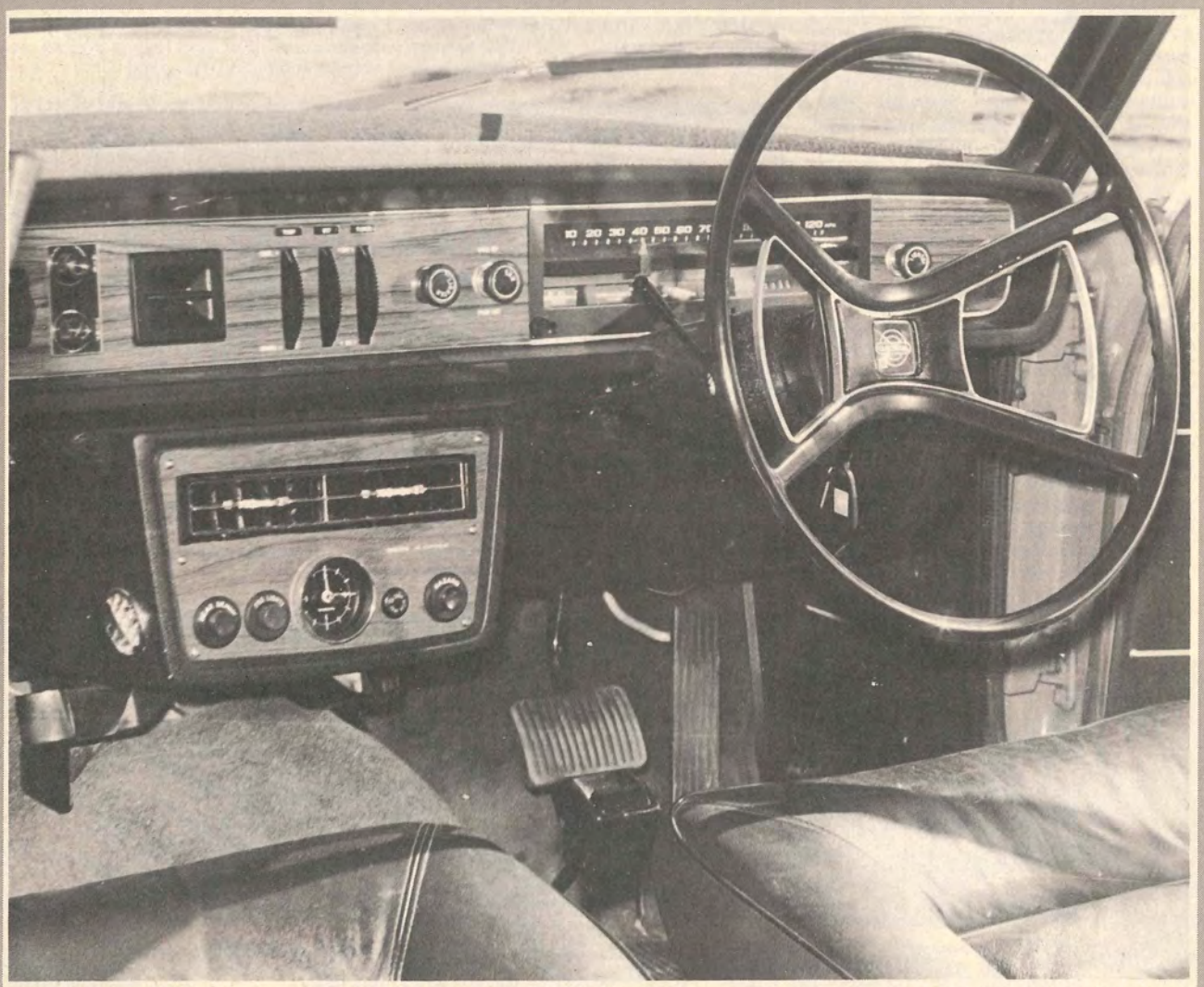
Autotest: Volvo 164 E automatic, air-conditioned.

Softly, Swiftly, Safely.



Office space for Volvo conducteur; big wheel, faintly old-fashioned instrumentation, but clever design and that lovely leather smell.

We have been looking forward to testing a Volvo for AUTOSAFE because the Swedish company has long been up with the leaders in the field of automotive crash safety. It is not by any means the oldest car manufacturing company in the world. Its first model, a metal-bodied, wooden-framed four-cylinder tourer, coded OV-4 but nick-named "Jacob", rolled through the factory gates on April 14, 1927. However, Volvo's use of safety construction techniques can be traced from the 1958 PV-544 model — and that was well before Detroit or Cologne or Dagenham or Fishermens Bend or almost anyone apart from Daimler-Benz and Citroen started understanding that you could protect people against the consequences of their mistakes by making the vehicle more forgiving.

The 164E is a larger and more powerful version of the 140 series that was introduced in 1966. The 144 then had a triangle-split braking system, energy-absorbing front and rear ends, head restraints, the famous Volvo belts and seats, and a roof strong enough for an elephant to stand on — as Volvo proved photographically.

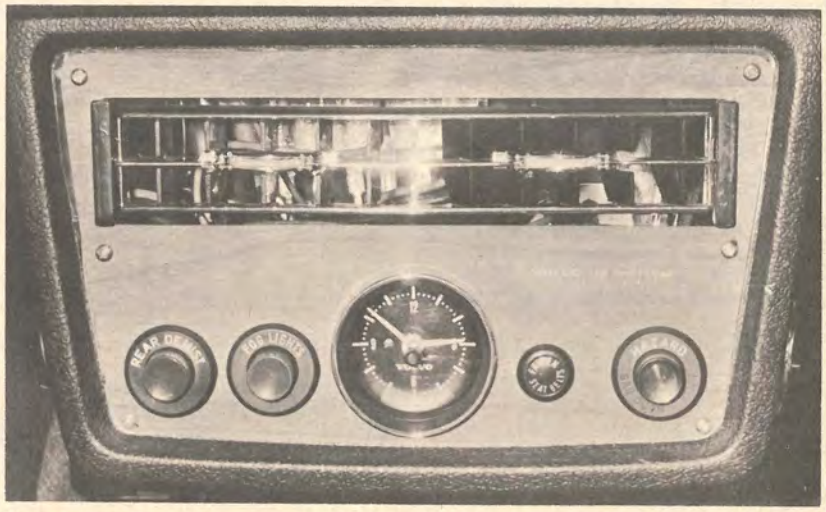
The first 164 appeared in 1968, and it was Volvo's first six-cylinder car since the PV60 died out in 1950. The 164 produced 145bhp on carburettors but the fuel injection engine in the 164E produces 175 bhp at 5800rpm. Since Volvo Australia started local manufacture-assembly, the carburettored 164 has been dropped.

The bright red Volvo had almost 6000 miles behind it when it arrived for AUTOSAFE testing. It came with automatic transmission controlled by a lever on the centre tunnel, push-button radio, and air-conditioning. The air (extra cost $595) emerged from a centre sub-panel that also carried a clock, push-buttons for hazard flashers, rear window demister and fog lights, as well as the seat belt warning light. Exceptional among most of our test cars to date was the excellent and comprehensive owner's manual. Maybe test-drivers don't really need them but it is a guide to attention to detail.

OBJECTIVE ASSESSMENT

PERFORMANCE: The engine is a conventional 3 litre six-cylinder overhead-valve pushrod with a seven-bearing crankshaft, and bears a close family relationship to the now almost-elderly four-cylinder engine in the 140 series. The 30bhp increase it has over the carburettored version is due also to an increase in compression ratio from 9.3 to 1 to 10.5, and a higher-lift camshaft profile. The torque increase — from 163lb/ft at 3000rpm to 177lb/ft at 2500rpm — is not as dramatic, but the torque curve has been flattened and lengthened. Volvo Australia also specified — against some resistance from the parent factory, incidentally — the same final drive ratio of 3.73 for the automatic car as the manual; normally the automatic gets a higher (numerically)

Fingertip release flips Volvo belt tongue out of centre mounting block. System is well ahead of most current standard equipment restraint systems.



New centre console carries standard equipment rear demister, fog and hazard light buttons, as well as clock and air conditioning outlets.

Head restraints are not integral, but are nonetheless properly positioned and adjustable. However, unless locked in place they might fly loose in crash.

ratio of 3.31, which naturally enough donates longer cruising "legs" at the penalty of urban acceleration. The result is some fairly considerable acceleration, about on a par with the XJ6 Jaguar, and a top speed of around 115mph. The fuel injection system is the normal Bosch version, based on a master control system that monitors induction air temperature, inlet manifold pressure, fuel temperature and variations in distributor pulses. All our testers found that the car was fussy to start, however. You had to turn the key without touching the throttle at all, and after idling fluffily for perhaps 45 seconds the engine smoothed out normally. Even when started from warm. Using the throttle produced an annoying stumbling for the first couple of blocks or so.

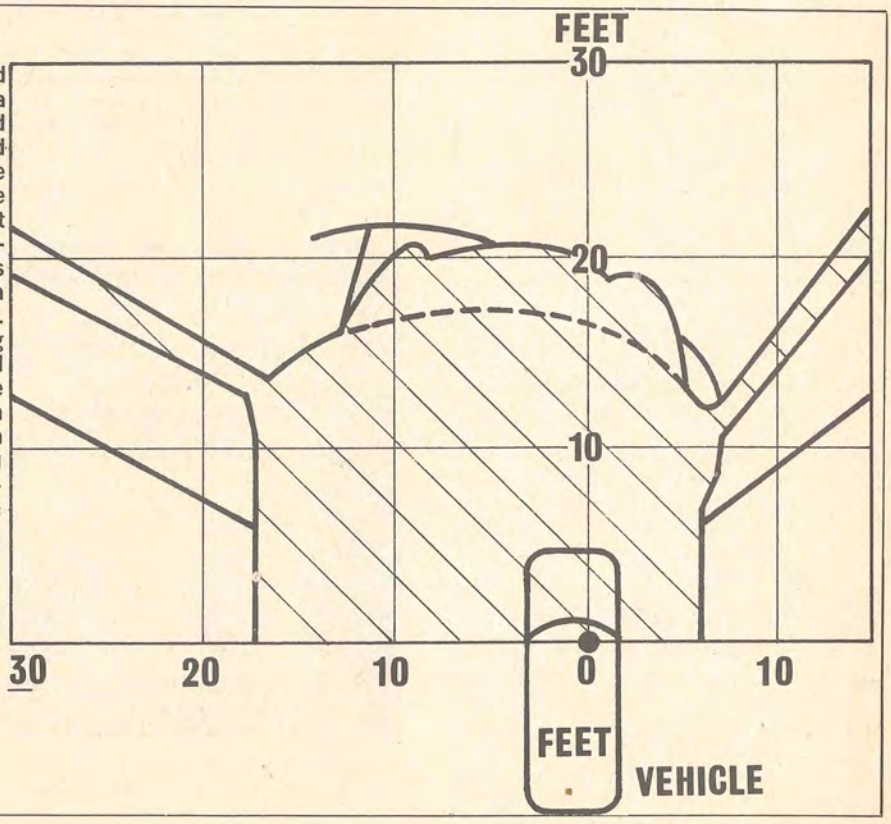
TRANSMISSION: Operated through a shaped knob with inbuilt button for reverse, the three-speed transmission is well-matched to the power and torque bands of the engine. All drivers found themselves content to leave the lever in Drive, rather than use it manually.

BODY: Conventional the styling may be (that, of course, is a subjective matter) but the car has excellent, large glass areas. Door handles became fully recessed on the 1972 models. The certification plate under the bonnet showed that the car did not comply with any of the new Australian Design Rules that come in on January 1, 1973, but one could reasonably assume that Volvo would have little or no trouble passing (for instance) the two new rules which govern steering column penetration into the interior and head impact on the dashboard. The six pillars of boxed section steel contribute to a structure which Volvo claims can together support 15 tons. Volvo's reputation for frame rigidity is well established. Extensive barrier crash testing has shown that at 30mph impacts there is hardly any deformation of the passenger cabin.

RESTRAINT SYSTEM: Volvo's belts are now too well known to need the usual high praise. The

Continued on page 34 »

This chart delineates the near forward visibility from the driver's seat for a driver of average height. The hatched or shaded part is the area at ground level which is not visible from the driver's seat because of the vehicle structure — usually the bonnet, front mudguards, dashboard and windscreen pillars. The oddly curved lines at centre top represent the small area obscured by the windscreen wipers. The vision screen is drawn by standing the vehicle in a cleared, flat space and manually drawing the chart on the ground, then reproducing it in graph form. It is a new way (in Australian tests at least) of depicting forward vision, and while it is essentially one-dimensional it is a good geometric way and as accurate as any other.



And for the Volvo toddler...

« Continued from page 26

1972 models saw the belts converted to inertia reel operation, which improved them yet again. A further refinement: the webbing passes from the top archer slip loop to the retractor on the floor via a tunnel formed by the pillar trim. The belts are almost one-handed in operation in that the buckle tongue plugs vertically into a fixed buckle mounted between the front seats. Release is by a red spring-loaded lever. Rear seat restraint systems are more conventional, but show equal evidence of careful thought. Head restraints are well-designed and made, although we at AUTOSAFE prefer the integral restraint type in principle. (People just don't position adjustable restraints correctly. Wrongly positioned they can be worse than useless — literally. Adjustable restraints have been known to be thrown out by crash impact too.) An accessory now available for Volvo is a unique rearward-facing child safety seat that fits into the space normally occupied by the front passenger seat cushion. We review this product starting page 28.

INTERIOR: We have comments in the subjective section on the car's dash layout. The facts: The interior is trimmed in leather, and the driver's seat has four different height positions, which provide an excellent headroom range for a variety of driver sizes. This is essential in view of the unfashionably high sills of the car and the over-large steering wheel. However, combine this with the infinitely adjustable seat recliner clutches and it is difficult to see anyone not achieving a properly comfortable driving position. Entry and exit are made particularly easy with the wide doors. A high central tunnel acts as a backbone through the car. The glovebox is in the form of a collapsible drop-down bin. This was stated by some drivers as awkward and funny — it has no top, for example. There is a soft grab-handle facing the passenger in the dash, and then to the right you find, in order, the radio, air-conditioning controls, pull-out ashtray, the now-traditional three big red-lit wheels for air and heat control (designed to be used with a thick driving glove in the Swedish winter), and then the soft rubberised knobs for the minor controls. The wheel has four spokes, with copy-styled horn shape recessed within them. The brake pedal is a large rectangular pad. The handbrake is to the right of the driver. The mirrors combine to good effect — see diagram — and the outside one was highly praised. But why in a quality car like this isn't it adjustable from inside?

BRAKING: As delivered, the handbrake was completely useless, and we asked Volvo's service technicians to adjust it properly before we ran the tests. On the test track the car locked both nearside wheels in emergency braking, but stopped straight and true. On the TARU rolling dynamometer, we got the following results: The handbrake, operating on rear drum brakes (separate from the four-disc footbrake system) gave an acceptable deceleration figure of 0.23g. For 1972 the 164 models got ventilated discs double the thickness (up from 0.5in to 1in), as well as improved brake pad materials. Like most cars the Volvo has a dual-circuit braking system, but unlike most if one circuit fails then the driver still has braking on three wheels to give about 80 percent effect. A dash light warns of circuit failure and does double duty as a handbrake warning lamp. There

are pressure relief valves in the system to prevent rear wheel locking; wheel lock under braking is a current Volvo research specialty, as they are producing original research on this as part of the NATO countries' communal effort to provide world-wide traffic safety development. On the brake dynamometer the limiter worked effectively at 45psi pedal pressure, when braking effort was 1660lb distributed 70:30 front and rear. With a total unladen weight of 3076lb the maximum deceleration available was 0.54g.

SUBJECTIVE ASSESSMENT

STYLING: While some testers used adjectives like "stolid" and "uninspiring", the general opinion was that the 164E is a handsome, rich-looking car, particularly with the help it gets from an obviously deep paint finish and the big glass areas, as well as the first-class brightware. Certainly it attracted a lot of looks on test, but that may have been the bright tomato paintwork. One of the normal penalties of the square three-box styling technique this car uses is in angular limits of lamp visibility, but very clever work has practically avoided this with the Volvo. However, protection of the lamp systems from minor accident damage is poor, and the front registration plate is badly placed in relation to a pedestrian's legs. Overall, however, the pedestrian injury potential of the styling is fairly good.

PAINT AND TRIM: There was almost unqualified praise for this, particularly for the paint and brightwork. It is immediately obvious that all Volvo's claims for deep-skin rustproofing and extreme care in painting and inspection are not exaggerated. One small complaint was that the leather trim on the seats made them a little slippery, but this can be countered by the beautifully subjective answer that a little slipperiness is more than compensated for by the marvellous smell of the leather. But of course, leather doesn't "breathe" very well in Australian summers, and the barely adequate air-conditioning only just held the temperature down enough to stop the seat facings becoming greasy.

BOOT AND BONNET: On the test car the boot interior light sometimes failed to work. All the drivers criticised the high boot sill, but loved the big, generally flat area available for luggage — one of the plus points about three-box styling. Spare wheel accessibility is good. Up front, high marks went to the accessibility of battery, dipstick, radiator, washer reservoir, and brake reservoir, but that for transmission dipstick, distributor and spark plugs was rated only fair.

INTERIOR: The ergonomics of the car are a bit of a mixture. The horizontal strip speedometer was blasted by all testers, but the change to round dials for 1973 is already known, so we can leave that subject alone. Combining the dipswitch with the turn indicator stalk has been done before (the Mazda Capella is an example) but it was too sensitive on the Volvo and sometimes did both things at once. Some praised the ignition steering lock, others said it was hard to find at night, while admitting that the actual operation was far better mechanically than any Australian-made car. One senior man commented rather irascibly that the 1938 Plymouth he once owned had a key-slot light and he would expect something similar in a car costing $7160 in automatic form. (Next test: A 1938 Plymouth?) The air-conditioning and radio controls were a longish reach for the driver, while few could work out the air-conditioning control labelling and the unit itself was not efficient enough for Australian conditions. Window winders at 5.5 turns are far too low geared, the steering wheel is far too large, and most said the brake pedal was too high for left-foot operation. They praised the range of seat adjustment and comfort very highly, rated the visibility fore and aft as excellent, and were almost escatic about the interior room, including leg room and head room. Seat belt operation also scored very well.

RIDE AND HANDLING: This was where the car stood out. The ride could not be faulted over almost any surface. The car is remarkably

quiet in both wind and reflected road/suspension noise, although some moan was noticeable from the Olympic radials fitted. It is not the sort of car that encourages enthusiastic driving, but if you drive it as though in a hurry it displays no vices, no tricks, and no bad habits. Like all Volvos there is a lot of reserve ability built into the handling.

STEERING: The over-large wheel was annoying, but the 1973 models have a smaller wheel. The steering is power-assisted ball and nut, with 3.75 turns lock to lock and an excellent turning circle of only 32ft. Even at high speed the steering is quite responsive and the car tracks dead straight in all conditions.

BRAKES: Two of the testers thought the effort required at the pedal was high, but dynamometer testing showed it was not. What they probably meant was that the pedal felt a little vague, or remote, with an initial deadness that could be a product of the complex but very effective triple-safe braking system. Otherwise the brakes are excellent.

PARKING: Far less problem in this than with most contemporary cars, thanks to the styling and the relatively small turning circle.

MISCELLANEOUS: As our vision screen shows, the windscreen wipers mysteriously park themselves a good few inches above the windscreen base. That's annoying, and unnecessary. The air-conditioner blower was far too noisy, but if you want ventilation you have to use it — there is no closed-window ventilation without the blower. We must, however, make particular mention of the superb headlights, which really coped with almost any road or speed. A laminated windscreen is standard. Like all Volvos the throttle pedal return spring was unnecessarily heavy. There was not enough provision for parcel stowage — and we do **NOT** include the rear window shelf as a parcels stowage area. But while these are basic functional items which one does not expect to miss in a car of this quality and price, they do not mar the enjoyment of the way the Volvo 164E does its job with a minimum of fuss and a maximum of expertise. It isn't perfect, but it's nearer to being perfect than most of the cars around today.

SPECIFICATIONS

Engine: Water-cooled six-cylinders in line, 2980cc, pushrod overhead valves. Bore 88.9mm, stroke 80.0mm. Compression ratio 10.5 to 1. Maximum power 175 @ 5800rpm, maximum torque 177lb/ft @ 2500rpm.

Transmission: Three-speed automatic, floor shift. Final drive ratio 3.73 to 1.

Running gear: Independent front, with coil springs, control arms, ball joints and stabiliser bar. Rear, rigid rear axle in coil springs, support arms and torque rods. Steering, power-assisted ball and nut.

Dimensions: Wheelbase 106.3in, track 53.2 front and rear, length 185.6in, width 68.3in, height 56.7in, kerb weight 3076lb unladen, fuel tank 12.75gal, turning circle 32ft.

PERFORMANCE

Maximum speeds in gears: 1st 43.6mph, 2nd 70mph.

Acceleration: 30-50mph — 4.84sec; 40-60mph — 5.0sec (2nd gear). In Drive, 30-50 — 5.25sec; 40-60 5.4sec; 50-70 — 5.95sec.

External noise emission: Tests were carried out in accordance with ADR28, which applies after January 1, 1974. The average level was 76.73 dB(A), which is regarded as acceptable.

Engine emission: Tests were carried out at the NSW Department of Health Laboratories and were set up to comply with Australian Design Rule 26. This rule limits engine emission of carbon monoxide at idle to 4.5 percent. The Volvo 164E returned the following readings: Idling in neutral — 3.5; idling in Drive — 4.7; idling in Drive with air-conditioning running — 5.3. The car complies when idling in neutral, but otherwise exceeds the limit. Adjustment was not carried out because of fuel injection system.

Certification: The certification plate fixed to the Volvo 164E, in accordance with regulations, lists compliance with ADRs 1, 2, 3, 4, 5A, 7, 8, 9, 10A, 11, 14, 15, 20, 22, 25 and 26 — the same as the two-door Falcon hardtop tested last issue.