MANLEY
PERFORMANCE PRODUCTS, INC.

09/21/16

# PISTON AND RING INSTALLATION INSTRUCTIONS

## SUBARU EJ20, EJ25, FA20

### PISTON INSTALLATION INSTRUCTIONS

Important - Before balancing, please check to make sure that you have the correct components. Used or altered parts are non-returnable.

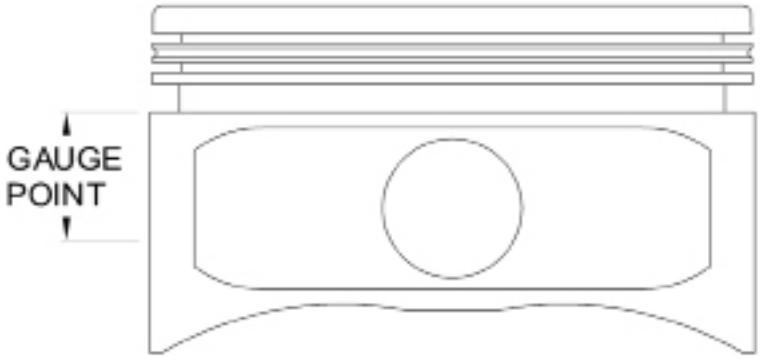
### PISTON TO CYLINDER WALL CLEARANCE

Although piston to wall clearance preferences vary somewhat among engine builders, we recommend the following:

| | Gauge Point Distance | Uncoated Skirt | Coated Skirt |
|---|---|---|---|
| Subaru 75mm Stroke (Mild Boost) | 1.100” | .0035” | .003” |
| Subaru 75mm Stroke (High Boost) | 1.100” | .004” | .0035” |
| Subaru 79/83mm Stroke (Mild Boost) | .850” | .0035” | .003” |
| Subaru 79/83mm Stroke (High Boost) | .850” | .004” | .0035” |
| Subaru 86mm/FA20 (Mild Boost) | .850” | .0035” | .003” |
| Subaru 86mm/FA20 (High Boost) | .850” | .004” | .0035” |

Piston diameter must be measured at a gauge point, which is measured from the bottom of the oil ring. (See Fig. 1) Clearance is built into the piston based upon the finished bore size of the cylinder.

Fig. 1




**Installation instructions for Subaru Grade A and B Platinum Series pistons**

### PISTON SIZING

Manley Subaru bore graded pistons are manufactured to provide DROP-IN installation and correspond to the OEM Grade Range A or B bore sizes. Select the appropriate mix of grade range pistons for your block’s requirements. The proper clearance is designed into each grade range. Do not attempt to modify the piston to wall clearance by mis-matching the grade ranges. Corresponding Grade A and B pistons will have a piston to wall clearance range of .0023”- .0031”. The piston to wall clearance gauge point for all Subaru graded pistons is 0.850” from the bottom of the oil ring.

### CYLINDER WALL PREP

Depending upon the mileage of your engine and the condition of the cylinder walls, you may elect to leave the bores in their current condition or introduce some crosshatch with an abrasive-ball brush hone or polish with Scotchbrite®. For factory honed (new blocks) we recommend a flex hone with 240-320 grit. This won’t alter bore size and creates a better surface finish for performance ring sets.

### PISTON WRIST PIN OFFSET

Manley Subaru pistons are designed with offset wrist pins to reduce connecting rod angularity. Please note the arrow on the top of each piston. This arrow MUST point to the front of the block.

### ROUND WIRE LOCKS

Manley pistons are designed to retain the wrist pin with round wire locks (2 per piston). Proper intallation of locks is critical!

***Please consult a professional engine builder or contact Manley Performance if you have any questions.***

### RECOMMENDED RINGS

**DUE TO DISCREPANCIES IN RADIAL DEPTHS OF PISTON RINGS IN THE FIELD FROM VARIOUS MANUFACTURERS, WE ADVISE USING MANLEY PERFORMANCE PISTON RINGS ON ALL MANLEY PERFORMANCE PISTONS ENSURING MAXIMUM PERFORMANCE.**

SEE REVERSE SIDE FOR SUBARU PISTON RING INSTALLATION INSTRUCTIONS

# *PISTON RING INSTALLATION INSTRUCTIONS*

## SUBARU EJ20, EJ25, FA2O

### GENERAL GAPPING RECOMMENDATIONS

| APPLICATION | FUEL | TOP RING | SECOND RING | OIL RING RAIL |
|---|---|---|---|---|
| Mild Boost up to 15lb | Gas, Alky, E85 | Bore x .005” | Bore x .005” | Min. .015” |
| Medium Boost 16-25lb | Gas, Alky, E85 | Bore x .006” | Bore x .006” | Min. .015” |
| High Boost 26-35lb+ | Gas, Alky, E85 | Bore x .0065” | Bore x .0065” | Min. .015” |
| Extreme Boost 35lb+ | Gas, Alky, E85 | Bore x .0075” | Bore x .0075” | Min. .015” |

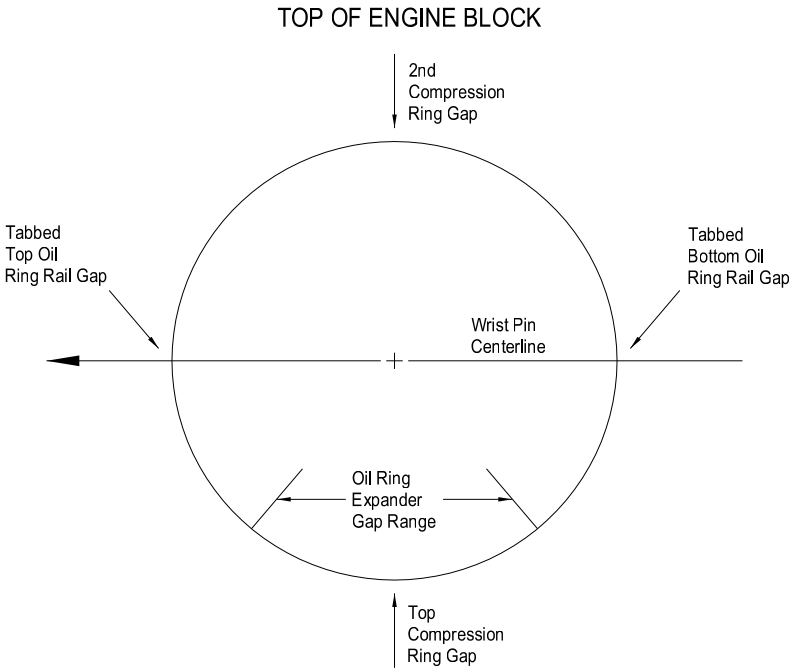
**Disclaimer:** These are general gapping recommendations and are not to be considered absolute. State of engine tune, operating environment and personal experience must also be considered.

**1. File fit ring sets require filing of the top and 2nd rings to achieve the correct end gap. To properly measure the ring gap, the ring should be square in the bore 1” down from the deck. Measure the ring end gap with a feeler gauge or equivalent device. Calculate the recommended ring end gap from the chart above. (Bore size measured in inches)**

**2. A proper ring gap filing tool must be used. Ring filing should be done in an inward direction and square to the sides of the ring. Must de-burr all edges after filing.**

**3. Correct ring installation is critical. The top ring will have a shiny gray edge. When the top and 2nd ring has a dot, install dot side up. Unmarked top rings with an inner bevel install with bevel up. Unmarked 2nd rings with inner bevel install with bevel down. Narrow rings (1.0/1.2mm) that aren’t marked or beveled can be installed with either side up. Do not overlap the ends of the oil ring expander. See orientation diagram.**

**4. Ring to piston groove back clearance should be a minimum of .005” deeper than the radial wall dimension of the piston ring. The piston ring should not stick out of the groove by any amount. Ring groove side clearance should be a minimum of .0015” to a maximum of .0030”.**

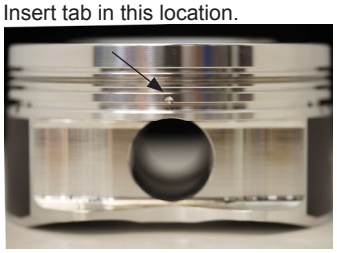



## Subaru EJ20/EJ25/FA20 Ring Sets Containing Oil Rails with Tab

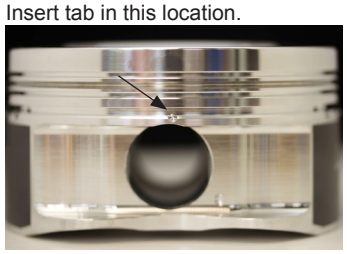
**When installed in a horizontally opposed engine, rail gaps should be installed as shown to the right.**

**The top and bottom rails are tabbed to prevent rotation and to block oil migration at the bottom of the cylinders. These tabs should be installed into the tab receiver grooves located above and below the oil ring groove in line with the wrist pin.**

Insert tab in this location.



Insert tab in this location.



## Ring Seating

When first starting your engine to ensure proper ring seating, do not allow the engine to idle for long periods at a time. It is a good idea to mildly load the engine as soon as you can. Highway driving is a good way to properly seat the rings quickly. Do not idle the engine as idling does not break in any engine. Manley DOES NOT recommend the use of synthetic oils during break-in. After 2000-3000 miles on the street, or one night racing on the track, the rings should be adequately seated so that any oil you prefer can then be used.

## Engine Preparation - Iron Cylinders

Finish hone cylinder walls with torque plates installed if available. Recommended hone grit specification: Chrome face top ring: 280 grit. Followed by light plato hone. Finished hone with a 30 degree cross-hatch pattern off horizontal axis; resulting in a 60 degree included angle.