BMW R100RT

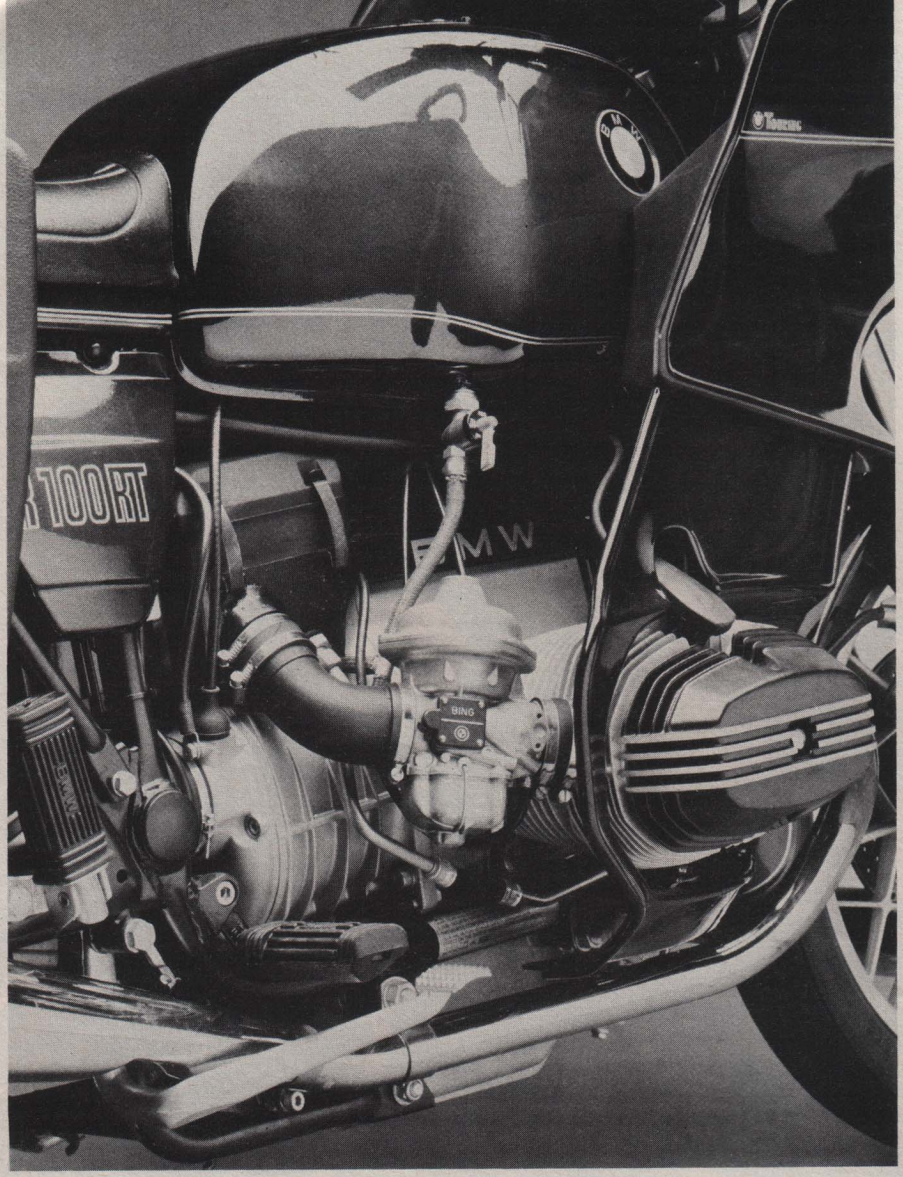
For long-distance calls, maybe you shouldn't pick up the telephone. You could be more creative and extravagant just by dialing R100RT.

● YOUR MIDDLE NAME NEEDN'T BE ME109 to like the BMW R100RT. Try a long winter's night on a stretch of desert highway, where Kenworths and Freightliners hook up under CB umbrellas. Such groups develop enough forward velocity to make 80-mph speedo-marks come-and-go like blue lights at the end of runways. With temperatures skidding toward 35 degrees F., the R100RT rider stays reasonably warm and cozy, insulated with a touring suit and shielded by the RT's full fairing. The heat pouring off the cylinders warms the rider from the knees down; the firm saddle leaves the rider's hide unscuffed and the muscles in his back, arms and legs free from knots and aches; the suspension rolls across pavement breaks, slab edges and ripply bumps without telegraphing the axle-level activity through the bar and seat; the engine pushes the fairing into the 90-mph gale with a consummate smoothness on the far side of 5000 rpm; despite malevolent sidewinds and buffeting from 18-wheelers, the 557-pound package just lists into the pressures without alarm. Full force ahead. On a long winter's night the RT becomes a rider's welcome friend.

Those who like things German have learned they must pay for their travelling companions, increasingly so. The RT—full fairing, luggage rack and saddlebags—has pierced the $7000 ceiling. Those with the wherewithal to drop themselves into the RT's seat recognize this tag as a result of American greenbacks inflating at an F-16 climb-rate while German marks bob upward like hot-air balloons. The concern in Berlin is real. No one at BMW wants to reach a point at which their exclusive clientele club gets so exclusionary that it becomes extinct.

Price sensitivity is one thing; value sensitivity quite another. While BMW can't go into the bargain-basement on pricing, the Germans want to deliver on value. Not in a transitory way, but in substantive

PHOTOGRAPHY: DAVE HAWKINS, ROBIN RIGGS



(Right) Running from the airbox, behind and under the carburetor and cylinder, is the line for the exhaust port air-feed. Cleaner emissions result from oxygen combining with hot unburned carbon in the exhaust.

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fashion. Because the company has such a commitment to function, consider all the things that BMW *can't* do in order to titillate buyers: Zippy-dee-doo paint jobs; trick radio systems; flashing display panels with warning lights for unlatched saddlebags; 10-speed transmissions; and kicked-out, laid-back cruiser-type motorcycles. *Nicht möglich* and most likely *verboten.* They are proud of their motorcycles as functional pieces. The Germans, you might gather, would rather be out of business than out of character.

What's in character for BMW is this: solid, functional lightweight motorcycles with the kind of simplicity and durability that never has an owner two years and 20,000 miles down the road wondering what he has spent his money for. BMW must attract a clientele by making their boxer twins more functional, sometimes in ways that aren't readily apparent.

For 1981 the prime examples of invisible, functional improvements are BMW's new nikasil cylinders. Instead of lining their aluminum cylinders with cast iron, BMW bores linerless cylinders to size and then applies silicon-carbide particles in a nickel carrier directly to the aluminum.

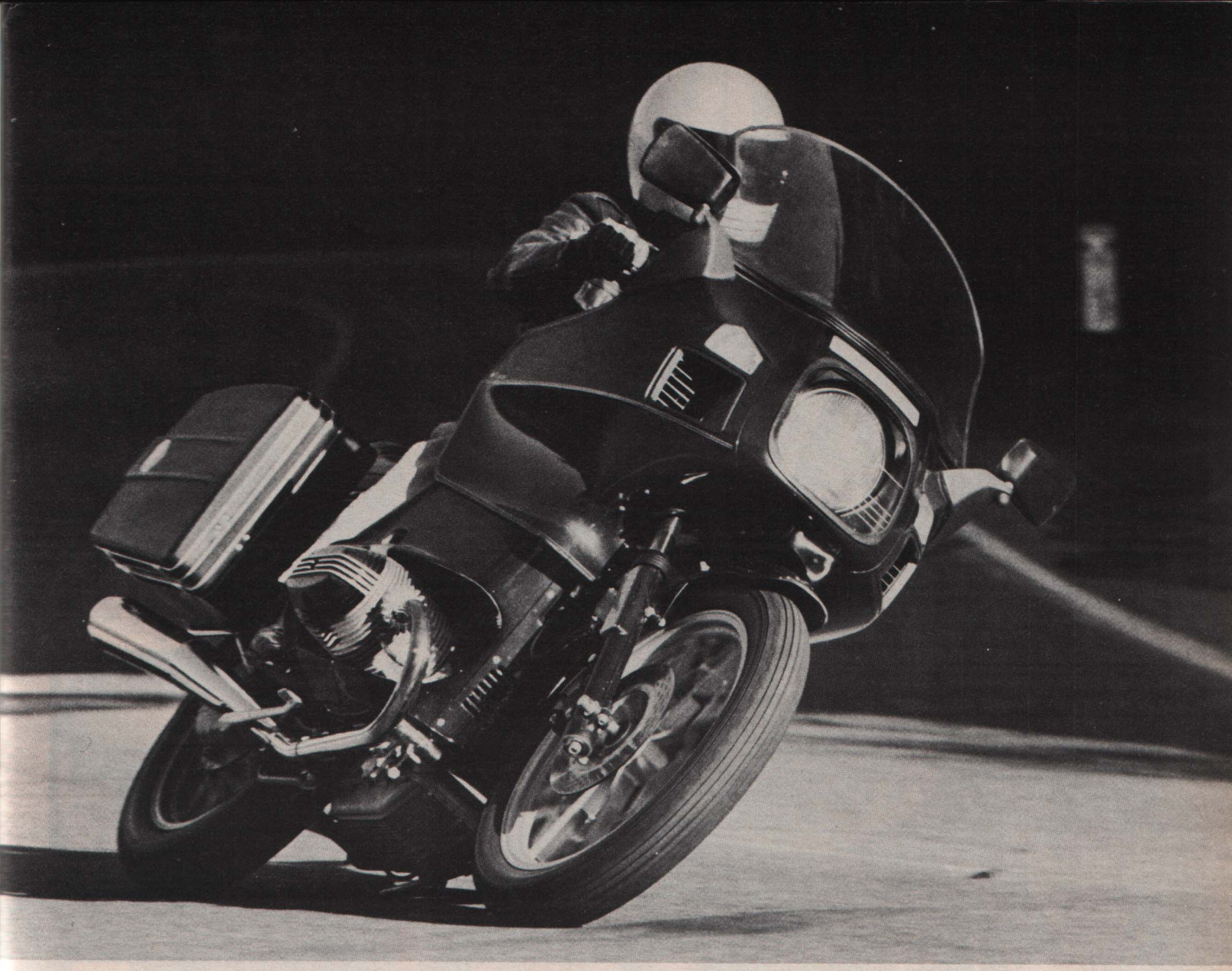
The new BMW cylinder weighs 4.5 pounds, 2.3 pounds less than the old linered model, a significant figure when you consider there are few places where pounds can be lopped off the already-light BMW. Like chrome-plated cylinders, nikasil cylinders dissipate heat better than linered ones because there's a direct metal-to-metal bond between the wall material and the aluminum cylinder. Liners, on the other hand, have minute gaps which are barriers to heat transfer.

Hard chrome is soft stuff compared to nikasil. Nikasil cylinders must be finish-ground to final dimensions. This involves, among other things, diamond abrasives. The finishing process requires that cylinders be spun on their bore centers while grinding wheels move in and cut the walls. The BMW engine layout with individual cylinders lends itself to this production technique. If you were manufacturing a four-cylinder motorcycle with a single-cylinder block with four bores, just spinning the unit around the individual bore centers would be a major problem. Consequently it's unlikely that anyone building multis would do nikasil cylinders.

Nikasil is so hard that, short of losing a wrist-pin clip or tossing gravel into the intake tracts, the surface can't be damaged. Nikasil doesn't polish like chrome bores, which become so shiny and perfectly smooth that the oil film can't adhere to the wall surface. Rings in nikasil cylinders must be hard-chrome or have molybdenum-filled faces (BMW uses chrome rings) thanks to the wall hardness.

Most of the wear in any street bike cylinder comes from acid-etching. The acids, of course, are a by-product of the combustion process; not surprisingly, then, iron-liners show the greatest "wear" near the top of the bores where acid concentration is highest. For longevity, nikasil is better: acids don't etch it.

Not all the functional improvements in the 1981 BMW lineup require technical knowledge to enjoy fully. Three areas stand out: clutch assembly, brakes and rear suspension. BMW's revamped and lightened engine flywheel/clutch assembly is the most welcome single change to the German twins; the total assembly weighs under 10 pounds. The savings become more dramatic when you understand that there's been a 40 percent reduction in clutch-assembly weight.



In the past BMW used very heavy flywheels to smooth out the half-liter power pulses coming out of the engine. In the interest of longevity, the parts in the power train—like the gearbox and drive shaft—needed protection from the power-delivery peaks, and a lot of mass hanging on the crank's end provided it.

We might have guessed that a much lighter clutch/flywheel assembly was on the way, as far back as 1979. That year BMW incorporated a new ramped coupler-type shock absorber in the drive shaft; it was roughly similar in concept to another unit coupling the engine and transmission. These shock absorbers helped to damp driveline shocks going to and coming from the rear wheel, and thus eased the loadings on line-components. As a result, BMW could cut the flywheel/clutch assembly weight substantially without compromising durability.

From the saddle of the 1981 BMW four things are obvious: the engine is more responsive; the clutch lever draws much easier than before; the gearbox shifts slicker than previous BMWs; and there's less torque reaction fed into the frame, a benefit that's apparent when the engine is revved at a stoplight.

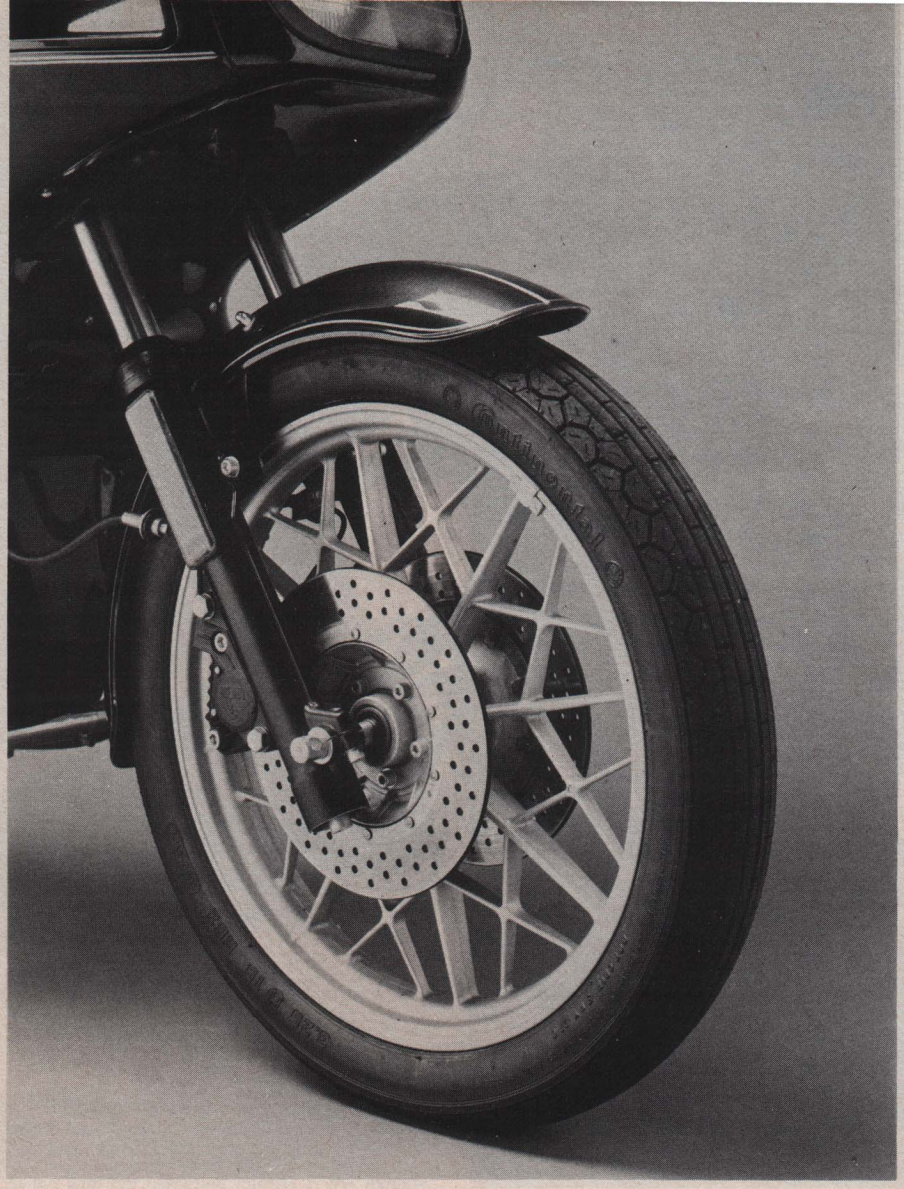
The ease with which the gearbox shifts makes riders less conscious of and less deliberate with their BMW shifting than before. There's only one glitch. The lever-throw is still moderately long, and occasionally our test unit wouldn't complete second-gear engagement in the first-to-second transfer. A little auxiliary pressure, applied a moment later, would result in full engagement. From time to time third-to-second-gear engagement also benefited from more deliberate foot action.

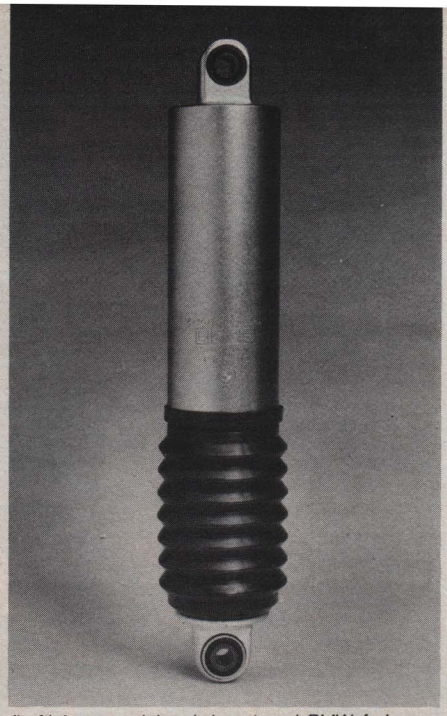
The clutch action is terrific. The decrease in draw pressure—down 30 percent according to BMW—accompanies a wider lever-arc in which engagement/disengagement occurs. The latter may simply be an effect of the former, inasmuch as the lighter pull makes it easier to feel for engagement.

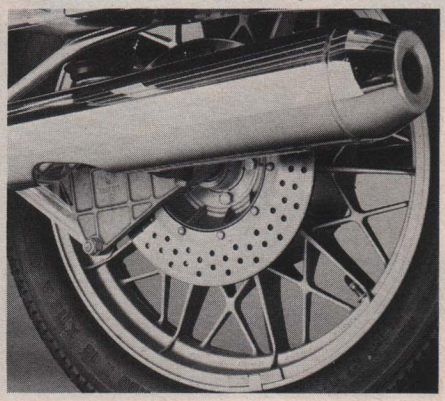
Like the old clutch assembly, BMW's time-honored front dual-disc brakes have become history. For years, BMW employed two calipers, each of which had single hydraulic pistons. The hydraulic piston in each caliper would push the "live puck" into the rotor, and, in turn, the pivoting caliper body would move, sandwiching the rotor between the live and dead pucks. The method was—and still is—common.

Not so common was BMW's location of the master cylinder under the tank. This layout required a cable from the hand lever to the master cylinder. The cable introduced a certain sponginess into the braking action, and the calipers themselves never worked as well as their best contemporaries. *Some* examples of the old BMW brakes worked very well indeed; however, there wasn't great consistency from one bike to the next.

BMW has simplified and improved and lightened the braking system by fitting dual-piston Italian Brembo calipers which mount stationary on the fork legs. The slave cylinders connect to the handlebar-mounted master cylinder made by Magura. The pad material is asbestos-free, and BMW claims this pad material produces better wet braking than before, which, thanks to the alternating holes in the discs, was quite good. The rear disc is likewise so vented and mated to a Brembo caliper, though this combination has been used for some time. One of the driest winters in California history offered no real opportunity to test the brakes' wet weather capabilities.







(Left) Long-acclaimed, long-travel BMW fork now wears two Brembo dual-piston calipers. (Above) Boge hydropneumatic shock. (Below) Perforated discs, front and rear, aid wet braking.

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Braking action in the dry has never been better on a BMW. The new Brembos up front introduce a certitude and linearity and bike-to-bike consistency unknown before in BMW quarters. At the rider's middle finger, the brake lever pulls back about a half-inch, at which point firm resistance is encountered. The rider can't squeeze the lever back anywhere near the grip: no vagueness and no sponginess. Increasing pressure at the lever drops the Beemer's front, and there's enough braking power available to skitter the full-load R100RT off its front tire. But the linearity and predictability of the brake system allows a rider to know where he's at. If you have 300-pounds-plus on board, there's simply no substitute for braking power, and predictability.

There's real creativity loose in the RT's rear suspension. Boge has developed a new shock absorber, gas/oil spring units with an automatic load-leveling feature and load-dependent damping. The R100RT carries these "Nivomat" units as standard; they're extra-cost options on other 1000cc Beemers.

In the Nivomat unit, the damper piston, surrounded top and bottom by oil, goes up and down in its cylinder. Velocity-sensitive valves in the piston regulate the oil flow and thus provide damping. A high-pressure gas/oil chamber is located in the lower part of the shock body; there nitrogen gas, held behind a diaphragm, exerts pressure on the oil in the chamber. Were it not for the tendency of nitrogen under extreme pressure to diffuse into oil, the diaphragm would be unnecessary.

Passageways from the high-pressure chamber lead directly into the damper cylinder, so that the cylinder—both on the top and bottom of the piston—is part of the high-pressure system. Pressure inside the damper cylinder causes the shock rod to extend.

Nothing remarkably new, you say. Suppose, however, you drilled down the center of the damper piston and into the damper rod, forming a long cylindrical cavity inside the piston and rod. Suppose you inserted into this interior a small hollow rod, one end of which fit down inside the cavity and the other end of which attached permanently to the roof of the shock body. This would establish a male/female relationship between the small rod attached to the shock-body roof and the long cylindrical cavity going down the center of the damper piston and rod. When the damper piston and rod went up and down in its cylinder, the rod cavity would move up and down relative to the small male rod.

Boge built such a device, and more. Their engineers located a low-pressure gas/oil chamber in the top portion of the shock body and then opened a passageway from this chamber to the male rod in the roof of the shock body.

Next an inlet valve was installed at the lower end of the male rod residing deep in the cylindrical cavity inside the damper rod. When the shock extends and the damper piston goes down, oil from the aforementioned low-pressure chamber proceeds down through the hollow male rod, past the inlet valve and into the interior cavity, the volume of which grows as the damper piston goes down. When the shock compresses and the damper piston rises in its cylinder, an outlet valve above the damper piston opens and the oil inside the interior cavity is expelled into the (high-pressure) damper cylinder. Presto: you have a pump, energized by the suspension's up-and-down movement.

certainly less forward draft at the rider's back than is the fairing norm. The riding position, weather protection, fatigue-fighting saddle, suspension compliance, cockpit amenities, engine smoothness and performance all mark the RT as a motorcycle built by people who ride motorcycles, at length and well.

Everywhere you look on the 1981 BMW R100RT you see signs of renewed effort: breakerless electronic ignition system; exhaust port air-injection to clean up emissions; front fork refinements; a lighter, stronger die-cast rear-axle housing; stiffened-up rear swing arm; redesigned airbox; in detail the list becomes exhaustive.

The BMW factory has strengthened its role in the importation and distribution of its motorcycles. In October, 1980, BMW of North America, Inc., the same corporation that handles BMW automobiles here, took over BMW motorcycle imports from Butler and Smith, the private importer long associated with BMW. Whatever the future holds, the evidence here and now is clear. The R100RT is a strong, functional, lightweight motorcycle. Compared to its RT predecessor, the 1981 version is lighter by 10 pounds, more than a half-second stronger in the quarter-mile, more functional and fiddle-free in dozens of ways.

That kind of commitment pays off. The BMW R100RT remains high on our list as a great fellow-traveler, albeit an expensive one. ◉

Cycle Test Specifications

BMW R100RT

Make and model ..... BMW R100RT
Price, suggested retail (as of 1/1/81) $7300

PERFORMANCE
Standing start ¼-mile ..... 13.51 sec. @ 95.03 mph
Engine rpm @ 60 mph, top gear 3440
Average fuel consumption rate ..... 46.2 mpg (19.68 km/l)
Cruising range, main/reserve ..... 256.5/36.0 mi.
Load capacity (GVWR less curb weight) ..... 148 kg (324 lbs.)
Maximum speed in gears @ engine redline ..... (1) 43.5, (2) 66.7, (3) 92.5, (4) 114.5, (5) 127.3

ENGINE
Type ..... Four-stroke horizontally opposed twin; air-cooled with pushrod-operated overhead valves
Bore and stroke ..... 94.0 x 70.6mm (3.54 x 2.80 in.)
Piston displacement ..... 980cc (59.8 cu. in.)
Compression ratio 9.5:1
Carburetion ..... (2) 40mm Bing constant-vacuum
Exhaust system ..... Twin-pipe, twin muffler with connecting cross-over pipe
Ignition ..... Battery-powered, inductive, magnetically triggered
Air filtration ..... Dry paper element, disposable
Oil filtration ..... Paper element, disposable
Oil capacity ..... 2.1 liters (2.3 qts.)

TRANSMISSION
Type ..... Five-speed, constant-mesh, dry clutch
Final drive ..... Shaft; helical gears, 11/32, 2.91:1
Gear ratios, overall ..... (1) 12.80, (2) 8.32, (3) 6.08, (4) 4.86, (5) 4.37

CHASSIS
Type ..... Dual-downtube, full-cradle with bolt-on rear section
Suspension, front ..... Leading-axle, coil-spring, oil dampers
rear ..... Swing arm with (2) hydropneumatic self-leveling units with load-dependent damping
Wheelbase ..... 1465mm (57.7 in.)
Rake/trail ..... 28.5°/95mm (3.7 in.)
Brake, front ..... Hydraulic, dual-disc, 260mm (10.2 in.) perforated rotors with dual-piston calipers
rear ..... Hydraulic, disc, 260mm (10.2 in.) perforated rotor with dual-piston caliper
Wheel, front ..... Cast aluminum alloy, 1.85 x 19 in.
rear ..... Cast aluminum alloy, 2.75 x 18 in.
Tire, front ..... Continental 3.25H 19 RB2
rear ..... Continental 4.00H 18 K112
Seat height ..... 820mm (32.1 in.)
Ground clearance ..... 150mm (5.9 in.)
Fuel capacity, main/reserve ..... 21.9/3.0 liters (5.6/0.8 gal.)
Curb weight, full tank ..... 252.7 kg (557 lbs.)
Test weight ..... 327.5 kg (722 lbs.)

ELECTRICAL
Power source ..... Alternator, 280 watts
Charge control ..... Mechanical voltage regulator
Headlight beams, high/low ..... 60/55 watts
Tail/stop lights ..... 5/21 watts
Battery ..... 12 V 28AH

INSTRUMENTS
Includes ..... Speedometer, odometer, tripmeter, tachometer, clock, voltmeter. Indicators for oil pressure, turn signals, neutral, high beam.
Speedometer error, 30 mph indicated, actual ..29.81 mph
60 mph indicated, actual ..61.43 mph

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