Wolf 3D Version 4.61 Boost Control Folder.

These first criteria must be met and all values known to proceed further.
A Non-Sequential Hitachi Twin Turbo FD3S is used for depiction.

- Waste-gate Partial Open Pressure 7psi
- Waste-gate Full Open Pressure 10psi
- Boost Valve Duty Cycle 95PMW
- Max Boost Delivered By Turboes 18.8psi
- Load Table For Load Band Setup 17psi
- 0psi Load 42%

Boost Control Active on Load.

15% of the Waste-gate Full Open (10psi) = 8.5psi

100% - 42% =58

That is, between 0psi and full required boost (FRB) there are 58 load bands in all.

- Therefore, 8.5psi is 29 load bands.
- 43% Load Band (0Boost) + 29 Load Bands =72% Load Band.
  That is, at 72% Load Band you will be running 8.5psi boost.
- Therefore at 72% Load Band, Valve activation will occur to attain 17psi FRB.

Valve Trim Table.

Always note thus:
Minimum Boost (Waste-gate spring) 10psi
Maximum Possible Boost (Turbo Limit) 18.8psi

That is the Valve will control only above 10 psi, maximum 18.8 psi.

Therefore:

- Valve Position 0 (fully open) 10psi (Min Boost)
- Valve Position 255 (fully closed) 18.8psi (Max Poss. Boost)

So the difference:

255 Units	-	0 Units	255 Units
18.8 psi	-	10 psi	8.8 psi

Boost Limit is desired to be set to 17 psi (RFB).

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Therefore with the current waste-gate spring, a minimum 10 psi is definite, while a RFB of 17 psi is sought. That is a 7 psi increase in boost from the guaranteed waste-gate 10 psi.

So, if 8.8 psi (Max Poss. Boost Difference) is 255 Unit.
7 psi (Req. Full Boost Difference) is 202

Conclusion:

0 Units (Valve Full Open)	10 psi (Min Waste-gate Boost)
255 Units (Valve Full Closed)	18.8 psi (Max Available Boost)
202 Units (Valve Slightly Open)	17 psi (Full Required Boost)

Boost Pressure Valve Position Table.

Unit per PSI with maximum boost of 18.8 psi and minimum of 10 psi:

PSI(Diff)	Units
8.8	255
8	231.8
7	202.8
6	173.8
5	144.8
4	115.9
3	86.9
2	57.9
1	28.9

Typical Representation with RPM versus Boost Required versus Valve Position Table.

Actual RPM	Desired Boost (psi)	Valve Trim Table (Units)
8000	17	202
7000	17	202
6000	17	202
5000	15	144
4000	13	87
3000	10	0
2000	8	0
1000	0	0
0	0	0

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Boost Cut.

Mode 2 used. That is the Valve returns to a preset Unit so as that amount of boost is supplied.

Therefore, if 0 Units is set, 10 psi of waste-gate pressure is supplied, i.e. the valve reverts to full open position, and the waste-gate spring is the controlling force.

If on the other hand, say 86 Units is entered, in this particular setup, the over boost will be reduced to 13 psi.

Temperature Compensation on Valve Position.

Note: to reduce boost while the engine is cold or the air temperature is below operating temperature, the valve position must be reduced to decrease the amount of supplied boost to the engine.

If correction is needed from the FRB of 17 psi, but due to cold running, say 60 deg C, it is deemed that at 8000 rpm, just 15 psi should be given. Therefore, for 15 psi the valve position should be at 144 Units.

So, Required Boost (15 psi) – FRB (17psi) = 144 - 202 = -58

Therefore at ex. 60 deg C, you are asking to reduce 58 Units from the otherwise 202 Units value of 8000 rpm thus supplying and reduce boost of an actual 15 psi.

Eng/Air Temp	Boost Adj. psi	Working	Correction	Resultant
90	17	202-202	0	No Adjustment
80	17	202-202	0	No Adjustment
70	17	202-202	0	No Adjustment
60	15	144-202	-58	Bst Red. x 2 psi
50	13	86-202	-116	Bst Red. x 4 psi
40	10	0-202	-202	Full Red. 7 psi
30	5	0-202	-202	Full Red. 7 psi
20	0	0-202	-202	Full Red. 7 psi
10	0	0-202	-202	Full Red. 7 psi
0	0	0-202	-202	Full Red 7 psi

Note 1: 1 psi is approximately 29 units. Therefore, as a crosscheck, ex. at 60 deg C, 2 psi = 29 x2. Therefore it is like asking, at 60 Deg C, please remove 29 units and another 29 units, to a total of 2 psi i.e. 58 Units.

Note 2: The Engine will still boost up to 10 psi waste-gate spring since the valve is inoperative below 10 psi.

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TPS Valve Position Compensation.

Also similar to the reasoning with the temperature compensations. Consider this:

- Max TPS Value: 105.1. Min TPS Value : 3.3

- FRB 17 psi @ WOT. Max TPS setting is 105.1
- Req. 15 psi @ 50% WOT. TPS Setting at 50% is 54.2.

TPS Value	Boost Req. psi	Working	Correction	Resultant
105.1	17	202-202	0	No Adjustment
54.2	15	144-202	-58	Bst Red. x 2 psi

Note: This applies if at 50%WOT; FRB of 17 psi is achieved. It is the only way to co relate boost with TPS if the Turboes spool very fast and the system reverts to boost cut prior to the desired TPS.