



423-748-7977

Receipt for work performed for Gordon Gray, June 1, 2006

CHARGES:

- Longblock 93-95 engine, no core \$2800 Warranty on shortblock only.

Total: \$2800

PAYMENTS RECEIVED:

Paid \$1800 deposit via paypal 5-22-06

Paid \$1000 balance via MO 5-31-06

Total cost \$2800 paid in full.

Please keep in mind that if I did not install your engine into a car, I have already test-run it on an engine stand for several hours (except 93+ engines which are not compatible with said stand) to check for defects in compression, coolant system, and oil pressure. Due to this, the engine may arrive slightly dirty with oil or coolant residue, or general dust/dirt from the components being installed and removed.

Startup/breakin tips

For those installing their own engine:

- When engine is installed, remove the EGI fuse from the engine bay fusebox, and crank the engine repeatedly until oil pressure registers, this ensures priming of the oil system and bearings before first startup. Now is also a good time to check for oil leaks. Do not expect the engine to run until the EGI fuse is replaced
- When starting the engine, expect smoke, both from the exhaust, and from the engine bay area...this should dissipate within 15 minutes, but light smoke is normal for about an hour after first startup as the exhaust burns off contaminants.
- Before startup, adjust idle higher than normal, until the engine begins to seat and stabilize it may run somewhat rough and may not idle on it's own. This is largely dependant on the condition of the housings that were used...89+ engines are usually stronger than the older ones because of less wear on the average used housing.
- When starting, several cranks may be necessary to prime the fuel system. If it refuses to start, check or replace your plugs (they foul

easily, especially in the presence of excess oil used as assembly lube). IF it starts and dies quickly, and refuses to restart, it may be necessary to add motor oil to the lower sparkplug holes to momentarily increase compression. Fresh rotary rebuilds are often low on compression and build up as mileage is added.

- Once it starts, keep it around 2-3000rpm for a few minutes, while watching for fuel, water, or oil leaks. Then drop it to 1500 or so, and leave it for a few minutes. Go for a short test drive, and again check for leaks or other issues. I generally leave idle set to around 1200-1500 on fresh rebuilds until after 1500 miles, at which time stock idle and TPS adjustment are recommended. Keep in mind larger ported engines may not idle well at the stock 800rpm mark, so 1000rpm or so is where I set these. Every engine is different in how it behaves before and during breakin.
- For those engines that have had emissions and cold start systems removed and blocked off, I have used rubber fuel line and vacuum caps in some places. Though these generally hold up well, I strongly suggest checking them every 6 months or so for deterioration, cracking, or leaks, especially the large caps used to block off coolant passages. Leakage of these caps and failure of the engine as a result of leakage will not be covered under warranty, since this is a maintenance issue.

For engines already installed:

- Keep engine at or below 4000rpm when possible, up to 1000 miles. Afterwards gradually work up to redline by 2000 miles. Going over 4krpm too soon is not going to tear up the engine, but should be avoided whenever possible to give seals the chance to seat on their own.
- Change oil at or near 500 miles, again at 2000-2500, and every 2000-2500 thereafter.
- Drive it as much as you can, road trips are a great way to break in the engine. You'll notice it'll be much stronger and smoother after a long trip. City driving is also fine, but it takes much longer, and is harder to discipline yourself to stay under 4krpm and out of boost. Also many rebuilds flood during breakin, so in-and-out city driving is not always the best idea.
- I recommend 20-50 motor oil for those in southern areas, 10-40 elsewhere. Most importantly, pick a brand and weight of oil and stay with that. The oil itself is not as important as the consistency it is maintained.
- For turbo models, stay at or below atmospheric (zero boost) when possible, for 1000 miles. Afterwards gradually work up to full boost by 2000 miles. Going into a few psi of boost by accident is not going to hurt the rebuild's progress, but don't make a habit of it.

- Use fuel cutoff switch (where applicable on 88 and prior models) during breakin for ease of starting. The need for this should decrease or stop after 2000 miles. For 89-95 cars, the gas pedal serves as the fuel switch, depress it fully during cranking to cut fuel. For 88 and prior cars, I highly recommend you depress the gas pedal fully before and during cranking to help prevent a flood...this introduces more air into the engine, and better allows the engine to make compression for startup.
- Change plugs after breakin is complete.
- For those engines that have had emissions and cold start systems removed and blocked off, I have used rubber fuel line and vacuum caps in some places. Though these generally hold up well, I strongly suggest checking them every 6 months or so for deterioration, cracking, or leaks, especially the large caps used to block off coolant passages. Leakage of these caps and failure of the engine as a result of leakage will not be covered under warranty, since this is a maintenance issue.

WARRANTY:

Included is a 12 month unlimited mileage warranty ON THE SHORTBLOCK ONLY. Main terms of the warranty are as follows:

- 12 months from date of purchase/pickup/shipment regardless of mileage
- provides that the engine will not smoke excessively after startup. All rotary engines smoke on startup for approx. 1 minute. This does not extend to defective turbos or oil metering systems which can also cause smoke.
- provides that the engine will maintain good compression, 85psi is the lowest acceptable limit *after full and proper breakin*. Seal damage/breakage due to overboost/detonation/overrevving is not covered. New seals will not break as a result of normal use.
- provides that the engine will hold good oil pressure as indicated by a known functional mechanical external gauge. Rotary engines usually produce 25psi at idle and 40+ at higher rpms. Stock electrical gauges are not to be trusted.
- If you wish to return an engine for repair, shipping/transportation is at all times the responsibility of the customer. At no time will I be

responsible in full or part for shipping costs or costs to transport your engine/car back for repair.

- provides that the engine will not overheat and/or lose coolant as a result of an internal coolant leak. This does not cover leaking external accessories, even if installed by me.
- Warranty is non transferable, valid for original purchaser only.
- Does not cover leaking external accessories such as hoses, water pump, oil lines, oil pan, etc. even if installed by me. I make every effort to seal these parts, but oilpan etc. leaks on rotaries are often unavoidable.
- At no time will a cash refund, full or partial, be issued for defective engines/parts.
- Depending on circumstances customer may be required to pay for part or all of the parts replacement cost depending on the nature of the failure. Gasket and seal kits do not come with any warranty, so anytime they require replacement a new set must be purchased.
- Warranty provides for a one-time repair. IF the engine develops a serious problem that requires teardown/rebuild, and I repair this, you are not eligible for further warranty claims afterwards. To have a single engine fail more than once after rebuild would indicate user error or a pattern of abuse rather than builder error or parts defects.
- Full list of warranty terms at www.rotaryresurrection.com