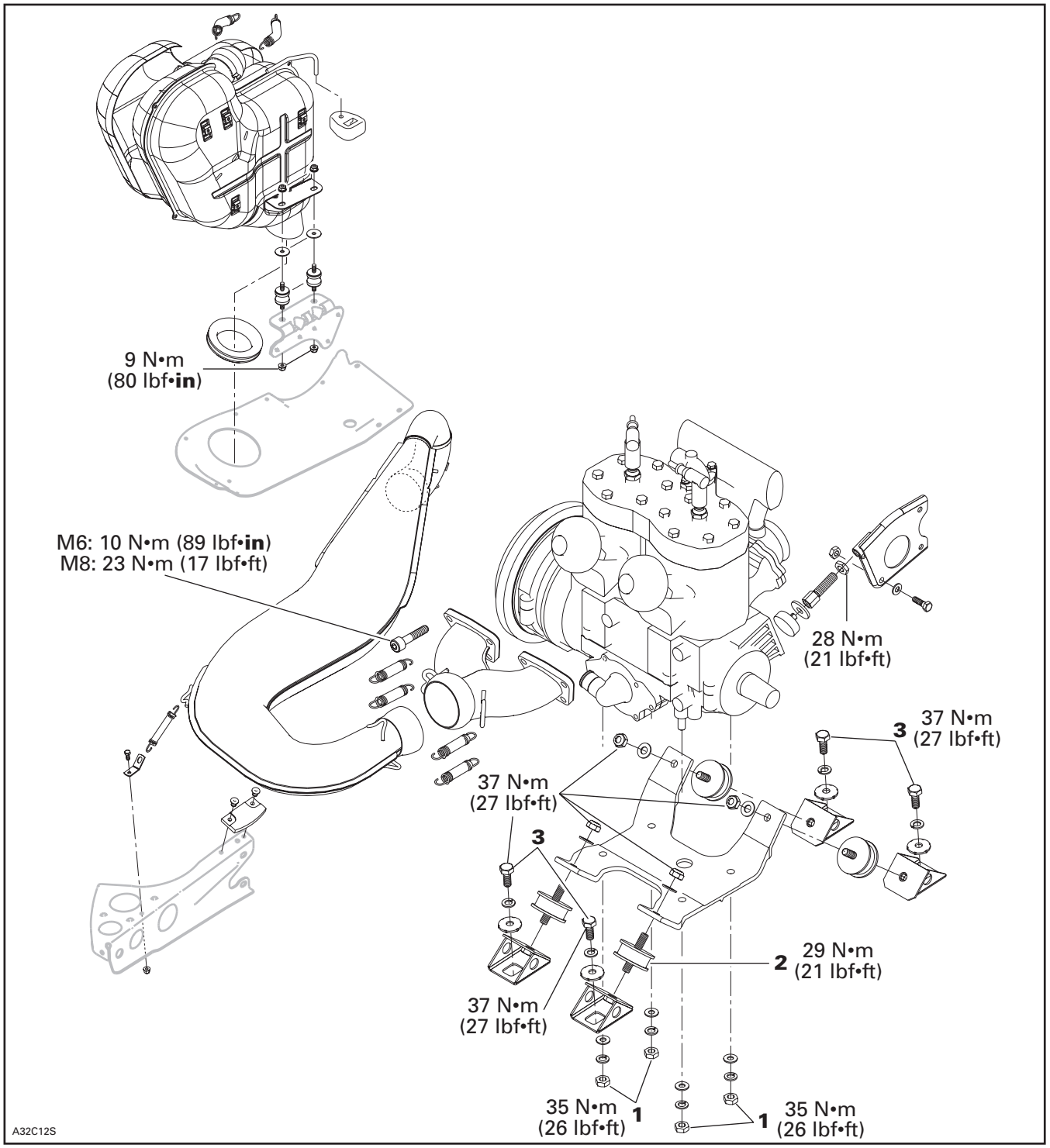
TABLE OF CONTENTS

493, 593 AND 693 ENGINE TYPES

ZX Series



TYPICAL

REMOVAL FROM VEHICLE

Open hood.

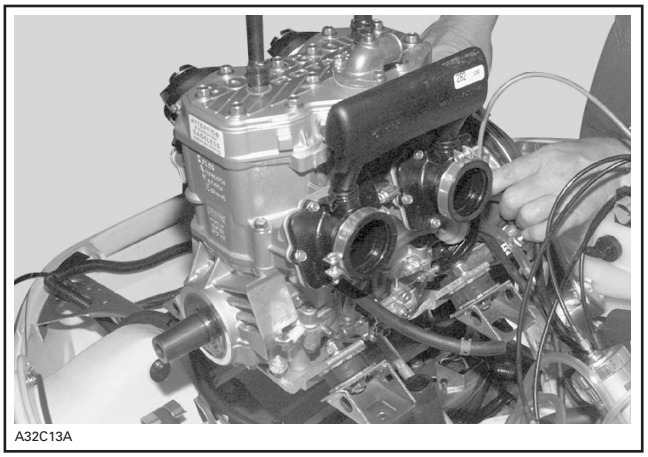
Remove tuned pipe and muffler.

Drain engine coolant.

Remove or unplug the following then lift off engine from engine compartment.

NOTE: Use of a hoist is recommended.

– guard
– air silencer
– drive belt
– rewind starter handle
– drive pulley (not necessary if engine has not to be disassemble)
– hood, refer to 09-02 BODY
– carburetors
– impulse hose and electrical connectors
– oil injection inlet line at oil injection pump, install hose pincher
– oil pump cable
– coolant hoses between cylinder head and radiator
– coolant by-pass hose
– coolant hose at front of coolant reservoir
– engine support screws
– engine stopper (left rear of engine)


A32C13A

TYPICAL — ENGINE REMOVAL

1,2,3,4, Engine Support Nut and Manifold Screw

Torque the engine/support nuts **no. 1** to 35 N•m (26 lbf•ft).

Torque rubber mounts **no. 2** to support bracket to 29 N•m (21 lbf•ft).

Torque rubber mount/support nuts to 37 N•m (27 lbf•ft).

Torque support brackets/chassis screws **no. 3** to 37 N•m (27 lbf•ft).

Torque manifold screws **no. 4** to:

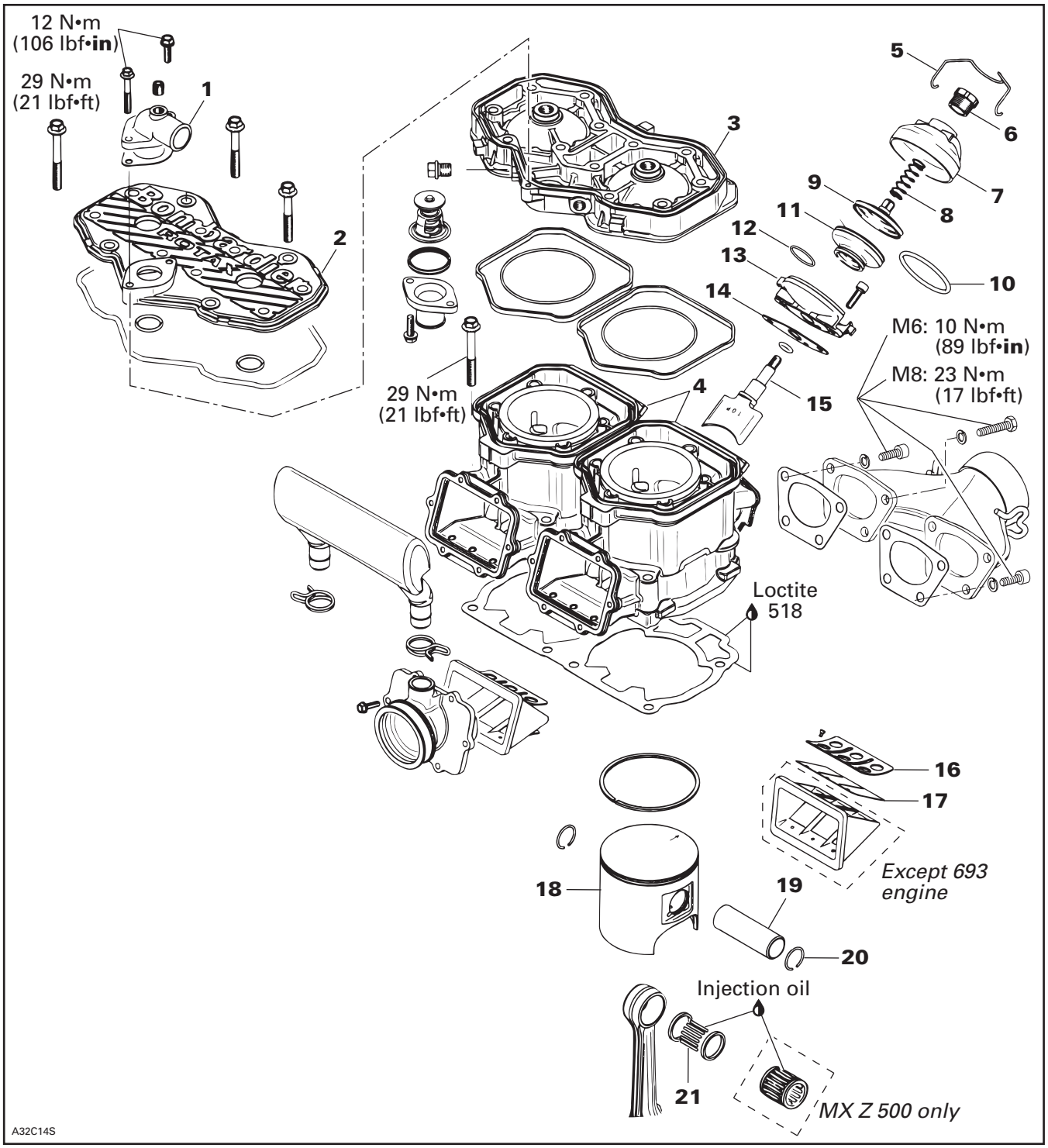
M6 = 10 N•m (89 lbf•**in**)
M8 = 23 N•m (17 lbf•ft)

INSTALLATION ON VEHICLE

To install engine on vehicle, reverse removal procedure. However, pay attention, to all appropriate component/system reinstallation procedures described throughout this *Shop Manual* and to the following:

– After throttle cable installation, check carburetor maximum throttle opening and oil injection pump adjustment.
– Check pulley alignment and drive belt tension.
– Seal exhaust ball joints with Ultra Copper (P/N 413 710 300).

TOP END


12 N•m
(106 lbf•in)
29 N•m
(21 lbf•ft)
1
2
3
5
6
7
8
9
11
12
13
14
10
M6: 10 N•m
(89 lbf•in)
M8: 23 N•m
(17 lbf•ft)
15
4
29 N•m
(21 lbf•ft)
Loctite
518
16
17
18
19
20
Except 693
engine
Injection oil
21
MX Z 500 only
A32C14S

COMPONENT REMOVAL

Most engine components can be removed with engine on vehicle such as:

– cylinder head
– piston(s)
– cylinder(s)
– rewind starter
– oil pump
– water pump
– magneto flywheel
– RAVE valve(s)
– reed valve(s)

CLEANING

Discard all gaskets and O-rings.

Clean all metal components in a non-ferrous metal cleaner.

Scrape off carbon formation from cylinder exhaust port cylinder head and piston dome using a wooden spatula.

NOTE: The letters "AUS" (over an arrow on the piston dome) must be visible after cleaning.

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

DISASSEMBLY

RAVE System

NOTE: RAVE stands for Rotax Adjustable Variable Exhaust.

Remove spring clip **no. 5**, cover **no. 7** and spring **no. 8**.

Remove spring **no. 10**.

Unscrew valve piston **no. 9**.

Remove bellows **no. 11** and spring **no. 12**.

Remove cylindrical screws. Remove valve housing **no. 13**.

Pull out exhaust valve **no. 15**.

A32C15A

RAVE VALVE PARTIALLY REMOVED

2, Cylinder

Remove spark plugs, coolant outlet **no. 30**. Unscrew cylinder head cover **no. 2** then cylinder head **no. 3**.

18, Piston

Place a clean cloth or rubber pad (P/N 529 023 400) over crankcase. then with a pointed tool inserted in piston notch, remove both circlips **no. 20** from piston **no. 18**.


A02C29A

TYPICAL

MX Z 500

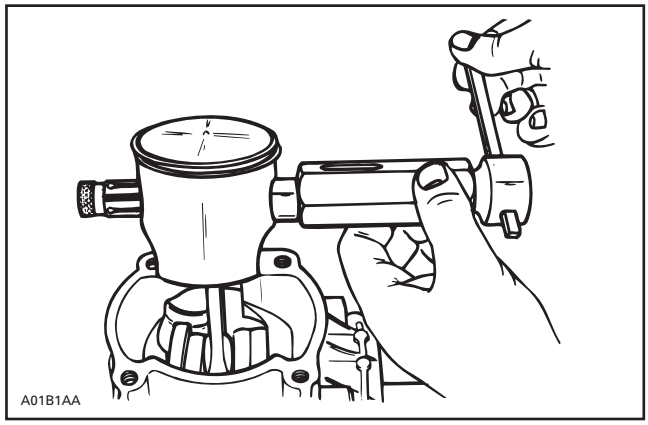
To remove piston pin no. 19, use piston pin puller (P/N 529 035 503) as follows:

Fully screw puller handle.

Insert puller end into piston pin.

Screw (LH threads) extracting nut.

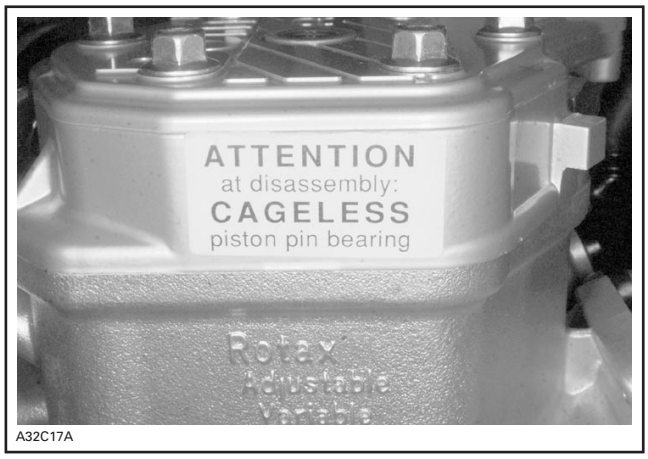
Hold puller firmly and rotate puller handle counterclockwise to pull piston pin.



TYPICAL

All Models Except MX Z 500

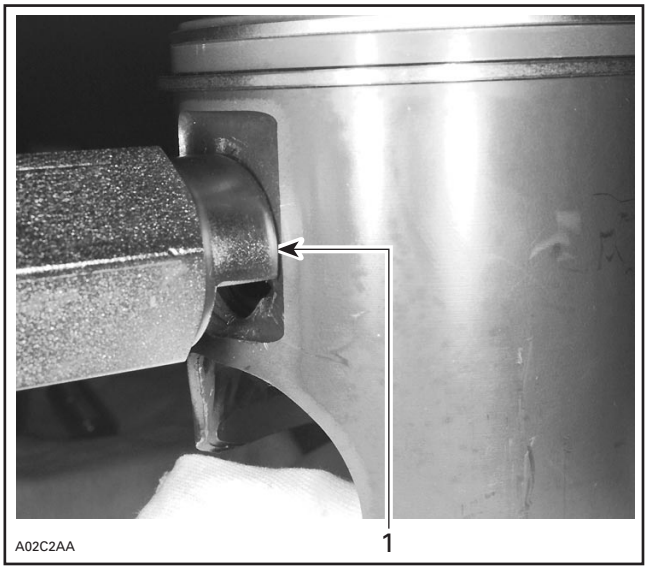
These models are equipped with cageless piston pin bearings.



Use piston pin puller (P/N 529 035 503) along with 20 mm sleeve kit (P/N 529 035 542) and locating sleeve.

NOTE: The locating sleeve is the same that contains new cageless bearing.

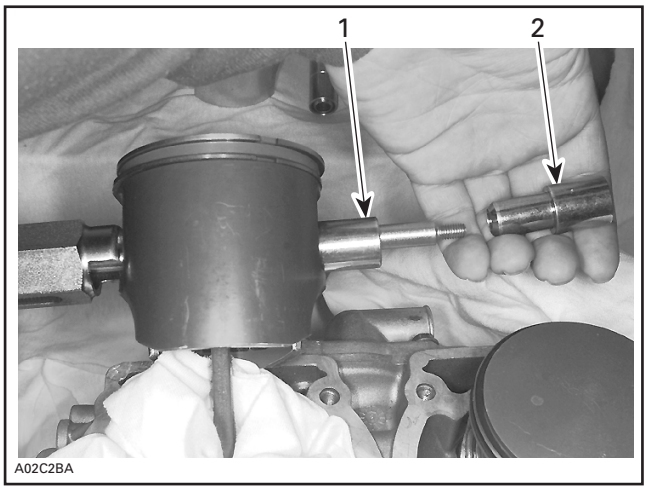
Insert piston pin puller (P/N 529 035 503) making sure it sits squarely against piston.



TYPICAL

1. Properly seated all around

Install sleeve then shouldered sleeve over puller rod.

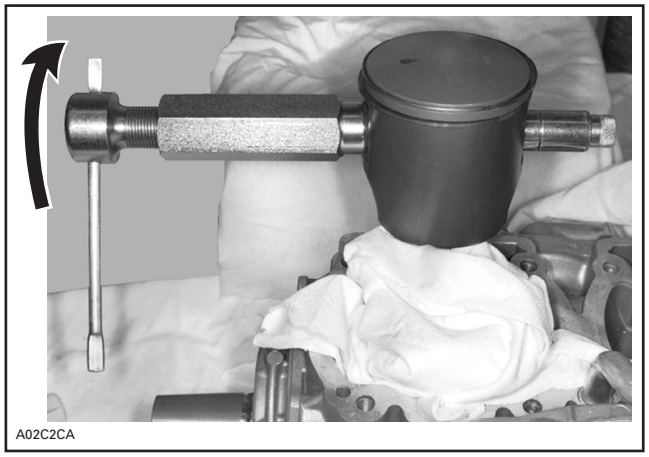


TYPICAL — INSTALLATION OF SLEEVE KIT

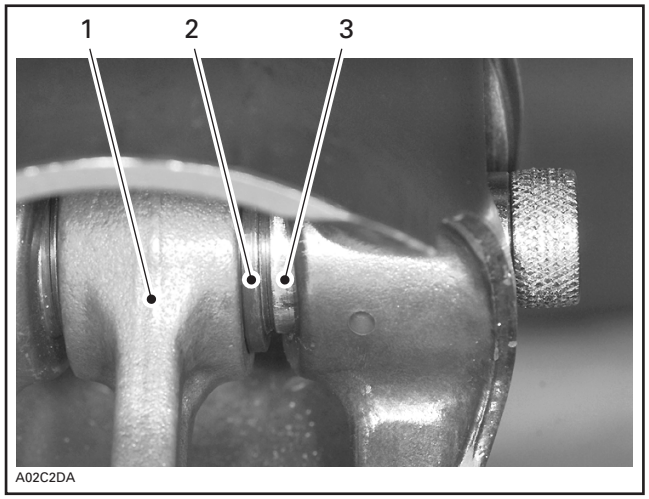
1. Sleeve
2. Shouldered sleeve

Screw (LH threads) extracting nut.

Pull out piston pin no. 19 by unscrewing puller until shouldered sleeve end is flush with thrust washer of piston pin bearing.



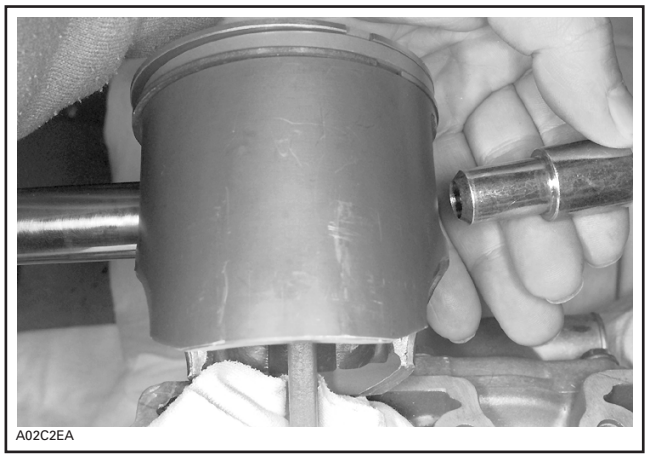
TYPICAL — PISTON PIN EXTRACTION



TYPICAL

1. *Sleeve inside bearing*
2. *Thrust washer*
3. *Shouldered sleeve end*

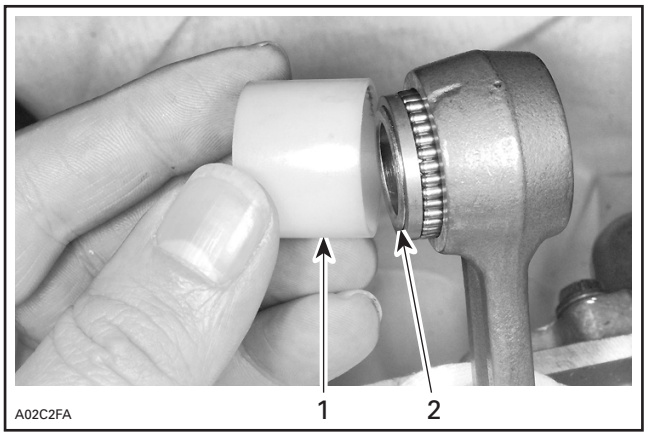
Remove puller. Pull out shouldered sleeve carefully.



TYPICAL

Remove piston from connecting rod.

Install locating sleeve. Then push needle bearings along with thrust washers and sleeve.



TYPICAL

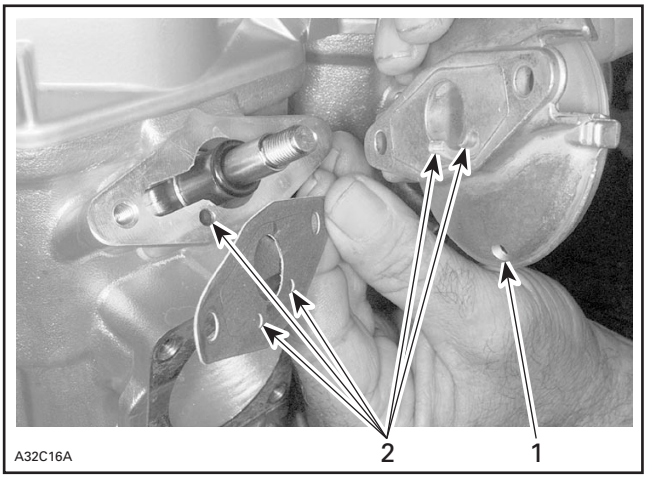
1. *Locating sleeve*
2. *Sleeve*

INSPECTION

NOTE: Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT 04-03.

RAVE System

Check valve rod housing and cylinder for clogged passages.



1. *Draining hole*
2. *Passages*

NOTE: Oil dripping from draining hole indicates a loosen spring or damaged bellows.

11, Bellows

Check for cracked, dried or perforated bellows.

8, Spring

Engine Type	Spring P/N	Wire Dia. mm (in)	Free Length mm (in)	Preload in N (LBF) at Compressed Length of 14 mm (.551 in)
493	420 239 948	1.0 (.039)	38.0 (1.50)	19.5 (4.37)
593 and 693	420 239 944	0.9 (.031)	48.5 (1.91)	15.9 (3.56)

ASSEMBLY

RAVE System

Install RAVE valve with its mention top as illustrated in the removal photo. Tighten red cap **no. 6** screw to bottom.

4,18, Cylinder and Piston

493 and 593 Engines Only

Be sure to restore the chamfer around all cylinder sleeve port openings.

All Engines

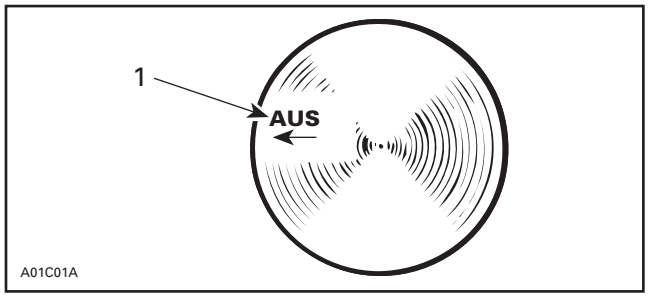
Before inserting piston in cylinder, lubricate the cylinder with new injection oil or equivalent.

2,3,4, Cylinder Head Cover, Cylinder Head and Cylinder

Check flatness of part sealing surfaces. Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT 04-03 and look for **Checking Surface Flatness**.

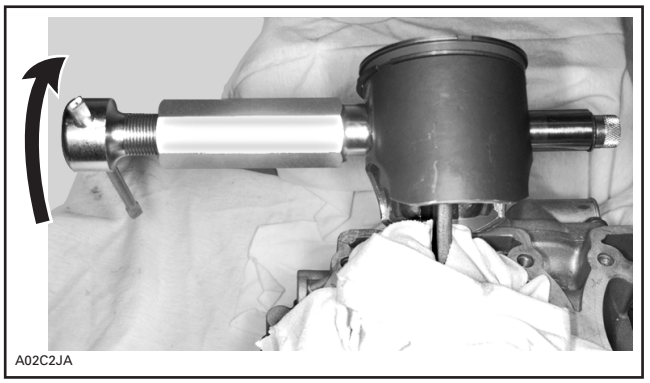
MX Z 500

Mount piston over connecting rod with the letters "AUS" (over an arrow on the piston dome) facing in the direction of exhaust port (see illustration below).



1. Exhaust

Install piston pin puller and turn handle until piston pin is correctly positioned in piston.

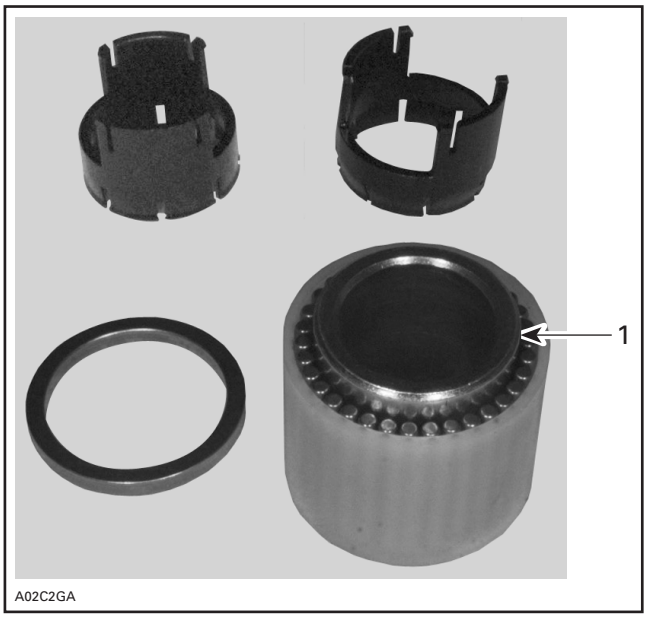


TYPICAL

All Models Except MX Z 500

When installing a new cageless bearing, replace half plastic cages by sleeve.

NOTE: 593 and 693 engine cageless bearings have 28 needles.



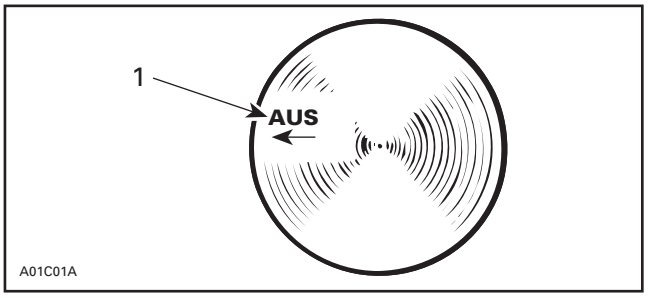
TYPICAL
1. Sleeve

Grease thrust washers and install them on each end of needles.

Insert cageless bearing into connecting rod.

TYPICAL — CAGELESS BEARING AND SLEEVE INSTALLED

At assembly, place the pistons over the connecting rods with the letters "AUS" (over an arrow on the piston dome) facing in direction of the exhaust port.

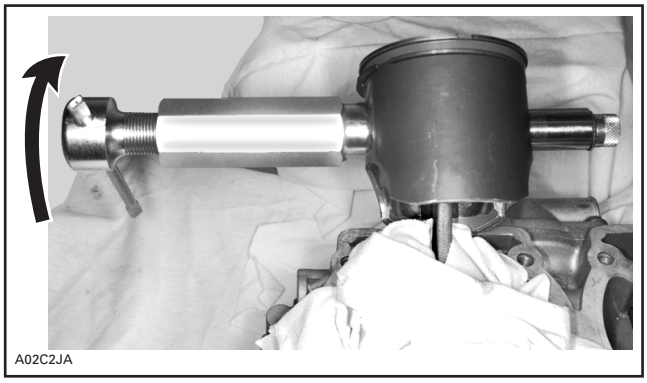


1. Exhaust

Install shouldered sleeve.

TYPICAL — SHOULDERED SLEEVE INSTALLATION

Install piston pin puller and turn handle until piston pin is correctly positioned in piston.



TYPICAL

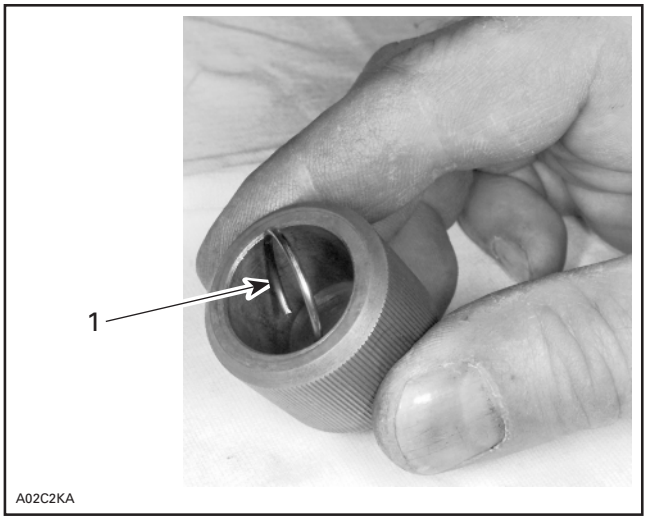
All Models

CAUTION: Always install new circlips.

To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated. Use appropriate piston circlip installer.

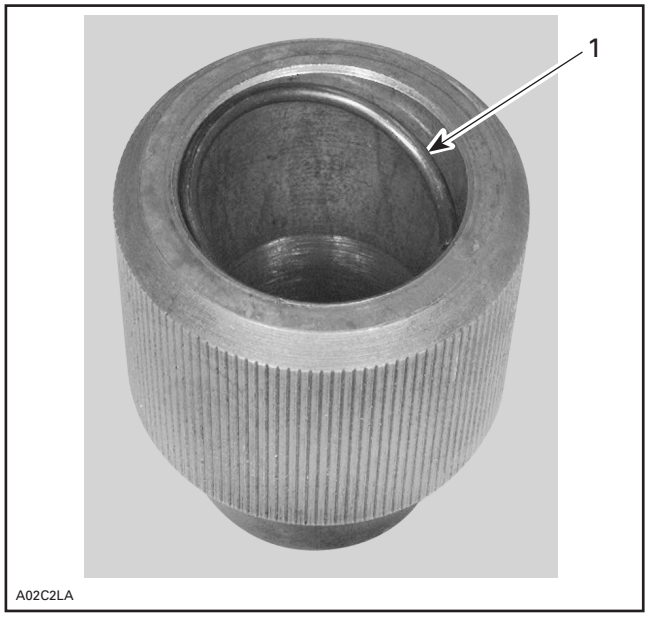
ENGINE TYPE	PISTON CIRCLIP INSTALLER (P/N)
493	529 035 561
593 and 693	529 035 562

Insert circlip in tool at an angle.



TYPICAL
1. Circlip

Square it up using a finger.

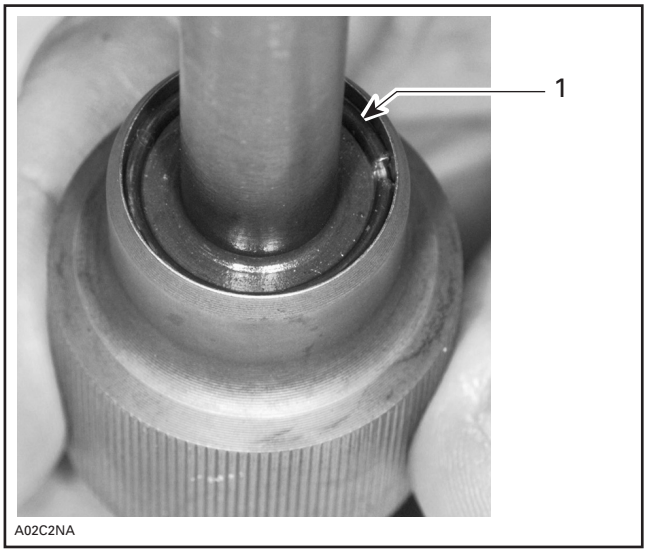


TYPICAL
1. Circlip

Continue to square it up using round end of circlip installer.

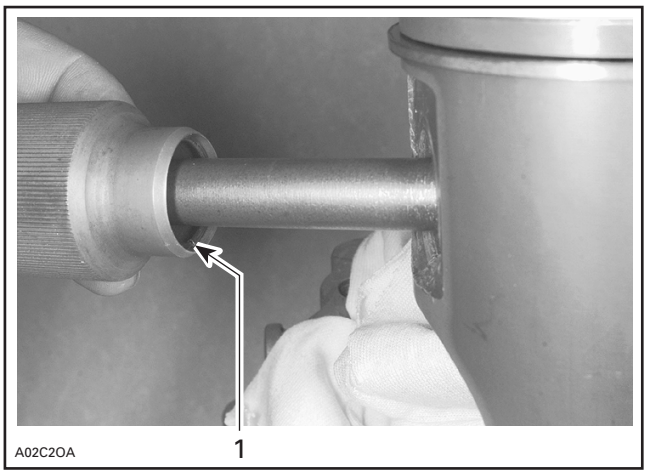
TYPICAL

Using square end of tool, push circlip in until it rests in groove.



TYPICAL
1. Circlip in groove

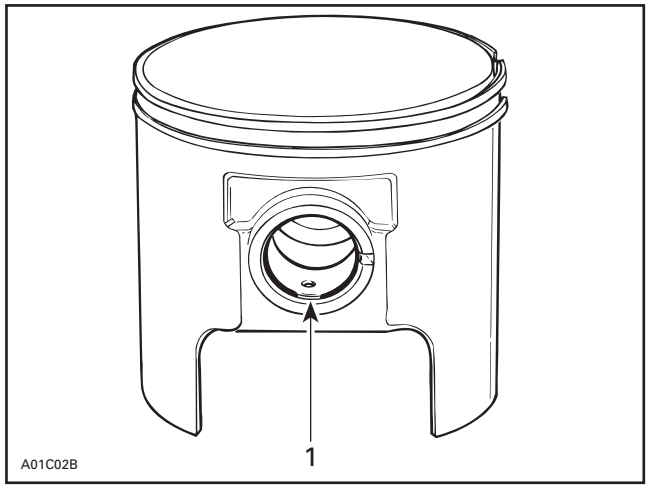
Mount tool in piston making sure that circlip break is facing down.



TYPICAL
1. Circlip break facing down

Hold tool firmly against piston then strike on round end of tool. Circlip will move from tool groove to piston groove.

TYPICAL



TYPICAL
1. Circlip break

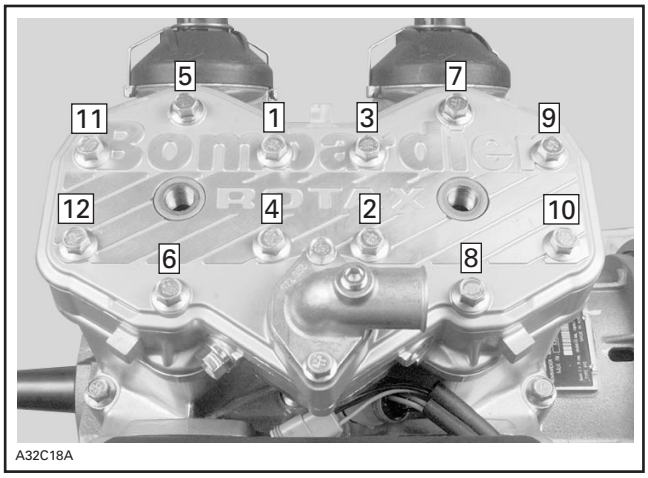
CAUTION: Circlips must not move freely after installation; if so, replace them.

Coat both sides of a new cylinder gasket with Loctite 518 then, install it on crankcase.

Loosely install cylinders.

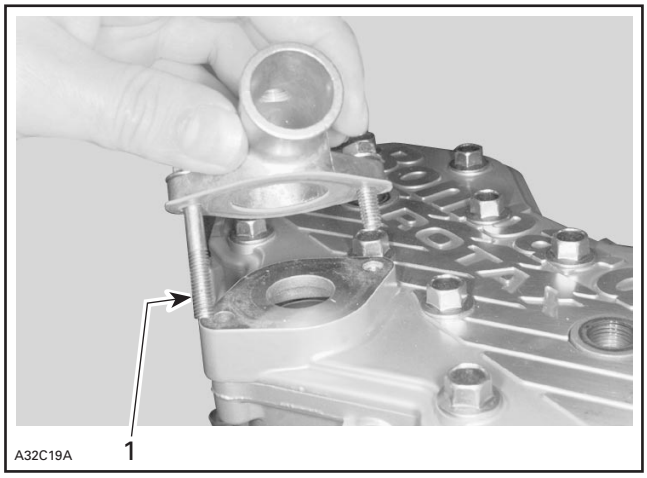
Install exhaust manifold then, tighten cylinder retaining screws to 29 N•m (21 lbf•ft) in a criss-cross sequence.

At assembly, torque cylinder head screws to 29 N•m (21 lbf•ft) in the following illustrated sequence.



TYPICAL

Install outlet socket and tighten screws to 12 N•m (106 lbf•**in**). Note position of longer screw.



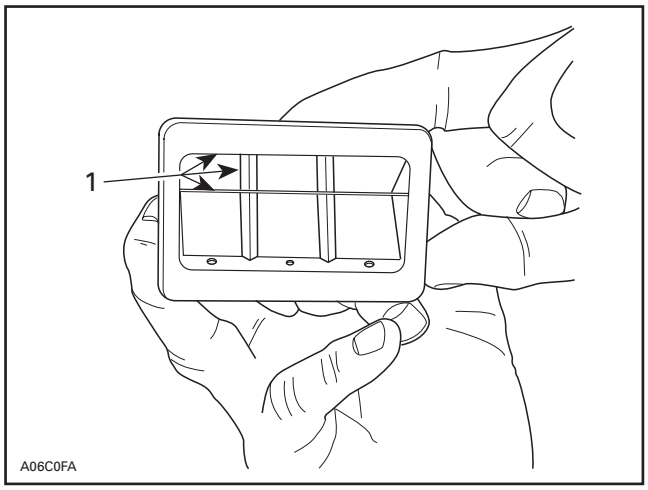
1. Longer screw

17, Reed Valve

Blades have a curved shape. Install with their curve facing reed block.

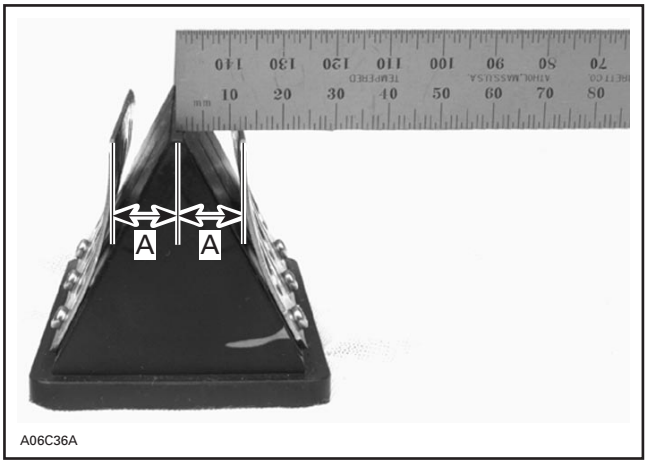
With blade stopper **no. 16** removed, check reed valve for proper tightness. There must be no play between blade and valve body when exerting a finger pressure on blade at blade stopper location.

In case of a play, turn blade upside down and recheck. If there is still a play, replace blade and/or valve body.



1. No play

Check distance from blade stopper outer edge and distance from center of reed valve block.



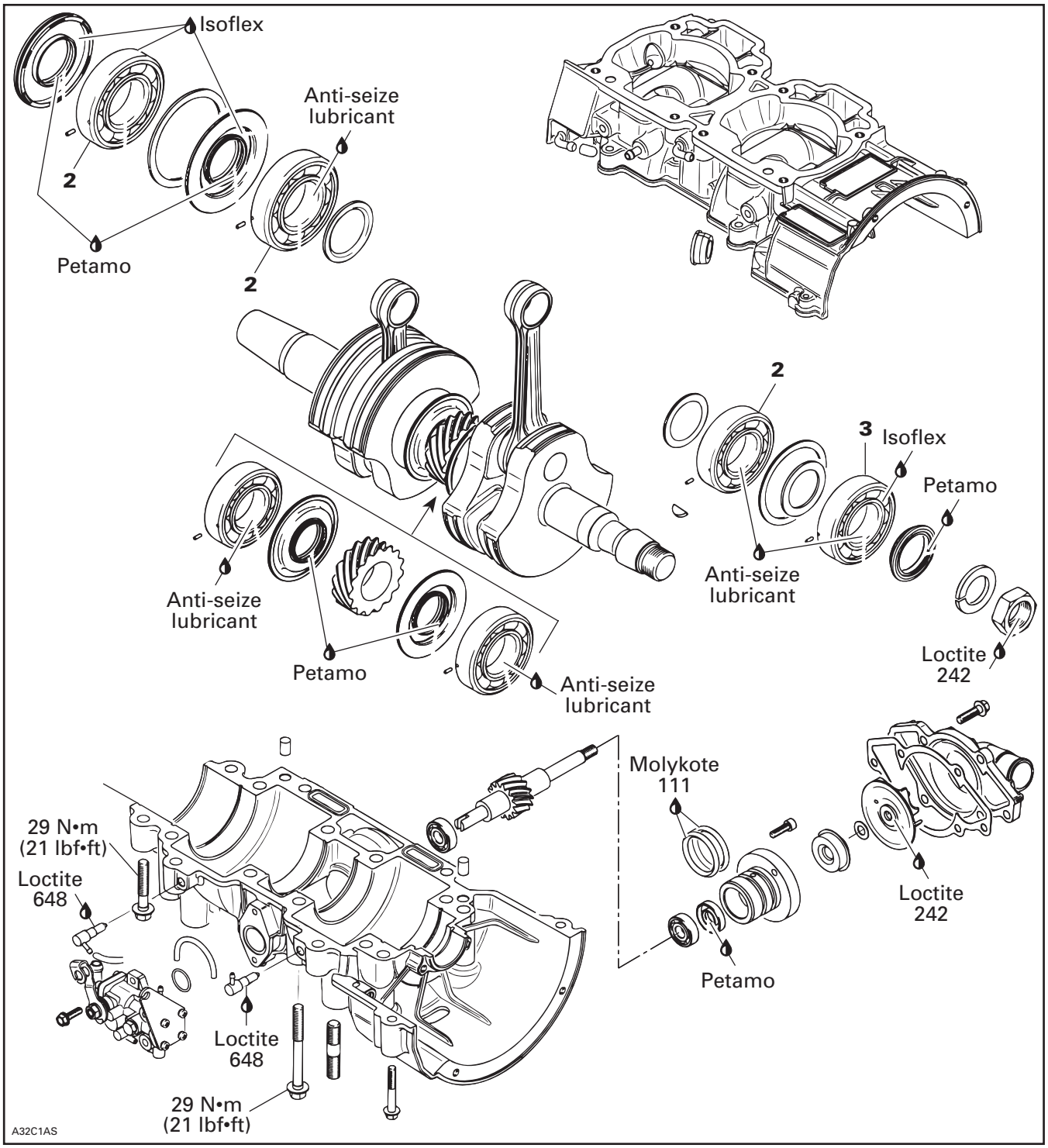
TYPICAL

A. 17.0 - 0, + 0.75 mm (.669472 - 0, + .030 in)

Bent blade stopper as required to obtain the proper distance.

Blade stoppers may slightly interfere with cylinder during installation. Adjusted distance will be reduced automatically upon installation.

BOTTOM END



PARTS FLAT RATE

NOTE: Engine must be removed from chassis to perform the following procedures.

CLEANING

Discard all oil seals, gaskets, O-rings and sealing rings.

Clean all metal components in a non-ferrous metal cleaner. Use Gasket remover (P/N 413 708 500) accordingly.

Remove old paste gasket from crankcase mating surfaces with Gasket remover (P/N 413 708 500).

CAUTION: Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

DISASSEMBLY

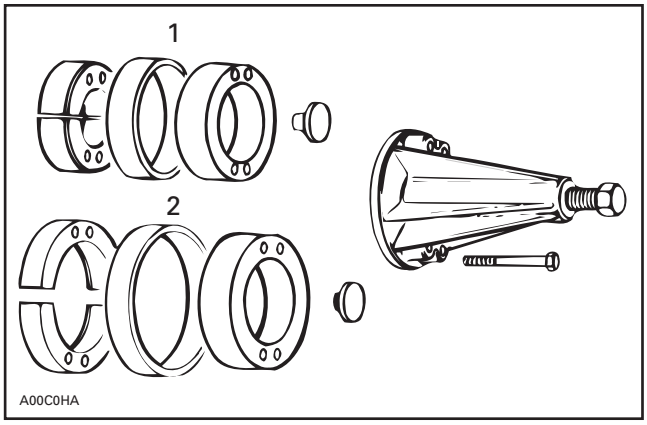
General

To remove drive pulley, refer to DRIVE PULLEY 05-03.

To remove magneto, refer to CDI SYSTEM 04-04.

2,3, Crankshaft Bearing

To remove bearings from crankshaft, use a protective cap and special puller, as illustrated.



1. PTO side
2. MAG side

INSPECTION

NOTE: Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT 04-03.

ASSEMBLY

Coat lip of all seals with Petamo grease (P/N 420 899 271).

2, Crankshaft Bearing

Smear anti-seize lubricant (P/N 413 701 000) on part of crankshaft where bearing fits.

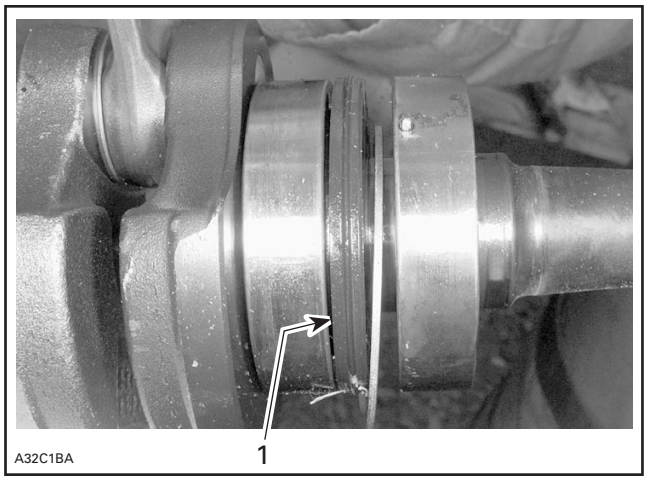
Prior to installation, place bearings into an oil container filled with injection oil previously heated to 75°C (167°F). This will expand bearing and ease installation.

Some bearings must be lubricated with Isoflex grease (P/N 293 550 021).

CAUTION: Use only the recommended Isoflex grease. Make sure not to push Isoflex grease between outside bearing race and half crankcase.

NOTE: The 50 g tube corresponds to 50 cc of grease.

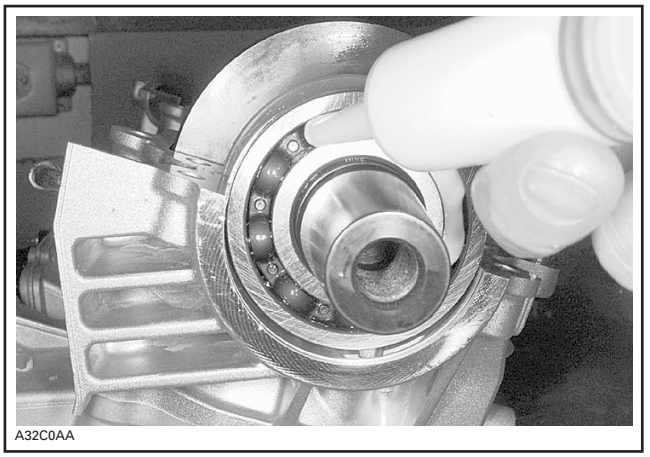
Fill PTO side inner seal with Isoflex grease.



1. PTO side inner seal filled with Isoflex grease

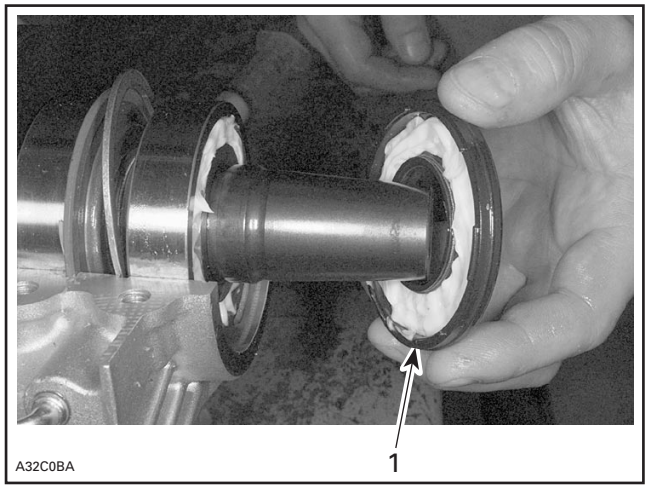
Put 35 to 40 mL of grease in a syringe.

With the syringe, fill the outer ball bearing with grease.



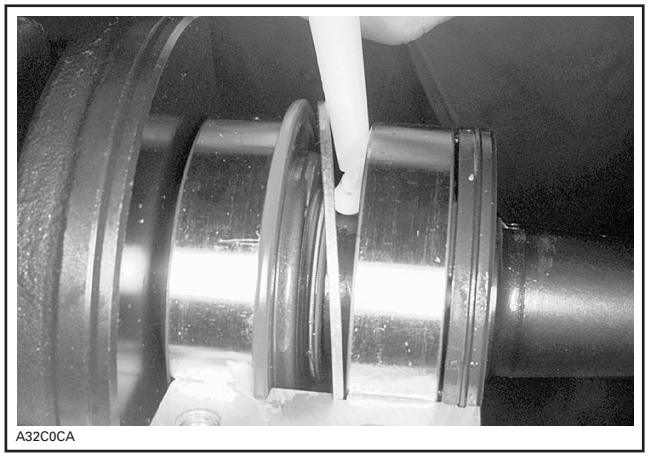
BALLS COATED WITH A SEAM OF GREASE

Coat inner side of seal and set it in place.



1. Fill with grease and set in place

Use the remaining grease to coat the inner side of the ball bearing.



493 and 593 Engines

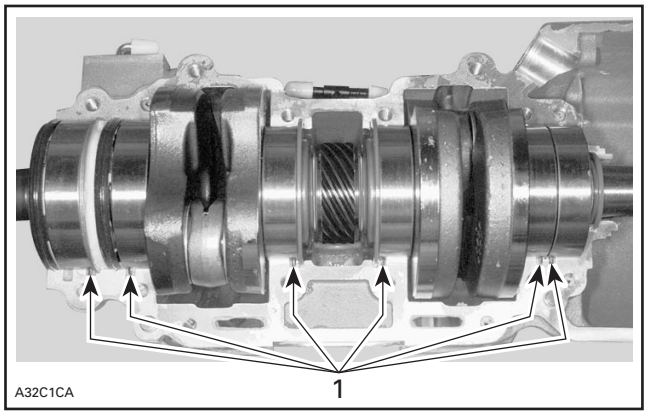
Apply 20 mL of grease to MAG side outer bearing.

693 Engine

Apply 30 mL of grease to MAG side outer bearing.

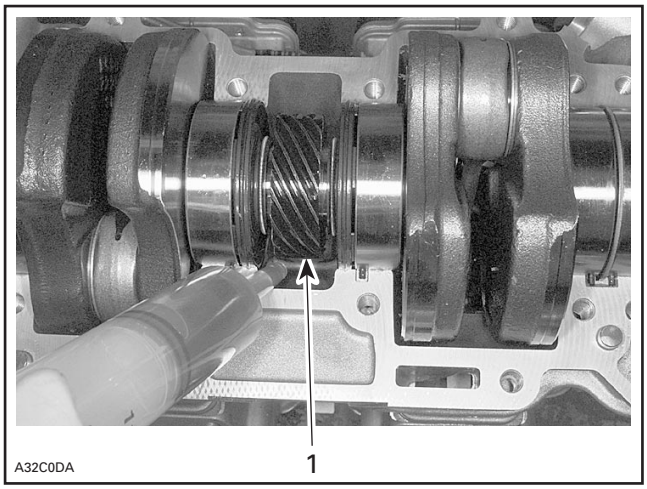
All Engines

At crankshaft installation, position drive pins as illustrated.



1. Position pins

Drop 50 mL (2 U.S. oz) of injection oil in the pan under central gear to lubricate pump gearing as per photo.

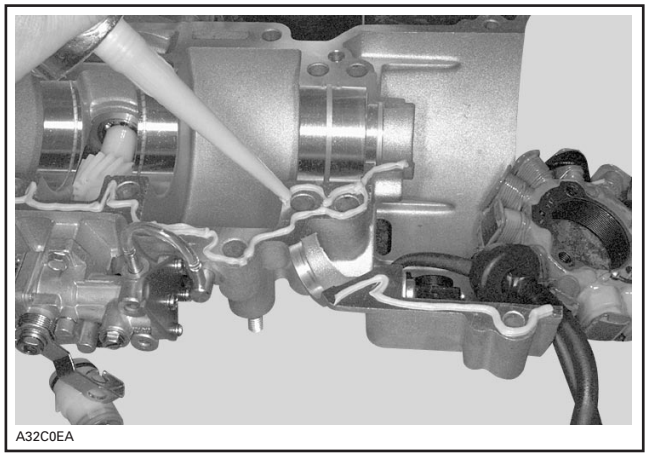


1. Oil bath

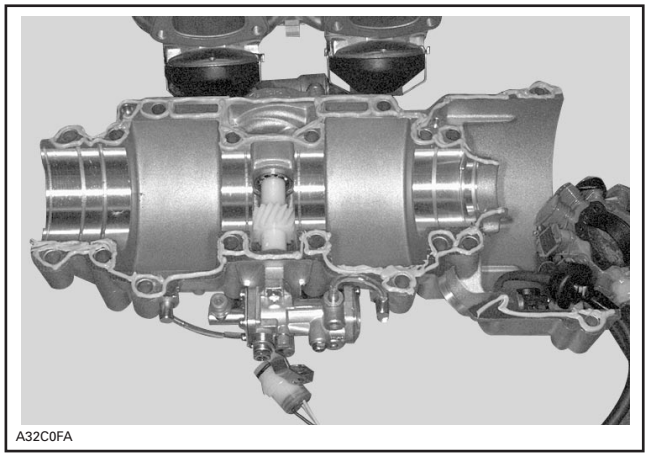
Crankcase Assembly

Before screwing both parts of crankcase, seal it with a sealing compound (P/N 420 297 905). Make sure surfaces are clean and degreased before applying sealing compound.

Spread a seam of 1.2 mm (1/16 in) maximum in diameter on surface of lower crankcase half.


A32C0EA

As far as possible, sealing compound must be applied in one run to avoid any risks of leaking through the crankcase.

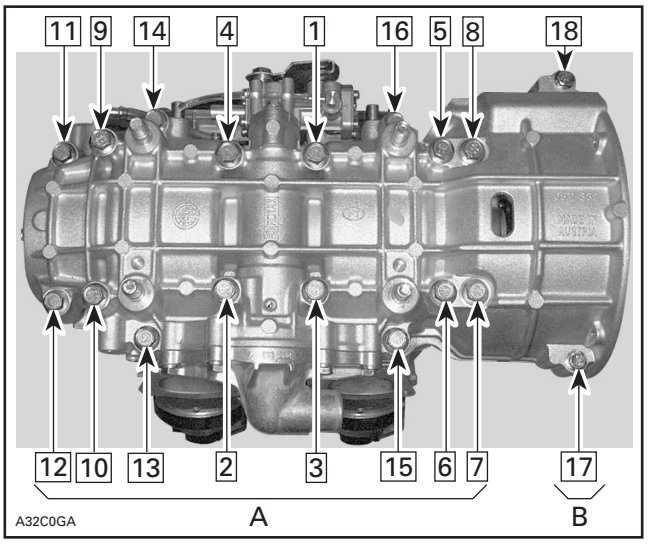

A32C0FA

SEAMING COMPLETED — CONTACT SURFACES COVERED AND SCREW HOLES SURROUNDED

Screw the 4 central bolts to squeeze compound between crankcase halves before it starts to dry.

NOTE: Sealing compound spreading plus screwing of engine central four bolts must be performed within 2 minutes to ensure a good sealing and avoid linking.

Screw all crankcase bolts in place in the following sequence and to the appropriate torque through a two steps torquing: first, screw bolts up to 60% of the final torque (18 N•m (13.5 lbf•ft) for most of the bolts), then, tighten to the required torque (i.e. 29 N•m (21 lbf•ft).



A. Torque bolts 1 through 16 to 29 N•m (21 lbf•ft)
*B. Torque bolts 17 and 18 to 9 N•m (80 lbf•**in**)*

NOTE: The total assembly sequence, including sealing compound spreading, screwing and torquing of bolts according to the proper sequence must be performed within 10 minutes.

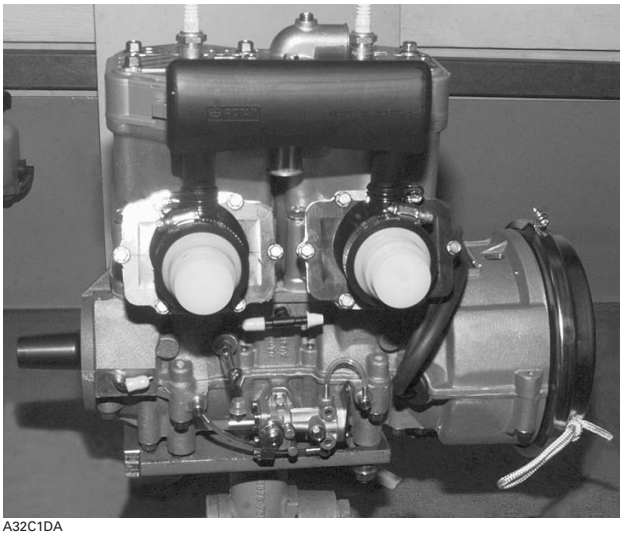
LEAK TEST AND ENGINE DIMENSION MEASUREMENT

LEAK TEST

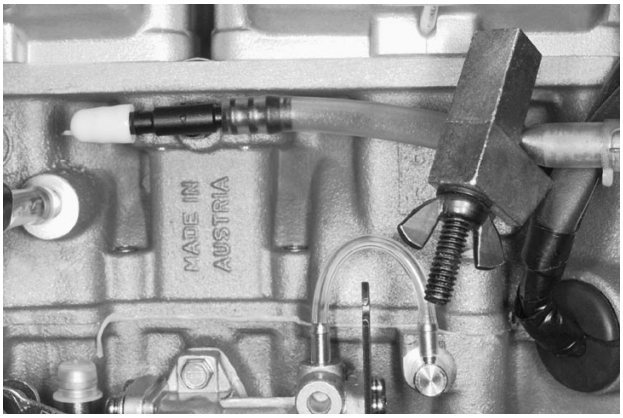
The following gives verification procedures for 2-cylinder reed valve liquid cooled engines.

PREPARATION

1. Remove tuned pipe.
2. Install plug over exhaust manifold.
3. Remove carburetors.
4. Insert plugs in intake rubber boots. Tighten with clamps already there.


A32C1DA

5. Using a hose pincher (P/N 295 000 076), block impulse hose.
6. Using hose pinchers (P/N 295 000 076), block pump shaft oil hose and lubrication nipple on PTO side.

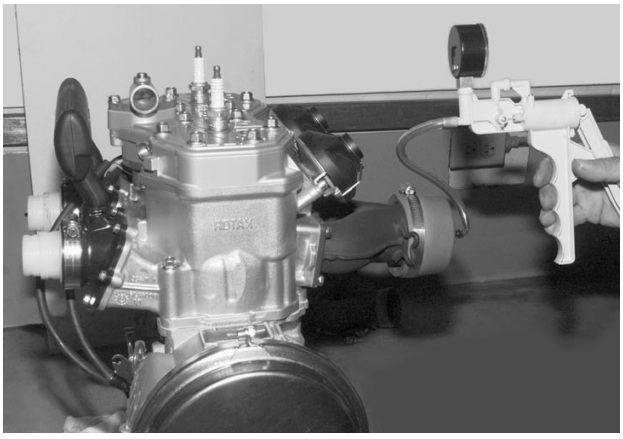


A32C1EA

7. Install air pump on exhaust plug.

NOTE: If necessary, lubricate air pump piston with mild soap.

CAUTION: Using hydrocarbon lubricant (such as engine oil) will damage rubber seal of pump piston.



A32C1FA

8. Activate pump and pressurize engine to 34 kPa (5 PSI). Do not exceed this pressure.
9. Engine must stand this pressure during 3 minutes. If pressure drops before 3 minutes, check tester kit by spraying a soapy solution on pump cylinder, all plugs and fittings.
   – If tester kit is leaking, bubbles will indicate where leak comes from.
   – If tester kit is not leaking, check engine as per following procedure.

PROCEDURE

NOTE: A flow chart has been prepared as a visual reference. See last page of this chapter.

Using flow chart and following text, pressurize area to be tested and spray soapy solution at the indicated location.

**TEST PRESSURE: 34 KPA (5 PSI)
FOR 3 MINUTES**

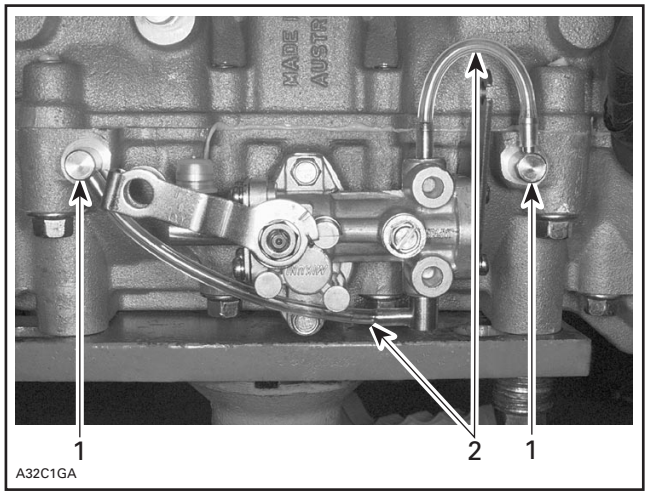
– If there is a leak at the tested location, it is recommended to continue testing next items before overhauling engine. There is a possibility of more than one leak.
– If there is no leak at the tested location, continue pumping to maintain pressure and continue with next items until leak is found.

Engine

Check the following:

1. All jointed surfaces and screw/stud threads of engine:
   – spark plug base, insulator
   – cylinder head
   – RAVE valve bellows, piston and housing
   – cylinder
   – crankcase halves (joint)
   – oil injection pump mounting flange (O-ring, seal)
   – coolant pump housing
   – bleed screws/plugs

2. Small injection oil lines coming from pump.



1. Injection nipples
2. Small injection oil lines

Check for air bubbles or oil column going toward pump. It indicates defective check valve in injection nipples.

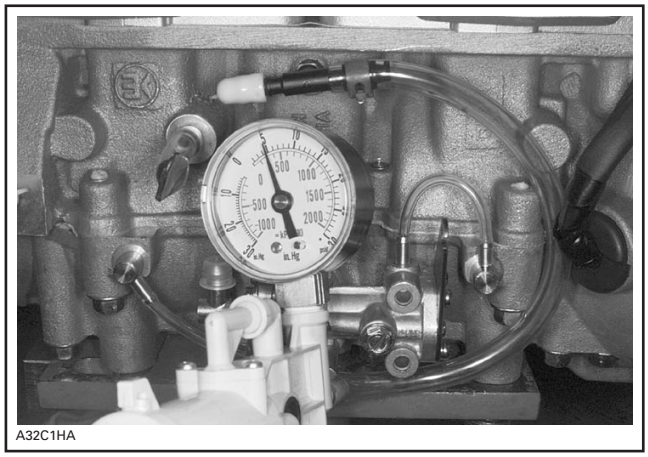
3. Remove cooling system cap.

Check for air bubbles in antifreeze. It indicates defective cylinder head O-ring or cylinder base gasket.

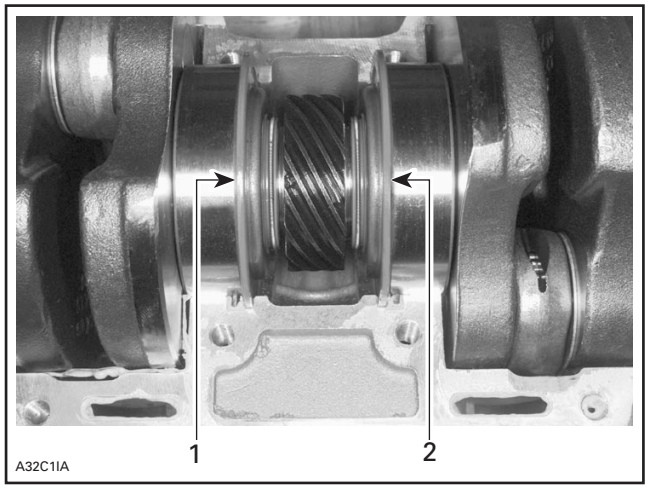
4. Remove drive pulley then check crankshaft outer seal.
5. Remove rewind starter and magneto system then check crankshaft outer seal.
6. Check pump shaft gear oil reservoir.

Pump Shaft Oil Gear Reservoir

Install air pump on adapter and pressurize as before.



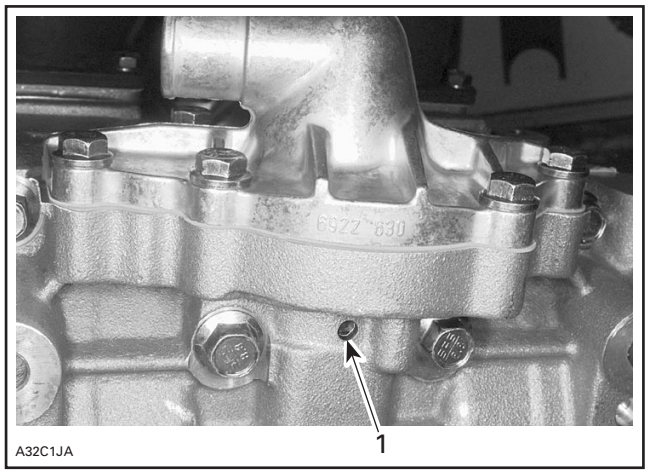
If pressure drops, it indicates a defective crankshaft inner seal.



CRANKSHAFT INSTALLED IN UPPER HALF CRANKCASE

1. *Crankshaft inner seal on PTO side*
2. *Crankshaft inner seal on MAG side*

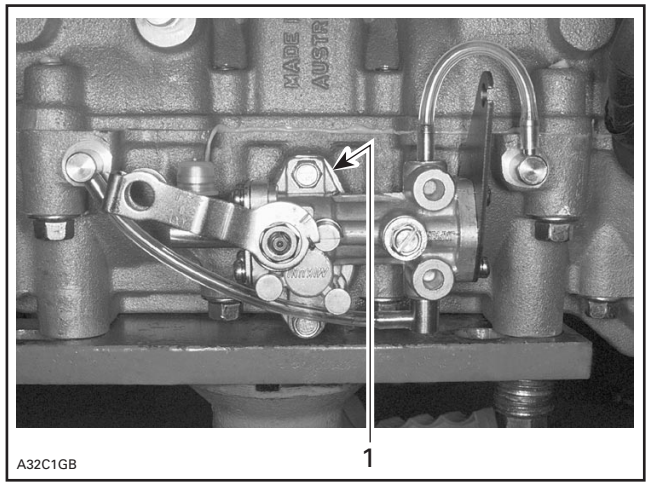
1. Check drain hole below coolant pump housing with soapy water.



1. *Drain hole*

If there is a leak, it indicates defective seal of pump shaft (oil seal beside coolant ceramic seal).

2. Leaks can be also on oil pump side. Check mounting area for leaks.



1. *Check mounting area*

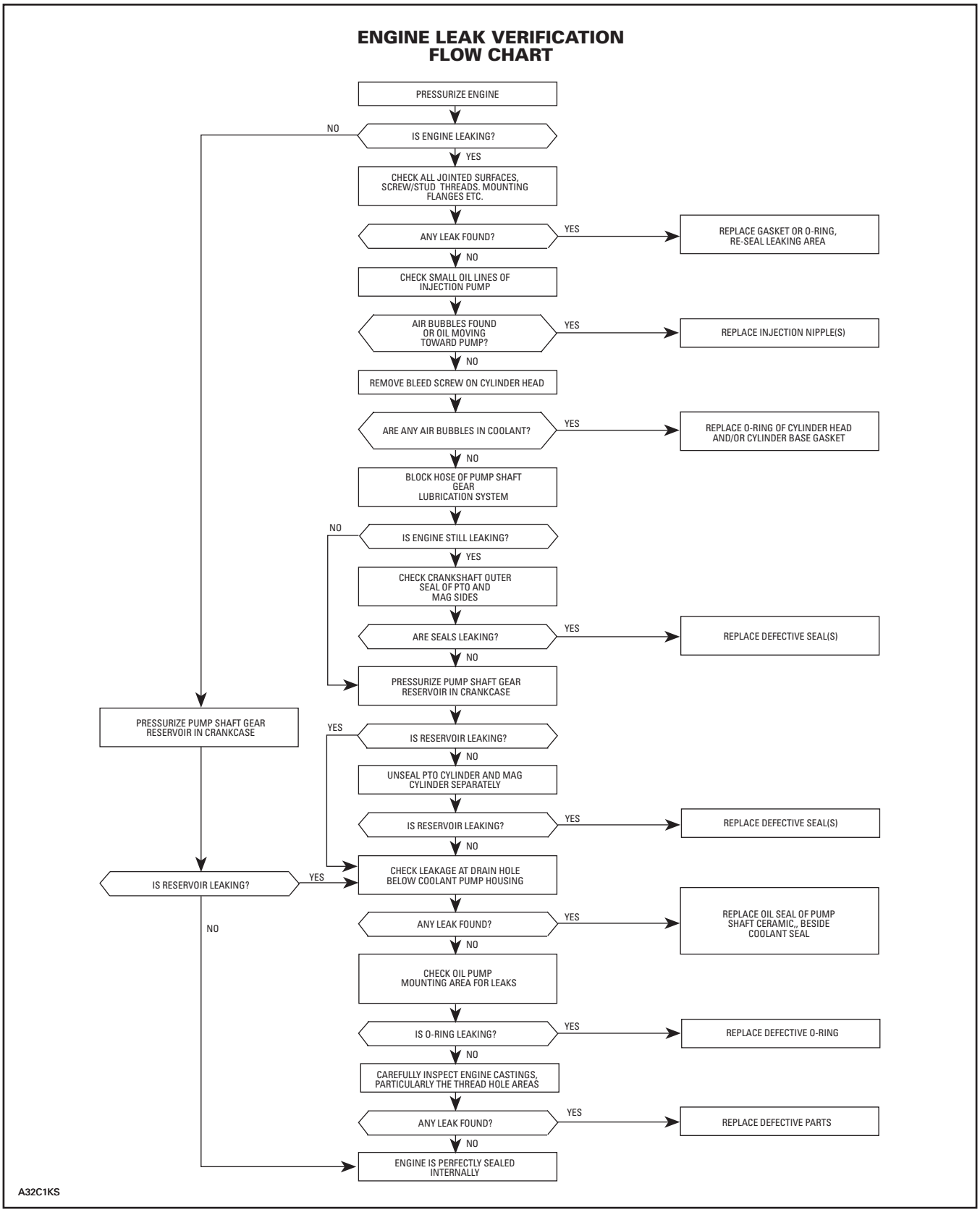
3. If leak still persists, it indicates a defective casting somewhere in engine.

   Disassemble engine and carefully check for defects in castings. Pay attention to tapped holes which may go through engine sealed area and thus lead to leakage.

FINALIZING REASSEMBLY

After reassembling engine, always recheck for leakage.

ENGINE LEAK VERIFICATION FLOW CHART



ENGINE DIMENSION MEASUREMENT

This section covers all engine types.

CYLINDER HEAD WARPAGE

ENGINE TYPE	MAXIMUM
All	0.05 mm (.002 in) per 50 mm (2 in) of surface
	0.5 mm (.020 in) for total length of cylinder head

Check gasketed surface of the cylinder head with a straightedge and a feeler gauge.

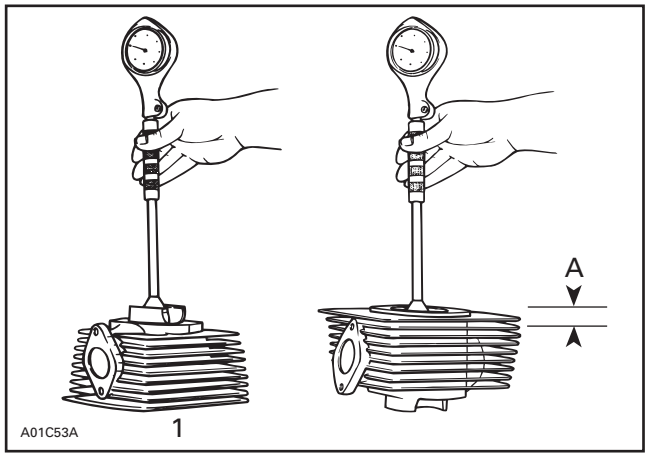
CYLINDER TAPER

ENGINE TYPE	MAXIMUM
All	0.10 mm (.004 in)

Compare cylinder diameter 16 mm (5/8 in) from top of cylinder to just below its intake port area.

On rotary valve engines, measure just below auxiliary transfer port, facing exhaust port. If the difference exceeds the specified dimension the cylinder should be rebored and honed or should be replaced.

NOTE: Be sure to restore the chamfer around all cylinder sleeve port openings.



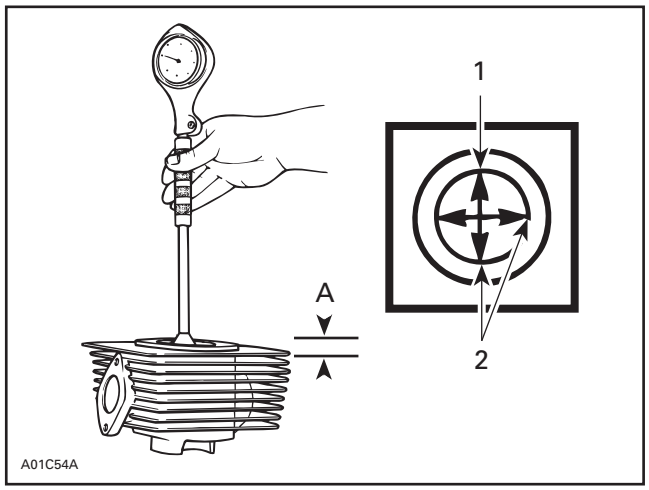
1. Below the intake port
A. 16 mm (5/8 in) from top

CYLINDER OUT OF ROUND

ENGINE TYPE	MAXIMUM
All	0.08 mm (.003 in)

Measuring 16 mm (5/8 in) from top of cylinder with a cylinder gauge, check if the cylinder out of round is more than the specified dimension. If larger, cylinder should be rebored and honed or should be replaced.

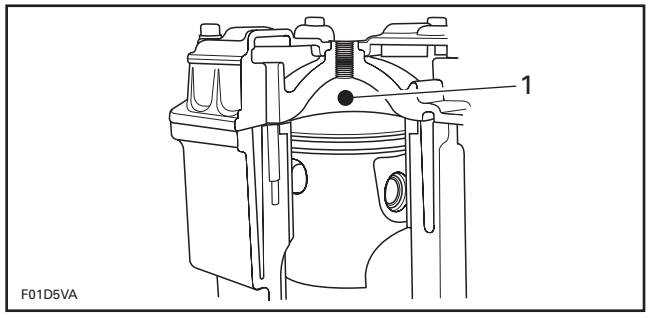
NOTE: Be sure to restore the chamfer around all cylinder sleeve port openings.



1. Piston pin position
2. Measures to be compared
A. 16 mm (5/8 in)

COMBUSTION CHAMBER VOLUME MEASUREMENT

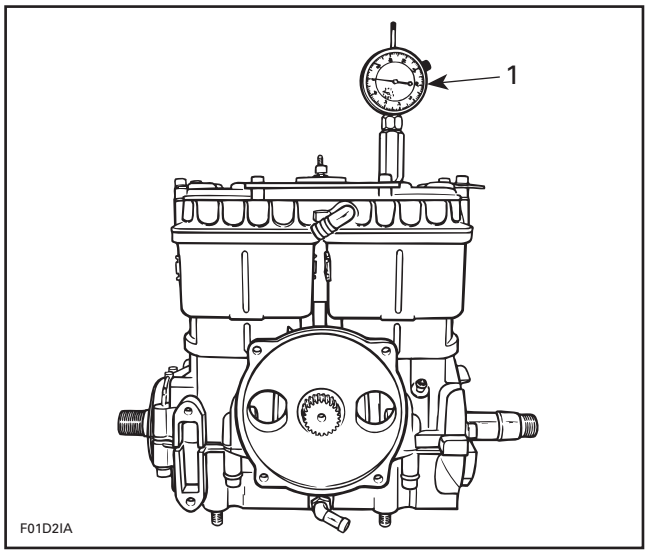
The combustion chamber volume is the region in the cylinder head above the piston at Top Dead Center. It is measured with the cylinder head installed on the engine.



1. Combustion chamber

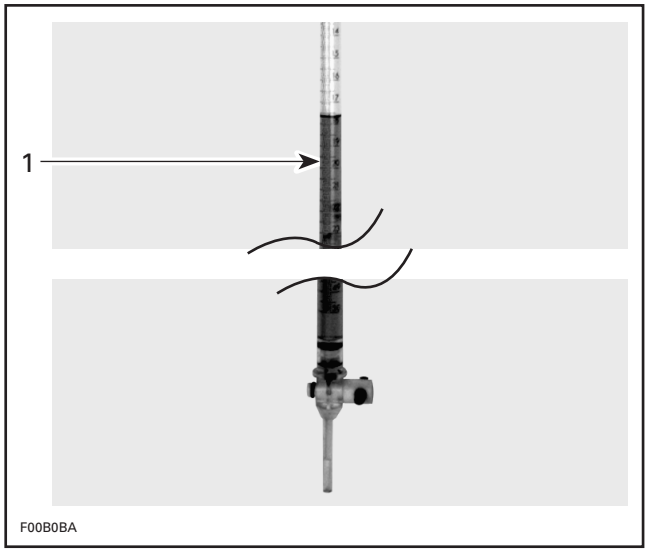
NOTE: When checking the combustion chamber volume, engine must be cold, piston must be free of carbon deposit and cylinder head must be leveled.

1. Remove both spark plugs and bring one piston to Top Dead Center a using a TDC gauge.



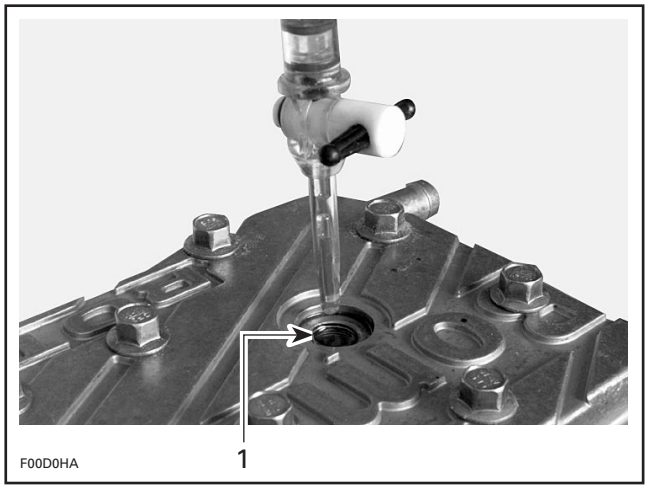
1. Bring piston to TDC

2. Obtain a graduated burette (capacity 0-50 cc) and fill with an equal part (50/50) of gasoline and injection oil.



1. Graduated burette (0-50 cc)

3. Open burette valve to fill its tip. Add liquid in burette until level reaches 0 cc.
4. Inject the burette content through the spark plug hole until liquid touches the top spark plug hole.



1. Top of spark plug hole

NOTE: The liquid level in cylinder must not drop for a few seconds after filling. If so, there is a leak between piston and cylinder. The recorded volume would be false.

5. Let burette stand upward for about 10 minutes, until liquid level is stabilized.
6. Read the burette scale to obtain the quantity of liquid injected in the combustion chamber.

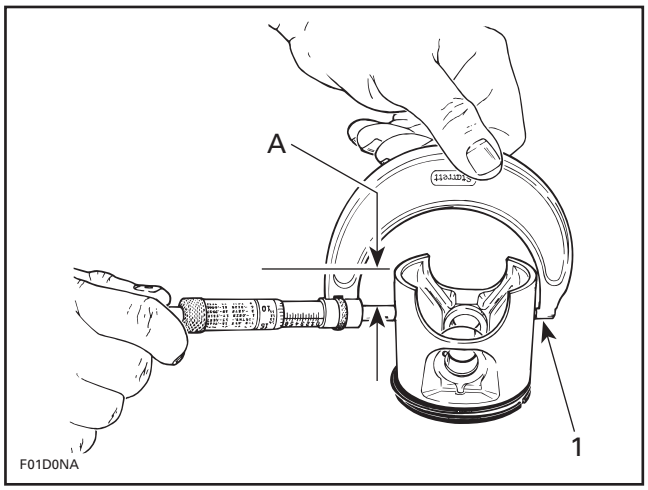
NOTE: When the combustion chamber is filled to top of spark plug hole, it includes an amount of 2.25 cc corresponding to the spark plug tip.

7. Repeat the procedure for the other cylinder.

ENGINE TYPE	COMBUSTION CHAMBER VOLUME (CC) (UP TO TOP THREAD OF SPARK PLUG HOLE)
493	24.89 ± 1.0
593	29.89 ± 1.2
693	33.89 ± 1.4

USED PISTON MEASUREMENT

Using a micrometer, measure piston at A perpendicularly (90°) to piston pin.



1. Measuring perpendicularly (90°) to piston pin axis
A. See table below

ENGINE TYPE	DIMENSION A mm (in)
493	30 (1.18)
593	27 (1.06)
693	29 (1.14)

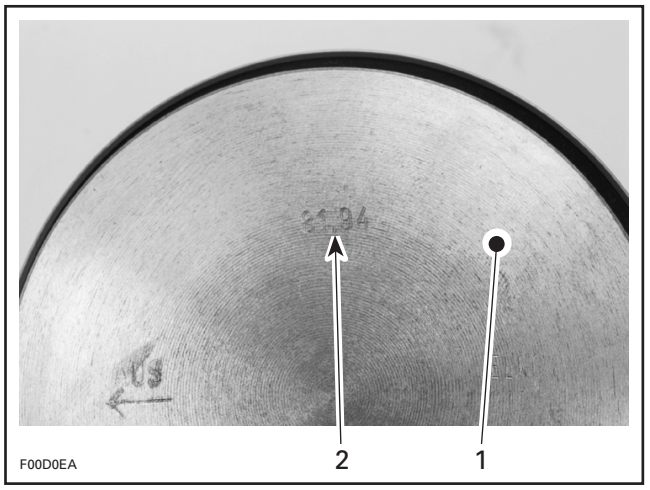
The measured dimension should be the same as the one scribed on piston dome. If not, install a new piston.

CYLINDER/PISTON CLEARANCE

Used and New Pistons

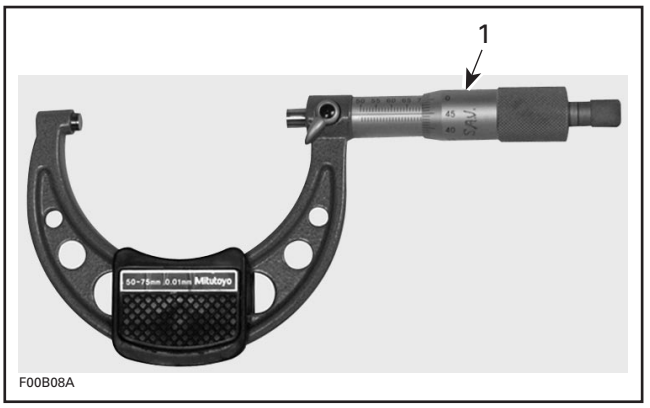
NOTE: Make sure used piston is not worn. See USED PISTON MEASUREMENT above.

Take the measurement on the piston dome.



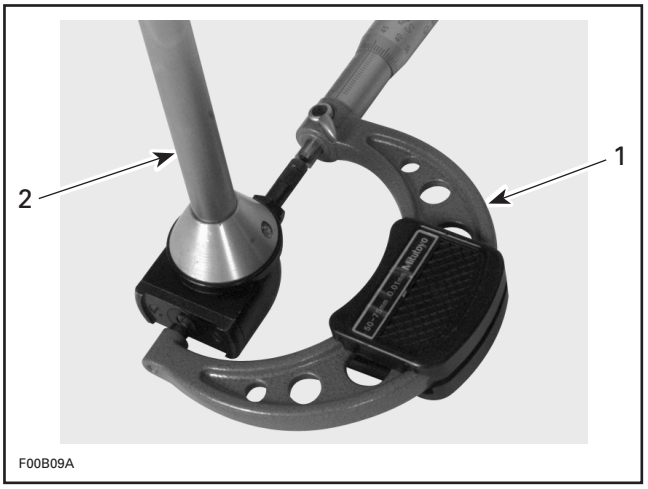
1. Piston dome
2. Piston measurement

Adjust and lock a micrometer to the specified value on the piston dome.

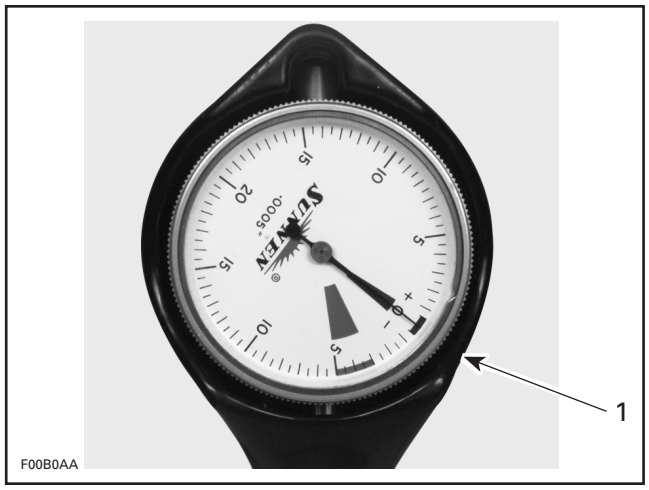


1. Micrometer set to the piston dimension

With the micrometer set to the piston dimension, adjust a cylinder bore gauge to the micrometer dimension and set the indicator to 0.

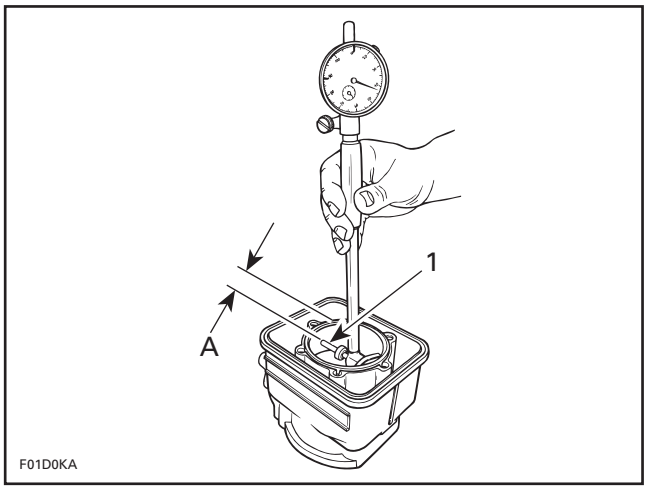


1. Use the micrometer to set the cylinder bore gauge
2. Dial bore gauge



1. Indicator set to 0 (zero)

Position the dial bore gauge at 16 mm (5/8 in) below cylinder top edge.



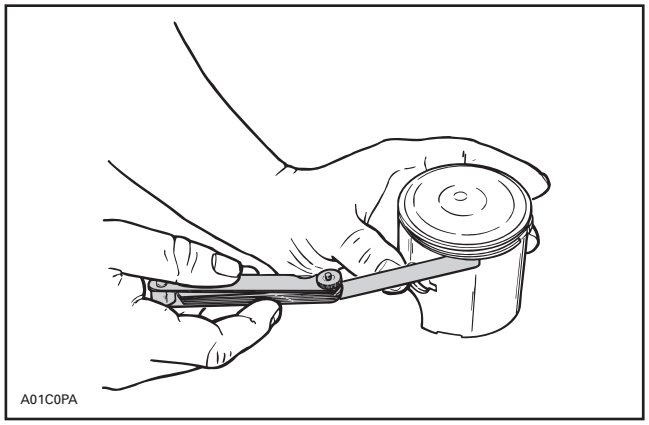
1. Measuring perpendicularly (90°) to piston pin axis
A. 16 mm (5/8 in)

Read the measurement on the cylinder bore gauge. The result is the exact piston/cylinder wall clearance. If clearance exceeds specified tolerance, replace cylinder or rebore. Refer to TECHNICAL DATA 10.

NOTE: Make sure the cylinder bore gauge indicator is set exactly at the same position as with the micrometer, otherwise the reading will be false.

RING/PISTON GROOVE CLEARANCE

Using a feeler gauge check clearance between rectangular ring and groove. Replace piston if clearance exceeds specified tolerance. Refer to TECHNICAL DATA 10.

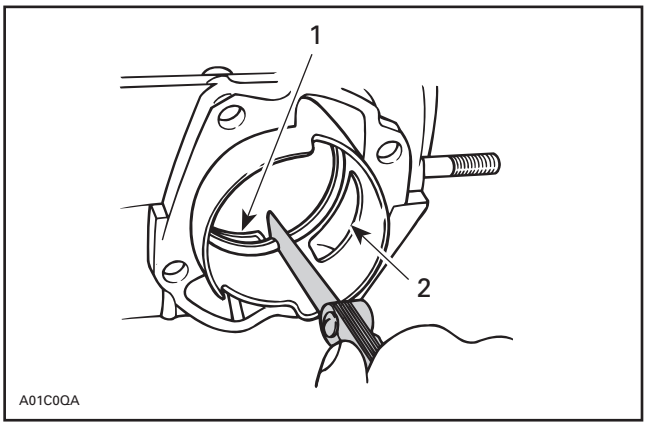


RING END GAP

Position ring half-way between transfer ports and intake port. On rotary valve engines, position ring just below transfer ports.

NOTE: In order to correctly position the ring in the cylinder, use piston as a pusher.

Using a feeler gauge, check ring end gap. Replace ring if gap exceeds specified tolerance. Refer to TECHNICAL DATA 10.



1. Transfer port
2. Intake port

CRANKSHAFT DEFLECTION

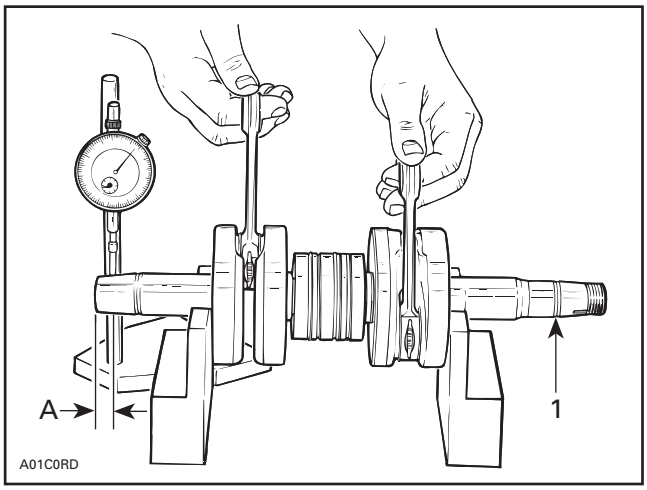
Crankshaft deflection is measured with a dial indicator.

Measuring (in engine)

First, check deflection with crankshaft in engine. If deflection exceeds the specified tolerance, recheck deflection using V-shaped blocks to determine the defective part(s). See below.

Measuring (on bench)

Once engine is disassembled, check crankshaft deflection on V-shaped blocks. If deflection exceeds the specified tolerance, it can be worn bearings or a bent crankshaft. Remove crankshaft bearings and check deflection again on V-shaped blocks to determine the defective part(s). See measurement A in following illustration.



TYPICAL

1. Measure at mid point between the key and the first thread
A. 3 mm (1/8 in)

Crankshaft Deflection on PTO Side

ENGINE TYPE	MAXIMUM ON PTO SIDE mm (in)
All	0.06 (.0024)

Crankshaft Deflection on MAG Side

ENGINE TYPE	MAXIMUM ON MAG SIDE mm (in)
All	0.05 (.002)

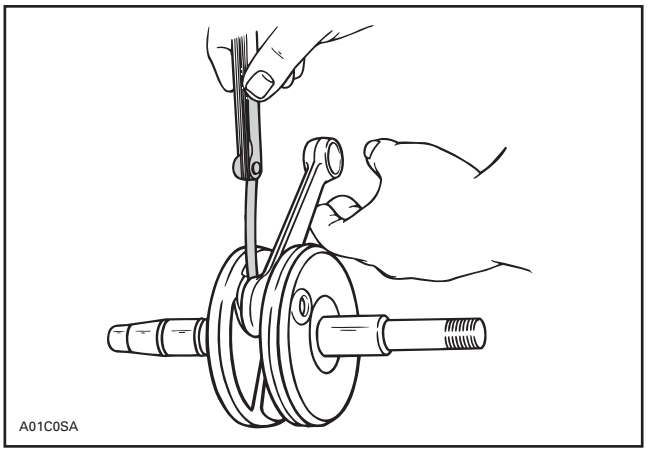
NOTE: Crankshaft deflection cannot be correctly measured between centers of a lathe.

If the deflection exceeds the specified tolerance, crankshaft should be repaired or replaced.

CONNECTING ROD BIG END AXIAL PLAY

ENGINE TYPE	NEW PARTS MIN. - MAX.	WEAR LIMIT
All	0.39 - 0.74 mm (.015 - .029 in)	1.20 mm (.047 in)

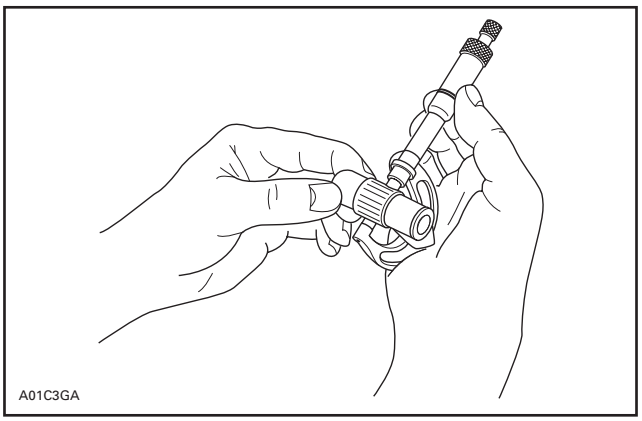
Using a feeler gauge, measure distance between thrust washer and crankshaft counterweight. If the distance exceeds specified tolerance, repair or replace the crankshaft.

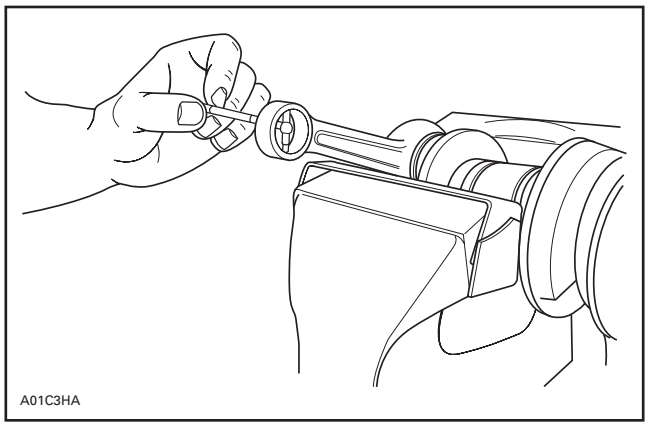


TYPICAL

CONNECTING ROD/PISTON PIN CLEARANCE

Measure piston pin with its needle bearing. Compare to inside diameter of connecting rod.





ENGINE TYPE	NEW PARTS MIN. - MAX.	WEAR LIMIT
All	0.003 - 0.012 mm (.0001 - .0005 in)	0.015 mm (.0006 in)

CONNECTING ROD/CRANKPIN CLEARANCE

ENGINE TYPE	NEW PARTS MIN. - MAX.	WEAR LIMIT
493	0.024 - 0.038 mm (.0009 - .0015 in)	0.06 mm (.0024 in)
593 and 693	0.038 - 0.050 mm (.0015 - .0020 in)	0.06 mm (.0024 in)

CRANKSHAFT END-PLAY

All Engine Types

End-play is not adjustable but it should be between 0.10 - 0.30 mm (.004 - .012 in).

CHECKING SURFACE FLATNESS

Intake manifold, intake manifold cover can be checked for perfectly mating surfaces.

Lay part on a surface plate (marble, mirror or thick glass plate).

Holding down one end of part, try pushing down the other end.

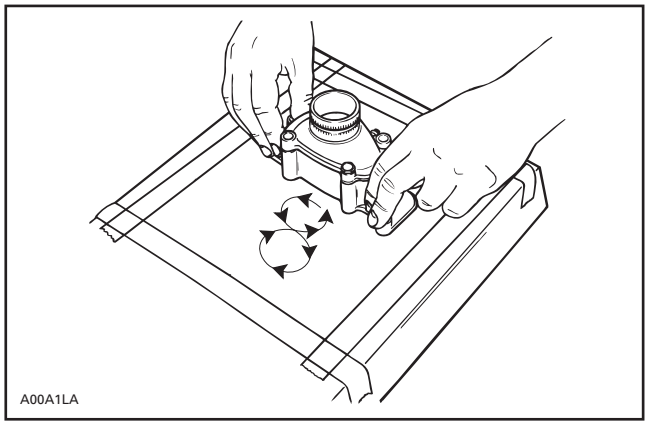
If any play is felt, part must be rectified.

RECTIFYING SURFACES

Stick a fine sand paper sheet on the surface plate then lightly oil the sand paper.

Rub part mating surface on sand paper using 8-figure movements.

Sand until mating surface is perfectly straight.



CHECKING CRANKSHAFT ALIGNMENT

Install a degree wheel (P/N 414 352 900) on crankshaft end.

Remove both spark plugs.

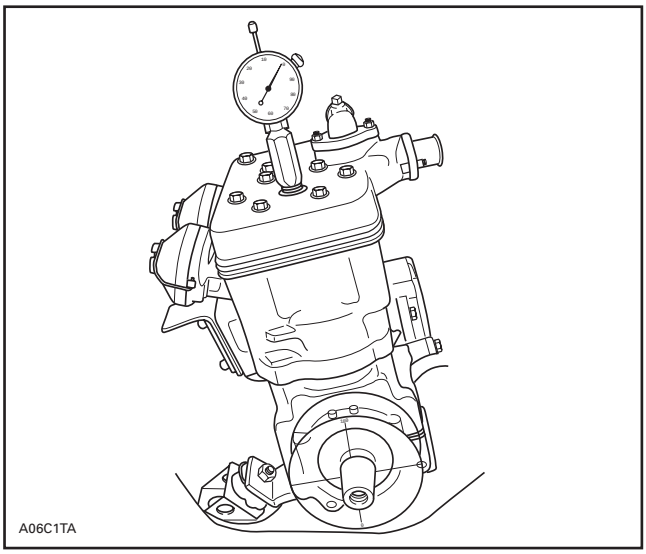
Install a TDC gauge (P/N 414 104 700) in spark plug hole on MAG side.

Bring MAG piston at top dead center.

Rotate degree wheel (not crankshaft) so that 360° mark aligns with center of crankcase. Scribe a mark on crankcase.

Remove TDC gauge and install it on center cylinder.

Bring PTO piston to top dead center. Degree wheel must rotate with crankshaft.



TYPICAL

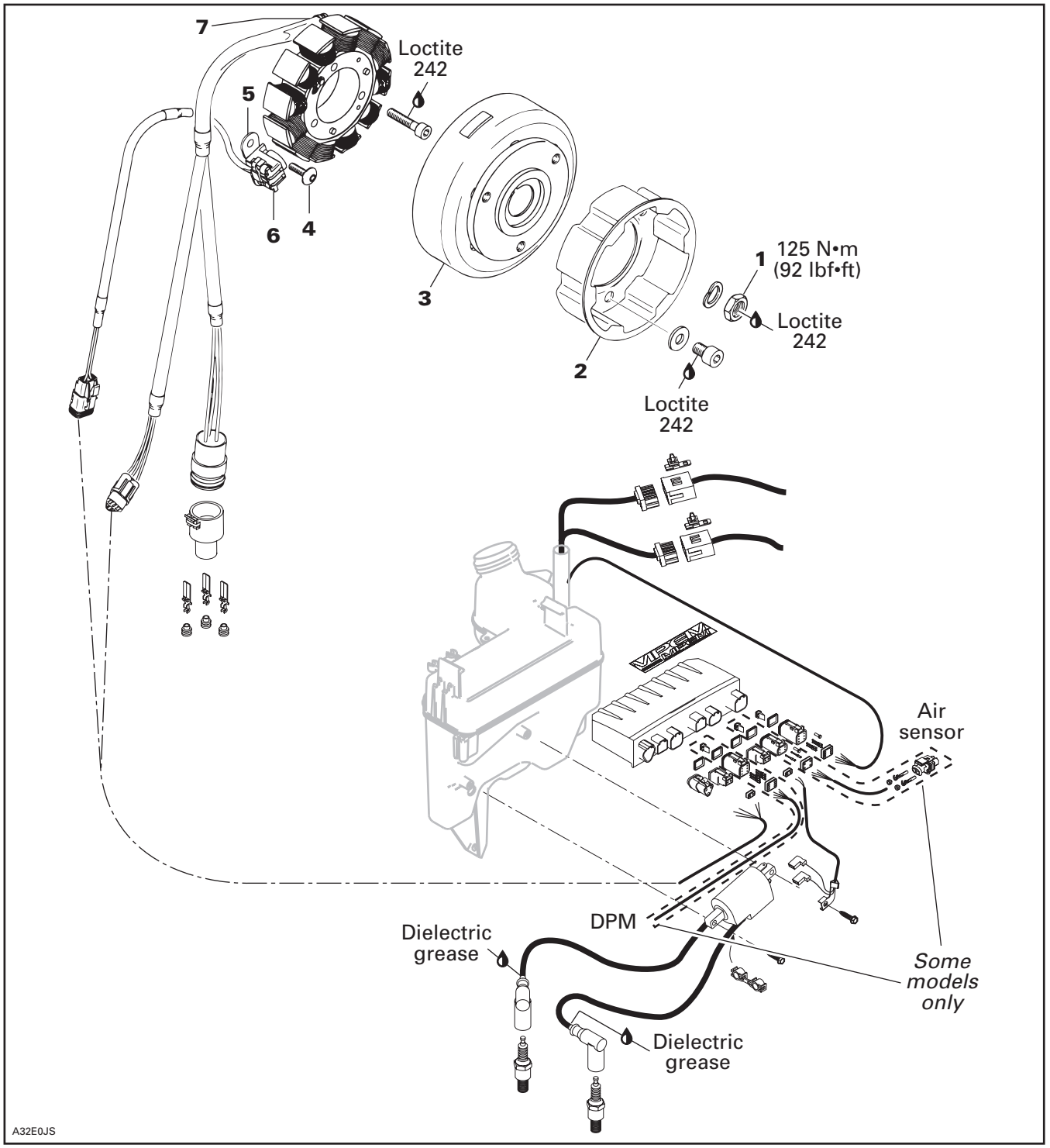
Interval between cylinders must be 180° ± 0.5.

Any other reading indicates a misaligned (twisted) crankshaft.

CDI SYSTEM

NIPPONDENSO TRIGGER COIL IGNITION SYSTEM

290 W on ZX Series



NOTE: The following procedures can be done without removing the engine from chassis. To facilitate magneto removal, hold drive pulley with tool (P/N 529 027 600).

CDI means Capacitor Discharge System.

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

CAUTION: Clean stator and magneto using only a clean cloth.

DISASSEMBLY

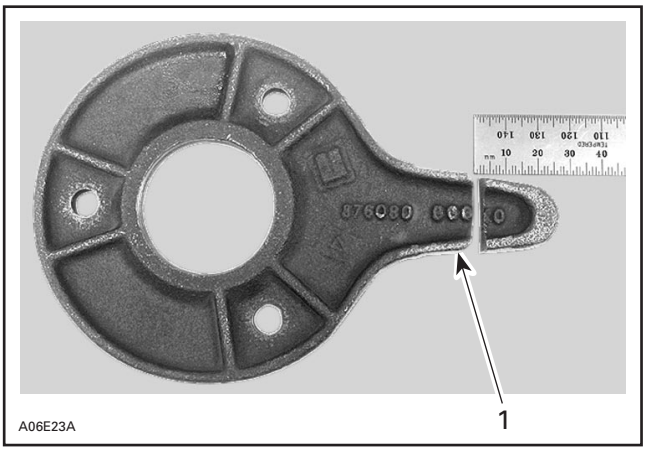
3, Magneto Flywheel

To gain access to magneto assembly, remove the following parts as needed on different engines:

– tuned pipe and muffler
– rewind starter
– starting pulley **no. 2**

To remove magneto flywheel retaining nut **no. 1**:

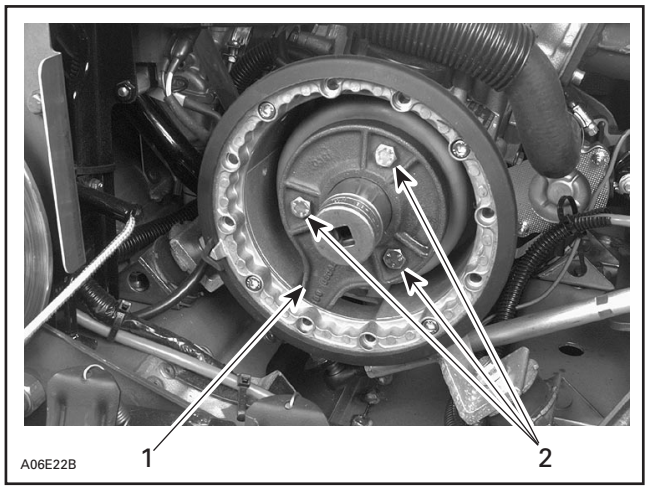
– Use magneto puller ring (P/N 420 876 080). Former puller has to be modified as shown.



1. Cut by 25 mm (1 in)

– Install puller with its tab in magneto housing opening.

CAUTION: Use only M8 x 20 mm screws to bolt puller to magneto.



TYPICAL

1. Tab in magneto housing opening
2. M8 x 20 mm screws

– Remove magneto flywheel nut, using a 30 mm socket machined to 40 mm (1.580 in) outside diameter by 16 mm (5/8 in) long.

NOTE: To correctly remove a threadlocked fastener it is first necessary to tap on the fastener to break threadlocker bond. This will eliminate the possibility of thread breakage.

To remove magneto flywheel, install the puller (P/N 529 022 500).

– Tighten puller bolt and at the same time, tap on bolt head using a hammer to release magneto flywheel from its taper.

5, Trigger Coil

Magneto and stator plate **no. 7** must be removed before trigger coil removal.

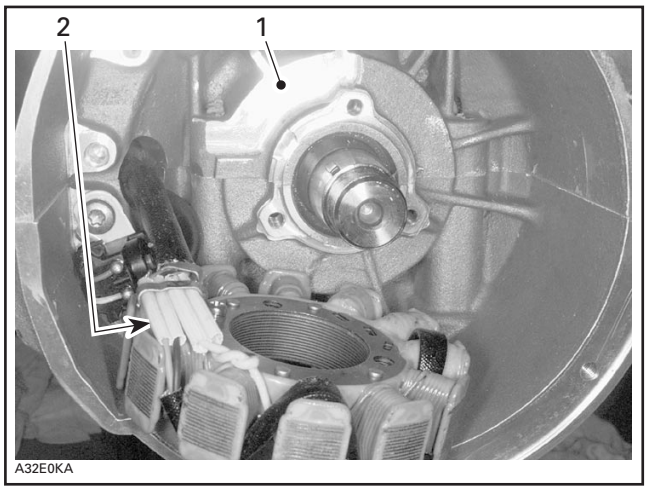
To replace trigger coil:

– Disconnect trigger coil connector housing.
– Remove grommet from crankcase where trigger coil wire exits magneto housing.
– Remove retaining screws **no. 4**.
– Remove trigger coil and carefully pull wires.
– Install new trigger coil and other parts removed.

ASSEMBLY

7, Stator Plate

Make to position stator plate in a way that its wire protectors are over recess of crankcase.



1. Crankcase recess
2. Wire protectors

3, Magneto Flywheel

Clean crankshaft extension (taper) and apply Loctite 242 (blue) on taper, then position Woodruff key, flywheel and lock washer on crankshaft.

Clean nut threads and apply Loctite 242 (blue) then tighten nut 125 N•m (92 lbf•ft).

At reassembly coat all electric connections except Deutsch housings (waterproof gray housing) with silicone dielectric grease (P/N 413 701 700) to prevent corrosion or moisture penetration.

CAUTION: Do not use silicone "sealant", this product will corrode contacts. Do not apply silicone dielectric grease on any Deutsch (gray) housing otherwise housing seal will be damaged.

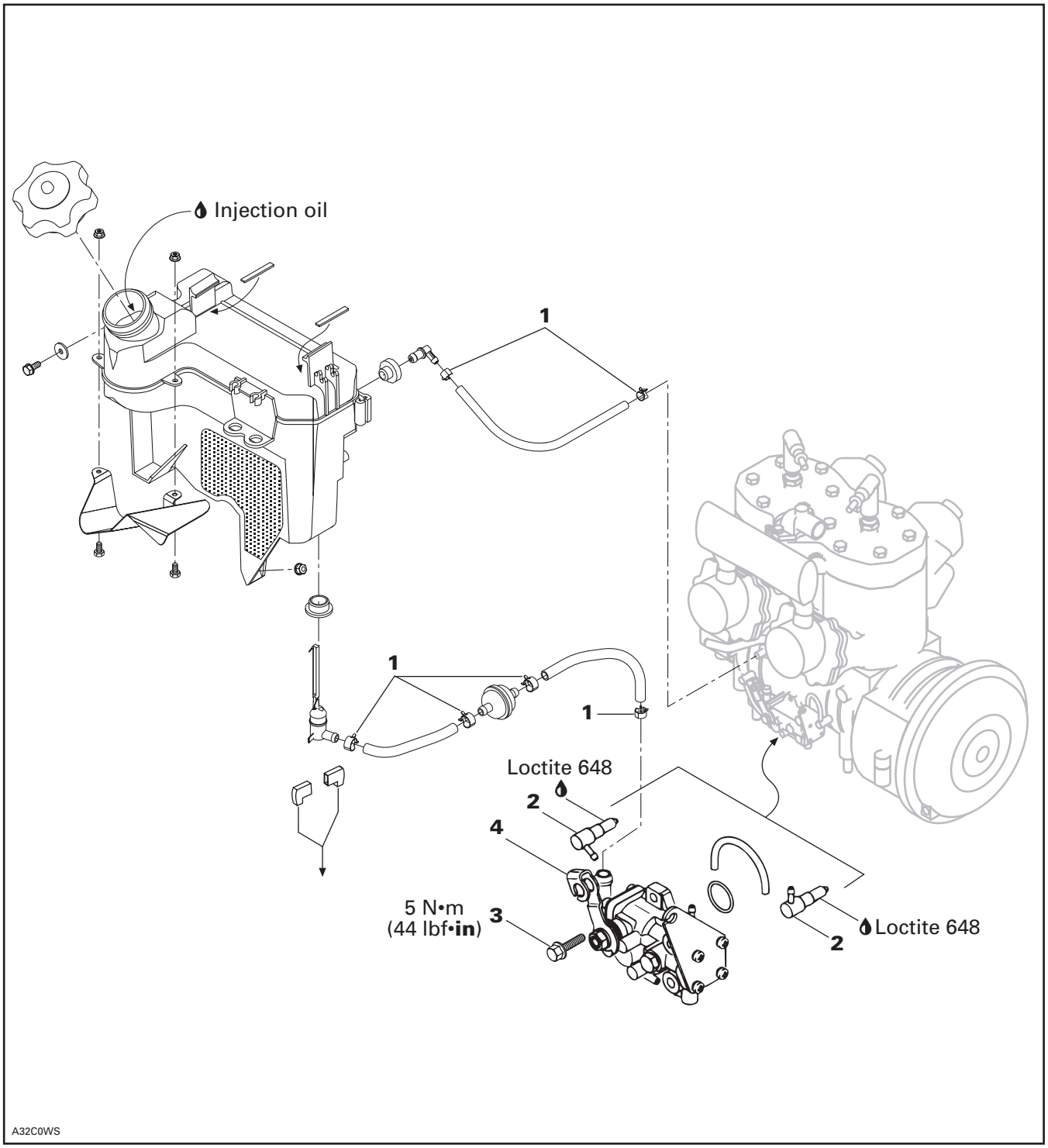
Ignition Timing

Check as described in IGNITION TIMING 06-02.

OIL INJECTION SYSTEM

OIL INJECTION PUMP

493, 593 and 693 Engines



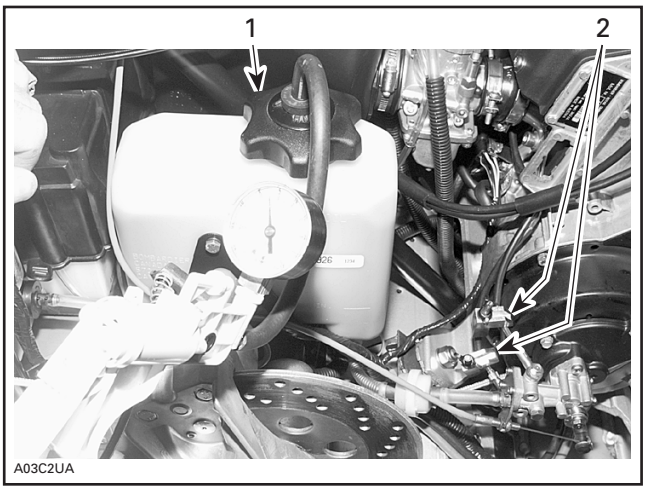
OIL SYSTEM LEAK TEST

All Models

The following test will indicate any leak from oil reservoir to the banjo fitting(s).

Install on oil reservoir special cap of leak testing kit (P/N 529 033 100).

Install hose pinchers (P/N 295 000 076) on outlet hoses.



TYPICAL

1. *Special cap on reservoir*
2. *Hose pinchers on outlet hoses*

Connect pump of leak testing kit to special cap.

Pressurize oil system to 34 kPa (5 PSI). That pressure must not drop during 3 minutes.

If pressure drops, locate leak(s) and repair/replace leaking component(s). To ease locating leak(s) spray soapy water on components, bubbles will indicate leak location(s).

OIL PUMP IDENTIFICATION

4, Pump Lever

Different engines need different pumps. See identification on lever no. 4.

CAUTION: Always mount proper pump on engine.

ENGINE TYPE	OIL PUMP IDENTIFICATION
493	L7
593	L7
693	L8

NOTE: The following procedures can be done without removing the engine from chassis.

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

DISASSEMBLY

NOTE: Some oil pump components are not available as single parts.

ASSEMBLY

1, Spring Clip

Always check for spring clips tightness.

3, Screw

Torque to 5 N•m (44 lbf•**in**).

Cable plastic elbow must be fastened and fully inserted.

Make sure cable barrel is well seated in oil pump lever.

Secure barrel with plastic washer and circlip.

Install cable lock washer on left side of support.

Verify cable and oil pump lever operation.

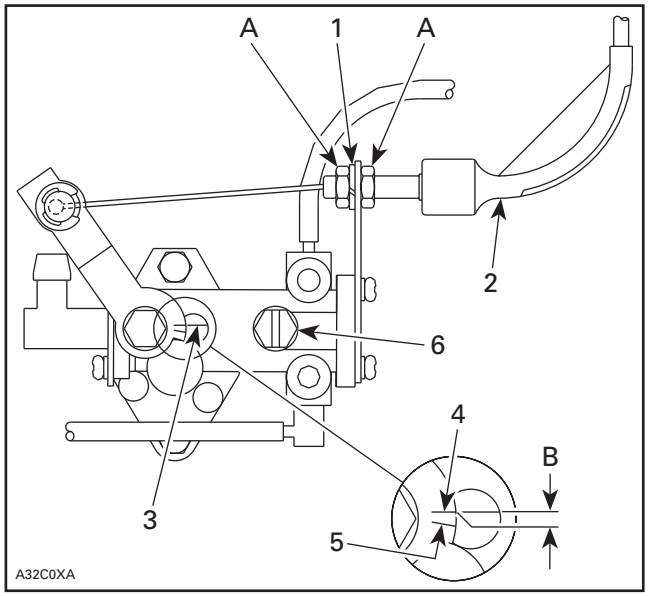
ADJUSTMENT

Prior to adjusting the pump, make sure all carburetor adjustments are completed.

Synchronizing Pump with Carburetor

Eliminate the throttle cable free-play by pressing the throttle lever until a light resistance is felt, then hold in place. The second mark on pump lever must be aligned or up to 1 mm (.039 in) below pump casting mark. If not, loosen the adjuster nut and adjust accordingly.

Retighten the adjuster nut.



1. Lock washer
2. Plastic elbow fastened and fully inserted
3. Pump casting mark
4. Second mark aligned or below
5. First mark
6. Bleeder screw
*A. 5 N•m (44 lbf•**in**)*
B. 0 to 1 mm (0 to .039 in)

CAUTION: Proper oil injection pump adjustment is very important. Any delay in the opening of the pump can result in serious engine damage.

To Bleed Oil Lines

Bleed main oil line (between tank and pump) by loosening the bleeder screw until air has escaped from the line. Add injection oil as required.

Reinstall all parts.

Bleed the small oil line between pump and engine by running engine at idle while holding the pump lever in fully open position.

NOTE: Make a J hook out of mechanical wire to lift the lever.

⚠ WARNING

Ensure not to operate carburetor throttle mechanism. Secure the rear of the vehicle on a stand.

CHECKING OPERATION

Oil Pump

On Vehicle

NOTE: Main oil line must be full of oil. See bleeding procedure above.

Lift rear of vehicle and support with a mechanical stand. Unplug oil lines from pump. Start engine and stop it as soon as it fires.

Check that oil in small oil lines has been sucked up (this will be indicated by a clear section of small oil lines). Repeat the procedure until this condition is attained.

Reconnect small oil lines, start engine and run at idle while holding the pump lever in fully open position. Oil columns must advance into small oil lines.

If not, remove pump assembly and check the pump gear and drive shaft (if applicable) for defects, replace as necessary. Test pump as describes below.

NOTE: Through normal use, oil level must not drop in small tubes. If oil drops, verify check valve operation in injection nozzle. Replace as necessary.

Test Bench

Connect a hose filled with injection oil to main line fitting. Insert other hose end in an injection oil container. Using a clockwise rotating drill rotate pump shaft. Oil must drip from outer fittings while holding lever in a fully open position. If not replace pump.

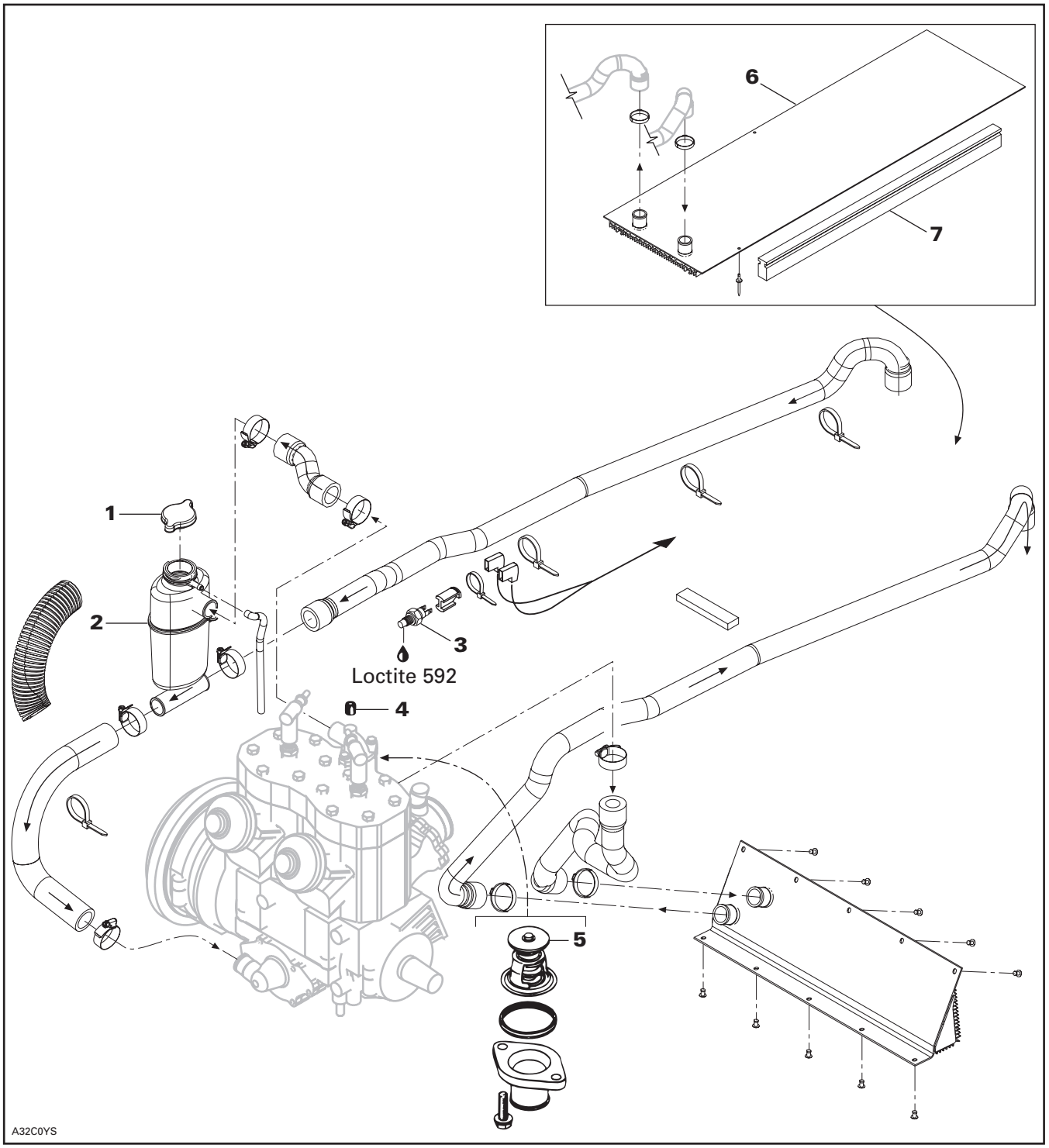
2, Check Valve

To verify this check valve, proceed the same as for checking pump operation on vehicle. First unplug oil line from check valve. After restarting the engine, check that a clear section in small oil line is present. Reconnect oil line.

Run engine at idle. Oil column must advance. If the check valve is faulty, oil column will go back and forth. Replace if so.

LIQUID COOLING SYSTEM

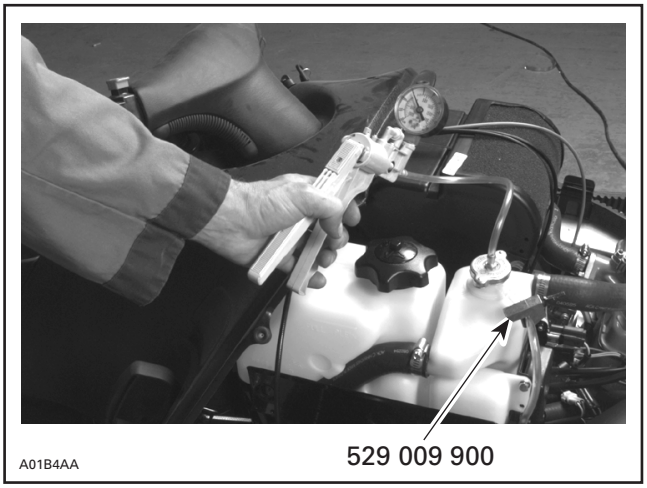
699 and 809 Engines



COOLING SYSTEM LEAK TEST

Install special plug (radiator cap) (P/N 529 021 400) and hose pincher (P/N 529 009 900) on overflow hose. Pressurize all system through coolant reservoir to 100 kPa (15 PSI).

Check all hoses and cylinder/base for coolant leaks. Spray a soap/water solution and look for air bubbles.



TYPICAL

INSPECTION

Check general condition of hoses and clamp tightness.

DRAINING THE SYSTEM

⚠ WARNING

Never drain or refill the cooling system when engine is hot.

To drain the cooling system, siphon the coolant mixture from the coolant tank. Disconnect hose at water pump.

DISASSEMBLY AND ASSEMBLY

3,4, Sender and Plug

Apply Loctite 592 (P/N 413 702 300) thread sealant on sender and plug to avoid leaks.

1, Pressure Cap

Check if the cap pressurizes the system. If not, install a new 90 kPa (13 PSI) cap (do not exceed this pressure).

6,7, Radiator and Radiator Protector

Insert radiator protector into radiator C-rail and crimp C-rail at rear end. Refer to FRAME 09-03 for radiator removal.

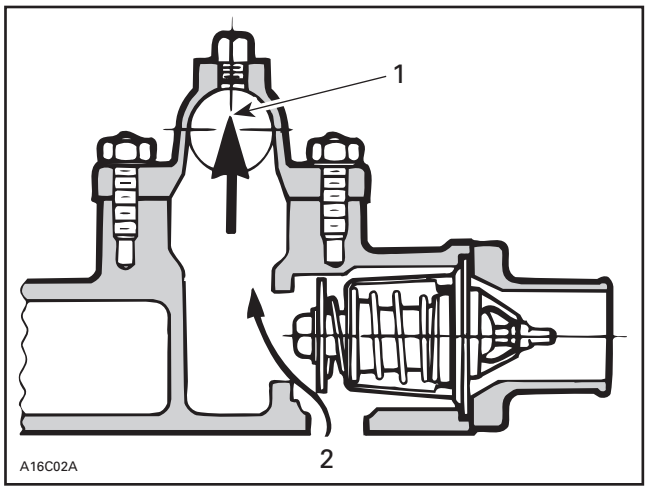
5, Thermostat

To check thermostat, put in water and heat water. Thermostat should start to open when water temperature reaches the following degree. It will be almost fully open at 50°C (122°F).

ENGINE	TEMPERATURE
493, 593 and 693	42°C (108°F)

Thermostat is a double action type.

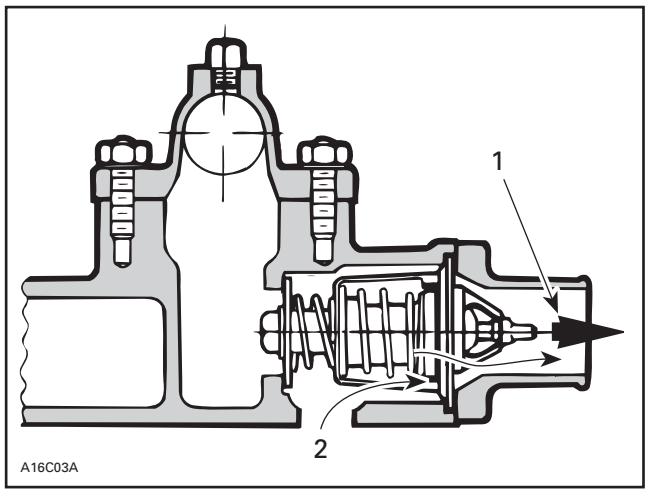
a. Its function is to give faster warm up of the engine by controlling a circuit; water pump — engine — coolant tank. This is done by bypassing the radiator circuit.



TYPICAL — CLOSED THERMOSTAT, COLD ENGINE

1. *To reservoir*
2. *From cylinders*

b. When the liquid is warmed enough, the thermostat opens progressively the circuit, water pump — engine — radiators — coolant tank to keep the liquid at the desired temperature. (See the diagram of the exploded view).



TYPICAL — OPEN THERMOSTAT, WARM ENGINE

1. *To radiators*
2. *From cylinders*

These 2 functions have the advantage of preventing a massive entry of cold water into the engine.

COOLING SYSTEM REFILLING PROCEDURE

Recommended Coolant

Use a blend of 60% antifreeze with 40% water. Do not reinstall pressure cap.

CAUTION: To prevent rust formation or freezing condition, always replenish the system with 60% antifreeze and 40% water. Pure antifreeze without water freezes. Always use ethylene glycol antifreeze containing corrosion inhibitors specifically recommended for aluminum engines.

System Capacity

Refer to TECHNICAL DATA 10.

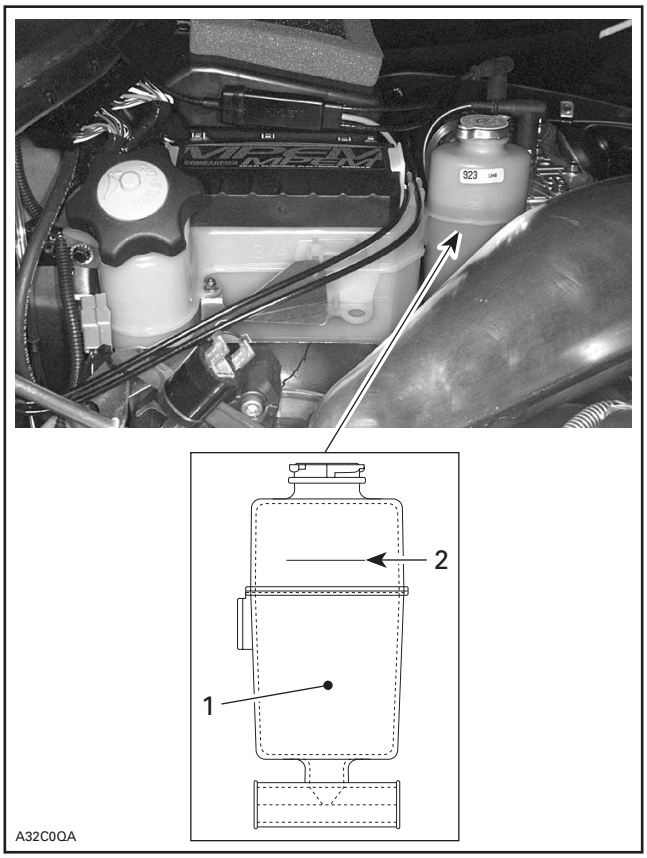
Refilling Procedure

Lift front of vehicle until the tunnel is horizontal. With engine cold, refill coolant tank no. 2 up to cold level line. Wait a few minutes then refill to line. Start engine. Refill up to line while engine is idling until all air bubbles have excaped from system (about 4 to 5 minutes). Install pressure cap.

To make sure coolant flows through radiators, touch them by hand. They must feel warm.

Put back front of vehicle on the ground.

When engine has completely cooled down, recheck coolant level in coolant tank and refill up to line.

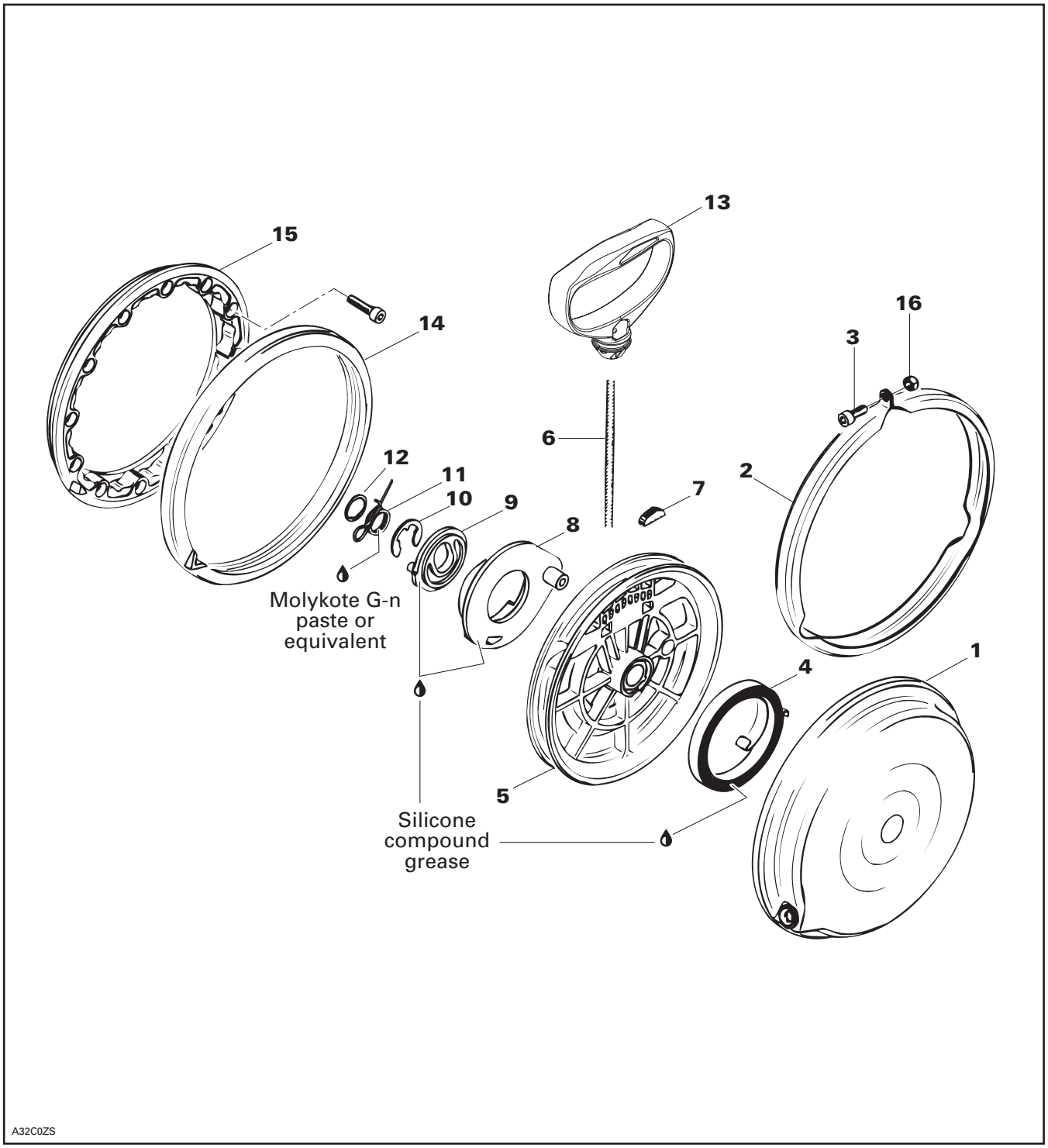


1. *Coolant tank*
2. *COLD LEVEL line*

Check coolant concentration (freezing point) with proper tester.

REWIND STARTER

All Models



INSPECTION

NOTE: Due to dust accumulation, rewind starter must be periodically cleaned, inspected and relubricated.

CAUTION: It is of the utmost importance that the rewind starter spring be lubricated periodically using specific lubricant. Otherwise, rewind starter component life will be shortened and/or rewind starter will not operate properly under very cold temperatures.

Check if rope no. 6 is fraying, replace if so.

When pulling starter grip, mechanism must engage within 30 cm (1 ft) of rope pulled. If not, disassemble rewind starter, clean and check for damaged plastic parts. Replace as required, lubricate, reassemble and recheck.

When releasing starter grip, it must return to its stopper and stay against it. If not, check for proper spring preload or damages. Readjust or replace as required.

REMOVAL

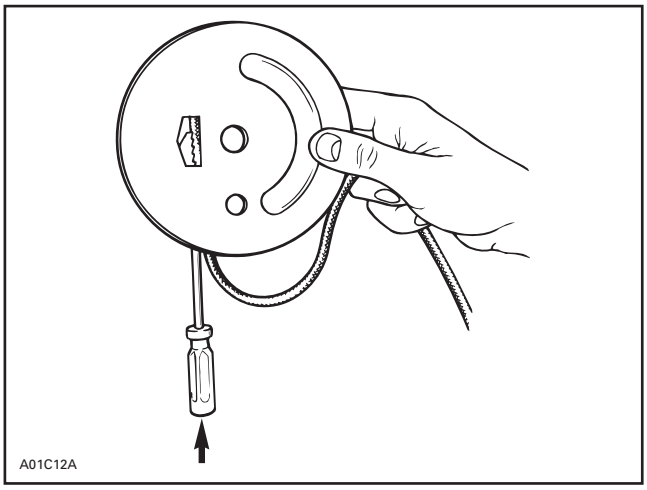
Using a small screwdriver, extract rope knot from starter grip no. 13. Cut rope close to knot. Tie a knot near starter.

Remove bolt no. 3 and nut no. 16 securing rewind starter housing no. 1 to connecting flange no. 15 then remove rewind starter.

DISASSEMBLY

To remove rope from rewind starter mechanism:

– First remove locking ring no. 12, locking spring no. 11, circlip no. 10, pawl lock no. 9 and pawl no. 8.
– Let sheave get free to release spring preload.
– Remove sheave no. 5 from starter housing no. 1.
– Disengage key no. 7 and pull out rope no. 6.



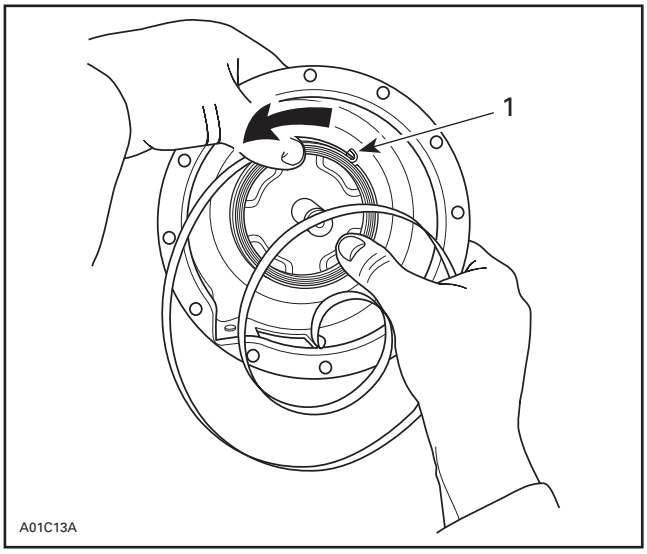
GENTLY TAP ON KEY

ASSEMBLY

At assembly, position spring no. 4 outer end into spring guide notch then wind the spring counterclockwise into guide.

⚠ WARNING

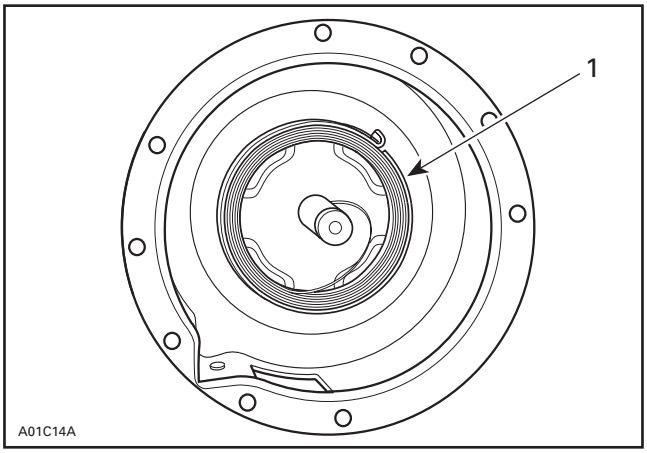
Since the spring is tightly wound inside the guide it may fly out when rewind is handled. Always handle with care.



1. Outer end into guide notch

Lubricate spring assembly with silicone compound grease (P/N 420 897 061) and position into starter housing as illustrated.

CAUTION: This lubricant must NOT be used on rewind starter locking spring as it does not stay on under vibration.

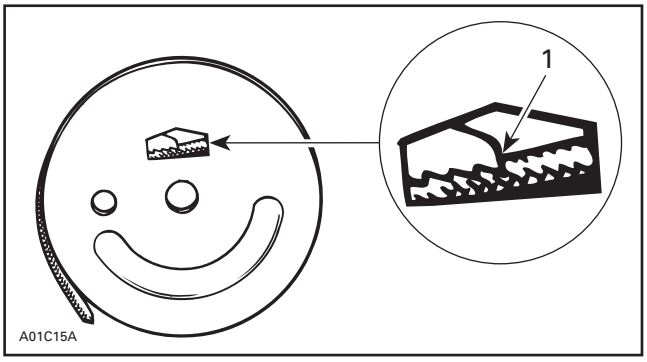


1. Silicone compound grease inside spring guide

CAUTION: The use of standard multi-purpose grease could result in rewind starter malfunction.

To install a new rope **no. 6**, insert rope into sheave **no. 5** orifice and lock it with the key **no. 7** as illustrated.

Lubricate sheave center hole with silicone compound grease (P/N 420 897 061) before installing sheave into rewind starter housing.



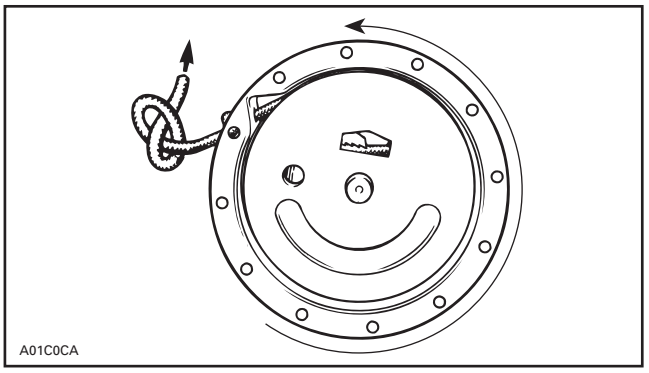
1. Push to lock

To adjust rope tension:

Wind rope on sheave and place sheave into starter housing making sure that the sheave hub notch engages in the rewind spring hook.

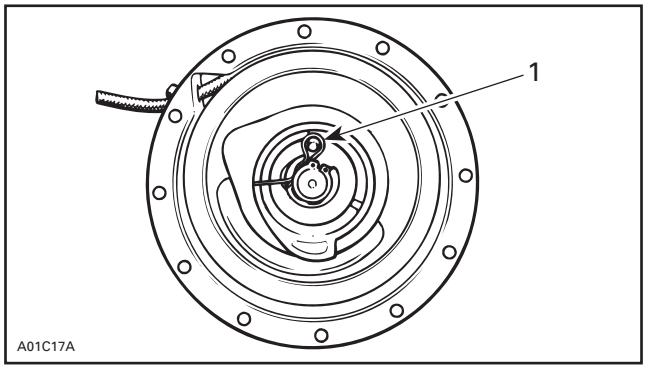
Rotate the sheave counterclockwise until rope end is accessible through starter housing orifice.

Pull the rope out of the starter housing and temporarily make a knot to hold it. Rope preload will be made when threading rope up to console hole.



Position pawl **no. 8**, pawl lock **no. 9** and circlip **no. 10**.

Install locking spring **no. 11** and lubricate with MOLYKOTE G-n paste from Dow Corning® or equivalent.



1. Spring coated with MOLYKOTE G-n paste

Install locking ring.

CAUTION: This lubricant must NOT be used on rewind springs as it does not stay on when dry.

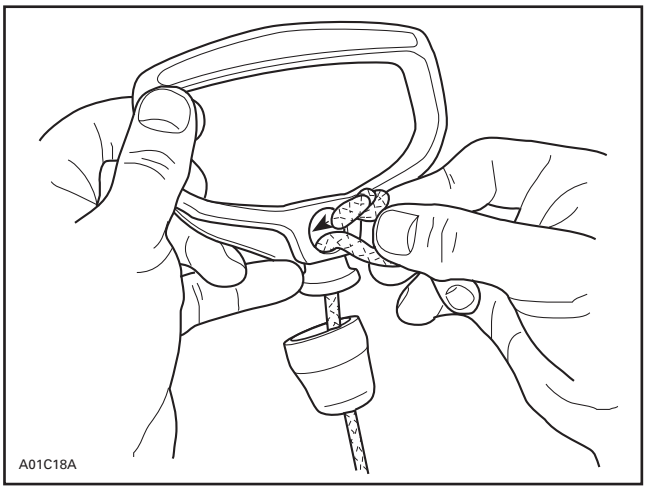
INSTALLATION

Secure rewind starter to damper ring **no. 14** and connecting flange **no. 15** with clamp **no. 2** matching notch and embosses.

1. Notch

Reinstall rewind starter assembly on engine.

Prior to installing starter grip **no. 13** on new rope, it is first necessary to fuse the rope end with a lit match. Pass rope through starter grip and tie a knot in the rope end. Fuse the knot with a lit match then insert rope end down and pull the starter grip over the knot.

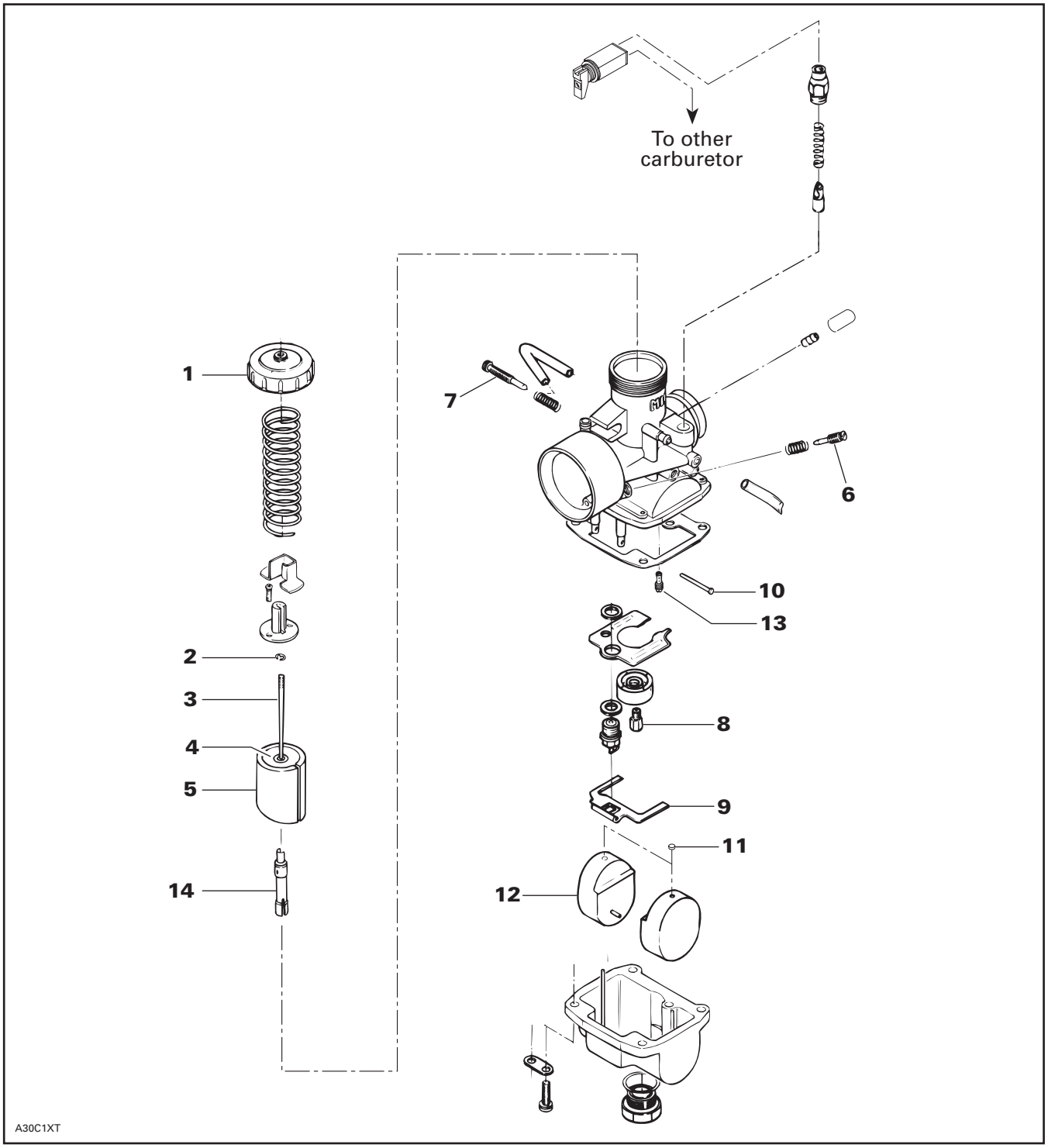


TYPICAL

CARBURETOR AND FUEL PUMP

CARBURETOR

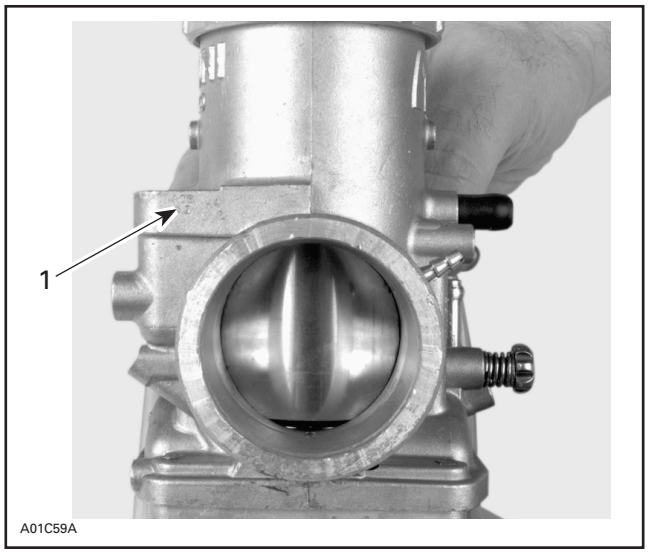
VM Type on All ZX Series Models



TYPICAL

IDENTIFICATION

All carburetors are identified on their body.

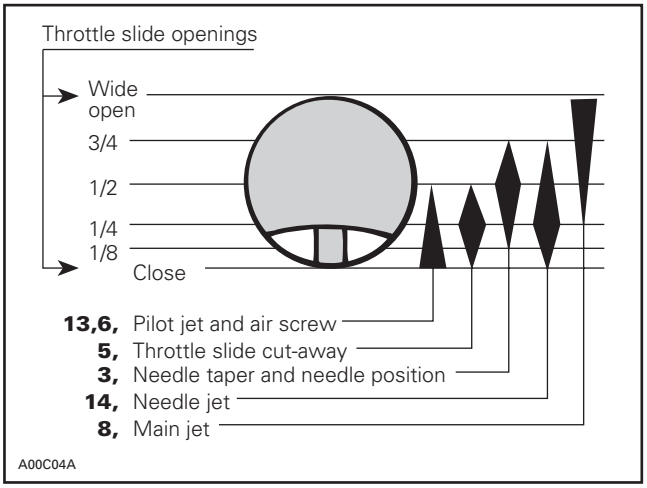


TYPICAL
1. Identification: 34-482

CARBURETOR CIRCUIT OPERATION VERSUS THROTTLE OPENING

The following illustration shows the part of the carburetor which begins and stops to function at different throttle slide openings.

Note that the wider part of symbol corresponds to the opening mostly affected. For instance, throttle slide cut-away begins to function at closed position but it is most effective at 1/4 opening and decreases up to 1/2 opening.



VIEW FROM AIR INTAKE OPENING

NOTE: For fine tuning refer to TECHNICAL DATA 10 and to SPARK PLUG 06-03.

NOTE: For high altitude regions, the *High Altitude and Sea Level Technical Data Booklet* (P/N 484 200 019 and 484 054 500 for binder) gives information about calibration according to altitude and temperature.

REMOVAL

DPM Equipped Models

Twist DPM manifold and detach from air intake silencer.

All Models

Unfasten clamps then, remove air intake silencer from left hand side.

Disconnect fuel inlet lines.

DPM Equipped Models

Unplug DPM solenoid connector.

All Models

Unscrew carburetor cover **no. 1** then pull out throttle slide **no. 5** from carburetor.

⚠ WARNING

Exercise care when handling throttle slide. Scratches incurred may cause throttle slide to stick open in operation.

Disconnect throttle cable from throttle slide.

Remove carburetors from engine.

Unscrew choke plunger from each carburetor.

CLEANING AND INSPECTION

All Models

The entire carburetor should be cleaned with a general solvent and dried with compressed air before disassembly.

CAUTION: Heavy duty carburetor cleaner may be harmful to the float material and to the rubber parts, O-rings, etc. Therefore, it is recommended to remove those parts prior to cleaning.

Carburetor body and jets should be cleaned in a carburetor cleaner following manufacturer's instructions.

⚠ WARNING

Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as they are flammable and explosive.

Check inlet needle tip condition. If worn, the inlet needle and seat must be replaced as a matched set.

NOTE: Install needle valve for snowmobile carburetor only. It is designed to operate with a fuel pump system.

Check throttle slide for wear. Replace as necessary.

Check idle speed screw straightness. Replace as necessary.

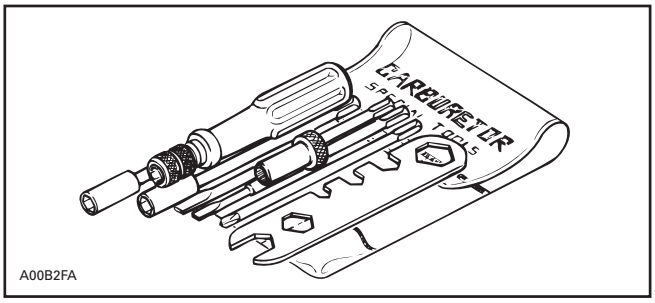
Check for fuel soaked into float no. 12; replace as necessary.

Check float for cracks or other damages affecting free movement; replace as necessary.

Inspect throttle cable and housing for any damages. Replace as necessary.

DISASSEMBLY AND ASSEMBLY

NOTE: To ease the carburetor disassembly and assembly procedures it is recommended to use carburetor tool kit (P/N 404 112 000).

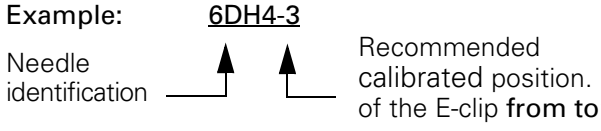


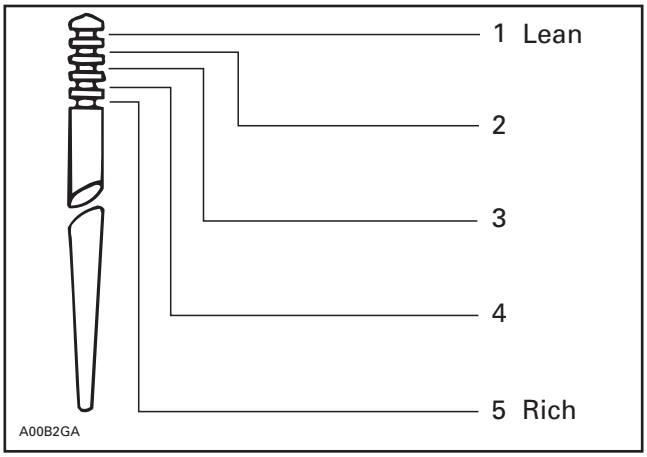
2,3, E-Clip and Needle

Remove screws from needle retaining plate to withdraw the needle.

The position of the needle in the throttle slide is adjustable by means of an E-clip inserted into 1 of 5 grooves located on the upper part of the needle. Position 1 (at top) is the leanest, 5 (at bottom) the richest.

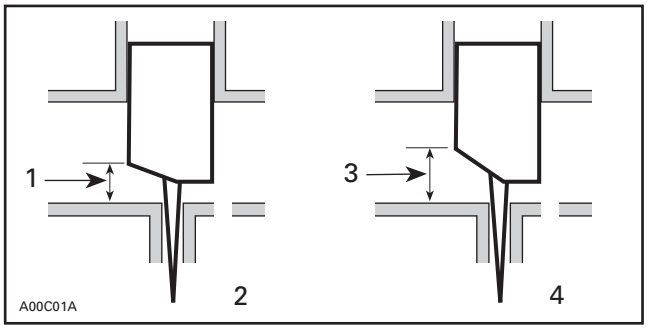
NOTE: The last digit of the needle identification number gives the recommended calibrated position of the E-clip **from the top** of the needle.





CLIP POSITIONS

The size of the throttle slide cut-away affects the fuel mixture between 1/8 to 1/2 throttle opening.



1. *Low cut-away*
2. *Rich mixture*
3. *High cut-away*
4. *Lean mixture*

8, Main Jet

The main jet installed in the carburetor has been selected for a temperature of - 20°C (0°F) at sea level. Different jetting can be installed to suit temperature and/or altitude changes. Refer to *High Altitude and Sea Level Technical Data Booklet* (P/N 484 200 019).

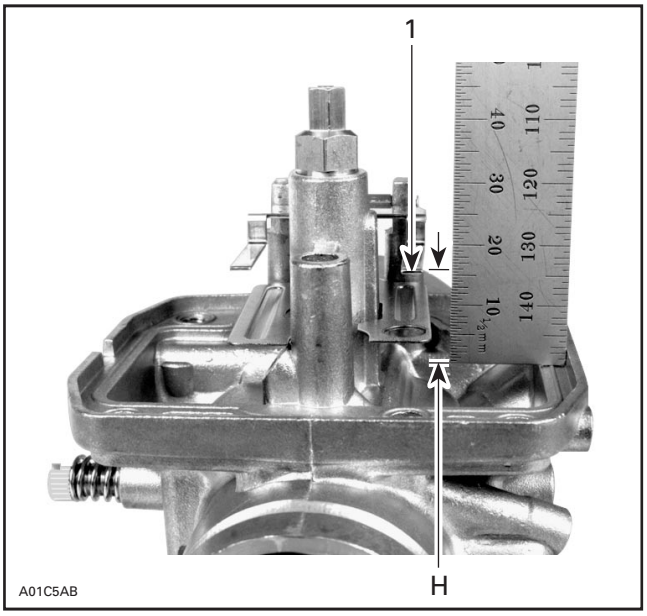
CARBURETOR FLOAT LEVEL ADJUSTMENT

CAUTION: Spark plugs will foul if float is adjusted too low. Engine may be damaged if float is adjusted too high.

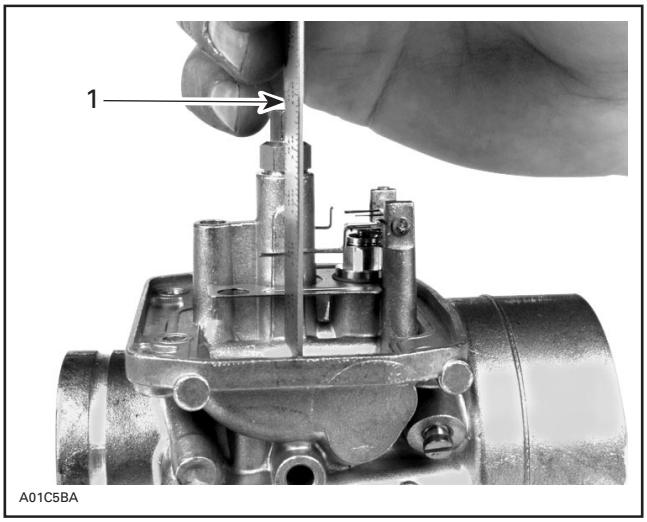
9,10, Float Arm and Float Arm Pin

Correct fuel level in float chamber is vital toward maximum engine efficiency. To check for correct float level proceed as follows:

– Make sure that float arm is symmetrical — not distorted.
– Remove float bowl and gasket from carburetor.
– With carburetor chamber upside-down on a level surface, measure height H between bowl seat and **top** edge of float arm. Keep ruler perfectly vertical and in line with main jet hole.

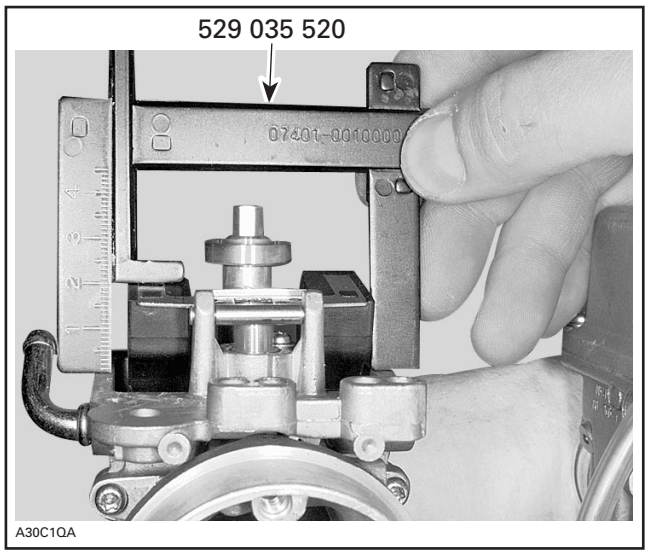


TYPICAL — VM TYPE
1. Measure from top of float arm
H: Float height (including float arm thickness)



TYPICAL — VM TYPE
1. Ruler vertical and in line with main jet

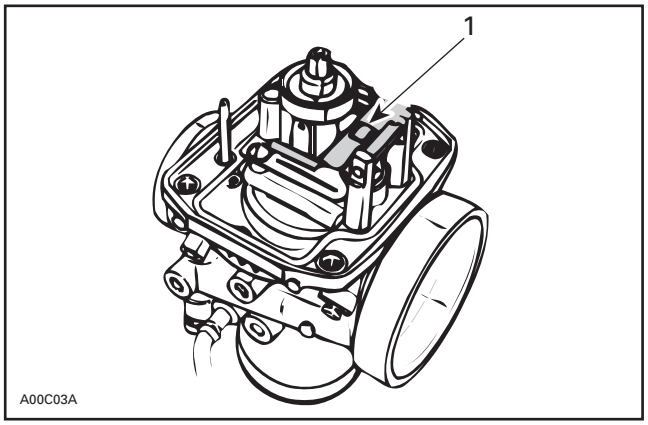
Float level height can be check using tool (P/N 529 035 520). Keep tool in line with main jet as explained above.



CARBURETOR TYPE	FLOAT HEIGHT H	
	± 1 mm	(± .040 in)
All	22.9	(.902)

To Adjust Height H

– Bend the contact tab of float arm until the specified height is reached.

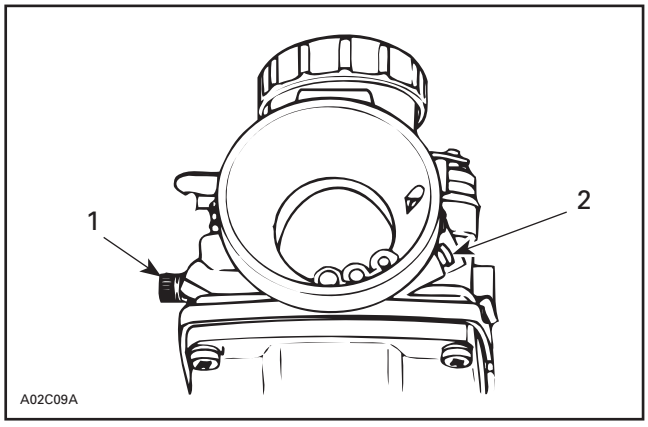


TYPICAL
1. Contact tab

CARBURETOR ADJUSTMENTS

Adjustments should be performed following this sequence:

– air screw adjustment
– throttle slide height
(preliminary idle speed adjustment)
– throttle cable adjustment
– carburetor synchronization
– final idle speed adjustment (engine running)
– oil pump and carburetor synchronization



1. Idle speed screw
2. Air screw

6, Air Screw Adjustment

Completely close the **air screw** (until a slight seating resistance is felt) then back off as specified.

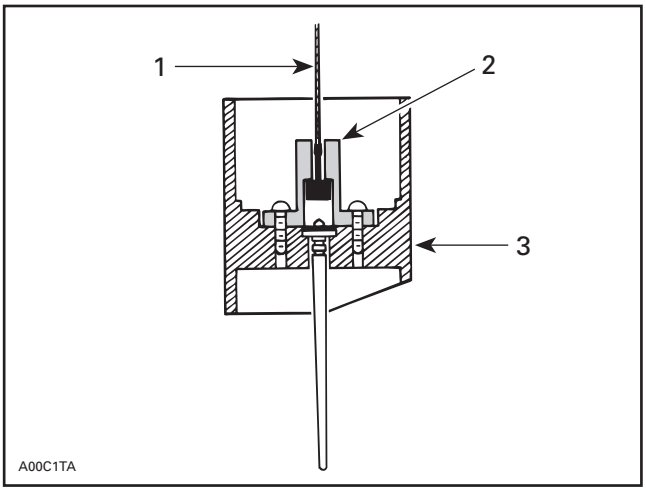
Turning screw in clockwise enrichners mixture and conversely, turning it out counterclockwise leans mixture.

Refer to TECHNICAL DATA 10 for the specifications.

Throttle Slide Height (preliminary idle speed adjustment)

Hook throttle cable into the needle retainer plate.

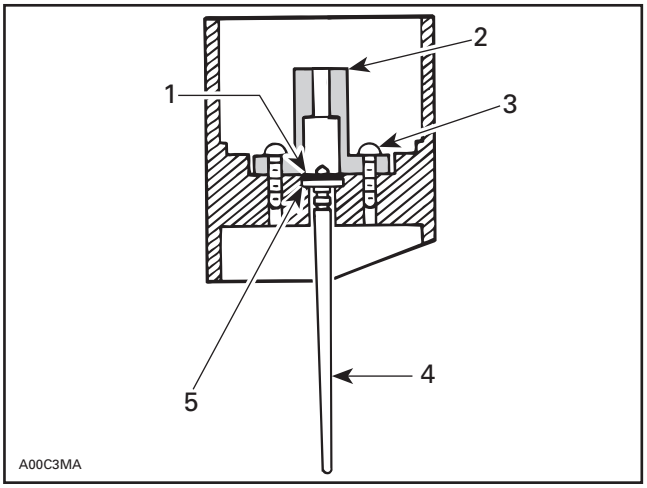
NOTE: Do not obstruct hole in throttle slide when installing needle retaining plate. This is important to allow air escaping through and thus allowing a quick response.



CENTER POST TYPE
1. Throttle cable
2. Needle retaining plate
3. Throttle slide

Make sure the nylon packing **no. 4** is installed on all applicable throttle slides.

CAUTION: Serious engine damage can occur if this notice is disregarded.



CENTER POST TYPE

1. *E-clip*
2. *Needle retaining plate*
3. *Screw*
4. *Needle*
5. *Nylon packing*

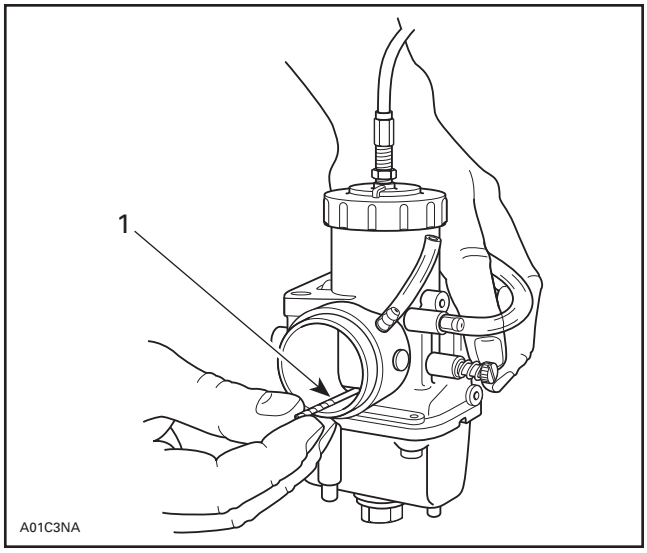
Using a drill bit adjust throttle slide height (see following table) by turning idle speed screw no. 7.

Throttle slide height is measured on outlet side of carburetor (engine side).

NOTE: Make sure that throttle cable does not hold throttle slide. Loosen cable adjuster accordingly.

Final idle speed adjustment (engine running at idle speed) should be within 1/2 turn of idle speed screw from preliminary adjustment.

MODELS	THROTTLE SLIDE HEIGHT ± 0.2 mm (± .008 in)
MX Z 500	1.4 (.055)
Grand Touring 600 Formula DLX 600 Formula Z 600 MX Z 600 MX Z 600 (DPM)	1.3 (.051)
Summit 600 Summit 700/700 M.E.	1.7 (.067)
Formula Z 700 Formula DLX 700 MX Z 700 MX Z 700 (DPM) MX Z 700 M.E. (DPM)	1.5 (.059)



TYPICAL

1. *Drill bit used as gauge for throttle slide height*

INSTALLATION

CAUTION: Never allow throttle slide(s) to snap shut.

Prior to install carburetor, adjust air screw and preliminary idle speed as described above.

To install carburetor on engine, inverse removal procedure.

However, pay attention to the following:

On applicable models, make sure to align tab of carburetor and air intake silencer (if applicable) with notch of adaptor(s). On applicable models, install adaptor with UP mark facing up.

CAUTION: The rubber flange must be checked for cracks and/or damage. At assembly, the flange must be perfectly matched with the air intake manifold or severe engine damage will occur.

Install clamps in a way that their tightening bolts are staggered — not aligned.

Throttle Cable Adjustment

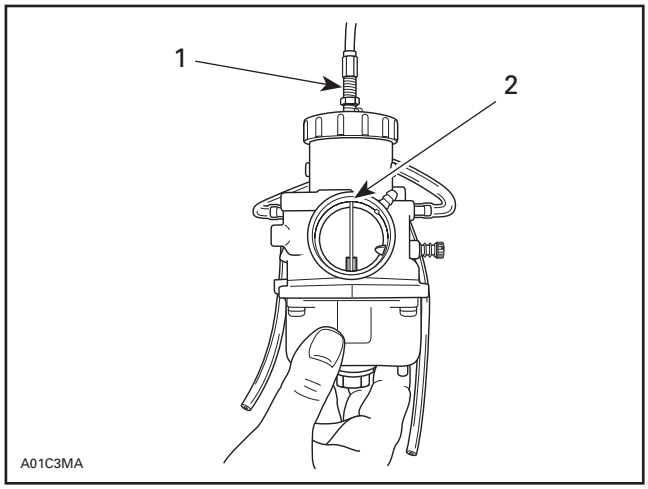
⚠ WARNING

Ensure the engine is turned OFF, prior to performing the throttle cable adjustment.

For maximum performance, correct cable adjustment is critical.

At full opening throttle slide must be flush or 1.0 mm (.040 in) lower than the top of carburetor **outlet** bore (engine side).

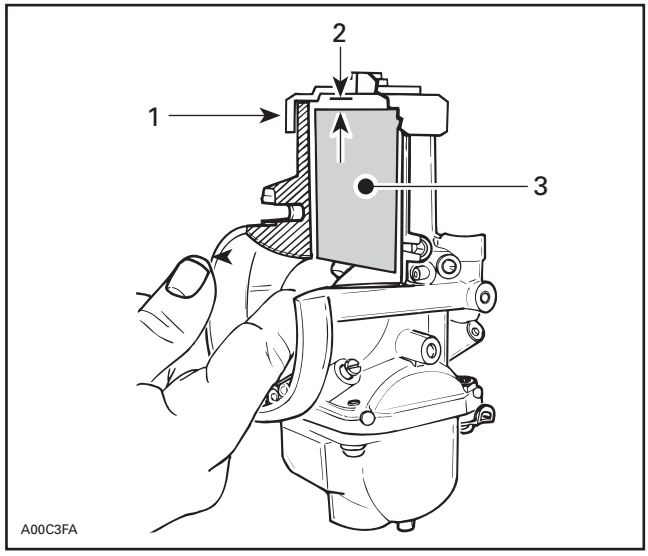
First loosen adjuster nut then turn throttle cable adjuster accordingly.



FULL OPENING (THROTTLE LEVER AGAINST HANDLE GRIP)

1. *Throttle cable adjuster*
2. *Throttle slide flush or 1.0 mm (.040 in) lower than carburetor outlet bore (engine side)*

Check that **with the throttle lever fully depressed**, there is a free play between the carburetor cover and top of throttle slide.



FULL OPENING (THROTTLE LEVER AGAINST HANDLE GRIP)

1. *Cover*
2. *Free play*
3. *Throttle slide*

⚠ WARNING

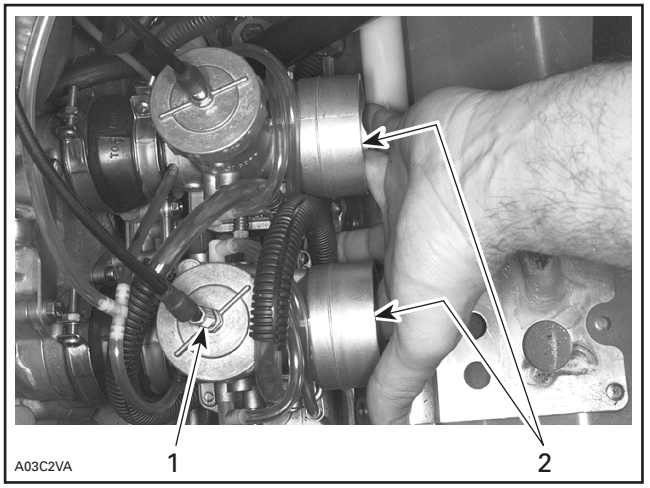
This gap is very important. If the throttle slide rests against the carburetor cover at full throttle opening, this will create too much strain and may damage the throttle cable or other components in throttle mechanism.

Carburetor Synchronization

When depressing throttle lever, both carburetor slides must start to open at same time.

Unlock cable adjustment lock nut on one carburetor.

Screw or unscrew cable adjuster until all carburetor slides start to open at same time. Cable play will be identical on all carburetors. Retighten jam nut.



TYPICAL

1. *Screw or unscrew adjuster*
2. *Check that all slides start to open at the same time*

Check throttle slide position at wide open throttle. Throttle slide must be flush or 1.0 mm (.040 in) lower than carburetor **outlet** bore. At that same position, check that throttle slide does not contact carburetor cover. Turn cable adjuster and recheck synchronization.

CAUTION: If the throttle slide rests against the carburetor cover at full throttle opening, this will create too much strain and may damage the throttle cable or other components in throttle mechanism.

CAUTION: Make sure all carburetors start to operate simultaneously.

Idle Speed Final Adjustment

CAUTION: Before starting engine for the final idle adjustment, make sure that oil pump is adjusted. The oil injection pump adjustment must be checked after each time carburetor idle is adjusted. Refer to OIL INJECTION SYSTEM 04-05.

Start engine and allow it to warm then adjust idle speed to specifications by turning idle speed screw clockwise to increase engine speed or counterclockwise to decrease it.

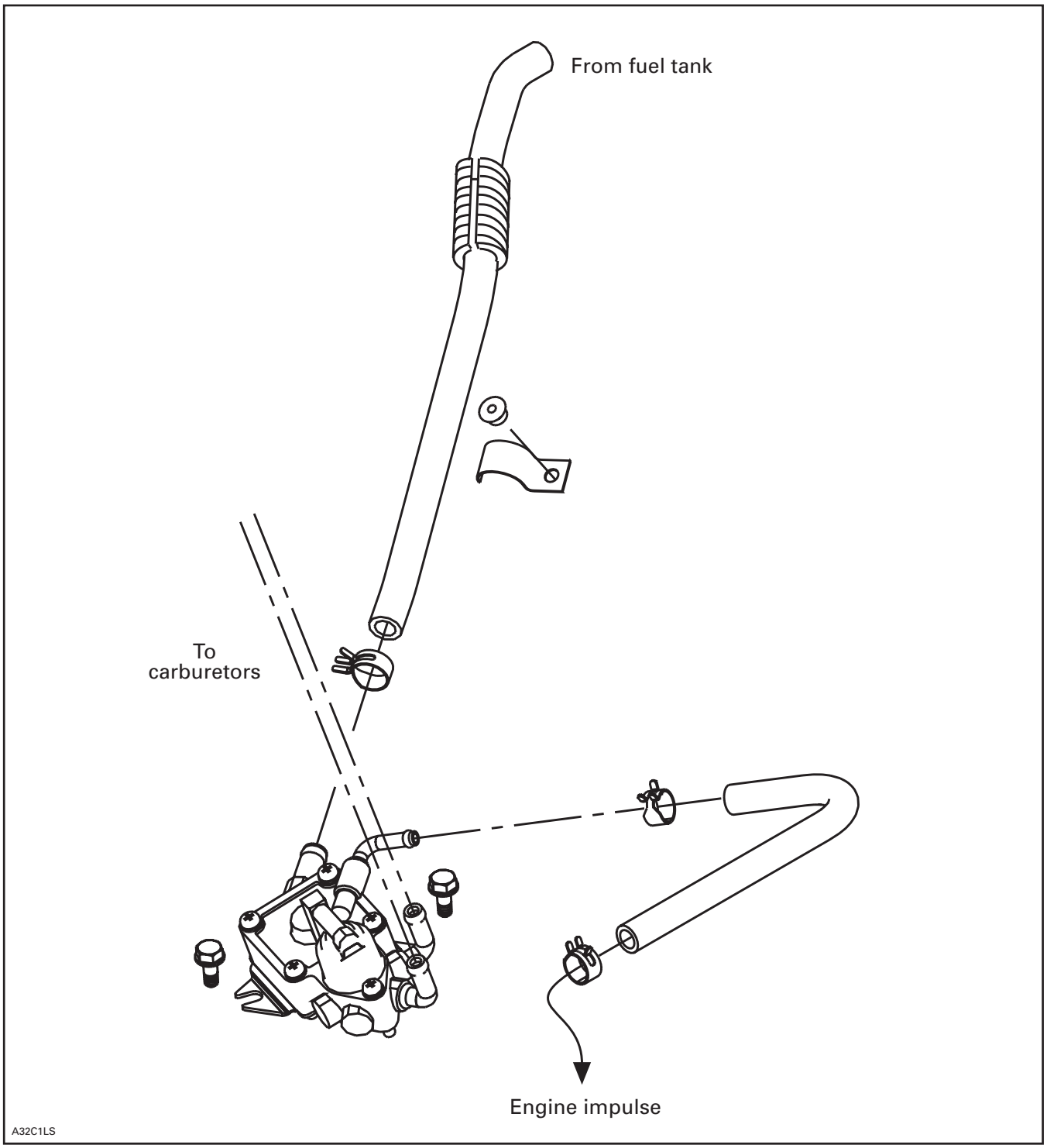
Refer to TECHNICAL DATA 10 for the specifications.

NOTE: Turn adjustment screw the same amount to keep carburetors synchronized.

CAUTION: Do not attempt to set the idle speed by using the air screw. Severe engine damage can occur.

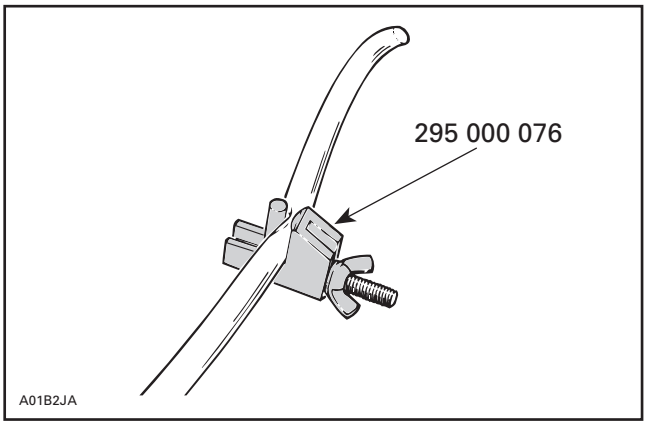
FUEL PUMP

All Models



REMOVAL

Install a hose pincer (P/N 295 000 076) on fuel supply line close to pump inlet.



Disconnect fuel outlet line(s).

Disconnect impulse line.

Remove screws securing fuel pump to chassis.

PUMP VERIFICATION

Check fuel pump valves operation as follows:

Connect a clean plastic tubing to the inlet nipple and alternately apply pressure and vacuum with pump of leak test kit. The inlet valve should release with pressure and hold under vacuum.

Repeat the same procedure at the outlet nipple. This time the outlet valve should hold with pressure and release under vacuum.

NOTE: Plug remaining outlet with finger while checking outlet valve.

Check impulse diaphragm and gasket on high-supply fuel pump with twin outlets as follows:

Connect a clean plastic tubing to the impulse nipple and plug vent hole on top cover. Either apply pressure or vacuum. The diaphragm/gasket must not leak.

CLEANING AND INSPECTION

The entire pump should be cleaned with general purpose solvent before disassembly.

Fuel pump components should be cleaned in general purpose solvent and dried with compressed air.

⚠ WARNING

Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as each is flammable and explosive.

Inspect diaphragm. The pumping area should be free of holes, tears or imperfections. Replace as needed.

INSTALLATION

Inverse removal procedure.

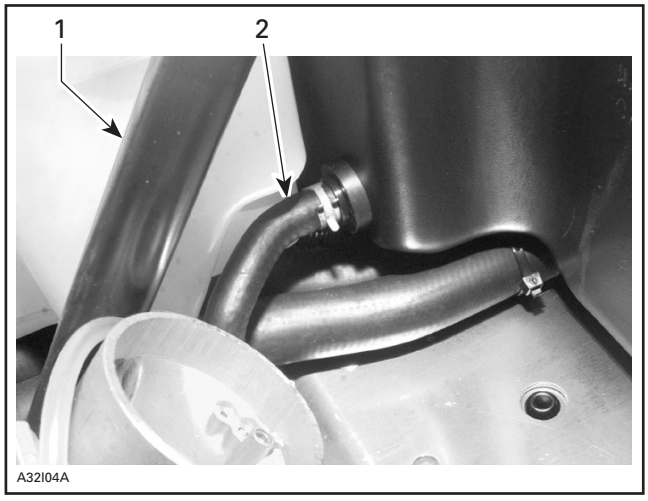
⚠ WARNING

Pressure test to ensure there is no leak in fuel system.

FUEL TANK AND THROTTLE CABLE

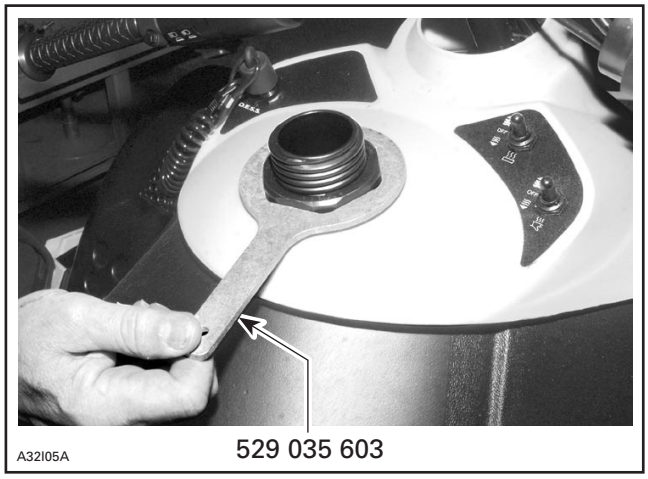
Fuel Tank

After draining fuel tank, unplug fuel line.

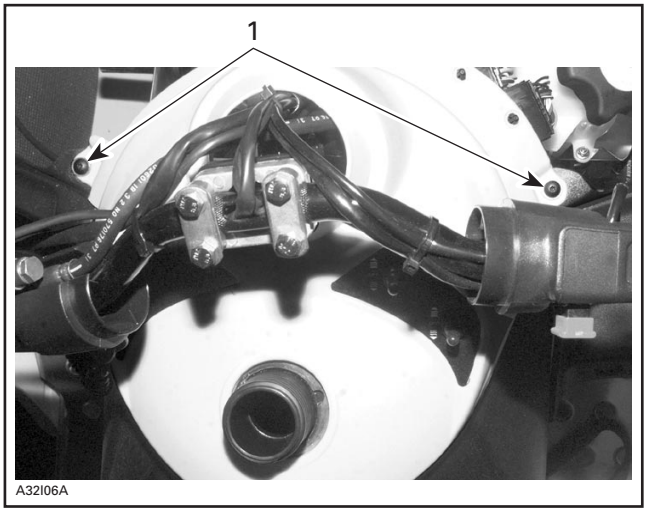


1. *Steering column*
2. *Fuel line*

Remove console nut using console nut key (P/N 529 035 603).



Unscrew console and move it toward front.



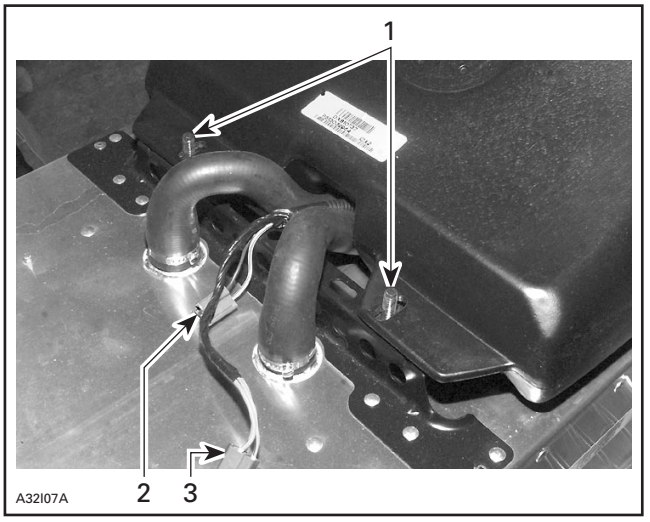
1. *Remove these screws*

Open storage compartment at rear of seat.

Remove nuts and washers retaining rear of seat then move seat rearward.

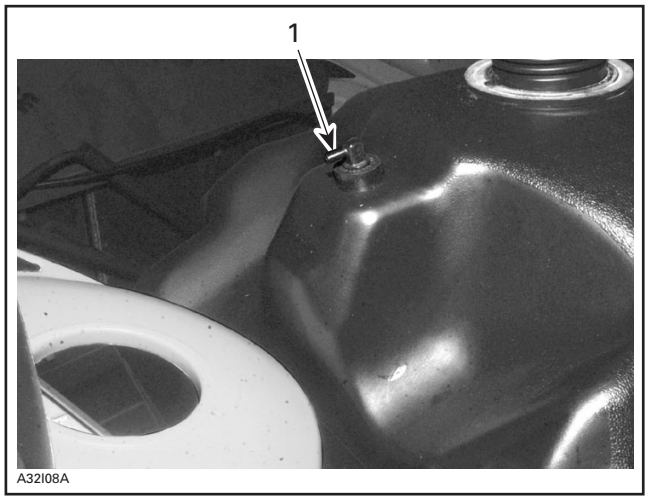
Disconnect taillight connector housing located between seat and fuel tank.

Remove seat then unbolt rear of fuel tank. Unplug electric fuel level gauge on so equipped models.



1. *Nuts retaining rear of fuel tank removed*
2. *Connector housing of electric fuel level gauge*
3. *Connector housing of taillight*

Move fuel tank rearward then, unplug vent tube from vent fitting at top front of fuel tank.

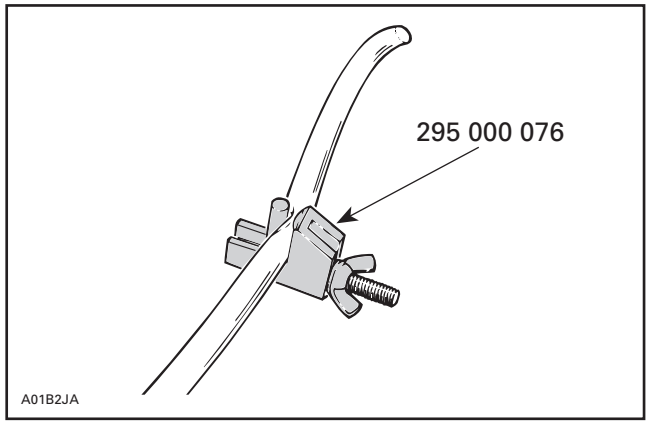


1. Vent fitting

Fuel Tank Lines

⚠ WARNING

Whenever a fuel line is disconnected, obstruct line with a hose pincher (P/N 295 000 076) or equivalent device. Fuel is flammable and explosive under certain conditions. Ensure work area is well ventilated. Do not smoke or allow open flames or sparks in the vicinity.



Impulse/Fuel Lines Spring Clips (all models)

Always reposition spring clips after any repair to prevent possible leaks.

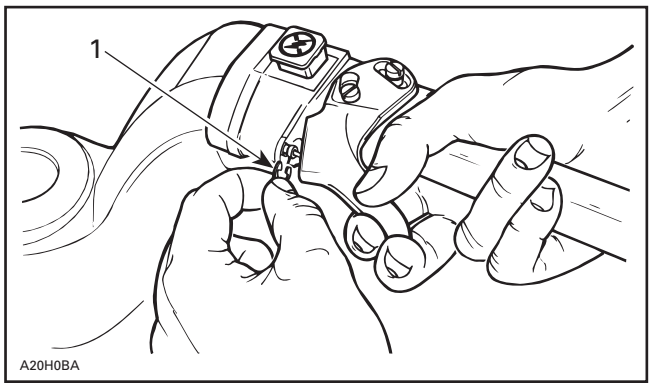
Throttle Cable Circlip at Handlebar (all models)

Put silicone grease (P/N 293 550 004) around cable barrel. Locate circlip as per illustration.

⚠ WARNING

If this procedure is disregarded, throttle might be half-open at normally closed position and the engine will speed up when starting.

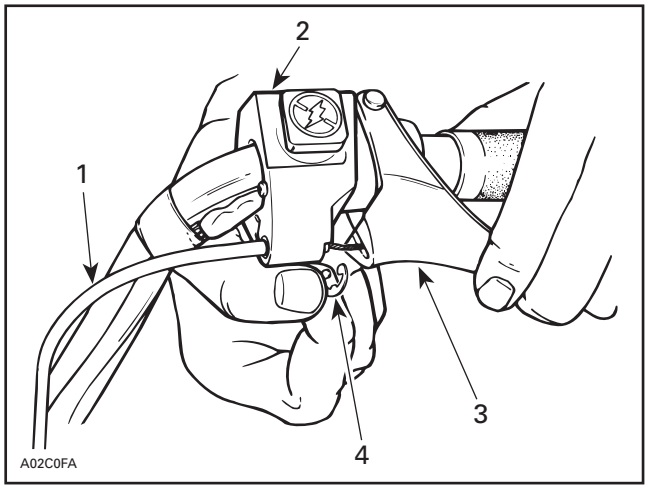
Models with Easy Action Throttle Lever



TYPICAL

1. Circlip

Other Models



TYPICAL

1. Throttle cable housing
2. Throttle handle housing
3. Throttle handle
4. Circlip

Adjust throttle cable as specified in CARBURETOR AND FUEL PUMP 04-08.

Throttle Cable Routing

CAUTION: Check that throttle cable is routed away from sharp edges, hot or vibrating parts. When turning steering while engine is running, idle speed must not vary.

Fuel Level Sensor

Inspection

Visually inspect the condition of connectors and wiring throughout the circuit. Connections must be clean and tight, and wiring free of damage. Repair as necessary. Use silicone dielectric grease to prevent corrosion at the connectors. Operate the engine to see if the problem has been corrected.

Fuse Replacement

A 0.25 ampere fuse protects fuel level sensor circuitry. Remove seat to gain access.

Fuel Level Sensor Screws

Torque fuel level sensor retaining screws to 1 N•m (8 lbf•**in**) in the sequence shown and then to 2.5 N•m (22 lbf•**in**), using the same sequence.