

Volvo 760 Turbo



VOLVO has never traded on a high-performance image, relying instead on its much-publicised reputation for building safe and long-lasting cars. The controversially styled 700 series stayed with this philosophy, but it had a chassis of real ability - capable of accepting far more power than it was originally equipped with.

Enter the 760 Turbo, powered by a 2.3-litre turbocharged engine producing over 20 bhp more than the larger capacity V6 that's fitted to the GLE, and over 60 bhp more (55 per cent more) than the equivalent unblown version fitted to the 740GL.

It is understandable that Audi, Citroën and Saab - who do not have the option of large capacity normally aspirated engines - should rely on turbocharging to boost the power of their top models; forced induction is an expedient (and cheap) way of getting more power from existing engines. But Volvo has the 2.8-litre "PRV" V6 engine, used in the 760 since the car's inception. So why has Volvo chosen a small capacity turbo "four" for its top model?

Well, the four-cylinder engine is of wholly Volvo manufacture, rather than being a shared "co-operative" engine, and it makes sense from the point of view of rationalisation. At the moment, the V6 GLE is an automatic only, and the Turbo has a four-speed plus overdrive transmission, but an auto version of the Turbo is imminent and will be priced at over £17,000. Perhaps the V6 engine will eventually disappear.

The 760 Turbo is not new, but the engine has been completely revised for 1985, and is of Volvo's latest "low friction" design, with reduced bearing surface areas and lighter reciprocating parts. Designated the B230ET (previously B23ET), it shares only the cylinder dimensions and main operating features with its predecessor.

It has an iron block, aluminium

cylinder head and belt-driven sohc valve gear. Like Saab (with the Turbo 16), Volvo uses an intercooler to lower the charge temperature, permitting a very high compression ratio (9.0:1) for a turbocharged engine. Maximum boost pressure is 0.7 bar (10 psi), compared with the 0.85 bar that the Saab's APC system permits, with a similar compression ratio. A Bosch Motronic engine management system governs all fuel injection and ignition requirements.

As with many contemporaries, including the Saab and Citroën CX GTi Turbo, a Garrett T3 turbocharger is used, together with a knock sensor for detonation detection. The power output (177 bhp at 5700 rpm) compares favourably with the Saab 900 APC (145 bhp) and Citroën (168 bhp), but the Volvo's 187 lb ft torque output is inferior to the Citroën.

The engine is mated to a four-speed gearbox, with a Laycock overdrive acting on fourth gear - to give it effectively five speeds. This is in contrast to the "proper" five-speed gearbox fitted to the 740GL. Both cars share the same final drive ratio, gearbox direct fourth gears and internal ratios. But the 0.75:1 overdrive gives the Turbo slightly taller gearing, at 25.2 mph/1000 rpm.

The drive is taken to a live rear axle, located with outboard trailing links, upper and lower arms attaching the differential casing to a rubber-mounted subframe providing some fore and aft movement, and a Panhard rod for lateral location. Front suspension is by MacPherson struts, track control arms and tie rods for lower location, and an anti-roll bar. Coil springs are used all round, together with telescopic dampers - those at the rear being of the self-levelling type.

Steering is by power-assisted rack and pinion, and braking is servo assisted all-round discs - ventilated at the front.

At £14,850, the 760 Turbo is exactly the same price as the 760 GLE auto, pitching it firmly in the performance executive sector occupied by cars like the Rover Vitesse (£15,465), BMW 528i (£14,035), Citroën CX GTi Turbo (£12,990) and Saab 900 Turbo (£13,490). But for its high cost, we would have included the similar power Audi 200 Turbo; the normally aspirated Audi 1000D (£12,037) is a closer match to the Volvo.

However one views the 760's styling, which was dictated very much by important US market considerations, it is less efficient aerodynamically than today's best, boasting a Cd no better than 0.39. But that doesn't seem to have affected UK sales, with over 4000 700-series Volvos being sold here last year, nearly 800 of which were the Turbo.

Performance isn't everything in this class, but the addition of a "Turbo" badge, however discreet, tends to raise expectations. Volvo claims a maximum speed of over 125 mph, combined with a 0 to 60 mph acceleration time of 8.5 sec - so the 760 should perform in the same league as a Rover Vitesse or Citroën CX GTi Turbo.

Subjectively it does go well, especially by the standards of a large-bodied executive car. It pulls lustily from around 2000 rpm, and with considerably more smoothness than one might expect from only four cylinders - yet off-boost performance is acceptable too. Unfortunately, this surge of power trails off noticeably further up the rev range, confirming that the engine has been tuned for mid-range torque, rather than sheer power.

These impressions were underlined at the test track, when the Volvo came well short of matching its maker's claims. It recorded a mean maximum speed of "only" 115.8 mph (in overdrive fourth gear), and a 0 to 60 mph acceleration time of 9.3 sec. The makers could find nothing wrong with the car to explain its lacklustre performance, so the figures must stand.

Thus, the Turbo is quicker than the 760GLE Auto (113.4 mph, and 10.3 sec), but its performance is inferior to the Citroën CX GTi (129.6 mph and 7.6 sec), Rover Vitesse (132.1 mph and 7.1 sec) and Saab 900 Turbo (120.8 mph and 8.9 sec), though it does out-accelerate the Audi 1000D (123.4 mph and 9.9 sec).

In the lugging stakes, the Volvo does better - with a fourth gear 30 to 50 mph time (7.0 sec)



Is a turbocharged four-cylinder engine good enough for Volvo's flagship, or is the Swedish car maker simply complying with the dictates of fashion? The 760 Turbo is the fastest Volvo *Motor* has tested, but it is not the performance equal of a Rover Vitesse or BMW 528i

beaten only by the CX GTi Turbo (5.1 sec); corresponding figures for the BMW 528i and Rover Vitesse are 8.6 sec and 7.6 sec respectively. But in absolute terms, all these cars - with the exception of the Audi - pull strongly from low engine speeds, minimising the Volvo's advantage.

Overall, the Turbo is still the fastest Volvo *Motor* has tested, though the figures are very disappointing in the light of the excellent performance of the non-Turbo 740GL; this car achieved a maximum speed of 109.7 mph, a 0 to 60 mph acceleration time of 10.6 sec and a 30 to 50 mph time of 8.7 sec.

Our testers were not overly enthusiastic about the overdrive gearbox, the advantage of "electric" selection being outweighed by jerky engagement - so for a smooth change into overdrive fourth, you still need to dip the clutch. Otherwise, the four-speed change has a satisfyingly robust, if rather clunky action. It is capable of fast changes, but the engine's heavy flywheel effect encourages a more leisurely approach. The ratios themselves are widely spaced, allowing maxima of 29, 55 and 87 mph in the lower gears.

With an overall consumption of 20.0 mpg, fuel economy is not one of the Volvo's better points - though with the exception of the Audi (27.9 mpg), none of the other rivals can do significantly better. The calculated touring consumption of 26.8 mpg shows that a small improvement is possible with more restrained driving, and this Volvo does have the advantage of a very large (82-litre) fuel tank.

Do not be deceived by the 760's appearance: it is considerably more wieldy than it looks and not in the least bit stodgy. Tipping the scales at 1 338 kg, it is no heavier than comparably sized rivals, and nor does it feel it. It doesn't lurch or roll to excess, it turns in promptly and displays commendable grip. The basic trait is mild understeer, though the composure can be affected by mid-corner bumps. Some discretion is needed when powering out of tight corners in the wet - but even when the tail lets go, the Volvo still handles in a consistent, predictable way. The power steering is responsive and sensibly weighted and, as the adverts claim, the 760 has an impressively tight turning circle.

The disadvantage of having a live axle - albeit a very well located one - is more apparent

with the 760 Turbo than it was with the 740. It is inclined to thump over transverse ridges, and imparts a feeling of restlessness over uneven surfaces. Damping is well controlled, and the ride certainly improves at speed but, ultimately it has to apologise for having a live axle amongst a class of predominantly independently sprung rivals.

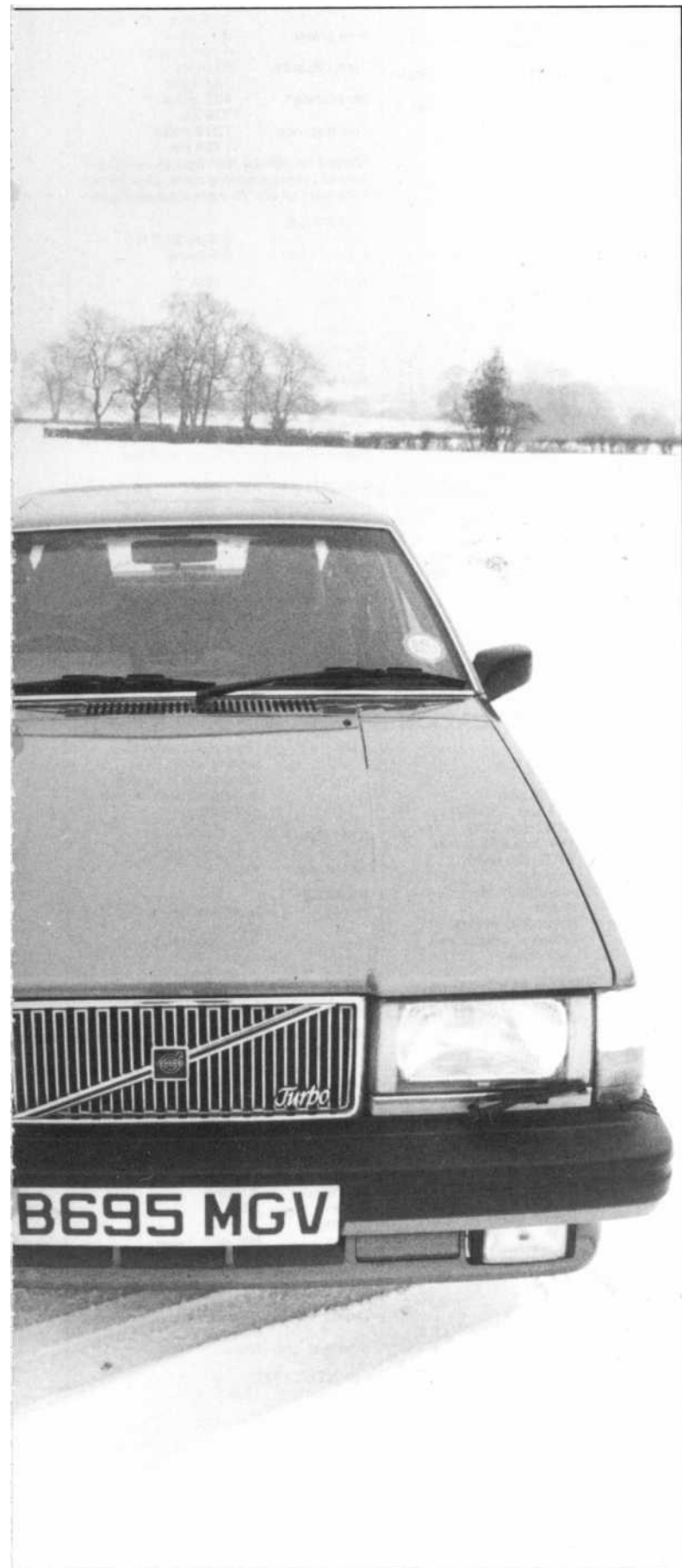
Sophistication certainly isn't lacking in the 760's braking department, the front ventilated discs being clamped by four-piston calipers (to allow a safer-in-the-event-of-failure "L" circuit hydraulic split to be used). Our testers found the firm brake pedal reassuring, but judged the brakes slightly over-servoed.

For the money, the 760 Turbo is not an especially quiet car - but then the engine noise which predominates is not objectionable in character, and is certainly preferable to the throbbiness of the V6. Upward gearshifts are accompanied by a noticeable rumbling growl on the over-run - contrasting with the engine's otherwise civilised behaviour.

With the 109 in wheelbase, the Volvo 760 could hardly not be a roomy car, but it is no great wonder of packaging, and lacks vital headroom (as a result of the sun roof's intrusion) to suit taller drivers.

In the back, the Volvo fares well for the simple reason that the front seats have restricted rearward movement, which flattens our "minimum rear legroom" measurement. Rear seat passengers benefit from proper footwell heating, a central armrest, head restraints, and of course rear seat belts.

Both front seats are heated, and the driver's is adjustable for both height and tilt, giving shorter drivers a commanding driving position. But taller drivers will find the Volvo lacking in head-



MOTOR ROAD TEST

VOLVO 760 TURBO

PERFORMANCE

WEATHER CONDITIONS	
Wind	5-10 mph
Temperature	37 deg F/3 deg C
Barometer	30.0 in Hg/1016 mbar
Surface	Dry tarmac/adam

MAXIMUM SPEEDS

	mph	kph
Banked Circuit (5th gear)	115.8	186.4
Best 1/4 mile (5th gear)	117.3	188.8
Max speed (4th gear)	112.6	181.2
Terminal speeds:		
at 1/4 mile	81	130
at kilometre	97	156
Speeds in gears (at 6000 rpm):		
1st	29	47
2nd	55	89
3rd	87	140

ACCELERATION FROM REST

mph	sec	kph	sec
0-30	3.1	0-40	2.3
0-40	4.7	0-60	4.2
0-50	6.5	0-80	6.5
0-60	9.3	0-100	9.9
0-70	12.4	0-120	14.2
0-80	16.8	0-140	21.4
0-90	23.8	0-160	33.5
0-100	34.5		
Stand'g 1/4	17.0	Stand'g km	31.8

ACCELERATION IN TOP

mph	sec	kph	sec
20-40	12.9	40-60	7.6
30-50	10.8	60-80	6.4
40-60	9.9	80-100	6.3
50-70	10.4	100-120	6.9
60-80	11.6	120-140	9.6

ACCELERATION IN 4TH

mph	sec	kph	sec
20-40	8.0	40-60	4.7
30-50	7.0	60-80	4.2
40-60	6.8	80-100	4.3
50-70	7.2	100-120	5.1
60-80	8.7	120-140	6.8
70-90	11.1		

GENERAL SPECIFICATION

ENGINE	Four in-line
Cylinders	2316 cc
Capacity	96/80 mm
Bore/stroke	177 bhp, 130 KW at 5700 rpm (DIN)
Max power	187 lb ft, 253 Nm at 3400 rpm (DIN)
Max torque	Cast iron
Block	Aluminium alloy
Head	Water
Cooling	Sohc, 2 valves per cylinder, toothed belt cam drive
Valve gear	9.0:1
Compression	Bosch DME-L Motronic electronic fuel injection
Fuel system	Fully programmed electronic
Ignition	5 main
Bearings	TRANSMISSION
	Drive Rear-wheel drive
	Type Four speed manual, with overdrive
	Internal ratios and mph/1000 rpm
	0/D 0.79:1/25.2
	4th 1.00:1/19.9
	3rd 1.37:1/14.5
	2nd 2.16:1/9.2
	1st 4.03:1/4.9
	Rev 3.68:1
	Final drive 3.54:1
	AERODYNAMICS
	Drag coefficient (Cd) 0.39
	SUSPENSION
	Front Independent by MacPherson struts with lower location by track control arms and tie rods; coil springs; anti-roll bar

FUEL CONSUMPTION	
Overall	20.0 mpg
	14.1 litres/100 km
Touring*	26.8 mpg
	10.5 litres/100 km
Govt tests	19.8 mpg (urban)
	38.2 mpg (56 mph)
	29.4 mpg (75 mph)
Fuel grade	98 octane
	4 star rating
Tank capacity	82 litres
	18.0 gallons
Max range*	482 miles
	776 km
Test distance	1079 miles
	1736 km

*Based on official fuel figures — 50 per cent of urban economy cycle, plus 25 per cent each of 56/75 mph consumptions.

STEERING

Turning circle	9.6 m, 31.5 ft
Lock to lock	3.5 turns

NOISE

	dBA
30 mph	59
50 mph	64
70 mph	70
Maximum†	76

†Peak noise level under full-throttle acceleration in 2nd

SPEEDOMETER (mph)

True mph	30	40	50	60	70	80	90	100
Speedo	34	45	55	65	76	86	96	106
Distance recorder:	1.0 per cent fast							

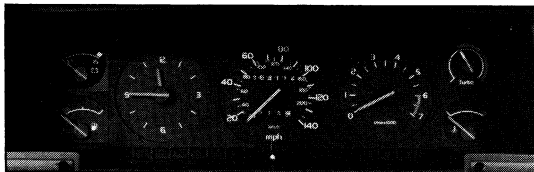
WEIGHT

	cwt	kg
Unladen weight*	26.3	1338
Weight as tested	30.0	1526

*No fuel

Performance tests carried out by **Motor's staff at the Motor Industry Research Association proving ground, Lindley, and Millbrook proving ground, near Ampthill.**

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Facia is well laid out, but stereo is an expensive extra. Clear instruments but steering wheel rim masks voltmeter and boost gauge. Sunroof limits headroom for taller drivers, despite front seat's height adjustment

room, and the non-adjustable steering column means that the wheel obscures part of the instrument binnacle. Making things worse, the throttle is further away from the driver than the other pedals - and has very long travel. So overall, the 760 is not the most comfortable car for drivers, especially tall ones.

The instruments are clearly presented with illuminated pointers. They include a central speedometer, flanked on either side by a tachometer (red-lined at 6000 rpm) and an analogue clock, with smaller supplementary dials covering water, fuel contents and an uncalibrated turbo boost gauge.

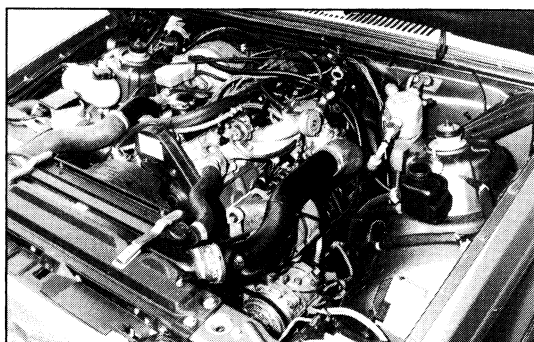
As one would expect, the heater is both powerful and easily regulated, but being a linked system, the car quickly gets stuffy with the heater in use. There was no opportunity to assess the air conditioning, but the fact that it's fitted gives the Volvo one advantage over all the rivals we have listed. It is just one of this car's impressive list of standard fittings. Fickle executive car buyers expect electric windows, central locking, headlamp washers etc. The Volvo obliges, and it also has heated seats, heated door mirrors, an electric sunroof as well as the air conditioning. All it lacks is a radio, but

the Mitsubishi-sourced radio/tape player fitted to the test car proved very satisfactory. And as a £489 listed extra, so it should have done.

The interior is expensively trimmed in velour type cloth seat trim - Volvo calls it Plush. This extends to the door panel trims. It looks well finished and strikes a good balance between luxury and practicality. Leather trim is available as a no-cost option to give that luxury atmosphere.

As ever, much of the 760 Turbo's appeal lies with its air of ruggedness and promise of longevity, coupled with its maker's concern for occupant safety - if the adverts are to be believed. But these attributes are not easy to quantify, and buyers will have to balance these potential advantages against the more easily proven disadvantages the 760 Turbo has in terms of performance, economy and indifferent packaging.

In many respects the 760 Turbo proved better than expected, with a good engine matched to a surprisingly wieldy chassis. But at the end of the day, it is a difficult car to justify in terms of statistics. It is not the overtly sporting "limo" that the badge suggests, more a plush express for people who like Volvos.



Inclined four-cylinder engine is turbocharged and intercooled and equipped with Bosch Motronic engine management system. Not a diy proposition!

Make: Volvo **Model:** 760 Turbo **Country of Origin:** Sweden

Maker: AB Volvo, Goteborg, Sweden

UK Concessionaires: Volvo Concessionaires Ltd, Lancaster Road, High Wycombe, Buckinghamshire HP12 3QE. Tel: 0493 33444

Price: inc. Car Tax and VAT, £14,850.32

Extras fitted to test car: Volvo stereo radio/cassette player £488.75.