Source Injector Data: http://siemensdeka.com/specsheets/FI114992cs.jpg AKA: Ford M-9593-LU80 seijirou : msextra.com & corral.net forums.

Go to File -> Make a copy to make changes for yourself! **** Small Pulsewidth Curve is BETA and is probably total garbage! ****

This is my attempt to automate dead time settings for Megasquirt 2 and Megasquirt 3 systems using manufacturer's injector data. This was based on Siemens Deka data sheets which are very similar to if not exactly the same as Ford data sheets. This uses the Forecast function to linearize various fuel pressure compensation curves to get a "good" value for a user defined fuel pressure. This is not perfect! This is useable as-is for "good" values. If you are comfortable with spreadsheets you can tweak it for "good" values by updating the 4 forecast functions to only linearize across 2 points surrounding your defined fuel pressure. For "best" values use one of the fuel pressures provided on the sheet, and enter the appropriate multipliers directly, replacing the forecast function. This is done for the 4 compensation multipliers in bold below. To understand how far off the forecast function wanders away from best, enter a fuel pressure with a known multiplier and check.

Small Pulsewidth Curve (SPC) approach: Megasquirt calculates the linear High Slope (HS) based on injector flow automatically. Megasquirt always assumes the HS is true at any Pulsewidth (PW). The SPCurve provides a corrected PW to use when desired PW is small. Data sheets provide the Low Slope (LS) which is a 2nd linear flow rate between the Break Point and Min PW. The Break Point is reached on the LS flow rate, so a different point must be selected to handoff from the LS to the HS. This is selected as the Break Point + .01, and named High Slope Handoff. All points below the High Slope Handoff map a calculated PW on the HS to the correct replacement PW on the LS based on the fuel mass that the HS would provide, if it were accurate.
Below the Min PW injector characteristics are non-linear. 2 points are used to characterize this, Low Curve Factor 1 (LCF1) and Low Curve Factor 2 (LCF2). These are simply a reduction of the MinPW and should be adjusted to approximate the non-linear injector flow below the MinPW.

## Update the values below

| User Settings | |
|---|---|
| Fuel Pressure | 39.15 |

| Injector Characteristics | |
|---|---|
| Low Slope (lb/s) | 0.009116 |
| High Slope (steady state) (lb/s) | 0.008398 |
| Break Point (lb) | 0.00002134 |
| Min Pulsewidth (ms) | 1.081 |

| Voltage Offset | |
|---|---|
| 6 | 3.253 |
| 8 | 1.669 |
| 10 | 1.057 |
| 11 | 0.872 |
| 12 | 0.73 |
| 13 | 0.627 |
| 14 | 0.519 |
| 15 | 0.441 |

| Fuel Pressure Low Slope Compensation | |
|---|---|
| 20.01 | 0.7149 |
| 30.02 | 0.8781 |
| 39.15 | 1 |
| 50.03 | 1.1084 |
| 54.96 | 1.1428 |
| 60.03 | 1.1972 |

| Fuel Pressure High Slope Compensation | |
|---|---|
| 20.01 | 0.717 |
| 30.02 | 0.8749 |
| 39.15 | 1 |
| 50.03 | 1.1327 |
| 54.96 | 1.1892 |
| 60.03 | 1.2441 |

| Fuel Pressure Break Point Compensation | |
|---|---|
| 20.01 | 0.7149 |
| 30.02 | 0.9255 |
| 39.15 | 1 |
| 50.03 | 1.1626 |
| 54.96 | 1.1856 |
| 60.03 | 1.2915 |

| Fuel Pressure Voltage Offset Compensation | |
|---|---|
| 20.01 | 0.7149 |
| 30.02 | 0.9962 |

## Calculated Values *** Expert Modification Only!! ***

| Fuel Rate @ Fuel Pressure | |
|---|---|
| lb/hr | 30 |
| cc/min | 315 |

| **Voltage Offset Multiplier** | **0.9431653621** |
|---|---|
| Compensated Voltage Offsets | |
| 6 | 3.253 |
| 8 | 1.669 |
| 10 | 1.057 |
| 11 | 0.872 |
| 12 | 0.73 |
| 13 | 0.627 |
| 14 | 0.519 |
| 15 | 0.441 |

| **Low Slope Multiplier** | **0.9691415977** |
|---|---|
| Compensated Low Slope (lb/ms) | 0.000008834694804 |

| **High Slope Multiplier** | **0.9842631845** |
|---|---|
| Compensated High Slope (lb/ms) | 0.000008265842223 |

| **Break Point Multiplier** | **1.003433647** |
|---|---|
| Compensated Break Point (lb) | 0.00002141327403 |

| Calculations | |
|---|---|
| PW to Compensated Break Point | 2.423770658 |
| Min PW to Comp. Break Point Δ | 1.342770658 |

| Compensated Fuel Mass @ Low Slope | |
|---|---|
| **Low curve factor 1** | **0.112** |
| **Low curve factor 2** | **0.33** |
| | |
| 0 point | 0 |
| Low curve low | 0.000001069634169 |
| Low curve high | 0.000003151600678 |
| Min PW | 0.000009550305083 |
| Break Point | 0.00002141327403 |
| High Slope Handoff | 0.00002297527556 |

## MS3 Output *** Do Not Modify!! ***

| **BETA** Small Pulsewidth Curve | | |
|---|---|---|
| | Low Slope - "New" | High Slope - "Original" |
| 0 point | 0 | 0 |
| Low curve factor 1 | 0.121072 | 0.1294041358 |
| Low curve factor 2 | 0.35673 | 0.3812800429 |
| Min PW | 1.081 | 1.155394069 |
| Break Point | 2.423770658 | 2.590573768 |
| High Slope Handoff | 2.600573768 | 2.600573768 |

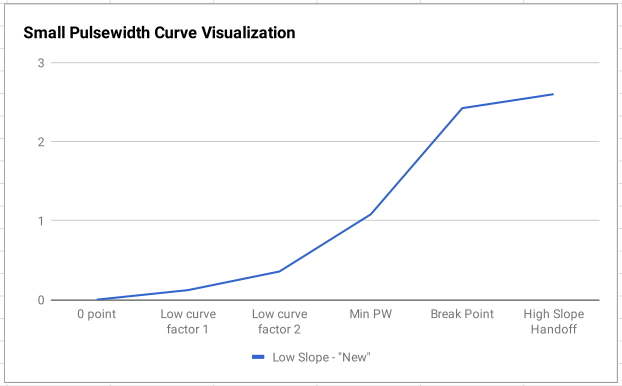
| Dead Time | 0.519 |
|---|---|

| Dead Time Voltage Curve | |
|---|---|
| 8 | 321.58% |
| 11 | 168.02% |
| 12 | 140.66% |
| 13 | 120.81% |
| 14 | 100.00% |
| 15 | 84.97% |

## MS2 Output *** Do Not Modify!! ***

Keep the lowest PW that MS will use above this Target Min PW. You'll need to use data logging at low load/low RPM to see the lowest PW used. If it drops below the given value, decrease the number of squirts used.

| Target Min PW (ms) | 2.423770658 |
|---|---|
| Dead Time | Battery Correction |
| 0.6042333333 | 0.1055 |



| | |
|---|---|
| 39.15 | 1 |
| 44.95 | 1.0573 |
| 50.03 | 0.991 |
| 54.96 | 0.9715 |
| 60.03 | 1.0032 |