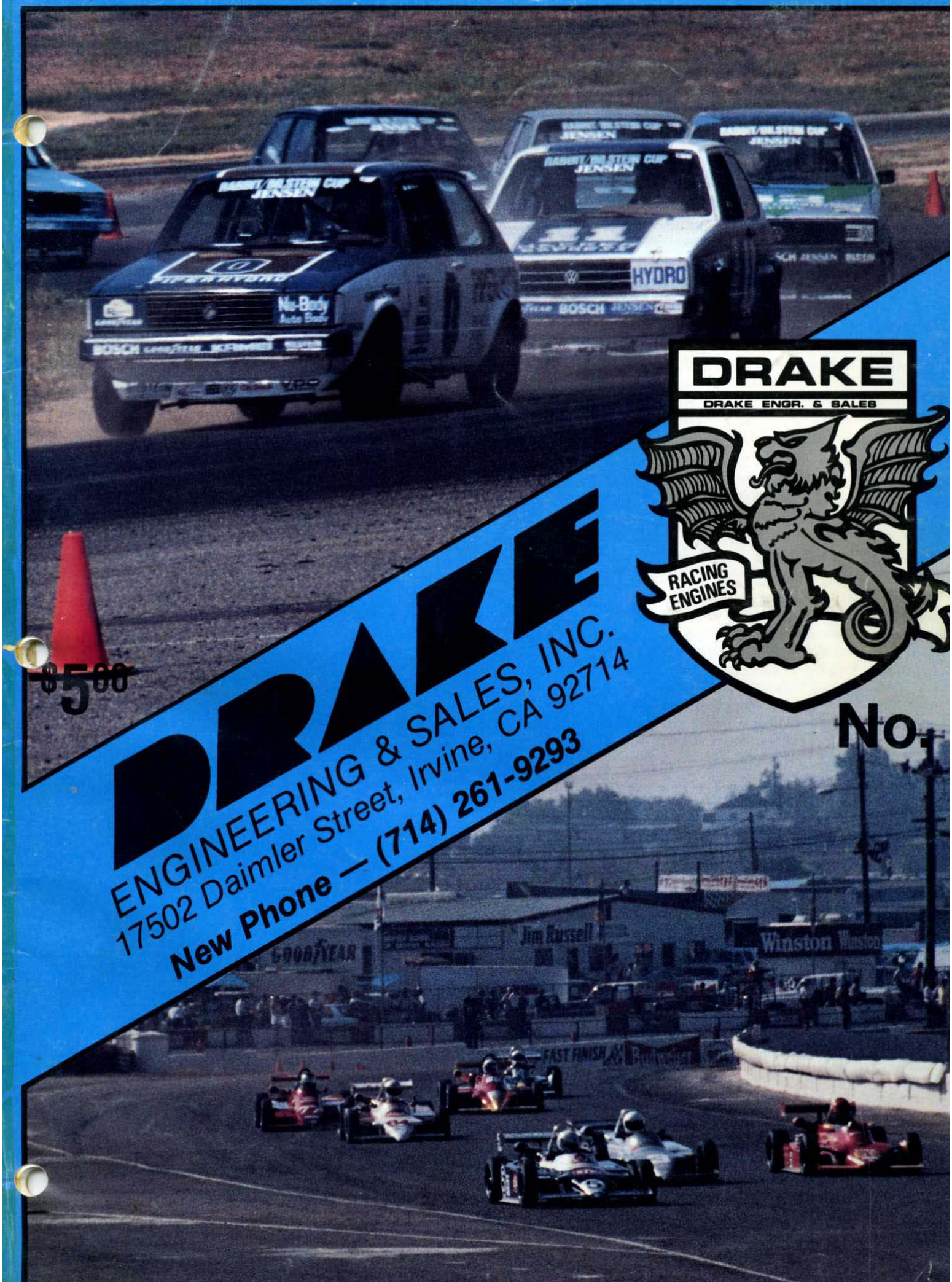
DRAKE
DRAKE ENGR. & SALES
RACING ENGINES
$5.00
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ENGINEERING & SALES, INC.
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New Phone — (714) 261-9293
HYDRO
BOSCH
Jim Russell
Winston

DRAKE CAMSHAFTS

Cam Billet — **20-01-000**
Unfinished cam billet allows customer to grind to your own specifications. Final precision machined bearing surfaces and keyways cut.

Sport Camshaft — **20-01-410**
For street use, enhancing mid-range torque and top-end performance. Best suited for use with carbureted engines. .410" lift, 240° duration at .050" lift. Ground from billet on a standard base circle on 108° lobe centers. Recommend using Super Sport Valve Springs with cam for best results.

Street Performance and Turbo Cam I — **20-01-426**
For hi-performance or sport use, increasing top-end power without sacrificing the bottom-end. .426" lift, 222° duration at .050" lift. Ground from billet on standard base circle on 110° lobe centers. Requires the use of Super Sport Valve Spring Set.

Street Performance & Turbo Cam II — **20-01-442**
An excellent performer with smooth idling characteristics for street use. Will work with CIS injected engines both normally aspirated and turbocharged. .442" lift, 238° duration at .050" lift. Ground from billet on 110° lobe centers. Requires the use of Super Sport Valve Spring Set. Smooth idling characteristics when warm.

Short Track Cam — **20-01-475**
An excellent bottom-end short course camshaft for sedan racing. .475" lift, 284° duration at .050" lift. Ground from a billet on 104° lobe centers. Works with stock Cam Followers. Specify desired base circle.

Roadrace Cam I — **20-01-470**
Designed for roadcourses with relatively short straights where acceleration is critical. Good for sedan classes. .470" lift, 282° duration at .050" lift. Ground from billlet on 102° lobe centers. Requires the use of Super Sport or Race Valve Spring Set. Specify desired base circle.

Roadrace Cam II — **20-01-498**
Designed for roadcourses with long straights and sweeping curves. Good for both sedan and Super Vee racing. .498" lift, 282° duration at .050" lift. Ground from billet on 102° lobe centers. Requires the use of Super Sport or Race Valve Spring Set. Specify desired base circle.

Race Camshaft — **20-01-505**
Designed for long oval tracks with predominately "flat-out" running at high rpm. Best suited for Super Vee only. .505" lift, 298° duration at .050" lift. Ground from billet on 102° lobe centers. Requires the use of Super Sport Valve springs or preferrably the use of Race Valve Springs and valve train components. Specify desired base circle.

Roadrace Camshaft III — **20-01-535**
Designed for roadcourses with long straights and sweeping curves. Good for both sedan and Super Vee racing. .535" lift, 285° duration at .050" lift. Ground from billet on 102° lobe centers. Requires the use of racing Valve Train Components. Specify desired base circle.

Note: All race cams specified above require the use of race Valve Cups. Specify desired base circle and lobe centers. Allow 5 days to custom grind. ***All grinds available for the GTI head. Please add "G" to the end of the part number.***

Drake Adjustable Cam Sprocket
Advance or retard the camshaft to shift the engine's power curve. For example: Advancing the cam timing will increase engine power in lower rpm range along with better around-town mileage. A necessity for adjusting variations in keyway locations on cams and for changes in timing caused by resurfacing of the head.
— **20-00-100**

Drake Cam Cover
Drake Engineering Cast Aluminum Cam Covers designed for racing applications on vehicles with a dry sump oiling system. **NOTE:** Not suitable for street use.
— **20-00-200**

Drake Econo Sprocket
A simple, low cost alternative for adjusting cam timing. A standard sprocket with two extra keyways positioned 4 degrees advanced and 4 degrees retarded for altering the engine's power curve.
Advancing cam timing provides better low-end performance, while retarding the cam allows for more power in the higher rpm range. The sprocket can also be used to compensate for resurfaced cylinder heads by just removing the center bolt and following the instructions.
— **20-00-110**

Idler Pully
A good item to replace when rebuilding your engine. The stock pulley bearings may wear out and cause side loading on the belt and sprockets, resulting in damaged belts.

— **20-00-170**

VALVE SPRINGS

Drake Super Sport Valve Spring Set
Matched special alloy valve springs for use on both street and racing applications. Designed by Drake Engineering to work with **standard Spring Retainers** and **Seats.** The springs use the **stock Installed Height** of 1.25", or can be shimmed for more seat pressure and work with cam lifts exceeding .500".
— **20-03-000**

VW Sport Valve Spring Set
Double Valve Spring approximately 23% stiffer rate than stock. Will fit standard Valve Train Components, but will not accept lifts over.430". (Note: Has a VW Part No.)
— **20-03-001**

Race Valve Spring Set
Special Long Valve Springs designed for use with solid Racing Cam Followers, Titanium Retainers, and Drake long stemmed Racing Valves.
— **20-03-002**

WEBER BIG THROAT

Weber Big Throat
Designed as a stock throttle body replacement. Increases horsepower (6 hp gain was seen on the Drake dynomometer using 1588cc dyno motor with Drake big valve head) and improves throttle response that you can feel on CIS injected cars. The unit is easily installed in approximately an hour and a half. It's one of the easiest ways to add preformance to your vehicle.

20-14-300

Euro Throttle Body
Larger primaries and secondary bores allow more air to be passed to engine. Progressive linkage take the twitch out of around-town driving.

NEW **20-14-325**

Big Throat Lambda Switch Bracket
For use with the Weber Big Throat on all new GTI 1.8L engines. Allows the use of the throttle microswitch.

20-14-310

Soft Mount Kit
Designed to prevent carburetor float bowl foaming caused by 4 cylinder engine vibration. Each kit is for mounting one DCOE two barrel carburetor. Fits both Mikuni and Weber. Specify 40, 45 or 48 DCOE.

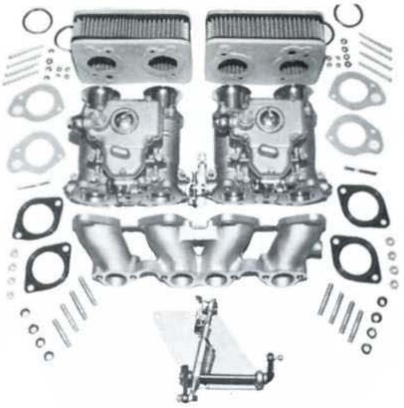
20-12-300

DCOE Air Filters
Short - Specify carburetor application, style element desired.

20-12-400

Tall - Specify carburetor application, style element desired.

20-12-410



Dual 40 DCOE Weber Carburetor Kit
This kit is recommended for street or race applications. Offers much higher performance over stock carburetor set-ups. The kit contains: (2) 40 DCOE Weber carburetors, aluminum intake manifold, anti-vibration soft mount kits, Drake's famous linkage set-up and (2) air cleaners with K&N gauze elements. Designed to mount in the car without altering the firewall, this kit offers the renowned Weber quality found on most of the world's exotic cars.

20-12-355

Dual 45 DCOE Weber Carburetor Kit
Same as the 20-12-355 kit, but is recommended for racing applications. Will not have the same bottom-end power as the 40 DCOE's, but offers higher flow for top-end power on racing applications.

20-12-365

40 DCOE Sidedraft Weber Carburetor

20-12-330

45 DCOE Sidedraft Weber Carburetor

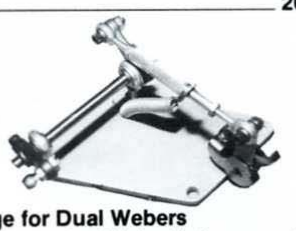
20-12-340

48 DCOE Sidedraft Weber Carburetor

20-12-350

Dual Weber Manifold
Designed for mounting two Weber DCOE series carburetors for ultimate performance. Results are quick throttle response with emphasis on top-end performance. Recommend two 40 DCOE Webers for street, two 45 DCOE Webers for racing applications.

20-12-220



Linkage for Dual Webers
Drakes own dual Weber linkage made of high quality components for reliability.

20-12-225

Weber & Mikuni Solex Assorted Parts
Drake Engineering carries other models of carburetors and kits, including jets, linkages and assorted replacement parts. Call for desired items.

20-12-380

Lambdapower
For 1981 and later CIS/Lambda cars including modified GTI's. The "Lambdapower™" circuit puts an end to the "too lean" woes of stock and modified engines. Fully adjustable, the kit comes with all parts and detailed instructions necessary for a complete installation requiring only basic hand tools.

20-14-350

32/36 DFEV Weber Carburetor Kit
Designed for performance and efficient running as a good two barrel progressive carburetor application.

20-12-370

Dual 40PPH Mikuni Solex Carburetor Kit
Supplied with a high flow dual manifold, linkage, hardware and carburetors. Recommended as a good performance addition for street applications.

20-12-310

Dual 44PPH Mikuni Solex Carburetor Kit
Same as 20-12-310, but with larger 44PPH Mikini Solex carburetors. Recommended for racing applications.

20-12-320

CIS Replacement Air Filter
Bosch replacement air filters for all CIS cars. Maintain performance and fuel mileage with proper attention to replacement.

20-14-100

LEISTRITZ SPORT SOUND EXHAUST SYSTEM

Leistritz Sport Exhaust System
Popular German quality, heavy guage steel, performance exhaust system which mounts from the flex coupling on back. This exhaust system with the Drake Short Tube Header showed a 9 horsepower gain on Drake's Dyno. Designed to fit 49 state model cars. The Leistritz Sport Sound Exhaust System has a center resonator and rear muffler with a 924 style exhaust tip.
Rabbit/Scirocco w/o catalytic converter.
_____ **20-16-022**
Rabbit/Scirocco w/catalytic converter.
_____ **20-16-023**

Leistritz Sport Sound Exhaust System, Euro-GTI
2 muffler exhaust system for use with Cast Iron GTI Manifolds (P/N 20-16-015 or P/N 20-16-016) and the GTI Down Pipe (P/N 20-16-017). Slighty shorter center section makes this an easy bolt-on addition to any non-catalytic Rabbit or Scirocco. Includes installation kit.
NEW _____ **20-16-024**

Leistritz Sport Sound Exhaust System, Jetta
Flanged, single muffler system for use on Jetta's to 1984 with Catalytic Converter. Includes installation kit. Easy bolt-on power.
NEW _____ **20-16-025**

NEW
GASKETS INCLUDED IN ALL HEADER SETS

Super Sprint Header
Patterned after GTI manifold and down pipe. This Tri-Y (Four-into-2-into-1) Header makes good power at all RPMs. Designed with clearance for factory front sway bar. This header has no provision for Flex-Pipe or Catalytic Converter. Drake recommends Motor Mount (P/N 30-70-100), to help limit engine rocking stress on entire exhaust system.
NEW _____ **20-16-004**

GASKETS INCLUDED IN ALL HEADER SETS

Short Tube Header
Works on all year Rabbits, Sciroccos, and Jettas not running smog hook-ups. 1982 cars require Ball Socket Flex Pipe (#20-16-003) or early style OEM flex coupling. Also works well on cars using diferent carburetor combinations.
_____ **20-16-005**

Short Tube Header (EGR)
Fits CIS Rabbits, Sciroccos, and Jettas with provisions for EGR valve or Lambda sensor. Fits 1977 thru 1980
_____ **20-16-006**

Short Tube Header (Lambda)
Fits 1981 thru 1983 (Lambda sensor provisions). VW support brackets required on early 1982 and later cars.
_____ **20-16-007**

GASKETS INCLUDED IN ALL HEADER SETS

Small Tube Race Header
Long tube design with round collector. 1½" primary tube diameter. Fits all race Rabbits, Sciroccos, and Jettas. Can not be bolted to exhaust system.
_____ **20-16-008**

Large Tube Race Header
Same as 20-16-008, but with 1⅝" primary diameter.
_____ **20-16-009**

Cast Iron GTI Manifold (Early)
European GTI Manifold makes good power over wide RPM range. This manifold uses 10 mm studs on wider bolt pattern. Requires use of P/N 20-16-017. Has provision for EGR, Flex Pipe or Catalytic Converter. Recommended P/N 30-70-100 and 20-16-024.
NEW _____ **20-16-015**

Cast Iron GTI Manifold (Late)
Same as above, but with provision for oxygen sensor as required on 1980 and later models. Recommended P/N 20-16-017, 20-16-024, and 30-70-100.
NEW _____ **20-16-016**

GTI Down Pipe
European Long Down Pipe to be used with manifolds P/N 20-16-015 and 20-16-016 listed above. Use Leistritz Exhaust System P/N 20-16-024 to complete entire system.
NEW _____ **20-16-017**

Distributor Cap
Bosch OEM
_____ **20-19-001**

Rotor
Bosch OEM
_____ **20-19-002**

Points
Bosch OEM
_____ **20-19-003**

Condensor
Bosch OEM
_____ **20-19-004**

NEW

5 Speed Transmission, (US)
Standard 5 speed transmission with the following ratios: 1st - 3.45:1, 2nd - 1.94:1, 3rd -1.29:1, 4th - .91:1, 5th - .71:1. 3.89 final drive ratio.
NEW _____ **30-30-200**

5 Speed Transmission, Close Ratio
5 Speed close ratio U.S. GTI with the following gear ratios: 1st - 3.45:1, 2nd - 2.12:1, 3rd - 1.44:1, 4th - 1.13:1, 5th - .91:1. 3.89 final drive ratio.
NEW _____ **30-30-250**

NEW

NEW

Ring and Pinion Gearset 4 speed, 3.47:1
NEW _____ **30-40-347**

Ring and Pinion Gearset 4 speed, 3.70:1
NEW _____ **30-40-370**

Ring and Pinion Gearset 4 speed, 3.89:1
NEW _____ **30-40-389**

Ring and Pinion Gearset 4 speed, 3.94:1
NEW _____ **30-40-394**

Ring and Pinion Gearset 4 speed, 4.22:1
NEW _____ **30-40-422**

Ring and Pinion Gearset 5 speed, 3.47:1
NEW _____ **30-50-347**

Ring and Pinion Gearset 5 speed, 3.67:1
NEW _____ **30-50-367**

Ring and Pinion Gearset 5 speed, 3.70:1
NEW _____ **30-50-370**

Ring and Pinion Gearset 5 speed, 3.89:1
NEW _____ **30-50-389**

Ring and Pinion Gearset 5 speed, 3.94:1
NEW _____ **30-50-394**

Ring and Pinion Gearset 5 speed, 4.22:1
NEW _____ **30-50-422**

5 Speed Close Ratio Conversion Kit
This kit includes all parts necessary to convert a standard 5 speed transmission, to a 5 speed GTI close ratio transmission. Kit includes: 2nd, 3rd, 4th, and 5th gears. All syncros, bearings, circlips, washers and gaskets needed.
NEW _____ **30-60-100**

4 Speed Close Ratio Gearset, Racing
Not recommended for street use. Ratios are: 1st - 2.77:1, 2nd - 1.95:1, 3rd - 1.46:1, 4th -1.20:1. Includes gaskets and racing syncros.
NEW _____ **30-60-150**

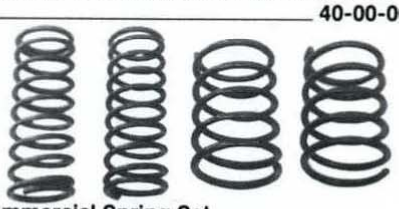
5 Speed Close Ratio Gearset, Racing
Not recommended for street use. Ratios are: 1st - 2.50:1, 2nd - 1.79:1, 3rd - 1.42:1, 4th -1.17:1, 5th - 1.03:1. Includes gaskets and racing syncros.
NEW _____ **30-60-200**

NEW

Heavy Duty Motor Mount
Harder rubber motor mount limits engine rocking, transfering more torque to the wheels and taking stress out of the exhaust system.
NEW _____ **30-70-100**

Motor Mounts, Race
A super heavy duty motor mount designed to stop rotational engine movement. Increases cockpit noise and resonate frequencies. Recommended for racing only.
Front mount.
NEW _____ **30-70-110**
Left side transmission mount.
NEW _____ **30-70-120**
Right side transmission mount.
NEW _____ **30-70-130**
Rear transmission mount.
NEW _____ **30-70-140**

Sport Spring Set
High quality springs wound from oil tempered steel wire. A 30% firmer ride for sport applications. Lowers car approximately 1".
Rabbit Diesel & Convertible
_____ **40-00-000**
Rabbit and Scirocco, 1975 thru 1979.
_____ **40-00-001**
Rabbit and Scirocco, 1980 thru 1981.
_____ **40-00-002**
Jetta, fits all models
_____ **40-00-003**
Scirocco 1982 and later, , Rabbit GTI 1983.
_____ **40-00-004**



Commercial Spring Set
Retains standard ride height with a 40% stiffer rate on Rabbit, Scirocco and Jetta. Good for retaining ground clearance or hauling vehicle capacity loads. 1980 and later cars require VW part number 171-412-341 for front spring installation. Springs made of cold wound chrome silicon wire.
_____ **40-00-008**

Autocross/Race Springs
50% stiffer spring rate for Rabbit, Scirocco and Jetta with a 2" lower ride height. 1980 and later cars, use VW P/N 171-412-341 for installation. Springs made of cold wound chrome silicon wire.
_____ **40-03-001**

Road Race Spring Set
100% stiffer spring rate for roadracing applications on Rabbit, Scirocco and Jetta. Lowers ride height 2½". Use with race struts and shocks only.
_____ **40-04-001**

INSTALL SPRINGS WITH THE MACPHERSON STRUT SPRING COMPRESSOR SEEN ON THE TOOL PAGE.

NEW

19mm Front Sway Bar
Integral Lower Stress Bar has a 4 point mount that stiffens the chassis. Reduces body roll and understeer. Cad plated, complete with all mounting hardware. Fits 1982 Scirocco.
NEW _____ **40-10-195**

GTI Front Sway Bar
The Drake Engineering GTI Sway Bar replaces the factory front bar perfectly. Two Sway Bar diameters to choose from. These Sway Bars are a must for racing classes requiring sway bars to be mounted in the factory location. Hardware and instructions included.
19 mm, front GTI
NEW _____ **40-10-200**
22 mm, front GTI
NEW _____ **40-10-215**

Sway Bar Kits
The Sway Bar Kits include all mounting hardware needed for easy installation. Kits fit all Rabbits, Sciroccos and Jettas thru 1983 (except as noted).

19mm Front
Street application (except 1982 Scirocco).
_____ **40-10-190**

21 Front
Heavy Duty Street/Race (except 1982 Scirocco).
_____ **40-10-210**

22mm Front
Integral Lower Stress Bar mounting for racing applications.
_____ **40-10-220**

25mm Front
Intregal Lower Stress Bar mounting for racing applications.
_____ **40-10-250**

19mm Rear
Street applications.
_____ **40-20-190**

22mm Rear
Street/Race applications.
_____ **40-20-220**

25mm Rear
Racing applications (Special Order).
_____ **40-20-250**

28mm Rear
Racing applications (Special Order).
_____ **40-20-280**

NEW

Koni Sport Suspension Kit
A complete high-performance four-point matched suspension package. Including; Koni adjustable shocks with a sport setting, progressive rate springs, and all hardware necessary for installation. Completely assembled and ready to bolt on the car. **There is no need to use a spring compressor.** Lowers the car up to 1½". With the adjustable lower spring retainer on the rear shock absorbers you can raise or lower the rear ride height. Fits all Rabbits, Sciroccos thru 84.

NEW _____ **40-40-300**

Golf 84, complete.

NEW _____ **40-40-400**

Sachs Sport Suspension Kit
Factory mated springs and shocks take the guess work out of suspension kits. Kits include struts, shocks and springs. Fits Rabbits and Sciroccos thru 84.

NEW _____ **40-50-300**

Sachs Sport (Insert Kit)
Includes only shocks and springs. Fits only German Rabbits and Sciroccos thru 84.

NEW _____ **40-50-350**

Sachs Sport Suspension Kit
Fits 1985 Golf. Complete kit as P/N 40-50-300.

NEW _____ **40-50-400**

Bilstein Street Shocks
Gas shocks for a comfortable but firm ride on Rabbits, Sciroccos and Jettas. A great handling package with the addition of the Sport Spring sets.
Front Strut Inserts
_____ **40-30-010**
Rear Shocks (except Rabbit Pickup).
_____ **40-30-012**
Rear Shocks (fits Rabbit Pickup only).
_____ **40-30-014**

Bilstein Sport Shocks
Ideal for quick, responsive Sport Driving. Controlled handling with a firm ride for all Rabbits, Sciroccos and Jettas.
Front Strut Inserts
_____ **40-30-110**
Rear Shocks (except Rabbit Pickup).
_____ **40-30-112**
Rear Shocks (fits Rabbit Pickup only).
_____ **40-30-114**

Bilstein Rally & Group I Racing Shocks
Complete Racing Shock Handling Package. Rear Shock has Five Position Ring Clip adjustment. (Special Order)
Front Strut complete *(Specify left or right).*
_____ **40-30-210**
Rear Shocks (with adjustable spring perch).
_____ **40-30-212**

Bilstein Group II Racing Shocks
Complete threaded body Front Struts for the professional or serious amateur. (Special Order).
Front Race Struts complete *(Specify left or right).*
_____ **40-30-214**
Rear Race Shocks (with threaded body).
_____ **40-30-216**

Koni Street Adjustable Shocks
Hydraulic Adjustable front shocks for street applications.
Front Strut Inserts (will not fit U.S. made Rabbits).
_____ **40-40-010**
Front Strut Inserts (Fits U.S. made Rabbits only).
_____ **40-40-014**
Street Rear Shocks Fits all Rabbits, Sciroccos and Jettas.
_____ **40-40-012**

Koni Sport Adjustable Shocks
Adjustable Hydraulic Struts and Shocks for High Performance applications.
Front Strut Inserts
_____ **40-40-110**
Front Strut Inserts (Fits U.S. made Rabbits only).
_____ **40-40-111**
Rear Shocks
_____ **40-40-112**

DRAKE

Sachs Sport Adjustable Shocks
Hydraulic shocks up front with gas shocks in the rear fro sport driving. Provides greater control in high performance situations. Fits Rabbit, Scirocco and Jetta.
Front Strut Insert
_____ **40-50-110**
Rear Shocks with 5 position lower spring perch adjustment
_____ **40-50-112**

Fichtel & Sachs Group II Professional Racing Shocks
Complete hand built full threaded body gas strut and rear shock assemblies. For professional Road Racing applications. (Special Order).
Front Struts (Specify left or right)
_____ **40-50-250**
Rear Shocks (Rubber Mounted)
_____ **40-50-252**
Rear Shocks (Heim Joint ends)
_____ **40-50-255**

Front A-Arm Bushings
Drake Engineering graphite impregnated polyurethane A-Arm Bushings offer the latest design technology. Two piece front bushings prevent thrust problems which cause rattle. Rear Bushings have an extra wide body contact surface to prevent rollover problems. Great for racing and sport applications.
_____ **40-70-005**

Rear Trailing Arm Bushings
Same material and design as Front A-Arm Bushings (40-70-005).
_____ **40-70-010**

ENGINE BUILDING TIPS

The engine in your Rabbit, Scirocco, or Jetta is a very good basic design. In fact, it's proving itself to be like the venerable small-block Chevy -- a well-engineered power plant in stock form, but with an incredible potential for performance.

We at Drake are proud to have been selected by Volkswagen to help in the development of this water-cooled engine for the beginning of the Super-Vee Mini Indy Series in 1978. Access to engine blueprints and casting/alloy information, head-flow abilities and technical information helped Drake in knowing the water-cooled engine inside and out. This program gave Drake a hardcore data base: but Drake didn't stop with this information.

1983 was a year of intensive development on our dynomometer with the Volkswagen motor. And the results were well worth the time and effort. The Drake Stage 1, 2, and 3 kits for the 1.6 and 1.7 motors and the Stage 1 and 2 kits for the GTI were the result of this extensive development program. Like the entire Drake product line, these kits are quality pieces which work on the dyno and in your car. The results are impressive; and what the charts show are real horsepower figures -- not imagined, extrapolated, or made up.

1984 was marked by very extensive testing of a variety of products for the GTI and 1.8 engines. The star of the development was the State 3 GTI kit, as featured in the VW & Porsche Magazine's Project GTI. This engine produces 130 Hp and delivered 33.4 miles per gallon in a 50 hour coast to coast drive! A great combination of performance and economy. In addition to the GTI projects, we undertook extensive dyno testing of exhaust systems. The new exhaust system offerings in this catalog reflect the results of this testing. And last but not least, the Drake 16-Valve race engine hit the track in midget racing. This Drake designed and produced cylinder head on a 2-liter Rabbit motor pumps out 200 hp @ 8500. Look for the street CIS injected version in 1985!

Drake Engineering can offer anything in the way of engine modifications from a stock rebuild to the Drake 16 Valve racing motor. For simplicity's sake, we have divided the parts into Performance Systems which we have proven to work together and offer these in Stages to fit your budget or performance requirements. It is important to note that these parts make small changes on their own, but produce dramatic changes together in the combinations we have selected.

Various stroke and bore combinations are available. We at Drake feel that all combinations up to 90.5 mm stroke and (depending upon the year of the engine), up to an 82 mm bore (1911 cc) can produce an excellent engine. Two possible exceptions are the early 1500 cc engine, with its limited bore size, and the late 1500 with its cast crankshaft. Substituting the cast crankshaft in the 1978 1.5 with a 1.6 or 1.7 forged crankshaft improves displacement as well as offering a much better quality crank. Otherwise, the bottom end of the VW is very well designed, and motors approaching 200 hp are feasible.

Drake currently recommends the following pistons for street applications: For the 1.6 (1588 cc) motor with the stock crank, standard 79.5 or Big Bore 80.5 (1620 cc) pistons with 9.7 to 1 compression ratio. For the 1.7 engines, Drake offers the overbore 80.5 mm pistons (1760 cc) in a choice of 3 compression ratios to suit your requirements: 8.3 to 1, 8.6 to 1, and 9.2 to 1. These stroke, bore and compression ratio combinations as chosen by Drake offer improved performance and better economy to any of the Drake Performance System kits.

The Bosch CIS fuel injection on equipped VW's is an excellent system, suitable for 120 hp in stock form, and over 140 if modified. We recommend keeping this excellent system if your car is so equipped. The increased air flow and efficiency of the Drake Stages 1, 1+, 2 and 3 are quite ably handled, and the ease of tuning and reliability are retained. The Lambda system emissions control is also a good system, especially now that Drake Engineering offers the Lambdapower modification for improved performance. This little black box functions like the performance oriented GTI Lambda system, and with a modified engine can allow proper emissions control, good mileage in the cruise mode and a 4 to 9 HP increase (about 10%) over a broad portion of the power band. It's the latest in the proven technology which Drake Engineering has been proud to offer.

The stock electronic ignition system on later model Volkswagens has proven itself reliable and accurate to over 7500 RPM -- more than enough for most street applications. Drake does offer a coil for those that prefer a "hotter" spark, and also special silicon plug wires. Earlier cars can benefit from the MSD-5 CD ignition which gives a far higher voltage and quicker rise time than the stock ignition system can offer.

For the owners of Volkswagens which are equipped with carburetors, (or for all-out racing where fuel injection is not allowed). Drake offers a line of performance carburetors and Drake camshafts (specially designed by Drake) for carbureted engines. The best performance is obtained with dual sidedraft carburetors, such as the excellent Mikuni Solex PHH 40's or PHH 44's, or the classic Weber DCOE series. For the budget minded, Drake offers the 34 DMTR or 32/36 DFEV Webers as complete kits. As the camshaft requirements for carbureted engines are different than CIS injected engines, Drake has cams which are designed for the specific application.

The Drake Performance Systems Lineup: 1.6 & 1.7 MOTORS with CIS INJECTION.

STAGE 1: This stage offers mild performance gains, but driveability is remarkably increased. The kit consists of an Adjustable Cam Sprocket, to advance the cam timing 4 degrees, the Drake Recurved Distributor, one of the Drake -- tested exhaust systems, either the Short Tube Header, European Cast Iron Manifold, or Super Sprint Tri-Y Header and Tuned Exhaust. In addition, the CO should be set at 3% and fuel system pressure at 5.4 bar. Be sure the ignition system is in good working

order. The Distributor Cap, Rotor, Points, Condensor, and Silicon Sprak Plug Wires are recommended. The torque curve is improved and the horspower peaks at 91 @ 6000 PRM, a 31% improvement over stock.

STAGE 1+: All of the above, with the addition of the proven #426 camshaft and Super Sport Valve Spring Kit. This excellent design increases the midrange and top end breathing capabilities. The horsepower goes up to 94 hp @ 6500 RPM, a 40% increase over stock.

STAGE 2: The changes made with the Stage 2 Performance System revolve around the Drake Big-Valve Cylinder Head, with the Street port and polish. The Euro Throttle Body improves the fuel injection breathing for added performance. In addition, the kit includes the above mentioned improvements from Stage 1 and 1+. This engine beats the stock torque curve everywhere, with more than 100 ft/lbs. of torque from 3500 to 5000 RPM. With a stock compression 1.6 motor, this kit gives about 120 hp @ 7000 RPM. This kit offers horsepower performance equal to many turbo kits with no turbo hassle. On the Lambda system equipped cars, installing the new Lambdapower can add even more power while retaining good mileage.

STAGE 3: The Stage 3 Performance System uses the factory forged 86.4 mm crankshaft (1.7 motor) and Big-bore 80.5 mm pistons with 9.5 to 1 compression to make a free-revving 1760 cc engine. This is a very tractable, very torquey motor which is easy to care for. The horsepower is 129 @ 6500 RPM, the torque an is impressive 120 ft/lbs. @ 4000 RPM.

NEW GTI PERFORMANCE SYSTEMS

The GTI is Volkswagen's latest performance offering and a statement that Volkswagen of America is jumping onto the performance bandwagon. That's a good sign, and something which we at Drake have believed in for many years. The stock U.S. GTI comes with a 90 hp motor, close ratio box, sport seats, instrumentation, larger brakes and sport suspension all add up to one thing: a perfect base for the well-thought out Drake Performance Systems. Drake thinks that it's a shame that the new engine peaks at a mere 5000 rpm and here's what they offer to do about it:

STAGE 1 GTI: The Drake State 1 GTI kit consists of a Recurved Distributor, Adjustable Cam Sprocket, and one of the Drake-Tested exhaust systems, either the Short Tube Header, European Cast Iron Manifold, or Super Sprint Tri-Y header and Tuned Exhaust. The pieces all fit quite whell and are easy to install. The peak horsepower goes to 106 hp @ 5500 RPM, but more importantly, the power curve continues to climb where the stock engine falls off. While the Stock GTI loses power at 5000 RPM, the Stage 1 GTI has an increase of 17 horsepower over stock @ 6500 RPM. And the torque from 2000 to 6500 RPM is considerably more than the stock GTI.

STAGE 2 GTI: Even more impressive is the STAGE 2 GTI - a handful of simple bolt-ons that beats the European GTI's 112 horsepower. All of the parts of the Stage 1 kit are included. In addition, the proven Drake #426 camshaft, (with the correct lobe spacing for the new GTI cylinder head), and Super Sport Valve Spring Kit are added. The improvements in breathing and rev potential made by these additions brings the horsepower up to 116 @ 6500 RPM (a 29% improvement). That's 26 hp more than the stock GTI has at 5000 - 5500 RPM, and 40 hp more than the GTI has in the upper rpm range. The Drake Stage 2 pulls strongly where the stock motor falls flat.

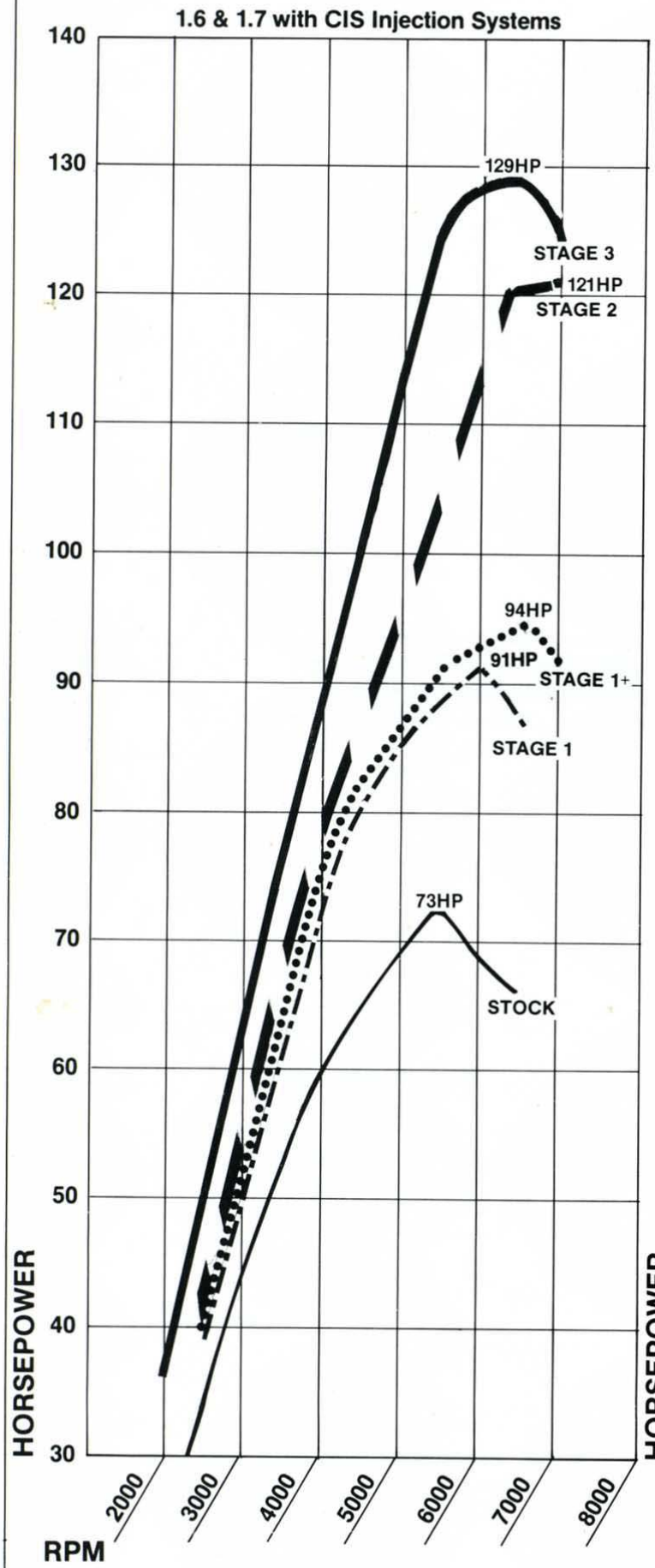
STAGE 3 GTI: The Stage 3 GTI kit adds the Drake Big Valve head for the 1.8 motor, which takes advantage of the new head's wider valve centerlines. The Big Valve GTI head uses larger 42 mm intake and 35 mm exhaust valves, as well as a complete street port and polish. To complete Stage 3, a larger throttle body, either the Weber Big Throat, or a European Bosch unit is offered. The torque and power changes are phenominal, as well as the lengthening of the power band. At 4000 RPM, the Drake Stage 3 equals the stock GTI's 5000 RPM power peak of 91 hp. The Stage 3 itself peaks at 6500 RPM with 130 hp, but still has over 120 hp from 5000 to 7000 RPM. The engine now develops more torque at 2000 RPM than the stock GTI has at its torque peak of 3000 RPM. The Stage 3 torque peak at 5000 RPM is 35% more than the stock GTI. This engine is a classic "Unturbo"; better torque and performance than most turbo's with 6 psi of boost . . . without throttle lag or the turbo hassle.

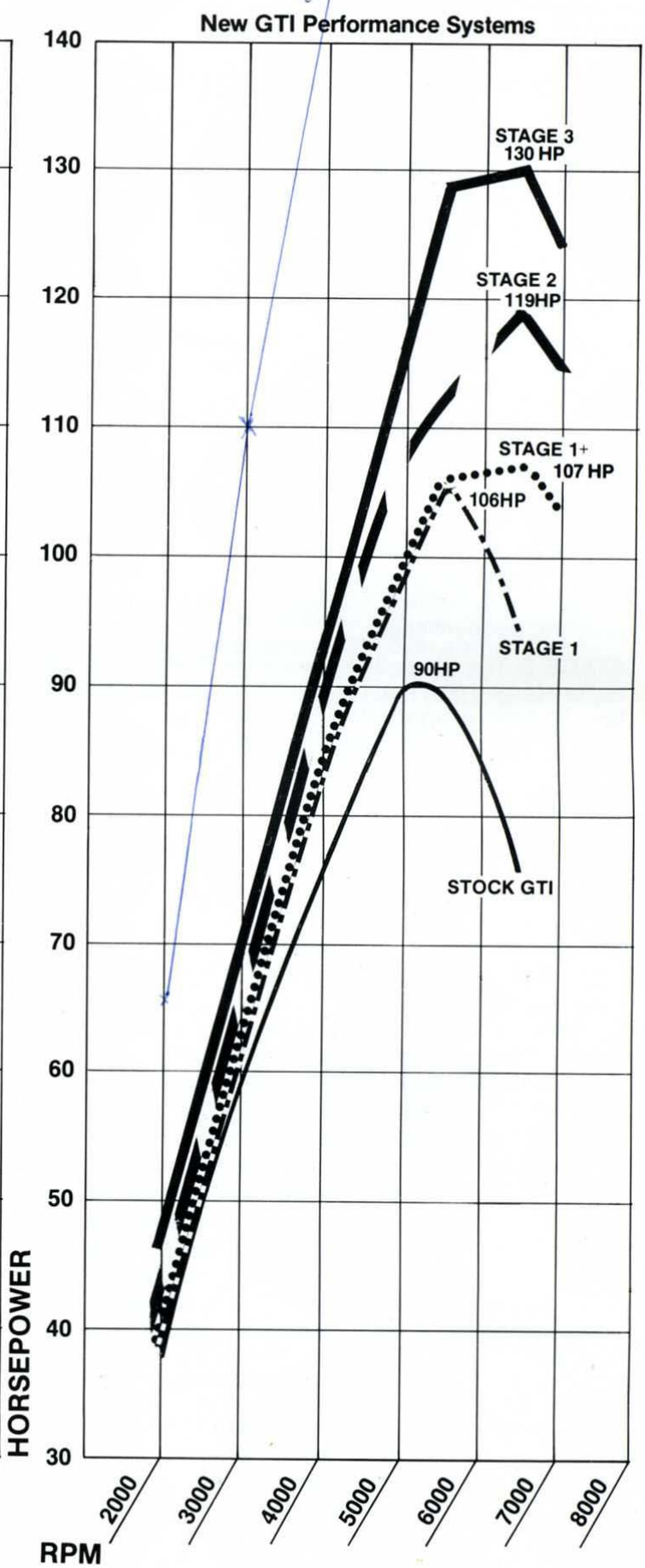
ADDED TIPS FOR HIGH PERFORMANCE

The Volkswagen engine, in stock or modified form, is a hardworking, high-revving engine. Drake's years of experience with the demands of high performance engines leads us to recommend Valvoline 20-50 Racing Oil. All of the Volkswagen engines - whether gasoline or diesel, high performance or stock, need an oil cooler, such as the high quality Drake Street Oil Cooler Kit. Drake also offers a Heavy Duty Oil Pump for high performance applications. One area where the stock oiling system suffers is in hard cornering. The Drake 5 QT. Baffled Oil Pan solves this problem, and features a removable windage tray, dual one-way trap doors (to keep oil around the pickup), where it belongs, and has a five quart capacity. The gold cad-2 plating reduces the heat retention problems associated with the chrome-plated style oil pans.

Drake is an engineering and developement company -- and can undertake any project in automotive high-performance and competition development. We insist on quality in the parts and services which we market. While the parts and services which Drake offers are not necessarily the least expensive, they are often the best value for your money.

ENGINE BUILDING TIPS





HANDLING TIPS

Whether you've modified the engine of your Rabbit, Scirocco, or Jetta or not, you'll want to make sure that the other aspects of the car's performance can match your driving ability and performance expectations.

Luckily for you, simple suspension modifications can give you as big a change in handling characterisitics as Drake's simple engine modifications do for horsepower and torque.

Modifying your suspension can make major gains in every aspect of handling performance in terms of corner traction, stability, steering response, and braking. Like any performance modification, it's important to remember that the big improvements come from the collective benefits of a whole number of individual changes working together. Drake has put together some intelligent choices that make it easy to get your own handling program together. Here's some or our recommendations:

SEQUENCE OF MODIFICATIONS

1. Tire and Wheel upgrade.
2. Shock Absorber upgrade to units with revised valving.
3. Addition of Anti-Roll Bars to reduce body roll.
4. Addition of Stress Bars reducing body twisting.
5. Increase Spring Rate, usually combined with lowering.
6. Reduction of suspension compliance through improved polyurethane bushings.
7. Addition of Front Spoiler.

(See the chart on the next page for results and side effects from these modifications).

1. Wheels and Tires

The first and easiest step is to upgrade the stock tires and wheels. Since those tiny contact patches are your only connection to the ground, it makes good sense to upgrade your tires first.

Stock tires are getting better and better, but even the rubber on the top-of-the-line GTI allows plenty of room for improvement. Most High Performance tires are not just wider, but also lower profile. Moving up from a 5" wide rim and a 175-13 tire to a quality 6" wide wheel and 250/60-13 high performance tire will make a dramatic improvement in handling. And for even higher performance, the "Plus 1" or "Plus 2" concepts of moving up to a 14" or 15" wheel/tire combination is the trick. The stiffer sidewalls of the lower profile tires and increased tread width work with the reduced weight of the alloy wheels to improve handling and steering response.

What's the trade-off? There's some small reduction in ride comfort, nothing serious. The broad stabel tread is less tolerant of running at an incorrect camber angle, ant this is the part of suspension tuning where the real work and benefits begin. Be sure that the wheels you chose have the correct offset so that they will fit correctly on your front wheel drive car.

2. Shock Absorbers

The stock shock absorbers have settings for bump and rebound dampening forces that are a practical compromise for comfort and control over a variety of surfaces, for the average driver.

For high speed touring over mainly asphalt rodes and for the interested, involved driver, the stock settings will be too soft. The stability and responsiveness of the car can be easily improved by fitting a quality aftermarket shock absorber with appropriate valving.

Drake offers your choice of the Drake-Bilstein, Koni or Sachs Sport units with their well-engineered valve settings specifically set up for your performance driving.

If your car is new, you might want to put off the upgrade of the shock absorbers and buy anti-roll bars at this time, then purchase the shocks as the stock units wear out, usually around 10 to 15,000 miles. Due to the suspension design, some installation charges can be saved by putting your shocks and sport springs on at the same time.

3. Anti-Roll Bars

Body roll and weight transfer to the outer loaded wheel during cornering usually produces a wheel camber angle which is detrimental to handling. Because of this, front and rear anti-roll bars can make a substantial difference in cornering power and cornering response. Anti-roll bars are one of the most cost-effective improvements you can add to your car.

The benefits are better tire-to-road geometry and improved cornering response because of a more rapid weight transfer at the entry to the turn. And, just as importantly, the car feels so much better, in addition to working better. The only disadvantages are minimal changes in ride comfort.

Anti-roll bars introduce another variable into the handling equation, namely "front-to-rear balance." The cars come from the factory with a built-in amount of understeer, a conservative way of making the car safe for "less motivated" drivers. Understeer means that you have to turn the wheel more and more to get around a corner faster and faster. For a careful, responsive driver, understeer becomes something of an irritation, cutting down on the capability of the vehicle to be driven, for example, through a series of "S" bends at a steady speed.

Drake offers a complete line of proven anti-roll bars that are designed and manufactured to fit all of the Rabbits, Sciroccos, and Jettas, including upgraded rear bars to improve the handling of the GTI and TLI Jettas. Best of all, this selection of bars will allow you to tailor handling to suit your driving style. Usually, adding a rear bar, or a stiffer rear bar, if you already have a rear bar, will reduce understeer enough to do the trick. We're more than happy to help you with specific recommendations for your applications.

4. Stress Bars

When suspension changes are combined into a complete handling package, the car invites some spirited driving and the loads on the suspension attachment points are increased along with the performance.

Drake's Stress Bar Sets for the front suspension are a simple and very effective way to distribute suspension loading more evenly and to reduce body torsional twisting at the same time. While these easily installed bars contribute a noticable amount to the handling of even a stock Rabbit, Scirocco, or Jetta, they are a must when "going all the way" with your suspension modifications.

NOTE: Drake does not offer a Rear Stress Bar at this time as the design of the VW rear suspension is such that it does not benefit from reinforcing the body structure. Save your money on this one!

5. Springs

Small sedans like the Rabbit, Scirocco or Jetta have relatively high center of gravity, which is not the hot tip for getting around the corners quickly. While anti-roll bars can help this to some extent, the serious driver needs to make more significant changes.

Increasing spring rates have a real benefit for the enthusiast driver for several different reasons. Like Anti-Roll Bars they reduce body roll and help maintain better camber angles. They offer improved stability in braking conditions, and they improve stability in combined pitch/roll conditions, such as when braking into a reducing radius turn. Increased spring rates allow the car to be run lower with less risk of bottoming-out. This in turn lowers the center of gravity.

The disadvantages of increased rate springs are increased ride stiffness and increased transmission of road noise. Drake offers spring ratings which are selected to minimize these problems on road-going cars, as well as spring sets for the all-out racing application. Our recommendation is to go conservative with your spring selection, as what feels good for five

minutes might be difficult to live with for five hours.

6. Front Spoiler

While a Front Spoiler has little effect in low speed cornering, the right spoiler will make a big change in high speed handling and stability. An added plus is the reduction in drag, and corresponding increase in gas mileage that a good front spoiler guarantees.

We've put together the chart that follows to show you some of the advantages and trade offs of each of each of these modifications. Now all that's left is for you to start taking those steps to make your car's performance live up to its best!

MODIFICATION: Tire and Wheel Upgrade
RESULT: Great improvement in adhesion on dry pavement, usually with a gain in wet grip as well.
TRADE-OFFS: Full benefits gained when used in combintion with suspension changes. Some increase in tire and road noises possible.

MODIFICATION: Shock Absorbers
RESULT: Improved control of wheel movement, better stability and improved steering response.
TRADE-OFFS: Possible ride harshness, making continued use on rough pavement unacceptable. Loads and stresses on shock and suspension attachment points are increased.

MODIFICATION: Anti-Roll Bars
RESULT: Understeer can be controlled as desired, responsiveness improves and roll in cornering is noticeably reduced.
TRADE-OFFS: Possible minimal change in ride quality.

MODIFICATION: Addition of Stress Bar Set
RESULT: Transfers loads from shock attachment points to the rest of the body structure. Increases torsional stiffness of the body structure.
TRADE-OFFS: None.

MODIFICATION: Stiffer Spring Sets
RESULT: Allows the car to be run lower, reduces pitch, roll and dive, usually improving both cornering and braking performance.
TRADE-OFFS: A noticable reduction in ride quality and some increase in vibration and road noise from irregularities in the pavement.

MODIFICATION: Polyurethane Bushings
RESULT: Reduces suspension bushing compliance, increasing turn-in response and ultimate cornering power. Particularly noticeable on high powered cars.
TRADE-OFFS: Increase in vibration and road noise from irregularities in the pavement.

MODIFICATION: Front Spoiler addition
RESULT: Worthwhile drag reduction , especially when run close to the road with lowered suspension. Usually produces positive downforce of front wheels with gains in adhesion in high speed corners. Increases straight line stability in a cross-wind.
TRADE-OFFS: Possibly vulnerable to damage from curbs, drive ways and car washes.

At Drake Engineering we believe in putting fun into the driving of your Rabbit, Scirocco, Jetta or GTI, so theat even short trips are enjoyable, and a longer association with an up-dated car becomes a rewarding experience. The benefits and changes can be either mild or dramatic, and we've provided these notes here to outline the "cause and effect" of suspension modifications with the idea of guiding you to the level of modification that most suits your intended type (racing, autocross, rallies, or to the market quickly) of driving. And don't forget -- chassis modifications are a necessary and natural compliment to a Drake engine with increased horsepower and responsiveness.

The first step towards modifying your car is to be realistic in your objectives. The correct choice of Drake Engineering components combined with those from other suppliers will make a noticeable improvement in performance and handling. Isn't it time to take that next step?

SHOP SERVICES

Drake Engineering offers a complete line of machine shop services for racing and performance engines, or for someone who cares what quality goes into his or her engine.

All of the shop's staff is well trained in the use of the Drake equipment. Some of the equipment includes: lathes, mills, Sunnen CK-10 Hone, the very best in precision measuring equipment, balancing machines, and a Heenan-Froude dynomometer capable of a constant 1000 horsepower at up to 10,000 RPM (14,000 RPM maximum capacity) coupled with a computer monitor system to facilitate accurate testing.

Services offered: Complete cylinderhead modifications including porting & polishing, valve grinding, resurfacing, R & R guides, install bigger valve seats (using much tighter interferance fits to prevent loss of seats during running) assembling heads, and grinding cams. **Crankshaft Services:** Magnifluxing, drill and tap the oil passages (to clean out sediment built-up in the top of passage which can come loose and clog bearings), straighten crank, micro polish and tuftride. **Rod Services:** Magniflux rods. bolts and nuts, resize big ends, rebush and hone small ends, polish beams, shotpeen, lighten small ends, balance and machined for SPS bolts.

Balancing Services: Crank, rods, pistons and pins, flywheel and clutch. **Block Prep:** Drill and tap oil galley for pipe plugs, tank block, deburr block, clearance grind for long stroke, deglaze and hone bores, mill deck, align bore mains and hone, pressure test, CC. and race prep. **Other services:** Machining custom pistons, flywheel resurfacing, (Drake does not recommend lightening the flywheel because of the possible danger of disintegration, also the heaver flywheel gives better crankshaft harmonics for longer crankshaft life.), recurving distributors for both vacuum advance (recommended on cars with single carbs or CIS injection, or turbos), mechanical advance recurves (recommended only for cars with dual carburetors), complete engine building and dynomometer run-in and testing, as well as the design and development of new products or engines.

Racing development and experience runs deep with the Drake engineering staff. Experience from building Indy 500 winning race engines, to recent twin-cam development for racing and performance engines.

If any special needs are requested, please feel free to contact the Drake team.