2004 Arctic Cat 660 turbo

This Suzuki 660 three cylinder four-cycle has more standard boost pressure than any production gasoline turbo engine that I know of—nearly 40 inches of mercury, about 20 psi! That high boost pressure is made possible by excellent engine management combined with a very low static compression of 6.5-1. An odd looking 1981 Renault R5 turbo pseudo rally car in my garage has 6.5-1 compression but can only handle 15 psi boost on pump gas, even with an intercooler the size of a Samsonite suitcase.

The 660 also has plenty of boost tamper protection built in, so waste-gate hose-pullers will surely be disappointed. There appears to be an electronic boost controller that may be there to lower boost in some situations (ie: cold or high engine temp) or perhaps even adding some boost at high altitudes. It would be good to know if high altitude 660 riders are rewarded with higher that 20 psi boost that could create sea level performance in the mountains.

Increasing boost pressure is not only difficult on this engine, but would be risky. The tiny ball bearing turbo gives the sled good throttle response, and reasonably quick boost rise on the dyno. Overspeeding a ball bearing turbo can have expensive consequences. Continuous silent deto on a four-cycle engine is even worse.

The in tank fuel pump combined with the return line from the rail (controlled by a boost-referenced bypass regulator) makes measuring fuel flow difficult (two meters must be used, and the computer subtracts the bypassed fuel flow from the feed fuel flow) so that data is not shown. We would expect that BSFC would be similar to the RX1, maybe in the mid .40's, leading to good fuel economy for a 115 HP engine.

I found that the small intercooler is good for about 10HP, since during initial dyno runs, the blower ducts were not aimed properly at the hood, and HP was about 105. It's possible that engine management detecting overheated intake charge air would enrich mixture and/ or retard timing. Redirecting one of the ducts to hit the intercooler with 80 mph 30 degree F air resulted in these dyno numbers.

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| EngSpd | STPTrq | STPPwr | Air 2 | Fuel P | ManPrs |
|---|---|---|---|---|---|
| RPM | Clb-ft | CHp | scfm | psig | inHg |
| 4200 | 77.4 | 61.9 | 90 | 54.3 | 26.8 |
| 4300 | 76.8 | 62.9 | 91 | 54.5 | 26.9 |
| 4400 | 77.2 | 64.7 | 92 | 54.6 | 27.2 |
| 4500 | 77.9 | 66.8 | 95 | 54.8 | 27.8 |
| 4600 | 80.4 | 70.4 | 99 | 55.4 | 28.9 |
| 4700 | 81.2 | 72.6 | 103 | 55.8 | 29.9 |
| 4800 | 82.9 | 75.8 | 108 | 56.5 | 31.3 |
| 4900 | 85.1 | 79.3 | 113 | 57.3 | 32.9 |
| 5000 | 86.7 | 82.6 | 117 | 57.7 | 34.1 |
| 5100 | 87.4 | 84.9 | 120 | 58.1 | 34.7 |
| 5200 | 88.2 | 87.3 | 124 | 58.1 | 35.6 |
| 5300 | 88.5 | 89.3 | 128 | 59.1 | 36.7 |
| 5400 | 89.6 | 92.2 | 133 | 59.6 | 37.7 |
| 5500 | 91.2 | 95.5 | 139 | 60.2 | 38.8 |
| 5600 | 93.1 | 99.3 | 145 | 60.6 | 39.4 |
| 5700 | 93.4 | 101.3 | 146 | 60.5 | 39.7 |
| 5800 | 93.9 | 103.7 | 150 | 60.5 | 39.7 |
| 5900 | 92.9 | 104.4 | 152 | 60.4 | 39.4 |
| 6000 | 91.2 | 104.2 | 154 | 60.1 | 39.1 |
| 6100 | 90.1 | 104.7 | 156 | 60.2 | 39.1 |
| 6200 | 90.5 | 106.9 | 159 | 60.3 | 39.2 |
| 6300 | 90.5 | 108.6 | 162 | 60.3 | 39.2 |
| 6400 | 89.5 | 109.1 | 163 | 60.2 | 39.1 |
| 6500 | 88.7 | 109.7 | 165 | 60.3 | 39.1 |
| 6600 | 88.3 | 111.1 | 167 | 60.2 | 39.1 |
| 6700 | 86.7 | 110.6 | 170 | 59.9 | 39.1 |
| 6800 | 85.9 | 111.2 | 171 | 60.1 | 39.1 |
| 6900 | 85.3 | 112.1 | 174 | 59.9 | 38.8 |
| 7000 | 84.6 | 112.8 | 177 | 59.9 | 38.7 |
| 7100 | 84.1 | 113.6 | 180 | 59.9 | 38.7 |
| 7200 | 83.6 | 114.6 | 179 | 59.5 | 37.8 |
| 7300 | 81.1 | 112.6 | 177 | 58.6 | 36.2 |
| 7400 | 79.6 | 112.2 | 177 | 58.4 | 35.6 |
| 7500 | 78.5 | 112.1 | 178 | 58.2 | 35.2 |
| 7600 | 75.2 | 108.7 | 177 | 57.9 | 34.8 |
| 7700 | 72.7 | 106.6 | 175 | 57.2 | 33.4 |
| 7800 | 69.9 | 103.8 | 170 | 56.4 | 31.5 |