

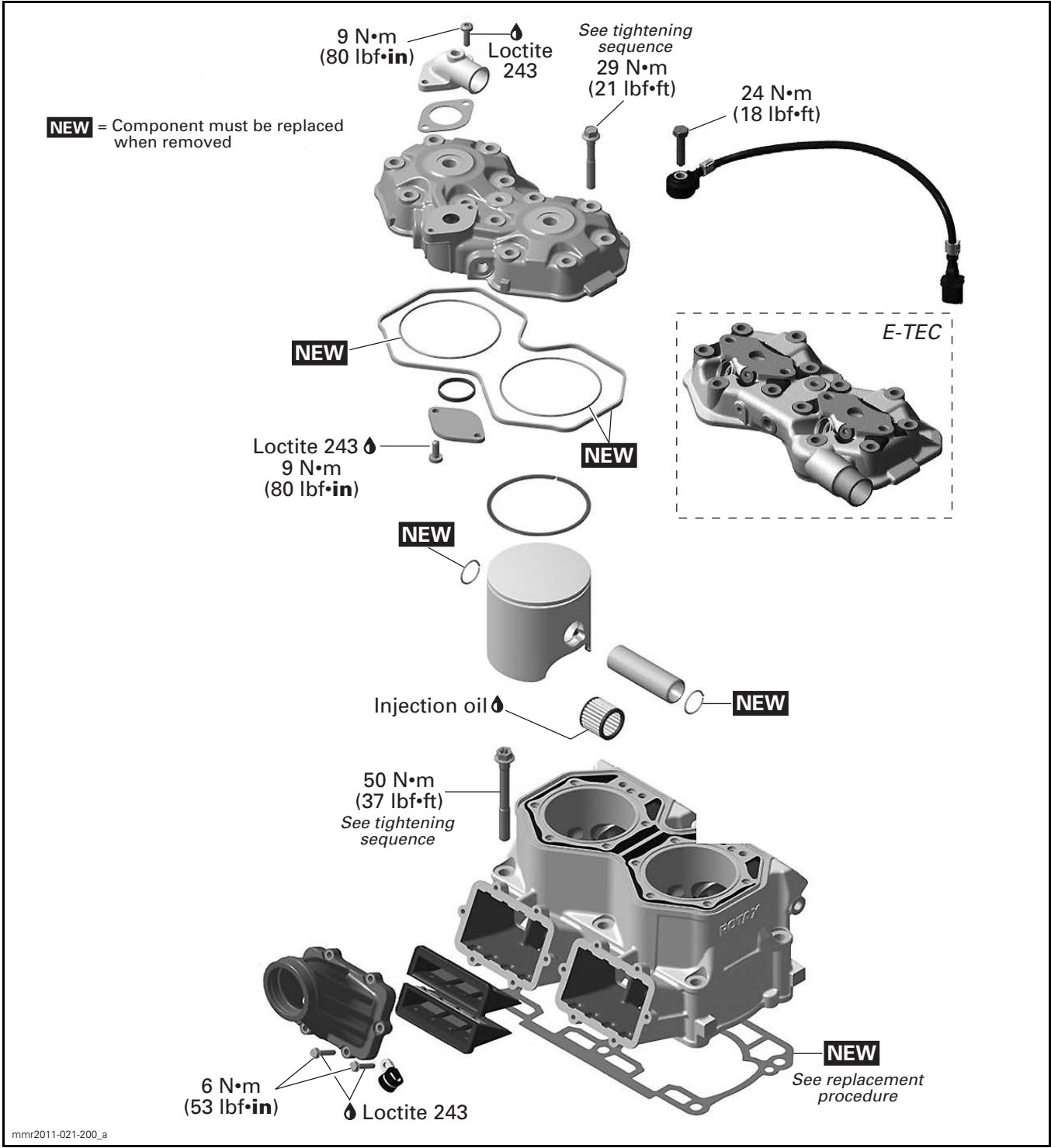
# TOP END (800R ENGINES)

## SERVICE TOOLS

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PISTON CIRCLIP INSTALLER 21MM.....	529 036 138 .....	10
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## SERVICE PRODUCTS

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## GENERAL

Before completely disassembling the engine, check airtightness. Refer to *ENGINE LEAK TEST* subsection.

To measure internal parts, refer to *ENGINE MEASUREMENT* subsection.

During assembly or installation:

- Use torque values and service products as shown in the exploded view.
- Clean threads before applying a threadlocker. Refer to the *INTRODUCTION* subsection.

### WARNING

Torque wrench tightening specifications must be strictly adhered to. Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new ones.

**NOTICE** Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.

### WARNING

Always disconnect the magneto connector prior to:

- Disconnecting any fuel hose.
- Removing a fuel injector (E-TEC).
- Removing a spark plug cable or spark plug.

Otherwise, if the engine is cranked, fuel vapors may ignite in presence of a spark creating a fire hazard.

## ENGINE BREAK-IN

**NOTICE** After a repair involving major parts replacement, a break-in period must be observed.

### *800R Power TEK*

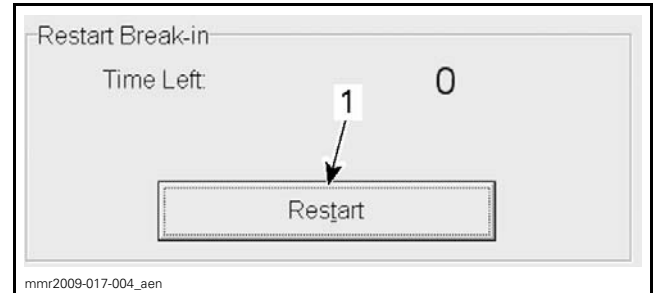
1. Follow *OPERATOR'S GUIDE* recommendation relating to break-in.
2. Add 500 ml (17 U.S. oz) of recommended injection oil into a full fuel tank.

### *800R E-TEC*

1. Follow *OPERATOR'S GUIDE* recommendation relating to break-in.

2. Restart break-in period in B.U.D.S. as follows:

- 2.1 Ensure to use the latest B.U.D.S. software specific to the E-TEC engine.
- 2.2 Select **Setting** tab.
- 2.3 Click on **Restart** button in **Restart Break-in** box.



1. Click on *Restart*

## INSPECTION

### ENGINE COMPRESSION TEST

1. Remove body parts as required to access to the spark plugs.
2. Lift rear of vehicle to clear track from the ground. Support it with a wide base stand.

### WARNING

Prior to measuring engine compression, ensure vehicle is properly lifted with the track off the ground.

3. Safely warm up engine.
4. Remove a spark plug.
5. Disconnect RAVE inlet hoses.
6. Install an appropriate ENGINE COMPRESSION TOOL on engine.



ENGINE COMPRESSION TOOL

**Manual Start Models**

Place emergency engine stop switch to OFF position.

Pull rewind starter several times.

**Electric Start Models**

Depress throttle lever to wide open position.

Press start button for a few seconds.

**All Models**

Check if engine compression is according to specification.

ENGINE COMPRESSION SPECIFICATION	
SERVICE LIMIT	7.5 bar (110 PSI)

**PROCEDURES**

**REED VALVES**

**Reed Valve Removal**

1. Remove carburetors or throttle bodies, refer to *FUEL SYSTEM* subsection.
2. Remove screws retaining intake adapters.
3. Remove reed valves.

**Reed Valve Inspection**

Check reed valve for proper tightness.

There must not be any play between blade and valve body when exerting a finger pressure on blade at blade stopper location.

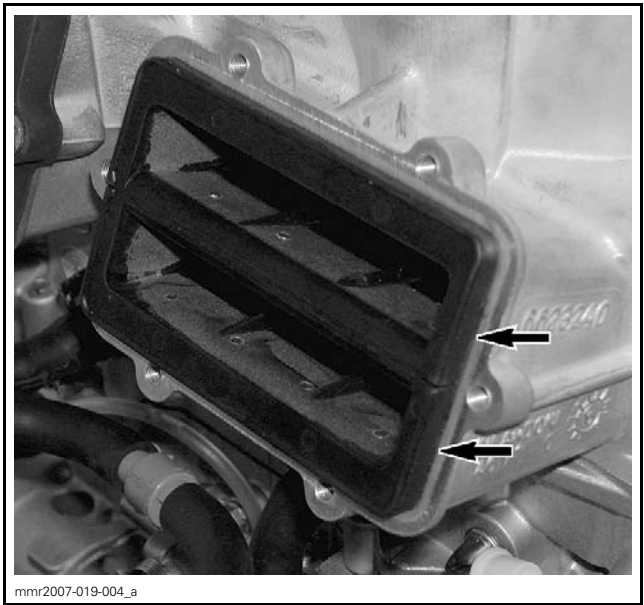
In case of a play, turn blade upside down and recheck.

If there is still a play, replace blade and/or valve body.

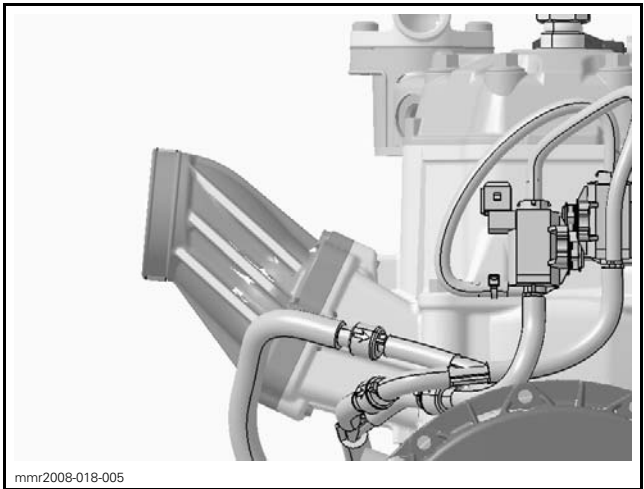
**Reed Valve Installation**

The installation is the reverse of the removal procedure. However, pay attention to the following. Blades have a curved shape. Install with their curve facing reed block.

Ensure to position reed valves so that they rest flat in intake opening.



Ensure to position intake adapter as shown.



**CYLINDER HEAD  
(800R POWER TEK)**

**Cylinder Head Removal**

1. Remove *DRIVE BELT GUARD*. Refer to *DRIVE BELT* subsection.
2. Drain coolant, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

3. Remove spark plugs.
4. Remove knock sensor.
5. Disconnect temperature sensor connector.
6. Disconnect coolant hoses from upper coolant socket.
7. Disconnect carburetor heater inlet hose from cylinder head.
8. Remove cylinder head screws.
9. Remove cylinder head.

### Cylinder Head Inspection

Check cylinder head for cracks or other damages. Replace if necessary.

### Cylinder Head Warpage

**NOTE:** Refer to *ENGINE MEASUREMENT* for the measurement procedures.

CYLINDER HEAD WARPAGE SPECIFICATION	
ENGINE	SERVICE LIMIT
800R Power TEK	0.05 mm (.002 in) per 50 mm (2 in) of surface
	0.5 mm (.02 in) for total length of cylinder head

### Cylinder Head Cleaning

Scrape off any carbon deposits from cylinder head.

Use LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500).

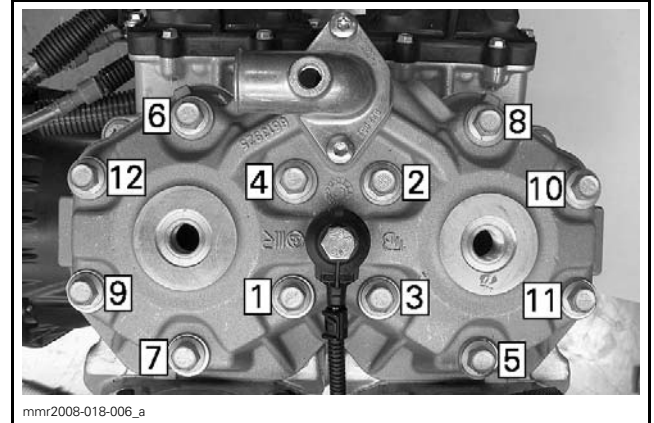
### Cylinder Head Installation

The installation is the reverse of removal procedure, however pay attention to the following.

Install **NEW** rubber ring and round O-rings on each cylinder.

Tighten cylinder head screws to specification as per the following sequence.

CYLINDER HEAD SCREWS TORQUE	
FIRST STEP	15 N•m (133 lbf•in)
SECOND STEP	29 N•m (21 lbf•ft)



TIGHTENING SEQUENCE

Tighten knock sensor retaining screw to specification.

KNOCK SENSOR SCREW TORQUE
24 N•m (18 lbf•ft)

## CYLINDER HEAD (800R E-TEC)

### Cylinder Head Removal

1. Release fuel pressure using B.U.D.S. software. Refer to *ELECTRIC FUEL PUMP (E-TEC)* in *FUEL TANK AND FUEL PUMP* subsection.
2. Remove LH side panel.
3. Remove drive belt guard. refer to *DRIVE BELT* subsection.
4. Drain coolant, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
5. Disconnect fuel lines. Refer to *FUEL SYSTEM* subsection.
6. Disconnect injectors electrical connectors.
7. Remove spark plugs.
8. Remove knock sensor.
9. Disconnect temperature sensor connector.
10. Disconnect coolant hoses at cylinder head.
11. Disconnect throttle body heater inlet hose at cylinder head.
12. Remove cylinder head screws.
13. Remove cylinder head from cylinder block.

### Cylinder Head Inspection

Check cylinder head for cracks or other damages. Replace if necessary.

**NOTE:** Refer to *ENGINE MEASUREMENT* for the measurement procedures.

Subsection XX (TOP END (800R ENGINES))

Cylinder Head Warpage

CYLINDER HEAD WARPAGE SPECIFICATION	
ENGINE	SERVICE LIMIT
800R E-TEC	0.05 mm (.002 in) per 50 mm (2 in) of surface
	0.5 mm (.02 in) for total length of cylinder head

Cylinder Head Cleaning

Scrape off any carbon deposits from cylinder head.

Use LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500).

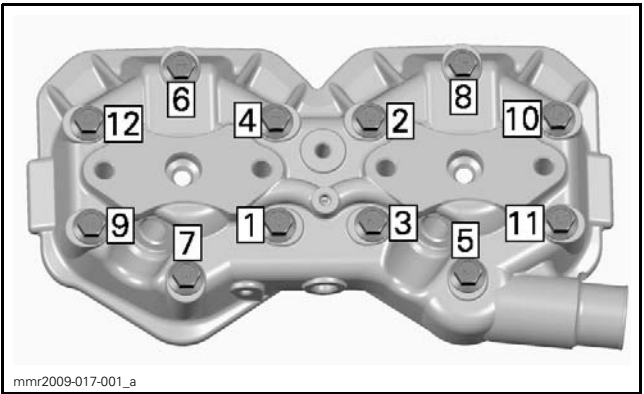
Cylinder Head Installation

The installation is the reverse of removal procedure, however pay attention to the following.

Install **NEW** rubber ring and round O-rings on each cylinder.

Tighten cylinder head screws to specification as per the following sequence.

CYLINDER HEAD SCREWS TORQUE	
FIRST STEP	15 N•m (133 lbf•in)
SECOND STEP	29 N•m (21 lbf•ft)



Tighten knock sensor retaining screw to specification.

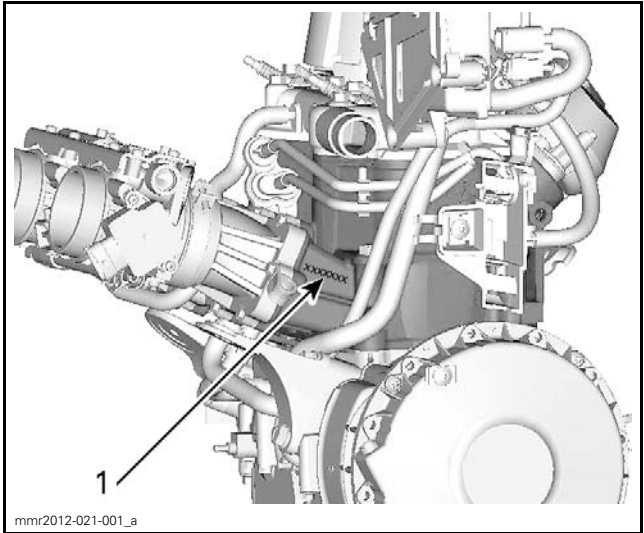
KNOCK SENSOR SCREW TORQUE
24 N•m (18 lbf•ft)

CYLINDER BLOCK

Cylinder Block Identification

The cylinder block version is identified by a number cast on the intake flange. of cylinder block.

CYLINDER BLOCK IDENTIFICATION NUMBER	
Summit (CAN/US) Freeride (CAN/US)	6413041
MX Z (CAN/US/EUR) Summit (EUR) Freeride (EUR) Renegade (CAN/US/EUR)	6413046



1. Identification number

Cylinder Block Removal

1. Remove *CYLINDER HEAD* as explained in this subsection.
2. Refer to *EXHAUST SYSTEM* subsection and remove:
  - Muffler
  - Tune pipe
  - Exhaust manifold.
3. Remove acoustic panel.
4. Refer to *DRIVEN PULLEY AND COUNTER-SHAFT* subsection and remove:
  - Driven pulley
  - Countershaft bearing support.
5. Disconnect carburetors or throttle bodies from intake adapters and set aside.

800R Power TEK

6. Remove clamp that supports RAVE valve hose to intake adapter on MAG side.
7. Disconnect RAVE valve hose from pressure solenoid.

**800R E-TEC**

8. Refer to *RAVE E-TEC* subsection and remove:
  - RAVE valves cover
  - RAVE valves link bar.
9. Disconnect RAVE valves oil lines and vacuum/pressure hoses.

**All Models**

10. Remove cylinder screws.
11. Remove cylinder block from crankcase.

**Cylinder Block Inspection**

Remove RAVE valves, refer to *RAVE 800R POWER TEK* or *RAVE 800R E-TEC* subsection.

Remove reed valves, refer to *REED VALVES REMOVAL* in this subsection.

Check cylinders for cracks and scoring on the top and bottom of cylinders. Replace if necessary.

**NOTE:** Refer to *ENGINE MEASUREMENT* for the measurement procedures.

**Cylinder Taper**

CYLINDER TAPER SPECIFICATION	
ENGINE	SERVICE LIMIT
800R Power TEK	0.1 mm (.004 in)
800R E-TEC	0.1 mm (.004 in)

**Cylinder Out of Round**

CYLINDER OUT OF ROUND SPECIFICATION	
ENGINE	SERVICE LIMIT
800R Power TEK	0.08 mm (.003 in)
800R E-TEC	0.08 mm (.003 in)

**Cylinder Block Cleaning**

Scrape off any carbon deposits from exhaust ports.

Carefully clean cylinder block screws, specifically under screw head.

Use LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500).

**Cylinder Block Installation**

The installation is the reverse of removal procedure, however pay attention to the following.

Install a **NEW** cylinder base gasket of the same thickness as the old one. Refer to *CYLINDER BASE GASKET*.

Check if dowel pins are in crankcase holes.



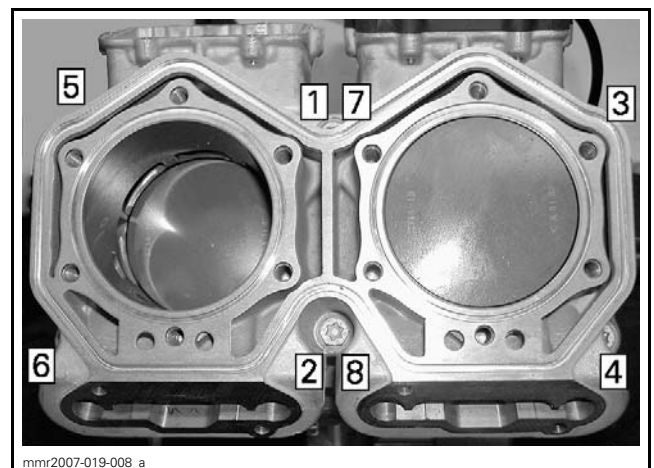
Lubricate cylinder with new injection oil or equivalent.

Carefully slide cylinder block down while squeezing piston rings to allow cylinder insertion.

Proceed one piston at a time, the help of an assistant may be required.

Tighten cylinder block screws to specification as per the following sequence.

CYLINDER BLOCK SCREWS TORQUE	
FIRST STEP	25 N•m (18 lbf•ft)
SECOND STEP	50 N•m (37 lbf•ft)

**TIGHTENING SEQUENCE**

Measure piston projection as described in *ENGINE MEASUREMENT* subsection.

Subsection XX (TOP END (800R ENGINES))

PISTON PROJECTION SPECIFICATION		
ENGINE	MODEL	SERVICE LIMIT
800R Power TEK	All	1.65 mm to 1.85 mm (.065 in to .073 in)
800R E-TEC		
	Summit (CAN/US) Freeride (CAN/US)	1.82 mm to 1.92 mm (.072 in to .076 in)
	All Others	1.62 mm to 1.72 mm (.064 in to .068 in)

800R E-TEC CYLINDER BLOCK IDENTIFICATION NUMBER	
Summit (CAN/US) Freeride (CAN/US)	6413041
All Others	6413046

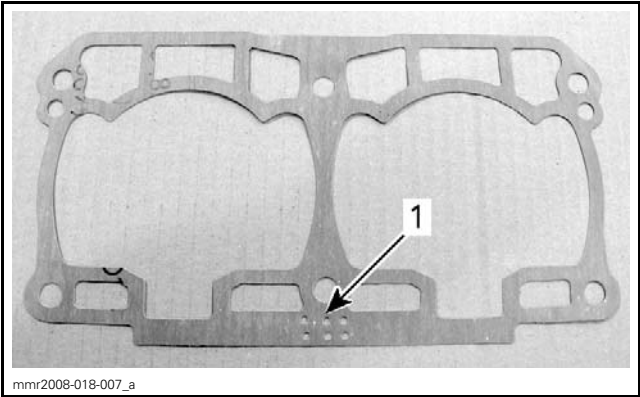
If piston projection measurement is out of specification, change cylinder base gasket thickness. Refer to *CYLINDER BASE GASKET* in this subsection.

CYLINDER BASE GASKET

Cylinder Base Gasket Replacement

The cylinder base gasket is available in different thicknesses to adjust precisely the piston projection.

THICKNESS	DOT PATTERN
1.2	• •
1.1	•
1.0	No dot
0.9	• • • • • • • • •
0.8	• • • • • • • • •
0.7	• • • • • • • • •
0.6	• • • • • • • • •
0.5	• • • • • • • • •



TYPICAL  
1. Gasket thickness identification dots

**NOTICE** Always install a cylinder base gasket of the proper thickness. Failure to do so may cause detonation and severe engine damage.

1. Ensure top surface of crankcase is clean.
2. Install a **NEW** cylinder base gasket of the same thickness as the one that was installed at factory.
- NOTE:** If thickness of the factory-installed gasket is unknown, install a 7-dot gasket (0.7 mm (.028 in)) as a base line.
3. Install cylinder block and measure piston projection. Refer to *CYLINDER BLOCK* in this subsection.
4. If piston projection is out of specification, follow this guideline:

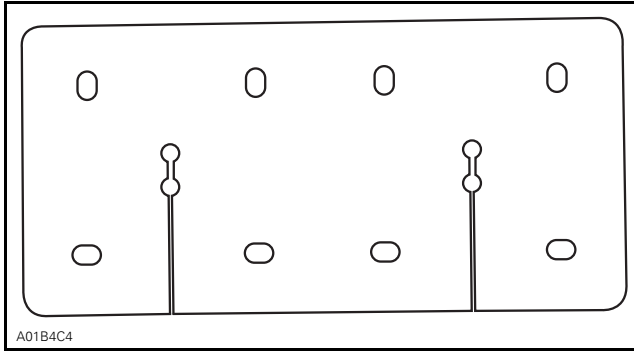
CYLINDER GASKET SELECTION GUIDELINE	
MEASURED PISTON PROJECTION	GASKET TO INSTALL
Below specification	Thinner
Above specification	Thicker

PISTONS

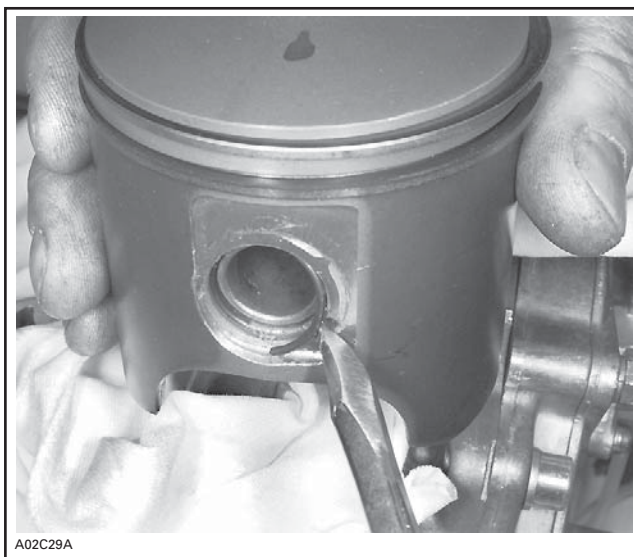
Piston Removal

1. Remove *CYLINDER BLOCK*, as explained in this subsection.
2. Place a clean cloth or the RUBBER PAD PROTECTOR (P/N 529 023 400) over crankcase.





3. Using a pointed tool inserted in piston notch, remove one circlip from piston.



TYPICAL

4. Push piston pin out of piston.
5. Remove piston.
6. Remove bearing.
7. Discard circlips.

### Piston Inspection

Inspect piston for scoring, cracking or other damage.

**NOTE:** Refer to *ENGINE MEASUREMENT* for the measurement procedures.

### Cylinder/Piston Clearance

CYLINDER/PISTON CLEARANCE SPECIFICATION	
ENGINE	SERVICE LIMIT
800R Power TEK	0.2 mm (.0079 in)
800R E-TEC	0.2 mm (.0079 in)

### Ring/Piston Groove Clearance

RING/PISTON GROOVE CLEARANCE SPECIFICATION	
ENGINE	SERVICE LIMIT
800R Power TEK	0.2 mm (.0079 in)
800R E-TEC	0.2 mm (.0079 in)

### Piston Ring End Gap

RING END GAP SPECIFICATION	
ENGINE	SERVICE LIMIT
800R Power TEK	1 mm (.039 in)
800R E-TEC	1 mm (.039 in)

### Piston Cleaning

1. Scrape off any carbon deposits from piston dome.

**NOTE:** The arrow on the piston dome must be visible after cleaning.

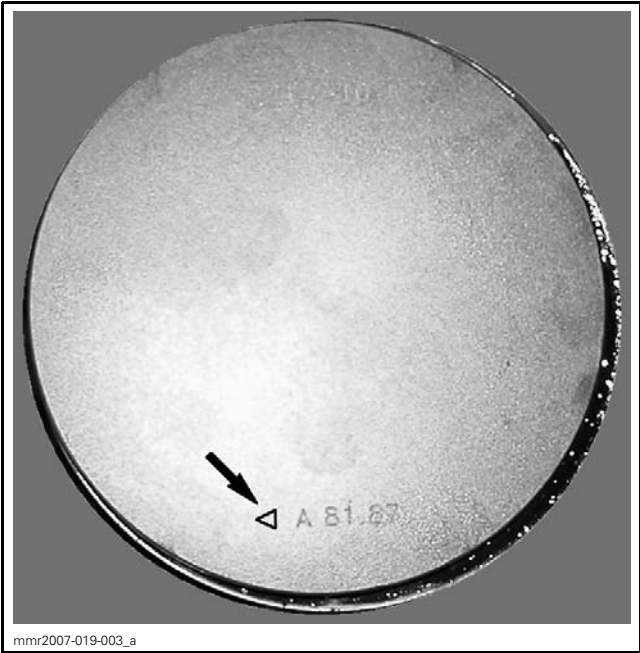


EXHAUST DIRECTION INDICATION

2. Clean the piston ring groove with a groove cleaner tool or with a piece of broken ring.

### Piston Installation

1. Lubricate needle bearing with injection oil.
2. Insert bearing into connecting rod.
3. Place pistons over connecting rods with the arrow on the piston dome facing towards exhaust port.



EXHAUST DIRECTION INDICATION

- 4. Install piston pin in piston.
- 5. Use the following tool to install **NEW** circlips.

ENGINE	TOOL
800R Power TEK and 800R E-TEC	PISTON CIRCLIP INSTALLER 21MM (P/N 529 036 138)

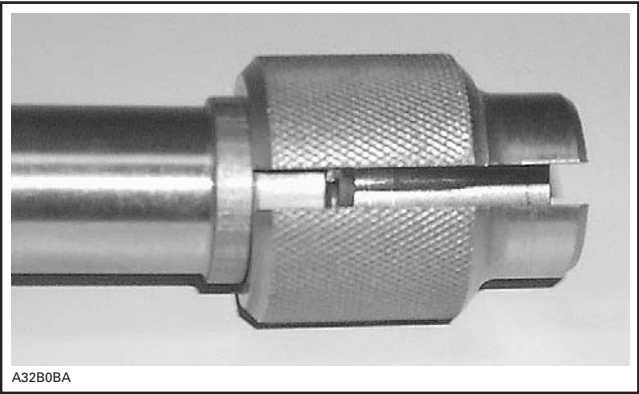
**NOTICE** Always install **NEW** mono-hook circlip(s). If circlip installation fails at the first attempt, always retry with a new one.

- 6. Use the following procedure to properly install circlip.
  - 6.1 Insert circlip into support so that, when installed in piston groove, the gap will be below the tab.



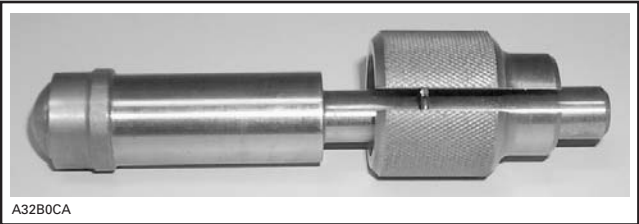
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- 6.2 With round end of pusher, position circlip perpendicularly to the support axis.

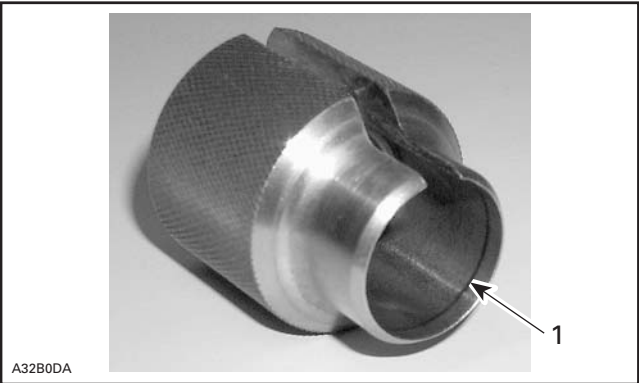


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- 6.3 With the other end of the pusher, push circlip into the support groove.



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A32B0DA

1. Groove

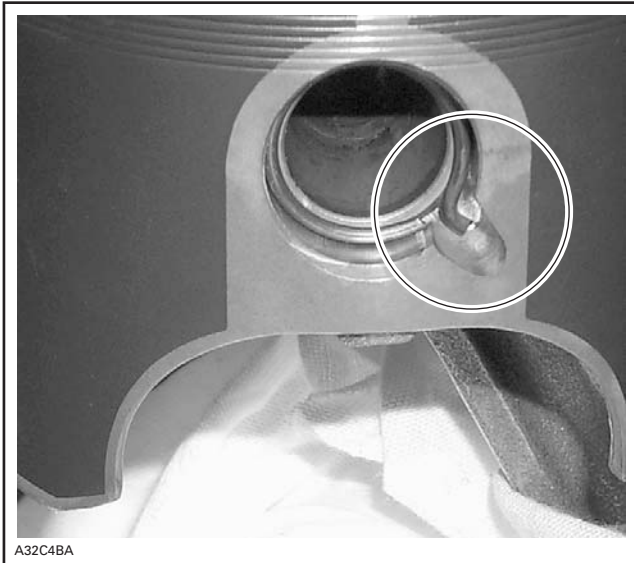


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CIRCLIP READY TO BE INSTALLED ON PISTON

- 6.4 Using a plastic hammer, tap pusher to put the new circlip in place.

**NOTE:** Make sure to install new circlip(s) with the gap below the tab exactly as shown on the following photo.



*GAP BELOW THE TAB*

**NOTICE** Circlips must not move freely after installation; if so, replace them.

7. Install all other removed parts as the reverse of removal procedure.