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ENGINE O-RING SET

Supplemental Instructions

IMPORTANT: This kit contains 2 different front cover cross over o rings. The SMALL (13.5 mm) o ring is for 86-88 engines. The LARGE (18 mm) o ring is for 89-91 and 93-95 engines. You will have one of these o ring left over at the end of the overhaul, depending on the year of your engine. If you are NOT overhauling a Renesis engine, you will have an additional Renesis REAR STATIONARY O RING

RESESIS NOTES: If you purchased the kit for a RENESIS engine, the Renesis REAR STATIONARY O RING is included in the package with all the other orings. Remember – this O ring is installed in the Renesis END HOUSING, NOT on the stationary gear. (You will NOT use the rear stationary O ring packaged in the large baggie and this will be a SPARE O RING when you are done closing your engine.)

Main gasket set:

This gasket and o-ring set contains all of the internal sealing components for any 1986-1995 13b rotary engines. Please note: many of our customers are building their engines for off road applications, in which case, a complete factory gasket set would be a waist of money, since many of the stock gaskets are discarded. If you are rebuilding for the street, you will need to purchase an installation gasket set. This set contains all of the appropriate components need to install your engine in a stock RX-7. It may be an extra part to order, but feel free to compare. When it comes down to the most bang for the buck, Real World Solutions feels confident that we offer economy, dependability and performance that is unsurpassed. The main gasket set is comprised of o-rings that are made of superior compounds than stock. Most o-rings, in contact with hot oil, are made from Viton. Viton has a higher operating temperature that the stock Buna o-rings and is more resistant to form setting and abrasion. The inner combustion o-ring is Teflon encapsulated, instead of the stock Teflon lined part. This offers better

resistance to heat and scorching. They can even be reused where their stock counterparts fall apart upon removal.

Rotor Oil Seal O-Rings:
More than a few 13bs have had to be rebuilt due to the disintegration to the stock Buna rotor oil seal o-rings. Viton offers more heat and oil resistance in this critical area. Lubricate O-rings and the steel seals with motor oil prior to assembly. They are stiffer than Buna, and require that the seals be pressed into place with a flat board, like a clean, smooth 2X6. Always install the outer seal first, applying pressure rotating around the perimeter of the seal, somewhat like installing a tire on a rim.

Combustion O-rings:
As mentioned before, our o-rings are Teflon encapsulated, not lined. These TES inner water jacket o-rings ARE more difficult to install than the factory o-rings. Make sure that the o-ring seam, (a visible seam) is installed just above the intake port. This would be approximately 11:00 o'clock position for the front housing and rear side of the intermediate, 1:00 o'clock for the front side of the intermediate and rear housings. Use Hylomar to hold them in place during assembly. Double check, as you assemble the engine, that the o-rings do not pop out of their grooves. It helps to press the o-rings flat under something like a phone book, 24 hours prior to assembly. It needs to be stressed that ***THE WATER JACKET O-RING GROOVES NEED TO BE THROUGHLY CLEAN.*** **The TES O-ring is a close tolerance part. Therefore, the o-ring grooves MUST be clean and free of any dirt, rust or scale. Pay attention to the walls of the o-ring groove. Rust and scale can be present there and reduce the volume of the o-ring groove.**
Scrape the grooves with a mechanic's pick and a small-sharpened screwdriver. Pay close attention to the corners between the wall and floor. Inspect them carefully. Rust and scale can keep the engine from clenching or

it can cause the o-rings to crack the o-ring channel wall. Follow the factory torque specifications carefully. If your housings have been resurfaced, measure the o-ring groove depth. **It CANNOT BE LESS that 0.057 in deep**. Please contact your retailer if your housings do not meet this minimum depth.

Outer Water Jacket O-Rings (Non Renesis):
The outer water jacket o-ring is installed in exactly the same manner as the OEM part. Be aware that the o-ring is taller than it is wide, with respect to its installed position in the iron side housing. The tall side should be installed vertical (perpendicular) to the flat surface of the iron housing. If you are in doubt of its position, look carefully at the o-ring side. You should see a faint mold parting line, midway on the sides of the o-ring. The sides that have the parting line should be installed in the o-ring groove so the side sits 90 degrees to the flat surface of the side housing. With all this being said, it is actually difficult to install the o-ring incorrectly since it must be twisted 90 degrees to it's natural free position to be installed incorrectly, but do pay attention, because an incorrectly installed o-ring **can cause an annoying coolant leak. Hold the water jacket o-rings in place during assembly with Hylomar.**

Front Cover O-ring:
This is the o-ring that seals the oil cross over from the front housing to the front cover. In stock configuration, it is surrounded by a paper gasket (86-88) or by a nylon back up ring and paper gasket (89-95) A common failure for the rotary is to blow this o-ring. Symptoms are low oil pressure at all rpms. Mazda recommends eliminating the front cover gasket and running just the o-ring for hi performance applications. Since we have seen this failure occur in "less than high performance" applications, our kit has eliminated the front cover gasket for all engines and the nylon back up ring for 89 and later models. Choose the correct o-ring for your application: small diameter for 86-88 models, large diameter for 89 and later. Coat the o-ring seat with Hylomar and seat the o-ring. **Remember, 89 and later engines: do not use the Nylon back up ring.** Apply a thin coat of RTV to the front cover and install. Use the RTV sparingly; especially around the oil metering pump feed line, which is located at approximately 3 O'clock facing the front of the engine. You should only use enough RTV here to create an opaque

film, no more. The RTV can be applied a little more liberally around the upper half of the front cover. (9 O'clock to 12 O'clock) Since this area lacks a clamping bolt and will not seat as tightly against the engine housing.

New Tension Bolt Seals:
In 2003 Real World Solutions introduced a new tension bolt seal that is better than stock and reusable.

Our new seal is a two-piece part that allows replacement of the sealing O-ring. The washer section is made from a grade 8 ductile steel. The reason for coming out with our own tension bolt seal is that we have experienced several warranty recalls on the stock product due to washer section cracking and breaking into several pieces when the tension bolts are torqued. Another issue is that it is not uncommon to have to break an engine back down to investigate an assembly problem. The stock-sealing washer will usually tear when the tension bolt is loosened. The o-ring on our seals will usually survive several iterations of tightening and loosening. If an o-ring is damaged, they can be replaced by purchasing new o-rings at the local hardware store.

Installation:
The black colored washer is for the lower passenger side exposed tension bolt. #18 in torque sequence. Later model engines have a piece of shrink-wrap around the center section of the bolt. This washer has a larger ID to clear the shrink wrap. No O-ring is needed for this washer.

Place a small drop of oil on the underside of each tension bolt head and on the o-ring. Install the washers with the beveled hole towards the tension bolt head. Slip an o-ring all the way up the tension bolt to where it holds the washer against the tension bolt head. Apply a film of anti-seize paste to the tension bolt threads. Install and seat the tension bolts by hand, taking care not to allow the o-ring to slide down.

Torque the tension bolts in at least 3 stages to 28 ft/lbs

Replace damaged or worn O-rings with a AS 568 – 012 (3/8 X 1/16) Buna-N 70 Shore