

Introduction to Motorcycle Testing and Equipment

For motorcycle testing, we sell several machines. It always comes down to the customer's budget but there are important things to understand along the way. CTW will detail as much information as possible to help guide this decision and follow with pictures of forks in the machine.

First, we need to understand if this is a motorcycle for the street, a track circuit that is smooth (GP) or what is called moto-cross (on dirt, lots of jumps) here in the USA. Each of these involve a front fork but they see very different velocities in the fork.



GP Race bike - smooth track/circuit



Motocross - dirt, rough, jumps

1 – Motorcycle front forks, on the bike, will see very high compression velocities. The highest are from Motocross where they jump in the air and land very hard as well as traverse a short series of bumps along the way. The front forks can see more than 8.0 M/sec and the rear damper can see more than 3 M/sec in compression. The rear damper also has a very poor motion ratio (typically) so it sees less movement for a given wheel travel.

2 - The extension / rebound for the front and rear see much less velocity than the compression and this is very important. If you try to run a fork or damper at high extension velocities it could potentially fail and/or break. The wheel simply will not experience the same velocities on extension.

3 - Even though the front fork will have a total travel ability of 300+mm, you do not need to test at full travel. You simply find a good stroke to test and repeat on every fork. The idea it to get a realistic travel (stroke for the dyno) and simply use that each time for baseline comparison.

The RD7.5 is the best crank dyno for motorcycle testing based on cost and available operating parameters of force, stroke and velocity. It has a peak stroke of 160mm for the front fork and can test at up to 3.00 M/sec on that stroke. It is a very good value for how much testing you can do. You can use the smaller strokes for the rear damper as well. The RD10 is just a little bit better because it has more horsepower (HP) so it can compress / extend a damper with higher forces but that comes at a price increase.

The one thing that a "crank dyno" cannot do is run a different compression and extension velocity. On the motorcycle, the compression will always go faster than the rebound / extension side. The only way to do this is with a linear actuator. The linear actuator can be programmed to run faster and faster on

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compression while keeping the extension speed at the same, lower velocity. A test profile will be different from a crank-type machine (RD3 / RD7.5 / RD10) compared to the LA series.

Examples...

Sample Test Profile of <u>crank type machine</u> - 150 mm stroke example - front fork Sine wave input

	Compression Velocity	Extension Velocity
1	0.250 M/sec	0.250 M/sec
2	0.500 M/sec	0.500 M/sec
3	0.750 M/sec	0.750 M/sec
4	1.000 M/sec	1.000 M/sec
5	1.500 M/sec	1.500 M/sec
6	2.000 M/sec	2.000 M/sec
7	2.500 M/sec	2.500 M/sec

Sample Test Profile of <u>linear actuator</u> - Variable Velocity Variable sine wave input

	Compression Velocity	Extension Velocity
1	0.250 M/sec	0.250 M/sec
2	0.500 M/sec	0.500 M/sec
3	0.750 M/sec	0.750 M/sec
4	1.000 M/sec	1.000 M/sec
5	1.500 M/sec	1.500 M/sec
6	2.000 M/sec	1.500 M/sec
7	2.500 M/sec	1.500 M/sec
8	3.000 M/sec	1.500 M/sec
9	3.500 M/sec	1.500 M/sec
10	4.000 M/sec	1.500 M/sec
11	5.000 M/sec	1.500 M/sec



Testing / Fixtures for the dyno

These come from **Race Tech** and we happily sell and provide them to our customers.

You can run an individual cartridge, a total front fork assembly and the rear damper using various fixtures for the machine.





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