

Repair Manual



F 650 GS

**BMW AG Motorcycle Division
After Sales**

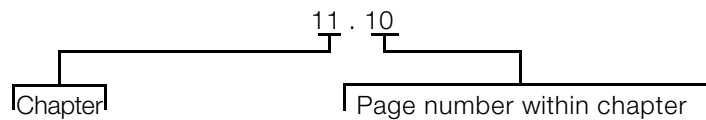
Introduction

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



An arrow symbol followed by the chapter and page numbers is a reference to another chapter, e.g. See Group 46

- 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. **[With heated handlebar grips]**.

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
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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 F 650 GS 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.



Warning:

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

Activities

- Activities
- The bullet symbol means that work steps are described in greater detail under another headline
- Preceding activities
- A line indicates work steps described in greater detail under another headline or in another chapter

If the term "release" or "remove" is used:
the fastener (e.g. screw) must be slackened off and taken out
or

a component (e.g. fuel rail) must be removed to the extent that other components which it conceals (e.g. throttle-valve rail) are accessible

If the term "loosen" or "slacken" is used:
the fastener (e.g. screw) must only be slackened off but not taken out



Tightening torques:

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

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Maintenance schedule

F 650 GS



		BMW Inspection at 1,000 km (600 miles)	BMW Service every 10,000 km (6,000 miles)	BMW Inspection every 20,000 km (12,000 miles)	BMW Annual Service
Customer	Licence plate no.				
Order No.	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 while at regular operating temperature; 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"/>	<input type="checkbox"/>
Replace oil in telescopic forks				<input type="checkbox"/>	
Check the coolant and restore to correct level if necessary *)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Replace the coolant (every 2 years)					<input type="checkbox"/> every 2 years
Check valve clearances, adjust if necessary		<input type="checkbox"/>	<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"/>	
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 type="checkbox"/>	
Replace fuel filter (every 20,000 km/12,000 miles)				<input type="checkbox"/> 20,000 km	
Check clutch play, adjust if necessary		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Check wheel spoke tension and tighten if necessary more frequently if motorcycle is ridden in severe off-road conditions		<input type="checkbox"/>	<input type="checkbox"/>		
Examine brake pads and discs for wear, replace if necessary *) more frequently if motorcycle is ridden in severe off-road conditions			<input type="checkbox"/>	<input type="checkbox"/>	
Check brake fluid level at front and rear and top up if necessary *)			<input type="checkbox"/>		
Check for operation of brake system and freedom from leaks; repair/replace if necessary *)				<input type="checkbox"/>	
Replace the brake fluid at least once a year					<input type="checkbox"/>
Replace the primary front/rear brake master cylinder cup (every 40,000 km/24,000 miles on a motorcycle with ABS)				<input type="checkbox"/> 40,000 km	
Check wheel bearings and replace if necessary *)				<input type="checkbox"/>	
Check or, if necessary, replace chain, sprocket, chain guide rollers and pinion *) more frequently if motorcycle is ridden in severe off-road conditions			<input type="checkbox"/>	<input type="checkbox"/>	
Check chain tension and adjust if necessary *)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check battery acid level, add distilled water if necessary more frequently if motorcycle is ridden in severe off-road conditions			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean and grease the battery terminals, if necessary				<input type="checkbox"/>	<input type="checkbox"/>
Check steering head bearings and adjust *) or replace if necessary *)			<input type="checkbox"/>	<input type="checkbox"/>	
Grease the side and main stands			<input type="checkbox"/>	<input type="checkbox"/>	
Grease the brake pedal			<input type="checkbox"/>	<input type="checkbox"/>	
Check bolts and nuts on engine mountings, frame connections, exhaust system mountings, swinging fork pivot, suspension levers, brake pedal, main and side stands and quick-release axles for tightness		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Final inspection with road safety and functional check: - (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 - Test ride, if necessary		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*) Associated work invoiced separately, see Flat rates brochure, Motorcycle '98					

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Pre-delivery Check

F 650 GS



_____	_____	BMW Pre-delivery check
Customer	Licence plate no.	
_____	_____	
Order No.	Mechanic's signature	
Check the shipping crate for damage		<input type="checkbox"/>
Motorcycle: <ul style="list-style-type: none"> - unpack - inspect for damage - install remaining items - clean 		<input type="checkbox"/>
Battery: <ul style="list-style-type: none"> - remove - add acid - charge - grease terminal posts - fit (mark with fitting date) 		<input type="checkbox"/>
Check that the delivery is complete: <ul style="list-style-type: none"> - Toolkit - Documentation - Motorcycle keys - Optional extras 		<input type="checkbox"/>
Read the fault code memory with the BMW MoDiTeC		<input type="checkbox"/>
Check tyre pressures		<input type="checkbox"/>
Fill fuel tank		<input type="checkbox"/>
Final inspection as functional check: <ul style="list-style-type: none"> - Oil inspection - Engine idle speed - Clutch, gearshift - Steering - Hand brakes and foot brakes - Check lights and signalling equipment, warning and indicator lights, instruments, ABS - Test ride, if necessary 		<input type="checkbox"/>

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Service data

F 650 GS



Item	Rated value	Unit of measurement/ specification
Oil capacities		
Engine (with filter)	2.3 (4.05/2.43)	Litres (Imp. pints/US quarts) Specification: see current Service Information
Telescopic fork – for each post	0.60 (1.06/0.63)	Litres (Imp. pints/US quarts) BMW telescopic fork oil
Coolant		
Cooling system (entire)	1.3 (2.29/1.37)	Litres (Imp. pints/US quarts)
Expansion tank	0.1 (0.18/0.11)	Litres (Imp. pints/US quarts)
		Composition: Water: 50% Antifreeze: 50% Antifreeze protection to –25 °C (–13 °F)
Brake fluid		DOT 4
Valve clearances		
Measured cold (max. 35 °C/95 °F)	Inlet: 0.10-0.15 (0.004-0.006) Exhaust: 0.25-0.30 (0.010-0.012)	mm (in) mm (in)
Spark plugs		
Electrode gap	0.6...0.7 (0.02...0.03)	NGK D8 EA mm (in)
Idle speed	1350 +100	rpm
Clutch cable play		
Hand lever cable	1.0 - 2.0 (0.004 - 0.008)	mm (in)
Tyre pressure (on cold tyres)		
solo	front/rear 1.9/2.1 (27/30)	bar (psi)
when fully loaded	2.1/2.3 (30/33)	bar (psi)
Tightening torques:		
Engine oil drain plug	40	Nm
Engine water drain plug	10	Nm
Oil tank drain plug	21	Nm
Oil filter cap	10	Nm
Valve cap	10	Nm
Camshaft bracket	10	Nm
Spark plug	20	Nm
Telescopic fork oil drain plug	6	Nm
Round nut, steering bearing	25	Nm
Steering bearing locking tube	65	Nm
Flanged nut on locking tube	65	Nm
Fork stabilizer clamping screws	21	Nm
Front quick-release axle	80	Nm
Clamping screws for front quick-release axle	21	Nm
Rear quick-release axle	100	Nm
Brake caliper at fork slider tube	41	Nm
Swinging arm bearings	100	Nm
Deflection lever/frame	50	Nm
Deflection lever/spring strut	47	Nm
Deflection lever/tension strut	71	Nm
Swinging fork/tension strut	41	Nm

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Instructions for pre-delivery check

