High power M30

The best way I have found to get a lot of NORMALLY ASPIRATED power out of an M30 is to do the following.

There are many places and wishes from where one can start. People may have Alpina or Hartge motors to start with, or want to keep as much of the original head/block as possible to have a 'numbers matching' car.

The pathway to a high-power M30 depends on the end-goal. The 3.5 liter racing motors in the 70s produced nearly 400 bhp, but are anything but streetable. Whereas the last incarnation of the production M30 had 208 bhp (US) and was a very smooth operator in the 3600 lb E32s.

For the purposes of this article, we will divide the 'horsepower goals' into 4 divisions: 210-240, 240-260, 260-280, and 280+. 210-240 bhp is a reasonably easily achievable goal without a large outlay of cash.

A few options include the following:

Options for 210-240 bhp range:

Start with a euro B34 high compression motor or a B35 motor. Modifications include: Headers and full dual 2" exhaust, B35 intake manifold with port matching, larger throttle body, 19 lb-hr injectors, updated chip. Reasonable estimate of power is 230-240 bhp. Hartge and Alpina were able to get this type of power using Motronic and L-jet in the 80s, keeping the stock displacement. Other options include a MAF. Similar figures can be obtained from a M30 B35, albeit probably not quite as high due to lower compression ratio. 230 bhp is a reasonable estimate in terms of bolt-on modifications for a B34 HC or B35 motor. The best that a B34 low-compression motor can do with simply bolt-on modifications (chip, exhaust, intake, injectors) is perhaps about 200-210 bhp. The problem is that upgrading the cam will not benefit you due to the low compression.
Typical costs (estimated total: under $2000):
Header: $500 + additional fitment work downstream
B35 intake manifold: $200
Chip: $200 (new)
Injectors: $250 (new)
MAF: $600-1000 (new, est.)

Options for 240-260 bhp:

This range of power effectively requires head work, and preferably a bump in compression ratio. Ideally the compression ratio would be 9.5:1 or higher (the euro B34 already has 10:1, but the B35 has 9.0:1). Running a stock chip on either the Motronic 1.0 from the euro B34 or the Motronic 1.3 (recommending the 179 ECU) is probably reasonable if your compression ratio bump on the B35 is only to 9.5:1. Headwork ought to include the standard larger intake values (47mm) and preferably the exhaust valves (to 38mm). A camshaft is a must, preferably 284 degree Shrick or equivalent. Replacement of valvetrain components is always recommended. Porting and polishing the head is also recommended. At this point the B35 intake is recommended, although Alpina claimed 254 bhp using the holder style intake. Headers are a must, as are dual 2" exhaust all the way. MAF conversion is a good option, as are big-bore throttle body. Note, both Alpina and Hartge used >10:1 compression to get over 250 bhp. And Alpina used Motronic 1.1/1.3 on its later motors with 254-260 bhp.

Typical costs (estimated total: $5000-$7000):
Header: $500 + additional fitment work downstream
B35 intake manifold: $200
Chip: $200 (new)
Injectors: $250 (new)
MAF: $600-1000 (new, est.)
Camshaft: $400 (custom grind)
Head work: $2000-3000 (see Top End Performance website)
Pistons: $1000 (see JE Custom pistons)
Wiring harness and ECU: $400 (used, estimated)
Throttle body: $200 (service, based on Big Coupe Group list)

Options for 260-280 bhp:

On top of what was said above, now's the time to consider a full B35 intake, 47/39mm valves, increased displacement, dual 2.25" exhaust and headers, big bore throttle bodies, 24 lb-hr injectors, and FI system updates/modifications that can include going to a newer Motronic, custom chips, MAFs, or other options. Over 10:1 compression is a must in these cases. Reworked combustion chamber shapes, a la Alpina, can also be considered in this case.
Typical costs (estimated total: $7500-$10,000+):
Header: $500 + additional fitment work downstream (more than $1000)
B35 intake manifold: $200
Chip: $200 (new)
Injectors: $250 (new)
MAF: $600-1000 (new, est.)
Camshaft: $400 (custom grind)
Head work: $3000-4000 (see Top End Performance website)
Pistons: $1000 (see JE Custom pistons)
Wiring harness and ECU: $400 (used, estimated)
Throttle body: $200 (service, based on Big Coupe Group list)
Tuning services: varies

Suggestions for 280 bhp+:

On top of the above: increased displacement and mild stroking, reworked combustion chambers, individual throttle bodies. At this point, 10.5:1 compression is probably required, as well as custom-tuned FI system. MAFs are highly recommended.
Typical costs (estimated total: $10,000+):
Boring motor: $400-600 (estimated)
ITBs: $600 for adapters, $500 per pair of ITBs, estimated $600-800 in additional components (fuel rail, plenum, etc)

'Clean sheet' option:

However, for the purposes of this whitepaper, we will assume to start off with an M30 B35 motor, and build a streetable, reliable, but high horsepower M30. Let's take for example the E34 535i, or a late E24 635CSi. Concentrating on the block, there is not much you can do with stroking, but there is a lot you can do to bore the motor. There is the option of using a 3.8 S38B38 crank, or machining your own custom crank to stroke a motor. However, an M30 already develops boatloads of torque, so the better option in this case is to bore it to increase displacement and thereby concentrate on making more horsepower rather than torque. The options to boring are basically anything between 92 and 94.5mm (S38 B38 specs). It is known

that the S38 B38 had some cylinder wall thickness issues, so maxing out at around 94mm bore is probably preferable. Of course you can use 93.4mm and keep a stock BMW dimension (e.g. S38 B36 specs). Therefore, Custom JE forged pistons that raise the compression to at least 10:1 and have a 94 mm bore. Raising compression is going to be a function of fuel use and head work. If you're using a B35 head and premium fuel, you can probably safely raise compression to around 10.5:1 (Alpina had these ratios in the mid-80s, but with a highly reworked combustion chamber.). If fuel quality is a question, or you don't want to be too aggressive, then 10.2:1 to 10.4:1 is a very reasonable compression ratio for these motors, especially if you are using a piano-top style piston profile as opposed to the heavily reworked Alpina style cylinder heads and pistons. However, the stock Motronic 1.3 will ping if you bump the compression by 1.5 points, therefore you will need to retard the timing that BMW built into the 1.3 with 9:1 compression.

Recommended Top End Performance can get JE Custom piston with Total Seal Rings which are far better than BMW's rings with just about any shape and compression ratio you want. They have blueprints and records and can do anything you want. Now, radius the con rods as that will increase strength. Of course I suggest using new con rods bushings and bearings. Custom, strengthened, and lightened con rods are available from Top End, should you go this route. Use the stock 86 mm stroke crank, but have it cross drilled and rifle bored, if you can. This will increase low end oil pressure and also the life of your rod end bearings which is a good thing because you will be making a lot of power. Now, you start to assemble the bottom end. Pistons, rods, crank. Then you get to the oil pump. You need to use an E28 oil pump because without it, you will not be able to bolt on the E28 oil pan which is necessary to clear the subframe in an E28 or E24 (that is if you're starting with a E34 or E32 engine). Now you have the bottom end built. I suggest using a lightened flywheel also from Top End Performance. 15lbs is light enough and an M5 clutch should do you. There have been people who’ve gone for 12 lb or lighter flywheels with success, albeit these are non-AC equipped cars. The later Motronics can probably handle the idle better too if you go for that light a flywheel.

Now that you have the bottom end together, it is time to work on the top end. Let me just say, that with the bore increase you will have a 3.58L motor. Also please don't forget it is important to use the E28 motor mounting arms so you can bolt the block to the subframe. I also suggest using 2 of the left side motor mounts from an M5 as they are stronger than the stock units (or the M535i mounts as those should be the same). Be sure you do not ‘He-Man’ torque them, as this will shear the rubber mounts. Speaking of torque specs, it is vitally important that one follows them! Do not under any circumstances over or under torque critical fasteners such as on a motor. Always follow the BMW torque specs.

As for the head, use a stock B35 head to start. It’s now time to invest in machine shop experience, and begin by skimming it to make sure it is flat. Port and polish it, and also do a three angle valve job – most engine builders who specialize in older BMWs and race motors can effectively do this service. Depending on what cam you are running you might want larger valves but I think that the 47 mm intake and 38 mm exhaust are just fine (although 47mm / 39mm will do you well too). Top End Performance again has loads of experience here and can make custom stainless steel valves for you. Anything larger than 47 / 39 will require custom valve seats and more headwork to get them to fit correctly. New guides, seats, etc. are a must. Then radius the (new) rockers which will give them added strength for the extra duration and lift of the cam. Now I suggest using Metric Mechanic progressive rate valve springs (Edit: the dual valve springs from MM are no longer available, and thus we'd recommend going with dual valves springs that Top End sources) and also their head oiling upgrade kit (which is a crimped oil sprayer bar to improve oiling a the cam). You can use titanium retainers if you like, depending

on the RPM you're expecting out of the motor this might be more or less beneficial. You can use pretty much any cam you want, but I suggest not going below a 280. Using a Shrick cam design (284 or 292) on a custom grind is preferable. Top End can provide these, as well as almost any other good engine shop with experience in BMW motors. An adjustable cam gear will let you advance and retard your cam for better performance or better economy. This might be particularly useful in final tuning.

For the head gasket, I believe you can use the early big six, with the 93.4mm bore gasket, but I would suggest getting a custom one with a solid metal ring in it so that you have less chance of blowing the gasket. These are again available at almost any good custom engine builder shop specializing in BMWs (e.g. Top End). MLS gaskets have also been recommended, but have a strict requirement for surface finish RA. Cometic have a good product that works well with older motors, particularly M30s.

On to the intake and exhaust... For the intake I would suggest starting with the E34 M30 B35 intake, and then port match it to the head. Extrude-hone will cost a pretty penny, but will give you the maximum flow possible out of the stock casting. As for the exhaust, custom headers are in order that have 1 1/2" ID primaries that go into dual 2" collectors at minimum. Custom track pipe to mate up with the collectors and I'd recommend an E28 M5 exhaust if possible. These exhaust dimensions are basically the minimum you can run...although it'd be preferable to run something slightly larger. A good tuning book (e.g., A. Graham Bell's "Four Stroke") should offer some insight into a custom exhuast. You should also be able to use the E24 M30 b35 intake bracket to support the intake to the block.

There are two options for a individual throttle body system. The first is to attempt to retrofit the M5 intake system. This requires at a minimum fabricating adapters from the head to the M5 intake runners. It also requires investigating the choice of fuel rail, as the M88 or S38 rail and FPR will not clear the t-stat housing on the M30. Similarly, the TPS switch will have to clear the t-stat housing. To do this the adapters have to be angled so as to point the intake runners above/ below the t-stat housing and rad hose. The other option is to get the Weber DCOE adapter brackets from Redline Weber (Redline Weber part # 99004 094). The castings aren't that great, so porting and polishing them is a must. However, 40mm or 45mm Weber fuel injection ITBs can then be bolted onto these. Again, one of the flanges near the t-stat housing has to be shaved a bit to clear, and I have not verified if the TPS switch will clear the t-stat housing and rad hose, but this looks to be more a 'bolt-in' solution. Additionally you'll need a custom intake plenum. http://www.jameng.com and http://www.twminduction.com are both good sources for the ITB components, as well as Top End Performance can order anything from Redline Weber.

Fuel system and engine management: Use either custom engine management (Megasquirt, etc.) or Motronic 1.3 out of the late '88 and '89 E24, along with the engine harness. Update the ECU to #179 (#150 is Motronic 1.1). This is because the Motronic unit will then mount in the same place as the one currently in the car, and Motronic 1.3 is adaptive enough to run this motor well. It is necessary to retard the timing a bit as the 1.3 was set by BMW with 9:1 compression, although this seems to be an issue (pinging that is) at lower rpm, high load conditions, for engines with ~9.8:1 compression or higher. I would then suggest a dyno day and a custom burnt chip. As for fuel system, I suggest running Mustang 24 lbs/hr injectors at minimum at 3.0 bar, but depending on your fuel requirements you may need to up that to 27 or 30 lb/hr. The Bosch Motronic 1.3 in limp-home (open loop) mode with the 179 ECU and 24 lb-hr injectors runs my (Chris's) engine around 11.8-13.0:1 AFR, or very rich. Idle is right around 14-14.5:1, and off-idle there is no hesitation. And the 3000 - 3500 rpm range is butter smooth. Cam seems to 'come on'

around 3700 rpm, although after 100 miles of break in I've not yet gotten past 4000 rpm, nor gotten past ½ throttle.

I would also suggest using a big bore throttle body because you will need as much air as possible. On this note, a Mass Air Flow Sensor conversion is in order as it will give the engine management more precise readings and also will be less of a restriction, in theory. There are and have been a number of options for MAF conversions for Motronic systems. However, it is important to note that a MAF will not in and of itself improve outright power, given similar flow conditions at wide open throttle vs an AFM. That isn't to say a well operating AFM isn't good as is - one has to remember that BMW used a AFM on the euro M5/M6 to great effect to get 286bhp. The E34 M5 3.6 increased power to 310 bhp, but included improvements to the head, increased displacement, a more complex intake resonance system, and better engine management system with O2 sensor feedback, all on top of going to a MAF. And the improvement was only 24 bhp. Alpina also got 260 bhp (DIN I believe, at the crank) out of their B10 3.5 liters using an AFM. The conclusion is that, in theory, a well operating MAF will provide better on/off throttle smoothness, and part throttle improvements. If you have a well operating AFM, unless one goes to standalone fuel injection system, it is not necessary to get a MAF. But in theory, a well operating MAF can provide some improvements over a AFM.

With regards to cone filters, their maintenance IS A MUST. Never leave a K&N or similar filter un-oiled. However, a stock air filter system works just as fine as well. Lots of work can be done here to 'dress up the engine bay' since a cone filter in and of itself will not do you much good in terms of power. Additionally, an oiled filter fitted too close to a MAF will ruin it in short order.

As for oiling system, I would try to run the euro E28 oil filter canister and housing because I would never run this motor without an oil cooler, which BMW's bolt on approach here will work just fine.

Rob and myself have built an engine very similar to the 'clean sheet' recommendations we have written above. These are a summary of the results as of October 2007:

Engine rebuilt with following specs:
• M30 B35 out of E24
• 10.45:1 custom JE forged pistons, total seal rings
• M90 head gasket
• Bored to 93.4mm (3535cc total)
• New con rod bushings, bearings, main bearings, etc; rods and pistons balanced to within 0.7 grams of each other
• 15 lb Top End Performance flywheel
• Larger, stainless steel valves (47mm / 39mm)
• Ported and polished intake and exhaust ports
• 3-angle valve job; new seats, new seals, etc.
• Metric Mechanic peened rocker arms
• 294 deg custom ground cam (Top End Performance, style 290MM)
• Dual valve springs, titanium valve retainers
• All new valvetrain components
• Hartge Headers (yet to be installed)
• Custom, dual 2.25" exhaust with high-flow catalytic converters (yet to be installed)
• Motronic 1.3, with custom burnt chip (Mark D'Sylva)

Future project tasks (as of October 2007):
• Custom tuning with Mark D'Sylva using EPROM emulator and Innovates DAQ, once engine is

broken in
• Finish custom exhaust
• No full dyno sheets until engine is fully broken in! (A 3000-mile process)

Updates:

Dec 2007: Mark D'Sylva has burned an equivalent of an Alpina B10 3.5 chip for the motor and we have installed it to great effect. The fueling maps are spot on (as shown above). And we will be letting the motor run closed loop as soon as the data logging systems are in place. The response in the engine is very smooth and progressive so far up to the 4500 rpm break-in imposed rev limit (we only have 300 miles so far on the motor). The ignition timing is far more retarded than the stock chip, although we have gotten on the verge of pinging at 2000 rpm-3000 rpm in 4th and 5th gear at higher loads going up hills (not fuel ping, but timing ping, as you can tell the chip is trying to advance the timing under the load and conditions). Nonetheless the engine can be driven around on a 'normal' basis and the chip works very well. Idle is at 1000 rpm upon initial installation. More updates to follow after the 300 mile break-in service (valve adjustment, oil change, etc).

Jan 2008: The 300 mile break-in service was complete. Motor is now running closed loop (O2 sensor connected). The idle is a but lumpy, but better than before the valve adjustment, and not unexpected with the cam and lack of headers. Also the Evap valve is operating and I needed to close off the supply hose since I have no evap cannister on my car. Fueling is spot on. It's noticeable how the ECU is learning/adapting as I drive the car more.

Jun 2008: Installed the knock sensor (Knock Link) to monitor pinging. Pinging under load can be heard/measured in higher gears (3rd, 4th, 5th), when leaning on the throttle from 2000 rpm on. Basically I figure that at >75% or >80% throttle, in those conditions, the timing is too advanced. Fueling has been spot-on since O2 sensor has been connected.

Nov 2008: Innovates LM-2 has been installed and now I can collect data. Engine has 600 miles on it - yes, I know, but I've been far too busy with work since the summer. I did an acceleration test run through 3rd gear on the street, short shifting at 5000-5500 rpm. With a 3.73 diff, and OD gearbox, I hit 60 mph at about 4250 rpm in 3rd gear. During the test, I only accelerated to about 80% throttle, since I was on the verge of pinging in 3rd gear. 1st and 2nd were not full throttle, but hard to say exactly what percentage.

Dec 2008: Replaced spark plugs from W8LRC to W8DC at 600 miles. Old plugs seemed to be operating within temp range, but some cylinders had some carbon/ash deposits that had not burned off - combination of rich running and cold starting, I figure, from the lack of use/driving the car saw over the summer/fall of 2008. Have purchased a chip emulator and will test a few custom files that will have backed off the timing to see if I can get the pinging to stop under high load conditions in the upper gears. 700 miles on motor so far...500 miles to go until the 1200 mile service to be done in January.

Sep 2009: In the spring of 2009, while having the engine in for it's valve adjustment and oil change, it was noticed that the intake rear rocker shaft was misaligned. Further investigation revealed that the wrong shaft was installed, and the head had to be removed and reassembled. In addition, the MLS was leaking slightly from the front edge on the exhaust side. This was replaced with a stock BMW M90 head gasket (actually a thicker one, as I wanted to lower the compression from the 10.6:1 to 10.45:1 to help the pinging). Car was finished in June, and I drove it on a 500 mile trip in September to finish the break-in. Oil consumption was 1/2 quart, plus the addition of another 1 quart in the process to refill all the head crevices from the engine rebuild. More data was collected, and it is possible to hit full throttle in 1st, 2nd, and 3rd in most

cases. 4th and 5th still pings. AFM voltage indicates I'm getting near full flap open at 6200 rpm. I also replaced the spark plugs with the W7DCs, since the W8DCs indicated they were running too hot, and I needed to get a colder plug. That is unsurprising since Alpina ran the W7s in their B9s and B10s. Motor has 1450 miles on it now.

Written by Rob Anderson '01 (Edit: Chris Graff '06, ‘07, '08)

Anybody use any of this stuff here?

From http://www.kormanautoworks.com/e34.htm

535i M30 "Big Six" Engine
Stock Rebuild
Our stock rebuilds are assembled to BMW specifications by our experienced and dedicated technicians rather than off a mass production assembly line. Korman engines are assembled with meticulous craftsmanship, precise machining, and detailed blueprinting. All of our boring is done with a torque plate for exceptional bore roundness and long engine life. These hand built engines are available at prices comparable to a factory reman units which offer only 12 month/12,000 mile warranties.
3.5 liter fuel injected late (89-93 E34 535) P/N 11056020

Korman Stage 1 3.5L Fuel Injected Engine-Late (89-93 535)
Stage 1 porting and polishing, balanced connecting rods, light weight piston pins, increased valve spring pressure, and a performance computer chip increase horsepower from 208 to 222, and torque goes from 223 lb/ft to 237 lb/ft.
P/N 11056120

Korman Stage 2 3.5L Fuel Injected Engine-Late (89-93 535)
Our Stage 2 for the late 3.5L includes our Stage 2 cylinder head porting and polishing, dual valve springs with chrome alloy retainers, lightened Stage 2 connecting rods, Korman Rocker Arms, and a special computer chip. Horsepower is increased from 208 to 230, and torque climbs from 223 lb/ft to 244 lb/ft.This engine is emissions legal.
P/N 11057220
Strokers/Conversions
Another way of gaining horsepower and torque without affecting emissions is to increase the displacement of the M30 engine. This option is available with all of our rebuilds, please call us with your needs.

Required main components:

3.5 to 3.8-crankshaft and conversion parts
Performance Computer Chip

BMW
ECU#
HP GAIN
REV LIMIT
P/N
535i M30 89-93
0.261.200.179
25
6800
124M30400

Adjustable Fuel Pressure Regulatorhttp://www.kormanautoworks.com/adjustablefpr.gif
This modified Bosch fuel pressure regulator allows you to adjust the fuel pressure on your 533 or 535. Increased fuel pressures can help compensate for performance modifications (chips, cams, exhaust, intake, etc.) as well as addressing some rough idle and "flat spot" problems. Improves spray patterns on older injectors.
P/N 13106020

Camshafts and Valvetrain Components

http://www.kormanautoworks.com/drschrick3.gif
Schrick's street performance cams all give a strong increase in power across the full rev range while retaining a smooth idle. They do not require cutting for additional piston/valve clearance. They are designed to perform with the BMW original fuel injection systems.

M30 Schrick Camshafts
Schrick 284-284º duration, 10.9 mm lift. Smooth idle, no internal engine modifications necessary. Dual valve springs, chrome alloy retainers required. Performance chip strongly suggested.
>9/83 P/N 11386282
9/83> P/N 1138628201

Korman K-300 Camshafts
These popular reground camshafts feature 300º duration, 9.4 mm of lift. Due to variations in distributor drives, we must have your core in advance for machining.
P/N 11316300

Offset Adjustable Cam Gear
Resurfacing the cylinder head retards the camshaft timing. Use this gear to advance it back to specification. Machined for 1,3,5 and 7 degrees of offset. Can also be used to fine tune the power band of the engine.
M30 11/78> P/N 11318606

Camshaft Installation Kit
M30 6 Cyl. Stage 1 includes cast alloy rocker arms, dual valve springs, and chrome alloy retainers. P/N 11396430

Korman Rocker Arms
Lightened cast alloy rocker arms, contoured, peened and polished. Radiused to clear valve spring retainers with high lift cams. Sold each.
M30 6 Cyl. P/N 1133K256229

Korman Racing Rocker Arms
Similar to above, fully polished arm, pads micropolished.
M30 6 Cyl. P/N 1133R256229

http://www.kormanautoworks.com/images/Steel_Alloy_Rocker_Arms_003.jpgSteel Racing Rocker Arms
If you need to turn high revs these steel rocker arms will give the reliability that aluminum can't provide. Proven durable on-track with consistent revs to 9000 and above with no failures. P/N 1133S256229

Aluminum Rocker Arm Locks
Designed to eliminate both the early style high tension and late style low tension rockershaft springs. Locks rocker arm into place with less friction loss than the OEM rockershaft springs. Minimizes the chance of broken rocker arms from rockershaft spring deflection. Weight is 20.8 grams each. Sold each.
P/N 11341M10M30

Jean

07-14-2010, 09:12 PM

High Performance Dual Valve Springs
Includes center damper spring sleeve. Long life with revs to 7600 RPM. No cylinder head machining required. Fits all M30 engines.
P/N 11341204

Schrick Racing Valve Springs
Made to sustain very high spring pressures, very high cam lift, and extended high RPM use. Will maintain original tension four or five times longer than any other spring that we tested for BMW engines. Use with titanium retainers, sold each.
P/N 11341028 (inner and outer set, each)

Titanium Valve Spring Retainershttp://www.kormanautoworks.com/titaniumretainers.jpg
About half the weight and twice as strong as steel. Used in all our Stage 3, 4, and race engines. Weight is 12.5 grams each.
For Korman Dual Valve Springs-M30 P/N 11342002
For Schrick Racing Valve Springs-M30 P/N 11341029

Chrome Alloy Steel Valve Spring Retainers
Stronger than stock, used in all our Stage 2 engines. Weight is 21.5 grams each.
P/N 11342001

Korman BMW Valves
Swirl polished, profiled, and radiused for improved flow.46 mm intake P/N 1134K257592 38 mm exhaust P/N 1134K250129
M30 6 cyl.
46 mm intake P/N 1134K257592
38 mm exhaust P/N 1134K250129

Special BIG Racing Valves-M30
Special 47 mm alloy intake valve (stock is 46 mm). Fits stock valve seat, features dished design with polished surface.
P/N 11344140

Lightweight Piston Pins
Similar to those used in our racing pistons. Nice addition to any engine job. Ten to twenty percent lighter than stock pins, suitable for full race or street applications.
M30 6 Cyl. P/N 1125K712198

Korman Modified Connecting Rods
Lightened, balanced, peened, sized, rebushed, and alignment checked. About 8% lighter than stock rods. Shipped complete with new rod bolts and nuts. Sold on an exchange basis.
M30 All (each) P/N LAB11241201

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LowR3V'in

07-14-2010, 10:10 PM

I love how they list prices. :/

Jb325is

07-15-2010, 08:39 PM

Their prices are usually ridiculously high.. But they definitely make and carry some really nice stuff

nmlss2006

07-16-2010, 11:25 AM

I shall preface my post by saying that I have not tried their stuff specifically. However, in my experience, anything that coaxes performance out of a N/A engine is going to be *very* expensive and generally not worth it unless your car is mated to that specific engine. Especially stateside, where prices for this sort of work are downright offensive (you can get people who are famous for getting great results on Ferrari engines to work for singificantly less than what it would cost here to rebuild an S52. I still can't get my head around this fact, but 'whatever the market will bear' is something that you can never escape).
Because we're talking M30-in-E30, we of course have no such requirement. At that point, from a price-per-HP point of view, an S52 with Shrick camshaft and supercharger will, at ~$7000 for the whole package, clean the floor with any other N/A 6 cylinder that you could build in an E30 and do it with a better torque curve and less driveabilty problems.
An M30 is, like an M20, a difficult engine to get results in: 2 valves per cylinder, no camshaft control, no

modern electronics means you can choose WHERE you have torque but it's effectively impossible to broaden the torque band very much.
In other words, in order to get meaningful horsepower you will have to spend a very material amount of money - several thousand $ - and then you'll have an engine that will probably only be good from 4000 to 6500-6800. That's 2800 RPM on 5800 on a good day (usable range/1000-redline range) - 41%.
If I were looking to make an M30 breathe, I'd try the Schrick 284, then I'd do three things: 1) put on a good exaust with an 6-to-2 to a constant-section X-crossflow and two 200 cell cats (no sense using the expensive 100 cell, there's plenty of room to use the 200s) to a decent catback. I'd keep the primary tubes LONG to try to fill the engine at lower RPM.
I would then have a custom intake manifold created, something with six equal-length runners with trumpets at the end in an oval-section plenum, with a 3.5" throttle body at the end of it, straight to the largest airbox I could fit by going to a radiator with built in overflow tank. Then add a custom plate to get modern coil-on-plug electronics with knock sensors on the engine, no MAF and wideband O2 sensors.
All this should be 'relatively inexpensive' and should give you an engine that is probably happy to 7000RPM or so - and good for 70-75? HP/litre close to the 6500-7000 mark. If you then wanted to get funny - and it's probably a good idea - you could replace the pistons with Mahle 11:1s and have the head worked on somewhat, but I would be surprised if even then you broke 80 HP/litre, assuming you had intake and exhaust headers LONG to try to fill in the low RPM as much as possible. That gives you 280ish HP for the cost of an S52, probably.

eugeman

07-17-2010, 10:10 AM

I have been eyeing up some Stahl headers, and they list different m30 primary i.d.'s everything from 1-1/4" to 1-5/8". With a Miller MAF + stock or Schrick 284 cam as the only modifications, what would be ideal = 1-3/8"?

kylekrueger

07-20-2010, 07:51 PM

Really in reality, building a fully 'built' naturally aspirated set up is basically pointless for street use. The m30 in my opinion is the best engine to put into an e30. The first reason is that it is extremely torquey on the bottom end which is where most people drive on the street. The second is lost cost maintenance especially because of the natural "bullet-proof-ness" of the m30 and timing chain. The third is that it is a rocker arm engine which in my opinion is more comfortable in a car that came with a rocker arm engine in the first place.

Now if you want to get a little extra "oomph" so to speak for your street car there are two options. In brief the first on is turbo, also a bad idea because if you don't already have an m106 or m102 then eventually you are going to destroy your engine by putting on an aftermarket turbo.

So, the second option is a N/A set up, respectively. For an n/a set up you could throw double or triple what you would to get to where you are for a turbo. In my opinion however, for a street car all you need is usable power, that is the important part. This is what I would do for a cheap usable street engine:

1. Make sure you have a b35 1989 or later head if you don't already have it (because these heads have the biggest valves, double valve springs, best flowing head and manifold, and most aggressive cam) est. $100

2. Next get rid of the AFM, swap to an MAF est. $300

3. Make sure you have motronic 1.3 if you don't already because it is adaptive engine management est. $70

4. Get a performance tuning chip est. $50-200

If you do these thing you get a very nice engine with around 230 bhp while still retaining all of the bottom end torque for around $800.

If you are still looking for more power or you are tracking your street car and feel the need for a bit more power for you street/track engine one possible combination could be as follows:

1. Same as above

2. more aggressive cam, usually a longer duration cam will give you more top end power which is good for the track but bad for the street and so for this I might choose a 284 grind. Cams can range from $200-500 depending if you are going with a regrind or a schrick.

3. higher compression pistions, I would say that 11:1 is the maximum for pump gas and some even say that you will need an anti-knock additive if you run 11:1 on pump. I might choose to go with a 10.8:1 compression pistons. CP pistons in my opinion are the best and these will run you about $1000 you can get cheaper ones for around $700 if you look around.

4. Some kind of exhaust but not necessarily a full race header and race exhaust system but something that is more free flowing. est. $200

These three additions to the build will probably boost power to around 270 bhp
which is excellent for any street/track car especially for an e30 which is only around 2900 pounds.

In total with the 800 that you put in for the first portion now it is around $2200 which is still half of what a turbo will cost you and you still have an engine which you can safely drive to its fullest extent on the street and track.

If you want to go full race/street engine but don't really care how it feels on the street but you still want to drive it on the street any way you can continue with the build:

1. do first two builds first

2. add a full race header. This can give you significantly better flow out of the head an therefore make it easier for the engine to rev. These can be expensive the cheapest way to do it is build your own header for around $100which is really just the cost of materials or you can get a ready made one new or used for $150-600.

This is really all you can do with this engine before going into re-doing the bottom end of the engine. So, this next part is a continuation of the above but now you engine will definitely be a serious race engine and if you do drive it on the street will never see its full power extent.

3. Bore out the block, the limit of the block according to BMW is 94mm however it is still possible to go wider than that because the s38 has 94.5mm pistons as does the m90 engine. I really don't know what this will cost as I have never looked into it so a price will come from your local engine machinist.

4. Stroke your engine. Stroke is what give the engine its torque. The easiest and cheapest way to stroke your engine is to by an m5 crank. I believe these run around $400-500 but will give you an extended stroke and therefore more displacement and more power. Another way to stroke is buy longer connecting rods, IE sells longer 144mm connecting rods however these require custom pistons but since you are getting new pistons anyway for the above build then you might as well go ahead and get these. The con rods are around $900 for a set.

5. Move to a lightened single mass fly wheel and stiffer clutch. These two things will run you around another $1000.

6. To get even more flow out of your head move to a individual throttle body system. There are a couple of options for ITBs. The first I have seen on m20's is modifying some suzuki gsxr ITBs to fit onto the head. Another way is to modify some s38 ITBs to fit onto the head. Both of those solutions require massive amounts of custom fabrication. Those two options will run around $400-600 depeding on what the initial investment costs plus R and D. The third option is to buy premade ITBs for the m30 from a company like Extrudabody or also I am lead to believe that you can buy weber manifolds for m30 and make an adapter plate to fit ITBs. The best bet and cheapest if it goes south is to modify gsxr itbs.

In all the last build ontop of the 2200 you already spend is around $4000. Expectations for horse power at that point is around 350bhp. Now that is a lot for any street car and more than likely will never be useful on the street an only see its full extent on the track. There is still so much more that one can do to make even more power out of an m30, some ideas to make your investment last longer is improving the valve train and associating components like the rocker arms, titanium valve keepers stiffer springs etc. etc. but for that expect to put another $2000 into the engine.

Here are a few things to think about that I have heard about what not to do. The first being port and polish, It has been said that polishing the head ports actually decreases engine performance, however I am not an expert on this. Another thing to keep in mind for your N/A build is that the stock BMW crank and connecting rods are in fact forged so if you are thinking of getting forged con rods and crank that are to stock specifications think again, they already are. Another thing not to do is deck the head/block/thinner head gasket to gain more compression. These are cheap ways of getting around new pistons and can damage your engine