Rotary Performance
311 E. Buckingham Rd.
Garland, TX 75040
(972)530-3335
sales@rotaryperformance.com

BILL TO
Brian Wright
Bentonville, AR

INVOICE 3628

DATE 06/21/2018 **TERMS** Due on receipt

DUE DATE 06/22/2018

VIN NUMBER	MILEAGE	COLOR
JM1FD3231R0302464	53,677	Montego

ACTIVITY	QTY	RATE	AMOUNT
3mm engine internal soft parts set New Mazda 3mm apex, side and corner seals with springs. Includes internal gasket and o-ring set, Viton oil seal o-rings plus F&R main seals.	1	1,450.00	1,450.00T
NF01-10-E07 Multi-window main bearing 1993+ multiwindow main bearing	2	73.61	147.22T
3mm rotor machining CNC groove rotor for 3mm apex seals (PER ROTOR)	2	175.00	350.00
Street porting Standard street porting for all housings (13B 1993-95)	1	500.00	500.00
Engine gasket set external (1993-95) Engine installation minor gasket set. Includes intake gaskets, oil and coolant connection gaskets and o-rings with crush washers. No turbo gasketing included.	1	110.00	110.00T
2200cc fuel injector 2200cc DEKA IV Siemens Bosch fuel injector with 1989-95 RX7 Denso electrical connector	2	175.00	350.00T
RP 2200cc secondary fuel rail (1993-95) Rotary Performance secondary performance fuel rail for bolt in 2200cc injectors	1	159.95	159.95T
N3A2-20-180 Pulsation damper (1993-95) Pulsation damper (1993-95)	1	164.59	164.59T
550cc reman side feed injector (1993-95) 550cc reman side feed injector (1993-95). Serviced by RC Engineering. Includes shipping to and from. REQUIRES CORE.	2	65.00	130.00T
N3A1-13-257 injector grommet primary (1993-95) 1993-95 primary injector pod grommet/seal	2	6.57	13.14T
FL600200 Injector o-ring kit (1993-95) 1993-95 side feed injector o-ring kit	1	16.00	16.00T

PAID

JUN 21 PAID

ROTARY PERFORMANCE
GARLAND, TEXAS

ACTIVITY	QTY	RATE	AMOUNT
N3A1-13-692A Front EFI coolant hose (1993-95) Front EFI coolant hose (1993-95)	1	6.36	6.36T
N3A1-13-681A Rear EFI coolant hose (1993-95) Rear EFI coolant hose (1993-95)	1	12.42	12.42T
N3A1-13-691B Throttle body coolant hose (1993-95) Throttle body coolant hose (1993-95)	1	6.26	6.26T
N3A1-15-183A Upper AST hose (1993-95) N3A1-15-183A Upper AST hose (1993-95)	1	24.23	24.23T
N3A1-15-184A Lower AST hose (1993-95) N3A1-15-184A Lower AST hose (1993-95)	1	36.99	36.99T
B455-61-240A Heater hose connector (1993-95) Heater hose connector (1993-95)	1	13.71	13.71T
RP Air separator tank (1993-95 RX7) RP Air separator tank (1993-95 RX7). Upgraded billet design with standard cap system and direct bolt in configuration. High polish aluminum.	1	149.95	149.95T
EN650166 Water pump (1993-95) Water pump (1993-95)	1	99.95	99.95T
N3A1-15-186B Upper radiator hose (1993-95) Upper radiator hose (1993-95)	1	31.93	31.93T
N3A1-15-185B Lower radiator hose (1993-95) Lower radiator hose (1993-95)	1	20.96	20.96T
NF02-18-840 Engine coolant temp sensor (1993-95) Engine coolant temp sensor (1993-95). For engine management system, not gauge.	1	41.20	41.20T
8AF6-15-171-9U Thermostat (1989-95) Thermostat (1989-95). Standard 82C or 180F temperature. Includes gasket/o-ring	1	21.25	21.25T
10802HD Exedy clutch (1993-95) Exedy Stage II organic performance clutch. Includes heavy duty nodular pressure plate, dual reinforced friction disc, release bearing and pilot bearing.	1	550.00	550.00T
RE7A NGK spark plug (04+ RX8) RE7A NGK spark plug (04+ RX8) Leading/lower position. Please set gap to 0.035"	2	24.95	49.90T
BUR9EQP Spark plug (1993-95) Spark plug (1993-95) trailing	2	9.95	19.90T
ZE30 NGK ignition wire set (1993-95) ZE30 NGK ignition wires (1993-95)	1	39.95	39.95T
Shop supplies Shop supplies	1	4.75	4.75T
Gasoline-93 Octane Standard 93 octane gasoline (RECEIPT TOTAL. NOT PER GALLON)	1	30.00	30.00
Fuel pump resistor 50 watt high power fuel injector power resistor for balancing low vs high speed	1	11.95	11.95T

ACTIVITY	QTY	RATE	AMOUNT
BC5E-64-090E-00 Glove box latch (1994-95) Glove box latch (1994-95). ONLY FOR 1994 AND 1995!	1	18.47	18.47T
LABOR Replace glove box latch mechanism	0.30	98.00	29.40
LABOR Remove and install engine assembly. Undress engine to bare block and preare accessories and manifolds. Includes regasketing components and redressing engine. Final cleanup included.	18.50	98.00	1,813.00
LABOR Initial engine bare block tear down for internal inspection	3	98.00	294.00
LABOR Final engine parts preparation and final overhaul	15	98.00	1,470.00
LABOR Remove old alarm and repair cut ignition switch wiring	1.50	98.00	147.00
LABOR Make supplement ground cable for fuel pump and fused positive to COR and add resistor for low speed FP	1.50	98.00	147.00
			Subtotal: 8,481.43
RP GT35R single turbo kit (1993-95) RP Single turbo conversion system with Garrett GT3582R turbocharger, TiAL 1.04 stainless V-band housing, TiAL MV-R wastegate, RP custom V-band manifold, RP V-band downpipe with recirculation (1993-95)	1	3,595.00	3,595.00T
RP Performance midpipe WITHOUT resonator (93-95 RX7) RP Performance midpipe WITHOUT resonator (93-95 RX7). 304 Stainless WITH stainless flanges	1	195.00	195.00T
LABOR Install RP single turbo system (substantially easier with engine overhaul)	5	98.00	490.00
LABOR-FAB Fabrication time labor. Includes specialized bending, notching, welding, etc. Modify provided Mishimoto radiator (cut off small barb and weld on correct size)	1	80.00	80.00
LABOR-DYNO 1st Dynomometer testing and tuning on Dynojet 248 with wideband air:fuel exhaust testing. First hour and includes intial setup and break down.	1	200.00	200.00
LABOR-DYNO 2nd Dynomometer testing and tuning on Dynojet 248 with wideband air:fuel exhaust testing. Subsequent hours.	2	125.00	250.00
			Subtotal: 4,810.00
FD01-39-040D Engine mount (1993-95) FD01-39-040D Engine mount (1993-95). Complete bracket plus liquid filled rubber mount. Updated steel design.	1	321.03	321.03T
Sales Specialty 2.75" S-bend tube for intercooler to Greddy throttle elbow connection	1	89.00	89.00T

ACTIVITY	QTY	RATE	AMOUNT
LABOR-FAB Fabrication time labor. Includes specialized bending, notching, welding, etc. Customize installation of intercooler and plumbing. Includes changing to dual pass tank arrangement, custom blow off valve install, connection, etc.	4.50	80.00	360.00
TiAL Q 50mm BOV TiAL Q 50mm BOV. Silver. Includes clamp and flange.	1	259.00	259.00T
Race gasoline (110 octane) Race gasoline (110 octane) - PER GALLON Necessary fore dyno tuning with safety margin	2	11.00	22.00
LABOR Bleed brake hydraulic system completely	0.80	98.00	78.40
Power FC repair Power FC repair. Test and replace driver chip on all S4 series Power FC's. Typical repair for dead injector driver(s), fan control, boost control, oil metering pump control and others. One repair does not necessarily fix all issues. Some units have multiple issues and need to be declared first so they can each be addressed. Oil metering pump driver chip was bad and is now replaced.	1	125.00	125.00T
Idemitsu synthetic gear oil 75W90 Idemitsu synthetic gear oil	5	8.99	44.95T
LABOR Change transmission and differential gear oils	0.50	98.00	49.00
			Subtotal: 1,348.38

SUBTOTAL	14,639.81
TAX (8.25%)	687.23
TOTAL	15,327.04
TOTAL DUE	**$15,327.04**

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Service Notes

June 13, 2018

- Please observe the basic needs for this car.
  1. Do not drive the car hard with less than a ¼ tank of fuel. The fuel system can lose pressure and damage the engine if driven hard while low on fuel.
  2. NEVER EVER DRIVE THE CAR HOT! Rotary engines are small in size and cannot handle overheating at all. They will be permanently damaged.
  3. Do not drive the car hard until the engine is fully warmed up.
  4. Change the oil every 3000 miles and keep the oil topped off. Rotary engines normally can consume up to 1 quart every 1500miles, so check it at fuel fillings. Always use 20W50 engine oil.
- This project began as a restoration. An emphasis is made to making this car as practical a stock original car as can be done. The engine was removed and overhauled to begin, accessories tested, repairs made and in the end, the car is a reliable, clean and fund car. We know you'll be impressed with the results and this is a memorial of the highlights of what was done.
- This car is a reasonable mileage RX-7. It's likely age, rather than miles that created the issues we faced with the motor. One rotor had little or no compression. Frequently broken apex seals require a replacement rotor and rotor housing. Fortunately, both were usable. The rotor had some damage, but was erased with the 3mm apex seal groove machining.
- All the internals have been updated to the latest style. Mazda continued developing the REW series 13B through the 1999-2002 series RX-7 in Japan. Rubberized metal gaskets, improved springs, etc. have all been installed.
- Since the goal was to push the performance to a higher level, we elected to go through the engine block and freshen up the internal components as well. The original 2mm apex seals have been changed over to Mazda 3mm seals. This requires CNC grooving of the rotors. This was done on our Haas CNC machine and is accurate to 0.0001".
- The engine has been street ported. This is a method to allow the engine to process more air. This essentially allows the engine to make the same power with less boost pressure. Having a lower boost pressure for the same power makes the engine more efficient overall. There are limits to what is practical. Too much porting eventually affects low speed stability and idle quality. We've ported this engine with good street manners in mind. The final performance yield was excellent and the driveability is unaltered.
- The engine main bearings were aged and had to be replaced. New Mazda multi-window bearings are the only alternative. Of note: The engine oil poured out of the oil pan wreaking of gasoline. Please use 20W50 engine oil in the future. The bearings and the turbos will like it.
- The engine had the original engine mounts. The drivers side originally was an aluminum type with a bonded, liquid filled mount. This mount ages poorly and inevitably tears loose from the bracket. The passengers side is totally different. It has a steel bracket and a thru-bolt hardware mount design. This type mount essentially never fails. Mazda updated the drivers side to be like the passengers. We installed one if these mounts. It will hold the engine far better and restore smoothness.
- The fuel system always needs improvement. This stock injector size is not adequate to support increased power levels. The original injector size is 550cc on the primaries and 850cc on the secondaries. The primaries remained on the car, but with new o-rings. We installed a pair of remanufactured injectors for the primaries. RC Fuel Injection in sunny California does an excellent job of cleaning and testing injectors. These are what are now in your primary position. The secondaries were upgraded to a 2200cc size. This is certainly the only injector upgrade that the car will ever need. They are a compact design and were combined with our

performance fuel rail. The rail is a bolt in solution to allow the 2200cc injectors to be installed with the factory pressure regulator. It also can accommodate the original emission system, if that is needed in the future (VERY unlikely).

- The primary injectors are a side feed design and are sealed with o-rings. We installed all new o-rings to ensure we do not have present or future fuel leaks.
- We installed a new pulsation damper on the primary fuel rail. This is a minor pressure regulator for the system and is the #1 cause of under manifold fuel leaks and fires. By replacing this, we prevent that risk.
- Fuel pressure is an essential component to all cars. It's especially true with performance builds. We commonly see voltage issues contribute to lowering the efficiency of the fuel pump. You car needed three areas addressed. The voltage supply for the furl pump circuit has been more directly connected. We added a fuse near the circuit opening relay by the strut tower. This is a dedicated 20A fuse for the fuel pump. Following this, we added an additional ground to the fuel pump sub-harness in the trunk area. Lastly, we added a voltage balancing 50W resistor to the two-speed ballast resistor pack. The combination makes a seamless operating voltage environment for the fuel pump.
- The cooling system is always an area of concern on rotaries. We installed a provided Mishimoto performance radiator for extra cooling effectiveness. Unfortunately, they do not have the correct diameter hose connection on the lower tank for the air separator tank. We cut this off and tig welded the correct fitting in place.
- We added an aluminum air separator tank for function and form. The original plastic AST was a common cause of sudden massive coolant loss and would jeopardize the engine. It cannot do that now.
- Many of the cooling system hoses had never been replaced. We addressed most of them now.. The engine coolant is set at a 50/50 ratio.
- The thermostat was older and has been replaced with a brand new NTN original equipment part.
- The car has been dramatically changed with the addition of a single turbo system. This is our designed GT3582R turbo system. It includes a dual ball bearing Garrett turbocharger, TiAL stainless turbine housing, MVR wastegate, stainless manifold and downpipe plus much much more. This is a tried and true system that has no compromises. The fitment is excellent, build quality excellent and the performance is spot on where a street car should be. You will be impressed with it's simple elegance and smooth driving nature (and the performance too).
- The wastegate has been set to 0.70bar. It is exactly accurate and makes a good strung linear powerband. Corrected, we tested at 307HP at the wheels. That's 100HP at the wheels more than stock and at the same boost level.
- We installed your provided standard mount intercooler and duct. It is a very nice setup, but is a challenge to get good piping to work on the car. We went with a clever/elegant approach to making this a real neat setup. The way it was shipped, the intercooler had the inlet tubing come into the lower tank, flow up to the top and out from there to the throttle elbow. There is little to no room for this and the look is terrible. We instead cut the intercooler open and added a divider to the top tank. This allowed us to add a tubing connetion to the top tank to make this a dual or U flow design. The bottom tank connection was plated off completely. The air now comes into the intercooler on the passengers side, flows to the bottom tank and back up and out on the drivers side of the top tank. That connects to the throttle elbow. Voila! Dual pass intercooler. This makes it cool better, fit better and look a ton better. Based on the excellent power number, it performs great as well.
- The clutch needed attention. We installed a performance Exedy Stage II organic clutch. It has about 35% more clamping force and a double reinforced clutch disc. This combination will be all the car needs. There is a 50 mile break in, but it's pretty much a moot point since the car is in the 500 mile engine break in period as well.
- The leading spark plugs are #7 RX-8 plugs gapped to 0.035". These plugs are an iridium narrow electrode design. Being single electrode, it allows us to narrow the gapping. Having a narrow gap makes for a more consistent and precise spark. Better starting, idling and consistently better performance will be noticed. In addition, it is easier on the ignition coils.

- You provided a Pineapple Racing pulley kit and belt. This setup is the best way to eliminate the air pump and still keep tension on the water pump pulley. It's been installed properly and works great.
- The power steering belt is still the same that was on the car. It had been replaced with a Gates belt in the recent past and is still in good condition.
- The engine management system (engine computer) is an Apexi PowerFC system. This system is a direct replacement for the factory computer. It can run any and all of the factory emission components or can be configured to ignore them as well. It has seamless operation of the twin turbo system and the oil metering pump. It's a 16 bit ECU and is far more capable than it's 8 bit factory unit. The system has been test and tuned on our in house chassis dynomometer. You will notice that the car is smoother and better running than the original system ever was. In addition, this system includes a hand held Commander for monitoring engine functions and basic adjustments. We've attached a PDF of the Commander operating manual. Please do not make changes that you are not specifically knowledgeable about. Changes can do immediate and unwanted results. Most people use the Commander in four channel mode to observe accurate water temp, injector duty, boost pressure and battery voltage.
- The exhaust system is now all new. The cars originally come with a precatalytic converter. This catalyst is superfluous and is quite hazardous to the health of the under hood components. The GT3582R turbo kit included a direct fit bolt in stainless downpipe. In addition, we installed a 3" stainless performance mid pipe. The final section of the exhaust is the muffler/catback section. You supplied a Racing Beat dual tip unit. This system is extremely popular for it's near factory look, quiet nature and good flowing performance. It is stainless steel as well.
- The engine has been tested on our Dynojet 248 chassis dynomometer. With this, we can test the general tune of the engine to make driveability as smooth as possible. For this testing, we use a wide band air:fuel meter to check the exact tune. With load testing and the air:fuel meter, the car has been set spot on accurate. You'll notice a smooth driving car for sure.
- The power level is excellent. As mentioned before, we set the car for boost pressure of 7 psi. This makes for a nice smooth power band. The car tested at 307HP at the wheels (about 362HP at the wheels). We're about 100HP more than stock at the moment. Very impressive. We've attached a dyno chart for your records.
- We added a couple gallons of race fuel (110 octane) to the gas for the dyno testing. Also, we added several ounces of premix. This was to allow the engine to be fully protected during the
- The AC system works well. In fact, it's one aspect of the car that required no service whatsoever. That's a good thing.
- Please fill the gas tank with 93 octane fuel as soon as possible. The tank is low and it could use more fresh fuel added. It is optional to premix oil with the gasoline. If the car is going to be operated in a motorsports environment, it is a good idea. Otherwise, the oil metering system has been tuned to take care of oil injection needs.
- The oil metering pump was not working with the PowerFC. Further testing revealed that the driver chip in the used PowerFC had failed. That unit was probably damaged by someone elses metering pump and they passed it along to you (those rascals). Fortunately, we have the ability to repair these kind of failures and we installed a new chip and the metering pump sprung back to life.
- We were not able to engage the starter from the key to start the car. There was a legacy starter kill/alarm part interfering with the starter operation. Brandon traced this down and properly eliminated it from the circuit. Now it cranks when commanded and with gusto.
- The suspension is pretty much original. It's mostly in good working order. The pillow ball bushings are making a little noise in the rear, but not too bad. Eventually they affect the stability of the car at highway speed, but for the moment, they are not. Also, the dampers are likely original parts (struts/shocks). The popular thing is to install coil overs. The Tein Flex Z system is very affordable. Let us know when the time is right to perform that in the future.
- The drivetrain gear oils have been changed with synthetic Idemitsu oil. This oil is the go to product for all our projects. You will notice that it is smoother shifting.

- The brake fluid get old, dark and thick with age. We have flushed the system out completely with fresh DOT 4 fluid. This will improve the pedal feel and make the hydraulic parts last longer.
- Thanks for the opportunity to revive your car again. It's a wonderful car and we're quite pleased with the final results. If you do have any questions or concerns, don't hesitate to call. Thanks again.

There are undoubtedly many other areas addressed during this major service. Be assured, the quality of the services are second to none.

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New Engine Tips

The first 500 miles of an engines life are the most critical. How these rules are adhered to will closely determine the longevity of the engine.

- Drive the car in a careful, controlled manner for the first 500 miles. Keep the rpm's *below 4,000* and speeds *below 75 mph*. Automatic transmission cars are difficult to control the rpm's exactly so use good sense in how much load you're using. It is not necessary to very speeds during the break in period. Use good sense on a happy cruising speed that is least stressful for the engine.
- Scan your gauges periodically. Keep tabs of the engine temperature and the oil pressure (if equipped with a gauge). Do not expect to see an issue in theses areas. In fact it is very rare to note a problem at all after an engine replacement. By catching a problem in the make, you'll save time and money for everyone.
- No heavy load hauling. This should be common sense. Don't hitch a trailer, boat or jet ski to the back of the car and set off on a pikes peak run. As a matter of fact, don't take anything but yourself, a passenger and reasonable contents for the first 500 miles. After such time, adhere to the factory owner's manual.
- No racing for 500 miles. Once again a common sense issue. Consider these 500 miles the "stretching exercises" of an athlete. Granted, this is a sports car, but spirited driving can come later.
- Change the oil and filter after the 500 miles are completed. If you live in the Dallas region, feel free to return to our facility for a complementary service. Otherwise, have a competent service center in your area tackle the job. Of note, we use Mobil natural lubricants for most cases. 10W30 weight for non-turbo's and 20W50 for turbo models. The only filter we recommend is the Mazda original unit (available from Mazda or though us). Synthetic engine oils can be used and do have superior lubrication properties. We use Idemitsu and AMSoil 20W50 as a racing lubricant, but others like Redline and Mobil 1 can be used instead. Of important note: the only synthetic engine oil that is <u>not</u> compatible with the rotary engine is Castrol Syntec. This oil has been proven to cause oil burning.
- Never, ever allow the engine to overheat for any reason. Period. Overheating, especially coolant loss overheating is the #1 cause of premature engine failures. Even the most robust new engine will be reduced to a chunk of slag by allowing it to overheat. This is especially true on the newer engines (1986+). Permanent, irreparable internal damage has occurred with as little as one minute of coolant loss driving on the highway. Remember, overheating is an operator error, not the engines. We or Mazda will honor <u>no</u> warranty if you overheat the engine.
- Rotary engines love owners who change their oil regularly. 3,000 miles is the gold standard. See the above notes about the 500-mile service for weights and types recommendations.
- Do all periodic maintenance services. Mazda is a deep engineering company and makes excellent periodic maintenance recommendations.
- Do all repairs as they come about. As the old adage goes "A stitch in time saves nine". Repairs like axle bearings, alternators, etc. will compound themselves if not attended to in a timely basis.
- Finally, be proud of your car...It's a reflection of yourself. Keeping it clean inside and out and well maintained will ensure your prolonged happiness with the car.

New engine warranty information

Rotary Performance warrants that each Rotary Performance engine shall be free, under normal use and maintenance, from any defects in material and workmanship, subject to the following conditions. This warranty shall exist for 12 months or 12,000 miles from time of sale of engine. This warranty does not apply to any of the following:

- accident, act of God or nature
- misuse, such as over revving or overloading
- lack of proper maintenance, as described in owner's manual
- improper repairs or replacement
- failure of any component or part other than RP engine
- engine damage caused by failure of any component or part other than engine
- engine damage caused by any foreign particle or substance that may fall into engine
- any engine damage caused by alteration of engine or adding any component or accessory or usage of other than specified fuel, oil lubricants recommended in owner's manual
- Racing or competition use
- Failure of seals or internal components from detonation damage.

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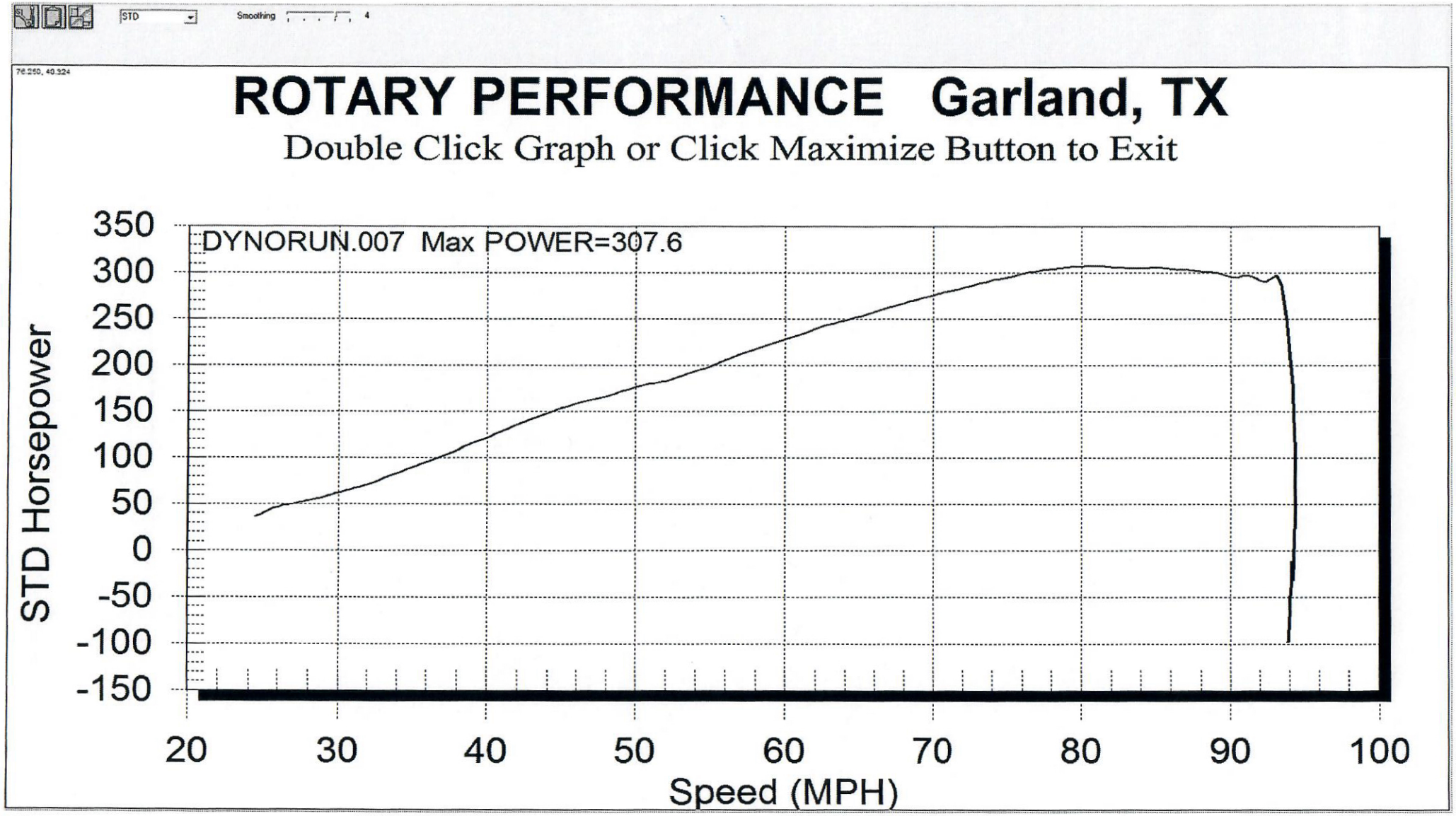
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Smoothing
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ROTARY PERFORMANCE Garland, TX
Double Click Graph or Click Maximize Button to Exit
DYNORUN.007 Max POWER=307.6
STD Horsepower
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