Photos: Neil Birkitt and Paz Chauhan

Fully charged!

The Superchipped Polo GTI produces potent performance, yet retains excellent fuel economy...

ONE OF THE most interesting engine developments from the Volkswagen Group in recent years has been the twincharged 1.4 TSI unit. Introduced in 2005 and first used in the Mk 5 Golf GT, this small capacity engine uses a combination of direct drive supercharger and exhaust-driven turbocharger, operating sequentially, to boost the power output way above normal expectations for a 1.4-litre engine.

Versions of this engine, producing 140, 150, 160, 170 and 180 PS, have since been used in vehicles as diverse as the Polo, Golf, Eos, Scirocco, Touran and Tiguan, but it's probably the latest application in the Polo GTI which has been the most exciting. Indeed, this car is probably the most memorable of all the Volkswagen Group models we've tested during the last year or so, not only for its lively performance but also its excellent fuel economy.

Our road test of the standard car in the March 2011 issue reported that 'The Polo GTI is all the car you could want, and more...' After all, our performance testing recorded a truly impressive combination of figures, not only recording 0 to 60 mph in well under 7 seconds and 80 in 11 seconds, but also returning nearly 40 mpg overall, with well over 50 mpg recorded on a cruising run. Indeed, we had to double-check our brim-to-brim figures because we almost didn't believe them ourselves at first!

That sort of performance and economy, all rolled into one, makes the Polo GTI a real force to be reckoned with. Combine it with sharp styling, sporty handling and braking ability, reasonable ride quality and a well-appointed interior and it becomes a very viable alternative to a Golf GTI, especially when you consider that it's a not inconsiderable £7,680 cheaper!

But that's only the start. In standard form, the CAVE series engine in the Polo GTI develops its peak power of 180 PS at 6200 rpm and maximum torque of 184 lb.ft (250 Nm) over a wide range between 2000 and 4500 rpm. Indeed, that's the beauty of this unit, not only providing a satisfying stretch to high engine speeds, but also capable of ready response in the mid-range. It's able to cruise along comfortably without having to constantly stir the gearbox, but also able to pick up its skirts and rev freely to the redline. It really does provide the best of both worlds; high performance at the top end, along with good flexibility and fuel-efficiency at lower speeds.

But we also remember the original press launch, when we were able to interview the engineers who had developed this engine. While none would be drawn to disclose exact figures, it was made very clear to us that the 1.4 TSI engine is capable of reliably producing considerably more power, without overstretching its physical integrity.

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Far from being a weakness, the modest displacement, with smaller and lighter reciprocating components, means that the high-powered 1.4 TSI is less likely to suffer stress-related failures than larger, heavier engines with the same power output. And, of course, any engine with forced induction, whether it be supercharger or turbocharger, let alone one with both, can easily be tuned to higher power outputs by simply increasing the boost pressures and manipulating the fuelling and ignition maps.

It has been over a year since we tested the standard Polo GTI, but we recently spent a few days with an example which has been modified by Superchips. Well known in the tuning industry, the company has a long pedigree in electronic engine tuning which goes back to the Seventies and, while not specialising exclusively in Volkswagen Group models, they clearly have a particular affinity with our own favourite brands. Regular readers may recall that we've featured quite a number of their conversions over the years, most recently reporting on a Mk 6 Golf 1.4 TSI (122 PS), the same 1.4 TSI engine but turbocharged only, which had been uprated to 155 PS.

It's important when evaluating aftermarket upgrades to consider the actual figures measured on the rolling-road dynamometer. Quite often, it is the case that the standard car records a baseline plot which is already well above the factory quoted figures. It's all too easy for the tuner to claim credit for the difference between the factory figure and the modified amount, usually also based on a spikey peak figure rather than a real achievement. Superchips, though, publishes power and torque plots which clearly show the measured figures for the standard car and those recorded with the modifications.

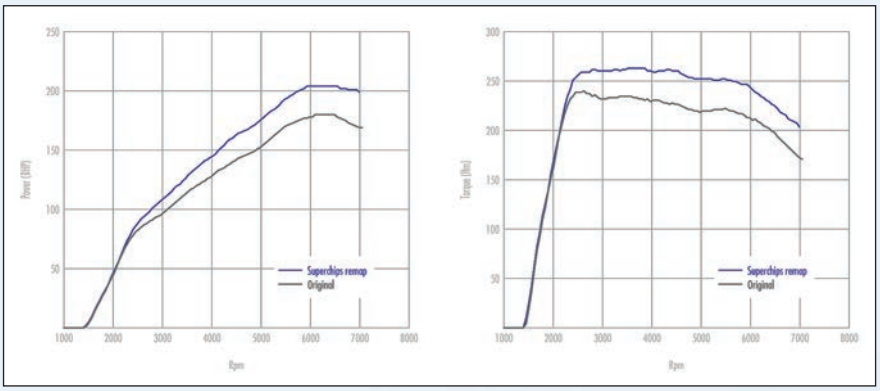
In the case of this Polo GTI, though, the standard power plot was right on the button, with exactly 180 PS recorded at 6447 rpm and maximum torque of 240 Nm at 2579 rpm. If anything, the torque figure was slightly down, compared with the factory figure of 250 Nm, but the graph shows the same broad range, peaking at 2579 rpm and remaining high, above 220 Nm, until tailing off past 5500 rpm. Note that essentially this same engine is also used in the SEAT Ibiza Cupra, Skoda Fabia vRS and the Audi A1 1.4 TFSI (185 PS).

There are no physical alterations involved, but Superchips modifies the engine management software by manipulating the mapping for boost, ignition and fuelling, to increase power and torque. It's a field in which their considerable experience and expertise stands them in good stead; knowing just where to readjust the digital coding to optimise the performance, without exceeding the safe parameters.

Once all the software development and testing has taken place, it's back on to the in-house Maha rolling-road dyno to power test the modified mapping and the final figures show not only a substantial increase in power, up by 27 PS to 204 PS at 6501 rpm, but also a 35 Nm increase in torque, peaking at 3475 rpm but also showing well over 250 Nm all the way from 2500 to 5500 rpm. It's particularly interesting to note that the power and torque of this 1.4-litre 4-cylinder engine are now almost identical to the output of the 2.8-litre VR6 engine which was used in the Mk 4 Golf V6 4Motion!

Just as important as the actual increase is that the shape of the curves remains virtually the same, just moved further up the scale at the same engine speeds. It's exactly what you want to see of a modified engine, especially one which has such a perfect blend of power and torque characteristics on the first place.

It was time to put the Polo GTI to the test against the clock, to see just what difference the improved power output makes to acceleration and general performance.



'THE POWER AND TORQUE OF THIS 1.4 TSI ARE NOW ON A PAR WITH THE 2.8 V6!'

Acceleration figures recorded using VI Monitor. For more information visit the website at: *www.vi-performance.com*

	Superchips Polo GTI	Standard Polo GTI	Mk 6 Golf GTI DSG	Mk 5 Golf GTI Edition 30 DSG	ABT Sportsline Scirocco 2.0 TSI DSG	Mk 4 Golf V6 4Motion
Displacement, cc	1390	1390	1984	1984	1984	2792
Power output, PS/kW	204/150	180/132	210/155	230/169	240/177	204/150
@ rpm	6500	6200	5300-6200	5500	6000	6200
Maximum torque, lb.ft./Nm	194/263	184/250	206/280	221/300	250/340	200/270
@ rpm	2700-4500	2000-4500	1750-5200	2200-5500	2400-4800	3200
Maximum speed, mph/kph	145/234*	142/229	147/236	151/243	153/246	146/235
0–50 mph, sec	5.0	5.2	4.6	4.8	4.6	5.2
0–60 mph, sec	6.2	6.7	6.5	5.9	5.9	7.0
0–70 mph, sec	7.8	8.8	8.2	7.8	7.3	9.5
0–80 mph, sec	9.8	11.1	10.1	9.8	9.3	11.8
30–50 mph (third gear), sec	2.5	3.2	2.4	2.4	2.3	3.6
30–50 mph (fourth gear), sec	–	–	–	–	–	4.7
50–70 mph (third gear), sec	2.7	3.5	3.3	3.0	3.0	3.8
50-70 mph (fourth gear) sec	–	–	–	–	–	4.7
50–70 mph (fifth gear), sec	–	–	–	–	–	5.9
50–70 mph (sixth gear), sec	–	–	–	–	–	–
Overall fuel consumption, mpg / l/100km	36.7/7.7	38.6/7.3	32.5/8.7	25.8/10.9	34.7/8.1	22.7/12.4
Unladen weight, lb/kg	2797/1269	2797/1269	2952/1339	3086/1399	3122/1416	3089/1401
Power/weight ratio, PS/ton	163/160	144/142	159/157	167/164	172/169	148/145
Test publication date	Apr '12	Mar '11	Aug '09	Mar '07	Nov '09	Sep '00

* Estimated

There's always going to be a problem here, because any car with only two driven wheels is going to have difficulty putting its high power output down cleanly. It can take quite a few attempts to achieve the optimum times, even in perfect conditions on a dry road, and a cold damp day in February was only going to add to the challenge.

Even in standard form, 180 PS and 250 Nm is enough to overwhelm the tractive ability, particularly since the Polo GTI doesn't have the XDS (electronic transverse differential lock) which is used on high-powered front-wheel-drive stablemates like the Golf GTI / GTD and Scirocco R. It's not such a problem in normal everyday use, because the extra power and torque of the Superchips conversion doesn't start to make itself felt until just after 2250 rpm, so you can ease it off the line and then apply the extra power progressively once on the move. But that's not a technique which achieves a significant improvement over the full-bore 0-60 times we recorded with the standard car.

Neither is the furious wheelspin and axle tramp which occurs if you accelerate forcefully from rest with anything above 2500 rpm on the tacho. Indeed, our first few acceleration times – recorded on the VI Monitor which we use for definitive performance testing – were actually slower than the standard car. Eventually, though, after much concerted effort, with ESP off and feeding in the power progressively, we managed to extract a set of figures which showed a significant improvement, with over half second lopped off the 0-60 time, a full second off the 0-70 time and nearly 1.3 off the 0-80 time.

Clearly, once the car is up and rolling, the extra power really tells, and this is substantiated by the in-gear times, with nearly a second saved on both the 30-50 and 50-70 times. It might not sound like much, but when you compare it with the performance figures for other hot hatches you realise that the tuned Polo GTI can outperform a Mk 6 GTI and comes very close to matching a Mk 5 GTI Edition 30. Note, of course, that we've compared with DSG transmission cars in each case, since the Polo GTI is equipped with the 7-speed DSG gearbox as its only option.

Photo: Paz Chauhan

So the outright performance is really impressive, but what of the general driveability and fuel economy? Surely, that will suffer badly as a consequence of the extra power and performance. Surprisingly not. In normal low-speed driving and steady state cruising, the Superchipped car is just as well mannered as the standard car, and our careful brim-to-brim checks produced an overall average figure of 36.7 mpg. Not quite as good as the 38.6 we achieved with the standard car, but not by any means disappointing and probably a consequence of the extra effort we'd had to employ in extracting those performance figures.

In normal road use, driven appropriately, you can even expect to see a small improvement in mpg since the extra torque allows you run in a higher gear at any given road speed. Indeed, on most road trips, at sensible speeds, we saw the MFA reading well into the mid-forties, and on a gentle motorway cruise in the high seventh gear it registered just over 51 mpg! Even when you consider the requirement for high octane fuel (we used BP Ultimate 97 RON), that still makes it as cost-effective to run as many lower-powered TDI diesel-engined models.

Whether the Superchips conversion makes sense in terms of usable performance is a personal decision. While the extra power is indisputable, the improvement in standing-start acceleration times is academic, because unless you're going to spend all day practising on the drag strip at Santa Pod, or in the Sprint at GTI International, you're not going to reap any real benefit.

Indeed, indulge in a traffic light grand prix at your peril, because you'd be just as likely to be left behind, sitting in a cloud of your own wheelspin. But for fast mid-range performance and swift, safe overtaking ability the Superchips Polo GTI definitely gives a good account of itself, in the same league as Golf GTIs costing many thousands of pounds more. Even in standard form, the Polo GTI's sports suspension and brake set-up are perfectly adequate to cope with the improved performance, although it will undoubtedly benefit from one of the many upgrades available, perhaps a set of uprated pads for regular fast-road use or an adjustable coilover kit to fully exploit the performance on track days.

'THE REAL BEAUTY OF THE TWINCHARGED 1.4 TSI ENGINE IS THAT IT ACHIEVES SUCH GIANT-KILLING PERFORMANCE AT SUCH LITTLE COST IN FUEL ECONOMY...'

The real beauty of the twincharged 1.4 TSI engine, even with the extra performance afforded by the Superchips conversion, is that it achieves such giant-killing performance at such little cost in fuel economy, still capable of overall average mpg figures in the 40s. That can only be a good thing.

Other features

Superchips Bluefin Mk 5 GTI	Feb 2007	p23-26
TSI engine in detail	Apr 2007	p37-40
Superchips GTI Edition 30	Jun 2007	p11-14
Superchips Bluefin Mk 6 GTI	Feb 2010	p29-31
Superchips Bluefin Passat CC 2.0 TDI	Mar 2010	p32-34
ABT Sportsline Golf 1.4 TSI (210 PS)	May 2010	p24-37
Road test: Polo GTI	Mar 2011	p35-38
Superchips Bluefin Mk 6 Golf 1.4 TSI	Apr 2011	p35-38

DIY download by Bluefin

THE SUPERCHIPS re-map on this Polo GTI was applied using the Bluefin system, using a handheld module which is plugged into the standard diagnostic (OBD) port to enable the ECU mapping to be switched between standard and high-performance versions.

When the customer first purchases the Bluefin system, they first plug it into the car, so that it reads and copies off the actual original standard ECU mapping in the car. This is then transmitted to Superchips HQ by internet and checked before the appropriate new high-performance mapping is sent back to be loaded into the Bluefin module.

The customer can then subsequently decide whether to run the car as standard or load up the high-performance map themselves, a process which takes about 20 minutes, either way, to make the data transfer, plugging it in to the OBD port under the dash and following the simple menu instructions which appear in the digital screen. The only real question is whether you'll ever want to revert to the standard software, once you've sampled the superior performance and excellent economy of the upgrade.

Contact

Superchips Ltd
Buckingham Industrial Park,
Buckingham MK18 1XJ
Tel: 01280 816 781
www.superchips.co.uk