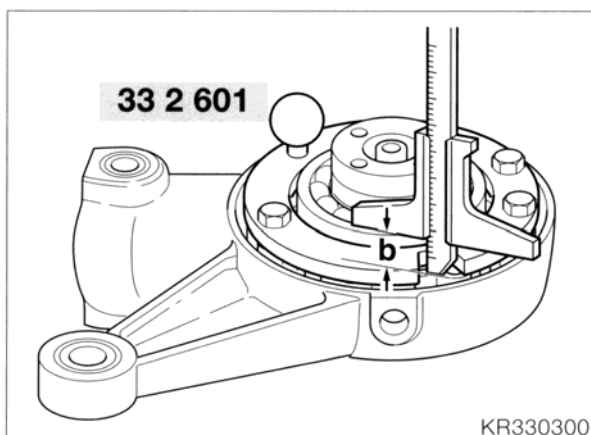
- If this contact pattern is obtained, a thicker shim washer must be installed.

## Shimming housing cover

- In order to obtain the correct taper roller bearing preload, the housing cover must be correctly shimmed.



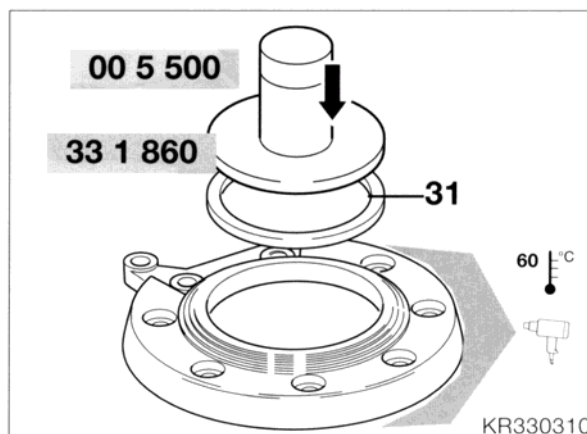
- Using depth gauge, **BMW No. 00 2 550**, measure distance a.



- Place measuring ring, **BMW No. 33 2 601**, in position and secure it.
- Measure from the outer ball bearing race through the cutout in the measuring ring to the housing joint face and determine distance b.
- Distance a - distance b = shim thickness (without preload).
- Lightly grease the shim of the selected thickness, and place it on the crown wheel.

**Preload:**..... 0.05...0.1 mm

## Installing housing cover



- Oil the shaft sealing ring (31) slightly.
- Using drift, **BMW No. 33 1 860**, and handle, **BMW No. 00 5 500**, drive in shaft sealing ring (31).
- Heat the housing cover to 60 °C and place it on the crown wheel.
- Lightly oil/grease the cord ring seal and insert it.
- Tighten retaining bolts in a crosswise pattern.

**! Tightening torque:**  
Housing cover to housing ..... 35 Nm

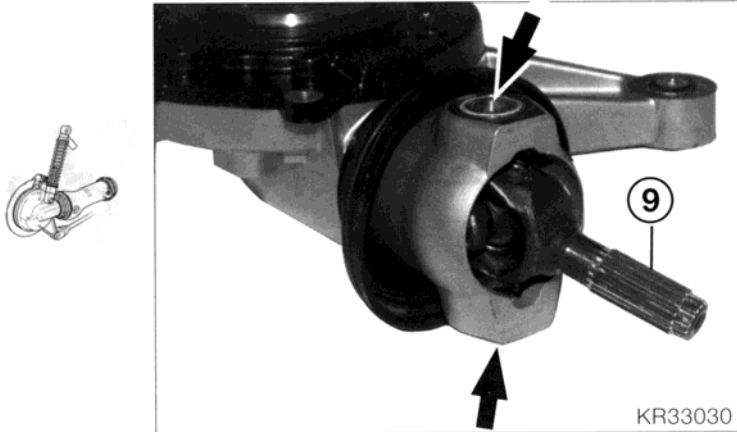
## Installing rear drive shaft

- Coat the splines at the input bevel pinion with **Never-Seez NS 160FG**.
- Place the rear drive shaft on the input pinion.

**! Caution:**  
Make sure that the circlip is correctly seated in the drive shaft.

- Snap the circlip into position by striking the rear drive shaft lightly with a plastic-faced hammer.

## Installing rear wheel drive



- Coat the splines on the rear drive shaft (9) with **Never-Seez NS 160FG**.

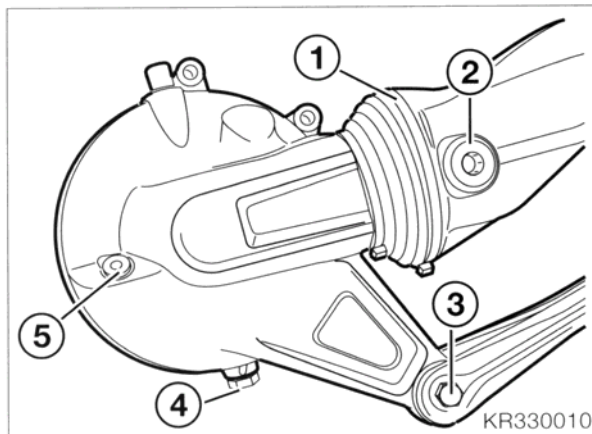
### ⚠ Caution:

The inner race must never press against the ends of the needles.

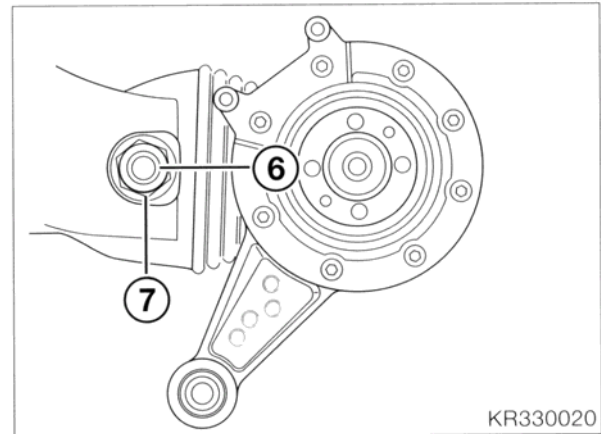
- Install the inner races (arrows) of the left/right needle roller bearing with a small quantity of grease.
- Push the flexible gaiter on to the neck of the housing and secure it with the clamping strap.
- Offer up the rear wheel drive with flexible gaiter and push the rear drive shaft (9) on to the journal of the front drive shaft.

### ⚠ Caution:

Support the rear wheel drive.



- Screw in the fixed bearing journal (2).



- Tighten the free bearing journal (6).
- Tighten the fixed bearing journal (2).
- Prevent the free bearing journal (6) from turning and tighten locknut (7).
- Tighten loose reaction link (3).
- Tighten clamping strap (1) on gaiter.
- Tighten the oil drain plug (4), using a new sealing ring.
- Add gear oil.
- Tighten the oil filler plug (5), using a new sealing ring.

### ⚠ Tightening torques:

Fixed bearing journal.....	160 Nm
Free bearing journal .....	7 Nm
Locknut .....	41 Nm
Reaction link to rear wheel drive .....	43 Nm
Oil filler/drain plug	
Initial tightening.....	12 Nm
Final tightening.....	23 Nm

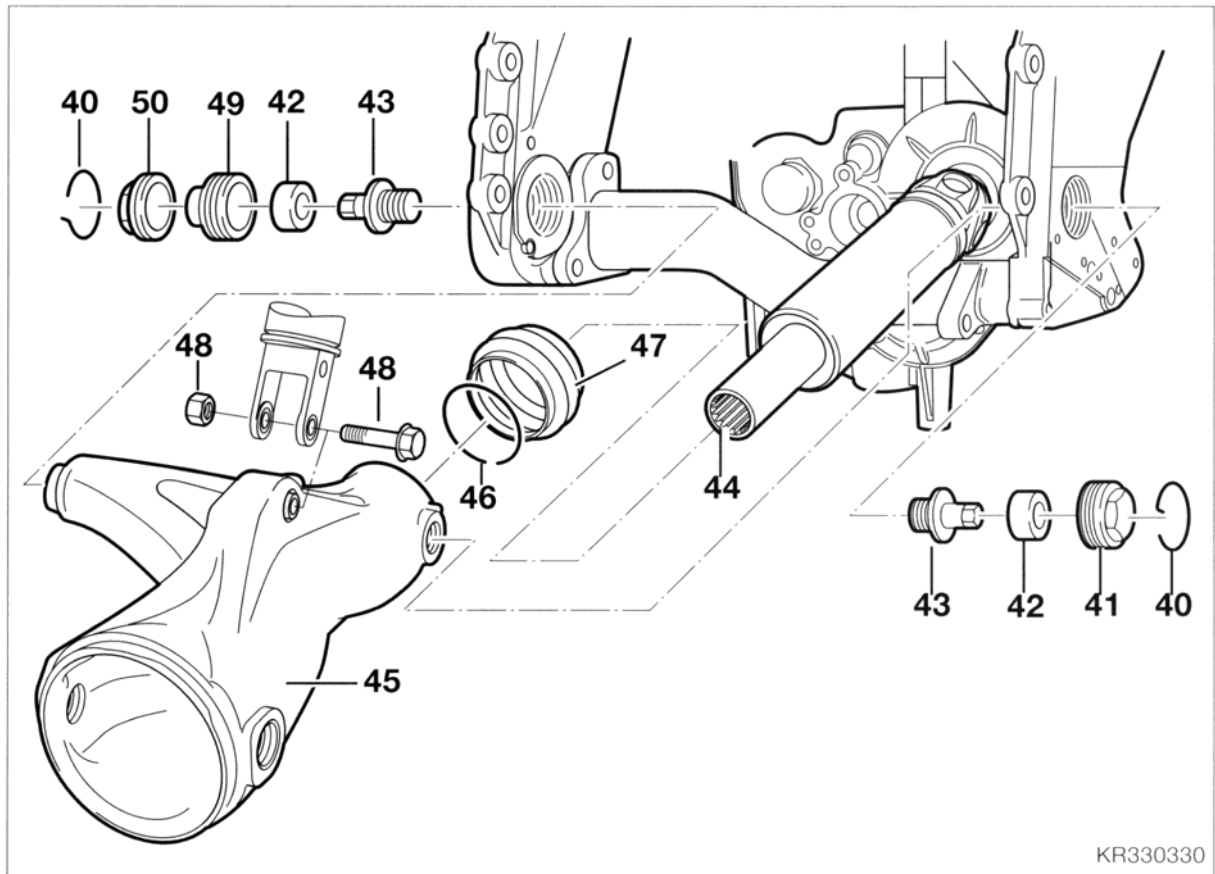
### Fill quantity:

Initial filling .....	0.25 l
During oil changes .....	0.23 l

### Oil grade:

Brand-name hypoid gear oil, SAE 90, API class GL 5

- Install the brake disc (→ 34.7).
- Install the brake caliper (→ 34.6).
- Install the speedometer signal transmitter (→ 61.15).
- Install the rear wheel (→ 36.8).

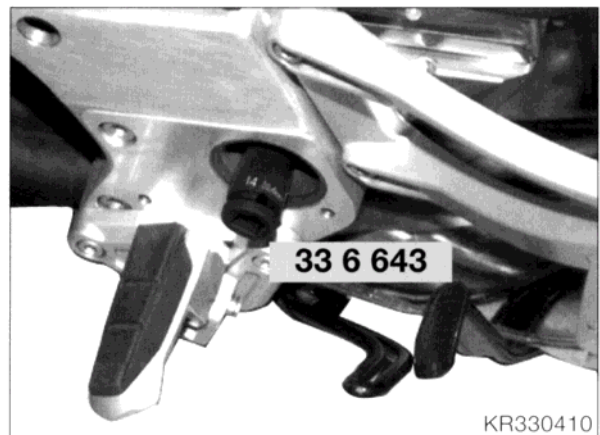


KR330330

## Removing, dismantling, reassembling and installing rear swinging arm

### Removing rear swinging arm

- Remove the rear wheel (→ 36.8).
- Remove the speedometer signal transmitter (→ 61.15).
- Remove the brake caliper, and tie it up with a cable strap to the rear frame, together with the speedometer signal transmitter (→ 34.6).
- Remove the brake disc (→ 34.7).
- Remove the rear wheel drive (→ 33.6).



KR330410

- Loosen the right rear footrest plate.



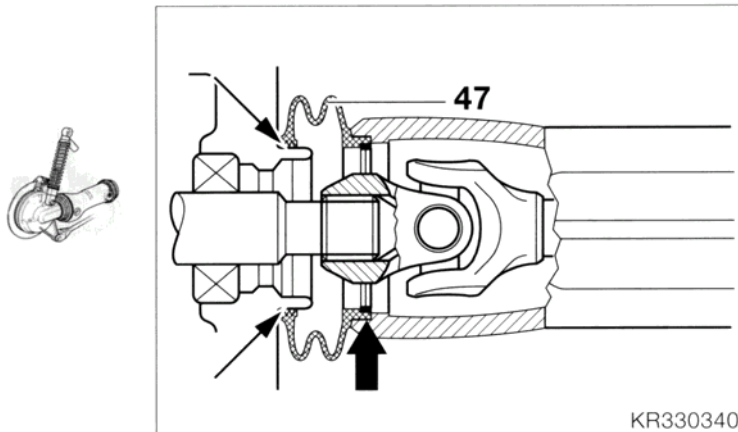
### Caution:

Note high loosening torque at lock ring and left/right threaded rings and bearing journals.

- Remove circlip (40) and use socket wrench adapter, **BMW No. 33 6 643**, to unscrew the right threaded ring (41).
- Remove circlip (40) and loosen lock ring (50).
- Loosen the left threaded ring (49) with socket wrench insert, **BMW No. 33 6 643**.
- Loosen bearing journals (43) at left and right.
- Detach mounting (48) for shock absorber and press the shock absorber upwards.
- Unscrew bearing journal (43) at left and right.
- Pull swinging arm (45) away from drive shaft.



## Removing and installing flexible gaiter



- Take out the inner circlip (arrow) and pull the flexible gaiter (47) out of the swinging arm.
- When installing, coat inner and outer sealing lips (arrows) with **Staburags NBU 30 PTM**.

## Removing/installing threaded ring bearings



### Removing bearing from left/right threaded ring

- Insert pressing-out tool, **BMW No. 33 6 644**, with pins (arrows) in the holes on the threaded ring.
- Press the left/right bearing out of the threaded ring.

### Installing bearing in left/right threaded ring

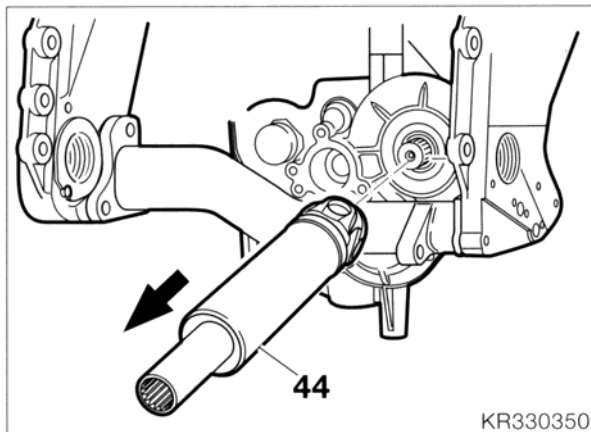


#### Caution:

Install with the open side of the bearing facing the threaded ring.

- Lightly oil/grease the bearing.
- Press the bearing into the left/right threaded ring.

## Removing drive shaft



- Use a tyre lever or similar tool to press off the front drive shaft (44).



### Caution:

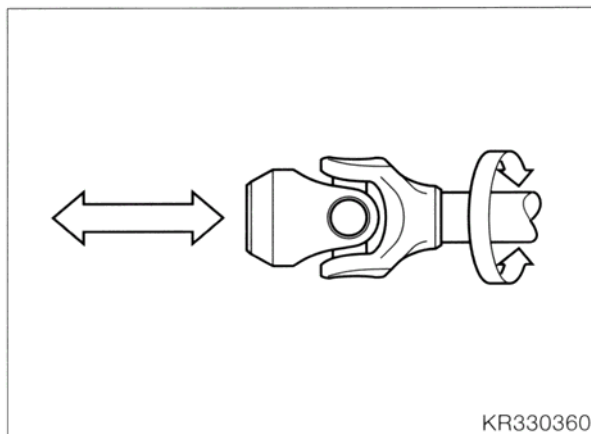
Do not scratch painted components: if necessary, use a rubber mat.



### Note:

If necessary, remove/install the circlip in the joint element.

## Checking universal joint for wear

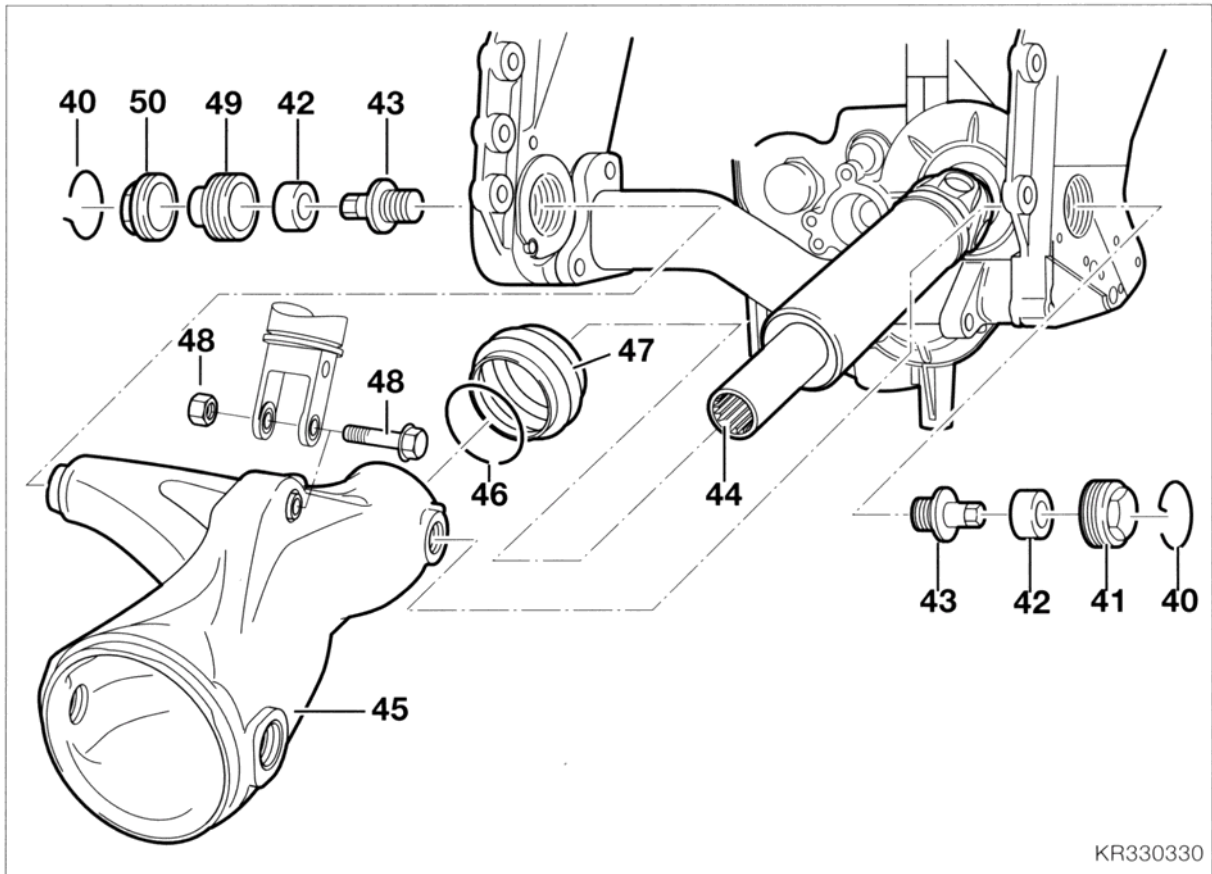


- Determine endplay and radial play (arrows).

## Installing drive shaft

- Coat the output shaft splines with **Never-Seeze**
- Slide the front drive shaft (44) on to the output shaft.
- Snap the circlip into position by striking the drive shaft lightly with a plastic-faced hammer.

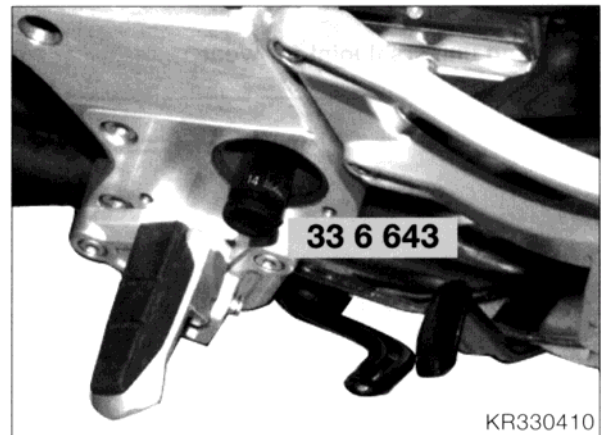




KR330330

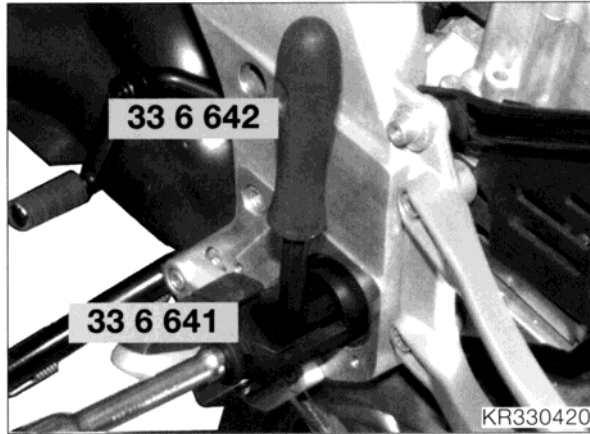
### Installing rear swinging arm

- Push swinging arm (45) as far as possible over front drive shaft (44) until flexible gaiter (47) snaps into position at the gearbox neck.
- Screw in left/right bearing journals (43).
- Attach suspension strut with mounting (48) to swinging arm (45).



KR330410

- Using socket wrench insert, **BMW No. 33 6 643**, tighten bearing journal (43) at left and right.



- Tighten the right threaded ring (41).
- Tighten the left threaded ring (49).
- Prevent the left threaded ring (49) from turning with socket wrench, **BMW No. 33 5 642**, and tighten lock ring (50) with socket wrench, **BMW No. 33 6 641**.
- Insert circlip (40) at left and right so that the hook faces outwards.

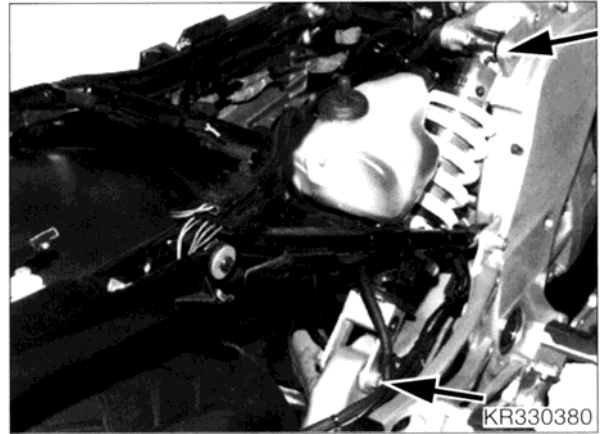
**Tightening torques:**

Swinging arm to frame	
Bearing journals, left/right .....	160 Nm
Threaded ring, right.....	200 Nm
Threaded ring, left.....	10 Nm
Lock ring.....	160 Nm
Suspension strut to swinging arm .....	47 Nm

- Tighten the right footrest plate at the rear.
- Install the rear wheel drive. (→ 33.18)
- Install the brake disc. (→ 34.7)
- Install the brake caliper. (→ 34.6)
- Install the speedometer signal transmitter. (→ 61.15)
- Install the rear wheel. (→ 36.8)

**Removing and installing suspension strut**

- Remove the dualseat. (→ 46.6)
- Remove the right rear side section. (→ 46.13)
- Remove the coolant level equalising tank.



- Unscrew the upper mounting (arrow).
- Press the suspension strut upwards.
- Undo the lower mounting (arrow) and lift the suspension strut out.

**Tightening torques:**

Suspension strut to swinging arm.....	50 Nm
Suspension strut to frame.....	43 Nm

- Install the coolant level equalising tank.
- Install the right rear side section. (→ 46.13)
- Install the dualseat. (→ 46.6)

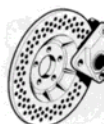


## **34 Brakes**

# Contents

Page

<b>Removing and installing front brake caliper</b> .....	5
<b>Removing and installing rear brake caliper</b> .....	6
<b>Removing and installing front brake disc</b> .....	7
<b>Removing/installing rear brake disc</b> .....	7
<b>Removing and installing front ABS sensor</b> .....	8
<b>Adjusting front ABS sensor</b> .....	9
Mark the ABS sensor wheel .....	9
Checking/adjusting ABS sensor gap .....	9
Check ABS sensor gap .....	9
Adjust ABS sensor gap .....	9
<b>Removing and installing rear ABS sensor</b> .....	10
<b>Adjusting rear ABS sensor</b> .....	11
Mark the ABS sensor wheel .....	11
Checking/adjusting ABS sensor gap .....	11
Check ABS sensor gap .....	11
Adjust ABS sensor gap .....	11
<b>Removing/installing brake lever fitting</b> .....	12
<b>Removing and installing rear brake master cylinder</b> .....	13
<b>Checking/adjusting blow-by clearance at piston rod</b> .....	13
Check blow-by clearance at piston rod .....	13
Adjust blow-by play at piston rod .....	13
<b>Removing/installing ABS control unit</b> .....	14
<b>Removing/installing ABS relay</b> .....	16
<b>Removing/installing front brake lines/hoses</b> .....	18
Removing front brake lines/hoses .....	19
Brake line/hose to telescopic fork .....	19
Installing front brake lines/hoses .....	19
<b>Removing/installing rear brake lines/hoses</b> .....	20



# Contents

Page

## **Checking brake pads and discs for wear/renewing** ..... 22

Checking brake pads for wear ..... 22

    Front brake pads ..... 22

    Rear brake pads ..... 22

Checking brake disc for wear ..... 22

Renewing brake pads ..... 23

    Front brake ..... 23

    Rear brake ..... 23

## **Checking brake fluid level/topping up** ..... 24

Front brake ..... 24

Rear brake ..... 24

## **Renewing brake fluid and bleeding brake system** ..... 25

Front brake ..... 25

    Additional preliminary work ..... 26

Rear brake ..... 27

    Additional preliminary work ..... 28

## **Bleeding the brake system** ..... 29

Front brake ..... 29

Rear brake ..... 30



Technical data	K 1200 RS	
Brake fluid		DOT 4
Brake actuation		hydraulic
<b>Front wheel</b>		
Front brake		4-piston fixed calipers, floating discs
Brake disc dia.	mm (in)	305 (12.0)
Brake disc thickness	mm (in)	5.0 (0.2)
Minimum thickness	mm (in)	4.5 (0.177)
Brake pad surface area	mm <sup>2</sup>	2460
Minimum lining thickness	mm (in)	1.0 (0.04 in)
Piston dia. in brake caliper	mm (in)	32/34 (1.26/1.34)
Wheel cylinder dia.	mm (in)	16 (0.63)
Sensor gap, front	mm (in)	0.45 ... 0.55 (0.020 ... 0.022)
Brake pad		Sintered metal
<b>Rear wheel</b>		
Rear wheel brake		2-piston fixed caliper with rigidly mounted disc
Brake disc dia.	mm (in)	285 (11.2)
Brake disc thickness	mm (in)	5.0 (0.2)
Minimum thickness	mm (in)	4.5 (0.177)
Brake pad surface area	mm <sup>2</sup>	1900
Minimum lining thickness	mm (in)	1.0 (0.04)
Piston dia. in brake caliper	mm (in)	38 (1.5)
Wheel cylinder dia.	mm (in)	13 (0.51)
Sensor gap, rear	mm (in)	0.45 ... 0.55 (0.020 ... 0.022)
Brake pad		Semi-metallic







## Removing and installing front brake caliper



### Caution:

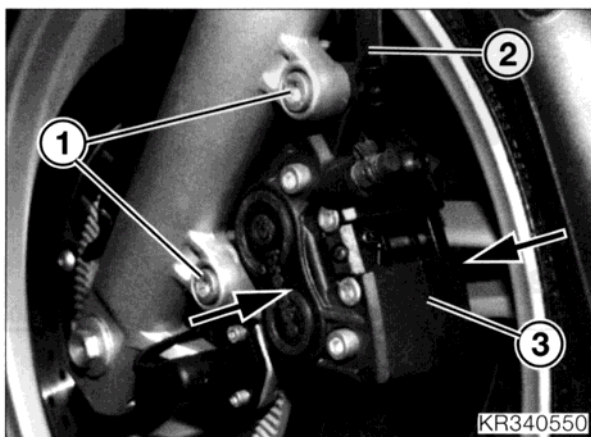
Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Drain fluid from brake system.



### Caution:

Avoid scratching the wheel rim; if necessary mask off the brake caliper.



- Detach brake line (2).
- Remove fastenings (1) from brake caliper (3).



### Caution:

Do not damage brake pads.  
Never operate the brake when the brake caliper has been removed from the motorcycle.

- Take off the brake caliper carefully, if necessary pressing it against the brake disc and pulling (arrows) in order to move the brake pads/pistons back.

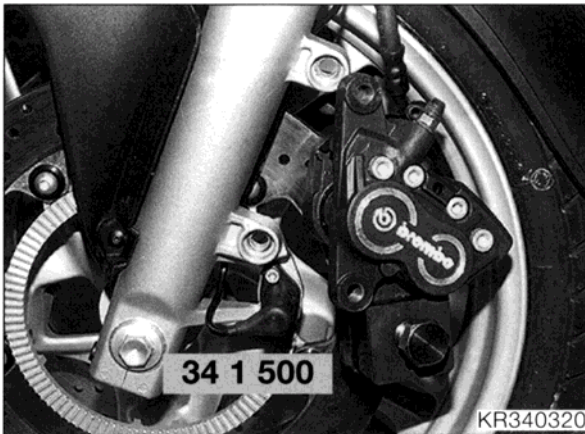
- Install in the reverse order of work, noting the following activities in particular.



### Caution:

Do not damage the brake pads when installing. Attach the brake hose with stop plate to the brake caliper.

- Use new sealing rings on brake line (2).



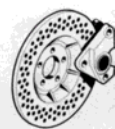
- If necessary, press the brake pads/pistons fully back with resetting tool, **BMW No. 34 1 500**.
  - Fill/bleed the brake system.
  - Check/adjust ABS sensor gap. (→ 34.9)

**Sensor gap** ..... 0.45 ... 0.55 mm



### Tightening torques:

Brake caliper at fork slider tube ..... 40 Nm  
 Brake hose to brake caliper ..... 15 Nm  
 Bleed screw at brake caliper ..... 12 Nm



## Removing and installing rear brake caliper

- Remove rear wheel.  
(⇒ 36.8)

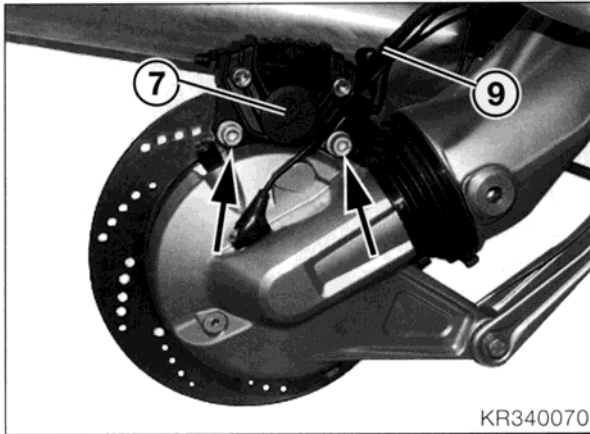


### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.



- Drain fluid from brake system.
- Remove the ABS sensor.  
(⇒ 34.10)



- Detach brake line (9) at brake caliper (7).
- Unscrew the fastenings (arrows) at brake caliper (7).



### Caution:

Do not apply the brake when the brake caliper is removed.

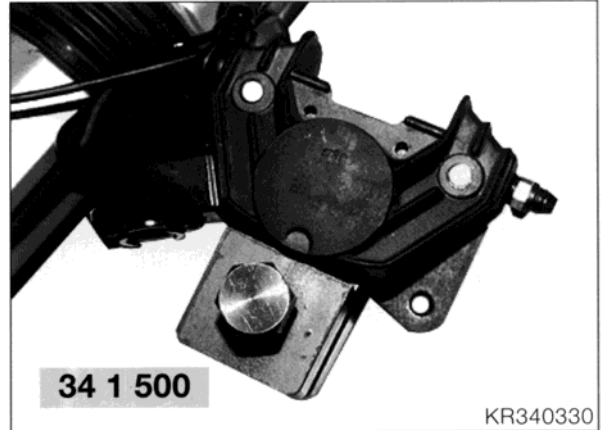
- Carefully remove the brake caliper.



### Caution:

Do not damage the brake pads when installing. Secure brake hose with stop plate to brake caliper.

- Use new sealing rings at brake line (9).



- Press the brake pads/pistons fully back with resetting tool, **BMW Nr. 34 1 500**.
- Fill/bleed the brake system.
- Check/adjust ABS sensor gap.  
(⇒ 34.11)

Sensor gap ..... 0.45 ... 0.55 mm

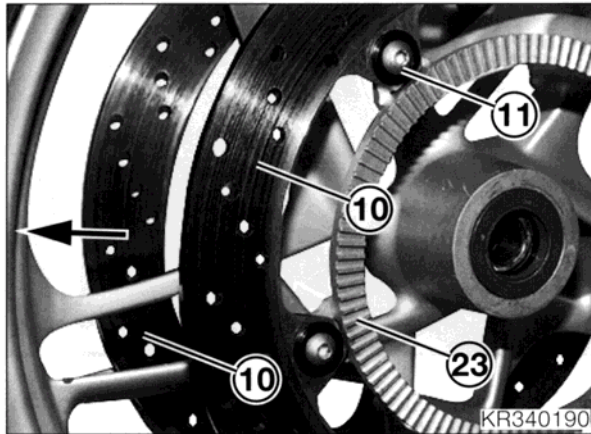


### Tightening torques:

Brake caliper to rear wheel drive ..... 40 Nm  
 Brake hose to brake caliper ..... 15 Nm  
 Bleed screw at brake caliper ..... 12 Nm

## Removing and installing front brake disc

- Remove front wheel.  
(→ 36.5)



### ⚠ Caution:

The fastening is secured with a thread retaining agent.

- Take out the five fastenings (11) at brake disc (10).
- Take off brake disc (10) and, at the left, sensor wheel (23) as well.
- Install in the reverse order of work, noting the following operations in particular.

### ⚠ Caution:

Degrease brake disc (10) before installing. Note hole pattern on brake disc (10); the arrow points in the forward travel direction. Insert the screw with **Loctite 2701**.

### ⚠ Caution:

If a new brake disc (10) is installed, the sensor wheel must be re-marked.

- Check/adjust ABS sensor gap.  
(→ 34.9)

**Sensor gap** ..... 0.45 ... 0.55 mm

### ⚠ Tightening torques:

Brake disc to front wheel ..... 21 Nm  
Brake caliper to rear wheel drive ..... 40 Nm

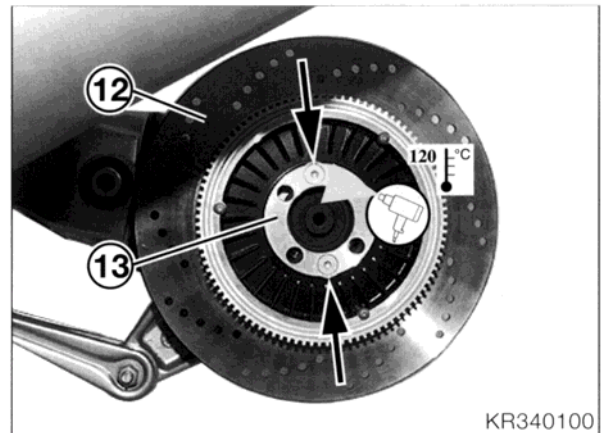
## Removing/installing rear brake disc

- Remove rear wheel.  
(→ 36.8)
- Unscrew the brake caliper.



### Note:

Mark the installed position of brake disc (12) at rear wheel drive (13), so that vertical runout of the sensor wheel is not altered.



### Caution:

The fastening is secured with a thread retaining agent.

- Heat the fastenings (arrows) for brake disc (12) to 120 °C.
- Install in the reverse order of work, noting the following activities in particular.



### Caution:

Degrease brake disc (12) before installing. When installing, use a new screw.

If a new brake disc (12) is installed, the sensor wheel must be re-marked.

- Check/adjust ABS sensor gap.  
(→ 34.11)

**Sensor gap** ..... 0.45 ... 0.55 mm

### ⚠ Tightening torques:

Brake disc to rear wheel drive ..... 21 Nm  
Brake caliper to rear wheel drive ..... 40 Nm

## Removing and installing front ABS sensor



### Warning:

Comply with safety precautions when handling or working with fuel; note that the fuel lines are pressurised.

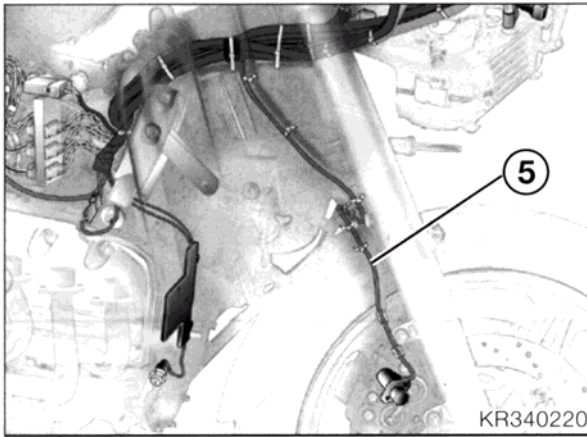


### Caution:

Detach and insulate earth (ground) lead at battery.

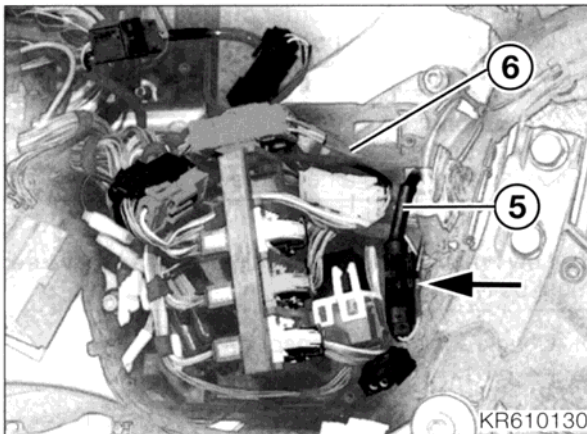


- Remove fuel tank.  
(→ 16.5)
- Open the lid of the electronic equipment box.



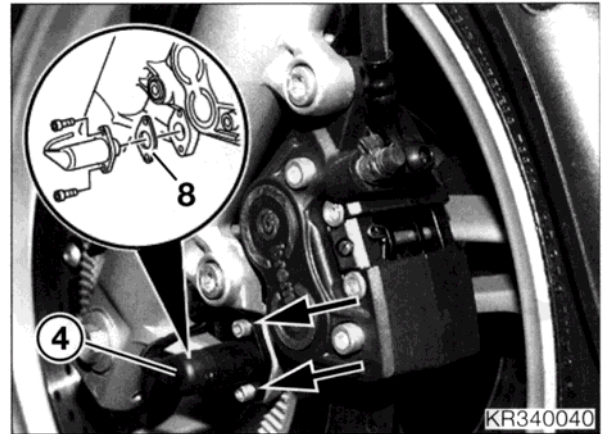
KR340220

- Open all cable straps holding ABS sensor wire (5).
- Detach ABS sensor wire (5) from the telescopic fork.



KR610130

- Separate the plug connector (arrow) for ABS sensor wire (5) in electronic equipment box (6).



KR340040

- Undo the fastenings (arrows) for ABS sensor (4).
- Take off ABS sensor (4) with spacing plate (8).
- Install in the reverse order of work, noting the following operations in particular.



### Caution:

Install the ABS sensor wire most carefully, securing it with cable straps.

- Check/adjust ABS sensor gap.  
(→ 34.9)

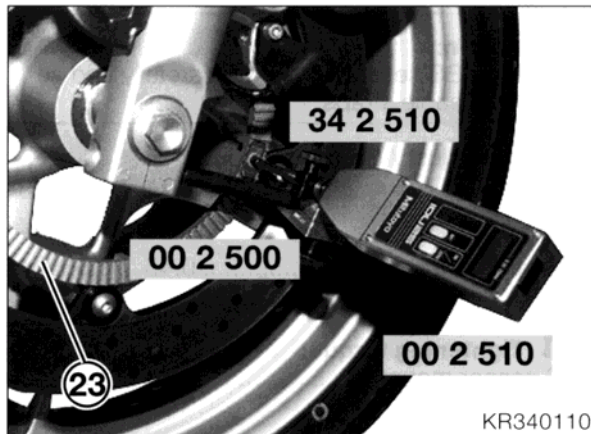
**Sensor gap** ..... 0.45 ... 0.55 mm

**Tightening torque:**  
ABS sensor mount ..... 4 Nm

## Adjusting front ABS sensor

### Mark the ABS sensor wheel

- Take load off front wheel/lift clear of ground.
- Undo clamp screw at left fork tube.



- Attach dial gauge holder, **BMW No. 00 2 500**, with dial gauge, **BMW No. 00 2 510**, and measuring shoe, **BMW No. 34 2 510**, to fork slider tube.
- Zero the dial gauge.
- Measure axial run out at all points on the circumference of sensor wheel (23).

### **!** Caution:

If parts are replaced (brake disc etc.) and an existing (and therefore marked) sensor wheel (23) is retained, the sensor wheel must be re-marked. Remove the old marking.

- With a paint pencil, make a permanent mark on sensor wheel (23) at the point where the gap between it and the ABS sensor is greatest.
- Detach dial gauge holder, **BMW No. 00 2 500**, with dial gauge, **BMW No. 00 2 510**, from the fork slider tube.
- Tighten the clamp screw at the left fork tube.
- Check/adjust ABS sensor gap.  
(→ 34.9)

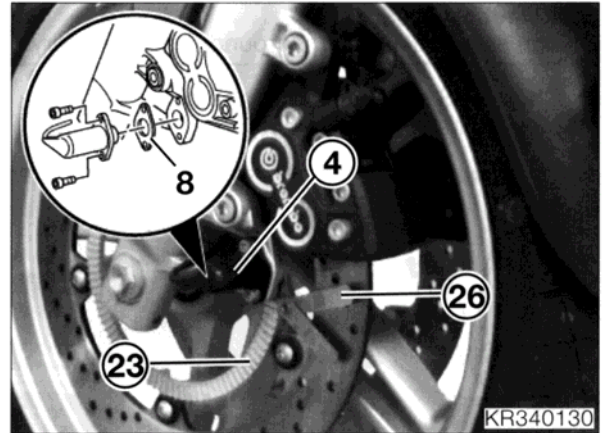
### **!** Tightening torque:

Clamp screw at telescopic fork ..... 20 Nm

### Checking/adjusting ABS sensor gap

- Take load off front wheel/lift clear of ground.

### Check ABS sensor gap



- Align the marked point on sensor wheel (23) with ABS sensor (4).
- Check ABS sensor gap by inserting a feeler gauge (26) between ABS sensor (4) and sensor wheel (23).

### Adjust ABS sensor gap

- Remove/install ABS sensor (4).

### **!** Caution:

After adjusting, check clearance of ABS sensor (4) round the entire circumference of sensor wheel (23).

- Adjust/check ABS sensor gap with spacing plate (8).

**ABS sensor gap**..... 0.45 ... 0.55 mm

### **!** Tightening torque:

ABS sensor mount..... 4 Nm



KR340350

## Removing and installing rear ABS sensor

- Remove rear wheel.  
(⇒ 36.8)



### Caution:

Detach and insulate earth (ground) lead at battery.

- Clean ABS sensor (14) and the hole before removing/installing.



### Caution:

Install the ABS sensor wire most carefully and secure it with cable straps.

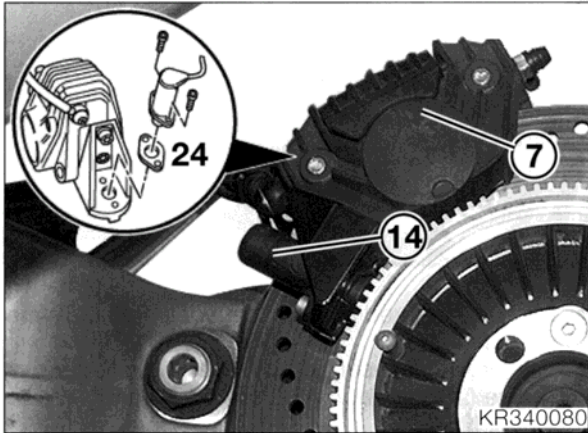
- Check/adjust ABS sensor gap.  
(⇒ 34.11)

**ABS sensor gap**..... 0.45 ... 0.55 mm

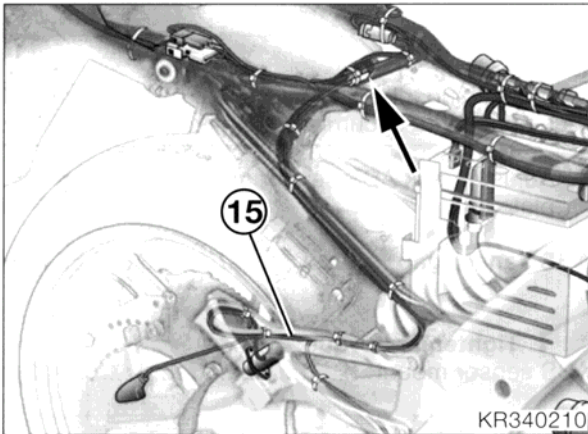


### Tightening torque:

ABS sensor mount..... 4 Nm



- Unscrew ABS sensor (14) from brake caliper (7).
- Take off ABS sensor (14) with spacing plate (24).

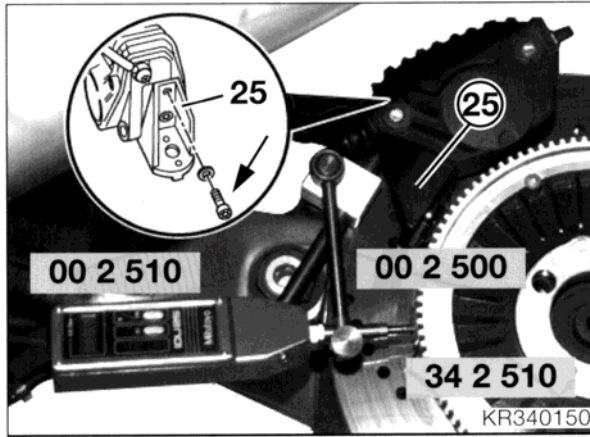


- Remove all cable straps holding the ABS sensor wire (15).
- Detach plug connector (arrow) from ABS sensor wire (15).

## Adjusting rear ABS sensor

### Mark the ABS sensor wheel

- Remove/install the rear wheel.  
(⇒ 36.8)
- Remove the ABS sensor.  
(⇒ 34.10)



#### **Caution:**

The fastening is secured with a thread retaining agent.

- Remove the upper fastening (arrow) from the retaining bracket (25).
- Screw dial gauge holder, **BMW No. 00 2 500**, with dial gauge, **BMW No. 00 2 510**, and measuring shoe, **BMW No. 34 2 510**, on to retaining bracket (25) for the ABS sensor.
- Zero the dial gauge.
- Measure axial runout over the entire circumference of the ABS sensor wheel.

#### **Caution:**

If replacement parts are fitted, the sensor wheel must be re-marked; remove the old mark.

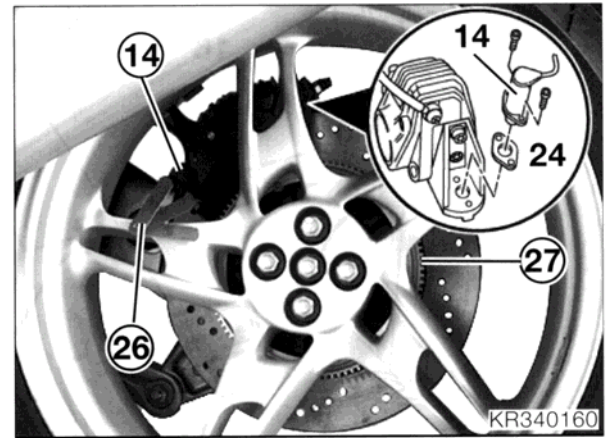
- With a paint pencil, make a permanent mark at the point on the ABS sensor wheel at the greatest distance from the ABS sensor.
- Check/adjust ABS sensor gap.  
(⇒ 34.11)
- Install in the reverse order of work, noting the following operations in particular.
- Renew the fastening for retaining bracket (25).

#### **Tightening torque:**

Retaining bracket to brake caliper..... 8 Nm

## Checking/adjusting ABS sensor gap

### Check ABS sensor gap



- Align the marked point on sensor wheel (27) with ABS sensor (14).
- Insert ABS feeler gauge (26) between ABS sensor (14) and sensor wheel (27) to check the ABS sensor gap.

### Adjust ABS sensor gap

- Remove/install rear wheel  
(⇒ 36.8)
- Remove/install ABS sensor.  
(⇒ 34.10)

#### **Caution:**

After adjusting, check clearance at ABS sensor (14) over the entire circumference of sensor wheel (27).

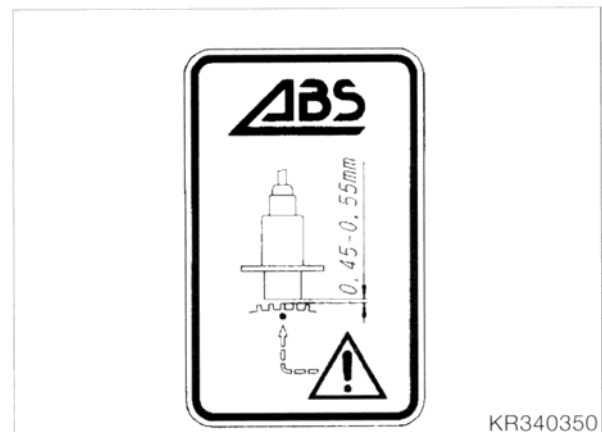
- Adjust/check ABS sensor gap with spacing plate (24).

### ABS

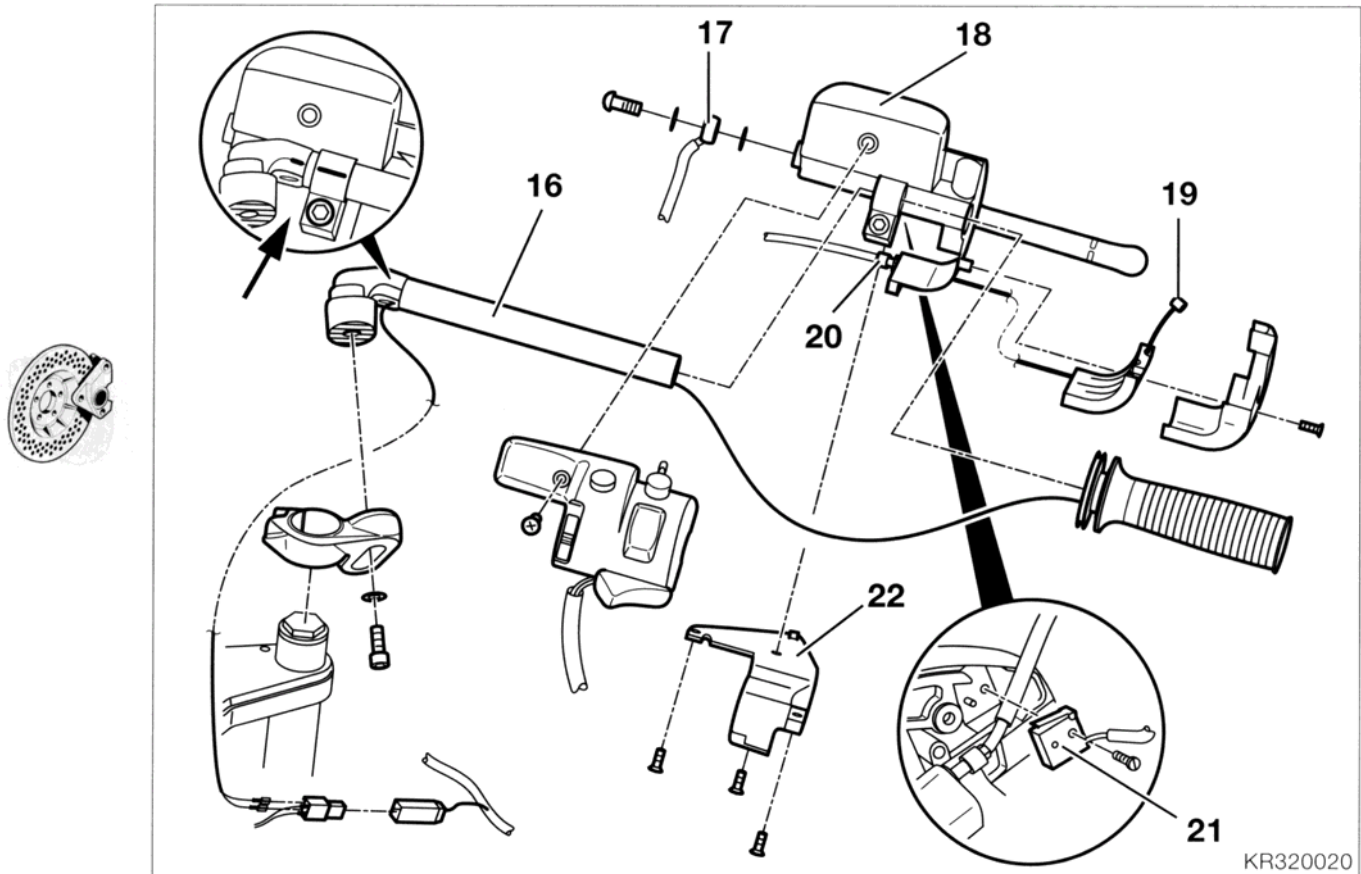
sensor gap..... 0.45 ... 0.55 mm

#### **Tightening torque:**

ABS sensor mount..... 4 Nm







## Removing/installing brake lever fitting

- Take off mirror.
- Remove grip tube.  
(→ 32.6)

### ⚠ Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Drain fluid from brake system.
- Detach brake hose (17) from brake lever fitting (18).
- Disconnect wire cable (19) at adjusting screw (20) of brake lever fitting (18).
- Detach cover (22) from brake lever fitting (18).
- Remove brake light switch (21) from brake lever fitting (18).
- Loosen fastening (arrow) for brake lever fitting (18) at handlebar tube (16).
- Pull brake lever fitting (18) off handlebar tube (16).

- Install in the reverse order of work, noting the following operations in particular.

### ⚠ Caution:

Make sure that the brake hoses are correctly positioned.  
Note correct installed position of brake light switch (21).

- Align the marks on brake lever fitting (18) and handlebar tube (16) (arrow).
- Tighten brake lever fitting (18).
- Fill/bleed the brake system.
- Adjust the basic throttle cable setting  
(→ 13.13).

### Adjusting values:

Initial throttle cable play  
with engine cold..... 1.5 mm (0.06 in)  
Throttle cable play  
with engine warm..... 0.5 mm (0.02 in)

### ⚠ Tightening torques:

Fastening for brake lever fitting ..... 7 Nm  
Brake hose to fitting..... 15 Nm  
Mirror ..... 20 Nm

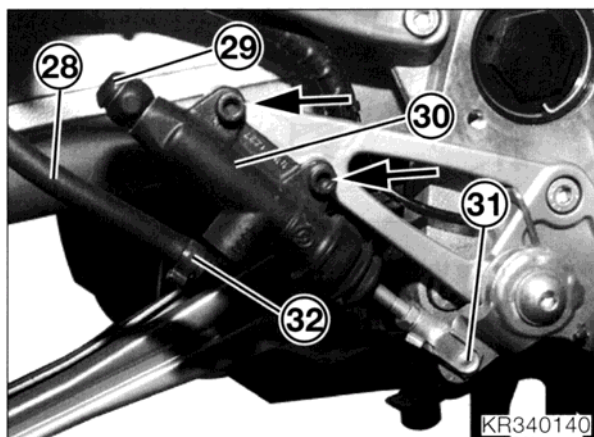
## Removing and installing rear brake master cylinder



### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Drain fluid from brake system.



- Detach brake line (29).
  - Unscrew the non-reusable hose clip (32).
  - Pull off hose (28).
  - Release and pull out pin (31).
  - Undo the fastenings (arrows) for the master brake cylinder (30).
- Install in the reverse order of work, noting the following operations in particular.
  - Tighten non-reusable hose clip (32) with pliers, **BMW No. 13 1 500**.
  - Fill/bleed the brake system.
  - Adjust blow-by clearance. (→ 34.13)



### Tightening torques:

Master cylinder to footrest plate ..... 7 Nm  
 Brake line/hose ..... 15 Nm

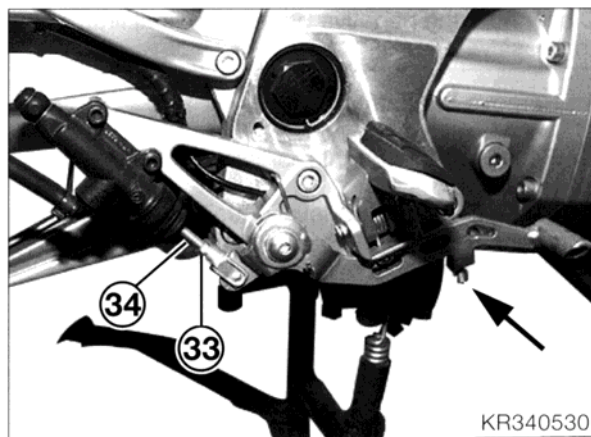
## Checking/adjusting blow-by clearance at piston rod



### Warning:

Adjusting work is only to be performed by an authorised BMW dealer.

### Check blow-by clearance at piston rod



- Insert a feeler gauge between the adjusting screw and the brake light switch plate (arrow).

**Feeler gauge thickness** ..... 0.2 mm (0.008 in)

### Adjust blow-by play at piston rod

- Adjust foot brake light switch. (→ 61.17)
- Unscrew locknut (33) at piston rod (34).
- Insert a feeler gauge between the adjusting screw and the brake light switch plate (arrow).
- Insert piston rod (34), turning to right until clearance is present.
- Unscrew piston rod (34) carefully by turning to left until no play is present, then secure it in this position.
- Tighten locknut (33).



### Warning:

Check blow-by clearance at piston rod.

## Removing/installing ABS control unit



### Warning:

Work on the ABS unit is only to be performed by an authorized BMW workshop.



### Caution:

Disconnect the negative battery terminal first, then the positive one.



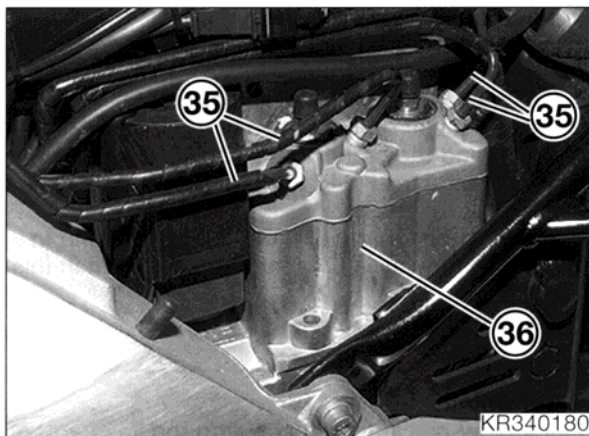
- Remove the battery.  
(→ 61.5)
- Remove the left/right rear side section.  
(→ 46.13)
- Take off the coolant level equalising tank and secure it to the frame.
- Remove exhaust system.  
(→ 18.5)
- Remove rear wheel.  
(→ 36.8)
- Remove rear carrier section at battery holder.  
(→ 46.8)



### Caution:

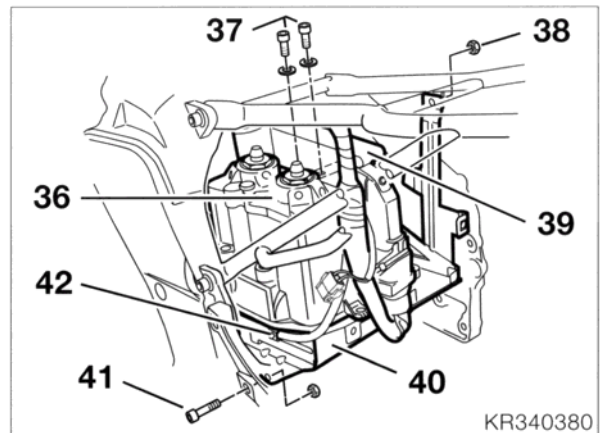
Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint

- Drain fluid from brake system.



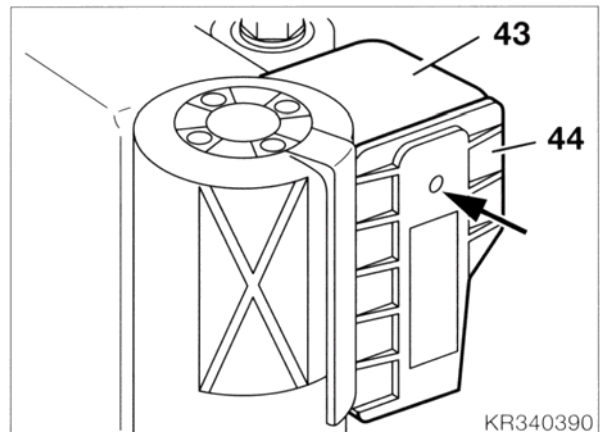
KR340180

- Detach ABS brake line (35) from ABS control unit (36).



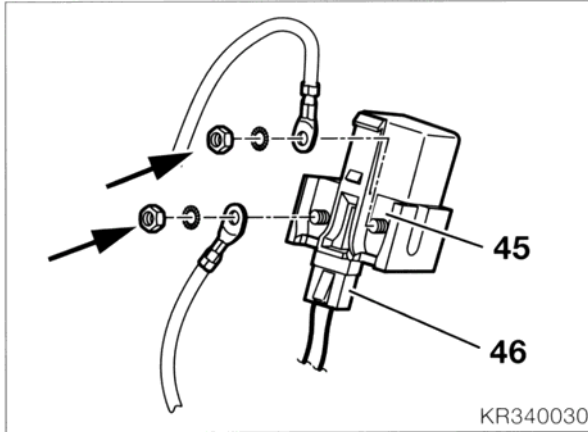
KR340380

- Separate the plug connector at ABS control unit (39).
- Unscrew fastening from frame (38).
- Unscrew the lower fastening for footrest holder (41).
- Unscrew fastenings at frame (37).
- Detach cable clip (42) from battery holder.
- Set the ABS control unit (36)/battery holder (40) down on the hoise platform.

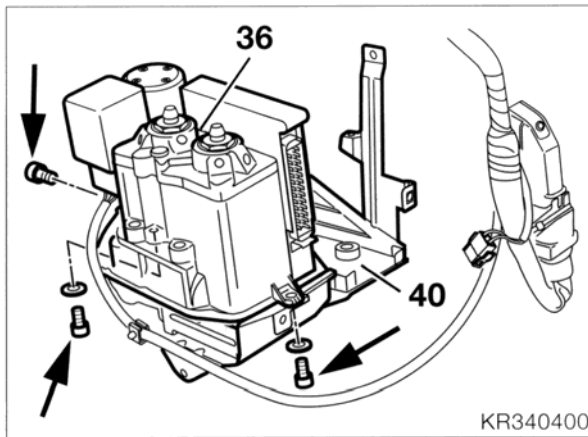


KR340390

- Using a small screwdriver, press end cover (44) of ABS relay housing (43) in (arrow) and at the same time pull end cover (44) upwards.
- Scrap the old cover (44).



- Release the fastenings (arrows) for the wires and plug connector (46) at ABS relay base (45).



- Undo the fastenings (arrows) for ABS control unit (36)/battery holder (40).
- Lift ABS control unit (36) out of battery holder (40).

- Install in the reverse order of work, noting the following activities in particular.

**! Caution:**  
When inserting ABS relay (47) and ABS relay base (45), make sure that all wires are located in the correct guides.

- Install a new cover (44).
- Fill/bleed the brake system.

**! Caution:**  
Attach and tighten the positive battery terminal first, then the negative one.

- Install the battery.
- Install the battery retaining plate.
- Install the tool compartment.

**! Tightening torques:**

Brake line to ABS control unit .....	15 Nm
ABS control unit to battery carrier .....	4 Nm
Battery carrier to frame .....	6 Nm
Battery carrier to cross-tube .....	6 Nm
Battery carrier to footrest plate .....	15 Nm



## Removing/installing ABS relay

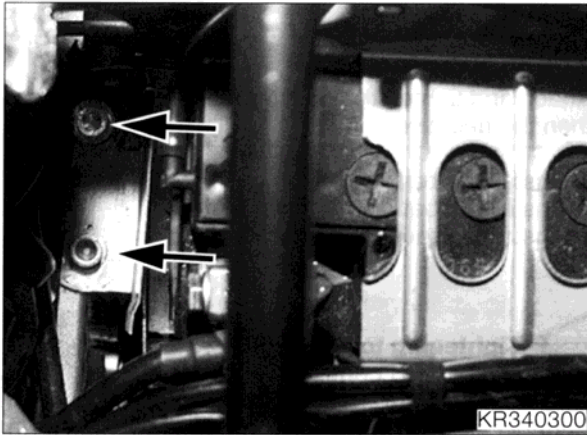
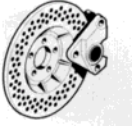
- Remove the left side section.  
(→ 46.13)



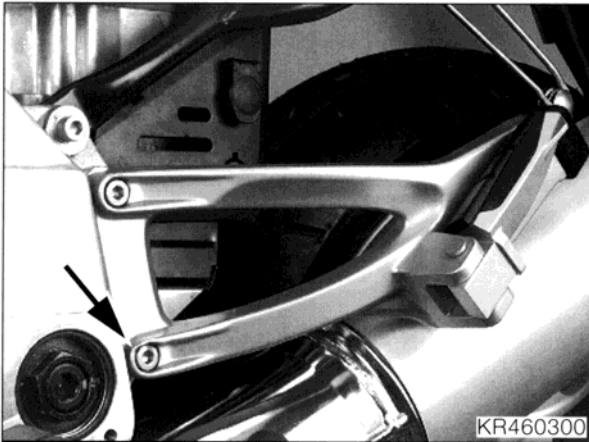
### Caution:

Detach and insulate earth (ground) lead at battery.

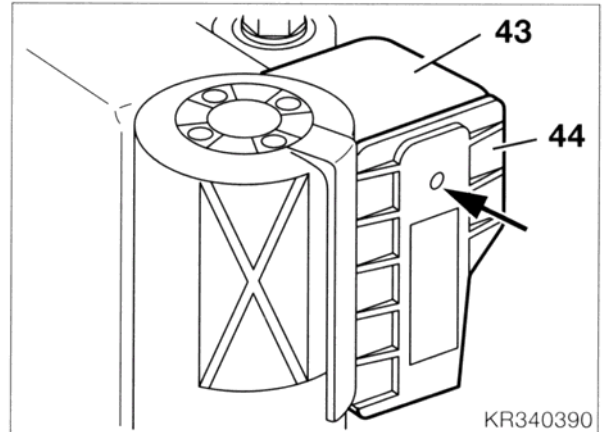
- Install in the reverse order of work, noting the following operations in particular.



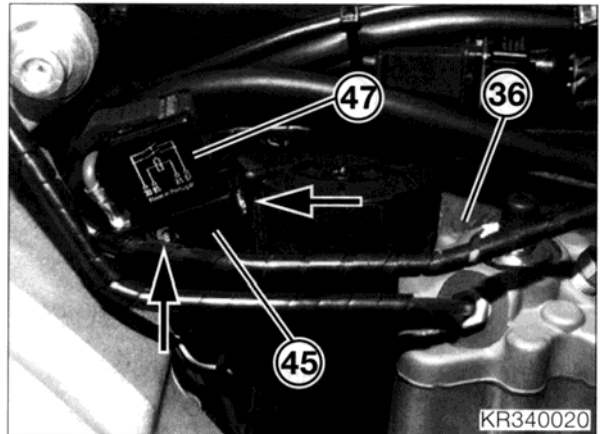
- Loosen fastenings (arrows) for battery holder.



- Loosen lower fastening (arrow) for rear left footrest holder.



- Using a small screwdriver, press end cover (44) of ABS relay housing (43) in (arrow) and at the same time pull end cover (44) upwards.
- Scrap the old cover (44).



### Note:

Carefully press ABS control unit (36) to the rear, including ABS relay (47) with ABS relay base (45) if they are to be removed.

- Pull ABS relay (47) and ABS relay base (45) out of the housing.
- Loosen fastenings (arrow) for ABS relay (47) at ABS relay base (45).
- Pull ABS relay (47) up out of ABS relay base (45).

- Install in the reverse order of work, noting the following activities in particular.



**Caution:**

When inserting ABS relay (47) and ABS relay base (45), make sure that all wires are located in the correct guides.

- Install a new end cover.
- Fill/bleed the brake system.



**Tightening torque:**

Battery carrier to frame ..... 6 Nm





## Removing front brake lines/hoses



### Warning:

Comply with safety precautions when handling or working with fuel; note that the fuel lines are pressurised.

- If necessary, remove/install the fuel tank. (→ 16.5)
- If necessary, remove/install the rear side section. (→ 46.12)



### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Drain fluid from brake system.
- Release/attach fastenings/cable straps.

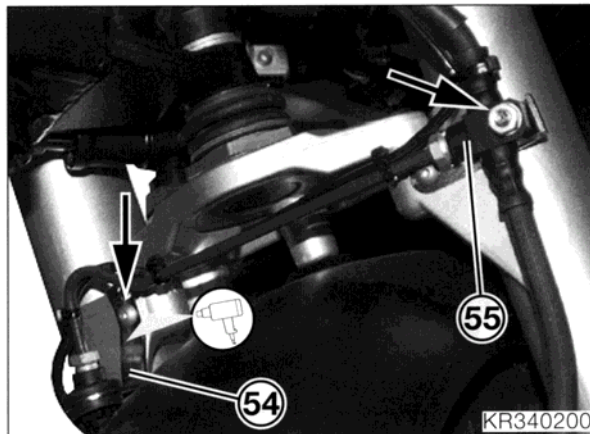


### Caution:

Always secure brake hose with stop plate.

- Remove/install brake line/hose.

### Brake line/hose to telescopic fork



### Caution:

The fastening (arrow) at holder (54) for the left brake line/hose is secured with a thread retaining agent. Carefully heat the fastening (arrow); avoid damaging the Allen screw when removing.

- Unscrew fastening (arrow) at holder (54) for left brake line/hose on telescopic fork.
- Unscrew fastening (arrow) at brake fluid distributor (55) for right brake line/hose at holder on telescopic fork.

## Installing front brake lines/hoses

- Install in the reverse order of work, noting the following operations in particular.



### Caution:

Renew sealing rings at brake line/hose. Secure the brake hose at the master cylinder so that it does not rub or become kinked when the handlebar is turned.

In the centre position the brake hose fitting must have adequate clearance from the centre section of the handlebar at the master cylinder (app. 5 ... 10 mm/0.2 ... 0.4 in); release the wiring harness if necessary.

Use a new screw to secure the holder for the left brake line/hose to the telescopic fork.

- Fill/bleed the brake system.

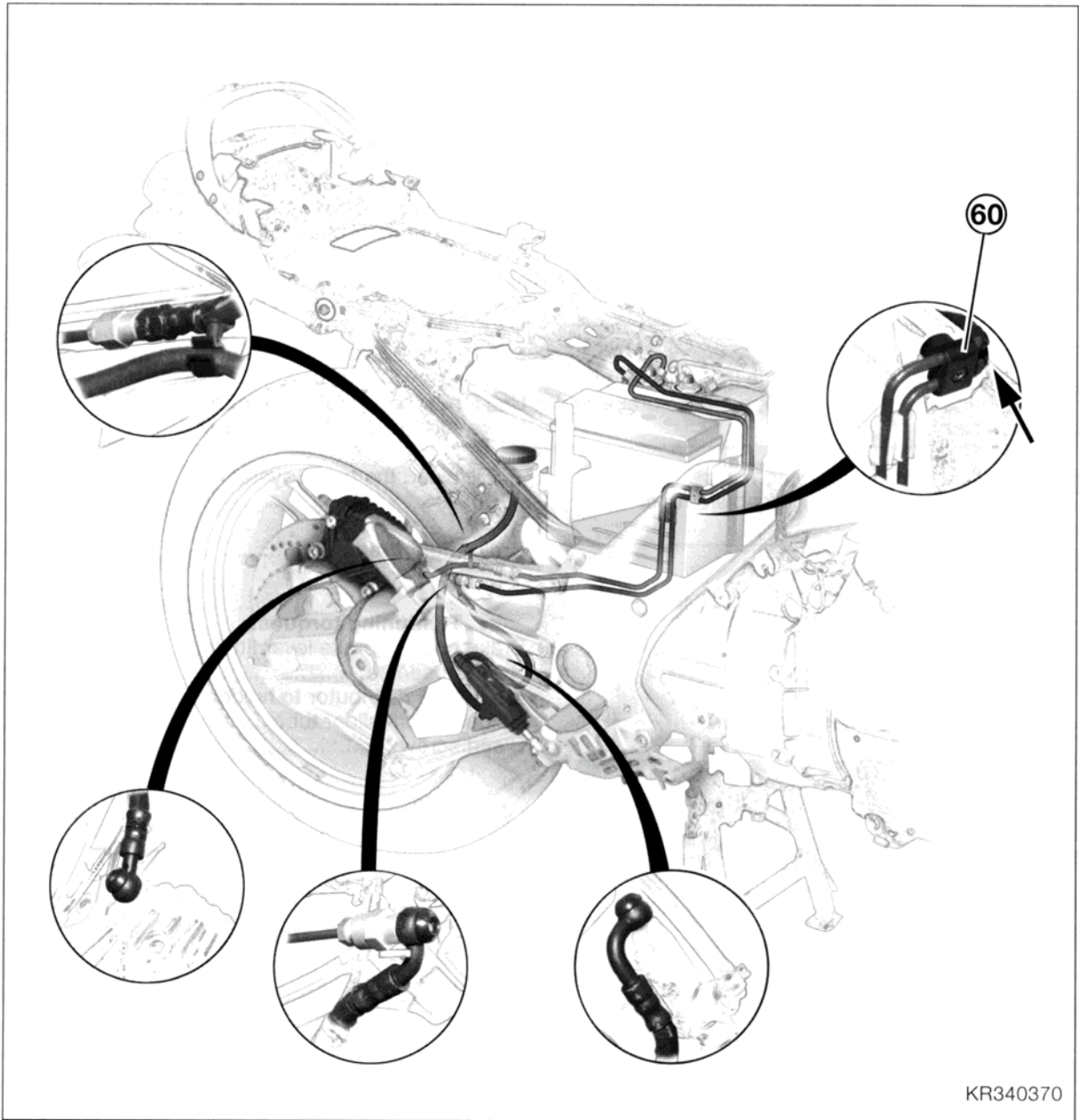
**Brake fluid grade**..... DOT 4



### Tightening torques:

Brake hose to brake lever fitting.....	15 Nm
Brake hose/line.....	15 Nm
Brake fluid distributor to holder.....	9 Nm
Holder to fork slider tube.....	4 Nm
Bleed screw.....	12 Nm





KR340370

**Removing/installing rear brake lines/hoses**

- If necessary, remove/install left/right rear side section.  
(→ 46.13)
- If necessary, remove/install suspension strut.  
(→ 33.23)



**Caution:**

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Drain fluid from brake system.



**Caution:**

When installing, attach fastening (60) at bend in brake line (arrow).

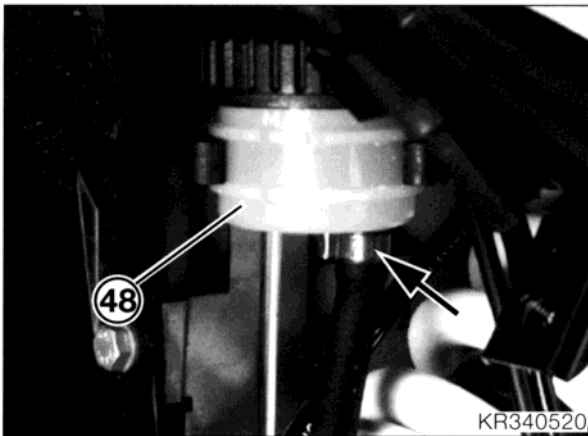
- Release/tighten fastenings/cable straps.



**Caution:**

Use new sealing rings for the brake line/hose. Always secure the brake hose with the stop plate.

- Remove/install the brake line/hose.



**Caution:**

The outlet (arrow) for the hose to reservoir (48) must be on the outside at the right of the motorcycle, and be installed facing rearwards.

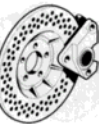
- Fill/bleed the brake system.

**Brake fluid grade** ..... DOT 4



**Tightening torques:**

Brake hose/line ..... 15 Nm  
Bleed screw ..... 12 Nm



## Checking brake pads and discs for wear/renewing

### Checking brake pads for wear



#### Warning:

Brake pad thickness must not fall below the minimum value.  
Always renew pads as a complete set.



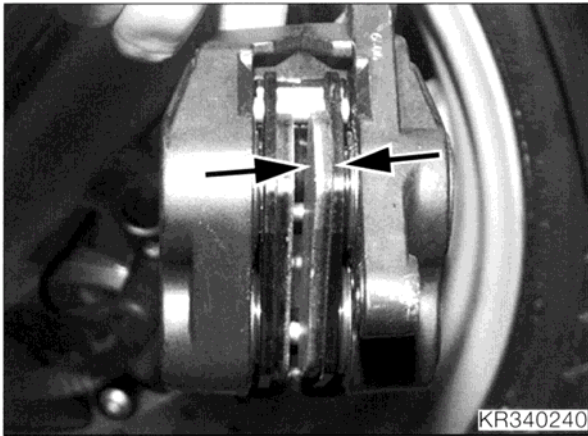
#### Front brake pads



#### Caution:

Do not scratch the wheel rim; mask off the brake caliper if necessary.

- Take off the brake caliper.

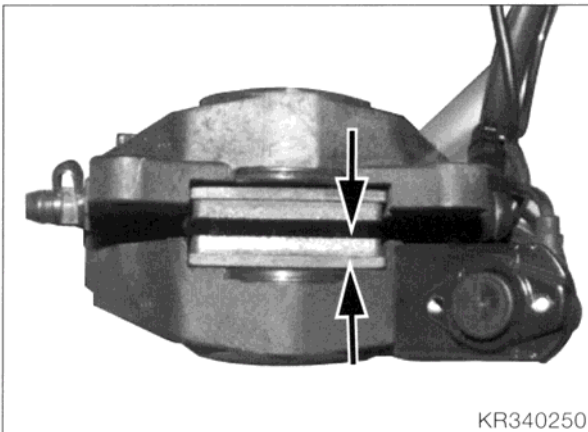


- Measure brake pad thickness (arrows).

**Minimum pad thickness** ..... 1.0 mm (0.04 in)

#### Rear brake pads

- Remove rear wheel.  
(→ 36.8)
- Take off brake caliper.

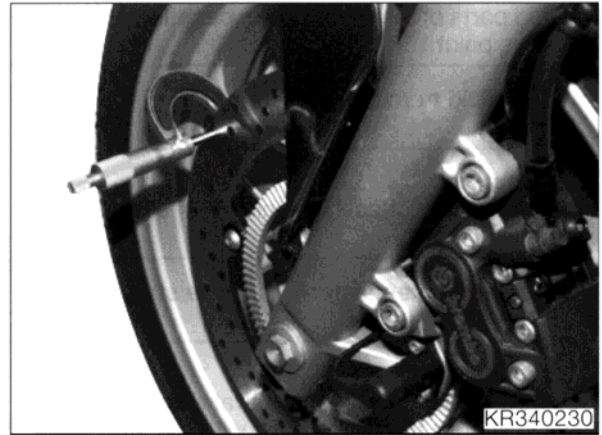


- Measure brake pad thickness (arrows).

**Minimum pad thickness** ..... 1.0 mm (0.04 in)

### Checking brake disc for wear

- Examine the brake disc carefully for cracks, damage, distortion or score-marks.



- Measure the brake disc with a micrometer.

#### Brake disc wear limits

Front brake discs ..... 4.5 mm (0.177 in)  
Rear brake disc ..... 4.5 mm (0.177 in)

## Renewing brake pads

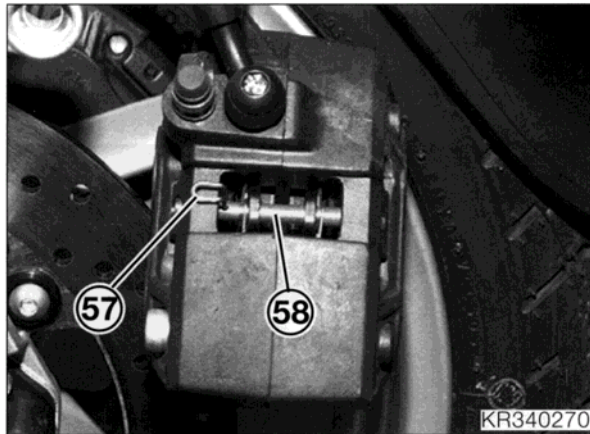
### Front brake



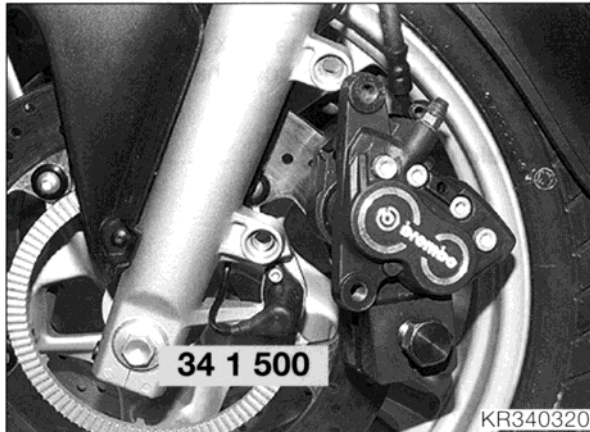
#### Caution:

Do not scratch the wheel rim; mask off the brake caliper.

- Take off the brake caliper.



- Remove the split-pin keeper (57) from retaining pin (58).
- Remove retaining pin (58).
- Remove brake pads by pulling downwards.



- Install in the reverse order of work, noting the following activities in particular.
- Before installing the brake caliper, force the pistons fully back with resetting tool, **BMW No. 34 1 500**.

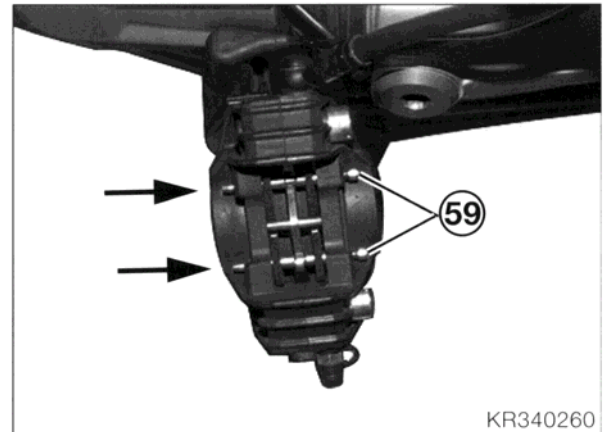


#### Tightening torque:

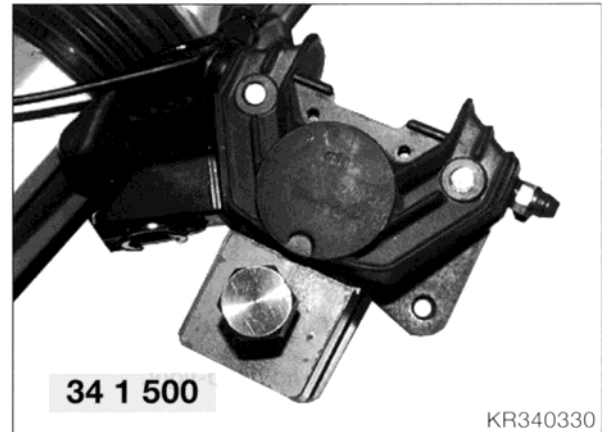
Brake caliper to fork tube ..... 40 Nm

### Rear brake

- Remove rear wheel.  
(→ 36.8)
- Take off the brake caliper.
- Remove the cap from the brake caliper.



- Remove retaining pin (59) from the wheel side (arrow).
- Remove brake pads.



- Install in the reverse order of work, noting the following operations in particular.
- Before installing the brake caliper, force the pistons fully back with resetting tool, **BMW No. 34 1 500**.



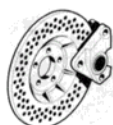
#### Tightening torque:

Brake caliper to rear wheel drive ..... 40 Nm

## Checking brake fluid level/topping up

### Front brake

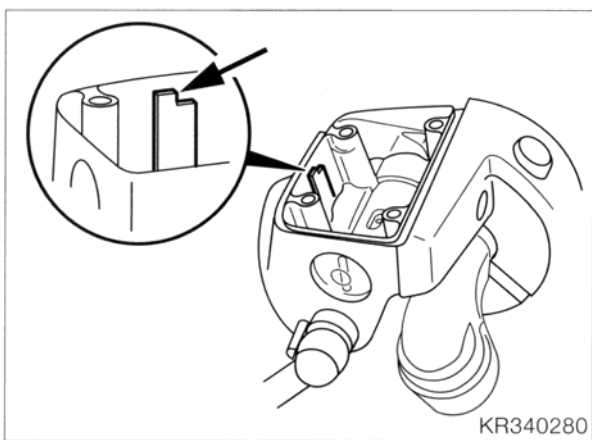
- Place motorcycle on main (centre) stand.
- Remove/install windshield. (→ 46.15)
- Turn handlebar fully to left.



**Caution:**

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Take off reservoir cover with rubber diaphragm.



**Caution:**

When adding brake fluid, do not allow it to enter the retaining holes for the reservoir cover.

- Add brake fluid up to the MAX mark (arrow).
- Replace the reservoir lid with rubber diaphragm in position.
- Screw on the reservoir lid hand-tight.

**Brake fluid grade** ..... DOT 4

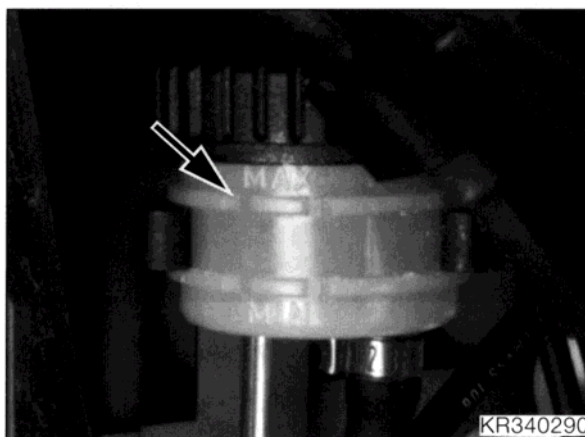
### Rear brake

- Place motorcycle on main (centre) stand.
- Remove/install right rear side section. (→ 46.12)



**Caution:**

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.



- Take off reservoir cover.
- Add brake fluid up to the MAX mark (arrow).
- Screw on the reservoir cover hand-tight.

**Brake fluid grade** ..... DOT 4

# Renewing brake fluid and bleeding brake system

## Front brake

- If necessary, perform additional preliminary work (see below).
- Place motorcycle on main (centre) stand.
- Remove/install windshield. (→ 46.15)



**Caution:**

When bleeding the brakes, always begin on the left side of the motorcycle.

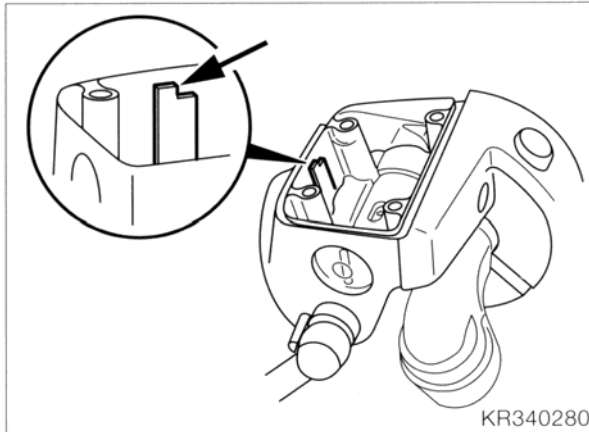
- Turn the steering to the left.



**Caution:**

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Take off reservoir cover with rubber diaphragm.



**Caution:**

When adding brake fluid, do not allow it to enter the retaining holes for the reservoir cover.

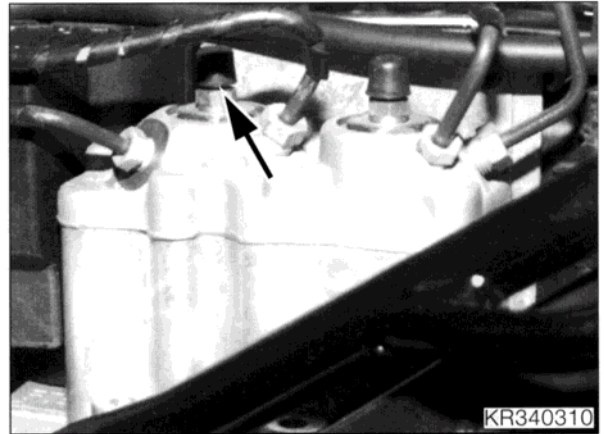
- Add brake fluid up to the MAX mark (arrow).
- Connect the brake bleeding device to the **left** brake caliper.
- Open the bleed screw by half a turn.



**Caution:**

Make quite sure during bleeding that the fluid replenishing bore is always covered by the brake fluid, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

- Draw off brake fluid until it emerges clear and free from air bubbles.
- Close the bleed screw on the left brake caliper.



- Connect the brake bleeding device to the bleed screw on the pressure modulator for the **front brakes** (arrow).



**Caution:**

Make quite sure during bleeding that the fluid replenishing bore is always covered by the brake fluid, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

- Open the bleed screw by half a turn.
- Draw off brake fluid until it emerges clear and free from air bubbles.
- Close the bleed screw.
- Repeat bleeding procedure at **right** brake caliper in precisely the same way as for the left brake caliper.
- If necessary, repeat the bleeding procedure at the left or right.

**Brake fluid grade**..... DOT 4



**Tightening torque:**

Bleed screw..... 12 Nm

## Additional preliminary work

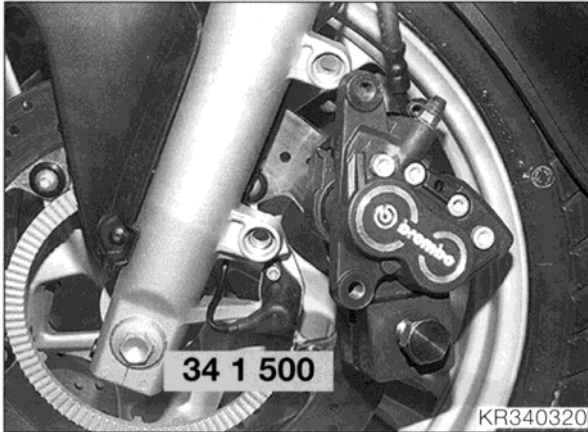


### Caution:

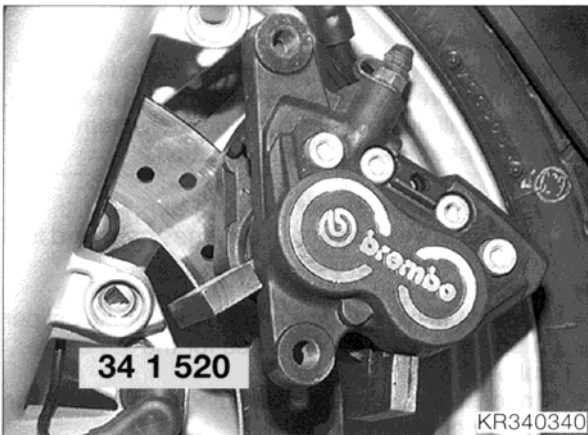
The following work must be performed before bleeding if the brake system was previously opened or drained.

Do not scratch the wheel rim; if necessary, mask off the brake caliper.

- Take off the brake caliper.
- Remove the brake pads.



- Using resetting tool, **BMW No. 34 1 500**, force the pistons fully back.



- Take out the resetting tool and insert spacer, **BMW No. 34 1 520**, in its place.
- In the second brake caliper, force the pistons back but do not remove the resetting tool afterwards.
- Apply the handbrake lever several times until brake pressure can be detected.
- Fill and bleed the front brake circuit.
- Install in the reverse order of work.



### Tightening torque:

Brake caliper to fork tube ..... 40 Nm

## Rear brake

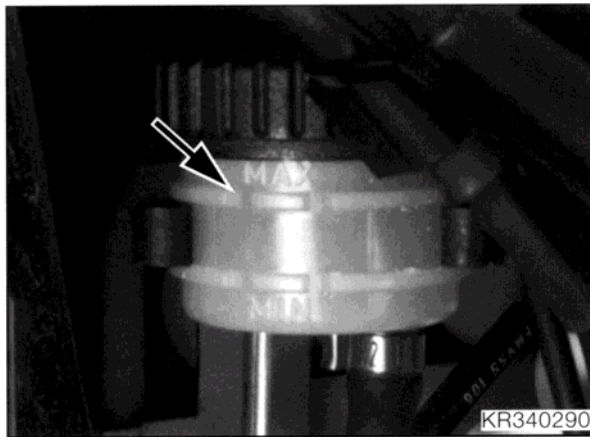
- If necessary, perform the additional preliminary work described below.
- Place the motorcycle on its main (centre) stand.
- Remove/install the right side section.  
(→ 46.13)



### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Take off the reservoir cover.



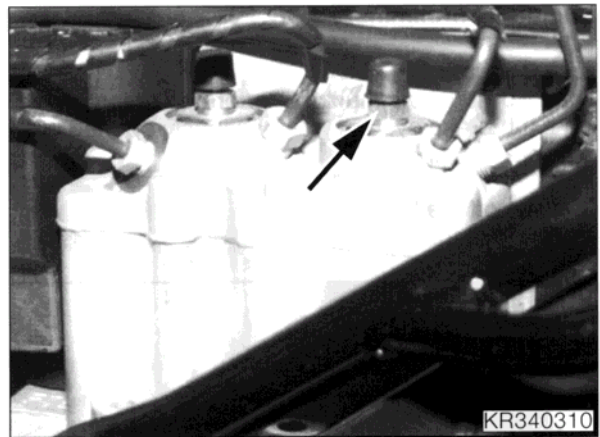
- Add brake fluid up to the MAX mark (arrow).
- Connect the brake bleeding device to the bleed screw on the brake caliper.
- Open the bleed screw by half a turn.



### Caution:

Make quite sure during bleeding that the fluid replenishing bore is always covered by the brake fluid, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

- Draw off brake fluid until it emerges clear and free from air bubbles.
- Close the bleed screw.



- Connect the bleeding device to the pressure modulator for the **rear brake** (arrow).
- Open the bleed screw by half a turn.



### Caution:

Make quite sure during bleeding that the fluid replenishing bore is always covered by the brake fluid, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

- Draw off brake fluid until it emerges clear and free from air bubbles.
- Close the bleed screw.
- If necessary, repeat the bleeding procedure.

**Brake fluid grade**..... DOT 4



### Tightening torque:

Bleed screw ..... 12 Nm



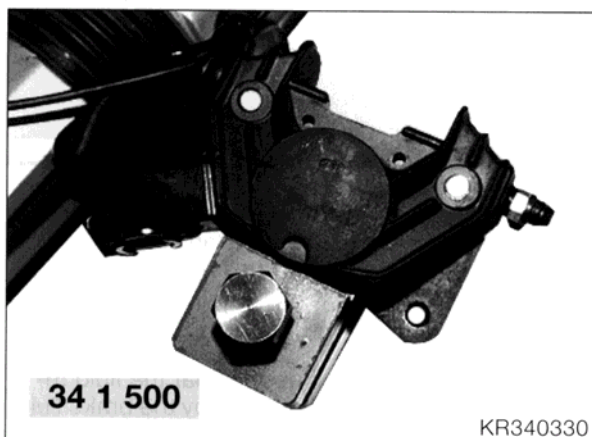
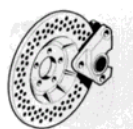


### Additional preliminary work

 **Caution:**

The following work must be performed before bleeding if the brake system was previously opened or drained.

- Take off the brake caliper.
- Remove the brake pads.



- Using resetting tool, **BMW No. 34 1 500**, force the pistons fully back.
- Apply handbrake lever several times until brake pressure can be detected.
- Fill and bleed the rear brake circuit.
- Install in the reverse order of work.

 **Tightening torque:**

Brake caliper to rear wheel drive ..... 40 Nm

## Bleeding the brake system

### Front brake

- Place the motorcycle on its main (centre) stand.
- Remove/install the windshield.  
(→ 46.15)



#### Caution:

When bleeding the brake system, always start on the left side of the motorcycle.

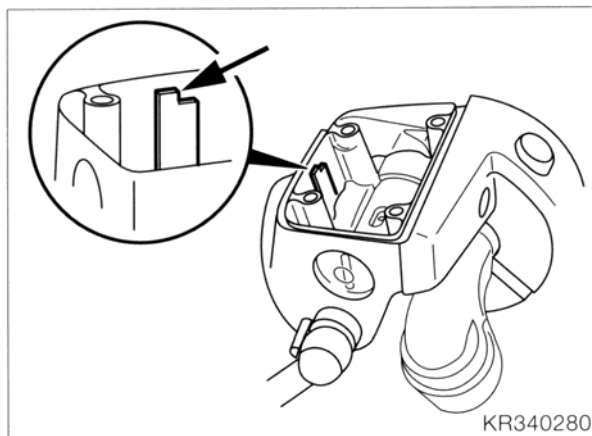
- Turn the steering to the left.



#### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Take off reservoir cover with rubber diaphragm.



#### Caution:

When adding brake fluid, do not allow it to enter the retaining holes for the reservoir cover.

- Add brake fluid up to the MAX mark (arrow).
- Connect the brake bleeding device to the bleed screw on the **left** brake caliper.
- Open the bleed screw by half a turn.



#### Caution:

Make quite sure during bleeding that the fluid replenishing bore is always covered by the brake fluid, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

- Draw off brake fluid until it emerges clear and free from air bubbles.
- Close the bleed screw on the left brake caliper.
- Perform the bleeding procedure at the **right** brake caliper in precisely the same way as for the left brake caliper.
- If necessary, repeat the bleeding procedure at the left or right.

Brake fluid grade..... DOT 4



#### Tightening torque:

Bleed screw..... 12 Nm

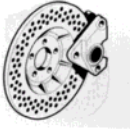
## Rear brake

- Place the motorcycle on its main (centre) stand
- Remove/install the right rear side section.  
(→ 46.13)

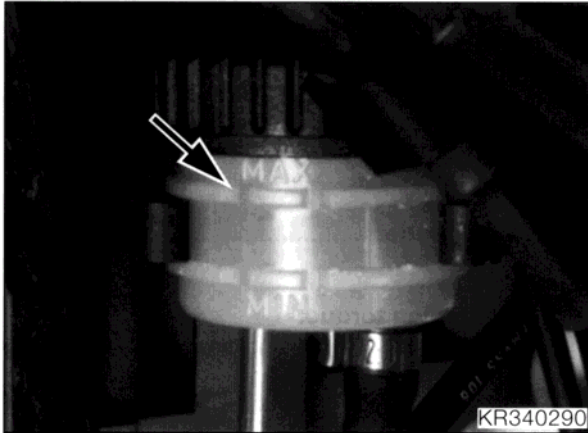


### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.



- Take off the reservoir cover.



- Add brake fluid up to the MAX mark (arrow).
- Connect the brake bleeding device to the bleed screw on the brake caliper.
- Open the bleed screw by half a turn.



### Caution:

Make quite sure during bleeding that the fluid replenishing bore is always covered by the brake fluid, or else air will be drawn into the brake system. If this occurs, repeat the bleeding operation.

- Draw off brake fluid until it emerges clear and free from air bubbles.
- Close the bleed screw on the brake caliper.
- If necessary, repeat the bleeding procedure.

**Brake fluid grade** ..... DOT 4



### Tightening torque:

Bleed screw ..... 12 Nm

## **36 Wheels and tyres**

# Contents

Page

<b>Removing and installing front wheel</b> .....	5
<b>Removing and installing wheel bearings</b> .....	6
Removing left/right wheel bearings .....	6
Installing right/left wheel bearing .....	7
Installing left wheel bearing .....	7
Installing right wheel bearing .....	7
<b>Removing/installing rear wheel</b> .....	8
Removing rear wheel .....	8
Installing rear wheel .....	8
<b>Static balancing of front and rear wheels</b> .....	9
Static balancing of front wheel .....	9
Static balancing of rear wheel .....	9
<b>Checking front/rear wheel rim for runout</b> .....	10
Checking front wheel rim for runout .....	10
Checking rear wheel rim for runout .....	11



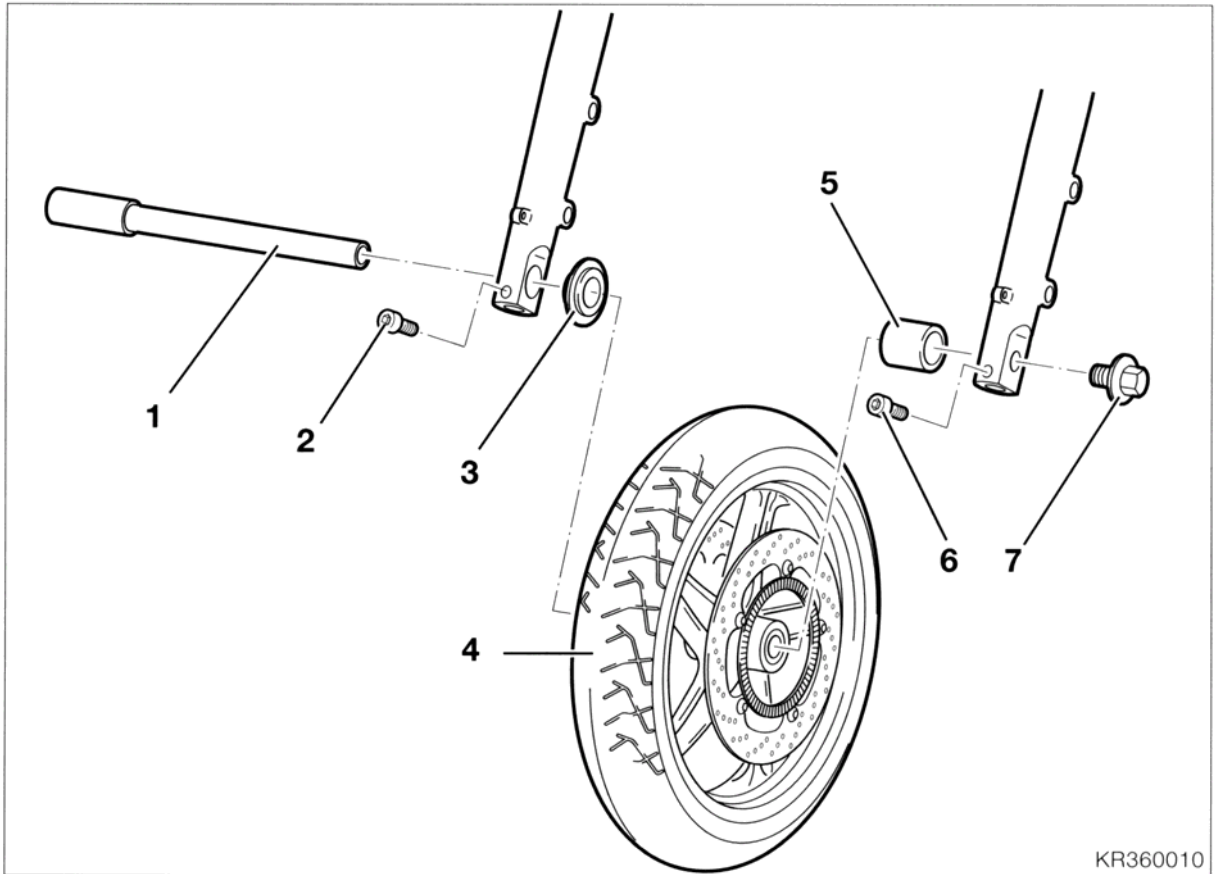


Technical data			K 1200 RS
Rim size	front		3.50"x17" MT H 2
	rear		5.00"x17" MT H 2
Max. vertical runout	front	mm	0.5
	rear	mm	0.3
Max. lateral runout	front	mm	0.5
	rear	mm	0.3
Tyre size	front	mm	120/70 ZR 17" tubeless
	rear	mm	170/60 ZR 17" tubeless
Tyre pressures (with tyres cold)	Solo, front	bar	2.5
	Solo, rear	bar	2.9
	Two-up, front	bar	2.5
	Two-up, rear	bar	2.9
Wheel bearing lubrication			Brand-name anti-friction bearing grease, operating temperature range -30...+140 °C, drip point 150...230 °C, high corrosion protection level, good resistance to water and oxidation, e.g. Shell Retinax EP2









KR360010

## Removing and installing front wheel

- Remove engine spoiler.  
(⇒ 46.13)
- Attach hoist, **BMW No. 00 1 510**, to oil sump.
- Remove front section of front mudguard.  
(⇒ 46.7)



### Caution:

Avoid scratching the wheel rim; if necessary mask off the brake caliper.  
Do not tilt the brake caliper.  
There is a risk of damage to the brake pads.



### Note:

Do not apply handbrake lever with brake calipers removed/front wheel removed.

- Detach left and right brake calipers.
- Remove hex bolt (7).
- Loosen left (2) and right (6) clamping screws on telescopic fork.
- Pull the quick-release axle (1) out to the right, noting the right bearing cover (3) and the left spacing bushing (5).
- Remove the front wheel (4).

- Install in the reverse order of work, noting the following operations in particular.
- Grease the quick-release axle (1) and bearing cover (3) lightly with **Shell Retinax EP2**.



### Note:

Tighten the quick-release axle (1) first, then the left clamping screw (2). Compress the telescopic fork several times, then tighten the right clamping screw (6).

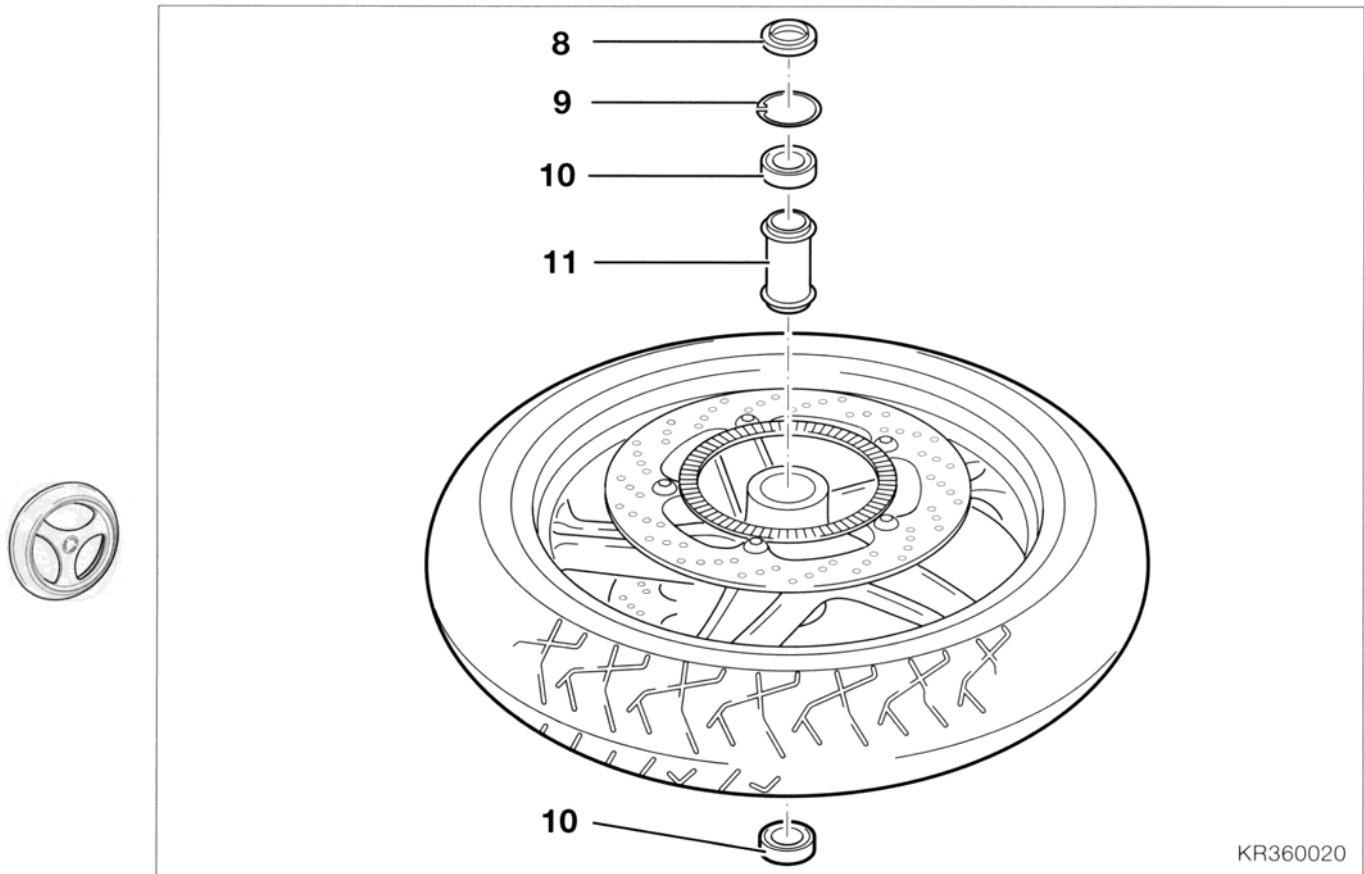
- Check/adjust ABS sensor gap.  
(⇒ 34.9)

**Front ABS sensor gap** ..... 0.45...0.55 mm



### Tightening torques:

Quick-release axle ..... 30 Nm  
Quick-release axle clamp screws ..... 20 Nm  
Brake caliper at fork slider tube ..... 39 Nm



## Removing and installing wheel bearings

- Place the front wheel on two wooden blocks (which must not touch the brake disc).

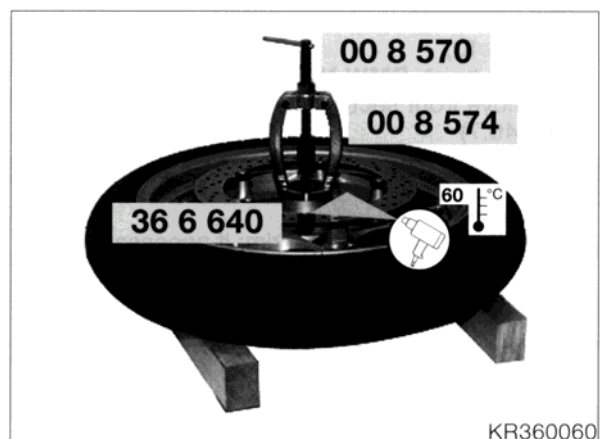
### Removing left/right wheel bearings



#### Note:

There is no circlip at the right wheel bearing.

- Lever out shaft seal (8).
- Remove circlip (9) with suitable pliers.



- Place support ring, **BMW No. 36 6 640**, on wheel hub.
- Heat bearing seat to 60 °C.
- Pull out wheel bearing (10) with puller, **BMW No. 00 8 570**, and internal puller 21/3, **BMW No. 00 8 574**.
- Take out spacing sleeve (11).

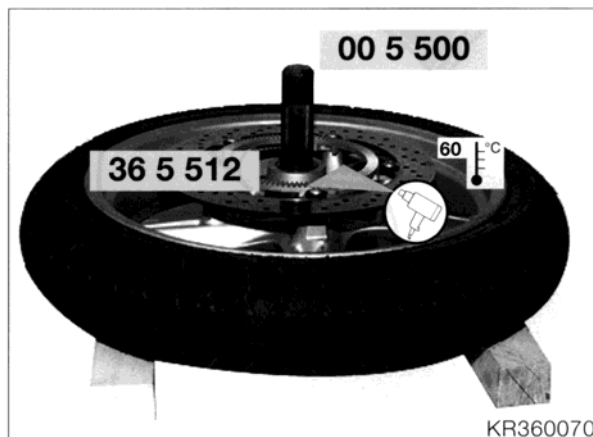
## Installing right/left wheel bearing



### Caution:

When installing, always start with the left side.

### Installing left wheel bearing



- Cool the wheel bearing (10).
- Heat the bearing seat to 60 °C.
- Press in wheel bearing (10) with handle for drift, **BMW No. 00 5 500**, and drift, **BMW No. 36 5 512**, until it is in contact with the bearing seat.



### Note:

The convex side of circlip (9) faces the wheel bearing (10).

- Install circlip (9) with suitable pliers.
- Grease shaft sealing ring (8) lightly with **Shell Retinax EP2** and drive it in flush with the wheel hub, using handle for drift **BMW No. 00 5 500**, and drift, **BMW No. 36 5 512**.

### Installing right wheel bearing

- Insert spacing sleeve (11).

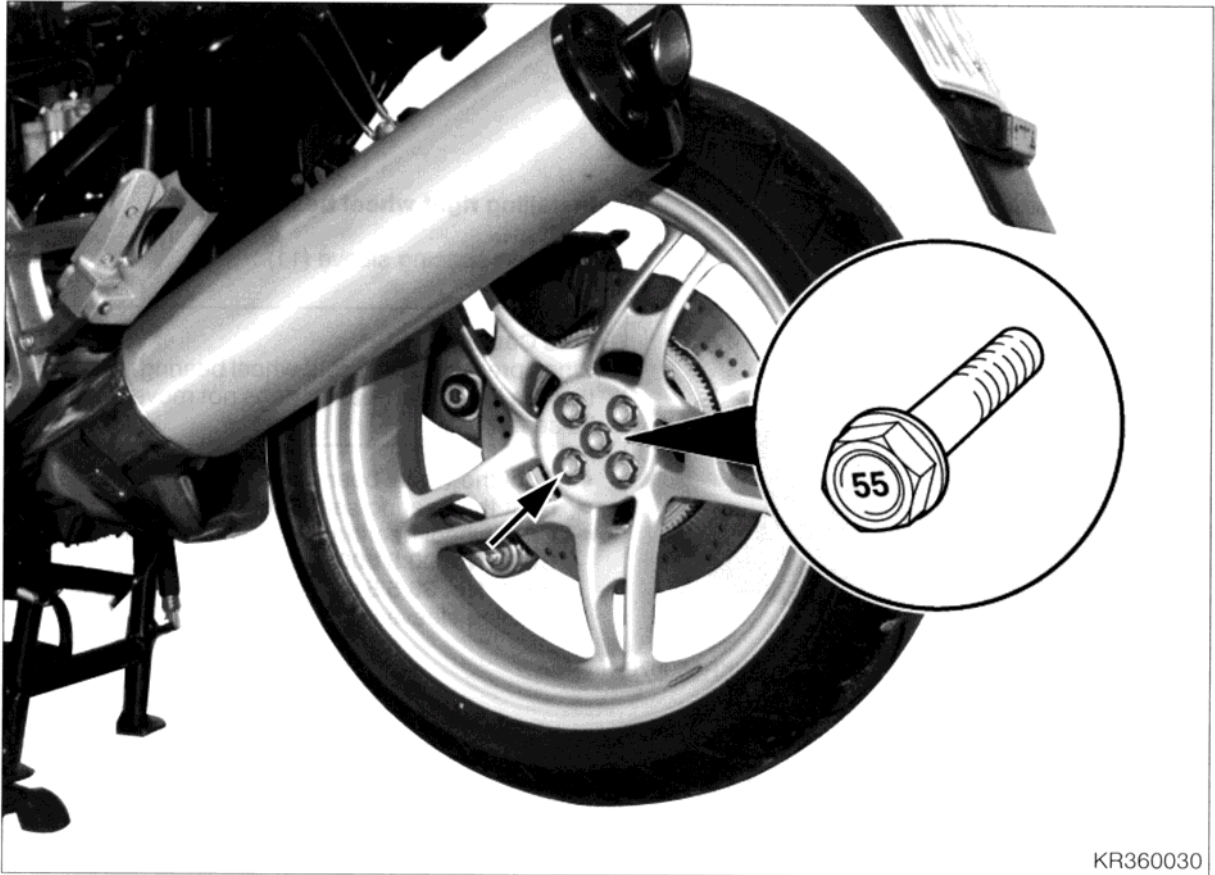


### Caution:

When pressing in the right wheel bearing, make sure that the left wheel bearing does not move away from its seat.

- Cool the wheel bearing (10).
- Heat the bearing seat to 60 °C.
- Drive wheel bearing (10) in with handle for drift, **BMW No. 00 5 500**, and drift, **BMW No. 36 5 512**, as far as the inner race of spacing sleeve (11).





KR360030

## Removing/installing rear wheel

### Removing rear wheel


- Select first gear.
- Unscrew wheel studs (arrow).
- Remove rear wheel with spacing washer to the rear.

- Tighten the wheel studs to the correct torque.
- Check/adjust ABS sensor gap. (→ 34.11)

**Rear ABS sensor gap**..... 0.45...0.55 mm

### Installing rear wheel

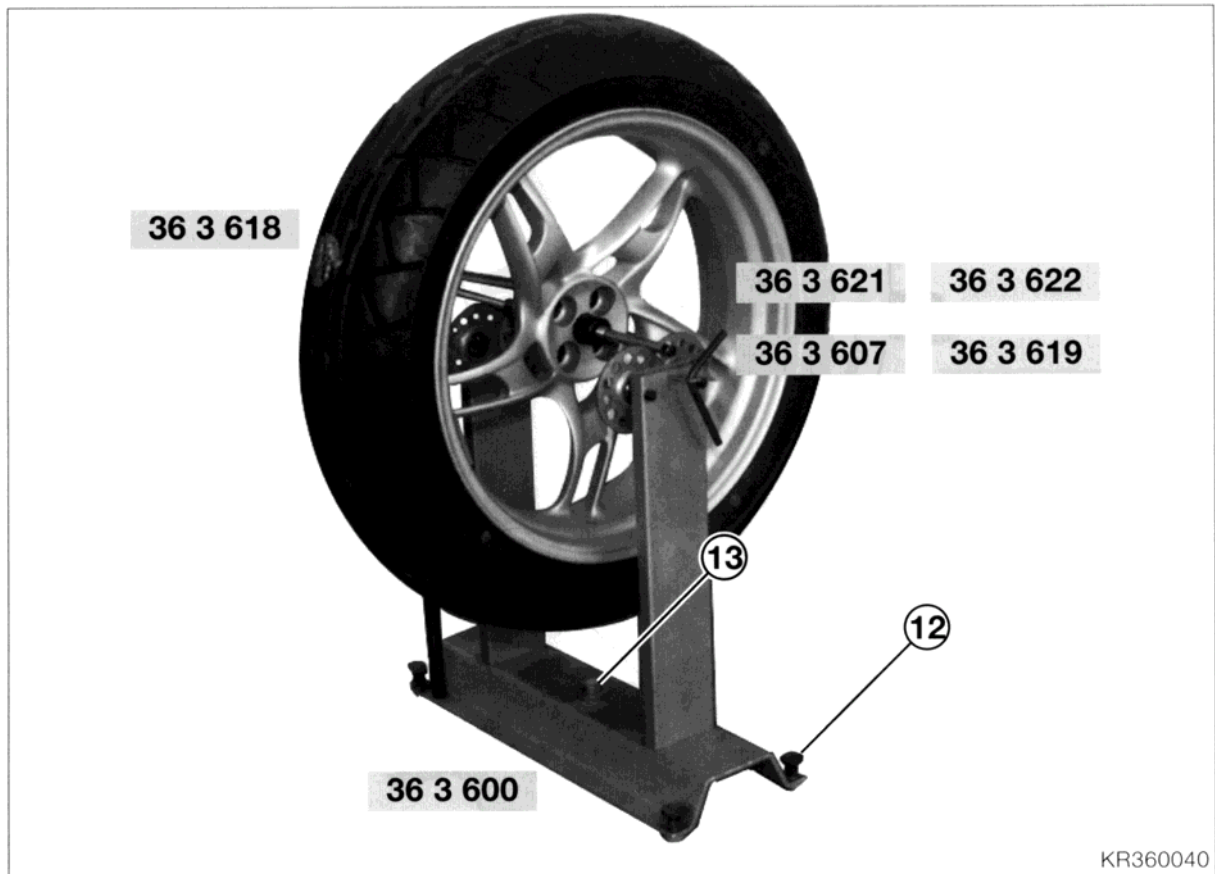
- The contact faces on the spacing disc, the rear wheel drive and the hub must be clean and free from grease.

 **Tightening torque:**  
 Wheel studs..... 105 Nm

 **Caution:**

Only use wheel studs with length code 55.

- Offer up the rear wheel with spacing washer to the rear wheel drive and insert all wheel studs handtight.



## Static balancing of front and rear wheels

### Static balancing of front wheel

- Align the balancer, **BMW No. 36 3 600**, with knurled screws (12)/level gauge (13).
- Insert the balancing shaft, **BMW No. 36 3 621**, through the front wheel.
- Screw the balancing shaft up handtight with knurled nut, **BMW No. 36 3 622**.
- Place front wheel on balancer, **BMW No. 36 3 600**.
- Rotate the front wheel and allow it to come to a halt.
- Clean the attachment points for the adhesive weights.

#### **Caution:**

The maximum balancing weight is 60 g!

- Attach the adhesive balance weights, equally distributed between the left and right sides of the wheel rim, opposite the heaviest point on the wheel.
- Repeat the balancing procedure as a check.

### Static balancing of rear wheel



#### **Note:**

The rear wheel can also be balanced dynamically.

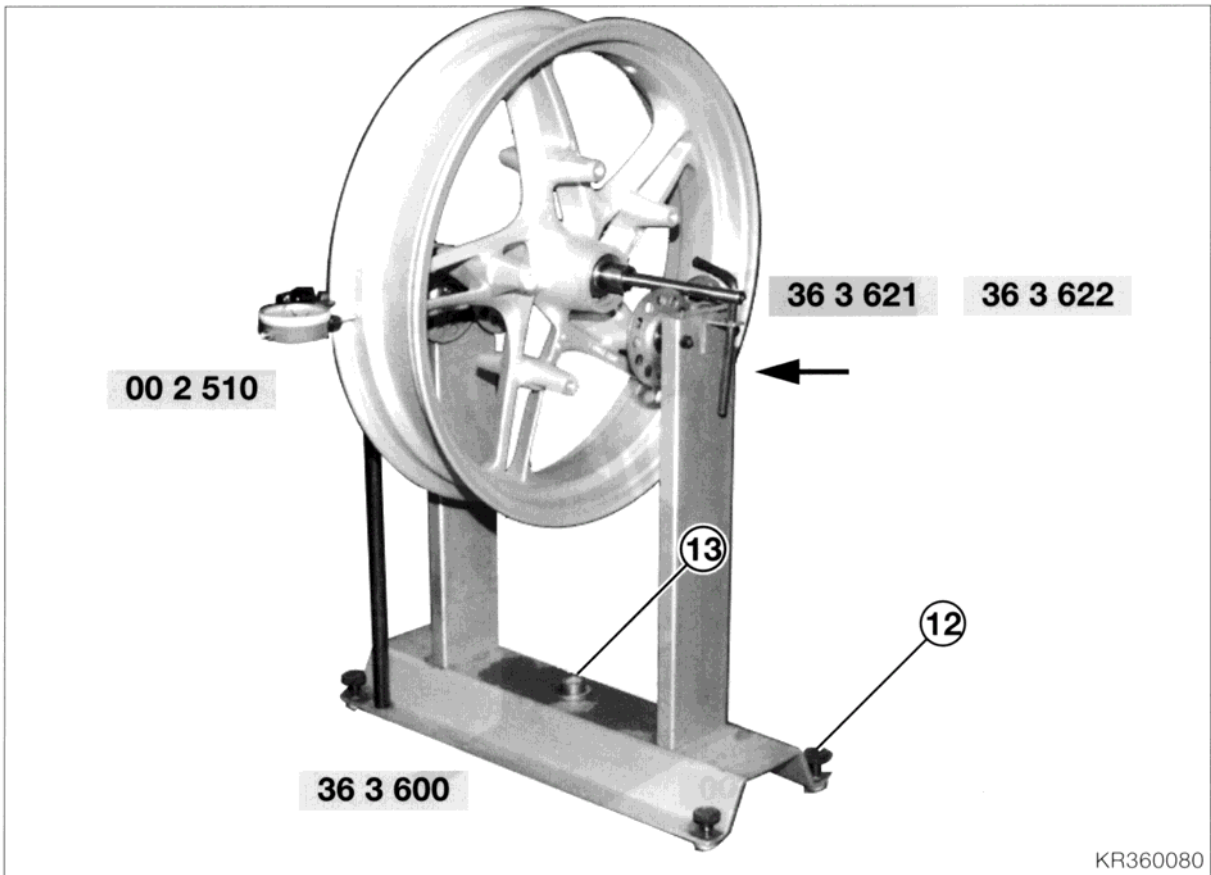
- Align the balancer, **BMW No. 36 3 600**, with knurled screws (12)/level gauge (13).
- Attach mounting fixture, **BMW No. 36 3 618**, to the centering-collar side of the rear wheel.
- Pass the balancing shaft, **BMW No. 36 3 607**, through the rear wheel.
- Screw the balancing shaft up handtight with knurled nut, **BMW No. 36 3 619**.
- Place the rear wheel on the balancer, **BMW No. 36 3 600**.
- Rotate the rear wheel and allow it to come to a halt.
- Clean the points at which the adhesive weights are to be attached.



#### **Caution:**

The maximum balancing weight is 60 g!

- Attach the adhesive balance weights, equally distributed between the left and right sides of the wheel rim, opposite the heaviest point on the wheel.
- Repeat the balancing procedure as a check.



## Checking front/rear wheel rim for runout

### Checking front wheel rim for runout

- Remove tyre.
- Align balancer, **BMW No. 36 3 600**, with knurled screws (12)/level gauge (13).
- Pass the balancing shaft, **BMW No. 36 3 621**, through the front wheel.
- Screw the balancing shaft up handtight with knurled nut, **BMW No. 36 3 622**.
- Place front wheel on balancer, **BMW No. 36 3 600**.
- Lock the balancing shaft at the balancing stand with the pin (arrow) to prevent it from turning.
- Install dial gauge, **BMW No. 00 2 510**, in the dial gauge holder on the balancer and adjust it to suit the measuring work to be performed.



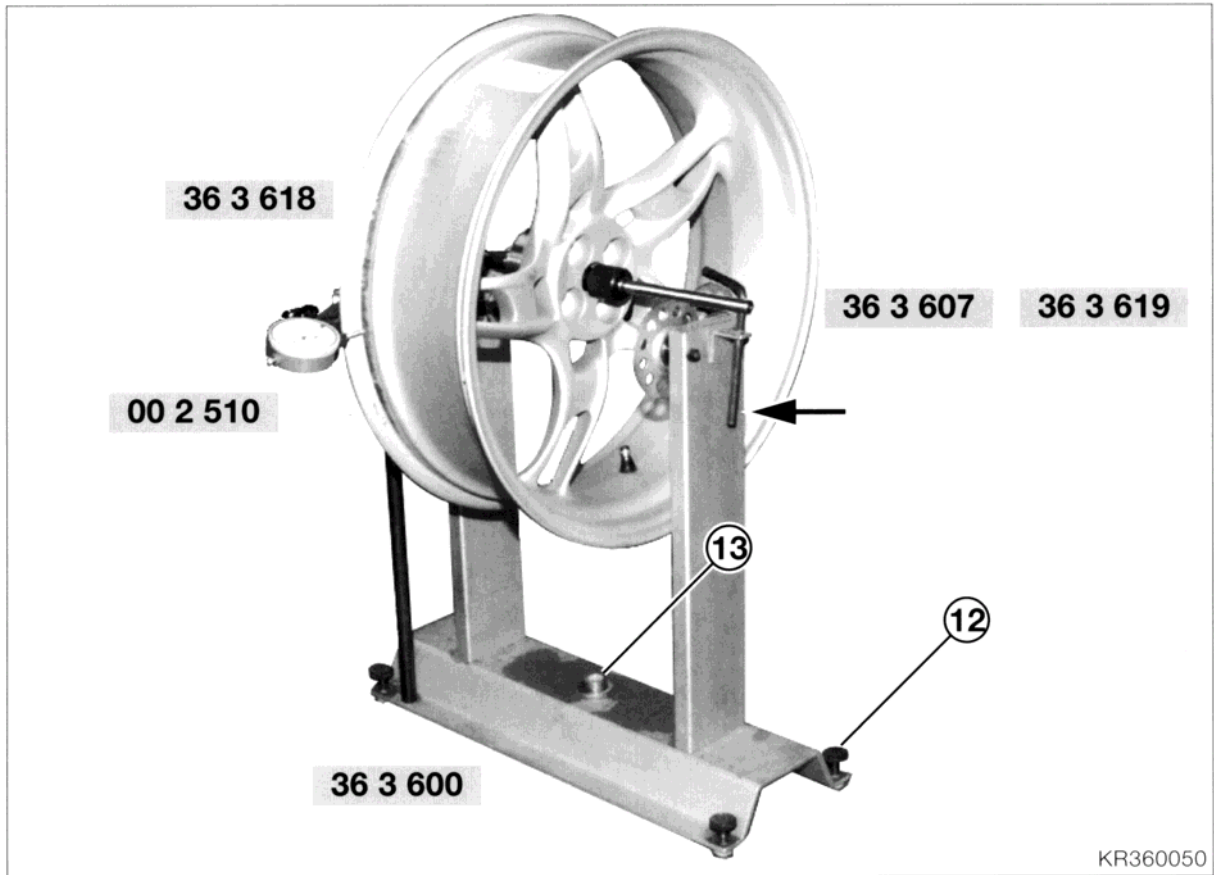
#### Note:

Apply the dial gauge, **BMW No. 00 2 510**, only to the machined inner surface of the wheel rim.

- Measure vertical or horizontal runout.

#### Maximum wheel rim runout:

Vertical runout ..... 0.5 mm  
Lateral runout ..... 0.5 mm



KR360050

## Checking rear wheel rim for runout

- Remove tyre.
- Align balancer, **BMW No. 36 3 600**, with knurled screws (12)/level gauge (13).
- Attack the mounting device, **BMW No. 36 3 618**, to the centering-collar side of the rear wheel.
- Pass the balancing shaft, **BMW No. 36 3 607**, through the rear wheel.
- Screw the balancing shaft up handtight with knurled nut (3), **BMW No. 36 3 619**.
- Place the rear wheel on the balancing stand, **BMW No. 36 3 600**.
- Lock the balancing shaft at the balancing stand with the pin (arrow) to prevent it from turning.
- Install the dial gauge, **BMW No. 00 2 510**, in the dial gauge holder on the balancer and adjust it to suit the measuring operation to be performed.



### Note:

Apply the dial gauge, **BMW No. 00 2 510**, only to the machined inner face of the wheel rim.

- Measure vertical or horizontal runout.

### Maximum wheel rim runout:

Vertical runout .....	0.3 mm
Lateral runout .....	0.3 mm

## **46 Frame**



# Contents

Page

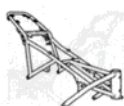
<b>General view of fairing sections</b> .....	5
<b>Removing dualseat</b> .....	6
<b>Installing dualseat</b> .....	6
<b>Adjusting dualseat</b> .....	6
<b>Removing/installing front mudguard</b> .....	7
<b>Removing/installing rear section</b> .....	8
<b>Removing/installing rear carrier section</b> .....	8
<b>Removing/installing fairing</b> .....	9
Removing/installing left/right hand guard .....	9
Removing left/right hand guard .....	9
Installing left/right hand guard .....	9
Removing/installing left/right side sections of fairing .....	10
Removing/installing left/right air outlet grilles .....	11
Removing/installing intake air guide .....	11
Removing/installing intake air pipe .....	11
Removing/installing air outlet guide for left/right radiator .....	12
Removing/installing engine spoiler .....	12
Removing/installing holder for engine spoiler .....	13
Removing/installing left/right rear side section .....	13
Removing/installing left/right inner cover .....	14
Removing/installing windshield and windshield holder .....	15
Removing and installing windshield .....	15
Removing/installing windshield holder .....	15
Removing/installing upper section of fairing with headlight .....	16
Removing and installing fairing holder .....	17
<b>Removing/installing heat shield</b> .....	18
<b>Removing/installing grab handle</b> .....	18
<b>[OE] Removing/installing pannier case carrier</b> .....	18
<b>[OE] Removing/installing luggage rack</b> .....	18
<b>Removing/installing lock carrier</b> .....	19
<b>Stripping/assembling side (prop) stand</b> .....	19



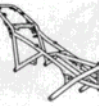
# Contents

Page

<b>Removing/installing pivot mount with centre (main)</b> .....	19
and side (prop) stands .....	19
<b>Stripping/assembling centre (main) stand</b> .....	20
<b>Removing/installing footrest supports</b> .....	21
Removing/installing right footrest support .....	21
Removing and installing brake pedal .....	21
Removing/installing footrest .....	22
Removing/installing brake light switch .....	22
Removing/installing left footrest support .....	22
Removing/installing rear left footrest holder .....	22
Removing/installing right-hand rear footrest holder .....	23
Adjusting footrests at left/right .....	23
<b>Removing and installing frame</b> .....	24
Removing/installing rear section of frame .....	24
Removing/installing cross-tube .....	25
Removing/installing left/right cross-member .....	25
Removing and installing frame .....	26
<b>Measuring wheel track offset</b> .....	29

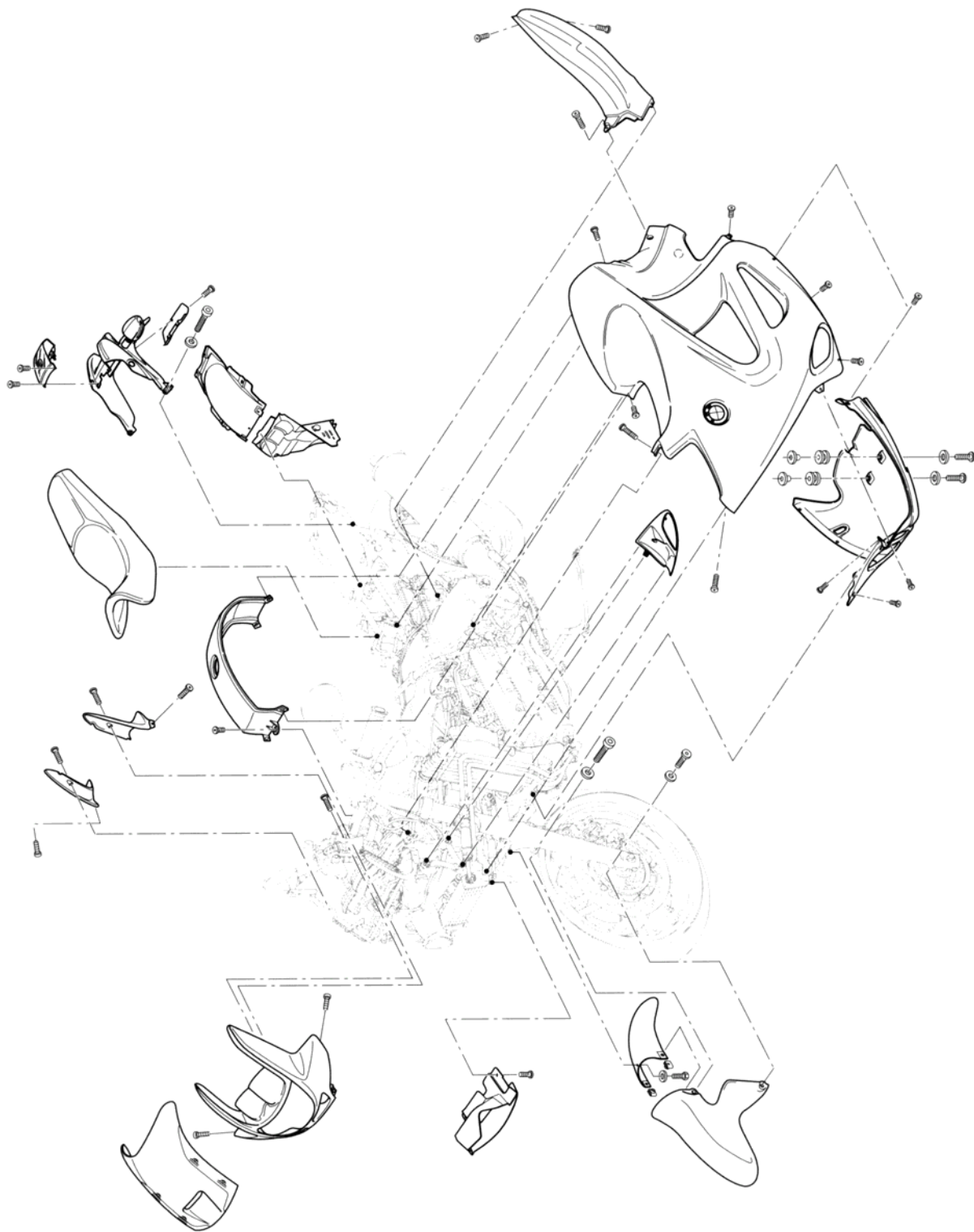


Technical data	K 1200 RS	
Location of type plate/frame number (take off dualseat)		Left rear frame, inside/bottom right of frame
Length, overall	mm	2250
Max. height (windshield)	mm	1160
Width of handlebar	mm	700
Height of seat at unladen weight	mm	770 and 800
Wheelbase in normal-load position	mm	1555
Ground clearance in normal-load position	mm	125
Max. wheel offset (rear wheel to right)		
Rear wheel 5 x 17"	mm	4,5
Rear wheel 5.5 x 17"	mm	0
Caster angle in normal-load position	mm	124
Steering head angle in normal-load position	°	62.8
Steering lock angle	°	± 31.5...32
Dynamic heel angle (footrests in upper position)	°	50
Axle load distribution (without rider), front/rear	%	50 / 50
Unladen weight, ready for road, tank full (without optional extras)	kg	285
Max. payload	kg	215
Permitted total weight	kg	500





## General view of fairing sections



## Removing dualseat

- Turn key in dualseat lock to left and hold it there.
- Pull the dualseat upwards and to the rear out of its catch, as far as the first detent position.
- Remove dualseat.

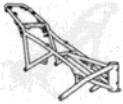
## Installing dualseat



### Caution:

When installing, make sure that the dual seat is retained firmly.

- Push the dualseat tongue under the dualseat support.
- At the rear end, guide the dualseat carefully into the first detent position of the catch.
- At the front, push the dualseat into the lower or upper guide (depending on the rider's height).
- Press down on the rear end of the dualseat to engage the second detent position of the catch.



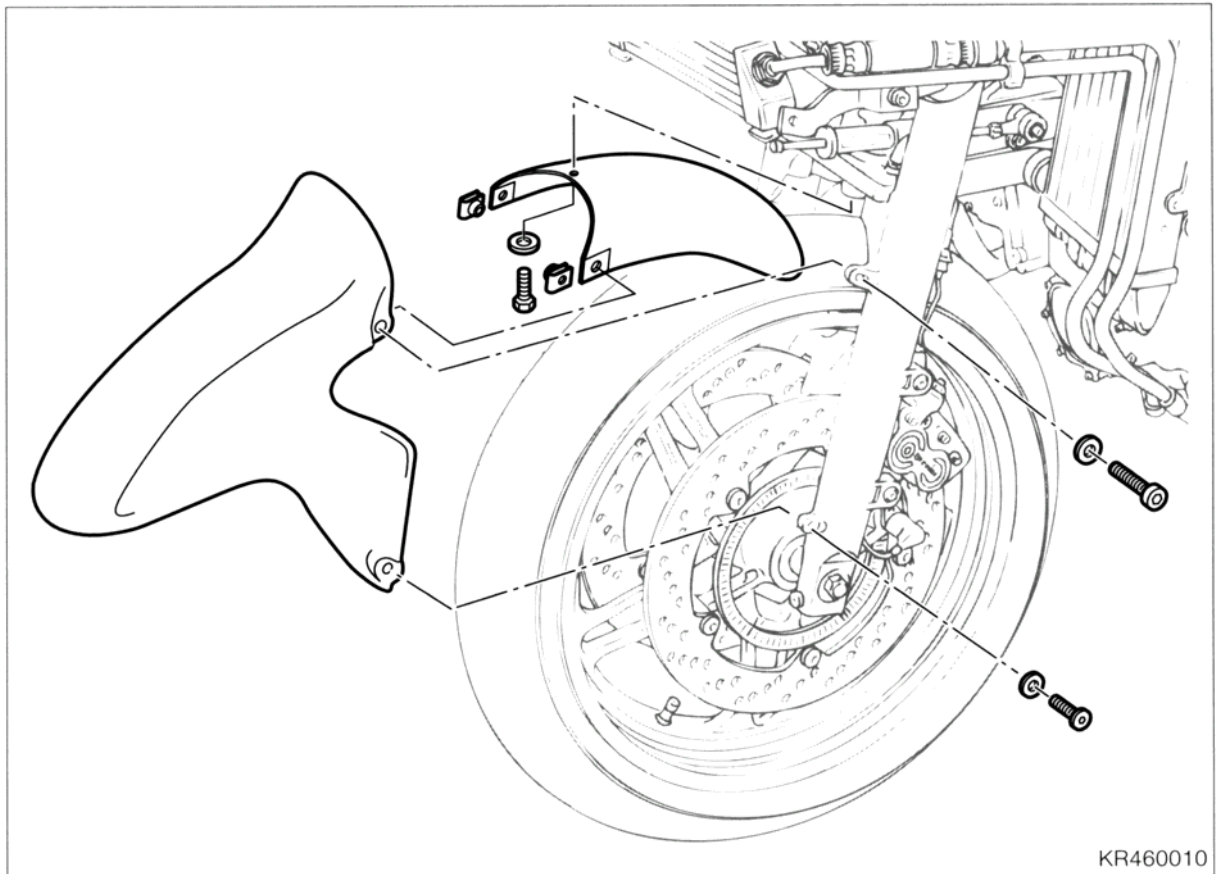
## Adjusting dualseat



### Caution:

When installing, make sure that the dualseat is secured firmly.

- Turn the key in the dualseat lock to the left and hold it there.
- Pull the dualseat upwards and to the rear out of its catch, as far as the first detent position.
- At the front, push the dualseat into the lower or upper guide (depending on the rider's height).
- Press down on the rear end of the dualseat to engage the second detent position of the catch.



## Removing/installing front mudguard



### Note:

To remove or install, the rear section of the front mudguard must first be removed.



### Caution:

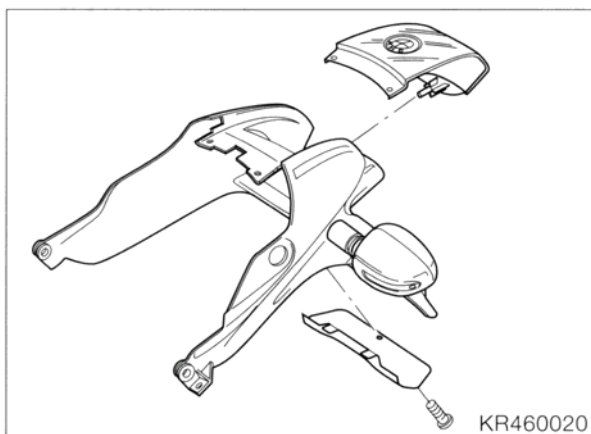
When installing the rear section of the front mudguard, align it centrally in relation to the wheel.



### Tightening torques:

Rear section of front mudguard:  
 to fork slider tube bridge ..... 4 Nm  
 Front section to rear section of front mudguard:  
 at upper slider tube ..... 9 Nm  
 Front section of front mudguard:  
 at lower slider tube..... 3 Nm

## Removing/installing rear section



- **[Optional extra pannier case carrier without luggage rack]** Detach the pannier case carrier at the left and right from the frame and at the grab handle.
- **[Optional extra pannier case with luggage rack]** Detach the pannier case carrier at the left and right from the frame, the grab handle and the luggage rack.



### Note:

The grab handle need not be removed.

- Remove the left/right rear side sections. (→ 46.13)
- Remove the flasher holder cover.
- Undo the cable strap and separate the plug connector for the rear light.
- Detach the rear section at the left and right, and from the frame at the bottom.
- Pull the rear section off to the rear.
- Remove the spray guard from the rear section.



### Caution:

When installing, note the correct torque, so that the detent mechanism operates correctly.

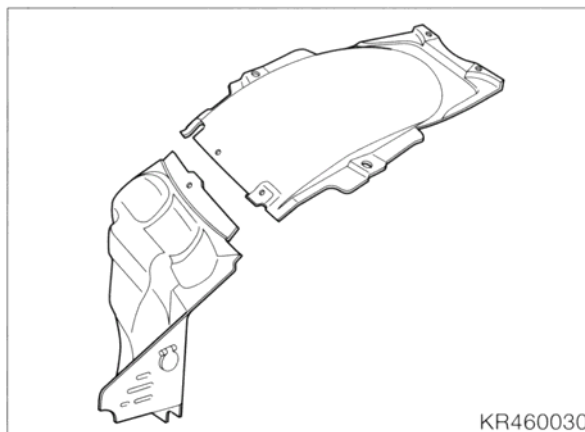
- Remove the reflector.
- Remove the number plate light.
- Remove the flashing turn indicators at left and right.
- Remove the rear light.
- Install in the reverse order of work.



### Tightening torques:

Spray guard ..... 3 Nm  
 Rear section:  
 to frame at left/right ..... 3 Nm  
 to frame at bottom ..... 3 Nm

## Removing/installing rear carrier section



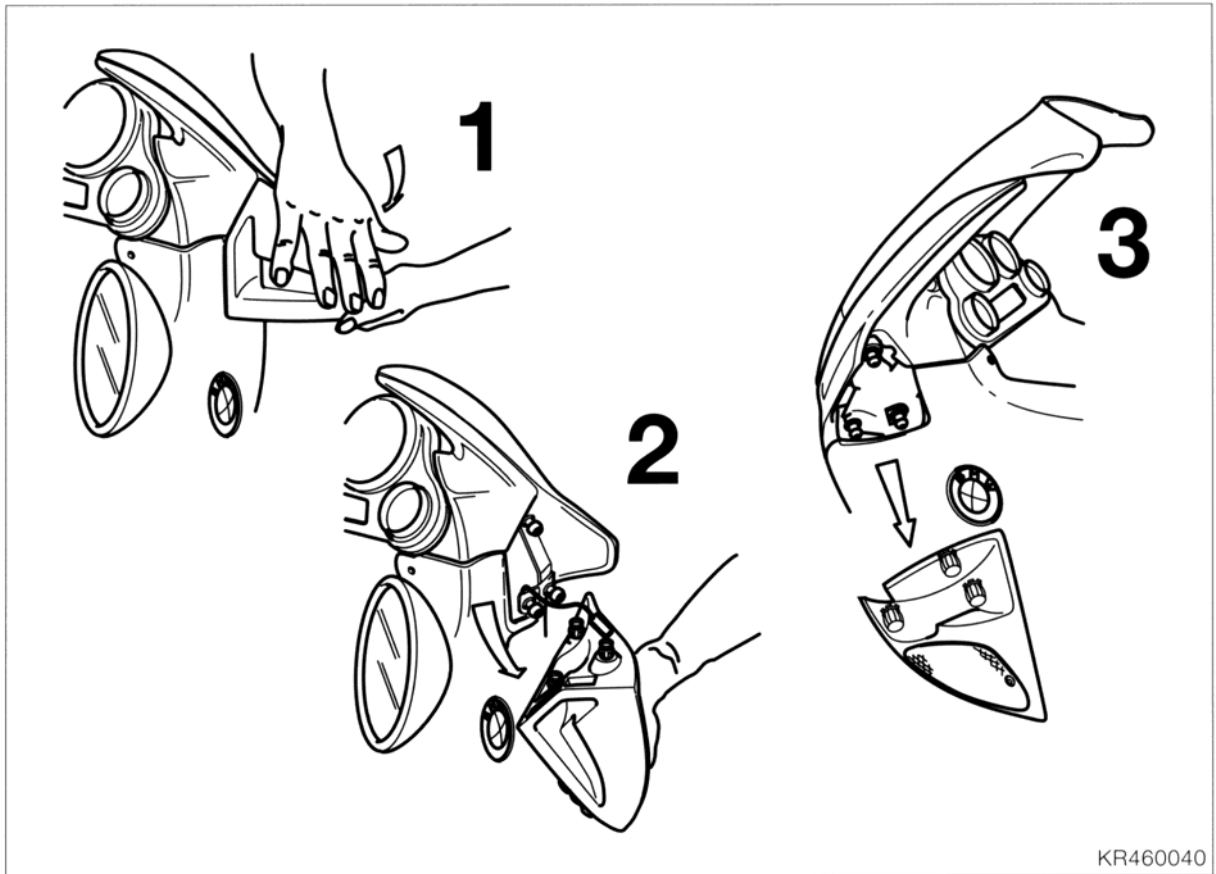
- Remove the dualseat. (→ 46.6)
- **[USA]** Undo the cable strap for the activated charcoal filter at the front of the rear carrier section.
- Release the rear carrier section from the frame at left and right (secured with clips).
- Release the rear and front carrier sections together at the frame.
- Release the rear carrier section from the battery carrier at the front.
- Separate the plug connector for the power socket.
- Install in the reverse order of work.



### Tightening torque:

Rear carrier section, front:  
 to battery carrier ..... 3 Nm  
 together with rear of rear carrier section  
 to frame ..... 3 Nm





## Removing/installing fairing

### Removing/installing left/right hand guard

#### Removing left/right hand guard

- Hold the hand guard with one hand and detach it at the front (1) by striking it lightly with the other hand.
- Separate the plug connector for the flashing turn indicator (2).



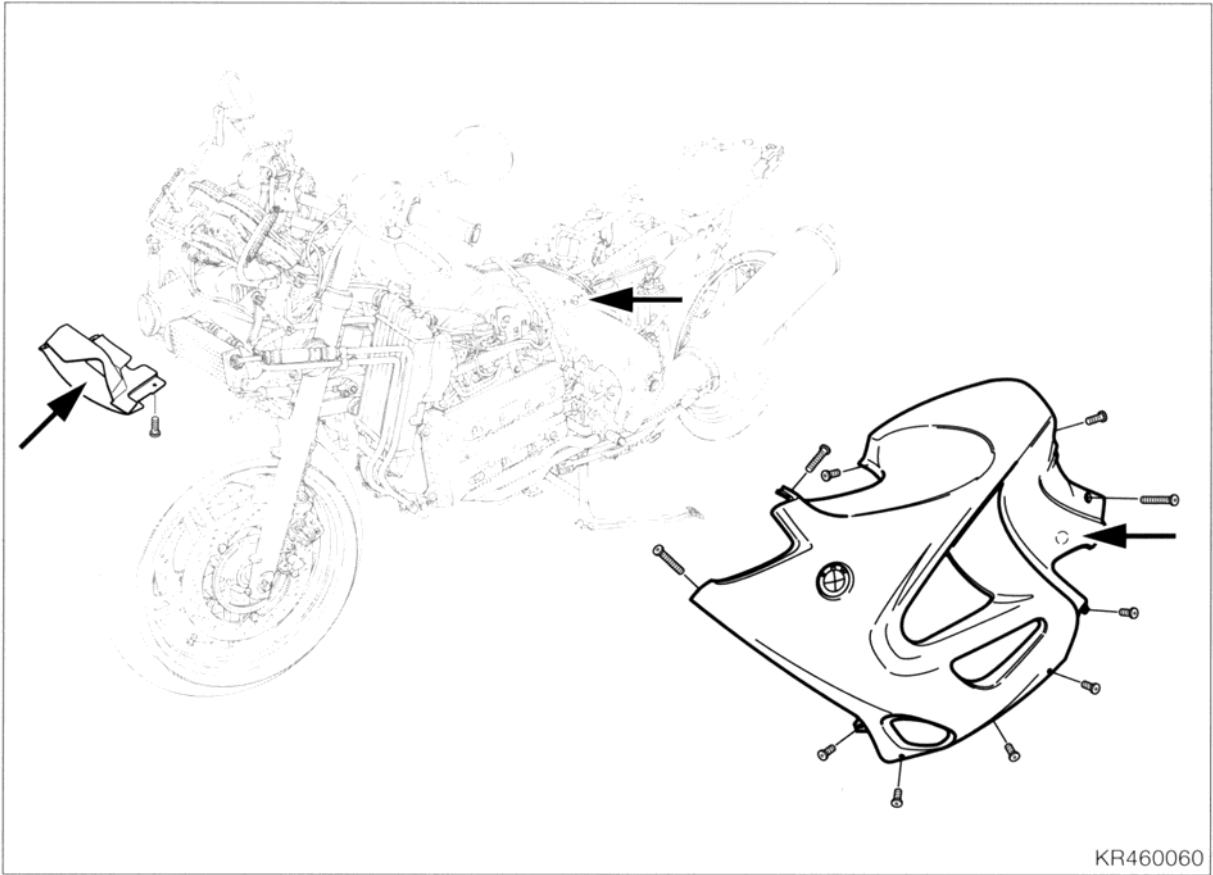
#### Note:

Each hand guard is secured to the fairing holder by three retaining pins.

#### Installing left/right hand guard

- Join the plug connector for the flashing turn indicator.
- Offer up the hand guard at the three retaining pins and press it on.





KR460060

### Removing/installing left/right side sections of fairing

- Remove the dualseat.  
(→ 46.6)
- Release the air guide fastenings (arrow) at the oil cooler.
- Release the fastenings for the left and right side sections of the fairing.



#### Note:

The side sections of the fairing are attached to retaining pins at the tank cover and on the frame at the sides (arrows).

- Install in the reverse order of work, noting the following operations in particular.



#### Caution:

Avoid scratching the paint; take special care when installing the side sections of the fairing on the upper section and the hand guards.



#### Note:

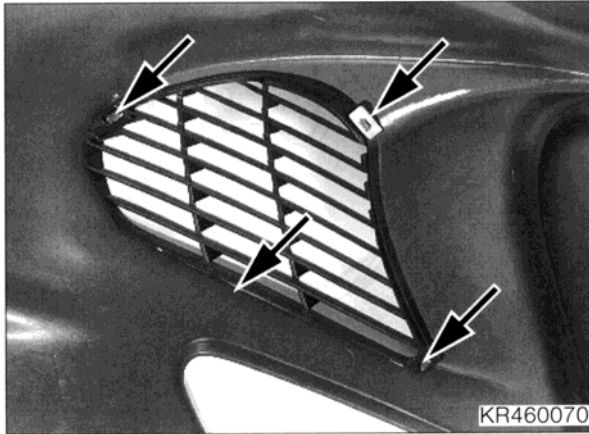
See table below for correct order of assembly.



#### Tightening torque:

Side section of fairing:	
to tank cover at rear .....	3 Nm
to rear of frame .....	3 Nm
at rear section of frame .....	3 Nm
to engine spoiler .....	3 Nm
to fairing holder at front.....	3 Nm
to inner cover at front.....	3 Nm
to tank cover at front.....	3 Nm
Air guide for oil cooler .....	3 Nm

## Removing/installing left/right air outlet grilles

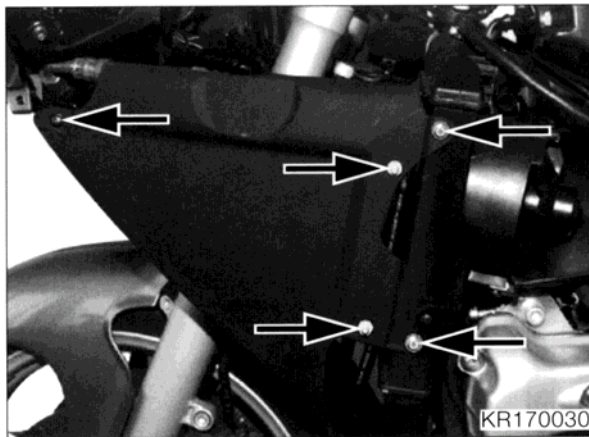


### **! Caution:**

Carefully open up the spring nuts (arrows). When installing, do not damage the projections on the side section of the fairing.

## Removing/installing intake air guide

- Remove the left side section of the fairing (→ 46.10).



- Loosen fastenings (arrows) and take off intake air guide.
- Install in the reverse order of work.

### **! Tightening torque:**

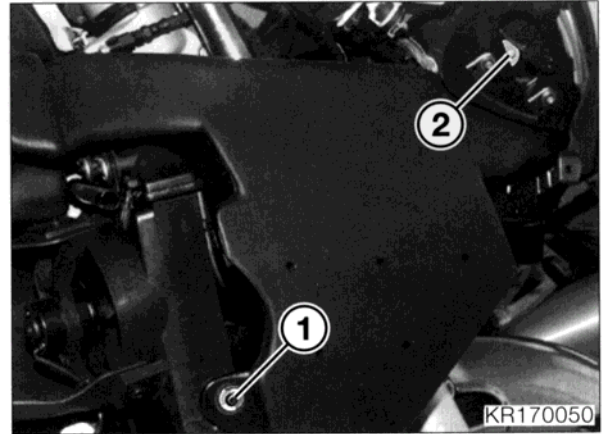
Intake air guide:  
to radiator ..... hand-tight  
to fairing holder ..... 3 Nm

## Removing/installing intake air pipe

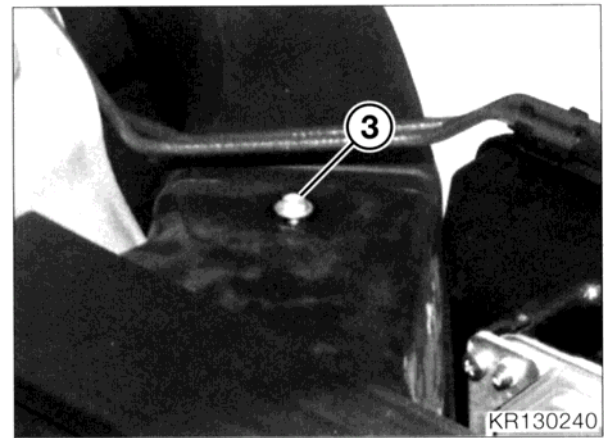
### **! Warning:**

Comply with safety regulations; note that fuel lines are pressurised.

- Remove the fuel tank. (→ 16.5)
- Take off the oil cooler.
- Remove the right hand guard. (→ 46.9)



- Release the fastenings for the intake air pipe at the right radiator (1) and at the fairing holder (2).



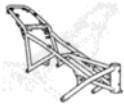
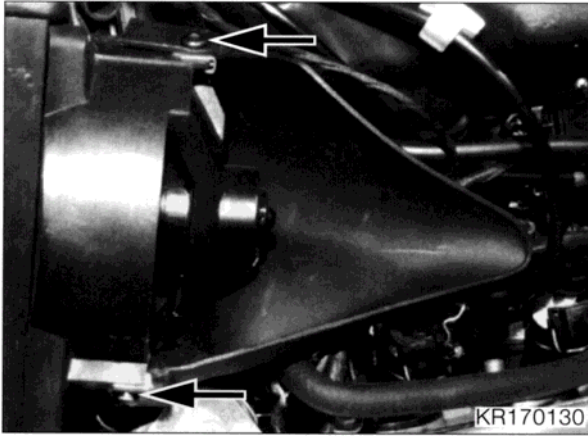
- Release fastening (3) at the intake air silencer.
- Pull the intake air pipe off the right radiator and the intake air silencer and pull it downwards and to the front out of the fairing holder.
- Install in the reverse order of work.

### **! Tightening torque:**

Intake air pipe to fairing holder ..... 10 Nm  
Oil cooler ..... 9 Nm

## Removing/installing air outlet guide for left/right radiator

- Remove the left/right side section of the fairing. (→ 46.10)



- Undo screws (arrows) and take off the radiator air outlet guide.



### Note:

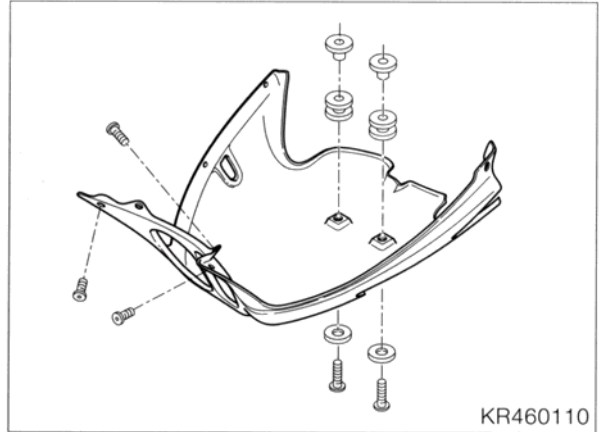
When removing and installing at the left, detach the radiator at the top from its holder if necessary.

- Install in the reverse order of work.

### Tightening torque:

Air outlet guide to radiator surround..... 3 Nm

## Removing/installing engine spoiler



- Detach the engine spoiler at the left/right side sections and at front left engine spoiler holder.
- Detach the engine spoiler at the lower holder and remove it.
- Install in the reverse order of work.

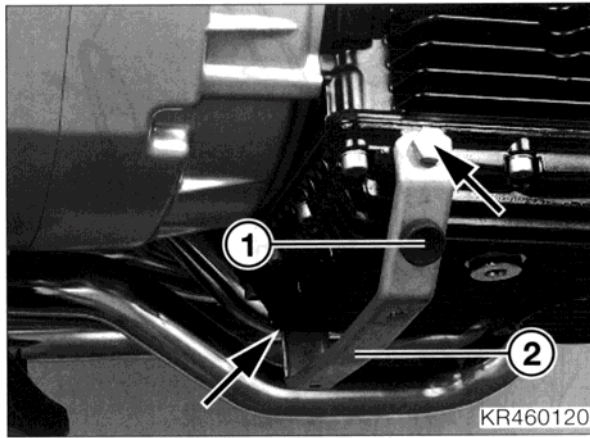
### Tightening torques:

Engine spoiler:

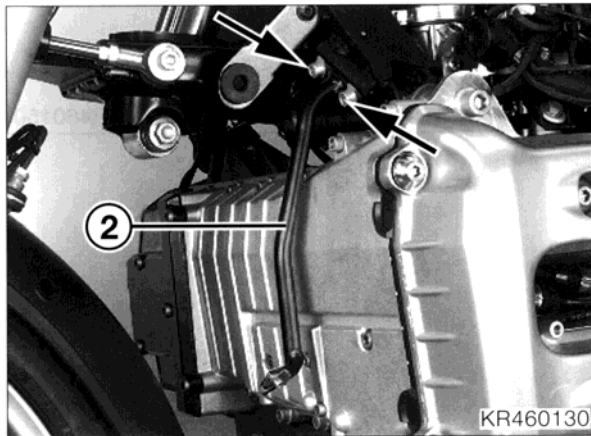
at lower holder .....	9 Nm
at front left holder.....	3 Nm
at fairing.....	3 Nm

## Removing/installing holder for engine spoiler

- Remove engine spoiler.  
(→ 46.12)



- Take out screws (arrows) at left and right and remove the engine spoiler holder (2) downwards.
- Remove rubber support (1).



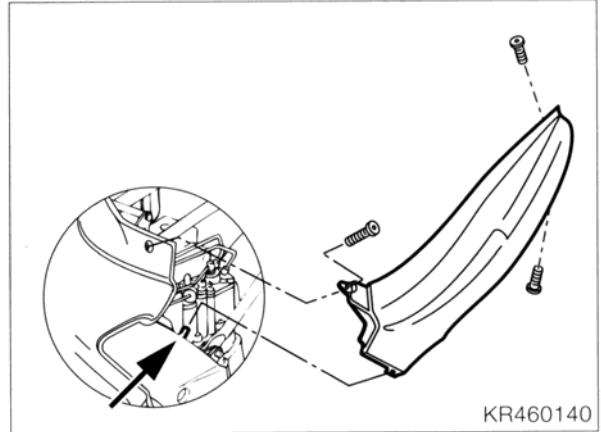
- Undo the screws (arrows) at the cross-member and take off the front left engine spoiler holder (2).
- Install in the reverse order of work.

### Tightening torques:

Holder for engine spoiler:  
 lower, at sump ..... 22 Nm  
 front left, at frame ..... 9 Nm

## Removing/installing left/right rear side section

- Remove the dualseat.  
(→ 46.6)
- **[Optional extra pannier case carrier]** Detach the left/right pannier case carrier at the front.



- Detach the left/right rear side section.



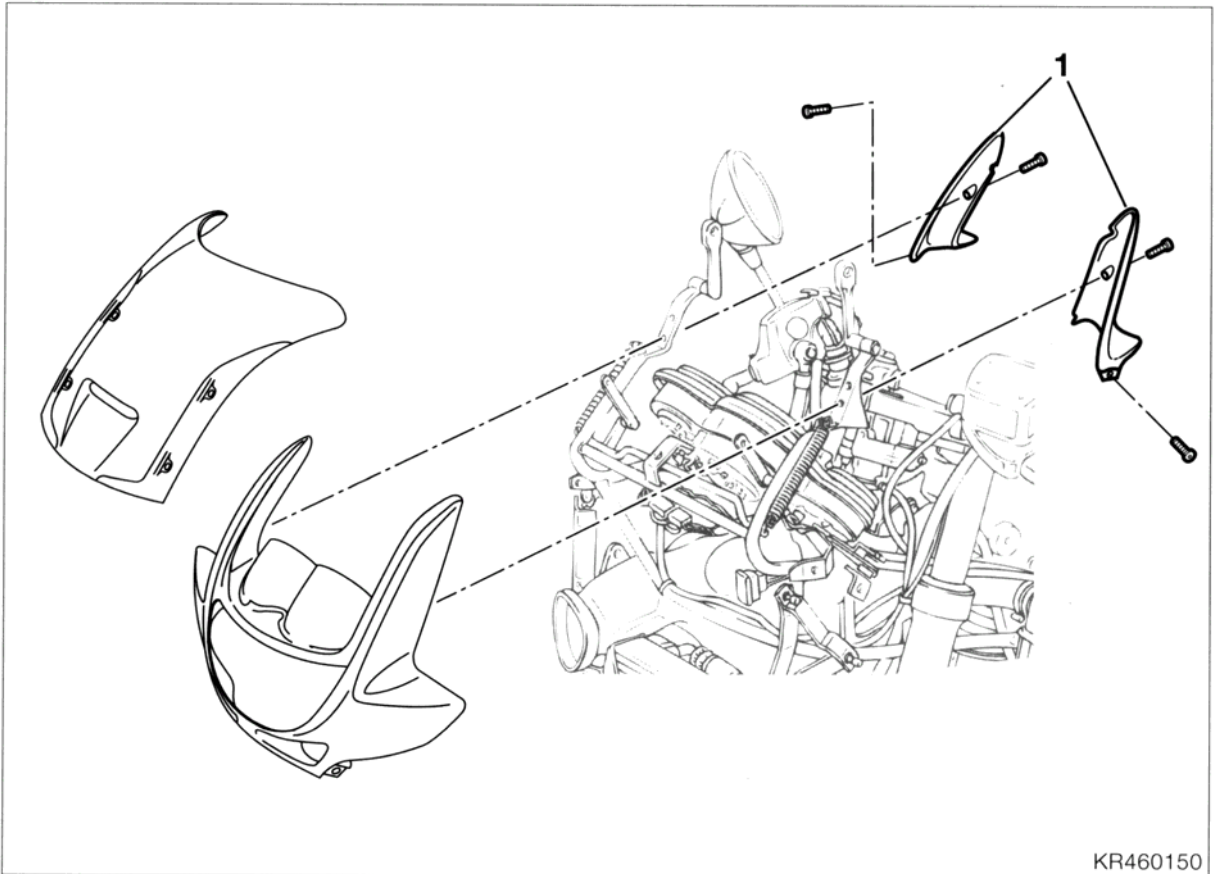
### Note:

The rear side section is a push fit at the front (arrow).

- Install in the reverse order of work.

### Tightening torques:

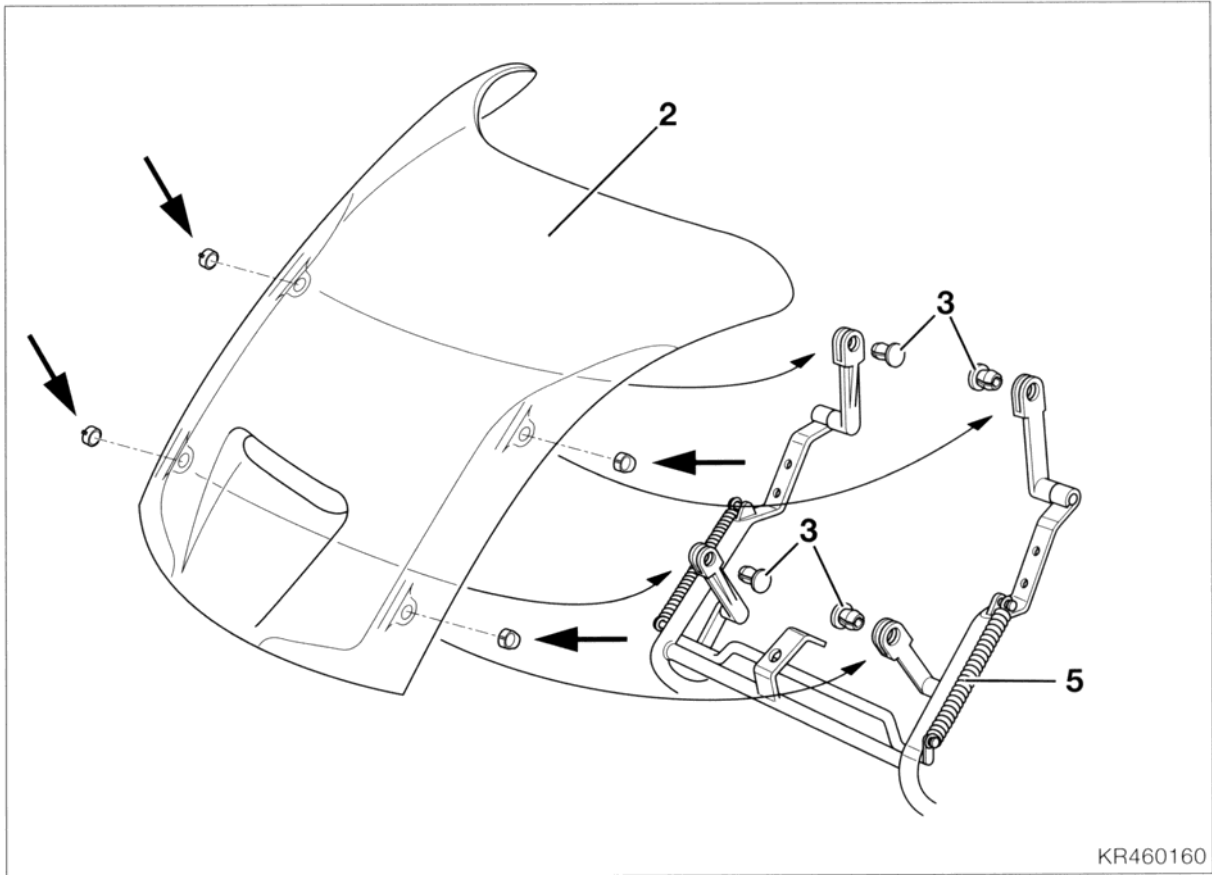
Rear side section ..... 3 Nm  
 Pannier case carrier, front ..... 22 Nm



### Removing/installing left/right inner cover

- Remove left/right hand guard.  
(→ 46.9)
- Remove left/right side section of fairing.  
(→ 46.10)
- Detach and remove left/right inner cover (1).
- Install in the reverse order of work.

**Tightening torque:**  
 Inner cover ..... 3 Nm



KR460160

## Removing/installing windshield and windshield holder

### Removing and installing windshield



**Note:**

The windshield can be set manually to two positions.

- Raise the windshield (2).
- Press out pins (3) towards the bike's centreline and take off the windshield.



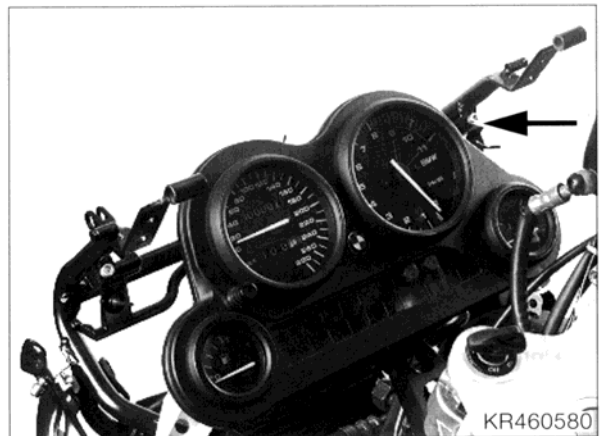
**Caution:**

Do not re-use the pins.

- Press the bushings (arrows) out of the cutouts in windshield (1).
- Install in the reverse order of work.

### Removing/installing windshield holder

- Remove windshield (2).
- Remove left/right inner cover.  
(→ 46.14)
- Remove top section of fairing with headlight.  
(→ 46.16)
- Remove circlips and take off left/right windshield holder at top.
- Remove tensioning springs (5) for windshield holder at left and right.



KR460580

- Unscrew pivot mounting for windshield holder (arrow) at left and right, and take off windshield holder.
- Install in the reverse order of work, noting the following operations in particular.



**Note:**

When installing, grease windshield holder at top left and right with **Staburags NBU 30 PTM**.

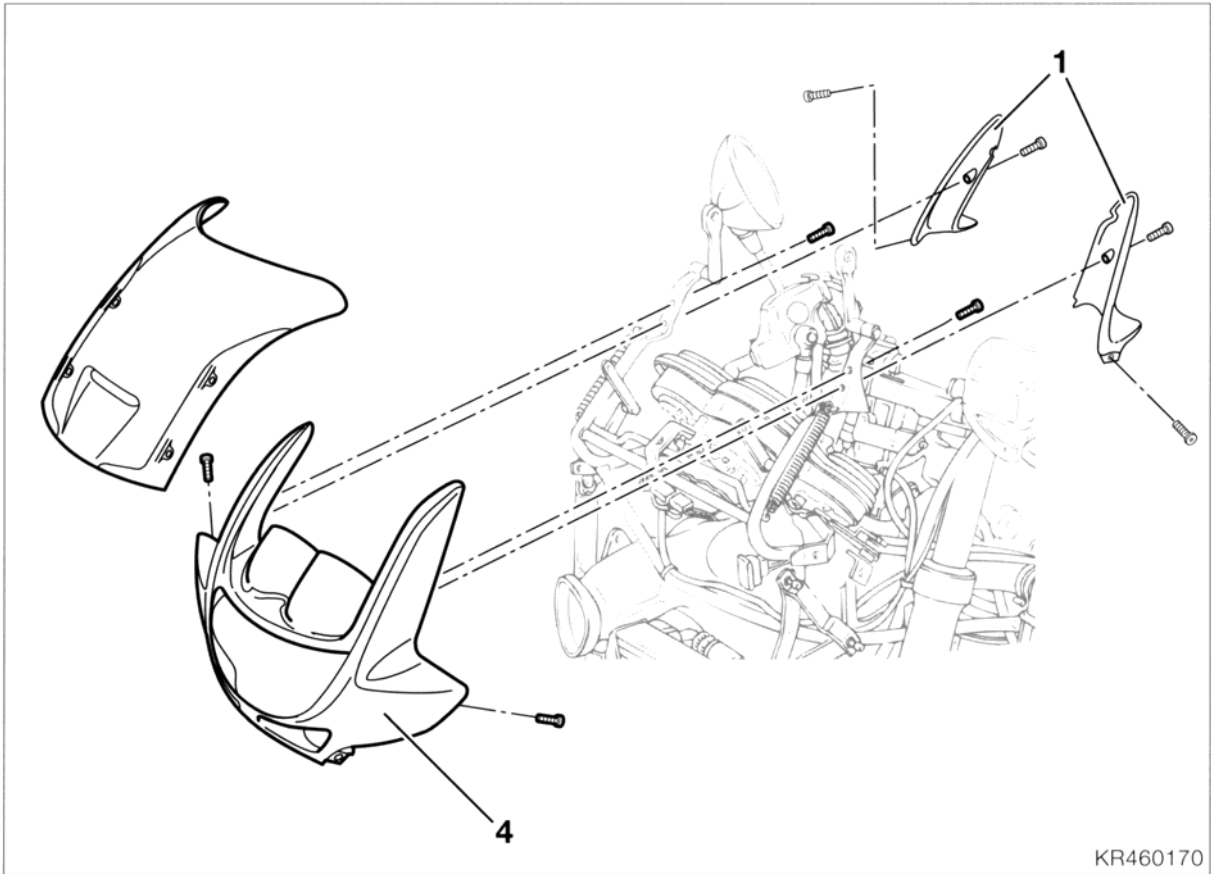
**Lubricant:**

Windshield holder .....Staburags NBU 30 PTM



**Tightening torque:**

Windshield pivot mounting ..... 6 Nm



KR460170

### Removing/installing upper section of fairing with headlight

- Remove windshield  
(⇒ 46.15)
- Remove left/right inner cover (1).  
(⇒ 46.14)
- Separate plug connector for headlight.
- Unscrew the upper section of the fairing (4) with headlight.
- Remove the parking light bulb and take off the upper section of the fairing with headlight.
- Remove the headlight if necessary.
- Install in the reverse order of work.

#### **Tightening torques:**

Headlight..... 3 Nm  
Upper section of fairing ..... 3 Nm





## Removing and installing fairing holder

- Remove windshield.  
(⇒ 46.15)



### Caution:

Comply with safety regulations; fuel lines are pressurised.

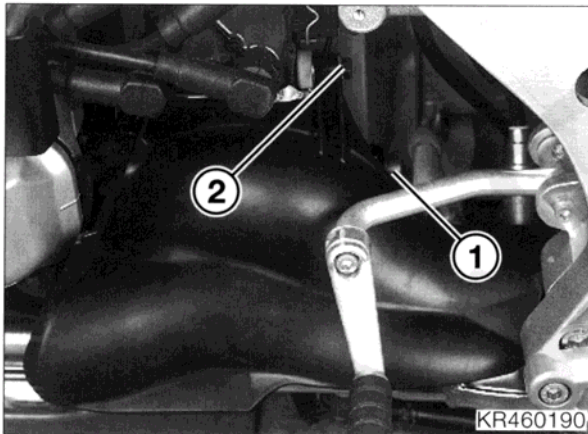
- Remove fuel tank.  
(⇒ 16.5)
- Remove left/right inner cover.  
(⇒ 46.14)
- Remove top section of fairing with headlight.  
(⇒ 46.16)
- Remove air inlet guide to left radiator.  
(⇒ 46.11)
- Remove right air intake pipe.  
(⇒ 46.11)
- Detach lines from oil cooler and remove it.
- Separate plug connector for horn.
- Release the instrument cluster at the fairing holder.

- Release the cable straps, guide the instrument cluster with wiring harness through the fairing holder and set it down on the frame.
- Detach the radiators at left and right from their holders and press forwards.
- Release the fairing holder and pull off forwards.
- Remove windshield holder and horn.
- Remove add-on parts.
- Install in the reverse order of work.

### Tightening torques:

Fairing holder:	
at frame, left/right.....	30 Nm
at centre of frame.....	22 Nm
Instrument cluster.....	9 Nm
Oil lines to oil cooler.....	25 Nm

## Removing/installing heat shield



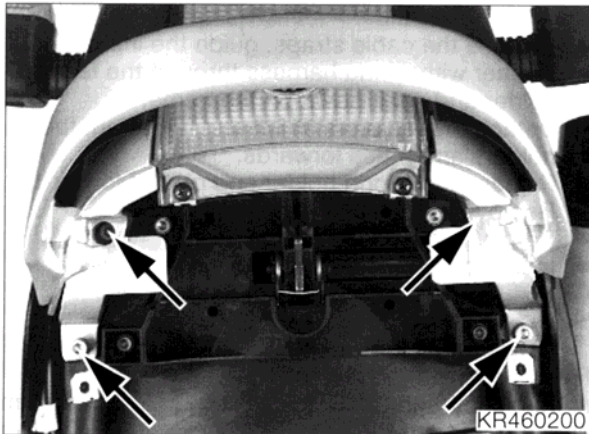
### Tightening torques:

Heat shield:  
 at gearbox (1) ..... 22 Nm  
 at coil (2) ..... 9 Nm



## Removing/installing grab handle

- Remove the dualseat.  
 (→ 46.6)

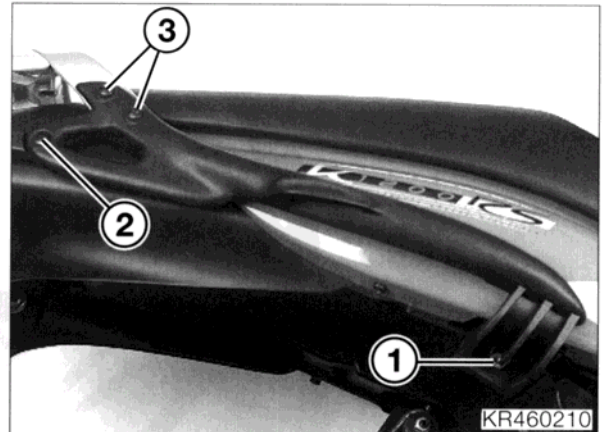


- Take out screws (arrows) for grab handle.
- Install in the reverse order of work.

### Tightening torque:

Grab handle ..... 9 Nm

## [OE] Removing/installing pannier case carrier

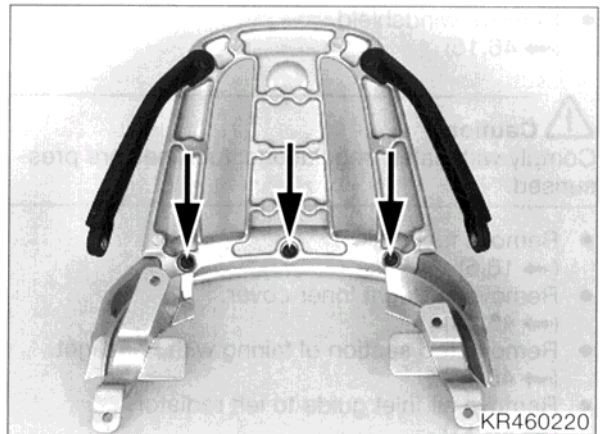


### Tightening torque:

Pannier case carrier:  
 at front, to frame (1) ..... 22 Nm  
 at luggage rack (2) ..... 3 Nm  
 at grab handle (3) ..... 3 Nm

## [OE] Removing/installing luggage rack

- Remove the dualseat.  
 (→ 46.6)



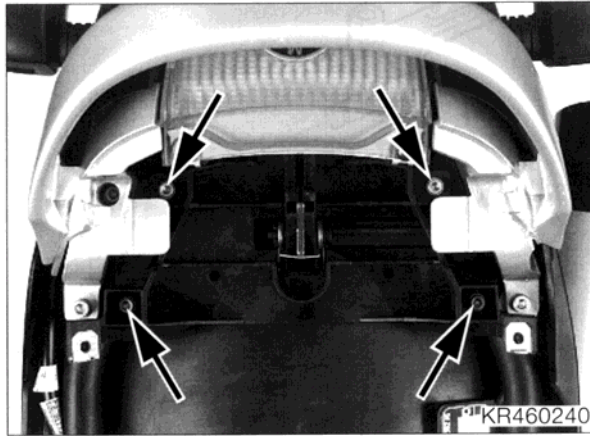
- Detach the left/right pannier case carriers from the luggage rack.
- Detach the luggage rack at the bottom of the grab handle (arrows).
- Install in the reverse order of work.

### Tightening torques:

Luggage rack:  
 to pannier case holder ..... 3 Nm  
 to grab handle ..... 3 Nm

## Removing/installing lock carrier

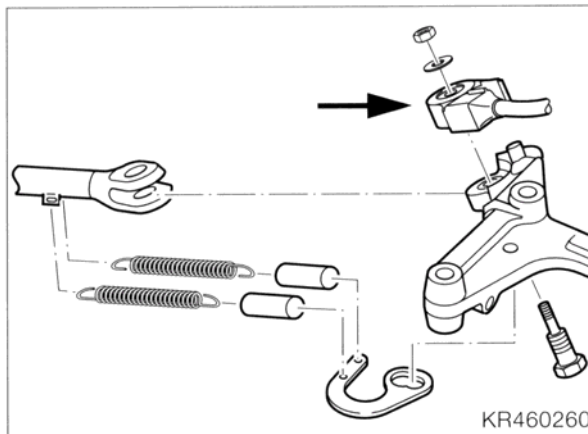
- Remove the dualseat.  
(→ 46.6)



- Remove the screws (arrows) and pull the lock carrier out to the right.
- Install in the reverse order of work.

**Tightening torque:**  
Lock carrier ..... 9 Nm

## Stripping/assembling side (prop) stand



- Disconnect the tension springs and take off the plate with the springs.
- Remove switch for side (prop) stand (arrow).  
(→ 61.16)
- Take off the side (prop) stand.
- Install in the reverse order of work, noting the following operations in particular.

**Caution:**  
Install screw and nut with **Loctite 243**.

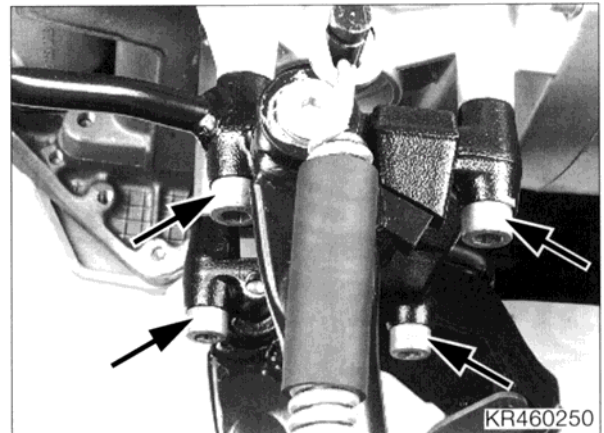
**Lubricant:**  
for bearing bushing.....**Shell Retinax EP 2**

**Tightening torques:**  
Side stand to pivot mount  
(clean thread + Loctite 243) ..... 41 Nm  
Switch to side stand  
(clean thread + Loctite 243) ..... 6 Nm

## Removing/installing pivot mount with centre (main)

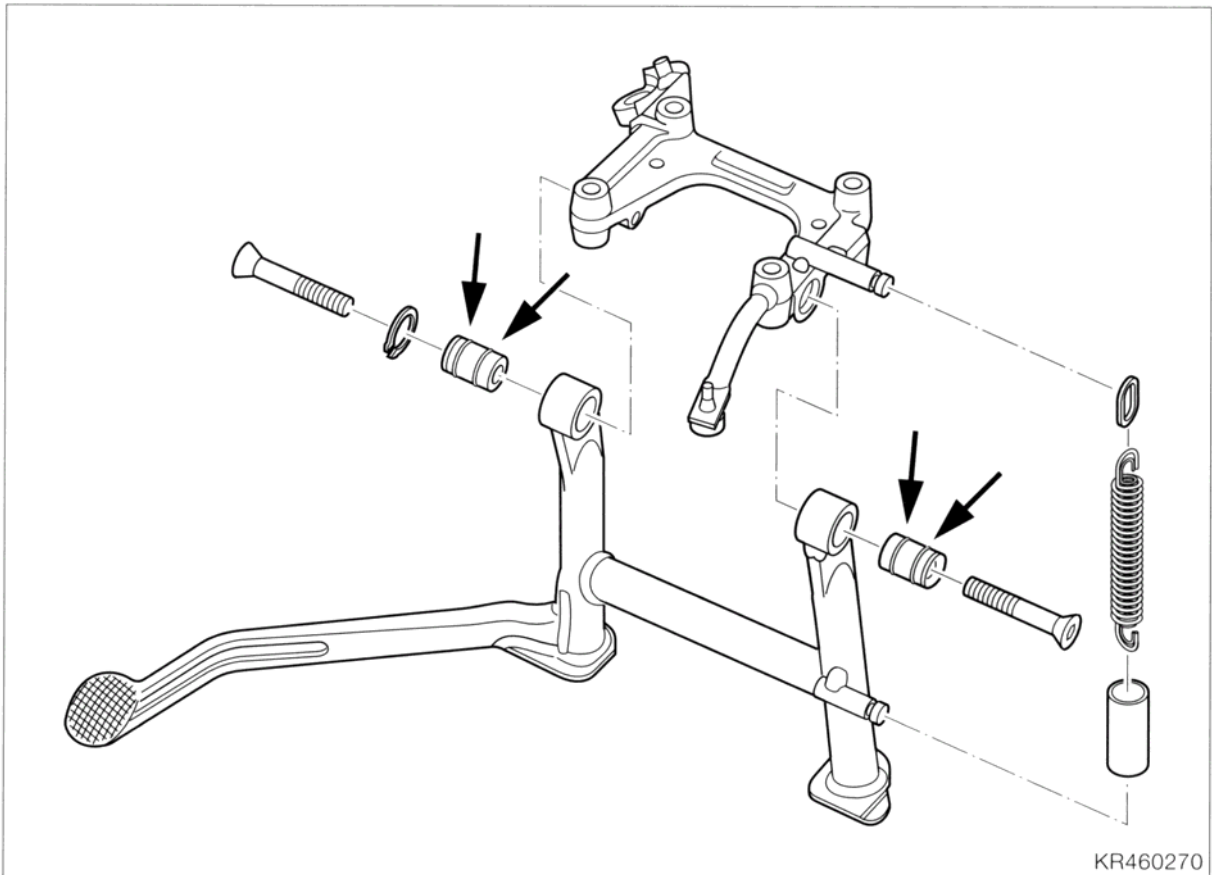
and side (prop) stands

- Remove the dualseat.  
(→ 46.6)
- Remove engine spoiler.  
(→ 46.12)
- Remove holder for engine spoiler.  
(→ 46.13)
- Attach hoist, **BMW No. 00 1 510**, to sump.
- Raise the motorcycle until the centre stand can move freely.
- Disconnect the cable strap, separate the plug connector for the side stand switch and guide the cable through downwards.



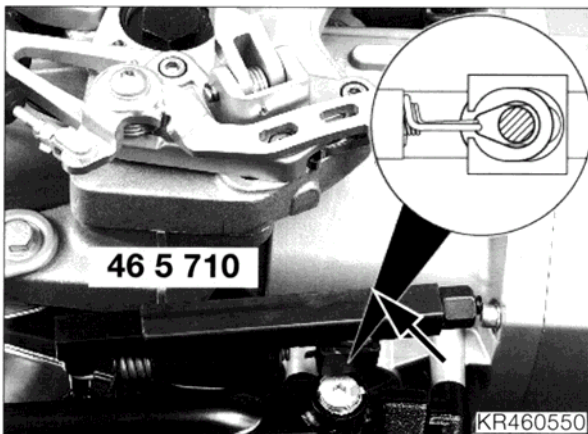
- Take out the screws (arrows) holding the pivot mount.
- Install in the reverse order of work.

**Tightening torque:**  
Pivot mount to gearbox..... 41 Nm



### Stripping/assembling centre (main) stand

- Remove the screw at right and left.
- Remove the circlip at the left.
- Press out the sleeve at right and left.
- Take off the pivot mount.
- Remove the O-rings (arrows).



**Note:**

Do not re-use the same O-rings.

- Install in the reverse order of work, noting the following operations in particular.



**Caution:**

Insert screws with **Loctite 243**.

**Lubricant:**

for sleeves.....**Staburags NBU 30 PTM**

- Using spring tensioner, **BMW No. 46 5 710**, tension the springs until they can be detached at the pivot mount (arrow).



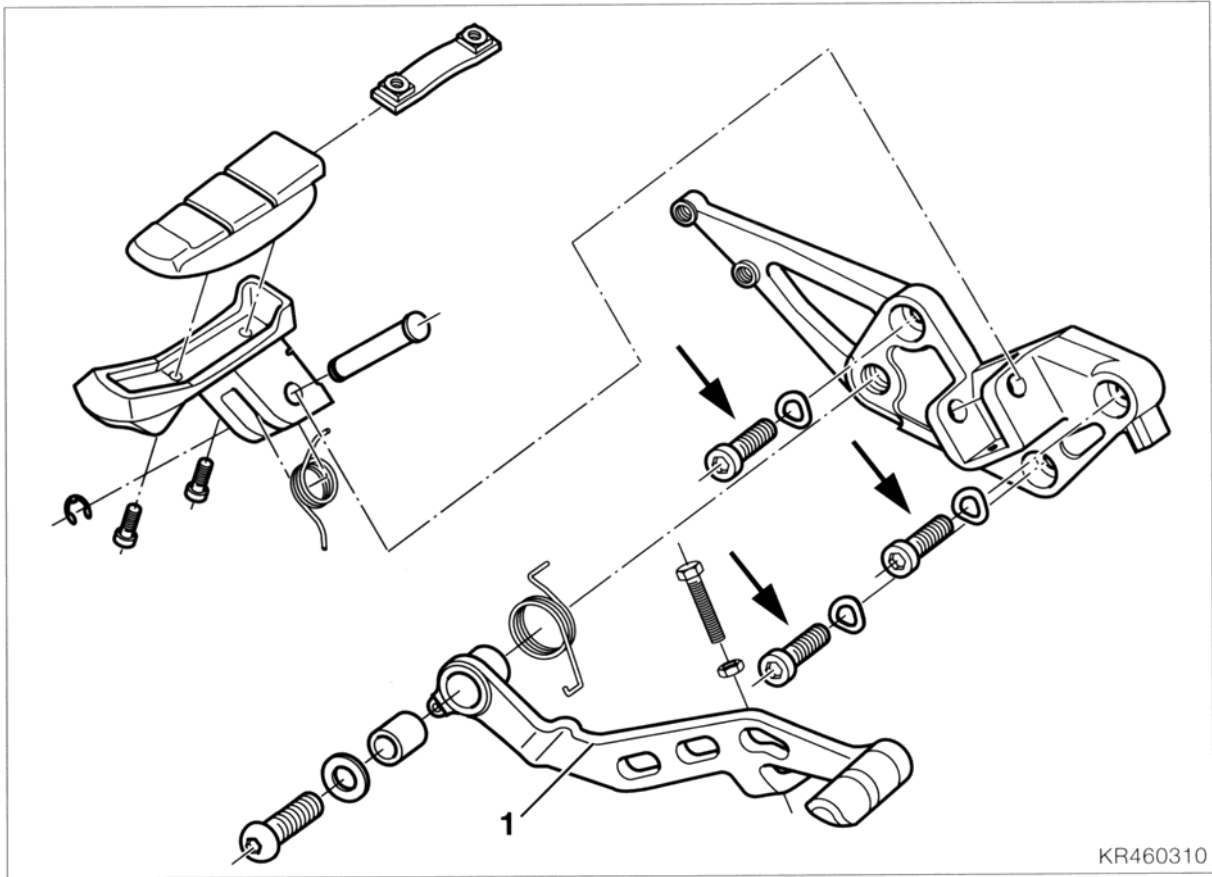
**Note:**

Fold up the centre stand.

- Release the spring tensioner and take off the plate with the springs.

**Tightening torque:**

Centre stand to pivot mount  
(clean thread + Loctite 243) .....41 Nm



## Removing/installing footrest supports

### Removing/installing right footrest support

- Mark the installed position.
- Remove the screws (arrows) and secure the footrest support to the frame together with the brake line and the master brake cylinder.
- Install the footrest support as indicated by the previously marked position.

### Removing and installing brake pedal

#### **Caution:**

When installing, check blow-by clearance at piston rod.  
(→ 34.13)

- Release the pin for the brake linkage.
- Detach the master cylinder from the footrest plate.

#### **Caution:**

The fastening is secured with a thread retaining agent.

- Detach the brake pedal (1) from the footrest plate and remove it with the torsion spring, bearing bushing and washer.

#### **Caution:**

Use a new screw when installing.

- Install in the reverse order of work, noting the following operations in particular.

#### **Lubricant:**

.....Staburags NBU 30 PTM

#### **Tightening torques:**

Footrest support to frame .....	21 Nm
Brake pedal stop .....	7 Nm
Brake pedal .....	41 Nm
Master cylinder .....	7 Nm

## Removing/installing footrest

- Remove lock washer, pin and torsion spring; take off footrest.



**Note:**  
When installing pin for footrest, grease with **Shell Retinax EP 2**.

- Remove footrest rubber at footrest.
- Install in the reverse order of work.



**Lubricant:**  
..... Shell Retinax EP 2

**Tightening torque:**  
Footrest rubber to footrest ..... 4 Nm

## Removing/installing brake light switch

- Unscrew and remove the brake light switch.
- Install in the reverse order of work.

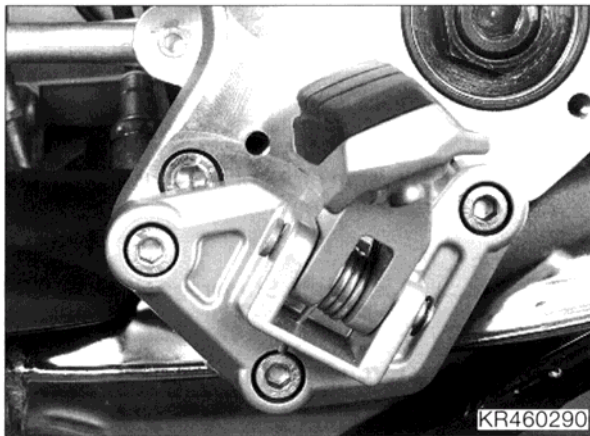


**Note:**  
The brake light must come on when the rear-wheel brake starts to slow the wheel.



**Tightening torque:**  
Brake light switch ..... 5 Nm

## Removing/installing left footrest support



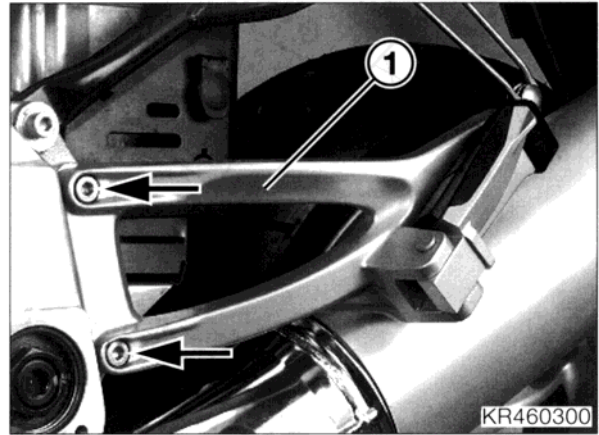
**Note:**  
When installing the footrest pin, grease it with **Shell Retinax EP 2**.

**Lubricant:**  
.....Shell Retinax EP 2



**Tightening torques:**  
Footrest plate to frame ..... 21 Nm  
Footrest rubber to footrest ..... 4 Nm

## Removing/installing rear left footrest holder



- Unscrew nut for battery holder.
- Take out screws (arrows) and remove footrest holder (1).
- Remove footrest.



**Note:**  
Note presence of ball and spring; when installing, grease footrest pin with **Shell Retinax EP 2**.

- Remove footrest rubber from footrest.
- Remove guide cap.



**Caution:**  
The guide cap (case mounting) is secured to the footrest holder with self-tapping screws. Insert screws with **Loctite 2701**.

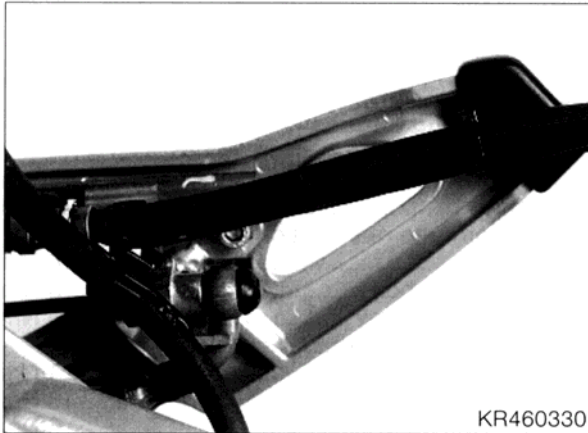
- Install in the reverse order of work.

**Lubricant:**  
.....Shell Retinax EP 2



**Tightening torques:**  
Footrest holder to frame at rear ..... 21 Nm  
Battery carrier, left, to footrest holder ..... 15 Nm  
Footrest rubber to footrest ..... 4 Nm

## Removing/installing right-hand rear footrest holder



- Remove the retaining plate for the brake lines (arrow) at the footrest holder.
- Take out the screws and remove the footrest holder.
- Remove the footrest.



### Note:

Note presence of ball and spring; when installing, grease footrest pin with **Shell Retinax EP 2**.

- Remove footrest rubber from footrest.
- Remove the guide cap.



### Note:

The guide cap (case mounting) is secured to the footrest holder with self-tapping screws. Insert screws with **Loctite 2701**.

- Install in the reverse order of work.

### Lubricant:

..... **Shell Retinax EP 2**



### Tightening torque:

Rear footrest holder to frame ..... 21 Nm  
 Retaining plate for brake lines .....  
 Footrest rubber to footrest ..... 4 Nm

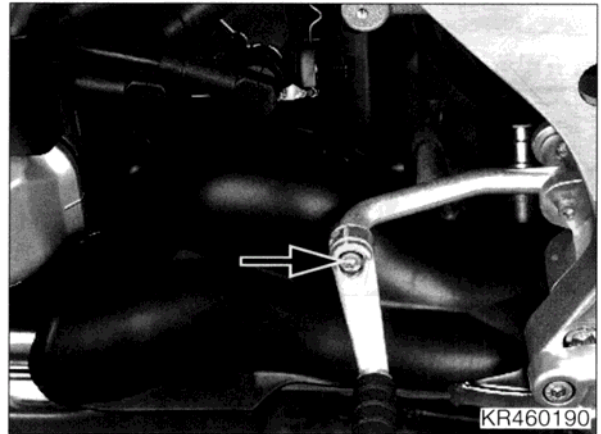
## Adjusting footrests at left/right

- Remove the left/right footrest support.
- Install the left/right footrest support in the alternative position.



### Note:

Make sure that the left and right footrest supports are both in either the upper or the lower position.



- Remove screw (arrow) and reposition the gear shift pedal to suit the altered footrest position.

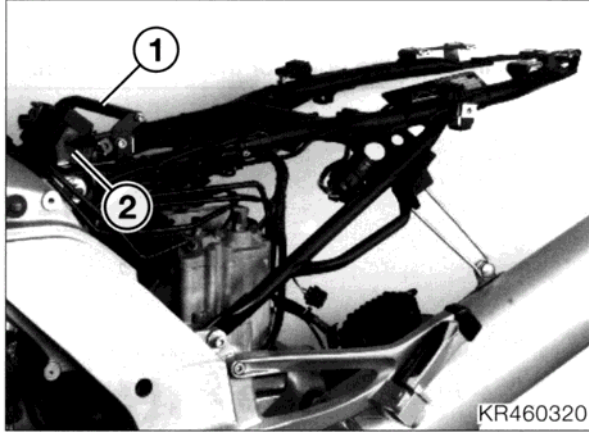


### Tightening torques:

Footrest support to frame ..... 21 Nm  
 Gear shift pedal ..... 21 Nm

## Removing and installing frame

### Removing/installing rear section of frame



KR460320

#### **Caution:**

Attach and tighten the positive battery terminal first, then the negative one.

- Detach and insulate earth (ground) lead at battery.
- Remove left/right side sections of fairing. (⇒ 46.10)
- Remove the rear section. (⇒ 46.8)
- Remove the grab handle. (⇒ 46.18)
- **[OE pannier case carrier with luggage rack]**  
Remove grab handle with luggage rack.
- Remove lock carrier. (⇒ 46.19)
- Remove rear carrier section. (⇒ 46.8)
- Remove coolant level equalising tank.
- Remove cable straps for wiring at rear of frame.
- Remove plug connectors at left and right of rear section of frame.
- Remove the diagnostic plug.
- Press the spring clip back and take off the fuse box.
- Remove the retaining hoop for the exhaust system.
- Remove the support for the seat tray (1).
- Remove the fuse box holder (2).
- Detach the battery holder at the rear of the frame on the right.
- Press the brake fluid reservoir out of its retaining clip.
- Detach the rear section of the frame from the main frame and lift it away.
- Remove add-on parts.



#### **Note:**

When exchanging the rear section of the frame, the motorcycle's type plate must be renewed.

- Install in the reverse order of work.

#### **Tightening torques:**

Rear section of frame to main frame:	
top .....	41 Nm
bottom .....	21 Nm
Battery carrier to rear section of frame	
at right .....	6 Nm
Holder for fuse box .....	9 Nm
Support for seat tray .....	6 Nm
Retaining hoop for exhaust system	
at frame .....	24 Nm
at silencer (muffler) .....	13 Nm
Coolant level equalising tank .....	6 Nm
Front section of rear carrier:	
to battery carrier .....	3 Nm
together with rear section of rear carrier	
to frame .....	3 Nm
Lock carrier .....	9 Nm
Grab handle .....	9 Nm
Pannier case carrier to frame .....	22 Nm
Rear section:	
left/right, at frame .....	3 Nm
bottom, at frame .....	3 Nm
Side section of fairing:	
rear, at tank cover .....	3 Nm
at rear of frame .....	3 Nm
rear, at frame .....	3 Nm
at engine spoiler .....	3 Nm
front, at fairing holder .....	3 Nm
front, at inner cover .....	3 Nm
front, at tank cover .....	3 Nm
Air guide for oil cooler .....	3 Nm

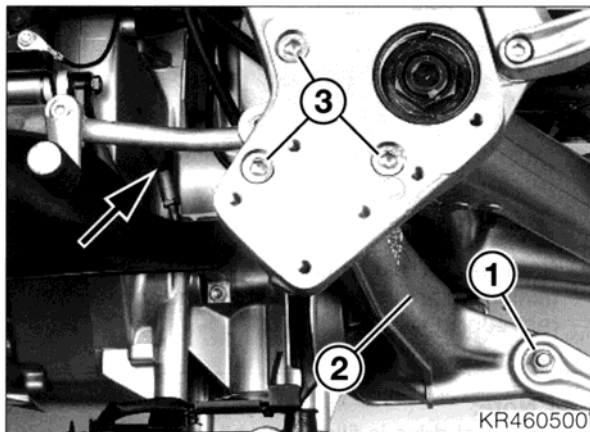


## Removing/installing cross-tube



### Note:

Before removing the cross-tube, remove either the exhaust system or the rear swinging arm.



- Open the safety catch (arrow) and disconnect the gear shift lever.
- Remove the left footrest support. (→ 46.22)
- Remove the right footrest support and attach it to the frame together with the brake line and master cylinder. (→ 46.21)
- Disconnect the rear wheel drive reaction strut (1) at cross-tube (2).
- Take out screws (3) for the cross-tube at left and right and remove the cross-tube.
- Install in the reverse order of work.

### Tightening torques:

Lower cross-tube to frame .....	41 Nm
Left footrest support.....	21 Nm
Right footrest support .....	21 Nm
Reaction strut to cross-tube.....	43 Nm

## Removing/installing left/right cross-member

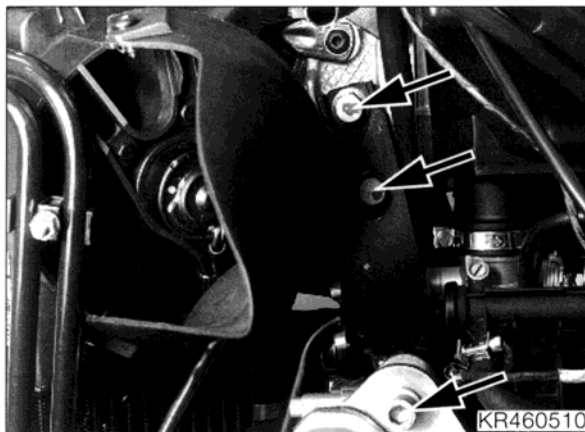


### Warning:

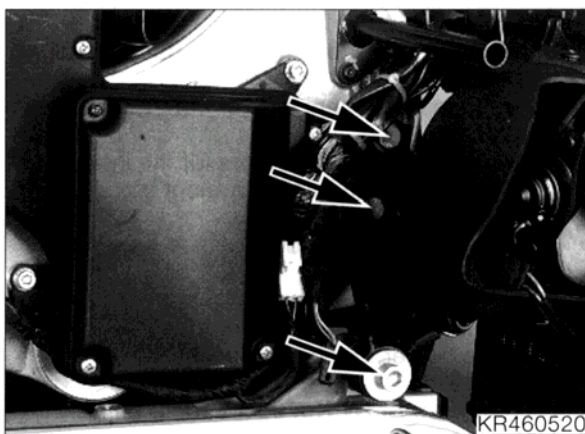
Comply with safety precautions when handling or working with fuel; note that the fuel lines are pressurised.

- Remove fuel tank. (→ 16.5)
- Remove air inlet guide to left radiator. (→ 46.11)
- Remove right air intake pipe. (→ 46.11)

- Detach left/right radiators from their holders and press them forwards.
- Remove engine spoiler. (→ 46.12)
- Remove holder for engine spoiler. (→ 46.13)
- Attach hoist, **BMW No. 00 1 510**, to sump.



- Take out screws (arrows) and detach left cross-member together with engine spoiler holder.



- Take out screws (arrows) and detach right cross-member.
- Install in the reverse order of work, noting the following operations in particular.



### Note:

For correct order of installation, see table below.

### Tightening torques:

Left/right cross-member to frame .....	74 Nm
Cross-member to engine, left .....	41 Nm
Cross-member to engine, right .....	41 Nm



## Removing and installing frame



### Caution:

Disconnect the negative battery terminal first, then the positive one.

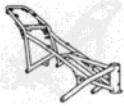
- Remove the battery.  
(⇒ 61.5)
- Remove the rear section of the frame.  
(⇒ 46.24)



### Warning:

Comply with safety precautions when handling or working with fuel; note that the fuel lines are pressurised.

- Remove fuel tank.  
(⇒ 16.5)
- Remove left/right radiators with fans.  
(⇒ 17.8)
- Remove fuel injection rail.  
(⇒ 13.7)
- Remove throttle butterfly rail together with intake air silencer.



### Note:

Disconnect throttle cable at throttle butterfly rail.

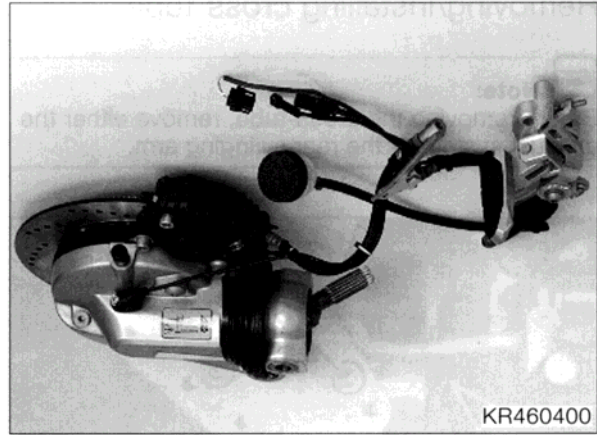
- Detach the instrument cluster from the fairing holder.
- Separate the plug connectors for the instrument cluster in the electronic equipment box and take off the instrument cluster.
- Remove the fairing holder.  
(⇒ 46.17)
- Remove engine spoiler.  
(⇒ 46.12)
- Remove holder for engine spoiler.  
(⇒ 46.13)
- Attach hoist, **BMW No. 00 1 510**, to sump.
- Separate plug connectors for ignition signal transmitter and oil pressure switch and guide the cables through downwards.
- Remove the rear right footrest holder.  
(⇒ 46.23)
- Remove the left/right footrest supports.  
(⇒ 46.22)



### Caution:

Do not allow brake fluid to come into contact with painted parts of the motorcycle, because brake fluid destroys paint.

- Drain fluid from brake system.
- Detach brake lines at rear right retaining plate and seal the brake lines and hoses.
- Separate the plug connectors for the inductive sensor (speedometer), engine speed sensor and rear brake light switch.



- Remove the rear wheel drive together with the retaining plate for the brake lines and the right footrest support.



### Note:

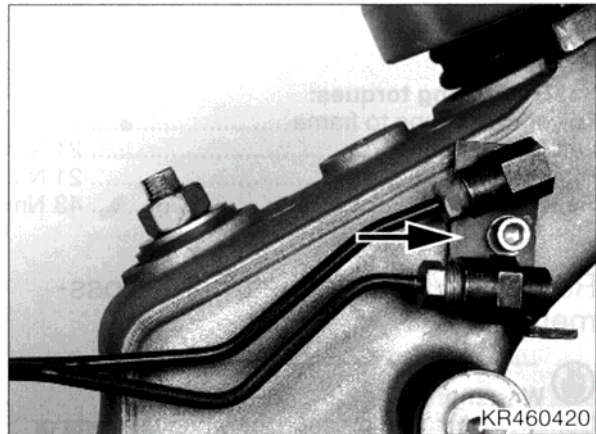
If rear wheel drive is filled with oil, do not place on side prior to installation: this will cause oil to escape later, when the bike is ridden (suction effect).



### Caution:

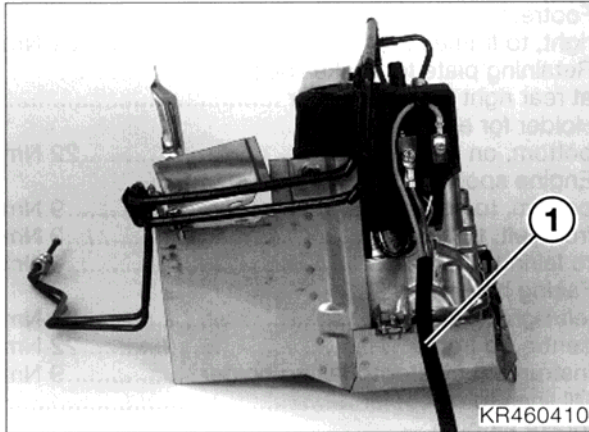
Note high loosening torque at lock ring and left/right threaded rings and bearing journals.

- Remove rear swinging arm.  
(⇒ 33.19)
- Remove the rear suspension strut.  
(⇒ 33.23)

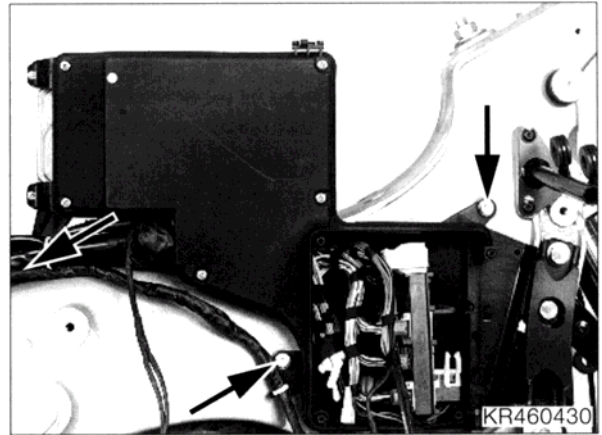


- Detach the brake hoses at the front holder (arrow) and seal the brake hoses and lines.
- Remove the brake lines for the front brake caliper at the pressure modulator and seal the brake lines and the pressure modulator.
- Detach the holder for the front and rear brake lines at the frame and take off the brake lines.
- Separate the plug connector for the ABS control unit.

- Remove the left rear footrest holder.  
(⇒ 46.22)
- Remove the holder for the brake lines at the battery carrier and take off the brake lines and battery carrier together with the pressure modulator, ABS relay and ABS control unit.



- Remove the cover for the ABS relay.
- Detach wiring harness (1) from ABS relay.
- Separate the plug connectors for the gear indicator switch, temperature sensor at cylinder head, side (prop) stand switch and oxygen sensor (lambda probe), and guide the cables through downwards.
- Detach the earth (ground) lead at the upper cross-tube and the leads at the alternator and starter motor.
- Remove rear cross-tube.  
(⇒ 46.25)
- Remove clutch slave cylinder.  
(⇒ 21.9)
- Guide the clutch line through upwards.
- Separate the plug connectors for the left/right handlebars.
- Remove the left handlebar with combined switch, together with the holder for the left radiator, the clutch line and the clutch slave cylinder.
- Remove the right handlebar with combined switch.
- Separate the plug connector for the front wheel speed sensor.



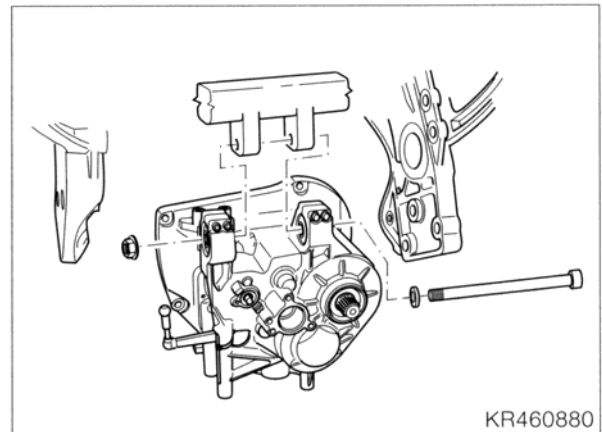
- Detach and remove the electronic equipment box and the wiring harness at the frame (arrows).
- Remove the telescopic fork with the front wheel.  
(⇒ 31.5)



**Note:**

Make sure that oil cannot escape from the telescopic fork.

- Remove fork bridge.  
(⇒ 31.9)
- Remove front suspension strut.  
(⇒ 31.15)
- Tie the leading link up to the frame.
- Detach the cross-member at the frame at left and right.



- Release the gearbox fastenings at the frame, holding at the left to prevent from turning.



**Caution:**

Make sure that the correct clearance is present between gearbox and frame at the right.

- Lift the frame with leading link clear of the other components.
- Remove add-on parts.
- Install in the reverse order of work, noting the following operations in particular.



**Note:**

For correct installation sequence, see table below.

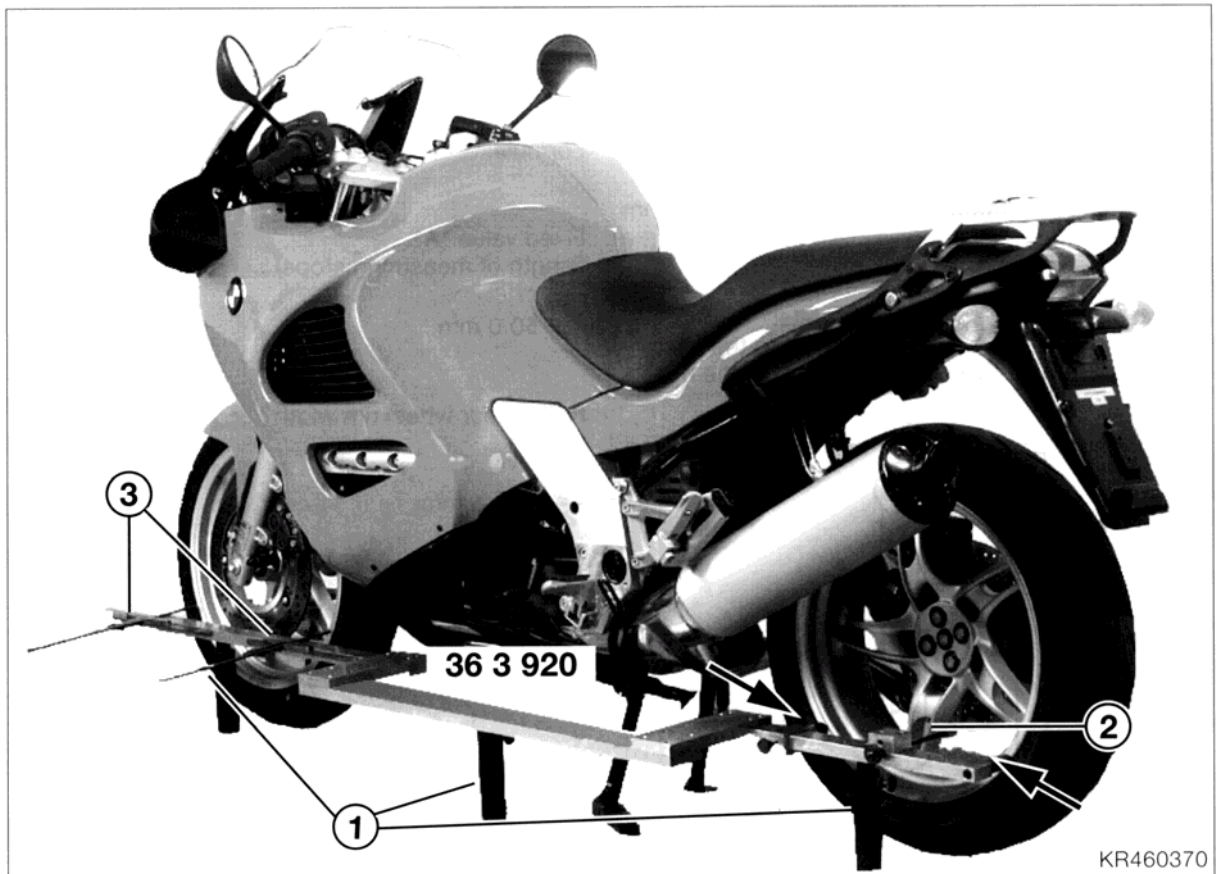


**Tightening torques:**

Gearbox to frame .....	82 Nm
Cross-member to frame, front left .....	74 Nm
Cross-member to frame, front right .....	74 Nm
Suspension strut to frame .....	43 Nm
Suspension strut to leading link).....	43 Nm
Ball joint to frame (clean thread + Precote 85) .....	130 Nm
Ball joint to leading link (clean thread + Precote 85) .....	130 Nm
Fork bridge to fork leg .....	21 Nm
Steering damper to leading link.....	21 Nm
Suspension strut remote adjuster at fork bridge.....	8 Nm
Handlebar holder to fork bridge.....	9 Nm
Handlebar holder to fork leg (clean thread + Precote 85) .....	21 Nm
Holder for radiator .....	10 Nm
Clutch slave cylinder .....	9 Nm
Lower cross-tube at frame .....	41 Nm
Rider's footrest holder, left .....	21 Nm
Rider's footrest holder, right.....	21 Nm
Cable to starter motor .....	15 Nm
Cable to alternator .....	20 Nm
Earth (ground) lead to upper cross-tube.....	6 Nm
Holder for brake lines at battery carrier .....	6 Nm
Footrest holder, rear left, to frame.....	21 Nm
Battery carrier, left, to footrest holder.....	15 Nm
Holder for brake lines, front, to frame .....	
Brake lines for brake caliper at pressure modulator .....	18 Nm
Brake hoses at holder, front .....	18 Nm
Swinging arm to frame: Bearing journal, left/right .....	160 Nm
Threaded ring, right.....	200 Nm
Threaded ring, left .....	10 Nm
Lock ring, left .....	160 Nm
Suspension strut to swinging arm .....	50 Nm
Suspension strut to frame .....	43 Nm
Rear wheel drive housing: Fixed bearing journal .....	160 Nm
Free bearing journal .....	7 Nm
Locknut .....	41 Nm



Reaction strut to rear wheel drive .....	43 Nm
to cross-tube .....	43 Nm
Rear wheel.....	105 Nm
Brake lines to rear right retaining plate .....	18 Nm
Footrest support, left/right .....	21 Nm
Footrest holder, rear right, to frame .....	21 Nm
Retaining plate for brake lines at rear right footrest holder .....	
Holder for engine spoiler: bottom, on engine.....	22 Nm
Engine spoiler: bottom, to holder .....	9 Nm
front left, to holder .....	3 Nm
to fairing.....	3 Nm
Fairing holder: left/right, to frame .....	30 Nm
centre, to frame .....	22 Nm
Instrument cluster to fairing holder.....	9 Nm
Oil lines to oil cooler .....	
Intake air pipe to fairing holder.....	10 Nm
Oil cooler .....	9 Nm
Air inlet guide, left to fairing holder.....	3 Nm
Top section of fairing .....	3 Nm
Inner cover.....	3 Nm
Fuel injection rail to engine block.....	9 Nm
Fuel tank to frame .....	22 Nm
Tank cover to frame.....	3 Nm
Rear section of frame to main frame: top .....	41 Nm
bottom .....	21 Nm
Battery carrier at right rear of frame .....	6 Nm
Holder for fuse box .....	9 Nm
Seat tray support .....	6 Nm
Retaining hoop for exhaust system at frame .....	24 Nm
at silencer (muffler).....	13 Nm
Rear carrier, front section: to battery carrier .....	3 Nm
together with rear section to frame .....	3 Nm
Level equalising tank .....	6 Nm
Lock carrier.....	9 Nm
Grab handle .....	9 Nm
Pannier case carrier to frame .....	22 Nm
Rear section: left/right, to frame .....	3 Nm
bottom, to frame .....	3 Nm
Side section of fairing: at rear, to tank cover.....	3 Nm
to rear frame .....	3 Nm
at rear, to frame .....	3 Nm
to engine spoiler .....	3 Nm
at front, to fairing holder.....	3 Nm
at front, to inner cover.....	3 Nm
at front, to tank cover.....	3 Nm
Air guide to oil cooler .....	3 Nm



## Measuring wheel track offset

- Place the motorcycle on its main (centre) stand on a flat, level surface.
- Measure wheel rim width at front and rear and make a note of the figures.
- Place track alignment gauge, **BMW No. 36 3 920**, against the left or right side of the motorcycle.



### Note:

In order to use the track alignment gauge on either the left or right side, simply screw the supports in on the other side.

- Adjust support (1) so that the measuring plane is as close as possible to the wheel centerline. The gauge must slide freely up to the motorcycle.
- Position the measuring stops (arrows) so that they touch the wheel rim and not the tyre.
- Connect hook (2) to a wheel spoke and use it to pull the gauge firmly up to the wheel.
- Align front wheel parallel with the gauge.
- Release tension in the track alignment gauge by raising it by approx. 5 mm (0.2 in) at the front and lowering it again.

- Using a depth gauge (3) or ruler, measure the distance from the outer edge of the gauge to the front wheel rim at the front and rear of the wheel and make a note of the figures. Deduct the width of the track alignment gauge.



### Note:

The average of these two values less the width of the track alignment gauge is measured value "B".

KR460370

- Calculate wheel track offset "S":

Wheel track offset "S" is the distance to left or right between the longitudinal axes of the front and rear wheels.

**Permissible wheel track offset:**

"S" ..... -5 ... +14 mm

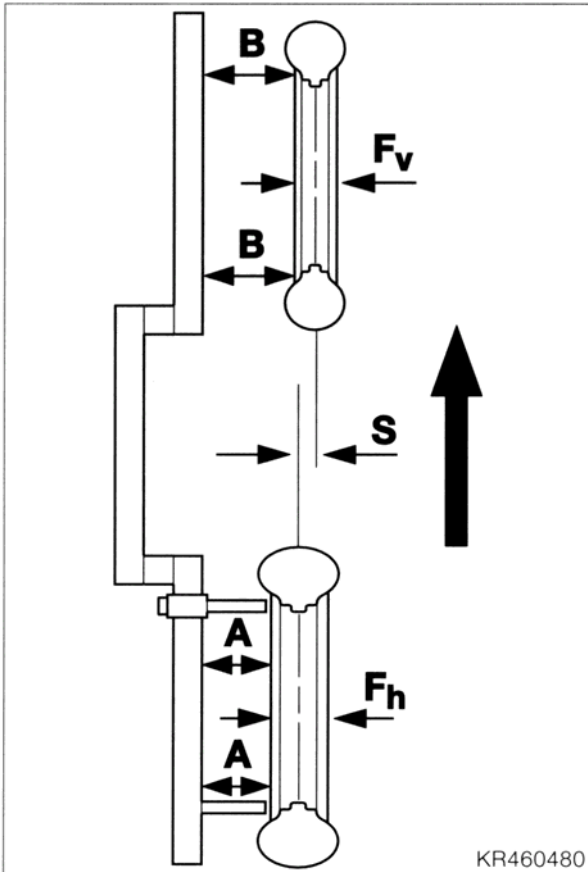


**Note:**

How to interpret the measured results:

If the value is positive = track offset is to the left

If the value is negative = track offset is to the right



KR460480

**EXAMPLE:**

(v = front, h = rear)

$$\text{Formula: } S = A + \frac{F_h}{2} \left( B + \frac{F_v}{2} \right)$$

Fixed value "A"  
(length of measuring stops)

A = 50.0 mm

Half of rear wheel rim width

$$\frac{F_h}{2} = 72.5 \text{ mm}$$

Measured value "B"  
(mean value)

B = 70.0 mm

Half of front wheel rim width

$$\frac{F_v}{2} = 54.5 \text{ mm}$$

**Track offset "S"**

$$S = A + \frac{F_h}{2} \left( B + \frac{F_v}{2} \right)$$

$$S = 122.5 \text{ mm} - 124.5 \text{ mm}$$

Track offset "S" = - 2.0 mm

## **51 Equipment**

# Contents

Page

<b>Raise the frame</b> .....	3
Removing starter/alternator .....	3
Removing clutch/gearbox .....	3
Removing engine .....	3
<b>Lowering the frame</b> .....	6
Installing engine .....	6
Installing clutch/gearbox .....	6
Installing starter/alternator .....	6
<b>Removing/installing ignition switch/steering lock</b> .....	10
Removing and installing lock barrel .....	10
<b>Removing and installing fuel tank lock barrel</b> .....	11
<b>Removing and installing dualseat lock</b> .....	12







## Raise the frame

[valid for the following work only]

Removing starter/alternator

Removing clutch/gearbox

Removing engine

### Remove the battery (⇒ 61.5)

- Remove the dualseat.
- Remove the tool tray.
- Remove the battery retaining plate.



#### Caution:

Disconnect the negative battery terminal first, then the positive one.

- Remove the battery.

### Remove the fairing (⇒ 46.9)

- Remove the air guide to the oil cooler.
- Remove the left/right side section of the fairing.
- Remove the air inlet guide.
- Take off the oil cooler.
- Remove the intake air pipe.
- Remove engine spoiler.
- Remove the engine spoiler holder.
- **[OE pannier case carrier]** Loosen the left/right pannier case carrier at the front.
- Remove the left and right rear side sections.
- Remove the front section of the rear carrier (front section of rear wheel splash guard) and separate the plug connector for the power socket.

### Unfasten the exhaust system

- Release the retaining hoop at the silencer.

#### [in addition, when removing engine]

### Remove the exhaust system (⇒ 18.5)

- Separate the plug connector for the oxygen sensor and guide the wire through downwards.
- Detach the exhaust system at the cylinder head and retaining hoop.
- Drain engine oil.
- Detach the oil cooler pipes at the intermediate oil pump flange.

### Remove the fuel tank (⇒ 16.5)

- Separate the plug connector for the immersed fuel level sensor.
- Separate the plug connector for the fuel pump.



#### Warning:

Comply with safety precautions when handling or working with fuel; note that the fuel lines are pressurised.

- Detach the fuel lines.
- Release the tank cover fastening.
- Release the fuel tank fastenings at the frame and take off the fuel tank.

#### [in addition, when removing engine]

### Remove throttle butterfly rail complete with intake air silencer

- Separate the plug connector for the temperature sensor at the intake air silencer.
- Release the hose clips for the intake stub pipes, noting the correct installed position.
- Pull off the throttle butterfly rail complete with intake air silencer.



#### Note:

Do not disconnect the throttle cable.

- Detach the hose connection for the crankcase breather at the crankcase.
- Secure the throttle butterfly rail together with the intake air silencer to the frame.

### Remove the intake air silencer (⇒ 13.6)

- Separate the plug connector for the air temperature sensor at the intake air silencer.
- Release the four hose clips at the throttle butterfly rail, noting their correct installed positions.
- Pull off the intake air silencer and secure it to the frame.



### Take off the fuel injection rail

- Separate the plug connector for the throttle positioner.
- Separate the plug connector for the throttle potentiometer.
- Disconnect the earth (ground) wire at the throttle butterfly rail.
- Detach the fuel hoses at the fuel injection rail.
- Disconnect the vacuum hose for the throttle butterfly rail at the fuel injection rail.



#### Note:

Do not disconnect the throttle cable.

- Pull out the fuel injection rail and secure it to the frame with the wiring harness.

### Position the hoist fixture against the engine's sump

- Attach hoist, **BMW No. 00 1 510**, to sump.

### Remove rear wheel (⇒ 36.8)

#### Remove the rear wheel drive (⇒ 33.6)

- Remove the inductive signal transmitter.
- Remove the rear brake caliper and secure it to the frame together with the inductive signal transmitter.
- Release the retaining strap at the flexible gaiter.
- Loosen the strut at the rear wheel drive.
- Unscrew the locknut at the left bearing journal for the rear wheel drive at the swinging arm.
- Release the left/right bearing journal for the rear wheel drive at the swinging arm.
- Detach the strut and pull the rear wheel drive away from the swinging arm.



#### Note:

If the rear wheel drive is filled with oil, do not place it on its side before installing (keep it in the correct position for installation), or else oil will escape when the motorcycle is ridden (suction effect).

### Remove swinging arm (⇒ 33.19) and drive shaft (⇒ 33.21)

- Remove circlips from threaded rings at left and right.



#### Warning:

Note that a high loosening torque is needed.

- Unscrew the lock ring at the left threaded ring.
- Remove the left/right threaded rings.
- Loosen the left/right bearing journals.
- Detach the suspension strut from the swinging arm.
- Release the left/right bearing journals and pull the swinging arm away from the gearbox.
- Press off drive shaft.

### Remove the cross-tube (⇒ 46.25)

- Open the retaining hoop and disconnect the gear shift lever.
- Remove the left footrest assembly.
- Remove the right footrest assembly and secure it to the frame together with the brake pipe and the master brake cylinder.
- Release the cross-tube and take it off with the strut.

### Separate or disconnect the plug connectors and wires for the engine and gearbox

- Cut through the cable strap for the clutch vent line at the frame.



#### Caution:

Unscrew the clutch slave cylinder fastenings alternately and uniformly.

- Remove the clutch slave cylinder and guide the clutch line through upwards.
- Separate the plug connector for the gear indicator switch and guide the cable through downwards.
- Separate the plug connector for the coolant temperature at the cylinder head and guide the wire through downwards.
- Separate the plug connector for the side (prop) stand switch and guide the wire through downwards.
- Separate the plug connector for the oxygen sensor and guide the wire through downwards.
- Disconnect the cables from the alternator.
- Disconnect the cable from the starter.
- Detach the earth (ground) line from the upper cross-tube.

### Press the left/right radiator with fan out of the holder

- Remove the retaining clip with washer.

**[in addition, when removing engine]**

**Remove left/right radiator with fan (→ 17.8)**

- Drain coolant.
- Separate the plug connectors for the left/right fan.
- Detach the vent hose and the connecting hose from the right to the left radiator.
- Detach the coolant hoses from the coolant stub pipes.
- Detach the coolant hose to the lower stub pipe on the right radiator.
- Pull the left/right radiator with fan and air outlet guide away from the holder.
- Remove the lid of the electronic equipment box.
- Separate the plug connectors for the ignition sensor, water pump temperature sensor and oil pressure switch.

**Raise the frame**

- Loosen the left/right engine mountings at the cross-member.
- Detach the gearbox mounting from the frame.



**Caution:**

Turn the steering to the right to avoid scratches. When raising the frame, make sure that no lines or cables are damaged.

- Using hoisting crane, **BMW No. 46 5 640**, raise the frame at the rear until the gearbox, starter and alternator are freely accessible.

**[only when removing engine]**

- Detach the engine at the front left cross-member.
- Detach the engine at the front right cross-member.



**Caution:**

Make sure that the correct clearance is present between gearbox and frame at the right. Mask off the timing case cover in the engine spoiler holder area.

- Raise the frame with the Telelever above the engine. Use hoisting crane, **BMW No. 46 5 640**.
- Remove the fuel lines at the engine block.

**Transfer the engine to the assembly stand**

- Secure the engine mount, **BMW No. 11 0 610**, to the crankcase.
- Lower the hoise and transfer the engine to assembly stand, **BMW No. 00 1 490**.
- Remove the hoisting fixture.

**Remove the starter (→ 12.13)**

- Release the fastenings and take off the starter.

**Remove the alternator (→ 12.10)**

- Release the fastenings and take off the alternator.

**Removing gearbox**

- Remove the heat shield.
- Remove the clutch release rod from the engine.
- Detach the gearbox at the intermediate flange.



**Note:**

If necessary, loosen the gearbox with light blows of a plastic-faced hammer.

- Remove the gearbox from the intermediate flange.

**Remove the clutch (→ 21.5)**



## Lowering the frame

[valid only for the following work]

Installing engine

Installing clutch/gearbox

Installing starter/alternator

### [only when installing engine

Position assembly stand, **BMW No. 00 1 480**, with engine above the hoist platform.

- Raise the hoist platform carefully.
- Attach hoist fixture, **BMW No. 00 1 510**, to sump.
- Raise the hoist.
- Detach the engine mount, **BMW No. 11 0 610**, from the crankcase and run the assembly stand out to one side.

### Install the clutch (⇒ 21.8)

- Note that the markings must be offset by 120° when installing.
- Using centering device, **BMW No. 21 2 670**, and centering pin, **BMW No. 21 2 680**, check clutch plate centering and correct if necessary.



### Tightening torque:

Housing cover to clutch flange ..... 19 Nm

### Installing gearbox

- Coat the splines on the gearbox input shaft with **Staburags NBU 30 PTM**.
- Install the heat shield.
- Offer up the gearbox to the intermediate flange and tighten the fastenings.
- Insert the clutch release rod.

### Tightening torques:

Gearbox to intermediate flange ..... 22 Nm  
Heat shield to coil ..... 9 Nm

### Install the alternator (⇒ 12.12)

**Tightening torque:**  
Alternator to intermediate flange ..... 20 Nm

### Install the starter (⇒ 12.15)

**Note:**  
Before lowering the frame, install the earth (ground) leads at the starter.

**Tightening torque:**  
Starter to gearbox ..... 20 Nm

**Caution:**  
Make sure that the correct clearance is present between gearbox and frame at the right. Mask off the timing case cover in the engine spoiler holder area. Turn steering to right to avoid scratches. When lowering the frame, make sure that no lines or cables are damaged.

### Lower the frame

- Lower the frame with hoisting crane, **BMW No. 46 5 640**.
- Insert the gearbox mounting into the frame and tighten it.
- Tighten the left/right engine mountings at the cross-member.

### [in addition, when installing engine]

- Attach the fuel lines to the engine block.

**Tightening torques:**  
Gearbox to frame ..... 82 Nm  
Engine to cross-member, front left ..... 41 Nm  
Engine to cross-member, front right ..... 41 Nm

## Press radiator with fan into holder at left/right

### [only when installing engine]

#### Install left/right radiator with fan (⇒ 17.8)

- Join the plug connectors for the ignition signal transmitter, water pump temperature sensor and oil pressure switch.
- Install the lid of the electronic equipment box.
- Insert radiator with fan into holder at left and right.
- Attach the fastenings.
- Join the plug connectors for the left/right fans.
- Attach the vent hose and the connecting hose to the right-hand radiator at the top of the left radiator.
- Attach the coolant hoses at the coolant stub pipe.
- Attach the coolant hose to the coolant stub pipe at the bottom of the right-hand radiator.
- Fill the cooling system.

#### Install and connect the plugs and lines for the engine and gearbox

- Connect the cable to the starter.
- Connect the cables to the alternator.
- Connect the earth (ground) lead to the upper cross-tube.
- Join the plug connector for the side (prop) stand switch.
- Join the plug connector for the oxygen sensor.
- Join the plug connector for the temperature sensor at the cylinder head.
- Join the plug connector for the gear indicator switch.



#### Caution:

Tighten the clutch slave cylinder fastenings alternately and uniformly.

- Install the clutch slave cylinder.
- Secure the cable strap.
- Install the clutch bleed line and secure it to the frame.



#### Tightening torques:

Cable to starter .....	15 Nm
Cable to alternator .....	20 Nm
Earth (ground) lead to engine .....	6 Nm
Clutch slave cylinder .....	9 Nm

#### Install lower cross-tube (⇒ 46.25)

- Tighten lower cross-tube at frame.
- Install left footrest assembly.
- Install right footrest assembly with brake line and master cylinder.
- Connect the gear shift lever and close the retaining hoop.



#### Tightening torques:

Lower cross-tube to frame.....	41 Nm
Left footrest assembly.....	21 Nm
Right footrest assembly .....	21 Nm

#### Install drive shaft (⇒ 33.21) and swinging arm (⇒ 33.22)

- Install drive shaft.
- Install swinging arm and screw in bearing journals hand-tight.
- Tighten suspension strut at swinging arm.



#### Note:

Use special socket wrench insert, **BMW No. 33 6 641**, with opening for locking ring socket wrench, **BMW No. 33 6 642**, to prevent the threaded ring from turning.

- Tighten the bearing journal, threaded ring and locking ring.
- Install the circlip at left and right with the hook facing outwards.



#### Tightening torques:

Swinging arm to frame:	
Bearing journal.....	160 Nm
Threaded ring, right .....	200 Nm
Threaded ring, left.....	10 Nm
Locking ring, left .....	160 Nm
Suspension strut:	
Suspension strut to frame.....	43 Nm
Suspension strut to swinging arm.....	43 Nm

### Install rear wheel drive (⇒ 33.18)

- Push rear wheel drive with rear drive shaft on to front drive shaft.
- Attach strut to rear wheel drive.
- Push flexible gaiter over swinging arm and secure with tensioning strap.
- Tighten the left/right bearing journals and the left locknut.
- Install the rear brake caliper.
- Install the inductive signal transmitter, using a new screw coated with **Precote 80**.
- Install the front section of the rear carrier (front section of rear wheel splash guard) and join the plug connector for the power socket.
- Install the rear side sections.
- **[OE pannier case holders]** Tighten the left/right pannier case holder at the front.
- Install the rear wheel.

#### **Tightening torques:**

Rear wheel drive housing:	
Left bearing journal .....	160 Nm
Right bearing journal .....	8 Nm
Shouldered nut, right.....	160 Nm
Strut to rear wheel drive housing.....	43 Nm
Strut to frame .....	43 Nm
Brake caliper .....	40 Nm
Speedometer signal transmitter .....	4 Nm
Rear carrier section, front.....	3 Nm
Rear side section .....	3 Nm
Pannier case holder, front .....	22 Nm
Rear wheel .....	105 Nm



### Install the fuel injection rail

- Press in the fuel injection rail with wiring harness.
- Connect the distribution hose for the throttle butterfly rail to the fuel injection rail, install the clutch line and connect the hose to the rear throttle stub pipe.
- Connect the fuel hoses to the fuel injection rail.
- Connect the earth (ground) line to the throttle butterfly positioner.
- Join the plug connector for the throttle potentiometer.
- Join the plug connector for the throttle butterfly positioner.

#### **Tightening torque:**

Fuel injection rail .....	9 Nm
---------------------------	------

### Install the intake air silencer (⇒ 13.6)

- Tighten the hose clips for the intake stub pipes.
- Install the intake air pipe.
- Install the oil cooler.

#### **Tightening torques:**

Oil cooler to fairing holder .....	9 Nm
------------------------------------	------



#### **Caution:**

Note correct positions of hose clips.

- Join the plug connector for the air temperature sensor at the intake air silencer.

### Install the fuel tank (⇒ 16.5)

- Place the fuel tank in position and secure it.
- Attach the tank cover to the frame.
- Connect the drain and vent hoses.
- Connect the fuel lines.
- Join the plug connector for the fuel pump unit.
- Join the plug connector for the immersed fuel level sensor.
- Secure the cable strap.
- Install the air inlet guide.
- Attach left and right side sections of fairing.
- Install air guide for oil cooler.




#### **Tightening torques:**

Fuel tank to frame .....	22 Nm
Side section of fairing to:	
Rear frame .....	3 Nm
Engine spoiler .....	3 Nm
Fairing holder .....	6 Nm
Tank cover .....	3 Nm
To bottom rear of frame .....	3 Nm
Air guide for oil cooler .....	hand-tight

### Attach the exhaust system


- Install retaining hoop at silencer.

 **Tightening torque:**  
Retaining hoop at silencer ..... 13 Nm

### [in addition, when installing engine]


#### Install the exhaust system (⇒ 18.5)

- Join the plug connector for the oxygen sensor.
- Attach exhaust system to cylinder head.
- Fill engine with oil.
- Install oil cooler lines at intermediate oil pump flange.

 **Tightening torques:**  
Retaining hoop to silencer ..... 13 Nm  
Exhaust system to cylinder head ..... 24 Nm

#### Install the fairing (⇒ 46.9)

- Detach hoist fixture, **BMW No. 00 1 510**, from sump.
- Install holder for engine spoiler.
- Attach engine spoiler.
- Install air guide for oil cooler.
- Install left/right side sections of fairing.

 **Tightening torque:**  
Holder for engine spoiler ..... 22 Nm

#### Install the battery (⇒ 61.5)



#### Caution:

Attach and tighten the positive battery terminal first, then the negative one.

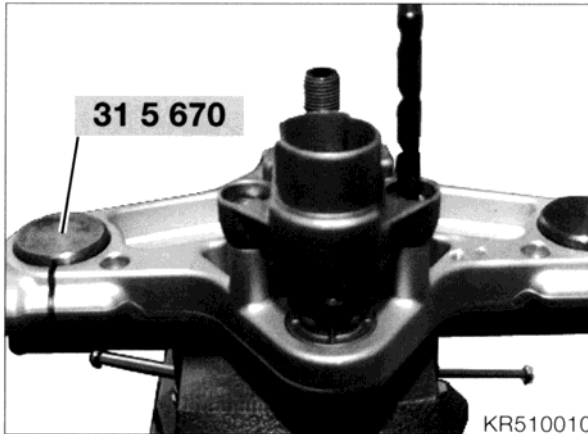
- Install the battery.
- Install the battery retaining plate.
- Install the tool tray.
- Install the dualseat.






## Removing/installing ignition switch/steering lock

- Remove fork bridge.  
(→ 31.9)



- Secure fork bridge in retaining fixture, **BMW No. 31 5 670**.
- Using a 4 mm drill bit, drill app. 5 mm deep into the serrated-head screws.
- Using an 8 mm drill bit, drill away the heads of the serrated-head screws.
- Remove the washers.
- Take off the ignition switch/steering lock.
- Unscrew the threaded pins with a stud remover.
- Install in the reverse order of work, noting the following operations in particular.
- Tighten the serrated-head screws with steering lock socket wrench insert, **BMW No. 51 0 510**.



 **Tightening torque:**  
Serrated-head screw..... 15 Nm

## Removing and installing lock barrel

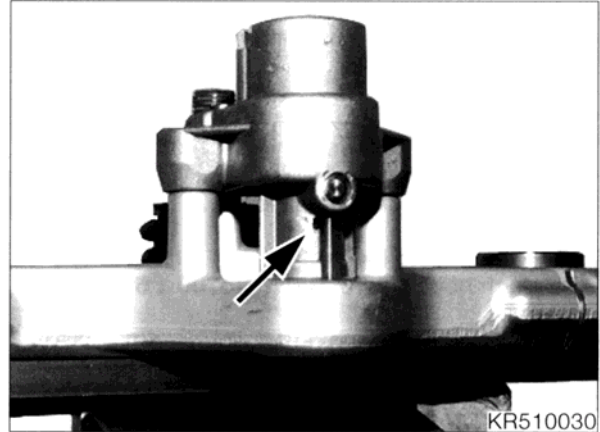
### Remove the lock barrel



#### Note:

The lock barrel can also be removed when the fork bridge is installed.

- Turn the ignition key to the ON position.



- Press in the safety catch by inserting a suitable tool through the opening (arrow), e.g. a piece of wire.
- Pull the lock barrel out with the ignition key.

### Removing lock barrel if ignition key has broken off



#### Caution:

When drilling (without removing the fork bridge) trap the swarf which is formed.

- Using a 4-5 mm drill bit, open up the entire length of the lock barrel.
- Repeat with a drill bit of larger diameter until the lock barrel can be removed.

### Installing lock barrel

- Grease the new lock barrel with **Shell Retinax EP2**.
- Insert the lock barrel with the key in the ON position.
- Press the lock barrel down with the key until the keeper engages.
- Grease the opening (arrow) for the keeper with **Shell Retinax EP2** and close it.

## Removing and installing fuel tank lock barrel

- Remove the fuel filler pipe.  
(→ 16.6)



### Note:

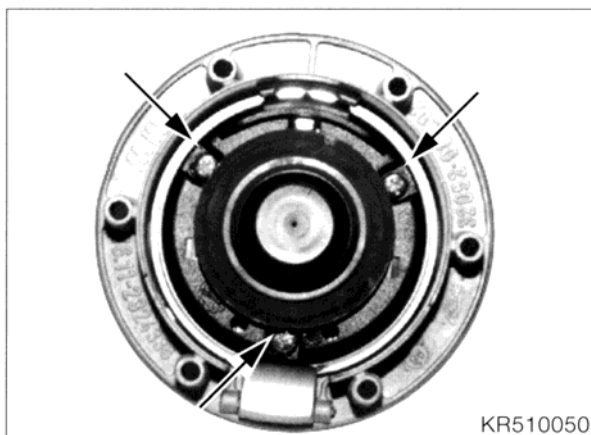
Cover the fuel tank stub pipe with a cloth.

- Grease the new lock barrel with **Shell Retinax EP2**.
- Install lock barrel with key (at a right angle to direction of travel).
- Installation continues in the reverse order of work.



### Tightening torque:

Fuel filler pipe to fuel tank ..... 5 Nm

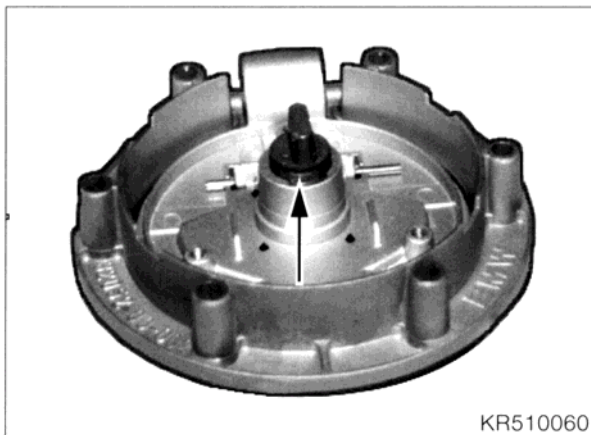


KR510050

- Remove the fastenings (arrows).
- Take off the cap.

### Drilling out lock barrel

- Use a 4-5 mm dia. drill bit to drill the full length of the lock barrel.
- Repeat with a drill bit of larger diameter until the lock barrel can be removed.



KR510060

- Press in the keeper (arrow) and pull off the lock barrel with the aid of the ignition key.



## Removing and installing dualseat lock

- **[OE pannier case carrier]** Remove the left-hand pannier case carrier with the dualseat lock.



- **[OE pannier case carrier]** Press keeper (arrow) into lock barrel.
- Remove lock carrier and press keeper into lock barrel through the small hole in the lock carrier.
- Pull out lock barrel with key.
- Grease new lock barrel with **Shell Retinax EP 2**.
- Insert the lock barrel until the keeper engages.
- **[OE pannier case carrier]** Install the left pannier case carrier with the dualseat lock.

### Lubricant:

..... Shell Retinax EP 2

## **61 General electrical system**

# Contents

Page

<b>Removing/installing battery</b> .....	5
<b>Removing and installing battery holder</b> .....	5
<b>Removing/installing electronic equipment box</b> .....	6
<b>Wiring harness</b> .....	7
Relay positions in electronic equipment box .....	9
Renewing left combined switch and clutch switch .....	10
Removing/installing clutch switch .....	11
Removing left combined switch .....	11
Renewing right combined switch and brake switch .....	12
Removing brake light switch .....	13
Removing/installing right combined switch .....	13
Removing/installing fuse box .....	14
Removing/installing power socket .....	14
Removing/installing inductive sensor for speedometer .....	15
Renewing ABS sensor at front/rear .....	15
Removing/installing water temperature sensor .....	15
Renewing side (prop) stand switch .....	16
Removing/installing side (prop) stand switch .....	16
Checking correct operation of side (prop) stand switch .....	16
Renewing/adjusting foot brake light switch .....	17
Removing/installing ignition switch/steering lock cable .....	18
Removing/installing oil pressure switch/cable for temperature sensor at water pump .....	19
Removing/installing oil pressure switch cable .....	19
Removing/installing temperature sensor at water pump .....	19
Removing/installing horn .....	20
Removing/installing gear indicator .....	20





Technical data	K 1200 RS
Circuit voltage	V 12
Battery	Amp/h 19







## Removing/installing battery



### Warning:

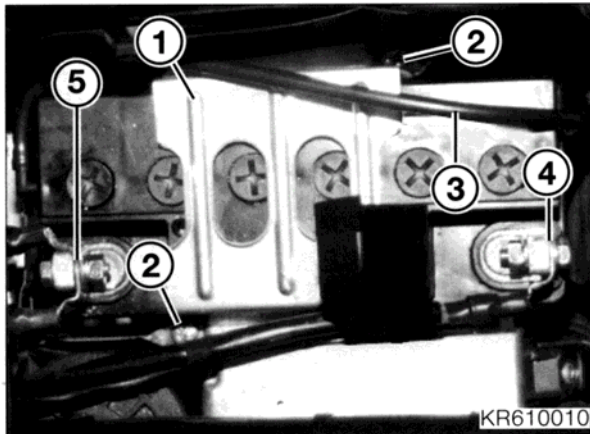
Battery acid is highly caustic! Protect the eyes, face, hands, clothing and painted surfaces.

- Remove the dualseat.  
(→ 46.6)
- Remove the tool wallet. Take out the tool tray.



### Caution:

Do not disconnect the battery unless the ignition has been switched off. Disconnect the negative battery terminal first, then the positive one..



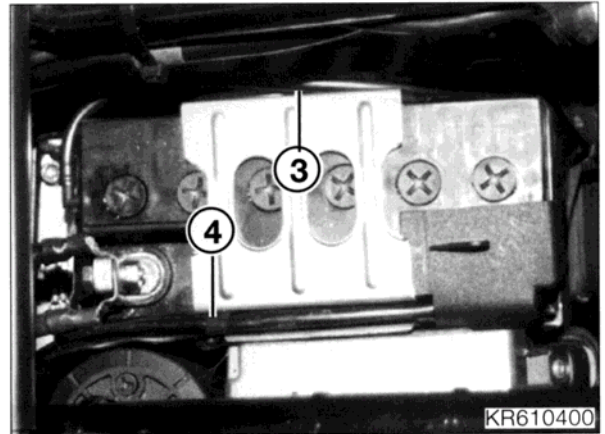
- Disconnect the earth (ground) lead (5) at the battery and insulate it.
- Disconnect the positive lead (4) at the battery.
- Release the mountings (2) at the battery retaining plate (1). Take off the battery retaining plate (1).
- Lift the battery with its vent hose (3) out of the holder.
- Pull off the battery vent hose (3).



### Caution:

Attach and tighten the positive battery terminal first, then the negative one.

- Clean the battery terminal posts and coat them with **Bosch Ft 40 V1** grease.



- Install in the reverse order of work, noting the following precautions in particular.



### Warning:

Install the positive lead (4) only in the position shown.

The motorcycle must only be operated with the cap closed and the tool tray installed.



### Caution:

When installing, make sure that the battery vent hose (3) is in the correct position.



### Tightening torques:

Battery retaining plate to battery holder ..... 4 Nm  
Positive and negative leads to battery ..... 4 Nm

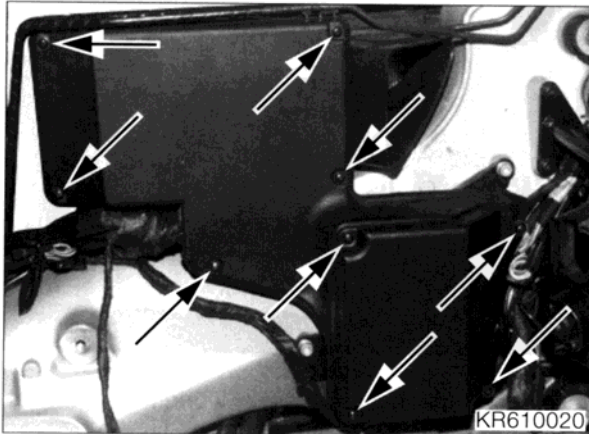
## Removing and installing battery holder

- Remove the ABS control unit  
(→ 34.14)

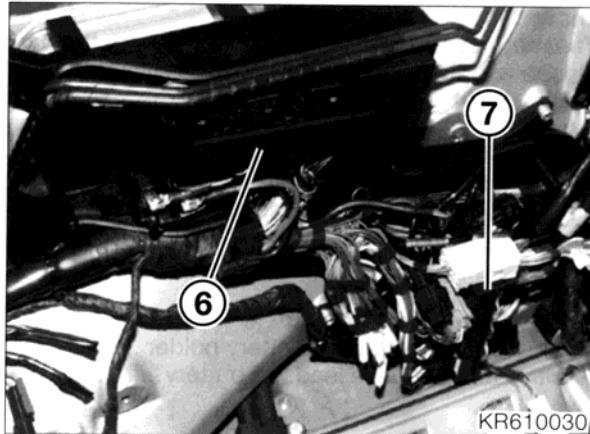


## Removing/installing electronic equipment box

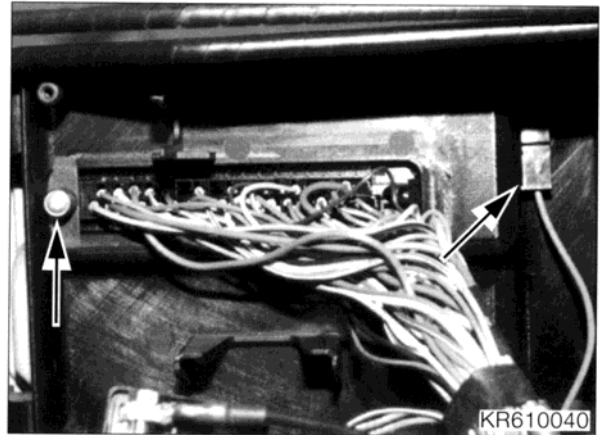
- Remove Motronic control unit.  
(⇒ 13.14)
- Remove the air output from the right-hand radiator.  
(⇒ 46.12)
- Remove the right-hand air intake pipe.  
(⇒ 46.11)



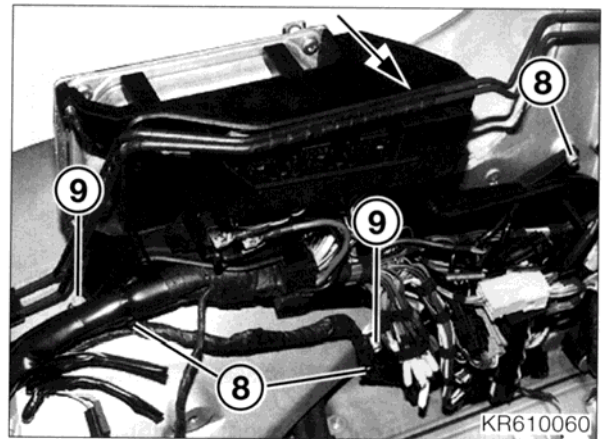
- Release the nine fastenings (arrows) lösen. Take off both covers.



- Pull out relay holder (6) and plug holder (7).



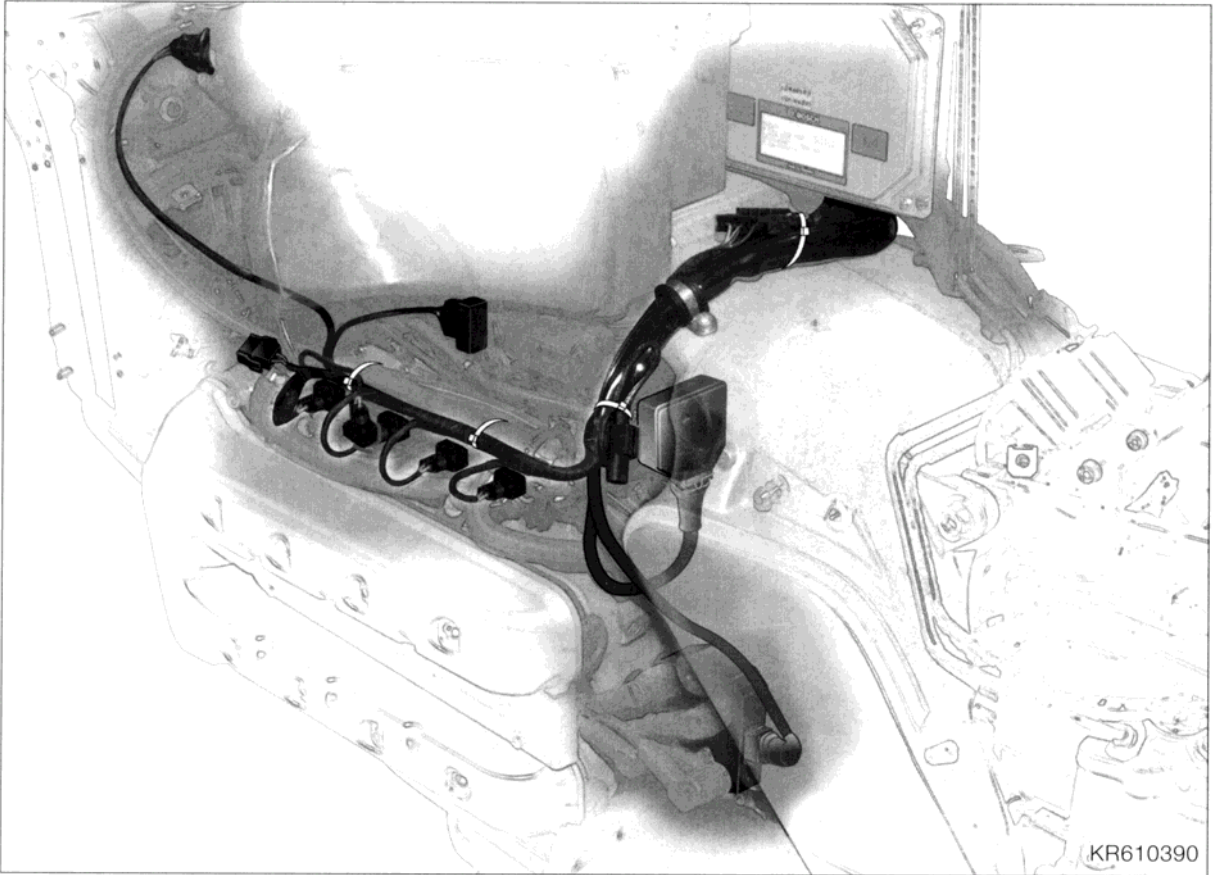
- Release fastening (arrow) for plug strip (Motronic control unit).
- Take off the seal and push the plug strip through to the inside.
- Detach the earth (ground) lead (arrow).



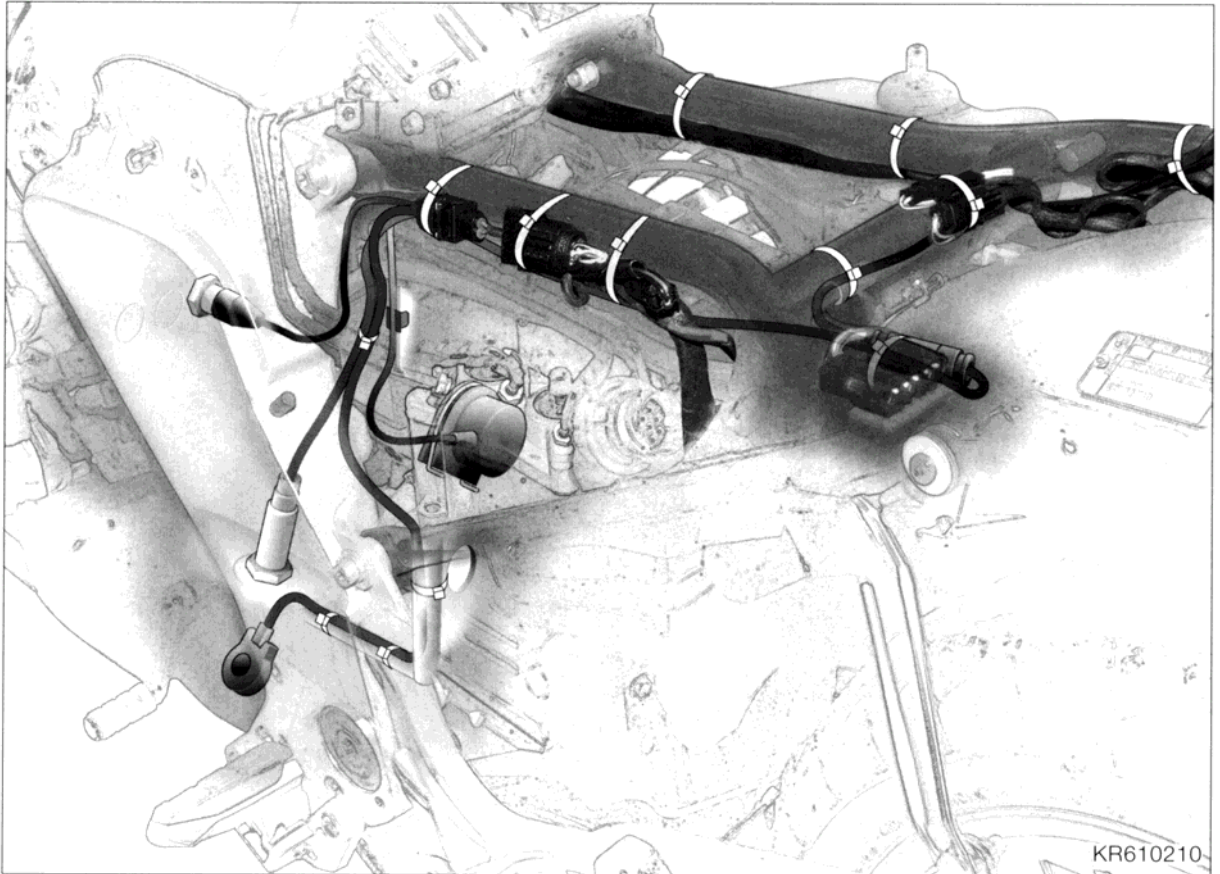
- Open the cable strap (8).
- Release fastenings (9).
- Remove brake lines (arrow) from holder.
- Take off electronic equipment box.
- Install in the reverse order of work.

## Wiring harness

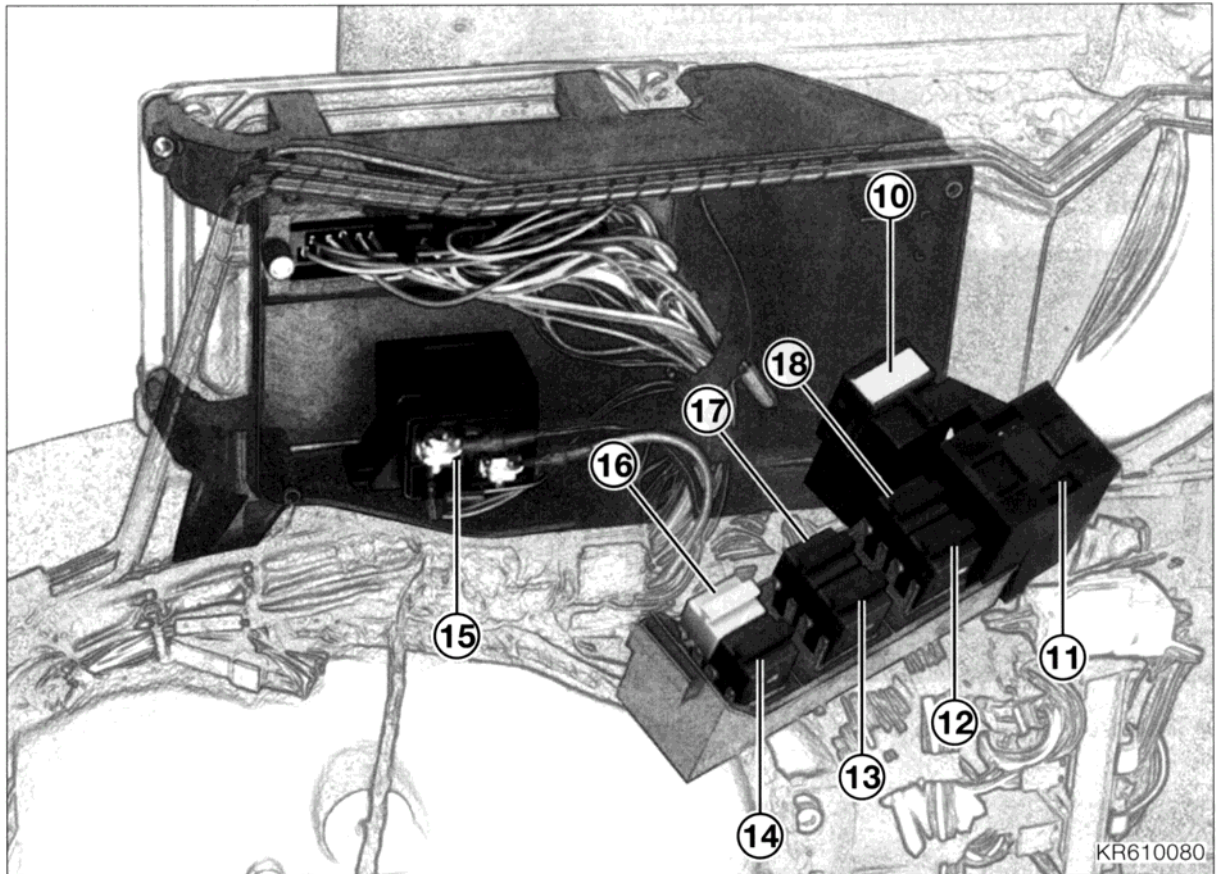




KR610390



KR610210



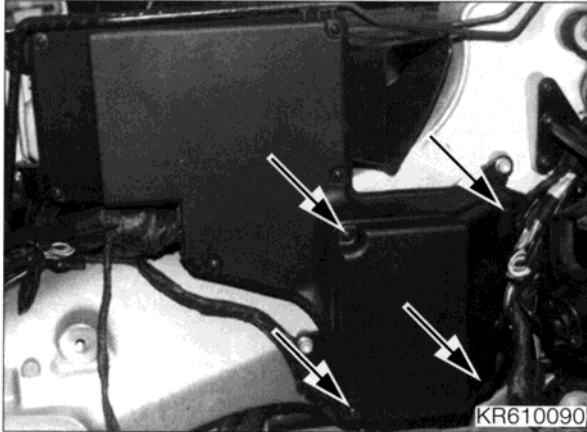
### Relay positions in electronic equipment box

- Control unit for fuel level warning light (10)
- Flasher relay (11)
- Motronic relay (12)
- Horn relay (13)
- Fan relay (14)
- Starter relay (15)
- ABS warning relay (16)
- Load relief relay (17)
- Fuel pump relay (18)

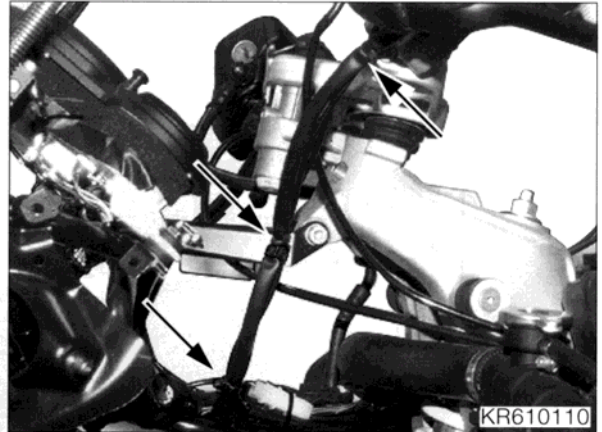


## Renewing left combined switch and clutch switch

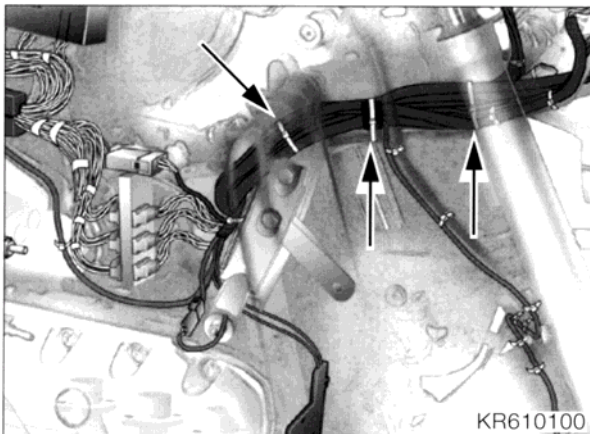
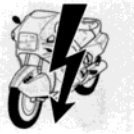
- Remove air outlet guide for right radiator.  
(⇒ 46.12)
- Press radiator out of holder.
- Remove the right-hand air intake pipe.  
(⇒ 46.11)



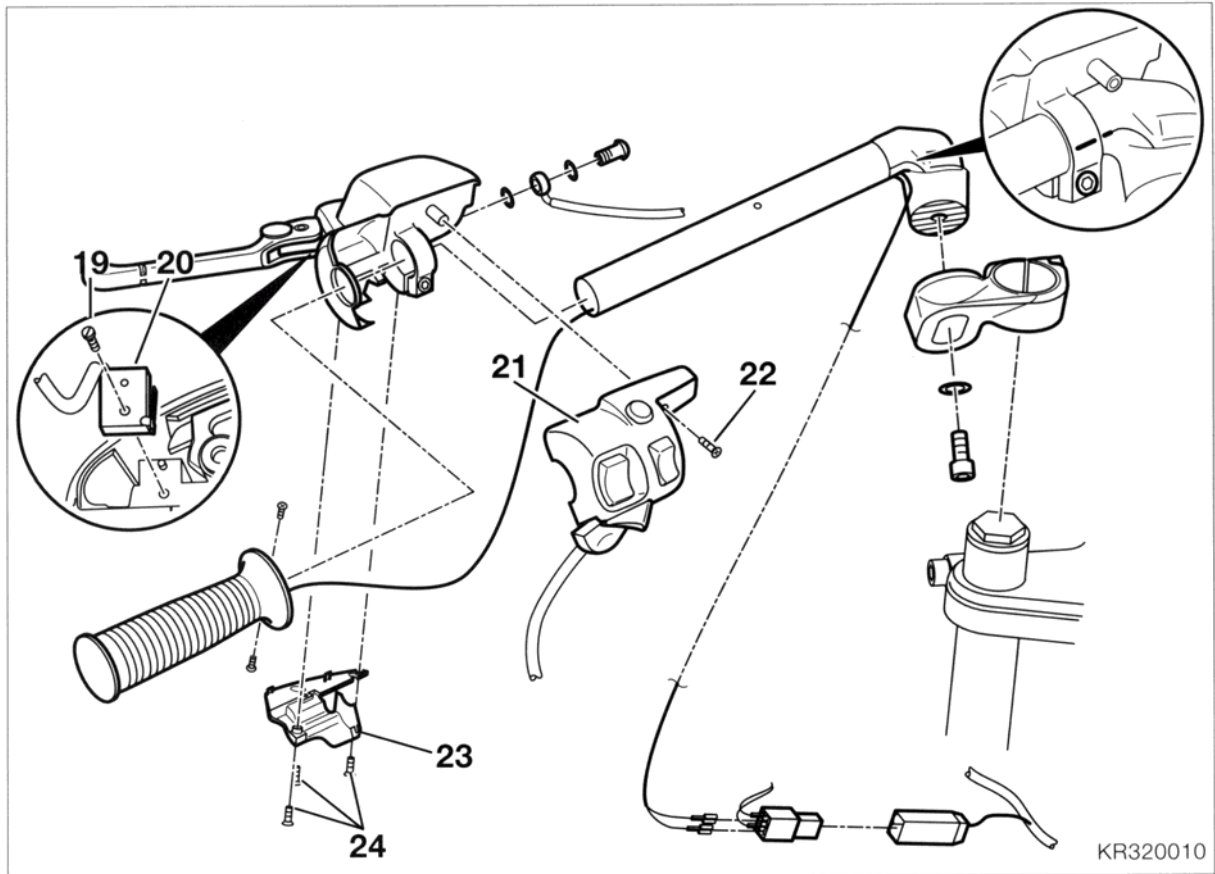
- Release the fastenings (arrows) and take off the cover.



- Release the cable straps (arrows).

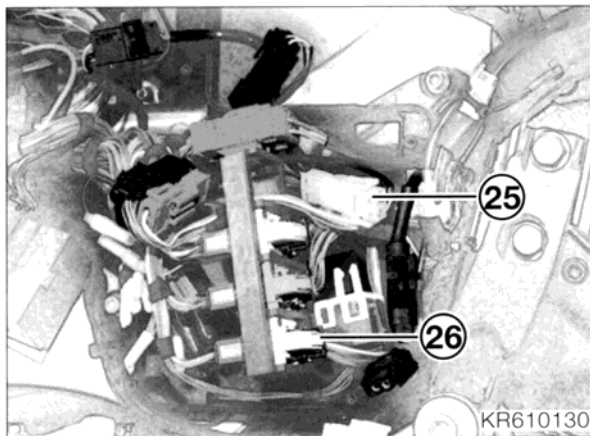


- Release the cable straps (arrows).



- Release fastenings (24) and take off lower cover (23).

#### Removing/installing clutch switch



- Separate plug connector at clutch switch (25).
- Release fastening (19).
- Remove clutch switch (20) with cable.
- Install in the reverse order of work.

#### Removing left combined switch

- Separate plug connector for combined switch (26) in electronics box.
- Release fastening (22).
- Take off combined switch (21) with cable.
- Install in the reverse order of work.

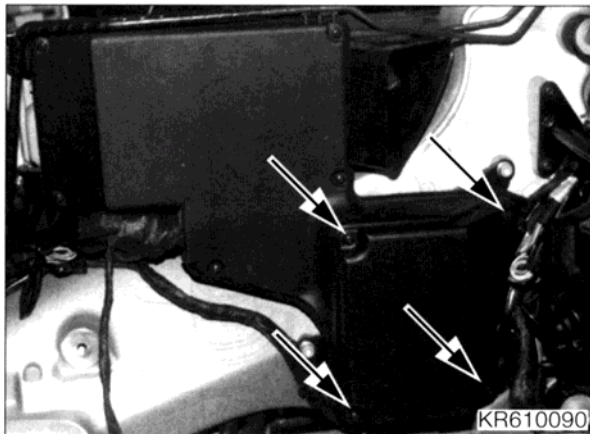
#### ⚠ Tightening torques:

Combined switch (21) to handlebar fitting ..... 1 Nm

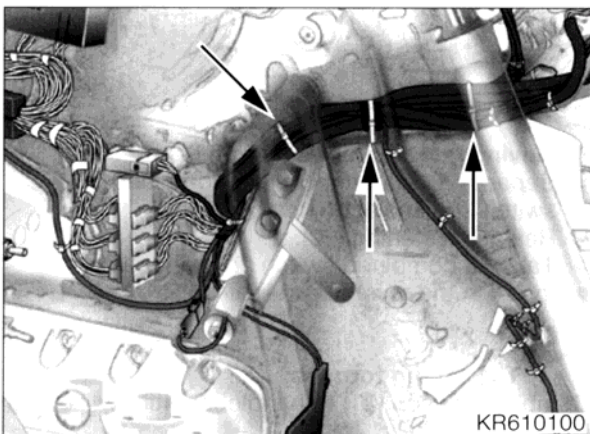


## Renewing right combined switch and brake switch

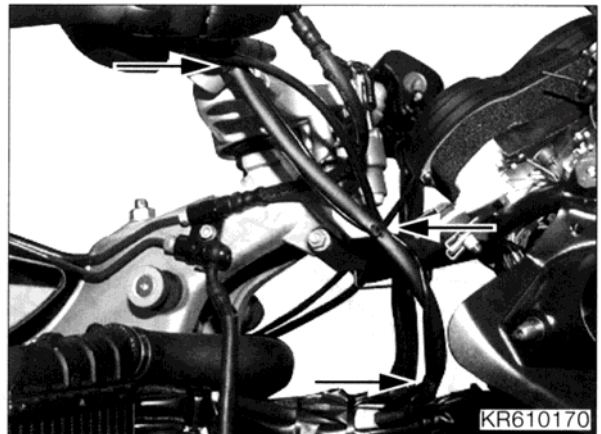
- Remove outlet air guide for right radiator  
(→ 46.12)
- Press radiator out of holder
- Remove right air intake pipe  
(→ 46.11)



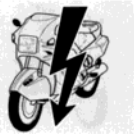
- Release fastenings (arrows) and take off cover.



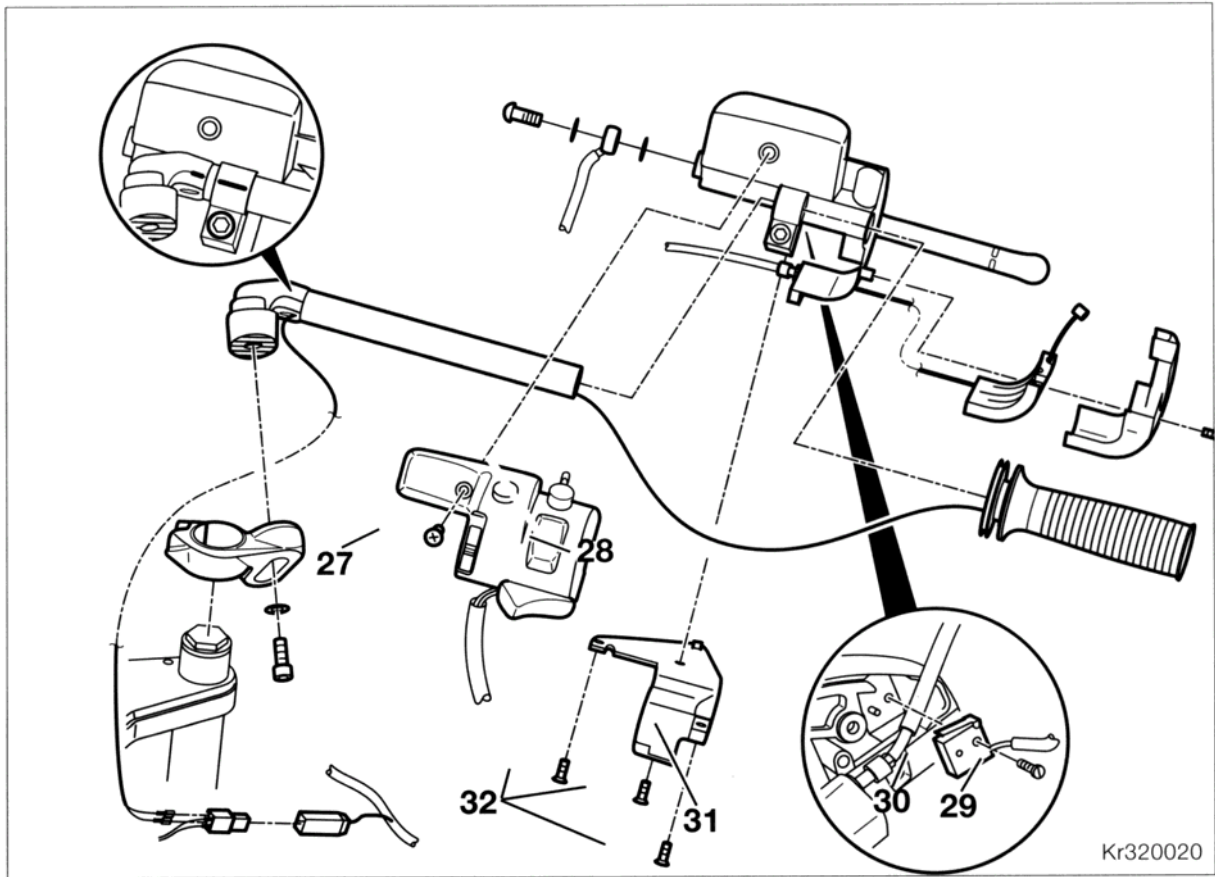
- Release cable straps (arrows).



- Release cable straps (arrows).





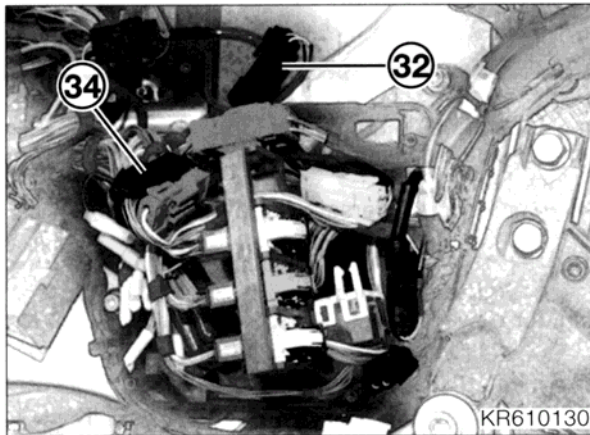


- Release fastenings (32) and take off lower cover (31).

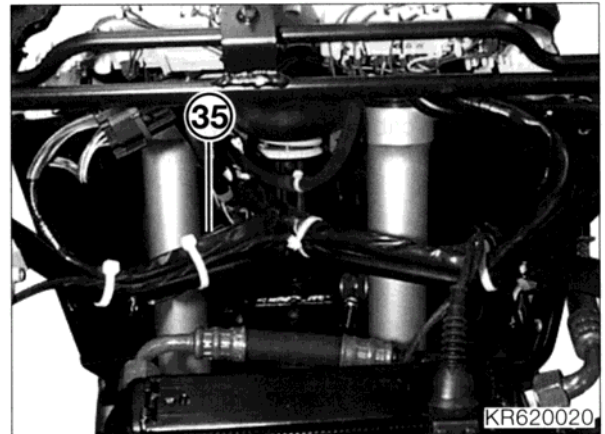
#### Removing/installing right combined switch

- Separate the plug connector (34) at the combined switch.

#### Removing brake light switch



- Separate the fastenings (32).
- Release fastening (29).
- Remove brake light switch (30) with cable.
- Install in the reverse order of work.



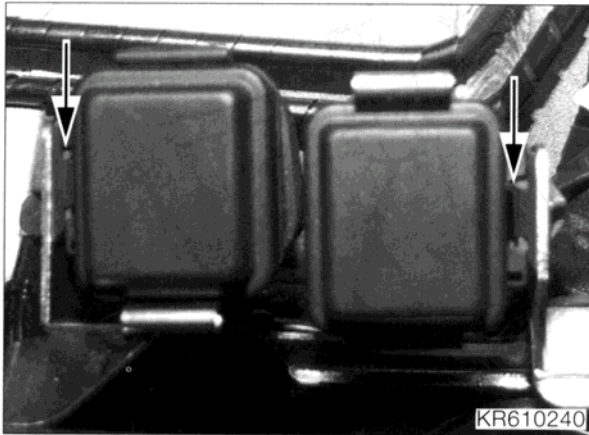
- Separate plug connector (35).
- Release fastening (27).
- Take off combined switch (28) with cable.
- Install in the reverse order of work.

**Tightening torques:**  
 Combined switch (28) to handlebar fitting ..... 1 Nm

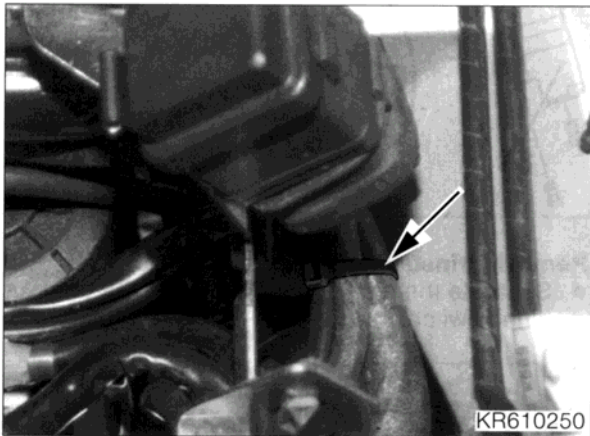


## Removing/installing fuse box

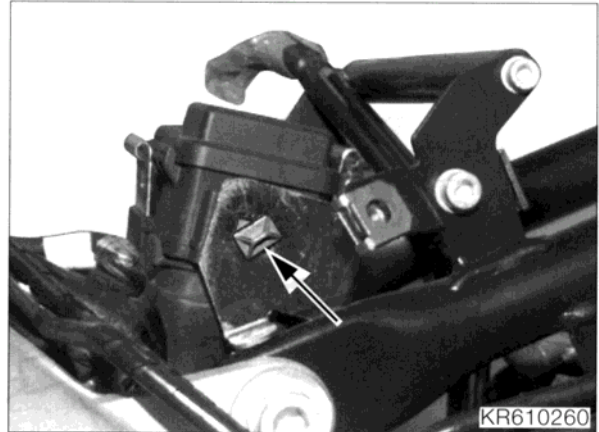
- Remove the dualseat.  
(→ 46.6)



- Pull the fuse box off upwards at the clip (arrow).



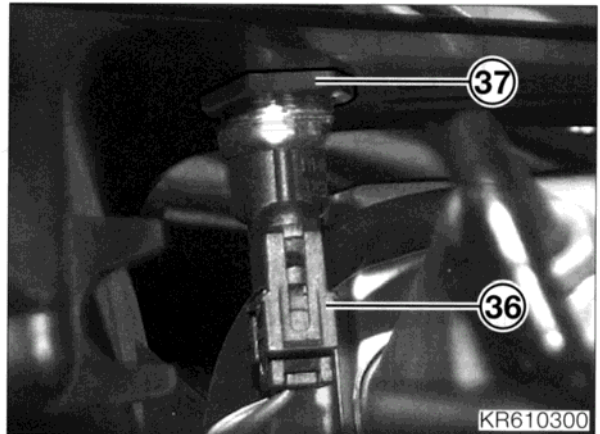
- Release the cable strap (arrow).
- Renew the fuse box with wiring harness.



- Turn the holder and take it off.
- Install in the reverse order of work.

## Removing/installing power socket

- Remove the left rear side section of the fairing.  
(→ 46.13)



- Separate plug connector (36).
- Release the fastening (37) and take off the power socket.
- Install in the reverse order of work.

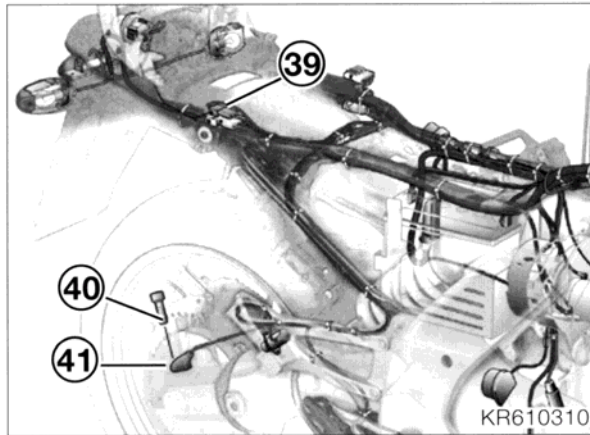


### Tightening torque:

Nut for power socket ..... 3 Nm



## Removing/installing inductive sensor for speedometer



- Release the fastening (40).
- Separate plug connector (39).
- Release the cable straps.
- Remove inductive sensor (41) for speedometer with cable.



### Caution:

When installing, make sure that the O-ring is in good condition.



### Note:

When installing, note the correct positions of the cable straps.

- Install in the reverse order of work.



### Tightening torque:

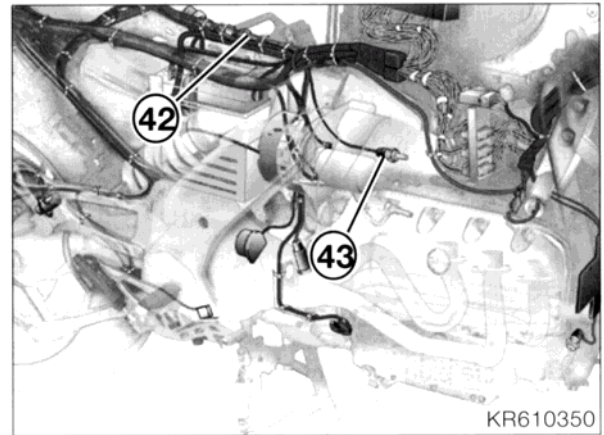
Inductive sensor (41) to rear wheel drive ... ??? Nm

## Renewing ABS sensor at front/rear

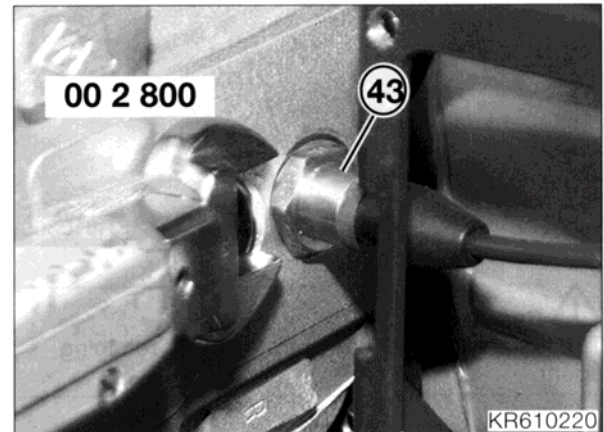
- Remove/install front ABS sensor (→ 34.8)
- Remove/install rear ABS sensor (→ 34.10)

## Removing/installing water temperature sensor

- Remove left side and left rear side sections of fairing. (→ 46.9)
- Drain the coolant. (→ 17.7)



- Separate plug connector (42).
- Release the cable straps.
- Remove temperature sensor (43) with washer.
- Install in the reverse order of work, noting the following operations in particular.



- Install temperature sensor (43) with special wrench, **BMW No. 00 2 800**.



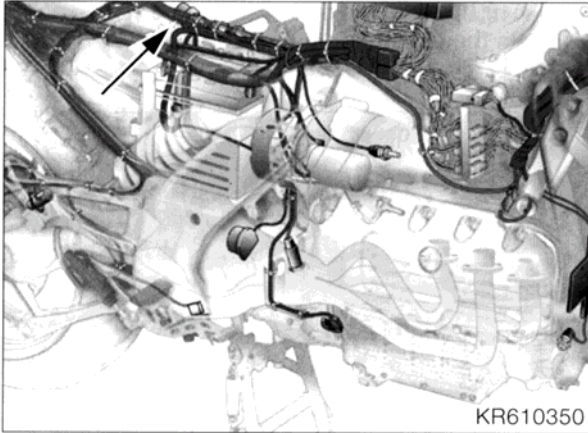
### Tightening torque:

Temperature sensor (43) to cylinder head .....30 Nm

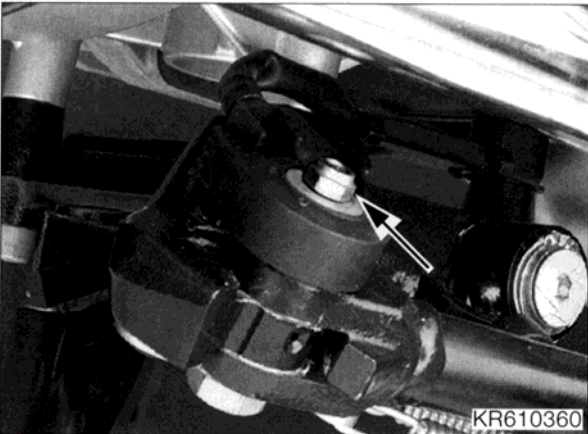


## Renewing side (prop) stand switch

### Removing/installing side (prop) stand switch



- Separate plug connector (arrow).
- Release cable straps.



#### **Caution:**

The fastening is secured with a thread retaining agent.

- Release fastening (arrow).
- Remove side (prop) stand switch with cable.
- Install in the reverse order of work, noting the following operations in particular.



#### **Note:**

When installing, note correct positions of cable straps.  
Clean the thread and apply Loctite to secure the connection.



#### **Tightening torque:**

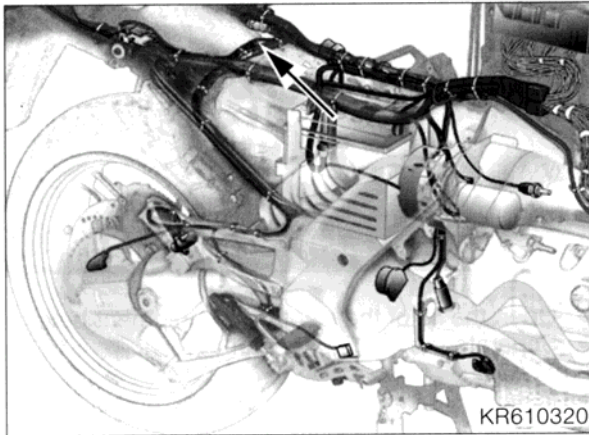
Side (prop) stand switch mounting ..... 6 Nm

### Checking correct operation of side (prop) stand switch

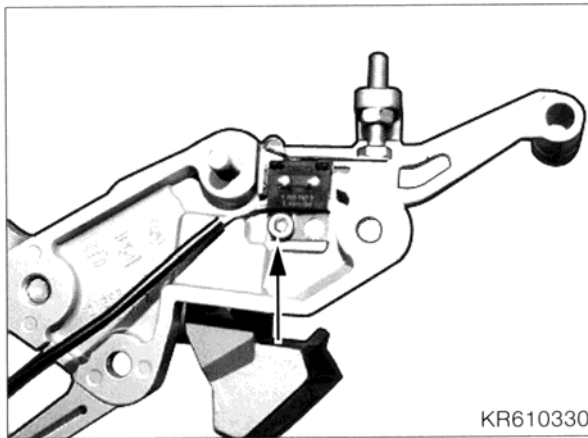
- Switch off the engine.
- Place the motorcycle on its main (centre) stand.
- Select a gear and switch on the ignition.
- Unfold the side (prop) stand slowly, watching the neutral indicator light at the same time.
- As the stand is extended, the neutral indicator light should come on briefly.

## Renewing/adjusting foot brake light switch

- Remove the right footrest stop  
(⇒ 46.21)



- Separate the plug connector (arrow).
- Release the cable straps.



- Undo the fastening (arrow).
- Remove brake light switch with cable.

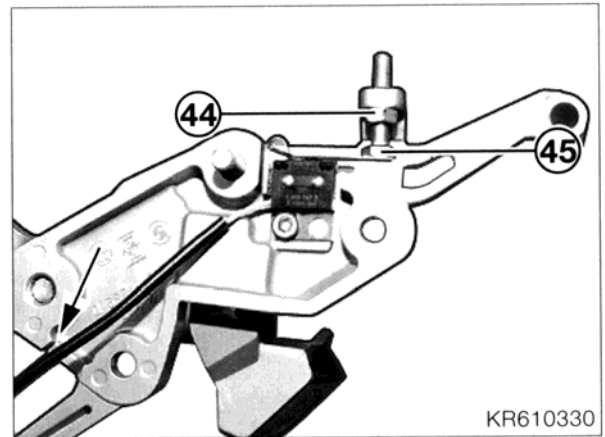
- Install in the reverse order of work, noting the following operations in particular.

**Tightening torque:**  
Brake light switch to footrest plate ..... 5 Nm

**Caution:**  
Make sure that the cable is run correctly at the cut-out (arrow) in the footrest plate.

**Tightening torque:**  
Footrest plate to frame ..... 21 Nm

**Note:**  
When installing, note correct position of cable straps.



- To adjust the brake light switch, loosen locknut (44).
- Turn adjusting screw (45) until distance "A" is obtained.
- Tighten the locknut.

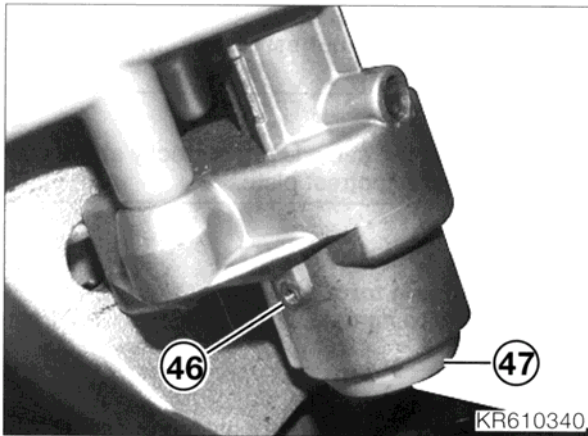
**Warning:**  
Check blow-by clearance at piston rod. (⇒ 34.13)

**Adjusting value:**  
Distance "A" ..... 15 mm

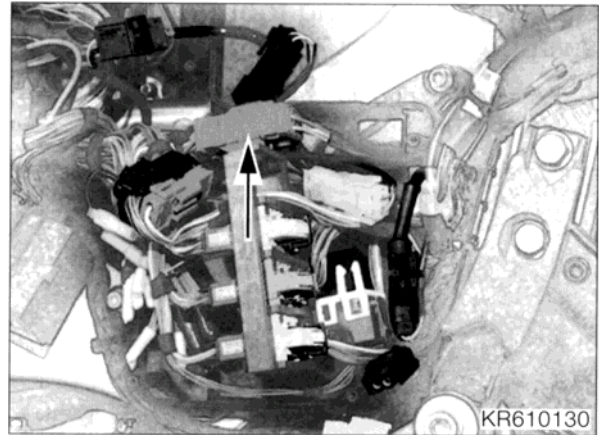


## Removing/installing ignition switch/ steering lock cable

- Remove right side section of fairing.  
(→ 46.10)



- Carefully remove the sealing lacquer from the tapped hole for grub screw (46).
- Remove the grub screw.
- Pull the ignition/light switch housing (47) with cable off downwards.

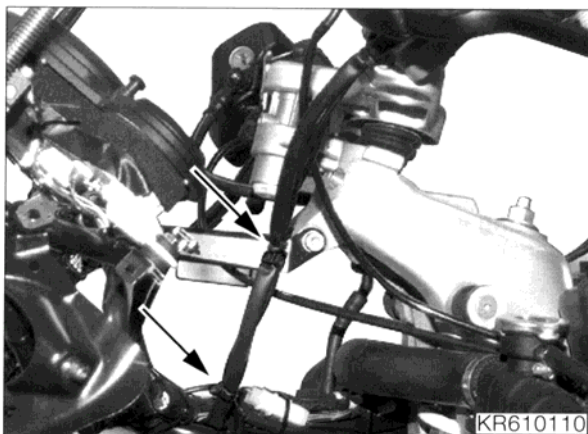
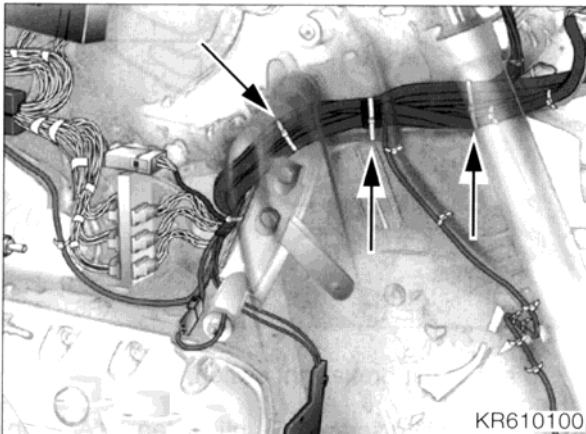


- Open the lid of the electronic equipment box.
- Separate the plug connector (arrow).
- Install in the reverse order of work, noting the following operations in particular.



### Note:

Seal the tapped hole for grub screw (46) with lacquer.  
When installing, note correct position of cable straps.

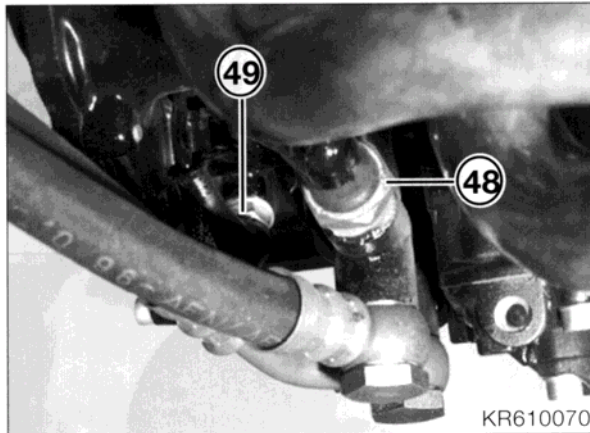


- Release the cable strap (arrow).

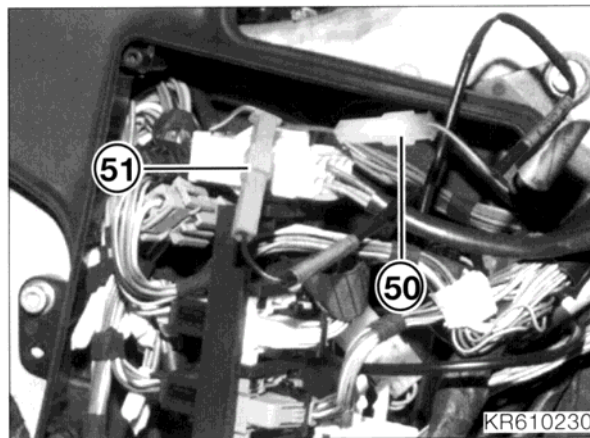
## Removing/installing oil pressure switch/cable for temperature sensor at water pump

- Remove right side section of fairing and engine spoiler.  
(→ 46.9)
- Remove cover from Hall-effect transmitter.  
(→ 12.5)
- Open the lid of the electronic equipment box.

### Removing/installing oil pressure switch cable



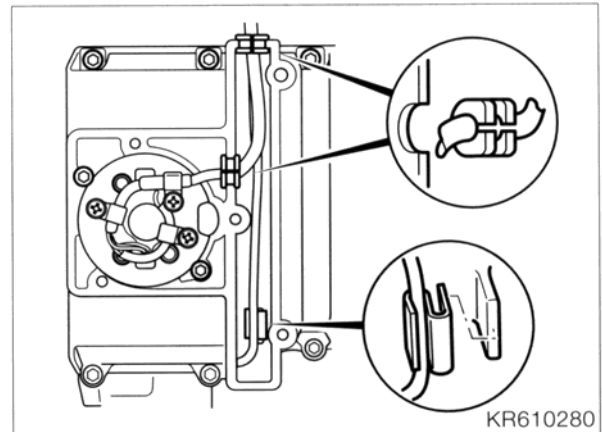
- Pull off protective cap and plug at oil pressure switch (48).



- Separate the plug connector for the oil pressure switch (50) in the electronic equipment box.
- Detach the cable.

### Removing/installing temperature sensor at water pump

- Pull off protective cap and plug at temperature sensor (49).
- Separate the plug connector for the temperature sensor (51) in the electronic equipment box.
- Detach the cable.



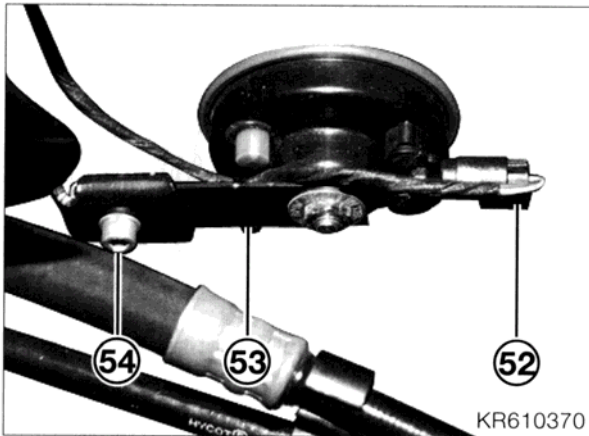
- Run the cable at the Hall-effect transmitter as illustrated.
- Further installation takes place in the reverse order of work.

**! Tightening torque:**  
Cover of Hall-effect transmitter ..... 9 Nm



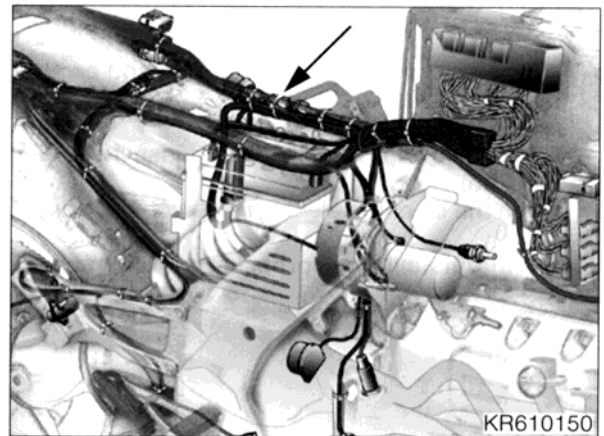
## Removing/installing horn

- Remove air inlet guide at left radiator.  
(→ 46.11)

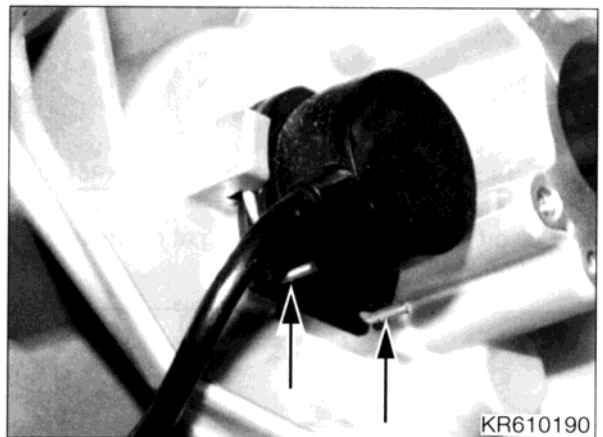


- Separate plug connector (52).
- Release cable strap (53).
- Release fastening (54) and take off the horn.
- Install in the reverse order of work.

## Removing/installing gear indicator



- Separate the plug connector (arrow).
- Release the cable strap.



- Press the clip (arrow) together and pull the gear indicator out to the rear.
- Install in the reverse order of work.





## **62 Instruments**

# Contents

Page

<b>Renewing instrument cluster</b> .....	5
Wiring colours .....	5
Removing and installing instrument cluster .....	6
Renewing telltale/warning lights .....	7
<b>Removing and installing wiring harness</b> .....	8

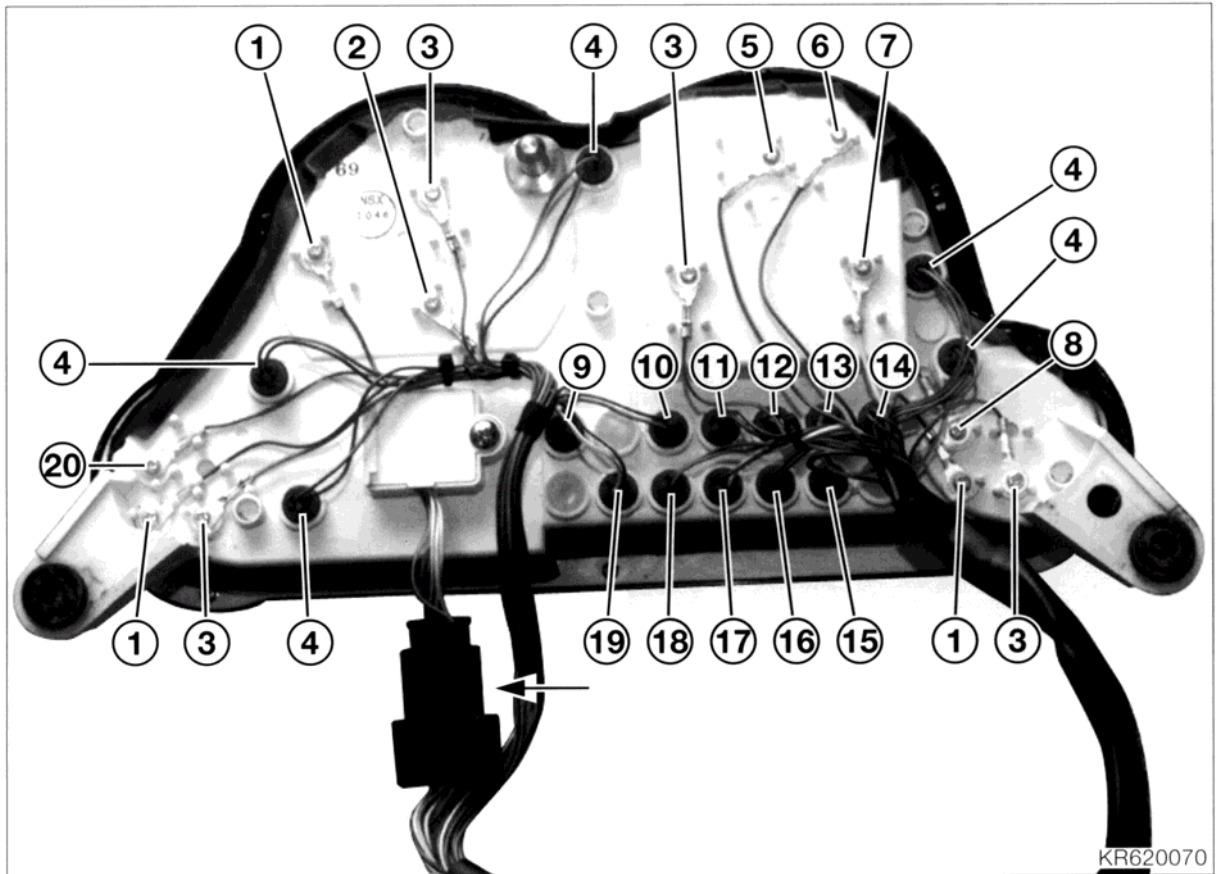




<b>Technical data</b>	<b>K 1200 RS</b>
Instrument cluster	
Telltale lights	12 V / 1.7 W







## Renewing instrument cluster

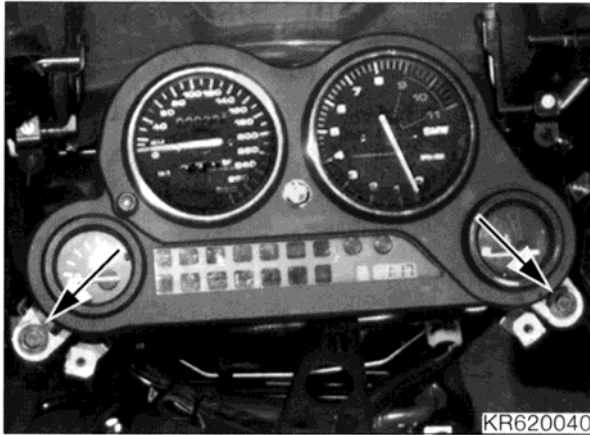
### Wiring colours

- brown (1)
- black (2)
- green-black (3)
- grey-blue/brown (4)
- brown (5)
- blue (6)
- yellow (7)
- yellow-violet (8)
- blue-black/brown-blue (9)
- violet-yellow/green-black (10)
- brown-violet/green-black (11)
- white-black/green-black (12)
- green-yellow/brown-blue (13)
- blue-red/brown-blue (14)
- brown-black/green-black (15)
- blue/green-black (16)
- white/brown-blue (17)
- brown-green/green-black (18)
- white-green/green-black (19)
- violet/white (20)



## Removing and installing instrument cluster

- Remove left and right side sections of fairing.  
(⇒ 46.10)
- Remove inner cover at left/right.  
(⇒ 46.14)

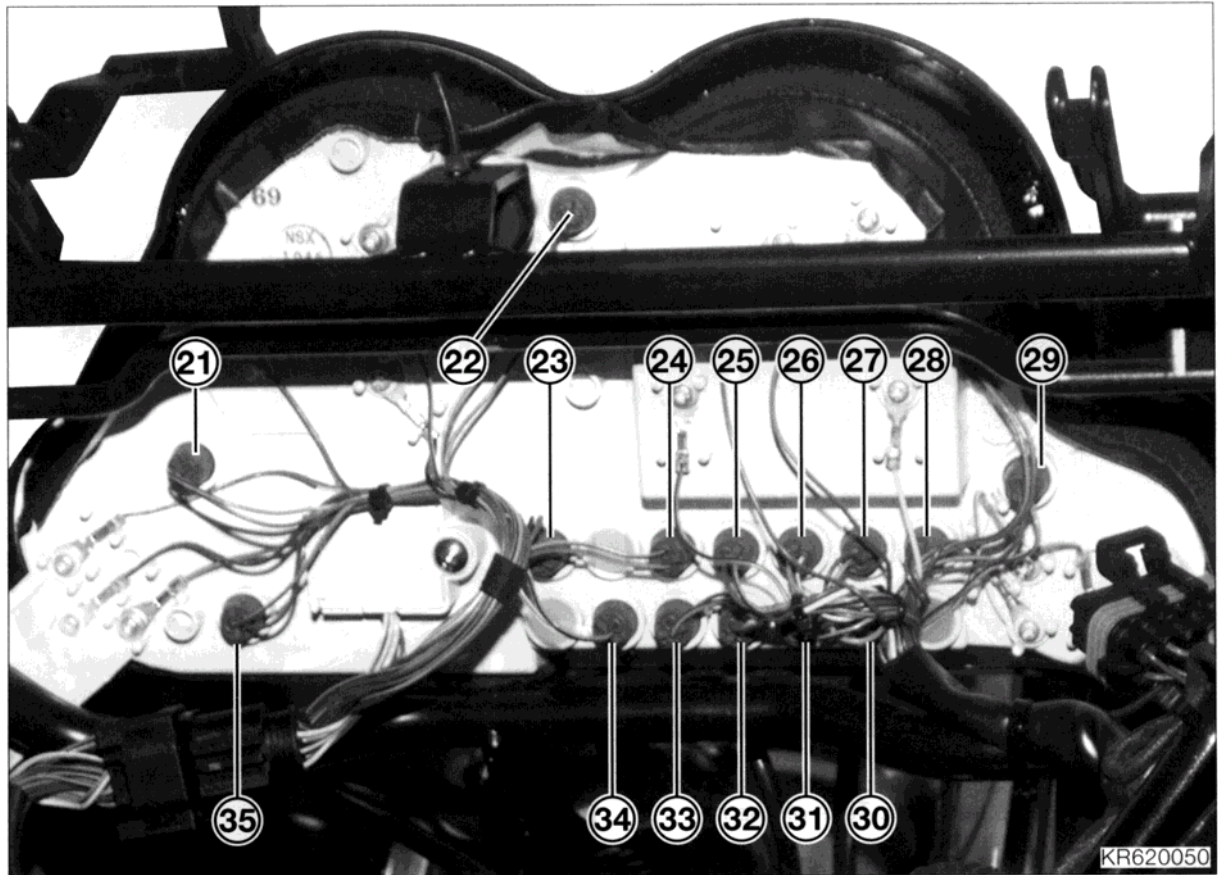


- Release instrument cluster fastenings (arrows).
- Pull instrument cluster out of holder.
- Pull out the telltale/warning lights. Release the contacts.
- Separate the plug connector for the digital display.

- Install the contacts and telltale/warning lights in the new instrument cluster according to the correct colours.
- Reconnect the digital display plug.
- Press the instrument cluster into its holder.
- Secure the fastenings.

 **Tightening torque:**  
Instrument cluster to fairing holder.....9 Nm





## Renewing telltale/warning lights

- Revolution counter light (21)
- Speedometer light (22)
- Right flashing turn indicator repeater (23)
- SET telltale light (24)
- Neutral indicator light (25)
- ABS warning light, red (26)
- ABS warning light, red (27)
- Left flashing turn indicator repeater (28)
- Fuel gauge lighting (29)
- Overheat warning light (30)
- Battery charge warning light (31)
- Headlight high beam repeater (32)
- Engine oil pressure warning light (33)
- Low fuel level warning light (34)
- Temperature display warning light (35)

- Remove top section of fairing with headlight. (→ 46.16)



### Note:

The telltale/warning lights may if necessary be removed by pulling on the cables.

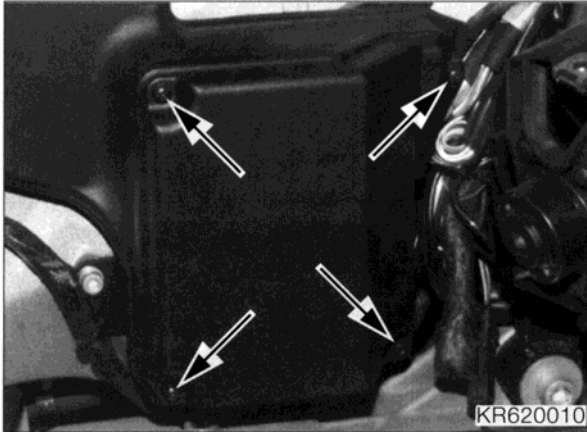
- Pull out the appropriate holder with telltale/warning light.
- Renew the telltale/warning light.
- Press the telltale/warning light holder as far as possible into the instrument cluster.
- Install top section of fairing with headlight.



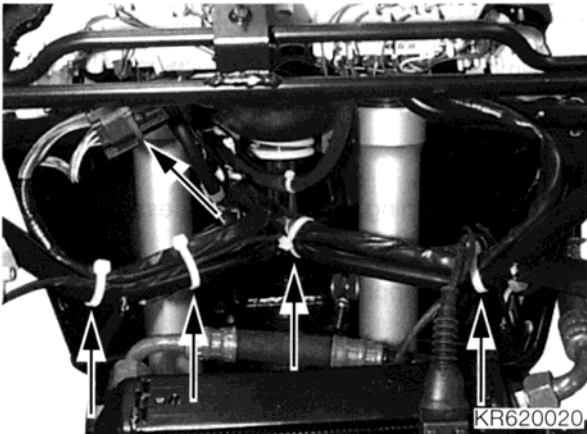


## Removing and installing wiring harness

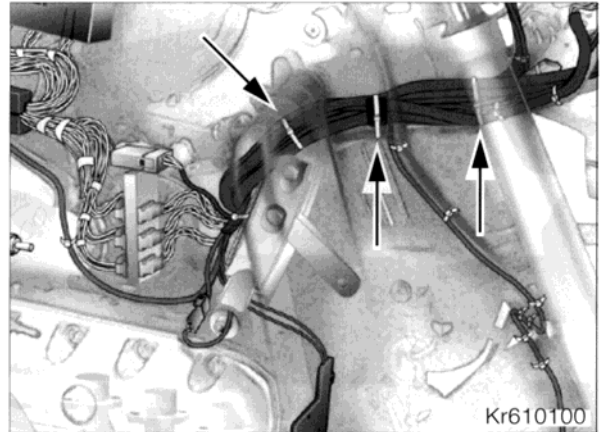
- Remove the intake air pipe.  
(→ 46.11)
- Remove the air outlet guide for the right-hand radiator.  
(→ 46.12)
- Press the radiator out of the holder.



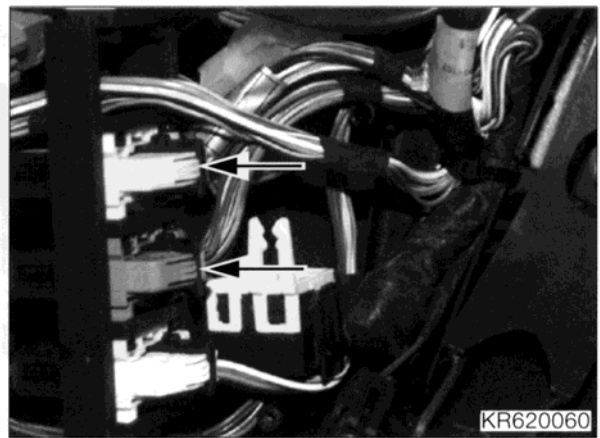
- Release the fastenings (arrows) for the lid of the electronic equipment box. Take off the lid.



- Release cable straps (arrows) at fairing holder.



- Release cable straps (arrows) at wiring harness.



- Separate the plug connectors (arrow) in the electronic equipment box by swinging the hoop over.



### Note:

The telltale/warning lights may also be removed by pulling their cables.

- Remove telltale light and contacts from instrument cluster.
- Separate the plug connector for the digital display.
- Take off the wiring harness.
- Install the new wiring harness in the correct positions.
- Install contacts and telltale/warning lights in accordance with the cable colours (→ 62.5).
- Connect the digital display plug.
- Continue installation in the reverse order of work.

## **63 Lights**

# Contents

Page

<b>Removing and installing headlight</b> .....	5
<b>Renewing bulb</b> .....	5
<b>Adjusting headlight</b> .....	6
<b>Renewing rear lights</b> .....	7
Removing and installing rear/brake light housing .....	7
Removing and installing turn indicator housing .....	7
Changing bulbs .....	7
<b>Renewing front turn indicators</b> .....	7
Removing and installing front turn indicator .....	7
Changing the bulb .....	7

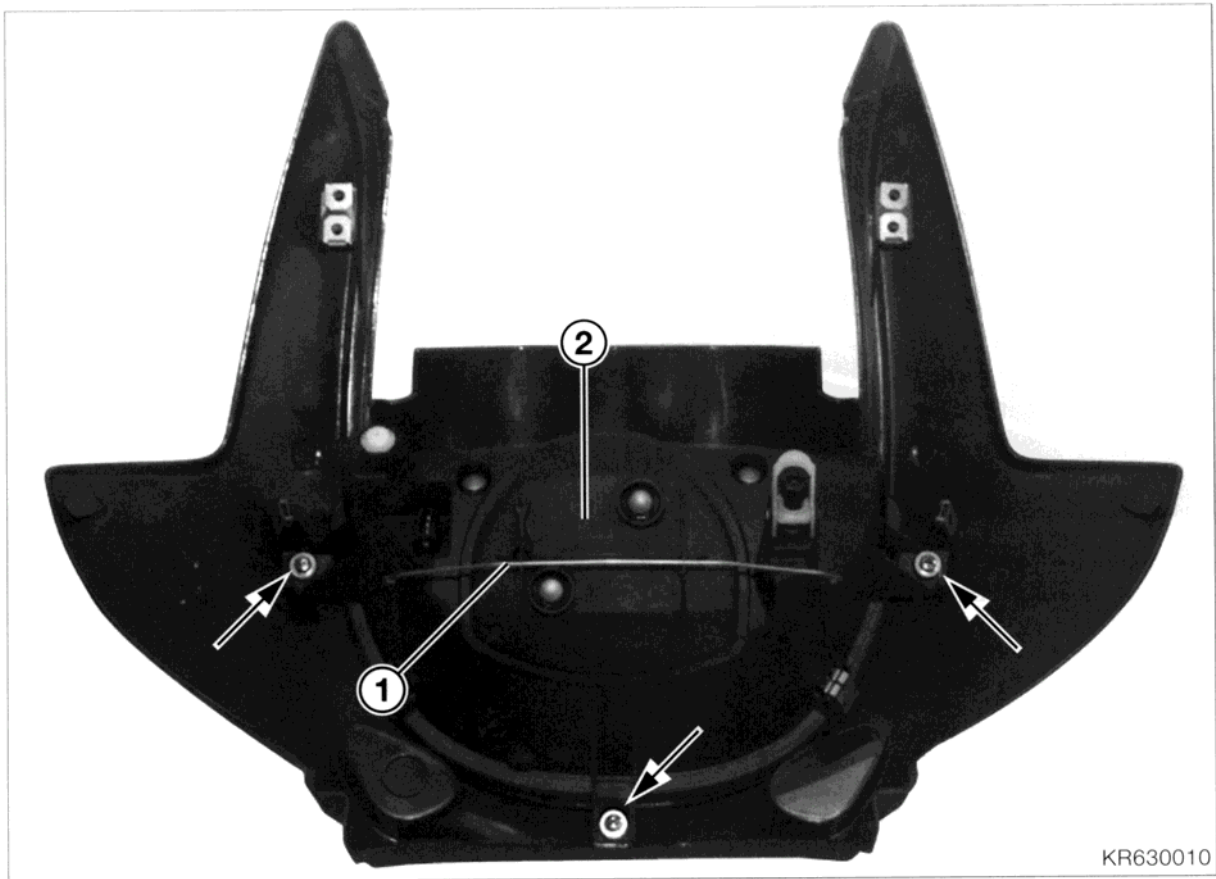




Technical data	K 1200 RS
<b>Lights</b>	
Headlight	H7 tandem headlight with free-form reflector and manual beam throw adjustment
<b>Bulbs</b>	
High (main) beam	H3 halogen bulb, 12 V 55 W, asymmetric, use only original BMW replacement bulb, BMW part number 23 05 755
Low (dipped) beam	H7 halogen bulb, 12 V 55 W, asymmetric
Parking light	12 V 5 W DIN 72 601 Standard designation W 10/5
Brake/rear light	12 V 21/5 W DIN 72 601 Standard designation P 25-2
Flashing turn indicators	12 V 21 W DIN 72 601 BMW part number 23 06 150
Number plate light	12 V 5 W DIN 72 601 Standard designation C 11
Turn indicator repeaters	12 V 1.7 W DIN 72 601 BMW part number 23 06 127







KR630010

### Removing and installing headlight

- Remove top section of fairing with headlight. (→ 46.16)
- Release fastenings (arrows) for headlight on top section of fairing.
- Take off the headlight.



**Note:**

Do not touch the inner surface of the reflector or the glass of the bulbs with the fingers.

- Install in the reverse order of work.

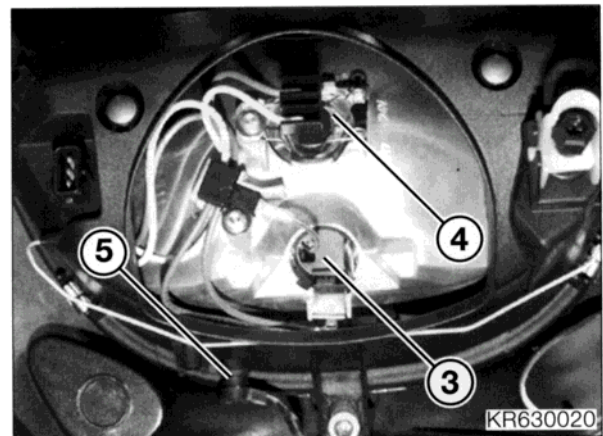


**Tightening torque:**

Headlight to fairing ..... 3 Nm

### Renewing bulb

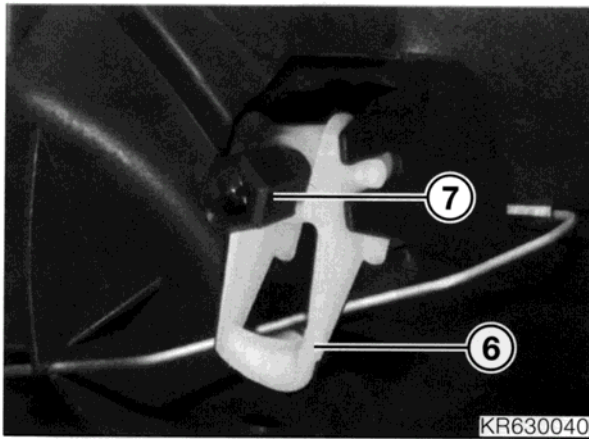
- Press the retaining hoop (1) down. Take off the housing cover (2).



KR630020

- Renew the high (main) beam (3), low (dipped) beam (4) or parking light (5) bulb.
- Place the housing cover in position and snap the fastenings together.

## Adjusting headlight



- Engage the pivot lever (6) in its lower position.
- Adjust headlight beam throw with adjusting screw (7).
  - Anti-clockwise rotation: longer.
  - Clockwise rotation: shorter.
- Adjust beam throw with a suitable adjuster.
- Set the pivot lever to the centre position.

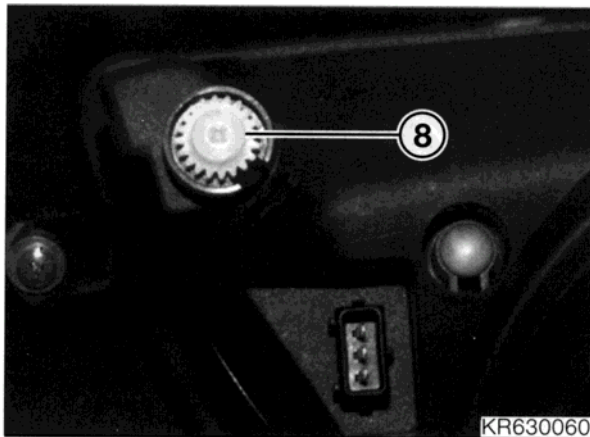
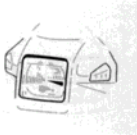
### Setting for headlight beam throw adjuster

.....-10 cm at a distance of 10 m



#### Note:

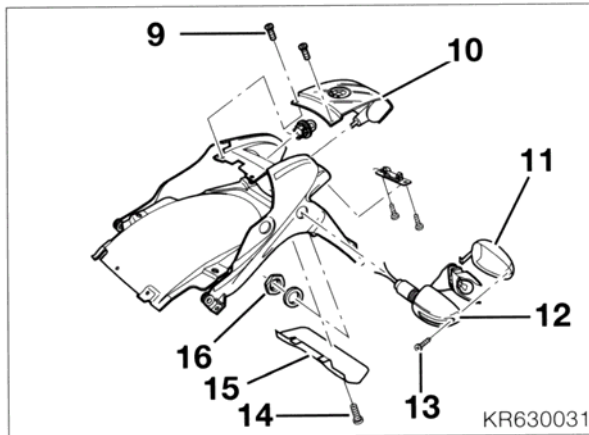
Use the headlight only with the pivot lever in the centre (normal) or lower (heavy load) positions.



- Adjust left/right angle at screw (8).



## Renewing rear lights



### Removing and installing rear/brake light housing

- Release the fastenings (9) and pull the rear/brake light housing (10) off to the rear.
- Remove bulb with holder from rear/brake light housing.
- Install in the reverse order of work.

### Removing and installing turn indicator housing

- Release the fastening (13) and take off the turn indicator glass (11).
- Pull off the cable connectors.
- Release the cover (15) and take it off.
- Release fastening (16).
- Pull off the flashing turn indicator (12).
- Install in the reverse order of work.

### Changing bulbs



#### Note:

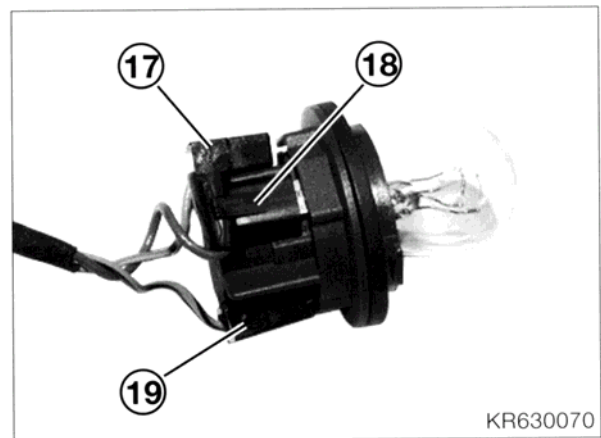
Never touch the glass of the bulb with the fingers.

- Take off the appropriate housing. Change the bulb.



#### Caution:

When changing the rear and brake light bulbs, do not accidentally confuse their contacts.



#### Cable colours at contacts

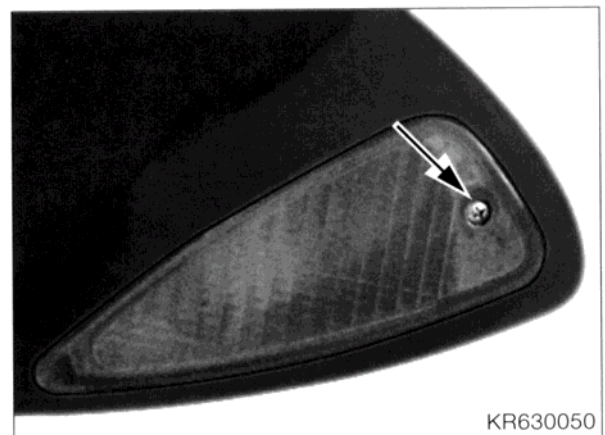
grey-yellow (17)  
brown (18)  
grey-black (19)

## Renewing front turn indicators

### Removing and installing front turn indicator

- Remove/install left or right hand guard (→ 46.9)

### Changing the bulb



- Release the fastening (arrow) and take off the turn indicator glass.
- Change the bulb.