Measuring for Shock Absorbers

Instructions

CAUTION: Safety glasses should be worn at all times when working with vehicles and related tools and equipment.

FOR ADDITIONAL COPIES OF THESE AND OTHER INSTRUCTIONS GO TO: www.lowrangeoffroad and click on the “INSTRUCTIONS” tab.

Suggested Tools:
- Fork Lift (or Flex Ramp)
- Measuring Tape
- Safety Stand

Flex Ramp
Basic Shock Absorbers do not have any load carrying capability. The weight of the vehicle and its cargo is carried or supported by the springs. Shock absorbers, or “shocks” as they are sometimes called, are more accurately called dampeners because in reality they dampen spring occupations. They dampen in a compressing mode when the wheel encounters a bump in the road and dampen in the extension mode when the wheel encounters a hole in the road.

The job of selecting the correct shock absorber for your vehicle is quite simple when your vehicle is completely stock or unmodified. You simply order new shock absorbers according to year, make, model, engine size and in some cases, one or two other specifications. But, if your vehicle has been modified, selecting the right shock for your vehicle becomes a bit more technical.

These instructions have been created to make this process easier for you, the customer and for us, the supplier.

To begin this process we need to establish a few terms and definitions:

**Shock Mounting Methods:** How the shock is attached to the vehicle, at the top and bottom.

- **Stem (or Stud) Mount** - The symbol used is “S1”. This type of mount is where the shock has a vertical stud which mounts in a hole. (See Figure A)

- **Eye Bolt** - The symbol used is “EB1”. This type mount is where the shock is mounted to a horizontal bolt or stud. (See Figure A)

**Shock Length:** This is how long the shock is when fully extended and fully collapsed (or compressed).

- Extended length - See Figure B
- Collapsed length - See Figure B

**Hardware Kits:** These are the bushings, washers, sleeves and nuts that are needed to attach the shock to the vehicle. These kits vary in contents according to application. (See Example Below)
Measuring To Determine The FRONT Shock Size

Step 1
All measurements are to be taken from the center of the shock mount bolt at the top.

Step 2
... and the center of the shock mount bolt (or stud) at the bottom.

Tech Tip
If the upper shock mount was an OEM (Original Equipment Manufactured) mount, it would be a stem or (stud) mount which would be measured like the one shown in Figure C.
Measuring To Determine The REAR Shock Size

Step 3
All measurements are to be taken from the center of the shock mount bolt at the top.

Step 4
. . . and the center of the stud mount bolt at the bottom. See Figure D.
NOTICE: These instructions will work for any vehicle. We chose to use a 1987 Suzuki Samurai as our example.

**Step 5**
Using a fork lift or flex ramp; lift the Right Rear wheel until another wheel (either Right Front or Left Rear) leaves the ground. Place a safety stand under the vehicle in case the lifting device fails. Measure all 4 shock absorber lengths and record the measurements. See Figure E

**Caution:** You should never work under a vehicle that is supported ONLY by a floor jack, forklift, or any other lifting device. ALWAYS, use safety stands to insure the vehicle does not fall unexpectedly during this or any other procedure.
Step 6
Lift the Left Front Wheel until another wheel (either Left Front or Right Rear) leaves the ground. Measure all 4 shock absorber lengths and record the measurements. See Figure F.

Figure F

16.5”  19.25”  18.5”  23.25”

Forward
Step 7
Now that you have all 8 measurements, let's analyze the results. Let's look at the rear measurements first. The rule is: **The new shocks should collapse less than the smallest measurement and extend more than the longest measurement.** This means the new shock absorbers, once installed, should never compress all the way and should never extend all the way. Another way of looking at it is; the shock absorbers should not limit wheel travel in any way, at any time.

### Rear Results

<table>
<thead>
<tr>
<th>Smallest Measurement</th>
<th>16.25”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Largest Measurement</td>
<td>19.50”</td>
</tr>
</tbody>
</table>

This means the REAR shock absorber should be able to collapse to a measurement less than 16.25” and extend to a measurement greater than 19.50”. To make things easier let's round these numbers as well:

**16” Collapse Length**

**20” Extended Length**

This means our rear shock should collapse less than 16” and extend greater than 20”. If you have to compromise either measurement, it is better to increase the extended length.

Step 8
Now let's look at our front measurements.

### Front Results

<table>
<thead>
<tr>
<th>Smallest Measurement</th>
<th>18.50”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Largest Measurement</td>
<td>23.50”</td>
</tr>
</tbody>
</table>

This means the FRONT shock absorber should be able to collapse to a measurement less than 18.50” and extend to a measurement greater than 23.5”. To make things easier let's round these numbers as well.

**18” Collapse Length**

**24” Extended Length**

This means our front shock should collapse less than 18” and extend greater than 24”. If you have to compromise either measurement it is better to increase the extended length.

Note: In our example both shocks (Front and Rear) require a mounting method of Eye Bolt “EB1” on both ends.
Selecting the Shock

**Our front shock choice is:**
Pt # 3336 for a 3000 Series
Pt # 8336 for an 8000 Series

*Note: The 3371 or 8371 could have been used here but we felt that the 17” collapsed length might be a bit too close to our 18” measurement. Especially if you chose the 8000 Series shock with the built-in bump stop.*

**Our rear shock choice is:**
Pt # 3268 for a 3000 Series
Pt # 8268 for an 8000 Series

*Note: The 3234 or 8234 could have been used here but we like a longer extended length in case we want to add a bit more lift to our vehicle in the future.*

**Rear Shock Rounded Measurements:**
Less than 16” Collapse Length
Greater than 20” Extended Length

**Front Shock Rounded Measurements:**
Less than 18” Collapse Length
Greater than 24” Extended Length

---

**Step 9**

Our rear shock choice is:
Pt # 3268 for a 3000 Series
Pt # 8268 for an 8000 Series

**Step 10**

Our front shock choice is:
Pt # 3336 for a 3000 Series
Pt # 8336 for an 8000 Series

*Note: The 3371 or 8371 could have been used here but we felt that the 17” collapsed length might be a bit too close to our 18” measurement. Especially if you chose the 8000 Series shock with the built-in bump stop.*
Tech Tip 1
The DT3000 Series is designed for Suzuki and smaller Toyota size vehicles, such as the Tacoma and 4Runner. If you have a full size pickup, such as a Tundra, you may consider the 8000 Series shock absorber. The 8000 Series shock is a little stiffer than the 3000. It also has a built in bump stop. However, the bump stop is not a real advantage because the shock will never completely compress, especially if you select the correct shock according to these instructions.

Tech Tip 2
Both the 3000 and 8000 Series shock absorbers come equipped to accommodate a 5/8” bolt with the Eye Bolt “EB1” mounting method and the necessary bushings, washers and nuts to accommodate the Stem (or Stud) “S1” mounting method.

Tech Tip 3
Along with the standard hardware mentioned above the shocks will include additional hardware. The additional hardware that is included is shown in the far right column of Figure E. It is labeled “Hardware Kits Included”. The contents of these kits are detailed at the top of Figure E.

Valued Customer
We hope these instructions have been helpful. Please call our Tech Support line if you have any questions. The phone number is shown at the bottom of each page.
As always, if you experience any difficulty using these instructions please contact Low Range Off-Road Technical Support at 801-805-6644 M-F 8am-5pm MST. Thank you for purchasing from Low Range Off-Road.

These instructions are designed as a general installation guide. Installation of many Low Range Off-Road products require specialized skills such as metal fabrication, welding and mechanical trouble shooting. If you have any questions or are unsure about how to proceed, please contact our shop at 801-805-6644 or seek help from a competent fabricator. Using fabrication tools such as welders, torches and grinders can cause serious bodily harm and death. Please operate equipment carefully and observe proper safety procedures.

Rock crawling and off-road driving are inherently dangerous activities. Some modifications will adversely affect the on-road handling characteristics of your vehicle. All products sold by Low Range Off-Road are sold for off road use only. Any other use or application is the responsibility of the purchaser and/or user. Some modifications and installation of certain aftermarket parts may under certain circumstances void your original dealer warranty. Modification of your vehicle may create dangerous conditions, which could cause roll-overs resulting in serious bodily injury or death. Buyers and users of these products hereby expressly assume all risks associated with any such modifications and use.

Revised 10/21/13 © Copyright 2013 Low Range Off-Road, LC All Rights Reserved