

Repair Manual

F 650 CS

**BMW Motorrad
After Sales**

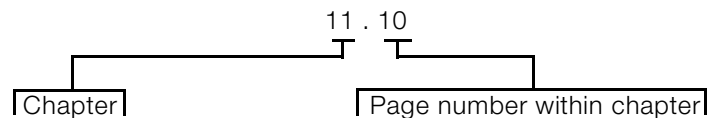
Introduction

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 toward achieving even higher Service quality.

A new issue of this repair manual will be published if amendments or additions (supplements) are needed.

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, Disassembling, Repair, Assembly, Installation.
- The entire contents are divided into individual chapters, corresponding to the Construction Groups.



If a reference is needed to a different page or chapter, an arrow symbol is shown followed by the chapter and page numbers, e. g. (➡ 12.5).

- 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 (ETK), 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. **[Heated handlebar grips]**.

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

BMW Motorrad
After Sales

Issued by BMW Motorrad
After Sales
UX-VS-2
D-80788 München

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Produced in Germany

BMW Motorrad

Maintenance schedule

F 650 CS



Customer	Licence No.	Mileage	BMW Inspection at 1,000 km/600 miles	BMW Maintenance Service every 10,000 km/6,000 miles	BMW Inspection every 20,000 km/12,000 miles	BMW Annual Service
Job Order No.	Date	Mechanic's signature				
Read the fault code memory with the BMW MoDiTeC			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Change the engine oil [engine only] while at regular operating temperature and replace the oil filter element			<input type="checkbox"/>			
Change the engine oil [engine and oil tank] while at regular operating temperature and replace the oil filter element if motorcycle is used only for short journeys or at outside temperatures below 0°C (32°F): every 3 months or at the latest after 3,000 km (1,800 miles)				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean oil strainer in frame once only at 10,000 km/6,000 miles				<input type="checkbox"/>		
Check the coolant and restore to correct level if necessary			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Grease rubber grommets for cover insert			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Replace the coolant *) every 2 years						<input checked="" type="checkbox"/>
Check valve clearances, adjust if necessary *)				<input type="checkbox"/>	<input type="checkbox"/>	
Replace the spark plug					<input type="checkbox"/>	
Drain the outlet hose from the air filter box			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Replace intake air filter If motorcycle is operated in very dirty or dusty conditions, clean or replace the intake air filter every 10,000 km (6,000 miles); check every 3,000 km (1,800 miles)					<input checked="" type="checkbox"/>	
Replace fuel filter every 40,000 km (24,000 miles)					<input checked="" type="checkbox"/>	
Check clutch play, adjust if necessary			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Examine brake pads and discs for wear, replace if necessary *)				<input type="checkbox"/>	<input type="checkbox"/>	
Check front/rear circuit brake fluid				<input type="checkbox"/>	<input type="checkbox"/>	
Check for operation of brake system and freedom from leaks; repair/replace if necessary *)					<input type="checkbox"/>	
Renew brake fluid at least once a year						<input type="checkbox"/>
[ABS] Replace the primary front/rear brake master cylinder cup *) every 40,000 km (24,000 miles)					<input checked="" type="checkbox"/>	
Replace toothed belt					<input type="checkbox"/>	
Check toothed belt and sprocket, replace if necessary *)					<input type="checkbox"/>	
Check belt tension, adjust if necessary *)			<input type="checkbox"/>	<input type="checkbox"/>		
Check battery acid level, add distilled water if necessary				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean and grease the battery terminals, if necessary						<input type="checkbox"/>
Check steering head bearings and adjust *) or replace if necessary *)				<input type="checkbox"/>	<input type="checkbox"/>	
Grease the side stand				<input type="checkbox"/>	<input type="checkbox"/>	
Using a torque wrench, check that the screws and nuts of the engine mounts, manifold fastener, the frame threaded fasteners, the rear-frame threaded fasteners, and the eccentric clamp are tightened to specified torque			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Final inspection with road safety and functional check: <ul style="list-style-type: none"> - Clutch, gearshift - Steering - Front and rear brakes - Side stand contact switch - Condition of tyres and wheels, tyre pressures - Lights and signalling equipment, indicator and warning lights, instruments - Optional equipment - Test ride, if necessary 			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*) Write up on separate invoice; ☐ Not part of standard service procedure

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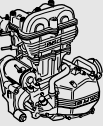
00 Tightening torques, Operating fluids

00 Pre-delivery check

00 Maintenance



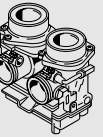
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12 Engine electrics



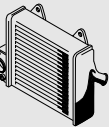
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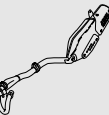
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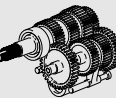
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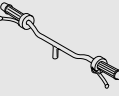
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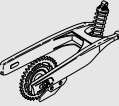
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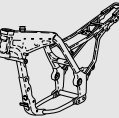
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36 Wheels and tyres



46 Frame



51 Equipment



61 General electrical equipment



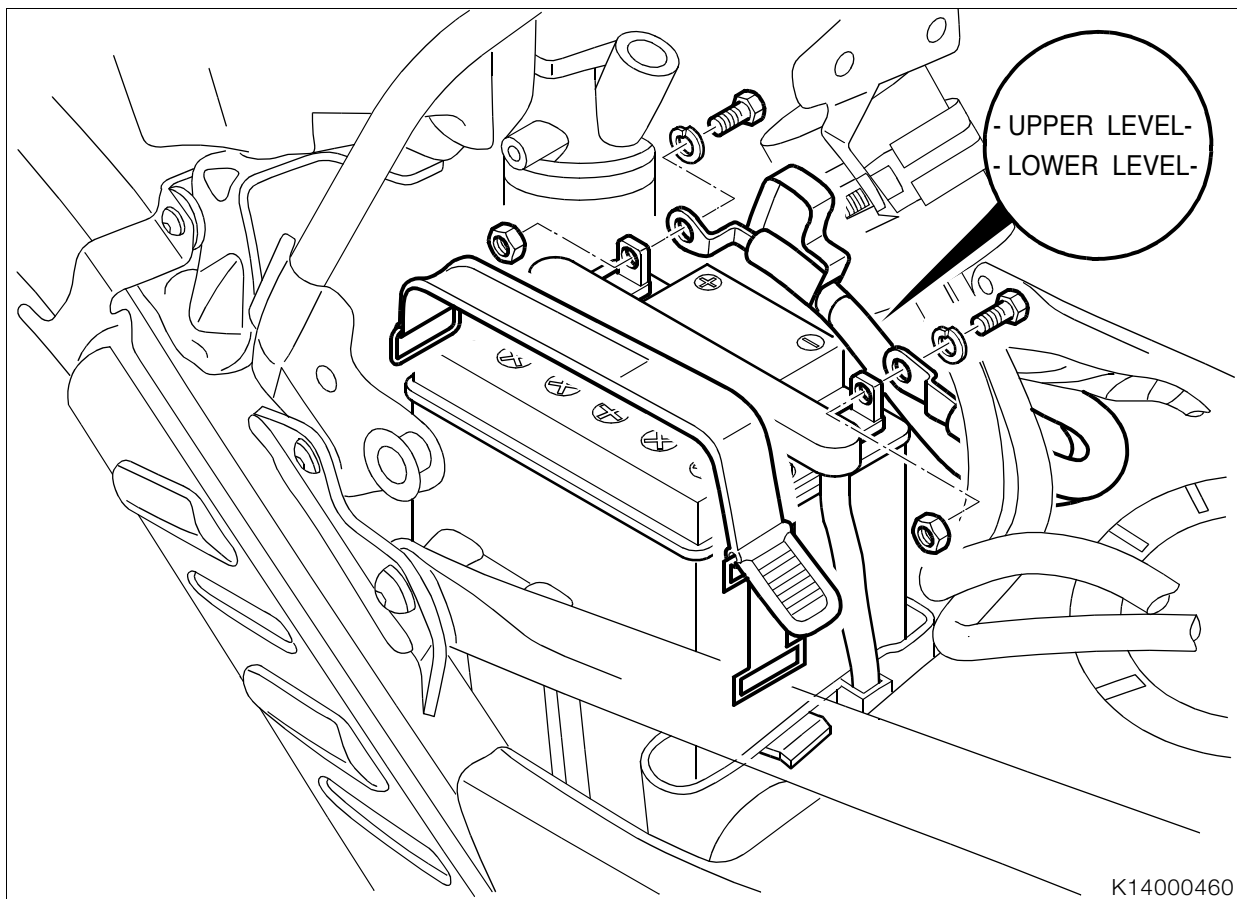
62 Instruments



63 Lights



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K14000460

61 21 Filling and charging the battery



Warning:

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

- Disengage the rubber strap holding the battery.
- Disconnect the battery breather hose.
- Remove the battery.
- Fill all the cells with pure battery acid of density 1.28 to the Upper Level mark.
- Allow the battery to stand for approximately 30 minutes.

- The battery does not achieve full charge capacity from being filled, so it has to be charged with a battery charger.



Note:

Follow the instructions for use supplied with the battery charger.

Charge current (A)

..... 10 % of rated battery capacity (Ah)

Charging time

..... 5-10 hours

- Battery charge can be measured by checking the density of the battery acid.

Acid density

Battery fully charged

..... 1.26-1.30 at a temperature of 20 °C (68 °F)

- Shake the battery slightly to allow the gas bubbles to escape.
- Wait until the battery acid has settled, check that no more bubbles rise and if necessary, top up the acid to the max. mark.
- Reinstall the plugs.
- Make a note of the charging date on the battery.

00 Maintenance

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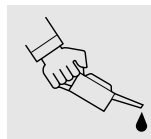
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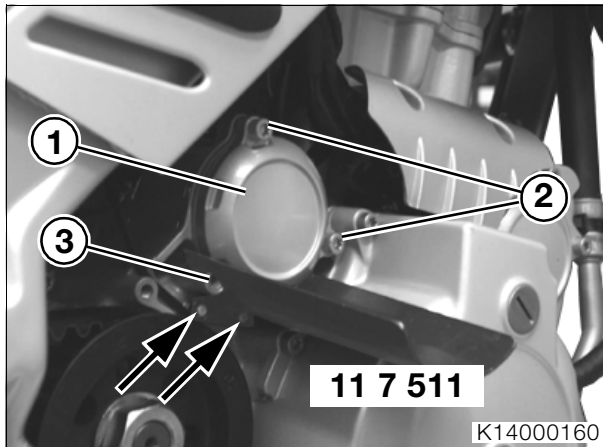
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00 11 215 Replacing oil filter element



- Remove the left-hand screw (3) securing the oil-filter cover (1).
- Remove the cable for the neutral-indicator switch from its guide.
- Engage the oil drain guide, **BMW No. 11 7 511**, on the pins (arrows) on the engine block.
- Position a drip tray beneath the engine.
- Remove the screws (2) and remove the oil-filter cover.
- Remove the filter element.
- Fully drain the oil and clean the oil-filter housing.



Attention:

Dispose of the used oil and oil filter in an environmentally compatible manner.

- Fit a new filter element onto the oil-filter cover.
- Coat the O-ring of the filter element lightly with oil.
- Check the O-ring of the oil-filter cover for damage and replace if necessary.
- Install the oil-filter cover complete with filter element.
- Installation is the reverse of the removal procedure: pay particular attention to the following.



Note:

Do not reinstall the belt sprocket cover at this stage, if other maintenance work has to be performed on assemblies normally concealed by this component.



Tightening torque:

Oil filter cover 10 Nm
Sprocket cover to engine 2 Nm

00 11 215 Filling with engine oil

- Install the oil drain plug in the engine with a new sealing ring and tighten.
- Fill the oil tank with 0.5 l (0.88 Imp. pints/0.53 US quarts) of engine oil and install the filler cap.



Note:

The requisite quantity of oil is 0.5 (0.88 Imp. pints/0.53 US quarts) to 1,5 l (2.64 Imp. pints/1.59 US quarts), depending on operating status.



Warning:

Observe the hazard avoidance instructions for running internal combustion engines in enclosed spaces.

- Installation is the reverse of the removal procedure: pay particular attention to the following.



Warning:

Observe the hazard avoidance instructions for running internal combustion engines in enclosed spaces.

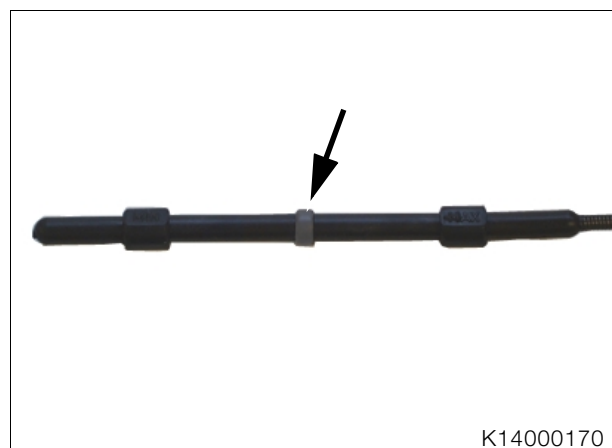
- Check the oil level with the engine at operating temperature, proceeding as follows:



Note:

Lower the dipstick into the oil filler neck, but do not engage the threads.

1. Make sure the engine is at operating temperature, and allow it to idle for 1 minute.
2. Switch off the engine and check the oil level with the dipstick.



3. Top up the engine oil if necessary, but no higher than the midway mark (arrow) and repeat steps 1) to 3).



Attention:
Do not use synthetic oils.

Operating fluids:

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

Capacity, engine:

with filter replacement 0.5 l
..... (0.88 Imp. pints/0.53 US quarts)



Tightening torque:

Oil drain plug, engine 40 Nm

00 11 215 Changing the engine oil [engine and oil tank] and oil filter element

(Inspections II, III and IV)



Note:

If an engine failure occurs, the oil tank and feed line must be flushed with thin oil, and then blown through with compressed air (→ 11.17).

00 11 215 Preparatory work

- Place motorcycle on side stand.
- Remove cover for belt sprocket from engine.

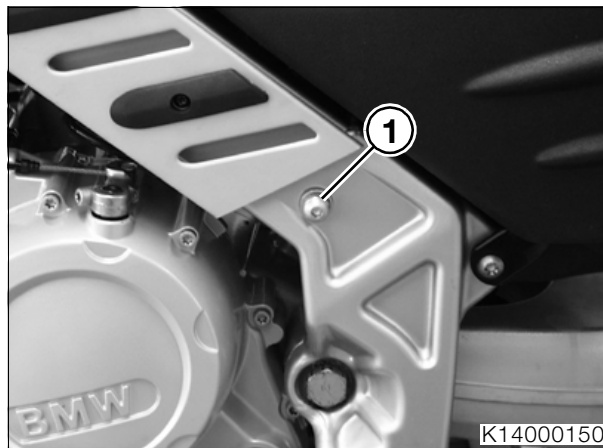
00 11 215 Draining engine oil



Warning:

Observe the hazard avoidance instructions for running internal combustion engines in enclosed spaces.

- Warm up the engine to operating temperature.
- Place a suitable container in position to catch the oil.



- Remove the filler cap from the oil tank.
- Remove the oil drain plug from the frame (1).
- Fully drain the oil.
- Place the motorcycle on the auxiliary stand, **BMW No. 00 1 620.**
- Remove the oil drain plug from the engine and fully drain the oil from the engine.

63 99 271 Flashing turn indicator

- Remove turn-indicator cover.
- Press the bulb to the rear and turn it counter-clockwise to release.
- Installation is the reverse of the removal procedure.

63 99 381 Rear lights

- Remove rear-light lens.
- Press the bulb to the rear and turn it counter-clockwise to release.
- Installation is the reverse of the removal procedure.

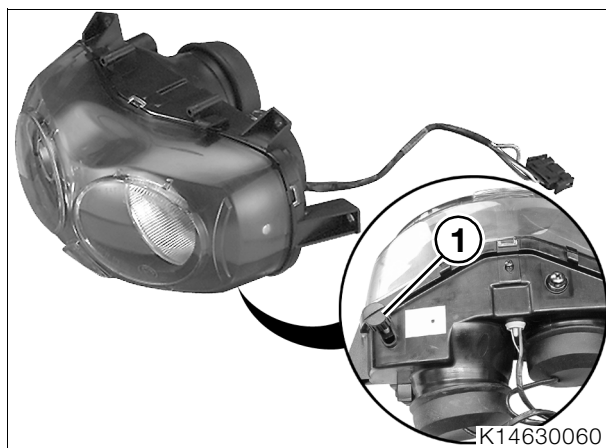
63 99 399 Bulb for number-plate light

- Remove the number plate light.
- Lift the rubber cap, press the bulb in and turn it counter-clockwise to disengage.

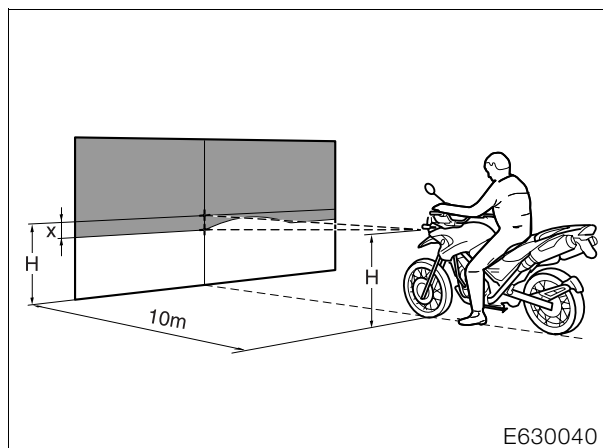
63 10 004 Checking and adjusting headlight beam throw

Vertical adjustment

- Rider's weight on motorcycle (75 kg/165 lbs).



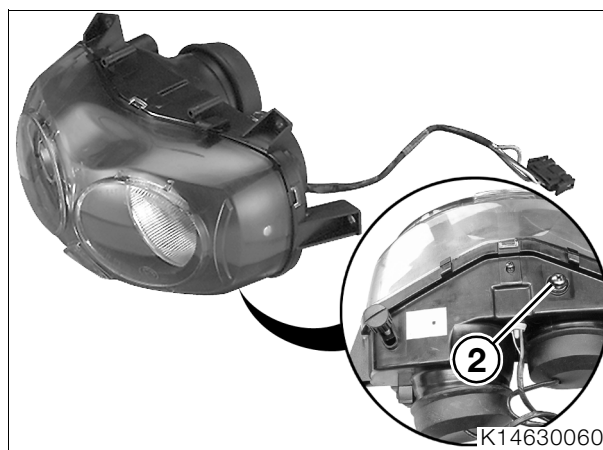
- Manually adjust the headlight throw by turning adjusting screw (1).



Setting for headlight beam adjuster

X 10 cm (3.93 in) over a distance of 10 m (32.81 ft)

Lateral adjustment



- Adjust lateral throw by turning screws (2), if necessary.

