SHOP MANUAL
MX-4

BOMBARDIER®

can-am*
motorcycles

Litho'd in Canada

735 008 006

SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair the Can-Am motorcycle.

This edition was primarily published to be used by motorcycle mechanics who are already familiar with all service procedures relating to Bombardier made motorcycles.

Please note that the instructions will apply only if proper hand tools and special service tools are used.

Strict adherence to the information within will result in better, safer service work.

This manual emphasizes particular information denoted by the wording and symbols;

◆ WARNING: Identifies an instruction which, if not followed, could cause personal injury.

▼ CAUTION: Denotes an instruction which, if not followed, could severely damage vehicle components.

○ NOTE: Indicates supplementary information needed to fully complete an instruction.

Although the mere reading of such information does not eliminate the hazard, your understanding of the information will promote its correct use.

◆ WARNING: This information relates to the preparation and use of Can-Am motorcycles and has been utilized safely and effectively by Bombardier Limited. However, Bombardier Limited disclaims liability for all damages and/or injuries resulting from the improper use of the contents. We strongly recommend that any services be carried out and/or verified by a highly skilled professional mechanic. It is understood that certain modifications may render use of the vehicle illegal under existing federal, provincial and state regulations.

Litho'd in Canada

INTRODUCTION

Before using this manual, read carefully the following information.

DEFINITION OF NUMBERING SYSTEMS

The manual makes use of a 2-part digital numbering system (i.e. 01-01), in which the first digit represents the Section, the second digit the Sub-section.

Example: section 01 engine
sub-section 01 (engine/transmission)

The numerotation at the bottom of each page assists the user in page location.

ARRANGEMENT OF THE MANUAL

The manual is divided in 7 major sections, 01 engine, 02 electrical, 03 suspension, 04 steering, 05 chassis, 06 tools, 07 technical data.

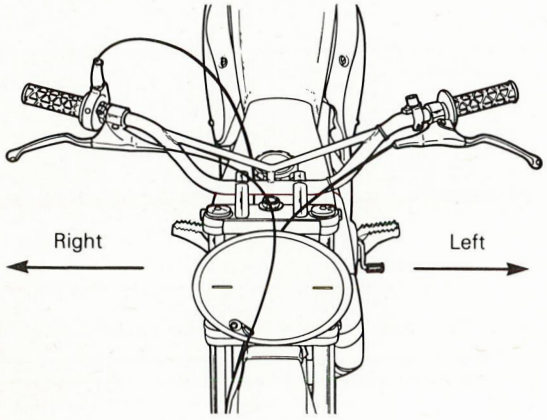
Each section is comprised of various sub-sections, and yet again, although not indicated in the table of content, each sub-section has one or more divisions. For example, section 02 electrical; sub-section 02 ignition system, contains two divisions: "Bosch system" and "Motoplat system".

ILLUSTRATIONS AND PROCEDURES

An exploded view is conveniently located as close as possible to the written procedures and is meant to assist the user in identifying parts and components. When something special applies (such as adjustment, torques, etc.) the specific parts are circled and referred to in the text.

For more convenience, the main torque values can be found in text and also in exploded view.

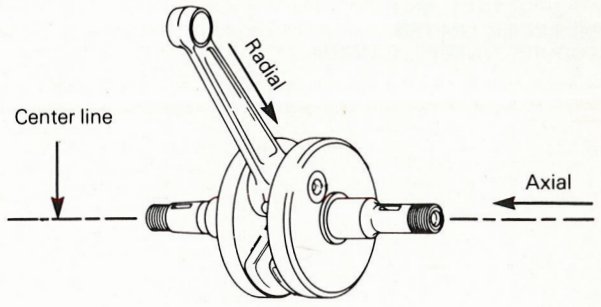
The use of "RIGHT" and "LEFT" indications in text, always refers to (when being sat on the bike) driving position.



When speaking of forces and stresses applied to rotating parts in may be useful to explain the following words:

Axial: parallel to the center line

Radial: perpendicular to the center line.



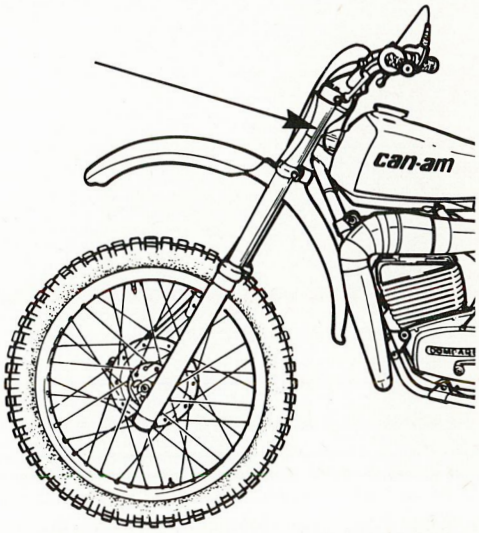
As many procedures in this manual are interrelated, we suggest that before undertaking any task, you read and thoroughly understand the entire section in which the procedure is contained. A number of procedures throughout the book require the use of special tools. **Before commencing any procedure be sure to have on hand all of the tools required, or approved equivalents.**

MODEL IDENTIFICATION

This manual applies to the following MX-4 models.

8840 MX-4 125
8864 MX-4 250
8884 MX-4 370

This number precedes the serial number stamped on the steering head.



GENERAL

All of the information, illustrations and component/system descriptions contained in this manual are correct at time of publication. Bombardier Limited, however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on products previously manufactured.

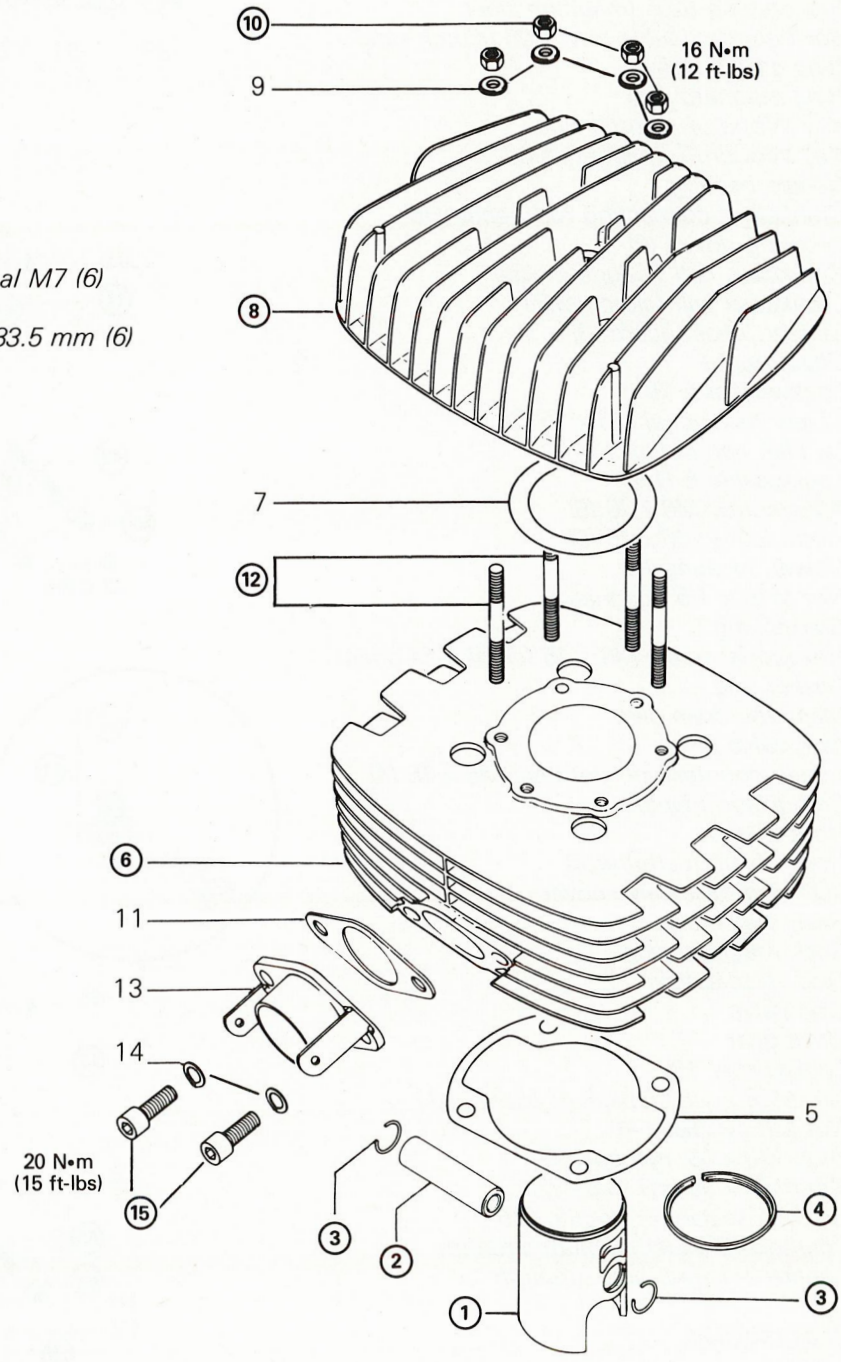
This manual has been written by the

TECHNICAL INFORMATION CENTRE
SERVICE DEPARTMENT
BOMBARDIER LIMITED
VALCOURT, QUÉBEC, CANADA

124 ENGINE TYPE (MX-4 125)

TOP END

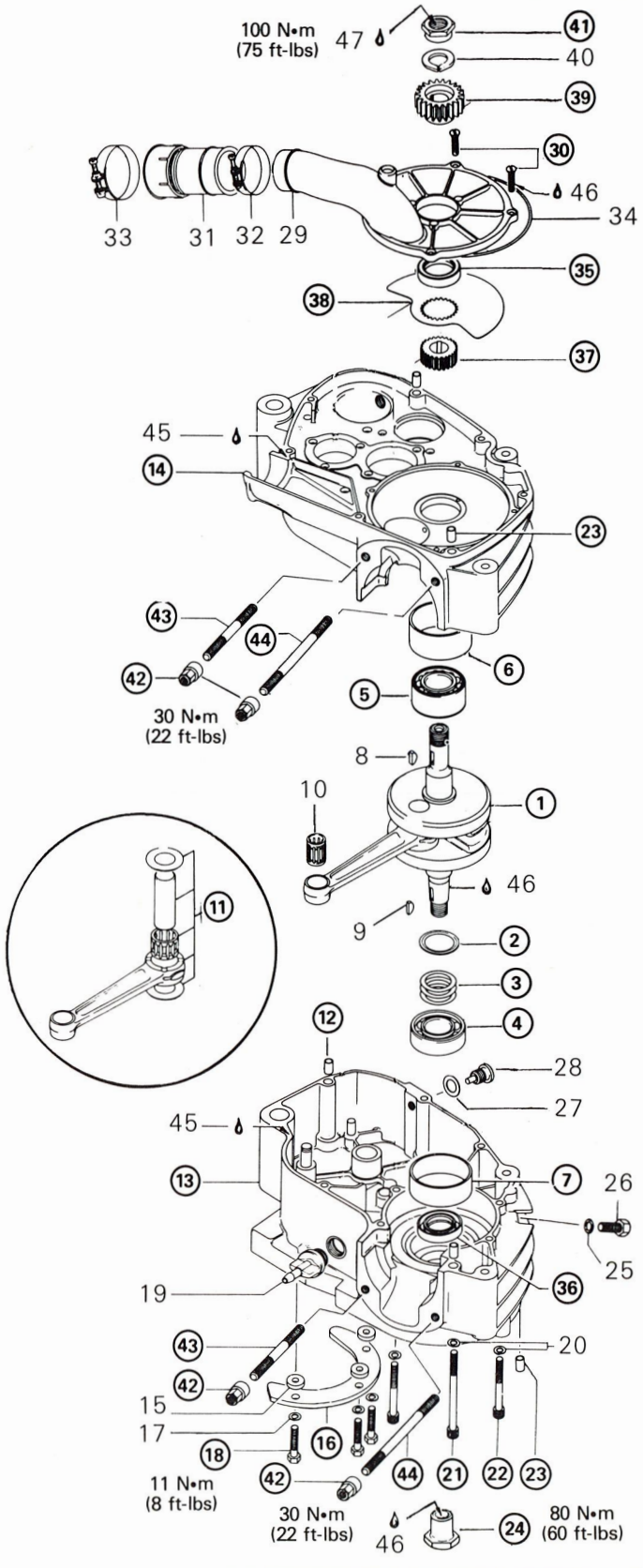
1. *Piston*
2. *Piston pin*
3. *Circlip*
4. *"L" semi-trapez ring (1)*
5. *Cylinder base gasket*
6. *Cylinder*
7. *Cylinder head shim*
8. *Cylinder head*
9. *Washer 7.4 (6)*
10. *Cylinder heat nut hexagonal M7 (6)*
11. *Gasket (exhaust)*
12. *Cylinder heat studs M7 x 33.5 mm (6)*
13. *Exhaust socket*
14. *Lockwasher 8 (2)*
15. *Allen screw M8 x 25 (2)*

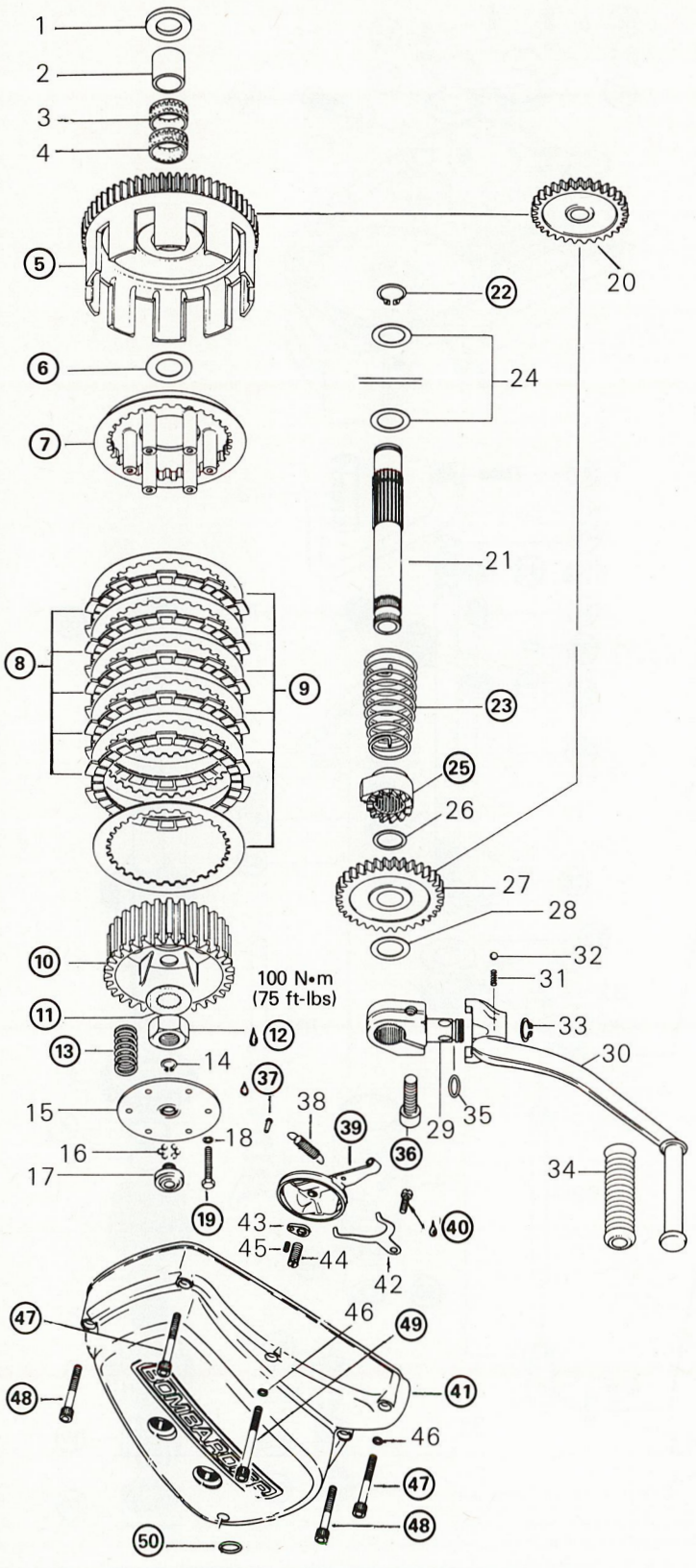


BOTTOM END

1. *Crankshaft*
2. *Distance ring (1)*
3. *Shim(s) A.R.**
4. *Ball bearing 6205 (magneto side)*
5. *Ball bearing double row 3205 (clutch side)*
6. *Ring clutch side*
7. *Ring magneto side*
8. *Key Woodruff, clutch side*
9. *Key Woodruff, magneto side*
10. *Needle bearing*
11. *Crankshaft connecting rod (repair kit)*
12. *Locating dowel (2)*
13. *Crankcase half (magneto side)*
14. *Crankcase half (clutch side)*
15. *Spacer, chain guard (3)*
16. *Chain guard*
17. *Lockwasher 6 (3)*
18. *Screw hexagonal M6 x 16 (3)*
19. *Oil filler cap M18 x 1.5*
20. *Lockwasher 6 (10)*
21. *Allen screw M6 x 70 (5)*
22. *Allen screw M6 x 45 (5)*
23. *Dowel, locating (5)*
24. *Nut M16 x 1.5 (magneto)*
25. *Gasket ring*
26. *Hexagonal screw M8 x 16 (crankcase drain)*
27. *Gasket ring*
28. *Magnetic drain plug*
29. *Disc valve cover*
30. *Screw countersunk slot heat M5 x 16 (4)*
31. *Carburetor adapter*
32. *Hose clamp*
33. *Hose clamp (carburetor)*
34. *"O" ring, disc valve cover*
35. *Seal, clutch side*
36. *Seal, magneto side*
37. *Disc valve spacer*
38. *Disc valve*
39. *Drive gear*
40. *Lockwasher 18*
41. *Nut M18 x 1.5 crankshaft clutch side*
42. *Nut M8 cyl. base (4)*
43. *Stud M8 x 68. cyl. base (2)*
44. *Stud M8 x 96. cyl. base (2)*
45. *Silicone sealant or Loctite 515*
46. *Loctite 242 (blue) medium strength*
47. *Loctite 271 (red) high strength*

**A.R. as required*

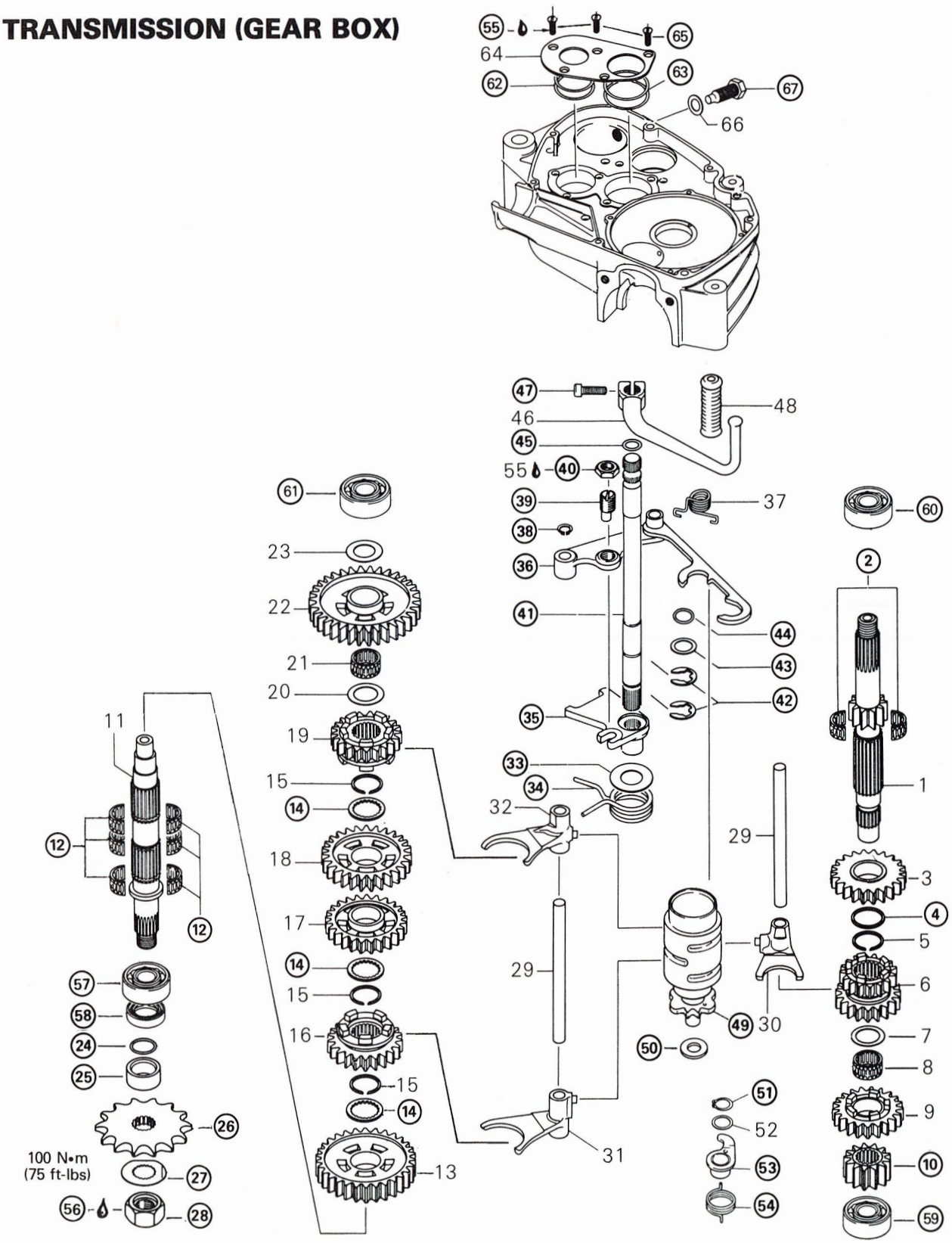




CLUTCH KICK START

1. *Thrust washer (inner)*
2. *Inner race*
3. *Needle bearing*
4. *Needle bearing*
5. *Clutch drum*
6. *Thrust washer (outer)*
7. *Inner pressure plate*
8. *Friction plate (5)*
9. *Driven plate (6)*
10. *Clutch hub*
11. *Locking washer*
12. *Clutch shaft nut M18 x 1.5*
13. *Clutch spring (6)*
14. *Snap ring 10 x 1*
15. *Spring retaining plate*
16. *Ball 5/32" (12)*
17. *Spring retaining plate hub*
18. *Lockwasher 5 mm (6)*
19. *Screw M5 x 25 (6)*
20. *Idler gear 31 tooth*
21. *Kick start shaft*
22. *Circlip*
23. *Return spring*
24. *Thrust washer (2)*
25. *Ratchet gear*
26. *Thrust washer*
27. *Drive gear 34 tooth*
28. *Thrust washer*
29. *Kick start hub*
30. *Kick start lever*
31. *Spring*
32. *Ball 7/32"*
33. *Snap ring*
34. *Rubber sleeve*
35. *O' ring*
36. *Screw M8 x 30*
37. *Drive pin 3 x 8*
38. *Clutch cam return spring*
39. *Clutch release cam*
40. *Screw M5 x 12*
41. *Clutch cover*
42. *Clutch cam retaining spring*
43. *Clutch adjustment locking plate*
44. *Clutch adjustment screw M8 x 15*
45. *Clutch adjustment locking screw M4 x 6*
46. *Gasket*
47. *Allen screw M6 x 40 (3)*
48. *Allen screw M6 x 35 (4)*
49. *Allen screw M6 x 50 (1)*
50. *Seal, kick start shaft*

TRANSMISSION (GEAR BOX)



1. *Clutch shaft 13T*
2. *Needle bearing ass'y, clutch shaft, width 9.73 mm (.383")*
3. *6th gear, clutch shaft 22T*
4. *Thrust washer, clutch shaft*
5. *Snap ring, clutch shaft*
6. *3rd/4th gear, clutch shaft 17/19T*
7. *Thrust washer, clutch shaft*
8. *Needle bearing, clutch shaft*
9. *5th gear, clutch shaft, 21T*
10. *2nd gear, clutch shaft, 15T*
11. *Main shaft*
12. *Needle bearing ass'y main shaft, width 9.65 mm (.380") (3)*
13. *2nd gear, main shaft, 29T*
14. *Thrust washer, main shaft (3)*
15. *Snap ring, main shaft (3)*
16. *5th gear, main shaft, 23T*
17. *4th gear, main shaft, 25T*
18. *3rd gear, main shaft, 27T*
19. *6th gear, main shaft, 21T*
20. *Thrust washer, main shaft*
21. *Needle bearing, main shaft*
22. *1st gear, main shaft, 31T*
23. *Thrust washer, main shaft*
24. *"O" ring, main shaft*
25. *Sprocket spacer*
26. *Sprocket (13T)*
27. *Locking washer, main shaft*
28. *Main shaft nut M18 x 1.5*
29. *Guide pin, shift fork (2)*
30. *Shifting fork, 5th-6th*
31. *Shifting fork, 2nd-4th*
32. *Shifting fork, 1st-3rd*
33. *Thrust washer, actuating lever*
34. *Spring, actuating lever*
35. *Actuating lever*
36. *Pawl ass'y*
37. *Pawl spring*
38. *Snap ring 10 x 1*
39. *Pawl positioning screw*
40. *Locking nut M12 x 1, pawl positioning screw*
41. *Shift shaft*
42. *Retaining ring (2)*
43. *Thrust washer, shift shaft*
44. *"O" ring, shift shaft*
45. *"O" ring, shift shaft*
46. *Shift lever*
47. *Allen screw M6 x 20*
48. *Shift lever rubber*
49. *Shift drum ass'y*
50. *Washer, shift drum*
51. *Index snap ring*
52. *Index washer*
53. *Index lever*
54. *Index spring*
55. *Loctite 242 blue (medium strength)*
56. *Loctite 271 red (high strength)*
57. *Ball bearing 6204, main shaft, sprocket side*
58. *Seal main shaft*
59. *Ball bearing 6203, clutch shaft, sprocket side*
60. *Ball bearing 6204, clutch shaft, clutch side*
61. *Ball bearing 6203, main shaft, clutch side*
62. *Shim 0.5 mm, 0.3 mm, 0.1 mm, main shaft bearing (A.R.)**
63. *Shim 0.5 mm, 0.3 mm, 0.1 mm, clutch shaft (A.R.)* bearing*
64. *Retaining plate (transmission bearings)*
65. *Countersunck screw M5 x 12 (5)*
66. *Gasket ring*
67. *Stop screw, kick starter*

** A.R.: As required*

REMOVAL

Disconnect or remove the following from vehicle if applicable:

Vent tubes

Magneto cover

Spark plug

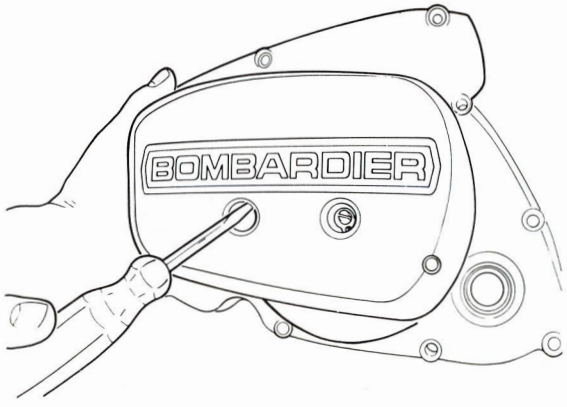
Drive chain

Exhaust pipe

Carburetor

Front engine mounts and stud.

Clutch cable (Remove the clutch cable from the handlebar lever. Remove the clutch cable access plug. Pull the cable housing away from the clutch cover. Push the inner cable inside the cover until its tip is visible through the installation hole, with a screwdriver, disengage it from the clutch release arm and pull it out of the cover).



Lower engine stud and spacers.

Swing arm pivot bolt (note the number of shim/s on the inside swing arm pivot flanges).

Pull the engine upward and forward and withdraw it from the frame through the magneto side.

DISASSEMBLY & ASSEMBLY

NOTE: Refer to Technical Data for component fitted tolerance wear limit.

Top end

①⑥⑧ At the replacement of the piston, cylinder and cylinder head, the squish area should be remeasured (See technical data).

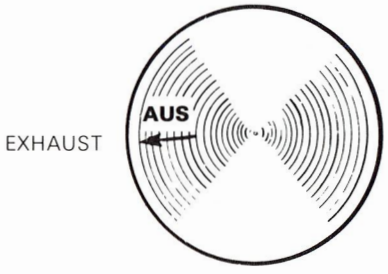
NOTE: The cylinder is made of Nikasil material and there is no possibility of reboring.

①②③ Place a clean cloth over crankase then use a pointed tool to remove circlips from piston.

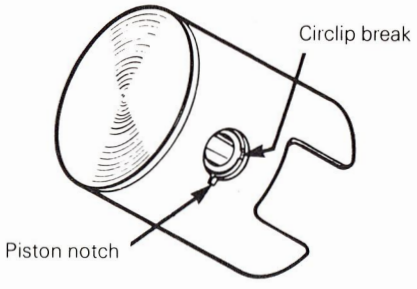
Drive the piston pin in or out using a suitable drive punch and hammer.

CAUTION: When tapping piston pin in or out of piston, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

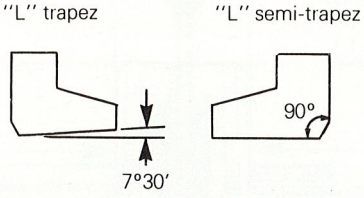
At assembly, place the piston over the connecting rod with the letter AUS (over an arrow on the piston dome) facing direction of the exhaust port.



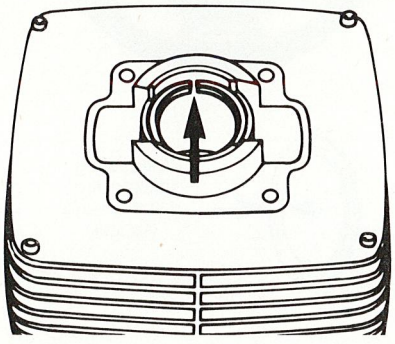
Once the circlips are installed, turn each circlips so that the circlip break is not directly in line with piston notch. Using very fine emery cloth, remove any burrs on piston caused through circlip installation.



④ There is two different types of "L" ring.

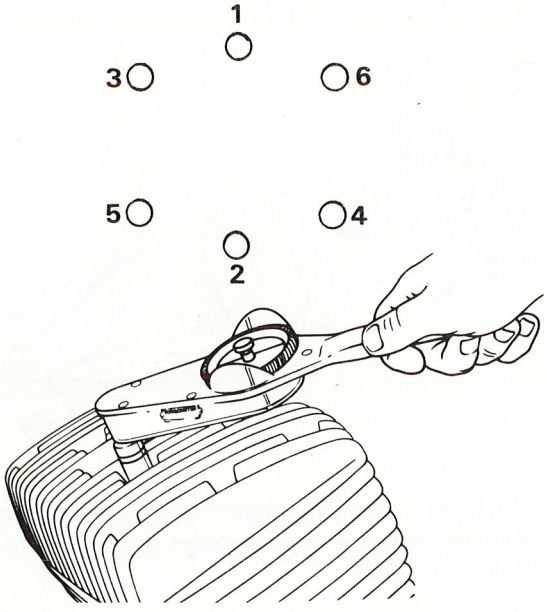


124 engine type (MX-4 125) uses 1 "L" semi-trapez.
Ring end gap: 0.15-0.35 mm (.006-.014 in.).

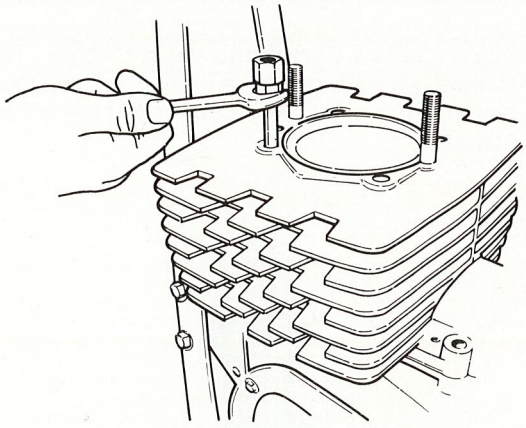


CAUTION: Prior to "L" ring replacement always ensure to visually identify the appropriate type needed. The two ring types are not interchangeable. Damage may occur if interchanged.

⑧⑩ At assembly, torque to 16 N•m (12 ft-lbs) in a criss-cross sequence.



⑫ To unscrew, use 2 cylinder head nuts blocked one against the other.



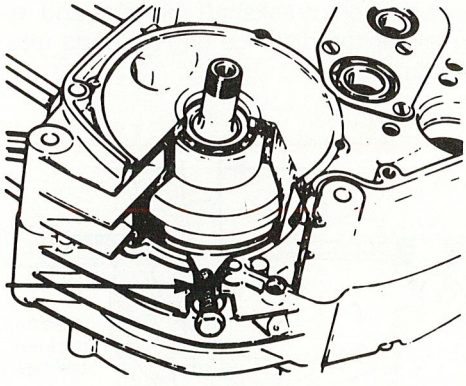
At assembly, screw the long threaded portion of the stud into the cylinder.

⑮ At assembly, torque to 20 N•m (15 ft-lbs).

Bottom End

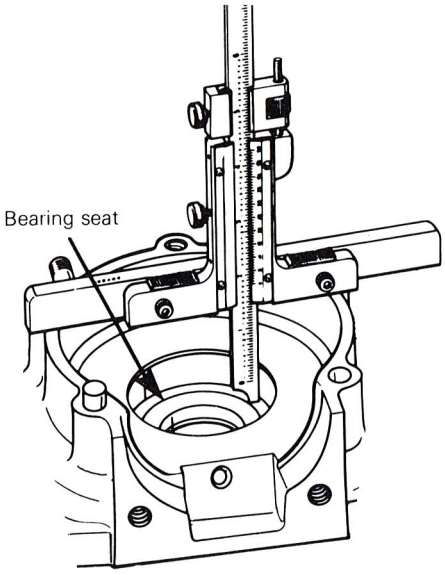
①⑪⑬⑭ At the replacement of the crankshaft, connecting rod and crankcase halves, the squish area should be measured (see Technical Data).

①⑬ To facilitate some procedures, the crankshaft can be locked at the top dead center position using a crankshaft locking bolt as illustrated.

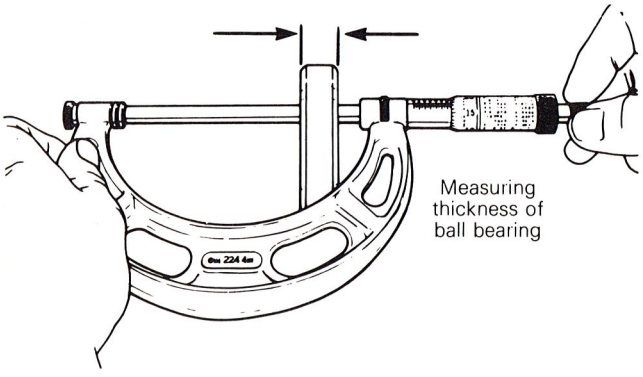


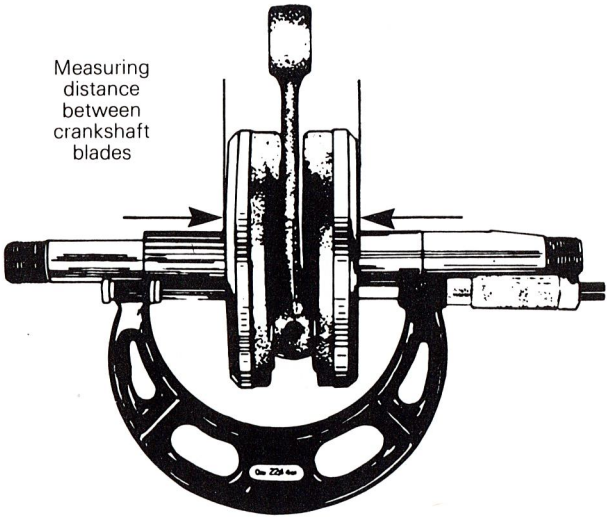
②At assembly, position the distance ring with the chamfered side facing the crankshaft.

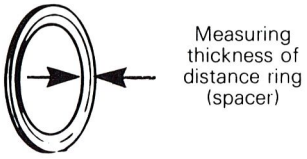
①③Crankshaft end-play should be between 0.025 mm (.001") to 0.1 mm (.004"). To determine the necessary shims: it is necessary to measure the crankcase. To do this, first measure each half from mating surface to bottom of bearing seat. Add measurements of both halves, total equals A.



Measure thickness of each ball bearing. Measure distance between crankshaft blades, and measure the thickness of the distance ring ②. Add measurements. Total equals B.



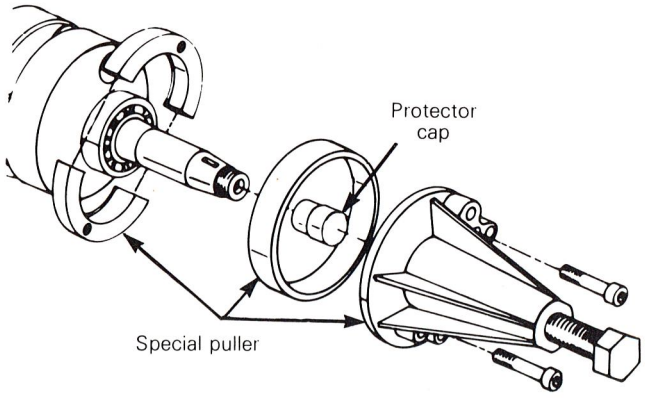




Substract measurement B from measurement A, minus tolerance of 0.025 (.001") to 0.1 mm (.004"). Total balance is distance to be shimed. Shim(s) must be located between distance ring and bearing.

NOTE: Crankshaft end-play is adjusted only when crankshaft and/or crankcase is replaced.

④⑤To remove bearing from crankshaft use bearing puller as illustrated. (See tool section).



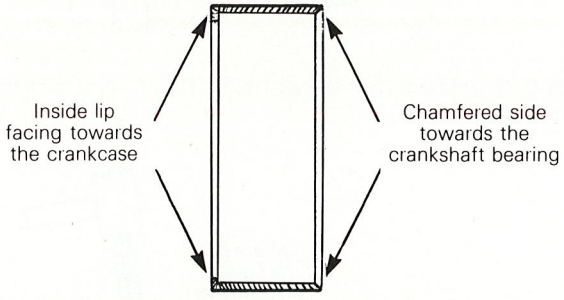
NOTE: Prior to magneto side bearing installation, install distance ring, required shim(s) and bearing on crankshaft.

At assembly, place bearings in an oil container and heat the oil to 93°C (200°F) for 5 to 10 min. This will expand the bearings and permit them to slide easily onto the shaft.

CAUTION: For lubrication purpose, always place the magneto side bearing with open side facing towards outside.

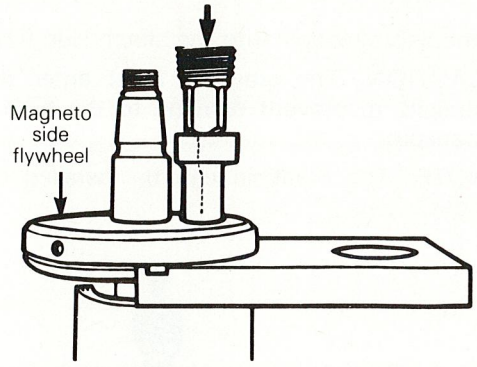
⑥⑦ To install a new polyamid ring use an appropriate insertion pusher (See Tools section).

CAUTION: Make sure to position the polyamid ring with the inside lip portion facing towards the crankcase.



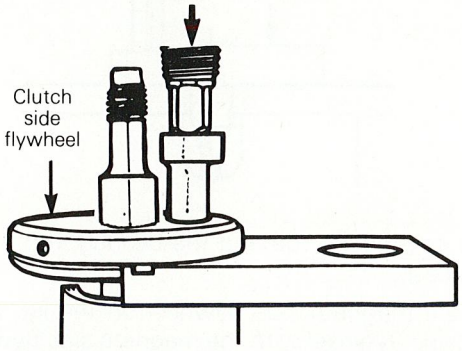
⑪ To replace the connecting rod proceed as follows:

Mount the crankshaft assembly in jig and press the crankpin out of the magneto side flywheel.

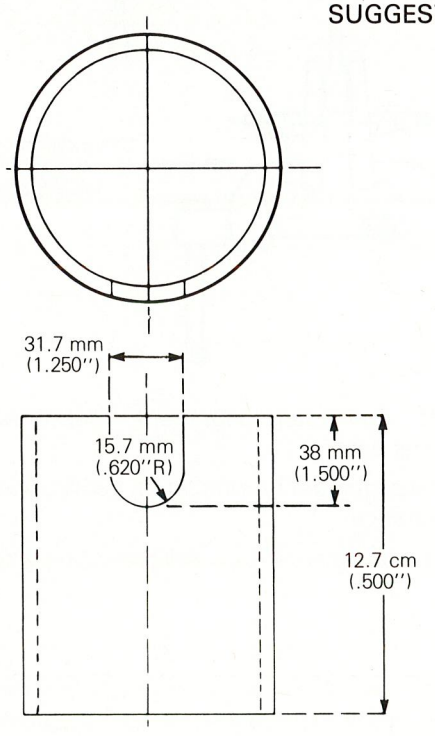


Remove the connecting rod and the bearing.

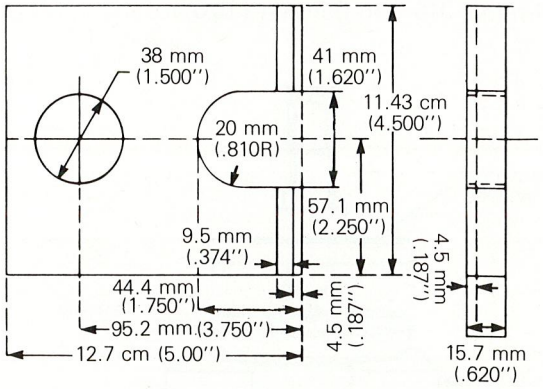
Press the crankpin out of the clutch side flywheel.



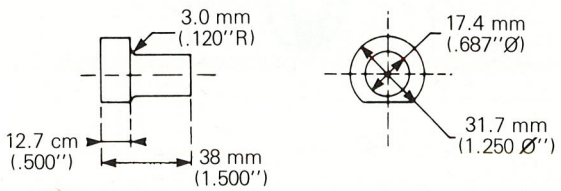
SUGGESTED CRANKSHAFT REPAIR TOOL



STEEL TUBE 11.43 cm (4.5") O.D. x 63 mm (.250") WALL



H.R. ST'L PLATE 11.43 cm (4 1/2") x 15.9 mm (.625") THICK

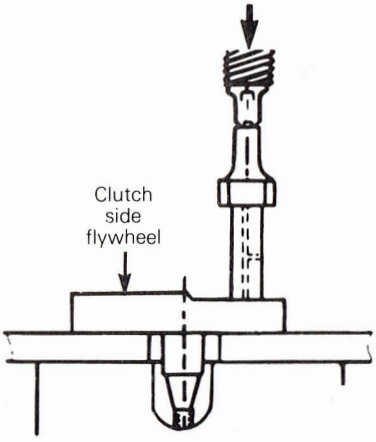


H.R.C.Q. ST'L 31.7 mm (1.250") DIA.

Press the new crankpin into the clutch side flywheel.

CAUTION: The crankpin must enter the bore straight to prevent damage to the bore and/or crankpin.

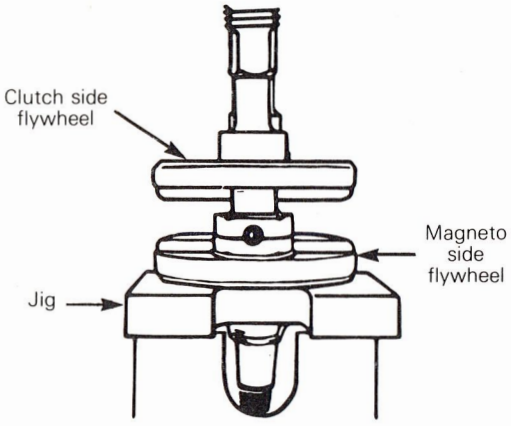
NOTE: The crankpin can be installed on both sides.



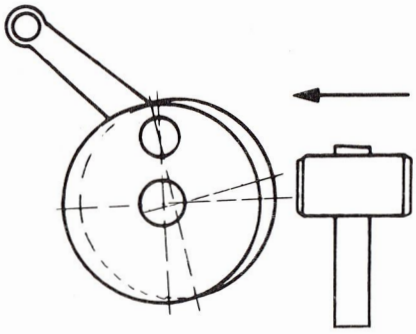
Fit the connecting rod and the bearing into place with light grease.

Place the magneto side flywheel on the jig. Align the clutch side flywheel with the magneto side flywheel and press the crankpin (with rod assembly) into magneto side flywheel.

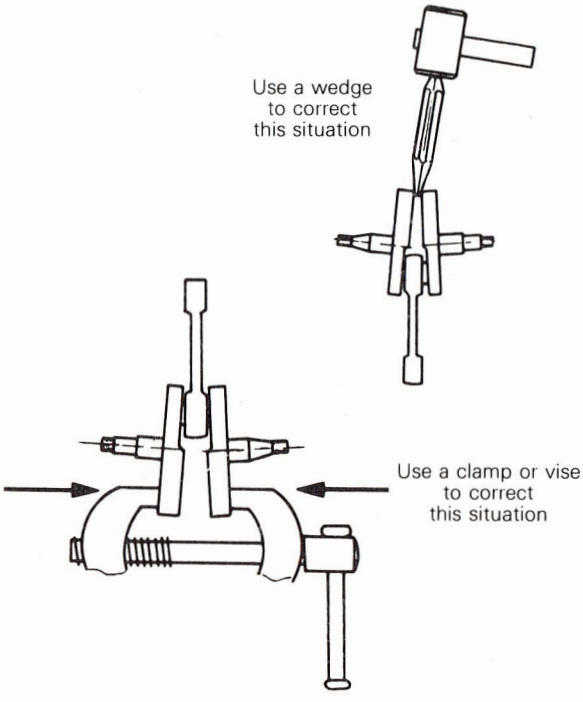
NOTE: The connecting rod side clearance must be 0.4 mm (.015") to 0.5 mm (.020").



Using a "straight edge", check for flywheel alignment. Drift with a heavy brass mallet to align if necessary.



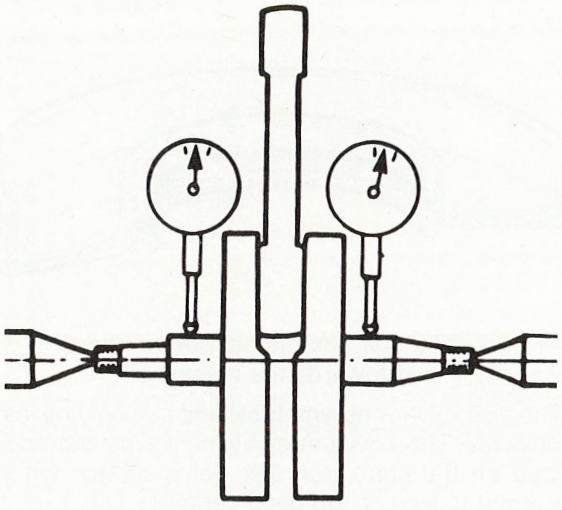
Using a micrometer or vernier caliper, check for flywheel alignment.



NOTE: For final alignment measures, see technical data.

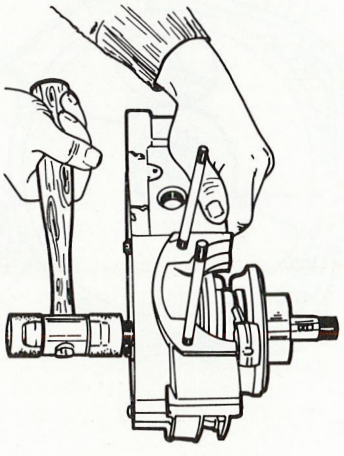
When overall alignment is completed, verify connecting rod side clearance.

NOTE: Make a final alignment check using a dial indicator.



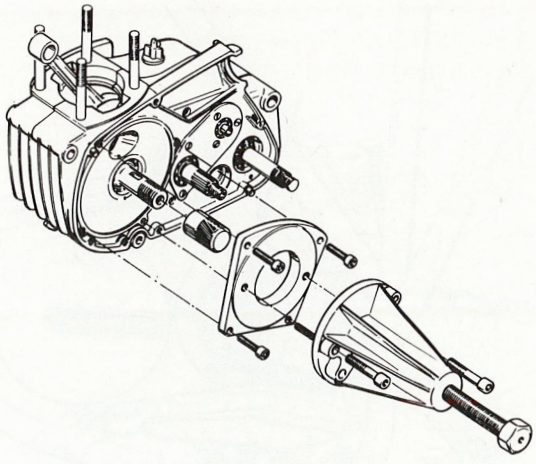
⑫ At the joining of the crankcase halves, make sure the locating dowel sleeves are in place.

⑬ Remove the crankshaft from the crankcase by tapping on the crankshaft end with a soft hammer.

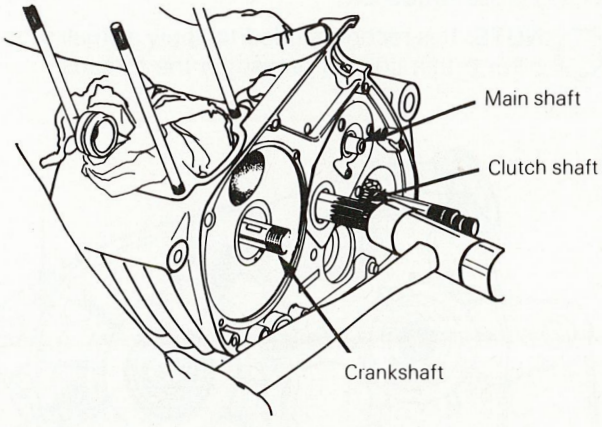


CAUTION: Prior to the crankshaft removal ensure that the crankshaft locking bolt is removed.

⑬⑭ To split the crankcase halves, use a protective cap and puller (See Tools section).



NOTE: The crankcase halves can also be split, by tapping equally on the main shaft, clutch shaft and crankshaft.

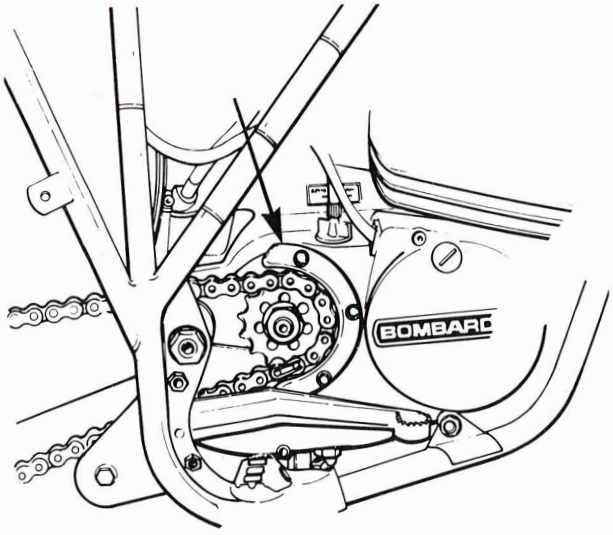


CAUTION: Do not pry between crankcase halves, as score marks incurred are detrimental to crankcase sealing.

Prior to joining the crankcase halves, carefully clean the mating surfaces with acetone, wood alcohol or equivalent.

Apply a light coat of Loctite 515 sealant or silicone sealant.

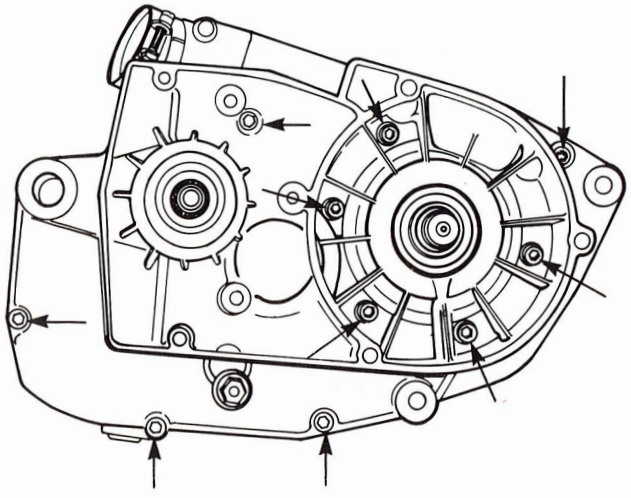
⑯⑱ At assembly, ensure to use the proper chain guard (13 teeth, 14 teeth or 15 teeth engine sprocket).



Torque the retaining bolts to 11 N•m (8 ft-lbs).

㉑㉒ At assembly, torque to 11 N•m (8 ft-lbs) following a criss-cross sequence.

NOTE: It is recommended to apply a small drop of oil or a thin coat of grease on the threads.

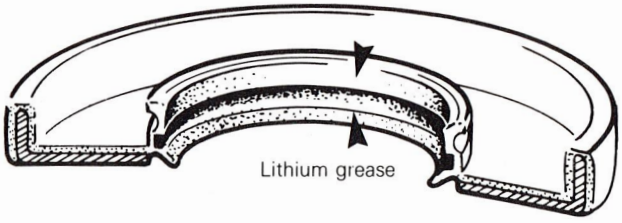


㉓ At assembly of the magneto cover and/or clutch cover ensure that the locating dowel sleeves are in place.

㉔ At assembly apply Loctite no. 242 blue, (medium strength) on the inside threads of the magneto retaining nut and torque to 80 N•m (60 ft-lbs).

㉚ At assembly, apply Loctite 242 blue (medium strength) on threads and torque to 5.5 N•m (4 ft-lbs).

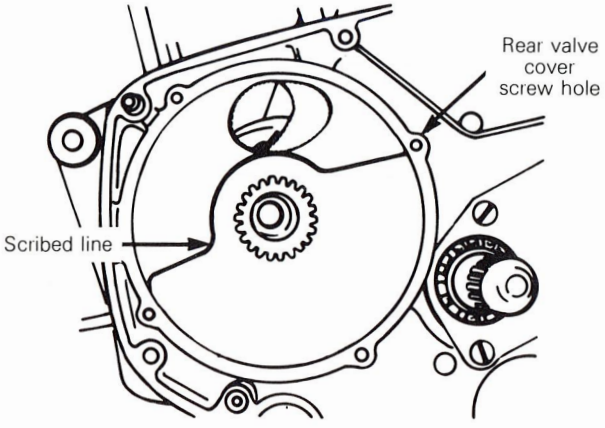
㉟㊱ To install new seals, use the appropriate oil seal insertion pusher. (See Tool section). At assembly, apply a light coat of lithium grease on the seal lips.



㊲ At assembly, the chamfered side of the disc valve spacer must face towards the crankshaft.

㊳ The disc valve is **assymetrical** and can only be installed one way. The valve cut-away must align with the line scribed on the crankcase disc valve surface with the crankshaft locked at **top dead center** (T.D.C.).

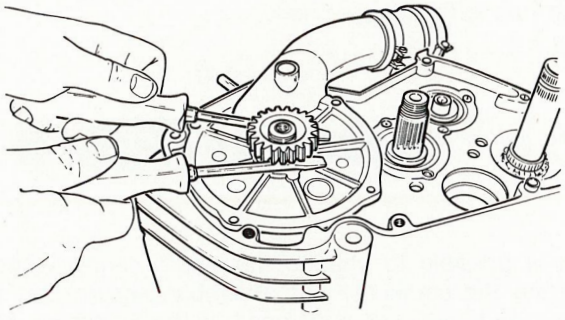
NOTE: If the crankcase disc valve surface is not scribed, the disc leading edge must align with the top rear valve cover screw hole as illustrated.



㊴ Use 2 screwdrivers to remove the crankshaft drive gear.

CAUTION: Excessive leverage may damage rotary valve cover.

Use a small finger puller if gear resists easy removal.



At assembly, install the crankshaft drive gear very carefully to avoid folding the seal lip over.

㊶ Prior to the installation of the crankshaft drive gear retaining nut, proceed as follows:

Clean the nut and crankshaft threads with Loctite "Kleen N' Prime" or equivalent. Apply Loctite no. 271 red (high strength) or equivalent on the inside threads of the drive gear retaining nut only.

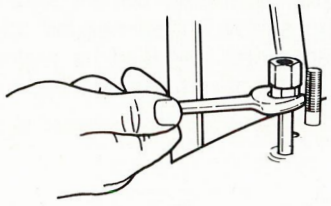
CAUTION: Do not apply Loctite Lock'n Seal on the threaded portion of the crankshaft as the drive gear could become glued to the crankshaft and damage to other engine parts could occur during the removal of the drive gear.

Torque the drive gear retaining nut to 100 N•m (75 ft-lbs).

NOTE: Allow at least one hour for the Loctite to set before starting the engine.

㊷ At assembly torque the cylinder base nuts to 30 N•m (22 ft-lbs) following a **criss-cross** sequence.

㊸㊹ To unscrew, use 2 cylinder base nuts blocked one against the other.

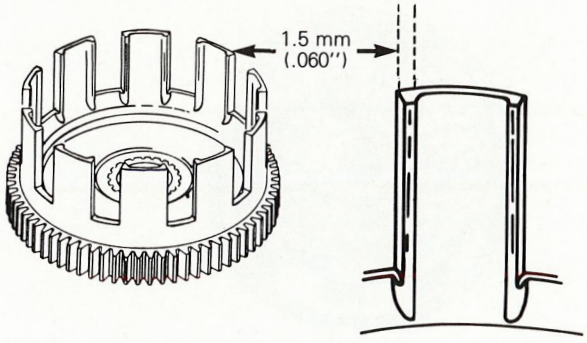


At assembly, ensure to position the 2 shortest studs at the rear and to screw the flat end portion of the stud into the crankcase.

Clutch and kick start

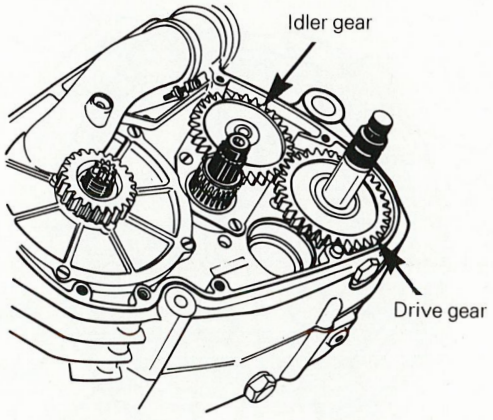
⑤ If the clutch drum splines are found to be severely worn, replacement may not be necessary. File the damaged spline surfaces equally.

CAUTION: The shouldered wall should not be filled thinner than 1.5 mm (.060").



⑤⑥⑦⑧⑨⑩ Prior to assembling the clutch hub, make sure to position the idler and drive gear as illustrated.

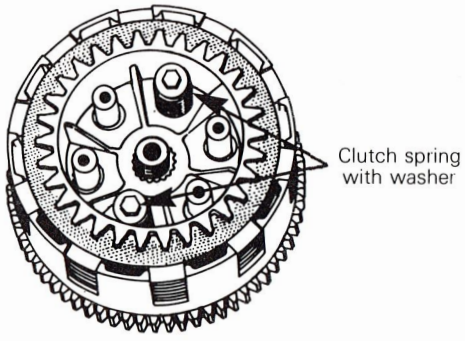
NOTE: The flanged side of the idler gear must face toward the crankcase.



CAUTION: Prior, to clutch hub installation properly position the thrust washer ⑥.

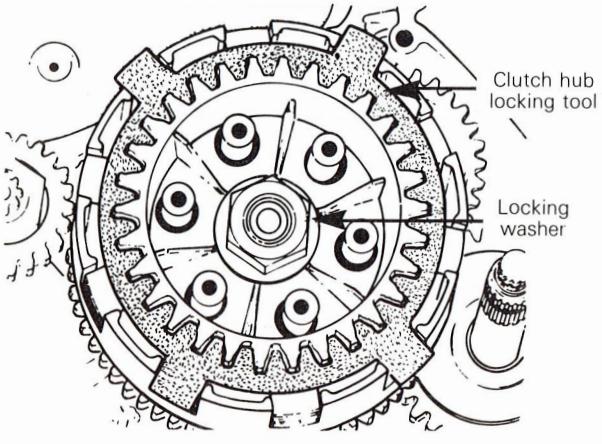
With the clutch plates mounted on the clutch hub, fit clutch inner pressure plate in alignment with hub splines. Carefully insert clutch hub/plate assembly into clutch drum onto clutch shaft.

NOTE: To ease assembly, install two clutch springs with washers to hold the clutch together.



⑪ CAUTION: Locking washer should be replaced if bent more than twice. If in doubt, replace.

⑫To remove clutch shaft nut, lock the crankshaft at top dead center, unbend the locking washer and lock the clutch using the clutch hub locking tool (see tool section).



At assembly, apply Loctite no. 271 red (high strength) on the threads of the clutch shaft nut and torque to 100 N•m (75 ft-lbs).

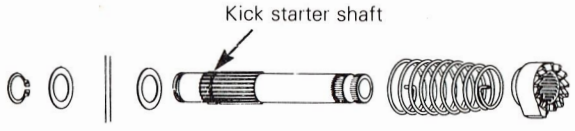
WARNING: Make sure to bend the clutch shaft nut locking washer.

CAUTION: Do not pry on the inner pressure plate spring post to bend the locking washer, use a pair of waterpump pliers.

⑬If spring(s) replacement is needed ensure to change the springs in sets only.

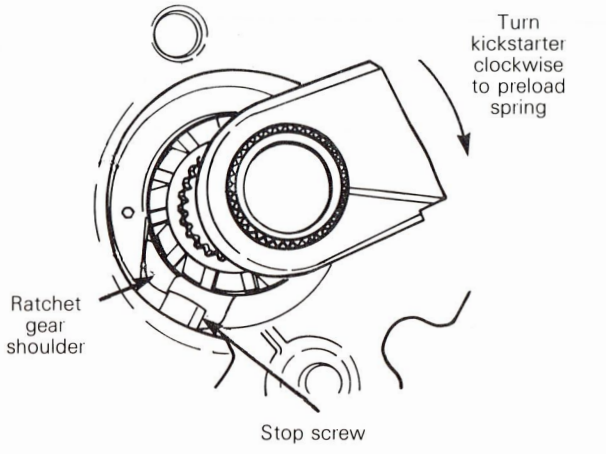
⑲At assembly, tighten in a criss-cross sequence and torque to 5.5 N•m (4 ft-lbs).

㉒To remove the kickstart assembly from the crankcase remove the snap ring located in the inside portion of the crankcase and unscrew the kick starter stop screw under the left crankcase half.



㉓It is possible to change the return spring without splitting the crankcase. At assembly, ensure that the spring ends are well positioned in the crankcase hole and ratchet gear holes.

㉕To position ratchet gear, install the kick starter lever and preload the kick starter spring approximately 1 turn clockwise. Slide ratchet gear onto spline while retaining the tension with the kick starter lever. Release the kick starter lever and the ratchet gear shoulder will lean against the stop screw.



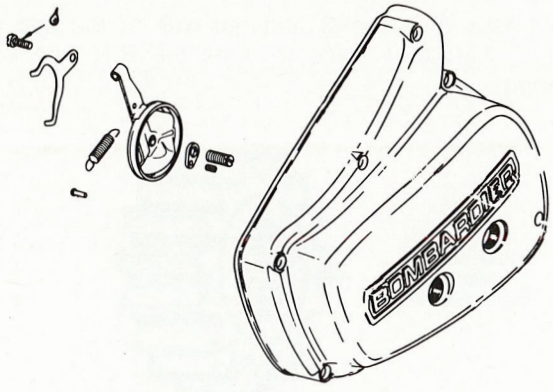
NOTE: After assembly, do not remove the kick starter stop screw unless needed otherwise the kick starter spring will lose its preload and the clutch cover will have to be removed to reposition.

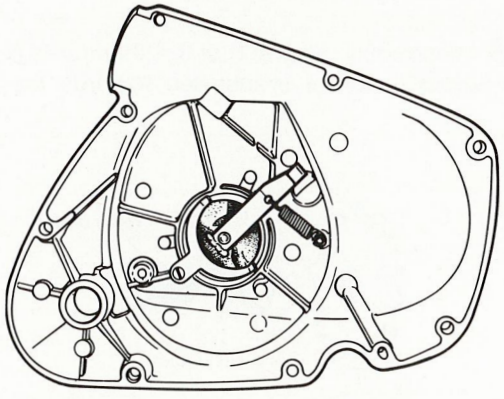
(36) At assembly, torque to 20 N•m (15 ft-lbs).

(37) Apply Loctite no. 271 red (high strength) and press fit into place.

NOTE: Replace only if damaged or when replacing clutch cover.

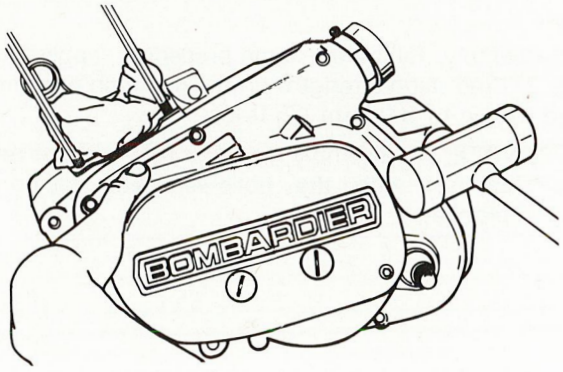
(39) (40) At assembly, position as illustrated.





At assembly, apply Loctite no. 242 blue (medium strength) on screw threads and torque the screw to 5.5 N•m (4 ft-lbs).

(41) To remove the clutch cover, tap lightly using a soft faced hammer to break the seal (as illustrated).

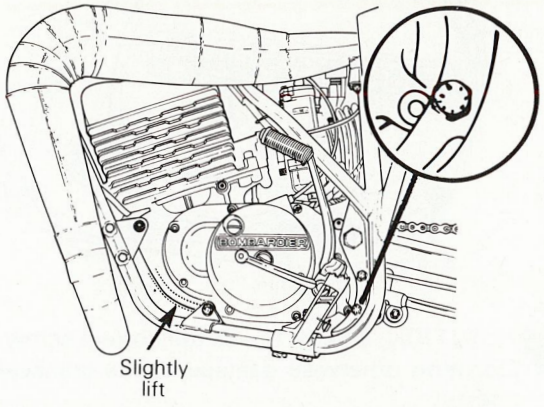


CAUTION: Do not pry between sealing surfaces, as score marks incurred are detrimental to clutch cover sealing.

NOTE: If the clutch cover is to be removed with the engine in the frame, it is necessary to slightly lift the front of the engine to allow clutch cover to clear the lower frame portion, near footrest.

Prior to removal, ensure to drain the engine oil and to slacken the swing arm bolt.

CAUTION: Do not attempt to remove clutch cover without lifting engine. Severe damage can occur.



With clutch cable still connected, pull clutch lever in. It will then pre-load against the cover to ease removal.

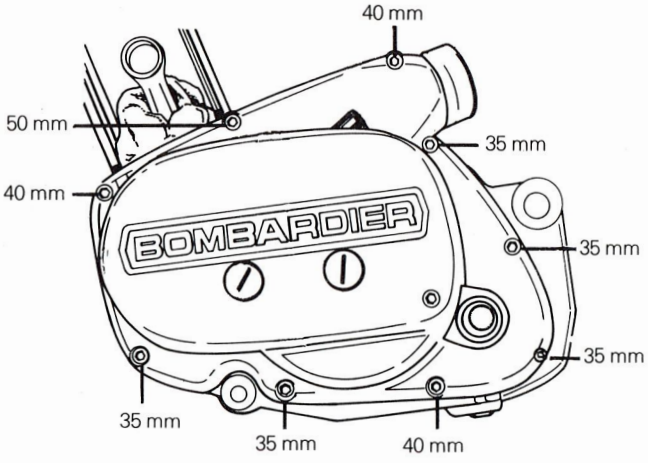
At assembly, clean the mating surfaces of the crankcase and clutch cover with acetone, wood alcohol or equivalent. Apply a light coat of Loctite 515 sealant or silicone sealant to the mating surfaces and lightly tap cover into place.

CAUTION: Make sure the kick starter oil seal is not flipped over by the kick starter shaft splines when pushing the clutch cover into place.

At assembly, apply lithium grease on the seal lips.

⑰⑱⑲ At assembly, torque the retaining screws to 8 N•m (6 ft-lbs) following a criss-cross sequence and apply a small drop of oil or a thin coat of grease on the threads.

NOTE: For the proper location of the clutch cover retaining screws follow illustrated sequence.



CAUTION: Ensure to use the correct screw for its location otherwise damage to the crankcase will occur.

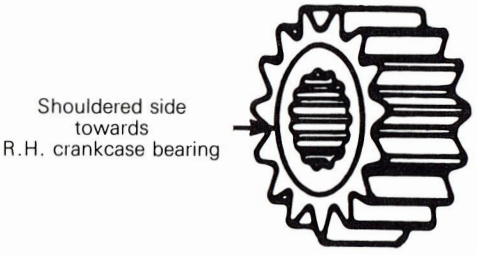
Transmission (gear box)

②⑫ The needle bearing halves must be replaced in pairs only.

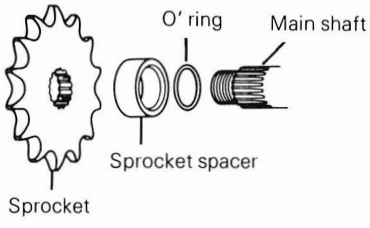
CAUTION: Do not intermix the needle bearing halves, damage could occur. If bearing halves have been intermix, refer to the description to find the proper width of the bearing halves.

④⑭ The sharp edge of the splined thrust washer must face the retaining snap ring.

⑩ At assembly, the shouldered side of the 2nd gear clutch shaft must face towards the R.H. crankcase bearing.



㉔㉕㉖ At assembly, ensure that the chamfered portion of the sprocket spacer is installed towards the main shaft.



㉗CAUTION: Locking washer should be replaced if bent more than twice. If in doubt, replace.

㉘ To remove the sprocket retaining nut, unbend locking washer. Lock crankshaft at the top dead center position and with the transmission in gear, unscrew the nut.

At assembly, follow the same procedure, apply Loctite no. 271 red (high strength) on the retaining nut threads and torque to 100 N•m (75 ft-lbs).

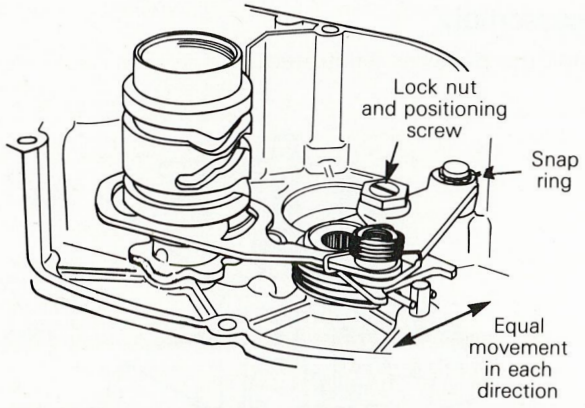
NOTE: At assembly, position the sprocket retaining nut with the hollowed side facing the sprocket.

㉝㉞㉟ Assemble the spring, thrust washer and actuating lever as illustrated.

WARNING: Exercise care when removing or installing the actuating lever spring.

㊳㊴㊵ To adjust shifter drum actuating pawl proceed as follows. Position shift drum ass'y in 2nd gear or above to obtain an even travel at the actuating lever.

Then with the shift shaft in position, gently move shift lever in each direction from the middle position until shifter pawl contacts the shifter drum pin and note the amount of movement in each direction at the actuating lever.

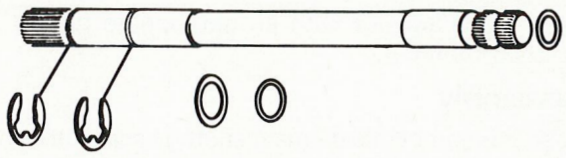


Movement in both direction must be equal. If not, the pawl ass'y can be repositioned by unlocking the lock nut and adjusting the pawl positioning screw. Lock the nut and verify. Repeat until the travel is equal on both sides.

When final adjustment has been reached, **apply Loctite no. 242 blue (medium strength) on the lock nut threads and torque to 27 N•m (20-22 ft-lbs).**

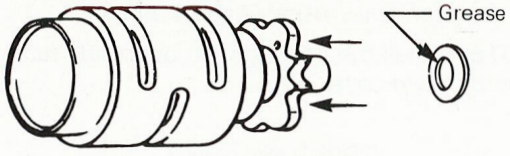
㊳CAUTION: At the removal of the pawl ass'y take care not to overspread the snap ring. Prior to assembly, make sure to reclose snap ring gap.

㊶㊷㊸㊹㊺ At assembly, position the retaining rings, thrust washers and "O" rings as illustrated.



㊼ At assembly, torque to 11 N•m (8 ft-lbs).

㊾㊿ At re-assembly it is recommended to coat the shift drum washer with grease, this will allow the washer to stick on the shift drum for ease of installation.



Hold the index lever (in crankcase) fully open while inserting the shift drum in place.

(51)(53)(54) At assembly, properly position the index spring in index lever hole and crankcase hole.

CAUTION: Ensure that the index snap ring is well seated in its groove.

(57) Heat is needed to remove or install the main shaft bearing into the sprocket side.

CAUTION: Always apply heat to remove or install a bearing in the crankcase. Failure to apply heat may result in metal being drawn out of the bearing to crankcase contact surface, thus causing a loose fit within the crankcase.

Proceed as follows:

WARNING: Engines have magnesium crankcase. Magnesium must be heated with great care.

Disassembly

Using a butane torch with a large soft flame, heat the outside crankcase bearing embossment with 4 to 5 rapid circular passes.

Drift the bearing out with an appropriate pusher and soft faced hammer.

Reassembly

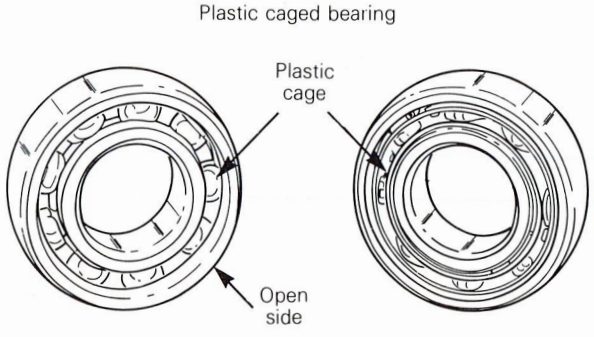
Grease the sprocket side main shaft oil seal with lithium grease.

Cut a 50 mm (2") diameter disc out of asbestos material. Place the disc over the oil seal to protect it from the flame.

Heat the crankcase bearing embossment as described above.

Quickly turn the crankcase half over and drift the bearing into the crankcase using a soft hammer.

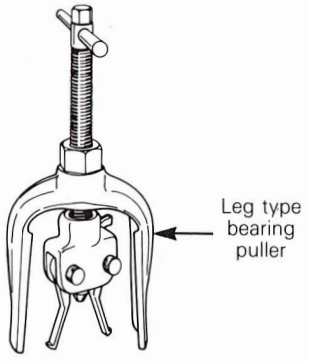
◯ **NOTE:** Install the bearing with open side facing inside of crankcase.



(58) To install a new seal, use the appropriate oil seal insertion pusher. (See tool section). Apply a light coat of lithium grease on the seal lip.

◯ **NOTE:** The oil seal can only be replaced with the main shaft bearing removed.

(59) Heat and a leg type puller is needed to remove the clutch shaft bearing from sprocket side crankcase.



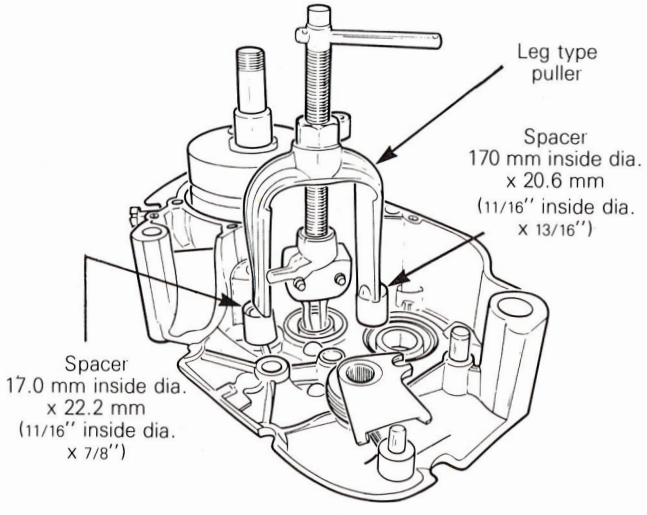
▼ **CAUTION: Always apply heat to remove or install a bearing in the crankcase. Failure to apply heat may result in metal being drawn out of the bearing to crankcase contact surface, thus causing a loose fit in the crankcase.**

Proceed as follows:

◆ **WARNING: Engines have magnesium crankcase. Magnesium must be heated with great care.**

Disassembly

Install the puller as illustrated.



◯ **NOTE:** Two (2) cylindrical spacers are needed to properly position the puller in the crankcase.

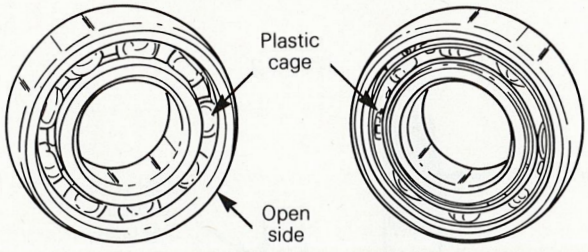
Using a butane torch with a large soft flame, heat around the crankcase clutch shaft bearing area with 4 to 5 rapid circular passes, then extract the bearing.

◯ **NOTE:** Install the bearing with open face facing inside of the crankcase.

Reassembly

Heat around the crankcase area as described above and quickly drift the bearing into the crankcase using a soft hammer.

Plastic cage bearing



⑥⓪⑥① Heat is needed to remove or install the clutch and main shaft bearings in the clutch side crankcase.

CAUTION: Always apply heat to remove or install a bearing in the crankcase. Failure to apply heat may result in metal being drawn out of the bearing to crankcase contact surface, thus causing a loose fit in the crankcase.

Proceed as follows:

WARNING: Engines have magnesium crankcase. Magnesium must be heated with great care.

Disassembly

Remove the bearing retaining plate and shim(s).

Using a butane torch with a large soft flame, heat the crankcase (inside portion) around the bearing area with 4 to 5 rapid circular passes.

Drift the bearing(s) out with an appropriate pusher and soft hammer.

Reassembly

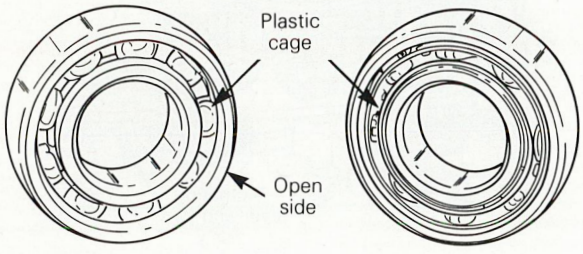
Install the bearings retaining plate without shim(s).

Heat the crankcase (inside portion) as described above.

Quickly drift the bearing(s) into the crankcase using a soft hammer, until the bearing(s) sit against the bearing retaining plate.

NOTE: Install the bearing(s) with open side facing outside of the crankcase.

Plastic caged bearing



Remove the bearing retaining plate and verify the end play.

⑥②⑥③ The transmission shaft end-play must be 0.1 mm (.004") maximum.

Proceed as follows to verify the end-play.

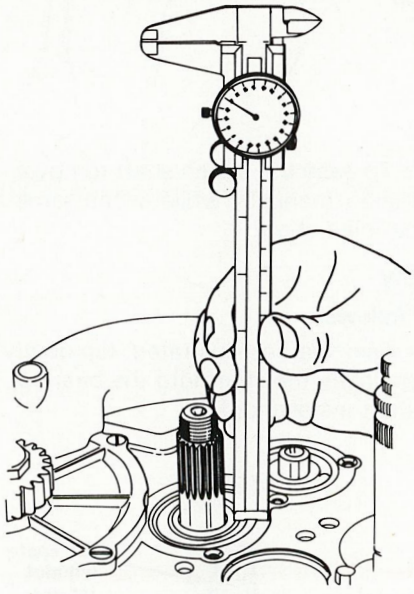
Remove the bearing(s) retaining plate and shims.

Tap both clutch and main shafts towards the sprocket side crankcase.

Tap both bearing **inner** races towards the sprocket side crankcase.

Measure the distance between the bearing **outer race** and the **crankcase surface** to determine the shims required between the bearing and the retaining plate.

The end-play must be 0.1 mm (.004") maximum.



CAUTION: If transmission shimming is too tight, transmission binding and excessive friction will occur.

⑥⑤ At assembly, apply Loctite no. 242 blue (medium strength) on the retaining screw threads and torque to 4-5.5 N•m (3-4 ft-lbs).

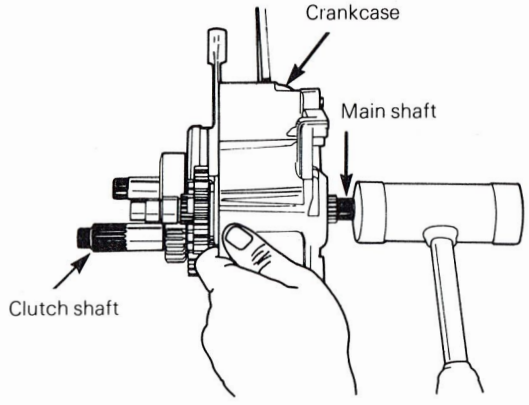
⑥⑦ At assembly, torque the kick starter stop screw to 34-40 N•m (25-29 ft-lbs).

NOTE: After assembly, do not remove the kick starter stop screw unless needed otherwise the kick starter spring will loose its preload and the clutch cover will have to be removed to reposition.

Transmission gear cluster

Disassembly

To remove the clutch and main shaft gear cluster from the crankcase, tap on the sprocket side end of the main shaft.



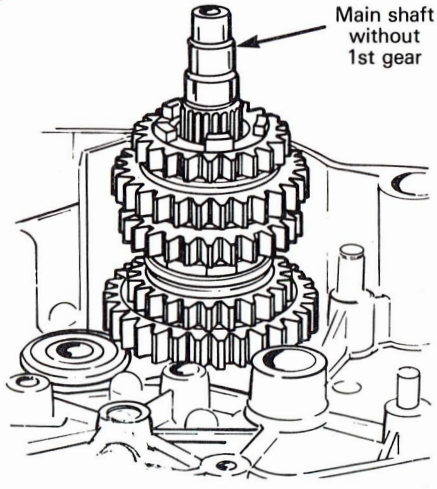
NOTE: To ease the clutch shaft removal, turn the clutch shaft manually while at the same time hitting the main shaft.

Reassembly

Proceed as follows:

Position the main shaft as illustrated, tap gently without pushing completely the shaft into the bearing. (to ease the clutch shaft installation).

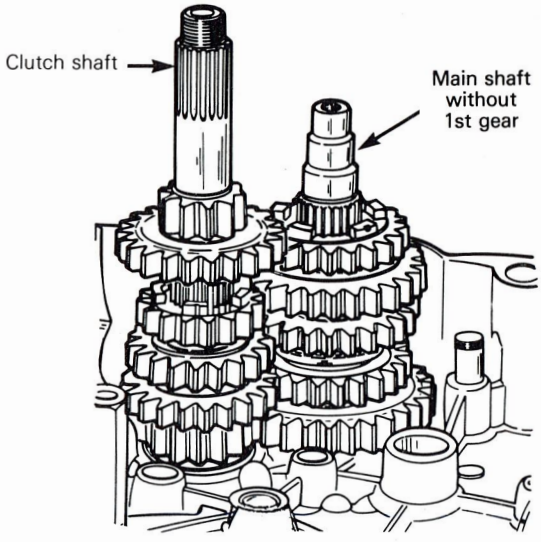
STEP 1



Position the clutch shaft as illustrated, tap gently to push the shaft into the bearing, while turning the main shaft manually; completely seat both shafts.

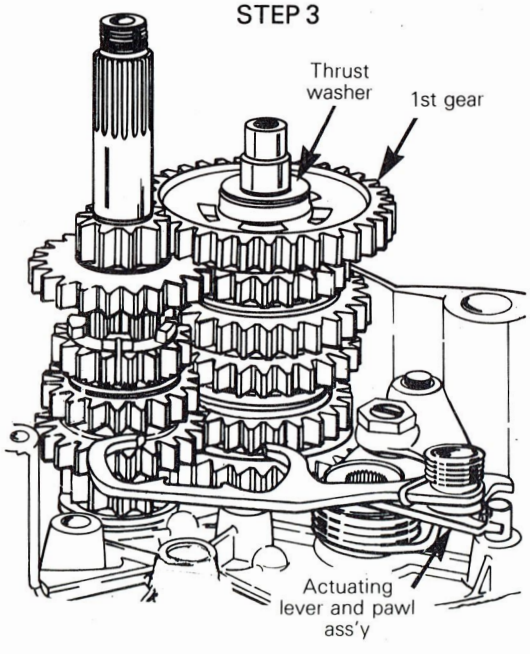
CAUTION: Prior to pushing the clutch shaft into the bearing, make sure the gears match.

STEP 2



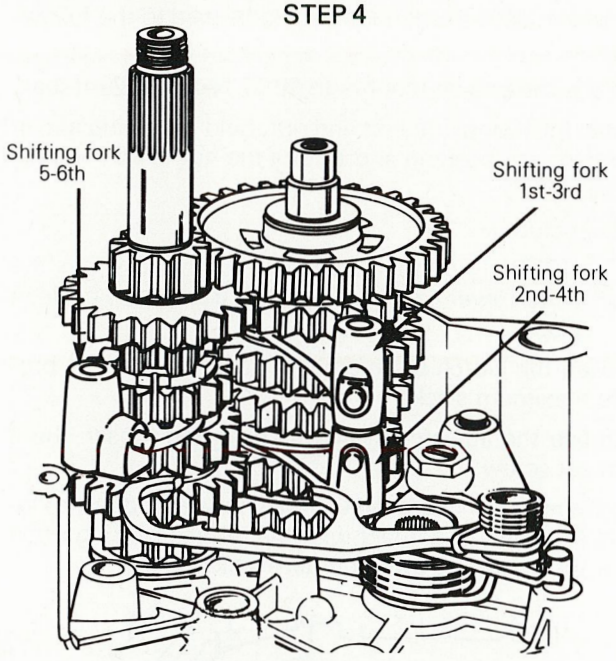
Position the thrust washer, needle bearing, first gear and thrust washer, and then the actuating lever and pawl ass'y as illustrated.

STEP 3



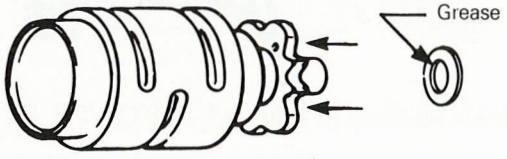
Position the shifting forks as illustrated.

STEP 4

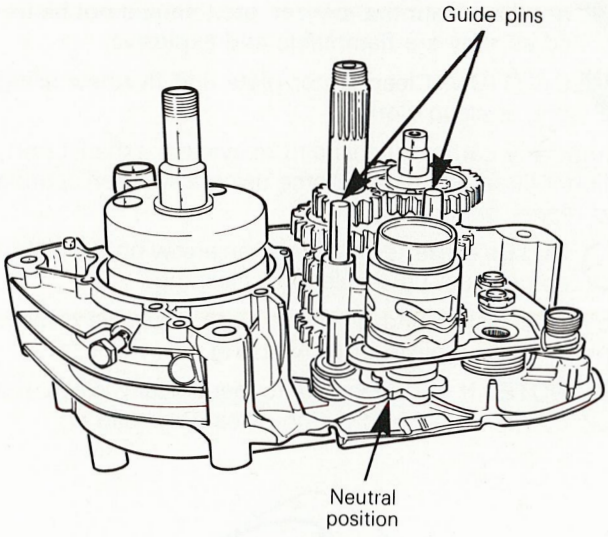


STEP 5

Coat the shift drum washer with grease, this will allow the washer to stick on the shift drum for ease of installation.



Position the shift drum ass'y, and match all the shifting forks with the drum slots then position the guide pins as illustrated:



Hold the index lever (in crankcase) fully open while inserting the shift drum in place.

NOTE: To facilitate the assembly of the shifting forks, position the shift drum assembly at the neutral position.

Prior to reassembly of the crankcase halves, **adjust the shifting mechanism** and **ensure that the index is leaning against the neutral notch.**

CLEANING

Clean all the metal components in a metal cleaner.

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

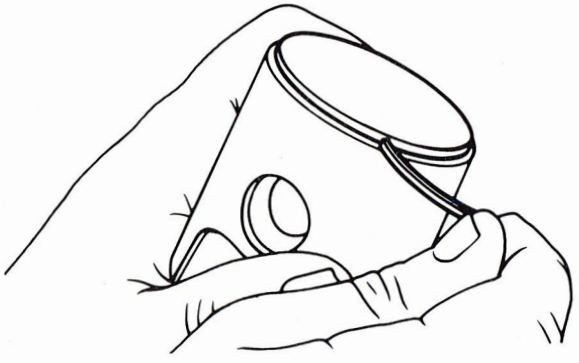
CAUTION: Clean stator plate and flywheel using only a clean cloth.

Scrape any carbon deposits from cylinder exhaust port, cylinder head and piston dome using a wooden spatula and repeat periodically.

NOTE: The letter **AUS** over an arrow on the piston dome must be visible after cleaning.

Clean the piston ring groove(s) with a groove cleaner tool, or using a piece of broken ring.

NOTE: It is suggested to periodically clean the cylinder head and piston of carbon build up.



Scrape any deposit from the piston crown and inspect the piston for cracks or seizure marks.

Remove all traces of the cylinder base gasket and fit a new lightly greased gasket.

Remove old sealant from mating surfaces of crankcase with acetone wood alcohol or equivalent.

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

INSTALLATION

To install engine on vehicle inverse removal procedure.

However, special attention should be paid to the following.

Torque the engine mounts to 20-27 N•m (15-20 ft-lbs).

Install the swing arm bolt and nut, hold the swing arm in the mid-way position and torque the nut to 95 N•m (70 ft-lbs).

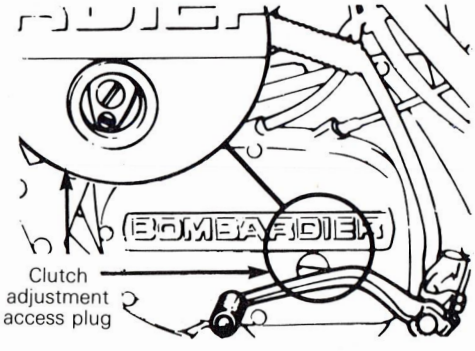
Adjust clutch.

NOTE: Prior to clutch adjustment, operate the clutch lever a couple of times, to seat the cable in place.

Loosen the clutch cable adjuster (at handlebar) to provide maximum slack.

Remove the adjustment access plug and loosen the 4 mm set screw.

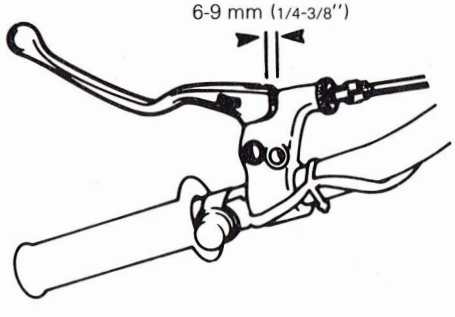
Turn the 8 mm clutch adjusting screw in and out to locate the point of contact with the release bearing, then turn the screw 1/2 **turn counter-clockwise.**



Carefully tighten the 4 mm set screw to lock the adjustment.

Replace the access plug.

Adjust the cable adjuster to provide 6-9 mm (1/4-3/8") slack between clutch lever and housing.

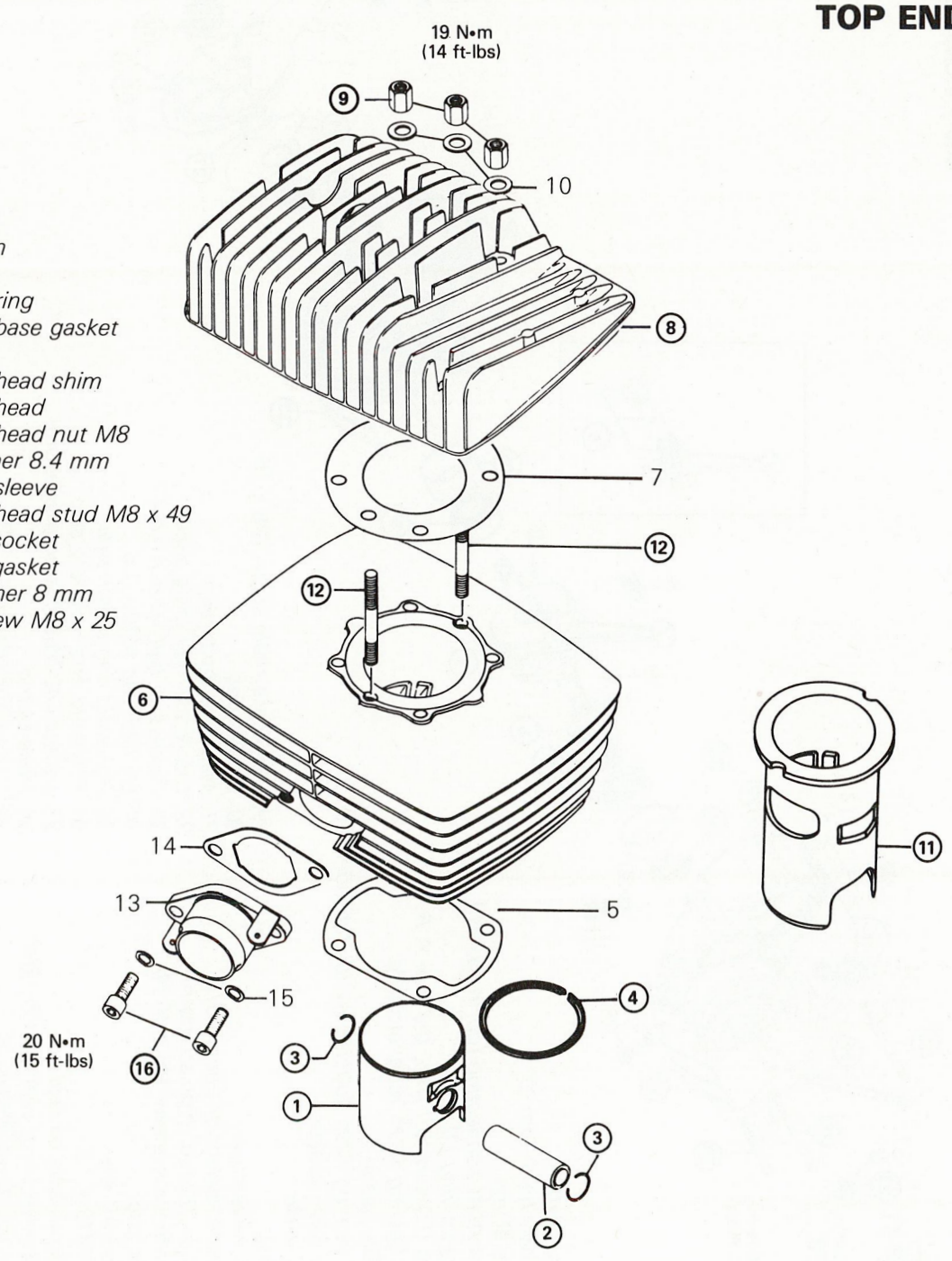


Check ignition timing.

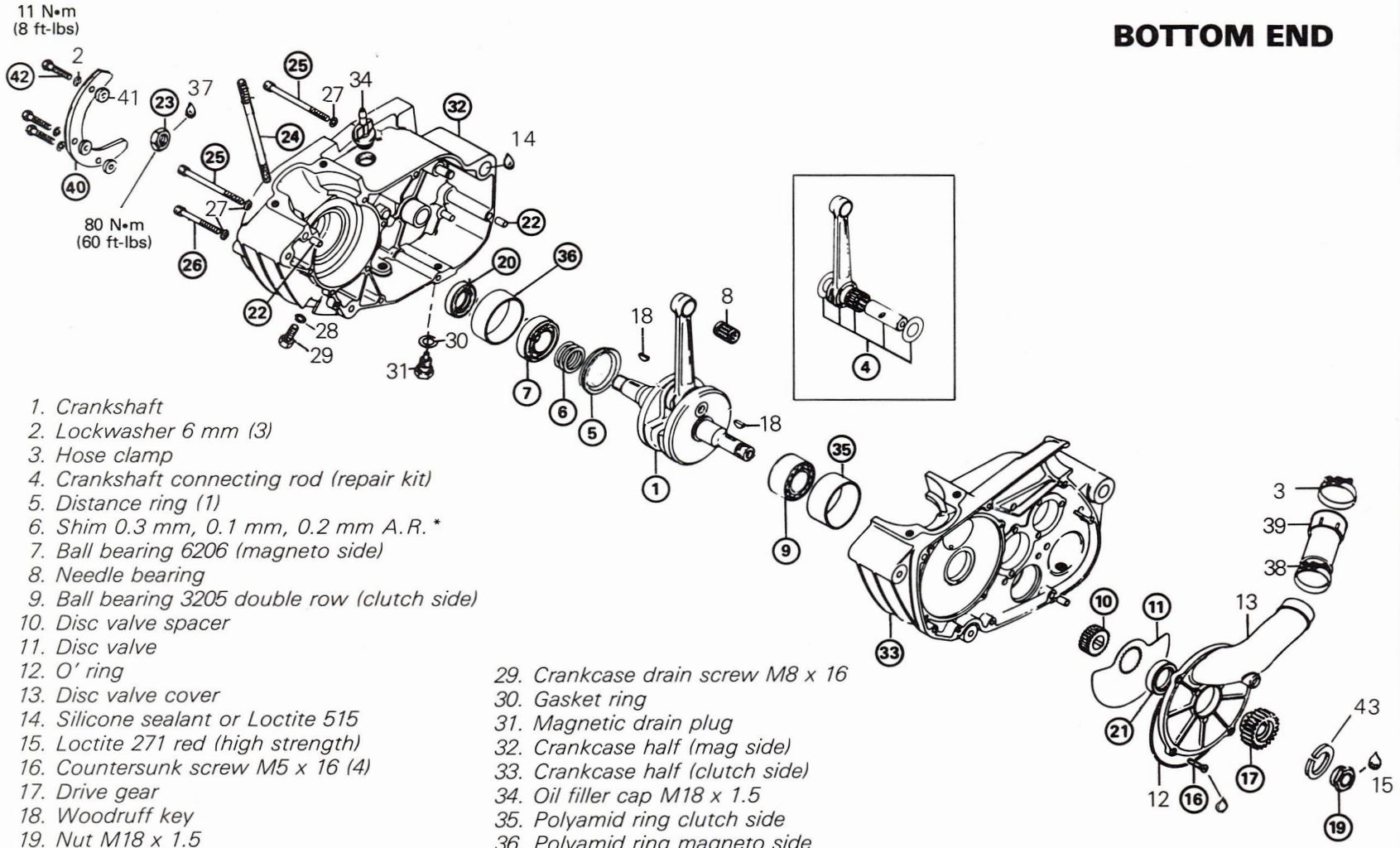
244 ENGINE TYPE (MX-4 250)

TOP END

1. *Piston*
2. *Piston pin*
3. *Circlip*
4. *L-trapez ring*
5. *Cylinder base gasket*
6. *Cylinder*
7. *Cylinder head shim*
8. *Cylinder head*
9. *Cylinder head nut M8*
10. *Flat washer 8.4 mm*
11. *Cylinder sleeve*
12. *Cylinder head stud M8 x 49*
13. *Exhaust socket*
14. *Exhaust gasket*
15. *Lockwasher 8 mm*
16. *Allen screw M8 x 25*



BOTTOM END

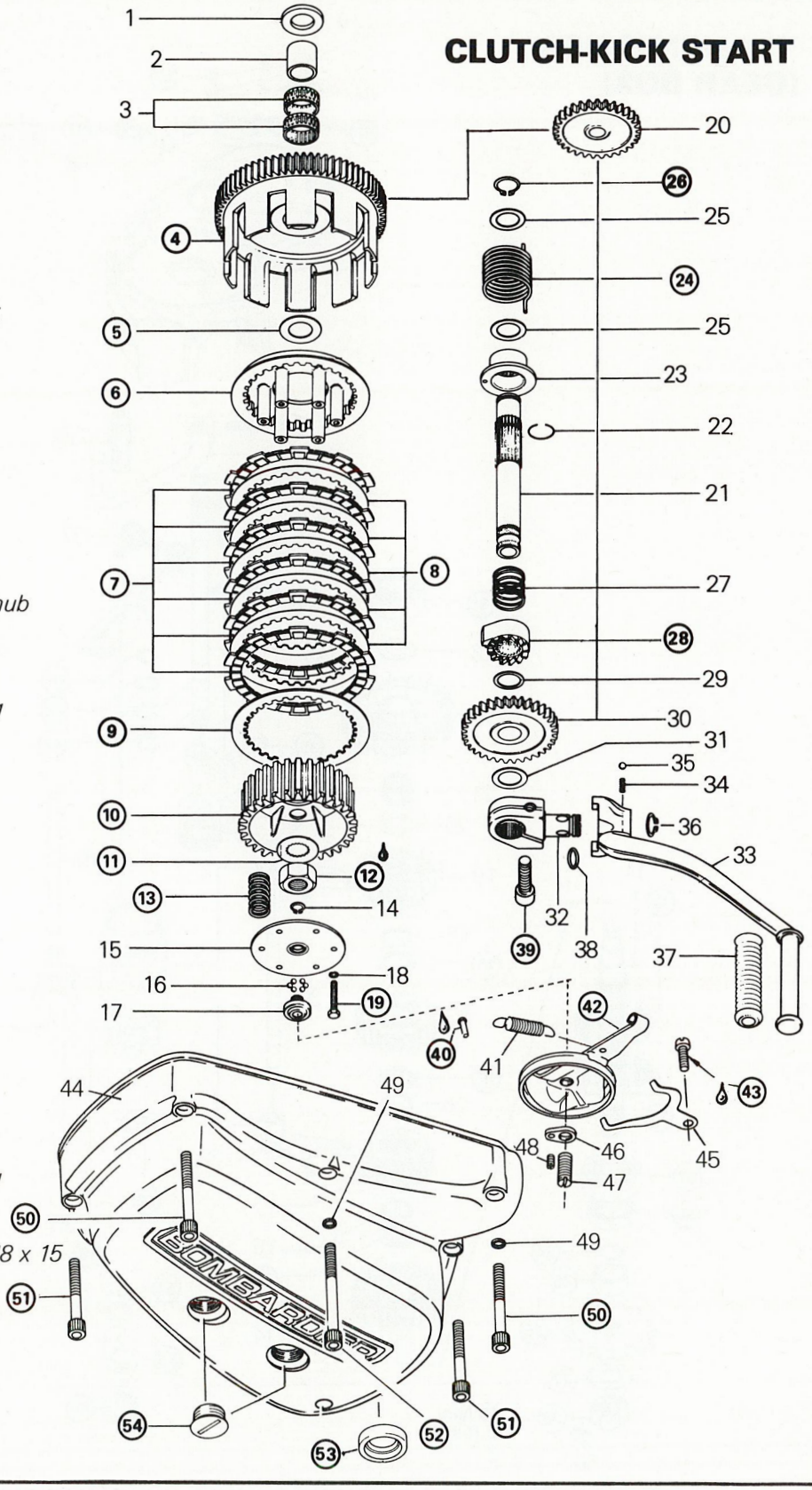


1. *Crankshaft*
2. *Lockwasher 6 mm (3)*
3. *Hose clamp*
4. *Crankshaft connecting rod (repair kit)*
5. *Distance ring (1)*
6. *Shim 0.3 mm, 0.1 mm, 0.2 mm A.R. **
7. *Ball bearing 6206 (magneto side)*
8. *Needle bearing*
9. *Ball bearing 3205 double row (clutch side)*
10. *Disc valve spacer*
11. *Disc valve*
12. *O' ring*
13. *Disc valve cover*
14. *Silicone sealant or Loctite 515*
15. *Loctite 271 red (high strength)*
16. *Countersunk screw M5 x 16 (4)*
17. *Drive gear*
18. *Woodruff key*
19. *Nut M18 x 1.5*
20. *Magneto side oil seal*
21. *Disc valve cover seal (clutch side)*
22. *Locating dowel sleeve (2)*
23. *Magneto retaining nut M16 x 1.5*
24. *Cylinder stud M8 x 167 (4)*
25. *Allen screw M6 x 70 (5)*
26. *Allen screw M6 x 45 (5)*
27. *Lockwasher 6 mm (10)*
28. *Gasket ring*
29. *Crankcase drain screw M8 x 16*
30. *Gasket ring*
31. *Magnetic drain plug*
32. *Crankcase half (mag side)*
33. *Crankcase half (clutch side)*
34. *Oil filler cap M18 x 1.5*
35. *Polyamid ring clutch side*
36. *Polyamid ring magneto side*
37. *Loctite 242 blue (medium strength)*
38. *Hose clamp*
39. *Carburetor adaptor*
40. *Chain guard*
41. *Chain guard spacer (3)*
42. *Screw M6 x 16 (3)*
43. *Lockwasher 18 (1)*

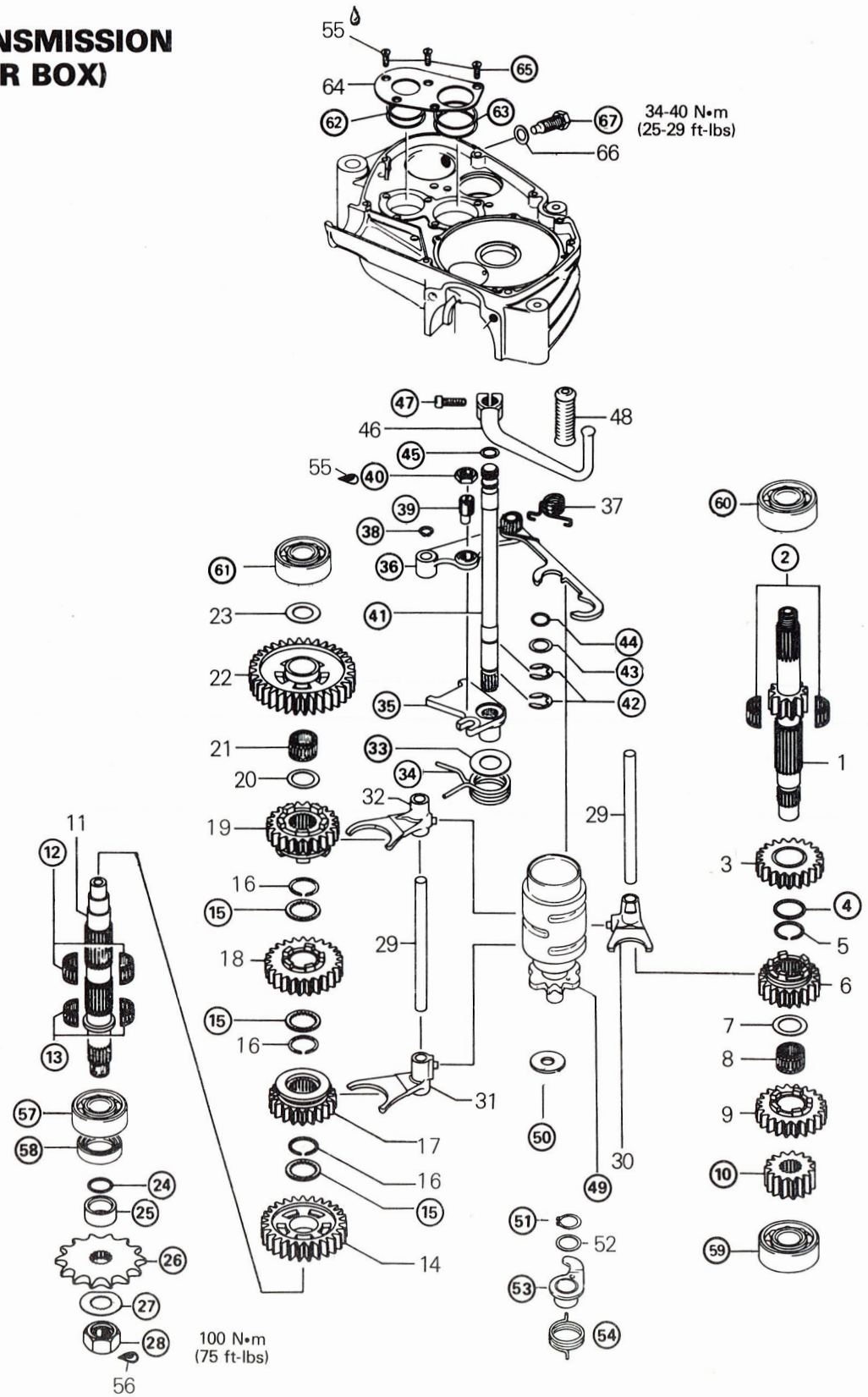
**A.R.: As required*

CLUTCH-KICK START

1. *Thrust washer (inner)*
2. *Inner race*
3. *Needle bearing*
4. *Clutch drum*
5. *Thrust washer (outer)*
6. *Inner pressure plate*
7. *Friction plate (6)*
8. *Driven plate (5)*
9. *Outer pressure plate (1)*
10. *Clutch hub*
11. *Locking washer*
12. *Clutch shaft nut M16 x 1.5*
13. *Clutch spring (6)*
14. *Snap ring 10 x 1*
15. *Spring retaining plate*
16. *Ball 5/32''*
17. *Spring retaining plate hub*
18. *Lockwasher 5 mm (6)*
19. *Screw M5 x 25 (6)*
20. *Idler gear 31 tooth*
21. *Kick start shaft*
22. *Circlip*
23. *Kick start spring retaining hub*
24. *Return spring*
25. *Thrust washer*
26. *Snap ring*
27. *Ratchet engagement spring*
28. *Ratchet gear*
29. *Thrust washer*
30. *Drive gear 34 tooth*
31. *Thrust washer*
32. *Kick start hub*
33. *Kick start lever*
34. *Spring*
35. *Ball 7/32''*
36. *Snap ring*
37. *Rubber sleeve*
38. *O' ring*
39. *Screw M8 x 30*
40. *Drive pin 3 x 8*
41. *Clutch cam return spring*
42. *Clutch release cam*
43. *Screw M5 x 12*
44. *Clutch cover*
45. *Clutch cam retaining spring*
46. *Clutch adjustment locking plate*
47. *Clutch adjustment screw M8 x 15*
48. *Clutch adjustment locking screw M4 x 6*
49. *Gasket*
50. *Allen screw M6 x 40 (3)*
51. *Allen screw M6 x 35 (5)*
52. *Allen screw M6 x 50 (1)*
53. *Seal kickstarter shaft*
54. *Plug (2)*



TRANSMISSION (GEAR BOX)



1. *Clutch shaft 13T*
2. *Needle bearing ass'y, clutch shaft, width 11.68 mm (.460")*
3. *4th gear, clutch shaft, 21T*
4. *Thrust washer, clutch shaft*
5. *Snap ring, clutch shaft*
6. *3rd gear, clutch shaft, 18T*
7. *Thrust washer, clutch shaft*
8. *Needle bearing, clutch shaft*
9. *5th gear, clutch shaft, 23T*
10. *2nd gear, clutch shaft, 16T*
11. *Main shaft*
12. *Needle bearing ass'y main shaft width 12.55 mm (.494")*
13. *Needle bearing ass'y main shaft width 9.65 mm (.380")*
14. *2nd gear, main shaft, 28T*
15. *Thrust washer, main shaft (3)*
16. *Snap ring, main shaft (3)*
17. *5th gear, main shaft, 21T*
18. *3rd gear, main shaft, 25T*
19. *4th gear, main shaft, 23T*
20. *Thrust washer, main shaft*
21. *Needle bearing, main shaft*
22. *1st gear, main shaft, 31T*
23. *Thrust washer, main shaft*
24. *"O" ring, main shaft*
25. *Sprocket spacer*
26. *Sprocket, 14T*
27. *Locking washer, main shaft*
28. *Main shaft nut M16 x 1.5*
29. *Guide pin, shift fork (2)*
30. *Shifting fork, 4-5th*
31. *Shifting fork, 2nd*
32. *Shifting fork, 1st-3rd*
33. *Thrust washer, actuating lever*
34. *Spring, actuating lever*
35. *Actuating lever*
36. *Pawl ass'y*
37. *Pawl spring*
38. *Snap ring 10 x 1*
39. *Pawl positioning screw*
40. *Locking nut M12 x 1, pawl positioning screw*
41. *Shift shaft*
42. *Retaining ring (2)*
43. *Thrust washer, shift shaft*
44. *"O" ring, shift shaft*
45. *"O" ring, shift shaft*
46. *Shift lever*
47. *Allen screw M6 x 20*
48. *Shift lever rubber*
49. *Shift drum ass'y*
50. *Washer, shift drum*
51. *Index snap ring*
52. *Index washer*
53. *Index lever*
54. *Index spring*
55. *Loctite 242 blue (medium strength)*
56. *Loctite 271 red (high strength)*
57. *Ball bearing 6204, main shaft, sprocket side*
58. *Seal main shaft*
59. *Ball bearing 6203, clutch shaft, sprocket side*
60. *Ball bearing 6204, clutch shaft, clutch side*
61. *Ball bearing 6203, main shaft, clutch side*
62. *Shim 0.5 mm, 0.3 mm, 0.1 mm, main shaft bearing *A.R.*
63. *Shim 0.5 mm, 0.3 mm, 0.1 mm, clutch shaft bearing *A.R.*
64. *Retaining plate (transmission bearings)*
65. *Countersunk screw M5 x 12 (5)*
66. *Gasket ring*
67. *Stop screw, kick starter*

**A.R.: As required*

REMOVAL

Disconnect or remove the following from vehicle.

Vent tubes.

Magneto cover.

Spark plug.

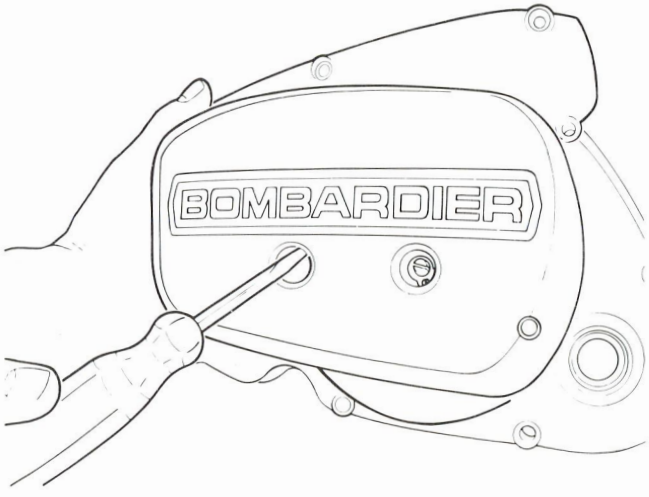
Drive chain.

Exhaust pipe (including exhaust socket).

Carburetor.

Front engine mounts and stud.

Clutch cable. (Remove the clutch cable from the handlebar lever. Remove the cluth cable access plug. Pull the cable housing away from the clutch cover. Push the inner cable inside the cover until its tip is visible through the installation hole using a screwdriver, disengage it from the clutch release arm and pull it out of the cover).



Lower engine stud and spacers.

Swing arm pivot bolt (note the number of shim/s on the inside swing arm pivot flanges).

Pull the engine upward and forward and withdraw it from the frame through the clutch side of the vehicle.

DISASSEMBLY & ASSEMBLY

NOTE: Refer to Technical Data for component fitted tolerance and wear limit.

Top End

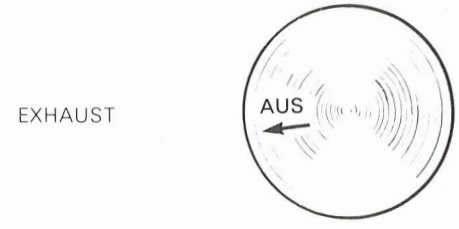
①⑥⑧⑪ At the replacement of the piston, cylinder, cylinder head, cylinder sleeve, the squish area should be remeasured (See technical data).

①②③ Place a clean cloth over crankcase to prevent circlips from falling into crankcase then use a pointed tool to remove circlips from piston.

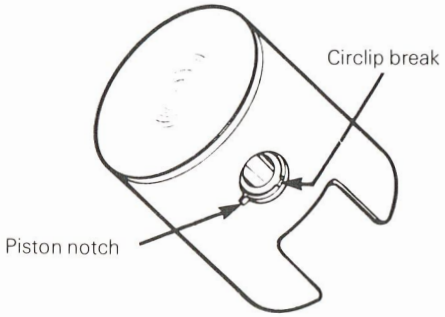
Drive the piston pin in or out using a suitable drive punch and hammer.

CAUTION: When tapping piston pin in or out of piston, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

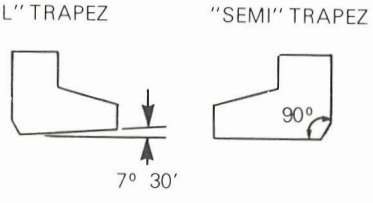
At assembly, place the piston over the connecting rod with the letters AUS, over an arrow on the piston dome, facing direction of the exhaust port.



Once the circlips are installed, turn each circlips so that the circlip break is not directly in line with piston notch. Using very fine emery cloth, remove any burrs on piston caused through circlip installation.

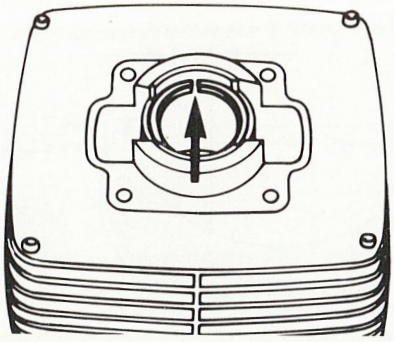


④There is two different types of "L" ring.



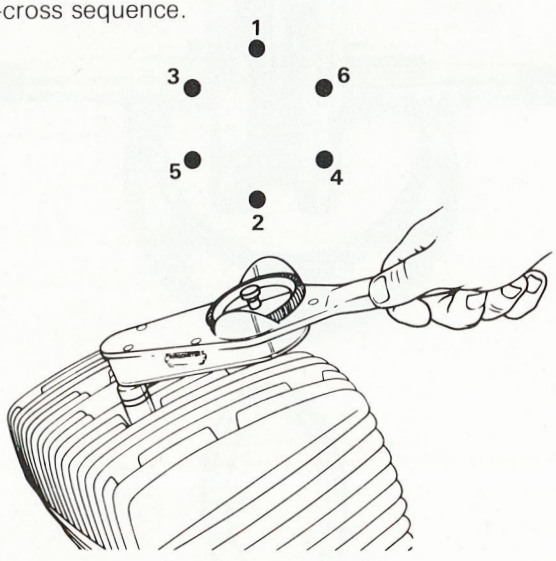
244 engine type (MX-4 250) uses 1 "L" semi-trapez.

Ring end gap: 0.20-0.40 mm (.008-.016 in)



CAUTION: Prior to "L" ring replacement always ensure to visually identify the appropriate type needed. The two ring types are not interchangeable. Damage may occur if interchanged.

⑧⑨At assembly, torque to 19 N•m (14 ft-lbs) in a criss-cross sequence.



⑪Cylinder sleeve should be replaced whenever its inside diameter becomes 0.135 mm (.005") or more larger than a new 2nd oversize piston.

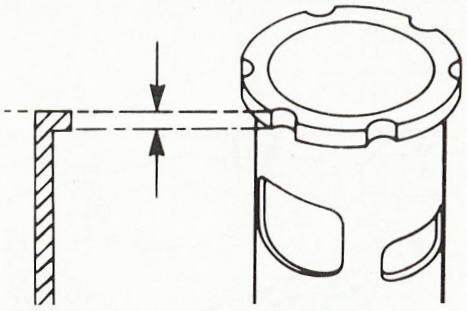
Proceed as follows:

Place the cylinder in a range oven for 30 minutes, at a temperature of 175°C (350°F) maximum.

Place the new cylinder sleeve in a freezer for one hour minimum.

Support cylinder barrel upside down and press out the cylinder sleeve using a suitable pusher.

Measure the thickness of the old liner top flange and if necessary, machine the new liner flange to the same measurement.



Inspect cylinder barrel, remove any grooves or scratches. Clean away any dirt or carbon.

Re-heat cylinder barrel in range oven for 30 minutes at a temperature of 175°C (350°F) maximum.

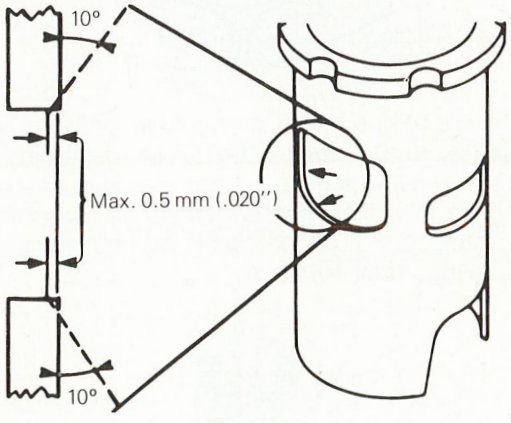
Immediately align chilled cylinder sleeve with hot cylinder, drop into place from top side making sure to align the exhaust port of the sleeve with the one of the cylinder barrel. To ease alignment, leave two cylinder studs in the cylinder.

NOTE: Only 3-4 seconds maximum are needed before cylinder cools sufficiently to grip onto sleeve.

Bore the new sleeve to provide a piston clearance of:

Minimum	Maximum
0.050 mm (.002")	0.085 mm (.003")

Using a rotary file or jeweler's hand file, chamfer the sharp edges of each port 10°, to a width of 0.5 mm (.020").

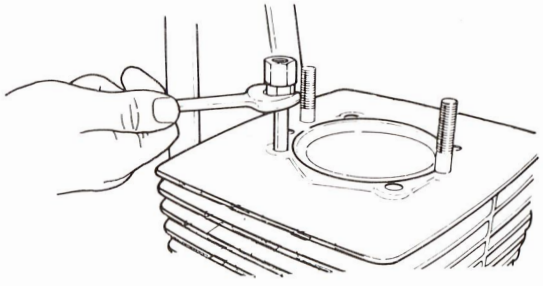


CAUTION: Excessive chamfer will alter port timing

Check the ring end gap.

Make sure to check the squish area measurement during assembly (see Technical Data).

⑫To unscrew, use 2 cylinder head nuts blocked one against the other.



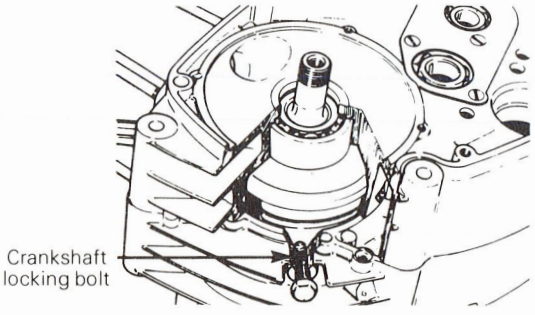
At assembly, screw the short threaded portion of the stud into the cylinder.

⑯At assembly, torque to 20 N•m (15 ft-lbs).

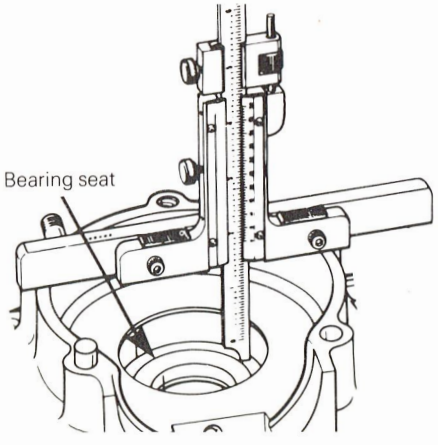
Bottom End

①④㉜㉝At the replacement of the crankshaft, connecting rod and crankcase halves, the squish area should be measured (see Technical Data).

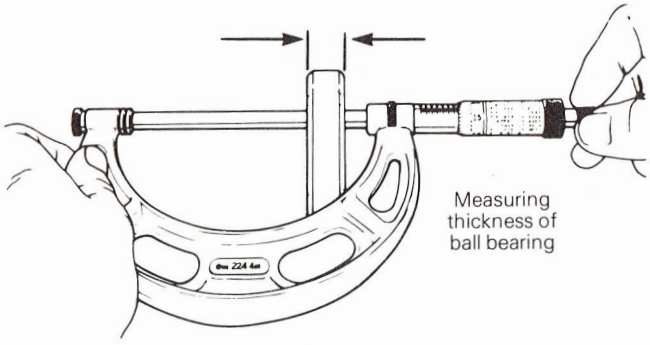
①㉜To facilitate some procedures, the crankshaft can be locked at the top dead center position using a crankshaft locking bolt as illustrated.

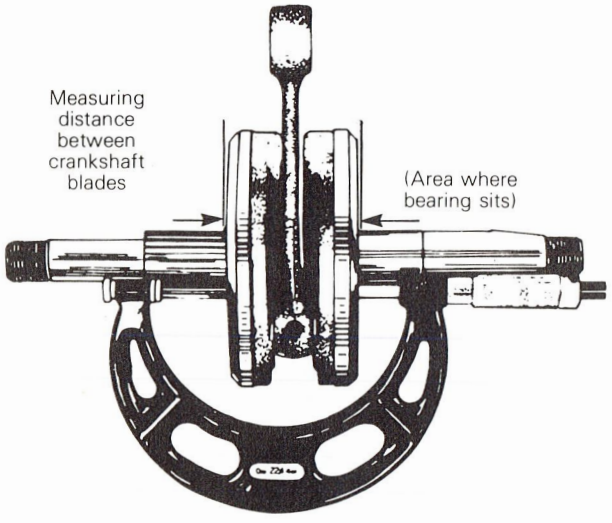


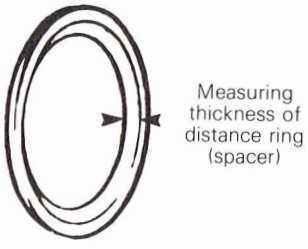
①⑥The crankshaft end-play should be between 0.025 mm (.001") to 0.1 mm (.004"). To determine the necessary shims: it is necessary to measure the crankcase. To do this, first measure each half from mating surface to bottom of bearing seat. Add measurements of both halves, total equals A.



Measure the thickness of each ball bearing. Measure the distance between crankshaft blades, and measure the thickness of the distance ring Add measurements. Total equals B.





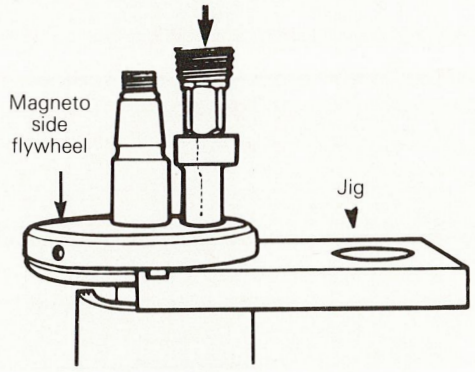


Subtract measurement B from measurement A, minus tolerance of 0.025 mm (.001") to 0.1 mm (.004"). Total balance is distance to be shimed. Shim(s) must be located between distance ring and bearing.

NOTE: Crankshaft end-play is adjusted only when crankshaft and/or crankcase is replaced.

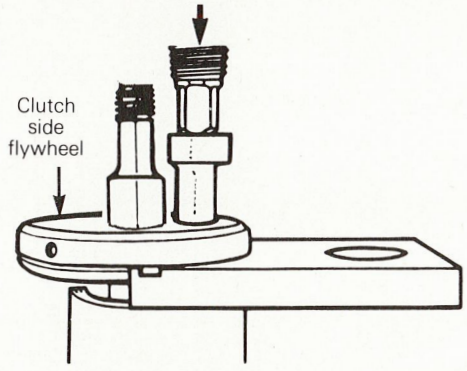
④To replace the connecting rod proceed as follows:

Mount the crankshaft assembly in jig and press the crankpin of the magneto side flywheel.



Remove the connecting rod and the bearing.

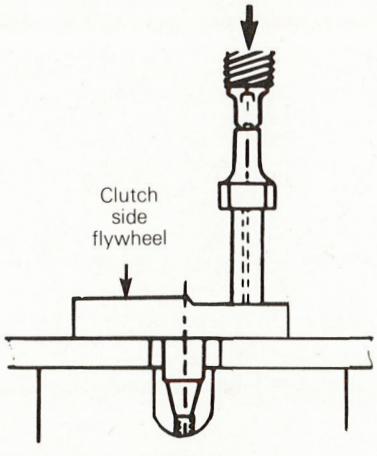
Press the crankpin out of the clutch side flywheel.



Press the new crankpin into the clutch side flywheel.

CAUTION: The crankpin must enter the bore straight to prevent damage to the bore and/or the crankpin.

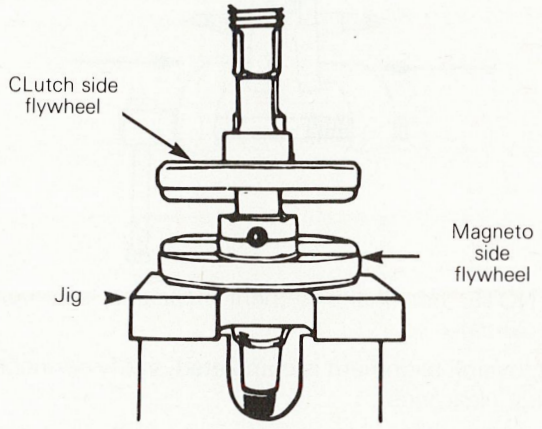
NOTE: The crankpin can be installed on either side.



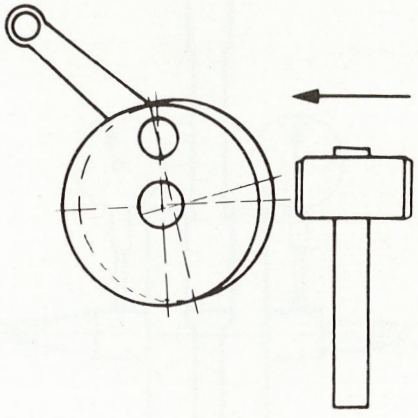
Fit the connecting rod and the bearing into place with light grease.

Place the magneto side flywheel on the jig. Align the clutch side flywheel with the magneto side flywheel and press the crankpin (with rod assembly) into magneto side flywheel.

NOTE: The connecting rod side clearance must be 0.4 mm (.015") to 0.5 mm (.020").

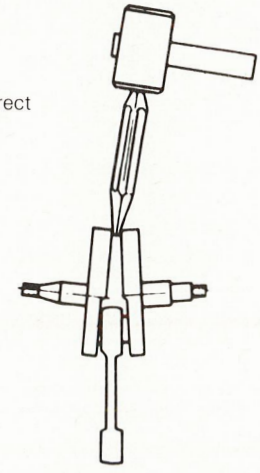


Using a "straight edge", check for flywheel alignment. Drift with a heavy brass mallet to align if necessary.

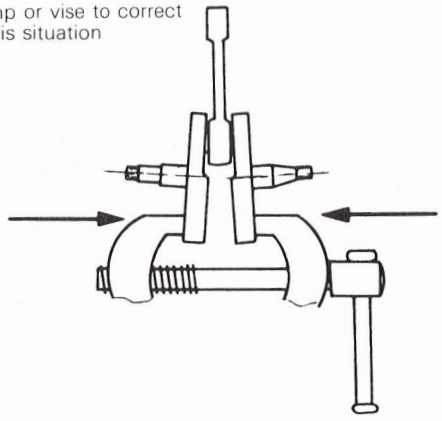


Using a micrometer or vernier caliper, check for counterweights alignment.

Use a wedge to correct this situation



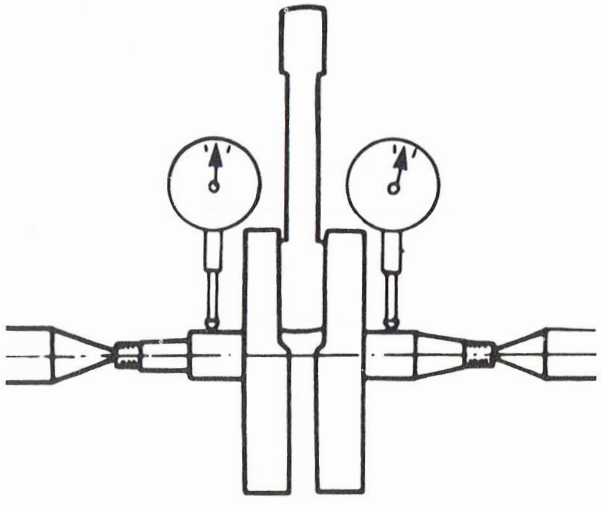
Use a clamp or vise to correct this situation



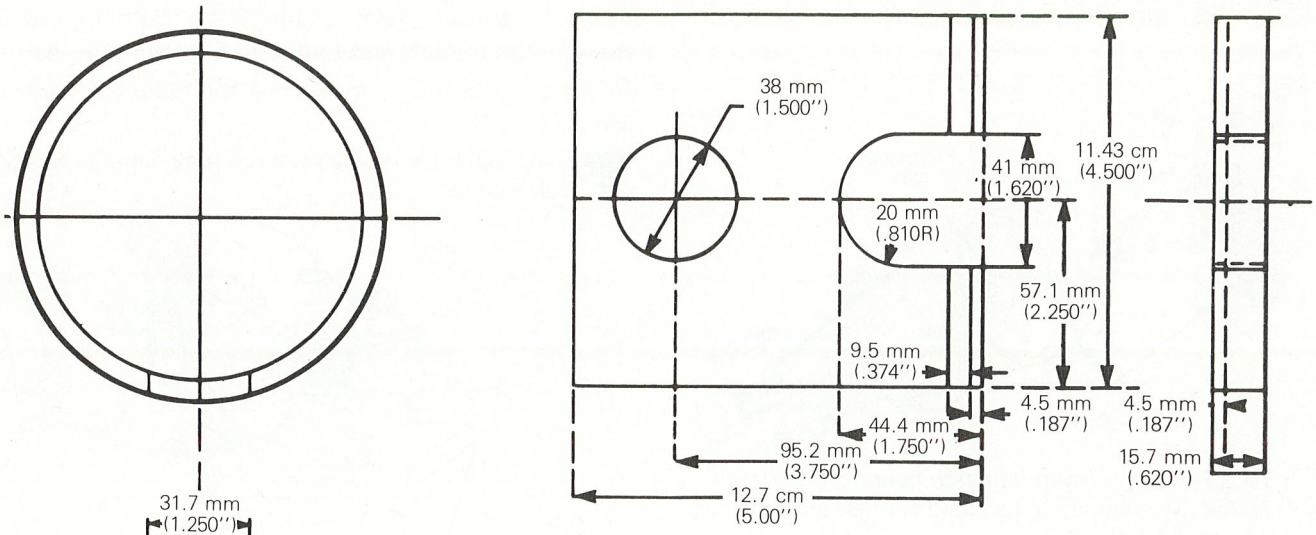
NOTE: For final alignment measures, see technical data.

When overall alignment is completed, verify connecting rod side clearance.

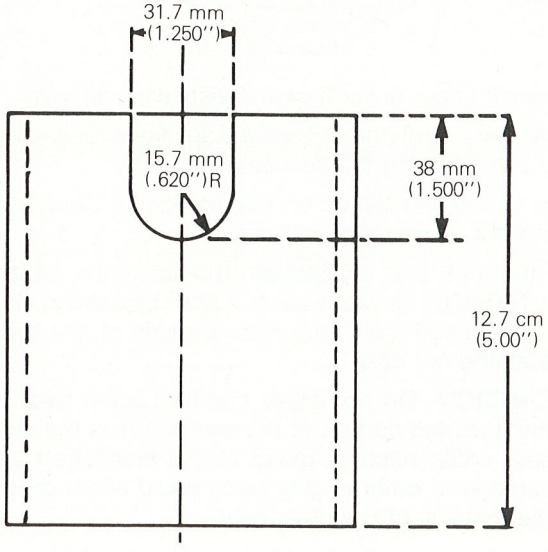
NOTE: Make a final alignment check using a dial indicator.



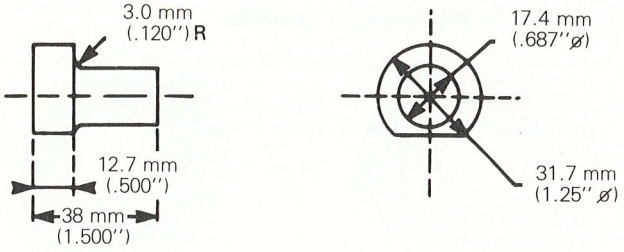
SUGGESTED CRANKSHAFT REPAIR TOOL



H.R. ST'L PLATE 11.43 cm (4 1/2") x 15.9 mm (.625") THICK.



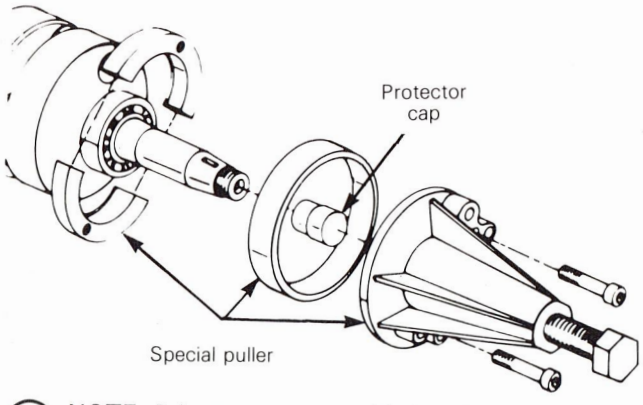
STEEL TUBE 11.43 cm (4.5") O.D. x 6.3 mm (.250") WALL.



H.R.C.Q. ST'L 31.7 mm (1.250") DIA.

⑤ At assembly, position the distance ring with the chamfered side facing the crankshaft.

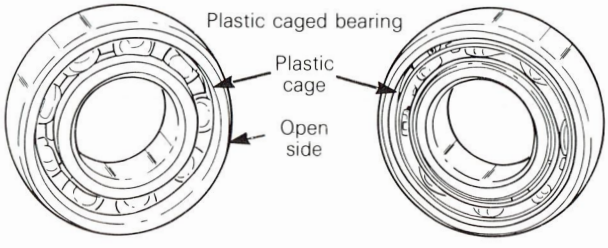
⑦ ⑨ To remove bearing from crankshaft use a bearing puller as illustrated. (See tool section).



NOTE: Prior to magneto side bearing installation, install distance rings, required shim(s) and bearing on crankshaft.

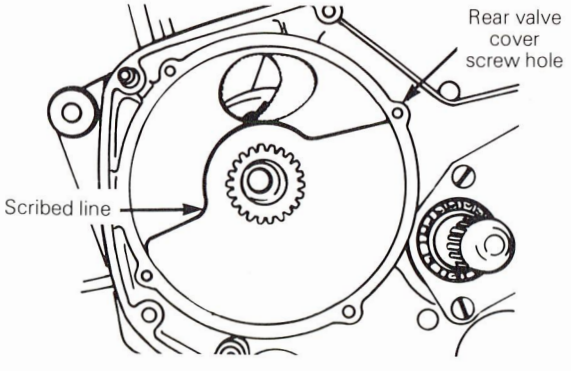
At assembly, place bearings in an oil container and heat the oil to 93°C (200°F) for 5 to 10 min. This will expand the bearings and permit them to slide easily onto the shaft.

CAUTION: For lubrication purpose, always place the magneto side crankshaft bearing with open face facing towards outside.



⑩ At assembly, the chamfered side of the disc valve spacer must face towards the crankshaft.

⑪ The disc is asymmetrical and can only be installed one way. The valve cut-away must align with the line scribed on the crankcase disc valve surface with the crankshaft locked at top dead center (T.D.C.).

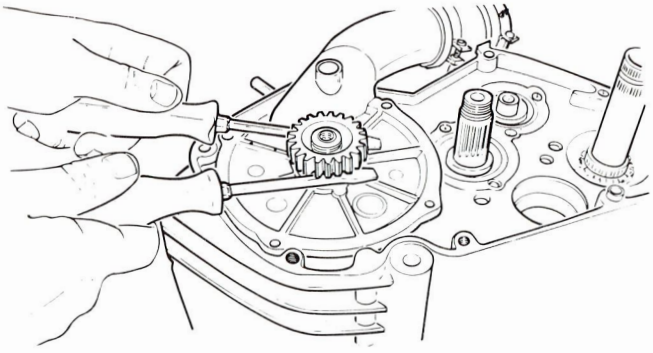


NOTE: If the crankcase disc valve is not scribed, the disc leading edge must align with the top rear valve cover screw hole as illustrated.

⑯ At assembly, apply Loctite no. 242 (medium strength) on threads and torque to 5.5 N•m (4 ft-lbs).

⑰ Use 2 screwdrivers to remove the crankshaft drive gear.

CAUTION: Excessive leverage may damage rotary valve cover.



Use a small finger puller if gear resists easy removal.

At assembly, install the crankshaft drive gear very carefully to avoid folding the seal lip over.

⑲ Prior to the installation of the crankshaft drive gear retaining nut, proceed as follows:

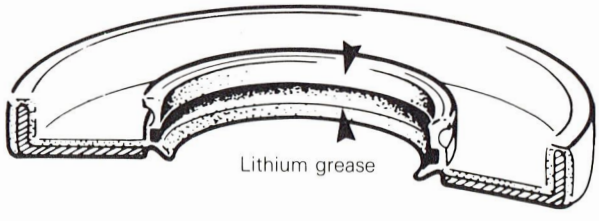
Clean the nut and crankshaft threads with Loctite "Kleen N'Prime" or equivalent. Apply Loctite no. 271 red (high strength) on the inside threads of the drive gear **retaining nut only.**

CAUTION: Do not apply Loctite Lock'n Seal on the threaded portion of the crankshaft as the drive gear could become glued to the crankshaft and damage to other engine parts could occur during the removal of the drive gear.

Torque the drive gear retaining nut to 100 N•m (75 ft-lbs).

NOTE: Allow at least one hour for the Loctite to set before starting the engine.

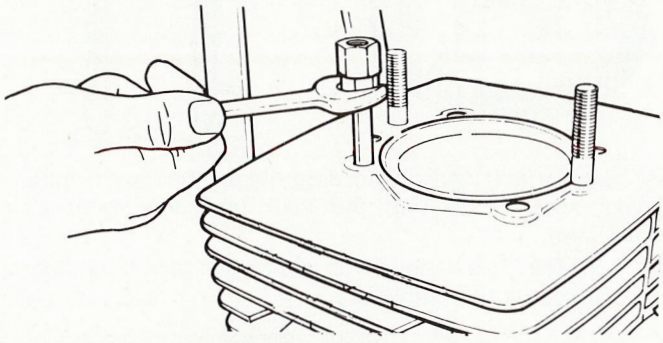
⑳ ㉑ To install new seals, use the appropriate oil seal insertion pusher. (See Tool section). At assembly, apply a light coat of lithium grease on the seal lips.



㉒ At assembly, ensure that the locating dowel sleeves are in place.

㉓ At assembly, apply Loctite 242 blue (medium strength) on the threads of the flywheel retaining nut and torque to 80 N•m (60 ft-lbs).

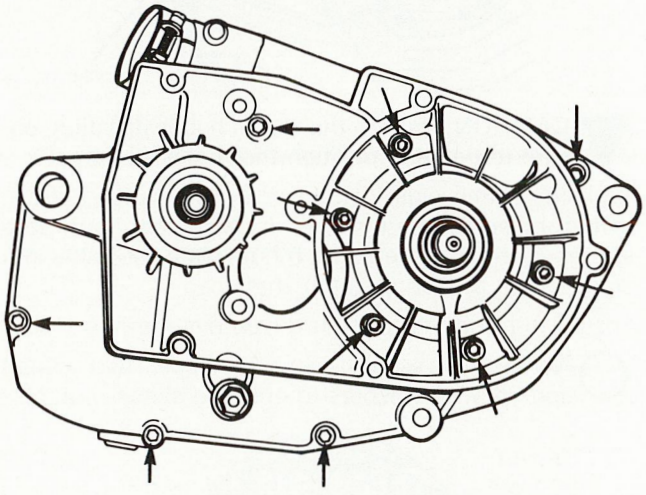
㉔ To unscrew, use 2 cylinder head nuts blocked one against the other.



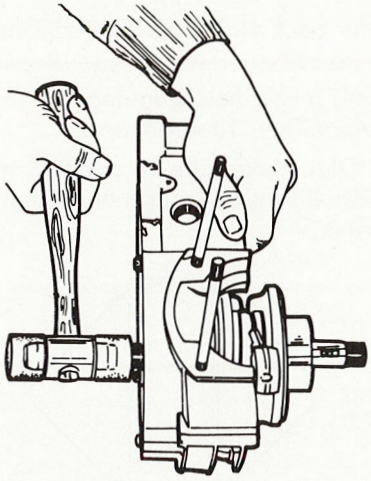
At assembly, position the long threaded portion of the stud into the crankcase.

㉕ ㉖ At assembly, torque to 11 N•m (8 ft-lbs) following a criss-cross sequence.

NOTE: It is recommended to apply a small drop of oil or a thin coat of grease on the threads.

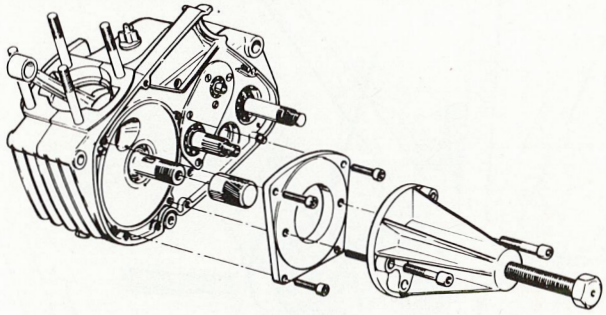


㉜ Remove the crankshaft from the crankcase by tapping on the crankshaft end with a **soft** hammer.

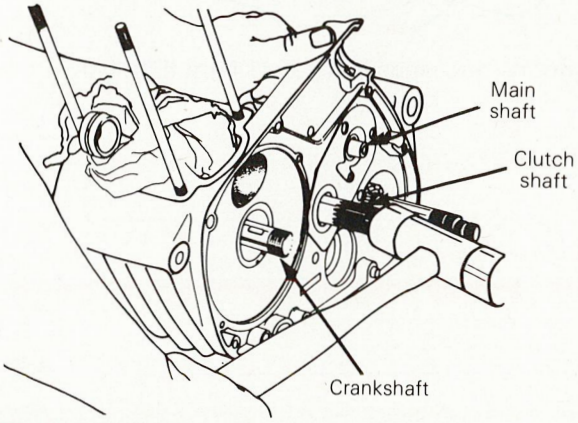


CAUTION: Prior to the crankshaft removal ensure that the crankshaft locking bolt is removed.

㉜ ㉝ To split the crankcase halves, use a protective cap and puller (See Tools section).



NOTE: The crankcase halves can also be split, by tapping equally on the main shaft, clutch shaft and crankshaft.



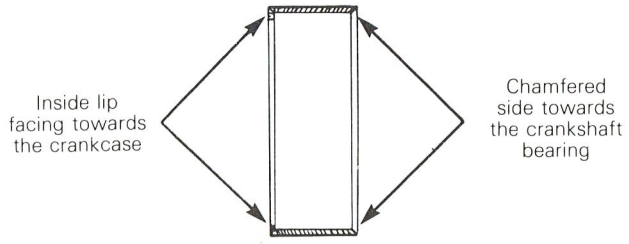
CAUTION: Do not pry between crankcase halves, as score marks incurred are detrimental to crankcase sealing.

Prior to joining the crankcase halves carefully clean the mating surfaces with acetone, wood alcohol or equivalent.

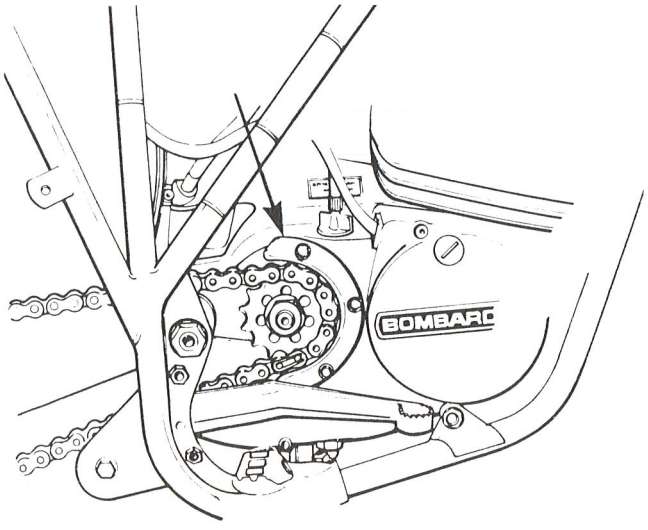
Apply a light coat of Loctite 515 sealant or silicone sealant.

㉟㊱To install a new polyamid ring use an appropriate insertion pusher (See Tool section).

CAUTION: Make sure to position the polyamid ring with the inside lip portion facing towards the crankcase.



㊵㊷At assembly, ensure to use the proper chain guard (13 teeth, 14 teeth or 15 teeth engine sprocket).

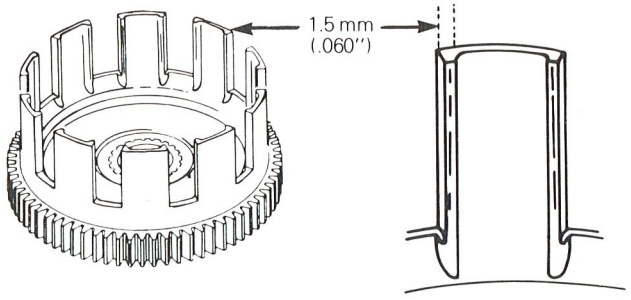


Torque the retainings bolts to 11 N•m (8 ft-lbs).

Clutch and kick start

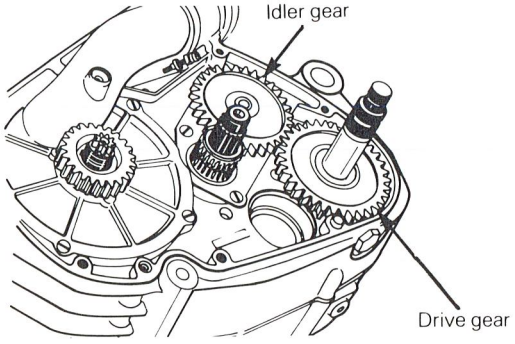
④If the clutch drum splines are found to be severely worn, replacement may not be necessary. File the damaged spline surfaces equally.

CAUTION: The shouldered wall should not be filled thinner than 1.5 mm (.060").



④⑤⑥⑦⑧⑨⑩Prior to assembling the clutch hub, make sure to position the idler and drive gear as illustrated.

NOTE: The flanged side of the idler gear must face towards the crankcase.

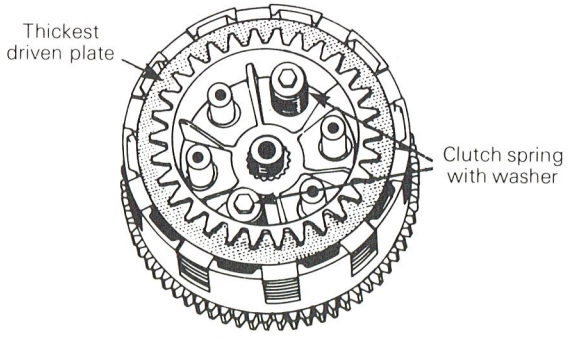


CAUTION: Prior to the clutch hub installation, ensure to properly position the thrust washer ⑤.

With the clutch plates mounted on the clutch hub, fit clutch inner pressure plate in alignment with hub splines. Carefully insert clutch hub/plate assembly into clutch drum and onto clutch shaft.

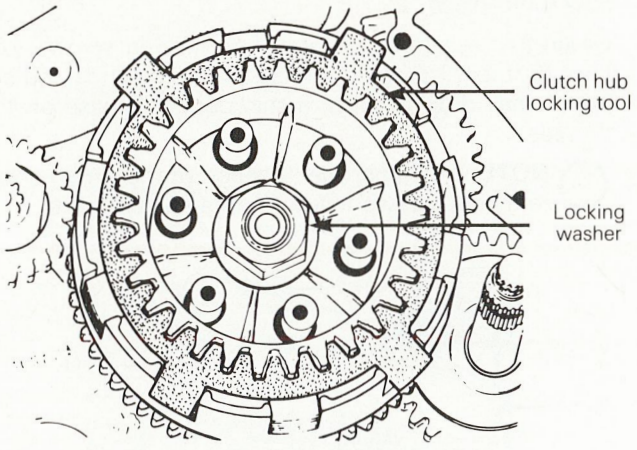
Ensure to place the thickest driven plate on the top.

NOTE: To ease assembly, install two clutch springs with washers to hold the clutch together.



⑪ CAUTION: Locking washer should be replaced if bent more than twice. If in doubt, replace.

⑫ To remove clutch shaft nut, lock the crankshaft at top dead center, unbend the locking washer and lock the clutch using the clutch hub locking tool (see tools section).



At assembly, apply Loctite no. 271 red (high strength) on the threads of the clutch shaft nut and torque to 100 N•m (75 ft-lbs).

WARNING: Make sure to bend the clutch shaft nut locking washer.

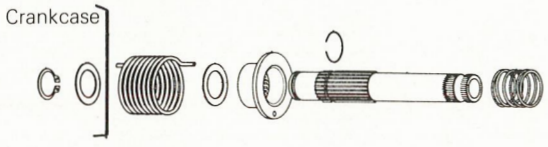
CAUTION: Do not pry on the inner pressure plate spring post to bend the locking washer, use a pair of waterpump pliers.

⑬ If spring(s) replacement is needed, ensure to change the springs in sets only.

⑲ At assembly, tighten in a criss-cross sequence and torque to 5.5 N•m (4 ft-lbs).

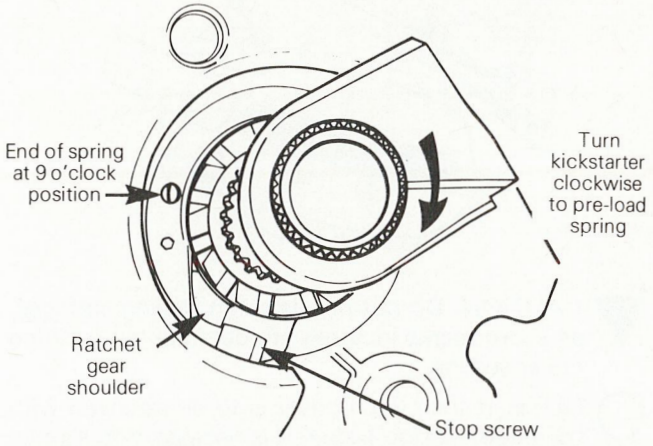
㉔ It is not possible to change the return spring without splitting the crankcase. At assembly, ensure that the spring ends are well positioned in the crankcase and retaining hub hole.

㉖ To remove the kick start assembly from the crankcase remove the snap ring located in the inside portion of the crankcase and unscrew the kick starter stop screw under the left crankcase half.



㉘ To position the ratchet gear, install the kick starter lever and preload the kick starter spring approximately 3/4 turn clockwise. Slide the ratchet gear onto the splines.

Release the kick starter lever until the ratchet gear leans against the stop screw. The end of the spring protruding through the retaining hub should be at 9 o'clock position.



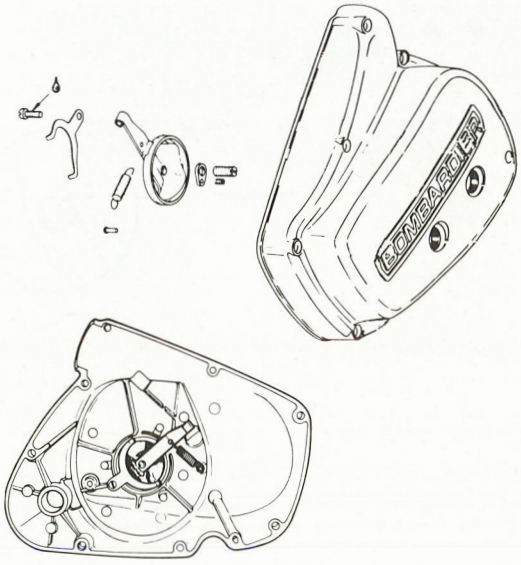
NOTE: After assembly, do not remove the kick starter stop screw unless needed, otherwise the kick starter spring will loose its preload and the removal of the clutch cover will be necessary to re-preload the spring.

㊴ At assembly, torque to 20 N•m (15 ft-lbs).

㊵ Apply Loctite no. 271 (high strength) and press fit into place.

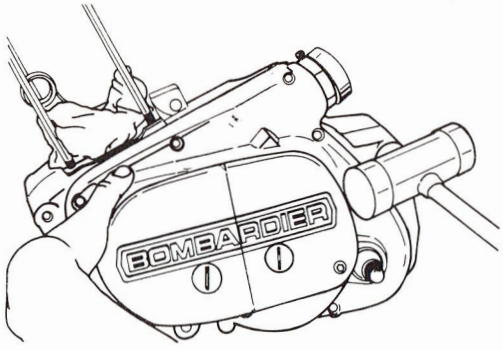
NOTE: Replace only if damaged or when replacing clutch over.

㊷ ㊸ At assembly, position as illustrated.



At assembly, apply Loctite no. 242 blue (medium strength) on screw threads and torque the screw to 5.5 N•m (4 ft-lbs).

(44) To remove the clutch cover, tap lightly using a **soft** faced hammer to break the seal (As illustrated).

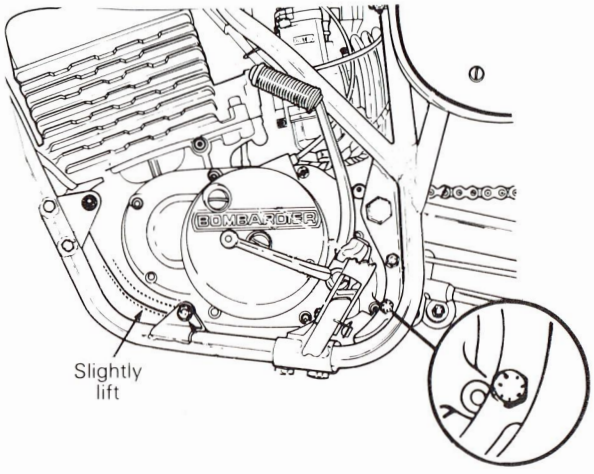


CAUTION: Do not pry between sealing surfaces, as score marks incurred are detrimental to clutch cover sealing.

NOTE: If the clutch cover is to be removed with the engine in the frame, it is necessary to slightly lift the front of the engine to allow clutch cover to clear the lower frame portion, near footrest.

Prior to removal, ensure to drain the engine oil and to slacken the swing arm bolt.

CAUTION: Do not attempt to remove clutch cover without lifting engine. Severe damage can occur.

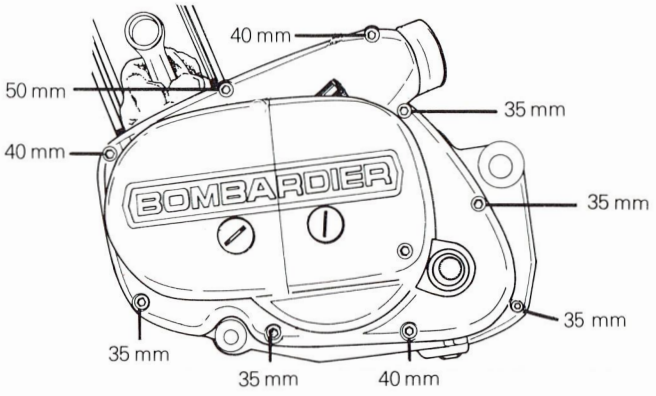


With clutch cable still connected, pull clutch lever in, it will then preload against the cover to ease removal.

At assembly, clean the mating surfaces of the crankcase and clutch cover with acetone, wood alcohol or equivalent. Apply a light coat of Loctite 515 sealant or silicone sealant to the mating surfaces and lightly tap cover into place.

(50) (51) (52) At assembly, torque the retaining screws to 8 N•m (6 ft-lbs) following a criss-cross sequence and apply a small drop of oil or a thin coat of grease on the threads.

NOTE: For the proper location of the clutch cover retaining screws follow illustrated sequence.



CAUTION: Ensure to use the correct screw for its location otherwise damage to the crankcase will occur.

(53) CAUTION: Make sure the kick starter oil seal is not flipped over by the kick starter shaft splines when pushing the clutch cover into place.

At assembly, apply lithium grease on the seal lips.

(54) For removal or installation use the screwdriver grip end, provided with the motorcycle tool kit.

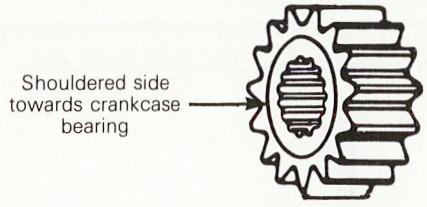
Transmission (gear box)

②⑫⑬The needle bearing halves must be replaced in pairs only.

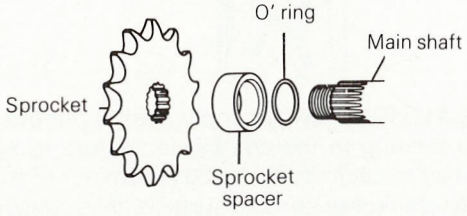
CAUTION: Make sure not to intermix the needle bearings halves, damage could occur. If bearing halves have been intermixed refer to the description to find the proper width of the bearing halves.

④⑮The sharp edge of the splined thrust washer must face retaining snap ring.

⑩At assembly, the shouldered side of the 2nd gear, clutch shaft must face towards the crankcase bearing.



㉔㉕㉖ At assembly, ensure that the chamfered portion of the sprocket spacer is installed towards the main shaft.



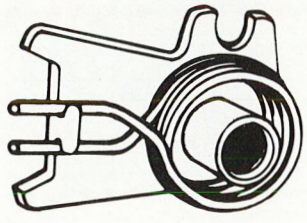
㉗CAUTION: Locking washer should be replaced if bent more than twice. If in doubt, replace.

㉘To remove the sprocket retaining nut, unbend locking washer. Lock crankshaft at the top dead center position and with the transmission in gear, unscrew the nut.

At assembly, follow the same procedure, apply Loctite no. 271 red (high strength) on the retaining nut threads and torque to 100 N•m (75 ft-lbs).

NOTE: At assembly, position the sprocket retaining nut with the hollowed side facing the sprocket.

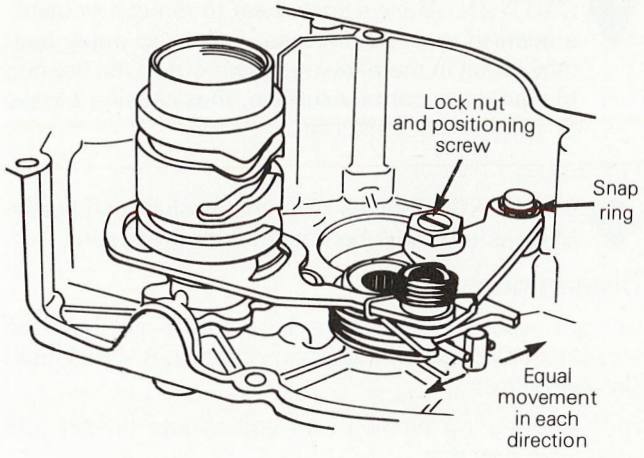
㉝㉞㉟ Assemble the spring, thrust washer and actuating lever as illustrated.



WARNING: Exercise care when removing or installing the actuating lever spring.

㊱㊴㊵To adjust shifter drum actuating pawl proceed as follows. Position shift drum ass'y in 2nd gear or above to obtain an even travel at the actuating lever.

Then with the shift shaft in position, gently move shift lever in each direction from the middle position until shifter pawl contacts the shifter drum pin and note the amount of movement in each direction at the actuating lever.

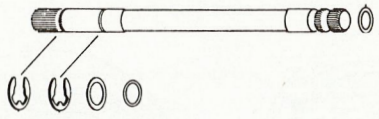


Movement in both direction must be equal. If not, the pawl ass'y can be repositioned by unlocking the lock nut and adjusting the pawl positioning screw. Lock the nut and verify. Repeat until the travel is equal on both sides.

When final adjustment has been reached, **apply Loctite no. 242 (medium strength) on the lock nut threads and torque to 27-29 N•m (20-22 ft-lbs).**

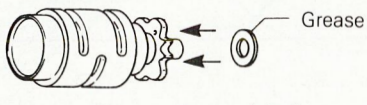
㊳CAUTION: At the removal of the pawl ass'y take care not to overspread the snap ring. Prior to assembly, make sure to reclose snap ring gap.

㊶㊷㊸㊹㊺ At assembly, position the retaining rings, thrust washers and "O" rings as illustrated.



㊼At assembly, torque to 11 N•m (8 ft-lbs).

㊾㊿At re-assembly it is recommended to coat the shift drum washer with grease, this will allow the washer to stick on the shift drum for ease of installation.



Hold the index lever (in crankcase) fully open while inserting the shift drum in place.

(51) (53) (54) At assembly, properly position the spring end into the index lever and crankcase hole.

CAUTION: Ensure that the index snap ring is well seated in its groove.

(57) Heat is needed to remove or install the main shaft bearing into the sprocket side.

CAUTION: Always apply heat to remove or install a bearing in the crankcase. Failure to apply heat may result in metal being drawn out of the bearing to crankcase contact surface, thus causing a loose fit within the crankcase.

Proceed as follows:

WARNING: Engines have magnesium crankcase. Magnesium must be heated with great care.

Disassembly

Using a butane torch with a large **soft** flame, heat the outside crankcase bearing embossment with 4 to 5 rapid circular passes.

Drift the bearing out with an appropriate pusher and soft faced hammer.

Reassembly

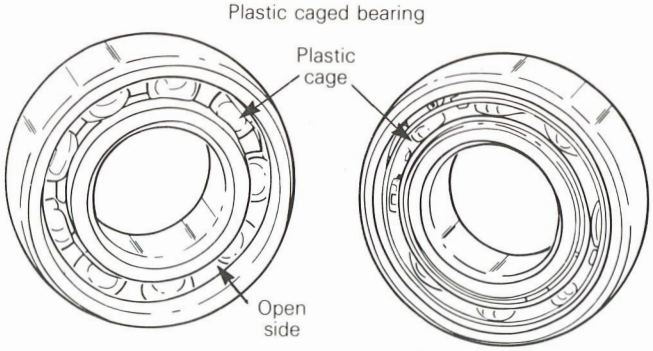
Grease the sprocket side main shaft oil seal with lithium grease.

Cut a 50 mm (2") diameter disc out of asbestos material. Place the disc over the oil seal to protect it from the flame.

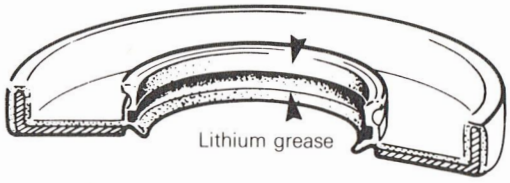
Heat the crankcase bearing embossment as described above.

Quickly turn the crankcase half over and drift the bearing into the crankcase using a **soft** hammer.

NOTE: Install the bearing with open side facing inside of crankcase.

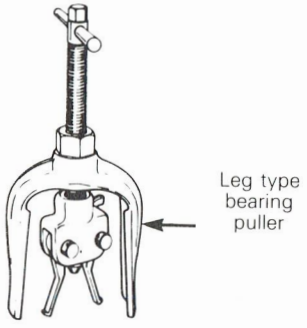


(58) To install a new seal, use the appropriate oil seal insertion pusher. (See tool section). Apply a light coat of lithium grease on the seal lip.



NOTE: The oil seal can only be replaced with the main shaft bearing removed.

(59) Heat and a leg type puller is needed to remove the clutch shaft bearing from sprocket side crankcase.



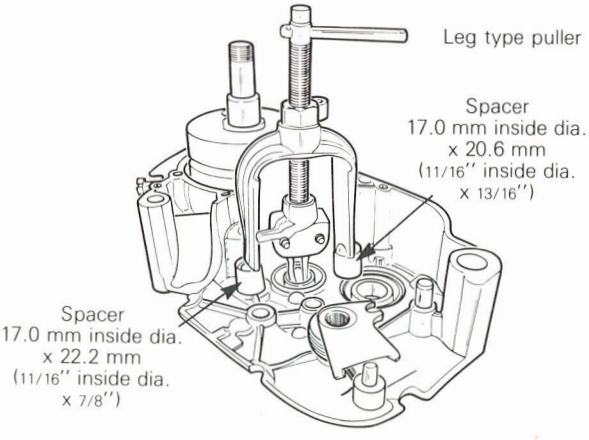
CAUTION: Always apply heat to remove or install a bearing in the crankcase. Failure to apply heat may result in metal being drawn out of the bearing to crankcase contact surface, thus causing a loose fit in the crankcase.

Proceed as follows:

WARNING: Engines have magnesium crankcase. Magnesium must be heated with great care.

Disassembly

Install the puller as illustrated.



NOTE: Two cylindrical spacers are needed to properly position the puller in the crankcase.

Using a butane torch with a large **soft** flame, heat around the crankcase clutch shaft bearing area with 4 to 5 rapid circular passes, then extract the bearing.

Reassembly

Heat around the crankcase bearing area as described above and quickly drift the bearing into the crankcase using a **soft** hammer:

(60) (61) Heat is needed to remove or install the clutch and main shaft bearings in the clutch side crankcase.

CAUTION: Always apply heat to remove or install a bearing in the crankcase. Failure to apply heat may result in metal being drawn out of the bearing to crankcase contact surface, thus causing a loose fit in the crankcase.

Proceed as follows:

WARNING: Engines have magnesium crankcase. Magnesium must be heated with great care.

Disassembly

Remove the bearing retaining plate and shim(s).

Using a butane torch with a large **soft** flame, heat the crankcase (inside portion) around the bearing area with 4 to 5 rapid circular passes.

Drift the bearing(s) out with an appropriate pusher and soft hammer.

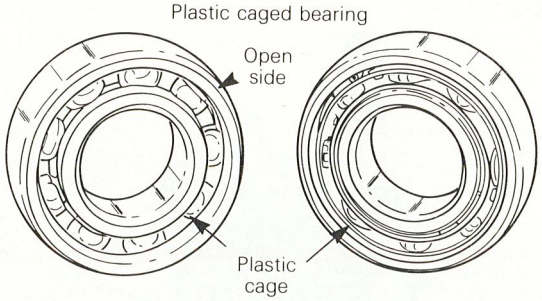
Reassembly

Install the bearings retaining plate without shim(s).

Heat the crankcase (inside portion) as described above.

Quickly drift the bearing(s) into the crankcase using a soft hammer, until the bearing(s) seats against the bearing retaining plate.

NOTE: Install the clutch shaft bearing with open face facing outside of the crankcase.



Remove the bearing retaining plate and verify the end play.

(62) (63) The transmission shaft end-play must be 0.1 mm (.004") maximum.

Proceed as follows to verify the end-play.

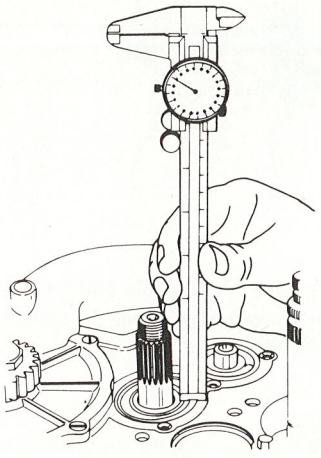
Remove the bearing(s) retaining plate and shims.

Tap both clutch and main shafts towards the sprocket side crankcase.

Tap both bearing **inner** races towards the sprocket side crankcase.

Measure the distance between the bearing **outer race** and the **crankcase surface** to determine the shims required between the bearing and the retaining plate.

The end-play must be 0.1 mm (.004") maximum.



CAUTION: If transmission shimming is too tight, transmission binding and excessive friction will occur.

(65) At assembly, apply Loctite no. 242 blue (medium strength) on the retaining screw threads and torque to 4-5.5 N•m (3-4 ft-lbs).

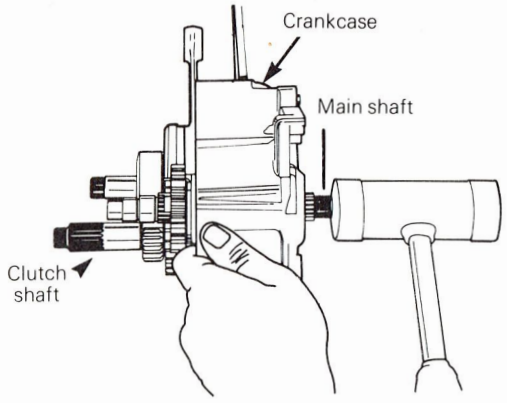
(67) At assembly, torque the kick starter stop screw to 34-40 N•m (25-29 ft-lbs).

NOTE: After assembly, do not remove the kick starter stop screw unless needed otherwise the kick starter spring will loose its preload and the removal of the clutch cover will be necessary to repreload the spring.

Transmission gear cluster

Disassembly

To remove the clutch and main shaft gear cluster from the crankcase, tap on the sprocket side end of the main shaft.



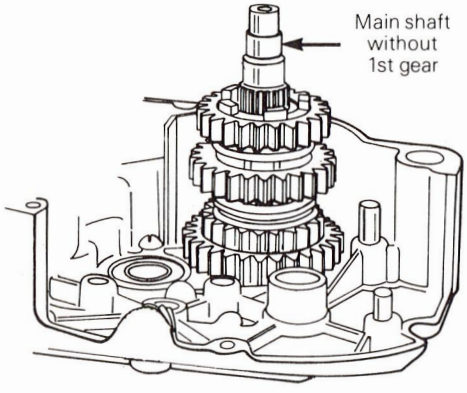
NOTE: To ease the clutch shaft removal, turn the clutch shaft manually while at the same time, tapping on the main shaft.

Reassembly

Proceed as follows:

Position the main shaft as illustrated, gently tap without pushing completely the shaft into the bearing (to ease the clutch shaft installation).

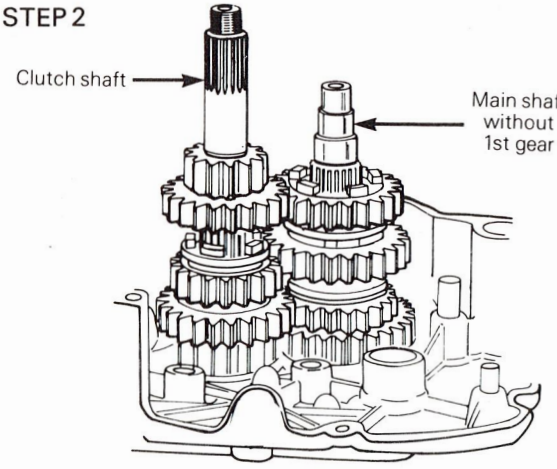
STEP 1



Position the clutch shaft as illustrated, gently tap to push the shaft into the bearing, while turning the main shaft manually, completely seat both shafts.

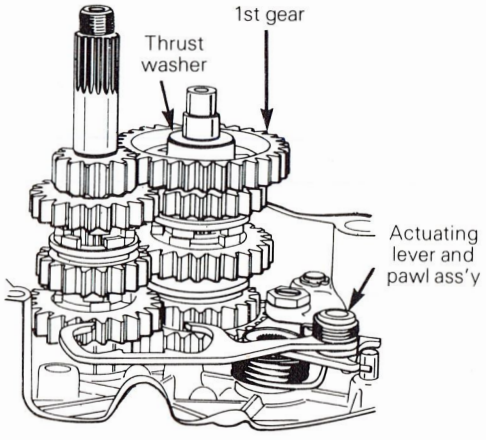
CAUTION: Prior to pushing the clutch shaft into the bearing, make sure the gears match one another.

STEP 2



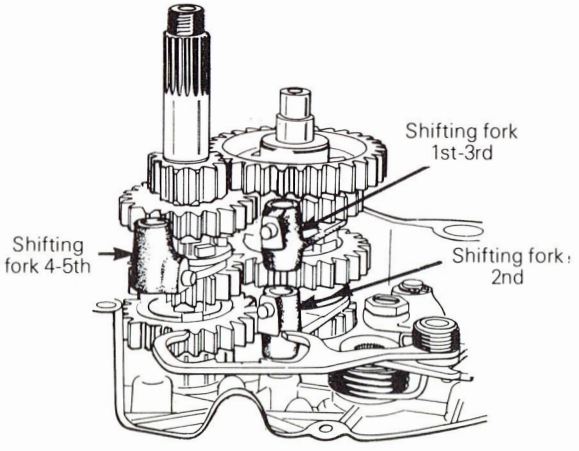
Position the thrust washer, needle bearing, first gear and thrust washer, and then the actuating lever and pawl ass'y as illustrated.

STEP 3

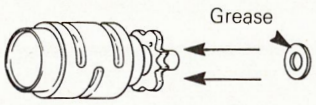


Position the shifting forks as illustrated.

STEP 4

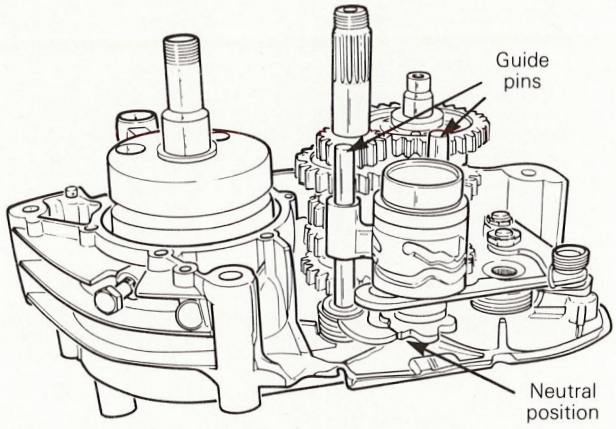


Coat the shift drum washer with grease, this will allow the washer to stick on the shift drum for ease of installation.



Position the shift drum ass'y, and match all the shifting forks with the drum slots then position the guide pins as illustrated.

STEP 5



Hold the index lever (in crankcase) fully open while inserting the shift drum in place.

NOTE: To facilitate the assembly of the shifting forks, position the shift drum assembly at the neutral position.

Prior to reassembly of the crankcase halves, **adjust the shifting mechanism** and **ensure that the index is leaning against the neutral notch.**

CLEANING

Clean all the metal components in a metal cleaner.

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

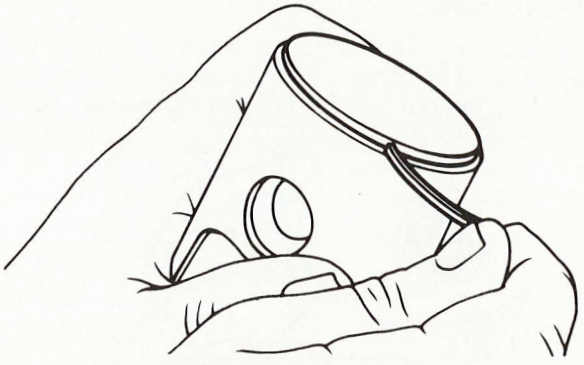
CAUTION: Clean stator plate and flywheel using only a clean cloth.

Scrape any carbon deposits from cylinder exhaust port, cylinder head and piston dome using a wooden spatula.

NOTE: The letter AUS over an arrow on the piston dome must be visible after cleaning.

Clean the piston ring groove(s) with a groove cleaner tool, or using a piece of broken ring.

NOTE: It is suggested to periodically clean the cylinder head and piston of carbon build-up.



Scrape any deposit from the piston crown and inspect the piston for cracks or seizure marks.

Remove all traces of the cylinder base gasket and fit a new lightly greased gasket.

Remove old sealant from mating surfaces of crankcase with acetone, wood alcohol or equivalent.

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

INSTALLATION

To install engine on vehicle inverse removal procedure.

However, special attention should be paid to the following.

Torque the engine mounts to 20-27 N•m (15-20 ft-lbs).

Install the swing arm bolt and nut, hold the swing arm in the mid-way position and torque the nut to 95 N•m (70 ft-lbs).

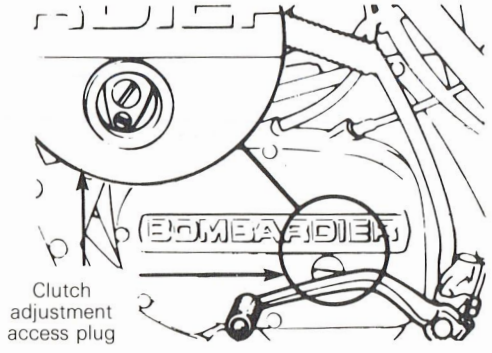
Adjust clutch.

NOTE: Prior to the clutch adjustment, operate the clutch lever a couple of times to seat the cable in place.

Loosen the clutch cable adjuster (at handlebar) to provide maximum slack.

Remove the adjustment access plug and loosen the 4 mm set screw.

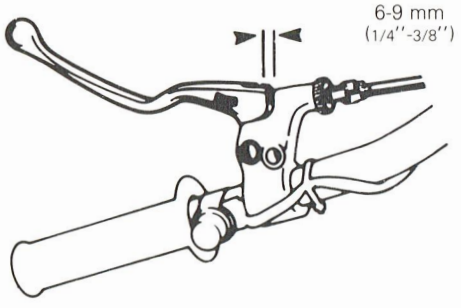
Turn the 8 mm clutch adjusting screw in and out to locate the point of contact with the release bearing, then turn the screw out **1/2 turn counter-clockwise.**



Carefully tighten the 4 mm set screw to lock the adjustment.

Replace the access plug.

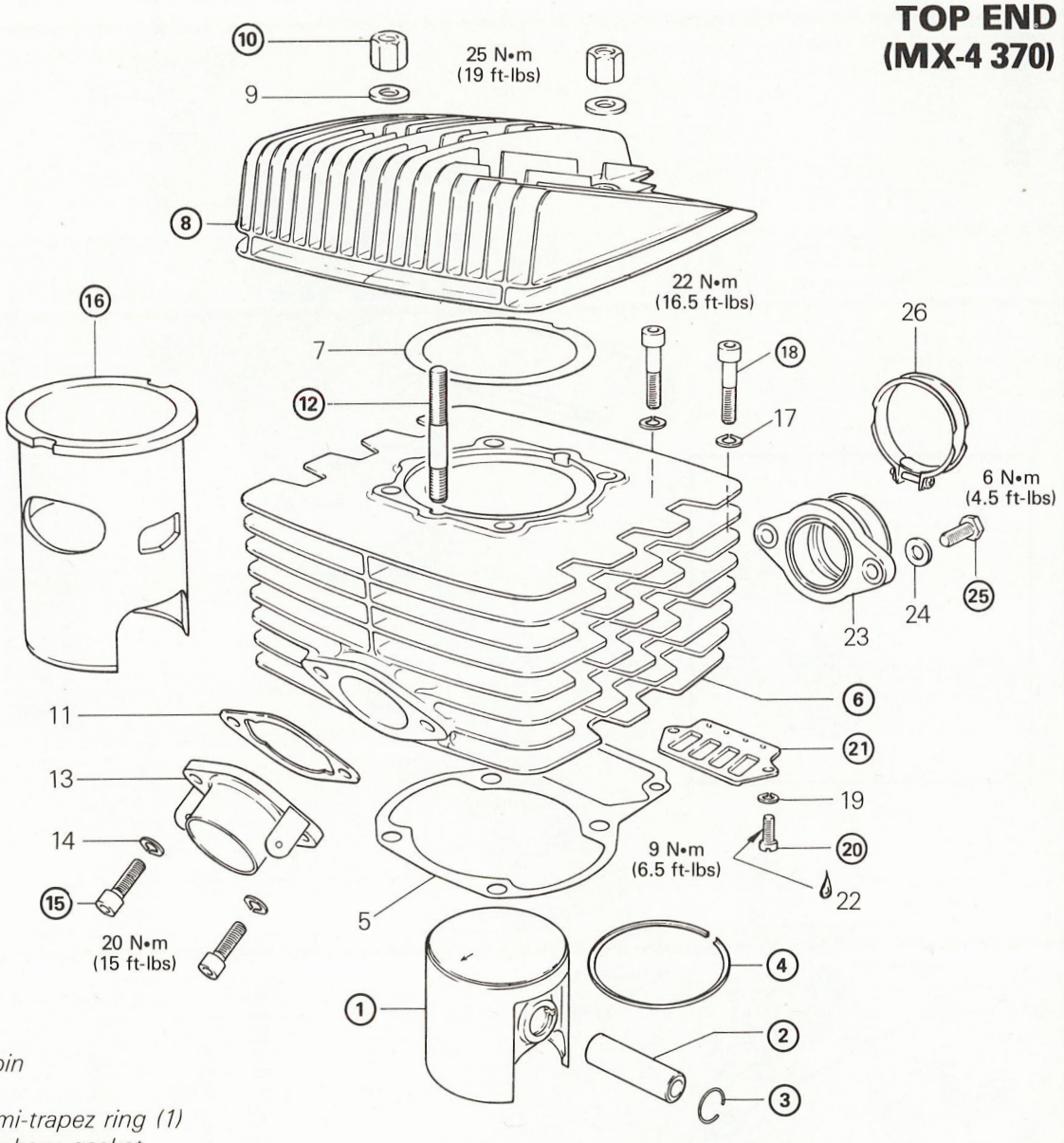
Adjust the cable adjuster to provide 6-9 mm (1/4''-3/8'') slack between clutch lever and housing.



Check ignition timing.

366 ENGINE TYPE (MX-4 370)

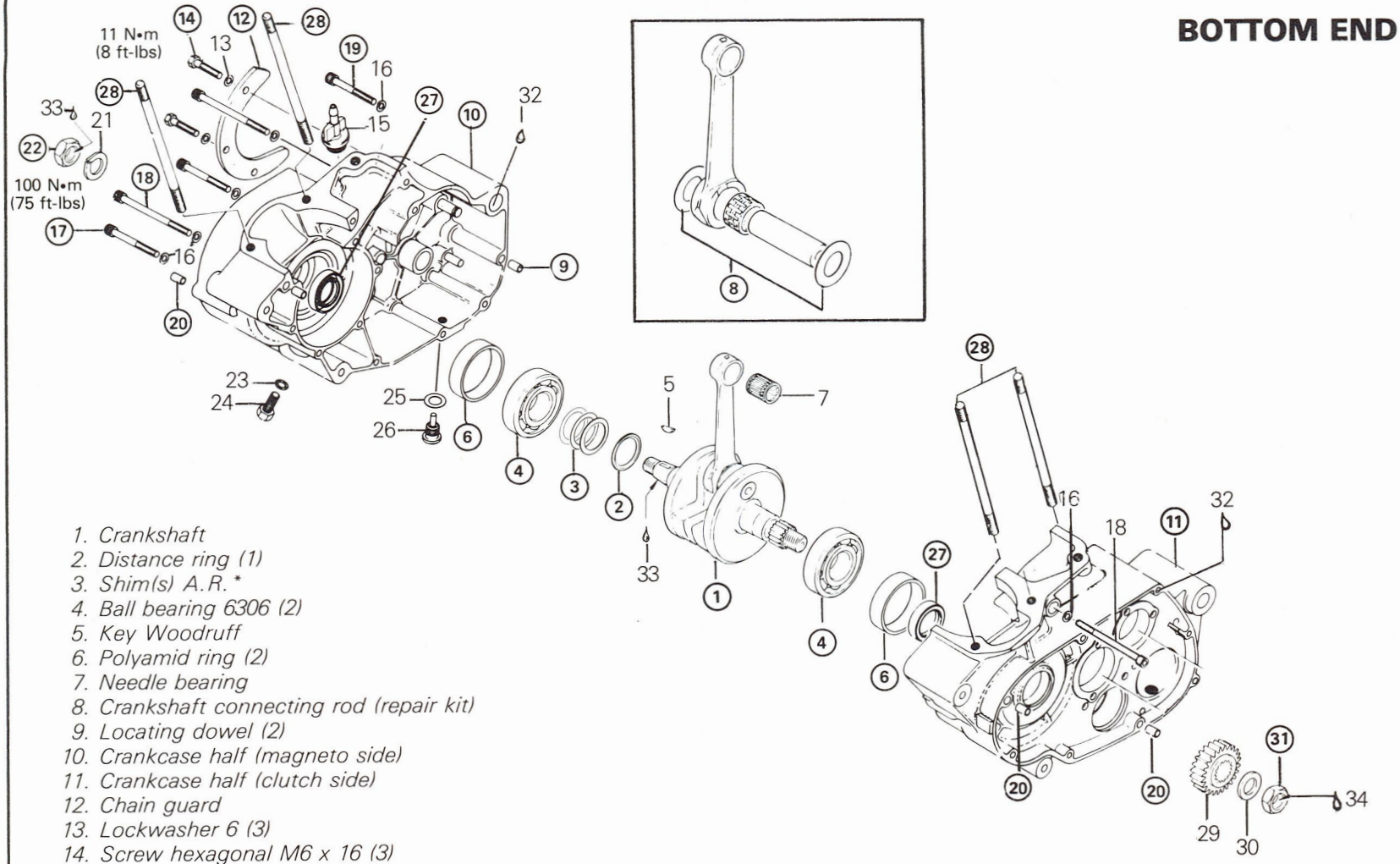
TOP END (MX-4 370)



1. *Piston*
2. *Piston pin*
3. *Circlip*
4. *"L" Semi-trapez ring (1)*
5. *Cylinder base gasket*
6. *Cylinder*
7. *Cylinder head shim A.R. **
8. *Cylinder head*
9. *Washer 10.5 (6)*
10. *Cylinder head nut hexagonal M10 (6)*
11. *Gasket (exhaust)*
12. *Cylinder head stud M10 x 56 (2)*
13. *Exhaust socket*
14. *Lockwasher 8 (2)*
15. *Allen screw M8 x 25 (2)*
16. *Cylinder sleeve*
17. *Lockwasher 8 (2)*
18. *Allen screw M8 x 40 (2)*
19. *Lockwasher 6 (2)*
20. *Pan head screw M6 x 16 (2)*
21. *Reed valve assembly*
22. *Loctite 271 red (high strength)*
23. *Rubber flange*
24. *Washer 8.4 (2)*
25. *Hexagonal screw M8 x 20 (2)*
26. *Clamp*

**A.R.: As required*

BOTTOM END



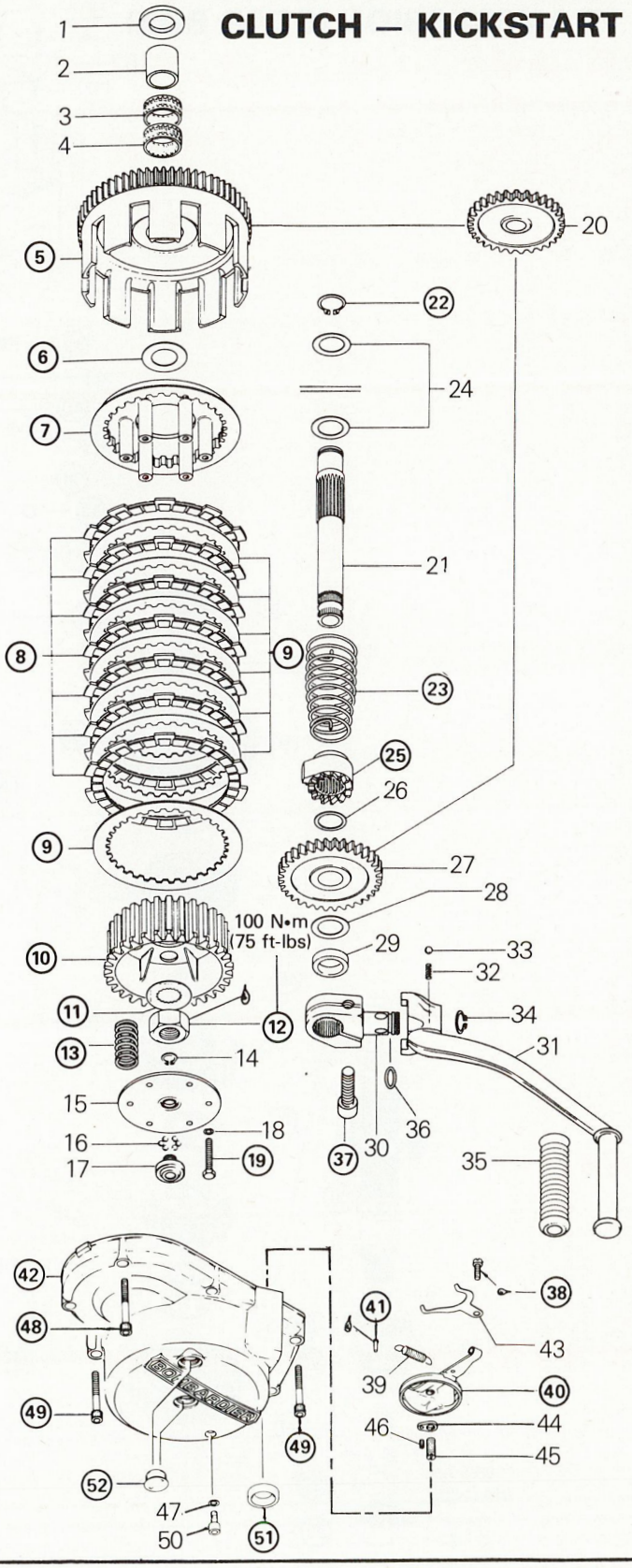
1. *Crankshaft*
2. *Distance ring (1)*
3. *Shim(s) A.R.**
4. *Ball bearing 6306 (2)*
5. *Key Woodruff*
6. *Polyamid ring (2)*
7. *Needle bearing*
8. *Crankshaft connecting rod (repair kit)*
9. *Locating dowel (2)*
10. *Crankcase half (magneto side)*
11. *Crankcase half (clutch side)*
12. *Chain guard*
13. *Lockwasher 6 (3)*
14. *Screw hexagonal M6 x 16 (3)*
15. *Oil filler cap M18 x 1.5*
16. *Lockwasher 6 (13)*
17. *Allen screw M6 x 55 (8)*
18. *Allen screw M6 x 70 (4)*
19. *Allen screw M6 x 50 (1)*
20. *Locating dowel (5)*
21. *Lockwasher 18*
22. *Hexagonal nut M18 x 1.5 (magneto)*
23. *Gasket ring*
24. *Hexagonal screw M8 x 16 (crankcase drain)*
25. *Gasket ring*
26. *Magnetic drain plug*
27. *Seal magneto side and clutch side*
28. *Stud M19 x 191 (4)*
29. *Drive gear*
30. *Distance ring 3 mm*
31. *Nut M18 x 1.5*
32. *Silicone sealant or Loctite 515 sealant*
33. *Loctite 242 (blue) medium strength*
34. *Loctite 271 (red) high strength*

100 N•m
(75 ft-lbs)

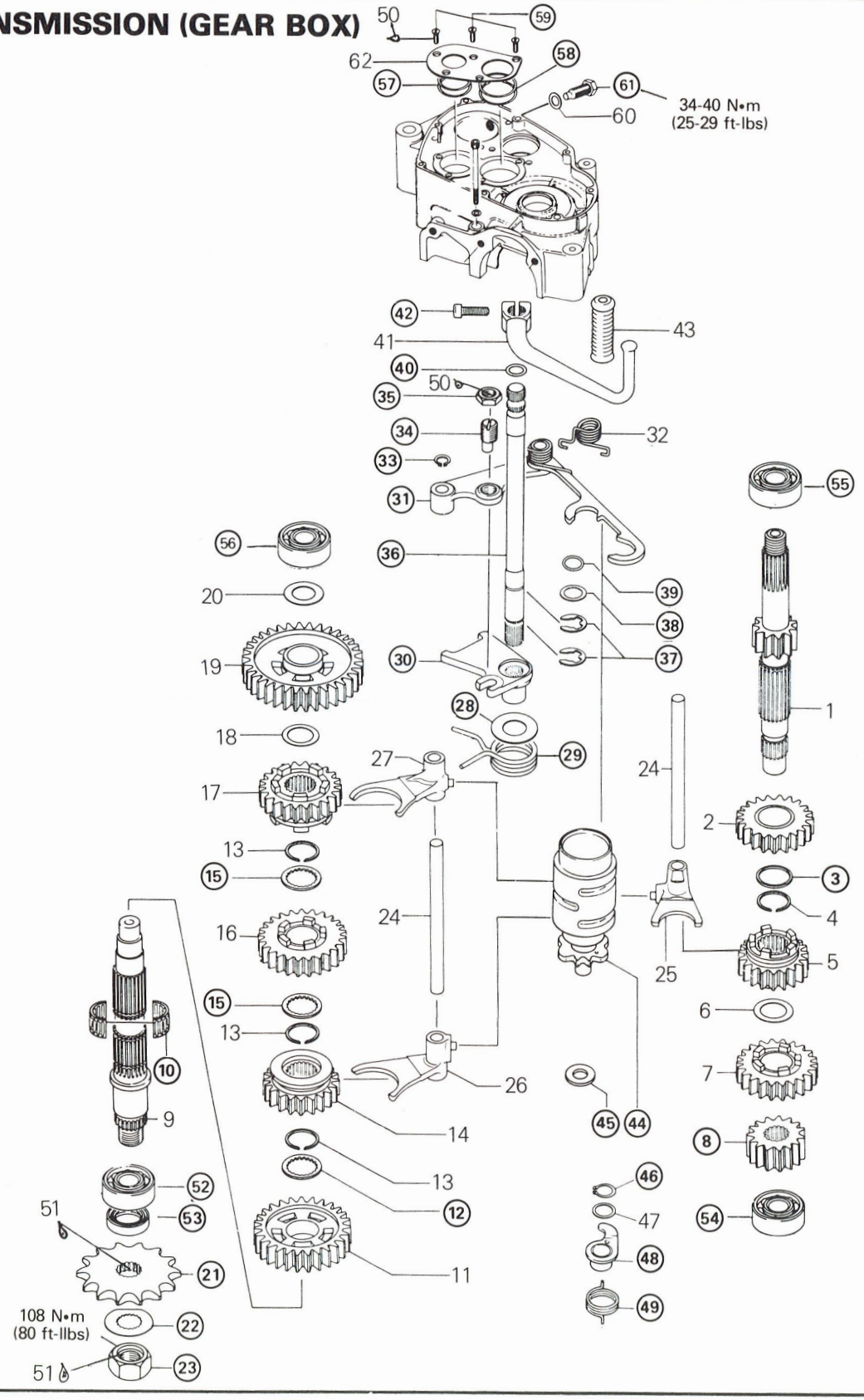
**A.R.: As required*

CLUTCH – KICKSTART

1. *Thrust washer (inner)*
2. *Inner race*
3. *Needle bearing*
4. *Needle bearing*
5. *Clutch drum*
6. *Thrust washer (outer)*
7. *Inner pressure plate*
8. *Friction plate 7*
9. *Driven plate 7*
10. *Clutch hub*
11. *Locking washer*
12. *Clutch shaft nut M18 x 1.5*
13. *Clutch spring (6)*
14. *Snap ring 10 x 1*
15. *Spring retaining plate*
16. *Ball 5/32" (12)*
17. *Spring retaining plate hub*
18. *Lockwasher 5 mm (6)*
19. *Screw M5 x 25 (6)*
20. *Idler gear 31 tooth*
21. *Kick start shaft*
22. *Circlip*
23. *Return spring*
24. *Thrust washer (2)*
25. *Ratchet gear*
26. *Thrust washer*
27. *Drive gear 34 tooth*
28. *Thrust washer*
29. *Distance sleeve 6 mm*
30. *Kick start hub*
31. *Kick start lever*
32. *Spring*
33. *Ball 7/32"*
34. *Snap ring*
35. *Rubber sleeve*
36. *O' ring*
37. *Screw M8 x 30*
38. *Slot head screw M5 x 12*
39. *Clutch cam return spring*
40. *Clutch release cam*
41. *Drive pin*
42. *Clutch cover*
43. *Clutch cam retaining spring*
44. *Clutch adjustment locking plate*
45. *Clutch adjustment screw M8 x 19.5*
46. *Clutch adjustment locking screw M4 x 6*
47. *Sealing ring*
48. *Allen screw M6 x 40 (2)*
49. *Allen screw M6 x 35 (6)*
50. *Plug, oil level*
51. *Seal, kick start shaft*
52. *Plug (2)*



TRANSMISSION (GEAR BOX)



1. *Clutch shaft 13T*
2. *4th gear clutch shaft, 21T*
3. *Thrust washer, clutch shaft*
4. *Snap ring clutch shaft*
5. *3rd gear clutch shaft, 18T*
6. *Thrust washer, clutch shaft*
7. *5th gear, clutch shaft, 23T*
8. *2nd gear, clutch shaft, 16T*
9. *Main shaft*
10. *Needle bearing main shaft*
11. *2nd gear, main shaft, 28T*
12. *Thrust washer, main shaft*
13. *Snap ring, main shaft (3)*
14. *5th gear, main shaft, 21T*
15. *Thrust washer, main shaft (2)*
16. *3rd gear, main shaft, 25T*
17. *4th gear, main shaft, 23T*
18. *Thrust washer, main shaft*
19. *1st gear, main shaft, 31T*
20. *Thrust washer, main shaft*
21. *Sprocket (14T)*
22. *Lockwasher*
23. *Hexagonal nut, M20 x 1.5 (main shaft)*
24. *Guide pin, shift fork (2)*
25. *Shifting fork, 4-5*
26. *Shifting fork, 2*
27. *Shifting fork, 1-3*
28. *Thrust washer, actuating lever*
29. *Spring, actuating lever*
30. *Actuating lever*
31. *Pawl ass'y*
32. *Pawl spring*
33. *Snap ring 10 x 1*
34. *Pawl positioning screw*
35. *Locking nut M12 x 1, pawl positioning screw*
36. *Shift shaft*
37. *Retaining ring (2)*
38. *Thrust washer, shift shaft*
39. *"O" ring, shift shaft*
40. *"O" ring, shift shaft*
41. *Shift lever*
42. *Allen screw M6 x 20*
43. *Shift lever rubber*
44. *Shift drum ass'y*
45. *Washer, shift drum*
46. *Index snap ring*
47. *Index washer*
48. *Index lever*
49. *Index spring*
50. *Loctite 242 blue (medium strength)*
51. *Loctite 271 red (high strength)*
52. *Ball bearing 6205 main shaft, sprocket side*
53. *Seal main shaft*
54. *Ball bearing 6203, clutch shaft, sprocket side*
55. *Ball bearing 6204, clutch shaft, clutch side*
56. *Ball bearing 6203, main shaft, clutch side*
57. *Shim 0.5 mm, 0.3 mm, 0.1 mm, main shaft bearing (A.R.)**
58. *Shim 0.5 mm, 0.3 mm, 0.1 mm, clutch shaft (A.R.)**
59. *Countersunk screw M5 x 12 (5)*
60. *Gasket ring*
61. *Stop screw, kick starter*
62. *Retaining plate (transmission bearings)*

**A.R.: As required*

REMOVAL

Disconnect or remove the following from vehicle.

Vent tubes

Magneto cover

Spark plug

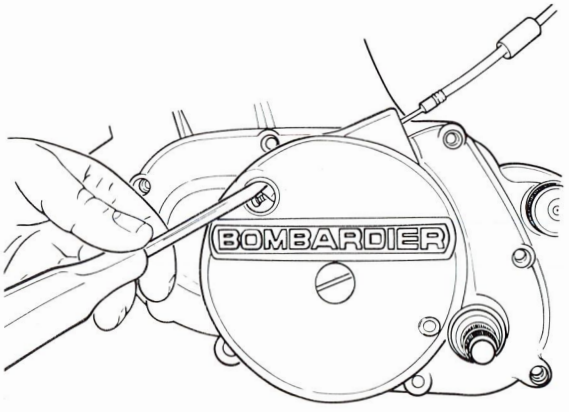
Drive chain

Exhaust pipe (including exhaust socket)

Carburetor

Front engine mounts and stud.

Clutch cable (Remove the clutch cable from the handlebar lever. Remove the clutch cable access plug. Pull the cable housing away from the clutch cover. Push the inner cable inside the cover until its tip is visible through the installation hole, with a screwdriver, disengage it from the clutch release arm and pull it out of the cover).



Lower engine stud and spacers.

Swing arm pivot bolt (note the number of shim/s on the inside swing arm pivot flanges).

Pull the engine upward and forward and withdraw it from the frame through the left side of vehicle.

DISASSEMBLY & ASSEMBLY

NOTE: Refer to Technical Data for component fitted tolerance and wear limit.

Top End

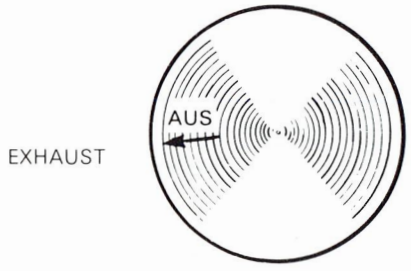
①⑥⑧⑯ At the replacement of the piston, cylinder, cylinder head, cylinder sleeve, the squish area should be remeasured (See technical data).

①②③ Place a clean cloth over crankcase to prevent circlips from falling into crankcase then use a pointed tool to remove circlips from piston.

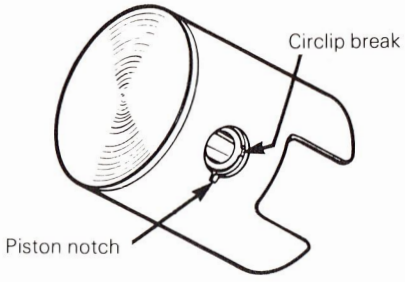
Drive the piston pin in or out using a suitable drive punch and hammer.

CAUTION: When tapping piston pin in or out of piston, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

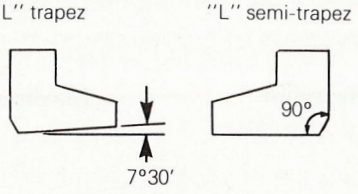
At assembly, place the piston over the connecting rod with the letters AUS, over an arrow on the piston dome, facing direction of the exhaust port.



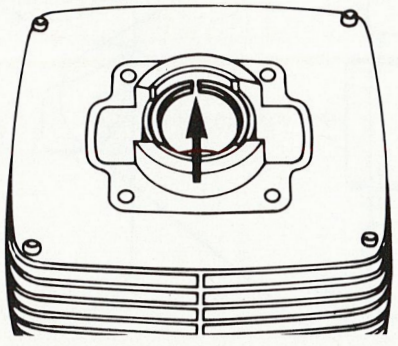
Once the circlips are installed, turn each circlip so that the circlip break is not directly in line with piston notch. Using very fine emery cloth, remove any burrs on piston caused through circlip installation.



④ There are two different types of "L" ring.



366 engine type (MX-4 370) uses 1 "L" semi-trapez.
Ring end-gap: 0.25-0.45 mm (.010"-.018").

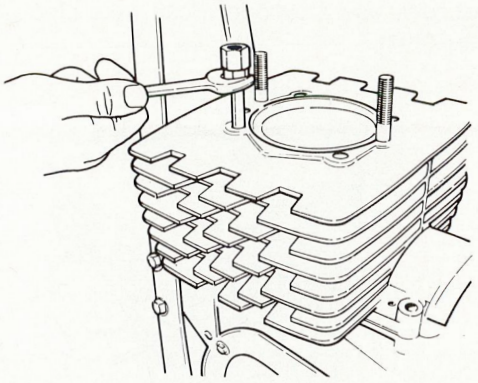


CAUTION: Prior to "L" ring replacement always ensure to visually identify the appropriate type needed. The two ring types are not interchangeable. Damage may occur if interchanged.

⑥ It is possible to remove the cylinder from the engine with the engine in the frame.

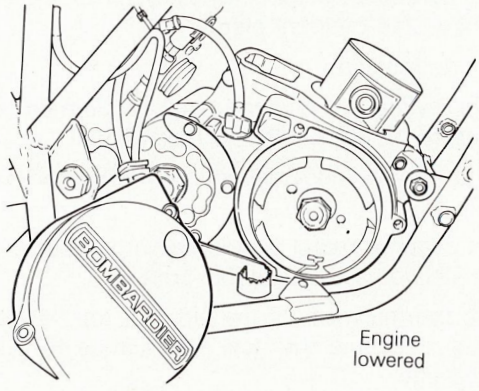
Proceed as follows:

- Remove the seat, the gas tank, the L.H. side panel and the complete exhaust pipe, including the engine exhaust socket.
- Disconnect the high tension wire and remove the carburetor and rubber flange.
- Remove the front and lower engine supports, including the R.H. and L.H. bushing under the engine.
- Remove the magneto cover.
- Remove the front bolt of the left foot peg.
- Slacken the swing arm bolt to ease the lowering of the engine.
- Remove the cylinder head.
- Remove the four (4) cylinder studs.



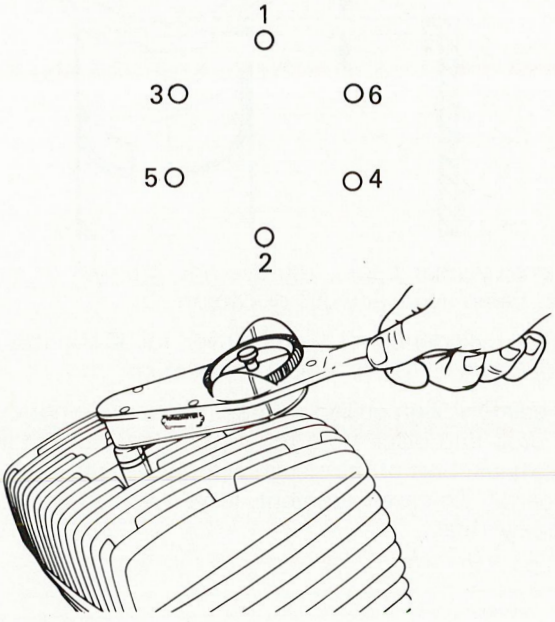
NOTE: It is not necessary to remove the front and rear middle studs which are screwed into the cylinder instead of the crankcase.

Lift and remove the cylinder.

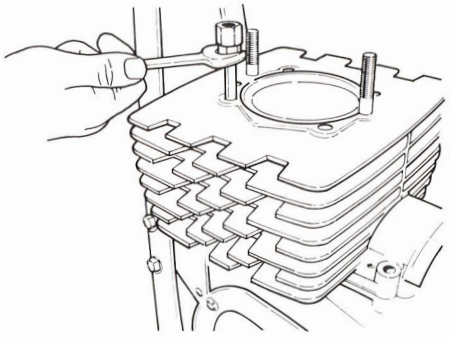


Engine lowered

⑧ ⑩ At assembly, torque to 25 N•m (19 ft-lbs) in a criss-cross sequence.



⑫ To unscrew, use 2 cylinder head nuts blocked one against the other.



At assembly, screw the short threaded portion of the stud into the cylinder.

⑮ At assembly, torque to 20 N•m (15 ft-lbs).

⑯ Cylinder sleeve should be replaced whenever its side diameter becomes 0.190 mm (.0075") or more larger than a new 2nd oversize piston.

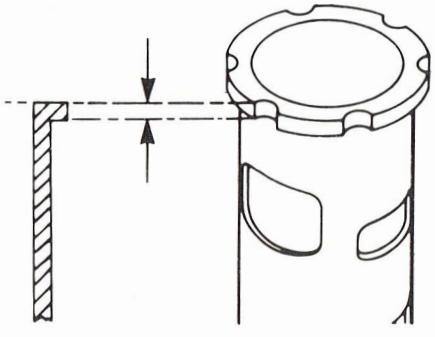
Proceed as follows:

Place the cylinder in a range oven for 30 minutes, at a temperature of 175°C (350°F) maximum.

Place the new cylinder sleeve in a freezer for one hour minimum.

Support cylinder barrel upside down and press out old cylinder sleeve using a suitable pusher.

Measure the thickness of the old liner top flange and if necessary, machine the new liner flange to the same measurement.



Inspect cylinder barrel, remove any grooves or scratches. Clean away any dirt or carbon.

Re-heat cylinder barrel in range oven for 30 minutes at a temperature of 175°C (350°F) maximum.

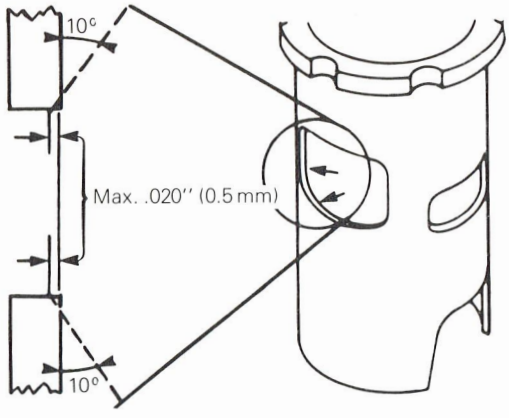
Immediately align chilled cylinder sleeve with hot cylinder, drop into place from top side making sure to align the exhaust port of the sleeve with the one of the cylinder barrel. To ease alignment, leave two cylinder studs in the cylinder.

NOTE: Only 3-4 seconds maximum are needed before cylinder cools sufficiently to grip onto sleeve.

Bore the new sleeve to provide piston clearance of:

Minimum	Maximum
0.085 mm (.003")	0.100 mm (.004")

Using a rotary file or jeweler's hand file, chamfer the sharp edges of each port 10°, to a width of 0.5 mm (.020").



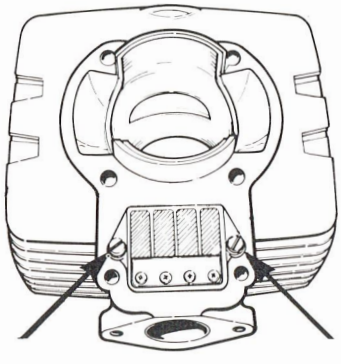
CAUTION: Excessive chamfer will alter port timing.

Check the ring end gap.

Make sure to check squish area measurement during assembly (see Technical Data).

⑱ At assembly, torque to 22 N•m (16.5 ft-lbs).

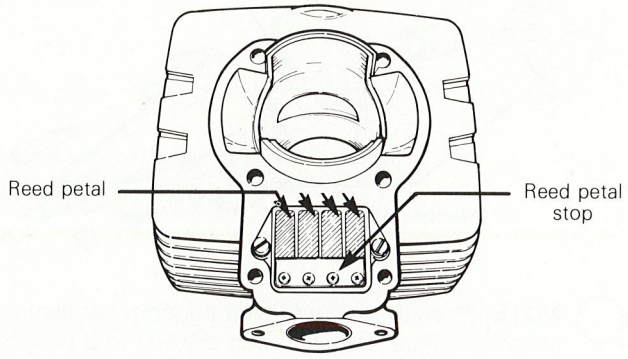
⑳ At assembly, apply Loctite 271 red (high strength) on threads and torque to 9 N•m (6.5 ft-lbs).



NOTE: It is necessary to use an impact screwdriver to remove the screws.

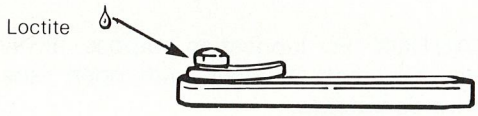
(21) If the reed petal has to be removed proceed as follows:

Remove the four (4) screws (P/N 420 240 350) retaining the reed petal stop.



Remove the reed petal.

At reassembly install the reed petal stop ensuring to position as illustrated.



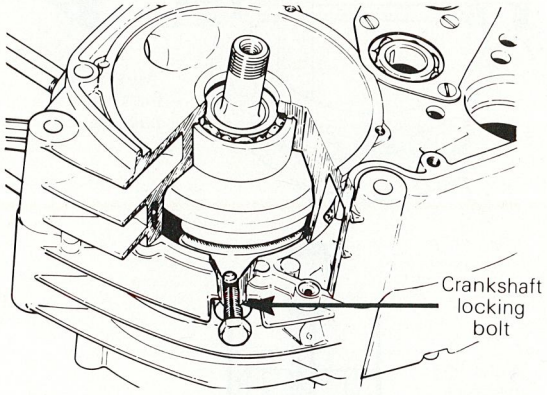
Apply Loctite 271 red (high strength) to the retaining screws.

(25) At assembly torque to 6 N•m (4.5 ft-lbs).

Bottom End

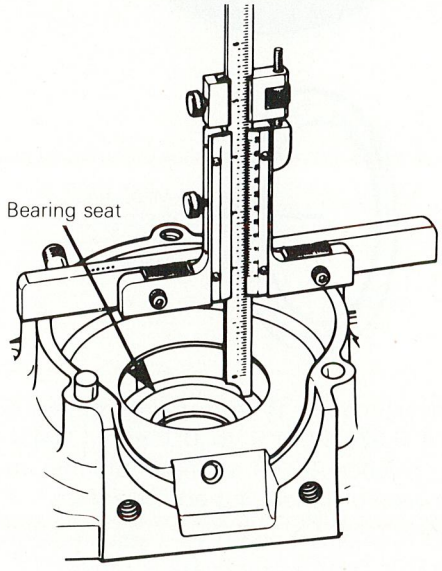
(1) (8) (10) (11) At the replacement of the crankshaft, connecting rod and crankcase halves, the squish area should be measured (see Technical Data).

(1) (10) To facilitate some procedures, the crankshaft can be locked at the top dead center position using a crankshaft locking bolt as illustrated.

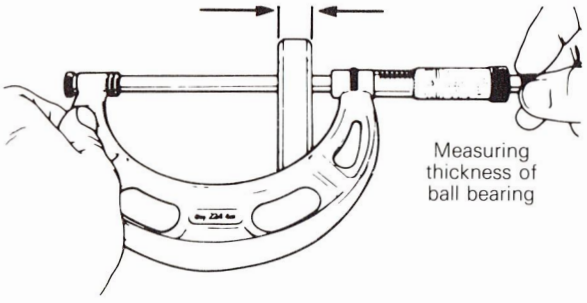


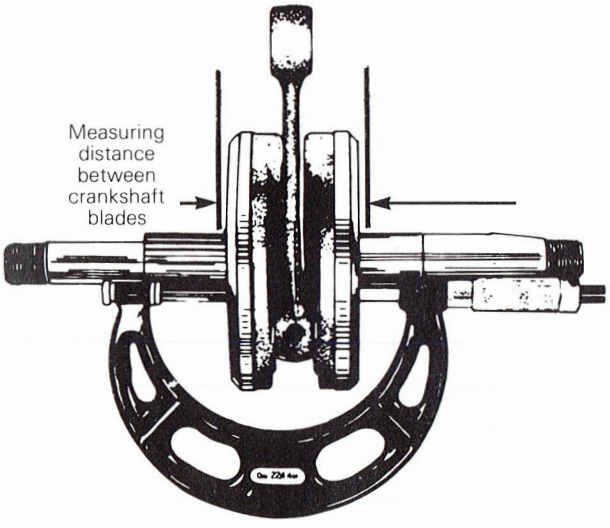
(2) At assembly, position the distance ring with the chamfered side facing the crankshaft.

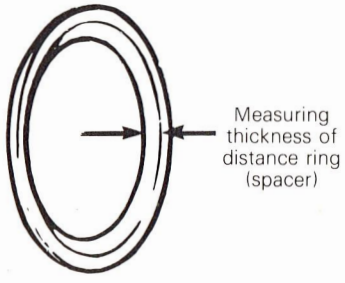
(1) (3) Crankshaft end-play should be between 0.025 mm (.001") to 0.1 mm (.004"). To determine the necessary shims: it is necessary to measure the crankcase. To do this, first measure each half from mating surface to bottom of bearing seat. Add measurements of both halves, total equals A.



Measure thickness of each ball bearing. Measure distance between crankshaft blades, and measure the thickness of the distance ring ②. Add measurements. Total equals B.



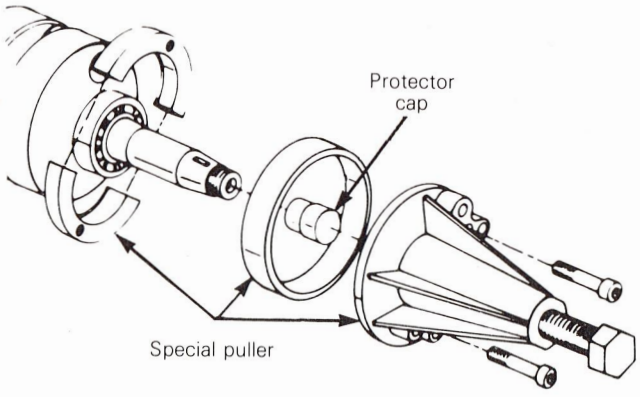




Subtract measurement B from measurement A, min. tolerance of 0.025 (.001") to 0.1 mm (.004"). Total balance is distance to be shimed. Shim(s) must be located between distance ring and bearing.

NOTE: Crankshaft end-play is adjusted only when crankshaft and/or crankcase is replaced.

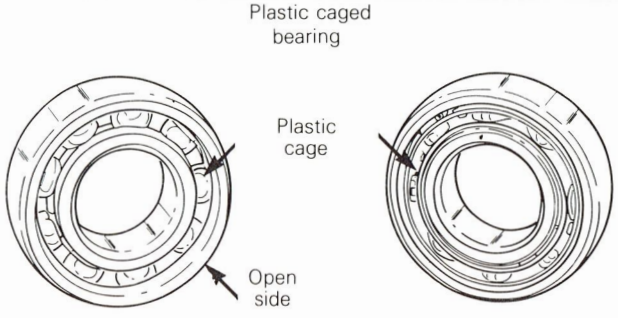
④To remove bearing from crankshaft use bearing puller as illustrated. (See tool section).



NOTE: Prior to magneto side bearing installation, install distance ring, required shim(s) and bearing on crankshaft.

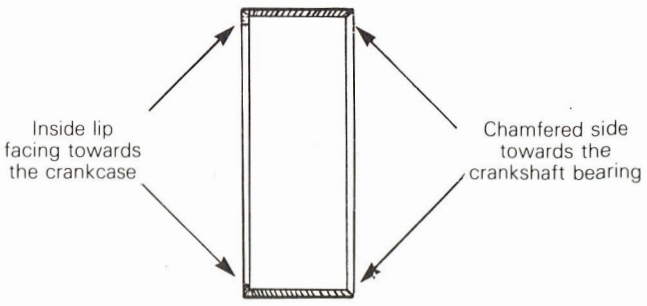
At assembly, place bearings in an oil container and heat the oil to 93°C (200°F) for 5 to 10 min. This will expand the bearings and permit them to slide easily onto the shaft.

CAUTION: For lubrication purpose, always place the crankshaft bearings with open face facing towards outside.



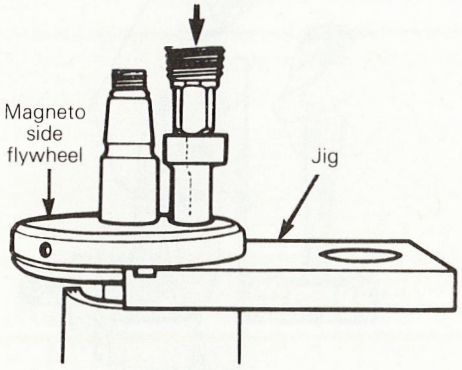
⑥To install a new polyamid ring use an appropriate insertion pusher (See Tools section).

CAUTION: Make sure to position the polyamid ring with the inside lip portion facing towards the crankcase.



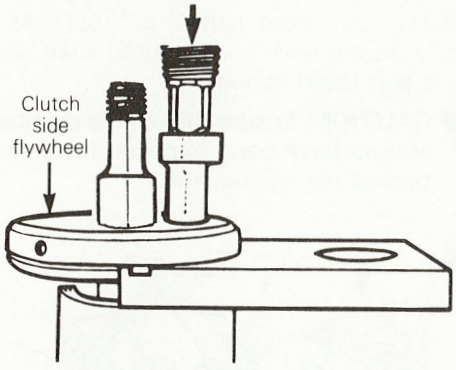
⑧ To replace the connecting rod proceed as follows:

Mount the crankshaft assembly in jig and press crankpin out of the magneto side flywheel.



Remove the connecting rod and the bearing.

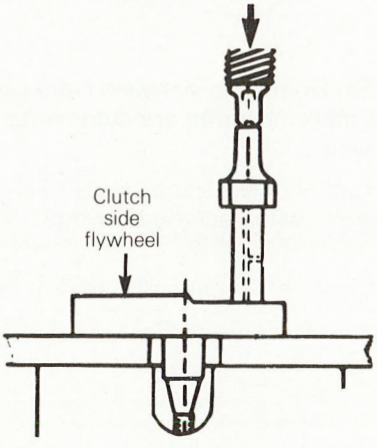
Press the crankpin out of the clutch side flywheel.



Press the new crankpin into the clutch side flywheel.

▼ **CAUTION: The crankpin must enter the bore straight to prevent damage to the bore and/or the crankpin.**

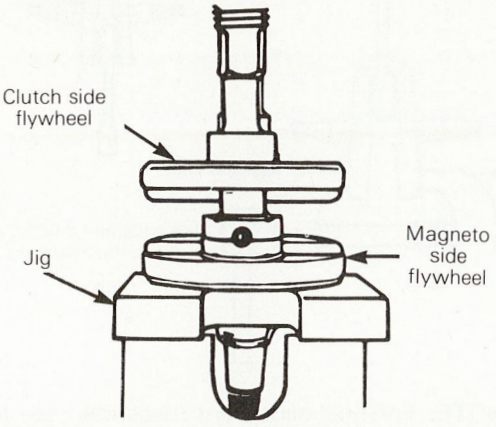
◯ **NOTE:** The crankpin can be installed on both sides.



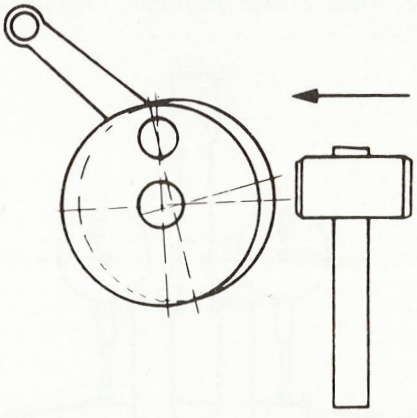
Fit the connecting rod and the bearing into place with light grease.

Place the magneto side flywheel on the jig. Align the clutch side flywheel with the magneto side flywheel and press the crankpin (with rod assembly) into magneto side flywheel.

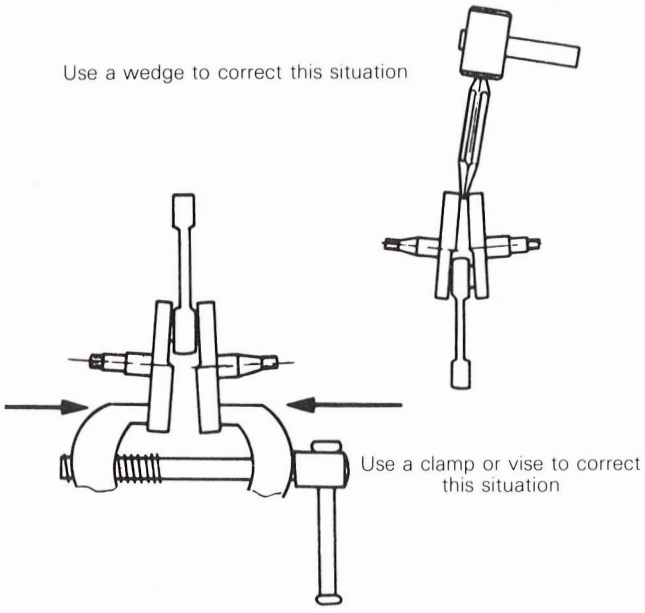
◯ **NOTE:** The connecting rod side clearance must be 0.4 mm (.015") to 0.5 mm (.020").



Using a "straight edge", check for flywheel alignment. Drift with a heavy brass mallet to align if necessary.



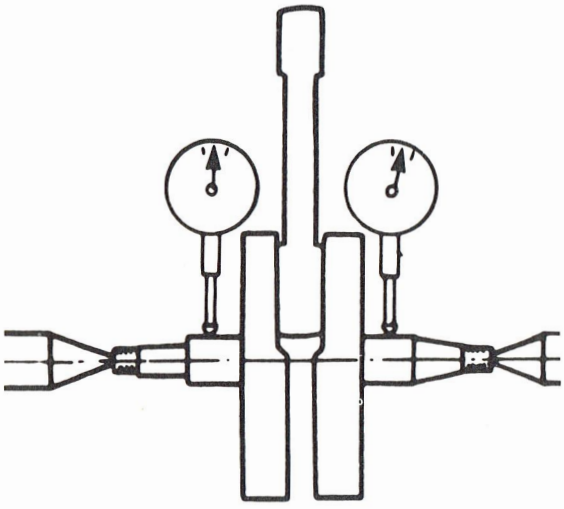
Using a micrometer or vernier caliper, check for counterweight alignment.



NOTE: For final alignment measures, see technical data.

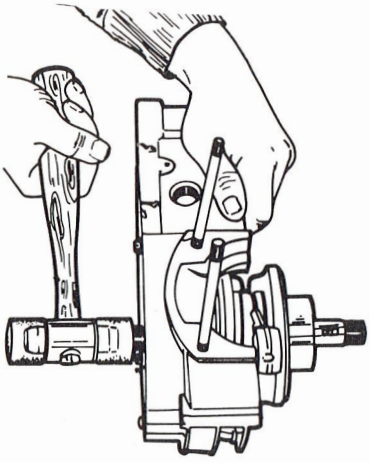
When overall alignment is completed, verify connecting rod side clearance.

NOTE: Make a final alignment check using a dial indicator.



⑨ At the joining of the crankcase halves, make sure the locating dowel sleeves are in place.

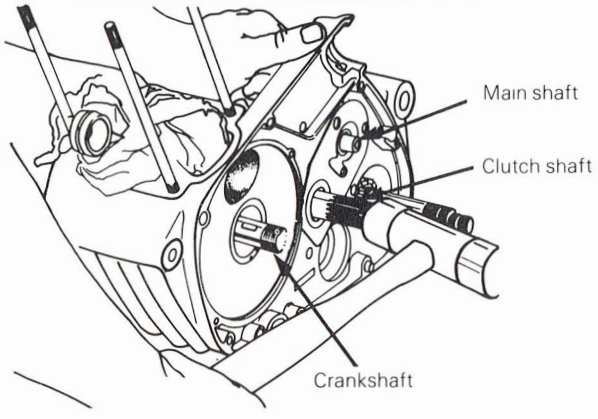
⑩ Remove the crankshaft from the crankcase by tapping on the crankshaft end with a soft hammer.



CAUTION: Prior to the crankshaft removal ensure that the crankshaft locking bolt is removed.

⑩⑪ The crankcase halves can be split, by tapping equally on the main shaft, clutch shaft and crankshaft with a **soft** faced hammer.

CAUTION: Ensure that all the crankcase retaining screws have been removed (including the screw behind the chainguard).

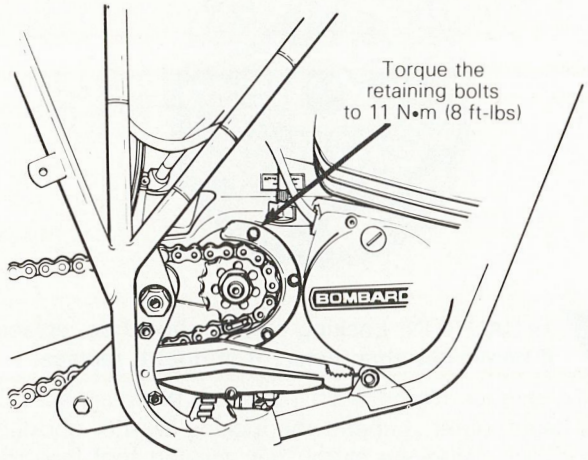


CAUTION: Do not pry between crankcase halves, as score marks incurred are detrimental to crankcase sealing.

Prior to joining the crankcase halves carefully clean the mating surfaces with acetone, wood alcohol or equivalent.

Apply a light coat of Loctite 515 sealant or silicone sealant.

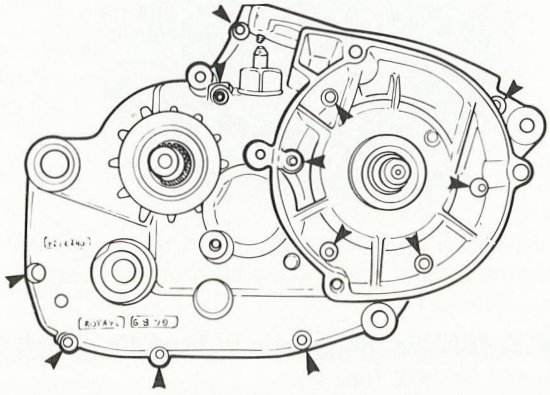
⑫ At assembly, ensure to use the proper chain guard (13 teeth, 14 teeth or 15 teeth engine sprocket).



⑭ At assembly, torque to 11 N•m (8 ft-lbs).

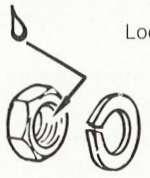
⑰ ⑱ ⑲ At assembly, torque to 11 N•m (8 ft-lbs) following a criss-cross sequence.

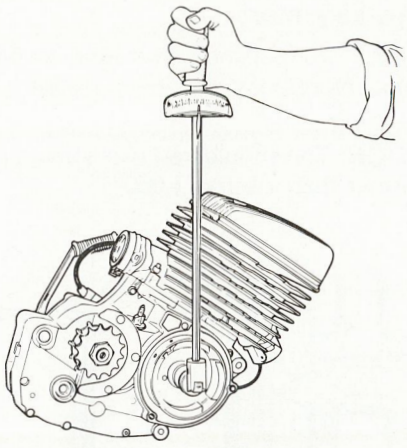
NOTE: It is recommended to apply a small drop of oil or a thin coat of grease on the threads.



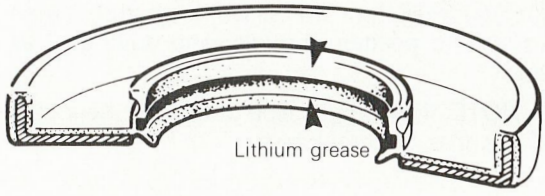
⑳ At assembly, ensure that the locating dowel sleeves are in place.

㉒ At assembly, apply Loctite 242 blue (medium strength) on the threads of the flywheel retaining nut and torque to 100 N•m (75 ft-lbs).

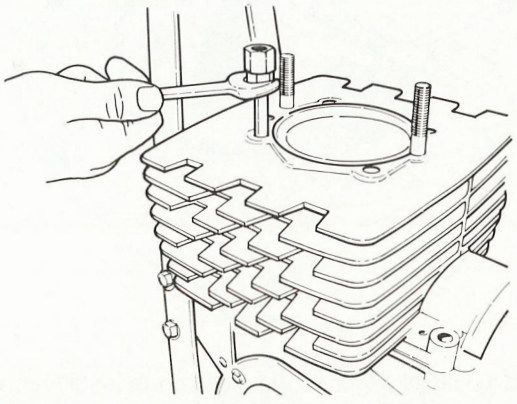




㉗ To install new seals, use the appropriate oil seal insertion pusher. (See Tool section). At assembly, apply a light coat of lithium grease on the seal lips.



㉘ To unscrew, use 2 cylinder head nuts blocked one against the other.



At assembly, position the long threaded portion of the stud into the crankcase.

㉛ Prior to the installation of the crankshaft drive gear retaining nut, proceed as follows:

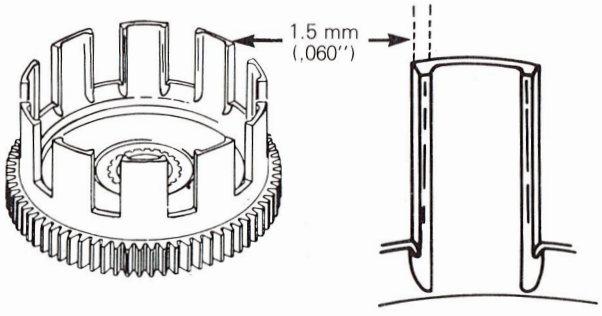
Clean the nut and crankshaft threads with Loctite "Kleen N' Prime" or equivalent, apply Loctite 271 red (high strength) on threads and torque to 100 N•m (75 ft-lbs).

NOTE: Allow at least one hour for the Loctite to set before starting the engine.

Clutch and kick start

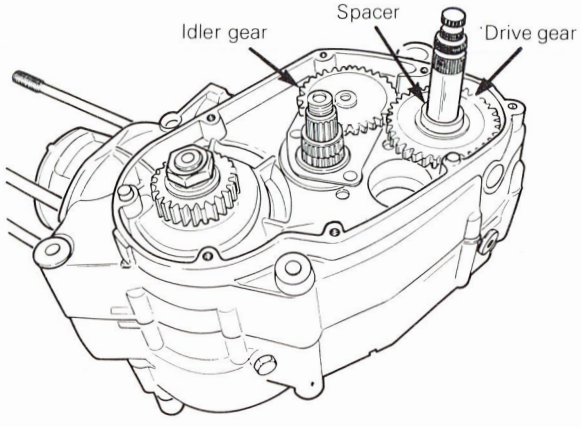
⑤If the clutch drum splines are found to be severely worn. Replacement may not be necessary. File the damaged spline surfaces equally.

CAUTION: The shouldered wall should not be filled thinner than 1.5 mm (.060").



⑤⑥⑦⑧⑨⑩Prior to assembling the clutch hub make sure to position the idler and drive gear as illustrated.

NOTE: The flanged side of the idler gear must face towards the crankcase.

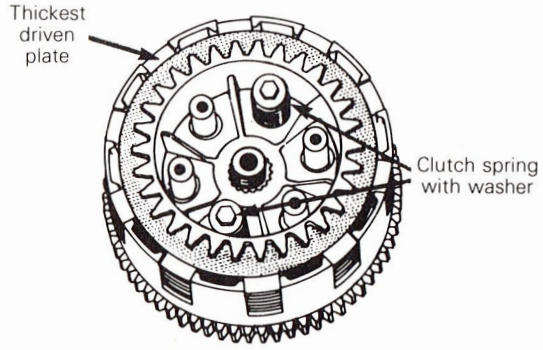


CAUTION: Prior to the clutch hub installation, ensure to properly position the thrust washer ⑥ .

With the clutch plates mounted on the clutch hub, fit clutch inner pressure plate in alignment with hub splines. Carefully insert clutch hub/plate assembly into clutch drum onto clutch shaft.

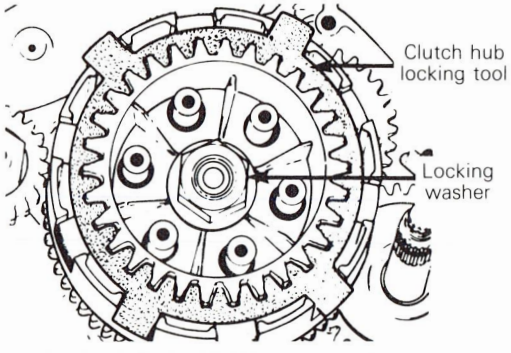
Ensure to place the thickest driven plate on the top.

NOTE: To ease assembly, install two clutch springs with washers to hold the clutch together.



⑪ CAUTION: Locking washer should be replaced if bent more than twice. If in doubt, replace.

⑫To remove clutch shaft nut, lock the crankshaft at top dead center, unbend the locking washer and lock the clutch using the clutch hub locking tool (see tool section).



At assembly, apply Loctite no. 271 red (high strength) on the threads of the clutch shaft nut and torque to 100 N•m (75 ft-lbs).

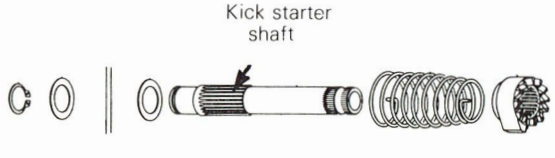
WARNING: Make sure to bend the clutch shaft nut locking washer.

CAUTION: Do not pry on the inner pressure plate spring post to bend the locking washer, use a pair of waterpump pliers.

⑬If spring(s) replacement is needed, ensure to change the springs in sets only.

⑲At assembly, tighten in a criss-cross sequence and torque to 5.5 N•m (4 ft-lbs).

㉒To remove the kick start assembly from the crankcase remove the snap ring located in the inside portion of the crankcase and unscrew the kick starter stop screw under the left crankcase half.



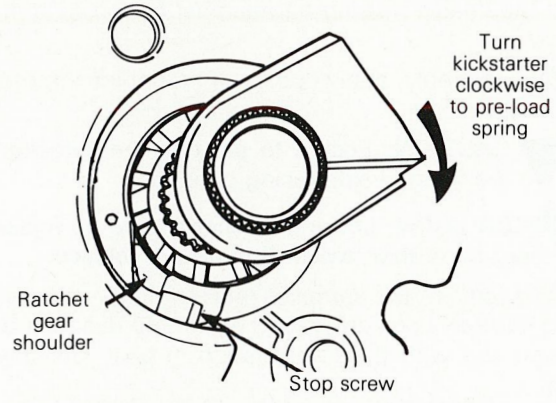
㉓It is possible to change the return spring without splitting the crankcase. At assembly, ensure that the spring ends are well positioned in the crankcase and ratchet gear hole.

㉕To position the ratchet gear, install the kick starter lever and preload the kick starter spring approximately 1 turn clockwise.

Slide the ratchet gear onto the splines while retaining the tension with the kick starter lever.

Release the kick starter lever and the ratchet gear will lean against the stop screw.

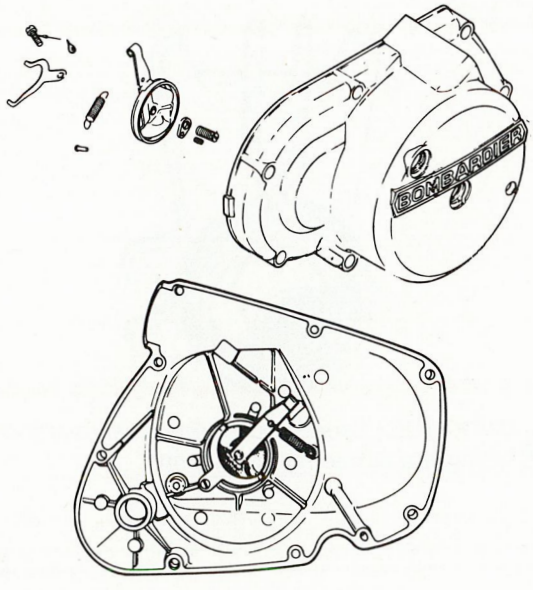
◆ **WARNING: Exercise care when removing or installing the ratchet gear.**



○ **NOTE:** After assembly, do not remove the kick starter stop screw unless needed, otherwise the kick starter spring will loose its preload and the clutch cover will have to be removed to reposition.

㊲At assembly, torque to 20 N•m (15 ft-lbs).

㊳㊵At assembly, position as illustrated.

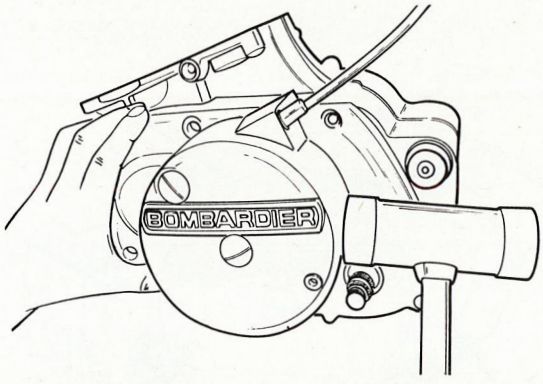


At assembly, apply Loctite no. 242 blue (medium strength) on screw threads and torque the screw to 5.5 N•m (4 ft-lbs).

㊶Apply Loctite no. 271 red (high strength) and force fit into place.

○ **NOTE:** Replace only if damaged or when replacing clutch cover.

㊷To remove the clutch cover, tap lightly using a soft faced hammer to break the seal (as illustrated).

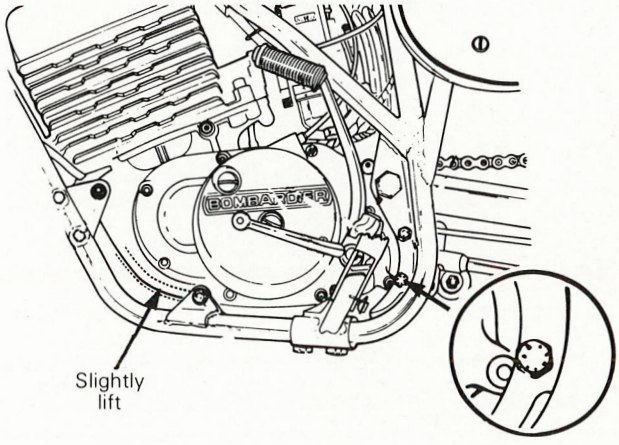


▼ **CAUTION: Do not pry between sealing surfaces, as score marks incurred are detrimental to clutch cover sealing.**

○ **NOTE:** If the clutch cover is to be removed with the engine in the frame, it is necessary to slightly lift the front of the engine to allow clutch cover to clear the lower frame portion, near footrest.

Prior to removal, ensure to drain the engine oil and to slacken the swing arm bolt.

▼ **CAUTION: Do not attempt to remove clutch cover without lifting engine. Severe damage can occur.**

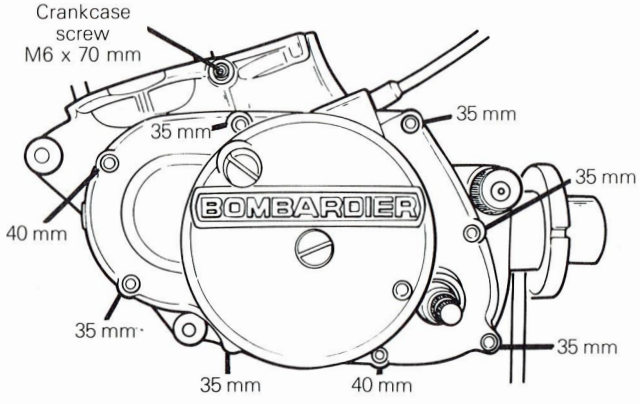


With clutch cable still connected, pull clutch lever in. It will then preload against the cover to ease removal.

At assembly, clean the mating surfaces of the crankcase and clutch cover with acetone, wood alcohol or equivalent. Apply a light coat of Loctite 515 sealant or silicone sealant to the mating surfaces and lightly tap cover into place.

(48) (49) At assembly, torque the retaining screws to 8 N•m (6 ft-lbs) following a criss-cross sequence and apply a small drop of oil or a thin coat of grease on the threads.

NOTE: For the proper location of the clutch cover retaining screws follow illustrated sequence.



CAUTION: Ensure to use the correct screw for its location otherwise damage to the crankcase will occur.

(51) CAUTION: Make sure the kick starter oil seal is not flipped over by the kick starter shaft splines when pushing the clutch cover into place.

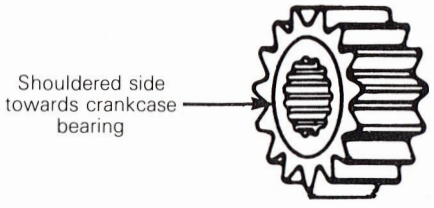
At assembly, apply lithium grease on the seal lips.

(52) For screwing or unscrewing use screwdriver grip end, provided with motorcycle tool kit.

Transmission (gear box)

(3) (12) (15) At assembly, the sharp edge of the splined thrust washer must face the retaining snap ring.

(8) At assembly, the shouldered side of the 2nd gear, clutch shaft must face towards the crankcase bearing.



(10) The needle bearing halves must be replaced in pairs only.

(21) At assembly, apply Loctite 271 red (high strength) on splines.

CAUTION: Ensure to position the sprocket with the flanged side facing outside.

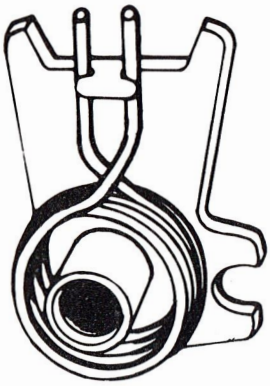
(22) CAUTION: Locking washer should be replaced if bent more than twice. If in doubt, replace.

(23) To remove the sprocket retaining nut, unbend locking washer. Lock crankshaft at the top dead center position and with the transmission in gear, unscrew the nut.

At assembly, follow the same procedure, apply Loctite no. 271 red (high strength) on the retaining nut threads and torque to 108 N•m (80 ft-lbs).

NOTE: At assembly, position the sprocket retaining nut with the hollowed side facing the sprocket.

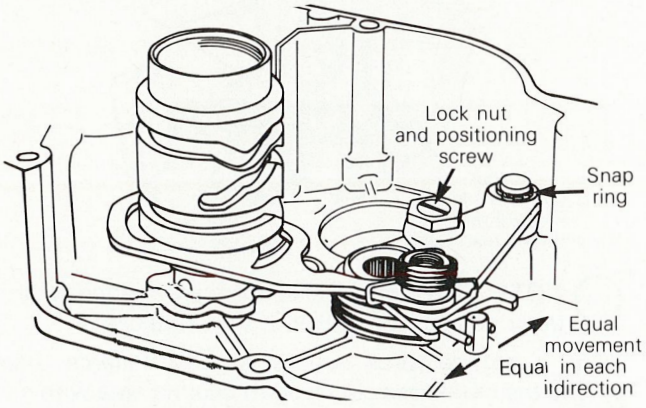
(28) (29) (30) Assemble the spring, thrust washer and actuating lever as illustrated.



WARNING: Exercise care when removing or installing the actuating lever spring.

㉛㉞㉟To adjust shifter drum actuating pawl proceed as follows. Position shift drum ass'y in 2nd gear or above to obtain an even travel at the actuating lever.

Then with the shift shaft in position, gently move shift lever in each direction from the middle position until shifter pawl contacts the shifter drum pin and note the amount of movement in each direction at the actuating lever.

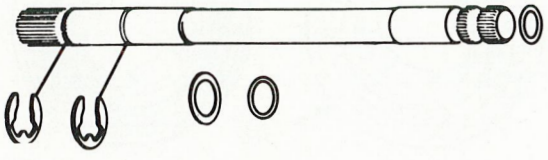


Movement in both direction must be equal. If not, the pawl ass'y can be repositioned by unlocking the lock nut and adjusting the pawl positioning screw. Lock the nut and verify. Repeat until the travel is equal on both sides.

When final adjustment has been reached, apply **Loctite no. 242 blue (medium strength) on the lock nut threads and torque to 27-29 N•m (20-22 ft-lbs).**

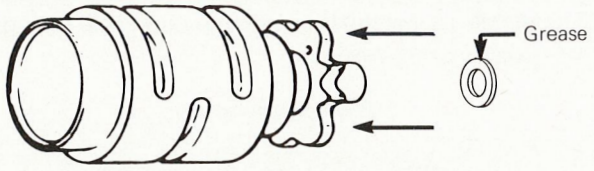
㉝CAUTION: At the removal of the pawl ass'y take care not to overspread the snap ring. Prior to assembly, make sure to reclose snap ring gap.

㊱㊲㊳㊴㊵At assembly, position the retaining rings, thrust washers and "O" rings as illustrated.



㊷At assembly, torque to 11 N•m (8 ft-lbs).

㊹㊺At re-assembly it is recommended to coat the shift drum washer with grease, this will allow the washer to stick on the shift drum for ease of installation.



Hold the index lever (in crankcase) fully open while inserting the shift drum in place.

㊻㊽㊾At assembly, properly position the index spring in index lever hole and crankcase hole.

CAUTION: Ensure that the index snap ring is well seated in its groove.

㊷Heat is needed to remove or install the main shaft bearing into the sprocket side.

CAUTION: Always apply heat to remove or install a bearing in the crankcase. Failure to apply heat may result in metal being drawn out of the bearing to crankcase contact surface, thus causing a loose fit within the crankcase.

Proceed as follows:

WARNING: Engines have magnesium crankcase. Magnesium must be heated with great care.

Disassembly

Using a butane torch with a large **soft** flame, heat the outside crankcase bearing embossment with 4 to 5 rapid circular passes.

Drift the bearing out with an appropriate pusher and soft face hammer.

Reassembly

Grease the sprocket side main shaft oil seal with lithium grease.

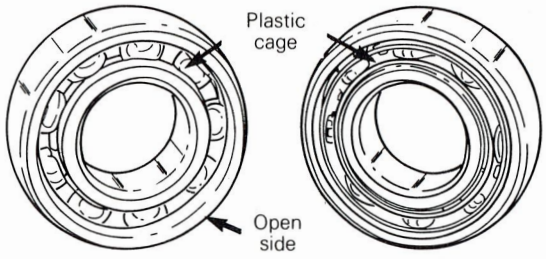
Cut a 50 mm (2") diameter disc out of asbestos material. Place the disc over the oil seal to protect it from the flame.

Heat the crankcase bearing embossment as described above.

Quickly turn the crankcase half over and drift the bearing into the crankcase using a **soft** hammer.

NOTE: Install the bearing with open side facing inside of crankcase.

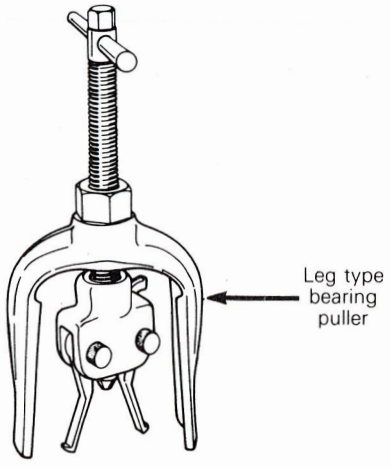
Plastic caged bearing



(53) To install a new seal, use the appropriate oil seal insertion pusher. (See tool section). Apply a light coat of lithium grease on the seal lip.

NOTE: The oil seal can only be replaced with the main shaft bearing removed.

(54) Heat and a leg type puller is needed to remove the clutch shaft bearing from sprocket side crankcase.



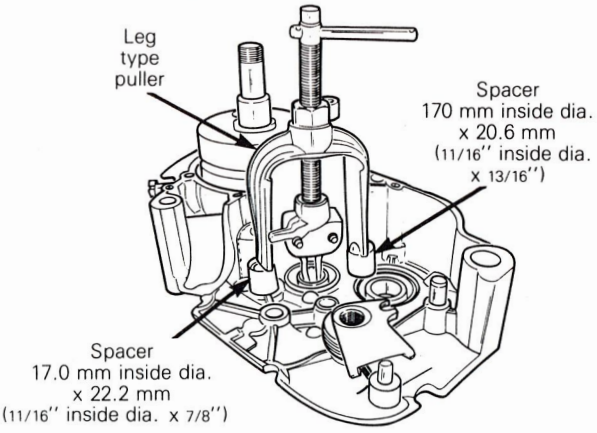
CAUTION: Always apply heat to remove or install a bearing in the crankcase. Failure to apply heat may result in metal being drawn out of the bearing to crankcase contact surface, thus causing a loose fit in the crankcase.

Proceed as follows:

WARNING: Engines have magnesium crankcase. Magnesium must be heated with great care.

Disassembly

Install the puller as illustrated.



NOTE: Two cylindrical spacers are needed to properly position the puller in the crankcase.

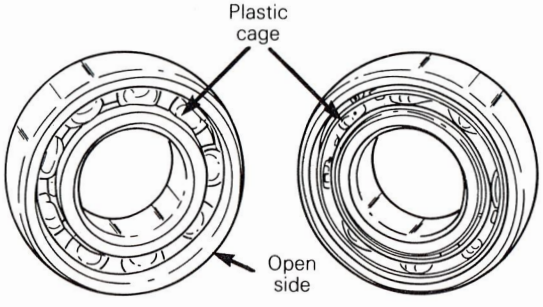
Using a butane torch with a large soft flame, heat around the crankcase clutch shaft bearing area with 4 to 5 rapid circular passes, then extract the bearing.

Reassembly

Heat around the crankcase bearing area as described above and quickly drift the bearing into the crankcase using a **soft** hammer.

NOTE: Install the bearing with open face facing inside of the crankcase.

Plastic caged bearing



(55) (56) Heat is needed to remove or install the clutch and main shaft bearings in the clutch side crankcase.

CAUTION: Always apply heat to remove or install a bearing in the crankcase. Failure to apply heat may result in metal being drawn out of the bearing to crankcase contact surface, thus causing a loose fit in the crankcase.

Proceed as follows:

WARNING: Engines have magnesium crankcase. Magnesium must be heated with great care.

Disassembly

Remove the bearing retaining plate and shim(s).

Using a butane torch with a large **soft** flame, heat the crankcase (inside portion) around the bearing area with 4 to 5 rapid circular passes.

Drift the bearing(s) out with an appropriate pusher and a soft hammer.

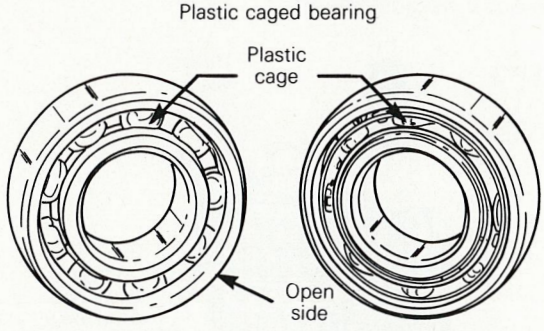
Reassembly

Install the bearings retaining plate without shim(s).

Heat crankcase (inside portion) as described.

Quickly drift the bearing(s) into the crankcase using a soft hammer, until the bearing(s) sit against the bearing retaining plate.

NOTE: Install the clutch shaft bearing with open face facing outside of the crankcase.



Remove the bearing retaining plate and verify the end play.

(57)(58)The transmission shaft end-play must be 0.1 mm (.004") maximum.

Proceed as follows to verify the end-play.

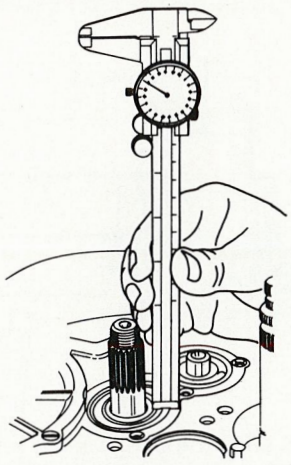
Remove the bearing(s) retaining plate and shims.

Tap both clutch and main shafts towards the sprocket side crankcase.

Tap both bearing **inner** races towards the sprocket side crankcase.

Measure the distance between the bearing **outer race** and the **crankcase surface** to determine the shims required between the bearing and the retaining plate.

The end-play must be 0.1 mm (.004") maximum.



CAUTION: If transmission shimming is too tight, transmission binding and excessive friction will occur.

(59) At assembly, apply Loctite no. 242 blue (medium strength) on the retaining screw threads and torque to 4-5.5 N•m (3-4 ft-lbs).

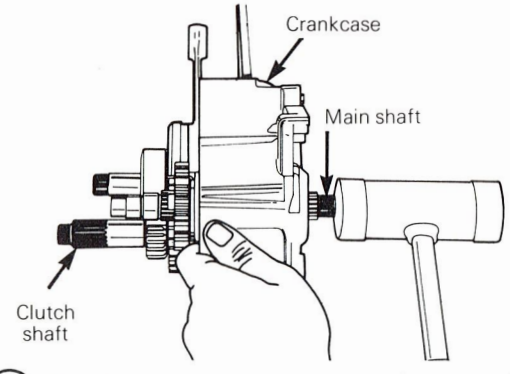
(61) At assembly, torque the kick starter stop screw to 34-40 N•m (25-29 ft-lbs).

NOTE: After assembly, do not remove the kick starter stop screw unless needed otherwise the kick starter spring will loose its preload and the clutch cover will have to be removed to position.

Transmission gear cluster

Disassembly

To remove the clutch and main shaft gear cluster from the crankcase, tap on the sprocket side end of the main shaft.



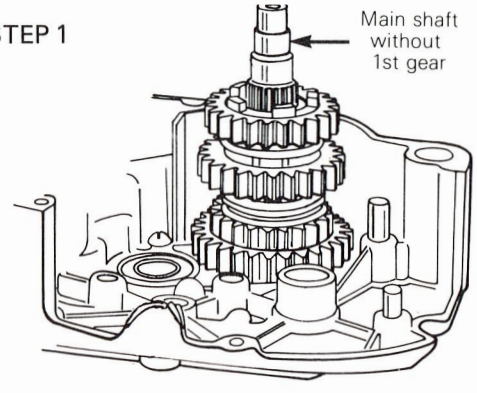
NOTE: To ease the clutch shaft removal, turn the clutch shaft manually while at the same time hitting the main shaft.

Reassembly

Proceed as follows:

Position the main shaft as illustrated tap gently without pushing completely the shaft into the bearing (to ease the clutch shaft installation).

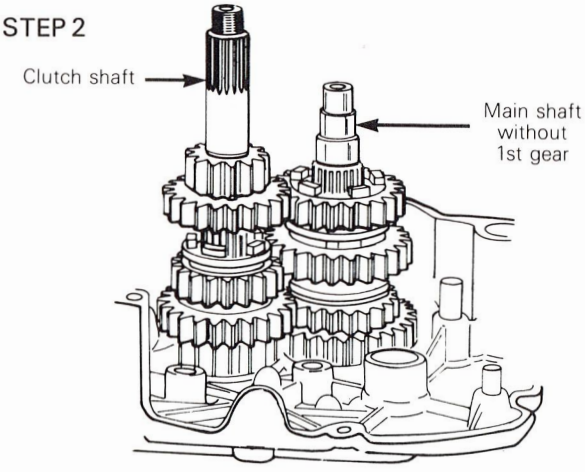
STEP 1



Position the clutch shaft as illustrated, tap gently to push the shaft into the bearing, while turning the main shaft manually, completely seat both shafts.

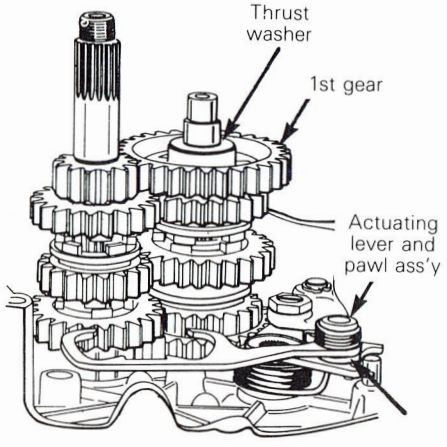
CAUTION: Prior to pushing the clutch shaft into the bearing, make sure the gears match one another.

STEP 2



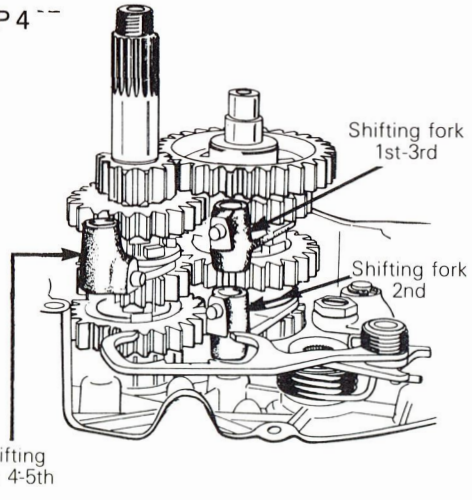
Position the thrust washer, needle bearing, first gear and thrust washer, and then the actuating lever and pawl ass'y as illustrated.

STEP 3



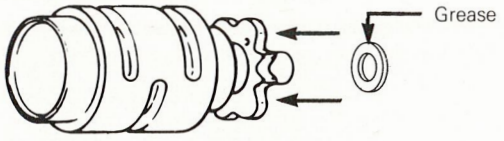
Position the shifting forks as illustrated.

STEP 4

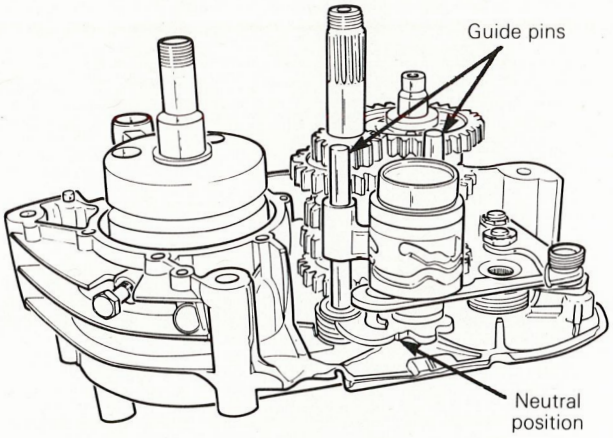


Coat the shift drum washer with grease, this will allow the washer to stick on the shift drum for ease of installation.

STEP 5



Position the shift drum ass'y, and match all the shifting forks with the drum slots then position the guide pins as illustrated.



Hold the index lever (in crankcase) fully open while inserting the shift drum in place.

NOTE: To facilitate the assembly of the shifting forks, position the shift drum assembly at the neutral position.

Prior to reassembly of the crankcase halves, **adjust the shifting mechanism** and **ensure that the index is leaning against the neutral notch.**

CLEANING

Clean all the metal components in a metal cleaner.

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

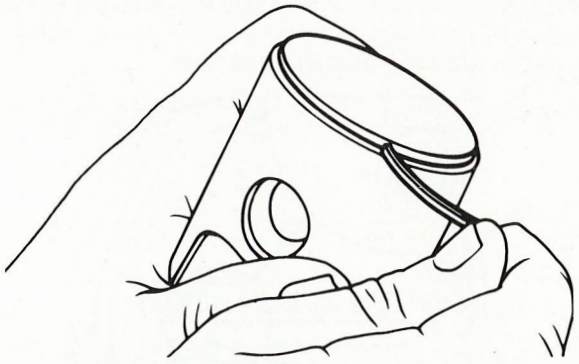
CAUTION: Clean stator plate and flywheel using only a clean cloth.

Scrape any carbon deposits from cylinder exhaust port, cylinder head and piston dome using a wooden spatula and repeat periodically.

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

Clean the piston ring groove(s) with a groove cleaner tool, or using a piece of broken ring.

NOTE: It is suggested to periodically clean the cylinder head and piston of carbon build-up.



Scrape any deposit from the piston crown and inspect the piston for cracks or seizure marks.

Remove all traces of the cylinder base gasket and fit a new lightly greased gasket.

Remove old sealant from mating surfaces of crankcase with acetone, wood alcohol or equivalent.

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

INSTALLATION

To install engine on vehicle inverse removal procedure.

However, special attention should be paid to the following.

Torque the engine mounts to 20-27 N•m (15-20 ft-lbs).

Install the swing arm bolt and nut, hold the swing arm in the mid-way position and torque the nut to 95 N•m (70 ft-lbs).

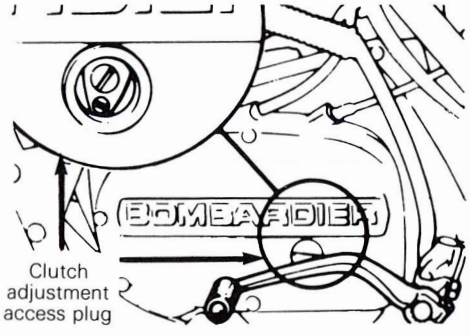
Adjust clutch.

NOTE: Prior to clutch adjustment, operate the clutch lever a couple of times, to seat the cable in place.

Loosen the clutch cable adjuster (at handlebar) to provide maximum slack.

Remove the adjustment access plug and loosen the 4 mm set screw.

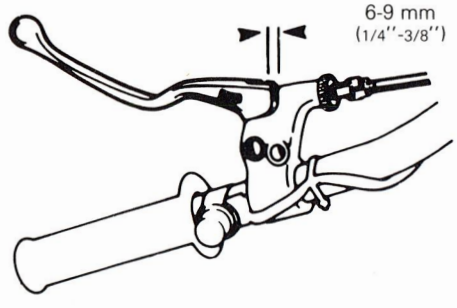
Turn the 8 mm clutch inside screw in and out to locate the point of contact with the release bearing, then turn the screw 1/2 turn counter-clockwise.



Carefully tighten the 4 mm set screw to lock the adjustment.

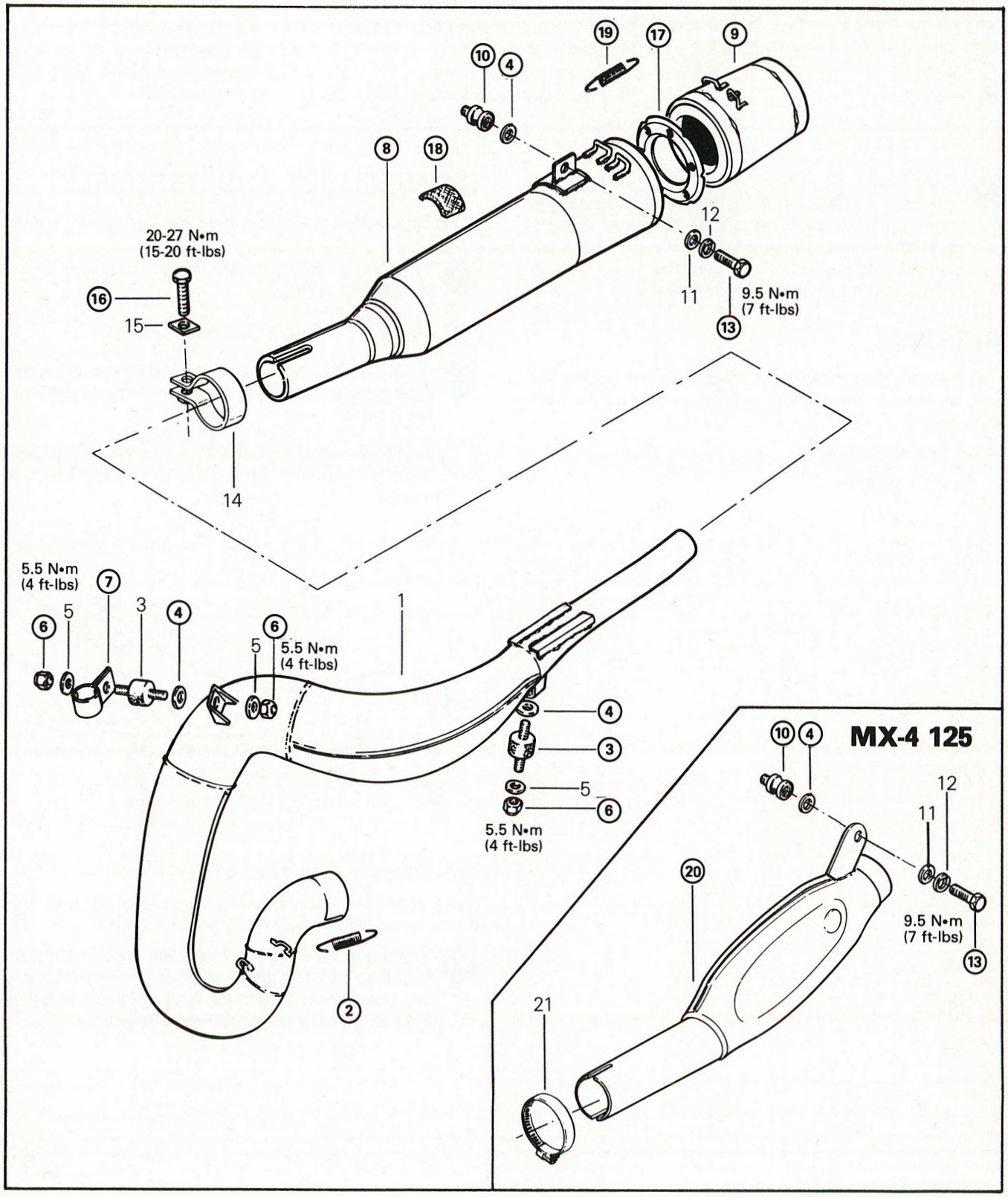
Replace the access plug.

Adjust the cable adjuster to provide 6-9 mm (1/4''-3/8'') slack between clutch lever and housing.



Check ignition timing.

EXHAUST SYSTEM



1. *Exhaust pipe*
2. *Exhaust spring (2)*
3. *Rubber mount (2)*
4. *Asbestos washer (3)*
5. *Washer 6 x 20 x 2 (3)*
6. *Hexagonal nut M6 x 1.00 (3)*
7. *Clamp*
8. *Muffler*
9. *Resonator*
10. *Rubber mount (2)*
11. *Washer M8 x 25 x 1.5 (2)*
12. *Lock washer 8*
13. *Hexagonal screw M8 x 1.25 x 14*
14. *Clamp*
15. *Reinforcement plate*
16. *Hexagonal screw M8 x 1.25 x 16*
17. *Diffuser disc:*
    MX-4 250: 5
    MX-4 370: 7
18. *Noise insulator*
19. *Spring (4)*
20. *Muffler (MX-4 125)*
21. *Clamp (MX-4 125)*

WARNING: To prevent any burns, it is necessary to allow sufficient time to the exhaust system to cool prior to working on or near the exhaust system. If any adjustment has to be performed with the engine running do not touch the components related to the exhaust system.

REMOVAL

Remove or disconnect the followings (if applicable) then withdraw the muffler and/or exhaust pipe from motorcycle.

– Left number plate.

– Exhaust springs.

DISASSEMBLY AND ASSEMBLY

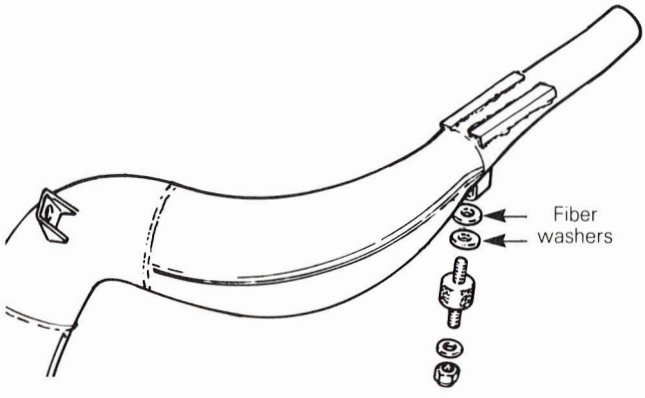
②⑲ For removal and installation use "vise-grip" pliers.

WARNING: Exercise care when removing or installing the springs.

③⑩ At assembly, torque to 3 N•m (2 ft-lbs).

④CAUTION: Make sure to install the asbestos washer at assembly as heat can damage the rubber mount.

NOTE: To obtain a better fit, it may be necessary to install two fiber washers to the middle exhaust mount.



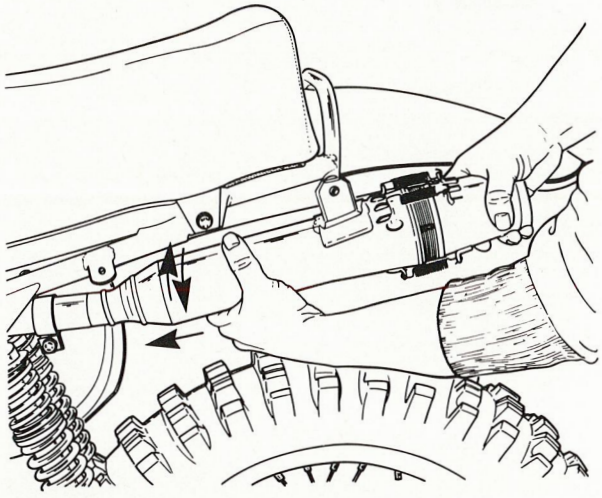
⑥ At assembly, torque to 5.5 N•m (4 ft-lbs).

⑦ At assembly, closely wrap the clamp around the frame tube, using a pair of "vise grip" pliers.

⑧⑨⑰⑳ WARNING: Removal, modification or failure to maintain spark arrestor in effective working order may constitute a violation of existing federal, state or provincial regulations.

At assembly, the muffler must be hand-splined over the exhaust pipe.

CAUTION: Do not use a hammer or heavy mallet to drive the muffler onto the exhaust pipe. Damage to the discs will occur, causing improper pressure in exhaust system and possible engine damage.

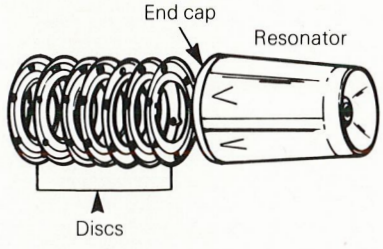


⑬ At assembly, torque to 9.5 N•m (7 ft-lbs).

CAUTION: Do not overtighten the muffler retaining nut, damage may occur.

⑯ At assembly, torque to 20-27 N•m (15-20 ft-lbs).

⑰ MX-4 250-370; At assembly, ensure that the dimples around the outer edge of each disc interlocks with those on the end cap.



CAUTION: Engine performance is directly related to with the number of discs on the muffler, therefore addition or substraction of discs must not be made.

Number of discs:

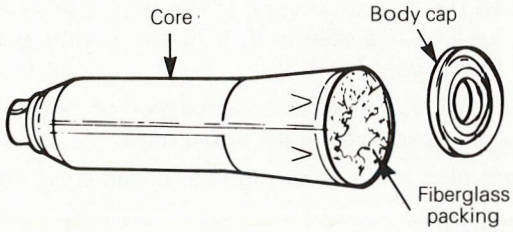
MX-4 250: 5

MX-4 370: 7

(MX-4 125 not applicable).

CAUTION: To maintain vehicle performance and resonator efficiency, the discs should be periodically cleaned, and the core repacked with new fiberglass insulation.

⑱ The fiberglass packing inside the core can be replaced by removing the body cap.



⑲ If spring(s) breakage is experienced, it is possible to install heavy duty retaining springs (piano wire), available under P/N 732 307 002.

Also, the resonator may be wired to the muffler.

CLEANING AND INSPECTION

Clean the exhaust pipe and muffler with a solution of soapy water to remove dirt, mud, grease, etc.

Inspect the exhaust pipe for any fractured brackets or crushed surfaces. Replace or repair as per condition.

NOTE: If any welding is required, use oxy-acetylene with a steel rod, it is not recommended to braze weld.

Inspect exhaust pipe for accumulation of carbon. Clean with a scraper or a length of old chain.

Inspect nuts and rubber mounts. If damaged, replace.

125 model:

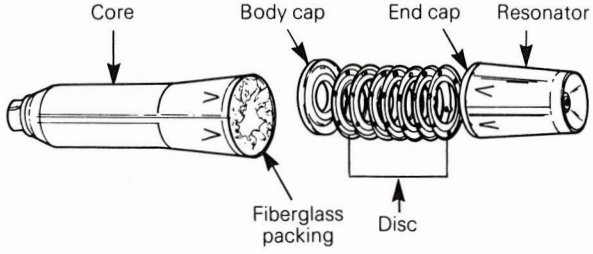
This model is equipped with a resonator requiring only visual check up.

250-370 model:

These models are equipped with "multidisc/resonator" muffler.

The resonator and the discs must be cleaned regularly to prevent carbon build up. To clean the discs use a brush or a cloth. When reassembling ensure dimples around outer edge of each disc interlocks with those on end cap.

CAUTION: Any carbon build up, will greatly affect engine performance.



The fiberglass packing inside the core must be checked once a year by removing the body cap.

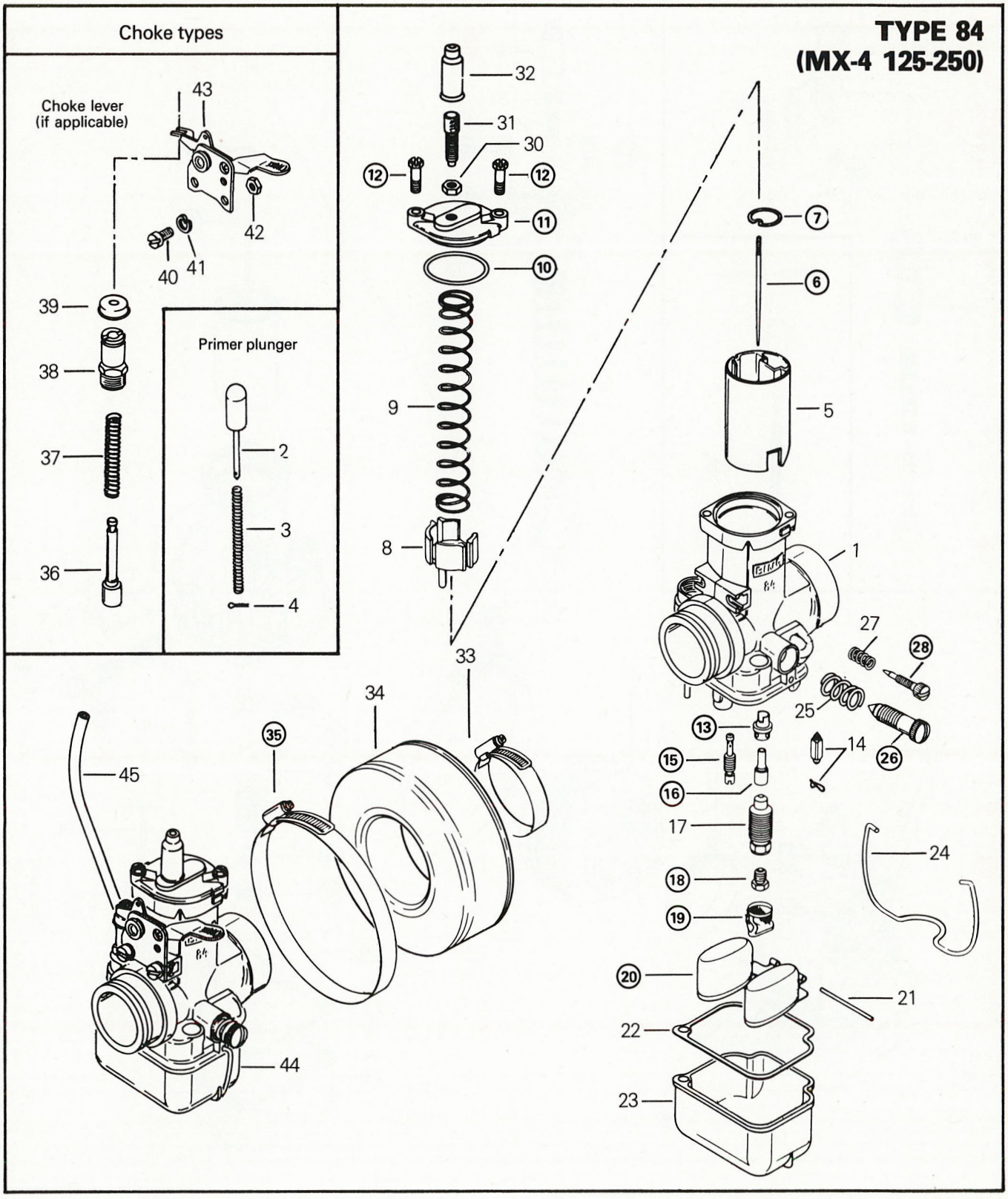
CAUTION: Engine performance is directly related with the number of discs on the muffler, therefore addition or substraction of discs must not be made.

INSTALLATION

To install the exhaust pipe and/or muffler on the vehicle, inverse removal procedure.

CAUTION: After installation of exhaust pipe, be sure all cables, hoses or wires are routed away from exhaust pipe. Use tape or tie-wraps if necessary.

CARBURETOR


Choke types
Choke lever
(if applicable)
43
42
40
41
39
38
37
36
Primer plunger
2
3
4
TYPE 84
(MX-4 125-250)
32
31
30
12
12
11
10
9
8
33
34
35
45
44
7
6
5
1
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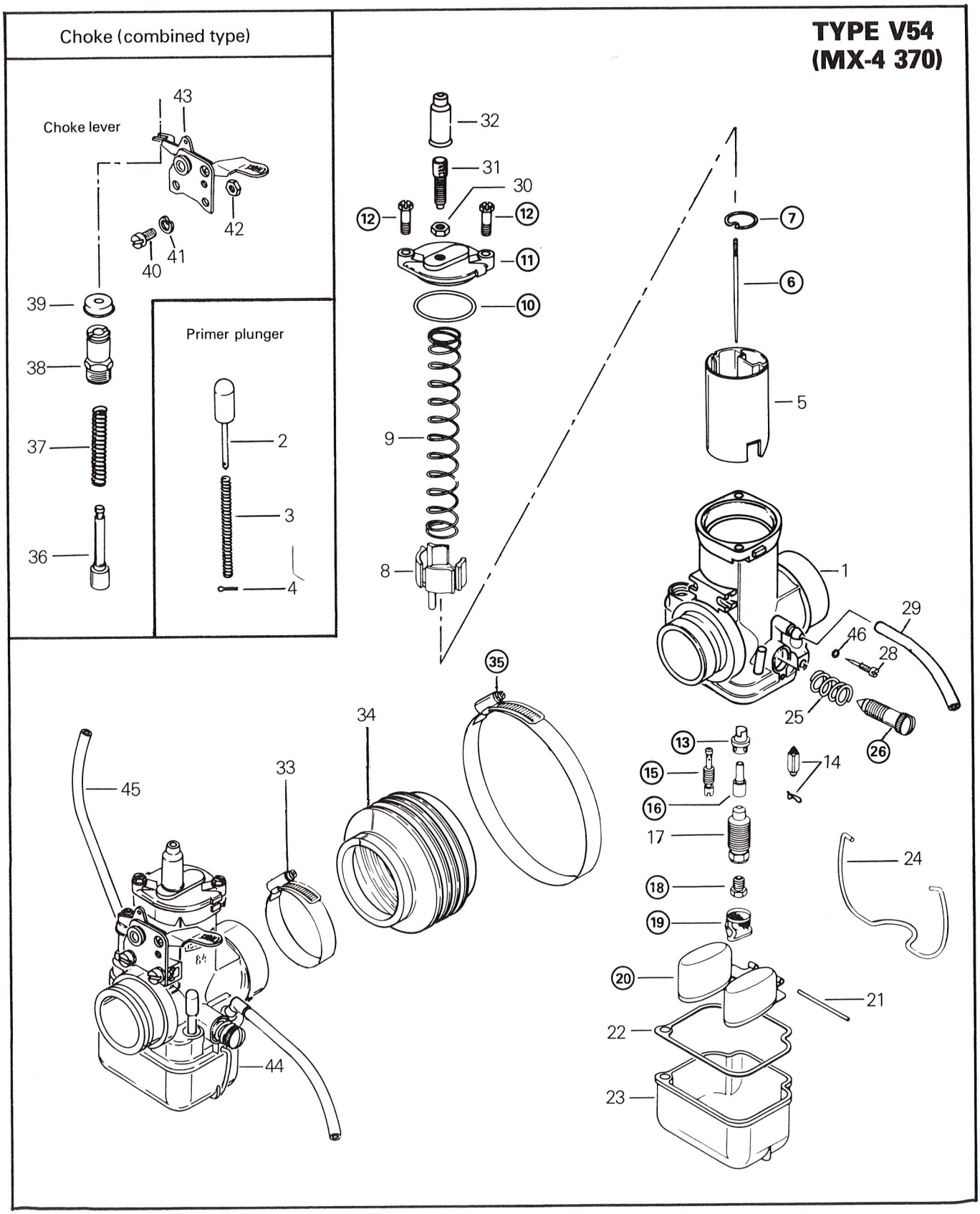
Choke (combined type)
Choke lever
Primer plunger
TYPE V54
(MX-4 370)
43
42
41
40
39
38
37
36
2
3
4
32
31
30
12
11
10
9
8
7
6
5
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23
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45
44

1. *Carburetor body*
2. *Primer knob*
3. *Primer spring*
4. *Primer split pin*
5. *Throttle slide*
6. *Needle*
7. *Needle clip*
8. *Plastic spring cup*
9. *Throttle slide spring*
10. *"O" ring*
11. *Slide chamber cover*
12. *Hexagon screw, M5 x 12 (2)*
13. *Diffuser*
14. *Inlet needle & clip*
15. *Idle jet*
16. *Needle jet*
17. *Mixing tube*
18. *Main jet*
19. *Screen sleeve*
20. *Float*
21. *Float arm pin*
22. *Float chamber gasket*
23. *Float chamber*
24. *Float chamber spring clip*
25. *Idle adj. screw spring*
26. *Idle adj. screw*
27. *Idle air screw spring*
28. *Idle air screw*
29. *Vent tube*
30. *Hexagon nut M6 x 0.75*
31. *Adj. screw M6 x 0.75*
32. *Rubber grommet*
33. *Hose clamp (carburetor)*
34. *Carburetor boot*
35. *Hose clamp (air box)*
36. *Starting piston w/gasket*
37. *Starting piston spring*
38. *Closure screw*
39. *Rubber cap*
40. *Cylinder screw M5 x 10 (2)*
41. *Lockwasher 5 mm (2)*
42. *Hexagonal nut M5 (2)*
43. *Choke lever ass'y*
44. *Bing double float carburetor*
45. *Fuel line*
46. *O' ring*

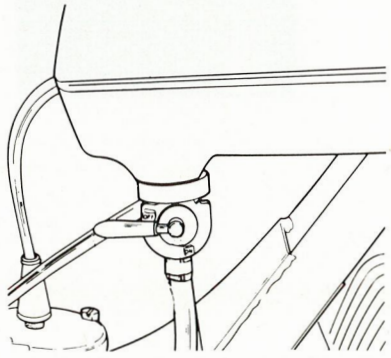
REMOVAL

WARNING: Gasoline is flammable and explosive under certain conditions. Always perform procedures in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity.

Disconnect or perform the following then remove carburetor from engine.

Fuel line (at carburetor).

NOTE: Make sure the fuel valve is on "O" (off) position.



Completely loosen both carburetor retaining hose clamps. (Slide front clamp forward and rotate carburetor towards clutch side).

Unscrew the 2 screws from carburetor slide chamber cover & pull out throttle slide ass'y.

CAUTION: Exercise care when handling throttle slide. Damage incurred may cause throttle slide to stick open in operation.

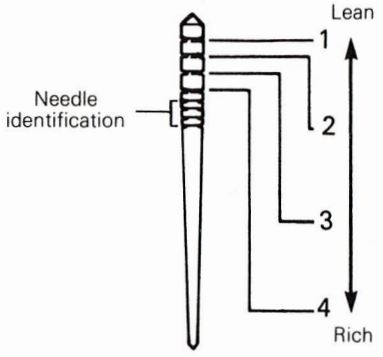
Pry carburetor body towards air box, out of the engine/carburetor adaptor.

Twist carburetor body away from engine inlet port and remove carburetor (complete with boot).

DISASSEMBLY & ASSEMBLY

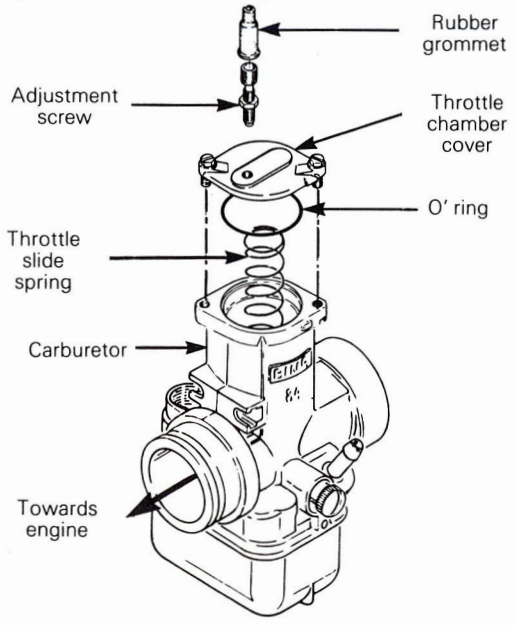
⑥ ⑦At assembly, refer to technical data for correct installation position of needle clip into needle grooves.

◯ **NOTE:** Grooves are numbered 1 to 4, starting from the top.



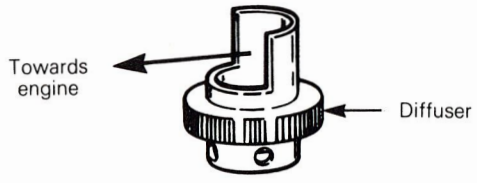
◯ **NOTE:** Three grooves only for V54 type carburetor (MX-4 370).

⑩ ⑪ ⑫The slide chamber cover should be installed with the throttle cable adjuster facing **towards the engine**. Tighten the (2) retaining screws securely.



◯ **NOTE:** If the slide chamber cover is positioned backwards, the throttle slide will not reach the full throttle opening.

⑬The diffuser should be installed with the cut-away facing towards the engine.



⑮ ⑯ ⑱Different size jets (main, idle, needle) are available for various temperatures and altitudes. Refer to the technical data's application charts for jet selection.

▼ **⑲CAUTION: At assembly, make sure to install the screen sleeve, otherwise dirt or water may clog the carburetor main jet.**

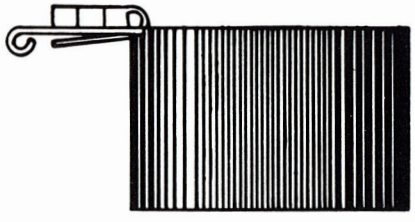
⑳Correct fuel level in float chamber is vital for engine efficiency. To check for correct level, proceed as follows:

Remove float chamber and gasket from carburetor.

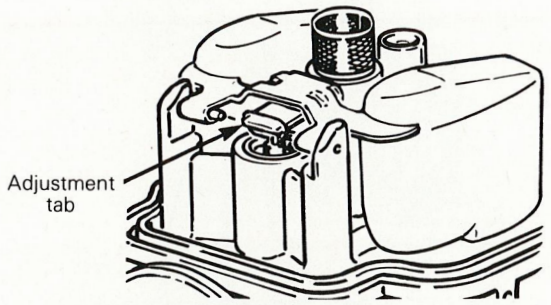
With carburetor on its side with float adjustment tab just touching the needle, measure distance between top of float chamber body (from the gasket groove bottom).

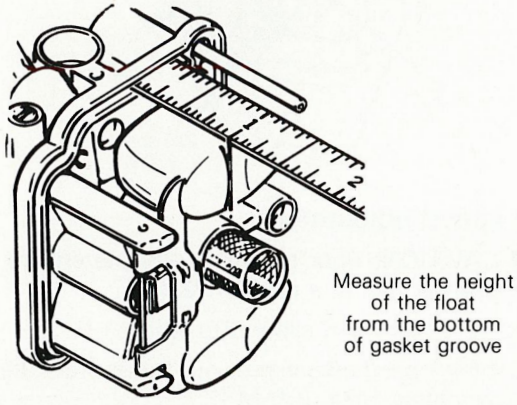
Adjust float height to:

(black float type)
22.5 mm (.885")



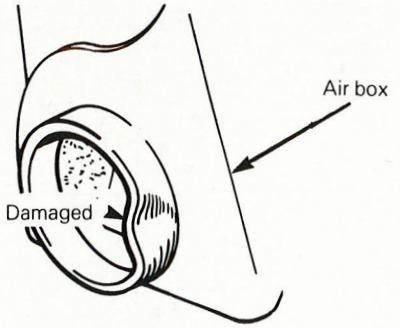
To adjust, carefully bend adjustment tab of float arm until specified height is reached.





NOTE: If no measuring device is available, position the top of the float parallel with the carburetor body.

⑮ CAUTION: Make sure not to overtighten the air box boot hose clamp. Air box flange may distort sufficiently to allow entry of foreign particles.



CLEANING AND INSPECTION

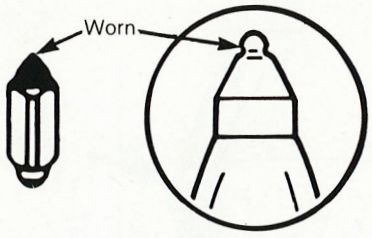
The entire carburetor should be cleaned with a general solvent and dried with compressed air before disasse,bly.

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

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

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 ⑭ . If worn, the inlet needle should be replaced.



CAUTION: A worn inlet needle will cause carburetor overflooding.

Check if floats are leaking or damaged and replace if necessary.

Check the throttle slide for wear, replace if worn or damaged.

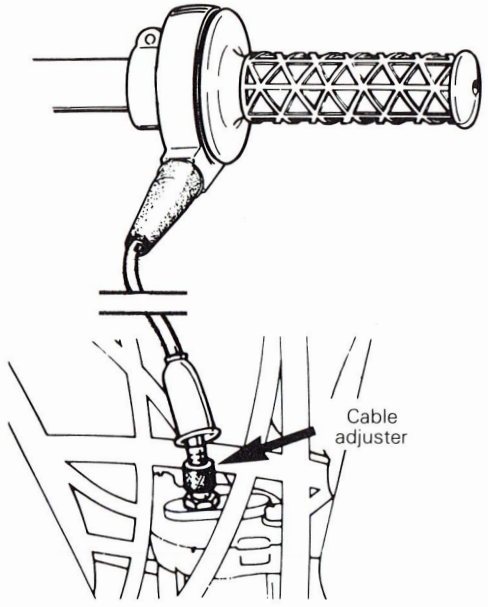
WARNING: An excessively worn or damaged throttle slide may cause the slide to stick in the open position.

INSTALLATION AND ADJUSTMENT

To install carburetor, inverse the removal procedure.

Throttle adjustment

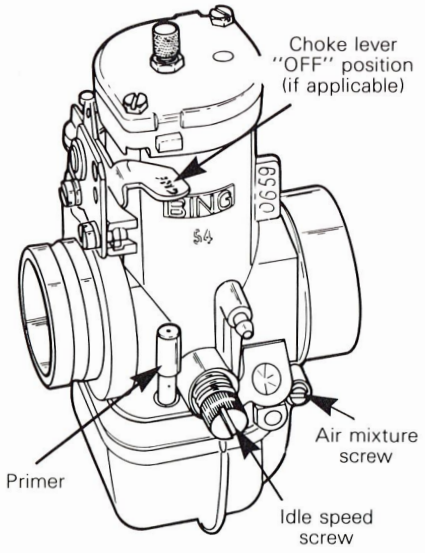
Using the cable adjuster on the throttle slide chamber cover, set cable slack to 1,6 mm (1/16").



◆ **WARNING: Before starting engine, carburetor slide must be free to snap back to idle position. Make sure the rubber grip does not rub on the throttle body or the handlebar end.**

Mixture adjustment

With the motorcycle held in a vertical position, gently turn air mixture adjusting screw in until it stops, then back it out to specification. (Refer to technical data section).



Idle speed adjustment

▼ **CAUTION: Prior to starting engine ensure to use premix fuel at a ratio of 32 to 1.**

Start the engine and allow it to warm.

Adjust idle speed screw in or out for desired idle speed (approximately 1,000 R.P.M.).

○ **NOTE:** The air mixture screw can be turned in or out (within 1/4 turn of basic setting) to achieve smoothest idle possible. Re-adjust idle speed if necessary.

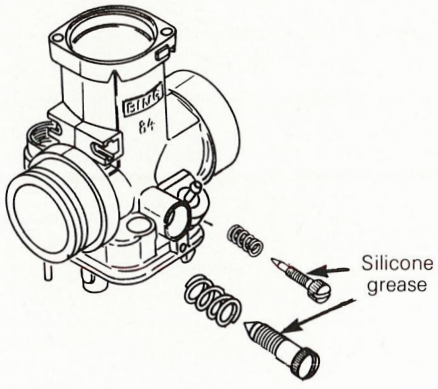
▼ **CAUTION: Do not attempt to set the idle speed by using the air screw. Severe engine damage can occur.**

WATERPROOFING

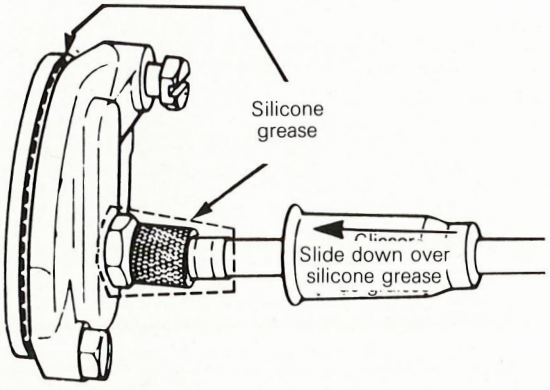
Under wet and muddy conditions it is recommended to properly seal the carburetor.

Proceed as follows:

To improve the sealing ability, apply a light coat of silicone **grease** (DC-4 or equivalent), on the adjustment screw threads.



Apply silicone **grease** (DC-4 or equivalent) to the carburetor cover and throttle cable rubber boot (at carburetor top).



Ensure carburetor/engine and carburetor/air box connections are leakproof.

CAUTION: The carburetor-air filter servicing/ sealing is of the upmost importance under wet and muddy conditions; refer to "waterproofing" section 05 chassis, sub-section 02, (body).

FUEL MIXING

Recommended gasoline

The correct gasoline is premium gasoline.

CAUTION: Never experiment with different fuel or fuel ratios. Never use low lead or non leaded gasoline, naphtha, methanol or similar products.

Recommended oil

Use concentrated Bombardier 50/1.

This type of oil has specially formulated oil bases to meet the lubrication requirements of the Bombardier-Rotax engine.

If Bombardier 50/1 oil is unavailable substitute with a high-quality 2 cycle oil, ex: Castrol Super TT, Belray MC3. The oil gas mix must met the vehicle requirements. See oil manufacturer recommendations on container.

CAUTION: Never use outboard oils, straight mineral oils or injector oils.

Fuel mixture ratio

The importance of using the correct fuel mixture cannot be overstressed. An incorrect fuel ratio results in serious engine damage. Recommended fuel ratio is 32/1. (Refer to "Technical Data" for complete mixing chart.

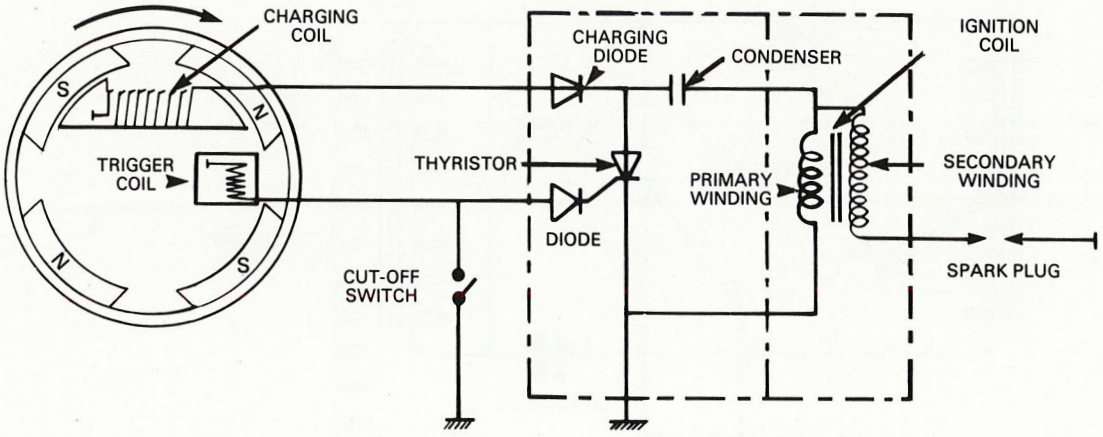
EX.: 5 imp. oz to 1 imp. gallon
4 U.S. oz to 1 U.S. gallon
160 mL to 5 L
25 imp. oz to 5 imp. gallons
20 U.S. oz to 5 U.S. gallons
625 mL to 20 L

AIR FILTER SERVICING

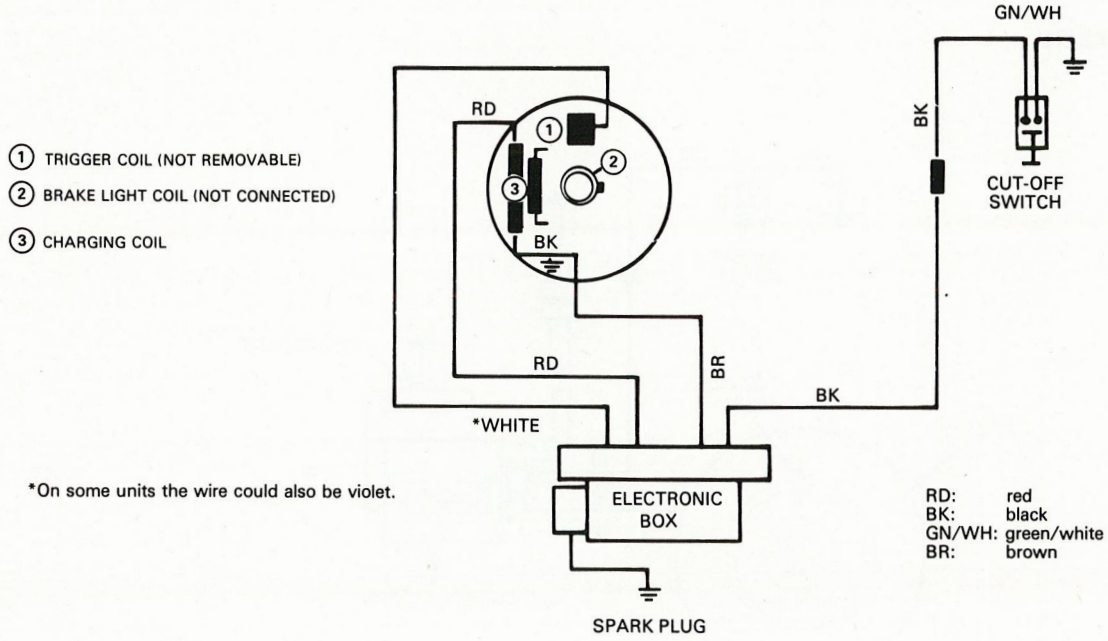
Refer to section 05 chassis, sub-section 02, (Body).

BOSCH IGNITION SYSTEM (MX-4 250-370)

Theoritical

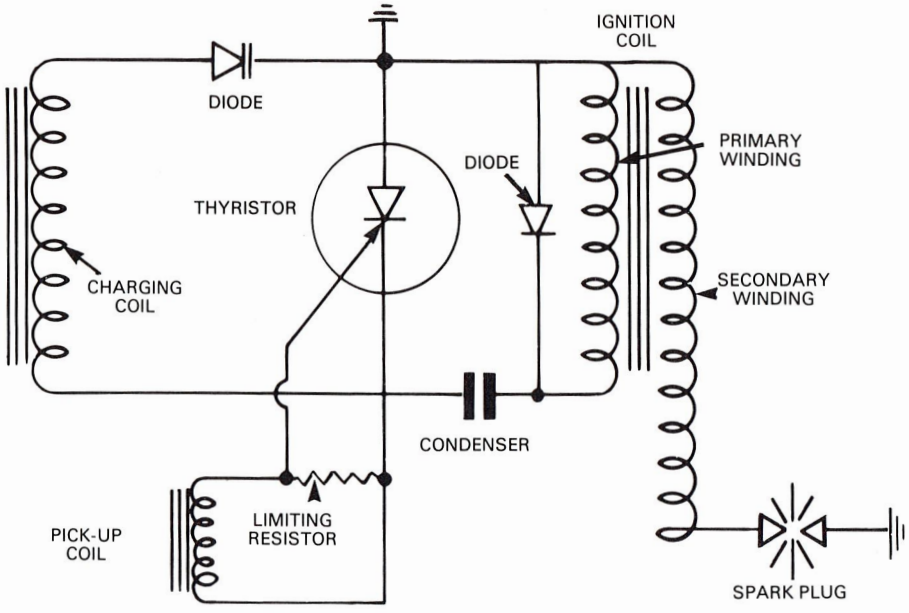


Wiring Diagram

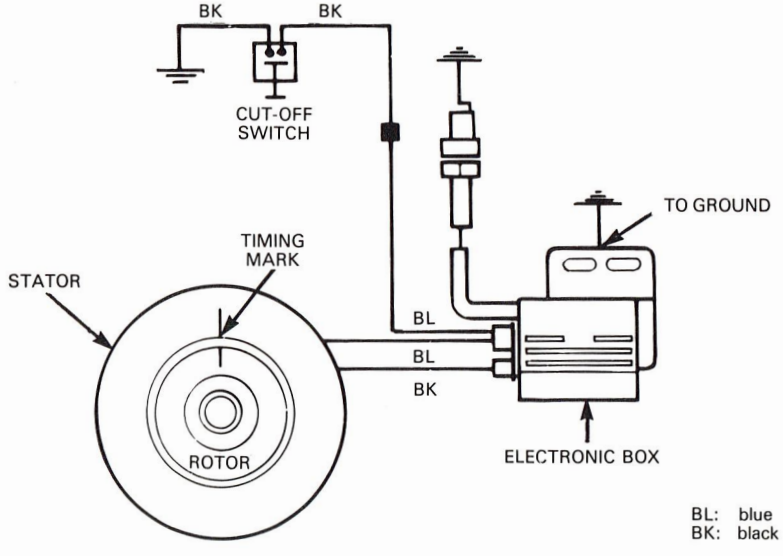


MOTOPLAT IGNITION SYSTEM (MX-4 125)

Theoritical



Wiring Diagram



IGNITION SYSTEM/TESTING PROCEDURE

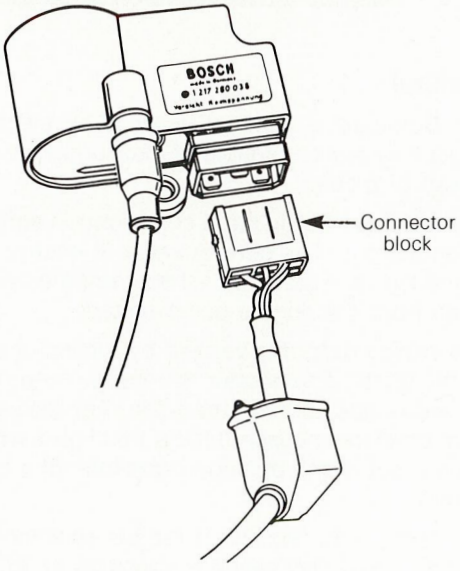
CONTINUITY TESTS

The charging coils, triggering coils, high tension wires and emergency cut-off switches can be tested using an ohmmeter.

NOTE: Values are taken at 20°C (68°F), remember that resistance increases with temperature.

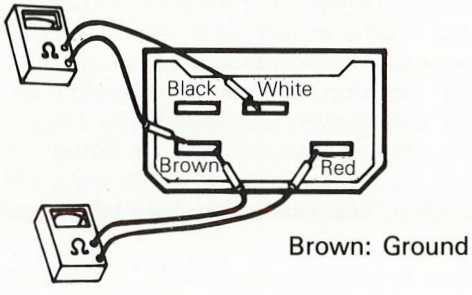
Bosch Type (MX-4 250-370)

Disconnect the multiple connector at the electronic box unit and run a resistance test between the pins of the connector block.



Trigger coil: Between white and brown (ground)

MAX.: 80 ohms
MIN.: 50 ohms

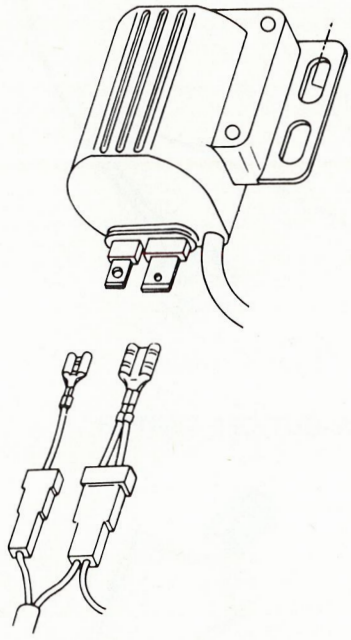


Charging coil: Between red and brown (ground)
(Cloth insulated)

MAX.: 550 ohms
MIN.: 450 ohms

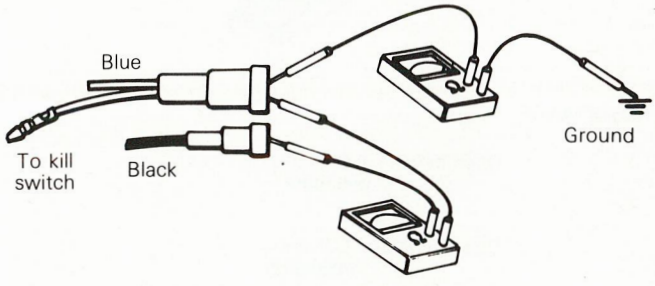
Motoplat System (MX-4 125)

Disconnect the connectors from the ignition coil and run a resistance test between the pins of the connectors.



Charging coil: Between blue and ground

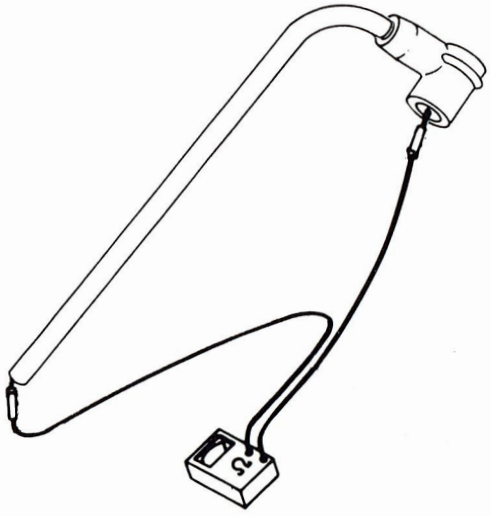
630 ohms ± 10%



Trigger coil: Between black and blue 7 ohms

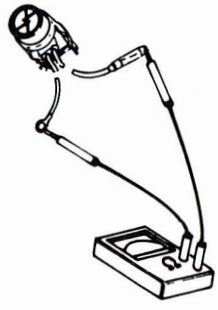
NOTE: While testing the coils with the ohmmeter it may occur that the readings alter. To make sure the proper reading is obtained, inverse the test lead of the ohmmeter and perform the test again. Take the highest reading.

HIGH TENSION WIRE (MX-4 250-370)



RESISTANCE = 0 ohm = continuity

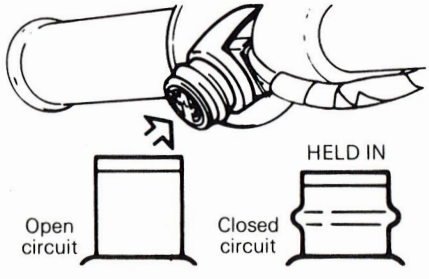
EMERGENCY CUT-OFF SWITCH



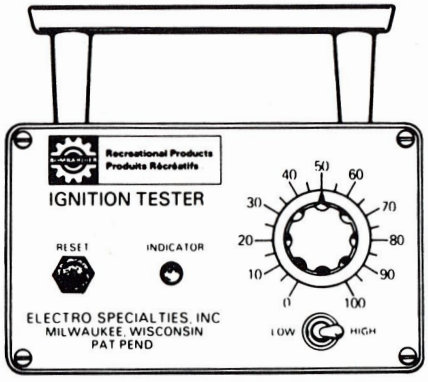
RESISTANCE

Open circuit: 1000 ohms **minimum**

Closed circuit: .001 ohm **maximum**



BOMBARDIER IGNITION TESTER (P/N 419 0033 00)



General

The Bombardier ignition tester is an electrical energy measuring device capable of measuring the peak energy output of a coil.

The tester is of solid state construction and performs as a comparator. The correct value of energy output is indicated in each test and is then compared with the value taken from the engine being tested.

The energy output is verified by means of a 0-100 scale on the tester. The greater the energy output, the greater the value indication on the scale. The indication is in the form of an incandescent lamp that lights when the scale knob is set at the position corresponding to the energy output.

The tester has two input ranges selected by a toggle switch. The LOW range is sensitive to AC or DC voltages from 0.5 to 27 volts. The HIGH range is sensitive to AC or DC voltages from approximately 75 to 500 volts.

Test condition

All tests are performed on the vehicle at cranking speed. It would seem logical that removal of spark plug would allow the engine to turn over faster, therefore raising the output level of the ignition system. It was found that vigorous cranking against compression causes the flywheel to snap over, raising the output higher than by cranking without compression. If output results are marginal, output can be measured with and without compression. **Test values listed are taken against compression.**

CAUTION: Never crank engine with spark plug wire detached from spark plug unless emergency cut-off switch is at off position otherwise electronic box damage may occur.

Always crank vigorously as in actual starting.

Read all instructions **thoroughly** and as you become familiar with this test instrument it will be possible to test a complete ignition system in a matter of minutes.

Always proceed in the following order:

1. Connect tester **P** and **N** clip leads as illustrated.
2. Follow test procedure sequence.
3. After every test that lights the indicator lamp, **reset** the indicator circuit by depressing the reset button.

ANALYSIS OF TEST RESULTS

Indicator lamp lights at specific setting

Output is as specified. Test results should repeat 3 times. If readings do not repeat, output is erratic and cause should be investigated (loose connections or components, etc.).

Indicator lamp lights at a lower setting

This indicates that the output is less than that designed to operated the engine in a satisfactory manner. The engine may run at a lower setting but be subject to hard starting and misfiring. Be certain that correct engine cranking conditions were met before condemning the ignition.

Indicator lamp does not light

One component is defective. Proceed as instructed to find defective component.

Intermittent ignition problems

In dealing with intermittent problems there is no easy diagnosis. For example, problems that occur only at normal engine operating temperature have to be tested under similar conditions.

In most cases of temperature and/or vibration failure, only parts replacement can solve the problem as most of these failures return to normal when engine is not running.

Double trouble

There is always the possibility of more than one defective part. If after a component has been replaced, the problem still persists, carefully repeat the complete test procedure to find the other defective part.

ANALYSER TEST AND MAINTENANCE

A test simulator is provided with each tester as a means to test the lamp, detector circuit, and batteries.

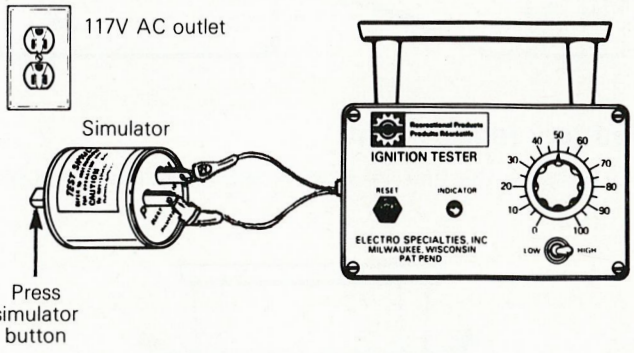
High scale test

a) Place switch in HIGH position. Plug the simulator into an electric outlet (117V AC) for ten seconds.

CAUTION: After charging, do not touch plug terminals while pressing test button. A mild shock will result.

b) Remove the simulator from the outlet, and connect the "P" and "N" leads from the tester to the simulator as indicated on the bottom of the simulator.

c) Set the tester dial to 50, or below. Depress the button of the simulator. The indicator lamp on the tester should light.



NOTE: For each test performed by the simulator, it must be recharged.

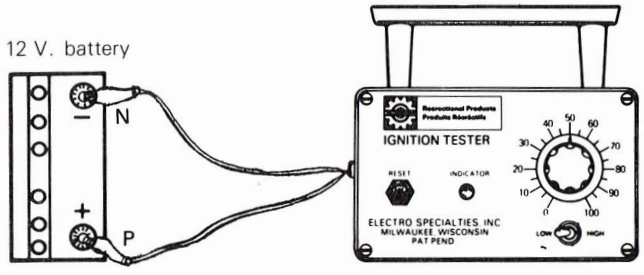
Low scale test

a) Place switch in LOW position.

b) Set tester dial to 50, or below.

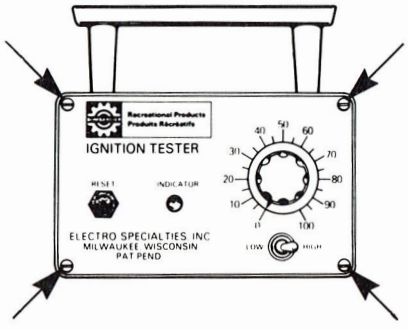
c) Connect **N** lead to negative terminal of 12 volt battery. Connect **P** lead to positive terminal of a fully charged 12 volt battery. Indicator lamp should light.

If lamp does not light, check tester batteries. If they are installed correctly and are good, check the clip lead for faulty connections. If no fault can be found, refer to the warranty statement for instructions for sending the tester back to Electro-Specialties, Inc.

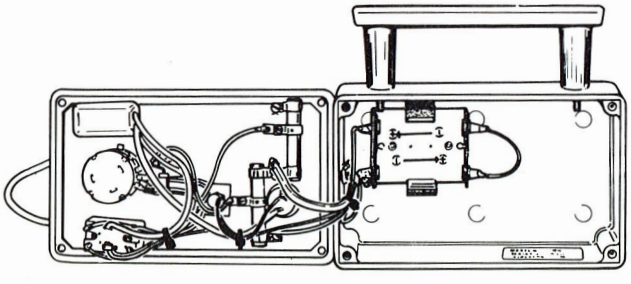


Battery replacement

1. Remove the four (4) screws securing cover to case.



2. Carefully lift cover.
3. Replace batteries with size "C" Alkaline batteries. Be sure to observe polarity markings on battery holder or lamp will not light.



4. Install cover on case carefully being certain that no wires are pinched between cover and case. Secure cover.

NOTE: Weak batteries will not impair tester operation or calibration. The light will glow dim.

Indicator knob alignment

Check indicator knob alignment by turning knob fully clockwise. The white mark on the knob must align with the no. 100 on the scale. If the mark does not line up with the no. 100, loosen the knob set screw, line the mark on the knob with the no. 100, and tighten the set screw. Recheck alignment.

NOTE: If after adjustment, the knob is turned fully counter-clockwise and it does not exactly align with the 0, it is no consequence.

The ignition tester may give false readings if the rivets on the back cover come in contact with metal.

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BOSCH C.D. IGNITION (MX-4 250-370)

Test no. 1 Charging coil output

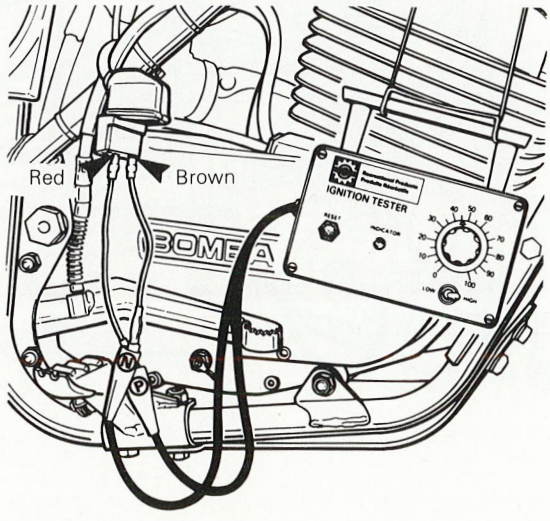
1. Disconnect wire connector at C.D.I. electronic box.
2. Connect tester **P** lead to the red wire coming from the cnarging coil using the harness adaptor, as illustrated. Connect tester **N** lead, to the ground wire (**brown**).
3. Set tester switch at HIGH position and dial at **45**.
4. Set transmission in neutral, then kick start pedal down vigorously.

A. Indicator lamp lights: Charging coil output is up to specifications. Repeat test at least three (3) times to verify reading and check for consistency.

B. Indicator lamp lights at lower setting: Charging coil output is weak. Check for resistance, bad connections or broken flywheel magnets; replace if necessary.

C. Indicator lamp lights intermittent: Check for bad connections or loose components.

D. Indicator lamp does not light: Replace charging coil and repeat test, ensure proper grounding.



Test no. 2 Trigger coil output

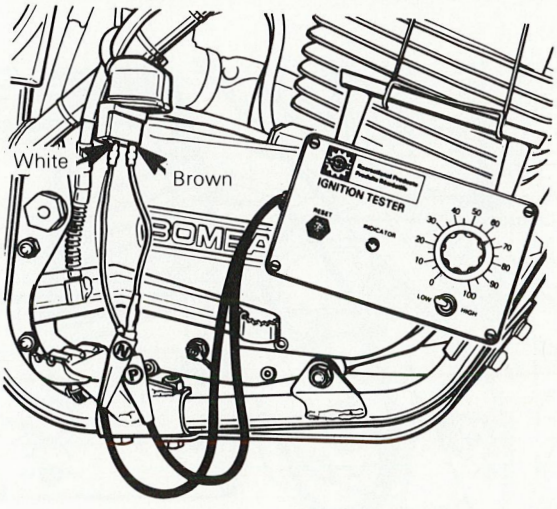
1. Disconnect wire connector at C.D.I. electronic box.
2. Connect tester **P** lead to white* wire leading from trigger coil using the harness adaptor as illustrated. Connect tester **N** lead to the ground wire (**brown**).
3. Set tester switch at LOW position and dial at **65**.
4. Set transmission in neutral, kick start pedal down vigorously.

A. Indicator lamp lights: Trigger coil output is up to specifications. Repeat test at least three (3) times to verify reading and check for consistency.

B. Indicator lamp lights at lower setting: Trigger coil output is weak. Check for resistance, bad connections, or broken flywheel magnets. Replace if necessary.

C. Indicator lamp lights intermittent: Check for bad connections or loose components.

D. Indicator lamp does not light: Grounding is defective or stator plate is faulty, check and replace if neccessary.



*On some units the wire could be violet.

MOTOPLAT CD IGNITION (MX-4 125)

Test no. 1 Charging coil output

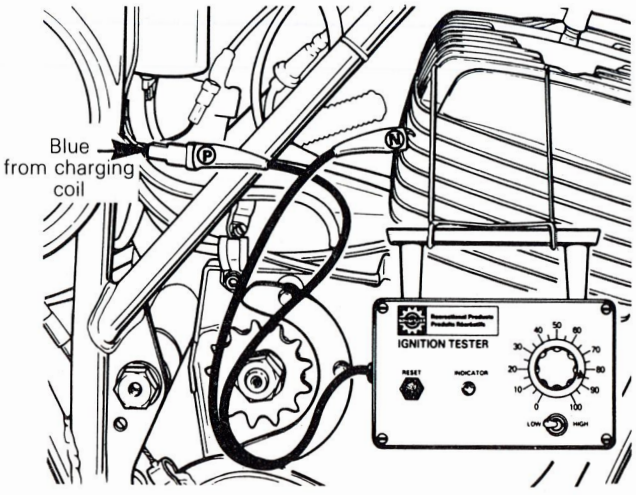
1. Disconnect the two (2) wire connectors from the ignition coil.
2. Connect tester **P** lead to **blue** wire leading from charging coil, using the harness adaptor. Connect **N** lead to a good engine ground.
3. Set tester switch at **LOW** position and dial at **85.**
4. Set transmission in neutral, release emergency stop switch then kick start pedal down vigorously.

A. **Indicator lamp lights:** Coil output is up to specifications. Repeat test at least three (3) times to verify reading and check for consistency.

B. **Indicator lamp lights at lower setting:** Charging coil output is weak, check for resistance or damaged components; replace if necessary.

C. **Indicator lamp lights intermittent:** Check for bad connections or loose components.

D. **Indicator lamp does not light:** Kill switch is defective or stator plate is faulty, check and replace; ensure proper grounding.



Test no 2 Trigger coil output

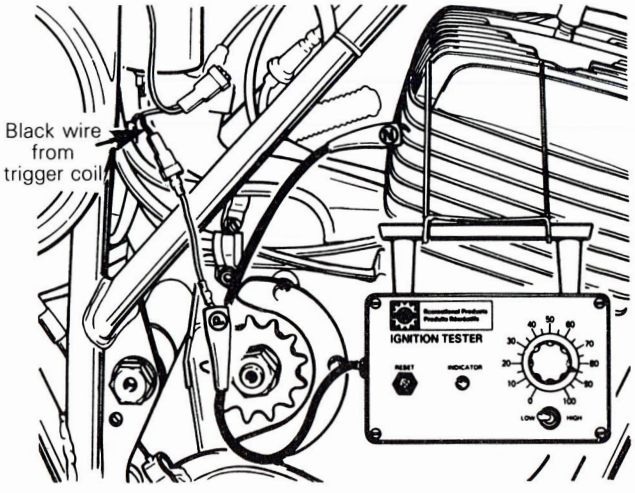
1. Disconnect two (2) wire connectors from the ignition coil.
2. Connect tester **P** lead to **black** wire leading from trigger coil, using the harness adaptor. Connect **N** lead to a good engine ground.
3. Set tester switch at **LOW** position and dial at **85.**
4. Set transmission in neutral, release emergency stop switch into upper position then kick start pedal down vigorously.

A. **Indicator lamp lights:** Coil output is up to specifications. Repeat test at least three (3) times to verify reading and check for consistency.

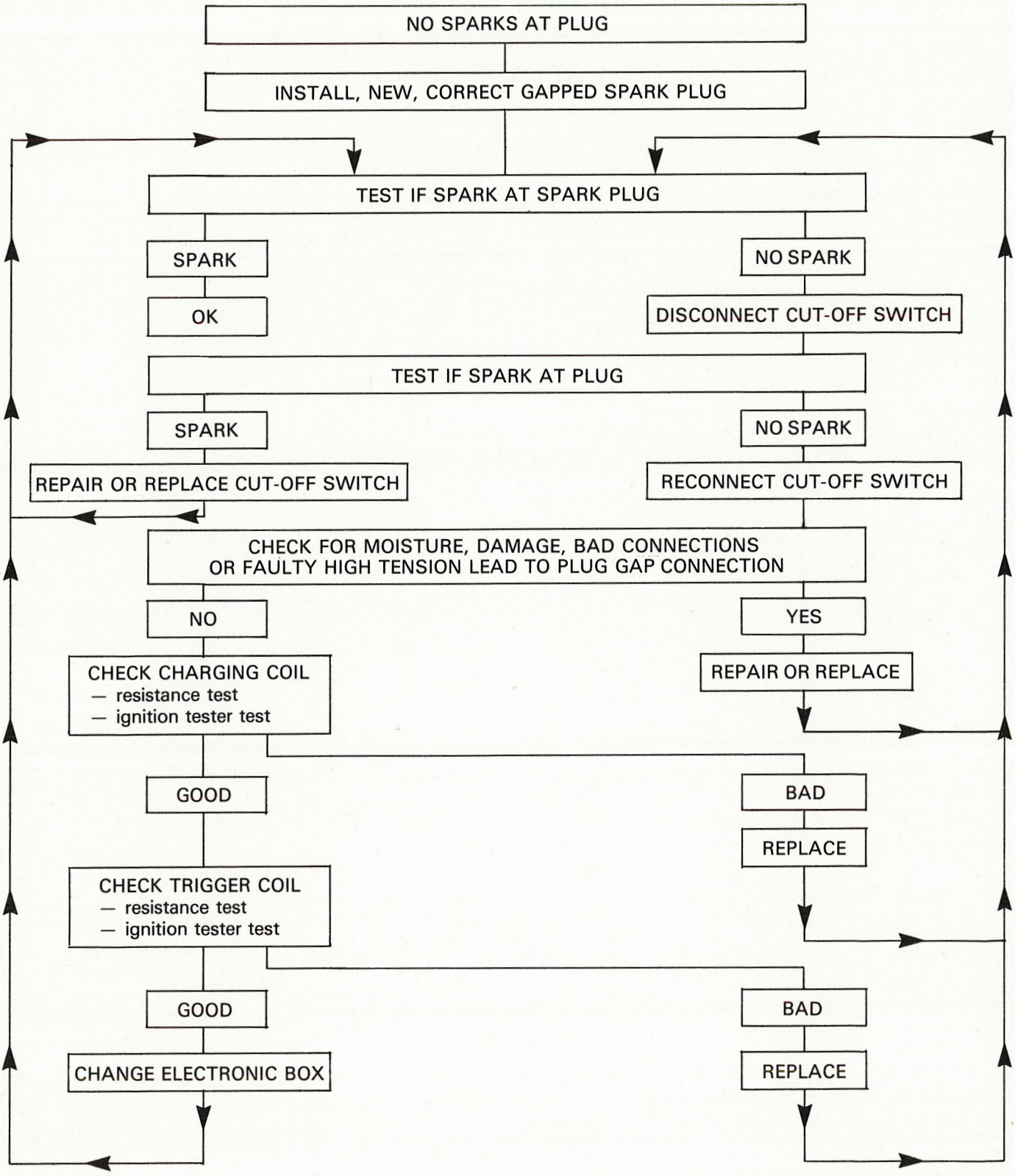
B. **Indicator lamp lights at lower setting:** Trigger coil output is weak, check for resistance or damaged components; replace if necessary.

C. **Indicator lights intermittent:** Check for bad connections or loose components.

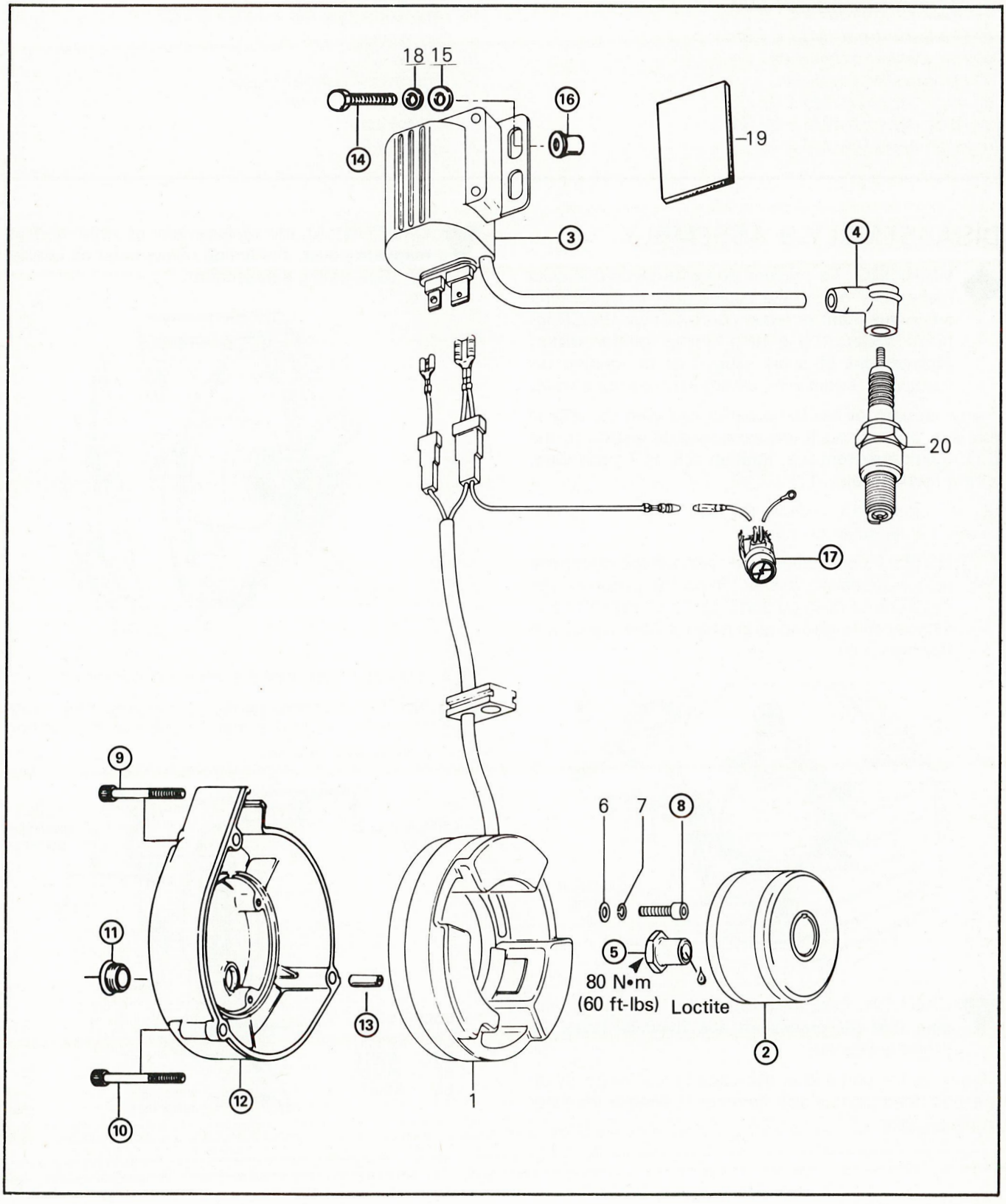
D. **Indicator lamp does not light:** Grounding is defective or stator plate is faulty; check and replace if necessary.



IGNITION TROUBLE SHOOTING CHART



MOTOPLAT SYSTEM
(MX-4 125)



1. *Stator plate*
2. *Rotor (low inertia)*
3. *Ignition coil (electronic box)*
4. *Spark plug protector*
5. *Crankshaft nut (M16 x 1.5)*
6. *Flat washer 5.3 mm (3)*
7. *Lockwasher 5 mm (3)*
8. *Allen capscrew M5 x 20 (3)*
9. *Allen capscrew M6 x 50 (2)*
10. *Allen capscrew M6 x 45*
11. *Adjustment plug*
12. *Magneto cover*
13. *Locating dowel (3)*
14. *Hex. capscrew M6 x 1.00 x 35 (2)*
15. *Flat washer 6 mm x 12 x 1.5 (2)*
16. *Spacer (2)*
17. *Emergency cut-out button*
18. *Lock washer 6 mm (2)*
19. *Rubber pad*
20. *Spark plug*

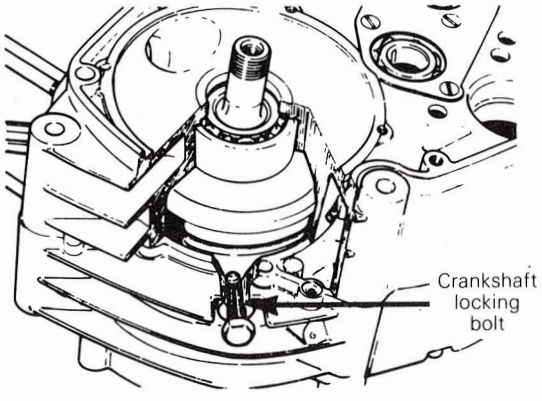
DISASSEMBLY & ASSEMBLY

WARNING: To prevent powerful electric shocks make sure to stop the engine prior to performing any adjustment or repairs onto or near the CD ignition system (i.e ignition timing, ignition tester, replacement of spark plug, coil or ignition armature, H-T lead wire, emergency cut-out button.

If any adjustment has to be performed with the engine running, do not touch any components related to the C.D. ignition system (i.e. ignition coil, H.T. lead wire, wiring harness, etc...)

② Lock crankshaft, remove the rotor retaining nut and install special puller on rotor.

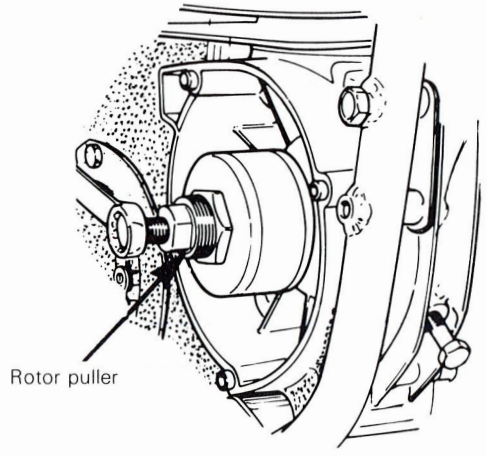
NOTE: To lock crankshaft, remove the crankcase plug and sealing washer. Bring the piston to top dead center position and insert a crankshaft locking bolt through the plug hole into the crankshaft flywheel hole.



CAUTION: Prior to screwing the locking bolt, ensure that the crankshaft and flywheel holes are properly aligned.

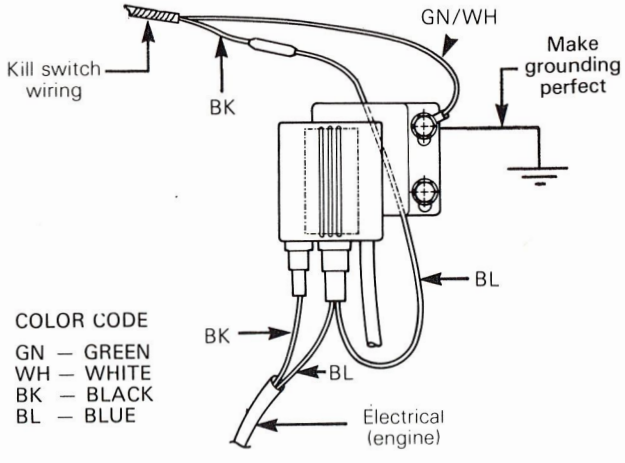
Tighten puller bolt and at the same time, tap gently on the bolt head using a soft hammer to release the rotor from its taper.

CAUTION: At the replacement of rotor and/or magneto cover, the timing marks must be checked. (See timing sub-section).

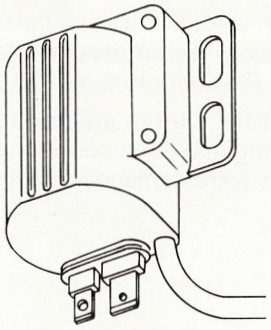


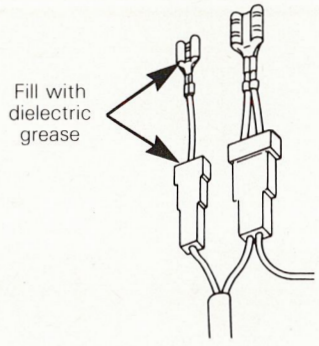
③ At assembly, connect the wires (as illustrated).

NOTE: To ensure perfect grounding, make sure the frame surface is free of paint at the ignition coil mounting area.



Prior to assembly, check all connections for dirt or corrosion and fill with dielectric grease Dow Corning DC 4 or equivalent.

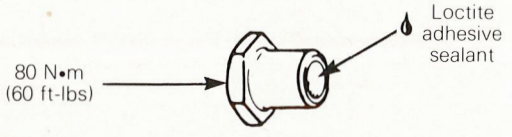




CAUTION: To prevent moisture, make sure no air is trapped within the connections. Do not use silicone sealant as contacts may corrode.

④ At assembly, ensure spark plug protector is not screwed in high tension wire insulation instead of wire core, causing a poor contact.

⑤ At assembly, apply a light coat of Loctite 242 (medium strength) and torque to 80 N•m (60 ft-lbs).

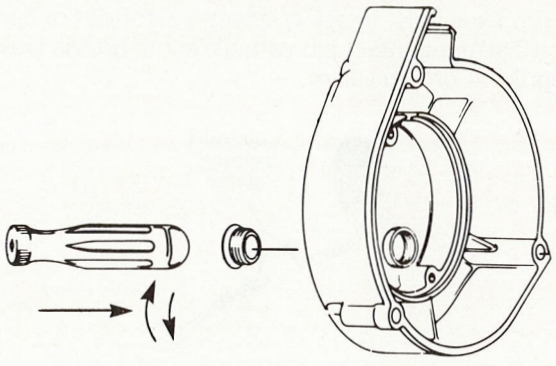


⑧ At assembly, torque to 5.5 N•m (4 ft-lbs).

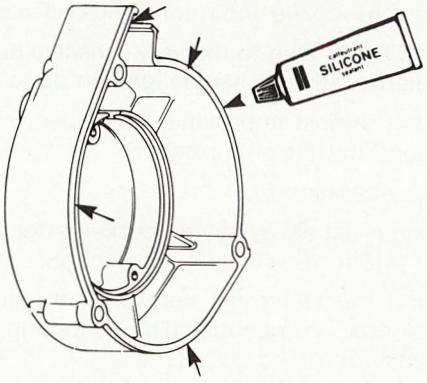
⑨ ⑩ At assembly, apply a small drop of oil or a thin coat of grease on threads and torque to 8 N•m (6 ft-lbs).

NOTE: The longest retaining screws (50 mm long) must be fitted in the top and bottom magneto cover holes.

⑪ For screwing or unscrewing use screwdriver grip end, provided with motorcycle tool kit.



⑫ At assembly, apply a light coat of Loctite 515 sealant or silicone sealant or equivalent on the mating surface.

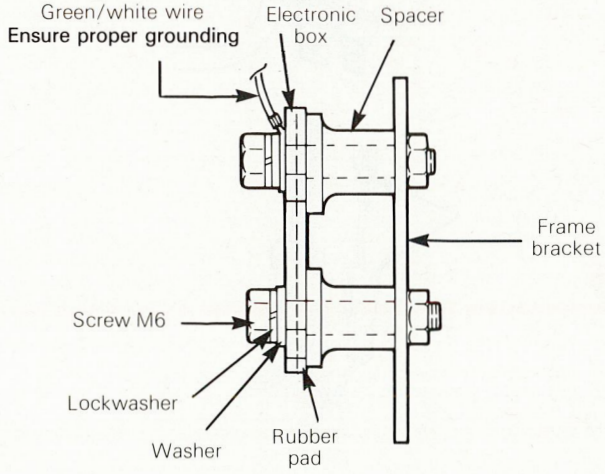


CAUTION: At the replacement of the rotor and/or magneto cover, the timing marks must be checked. (See timing sub-section).

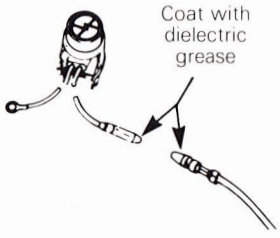
⑬ At assembly, make sure the three (3) locating dowels are in position, either in crankcase or in magneto cover.

⑭ At assembly, torque to 8-9 N•m (6-7 ft-lbs).

⑯ At assembly, the large diameter end of the spacer must be mounted against the ignition coil bracket.



⑰Prior to assembly, check connections for dirt or corrosion. Coat the contact pin with dielectric grease Dow Corning DC 4 or equivalent.



CLEANING & SERVICING

Clean the stator plate and rotor using only a clean cloth.

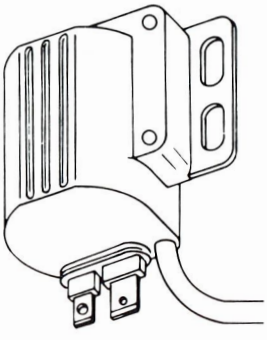
CAUTION: Due to the very sensitive built-in components. Always handle ignition parts with care.

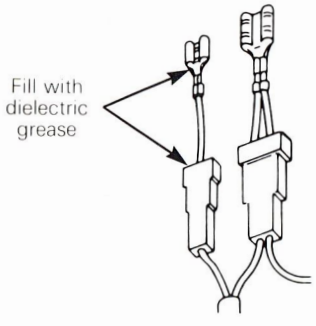
It is of the utmost importance to inspect all electrical connections for dirt or corrosion.

Clean as necessary.

The timing must always by rechecked after working on ignition system. (See timing sub-section).

Fully pack the electronic control connector terminal with dielectric compound (Dow Corning DC 4 or equivalent).



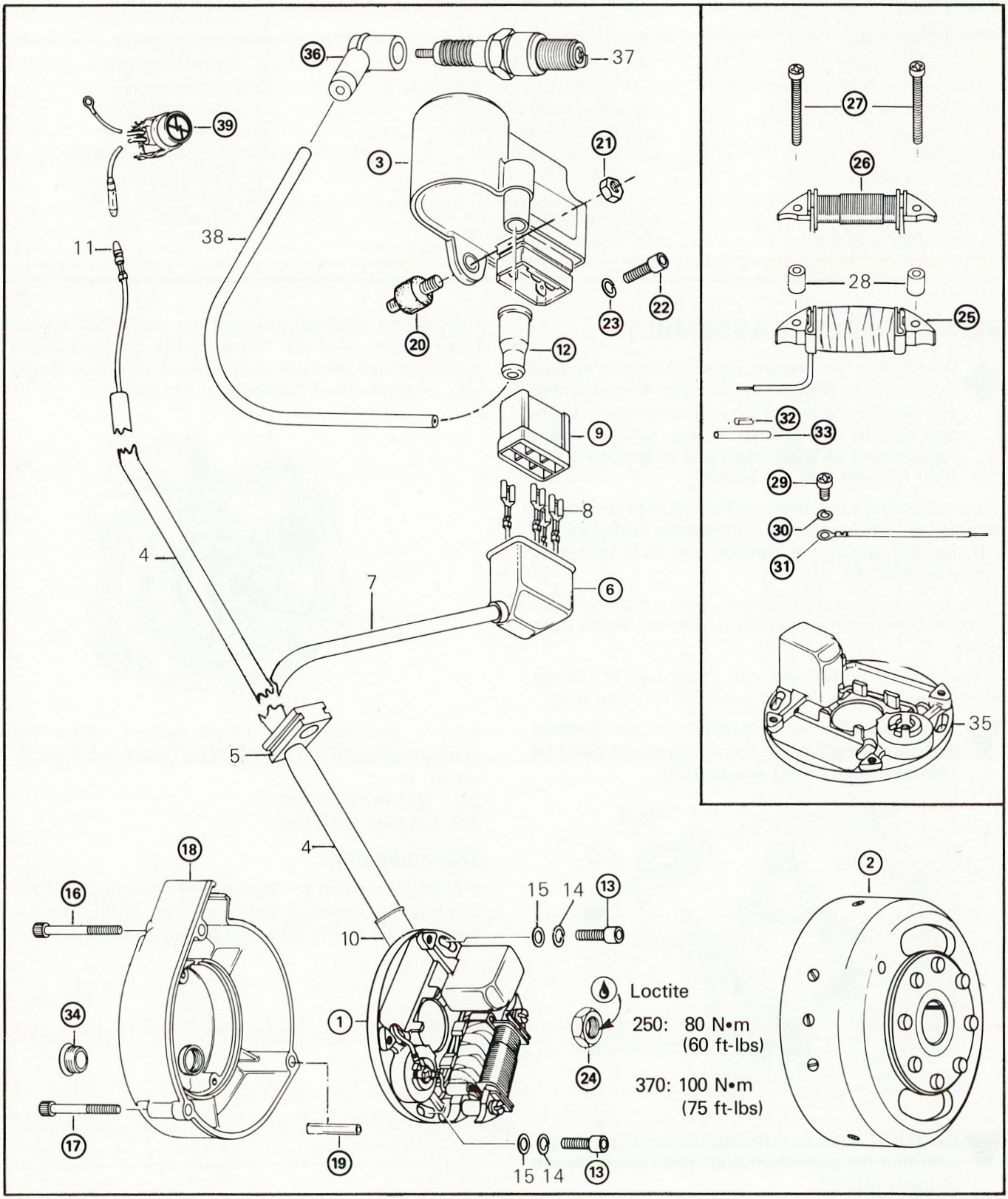


CAUTION: To prevent moisture, make sure no air is trapped within the connections. Do not use silicone sealant as contacts may corrode.

Frequently inspect the ignition cover and crankcase unpainted surfaces for corrosion. If corroded, clean then spray with LPS 3 oil or equivalent.

CAUTION: Do not attempt to stop the engine by removing the high tension wire from the spark plug. Severe damage will occur to electronic box.

BOSCH SYSTEM
(MX-4 250/370)



1. *Stator plate ass'y*
2. *Flywheel*
3. *Electronic box*
4. *Protection hose (400 mm)*
5. *Cable grommet*
6. *Protection boot*
7. *Protection hose (185 mm)*
8. *Straight tab receptacles*
9. *Connector*
10. *Holder*
11. *Contact pin*
12. *Protection cap*
13. *Allen screw M5 x 16*
14. *Lockwasher 5 mm*
15. *Flat washer 5.3 mm*
16. *Allen screw M6 x 50*
17. *Allen screw M6 x 45*
18. *Magneto cover*
19. *Locating dowel (3)*
20. *Rubber mount (2)*
21. *Elastic stop nut 6 mm*
22. *Allen screw M6 x 1.00*
23. *Lockwasher 6 mm*
24. *Crankshaft nut*
    250: M16 x 1.5
    370: M18 x 1.5
25. *Charging coil*
26. *Brake light coil*
27. *Screw M4 x 28 (2)*
28. *Distance sleeve 10.5 mm*
29. *Screw M4 x 6*
30. *Lockwasher 4 mm*
31. *Cable shoe M4*
32. *Splice connector*
33. *Protector tube*
34. *Adjustment plug*
35. *Trigger plate*
36. *Spark plug protector*
37. *Spark plug*
38. *High tension wire*
39. *Kill switch*

DISASSEMBLY & ASSEMBLY

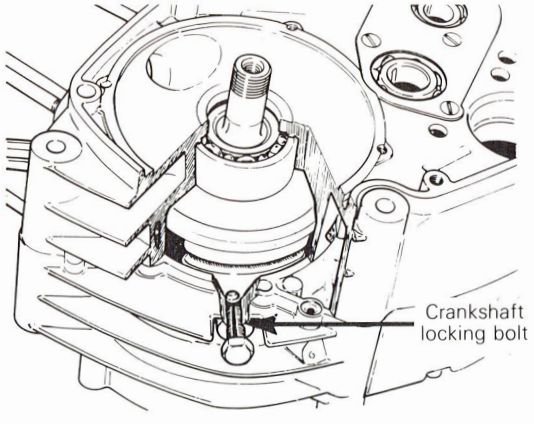
WARNING: To prevent powerful electric shocks make sure to stop the engine prior to performing any adjustment or repair onto or near the CD ignition system (i.e. ignition timing, ignition tester, replacement of spark plug, coil or ignition armature, HT lead wire, kill switch).

If any adjustment has to be performed with the engine running, do not touch any components related to the C.D. ignition system (i.e. ignition coil, H.T. lead wire, wiring harness, etc...).

①To facilitate timing procedure, perform primary adjustment by matching magneto cover and stator plate marks.

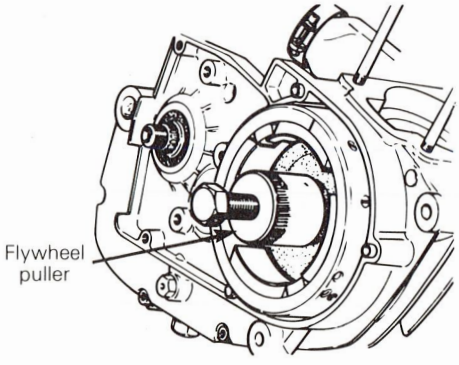
②To remove the flywheel, lock crankshaft at the top dead center position using a crankshaft locking bolt.

CAUTION: At the replacement of the flywheel and/or magneto cover the timing marks must be checked. (See timing sub-section).



CAUTION: Prior to screwing the locking bolt, ensure that the crankshaft and crankcase holes are properly aligned.

Remove the flywheel retaining nut and install special puller on the flywheel. Tighten puller bolt and at the same time, tap gently on the bolt head using a soft hammer to release the flywheel from its taper.



Prior to assembly apply a light coat of Loctite 242 (medium strength) on the crankshaft taper and threads. Torque to

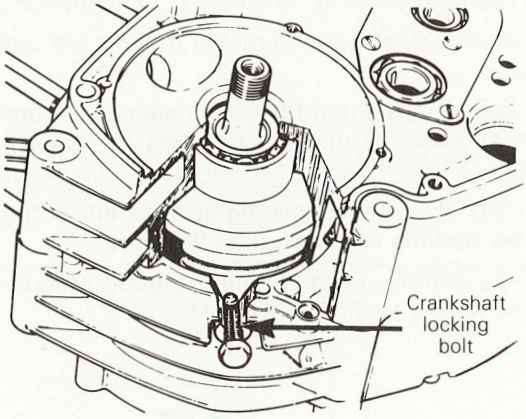
250: 80 N•m (60 ft-lbs)
370: 100 N•m (75 ft-lbs)

370 model only:

It is recommended to retorque the flywheel after the first hour of operation and to retorque again after the first three (3) to five (5) hours of operation.

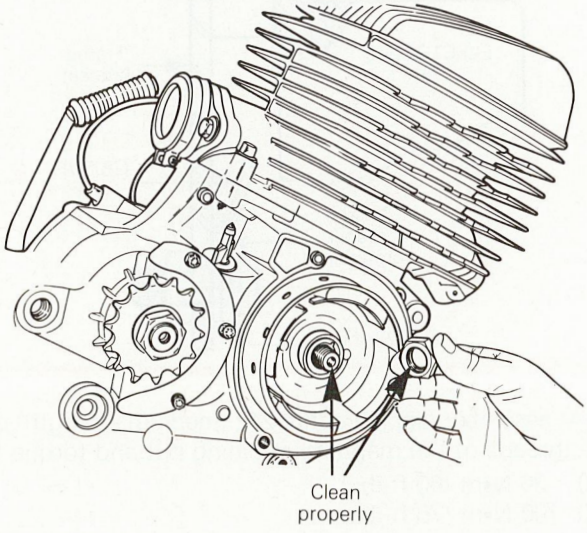
PROCEED AS FOLLOWS:

To remove the flywheel nut, lock crankshaft at the top dead center position using a crankshaft locking bolt.

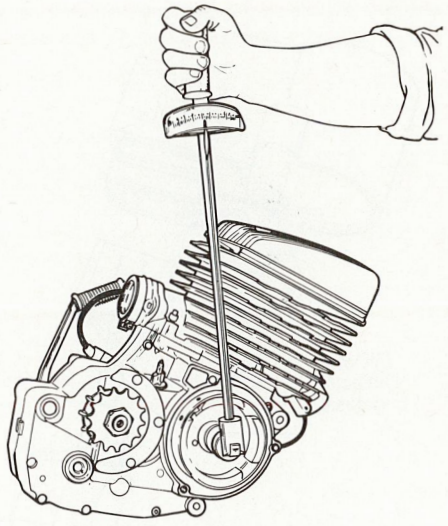


Remove the magneto cover and the crankshaft nut.

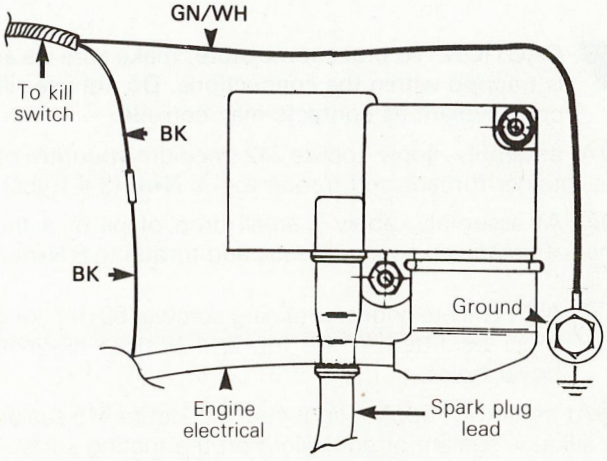
Clean threads properly.



Apply Loctite adhesive sealant 242 blue (medium strength) on threads and retorque to 100 N•m (75 ft-lbs).



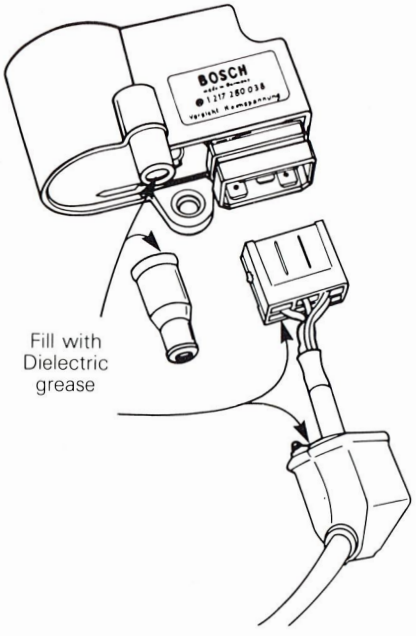
③ At assembly, connect the wires (as illustrated).



COLOR CODE: GN – GREEN
WH – WHITE
BK – BLACK

⑥⑨⑫ Prior to assembly check all connections for dirt or corrosion.

Fully pack the electronic control, the connector block, the rubber boot, the high tension connection and the protector boot with dielectric grease Dow Corning DC 4, or equivalent.



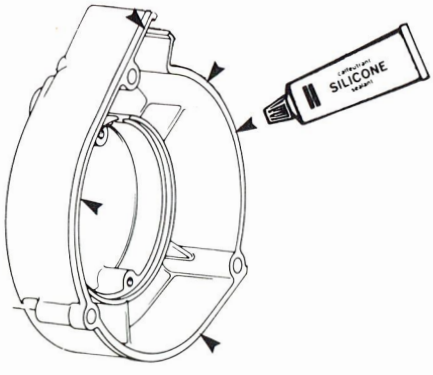
CAUTION: To prevent moisture, make sure no air is trapped within the connections. Do not use silicone sealant as contacts may corrode.

⑬ At assembly, apply Loctite 242 (medium strength) on the retainer threads and torque to 4-5 N•m (3-4 ft-lbs).

⑯ ⑰ At assembly, apply a small drop of oil or a thin coat of grease on screw threads and torque to 8 N•m (6 ft-lbs).

NOTE: The longest retaining screws (50 mm long) must be fitted in the top and bottom magneto cover holes.

⑱ At assembly, apply a light coat of Loctite 515 sealant or silicone sealant or equivalent on the mating surface.



CAUTION: At the replacement of the flywheel and/or magneto cover, the timing marks must be checked. (See timing sub-section).

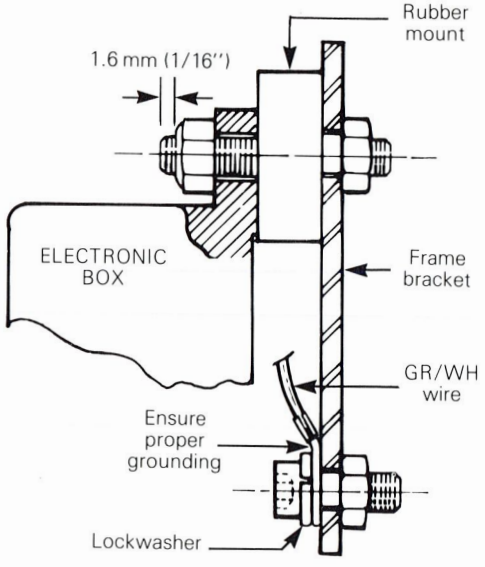
⑲ At assembly, make sure the three (3) locating dowels are in position, either in crankcase or in magneto cover.

⑳ At assembly, ensure the rubber mounts are properly tightened.

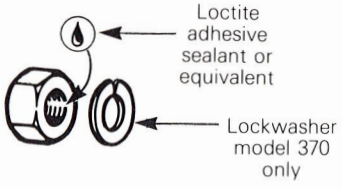
㉑ At assembly, tighten the elastic stop nut in order to obtain at least 1.6 mm (1/16") long of threads protruding past the nylock. This will secure the assembly.

CAUTION: Do not overtighten the nuts or the rubber mounts will loose their flexibility.

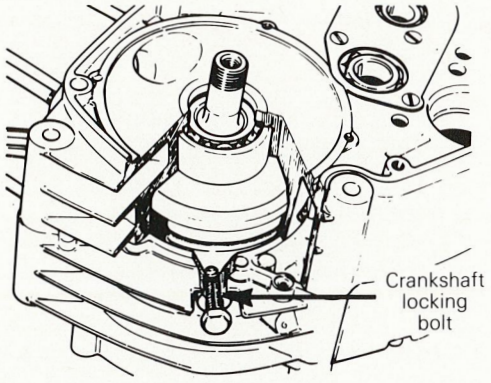
㉒ ㉓ At assembly, ensure there is a good ground contact and torque to 8 N•m (6 ft-lbs).



㉔ At assembly, apply Loctite 242 (medium strength) on the threads of the magneto retaining nut and torque to
250: 80 N•m (60 ft-lbs)
370: 100 N•m (75 ft-lbs)



NOTE: Prior to tighten, lock crankshaft at the top dead center position using a crankshaft locking bolt.



CAUTION: Prior to screwing the locking bolt, ensure that the crankshaft and crankcase holes are properly aligned.

㉕㉖ At assembly, hold the coils towards the center of the stator plate while tightening to prevent the coil shoes from contacting the magneto.

CAUTION: Make sure to route the coil wires away from the center of the stator plate to prevent the wires from rubbing on the magneto flywheel nut.

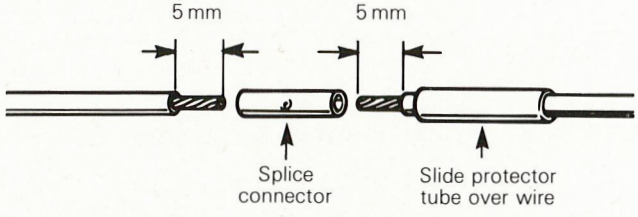
NOTE: The brake light coil ㉖ is used as a spacer only.

㉗㉙ At assembly, torque to 3 N•m (2 ft-lbs).

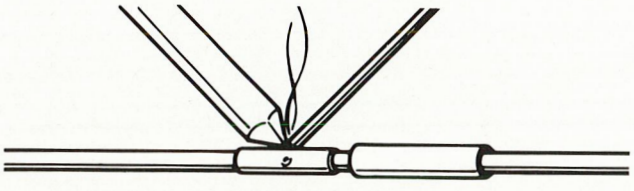
㉚㉛ At assembly, ensure proper grounding with stator plate.

㉜㉝ Use a splice and protector tube, as illustrated, to connect the wires.

Strip 5 mm of insulation from each end.

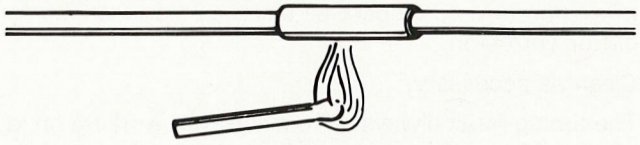


Crimp and solder wires into splice connector with resin core type solder.

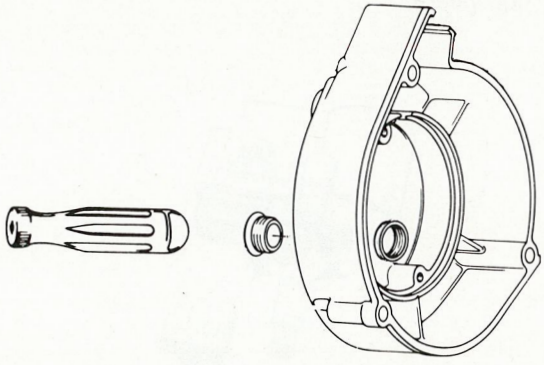


CAUTION: Do not use acid core solder, as connections will corrode.

Slide protector tube over splice connector then heat slightly with a match to shrink the protector tube.



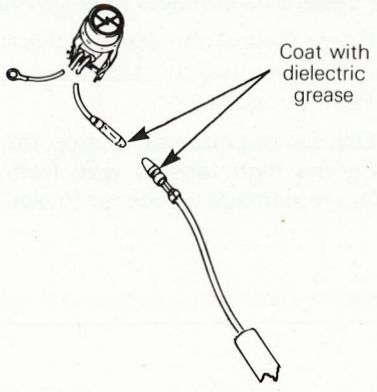
㉞ For screwing or unscrewing use screwdriver grip end, provided with motorcycle tool kit.



㊱ At assembly, ensure spark plug protector is not screwed in high tension wire insulation instead of wire core, causing a poor contact.

㊴ Prior to assembly, check connection for dirt or corrosion.

Coat the contact pin with dielectric grease Dow Corning DC 4 or equivalent.



CLEANING AND SERVICING

Clean the stator plate and flywheel using only a clean cloth.

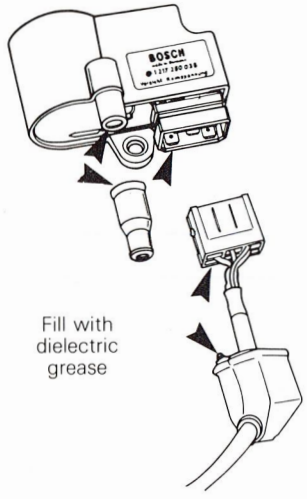
CAUTION: Due to the very sensitive built-in components. Always handle ignition parts with care.

It is important to inspect all electrical connections for dirt or corrosion.

Clean as necessary.

The timing must always be recheck after working on ignition system. (See timing sub-section).

Fully pack the electronic control, the connector block the rubber boot, the high tension connection and the protector boot with dielectric grease Dow Corning DC 4, or equivalent.



CAUTION: To prevent moisture, make sure no air is trapped within the connections. Do not use silicone sealant as contacts may corrode.

Frequently inspect the ignition cover and crankcase unpainted surfaces for corrosion. If corroded, clean then spray with LPS 3 or equivalent.

CAUTION: Do not attempt to stop the engine by removing the high tension wire from the spark plug. Severe damage will occur to electronic box.

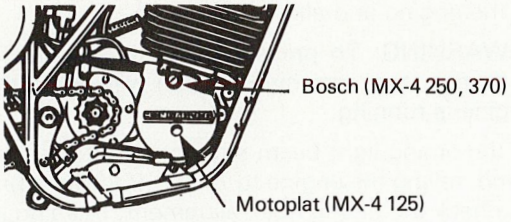
IGNITION TIMING BOSCH TYPE: MODELS 250-370 AND MOTOPLAT TYPE: MODEL 125

TIMING MARK VERIFICATION (TOP DEAD CENTER GAUGE)

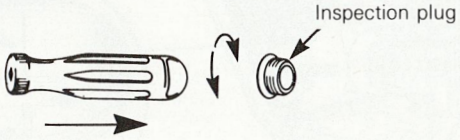
Mount the motorcycle on a box or stand with the rear wheel raised.

Disconnect spark plug wire and remove spark plug.

Remove the inspection plug on the magneto cover.

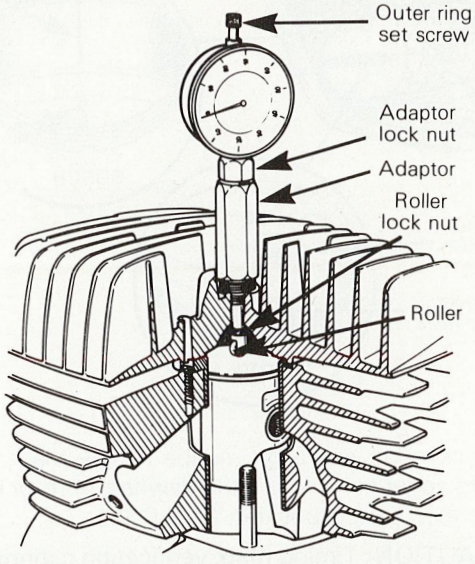


NOTE: For screwing or unscrewing the plug use screw driver grip end, provided with motorcycle tool kit.



Install and adjust T.D.C. gauge (dial indicator) on engine as follows:

- Engage the transmission in the highest gear.
- Rotate the rear wheel until the piston is just before top dead center.
- With gauge in adaptor, adjust roller parallel with dial face. Tighten roller lock nut.



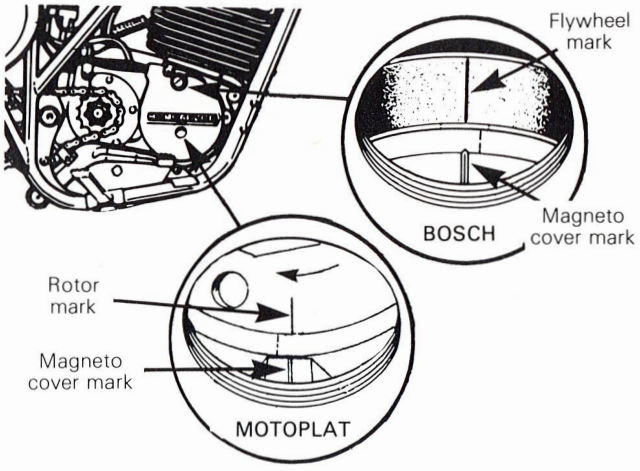
- Loosen adaptor lock nut then holding gauge with dial face toward magneto. Screw adaptor in spark plug hole.
- Slide gauge far enough into adaptor to obtain a reading then finger tighten adaptor lock nut.
- Rotate the rear wheel until the piston is at top dead center.
- Unlock the outer ring of the dial and turn it until "0" on the dial aligns with the pointer.
- Lock the outer ring in position.

Rotate the rear wheel **counter-clockwise** and slightly go beyond the specified distance before top dead center, then gently rotate **clockwise** until the specified distance before top dead center is reached:

125: 1.0 mm ± .2 (0.039" ± .007")
250: 1.3 mm ± .2 (0.051" ± .007")
370: 2.5 mm ± .2 (0.098" ± .007")

NOTE: Turning clockwise to achieve setting will take up all free-play and ensure an accurate reading.

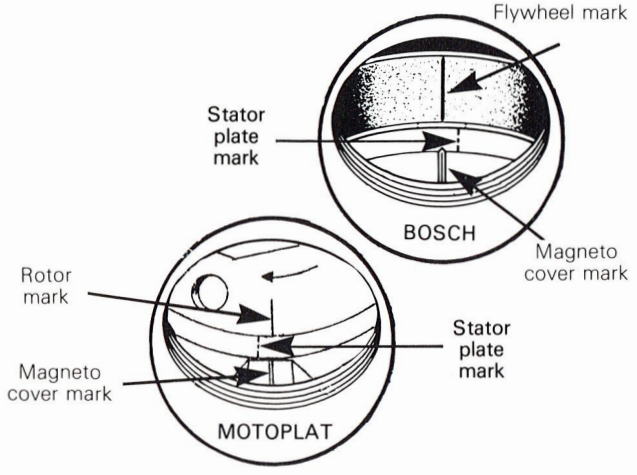
Look through the inspection hole to see if the flywheel or rotor and magneto cover marks align.



If the marks do not align, scribe a new mark on the **magneto cover** (in line with the **flywheel or rotor mark** at the specified piston position (B.T.D.C.).

CAUTION: Timing mark verification cannot be used as a timing procedure, therefore always check the timing (using a stroboscopic timing light at 7,000 R.P.M.) after the marks have been aligned.

The stator plate is also marked.



The stator plate mark is used only to ease the **preliminary** timing adjustment, by matching **stator plate mark** and **magneto cover mark, when parts are re-assembled.** Also, this mark may be used, when performing timing with a stroboscopic timing lamp. To determine the approximate distance the stator plate should be rotated (retard or advance) using magneto cover mark as a reference.

Prior to timing procedure, ensure to clearly identify all the timing marks.

CAUTION: Only the magneto cover mark and the flywheel/rotor mark must be matched to obtain proper timing.

TIMING PROCEDURE (stroboscopic timing lamp)

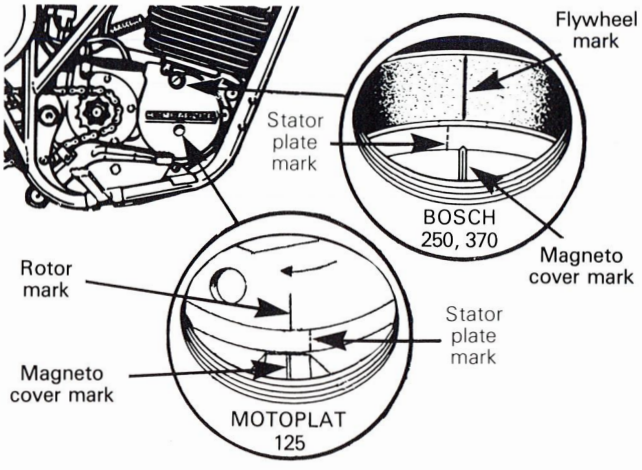
Remove the timing inspection plug, and connect the timing light pick-up to the high tension lead.

NOTE: Use a separate battery to supply timing lamp.

Start the engine and allow it to warm.

WARNING: To prevent powerful electric shock, do not touch the high tension wire while the engine is running.

Point the timing light beam straight into the inspection hole and, reving the engine to 7000 R.P.M. **for a brief instant**, check the timing mark alignment. If timing is correct, the **magneto cover mark** and **flywheel or rotor mark** will align as shown. Stop the engine.

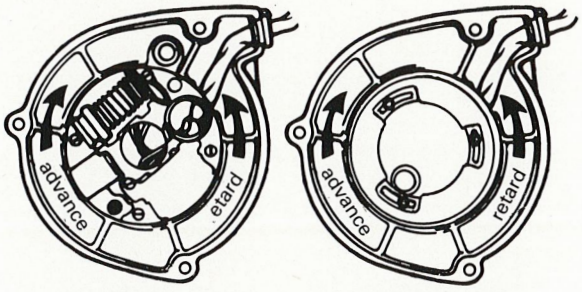


CAUTION: Prior to timing procedure, ensure that the timing marks have been checked with a dial indicator for perfect accuracy.

If timing was incorrect,

Remove the magneto cover.

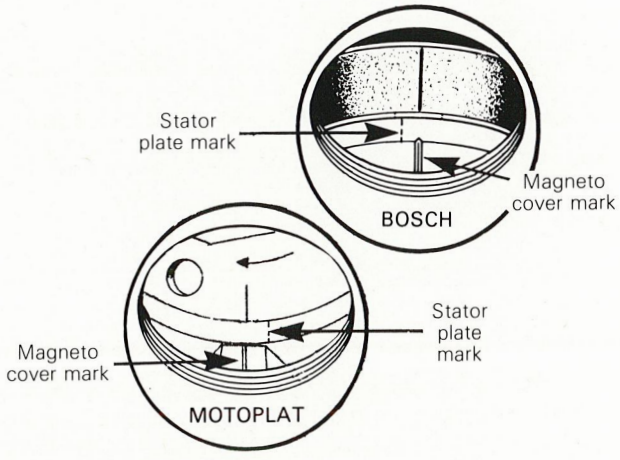
Loosen the stator retaining screws then move the stator plate in the advance or retard direction to correct the misalignment.



BOSCH
MODEL 250-370

MOTOPLAT
MODEL 125

NOTE: To determine the amount of rotation given to the stator plate, use the stator plate mark with the magneto cover mark as a reference point.



Tighten the Allen screws.

Install the magneto cover, start the engine and recheck the alignment of the timing marks on the **flywheel or rotor and magneto cover.**

Repeat this procedure until the timing marks on the flywheel or rotor and magneto cover are perfectly aligned at 7000 R.P.M.

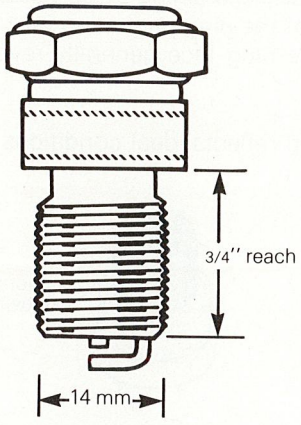
NOTE: Only stroboscopic timing lights utilizing capacitor or inductive pick-up can be used to indicate correct spark setting without disturbing the electronic equilibrium of the ignition circuit.

Examples of suitable timing lights:
SUN PTL 45
Snap-on MT 215 B
Bosch EFAW 169 A
Marquette 41-220

CAUTION: Only the **magneto cover mark and the flywheel/rotor mark** must be matched to obtain proper timing.

SPARK PLUG

SPARK PLUG TYPE



BOSCH SPARK PLUG NUMBERING SYSTEM

Old system:

W 280 MZ 2—Indicates particular design detail (such as 3/4" reach).

M: Two cycle engine

Z: Semi covered front electrode

Heat range: If we consider a 280 rating as normal, a plug with a 260 rating is "hotter" and a 300 rating is "colder".

W: indicates 14 mm thread.

New system:

W 3 CO

C: thread reach 3/4" regular electrode.

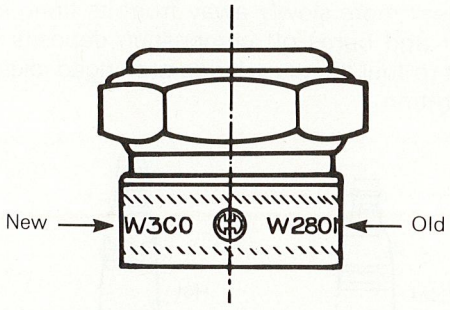
O: electrode design.

Heat range: If we consider a 3 rating as normal, a plug with a 2 rating is **"colder"** and a 4 rating is **"hotter".**

W: indicates 14 mm thread.

CAUTION: On the new Bosch identification system, the heat range identification must be well understood; the higher the number is, the hotter is the plug and the lower the number is, the colder is the plug.

NOTE: The spark plug will carry the new and old type identification system on the plug shell during the transition period.

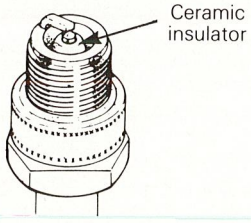


HEAT RANGE

Factory tests have shown that the Bosch W 280 MZ2/W 3 CO spark plug is the best for general use. However, spark plug requirements may slightly differ with the ignition and carburation adjustments and with the various riding conditions.

When the correct heat range is used, the spark plug electrode will stay hot enough to keep all the carbon burned off and also, the electrode will stay cool enough to prevent overheating or red-hot points which are harmful to the engine and to the plug itself.

A careful inspection of the condition and color of the ceramic insulator around the center electrode will show you if the plug has the proper heat range:



the ideal condition is when the ceramic is clean and of a light brown color.

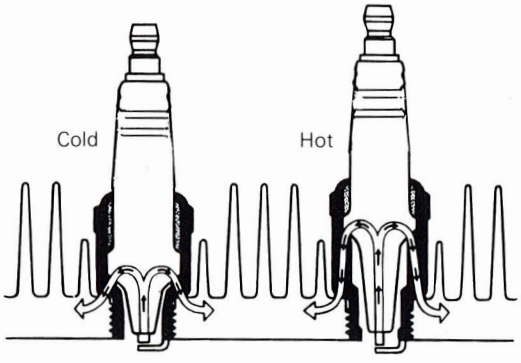
NOTE: To obtain a very accurate reading, install a brand new plug for the test and ensure that the carburetor jetting, fuel/oil mixture and engine conditions are good; refer to spark plug check procedure.

Difference between a "cold" and a "hot" spark plug:

A "cold" type plug has a relatively short insulator nose and transfers heat very rapidly into the cylinder head.

Such a plug is used in heavy duty or continuous high speed operation to avoid overheating.

The "hot" type plug has a longer insulator nose and transfers heat more slowly away from its firing end. It runs hotter and burns off combustion deposits which might tend to foul the plug during prolonged idle or low speed operation.



CAUTION: Severe engine damage can occur if a wrong heat range plug is used:

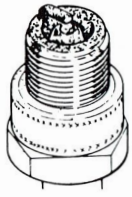
A too "hot" plug will result in overheating and red-hot points pre-ignition, etc.

A too "cold" plug will result in fouling (shorting the spark) or may create carbon build up which can heat up red-hot and cause pre-ignition or detonation.

SPARK PLUG ANALYSIS

The plug face reveals the condition of the engine, operating condition, method of driving, and fuel mixture. For this reason it is advisable to inspect the spark plug at regular intervals, examining in particular the plug face (i.e. the part of the plug projecting into the combustion chamber). The plug face generally reveals any trouble symptoms.

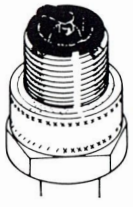
A brownish tip reflects ideal conditions.



Normal
(brownish)

A black insulator tip indicates fouling caused by:

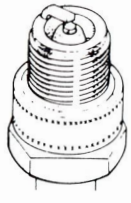
- fuel/oil mixture too rich
- dirty air cleaner element
- wrong spark plug heat range (too cold)
- fuel/air mixture too rich, wrong jetting
- weak or faulty ignition system.



Fouled
(black)

A light gray, ash white insulator tip indicates a lean mixture caused by:

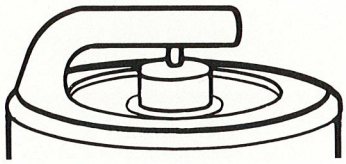
- advanced ignition timing
- insufficient lubrication
- clogged carburetor jets or lean jetting
- wrong spark plug heat range
- spark plug loose in head or no gasket fitted
- leaking seal or gasket.



Overheated
(light grey)

Lead or carbon particles wedged or fused between the electrodes are caused by:

- excessive carbon in cylinder
- brand of fuel or oil
- dirt particles entering through the carburetor with the air flow
- improper ratio of fuel/oil mixture.



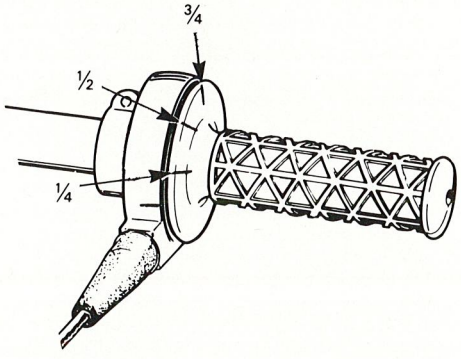
Gap binding

Spark plug check procedure

The reading of the spark plug face is the best method to find the good spark plug heat range or to achieve correct carburetor jetting.

Proceed as follows to check the carburetor jetting.

Mark the throttle twist grip and the twist grip body to indicate 1/4, 1/2, 3/4 throttle opening:



CAUTION: It is best to start test with standard jetting or slightly richer to ensure engine protection.

Install a brand new spark plug and run the motorcycle along a **level** 1/2 mile open road, at a **steady** 1/4 throttle opening. At the end of the 1/2 mile pull the clutch lever in while readily stopping the engine using the kill switch.

Remove the spark plug and perform a plug reading.

If the plug reads lean, fit a larger idle jet; if the plug reads rich, fit a smaller idle jet.

NOTE: It is important to readily stop the engine at the end of a steady throttle opening test to have an accurate plug reading.

Variable throttle opening and prolonged idle period alter the readings.

NOTE: To obtain a very accurate reading, a brand new spark plug should be installed before each run. The air filter should always be clean and the engine in perfect condition.

Proceed to the 1/2 throttle opening and adjust as necessary.

If the plug reads rich, position the needle clip in a higher groove or install a larger needle jet.

If the plug reads lean, position the needle clip in a lower groove or install a smaller needle jet.

Proceed to the 3/4 full throttle opening and adjust as necessary. If the plug reads rich, fit a smaller main jet.

If the plug reads lean, fit a larger main jet.

CAUTION: Always verify each jetting change by repeating the test before proceeding to the next step.

	This chart indicates the range of throttle openings through which each adjustment is effective.	
4	*3/4 - Full opening*	*Main jet size*
3	*1/4 - 3/4 Opening*	*Needle jet size and needle clip position.*
		Throttle slide cut-away.
2	*1/8 - 1/4 Opening*	*Idle jet size and air screw adjustment.*
1	*0 - 1/8 Opening*	

NOTE: Unless effected by climatic conditions, altitude or special engine modifications, carburetion should be left at standard settings.

SPARK PLUG MAINTENANCE/ INSTALLATION

Clean the electrodes and the ceramic insulator and wash the plug in gasoline.

Prior to installation make sure that contact surfaces of the cylinder head and spark plug are free of grime.

1. Using a wire feeler gauge, set electrode gap to 0.5 mm (.020").
2. Apply a light coat of graphite grease over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head and tighten with a torque wrench.

Torque to: 27 N•m (20 ft-lbs)

NOTE: A used spark plug needs a lot more voltage to spark than a new one, but when **cleaned** and **re-gapped** the voltage needed drops near the specification and the service life of the plug is extended.

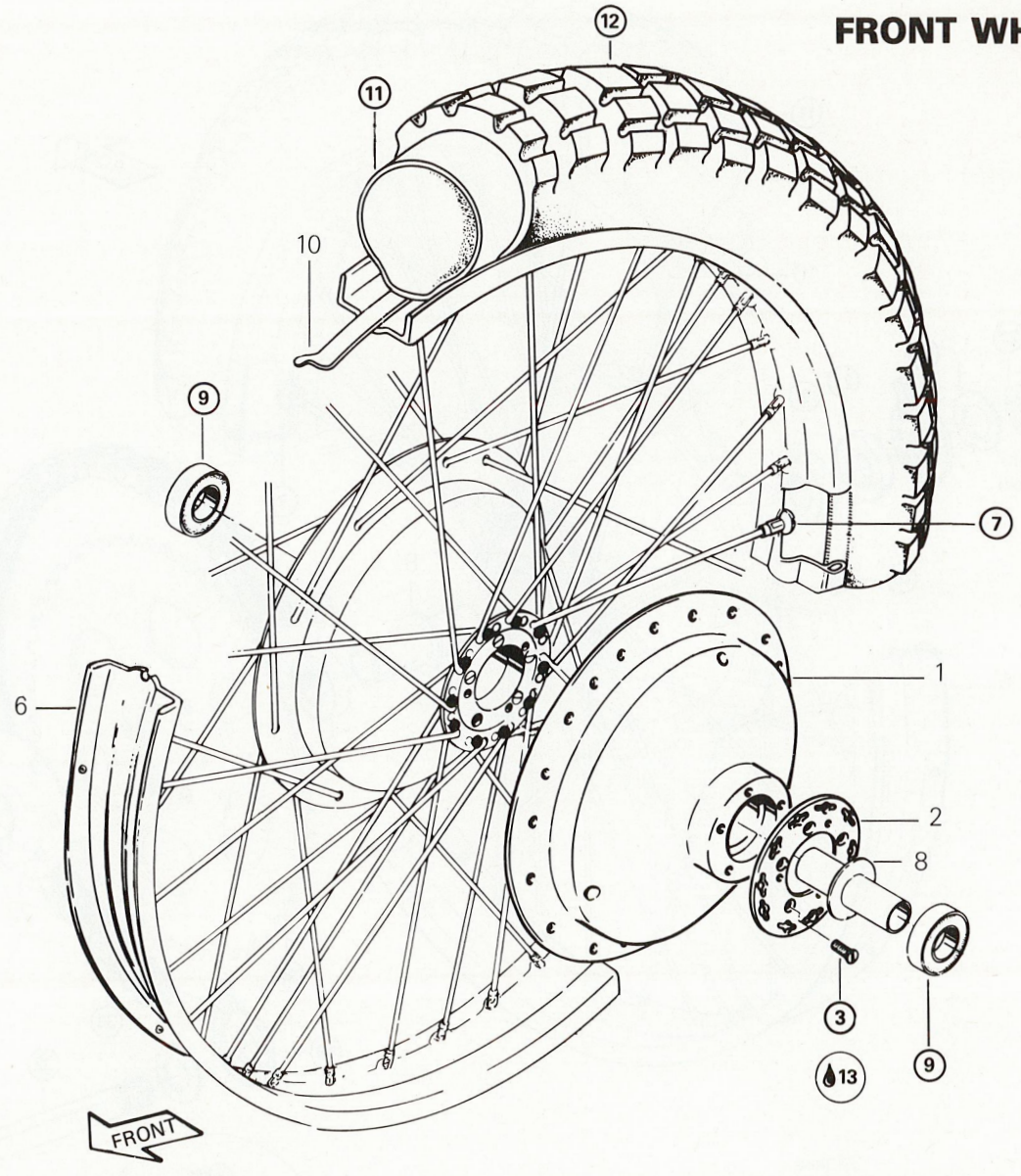
OPTIONAL SPARK PLUGS

- NGK: B 8 ES
- Champion: N2G, N57

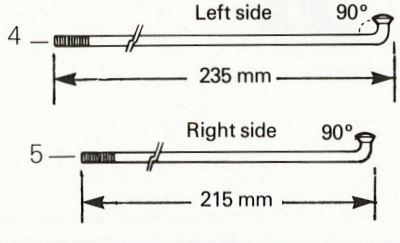
CAUTION: Use as a guideline only, check spark plug heat range. Due to the different design, material etc., heat ranges vary from one plug manufacturer to another.

WHEELS

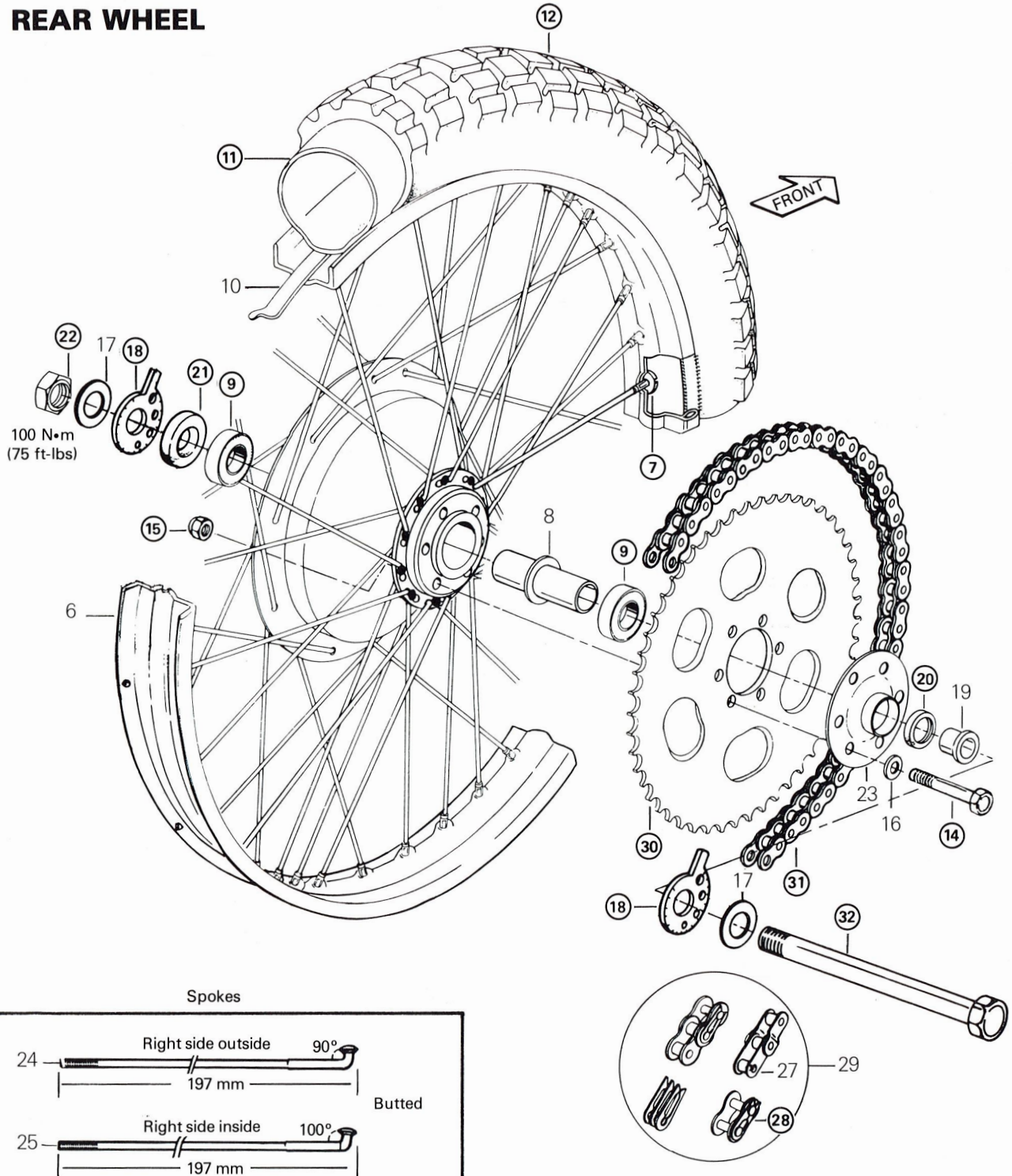
FRONT WHEEL



SPOKES (standard)



REAR WHEEL



Spokes

1. *Front hub*
2. *Spoke flange*
3. *Flat head screw M6 x 1.00 x 12 (5)*
4. *Spoke left side, 90 degree (235 mm long) standard (20)*
5. *Spoke right side, 90 degree (215 mm long) standard (20)*
6. *Rim*
7. *Nipple*
8. *Bearing spacer*
9. *Bearing*
10. *Rim liner*
11. *Tube*
12. *Tire (knobby)*
13. *Loctite 271 blue (medium strength)*
14. *Hexagonal screw M8 x 1.25 x 45 (6)*
15. *Hexagonal nut M8 x 1.25 (6)*
16. *Washer 8 x 17 x 2 (12)*
17. *Washer 17.7 x 30 x 3 (2)*
18. *Adjuster cam (2)*
19. *Spacer R.H.*
20. *Seal 25 x 38 x 7 (1)*
21. *Seal 26 x 47 x 6 (1)*
22. *Hexagonal nut M16 x 1.5 (1)*
23. *Cover*
24. *Spokes: R.H. outside 90° 197 mm long (butted) (10)*
25. *Spokes: R.H. inside 100° 197 mm long (butted) (10)*
26. *Spokes: L.H. inside 110° 185 mm long (standard) (20)*
27. *Half link*
28. *Master link*
29. *Link kit*
30. *Sprocket 125: 54 teeth*
    250/370: 47 teeth
31. *Chain (520)*
32. *Rear axle*

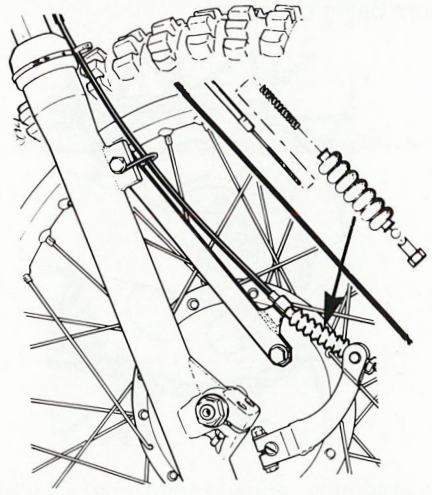
REMOVAL

Front wheel

Mount the motorcycle on a stand or a box with the front wheel raised.

Unscrew the brake cable adjuster nut (at brake plate) and pull the cable housing away from the backing plate. Unscrew the torque arm retaining screw.

NOTE: Place the spring, rubber boot, rod barrel and adjuster nut back on the cable to prevent loss.



Remove the axle nut.

Loosen the four (4) axle pinch bolts, and remove axle.

Rear wheel

Mount the motorcycle on a stand or a box with the rear wheel raised.

Remove the brake rod.

Remove the chain master link and the chain from the wheel sprocket.

Remove the axle nut, the washer and the cam adjuster; pull the axle out.

The wheel can then easily be removed.

DISASSEMBLY & ASSEMBLY

③⑬ At assembly, apply a light coat of Loctite no. 242 blue (medium strength) and torque to 8-10 N•m (6-8 ft-lbs).

⑦ At assembly, torque equally to 5-7 N•m (2-5 ft-lbs).

⑨ Proceed as follows to service the wheel bearing:

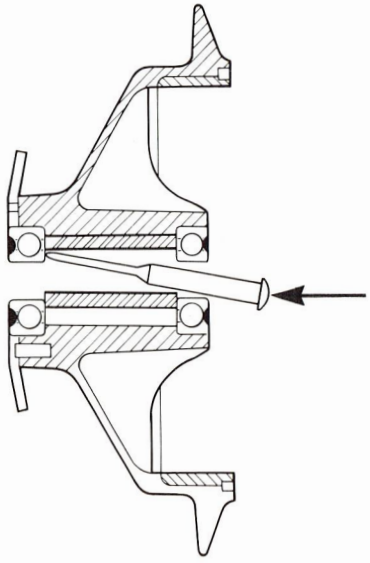
At disassembly, remove the dust cover/seal (if applicable) from the front wheel.

Remove the oil seal cover and sprocket from the rear wheel.

WARNING: The front wheels have magnesium hubs.

Magnesium must be heated with great care to avoid personal injury. Use a torch with a large soft flame (butane), heat the boss with 4 to 5 rapid circular passes.

Heat inside bearing boss in hub with butane torch, place heated side on work bench and tap out bearing using a flat ended punch and hammer.



Set bearing distance spacer aside. Heat outer bearing boss and tap out outer bearing.

CAUTION: Always apply heat to remove or install wheel bearings, failure to apply heat can result in metal being drawn out from the bearing boss, causing a loose fitting bearing within the hub.

At assembly, pack the wheel bearings with a waterproof wheel bearing grease.

Heat one side of the hub around bearing boss then seat bearing into hub.

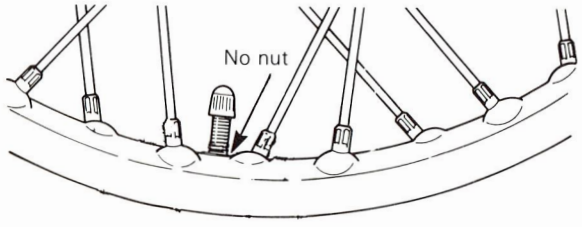
CAUTION: Be careful not to slant the bearing in the mount.

Turn the wheel over, install bearing distance spacer. Heat hub around bearing boss and install the other bearing.

NOTE: The shielded portion of the bearings must face towards the outside of the wheel.

Allow hub to cool, mount dust cover/seal, sprocket, properly.

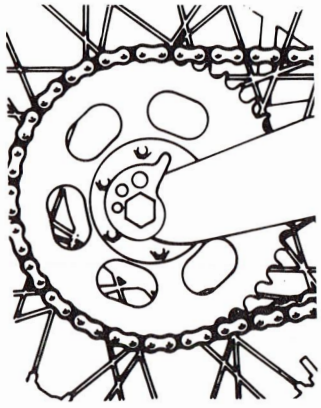
⑪ CAUTION: At assembly, if the valve stem is found to be tilted, deflate the tube and rotate the tire to straighten the valve stem. Assemble without nut.



⑫ At the installation of a new tire, the painted dot on the side of the bead indicates a lighter point on the tire and should be placed next to the valve (front or rear wheel). To ease assembly, use a solution of soapy water.

⑭⑮ At assembly, torque to 20-27 N•m (15-20 ft-lbs).

⑱ CAUTION: Always position the chain adjuster cam as illustrated. This will prevent the cam end from being caught.

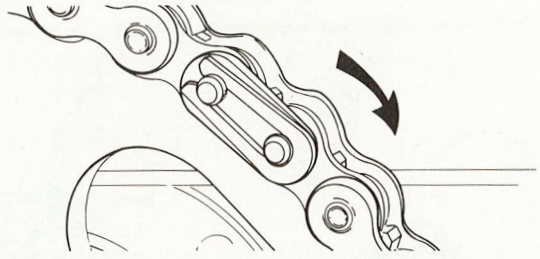


⑳㉑ At assembly, apply a light coat of lithium grease on the seal lip.

㉒㉜ Prior to assembly check the axle for rust or damage and also check for straightness.

At assembly, spin the wheel in forward rotation, apply brake and while holding brake on torque the axle nut to 88-100 N•m (65-75 ft-lbs).

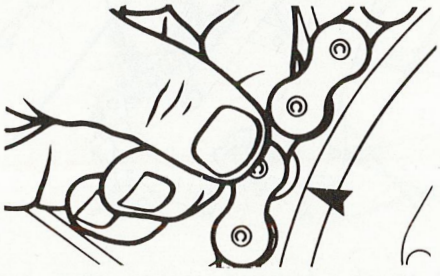
㉘ At assembly, the master link clip must be installed with its closed end facing the direction of chain travel.



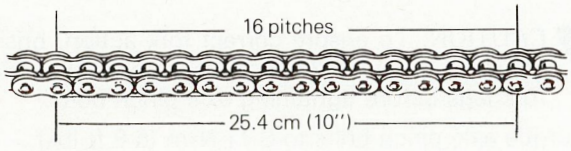
㉚ CAUTION: To prevent rapid chain wear the sprocket should be replaced as soon as a hooked appearance is noticed.

At installation, ensure to place the sprocket in order to have the word "Bombardier" (stamped) facing the outside.

㉛ CAUTION: To prevent rapid sprocket wear, the chain should be checked periodically. If the chain can be lifted away from the rear sprocket any more than illustrated, the chain should be replaced.



The length of 16 pitches of new chain (no. 520) is 25.4 cm (10"). If the chain has "stretched" more than 25.6 cm (10 7/32"), for 16 pitches, it must be replaced.



NOTE: Chain must be clean for this measurement.

Standard length:
125: 114 links
250/370: 108 links

CLEANING AND INSPECTION

Clean bearings, distance spacer and wheel hub with solvent. Dry using compressed air.

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

Clean brake friction surface with lacquer thinner to remove any oil film. Remove the glazed finish using a medium grit taper.

WARNING: Always perform this procedure in a well ventilated area.

Check if the inner and outer races of the wheel bearings are cracked, pitted or chafed. Rotate the bearing and check for roughness.

Inspect wheel hub at bearing bosses and inside where the distance spacer is supported. If distorted, fractured or worn, replace hub.

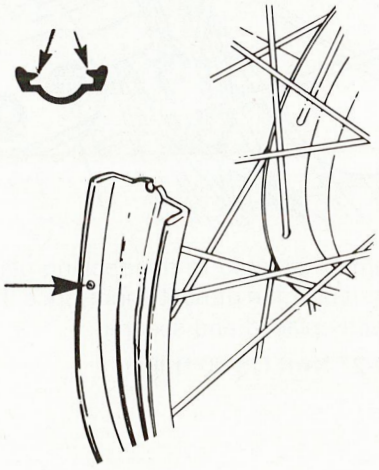
Inspect dust seal lips. If damaged, replace.

Check the bearing fit within the hub bosses. If a loose fit is encountered, a hub replacement is necessary.

RIMS

Rims are provided with inside pins as a tire retention device.

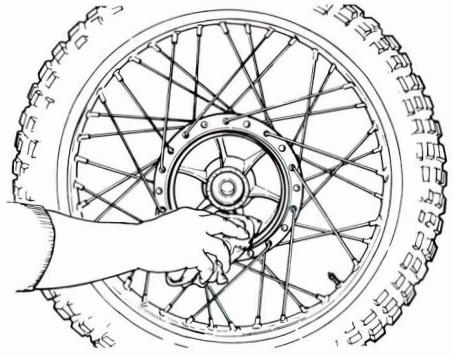
Quantity: front 5 pins each side
rear 10 pins each side



INSTALLATION

Front wheel

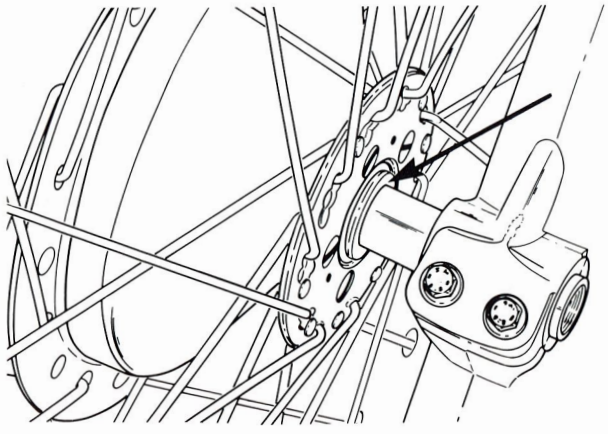
Carefully clean the brake shoe linings and the brake drum with a dry cloth.



Position the brake plate.

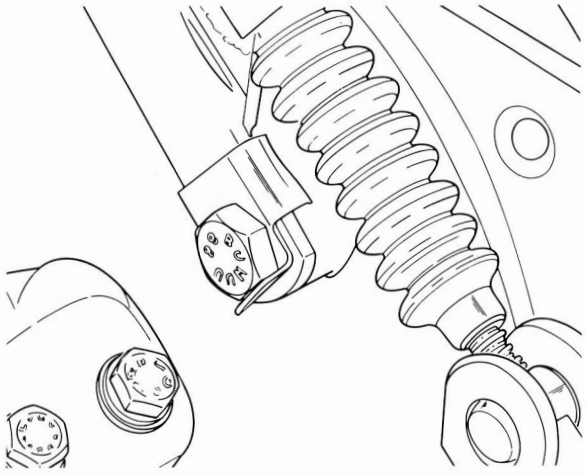
Position the wheel and insert the axle from the clutch side. Slightly tighten the axle nut.

NOTE: Ensure the wheel spacer is installed between the fork leg (clutch side) and the wheel.



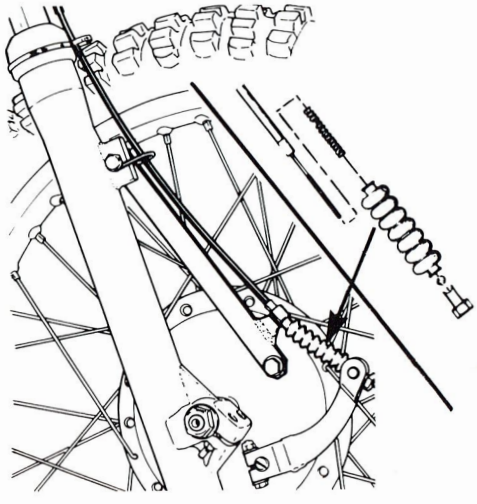
The torque arm is secured to the backing plate using a retaining bolt. It is of the utmost importance that the tab lock be correctly placed and secured.

Torque to 20-27 N•m (15-20 ft-lbs).



WARNING: Bend tab lock against flat face of retaining bolt and always replace by a new one each time parts are disassembled.

Install and route the front brake cable. As illustrated.



Spin front wheel in forward rotation, apply brake and while holding brake **on,** torque the axle nut to 34-81 N•m (25-60 ft-lbs).

NOTE: This is important, it centers the brake shoes.

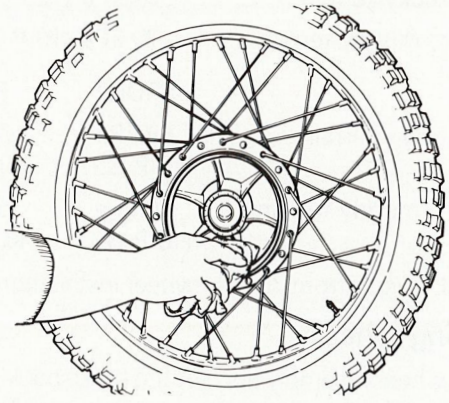
CAUTION: To ensure correct fork action, briskly compress forks (with front brake applied) to align fork legs before tightening axle pinch bolts.

Retorque axle pinch bolts to 8-11 N•m (6-8 ft-lbs).

Inspect front wheel spokes and tighten if necessary.

Rear wheel

Carefully clean the brake shoe linings and the brake drum with a dry cloth.



Position the spacer on the right hand side and the backing plate on the other. Position the wheel and insert the axle nut.

Install the brake rod and adjust the chain tension.

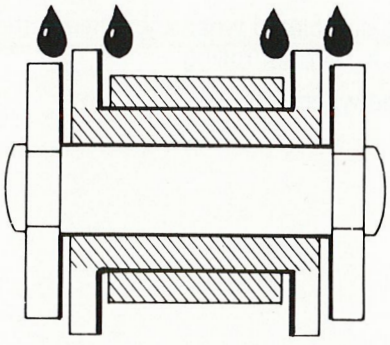
Spin the wheel brake in forward rotation, apply brake, and while holding brake **on**, torque the axle nut to 88-100 N•m (65-75 ft-lbs).

Drive chain lubrication

Clean the chain with a stiff bristle brush and chain oil.

Using a chain lubricant, direct the lubricant as shown for maximum penetration to the chain inner surfaces.

NOTE: Allow sufficient time for lubricant to penetrate and thicken before riding.



If the motorcycle is not to be used for a long period of time, it is recommended to remove the chain from vehicle and to immerse it in chain oil.

NOTE: It is possible to slightly heat the oil to allow better oil penetration.

Drive chain adjustment

Loosen the rear axle nut and move each adjuster plate equally to tighten or loosen chain as required.

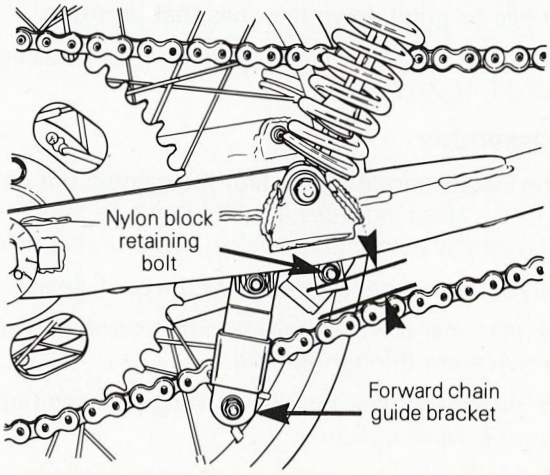
NOTE: Alignment marks on adjuster plate must be at the same position on each side of the wheel.

CAUTION: Check chain slack at several places and always ensure to set correct tension at the chain's tightest point.

Adjust the drive chain in order to obtain the specified distance between the top run of the chain and the nylon block retaining bolt of the forward chain guide bracket.

125 model: 15 mm (5/8")
250/370 models: 9 mm (3/8")

(Measured at the chains tightest point and with **wheel off the ground).**



NOTE: The chain guide should be adjusted as high as possible to partially take up the chain slack.

FLAT TIRE REPAIR PROCEDURE

Removal

Mount the motorcycle on a stand or a box with the applicable wheel raised.

Remove the wheel.

Remove the valve cap and core.

Work the tire bead away from the rim on both sides.

Beginning at the valve stem work either bead completely over the rim.

NOTE: A solution of soapy water around the rim on both sides, will considerably help the removal and installation of the tire.

The tube can now be removed for inspection or repair.

CAUTION: Remove the rim liner and verify if any spoke stems protrude through the spoke nipples. File or grind down the ones that protrude.

Inspect the rim liner carefully before re-installing. If damaged, replace.

Re-assembly

At the installation of a new tire, the painted dot on the side of the bead indicates a lighter point on the tire and should be place next to the valve, (front or rear wheel).

Lightly sprinkle inner tube with talcum or chalk powder.

Work the inner tube carefully into the casing and insert the valve stem through the rim.

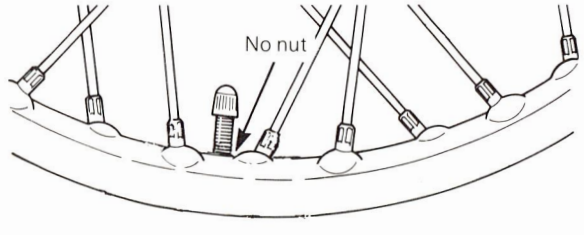
Work the bead under the rim, starting at a point opposite to the valve orifice.

CAUTION: Be careful not to pinch the inner tube while working the bead over the rim.

Inflate the tire to 385 kPa (55 lbs/in^2) maximum to properly seat the bead.

CAUTION: If the valve stem is found to be tilted, deflate the tube and rotate the tire to straighten the valve stem.

Assemble without nut.



Release the air and install the valve core, inflate the tire to the recommended pressure:

125	FRONT & REAR
Dry and rocky terrain	84 kPa (12 P.S.I.)
Soft, wet, muddy terrain	70 kPa (10 P.S.I.)

250/370	FRONT	REAR
Dry and rocky terrain	84 kPa (12 P.S.I.)	70 kPa (10 P.S.I.)
Soft, wet, muddy terrain	70 kPa (10 P.S.I.)	56 kPa (8 P.S.I.)

Re-install wheel (front or rear wheel installation).

Balancing wheels

Remove wheel assembly and set the brake backing plate aside.

Mount the wheel onto motorcycle (without the backing plate).

NOTE: Ensure that the wheel bearings are in good condition and properly lubricated.

Turn the wheel and allow it to stop. The heaviest portion will be down, mark the center of that heavy area.

Suppose the mark made is 0° mark the wheel at 120° and 240° around the circumference of the tire.

Using resin core wire solder, add equal weight to the 120° and 240° positions by coiling the wire solder around the spokes nearest to the marks. Begin coiling around the spoke nipple and do not extend coils longer than 50 mm (2").

CAUTION: Do not use acid core wire solder, the acid can damage the surface of the spokes and wheel.

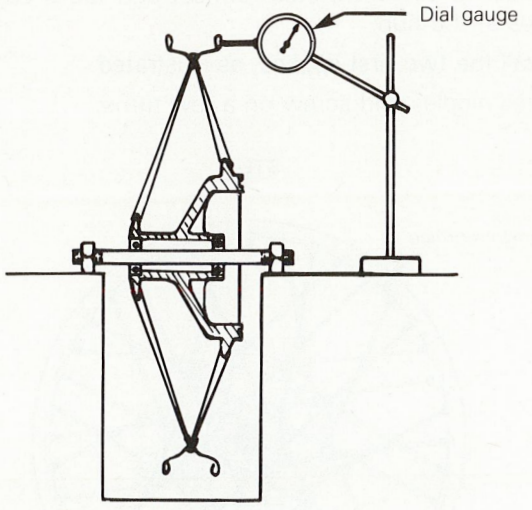
Balancing is completed when the wheel remains in any static position without rolling.

Remount the wheel.

Truing wheels

To perform the truing of the wheel, the tire, and rim liner have to be removed to allow the grinding off of spokes that might protrude trough the spoke nipples after truing the wheel.

Check run-out of the rim (as illustrated).



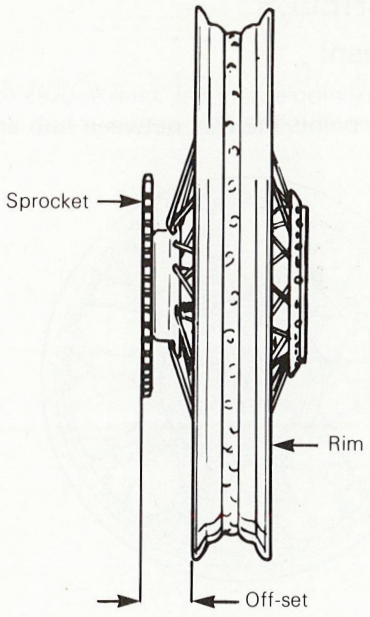
If all spokes are loose, tighten each spoke 1 to 1 1/2 turns. Tighten any single loose spoke and replace any broken one.

Check the rim off-set.

Front wheel: rim off-set: measured from steel spoke flange surface (around bearing area) to outer edge of rim: 7.9 mm (5/16").

Rear wheel rim off-set: measured from sprocket outer edge to rim outer edge:

125: 53.1 mm (2 3/32")
250/370: 43.6 mm (1 23/32")



To correct the off-set, loosen all spokes on one side an equal amount and tighten the opposite ones by the same amount.

To correct an eccentric wheel (oval shape), spin the wheel then using a piece of chalk, mark the high spots on one edge of the rim. Stop wheel and check marks. Usually, one or two sections will be found to be high, covering the distance of two to five spokes. According to the amount of eccentricity, the spokes in the marked area should be tightened, normally from 1 to 2 turns.

NOTE: Tighten each spoke equally, to prevent side to side distortion.

Erase the chalk marks and repeat process.

Adjust rim to run true within a tolerance of 1.6 mm (1/16") maximum.

CAUTION: Any overtightening in one area of the rim will create a flat spot. It may be necessary to loosen the spokes directly opposite from the high spots to relieve the pressure.

To correct a woobling (side-to-side motion), spin the wheel and mark the rim to find the sections out of true. The out of true section is usually covered by two to five spokes. Supposing that the mark covers three spokes, the spokes on the marked side should be loosened 3/4 or 1 1/4 turns and the opposite spokes should be tightened the equal amount.

NOTE: As you move away from the high spots, in both directions, less turns are required on the spoke nipples.

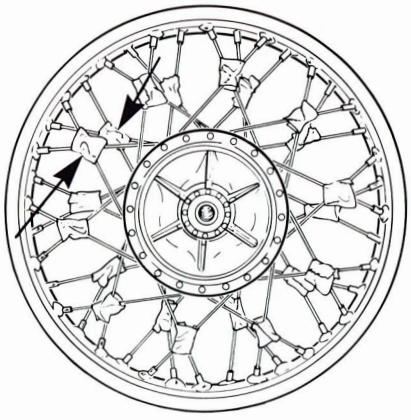
Erase chalk marks and repeat process.

Adjust rim to run within a tolerance of 1.6 mm (1/16") maximum.

LACING WHEELS

Rim replacement

Prior to the spoke nipple removal, tape spokes together at each meeting points midway between hub and rim.



Remove nipples and lift away hub and spokes.

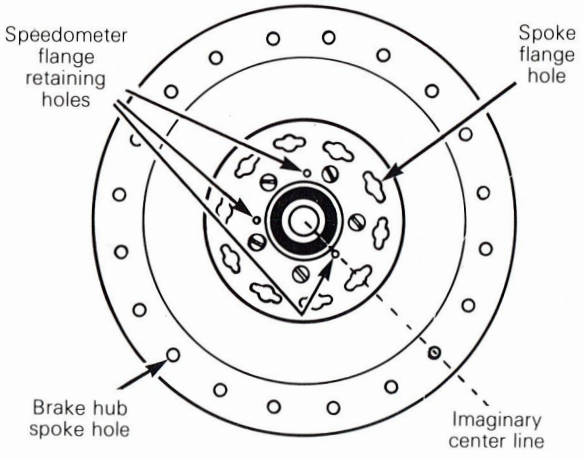
Prior to assembly, properly locate the rim, as described in hub replacement.

Reposition all the spokes and tighten. True the wheel as earlier described in truing wheel.

HUB REPLACEMENT

Front wheel

Place hub with the brake side facing downwards. On the wheel hub, three holes align perfectly together when tracing an imaginary center line. i.e. one brake hub spoke hole, one spoke flange hole and one speedometer flange retaining hole.



Position the rim to have the numbers following the letters "DOT" (stamped) facing **upwards.**

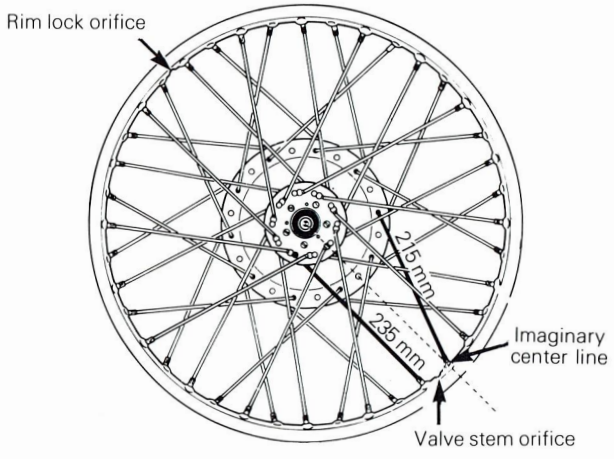
CAUTION: The rim can be laced only from one side. A difficult lacing may be the result of a rim positioned upside down.

Align the hub and the rim on an imaginary center line drawn trough the right spoke nipple hole (located nearest to the valve stem orifice) and the 3 centered holes of the hub.

Install the two first spokes, as illustrated.

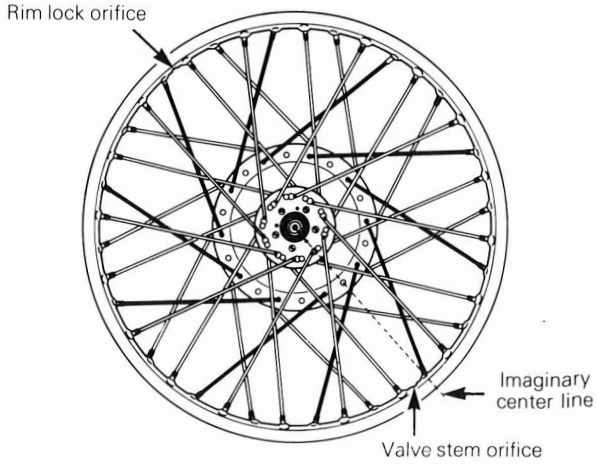
Install nipples and screw on a few turns.

STEP 1



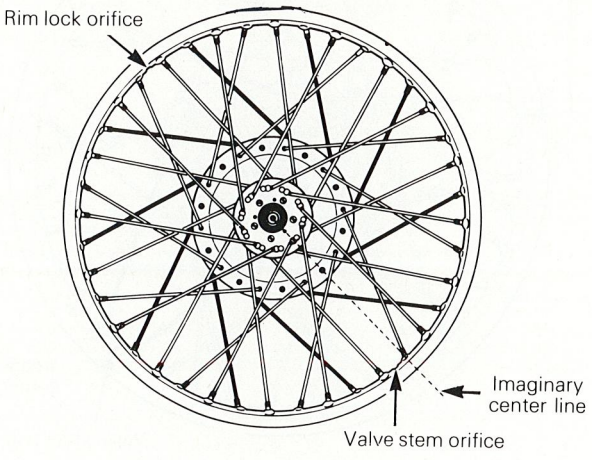
Install all the brake side spokes (215 mm, 90°) facing upwards. As illustrated. Install nipples and screw on a few turns.

STEP 2



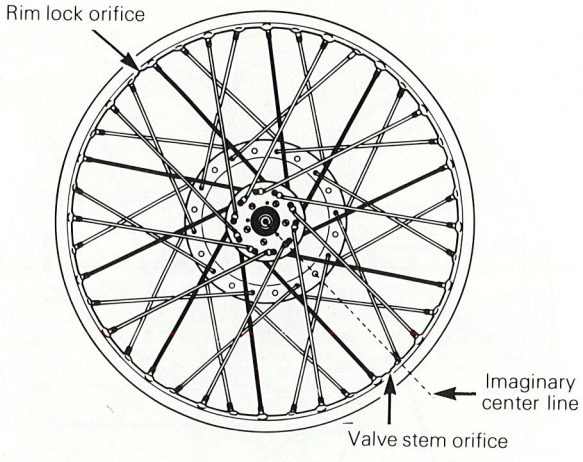
Install all the brake side spokes (215 mm, 90°) facing downwards. As illustrated. Install nipples and screw on a few turns.

STEP 3



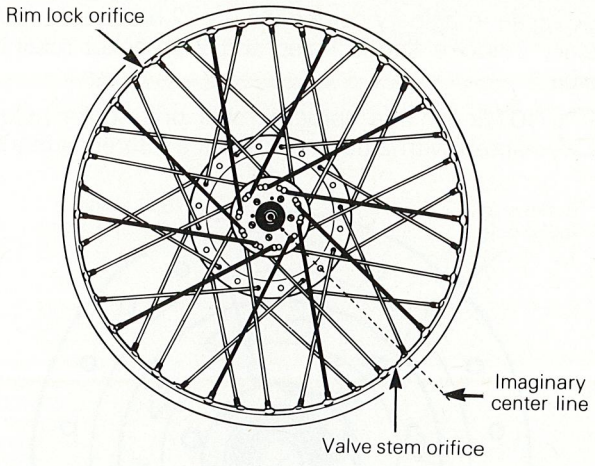
Install all the spoke flange side spokes (235 mm, 90°) facing downwards. As illustrated. Install nipples and screw on a few turns.

STEP 4



Install all the spoke flange side spokes (235 mm, 90°) facing upwards. As illustrated. Install nipples and screw on a few turns.

STEP 5



All the spokes are now loosely installed in the wheel assembly. Starting at the valve stem orifice, tighten all the spokes equally a couple of turns. After tightening, true the wheel as described in truing wheels.

Front wheel rim off-set: measured from steel spoke flange surface (around bearing area) to outer edge of rim: 7.9 mm (5/16").

After wheel is put into service, the following maintenance schedule is suggested to keep rim true and spokes properly torqued.

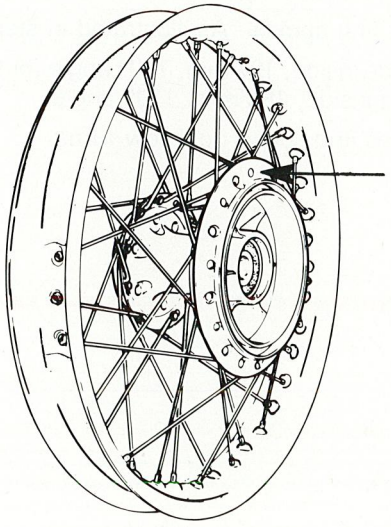
After first 5 hours;

Before each race meet or off-road ride;

As required, depending on riding conditions.

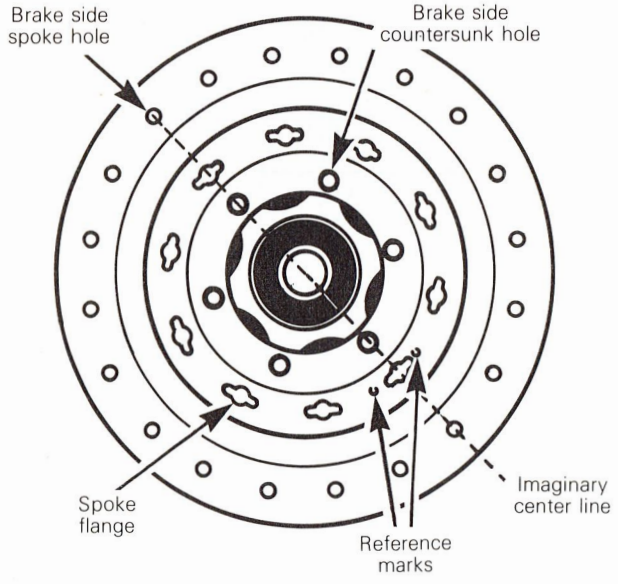
CAUTION: Loose spokes will cause rim and/or hub damage.

Rear wheel (spokes mounted on the inside of the hub, brake side).



Place hub with the brake side facing downwards. On the wheel hub 6 holes align perfectly together when tracing an imaginary center line, i.e. 2 brake side spoke holes, 2 spoke flange holes and 2 sprocket retaining holes.

NOTE: On the sprocket side one spoke hole is marked with 2 dots, to use as a reference mark.



Position the rim in order to have the numbers following the letters "DOT" (stamped) facing **upwards.**

CAUTION: The rim can be laced only from one side. A difficult lacing may be the result of a rim positioned upside down.

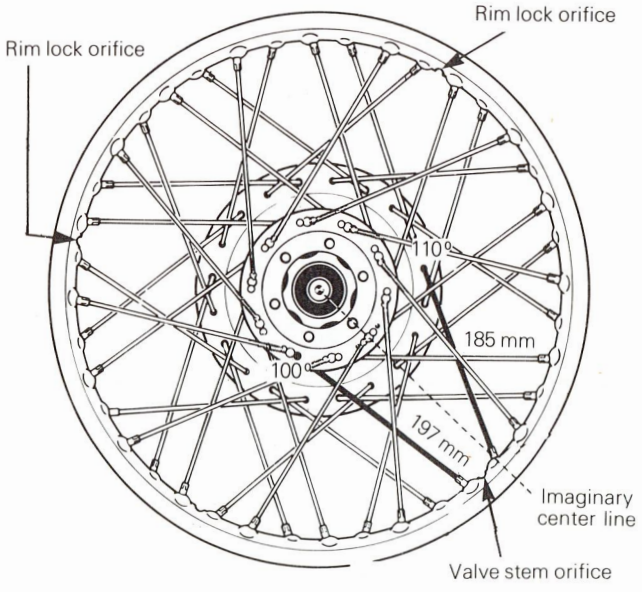
Align the hub and the rim on an imaginary center line drawn trough the right spoke nipple hole located nearest to the right hand side of the valve stem orifice and the spoke flange reference mark (1 dot stamped on each side of a spoke hole).

Install the 2 first spokes. As illustrated in step 1.

One right side inside, 197 mm, 100° angle (butted). And one left side inside, 185 mm, 110° angle.

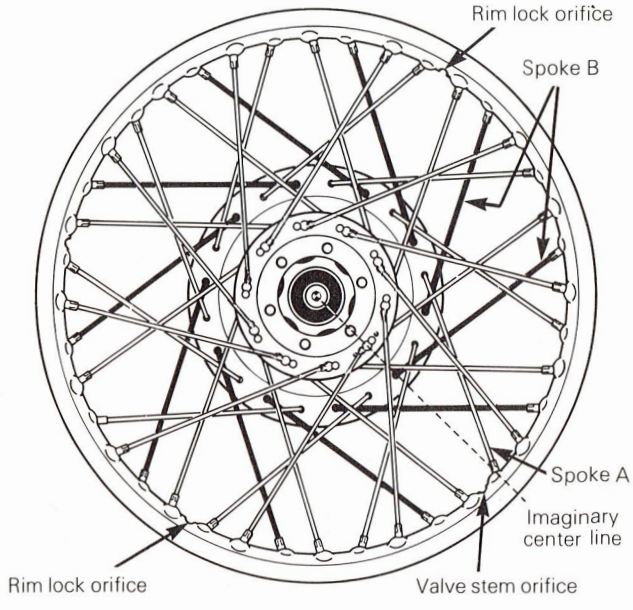
Install nipples and screw on a few turns.

STEP 1



Install all 10 brake side spokes (185 mm, left side inside, 110°) facing upwards into the inside of the hub **countersunk** holes. As illustrated in step 2. Install nipples and screw on a few turns.

STEP 2

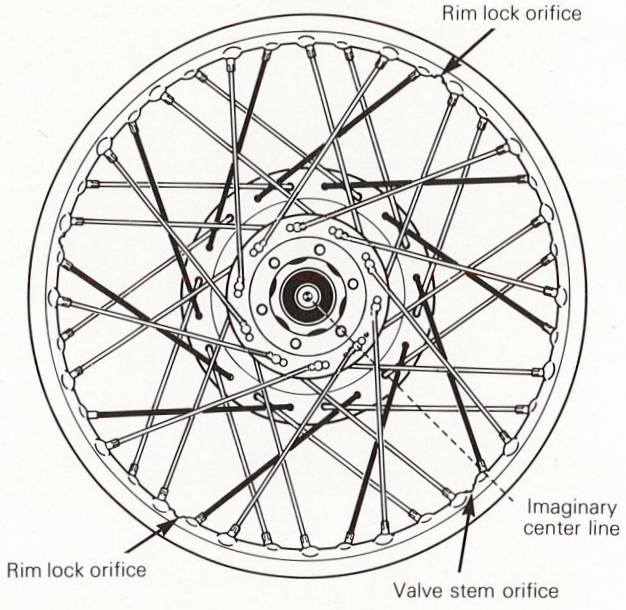


NOTE: In order to install all the spokes in step 2, it is necessary to remove the spoke (A) (185 mm facing upwards brake side) that was used to start the lacing of the wheel in step 1. This will route the spokes (B) properly.

Install all 10 brake side spokes (185 mm, left side inside, 110°) facing upwards into the inside of the hub **non-countersunk holes.** As illustrated in step 3. Install nipples and screw on a few turns.

NOTE: The spokes installed on step 3 must overlap the ones previously fitted in step 2.

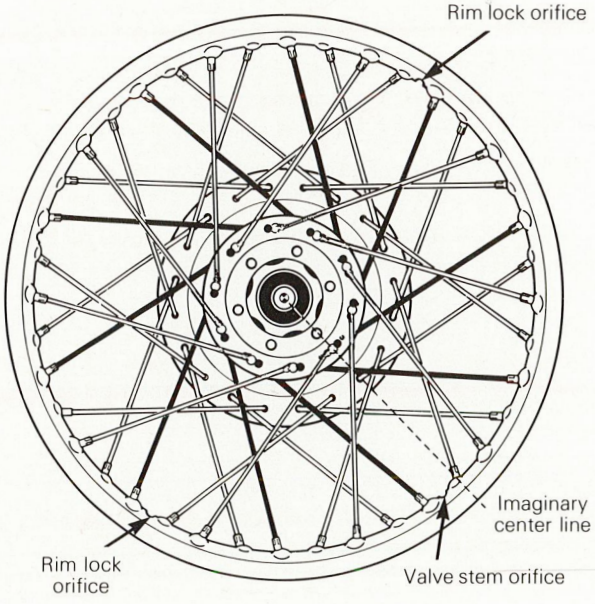
STEP 3



Install all 10 sprocket side spokes (right side inside, 197 mm, 100°) butted, facing downward. As illustrated in step 4.

Install nipples and screw on a few turns.

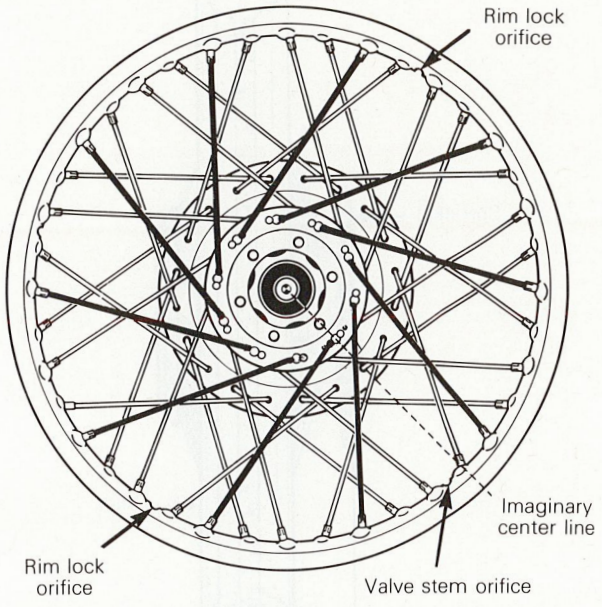
STEP 4



Install all 10 sprocket side spokes (right side outside, 197 mm, 90°) facing upward. As illustrated in step 5.

Install nipples and screw on a few turns.

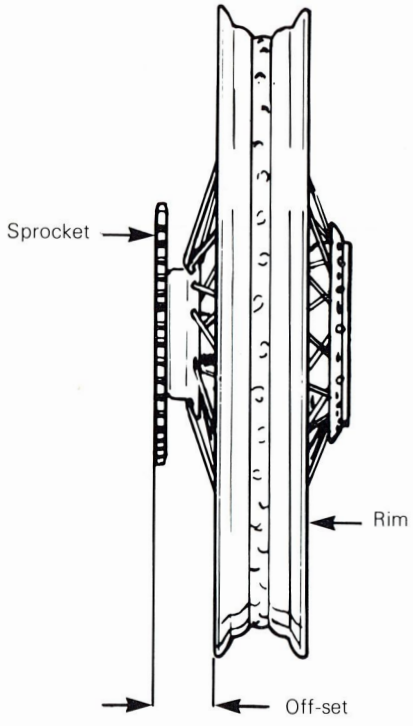
STEP 5



All the spokes are now loosely installed in the wheel assembly. Starting at the valve orifice, tighten all the spokes equally a couple of turns. After tightening, true the wheel as earlier described in truing wheels.

Rear wheel rim off-set: measure from sprocket outer edge to rim outer edge.

125: 53.1 mm (2 3/32")
250/370: 43.6 mm (1 23/32")



After wheel is put into service, the following maintenance schedule is suggested to keep rim true and spokes properly torqued:

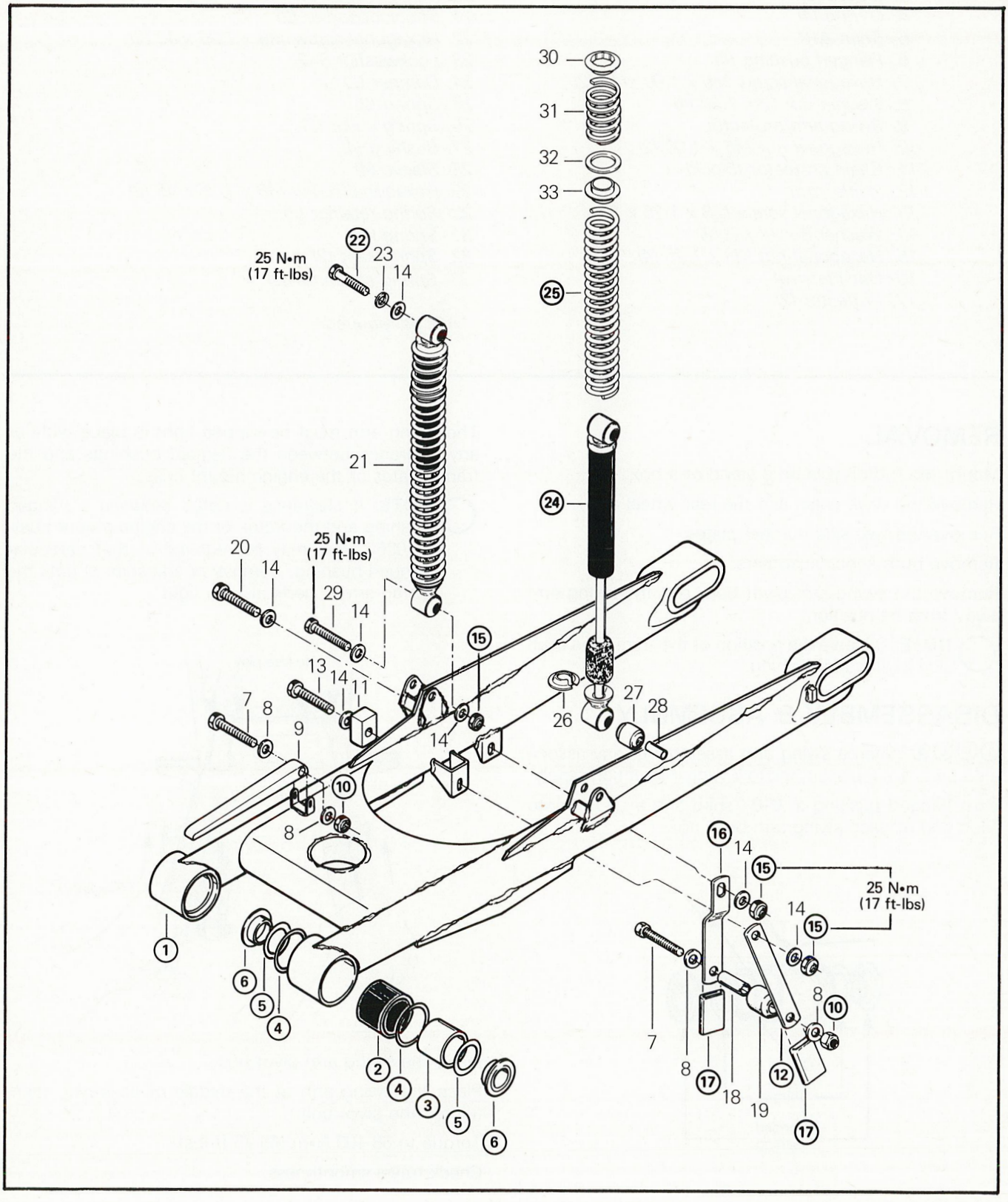
After first 5 hours;

Before each race meet or offroad ride;

As required, depending on riding conditions.

CAUTION: Loose spokes will cause rim and/or hub damage.

SWING ARM


30
31
32
33
22
25 N•m
(17 ft-lbs)
23
14
25
21
24
20
14
25 N•m
(17 ft-lbs)
29
14
15
13
14
11
7
8
9
10
8
14
26
27
28
16
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25 N•m
(17 ft-lbs)
14
15
8
10
12
17
18
19
17
7
8
1
6
5
4
2
4
3
5
6

1. *Swing arm*
2. *Bushing (2)*
3. *Sleeve (2)*
4. *O' ring (4)*
5. *Shim AR**
6. *Flanged bushing (4)*
7. *Hexagonal screw M6 x 1.00 x 45 (2)*
8. *Washer 6 x 12 x 1.50 (4)*
9. *Swing arm protector*
10. *Hexagonal nut M6 x 1.00 (2)*
11. *Chain protector (block)*
12. *Inside strut*
13. *Hexagonal screw M8 x 1.25 x 30*
14. *Washer 8 x 17 x 2 (9)*
15. *Hexagonal nut M8 x 1.25 (4)*
16. *Outside strut*
17. *Protector (2)*
18. *Spacer*
19. *Roller*
20. *Hexagonal screw M8 x 1.25 x 16*
21. *Shock absorber (2)*
22. *Hexagonal screw M8 x 1.25 x 40 (2)*
23. *Lockwasher 8 (2)*
24. *Damper (2)*
25. *Spring (2)*
26. *Spring collar (2)*
27. *Bushing (4)*
28. *Sleeve (4)*
29. *Hexagonal screw M8 x 1.25 x 45 (2)*
30. *Spring retainer (2)*
31. *Spring (2)*
32. *Spring seat (2)*
33. *Spring separator (2)*

**AR: as required*

REMOVAL

Mount the motorcycle on a stand or a box.

Remove the drive chain and the rear wheel ass'y.

Remove the two side number plates.

Remove both shock absorbers.

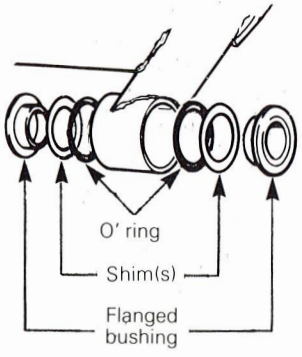
Remove the swing arm pivot bolt, pull the swing arm away from its position.

NOTE: Observe the position of the shim/s on each side of flanged bushing.

DISASSEMBLY & ASSEMBLY

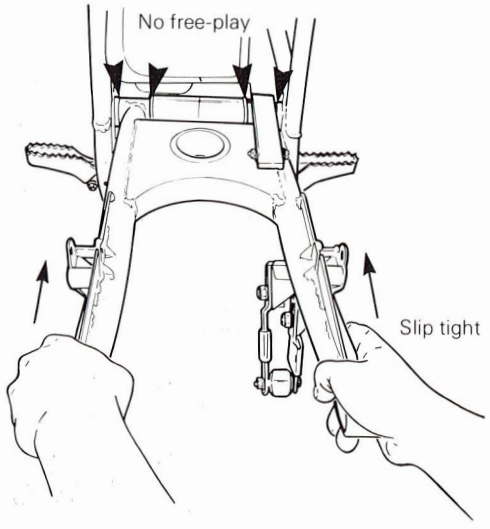
①④⑤⑥ When a swing arm assembly or any associated parts are replaced, the following instructions apply:

Fit a flanged bushing a .018" shim and a O' ring into each end of each swing arm bushing.



The swing arm must be slipped tight in place without any clearance between the flanged bushings and the frame plates or the engine mount boss.

NOTE: If clearance is noted between a flanged bushing and the frame or the engine mount boss, a .036" shim may be required at that particular flanged bushing. Remove or add shim(s) until the swing arm is perfectly slip tight.



Insert the swing arm pivot bolt.

Place the swing arm at the middle of its travel, then tighten the pivot bolt.

Torque to 88-100 N•m (65-75 ft-lbs).

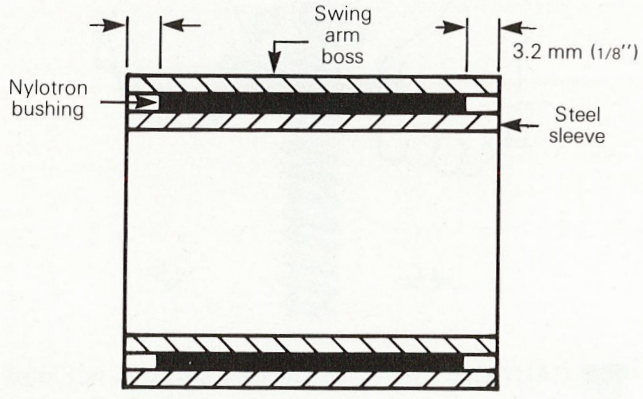
Check travel smoothness.

②③ To replace the bushing or the sleeve, proceed as follows:

Using the proper diameter adaptor (ex: socket) press the inner steel sleeve out of the swing arm.

Using another adaptor (slightly bigger) press the bushing out of the swing arm.

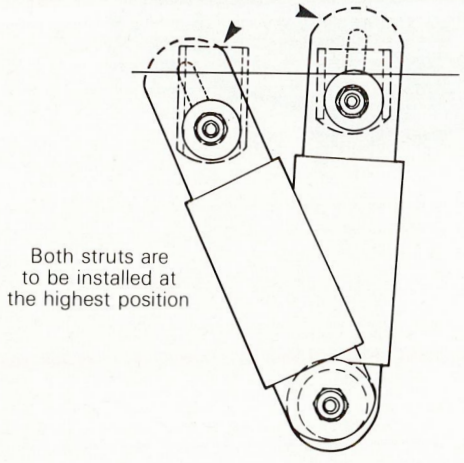
Inverse procedure for assembly and ensure that the inner steel sleeve protrudes equally on both sides of the swing arm boss and that the bushing is well centered in the swing arm boss.



CAUTION: The bushings are maintenance free but the pivot bolt must be tight or sleeve damage will occur.

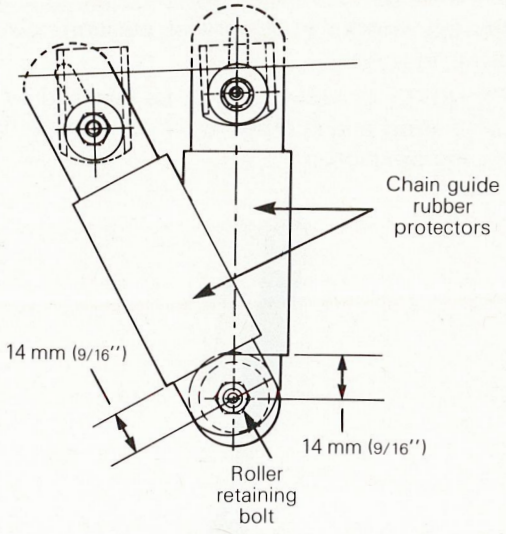
⑩ At assembly, torque to 7-8 N•m (5-6 ft-lbs).

⑫⑯ At assembly, always ensure that the chain guide struts are installed at their highest point. This will partially take up the chain slack.



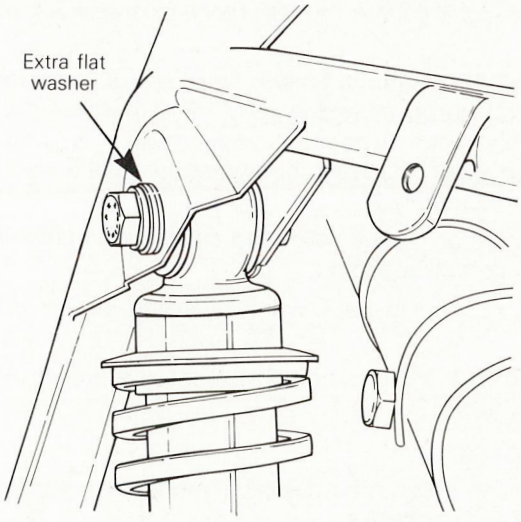
⑮ At assembly, torque to 20-27 N•m (15-20 ft-lbs).

⑰ At assembly, position the lower edge of the chain guide rubber protectors at 14 mm (9/16") distance from the center of the roller retaining bolt.



㉒ At assembly, torque to 20-27 N•m (15-20 ft-lbs).

NOTE: (L.H. side only). It is recommended to add an extra flat washer at the upper retaining screw, to provide better clearance between exhaust pipe and upper screw.

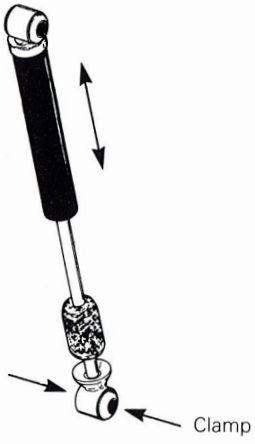


㉔ Proceed as follows to test the shock absorber damping condition.

Remove both shocks from motorcycle, and remove the shock springs.

With the shocks in a vertical position, clamp lower mounts in a vise.

NOTE: The shocks must be checked by clamping the **rod end** in order to partially create the operating position.



CAUTION: Do not clamp the shock body in the vise.

Compress and extend each shock by hand at various speeds and compare the resistance of one shock to the other.

NOTE: Obtain a known good shock for comparison purposes and keep in mind that the rebound resistance (retracting the shock) is normally stronger than the compression resistance. (Approximately 2:1).

Pay attention to the following conditions that will denote a defective shock:

A skip or a hang back when reversing stroke at mid-travel.

Seizing or binding condition except at extreme end of either stroke.

Oil leakage.

A gurgling noise, after completing one full compression and extension stroke.

Occasionaly an air void may develop in the pressure chamber of a shock. To bleed this air from the pressure chamber:

Hold shock in normal vertical position (top end up) then fully extend shock.

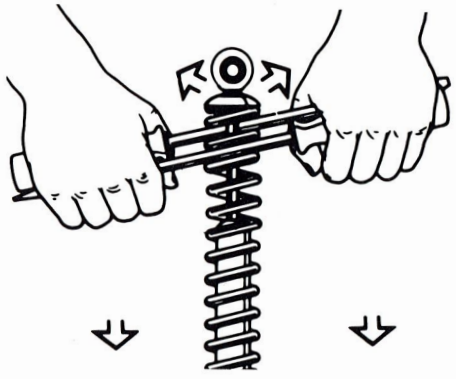
Turn the shock upside down and fully depress shock.

Repeat this procedure five (5) to six (6) times to make sure the air is properly bled.

CAUTION: The minimum length of shock fully collapsed must be 24.43 cm (9.62 in.).

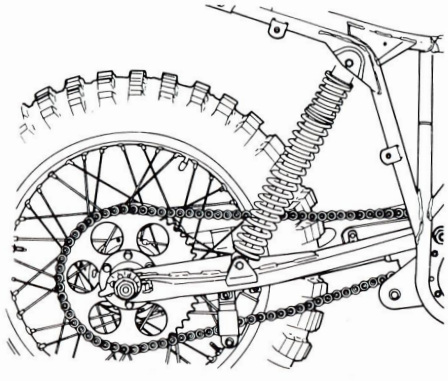
㉕ To replace the shock spring proceed as follows:

Clamp the shock absorber lower mount in a vise and press the spring down with a pair of screwdrivers as illustrated.



CAUTION: The small auxiliary spring is not interchangeable and must not be removed.

Make sure at re-assembly to position the shocks as illustrated.



SPRING RATE

Standard spring:	145 lbs purple/orange
Optional spring:	128 lbs purple/green

CLEANING AND INSPECTION

Clean all parts carefully using a general purpose solvent.

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

Check if swing arm is bent, cracked or twisted, repair or replace if necessary.

Check swing arm bushings and sleeves. If damaged, replace.

Check chain guide and nylon block. If bent, worn or cracked, repair or replace.

INSTALLATION

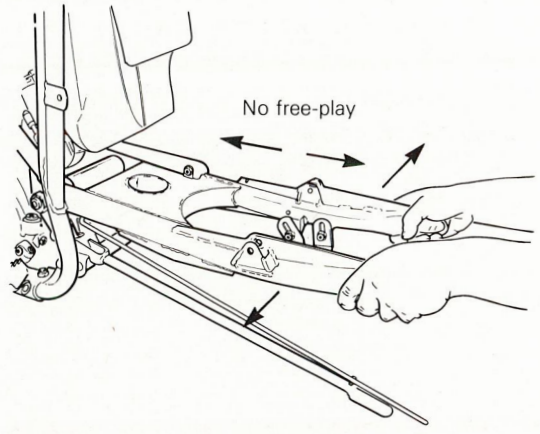
To install the swing arm on vehicle inverse removal procedure, however, pay a special attention to the following:

Install the swing arm bolt and nut, hold the swing arm in the mid-travel position and torque the nut to 88-100 N•m (65-75 ft-lbs).

Check travel smoothness before shocks installation.

MAINTENANCE

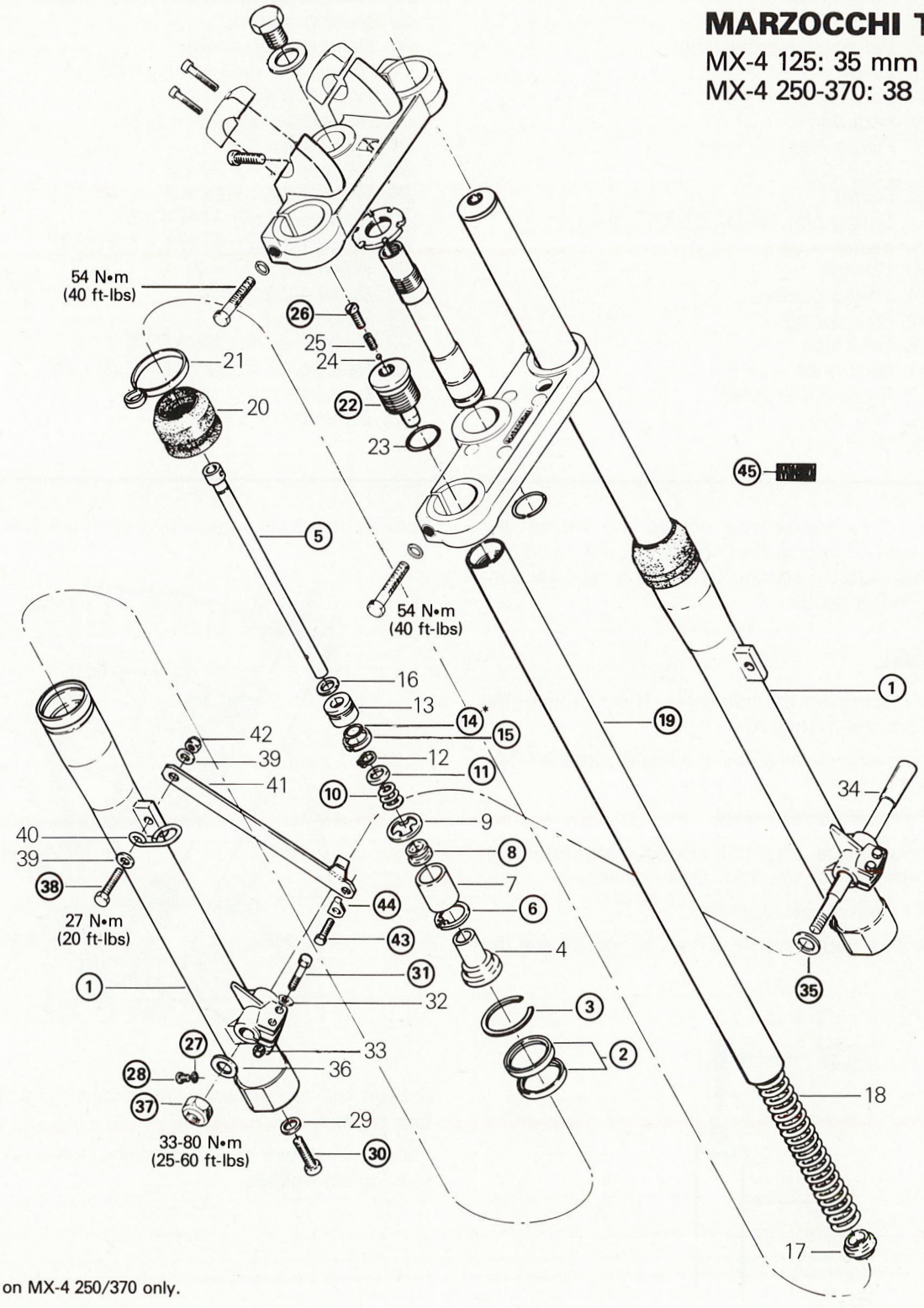
Regularly check the swing arm for any looseness and for bushing or sleeve wear.



FORKS

MARZOCCHI TYPE:

MX-4 125: 35 mm
MX-4 250-370: 38 mm



*Item 14: on MX-4 250/370 only.

1. *Fork slider*
2. *Main seal (4)*
3. *Snap ring*
4. *Bottom valve*
5. *Damper rod*
6. *Snap ring*
7. *Valve retainer bushing*
8. *Valve*
9. *Valve washer*
10. *Rebound*
11. *Piston ring*
12. *Snap ring*
13. *Piston*
14. *Spring ring (MX-4 250/370 only)*
15. *Sealing ring*
16. *Washer*
17. *Spring guide*
18. *Fork spring*
19. *Fork tube*
20. *Dust boot*
21. *Brake cable guide*
22. *Fork cap*
23. *O' ring*
24. *Check ball*
25. *Check ball spring*
26. *Machine screw, flat heat M6 x 1.00 x 10*
27. *O' ring*
28. *Drain screw pan head M6 x 1.00 x 7*
29. *Sealing washer*
30. *Damping rod screw*
31. *Hexagonal screw M6 x 1.00 x 40*
32. *Washer 6.4 x 1.5 x 14*
33. *Hexagonal nut M6 x 1.00*
34. *Front axle*
35. *Washer 17.7 x 30 x 3*
36. *Washer 17.7 x 28 x 2*
37. *Hexagonal nut M16 x 1.5*
38. *Hexagonal screw M8 x 1.25 x 30*
39. *Washer 8 x 17 x 2*
40. *Brake cable guide*
41. *Torque arm*
42. *Hexagonal nut M8 x 1.25*
43. *Hexagonal screw M8 x 1.25 x 20*
44. *Lock tab*
45. *Label MX-4 (2)*

NOTE: This sub-section covers the Marzocchi forks only, if information on the steering head are needed, refer to section 04 steering, sub-section 02 (steering head).

REMOVAL

Remove or disconnect the following. Then remove the fork legs from the motorcycle.

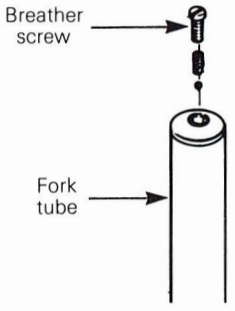
Mount the motorcycle on a box or a stand with the front wheel raised.

Remove the front number plate.

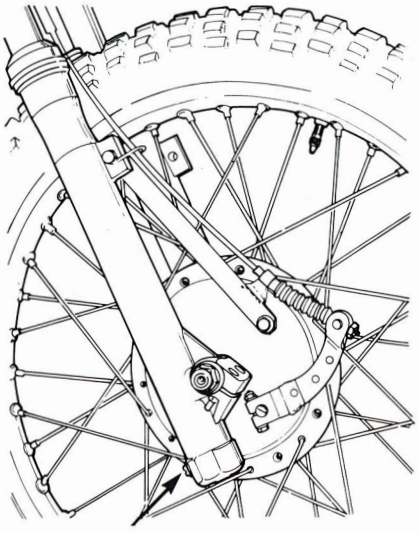
Unscrew the torque arm to backing plate retaining screw and disconnect the front brake cable.

Remove the front wheel assembly.

Loosen the fork cap breather screws to reduce the inside pressure.



Remove the drain screws and drain the fork oil.

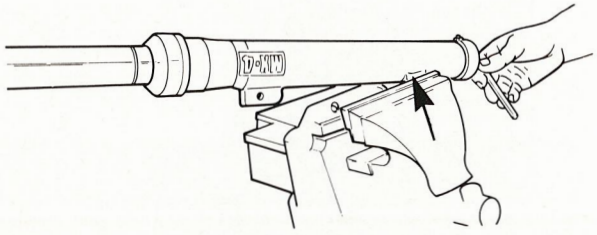

Drain screw

Loosen the top crown clamp screws and remove the fork caps.

Loosen the lower crown retaining screws and pull the fork leg assemblies.

DISASSEMBLY & ASSEMBLY

①⑤⑲㉚ To pull the fork slider apart proceed as follows: Clamp the fork slider axle boss in a vise and remove the retaining screw at bottom of fork slider.



CAUTION: Never apply the vise jaws directly onto the fork slider. Always use the axle boss or the torque arm boss as a clamping point.

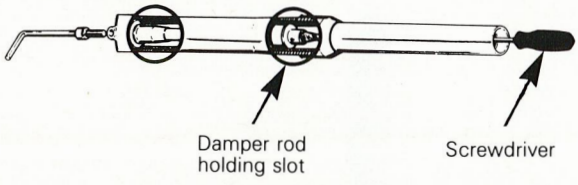
With the fork caps installed, the pressure created by the spring on the damper rod should be enough to ease the removal of the fork slider retaining screw.

However, if the fork slider retaining screw is still hard to remove, use the following procedure:

Remove the fork cap.

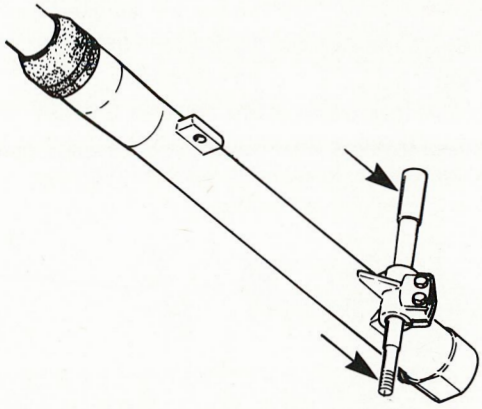
Remove the fork spring.

Using an appropriate screwdriver, hold the damper rod, then remove retaining screw at bottom of fork slider.



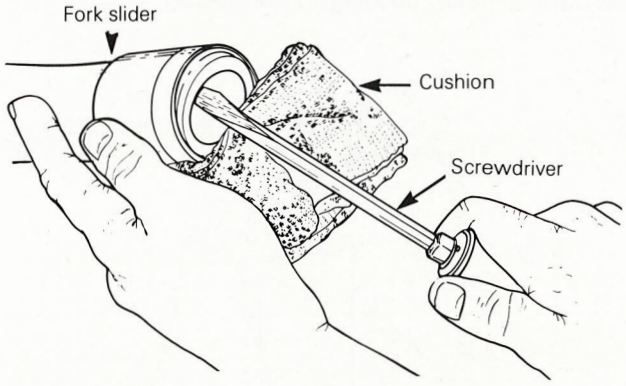
CAUTION: This procedure must be done with great care, making sure that the screwdriver doesn't make any damage.
Never insert any jamming device into oil drain orifice or slider may be damaged.

NOTE: To ease the damper removal it is possible to insert the axle into the slider and to strike it downwards using a soft faced hammer.



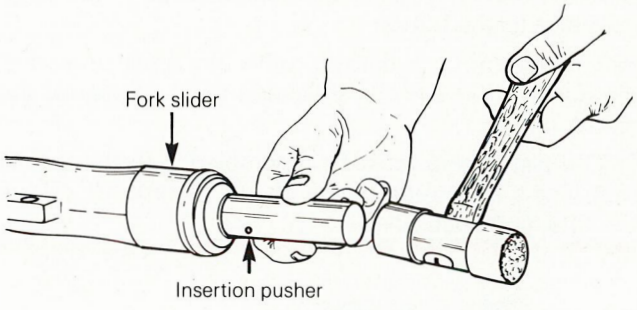
At assembly, inverse the procedure and torque the retaining screw to 20 N•m (15 ft-lbs).

②③ To remove the fork seals, remove the snap ring with a screwdriver, and pry the seals out as illustrated.



CAUTION: Use an appropriate cushion between the screwdriver blade and the fork slider top portion when prying seals out. Take care not to scratch or damage inside of fork slider.

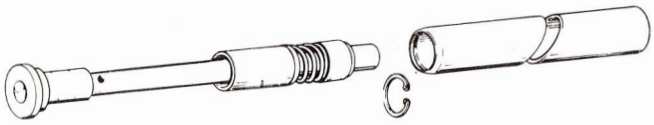
To install new seals use the appropriate oil seal insertion pusher. Apply a light coat of lithium grease or oil on the seal lip.



NOTE: If an insertion pusher is not available, it is possible to use an appropriate sized socket, which may be found in any socket wrench kit.

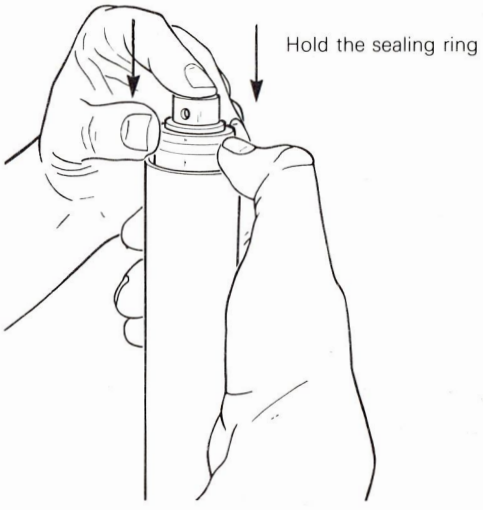
⑤⑥⑲㉒ To remove the damper rod assembly proceed as follows:

Remove the fork slider, then remove the fork cap and fork spring. Remove the large circlip from the bottom of the fork tube and pull on the damper rod.



▼ **CAUTION: At the assembly, ensure that the circlip is not deformed, and that the damper rod is properly centered in the valve retaining bushing.**

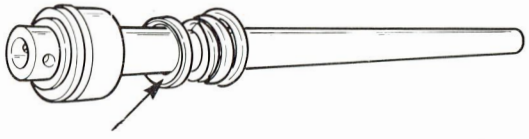
At assembly, insert the damping rod through the top of the fork tube then install the bottom valve, snap ring and valve retainer bushing to the bottom.



⑧ At assembly, position as illustrated with the large diameter to the bottom.

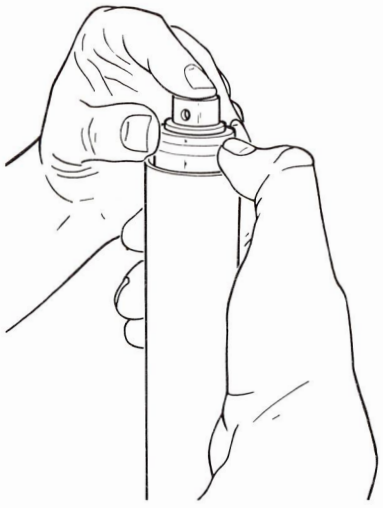
⑩ The rebound is a **tight fit** onto the upper portion of the damper rod and the small end must sit against the piston ring.

⑪ The piston ring must be assembled with the hollow side facing the inside of the piston, in order to relieve the retaining snap ring.

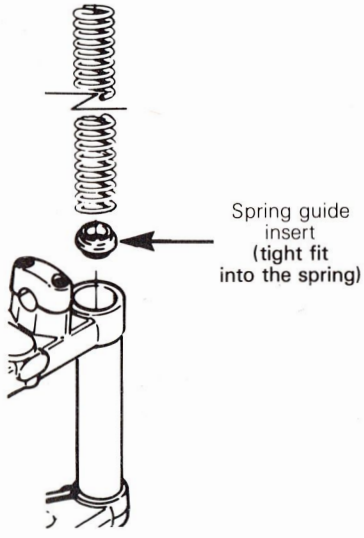


⑭ MX-4 250/370 only. At assembly place the spring ring under the sealing ring

▼ **⑮ CAUTION: At the assembly of the damper rod, be careful when inserting the piston into the fork tube, damage to the sealing ring could occur.**



▼ **CAUTION: At the assembly, always ensure that the spring guide insert is installed on the bottom of the spring. Damage to the damper rod piston could occur, if not installed. The spring guide is a tight fit into the spring.**



㉒ For assembly and disassembly, ensure to use the proper hexagonal tool (12 mm).

㉖ The breather screw must always be slackened prior to the draining of the fork oil in order to cancel any pressure build-up inside the fork.

㉗ At disassembly, take care not to loose the O' ring.

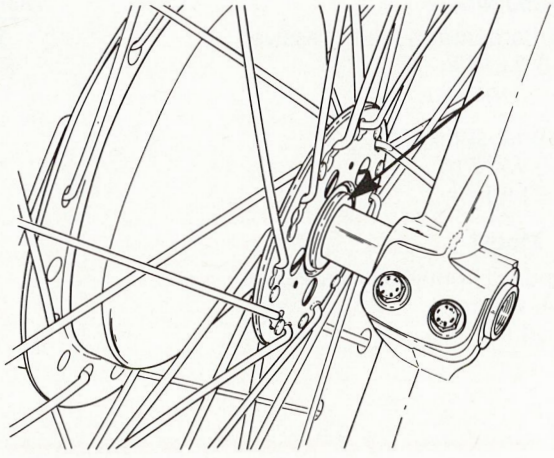
◆ **㉘ WARNING: Always release the inside fork oil pressure, prior to the fork draining by slackening the fork cap breather screws, this will prevent the oil from coming out of the fork under pressure.**

㉚ At assembly, torque the retaining screw to 20 N•m (15 ft-lbs).

▼ **㉛ CAUTION: To ensure correct fork action, briskly compress forks (with brake applied) to align fork legs before tightening axle pinch bolts.**

Torque axle pinch bolt to 8-10 N•m (6-8 ft-lbs).

㉟ The washer (spacer) must always be placed between front wheel and clutch side fork leg.

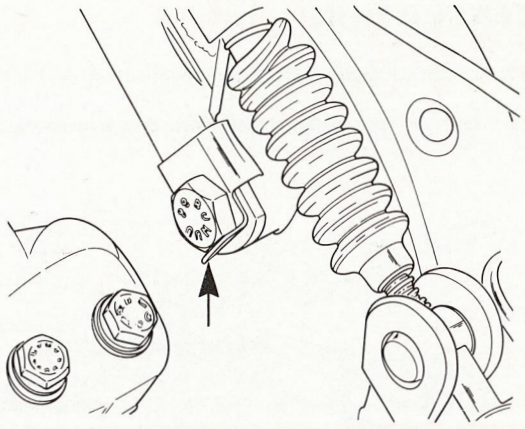


㊲ At assembly, spin front wheel in forward rotation, apply brake and while holding brake on, torque the axle nut to 33-80 N•m (25-60 ft-lbs).

㊳ ㊸ At assembly, torque to 20-27 N•m (15-20 ft-lbs).

㊹ At assembly, it is of the utmost importance that the lock tab be correctly placed and secured.

Torque to 20-27 N•m (15-20 ft-lbs).



◆ **WARNING: Bend lock tab against flat face of retaining bolt and always replace by a new one each time parts are disassembled.**

㊺ At assembly, position the decal on the fork slider, at 5.5 cm (2 1/4") from the rubber boot.

CLEANING AND INSPECTION

Clean all parts carefully with a general purpose solvent.

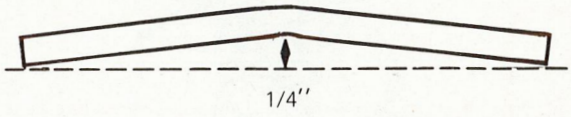
◆ **WARNING: Solvent with a low flash point such as gasoline, naphtha, benzol, etc. should not be used as each is flammable and explosive.**

Inspect all parts for damage, excessive wear or dents, replace if necessary.

Inspect the fork seals, replace if worn excessively or damaged.

Check if fork tubes are bent.

▼ **CAUTION: Tubes bent more than 1/4" must be replaced.**



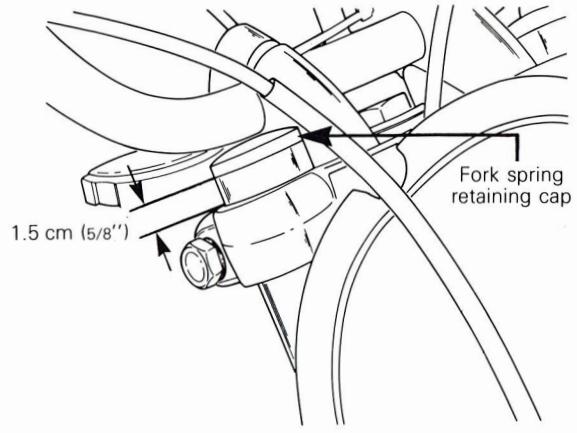
Check if the fork springs are broken, sagged, or worn.

▼ **CAUTION: If the fork springs need replacing, both springs should be replaced.**

Inspect dust boots, if damaged replace.

INSTALLATION

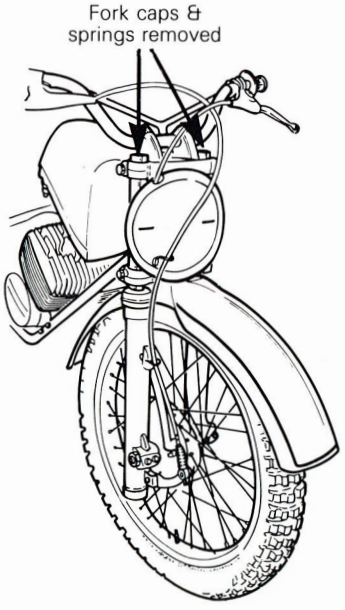
Slide both fork leg assemblies in position and adjust the fork tubes with 1.5 cm (5/8") protruding over the upper crown, tighten the lower fork crown clamp screws.



○ **NOTE:** On the 370 model, it may be necessary to set the fork tubes in order to have them protruding 13 mm (1/2") over the top crown to give enough clearance between the front fender and the front wheel.

To obtain a very accurate fork tube adjustment, proceed as follows:

Remove the fork spring retaining cap and fork springs. Fully compress the front suspension and check if there is clearance between the front fender and the front wheel.



To set, loosen the top and bottom crown clamp screws, afterwards, retorque to 47-54 N•m (35-40 ft-lbs).

Install the front number plate.

Remove the fork caps and add the recommended amount of fork oil.

Install the fork springs and fork caps.

○ **NOTE:** Ensure that the fork cap breather screws are tightened.

Install the front wheel assembly and secure the torque arm in place. Torque the retaining bolts to 20-27 N•m (15-20 ft-lbs).

◆ **WARNING: Bend the lock tab against flat face of retaining bolt.**

FORK SPRINGS

Spring rate

To change the spring rate, it is necessary to change the fork springs.

	Marked
370-250 Model:	
Standard spring: (progressive) 3.5-5.3 kN/m (20-30 lbF/in.)	white
Optional spring: 3.8-5.7 kN/m (22-33 lbF/in.)	blue

125 Model

Standard spring: (progressive)
3.8-5 kN/m
(21-29 lbF/in.)

FORK OIL

Oil change

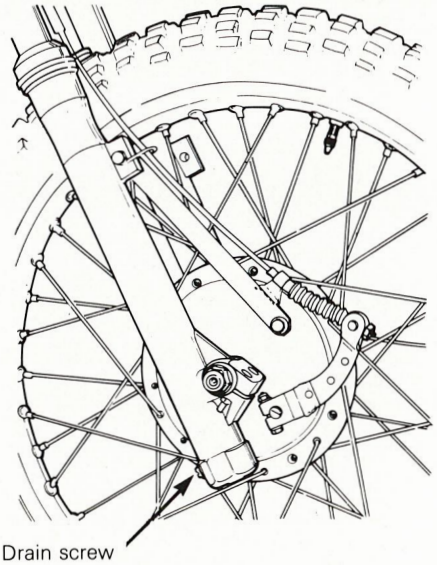
NOTE: This operation should be performed one leg at a time.

To change the fork oil, slacken the fork cap breather screw to reduce the inside pressure and remove the fork cap.

CAUTION: Use the proper hexagonal tool (12 mm) to remove the fork cap.

Place a drain pan underneath the fork leg and remove the drain screw from the bottom side of the fork slider.

Bounce the forks (hold brake on) a few times to insure complete draining of all the oil.



Drain screw

Reinstall drain screw and O' ring, add the recommended amount of fork oil.

Quantity:
125: 265 mL (9.3 fl. oz.)
250/370: 365 mL (12.8 fl. oz.)

Suggested grade: SAE 10

Reinstall the fork spring retaining cap ensuring that the breather screws are tightened.

Torque the fork cap to 40-54 N•m (30-40 ft-lbs) and the top crown retaining screws to 40-54 N•m (30-40 ft-lbs).

Oil level

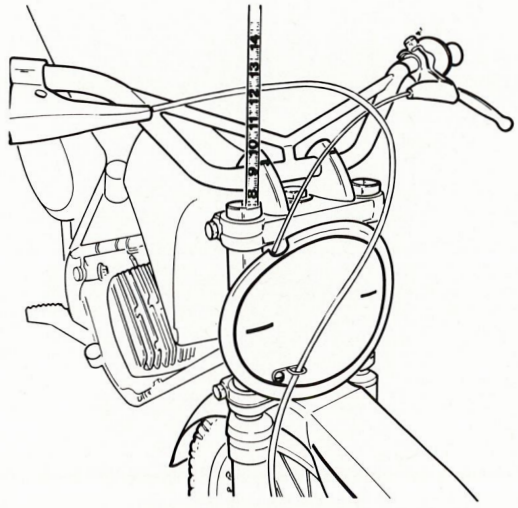
It is possible to check the amount of oil in the forks, by checking the oil level from the top of the fork tube.

To check, proceed as follows:

Remove the fork caps and fork springs, fully compress the front fork and check using a measuring tape, the distance from top of tube to the oil surface. It should be:

- on 250/370 (with 365 mL (12.8 fl. oz.) 19.6 cm (7 3/4")
- on 125 (with 265 mL (9.3 fl. oz.) 21.3 cm (8 3/8")

NOTE: While removing the fork springs, allow sufficient time for the fork oil to drip from the spring. This procedure must be used as a guideline only; to obtain the exact amount of oil it is recommended to pre-measure the quantity with a measuring cup.

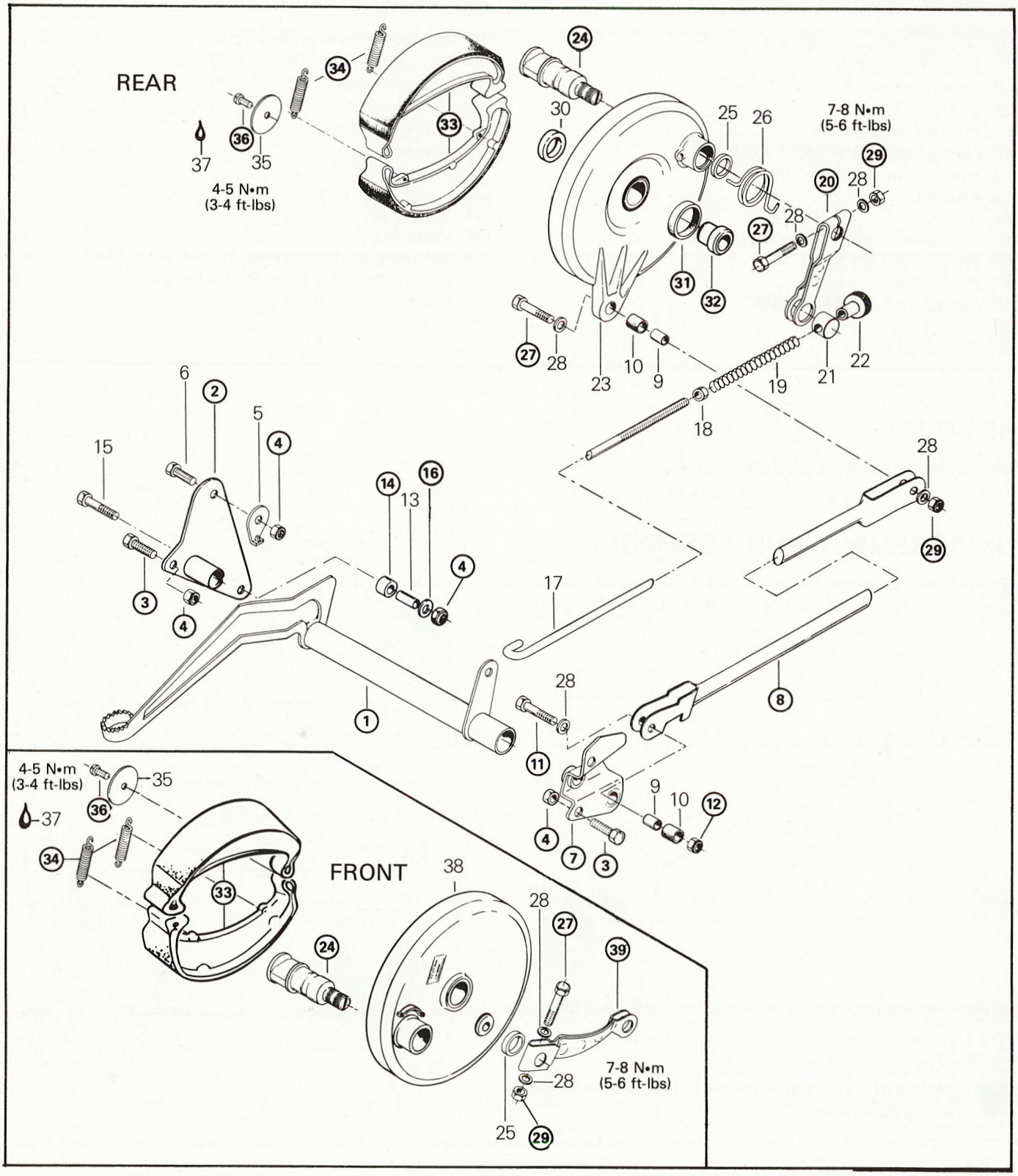


Afterwards, reinstall the fork springs and the caps.

FRONT FORK ALIGNMENT

To correct any misalignment, loosen the screws on each side of the top and lower triple clamps, hold the front wheel tightly between your legs and twist the handlebar right or left as necessary. Tighten the screws and test ride for result.

BRAKE



1. *Brake pedal*
2. *Pivot mount R.H.*
3. *Hexagonal screw M8 x 1.25 x 20 (2)*
4. *Hexagonal nut M8 x 1.25 (4)*
5. *Stop adjuster*
6. *Hexagonal screw M8 x 1.25 x 16*
7. *Pivot mount L.H.*
8. *Torque arm*
9. *Bushing (2)*
10. *Rubber cushion (2)*
11. *Hexagonal screw M6 x 1.00 x 30*
12. *Hexagonal nut M6 x 1.00*
13. *Bushing*
14. *Roller*
15. *Hexagonal screw M8 x 1.25 x 60*
16. *Washer 8 x 25 x 1.5*
17. *Brake rod*
18. *Hexagonal nut M6 x 1.00*
19. *Spring*
20. *Rear brake arm*
21. *Barrel*
22. *Adjuster nut*
23. *Rear backing plate (magnesium)*
24. *Cam (2)*
25. *Felt seal (2)*
26. *Rear brake arm spring*
27. *Hexagonal screw M6 x 1.00 x 35 (3)*
28. *Washer 6 mm x 12 x 1.5 (7)*
29. *Hexagonal nut M6 x 1.00 (3)*
30. *Backing plate spacer*
31. *Rubber seal*
32. *Spacer L.H.*
33. *Brake shoe (set) (2)*
34. *Spring (4)*
35. *Washer (2)*
36. *Slotted pan head screw M5 x 0.80 x 10 (2)*
37. *Loctite no. 271, blue (high strength)*
38. *Front backing plate*
39. *Front brake arm*

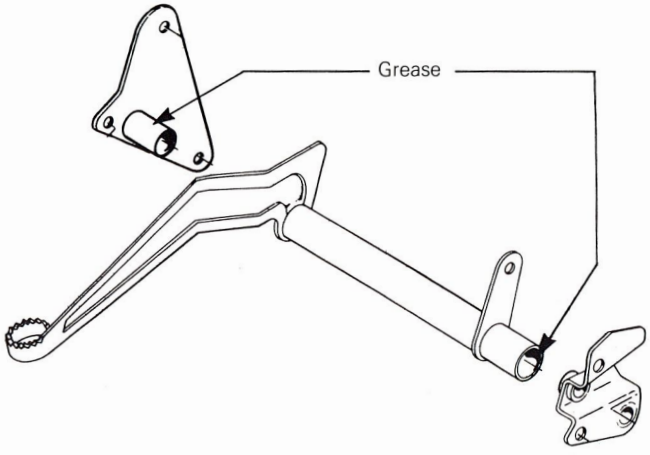
REMOVAL

Mount the motorcycle on a stand or a box.

Disconnect the brake cable/rod and remove the wheel.

DISASSEMBLY AND ASSEMBLY

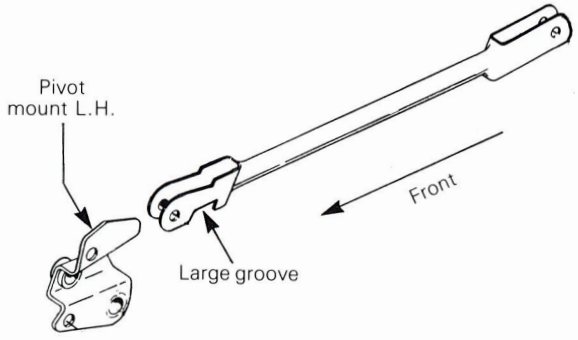
①②⑦At assembly, ensure that the brake pedal rotates freely on the pivot mounts. Lubricate with grease.



③④At assembly, torque to 20-27 N•m (15-20 ft-lbs).

⑧At assembly, ensure to assemble the torque arm grooved portion to the pivot mount.

CAUTION: The large grooved portion must be facing downwards.

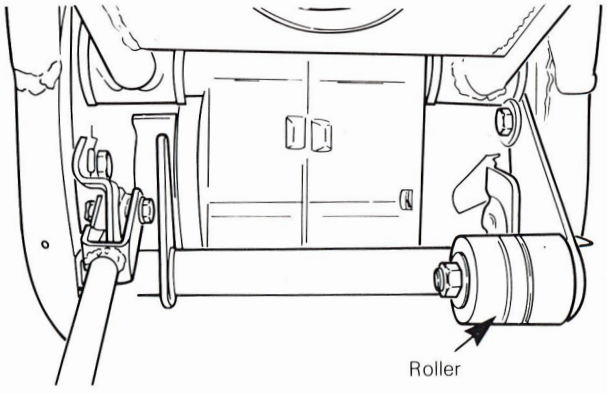


⑪⑫At assembly, torque to 7-8 N•m (5-6 ft-lbs).

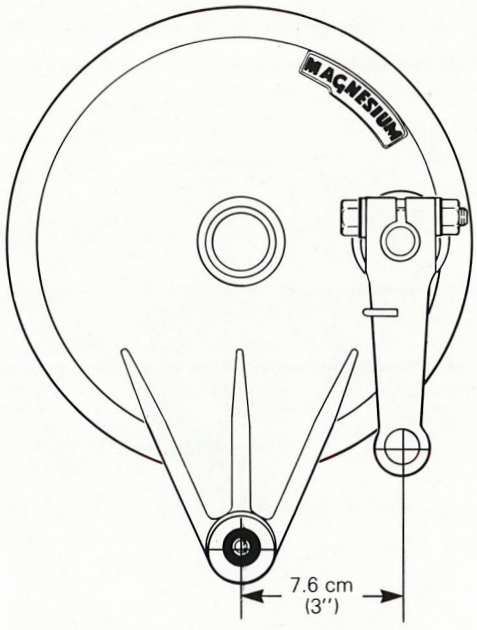
⑭⑯Inspect the roller and replace if excessive wear is noticed.

At assembly, ensure that the roller turns freely.

Torque to 20-27 N•m (15-20 ft-lbs).



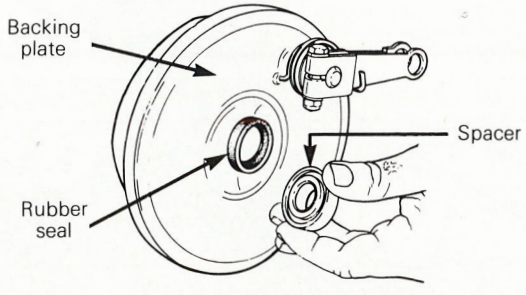
⑳ At assembly, position the rear arm at 7.6 cm ± 0.9 (3" ± 3/8") away from the torque arm retaining hole.



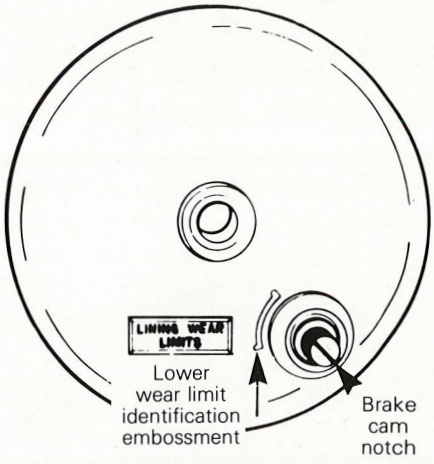
㉔ At assembly, apply a light coat of lithium grease.

㉗ ㉙ At assembly, torque to 7-8 N•m (5-6 ft-lbs).

㉛ ㉜ At assembly, ensure that the rubber seal is properly inserted between the spacer and the backing plate.

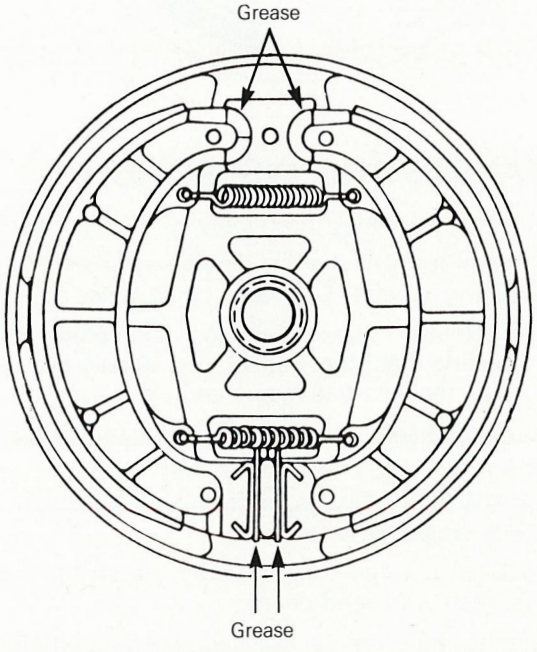


◆ ㉝ **WARNING: When the front brake cam notch comes in line with the lower wear limit identification embossment, the brake linings must be replaced or impaired braking may occur.**



◆ **WARNING: When the rear brake adjuster nut has reached its maximum adjustment, the brake linings must be replaced or impaired braking may occur.**

At assembly, **slightly** grease the brake shoe pivots.

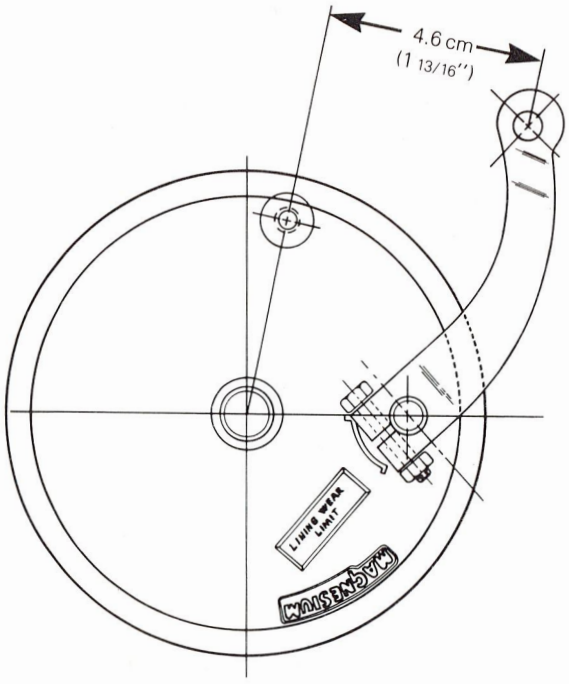


◆ **WARNING: Do not allow any grease to reach the brake linings and/or the brake drum or impaired braking will occur.**

㉞ It is recommended to replace the brake shoe springs everytime new brake shoes are fitted.

㊱ At assembly, apply Loctite no. 242 (medium strength) on screw threads and torque to 4-5 N•m (3-4 ft-lbs).

(39) At assembly, position the front brake arm at 4.6 cm ± 0.6 (1 13/16'' ± 1/4) from the torque arm retaining hole.



CLEANING AND INSPECTION

Clean the brake shoes thoroughly with soapy water.

Clean the brake plate, cam and pedal components using a degreasing solvent. Dry using compressed air.

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

Reclean brake shoes and brake hub friction surface using lacquer thinner or acetone to remove any oil film.

◆ **WARNING: Always perform this procedure in a well ventilated area.**

◯ **NOTE:** If wheel hub is rusted, polish the friction surface with sand paper.

Inspect the wheel hub for cracking, scoring, pitting, out of round, etc. If damaged, replace.

Inspect wheel bearings (See wheel bearing removal).

Inspect the lining condition. Replace if the lining is grease or oil soaked, or if lining is badly grooved.

◯ **NOTE:** If lining surface has a baked finish, rub it off using a fine sand paper.

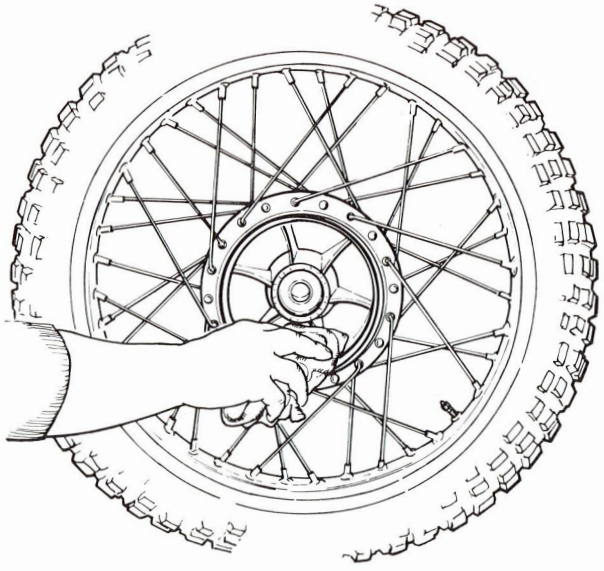
Inspect backing plate casting, cam shaft and brake arm splines. Replace if damaged.

Inspect the torque arm bushings. If worn or damaged, replace.

INSTALLATION AND ADJUSTMENT

Front wheel

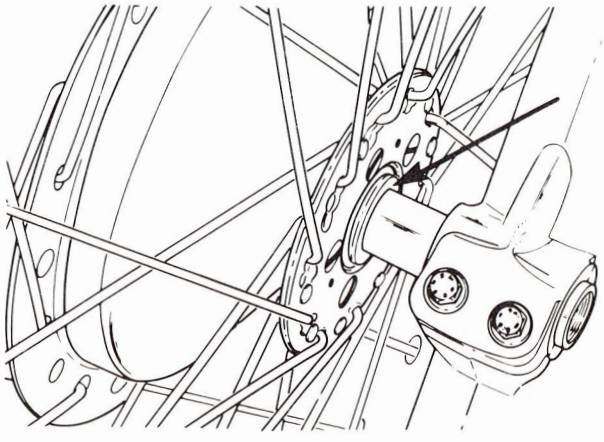
Carefully clean the brake shoe linings and the brake drum using a dry cloth.



Position the brake plate.

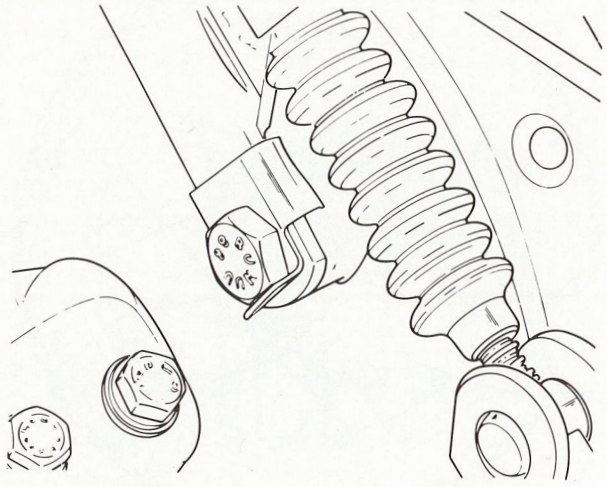
Position the wheel and insert the axle from the clutch side. Slightly tighten the axle nut.

◯ **NOTE:** Ensure the wheel spacer is installed between the fork leg (clutch side) and the wheel.



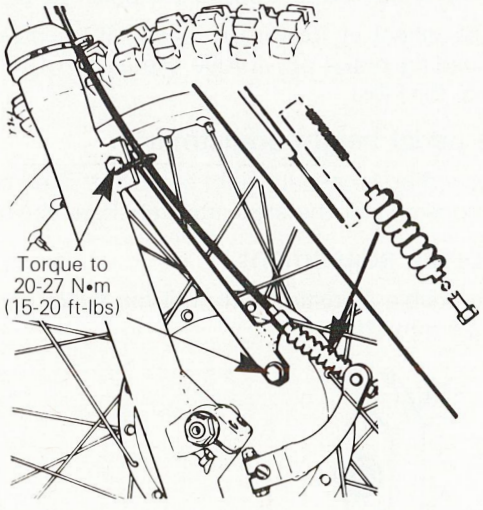
The torque arm is secured to the backing plate with a retaining bolt. It is of the utmost importance that the tab lock be correctly placed and secured.

Torque to 20-27 N•m (15-20 ft-lbs).

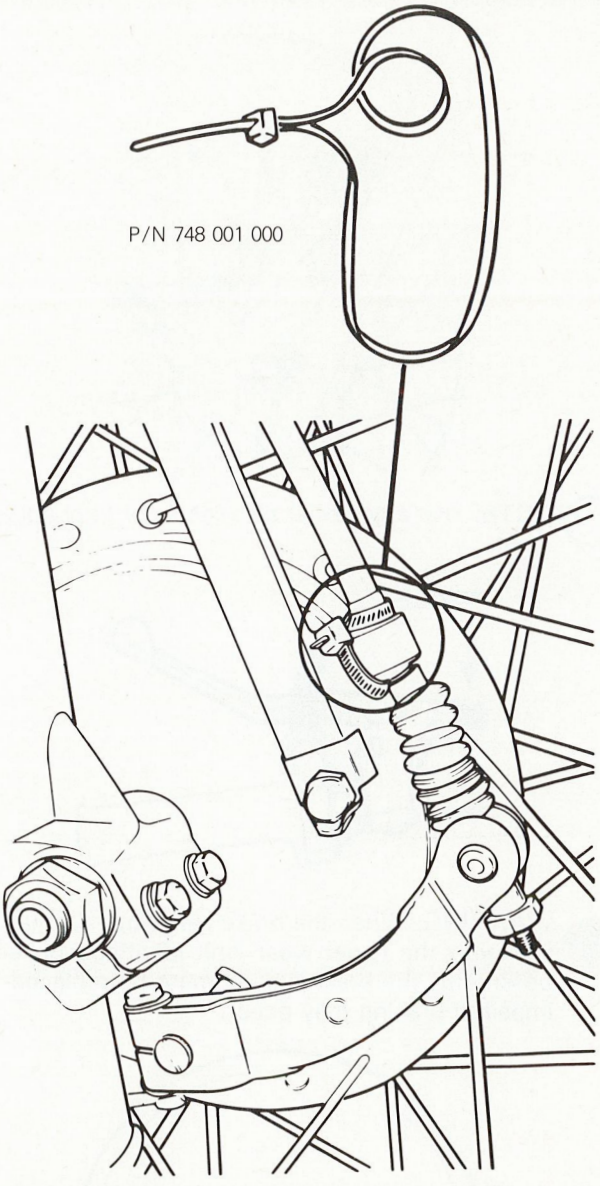


WARNING: Bend tab lock against flat face of retaining bolt and always replace by a new one each time parts are disassembled.

Install and route the front brake cable. As illustrated.



NOTE: It is recommended to use a tie wrap, to secure the lower end of the front brake cable housing to the backing plate cable retainer.



Spin front wheel in forward rotation, apply brake and while holding brake on, torque the axle nut to 34-81 N•m (25-60 ft-lbs).

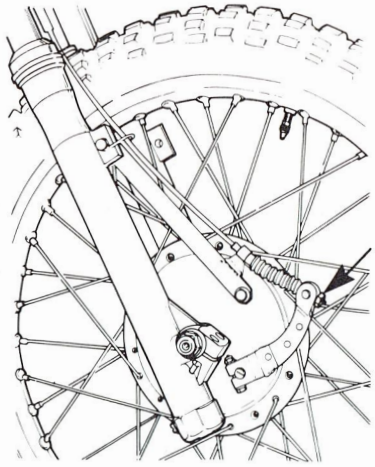
NOTE: This is important, it centers the brake shoes.

CAUTION: To ensure correct fork action, briskly compress forks (with front brake applied) to align fork legs before tightening axle pinch bolts.

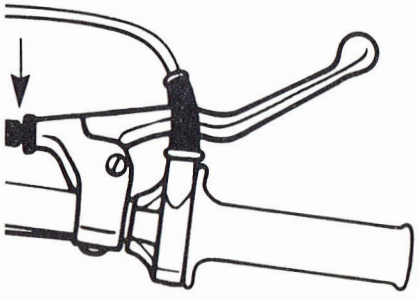
Retorque axle pinch bolts to 8-11 N•m (6-8 ft-lbs).

Front brake adjustment

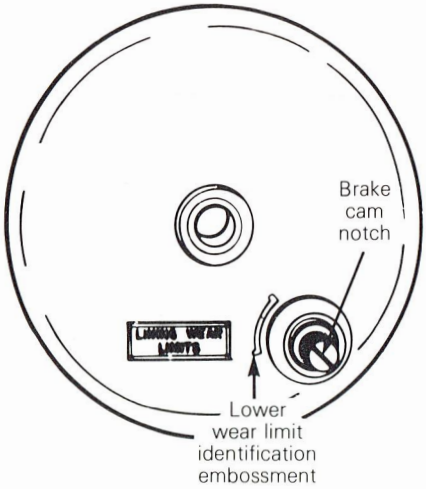
Completely loosen the brake cable adjuster (at handlebar) then using the adjuster located at the brake plate, adjust cable to provide 25 mm (1") of free lever travel. (at handlebar).



NOTE: Use adjuster at handlebar for final adjustment.

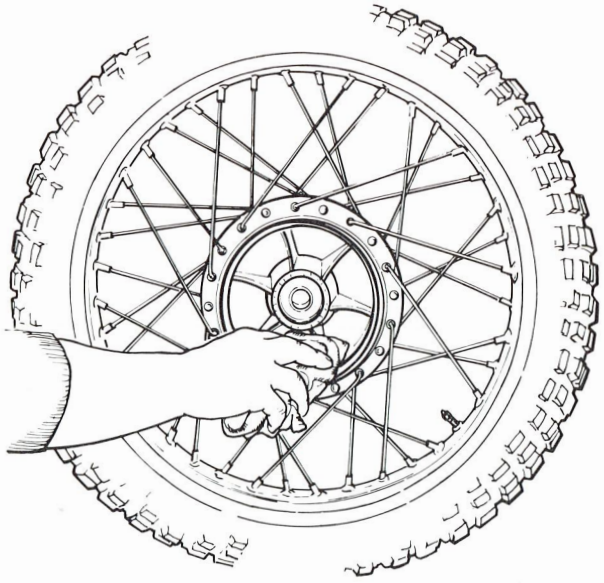


WARNING: When the brake cam notch comes in line with the lower wear limit identification embossment, the brake linings must be replaced or impaired braking may occur.



Rear wheel

Carefully clean the brake shoe linings and the brake drum using a dry cloth.



Position the spacer on the right hand side and the backing plate on the other. Position the wheel and insert the axle and nut.

Install the brake rod and adjust the chain tension.

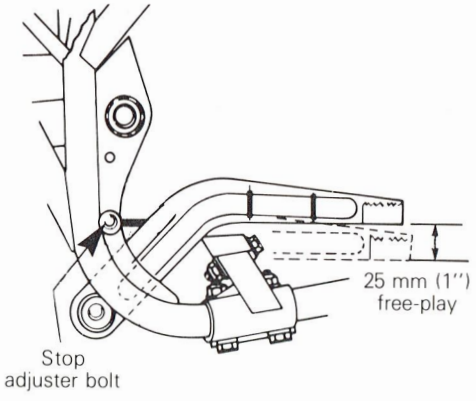
Spin the wheel in forward rotation, apply brake, and while holding brake on, torque the axle nut to 88-100 N•m (65-75 ft-lbs).

Brake pedal height adjustment

The desired brake pedal height can be attained by altering the position of the stop adjuster. (See illustration).

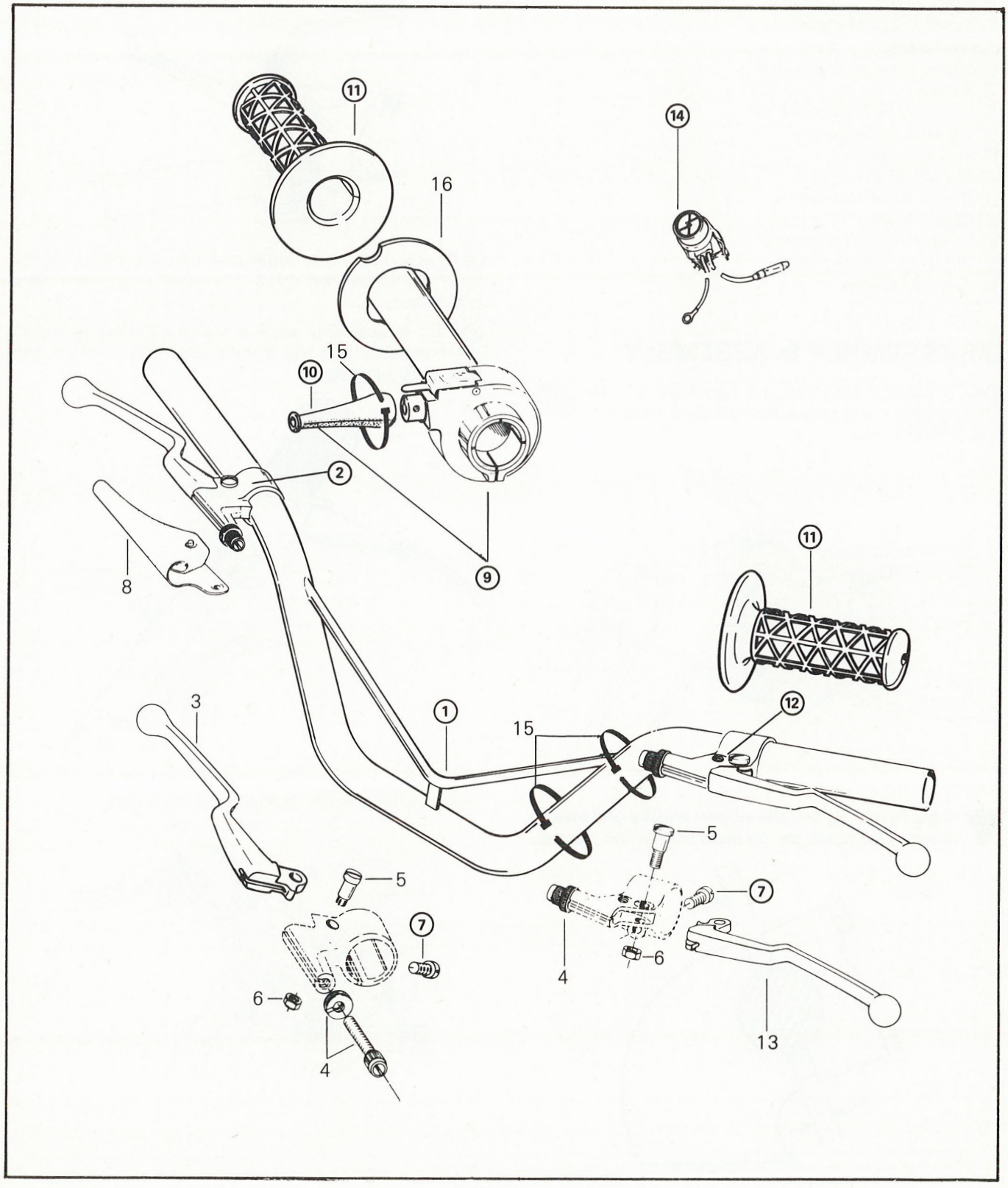
Rear brake adjustment

Turn the cable adjusting nut until the brake pedal free play is 25 mm (1").



WARNING: When the rear brake rod adjusting nut has reached its maximum adjustment, the brake linings must be replaced.

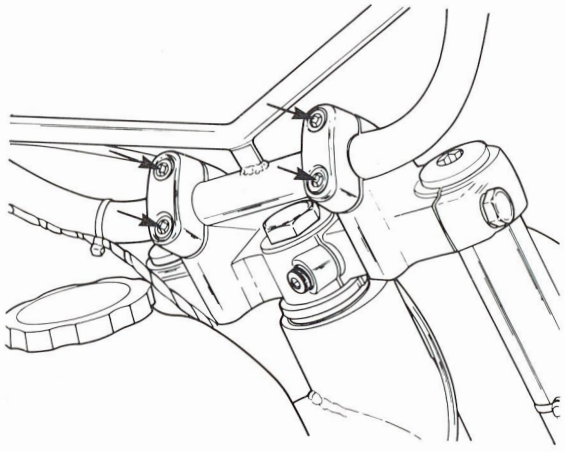
HANDLEBAR



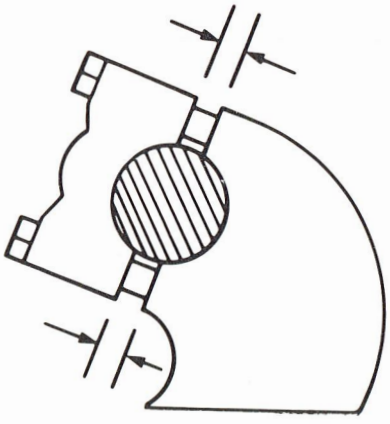
1. *Handlebar*
2. *Brake lever assembly*
3. *Brake lever*
4. *Cable adjuster screw*
5. *Pivot bolt*
6. *Elastic stop nut M6 x 100*
7. *Screw*
8. *Lever leather protector (2)*
9. *Throttle assembly*
10. *Protector boot*
11. *Rubber grip*
12. *Clutch lever assembly*
13. *Clutch lever*
14. *Cut-out switch assembly*
15. *Tie wrap (plastic) (3)*
16. *Throttle washer*

DISASSEMBLY & ASSEMBLY

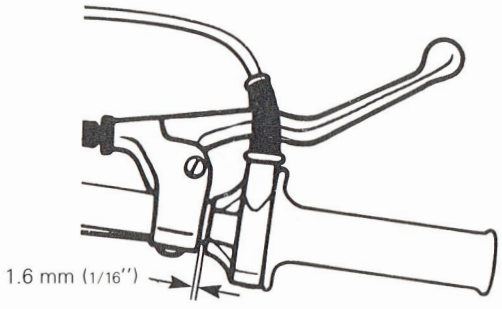
① At assembly, position the handlebar for the best riding position and torque the retaining screws to 13-16 N•m (10-12 ft-lbs).



CAUTION: Tighten the screws equally and ensure there is an equal gap on each side of the clamps.

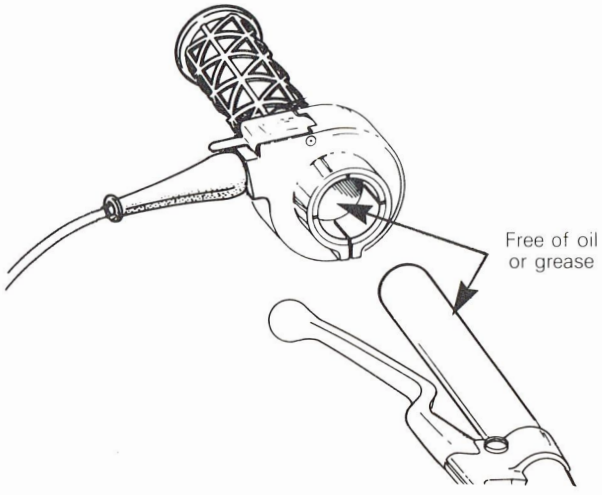


② At assembly, position the brake lever assembly at 1.6 mm (1/16") distance away from the throttle housing.

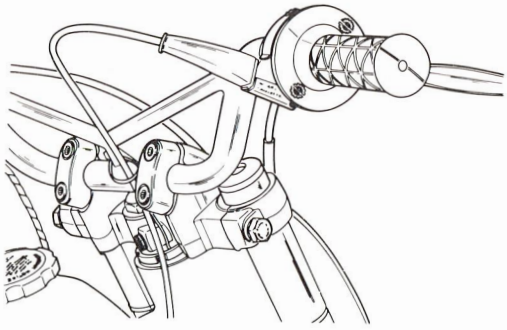


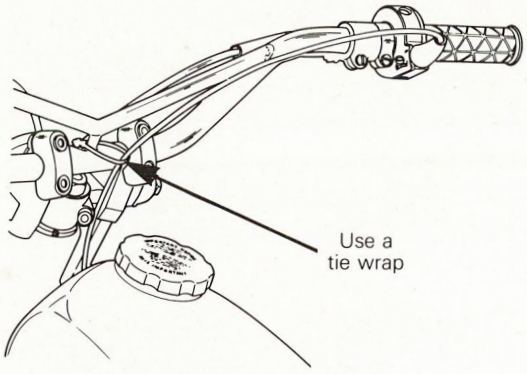
⑦ At assembly, only **slightly** tighten the lever housing retaining screw and adjust the position to the rider's preference.

⑨ Prior to assembly, ensure that the surface between the handlebar and the throttle assembly is clean and **free of oil or grease.**

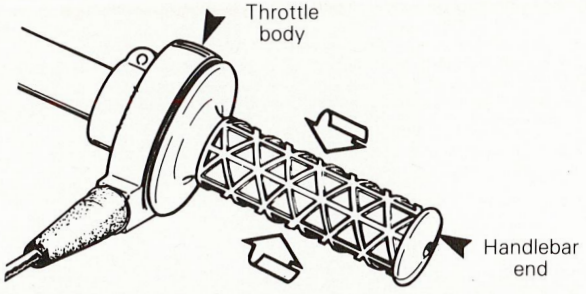


Position the throttle assembly as illustrated:



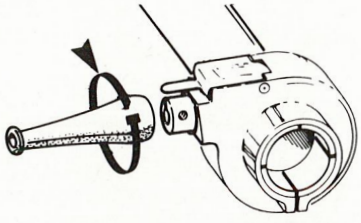


Ensure that the rubber grip does not rub on throttle body or handlebar end.



◆ **WARNING: Before starting engine, ensure that the carburetor slide is free to snap back to idle position, and that the throttle grip is totally free to rotate.**

⑩ Secure the protector boot to the throttle body using a tie wrap.

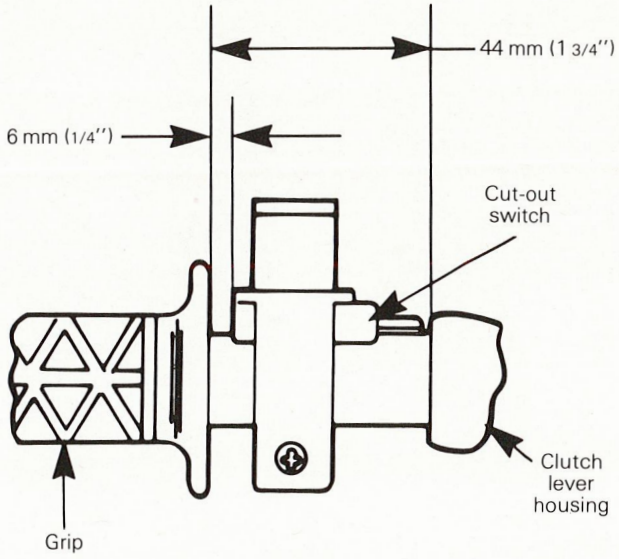


⑪ For removal without damage, use compressed air on one end of the handlebar while blocking off the air at the other end with your hand.

At assembly; use compressed air as explained above or dip the grip into a highly volatile alcohol such as wood alcohol, rubbing alcohol or equivalent, and rapidly slide the grip on the handlebar.

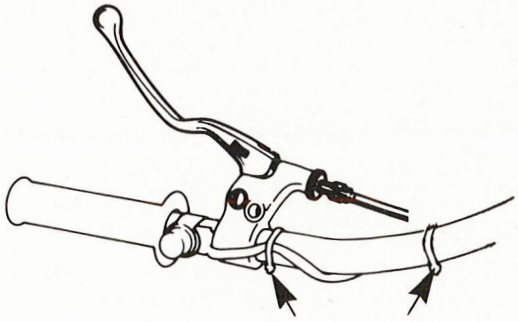
◆ **WARNING: Always perform this procedure in a well ventilated area.**

⑫⑭ Position the clutch lever housing and cut-out switch as illustrated.



Only slightly tighten the clutch lever housing retaining screw, and adjust the position to the rider preference.

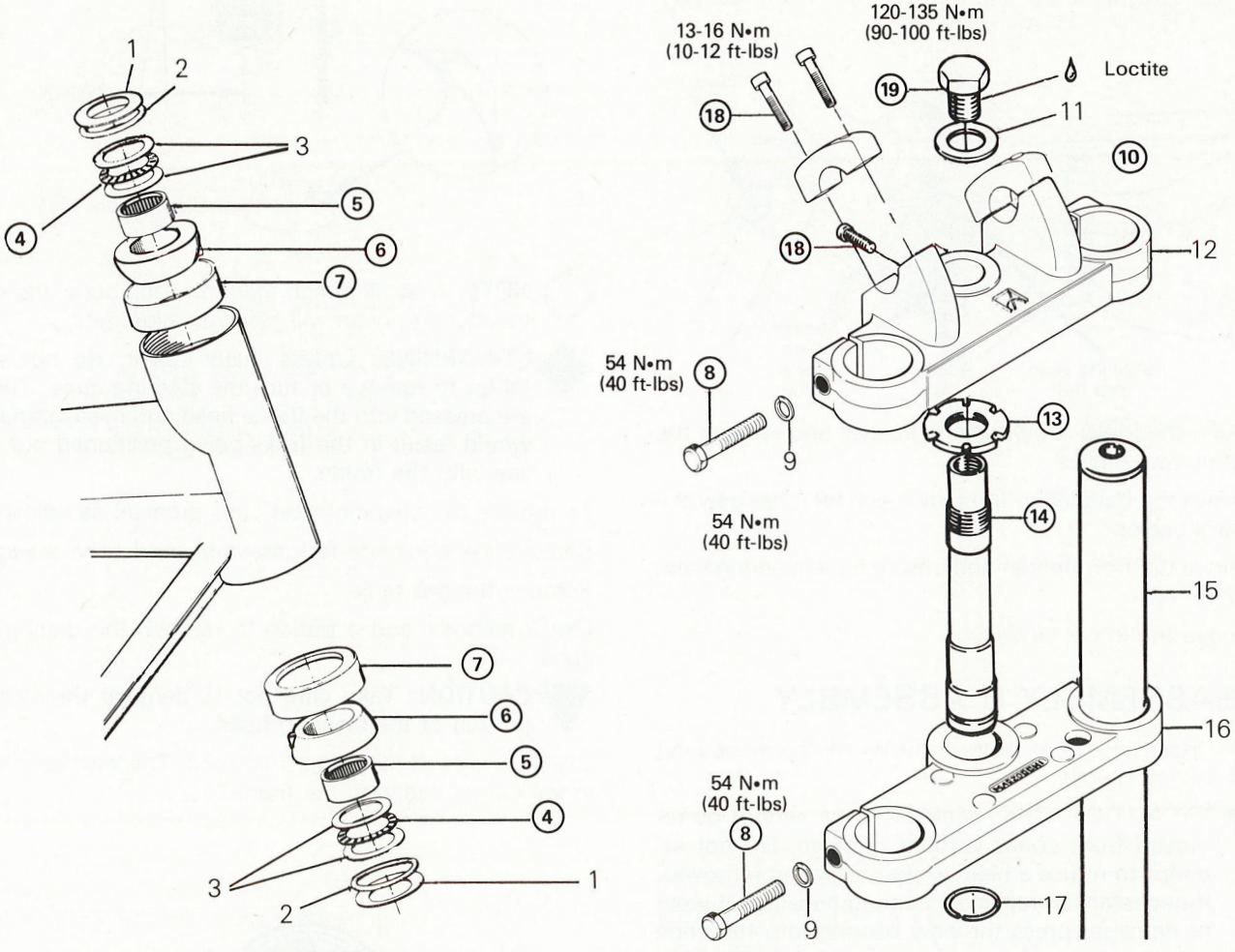
Use 2 tie wraps to secure the cut-out wire to the handlebar.



STEERING HEAD

Marzocchi type

(MX-4 125-250-370)



1. *Steering cone cover (2)*
2. *O' ring 1 1/2" x 1 3/4" x 1/8" (2)*
3. *Thrust washer (4)*
4. *Thrust bearing (2)*
5. *Needle bearing (2)*
6. *Steering cone (2)*
7. *Steering cup (2)*
8. *Hex. screw M10 x 1.5 x 45 (4)*
9. *Lockwasher 10 (4)*
10. *Handlebar clamp top*
11. *Steering stem cap screw washer*
12. *Top triple clamp**
13. *Steering stem adjuster nut*
14. *Steering stem*
15. *Fork tube 38 mm **
16. *Lower triple clamp**
17. *Circlip*
18. *Allen screw M8 x 1.25 x 30 (5)*
19. *Steering stem cap screw*

**On MX-4 125 only:*

Item 15: Fork tube 35 mm
Item 12 & 16: Upper and lower triple clamp slightly different.

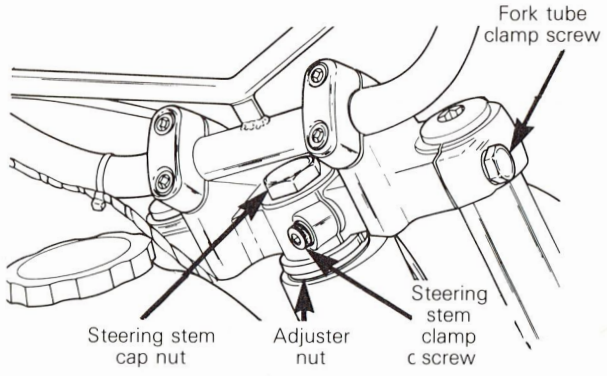
REMOVAL

With the motorcycle mounted on a stand (front wheel raised), proceed as follows:

Remove the front number plate.

Remove the front wheel ass'y.

Remove the steering stem cap nut and loosen the steering stem clamp screw and the fork tube clamp screws.



Loosen the lower crown clamp screws and remove the fork leg assemblies.

Remove the handlebar/top crown and let it hang by the control cables.

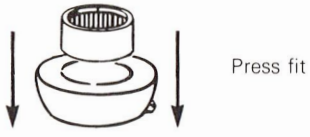
Remove the front fender and unscrew the steering stem adjuster nut.

Remove the lower crown.

DISASSEMBLY & ASSEMBLY

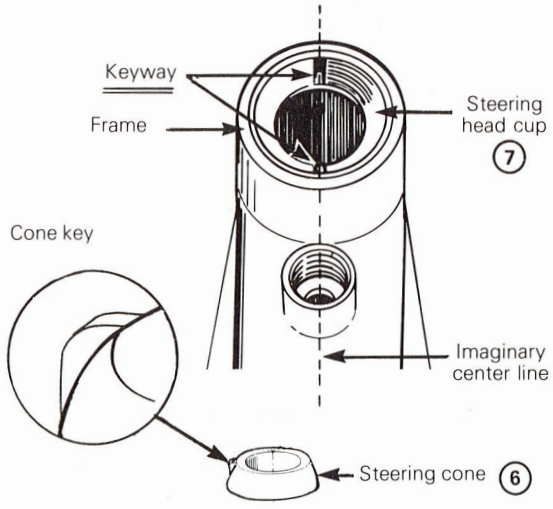
④ At assembly, coat both surfaces of thrust bearing with lithium grease.

▼ **⑤ CAUTION: The needle bearings cannot be removed from cones without damage. Do not attempt to re-use a bearing that has been removed. If necessary to replace a bearing because of wear or damage, press the new bearing into the cone using a large vise. Lubricate the bearing with lithium grease.**



⑥ At assembly, coat the round surface of both cones with a thick layer of silicone sealant. This will provide waterproofing of the assembly.

◆ **WARNING: To obtain correct fork angle and prevent loosening, ensure that the cone key perfectly aligns with the cup keyway.**



○ **NOTE:** A small punch mark on each cone and on the steering head will facilitate alignment.

◆ **⑦ WARNING: Unless major repair, do not attempt to remove or turn the steering cups. They are pressed into the frame head and misalignment would result in the forks being positioned out of line with the frame.**

To replace the steering head cups proceed as follows:

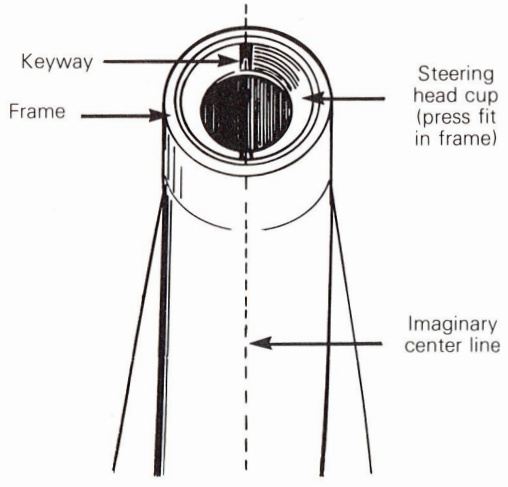
Remove the complete fork assembly and cone set-up.

Remove the gas tank.

Use a hammer and a punch to remove the damaged cups.

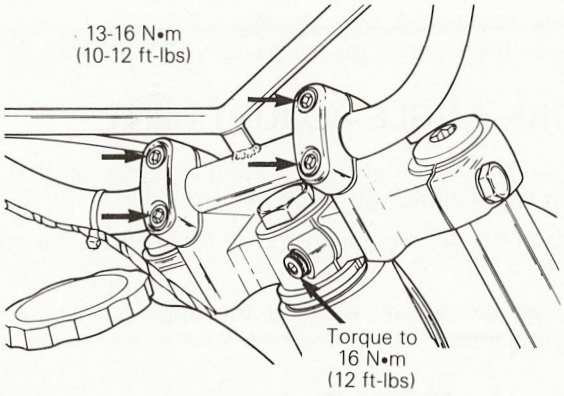
▼ **CAUTION: Take care not to damage the frame portion of the steering head.**

Use a press to fit new cups into place. The key has to be in the center line with the frame.

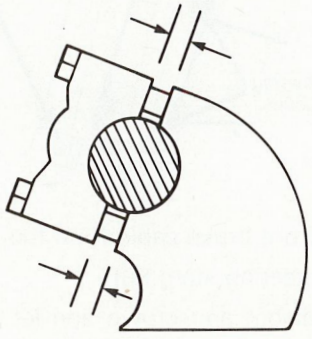


⑧ At assembly torque to 54 N•m (40 ft-lbs).

⑩⑱ At assembly torque to the following values.

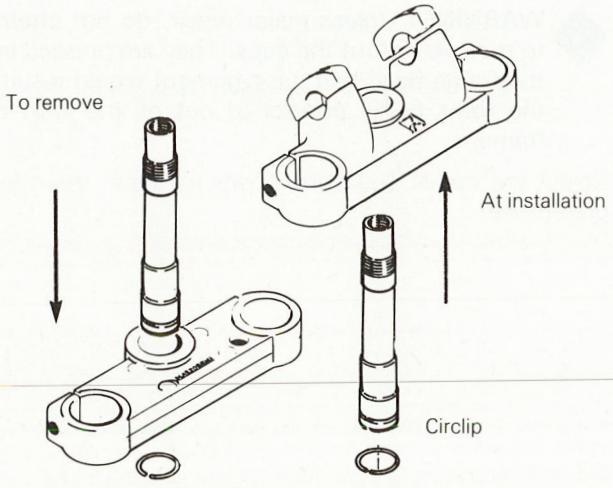


CAUTION: Tighten the screws equally and ensure there is an equal gap on each side of the clamps.



⑬ At assembly the steering stem adjuster nut must be tightened until the steering becomes snug, but not tight. Refer to steering adjustment and verification.

⑭ The steering stem on the Marzocchi type is press-fitted into the lower crown, proceed as follows to replace.



Remove the stem and crown from the steering head.

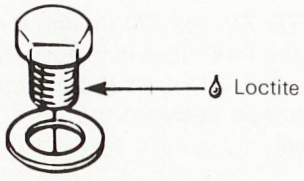
Remove the front fender.

Install the lower crown onto a press and drift the steering stem out and remove the circlip.

To re-install a new steering stem inverse the removal procedure, ensure to fit circlip prior to final press in. Apply a light coat of grease on the area to be press-fitted.

CAUTION: Prior to the removal or installation of the steering stem, always ensure that the fork crown is properly supported and aligned perfectly with the stem. Clean any material that could have been pressed out.

⑲ At assembly, apply Loctite no. 242 blue (medium strength) on the cap screw threads and torque to 120-135 N•m (90-100 ft-lbs).



CLEANING AND INSPECTION

Clean all parts carefully with a general purpose solvent.

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

Inspect bearing journals of the steering stem.

Inspect "O" rings. If damaged replace.

Inspect the thrust needle bearings and the thrust washers. If damaged, replace.

Inspect steering cone needle bearing. If damaged, replace.

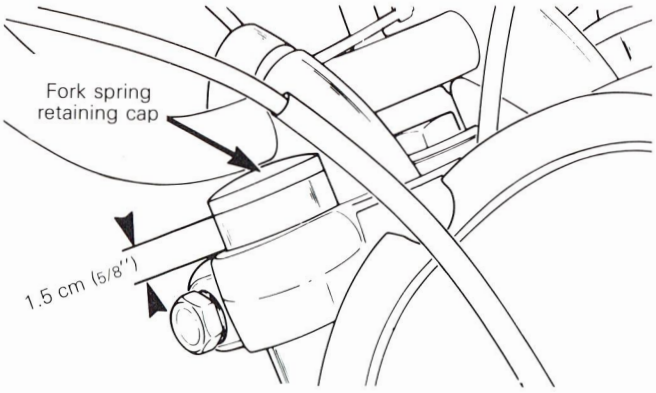
INSTALLATION

Select the cones needed (standard or optional) and determine their position as per table. Refer to "fork angle adjustment" or to the Technical data.

Lubricate both needle bearings, thrust bearing and O' ring with lithium grease.

Position the lower crown and stem with all the thrust washers and bearings in place and tighten steering stem adjuster nut until the steering becomes snug, but not tight. Refer to "steering adjustment and verification".

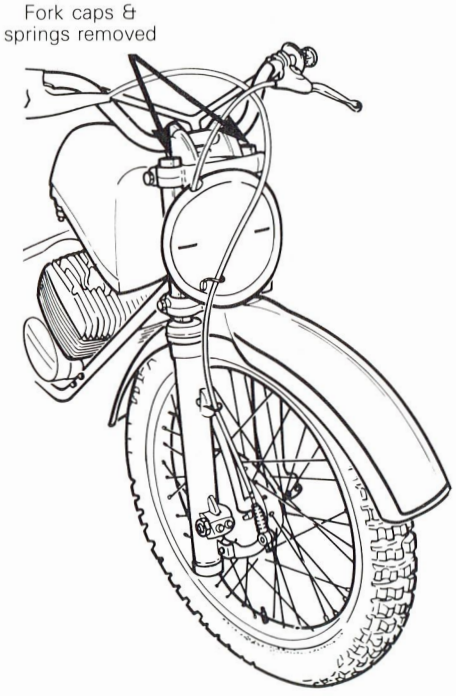
Replace handlebar/top crown and stem nut or screw, slide both fork leg assemblies in position and adjust the fork tubes with 1.5 cm (5/8") protruding over the upper crown, tighten the fork crown clamp screws.



NOTE: On the 370 model, it may be necessary to set the fork tubes in order to have them protruding 13 mm (1/2") over the top crown to give enough clearance between the front fender and the front wheel.

To obtain a very accurate fork tube adjustment, proceed as follows:

Remove the fork spring retaining caps and fork springs. Fully compress the front suspension and check if there is clearance between the front fender and the front wheel.



To set, loosen the top and bottom crown clamp screws, afterwards, retorque to 47-54 N•m (35-40 ft-lbs).

Install the front number plate.

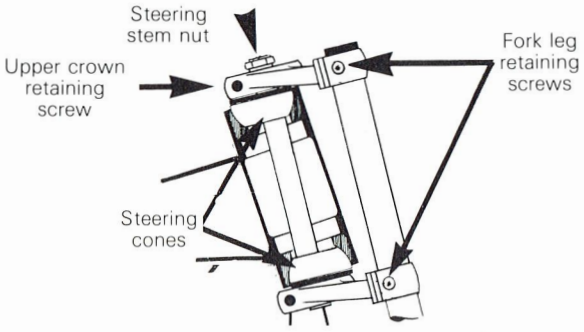
Apply Loctite 242 blue (medium strength) on the cap screw threads and torque to 120-135 N•m (90-100 ft-lbs).

FORK ANGLE ADJUSTMENT

Mount the motorcycle on a stand or a box, so that the front wheel does not touch the ground.

Loosen the screws retaining the fork legs to the upper crown.

Loosen the screw retaining the upper crown to the steering stem.



Remove the front brake cable from the lever.

Remove the steering stem nut.

Remove handlebar and crown and let it hang by the control cables.

Support the fork assembly and remove steering stem adjuster nut.

Remove the upper "O" ring retainer, the "O" ring, the first thrust washer, the thrust bearing then finally the second thrust washer. Place them in order on a clean rag.

Carefully lower the fork assembly from the frame head.

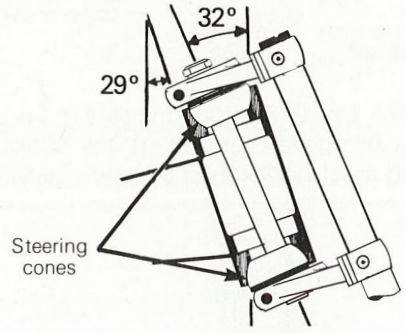
Remove the upper and lower cones from their cups.

WARNING: Unless major repair, do not attempt to remove or turn the cups. They are pressed into the frame head and misalignment would result in the forks being positioned out of line with the frame.

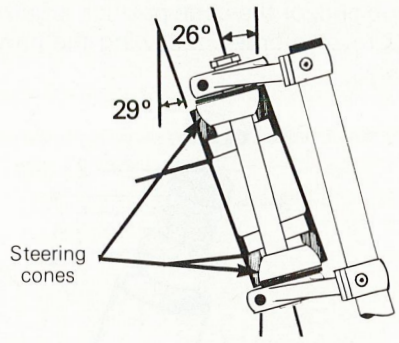
Select the cones and cone position to suit the rider's preference:

The standard fork angle on all MX-4 is 31° and provides the optimum steering and handling for most types of riding. However, the fork angle is adjustable from 26° to 32° inclusive, to provide fork angles that may be more suitable for specific racing or competition applications.

An extended fork angle provides greater stability at high speeds.



A retracted fork angles provides more maneuverability in restricted areas or on trials sections.



Fork angle recommandations	
Fast road work	29° to 31°
Motocross	30° to 32°
Oval racing	26° to 29°

The standard frame angle is 29°.

The standard fork angle is 31°.

◆ WARNING: Incorrect fork angle may cause adverse handling conditions.

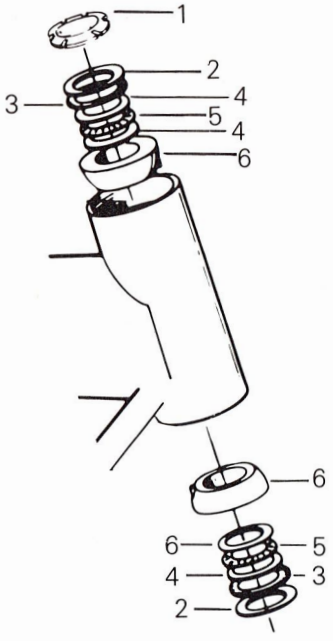
To obtain a specified fork angle use the following chart which shows the various fork angle when changing steering cones and/or steering cones position (forward or rearward).

	UPPER BEARING			LOWER BEARING		
FORK ANGLE	CONE KEY POSITION	CAN-AM PART NO.	CONE ANGLE	CONE KEY POSITION	CAN-AM PART NO.	CONE ANGLE
32	FORWARD (F)	010 301	+ 3	REARWARD (R)	010 301	+ 3
31 1/2	F	010 301	+ 3	R	010 201	+ 2
31°	**F**	**010 201**	**+ 2**	**R**	**010 201**	**+ 2**
30 1/2	F	010 201	+ 2	R	010 101	+ 1
30	F	010 101	+ 1	R	010 101	+ 1
29 1/2	F	010 101	+ 1	R or F	010 001	0
29	F or R	010 001	0	R or F	010 001	0
28 1/2	R	010 101	- 1	R or F	010 001	0
28	R	010 101	- 1	F	010 101	- 1
27 1/2	R	010 201	- 2	F	010 101	- 1
27	R	010 201	- 2	F	010 201	- 2
26 1/2	R	010 301	- 3	F	010 201	- 2
26	R	010 301	- 3	F	010 301	- 3

* Standard setting

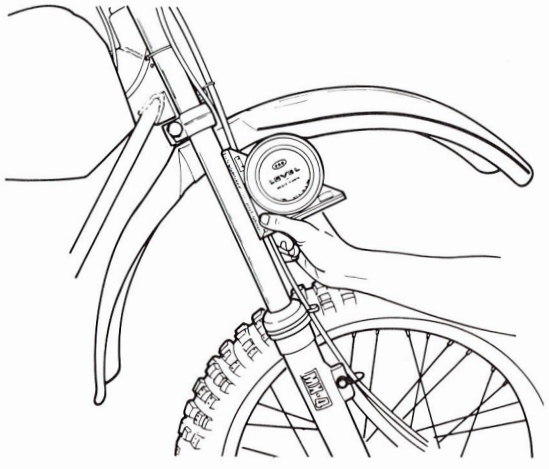
○ NOTE: The chart above is to be used as a **guideline only**. The fork angle can be altered by all kinds of factors, i.e. rear spring preload, fork spring, tire size/inflation, shock length, etc.

When the cone and/or the cone position is selected, reassemble in a reverse order, following the previous recommendations.



1. Stem adjuster nut
2. "O" ring retainer
3. "O" ring
   1 1/2" x 1 3/4" x 1/8"
4. Thrust washer
5. Thrust bearing
6. Cone

For more accuracy, it is possible to use an angle finder tool to check the fork angle change.

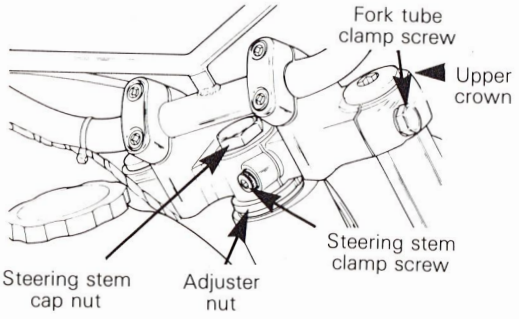


STEERING VERIFICATION AND ADJUSTMENT

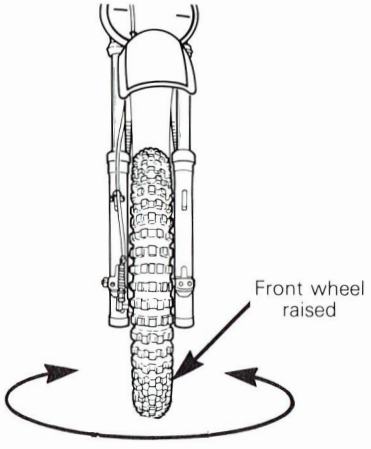
Lift the front wheel off the ground using a stand or a box under the motorcycle.

Loosen the stem cap nut and the screws retaining the upper crown.

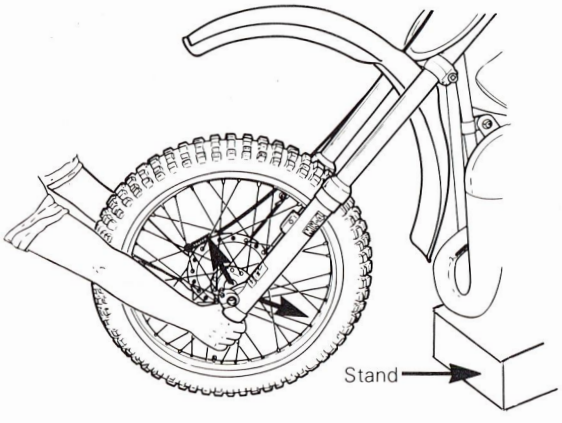
Tighten the adjuster nut until steering becomes snug, but not tight.



Check by turning steering from one side to the other for any flat spot or uneven tension. If any is noticed the steering head must be taken apart and checked.



Also, the steering head must be checked, if any radial play is noticed. To check, proceed as illustrated:



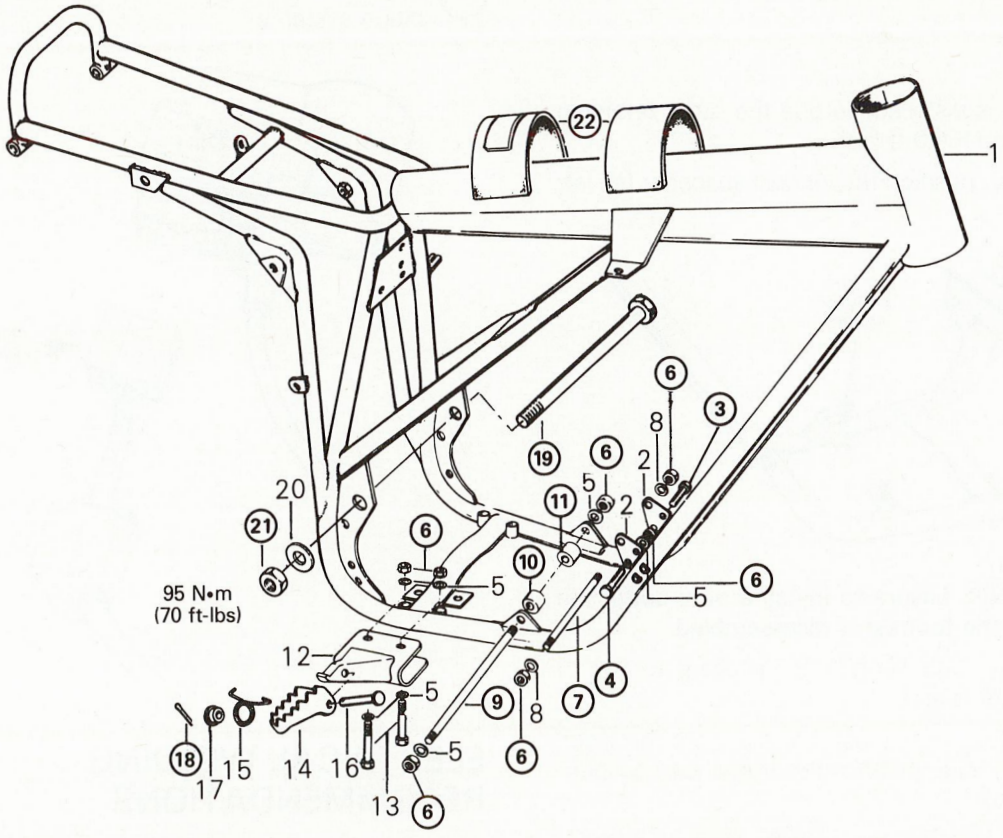
Tap upper crown down against adjuster nut then apply Loctite no. 242 blue (medium strength) adhesive sealant on the cap nut threads and torque to 120-135 N•m (90-100 ft-lbs).

Torque the steering stem clamp screw to 34 N•m (25 ft-lbs).

Torque the fork tube clamp screws to: 54 N•m (40 ft-lbs).

FRAME

MAIN FRAME
MX-4 125/250/370



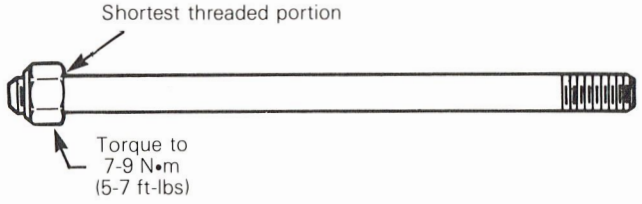
1. *Frame*
2. *Front engine mount*
3. *Hexagonal screw M8 x 1.25 x 45*
4. *Hexagonal screw M8 x 1.25 x 50*
5. *Washer 8*
6. *Hexagonal nut M8 x 1.25*
7. *Front engine stud*
8. *Washer*
9. *Lower engine stud*
10. *Spacer R.H.*
11. *Spacer L.H.*
12. *Foot peg R.H.*
13. *Hexagonal screw M8 x 1.25 x 40*
14. *Footrest R.H.*
15. *Spring*
16. *Clevis pin*
17. *Spacer*
18. *Cotter pin*
19. *Swing arm bolt*
20. *Washer 17 x 28 x 2*
21. *Hexagonal nut M16 x 1.5*
22. *Rubber pad*

DISASSEMBLY & ASSEMBLY

③④ At assembly, position the shortest screw (45 mm) in the upper hole and torque to 20-27 N•m (15-20 ft-lbs).

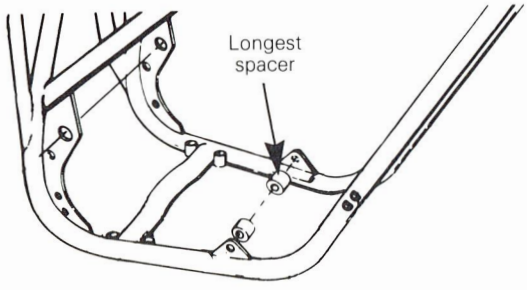
⑥ At assembly, torque to 20-27 N•m (15-20 ft-lbs).

⑦⑨ Prior to assembly, lock one nut on the shortest threaded portion of the engine stud. (Bottom of threads).



After the engine is installed, torque the other retaining nut to 20-27 N•m (15-20 ft-lbs).

⑩⑪ At assembly, position the longest spacer at the left (clutch side).

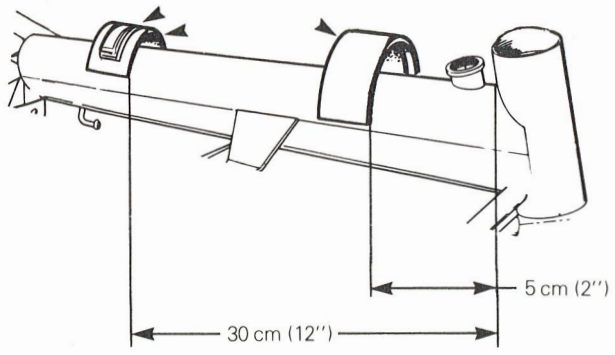


◆ ⑱ **WARNING: Ensure to install a new cotter pin every time the footrest is disassembled.**

⑲㉑ At assembly, (after engine is installed) torque to 88-100 N•m (65-75 ft-lbs).

◯ NOTE: Swing arm must be slip tight between R.H. & L.H. side plate of the frame (see suspension section).

㉒ At assembly, position the rubber pads at approximately 5.0 cm (2") and 30 cm (12") away from steering head.



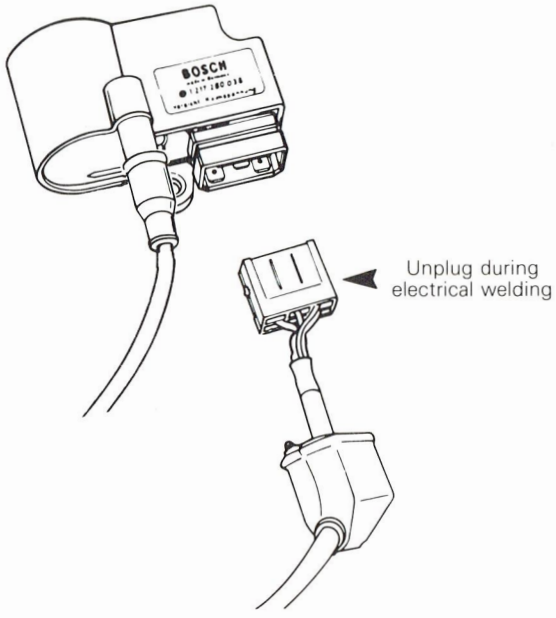
◯ NOTE: Ensure to put the small extra pad at the rear.

INSPECTION AND MAINTENANCE

Carefully inspect the frame and the welding for damage or cracks and repair as necessary.

If electrical welding is to be performed anywhere on the motorcycle, ensure to unplug the multiple connector at the electronic box prior to connecting the welding wire to the bike. This will protect the electronic box against damage caused by flowing current when welding.

◯ NOTE: This procedure applies to all electronic ignition systems.

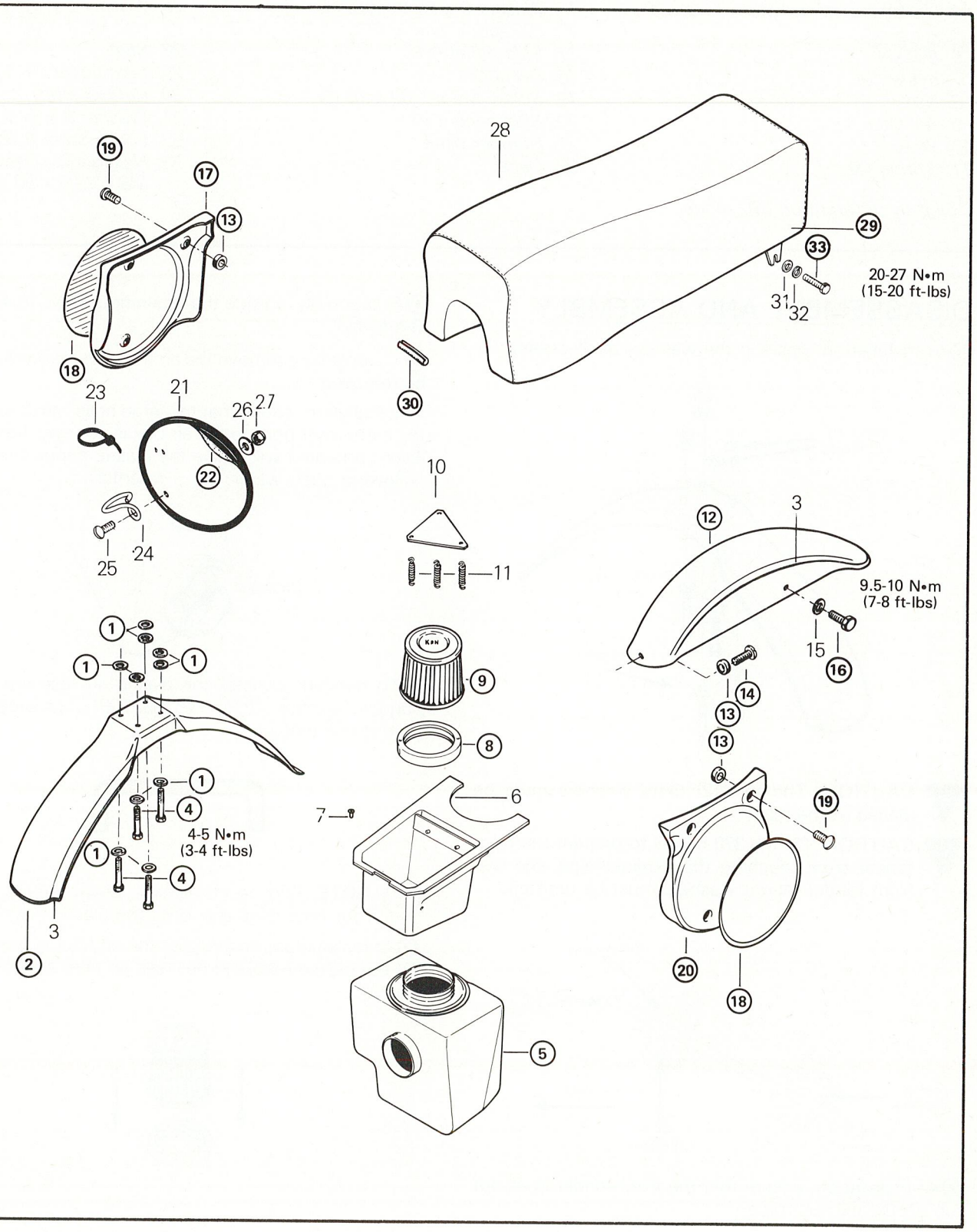


ELECTRICAL WELDING RECOMMENDATIONS

The welding rod suggested is steel rod E 7014 and there is no need of pre-heating or post-heating when performing welding.

◯ NOTE: Frame material is chrome-moly 4130.

BODY

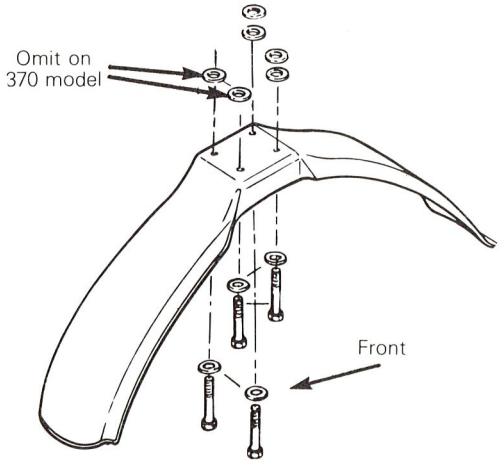

19
17
13
18
23
21
26
27
22
24
25
28
29
33
31
32
20-27 N•m
(15-20 ft-lbs)
30
10
11
12
3
9.5-10 N•m
(7-8 ft-lbs)
15
16
14
1
4
4-5 N•m
(3-4 ft-lbs)
2
9
8
7
6
5
20

1. *Washer 6 x 20 x 2 (10)*
2. *Front fender*
3. *Stripe*
4. *Hexagonal screw M6 x 1.00 x 20 (4)*
5. *Air box**
6. *Bucket*
7. *Eyelet (3)*
8. *Nut*
9. *Air filter*
10. *Plate*
11. *Spring (3)*
12. *Rear fender*
13. *Rubber washer*
14. *Screw M6 x 1.00 x 12 (1)*
15. *Washer 8 x 25 x 1.5 (2)*
16. *Hexagonal screw M8 x 1.25 x 16 (2)*
17. *Side panel R.H.*
18. *Decal (2)*
19. *Screw M6 x 1.00 x 15 (6)*
20. *Side panel L.H.*
21. *Number plate*
22. *Decal*
23. *Tie wrap (2)*
24. *Cable guide*
25. *Screw M6 x 1.00 x 16*
26. *Washer 6 x 20 x 2*
27. *Nut M6 x 1.00*
28. *Seat*
29. *Seat cover*
30. *Rubber strip*
31. *Washer 8 x 17 x 2 (2)*
32. *Lockwasher 8 (2)*
33. *Hexagonal screw M8 x 1.25 x 20 (2)*

**Slightly different on 370. model*

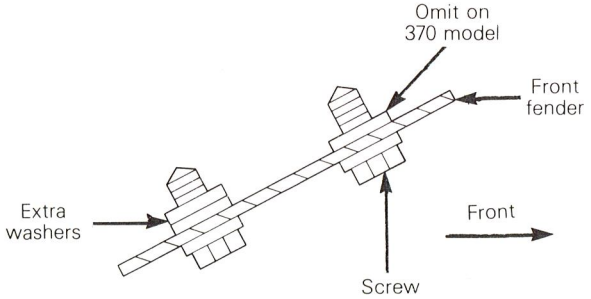
DISASSEMBLY AND ASSEMBLY

①At installation, position the washers as illustrated:



CAUTION: The two (2) extra washers must be placed at the rear.

CAUTION: On the 370 model to prevent the front fender from touching the exhaust pipe, the two front fender mount washers must be omitted.

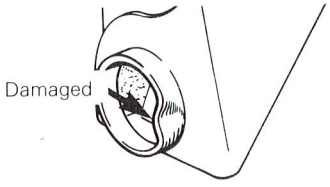


②At installation, ensure that the front fender does not rub on the exhaust pipe.

④At assembly, torque the retaining screws to 4-5 N•m (3-4 ft-lbs).

⑤To replace or remove the air box, the rear wheel must be removed.

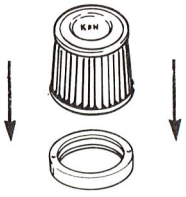
At installation, check that the large hose clamp securing the carburetor boot to the air box is not over-tightened. Over-tightening will cause the plastic flange to buckle. (Allowing dust, water, etc... to enter).



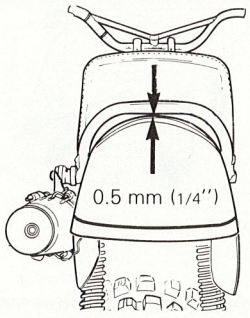
⑧To remove or install the plastic nut use the special purpose wrench (P/N 748 033 001), provided with motorcycle tool kit.

NOTE: Prior to installation, always apply a generous coat of grease onto the plastic nut threads.

⑨At installation, ensure that the air filter is well seated on the plastic retaining nut (see air filter service procedure).



⑫On the MX-4's, the opening between the seat base and the rear fender is used as carburetion air intake. Therefore, to allow sufficient air intake breathing, ensure there is a gap of around 0.5 mm (1/4") between the rear fender top portion and the frame bracket.

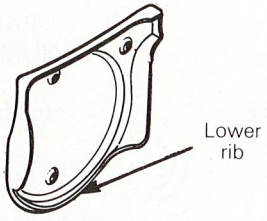


⑬⑭⑲At installation, rubber washers must not be compressed more than half of the original thickness.

⑯At installation, torque to 9.5-10 N•m (7-8 ft-lbs).

⑰⑳At assembly, ensure that the retaining screws have 2 rubber washers behind the number plate.

○ NOTE: It may be necessary to slightly cut the lower rib to prevent the number plate from rubbing on the shocks spring.



⑱㉒Proceed as described to replace any decals: Remove the damaged decal and clean the surface with acetone, wood alcohol or equivalent.

◆ **WARNING: Always perform procedures in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity.**

Apply a solution of soapy water on the new decal. Position decal and pass a sponge over decal to remove air bubbles and excess water. Allow to dry.

㉙Proceed as follows to replace the seat cover:

Remove the seat.

Place the seat upside down on a clean surface and pry out all the retaining staples.

Remove the damaged cover.

Warm the new cover with a heat lamp so as to make the material supple.

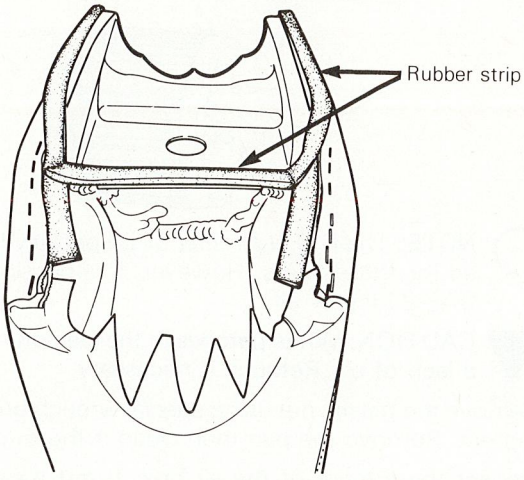
Fit the new cover over the seat and center it carefully.

Using contact cement or equivalent stick on the front and rear section then staple each side.

○ NOTE: While inserting the staples, compress the foam lightly by pushing on the bottom of the seat. This will stretch out the small wrinkles when releasing the tension on the foam.

Apply new rubber strip on seat base.

㉚Inspect the rubber strip for damage or bad adhesion and repair or replace as necessary.



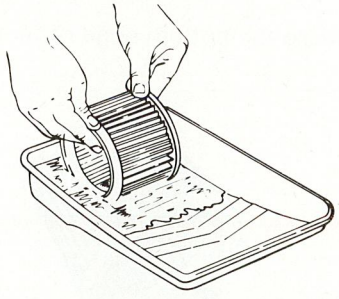
㉝At installation, apply pressure to the seat while tightening it in place. This will slightly compress the rubber strip in position. Torque to 20-27 N•m (15-20 ft-lbs).

AIR FILTER SERVICE

Remove the seat by slackening the two (2) rear retaining screws. Clean the area around the filter.

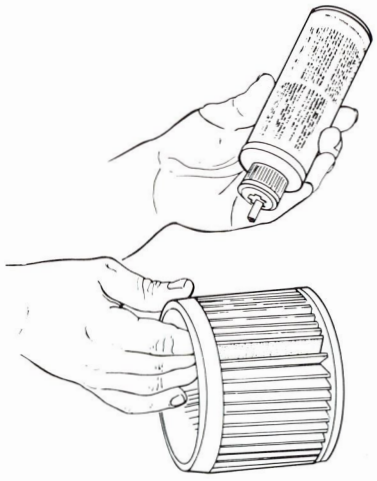
Remove the air filter. Do not allow dirt or dust to fall into the air box opening.

Clean with air filter cleaner and degreaser or by rinsing thoroughly in cleaning solvent. Allow to air dry.



▼ **CAUTION: Do not dry filter with a high pressure air flow as it will loose its efficiency.**

Generously apply "K & N" air filter oil into each pleat.



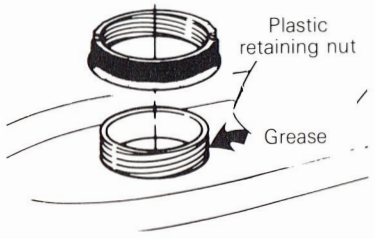
NOTE: The K & N air filter oil is specially formulated for these filters. However, it is possible to use SAE 30 motor oil.

CAUTION: White patches in the element indicates a lack of oil. Retouch if necessary.

Remove the plastic nut using special wrench provided in tool kit. Remove the pan then clean it thoroughly.

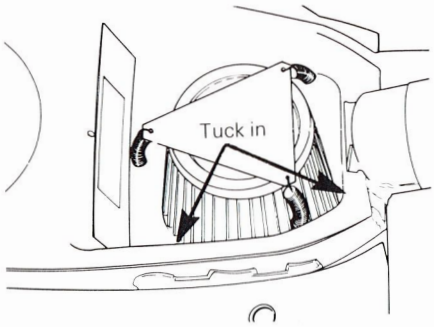
Inspect the interior of the air box. If dirt has entered, remedy the cause before re-assembly.

Grease the top of the pan around the air box opening then coat the threads of the plastic retaining nut with grease and screw it tightly into position using special purpose wrench in tool kit.



Generously grease the bottom edge of the air filter and install it.

CAUTION: Be sure air filter bottom edge is well seated on plastic retaining nut.



CAUTION: A dry or dirty filter will cause extreme piston and cylinder damage. Service filter monthly, weekly, daily, or hourly, as conditions dictate.

WATERPROOFING

When a vehicle is to be operated under very wet and muddy conditions, it is recommended to properly seal the air filter area.

PARTS NEEDED

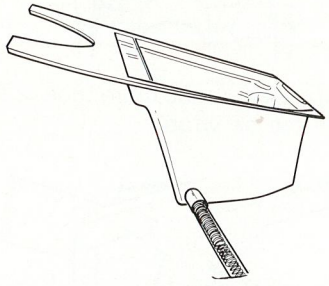
PART	PART NUMBER	QUANTITY
Drain insert	744 059 000	1
Drain tube	414 254 200	As required
Rubber strip	748 034 000	As required
Tie wrap	748 001 000	2
Spring	414 287 500	1
Silicone seal (or equivalent)	747 002 000	As required
Silicone grease (dielectric) (or equivalent)	747 018 002	As required
Duct tape		As required

Proceed as follows

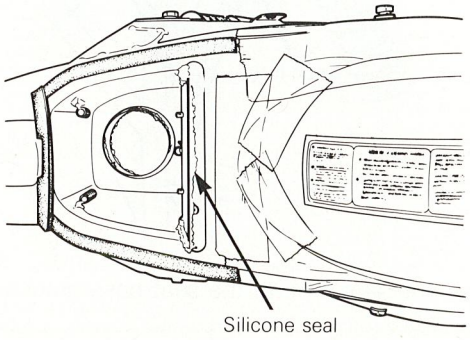
Remove the seat and inspect the rubber strip on the seat base for damage or bad adhesion and repair or replace if necessary.

Remove the air filter. Using the special wrench provided in the tool kit, remove the air filter plastic nut and bucket. Using the following illustrations, drill a 1/2'' hole in order to install the drain insert and drain tube. Install the spring in the drain tube.

NOTE: The drain tube should have a length of approx: 26.7 cm (10 1/2'').

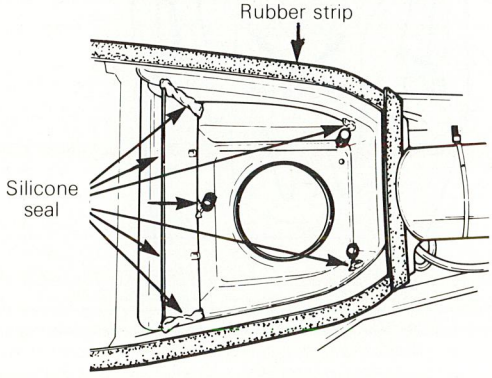


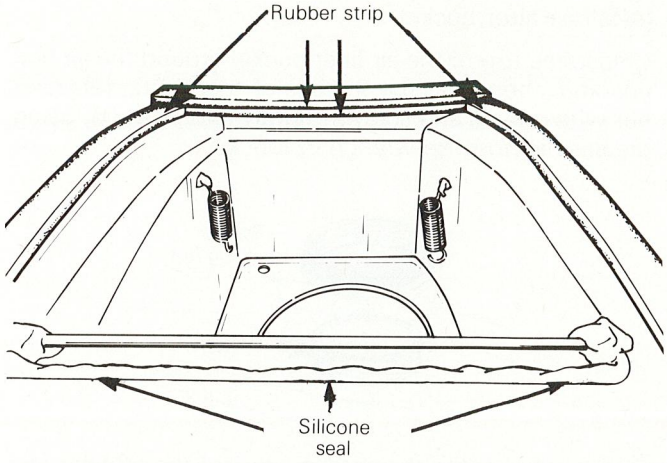
Properly seal the area indicated by the arrows using silicone seal or equivalent.



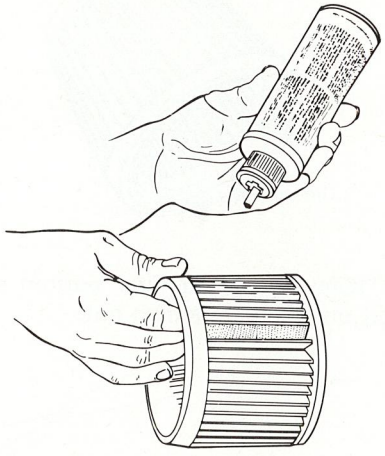
Apply a rubber strip on each side of the bucket and put two (2) superimposed stripes at the front.

NOTE: Carefully clean the surface before application and ensure proper adhesion.



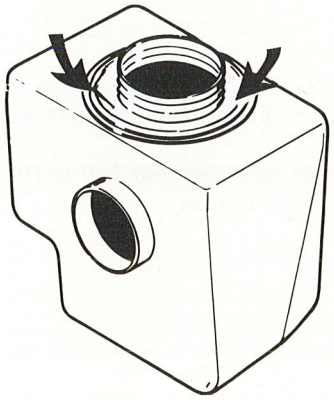


Inspect the air filter for sufficient oiling. White patches in the element indicate lack of oil. Retouch if necessary, using K & N air filter oil, or equivalent.



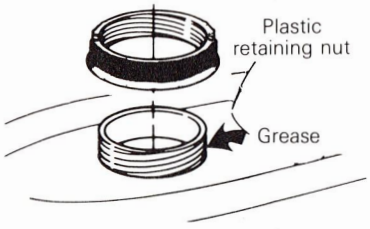
NOTE: The K & N air filter oil is specially formulated for these filters. However, it is possible to use SAE 30 motor oil.

Prior to the installation of the air box, apply a **thick** layer of grease around the air box opening.



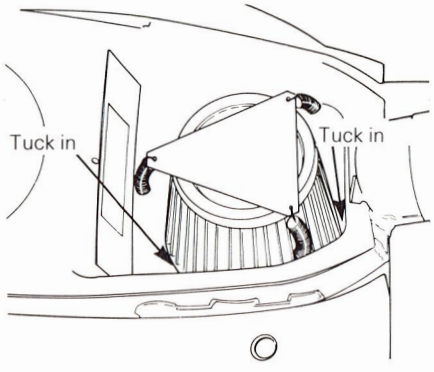
Install air filter bucket.

Grease the top of the air filter bucket around the air box opening, then coat the threads of the plastic retaining nut with grease and screw it **tightly** into position, using the special purpose wrench in tool kit.



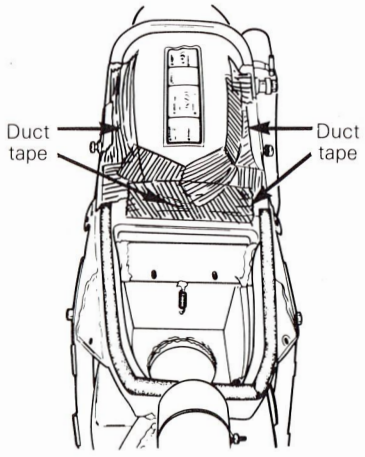
Generously grease the bottom edge of the air filter and install it.

CAUTION: Ensure air filter bottom edge is well seated on plastic retaining nut.

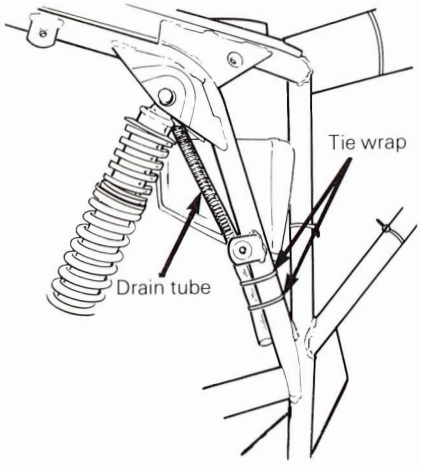


CAUTION: An under oiled or dry filter will cause extreme piston and cylinder damage.

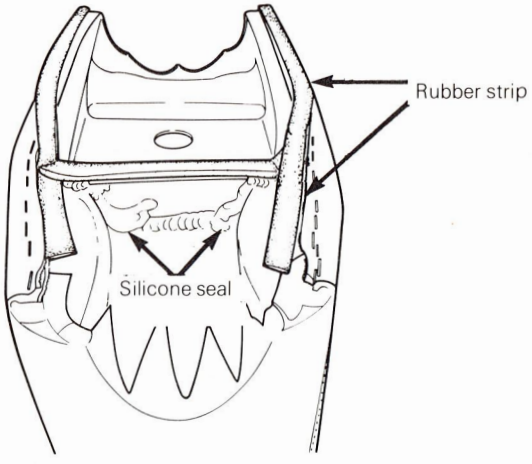
Using duct tape, seal the rear top portion of the rear fender and air filter bucket.



Using 2 tie wraps, secure the drain tube to the frame, do not overtighten the tie wraps.

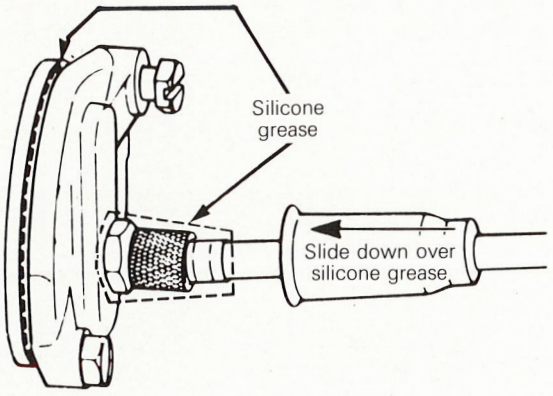


Apply silicone seal around the seat base bracket.



At installation, apply pressure to the seat while tightening it in place. This will slightly compress the rubber strip in position.

Apply silicone grease (dielectric) to the carburetor cover and throttle cable rubber boot (at carburetor top).



Ensure carburetor/engine and carburetor/air box connections are leakproof.

CAUTION: The air filter servicing/sealing is of the utmost importance under wet and muddy conditions; inspect often the air filter area and service as necessary.

OPTIONAL AIR FILTER ARRANGEMENT

To further improve the service ability of the air filter it is possible to secure the filter against the plastic retaining nut.

Parts required:

– 4 self tapping screws no. 6 x 1''

– silicone seal or equivalent.

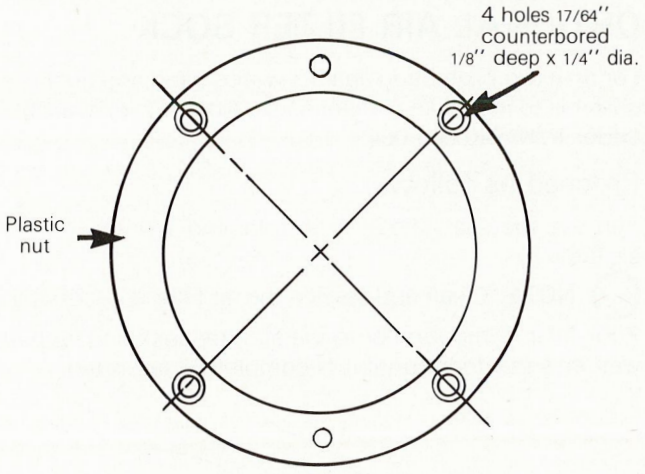
Proceed as follows:

Remove the seat, the air filter retaining springs and the air filter.

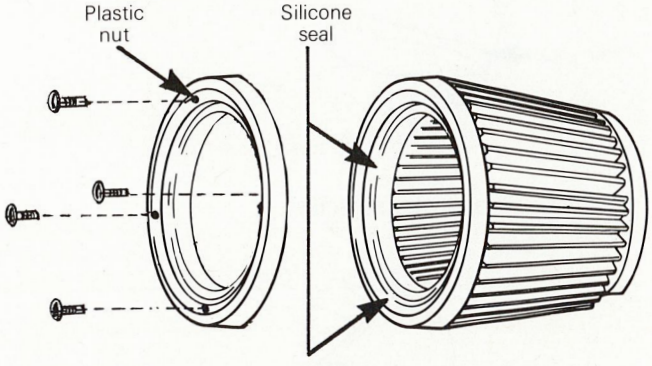
Remove the plastic retaining nut.

Clean the plastic nut and the air filter bottom edge portion thoroughly to remove all grease.

Drill 4 holes 17/64'' dia, equally spaced through the nut. (counter bore the four holes 1/8'' deep with a 1/4'' drill).



Apply a coat of silicone seal onto the air filter bottom edge to form a water tight seal.



Then, secure the plastic nut to the air filter with the four (4) retaining screws. Allow sufficient time for the silicone seal to cure. (approx. 15 min.).

CAUTION: Do not overtighten the screws.

Apply a thick layer of grease onto the plastic nut threads and install the filter/plastic nut in place.

CAUTION: Ensure that the filter/plastic nut is well secured in place.

NOTE: The filter retaining plate can still be used but is not necessary.

OPTIONAL AIR FILTER SOCK

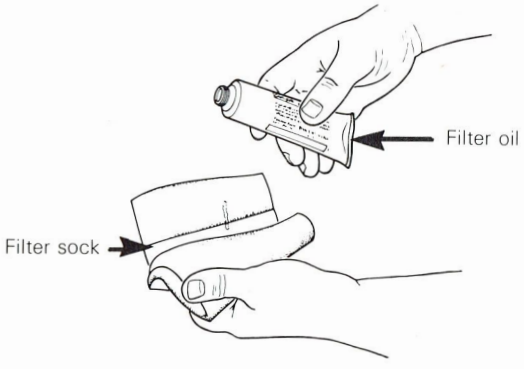
For an extra protection against water, sand and dust it is possible to install an air filter sock (slip on type) available under P/N 740 009 004.

Proceed as follows:

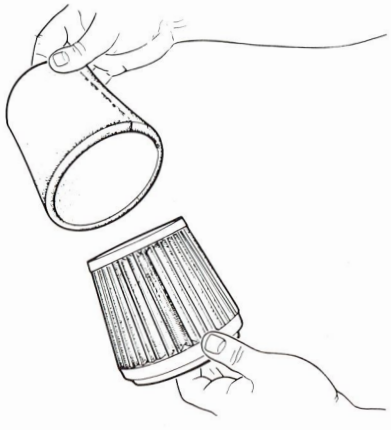
Remove the seat, the air filter retaining springs and the air filter.

◯ NOTE: Clean and service the air filter if necessary.

Pour filter compound onto the air filter sock and work it well into the foam until it is completely saturated.



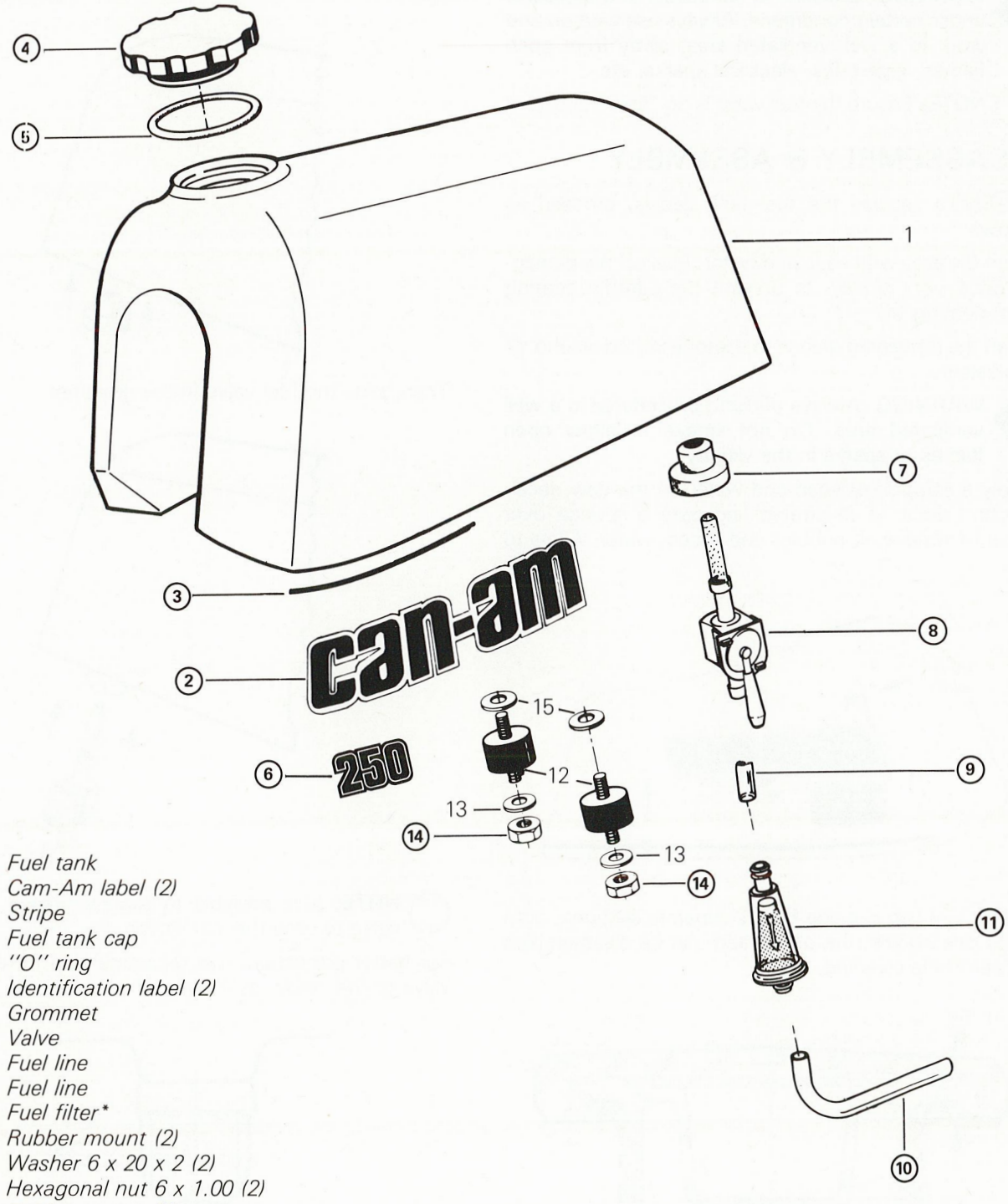
Fit the sock over the air filter.



Generously grease the bottom edge of the air filter and install it.

▼ CAUTION: Ensure that the air filter bottom edge is well seated on the plastic retaining nut.

FUEL TANK



1. *Fuel tank*
2. *Cam-Am label (2)*
3. *Stripe*
4. *Fuel tank cap*
5. *"O" ring*
6. *Identification label (2)*
7. *Grommet*
8. *Valve*
9. *Fuel line*
10. *Fuel line*
11. *Fuel filter**
12. *Rubber mount (2)*
13. *Washer 6 x 20 x 2 (2)*
14. *Hexagonal nut 6 x 1.00 (2)*
15. *Rubber spacer (2)*

**Omit on 370 model*

REMOVAL

Remove the seat and unscrew the two retaining nuts.

Disconnect the fuel line from carburetor.

◆ **WARNING: Gasoline is flammable and explosive under certain conditions. Always use caution and work in a well ventilated area, away from open flames, cigarettes, electrical sparks, etc.**

◯ **NOTE:** Ensure the fuel valve is on "OFF" position.

DISASSEMBLY & ASSEMBLY

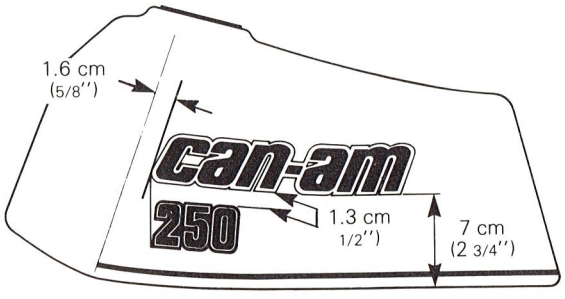
②③⑥ To replace the fuel tank decals, proceed as follows:

Clean the area with soap and water. Peel off the damaged decal very slowly, to prevent the paraffin coating from coming off.

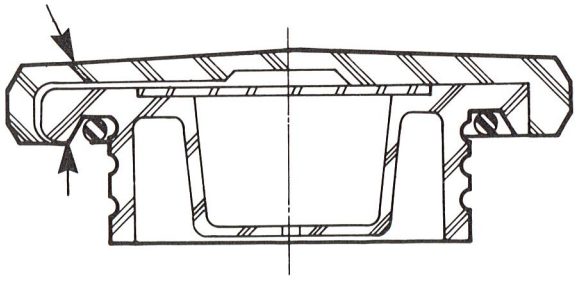
Clean the remaining glue with acetone, wood alcohol or equivalent.

◆ **WARNING: Always perform procedures in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity.**

Apply a solution of soap and water on the new decal. Position decal as illustrated and pass a sponge over decal to remove air bubbles and excess water. Allow to dry.

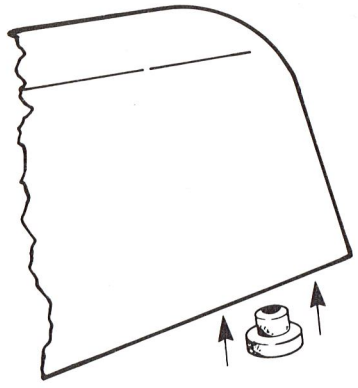


④ The fuel cap is made from 2 separate sections, tight fitted one against the other, and can be disassembled for vent hole cleaning.

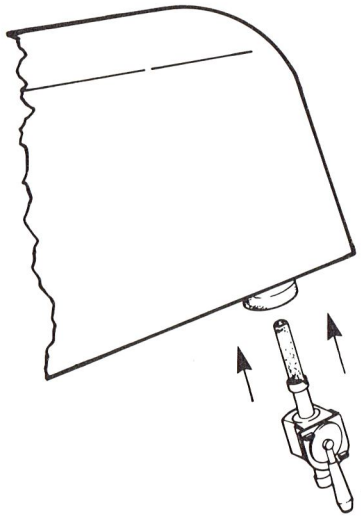


⑤ At assembly, apply a small coat of lithium grease to the "O" ring.

⑦⑧ The fuel valve is mounted tight fit in the fuel tank. At assembly, install the rubber grommet ⑦ in the fuel tank.

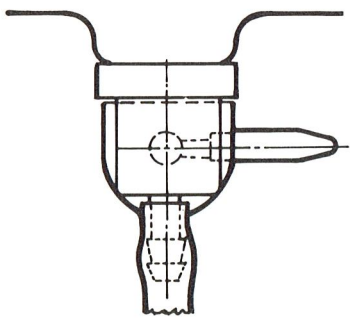


Then, slide the fuel valve in the grommet.

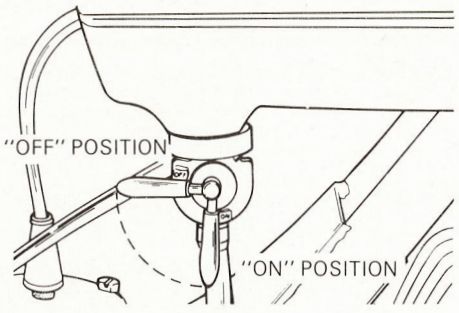


◯ **NOTE:** It is possible to slightly grease the fuel valve to ease the installation.

For better protection, it is recommended to rotate the valve to the inside, as illustrated.



NOTE: The fuel valve controls the fuel flow as indicated by the lever pointer.



⑨⑩ Fuel line length:

MX-4 125/250

From fuel valve to fuel filter: 7.6 cm (3")

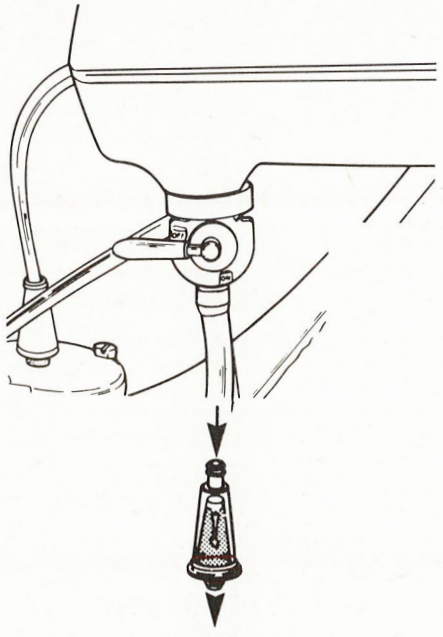
From fuel filter to carburetor: 14.7 cm (5 7/8")

MX-4 370

(without fuel filter) 18.4 cm (7 1/4")

⑪ If the fuel filter is to be replaced ensure to install it in the correct position: the arrow on the filter indicates the fuel flow direction.

WARNING: Fuel control valve must be at "OFF" position.



⑭ At assembly torque to 4.5-5.5 N•m (3-4 ft-lbs).

CLEANING AND INSPECTION

Clean the fuel tank with a solution of soapy water and rinse thoroughly.

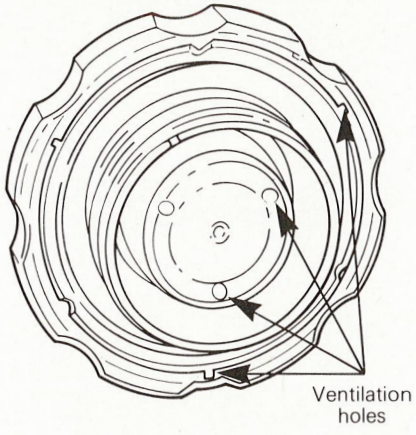
Inspect the rubber mounts. Replace if damaged.

Inspect the fuel line for leaks or cracks.

Inspect for any sediment in fuel tank. Flush, if necessary.

Inspect the fuel cap.

CAUTION: Under severe riding conditions, the ventilation holes of the fuel cap may become obstructed by hardened mud, ice, frost, etc... Periodic inspection is strongly recommended and if necessary, cleaning of the ventilation holes.



INSTALLATION

Slip the fuel tank over the frame, insert both rubber mount studs into the frame brackets then torque the retaining nuts to 4.5-5.5 N•m (3-4 ft-lbs).

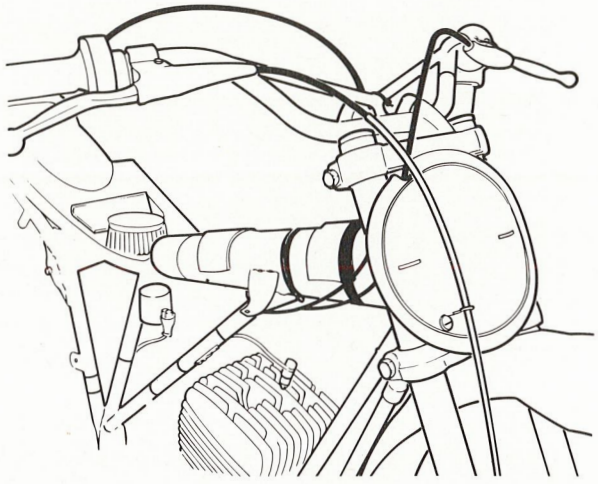
CAUTION: Ensure that the fuel tank retaining brackets do not rub on the fuel tank.

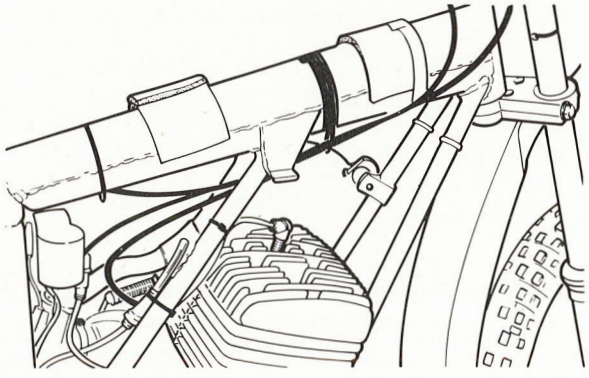
Connect the fuel line to the carburetor.

CABLE ROUTING

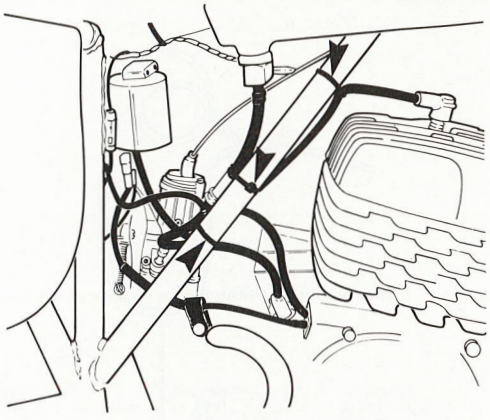
ROUTING DIAGRAM

NOTE: The tie wraps are indicated by arrows.

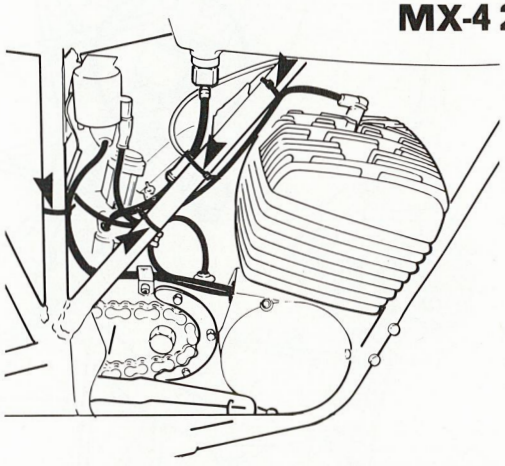




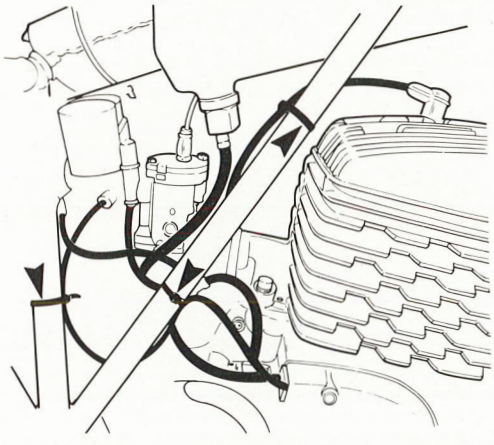
MX-4 125



MX-4 250

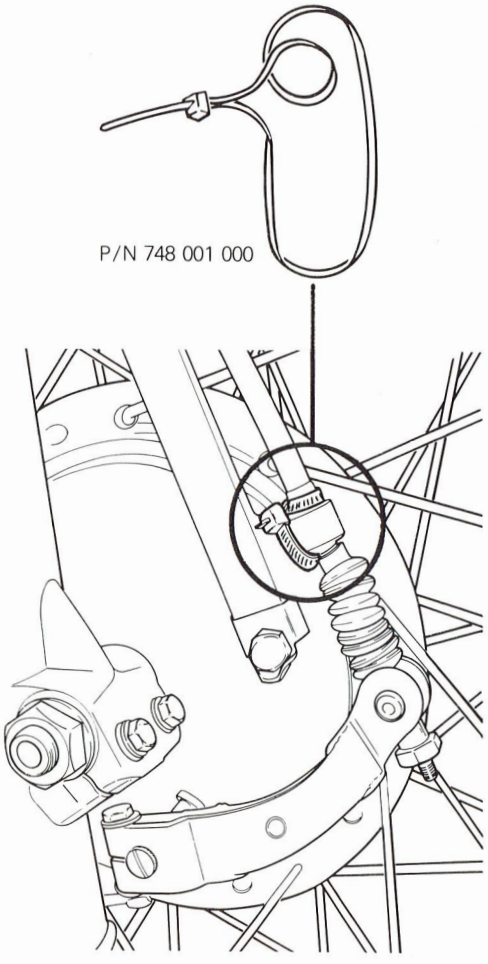


MX-4 370 (without fuel filter)

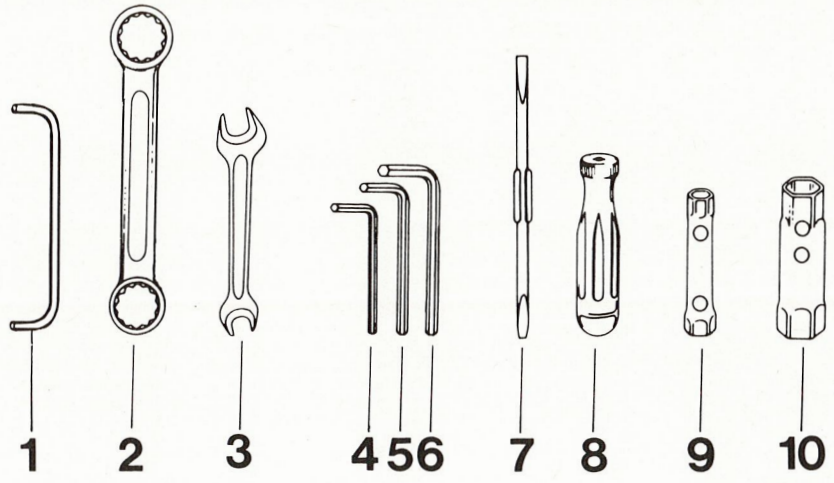


FRONT BRAKE CABLE

It is recommended to use a tie wrap, to secure the lower end of the the front cable housing to the backing plate cable retainer.



BASIC MOTORCYCLE TOOL KIT

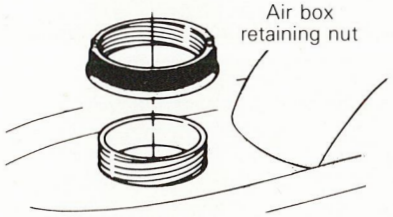


	Part Number
*1. Air box retaining nut wrench	748 033 001
2. Combined wrench 22/24 mm	420 277 825
3. Open end wrench 10/13 mm	420 276 065
4. Hexagonal wrench no. 4	420 277 790
5. Hexagonal wrench no. 5	420 876 360
6. Hexagonal wrench no. 6	420 277 810
7. Insert for screwdriver	420 277 830
*8. Grip for screwdriver	420 277 840
9. Socket wrench 11/13 mm	420 876 220
10. Socket wrench 17/21 mm	420 277 411

*SPECIFIC APPLICATIONS:

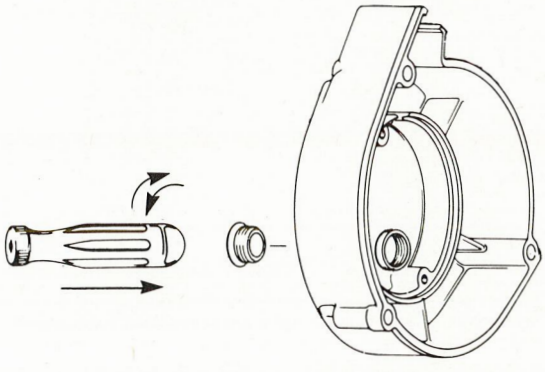
Item 1 (air box retaining nut wrench):

For installation and removal of the air box retaining nut.

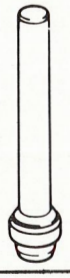
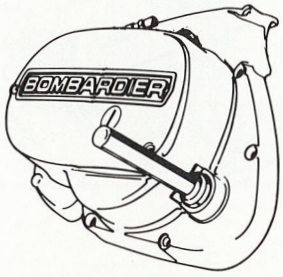
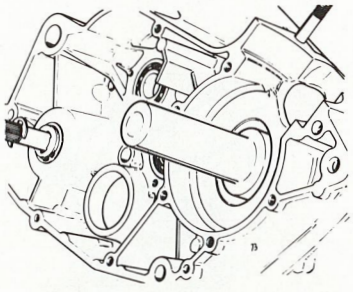
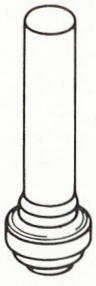
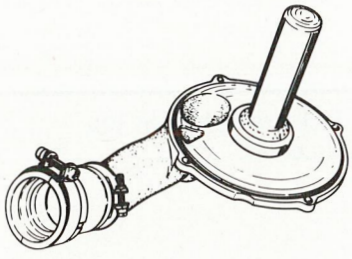
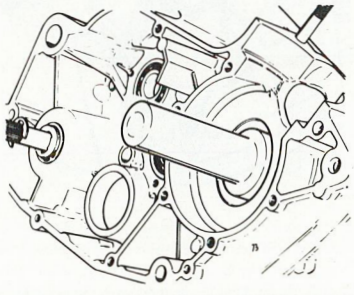


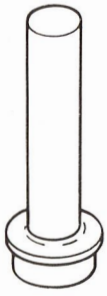
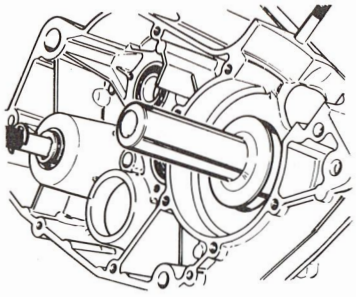
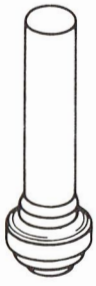
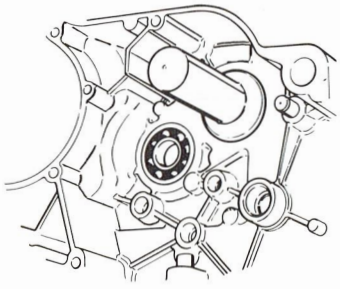
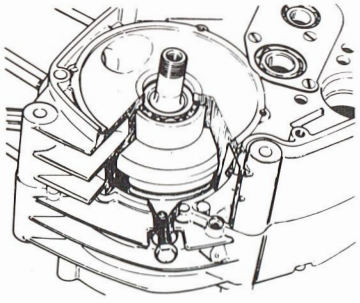
Item 8 (grip for screwdriver):

The screwdriver grip can also be used for installation and removal of the plugs.

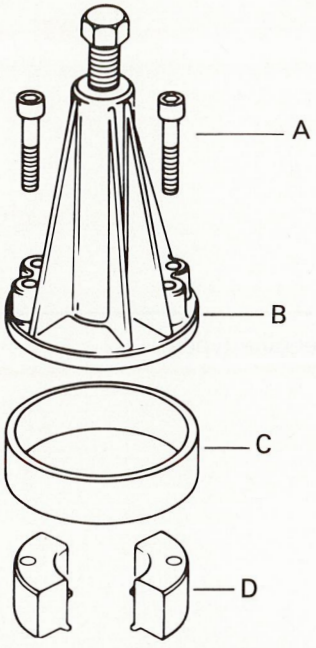


SERVICE TOOLS

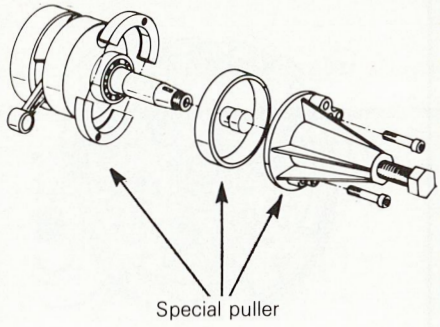
ITEM	USE	APPLICABLE TO
Insertion pusher (420 277 850) 	To install kick starter oil seal. 	All engine types.
(420 277 860) (420 277 980) 	To install crankcase magneto side seal. 	420 277 860: 124 engine types 420 277 980: 244 engine types
(420 277 875) 	To install disc valve cover seal. 	124-244 engine types
	To install magneto side and clutch side crankcase seal. 	366 engine types

(420 276 190) (420 276 200) (420 276 930) (420 276 940) 	To install polyamid ring in crankcase. 	(420 276 190) clutch side 124-244 engine types (420 276 200) magneto side 124 engine type (420 276 930) magneto side 244 engine type (420 276 940) magneto & clutch side 366 engine type
(420 277 870) (420 277 861) 	To install transmission main shaft oil seal (sprocket side). 	(420 277 870) 124-244 engine types (420 277 861) 366 engine type
Crankshaft locking bolt (420 241 965) 	To lock crankshaft at top dead center. 	All engine types.

Bearing puller



A) Allen screw M8 x 35
Allen screw M8 x 40
B) Puller
C) Ring for puller
D) Ring half for ball bearing



A) (420 840 680)
Screw M8 x 40
(420 940 491)
Screw M8 x 35

B) (420 876 296)

C) (420 977 480)
124-244 engine types

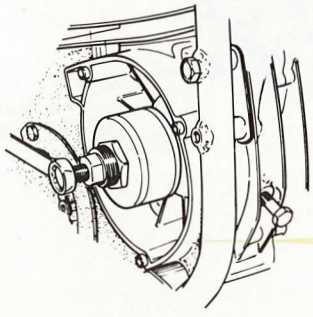
(420 977 490)
366 engine type

D) (420 277 890)
– 124 engine type: magneto & clutch side bearing.
– 244 engine type: clutch side bearing.

(420 276 020)
244 engine type: magneto side bearing.

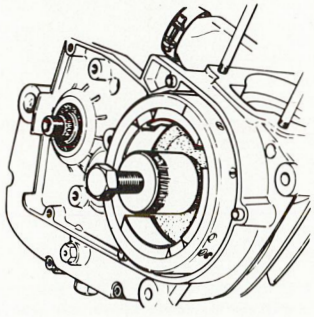
(420 977 470)
– 366 engine type: magneto & clutch side bearing.

Rotor puller
(420 287 030)

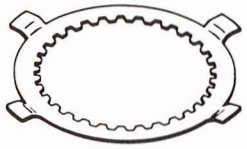
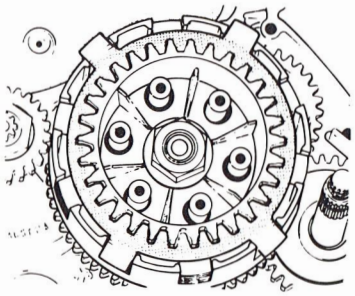
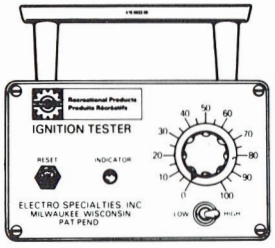
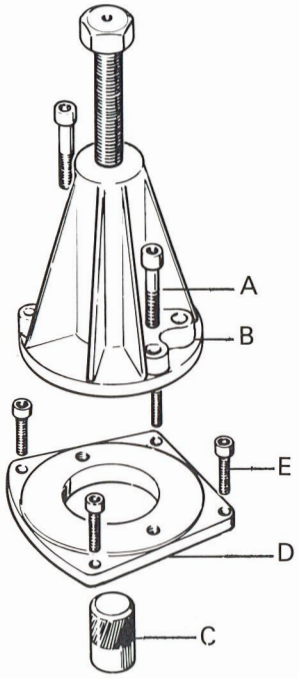
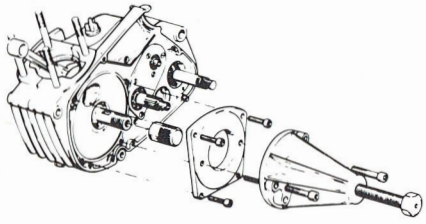


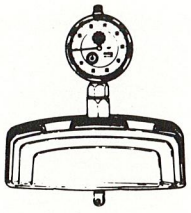
124 engine type
(Motoplat ignition system)

Flywheel puller
(420 277 807)



244-366 engine types
Bosch ignition system.

Clutch hub locking tool (420 277 885) 		All engine types.
Ignition tester (419 0033 00) 	Engine electronic components test.	All engine types.
Crankcase separator  A) Allen screw M8 x 35 B) Puller C) Protector cap D) Extractor plate E) Allen screw M5 x 20	To split engine crankcase. 	124-244 engine types A) (420 940 491) Allen screw M8 x 35 B) (420 876 296) C) (420 276 920) D) (420 276 910) E) (420 840 351) Cylinder screw M5 x 20

Dial indicator (T.D.C. gauge) (414 104 700) 	To perform B.T.D.C. measurement  (Basic timing)	All engine types.

SERVICE PRODUCTS

Tie rap		748 001 000
Silicone seal		747 002 000
Loctite 515		413 702 700
Silicone grease (dielectric)		747 018 002
Air filter oil		747 021 002
Air filter cleaner		747 023 000
Loctite 242 blue (medium strength)		413 702 500
Loctite 271 red (high strength)		747 020 000
L.P.S. (metal protector)		413 902 200

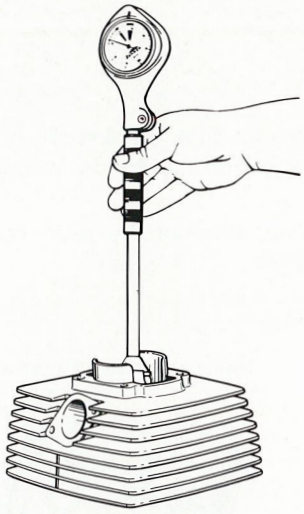
TECHNICAL DATA

ENGINE

CYLINDER

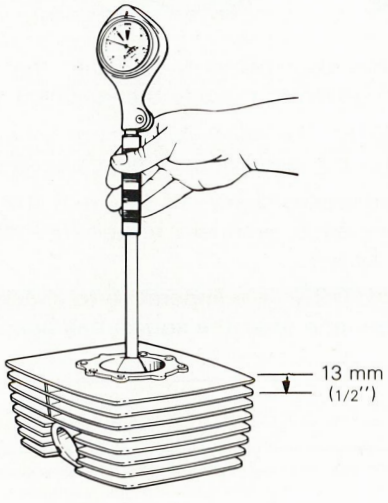
Cylinder taper

Measure cylinder diameter 16 mm (5/8'') from top of cylinder and down to just below the intake port. If the difference between each measurement exceeds 0.08 mm (.003'') the cylinder should be rebored and honed or should be replaced.



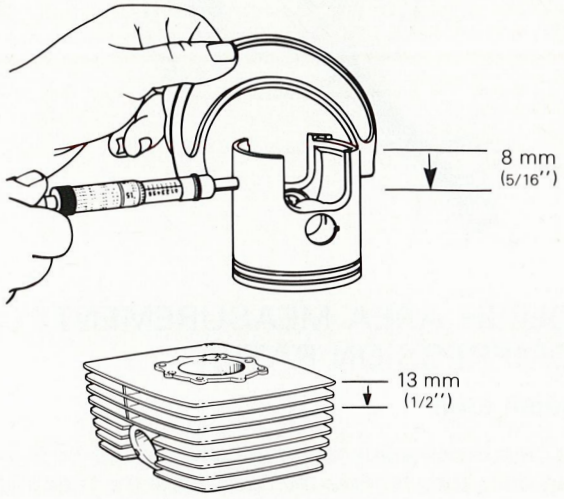
Cylinder out of round

Measuring 13 mm (1/2'') from top of cylinder with a cylinder gauge, check if the cylinder out of round is more than 0.05 mm (.002'') larger. If so cylinder should be rebored and honed or should be replaced.



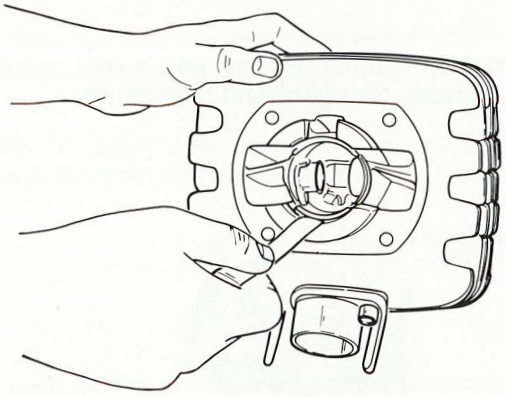
Piston to cylinder wall clearance

To determine this clearance, the piston should be measured 8 mm (5/16'') above its bottom edge and the cylinder should be measured 13 mm (1/2'') below its top edge.



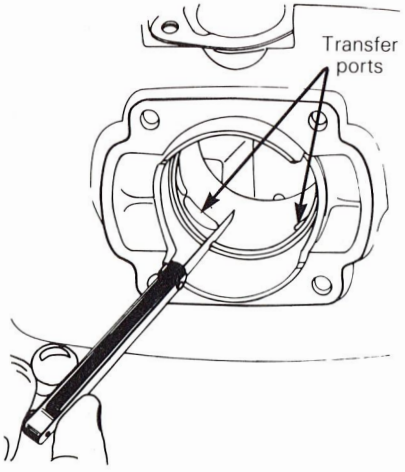
The difference between these two measurements should be within specified tolerance.

Also it is possible to check the clearance, with the piston in the cylinder, using a feeler gauge.



Ring end gap

Position ring under the transfer ports. Using a feeler gauge, check ring end gap. If gap exceeds specified tolerance the ring should be replaced.



SQUISH AREA MEASUREMENT/ COMPRESSION RATIO

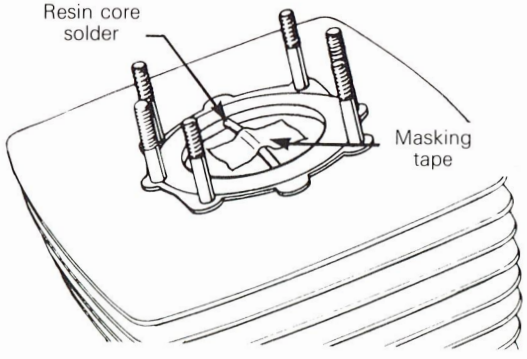
Squish area

In a criss-cross sequence, gradually remove the cylinder head nuts, then remove the head. Note the head shim/s used, (if any).

Bring the piston to 1/4'' B.T.D.C. and place a length of resin core solder (maximum of 1/8'' diameter) across the piston, making sure it is positioned parallel to the wrist pin to obtain an equal reading on each side of the cylinder.

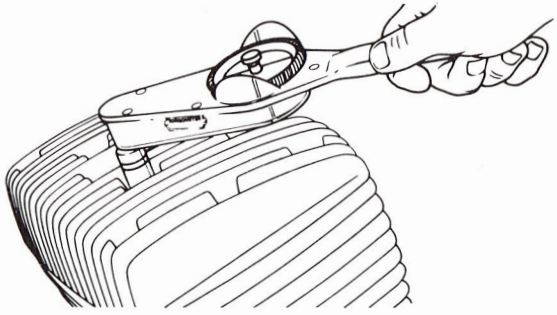
CAUTION: Do not use acid core solder, the acid can damage the piston and cylinder wall.

NOTE: To hold the resin core solder in place, clean the piston surface and use masking tape.



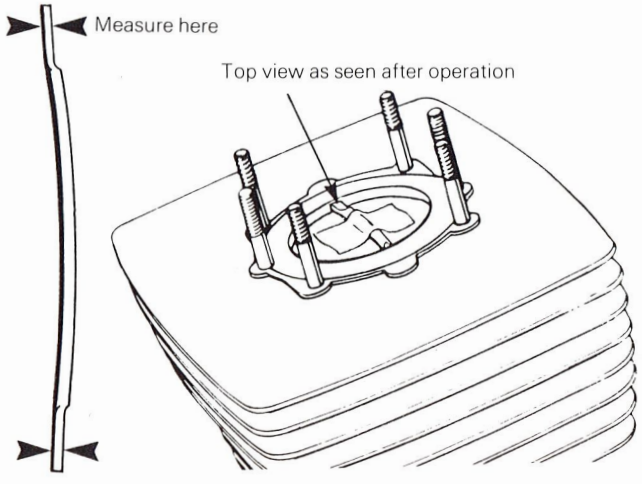
Install the cylinder head and using a criss-cross sequence, gradually torque the cylinder head nuts to the correct specifications:

125 cm^3 ..... 16 N•m (12 ft/lbs)
250 cm^3 ..... 19 N•m (14 ft/lbs)
370 cm^3 ..... 25 N•m (19 ft/lbs)



Using the magneto side crankshaft nut, rotate the crankshaft in order for the piston to pass the T.D.C. point.

Remove the head, remove the resin core solder and measure both ends.



Using this measurement, calculate the required head shim(s) needed to provide the specified squish area.

NOTE: The head shim is not a head gasket and does not need replacement unless damaged.

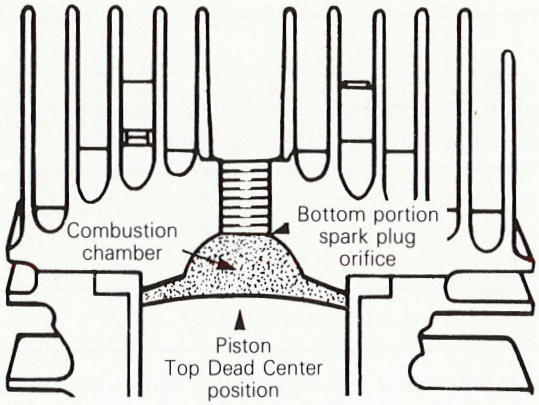
Fit the necessary shim/s (if required) and, using a criss-cross sequence, gradually torque the head nuts to the correct torque.

CAUTION: It is imperative to check the compression ratio after the squish has been corrected.

Compression ratio

To check the compression ratio, bring the piston to the top dead center position and pour a given amount (see chart) of oil (30 grade) into the combustion chamber through the spark plug orifice.

The compression ratio will be correct, when the specific given amount of oil fills the combustion chamber up to the bottom portion of the spark plug orifice.



MODEL	REQUIRED VOLUME OF OIL (30 grade)	NOMINAL =COMPRESSION RATIO
MX-4 125	8.2 mL ± 0.2	15.5-16.5 to 1
MX-4 250	19.1 mL ± 0.7	13.5-14.5 to 1
MX-4 370	31.7 mL ± 1.4	12-13 to 1

If the compression ratio is proven to be too low or too high, consult the possiblity chart to guide you in a remedy procedure.

CAUTION: To carry out some of the following procedures, it is necessary that special equipment be available. If you do not possess such equipment, have the cylinder head modified in a work-shop equipped with a proper tooling.

POSSIBILITY CHART

SQUISH TOO SMALL	
Compression ratio OK	Machine the squish angle to correct squish, then machine the flat surface of the cylinder head to correct the compression and re-verify the squish.
Compression ratio too high	Add shim/s.
SQUISH TOO LARGE	
Compression ratio OK	Machine flat surface of cylinder head to correct the squish and then machine the radius of the combustion chamber to correct the compression ratio.
Compression ratio too low	Remove the shim/s (if any) or machine flat surface of cylinder head to correct squish and verify compression ratio.
Compression ratio too high	Remove the shim/s (if any) to correct squish or machine flat surface of the cylinder head to correct squish and then machine the radius of the combustion chamber to correct the compression ratio.
SQUISH OK	
Compression ratio too low	Remove the shim/s (if any) to correct the compression or machine the flat surface of the cylinder head to correct the compression and then machine the squish angle to re-correct the squish and re-verify the compression ratio.
Compression ratio too high	Machine the radius of the combustion chamber to correct the compression ratio.
COMPRESSION RATIO OK	
Squish too small	Machine the squish angle to correct squish then machine the flat surface of the cylinder head to correct the compression and re-verify the squish.
Squish too large	Remove the shim/s (if any) or machine the flat surface of cylinder head to correct the squish then machine the radius of the combustion chamber to correct the compression ratio.

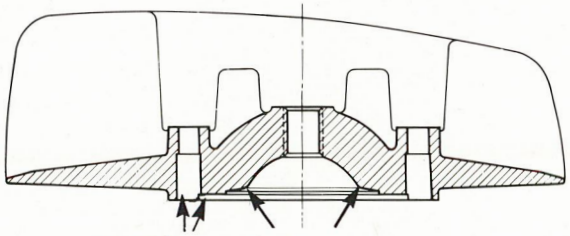
COMPRESSION RATIO TOO HIGH	
Squish too small	Add shim/s and verify the compression ratio.
Squish OK	Machine the radius of the combustion chamber to correct the compression.
Squish too large	Remove shim/s (if any) or machine the flat surface of the cylinder head to correct squish area then machine the radius of the combustion chamber to correct the compression.
COMPRESSION RATIO TOO LOW	
Squish too small	Remove the shim/s (if any) to correct the compression or machine the flat surface of the cylinder head to correct the compression ratio and then machine the squish angle to correct the squish, re-verify the compression ratio.
Squish too large	Remove the shim/s (if any) or machine the flat surface of the cylinder head to correct the squish and verify compression ratio.
Squish OK	Machine the flat surface of the cylinder head to correct the compression and then machine the squish angle to re-correct the squish.

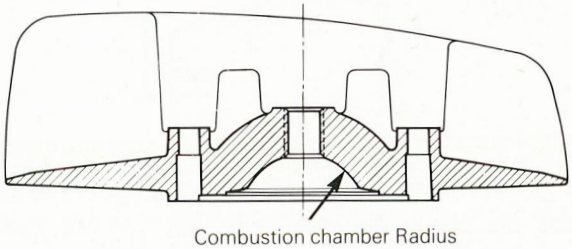
CAUTION: It is very difficult to pre-determine the amount of material to remove from the cylinder head anytime the squish and/or compression ratio needs to be modified, so, when machining is required, we recommend very light cuts and verify the results between each cut.

SQUISH ANGLE	
MX-4 125	12°
MX-4 250	12°
MX-4 370	20°

COMBUSTION CHAMBER RADIUS	
MX-4 125	3 mm (.118")
MX-4 250	3 mm (.118")
MX-4 370	8 mm (.314")

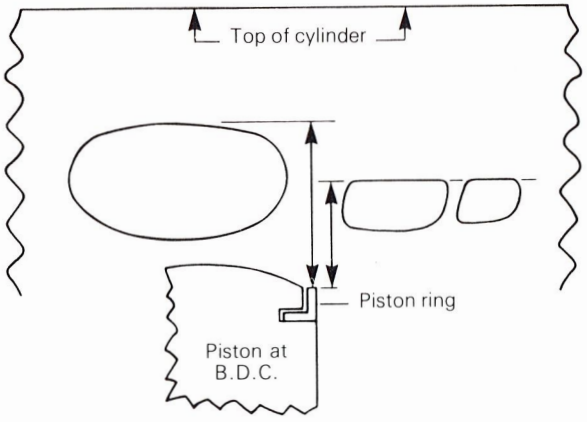
CAUTION: Squish area and compression ratio are interrelated, do not modify one without checking the other.



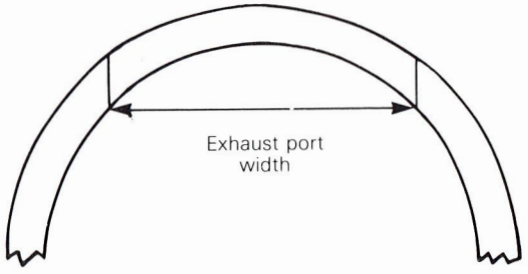


Port heights measurement

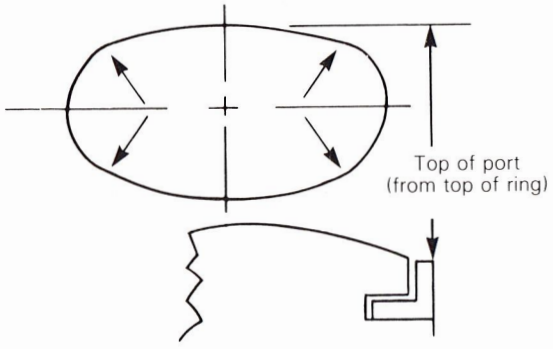
– Port heights are measured on the inside diameter of the cylinder and are taken from the top of the piston ring with the piston at bottom dead center (BDC).



– The exhaust port width is measured in a straight line from edge to edge (**Not** around the cylinder wall).



– The height and width specifications do not include port radius or edge chamfer.



The port shape must be approximately as shown to prevent piston ring breakage. The radius in each "Corner" guides the piston ring back into place as the piston travels past the port.

Rotary valve timing

The rotary valve controls the opening and closing of the intake port, therefore, its installation position is critical toward efficient operation.

For example, an engine with the following specifi cations:

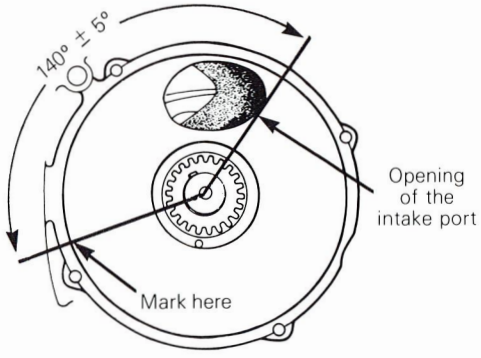
Disc opening at 140° B.T.D.C.

Disc closing at 85° A.T.D.C.

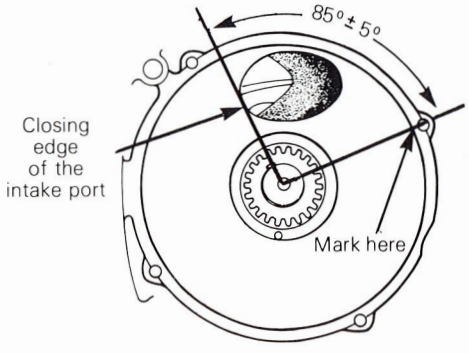
Disc is asymetrical.

Proceed as follows:

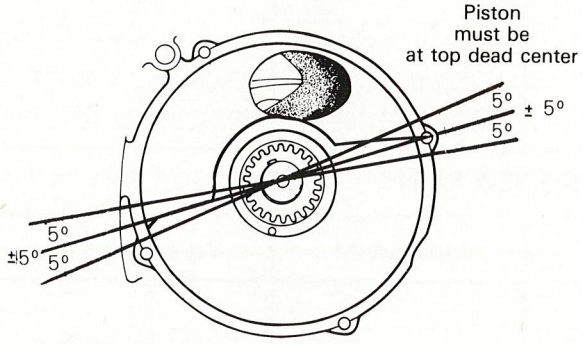
Using a degree wheel, mark 140° after the opening of the intake port. (degrees follow a counter-clockwise direction).



From the closing edge of the intake port, mark 85° (degrees follow a clockwise direction.)

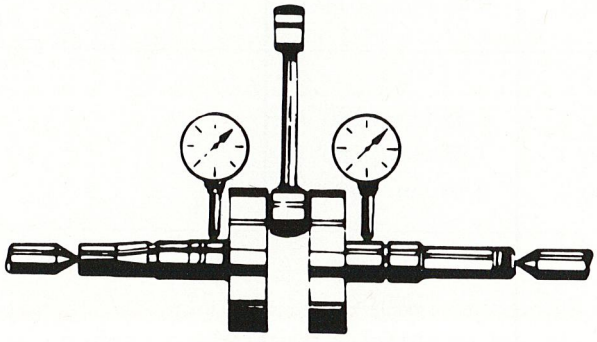


Using a dial indicator, place the piston at top dead center to have the edges of the disc as close as possible to the marks. If the edges do not align exactly, make sure the **error** is subdivided equally on either side of the marks. The maximum tolerance is 5° on either side of the marks.

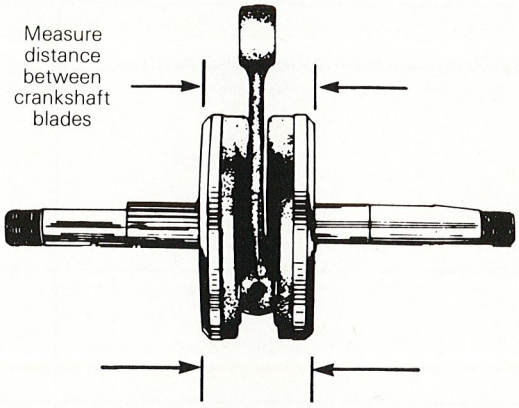


Crankshaft excentricity

With the crankshaft positioned between a center lathe, install a dial indicator as close as possible to crankshaft blade then measure deflection on each side. If deflection exceeds 0.05 mm (.002") the crankshaft should be repaired by a specialized shop or it should be replaced.



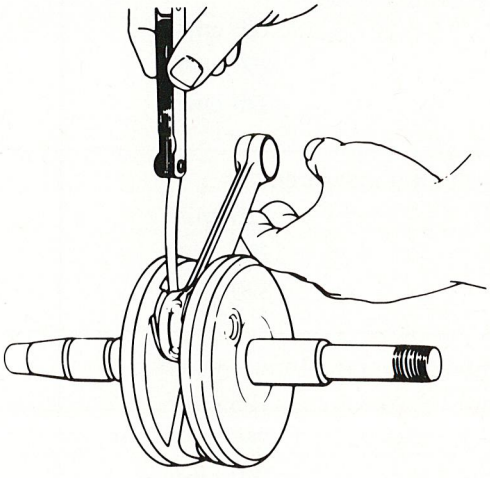
Crankshaft blade width



The distance between the two points must be equal.

Connecting rod big end axial play

Using a feeler gauge measure distance between connecting rod and thrust washer. If axial play exceeds 0.8 mm (.030"), the crankshaft should be replaced.



POWER HEAD			
Cylinder bore nominal dimension	STANDARD	FIRST OVERSIZED	SECOND OVERSIZED
125 cm³	54 mm (2.130")	Not applicable (Nikasil cylinder)	
250 cm³	72 mm (2.834")	72.25 mm (2.844")	72.50 mm (2.854")
370 cm³	84 mm (3.307")	84.25 mm (3.317")	84.50 mm (3.327")

	WHEN FITTING NEW PARTS		
	MINIMUM	MAXIMUM	WEAR LIMIT
Piston to cylinder wall clearance			
125 cm³	0.050 mm (.002")	0.085 mm (.003")	0.135 mm (.005")
250 cm³	0.050 mm (.002")	0.085 mm (.003")	0.135 mm (.005")
370 cm³	0.085 mm (.003")	0.100 mm (.004")	0.190 mm (.0075")
Piston ring end gap			
125 cm³	0.15 mm (.006")	0.35 mm (.014")	0.8 mm (.031")
250 cm³	0.20 mm (.008")	0.40 mm (.016")	1.0 mm (.039")
370 cm³	0.25 mm (.010")	0.45 mm (.018")	1.2 mm (.047")
Squish area measurement			
125 cm³	1.14 mm (.045")	1.39 mm (.055")	
250 cm³	1.39 mm (.055")	1.65 mm (.065")	
370 cm³	2.28 mm (.090")	2.54 mm (.100")	
Compression ratio (uncorrected)			
125 cm³	15.5:1	16.5:1	
250 cm³	13.5:1	14.5:1	
370 cm³	12:1	13:1	
Exhaust port height			
125 cm³	25 mm (.984")		
250 cm³	30 mm (1.181")		
370 cm³	33 mm (1.30")		
Exhaust port width			
125 cm³	37 mm (1.456")		
250 cm³	52 mm (2.047")		
370 cm³	58 mm (2.283")		

	WHEN FITTING NEW PARTS		
	MINIMUM	MAXIMUM	WEAR LIMIT
Transfer port height			
125 cm³	12 mm (.472")		
250 cm³	15 mm (.590")		
370 cm³	16 mm (.629")		
Rotary valve disc opens BTDC			
125 cm³	140°		
250 cm³	140°		
370 cm³	Not applicable		
Rotary valve disc closes ATDC			
125 cm³	85°		
250 cm³	85°		
370 cm³	Not applicable		
Cylinder sleeve outside diameter			
125 cm³	Not applicable		
250 cm³	79.124 mm (3.115")	79.146 mm (3.116")	
370 cm³	90.126 mm (3.548")	90.146 mm (3.549")	
Cylinder inside dia. (without sleeve)			
125 cm³	Not applicable		
250 cm³	79 mm (3.110")	79.035 mm (3.111")	
370 cm³	90 mm (3.543")	90.035 mm (3.544")	
Cylinder/sleeve interference fit			
125 cm³	Not applicable		
250 cm³	0.101 mm (.004")	0.152 mm (.006")	
370 cm³	0.09 mm (.0035")	0.146 mm (.0057")	
CRANKSHAFT/CRANKCASE			
Crankshaft end play	0.025 mm (.001")	0.100 mm (.004")	
Crankshaft excentricity		0.05 mm (.002")	

	WHEN FITTING NEW PARTS		
	MINIMUM	MAXIMUM	WEAR LIMIT
Crankshaft blade width (nominal) 125 cm^3 250 cm^3 370 cm^3	48.31 mm (1.902") 51.18 mm (2.015") 64.94 mm (2.557")		
Connecting rod side play in crankshaft	0.4 mm (.015")	0.5 mm (.020")	0.8 mm (.030")
Crankpin interference fit 125, 250,370 cm^3	0.076 mm (.003")	0.095 mm (.0037")	
Connecting rod to crankpin clearance			0.1 mm (.004")
Connecting rod to piston pin radial clearance			0.05 mm (.002")
Piston pin outside diameter	18 mm (.7086")		0.05 mm (.002")
Depth of groove caused by crankshaft seals		0.15 mm (.006")	
Ball bearings clearances (all axial)			0.01 mm (.004")
Ball bearings clearances (all radial)			0.05 mm (.002")
Crankshaft balance factor 125 cm^3 250 cm^3 370 cm^3	 45% 50% 50%		
Clearance between bearing and polyamid ring			0.1 mm (.004")
Disc valve rotational play 250, 370 cm^3			1.2 mm (.047")
CLUTCH			
Radial clearance of clutch drum needle bearing			0.06 mm (.0024")
Rotational play between slots of clutch drum and friction plate area			1 mm (.040")

	WHEN FITTING NEW PARTS		
	MINIMUM	MAXIMUM	WEAR LIMIT
Rotational play between the splines of clutch hub and the teeth of driven plate			0.7 mm (.028")
Thickness of friction plate	3.5 mm (.138")		0.4 mm (.016")
TRANSMISSION			
Needle bearing radial play			0.08 mm (.003")
Axial clearance between shift fork and groove in gear			0.5 mm (.020")
Axial clearance between pin of shift forks and groove in shift drum (Measured with shifter drum indexed in each gear except neutral)			0.4 mm (.015")
Main shaft end play		0.1 mm (.004")	
Clutch shaft end play		0.1 mm (.004")	
Shifter shaft end play	0.03 mm (.001")	1.18 mm (.046")	
Shifter drum end play		0.47 mm (.018")	
Kick starter shaft end play	0.02 mm (.0007")	0.74 mm (.029")	
Shifter shaft radial clearance	0.127 mm (.005")	0.152 mm (.006")	

POWER TRAIN

VEHICLE MODEL	MX-4 125 8840	MX-4 250 8864	MX-4 370 8884
BOMBARDIER-ROTAX TYPE	124	244	366
Primary drive	Straight cut and ground gears		
Primary drive ratio	3.286 21/69T	2.91 23/67T	2.60 25/65T
Clutch	Multiplate 5 disc oil bath	Multiplate 6 disc oil bath	Multiplate 7 disc oil bath
Transmission	Constant mesh 6 speed	Constant mesh 5 speed	
Gear ratio	1st 2.38 (13/31T) 2nd 1.93 (15/29T) 3rd 1.58 (17/27T) 4th 1.31 (19/25T) 5th 1.09 (21/23T) 6th 0.96 (22/21T)	1st 2.38 (13/31T) 2nd 1.75 (16/28T) 3rd 1.39 (18/25T) 4th 1.095 (21/23T) 5th .913 (23/21T)	
Chain	520 (5/8" pitch x 1/4")		
Number of links	114	108	
Engine sprocket	13T	14T	
Rear wheel sprocket	54T	47T	
Ratio	4.15	3.36	
Overall ratio	13.09	8.92	7.97

T: teeth

ELECTRICAL	VEHICLE MODEL		MX-4 125 8840	MX-4 250 8864	MX-4 370 8884
	BOMBARDIER-ROTAX TYPE		124	244	366
	Ignition system		Motoplat C.D.I. 40,000 volts	Bosch Electronic C.D.I. 30,000 volts	
	Spark plug		BOSCH W-280-MZ-2		
	Spark plug optional ①		NGK B8ES – CHAMPION N2G		
	Spark plug (gap)		0.5 mm (.020")		
	Ignition timing at 7000 R.P.M.		ALIGN FLYWHEEL/ROTOR AND COVER MARKS		
	Basic timing B.T.D.C. ②	mm (in.) (degr.)	1.0 ± .2 (0.039" ± .007) (13° ± 1°)	1.3 ± .2 (0.051" ± .007) (15° ± 1°)	2.5 ± .2 (0.098" ± .007) (20° ± 1°)
	Electrical resistance (ohms)	Gen. coil	630	450 à 550	
		Pick-up coil	7	50 à 80	

①Use as a guideline only, check spark plug heat range.

②– B.T.D.C.: before top dead center.

– Use top dead center (gauge dial indicator).

	VEHICLE MODEL	MX-4 125 8840	MX-4 250 8864	MX-4 370 8884
CARBURETION	BOMBARDIER-ROTAX TYPE	124	244	366
	Carburetor type	BING 32 mm TYPE 84		BING 36 mm Type V54
	Carburetor number	1/32A/3302		54-36-120
	Main jet	155		165
	Needle jet	2.70	2.73	2.82
	Idle jet	40		60
	Needle identification	4 RINGS STANDARD		8G2
	Needle setting	3e GROOVE FROM TOP		2nd GROOVE FROM TOP
	Slide	STANDARD NO. 1		230
	Air screw adjustment ± 1/4	1 1/8 TURN OUT		
	Float level mm (in.)	22.5 mm (.885")		
	Air filter	K & N OIL WETTED FILTER		
	Idle speed	APPROXIMATELY 1000 R.P.M.		
	Fuel grade/oil ratio	PREMIUM 32/1		

CARBURETOR SETTING APPLICATION CHART
MX-4 125-250 (CARB. NO. 1/32A/3302)

TEMPERATURE			ALTITUDE						
°C	(°F)		SEA LEVEL	500 m (1600 ft)	1 000 m (3200 ft)	1 500 m (4900 ft)	2 000 m (6500 ft)	2 500 m (8200 ft)	3 000 m (9800 ft)
40°	(104°)	① ② ③	150 3rd 1 1/8	145 2nd 1 5/8	140 2nd 1 5/8	140 2nd 1 5/8	135 2nd 1 5/8	130 2nd 1 5/8	125 1st 2 1/8
30°	(86°)	① ② ③	150 3rd 1 1/8	150 2nd 1 5/8	145 2nd 1 5/8	140 2nd 1 5/8	135 2nd 1 5/8	130 2nd 1 5/8	130 2nd 1 5/8
20°	(68°)	① ② ③	155 3rd 1 1/8	150 3rd 1 1/8	145 2nd 1 5/8	145 2nd 1 5/8	140 2nd 1 5/8	135 2nd 1 5/8	130 2nd 1 5/8
10°	(50°)	① ② ③	155 3rd 1 1/8	155 3rd 1 1/8	150 3rd 1 1/8	145 2nd 1 5/8	140 2nd 1 5/8	135 2nd 1 5/8	135 2nd 1 5/8
0°	(32°)	① ② ③	160 3rd 1 1/8	155 3rd 1 1/8	150 3rd 1 1/8	150 2nd 1 5/8	145 2nd 1 5/8	140 2nd 1 5/8	135 2nd 1 5/8
-10°	(14°)	① ② ③	165 3rd 1	160 3rd 1 1/8	155 3rd 1 1/8	150 3rd 1 1/8	145 2nd 1 5/8	140 2nd 1 5/8	135 2nd 1 5/8
-20°	(- 4°)	① ② ③	165 4th 5/8	165 3rd 1 1/8	160 3rd 1 1/8	155 3rd 1 1/8	150 3rd 1 1/8	145 2nd 1 5/8	140 2nd 1 5/8

① Main jet no.

② Needle position (groove from top).

③ Air screw.

CAUTION: These adjustments are guidelines only. Specific adjustments vary with temperature, altitude and terrain conditions. Always observe spark plug condition for proper jetting.

CARBURETOR SETTING APPLICATION CHART
MX-4 370 (CARB. NO. 54-36-120)

TEMPERATURE			ALTITUDE						
°C	(°F)		SEA LEVEL	500 m (1600 ft)	1 000 m (3200 ft)	1 500 m (4900 ft)	2 000 m (6500 ft)	2 500 m (8200 ft)	3 000 m (9800 ft)
40°	(104°)	① ② ③	160 2nd 1 1/8	155 1st 1 5/8	150 1st 1 5/8	150 1st 1 5/8	140 1st 1 5/8	140 1st 1 5/8	135 1st 2 1/8
30°	(86°)	① ② ③	165 2nd 1 1/8	160 1st 1 5/8	155 1st 1 5/8	150 1st 1 5/8	145 1st 1 5/8	140 1st 1 5/8	135 1st 1 5/8
20°	(68°)	① ② ③	165 2nd 1 1/8	165 2nd 1 1/8	155 1st 1 5/8	155 1st 1 5/8	150 1st 1 5/8	145 1st 1 5/8	140 1st 1 5/8
10°	(50°)	① ② ③	170 2nd 1 1/8	165 2nd 1 1/8	160 2nd 1 1/8	155 1st 1 5/8	150 1st 1 5/8	145 1st 1 5/8	140 1st 1 5/8
0°	(32°)	① ② ③	170 2nd 1 1/8	165 2nd 1 1/8	165 2nd 1 1/8	160 1st 1 5/8	155 1st 1 5/8	150 1st 1 5/8	145 1st 1 5/8
-10°	(14°)	① ② ③	175 3rd 5/8	170 2nd 1 1/8	165 2nd 1 1/8	160 2nd 1 1/8	155 1st 1 5/8	150 1st 1 5/8	145 1st 1 5/8
-20°	(- 4°)	① ② ③	180 3rd 5/8	175 2nd 1 1/8	170 2nd 1 1/8	165 2nd 1 1/8	160 2nd 1 1/8	155 1st 1 5/8	150 1st 1 5/8

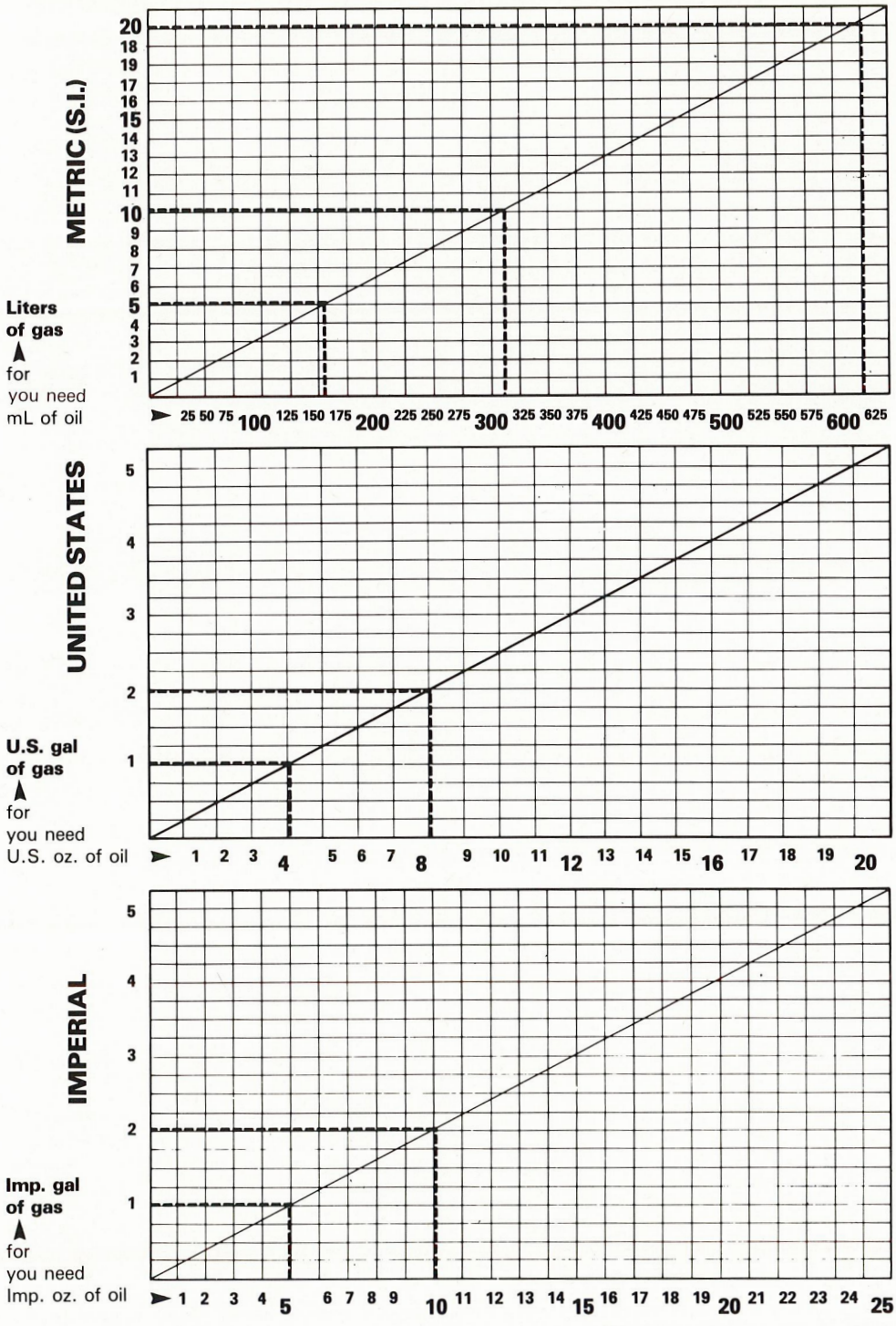
① Main jet no.

② Needle position (groove from top).

③ Air screw.

CAUTION: These adjustments are guidelines only. Specific adjustments vary with temperature, altitude and terrain conditions. Always observe spark plug condition for proper jetting.

FUEL MIXING RECOMMENDATIONS (32 to 1 ratio)



Use concentrated Bombardier 50/1 oil or any equivalent, high quality 2 cycle oil mixed with premium gasoline.

CAUTION: Never use outboard oils, straight mineral oils or injector oils.

LIQUID CAPACITIES

LIQUID CAPACITIES

VEHICLE MODEL		MX-4 125 8840	MX-4 250 8864	MX-4 370 8884
Gas tank	Liter Imp. gal. U.S. gal.	7.7 liters 1.7 Imp. gal. 2.0 U.S. gal.		
Fork (each leg)	mL fl. oz. grade	265 mL 9.3 fl. oz. SAE 10	365 mL 12.8 fl. oz. SAE 10	
Transmission	Liter Imp. qt. U.S. qt. (Grade)	FILL UP TO LEVEL PLUG 1.14 liters – 1 Imp. quart – 1.2 U.S. quart (SAE 80 GEAR OIL OR SAE 30 MOTOR OIL)		

DIMENSIONS

	VEHICLE MODEL		MX-4 125 8840	MX-4 250 8864	MX-4 370 8884
DIMENSIONS	Wheel base	cm (in.)	146.7 (57.75)		
	Overall length	cm (in.)	215.3 (84.75)		
	Overall width	cm (in.)	86.4 (34.0)		
	Overall height	cm (in.)	119.4 (47.0)		
	Ground clearance	cm (in.)	26.0 (10.25)	27.3 (10.75)	
	Seat height	cm (in.)	87.6 (34.5)	88.9 (35.0)	
	Dry weight	kg (lbs)	92.5 (204)	98.4 (216.4)	104.3 (229.4)
	Chassis type/material		TUBULAR, DOUBLE LOOP SPACE FRAME WITH TAPERED BACK BONE/CHROME-MOLY		

	VEHICLE MODEL	MX-4 125 8840	MX-4 250 8864	MX-4 370 8884
SUSPENSION	Front	MARZOCCHI 35 mm	MARZOCCHI 38 mm	
	Travel ① cm (in.)	25 (9.8)		
	Rear	Trailing arms & gas shocks		
	Travel ② cm (in.)	25 (9.8)		
	Fork angle	31° standard, 26° to 32° adjustable		
	Forks springs (progressive)	3.8-5 kN/m 21-29 lb F/in.	3.5-5.3 kN/m 20-30 lb F/in.	
	Brake front	Drum, single leading shoe, 15.24 cm diameter x 2.54 cm (6 in. dia. x 1 in.)		
	Brake rear	Drum, single leading shoe 15.24 cm diameter x 2.54 cm (6 in. dia. x 1 in.)		
	Rim front ③	1.60" x 21" alloy profile		
	Rim rear ③	1.85" x 18" Alloy low profile	2.75" x 18" Alloy low profile	
	Tire front	3.00" x 21" knobby (Dunlop)		
	Tire rear	4.00 x 18 knobby (Dunlop)	5.00 x 18 knobby (Dunlop)	

① Without rebound spring
② At rear wheel
③ Provided with inside pins as tire retention device

FORK SPRING SPECIFICATIONS

MODEL		SPRING RATE (progressive)	COLOR CODE	WIRE DIAMETER	SPRING LENGTH	OUTSIDE DIAMETER (small)	TOTAL COILS	SPRING COLLAPSED LENGTH
MX-4 125	STD	3.8-5 kN/m (21-29 lbf/in.)	–	4.2 mm (.165")	58.7 cm (23.125")	27.6 mm (1.090")	72 1/2	34.6 cm (13.620")
MX-4 250 370	STD	3.5-5.3 kN/m (20-30 lbf/in.)	White	4.2 mm (.165")	63.1 cm (24.87")	27.5 mm (1.085")	72	32.9 cm (12.97")
	OPT.	3.85-5.7 kN/m (22-33 lbf/in.)	Blue	4.2 mm (.165")	63.1 cm (24.87")	27.5 mm (1.085")	65	29.4 cm (11.59")

SHOCK SPRING

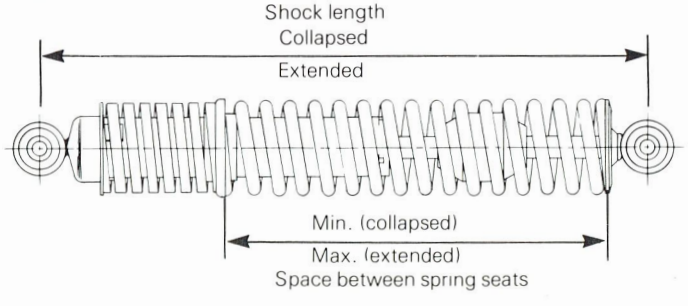
MODEL		SPRING RATE lb/in.	COLOR CODE	WIRE DIAMETER	SPRING LENGTH	INSIDE DIAMETER	TOTAL COILS	SPRING COLLAPSED LENGTH
MX-4 125 250 370	STD	25.3 kN/m (145 lbf/in.)	Purple/ purple	7.7 mm (.306")	26.6 cm (10.5")	36.1 mm (1.425")	16.5	12.5 cm (4.92")
	OPT.	22.4 kN/m (128 lbf/in.)	Purple/ green	7.1 mm (.281")	26.6 cm (10.5")	36.1 mm (1.425")	15.5	10.8 cm (4.24")

CAUTION: Always ensure that the collapsed spring length is shorter than the minimum space between the spring seats.

SHOCK

MODEL	SHOCK LENGTH EXTENDED	SHOCK LENGTH COLLAPSED	SPACE BETWEEN SPRING SEATS MINIMUM	MAXIMUM
MX-4 125-250-370 (Girling)	380 mm ± 6 (14.96" ± 0.25)	244.3 mm ± 6 (9.62" ± 0.25)	154.9 mm ± 6 (6.1" ± 0.25)	257.1 mm ± 6 (10.125" ± 0.25)

NOTE: The shock collapsed length is always measured with the rubber bumper fully compressed, and without the spring retainer.



STEERING HEAD

To obtain a specified fork angle use the following chart which shows the various fork angle when changing steering cones and/or steering cones position (forward or rearward).

	UPPER BEARING			LOWER BEARING		
FORK ANGLE	CONE KEY POSITION	CAN-AM PART NO.	CONE ANGLE	CONE KEY POSITION	CAN-AM PART NO.	CONE ANGLE
32	FORWARD (F)	746 010 301	+ 3	REARWARD (R)	746 010 301	+ 3
31 1/2	F	746 010 301	+ 3	R	746 010 201	+ 2
31*	**F**	**746 010 201**	**+ 2**	**R**	**746 010 201**	**+ 2**
30 1/2	F	746 010 201	+ 2	R	746 010 101	+ 1
30	F	746 010 101	+ 1	R	746 010 101	+ 1
29 1/2	F	746 010 101	+ 1	R or F	746 010 001	0
29	F or R	746 010 001	0	R or F	746 010 001	0
28 1/2	R	746 010 101	- 1	R or F	746 010 001	0
28	R	746 010 101	- 1	F	746 010 101	- 1
27 1/2	R	746 010 201	- 2	F	746 010 101	- 1
27	R	746 010 201	- 2	F	746 010 201	- 2
26 1/2	R	746 010 301	- 3	F	746 010 201	- 2
26	R	746 010 301	- 3	F	746 010 301	- 3

* Standard setting

NOTE: The chart above is to be used as a guide-line only. The fork angle can be altered by all kinds of factors, i.e. rear spring preload, fork spring, tire size/inflation, shock length, etc.

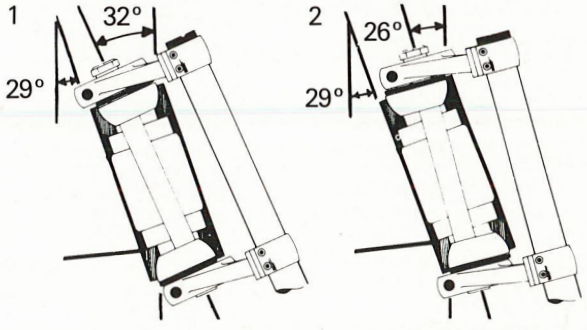
Fork angle recommendations:	
Fast road work	29° to 31°
Motocross	30° to 32°
Oval racing	26° to 29°

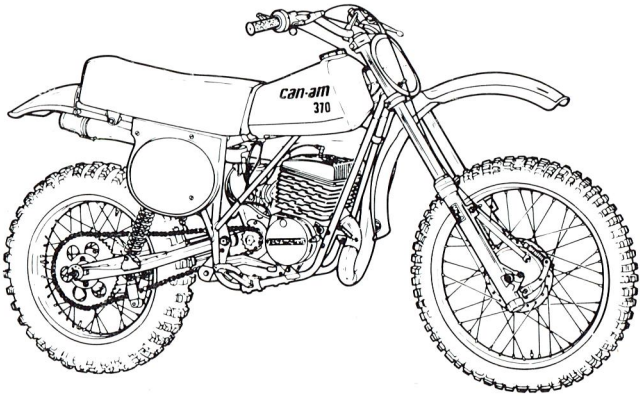
The standard frame angle is 29°.

The standard fork angle is 31°.

WARNING: Incorrect fork angle may cause adverse handling conditions.

1. An extended fork angle provides greater stability at high speeds.
2. A retracted fork angle provides more maneuverability in restricted areas or on trials sections.

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