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INSTALLATION, ASSEMBLY, AND SERVICE INSTRUCTIONS
FOR
SINGLE AND DOUBLE ADJUSTABLE ULTRA STRUTS

Kit Parts #	Stroke (in.) *bump rubber installed*	Adjustability
S3600	2.50	Extension
S3602	3.63	Extension
S3900	2.50	Extension & Compression
S3902	3.63	Extension & Compression

BEFORE YOU BEGIN INSTALLATION:
Strange Engineering Ultra struts and associated brakes are for **DRAG RACING ONLY**! The basic guidelines for strut geometry are covered, however, a professional and qualified chassis shop should perform the welding to ensure correct alignment of the front end and sufficient weld integrity. In addition, assembly should be performed by a professional & qualified mechanic. Read these instructions thoroughly and save for future reference. If after reading these installation instructions, you have any questions or comments, please do not hesitate to call us.

INTRODUCTION:
Strange Engineering Ultra struts, like the forged aluminum struts, provide the basis for a lightweight front suspension that is particularly popular for Pro Stock and all types of Sportsman cars. Frame construction is much simpler, suspension geometry is more easily established, and header clearance is improved over conventional A-frame suspension. In addition, Strange strut suspension systems offer a reduction in front vehicle weight. Compared to a lightweight tubular A-arm suspension, a savings of at least 15 lbs. can be expected.

FEATURES & BENEFITS:
The main body of the Ultra strut is made out of heat treated 17-4 stainless steel. It provides strength characteristics very similar to that of heat treated 4340 steel. National Aerospace Standard (NAS) hardware that exceeds grade 8 specifications is used to attach the steering arms and caliper mounts. The Ultra strut offers several advantages over the aluminum strut. The design is more compact and placed closer to the wheel, allowing for more flexibility in the engine bay. The overall height is the same or less than the aluminum strut while providing more available stroke. The piston and rod design of the Ultra strut promotes a more stable design at full extension increasing rigidity and usable life.

LIGHTWEIGHT BRAKE KITS:
Ultra struts are designed with an Anglia style spindle for use with spindle mount wheels which use direct mount (lightweight) brake kits. These wheels utilize an integrated hub assembly. Only one large nut holds the wheel to the strut. This system is used primarily in Pro Stock, Pro Modified, or Comp. Eliminator cars. Due to the limited size of the brakes, this system should only be used with vehicles deploying a parachute. Otherwise, premature pad wear and rotor warpage may occur.

CUSTOM VALVING:
Ultra struts have a wide range of adjustability, however, if you prefer to have lighter or stiffer than normal strut valving for compression or extention, we can change the valving range utilizing our in house strut/shock dyno. Dyno checking is also useful to ensure that older struts are performing properly and to provide feedback as to how the struts are currently adjusted. Contact Strange for pricing and/or additional information in regard to dyno checking and revalving.

CUSTOM STROKES:
The Ultra struts are available in two stroke lengths of 2.50" and 3.63".
Custom shorter strokes can be achieved that will not affect compressed length, but will shorten extended length.

MAINTENANCE:
Regular maintenance would include a yearly inspection of wheel bearings and seals. Check the lower control arm ball assembly for excessive play. Look for any leakage of fluid where the shaft enters the strut body. With the strut at full extension, rock the shaft back and forth. The shaft is least supported in this position so wear would be most evident in this condition. Expect a little play, but anything seeming excessive should be sent in for inspection. Also, check all fasteners to be sure they are torqued to proper specifications.

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Common Components Between All Kits *(Internal components are not listed. Only serviceable by Strange Engineering)*

Item#	Part#	Qty.	Description
1	S3400L	2	Cotter Pin
2	S3400J	2	Stamped Retainer
3	S3400H	2	Spindle Nut (Dorman 615-072)
4	B4600K	2	Spindle Key Washer (Dorman 618-011)
5	B4600I	2	Outboard Bearing Cone Timken A6075
6	B4600J	2	Outboard Bearing Cup Timken A6162
7	B4600E	2	Inboard Bearing Cup Timken L44613
8	B4600F	2	Inboard Bearing Cone Timken L44649
9	B4600G	2	Bearing seal *(National #481181N)*
10	S3600A	2	Ultra Strut Body
11	S3402E	2	Jam Nut
12	S3402D	2	Spring Seat Nut
13	S3600B	2	Extension tube *(Included only in kits S3600 & S3900)*
not shown	S3600B1	2	Extension tube *(Included only in kits S3602 & S3902)*
14	S3600C	2	Ultra Strut Gland Nut
15	S3800A1075	2	Piston Rod
16	S3800K	2	Adjuster Knob
17	S3600W	2	Compression Bumper
18	S3600D	2	Top Spring Seat
19	S4000M	4	Thrust Bearing Races
20	S4000N	2	Thrust Bearing
21	S4000K	2	Thrust Bearing Cover
22	S3403C	2	1-7/8" O.D. Polyurethane Cushion
23	S3403D	2	1-3/4" O.D. Polyurethane Cushion
24	S3600E	2	Top Bushing Case
25	S3403E	2	11/16" I.D. Flat Washer
26	S3600P	2	5/8"-18 Ny-lock Nut
27	S3600FR1	1	R.H. Steering Arm
not shown	S3600FL1	1	L.H. steering arm
28	S3600O	6	Steering Arm Bushing *(Installed in steering arms)*
29	S3600T	6	3/8"-24 x 1" Steering Arm/caliper Bracket NAS bolt
30	F1282	8	3/8"-24 Jet Nut
31	S3402N	6	3/8" AN Washer
32	S3600V	2	Steering Arm Rod End
33	S3600U	2	3/8"-24 x 1-1/2" Steering Arm Rod End NAS Bolt
not shown	S3600ADL	1	LH double adjustable strut body *(Included only in kits S3900 & S3902)*
not shown	S3600ADR	1	RH double adjustable strut body *(Included only in kits S3900 & S3902)*
not shown	S3602F	2	Compression adjuster *(Included only in kits S3900 & S3902)*
not shown	S3602E	2	Plastic cap for compression adjuster *(Included only in kits S3900 & S3902)*

Lower Control Arm Kits S3418 *(7/16" Rod Ends)* & S3419 *(1/2" Rod Ends)* *(w/ complete strut kits)*

34	S3418B	1	RH rear Lower Control Arm
35	S3400Y	2	Spherical Bearing
36	S3400X	2	Spirolok
37	L4000UM	2	1/2"-20 LCA nut *(included with struts)*
38	S3418C	2	Front Lower Control Arm Tube
39	F1282	2	3/8"-24 Jet nut
40	S3402N	2	3/8" AN washer
41	S3402Q	2	3/8"-24 x 1" Control Arm Bolt
42	R2207	4	7/16" bore x 1/2"-20 rod end (S3418 kit)
43	R2108	4	1/2" bore x 1/2"-20 rod end (S3419 kit)
44	S3752E	4	1/2"-20 Jam nut RH
45	S3752C	2	Tube Adapter 1/2"-20
46	S3752CM	2	Tube Adapter 1/2"-20
47	S3418A	1	LH Rear Lower Control Arm

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WELDING:

The tube adapters and control arm tubes are manufactured from 4130 chromoly steel.
The only welding method we recommend is TIG welding using a mild steel rod or 4130 steel rod.
WARNING - IT IS NOT RECOMMENDED TO USE STRUT AS A WELDING FIXTURE - SERIOUS INTERNAL DAMAGE MAY OCCUR. If no other option is available be sure to attach the ground clamp to the chassis as close as possible to the area being welded. Before final welding the front end should be mocked up by tack welding the assembly together. The tubes can be cut to length to achieve proper geometry. Install the strut without the spring and bump rubber and fully extend and compress to ensure that there is not any binding with any of the rod ends or spherical bearings. Once proper alignment is verified completely weld all mounts and lower control arms by plug welding and by welding 360 deg. around tube.

VEHICLE TRANSPORT:

Limiting chassis movement while trailering is very important. An unsecured race car will experience the same mileage as the tow vehicle. A fifty mile drive to the track, and the car's struts have already experienced two hundred passes. The situation is even worse considering these are bumpy passes. Not securing the struts could drastically shorten the life of the internal components causing premature rebuilding.

FRONT END GEOMETRY:

The following are suggested parameters for setting up the front end geometry for all Ultra struts:
Caster - 6-10 deg.
Camber - 0 deg.
Toe in - 1/16" total measured at the wheels
Kingpin angle - 10 deg. (built into the strut)

When setting up the top mounting location on the chassis the strut should be at ride height using the information in Table #1. For example, for the 2.50" stroke Ultra strut (S3602), the strut would be fully compressed and then extended by 1".

The front lower control arms (38) are the same for both sides of the car. They consist of 7/8" O.D. x 0.058" wall 4130 chromoly tubing with a female clevis welded to one end. The rear lower control arms (47, 48) are made with 7/8" O.D. x 0.085" wall 4130 chromoly tubing with a spherical bearing mount and flat tab welded to one end. To identify the left and right lower control arms, place them on a flat surface orientated like they would be in the car with the spherical bearing mounts out by the wheels and the raw end of the tubing near the frame. The large chamfer in the spherical bearing mount must be facing upward. The flat tabs need to be facing towards the front of the vehicle and angled downward.

The mounting points on the frame for the lower control arms are as follows. The rear lower control arm should **NEVER** be attached to the frame in-line or in front of the strut spindle shaft. It should be mounted as far towards the back of the vehicle as practical or approximately 1-3/4" behind the strut spindle shaft. When viewed from the front of the car, the rear lower control arm should angle 5 deg. (+/-5 deg.) down going from the strut towards the center of the car.

The mounting point for the front lower control arm should be about 14" in front of and 1/4" lower than the rear lower control arm mounting point. Both front and rear lower control arms can be cut to adjust installed length depending on geometry required, frame design, track width, etc.

When mounting the steering rack it should be positioned so that the steering tie rods are parallel to the plane of the lower control arms. This will provide for the minimum amount of bumpsteer. The rod end connected to the strut steering arm may mounted to the top or bottom of the steering arm to help accomplish this. Check to be sure that wheel clearance is not a problem.

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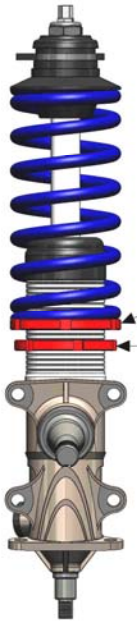
Ride Height Adjustment

(do not alter height of bump rubber! severe damage to internals will result)

- Rotate spring seat adjuster until desired height is obtained
- Jam nut is tightened to lock spring seat in place



Extension Adjustment

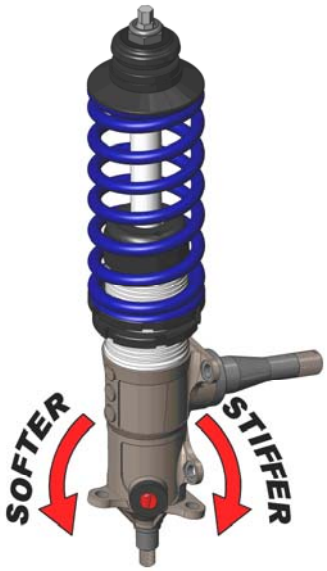
(single & double adjustable struts)

- 3/8" Hex Knob
- Adjustment range is 3-1/8 turns
- DO NOT FORCE ADJUSTER

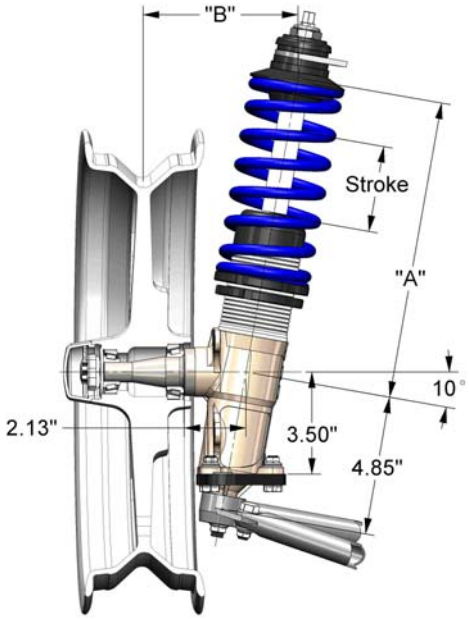
Compression Adjustment

(double adjustable struts only)

- Slotted screwdriver
- 13 positions or 12 "clicks"



Ultra Strut Dimensions



		"A"			"B"		
Stroke	**Spring Length**	**Extended**	**@ Ride Height**	**Compressed**	**Extended**	**@ Ride Height**	**Compressed**
2.50"	7"	9.40"	7.90"	6.90"	5.17"	4.91"	4.73"
3.63"	8"	11.38"	9.20"	7.77"	5.51"	5.13"	4.89"

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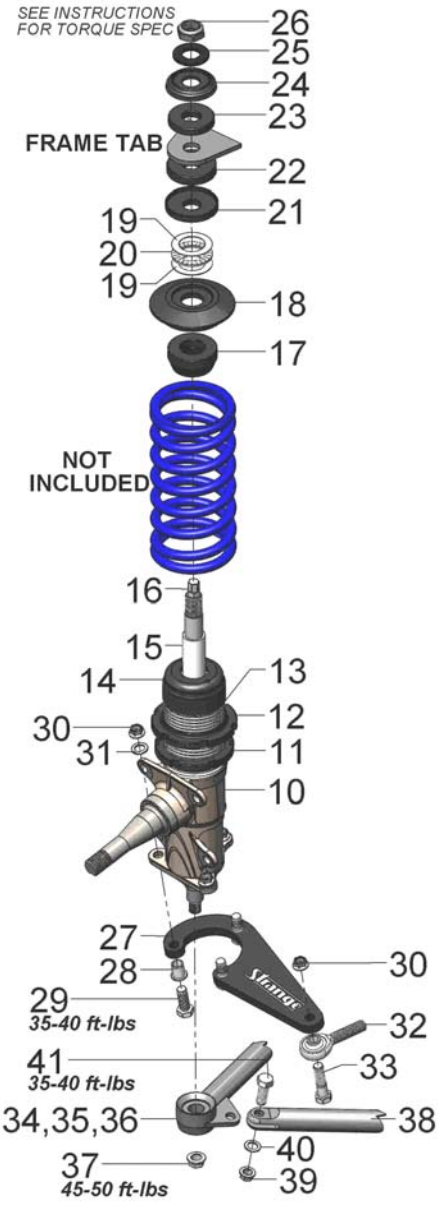
1. All Ultra struts come from Strange Engineering with all the internals assembled and filled with shock oil. Some of the external components are also assembled for your convenience.

2. When attaching the top of the strut to the frame, tighten the top nut (26) until the polyurethane cushions (22, 23) just begin to compress. This will allow the strut to pivot slightly without binding or having a sloppy fit.
DO NOT USE AN IMPACT WRENCH TO TIGHTEN THE TOP NUT. Damage to the adjuster or the internals may occur. The proper way to tighten the top nut is to thread the nut on as far as possible by hand, then hold the top of the piston rod with a 7/16" wrench and finish tightening the nut.
DO NOT HOLD ON THE ADJUSTER WHEN TIGHTENING THE NUT.

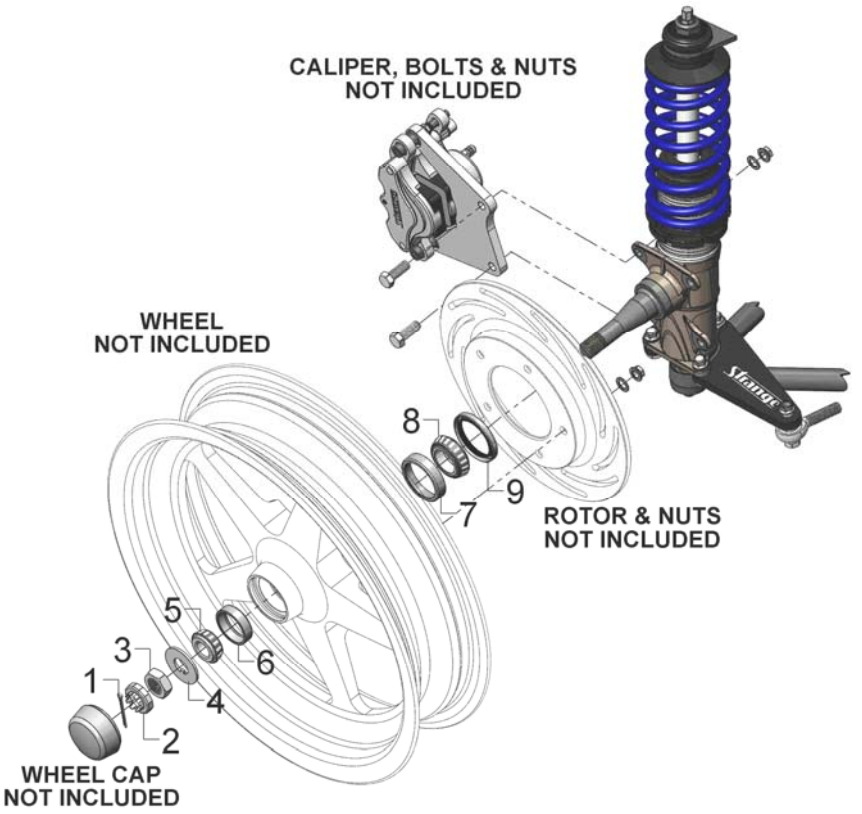
3. Refer to specific brake kit instructions when installing brakes.

4. When installing the wheel and tire, press the bearing cups (6, 7) in squarely making sure they are fully seated in the wheel.
NOTE: EVEN IF WHEEL COMES WITH BEARING RACES INSTALLED THEY MUST BE REMOVED AND REPLACED WITH RACES SUPPLIED WITH THE STRUT. THE ULTRA STRUT HAS A UNIQUE SPINDLE THAT REQUIRES SPECIAL BEARINGS. Pack the inboard (8) and outboard (5) bearing cones with a high quality wheel bearing grease such as NLGI #1 or #2. **NOTE**: A bearing packer is recommended for this procedure. If one is not available, work as much grease as possible by hand into the cage and around the rollers. Slide the inboard bearing cone into the wheel and then press the seal into the wheel. Ensure the lettering on the seal faces toward the strut and that the seal is flush with the face of the wheel. Slide wheel onto spindle, slide outer bearing cone into wheel, and install spindle nut and washer. While rotating wheel, torque spindle nut to approximately 20 ft-lbs. Loosen spindle nut until wheel spins freely and there is no end play. Install stamped retainer, cotter pin and hub cap.

Strut Assembly Exploded



Wheel & Strut Assembly



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Chassis Mounting Points (driver side shown)

WARNING – RACING IS HAZARDOUS · STRANGE STRUTS ARE FOR LEGAL DRAG RACING ONLY

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