TECHNICAL DATA AND SERVICE US MODELS

R 60/7

R 75/7

R 100/7

R 100 S

R 100 RS

Model

Chassis No.

License No.

Vehicle Owner

Address

Telephone No.

Dealer

Date of first registration

We reserve the right to modify designs, equipment and accessories in the interests of continuing technical development. Dimensions, weights and performance data are quoted to generally accepted tolerances. Errors and omissions excepted.

Dear BMW Enthusiast.

Congratulations on your decision in favor of the BMW motorcycle, with its powerful yet refined twin-cylinder horizontally-opposed engine and shaft drive – built to the finest engineering standards.

In order that you can familiarize yourself with the technical details of your motorcycle, we have prepared this Technical Data and Service Manual.

Apart from interesting details of the BMW motorcycle's engineering features, it provides a full summary of all maintenance work to be performed by your BMW dealer at the specified intervals.

Remember to take this manual along when your machine is due for service or inspection work. The BMW dealer will confirm in the spaces provided that all the necessary maintenance and inspection work has been performed without interruptions.

And now, enjoy the sheer riding pleasure that your BMW can offer – and which will, we are sure, make you a firm friend of the BMW blue-and-white badge if you are not one already.

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Technical description

Engine

The engine used in the type R 60/7 – R 100 RS motorcycles is an air-cooled horizontally opposed twin cylinder, 4-cycle unit.

The engine block takes the form of a 1-piece tunnel housing, reinforced by internal webs. It contains the crankshaft and camshaft.

The 1-piece crankshaft is a steel drop forging. Great rigidity is achieved by generously dimensioned main bearing journals and a high degree of overlap with the big-end bearing journals. The main and big-end bearing surfaces are treated for maximum surface hardness and resistance to abrasion.

The crankshaft runs in 4-layer main bearings pressed directly into the crankcase at the flywheel end and into a drop forged light alloy bearing cap at the alternator end. Careful dynamic balancing of the crankshaft ensures exceptional freedom from vibration. The **split, drop forged connecting rods** run on the crankpin in 4-layer bearings, and have I-section shafts.

The big-end bolts are screwed directly into the positively located big-end bearing caps. The small-end bearing is a pressed-in bronze bushing.

The camshaft is a case hardened phosphatized die casting located below the crankshaft, and running directly in the crankcase at the rear and in a cast iron flange with a brass bushing at the front. The rear end of the camshaft carries the inner rotor of the oil pump, and the front end the drive sprocket, the worm wheel for the revolution counter drive and the centrifugal advance cam for the distributor.

The off-center pistons are of cast aluminium alloy, with 3 piston rings; the top ring is a hard chromed spheroidal graphite ring, the second a cutaway ring and the third a double chamber oil scraper ring. The piston pin is of ample size and of the fully floating type; it is located in the piston on both sides by spring circlips to prevent axial movement.

The cylinders are made from a combination of materials. A cast iron liner is surrounded by a light alloy finned barrel thus assuring excellent heat dissipation, keeping rubbing surface temperatures low and thus improving oil adhesion.

Two pushrod outer tubes are pressed into the base of the cylinder and sealed against the engine block with rubber sleeves; these also act as oil return tubes from the cylinder head.

The cylinders are mounted on the crankcase using a special sealing compound (Hylomar). In addition, the 2 oil passages at the upper tie rod bolts are sealed with O-rings. The cylinder head has a metal-asbestos gasket.

The cylinder heads are of light alloy, with carefully designed fins and shrunk-in valve seats (fine perlitic gray cast iron for the inlet valves, high alloy gray cast iron for the exhaust valves). The valve guides are press fitted.

The cylinder heads are attached to the crankcase by 4 through bolts on each side, which also locate and retain the cylinder barrels. In addition the cylinder head is secured directly to the cylinder barrel by 2 nuts. The through bolts also carry the valve rocker needle roller bearings. The use of pressed-in pushrod tubes ensures that cooling air can reach those parts of the cylinder head which are subject to the highest thermal loadings, thus maintaining temperatures at a satisfactorily low level.

The valves are operated from the camshaft by hardened cast tappets, pushrods and rockers. The camshaft is driven at half engine speed by a duplex chain. Any stretching of the duplex chain is compensated for by a chain tensioner operated by a leaf spring.

The pushrods are manufactured from light alloy tube with approximately the same coefficient of expansion as the cylinder heads; this prevents alterations in valve operating clearances.

The exhaust valves consist of a highly heat conductive ferritic stem and a high alloy austenitic, scale resistant head; in addition the valve stems are hard chromium plated and the valve seat is armoured. The keeper arrangement permits the valves to rotate during operation.

Lubricating system

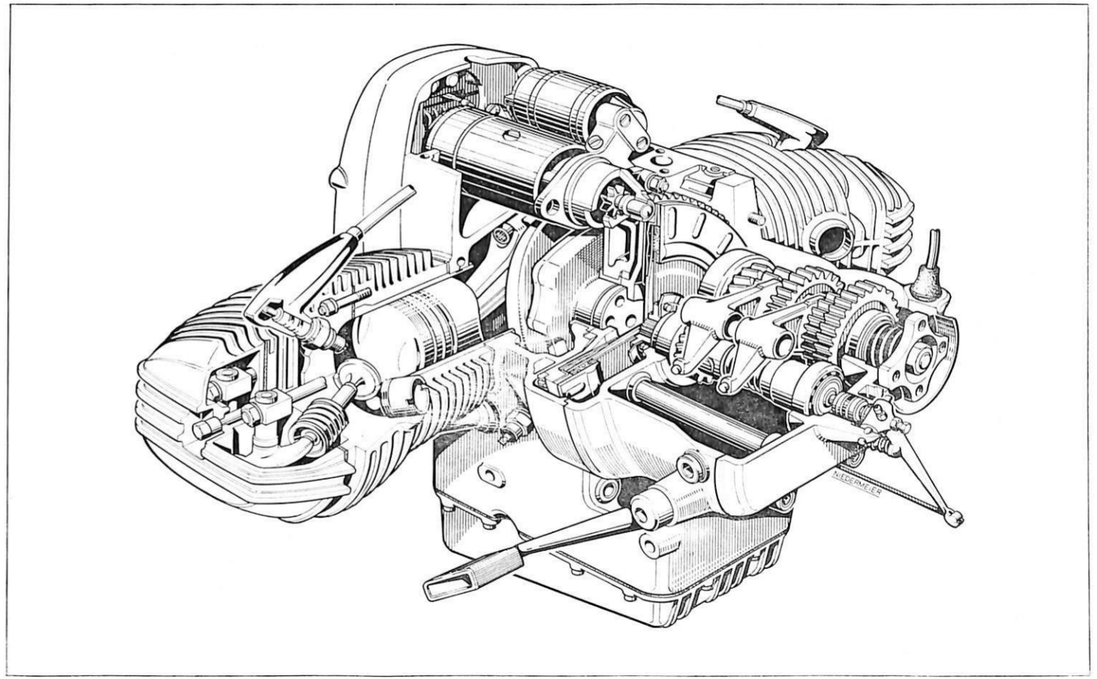
The engine employs a high pressure recirculating lubricating system with a full flow oil filter.

The lubricating oil pump is an Eaton trochoid gear type pump driven from the camshaft. It draws oil from the oil pan through an immersed dome with perforated metal screen, pumps it through the main lubricating passage to the full flow oil filter and from there to an annular passage in the camshaft bearing flange to the oil gallery in the main bearing cap.

From the annular gallery in the bearing cap the oil first passes through a hole in the left sidewall of the engine block to the rear main bearing, and then through 2 upward sloping passages in either crankcase sidewall to the upper tie rod bolts. The holes for the upper cylinder tie rod bolts are used to convey oil to the rocker pedestals and shafts, and thus to lubricate the rocker bearings and other timing gear components.

The connecting rods are lubricated through passages in the crankshaft, using oil drawn from the anular groove, in the front or rear main bearing bushing. The rear camshaft bearing is lubricated by oil leak from the oil pump. The timing chain runs beneath the normal oil level in the oil pan, and is additionally lubricated by oil emerging from the front main bearing and pressure relief valve.

Crankcase ventilation is obtained by drawing fumes against the direction of crankshaft rotation through a settling chamber, in which the oil mist is deposited, to a non-return valve. From this point the fumes are re-introduced into the combustion air intake.



Carburetors

Slide type carburetor — type R 60/7

R 60/7 models are equipped with 2 Bing plunger slide carburetors with a 26 mm throat and removable, centrally located float chamber. The carburetors are inclined and are attached to the cylinder-heads by a clamp ring.

Fuel flows into the **float chamber** 4 through a feed hose, the correct level being maintained in all driving attitudes of the machine by a double plastic float 5, which operates the float needle valve 11 via a pivot pin 10. The float chamber is vented to atmosphere, and supplies fuel to the main and idle jets.

The main jet 6 is screwed into the lower end of mixing tube 8 together with main jet block 7. Needle jet 12, into which a conical jet needle 16 is inserted, is mounted on the upper end of the mixing tube. The jet needle together with plunger piston 17 is raised or lowered by throttle operating cable 18. This enlarges or reduces the fuel outlet cross-section at the needle jet and the cross-section of air venturi. A proportion of the intake air by-passes the needle jet: this air supply is drawn from the air intake pipe 15 through passage 14; and causes pre-atomisation of the fuel emerging from the annular opening of the needle jet. In air venturi 15, the fuel/air mixture strikes the main air flow and a further intensive atomising process takes place before the mixture passes into the cylinder combustion chamber.

When the throttle is opened, upward movement of the jet needle frees plunger 9 of the **accelerator pump.** This is pressed up by a spring beneath and forces fuel above the plunger via the needle jet into the intake tract. In the carburetor's idle setting, the plunger is pressed back down by the jet needle, and fuel allowed to reach the space above the plunger at the same time via a miniature plate valve. This closes and cuts off the fuel supply as soon as the plunger moves up during acceleration, thus preventing fuel from flowing back into the float chamber.

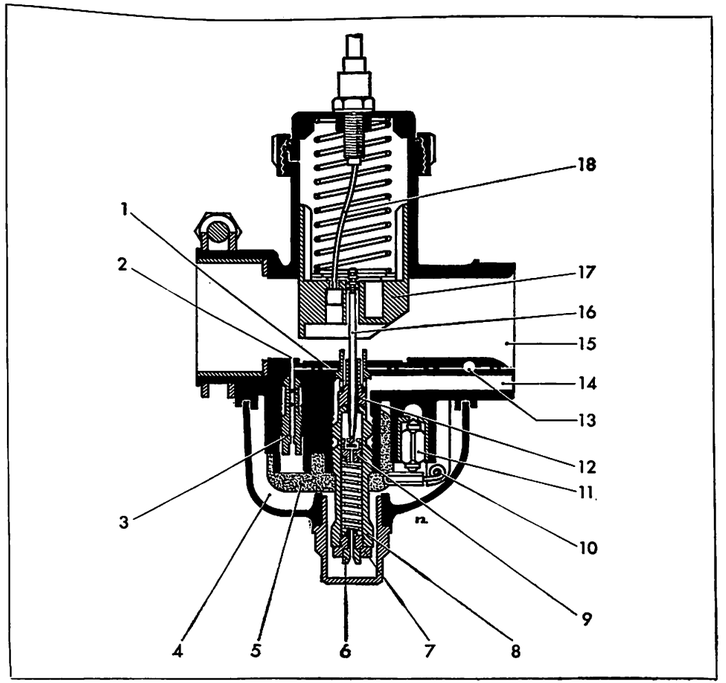
Fuel drawn in from the float chamber through **idle jet** 3 is mixed with air emerging from idle air passage 1, the volume of which can be adjusted with idle air regulating screw 13. This mixture enters the air venturi through a small passage 2 immediately behind the throttle slide. If the idle air regulating screw is screwed in, a richer mixture will be obtained; if screwed out, the mixture will be weakened.

Idle speed is regulated by means of the **throttle slide stop screw,** whereas the idle air regulating screw governs the fuel-air mixture strength.

In order to prevent fuel from flowing into the cylinders in the event of a leaking fuel feed valve, excess fuel is conducted away to the outside by a pipe in the float chamber.

To provide a richer mixture, especially when starting a cold engine, the carburetor contains a second, considerably smaller and more simple slide system; this is the **cold start or choke unit.** If its slide (cold start plunger) is raised against spring pressure by the operating cable, the engine will draw additional fuel via the cold start jet and riser pipe while the main throttle slide remains closed.

The choke operating cable must be installed with adequate free movement, so that the choke plunger can close completely.



Constant depression carburetors — types R 75/7, R 100/7, R 100 S, R 100 RS

The R 75/7 — R 100 RS models are equipped with 2 Bing constant depression carburetors using a throttle butterfly and removable, centrally located

When throttle butterfly 21 is opened, the partial vacuum in air venturi 3 is connected to vacuum chambers 23, which in turn are linked via 2 passages 19 in vacuum plunger 20 to the main air venturi. Space 1 below diaphragm 22 is connected by passage 2 directly with

ed, with the throttle butterfly stop screw the quantity of fuel supplied for engine idling. Two by-pass passages 18 also convey fuel-air mixture to the air venturi. This is intended to improve the transition from the idle jet to the main jet system. They act only when throttle

When the engine has started, an initial emulsion is formed by means of a calibrated air hole in the cold start immersed tube, and the starting mixture is in this way weakened so that the engine continues to run smoothly during the