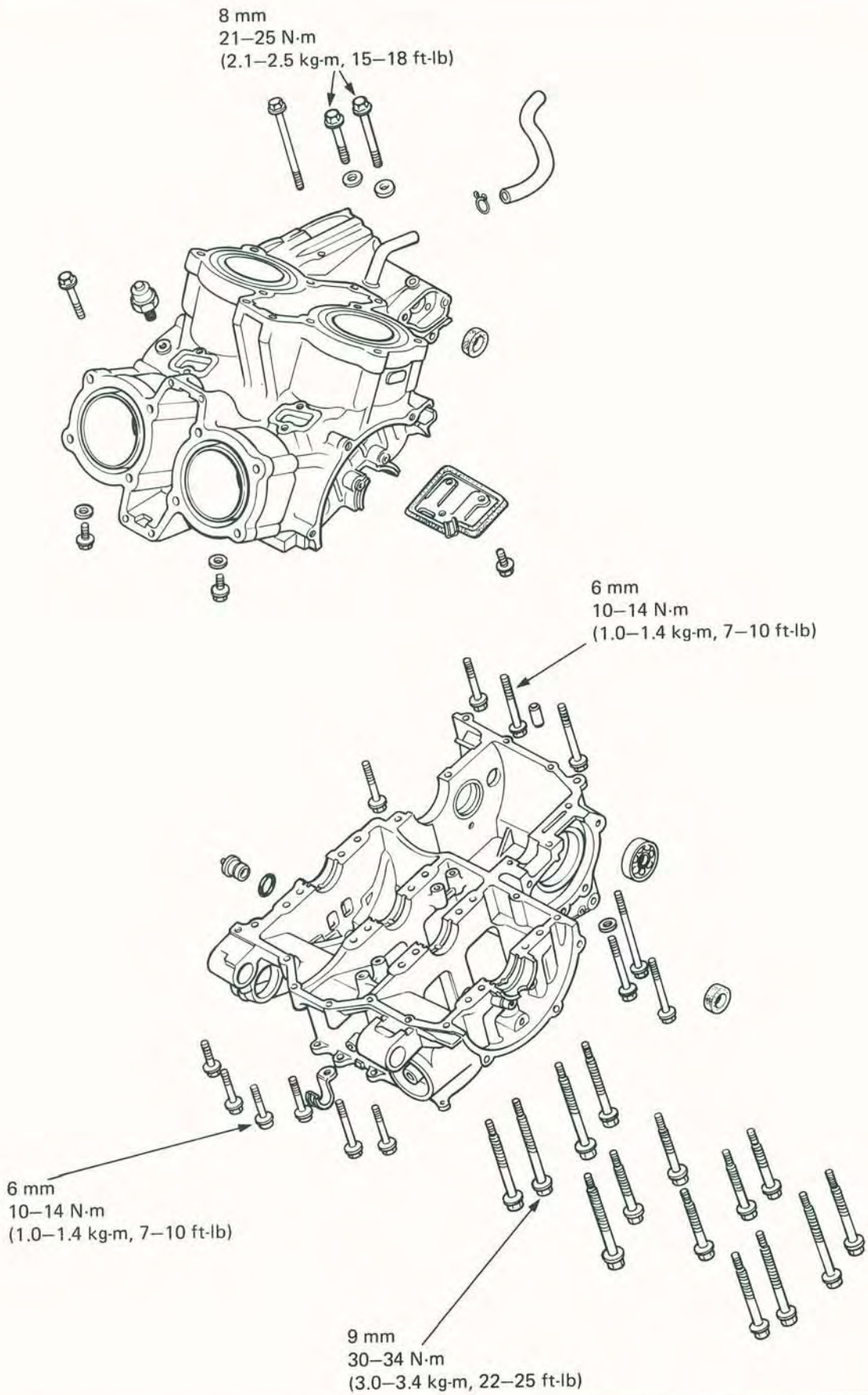

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11. CRANKCASE

SERVICE INFORMATION

GENERAL

- To service the pistons, crankshaft, connecting rods and transmission, the crankcase halves must be separated.
- The following parts must be removed before disassembling the crankcase.

• Oil pan	Refer to section 2
• Oil pump	Refer to section 2
• Water pump	Refer to section 6
• Clutch/starter clutch	Refer to section 7
• Gearshift linkage	Refer to section 8
• Alternator	Refer to section 9
• Cylinder heads	Refer to section 10
• Starter motor	Refer to section 19

TORQUE VALUES

9 mm bolt:	30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)
8 mm bolt:	21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
6 mm bolt:	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

TOOLS

Special

Driver	07949–3710000

Common

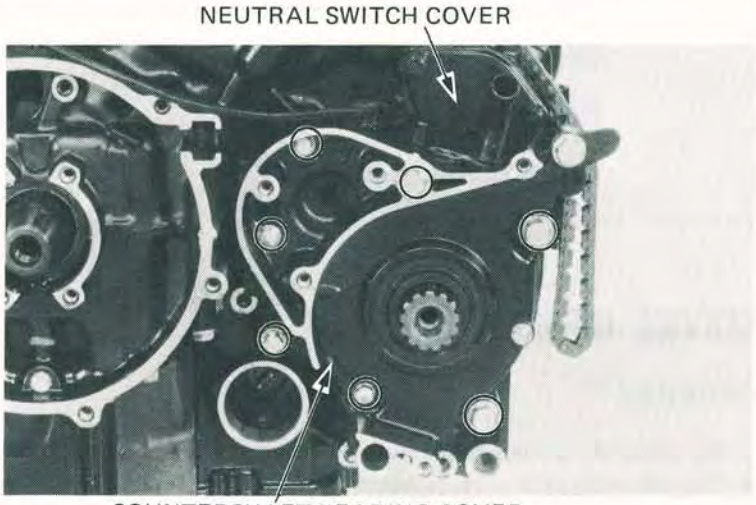
Attachment, 52 x 55 mm	07746–0010400

CRANKCASE DISASSEMBLY

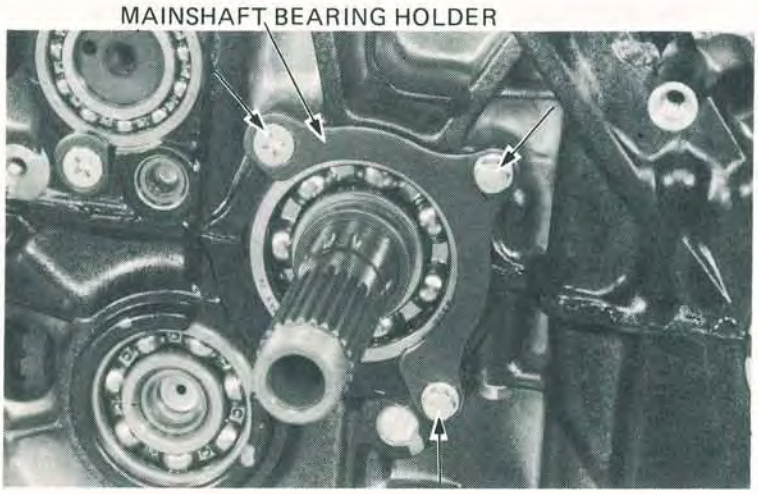
Refer to Service Information (page 11-1) for removal of necessary parts before disassembling crankcase.

Remove the countershaft bearing cover.

Remove the neutral switch cover and the switch (page 20-3).



Remove the mainshaft bearing holder by removing the screw and bolts.



Remove the upper crankcase bolts.

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Turn the engine over and remove the lower crankcase bolts.

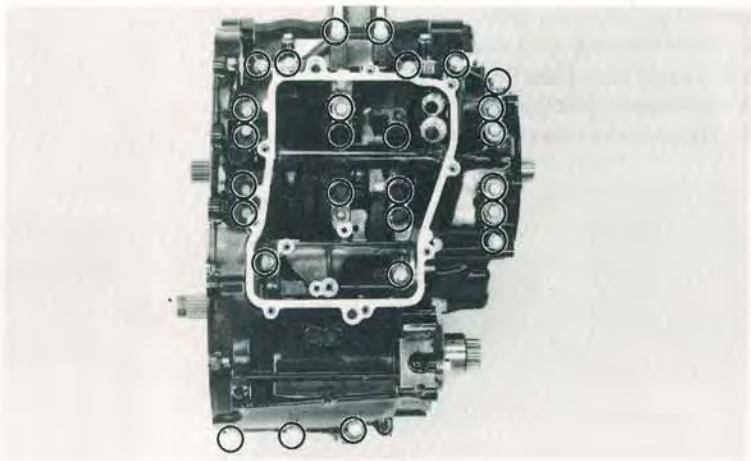
NOTE:

> Remove the bolts in two or more steps and in a crisscross pattern to prevent distorting the crankcase.

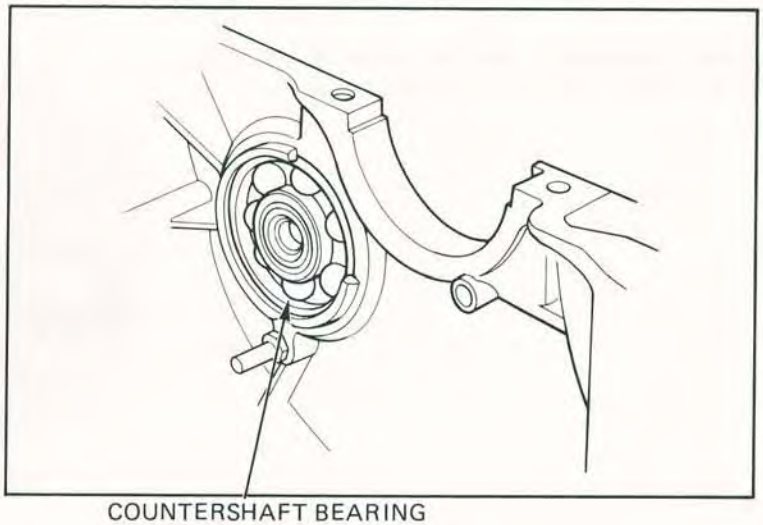
Separate the crankcase.

Remove the following parts:

- Piston and connecting rods (Section 12).
- Crankshaft (Section 12).
- Shift fork and shift drum (Section 13).
- Transmission (Section 13).



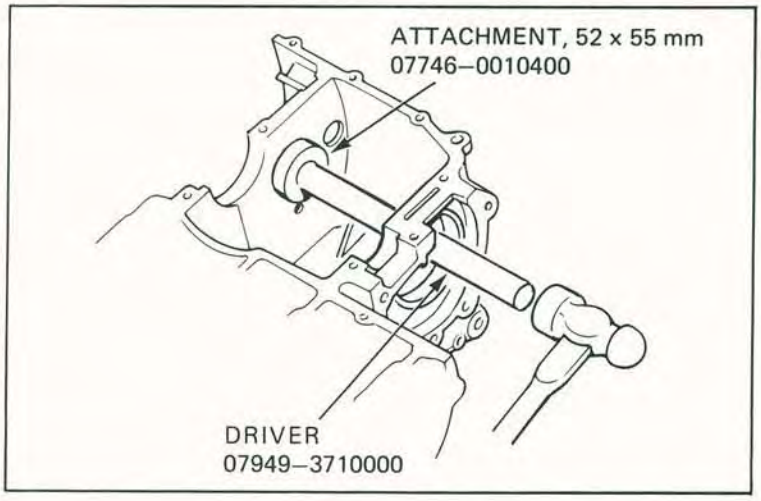
Drive the countershaft bearing out of the case.



COUNTERSHAFT BEARING

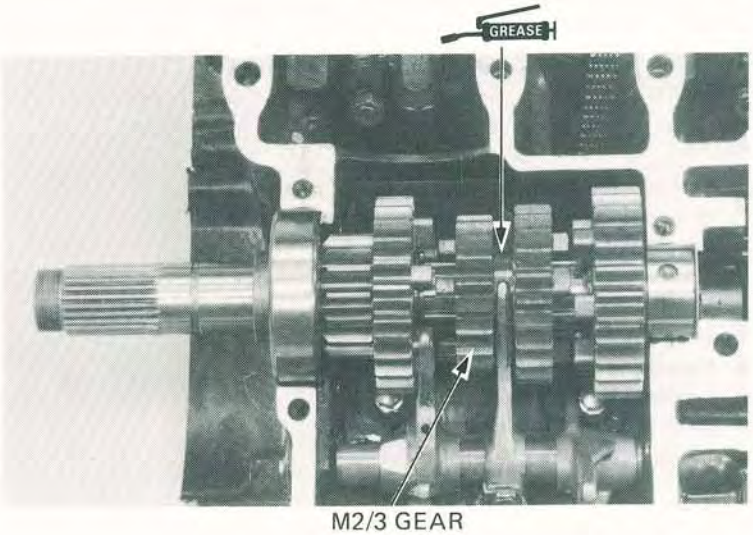
CRANKCASE ASSEMBLY

Drive the countershaft bearing into the crankcase.



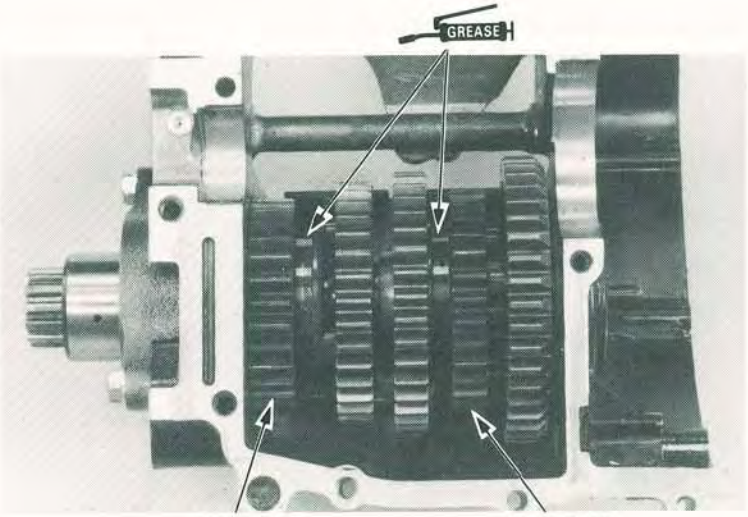
Install the following parts:

- Shift fork and shift drum (Section 13).
- Transmission (Section 13).
- Crankshaft (Section 12).
- Piston and connecting rods (Section 12).



M2/3 GEAR

Apply molybdenum disulfide grease to the shift fork grooves of the M2/3, C4 and C5 gears.



C5 GEAR C4 GEAR

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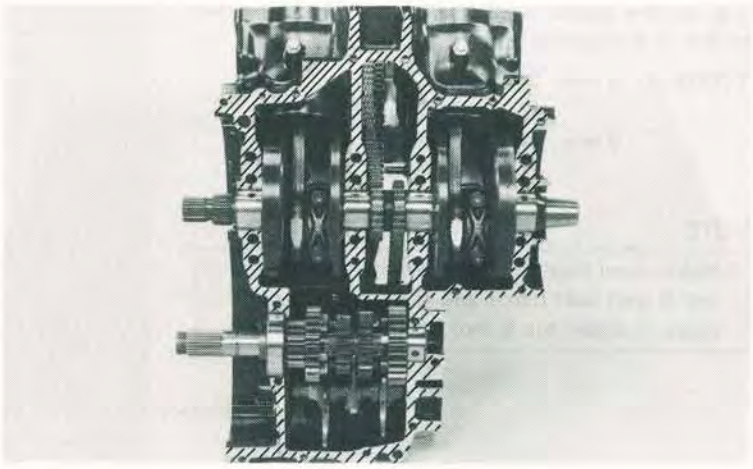
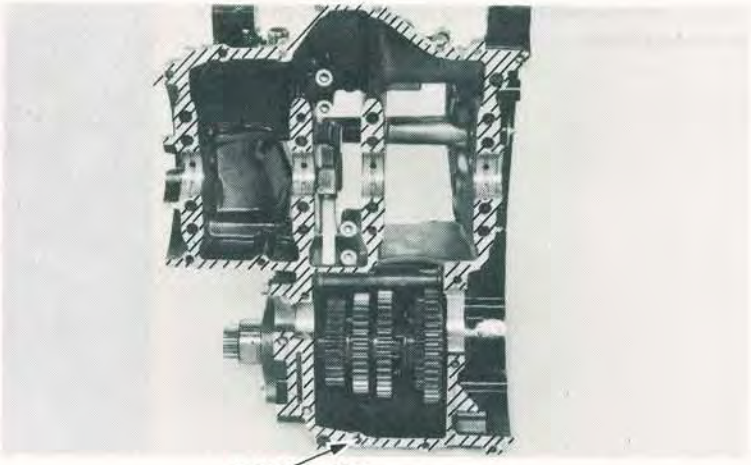
Clean the crankcase mating surfaces.
Apply liquid sealant to the mating surface of the lower and upper crankcase.

CAUTION

Do not apply sealant to the area near the main bearings.



Install the dowel pin into the lower crankcase.

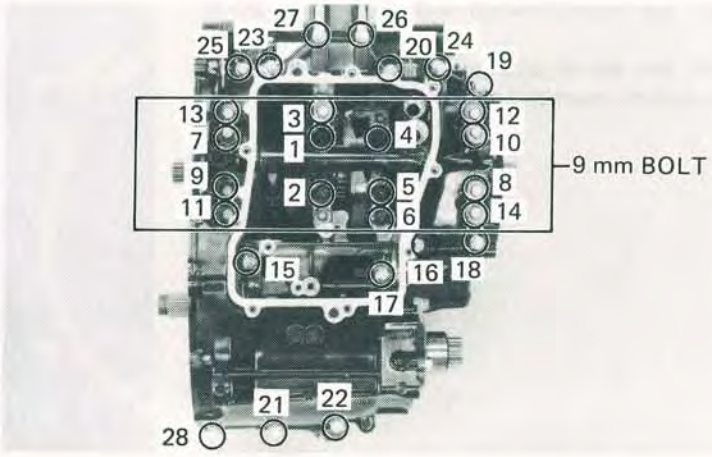


Assemble the crankcase halves, aligning the shift forks with the gears.
Tighten the bolts to the specified torque values in the sequence shown.

TORQUE VALUES:

9 mm bolt: 30–34 N·m
(3.0–3.4 kg-m, 22–25 ft-lb)
8 mm bolt: 21–25 N·m
(2.1–2.5 kg-m, 14–18 ft-lb)
6 mm bolt: 10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)

Tighten the bolts in a crisscross pattern and in 2–3 steps.

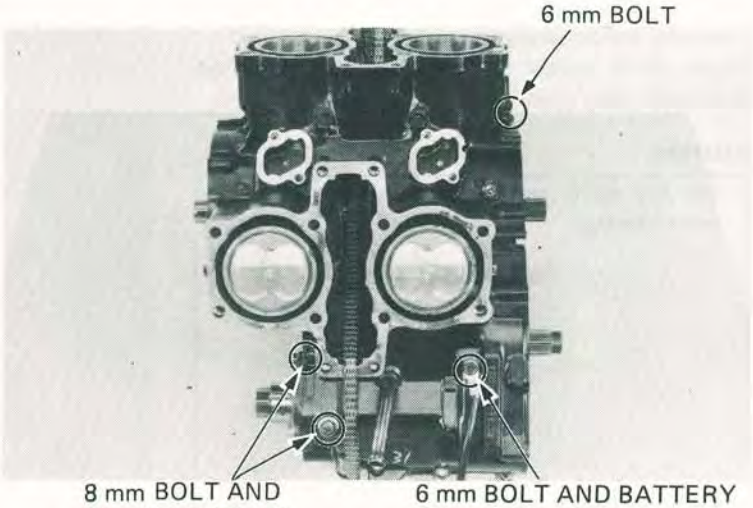


Tighten the upper crankcase bolts to the specified torque in a crisscross pattern and in 2–3 steps.

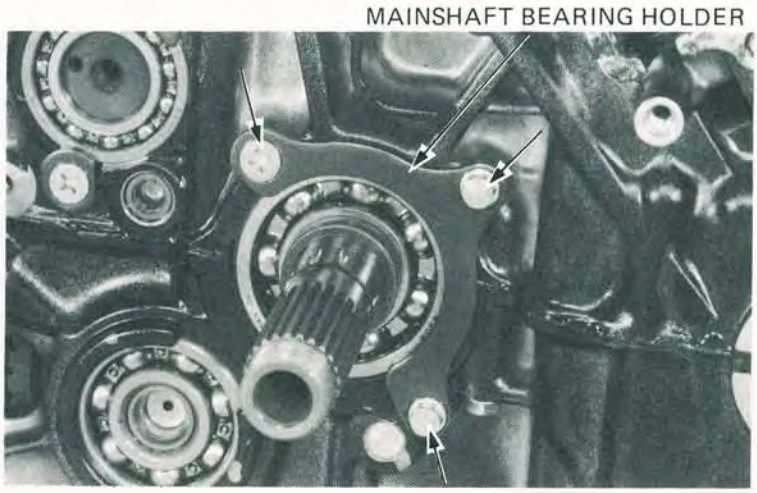
TORQUE: 8 mm: 21–25 N·m
(2.1–2.5 kg-m, 15–18 ft-lb)
6 mm: 10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)

NOTE

Make sure that the plain washers are under the 8 mm bolt heads and the battery ground cable is under the 6 mm bolt head as shown.

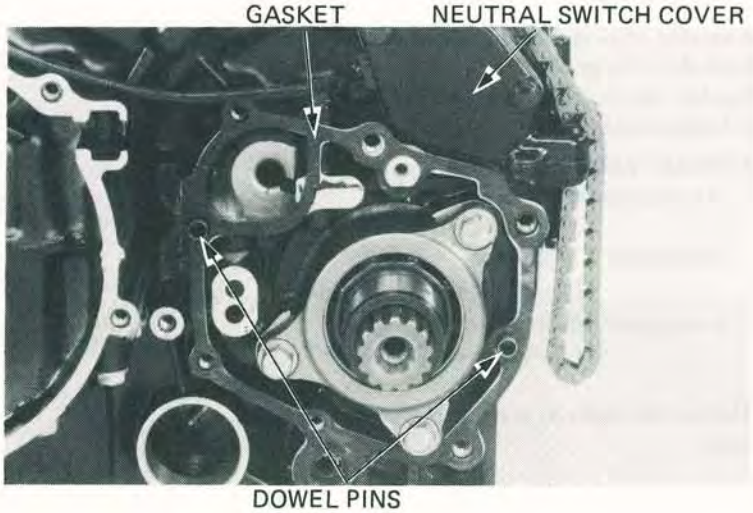


Install the mainshaft bearing holder and tighten the screw and bolts.



Install the neutral switch and cover (page 20-3).

Install the dowel pins and a new gasket on the countershaft bearing cover mounting surface.



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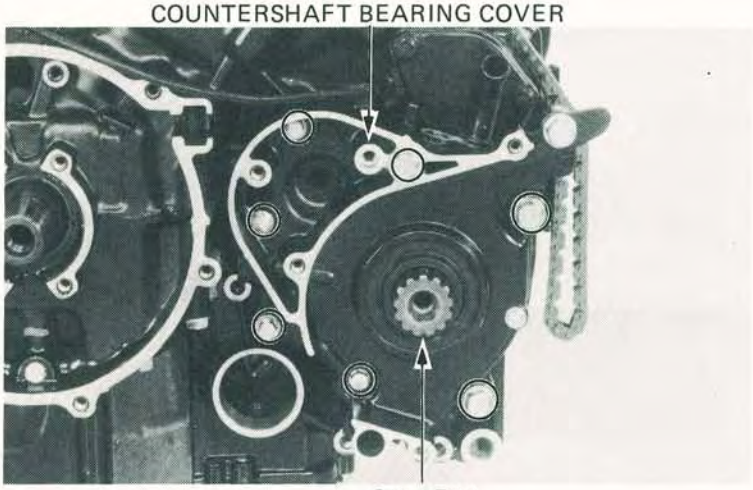
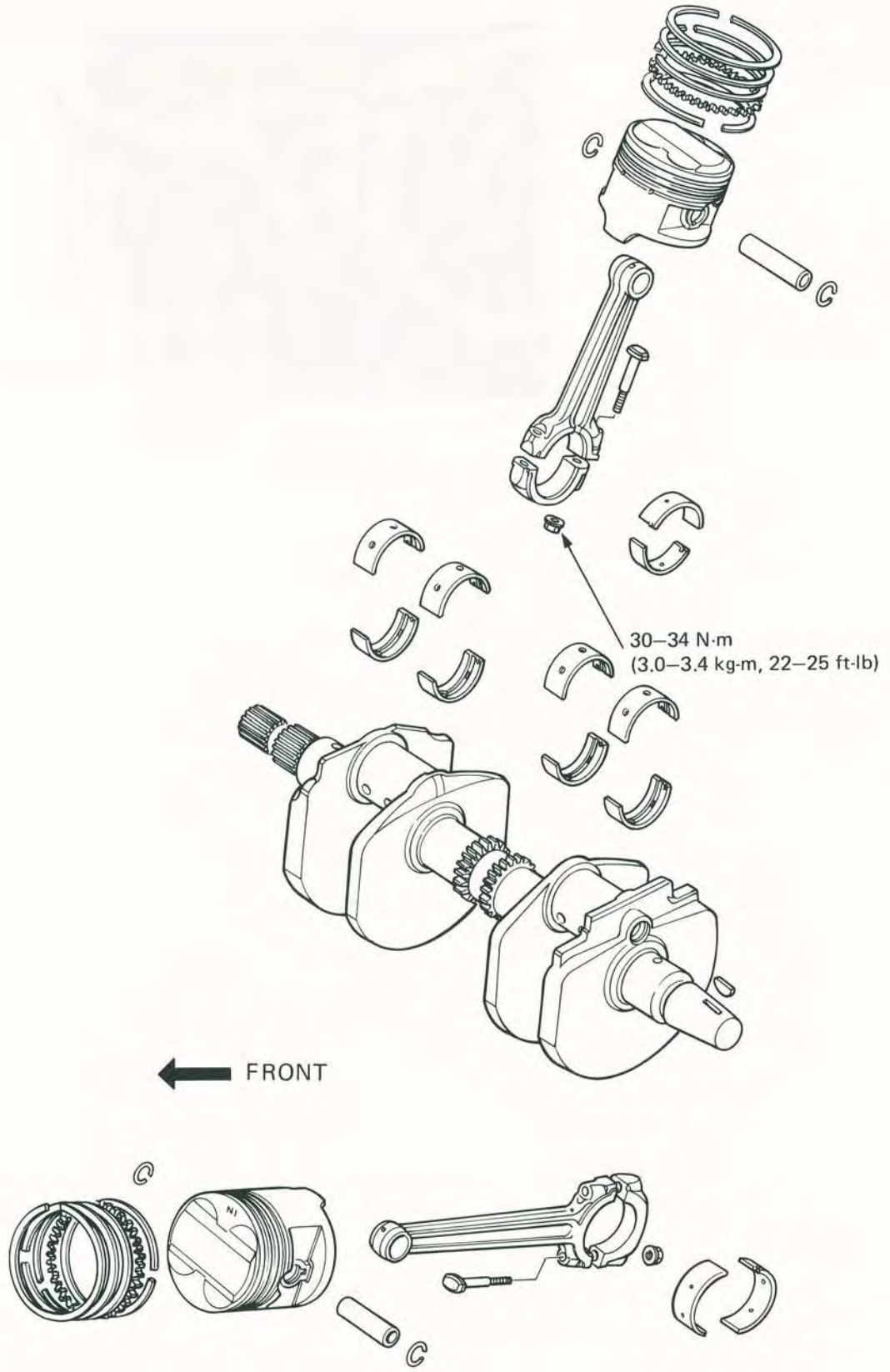
Apply grease to the countershaft oil seal lip in the countershaft bearing cover, then install it being careful not to damage the oil seal lip.





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12. CRANKSHAFT/PISTON

SERVICE INFORMATION

GENERAL

- All bearing inserts are select fit and are identified by color code. Select replacement bearings from the code tables. After installing new bearings, recheck them with plastigauge to verify clearance.
- Apply molybdenum disulfide grease to the main journals and crankpins during assembly.
- Before removing the piston and connecting rod assemblies, clean the top of the cylinder of any carbon deposits.
- For servicing the piston, connecting rod and crankshaft, the crankcase assembly must be separated (Section 11).

SPECIFICATIONS

	ITEM		STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod big end side clearance		0.10–0.30 mm (0.004–0.012 in)	0.40 mm (0.016 in)
	Runout		—	0.03 mm (0.001 in)
	Crankpin oil clearance		0.028–0.052 mm (0.0011–0.0020 in)	0.08 mm (0.003 in)
	Main journal oil clearance		0.020–0.044 mm (0.0008–0.0017 in)	0.06 mm (0.002 in)
Cylinder	I.D.		70.000–70.015 mm (2.755–2.756 in)	70.10 mm (2.76 in)
	Warpage		—	0.10 mm (0.004 in)
Piston	Ring-to-groove clearance	Top	0.015–0.045 mm (0.0006–0.0018 in)	0.10 mm (0.004 in)
		Second	0.015–0.045 mm (0.0006–0.0018 in)	0.10 mm (0.004 in)
	Ring end gap	Top	0.20–0.35 mm (0.008–0.014 in)	0.55 mm (0.022 in)
		Second	0.20–0.35 mm (0.008–0.014 in)	0.55 mm (0.022 in)
		Oil (Side rail)	0.20–0.90 mm (0.008–0.035 in)	1.1 mm (0.04 in)
	Piston O.D.		69.960–69.990 mm (2.754–2.755 in)	69.85 mm (2.750 in)
	Piston-to-cylinder clearance		0.01–0.055 mm (0.004–0.002 in)	0.10 mm (0.004 in)
	Piston pin bore		18.002–18.008 mm (0.7087–0.7090 in)	18.06 mm (0.71 in)
	Piston pin O.D.		17.994–18.000 mm (0.7084–0.7086 in)	17.98 mm (0.70 in)
	Piston-to-piston pin clearance		0.002–0.014 mm (0.0001–0.0006 in)	0.04 mm (0.002 in)
	Connecting rod small end I.D.		18.016–18.034 mm (0.7093–0.7100 in)	18.08 mm (0.712 in)
	Piston pin-to-connecting rod clearance		0.016–0.040 mm (0.0006- 0.0016 in)	0.060 mm (0.0024 in)
Cam chain	Length at 13 kg (29 lb) tension		323.85–324.30 mm (12.750–12.767 in)	326.120 mm (12.84 in)

TORQUE:

Crankpin: 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)

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TROUBLESHOOTING

Excessive noise

1. Crankshaft
   - Worn main bearing
   - Worn rod bearing

2. Piston and Connecting Rod
   - Worn piston or cylinder
   - Worn piston pin or pin hole
   - Worn rod small end

Low compression or uneven compression

1. Worn cylinder or piston ring

Excessive smoke

1. Worn cylinder, piston or piston rings
2. Improperly installed piston rings
3. Damaged piston or cylinder

Overheating

1. Excessive carbon build-up on piston head
2. Blocked or restricted flow of coolant
3. Sticking thermostat

Knocking or abnormal noise

1. Worn pistons and cylinders
2. Excessive carbon build-up on piston head.

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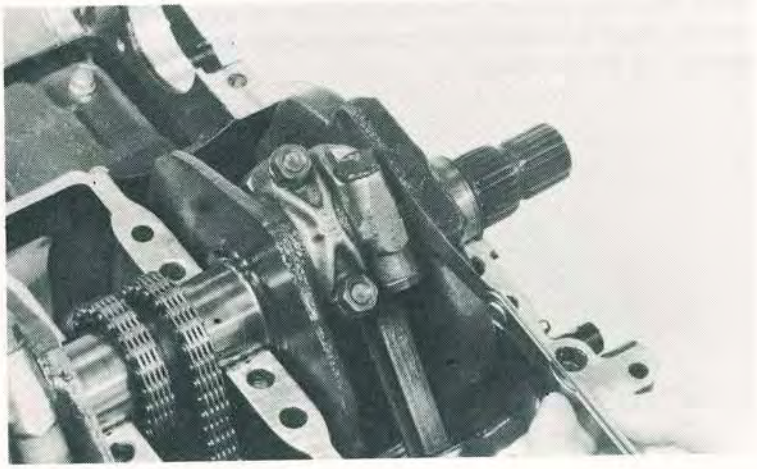
CONNECTING ROD REMOVAL

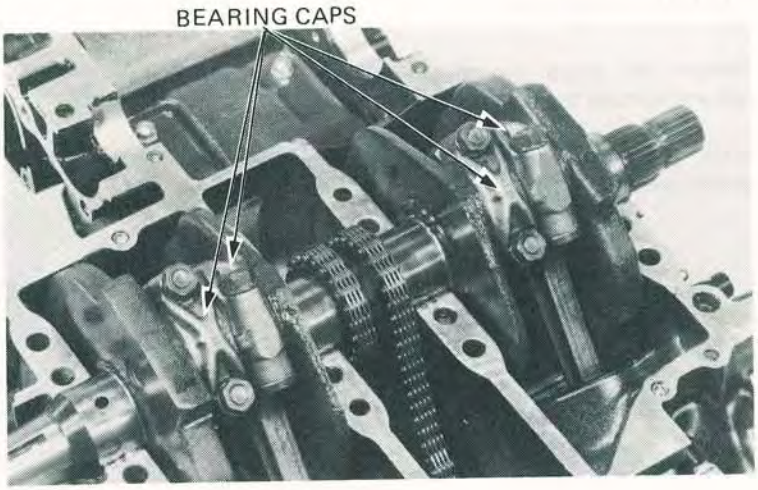
Separate the crankcase assembly (Section 11).

Check the connecting rod side clearance.

SERVICE LIMIT: 0.40 mm (0.016 in)



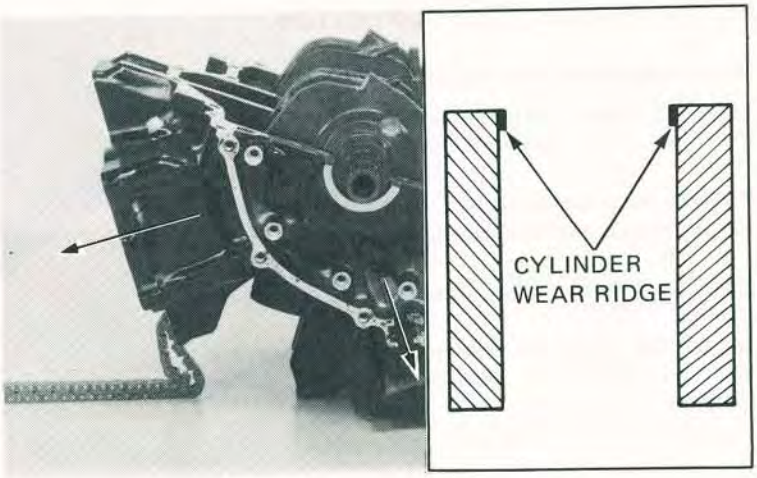
Remove the connecting rod bearing caps and note their locations.



Push the connecting rods and pistons out through the top of the cylinder bores.

CAUTION

On engines with high mileage, inspect the cylinders for a ridge just above the highest point of ring travel. Any ridge must be removed with an automotive type ridge reamer before removing the pistons to allow the pistons and rings to pass through the cylinder.

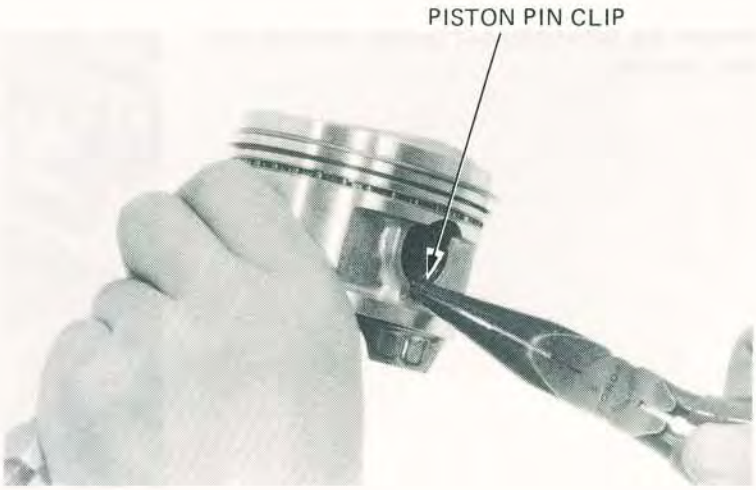


Mark the rods, pistons, bearings and caps as you remove them to indicate the correct cylinder and position on the crankpins.

PISTON REMOVAL

Remove the piston pin clips. Push the piston pin out and remove the piston.

Mark the piston pins to indicate their correct piston position.



PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)
(TOP/SECOND)

Remove the piston rings and mark them to indicate the correct cylinder and piston position.

Clean the piston crown, removing all carbon deposits.
Inspect the piston for cracks or other damage and the ring grooves for excessive wear and carbon build-up.

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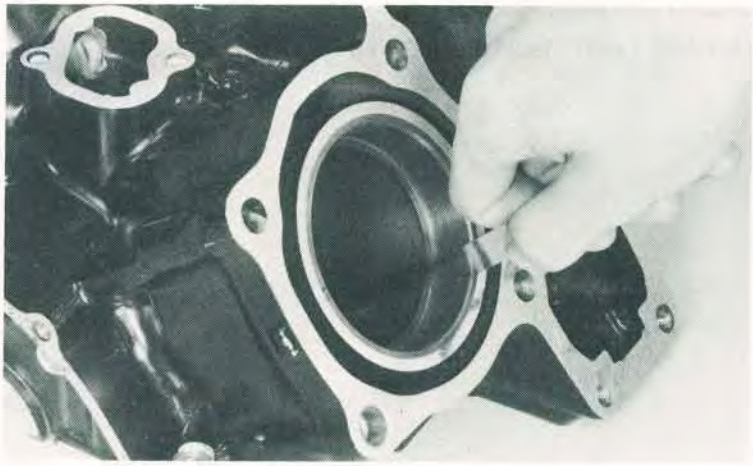
Using a piston, push the ring into the cylinder squarely and measure the end gap.

SERVICE LIMITS:

TOP:	**0.55 mm (0.022 in)**
SECOND:	**0.55 mm (0.022 in)**
OIL (Side rail):	**1.1 mm (0.04 in)**



Measure the piston O.D.

NOTE:

> Take measurements 10 mm (0.4 in) from the bottom, and 90° to the piston pin hole.

SERVICE LIMIT: 69.85 mm (2.750 in)

Inspect the cylinder bores for wear or damage. Measure the cylinder I.D. at three levels in X and Y axis.

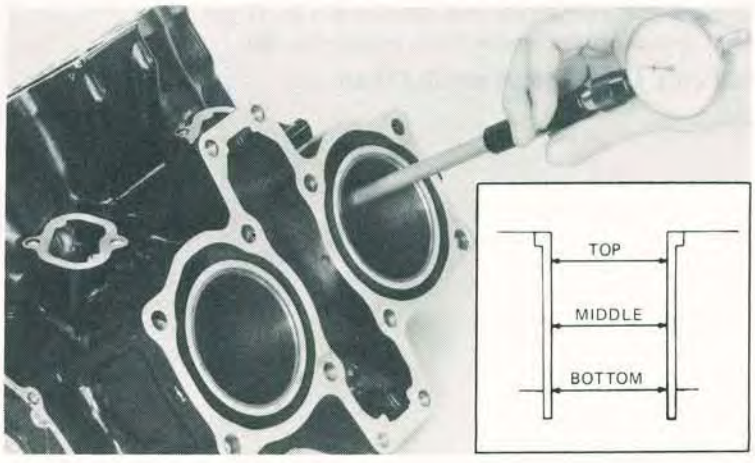
SERVICE LIMIT: 70.10 mm (2.76 in)

Calculate the piston-to-cylinder clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

Oversize pistons are available in the following sizes:

0.25, 0.50, 0.75 and 1.00 mm



Measure each piston pin hole I.D.

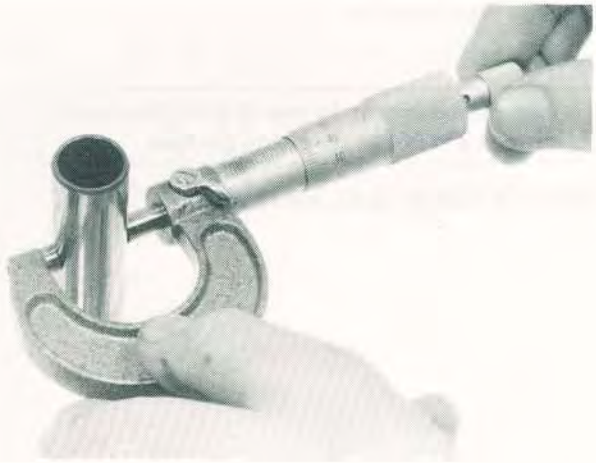
SERVICE LIMIT: 18.06 mm (0.71 in)

Measure each piston pin O.D.

SERVICE LIMIT: 17.98 mm (0.70 in)

Calculate the piston pin-to-piston clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)



Measure the connecting rod small end I.D. If the reading exceeds the service limit, replace the rod.

SERVICE LIMIT: 18.08 mm (0.712 in)

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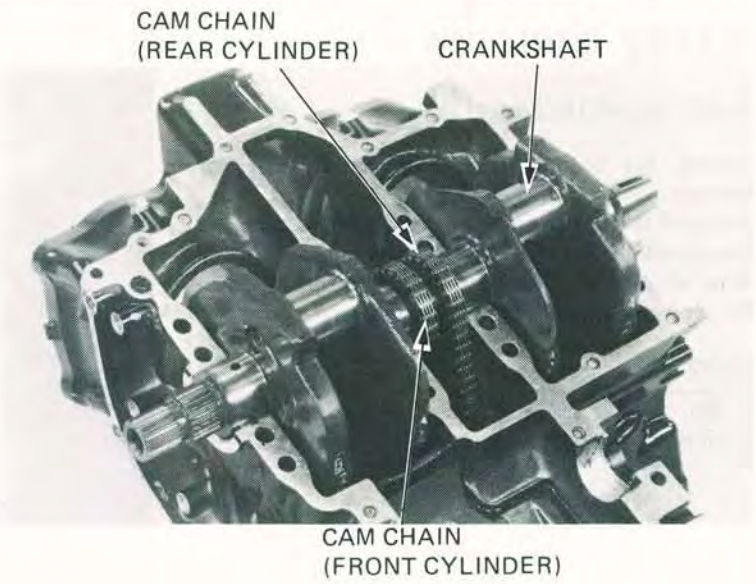
CRANKSHAFT REMOVAL

Remove the crankshaft and cam chains.

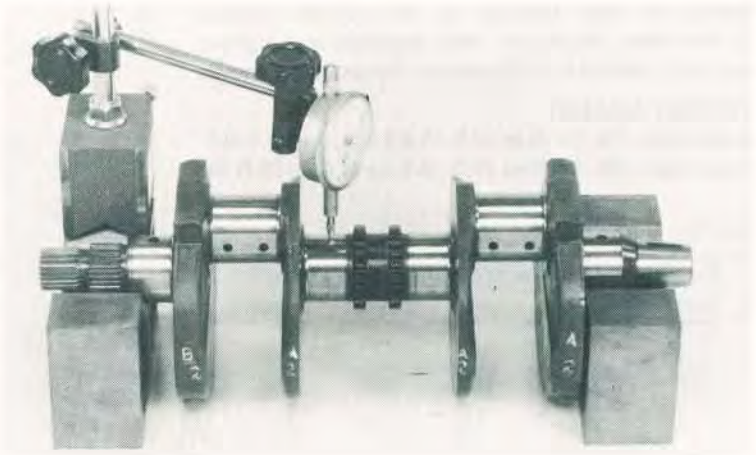


CRANKSHAFT INSPECTION

Set the crankshaft on a stand or Vee blocks.
Set a dial indicator on the center main bearing journal. Rotate the crankshaft two revolutions and read the runout.

Actual runout is 1/2 of the total indicator reading.

SERVICE LIMIT: 0.03 mm (0.001 in)



CAM CHAIN LENGTH INSPECTION

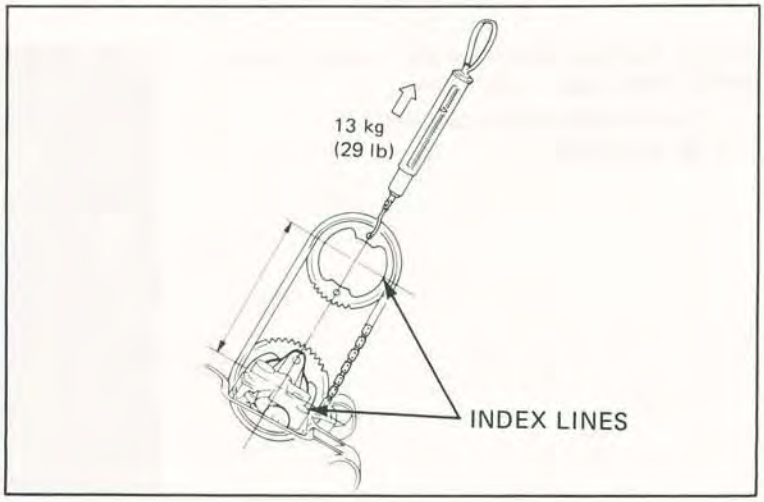
Place the cam chain on the camshaft sprockets with the index lines positioned as indicated.
Secure one camshaft sprocket and apply 13 kg (29 lbs) of tension to the other.
Then measure the distance between the index lines as shown.

SERVICE LIMIT: 326.120 mm (12.84 in)

NOTE

The lidex lines should be parallel to each other.

Replace the cam chain if it is longer than the service limit.



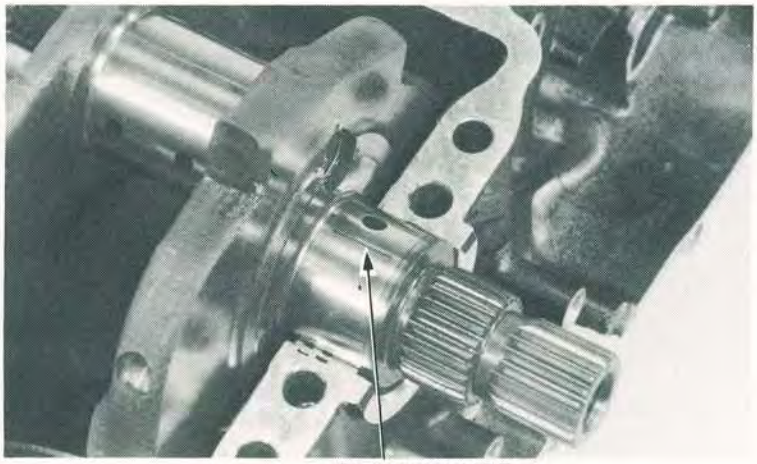
BEARING INSPECTION

MAIN BEARING

Inspect the bearing inserts for unusual wear or damage.
Reinstall the upper crankcase's main bearing inserts, then carefully lower the crankshaft in place.
Wipe all oil from the bearing inserts and journals. Put a piece of plastigauge on each journal.

NOTE

> Do not put the plastigauge over the oil hole in the main bearing journal of the crankshaft.

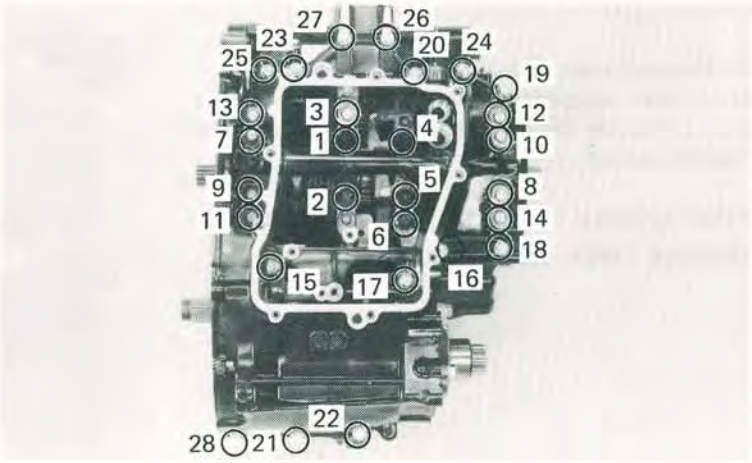

PLASTIGAUGE

Install the main bearings on the correct journals in the lower crankcase, then assemble and tighten the bolts evenly in 2–3 steps in the sequence shown.

TORQUE VALUES:
6 mm bolt: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
9 mm bolt: 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)

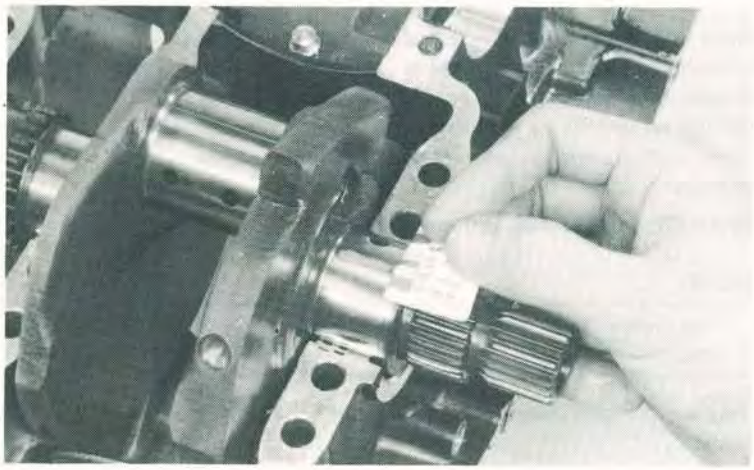
NOTE:

> Do not rotate the crankshaft during inspection.



Remove the lower crankcase and measure the compressed plastigauge on each journal.

OIL CLEARANCE SERVICE LIMIT:
0.06 mm (0.002 in)



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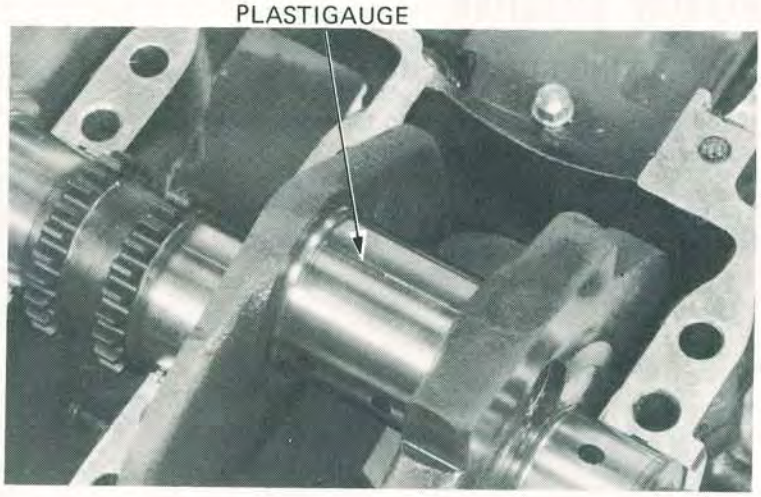
CRANKSHAFT/PISTON

Inspect the bearing inserts for unusual wear or damage.
Wipe all oil from the bearing inserts and crankpins.
Put a piece of plastigauge on each crankpin.

NOTE

- Do not put the plastigauge over the oil hole in the crankpin.
- The bearing tabs should face toward the exhaust ports. Remember the front and rear cylinder exhaust ports face opposite directions.

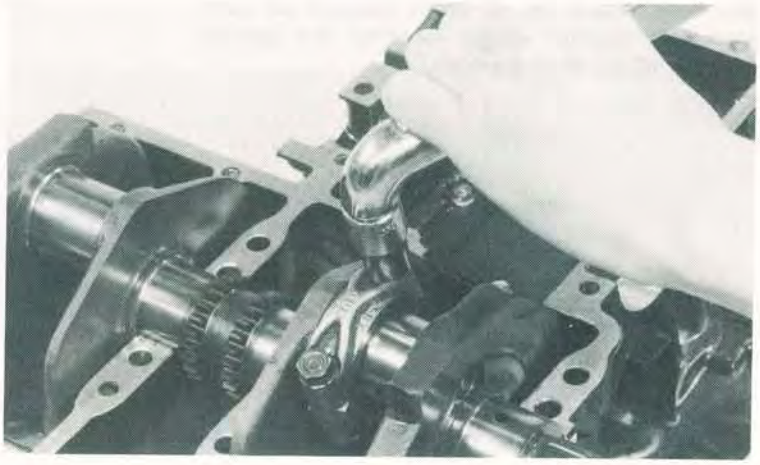


Install the bearing caps and rods on the correct crankpins, and tighten them evenly.

TORQUE: 30–34 N·m (3.0–3.4 kg-m, 22-25 ft-lb)

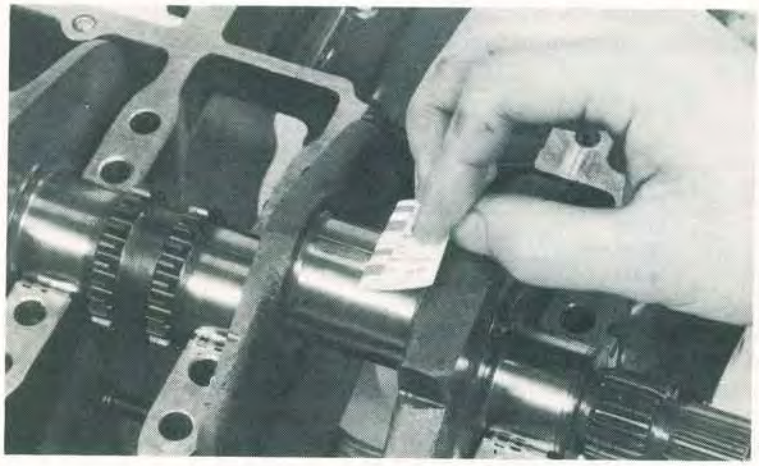
NOTE

Do not rotate the crankshaft during inspection.



Remove the caps and measure the compressed plastigauge on each crankpin.

OIL CLEARANCE SERVICE LIMIT:
0.08 mm (0.003 in)

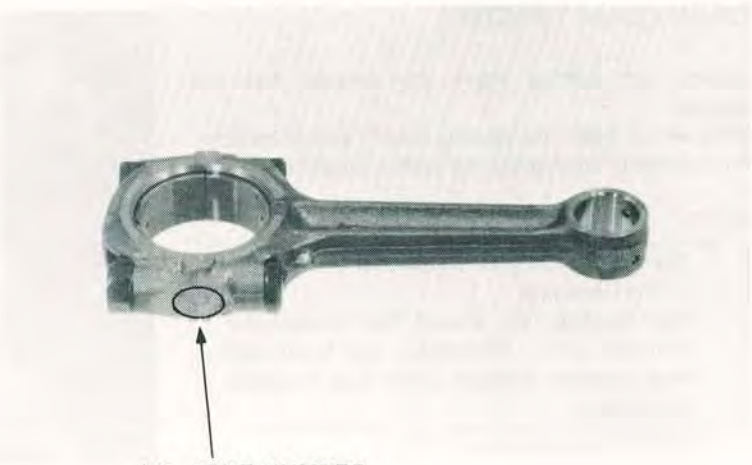


BEARING SELECTION

CONNECTING ROD BEARING

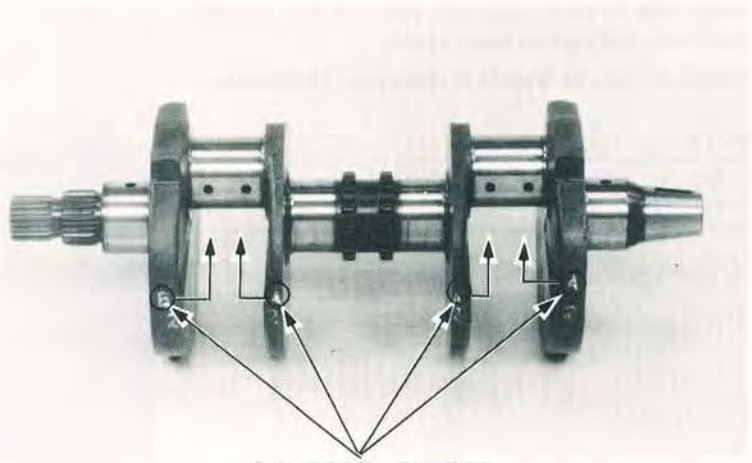
If rod bearing clearance is beyond tolerance, select replacement bearings as follows:

The code numbers (1, 2, or 3) stamped on each connecting rod identifies its inside diameter (I.D.).



I.D. CODE NUMBER

The code letters (A, B, or C) stamped on each crankshaft counter weight identifies the outside diameter (O.D.) of its crankpin.



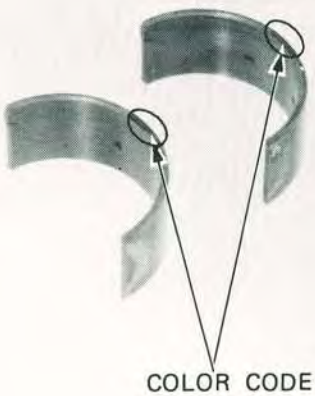
O.D. CODE LETTERS

Cross reference the crankpin and rod codes to select the correct replacement bearing.

			CRANKPIN O.D. CODE LETTER		
			A	B	C
			35.992–36.000 mm	35.984–35.992 mm	35.976–35.984 mm
CONNECTING ROD I.D. CODE NO.	1	39.000–39.008 mm	E (Yellow)	D (Green)	C (Brown)
	2	39.008–39.016 mm	D (Green)	C (Brown)	B (Black)
	3	39.016–39.024 mm	C (Brown)	B (Black)	A (Blue)

BEARING INSERT THICKNESS:

A (Blue): 1.502–1.506 mm (0.0591–0.0593 in)
B (Black): 1.498–1.502 mm (0.0590–0.0591 in)
C (Brown): 1.494–1.498 mm (0.0588–0.0590 in)
D (Green): 1.490–1.494 mm (0.0587–0.0588 in)
E (Yellow): 1.486–1.490 mm (0.0585–0.0587 in)

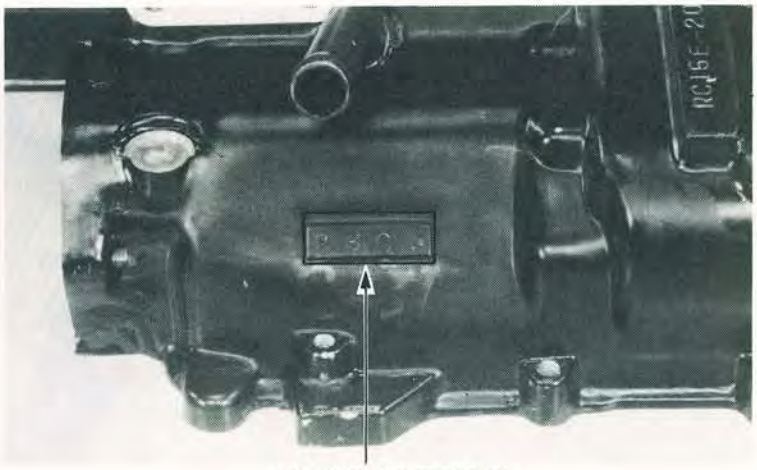


COLOR CODE

Date of Issue: January, 1983

MAIN BEARING

The code letters (A, B, or C) stamped on the rear portion of the upper crankcase identifies the inside diameter (I.D.) of each main bearing journal, from left-to-right. In this example, the I.D. code for the right main journal is "A".



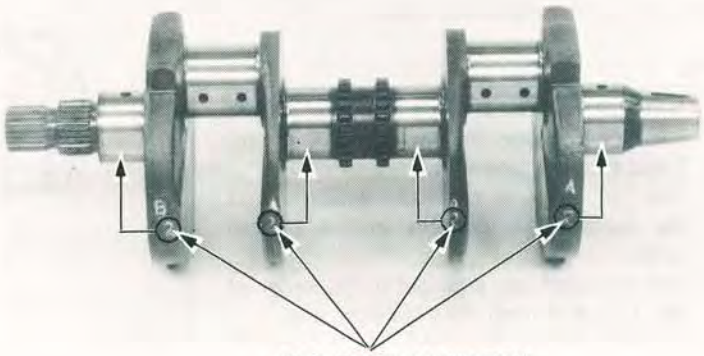
I.D. CODE LETTERS

The code numbers (1, 2, or 3) stamped on each crankshaft counter weight identifies the outside diameter (O.D.) of its main journal.
Cross reference the crankcase and crank jouranl codes to select the correct replacement bearing.

SELECTION TABLE (ENGINE No. ~ RC15E 2001586)

Unit : mm (in)

CASE I.D. CODE LETTERS / MAIN JOURNAL O.D. CODE NUMBER		1	2	3
		35.992-36.000 (1.4170-1.4173)	35.984-35.992 (1.4167-1.4170)	35.976-35.984 (1.4164-1.4167)
A	39.000-39.008 (1.5354-1.5357)	D (Green)	C (Brown)	B (Black)
B	39.008-39.016 (1.5357-1.5361)	C (Brown)	B (Black)	A (Blue)
C	39.016-39.024 (1.5361-1.5364)	B (Black)	A (Blue)	A (Blue)



O.D. CODE NUMBERS

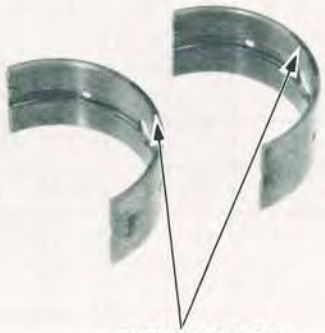
SELECTION TABLE (ENGINE NO. RC15E 2001587 ~)

Unit : mm (in)

CASE I.D. CODE LETTERS / MAIN JOURNAL O.D. CODE NUMBER		1	2	3
		36.000-36.008 (1.4173-1.4176)	35.992-36.000 (1.4170-1.4173)	35.984-35.992 (1.4167-1.4170)
A	39.000–39.008 (1.5354-1.5357)	E (Yellow)	D (Green)	C (Brown)
B	39.008-39.016 (1.5357-1.5361)	D (Green)	C (Brown)	B (Black)
C	39.016-39.024 (1.5361-1.5364)	C (Brown)	B (Black)	A (Blue)

MAIN BEARING INSERT THICKNESS:

A (Blue): 1.506–1.510 mm (0.0593–0.0594 in)
B (Black): 1.502–1.506 mm (0.0591–0.0593 in)
C (Brown): 1.498–1.502 mm (0.0590–0.0591 in)
D (Green): 1.494–1.498 mm (0.0588–0.0590 in)
E (Yellow): 1.490–1.494 mm (0.0587–0.0588 in)



COLOR CODE

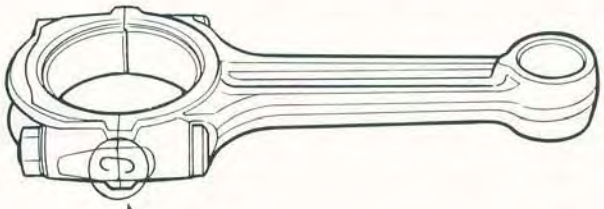
CRANKSHAFT INSTALLATION

Install the main bearings into the upper crankcase. Apply molybdenum disulfide grease to the upper and lower main bearings.
Install the crankshaft with the cam chains.

The weight code is stamped on the connecting rod by the alphabetical code.
When replacing the connecting rod, perform the weight selection between the No. 1 and 2 connecting rods, or No. 3 and 4 connecting rods in accordance with the selection table.

NOTE:

- It is not necessary to perform the weight selection between the No. 1 and 3, or No. 2 and 4 connecting rods.
- The "o" mark in the table indicates that the matching is possible in the crossed codes.
- The cylinders are arranged in the order of No. 1, 2, 3, 4 from the alternator side.



SELECTION TABLE

#1, #2 CONNECTING RODS						#3, #4 CONNECTING RODS					
#2 ROD CODE / #1 ROD CODE	A	B	C	D	E	#4 ROD CODE / #3 ROD CODE	A	B	C	D	E
A				○	○	A				○	○
B			○	○	○	B			○	○	○
C		○	○	○		C		○	○	○	○
D	○	○	○			D	○	○	○		
E	○	○				E	○	○			

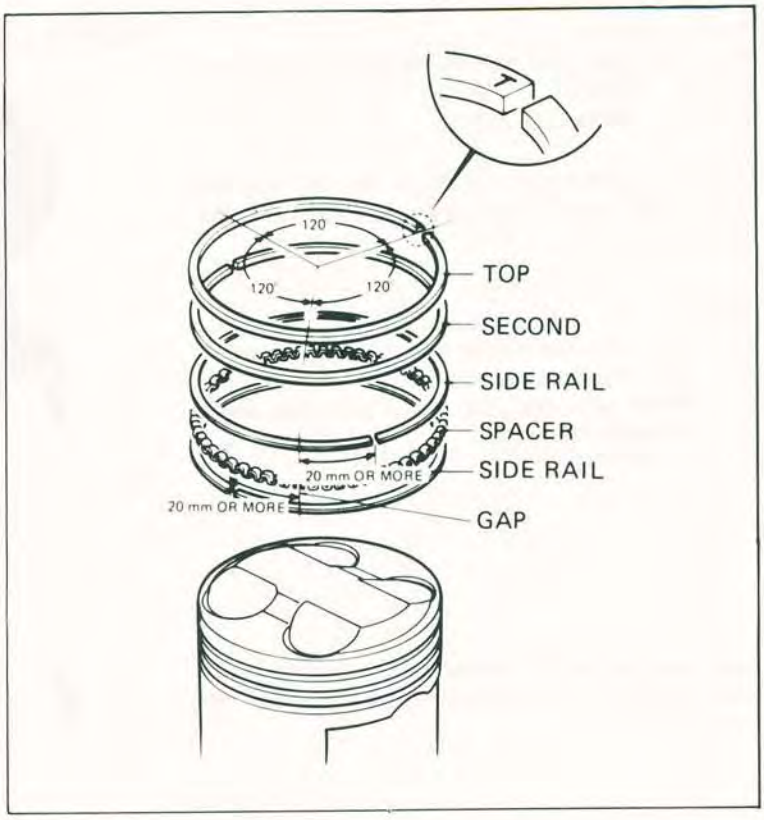
Date of Issue: October, 1983

PISTON AND ROD INSTALLATION

Clean the piston domes, ring lands, and skirts.
Carefully install the piston rings onto the piston.
Stagger the ring end gaps as shown.

NOTE:

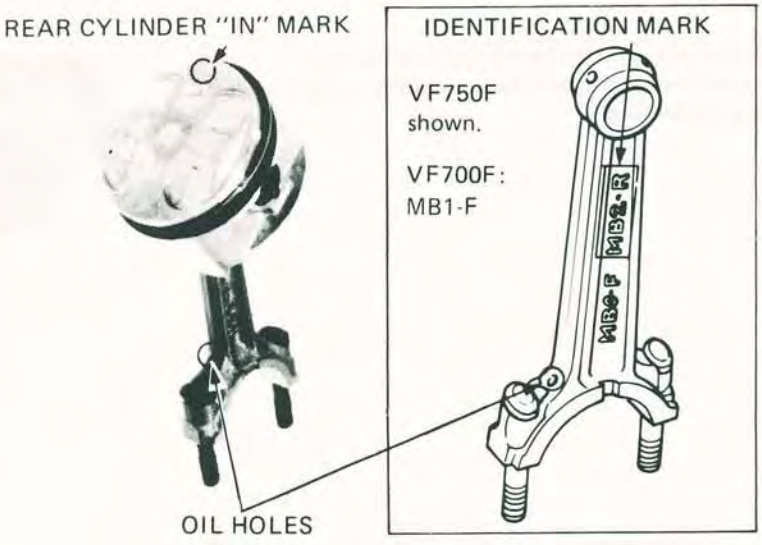
- Be careful not to damage the piston and piston rings during assembly.
- All rings should be installed with the markings facing up.
- After installing the rings they should rotate freely, without sticking.



Coat the rod's small end with molybdenum disulfide grease.

Rear cylinders:
Note that the rear cylinder connecting rods are marked "MB0-F" or "MB2-R" for the VF750F, and "MB1-F" for the VF700.

Install the pistons on the rear connecting rods so that the intake "IN" mark is facing opposite the oil hole in the rod.

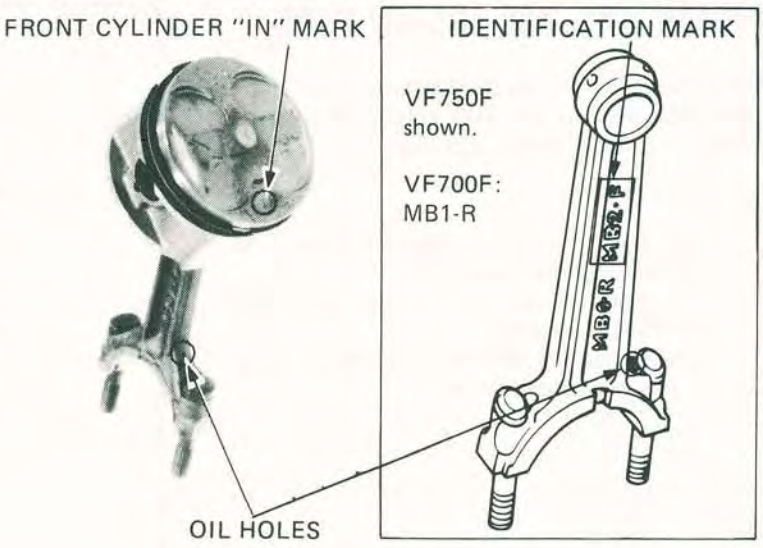


Front cylinders:
Note that the front cylinder connecting rods are marked "MB0-R" or "MB2-F" for the VF750F, and "MB1-R" for the VF700.

Install the pistons on the front rods so that the intake "IN" mark is facing the same direction as the oil hole in the rod.

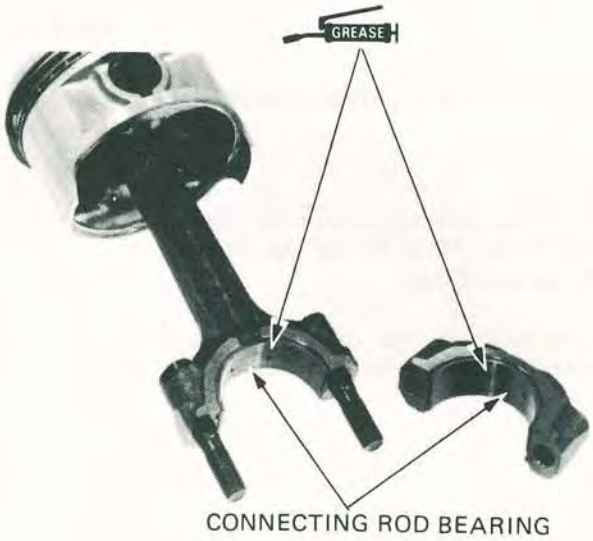
NOTE:

- Do not interchange the pistons, piston pins or connecting rods.
- Make sure that the piston pin clips are properly seated.



Align the hole in the connecting rod bearing insert with the hole in the connecting rod and install the insert.

Install the connecting rod cap bearing insert.
Apply molybdenum disulfide grease to the connecting rod bearings.



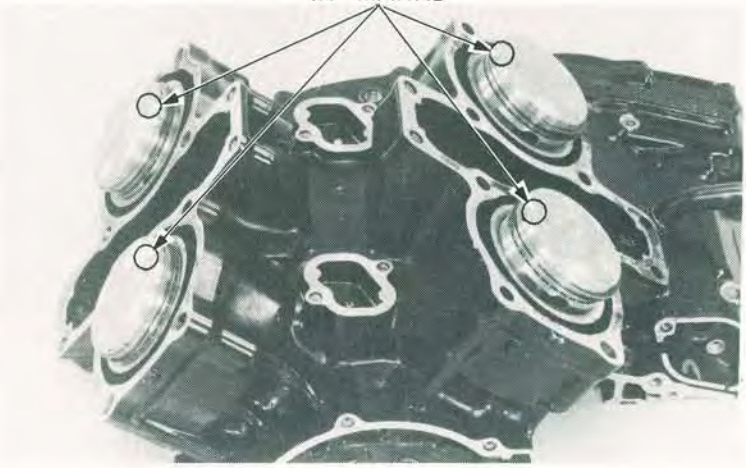
Date of Issue: July, 1984

Coat the cylinders, piston rings/grooves and piston with oil. To prevent damaging the crankshaft, slip short sections of rubber hose over the rod bolts before installation.

Install the rod and piston assemblies into the cylinders from the top of the crankcase. Be sure each assembly is returned to its original position as noted during removal.

NOTE

The piston intake "IN" marks should be facing each other as shown.



Compress the piston rings with a ring compressor and insert the piston and rod into the cylinder until the rod seats on the crankpin.

NOTE

Be careful not to damage the pistons or rings during assembly.

Flip the upper crankcase over.

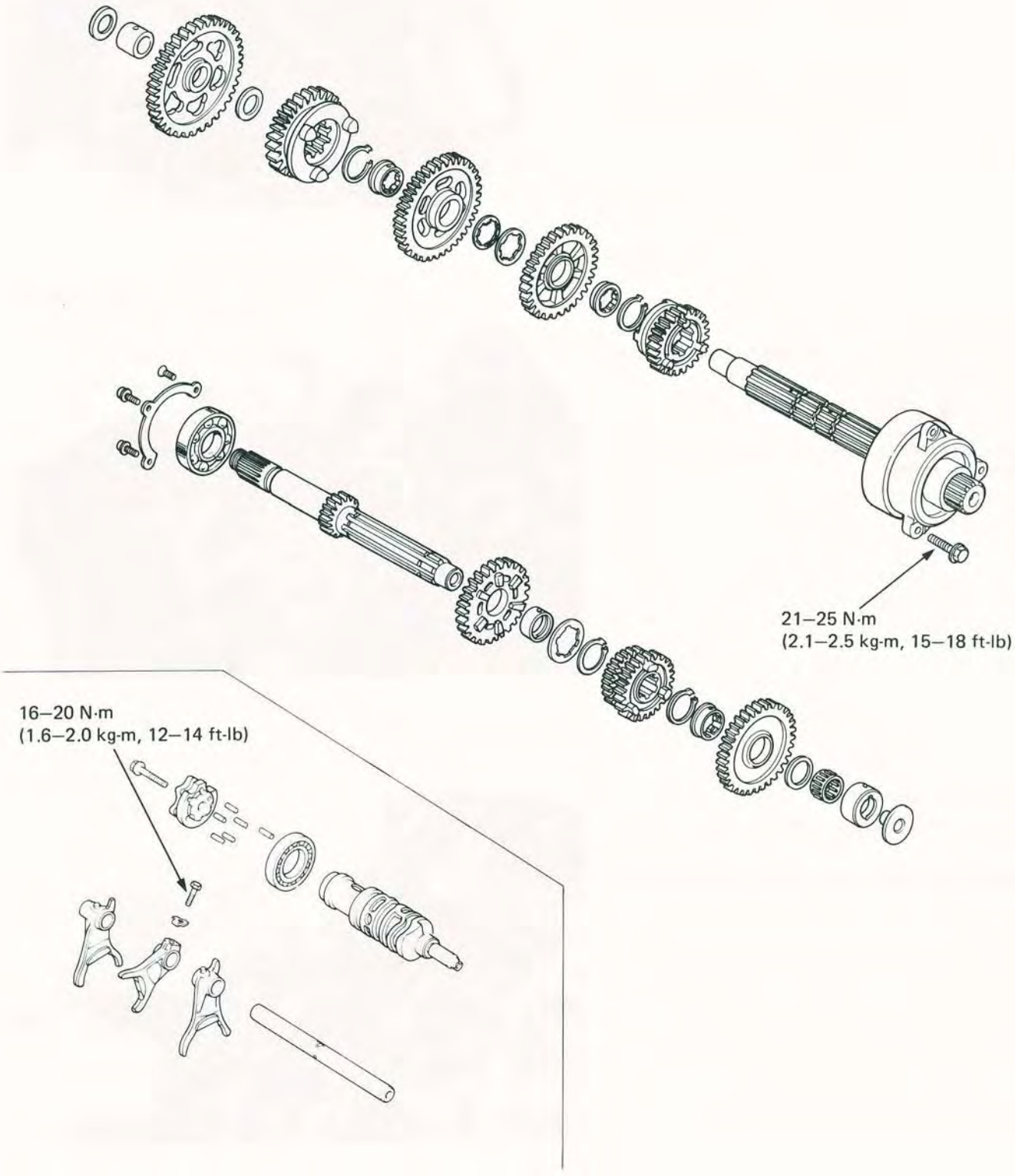
Install and torque the connecting rod caps.

TORQUE: 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)

NOTE

- Be sure the bearing caps are installed in their correct location as marked during removal.
- Tighten the nuts in two or more steps.
- After tightening the bolts, check that the rods move freely without binding.

Assemble the crankcase (See page 11-3).



Date of Issue: January, 1983

13. TRANSMISSION

SERVICE INFORMATION

GENERAL

- The gearshift linkage can be serviced with the engine in the frame (Section 8).
- For internal transmission repairs, the crankcase must be separated (Section 11).

SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Transmission	Backlash	1st	0.047–0.142 mm (0.0019–0.0056 in)	0.20 mm (0.008 in)
		2nd	0.064–0.128 mm (0.0025–0.0050 in)	0.17 mm (0.007 in)
		3rd, 4th, 5th	0.068–0.136 mm (0.0027–0.0054 in)	0.18 mm (0.007 in)
	Gear I.D.	M4, M5 gear	28.000–28.021 mm (1.1024–1.1032 in)	28.04 mm (1.104 in)
		C1 gear	26.000–26.021 mm (1.0236–1.0244 in)	26.04 mm (1.025 in)
		C2, C3 gear	31.000–31.025 mm (1.2205–1.2215 in)	31.04 mm (1.222 in)
	Gear bushing O.D.	M4, M5 gear	27.959–27.980 mm (1.1007–1.1016 in)	27.94 mm (1.100 in)
		C1 gear	25.959–25.980 mm (1.0220–1.0228 in)	25.94 mm (1.021 in)
		C2, C3 gear	30.950–30.975 mm (1.2185–1.2195 in)	30.93 mm (1.218 in)
	Gear bushing I.D.	M4	24.995–25.016 mm (0.9840–0.9849 in)	25.04 mm (0.986 in)
		C1	22.020–22.041 mm (0.8669–0.8678 in)	22.06 mm (0.869 in)
	Mainshaft O.D. (at M4)		24.977–24.990 mm (0.9833–0.9839 in)	24.92 mm (0.981 in)
	Countershaft O.D. (at C1)		21.979–22.000 mm (0.8653–0.8661 in)	21.96 mm (0.865 in)
	Gear-to-bushing clearance	M4, M5	0.020–0.062 mm (0.0008–0.0024 in)	0.10 mm (0.004 in)
		C1	0.020–0.062 mm (0.0008–0.0024 in)	0.10 mm (0.004 in)
		C2, C3	0.025–0.075 mm (0.0010–0.0030 in)	0.11 mm (0.004 in)
	Bushing-to-shaft clearance	M4	0.005–0.047 mm (0.0002–0.0019 in)	0.06 mm (0.002 in)
		C1	0.020–0.062 mm (0.0008–0.0024 in)	0.10 mm (0.004 in)
Shift fork	Claw thickness		6.43–6.50 mm (0.253–0.256 in)	6.1 mm (0.24 in)
	I.D.	Left and right	14.000–14.021 mm (0.5512–0.5520 in)	14.04 mm (0.553 in)
Fork shaft	O.D.		13.966–13.984 mm (0.5498–0.5505 in)	13.90 mm (0.547 in)

13

TORQUE VALUES

Countershaft bearing holder	21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
Shift fork center	16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb)

TOOLS

Common

Driver	07746–0030100	or Driver	07945–3710200
Attachment, 25 mm	07746–0030200		

TROUBLESHOOTING

Hard to shift

1. Clutch slave cylinder sticking
2. Shift fork bent
3. Shift shaft bent
4. Shift claw bent
5. Shift drum cam grooves damaged

Transmission jumps out of gear

1. Gear dogs worn
2. Shift shaft bent
3. Shift drum stopper broken
4. Shift forks bent

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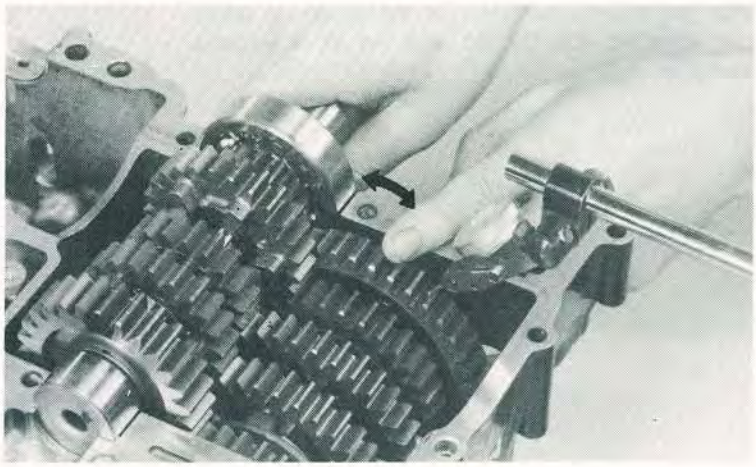
TRANSMISSION DISASSEMBLY

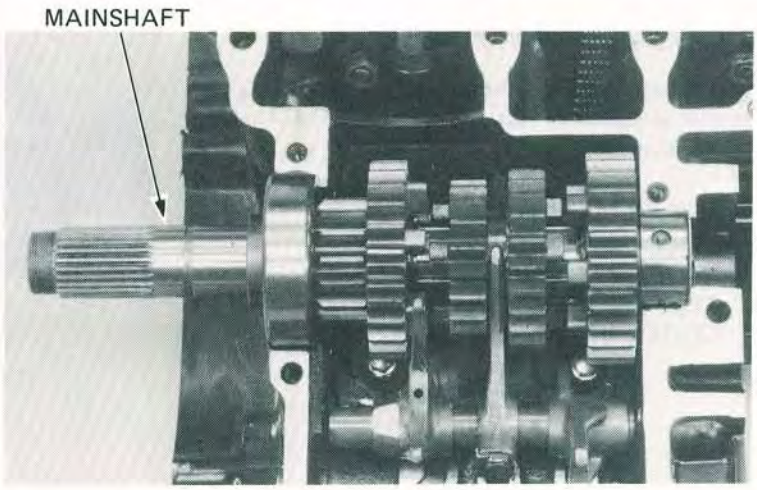
Separate the crankcase (Section 11).
Remove the dowel pins from the crankcase.
Inspect the backlash of each gear.

SERVICE LIMIT:

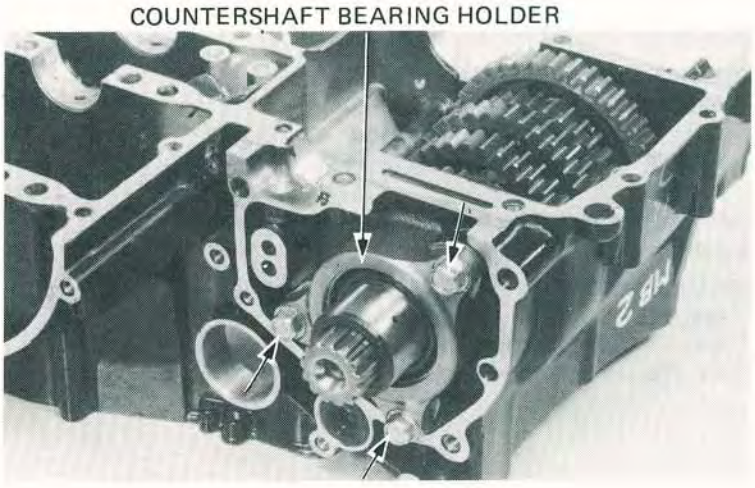
1st:	**0.20 mm (0.008 in)**
2nd:	**0.17 mm (0.007 in)**
3rd, 4th, 5th:	**0.18 mm (0.007 in)**



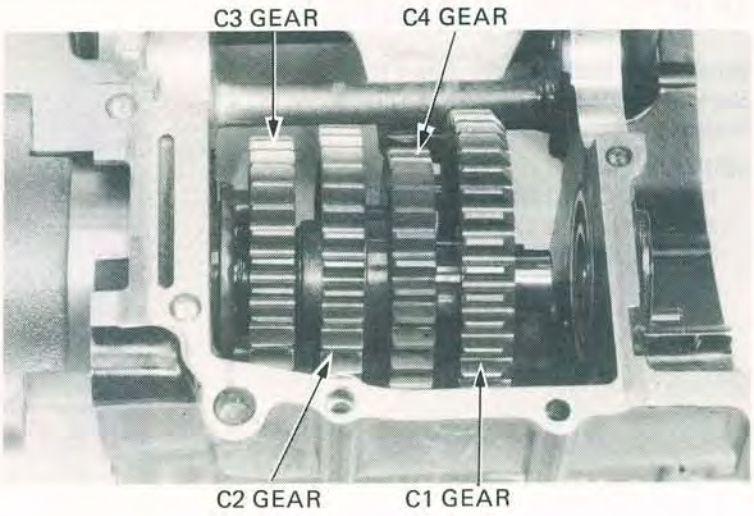
Remove the mainshaft.



Remove the countershaft bearing holder bolts.



Pull the countershaft out of the crankcase while removing C1, C4, C2, C3, and the spline washers and bushings.



TRANSMISSION INSPECTION

Check gear dogs, dog holes and gear teeth for excessive or abnormal wear, or evidence of insufficient lubrication.

Measure the I.D. of each gear.

SERVICE LIMIT:

M4, M5 gear:	**28.04 mm (1.104 in)**
C1 gear:	**26.04 mm (1.025 in)**
C2, C3 gear:	**31.04 mm (1.222 in)**

Measure the O.D. of the gear bushings.

SERVICE LIMIT:

M4, M5:	**27.94 mm (1.100 in)**
C1:	**25.94 mm (1.021 in)**
C2, C3:	**30.93 mm (1.218 in)**

Calculate the clearance between the gear bushings and the gears.

SERVICE LIMIT:

M4, M5:	**0.10 mm (0.004 in)**
C1:	**0.10 mm (0.004 in)**
C2, C3:	**0.11 mm (0.004 in)**

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Measure the I.D. of the gear bushings.

SERVICE LIMIT:

M4 gear bushing:	**25.04 mm (0.986 in)**
C1 gear bushing:	**22.06 mm (0.869 in)**

Measure the O.D. of the mainshaft and countershaft.

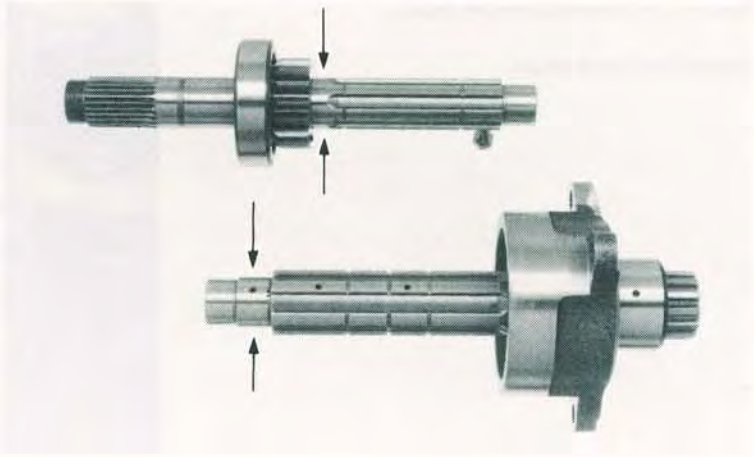
SERVICE LIMIT:

Mainshaft (at M4 bushing):
24.92 mm (0.981 in)
Countershaft (at C1 bushing):
21.96 mm (0.865 in)

Calculate the clearance between the bushing and shaft.

SERVICE LIMIT:

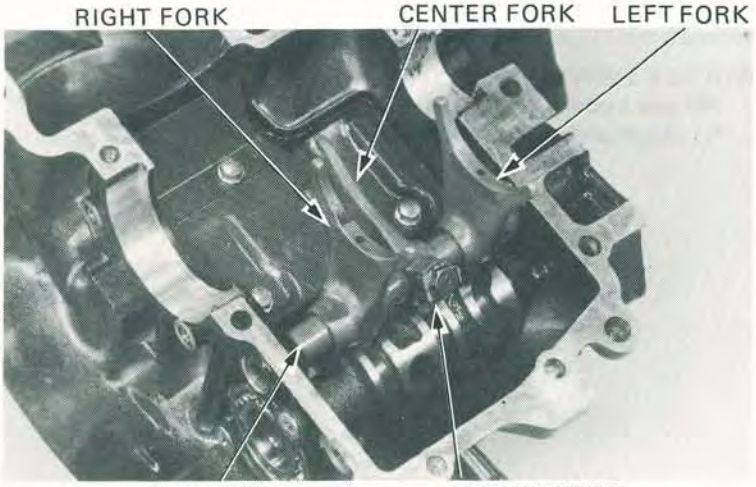
M4 bushing-to-shaft:	**0.06 mm (0.002 in)**
C1 bushing-to-shaft:	**0.10 mm (0.004 in)**



SHIFT FORK AND SHIFT DRUM

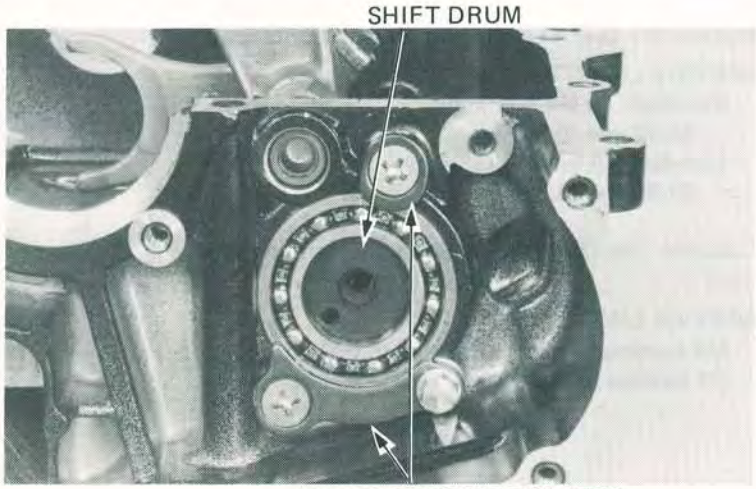
REMOVAL

Bend the lock washer tab down and remove the center fork mounting bolt.
Remove the shift fork shaft and shift forks.



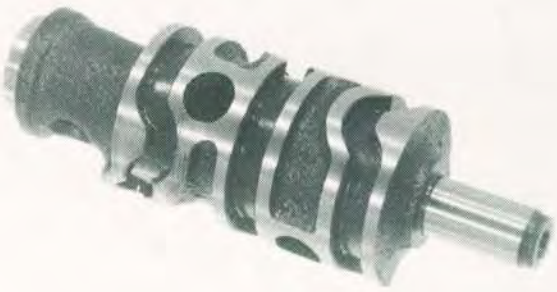
Remove the bearing stopper plates.

Remove the shift drum.



GEAR SHIFT DRUM AND SHIFT FORK INSPECTION

Inspect the shift drum end for scoring, scratches, or evidence of insufficient lubrication.
Check the shift drum grooves for damage.



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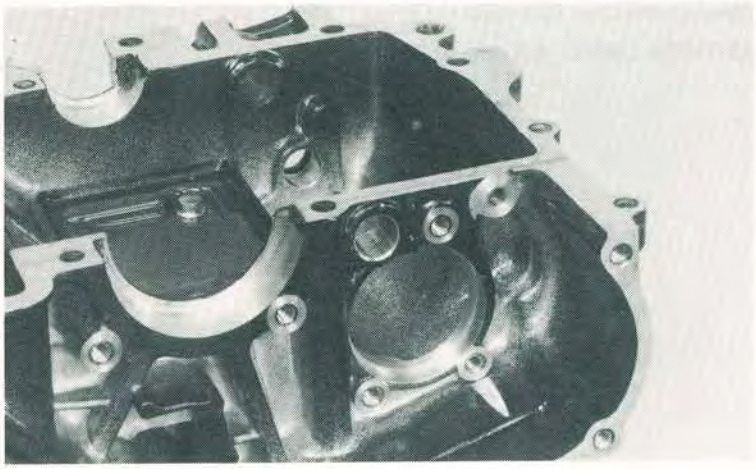
Inspect the shift drum hole and shift fork shaft hole for scoring or scratches.



Measure the shift fork shaft O.D. at right and left shift fork surfaces.
Check for scratches, scoring or evidence of insufficient lubrication.

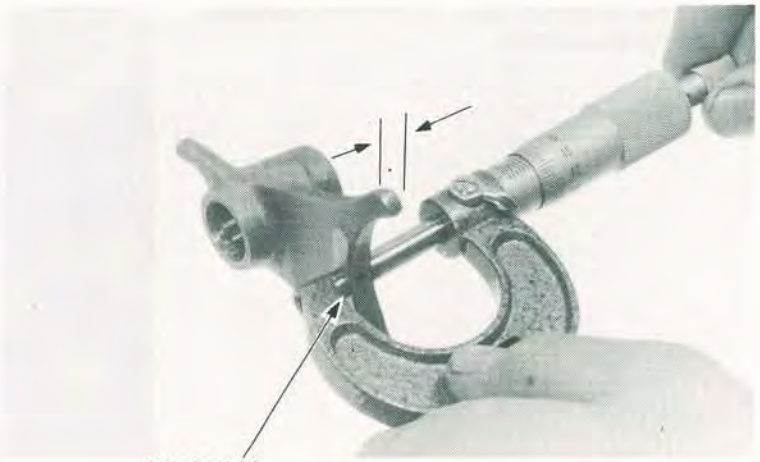
SERVICE LIMIT: 13.90 mm (0.547 in)

Measure the right and left shift fork I.D.

SERVICE LIMITS:
I.D. (right and left fork): 14.04 mm (0.553 in)

Measure the shift fork claw thickness.

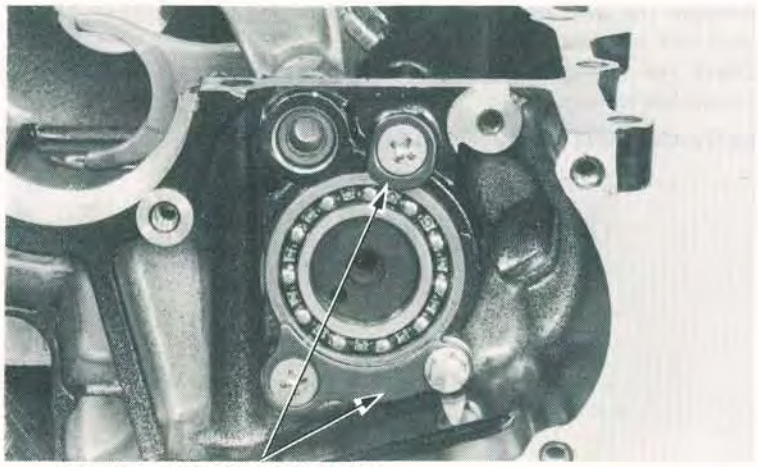
SERVICE LIMIT: 6.1 mm (0.24 in)



'83 ONLY

INSTALLATION

Install the shift drum.
Apply a locking agent to the screw threads and install the bearing stopper plates.



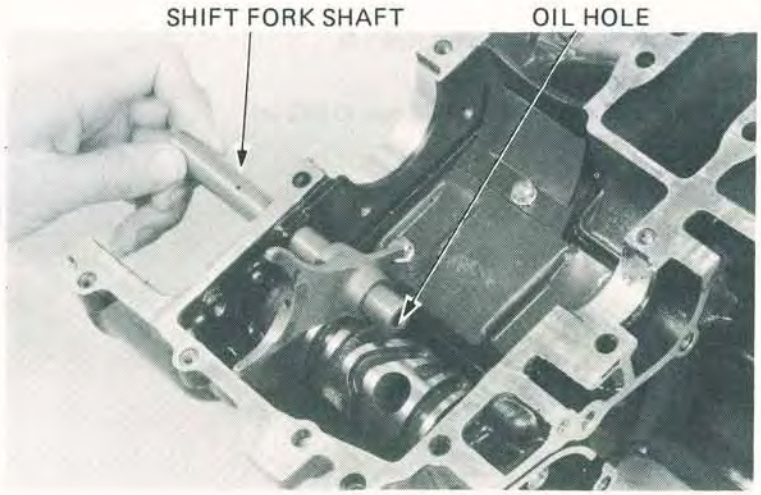
BEARING STOPPER PLATES

Install the shift fork shaft so that the oil hole end is toward the right.

Install the shift forks onto the shaft.
Install a new lock washer and the bolt to the center shift fork and tighten the bolt.

TORQUE: 16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb)

Bend up the lock washer's tabs.



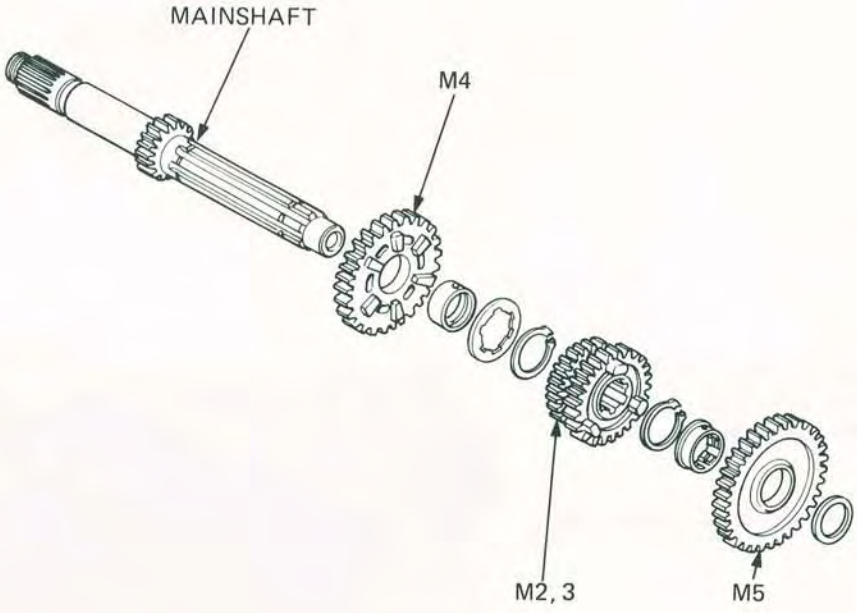
Date of Issue: October, 1983

TRANSMISSION ASSEMBLY

MAINSHAFT

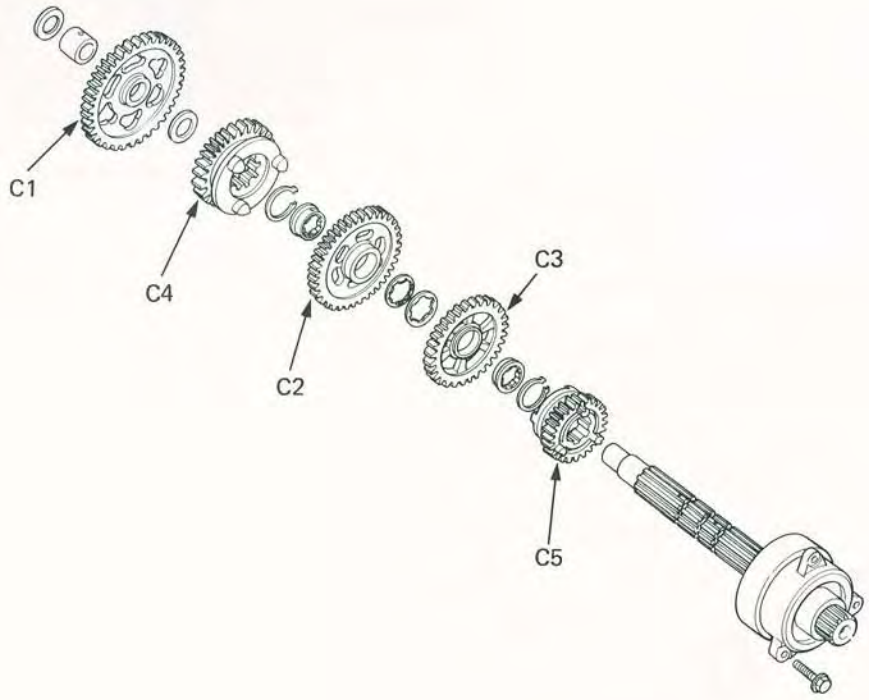
Install the mainshaft bearing with the special tools.

Check the gears for freedom of movement or rotation on the shaft.
Check that the snap rings are seated in the grooves.



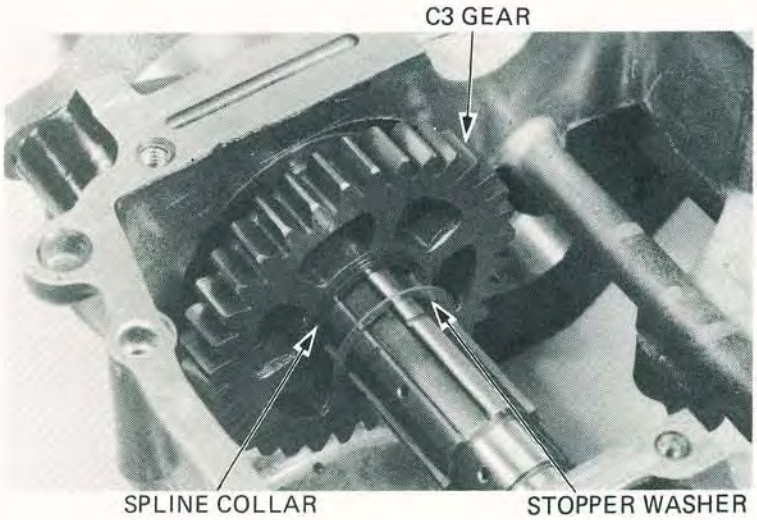
COUNTERSHAFT

Before installing the countershaft in the crankcase, install the C5 gear and snap ring.



Install the C3 gear and spline collar.
Install the stopper washer while aligning the tab of the stopper washer with the groove in the spline collar.

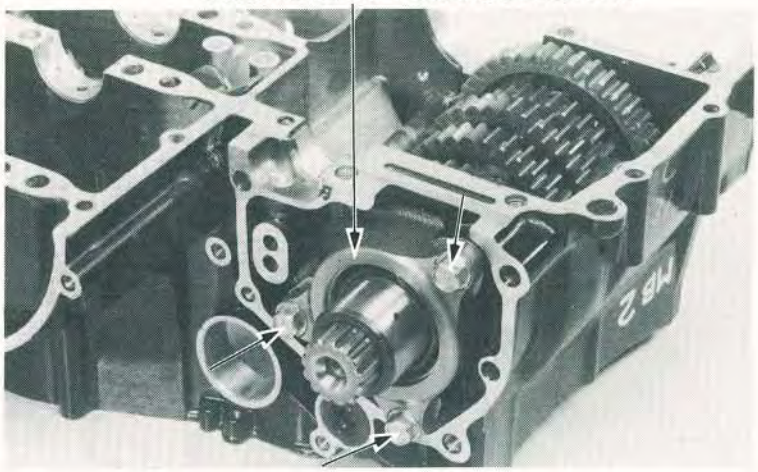
Assemble the C2, C4 and C1 gears, washers and collars.



Date of Issue: January, 1983

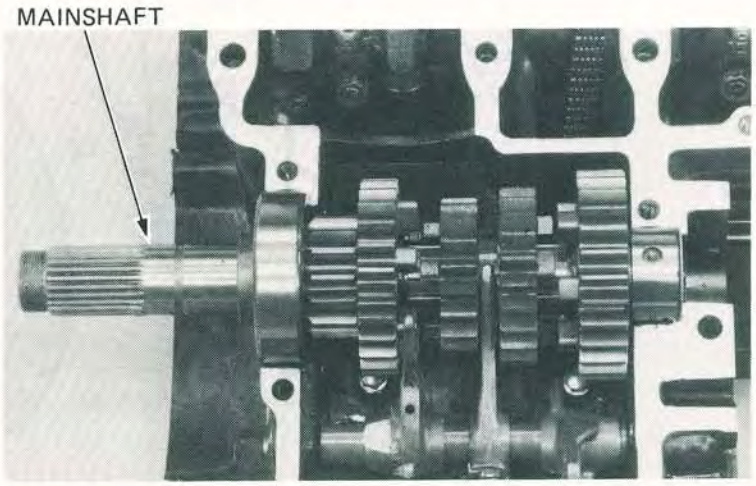
Install the countershaft bearing holder bolts and tighten them.

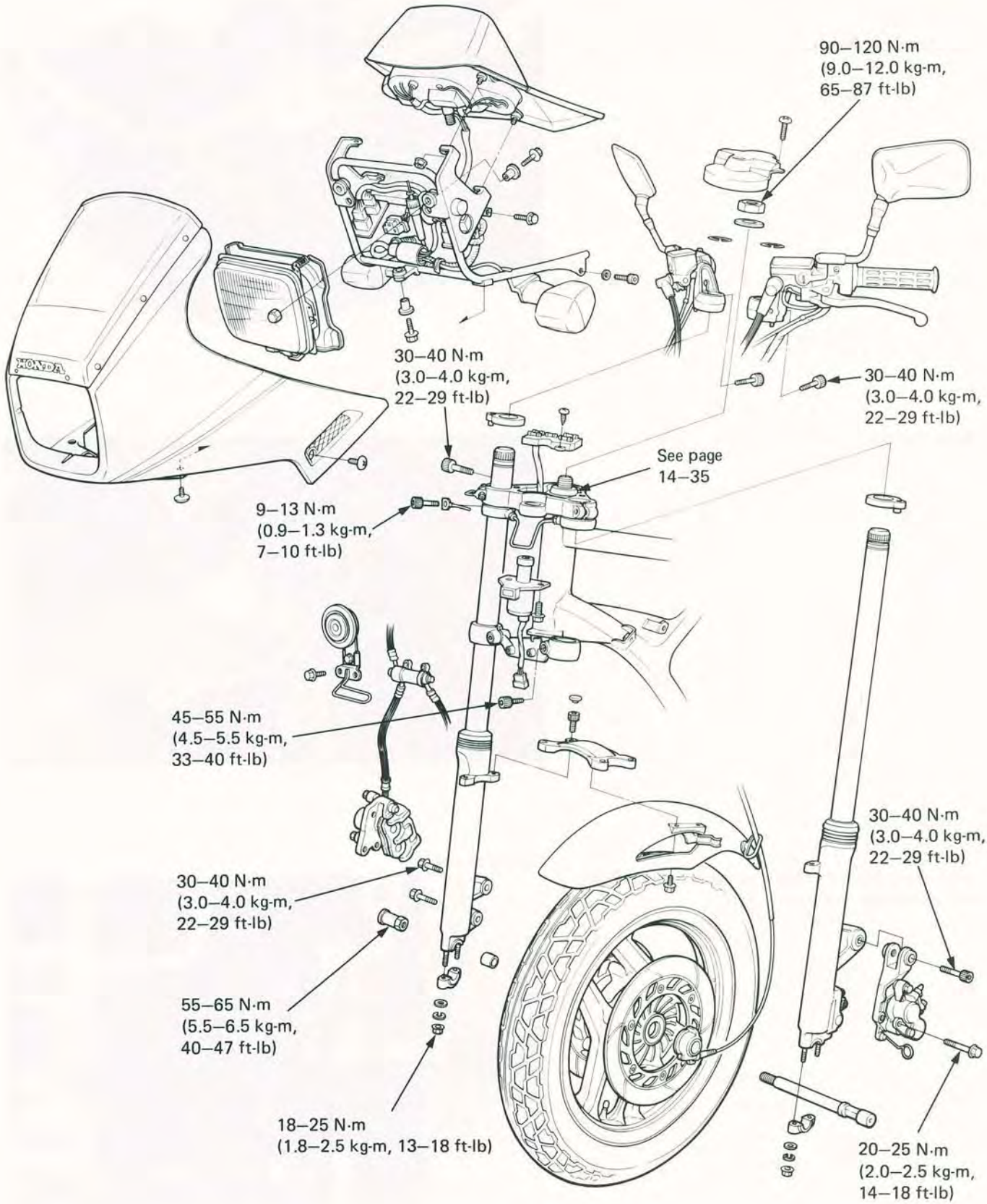
TORQUE: 21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)



Check that the oil orifice is clear.

Install the mainshaft, then reassemble the upper and lower crankcase (see Section 11).





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14. FRONT WHEEL/SUSPENSION

SERVICE INFORMATION

GENERAL

A jack or other support is required to support the front of the motorcycle when your are working on the front wheel or fork.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Axle shaft runout		—	0.2 mm (0.01 in)
Front wheel rim runout	Radial	—	2.0 mm (0.08 in)
	Axial	—	2.0 mm (0.08 in)
Fork spring free length		479.3 mm (18.87 in)	470 mm (18.5 in)
Fork tube runout		—	0.2 mm (0.01 in)
Front fork fluid capacity	Right	VF750F: 360 cc (12.2 oz), VF700F: 350 cc (11.9 oz) After '84 VF700F: 350 cc (11.9 oz)	—
	Left	VF750F: 380 cc (12.8 oz), VF700F: 370 cc (12.5 oz) After '84 VF700F: 375 cc (12.7 oz)	—
Front fork air pressure		0—40 kPa (0—0.4 kg/cm², 0—6 psi)	—

TORQUE VALUES

Steering stem nut	90—120 N·m (9.0—12.0 kg-m, 65—87 ft-lb)
Steering bearing adjustment nut	'83: 10—12 N·m (1.0—1.2 kg-m, 7—9 ft-lb) After '83: 19—23 N·m (1.9—2.3 kg-m, 14—17 ft-lb)
Fork bridge pinch bolt	30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)
Front axle holder	18—25 N·m (1.8—2.5 kg-m, 13—18 ft-lb)
Front axle nut	55—65 N·m (5.5—6.5 kg-m, 40—47 ft-lb)
Fork top pinch bolts	9—13 N·m (0.9—1.3 kg-m, 7—10 ft-lb)
Fork bottom pinch bolts	45—55 N·m (4.5—5.5 kg-m, 33—40 ft-lb)
Handlebar pinch bolts	30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)
Front brake caliper mount bolts	30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)
Anti-dive piston pin bolt	20—25 N·m (2.0—2.5 kg-m, 14—18 ft-lb)
Front brake disc	35—40 N·m (3.5—4.0 kg-m, 25—29 ft-lb)

TOOLS

Special

Hex. wrnech, 6 mm	07917–3230000 or equivalent
Snap ring pliers	07914–3230001 or equivalent in U.S.A.
Fork seal driver	07947–4630100
Steering stem socket	07916–3710100
Bearing race remover	07946–3710500
Ball race remover	07953–4250002
Steering stem driver	07946–MB00000 or– Steering stem driver 07946–3710601 Attachment 07964–MB00200

Common

Driver	07749–0010000
Attachment, 42 x 47 mm	07746–0010300
Pilot, 15 mm	07746–0040300
Lock nut wrench, 30 x 32 mm	07716–0020400 or equivalent in U.S.A.
Extension	07716–0020500 or equivalent in U.S.A.
Attachment, 52 x 55 mm	07746–0010400
Bearing remover shaft	07746–0050100 or equivalent in U.S.A.
Bearing remover head, 15 mm	07746–0050400 or equivalent in U.S.A.

TROUBLESHOOTING

Hard steering
1. Steering bearing adjustment nut too tight
2. Faulty steering stem bearings
3. Damaged steering stem bearings
4. Insufficient tire pressure

Steers to one side or does not track straight
1. Bent forks
2. Bent front axle
3. Wheel installed incorrectly

Front wheel wobbling
1. Bent rim
2. Worn front wheel bearings
3. Faulty tire
4. Axle nut tightened improperly

Soft suspension
1. Weak fork springs
2. Insufficient fluid in forks
3. Fork air pressure incorrect

Hard suspension
1. Incorrect fluid weight in forks
2. Fork air pressure incorrect
3. Bent fork tubes
4. Clogged fluid passage
5. Clogged anti-dive orifice

Front suspension noise
1. Worn slider or guide bushings
2. Insufficient fluid in forks
3. Loose front fork fasteners
4. Lack of grease in speedometer gearbox

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HEADLIGHT

REMOVAL/INSTALLATION

Remove the fairing.

FAIRING

Remove the headlight rim and headlight by removing the three screws.

Disconnect the headlight coupler.

Install the headlight in the reverse order of removal.

Check the headlight aim and adjust it if necessary (page 3-17).

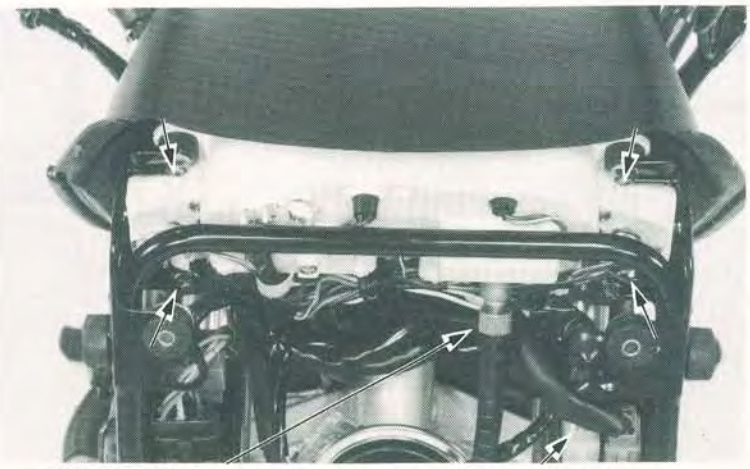
INSTRUMENTS

REMOVAL

Remove the fairing.
Remove the headlight with its bracket by removing the mount bolt and nuts.

Disconnect the instrument wire coupler and the speedometer cable.

Remove the mount nuts and remove the instrument assembly from the bracket.

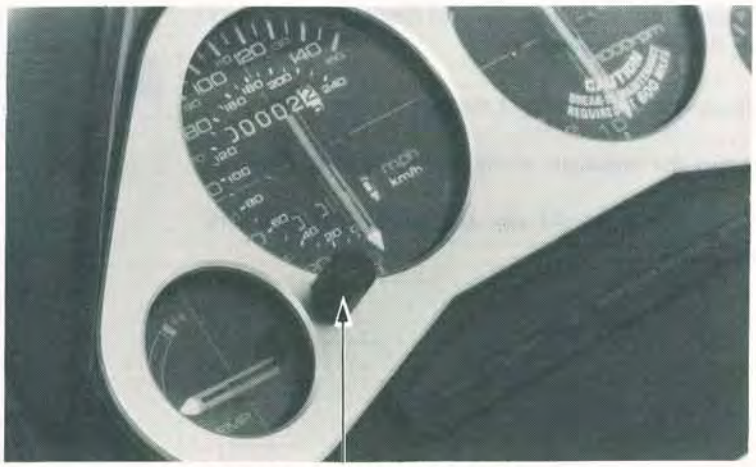


SPEEDOMETER CABLE

INSTRUMENT WIRE COUPLER

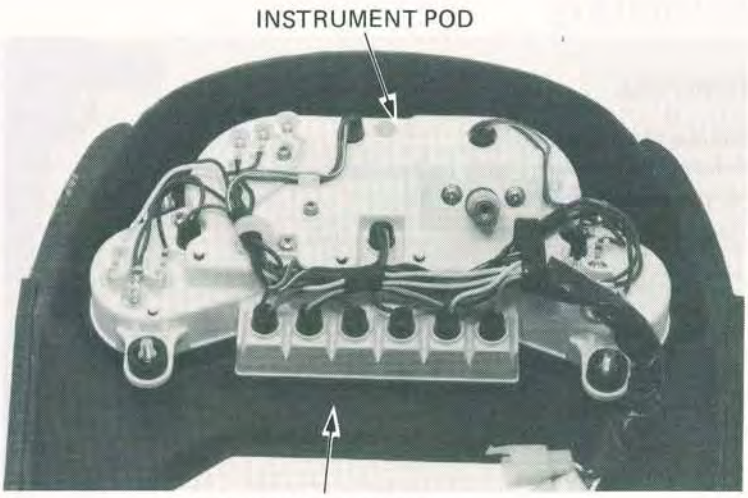
DISASSEMBLY

Remove the odometer reset knob.



ODOMETER RESET KNOB

Remove the instrument pod from the instrument panel.
Remove the instrument bulb sockets.
Replace any burnt bulbs.
If the bulb does not light, inspect the wiring for an open or short circuit.



INSTRUMENT POD

INSTRUMENT PANEL

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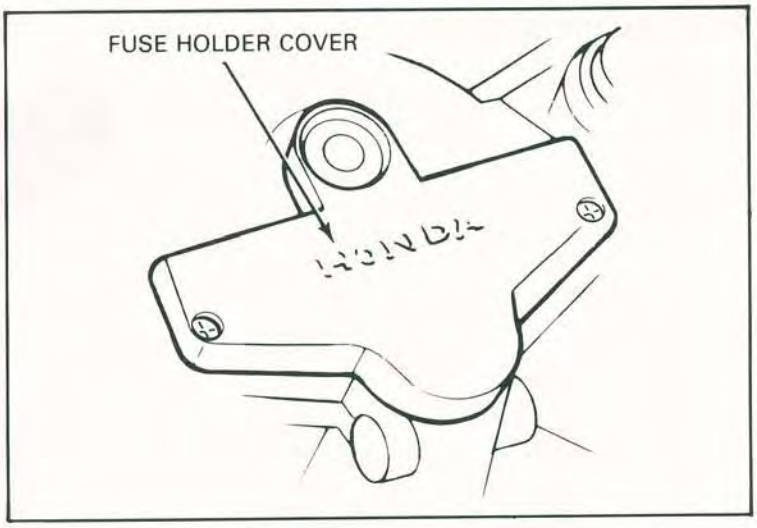
INSTRUMENT ASSEMBLY/
INSTALLATION

Assemble and install the instruments in the reverse order of disassembly and removal.

FUSE HOLDER REPLACEMENT

Remove the headlight bracket (page 14-3).
Disconnect the fuse holder wire coupler.
Remove the fuse holder cover.



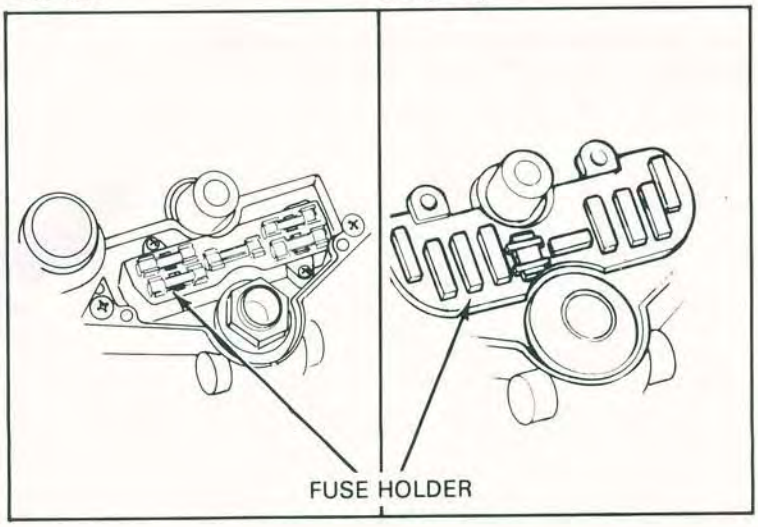
Remove the two attaching screws and remove the fuse holder from the fork bridge.

Install the fuse holder in the reverse order of removal.

NOTE

> Be sure to rout the fuse holder wire properly (pages 1-10 thru 1-12).

'83-'84: After '84

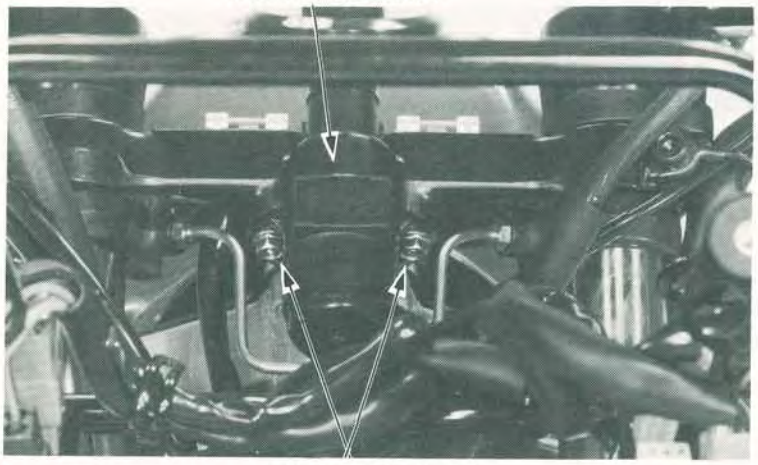


IGNITION SWITCH

REMOVAL/INSTALLATION

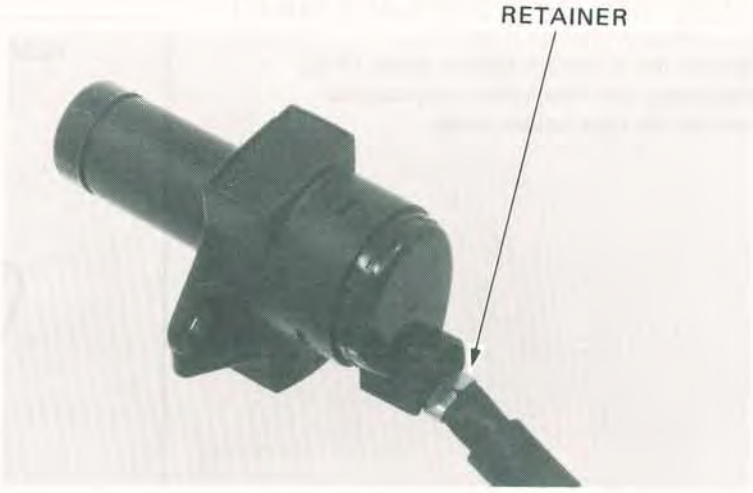
Remove the headlight and the instruments (page 14-3).
Remove the fuse holder cover.
Disconnect the ignition switch wire coupler.
Remove the ignition switch mounting bolts, and remove the ignition switch.

Install the ignition switch in the reverse order of removal.



DISASSEMBLY/ASSEMBLY

Pry open the retainer.



Insert the ignition key and turn it so it is partway between the ON and OFF detent positions.

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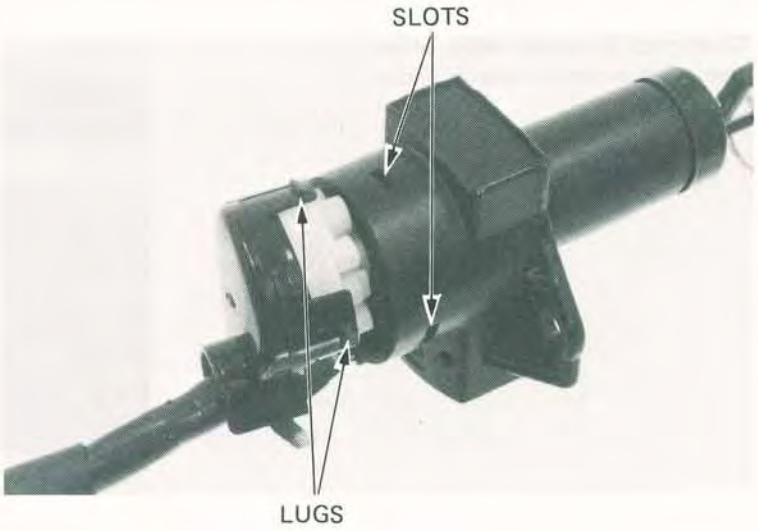
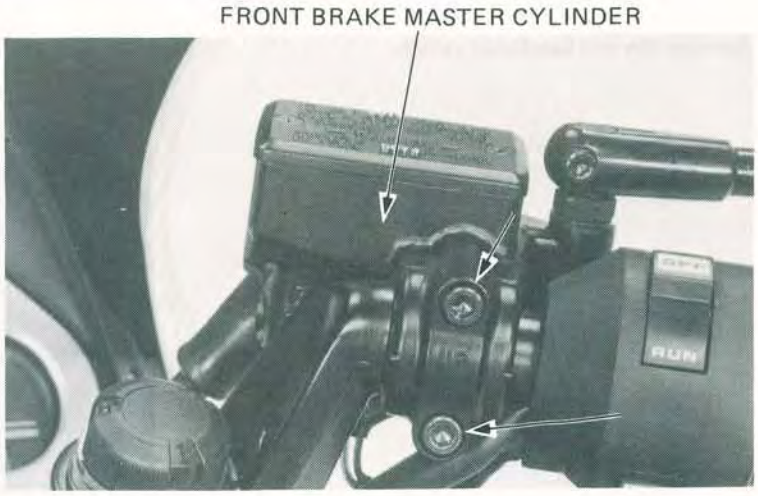
Push in the lugs, that are locked in the slots, then pull the contact base from the switch.
Assemble the ignition switch in the reverse order of disassembly.



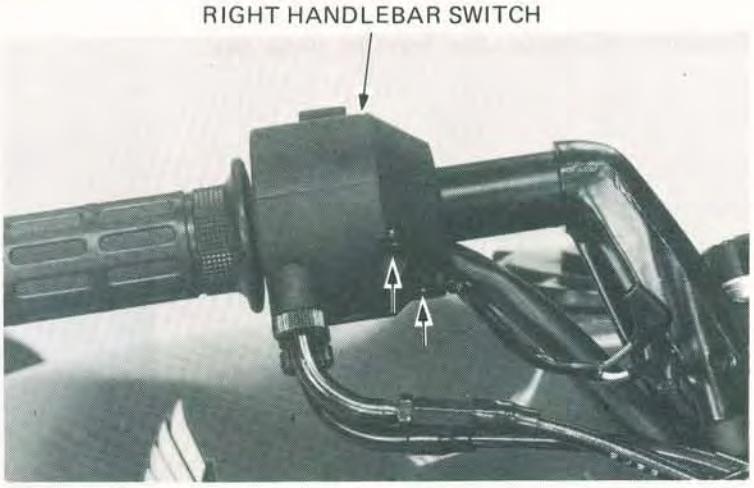
HANDLEBARS

REMOVAL

Disconnect the front brake switch wires.
Remove the front brake master cylinder.



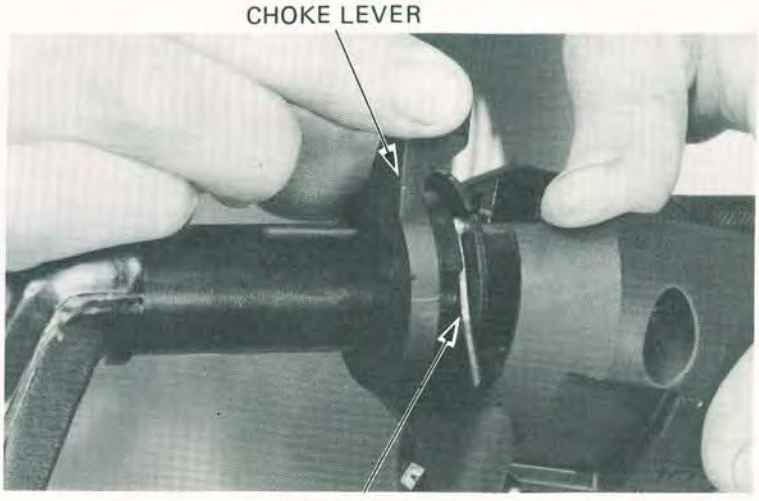
Remove the right handlebar switch.



Disconnect the clutch switch wires.
Remove the clutch master cylinder.

Remove the left handlebar switch.

Disconnect the choke cable from the choke lever.



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Remove the left and right handlebar retainer rings.
Loosen the left and right handlebar pinch bolts.
Remove the handlebars from the fork tubes.
Remove the throttle grip from the right handlebar.

INSTALLATION

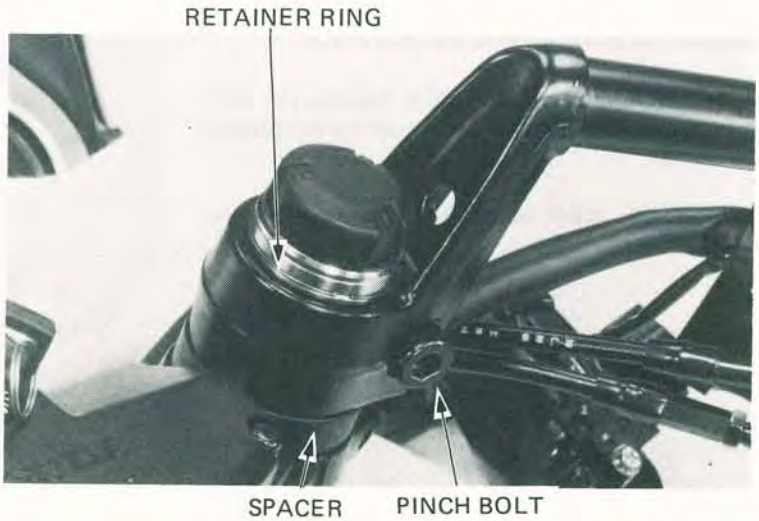
Apply grease to the throttle grip sliding surface and slide the throttle grip over the handlebar.

Install the handlebars onto the fork tubes and on the handlebar spacers, aligning the pin on the bottom of the handlebar with the hole in the spacer.

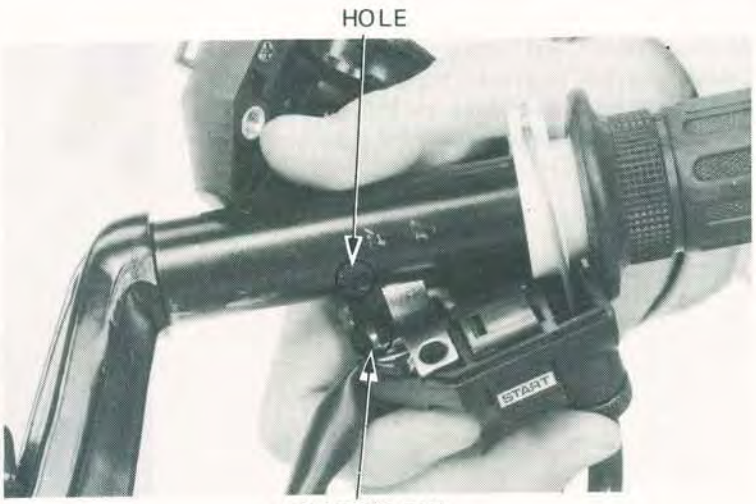
Tighten the handlebar pinch bolts.

TORQUE: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)

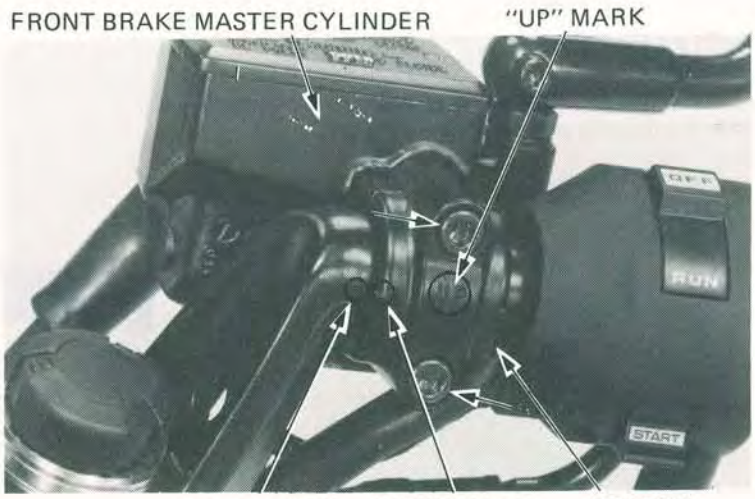
Install the handlebar retainer rings.



Align the right handlebar switch locating pin with the hole in the handlebar and install the right handlebar switch.
Install the top portion of the switch and tighten its screws.
Tighten the forward screw first, then tighten the rear screw.



Place the front brake master cylinder on the handlebar and install the master cylinder holder with the "UP" mark facing up.
Align the index mark on the holder with the punch mark on the handlebar, and tighten the upper bolt first then tighten the lower bolt.



Connect the choke cable to the choke lever.

Align the left handlebar switch locating pin with the hole in the handlebar and install the left handlebar switch.

Tighten the upper screw first, then tighten the lower screw.

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Place the clutch master cylinder on the handlebar and install the master cylinder holder with the "UP" mark facing up.
Align the index mark on the holder with the punch mark on the handlebar, and tighten the upper bolt

Connect the clutch switch wires.

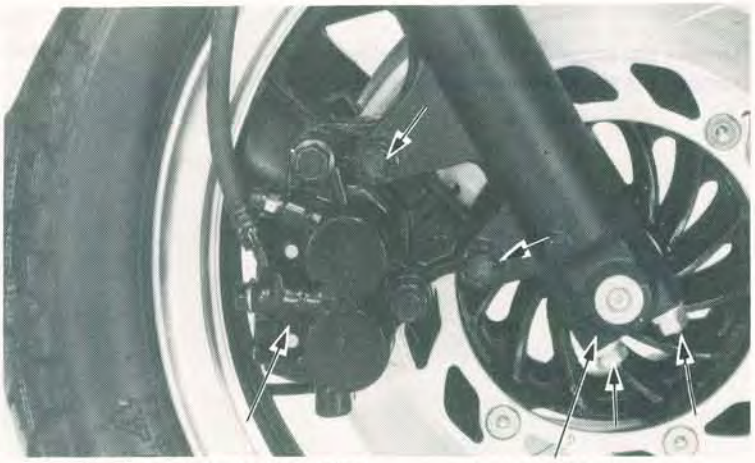
FRONT WHEEL

REMOVAL

Remove the right front brake caliper from the fork leg. Remove the right axle holder.

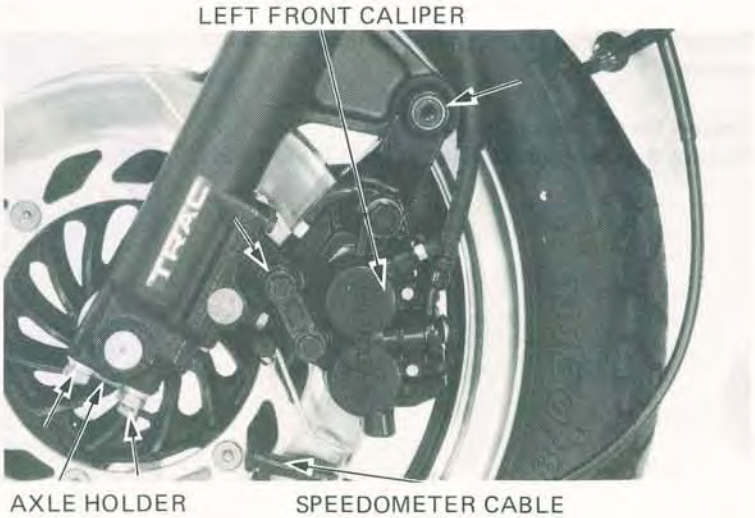
NOTE

> If you squeeze the front brake lever after the caliper is removed, the caliper piston will move out and make reassembly difficult.



Remove the speedometer cable set screw and disconnect the speedometer cable.
Remove the left front caliper from the fork leg and anti-dive piston case.

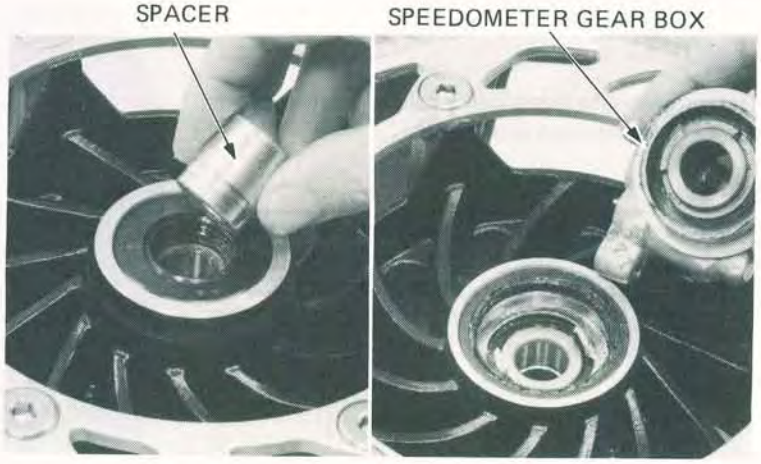
Remove the left axle holder.



DISASSEMBLY

Remove the front axle nut and axle.

Remove the spacer from the right side.
Remove the speedometer gear box from the left side.



Remove the left and right brake disc mounting bolts and discs.

Remove the dust seal from both sides.
Remove the speedometer ratainer from the left side.

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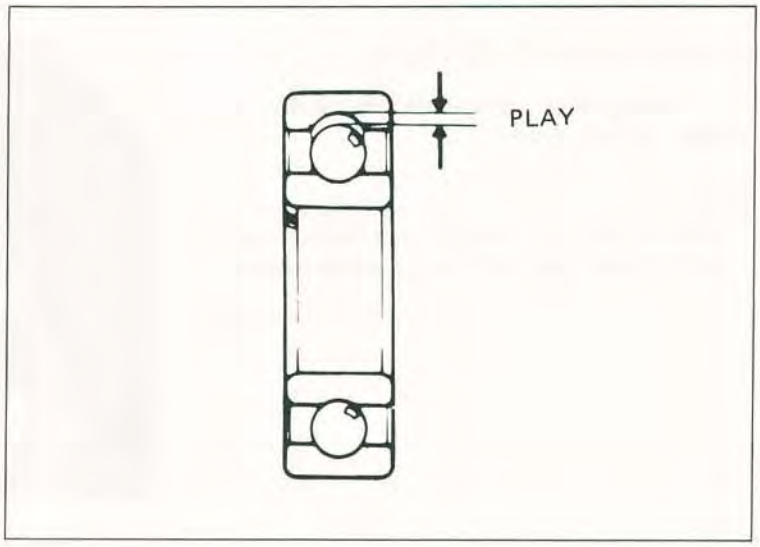
WHEEL BEARING INSPECTION

Check wheel bearing play by placing the wheel in a truing stand and spinning the wheel by hand. Replace the bearings with new ones if they are noisy or have excessive play.



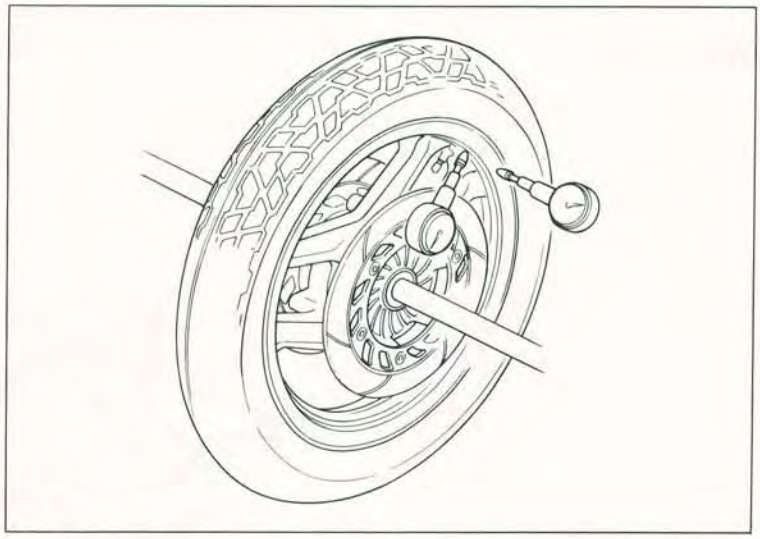
WHEEL INSPECTION

Check the rim runout by placing the wheel in a truing stand. Spin the wheel slowly and read the runout using a dial indicator.

SERVICE LIMITS:
RADIAL RUNOUT: 2.0 mm (0.08 in)
AXIAL RUNOUT: 2.0 mm (0.08 in)

NOTE

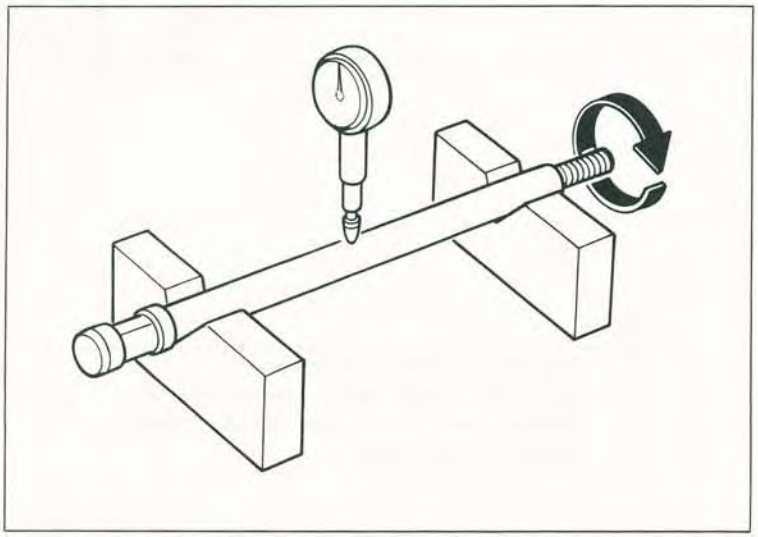
> The wheel cannot be repaired and must be replaced with a new one if the service limits are exceeded.



AXLE INSPECTION

Set the axle in V blocks and measure the runout.

SERVICE LIMIT: 0.2 mm (0.01 in)

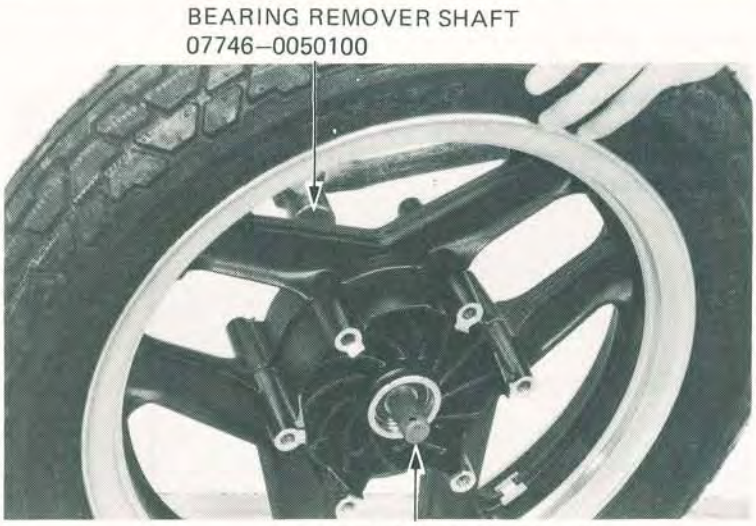


WHEEL BEARING REMOVAL

If the bearing need replacement, remove the bearings and distance collar.

NOTE

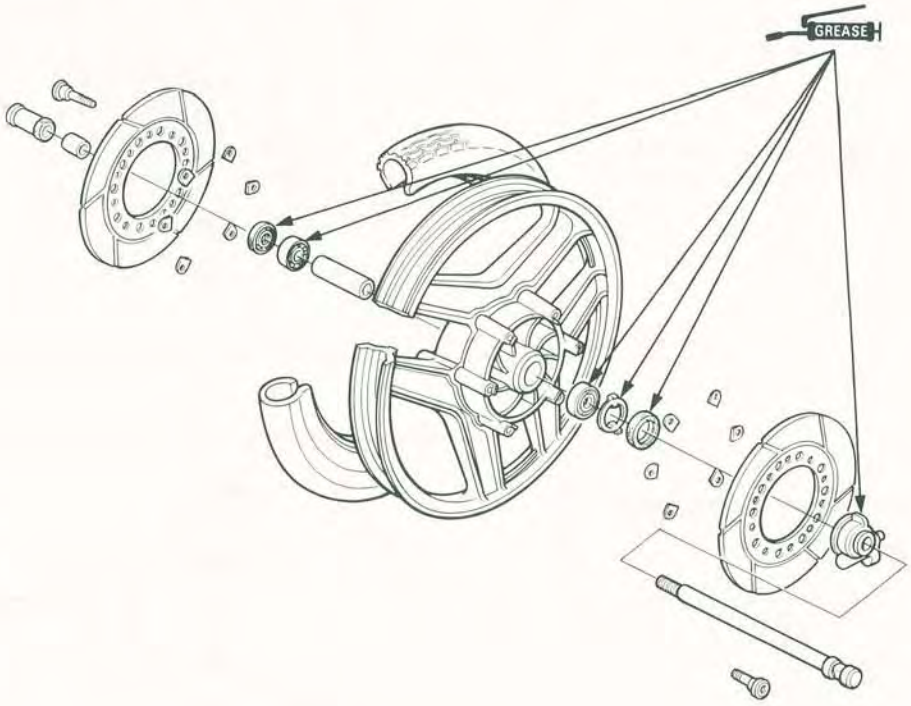
Never reinstall old bearings; once the bearings are removed, they must be replaced with new ones.



ASSEMBLY

WARNING

Do not get grease on the brake disc or stopping power will be reduced.



NOTE

- The cast wheel has no rim band.
- The front wheel uses a tubeless tire. For tubeless tire repair, refer to the Honda Tubeless Tire Manual.

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Pack all bearing cavities with grease.
Drive in the right bearing first, sealed side facing out, then press the distance collar into place.

NOTE

Be certain the distance collar is in position before installing the left bearing.

Drive in the left bearing squarely, making sure that it is fully seated and that the sealed side is facing out.

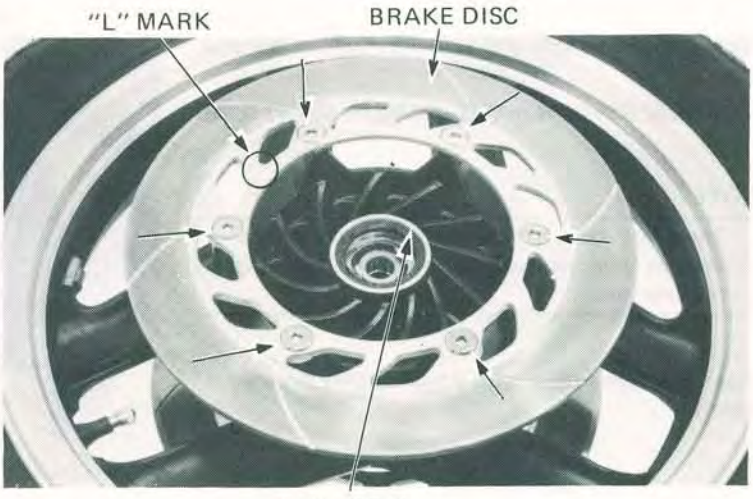
ATTACHMENT, 42 x 47 mm 07746–0010300
PILOT, 15 mm 07746–0040300

Install the speedometer gear retainer in the left side of the wheel hub, aligning its tangs with the slots in the hub.

Align

Install the left dust seal.
Place new gaskets on the disc mounting flange, then install the left disc with its "L" mark facing out.
Tighten the disc mounting bolts.

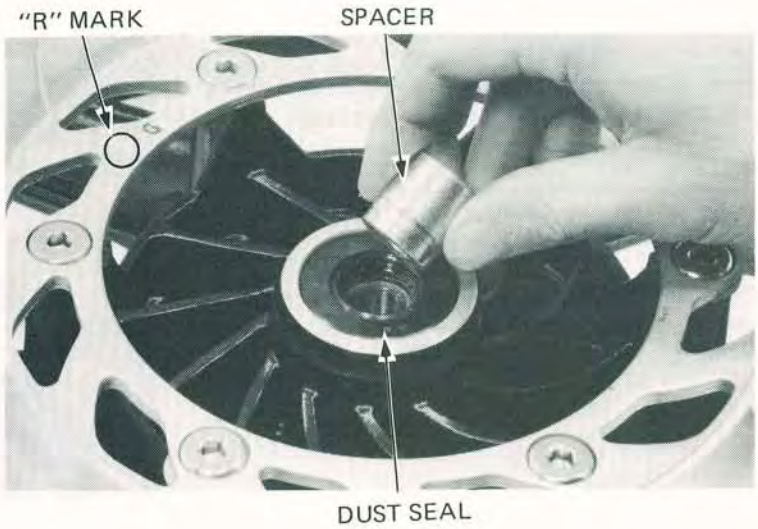
TORQUE 35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)



DUST SEAL

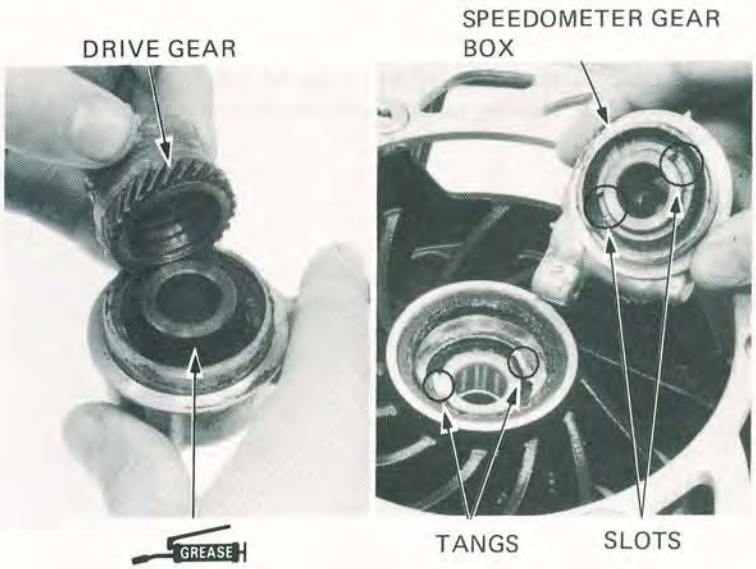
Install the right dust seal.
Place new gaskets on the disc mounting flange, then install the right disc with its "R" mark facing out. Tighten the mounting bolt to the same torque as left side.

Install the spacer.



Fill the speedometer gearbox with grease and install the plain washer and drive gear.

Install the speedometer gearbox in the wheel hub, aligning the tangs with the slots.



Install the front axle and axle nut. Tighten the axle nut.

TORQUE: 55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)

NOTE

> There are flats on the opposite end of the axle, so you can hold the axle while torquing the axle nut.

Clean the brake discs with a high quality degreasing agent.

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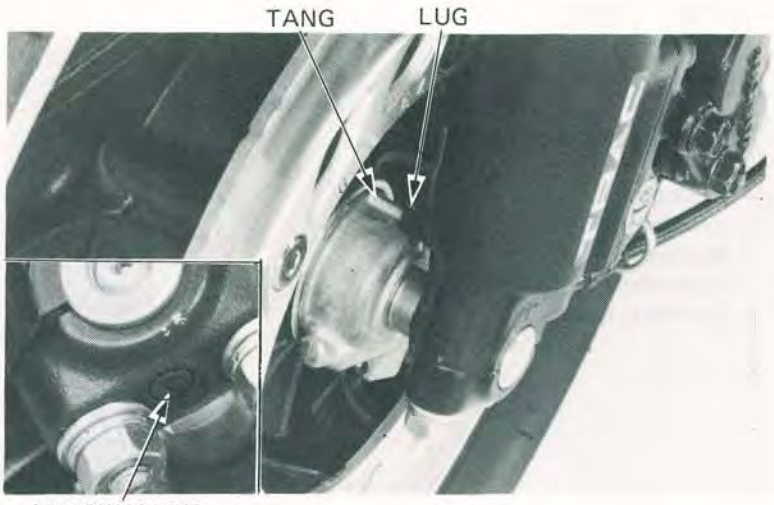
INSTALLATION

Position the wheel between the fork legs.
Lower the engine so the fork legs rest on the top of the axle.

Position the tang on the speedometer gear box against the lug on the left fork leg.

Install the axle holders with the arrow pointing forward.



Install the right front caliper and tighten the mount bolts.

TORQUE: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)

Tighten the right axle holder nuts to the specified torque, starting with the forward nut.

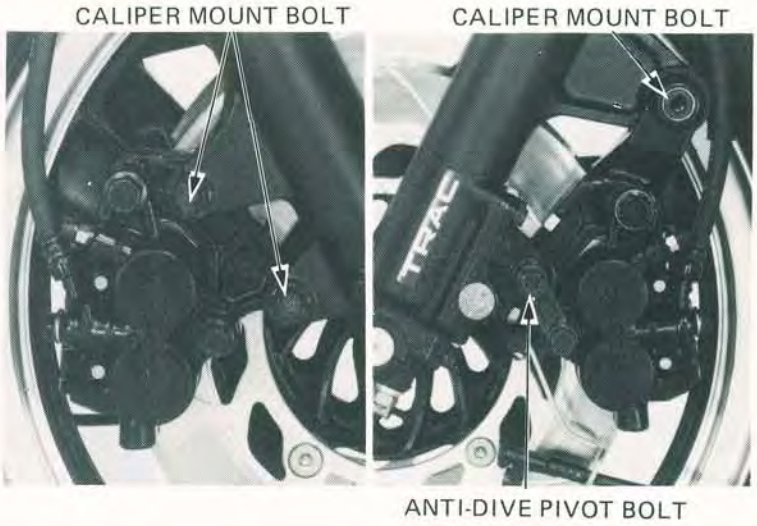
TORQUE: 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)

Install the left front caliper.
Tighten the anti-dive pivot bolt.

TORQUE: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

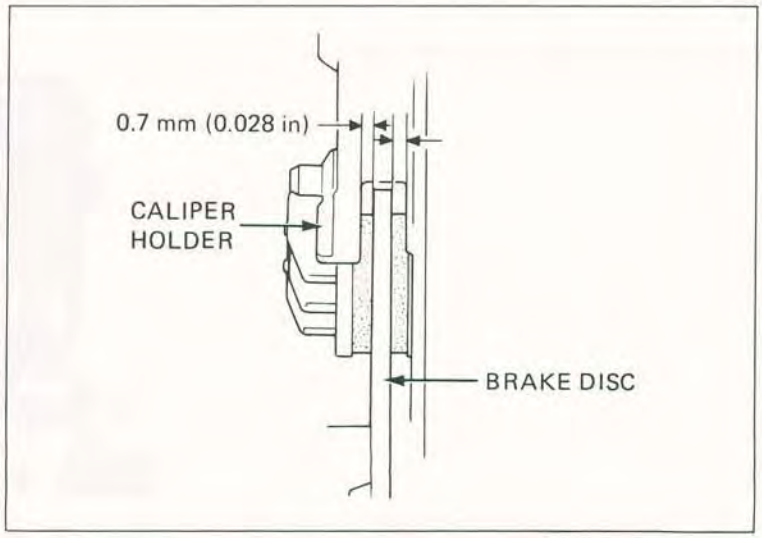
Tighten the caliper mount bolt.

TORQUE: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)



Connect the speedometer cable and secure it with the set screw.

Measure the clearance between each surface of the left brake disc and the left caliper holder with a 0.7 mm (0.028 in) feeler gauge. If the gauge inserts easily, tighten the forward left axle holder nut to the specified torque, then tighten the rear nut.
If the feeler gauge cannot be inserted easily, pull the left fork out or push it in until the gauge can be inserted.
After installing the wheel, apply the brake several times, then recheck both discs for caliper holder to disc clearance.



WARNING

Failure to provide adequate disc to caliper holder clearance may damage the brake disc and impair brake efficiency.

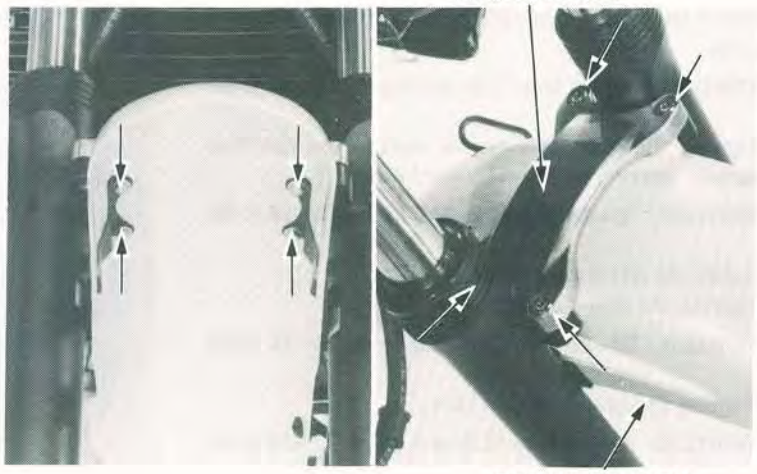
FRONT FORKS

REMOVAL

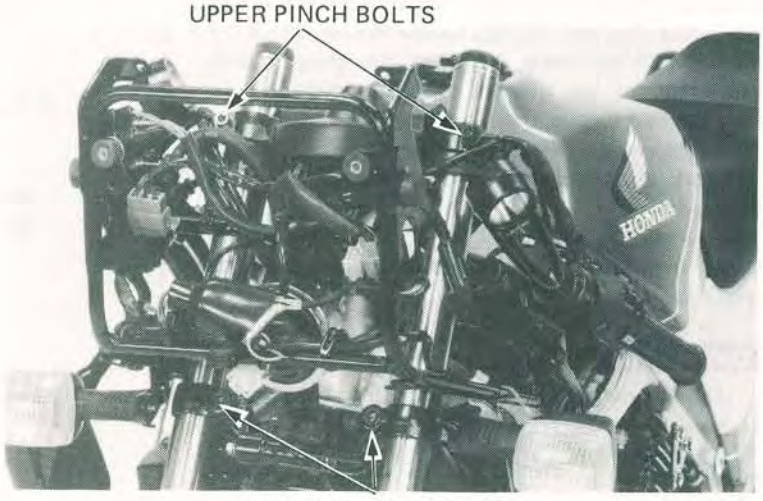
Remove the following parts:
- fairing.
- headlight.
- instruments.
- handlebars.
- front wheel.
- handlebar spacers.

HANDLEBAR SPACERS

Remove the front fender and fork brace.



Loosen the fork upper and lower pinch bolts.



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Pull each fork tube out of the top bridge.

NOTE

Because of the friction caused by the air joint O-rings, you'll have to turn the tubes while pulling down.

Remove the fork stop rings.

FORK STOP RING

Pull each fork tube out of the fork bottom bridge.

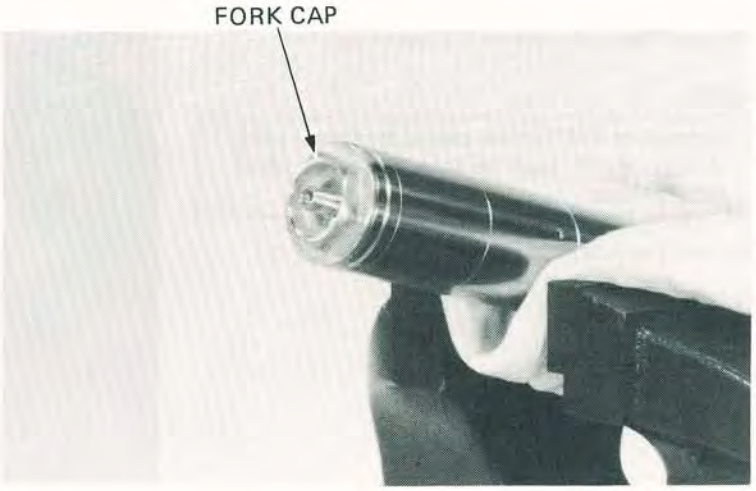
If replacement of the air joint is necessary, remove the two screws which attach the fork air joint to the top bridge.

DISASSEMBLY

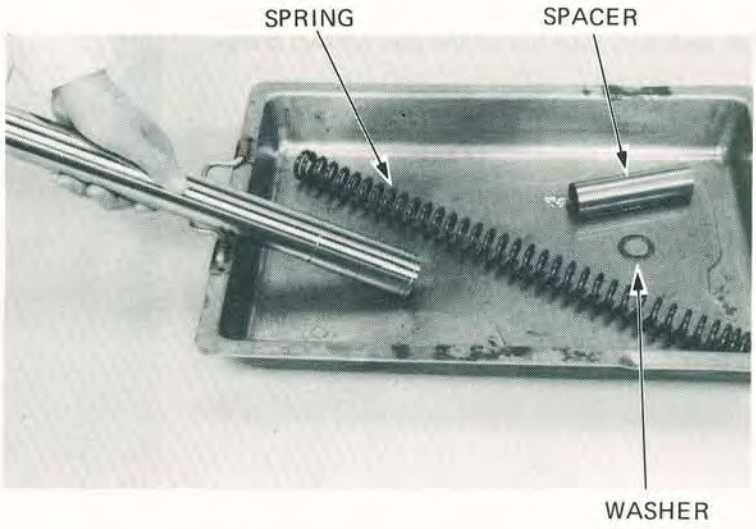
Hold the fork tube in a vise, with soft jaws or a shop towel and remove the fork tube cap.

CAUTION

Do not damage the sliding surface.



Remove the fork spring, spacer and washer.
Drain the fork fluid by pumping the fork up and down several times.



Hold the fork slider in a vise with soft jaws or a shop towel.
Remove the socket bolt with a hex wrench.

NOTE

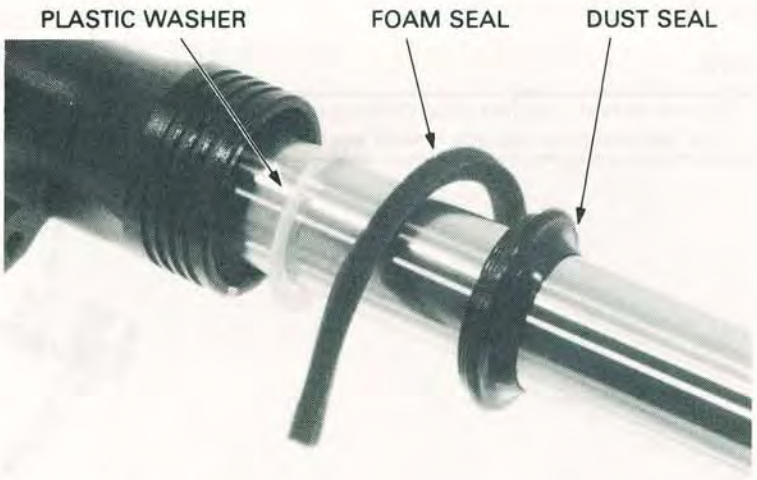
Temporarily install the spring and fork cap if difficulty is encountered in removing the socket bolt.

The piston and rebound spring can be removed from the right fork.

Date of Issue: January, 1983

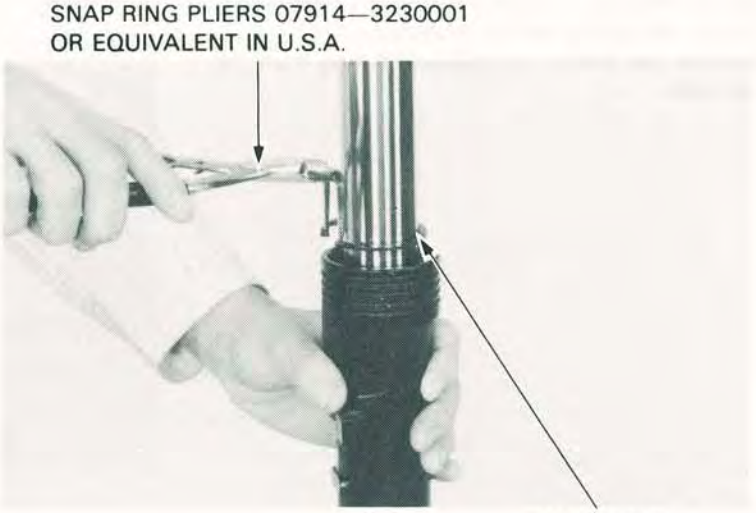
'83-'84:
Remove the dust seal, foam seal and plastic washer.
Discard the foam seal and plastic washer. Do not reuse or replace.

After '84:
Remove the dust seal.



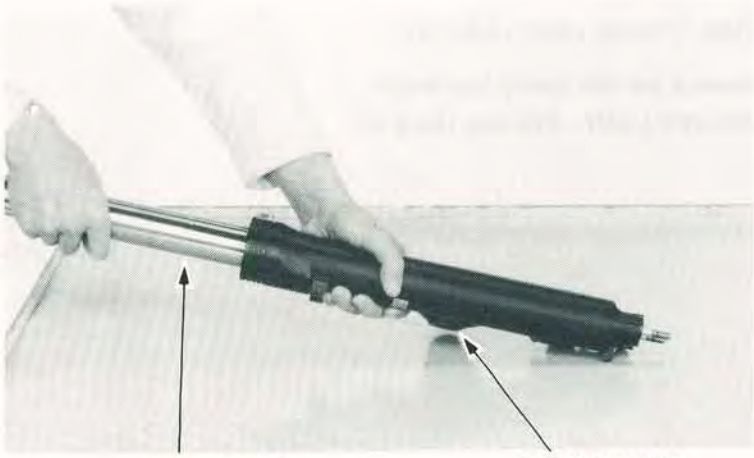
'83-'84 Shown

Remove the snap ring.



Pull the fork tube out until resistance from the slider bushing is felt. Then move it in and out, tapping the bushing lightly until the fork tube separates from the slider. The slider bushing will be forced out by the fork tube bushing.

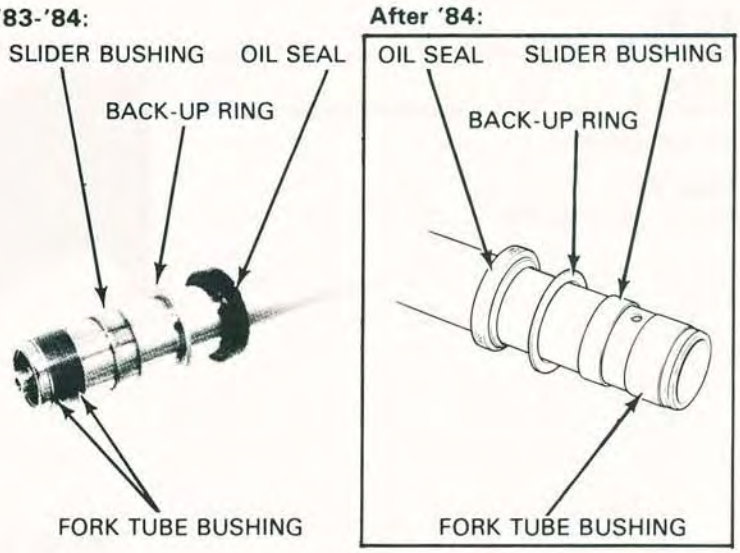
Remove the oil lock piece from inside the slider.



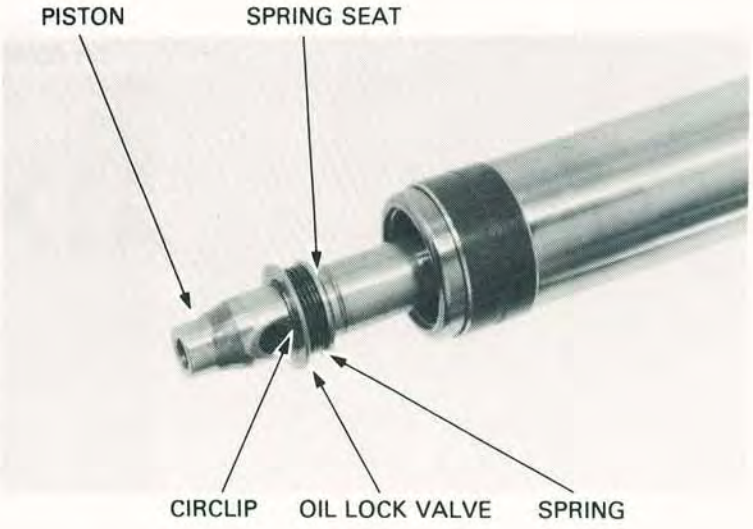
Remove the oil seal, back-up ring and slider bushing(s) from the fork tube.

NOTE

Do not remove the fork tube bushings unless it is necessary to replace it with a new one.



On the left fork, remove the circlip, oil lock valve, spring, and spring seat from the piston.
Remove the piston and rebound spring from the fork tube.

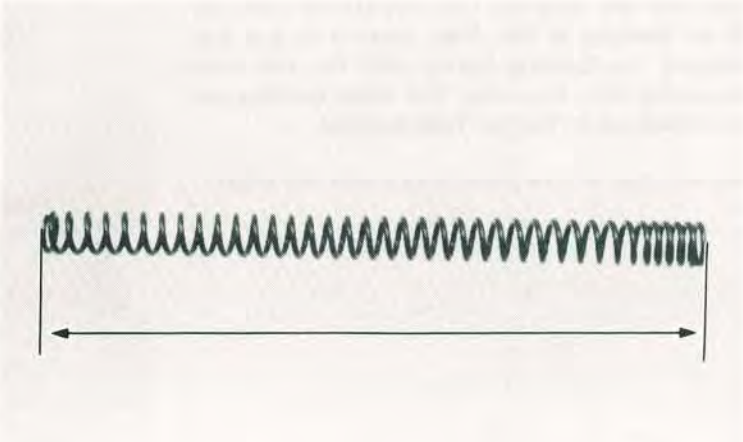


INSPECTION

FORK SPRING FREE LENGTH

Measure the fork spring free length.

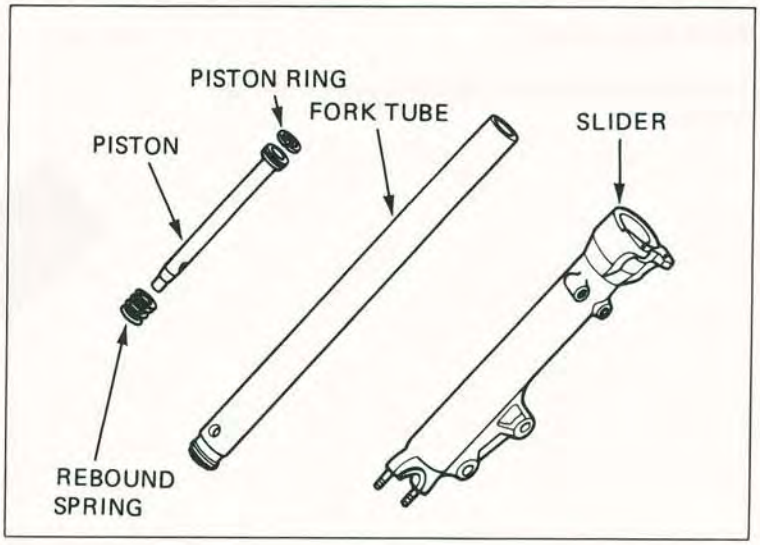
SERVICE LIMIT: 470 mm (18.5 in)



Date of Issue: October, 1984

FORK TUBE/FORK SLIDER/PISTON

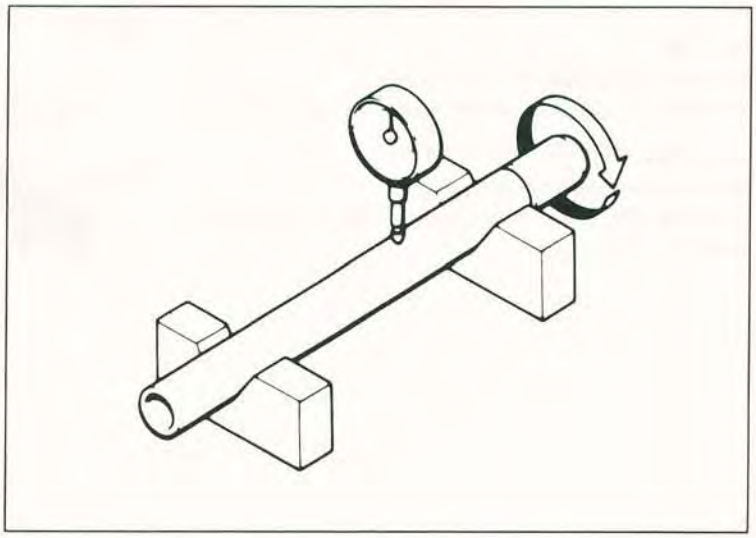
Check the fork tube, fork slider and piston for score marks, scratches, or excessive or abnormal wear. Replace any components which are worn or damaged.
Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.



FORK TUBE

Set the fork tube in V blocks and check its runout.

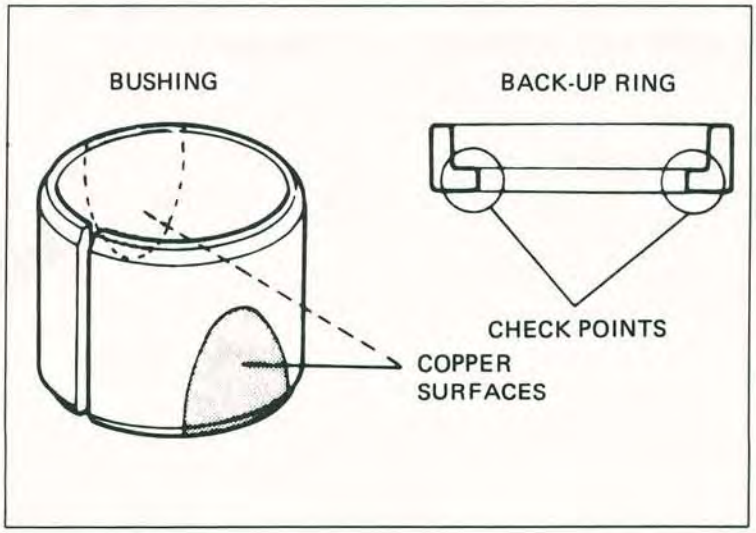
SERVICE LIMIT: 0.20 mm (0.008 in)



BUSHING/BACK-UP RING

Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

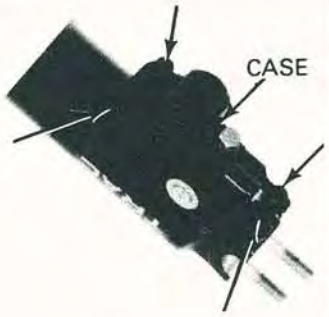
Check the back-up ring; replace it if there is any distortion at the points shown.



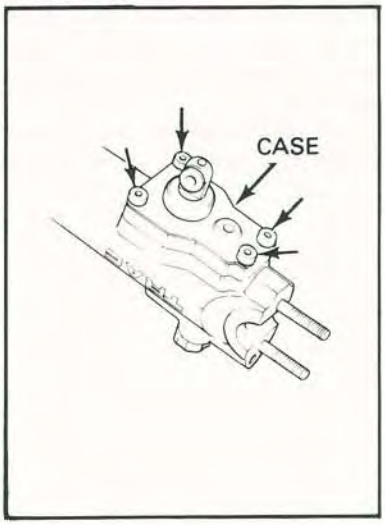
ANTI-DIVE CASE

Remove the four socket bolts and remove the anti-dive case.

'83-'84:



After '84:

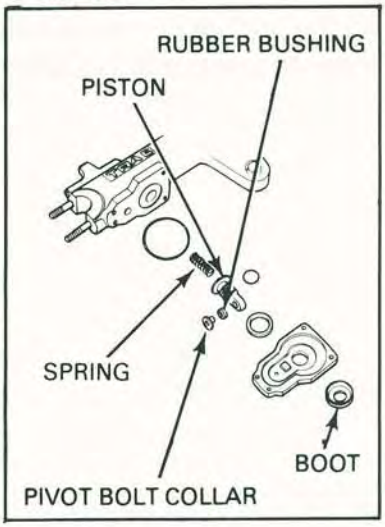


'83-'84:
Remove the piston and spring.
Remove the boots, pivot bolt collar and stop rubber.

After '84:
Remove the piston and spring.
Remove the boot, pivot bolt collar and rubber bushing.

'83-'84:

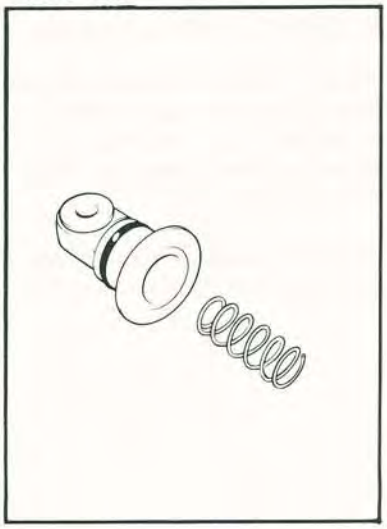
After '84:



Check the spring and piston for wear or damage.

'83-'84:

After '84:

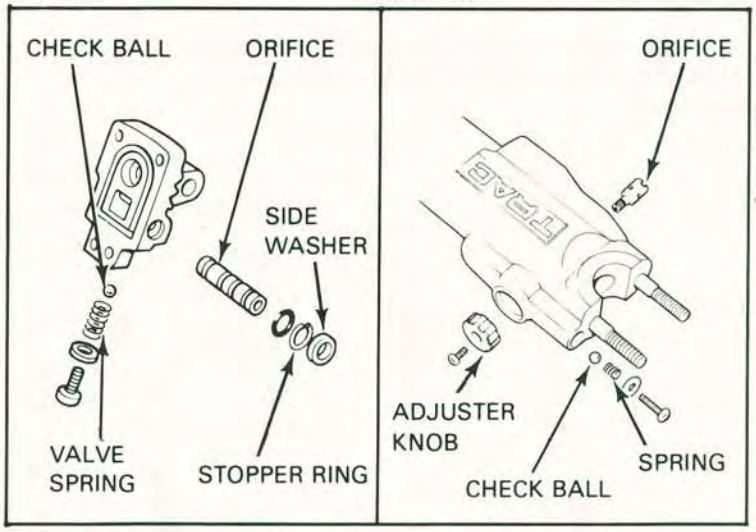


Date of Issue: October, 1984

'83-'84:
Remove left side washer, stopper ring and orifice. Check the orifice for clogging by applying compressed air. Also check the orifice for damage and replace if necessary
Remove the check valve setting screw, valve spring and check ball.

After '84:
Remove the screw attaching the anti-drive adjuster knob, knob and orifice.
Remove the check ball screw, spring and ball.
Check the orifice for clogging, scoring, excessive wear or damage.
Replace if necessary.

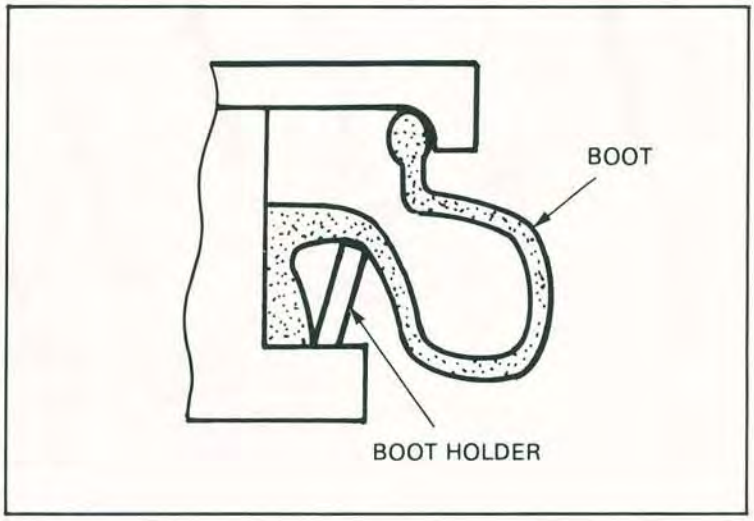
'83-'84: **After '84:**



Assemble the anti-dive case in the reverse order of disassembly.

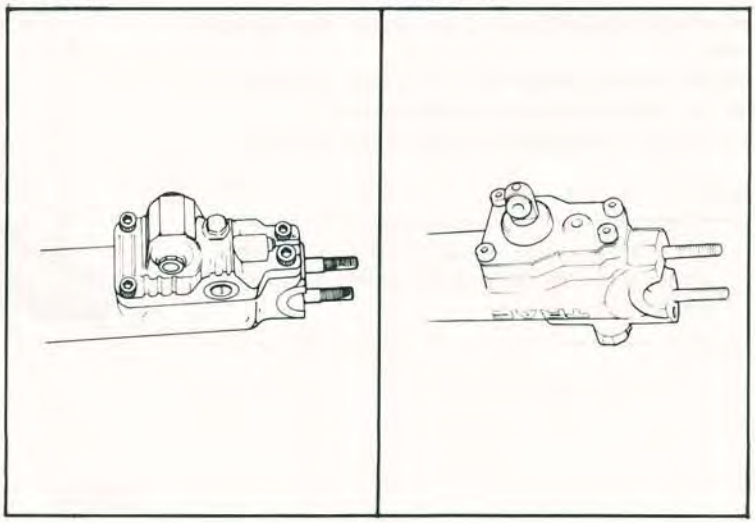
NOTE

Apply a Thread Lock Agent to the threads of the screws and socket bolts before assembly.
Apply ATF to the piston and piston O-ring.
Apply silicone grease to the pivot bolt collar.
Install the pivot bolt collar boot holder as shown.



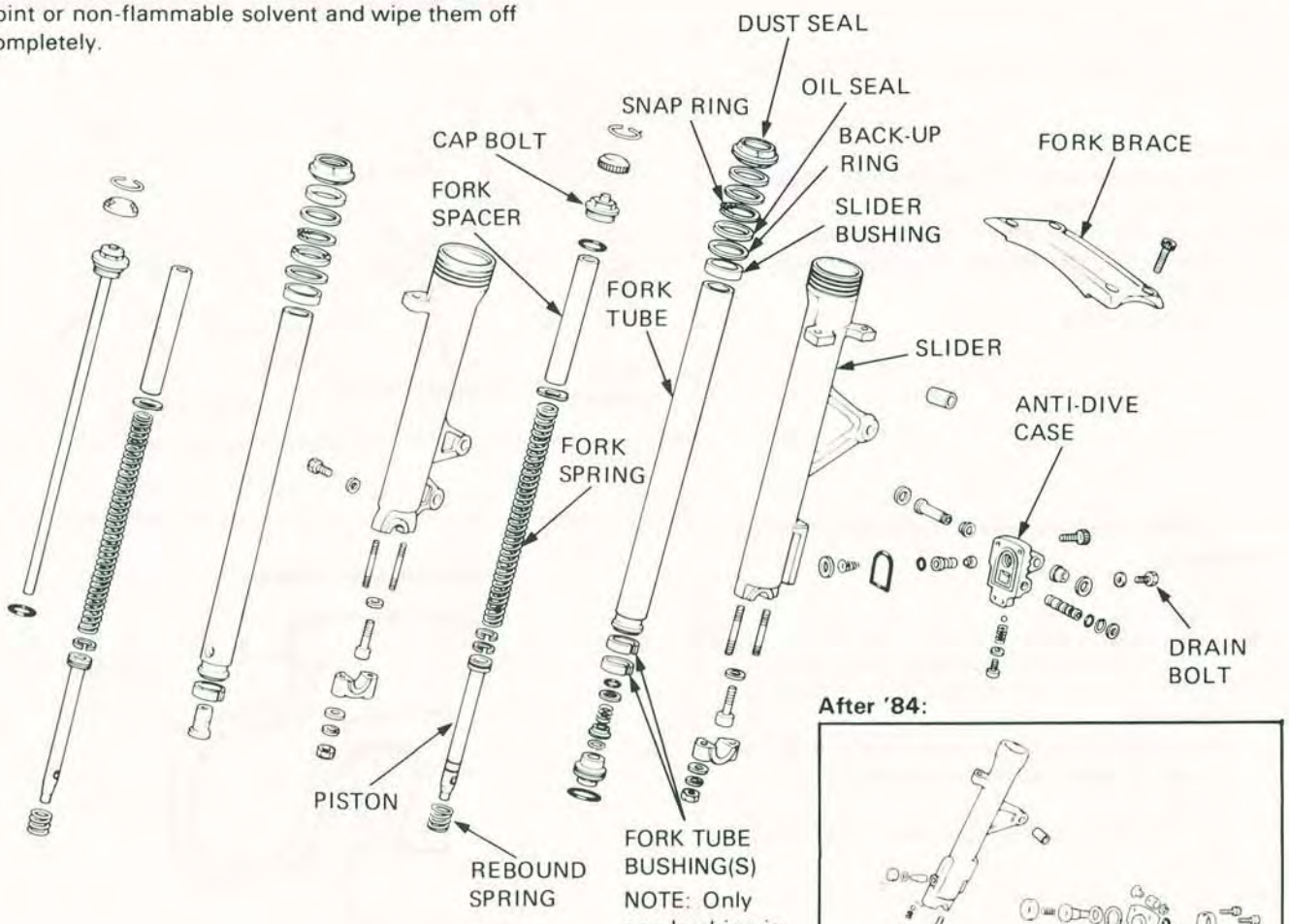
Check the operation of the collar and piston.

'83-'84 **After '84:**

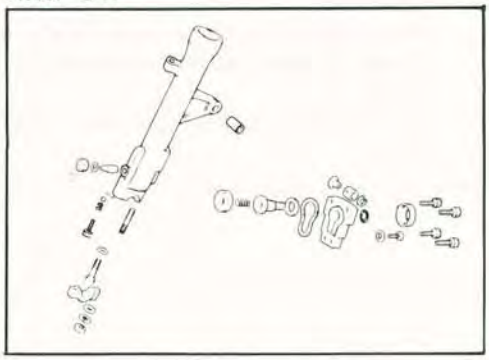


ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



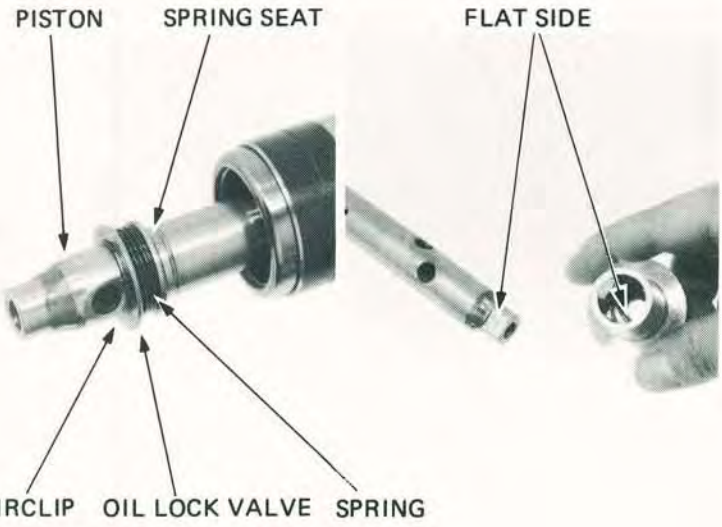
After '84:



Insert the rebound spring and piston into the fork tube.
On the left fork, install the spring seat, valve spring, oil lock valve and circlip on the piston.
Place the oil lock piece on the end of the piston.

NOTE

> On the right fork, install the oil lock piece, aligning the flat sides of the oil lock piece and piston end.



Date of Issue: October, 1984

Insert the fork tube into the slider.

NOTE

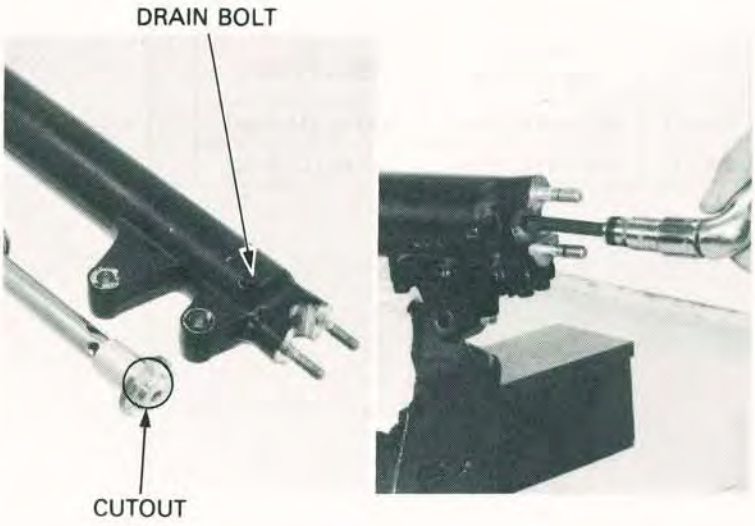
> Align the cutout of the oil lock piece with the drain bolt in the slider.

Place the fork slider in a vise with soft jaws or a shop towel.
Apply a locking agent to the socket bolt and thread it into the piston. Tighten with a 6 mm hex wrench.

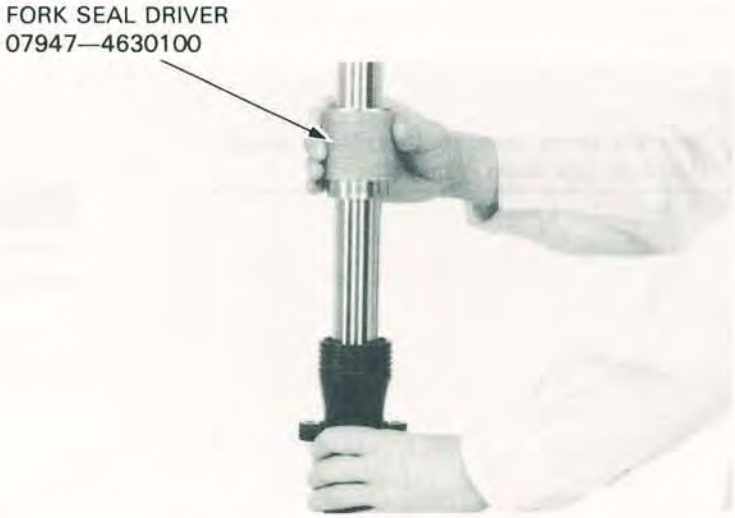
NOTE

> Temporarily install the fork spring and fork cap bolt to tighten the socket bolt.

TORQUE:
15—25 N.m (1.5—2.5 kg-m, 11—18 ft-lb)



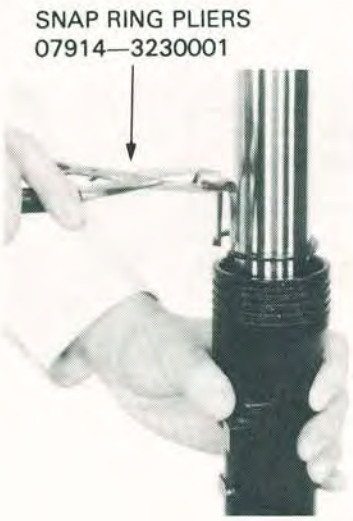
Place the slider bushing over the fork tube and rest it on the slider. Put the back-up ring and an old bushing or equivalent tool on top.
Drive the bushing into place with the seal driver and remove the old bushing or equivalent tool.
Coat a new oil seal with ATF and install it with the seal markings facing up. Drive the seal in with the seal driver.

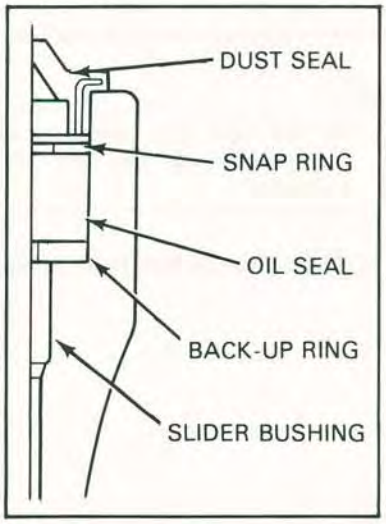


Install the snap ring with its radiused edge facing down and install the dust seal.

NOTE

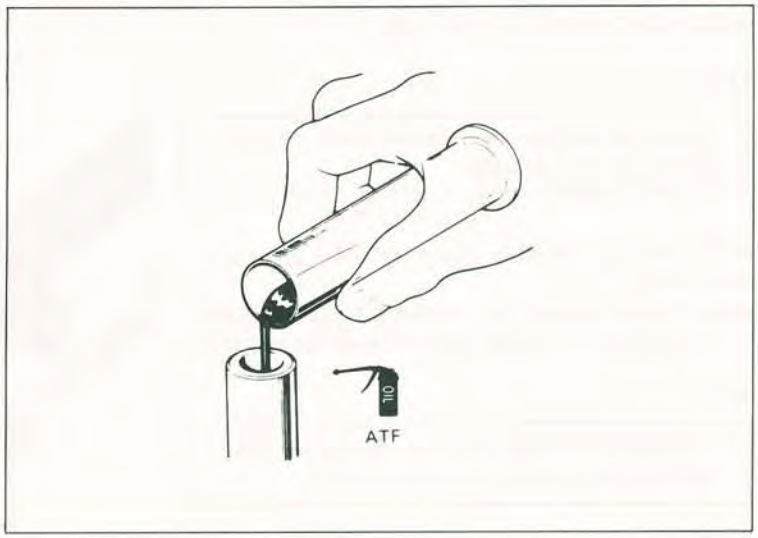
> On '83 and '84 do not install the plastic washer or foam seal.





Pour the specified amount of ATF into the fork tube.

	VF750F '84 VF700F	'85 VF700F
RIGHT	360 cc (12.2 oz)	350 cc (11.9 oz)
LEFT	380 cc (12.8 oz)	375 cc (12.5 oz)



Install the fork spring, spring seat and spacer in the fork tube.

NOTE

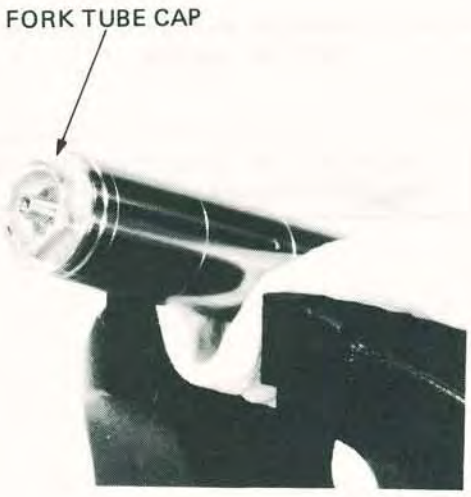
Note the spring direction; the closely wound coils must face down in the tube.

Install and torque the fork tube cap.

NOTE

On the right fork, align the cavity on the damping adjuster rod with the flat side in the piston.

TORQUE: 15–30 N·m (1.5–3.0 kg-m, 11–22 ft-lb)



Date of Issue: February, 1986

INSTALLATION

Install the forks and temporarily tighten the bottom pinch bolts.

Install the fork stop rings in the grooves in the fork tube.

Push the fork tubes up until the stop rings contact the air joints.

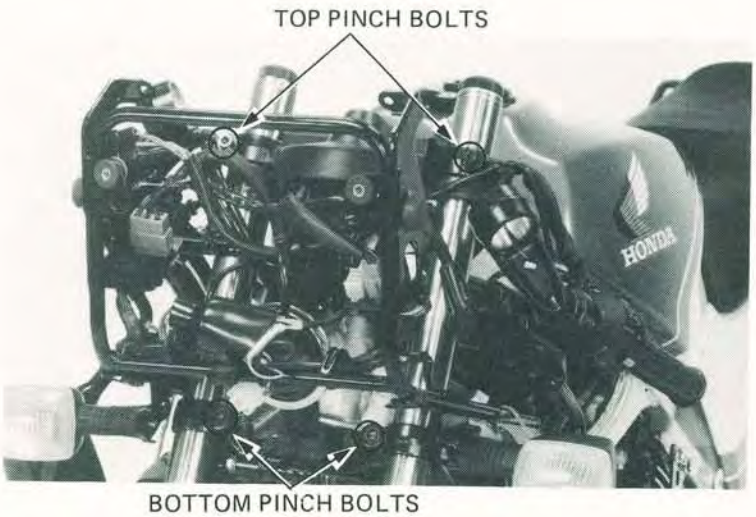
FORK STOP RING

Tighten the bottom pinch bolts.

TORQUE 45–55 N·m (4.5–5.5 kg-m, 33–40 ft-lb)

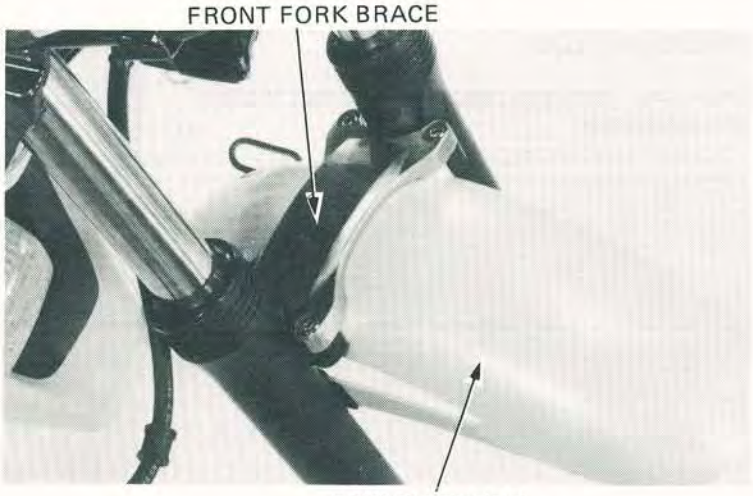
Tighten the top pinch bolts.

TORQUE: 9–13 N·m (0.9–1.3 kg-m, 7–10 ft-lb)



Loosely install the fork brace.
Install the removed parts in the reverse order of removal.
– front fender.
– handlebar spacers.
– handlebars.
– front wheel.
– headlight.
– instruments.
– fairing.

With the front brake applied, pump the forks up and down several times.
Tighten the front fork brace mounting bolts.



Fill the fork tubes with air.

RECOMMENDER PRESSURE:
0–40 kPa (0–0.4 kg/cm^2, 0–6 psi)

CAUTION

- *Use only a hand-operated air pump to fill the fork tubes. Do not use compressed air.*
- *Maximum pressure is 300 kPa (3 kg/cm^2, 43 psi). Do not exceed this or fork tube component damage may occur.*

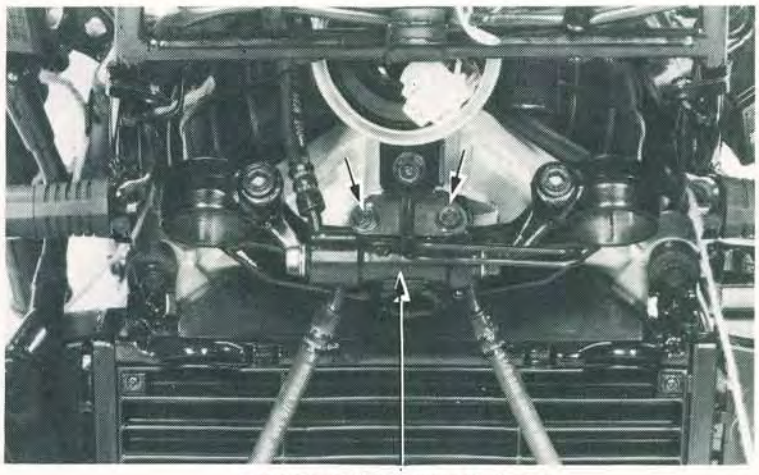
With the front brake applied, pump the forks up and down several times. Place the motorcycle on its center stand. Check the air pressure and adjust if necessary.

Date of Issue: January, 1983

STEERING STEM

REMOVAL

Remove the following components.
- fairing.
- headlight.
- instrument.
- handlebars.
- front wheel.
- ignition switch.
- brake hose 3-way joint.



BRAKE HOSE 3-WAY JOINT

Loosen and remove the steering stem nut.

Remove the forks.

LOCK NUT WRENCH, 30 x 32 mm
07716–0020400 or EQUIVALENT IN U.S.A.

EXTENSION 07716–0020500
OR EQUIVALENT U.S.A.

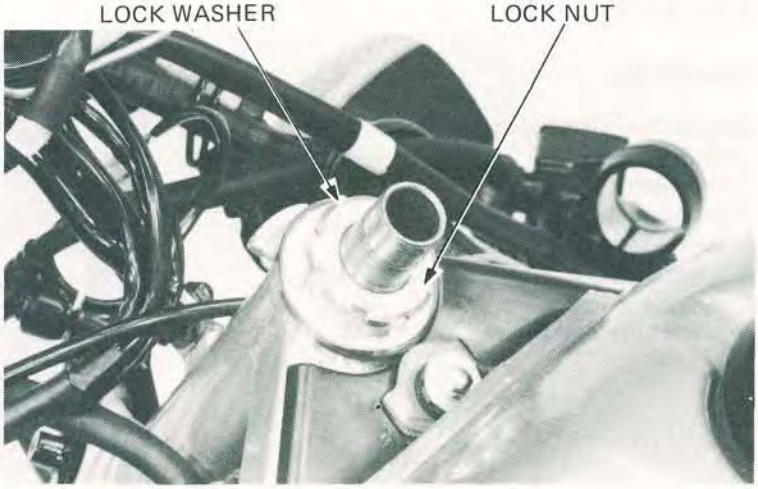
Loosen the top bridge pinch bolt and remove the top bridge with the fork air joint.

TOP BRIDGE

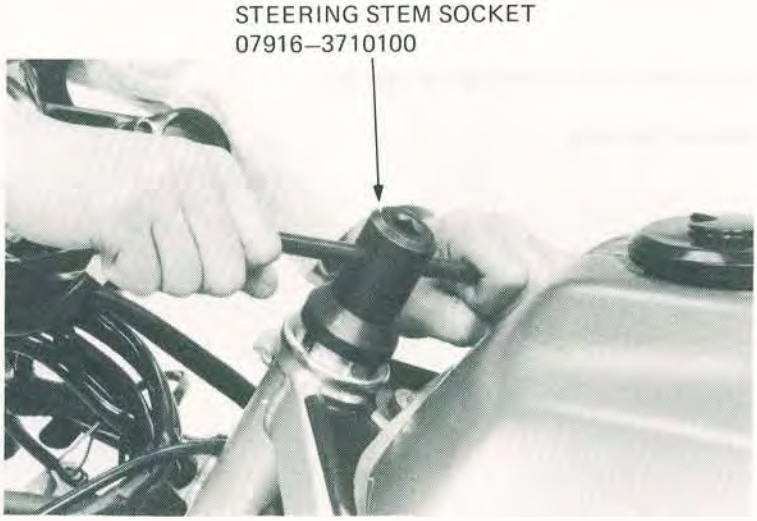
PINCH BOLT

AIR JOINT

Straighten the lock washer tabs and remove the lock nut and lock washer.



Loosen the bearing adjustment nut and remove the steering stem.



Check the steering stem bearings for damage or wear.

BEARING REPLACEMENT

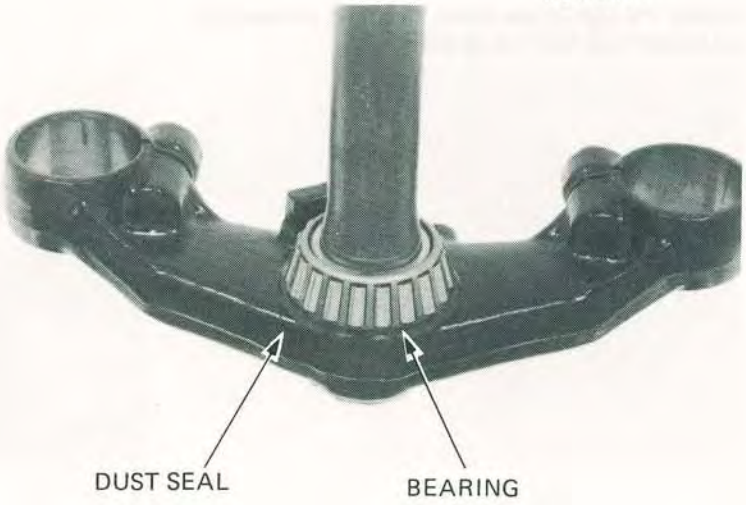
NOTE

Replace the bearing and bearing race as a set.

Remove the grease retainer.

Remove the bearing inner race and dust seal from the steering stem.

'83 shown



Date of Issue: October, 1983

Remove the upper bearing race with the special tool.

BALL RACE REMOVER
07953—4250002

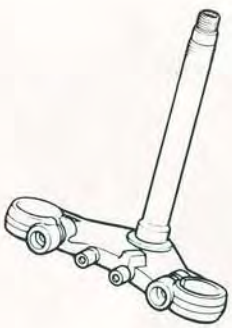
Remove the lower bearing race with the special tool.

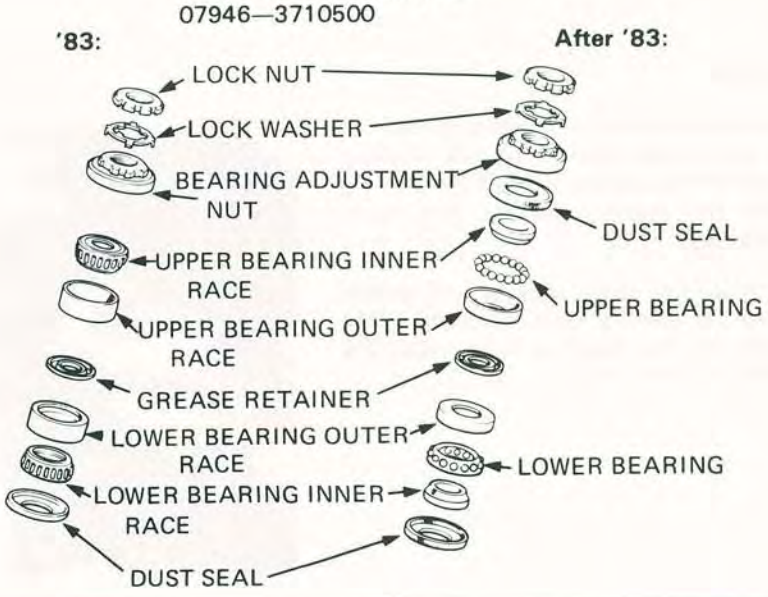
NOTE

> If the motorcycle has been involved in an accident, examine the area around the steering head for cracks.

BALL RACE REMOVER
07953—4250002

BEARING RACE REMOVER
07946—3710500



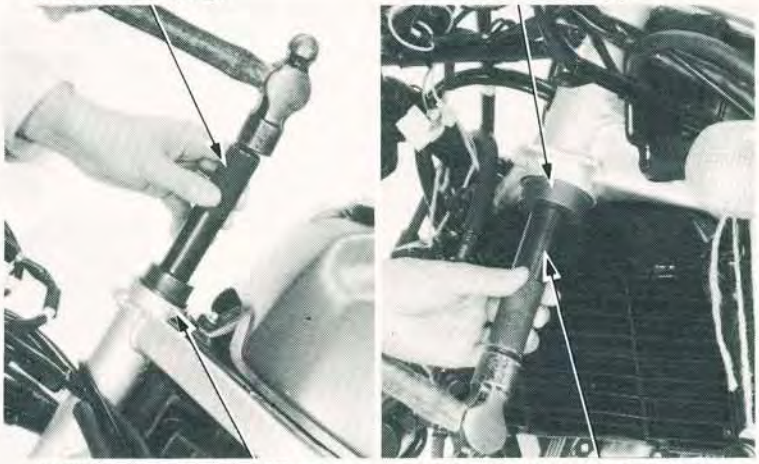


Drive the upper bearing outer race into the steering head

Drive the lower bearing outer race into the steering head.

DRIVER
07749—0010000

ATTACHMENT, 52 x 55 mm
07749—0010400

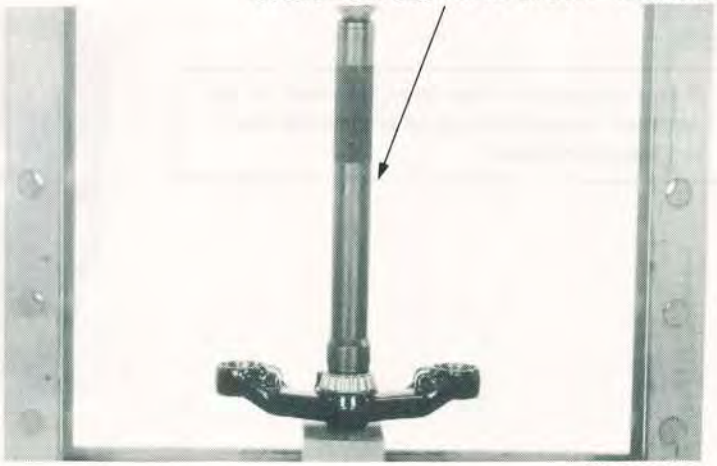


ATTACHMENT, 42 x 47 mm
07746—0010300

DRIVER 07749—0010000

Install a dust seal onto the steering stem and press the lower bearing inner race over the stem with the special tool.

STEERING STEM DRIVER
07946—MB00000 OR
07946—3710601 AND 07964—MB00200



'83 SHOWN

INSTALLATION

Pack the bearing cavities with bearing grease.
'83: Install the grease retainer on the steering stem, then insert the steering stem into the steering head. Install the bearing retainer and upper bearing/inner race.

After '83: Install the lower bearing and grease retainer onto the steeing stem, then insert the steering stem into the steering head. Install the upper bearing and inner race.

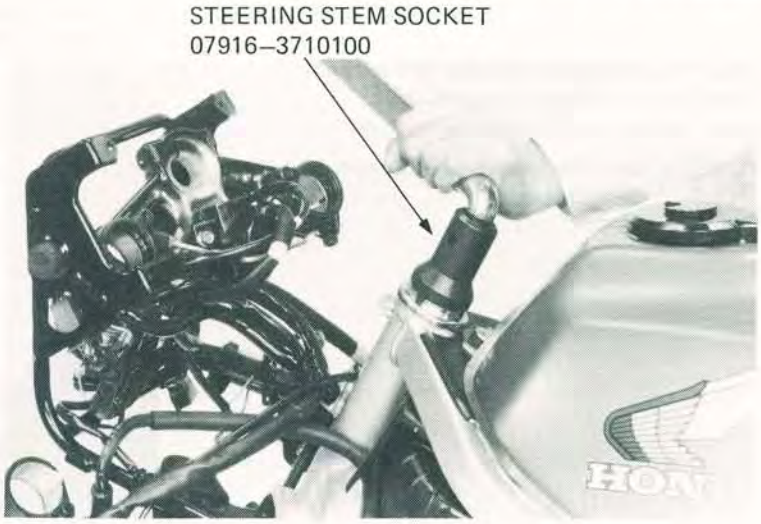
UPPER BEARING/
INNER RACE

'83 SHOWN

Date of Issue: October, 1984

Install and tighten the adjusting nut to the specified torque.

TORQUE:
'83: 10–12 N·m (1.0–1.2 kg-m, 7–9 ft-lb)
'84: 19–21 N·m (1.9–2.1 kg-m, 14–15 ft-lb)



Turn the steering stem lock-to-lock 4–5 times to seat the bearings, then tighten the nut to the same torque.
'83: Again turn the steering stem lock-to-lock 5 times to seat the bearings, then tighten the adjustment nut to the same torque.

Install a new bearing adjustment nut lock washer aligning the tabs with the grooves in the nut. Bend two opposite tabs down into the grooves.

NOTE

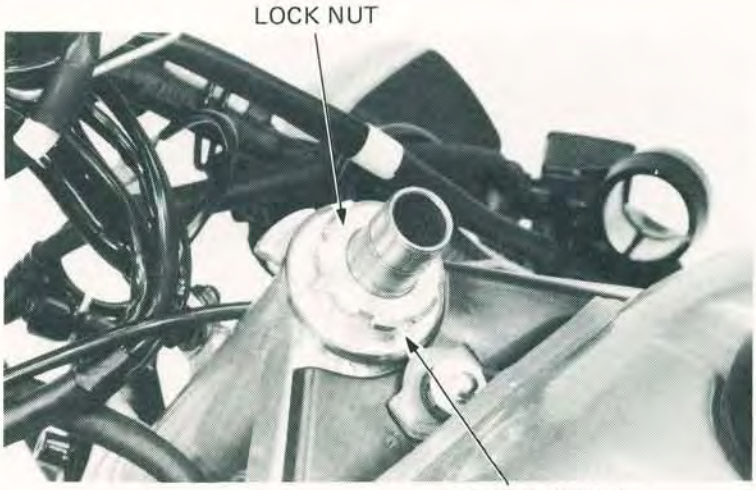
DO NOT install a used bearing adjustment nut lock washer.

Hand tighten the lock nut.
Hold the adjustment nut and further tighten the lock nut only enough to align its grooves with the lock washer tabs.

NOTE

If the lock nut grooves cannot be easily aligned with the lock washer tabs, remove the nut, turn it over and reinstall it.

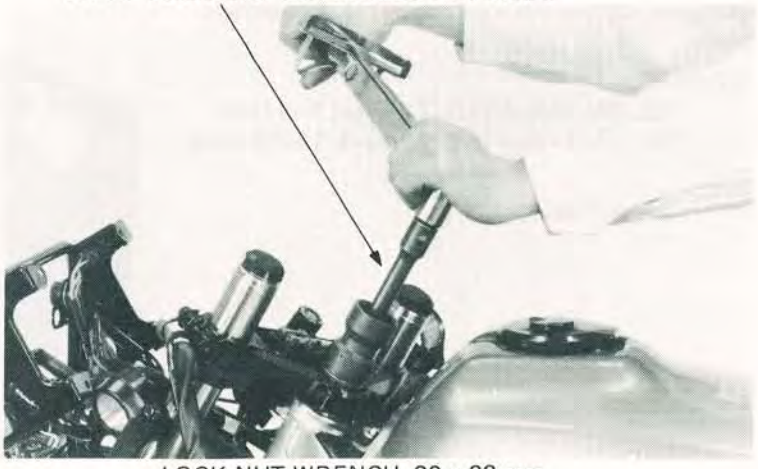
Bend two lock washer tabs up into the lock nut grooves.



Install the top bridge with the fork air joint.
Install the front forks (page 14–29).
Install and tighten the steering stem nut.

TORQUE: 90–120 N·m (9.0–12.0 kg-m, 65–87 ft-lb)

EXTENSION
07716–0020500 or EQUIVALENT IN U.S.A.



LOCK NUT WRENCH, 30 x 32 mm
07716–0020400
or EQUIVALENT IN U.S.A.

STEERING HEAD BEARING PRELOAD

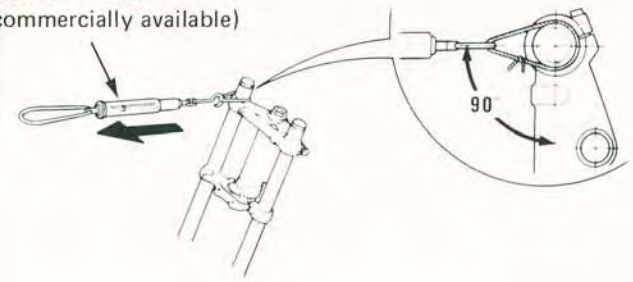
Install the front wheel (page 14-17).
Place a stand under the engine and raise the front wheel off the ground.
Position the steering stem to the straight ahead position.
Hook a spring scale to the fork tube and measure the steering head bearing preload.

NOTE

> Make sure that there is no cable and wire harness interference.

The preload should be within 1.0–1.6 kg (2.21–3.53 lb) for right and left turns.
If the readings do not fall within the range, lower the front wheel and adjust the bearing adjustment nut.
After making sure the bearing preload is acceptable, install the removed parts in the reverse order of removal.

SPRING SCALE
(commercially available)



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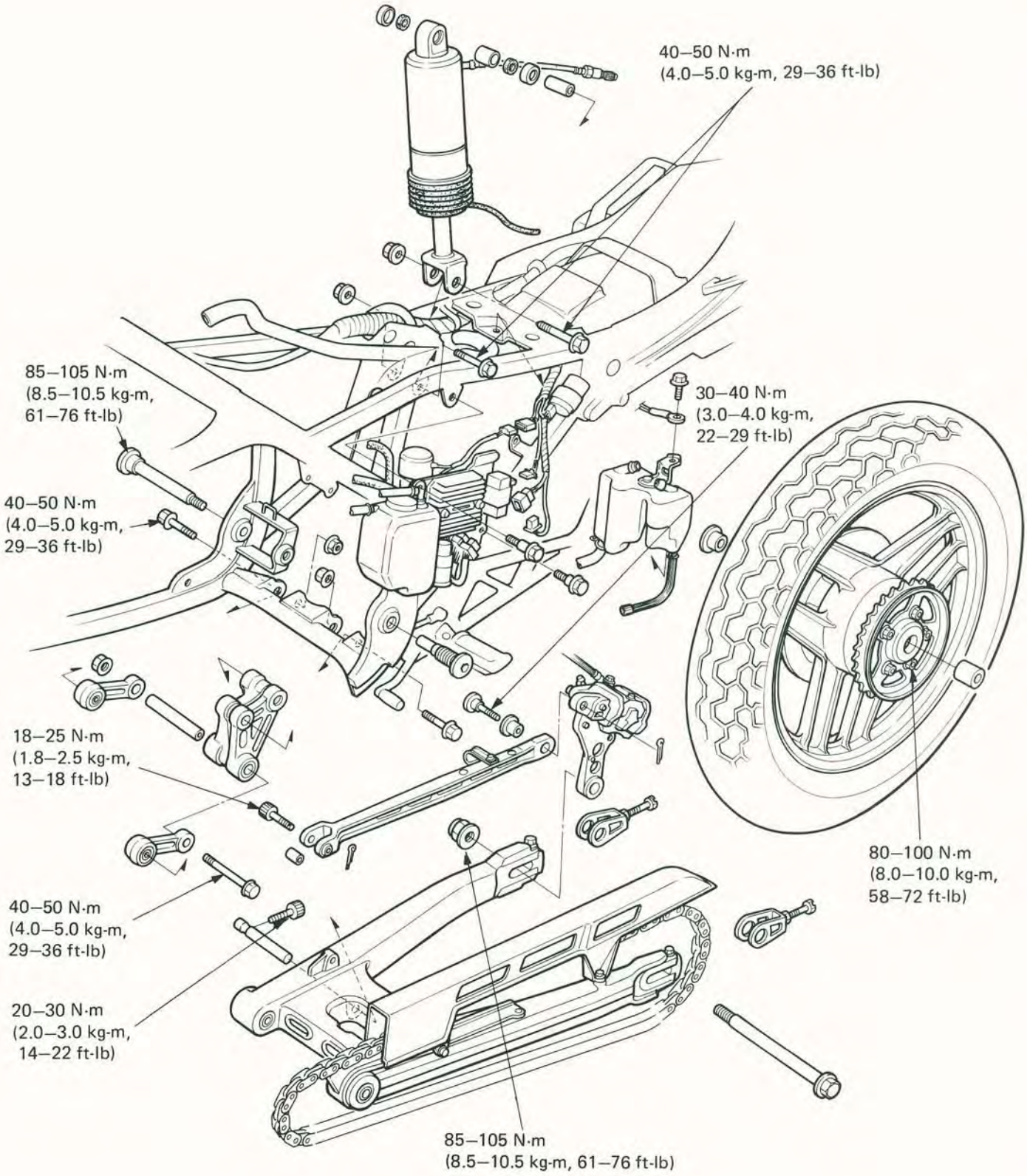
MEMO



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15. REAR WHEEL/SUSPENSION

SERVICE INFORMATION

GENERAL

- The rear wheel uses a tubeless tire. For tubeless tire repairs, refer to the TUBELESS TIRE MANUAL.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Axle runout		–	0.2 mm (0.01 in)
Rear wheel rim runout	Radial	–	2.0 mm (0.08 in)
	Axial	–	2.0 mm (0.08 in)
Shock absorber air pressure		50–300 kPa (0.5–3.0 kg/cm^2, 7–43 psi)	–

TORQUE VALUES

Shock arm-to-frame bolts		40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
Shock link-to-shock arm bolt		40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
Rear shock absorber mount bolts		40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
Swingarm pinch bolt		20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)
Swingarm pivot bolts		85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)
Rear brake torque rod	8 mm	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
	10 mm	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Final driven sprocket		80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)
Rear brake disc		35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)
Rear axle nut		85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)

TOOLS

Special

Needle bearing remover	07931–MA70000
Oil seal driver attachment	07965–MC70100
Oil seal driver attachment ring	07965–ME70100
Oil seal driver	07965–MB00100

Common

Attachment, 32 x 35 mm	07746–0010100
Attachment, 37 x 40 mm	07746–0010200
Attachment, 52 x 55 mm	07746–0010400
Attachment, 62 x 68 mm	07746–0010500
Pilot, 17 mm	07746–0040400
Pilot, 20 mm	07746–0040500
Pilot, 25 mm	07746–0040600
Driver	07749–0010000
Bearing remover shaft	07746–0050100 or equivalent in U.S.A.
Bearing remover head, 20 mm	07746–0050600 or equivalent in U.S.A.

15

TROUBLESHOOTING

Oscillation
1. Bent rim
2. Loose wheel bearings
3. Faulty tire
4. Loose axle
5. Tire pressure incorrect
6. Swingarm bearings worn
7. Worn tires

Soft suspension
1. Weak spring
2. Insufficient fluid in shock absorber
3. Shock absorber air pressure incorrect

Hard suspension
1. Incorrect fluid weight in shock absorber
2. Bent shock absorber
3. Shock absorber air pressure incorrect

Suspension noise
1. Shock case binding
2. Loose fasteners

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REAR WHEEL

REMOVAL

Place the motorcycle on its center stand.
Loosen the drive chain adjusting bolts lock nuts and the adjusting bolts.

Remove the axle nut and axle.

Push the wheel forward and remove the drive chain from the driven sprocket and remove the rear wheel.

NOTE

> If you depress the brake pedal after the rear wheel is removed, the caliper piston will move out and make reassembly difficult.

DISASSEMBLY

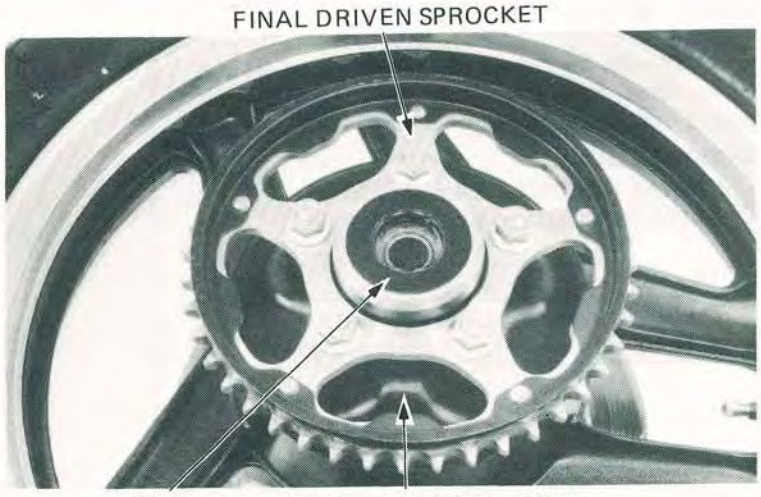
Remove the rear brake disc.
Remove the dust seal.

Remove the final driven sprocket and driven flange together.

NOTE

> Do not separate the driven sprocket and flange, unless replacement of the driven sprocket or flange is necessary.

Remove the dust seal from the final driven flange.

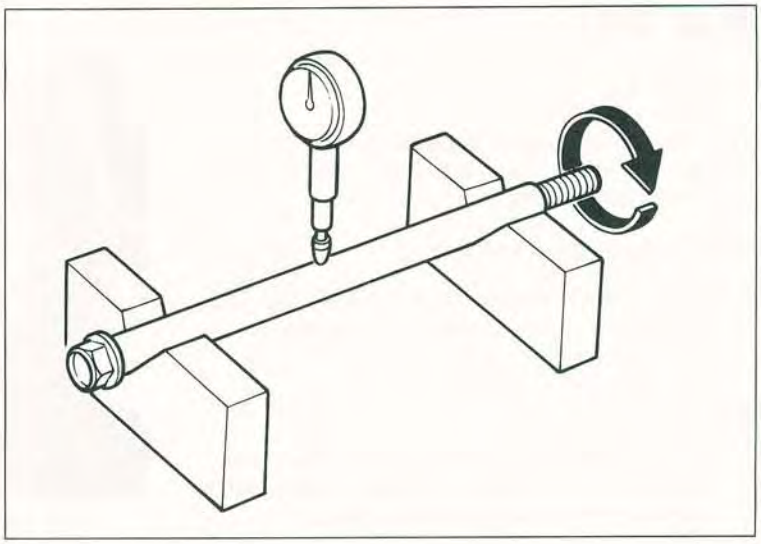


INSPECTION

AXLE

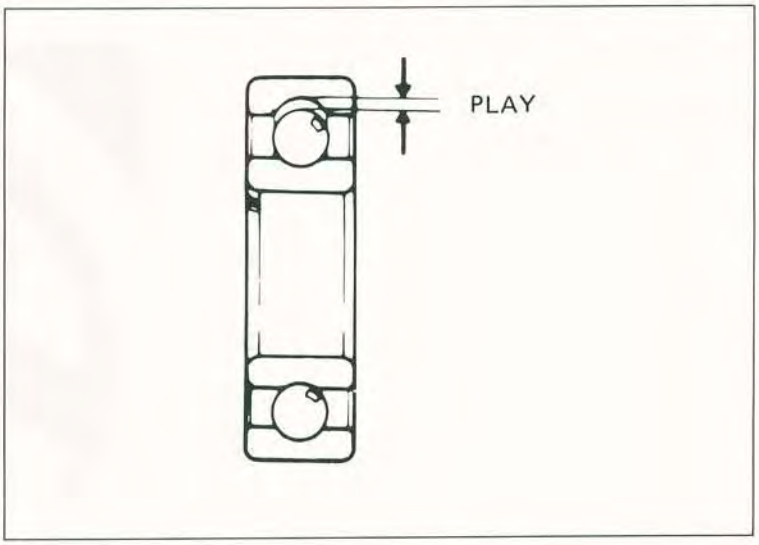
Set the axle in V blocks and read the axle runout with a dial indicator.

SERVICE LIMIT: 0.2 mm (0.01 in)



REAR WHEEL BEARING

Check the wheel bearing play by rotating the wheel by hand. Replace the bearings with new ones if they are noisy or have excessive play.



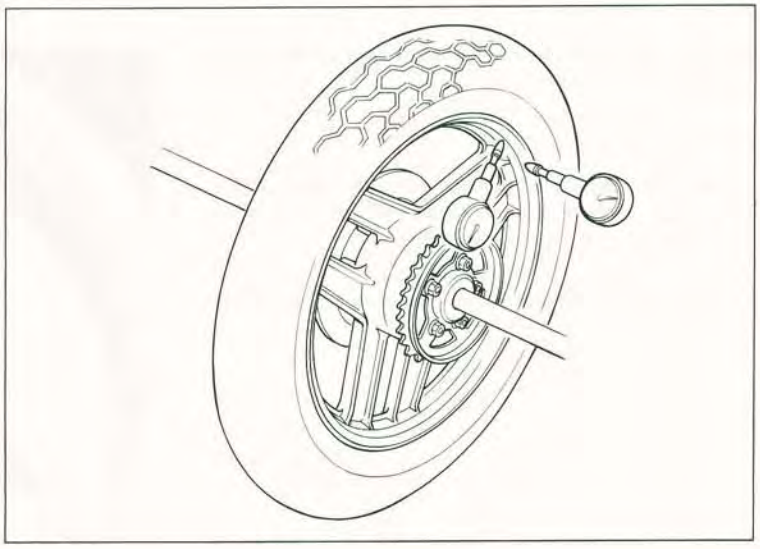
REAR WHEEL RIM RUNOUT

Check the rim for runout by placing the wheel in a truing stand. Spin the wheel slowly, and read the runout using a dial indicator.

SERVICE LIMITS:
RADIAL RUNOUT: 2.0 mm (0.08 in)
AXIAL RUNOUT: 2.0 mm (0.08 in)

NOTE

> The wheel cannot be serviced and must be replaced if the above limits are exceeded.



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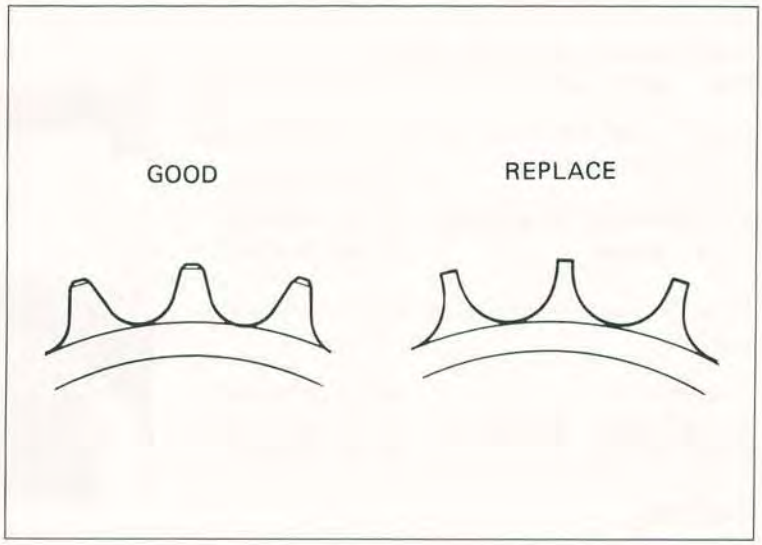
FINAL DRIVEN SPROCKET

Check the condition of the final driven sprocket teeth. Replace the sprocket if worn or distorted.

NOTE

If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.



DAMPER RUBBERS

Replace the damper rubbers if they are damaged or deteriorated.

BEARING REPLACEMENT

Remove the wheel bearings.
Drive the driven flange side bearing out.

NOTE

Never reinstall old bearings; once the bearings are removed, they must be replaced with new ones.

Pack all bearing cavities with grease.
Press distance collar into place from the left side.

Drive the right bearing in first, then the left bearing with the following tools.

DRIVER	07749–0010000
ATTACHMENT, 52 x 55 mm	07746–0010400
PILOT, 20 mm	07746–0040500

Drive the driven flange bearing in with the following tools.

DRIVER	07749–0010000
ATTACHMENT, 62 x 68 mm	07746–0010500
PILOT, 25 mm	07746–0040600

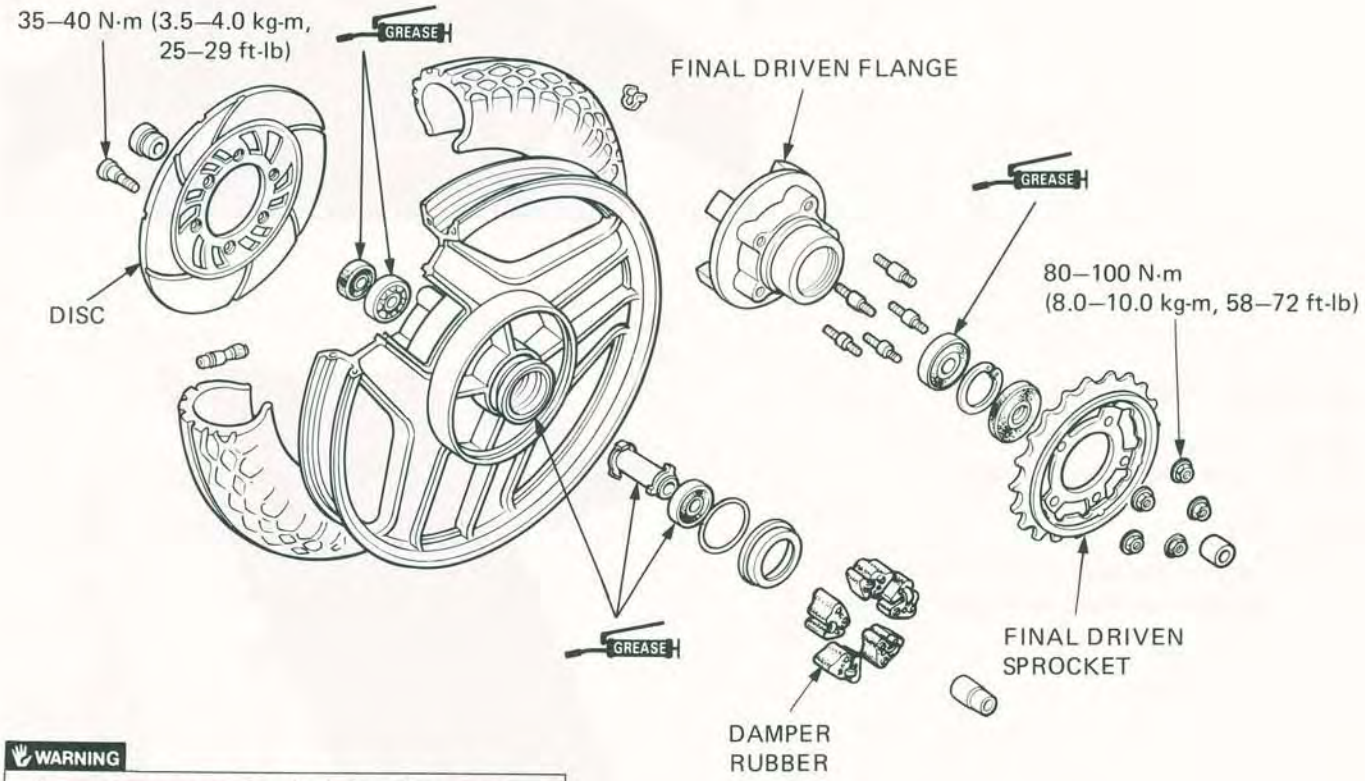
CAUTION

Drive the bearings in squarely with the sealed end facing out, making sure they are fully seated.

ASSEMBLY

NOTE

The rear wheel uses a tubeless tire. For tubeless tire repairs, refer to the Tubeless Tire Manual.



WARNING

Do not get grease on the brake disc or stopping power will be reduced.

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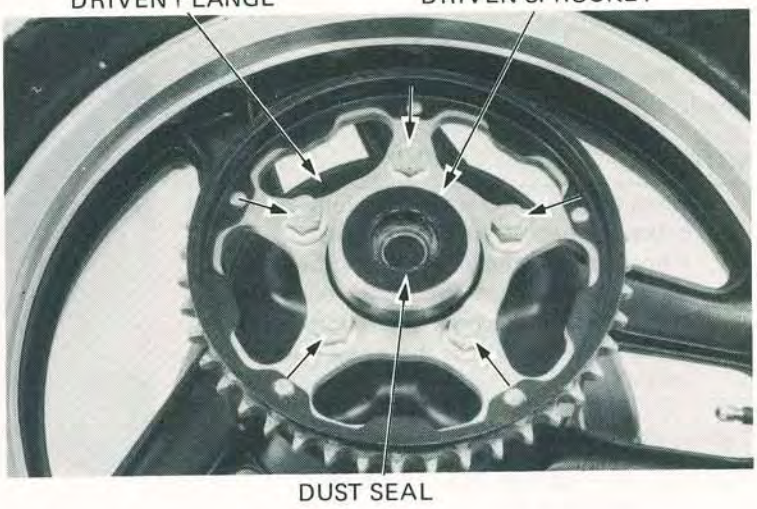
Install the rear axle sleeve, final driven flange and driven sprocket.

If the driven sprocket was removed from the flange, tighten the driven sprocket nuts to the specified torque.

TORQUE: 80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)

Install the dust seal.

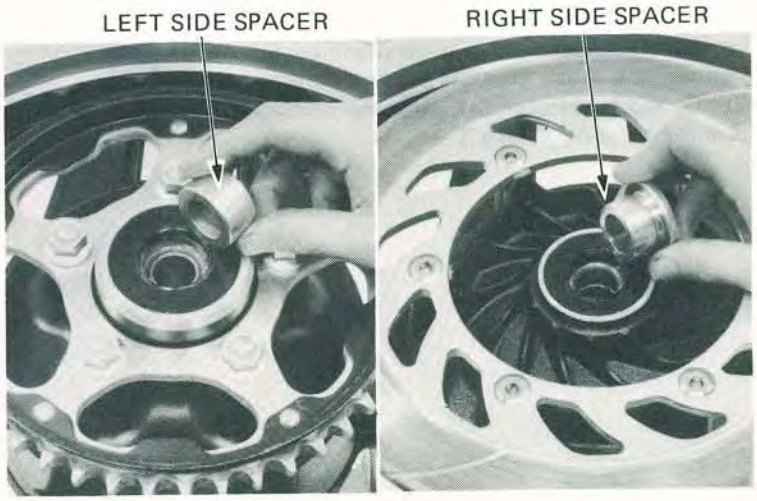


Install the brake disc and tighten the bolts.

TORQUE: 35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)

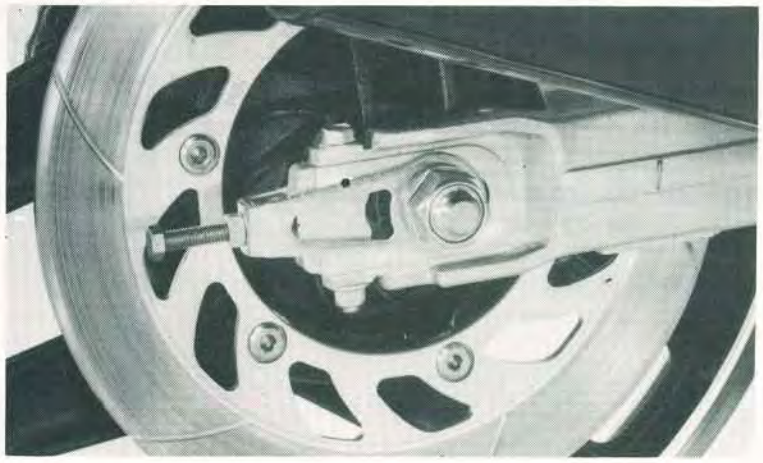
Install the dust seal.

Install the left and right side spacers.



INSTALLATION

Install the rear wheel in the reverse order of removal.



NOTE

- When installing the wheel, carefully fit the brake disc between the brake pads.
- After installing the wheel, apply the brake several times. Then check that the wheel rotates freely. Recheck wheel installation if the brake drags or if the wheel does not rotate freely.

Tighten the rear axle nut.

TORQUE: 85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)

Adjust the drive chain slack (page 3-14).

SHOCK ABSORBER

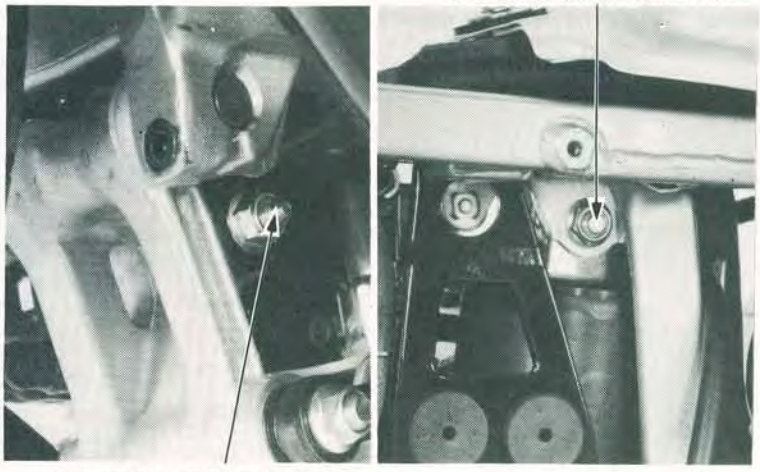
REMOVAL

Place the motorcycle on its center stand.

Remove the seat and left frame side cover.

Remove the breather separator and the electric panel.

Remove the shock absorber lower mounting bolt. Remover the shock absorber upper mounting bolt, tilt the shock absorber rearward and remove it from the frame by pulling it up.



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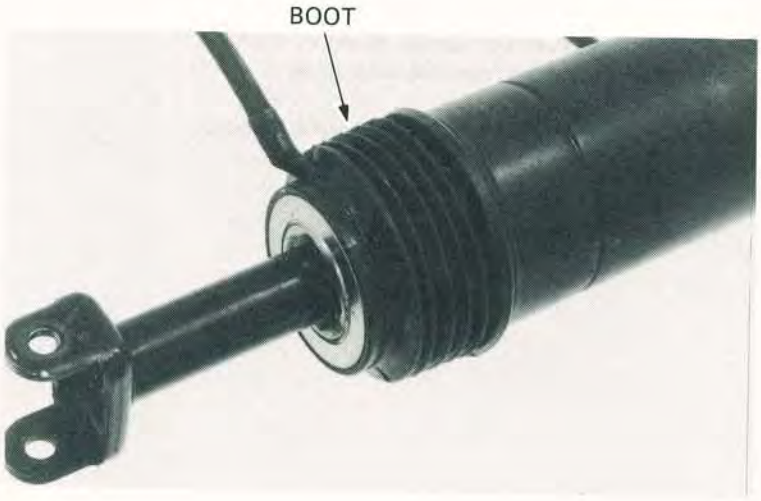
OIL SEAL REPLACEMENT

Remove the shock case boot.

Remove the air valve cap and release the air pressure by depressing the air valve stem.

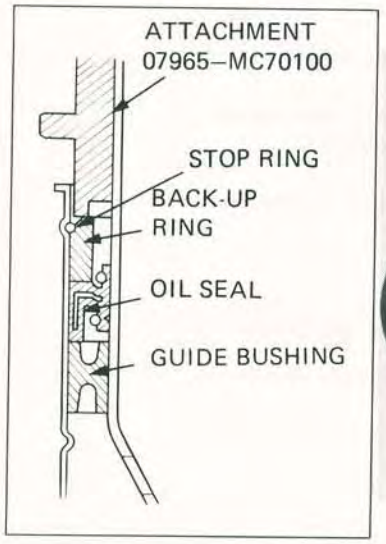


Press the back-up ring 1.0–2.0 mm (0.04–0.08 in) in with the Oil Seal Driver and attachment.

CAUTION

Do not press in the back-up ring excessively, since it can cause the guide bushing to jam into the shock case, making guide bushing removal difficult.

Remove the stop ring.



STOP RING

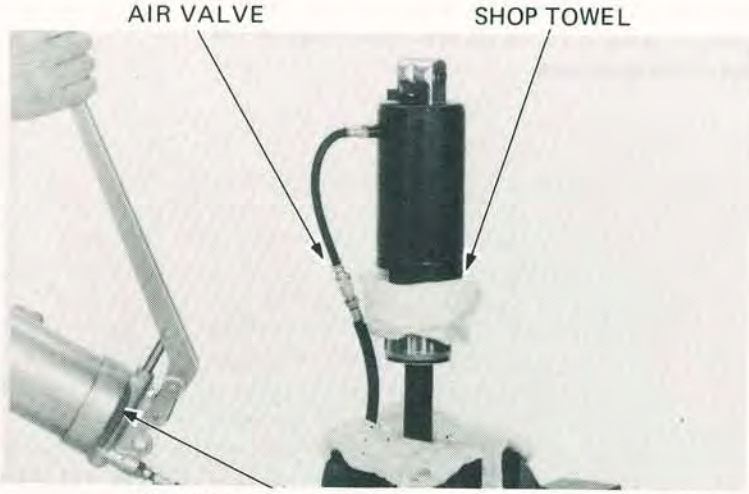
Hold the shock absorber upright in a vise.

Fill a high pressure grease gun with ATF (Automatic Transmission Fluid) and connect the attachment hose to the shock absorber air valve. Keep the shock upright.

Wrap a shop towel around the oil seal.
Pump ATF into the shock absorber through the attachment hose to force the oil seal and guide bushing out. The ATF will also come out.

Let the shock absorber stand for another 10 minutes to allow all of the ATF to drain from the outer case.

Do not tilt the shock absorber or ATF will flow out of the damper case.



GREASE GAN FILLED WITH ATF

Turn the shock absorber upside down as soon as all the ATF has drained from the outer case.

Fill the damper case with the specified amount of ATF.

SPECIFIED AMOUNT:
120 cc (4.06 US oz, 3.38 Imp oz)

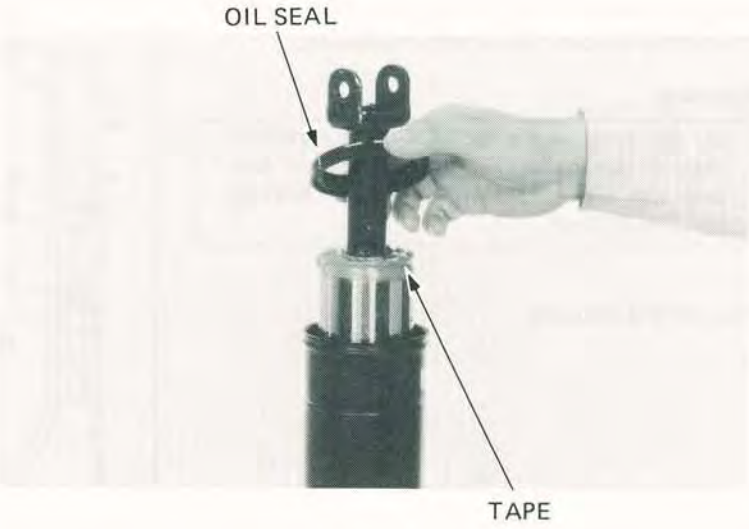
Install the guide bushing into the damper case.

To prevent seal damage, wrap a piece of tape around the groove at the end of the shock absorber.

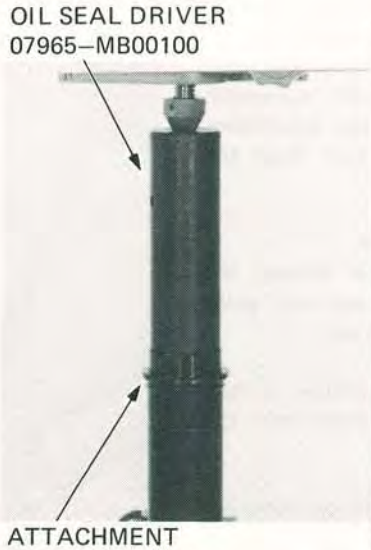
Dip the oil seal in ATF and install it onto the damper.

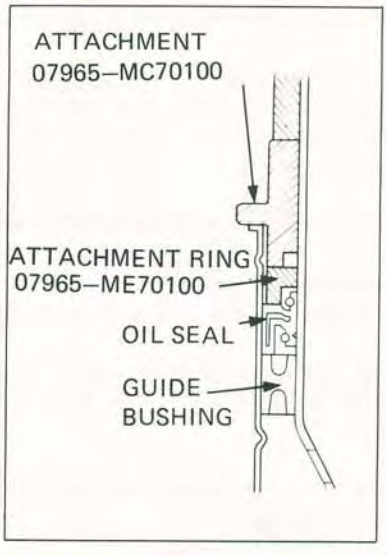
CAUTION

Be careful not to damage the oil seal during installation.



Press the oil seal into the shock absorber with a hydraulic press until the oil seal driver stops at the edge of the outer case.





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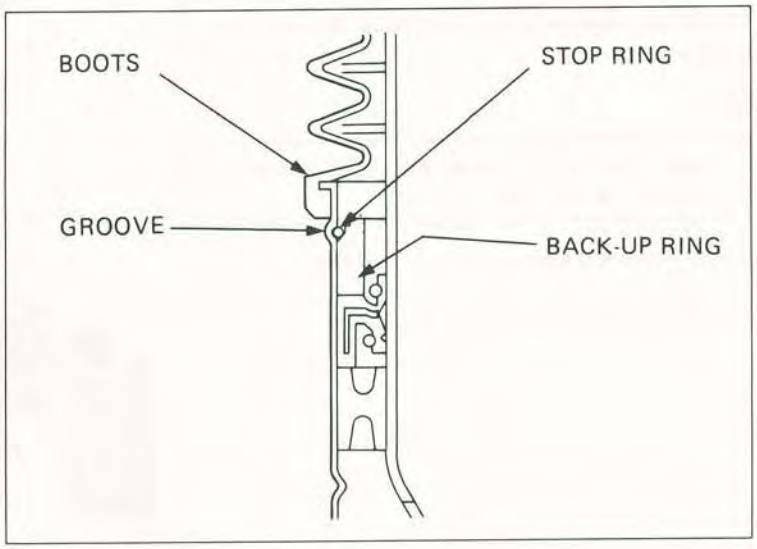
Install the back-up ring.

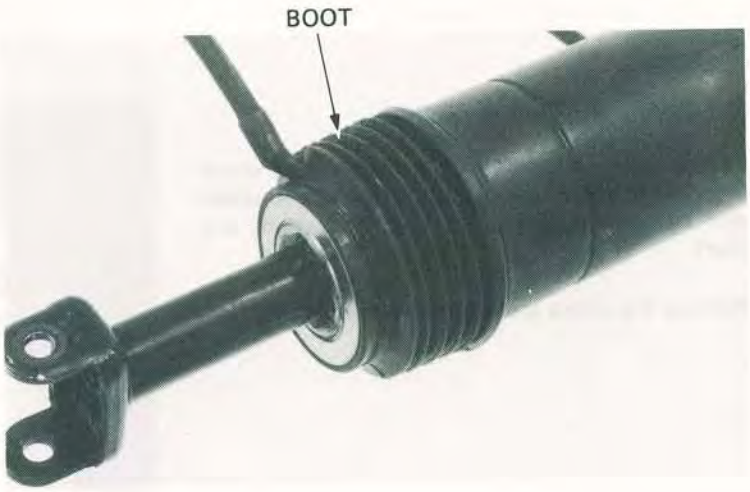
Install the stop ring, being certain that it is fully seated in the ring groove in the outer case.

WARNING

Do not forget to install the stop ring; the shock can come apart without this ring.



Install the boot.
Install the boot clip with the edge facing down.



INSTALLATION

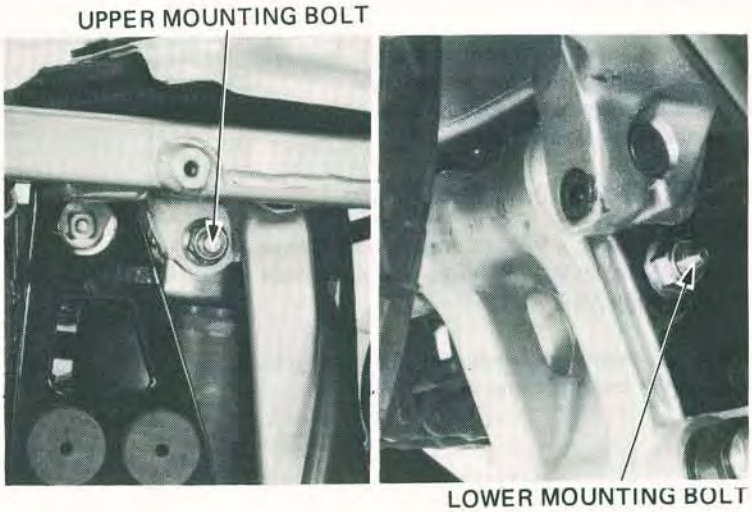
Apply paste grease (containing more than 45% of molybdenum) to the upper mounting bushings.

NOTE

Use paste grease (containing more than 45% of molybdenum) as follows:
- *MOLYKOTE G-n PASTE manufactured by Dow Corning, U.S.A.
- *Locol Paste manufactured by Sumico Lubricant, Japan.
- *Other lubricants of equivalent quality.

Install the shock absorber in the frame and tighten the upper and lower mounting bolts.

TORQUE: 40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)



Install the electric panel and crankcase breather separator.

NOTE

> Route the wires, hoses and tubes properly (pages 1-9 thru 12).

Install the left frame side cover and seat.

Adjust the air pressure (page 3-19).

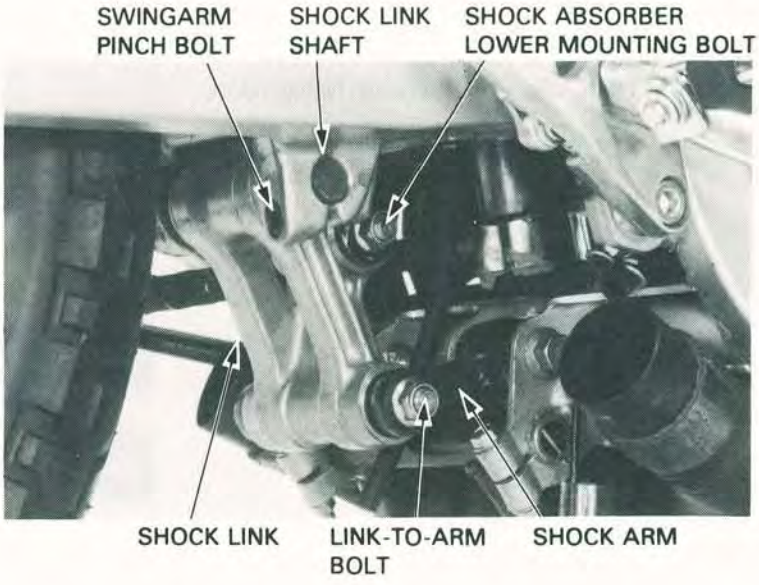
SHOCK ABSORBER LINKAGE

REMOVAL

Remove the left and right mufflers.

Remove the shock link by removing the shock absorber lower mounting bolt, shock link-to-shock arm bolt, swingarm pinch bolt, and shock link shaft.

Remove the shock arms from the frame.



LINKAGE PIVOT INSPECTION

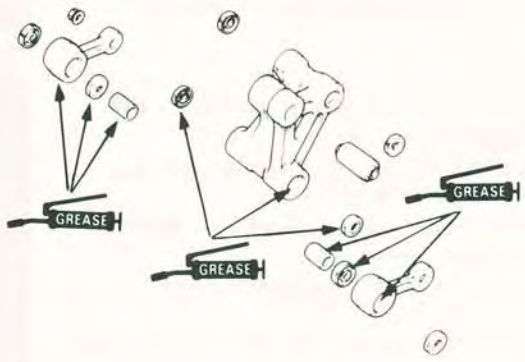
Check the linkage needle bearings (bushings for '83) and collars for wear or damage.
Inspect the dust seals for damage.
Replace parts as necessary.

SHOCK LINKAGE INSTALLATION

'83: Apply paste grease (containing more than 40% molybdenum) to the bushings and dust seals. See note on page 15-11.

After '83: Apply molybdenum disulfide grease to the needle bearings and dust seals.

'83 SHOWN:



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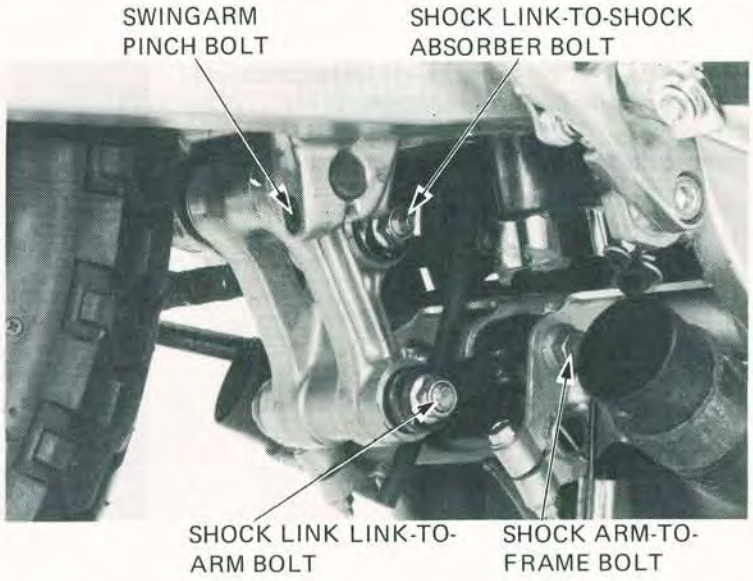
Install the shock arms and shock link and tighten each bolt in the order listed.

TORQUE:
SHOCK ARM-TO-FRAME:
40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
SHOCK LINK-TO-SHOCK ABSORBER
40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
SHOCK LINK-TO-SHOCK ARM:
40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
SWING ARM PINCH BOLT:
20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)

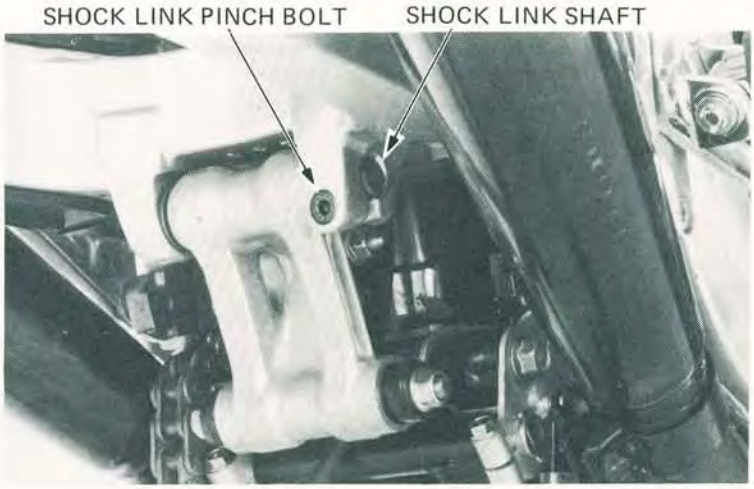
Install the mufflers.



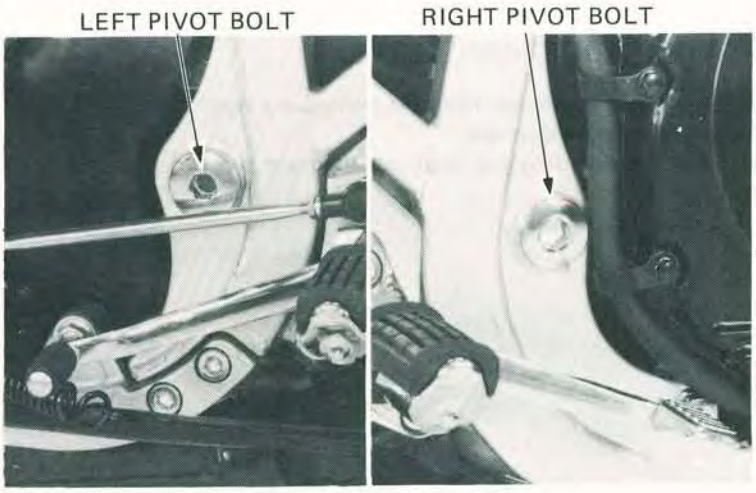
SWINGARM

REMOVAL

Remove the rear wheel (page 15-3).
Remove the right muffler.
Remove the shock link pinch bolt and shock link shaft.

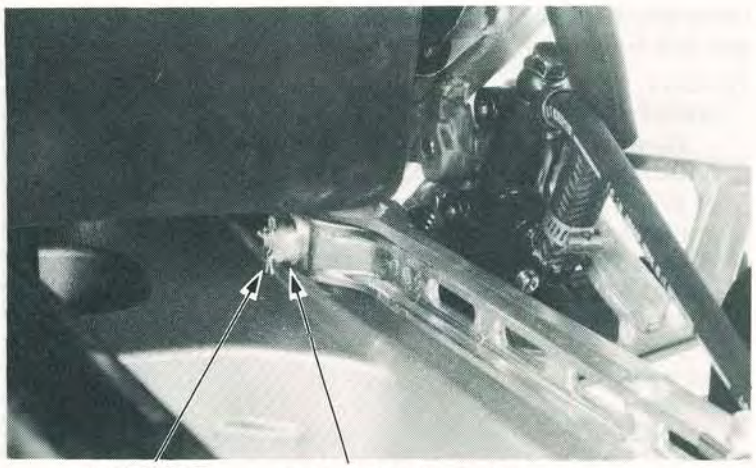


Remove the left and right swingarm pivot bolts.

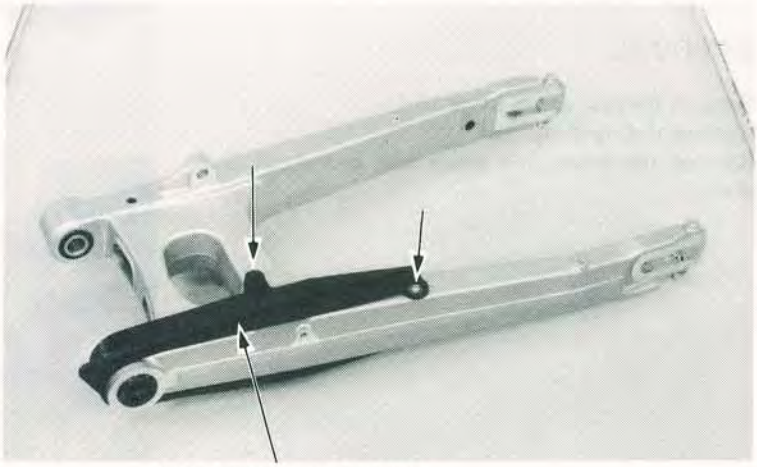


Remove the lock pin from the rear brake torque rod bolt and remove the torque rod bolt.

Remove the swingarm from the frame.

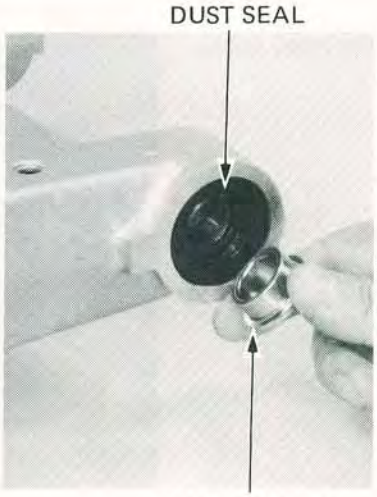


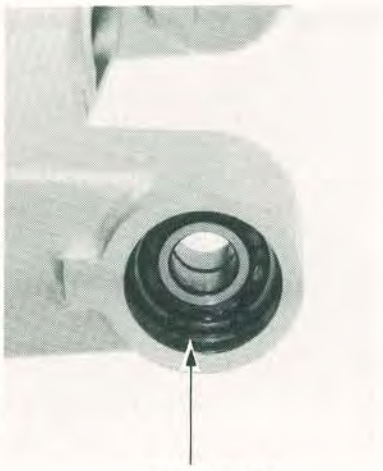
Remove the drive chain slider from the swingarm.



PIVOT BEARING REPLACEMENT

Remove the pivot collar from the swingarm's right pivot. Remove the dust seal.
Remove the snap ring and drive out the right pivot bearings.





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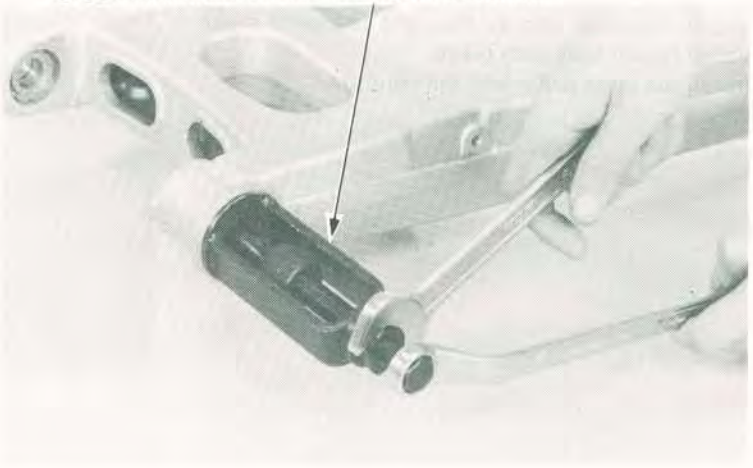
Remove the dust seal from the swingarm's left pivot.
Remove the left pivot needle bearing with the special tool.

NEEDLE BEARING REMOVER
07931-MA7000 NOT AVAILABLE IN U.S.A.



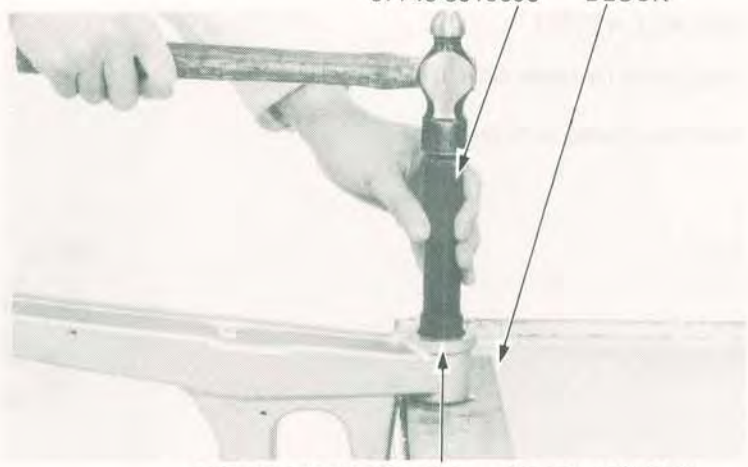
Drive a new needle bearing into the swingarm left pivot.

CAUTION

To prevent swingarm damage, support the swingarm as shown.

DRIVER
07749-0010000

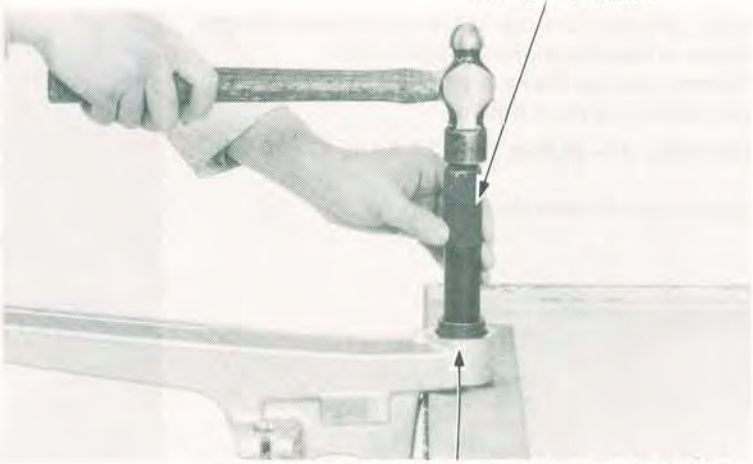
WOODEN
BLOCK



ATTACHMENT, 32 x 35 mm 07746–0010100
PILOT, 20 mm 07746–0040500

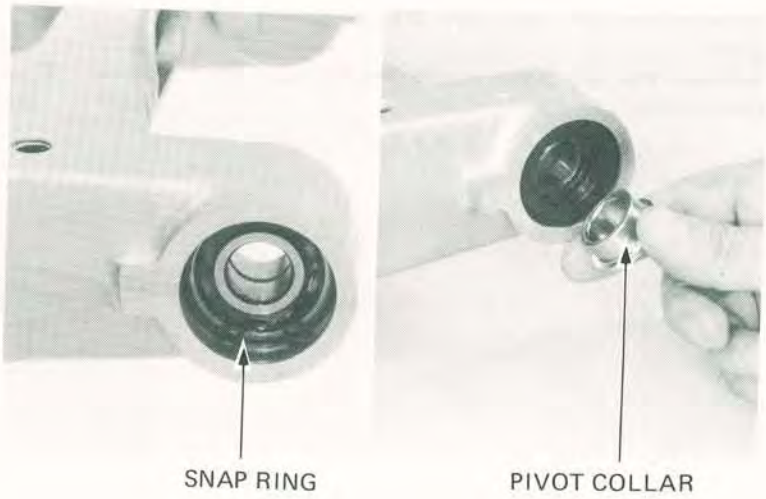
Drive new ball bearings into the swingarm right pivot.

DRIVER
07749–0010000



ATTACHMENT, 37 x 40 mm 07746–0010200
PILOT, 17 mm 07746–0040400

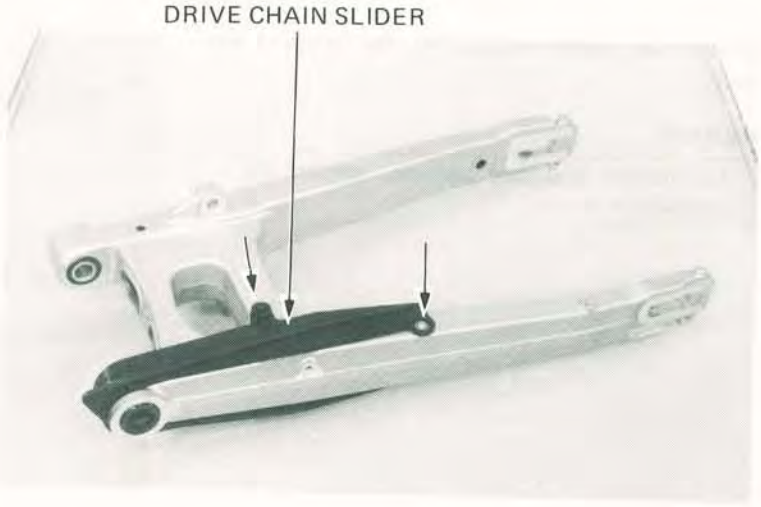
Install the snap ring in the right swingarm pivot.
Install the oil seals both pivots.
Install the pivot collar into the right pivot.



INSTALLATION

Install the drive chain slider.

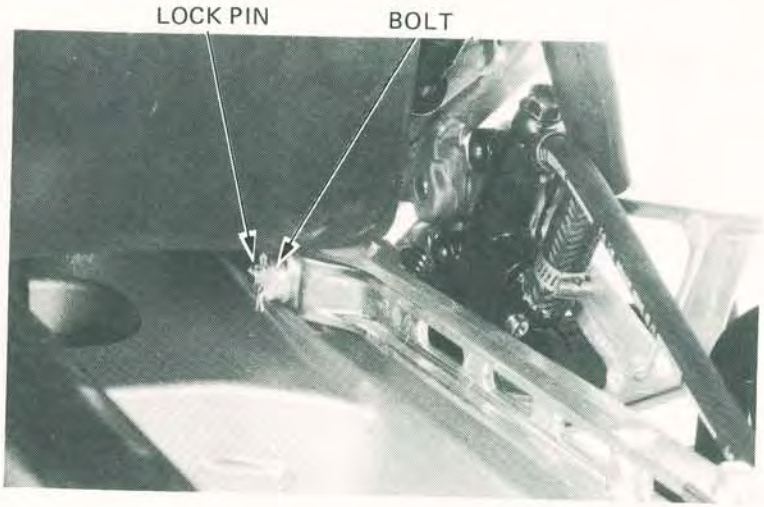
Install the swingarm in the frame.



Make sure that the rear brake torque rod's flanged washer is installed in the swingarm pivot.
Connect the rear brake torque rod to the swingarm and tighten the pivot bolt.

TORQUE: 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)

Secure the bolt with the lock pin.



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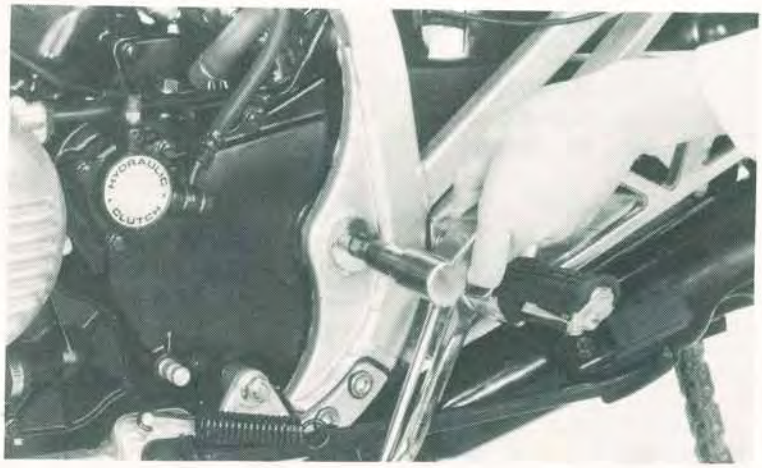
Install the left and right pivot bolts.
Tighten the right pivot bolt.

TORQUE: 85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)

Tighten the left pivot bolt.

TORQUE: 85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)



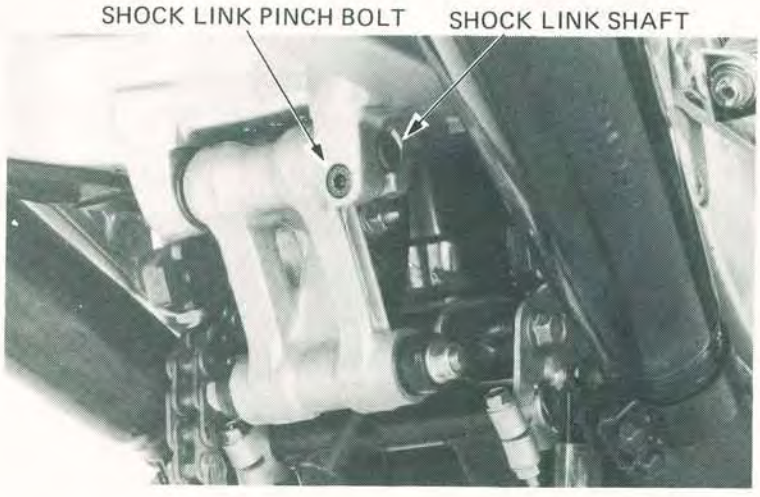
Connect the swingarm and shock link and install the shock link shaft and shock link pinch bolt.

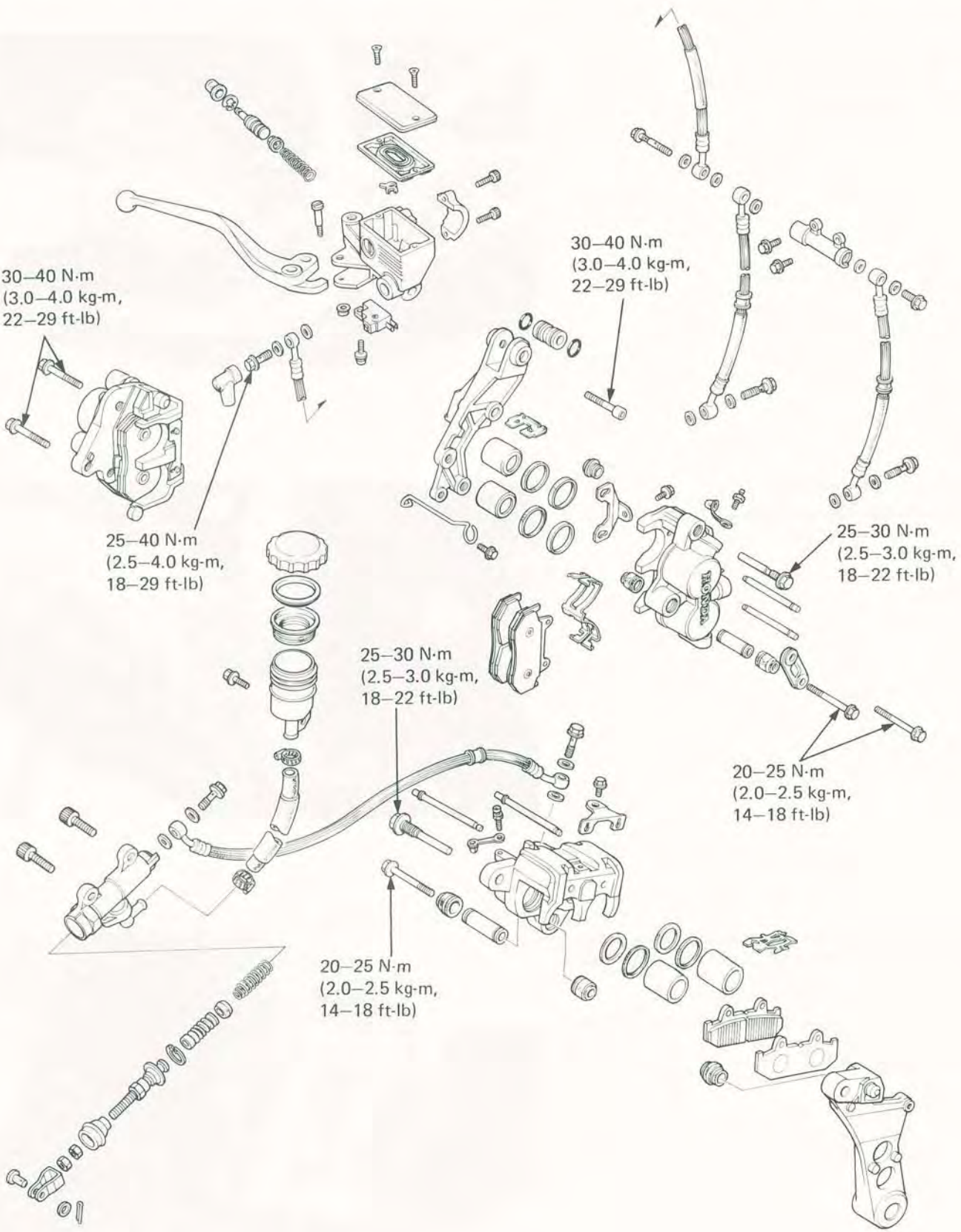
Tighten the shock link pinch bolt.

TORQUE: 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)

Install the right muffler.

Install the rear wheel (page 15–8).





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16. HYDRAULIC BRAKES

SERVICE INFORMATION

GENERAL

- The brake calipers can be removed without disconnecting the hydraulic system.
- Bleed the hydraulic system if it is disassembled or if the brake feels spongy.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling brake fluid on painted surfaces or instrument lenses, as severe damage can result.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT
Front disc thickness	4.5–5.2 mm (0.177–0.205 in)	4.0 mm (0.157 in)
Front disc runout	–	0.30 mm (0.012 in)
Front master cylinder I.D.	15.870–15.913 mm (0.6248–0.6265 in)	15.925 mm (0.6270 in)
Front master piston O.D.	15.827–15.854 mm (0.6231–0.6242 in)	15.815 mm (0.6226 in)
Front caliper piston O.D.	31.948–31.998 mm (1.2578–1.2598 in)	31.940 mm (1.2575 in)
Front caliper cylinder I.D.	32.030–32.080 mm (1.2610–1.2630 in)	32.090 mm (1.2634 in)
Rear master cylinder I.D.	14.000–14.043 mm (0.5512–0.5529 in)	14.055 mm (0.5533 in)
Rear master piston O.D.	13.957–13.984 mm (0.5495–0.5506 in)	13.945 mm (0.5490 in)
Rear caliper cylinder I.D.	27.000–27.050 mm (1.0630–1.0650 in)	27.060 mm (1.0654 in)
Rear caliper piston O.D.	26.918–26.968 mm (1.0598–1.0617 in)	26.910 mm (1.0594 in)
Rear disc thickness	6.5–7.2 mm (0.256–0.283 in)	6.0 mm (0.236 in)
Rear disc runout	–	0.30 mm (0.012 in)

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TORQUE VALUES

Front brake caliper bracket mount bolt (Right)	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Front brake caliper bracket mount bolt (Left-upper)	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
(Left-lower)	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Brake caliper mount bolt	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Brake caliper pivot bolt	25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
Brake hose oil bolt	25–40 N·m (2.5–4.0 kg-m, 18–29 ft-lb)
Rear brake actuating arm	10–15 N·m (1.0–1.5 kg-m, 7–11 ft-lb)

TOOL

Special

Snap ring pliers	07914–3230001 or equivalent in U.S.A.

TROUBLESHOOTING

Brake lever/pedal soft or spongy

1. Air bubbles in hydraulic system
2. Low fluid level
3. Hydraulic system leaking

Brake lever/pedal too hard

1. Sticking piston(s)
2. Clogged hydraulic system
3. Pads glazed or worn excessively

Brake drag

1. Hydraulic system sticking
2. Sticking piston(s)

Brakes grab

1. Pads contaminated
2. Disc or wheel misaligned

Brake chatter or squeal

1. Pads contaminated
2. Excessive disc runout
3. Caliper installed incorrectly
4. Disc or wheel misaligned

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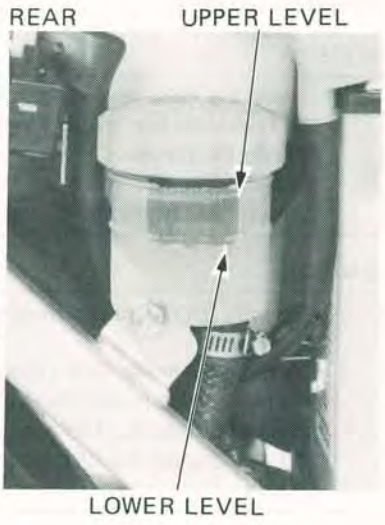
BRAKE FLUID REPLACEMENT/ AIR BLEEDING

Check the fluid level with the fluid reservoir parallel to the ground.

CAUTION

- *Install the cover on the reservoir whenever operating the brake lever or pedal. Failure to do so will allow brake fluid to squirt out of the reservoir during brake operation.*
- *Avoid spilling fluid on painted surfaces. Place clean shop towels over the fuel tank whenever the system is being serviced.*



BRAKE FLUID DRAINING

Connect a bleed hose to the bleed valve to avoid spilling fluid.

WARNING

A brake fluid contaminated brake disc or pad reduces stopping power. Discard pads and clean a contaminated disc with a high quality brake degreasing agent.

Loosen the caliper bleed valve and pump the brake lever or pedal.
Stop operating the lever or pedal when fluid stops flowing out of the bleed valve.

BRAKE FLUID FILLING

NOTE

Do not mix different types of fluid since they may not be compatible.

Close the bleed valve, fill the reservoir, and install the cover.
To prevent piston overtravel and brake fluid seepage, keep a 20 mm (3/4 in) spacer between the handlebar grip and lever when bleeding the front brake system. When bleeding the rear brake system depress the pedal only as far as its normal travel. Pump up the system pressure with the lever or pedal until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever or pedal resistance is felt.

AIR BLEEDING

NOTE

- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using the Mityvac Brake Bleeder, follow the manufacturer's instructions.

CAUTION

- *Use only **DOT4 brake fluid** from a sealed container.*
- *Do not mix brake fluid types and never reuse the contaminated fluid which has been pumped out during brake bleeding, because this will impair the efficiency of the brake system.*

Pump the brake lever or pedal to bring the caliper pads in contact with the disc.
Remove the master cylinder cap and fill the reservoir to near full.
Connect the Mityvac Brake Bleeder or equivalent to the bleeder valve.
Pump the brake bleeder and loosen the bleeder valve.
Add fluid when the fluid level in the master cylinder reservoir is low.
Repeat above procedures until air bubbles do not appear in the plastic hose.

NOTE

If air is entering the bleeder from around the bleeder valve threads, seal the threads with teflon tape.

If a Mityvac Brake Bleeder or equivalent not available, bleed the system as follows:

1) Connect a bleeder tube to the bleeder valve.
2) Squeeze the brake lever or depress the brake pedal, open the bleed valve 1/2 turn and then close the valve.

NOTE

Do not release the brake lever or pedal until the bleed valve has been closed.

3) Release the brake lever or pedal slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1 and 2 until bubbles cease to appear in the fluid at the end of the hose.

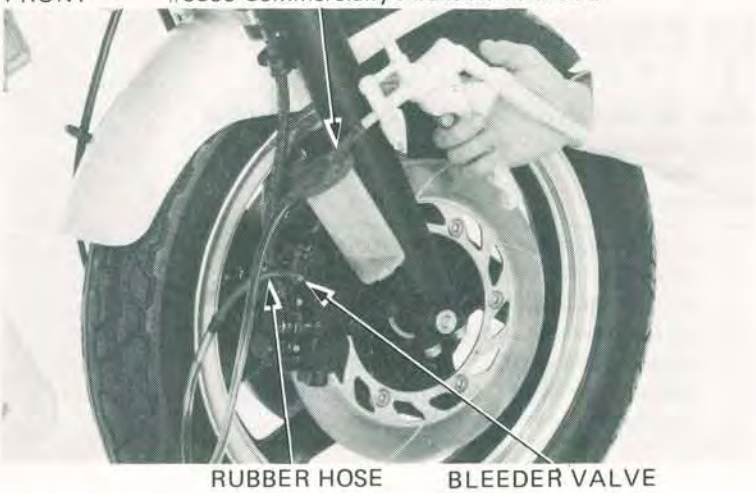
Fill the fluid reservoir to the upper level mark.

WARNING

A brake fluid contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

MITYVAC BRAKE BLEEDER
#6860-Commercially Available in U.S.A.

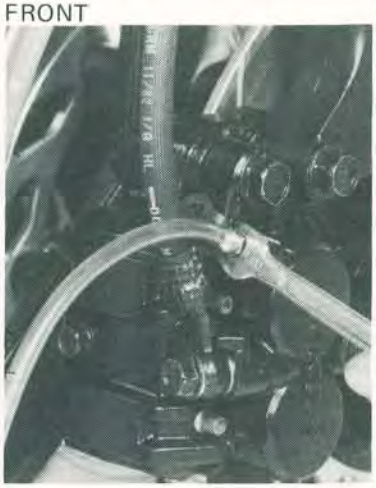
FRONT



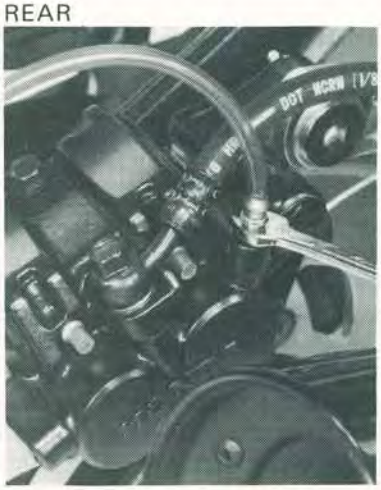
MITYVAC BRAKE BLEEDER
#6860-Commercially Available in U.S.A.

REAR

FRONT



REAR



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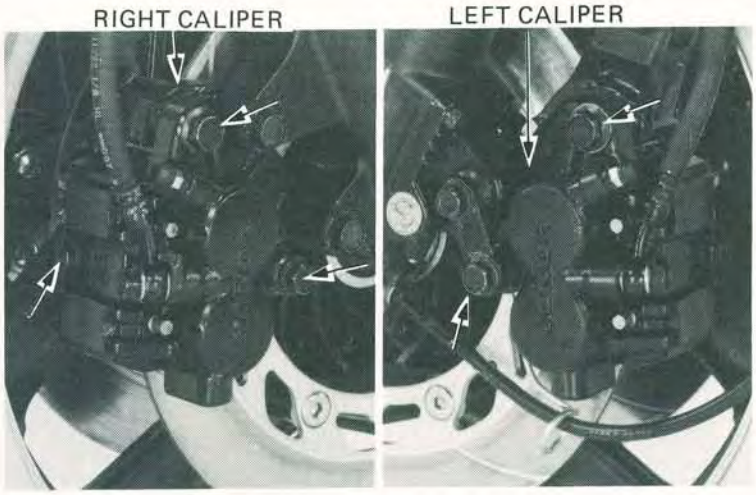
BRAKE PAD/DISC

FRONT PAD REPLACEMENT

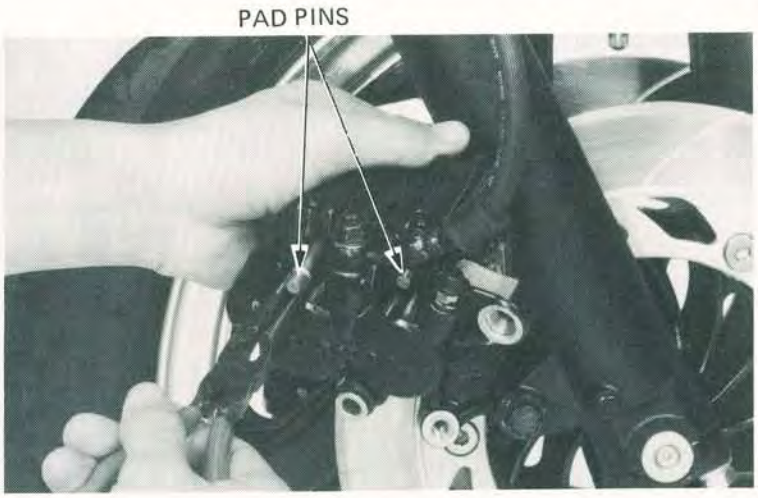
NOTE

> Always replace the brake pads in pairs to assure even disc pressure.

Remove the pad pin retainer bolt.
Right caliper: Remove the caliper bolt and pivot bolt.
Left caliper: Remove the caliper pivot bolt and anti-dive link bolt.
Remove the caliper from the bracket.

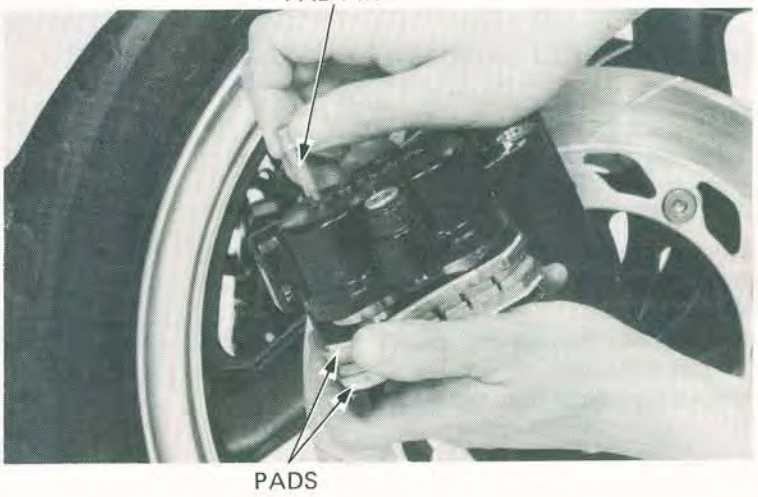


Remove the pad pin retainer and pull the pad pins out of the caliper.
Remove the brake pads.



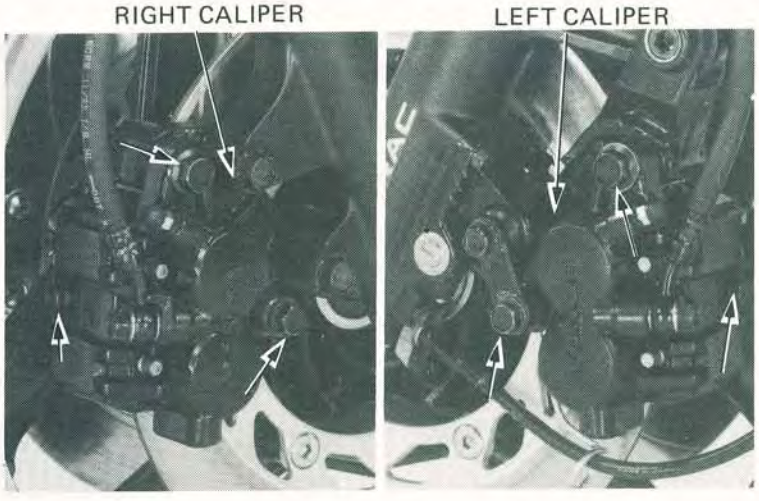
Position the pad spring in the caliper as shown.
Push the caliper pistons in all the way.

Install the new pads in the caliper.
Install the pad pins, one pad pin first, then install the other pin by pushing the pads against the caliper to depress the pad spring.



Place the pad pin retainer over the pad pins. Push the retainer down to secure the pins.

Install the pad pin retainer bolt.
Install the caliper to the bracket so the disc is positioned between the pads, being careful not to damage the pads.
Right caliper: Tighten the caliper bolt and pivot bolt.
Left caliper: Tighten the caliper pivot bolt and anti-dive link bolt.



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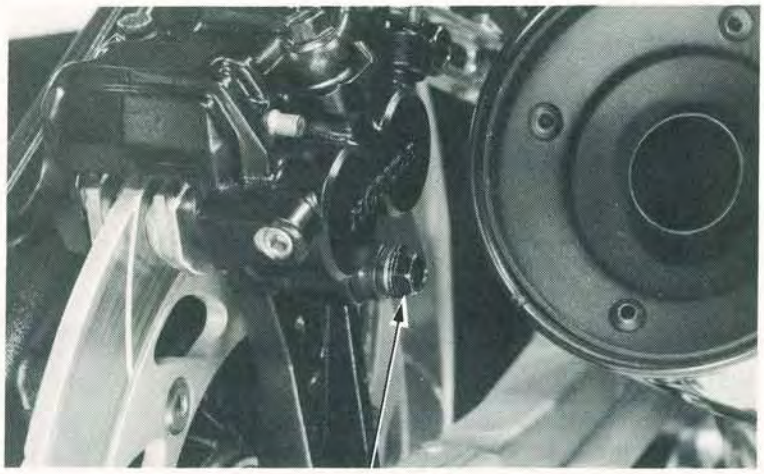
REAR BRAKE PAD REPLACEMENT

Loosen the caliper bolt and remove it from the caliper bracket.
Pivot the caliper up out of the way.
Replace the rear brake pads using the same method as used for front brake pad replacement.



CALIPER BOLT

DISC THICKNESS

Measure the thickness of each disc.

SERVICE LIMIT:
FRONT: 4.0 mm (0.16 in)
REAR: 6.0 mm (0.24 in)

BRAKE DISC WARPAGE

Measure brake disc for warpage.

SERVICE LIMIT: 0.30 mm (0.012 in)

FRONT MASTER CYLINDER

DISASSEMBLY

Drain brake fluid from the hydraulic system. Remove the brake lever and rear view mirror from the master cylinder. Disconnect the brake hose.

CAUTION

Avoid spilling brake fluid on painted surfaces. Place a rag over the fuel tank whenever the brake system is being serviced.

NOTE

When removing the fluid hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

Disconnect the front brake switch wires.
Remove the front brake master cylinder.

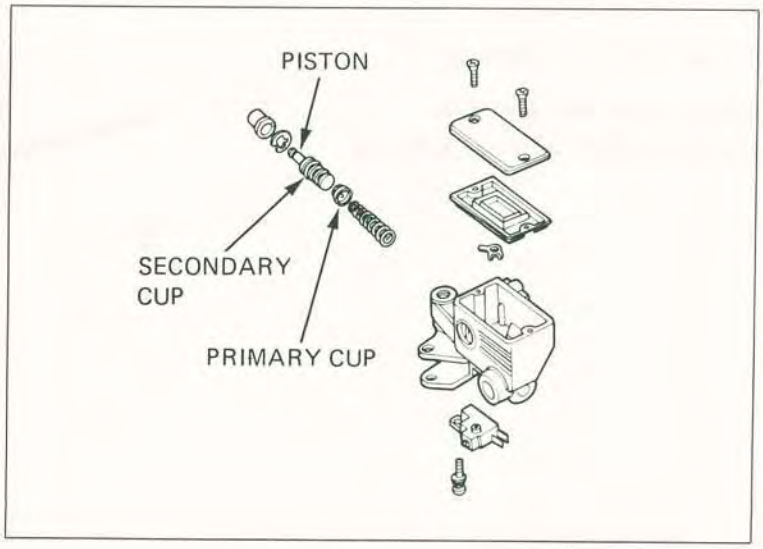
Remove the piston boot and the snap ring from the master cylinder body.

SNAP RING PLIERS or EQUIVALENT IN U.S.A.
07914–3230001

Remove the secondary cup and piston. Then remove the primary cup and spring.

Remove the brake light switch from the master cylinder body, if necessary.

Clean the inside of the master cylinder and reservoir with brake fluid.



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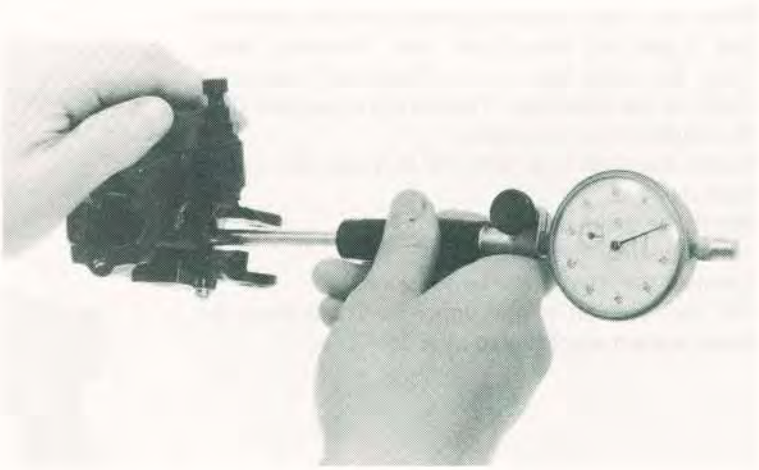
INSPECTION

Measure the master cylinder I.D.
Check the master cylinder for scores, scratches or nicks.

SERVICE LIMIT: 15.925 mm (0.6270 in)



Measure the master piston O.D.

SERVICE LIMIT: 15.815 mm (0.6226 in)

Check the primary and secondary cups for damage before assembly.

ASSEMBLY

CAUTION

Keep the master cylinder piston, cylinder and spring as a set; don't substitute individual parts.

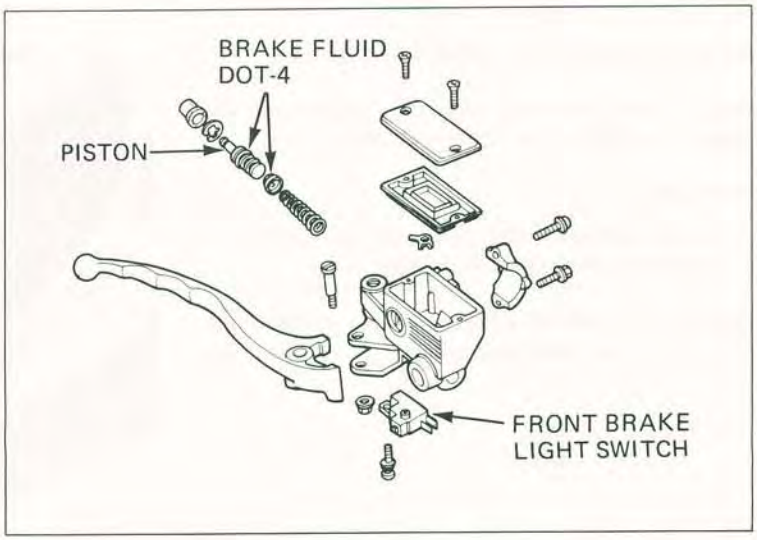
Assemble the master cylinder. Coat all parts with clean brake fluid before assembly. Install the spring and primary cup together.

Dip the piston cup in brake fluid before assembly.

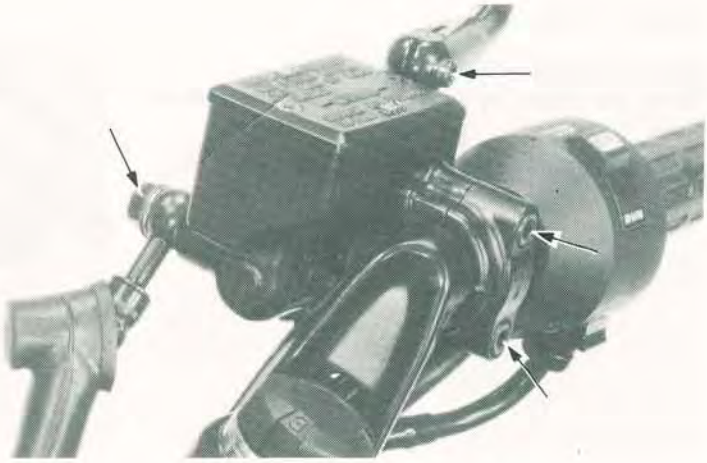
CAUTION

When installing the cups, do not allow the lips to turn inside out and be certain the snap ring is firmly seated in the groove.

Install the piston and snap ring.
Install the boot.



Place the front master cylinder on the handlebar and install its clamp and two mounting bolts. Align the index mark on the clamp with the punch mark on the handlebar. Tighten the upper bolt first, then tighten the lower bolt.
Install the fluid hose with the bolt and two sealing washers.
Install the brake lever.
Install the rear view mirror.
Connect the front brake switch wires.
Fill the reservoir to the upper level and bleed the brake system according to page 16-4.



BRAKE CALIPERS

FRONT BRAKE CALIPER REMOVAL

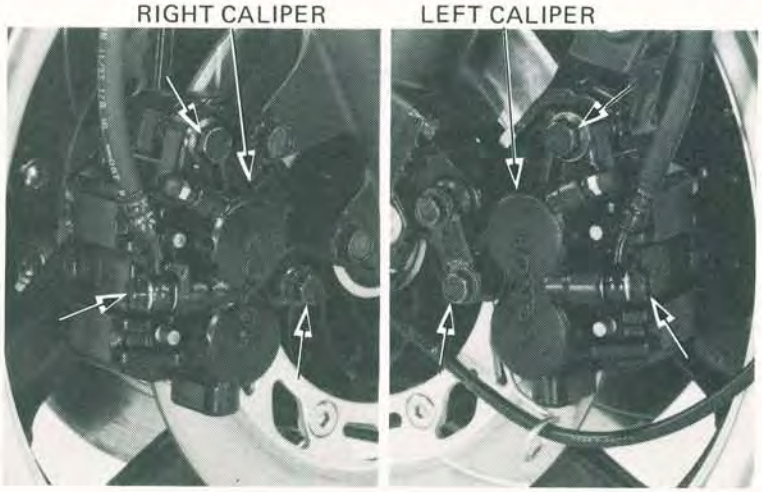
Place a clean container under the caliper and disconnect the brake hose from the caliper.

CAUTION

Avoid spilling brake fluid on painted surfaces.

Right caliper: Remove the caliper pivot bolt and caliper bolt, and remove the caliper.
Left caliper: Remove the caliper pivot bolt and anti-dive link bolt, and remove the caliper.

RIGHT CALIPER LEFT CALIPER



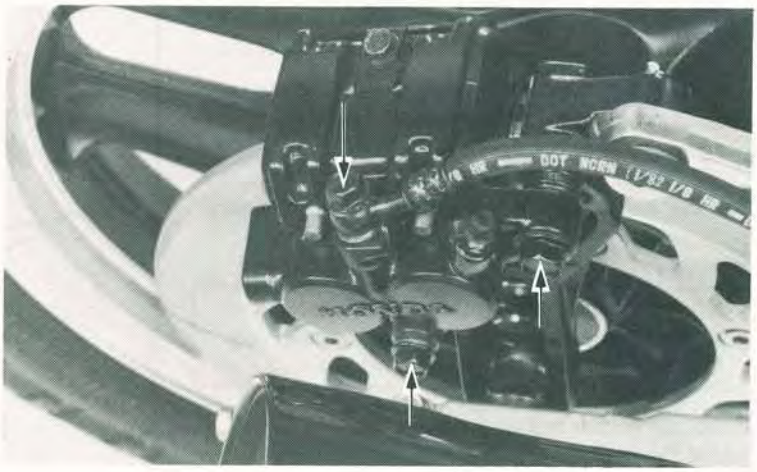
REAR BRAKE CALIPER REMOVAL

Place a clean container under the caliper and disconnect the brake hose from the caliper.

CAUTION

Avoid spilling brake fluid on the painted surfaces to prevent paint damage.

Remove the caliper pivot bolt and caliper bolt, and remove the rear brake caliper.



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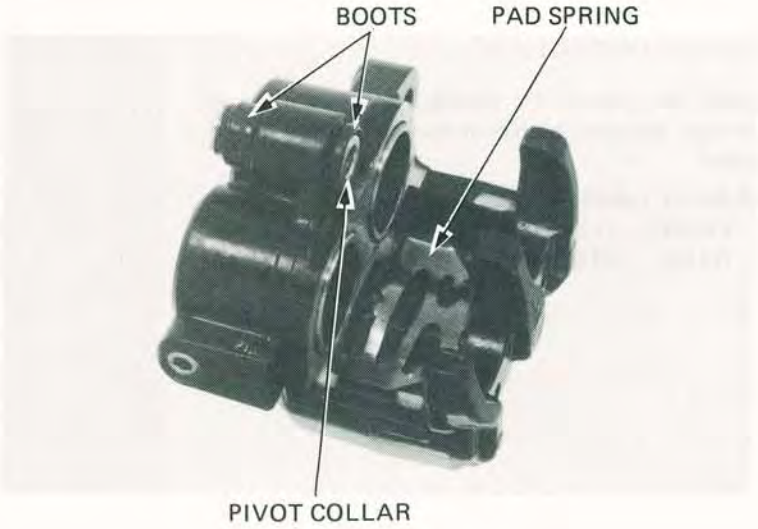
DISASSEMBLY

Remove the brake pads (page 16-5).
Remove the pad spring.
Remove the caliper pivot collar and boots.
Remove the pistons from the caliper.



If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place a shop rag under the caliper to cushion the piston when it is forced out. Use the air in short spurts.

WARNING

Do not bring the nozzle too close to the inlet.

Examine the pistons and cylinders for scoring, scratches or other damage and replace if necessary.

Push the piston seals in and lift them out, then discard them.
Clean the piston seal grooves with brake fluid.

CAUTION

Be careful not to damage the piston sliding surfaces.

PISTON INSPECTION

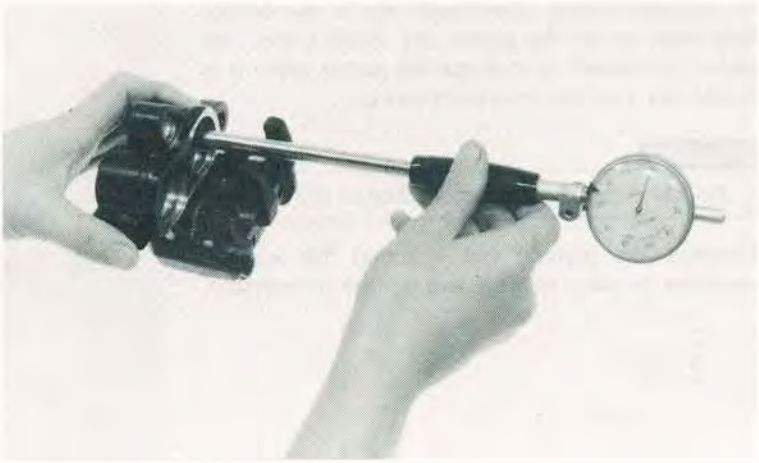
Check the pistons for scoring, scratches or other damage. Measure the piston diameter with a micrometer.

SERVICE LIMIT:
FRONT: 31.940 mm (1.2575 in)
REAR: 26.910 mm (1.0594 in)

CYLINDER INSPECTION

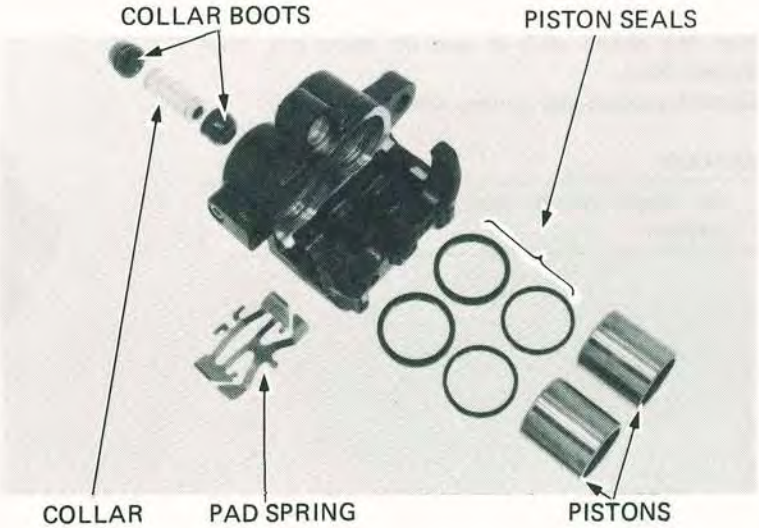
Check the caliper cylinder for scoring, scratches or other damage. Measure the caliper cylinder bore.

SERVICE LIMIT:
FRONT: 32.090 mm (1.2634 in)
REAR: 27.060 mm (1.0654 in)



ASSEMBLY

If the collar boots are hardened or deteriorated, replace them with new ones.
The piston seals must be replaced with new ones whenever they are removed. Coat the seals with silicone grease or brake fluid before assembly.
Install the pistons with the dished ends toward the pads.
Apply midium grade of Hi-Temperature silicon grease to the collar and inside of the collar grease.
Install the collar boots and collar making sure that the boots are seated in the collar and caliper grooves properly.
Install the pad spring.
Install the pads (page 16-5).



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FRONT BRAKE CALIPER INSTALLATION

Make sure that the retainer clip is in position on the caliper bracket.
Inspect the condition of the caliper pivot boot.
Apply silicone grease to the caliper pivot bolt.

Install the caliper assembly over the brake disc so that the disc is positioned between the pads.

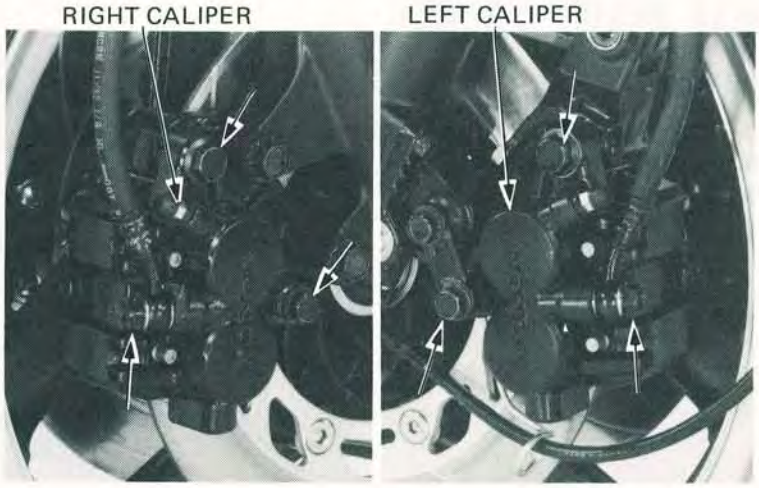
CAUTION

Be careful not to damage the pads.

Right caliper: Install the caliper pivot bolt and caliper bolt, and tighten them securely.
Left caliper: Install the caliper pivot bolt and anti-dive link bolt, and tighten them securely.

Connect the brake hose to the caliper with the bolt and two sealing washers.

Fill the brake fluid reservoir and bleed the brake system (page 16-4).



REAR BRAKE CALIPER INSTALLATION

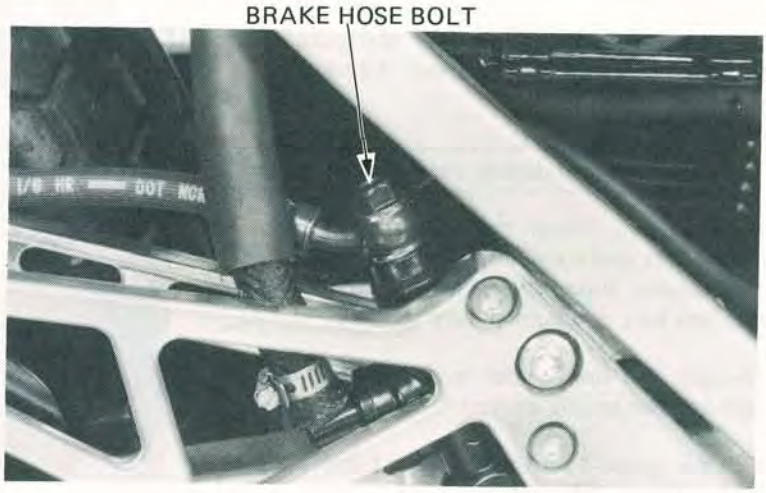
Make sure that the retainer clip is in position on the caliper bracket.
Inspect the condition of the caliper pivot boot.
Apply silicone grease to the caliper pivot bolt.

Install the caliper assembly over the brake disc so that the disc is positioned between the pads, being careful not to damage the pads.
Install the caliper pivot bolt and caliper bolt and tighten them securely.
Connect the brake hose to the caliper with the bolt and two sealing washers.
Fill the rear brake fluid reservoir and bleed the rear brake system (page 16-4).

REAR MASTER CYLINDER

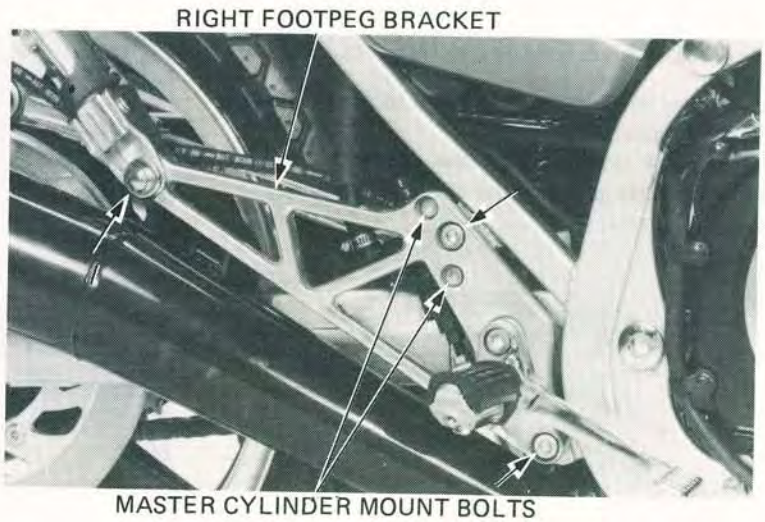
REMOVAL

Drain the rear brake hydraulic system (page 16-3).
Remove the brake hose bolt and disconnect the brake hose.



Loosen the rear master cylinder mount bolts.
Remove the right footpeg bracket.

Unhook the rear brake switch spring from the rear brake actuating arm.



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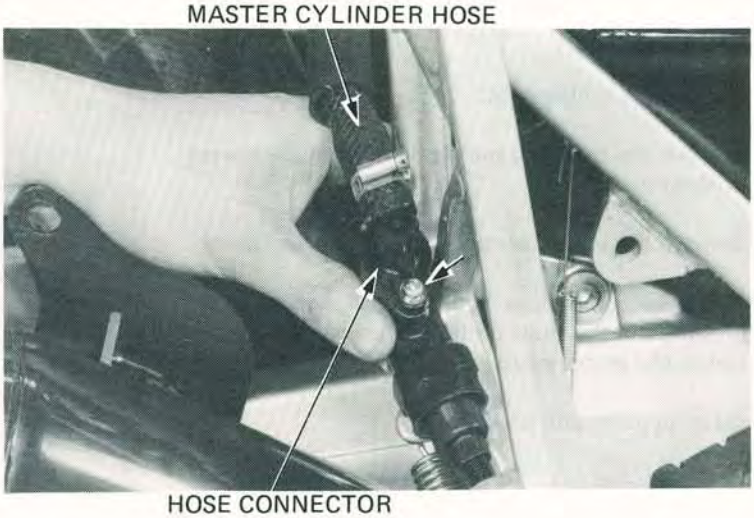
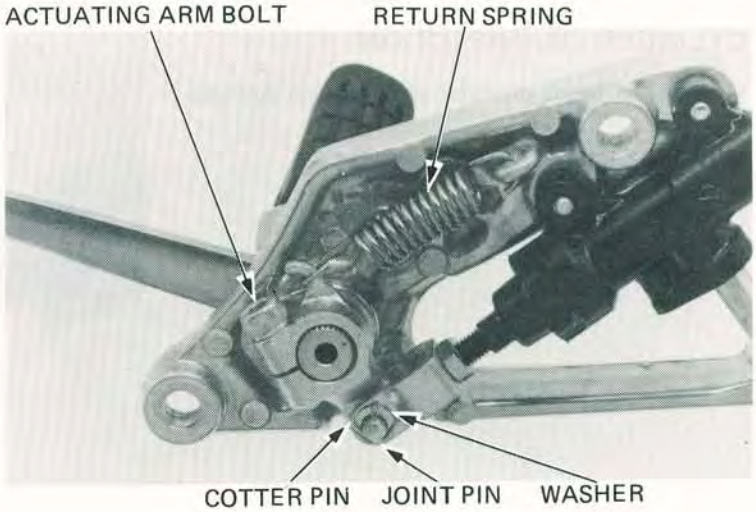
Remove the hose connector screw and disconnect the master cylinder hose.

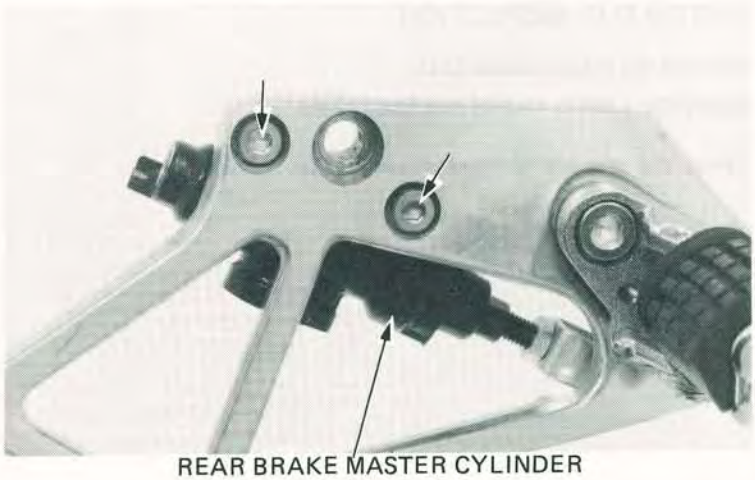


Unhook the rear brake pedal return spring.
Remove the rear brake actuating arm bolt and the middle arm.

Remove the cotter pin, washer and joint pin, and disconnect the brake actuating arm from the master cylinder push rod.



Remove the rear master cylinder from the footpeg bracket.



DISASSEMBLY

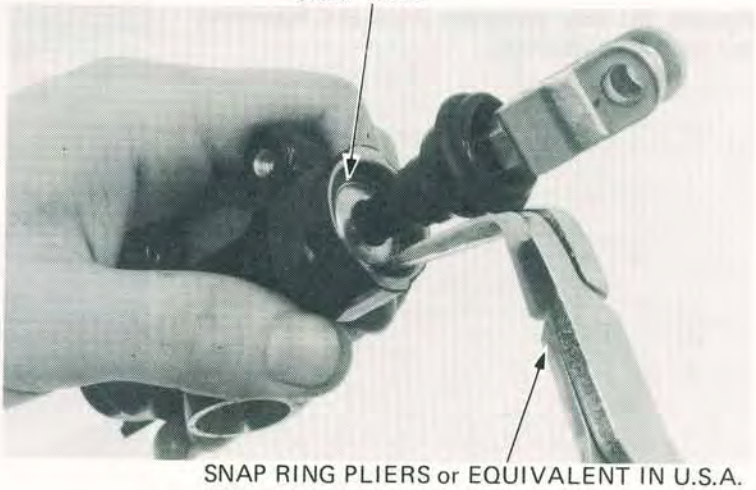
Remove the rubber boot.

Remove the snap ring and push rod from the master cylinder body.

Remove the master piston, primary cup and spring.

It may be necessary to apply a small amount of air pressure to the fluid outlet to remove the master piston and primary cup.

Clean all parts with brake fluid.



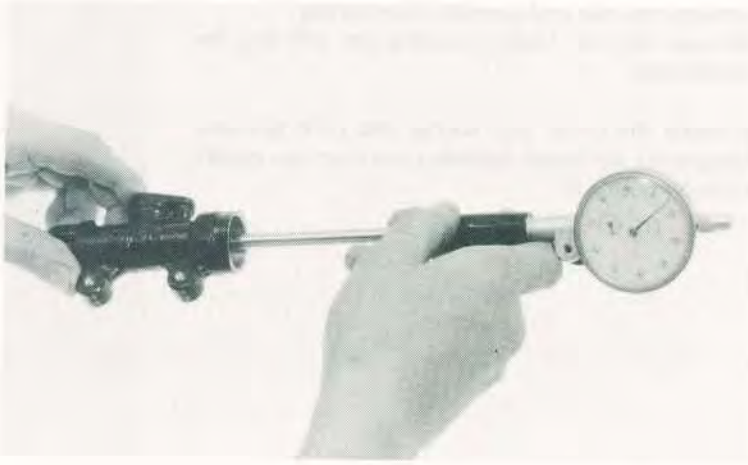
SNAP RING PLIERS or EQUIVALENT IN U.S.A.
07914–3230001

CYLINDER I.D. INSPECTION

Measure the inside diameter of the master cylinder bore.

SERVICE LIMIT: 14.055 mm (0.5533 in)

Check for scores, scratches or nicks.



PISTON O.D. INSPECTION

Measure the master piston O.D.

SERVICE LIMIT: 13.945 mm (0.5490 in)

Check the primary cup and piston cup for damage.

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ASSEMBLY

CAUTION

Keep the master cylinder piston, cylinder and spring as a set; do not substitute individual parts.

Assemble the master cylinder.
Coat all parts with clean brake fluid.

Dip the piston cup in brake fluid before assembly.

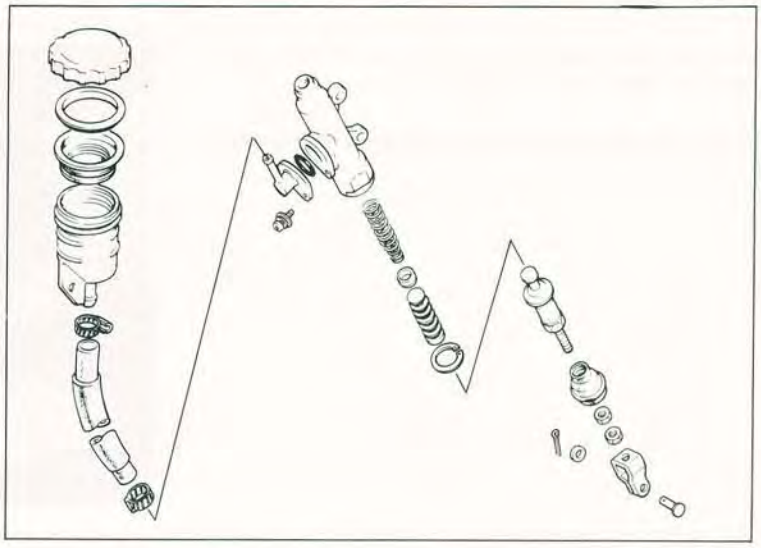
CAUTION

When installing the cups, do not allow the lips to turn inside out and be certain the snap ring is seated firmly in the groove.

Install the primary cup and piston.

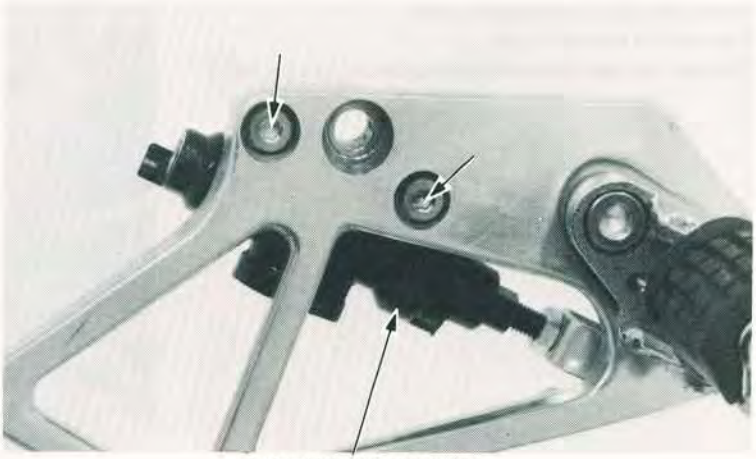
Install the push rod and snap ring.

Install the rubber cover.



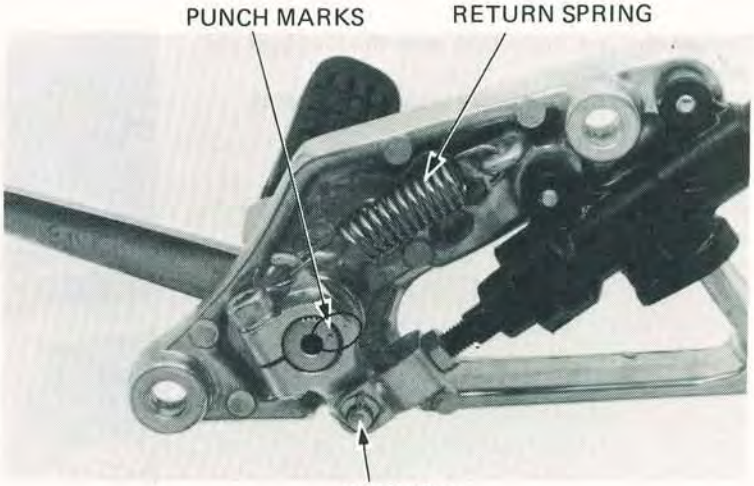
INSTALLATION

Install the master cylinder to the right footpeg bracket.



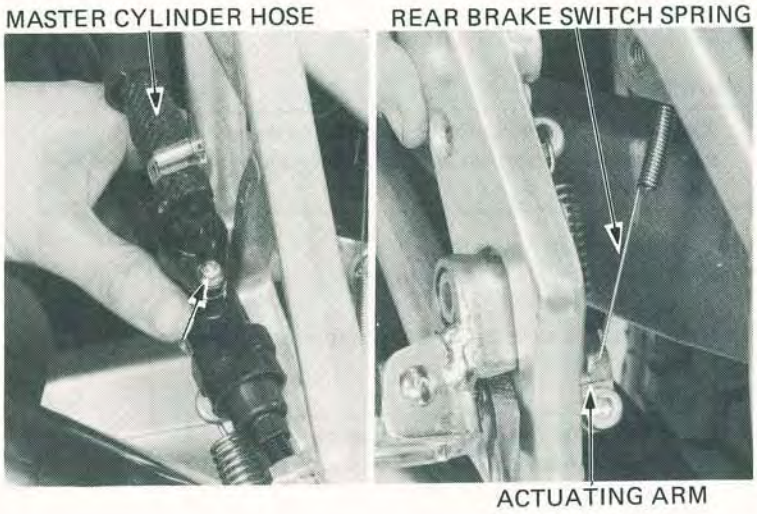
MASTER CYLINDER

Connect the rear brake actuating arm to the master cylinder push rod with the joint pin, and secure the joint pin with the washer and a new cotter pin.
Install the actuating arm onto the rear brake pedal shaft, aligning the punch marks on the arm and shaft.
Hook the rear brake pedal return spring to the actuating arm.
Tighten the actuating arm bolt.
TORQUE: 10–15 N·m (1.0–1.5 kg-m, 7–11 ft-lb)

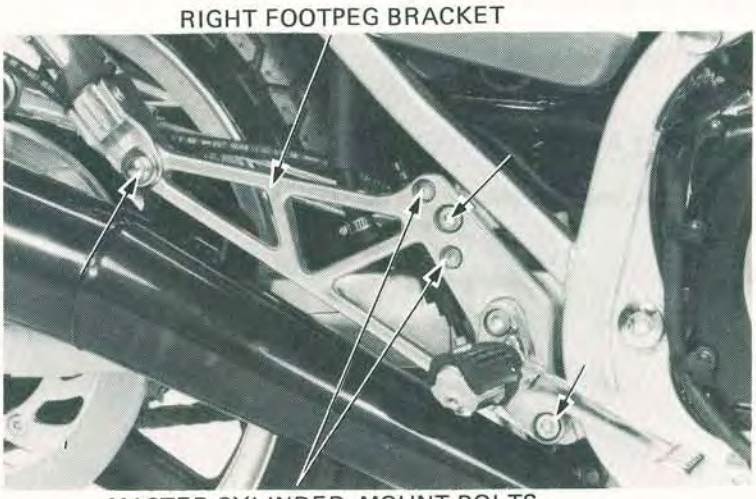


Connect the master cylinder hose to the master cylinder with a new O-ring and screw.

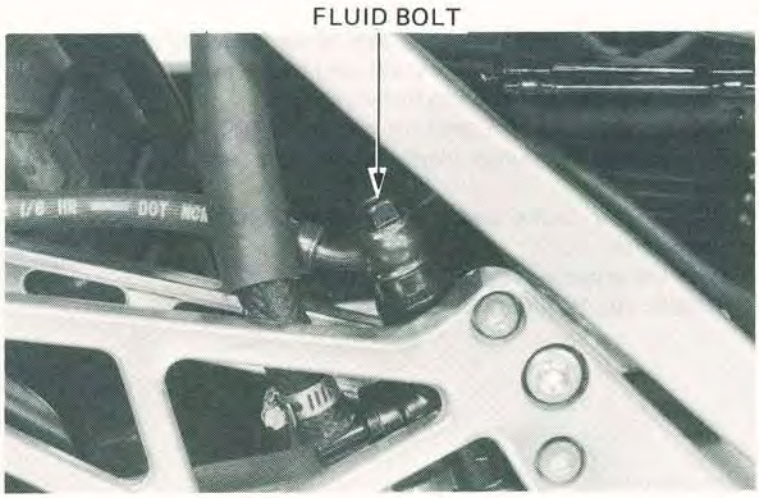
Hook the rear brake switch spring to the actuating arm.



Install the right footpeg bracket.
Tighten the bracket bolt.
Tighten the rear brake master cylinder mount bolts.



Connect the rear brake hose with the fluid bolt and two sealing washers.
Fill and bleed the rear brake system (page 16-4).



Date of Issue: January, 1983

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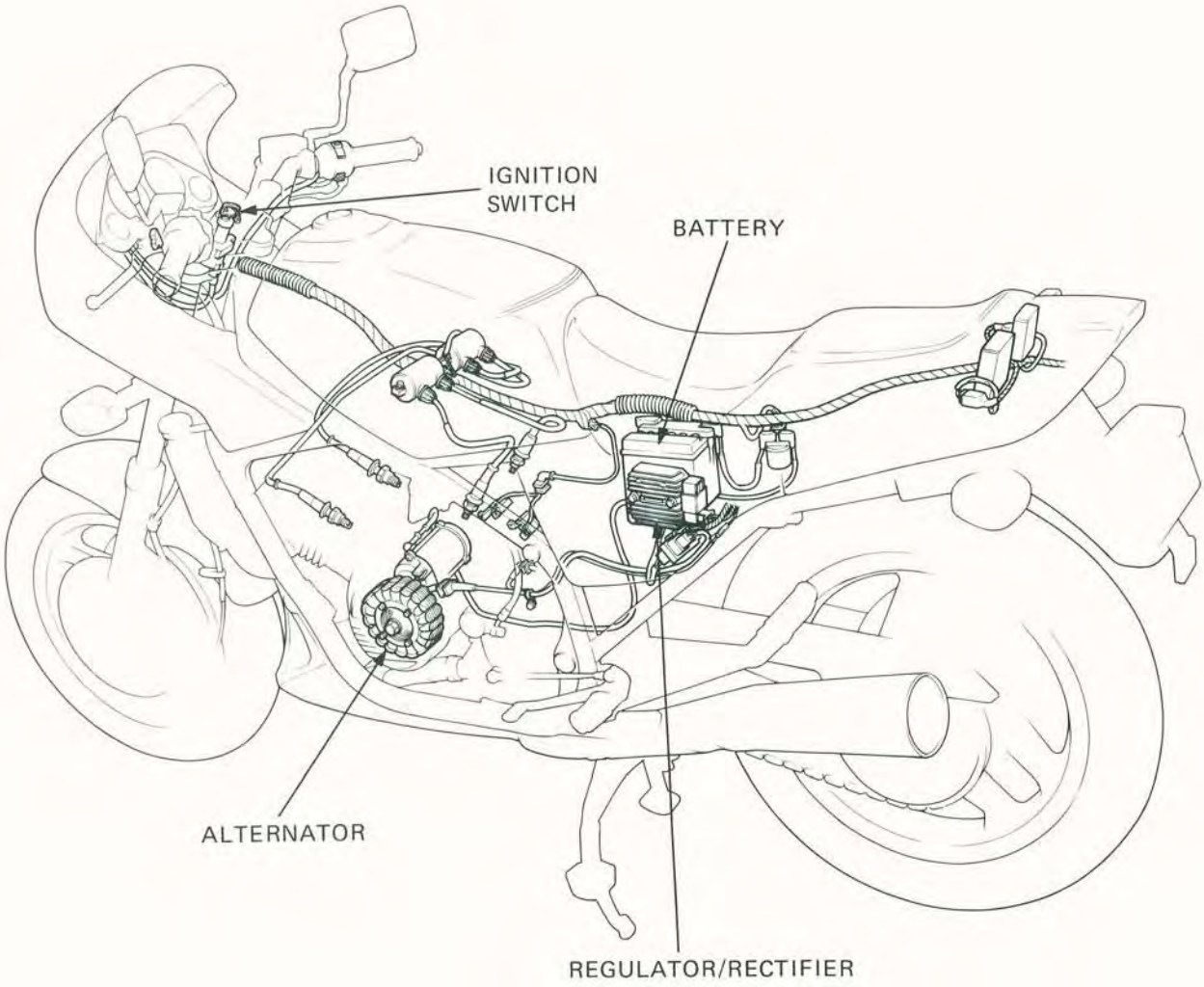
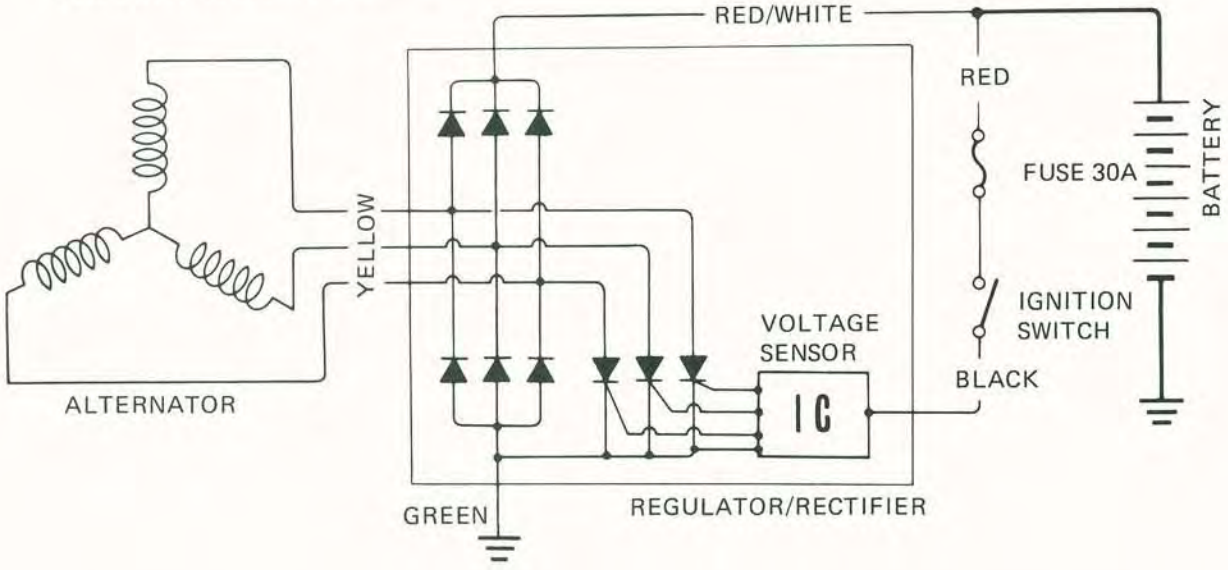


BATTERY/CHARGING SYSTEM



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17. BATTERY/CHARGING SYSTEM

SERVICE INFORMATION

GENERAL

- Battery fluid level should be checked regularly. Fill with distilled water when necessary.
- Quick charge a battery only in an emergency; slow-charging is preferred.
- Remove the battery from the motorcycle for charging. If the battery must be charged on the motorcycle, disconnect the battery cables.

WARNING

Do not smoke or allow flames near a charging battery. The gas produced by a battery will explode if flames or sparks are brought near.

- All charging system components can be tested on the motorcycle.
- Alternator removal is in Section 9.

SPECIFICATIONS

Battery	Capacity	12V 14AH
	Specific gravity	1.280/20°C (68°F)
	Charging rate	1.4 amperes maximum
Voltage regulator	Type	Transistorized non-adjustable regulator
	Regurate voltage	14.0 V–15.0 V

17

TROUBLESHOOTING

No power – key turned on:

1. Dead battery
   - Low fluid level
   - Low specific gravity
   - Charging system failure
2. Disconnected battery cable
3. Main fuse burned out
4. Faulty ignition switch

Low power – key turned on:

1. Weak battery
   - Low fluid level
   - Low specific gravity
   - Charging system failure
2. Loose battery connection

Low power – engine running:

1. Battery undercharged
   - Low fluid level
   - One or more dead cells
2. Charging system failure

Intermittent power:

1. Loose battery connection
2. Loose charging system connection
3. Loose starting system connection
4. Loose connection or short circuit in ignition system
5. Loose connection or short circuit in lighting system

Charging system failure:

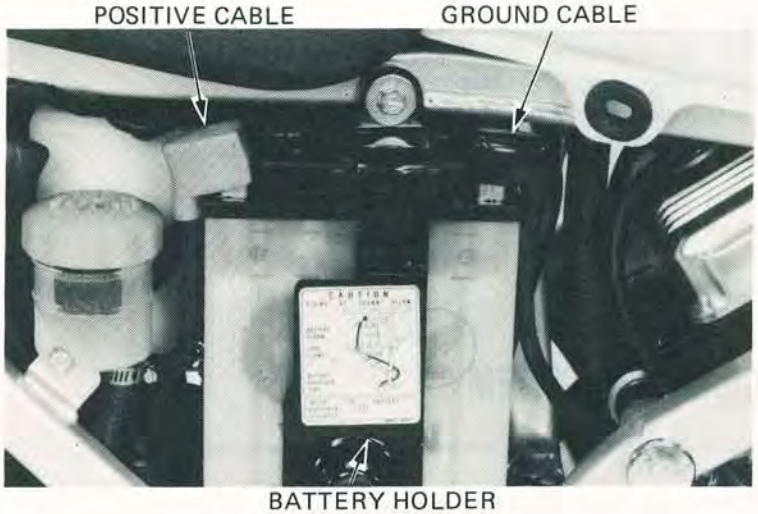
1. Loose, broken or shorted wire or connection
2. Faulty voltage regulator/rectifier
3. Faulty alternator

Date of Issue: January, 1983

BATTERY

REMOVAL

Remove the battery holder bolt, then swing the holder out of the way.
Disconnect the negative cable at the battery, then disconnect the positive cable.
Disconnect the battery breather hose from the battery.
Remove the battery.



BATTERY HOLDER

TESTING SPECIFIC GRAVITY

Test each cell with a hydrometer.

SPECIFIC GRAVITY: 1.270–1.290 (20°C, 68°F)

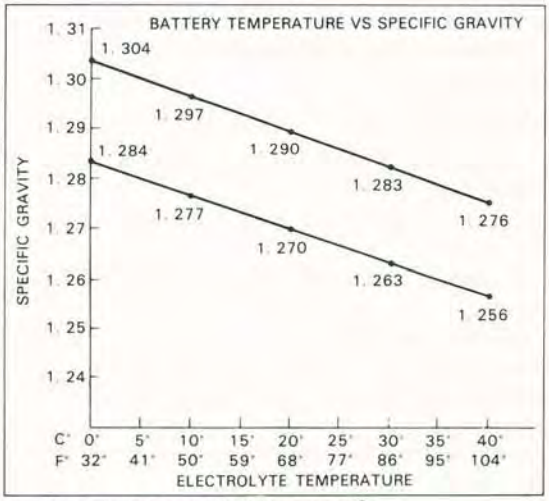
1.270–1.290	Fully charged
Below 1.260	Undercharged

NOTES

- The battery must be recharged if the specific gravity is below 1.230.
- The specific gravity varies with the temperature as shown in the accompanying table.
- Replace the battery if sulfation is evident or if the space below the cell plates is filled with sediment.

WARNING

The battery contains sulfuric acid. Avoid contact with skin, eyes, or clothing.
Antidote: Flush with water and get prompt medical attention.

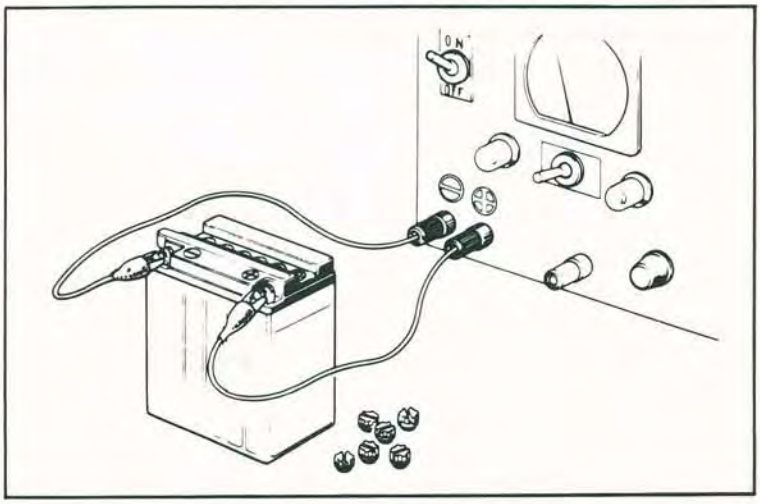


Specific gravity changes by 0.007 for every 10°C.

CHARGING

Remove the battery cell caps.
Fill the battery cells with distilled water to the upper level line, if necessary.
Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (–) cable to the battery negative (–) terminal.

Charging current: 1.4 amperes max.
Charge the battery until specific gravity is 1.270–1.290 at 20°C (68°F).



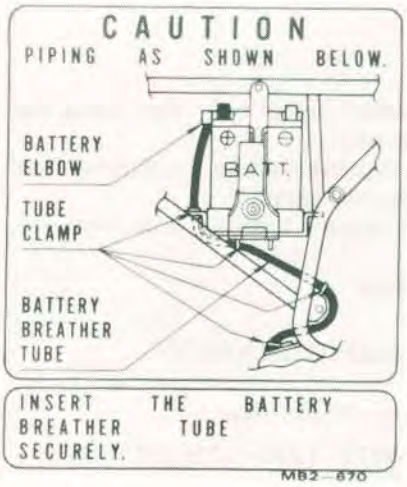
WARNING

- *Before charging a battery, remove the cap from each cell.*
- *Keep flames and sparks away from a charging battery.*
- *Turn power ON/OFF at the charger, not at the battery terminals to prevent sparks.*
- *Discontinue charging if the electrolyte temperature exceeds 45°C (113°F).*

CAUTION

- *Quick-charging should only be done in an emergency; slow-charging is preferred.*
- *Route the breather tube as shown on the battery caution label.*

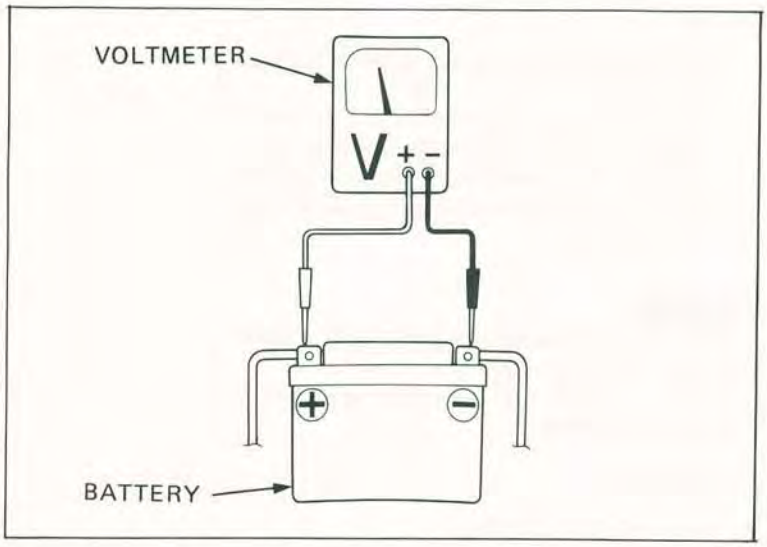
After installing the battery, coat the terminals with clean grease.



CHARGING SYSTEM

Warm the engine and warm it up to operating temperature.
Remove the frame right side cover and seat.
Connect the voltmeter between the battery terminals as shown.
Start the engine and allow it idle.
Check the voltage by raising the engine speed gradually. The voltage should be maintained with in thc regurate voltage.

REGURATE VOLTAGE: 14.0–15.0 V



If voltage is exceedes 15 V when raising the engine speed, the likelihood is:

- Open or short circuit (black wire of the regurator/rectifier)
- Loose or poorly contacted regurator/rectifier coupler
- Faulty regurator/rectifier

If the voltage is do not increase from the battery voltage when raising the engine speed, the likelihood is:

- Open or short circuit between the alternator and regurator/rectifier
- Loose or poorly contacted alternator or regurator/rectifier couplers
- Open circuit in wire harness (red/white or green wires)
- Faulty alternator or regurator/rectifier

Date of Issue: Nov., 1985

STATOR CONTINUITY TEST

Remove the left side cover.
Disconnect the alternator and regulator/rectifier coupler.
Check for continuity between the leads, and between the leads and ground.
Replace the stator if there is no continuity between the leads, or if there is continuity between the leads and ground.

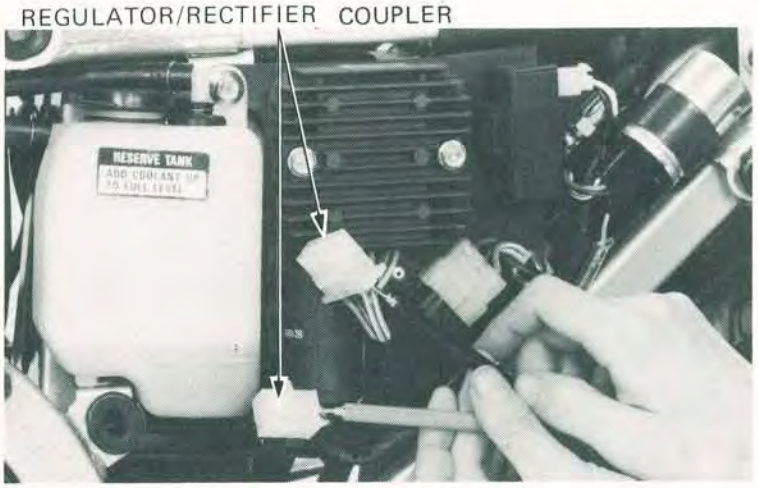
VOLTAGE REGULATOR/RECTIFIER TEST

Remove the left side cover.
Disconnect the regulator/rectifier couplers.

Check for continuity between the leads with an ohmmeter.

NOTE

> The test results shown are for a positive ground ohmmeter and the opposite results will be obtained when a negative ground ohmmeter is used.

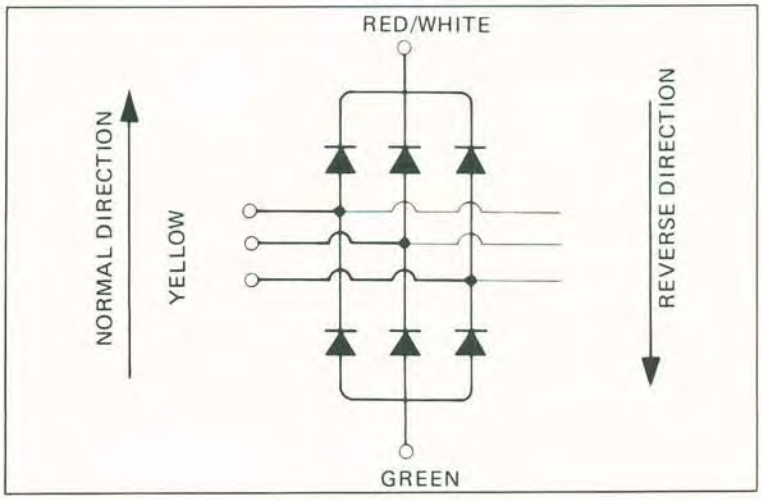


NORMAL DIRECTION: CONTINUITY

	⊕ probe	⊖ probe
I	YELLOW	GREEN
II	RED/WHITE	YELLOW

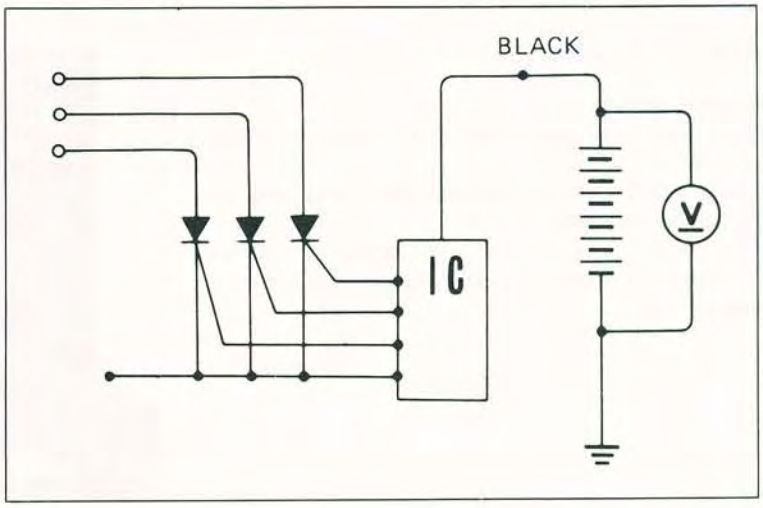
REVERSE DIRECTION: NO CONTINUITY

	⊕ probe	⊖ probe
I	GREEN	YELLOW
II	YELLOW	RED/WHITE



VOLTAGE REGULATOR PERFORMANCE TEST

Connect a voltmeter across the battery.
Check regulator performance with the engine running. The regulator must divert current to ground when battery voltage reaches 14.0 ~ 15.0 V.



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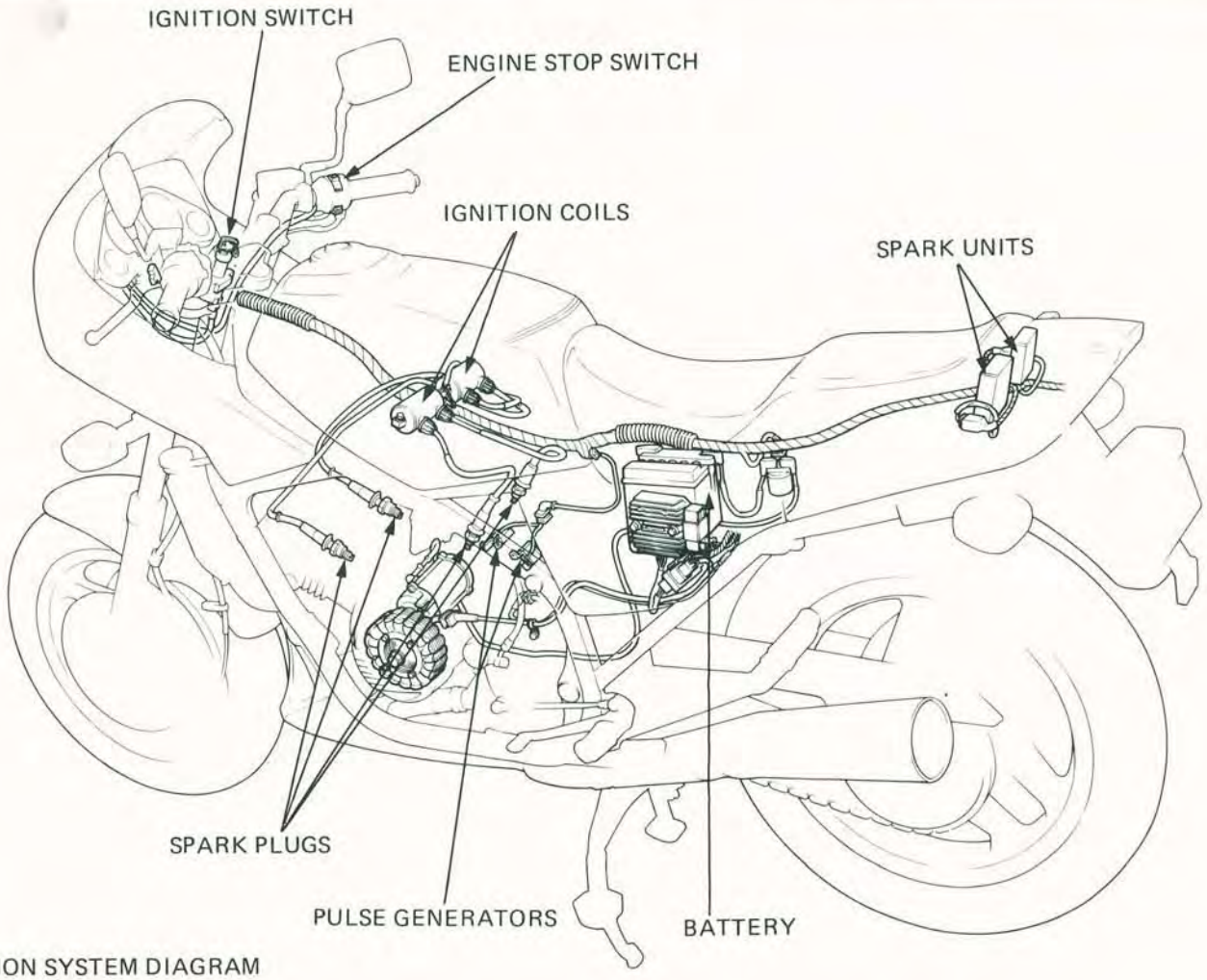
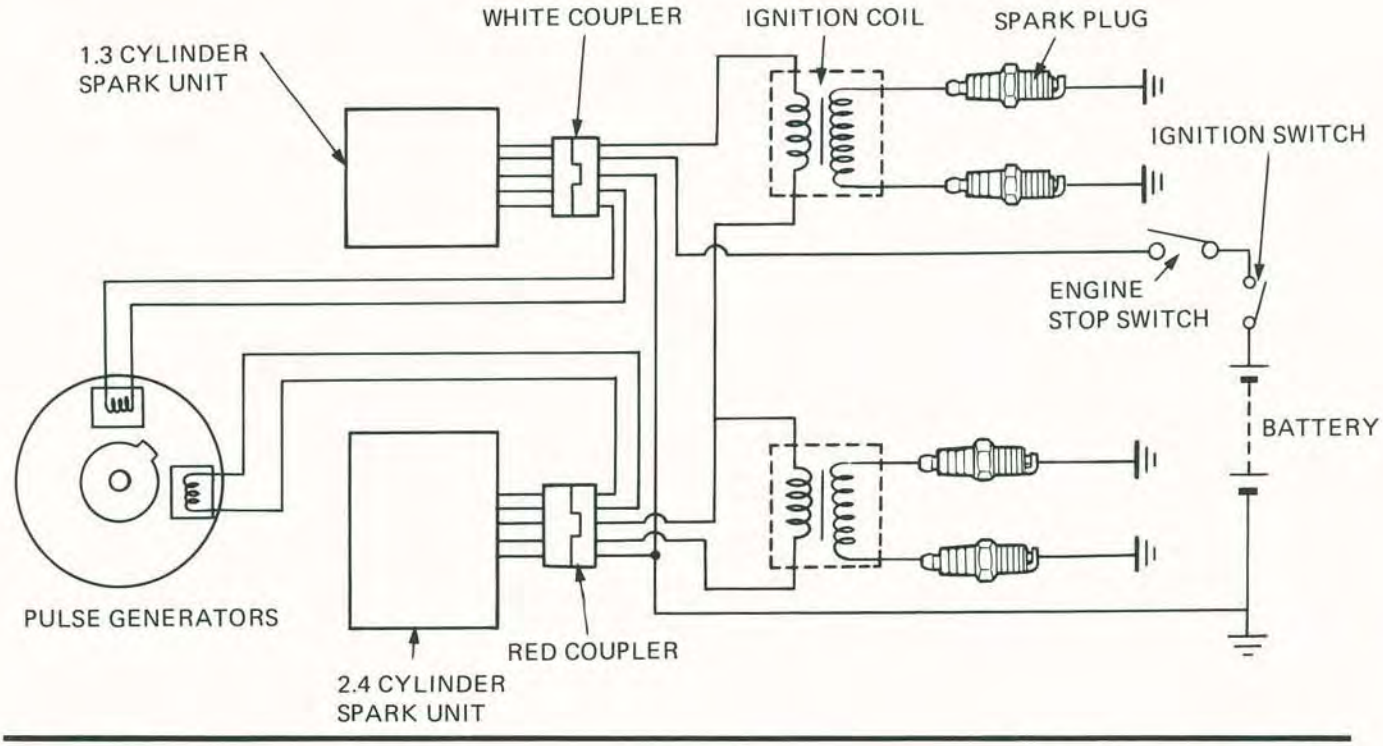
MEMO



IGNITION SYSTEM DIAGRAM



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18. IGNITION SYSTEM

SERVICE INFORMATION

GENERAL

- A TRANSISTORIZED IGNITION SYSTEM is used and no adjustments can be made.

SPECIFICATIONS

		ND	NGK
Spark plug	Standard	X24EPR-U9	DPR8EA-9
	For cold climate Below 5°C (41°F)	X22EPR-U9	DPR7EA-9
	For extended high speed driving	X27EPR-U9	DPR9EA-9
Spark plug gap		0.8–0.9 mm (0.031–0.035 in)	
Ignition timing		At idle – VF750F: 10°, VF700F: 15° BTDC	
		Full advance 37°BTDC/3,300 rpm	
Pulse generator air gap		0.3–0.9 mm (0.012–0.035 in)	

TOOL

Special

Timing inspection cover	07998–MB00000

18

TROUBLESHOOTING

The ignition system has two sub-systems; one for the No. 1 and No. 3 cylinders and one for the No. 2 and No. 4 cylinders. Determine which sub-system is faulty, then proceed to the detailed tests below.

Engine cranks but will not start
- Engine stop switch OFF
- No spark at plugs
- Faulty transistorized spark unit
- Faulty pulse generator

No spark at plug
- Engine stop switch OFF
- Poorly connected, broken or shorted wires
  - Between ignition switch and engine stop switch
  - Between spark unit and engine stop switch
  - Between spark unit and ignition coil
  - Between ignition coil and plug
  - Between spark unit and pulse generator
- Faulty ignition coil
- Faulty ignition switch
- Faulty spark unit
- Faulty pulse generator

Engine starts but runs poorly
- Ignition primary circuit
  - Faulty ignition coil
  - Loose or bare wire
  - Intermittent short circuit
- Secondary circuit
  - Faulty plug
  - Faulty high tension wire

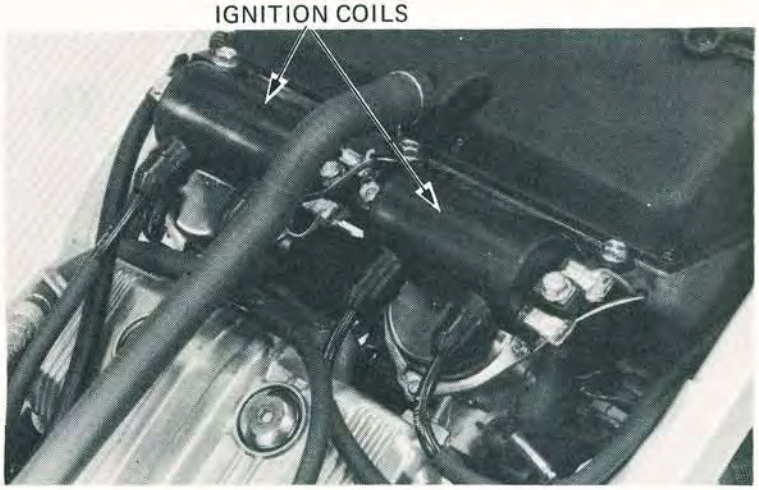
Timing advance incorrect
- Faulty pulse generator
- Faulty spark unit

Date of Issue: January, 1983

IGNITION COIL

Remove the seat and fuel tank.

IGNITION COILS



CONTINUITY TEST

Disconnect the coils primary leads.

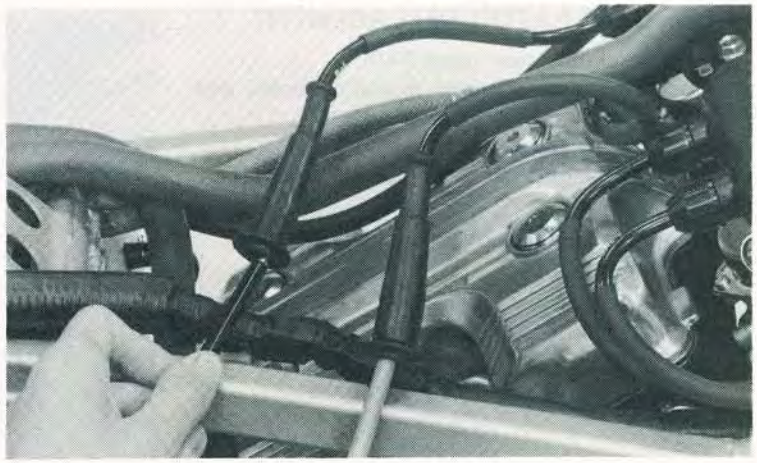
Measure the primary coil resistance.

RESISTANCE: 2.8 Ω

IGNITION COIL TERMINALS

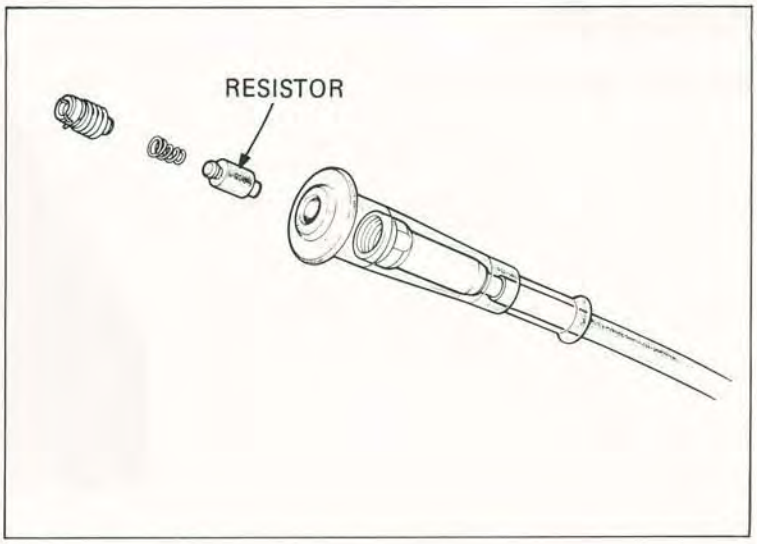
Measure the secondary coil resistance with the spark plug caps in place.

RESISTANCE: 21–28 k Ω



Remove the spark plug cap resistors and measure the secondary coil resistance (page 18-3).

RESISTANCE 13.6–15.5 kΩ



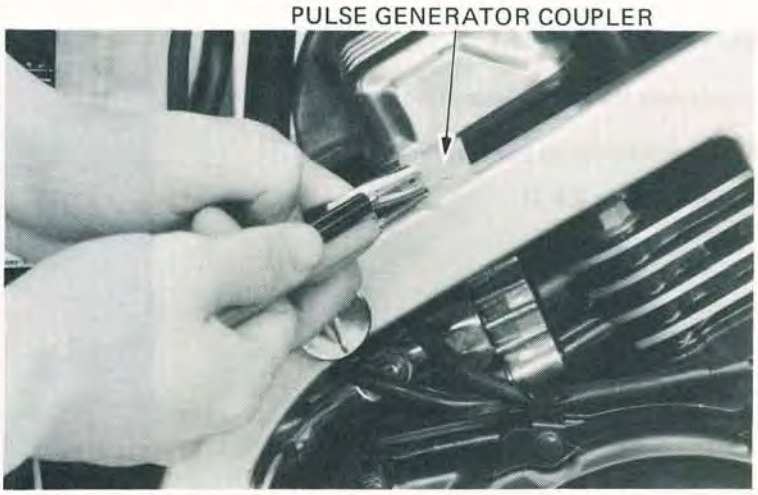
TRANSISTORIZED IGNITION SYSTEM

PULSE GENERATOR TEST

Remove the right side cover.
Disconnect the pulse generator coupler and measure the coil resistance.

RESISTANCE: Approximately 480 Ω

Between white/yellow and yellow leads (1, 3 cylinders)
Between white/blue and blue leads (2, 4 cylinders)

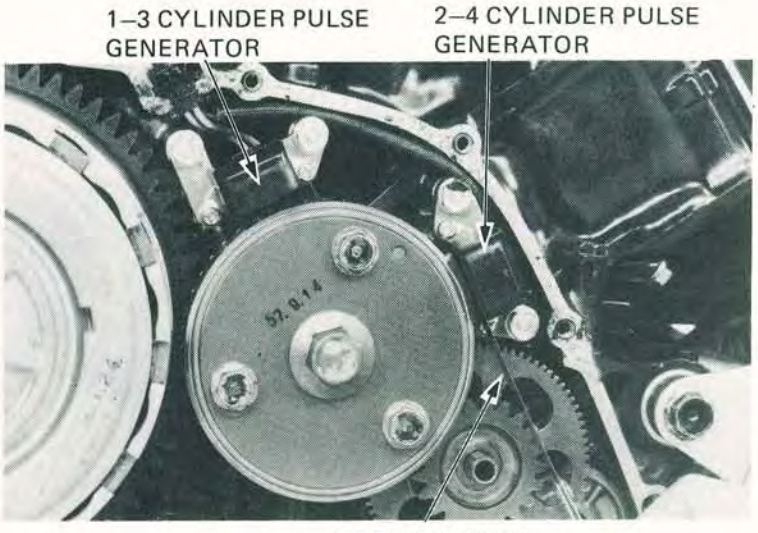


PULSE GENERATOR REPLACEMENT

Remove the clutch cover (page 7-10).
Remove the pulse generator mounting bolts, and pulse generators.
Install new pulse generators.
Measure the air gap between the pulse generator and rotor.

AIR GAP: 0.3–0.9 mm (0.012–0.035 in)

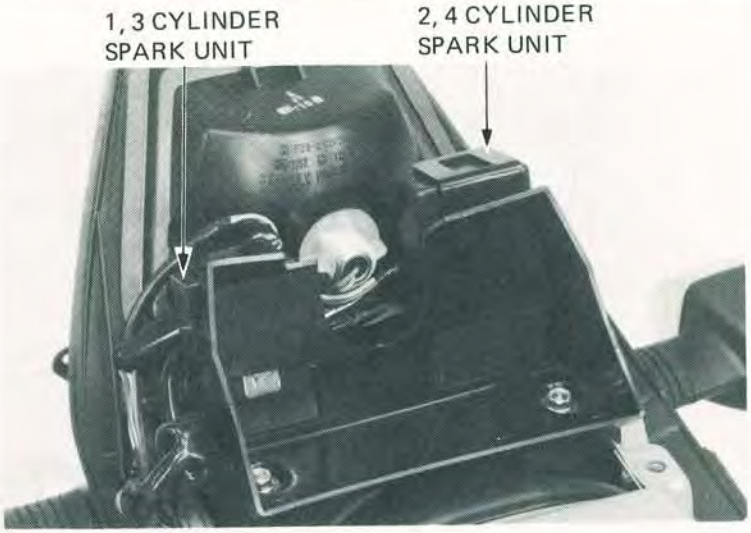
Install the clutch cover (page 7-22).
Recheck the ignition timing (page 18-5).



Date of Issue: January, 1983

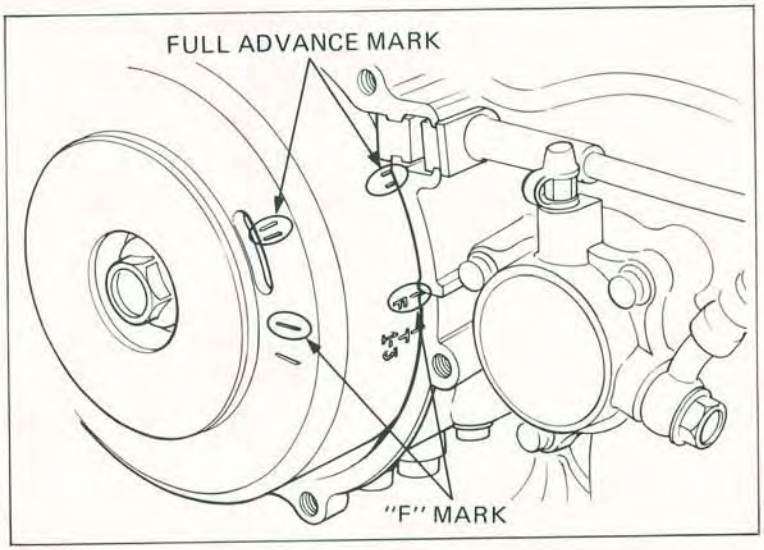
SPARK UNIT

If the pulse generators, ignition coils and wiring are good, and the ignition timing is not within specification; replace the spark units with new ones and recheck the ignition timing.



IGNITION TIMING

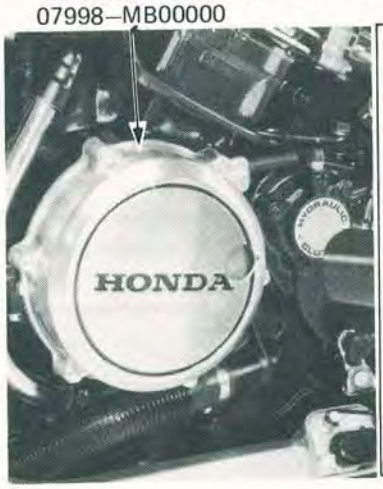
Warm up the engine and remove the alternator cover.
Align the F mark on the flywheel with the rear crankcase mating surface.
Use a felt pen to mark a dark line and "1-3F" in line with the F mark on the end surface of the flywheel.

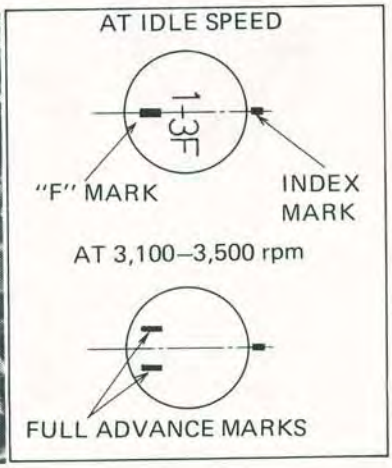


Install the timing inspection cover.
Connect the timing light to the high tension wire of the No. 1 or No. 3 cylinder.
Start the engine and check the ignition timing.

AT IDLE SPEED: The dark line (1-3F) should align with the index mark on the timing cover.
1,300–1,750 rpm: The advance starts.
3,100–3,500 rpm: The advance ends and the index mark should be between the full advance marks.

TIMING INSPECTION COVER
07998–MB00000



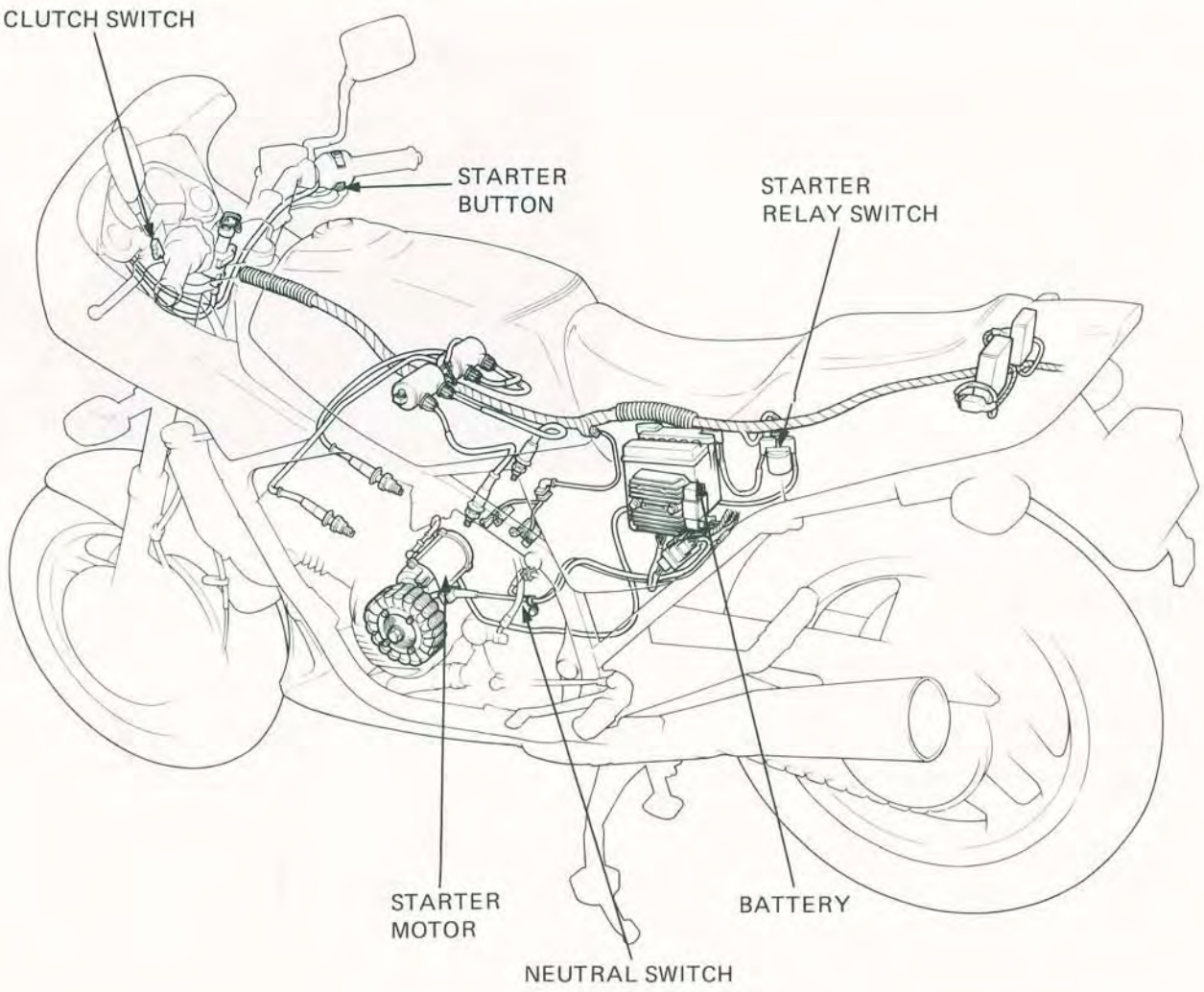


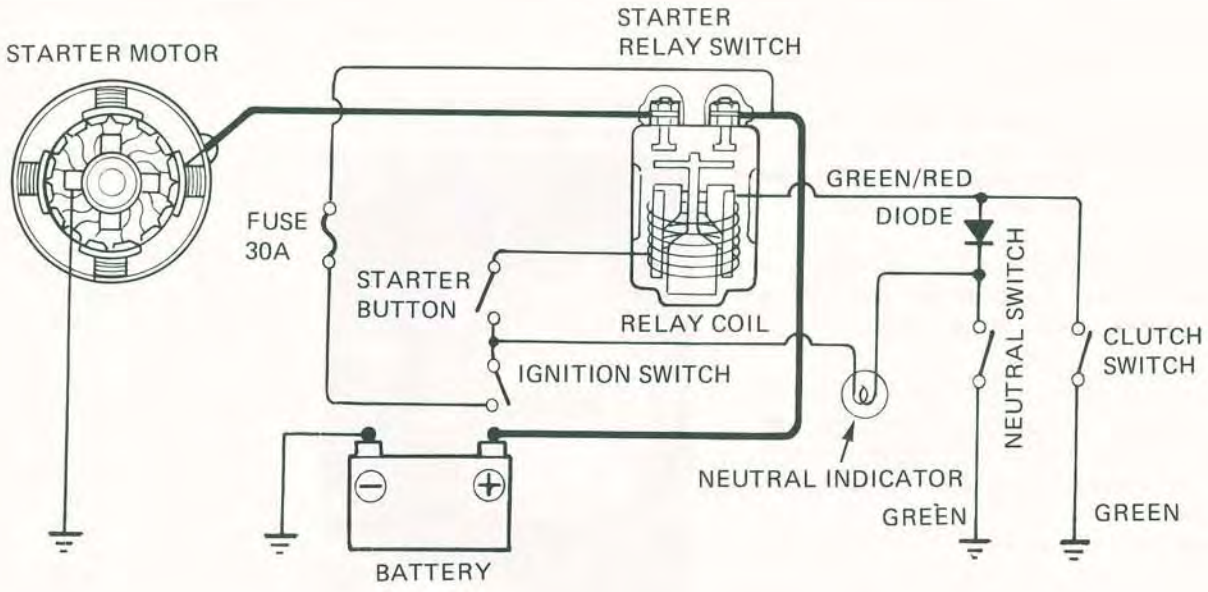
Connect the timing light to the high tension wire of the No. 2 or No. 4 cylinder and check the ignition timing for No. 2 and No. 4 cylinders.

NOTE

> The ignition system is transistorized and cannot be adjusted. If the ignition timing is incorrect, check the spark units and pulse generators.
> Replace parts as required.

After timing inspection, check the engine oil level and add if necessary.





Date of Issue: January, 1983

19. ELECTRIC STARTER

SERVICE INFORMATION

GENERAL

- The starter motor can be removed with the engine in the frame.

SPECIFICATIONS

		STANDARD	SERVICE LIMIT
Starter motor	Brush spring tension	680–920 g (24.0–32.5 oz)	545 g (19.2 oz)
	Brush length	12.0–13.0 mm (0.47–0.51 in)	6.5 mm (0.26 in)

TROUBLESHOOTING

Starter motor will not turn:
1. Battery discharged.
2. Faulty ignition switch.
3. Faulty starter switch.
4. Faulty neutral switch.
5. Faulty starter relay switch.
6. Loose or disconnected wire or cable.
7. Clutch diode open.

Starter motor turns engine slowly
1. Low specific gravity in battery.
2. Excessive resistance in circuit.
3. Binding in starter motor.

Starter motor turns, but engine does not turn:
1. Faulty starter clutch.
2. Faulty starter motor gears.
3. Faulty starter motor or idle gear.

Starter motor and engine turns, but engine does not start
1. Faulty ignition system.
2. Engine problems.
   - Low compression.
   - Fouled spark plugs.

19

STARTER MOTOR

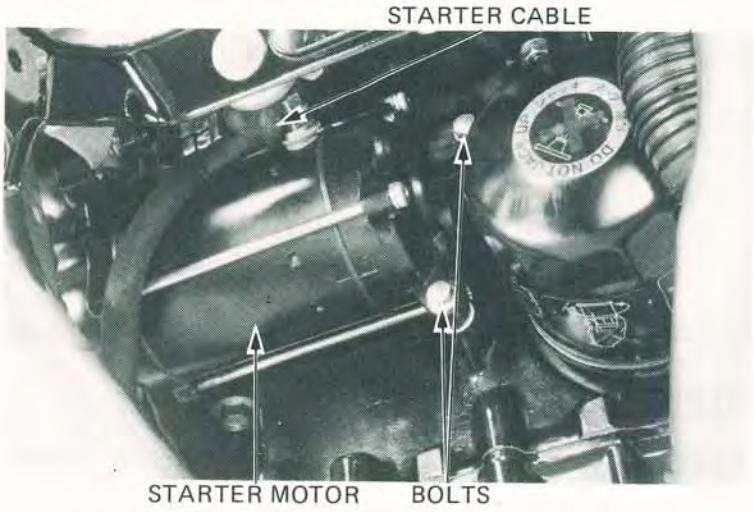
REMOVAL

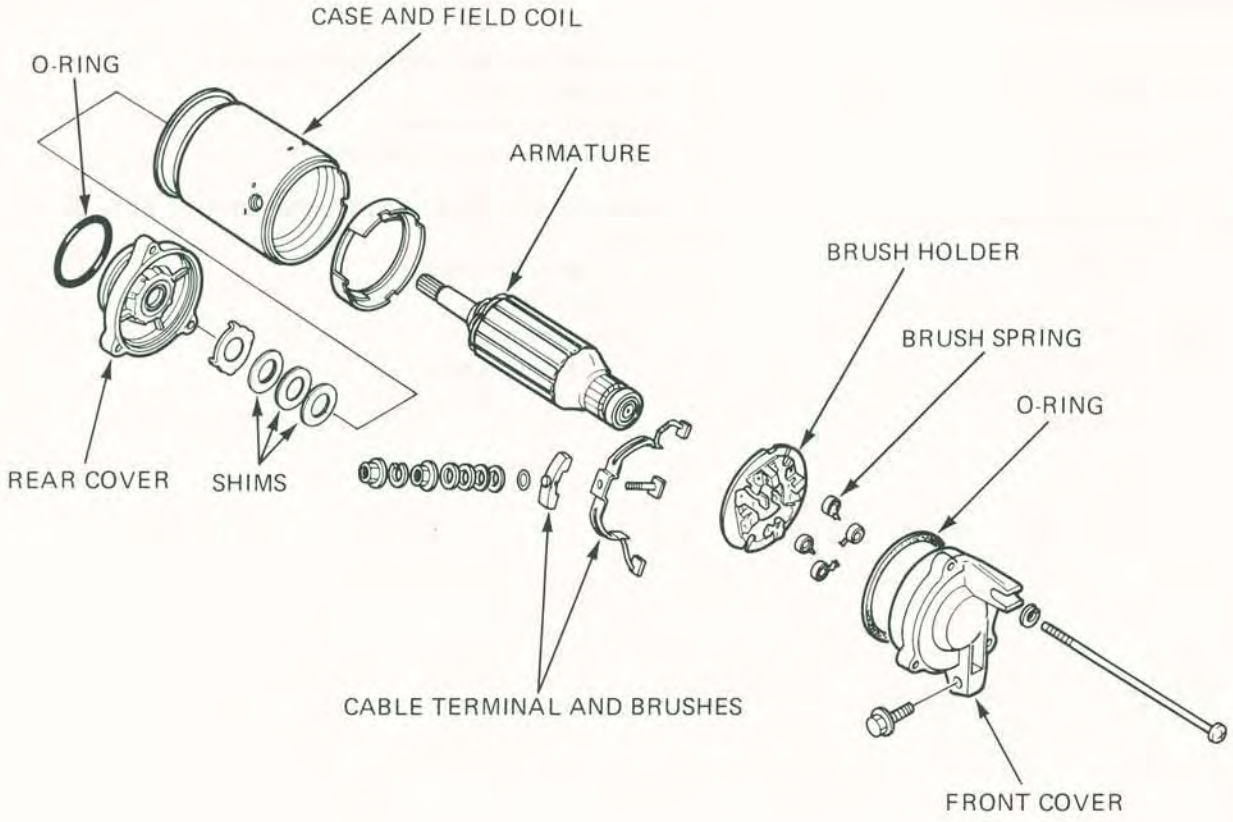
WARNING

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Remove the lower radiator (page 6-7).

Disconnect the starter motor cable at the motor. Remove the starter motor mounting bolts, and starter motor.





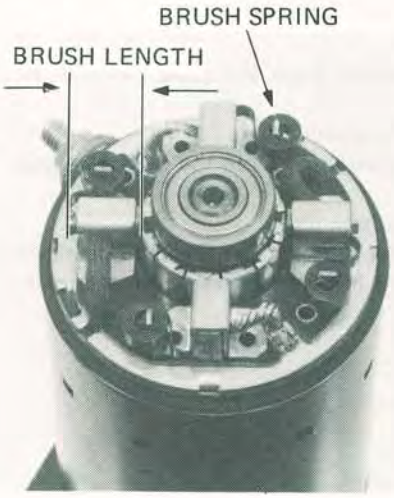
Date of Issue: October, 1983

BRUSH INSPECTION

Remove the starter motor case screws.
Inspect the brushes and measure the brush length.
Measure brush spring tension with a spring scale.

SERVICE LIMITS:

Brush length:	**6.5 mm (0.26 in)**
Brush spring tension:	**545 g (19.2 oz)**



COMMUTATOR INSPECTION

Remove the starter motor case.

NOTE

> Record the location and number of shims.

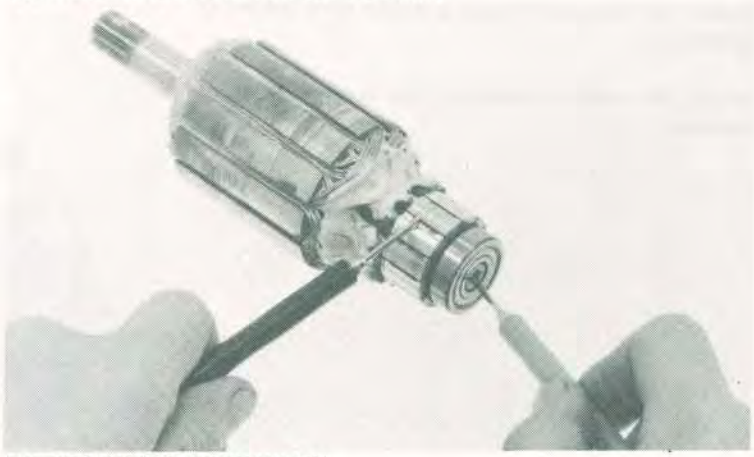
Inspect the commutator bars for discoloration.
Bars discolored in pairs indicate grounded armature coils.

NOTE

> Do not use emery or sand paper on the commutator.

Check for continuity between pairs of commutator bars.
There should be continuity.
Also, make a continuity check between individual commutator bars and the armature shaft.
There should be no continuity.

CONTINUITY BETWEEN
COMMUTATOR BAR PAIRS: NORMAL

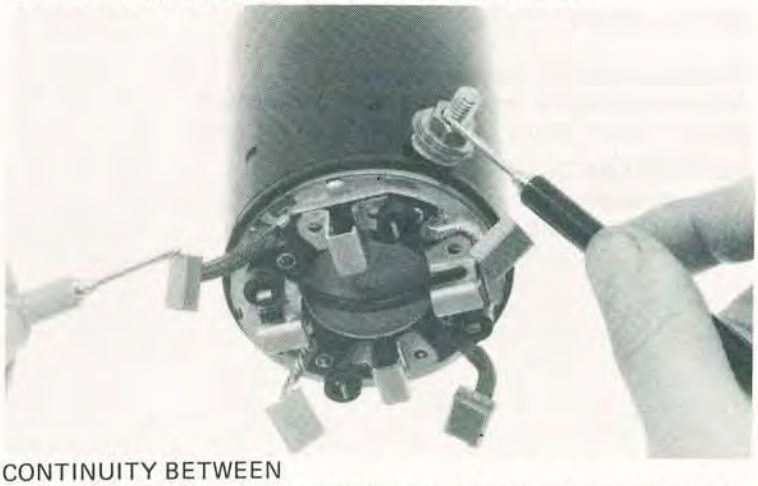


NO CONTINUITY BETWEEN
COMMUTATOR BARS AND ARMATURE SHAFT: NORMAL

FIELD COIL INSPECTION

Check for continuity from the cable terminal to the motor case.
There should be no continuity.
Then check for continuity from the cable terminal to the brush.
There should be continuity.
Replace the starter motor if the field coil does not have continuity or if it is shorted to the motor case.

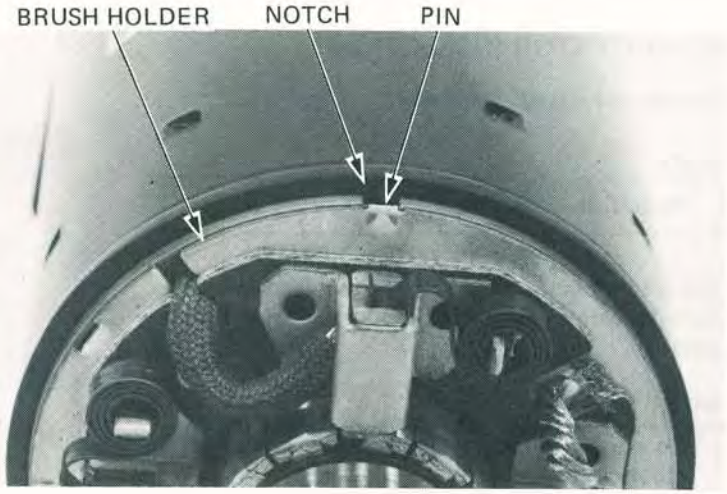
NO CONTINUITY BETWEEN
CABLE TERMINAL AND MOTOR CASE: NORMAL



CONTINUITY BETWEEN
CABLE TERMINAL AND BRUSH WIRE (INSULATED): NORMAL

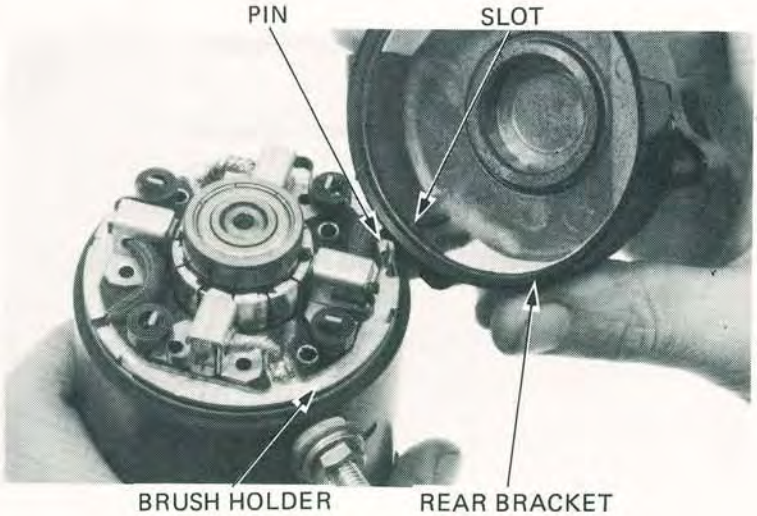
ASSEMBLY/INSTALLATION

Assemble the starter motor.
Align the case notch with the brush holder pin.



Install the rear cover aligning its slot with the brush holder pin.

Install the starter motor in the reverse order of removal.



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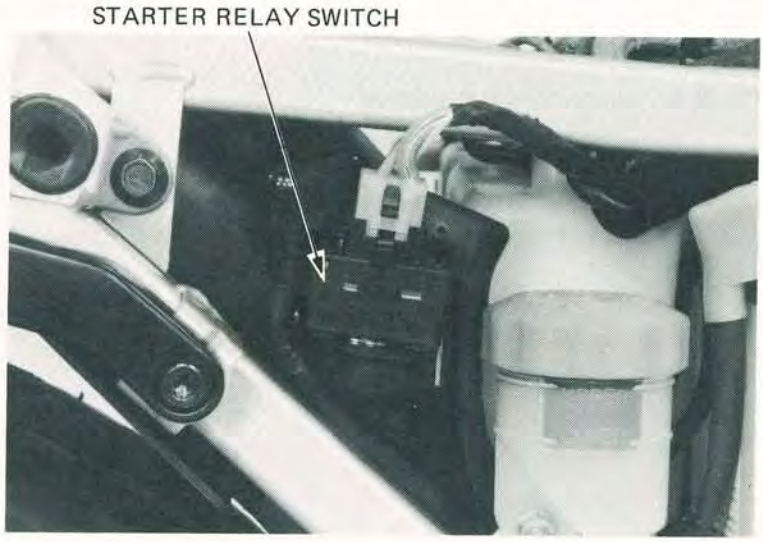
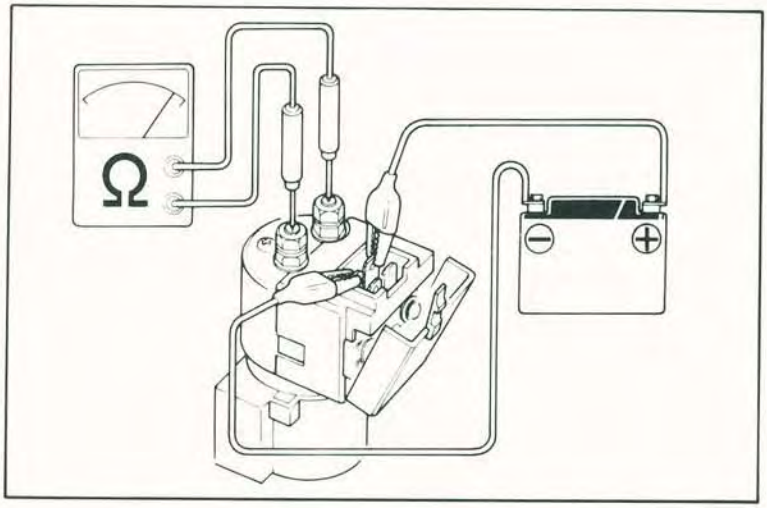
STARTER RELAY SWITCH

INSPECTION

Depress the starter switch button with the ignition ON.
The coil is normal if the starter relay switch clicks.



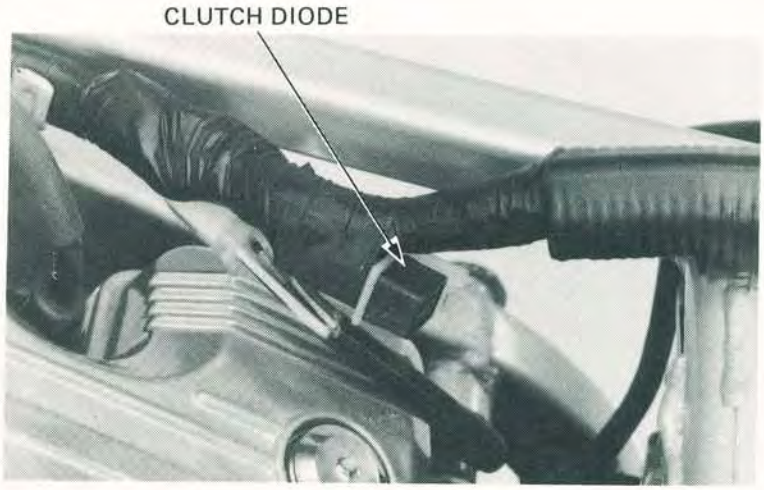
Connect an ohmmeter to the starter relay switch terminals.
Connect a 12 V battery to the switch cable terminals.
The switch is normal if there is continuity.



CLUTCH DIODE

REMOVAL

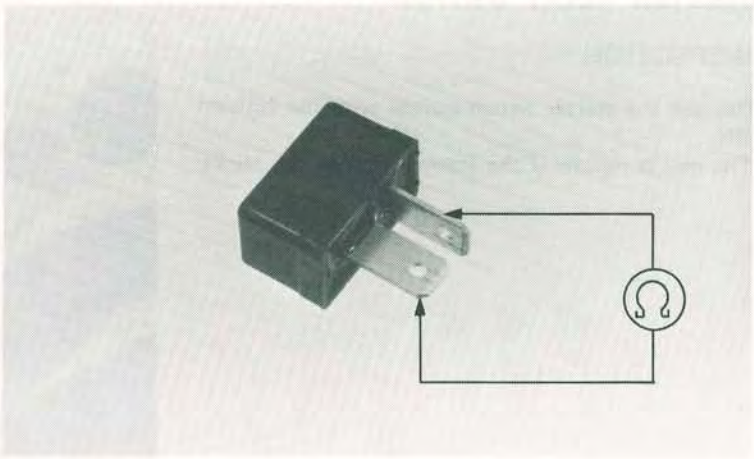
Remove the fuel tank.
Remove the clutch diode from the wire harness.



INSPECTION

Check for continuity with an ohmmeter.

NORMAL DIRECTION: CONTINUITY
REVERSE DIRECTION: NO CONTINUITY



Date of Issue: October, 1983

20. SWITCHES

SERVICE INFORMATION

GENERAL

- Some wires have different colored bands around them near the connector. These are connected to other wires which correspond with the band color.
- All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- The following color codes used are indicated throughout this section and on the wiring diagram.

Bu = Blue	G = Green	LG = Light Green	R = Red
Bl = Black	Gr = Grey	O = Orange	W = White
Br = Brown	LB = Light Blue	P = Pink	Y = Yellow

- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle. Simply disconnect the wires and connect a continuity tester or volt-ohmmeter to the terminals or connections.
- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. An ohmmeter is needed to measure the resistance of a circuit, such as when there is a specific coil resistance involved, or when checking for high resistance caused by corroded connections.

OIL PRESSURE SWITCH

Disconnect the oil pressure switch lead and remove the switch.

Check for continuity while applying pressure to the switch.

Continuity: Below 20 kPa (0.2 kg/cm^2, 2.8 psi)
No continuity: Above 20–40 kPa (0.2–0.4 kg/cm^2, 2.8–5.7 psi)

Replace the switch if necessary.

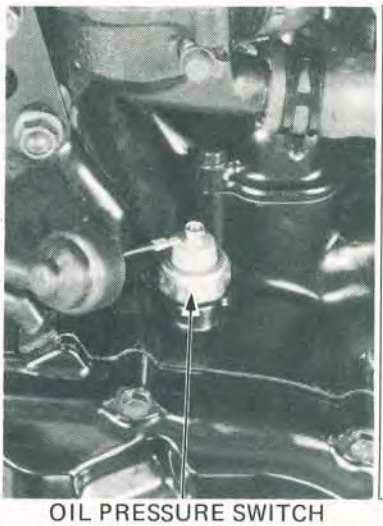
Apply a liquid sealant to the switch threads before installing the switch.

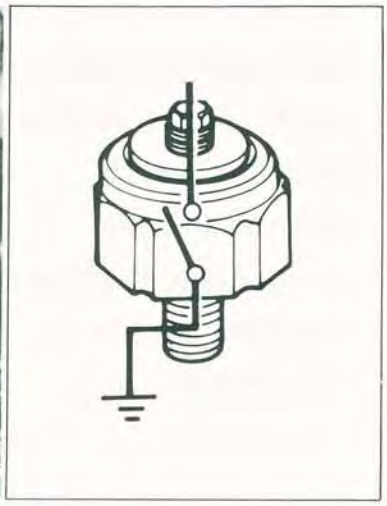
Screw the switch into the crankcase but stop two threads from the bottom. Then tighten it to the specified torque.

TORQUE: 15–20 N·m (1.5–2.0 kg-m, 11–14 ft-lb)

NOTE

> To prevent crankcase damage, do not over-tighten the switch.





OIL PRESSURE SWITCH

BRAKE LIGHT SWITCH

Check the rear brake light switch for continuity with the rear brake applied.

REAR BRAKE LIGHT SWITCH WIRE

Check the front brake light switch for continuity with the front brake applied.

Replace the switches if necessary.

FRONT BRAKE LIGHT SWITCH

Date of Issue: January, 1983

NEUTRAL SWITCH

Remove the left side cover and disconnect the neutral switch connector.

Check the switch for continuity between the switch connector terminal and ground.
There should be continuity with the transmission in neutral and no continuity with the transmission in any gear.

REMOVAL

Remove the neutral switch cover.

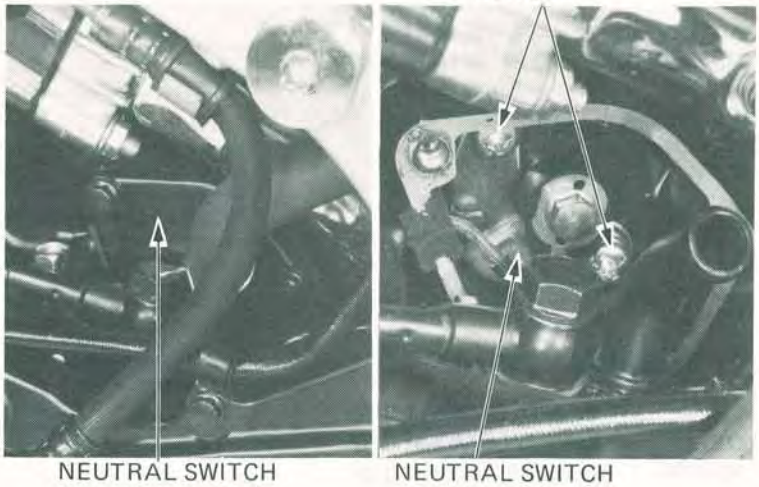
Remove the neutral switch attaching screws and the switch.

INSTALLATION

Install the neutral switch in the reverse order of removal. Tighten the switch mounting screws.

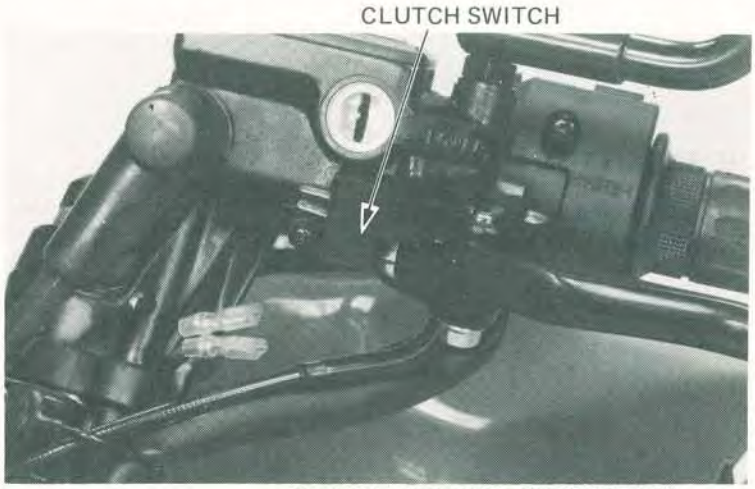
TORQUE: 7–11 N·m
(0.7–1.1 kg-m, 5–8 ft-lb)

Install the neutral switch cover.



CLUTCH SWITCH

Check continuity of the clutch lever (safety) switch with the clutch released and applied. Replace if necessary.



CLUTCH APPLIED: CONTINUITY
CLUTCH RELEASED: NO CONTINUITY

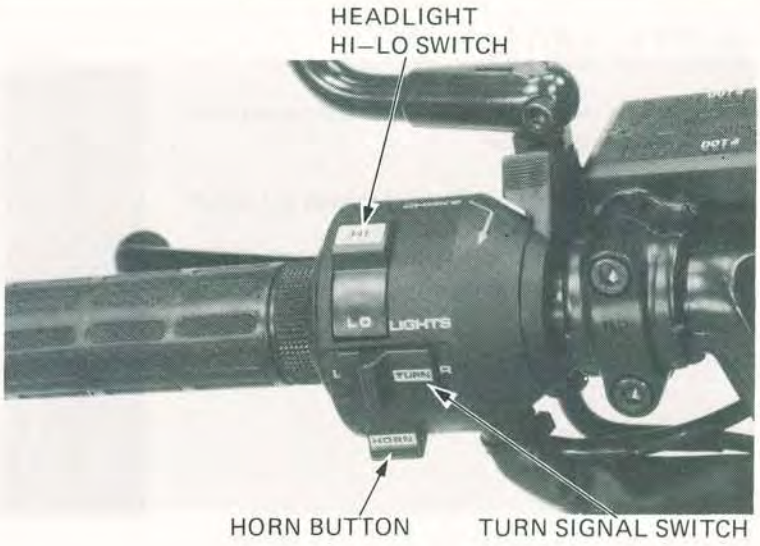
HANDLEBAR SWITCHES

The handlebar cluster switches (lights, turn signals, horn, etc.) must be replaced as assemblies.

Remove the fairing, headlight, and headlight bracket.

Continuity tests for the components of the handlebar cluster switches follow:

Continuity should exist between the color coded wires in each chart.



HEADLIGHT HI–LOW SWITCH

HI: Bu/W to Bu
MIDDLE (N): Bu/W to W to Bu
LO: Bu/W to W

Headlight Hi–Low Switch

	HL2	Hi	Lo
Hi	○	○	
(N)	○	○	○
Lo	○		○
Color code	Bu/W	Bu	W

TURN SIGNAL SWITCH

LEFT: Gr to O, Br/W to LB/W
OFF: Br/W to LB/W and O/W
RIGHT: Gr to LB, Br/W to O/W

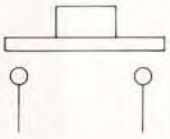
Turn Signal Switch

	W	L	R	P1	PR	PL
LEFT	○	○		○	○	
OFF				○	○	○
RIGHT	○		○	○		○
Color code	Gr	O	LB	Br/W	LB/W	O/W

HORN BUTTON

LG to W/G with button depressed
No continuity with button released

Horn Button

	Ho	BAT3
		
Color code	LG	W/G

Date of Issue: January, 1983

STARTER BUTTON

Bl to Y/R with button pushed in.
Bl/R to Bu/W with button out.

Starter Button

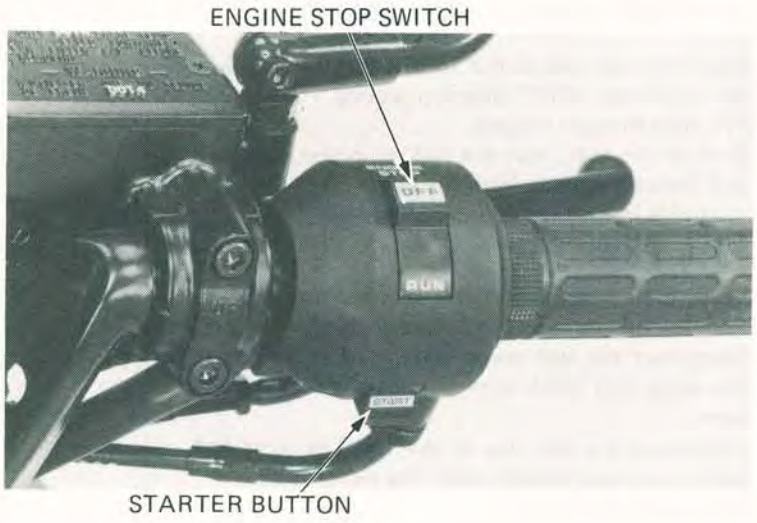
	IG	ST	HL1	HL2
OUT			○—○	
START	○—○			
Color code	Bl	Y/R	Bl/R	Bu/W

ENGINE STOP SWITCH

RUN: Bl to Bl/W
OFF: No continuity

Engine Stop Switch

	BAT_2	IG
OFF		
RUN	○—○	
Color code	Bl/W	Bl



IGNITION SWITCH

Remove the fairing and headlight. Disconnect the ignition switch coupler.

Check continuity of terminals on the ignition switch coupler in each switch position.

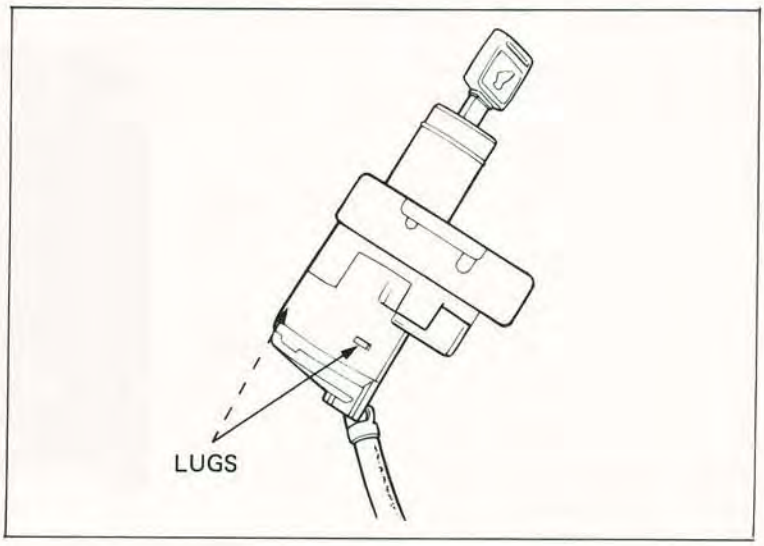
SWITCH POSITION

LOCK: No continuity
OFF: No continuity
ON: R to Bl, Br/W to Br – continuity
PARK: Br to R – continuity

Terminal / Position	PA	BAT_1	IG	TL_1	TL_2
P	○—○				
ON		○—○		○—○	
OFF					
LOCK					
Color code	Br	R	Bl	Br/W	Br

IGNITION SWITCH DISASSEMBLY

Insert the key and turn it so it is part way between the "ON" and "OFF" detent positions.
Pry open the wire retainer.
Push in the lugs, that are locked in the slots then pull the contact base from the switch.
Assemble in the reverse order of removal.

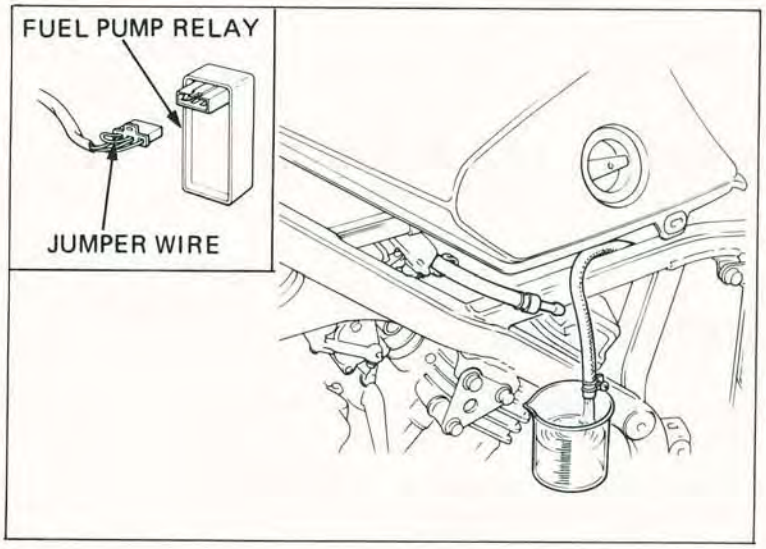


FUEL PUMP

Remove the frame side covers, seat and fuel tank.
Turn the fuel valve and ignition switch off.
Disconnect the fuel pump relay coupler and short the white and black wire terminals with a jumper wire.
Disconnect the fuel line at the fuel line joint and hold a graduated beaker under the outlet tube.
Reinstall the fuel tank.

WARNING

- *Do not allow flames or sparks near gasoline.*
- *Wipe up spilled gasoline at once.*



Turn the ignition switch on and let fuel flow into the beaker for 5 seconds, then turn the ignition switch off. Multiply the amount in the beaker by 12 to determine the fuel pump flow capacity per minute.

FUEL PUMP FLOW CAPACITY:
660cc (22 US oz, 18.6 Imp oz) ± 10%/minute

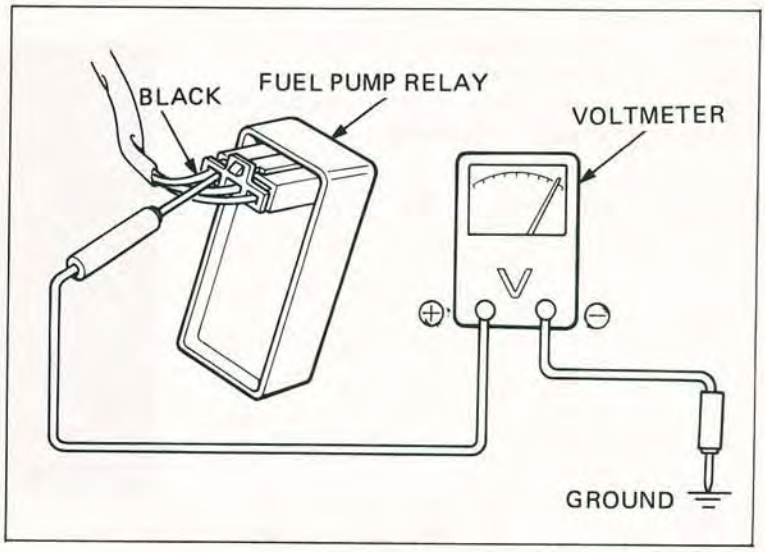
NOTE

- Use a fully charged battery or false readings may result.
- Battery voltage should be above 12.5 V.

If the fuel pump flow capacity is below the specification, measure the voltage at the fuel pump coupler. Replace the fuel pump if battery voltage is persent.

FUEL PUMP RELAY

Check for a burnt sub-fuse.
Check the relay coupler for improper contact and looseness.
Measure the voltage between the relay black wire and a body ground. The battery voltage should register with the ignition switch ON.
Make sure that the fuel pump operates while the relay coupler black and white wires are shorted and the ignition switch is ON.
If the pump does not operate, check the fuel pump coupler for improper contact and the fuel pump.



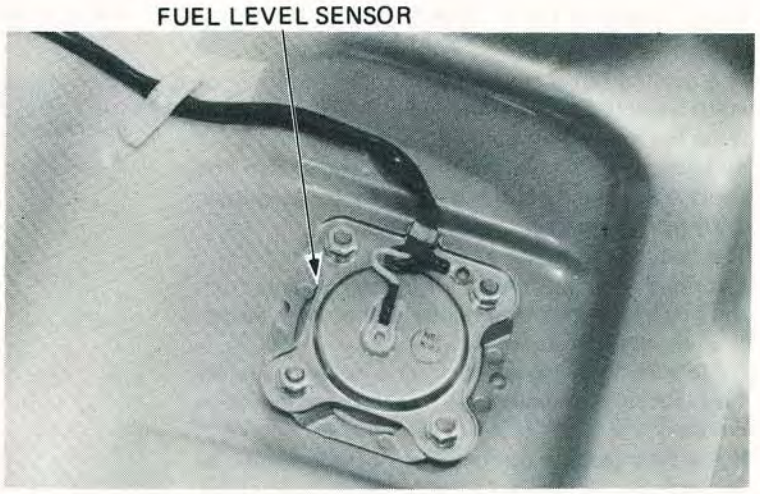
Check for continuity between the ignition control unit blue wire and the fuel pump relay coupler blue wire. If there is continuity, replace the fuel pump relay. If there is no continuity, replace the wire harness.

Date of Issue: Nov., 1985

FUEL LEVEL SENSOR

REMOVAL

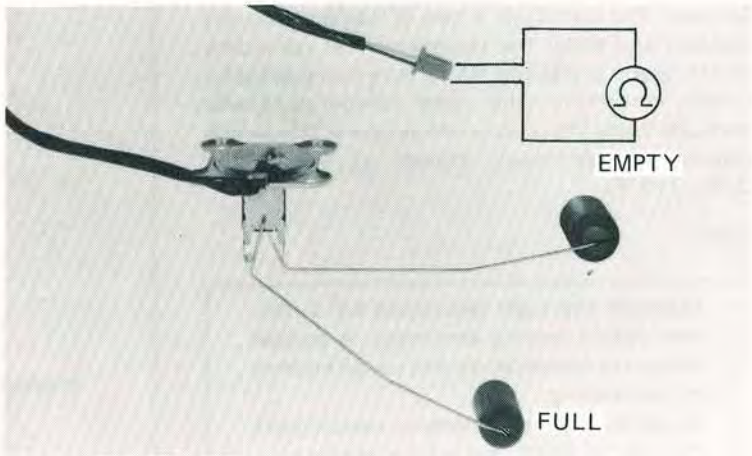
Remove the fuel tank and drain the fuel.
Remove the fuel level sensor attaching nuts and fuel level sensor.



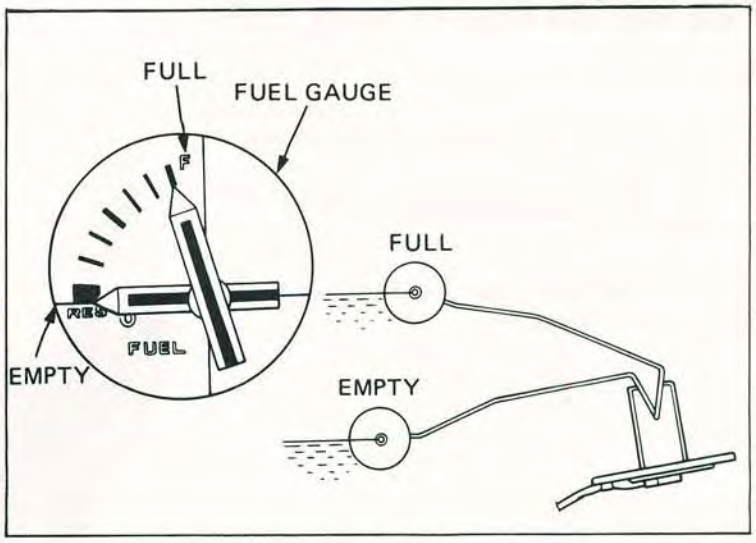
INSPECTION

Measure the resistance of the fuel level sensor in the full and empty float positions.

RESISTANCE: FULL 3.5–9.5 Ω
EMPTY 90–100 Ω

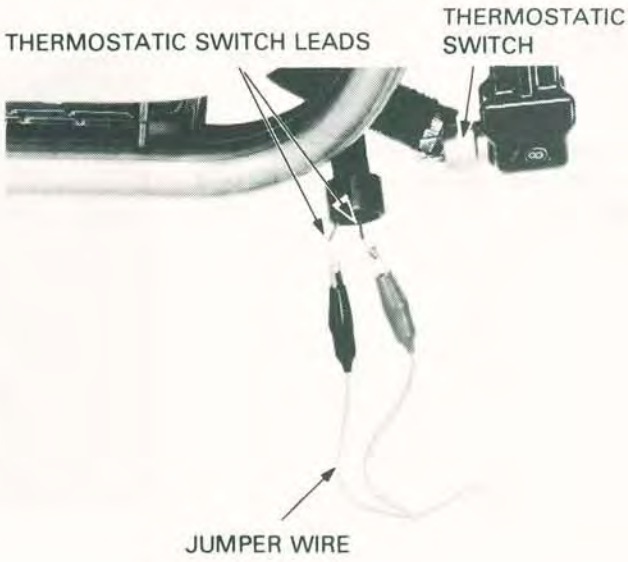


Turn the ignition switch ON.
Connect the fuel level sensor coupler to the wire harness. Move the float to full and empty and check the fuel gauge needle in both positions. If the fuel gauge does not indicate the proper level, replace it with a new one.



THERMOSTAT SWITCH

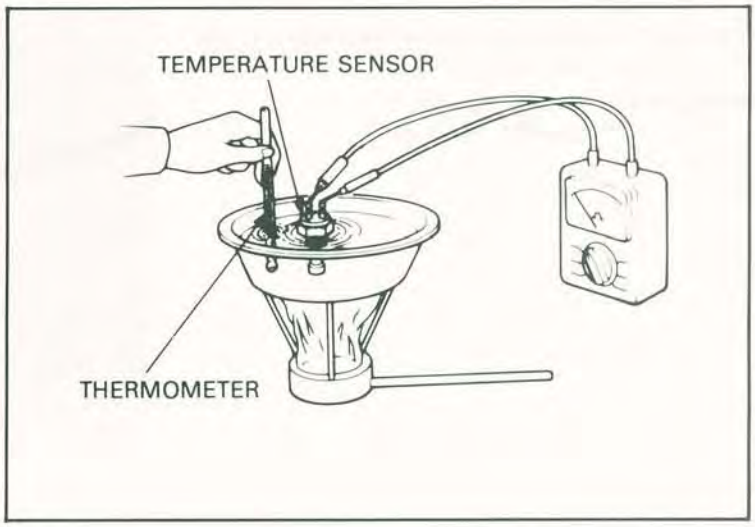
The cooling fan motor is actuated by the thermostatic switch located in the lower radiator.
If the fan motor does not start, disconnect the black and green leads from the thermostatic switch and short them together with a jumper wire as shown.
Turn the ignition switch on.
The cooling fan motor should start running.
If it does not start, check for battery voltage from the black lead (positive) to black/blue (negative) of the fan motor coupler.
If there is no voltage, check for a blown or faulty fuse, loose terminals or connectors, or an open circuit.
If it starts, inspect the fan thermostatic switch as follows:



Suspend the switch in a pan of coolant (50—50 mixture) and check the temperature at which the switch opens and closes. Make sure that there is no switch continuity with room temperature and gradually raise the coolant temperature. The switch should be continuity (close) at 98—102°C (208—215°F)

NOTE

> Maintain the high teperature for 3 minutes before testing continuity. A sudden change in temperature will cause an error in the reading.
> Do not let the themometer or switch touch the pan as it will give a false reading.
> Soak the switch in coolant up to its threads.



FAN MOTOR RELAY ('83 VF750F)

NOTE

> The VF700F/VF750F after '83 do not have the fan motor relay.
> The '83 wiring diagram calls this part a Main Relay.

Remove the left side cover and disconnect the fan motor relay coupler.

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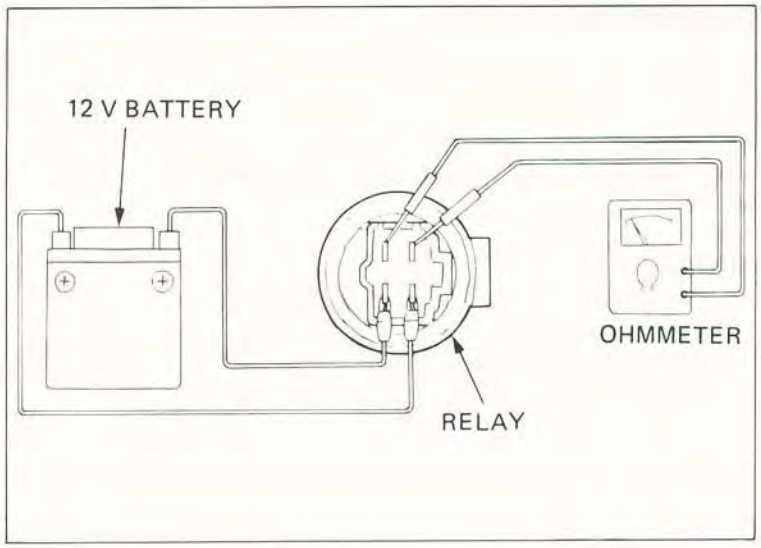
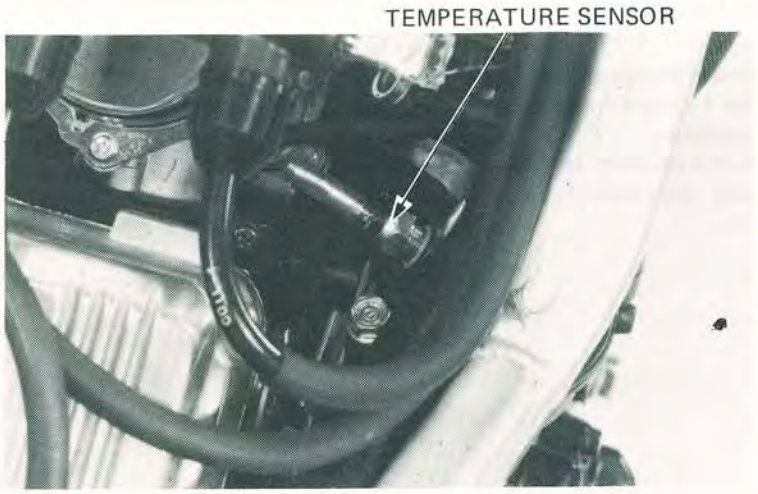
Connect a fully charged 12 V battery and an ohmmeter to the relay terminals as shown.

The relay is normal if there is continuity when voltage is applied.



TEMPERATURE SENSOR

Disconnect the green/blue wire from the temperature sensor.
Drain the coolant and remove the temperature sensor from the thermostat case.



Suspend the unit in oil over a burner and measure the resistance through the unit as the oil heats up.

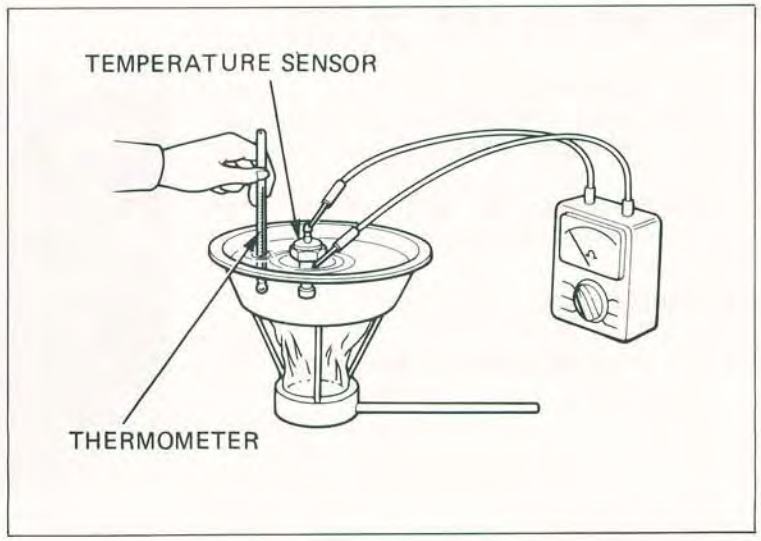
Temperature	60°C	85°C	110°C	120°C
	140°F	185°F	230°F	248°F
Resistance	104.0Ω	43.9Ω	20.3Ω	16.1Ω

WARNING

Wear gloves and eye protection.

NOTE

- Oil must be used as the heated liquid to check operation above 100°C (212°F).
- You'll get false readings if either the thermometer or temperature sensor touches the pan.

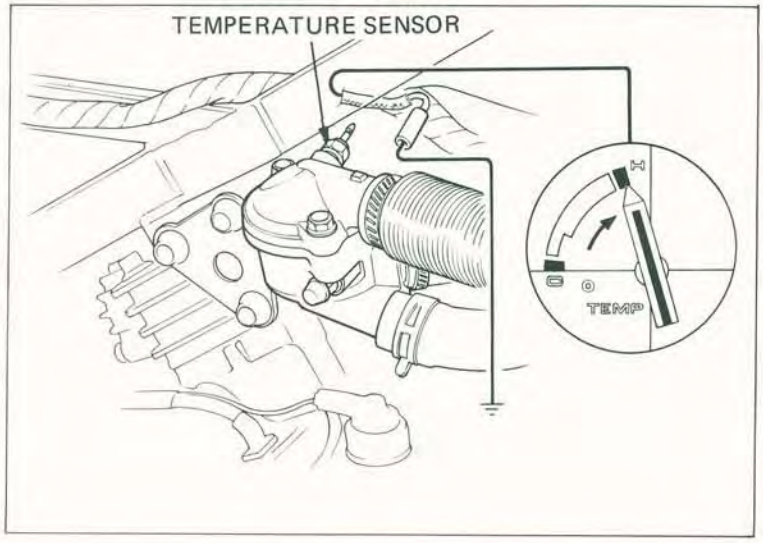


TEMPERATURE GAUGE

Disconnect the wire from the temperature sensor and short it to ground.
Turn the ignition switch to ON.
The temperature gauge needle should move all the way to the H.

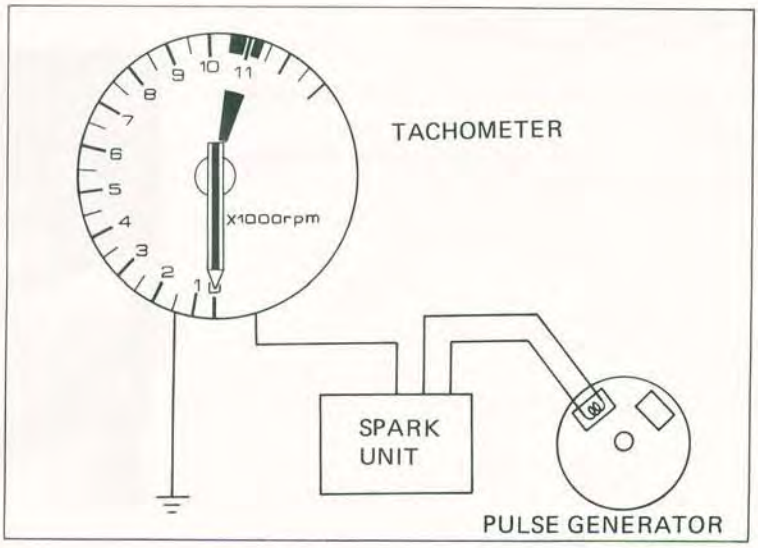
CAUTION

Do not leave the temperature sensor wire grounded for longer than a few seconds or the temperature gauge will be damaged.



TACHOMETER

If the tachometer does not work properly, replace the 1–3 spark unit with a new one and recheck the operation.
If the problem still appears, replace the spark unit with the original one and tachometer with a new one.

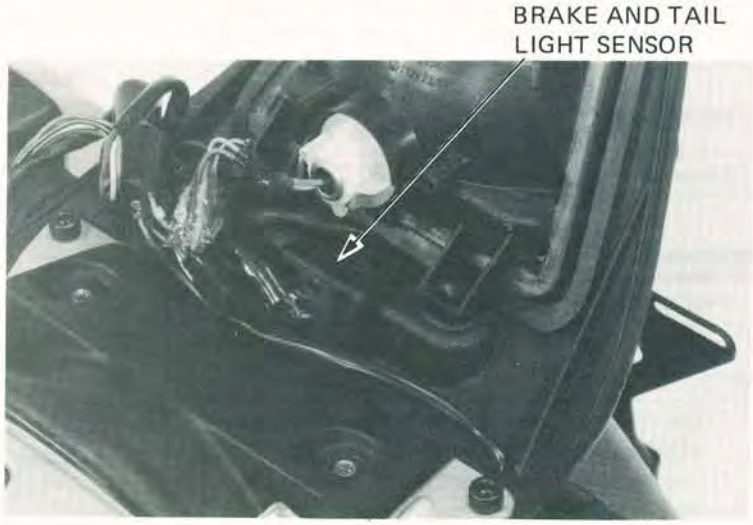


BRAKE AND TAIL LIGHT SENSOR

Turn the ignition switch on.
Check the source voltage at the black/brown lead. If there is no voltage, check and repair the source circuit.
If there is voltage, measure the voltage at the white/yellow (positive) and green/yellow (negative) wires.

VOLTAGE: 5V

If there is no voltage, replace the sensor unit.



Date of Issue: January, 1983

'83

AFTER '83

V45 I

METEF

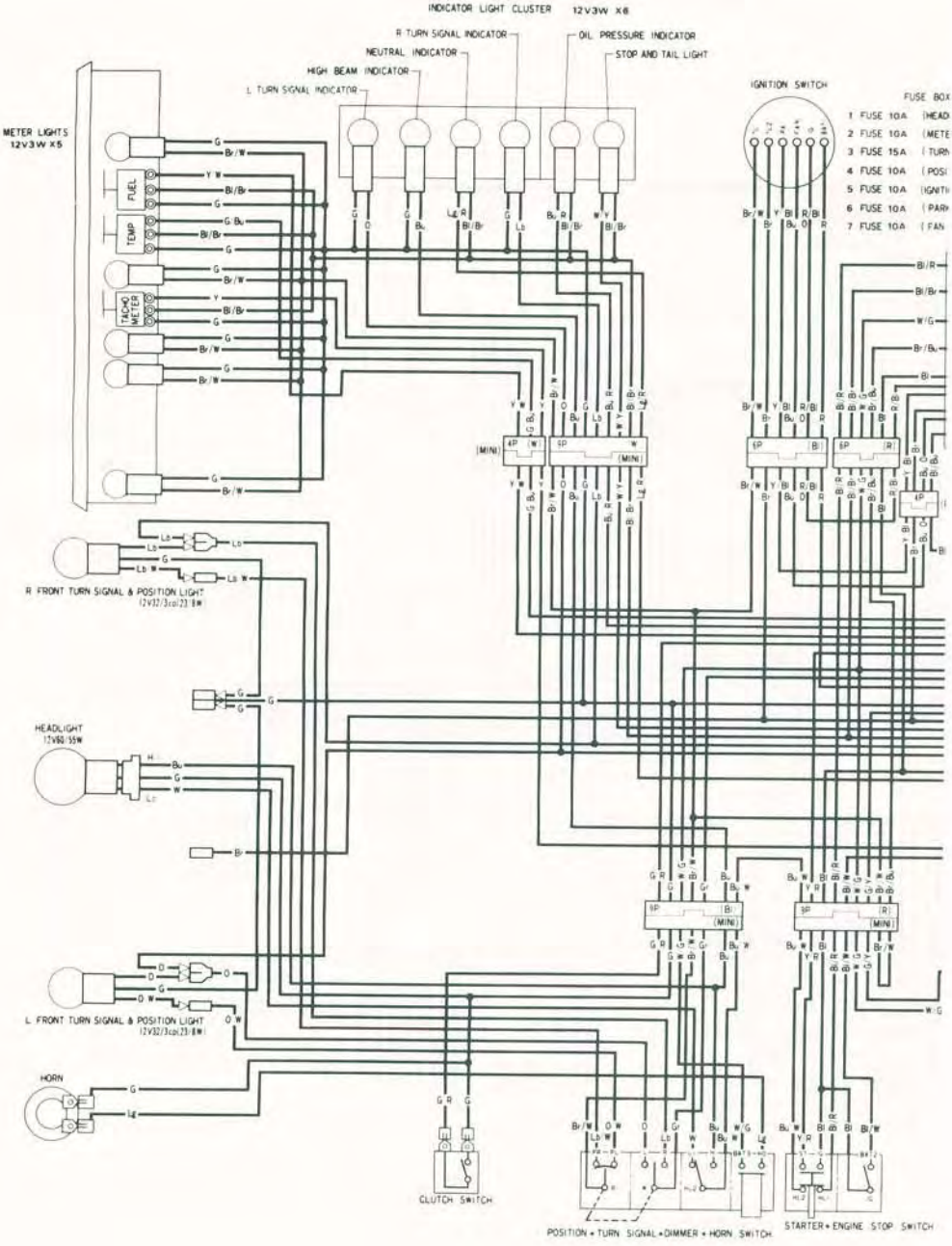
12V32

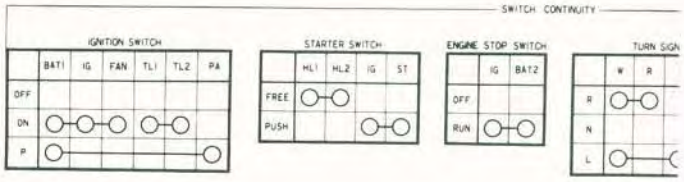
R FRC

12V6

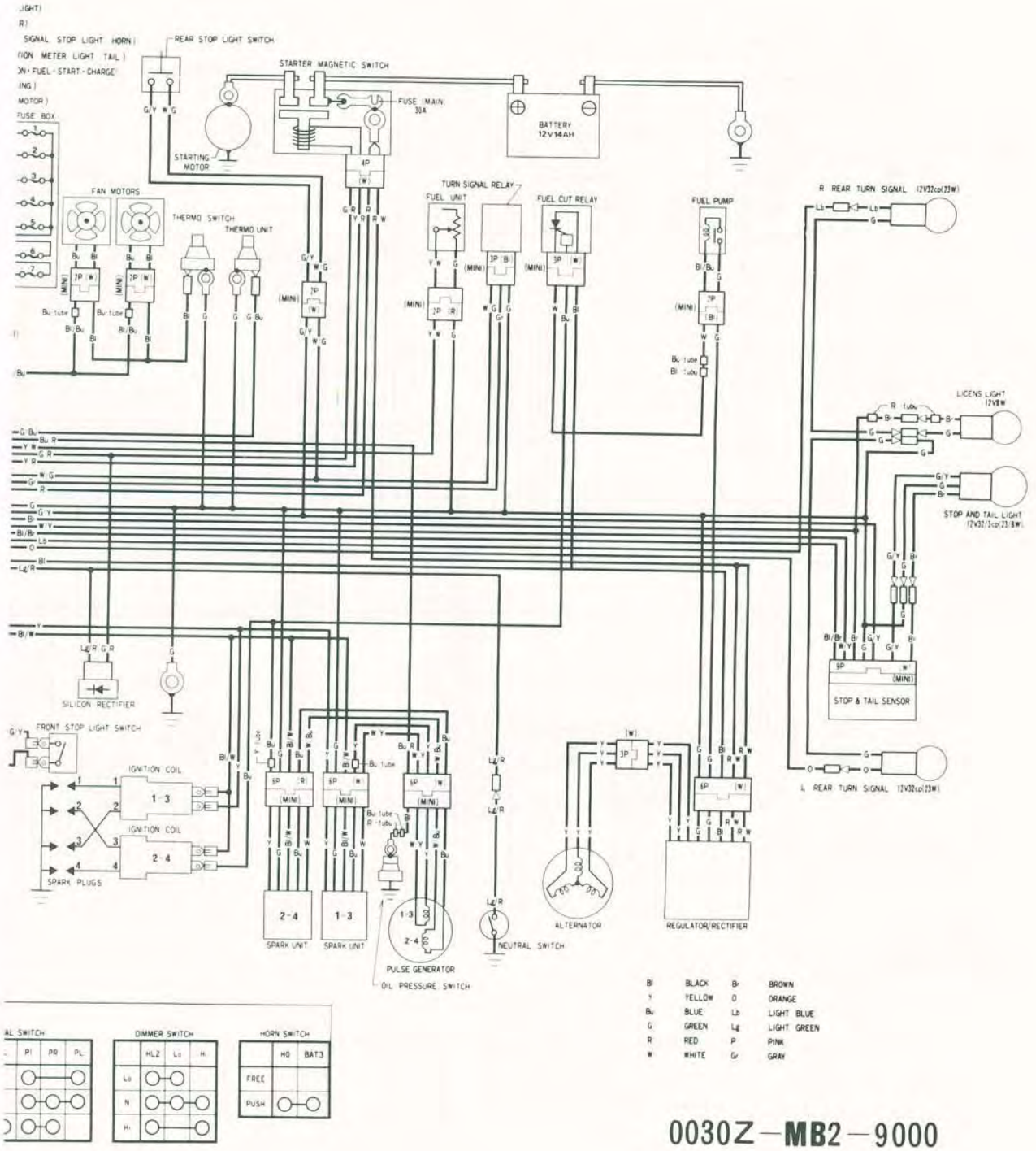
12V32

L FRC





INTERCEPTOR (VF750F)



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Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

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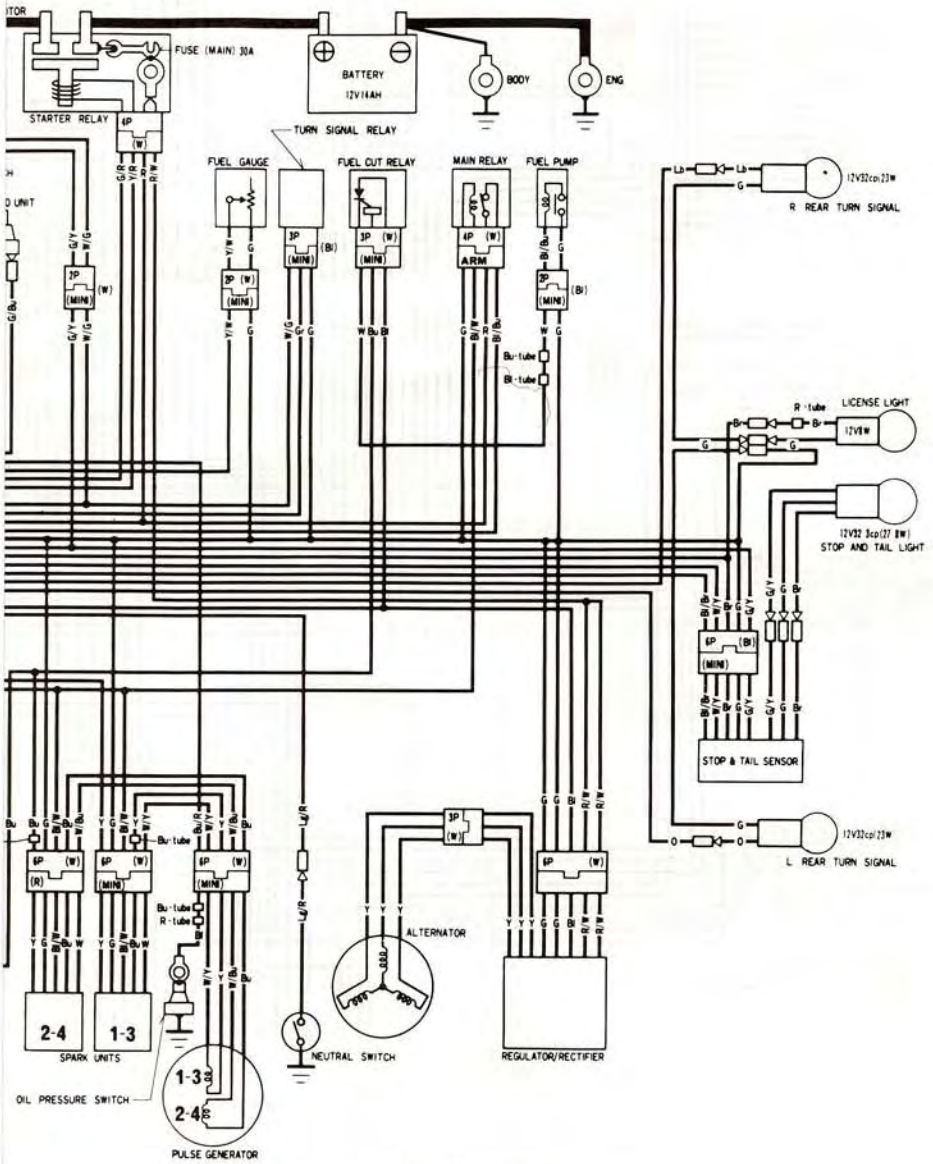

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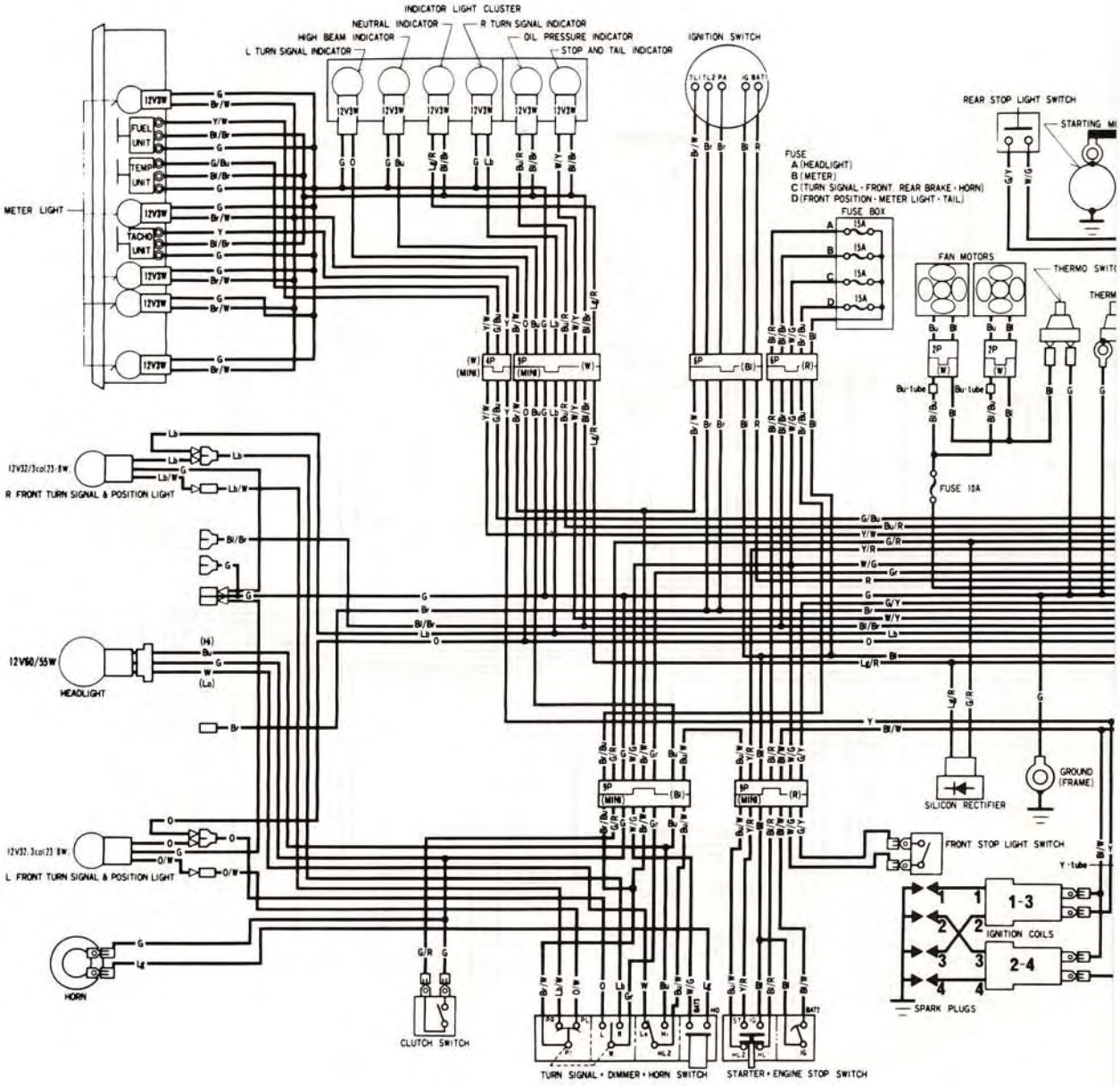
V45 INTERCEPTOR (VF750F



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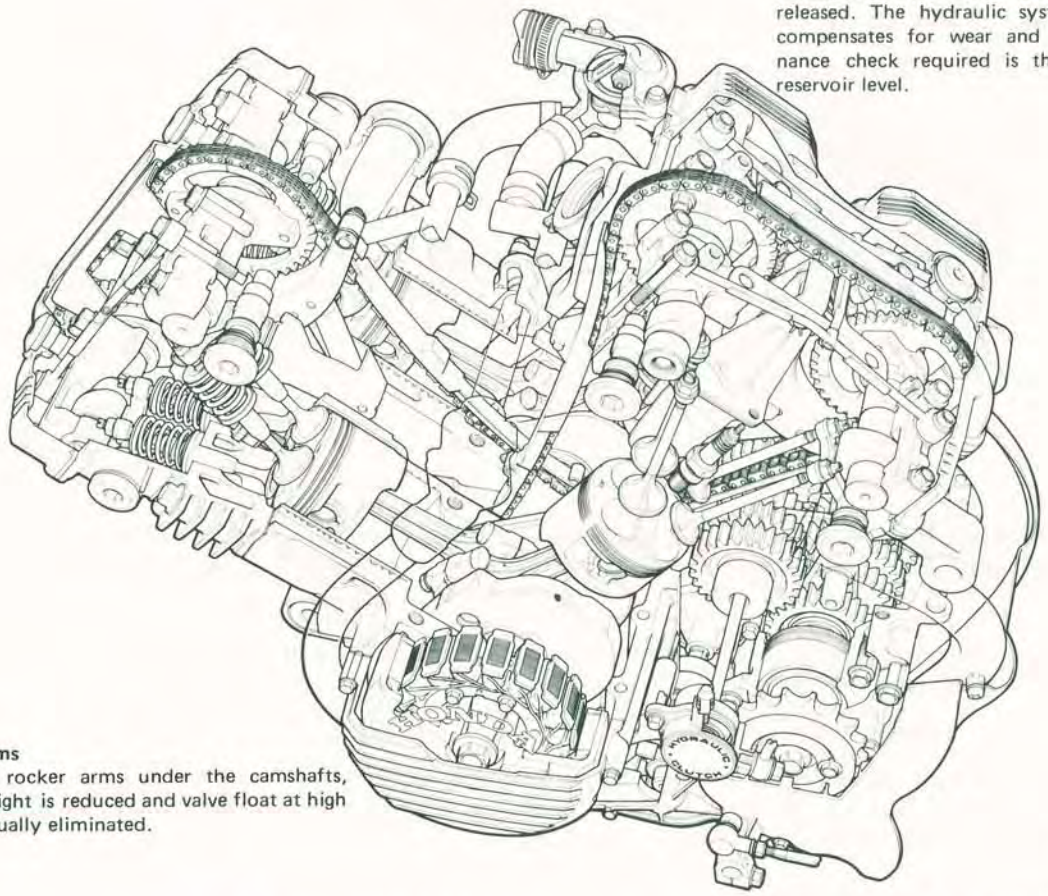
22. TECHNICAL FEATURES

V-4 ENGINE FEATURES

The engine design is a DOHC, 16-valve, water cooled V-4.
The cylinders are arranged in two banks of two cylinders, 90 degrees apart.
The pent-roof combustion chamber has four valves per cylinder (two intake and two exhaust valves) ensure highly-efficient intake and exhaust flow.

- **One-way clutch**
  Prevents rear wheel lock-up during rapid deceleration caused by down shifting of the transmission at high engine speed.

- **Self-adjusting hydraulic clutch**
  Hydraulically assisted, the clutch requires a lighter lever pull compared to cable operated motorcycle clutches.
  This system also provides a consistently smooth feeling when the clutch lever is pulled in and released. The hydraulic system automatically compensates for wear and the only maintenance check required is the hydraulic fluid reservoir level.



- **Rocker arms**
  With the rocker arms under the camshafts, overall weight is reduced and valve float at high rpm is virtually eliminated.

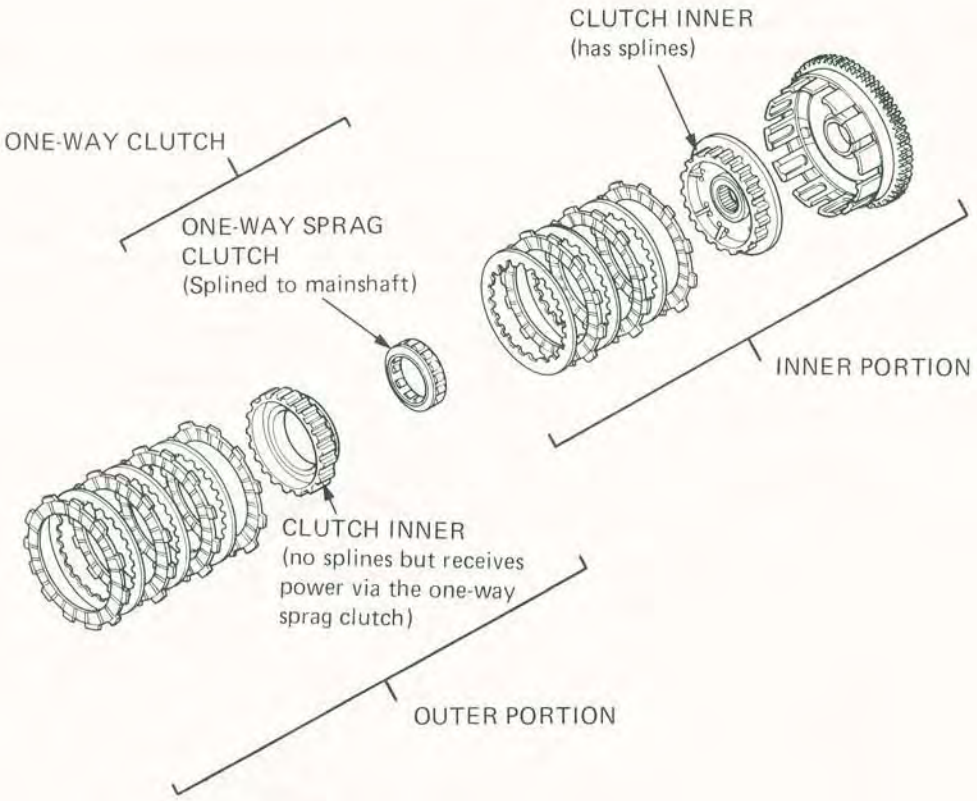
- **Automatic cam chain adjuster**
  The cam chain tensioner automatically compensates for cam chain wear, eliminating periodic adjustment and maintenance.

- **Carburetors with bystarter valve**
  The carburetors deliver the proper amount of air/fuel mixture into the cylinder under all operating conditions.
  The bystarter valve in each carburetor provides sufficient fuel flow during cranking, making the engine easier to start in cold weather. The bystarter is controlled by the choke lever on the handlebar.

ONE-WAY CLUTCH SYSTEM

Purpose:

On rapid downshifting from high RPM, the compression braking forces created by the engine can exceed the rear wheel's traction; the engine becomes a rear wheel brake. This can cause momentary lockup of the rear wheel – until the compression braking force drops below the level necessary to make the rear tire break traction. If multiple downshifts are made, the result will be a much longer loss of traction. The one-way clutch system has been specifically designed to prevent this loss of traction.



Design:

The major difference between this system and a conventional clutch is a two-piece clutch inner. In addition, the outer portion of the clutch inner, that which controls the majority of the clutch plates and discs, is driven by a special one-way sprag clutch.

- The inner portion of the clutch inner is splined to the transmission's mainshaft as is normal. But it only controls about two-fifthes of the clutch plates and discs. This portion of the clutch transmits power and deceleration forces in the usual manner.

- The outer portion of the clutch inner is not splined to the transmission's mainshaft. It controls about three-fifthes of the clutch plates and discs. This portion transmits power when the sprag clutch is locked up, such as during normal acceleration, cruising, and deceleration.

Operation:

When the transmission is downshifted from high RPM, it causes a backloading at the clutch because of the forces generated by the engine's compression braking effect. If these forces approach that which will cause the rear wheel to lock up, the one-way clutch will disengage the outer portion and allow the inner portion to slip. It will do this to a degree that allows the rear wheel to maintain traction while maintaining the highest effect of engine braking. So rather than being a harsh ON or OFF mechanism, the one-way clutch determines the correct amount of slip for each situation, all the while maintaining maximum possible engine braking effect.

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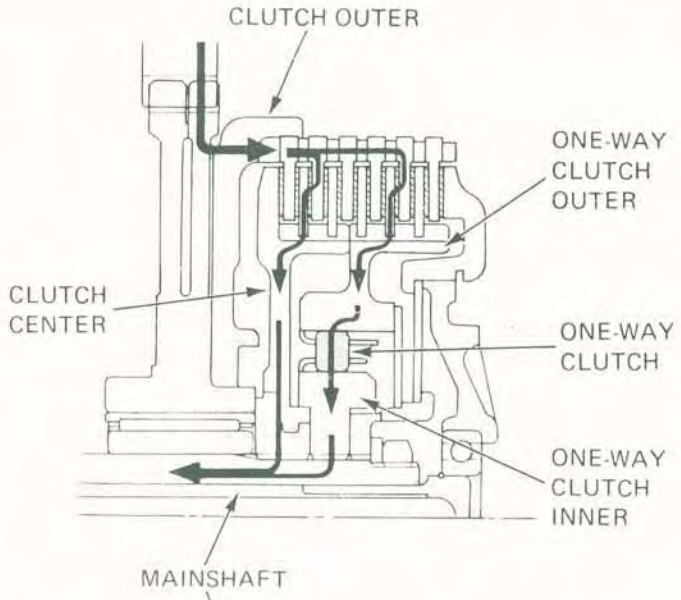
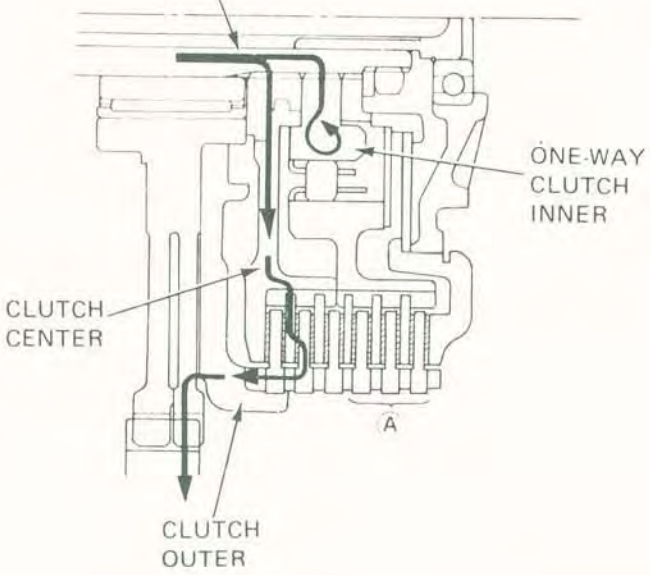
• Operation

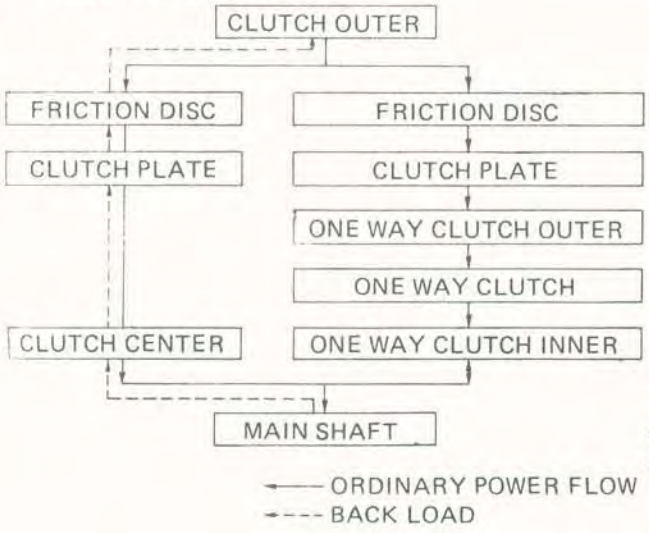
During acceleration, cruising and deceleration, power is transmitted through the clutch in the normal manner:
Clutch outer → friction disc → plate → one-way clutch → mainshaft.

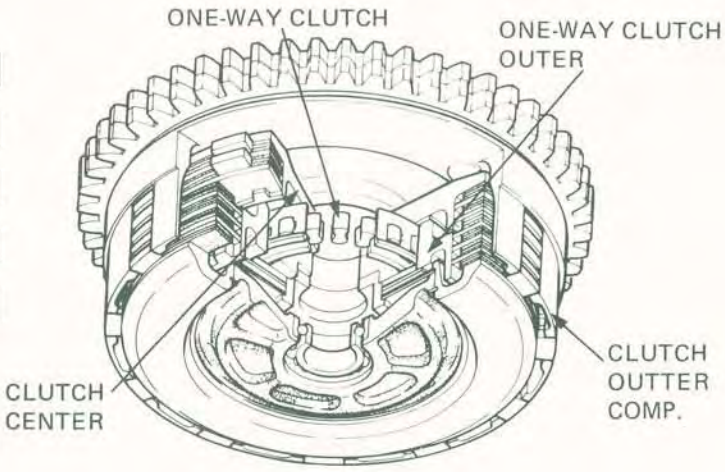


When there is a backloading on the clutch caused by the rear wheel nearing lock-up, the one-way clutch (A) will slip just enough to prevent the wheel from locking: without losing the benefit of maximum engine compression braking.



• POWER FLOW DIAGRAM





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23. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

		POSSIBLE CAUSE
1. Check fuel flow to carburetor	NOT REACHING CARBURETOR →	(1) Fuel tank empty (2) Clogged fuel line or fuel filter (3) Sticking float valve (4) Faulty fuel pump (5) Faulty fuel pump relay (6) Pinched fuel tank vent hose
REACHING CARBURETOR ↓		
2. Perform a 3-point spark test	WEAK OR NO SPARK →	(1) Faulty spark plugs (2) Fouled spark plugs (3) Faulty spark unit (4) Broken or shorted high tension wires (5) Faulty spark unit (6) Broken or shorted ignition coil (7) Faulty ignition switch (8) Faulty pulse generator
GOOD SPARK ↓		
3. Test cylinder compression	LOW COMPRESSION →	(1) Low battery charge (2) Improper valve clearance (too small) (3) Valve stuck open (4) Worn cylinder and piston rings (5) Damaged cylinder head gasket (6) Seized valve (7) Improper valve timing
COMPRESSION NORMAL ↓		
4. Start by following normal procedure	ENGINE STARTS BUT STOPS →	(1) Improper choke operation (2) Carburetor incorrectly adjusted (3) Intake pipe leaking (4) Improper ignition timing (Spark unit or pulse generator) (5) Fuel contaminated
ENGINE DOES NOT FIRE ↓		
5. Remove and inspect spark plug	WET PLUG →	(1) Carburetor flooded (2) Carburetor choke excessively closed. (3) Cylinder flooded (4) Air cleaner dirty

ENGINE LACKS POWER

		POSSIBLE CAUSE
1. Raise wheels off ground and spin by hand	WHEELS DO NOT SPIN FREELY →	(1) Brake dragging (2) Worn or damaged wheel bearings (3) Wheel bearing needs lubrication (4) Drive chain too tight (5) Rear axle nut excessively tight
WHEEL SPINS FREELY		
2. Check tire pressure	PRESSURE LOW →	(1) Punctured tire (2) Faulty tire valve
PRESSURE NORMAL		
3. Accelerate rapidly from low to second	ENGINE SPEED CHANGED WHEN CLUTCH IS RELEASED →	(1) Clutch slipping (2) Worn clutch disc/plate (3) Warped clutch disc/plate
ENGINE SPEED LOWERED WHEN CLUTCH IS RELEASED		
4. Accelrate lightly	ENGINE SPEED DOES NOT INCREASE →	(1) Carburetor choke closed (2) Clogged air cleaner (3) Restricted fuel flow (4) Clogged muffler (5) Clogged fuel tank vent hole
ENIGNE SPEED INCREASES		
5. Check ignition timing	INCORRECT →	(1) Faulty spark unit (2) Faulty pulse generator
CORRECT		
6. Check valve clearance	INCORRECT →	(1) Improper valve adjustment (2) Worn valve seat
CORRECT		
7. Test cylinder compression	TOO LOW →	(1) Valve stuck open (2) Worn cylinder and piston rings (3) Leaking head gasket (4) Improper valve timing
NORMAL		
8. Check carburetor for clogging	CLOGGED →	(1) Carburetor not serviced frequently enough
NOT CLOGGED		
9. Remove spark plug	FOULED OR DISCOLORED →	(1) Plugs not serviced frequently enough (2) Spark plug with incorrect heat range
NOT FOULED OR DISCOLORED		
10. Check oil level and condition	INCORRECT →	(1) Oil level too high (2) Oil level too low (3) Contaminated oil
CORRECT		
11. Remove cylinder head cover and inspect lubrication	VALVE TRAIN NOT LUBRICATED PROPERLY →	(1) Clogged oil passage (2) Clogged oil control orifice
VALVE TRAIN LUBRICATED PROPERLY		
12. Check for engine overheating	OVERHEATING →	(1) Coolant level low (2) Fan motor not working (fan motor relay faulty) (3) Thermostat stuck closed (4) Excessive carbon build-up in combustion chamber (5) Use of poor quality fuel (6) Clutch slipping
NOT OVERHEATING		
13. Accelerate or run at high speed	ENIGNE KNOCKS →	(1) Worn piston and cylinder (2) Wrong type of fuel (3) Excessive carbon build-up in combustion chamber (4) Ignition timing too advanced (Faulty spark unit)
ENGINE DOES NOT KNOCK		

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POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		POSSIBLE CAUSE
1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Improper ignition timing (Faulty spark unit)
CORRECT ↓		
2. Check carburetor pilot screw adjustment	INCORRECT →	See Fuel System Section
CORRECT ↓		
3. Check for leaking intake pipe	LEAKING →	(1) Deteriorated insulator O-ring (2) Loose carburetor
NO LEAK ↓		
4. Perform spark test	WEAK OR INTERMITTENT SPARK →	(1) Faulty, carbon or wet fouled spark plug (2) Faulty spark unit (3) Faulty ignition coil
GOOD SPARK		

POOR PERFORMANCE AT HIGH SPEED

NOTE: Ignition to the No. 2 and No. 4 cylinders is cut-off at 11,300–11,800 rpm to prevent engine damage.

1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Faulty spark unit (3) Faulty pulse generator
CORRECT ↓		
2. Disconnect fuel line at carburetor	FUEL FLOW RESTRICTED →	(1) Fuel tank empty (2) Clogged fuel line (3) Clogged fuel tank breather hole (4) Clogged fuel valve (5) Faulty fuel pump
FUEL FLOWS FREELY ↓		
3. Remove carburetors and check for clogged jets	CLOGGED →	Clean
NO CLOGGED JETS ↓		
4. Check valve timing	INCORRECT →	Cam sprocket not installed properly
CORRECT ↓		
5. Check valve spring tension	WEAK →	Faulty spring
NOT WEAKENED		

POOR HANDLING → Check tire and suspensions pressures

1. If steering is heavy →	(1) Steering stem adjuster nut too tight (2) Damaged steering head bearings
2. If either wheel is wobbling →	(1) Excessive wheel bearing play (2) Bent rim (3) Improperly installed wheel (4) Swingarm pivot bearing excessively worn (5) Bent frame
3. If the motorcycle pulls to one side →	(1) Bent frame (2) Front and rear wheels not aligned (3) Bent front fork (4) Bent swingarm

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