2005 YAMAHA VECTOR

This new three cylinder four-cycle snowmobile engine displaces 973cc. Four valves per cylinder, long-stroke/ low RPM power peak creates more torque/ HP in the low-midrange than the RX1, and a horsepower band that is higher and broader than the Arctic Cat 660 Turbo. The torquey Vector engine sets a new standard for broad powerbands by maintaining 98% of max HP over an incredible 1300 RPM (from 7800 to 9100 RPM)! Even I can clutch one of those. We left stock winter jets in the Keihin 40mm CV carbs, and 56 degree air temp and 28.8 in.hg. barometer air surely cost us a couple of HP, so it is reasonable to expect 120 HP in good winter air.

For comparison, I have included SFD files from the 660T, RX1 and the three 600 two-stroke twin sleds from last year's AmSnow Shootout. On most of these two-strokes, to stay within the same 98% of max HP, you only have about a 200 RPM window to clutch to. This clutching "window" is 1100 RPM smaller than the Vector's.

Also, note the Vector's fuel flow at HP peak is a stingy 54 lb/hr with BSFC of .48 lb/hphr (safe on efficient four-cycle engines). The 600 two-strokes make less HP with way more fuel, averaging 85 lb/hr at HP peak (50% higher fuel consumption and probably 200% higher emissions). And with the four-strokes there are no clouds of blue smoke to drive the tree huggers nuts.

Like the RX1, the Vector has what appears to be a great, acoustically correct airbox with long curved rubber velocity stacks that may contribute to the broad powerband. It will be interesting to see if the HP curve is altered negatively by removing the airbox. One interesting note—we attached the airbox to the engine flipped upside down (test E) to enable us to connect our airflow meter to the airbox opening underneath. By doing this fuel flow jumped 10% and HP suffered.

Mods? Unfortunately there's not likely to be any good cheap way to increase HP. Big cams are a few hundred bucks, may make a few more HP but will require high revs, maybe stiffer, friction-adding valve springs, and will lose bottom end torque to gain some top end HP. Beware of loud mufflers since the stock RX1 made best HP here with its whisper-quiet stock muffler. I would like to dyno before and after one of the sure to be popular open filter/ rejet/ respring kits to see what they do to peak HP and shape of the curve.

Since it's a good way to boost HP, there are sure to be lots of turbo systems available for the Vector. This Vector was obtained early by Bender for development of their turbo kits and other performance stuff. We'll have dyno numbers on their kit, but all turbo brands are welcome here. This is an equal opportunity dyno facility. With a good intercooler and good fuel management, 180 HP on pump gas is reasonable to expect. Last season RX1 turbo owners were generally a happy lot. Turbo four-strokes are forgiving and reliable as long as boost level is matched to octane level. While pumping air into a four-stroke is the most efficient way to add lots of HP, even the most basic non-intercooled turbo system adds thousands of dollars to the cost of the machine.

2005 Yamaha Vector Stock Dyno Evaluation test#05YVSTD

EngSpd	STPTrq	STPPwr	BSFC	Fuel B	OilOut	AirTmp	BaroP	WtrOut
RPM	Clb-ft	CHp	lb/hph	Lb/hr	degF	degF	inHg	degF
5000	74.1	70.4	0.416	28.1	163	55	28.83	161
5100	73.7	71.5	0.421	28.9	163	55	28.83	161
5200	74.1	73.3	0.401	28.2	163	56	28.83	161
5300	74.9	75.6	0.392	28.4	163	56	28.83	161
5400	75.7	77.9	0.394	29.4	163	56	28.83	161
5500	76.5	80.1	0.395	30.3	163	56	28.83	161
5600	77.6	82.8	0.402	31.9	163	55	28.83	161
5700	76.9	83.5	0.409	32.8	163	54	28.83	161
5800	76.9	85.1	0.406	33.1	163	54	28.83	162
5900	77.5	87.1	0.406	33.9	163	55	28.83	162
6000	77.3	88.3	0.409	34.6	163	55	28.83	162
6100	77.5	90.1	0.408	35.2	164	55	28.83	162
6200	77.6	91.6	0.401	35.1	164	55	28.83	163
6300	77.6	93.1	0.397	35.4	164	55	28.83	163
6400	78.1	95.1	0.402	36.6	164	56	28.83	163
6500	78.9	97.7	0.396	37.1	164	55	28.83	163
6600	79.6	100.1	0.393	37.7	165	55	28.83	163
6700	80.2	102.3	0.406	39.8	165	55	28.83	163
6800	79.5	102.9	0.408	40.2	164	55	28.83	163
6900	80.8	106.2	0.401	40.7	165	55	28.83	164
7000	80.3	107.1	0.392	40.2	166	56	28.83	164
7100	79.4	107.3	0.402	41.3	166	56	28.83	164
7200	79.9	109.5	0.401	42.1	165	56	28.83	165
7300	79.6	110.6	0.398	42.2	166	56	28.83	165
7400	79.4	111.9	0.403	43.2	166	56	28.83	165
7500	79.7	113.8	0.407	44.3	167	56	28.83	165
7600	78.9	114.1	0.415	45.3	167	56	28.83	165
7700	78.3	114.7	0.422	46.3	166	56	28.83	165
7800	79.3	117.8	0.427	48.1	166	56	28.83	165
7900	77.7	116.8	0.437	48.8	167	56	28.83	165
8000	76.6	116.7	0.436	48.7	167	55	28.83	165
8100	75.5	116.4	0.438	48.8	167	55	28.83	165
8200	75.4	117.7	0.458	51.6	167	56	28.83	166
8300	73.7	116.5	0.476	53.1	167	56	28.83	166
8400	73.5	117.5	0.483	54.3	167	55	28.83	166
8500	73.2	118.4	0.471	53.3	167	55	28.83	166
8600	72.5	118.8	0.476	53.9	167	56	28.83	167
8700	71.6	118.6	0.474	53.7	168	56	28.83	167
8800	70.5	118.1	0.483	54.5	168	56	28.83	167
8900	69.2	117.3	0.471	52.8	169	56	28.83	168
9000	68.4	117.2	0.509	57.1	169	56	28.83	168
9100	67.9	117.6	0.505	56.7	169	56	28.83	168

9200	65.9	115.5	0.522	57.5	169	56	28.83	168
9300	64.7	114.6	0.521	56.9	169	56	28.83	168
9400	63.5	113.6	0.517	56.1	169	56	28.83	169