B20 vtec builds

Building an engine can be a challenging process. So we've had time to break down what we've learned over 20 years of engine building and racing experience to help users new and old alike to make a list of what's common combination of engines as well as stepping stones for someone wondering what their next revision should be. Keep in mind while reading this guide: Everyone has different opinions and different experiences. The number of horsepower that we give is not rigid rules, but a general guideline. Your mileage may vary, but hopefully we can keep your expectations within the right realm of thinking. Introduction Honda Powerplant's biggest draw is the extensive width of the customization and build option. That being said, this guides not tough and fast rules on how to build an engine, but rather a general guideline of what we have successfully used for 2 decades. Each part we list is available to buy on our webstore, and we also offer packages together with this guide to make your shopping experience easier. If you would like to show appreciation for this walkthrough, please be sure to check out our store for all your performance needs. 1.0 Engine BLOCK1.1 Quick and Dirty Target Setting The first part of any build should start with the general idea or goal of your final result. Below is a quick and dirty guide on what power the modified B series can usually hold safely. Stock Engine B-Series B18 LS: 250-300WHP B18 VTEC: 300-350WHP B16: 250-300WHP B20: 225-250WHP Stock Sleeve +Aftermarket ROD/Piston/Spring/Retainer B-Series B18 LS: 400-500WHP B18 VTEC: 500-550WHP B16:450-500WHP B20: Do not. CSS B-Series B18 LS: 500-600WHP B18 VTEC: 700-900WHP B16: 700-900WHP Side B-Series B18/B16/B20: 1000+ WHP should allow you to have an idea in your head as to what you can create. In our experience the average streetable horsepower is in the realm of 400-500WHP, the last anything 500HP typically results in nothing but spinning. To put 400-500WHP into perspective, a full-weight civilian at that power limit would run a low 11 to a high 10 second pass at 1/4 miles. 1.2 Stock Sleeves vs CSS We have proven it again and again. A stock sleeve B-series engine can hold power. We've made stock gsr top of 700HP on the sleeve and made several 9 second passes, more than 200 dino passes and never cracked a sleeve. That being said, it should be noted: A stock sleeve B18 over 500HP is a timebomb. If you're on a budget and want to build the most power, it's not a good idea to move the limit on the stock sleeve. If you want to make 500+ HP on a limited budget, you're better off buying CSS for an additional $350 insurance, as this initial $350 investment will save you labor and parts that cost more than $350 to replace your broken engine. If you are building an engine for 500+ HP nowadays, unless you are going for big power, Must be a no-brainer. 1.3 Sleeves vs CSS In our experience, we get a lot of phone calls People asking about a side-side engine for high-powered street cars. While sleeves provide an extremely strong and much more bulletproof block for a road car, we usually mistake the edge of css (cylinder support system). The big advantage of having the cost. You're saving nearly $1000 versus sleeves to run CSS, and for 90% of our customers, a CSS is entirely enough. CSS is limited to 81-82mm bore, and we recommend running .020 on pistons in CSS blocks to ensure cylinder rounding. If your plan is primarily a high power track oriented car that needs to eek out every inch of power on a large bore engine, sleeves take priority. 1.4B20 Turbo Problems B20V is a great setup for a budget N/A car, but due to a poor sleeve design, we do not recommend a B20 for Turbo applications. The sleeves are so weak that the rupture never occurs, but when. There is no way to strengthen the sleeves sufficiently to reduce wear and tear, your only option is to give sleeves to the engine. After sledding, the engine can hold whatever you throw at it. On average, B20 sleeves break around 300HP like clockwork. 1.5 LS/VTEC vs VTEC Optimum you will get a full VTEC B18, but LS/V is still a great option. There are many design differences, but for the average road car, the differences are short. High Power LS/Vs GSR/ITR engine is just as reliable. Compared to a full LS engine, LS VTEC is a drastic improvement due to head design and VTEC. We stay away from non-vtec B18 engines due to lack of capacity compared to LS/V due to head flow and design. LS/V is a cost-effective way to create the most capacity out of your build.2.0 INTERNALS Now it's time to get to the gritty of selecting parts for the engine. We're going to start from the bottom up. 2.1 Bearings ACL race bearings are known to our bearing. When assembling, make sure you check or inspect your journals for appropriate oversized on the effect of lower size to your machine store. 2.2 Connecting Rods/Piston Rods/Pistons should always be one of the first items you think of. For the average road car, we recommend your humble performance down-end kit. We offer several stages to strip to the street. Our street kit is our go-to setup for all sub-700HP cars. A good piston/rod package is probably one of the most important items in a performance building and should never be tight on. 2.3 Oil pump oil pump is the lifeblood of your engine. Honda OEM is the best pump, duration. For high horsepower/high revving applications, we always recommend pumping 4Piston ported oil. As stated earlier, for a road car we recommend up to 500HP, as anything past 500HP usually results in excessive tire spins. The result of extra tire spin is a broken oil pump, countering breaking oil pumps, reducing tire spins and an offmarket harmonic balancer like ati fludumper There are many ways to do that. 2.4 Water pump OEM. 2.5 Head Gasket is a multi-layer steel head gasket For Turbo applications. We run a cometic headgasket on every car. Usually a .040 thickness, but the thickness should be determined by your cylinder head and engine block deck measurement. 2.6 Head Stud Standard ARP or Speedfactory 4130 Head Studs are perfect for almost all street builds. If your target exceeds 700WHP, we recommend ARP L19 Head Stud to prevent head lift. 2.7 Springs/Retainer Springs and Retainer any B-series engine should be addressed for trying to build on 300HP. The valve will hold power safely up to 500, but OEM springs and retainers must be replaced to avoid leaving a valve and catastrophically destroying your engine. Check our head packages for more information on selecting the appropriate parts for your cylinder head. 2.8 valves for valves, we fully use ferreya products. Ferrea 6000 valves are for every road car for our go. For a track oriented car that makes upwards of 600HP, we recommend a combination plus valve on the exhaust side. After 800HP we started bending 6000s like clockwork, but Comp Pluses are created to maintain heat and are used in the top engine of 1200WHP. 2.9 Lost Motion Assembly Badass 2 Replace OEM LMA for Lost Motion Assembly and never look back. The OEM lma is at risk of failure. 2.10 Camshaft OEM Camshafts can take you in a long way. If you're running a big turbo and need to start lifting power, we've seen a huge gain of over 70+ hp in midrange using the Skunk2 Pro1 Camshafts. For our high horsepower applications, we've worked with a build to develop a custom camshaft that you can buy here. After 3.0 performance modifications have been selected all parts for the engine, it's time to start

purchasing parts like turbo manifold, intake, turbocharger etc. 3.1 Turbocharger size A turbocharger is a balancing act of peak power and usable power. Here is our general guide to selecting Turbocharger for your application. 400-600HP 5858 Fast Spool/Broad Powerband Great Street Turbo 600-700HP 6062 Fast Spool/Broad Powerband Great High HP Street/Strip Turbo 700-800HP 6266 Moderate Spool/Good Powerband Great High HP Street/Turbo Strip 606 800-900HP 6466 Moderate Spool/Peaky Powerband Great Strip Turbo/Moderate Street Turbo 900-1100HP 6870 Long Spool/Peaky Powerband Great Strip Turbo 3.1.1 Ball Bearing vs Journal Bearing Should You Choose a Ball Bearing or a Journal Bearing Turbo? Ball bearing spool carries many gains on journal bearing including time and reliability. But the added price comes at. If you have money to buy ball bearing, it's a good idea to drive a ball turbo bearing, but not need it. Some come in bearing the ball just like turbos, 6466. The Gen 1 exact turbos did carry some reliability issues, but since the release of the Gen 2 Turbos, we've seen some really impressive numbers and reliability have died on. 3.2 Waste door control issues There are two major contributors to giving. Turbo manifold, and useless. When looking for a Downsizing is important for proper low boost control. If you give the gate a very small size on a large turbo, the exhaust gases will overcome unemployment and make it impossible to boost less. Anything bigger than 6266 we always suggest a 60mm gate or twin 44 setup, if turbo is dependent on manifold design function then a gate can be used on a large turbo, but these numbers are for a general idea. 5858 38mm Westgate 6062-6266 44mm Westgate 6466 and above twin 44mm Westgate or 60mm Westgate 3.3 turbo manifold If there is any part I can not give enough stress, so it is not manifold cheaper on turbo. Many people will buy cheaper, thin-walled ebay ramhorn manifold and run into cracking issues. We've seen everything from runners blowing up manifolds from breaking trash. Make sure you buy a high quality manifold. This may hurt at the beginning, but most reputable builders carry lifetime warranties in cracking conditions while you'll spend a lot of downtime to pull off your turbo and recreate the many times that have been poorly constructed. Our two favorite brands for manifold are Go-Autoworks and KLM. Both companies are staples in the Honda industry and carry great craftsmanship. There are many great manifold options available for 3.3.1 Ramhorn vs Top Mount B-series and many designs, but the two most common designs are Ramhorn and Top Mount. Both come with pros and cons, and you honestly can't go wrong with any of them. A ramhorn offers fast spools but can limit top-end power, while a Topmount won't have the same response as a ramhorn several times, but it builds in top-end power. For a small road setup, pairing with a ramhorn for quick usable power is a great idea. For a strip-centric car, a top mount allows you to get a bigger turbo. The Ramhorns are great for those wishing to maintain A/C and power steering as most options allow for it. There are top mounts that are A/c P/s compatible as well, but they are not quite as common. Both can work great on the road, just downsizing your turbo and be mindful of overall goals. 3.4 Intercooler + Piping Intercooler is very straightforward. There are many options available on the market. Many people cheap out on intercoolers for street setup and shaping precisely will just be important. When selecting your intercooler, be sure to read the specs and flow rate to see what it supports. When running over 600+ WHP high-end intercoolers become more important. We suggest selecting klm or Go Autoworks Intercooler suitable for your setup. 3.4.1 Intercooler Piping Sing Guide 2.5 Intercooler Piping from 600hp 3.0 Intercooler Piping 800hp 3.5+ for 900 + HP 2.5 Piping is effective for more than 600HP, But as a general rule of thumb, when downsizing piping for a customer car, if we know they want to make 600HP off the bat, they're going to want to create more power later are. Consider it future proofing. 3.4.2 Valves are recommended to prolong the life of blown valves There is no real guide for them, most will work. Cheap eBay rigs and can cause turbos to go into an overhaul position. Make sure to buy a quality valve like a Tial, real HKS, TurboSmart, etc. 3.5 intake intake of manifold stock is very capable of power for a road car, but when you start making 500+, it's worth looking at in breath mode. There are many Intex that work great for every application. The Skunk2 Pro holds plenty of intake power and has been a goto for quite some time. We recommend that under 500HP makes pro for light road. The Skunk2 Ultra Street has a great road/strip intake manifold, it is paired well with a good 6062-6466 turbo setup and will allow plenty of power to build. The 500-700HP Skunk2 Ultra Drag Big Daddy is manifold. A big planum for big power, some big gains are to be made on the 6466+ setup. Ultra drag should definitely be on your list if you're shooting for 700+ HP. Notable mentions: Adelbroke Victor X is a great manifold for a budget. If you're looking for 500-800HP, Victor X is a good budget option. For ultra drag manifold 3.5.1 Skunk2 Ultra Drag Accessories, paired with a 2L planum spacer and a 90mm throttle body, we've seen some massive horsepower gains when compared to an Edelbrock Victor X setup. For a strip-only car, Ultra Drag is our 100% manifold go. For extra power, 4Spistan also provides CNC porting for manifold for maximum production. 3.6 Engine Mount keeps your engine mount engine in place. Don't make the bargains out. Mount Henport are the best mount on the market and have always been a mainstay. 60A - 100-400HP minimum vibration, easy driver 70A - 500-600HP not some vibration but teeth 88A broken - 600+ HP heavy vibration, but still driveable 94A - 900+ HP strip priority car, road capacity is not a priority. Recommended only for 900+HP Extreme Vibration Racers.4.0 Driveline 4.1 OEM Transmission Selection for a turbo car, the best stock gearset is GSR transmission with 4.4 final drive. This transmission works well on the road and is almost perfectly ready for 1/4. We typically carry stock GSR gearsets to ~500-600WHP and run several 9 second passes on them. 4.1.1 Highway Cruising LS 5 Gear Many people looking for a road/strip car will install 5 gears from a B18 LS transmission in a GSR for cruising gear for driving a good low RPM highway. This is a great modification for anyone not wanting to cruise on the highway at 4000RPM for hours on end. 4.1.2 While pushing the power limit of car 800+ on dragstrip, many people have participated in the issue of cracking transmission matters. To put it together there are several treatments, several weld reinforcements in the transmission case. The second solution is running a Libert Billett bellhouseing. 4.2 Axle is the best cheap axle you can run OEM or Autozone Lifetime Warranty Axle for a road and road strip car. We regular Let's take it from 500+ hp is made up to near several 9 seconds on axles and OEM axles. If you're looking to create more passes on the track, there are a few options. DriveShaft Shop makes many great choices that guarantee you to reliably achieve B without worrying about breakage. The second option is the lesser known option. OEM 36mm RSX axles. We replace the hub with 36mm hub and run 36mm OEM axles without worry in many cars. Most notably, our 900HP SFWD build 'La Y'Axiel' went 9.0 on 36mm axles without breaking a sweat at countless launches. If you're looking to get serious, Driveshaft Shop 5.9s are unbreakable borderline, but come with a pricetag. One of the biggest issues we see with axle breakage is driver error. I cannot insist enough on this. Preload. Preloading is the act of lightly engaging the clutch holding the car in place with parking or staging brakes. This removes the shock load from the axle, and will make the gearset and driveline much longer. If you can preload properly, your axles will thank you. Up to 4.3 clutch 600HP we recommend competition clutch stage 4 for road driven car. If you plan to track your car more, we recommend competing clutch super single. Both clutches have roughly the same torque potential, but super single shifts over high RPMs with more ease than a phase 4 at the expense of some driveability. There is more than 600HP twin disk area. A twin disc is nowhere near the driveability of a single plate full face disc, but it has significantly more torque capacity. There are some twin discs on the market with street/strip in mind like the Clutchmasters 750. Becomes 1000+ triple disk area. 5.0 FUELINGS There are many ways to contact the fuel system, so we're going to break down some basic concepts for you. 5.1 Fuel type for a road car, there are usually 2 options. Gasoline or E85. We strongly recommend E85 for any 500+ HP Street cars. The E85 is a strong fuel with high explosion resistance. It's a great fuel and in our region, we only see the roughly E68 and have made 700+ HP with regular zero knocks. The only reason I would mistake on the side of petrol would be availability and if you plan on making regular long trips (but flex fuel is an option!). The E85 comes at the expense of increased maintenance and worse fuel economy, but the upsides are tremendous in terms of reliability and power. This refueling guide has increased maintenance with E85 and petrol5.1.1 E85 maintenance. Here are some quick tips to make sure your ethanol-based fuel system stays in tact. The car was run regularly. If you let the car sit for more than 3 weeks, you need to pickle the fuel system with gasoline to remove corrosive ethanol from the system. Any time you are about to perform maintenance that involves removing the injector from the engine or fuel rail, either pickle the system or have an instant injector If injectors are out of the fuel rail for more than a few days, the ability for them to seize is very high. This is especially true for injectors without stainless interior like most 2000cc injectors.3.) If you're running aftermarket fuel lines, make sure those E85 compatible, PFE lines are better. 4.) Make sure you run an adequate fuel filter system. The injector calls for a certain micron filter for the injector. 5.2 Before jumping into fuel pressure injector and fuel pump size, one should understand the demand for fuel. Your standard fuel system will run a base fuel pressure of 43.5psi. As your car boost comes on, fuel pressure will increase. So at 30psi of boost with 43.5psi base pressure, your fuel system will be running at 73.5psi. Why is this number important? Injector flow rates and fuel pump flow rates change as fuel pressure changes. A '450lph' walbro pump does not always flow 450lph. In fact, walbro fuel pumps are rated at 0psi pressure, while the pump we recommend, Deatshwerks DW400 flows 400lph at 40psi of pressure. Why is this important? Because as the fuel pressure increases, the flow decreases. Don't be confused with naming, calculate your fuel pump and injector demands how much boost and base pressure you're going to run. Adjusting your fuel pressure using a hugging fuel pressure regulator is a must on 400+ HP Street cars. Our standard turbo street cars are usually set at 60psi base pressure and will see an average boost of 30-35psi levels on the dino. That means we need a pump that flows in sufficient quantities for a 90-95psi of fuel pressure, and so we choose DW400 as our standard turbocharged streetcar fuel pump. 5.3 Fuel LinesThe standard EG/DC/EK fuel lines are pretty enough up to 600-700WHP depending on your fuel pump/fuel line. OEM lines are roughly -6an. We recommend upgrading your feed line to -8an line if your plan is mostly track duty at 600+. On a DW400, we built 840WHP on stock easy fuel lines using a DW400 fuel and DW2000 injector. Why upgrade lines? Think of the same way you fuel drinking through a straw. A smaller, more restrictive straw fluid requires more effort to move, while a larger straw allows more fluids to pass along less effort. The same applies to fuel lines. Opening lines allows the pump to move more fuel with less effort. As you begin to reach higher power, and as fuel demand increases, a major drop in fuel pressure at higher RPM indicates low-sized fuel lines or an undersized pump that can lean and fail the engine. Check out the guide below on shaping fuel lines and pumps for your application. 5.4 Fuel Pump Thumb Sizing Your Fuel Pumps DW Fuel Pump Calculator Demands Your Fuel Pump by Using EC Rule 0-400HP DW200400-600 DW300 600-800 DW400800+ Multiple Pump or High Flow Use DW400 at 90% of our Form 400+.5.5 Fuel InjectersV14 body injectors are the latest and largest. When searching for injectors, time, Sure it has a Bosch EV14 core. Most modern injectors are flow-matching Bosch EV14 injectors for refueling in all cylinders and also in high-quality passive. Easy thumb shaped rule for your injectors: Gasoline: 550cc injector up to 300HP850cc injectors up to 500HP1000cc injector up to 500HPE85 (4 injectors)): 1000cc injector 400HP1300cc injector up to 600HP1650cc injector up to 700HP2200cc injector up to 900HP 900HP