

A Little Japanese Magic

Helpful hints from the people at Rmagic

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KNOW A LOT OF TIMES CAR MAGAZINES feature articles on a custom shop, complete with colorful pictures of the cars and facility, and detail how wonderful the people are and the excellent work they do. And you think, “Man, what a nice shop, but what does that have to do with me?” Well, RX Tuner feels your pain and we decided to sit down and talk to Ohara, the owner of Rmagic about some specific tuning issues that rotorheads deal with and need answers to.

A little background first. Rmagic was established in 1993, and has produced a few world-class RX-7s. The company is best known for its “To Bounds” series of products and Aero. After seeing the cars in magazines and videos, I first met the staff at the 2004 Autosalon. That is when I learned that they really care about their customers and have a deep love of everything RX-7. Ohara was quick to give me a tour of the immaculate shop and really wanted me to see the Dyno and the other facilities designed for building and tuning powerful, long lasting rotaries. The staff’s goal is not to extract the very maximum horsepower from an engine, but to make it perform reliably in every situation. Ohara stressed that he tunes a car on the dyno exclusively; putting the motor in every situation and evaluating its performance so that the driver gets a fun car that is not going to grenade two weeks later.

Willing To Talk

Ohara was candid and willing to talk about anything when it comes to making those triangles spin. So I decided this was the best opportunity to really get some long-sought after answers. I started by discussing ignition timing, a much debated topic and one I have found to cause great changes in an engine’s performance.

General ignition timing goes anywhere from 50degrees of advance in vacuum down to sometimes only 8 or 9 degrees BTDC at high rpm and boost. Ignition timing depends on a number of factors and only testing and tuning will reseal the optimum setting.

Timing Split is a major topic of discussion in the rotary world. Rmagic believes that actual timing splits cannot be shown and because every engine differs somewhat the actual numbers will vary. However, we can see a good outline of what is going on with split. As has been discussed many times by tuners and is described in the SAE papers from Mazda firing both the leading and trailing plugs together will give the best peak horsepower. Ohara believes no split is 100 percent advantageous in all situations. As a general rule, a split is based mainly on RPM. Low RPM will have a large



split and as the rotation speeds up the split will close to the point where there will be no split in the higher RPMs. The reasoning is simple: at low engine speeds there is plenty of time for both plugs to fire and you can get a cleaner burn. Also, at higher engine speeds there is no time for a delay in the firing, and bringing them together will maintain proper combustion.

There are some exceptions. Using a higher boost and widening the split will sometimes provide a margin of safety and even power gains. Rmagic’s method of determining timing split involves hours on the dyno, listening to knocks and watching the exhaust temperatures to determine best setting.

Balance is the Key

Rmagic also spoke about turbine A/R. There are a several things to consider when sizing a turbine. Horsepower goals are obviously first and you need a compressor that will flow the amount of air required to make that horsepower. The other thing that is intertwined with A/R on the exhaust side is porting. Porting will change the volume and pressure of the air that is hitting the exhaust and depending on turbine size and horsepower goals the engine should be ported to sustain these levels and spool the turbine promptly. For Garret turbines exhaust ports can go much larger than the Mitsubishi turbines. Rmagic says the more exhaust you can feed the Garrett turbines the better they work. The Mitsubishi turbines require a little more finesse as too much exhaust pressure will cause top end performance to fall. The best method for choosing an A/R is to monitor exhaust pressure, horsepower and torque curves. Balance is the key.

Rmagic uses some unique methods when tuning. Ohara swears by his dyno and says that proper tuning cannot be fully achieved on the street. There are too many hazards with operating equipment, driving and the



Ohara



normal pitfalls of cruising on a road that prevent runs to be duplicated accurately. Every car at Rmagic immediately has a fitting plumbed that supports an exhaust gas temp probe and exhaust pressure probe. A wideband O2 and data logging are also wired to the vehicle. Another important item is the exhaust pressure. Very few tuners use exhaust pressure to tune. Rmagic likes to plot exhaust pressure versus boost pressure and says there is a point when raising the boost will in fact reduce horsepower, even if fuel requirements are met.

Do It Yourself!

Most rotorheads don't want to just take their baby to a shop and let a stranger tune it. After all, we are investing a great deal of money and we want to make changes in our setups and feel and see them for ourselves--all the while learning more and more about our engine. Rmagic believes the minimum equipment a tuner would need to be successful at tuning their own RX7 is: wideband oxygen sensor; a knock monitor, preferably one that works on headphones



so that knock can be evaluated by the tuner as opposed to looking at a number on the screen; an EGT gauge, for adjusting timing and refining fuel curves; and data logging equipment, to organize and evaluate all the information. They also recommend investing in a Dyno whenever possible so that when changes are made you can instantly see if power has changed or not.

Rmagic has a full assortment of custom parts and modifications for all model RX-7s and RX-8s for sale. Their most recent endeavor is a combined effort with Super Autobacs. Together they have produced two cars, affectionately known as Pinky 7 and Pinky 8. One is an FD with a tune on the stock twins and a shot of nitrous. The other is an RX-8 with a ROM tune and Nitrous. These cars are outfitted with beautiful graphics, designed by Ohara, but the modifications go as far as custom wide fenders, suspension and a host of electronics and audio pieces provided by Super Autobacs.

If you are ever in Tokyo take the time to check out this shop and the wealth of knowledge they are more than willing to share. **RX**

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