



Cycle Street Test



BMW R100S

When you count the hours of the day by the numbers on the odometer, you'd better be with a pleasing companion. And this is one.

● FOUR-HUNDRED MILES HAVE PASSED BELOW this BMW R100S since daybreak, and the sun still hangs in the late afternoon sky. The bike has given you a hundred impressions which your mind begins to sort out and assemble, as if all those bits of information had been punched into a lime-colored computer screen.

Several lines stand out. The most obvious one is gas mileage. The BMW R100S has delivered a whopping 48.1 miles to the OPEC gallon, and there have been times when the one-liter boxer has sipped ever-so-gently through its 40mm Bings, returning an amazing 55 mpg. True, it won't do the fifties if you're going out to scuff the cylinder heads into the pavement or see how badly you can maim the double-nickel speed limit. Still, the motorcycle can be ridden briskly without

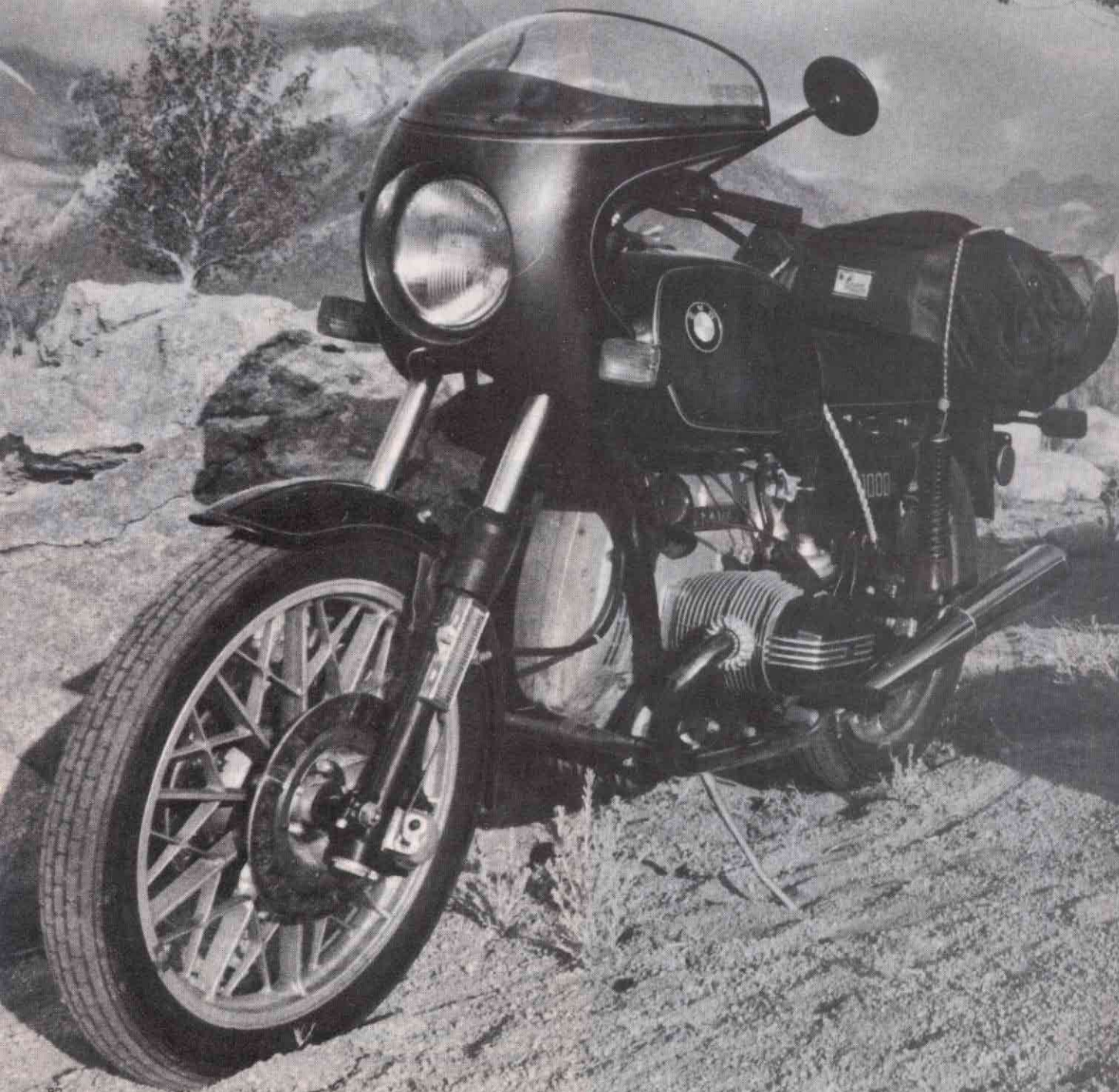
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making you wonder when the oil companies will have the last silver dollar residing at the bottom of your porcelain-china piggy bank.

Another line pops up in your mind. You might have to slaughter an entire litter of silver-laden piggy banks to give the \$5875 Beemer a home in your garage. That puts the BMW R100S a great distance from

any kind of impulse-buy. It must be such a considered purchase that you're willing to think about it, and hard.

Another line, a big one. Four-hundred miles in a day says this motorcycle has been designed with more attention to human needs than other machines. Everything fits together around the rider; everything meets the rider in such a way that it shows genuine premeditation and forethought to the act of motorcycling.



BMW engineers and BMW supporters have long maintained that ergonomics and comfort play a big part in the German bikes' attraction. Thick rubber cushions the footrests and handgrips, and the saddle is broad and flat. Notches are stamped into the 6.3-gallon fuel tank to provide comfortable knee-niches. Rider accommodations would best be described as "roomy," since the R100S's staggered footpegs are mounted low. This can make shorter pilots feel as if they're approaching up-on-the-pegs riding.

A two-inch-rise handlebar is clamp-studded to the plate-steel steering crown, allowing you to crouch forward, racer-style. At speed the BMW's fiberglass bikini fairing provides a comfortable windbreak for your torso, letting you relax. The instrument console contains a speedometer, odometer (0.8 per cent slow) and resettable tripmeter, a tachometer, delightfully accurate clock and a voltmeter. All have non-glare glass, are lighted and easy to read at night. Indicator lamps are provided for turn signals, oil pressure, "generator" failure, neutral, and low brake fluid level. Two mirrors attach on the Magura clutch and brake lever brackets.

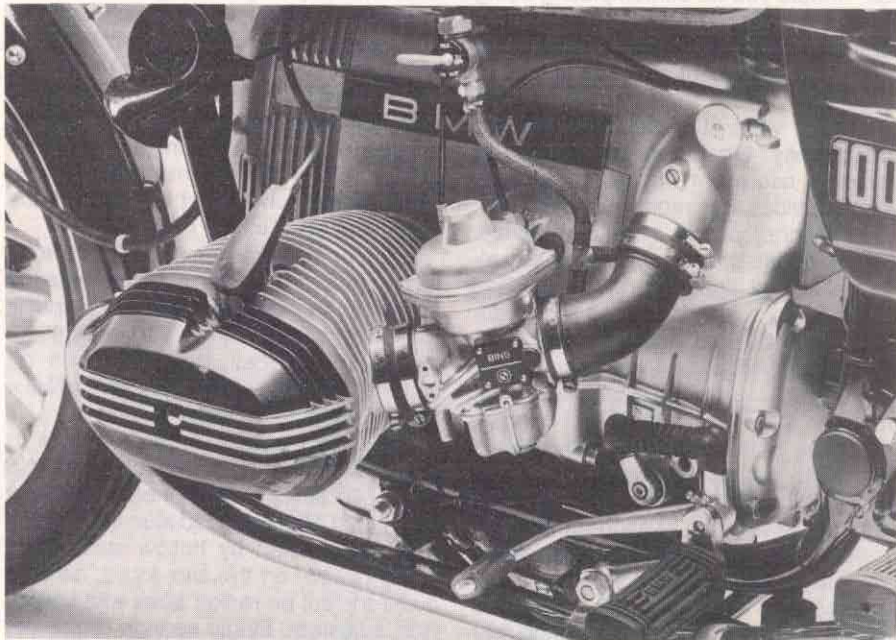
As with the new-for-1979 BMW R65 (*Cycle*; July 1979), the 1000's left-side-mounted turn signal switch is a linear left-for-left and right-for-right device, instead of the old up-for-right and down-for-left item. Additionally, this sports-tourer has a turn signal beeper that's annoyingly loud. Also commanded by your left thumb is a high beam/low beam/high beam flasher switch which activates an absolutely dazzling Bosch H4 quartz-glass lamp. For defensive night-storage, front and rear parking lamps are fitted. Rounding out the R100S's enviable electrics selection are loud Fiamm horns. The front brake master cylinder is beneath the tank where it's out of harm's way but difficult to check.

Passenger appointments are not extravagant: just sensible. The S-type's passenger "section" is approximately an inch higher than the rider's, with an ounce more padding and a kick-up rear end that blends into the rack-covered tail section. The passenger footrests are eight inches rearward and two inches above the rider's—most soloists have shoe soles large enough to straddle both footrests, inventing a quasi-floorboard.

Each of the dogleg handlebar control levers is designed for an easy one or two-finger reach. The clutch lever has an almost secret adjuster beneath a central plastic dashboard. Once adjusted, however, the clutch remains fiddle-free and its lever provides an easy pull and smooth engagement. Little sponginess is apparent in the front brake activating mechanism, even with the cable-operated hydraulic master cylinder. A firm pull is required to haul down the 510-pound twin, yet two fingers can produce impressive stops and provide most of the pressure needed to complete last-second



The R100S nose fairing keeps the airstream off the rider's torso and provides coverage for the instruments.



Choke lever is still on air-cleaner case. With sensible riding, 40mm Bing's help deliver impressive mileage.



Handle, not tool-kit tool, adjusts shock-spring preload. Disc holes improve BMW's wet-weather braking.

speed changes on a serpentine road.

Two mirror-image, single-piston aluminum calipers are located behind the BMW's leading-axle fork—where their mass is close to the steering axis. The calipers clamp on riveted-together 260mm rotors; drilled, stainless-steel discs attach to aluminum carriers. Moder-

ately sized as the holes are, they reduce unsprung weight by an inconsequential amount but significantly increase braking effectiveness in the wet. The holes may contribute in a small way to fade-resistance and longer pad life by providing an escape route for boundary-area gases and debris produced by disc brakes. A

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single 260mm rear disc mounts on the left of the back hub; it's stopped by a dual-piston caliper.

Ten main and twenty tributary spokes constitute each pressure die-cast wheel, and they're easily cleaned, contributing little to the BMW's generally light maintenance demands. The front rim width is 1.85 inches, and the rear 2.75 inches.

We've said it before, and we'll say it again; the Metzeler 3.25 H 19 rib front and 4.00 H 18 block rear tires are suitable for touring and casual street riding, but little else. Should you be contemplating doing serious go-fast cornering with your Beemer, you'd best look into some other treads. On pavement that has a hint of irregularity or less than perfect traction (read oil or water) the Metzeler's give up, and quickly. On the other hand, the Metzeler's use a firm rubber compound, which provides admirable wear durability.

Eight inches of fork travel is available, and every bit of it is well damped, although it's all lightly sprung too. This results in good sports-touring fork manners, except under braking situations, where the BMW nose dives on its 36mm stanchions. Three-way adjustable springs mount on small-oil-capacity rear shocks, and these units allow the rear axle to move five inches. Typically, the shock absorber springs are adjustable by hand; a tommy-bar is a part of each ramp-collar to make this job simple. Happily, when optional-equipment saddlebags are mounted, the rider can still reach and operate the spring lever arms. Spring rate and damping characteristics at the rear match the front's for a soft, predictable ride.

Not much of the opposed twin's tubular frame shows, although close inspection would reveal dual downtubes, an open, hollow central backbone, and well-geared steering head and swing-arm areas. The steel and aluminum steering stem (and the swing arm) pivots in tapered roller bearings, and the stem shaft may be locked independently of the ignition with the ignition key itself. In fact, this key secures both the flip-up saddle and sometimes-obstinate screw-in gas cap, though both may be left unlocked. Static support is provided by a flexy spring-loaded side-stand or a tubular centerstand. Unfortunately, although the centerstand allows either-wheel servicing, its tiny feet sink readily in dirt.

Enough amperage to power a New York City Saturday Night is contained below the Beemer's seat in the form of a 12-volt, 28 AH battery. For this reason, no kickstarter is provided, but one is available as an option. The battery remained fully charged during the 1000's stay at *Cycle*, despite some periods of idleness and an occasional long lights-on crawl through traffic.

Inside the central frame backbone snuggles a standard-equipment hard-

ened-steel cable and lock, long enough to slip around a wheel and a nearby fence or post. The lock works off its own key. Under the seat is a tire pump, two extra glove boxes, and tools enough to pull the top end if necessary.

Interconnected fuel tap hoses pass gasoline from each side of the tank "saddles," so one carburetor won't run out of fuel simply because the tap on its side of the tank draws air. Both taps have reserve positions which total 0.8 gallon, enough for almost 40 miles given an average 48.1 mpg. Concentric-float butterfly/slide carburetors have a venturi bore of 40mm, and externally they are large instruments. The carbs have bell-tops and substantial body size, interfering somewhat with your shins during heavy braking. Air for the carbs' mixing chores is drawn through a common replaceable paper filter, housed inside the voluminous aluminum chamber above the five-speed transmission's case. Hard, plastic tubes duct air towards the carbs and keep intake roar low.

Another Magura component, a choke lever, attaches to the air filter housing cover on the engine's left side, and is friction damped to allow a variable setting. In most instances, the BMW can be started using little choke, and after a half a minute the choke can be turned off.

Valve train action is quiet, thanks to gentle camshaft closing ramps and a short hydraulically tensioned single row cam chain. Steel-capped aluminum pushrods are worked by hollow steel lifters riding directly on the cam lobes, and the pushrods act on rocker arms with screw-type adjusters. Single springs return the 44mm intake and 40mm exhaust valves to their seats.

Engine cooling capabilities are superb, since the cylinders and heads are parked way out in the air stream. However, due to the exhaust headers' thin-wall tubing, each of our test bike's chrome-plated pipes turned bright blue well beyond the crossover-pipe junction.

BMW recommends premium-grade gasoline; we ran our 1000 on regular and unleaded to see what, if anything, would happen. A slight amount of engine ping-pong was detectable, and the hotter-burning fuel may have caused our bike's pipes to turn somewhat bluer than expected.

Oiling chores are handled by a trochoidal oil pump driven off the camshaft's rear. It circulates the wet-sump BMW's 2.3 quarts of oil through a throw-away paper filter, the crankshaft, gearbox, and upper end components by way of cylinder head stud holes. Top-end return oil drains through the four pushrod tubes. Our test bike used a small amount of oil during extended, high-speed use and, as well, weeped slightly from its cylinder bases. Too, both the carburetors and petcocks proved to be messy.

Like the valve camshaft, the ignition breaker-points' twin-lobe cam runs at one-half crankshaft speed and, as with all BMWs, it sparks both spark plugs at the same time: once every engine revolution. In this fashion, one set of ignition points can be used with two six-volt coils wired in series for simplicity and production efficiency. There is a waste spark in each cylinder on the exhaust stroke since the pistons reach their compression strokes 360 degrees apart.

Fourteen-millimeter diameter, 3/4-inch deep spark plugs have "noise-suppressing" caps. If you're cruel enough to leave

Make and model	BMW R100S	Wheelbase	1465mm (57.7 in.)
Price, suggested retail (as of 8/13/79)	\$5875	Brake, front	Hydraulic, (1) 260mm (10.2 in.) disc with single-piston caliper
PERFORMANCE		rear	Hydraulic, (2) 260mm (10.2 in.) disc with dual-piston caliper
Standing start 1/4-mile	13.26 seconds @ 101.46 mph	Wheel, front	Cast aluminum alloy, 1.85 x 19 in.
Engine rpm @ 60 mph, top gear	3440 rpm	rear	Cast aluminum alloy, 2.75 x 18 in.
Average fuel consumption rate	20.5 km/l (48.1 mpg)	Tire, front	3.25 H 19 Metzeler Rille 12
Cruising range, main/reserve	430.5/61.5 km (266.9/38.1 miles)	rear	4.00 H 18 Metzeler Block C66 Touring Special
Load capacity (GVWR less curb weight)	168.3 kg (371 lbs.)	Seat height	816mm (32.1 in.)
Maximum speed in gears @ engine redline	(1) 43.5 (2) 66.9 (3) 92.4 (4) 114.5 (5) 127.3 mph	Ground clearance	146mm (5.8 in.)
ENGINE		Fuel capacity, main/reserve	21.0/3.0 liters (5.5/ 0.8 gal.)
Type	Four-stroke horizontally opposed twin, air-cooled with pushrod-operated overhead valves	Curb weight, full tank	231.3 kg (510 lbs.)
Bore and stroke	94.0 x 70.6mm (3.54 x 2.80 in.)	Test weight	301.2 kg (675 lbs.)
Piston displacement	980cc (59.8 cu. in.)	ELECTRICAL	
Compression ratio	9.5:1	Power source	Alternator, 280 watts
Carburetion	(2) butterfly/slide Bing	Charge control	Mechanical voltage regulator
Exhaust system	Twin-pipe, twin-muffler with connecting crossover pipe	Headlight beams, high/low	60/55 watts
Ignition	Battery-powered, mechanically triggered capacitor discharge	Tail/stop lights	5/21 watts
Air filtration	Dry paper	Battery	12V 28AH
Oil filtration	Disposable paper element	INSTRUMENTS	
Oil capacity	2.1 liters (2.3 qts.)	Includes	Speedometer, tachometer, odometer and resettable tripmeter, clock, voltmeter. Indicators for turn signals, oil pressure, "generator" failure, neutral, and low brake fluid level
TRANSMISSION		Speedometer error, 30 mph indicated, actual	26.95
Type	Five-speed, constant-mesh with dry-plate clutch	60 mph indicated, actual	55.45
Primary drive	Helical-cut gears	Odometer error	0.8% "slow"
Final drive	Shaft and helical-bevel gears, 11/32, 2.91:1	CUSTOMER SERVICE CONTACT	
Gear ratios, overall	(1) 12.80 (2) 8.32 (3) 6.08 (4) 4.86 (5) 4.37	Customer Service Department	
CHASSIS		Butler & Smith, Inc.	
Type	Dual-downtube, full-cradle with bolt-on rear section	Walnut Street and Hudson Ave.	
		Norwood, New Jersey 07648	

your twin out in the rain for a couple of days, you may find it misfires slightly. Moisture creeps around the base of the spark plug caps and establishes an easy route for the ignition current until engine heat evaporates the water.

The BMW's one-piece, forged steel crankshaft utilizes plain bearings both at its connecting rod and dual main bearing journals. The rods attach to their respective pistons by steel wrist pins and outside circlips. Steel cylinder bores are 94.0mm, yielding an actual displacement of 980cc. The three-ring pistons have a compression ratio of 9.5:1—relatively high—and this explains why our test bike wasn't too happy about running on low-octane fuel.

The crankshaft's front drives a 280-watt alternator. In back, a dry, automotive-style single-plate clutch is cable-actuated; and when engaged, the clutch transfers engine torque through a jackshaft-contained ramp-spring cush drive assembly and into the transmission primary shaft. The gearbox is a self-contained unit—complete with its own 800cc oil supply—and can be taken from the motorcycle without removing the engine. Up and down shifts can be completed in amazing silence; a far cry from the BMWs of yesteryear, thanks to the recently added drive shaft cush-drive. Downshifting can be accomplished without using the clutch if you like; the gear engagement dogs are willing and sure. The 1000's shift throw, though moderately long, provides good gearbox "feel."

Since the boxer engine is mounted in line with the frame, no right-angle joints are necessary to deliver revolutions to the drive shaft. Instead, one pallid-toothed direction change appears after the single U-joint drive shaft. All one-liter BMWs have a 2.91:1 final drive ratio. Their smaller brothers, the R65 and R80, each have private ratios to go along with their more modest torque outputs. Beyond never cleaning chain oil off your jacket and the rear rim, shaft drives afford a luxuriously long maintenance interval; in the R100S's case, rear end oil should be changed every 10,000 miles.

While you're not servicing drive chains, you can be out enjoying the Beemer's supple suspension—in sane riding situations. For touring or moderately fast twisty road dicing, the soft springing and longest travel this side of dirt-heaven is friendly, yet allows ground clearance limits to be quickly reached. First to touch on the left are the side and center stands; on the right the rear brake pedal drags. The trick to riding a BMW at a sporting canyon-pace is to be smooth, smooth—no sudden powershifts in corners; no tossing the bike over with its suspension compressed. For all but past-legal-speeds cornering, the R100S chassis remains acceptably rigid. Steering effort at low speeds is high, and at high speeds the 1000 is stable, with "neutral" cornering.

(Continued on page 66)



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BMW R100S *Continued from page 65*

Four-hundred-mile days seem like pleasant jaunts in light of the S-type's weather protection, suspension compliance and near-300-mile cruising range. On the open road, all is bliss, except for two shallow thorns. First, remember that nice, broad saddle? It's also a broad, firm saddle—the kind that you get tired of just plain sitting on—like a dining room chair. It requires an obligatory squirm-around every once in a while to modulate the effects of that firmness. Second, the R100S has low-frequency engine vibration. As BMW has increased engine displacements over the years, the factory has found it harder and harder to maintain a silky-smooth powerband. The 100-series bikes suffer from small vibration annoyances. No tingling ever makes you want to get off the motorcycle; it's just there. But the BMW's mild state of tune and its CV carburetors lend it an apparently infinite torque curve, so same-gear passes are a reality, even if the throttle is hard to turn near its full-open position. A curious "rocking" motion takes over the cycle when the engine is at or near idle.

The R100S is a lavish motorcycle. Care has been taken in almost all areas, and where cost-effectiveness has dictated a short-cut, that short-cut is not evident in a tacky sort of way. This machine is also breathtakingly expensive, though its price



reflects more on American economic policy, which accepts double-digit inflation, than on BMW's profit-taking. So long as Americans live with high inflation while the Germans regard anything over four per cent as immoral, the American dollar will continue to sink relative to the mark. And that goes a long way in explaining how the price of BMW flagships have been rising more than the domestic inflation rate.

This is a motorcycle with surprisingly few compromises. Yes, it could be a 12-second quarter-miler, but it turns 13.26 seconds at 101.46 mph. Using a more aggressive engine would displace part of the S-type's great easy-going nature. Bavarian Motor Works could firm up the R100's suspension springs, thereby

lessening the bike's appeal as a tourer. For these points, reasonable compromises were observed to maintain a workable package.

The R100S is an investment. Not because it's going to necessarily skyrocket in value, but because you're going to invest your time riding it. If you ride a lot, and you value the way your time is spent, this motorcycle makes a certain amount of sense. Though not for everyone. If every time you look at the R100S you examine the motorcycle in detail, wondering what you could be paying for, then try something else. But at the end of a 400-mile day, if you can sit on the R100S and not even think about how much the bike cost, then it was worth sneaking up on your silver-laden piggy bank in the dark. ©

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