

Automobile

25 THINGS
NO ONE ELSE
WILL TELL YOU ABOUT THE **NEW**

M5

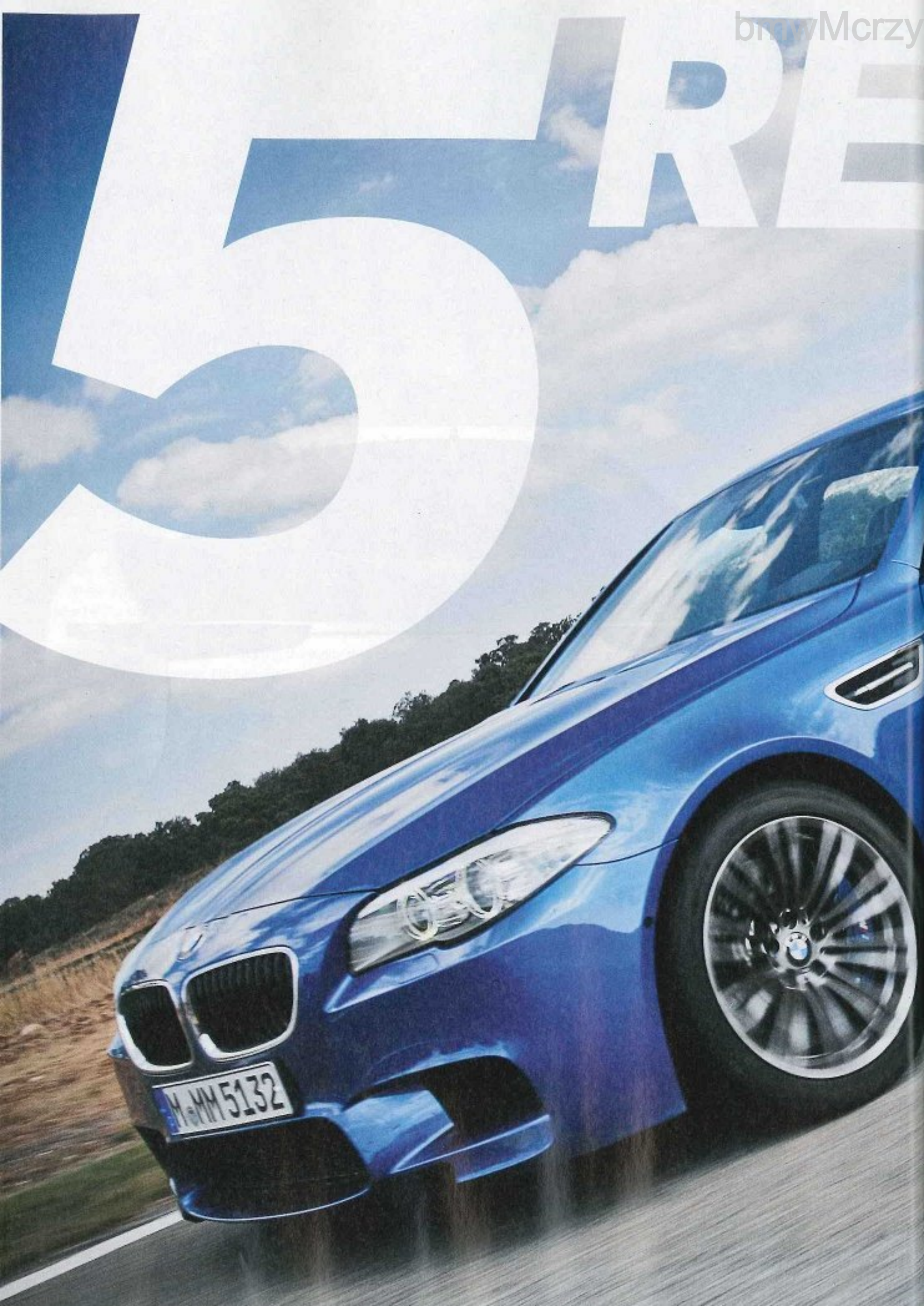
{ Like, what happens when
you pull fuse #200? }

HYUNDAI VELOSTER
VOLKSWAGEN BEETLE
MINI COOPER COUPE
THE ODDBALLS AMONG US

KITMAN DINES WITH THE
PRESIDENT

DRIVEN:
SUBARU IMPREZA,
MERCEDES SLS AMG ROADSTER,
BUICK REGAL GS, BENTLEY GTC,
MORGAN 3 WHEELER

129
674
929
0298
P620
6550



VIVED!

bmwMerzy



BMW'S NEW M5
BREATHES LIFE INTO
THE 5-SERIES. by JASON CAMMISA



FUSE NUMBER 200, RATED AT 40 AMPS, is located in the main fuse box on the passenger side of the 2013 BMW M5's trunk. The electrons that flow through the orange spade fuse continue to the amplifier that makes the BMW's speakers thump and wiggle in response to your favorite Pink Floyd song.

Yank it. When you climb back into the driver's seat, you'll notice that "comfortably numb" is now "uncomfortably silent," iDrive can't *blung-blung* at you, and the engine has gone all quiet and distant. That's right: part of the V-8 soundtrack you had just been enjoying inside the latest M5 was brought to you through the stereo speakers.

Say what?

"We're not adding something artificial," claims Jürgen Poggel, head of engine development at BMW M. "We're trying to replace something that was taken out by the 5-series' extraordinarily well-insulated chassis." That nonsense spin aside, he's right—with Fuse Number 200 pulled, the M5 really could use some more engine noise.

Alas, it's not that easy to reintroduce the sound of an engine into the cabin. BMW engineers experimented with a tube connecting the induction tract to the cockpit. They tried a microphone in the engine's intake and a speaker in the dash to reproduce what it heard. Neither ploy worked. The microphone picked up undesirable noises that required digital signal processing to filter out, Poggel explains, and it introduced enough of a delay in the sound that test drivers thought it sounded fake.

In the end, the most authentic way to reintroduce the M5's engine noise into the cabin was to record the screaming engine on a dyno, delete the acoustics that you wouldn't hear from inside the car, and load the remainder into a computer that plays it back through the stereo speakers at the appropriate time, pitch, and volume. BMW calls it Active Sound Design. We call it cheating.

We could easily whip ourselves into a purist, traditionalist rage over Active Sound Design—a fireball of fury further fueled by the two big, fat turbochargers under the M5's hood. Or we could calm down and realize that M had its work cut out here—injecting a little personality into the aloof and cold F10-chassis 5-series must have been a tough task. To be honest, it worked, because the M5 is engaging, interesting, and authentic in ways that no other current 5-series is. Active Sound who? Turbo say what?

The first—and most obvious—step in the transformation was



Visually, the 5-series responds very well to the M5 treatment. An aggressive front fascia is offset by a very subtle body kit with flared front fenders, side sill extensions, and a tasteful rear spoiler and diffuser. Too bad about those clunky side gills.



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TWENTY-FIVE THINGS NO ONE ELSE WILL TELL YOU ABOUT THE M5.

1 When you walk toward the front of the M5, you can look through the air dam's big opening and see the engine oil cooler mounted horizontally below the opening. It's saying, "You hit that curb, it's gonna cost you."

2 Launch control is a pain in the butt to activate. In theory, you turn off stability control, aim the steering wheel straight ahead, hold the shifter forward, and hit the gas. In reality, you also have to say "Betelgeuse!" three times

in rapid succession while rubbing your belly, tapping your head, and humming the German national anthem through your right nostril. If you can do it, the M5 will reward you with a hundred feet of dark squiggly black lines on the pavement.

3 In manual mode, the transmission won't upshift at redline or downshift under full throttle unless you specifically ask it to. However, if you hold the **left (downshift) paddle** while flooring the

accelerator, the transmission will kick down into the lowest possible gear.

4 When you hit a pothole in the M5, the suspension...uh, we have no idea. In more than 300 miles of driving around southern Spain, we couldn't find a single pothole. Who says Spain is in crisis?



5 The multicontour sport seatbacks have **four double rows of vertical stitching** that's reminiscent of the original E28-chassis M5's chairs. The original seats had only three rows of stitching, though, and they weren't this cushy.

6 If you're at full throttle at, say, three grand and lift off the accelerator pedal quickly, an enormous burp rattles the rear of the car as the engine computers attempt to expel what's left of all that pent-up turbo boost.

7 M wanted a longer cruising range, but there



wasn't any room in the 5-series for a bigger fuel tank. By switching from a 4.0-millimeter-thick plastic tank to a 0.7-millimeter-thick steel tank, engineers could squeeze an extra 2.6 gallons of fuel capacity into the same space.

8 Redline is at 7200 rpm, but if you ask nicely the computer will let you see 7500 rpm. »

ditching the base 5-series' electric power-steering system. It takes but twenty feet of forward progress to feel the difference—the M5's sport steering wheel jumps immediately to life, dancing in your hands as the Michelin Pilot Super Sport tires relay surface information right to your fingertips. We're certain that, one day, BMW will get EPS right—until then, M made the decision to sacrifice some fuel economy for enhanced feel. "After all, you are always steering a car," says Poggel. "You only occasionally stop to get gas—you'll never notice a two percent penalty at the pump the way you notice the steering." Besides, a fraction of an mpg lost in

the name of steering feel is a worthwhile sacrifice when the new M5 uses, according to BMW, 30 percent less fuel than the outgoing E60-chassis car with its normally aspirated V-10.

Yes, the new M5 has a twin-turbo V-8. The M division's first turbocharged engine was the S63B44 that made its debut in the X5 M and the X6 M. That V-8's claim to fame is an ingenious exhaust manifold that dramatically reduces turbo lag (see page 68). The manifold has been redesigned for M5 duty, and the rest of the engine has been updated sufficiently to earn it the Tü suffix, which stands for *technisch überarbeitet*, or technically revised.

"THE ARTISTRY LIES IN MANAGING THE BOOST SO IT'S CONTROLLABLE—SO THE DRIVER GETS WHAT HE ASKS FOR, NOT ZERO FOLLOWED BY TOO MUCH."





9 The **standard head-up display** is bright, colorful, and clear—and it has an M mode with a big, numberless rev counter and shift lights that flash as you approach redline.

10 The M5 comes with **standard auto start/stop**. You'll genuinely think this is a quiet car until the engine quits on you at a stoplight. The sudden lack of noise

and vibration reminds you of that feeling you get right before you pass out.

11 **Wanna turn off stability control?** You had better be very, very careful with that gas pedal. The electronically controlled, predictive limited-slip differential locks with all the subtlety of a jail cell, and the turbos' torque hits like a bolt of lightning. Big prods of the throttle are met with even bigger sideways "uh-oh" moments.

12 Keep your foot on the floor in a high gear, and you'll notice a deep driveline vibration at



about 2000 rpm. The M5's project manager thinks it's a resonance in the dual-mass flywheel. We think of it as a reminder that the regular 5-series is too clinical.

13 In the most aggressive **manual mode**, S3, full-throttle upshifts are so brutal you can feel the entire driveline jumping in its mounts. We made it one lap around the Ascari Race Resort before mechanical sympathy forced a downgrade to S2.

14 The **hydraulic power steering system lets you choose from three boost levels**. Sport Plus is so heavy that the steering won't even self-center at around-town speeds. It's a bit silly, but it'll save you some money on a gym membership.

15 German buyers can

choose to have their M5's electronic speed limiter raised from the usual 155 mph to 190 mph. If you put on your nerd glasses and crunch the numbers, you'll find that's about all the M5 is capable of anyway. But saying that your car is limited to 190 mph sounds even more impressive than saying that it will run out of steam at 190 mph.

16 The M5's steering transmits so much on-center information that we actually chanted, "It's alive!" within a few feet of driving off. If you've been disappointed by the regular 5's numb



The M5 offers ultracool aluminum trace trim. Modern and elegant without being stark, it brings a hint of personality to the 5-series' otherwise all-business cabin.



The S63B44TÜ keeps its predecessor's 4.4-liter displacement, direct injection, and dual variable valve timing but adds BMW's infinitely variable intake-valve lift system, Valvetronic, which makes its first appearance on an M engine. For increased efficiency, the TÜ has a higher compression ratio (10.0:1 instead of 9.3:1), and it breathes through slightly larger twin-scroll turbos, bigger intercoolers, and less restrictive intake and exhaust plumbing.

BMW says the changes were made predominantly to get rid of pesky turbo lag—something that is anathema to an M car. To assert that any turbocharged engine has no lag is to demonstrate a lack of understanding of the fundamental mechanics of the turbocharger, but M is honest about it. "We'll never completely eliminate turbo lag," says Poggel, "and I won't pretend that a turbo engine will ever have the same response as a normally aspirated engine."

"If we listen to what our customers are actually saying," he continues, "it's not that they're demanding an engine with zero turbo lag. Instead, they want the engine's output to be easily controlled. The artistry lies in managing the boost so it's controllable—so the driver gets what he asks for, not zero followed by too

much." In that regard, Poggel and his team have been successful, but our backsides still remember feeling less turbo lag in the X5 M. As usual, though, once that insane thrust knocks your noggin into the padded M-logo-embossed headrest, you won't much care.

The M5 is brutally fast, as you'd expect from a sedan with 560 hp and 500 lb-ft of torque. A hood, front fenders, doors, and suspension made from aluminum haven't prevented a big

2.5/1.5

electric steering, you'll probably do the same.

17 The parameters of the M1 and M2 buttons on the steering wheel are normally set through the iDrive controller, but there's a shortcut. Like a radio preset, you can hold down the button to store the current settings.



18 The X5 M and X6 M use a conventional torque-converter automatic transmission, and they can open the throttle during downshifts, meaning no waiting for boost on passing maneuvers. That transmission couldn't handle the M5's 7200 rpm, so this car receives a dual-clutch seven-speed that's better suited to an M car, anyway. Problem is, it can't handle boost during downshifts—it would roast the clutches—and as a result, the M5 feels laggy in response to full throttle at highway speeds.

19 There's a subtle differential whine that

comes from the rear end of the M5. It's a glorious reminder that this car's subframe is bolted directly to the body.

20 The M5 is a monster in the corners, but it's a patient kind of a monster. If you keep your foot out of the gas, there's pretty much nothing you can do to upset it. Injudicious use of the right pedal, however, is like kicking that monster in the nuts. See #11.

21 The most ferocious automatic mode, D3, isn't really aggressive enough for track use. Since it doesn't always downshift into the lowest possible

gear under braking, you might get that downshift while accelerating out of a corner. The unexpected power will... well, see #11.

22 The M5 needs more than two additional feet to make a U-turn than a regular 5-series does. Thankfully, three-point turns are much easier because, unlike the regular BMW shifter, the M5 has a discrete gate for reverse—and you don't have to be stopped for a moment before requesting the gear. Of course, the easiest way to make a quick 180 is to turn off stability control, stab the gas, yank the wheel, and

do a donut. But, uh, see #11.



23 Think you're having a rough day? The M5's rear tires need to cope with 7593 lb-ft of torque at full throttle in first gear.

24 The M5 has six-piston fixed calipers up front and single-piston floating rears, all painted dark

weight gain—don't be surprised if this M5 weighs almost 4500 pounds—but with 60 extra horses and a gargantuan, 4250-rpm-wide plateau of torque hovering some 120 lb-ft over the old V-10's narrow peak, it'll blow the doors off the previous M5. It's also a lot more livable than the last M5, which was too harsh. Everything in that car, from the seemingly endless combination of chassis settings and the jerky transmission to the clumsy ride and the ominous wail of the V-10, seemed like an unnecessary attempt to stress out its driver. The new M5 is much more like the 2000–2003 E39-chassis M5, which was a master at exciting all of the human brain's adrenaline receptors without ever rousing the fatigue center.

A relaxed driver behind the wheel of a new M5 could, you'd suspect, keep up with a sweating stress-case behind the wheel of a supercar on a challenging back road. There may be layers of computers between driver and tires, but the M5's primary controls

paint a clear picture of what's important, leaving out all the rest. The M5 masks its speed masterfully, constantly reassuring its driver through the talkative steering, the linear brakes, and an obedient dual-clutch automatic transmission. Yes, a conventional six-speed manual will be available when the M5 goes on sale next summer. Yes, we think we'll like it even better. (For the record, the U.S. market sucks up about as many M5s as every other country combined, and we love our manuals, dammit.)

Like the E60, the F10-chassis M5 allows the driver to customize the car's feel, but it's easier and more intuitive to do so (you don't have to use iDrive, for instance). There are three modes to select suspension firmness, three to determine steering effort, three to adjust engine response, three for stability control, and six modes for the transmission—three for automatic mode, three for manual. Cycling through the settings couldn't be any easier—there are buttons surrounding the shifter that each control a different

The nineteen-inch wheels, side gills, and blue brake calipers are a sign that this is an autobahn stormer. Or is it? BMW sold five E60 M5s in the States for every one it sold in the fatherland. The U.S. is by far the number-one market for the M5—so the manual transmission will be back. And for show, you can order your M5 with twenty-inch forged wheels. Bling bling!





metallic blue. They clamp cross-drilled rotors that are only a pinkie-finger-width smaller than the wheels of an original E28-chassis M5. You can try to fade them all you like, but you'll probably barf before they overheat.

25 Contrary to Internet rumors, BMW says the M5

will not have optional all-wheel drive. The 5-series project manager admits that the added traction would help under certain conditions, but he doesn't like that it would change the character of the car. We agree—an M5 that can't lay rubber is no M5. Betelgeuse! Betelgeuse! Betelgeuse! (See #2.) — JC

2013 BMW M5

BASE PRICE: \$90,000 (est.)

Powertrain

ENGINE 32-valve DOHC twin-turbo V-8

DISPLACEMENT 4.4 liters (268 cu in)

HORSEPOWER 560 hp @ 6000 rpm (est.)

TORQUE 500 lb-ft @ 1500 rpm (est.)

TRANSMISSIONS 7-speed dual-clutch automatic, 6-speed manual

DRIVE Rear-wheel



Chassis

STEERING Hydraulically assisted

SUSPENSION, FRONT Control arms, coil springs

SUSPENSION, REAR Multilink, coil springs

BRAKES Vented discs, ABS

TIRES Michelin Pilot Super Sport

TIRE SIZE F, R 265/40YR-19, 295/35YR-19

Measurements

L x W x H 193.3 x 74.4 x 57.3 in

WHEELBASE 116.7 in

TRACK F/R 64.1/62.3 in

WEIGHT 4450 lb (est.)

EPA MILEAGE 14/21 mpg (est.)

0-62 MPH 4.4 sec

TOP SPEED 155 mph

function, and each button press results in a very noticeable change. Once you find your desired combination of chassis, stability control, and head-up display settings, you can save it and recall it using one of the two memory buttons on the steering wheel.

Whichever settings you choose, the M5 is a huge step forward over both the current 5-series and the last-generation M5. That

old M5 was a little too high-strung, whereas the new 5-series has become slightly numb and disconcertingly bland amid a sea of ever-improving competitors. The M5 lands right in the sweet spot as an interactive, communicative, and supremely capable luxury sedan—even if some of its personality has to flow through Fuse Number 200. **AM**

TECHTONICS

SPAGHETTI HEADERS WITH THE MEATBALLS ON TOP.

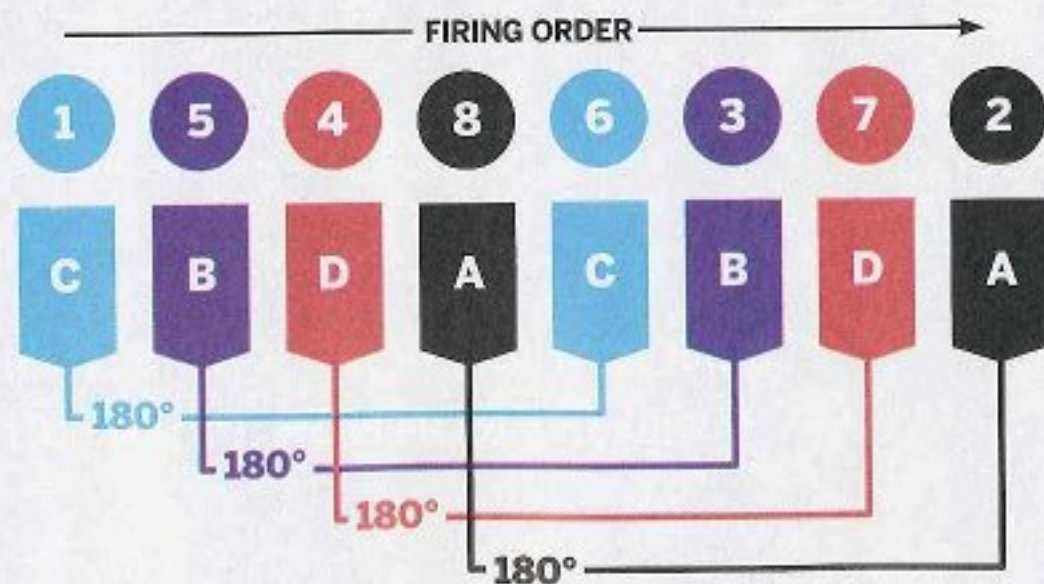
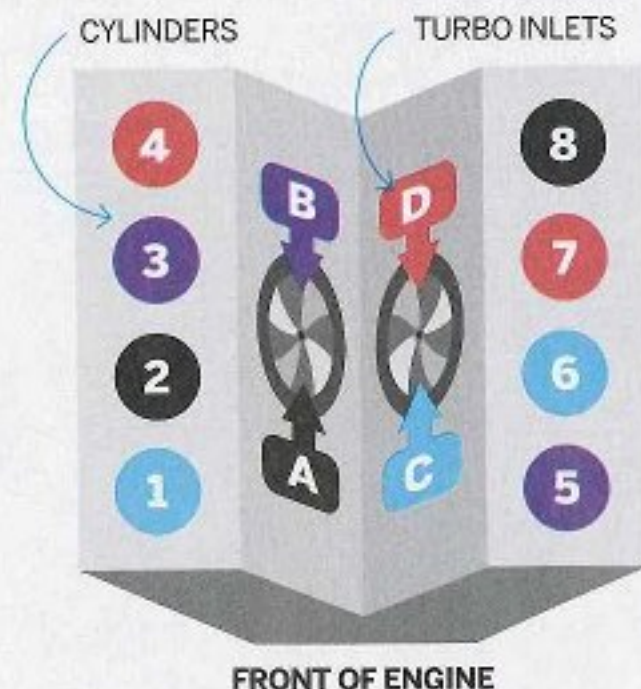
IN CASE YOU HADN'T NOTICED, there are two kinds of V-8 engine noise. A V-8 with a flat-plane crank (think Ferrari) sounds like two in-line four-cylinders as its combustion strokes alternate evenly between its two banks of cylinders. Most V-8 engines have a 90-degree, or "cross-plane," crank, and they sound very different. Their characteristic burble happens because the firing pulses don't alternate evenly between the two cylinder banks.

BMW's eight-cylinder engine is a burbly, cross-plane V-8, so the firing order is such that there are two times in the sequence when the same bank fires twice in a row—and the other bank doesn't fire at all.

No biggie, right? Well, when you put two turbochargers on a V-8, each typically breathes off one bank of cylinders. That means each turbo gets an uneven supply of exhaust air—even pulses for a while, then two pulses in a row, then none, and so on. This makes it difficult to build and maintain consistent boost levels, and the result is turbo lag and surging.

BMW's twin-turbo V-8 is "reverse flow," meaning that the exhaust runners and turbos are positioned in the center of the vee, rather than on the outside. Having the exhaust manifolds so close together allows BMW to cross the runners over and split each turbo's intakes between the two banks. Position the runners based on the firing order and, *voilà!*—each of the turbos receives pulses of exhaust gas at perfectly spaced intervals.

As a result, the S63 and S63TU engines respond far more quickly than the turbo V-8s found in the 550i, the 650i, and the 750i, which lack the crossover feature. The M5's TU engine uses a different layout from the regular S63, with thinner, shorter tubes, but the result is the same. An interesting side effect is that the exhaust of the S63 cars—the X5 M, the X6 M, and now the M5—sounds like a flat-plane V-8 because each muffler receives perfectly spaced pulses. The engine's intake bark, however, remains that of a cross-plane V-8. Add the computerized noise, and the M5 sounds almost like a V-10 at times. Go figure.



EVEN INTERVAL BETWEEN EXHAUST PULSES. Each turbo receives an exhaust pulse every 90° of crankshaft rotation, alternating evenly between its two inlets.