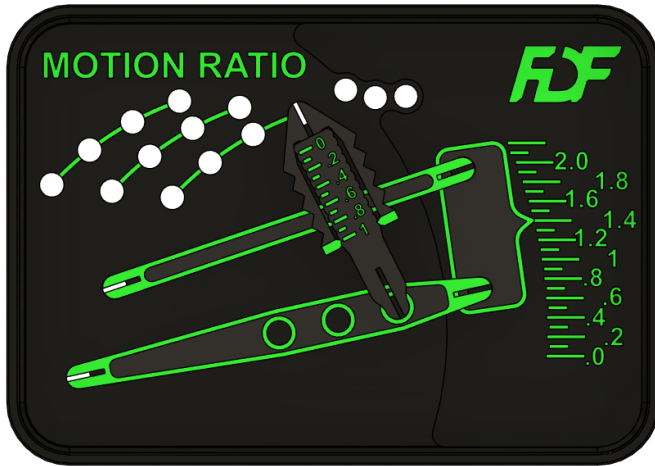


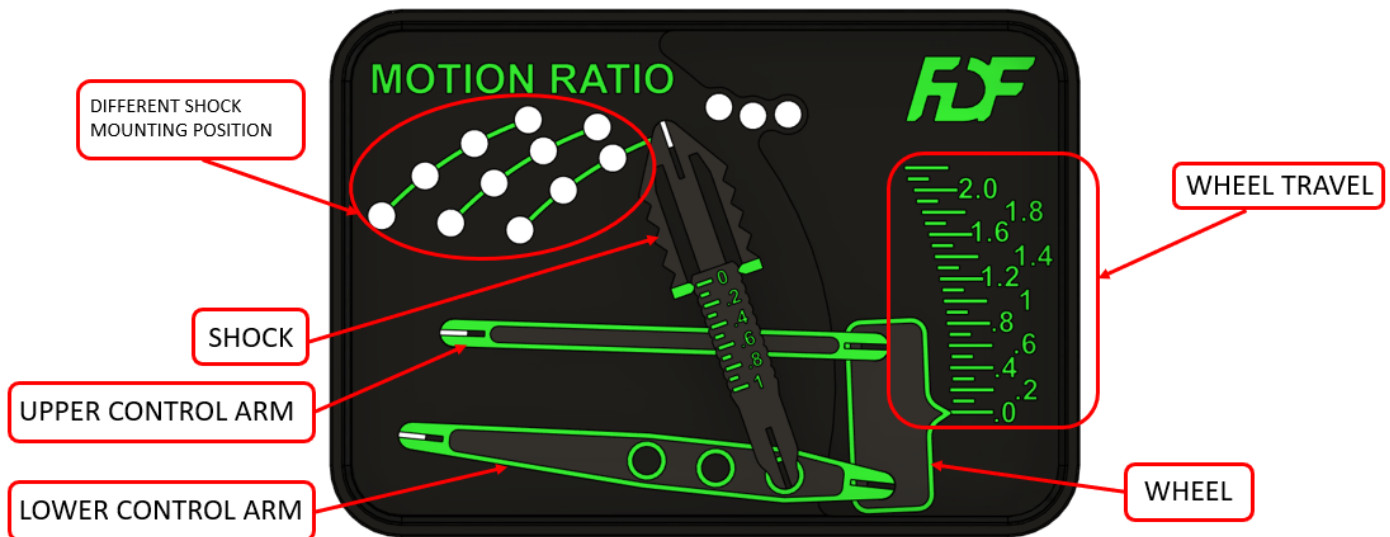
Introduction:

- The FDF Raceshop educational products are crafted to simplify the most complex suspension concepts. These products are ideal for students, automotive professionals, and enthusiasts aiming to understand how suspension dynamics affect vehicle handling and tire wear. Whether you're in the classroom, at the shop or in the trailer, these products end debates and guesswork.



- Here, the featured Motion Ratio Display is a hands-on learning tool designed to explain the basics of Motion Ratio and Wheel Rate. Motion Ratio is critical in suspension geometry, especially with customizable suspensions. With this innovative FDF Display, understand how motion ratio can be calculated and what variables need to be adjusted in a real-world setup.

Understand Motion Ratio Tool:

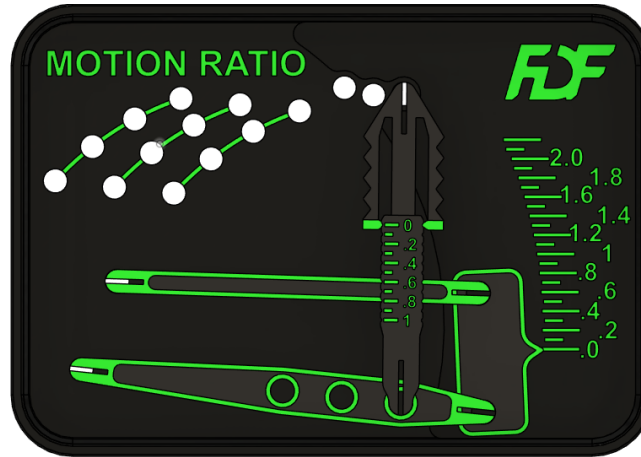


- Shock:** Can Compress From 0 to 1 with increment of 0.1 (in Inches).
- Wheel Travel:** Vertical displacement of the wheel as the suspension compresses. Can travel from 0 to 1.9 with increment of 0.1 (in Inches).
- Lower Control Arm:** Represents different mounting position of shock.

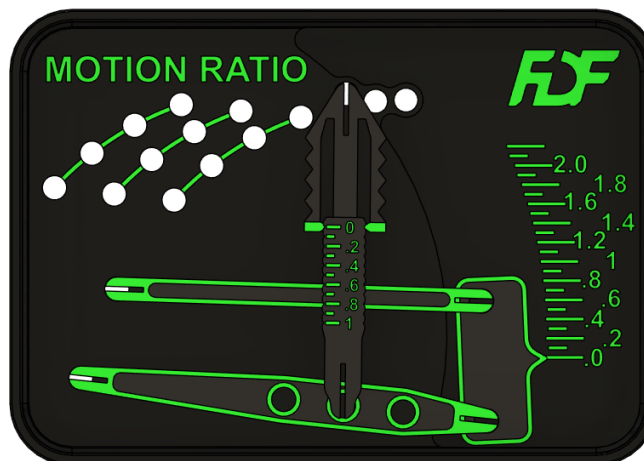
Different Suspension Setup Position:

- Following are some suspension setups for different cars.

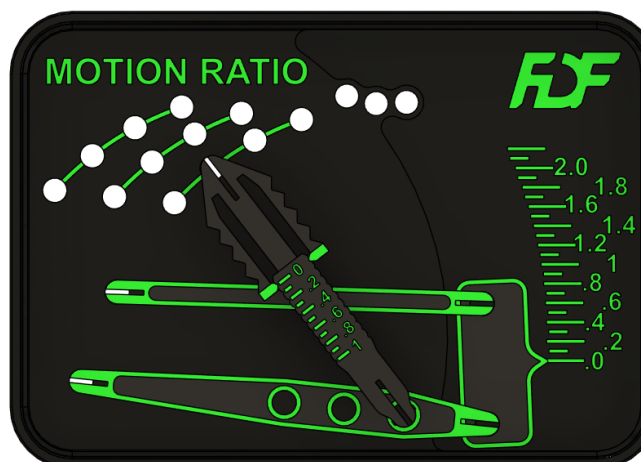
1. BRZ Rear Suspension Setup:



2. Nissan 350Z (With Spring Bucket):



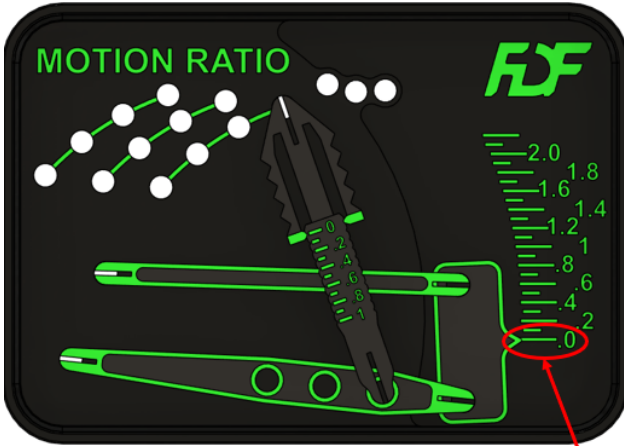
3. Corvette C6 Suspension Setup:



Calculate Motion Ratio & Wheel Rate:

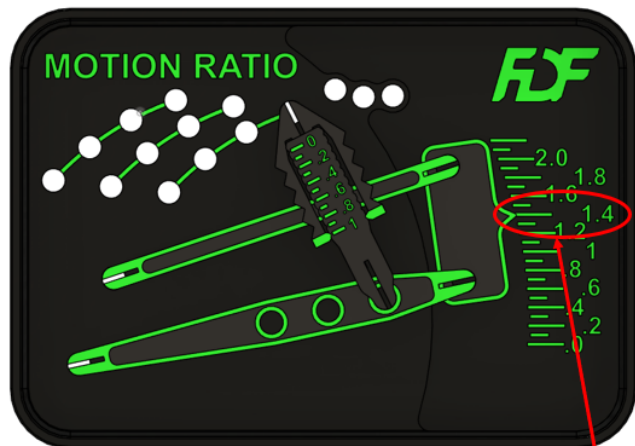
- Now, we are going to calculate Motion Ratio & Wheel rate for following suspension set up.

Initial Position



WHEEL TRAVEL

After Shock Compression (1 Inch)



WHEEL TRAVEL

- As we can see, during the 1 inch of shock compression, Wheel has travel from 0 to 1.4 Inch. Now, lets calculate motion ratio using formula from back of the plate,

$$\text{Motion Ratio} = \frac{\text{Shock Travel}}{\text{Wheel Travel}}$$

$$MR = \frac{1}{1.4}$$

$$MR = 0.7143$$

$$MR = \frac{\text{Shock Travel}}{\text{Wheel Travel}}$$

$$WR = \text{Spring rate} \times (MR)^2$$

- Let's assume we have Spring rate as 8K,

$$\text{Wheel Rate} = \text{Spring Rate} \times (MR)^2$$

$$\text{Wheel Rate} = 8 \times (0.7143)^2$$

$$\text{Wheel Rate} = 4.0818$$

- Now, if you compress your shock with 0.1 Increments, you will get the following readings on the wheel travel.

	WHEEL TRAVEL
0.1	0.125
0.2	0.287
0.3	0.425
0.4	0.575
0.5	0.700
0.6	0.825
0.7	1.00
0.8	1.10
0.9	1.275
1.0	1.4

Now, Lets plot a graph using these data.



Practically, you can also plot a graph for your own setup using this exact calculation and understand how motion ratio will affect your wheel rate and will ultimately affect your car handling.

***Please note, there are multiple other factors such as customized control arms, customized angle kit, wheel offsets, ride height, wheel spacers, anti-dive, anti squat properties and many more determines your motion ratio calculations.**



Conclusion:

Feel free to reach out to FDF Raceshop for any question or concerns.

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