CLUTCH

OUTLINE

SPECIFICATIONS

			13B engine	12A engine
Clutch control			Hydraulic	
Clutch cover	Spring type		Diaphragm spring	
	Load		49,000 N (1,080 lb)	44,500 N (980 lb)
Clutch disc	Facing	Outer diameter x Inner diameter	225 mm x 150 mm (8.86 in x 5.91 in)	
		Quantity x Thickness	2 x 3.5 mm (0.14 in) engine side, 4.1 mm (0.16 in) pressure plate side	2 x 3.5 mm (0.14 in)
	Spline	Inner diameter x number of teeth	22.225 mm (0.875 in) x 22	
Clutch pedal	Type		Suspended	
	Total stroke		135 mm (5.31 in)	
	Height		190 ~ 195 mm (7.5 ~ 7.7 in)	
Master cylinder	Inner diameter		15.87 mm (5/8 in)	
Release cylinder	Inner diameter		19.05 mm (3/4 in)	
Clutch fluid			FMVSS 116, DOT-3 or DOT-4, or SAE J 1703a	

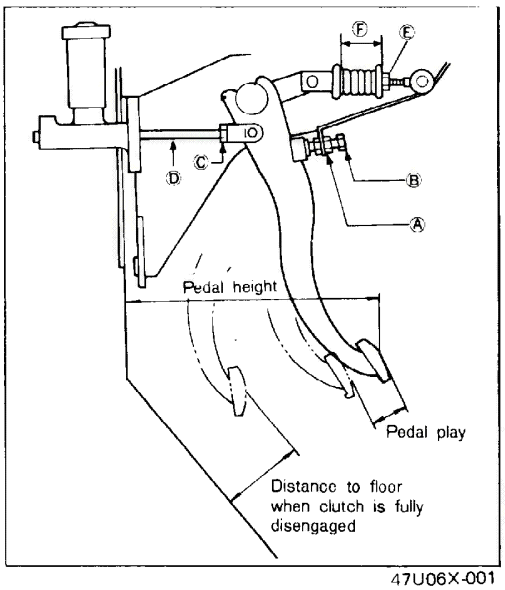
47U06X-027

TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Slipping	Excessive wear of facing	Replace	6–9
	Hardened facing, or oil/grease on facing	Repair or replace	6–9
	Distorted pressure plate	Repair or replace	6–8
	Distorted flywheel	Repair or replace	6–9
	Damaged or wear diaphragm spring	Replace	6–8
	Insufficient clutch play	Adjust	6–3
	Lack of smoothness in clutch pedal operation	Repair or replace	
Disengagement malfunction	Excessive distortion or deflection of clutch disc	Replace	6–9
	Wear or corrosion of clutch disc spline	Repair or replace	
	Oil/grease on facing	Repair or replace	6–9
	Weak diaphragm spring	Replace	6–8
	Excessive play of clutch pedal	Adjust	6–3
	Insufficient clutch fluid	Add fluid	6–7
	Leakage of clutch fluid	Repair or replace	6–7
Shudder when clutch is released	Oil/grease on facing	Repair or replace	6–9
	Weak torsion spring	Replace	
	Hardened or distorted facing	Repair or replace	6–9
	Weak diaphragm spring	Replace	6–8
	Excessive deflection or distortion of pressure plate	Replace	6–8
	Loose facing rivet	Replace	6–9
	Hardened surface or distortion of flywheel	Repair or replace	6–9
	Loose engine mount, or non-resiliency of rubber	Tighten or replace	
Lack of smoothness in clutch pedal operation	Insufficient lubrication of pedal shaft	Lubricate or replace	
Abnormal noise	Damaged release bearing	Replace	6–8
	Insufficient lubrication of release bearing sleeve	Lubricate or replace	6–8
	Weak torsion spring	Replace	
	No clutch pedal play	Adjust	6–3
	Worn or seized pilot bearing	Replace	6–10
	Wear of moving part of release fork	Repair or replace	6–8
	Excessive end play of eccentric shaft	Repair	

57U06X-028

INSPECTION AND ADJUSTMENT



47U06X-001

CLUTCH PEDAL HEIGHT

Inspection
Measure to check whether the distance from the upper surface of the pedal pad to the dash panel agrees with the standard value.

Standard pedal height: 190 ~ 195 mm (7.5 ~ 7.7 in)

Adjustment
Adjust the pedal height by loosening lock nut A and turning stopper bolt B on the clutch switch.

CLUTCH PEDAL PLAY

Inspection
Depress the pedal lightly by hand and measure to determine whether the play is within the standard value range.

Standard pedal play: 0.6 ~ 3.1 mm (0.02 ~ 0.12 in) at pedal pad

Adjustment
Adjust the pedal play by loosening lock nut C and turning push rod D .

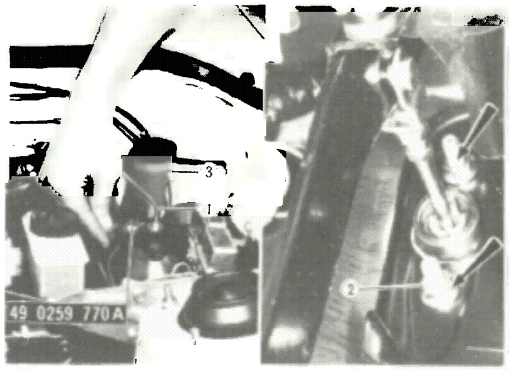
Caution
After adjusting, tighten lock nut C .

ASSIST SPRING

Inspection
Measure to check whether the dimension F agrees with the standard valve.

Standard spring hight: 36.5 ~ 37.5 mm (1.44 ~ 1.48 in)

Adjustment
Adjust the pedal play by turning nut E.



47U06X-002

CLUTCH MASTER CYLINDER

REMOVAL

Remove or disconnect the following parts in sequence.

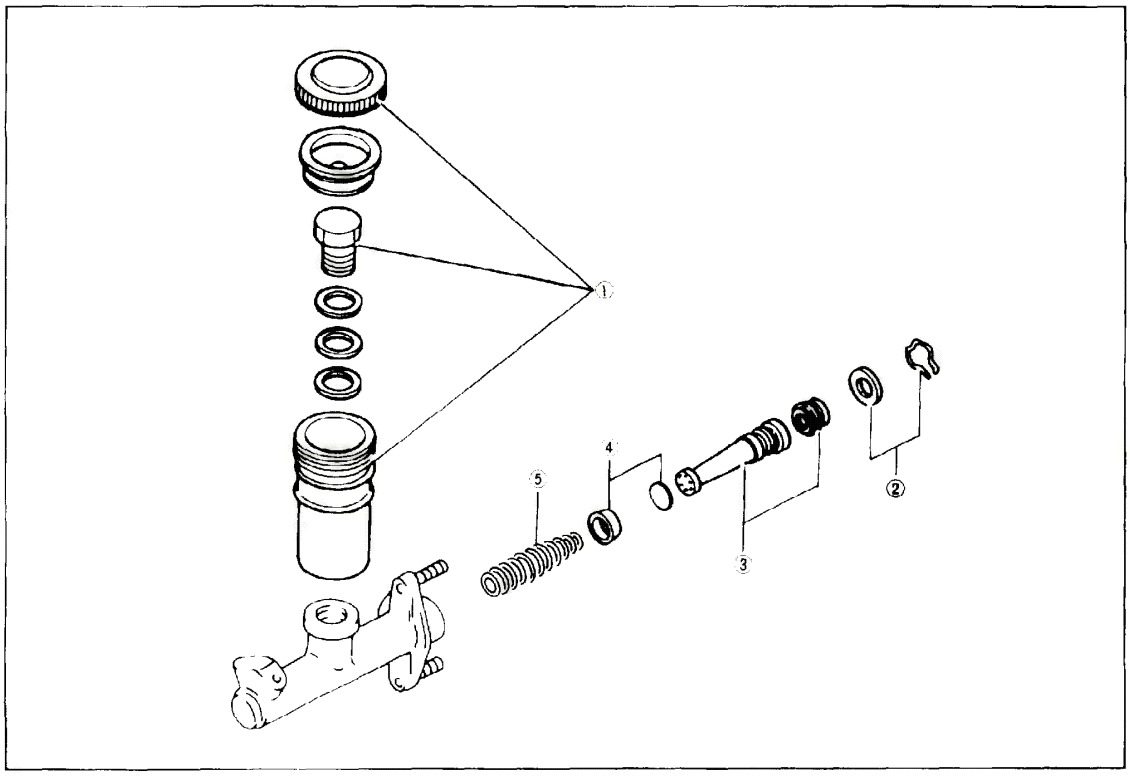
1. Fluid pipe (Disconnect)
   Use the **flare nut spanner** (49 0259 770A).
2. Attaching nuts (From inside of cabin)
3. Clutch master cylinder

Note
Never allow the brake fluid to drop on painted surfaces.

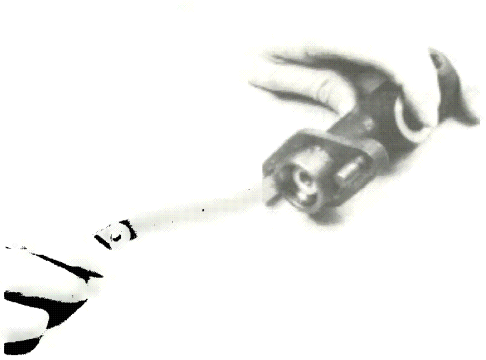
DISASSEMBLY

After draining the brake fluid, disassemble the clutch master cylinder in the numerical order.

1. Connector bolt and reserve tank set
2. Piston stop ring and washer
3. Piston and secondary cup assembly
4. Primary piston cup and spacer
5. Return spring



57U06X-003



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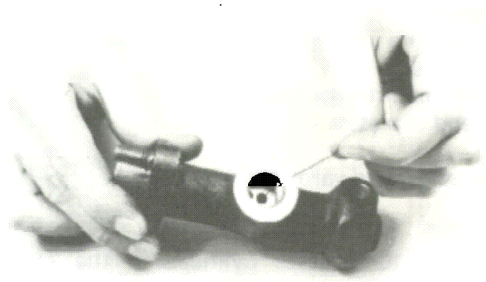


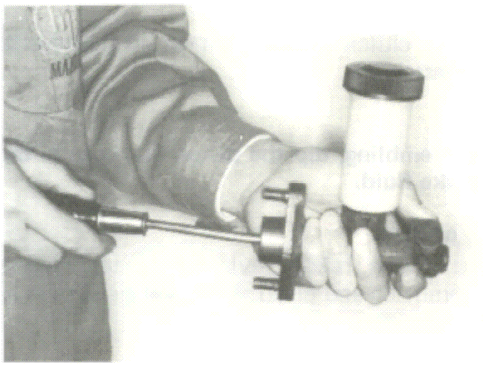
47U06X-005

INSPECTION

1. Wash the parts in clean alcohol or brake fluid. **Never use gasoline or kerosene.** Blow the parts dry with compressed air.
2. Check the piston cups and replace if they are damaged, worn, softened, or swelled.
3. Examine the cylinder bore and the piston for wear, roughness, or scoring.
4. Check the clearance between the cylinder bore and piston. If it exceeds the limit, replace the cylinder or piston.

Clearance limit: **0.15 mm (0.006 in)**

5. Ensure that the compensating port on the cylinder is open.



47U06X-006

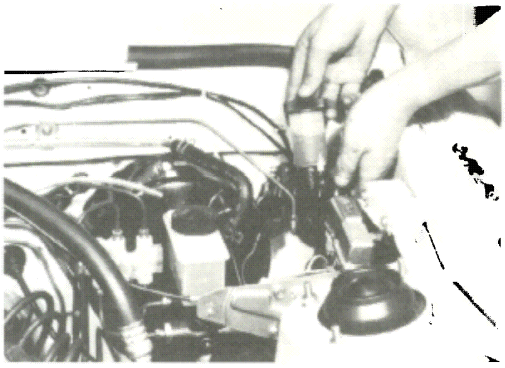
ASSEMBLY

Assemble the clutch master cylinder in the reverse order of disassembly.

Notes

a) Before assembling, dip the piston and cups in clean brake fluid.

b) After assembling, fill the cylinder with brake fluid and operate the piston with a screwdriver until the fluid is ejected at the outlet.



47U06X-007

INSTALLATION

To install the clutch master cylinder, carry out the removal operations in the reverse order.

After installing, bleed the clutch hydraulic system, as described in air bleeding.

47U06X-008

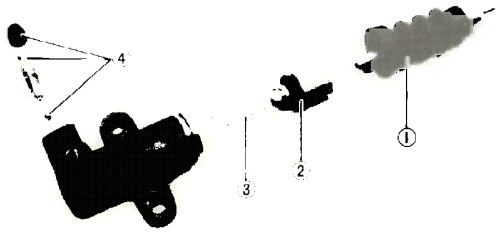
CLUTCH RELEASE CYLINDER

REMOVAL

Remove the following parts.
1. Connecting bolt and flexible hose
2. Attaching nuts
3. Release cylinder

DISASSEMBLY

Disassemble the clutch master cylinder in the numerical order.
1. Dust boot and release rod
2. Piston and cup assembly
3. Spring
4. Bleeder screw and valve (steel ball)



47U06X-009

INSPECTION

Check the clutch release cylinder in the same manner for the clutch master cylinder.

47U06X-010

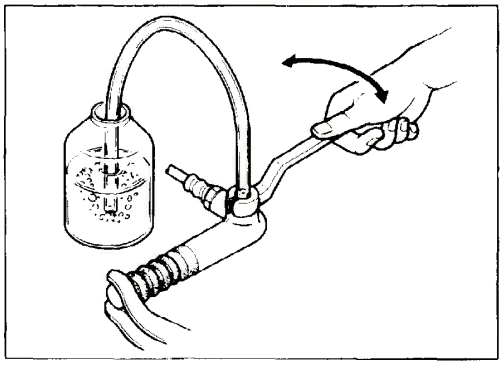
ASSEMBLY

Assemble the clutch release cylinder in the reverse order of disassembly.

Note
Before assembling, dip the piston and cups in the clean brake fluid.

INSTALLATION

Install the clutch release cylinder in the reverse order of removing and bleed the hydraulic system as described in air bleeding.



57U06X-011

AIR BLEEDING

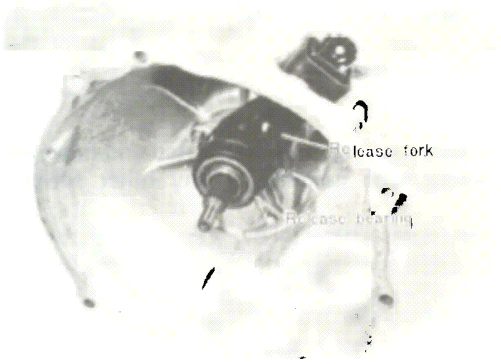
1. Remove the rubber cap from the bleeder screw and attach a vinyl tube to the bleeder screw.
2. Place the end of the tube in the glass jar and submerge in brake fluid.
3. Loosen the bleeder screw. Depress the clutch pedal and allow it to return slowly. Continue this pumping action and watch the flow of fluid in the jar.
4. When air bubbles cease to appear, tighten the bleeder screw, remove the vinyl tube and fit the cap to the bleeder screw.
5. Fill the fluid reservoir and fit the filler cap.

Cautions

a) During bleeding operation, the reserve tank of the master cylinder must be kept at least 3/4 full of the brake fluid.

b) Never re-use the brake fluid which has been drained from the clutch hydraulic system.

6. Start the engine check whether clutch operation is correct.
7. Check to be sure there is no fluid leakage from the pipe.

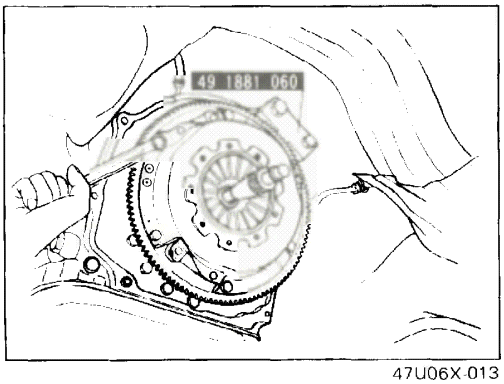


47U06X-012

CLUTCH AND FLYWHEEL

REMOVAL

1. Remove the transmission as described in section 7A.
2. Remove the release fork and release bearing.

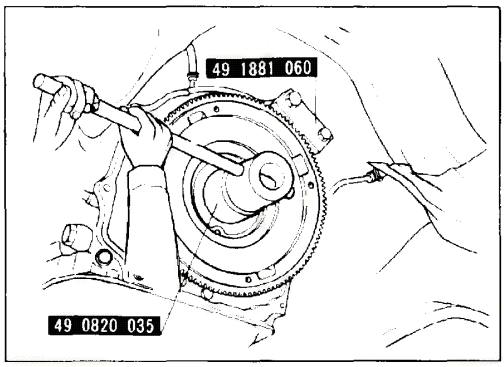


47U06X-013

3. Lock the flywheel with the **ring gear brake** (49 1881 060).
4. Remove the clutch pressure plate and cover assembly, and clutch disc.

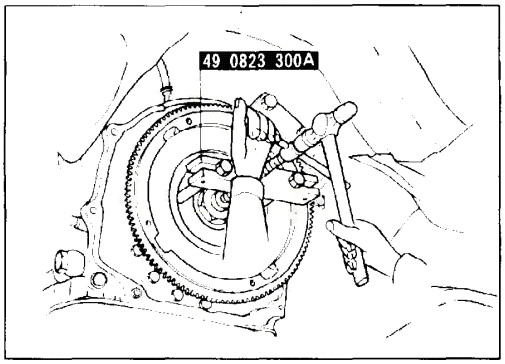
Caution

Take care not to get oil or grease on the clutch disc linings, or the pressure plate or the flywheel surface where it contacts on the clutch disc.



47U06X-014

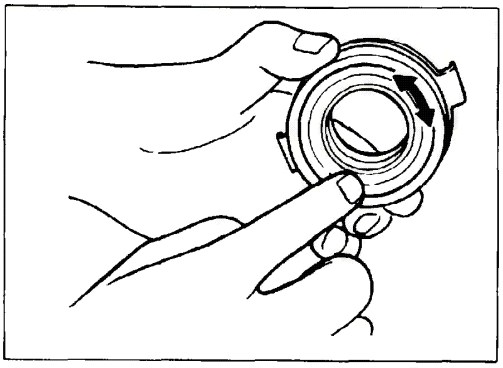
5. Loosen the lock nut by using the **flywheel box wrench** (49 0820 035).



47U06X-015

6. Remove the flywheel with the **flywheel puller** (49 0823 300A), turning the puller handle and lightly hitting the puller head.
Be careful not to drop the flywheel.

Note
After removing the flywheel, inspect for oil leaking through the eccentric shaft rear oil seal.



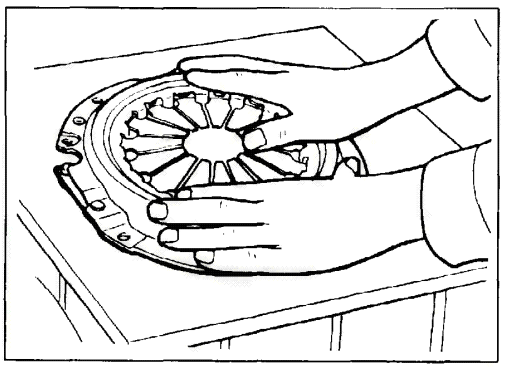
47U06X-016

INSPECTION

Release fork and bearing

Note
The release bearing is pre-lubricated and must not be washed with gasoline or any other solvent.

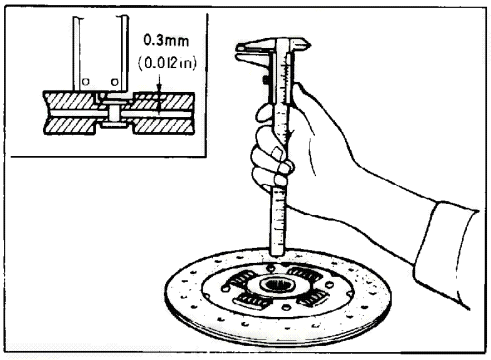
Check the release bearing by pressing and turning the front race slowly by hand. Replace if the bearing feels rough or seems noisy when turning.
Check the release fork for crack or bend.
If necessary, replace the release fork.



47U06X 017

Pressure plate and cover assembly

Check the contact surface of the pressure plate for wear, damage or warp.
If the warp is slight, correct it by lapping with compound or by turning on a lathe. But if they are severe, replace with a new one.
Check the diaphragm spring and cover and if any wear or damage is found, replace the pressure plate and cover assembly.



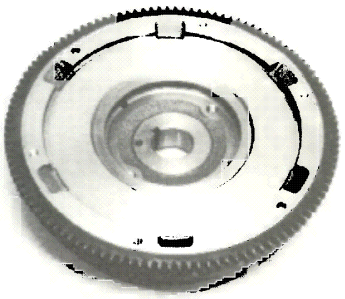
47U06X-018

Clutch disc

Inspect the clutch disc for worn or loose facing, distortion, loose rivets at the hub, and for broken springs.

Rivet head depth limit:	**0.3 mm (0.012 in)**
Run-out limit:	**1.0 mm (0.039 in)**

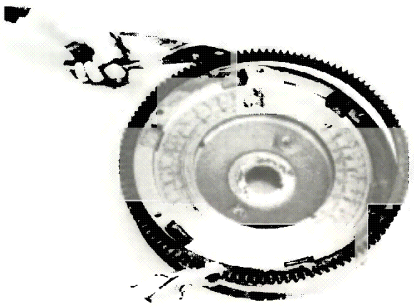
If oil is evident on the facing, clean or replace the clutch disc and eliminate the cause of oil leakage. Make certain that the clutch disc slides easily on the main drive shaft without any excessive play.



47U06X-019

Flywheel

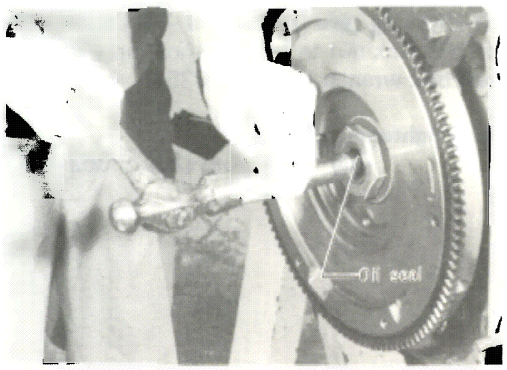
Inspect the contact surface of the flywheel with the clutch facing for burnt surface, scored surface or rivet grooves.
If it is slight, it can be reconditioned by grinding or by turning on a lathe. If the damage is deep, the flywheel should be replace.
Check the ring gear teeth and replace if the ring gear teeth are broken, cracked or seriously burred.



47U06X-020

Replacing ring gear

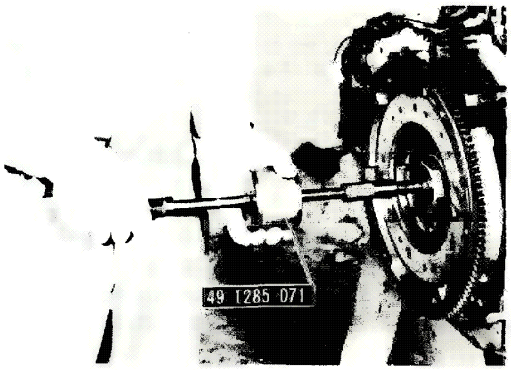
1. Heat the old ring gear and remove it from the flywheel.
2. Heat a new ring gear **evenly 250 ~ 300°C (480 ~ 570°F).**
3. Place the ring gear on the cold flywheel, making sure that the **chamfer on the teeth is faced to the transmission.**
4. Allow the ring gear to cool slowly to shrink it onto the flywheel.



47U06X-021

Eccentric shaft rear oil seal

Check the oil seal for wear or damage. If traces of oil leakage are found, replace the oil seal.

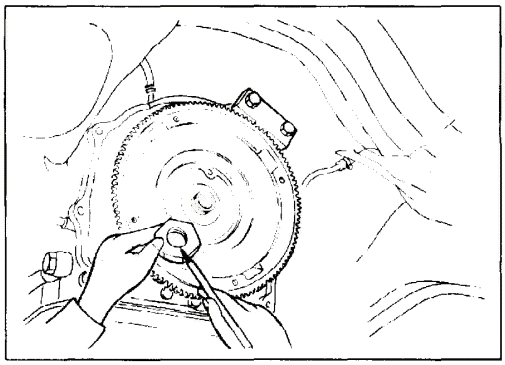


47U06X-022

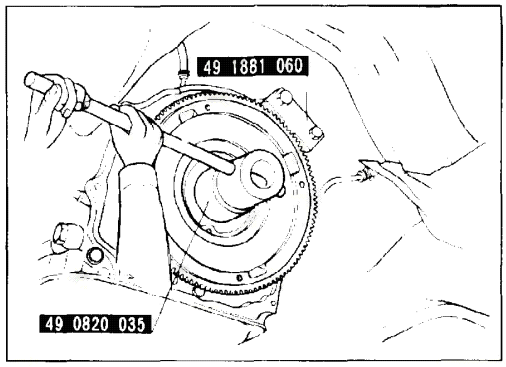
Needle bearing (Pilot bearing)
Check the pilot bearing for roughness, looseness and any damage. If necessary, replace the pilot bearing.
Replace the pilot bearing, proceed as follows.
1. Remove the bearing and seal with the **eccentric shaft bearing puller** (49 1285 071).

47U06X-023

2. Install a new pilot bearing with the **eccentric shaft bearing installer** (49 0823 072A) and apply the multipurpose grease on it.
3. Install the oil seal.


47U06X-024

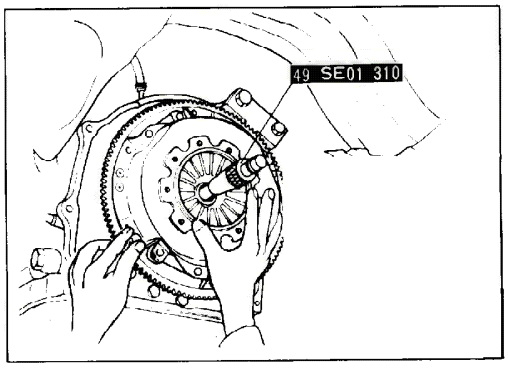
INSTALLATION
Install the clutch in the reverse order of removal, **noting** the followings.
1. Apply the sealing agent to lock nut surface that contact with flywheel and install the lock nut.



47U06X-025

2. Attach the **ring gear brake** (49 1881 060) and tighten the lock nut to the specifications with the **flywheel box wrench** (49 0820 035).

Flywheel tightening torque:
400 ~ 500 N-m (289 ~ 362 ft-lb)



57U06X-026

3. Hold the clutch disc in its mounting position with the **clutch disc centering tool** (49 SE01 310).
   If the tool is not avairable, use a spare main drive shaft.
4. Install the pressure plate and cover assembly, aligning the three knock pins of the clutch cover. To avoid pressure plate cover distortion, tighten the bolts a few turns at a time until they are all tight.
   Then torque the bolts to specifications.

Tightening torque: 18 ~ 27 N·m (13 ~ 20 ft-lb)