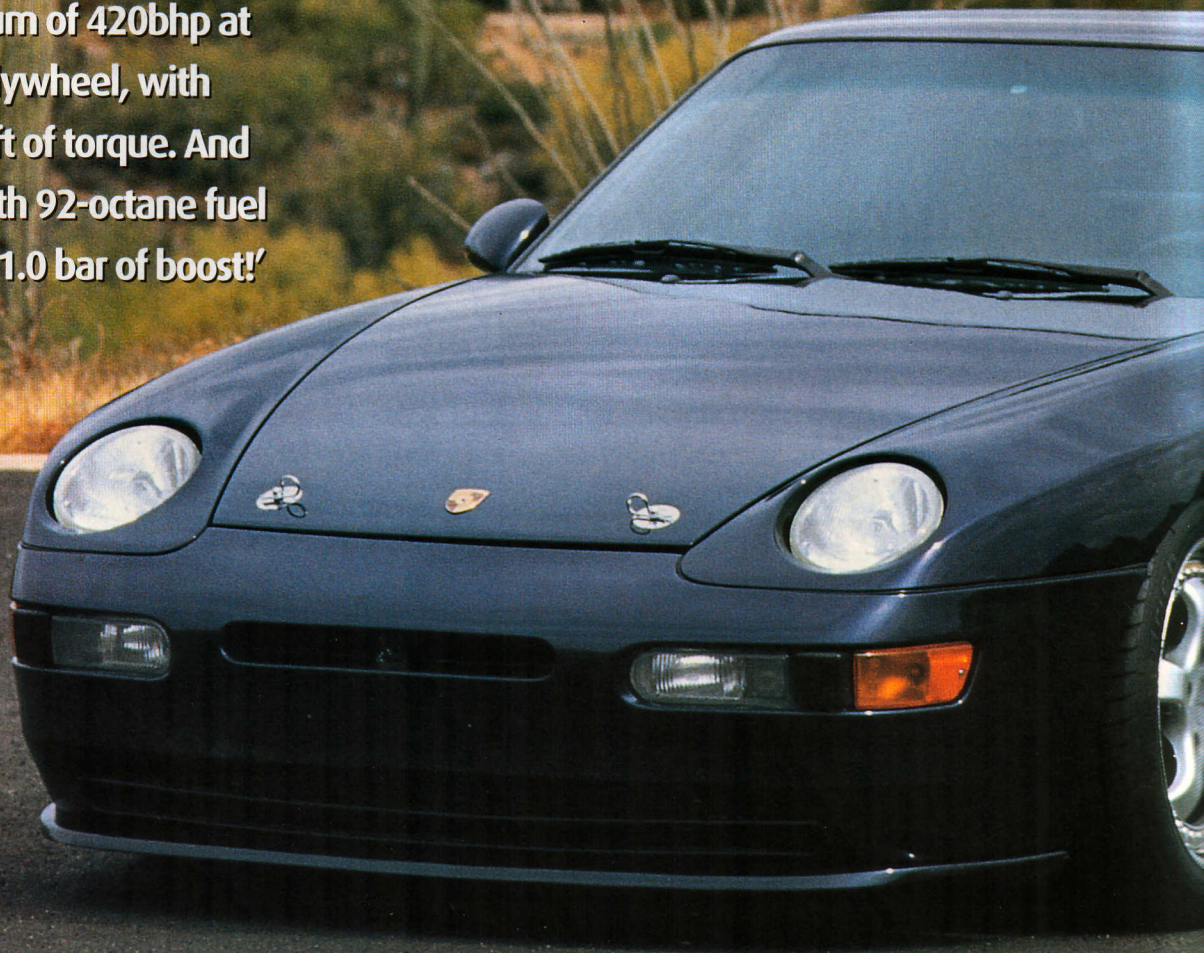


# For

**'Our road-going 968 engines dyno at a minimum of 420bhp at the flywheel, with 448lb/ft of torque. And that's with 92-octane fuel and just 1.0 bar of boost!'**





# Speed FOUR

When John McCarter read about the rare turbocharged 968s that Porsche produced during the early 1990s, he went straight to well-known US tuner PowerHaus and had his own standard 968 converted. Story and photographs by Jeff Hartman



**P**orsche never really built a production 968 Turbo (although it did dabble with the idea; see sidebar on page 16), preferring instead to keep very high levels of power for the more expensive 911. Which is a great shame, if you think about it, because the 968 has both a brilliantly balanced chassis and an engine capable of producing much more power.

These thoughts were running through American John McCarter's mind when, soon after he bought his 968 (for just \$9000), he came across an old magazine article about the rare 968 Turbo 'S' and RS cars (again, see panel on page 16). Before long McCarter's 968 was headed 3000 miles west to Arizona, where Porsche tuner PowerHaus set about producing its own interpretation of a 968 Turbo.

PowerHaus proprietor David Raines takes up the story. 'Unfortunately, turbocharging a 968, with its complex 16-valve engine, is expensive. It requires many additional parts, and lots of expertise. We're selling factory parts, our own components, and not least the knowledge to turbocharge a 968 motor the way Porsche would have done it.

'The package exceeds the 305bhp of the genuine 968 Turbo "S" by a wide margin, yet retains the standard wiring harness, the standard computer, and the original air-mass metering unit. Our road-going 968 engines dyno at a minimum of 420bhp at the flywheel, with 448lb/ft of torque. And that's with 92-octane fuel and just 1.0 bar of boost!'

PowerHaus began the high-power turbo conversion by removing and completely disassembling the engine. The counterweights of the forged crankshaft were machined to remove a full 10lb of reciprocating and rotating mass, which in turn provided both improved throttle response and more horsepower, by keeping the crankshaft just that little bit further out of the oil in the sump.

In order to improve crankshaft lubrication PowerHaus cross-drilled the connecting-rod journals and added baffles to the sump to prevent oil starvation during extreme cornering. In order to reduce the compression ratio from 11.0:1 to 8.9:1, ready for turbocharging, the company specified standard Turbo 'S' pistons (dished, forged, and with fully floating gudgeon pins), moly-coated cast-iron piston rings,



and shorter, lightweight connecting-rods.

Meanwhile the bare cylinder head was machined for wire 'O' rings that bite into the head gasket around each combustion chamber in order to improve sealing under extreme pressure. PowerHaus also removed the 968's VarioCam mechanism, and ported and polished the head, as well as replacing and lapping in the valves, which were fitted with stronger 944 Turbo springs. The head was assembled with static-timing camshafts ground to stock 968 specifications, and not least a 928S4 camshaft-chain tensioner.

To accommodate the turbo conversion under the car's bonnet PowerHaus came up with a new intake manifold that fitted in the rather limited space between the cylinder head and the brake servo (see photo on page 17), neatly interfacing the 16-valve head with a 944 Turbo throttle body. Said throttle body was bored out and modified to accept the 968 throttle-position sensor.

On the hot side, as it were, PowerHaus modified the 968's exhaust manifolds to

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## Driving the PowerHaus 968 Turbo

**The engine settles quickly into a healthy-sounding purr in the hot, dry Arizona air. Blip the throttle and the response is quick – very quick.**

I scan the horizon, where the desert landscape is alive with ragged mountains and gigantic heaps of boulders. The road is a curving two-lane which is ideal for testing the car's capabilities. Drop the clutch and push the six-speed slowly up through the gears while the 3.0-litre engine gradually builds up to operating temperature.

The modified suspension is very firm, indeed. Even minor bumps are super-conducted directly through the heavily bolstered race-style seats in a way that

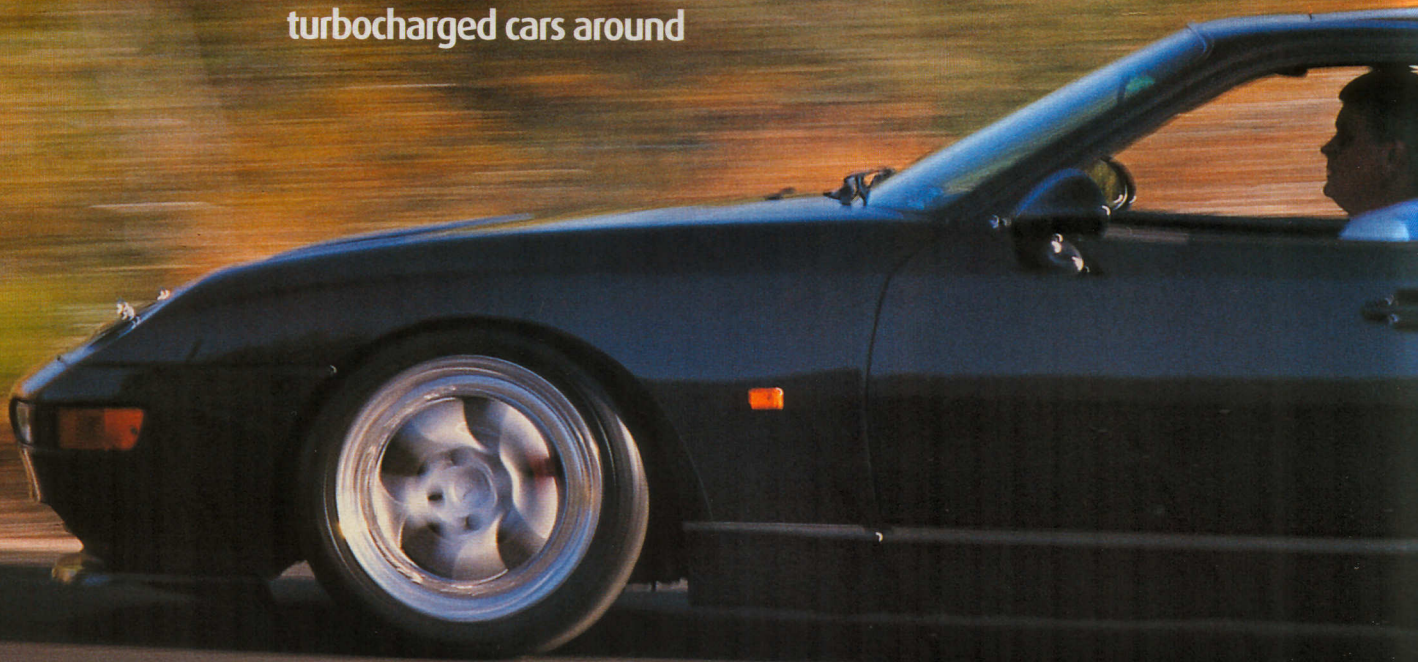
lends a whole new meaning to the words 'road feel'. But feel through the steering wheel is excellent, too, and the 968's tyres really do feel like they're nailed to the asphalt.

Temperature's up now. I urge the car a little harder through the turns, seeing just what it can do. In fifth gear at 20mph I floor the throttle and the boost builds immediately. By 3500rpm the wastegate is open, the boost gauge has maxed at over two atmospheres, and at this point the big four's torque curve simply goes nuts. The car lunges forward as if someone is pouring nitrous oxide straight down the throttle body.

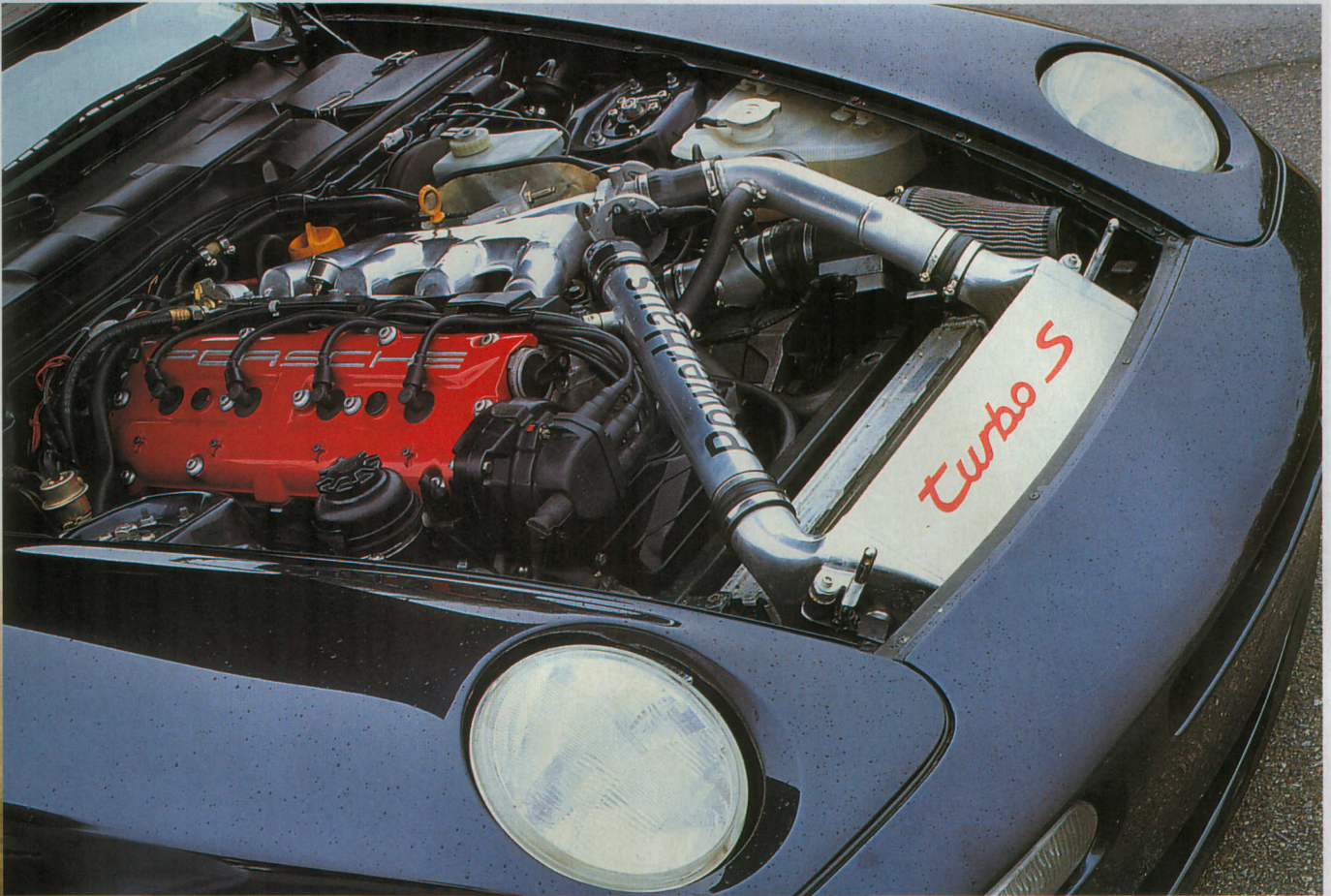
This surely has to be one of the most fun, responsive and driveable turbocharged cars around! ■

● PowerHaus can be found at 7905E Greenway, Scottsdale, Arizona, USA; tel: 480 948-4788.

The car lunges forward as if someone is pouring nitrous oxide straight down the throttle body. This surely has to be one of the most fun turbocharged cars around







*Clever engine conversion mates 16-valve 968 cylinder head to a number of (eight-valve) 944T parts. Inside, the 968's cam-chain tensioner has been replaced with a 928S4 item, and thus the VarioCam mechanism has been dispensed with, too. Intercooler and its associated plumbing (above and below) is little short of a work of art*





# It almost happened...

## **P**orsche did actually build a handful of turbo-charged 968s back in 1993.

First came the 968 Turbo RS race car, which was based on the lightweight 968 Club Sport, and fitted with a turbocharged engine that produced 350bhp.

The bodywork was extensively modified, with enlarged front and rear spoilers, and a pair of distinctive so-called NACA cooling ducts in the bonnet.

Sadly, though, the RS was dogged by changing competition rules, and just three examples were produced. Not wanting to give up, however, Porsche reworked it as a 305bhp road car badged as the 968 Turbo 'S'. The bonnet ducts remained, but the spoilers were toned down in size.

The Turbo 'S' could reach 62mph in just five seconds, and went on to a top speed of no less than 175mph. Again, though, the car wasn't a huge success, with buyers preferring the 911RS, and only 16 were built. ■

## **POWERHAUS 968 TURBO CONVERSION**

### **Facts & figures**

#### **BODY**

968 Turbo 'S' chin spoiler at front, plus 968 Turbo 'S' adjustable rear wing

#### **ENGINE**

Water-cooled in-line four; front-mounted. Four valves per cylinder operated by belt- and chain-driven twin overhead camshafts. Standard 968 VarioCam mechanism replaced by fixed, 944S2-style camshafts ground to PowerHaus's own profiles; 968 cam-chain tensioner replaced by 928S4-style unit. Single KKK turbocharger; standard air-mass metering unit, PowerHaus-remapped Bosch Motronic engine-management system. Custom-made stainless-steel exhaust system

**Bore/stroke** 104.0mm/88.0mm

**Capacity** 2990cc

**Compression ratio** 8.9:1 (previously 11.0:1)

**Maximum power at rear wheels** 336bhp

**Maximum torque at rear wheels** 358lb/ft

#### **TRANSMISSION**

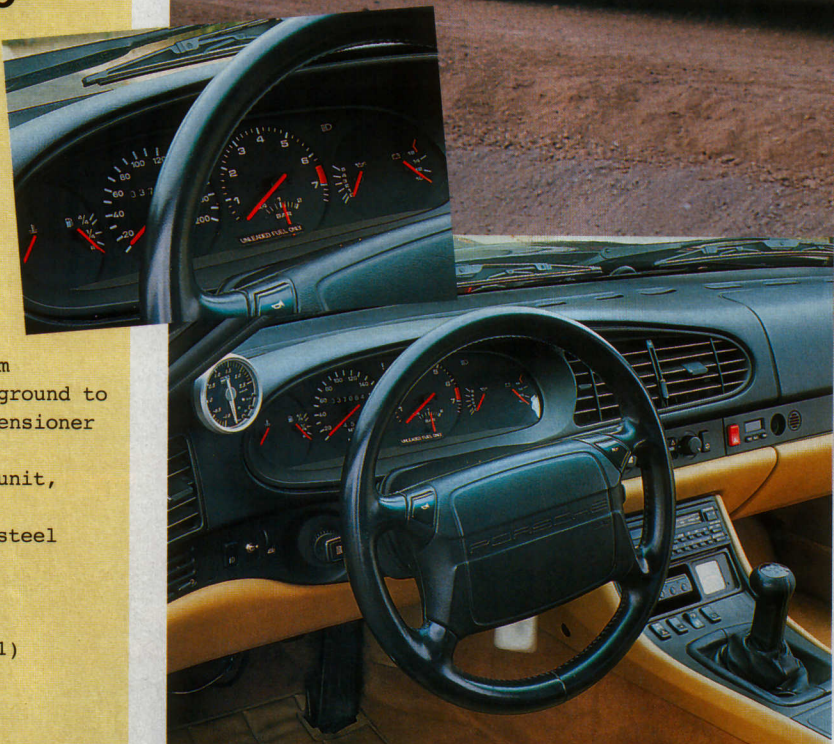
Heavy-duty clutch pressure plate. Standard six-speed manual gearbox with genuine Porsche limited-slip differential (with 70 per cent locking action)

#### **SUSPENSION & BRAKES**

Lowered (50mm) and uprated springs front and rear. Race-specification Bilstein coil-overs front and rear. M030-specification anti-roll bars. Lower front suspension arms rebuilt by PowerHaus. 993-model 911 Turbo brake calipers and front discs; M030-specification 968 rear discs, cross-drilled

#### **WHEELS & TYRES**

Three-piece forged alloys: 8.0J x 17-inch and 10.0J x 17-inch at front and rear, respectively; 235/45 and 255/40 tyres



accept 944 Turbo-compatible flanges, and bolted 944 Turbo exhaust-crossover plumbing to said flanges to drive a custom-built KKK 29 No 8 turbocharger with a high-flow (800cfm) compressor section. Spent gases escape through a custom-made downpipe and stainless-steel exhaust with a high-flow silencer section and a 968 tailpipe. To prevent overboost under high-output conditions the conversion included a 46mm PowerHaus nickel-alloy billet wastegate.

Before installing the engine PowerHaus fitted it with both a special clutch kit and a 4340 billet-machined lightweight steel-alloy flywheel whose ring-gear teeth are compatible with the 968 crankshaft-position sensor. The upgraded clutch pack weighs some 30lb less than standard, while at the same time offering over three times the clamping force available from the standard 968 assembly.

Because the conversion was designed from the start to produce over 420bhp, the original fuel injectors and fuel-pressure regulator were upgraded in order to provide sufficient fuel at maximum power. Indeed, PowerHaus claims that the system, which retains the standard fuel pump, is now capable of fuelling to around 500bhp.

Once the engine was back in the car the 968 wiring harness, fuel





system and cooling system were installed, as well as a 944 Turbo coolant-expansion tank and modified radiator. The conversion also uses a 944 Turbo-style air-oil separator kit, and 944 Turbo engine and turbocharger heat shields and air-oil separator heat shield. Once the radiator was in place the technicians at PowerHaus installed a 944 Turbo air-to-air intercooler, suitably modified to accommodate the reworked intake manifold and throttle-body geometry.

In order to cope with the considerable extra power the six-speed 968 transmission – including the limited-slip differential – was rebuilt with upgraded components. Finally, PowerHaus installed an Auto-Thority 968 engine-management chip, which was recalibrated to deliver correct fuel and ignition timing under boosted conditions.

Inside the cabin, the dashboard was modified to 944 Turbo specification, complete with a standard boost gauge, as well as an after-market boost-vacuum gauge mounted on the left-hand 'A'-pillar. ■

Inside the cabin, the dashboard was modified to 944 Turbo specification, complete with a standard boost gauge, as well as an after-market boost-vacuum gauge mounted on the left-hand 'A'-pillar. ■

**Car is a good 50mm lower than standard (top); looks superb. Wheels (above) are Turbo 'S'-style 17-inch items; three-piece construction. Instrument pack (above left) was from standard 944 Turbo; incorporates essential boost gauge. Special inlet manifold (right) neatly interfaces between 16-valve cylinder head and 944T throttle body**

