



To: Star Mazda Series Competitors

From: Star Race Cars

Date: 18.January.2010

RE: 3-way Damper Upgrade

Introduction

Star Race Cars has decided to move forward with an optional three-way adjustable damper. The low speed rebound adjuster will remain a one-way adjustment within the same operating range. The low speed compression adjuster will be replaced with a low and high speed compression adjuster based on a recommendation by Ohlins for a broader operating range.

Conversion of 2 way adjustable dampers into 3 way adjustable dampers

Teams that currently have a set of two way dampers will be able to get these reconfigured to 3 way dampers by Star Race Cars. Depending on the turnaround time needed and the customer's requirements, the damper could be overhauled at the same time. New dampers purchased from Star Race Cars will be three way adjustable dampers unless specifically requested otherwise by the customer.

Setting

The setting has been developed to allow enough adjustment range to achieve the forces desired for the ovals, road courses and street courses while still being able to achieve the forces seen with the 2 way damper. The new compression adjuster has more clicks on the low speed compression, with smaller adjustment increments. The total range on the new adjuster is about 42 clicks instead of about 24 on the old adjuster. A table of the approximate equivalent low speed clicks on the new adjuster compared to the old adjuster is seen below in Table 1. Also included on the table is a suggested starting setting on the high speed compression that will get the compression forces as close as possible to the 2 way adjustable damper.

Adjustments

Adjustment to the high speed compression is done with a 12mm wrench and it has a range of about 48 clicks. The clicks are counted from fully closed (clock wise) with the "0"-click being the first click at the stop.

Adjustment to the low speed compression is done with a 3mm Allen key and it has a range of approximately 42 clicks. The clicks are counted from fully closed (clock wise) with the "0"-click being the first click at the stop





Front			
2-way adj.		3-way	
Low speed setting		Low speed setting	High speed setting
0	=	15	48
3	=	16	48
6	=	17	48
9	=	19	48
12	=	21	48
15	=	22	48
18	=	24	48
22	=	25	48

Rear			
2-way adj.		3-way	
Low speed setting		Low speed setting	High speed setting
0	=	9	45
3	=	12	45
6	=	16	45
9	=	18	45
12	=	19	45
15	=	20	45
18	=	23	45
22	=	25	45

Table 1: 3-way settings vs. 2-way settings

Dyno Plots

As seen in on the plots in Figure 1 and 2 the total adjustment range, fully closed to fully open, is much bigger on compression with the 3 way adjustable damper than the previous 2 way adjustable damper. The key for each graph (Please take note of the color changes between front and rear!):

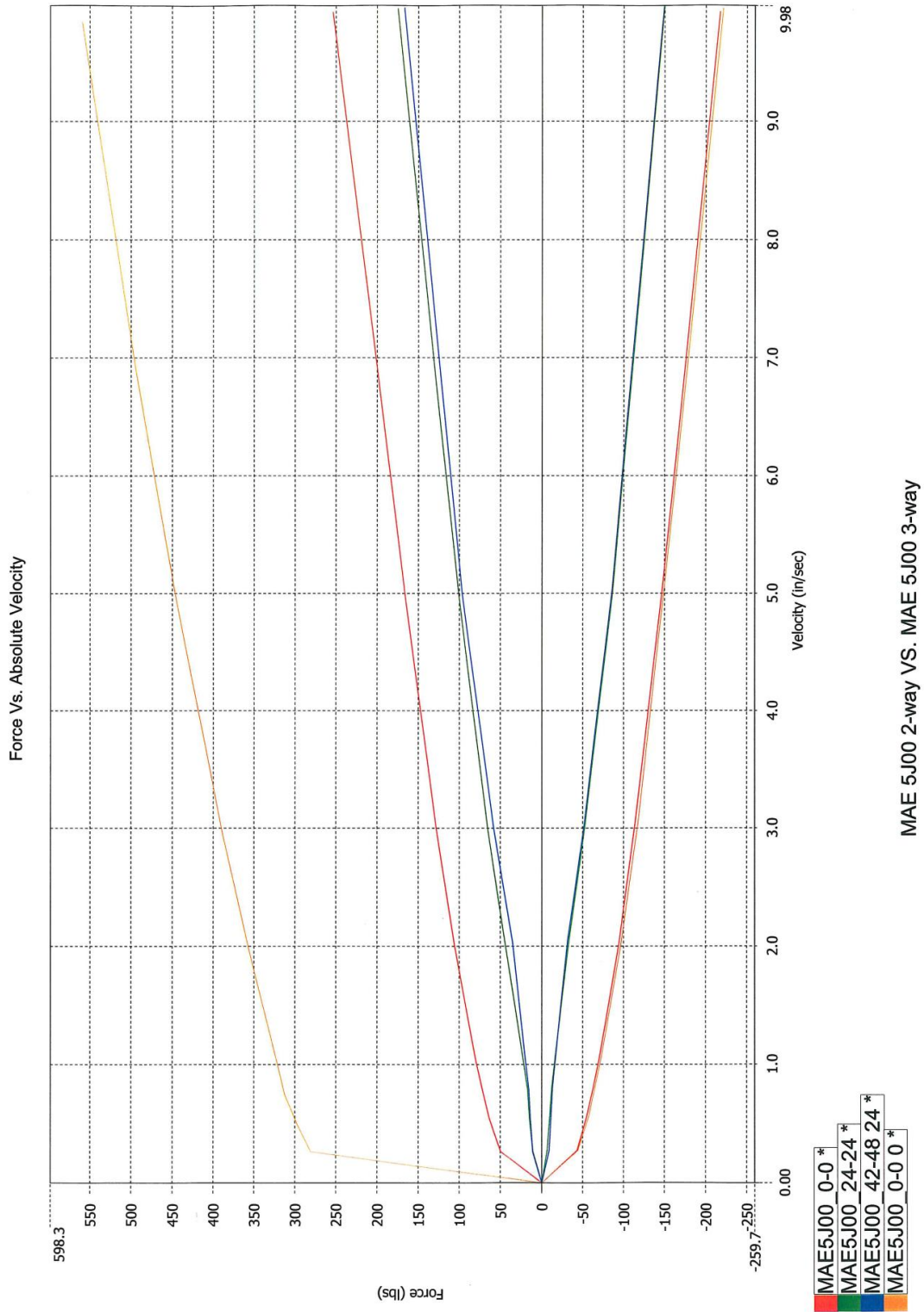
MAE5J00 is the front shock

- (RED) MAE5J00_0-0 = 2-way adjuster at full stiff (fully closed clockwise)
- (GREEN) MAE5J00_24-24 = 2 way adjuster at full soft where 24 = low speed bump, 24 = low speed rebound (fully open counter clockwise)
- (BLUE) MAE5J00_42-48 24 = 3-way adjuster full soft where 42 = low speed bump, 48 = high speed bump and 24 = low speed rebound
- (ORANGE) MAE5J00_0-0 0 = 3-way adjuster full stiff

MAE6J00 is the rear shock

- (RED) MAE6J00_42-48 24 = 3-way adjuster at full soft where 42 = low speed bump, 48 = high speed bump and 24 = low speed rebound
- (GREEN) MAE6J00_0-0 = 2-way adjuster full stiff
- (BLUE) MAE6J00_0-0 0 = 3-way adjuster at full stiff
- (ORANGE) MAE6J00_24-24 = 2-way adjuster at full soft





Force vs. Absolute Velocity Front TTX-36 Damper

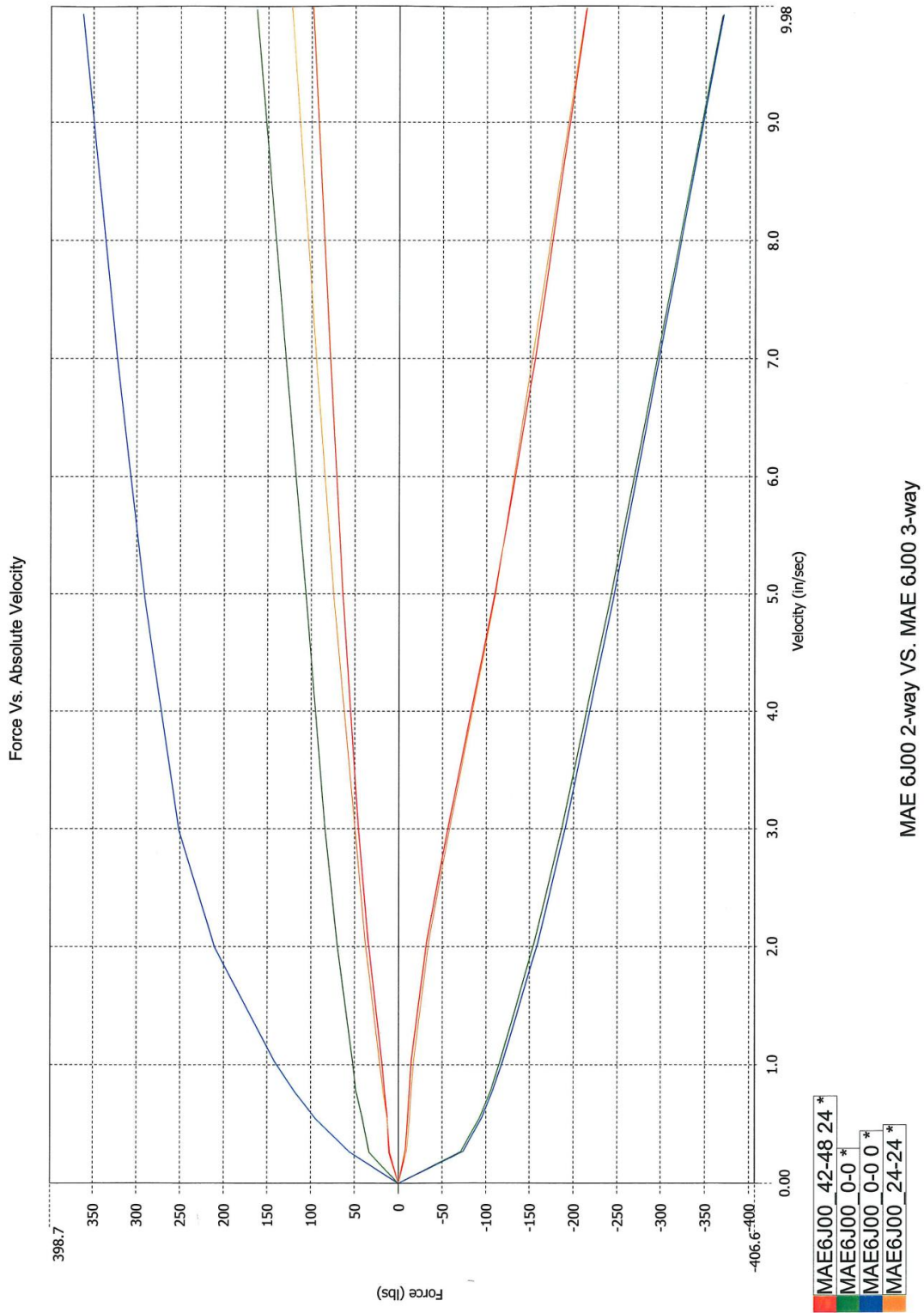


Figure 2: Force vs. Absolute Velocity Rear TTX-36 Damper