

PREMIERE

LIVE WIRES

The sixth model in the Panamera family has a pulse powered by two hearts. The Panamera S Hybrid fuels up while driving—with electric power instead of gasoline. It is also a master at sailing.

By Peter Weidenhammer



Blue ribbon:
The color of this premiere model was not chosen by chance



The newcomer often slacks off. That is not only tolerated; it is actively encouraged. Whenever the cobalt-blue marbles roll from left to right across the screen of the Porsche Communication Management (PCM) in the cockpit, the youngest member of the Porsche family is saving propulsive energy. The new Panamera S Hybrid is the first Gran Turismo that can fuel up while it drives. Not with gas, but with electricity.

The sixth model in the Panamera family draws its power from two hearts. Under the hood there is not only a 333-horsepower (245 kW) supercharged V6 engine hungry for action, but also a 47-horsepower

(34 kW) electric motor. They have two jobs: putting electricity into motion, and putting motion into electricity. Symbolized by the blue beads, the electricity flows with 288 volts to the rear of the car or back. At the far rear of the Panamera is the lair of the high-power battery with its 1.7 kilowatt hours.

Because the blue energy beads are always eager to go out for a roam, the Panamera S Hybrid is the most fuel-saving Porsche of all times. The Gran Turismo needs a mere 7.1 liters of fuel in the New European Driving Cycle (NEDC). On the car's optional low roll-resistance tires, fuel consumption drops to 6.8 liters. The

Panamera S Hybrid therefore comes out well ahead of all the series-production hybrids of its class in fuel consumption and CO₂ emissions. And with a top speed of 270 kilometers per hour (168 mph), it is already the fastest. This is what is meant by Porsche Intelligent Performance.

The new member of the Panamera family can combine these disparate types of top performance because its two hearts work in tandem, based on a parallel full hybrid principle. The car's simplicity and superior potential are the fruit of Porsche engineers' labor, expertise, and innovation (see the Technology Forum on page 28). In this version of the hybrid drive, the electric motor sits on a single shaft with the combustion engine and the transmission. This means the newcomer's power flow and characteristics correspond to a conventional Gran Turismo, and it is a true Panamera with rear-wheel drive. In agility it compares as well, because the Porsche hybrid drive has an especially lightweight design and requires little space. Taken together, the hybrid module, battery, ventilation system, power electronics, and high-voltage wiring add approximately 155 kilos (342 lbs.) to the scale. With a curb weight of 1,980 kilos (4,365 lbs.), the Panamera S Hybrid is at the lower end of the weight spectrum for its class, and can carry loads of up to 505 kilos (1,113 lbs.).

The car features the corresponding performance figures. The Panamera S Hybrid accelerates from a standstill to 100 kilometers per hour (62 mph) in exactly six seconds. This is just a tenth of a second behind the Panamera S with its 400-horsepower, eight-cylinder engine, despite 20 fewer horsepower and a few kilograms more—outstanding performance, thanks to its two hearts. “Boosting” is the term for the kick that sends the new Gran Turismo so nimbly to the fore. This is what happens when the drive torque of the combustion engine and the electric motor overlap and are combined. Another major advantage of the Porsche hybrid strategy: while the V6 combustion engine develops its maximum torque of 440 Nm (324 lb.-ft.) at 3,000 to 5,250 rpm, the electric motor can use its full torque of up to about 300 Nm (221 lb.-ft.) for propulsion starting from a standstill. Combining their forces, the engine team brings a torque of 580 Nm (428 lb.-ft.) to bear on the input shaft of the eight-speed automatic transmission already at 1,000 rpm. That surpasses even the powerful V8 of the Panamera S with its 500 Nm (370 lb.-ft.) at 3,500 rpm. The driver and passengers not



POWER PACK

Under the hood, next to the supercharged V6 engine, a 47-horsepower electric motor also hungers for action.

only feel this show of accelerative force; they can also see it. A fireworks display unfolds before their eyes on the PCM screen, with blue marbles shooting out of the battery to the hybrid manager and joining the orange-colored arrows that symbolize the combustion engine's power. A veritable joint armada of blue and orange arrows then storms toward the rear wheels.

In short, the Panamera S Hybrid takes every sporting challenge head on. It also proves itself with a discipline that only a Porsche parallel hybrid commands, namely, sailing. As soon as the driver takes his foot off the accelerator, the hybrid manager turns the combustion engine off (whenever possible) and opens the separator clutch to the electric motor, and the Gran Turismo sails on ahead without drive power. That works at low speeds just as well as at high speeds of up to 165 kilometers per hour (102 mph) on the autobahn, or with the cruise control switched on if there is enough momentum on rolling hills to hold the speed. The Porsche hybrid drive is the only system in the world that can

drive at high speeds without emissions and actively save fuel without a loss in dynamics. When the driver steps back on the accelerator in sailing mode, for example if he wants to pass, the combustion engine restarts and reaches the rpm of the moving speed within a fraction of a second. This enables spontaneous spurts just as easily as a Panamera with a conventional engine system.

Driving with comfort while saving fuel is an unparalleled experience for connoisseurs in a Panamera S Hybrid. Accompanied by the subtle sounds of wind and wheels, a Gran Turismo glides down the roads. Its adaptive pneumatic suspension displays an incomparable ability to absorb the effects of uneven surfaces, and whatever remains is ironed out by the Porsche Active Suspension Management (PASM). The Panamera Turbo is the only other car with this combined superior suspension as standard equipment. The energy needed by these two systems plus the power steering, brake power assist unit, transmission oil pressure pump, and the water pumps is provided by a classic twelve-volt onboard battery. Cool air is supplied when needed by the air-conditioning system, whose compressor is connected to the high-voltage network and draws power from the traction battery. The battery gives and takes: in sailing mode the electric motor operates in generator mode, producing electric energy without much braking torque and recharging the battery. By lightly pressing on the gas pedal, the

ENERGY BAR

*The new Panamera S Hybrid
is the best of its class in terms of
fuel consumption.*

Twice the power:
Who says that a hybrid
four-seater cannot make
the sports scene sit up
and take note?



driver can set the vehicle to sail without regeneration; pressing the gas pedal even more keeps the vehicle at the same speed through the electric drive element.

With the same elegance, the Panamera S Hybrid commands the royal discipline of low-noise and emission-free forward propulsion, namely, electro-mobility. Calm is the source of its strength. Gliding out of the underground garage in the morning is no problem, providing drivers treat the accelerator pedal judiciously, the battery is charged, and the outside temperature is above 15°C (60°F). The Gran Turismo can then flow silently for a distance of up to 2 kilometers (1.25 miles) and, depending on the driving situation, at a speed of up to 85 kilometers per hour (53 mph). Pure relaxation. Those who wish to push the gentle side of the Panamera S Hybrid to the limit can press the e-power button and thereby also change the characteristic curve of the accelerator pedal. The car then reacts less sensitively, responds more moderately to accelerative commands, and prevents the automatic start to the combustion engine from kicking in early at increased calls for performance.

Even when underway in this gentle mode, at some point the Panamera S Hybrid will consume the blue in the battery down to an iron reserve. “Charge me, please”—which is done via the combustion engine or by stepping on the accelerator. The Hybrid generates blue most effectively when another part of its system sees red, namely, the brake lights. This is called regeneration, or recovering energy invested previously in motion. The very first push on the brake switches the electric motor to generator mode, which at first takes a part of the braking torque to generate electricity.

The harder the driver brakes, the faster the battery charges; only when the driver’s braking exceeds the regeneration capacity does the normal service brake imperceptibly engage as well.

The hybrid manager is intelligent, otherwise it would not have such a perfect command of the interplay with the clutch and the action of its mixed pair of engines. Yet it cannot read the future. Because it does not know when and how hard the driver might brake, it charges the battery in accordance with a sophisticated strategy while driving, using the power of the combustion engine. The clever part of this is that it does not just shift energy at a loss from the fuel tank to the electric “tank.” On the contrary, when charging via the V6 engine, the hybrid manager derives more energy from every drop of gas. The key to this feat is called “load point shifting.” In the partial load range—when the driver is giving only a little gas—a combustion engine does not operate with the greatest efficiency possible. So the hybrid manager switches the electric motor to generator mode, which places an additional load on the six-cylinder engine. The hybrid manager then imperceptibly increases the engine load, and the combustion engine changes to a more energetically favorable load point with a higher degree of efficiency. The driver does not notice, but he sees the blue marbles start rolling.

The marble show quickly becomes a sporting challenge. The foot on the accelerator pedal has to be just as skillful to drive efficiently as it does to drive fast. The Panamera S Hybrid is superb at both. Who else lets its drivers sail, brake, and accelerate without consuming a drop of fuel? ●



www.youtube.com/watch?v=pU9NM-qqzQc

Hybrid sailing:
Scan this code with your cell phone camera to see the two hearts of the Panamera in full action. See page 8 for more information.



PANAMERA S HYBRID

Engine: V6
 Displacement: 2,995 cc
 Power
 – Combustion engine: 333 hp (245 kW)
 – Electric motor: 47 hp (34 kW)
 – Combined: 380 hp (279 kW)
 Maximum torque: 580 Nm at 1,000 rpm
 0–100 km/h: 6.0 sec.
 Top track speed: 270 km/h (168 mph)
 CO₂ emissions:* 159 g/km
 Fuel consumption*
 – City: 7.4 l/100 km
 – Highway: 6.6 l/100 km
 – Combined: 6.8 l/100 km
 * with 19-inch all-season tires optimized for roll-resistance