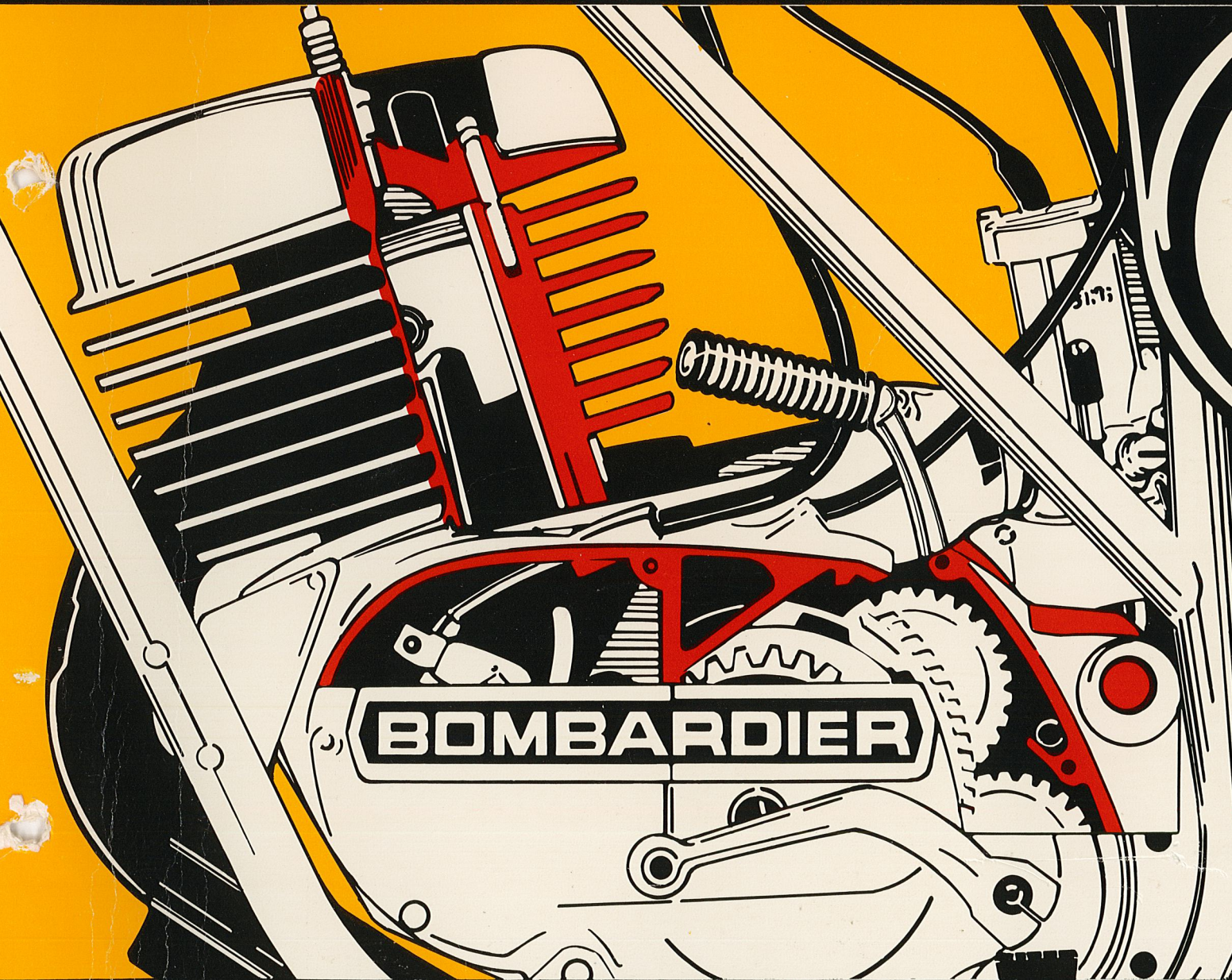




1975-1976

# SHOP MANUAL

## SUPPLEMENT











## **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, in general, 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:** Identifying 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.



# FOREWORD

## THE CAN-AM MOTORCYCLE SHOP MANUAL

As a supplement edition, this manual covers only procedures and information, relating to the 1975-76 production series of Can-Am motorcycles, which differ from those stated in the 1973-74 Can-Am shop manual.

## 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.

As many of the procedures in this manual are inter-related, 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.

## 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 published by the

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

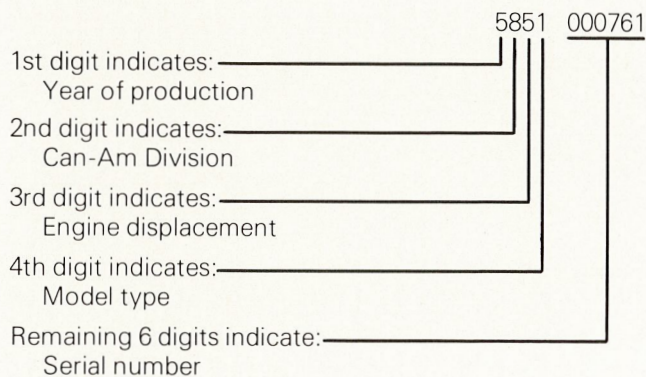


## (Sub-Section 1-2)

## VEHICLE IDENTIFICATION

The Vehicle Identification Number, commonly known as the "VIN", is a 10 digit number that will identify the motorcycle as shown:

**Example:** In 1975, Can-Am Division of Bombardier produced a 175cc T'NT model motorcycle that was the 761st unit of that production schedule. The "VIN" would be



The "VIN" is required:

- When motorcycle is registered.
- For warranty claim processing.
- For ordering spare parts.

○ **NOTE:** Always quote all 10 digits when referring to "VIN" or serial number.

The Can-Am "VIN" will change according to year, displacement and model as shown.

### ENGINE DISPLACEMENT (3rd digit)

1	Up to 50cc
2	51 to 80cc
3	81 to 100cc
4	101 to 125cc
5	126 to 200cc
6	201 to 250cc
7	251 to 350cc
8	351 to 500cc
9	501 to 750cc
0	751 to 1000 open

### 1975-76

#### MODEL TYPE (4th digit)

T'NT	1
Road Bike	2
Motocross MX-1	3
Motocross MX-2 and up	4
Enduro	5
Reserved for future models	6
	7
	8
	9
Motocross (GP)	0

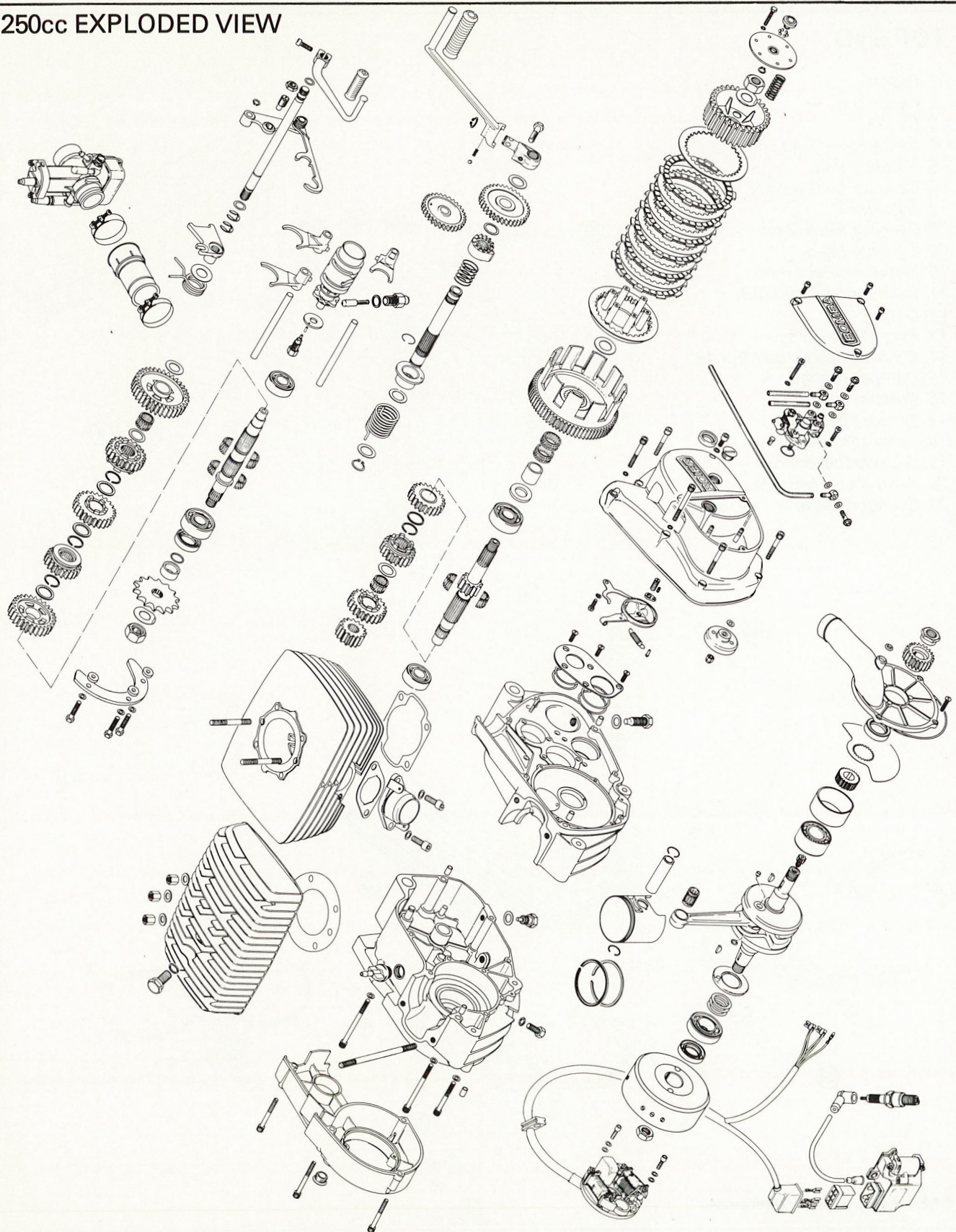
- The "VIN" is stamped on the steering head.
- The engine identification number is stamped on the right side of the rear mount boss.
- The engine displacement is stamped on the left side of the cylinder between the two bottom cooling fins.







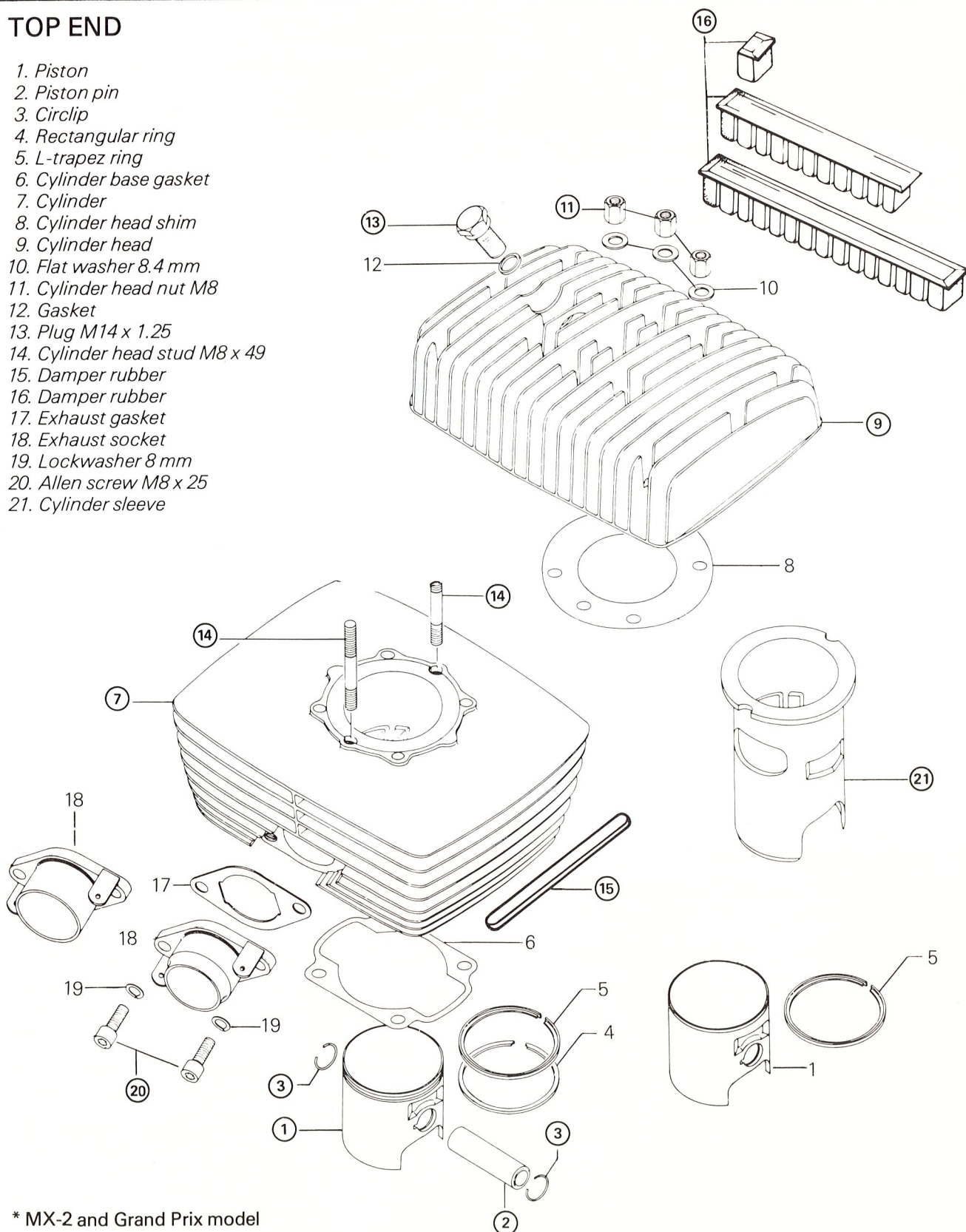
250cc EXPLODED VIEW





## TOP END

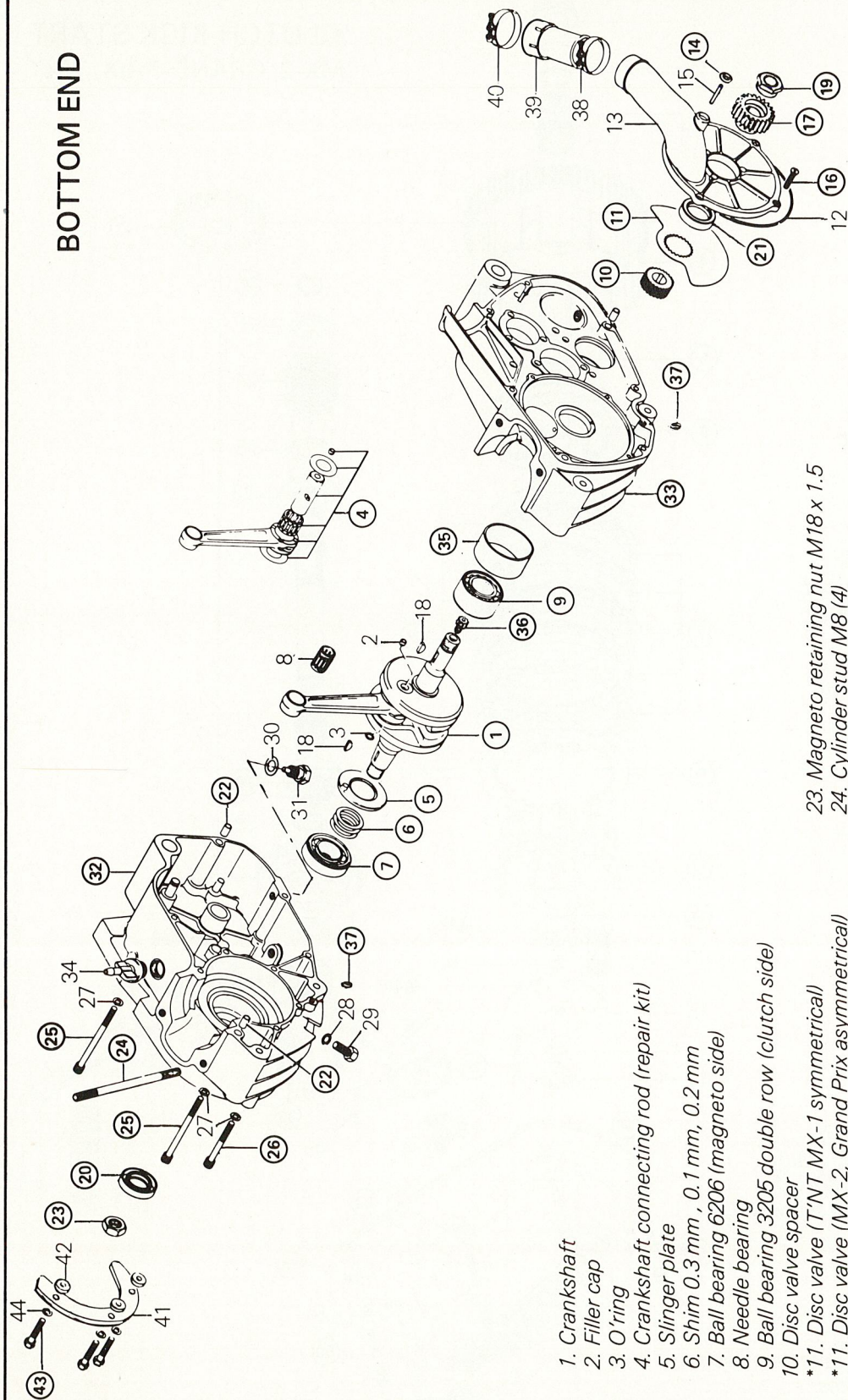
1. Piston
2. Piston pin
3. Circlip
4. Rectangular ring
5. L-trapez ring
6. Cylinder base gasket
7. Cylinder
8. Cylinder head shim
9. Cylinder head
10. Flat washer 8.4 mm
11. Cylinder head nut M8
12. Gasket
13. Plug M14 x 1.25
14. Cylinder head stud M8 x 49
15. Damper rubber
16. Damper rubber
17. Exhaust gasket
18. Exhaust socket
19. Lockwasher 8 mm
20. Allen screw M8 x 25
21. Cylinder sleeve



\* MX-2 and Grand Prix model



## BOTTOM END

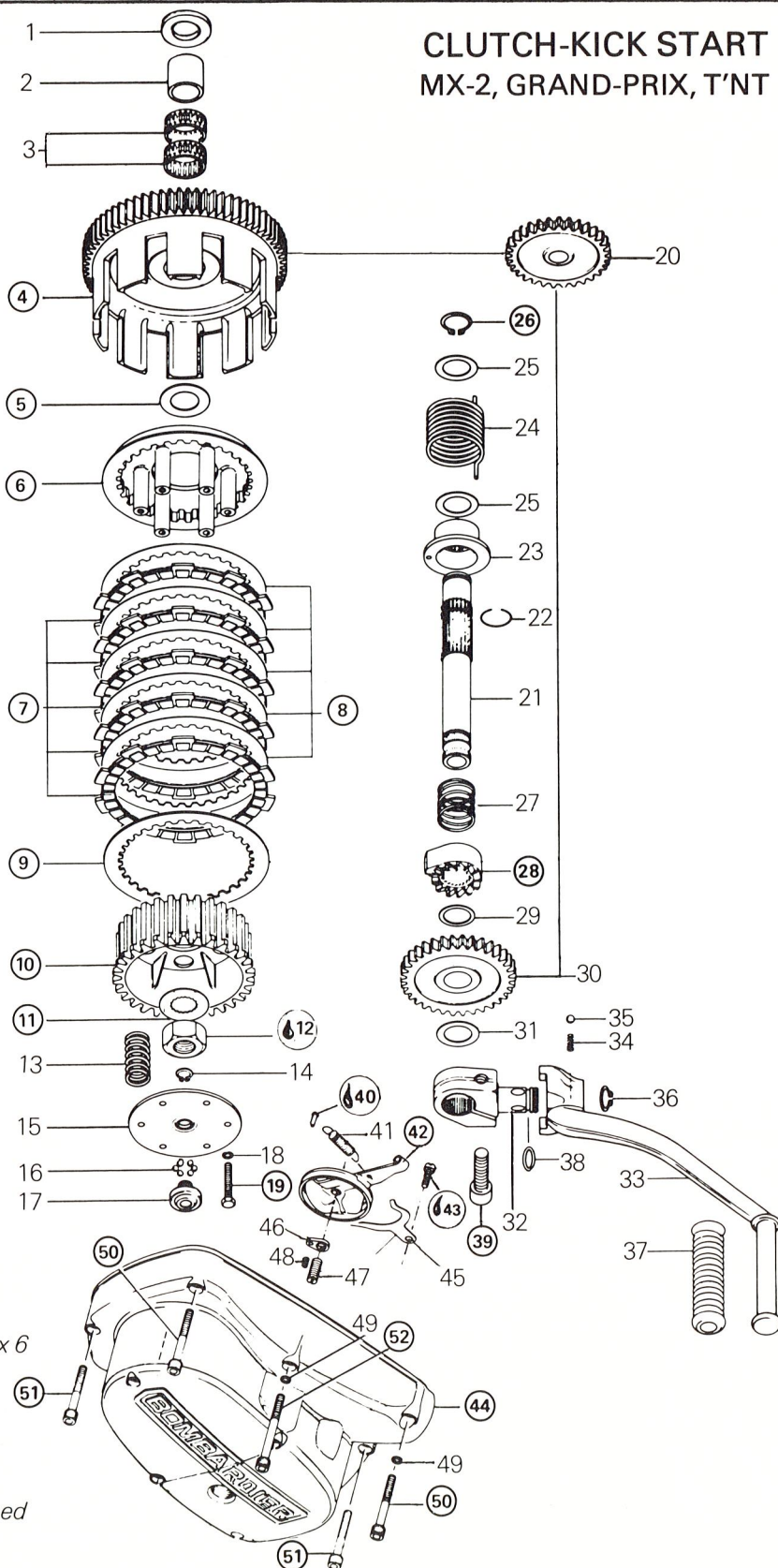


1. Crankshaft
2. Filler cap
3. O'ring
4. Crankshaft connecting rod (repair kit)
5. Slinger plate
6. Shim 0.3 mm, 0.1 mm, 0.2 mm
7. Ball bearing 6206 (magneto side)
8. Needle bearing
9. Ball bearing 3205 double row (clutch side)
10. Disc valve spacer
- \*11. Disc valve (T'NT MX-1 symmetrical)
- \*11. Disc valve (MX-2, Grand Prix asymmetrical)
12. O'ring
13. Disc valve cover
14. O'ring
15. Diffuser tube
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
23. Magneto retaining nut M18 x 1.5
24. Cylinder stud M8 (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
36. Oil pump pinion gear 9 tooth
37. O'ring
38. Hose clamp
39. Carburetor adaptor
40. Hose clamp
41. Chain guard
42. Chain guard spacer (3)
43. Screw M6 x 25 (3)
44. Lockwasher 6 mm (3)



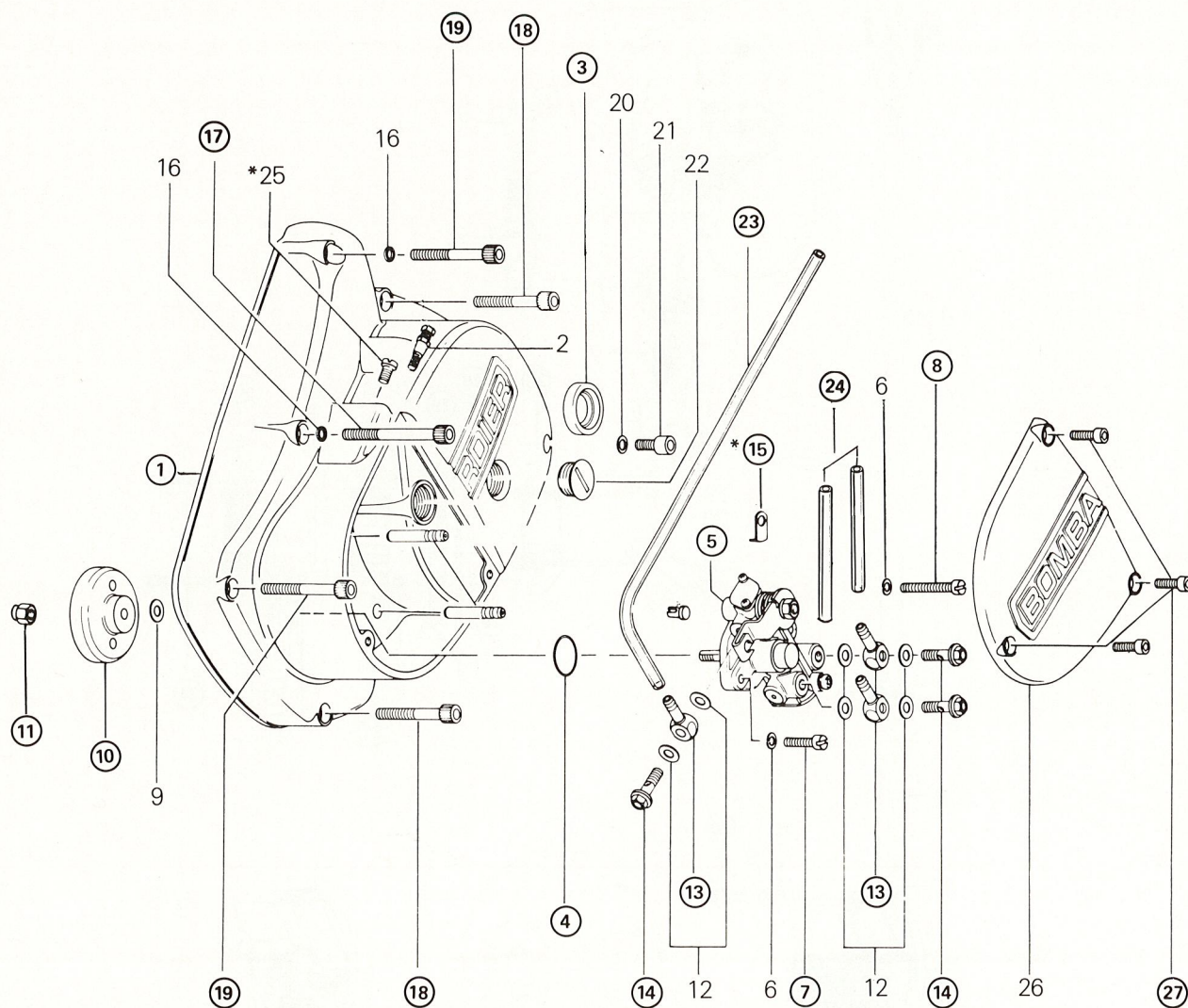
## CLUTCH-KICK START MX-2, GRAND-PRIX, T'NT

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 \*
10. Clutch hub
11. Locking washer
12. Clutch shaft nut M16 x 1.5
13. Clutch spring
14. Snap ring 10 x 1
15. Spring retaining plate
16. Ball  $\frac{5}{32}$ "
17. Spring retaining plate hub
18. Lockwasher 5 mm
19. Screw M5 x 25
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  $\frac{7}{32}$ "
36. Snap ring
37. Rubber sleeve
38. C ring (MX-2 only)
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
51. Allen screw M6 x 35
52. Allen screw M6 x 50



\* On T'NT model 5 friction plates are used with 6 outer pressure plates.



**OIL PUMP**

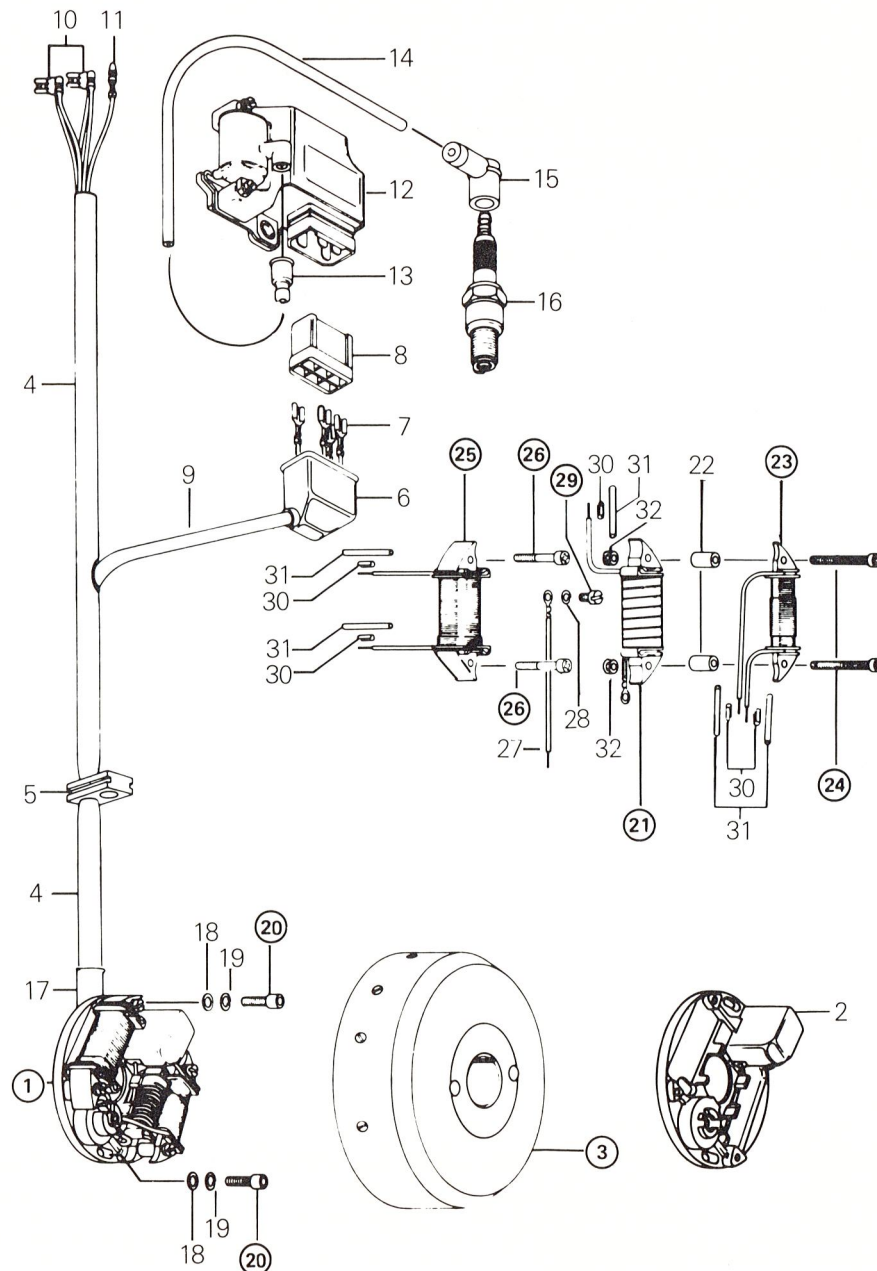
- 1. Clutch cover
- 2. Cable adjuster
- 3. Kick start shaft seal
- 4. O'ring
- 5. Oil pump ass'y
- 6. Lockwasher 5 mm
- 7. Screw M5 x 16
- 8. Screw M5 x 28
- 9. Flat washer 6.2 mm

- 10. Oil pump gear 34T
- 11. Hex nut M6
- 12. Oil banjo gasket
- 13. Banjo
- 14. Banjo bolt
- 15. Oil pump fixation
- 16. Gasket
- 17. Allen screw M6 x 50
- 18. Allen screw M6 x 35

- 19. Allen screw M6 x 40
- 20. Fiber gasket
- 21. Oil level plug
- 22. Adjustment plug
- 23. Oil line 560 mm
- 24. Oil line 90 mm
- 25. Screw M6 x 10
- 26. Oil pump cover
- 27. Allen screw M5 x 12

\* MX-2 and Grand Prix models only

## MAGNETO (T'NT, MX-1)



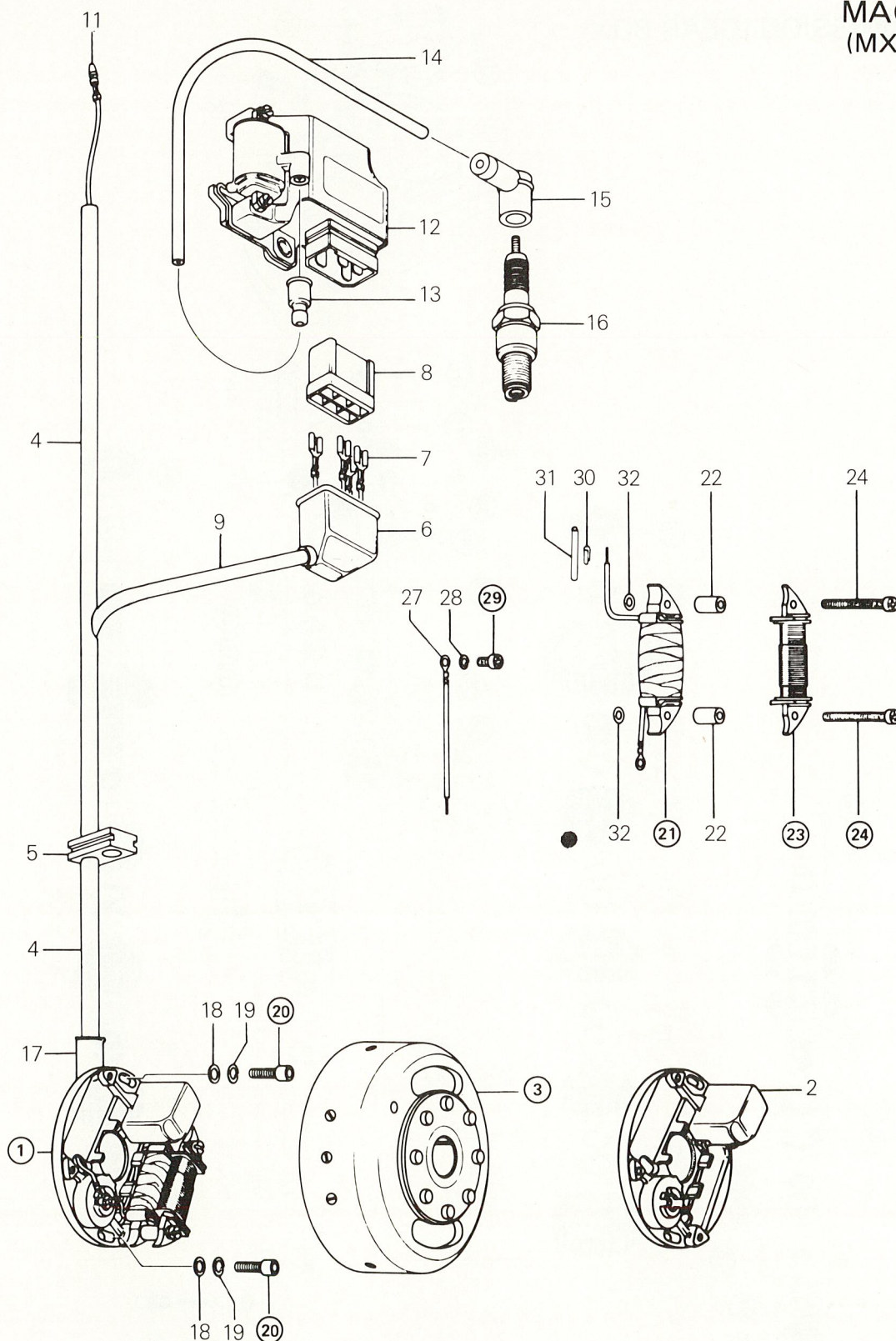
1. Stator plate ass'y
2. Trigger plate
3. Flywheel
4. Protection hose (400 mm)
5. Cable grommet
6. Protection boot
7. Straight tab receptacle
8. Connetor
9. Protection hose (185 mm)
10. Flag receptacle
11. Contact pin

12. Electronic box
13. Protection cap
14. Ignition cable 400 mm
15. Spark plug protector
16. Spark plug
17. Holder
18. Flat washer 5.3 mm
19. Lockwasher 5 mm
20. Allen screw M5 x 16
21. Charging coil
22. Distance sleeve 10.5 mm

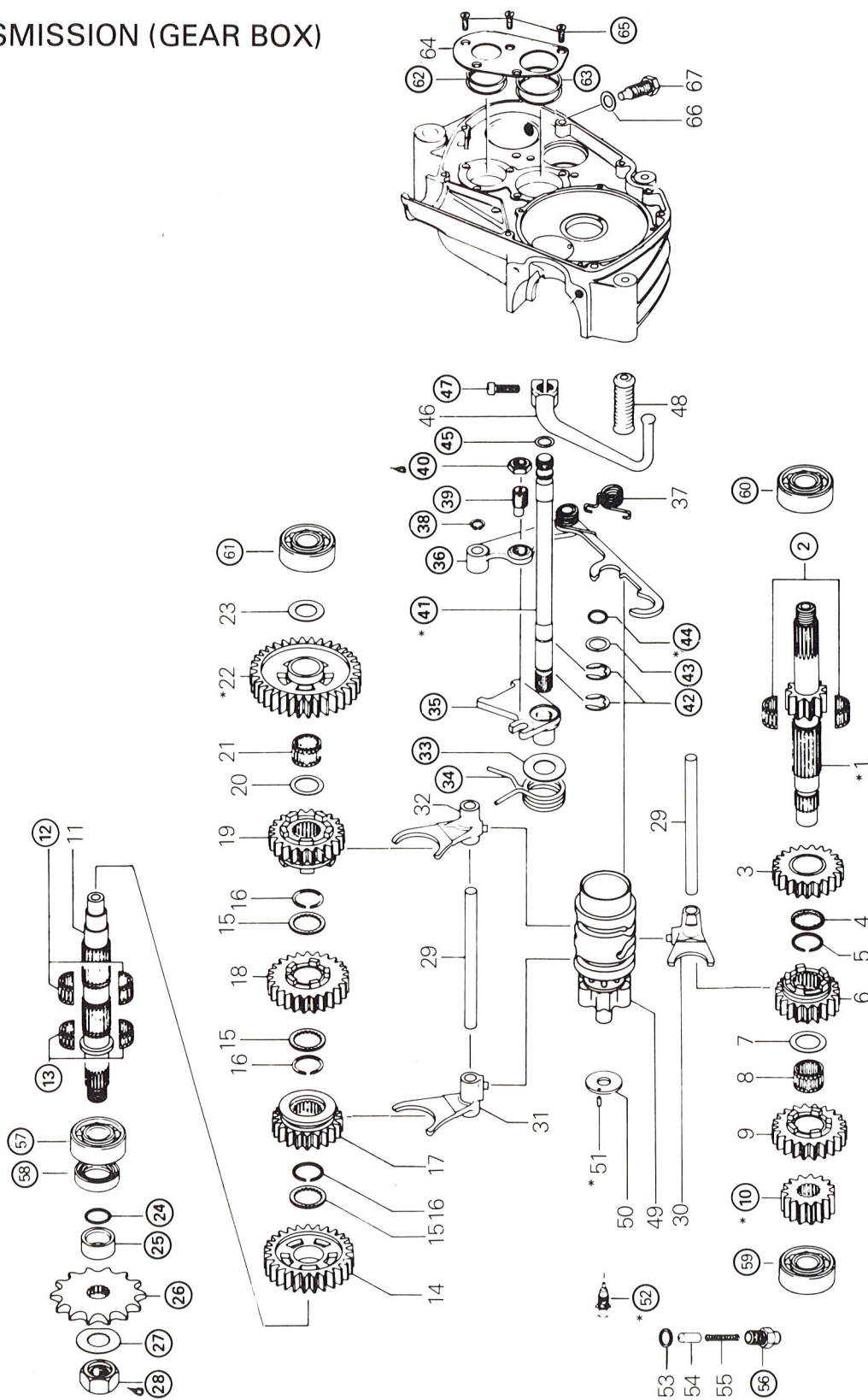
23. Brake light coil
24. Screw M4 x 28
25. Lighting coil
26. Screw M4 x 22
27. Ring tongue M4
28. Lockwasher 4 mm
29. Screw M4 x 6
30. Splice connector
31. Protector tube
32. Washer 4.3 mm



MAGNETO  
(MX-2, G.P.)



## TRANSMISSION (GEAR BOX)





- \* 1. Clutch shaft 13 tooth (Grand-Prix, MX-2, MX-1)  
Clutch shaft 11 tooth (T'NT)
- 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. (Grand-Prix, MX-2, MX-1)
- 10. 2nd gear, clutch shaft, 15T. (T'NT)
- 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
- 16. Snap ring, main shaft
- 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 (MX-1, MX-2, Grand-Prix)  
1st gear, main shaft, 32T (T'NT)
- 23. Thrust washer, main shaft
- 24. "O" ring, main shaft
- 25. Sprocket spacer
- 26. Sprocket
- 27. Locking washer, main shaft
- 28. Main shaft nut M16 x 1.5
- 29. Guide pin, shift fork
- 30. Shifting fork, 4-5 th
- 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 without "O" ring (MX-1, T'NT engine up to serial no 72856)  
Shift shaft with "O" ring (MX-2, Grand-Prix and T'NT engine serial no. 72856 and up)
- 42. Retaining ring
- 43. Thrust washer, shift shaft
- 44. "O" ring, shift shaft (MX-2, Grand Prix and T'NT engine serial no. 72857 and up only)
- 45. "O" ring, shift shaft
- 46. Shift lever
- 47. Allen screw M6 x 20
- 48. Shift lever rubber
- 49. Shift drum ass'y
- 50. Fiber washer, shift drum
- \* 51. Dowel pin, shift drum (MX-1, T'NT)
- \* 52. Neutral indicator contact screw (MX-1, T'NT)
- 53. Gasket ring, index plug
- 54. Index plunger
- 55. Spring, index plunger
- 56. Index plug
- 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
- 63. Shim 0.5 mm, . 0.3 mm, 0.1 mm, clutch shaft bearing
- 64. Retaining plate (transmission bearings)
- 65. Countersunk screw M5 x 16
- 66. Gasket ring
- 67. Stop screw, kick starter

## REMOVAL

Disconnect or remove the following from vehicle if applicable:

Oil line (block the oil flow with a short piece of ¼" I.D. tubing and 6 mm bolts).

Vent tubes

Neutral switch wire (on T'NT only)

Magneto cover

Spark plug

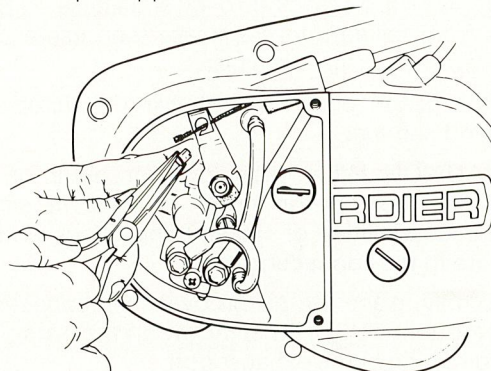
Drive chain

Skid plate

Exhaust pipe

Carburetor

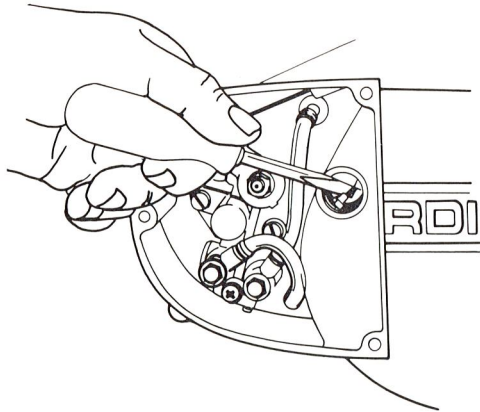
Oil pump cable (Remove the oil pump cover, rotate the oil pump control lever clockwise to disengage the cable and pull the split nipple out).





Front engine mounts and stud.

Clutch cable (Remove the clutch cable from the handle-bar lever. Remove the clutch cable access plug. Pull the cable outer casing 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 and wear limit.

### Top End

**NOTE:** If a top end job is to be done with the engine in the frame, remove the four exterior cylinder studs, prior to the removal of the cylinder.

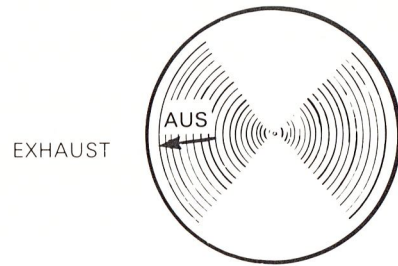
①⑦⑨②① At the replacement of the piston, cylinder, cylinder head and cylinder sleeve, the squish area should be remeasured (See technical data).

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

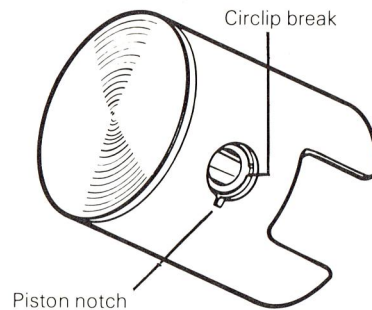
Drive the piston pin in or out using a suitable drive punch and hammer.

**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.

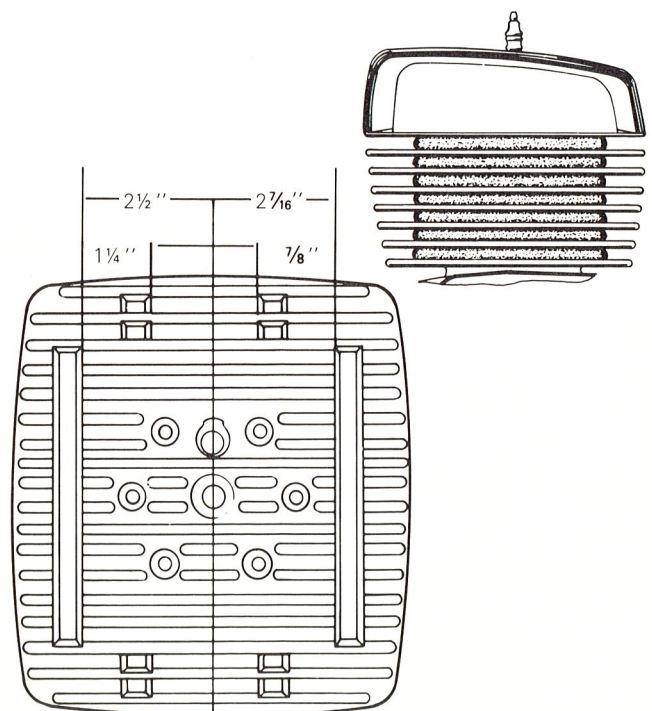


⑨⑪ At assembly, torque to 1.9 kg-m (14 ft-lbs) following a criss-cross sequence.

⑬ At assembly, torque to 2.8 kg-m (20 ft-lbs).

⑭ At assembly, screw the short threaded portion of the stud into the cylinder.

⑮⑯ If replaced, noise dampers should be installed as illustrated.





②① At assembly, torque to 2.1 kg-m (15 ft-lbs).

②① Cylinder sleeve should be replaced whenever its inside diameter becomes .006" (0.15 mm) or more larger than a new 3rd oversize piston.

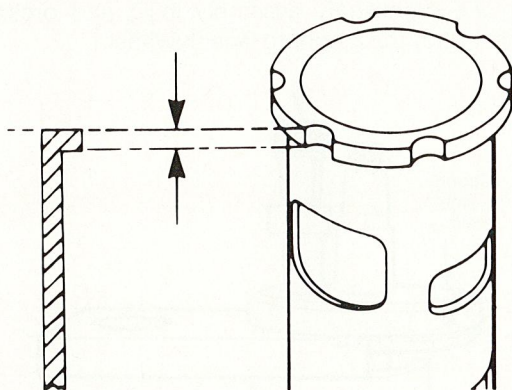
Proceed as follows:

○ **NOTE:** This procedure is also applicable for the 125cc and 175cc engine. Place the cylinder in a range oven for 30 minutes, at a temperature of 200° 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 200° C (350° F) maximum.

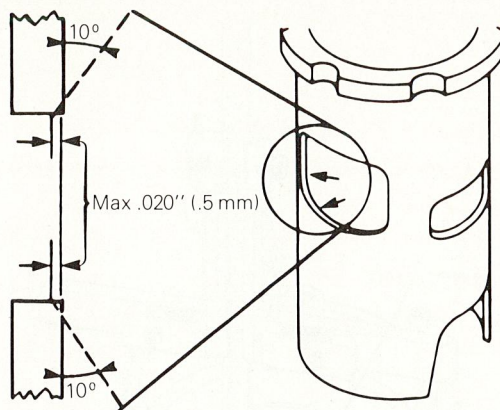
Immediately align chilled cylinder sleeve with hot cylinder, drop into place from top side making sure to align the exhaust port of the sleeve with the one of the cylinder barrel. To ease alignment, leave two cylinder studs in the cylinder.

○ **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
125cc:	.06 mm (.0024")	.076 mm (.003")
175cc:	.07 mm (.0028")	.076 mm (.003")
250cc:	.08 mm (.0032")	.09 mm (.0035")

Using a rotary file or jeweler's hand file, chamfer the sharp edges of each port 10°, to a width of .5 mm (.020").



▼ **CAUTION:** Excessive chamfer will alter port timing.

Gap new ring / s to provide:

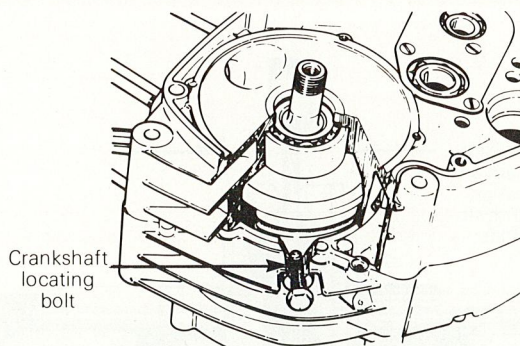
	Minimum	Maximum
125cc:	.20 mm (.008")	.35 mm (.014")
175cc:	.25 mm (.010")	.40 mm (.016")
250cc:	.30 mm (.012")	.46 mm (.018")

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

### Bottom End

① ④ ③② ③③ At the replacement of the crankshaft, connecting rod and crankcase halves, the squish area should be remeasured (see Technical Data).

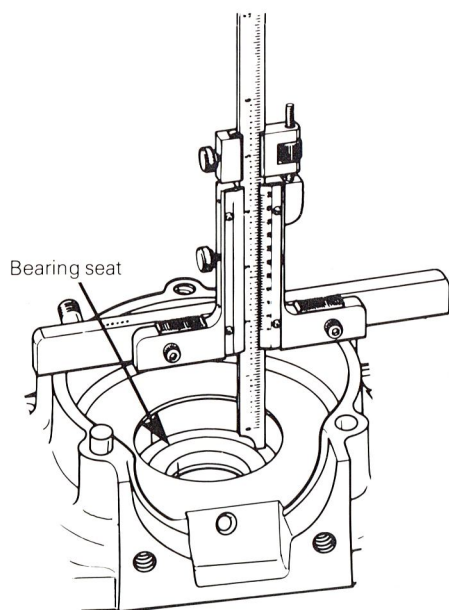
① ③② To facilitate some procedures, the crankshaft can be locked at the top dead center position using a crankshaft locating bolt as illustrated.



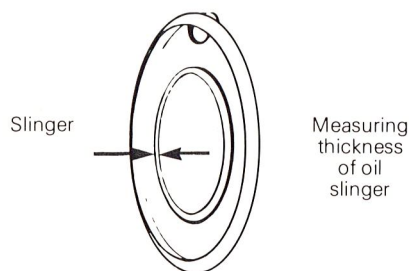
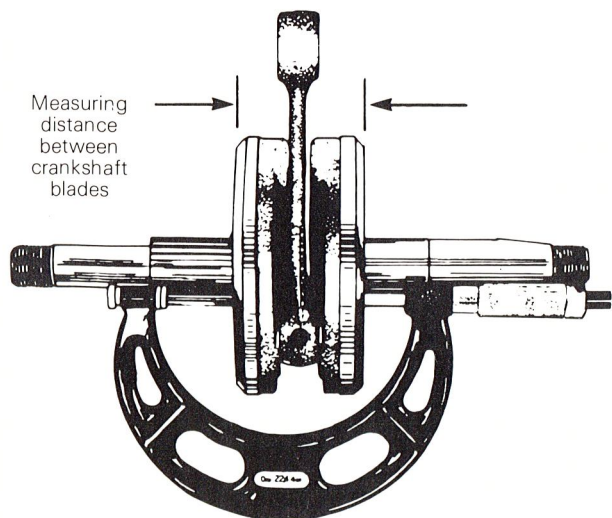
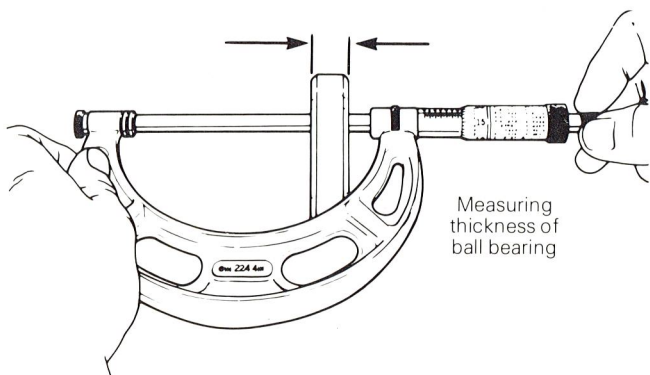
① ⑥ Crankshaft end-play should be between 0.025 mm (.001") to 0.3 mm (.012"). To determine necessary shims:

Measure 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 oil slinger. Add measurements. Total equals B.

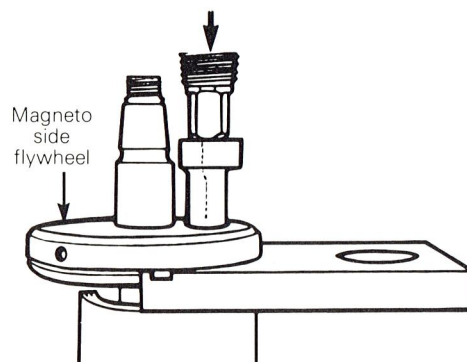


Subtract measurement B from measurement A, minus tolerance of 0.025 (.001") to 0.3 mm (.012"). Total balance is distance to be shimmed. Shim(s) must be located between oil slinger plate and bearing.

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

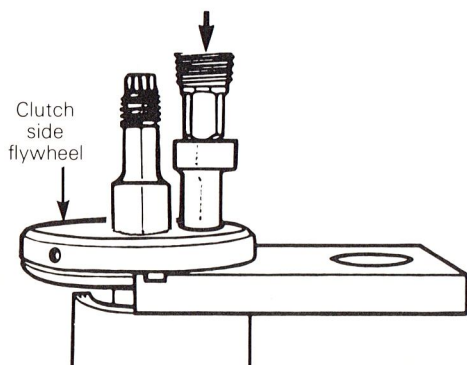
④ To replace the connecting rod proceed as follows:

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.

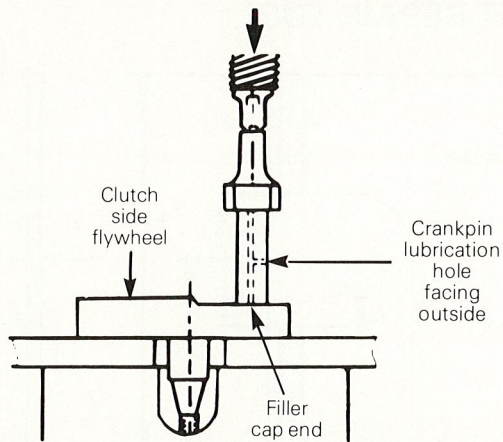


Press the new crankpin into the clutch side flywheel. Crankpin lubrication hole must point to the outside.

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

**CAUTION:** The end of the crankpin with the filler cap must be installed in the clutch side flywheel. →

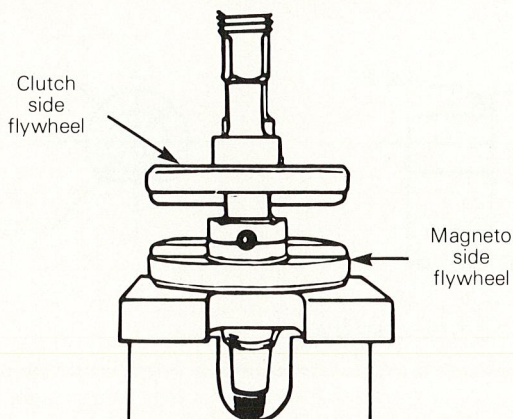




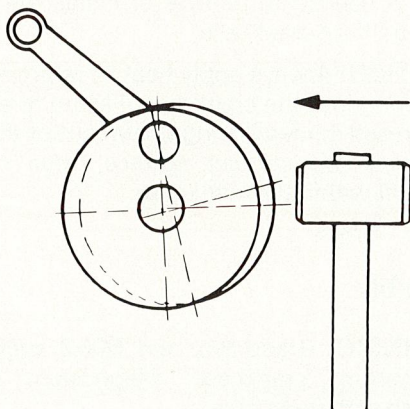
Fit the connecting rod and the bearing into place with light grease.

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 .25 mm (.010") to .43 mm (.017")

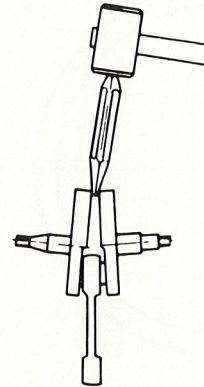


Using a "straight edge", check for flywheel alignment. Drift with a heavy brass mallet to align if necessary.

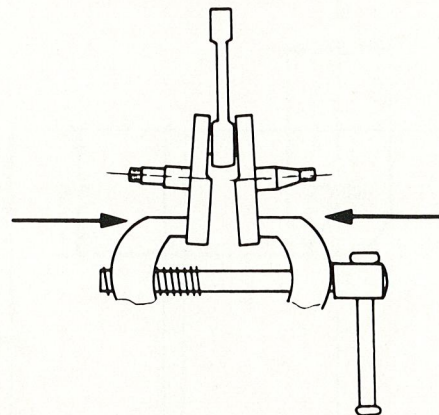


Using a micrometer or vernier caliper, check for flywheel alignment.

Use a wedge to correct this situation



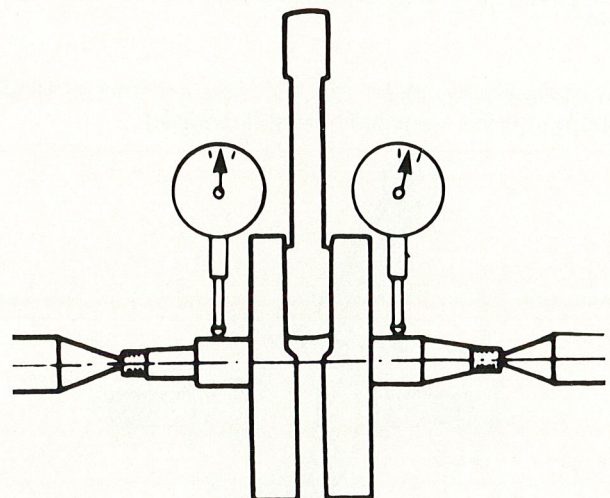
Use a clamp or vise to correct this situation



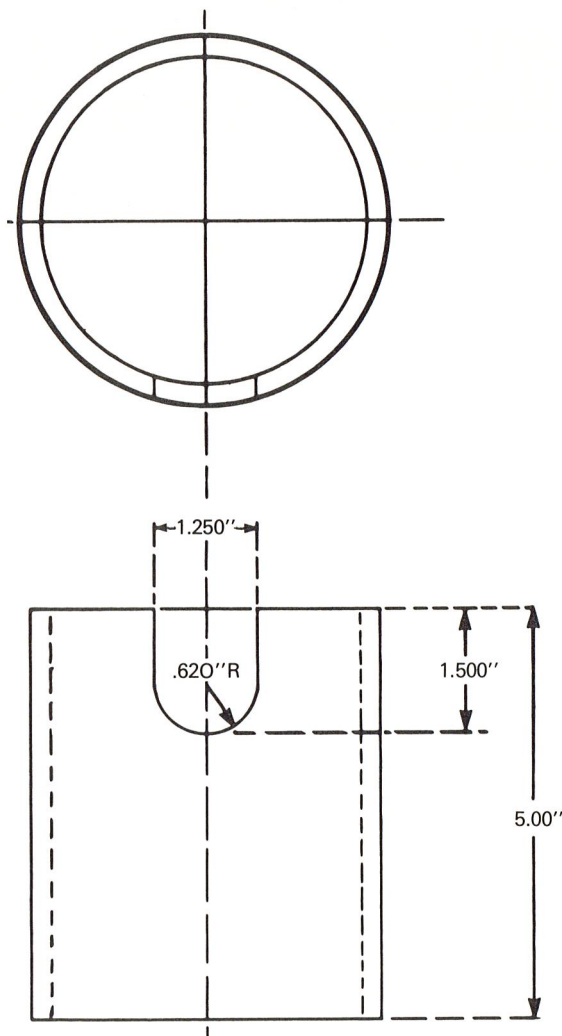
○ **NOTE:** For final alignment measures, see technical data.

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

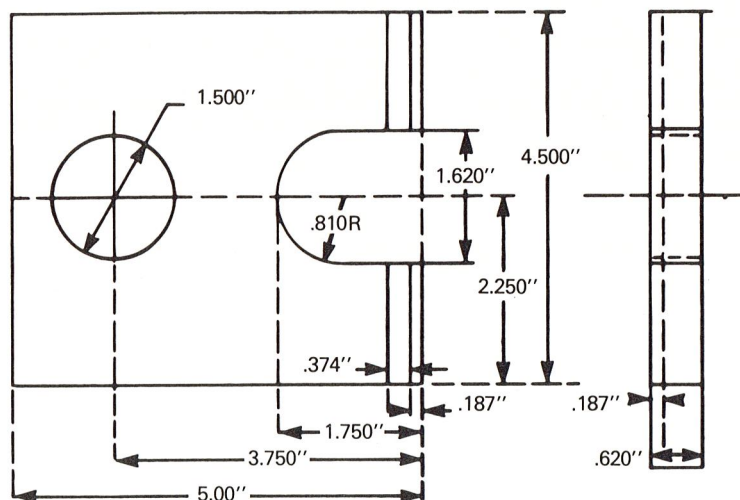
○ **NOTE:** Make a final alignment check using a dial indicator.



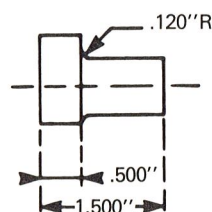
## SUGGESTED CRANKSHAFT REPAIR TOOL



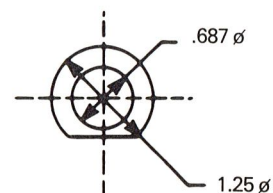
STEEL TUBE 4.5 O.D. x .250 WALL



H.R. ST'L PLATE 4½" x .625" THICK

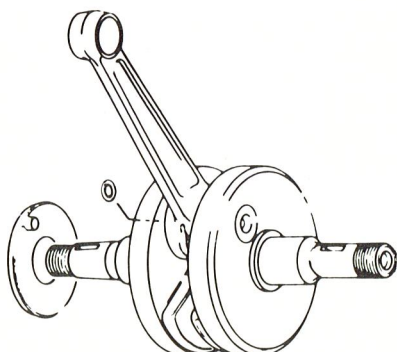


H.R.C.Q. ST'L 1.250" DIA.



NOTE: All values are in inches.

⑤ At assembly, insert the "O" ring and the oil slinger spout into the crank pin hole as illustrated.



⑦ ③② Heat is needed to remove or install the magneto side bearing of the crankcase.

**CAUTION:** Always apply heat to remove or install a bearing into 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:

## Disassembly

**WARNING:** Grand-Prix and MX-2 engines have magnesium crankcase. Magnesium must be heated with great care.



Using a butane torch with a large **soft** flame, heat the magneto side crankcase with 4 or 5 rapid circular passes.

With the engine upright on a bench top, hold the **HOT** magneto side crankcase (with a rag), and drift the crankshaft out of the crankcase using a **SOFT** hammer.

### Reassembly

Cut a 50 mm (2") diameter disc out of asbestos material.

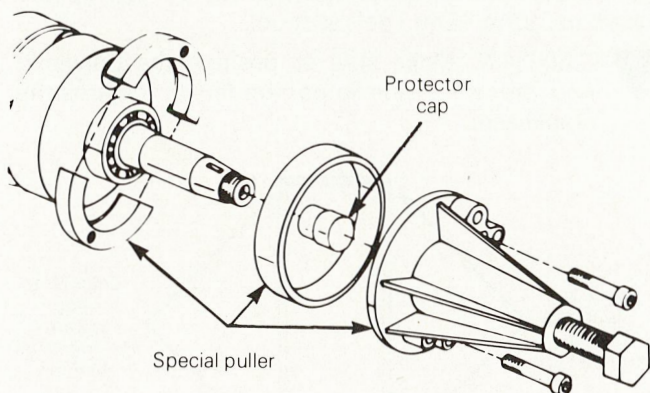
Grease the magneto side crankshaft oil seal with lithium grease.

Place the disc over the crankshaft oil seal to protect it from the flame.

Heat the crankcase as described above.

Quickly remove the seal protector disc and drift the crankshaft, complete with main bearing, into the crankcase using a **SOFT** hammer.

⑦⑨ To remove bearing from crankshaft use bearing puller as illustrated. (See tool section).

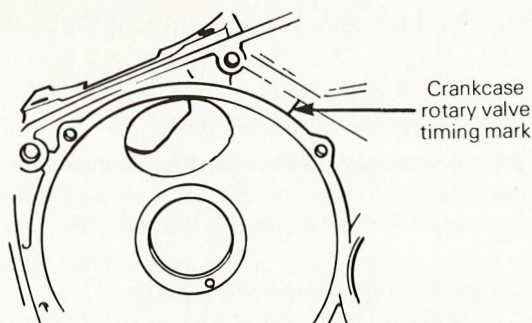


○ **NOTE:** Prior to magneto side bearing installation, install oil slinger plate, required shim(s) and bearing on crankshaft.

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.

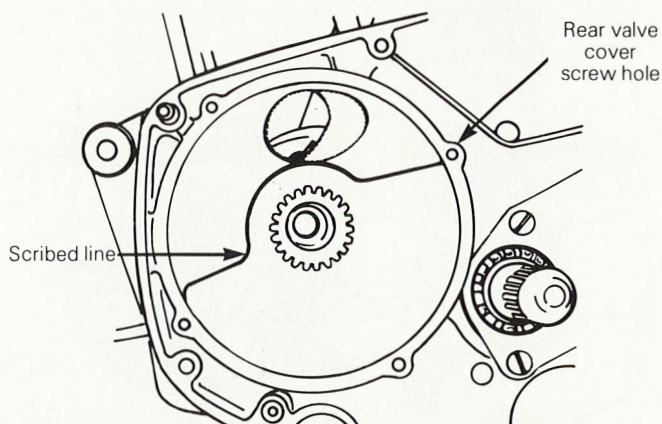
⑩ At assembly, the chamfered side of the disc valve spacer must face towards the crankshaft.

⑪ On T'NT and MX-1 models the disc valve is symmetrical and can be installed either way but the leading edge must be aligned with the timing mark on the crankcase, with the crankshaft locked at top dead center (T.D.C.).



On MX-2 and Grand-Prix models 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 surface is not scribed, the disc leading edge must align with the top rear valve cover screw hole as illustrated.



▼ ⑭ **CAUTION:** At the assembly of the clutch cover, make sure to install the sealing "O" ring as severe damage could occur to the engine.

⑮ At assembly, apply Loctite "Lock'n Seal" on threads and torque to .5 kg-m (4 ft-lbs).

⑯ At assembly, install the crankshaft drive gear very carefully to avoid folding the seal lip over.

⑰ 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 "Lock N' Seal" 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 at the removal of the drive gear.



Torque the drive gear retaining nut to 7.5-8 kg-m (54-60 ft-lbs).

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

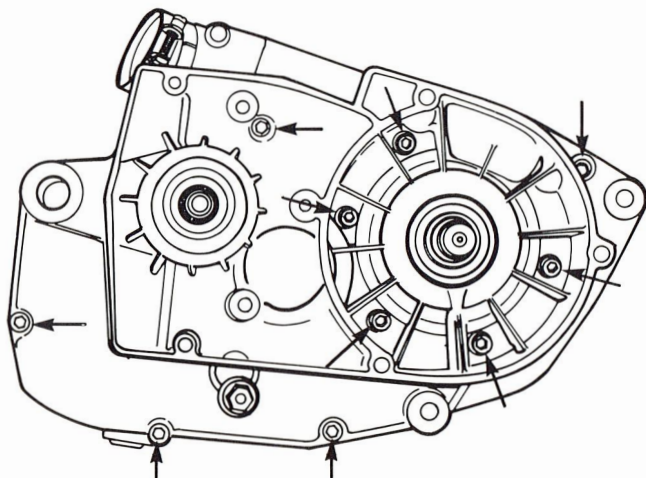
⑳ ㉑ To install new seals, use the appropriate oil seal insertion pusher. (See Tool section). At assembly, apply a light coat of lithium grease on the seal lips.

㉒ At the joining of the crankcase halves, make sure the locating dowel sleeves are in place.

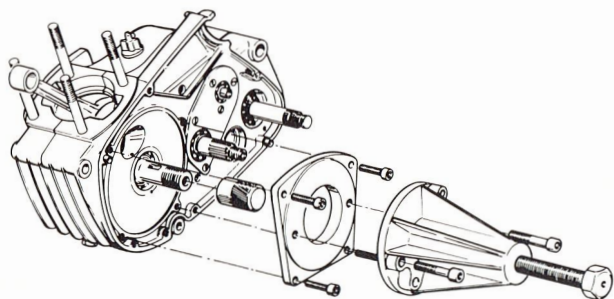
㉓ At assembly, apply Loctite Lock'n Seal on the inside threads of the magneto retaining nut and torque to 7.5-8 kg-m (55-60 ft-lbs).

㉔ At assembly, screw the long threaded portion of the stud into the crankcase.

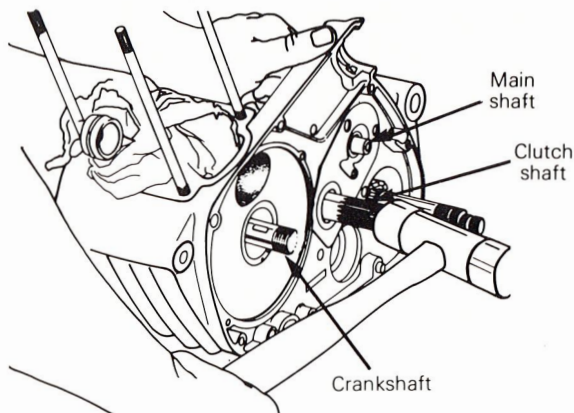
㉕ ㉖ At assembly, torque to 1.1 kg-m (8 ft-lbs) following a criss-cross sequence.



㉗ ㉘ 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. (Prior to tapping on the crankshaft make sure the oil pump pinion gear has been removed).

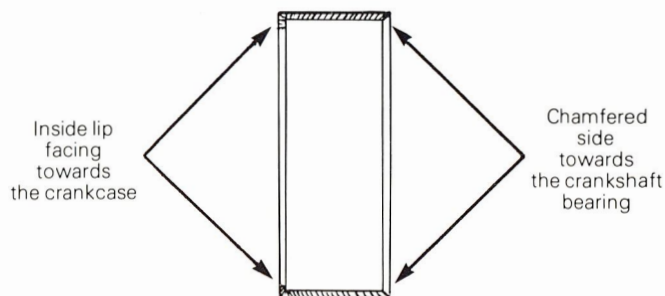


▼ **CAUTION:** Do not pry between crankcase halves, as score marks incurred are detrimental to crankcase sealing.

Prior to joining the crankcase halves, clean the mating surfaces with acetone or equivalent. Apply a light coat of silicone sealant, being careful not to plug the oil passages.

㉙ 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.



▼ ㉚ **CAUTION:** Exercise care when removing or installing the oil pump pinion gear. Damage to the teeth could occur and impair the oil pump function.

▼ ㉛ **CAUTION:** Prior to crankcase and / or clutch cover assembly, make sure to install the sealing "O" ring as severe damage could occur to the engine.

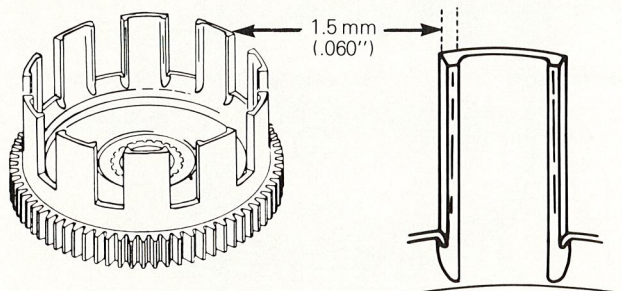
㉜ At assembly, torque to 1.1 kg-m (8 ft-lbs).

## Clutch and kick start

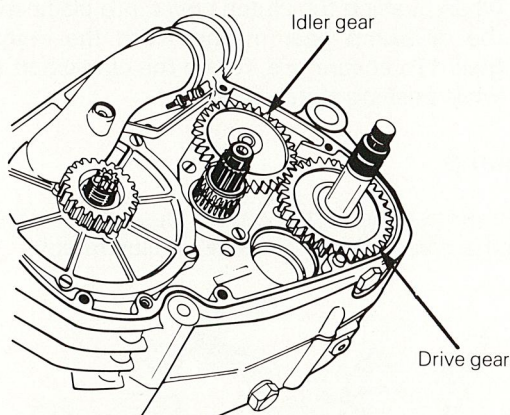
④ If the clutch drum splines are found to be severely worn. Replacement is not necessary. File the damaged spline surfaces equally.



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

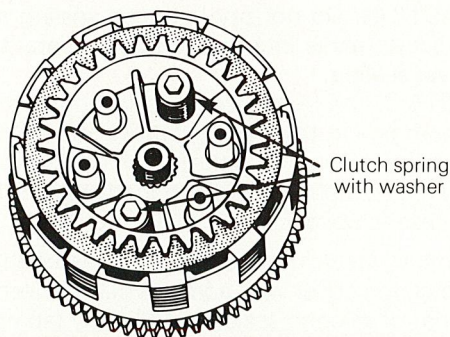


④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ Prior to assembling the clutch hub, make sure to position the idler and drive gear as illustrated.



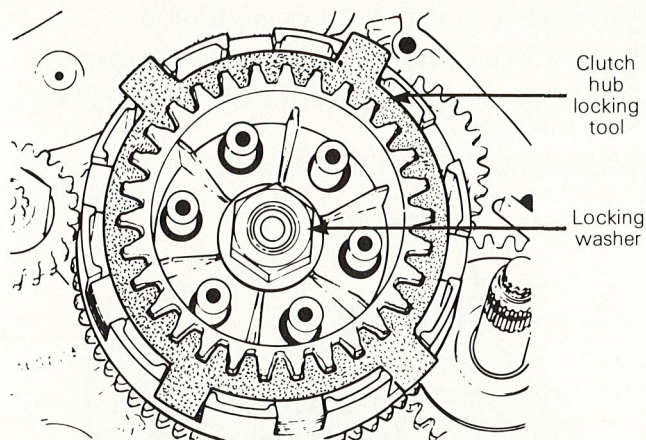
With the clutch plates mounted on the clutch hub, fit clutch inner pressure plate in alignment with hub splines. Carefully insert clutch hub / plate assembly into clutch drum and onto clutch shaft.

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



**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 tool section).



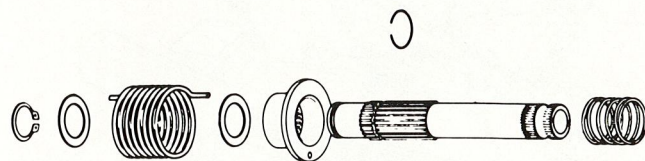
At assembly, apply Loctite Lock'n Seal on the threads of the clutch shaft nut and torque to 10 kg-m (75 ft-lbs).

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

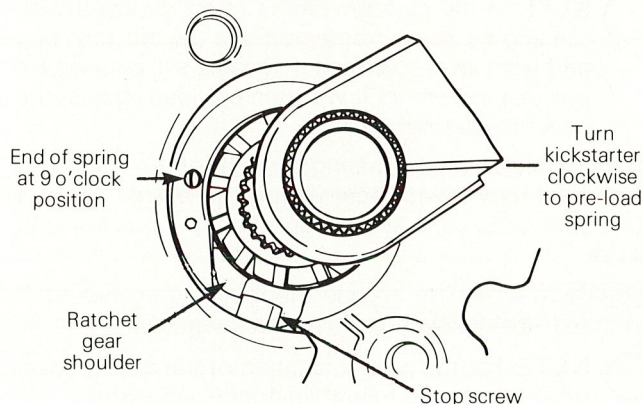
▼ **CAUTION:** Do not pry on the inner pressure plate spring posts to bend the locking washer, use a pair of waterpump pliers.

⑲ At assembly, torque to .5 kg-m (4 ft-lbs).

⑳ To remove the kick start shaft assembly from the crankcase remove the snap ring located in the inside portion of the crankcase.



㉔ To position ratchet gear, install the kick starter lever and preload the kick starter spring approximately ¾ turn clockwise. Slide ratchet gear onto spline. The end of the spring protruding through the retaining hub should be at the 9 o'clock position when the ratchet gear shoulder is leaning against the stop screw.



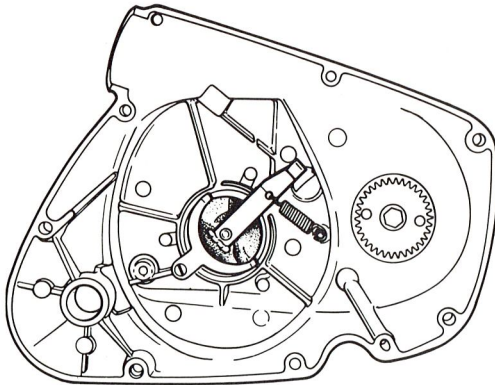


③⑨ At assembly, torque to 2.1 kg-m (15 ft-lbs).

④⑩ Apply Loctite Lock'n Seal and press fit into place.

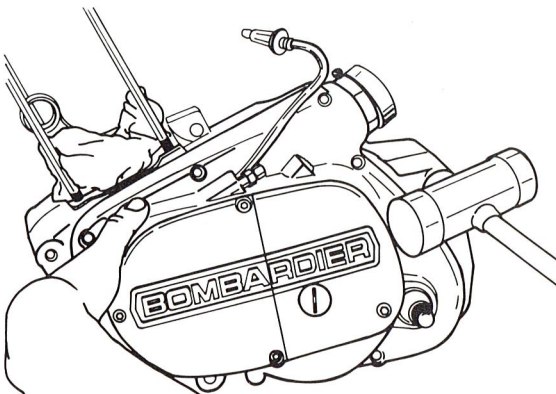
○ **NOTE:** Replace only if damaged or when replacing clutch cover.

④② At assembly, position as illustrated.



④③ At assembly, apply Loctite Lock'n Seal on screw threads and torque to .5 kg-m (4 ft-lbs).

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



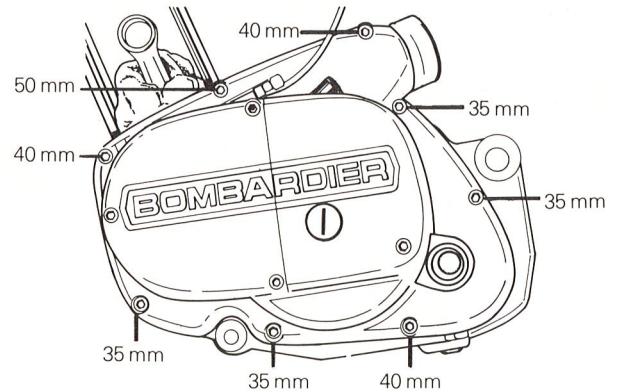
▼ **CAUTION:** Do not pry between sealing surfaces, as score marks incurred are detrimental to clutch cover sealing.

○ **NOTE:** If the clutch cover is to be removed with the engine in the frame, remove the left foot peg and both levers. 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 or equivalent. Apply a light coat of silicone sealant and lightly tap cover into place.

⑤⑩ ⑤① ⑤② At assembly, torque the retaining screws to .8 kg-m (6 ft-lbs) following a criss-cross sequence.

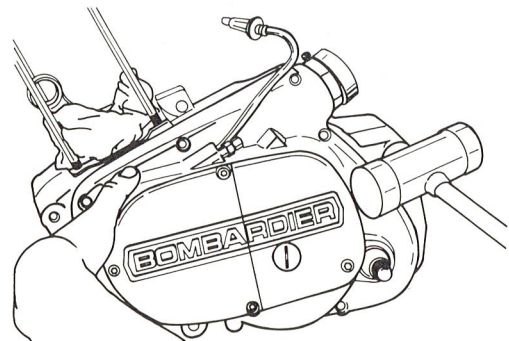
○ **NOTE:** For the proper location of the clutch cover retaining screws follow illustrated sequence.



▼ **CAUTION:** Make sure the kick starter oil seal lip is not flipped over by the kick starter shaft splines when pushing the clutch cover into place and that the oil pump gear meshes with the crankshaft gear. (To ensure this, rotate the crankshaft slowly while pushing clutch cover on).

## Oil pump

① 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, remove the left foot peg and both levers. With the clutch cable still connected, pull clutch in. It will pre-load against the cover to ease removal.

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

▼ **CAUTION:** Make sure the kick starter oil seal lip is not flipped over by the kick starter shaft splines when pushing the clutch cover into place and that the oil pump gear meshes with the crankshaft gear (to ensure this, rotate the crankshaft slowly while pushing clutch cover on).



③ To install a new seal into clutch cover, use an appropriate oil seal insertion pusher (see tool section).

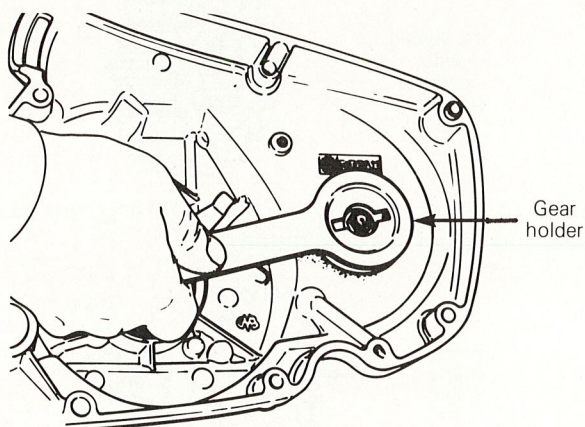
④ Prior to installation, apply lithium grease around "O" ring.

⑤ Prior to assembly, clean the mating surfaces of the oil pump and the clutch cover with acetone or equivalent. Apply a light coat of silicone sealant.

○ **NOTE:** If the oil pump is defective, replace with a complete unit.

⑦ ⑧ At assembly, torque to .2-.4 kg-m (2-3 ft-lbs).

⑩ ⑪ To remove or install the oil pump driven gear, lock the driven gear in position with special holder tool (see tool section).

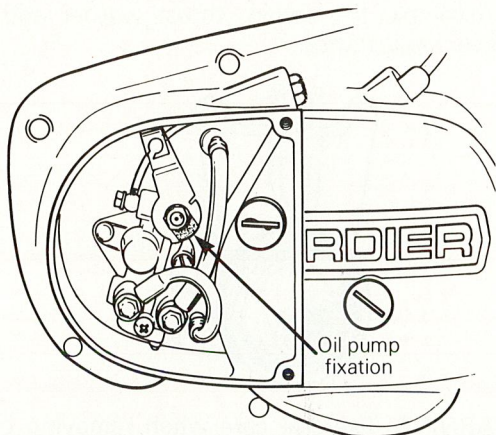


At assembly, torque retaining nut to .4-.6 kg-m (3-4 ft-lbs).

⑬ At assembly, install the large I.D. of the banjo towards the pump.

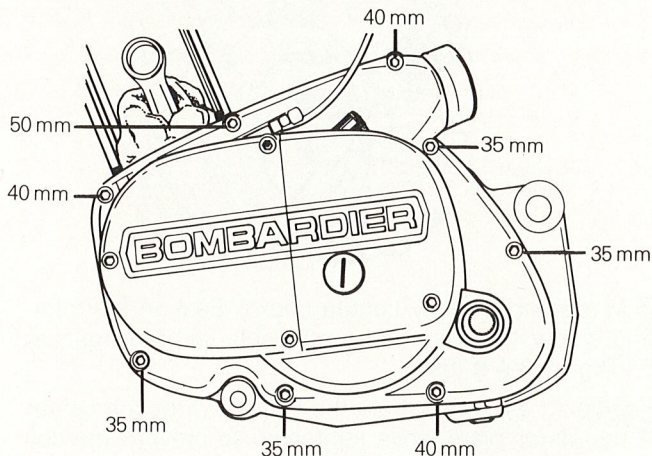
⑭ At assembly, torque to .5-.6 kg-m (3 to 4 ft-lbs).

⑮ On the MX-2 and GrandPrix models, the oil pump is locked to deliver a constant amount of oil at any given R.P.M.

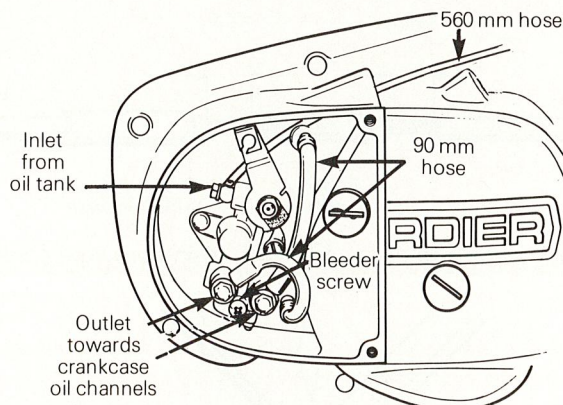


⑰ ⑱ ⑲ At assembly, torque to .8 kg-m (6 ft-lbs).

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



⑳ ㉑ At assembly, position oil line as illustrated and make sure to bleed the air out of the oil pump. Proceed as follows: At the installation, bleed the air out of the inlet oil line by unscrewing the lower screw (Phillips head type) until all the air bubbles are out. Then, to bleed the air out of the oil pump, start the engine and let it idle at 1100  $\approx$  1300 R.P.M. Push control lever to maximum opening and hold in this position for 3-5 minutes.



㉒ At assembly, torque to .5 kg-m (4 ft-lbs).

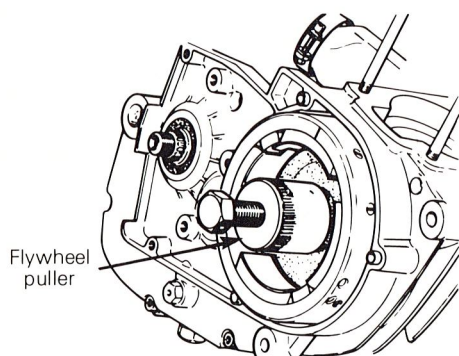
## Magneto

① To facilitate timing procedure, perform primary adjustment by matching magneto cover and stator plate marks.

③ To remove the flywheel, lock crankshaft, remove the flywheel retaining nut and install special puller on rotor.

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. →





⑳ At assembly, apply Loctite Lock'n Seal on the retaining screw threads and at assembly, apply torque to .5-.6 kg-m (3-4 ft-lbs).

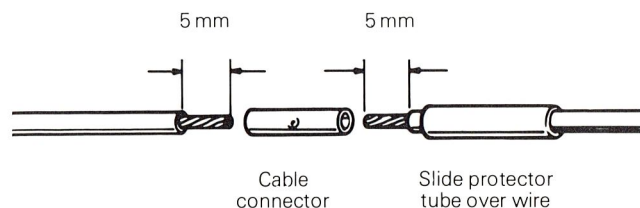
㉑ ㉒ ㉓ At assembly, hold the coils towards the center of the stator plate while tightening to prevent the coil shoes from contacting the magneto.

**CAUTION:** Make sure to route the coil wires away from the center of the stator plate to prevent the wires from rubbing in the magneto flywheel nut.

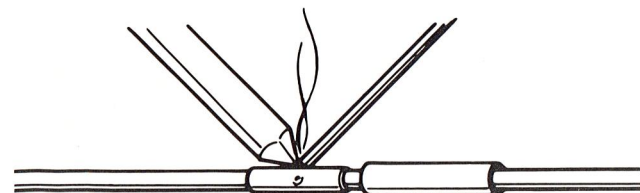
㉔ ㉕ ㉖ At assembly, torque to .3 kg-m (2 ft-lbs).

㉗ ㉘ Use a cable connector and a protector tube, as illustrated to connect the wires.

Strip 5 mm of insulation from each end.

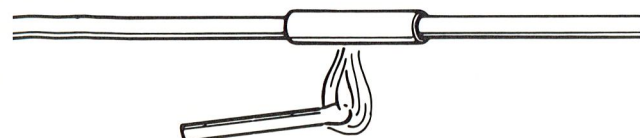


Solder wires into connector with resin core type solder.



**CAUTION:** Do not use acid core solder, as connections will corrode.

Slide protector tube over connector then heat with a match to shrink the protector tube.



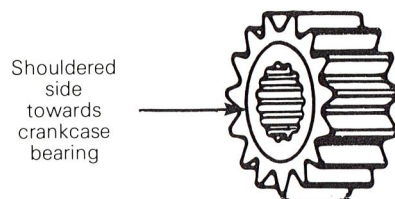
## Transmission (gear box)

㉚ ㉛ ㉜ The needle bearing halves must be replaced in pairs only.

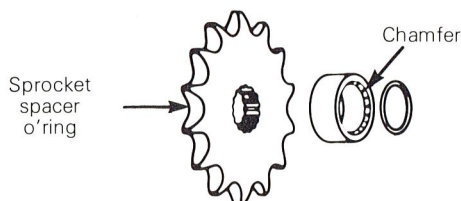
**CAUTION:** Make sure not to intermix the needle bearing halves, damage could occur. If bearing halves have been intermix, refer to the description to find the proper width of the bearing halves.

㉝ ㉞ The sharp edge of the splined thrust washer must face the retaining snap ring.

㉟ At assembly, the shouldered side of the 2nd gear, main shaft 16T must face towards the crankcase bearing.



㉡ ㉢ ㉣ At assembly, position the "O" ring, sprocket spacer and sprocket as illustrated.

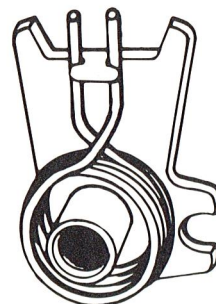


**CAUTION:** Locking washer should be replaced if bent more than twice. If in doubt, replace.

㉤ 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 Lock'n Seal on the retaining nut threads and torque to 10 kg-m (75 ft-lbs).

㉥ ㉦ ㉧ Assemble the spring, thrust washer and actuating lever as illustrated.

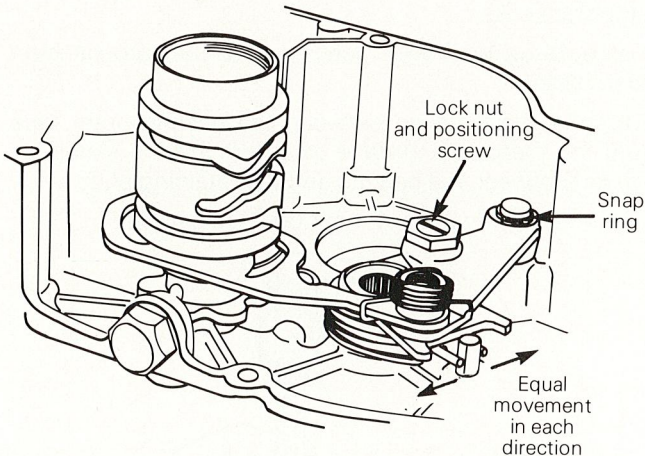


**WARNING:** Exercise care when removing or installing the actuating lever spring.



③⑥ ③⑨ ④⑩ 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.

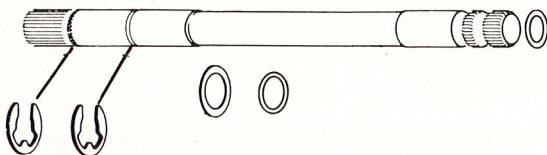


Movement in both direction must be equal. If not, the pawl ass'y can be repositioned by unlocking the lock nut and adjusting the pawl positioning screw. Lock the nut and verify. Repeat until the travel is equal on both sides.

When final adjustment has been reached, apply Loctite Lock'n Seal on the lock nut threads and torque to 2.8-3 kg-m (20-22 ft-lbs).

▼ **CAUTION:** 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.

④① ④② ④③ ④④ ④⑤ At assembly, position the retaining rings, thrust washers and "O" rings as illustrated.



④⑦ At assembly, torque to 1.1 kg-m (8 ft-lbs).

④② At assembly, torque to .5-.6 kg-m (3-4 ft-lbs).

④⑥ At assembly, torque to 3.5-4 kg-m (25-29 ft-lbs).

④⑦ 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:** Grand-Prix and MX-2 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 embossement 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.

Place the previously mentioned oil seal protection disc.

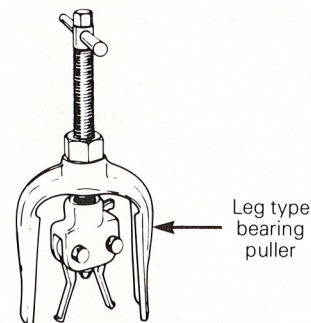
Heat the crankcase bearing embossement as described above.

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

④⑧ 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.

④⑨ 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.

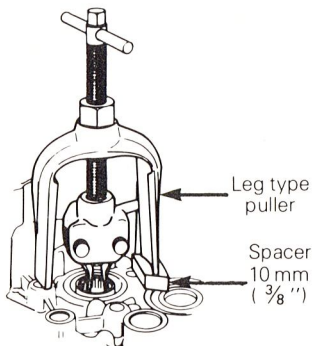
Proceed as follows:

◆ **WARNING:** Grand-Prix and MX-2 engines have magnesium crankcase. Magnesium must be heated with great care.

### Disassembly

Install the puller as illustrated. →





**NOTE:** A spacer of 10 mm (  $\frac{3}{8}$  ") is 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:

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:** Grand-Prix and MX-2 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.

Remove the bearing retaining plate and verify the end play.

⑥② ⑥③ The transmission shaft end-play must be .1 mm (.004") maximum.

Proceed as follows to verify the end-play.

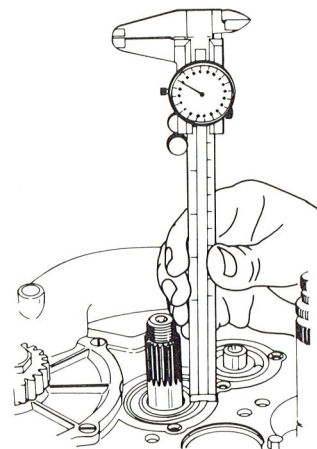
Remove the bearing(s) retaining plate and shims.

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 .1 mm (.004") maximum.



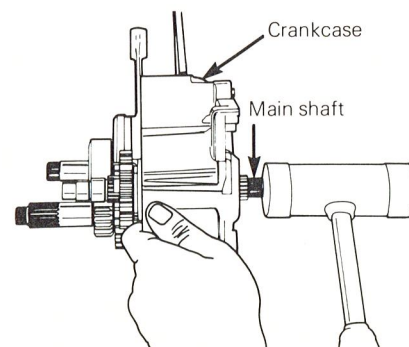
⑥⑤ At assembly, apply Loctite Lock'n Seal on the retaining screw threads and torque to .5-.6 kg-m (3-4 ft-lbs).

⑥⑦ At assembly, torque to 3.5-4 kg-m (25-29 ft-lbs).

## 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.



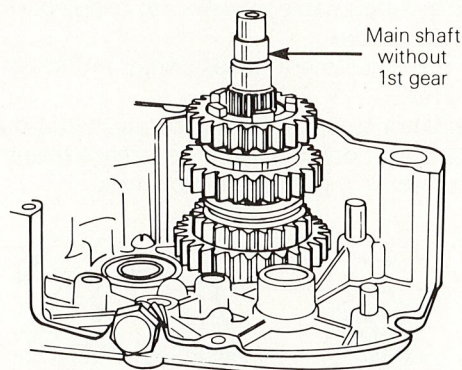


## Reassembly

Proceed as follows:

Position the main shaft as illustrated, tap gently to push the shaft into the bearing.

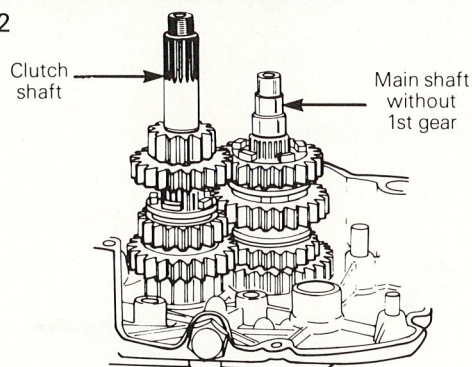
### STEP 1



Position the clutch shaft as illustrated, tap gently to push the shaft into the bearing.

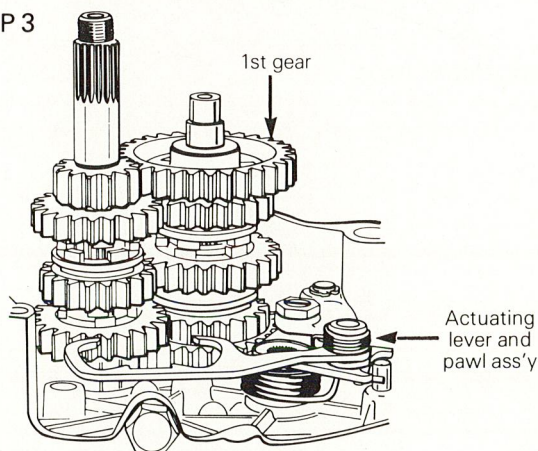
**CAUTION:** Prior to pushing the clutch shaft into the bearing, make sure the gears match one another.

### STEP 2



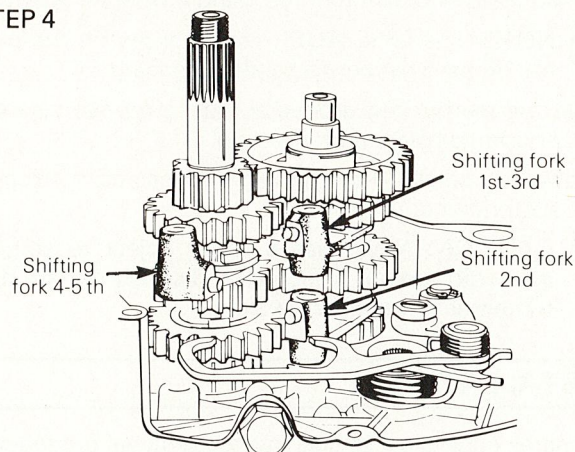
Position the thrust washer, needle bearing, first gear and thrust washer, and then the actuating lever and pawl ass'y as illustrated.

### STEP 3



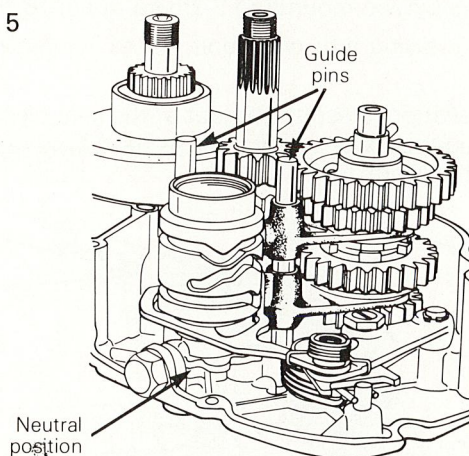
Position the shifting forks as illustrated.

### STEP 4

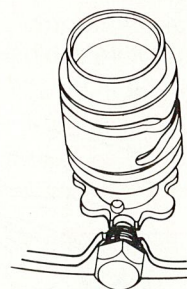


Position the shift drum ass'y, and index all the shifting forks and position the guide pins as illustrated.

### STEP 5



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



## CLEANING

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

**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.

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

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

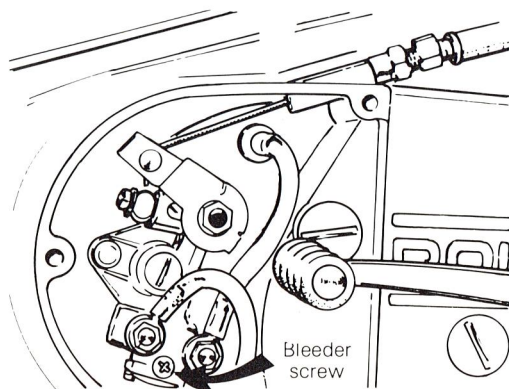
## INSTALLATION

To install engine on vehicle inverse removal procedure. However, special attention should be paid to the following.

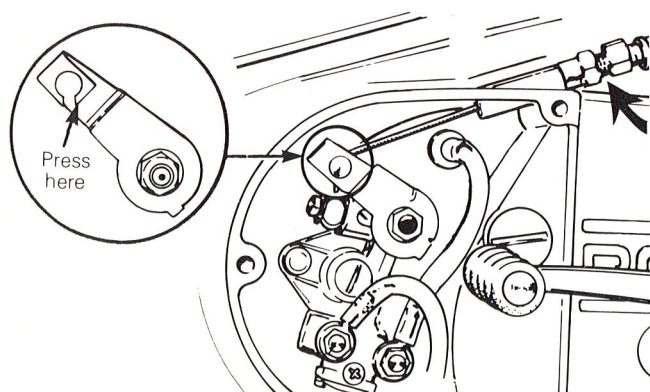
Torque the engine mounts to 2-2.5 kg-m (15-18 ft-lbs).

Torque the swing arm pivot bolt nut to 10.4 kg-m (75 ft-lbs).

After installation, bleed the air out of the inlet oil line by unscrewing the lower screw (Phillips head type) until all the air bubbles are out.



After the installation of the throttle cable to the oil injection pump lever, make sure to block the cable in place by bending the hooked end of the lever as illustrated.



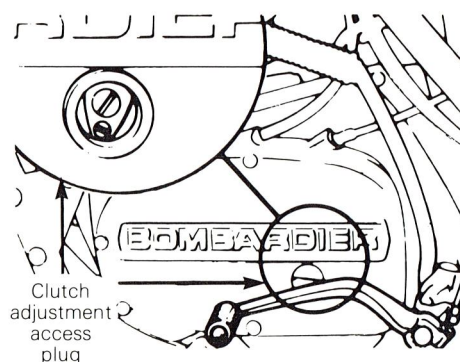
Prior to the clutch adjustment make sure to install the clutch cable access plug, then proceed as follows.

○ **NOTE:** Prior to final 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.

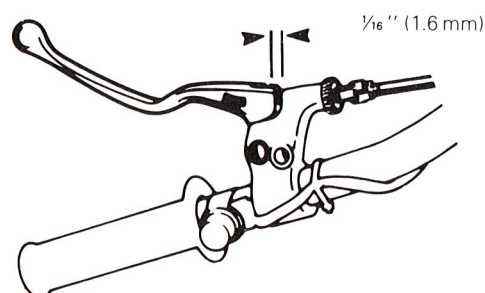
Turn the 8 mm clutch adjusting screw in and out to locate the point of contact with the release bearing, then turn the screw ¼ turn counter-clockwise.



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

Replace the access plug.

Adjust the cable adjuster to provide 1.6 mm (1/16") slack.



Check ignition timing.



**APPLICATION CHART**

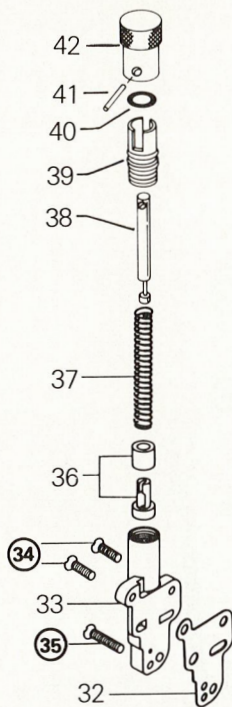
CARBURETOR TYPE	APPLICATION
TYPE 1	1975 T'NT 125 / 175 / 250
TYPE 2	MX-1 250 1975 MX-2 125 / 175 / 250 G.P. 250
TYPE 3	1976 T'NT O / R 175



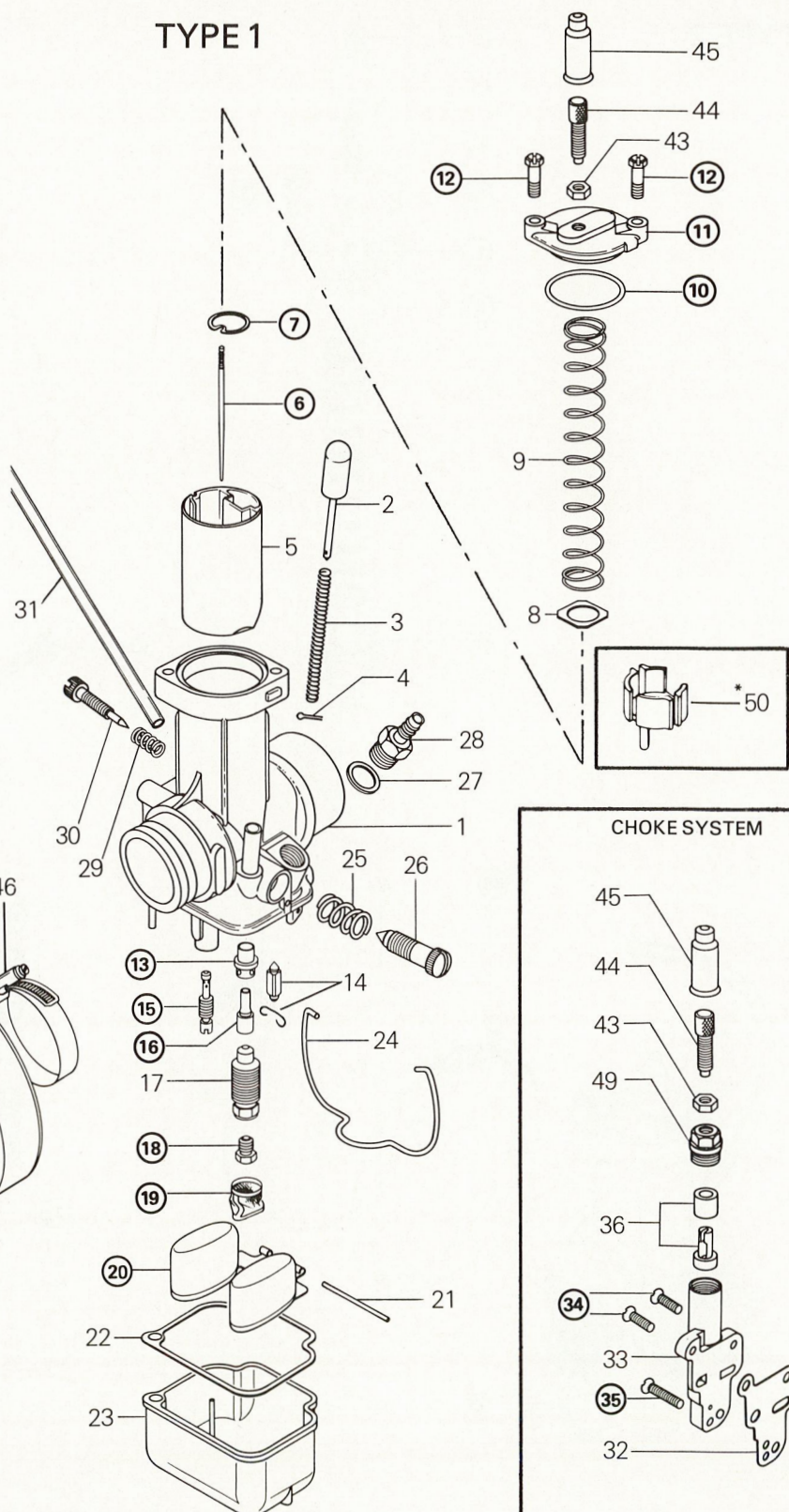




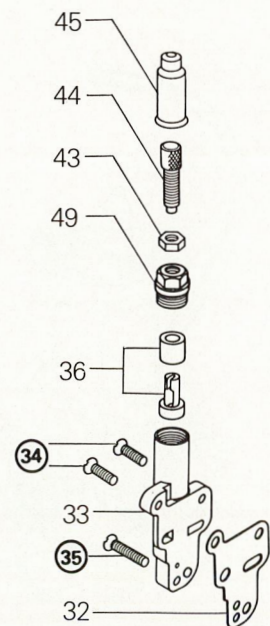
CHOKE SYSTEM



TYPE 1



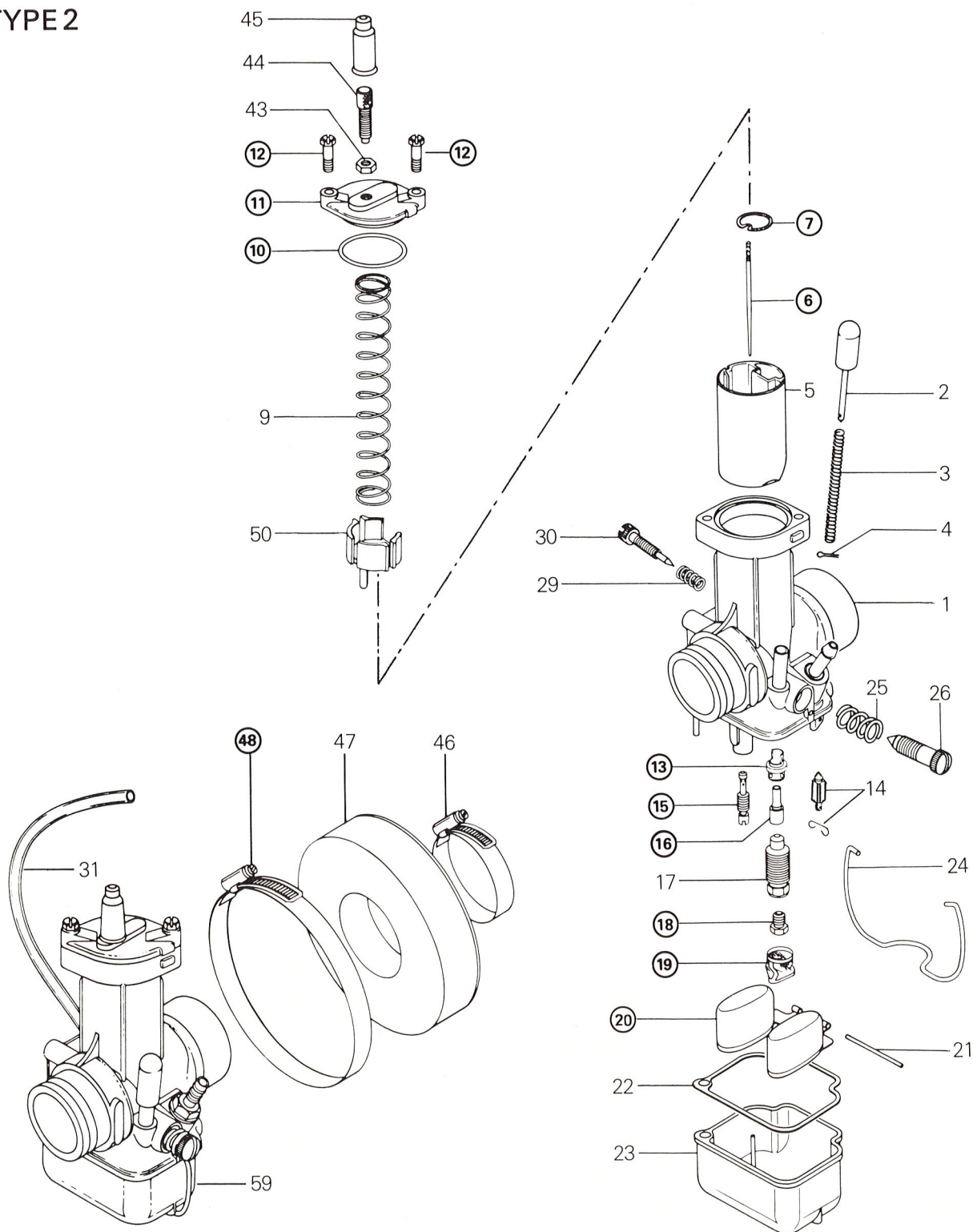
CHOKE SYSTEM



\* Item no. 50: Applicable on T'NT 250cc 1975.

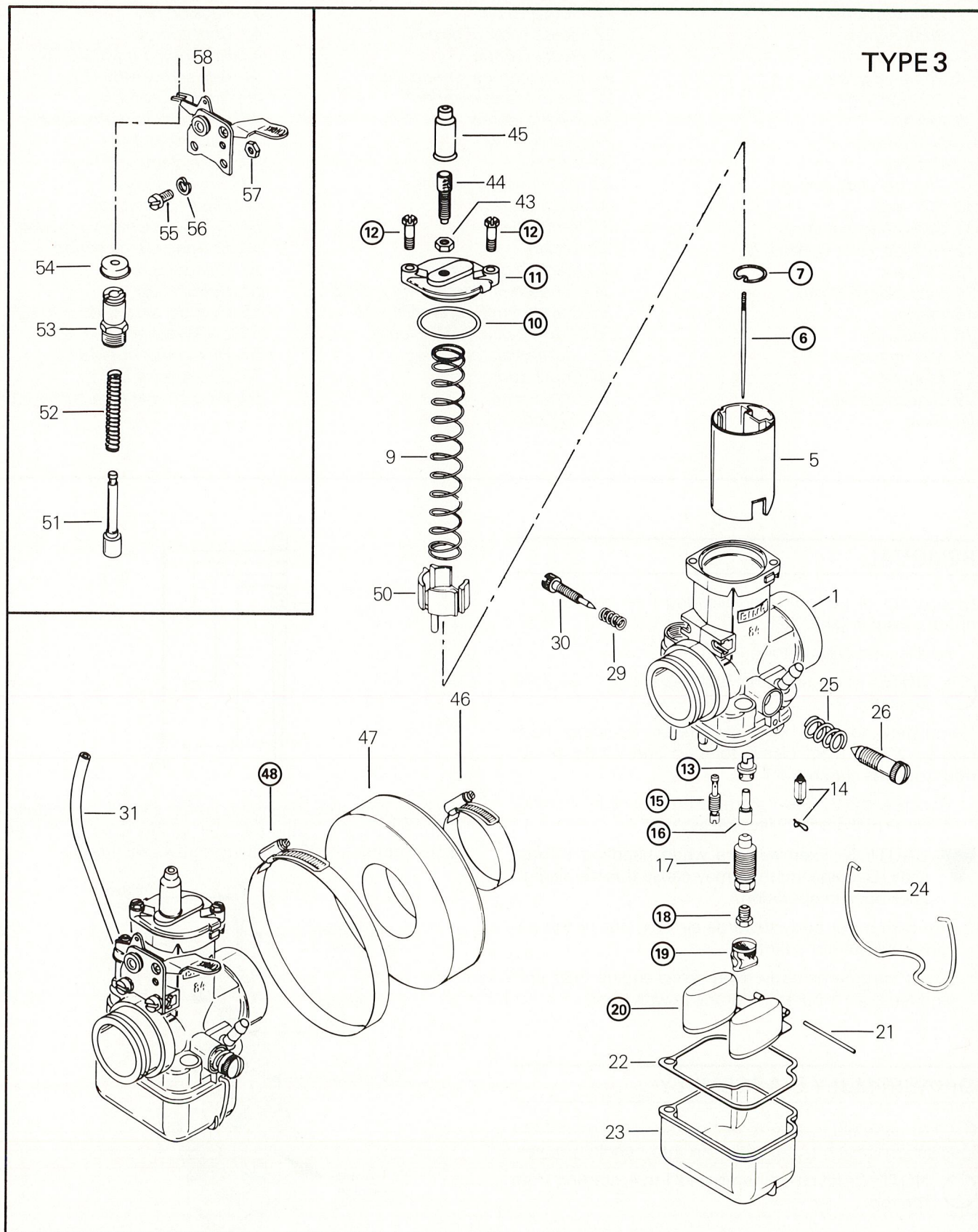


### TYPE 2





TYPE 3





- |                            |                                   |                                  |
|----------------------------|-----------------------------------|----------------------------------|
| 1. Carburetor body         | 21. Float arm pin                 | 41. Tension pin                  |
| 2. Primer knob             | 22. Float chamber gasket          | 42. Choke knob                   |
| 3. Primer spring           | 23. Float chamber                 | 43. Hexagon nut M6 x 0.75        |
| 4. Primer split pin        | 24. Float chamber spring clip     | 44. Adj. screw M6 x 0.75         |
| 5. Throttle slide          | 25. Idle adj. screw spring        | 45. Rubber grommet               |
| 6. Needle                  | 26. Idle adj. screw               | 46. Hose clamp (carburetor)      |
| 7. Needle clip             | 27. Sealing ring                  | 47. Carburetor boot              |
| 8. Washer                  | 28. Nipple                        | 48. Hose clamp (air box)         |
| 9. Throttle slide spring   | 29. Idle air screw spring         | 49. Closure screw                |
| 10. "O" ring               | 30. Idle air screw                | 50. Plastic spring cup           |
| 11. Slide chamber cover    | 31. Vent tube                     | 51. Starting piston w / gasket   |
| 12. Hexagon screw, M5 x 12 | 32. Gasket                        | 52. Starting piston spring       |
| 13. Diffuser               | 33. Starting piston body          | 53. Closure screw                |
| 14. Inlet needle & clip    | 34. Countersunk screw M4 x 12 (2) | 54. Rubber cap                   |
| 15. Idle jet               | 35. Countersunk screw M4 x 18     | 55. Cylinder screw M5 x 10 (2)   |
| 16. Needle jet             | 36. Starting piston w / sleeve    | 56. Lockwasher 5 mm (2)          |
| 17. Mixing tube            | 37. Starting piston spring        | 57. Hexagonal nut M5 (2)         |
| 18. Main jet               | 38. Choke rod                     | 58. Choke lever ass'y            |
| 19. Screen sleeve          | 39. Choke cam                     | 59. Bing double float carburetor |
| 20. Float                  | 40. "O" ring                      |                                  |

## REMOVAL

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.

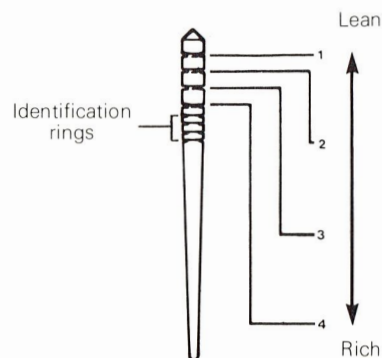
Completely loosen both carburetor retaining hose clamps. (Slide front clamp forward and rotate carburetor towards clutch side).

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

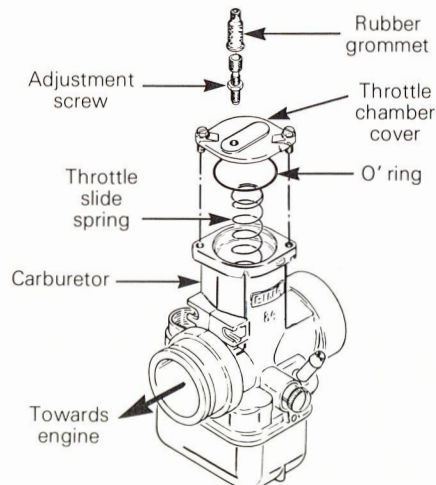
**CAUTION:** Exercise care when handling throttle slide. Damage incurred may cause throttle slide to stick open in operation.

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).



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



## DISASSEMBLY & ASSEMBLY

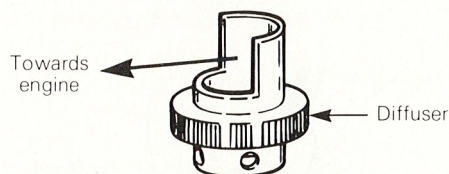
⑥ ⑦ At assembly refer to technical data for correct installation position of needle clip into needle grooves.

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



○ **NOTE:** Apply a light coat of silicone grease on the "O" ring to improve sealing ability.

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



⑮ ⑯ ⑰ Different size jets (main, idle, needle) are available for various temperatures and altitudes. Refer to the application charts for jet selections.

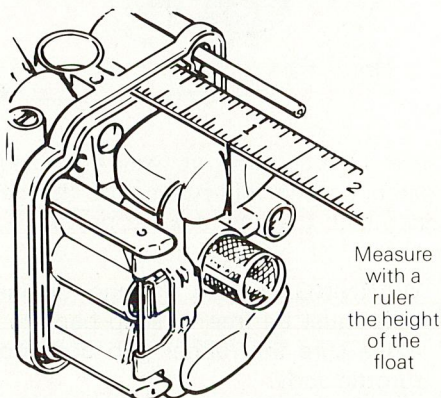
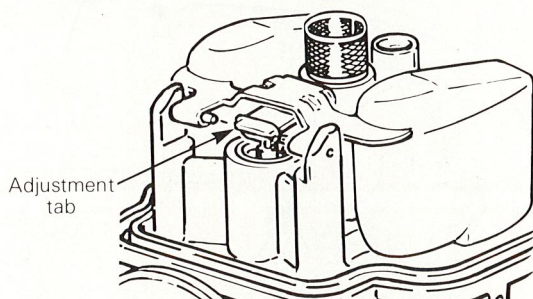
⑱ **CAUTION:** Make sure to install the screen sleeve at assembly, dirt or water may clog the carburetor main jet.

⑳ Correct 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 needle, measure distance between top of float and float chamber body (from the gasket groove bottom). Refer to technical data for correct height.

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

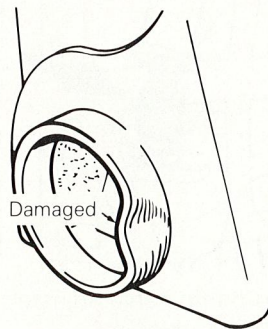


Measure with a ruler the height of the float

⑳ ㉑ Apply a light coat of "Loctite Lock'n Seal" on threads.

㉒

**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 disassembly.

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

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

Check inlet needle tip condition. If worn, the inlet needle should be replaced.

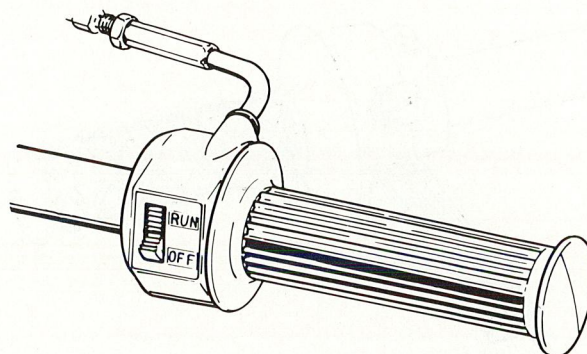
Check throttle slide for wear. Replace if worn or damage.

### INSTALLATION & ADJUSTMENT

To install carburetor, inverse removal procedure.

#### Throttle and injection pump adjustment

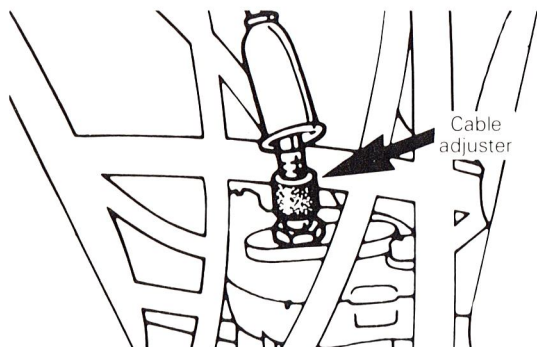
½ turn throttle (ZKW).



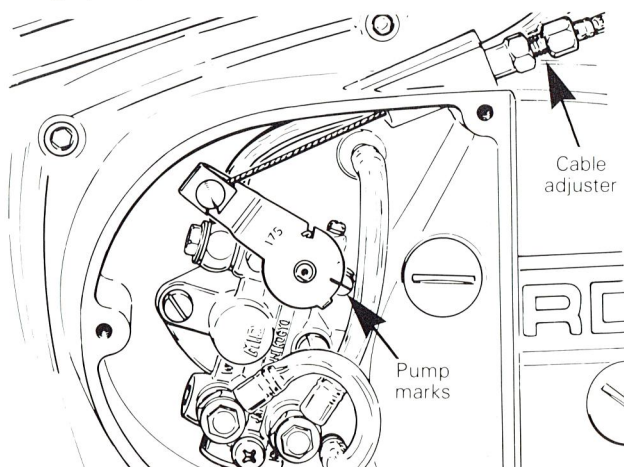


Loosen the throttle cable adjuster (at twist grip) to provide maximum slack.

Using the cable adjuster on the throttle slide chamber cover, set cable slack to 1.6 mm (  $\frac{1}{16}$  ").



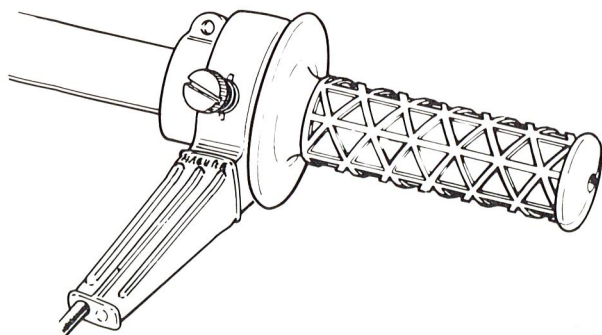
Using injection pump cable adjuster, adjust cable to align pump marks as shown.



Adjust throttle cable (at twist grip) to provide 1.6 mm (  $\frac{1}{16}$  ") slack.

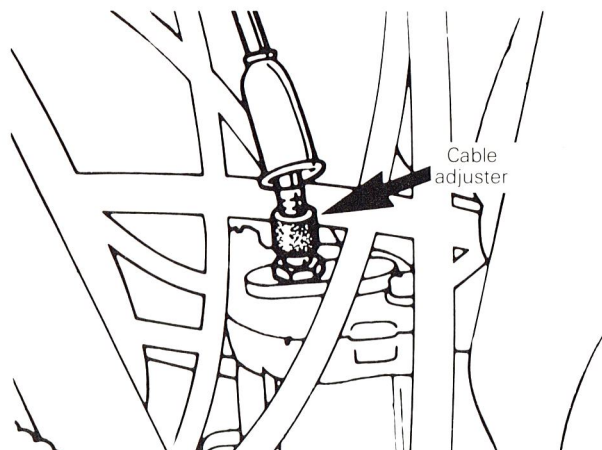
◆ **WARNING:** Before starting engine, carburetor slide must be free to snap back to idle position. Make sure the rubber grip does not rub on the throttle body or the handlebar end.

$\frac{1}{2}$  turn throttle (magura).

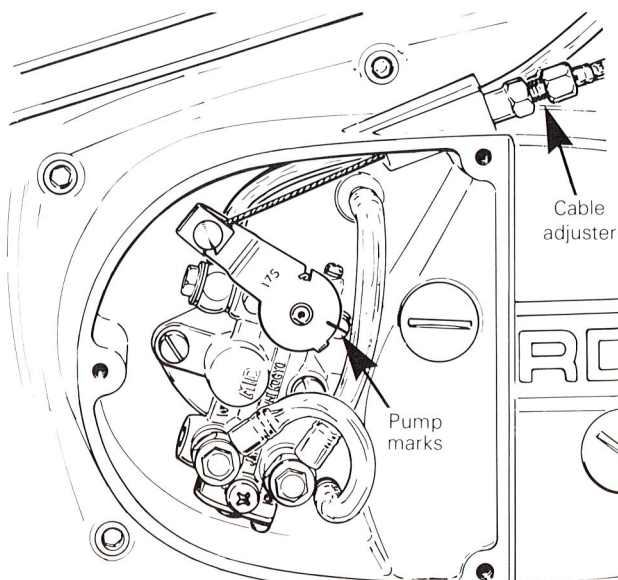


Loosen the twist grip throttle cable adjuster (located on the mid-portion of the cable routed underneath the gas tank) to provide maximum slack.

Using the cable adjuster located on the throttle slide chamber cover, set cable slack to 1.6 mm (  $\frac{1}{16}$  ").



Using pump cable adjuster, adjust cable to align pump marks as shown.

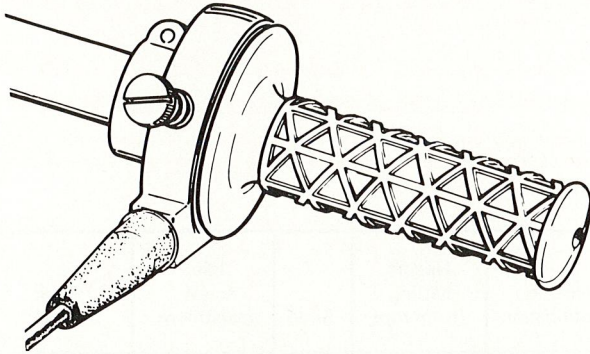


Adjust throttle cable at twist grip (cable adjuster is located on the mid-portion of the cable mounted underneath the gas tank) to provide 1.6 mm (  $\frac{1}{16}$  ") slack.

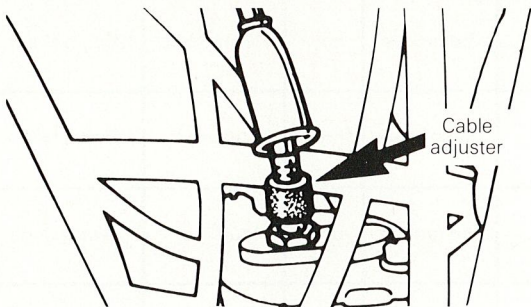
◆ **WARNING:** Before starting engine, carburetor slide must be free to snap back to idle position. Make sure the rubber grip does not rub on the throttle body.



$\frac{1}{4}$  turn throttle (Magura).



Using the cable adjuster located on the throttle slide chamber cover, set cable slack to 1.6 mm ( $\frac{1}{16}$ ").



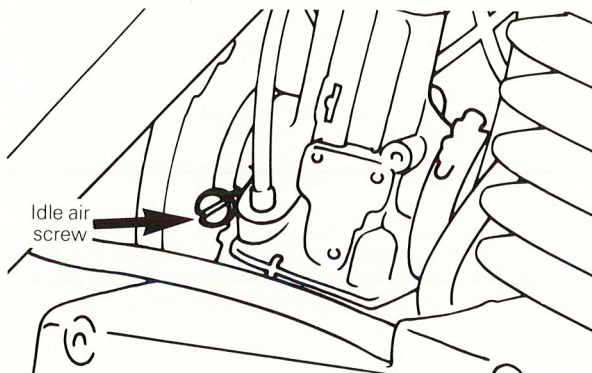
○ **NOTE:** On the G.P. model, cable adjuster at twist grip must be screwed tightly into place.

On the MX-2 / GP models, the oil injection pump is preset to deliver a constant amount of oil at any given R.P.M. and does not require any adjustment.

◆ **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.

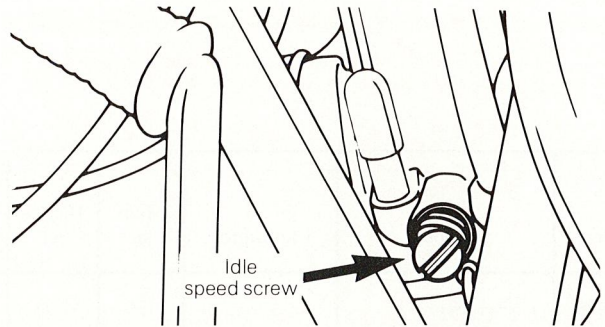
### Idle speed and mixture adjustment

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).



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  $\frac{1}{4}$  turn of basic setting) to achieve smoothest idle possible. Re-adjust idle speed if necessary.



**CARBURETOR TECHNICAL DATA**

Year	Model	Carburetor	Main jet	Needle jet	Idle jet	Needle identification	Needle setting (from top)	Slide	Idle screw adjustment	Float level
1975	T'NT 125cc	1 / 32 / 113	150	2.73	40	4 rings	3rd groove	no. 1	1¼ turn out	25 mm (1 in.)
1975	T'NT 175cc	1 / 32 / 114	155	2.73	40	4 rings	3rd groove	no. 1	1½ turn out	25 mm (1 in.)
1975	T'NT 250cc	1 / 32 / 116	150	2.73	40	4 rings	2nd groove	no. 1	1 turn out	25 mm (1 in.)
1975	MX-1 250cc	1 / 32 / 115	150	2.73	40*	4 rings	3rd groove	no. 1	1 turn out	25 mm (1 in.)
1975	MX-2 125,175,250cc	1 / 32 / 104	155	2.70	40	4 rings	3rd groove	no. 1	1¼ turn out	25 mm (1 in.)
1975	GP- 250cc	1 / 32 / 104	155	2.70	40	4 rings	3rd groove	no. 1	1 turn out	25 mm (1 in.)
1976	T'NT O / R 175cc	84 / 32 / 3214	155	2.73	40	4 rings	3rd groove	no. 1	1½ turn out	25 mm (1 in.)

\* Use no. 30 if rich at idle.



**CARBURETOR SETTING APPLICATION CHART**

1976


T'NT O / R 175cc (carb. no. 84 / 32 / 3214)

TEMPERATURE		ALTITUDE						
° C (° F)		SEA LEVEL	500 m (1600 ft)	1000 m (3200 ft)	1500 m (4900 ft)	2000 m (6500 ft)	2500 m (8200 ft)	3000 m (9800 ft)
40° (104°)	①	150	145	140	135	130	130	125
	②	3rd	2nd	2nd	2nd	2nd	2nd	2nd
	③	1½ turn	2 turns	2 turns	2 turns	2 turns	2 turns	2 turns
30° (86°)	①	155	150	145	140	135	130	125
	②	3rd	3rd	2nd	2nd	2nd	2nd	2nd
	③	1½ turn	1½ turn	2 turns	2 turns	2 turns	2 turns	2 turns
20° (68°)	①	155	150	145	140	135	130	125
	②	3rd	3rd	2nd	2nd	2nd	2nd	2nd
	③	1½ turn	1½ turn	2 turns	2 turns	2 turns	2 turns	2 turns
10° (50°)	①	155	150	145	145	140	135	130
	②	3rd	3rd	2nd	2nd	2nd	2nd	2nd
	③	1½ turn	1½ turn	2 turns	2 turns	2 turns	2 turns	2 turns
0° (32°)	①	160	155	150	145	140	140	135
	②	3rd	3rd	3rd	2nd	2nd	2nd	2nd
	③	1½ turn	1½ turn	1½ turn	2 turns	2 turns	2 turns	2 turns
-10° (14°)	①	165	160	155	150	145	140	135
	②	3rd	3rd	3rd	2nd	2nd	2nd	2nd
	③	1½ turn	1½ turn	1½ turn	1½ turn	2 turns	2 turns	2 turns
-20° (-4°)	①	165	160	155	150	145	145	140
	②	4th	3rd	3rd	3rd	3rd	2nd	2nd
	③	1 turn	1½ turn	1½ turn	1½ turn	2 turns	2 turns	2 turns

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

1975

T'NT 125cc (carb. no. 1 / 32 / 113)

TEMPERATURE		ALTITUDE						
° C (° F)		SEA LEVEL	500 m (1600 ft)	1000 m (3200 ft)	1500 m (4900 ft)	2000 m (6500 ft)	2500 m (8200 ft)	3000 m (9800 ft)
40° (104°)	①	145	140	135	130	125	125	120
	②	3rd	2nd	2nd	2nd	2nd	2nd	2nd
	③	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn
30° (86°)	①	150	145	140	135	130	125	120
	②	3rd	3rd	2nd	2nd	2nd	2nd	2nd
	③	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn
20° (68°)	①	150	145	140	135	130	125	120
	②	3rd	3rd	2nd	2nd	2nd	2nd	2nd
	③	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn
10° (50°)	①	150	145	140	135	135	125	120
	②	3rd	3rd	3rd	2nd	2nd	2nd	2nd
	③	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn
0° (32°)	①	155	150	145	140	135	130	125
	②	3rd	3rd	3rd	2nd	2nd	2nd	2nd
	③	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn
-10° (14°)	①	160	155	150	145	140	135	130
	②	4th	3rd	3rd	3rd	2nd	2nd	2nd
	③	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn
-20° (-4°)	①	160	155	150	145	140	135	130
	②	4th	3rd	3rd	3rd	2nd	2nd	2nd
	③	¾ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn

- 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****1975****MX-1 250cc (1 / 32 / 115)**

TEMPERATURE		ALTITUDE						
° C (° F)		SEA LEVEL	500 m (1600 ft)	1000 m (3200 ft)	1500 m (4900 ft)	2000 m (6500 ft)	2500 m (8200 ft)	3000 m (9800 ft)
40° (104°)	①	145	140	135	130	125	125	120
	②	3rd	2nd	2nd	2nd	2nd	2nd	2nd
	③	1 turn	1½ turn	1½ turn	1½ turn	1½ turn	1½ turn	1½ turn
30° (86°)	①	150	145	140	135	130	125	120
	②	3rd	3rd	2nd	2nd	2nd	2nd	2nd
	③	1 turn	1 turn	1½ turn	1½ turn	1½ turn	1½ turn	1½ turn
20° (68°)	①	150	145	140	135	130	125	120
	②	3rd	3rd	2nd	2nd	2nd	2nd	2nd
	③	1 turn	1 turn	1½ turn	1½ turn	1½ turn	1½ turn	1½ turn
10° (50°)	①	150	145	140	135	130	125	120
	②	3rd	3rd	3rd	2nd	2nd	2nd	2nd
	③	1 turn	1 turn	1 turn	1½ turn	1½ turn	1½ turn	1½ turn
0° (32°)	①	155	150	145	140	135	130	125
	②	3rd	3rd	3rd	2nd	2nd	2nd	2nd
	③	1 turn	1 turn	1 turn	1½ turn	1½ turn	1½ turn	1½ turn
-10° (14°)	①	160	155	150	145	140	135	130
	②	4th	3rd	3rd	3rd	2nd	2nd	2nd
	③	1 turn	1 turn	1 turn	1 turn	1½ turn	1½ turn	1½ turn
-20° (-4°)	①	160	155	150	145	140	135	130
	②	4th	3rd	3rd	3rd	2nd	2nd	2nd
	③	½ turn	1 turn	1 turn	1 turn	1 turn	1½ turn	1½ turn

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

1975

T'NT 250cc (carb. no. 1 / 32 / 116)

TEMPERATURE		ALTITUDE						
° C (° F)		SEA LEVEL	500 m (1600 ft)	1000 m (3200 ft)	1500 m (4900 ft)	2000 m (6500 ft)	2500 m (8200 ft)	3000 m (9800 ft)
40° (104°)	①	145	140	135	130	125	125	120
	②	2nd	1st	1st	1st	1st	1st	1st
	③	1 turn	1½ turn	1½ turn	1½ turn	1½ turn	1½ turn	1½ turn
30° (86°)	①	150	145	140	135	130	125	120
	②	2nd	2nd	1st	1st	1st	1st	1st
	③	1 turn	1 turn	1½ turn	1½ turn	1½ turn	1½ turn	1½ turn
20° (68°)	①	150	145	140	135	130	125	120
	②	2nd	2nd	1st	1st	1st	1st	1st
	③	1 turn	1 turn	1½ turn	1½ turn	1½ turn	1½ turn	1½ turn
10° (50°)	①	150	145	140	135	130	125	120
	②	2nd	2nd	2nd	1st	1st	1st	1st
	③	1 turn	1 turn	1 turn	1½ turn	1½ turn	1½ turn	1½ turn
0° (32°)	①	155	150	145	140	135	130	125
	②	2nd	2nd	2nd	1st	1st	1st	1st
	③	1 turn	1 turn	1 turn	1½ turn	1½ turn	1½ turn	1½ turn
-10° (14°)	①	160	155	150	145	140	135	130
	②	3rd	2nd	2nd	2nd	1st	1st	1st
	③	1 turn	1 turn	1 turn	1 turn	1½ turn	1½ turn	1½ turn
-20° (-4°)	①	160	155	150	145	140	135	130
	②	3rd	2nd	2nd	2nd	2nd	1st	1st
	③	½ turn	1 turn	1 turn	1 turn	1 turn	1½ turn	1½ turn

- ① Main jet no.
- ② Needle position
- 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**

1975


MX-2 125-175-250cc

GP 250cc (carb. no. 1 / 32 / 104)

T'NT 175cc (carb. no. 1 / 32 / 114)

TEMPERATURE		ALTITUDE						
° C (° F)		SEA LEVEL	500 m (1600 ft)	1000 m (3200 ft)	1500 m (4900 ft)	2000 m (6500 ft)	2500 m (8200 ft)	3000 m (9800 ft)
40° (104°)	①	150	145	140	135	130	130	125
	②	3rd	2nd	2nd	2nd	2nd	2nd	2nd
	③	1¼ turn	1¾ turn	1¾ turn	1¾ turn	1¾ turn	1¾ turn	1¾ turn
30° (86°)	①	155	150	145	140	135	130	125
	②	3rd	3rd	2nd	2nd	2nd	2nd	2nd
	③	1¼ turn	1¼ turn	1¾ turn	1¾ turn	1¾ turn	1¾ turn	1¾ turn
20° (68°)	①	155	150	145	140	135	130	125
	②	3rd	3rd	2nd	2nd	2nd	2nd	2nd
	③	1¼ turn	1¼ turn	1¾ turn	1¾ turn	1¾ turn	1¾ turn	1¾ turn
10° (50°)	①	155	150	145	145	140	135	130
	②	3rd	3rd	3rd	2nd	2nd	2nd	2nd
	③	1¼ turn	1¼ turn	1¼ turn	1¾ turn	1¾ turn	1¾ turn	1¾ turn
0° (32°)	①	160	155	150	145	140	140	135
	②	3rd	3rd	3rd	2nd	2nd	2nd	2nd
	③	1¼ turn	1¼ turn	1¼ turn	1¾ turn	1¾ turn	1¾ turn	1¾ turn
-10° (14°)	①	165	160	155	150	145	140	135
	②	4th	3rd	3rd	3rd	2nd	2nd	2nd
	③	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¾ turn	1¾ turn	1¾ turn
-20° (-4°)	①	165	160	155	150	145	145	140
	②	4th	3rd	3rd	3rd	2nd	2nd	2nd
	③	¾ turn	1¼ turn	1¼ turn	1¼ turn	1¼ turn	1¾ turn	1¾ turn

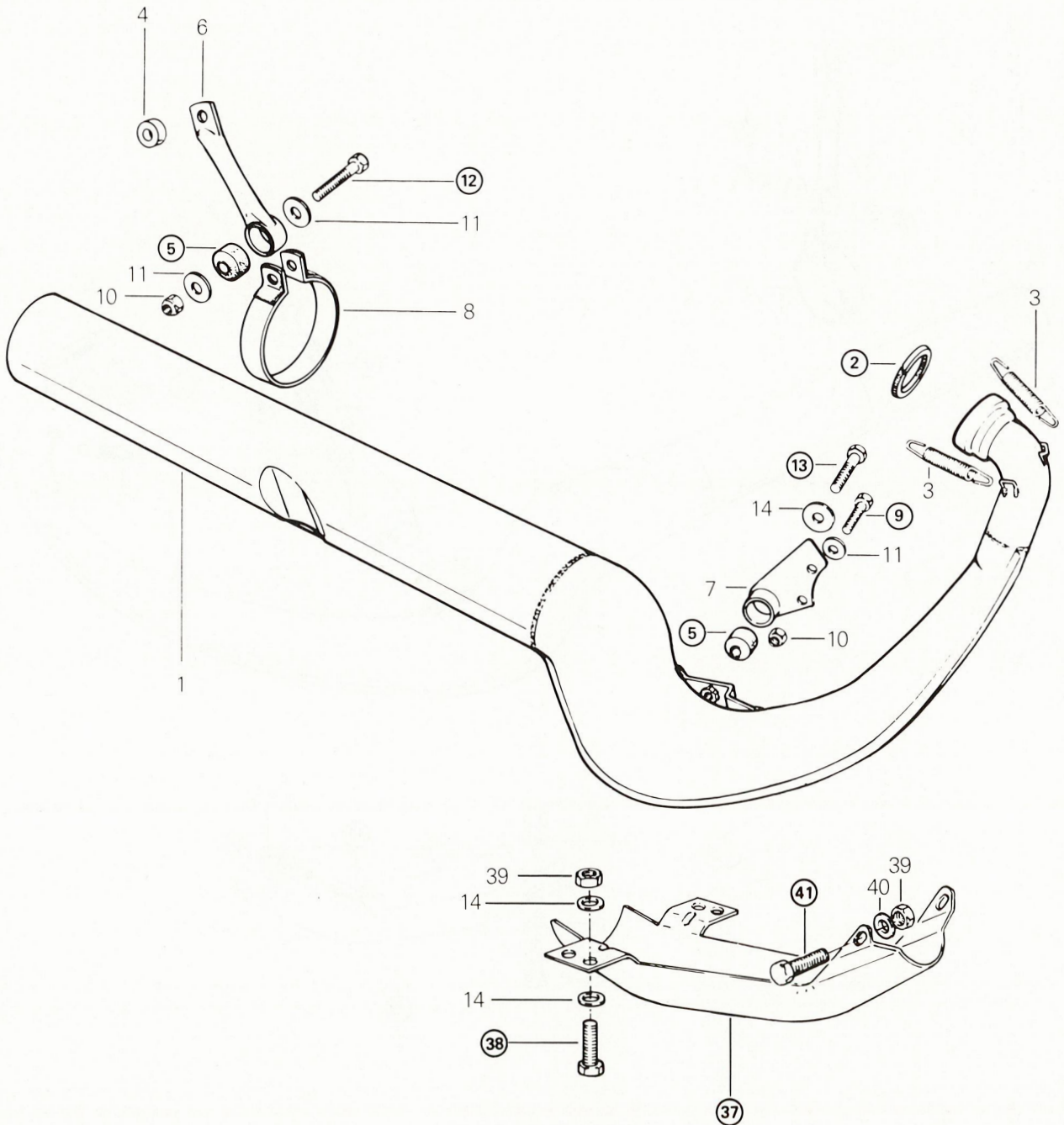
- ① Main jet  
 ② Needle position  
 ③ Air screw

 **CAUTION:** These adjustments are guidelines only. Specific adjustments vary with temperature, altitude and terrain conditions. Always observe spark plug condition for proper jetting.

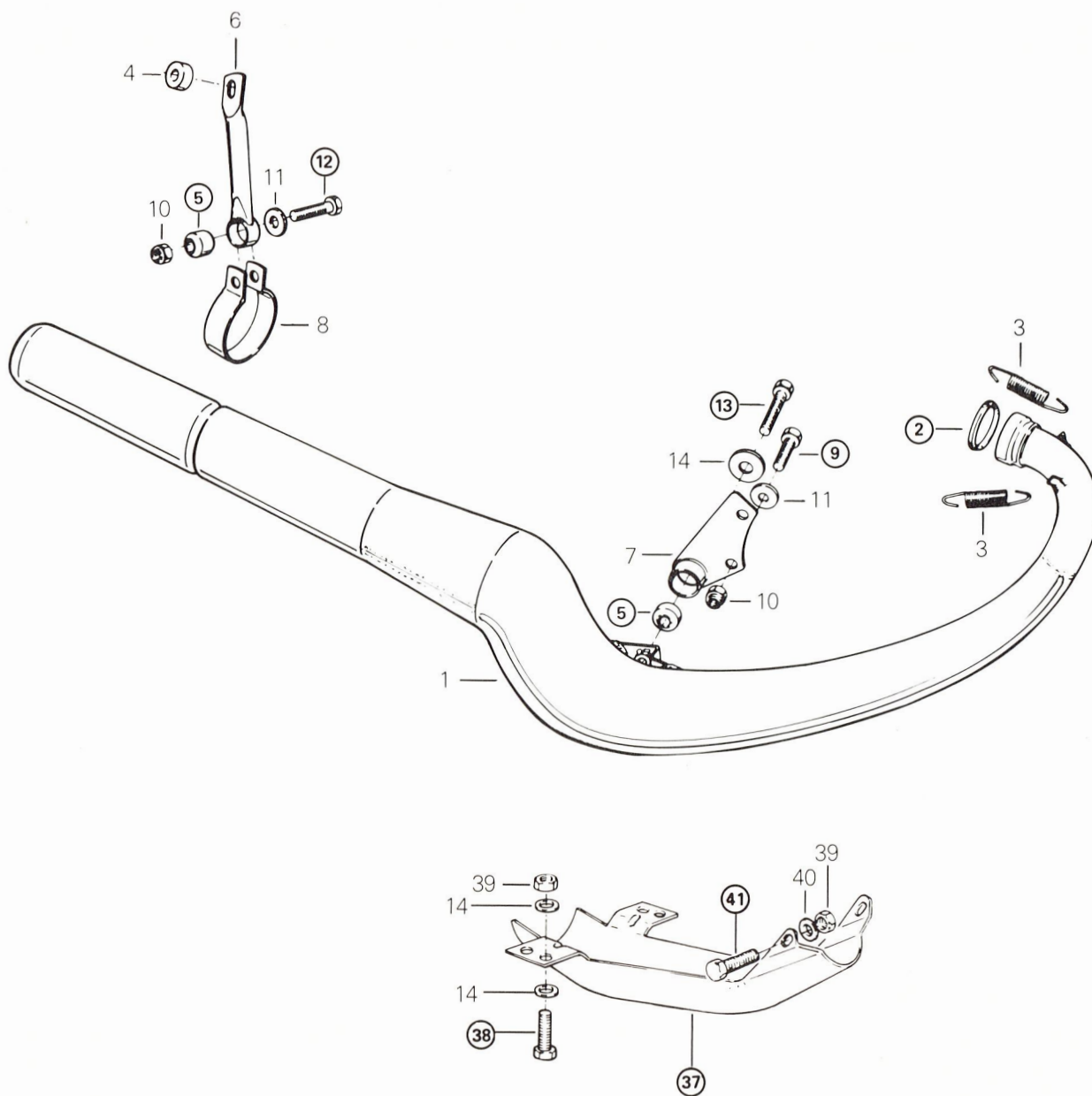




T'NT 250

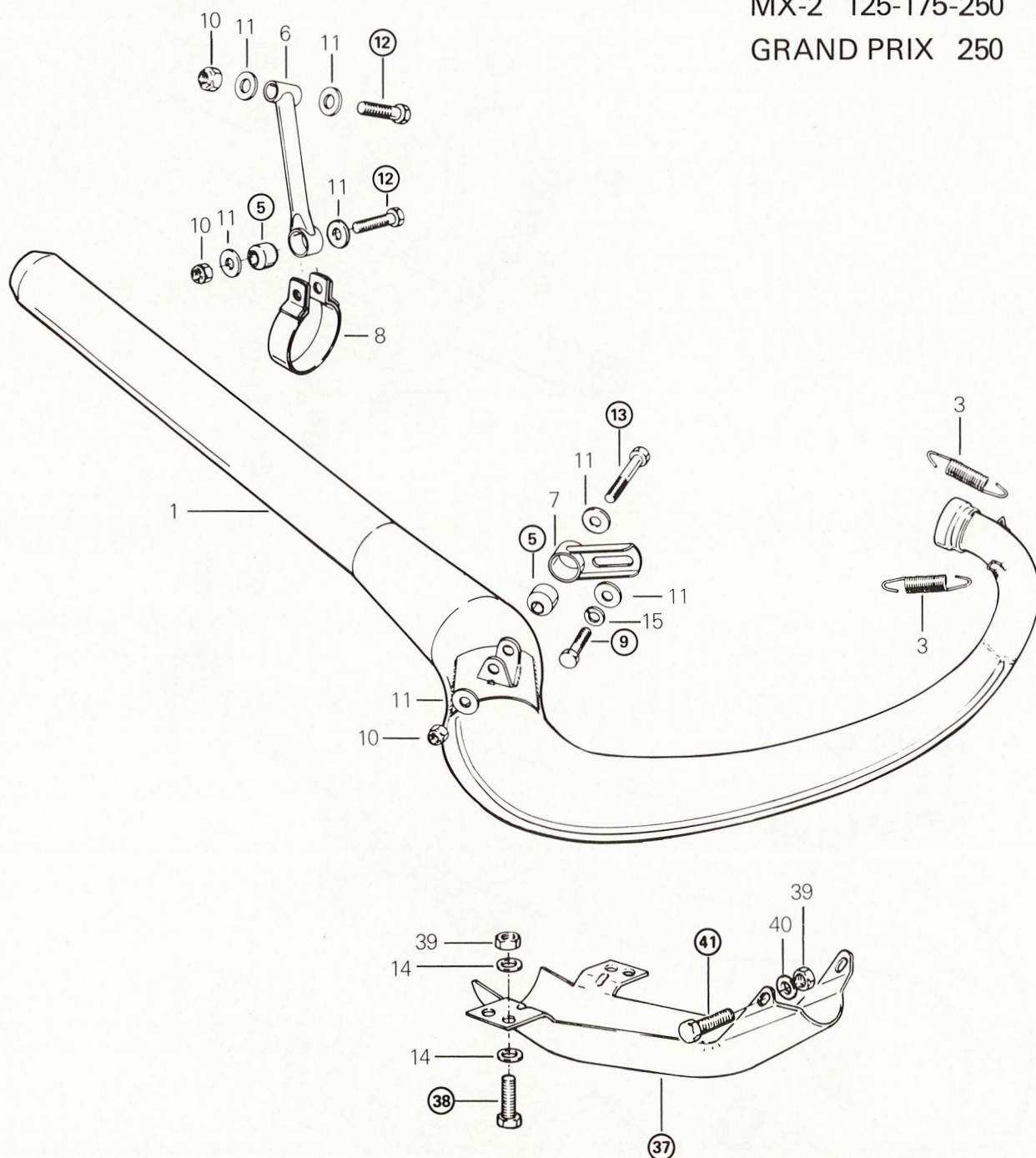


MX-1 250

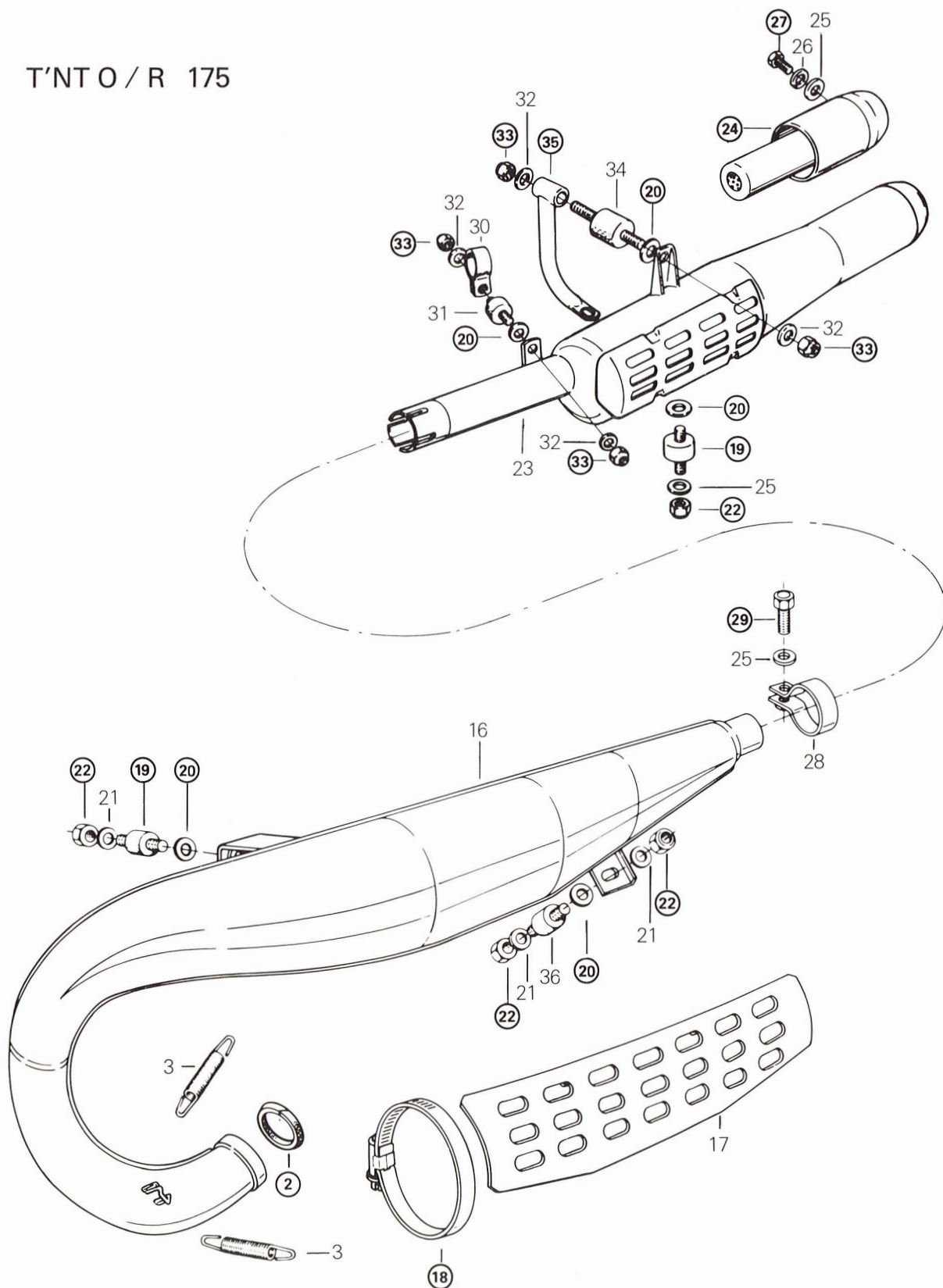




MX-2 125-175-250  
GRAND PRIX 250



T/NT O / R 175





## (Sub-Section 3-6)

## EXHAUST SYSTEM

- |                                |                                  |                                |
|--------------------------------|----------------------------------|--------------------------------|
| 1. Exhaust pipe                | 15. Lock washer 8 mm             | 29. Hex. bolt M6 x 1.00 x 6    |
| 2. Packing                     | 16. Exhaust pipe                 | 30. Clamp                      |
| 3. Spring                      | 17. Heat shield                  | 31. Rubber mount               |
| 4. Spacer (rear mount)         | 18. Hose clamp                   | 32. Flat washer 8 mm x 17 x 2  |
| 5. Center bounded mount        | 19. Rubber mount                 | 33. Elastic stop nut M8 x 1.25 |
| 6. Rear mount                  | 20. Asbestos washer              | 34. Rubber mount               |
| 7. Front mount                 | 21. Flat washer 6 mm x 12 x 1.50 | 35. Curved hanger bracket      |
| 8. Clamp                       | 22. Elastic stop nut M6 x 1.00   | 36. Rubber mount               |
| 9. Hex. screw M8 x 1.25 x 40   | 23. Muffler with resonator       | 37. Skid plate                 |
| 10. Elastic stop nut M8 x 1.25 | 24. Resonator                    | 38. Hex. bolt M8 x 1.25 x 16   |
| 11. Flat washer 8 mm x 17 x 2  | 25. Flat washer 6 mm x 14 x 1.5  | 39. Elastic stop nut M8 x 1.25 |
| 12. Hex. bolt M8 x 1.25 x 40   | 26. Lock washer 6 mm             | 40. Lock washer 8 mm           |
| 13. Hex. bolt M8 x 1.25 x 35   | 27. Hex. screw M6 x 1.00 x 8     | 41. Hex. bolt M8 x 1.25 x 50   |
| 14. Flat washer 8 mm x 25      | 28. Clamp                        |                                |

### REMOVAL

Remove or disconnect the following (if applicable) then withdraw muffler and / or exhaust pipe from motor-cycle.

- Skid plate
- Left number plate

### DISASSEMBLY AND ASSEMBLY

② Exhaust packing should be replaced everytime the exhaust pipe is removed.

○ **NOTE:** To accelerate the installation of the exhaust packing, it is recommended to glue the packing to the exhaust socket using contact cement or equivalent.

⑤ Use a solution of soapy water to insert the center bounded mount.

⑨ ⑫ ⑬ At assembly torque to 2-2.8 kg-m (15-20 ft-lbs).

⑮ At assembly torque to .3-.4 kg-m (2-3 ft-lbs).

⑲ At assembly torque to .4-.6 kg-m (3-4 ft-lbs).

⑳

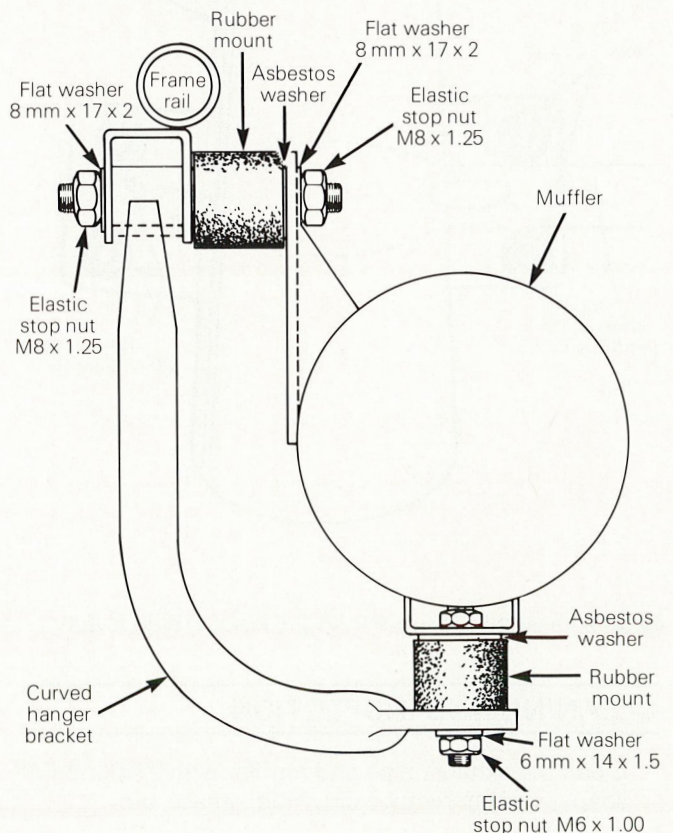
▼ **CAUTION:** Make sure to install the asbestos washer at assembly as heat can damage the rubber mount.

㉒ At assembly torque to .4-.6 kg-m (3-4 ft-lbs).

㉔

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

- ㉔ At assembly, torque to .4-.6 kg-m (3-4 ft-lbs).
- ㉙ At assembly, torque to .6-.7 kg-m (4-5 ft-lbs).
- ㉛ At assembly, torque to 1.4-1.7 kg-m (10-12 ft-lbs).
- ㉝ The curved hanger bracket is slotted to permit proper muffler alignment.

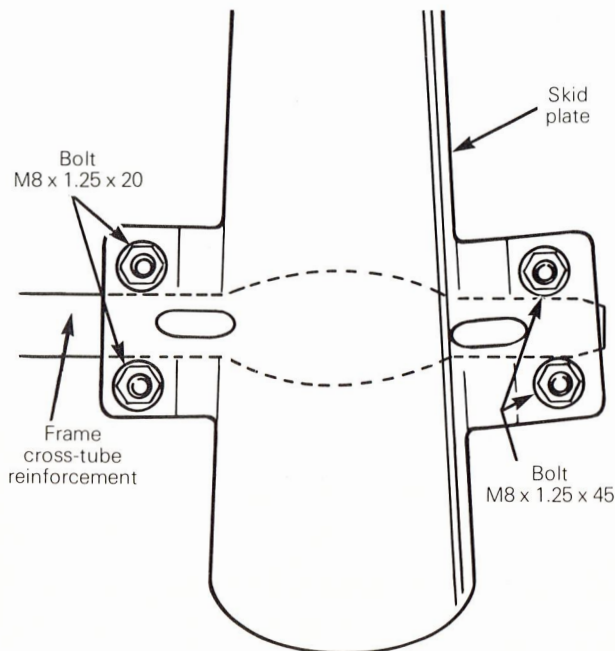
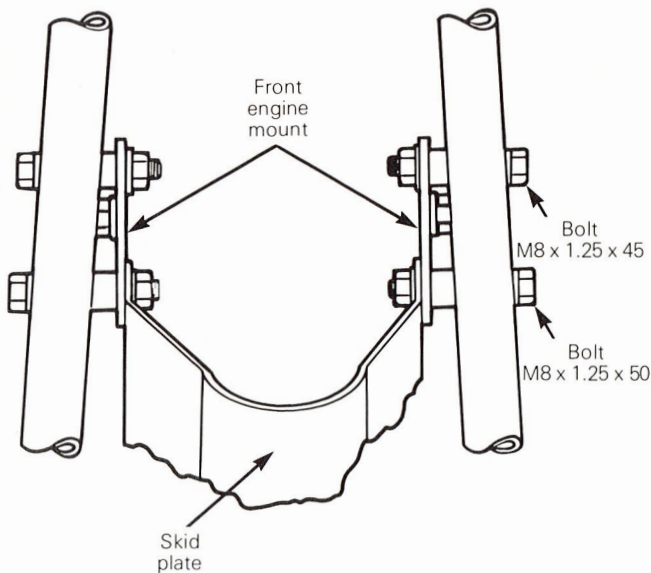




# EXHAUST SYSTEM

## (Sub-Section 3-6)

③⑦ At assembly, position the skid plate as illustrated.



③⑧ ④① At assembly torque to 2.-2.8 kg-m (15-20 ft-lbs).

### CLEANING AND INSPECTION

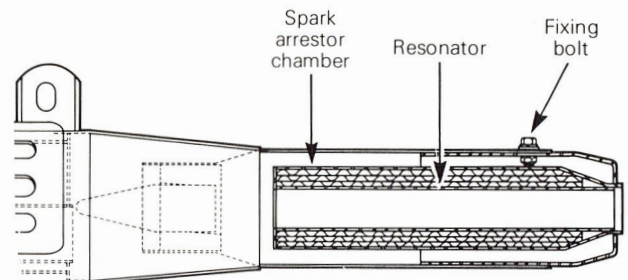
— Clean the exhaust pipe and muffler with a solution of soapy water to remove dirt, mud, grease, etc.

— 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.

— On models equipped with a spark arrestor / resonator, it is recommended to clean the spark arrestor chamber periodically to maintain it in effective working order.



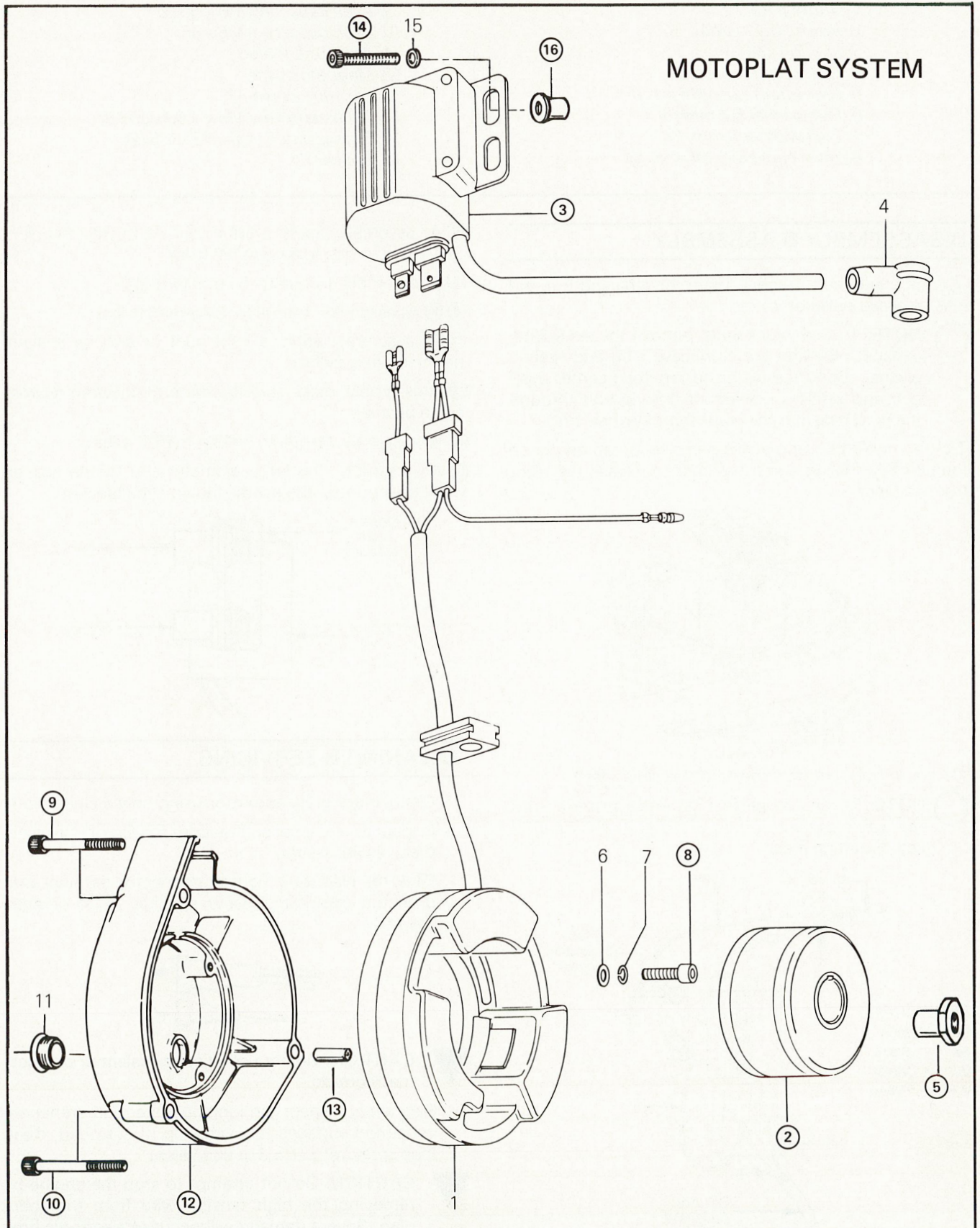
— Inspect nuts and rubber mounts. If damaged, replace.

### INSTALLATION

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

◆ **WARNING:** 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.





1. Stator plate
2. Rotor (low inertia)
3. Ignition coil
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)

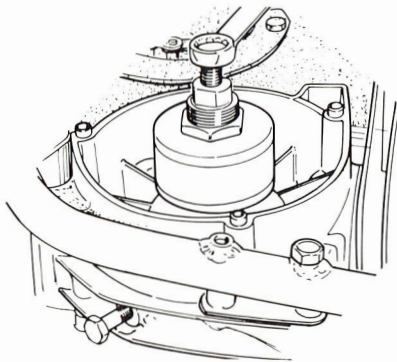
9. Allen capscrew M6 x 50 (2)
10. Allen capscrew M6 x 45
11. Adjustment plug
12. Magneto cover
13. Locating dowel (3)
14. Allen capscrew M6 x 1.00 x 35 (2)
15. Flat washer 6 mm x 12 x 1.5 (2)
16. Spacer (2)

## DISASSEMBLY & ASSEMBLY

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

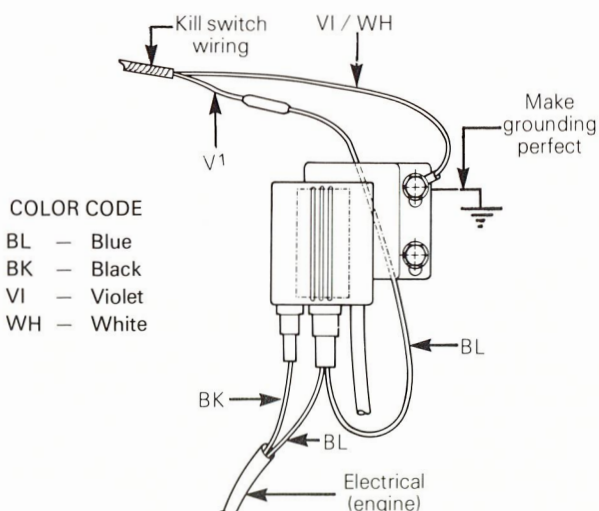
○ **NOTE:** To lock crankshaft, remove the skid-plate, exhaust pipe and the crankcase plug and sealing washer. Bring the piston to top dead center position and insert a crankshaft locking bolt through the plug hole into the crankshaft flywheel hole.

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.



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.



⑤ At assembly, apply a light coat of Loctite "Lock'n Seal" and torque to 8 kg-m (60 ft-lbs).

⑧ At assembly, torque to .5 kg-m (4 ft-lbs).

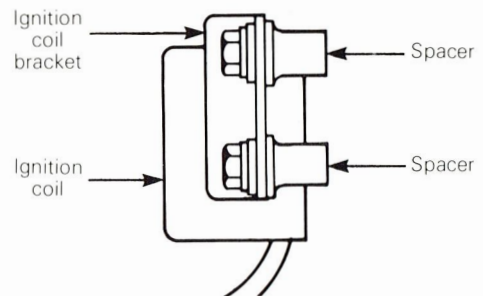
⑨ ⑩ At assembly, torque to .8 kg-m (6 ft-lbs).

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

⑬ At assembly, make sure the three (3) locating dowels are in position.

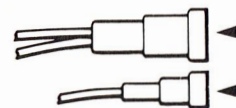
⑭ At assembly, torque to .8-1 kg-m (6-7 ft-lbs).

⑮ At assembly, the large diameter end of the spacer must be mounted against the ignition coil bracket.



## CLEANING & SERVICING

- Clean stator plate and rotor using only a clean cloth.
- Inspect all electrical connections for dirt or corrosion. Clean as necessary.
- Pack the electronic control connector terminal with dielectric compound (Dow Corning DC 4 or equivalent).



▼ **CAUTION:** Do not use silicone sealant or contacts may corrode.

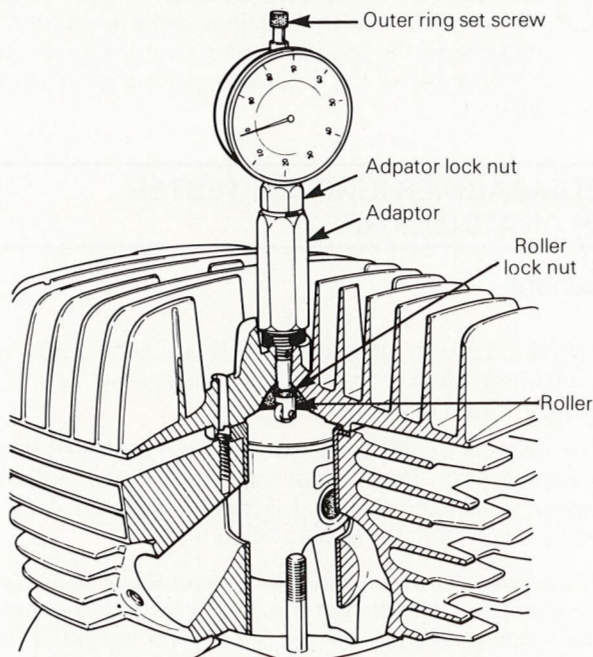
- Frequently inspect the ignition cover and crankcase unpainted surfaces for corrosion. If corroded, clean then spray with LPS 3 or equivalent.

▼ **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.



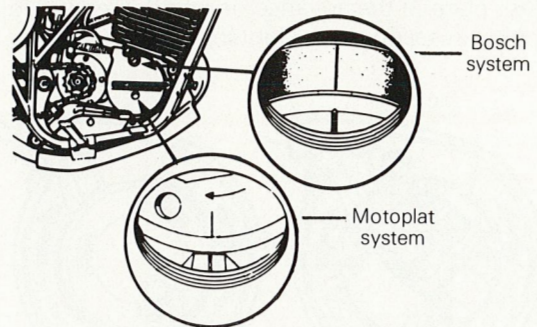
**IGNITION TIMING****Bosch and Motoplat system****Timing mark verification (Top dead center gauge).**

- 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.
- Install and adjust T.D.C. gauge 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 until the specified piston position before top dead center is reached. (Refer to technical data).
- Check through the inspection hole if the flywheel or

rotor and magneto cover marks align perfectly.



- 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.)).

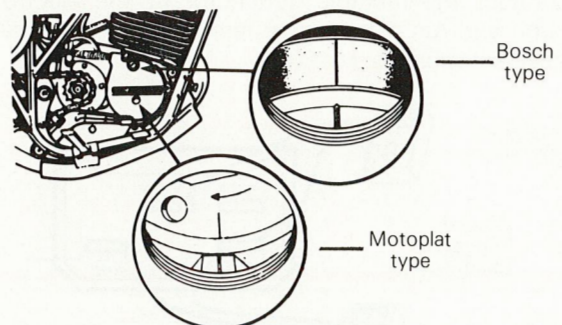
**CAUTION:** Timing mark verification cannot be used as a timing procedure, therefore always check the timing (using a stroboscopic timing light at 9,000 R.P.M.) after the marks have been aligned.

**TIMING PROCEDURE****Bosch and Motoplat system**

- Remove the timing inspection plug, and connect the timing light pick-up to the high tension lead.
- 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, revving the engine to 9000 R.P.M. for a brief instant, check the timing mark alignment. If timing is correct, the ignition cover mark and flywheel or rotor mark will align as shown. Stop the engine.



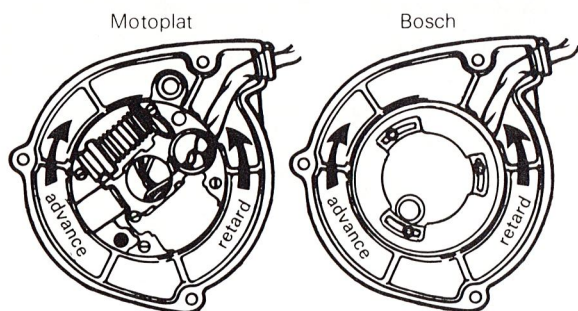
**CAUTION:** Timing marks must be checked with a dial indicator for perfect accuracy.

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. Tighten the Allen screws.



- Install the magneto cover, start the engine and re-check 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 9000 R.P.M.

○ **NOTE:** Only stroboscopic timing lights utilizing a capacitor or inductive pick-up can be used to indicate correct spark setting without disturbing the electronic equilibrium of the ignition circuit.

SUN PTL 45  
Snap-on MT 215 B  
Bosch E Fam 169 A

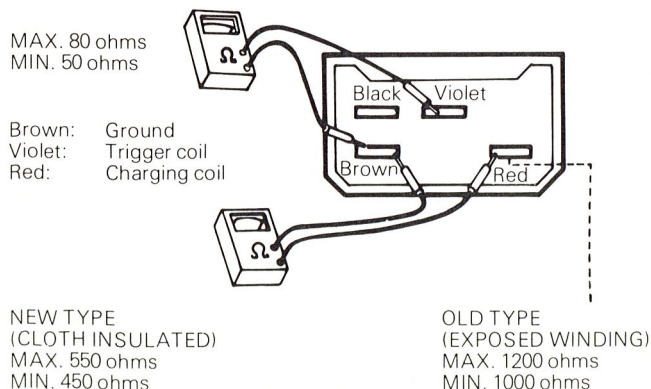
## TESTING PROCEDURE

### Continuity test

The charging and triggering coils can be tested with an ohmmeter.

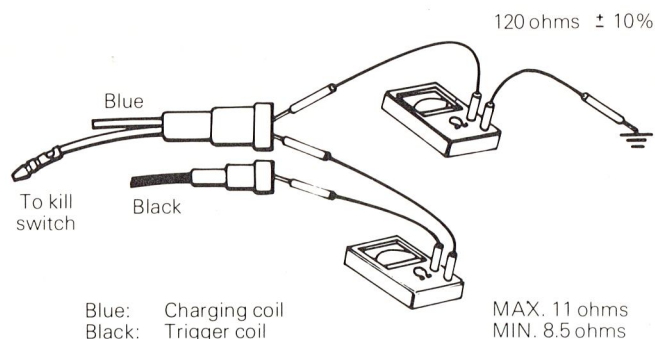
### Bosch type

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



### Motoplat system

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



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

## 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 .5 to 27 volts. The HIGH range is sensitive to AC or DC voltages of 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 plugs 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 stop 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 operate 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 parts. 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.

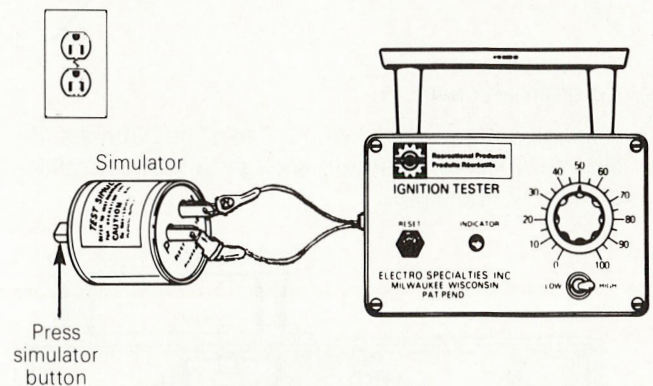
### High scale test

- a) Place switch in HIGH position. Plug the simulator into an electric outlet (117 VAC) 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.

117 VAC outlet



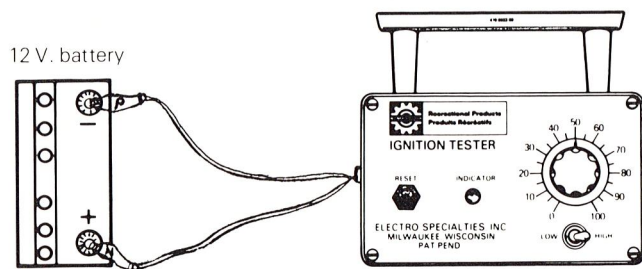
### Low scale test

- 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 charge 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 leads 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.

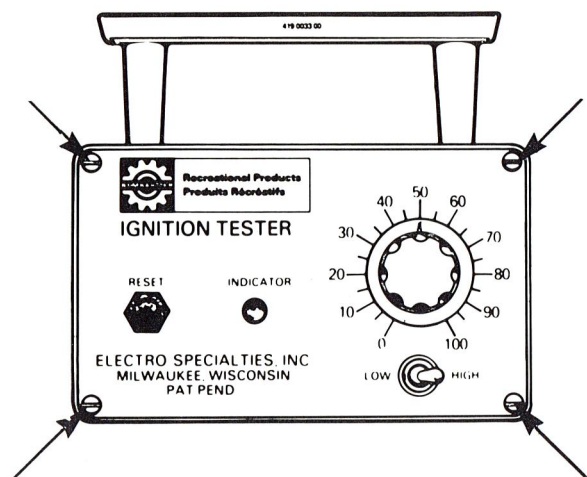
○ **NOTE:** For each test performed by the simulator, it must be recharged.



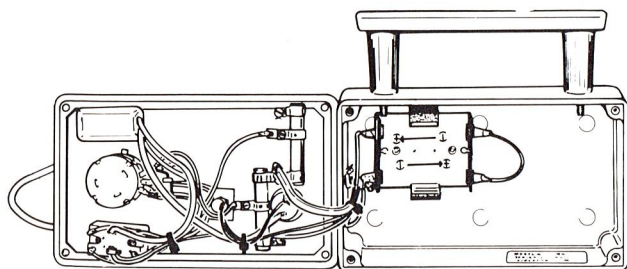


### Battery replacement

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 grow 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 of no consequence.

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

### INDEX

BOSCH C.D. IGNITION	PAGE
Test no. 1 Ignition coil output to spark plug	7
Test no. 2 Charging coil output	7
Test no. 3 Trigger coil output	8
Test no. 4 Lighting coil output	8
MOTOPLAT C.D. IGNITION	
Test no. 5 Ignition coil output to spark plug	9
Test no. 6 Charging coil output	9
Test no. 7 Trigger coil output	10



**BOSCH C.D. IGNITION****TEST NO. 1: IGNITION COIL OUTPUT TO SPARK PLUG**

NOTE: To obtain accurate readings it is necessary to install a new, correctly gapped, spark plug. However, if test is performed on engine before spark plug is changed, a low or no reading could indicate a fouled or faulty spark plug. Replace by a new one and recheck.

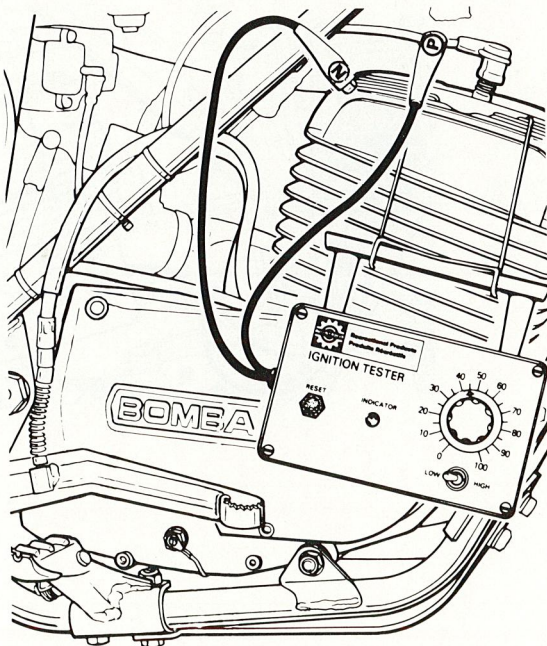
1. Attach tester **P** lead over spark plug wire, directly behind spark plug cap. Connect **N** lead to a good engine ground.

2. Set tester switch to LOW position and dial at ~~45~~ <sup>45</sup> ~~30~~ <sup>30</sup>

3. Select transmission neutral position, place emergency stop switch in **RUN** position and turn ignition key to **IGNITION**. Kick start pedal down vigorously.

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

B. Indicator lamp does not light: Coil output is low or spark plug is faulty. Refer to previous "NOTE" or proceed to test no. 2 and no. 3.

**TEST NO. 2: CHARGING COIL OUTPUT**

1. Disconnect wire connector at C.D.I. electronic box.

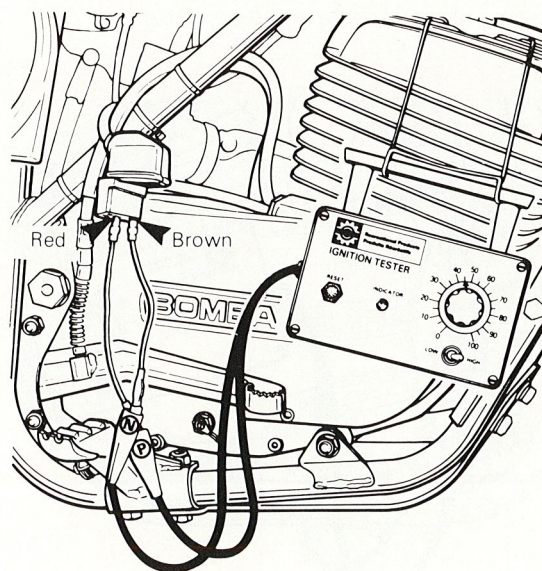
2. Connect tester **P** lead to **red** wire coming from charging coil using one (1) harness adaptor, as illustrated. Connect tester **N** lead, at wire connector, to **brown** wire using one (1) harness adaptor.

3. Set tester switch to HIGH position and dial at **45**.

4. Set transmission to 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 does not light: The problem is a faulty charging coil.



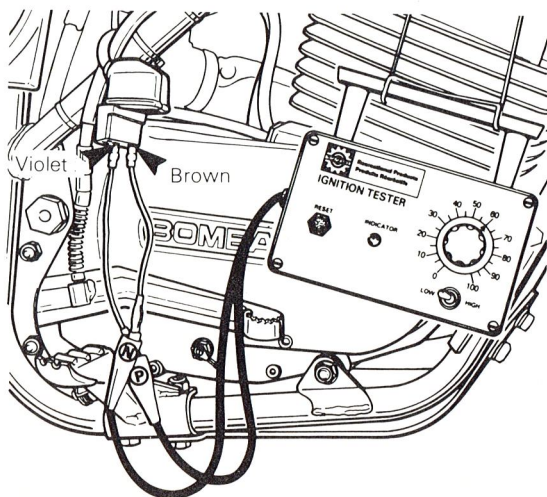


## BOSCH C.D. IGNITION

### TEST NO. 3: TRIGGER COIL OUTPUT

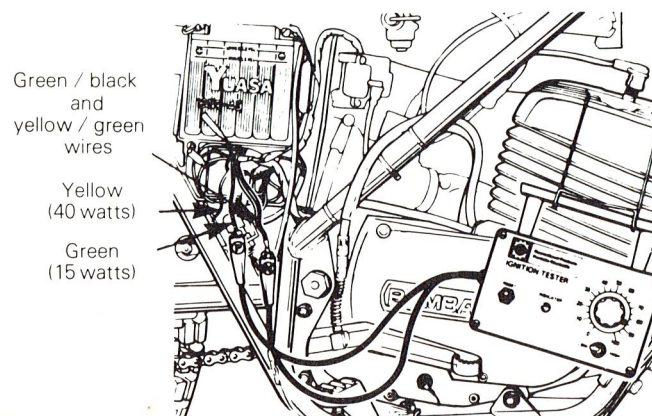
1. Disconnect wire connector at C.D.I. electronic box.
  2. Connect tester **P** lead to\* **violet** wire leading from trigger coil using one (1) harness adaptor as illustrated. Connect tester **N** lead to **brown** wire, at wire connector, using one (1) harness adaptor.
  3. Set tester switch to **LOW** position and dial at 60.
  4. Set transmission to neutral, place emergency stop switch in **RUN** position and turn ignition key to **IGNITION** position. 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 does not light:** The problem is a faulty coil.

\* On some units the wire could be white.



### TEST NO. 4: LIGHTING COIL OUTPUT

- NOTE:** There are two (2) lighting coils - 15 watts and 40 watts - connected in parallel. To test each coil individually, it is necessary to separate the **green** and **yellow** wires coming from the lighting coils and leading to the regulator / rectifier.
1. Disconnect the **green / black** and **yellow / green** wires connector from the regulator-rectifier. Disconnect and separate the **green** and **yellow** wires from the regulator-rectifier.
  2. Connect tester **P** lead to the **green** wire (15 watt coil). Connect tester **N** lead to green / black and yellow / green wire connector (see illustration).
  3. Set tester switch to **LOW** position and dial at 85.
  4. Set transmission to neutral, then kick start pedal down.
- A. Indicator lamp lights:** Lighting coil is operating.
- B. Indicator lamp does not light:** Lighting coil is defective.
2. Connect tester **P** lead to the **yellow** wire (40 watt coil) then repeat step 3 and 4.

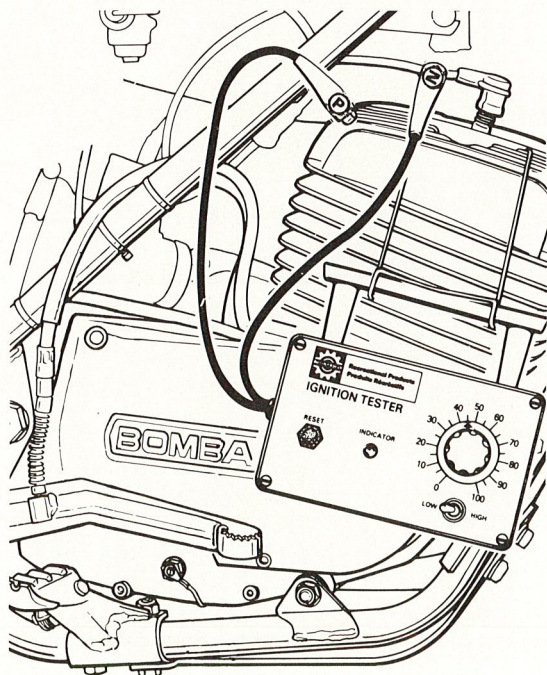




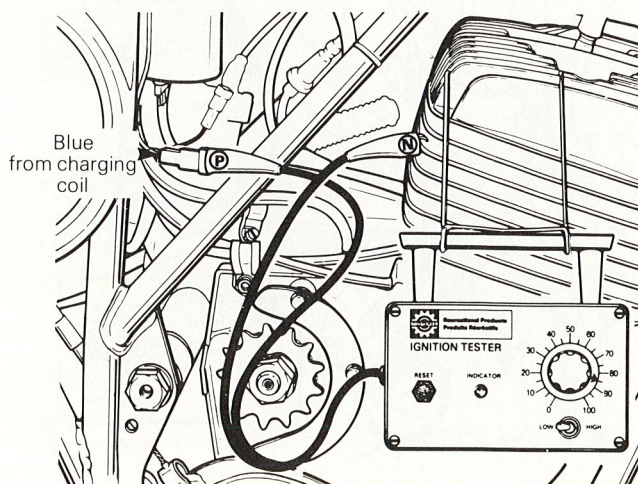
**MOTOPLAT CD IGNITION****TEST NO 5: IGNITION COIL OUTPUT TO SPARK PLUG**

○ **NOTE:** To obtain accurate readings it is necessary to install a new, correctly gapped spark plug. However, if test is performed on engine before spark plug is changed, a low or no reading could indicate a fouled or faulty spark plug. Replace by a new one and recheck.

1. Attach tester **P** lead to ground. Connect **N** lead over spark plug wire directly behind spark plug cap.
  2. Set tester switch to **LOW** and dial at **40**.
  3. Select transmission neutral position and release emergency stop switch into upper position. Kick start pedal down vigorously.
- A. Indicator lamp lights:** Coil output to spark plug is up to specifications. Repeat test at least three (3) times to verify reading and check for consistency.
- B. Indicator lamp does not light:** Coil output is low or spark plug is faulty. Refer to previous "NOTE" or proceed to test no. 6.

**TEST NO. 6: CHARGING COIL OUTPUT**

1. Disconnect two (2) wire connectors from the ignition coil.
  2. Connect tester **P** test lead to **blue** wire leading from charging coil, using one (1) harness adaptor. Connect **N** test lead to a good engine ground.
  3. Set tester switch to **LOW** position and dial at **85**.
  4. Set transmission to 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 does not light:** The problem is a faulty coil.

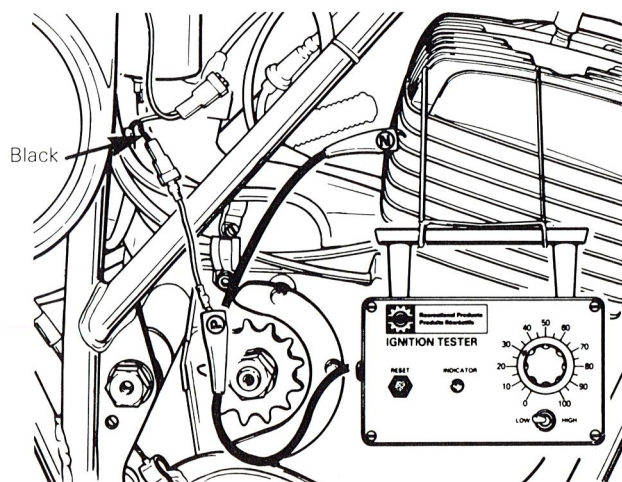




### MOTOPLAT CD IGNITION

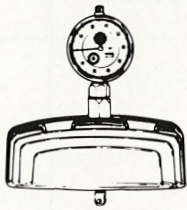
#### TEST NO 7: TRIGGER COIL OUTPUT

1. Disconnect two (2) wire connectors from the ignition coil.
  2. Connect tester **P** lead to **black** wire leading from trigger coil, using one (1) harness adaptor. Connect **N** lead to a good engine ground.
  3. Set tester switch to **LOW** position and dial at **30**.
  4. Set transmission to 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 does not light:** The problem is a faulty coil.





**TECHNICAL DATA****IGNITION TIMING SPECIFICATIONS**

MODEL		C.D. IGNITION TYPE	B.T.D.C. MEASUREMENT 	SPARK PLUG NUMBER TYPE 14 mm x 3/4" REACH	SPARK PLUG GAP
MX-1	250cc	Bosch	1.2 mm $\pm$ 0.02 (.047" $\pm$ .001)	CHAMPION N 59 G	0.5 mm (.020")
GP	250cc	Bosch	1.2 mm $\pm$ 0.02 (.047" $\pm$ .001)	CHAMPION N 59 G	0.5 mm (.020")
MX-2	250cc	Bosch	1.2 mm $\pm$ 0.02 (.047" $\pm$ .001)	CHAMPION N 59 G	0.5 mm (.020")
MX-2	175cc	Motoplat	1.0 mm $\pm$ 0.02 (.039" $\pm$ .001)	CHAMPION N 59 G	0.38 mm (.015")
MX-2	125cc	Motoplat	0.85 mm $\pm$ 0.02 (.033" $\pm$ .001)	CHAMPION N 59 G	0.38 mm (.015")
T'NT	250cc	Bosch	1.2 mm $\pm$ 0.02 (.047" $\pm$ .001)	CHAMPION N 57 G	0.5 mm (.020")
T'NT	175cc	Bosch	1.2 mm $\pm$ 0.02 (.047" $\pm$ .001)	CHAMPION N 57 G	0.5 mm (.020")
T'NT	125cc	Bosch	1.2 mm $\pm$ 0.02 (.047" $\pm$ .001)	CHAMPION N 57 G	0.5 mm (.020")
T'NT O / R	175cc	Bosch	1.2 mm $\pm$ 0.02 (.047" $\pm$ .001)	CHAMPION N 57 G	0.5 mm (.020")

**COIL RESISTANCE CHART**

MODEL	IGNITION TYPE	MAXIMUM IGNITION OUTPUT	MAXIMUM ALTERNATOR OUTPUT	CHARGING COIL	LIGHTING COIL	TRIGGER COIL	BRAKE LIGHT COIL
MX-1 250cc	Bosch	30000 volts	55 W	450-550	.8-1.2	50-80	7-9
G.P. 250cc	Bosch	30000 volts		450-550		50-80	
MX-2 250cc	Bosch	30000 volts		450-550		50-80	
MX-2 175cc	Motoplat	40000 volts		120 ①		8.5-11	
T'NT 250cc	Bosch	30000 volts	55 W	450-550	.8-1.2	50-80	7-9
T'NT 175cc	Bosch	30000 volts	55 W	450-550	.8-1.2	50-80	7-9
T'NT 125cc	Bosch	30000 volts	55 W	450-550	.8-1.2	50-80	7-9
T'NT 175cc O / R	Bosch	30000 volts	55 W	450-550	.8-1.2	50-80	7-9

All values are given in ohms.

①  $\pm 10\%$

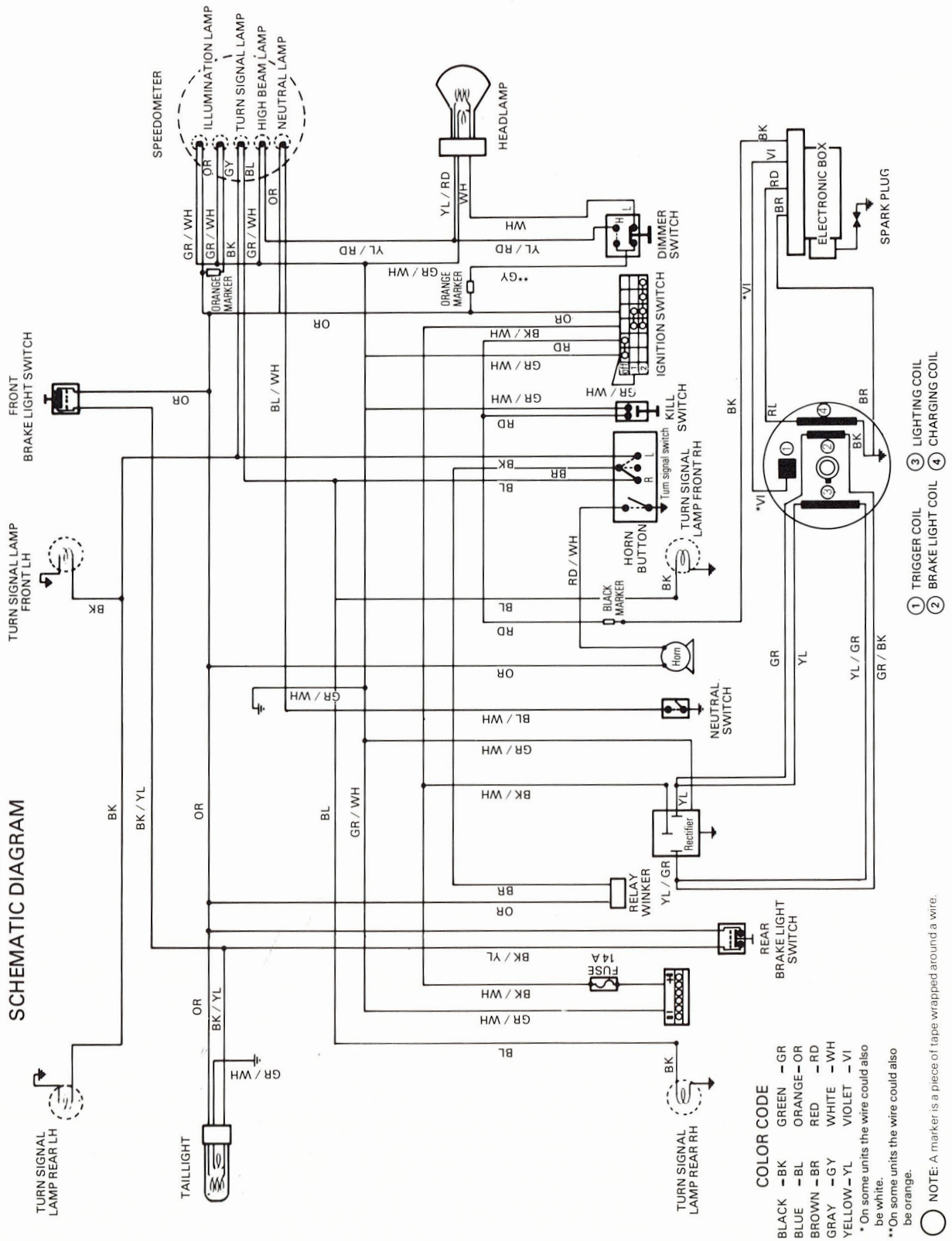
○ **NOTE:** If ohmmeter readings are below specifications, inverse the test lead and perform the test again, test for highest possible reading.



**BULB SPECIFICATIONS**

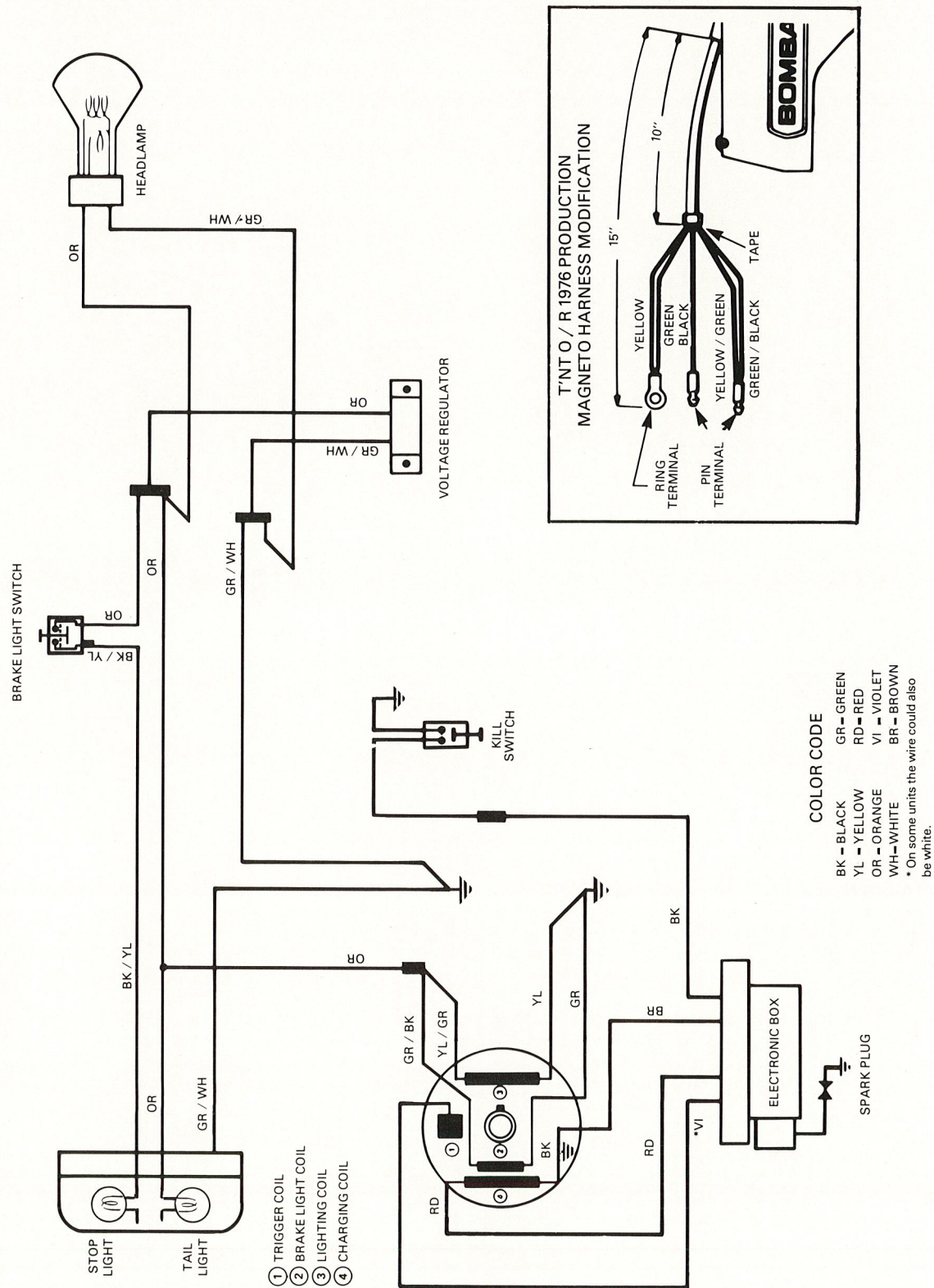
	1975 T'NT 125-175-250cc	1976 T'NT O / R 175cc
Battery rating	5 A / H	
Fuse	14 amps	
Headlamp	25 / 25 W (sealed beam)	35 / 35W (bulb)
Taillight bulb	8 / 27 W	3 / 3 W
Speedometer illumination bulb	1.7 W	
Neutral indicator bulb	2.8 W	
Hi-beam indicator bulb	1.7 W	
Turn-signal indicator bulb	2.8 W	
Turn signal bulb	23 W	
Turn signal (winker relay)	3.75 W signal stat no. 142	

T'NT 125-175-250cc 1975 PRODUCTION  
SCHEMATIC DIAGRAM





# T'NT O / R 1976 PRODUCTION SCHEMATIC DIAGRAM



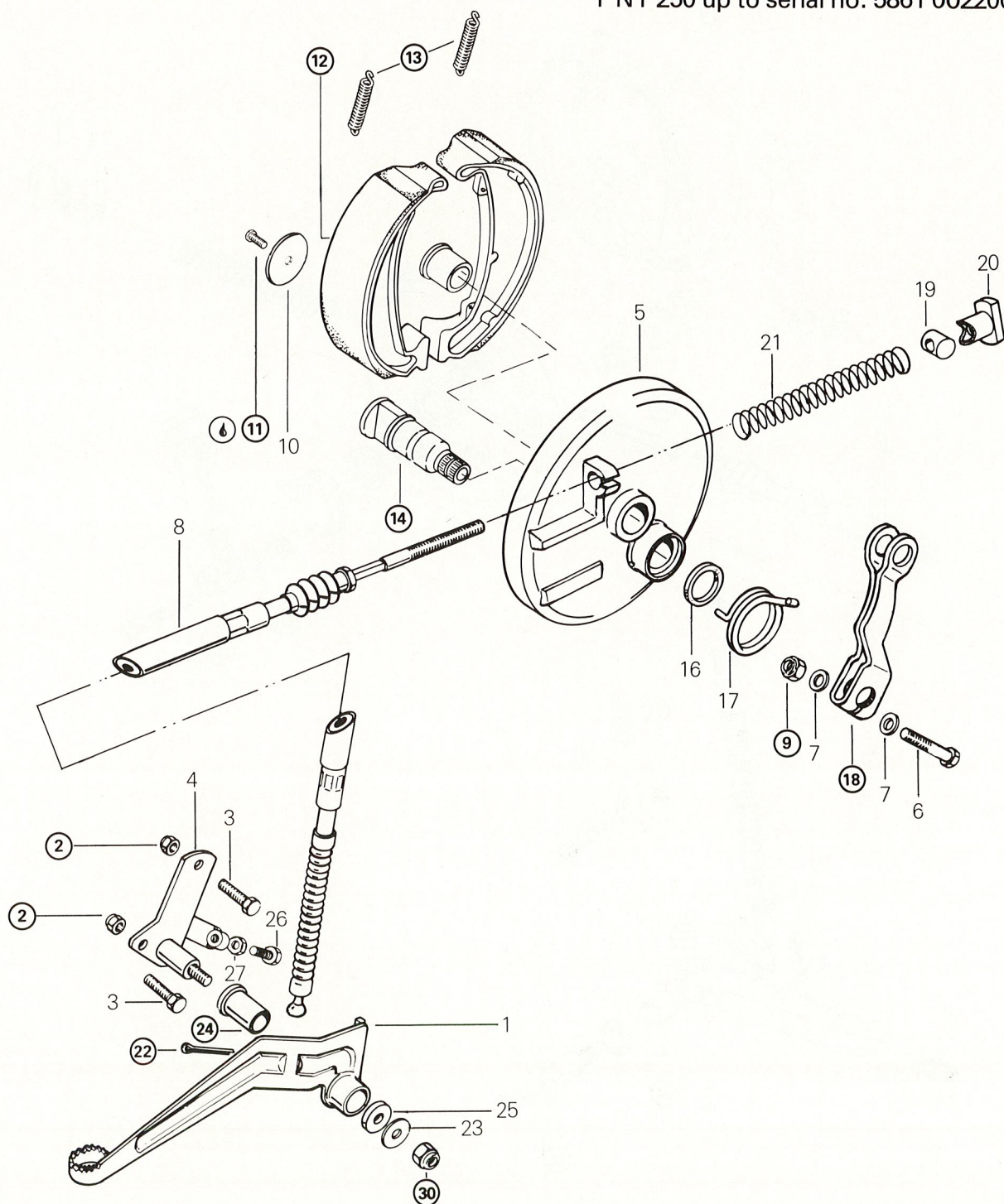




REAR BRAKE

MX-1 250

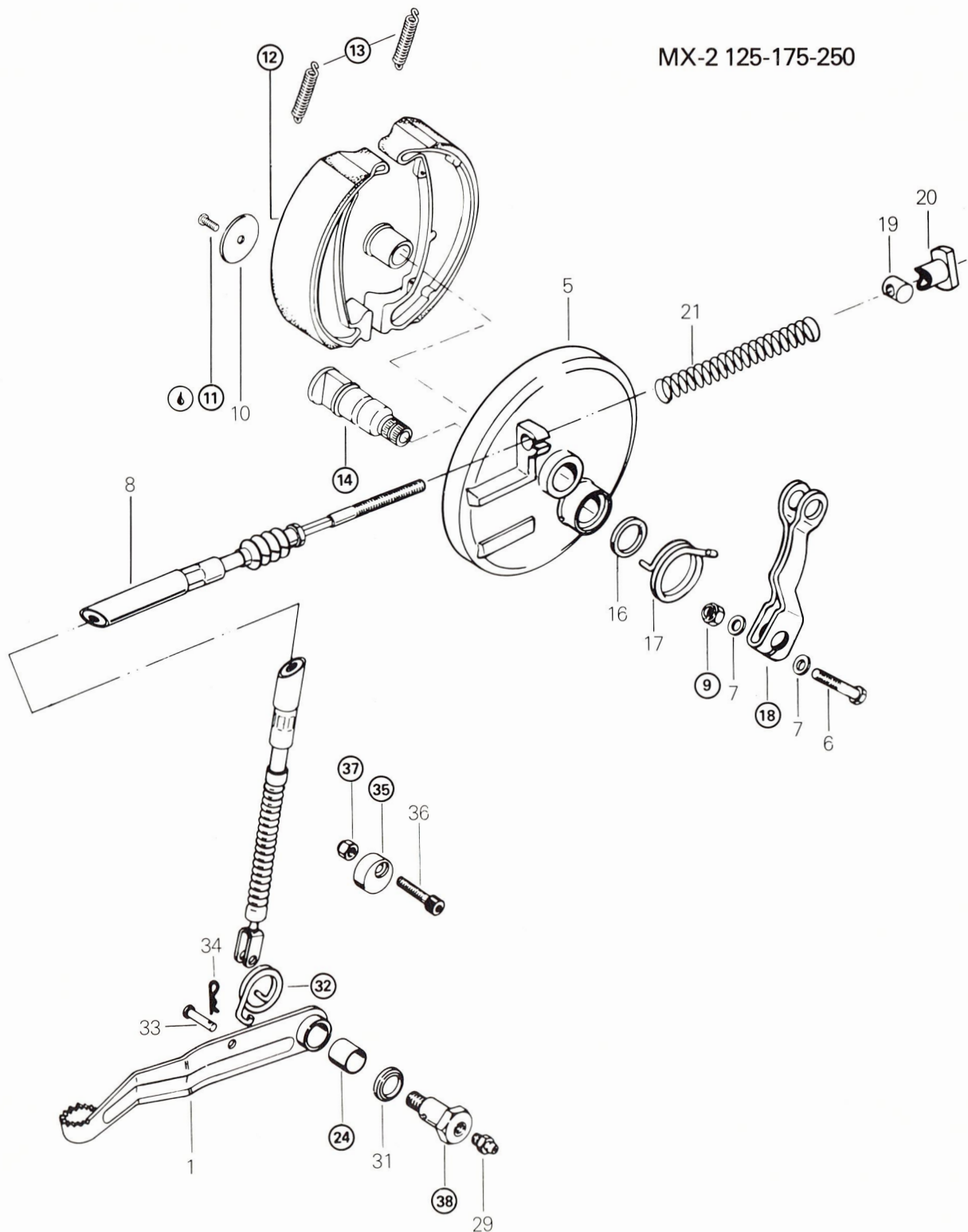
T'NT 250 up to serial no. 5861 002200



# WHEELS AND BRAKES

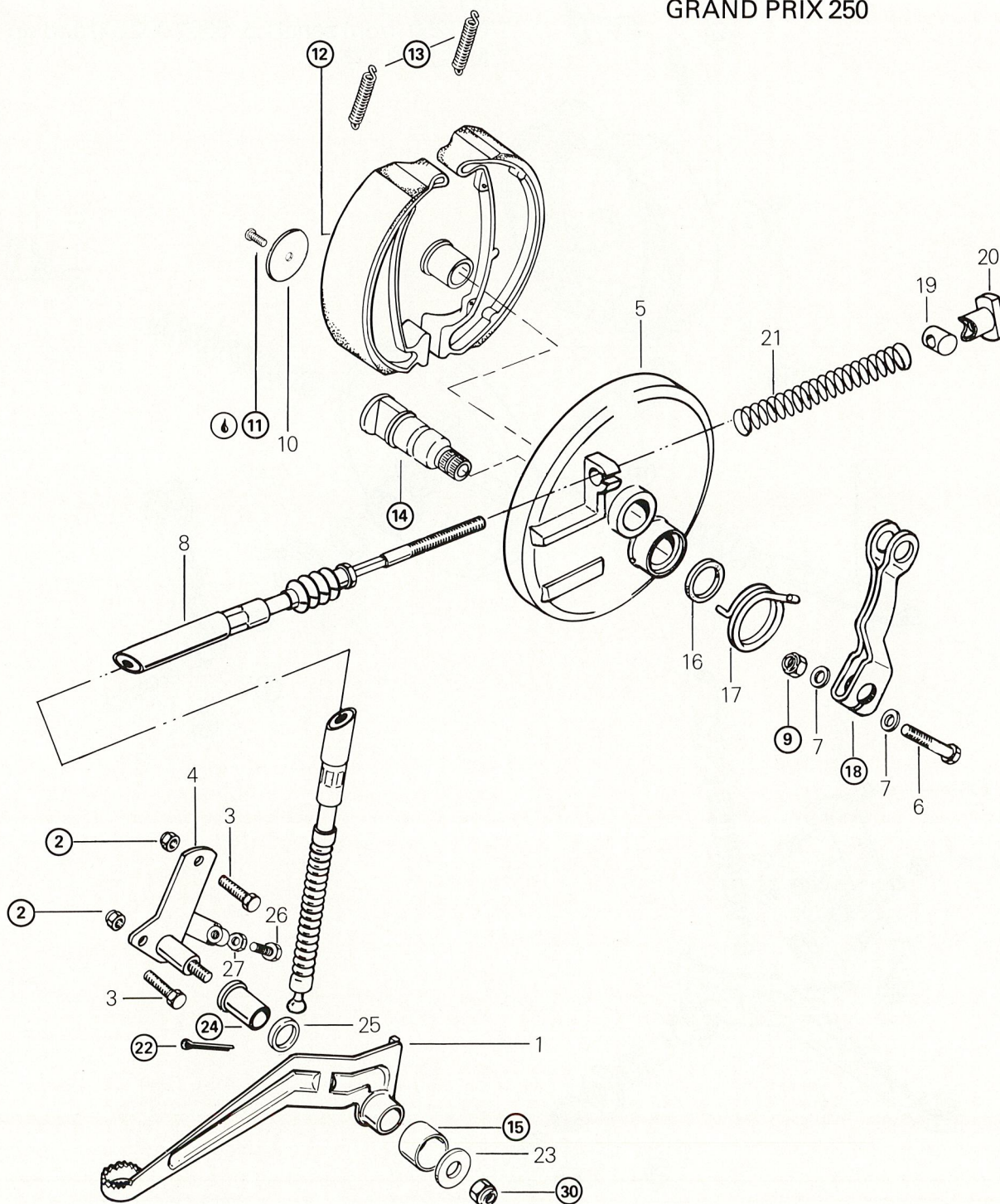
## (Sub-Section 3-9)

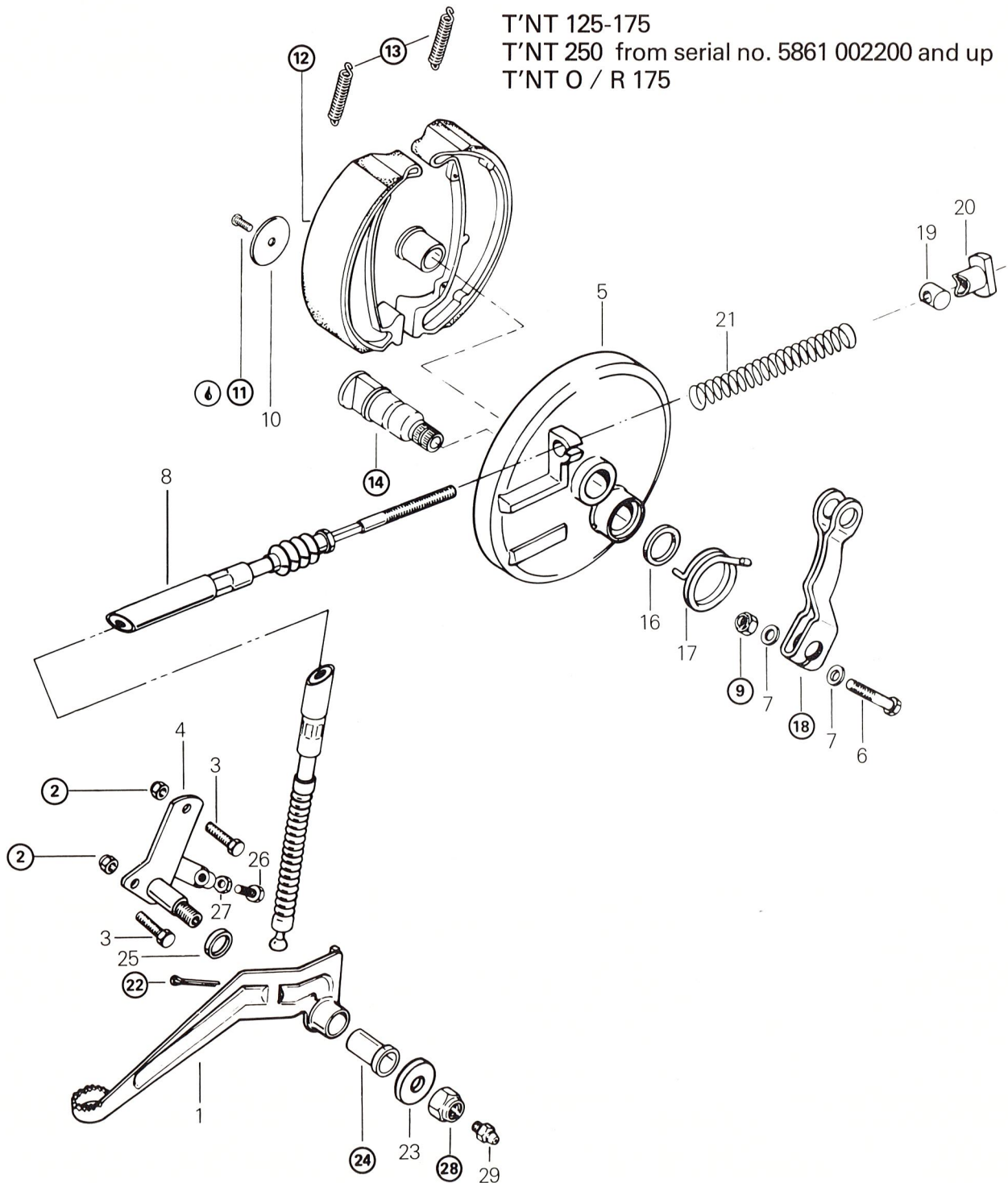
MX-2 125-175-250





GRAND PRIX 250





T'NT 125-175  
T'NT 250 from serial no. 5861 002200 and up  
T'NT O / R 175



1. Brake pedal
2. Elastic stop nut M8 x 1.25
3. Hex. bolt M8 x 1.25 x 20
4. Pivot mount
5. Backing plate
6. Hex. bolt M6 x 1.00 x 35
7. Flat washer 6 mm x 12 x 1.5
8. Brake cable
9. Elastic stop nut M6 x 1.00
10. Retaining washer (brake shoe)
11. Pan head screw M5 x 0.80 x 10
12. Brake shoe
13. Brake shoe spring

14. Cam
15. Nylon protection sleeve
16. Felt seal
17. Spring (brake arm)
18. Brake arm
19. Barrel
20. Adjuster nut
21. Spring (brake cable)
22. Cotter pin
23. Flat washer 8 mm x 1.25 x 25
24. Nylon bushing
25. Nylon ring
26. Adjuster screw M6 x 1.00 x 20

27. Hex. nut M6 x 1.00
28. Elastic stop nut M10 x 1.5
29. Grease fitting
30. Elastic stop nut M8 x 1.25
31. Brake pedal washer
32. Spring
33. Clevis pin
34. Air pin cotter
35. Eccentric bushing (stopper)
36. Hex. bolt M8 x 1.25 x 20
37. Elastic stop nut M8 x 1.25
38. Pivot shaft

## REMOVAL

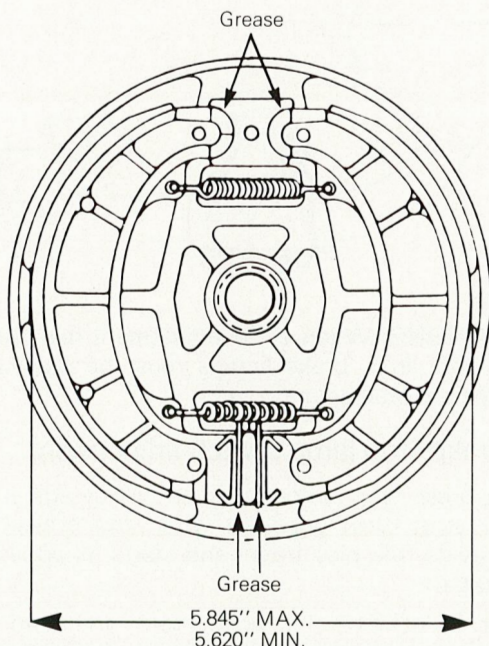
Mount the motorcycle on a box or a stand and remove the wheel.

## DISASSEMBLY & ASSEMBLY

- ② At assembly, torque to 2.-2.8 kg-m (15-20 ft-lb).
- ⑨ At assembly, torque to .7-.8 kg-m (5-6 ft-lb).
- ⑪ At assembly, apply Loctite "Lock'n Seal" on screw threads and torque to .4-.5 kg-m (3-4 ft-lb).

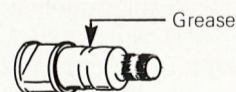
- ⑫ **WARNING:** Brake lining limits are: 148.5 mm (5.845") maximum (when fitting new parts). 142.7 mm (5.620") minimum (linings must be replaced).

Wheel hub inside diameter 149.8 mm (5.900").

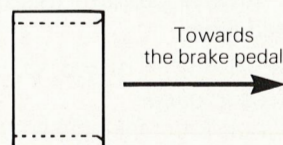


- ⑬ It is recommended to replace the brake shoe springs, everytime new brake shoes are fitted.

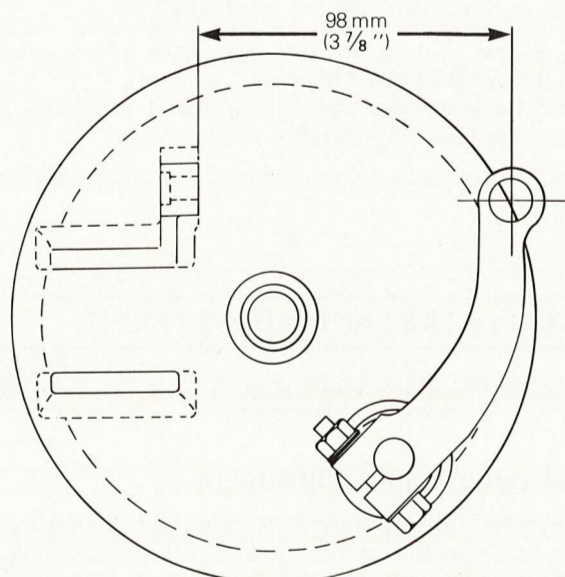
- ⑭ At assembly, apply a light coat of lithium grease.



- ⑮ At assembly, on Grand Prix model, the protection sleeve must be installed with its radius end towards the brake pedal.



- ⑰ At assembly, position the brake arm as illustrated.





# WHEELS AND BRAKES

## (Sub-Section 3-9)

②② **WARNING:** Make sure to install a new cotter pin every time the brake cable and / or the brake pedal is disassembled.

②④ At assembly, mount the bushing with a coat of lithium grease.

②⑧ ③⑦ At assembly, torque to 1.6-2 kg-m (12-15 ft-lb).

③② ③⑤ The eccentric stopper bushing should be removed when assembling the pedal. This will give the possibility of lifting the pedal to a higher position, reducing the tension on the return spring and facilitating the assembly.

③⑦ At assembly, torque to 2-2.8 kg-m (15-20 ft-lb).

③⑧ At assembly, torque to 2.8-3.5 kg-m (20-25 ft-lb).

### CLEANING AND INSPECTION

Clean the brake shoes thoroughly with soapy water. Clean the brake plate, cam and pedal components using a degreaser 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 brake pedal nylon-bushing. If worn or damaged, replace.

### INSTALLATION AND ADJUSTMENT

To install the brake pedal and / or the backing plate ass'y inverse the removal procedure.

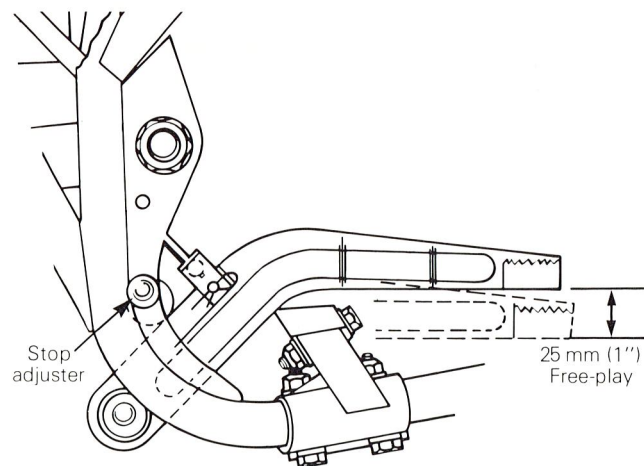
#### Brake pedal height adjustment

The desired brake pedal height can be attained by altering the position of the stop adjuster. (See illustration).

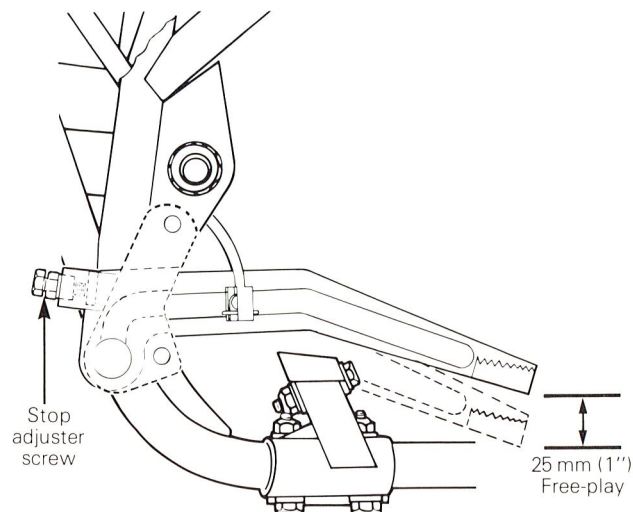
#### Rear brake adjustment

Turn the cable adjusting nut until the brake pedal free play is 25 mm (1").

MX-2 MODEL



ALL MODELS (EXCEPT MX-2)



◆ **WARNING:** When cable adjustment has reached its final limit, brake linings must be replaced or impaired braking may occur.

#### Rear brake stop lamp switch adjustment

The rear brake stop lamp switch should be adjusted so that the stop lamp goes on when the brake pedal completes its free play travel and starts its application of the brake.

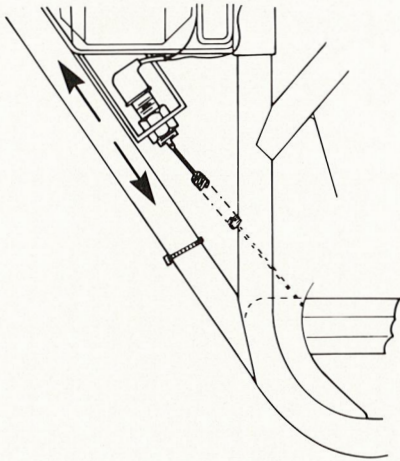
In order to achieve this adjustment, the stop lamp switch can be moved up or down in its mounting place.



To make this adjustment:

Remove the right hand side number plate.

Loosen the switch mounting nuts, move the switch to the correct position and retighten the mounting nuts.



## WHEEL BEARING SERVICE

Mount the motorcycle on a stand or a box to hold the wheels clear of the ground. Rotate the wheels slowly and check for noisy bearings. Any lateral motion from the vertical center line of the wheels indicates worn bearings.

### Disassembly

◆ **WARNING:** 1975 Grand Prix and MX-2 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.

Remove wheel(s) from machine.

Remove wheel bearing seal and / or dust cover.

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.

### Cleaning and inspection

Clean bearings, distance spacer and wheel hub with 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.

Clean brake friction surface with lacquer thinner to remove any oil film.

◆ **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 chuffed. 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.

### Re-assembly

Pack the wheel bearings with a waterproof wheel bearing grease.

Heat one side of the hub around bearing boss, 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.

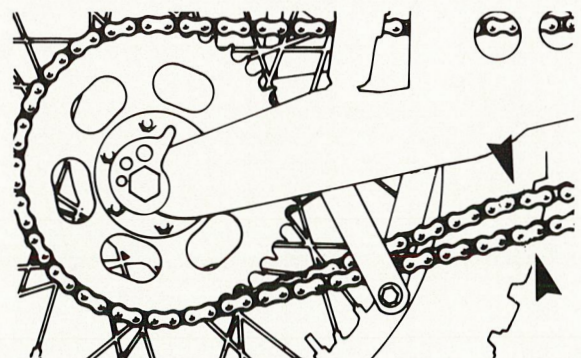
○ **NOTE:** The shielded portion of the bearings must face towards the outside of the wheel.

Allow hub to cool, mount dust cover and seal properly. Remount wheel(s) onto machine.

## DRIVE CHAIN ADJUSTMENT

Loosen the rear axle nut and move each adjuster plate equally to tighten or loosen chain as required.

○ **NOTE:** Alignment marks must be at the same position on each side of wheel.



Adjust chain slack to:

MX-1, T'NT, T'NT O / R: 25 mm (1")

MX-2 and Grand-Prix: 40 mm (1 5/8 ")

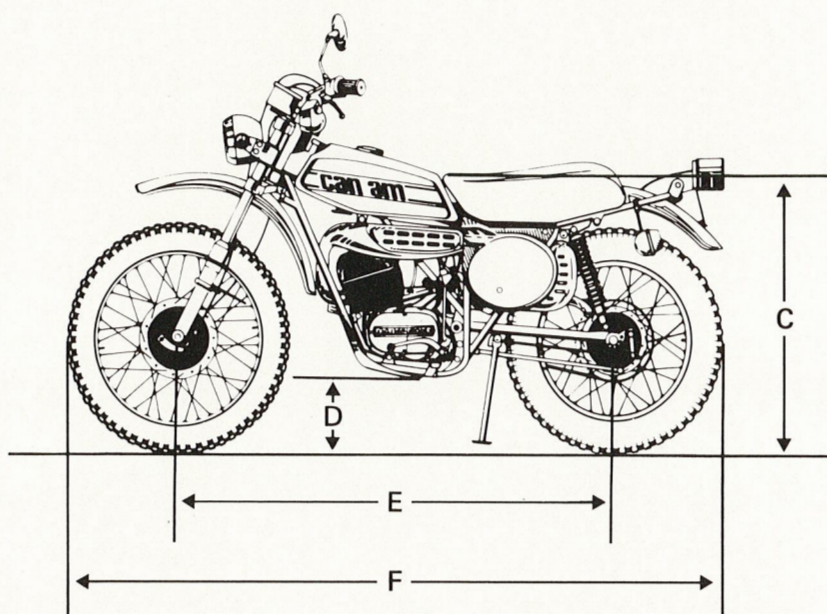
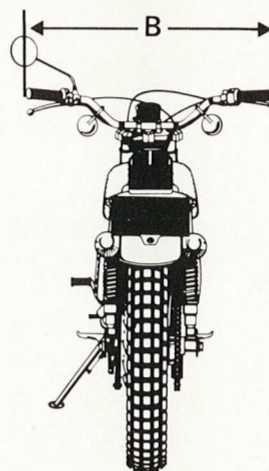
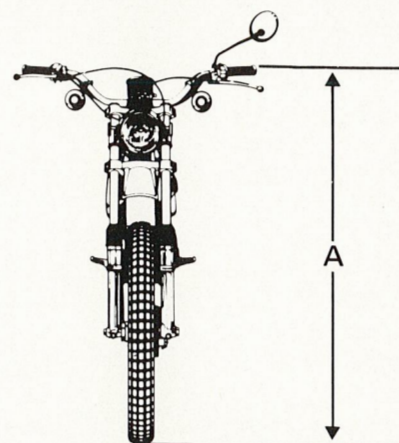




## (Sub-Section 4-2)

## DIMENSIONS


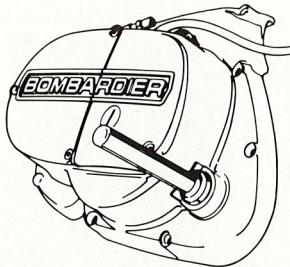
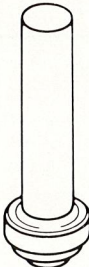
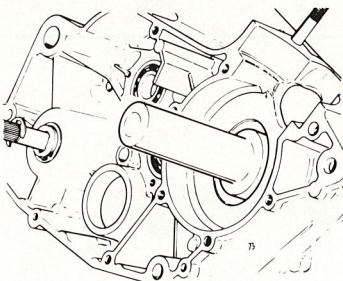
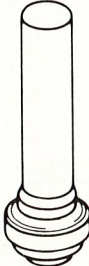
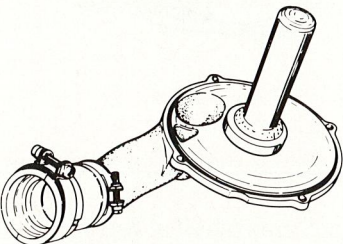

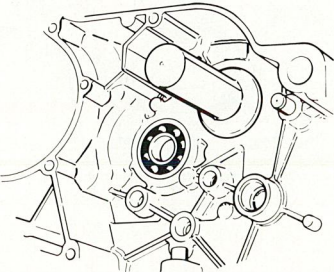
- A) Overall height (without mirror)
- B) Overall width (without mirrors)
- C) Seat height
- D) Ground clearance
- E) Wheelbase (with standard fork angle)
- F) Overall length



	1975 MX-1 250	1975 T'NT 125 & 175	1975 T'NT 250	1975 MX-2 125 & 175	1975 MX-2 250	1976 T'NT O / R 175
A	114.3 cm (45 in.)	114.3 cm (45 in.)	114.3 cm (45 in.)	114.3 cm (45 in.)	114.3 cm (45 in.)	114.3 cm (45 in.)
B	86.4 cm (34 in.)	86.4 cm (34 in.)	86.4 cm (34 in.)	86.4 cm (34 in.)	86.4 cm (34 in.)	86.4 cm (34 in.)
C	84 cm (33 in.)	84 cm (33 in.)	84 cm (33 in.)	85.1 cm (33½ in.)	85.1 cm (33½ in.)	84 cm (33 in.)
D	18 cm (7 in.)	22.9 cm (9 in.)	18 cm (7 in.)	18 cm (7 in.)	18 cm (7 in.)	22.9 cm (9 in.)
E	140 cm (55 in.)	140 cm (55 in.)	140 cm (55 in.)	138.4 cm (54½ in.)	140 cm (55 in.)	140 cm (55 in.)
F	213.4 cm (84 in.)	213.4 cm (84 in.)	213.4 cm (84 in.)	213.4 cm (84 in.)	213.4 cm (84 in.)	213.4 cm (84 in.)

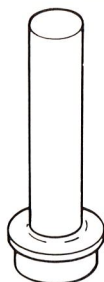




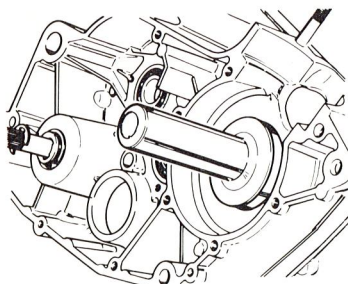
ITEM	USE	APPLICABLE TO
<p>Insertion pusher. (420 277 850)</p> 	<p>To install kick starter oil seal.</p> 	<p>All engine types.</p>
<p>(420 277 860)</p> 	<p>To install crankcase magneto side oil seal.</p> 	
<p>(420 277 875)</p> 	<p>To install disc valve cover oil seal.</p> 	
<p>(420 277 870)</p> 	<p>To install transmission main shaft oil seal (sprocket side).</p> 	

# TOOLS

(420 276 190)  
(420 276 200)

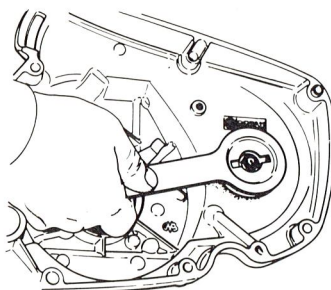


To install polyamid ring in crankcase.



(420 276 190)  
All engine types.  
(420 276 200)  
125-175cc engine only.

Pump gear holder  
(420 277 900)

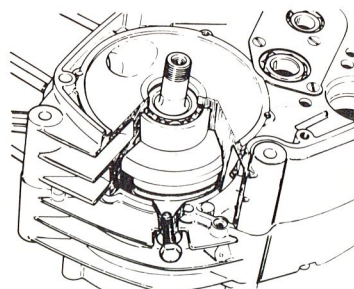


All engine types.

Crankshaft locating bolt.  
(420 241 960)



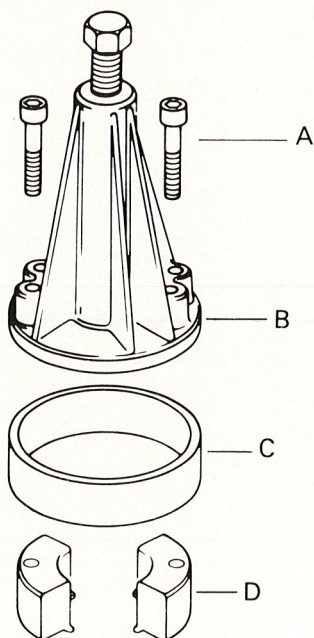
To lock crankshaft at top dead center.



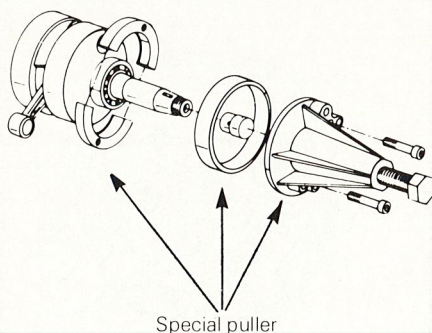
All engine types.



## Bearing puller.

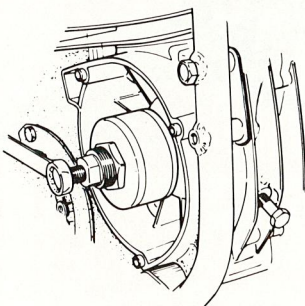
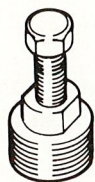


- A) Allen screw M8 x 35  
Allen screw M8 x 40
- B) Puller
- C) Ring for puller.
- D) Ring half for ball bearing.



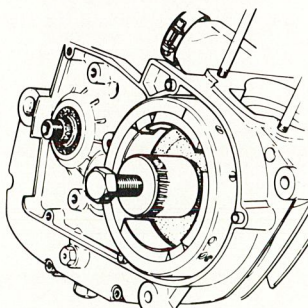
- A) (420 840 680)  
Screw M8 x 40  
(420 940 491)  
Screw M8 x 35
- B) (420 840 680)
- C) (420 977 480)  
All engine types.
- D) (420 277 890)  
All engine types.  
Clutch side bearing.  
125-175cc engine.  
Magneto side bearing.  
  
(420 276 020)  
All 250cc engine  
magneto side bearing.

## Rotor puller. (420 287 030)



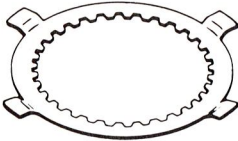
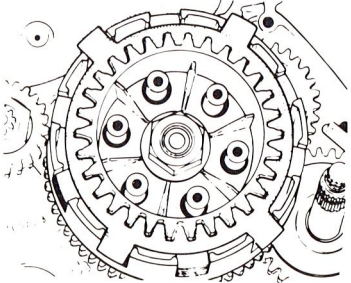
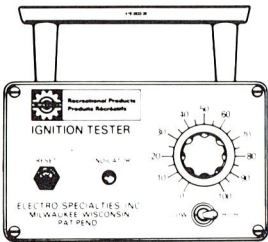
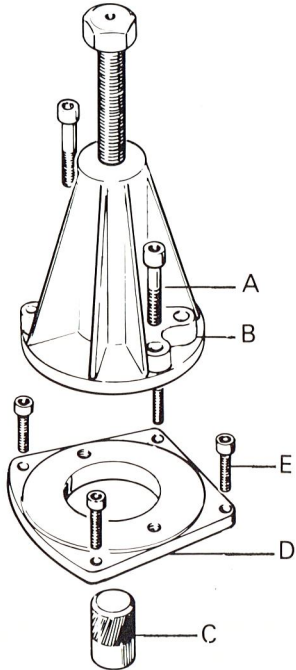
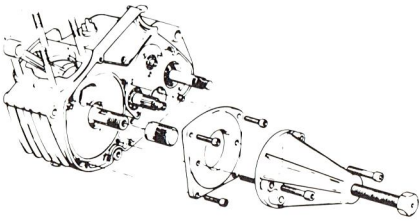
All engines equipped with a  
Motoplat ignition system.

## Flywheel puller. (420 277 805)



All engines equipped with a  
Bosch ignition system.

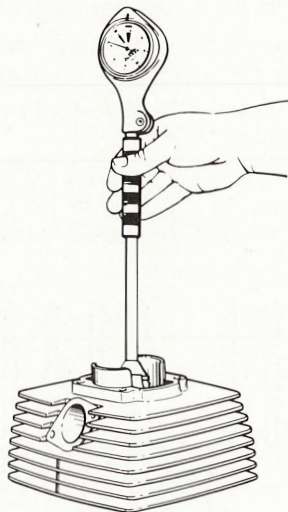
# TOOLS

<p>Clutch hub locking tool. (420 277 885)</p> 		<p>All engine types.</p>
<p>Ignition tester (419 0033 00)</p> 	<p>Engine electronic components test.</p>	<p>All engine types.</p>
<p>Crankcase separator.</p>  <p>A) Allen screw M8 x 35 B) Puller C) Protector cap D) Extractor plate E) Allen screw M5 x 20</p>	<p>To split engine crankcase.</p> 	<p>All engine types.</p> <p>A) (420 940 491) Allen screw M8 x 35</p> <p>B) (420 840 680)</p> <p>C) (420 276 920)</p> <p>D) (420 276 910)</p> <p>E) (420 240 180) Allen screw M5 x 20</p>



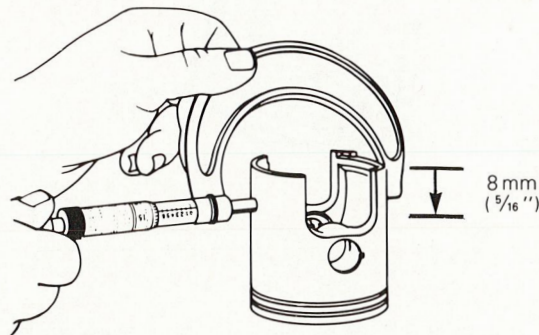
## Cylinder taper

Measure cylinder diameter 16 mm ( $\frac{5}{8}$ " ) from top of cylinder and down to just below the intake port. If the difference between each measurement exceed 0.08 mm (.003") the cylinder should be rebored and honed or should be replaced.



## Piston to cylinder wall clearance

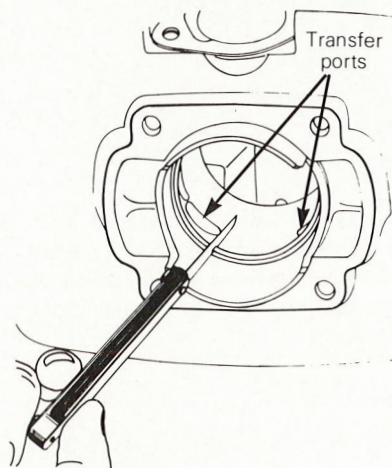
To determine this clearance, the piston should be measured 8 mm ( $\frac{5}{16}$ " ) above its bottom edge and the cylinder should be measured 13 mm ( $\frac{1}{2}$ " ) below its top edge.



The difference between these two measurements should be within specified tolerance.

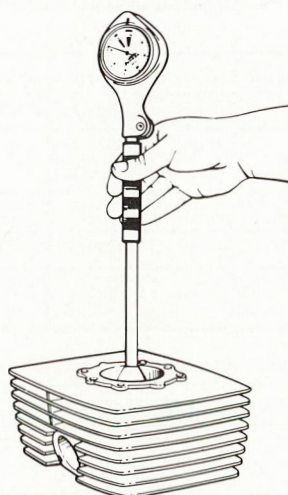
## Ring end gap

Position ring under the transfer ports. Using a feeler gauge, check ring end gap. If gap exceed specified tolerance the ring should be replaced.



## Cylinder out of round

Measuring 13 mm ( $\frac{1}{2}$ " ) from top of cylinder with a cylinder gauge, check if the cylinder out of round is more than 0.05 mm (.002") larger, cylinder should be rebored and honed or should be replaced.



13 mm  
( $\frac{1}{2}$ " )

## Squish area measurement / compression ratio

In a criss-cross sequence, gradually remove the cylinder head nuts, then remove the head. Note the head shim / s used, (if any).

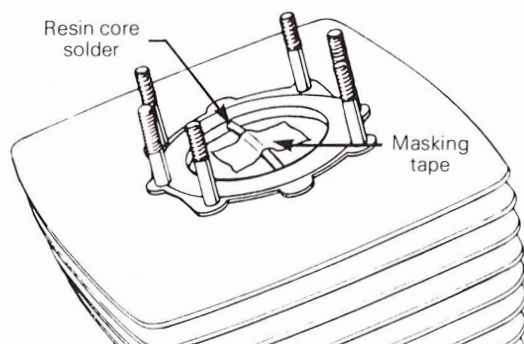
Bring the piston to  $\frac{1}{4}$ " B.T.D.C. and place a length of resin core solder (maximum of  $\frac{1}{8}$ " diameter) across the piston, making sure it is positioned parallel to the wrist pin to obtain an equal reading on each side of the cylinder.



# ENGINE TECHNICAL DATA

▼ **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.



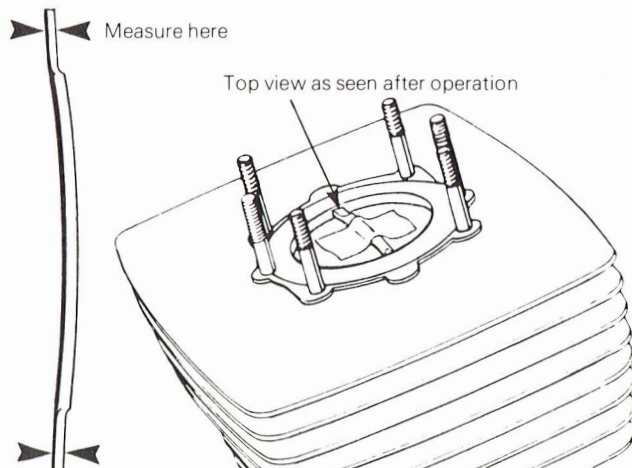
Install the cylinder head and using a criss-cross sequence, gradually torque the cylinder head nuts to the correct specifications:

125 / 175cc ..... 1.6 kg / m (12 ft / lb)  
250cc ..... 1.9 kg / m (14 ft / lb)



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.

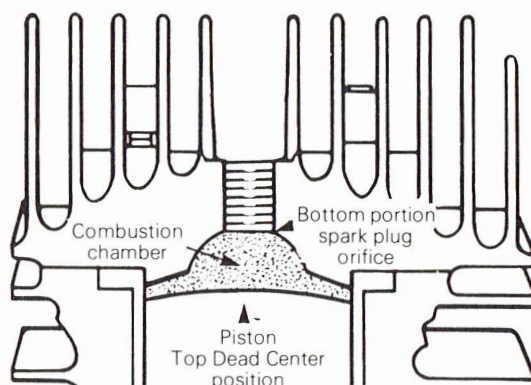
○ **NOTE:** The head shim is not a head gasket and does not need replacement unless damaged.

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.

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-1 250cc	20.6 ml + 0.9 ml - 0.8 ml	12.5-13.5 to 1
MX-2 125cc	8.85 ml + 0.3 ml	14.5-15.5 to 1
MX-2 175cc	13.4 ml - 0.6 ml	13.5-14.5 to 1
MX-2 250cc	19.8 ml + 0.9 ml - 0.8 ml	13-14 to 1
T'NT 125cc	10.3 ml + 0.4 ml	12.5-13.5 to 1
T'NT 175cc	14.5 ml - 0.6 ml	12.5-13.5 to 1
T'NT 250cc	20.6 ml + 0.9 ml - 0.8 ml	12.5-13.5 to 1

If the compression ratio is proven to be too low or too high, consult the possibility chart to guide you in a remedy procedure.



# ENGINE TECHNICAL DATA

**CAUTION:** To carry out some of the following procedures, it is necessary that special equipment be available. If you do not possess such equip-

ment, have the cylinder head modified in a workshop equipped with 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.

# ENGINE TECHNICAL DATA

## 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 and 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.



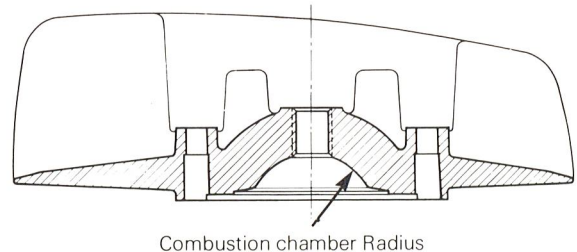
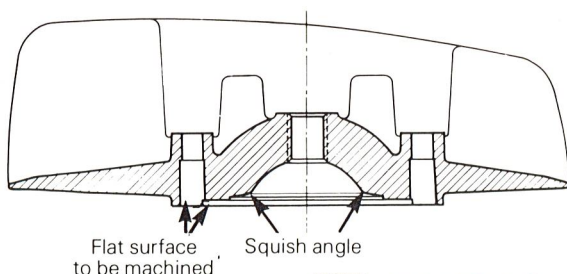
CAUTION: It is very difficult to pre-determine the amount of material to remove from the cylinder head anytime the squish and / or compression ratio needs to be modified, so, when machining is required, we recommend very light cuts and verify the results between each cut.

### SQUISH ANGLE

MX-1	250cc	118 mm Radius
MX-2	125cc	9° 30'
MX-2	175cc	9°
MX-2 & G.P.	250cc	16°
T'NT	125cc	9° 30'
T'NT	175cc	9°
T'NT	250cc	118 mm Radius

### COMBUSTION CHAMBER RADIUS

MX-1	250cc	27 mm (1.063")
MX-2	125cc	21 mm (0.826")
MX-2	175cc	23.40 mm (.921")
MX-2 & G.P.	250cc	27 mm (1.063")
T'NT	125cc	22.3 mm (0.878")
T'NT	175cc	23.8 mm (0.937")
T'NT	250cc	27 mm (1.063")

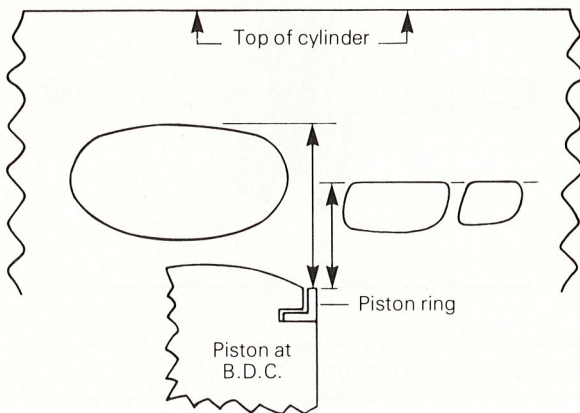


CAUTION: Squish area and compression ratio are interrelated, do not modify one without checking the other.

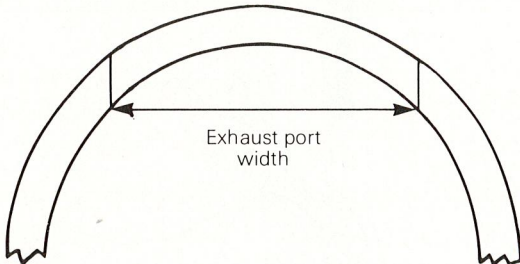


## Port heights measurement

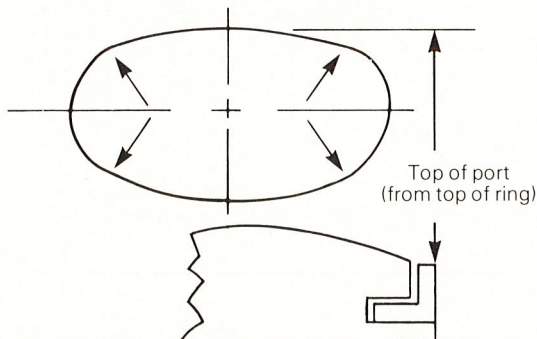
- Port heights are measured on the inside diameter of the cylinder and are taken from the top of the piston ring with the piston at bottom dead center (BDC).



- 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 MX-2 engine with the following specifications:

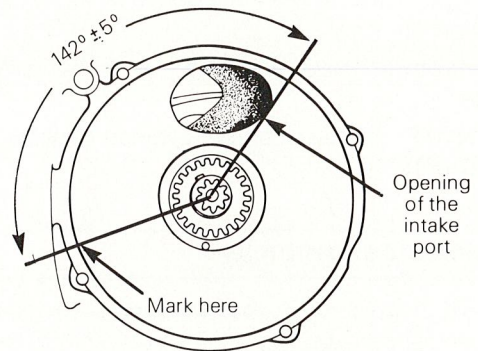
Disc opening at:  $142^\circ$  B.T.D.C.

Disc closing at  $85^\circ$  A.T.D.C.

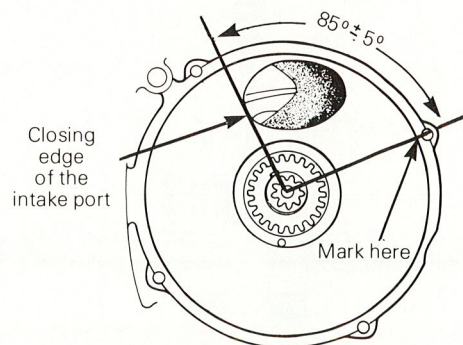
Disc is asymmetrical.

### Proceed as follows:

Using a degree wheel, mark  $142^\circ$  after the opening of the intake port. (degrees follow a counter-clockwise direction).



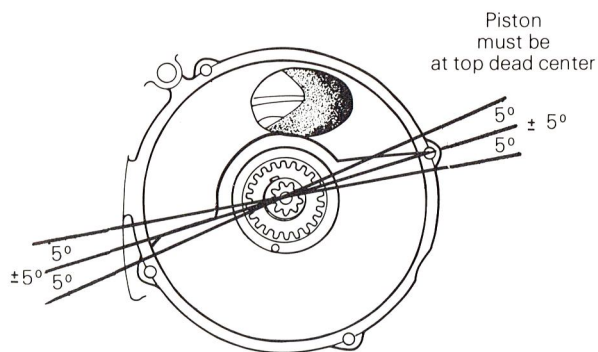
From the closing edge of the intake port, mark  $85^\circ$  (degrees follow a clockwise direction).



# ENGINE TECHNICAL DATA

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  $5^\circ$  on either side of the marks.

○ **NOTE:** The disc can be reversed to obtain a better result.



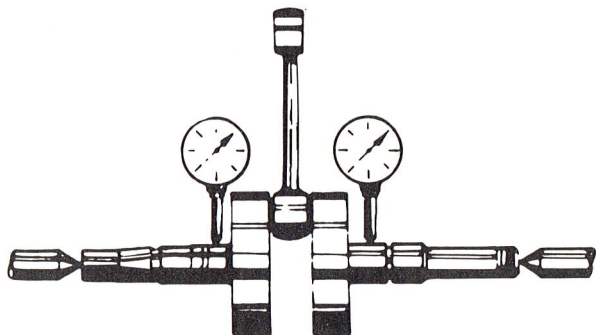
Position the disc to have the edges as close as possible to the marks.

The maximum tolerance is  $5^\circ$  on either side of the marks.

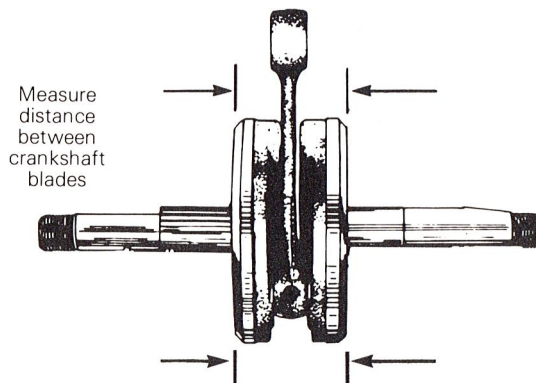
○ **NOTE:** The disc can be reversed to obtain a better result.

## 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 exceed 0.05 mm (.002") the crankshaft should be repaired by a specialized shop or it should be replaced.



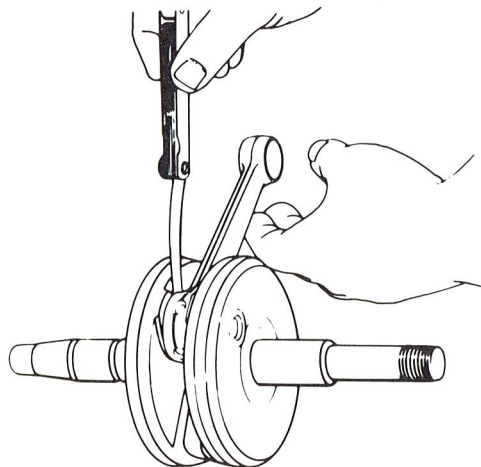
## Crankshaft blade width



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 exceed 0.7 mm (.028"), the crankshaft should be replaced.





# ENGINE TECHNICAL DATA

POWER HEAD				
Cylinder bore nominal dimension	STANDARD	FIRST OVERSIZED	SECOND OVERSIZED	THIRD OVERSIZED
125cc	54 mm (2.130")	54.25 mm (2.136")	54.50 mm (2.146")	54.75 mm (2.155")
175cc	62 mm (2.440")	62.25 mm (2.450")	62.50 mm (2.460")	62.75 mm (2.470")
250cc	74 mm (2.914")	74.25 mm (2.923")	74.50 mm (2.933")	74.75 mm (2.943")
WHEN FITTING NEW PARTS				
	MINIMUM	MAXIMUM	WEAR LIMIT	
Piston to cylinder wall clearance				
125cc	.06 mm (.0024")			.15 mm (.006")
175cc	.07 mm (.0028")			.15 mm (.006")
250cc	.08 mm (.0032")			.17 mm (.0067")
Piston ring end gap				
125cc	0.2 mm (.008")	0.35 mm (.014")		.8 mm (.031")
175cc	0.25 mm (.010")	0.4 mm (.016")		.8 mm (.031")
250cc	0.25 mm (.010")	0.4 mm (.016")		.8 mm (.031")
Squish area measurement + .005" — 0				
T'NT, MX-2 125cc	0.89 mm (.035")			
T'NT, MX-2 175cc	1.02 mm (.040")			
T'NT, MX-1, MX-2, G.P. 250cc	1.27 mm (.050")			
Compression ratio (uncorrected)				
MX-2 125cc	14.5 to 1	15.5 to 1		
MX-2 175cc	13.5 to 1	14.5 to 1		
MX-2, G.P. 250cc	13 to 1	14 to 1		
T'NT 125, 175, 250cc	12.5 to 1	13.5 to 1		
MX-1 250cc	12.5 to 1	13.5 to 1		
Exhaust port height				
T'NT 125cc	26.3 mm (1.035")			
T'NT, T'NT O / R 175cc	27.5 mm (1.083")			
T'NT, MX-1 250cc	29.2 mm (1.150")			
MX-2 125cc	27.5 mm (1.083")			
MX-2 175cc	28.5 mm (1.122")			
MX-2 250cc	29.2 mm (1.150")			
G.P. 250cc	29.2 mm (1.150")			
Exhaust port width				
T'NT 125cc	36 mm (1.418")			
T'NT, T'NT O / R 175cc	41 mm (1.615")			

# ENGINE TECHNICAL DATA

		WHEN FITTING NEW PARTS		
		MINIMUM	MAXIMUM	WEAR LIMIT
Exhaust port width (continued)				
T'NT, MX-1	250cc	50 mm (1.969")		
MX-2	125cc	40 mm (1.575")		
MX-2	175cc	44 mm (1.733")		
MX-2	250cc	54 mm (2.126")		
G.P.	250cc	55 mm (2.166")		
Transfer port height				
T'NT	125cc	12.5 mm (.492")		
T'NT, T'NT O / R	175cc	13.5 mm (.532")		
T'NT, MX-1	250cc	13.8 mm (.544")		
MX-2	125cc	13 mm (.512")		
MX-2	175cc	14.2 mm (.559")		
MX-2	250cc	14.3 mm (.563")		
G.P.	250cc	14.3 mm (.563")		
Rotary valve disc opens BTDC				
T'NT	125, 175, 250cc	137°		
MX-1	250cc	137°		
MX-2	125, 175, 250cc	142°		
G.P.	250cc	140°		
Rotary valve discs closes ATDC				
T'NT	125, 175, 250cc	75°		
MX-1	250cc	75°		
MX-2	125, 175, 250cc	85°		
G.P.	250cc	80°		
Cylinder sleeve outside diameter				
T'NT	125cc	60.102 mm (2.366")	60.121 mm (2.367")	
MX-2	125cc	59.102 mm (2.3268")	59.121 mm (2.3275")	
T'NT, T'NT O / R, MX-2	175cc	68.102 mm (2.681")	68.121 mm (2.682")	
T'NT, MX-1	250cc	81.124 mm (3.1938")	81.146 mm (3.1947")	
MX-2, G.P.	250cc	80.124 mm (3.1545")	80.146 mm (3.1554")	
Cylinder inside dia. (W / O sleeve)				
T'NT	125cc	60 mm (2.362")	60.03 mm (2.363")	
MX-2	125cc	59 mm (2.323")	59.03 mm (2.324")	
T'NT, T'NT O / R, MX-2	175cc	68 mm (2.677")	68.03 mm (2.678")	
T'NT, MX-1	250cc	81 mm (3.189")	81.035 mm (3.190")	
MX-2, G.P.	250cc	80 mm (3.150")	80.035 mm (3.151")	
Cylinder / sleeve interference fit				
	125cc	0.072 mm (.003")	0.121 mm (.005")	
	175cc	0.072 mm (.003")	0.121 mm (.005")	



# ENGINE TECHNICAL DATA

	WHEN FITTING NEW PARTS		
	MINIMUM	MAXIMUM	WEAR LIMIT
Cylinder / sleeve interference fit (continued) 250cc	0.09 mm (.0035")	0.146 mm (.0057")	

## CRANKSHAFT / CRANKCASE

Crankshaft end play		0.3 mm (.012")	
Crankshaft excentricity		0.05 mm (.002")	
Crankshaft blade width 125cc 175cc 250cc	45.95 mm (1.809") 45.95 mm (1.809") 48.95 mm (1.927")	46.05 mm (1.813") 46.05 mm (1.813") 49.05 mm (1.931")	
Connecting rod side play in crankshaft	0.25 mm (.010")	.427 mm (.017")	0.7 mm (.028")
Crankpin interference fit 125, 175cc 250cc	0.076 mm (.003") 0.082 mm (.0032")	0.095 mm (.0037") 0.101 mm (.004")	
Connecting rod to crankpin clearance			0.2 mm (.008")
Connecting rod to piston pin radial clearance			0.1 mm (.004")
Piston pin outside diameter 125, 175, 250cc	18 mm (.7086")		
Depth of groove caused by crankshaft seals		0.15 mm (.006")	
Ball bearings clearances (All axial)			0.1 mm (.004")
Ball bearings clearances (all radial)			0.05 mm (.002")
Crankshaft balance factor 125cc 175cc 250cc	40% 50% 35%		
Clearance between bearing and polyamid ring			0.1 mm (.004")
Disc valve rotational play			1.2 mm (.047")

# ENGINE TECHNICAL DATA

	WHEN FITTING NEW PARTS		
	MINIMUM	MAXIMUM	WEAR LIMIT
<b>CLUTCH</b>			
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")
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")
<b>TRANSMISSION</b>			
Shifter shaft end play	0.03 mm (.001")	1.18 mm (.046")	
Shifter drum end play T'NT MX		0.035 mm (.013") 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")	
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")	







