Diesel
PRO POWER

PISTON RINGS INSTALLATION INSTRUCTIONS

Figure 1a - Piston Ring Installation 1982 AND 1983 6V-92 CALIFORNIA ENGINES (TURBOCHARGED)

1. Oil Rings (Oil Ring Scraper Edges to Point Away from Dome)
2. Dome to Seal Ring (Install with Chamfer Away from Dome)
3. Compression Rings (Align Gaps of First and Third Rings, 180 Degrees from Gap of Second Ring)
4. Fire Ring (Identification Mark to Face Top of Dome)
5. Keystone Fire Ring, Chrome Flash Lower Side
6. Piston Dome
7. Oil Ring Expanders (Green Paint) 9-14 lbs. Tension
8. Piston Skirt

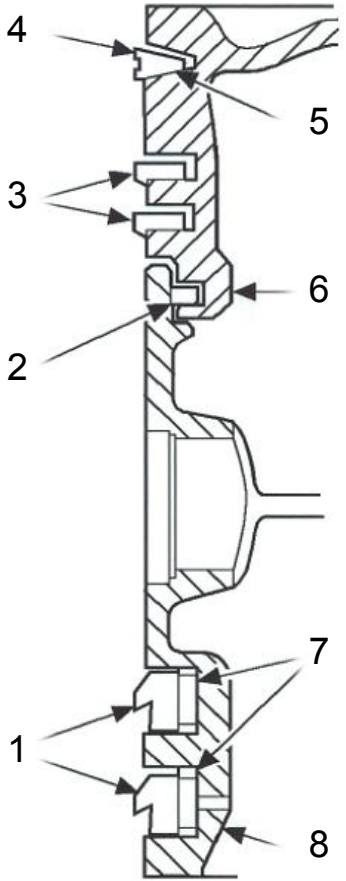
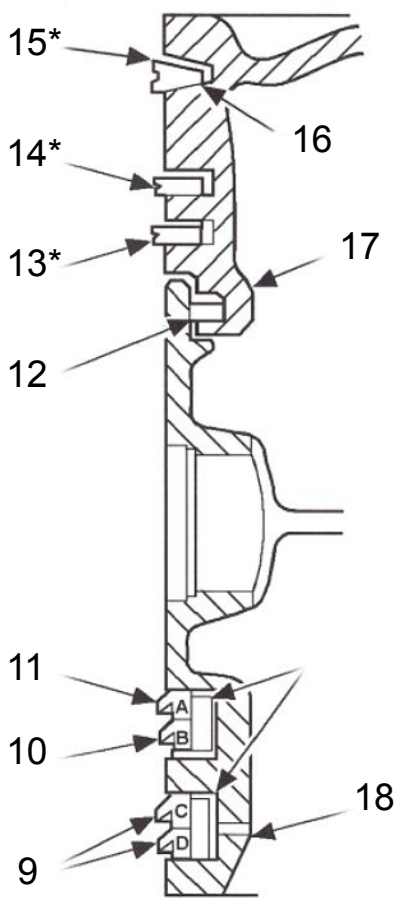


Figure 1b - Piston Ring Installation
COACH ENGINES (TURBOCHARGED)

9. Bottom Side of Ring Slotted (Black Rings) Locate A and C Ring Gaps 180 Degrees from Expander Gaps, B and D Ring Gaps 90 Degrees from A and C Gaps
10. Lower Oil Control Ring Orange Stripe (No Chrome)
11. Upper Oil Control Ring Orange Stripe (Chrome OD)
12. Dome to Skirt Seal Ring, Install with Chamfer Away from Top of Dome as Shown
13. Third Compression Ring
14. Second Compression Ring
15. First Ring-Fire Ring, Identification Mark to Face Top of Dome
16. Keystone Fire Ring, Chrome Flash Lower Side
17. Piston Dome
18. Oil Ring Expanders (White Paint) 12-17 lbs. Tension



* Align gaps of 1st and 3rd rings 180 degrees from gap of 2nd ring

NOTE:
Although they are physically interchangeable, the former and new compression rings, oil control rings and expanders must not be intermixed in an engine. Only the new piston ring configuration should be used in 1983 6V and 8V Federal-certified and 8V
California-certified turbocharged automotive engines.

NOTE:
The new piston ring configuration may also be used to service all prior 6V and 8V Federal and California automotive engines, except the 1982 6V California, the 1983 6V California and all inter-city transit and parlor coach engines.

Installation of Compression Rings

Install the compression rings as follows:
1 - Starting with the bottom ring, install the compression rings with tool J 8128.

NOTE:
To avoid breaking or over-stressing the rings, do not spread them any more than necessary to slip them over the piston.

2 - Stagger the ring gaps around the piston.

Installation of Oil Control Rings

Install the oil control rings as follows:

> **NOTICE:**
> Lubricate the piston rings and piston with ST, or equivalent, before installing to prevent serious engine damage.

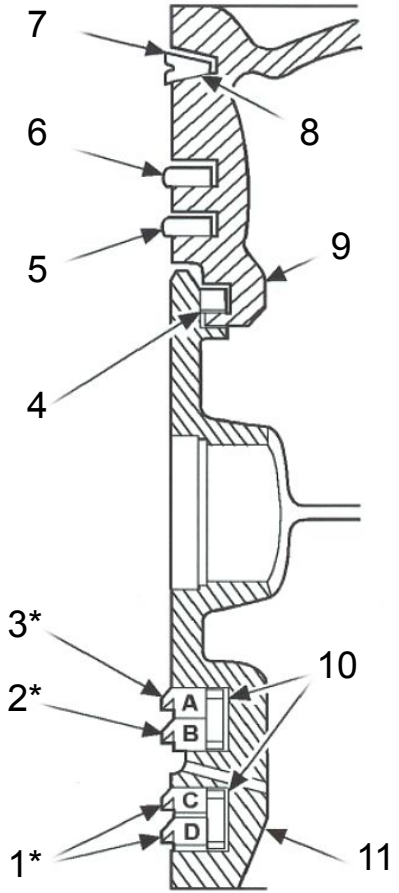
1 - See **Figure 2** for the type and location.

Figure 2 - Piston Ring Installation

1983 Federal, 1983 8V-92 California and Prior Engines (turbocharged)

1. Lower Oil Control Ring, Bottom Side of Ring Slotted (Black Rings) Locate A & C Ring Gaps 180 Degrees from Expander Gaps, and B & D Ring Gaps 90 Degrees from A & C Gaps
2. Oil Control Ring, Orange Stripe (No Chrome)
3. Oil Control Ring, Orange Stripe (No Chrome OD)
4. Dome to Skirt Seal Ring Install with Chamfer Away from Top of Dome as Shown
5. Third Compression Ring, Align Gaps of First and Third Rings 180 Degrees from Gap of Second Ring
6. Second Compression Ring, Either Side to Face Top of Dome
7. First Ring, Fire Ring, Identification Mark to Face Top of Dome
8. Keystone Fire Ring Chrome Flash Lower Side
9. Piston Dome
10. Oil Ring Expanders (White Paint) 9-14 lbs. Tension
11. Piston Skirt

* Install oil control rings with scraper edges pointed away from top of dome



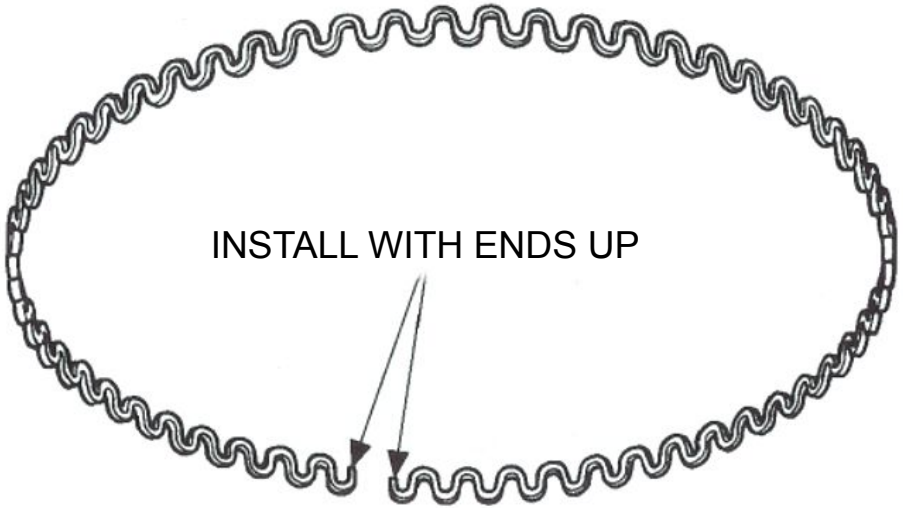
NOTICE:
When installing the oil control rings, use care to prevent overlapping the ends of the ring expanders. An overlapped expander will cause the oil ring to protrude beyond allowable limits and will result in breakage when the piston is inserted in the ring compressor during installation in the cylinder liner.

NOTICE:
To prevent overlapping, do not cut or grind the ends of the expanders. Cutting or grinding the ends will decrease the expanding force on the oil control rings and result in high lubricating oil consumption.

NOTICE:
Do not let the expander ends overlap while installing the piston.
The rings will break.

2 - Install the ring expanders in the oil control ring grooves in the piston skirt. Install the peripheral abutment type ring expanders with the legs of the free ends toward the top of the piston.
See Figure 3.

Figure 3 - Peripheral Abutment Type Oil Ring Expander



3 - Lubricate the oil control rings with STP, or equivalent.
All information subject to change without notice

NOTICE:
The scraper edges of all oil control rings must face downward (toward the bottom of the piston) for proper oil control.

4 - Install the rings by hand. Starting with the upper half of the top oil ring, align the gaps.

Installation of Piston and Connecting Rod Assembly

Install the piston and connecting rod assembly as follows:
1 - Install the piston and connecting rod assembly in the engine.

Installation of Cylinder Liner Seal Ring

Install the cylinder liner seal ring as follows:

NOTE:
The following instructions apply when cylinder liners or complete cylinder kit components are being replaced on the engine. They do not apply when replacement involves piston ring sets only.

CAUTION: USED ENGINE OIL

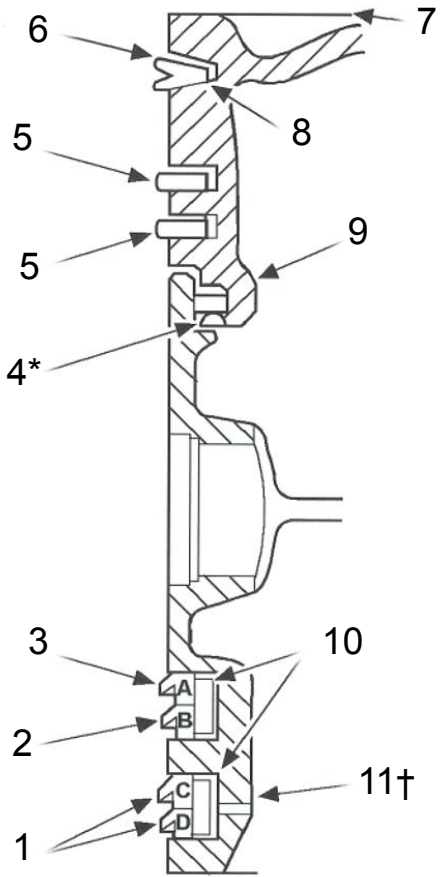
To avoid injury to skin from contact with the contaminants in used engine oil, wear protective gloves and apron.

NOTE:
The cylinder liner seal rings presently being used are improved composition seal rings with an orange Teflon coating. They provide highly effective resistance to heat, chemical and mechanical distortion. Clean engine nil may be used as an assembly lubricant on the seal rings when installing the liner.

NOTE:
Discontinue the use of hydrogenated vegetable type shortening as a lubricant when installing Teflon-coated seals. **See Figure 4**.

Figure 4 - Piston Ring Installation

1. Oil Rings (Oil Ring Scraper Edges to Point Away from Dome)
2. Dome to Seal Ring (Install with Chamfer Away from Dome)
3. Compression Rings (Align Gaps of First and Third Rings, 180 Degrees from Gap of Second Ring)
4. Fire Ring (Identification Mark to Face Top of Dome)
5. Keystone Fire Ring, Chrome Flash Lower Side
6. Piston Dome
7. Oil Ring Expanders (Green Paint) 9-14 lbs. Tension
8. Piston Skirt



* Prelube with engine oil at assembly

† Use oil ring expanders yellow paint (high tension) for non-turbo and transit bus applications.
Use oil ring expanders green paint (low tension) for other applications.
Locate A and C ring gaps 180° from expander gaps, and B and D ring gaps from A and C gaps.
Install oil control rings with scraper edges pointed away from top of dome
Align gaps of first and third rings 180° from gap of second ring.
Use wide gap fire ring for 75 horsepower per-cylinder engines and above. All others use standard gap fire ring.