4 Four-Cylinder Alpinas – The Neue Klasse, 2000CS and 02 Models

The car which put BMW firmly back on course after its confused and ultimately nearly disastrous period in the 1950s was the 1500 saloon. It was this car that also became the first BMW to receive Burkard Bovensiepen's attention. Announced at the Frankfurt Motor Show in September 1961 but not generally available until October the following year, the 1500 created a minor sensation. Bovensiepen bought one for himself and, like many other owners of the new BMW, quickly recognized that it could handle much more power than the 80PS of its standard specification.

So Bovensiepen decided to tune the car himself. He replaced the single Solex downdraught carburettor on its 1499cc 4-cylinder engine with a pair of Weber 40 DCOE twin-choke side-draught carburettors on a short, fabricated inlet manifold. With no further additions apart from a large oil-bath air filter, the modified engine delivered 90PS.

Bovensiepen was convinced that there was money to be made in the marketing of this bolt-on conversion and early in 1963 he went to see BMW's Sales Director, Paul Hahnemann, to make sure that BMW would have no objection to its manufacture and sale. Hahnemann could see nothing but advantages in the arrangement, so he gave Bovensiepen's venture his blessing.

With the knowledge that BMW was not going to stand in his way, Bovensiepen's next move was to drum up some publicity. So he approached Gerd Hack, a journalist with the leading German motoring magazine, *auto, motor und sport*, and pestered him until he agreed to test the modified BMW 1500 and to write it up for the magazine. Hack was initially very sceptical of Bovensiepen's work, arguing that it would put additional strains on the engine and so shorten its working life. However, he changed his mind after examining the car and driving it, writing an enthusiastic review for the magazine. When Bovensiepen introduced what he called the 90PS Alpina conversion on his own stand at the Frankfurt Motor Show in September 1963, he was able to display a copy of Hack's review in the windscreen of each of the display cars.

The timing was perfect, for it was at this show that BMW introduced the new 90PS 1800 model and announced (for February 1964 availability) a new top-model 1800Ti with a 110PS twin-carburettor version of the enlarged engine. These models were intended to satisfy customer demand for a more powerful edition of its Neue Klasse saloon. At the same time, of course, they left some existing owners of the 1500 model feeling a little cheated. However, for those who felt strongly enough about it, the Alpina twin-Weber conversion was an ideal way of redressing the balance.

Mixing and Matching

BMW's model development policy during the 1960s focused on making the most of relatively few basic components. So it was that the floorpan of the Neue Klasse saloons was reused for the very different 2000 coupés from 1964 and then from 1966 in shortened form for the two-door derivatives of the saloons, which later became known as the '02' cars.

A similar strategy was employed for the engines. The M10 4-cylinder, which had started life in 1961 as a 1499cc '1500', had been designed to be stretchable and in 1963 it was followed by a 1773cc '1800'. A 1573cc '1600' followed in spring 1964 and in the autumn of that year came a 1990cc '2000'. (The 1800 later changed bore and stroke dimensions to deliver the same power and torque from 1766cc.) By changing fuelling arrangements – from single carburettors to twin carburettors and then to fuel injection – the company was able to satisfy a wide range of requirements from a single basic design.

All this common engineering made it very easy for Alpina to develop upgrades for the whole range of M10-engined BMWs and over the next decade the company did exactly that. Its initial aim had been to create high-performance road cars, but customer demand for cars suitable for competition led to the creation of race and rally modifications as well.

Alpina's approach to the BMW engines remained constant and the typical Alpina-developed M10 engine of any capacity would have a new camshaft (with a 300-degree overlap for fast road use or a 324-degree overlap for competition), lighter pistons (made by Mahle for the road cars but by Kolbenschmidt for competition engines) to allow a higher safe rev limit and a reworked cylinder head with pure hemispherical combustion chambers instead of the BMW swirl-chamber design. On

The Neue Klasse saloons started it all for Alpina. This is an A4-engined 2000, probably dating from the early 1970s.

Mix-and-Match Tuning Parts from Alpina

As noted elsewhere, only cars built by Alpina at Buchloe would automatically have corresponded to the 'standard' or recommended Alpina specification. Customers could order items to be fitted by their own specialists or on a DIY basis, with the result that many of the cars proudly touted as 'Alpinas' in the late 1960s and early 1970s were very different from what the company saw as ideal.

As the Neue Klasse saloons, CS coupés and 02 cars had a great deal of their mechanical specification in common, by and large the items developed for one car could also be used on the others. Exceptions of course were the lightweight flared wings for the 02 models, made of GRP and designed to cover wide wheels.

Transmission

Alpina offered stronger rubber gearbox mountings and could also provide an uprated clutch. However, the standard four-speed gearbox was not ideal for a car modified with one of Alpina's engines and Buchloe favoured the close-ratio five-speed gearbox used in the BMW 'competitions special', the 1800TI/SA, of which just 200 had been built in 1964–5.

Five-speed gearboxes of any kind were rare in the 1960s and were invariably associated with high-performance and racing machinery. This one was manufactured by Getrag and had ratios of 3.330:1, 2.150:1, 1.565:1, 1.225:1 and 1.000:1. It was longer than the standard four-speed type and so Alpina provided a shortened propshaft to suit.

Alpina recommended matching the five-speed gearbox to a lowered final drive, in order to allow its higher-revving engines to pull maximum revs in fifth gear. Typically, an Alpina-modified BMW with the M10 engine would also have a limited-slip differential, with either a 40 per cent or a 75 per cent locking ratio. This might be provided with its own oil cooler if the car was expected to be driven very hard. Also available were reinforced rear drive flanges.

Suspension, Steering and Braking

Alpina always recommended that its high-performance engines were matched by improvements to the car's suspension, steering and braking systems in order to create a car that was properly balanced dynamically.

On offer were shorter and stiffer road springs, Bilstein gas-filled dampers at the rear and matching strut inserts at the front, boxed-in rear trailing arms (as used by BMW on the 2002ti) and adjustable front and rear anti-roll bars. Heavy-duty Boge front strut inserts were also available.

Harder suspension bushes made for much tauter handling, but at the expense of ride comfort. Alpina offered these for the rear subframe mountings, the track control arms and tie rod, the trailing arms and for the standard anti-roll bars. Front struts with 1 degree of negative camber could be had. Reinforced front hubs were also listed, to cope with the extra stresses imposed by the lowered suspension and hard driving.

Wider tyres were an important element of the Alpina handling improvements, always accompanied by wider wheels. There were 14in types for the Neue Klasse saloons and CS coupés and 13in wheels for the 02 cars, in each case matching the diameter of the factory originals. Cheapest were 5.5J steel types, easily distinguished from the standard issue by the holes drilled around their circumference. There were 5.5J and 6.5J alloy types, with Alpina's distinctive multiple radial-spoke design, plus – supposedly – Borrani wire-spoke wheels for the 2000CS. In addition, Alpina would supply Minilite magnesium alloy wheels for the 02 models in a 6J × 13 size. When larger-than-standard tyres were fitted to any of these optional wheels, the front wheel arch flanges had to be flared slightly. This modification was carried out with typical neatness by Alpina at Buchloe, but cars modified elsewhere may not have been treated so carefully.

A favourite Alpina modification was to fit a high-ratio (12.8:1) steering box to provide quicker steering. Typically, the front brake discs would also be replaced by 225mm × 20mm ventilated types, when the calipers would also be packed out to accept the thicker discs. A larger brake master cylinder was available, as were larger rear brake drums with the appropriate cylinders and shoes. Special brake pads by Ferodo or Textar could be had; for heavy-duty use Alpina also offered modified dust covers to aid the cooling of the front discs.

Bodywork and Interior

Most practical of the body addenda available from Alpina was a front spoiler, which improved the

continued overleaf

Mix-and-Match Tuning Parts from Alpina *continued*

aerodynamics at high speeds. The earliest examples seem to have been made of aluminium and later ones of GRP, although both types were available together in the early 1970s. Alpina offered quarter-bumpers for the front of the 02 models, intended partly to save weight. Sports door mirrors and additional spotlamps were also listed as Alpina accessories.

Between about 1969 and 1974, a set of side decals which displayed the name 'BMW Alpina' on the upper front wings could be had, in silver or black to suit the background colour. From approximately 1974, the so-called Deko Set of decal side stripes became available in a variety of colours. However, these were late arrivals as far as the Neue Klasse, CS and 02 cars were concerned, and so very few examples would have had them when new.

Interior modifications included supportive bucket-type front seats made by Scheel (although Recaros were used later), a 15in leather-rimmed sports steering wheel with three drilled spokes and the Alpina logo in the centre, and a rosewood gearshift knob with the Alpina logo. Alpina supplied its own speedometer, calibrated up to 220km/h (136mph), and its own 8,000rpm rev counter. Additional minor instruments were available and probably included oil pressure and oil temperature gauges and a temperature gauge for the final drive. For rally use, the company would also supply a trip meter.

carburettor engines, Alpina always favoured twin Webers. On the later injected types, it modified the factory-fitted Kugelfischer mechanical fuel injection.

From very early on, Alpina recommended that its engine upgrades should be accompanied by braking, suspension and tyre changes, and in some cases by transmission and driveline modifications as well. Over time, racing-type bucket seats became available, as did additional instrumentation. However, it was impossible for Alpina to insist on modifications that the customer had not ordered, and so it is probable that the 1960s and early 1970s saw many BMW–Alpina cars being created simply by bolting an Alpina engine into an otherwise unmodified BMW. This did not make for the best-balanced combination of characteristics.

Some cars – a relatively small number – were nevertheless modified by Alpina in the workshops at Buchloe, with the company having more control over how these were put together. The sidebars in this chapter list what was available and show what Alpina was able to achieve when it was given free rein to build a complete car.

Alpina 1500s

The 1499cc engine was only ever used in the original Neue Klasse 1500 saloon between 1961 and 1964. The standard factory car would accelerate to 100km/h (62mph) from rest in 16sec and would go on to a top speed of 148km/h (92mph). These were respectable figures, but Alpina's 90PS twin-Weber conversion delivered 0–100km/h in 13.1sec and a top speed of more than 160 km/h (99.5mph) – figures which compared very favourably with the 162km/h (100.7mph) and 13sec for the more expensive 1800 model.

However, nobody would have bought a new 1500 and fitted an Alpina conversion in preference to buying a new 1800. Inclusive of fitting, the Alpina conversion cost DM980, which was nearly twice the DM500 price differential between a BMW 1500 and a BMW 1800. (Later, as demand built up, Alpina appears to have dropped the price to DM950.) But while it was not especially cheap, it was not beyond the reach of the serious motoring enthusiast.

Thanks to the influence of Paul Hahnemann, the Alpina conversion was also

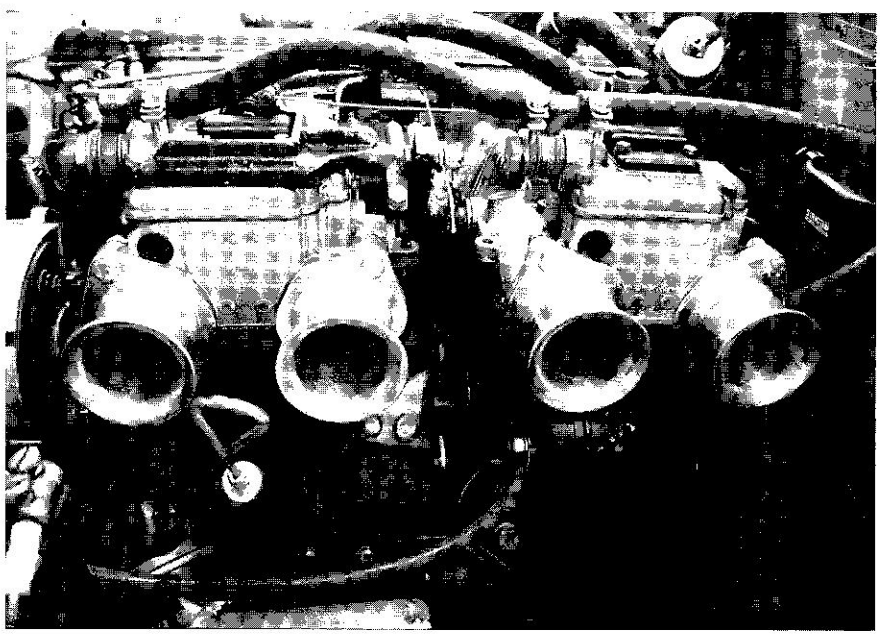
tested by BMW and approved for distribution through the BMW dealer network. During 1964 – by which time the original BMW 1500 was scheduled to go out of production – Hahnemann publicly praised the quality of the Alpina conversion and also promised that it would not invalidate the standard BMW warranty. This support did nothing but good to Alpina's sales.

Alpina 1800s

The original '1800' version of the BMW M10 engine was introduced in 1963 for the Neue Klasse saloons and was a 1773cc, stroked and bored derivative of the 1499cc original. From 1968, however, the bore and stroke were changed to make the components compatible with the 2-litre engine and the '1800' engine actually had a 1766cc swept volume. Power and torque were unchanged. The later 1800 engine was also used in the two-door 1802 and 1800 Touring models from 1971.

It was a very simple matter for Alpina to fit its twin-Weber conversion to the 1800 engine, meaning that for the same DM950 as the company charged for its 1500 upgrade, the owner of a BMW 1800 could get 113PS with the standard camshaft and compression ratio. The 0–100km/h acceleration time was reduced to 10.2sec (the standard car needed 13sec) and the maximum speed went up from the standard car's 162km/h (101mph) to 177km/h (110mph). Unfortunately, it is not clear how many BMW 1800s, 1802s and 1800 Tourings were converted in this way before production of the conversion stopped in August 1973.

Adding an Alpina conversion to the faster 1800Ti cost nearly twice as much: DM1790. The Ti had been introduced in 1964 with a 110PS twin-Solex version of the 1773cc M10 engine and would reach 175km/h (109mph) and accelerate from standstill to 100km/h in 11sec. Still retaining the standard camshaft, the Alpina conversion nevertheless had a raised compression ratio – though whether from



Twin Webers in close-up – the early Alpina trademark is seen here in a 1600Ti.

different pistons, from cylinder head work, or from both is unclear – and the twin Weber 40 DCOEs. The results were 125PS at 6,200rpm and torque of 151Nm; the 0–100km/h time went down to 10sec and the maximum speed went up to 183km/h (114mph).

Alpina 1600s

The BMW 1600 was introduced in spring 1964 as a replacement for the original 1500 model. Its larger-bore engine developed 83PS at 5,500rpm and powered the car to 155km/h (96mph) with a 0–100km/h time of 14sec. The same engine was used in the 1600-2 model from March 1966, but with a different carburettor and an output of 85PS. This car was known as a 1602 from April 1971. The 1600 engine also powered the 1600 Cabriolet from 1967 and the 1600 Touring from 1971. From 1967, there was a 105PS twin-carburettor version of the engine in the two-door 1600Ti.

Alpina's earliest conversion of the 1600 engine used the same bolt-on twin-Weber set-up as its 1500 and 1800 upgrades. For the usual DM950, this put power up to 105PS – but the introduction of the 1600Ti with the same power output must have knocked the bottom out of the market for this conversion. A so-called '1600-2 Spezial' conversion introduced in 1967 replaced the standard 264-degree camshaft with a 300-degree fast road type, relying once again on the twin 40 DCOEs; this time, however, new forged pistons raised the compression ratio to 10.0:1 and the power went up to 114PS at 6,200rpm while torque peaked at 3500rpm with 135Nm. This conversion seems to have cost around DM2,000, which was nearly 25 per cent of the cost of the 1600-2 it went into. The 0–100km/h time was claimed as 9.6sec, while the maximum speed was 183km/h (114mph). These figures were well ahead of the standard 1600Ti's 11sec and 175km/h (109mph).

Alpina developed an upgrade for the 1600Ti itself, too. Buchloe's favoured twin Webers replaced the standard twin-Solex set-up and a 300-degree camshaft was added. The compression ratio went up to a high 11.0:1, thanks to the use of special forged pistons. Power output soared to 140PS at 7,200rpm, while torque went up to 155Nm at 5,000rpm, so this was an engine designed for high revs.

Customers could order a fully converted car from Buchloe, who quoted a delivery time of eight weeks and a price of DM13,990 at a time when the 1600Ti cost DM9,950. This car was a real flyer, promising 0–100km/h in under 8sec and over 200km/h (124mph) according to one source. It came with a five-speed gearbox (a five-speed box with different ratios from the 1800TI/SA type was an option on the standard 1600Ti), anti-roll bars and high-speed radial tyres. The interior was kitted out with sports seats, a sports steering wheel and a rev counter.

This same engine was made available as an upgrade for the BMW 1600GT, a small coupé which BMW had inherited from Glass when it had bought out that company and had re-engined with its own 1600 M10 power unit. The conversion – which must have consisted of the engine alone – was advertised for a very reasonable DM1,200, but it is not clear whether any cars were ever given the Alpina treatment. One way or another, there cannot have been very many of them.

Some years later, when the 1573cc engine was reintroduced in detuned form for the 1975–7 1502 models that bridged the transition between the old 02 models and the new and more expensive E21 3 Series cars, Alpina introduced yet another derivative of the 1600 engine. Called the A0 conversion, it followed the practice that Alpina had begun in the late 1960s of giving its 'standard' engines an alphanumeric type code. Engines called the A1, A2 and so on already existed and so this

The stance of this 1967 Alpina 1600Ti reveals the car's sporting potential.

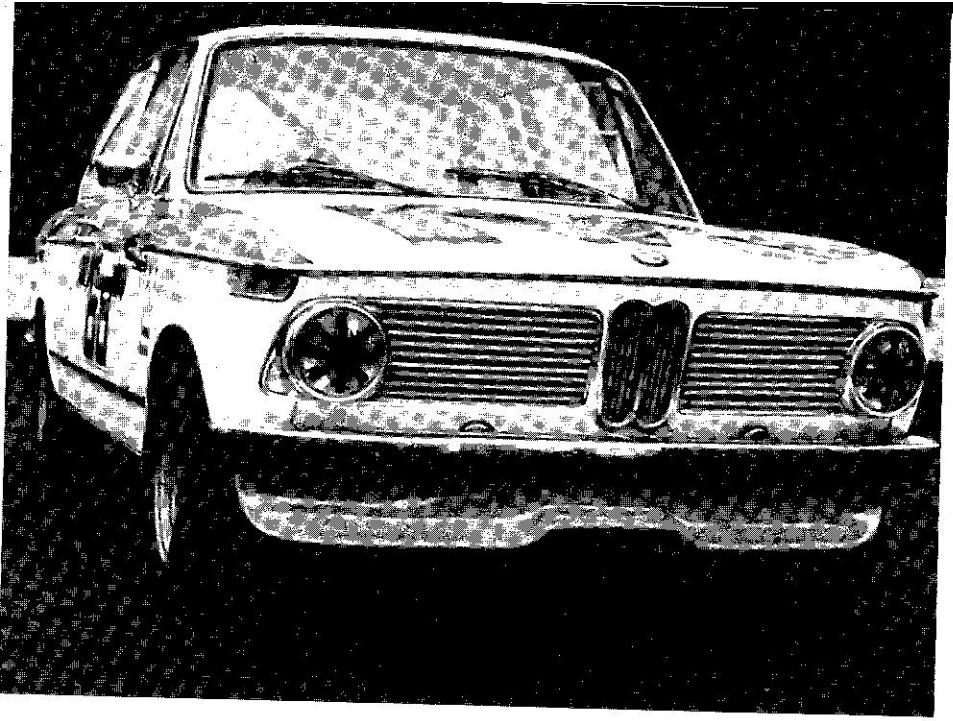
odd number with the zero was probably intended to show that this engine was less powerful than the A1 2-litre engine.

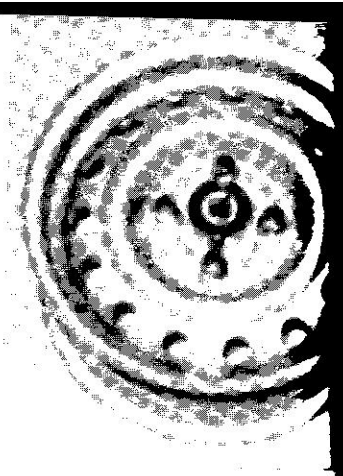
The A0 added twin Solex 40 DDH carburettors to the 1502 engine, but retained the standard camshaft and pistons. Typically for Alpina, it revved higher than the standard engine, delivering 95PS at 6,200rpm instead of 75PS at 5,800rpm and 128Nm at 4,000rpm instead of 118Nm at 3,700rpm. The cost of the conversion probably kept numbers to a minimum, but a complete car could be had from Alpina for DM15,000; the standard car cost around DM11,750.

There are indications that this conversion was also supplied as a retrospective upgrade for older 1600-2, 1602 or 1600 four-door models. In these cars, the Alpina A0 brought power up from the standard 85PS to 97PS.

However, tuning the 1600 engine itself was only one option for owners of the two-door 1600-engined cars. Altogether more attractive – and, of course, more expensive – was an upgrade to the Alpina-tuned 2-litre engine. This was available by early 1967 (*see* below, under 'Alpina Carburettor 2000s') and gave exhilarating performance.

According to legend, it was over the summer of 1967 that BMW's Sales Director Paul Hahnemann and Planning Director Helmut Bönsch had their own 1600-2 cars fitted with 2-litre engines. When the two men compared notes, their enthusiasm led to the creation for 1968 of the now-legendary BMW 2002. Whether the conversions carried out on the two Directors' cars were by Alpina is something that has not been confirmed – but they could well have been. Alpina would thus have been indirectly responsible for the creation of one of the best-loved BMWs of all time.





ABOVE: Perforated rim and central badge mark this steel wheel out as one of those offered by Alpina for the 4-cylinder cars.

LEFT: This 2002 was one of those turned out from the Alpina works in full competition trim.

Alpina Carburettor 2000s

BMW introduced the final enlargement of its M10 engines for its new coupé models in June 1965 as a 1990cc '2000' type. There were two varieties, a 100PS single-carburettor engine which went into the 2000C and a 120PS twin-carburettor for the 2000CS. These same engines went into the Neue Klasse saloons to create the single-carburettor 2000 and twin-carburettor 2000Ti in January 1966. From January 1968 there was also the single-carburettor 2002; the twin-carburettor 2002Ti arrived in September 1968. (Injected versions of the 2-litre engine arrived later and are discussed separately below.)

For the 2-litre engines, Alpina switched from Weber 40 DCOE to Weber 45 DCOE carburettors, still on its own inlet manifold. With the standard camshaft and 8.5:1 compression ratio, an Alpina-tuned Neue Klasse 2000 had 115PS at 5,700rpm and 167Nm at 4,000rpm – slightly higher crankshaft speeds in each case than were required for peak figures from the standard engine. This conversion cost DM1,100. More expensive was a 145PS engine, probably developed initially for the desperately underpowered 2000CS coupés, but also made available as a DM2,500 conversion for the Neue Klasse 2000 saloons, when it was known as a 2000 Spezial conversion. It developed its peak power at 6,500rpm and had maximum torque of 142Nm. This engine had the twin 45 DCOEs plus a 300-degree fast road camshaft and a compression ratio raised to 10.0:1 from the standard 8.5:1. In the saloons, it gave a claimed maximum speed of over 200km/h (124mph) with acceleration of under 10sec from 0–100km/h.

Performance was similarly impressive in the heavier 2000CS, at least when the car had been subjected to a full Alpina conversion. A standard 2000CS took 14sec to reach 100km/h from rest and had a top speed of only 185km/h (115mph); the Alpina-converted car delivered a 10sec 0–100km/h time and a maximum speed of 201km/h (125mph), both of them more in keeping with the CS coupé's pretensions. Whether the CS conversion could be had as a kit is not clear, but the cost of a fully converted car from Buchloe was DM23,900 (a standard 2000CS cost DM17,000 in 1965).

The additional DM6,900 bought not only the 145PS engine, but also a number of other

items. Customers got a five-speed gearbox, anti-roll bars front and rear and Koni dampers. The Alpina CS supposedly also had wire wheels with lightweight aluminium rims, made to an Alpina design by Borrani in Italy, and it is likely that racing-style bucket seats, a three-spoke steering wheel and a rev counter were all part of the interior specification. There are no records to show how many of these cars were built, but they probably remained very rare.

The big business for Alpina, however, was always in the 2-litre-engined two-door cars, which combined the biggest engine with the lightest and most agile of BMW's cars. As mentioned earlier, an Alpina 2-litre conversion for the 1600-2 was available as early as February or March 1967 – a date which can be calculated by working backwards from the dates given in a road test published in the December 1967 issue of the American magazine *Car and Driver*.

The first Alpina-converted 2002s probably appeared very soon after the car was announced in January 1968; after all, the high-performance 2-litre engine had been going into 1600-engined two-door cars for the best part of a year already. Although there may have been budget-priced upgrades that involved little more than the replacement of the car's single Solex carburettor with twin Webers, Alpina also put more comprehensive tuning kits onto the market. These had modified cylinder heads, sometimes with enlarged valves and usually with a raised compression ratio. Most kits incorporated either the 300-degree fast road camshaft or the 324-degree racing camshaft, which gave more top-end power but made the engine less flexible. Many engines were assembled and blueprinted by Alpina in Buchloe.

From approximately mid-1969, Alpina started using an alphanumeric code to distinguish its different engine conversions. Three

The *Car and Driver* Test of an Alpina 2-litre 1600-2

The car tested had reached the USA as a personal import by a US serviceman returning from a posting in West Germany. Its engine had twin Weber 45 DCOE carburettors, a high-performance camshaft and a 10.5:1 compression ratio. A tubular exhaust manifold had also been added and the power output was quoted as 160bhp. The rocker cover proudly carried the Alpina name alongside that of BMW and to allow for increased fuel consumption an enlarged 90ltr (20gal) tank had been installed. A five-speed 1800TI/SA gearbox drove to a 3.89:1 final drive with limited-slip differential in place of the standard 1600-2's 4.11:1 open differential.

The standard springs had been replaced by heavy duty types all round and there were adjustable Koni dampers on the rear. Stiffer but non-adjustable dampers were also used in the front struts. Stronger semi-trailing arms were added to the rear suspension, together with stronger front stub axles. There were anti-roll bars front and rear and steering response had been quickened by changing the ratio to 12.8:1 from the standard 17.6:1. The standard 4J × 13 steel wheels were replaced by 5.5J × 13 equivalents, with Michelin's latest asymmetrical tread XAS radial tyres, in a 165HR 13 size. The rear drum brakes were unchanged, but the front discs had been replaced by ventilated types with a diameter of 260mm (10.25in).

Inside the car, Alpina had installed Recaro front bucket seats and a leather-covered steering wheel with three drilled spokes. There was also an Alpina rev counter in place of the standard time clock, a necessary addition because the engine was limited strictly to 7,200rpm. The price of this car was quoted as $5,048.45 in West Germany, inflated further by $295 shipping to New York and $236 duty, making a grand total of $5,579.45. This figure was not far short of what Americans were then paying for a Porsche 911.

Car and Driver discovered that this car could reach 60mph from rest in 8.3sec and was geared to give a top speed of 120mph (193km/h).

different high-performance derivatives of the 2-litre M10 engine were available and these were called the A1, A2 and A3 types. All of them gave better performance than the standard 2002 or the twin-carburettor 2002Ti and so were made available as conversions for either model.

The A1 Engine This retained the standard 8.5:1 compression ratio and camshaft, but added a pair of Solex 40 DDH carburettors in place of the single 38 PDSI of the standard engine to give 115PS at 5,800rpm and 167Nm at 4,000rpm. A fully converted A1 2002 from Buchloe cost from DM15,350 and promised 0–100km/h in 8.9sec with a top speed of 190km/h (118mph) – a big improvement on the standard car's 11sec and 173 km/h (107mph).

The A2 Engine This was introduced in September 1969; Alpina records show that 585 examples were built before production ended in June 1975. The A2 had twin 45 DCOEs and the 300-degree camshaft, plus 39mm inlet valves in place of the standard 38mm size, hemispherical combustion chambers and forged pistons on lightened and polished con rods that brought the compression ratio up to 10.5:1. With 160PS at 6,600rpm and 200Nm at 5,000rpm, it made a 2002 capable of 200km/h (124mph) and 0–100km/h in 8sec. In fact, the German magazine *auto, motor und sport* bettered Alpina's claims, with a maximum speed of 208km/h (129mph). A complete 2002 with the A2 engine could be ordered from Alpina in 1969 at a cost of DM17,500, when the standard car cost DM9,480. No doubt a five-speed gearbox, suspension modifications and of course a less restrictive Alpina exhaust were included in that price.

The A3 Engine The third conversion was the A3, which was available for export only. It is not clear exactly how it differed from the A2, as it had the same twin 45 DCOEs, 39mm exhaust valves, 300-degree camshaft, dome-topped Mahle pistons on modified con rods and 10.5:1 compression ratio. An Alpina exhaust system was fitted and the engine boasted 165PS at 6,600rpm and 205Nm at 5,000rpm. As a conversion, the A3 cost DM3,950. No set of wholly reliable figures has come to light, but it looks as if an A3-engined 2002 promised 0–100km/h in 6.9sec and 205km/h (127mph).

However, these were only the 'standard' Alpina offerings of the period. The company's practice of selling individual engine tuning components separately meant that customers could mix and match as much as they liked. Even overseas concessionaires seem to have developed their own 'Alpina' engines; a typical case was the 2002 demonstrator prepared by Crayford Engineering in Britain during 1970.

This car had an Alpina cylinder head which raised the compression ratio to 10.2:1 and sported twin Weber 40 DCOE carburettors. The 300-degree sports camshaft was fitted (the 324-degree racing item cost extra). The modified head featured reworked and balanced combustion chambers, enlarged and gas-flowed inlet and exhaust ports and modified valve guides with special valve springs that allowed a rev limit of 6,400rpm. Although this car, registered as XMY 7 G, was tested by both *Motor* (30 January 1971) and *Autocar* (15 April 1971), neither magazine quoted power and torque figures. At this stage, a 180PS full-race engine with forged pistons was also available for a cost of £850 exchange.

Another car which seems to have differed from the Alpina 'standard' specifications was a 2000Ti that Belgian motoring journalist Paul Frère bought in late 1969 or early 1970. It was similar to a race-spec 2002Ti of the time but with detail differences. *Motor* magazine of 22 August 1970 revealed that its engine had an 11.5:1 compression ratio and 163bhp (161PS). The car had a five-speed gearbox, a limited-

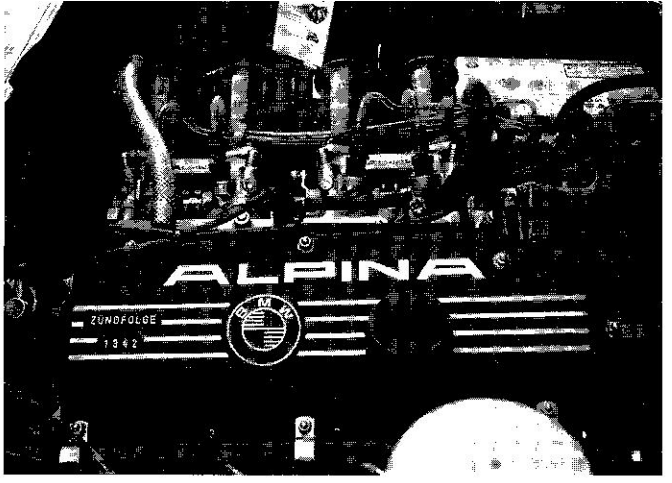
slip differential with 75 per cent locking ratio and lowered suspension. Top speed was quoted as 126.4mph (203km/h) and the car would accelerate from rest to 60mph in 6.8sec.

Some Alpina sales literature quotes the availability of a 185PS full-race engine for the 2002, with twin 45 DCOEs, a 324-degree camshaft and an 11.0:1 compression ratio. This engine revved even higher than the others, developing peak power at 7,000rpm and maximum torque of 211Nm at 5,000rpm. It was claimed to give 0–100km/h in 6.9sec and a top speed of 213 km/h (132mph) in a 2002. The cost for a complete car from Buchloe was DM22,000.

Of course, Alpina development of the 2-litre engine was continuous and by May 1973 the company's sales literature listed five different states of tune for the 2002. The entry-level tune now brought 140PS from a combination of two carburettors, a modified cylinder head, a sports camshaft and a special exhaust system This cost DM2,200 in West Germany. Next up, for DM3,950, was 150PS or 165PS, the difference perhaps being explained by a choice between 300-degree and 324-degree camshafts. For DM6,200, buyers could have 175PS and for DM9,000 came the ultimate 190PS.

Alpina Injected 2000s

Alpina's first version of the new injected 2-litre M10 engine reached the market some time during 1970, some months before BMW introduced the engine to the 02 body to make a 2002Tii in April 1971. Using the new alphanumeric-type coding system, it was known as an A4 engine. A competition engine called the A4S followed and later came a third version called the A5. Most of these engines must have gone into 2002 models of one type or another, as the Neue Klasse 2000s and 2000CS coupés were no longer attracting enthusiast interest by this stage.



The rocker cover of this A4S engine in a 2002 Touring proudly displays the Alpina name alongside the BMW logo.

The A4 Engine For this, Alpina enlarged the exhaust valves to 39mm diameter and modified the cylinder head to give a 10.0:1 compression ratio with the standard pistons. A 300-degree high-lift camshaft was fitted, while the exhaust manifold was modified and matched with an Alpina exhaust system. The Kugelfischer fuel-injection system was also modified. With 155PS at 6,600rpm and 195Nm at 5,500rpm, the Alpina A4 engine gave the 2002 a maximum speed of 214km/h (133mph) and 0–100km/h acceleration of 7.4sec. Later examples may have had 160PS. Figures from Alpina show that 186 A4 conversions were sold for 02 models before production ended in May 1976.

The A4S Engine This was the high-revving racing version of the A4 engine, with lightweight pistons and modified con rods, a 320-degree camshaft (not the usual 324-degree type) and an 11.0:1 compression ratio. The pistons were by Mahle rather than Kolbenschmidt, whose pistons had gone into earlier Alpina competition engines. Maximum power of 190PS was developed at a very high 7,400rpm and maximum torque of 205Nm was achieved at 5,500rpm. No sales figures are available for this engine, but the price for a fully converted car from Buchloe was an astronomically high DM40,000.

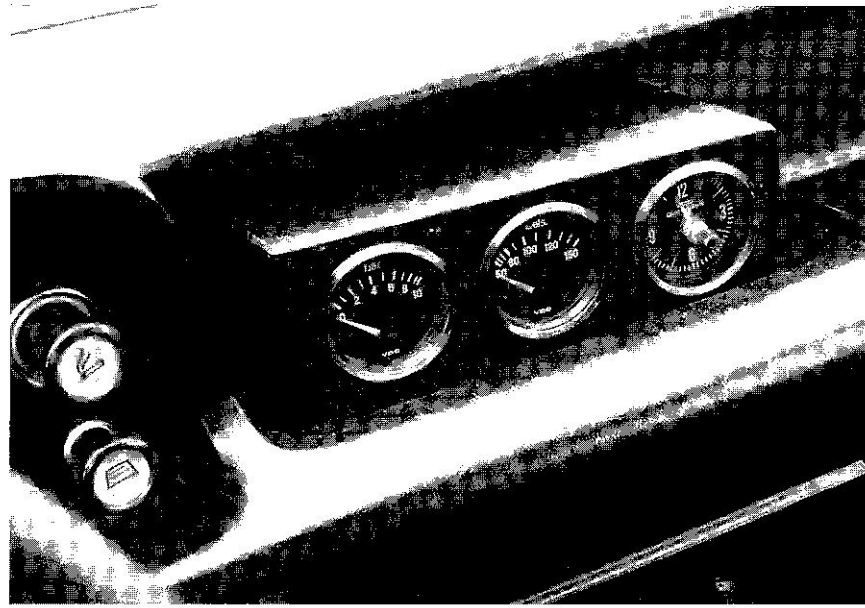
The A5 Engine With 170PS, this seems to have been a further development of the A4 and to have promised a 195km/h (121mph) maximum speed. It must have been an A5 engine in the complete car from Buchloe that was advertised in UK sales material during 1972–3. This had a 170bhp fuel-injected engine with a five-speed gearbox and limited-slip differential. It had the full Alpina chassis conversion, with Bilstein dampers, ventilated front brake discs, adjustable front and rear anti-roll bars and Alpina 5.5J perforated steel disc wheels. The car came with sports front seats (most likely by Scheel, although possibly by Recaro), an Alpina steering wheel and rosewood gearshift knob and a GRP front spoiler.

It may also have been an A5 engine in the Alpina 2002Tii tested by the Swiss magazine *Automobil-Revue*. Power output was quoted as 173PS and the car achieved a top speed of 205km/h (127mph) with a 0–100km/h time of 7.5sec.

Alpina Competition Versions of the M10 Engines

Some of Alpina's customers used their cars for competition and so the company obliged by supplying specially built engines. This side of

Once again, the stance says it all: this is a Swiss-registered 2002 Touring with the A4S competition engine.



Auxiliary instruments in a neat pod allowed drivers to keep an eye on the health of their Alpina-tuned M10 engines.

the Alpina business was probably at its busiest between 1969 and 1977, when the company was fielding its own racing cars.

Generally speaking, the race and rally engines would not have been suitable for road use. The specification of each engine depended on its intended use and every engine had to meet the competition regulations of the time. Probably all the Alpina race and rally engines had larger exhaust valves and no doubt all of them also used the special competition head gasket which Alpina supplied.

For Group 1 racing, engines had to remain in standard specification, but they were allowed to use any parts specially homologated for racing (that is, approved by the racing authorities). In preparing the engines, it was also permissible to take advantage of any manufacturing tolerances to improve performance – in other words, engines could be 'blueprinted'.

The precise specification of the Alpina Group 1 racing engine was never released. However, with a homologated exhaust system, a Group 1 2002Tii engine produced 140PS, an increase of 10PS over the standard 2002Tii.

Far more latitude was permitted in Group 2 racing. Once again, the precise specification of the Alpina Group 2 engines is not available, but the 1990cc engine produced 205PS in race tune and 195PS in rally tune. This was achieved by using forged pistons, twin Weber 45 DCOE carburettors, a special cylinder head and 324-degree camshaft, larger inlet and exhaust valves, reworked crank gear, a 5-litre oil sump with a modified oil pump, a competition clutch and competition exhaust. The main difference between the race and rally engines lay in their exhaust systems and camshaft profiles.

In later years, the Weber carburettors were replaced by Kugelfischer fuel injection and power output rose as high as 220PS. This was achieved at around 8,000rpm, which would have made dry-sump lubrication essential. However, mid-range torque was more important than top-end power in rally applications; an Alpina 2002Tii which was in use as a

Alpina Competition Parts

Alpina supplied many special parts for race and rally purposes only. Some were bought-in items, while others were of Alpina's own design and sometimes Alpina manufacture as well. According to research by Mike Macartney of 2002 specialists Jaymic, the known items for the 2002 cars – the most popular of the M10-engined models for competition work – are as follows:

- adjustable accelerator pedal
- alloy lightweight clutch (215mm or 228mm)
- aluminium knee supports, left and right
- Bilstein racing front damper inserts
- Bilstein racing rear dampers
- BBS lightweight cross-spoke wheels, three-piece, 5.5in to 11in rims
- brake pads (by Ferodo)
- brake shoes with bonded linings
- castor adjusting plates for front struts
- crossflow radiator with expansion tank
- driver's foot rest (for clutch foot)
- dry sump oil pump
- electric fuel pump (carburettor or injection)
- electronic cut-off switch (Digitron GRB 6)
- front spoiler
- full harness seat belts (by Kangol or Britax)
- high-compression forged lightweight pistons (by Kolbenschmidt or Mahle)
- high-pressure oil cooler
- high-pressure oil pump
- large-diameter exhaust valves (39mm)
- large-diameter inlet valves (46mm or 47mm)
- lightweight clutch release bearing
- lightweight connecting rods (24mm or 28mm widths)
- lightweight flywheel
- progressive-rate road springs
- racing camshaft (320 degrees or 324 degrees)
- racing exhaust manifold
- racing exhaust system
- racing seat with head restraint
- rally exhaust manifold
- rally exhaust system
- rally lamps (by Cibie or Hella)
- rally seat with head restraint
- rally trip meter
- rollover cage for race and rally (ONS approved)
- shield for sump and gearbox (for rally use)
- special rocker arms
- stronger valve springs
- titanium connecting rod nuts and bolts
- twin-plate clutch
- wheel arch extensions (9in front, 11in rear)
- wheel arch extensions (to suit maximum 8in wide wheels).

Group 2 rally car in Britain by 1974 laid claim to only 183PS. According to *Fast Car* magazine, which reported on the car for its March 1974 issue, it had Kugelfischer fuel injection and a cylinder head with hemispherical combustion chambers. The engine had KS (Kolbenschmidt) pistons on special con rods and was running a standard crankshaft which had nevertheless been tuftrided and counterbalanced.

Alpina also provided some engines for Group 5 racing. In February 1969, a road test of a Group 5 2002 with 180PS at 7,000rpm, an 11:1 compression ratio and two Weber 45 DCOE carburettors recorded a 0–100km/h standing start time of exactly 6sec.