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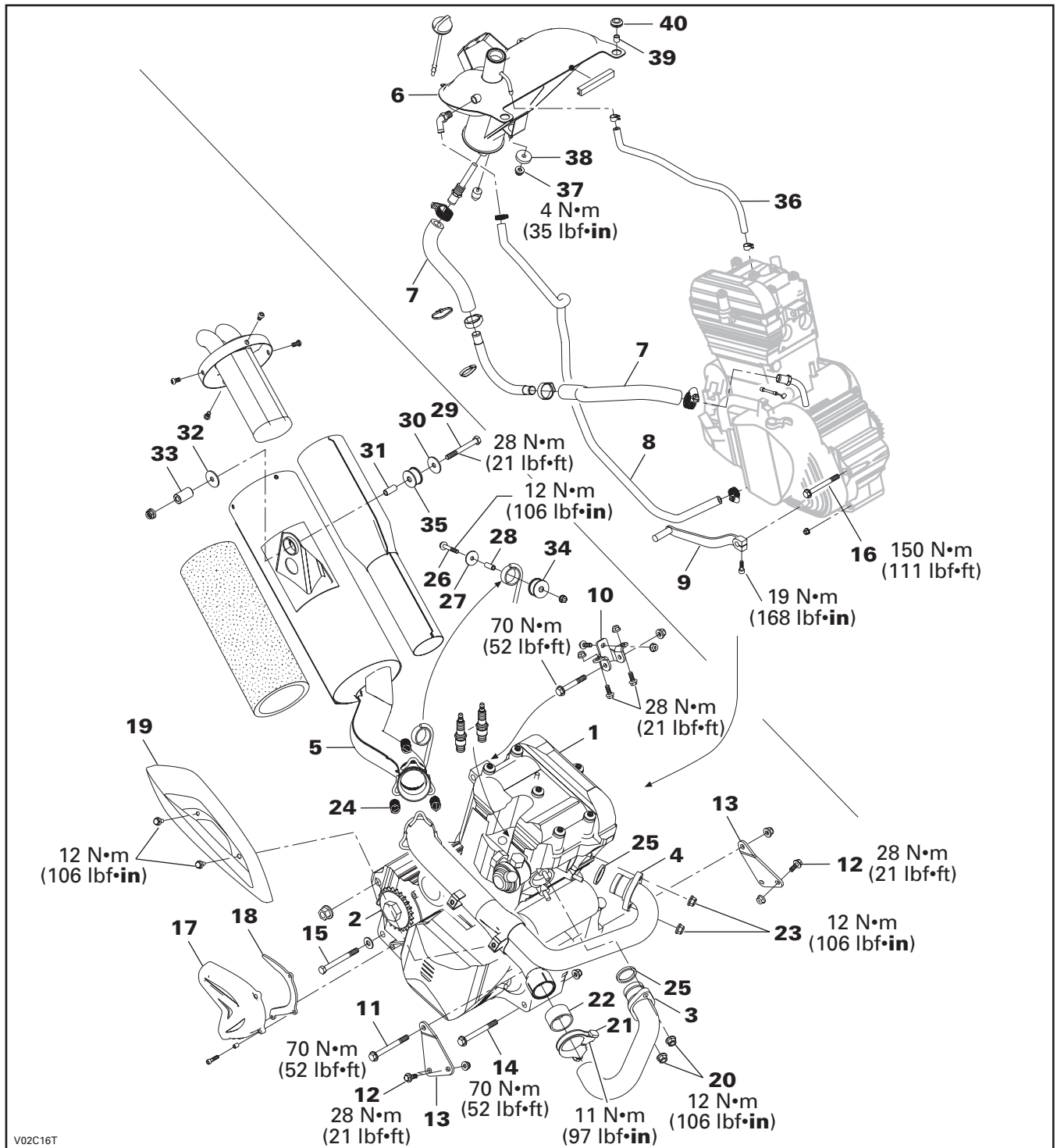
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Section 03 ENGINE

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REMOVAL AND INSTALLATION



Section 03 ENGINE

Subsection 02 (REMOVAL AND INSTALLATION)

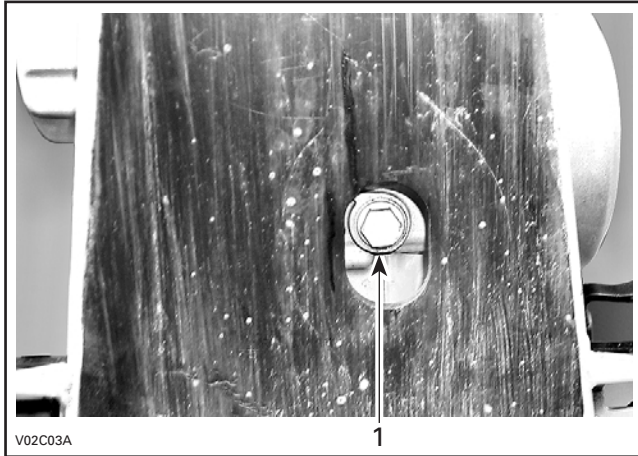
1, ENGINE

Vehicle Preparation

Place the vehicle on level surface and apply the parking brake.

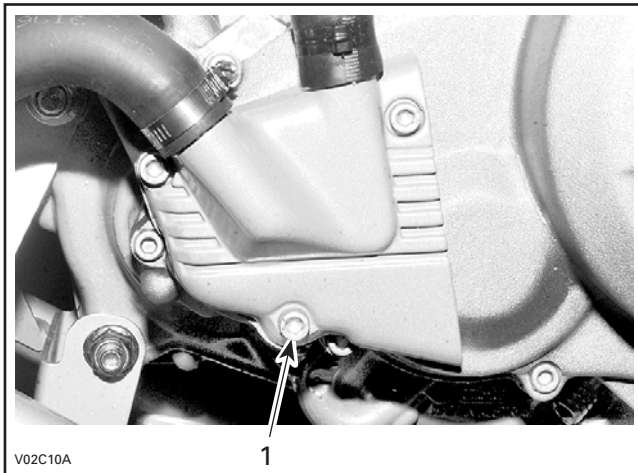
Close fuel valve.

Drain engine oil and engine coolant by drain plugs.



UNDER ENGINE

1. Engine oil plug



LH SIDE OF ENGINE

1. Engine coolant plug

Disconnect BLACK negative cable from battery, then RED positive cable.

WARNING

Always disconnect battery exactly in the specified order, BLACK negative cable first. It is recommended to disconnect electrical connections prior to disconnecting fuel lines.

Remove:

- seat
- front facia
- fuel tank.

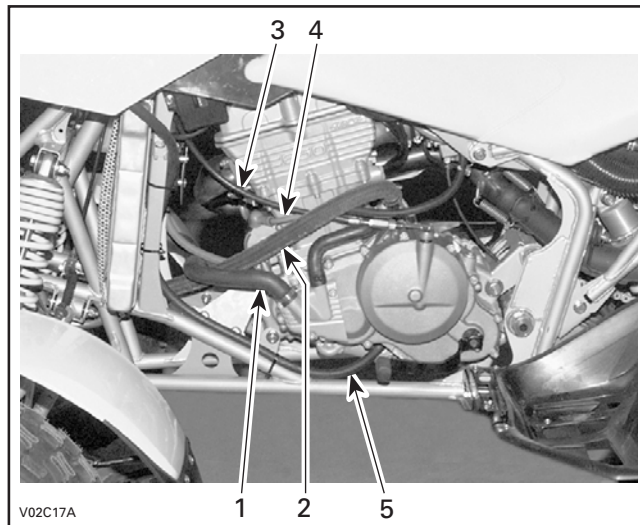
Engine Preparation

Unplug:

- spark plug cables
- oil pressure sensor, on the top of oil filter housing
- temperature sensor and temperature sender, located near thermostat housing
- magneto and trigger wiring harness connectors.

Remove:

- oil tank vent **no. 36** on the top of engine
- radiator outlet hose
- oil inlet hose **no. 7**
- clutch cable
- starter cable
- oil outlet hose **no. 8**



LH SIDE OF ENGINE

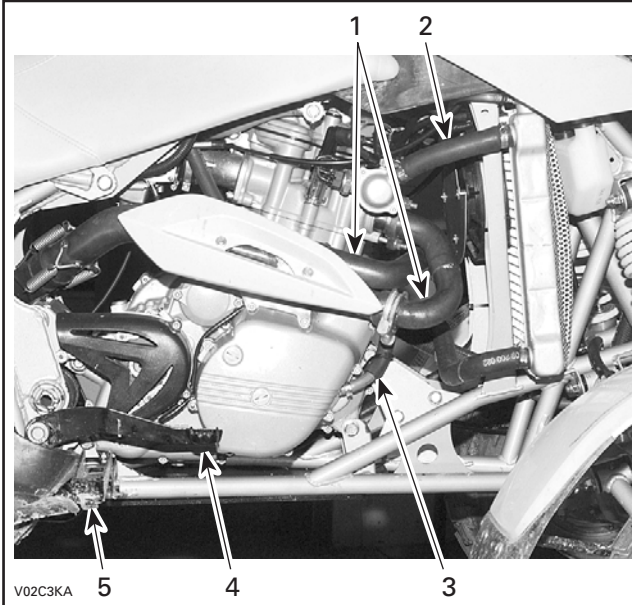
1. Radiator outlet hose
2. Oil inlet hose
3. Clutch cable
4. Starter cable
5. Oil outlet hose

- exhaust pipes **no. 3** and **no. 4** (refer to **Exhaust System** section)
- radiator inlet hose
- oil line
- brake pedal (refer to **HYDRAULIC BRAKES**)

Section 03 ENGINE

Subsection 02 (REMOVAL AND INSTALLATION)

- RH footrest (refer to BODY)
- engine pinion **no. 2**
(refer to **Engine Pinion** section)



RH SIDE OF ENGINE

1. Exhaust pipes
2. Radiator inlet hose
3. Oil line
4. Brake pedal
5. Footrest

- carburetor and carburetor adaptor (refer to CARBURETOR AND AIR INTAKE SILENCER)
- gearshift pedal **no. 9**.

Unscrew neutral switch connector.

Removal

Remove the upper support bracket **no. 10** completely.



Install engine lifting tool (P/N 529 035 610) then, install a hoist.

Remove:

- upper engine support bolt **no. 11**
- lower bolts **no. 12** retaining the engine support **no. 13** on either side, then, remove supports
- front lower mounting bolt **no. 14**
- rear lower mounting bolt **no. 15**
- rear upper mounting bolt **no. 16**.

Remove engine from vehicle.

Installation

For installation, reverse the removal procedure, paying attention to the following details.

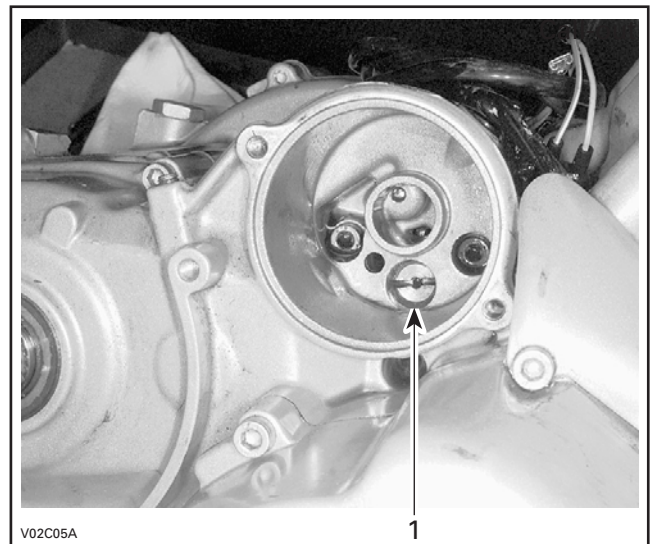
Reattach cables, hoses, wiring harness, etc.

Adjust clutch cable.

Bleed rear brake.

Before to start the engine, remove oil filter.

Unfasten pressure bleeding screw.



BEHIND OIL FILTER

1. Bleeding screw

Unscrew and remove one spark plug.

Turn engine using starter until oil emerges in filter chamber.

Tighten pressure bleeding screw. Torque to 25 N•m (18 lbf•ft).

Install oil filter.

This operation activated the oil pump. Check if vehicle runs correctly.

Section 03 ENGINE

Subsection 02 (REMOVAL AND INSTALLATION)

2, ENGINE PINION

Removal

Slack drive chain.

Remove pinion cover **no. 17** and metallic chain guard **no. 18**.

Set the first gear.

Unlock retaining ring then, unscrew the retaining nut.

NOTE: Discard the retaining ring.

Remove engine pinion and drive chain together.

Inspection

Check pinion for wear or other damage. Replace if necessary.

Installation

CAUTION: Replace chain, sprocket and pinion together to prevent rapid chain and sprocket wear. Install a new retaining ring each time the pinion is removed.

For the installation, reverse the removal procedure. Paying attention to the following details.

Install pinion with lips on the engine side.



Install retaining ring then retaining nut.

Torque retaining nut to 140 N•m (103 lbf•ft), then lock retaining ring.

Adjust drive chain. Refer to MAINTENANCE.

EXHAUST SYSTEM

WARNING

Never touch exhaust system components immediately after the engine has been run because these components are very hot.

Exhaust Pipe Removal

3, RH Exhaust Pipe

Remove heat shield **no. 19**.

Remove exhaust pipe nuts **no. 20**.

Unscrew exhaust clamp **no. 21**.

Pull exhaust pipe forward.

Remove pipe gasket **no. 22**.

4, LH Exhaust Pipe

Remove RH exhaust pipe.

Remove exhaust pipe nuts **no. 23**.

Remove springs **no. 24** retaining exhaust pipe and muffler. Use exhaust spring installer/remover (P/N 529 035 400).

Pull exhaust pipe forward.

Remove pipe gasket **no. 25**.

Exhaust Pipe Installation

RH Exhaust Pipe

For installation, reverse the removal procedure, paying attention to the following details.

Use a new exhaust pipe gasket and make sure that it is properly installed.

Tighten flange nuts, making sure RH exhaust pipe is properly aligned inside LH exhaust pipe.

LH Exhaust Pipe

For installation, reverse the removal procedure, paying attention to the following details.

Use a new exhaust pipe gasket and make sure that it is properly installed.

Install flange nuts, making sure exhaust pipe is properly aligned inside muffler ball socket then install retaining springs after pushing muffler forward in exhaust pipe. Do not torque yet.

Install RH exhaust pipe.

Torque all flange nuts.

5, Muffler Removal

Remove exhaust pipes.

Remove screw **no. 26**, washer **no. 27** and spacer **no. 28**.

Under rear fender, remove screw **no. 29**, washer **no. 30**, bushing **no. 31**, another washer **no. 32** and spacer **no. 33**.

Remove muffler.

Muffler Installation

For installation, reverse the removal procedure.

NOTE: Check rubber bushings **nos. 34** and **35** for cracks or other damages, change if necessary.

6, OIL TANK

Removal

Remove front facia. Refer to BODY.

Remove head light. Refer to ACCESSORIES.

Drain engine oil.

Remove:

- oil inlet hose **no. 7**
- oil outlet hose **no. 8**
- oil tank vent **no. 36**.

Unscrew bolts retaining oil tank and fuel tank cover to the frame.

Unscrew bolt **no. 37** under oil tank.

Pull oil tank.

Installation

For installation, reverse the removal procedure. Paying attention to the following details.

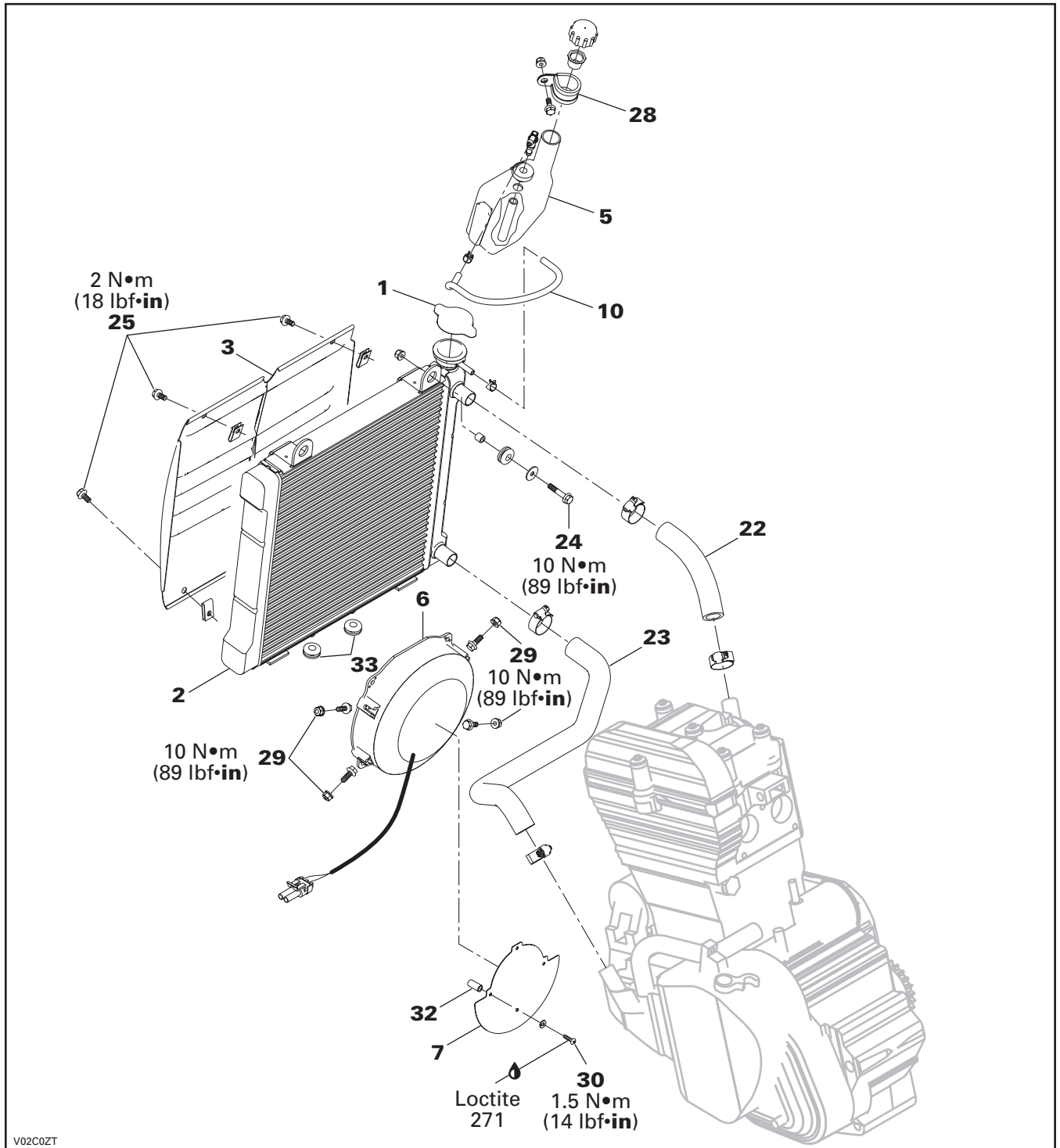
Install rubber washer **no. 38** between oil tank and frame.

Do not forget spacers **no. 39** in the grommets **no. 40**.

Bleed engine if necessary. Refer to MAINTENANCE.

COOLING SYSTEM

RADIATOR



Subsection 03 (COOLING SYSTEM)

This diagram illustrates the assembly of a Bombardier engine, showing the main engine block and two auxiliary components. The main engine block is shown in a perspective view with various parts labeled with numbers. The two auxiliary components are shown in exploded views, with their respective parts labeled with numbers. The diagram includes the following labels:

- 26**: Bolt
- 27**: Washer
- 4**: Nut
- 9**: Bolt
- 31**: Washer
- 8**: Nut
- 19**: Bolt
- 18**: Washer
- 17**: Nut
- 20**: Bolt
- 21**: Washer
- Molykote 111**: Lubricant
- 16**: Bolt
- 15**: Washer
- 13**: Nut
- 12**: Bolt
- 11**: Washer
- 10 N•m (89 lbf•in)**: Torque specification

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 **no. 10**. Pressurize all system through coolant reservoir to 103 kPa (15 PSI).

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

INSPECTION

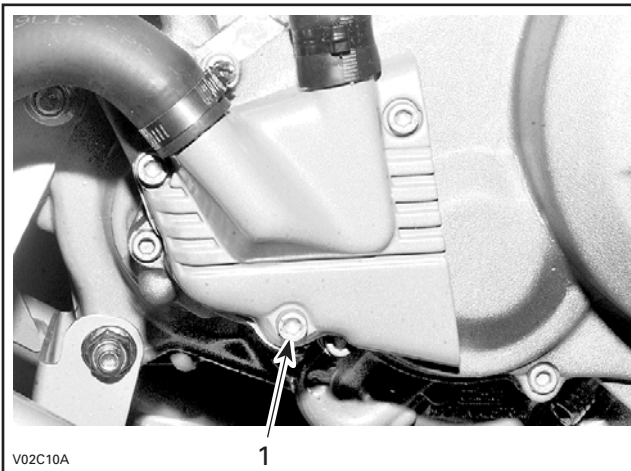
Check general condition of hoses and clamp tightness.

DRAINING THE SYSTEM

WARNING

Never drain or refill cooling system when engine is hot.

To drain cooling system, unscrew cooling plug **no. 11** on water pump cover and remove pressure cap **no. 1**.



1. Cooling plug

COOLING SYSTEM REFILLING

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 .

Refilling Procedure

With vehicle on a flat surface, engine cold, remove the temperature sensor **no. 9** on the top of thermostat housing. Fill radiator **no. 2** until coolant get out by the temperature sensor hole. Install the temperature sensor and continue the cooling system filling by the radiator. Fill coolant tank **no. 5** up to cold level mark. Install radiator pressure cap. Run engine for brief period then stop engine. Refill up to mark, if necessary.

When engine has completely cooled down, recheck coolant level in radiator **no. 2** and coolant tank **no. 5** and top up if necessary.

Check coolant concentration (freezing point) with proper tester.

1, PRESSURE CAP

Check if cap pressurizes the system. If not, install a new 110 kPa (16 PSI) cap (do not exceed this pressure).

WATER PUMP

Removal

Drain off coolant.

Remove cover **no. 12** from water pump with O-ring **no. 13**.

Drive out spring pin **no. 14** and remove impeller **no. 15**.

Remove left engine housing cover.

Remove shaft **no. 16** by pulling inwards.

Remove thrust washer **no. 17**, needle pin **no. 18** and gear **no. 19**.

Press out sealing rings **no. 20** and **no. 21**.

Inspection

Check shaft for traces of sealing rings and replace if necessary.

Installation

For installation, reverse the removal procedure.

NOTE: Do not drive spring pin into impeller until engine housing cover has been installed.

Drive internal sealing ring **no. 20** firmly into place.

Section 03 ENGINE

Subsection 03 (COOLING SYSTEM)

Fill cavity between sealing rings with Molykote 111 paste.

Drive external sealing ring **no. 21** into place with the relevant adapter until flush with the race.

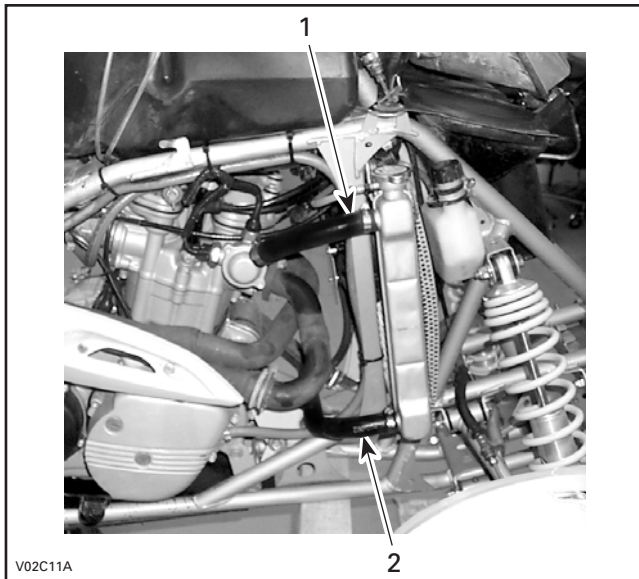
2, RADIATOR

Removal

Drain cooling system.

Remove:

- front facia (refer to BODY)
- inlet **no. 22** and outlet **no. 23** hoses



1. Radiator inlet hose
2. Radiator outlet hose

- overflow hose **no. 10**
 - headlight
 - ignition coils
 - radiator protector
 - mounting bolts **no. 24** on the top.
- Pull radiator out of frame by the RH side.

Inspection

Check radiator air passage for clogging or damage.

Remove insects, mud or other obstructions with compressed air or low pressure water.

Check for any coolant leakage from radiator and hoses.

Installation

For installation, reverse the removal procedure.

Refill radiator.

NOTE: Do not forget rubber bushings **no. 33** under radiator.

3, RADIATOR PROTECTOR

Removal

Remove screws **no. 25** retaining protector on radiator.

Inspection

Check protector air passage for damage.

Remove insects, mud or other obstructions with compressed air or low pressure water.

Installation

For installation, reverse the removal procedure.

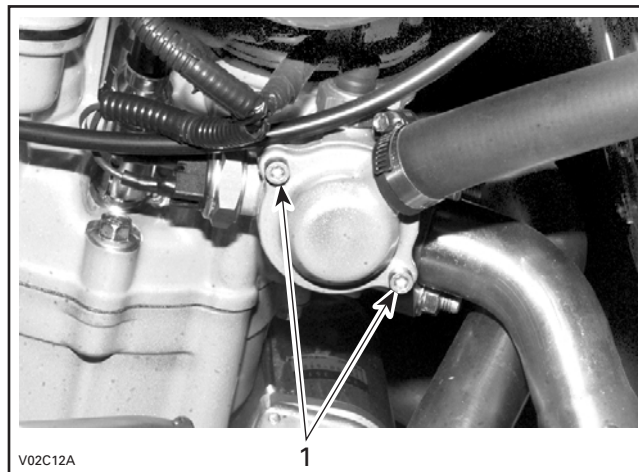
4, THERMOSTAT

The thermostat is a single action type.

Removal

The thermostat is located on the RH side of engine.

Unfasten cover **no. 26** from thermostat housing.



RH SIDE OF ENGINE

1. Remove screws

Pull out thermostat.

Remove O-ring **no. 27**. Check O-ring for damage and change if necessary.

Test

To check thermostat, put in water and heat water. Thermostat should open when water temperature reaches 75°C (167°F).

Installation

For installation, reverse the removal procedure.

5, COOLANT TANK

Overflow Coolant Tank

The coolant expands as the temperature (up to 100 - 110°C (212 - 230°F)) and pressure rise in the system. If the limiting system working pressure cap is reached 110 kPa (16 PSI), the pressure relief valve in the pressure cap is lifted from its seat and allows coolant to flow through the overflow hose into the overflow coolant tank.

Removal

Remove overflow hose **no. 10**.

Unfasten the hose anchor **no. 28** retaining coolant tank.

Empty coolant tank.

Installation

The installation is the reverse of the removal procedure.

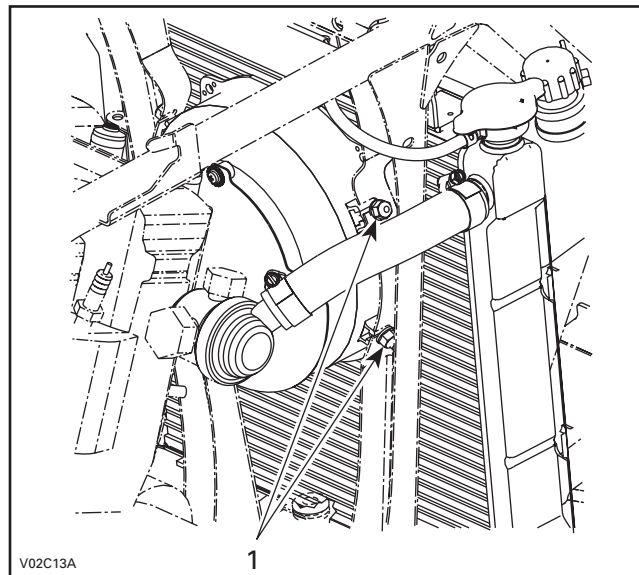
6,7, FAN AND HEAT SHIELD

Test

Refer to ACCESSORIES.

Fan Removal

Unscrew nuts **no. 29**, and pull fan in exhaust direction.



1. Remove bolts (two bolts on each side)

Unplug fan connector.

Fan Installation

For the installation, reverse the removal procedure.

Heat Shield Removal

Remove fan.

Remove bolts **no. 30** and spacers **no. 32**.

Heat Shield Installation

The installation is the reverse of the removal procedure.

NOTE: Apply Loctite 271 on threads.

Section 03 ENGINE

Subsection 03 (COOLING SYSTEM)

8, TEMPERATURE SENDER

Removal

Unplug temperature sender connectors.

Unscrew temperature sender.

Test

Using a multimeter, measure the resistance between both temperature sender connectors.

The multimeter should indicate an infinite resistance (O.L.), if not change the temperature sender.

If the resistance is infinite (O.L.), heat the temperature sender, above 95°C (203°F). The resistance should be 0.1 Ω . If not, change the temperature sender.

Installation

The installation is the reverse of the removal procedure, paying attention to the following detail.

Check gasket no. 31 and change if necessary.

CAUTION: Don't apply any product on the threads or on the gasket.

9, TEMPERATURE SENSOR

Removal

Unplug temperature sensor connector.

Unscrew temperature sensor.

Test

Using a multimeter, measure the resistance between connector on the top of temperature sensor and threads.

The multimeter should indicate an infinite resistance (O.L.), if not change the temperature sensor.

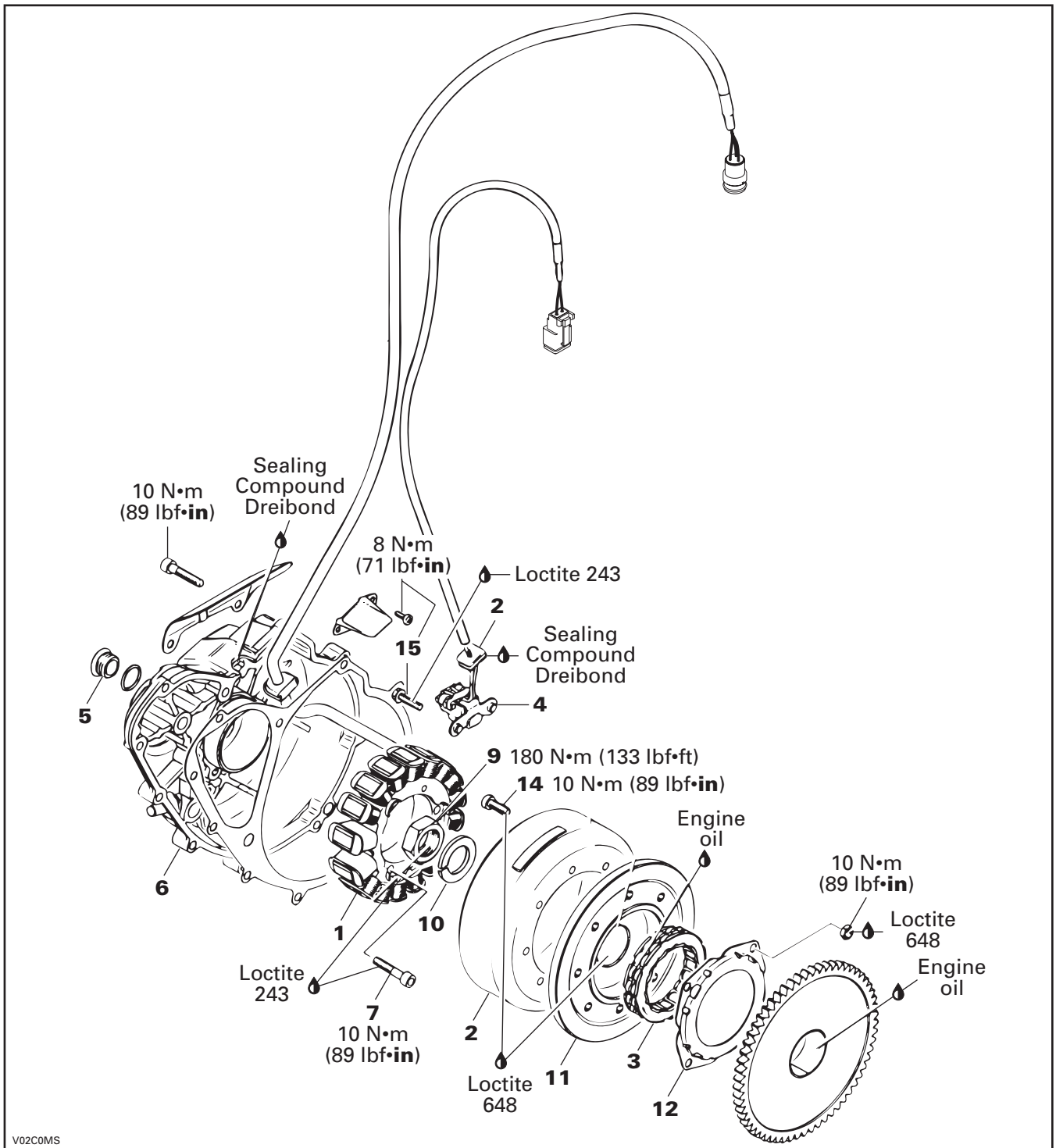
If the resistance is infinite (O.L.), heat the temperature sensor, above 115°C (239°F). The resistance should be 0.1 Ω . If not, change the temperature sensor.

Installation

The installation is the reverse of the removal procedure.

CAUTION: Don't apply any product on the threads.

MAGNETO SYSTEM



Section 03 ENGINE

Subsection 04 (MAGNETO SYSTEM)

1, MAGNETO

WARNING

Never disconnect harness on ignition system while engine is running.

Removal

Unfasten socket screws on right engine housing cover.

Unfasten central screw plug **no. 5**, screw in handle (P/N 529 035 622) and remove ignition cover **no. 6**.



RH SIDE

Remove gasket.

NOTE: Clean all metal component in a non-ferrous metal cleaner. Use Bombardier gasket remover (P/N 413 708 500) or suitable equivalent.

Remove all socket screws **no. 7** retaining magneto to ignition cover then pull magneto.

Installation

For installation, reverse the removal procedure. Paying attention to the following details.

Seal rubber grommet **no. 8** on electrical line with sealing compound Dreibond (P/N 420 297 906).

Screw handle in center bore.

Fit magneto housing and screw down.

Unfasten handle and install screw plug in cover.

NOTE: Install a new gasket on ignition cover.

2, ROTOR

Removal

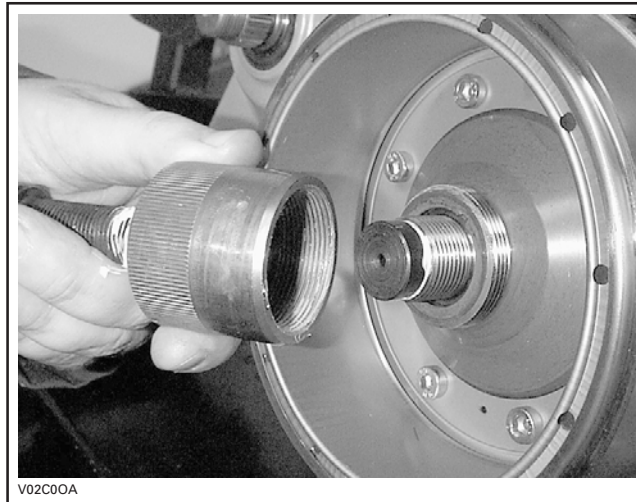
Lock crankshaft with locking bolt (P/N 529 035 617). Refer to CRANKSHAFT/BALANCER SHAFT.

Remove ignition cover **no. 6**.

Unscrew nut **no. 9** retaining rotor.

Remove lock washer **no. 10**.

Install magneto puller (P/N 420 976 235) and crankshaft protector (P/N 420 876 557) then remove rotor.



Installation

For installation, reverse the removal procedure. Paying attention to the following details.

Apply light coat of Loctite 648 to taper on rotor hub **no. 11**.

Oil sparg clutch **no. 3** in sparg clutch housing **no. 12**.

Slide rotor onto crankshaft, woodruff key and groove must be aligned in one line.

Rotate starter double gear counterclockwise to enable the sparg clutch to slide on the collar of sparg clutch gear **no. 13**.

CAUTION: Taper on crankshaft and rotor must be free of grease.

Install lock washer and nut on crankshaft end. Apply Loctite 243 on threads. Torque to 180 N•m (133 lbf•ft).

3, SPARG CLUTCH

Removal

Remove rotor **no. 2**.

Unscrew all socket screws **no. 14** retaining rotor and sparg clutch housing **no. 12**.

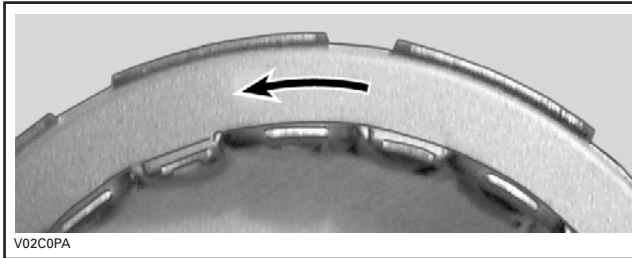
Remove sparg clutch from sparg clutch housing.

Installation

For installation, reverse the removal procedure.

NOTE: Apply engine oil on sparg clutch.

Install sparg clutch with the arrow on the top.



4, TRIGGER COIL

Removal

Remove the ignition cover **no. 6**.

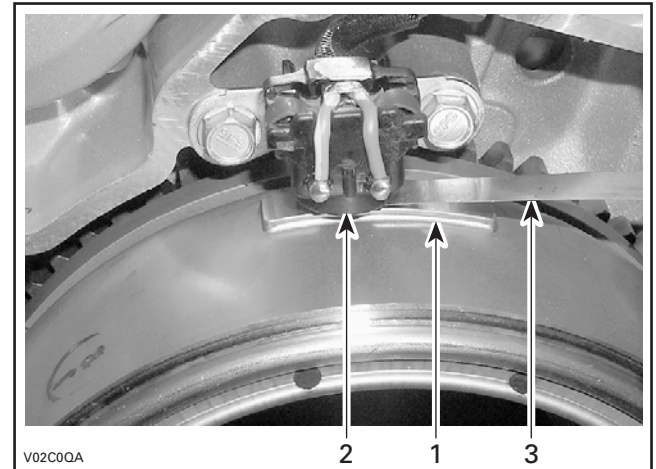
Unscrew bolts **no. 15** retaining trigger coil to housing then remove trigger coil.

Coat rubber grommet **no. 8** of trigger coil with sealing compound Dreibond (P/N 420 297 906) and install in housing.

Secure trigger coil with taptite screws and fix screws with Loctite 243.

Twist rotor **no. 2** until guide piece faces towards trigger coil.

Use feeler gauge to measure gap between guide piece and trigger coil.



1. Guide piece
2. Trigger coil
3. Feeler gauge

GAP BETWEEN GUIDE PIECE AND TRIGGER COIL	0.75 ± 0.25 mm (.03 ± .01 in)
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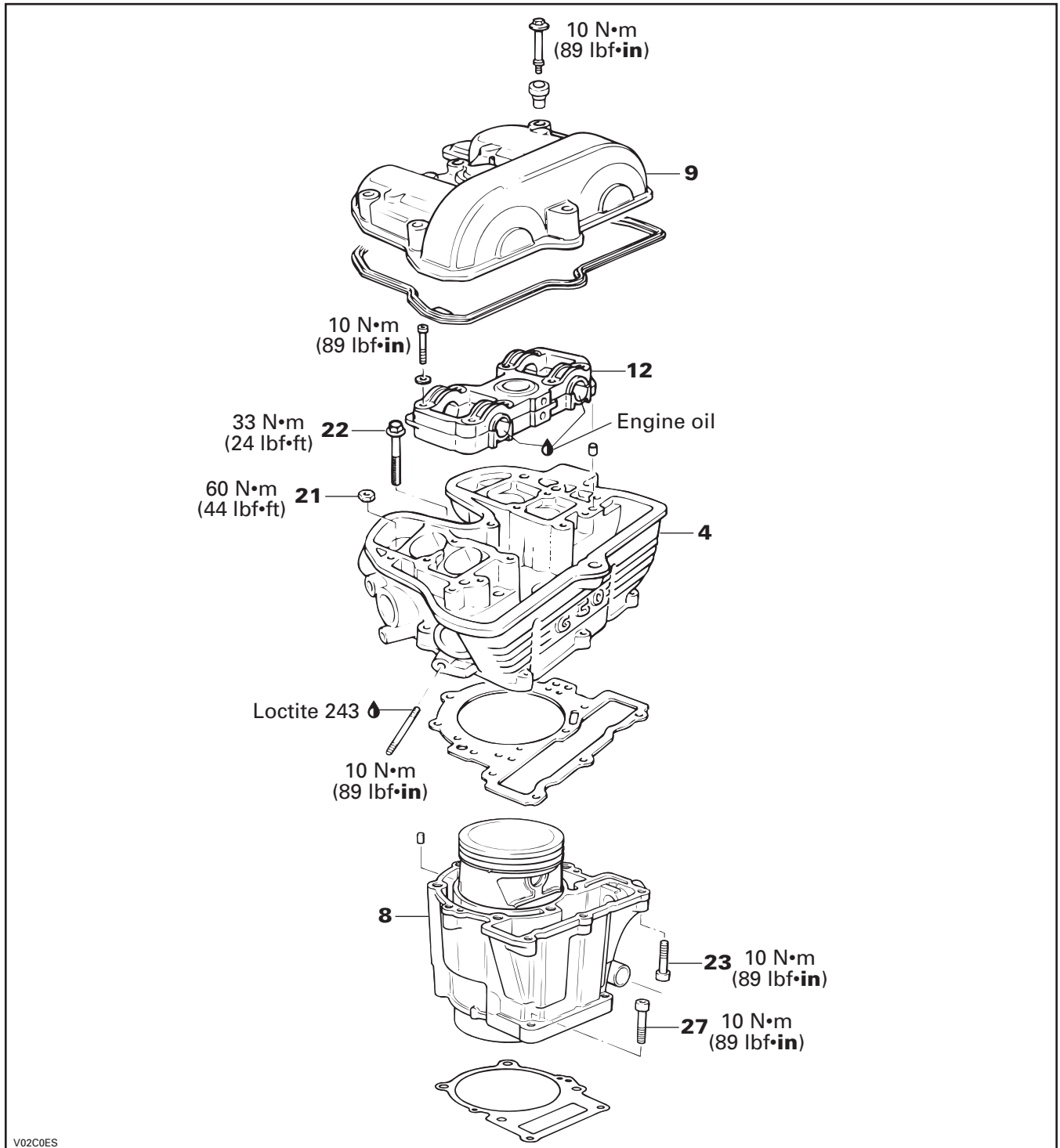
If necessary, correct gap by bending the retaining plate.

Coat rubber grommet on trigger coil and line from magneto in ignition cover beside sealing face with sealing compound Dreibond (P/N 420 297 906).

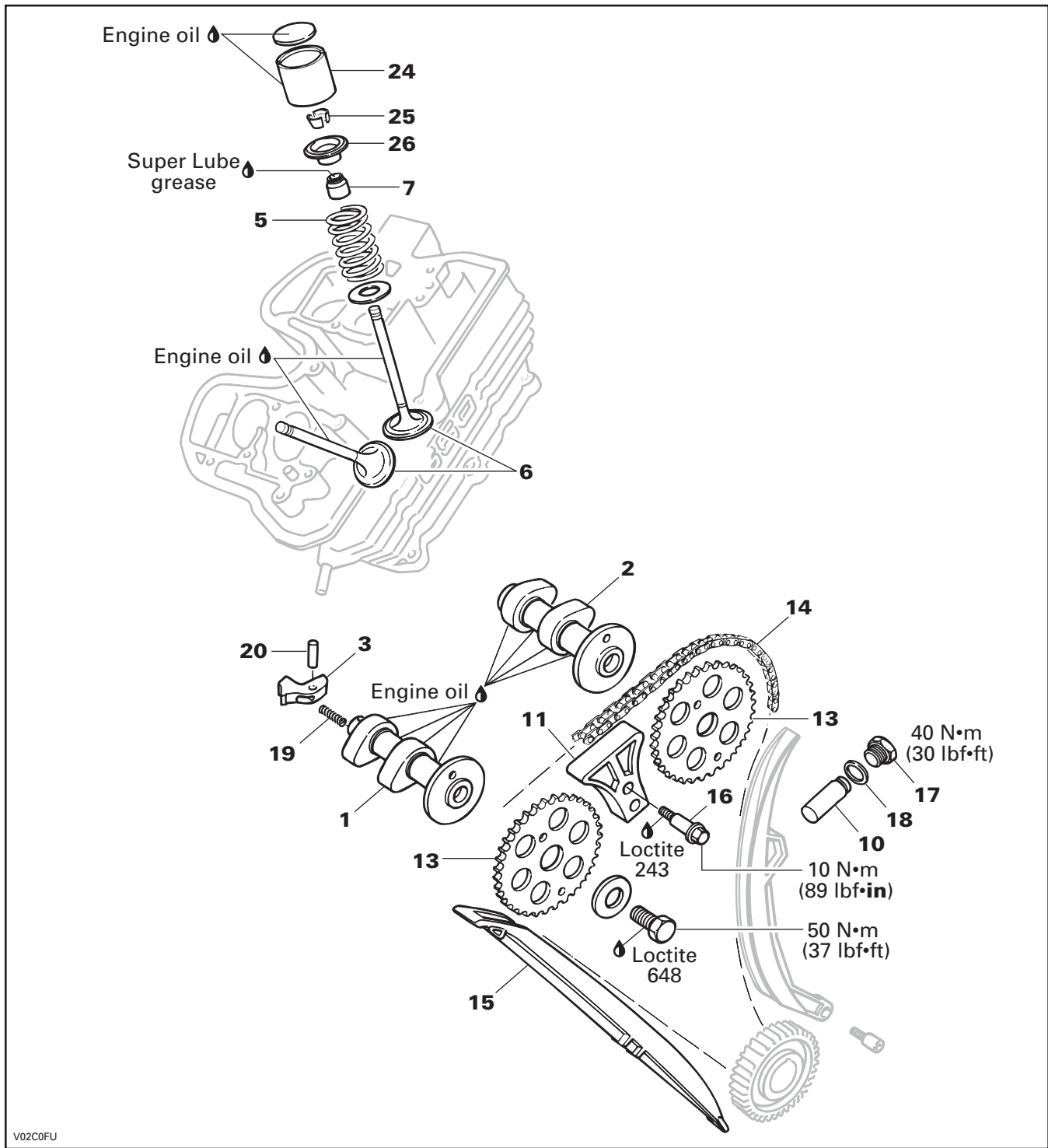
Fit gasket.

CYLINDER AND HEAD

CYLINDER AND HEAD



VALVE



1,2, CAMSHAFT

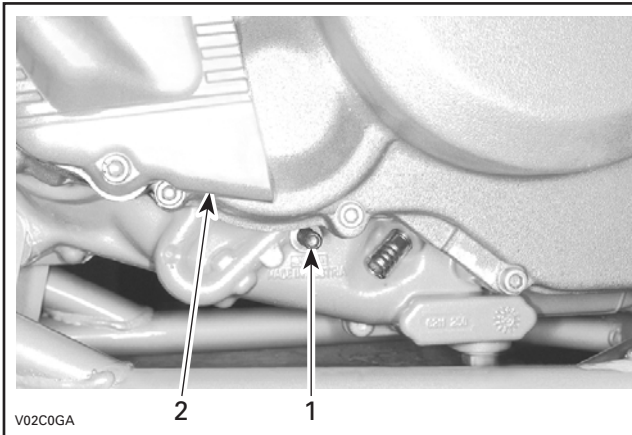
Removal

Remove fuel tank. Refer to FUEL CIRCUIT.

Unfasten center screw plug to right of engine housing cover.

Move crankshaft into TDC setting with the Allen key.

Install the crankshaft locking bolt (P/N 529 035 617).



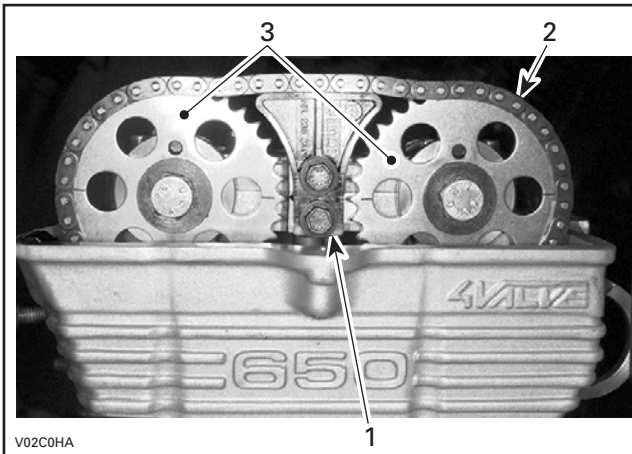
LH SIDE OF ENGINE

1. Crankshaft locking bolt
2. Water pump cover

Remove cylinder head cover no. 9.

Remove chain tensioner no. 10.

Unfasten chain guide no. 11.



1. Chain guide
2. Timing chain
3. Timing gears

Remove the upper section of camshaft carrier no. 12.

Remove camshafts no. 1 and no. 2 with timing gears no. 13.

NOTE: Only unfasten timing gears if they need to be replaced.

Secure timing chain no. 14 with a retaining wire.

Remove front chain rail no. 15.

Inspection

Check each lobe for scoring, scuffing, cracks, or other sign of wear.

Measure camshaft base circle diameter and lobe height, using a micrometer.

CAMSHAFT LOBE HEIGHT	
SERVICE LIMIT	39.7 mm (1.56 in)

Measure clearance between camshaft and camshaft carriers, using the plastic feeler gauge.

NOTE: The plastic feeler gauge is available at automotive parts retailer.

Tighten camshaft carrier to specified torque.

Unfasten camshaft carrier and determine clearance using comparative scale.

CAMSHAFT DIAMETER	
MINIMUM	21.950 mm (.864 in)

I.D. DIAMETER OF CAMSHAFT CARRIER	
MAXIMUM	22.040 mm (.868 in)

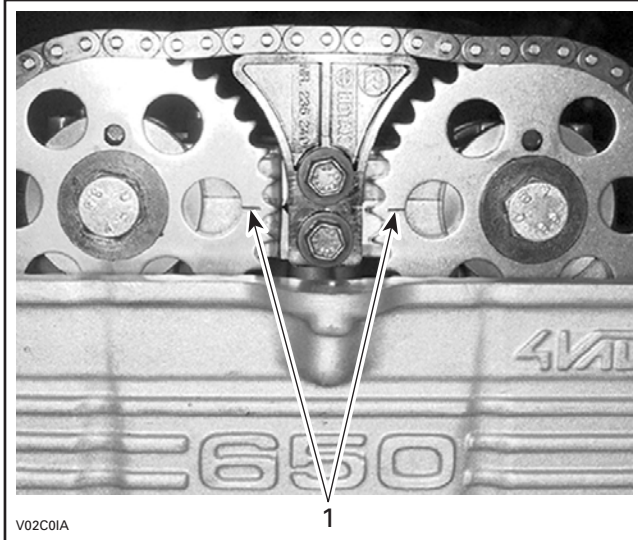
CLEARANCE BETWEEN CAMSHAFT AND CAMSHAFT CARRIER	
MAXIMUM	0.09 mm (.004 in)

Section 03 ENGINE

Subsection 05 (CYLINDER AND HEAD)

Installation

CAUTION: The markings on the timing gears must be aligned opposite the joint in the camshaft carrier.



1. Align marks

Tighten screws **no. 16** for chain guide with Loctite 243, hand tight.

Fit upper section of camshaft carrier and tighten down.

Check valve clearance. Refer to MAINTENANCE/LUBRICATION.

Install chain tensioner and tighten screw **no. 17** with sealing ring **no. 18**.

Install valve cover with gasket.

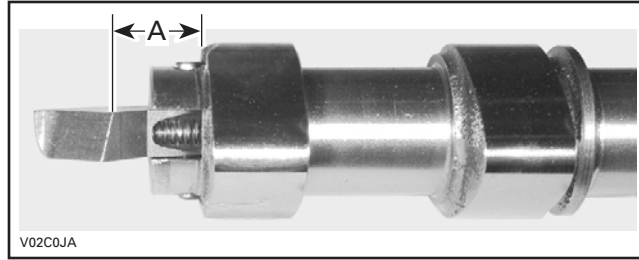
Unscrew and remove crankshaft locking bolt. Install the screw plug with sealing ring. Torque to 24 N•m (18 lbf•ft).

3, CENTRIFUGAL DECOMPRESSOR

Inspection

Hold down exhaust camshaft **no. 1** in horizontal position with cam tips facing downwards.

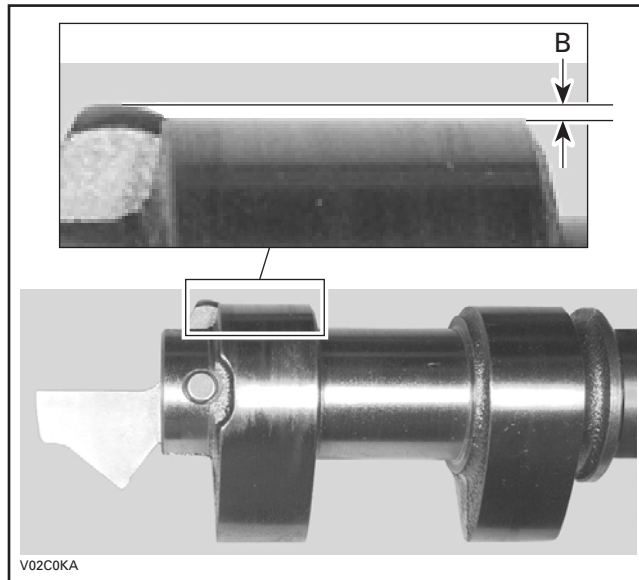
The spring **no. 19** must press the lever upwards to dimension "A", replace spring if necessary.



A. 11.5 mm (0.45 in)

NOTE: Never stretch spring since this alters the defined spring force.

When activated, the amount of lifting arm protruding over the cam pitch circle must not be less than dimension "B".



B. 0.4 mm (0.0157 in)

Disassembly

Remove the exhaust camshaft **no. 1**.

Use an appropriate punch to press shaft **no. 20** out of centrifugal weight **no. 3**.

Assembly

Reassemble in the reverse order of disassembly. Paying attention to the following detail.

If the centrifugal decompressor was dismantled, **ALWAYS** replace the spring.

After assembly, check if the centrifugal weight move smoothly.

4, CYLINDER HEAD

Removal

Remove engine from vehicle. Refer to INSTALLATION AND REMOVAL.

Remove starter. Refer to STARTING SYSTEM.

Remove camshafts.

Withdraw the front chain rail **no. 11**.

Unfasten nuts **no. 21** on stud bolts and collar screws **no. 22**.

Unfasten socket screws **no. 23** linking cylinder head to cylinder.

Remove cylinder head.

Inspection

Check for crack between valve seats or other damage, if so, replace cylinder head.

Installation

For installation, reverse the removal procedure. Paying attention to the following details.

Fitting cylinder head gasket.

Slide timing chain through chain duct.

Tighten cylinder head and cylinder hand tight with collar screws.

Screw collar nuts onto stud bolts and tighten crosswise.

Tighten collar screws crosswise.

Tighten socket screws on cylinder base.

Install camshafts.

5, VALVE SPRING

Removal

Remove:

- cylinder head **no. 4**
- valve tappet **no. 24**.

Compress valve spring, use a spring compressor.

Remove valve cotters **no. 25**.

Remove spring compressor, valve spring retainer **no. 26** and valve spring.

Inspection

Check valve spring for rust or corrosion and free length.

VALVE SPRING FREE LENGTH	
SERVICE LIMIT	44.5 mm (1-3/4 in)

Installation

For installation, reverse the removal procedure.

6, VALVE

Removal

Remove valve spring **no. 5**.

Push the valve stem then pull valve out of valve guide.

Inspection

Valve Clearance

Refer to MAINTENANCE/LUBRICATION.

Valve

Inspect valve surface, check for abnormal stem wear and bending. If so, replace by a new one.

Valve Stem and Valve Guide

Check valve stem and valve guide for wear or friction surfaces, if so, replace parts.

Measure valve stem and valve guide in three places, using a micrometer and a small hole gauge.

NOTE: Clean valve guide to remove carbon deposits before measuring.

VALVE STEM DIAMETER mm (in)	
SERVICE LIMIT	
Exhaust	5.935 mm (.233 in)
Intake	5.95 mm (.234 in)

I.D. VALVE GUIDE mm (in)	
SERVICE LIMIT	
Exhaust	6.080 mm (.239 in)
Intake	

Section 03

ENGINE

Subsection 05 (CYLINDER AND HEAD)

Change valve if valve stem is out of specification.
Change cylinder head if valve guides are out of specification.

Valve Face and Seat

Check valve face and seat for burning, pitting and other signs of damage.

Apply some lapping compound to valve face and work valve on its seat with a lapping tool.

Measure valve face contact width.

NOTE: The location of contact area should be in center of valve face.

Measure valve seat width, using a caliper.

VALVE SEAT CONTACT WIDTH mm (in)	
SERVICE LIMIT	
Exhaust	1.8 mm (.07 in)
Intake	1.6 mm (.06 in)

If valve seat contact width is too wide, too narrow or has spots, the seat must be ground or cylinder head replaced.

Installation

Install valve.

NOTE: Remove assembly sleeve once again.

Install valve spring and valve plate spring.

NOTE: Install valve tappets with a small amount of grease to facilitate assembly.

7, VALVE STEM SEAL

Removal

Remove valve.

Remove valve stem seal with a special pliers.

Inspection

Inspection of valve stem seals is not needed as new seals should always be installed whenever a cylinder head is diassembled.

Installation

For installation, reverse the removal procedure.

8, CYLINDER

Removal

Remove:

- cylinder head **no. 4**, if necessary

NOTE: If the cylinder head does not have to be disassembled, do not separate cylinder head from cylinder.

- water cooling hose from cylinder
- socket screws **no. 27** retaining cylinder to the crankcase housing.

Pull cylinder.

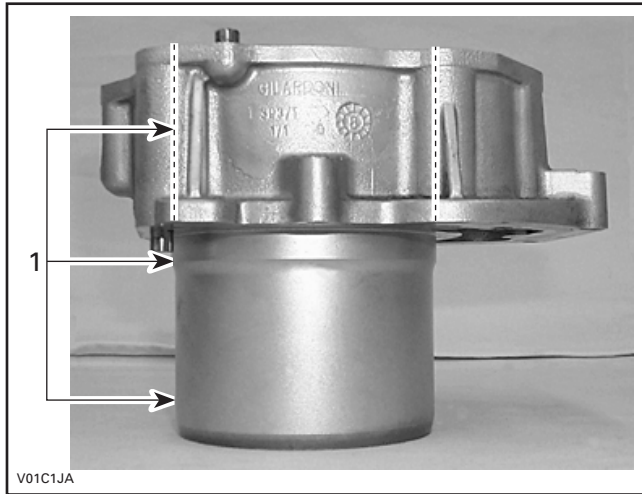
Inspection

Cylinder

Check cylinder for cracks, scoring, rust and wear ridges on the top and bottom of the cylinder.

Cylinder Taper

Measure cylinder diameter 16 mm (5/8 in) from top of cylinder then half-way through and finally at 13 mm (1/2 in) from bottom.



TYPICAL

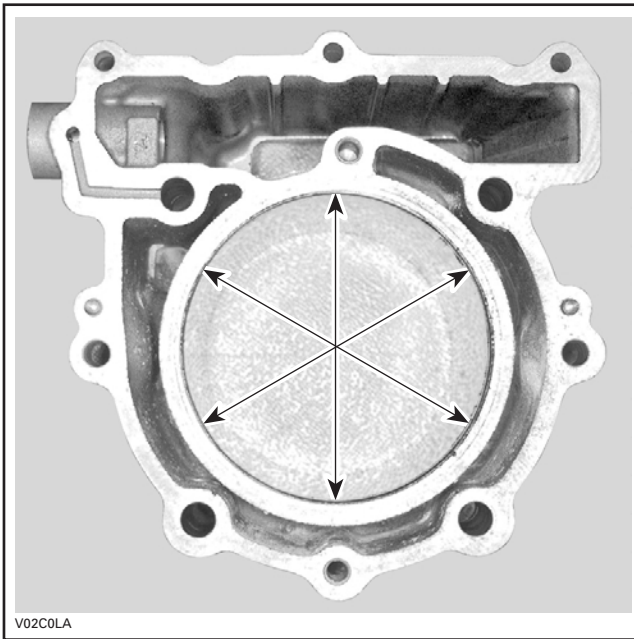
1. Measure at three points

Difference between measurements should not exceed 0.10 mm (.004 in). If so, replace cylinder.

LIFTER BORE CLEARANCE	
SERVICE LIMIT	100.03 mm (3.9382 in)

Cylinder Out of Round

Measure cylinder bore at distance of 60 mm (2-3/8 in) from the upper edge with an internal micrometer at three points. Difference between measurements should not exceed 0.10 mm (.004 in). If so, replace cylinder.



Installation

Coat piston rings with oil and slide the ring compressor over piston rings from above, allowing piston to protrude approximately 2 mm (3/32 in) from ring compressor.

Slide timing chain through chain duct, then slide cylinder over piston.

Remove the ring compressor.

Secure cylinder on engine housing with the socket screws. Do not torque yet.

Fit cylinder head.

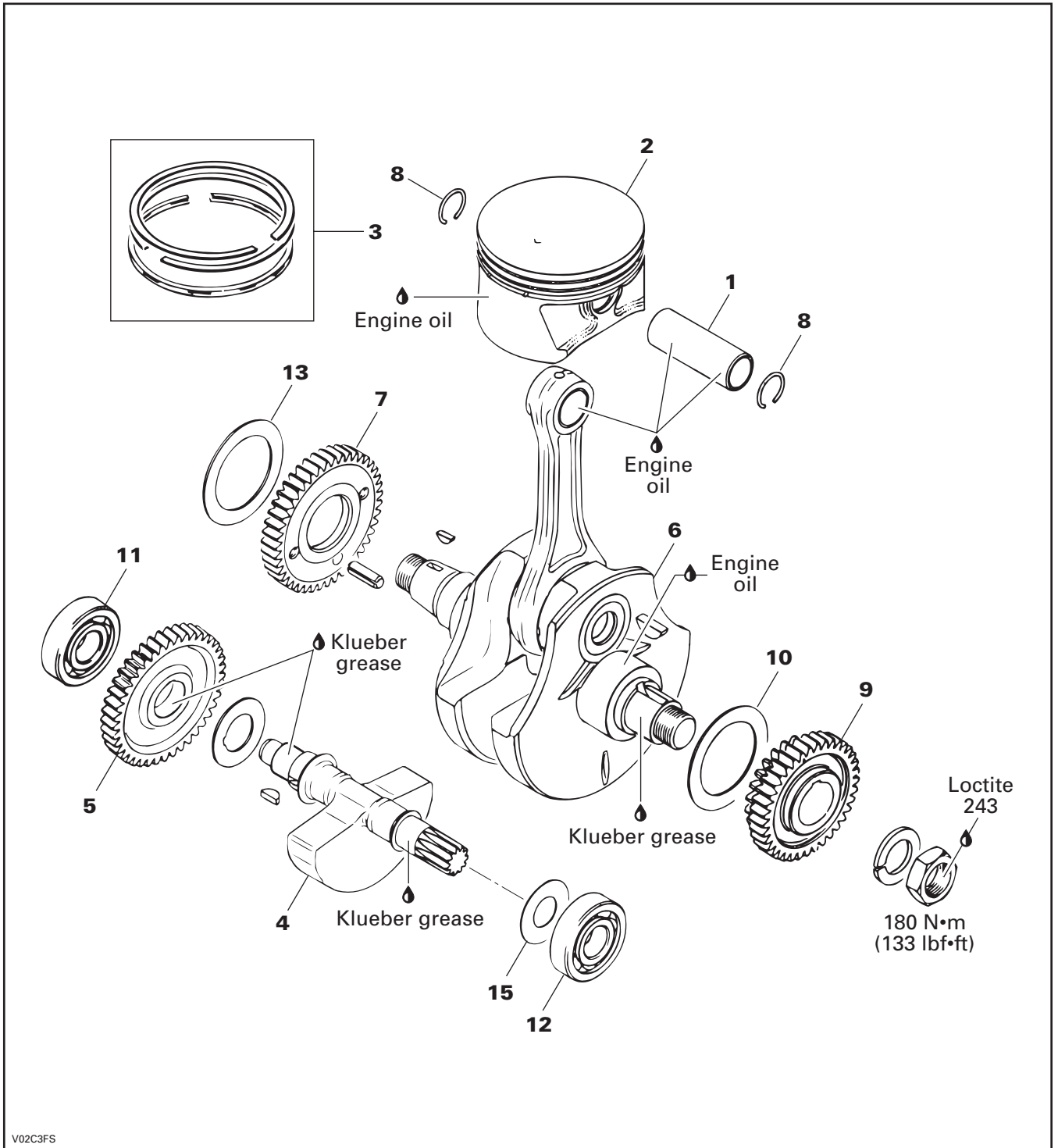
Tighten cylinder and cylinder head hand tight with collar screws.

Screw collar nuts onto stud bolts and tighten crosswise.

Tighten collar screws crosswise.

Tighten socket screws on cylinder base.

CRANKSHAFT/BALANCER SHAFT



1, PISTON PIN

Removal

Remove engine. Refer to REMOVAL AND INSTALLATION.

Remove cylinder. Refer to CYLINDER AND HEAD.

Remove both piston pin circlips **no. 8** then press out piston pin.

Inspection

Check piston pin for crack or other damage.

Measure both ends of piston pin with a micrometer.

PISTON PIN DIAMETER	
SERVICE LIMIT	21.98 mm (0.865 in)

Installation

For installation, reverse the removal procedure. Paying attention to the following details.

Apply engine oil on the piston pin.

Insert piston pin into piston and connecting rod.

Secure piston pin with both piston pin circlips.

NOTE: Do not align the end gap of the piston pin circlips with the cutout in the piston bore.

2, PISTON

Removal

Remove piston pin **no. 1**.

Detach piston from connecting rod.

NOTE: Mark base of piston on exhaust end.

Remove cylinder.

Remove both piston pin circlips **no. 8** then push piston pin **no. 1** out of piston.

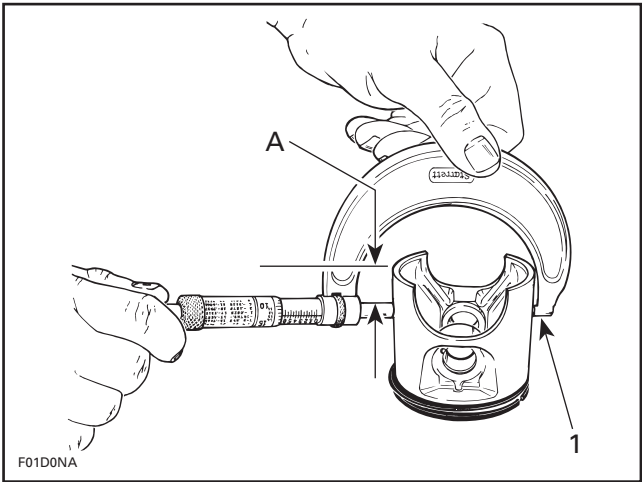
Detach piston from connecting rod.

NOTE: Mark base of piston on exhaust end.

Inspection

Inspect piston for scoring, cracking or other damages.

Using a micrometer, measure piston at 16 mm (5/8 in) perpendicularly (90°) to piston pin axis.



TYPICAL

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

The measured dimension should be as described in the previous table. If not, replace piston.

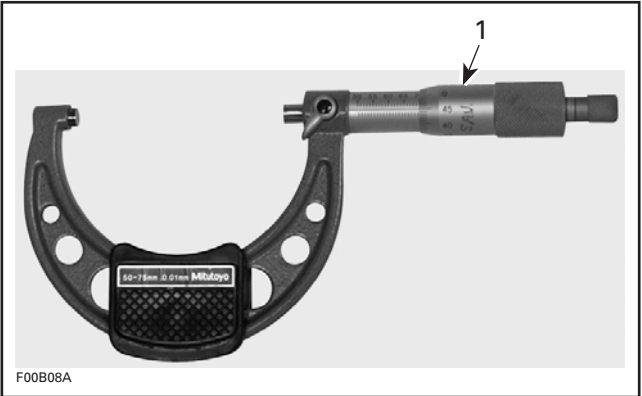
PISTON MEASUREMENT	
SERVICE LIMIT	99.94 mm (3.9346 in)

Piston/Cylinder Clearance

PISTON/CYLINDER CLEARANCE	
SERVICE LIMIT	0.09 mm (0.004 in)

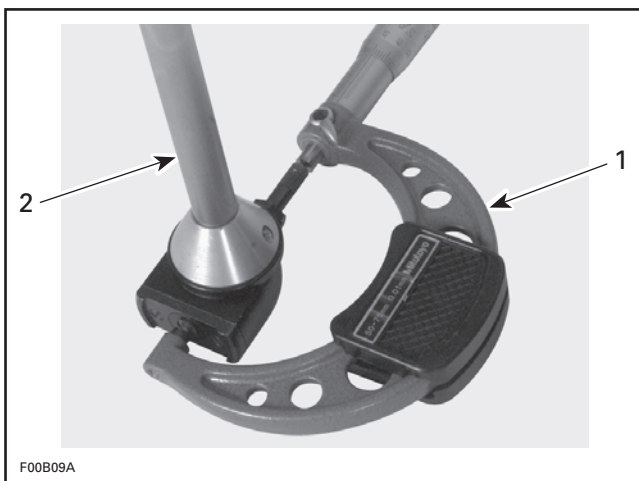
NOTE: Make sure used piston is not worn. See PISTON MEASUREMENT table above.

Adjust and lock a micrometer to the piston dimension.



1. Micrometer set to the piston dimension

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



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



TYPICAL

1. Indicator set to 0 (zero)

Position the dial bore gauge at 16 mm (5/8 in) below cylinder top edge, measuring perpendicularly (90°) to piston pin axis.

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. See previous table.

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.

Installation

For installation, reverse the removal procedure.

NOTE: Install piston with removal mark (on base of piston) in direction of exhaust end.

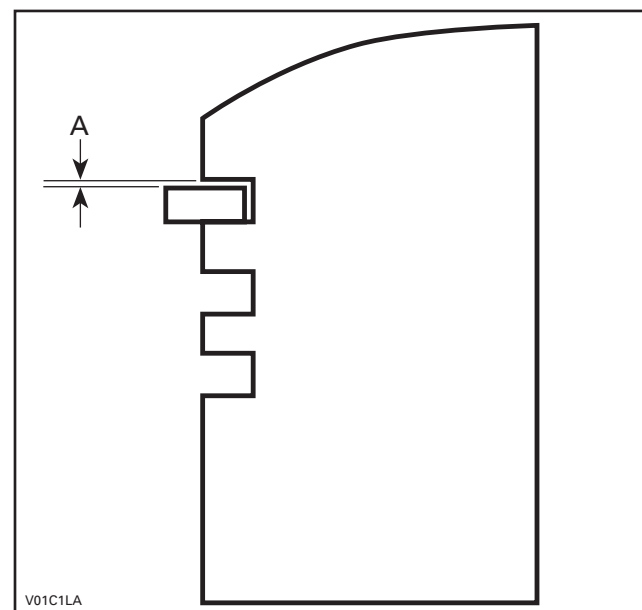
3, PISTON RINGS

Inspection

Ring/Piston Groove Clearance

Using a feeler gauge measure each ring/piston groove clearance. If the clearance is too large, the piston should be replaced.

RING/PISTON CLEARANCE mm (in)	
SERVICE LIMIT	0.15 mm (.006 in)



A. Measure here

Ring End Gap

RING END GAP mm (in)	
SERVICE LIMIT	1.0 mm (.04 in)

Position ring 16 mm (5/8 in) from top of cylinder.

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. See above table.

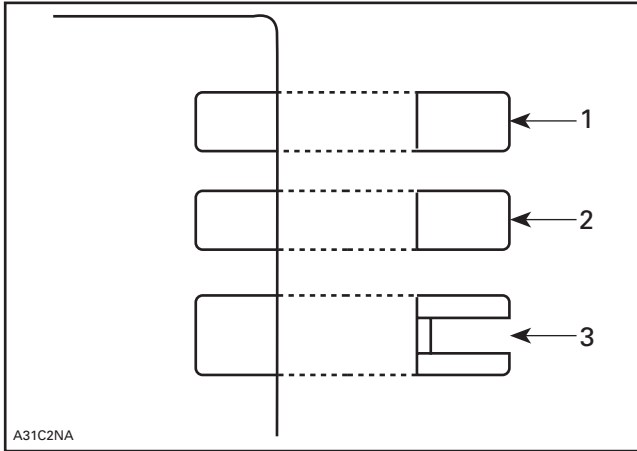
Section 03 ENGINE

Subsection 06 (CRANKSHAFT/BALANCER SHAFT)

Installation

For installation, reverse the removal procedure. Paying attention to the following details.

Install the oil ring first, then the middle ring with the word TOP facing up, then the top ring with a dot facing up.



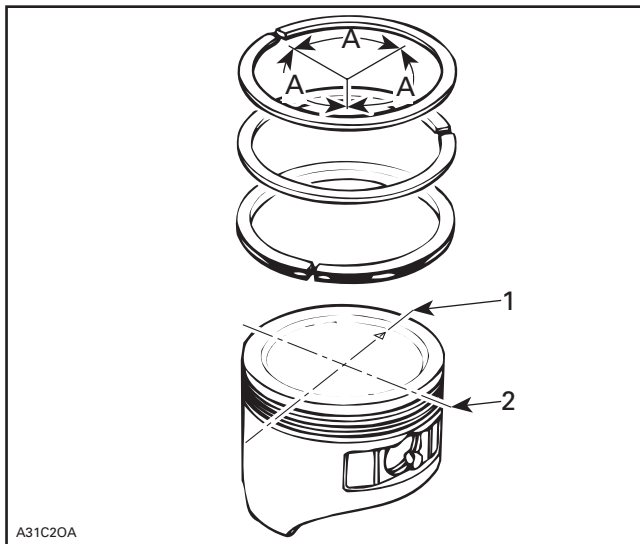
1. Top ring (rectangular, black/gray color)
2. Second ring (scraper, chrome/stainless steel looking ring)
3. Oil ring

CAUTION: Ensure that top and second rings are not interchanged.

NOTE: Use a ring expander to prevent breakage during installation. The oil ring must be installed by hand.

Check that rings rotate smoothly after installation.

Space the piston ring end gaps 120° apart and do not align the gaps with the piston pin bore or the thrust side axis.



1. DO NOT align ring gap with piston thrust side axis
2. DO NOT align ring gap with piston pin bore axis
- A. 120°

4, BALANCER SHAFT

Removal

Remove:

- engine (refer to REMOVAL AND INSTALLATION)
- cylinder (refer to CYLINDER AND HEAD)
- piston no. 2.

RH Side

Remove:

- magneto (refer to MAGNETO SYSTEM)
- free wheel and idle gears
- oil filter and unfasten two screw connections on base plate for engine housing.

LH Side

Remove:

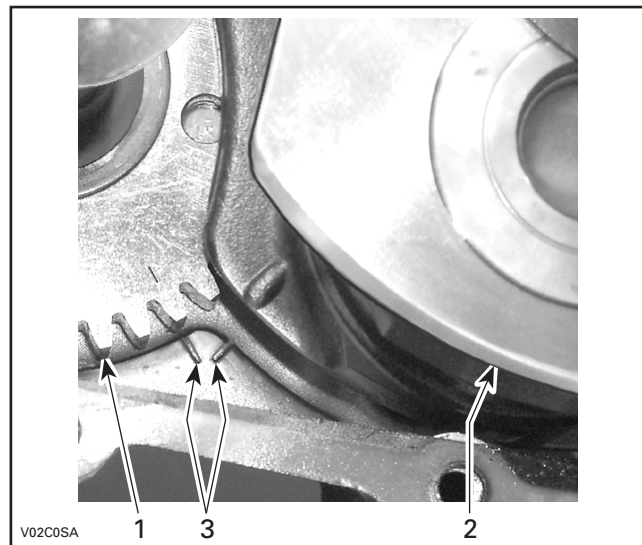
- clutch (refer to CLUTCH)
- double drive gear no. 9 and timing chain.

Lift up left side of engine housing, striking alternate gentle blows with plastic hammer on mainshaft, countershaft and balancer shaft to ensure that these remain on magnet side.

CAUTION: Do not tilt engine housing; this can cause damage to bearing cup.

Remove shims no. 10 and no. 15 on crankshaft and balancer shaft.

Align marks on balancer shaft and crankshaft with marks on housing.



1. Balancer shaft
2. Crankshaft
3. Marks on housing

First lift out crankshaft, then balancer shaft.

NOTE: Take care of spacer discs on crankshaft.

Inspection

Check balancer shaft bearings **nos. 11** and **12** in front and rear housing for excessive play and smooth operation. Replace if necessary.

Installation

Install balancer shaft in engine housing, mark must be aligned with mark on housing.

Coat thrust washer **no. 13** with oil and install in crankshaft.

Rotate crankshaft before installing so that mark is aligned with mark on housing.

Fit gasket.

NOTE: Coat bearing points on shafts. Recentre crankshaft and balancer shaft if either housing, crankshaft or balancer shaft were replaced. See RECENTRE CRANKSHAFT.

5, BALANCER GEAR

Removal

Mount balancer shaft in vise with protective jaws.

Use puller (P/N 529 035 623) to remove balancer gear.

Inspection

Check gears teeth for damage. Change if necessary.

Installation

For installation, reverse the removal procedure. Paying attention to the following detail.

Heat balancer gear to 80°C (176°F).

6, CRANKSHAFT

Removal

Use the same removal procedure that balancer shaft.

Inspection

Crankshaft Bearing Radial Play

Measure bearing journal diameter. The minimum diameter for bearing journal is 47.975 mm (1.888 in). If the measure exceeds specified tolerance, replace the crankshaft.

Measure the interior diameter of the crankshaft bushing.

Subtract bearing journal diameter from inside bushing diameter. The result is the main bearing radial play. If the measure exceeds specified tolerance, replace the crankshaft and/or bushing.

CRANKSHAFT BEARING RADIAL PLAY mm (in)	
SERVICE LIMIT	0.10 mm (.004 in)

Connecting Rod Big End Axial Play

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

CONNECTING ROD BIG END mm (in)	
SERVICE LIMIT	
Axial play	0.80 mm (.031 in)

Connecting Rod/Piston Pin Clearance

Measure piston pin. Compare to inside diameter of connecting rod.

CONNECTING ROD SMALL END DIAMETER	
SERVICE LIMIT	22.04 mm (.868 in)

PISTON PIN BORE CLEARANCE	
SERVICE LIMIT	0.06 mm (.002 in)

Installation

For installation, refer to balancer shaft installation.

Section 03 ENGINE

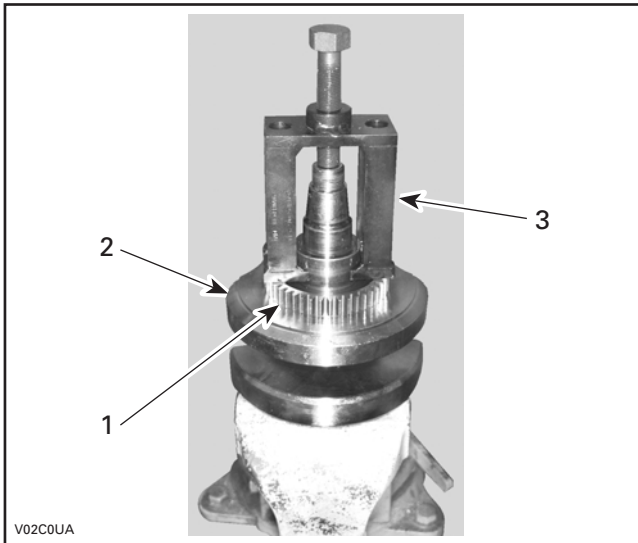
Subsection 06 (CRANKSHAFT/BALANCER SHAFT)

7, COUNTER GEAR

Removal

Clamp crankshaft in vise with protective jaws.

Using extractor (P/N 529 035 624) extract counter gear.



1. Counter gear
2. Crankshaft
3. Extractor

Inspection

Check counter gear teeth for damage. Replace if necessary.

Installation

Heat counter gear to 140°C (284°F).

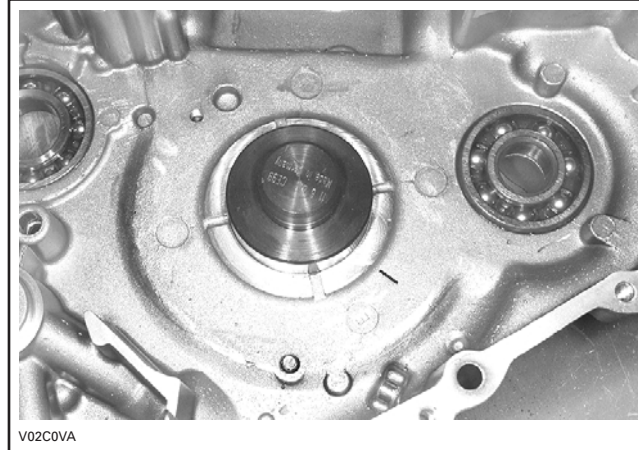
CAUTION: The roller pin no. 14 must not protrude from bore in counter gear; this is the support face for the thrust washer.

CRANKSHAFT BUSHING

Removal

Heat engine housing to 100°C (212°F).

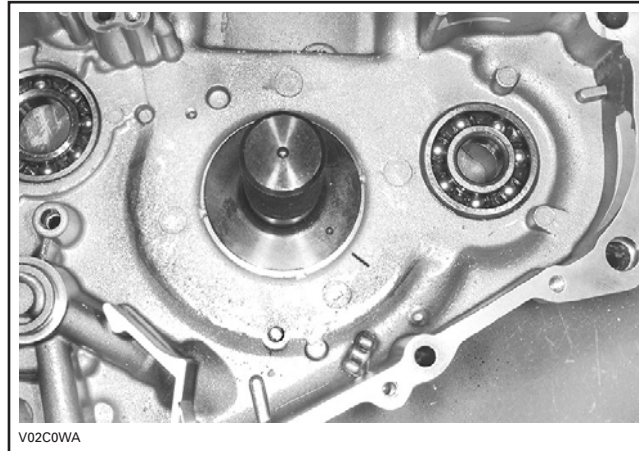
Drive out bushing with punch (P/N 529 035 688).



Installation

Heat engine housing to 100°C (212°F).

Coat bushing with Klueber grease (P/N 711 297 616) and drive home with punch (P/N 529 035 689), striking from inside.



CAUTION: Mark position of oil hole in bushing on housing. Align mark on punch with mark on housing. Bushing must be inset behind oil holes. The notch on the bushing should always face the balancer shaft.

BALL BEARINGS IN HOUSING

Removal

Heat output shaft in the housing to 80°C (176°F).
Using a suitable slide hammer, extract ball bearing.

Installation

Place the housing in oven to 100°C (212°F).

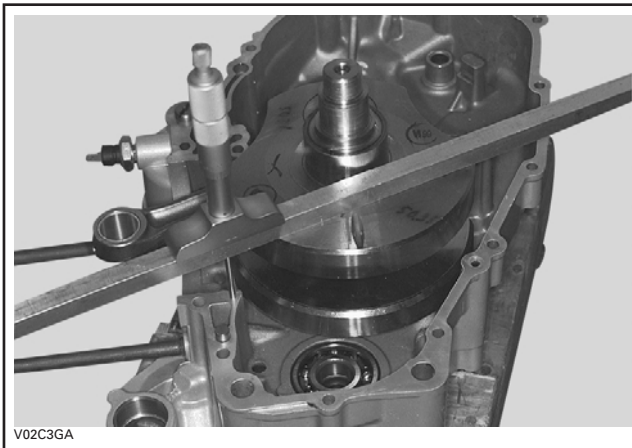
NOTE: The sealed ends of the cage must point outwards.

RECENTRE CRANKSHAFT

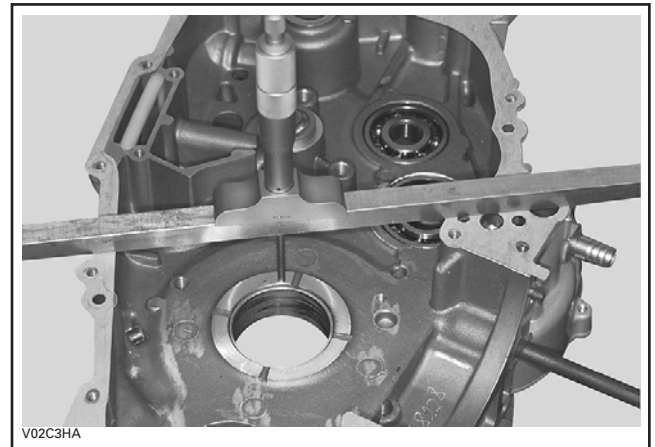
NOTE: Only fit spacer on clutch end. On magneto side, the spacer is always 1.0 mm (.04 in).

Place crankshaft into right engine housing (magneto side). Do not install spacer on clutch side.

Using depth gauge, measure distance between crank web and housing joint. This is the dimension "B".



Determine dimension between compressed gasket in left engine housing (clutch side) and washer contact face. This is the dimension "A".



Subtract dimension "B" from dimension "A", the result is the end float of crankshaft plus spacer thickness.

Select suitable spacer to ensure the correct end float is obtained.

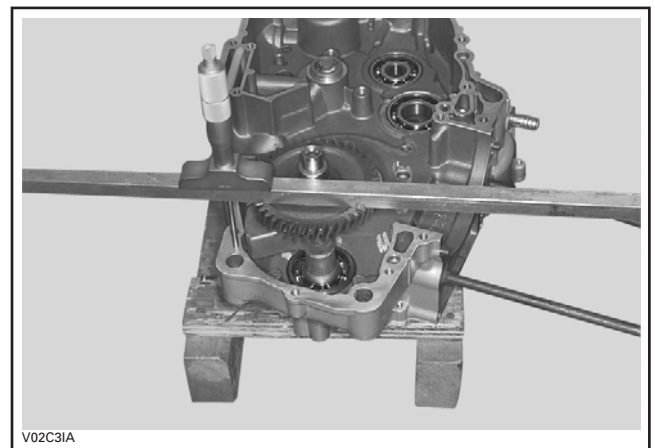
END FLOAT OF CRANKSHAFT	0.1 to 0.3 mm (.004 to .012 in)
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RECENTRE BALANCER SHAFT

NOTE: Only fit spacer on clutch end.

Place balancer shaft into left engine housing (clutch side). Do not install spacer on clutch side.

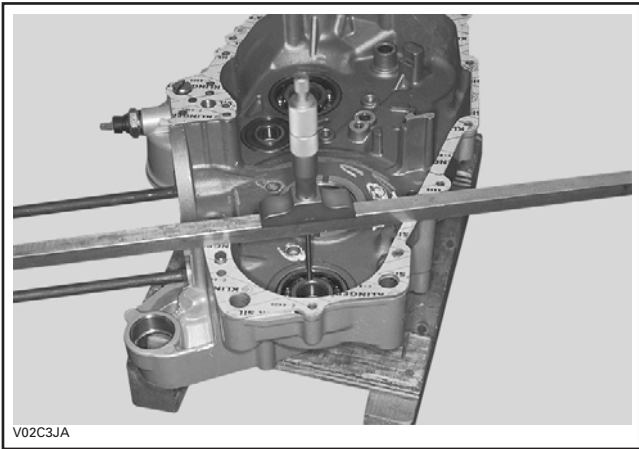
Using depth gauge, measure distance between the top of balancer gear and housing joint. This is the dimension "B".



Section 03ENGINE

Subsection 06(CRANKSHAFT/BALANCER SHAFT)

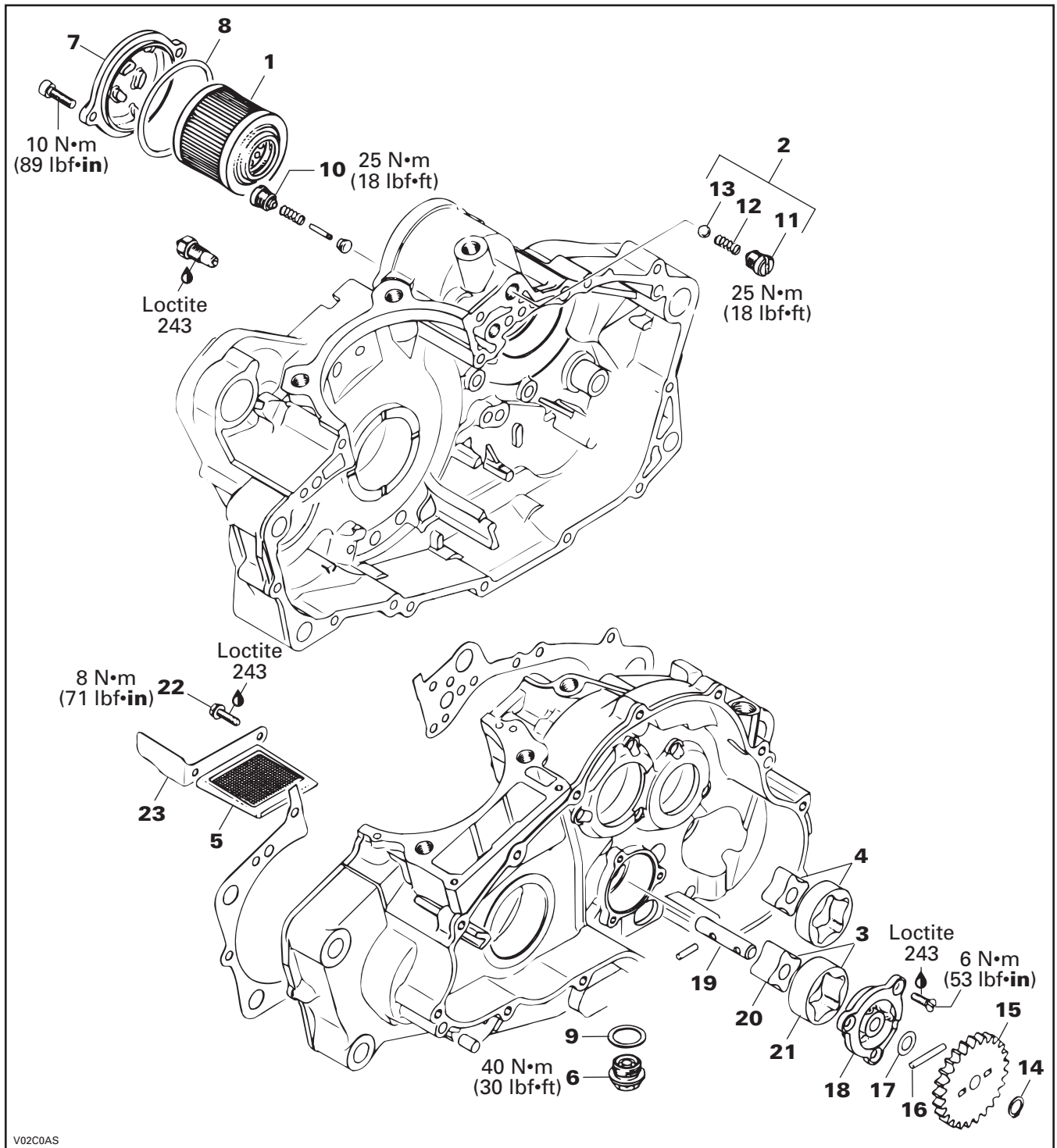
Determine dimension between compressed gas-
ket in right engine housing (magneto side) and in-
ner ring of bearing. This is the dimension "A".



Subtract dimension "B" from dimension "A", the
result is the end float of balancer shaft plus spacer
thickness.
Select suitable spacer to ensure the correct end
float is obtained.

END FLOAT OF BALANCER SHAFT	0.1 to 0.3 mm (.004 to .012 in)
--------------------------------	------------------------------------

LUBRICATION SYSTEM



Section 03 ENGINE

Subsection 07 (LUBRICATION SYSTEM)

TROUBLESHOOTING

Oil Level Low

- external oil leak
- worn or incorrect piston rings installation
- worn valve seal
- defective oil pump

Low or No Oil Pressure

- clogged oil orifice(s)
- incorrect oil being used
- leaking oil seal
- oil strainer
- oil pump worn or damaged
- defective oil pressure regulator

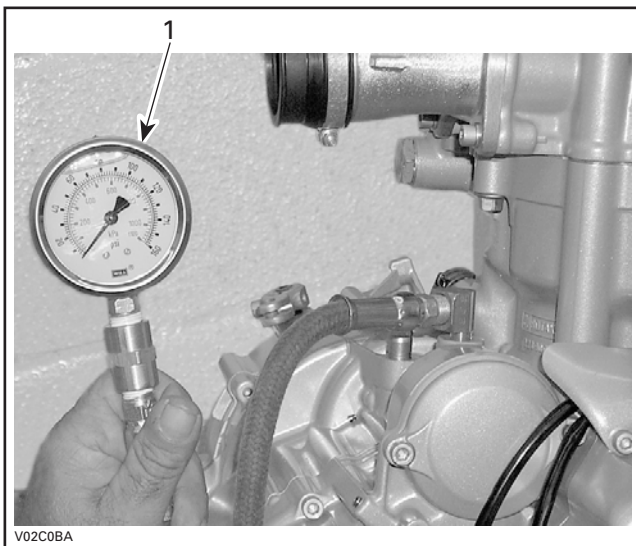
Oil Contamination (white appearance)

- coolant mixing with oil
- faulty water pump seal
- faulty head gasket
- water leak in crankcase
- air trapped at pump inlet

ENGINE PRESSURE TEST

NOTE: The engine pressure test should be done with a warm engine and the recommended oil.

Remove the oil pressure switch above oil filter and install an oil pressure gauge (P/N 529 035 652).



1. Oil pressure gauge

The engine pressure should be 50 kPa (7 PSI) minimum at idle and 300 kPa (44 PSI) at 6000 RPM.

NOTE: The maximum oil pressure is 600 kPa (87 PSI).

If the engine pressure is out of specifications, check the points described in **Low or No Oil Pressure** section above.

OIL CHANGE AND OIL FILTER REPLACEMENT

Oil and filter are to be replaced at the same time. Oil change should be done with a warm engine.

WARNING

The engine oil can be very hot. Wait until engine oil is warm.

Ensure vehicle is on a level surface.

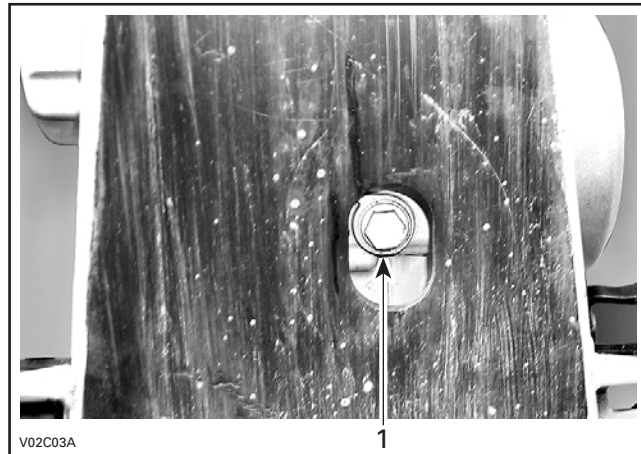
Remove dipstick.

Clean the reservoir drain plug area.

Drain all oil from oil tank by removing drain plug. Wipe out any oil spillage.

Place a drain pan under the engine drain plug area.

Unscrew drain plug **no. 6**.



UNDER VEHICLE

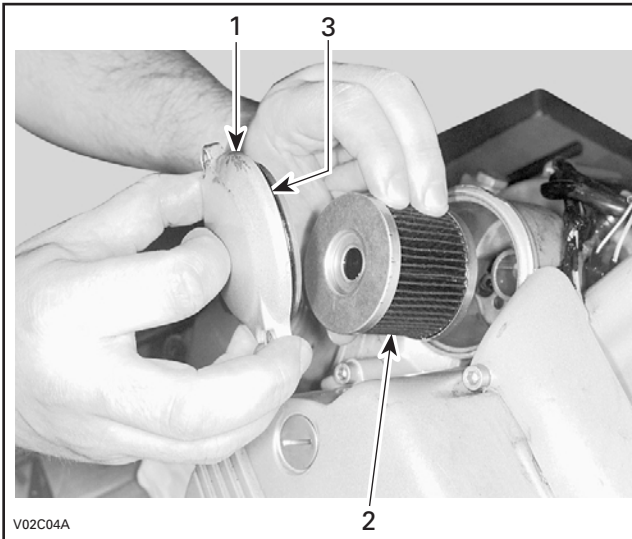
1. Oil drain plug

Wait a while to allow oil to flow out of oil filter.

Unscrew oil filter cover **no. 7**.

Remove oil filter and replace by a new.

NOTE: Check and change O-ring **no. 8**, if necessary.



RH SIDE OF VEHICLE

1. Oil filter cover
2. Oil filter
3. O-ring

Wipe out any oil spillage on engine.

Change gasket **no. 9** on engine drain plug. Clean gasket area on engine and drain plug then reinstall plug. Refill oil tank at the proper level with the recommended oil. Refer to **TECHNICAL DATA** for capacity.

Start engine and let idle for a few minutes. Ensure oil filter area, hose and drain plug areas are not leaking.

Check if the RED indicator lamp stays ON, if yes, stop engine and bleed system by removing oil filter and bleeding screw **no. 10**. Refer to **Bleeding Engine Oil Circuit** below.

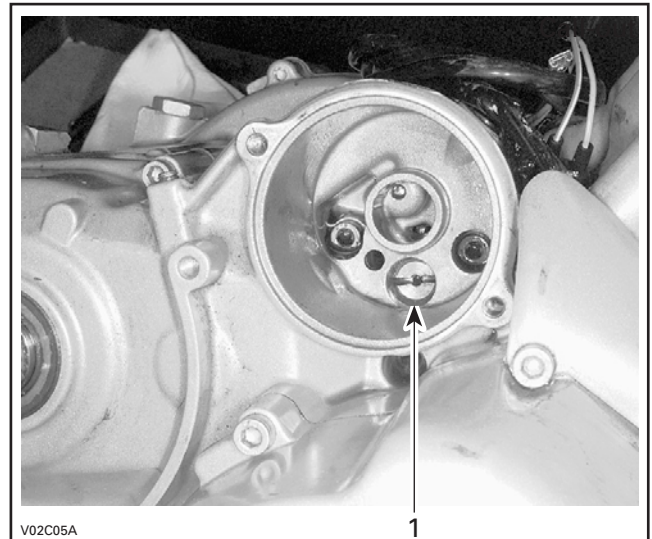
Stop engine and check oil level. Refill as necessary.

Dispose oil as per your local environmental regulations.

Bleeding Engine Oil Circuit

Remove oil filter **no. 1**.

Unfasten pressure bleeding screw **no. 10**.



BEHIND OIL FILTER

1. Bleeding screw

Unscrew and remove one spark plug.

Turn engine using starter until oil emerges in filter chamber.

Install pressure bleeding screw.

Install oil filter.

1, OIL TANK STRAINER

The oil tank strainer is located under oil tank.

Removal

Ensure vehicle is on a level surface.

Drain oil tank.

Remove hose under oil tank.

Unscrew and remove oil tank strainer.

Cleaning and Inspection

Clean oil tank strainer with the parts cleaner then use an air gun to dry it.

Installation

For installation, reverse the removal procedure.

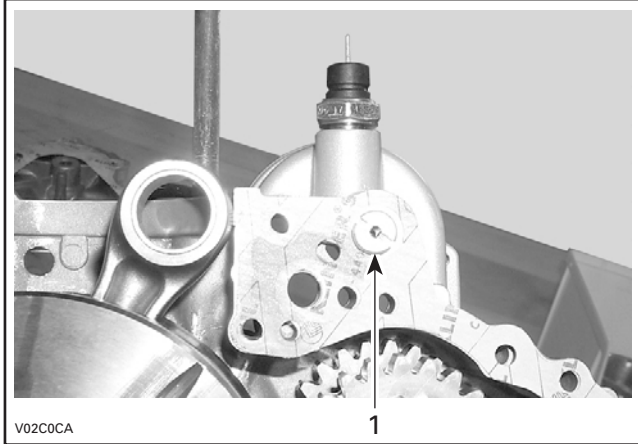
NOTE: Apply Loctite 567 on oil tank strainer threads.

Section 03 ENGINE

Subsection 07 (LUBRICATION SYSTEM)

2, ENGINE OIL PRESSURE REGULATOR

The engine oil pressure regulator is located in magneto side of the crankcase housing.



1. Engine oil pressure regulator

Removal

Remove the plug screw **no. 11**, compression spring **no. 12** and ball **no. 13**.

Inspection

Check compression spring for squareness or other damage.

Installation

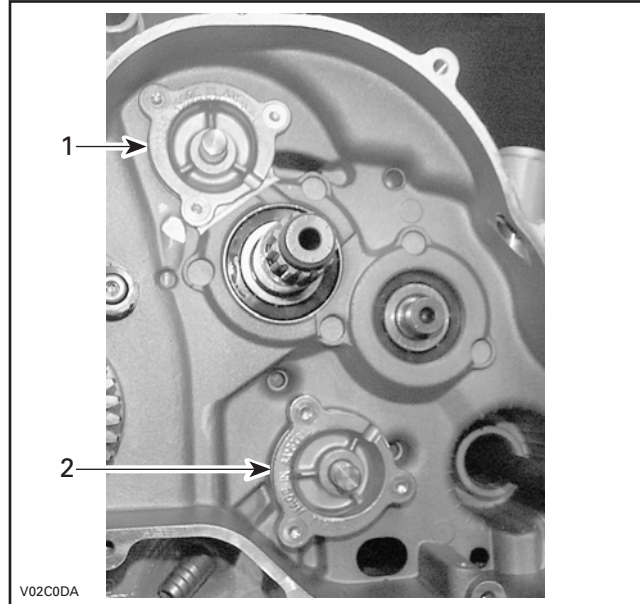
For installation, reverse the removal procedure.

3, RETURN OIL PUMP

The oil pump is located on the clutch side of the crankcase housing.

Removal

Remove clutch. Refer to CLUTCH.



1. Pressure oil pump
2. Return oil pump

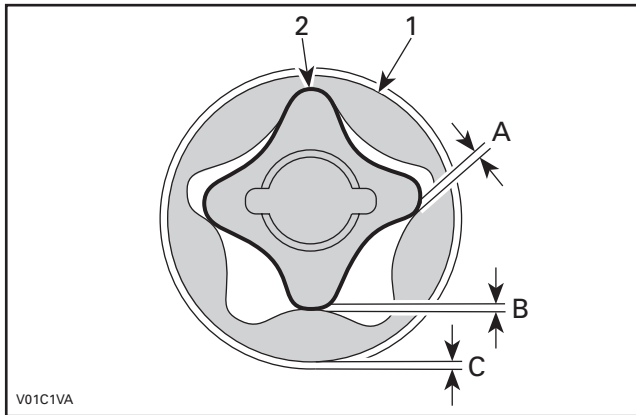
Remove:

- snap ring **no. 14**
- oil pump gear **no. 15**
- needle pin **no. 16**
- thrust washer **no. 17**
- oil pump cover **no. 18**
- oil pump shaft **no. 19**
- oil pump rotor **no. 20**
- inner rotor **no. 21**.

Inspection

Inspect oil pump for marks or other damages, specially scratches in crankcase between inlet and outlet parts.

Using a feeler gauge, measure the clearance between oil pump rotor and inner rotor.



- 1. Oil pump rotor
- 2. Inner rotor

OIL PUMP ROTOR AND INNER ROTOR CLEARANCE mm (in)	
SERVICE LIMIT	
A	0.25 mm (0.009 in)
B	
C	

Measure oil pump rotor thickness and oil pump rotor bore depth.

Difference between measurements should not exceed 0.25 mm (0.009 in). If so, replace oil pump rotor.

Installation

For installation, reverse the removal procedure. Paying attention to the following details.

Markings on inner rotor and oil pump rotor must be visible.

Coat inner rotor and oil pump rotor with oil.

4, PRESSURE OIL PUMP

For removal, inspection and installation, use the same procedures that return oil pump.

5, ENGINE OIL STRAINER

The engine oil strainer is located between both crankcase housings.

Removal

Separate both crankcase housings.

Unscrew the bolts **no. 22** retaining the oil strainer guide **no. 23**.

Cleaning and Inspection

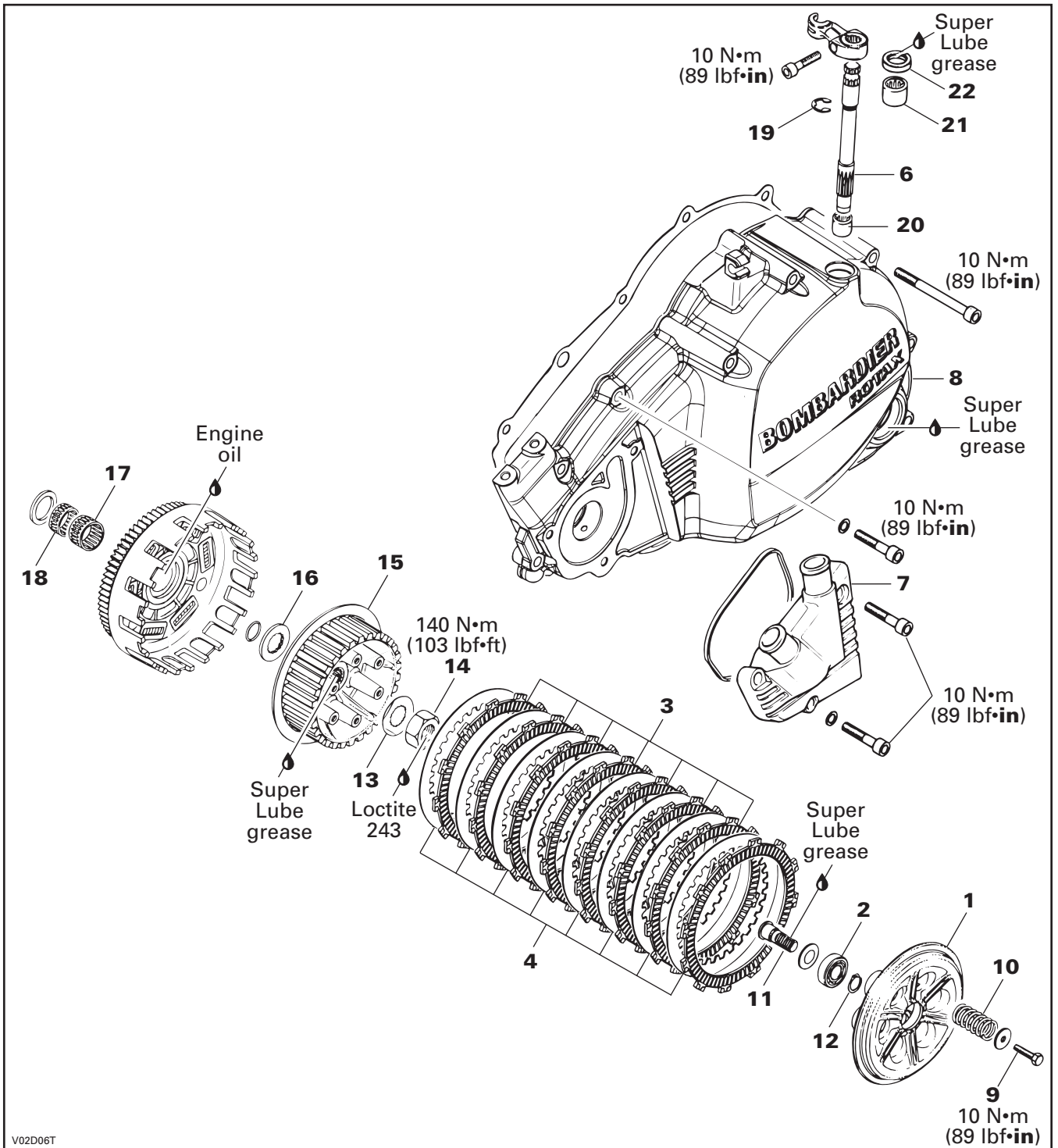
Clean engine oil strainer with the parts cleaner then use an air gun to dry it.

Check engine oil strainer for damage and change if necessary.

Installation

For installation, reverse the removal procedure.

CLUTCH



Section 03 ENGINE

Subsection 08 (CLUTCH)

CLUTCH ADJUSTMENT

The clutch adjustment is necessary after any works in the clutch system. Refer to MAINTENANCE for procedure.

1, PRESSURE PLATE

NOTE: It's not necessary to remove engine from vehicle to disassemble the clutch.

Removal

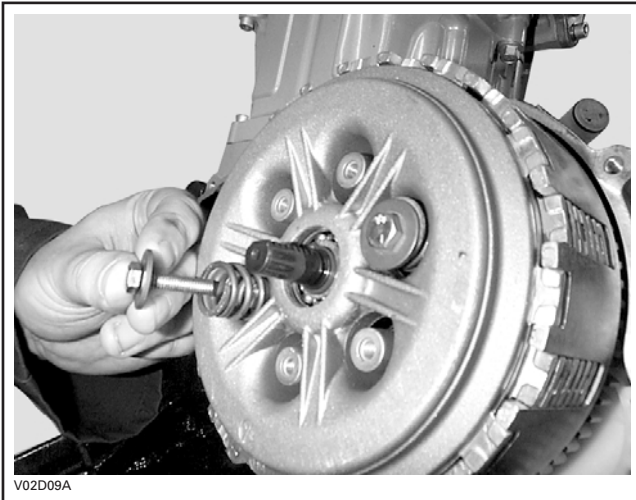
Drain engine oil and coolant.

Detach clutch cable.

Remove:

- starter
- water pump cover no. 7
- LH engine housing cover no. 8.

Unfasten screws no. 9, retaining clutch spring no. 10 and pressure plate, crosswise.



Lift off pressure plate completely.

Inspection

Check pressure plate for crack or other damage. Change if necessary.

Installation

For installation, reverse the removal procedure.

CAUTION: Never pull clutch release lever backwards when the engine is hot. The pressure plate bearing may come out of pressure plate.

2, PRESSURE PLATE BEARING

Inspection

Pressure plate bearing must have full freedom of movement. If not, change the bearing.

Check spline on clutch actuator rack no. 11. Change if necessary.

Disassembly

Remove the retaining ring no. 12 with retaining ring pliers.

Heat pressure plate to 80°C (176°F) then remove pressure plate bearing.

Assembly

For assembly, reverse the disassembly order.

CAUTION: Never pull clutch release lever backwards when the engine is hot. The pressure plate bearing may come out of pressure plate.

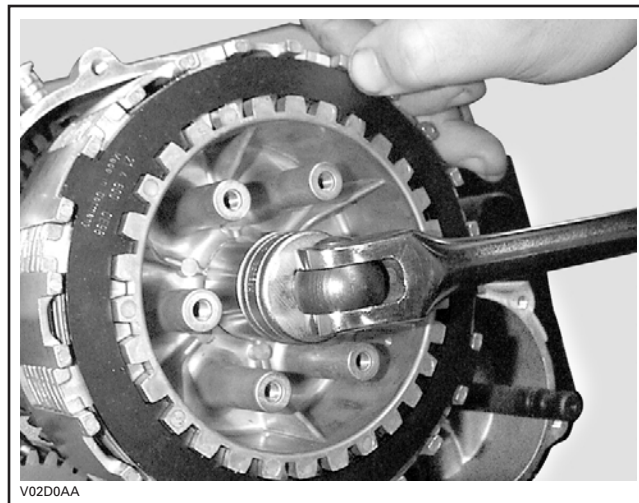
3,4,5, FRICTION DRIVE PLATE, STEEL DRIVEN PLATE AND CLUTCH BASKET

Disassembly

Remove the pressure plate no. 1.

Remove friction plates no. 3 and steel driven plates no. 4 from clutch basket no. 5.

Unlock the tab washer no. 13 then install spanner tool for clutch basket (P/N 529 035 618).



Unscrew the clutch lock nut **no. 14** then remove tab washer.

Remove clutch hub **no. 15**, clutch basket including thrust washer **no. 16** and needle bearings **no. 17** and **no. 18**.

Inspection

Friction Drive Plate

Measure the package of friction drive plate thickness.

Friction drive plates must be replaced when thickness is 27.5 mm (1.827 in) thick or less for the whole package.

FRICION DRIVE PLATE MINIMUM THICKNESS FOR THE WHOLE PACKAGE	27.5 mm (1.0827 in)
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The friction drive plate maximum warpage should fall through a slot of 3.75 mm (.148 in).

Steel Driven Plate

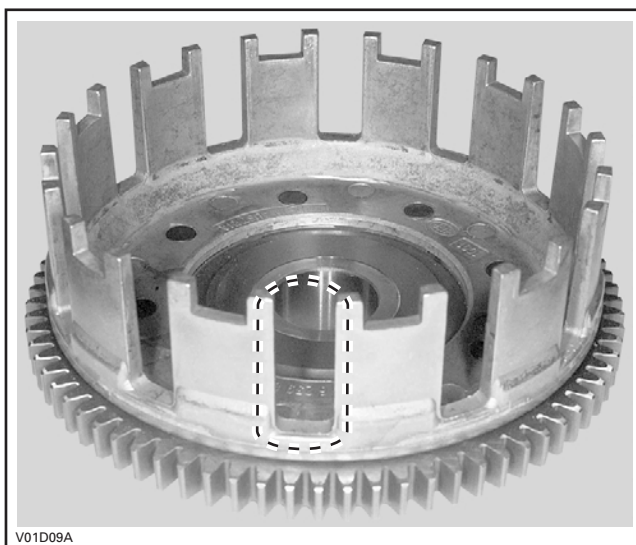
The steel driven maximum warpage should fall through a slot of 1.63 mm (.064 in).

The wear limit of the whole package is 11.5 mm (.453 in).

Clutch Basket

Check slots of clutch basket for damage or wear caused by friction drive plates.

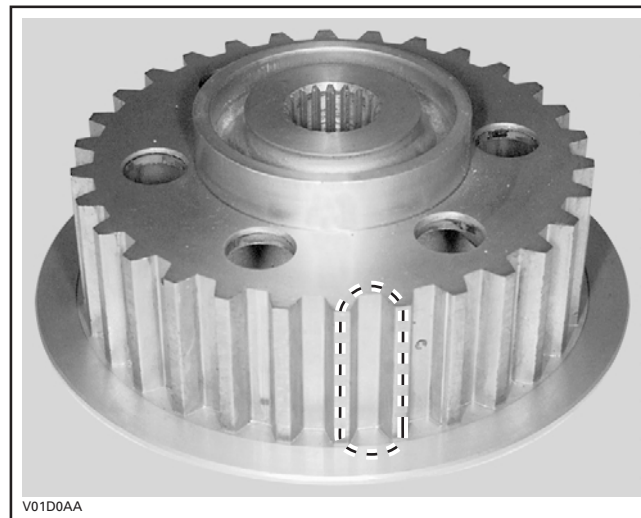
Change if necessary.



TYPICAL

Clutch Hub

Check grooves of clutch hub for damage or wear caused by steel driven plates.

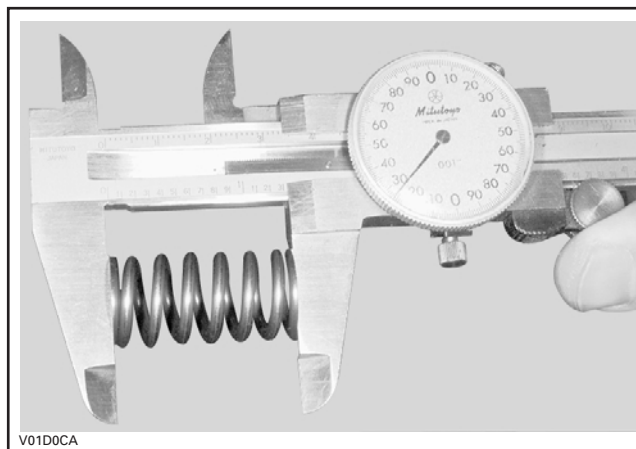


TYPICAL

Clutch Spring

Measure each clutch springs free length.

CLUTCH SPRING MINIMUM LENGTH	43 mm (1.69 in)
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TYPICAL

Assembly

Assembly in the reverse sequence of disassembly. Install the needle bearings.

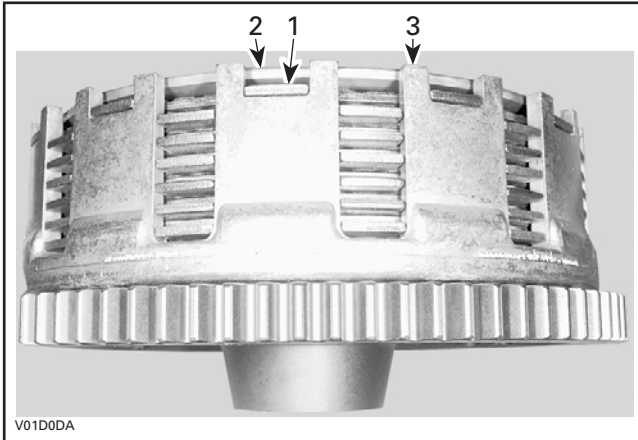
NOTE: Install small needle bearing underneath.

Coat spline on countershaft with Loctite anti-seize. In first, install steel driven plate, then friction drive plate in alternate order.

Section 03 ENGINE

Subsection 08 (CLUTCH)

NOTE: Place the last friction drive plate in short slots of clutch basket.



1. Last friction drive plate
2. Retaining plate
3. Clutch basket

6, CLUTCH RELEASE SHAFT

Removal

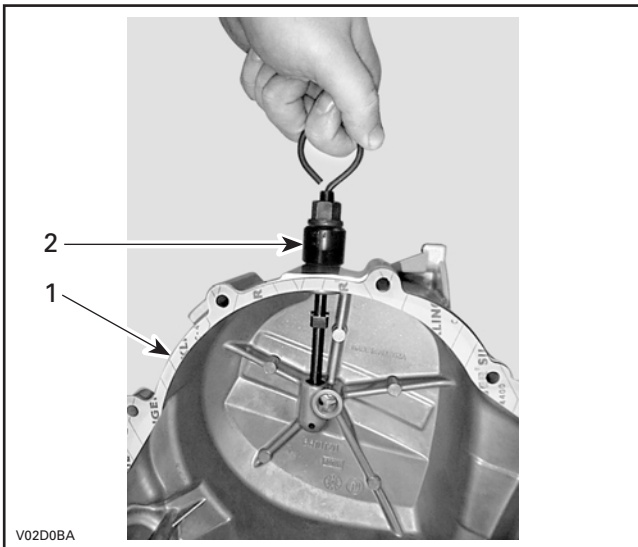
Detach clutch cable.

Remove LH engine housing cover.

Remove the retaining ring **no. 19**.

Withdraw clutch release shaft from housing.

With the extractor (P/N 529 035 690), remove both needle bearings **nos. 20** and **21**, and seal **no. 22** together.

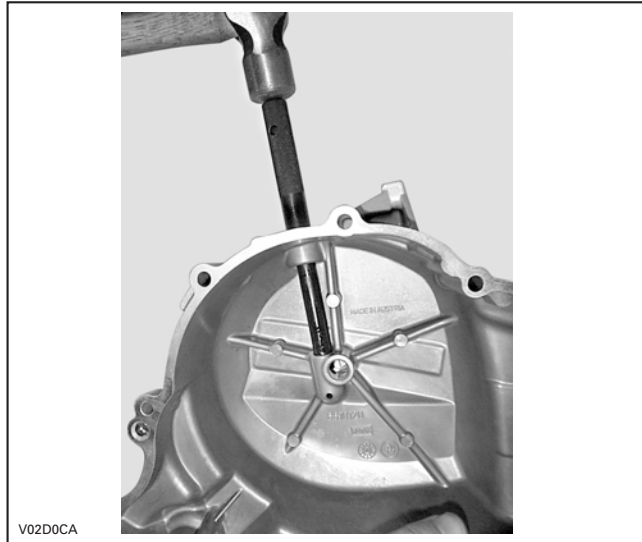


1. Clutch cover
2. Extractor

NOTE: With a heat gun, heat the clutch cover near bearings area.

Installation

Drive in lower and upper needle bearing together using the punch (P/N 529 035 691).



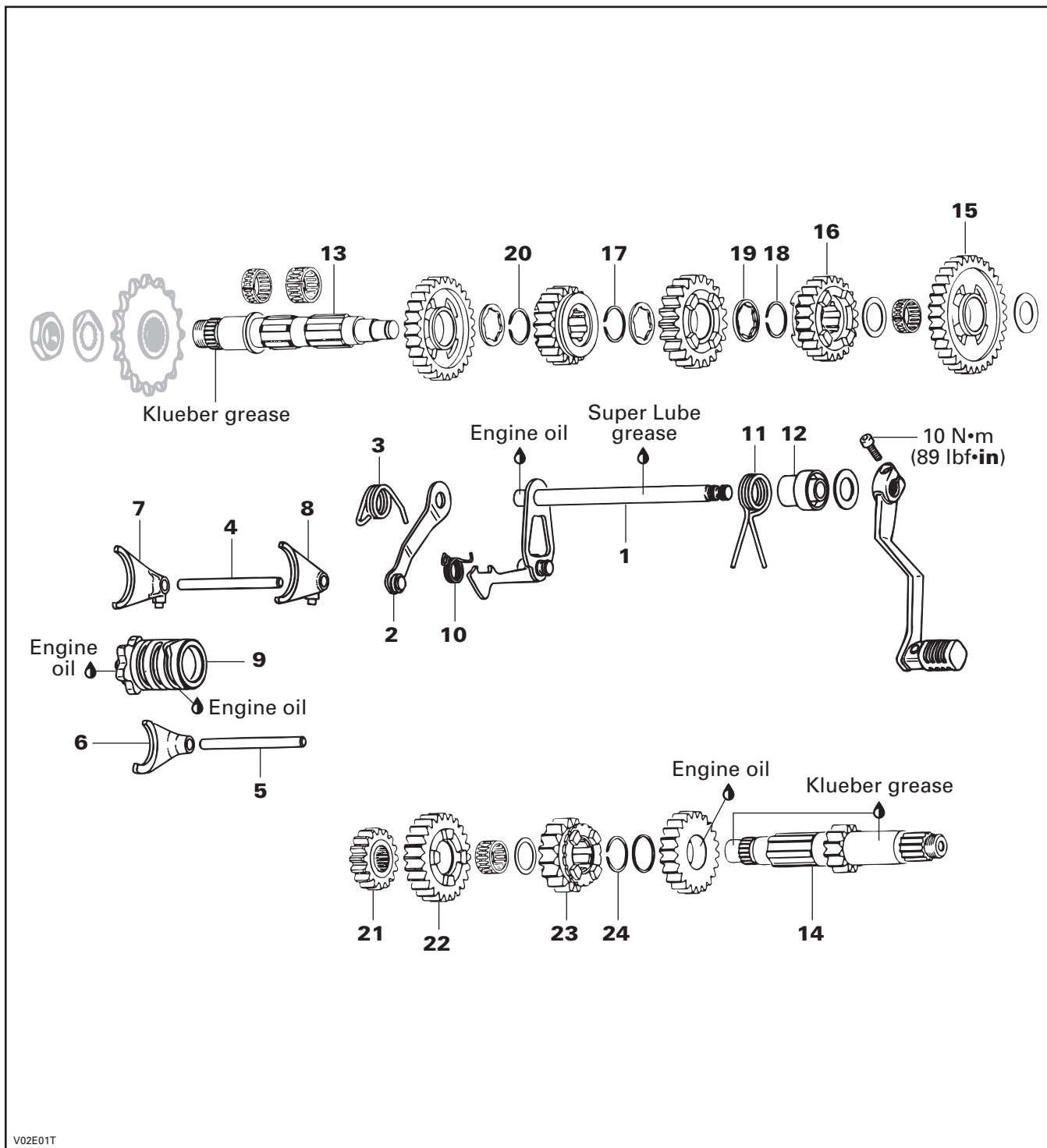
Insert clutch release shaft.

Using punch (P/N 529 035 693), drive in seal.

Install LH engine housing cover and do not forget gasket.

CAUTION: Never pull clutch release lever backwards when the engine is hot. The pressure plate bearing may come out of pressure plate.

TRANSMISSION



SHIFTING MECHANISM

Removal

Remove engine from vehicle. Refer to REMOVAL AND INSTALLATION.

Separate both crankcase housings. Refer to CRANKSHAFT/BALANCER SHAFT.

Press shift pawl slightly outwards and withdraw shift shaft **no. 1** with shift pawl.

Remove index lever **no. 2** and index spring **no. 3**.

Remove shift fork shafts **nos. 4** and **5** from shift forks **nos. 6, 7** and **8**.

Swivel shift forks outwards and remove.

Withdraw shift drum **no. 9**.

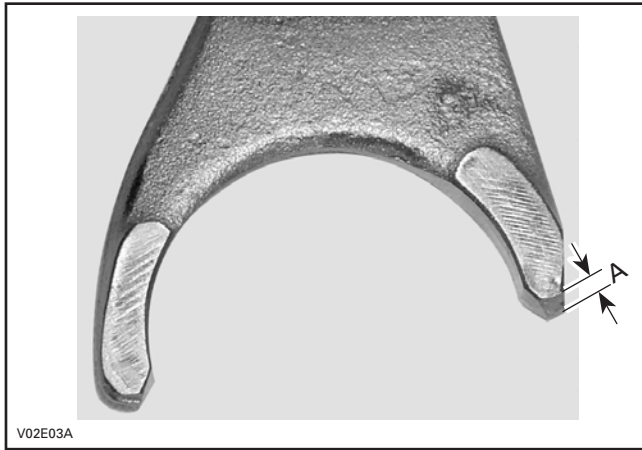
Inspection

Check for:

- worn or scored shifting forks
- rounded engagement dogs and slots
- bent shift forks
- bent shift fork shafts
- worn tracks on shift drum.

Measure the shift fork claw thickness.

SHIFT FORK CLAW THICKNESS mm (in)	
SERVICE LIMIT	3.45 mm (.136 in)

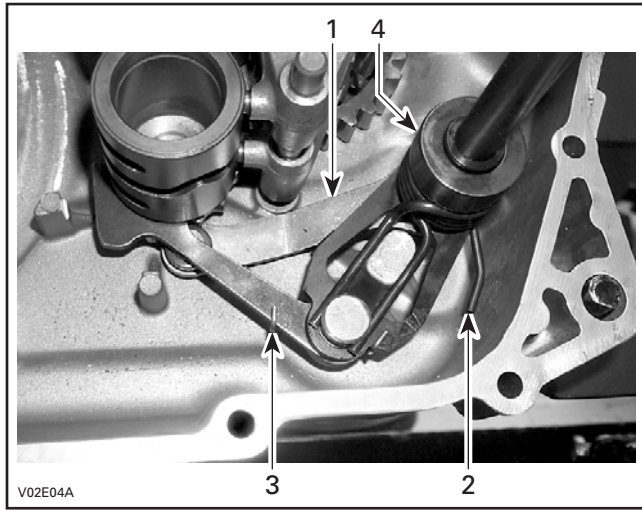


TYPICAL
A. Shift fork claw thickness

Measure the O.D. of the shift fork shaft in three places using an outside micrometer.

O.D. OF SHIFT FORK SHAFT mm (in)	
SERVICE LIMIT	5.85 mm (.230 in)

Installation



1. Index lever
2. Index spring
3. Pawl spring
4. Sleeve

Install index lever **no. 2** with index spring **no. 3** in housing.

Attach pawl spring **no. 10** to pawl.

Insert shift shaft **no. 1** in housing and secure index lever.

Slide spring **no.11** and sleeve **no. 12** onto shift shaft.

Attach spring to shift shaft pivot.

Insert shift fork **no. 6** in selector gear of clutch shaft.

Install shift fork shaft **no. 5** with the selector fork in the direction of the crankshaft.

Insert shift fork **no. 7** and **no. 8** in the corresponding selector gears of the mainshaft.

Install shift fork shaft **no. 4** with the shift forks outwards.

Install shift drum **no. 9** in the idle setting.

Press back index lever and shift pawl and install the shift drum.

Move index lever and shift pawl into mesh.

Check transmission function: shift up and down through all gears, checking that the detent in all gears disengages smoothly from the shift pawl.

Assemble engine.

Once again, shift up and down through all gears, slowly allowing selector lever to return to its original position. The clicking noise of the engaging shift pawl must be clearly audible.

Install engine.

TRANSMISSION

Removal

Remove the shifting mechanism. Refer to the above section.

Remove shift fork shafts **nos. 4 and 5**.

Swivel shift forks **nos. 6, 7 and 8** outwards and remove.

Withdraw shift drum **no. 9**.

Using a plastic mallet, tap mainshaft **no. 13** to assist withdrawing mainshaft together with clutch shaft **no. 14**.

NOTE: Before removal withdraw the separate gears **nos. 15 and 16** from mainshaft.

Disassembly

Mainshaft

Using special pliers slide circlip **no. 17** slightly backwards to remove circlip **no. 18** which is secured by the angled ring **no. 19**.

Remove gears.

Remove circlip **no. 20** and withdraw gear.

CAUTION: Retaining ring must not be overstretched.

Clutch Shaft

Remove gear **nos. 21, 22 and 23**.

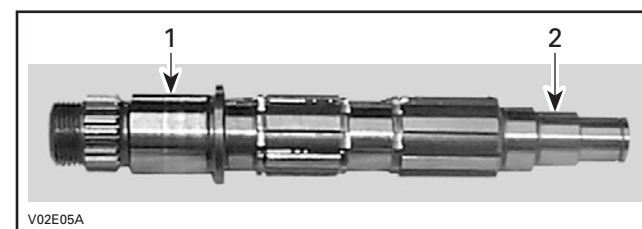
Remove circlip **no. 24** with special pliers.

Remove gear.

Inspection

Check mainshaft for wear.

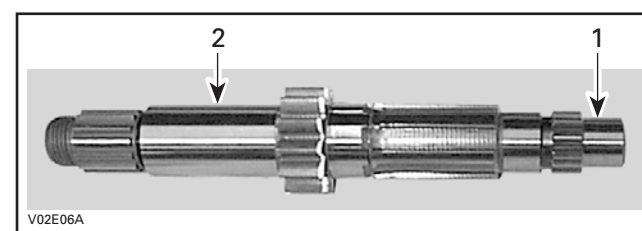
MAINSHAFT mm (in)	
SERVICE LIMIT	
Magneto end	24.98 mm (.98 in)
Clutch side	16.98 mm (.67 in)
Run-out	0 mm (0 in)



1. Magneto end
2. Clutch side

Check clutch shaft for wear.

CLUTCH SHAFT mm (in)	
SERVICE LIMIT	
Magneto end	16.98 mm (.67 in)
Clutch side	24.97 mm (.98 in)
Run-out	0 mm (0 in)



1. Magneto end
2. Clutch side

Check all bearings, bearing points, tooth flanks, taper grooves and annular grooves. Annular grooves must have sharp edges.

Replace gears only together with the corresponding meshing gears.

NOTE: Always replace circlips and install using special pliers.

Section 03 ENGINE

Subsection 09 (TRANSMISSION)

Assembly and Installation

For assembly and installation, reverse the disassembly and removal procedures. Paying attention to the following details.

Install clutch shaft and mainshaft together, and coat main bearing points with Loctite anti-seize.

Seat shafts fully home by tapping them into place with a plastic hammer.

NOTE: Before installation of the transmission shafts, remove crankshaft to simplify assembly operation.

Install the shifting mechanism.

TRANSMISSION SHAFT BEARINGS

Removal

Heat left or right engine housing to 80 - 100°C (170 - 212°F).

Using the suitable bearing extractor to remove bearings.

Tap out the mainshaft sealing ring from the inside.

Installation

Place new bearings in a freezer for 10 minutes before installation.

Place left or right engine housing in oven to 100°C (212°F) to ease bearings installation.

NOTE: Always replace the mainshaft sealing ring by a new one.