VAS 9012322

2-1/2” Travel Strut with Integral Spindle
Installation and Tuning Guide

DESCRIPTION: DRAG QUICKSET 2, 2-1/2”” TRAVEL, STEM STRUT SPINDLE SUSPENSION SYSTEM, INCLUDES QUICKSET 2 INTEGRAL SPINDLE, 3/4 x 5/8-18 STEM MOUNT, 2-1/2” TRAVEL STRUT, CONTROL ARM, BRAKE KIT, AND SPRINGS

NOTE: UPPER STRUT MOUNTS VAS 505-102 OR VAS 505-103 REQUIRED FOR INSTALLATION

Shock Specifications

Part Number	Valving	Mounting		Total Travel	Compressed Length*	Extended Length*	Ride Height*		Spring Length
		Upper	Lower				Min.	Max.	
VAS 9012322	Double	3/4” Stem (Uses 3/4” bearing with adapter hardware)	3/4” Stem	2.50”	11.75”	14.25”	12.75”	13.25”	6”

* Strut length is measured from center of upper to the center of the lower spherical bearing.

PART LISTS

Items for 2-1/2” Travel Stem Mount VariStrut (VAS 9012322)

Part Number	Qty	Description
6191	1 pr.	Control arm set, VariStrut
6192 or 6193	1	Rod end kit for control arms
VAS 511-2231	1 pr.	Stem strut body assembly, QuickSet 2
VAS 502-100	1	Strut stud base and steering arm
VAS 506-104	1	Strut 3/4” stem mount and flat spring seats
VAS 21-06XXX	1 pr.	VariSpring 2-1/2” ID, 6” Length (pair)

VAS 502-100 – Strut Stud Base and Steering Arm

Part Number	Qty	Description
2019	2	Spindle washer 1-1/2” x 3/4”
3108-038H-S	4	Lock washer 3/8” high-collar
3122-038C1.00B	4	12-point flange bolt 3/8-16 x 1”
3145.156-1.00C	4	Cotter pin 5/32 x 1” long
3630	2	Castle nut 3/4-20 steel
3174-250-0.75S	6	Dowel pin .25 diameter x .75 long
899-052-200	2	Base extension for integral spindle strut
899-052-201	2	Steering arm for integral spindle strut, 3/8-24
899-052-203	2	Strut control arm pivot stud
899-052-204	2	Pivot spacer lower strut pivot
899-057-625-18	2	Castle nut 5/8-18 steel

VAS 506-104 – Strut 3/4” Stem Mount and Flat Spring Seats

Part Number	Qty	Description
1268	2	Safety nut 5/8-18 stem strut
1333	2	Thrust stand .752 bore x .465 offset
3106-31CK0.25SP	4	Set screw 5/16-18 x 1/4” cup point
3117-063-18C	2	Half locknut 5/8-18 nylon insert
899-002-200	2	Lower spring seat
899-002-202	2	Upper spring seat
899-013-203	2	Bumper stop for 7/8” shaft
899-017-2431-22	4	Detent spring
899-018-250	4	Stainless steel ball .250 diameter
899-053NTA-1625	2	Thrust bearing 1” bore x 1-1/2” OD
899-053TRA-1625	4	Thrust washer 1” bore x 1-1/2” OD

Optional Upper Chassis Strut Mounts

Part Number	Qty	Description
VAS 505-102	1	Strut Chassis Mount, COM-12, Fixed Height
VAS 505-103	1	Strut Chassis Mount, COM-12, Adjustable Height

Items for Spindle Mount Wheel Brake Kit (8364)

Part Number	Qty	Description
3915	1	Brackets Single Piston Caliper Set
3918	1	Light Duty Slotted Rotor, 10-1/4” Diameter (pair)
3919	1	Hat Set for 10-1/4” Diameter Rotor (pair)
3988	1	Billet Single Piston Dynalite Caliper & Pads (pair)

Items for Light Duty Brake Kit (8365)

Part Number	Qty	Description
3905 or 3906	1	10” Solid Rotor Set, Slotted (pair)
3914	1	Light Duty Billet Hubs & Bearings (pair)
3916	1	Brackets Two-Piston Caliper Set
3996	1	Billet Two-Piston Dynalite Calipers & Pads (pair)

Items for Medium Duty Brake Kit (8366)

Part Number	Qty	Description
3903 or 3904	1	11-3/4” Solid Rotor Set, Slotted (pair)
3910	1	Medium Duty Billet Hubs & Bearings (pair)
3917	1	Brackets Four-Piston Caliper Set
3989 or 3990	1	Forged Four-Piston Dynalite Calipers & Pads (pair)

INSTRUCTIONS

CHASSIS MOUNT INSTALLATION

Note: A spherical bearing upper mount is required for use with the 2-1/2” travel strut (VAS 9012322). The spherical bearing allows the strut piston shaft to rotate and misalign without binding. The use of urethane stem mounts can cause damage to the strut’s piston shaft over long term use. We offer two styles of spherical bearing upper chassis mounts: VAS 505-102 (fixed height) and VAS 505-103 (adjustable height).

Assemble Strut Base and Steering Arm

1. Insert the three dowel pins into the holes on the bottom of the strut.
2. Slide the base extension block over the dowel pins. Use a rubber mallet to seat the extension tightly against the strut base. Be sure to keep the extension block square to the strut base as it is tapped into position.
3. Loosely secure the steering arm to the extension using a 3/8” 12-point bolt and lockwasher. Use a drop of 277 Red Loctite™ on each bolt.
4. Put three drops of 277 Red Loctite™ on the threads of the control-arm pivot stud and screw into the extension block, through the steering arm. Be sure this the end of the stud that **does not** have the cotter pin cross hole in it.
5. Torque the two 12-point bolts to 30 lb-ft.
6. Torque the pivot stud to 80 lb-ft.
7. Repeat this procedure for the second strut. The steering arm must face the opposite direction to create driver- and passenger-side strut assemblies.

Determine the Vehicle Hub-to-Hub Width

8. Measure the width between the front fenders. You will need 4-5” of clearance from the outside sidewall of each tire to the inner front fender lip. Example: **70**” between fenders **minus 10**” (five inches for each tire) **equals 60**” outside tire width.
9. Measure the wheel offset. Place a yardstick across the outside sidewall of the tire and measure from the yardstick through the center of the wheel to the wheel surface that will contact the hub. Subtract the offset of each wheel from the outside tire width. Example: **60**” outside tire width **minus 6**” (three inches for each wheel) **equals 54**” hub-to-hub width.

Estimate the Tire Rolling Radius

10. Measure the overall tire diameter and divide this measurement by two. This is the radius of the tire without the weight of the vehicle. Example: **25**” overall tire diameter, **divided by 2**, **equals 12.5**” unloaded tire radius.
11. Estimate how much the tire will compress when loaded with the weight of the vehicle and subtract this measurement from the unloaded tire radius. The tire manufacturer may be able to supply you with this dimension. Example: **12.5**” unloaded tire radius **minus .5**” tire compression, **equals 12**” rolling radius.

Prepare the Strut for Mock-up

12. Place the thrust stand and spherical bearing onto the stem of the strut and temporarily secure with the safety nut.
13. Place the lower control arm spherical bearing onto the strut-base stem and temporarily secure with the castle nut.
14. Adjust the strut valves to their softest setting.
15. Adjust the strut to its ride-height length of exactly 13” measured from the center of each spherical bearing.
16. Adjust the strut valves to their highest setting to help hold the strut at the correct length.

Position the Strut

17. Position the strut so that the centerline of the axle matches the fore/aft position shown on your chassis drawing. The axle centerline should be marked on the chassis and drawn along the ground for future reference.
18. Using half of the hub-to-hub width, position the strut at the correct distance from the centerline of the vehicle.
19. Support the strut so that the centerline of the axle is at the rolling radius height from the ground.
20. The hub face must be parallel to the vehicle centerline and perpendicular to the ground.
21. The strut body will lean toward the vehicle centerline 10-degrees with the center of the stem bearing 6.125” closer to the centerline than the hub face. Example: **27**” hub to centerline **minus 3.621**”, **equals 23.379**” from the stem bearing to the centerline of the vehicle.
22. With the strut length at 13”, as previously adjusted, the center of the top bearing should be exactly 8.1” above the axle centerline.
23. Lean the strut body toward the rear of the vehicle the number of degrees for which you need to set strut caster.
24. Mark the position of the upper and lower spherical bearings on the ground, using a plumb bob and measuring from the vehicle centerline and axle centerline.
25. Using the strut and upper mount assembly, the chassis’ forward strut tube can be positioned.

NOTE: *THE DIMENSIONS GIVEN FOR CONTROL ARM MOUNTS AND INNER-TIE-ROD PIVOT POINTS ARE SPECIFIC TO RACK AND PINIONS WITH A 24.5” PIVOT-TO-PIVOT WIDTH. IF USING A RACK WIDTH OTHER THAN 24.5” ALL SUSPENSION AND STEERING GEOMETRY MUST BE CALCULATED TO DETERMINE CORRECT PLACEMENT OF THE STEERING AND SUSPENSION COMPONENTS.*

Control Arm Mounts

The control arm mount points are referenced from the vehicle and axle centerlines. Dimensions given are measured from relative centerline to the center of the rod end’s spherical bearing.

26. Both front and rear control arm mounts are 12.25” from the vehicle centerline and 5.875” below the axle centerline. Example: **12**” rolling radius **minus 5.875**”, **equals 6.125**” from the ground.
27. Rear mounts are 3” behind the axle centerline.

28. Forward mounts are 13.625” in front of the axle centerline.
29. Chassis mounts must be positioned so that the rod ends are not misaligned.

Inner Tie-Rod Pivot Points

The tie-rod pivot points are referenced from the vehicle and axle centerlines. Dimensions given are measured from relative centerline to the precise point on which the inner-tie-rod pivots. The rack and pinion must be positioned to meet each of the required dimensions.

30. The inner tie-rod pivots are 12.25” from the vehicle centerline and 4.145” below the axle centerline. Example: **12**” rolling radius **minus 4.145**”, **equals 7.855**” from the ground.
31. The inner tie-rod pivots are 8.570” forward of the axle centerline.

Verify Steering and Suspension Geometry

32. Once all components are tack welded into position adjust the strut valves to their softest setting and manipulate the strut through its entire range of travel to measure bumpsteer and check for binding of any components. Any issues must be corrected at this time.

Strut Installation

Once the chassis and mounts have been completely welded and are ready for final installation of the strut, the coil spring, spring seats, and upper stem hardware can be installed.

33. Any hardware temporarily installed onto the strut stem should now be removed.
34. Apply anti-seize to the threads on the inside of the lower spring seat and screw onto the shock body until it is 1” from the strut base. The spanner wrench notches in the spring seat go toward the base of the strut. Make sure the ball-lock setscrews are backed-off enough to easily turn the spring seat.
35. Place the spring over the strut followed by the bump stop and upper spring seat.
36. Liberally grease and then install the thrust bearing assembly followed by the thrust stand.
37. Insert the strut stem through the upper-mount spherical bearing and secure with safety nut.
38. With the strut at full extension, screw the lower spring seat upward to remove any freeplay between the spring and upper spring seat. There should be approximately 1.7” between bottom of the lower spring seat and the strut base.
39. Tighten the set screws to lock the lower spring seat until you are ready to adjust spring preload to correct ride height.

Install the Brakes

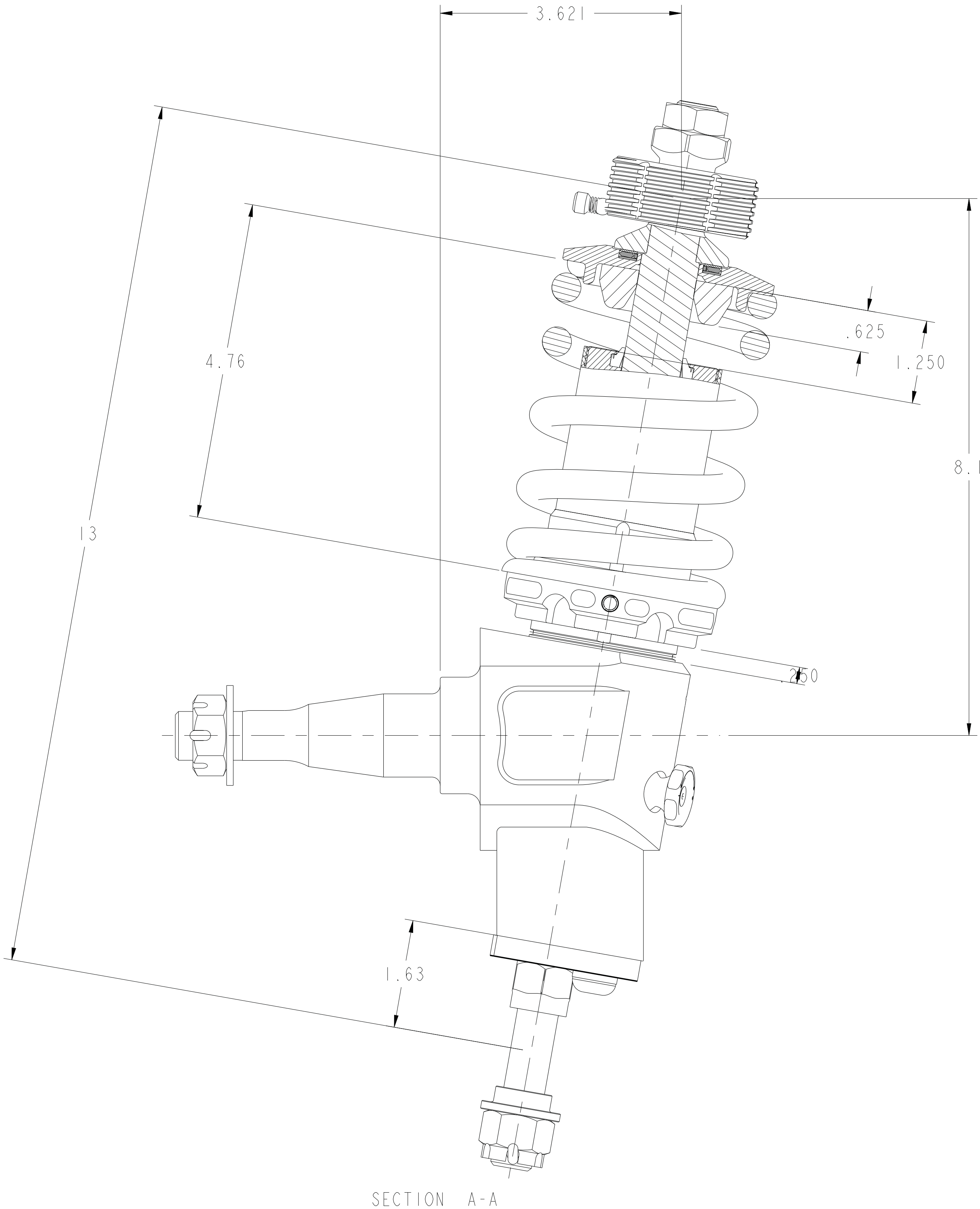
Refer to the installation guide included with your brake kit for specific instructions.

Spindle Mount Brakes (Part No. 8364) are for light vehicles and must always be used with a parachute. These brakes provide very little braking and are designed to be extremely light. ONLY FOR USE WITH Weld Racing Wheels - Alumastar 2.0 (788-15001) and Magnum Pro (786-15001 or 786P-15001) and American Racing Wheels - Torq Thrust® Pro (48553S) and TrakStar (48053SBC or 48053S).

Light Duty Brakes (Part No. 8365) are also for use on light cars. They provide a braking power similar to that of the spindle mount brakes. It is a little heavier because it is designed for a bolt-on wheel. It will have a little better rotor and pad life than the spindle mount brake. It also must be used with a parachute.

Medium Duty Brakes (Part No. 8366) provide much more stopping power and are recommended by Chassisworks for use whenever possible. This kit will provide better pad and rotor life. A parachute is recommended but many lightweight cars have had good pad and rotor life without one. It is your responsibility to determine the safest way to operate your vehicle.

DRAWINGS DEPICT STRUT AT RIDE HEIGHT OF 13".



VariStrut Adjustment and Tuning Guide - QuickSet 2

This guide covers adjustment features and tuning procedures for VariStrut QuickSet 2, double-adjustable strut. The information contained has been greatly simplified and is only intended to get you started in the right direction. Suspension tuning involves multiple variables such as: spring rates, antiroll bar rates, vehicle weight distribution, tire sizes, tire pressures, suspension geometry, and track conditions. We highly recommend thoroughly researching suspension tuning and vehicle dynamics, or consulting an experienced professional.

Travel Limiters

Struts are not to be used as travel limiters. An extension travel limiter, such as a strap or cable, should be used to prevent topping out and damaging the struts. The installed compression bumper protects the strut if bottomed out during normal use. If the bumper shows signs of wear or damage it must be replaced immediately. Never operate a vehicle with a missing or damaged bumper. Vehicles that consistently land harshly from wheel stands should use a higher rate spring along with some form of suspension stop to limit compression travel without directly impacting the strut body. Any strut will be damaged if the car is dropped from a wheel stand.

Ride Height

When a strut is at ride height a certain amount of travel is available in either direction. Drag race vehicles generally require more extension (rebound) travel to help weight transfer, and because the drag strip is very flat, less compression travel is needed. The amount of extension travel available in the strut will drastically affect how the car works. The VariStrut drag race strut has 2.5” of travel. At baseline ride height, the strut and spring should collapse a maximum of 1.25” from their installed heights. This results in 1.25” of available extension travel and 1.25” of compression travel.

Baseline Spring Rate Selection

Spring rate affects ride quality, ride height, stored energy, weight transfer and how effectively the front suspension handles downward movement after the launch. Differences in vehicles such as specific performance application, weight reduction and chassis stiffening should be taken into consideration. Additional springs can be purchased for tuning purposes. The recommended spring rates are based on the combination of front end weight of the car and baseline strut ride height. Put scales under the front tires to determine the actual weight, and then refer to the baseline spring rate chart. The recommended rate assumes that the strut travel is at the designed ride height with the strut collapsed 1.25”.

6” Spring Rate Baseline

Front Vehicle Weight (lbs)	Rate (lb/in)	Spring Travel (in)	Maximum Preload (in)	Part Number
1175-1550	500	3.62”	.995”	VAS 21-6500
1300-1800	550	3.56”	.935”	VAS 21-6550

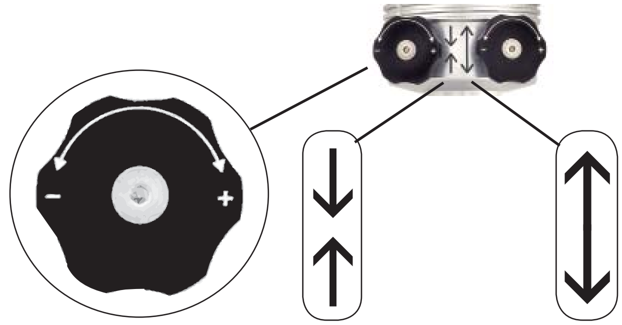
Spring Preload

The threaded lower spring seat is used to adjust spring preload. Compressing the coil spring to any length shorter than it’s free height, with the strut fully extended, is considered preloading the spring. If you adjust the spring seat to change the vehicle’s ground clearance, be aware that you will be adding or subtracting travel in the front strut. Usually when lighter-than-baseline spring rates are used it is necessary to add preload to achieve the correct balance of travel and ride height. If preload has been added make sure there is adequate spring travel remaining to prevent coil bind before the strut is fully collapsed. (Refer to the Spring Rate Baseline chart.)

Tuning with Spring Rate

A drag race car should run the lightest front spring rate possible, without letting the struts bottom out when making a pass. As a general guideline, lighter springs allow the car to easily transfer weight, and settle faster down track. Changing spring rate affects ride height and the rate at which weight is transferred to the rear tires. A softer rate makes the front easier to raise during acceleration. A stiffer rate makes the front harder to raise during acceleration. If you are having trouble getting the front end to rise, you can soften strut rebound valving or change to a softer spring. When using lighter rate springs preload must be added by screwing the lower spring seat upward, compressing the spring to achieve proper ride height. In general terms, the worse a car hooks the more strut extension travel it will need. If you need more extension travel, preload can be removed to lower ride height. Using this method will cause the car to have less ground clearance and reduce the amount of compression travel. If you are going to operate the strut at a ride height shorter than recommended, the upper chassis mounts must be relocated to correct any major vehicle ride height issues. It may take some work with spring rates and upper mount relocation to get the correct combination of vehicle ride height and front suspension travel for your application.

Adjustment Features



The QuickSet 2 valve system features dual adjustment knobs that independently control bump- and rebound-damping stiffness of the strut. Dual-arrow symbols engraved into the strut body demonstrate the function of each knob. Arrows pointing toward each other designate bump (compression) adjustment; the strut collapsing. Arrows pointing away from each other represent rebound (extension) adjustment; the strut extending. Knobs are clearly etched indicating the correct direction of rotation to decrease (-), or increase (+) damping stiffness. There are 16 specific adjustment positions for each knob, with a total of 256 unique combinations possible.

Symbol	Direction	Effect
+	Clockwise	Increase Stiffness
-	Counter-Clockwise	Decrease Stiffness
↓↑	Bump (compression) Adjustment	
↕	Rebound (extension) Adjustment	

Position 1, the softest setting, is found by turning the knob in the counter-clockwise direction until the positive stop is located. Rotating the knob in the clockwise direction increases damping stiffness. Each of the 16 settings is indicated by a detent that can be felt when turning the knob, and an audible click as the knob gently locks into position. Only very light force is necessary to rotate the knob past each detent. If access to the adjustment knobs is limited, a 5/64 ball-drive Allen wrench can be used to adjust the knob. Do not force the knob beyond its intended stop, doing so will damage the valve mechanism.

Note: VariStruts have a substantial range of adjustment with very little bypass or internal bleed. Due to our minimal-bleed design, struts will feel extremely stiff at some settings when operated by hand, whereas other struts with excessive bleed will move more freely. Manual comparison should not be performed. A person cannot manually operate the strut at a rate anywhere near real life conditions and any results found in this manner will be meaningless. Prior to shipping, every VariStrut is dynamometer (dyno) tested and calibrated throughout an accurate range of shaft speeds and cylinder pressures found in real-world operation.

The Truth About 16- vs. 24-Clicks

Don’t be fooled by struts offering more adjustment clicks. They are actually 1/2-click adjustments. The manufacturer merely added more detents to the mechanism without increasing the range of adjustment. This practice gives more clicks, but the adjustment is so slight that your vehicle will not respond to the change. A 16-position VariStrut actually has a broader range of adjustable force with the added benefit of a more manageable number of adjustments to try.

Tuning Procedures - QuickSet 2

VariStrut’s broad range of adjustment is suitable for the unique vehicle dynamic requirements of drag racing. A properly tuned drag race suspension effectively controls weight transfer and maintains traction throughout launch and each gear shift. Before proceeding verify that all suspension components, such as control arms, balljoints, and bushings are in acceptable condition and that tire pressures are correctly set.

Tuning for Drag Racing - QuickSet 2

Required settings for drag racing applications vary greatly depending upon, vehicle weight, weight distribution, suspension geometry and travel, horsepower, and available traction. A properly tuned drag race suspension enables the vehicle to launch straight while transferring weight to the rear tires in an efficient, controlled manner. Extensive testing and adjustment is critically important when operating your vehicle at or near its performance limits. Testing must be done in a safe and controlled environment, such as a dedicated motorsports facility. It is generally better to tune struts and shocks according to improvements in ET’s (Elapsed Times) rather than for specific occurrences such as the amount of wheel-stand. Due to differences in weight distribution, wheel base, tire size, and horsepower, not all vehicles leave the starting line in the same manner once their suspension has been optimized. Watch your ET’s and if your times start to get slower return to the prior adjustment. Once you have completed the following procedures, only fine adjustments may be needed to tune for specific track conditions.

Prior to Testing

Make certain that wheelie bars are raised as high as possible while maintaining control and eliminating their influence as much as possible on damper settings. Begin with struts adjusted to the number 3 position for bump and rebound.

Initial Testing

First verify that the vehicle tracks straight before aggressively launching from the line. Begin with light acceleration and low speeds. If the vehicle tracks and drives acceptably at this level, make incremental increases in acceleration and top speed until the vehicle is safe at higher speed. Vehicles not tracking straight at speed should verify all chassis settings including but not limited to alignment, bump steer, tire pressures, etc. Once the vehicle drives in a safe manner at speed, move on to test launching.

Test launches should consist of only the initial launch with no subsequent gear changes. Begin with low rpm launches and gradually increase rpm and severity if the car launches acceptably. At this time we are only determining that the car launches in a controlled manner to avoid damaging components or the vehicle. The vehicle should leave in a straight line without extreme wheel standing or harsh bounces. Sudden, uncontrollable front end lift should be corrected by making suspension instant center adjustments, if possible. More gradual front end lift can be corrected by adjusting the strut valving. If the car gradually wheel stands or bounces violently, adjust front suspension first, then rear. If there is rear tire shake, wheel hop or excessive body separation, adjust rear suspension first, then front. If your car is launching severely to the right or left, first check that the rear end is centered and there is no preload adjusted into the rear suspension. If the car still launches severely to the right or left, you will have to add preload to the rear suspension. If everything checks out okay and the car only minimally drives to the right or left, you can stagger the rear shock valving to correct this.

Use of a double-adjustable QuickSet 2 will allow the following procedure.
When a vehicle launches slightly toward the right, rebound (shock extension) stiffness is added to the driver side and bump (shock compression) stiffness is added to the passenger side. A vehicle launching slightly toward the left would make the opposite adjustments. It is not recommended to have more than two clicks difference side to side for either bump or rebound. Rear shock adjustments are only applicable to correcting the launch and will have little to no effect on down track performance.

After the car has been adjusted to launch straight, test launch and include the first gear change. Make any required adjustments and add the next gear change. Repeat until the car can be launched straight and driven at speed safely. The car is now ready for fine tuning to optimum results.

Front Strut Adjustment

Pay close attention to what is happening to the front end during launch. Your goal is to eliminate all jerking or bouncing movements during launch and gear shifts. Ideally the front end should rise in a controlled manner, just enough to keep the rear tires loaded, then continue the pass with smooth transitions at all times. Front end rise without any appreciable traction gain is wasted energy that should be used to propel the vehicle forward instead of up. While testing, document your ET’s along with any changes made. If ET does not improve, return to previous settings.

Front Rebound (Extension) Adjustment Overview

Too light of a rebound (extension) setting allows excessive front end chassis separation and may result in the front wheels jerking violently off the ground during launch. Also, during gear change, too light a setting allows the car to bounce off its front rebound travel limiter and then bottom out in an oscillating manner. Too firm a setting will prevent the front end from rising sufficiently, limiting the amount of weight transferred to the rear tires. Adjust the rebound setting in one click increments to control the rate at which the front end rises at launch and during gear changes. While testing, document your ET’s along with any changes made. If ET does not improve, return to previous settings.

Front Wheels Lose Contact with Ground	Increase Rebound Stiffness	Violent chassis separation and may result in jerking the front wheels off the ground. Increase strut rebound stiffness by one, then test again.
Rear Tires Hook Then Lose Traction	Increase Rebound Stiffness	If weight transfer occurs too quickly the rear tires may hook then lose traction as the front end begins to travel downward. Slowing the rate at which the front end rises prevents the struts from topping out too quickly and increases the duration of time that the rear tires benefit from the weight transfer. Increase strut rebound stiffness by one, then test again.
No Front End Rise	Decrease Rebound Stiffness	Too firm of a damper setting limits the amount of weight transferred to the rear tires, resulting in poor traction. Decrease strut rebound stiffness by one, then test again.

Front Bump (Compression) Adjustment Overview
After the launch or during a gear change, a firm bump setting will cause the chassis to bounce off the front tire as the chassis settles down. Too light of a bump setting allows the strut to bottom out and bounce off the stop travel bumper. Adjust bump in one click increments to control the amount and rate at which the front end settles during gear change. While testing, document your ET's along with any changes made. If ET does not improve, return to previous settings.

Front "Bottoms Out" After Launch	Increase Bump Stiffness	If front suspension settles too fast after launch or gear change it may cause the front suspension to bottom out at the end of its downward travel. If the suspension bottoms out hard enough, rear traction may be lost. Increase strut bump stiffness by one, then test again. If increasing bump stiffness cannot extend weight transfer duration long enough, a higher rate spring should be installed.
Hard Front End Bounce (After Launch or Gear Change)	Decrease Bump Stiffness	If the tires cause the front end to bounce upon landing, the struts are too stiff. The front end should settle in a single, smooth motion. Decrease strut bump stiffness by one, then test again. This can be a very subtle problem. Watch the front tire sidewall as it contacts the ground.

Rear Shock Adjustment (Double Adjustable)
Maintain traction by controlling the rate at which torque and weight is transferred to the rear tires. Ideally the rear suspension should be as firm as possible before a loss of traction occurs. Changes to the vehicle such as ride height, tire size, weight distribution, or suspension link adjustments will alter the instant center location in relation to the vehicle's center of gravity. Any shift of either the instant center or center of gravity will usually require a shock setting adjustment to optimize traction. While testing, document your ET's along with any changes made. If ET does not improve, return to previous settings.

Rear End Squats	Increase Bump Stiffness	Some vehicles will squat during launches instead of pushing the vehicle forward. To assist in planting the tires, increase shock bump stiffness by one, then test again.
Vehicle Separates from Rear End	Increase Rebound Stiffness	Some suspension geometries plant the tires so forcefully that the rear end of the vehicle rises away from the housing too rapidly. The vehicle may hook initially, then spin the tires once the shocks are topped out. Slowing the rate at which the rear end rises increases the duration of time that the rear tires benefit from the improved traction. Increase shock rebound stiffness by one, then test again.
Loss of Traction with Minimal Chassis Movement	Decrease Bump/ Rebound Stiffness	A suspension system that is too stiff can hit the tires too hard, causing a loss of traction. Softening the suspension slows the transfer of weight and reduces the initial tire shock. Minimal chassis movement makes if very difficult to visually tell if the bump or rebound needs to be decreased. We suggest adjusting bump first and watch for a gain or loss in the ET. If ET does not improve, return to previous setting, then adjust rebound instead and test again.

Completion of Testing
When all adjustments have been completed, reset your wheelie bars as low as possible without affecting your ET.

NOTES:

WARRANTY NOTICE:

There are NO WARRANTIES, either expressed or implied. Neither the seller nor manufacturer will be liable for any loss, damage or injury, direct or indirect, arising from the use or inability to determine the appropriate use of any products. Before any attempt at installation, all drawings and/or instruction sheets should be completely reviewed to determine the suitability of the product for its intended use. In this connection, the user assumes all responsibility and risk. We reserve the right to change specification without notice. Further, Chris Alston's Chassisworks, Inc., makes **NO GUARANTEE** in reference to any specific class legality of any component. **ALL PRODUCTS ARE INTENDED FOR RACING AND OFF-ROAD USE AND MAY NOT BE LEGALLY USED ON THE HIGHWAY**. The products offered for sale are true race-car components and, in all cases, require some fabrication skill. **NO PRODUCT OR SERVICE IS DESIGNED OR INTENDED TO PREVENT INJURY OR DEATH**.

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