

# **WORKSHOP MANUAL**

**NKR · NPR · NQR · NPS**

## **MANUAL TRANSMISSION AND CLUTCH MXA SERIES**

**SECTION 7**

# **ISUZU**

**ISUZU**



International Service & Parts  
Tokyo, Japan

## **NOTICE**

**Before using this Workshop Manual to assist you in performing vehicle service and maintenance operations, it is recommended that you carefully read and thoroughly understand the information contained in Section 0A under the headings "GENERAL REPAIR INSTRUCTIONS" and "HOW TO USE THIS MANUAL".**

**All material contained in this Manual is based on latest product information available at the time of publication.**

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**Applicable Model : NKR66. NPR66. NQR66. NPS66**

**This manual is applicable to 1994 year model and later vehicles.**

**THIS MANUAL INCLUDES THE FOLLOWING SECTIONS:**

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<b>00</b>	<b>Service Information</b>
<b>7B</b>	<b>Manual Transmission</b>
<b>7C</b>	<b>Clutch</b>

# SECTION 00

## SERVICE INFORMATION

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# **TROUBLESHOOTING**

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# TROUBLESHOOTING

## MANUAL TRANSMISSION

PROBLEM	POSSIBLE CAUSE	CORRECTION
Abnormal Noise	<ol style="list-style-type: none"> <li>1. Flywheel pilot bearing worn.</li> <li>2. Bearing worn or broken (Main shaft or counter shaft).</li> <li>3. Anti-lash plate malfunction.</li> <li>4. Gear tooth contact surface worn or scuffed (Main shaft, counter shaft and/or reverse idle gear).</li> <li>5. Spline worn (Synchronizer clutch hub).</li> <li>6. Gear, clutch hub or thrust washer thrust face seized.</li> <li>7. Lack of backlash between mating gears.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace.</li> <li>2. Repair or replace</li> <li>3. Repair or replace.</li> <li>4. Repair or replace.</li> <li>5. Replace.</li> <li>6. Replace.</li> <li>7. Replace.</li> </ol>
Hard Shifting	<ol style="list-style-type: none"> <li>1. Improper clutch pedal free play.</li> <li>2. Wrong oil in use.</li> <li>3. Gear control linkage misadjust.</li> <li>4. Change lever sliding portions worn.</li> <li>5. Shift block, shift rod and/or control box sliding faces worn.</li> <li>6. Shift arm and/or synchronizer sleeve groove worn.</li> <li>7. Synchronizer parts worn or weakened.</li> <li>8. Thrust washer, collar, and/or gear thrust faces worn (Main shaft and/or counter shaft thrust play).</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust.</li> <li>2. Replace with recommended oil.</li> <li>3. Readjust.</li> <li>4. Repair or replace.</li> <li>5. Repair or replace.</li> <li>6. Replace.</li> <li>7. Replace.</li> <li>8. Replace.</li> </ol>
Walking or Jumping out of Gear	<ol style="list-style-type: none"> <li>1. Gear control linkage misadjust.</li> <li>2. Detent spring weakened or broken.</li> <li>3. Detent ball worn.</li> <li>4. Change lever sliding portions worn.</li> <li>5. Shift block, shift rod and/or control box sliding faces worn.</li> <li>6. Shift arm and/or synchronizer sleeve groove worn.</li> <li>7. Synchronizer parts worn or weakened.</li> <li>8. Thrust washer, collar, and/or gear thrust faces worn (Main shaft and/or counter shaft thrust play).</li> <li>9. Spline worn (Synchronizer hub).</li> <li>10. Bearings worn or broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust.</li> <li>2. Replace.</li> <li>3. Replace.</li> <li>4. Repair or replace.</li> <li>5. Repair or replace.</li> <li>6. Replace.</li> <li>7. Replace.</li> <li>8. Replace.</li> <li>9. Replace.</li> <li>10. Replace.</li> </ol>

## TROUBLESHOOTING (CONT.)

### CLUTCH

PROBLEM	POSSIBLE CAUSE	CORRECTION
Dragging	<ol style="list-style-type: none"> <li>1. Hydraulic line leakage.</li> <li>2. Air in line.</li> <li>3. Master cylinder and/or slave cylinder seals worn.</li> <li>4. Driven plate worn or warped.</li> <li>5. Diaphragm spring weak or tip of finger worn.</li> <li>6. Driven plate sticking on spline.</li> <li>7. Release bearing worn or damaged.</li> <li>8. Clutch pedal excessive free play.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair.</li> <li>2. Bleed and check for damage.</li> <li>3. Replace.</li> <li>4. Replace driven plate.</li> <li>5. Replace pressure plate.</li> <li>6. Clean and free spline and lubricate with grease.</li> <li>7. Replace release bearing.</li> <li>8. Readjust.</li> </ol>
Slipping	<ol style="list-style-type: none"> <li>1. Driven plate facing worn or oil soaked.</li> <li>2. Diaphragm spring weak.</li> <li>3. Pressure plate and/or flywheel warped.</li> <li>4. Clutch pedal lack of free play.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace driven plate and check for leaks as needed.</li> <li>2. Replace pressure plate.</li> <li>3. Repair or replace.</li> <li>4. Readjust.</li> </ol>
Shudder (Chattering)	<ol style="list-style-type: none"> <li>1. Engine mounting loose or broken.</li> <li>2. Driven plate facing warped.</li> <li>3. Driven plate surface of facing hardened.</li> <li>4. Driven plate facing oil soaked.</li> <li>5. Driven plate damper spring weakened or broken.</li> <li>6. Pressure plate and/or flywheel warped.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten or replace.</li> <li>2. Replace driven plate.</li> <li>3. Replace driven plate.</li> <li>4. Replace driven plate and check for leaks.</li> <li>5. Replace driven plate.</li> <li>6. Repair or replace.</li> </ol>
Noisy	<ol style="list-style-type: none"> <li>1. Release bearing binding.</li> <li>2. Release bearing worn or broken.</li> <li>3. Release bearing insufficiently lubricate.</li> <li>4. Driven plate damper springs weakened or broken.</li> <li>5. Pilot bearing worn or broken.</li> <li>6. Driven plate rivet loosen.</li> <li>7. Ball stud insufficiently lubricate.</li> <li>8. Clutch pedal lack of free play.</li> <li>9. Clutch pedal shaft insufficiently lubricate.</li> <li>10. Pilot bearing loose or broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean or replace if damaged, and lubricate.</li> <li>2. Replace.</li> <li>3. Lubricate with grease or replace.</li> <li>4. Replace driven plate.</li> <li>5. Replace.</li> <li>6. Replace driven plate.</li> <li>7. Lubricate with grease.</li> <li>8. Readjust.</li> <li>9. Lubricate with grease.</li> <li>10. Replace.</li> </ol>
Pedal is Hard to Push	<ol style="list-style-type: none"> <li>1. Hydraulic line blocked or crimped.</li> <li>2. Clutch booster malfunction.</li> <li>3. Clutch pedal shaft insufficiently</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean out or replace.</li> <li>2. Repair or replace.</li> <li>3. Repair or replace.lubricate.</li> </ol>

# MAIN DATA AND SPECIFICATIONS

## MANUAL TRANSMISSION

Transmission Model		MXA5S	MXA5R	MXA6S
Transmission Type		5-Speed Overdrive		6-Speed Overdrive
Gear Mesh Type		Synchromesh on all forward gear		
Control Type		Floor Remote Control		
Gear Ratio				
	1st	4.987	4.987	4.987
	2nd	2.870	2.870	2.870
	3rd	1.684	1.594	1.684
	4th	1.000	1.000	1.000
	5th	0.728	0.728	0.728
	6th	–	–	0.626
	Reverse	4.774	4.774	4.774
Lubricating Oil		Engine Oil (SAE 5W-30)		
Oil Capacity	Litres(US qt/lmp qt)	3.2 (3.38/2.82)		4.0 (4.23/3.52)

## TRANSFER

Transfer Type		2 Speed, Helical Gear
Gear Ratio (to Engine)	High Speed	1.000
	Low Speed	1.868
Lubricating Oil		Engine Oil ( SAE 5W–30)
Oil Capacity	Litres(US qt/lmp qt)	Approx 2.0 (2.11/1.76)

## POWER TAKE OFF

Allowable Maximum Torque	N·m (kg·m)	147 (15)/at output shaft 1,000 RPM
Gear Ratio (to Engine)		1.4741
Distance Plate Thickness	mm (in)	1.460 (0.057)
Revolution Direction		Clockwise (Viewed from rear)



# MAIN DATA AND SPECIFICATIONS (CONT.)

## CLUTCH

<b>Pressure Plate</b> Spring Type Outside Diameter                      mm (in) Clamping Force                        N (kg/lb) Spring Finger Height                mm (in)	Diaphragm Spring 300 (11.811) 8,336 (850/1,874) 49 – 51 (1.929 – 2.008)
<b>Driven Plate</b> Type Outside Dia. × Inside Dia.           mm (in) Free Thickness                        mm (in) Clamping Thickness                mm (in)	Dry Single Plate with Damper Spring 300 × 190 (11.811 × 7.480) 9.0 (0.354) 8.6 (0.339)
<b>Clutch Control</b> Type Clutch Pedal Free Play                mm (in) Clutch Pedal Height                mm (in) Clutch Pedal Stroke                mm (in) Master Cylinder Inside Diameter Without Booster                    mm (in) With Booster                        mm (in) Slave Cylinder Inside Diameter    mm (in) Clutch Booster Diaphragm Diameter mm (in)	Hydraulic 15 – 25 (0.591 – 0.984) 160 – 170 (6.299 – 6.693) 159 – 169 (6.260 – 6.654) 19.050 – 19.102 (0.7500 – 0.7520) 20.640 – 20.692 (0.8126 – 0.8146) 25.400 – 25.452 (1.0000 – 1.0020) 130 (5.118)

# SERVICE STANDARD

## MANUAL TRANSMISSION

Items		Service Standard	Service Limit
BALL BEARING			
Ball Bearing Run-Out	mm (in)	–	0.20 (0.0079)
GEAR			
Gear Inside Diameter			
6th,5th	mm (in)	42.000 (1.6535)	42.100 (1.6575)
3rd,2nd,1st,Rev.	mm (in)	61.000 (2.4016)	61.100 (2.4055)
MAIN SHAFT			
Main shaft Run-Out	mm (in)	Less than 0.025 (0.001)	0.10 (0.0079)
BLOCK RING AND DOG TEETH			
Block Ring and Dog Teeth Clearance			
6th,5th,4th	mm (in)	1.4 (0.055)	0.5 (0.020)
3rd,2nd,1st,Rev.	mm (in)	1.5 (0.059)	0.5 (0.020)
CLUTCH HUB			
Clutch Hub Spline Play	mm (in)	Less than 0.05 (0.002)	0.3 (0.012)
BLOCK RING AND INSERT			
Block Ring and Insert Clearance			
6th,5th,4th,3rd,2nd	mm (in)	3.59 – 3.91 (0.141 – 0.154)	–
1st,Rev.	mm (in)	3.54 – 3.86 (0.139 – 0.152)	–
CLUTCH HUB AND INSERT			
Clutch Hub and Insert Clearance	mm (in)	0.09 – 0.31 (0.004 – 0.012)	–
SHIFT ARM			
Shift Arm Thickness	mm (in)	10.0 (0.3937)	9.0 (0.3543)
SHIFT PIECE			
Shift Piece Thickness	mm (in)	10.0 (0.3937)	9.0 (0.3543)
DETENT SPRING			
Detent Spring Free Length	mm (in)	31.6 (1.2441)	30.1 (1.1850)
PLUNGER SPRING			
Plunger Spring Free Length	mm (in)	35.1 (1.3819)	34.0 (1.3386)
DETENT SPRING(for shift block assembly)			
Detent Spring Free Length	mm (in)	24.4 (0.9606)	23.0 (0.9055)

## SERVICE STANDARD (CONT.)

### TRANSFER

Items		Service Standard	Service Limit
<b>SHIFT ARM</b>			
Shift Arm Thickness			
(2WD–4WD)	mm (in)	10.0 (0.3937)	9.0 (0.3543)
(High–Low)	mm (in)	10.5 (0.4134)	9.5 (0.3740)
<b>DETENT SPRING</b>			
Detent Spring Free Length	mm (in)	31.6 (1.2441)	30.1 (1.1850)
<b>MAIN SHAFT</b>			
Main shaft Run-Out	mm (in)	–	0.1 (0.0039)
<b>GEAR</b>			
Gear Inside Diameter			
Input Shaft High Gear	mm (in)	81.000 (3.1890)	81.100 (3.1929)
Input Shaft Low Gear	mm (in)	58.000 (2.2835)	58.100 (2.2874)
Front Drive Gear	mm (in)	55.000 (2.1654)	55.100 (2.1693)
<b>BALL BEARING</b>			
Ball Bearing Run-Out	mm (in)	–	0.2 (0.008)

### POWER TAKE OFF

Items		Service Standard	Service Limit
<b>BALL BEARING</b>			
Ball Bearing Run-Out	mm (in)	–	0.2 (0.008)
<b>GEAR</b>			
Output Shaft and Output Gear Bushing Clearance	mm (in)	–	0.2 (0.008)
<b>SHIFT ARM</b>			
Shift Arm Thickness	mm (in)	9.0 (0.354)	8.0 (0.315)

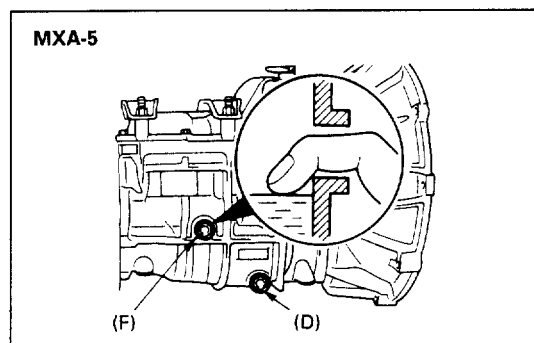
## SERVICE STANDARD (CONT.)

### CLUTCH

Items		Service Standard	Service Limit
<b>PRESSURE PLATE</b>			
Pressure Plate Warpage	mm (in)	–	0.3 (0.012)
Clutch Set Force	N (kg/lb)	8,336 (850/1,874)	–
Diaphragm Spring Finger Height	mm (in)	49 – 51 (1.929 – 2.008)	–
<b>DRIVEN PLATE</b>			
Driven Plate Warpage	mm (in)	less than 0.7 (0.028)	1.0 (0.039)
Spline Wear	mm (in)	less than 0.5 (0.020)	1.0 (0.039)
Depression of Rivet Head	mm (in)	1.6 – 2.2 (0.063 – 0.087)	0.2 (0.008)
<b>CLUTCH PEDAL</b>			
Clutch Pedal Free Play	mm (in)	15 – 25 (0.591 – 0.984)	–
Clutch Pedal Height	mm (in)	160 – 170 (6.299 – 6.693)	–
Clutch Pedal Stroke	mm (in)	159 – 169 (6.260 – 6.654)	–
Clutch Switch and Pedal Clearance	mm (in)	0.5 – 1.0 (0.020 – 0.039)	–
<b>MASTER CYLINDER</b>			
Cylinder Body and Piston Clearance	mm (in)	0.03 – 0.11 (0.0118 – 0.0043)	0.120 (0.0047)
<b>SLAVE CYLINDER</b>			
Cylinder Body and Piston Clearance	mm (in)	0.02 – 0.10 (0.0008 – 0.0039)	0.110 (0.0043)
<b>CLUTCH BOOSTER</b>			
Push Rod Length	mm (in)	3.75 – 4.00 (0.1476 – 0.1575)	–
Clevis Yoke Distance	mm (in)	157.00 (6.1811)	–

## SERVICING

### TRANSMISSION OIL LEVEL CHECK



1. Remove the filler plug.

2. Check the oil level.

- Add lubricant to within 0 to 10 mm (0 to 0.4 in) of bottom edge of the filler hole if necessary.

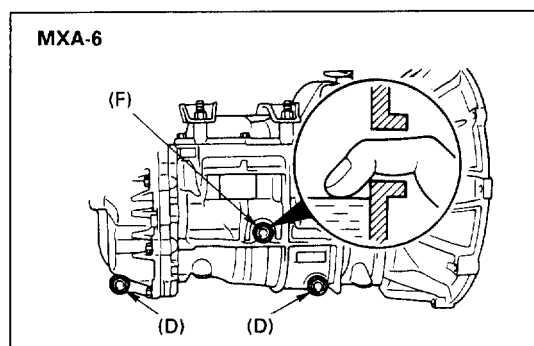


#### CAUTION

Use **ENGINE OIL (SAE 5W-30)** for transmission and transfer case.

3. Install the filler plug.

Filler Plug Torque	N·m (kg·m/lb·ft)
49 (5.0/36)	



### TRANSMISSION OIL CHANGE

1. Remove the drain plug (D) from the transmission case and drain the oil.

2. Install the drain plug (D).

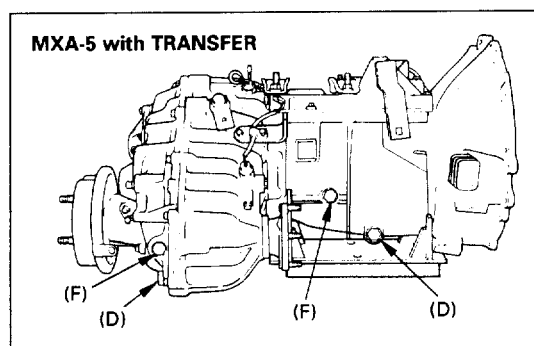
Drain Plug Torque	N·m (kg·m/lb·ft)
49 (5.0/36)	



3. Remove the filler plug (F).

4. Fill the transmission case from the filler plug hole with new oil of specified grade.

Oil Capacity	Litres (US qt/Imp.qt)
5-Speed Type	3.2 (3.38/2.82)
6-Speed Type	4.0 (4.23/3.52)
Transfer	2.0 (2.11/1.82)



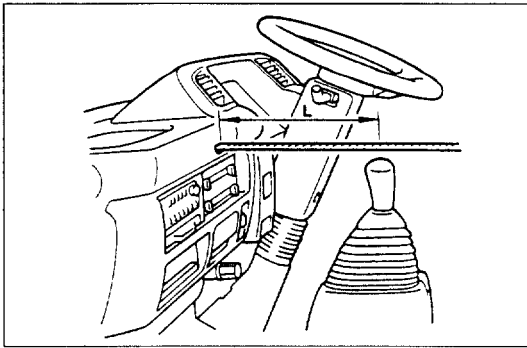
#### CAUTION

Use **ENGINE OIL (SAE 5W-30)** for transmission and transfer case.

5. Install filler plug (F).

Filler Plug Torque	N·m (kg·m/lb·ft)
49 (5.0/36)	

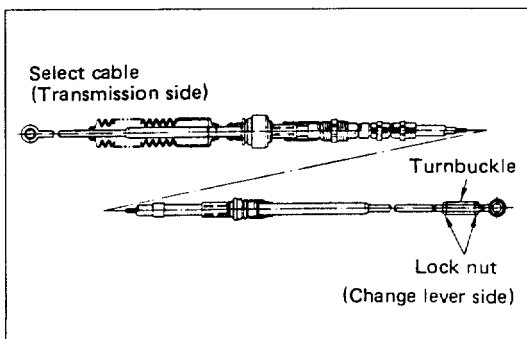
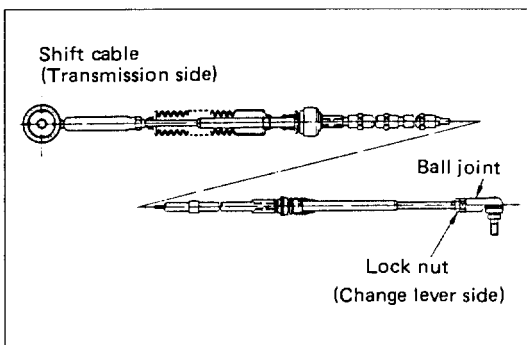
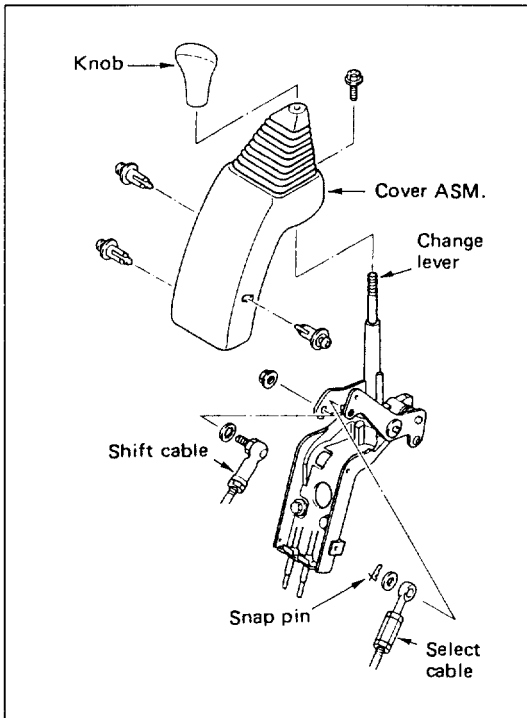




## GEAR CONTROL CABLE ADJUSTMENT

1. Set the change lever in the neutral position, then confirm if the dimension between the center of the change lever play and the instrument center cluster is within the reference value.

Change Lever Position	mm (in)
Standard cab	247±15 ( 9.7±0.6)
Wide Cab	283±15 (11.1±0.6)



2. If the dimension is out of the reference adjust as required.

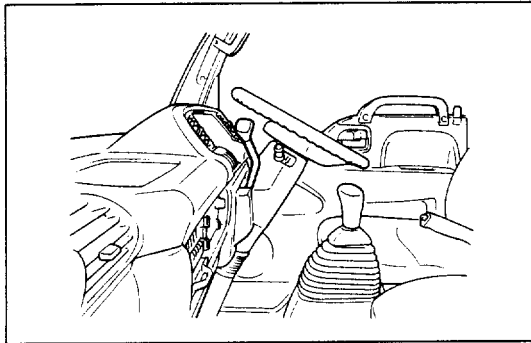
- 1) Remove the change lever knob.
- 2) Remove the cover assembly.
- 3) Disconnect the shift cable from the change lever.
- 4) Set the transmission in the neutral position.
- 5) Loosen the lock nut of the shift cable ball joint and the select cable turnbuckle, then turn the ball joint and turnbuckle as necessary for hole and pin.
- 6) Tighten the lock nuts and install the shift cable to the change lever.



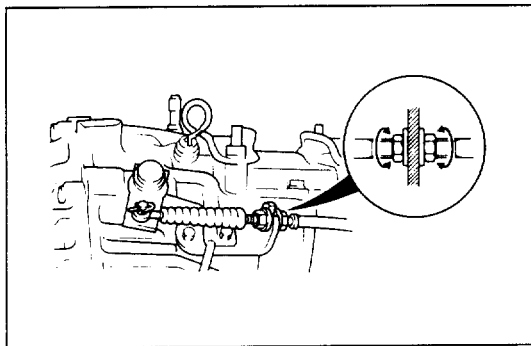
Lock nut torque	N·m (kg·m/lb·in)
	6 (0.6/52)

- 7) Install the cover assembly and the change lever knob.

## TRANSFER CONTROL CABLE ADJUSTMENT

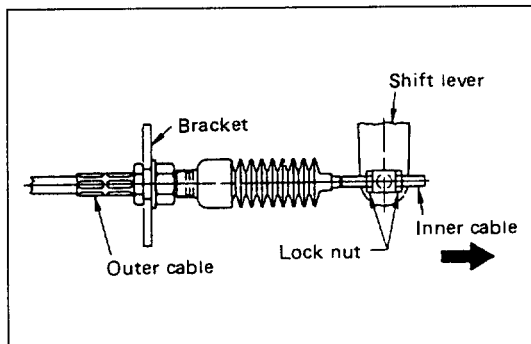


1. Set the external shift lever of transfer in the high speed range (4H) position.
2. Loosen the adjust nut.
3. Remove the split pin and the washer, then disconnect the control cable.



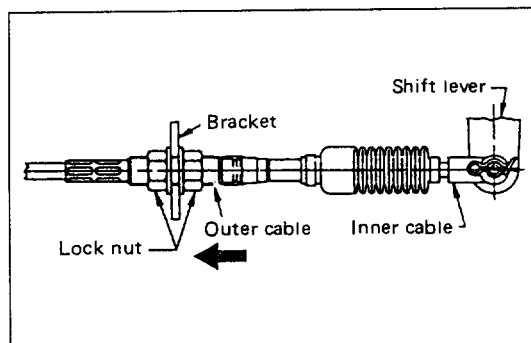
4. Set the external shift lever of transfer in the high speed range (4H) position. Adjust the position of the control cable eye end, then connect the control cable to the external shift lever.
5. Tighten the lock nut.
6. Install the washer and the split pin.

## POWER TAKE OFF CONTROL CABLE ADJUSTMENT



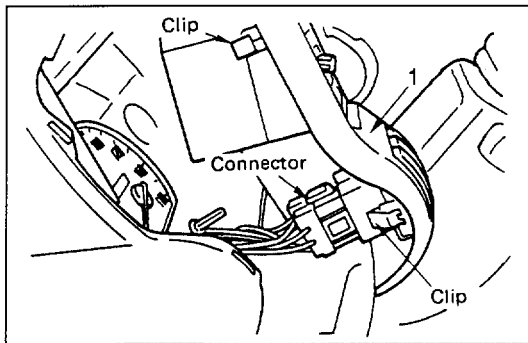
### Inner Cable Adjustment Type

1. Loosen the lock nuts.
2. Set the PTO shift lever in the OFF position. Be sure to confirm the PTO control lever is in the OFF position (PTO indicator light turned off).
3. Remove slack from the inner cable by pulling the inner cable in the direction of the arrow.
4. Tighten the lock nuts.



### Outer Cable Adjustment Type

1. Loosen the lock nuts.
2. Set the PTO shift lever in the OFF position. Be sure to confirm the PTO control lever is in the OFF position (PTO indicator light turned off).
3. Connect the inner cable to the PTO shift lever.
4. Remove slack from the inner cable by pulling the outer cable in the direction of the arrow.
5. Tighten the lock nuts.



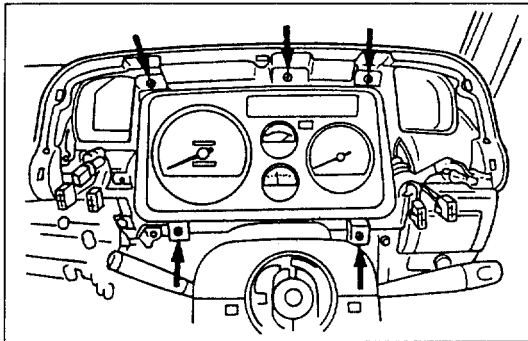
## CLUTCH PEDAL TRAVEL AND FREE PLAY ADJUSTMENT

### Clutch Pedal Height and Stroke



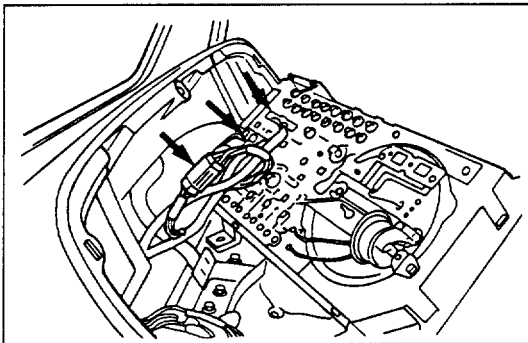
#### 1. Remove the meter cluster.

- Pull out the meter cluster and disconnect the harness connectors.

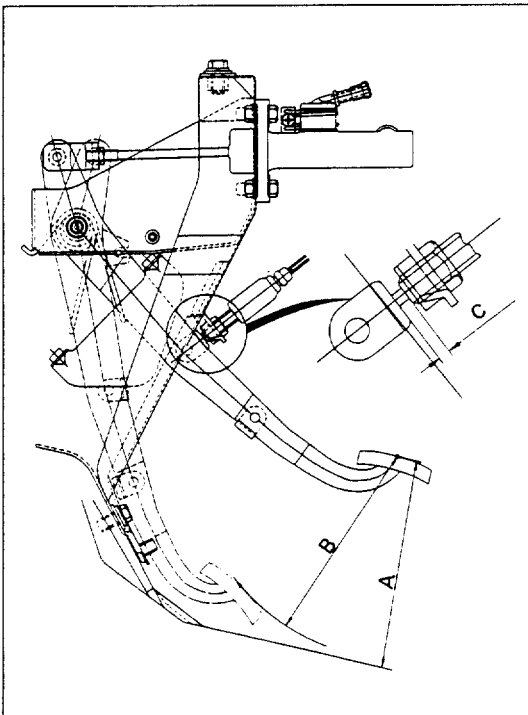


#### 2. Remove the meter assembly.

- Remove the 5 fixing screws.



- Disconnect the harness connectors.



#### 3. Loosen the lock nut of the clutch booster plunger or clutch master cylinder push rod.



#### 4. Adjust the pedal height by turning plunger or push rod.

Clutch Pedal Height and Stroke		mm(in)
Height(A)		160 – 170 (6.299 – 6.693)
Stroke(B)		159 – 169 (6.260 – 6.654)



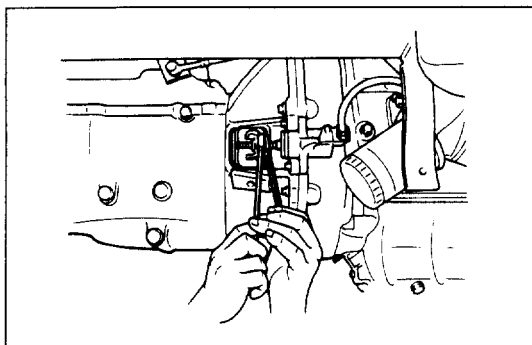
#### 5. Tighten the lock nut.

Lock Nut Torque		N·m (kg·m/lb·ft)
Plunger		20 (2.0/14)
Push Rod		13 (1.3/10)



#### 6. Install the meter assembly and meter cluster.



**Clutch Pedal Free Play****Slave Cylinder**

1. Remove the slave cylinder return spring.
2. Loosen the lock nut of the push rod.
3. Turn the adjust nut until it reaches the shift fork.
4. Back off the adjust nut 1.5 turns (shift fork free play approximately 2 mm).
5. Tighten the lock nut.



Lock Nut Torque	N·m(kg·m/lb·ft)
19 (1.9/14)	

6. Install the return spring.

**Clutch Switch or Stopper Bolt**

After completion of clutch pedal height adjustment, adjust the clutch switch or stopper bolt clearance.

1. Loosen the lock nut of clutch switch or stopper bolt.
2. Adjust the clutch switch or stopper bolt clearance by turning clutch switch or stopper bolt.



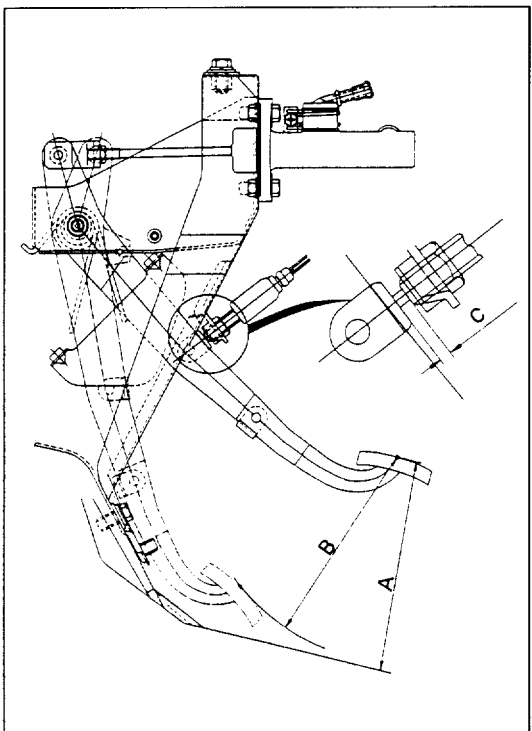
Clutch Switch or Stopper Bolt Clearance(C)	mm(in)
0.5 - 1.0 (0.02 - 0.04)	

Clutch Pedal Free Play	mm(in)
15 - 25 (0.59 - 0.98)	



3. Tighten the lock nut.

Lock Nut Torque	N·m(kg·m/lb·ft)
19 (1.9/14)	

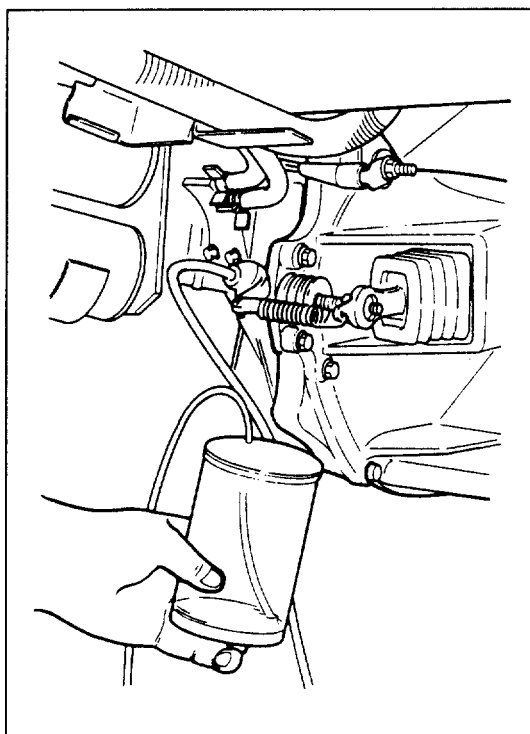


## CLUTCH HYDRAULIC CIRCUITS BLEEDING

If air enters the clutch circuit, it will causes clutch dragging. Therefore, bleeding operation should be performed if the clutch fluid reservoir has been emptied due to failure to mal-replenishment or if the hydraulic circuit has been disassembled. Bleeding operation calls for cooperative action of two men.

1. Check the level of clutch fluid in the reservoir and replenish if necessary.
2. Remove the rubber cap from the bleeder screw and wipe clean the bleeder screw.  
Connect a vinyl tube to the bleeder screw and insert the other end of the vinyl tube into a transparent container.
3. Pump the clutch pedal repeatedly and hold it depressed.
4. Loosen the bleeder screw on the clutch slave cylinder to release clutch fluid with air bubbles into the container and tighten the bleeder screw immediately.
5. Release the clutch pedal carefully. Repeat the above operation until air bubbles disappear from the clutch fluid being pumped out into the container. During the bleeding operation, keep the clutch fluid reservoir filled to the specified level.

Reinstall the rubber cap.



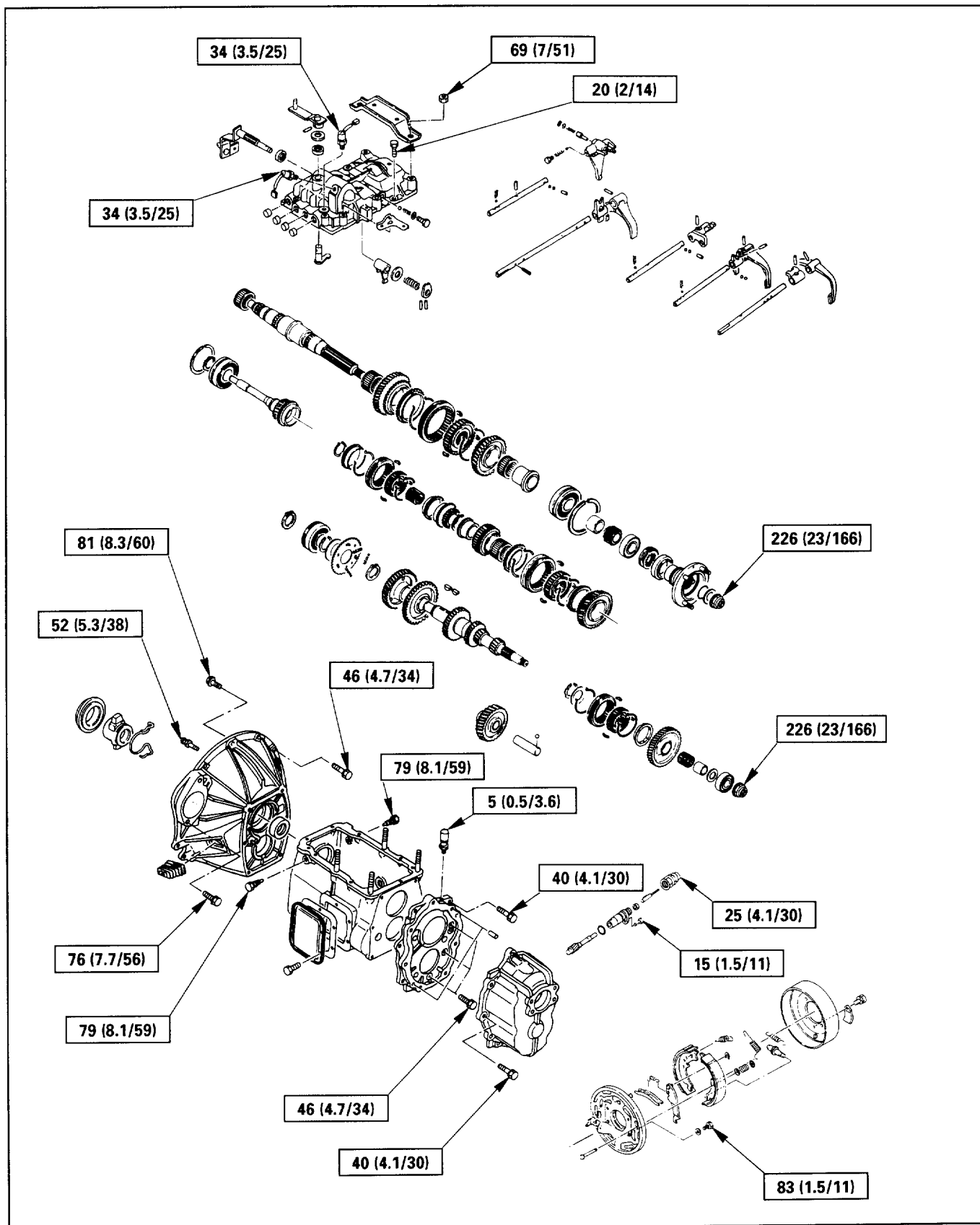
### CAUTION

**Do not let clutch fluid remain on a painted surface. Wash it off immediately.**

# FIXING TORQUE

## MANUAL TRANSMISSION

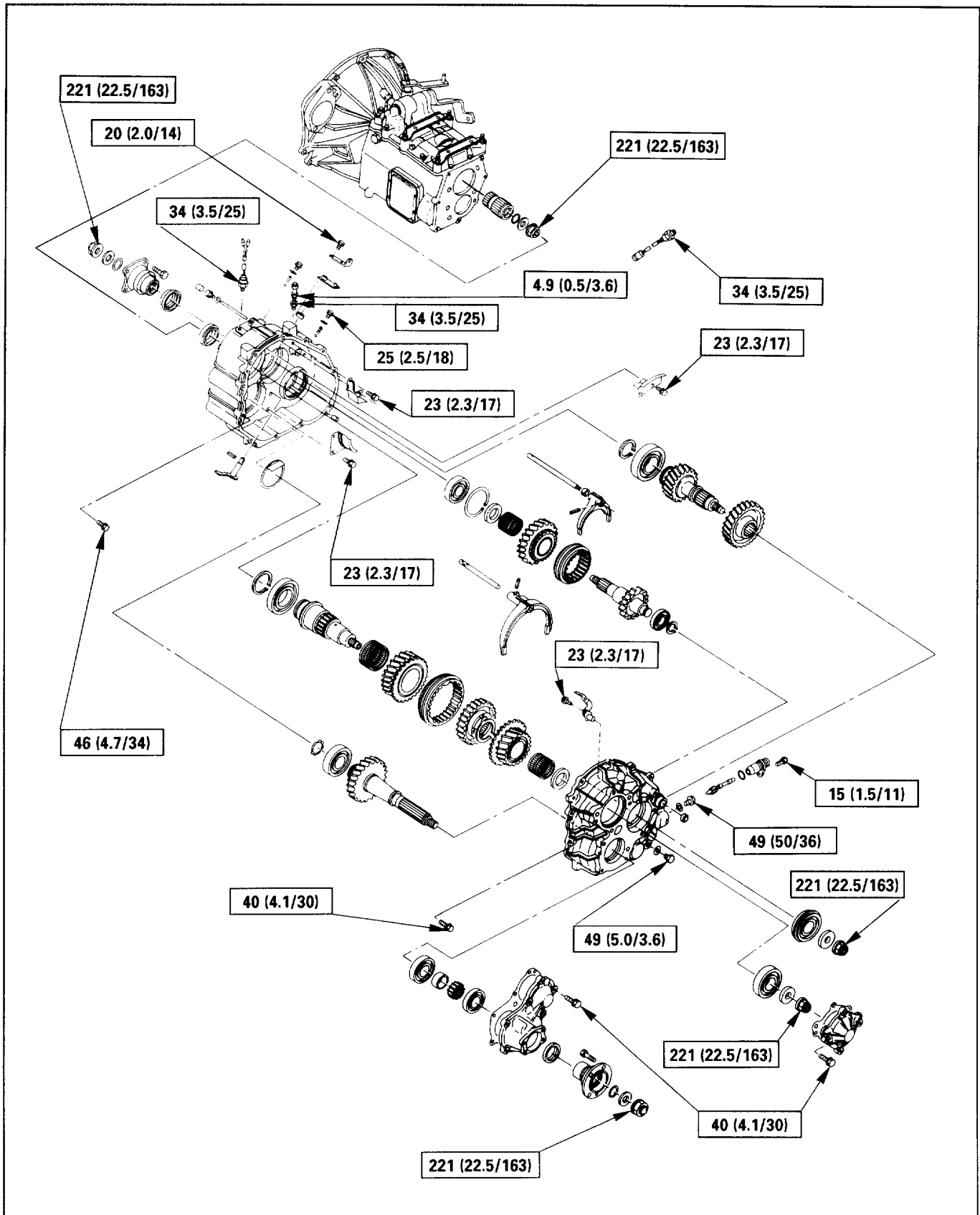
N·m(kg·m/lb·ft)



# FIXING TORQUE (CONT.)

## TRANSFER

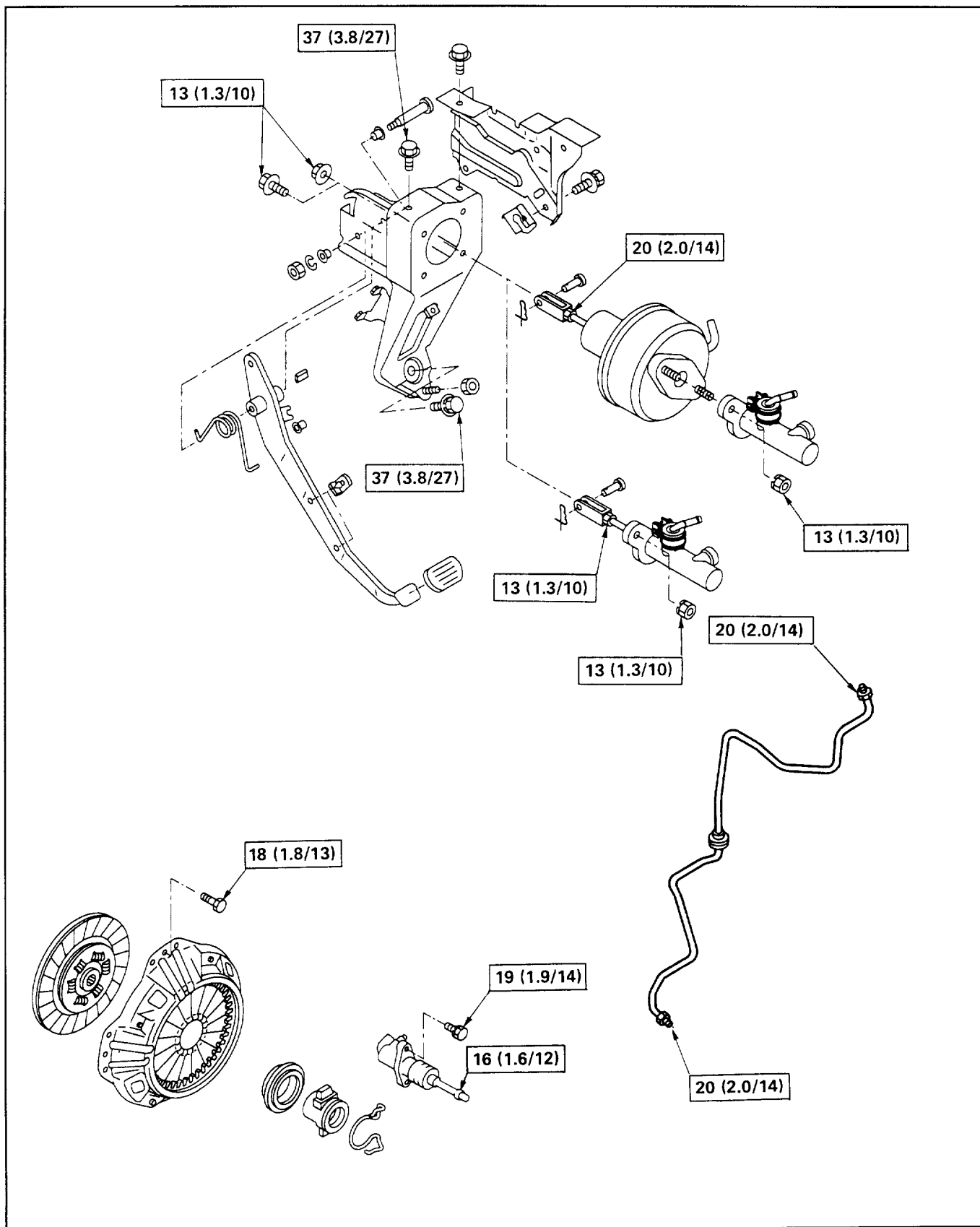
N·m(kg·m/lb·ft)



# FIXING TORQUE (CONT.)

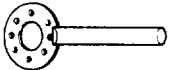
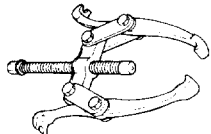
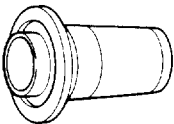
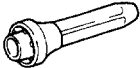
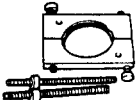
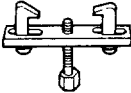
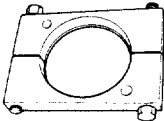
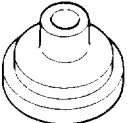
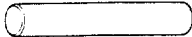
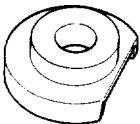
## CLUTCH

N·m(kg·m/lb·ft)



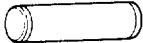
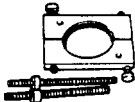
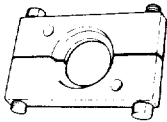


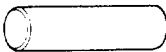

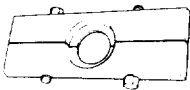
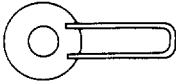
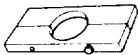
# SPECIAL TOOL

## MANUAL TRANSMISSION

ILLUSTRATION	PART NUMBER	PART NAME	REMARKS
	5-8840-2043-0	Handle	
	5-8840-2198-0	Bearing Remover	
	5-8840-2242-0	Oil Seal Installer	For rear cover oil seal
	5-8840-2243-0	Oil Seal Installer	For front cover oil seal
	5-8840-2042-0	Bearing Remover	
	5-8840-2027-0	Universal Puller	
	5-8840-2342-0	Bearing Remover	For main shaft rear bearing
	5-8840-2347-0	Main Shaft Holder	
	5-8840-2345-0	Clutch Hub & Collar Installer	
	5-8840-2348-0	Counter Shaft Holder	

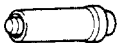
## SPECIAL TOOL (CONT.)

### MANUAL TRANSMISSION (CONT.)

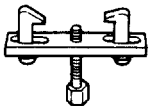
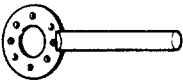

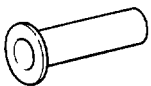

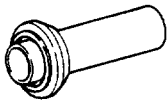
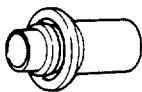
ILLUSTRATION	PART NUMBER	PART NAME	REMARKS
	5-8840-2244-0	Bearing Installer	
	5-8840-2112-0	Bearing Remover	
	5-8840-2341-0	Gear Remover	For main 6th gear
	9-8529-2201-0	Spring Pin Remover	
	5-8840-2344-0	Bolts & Nut	
	5-8840-2346-0	Gear Collar Installer	For Counter 6th gear collar
	5-8840-0587-0	Gear Remover	
	5-8840-2343-0	Clutch Hub Remover	
	5-8840-2045-0	Anti-Lash Plate Installer	
	5-8840-2295-0	Bearing Remover	

## SPECIAL TOOL (CONT.)

### MANUAL TRANSMISSION (CONT.)

ILLUSTRATION	PART NUMBER	PART NAME	REMARKS
	5-8840-2245-0	Oil Seal Installer	For control box oil seal

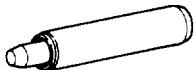
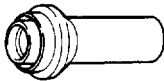
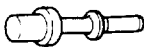
## TRANSFER

ILLUSTRATION	PART NUMBER	PART NAME	REMARKS
	5-8840-2027-0	Universal Puller	
	5-8840-2043-0	Handle	
	9-8522-1615-0	Bearing Collar Install	For reverse gear bearing collar
	5-8840-2144-0	Bearing Installer	
	5-8840-2146-0	Oil Seal Installer	For transfer case rear oil seal
	5-8840-2147-0	Oil Seal Installer	For rear cover oil seal
	5-8840-2148-0	Oil Seal Installer	For transfer case front oil seal

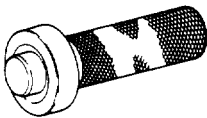
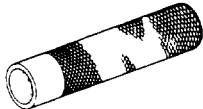
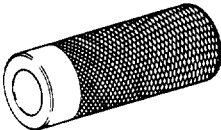




## SPECIAL TOOL (CONT.)

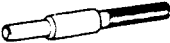
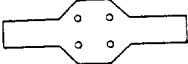
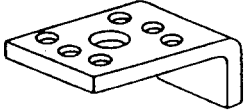
### TRANSFER (CONT.)

ILLUSTRATION	PART NUMBER	PART NAME	REMARKS
	5-8840-2149-0	Oil Seal Installer	For transfer case front oil seal
	9-8840-2150-0	Oil Seal Installer	For transfer case front oil seal
	5-8840-2151-0	Transfer Case Cap	

## POWER TAKE OFF

ILLUSTRATION	PART NUMBER	PART NAME	REMARKS
	5-8840-2064-0	Oil Seal Installer	For output shaft oil seal
	5-8840-2065-0	Oil Seal Installer	For shift rod oil seal
	5-8840-2066-0	Bearing Installer	For output shaft bearing
	5-8840-2067-0	Plug Installer	For shift rod cap
	9-8529-2201-0	Spring Pin Remover	

**SPECIAL TOOL (CONT.)****CLUTCH**

ILLUSTRATION	PART NUMBER	PART NAME	REMARKS
	5-8840-2240-0	Pilot Aligner	
	9-8523-1733-0	Handle	For clutch booster
	5-8840-2056-0	Support Plate	For clutch booster

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**SECTION 7**

**MANUAL TRANSMISSION AND CLUTCH**

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# SECTION 7B

## MANUAL TRANSMISSION

### CONTENTS

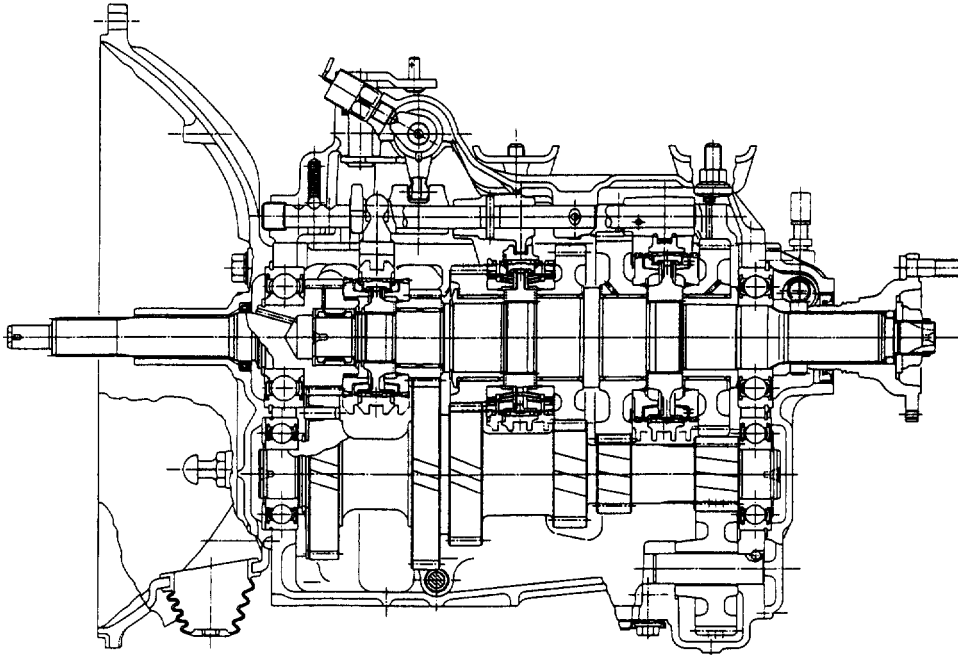
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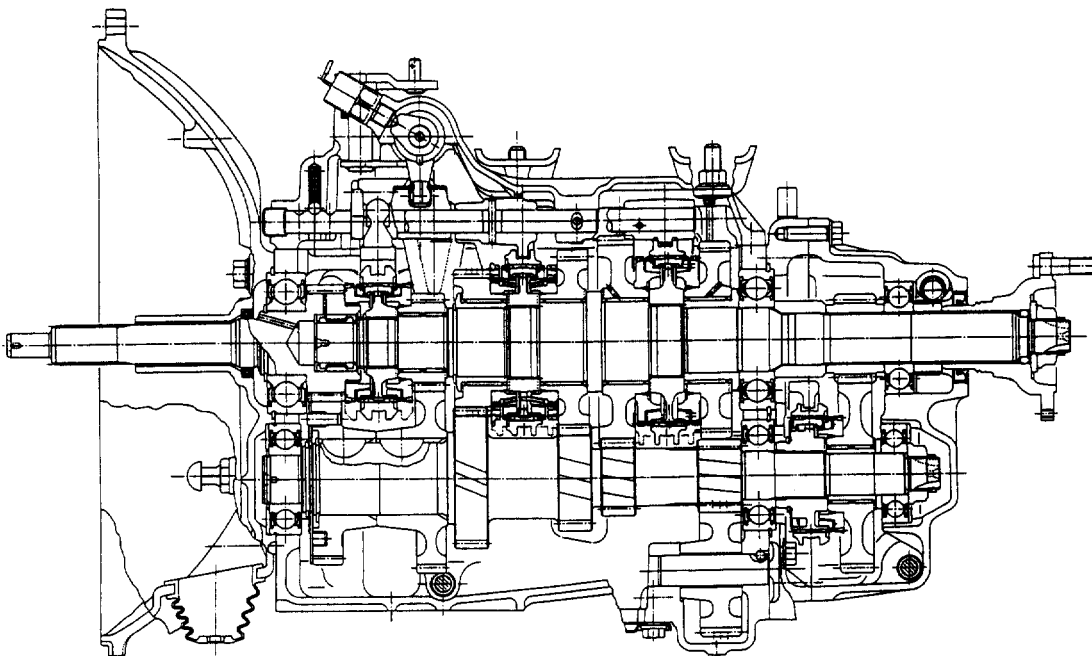
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## GENERAL DESCRIPTION

### MXA-5R and MXA-5S Models



### MXA-6S Model

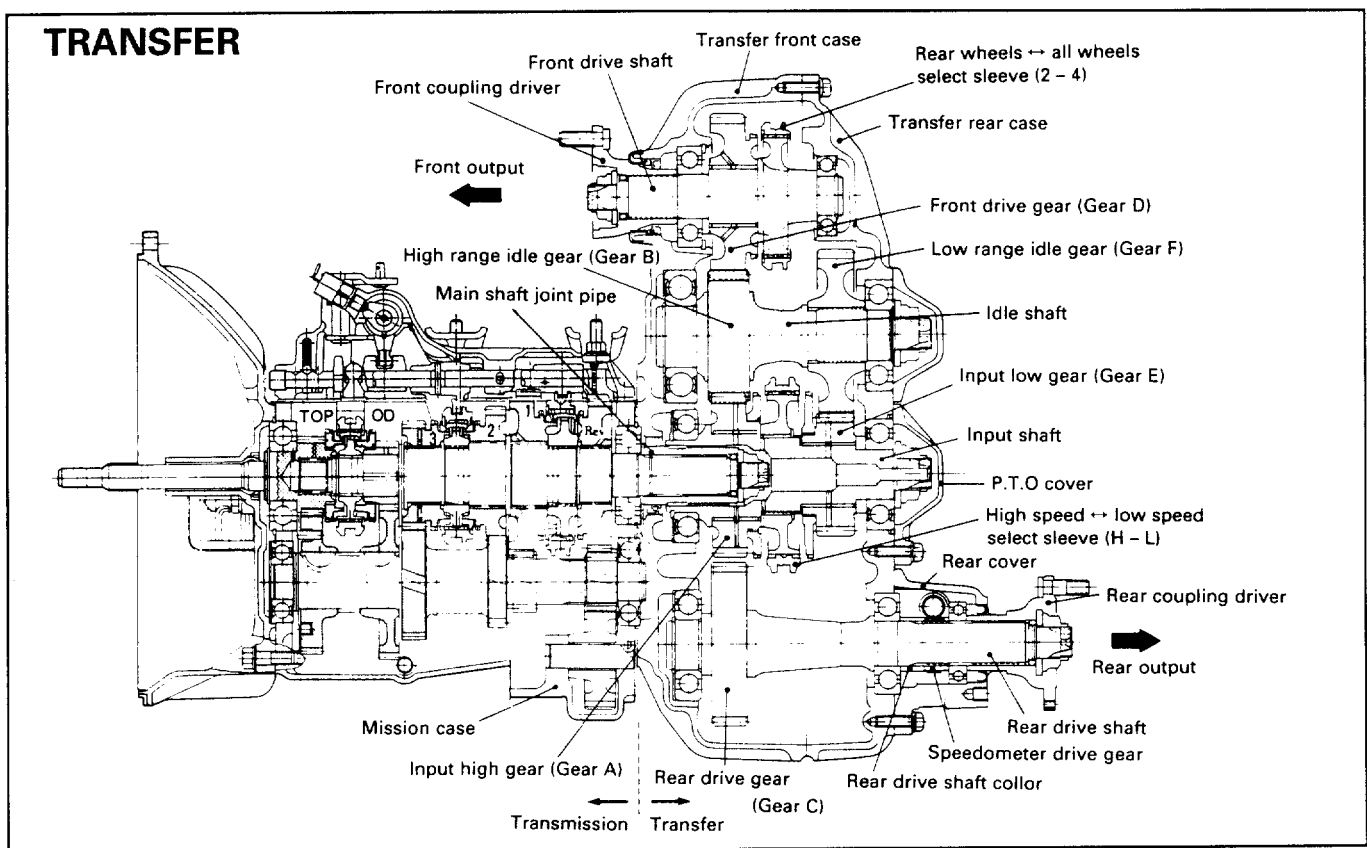


## 7B - 4 MANUAL TRANSMISSION

For MXA model transmission, a forward 5 or 6-shift all synchromesh type and a backward 1-shift constant-mesh type transmission are employed. The transmission case is made of a high rigidity cast iron, and the front cover integral with the clutch housing is made of aluminum die-cast. An aluminum die-cast control box containing a gear shift and gear select mechanism is installed on the top of the transmission case. A window for power take-off is also provided on the left side. For all the gears, helical gears are employed to reduce noises. The synchromesh mechanism that employs balking rings use block rings of special brass to obtain improved synchromesh performance.

With the main shaft screwed up at the rear, ball bearings are employed for the bearings on both sides of the main shaft and the counter shaft, and needle roller bearings employed for the bearings at the tip end of the main shaft and also for those of the 1st gear, 2nd gear, 3rd gear, 5th gear, reverse gear and 6th counter gear to secure improved durability and reduced noises.

Furthermore, with the anti-lash mechanism employed for the engagement of the top gear with the counter gear, fine-pitch gears are also employed for the top gear, the 5th and the 6th gear to reduce noises.



To cope with the 4-wheel drive (4WD), the transmission that contains a sub-transmission (transfer) with a one-step reduction gear for 4WD at the rear of transmission is employed.

The transmission gear ratio employed is the same as that of MXA5R type transmission.

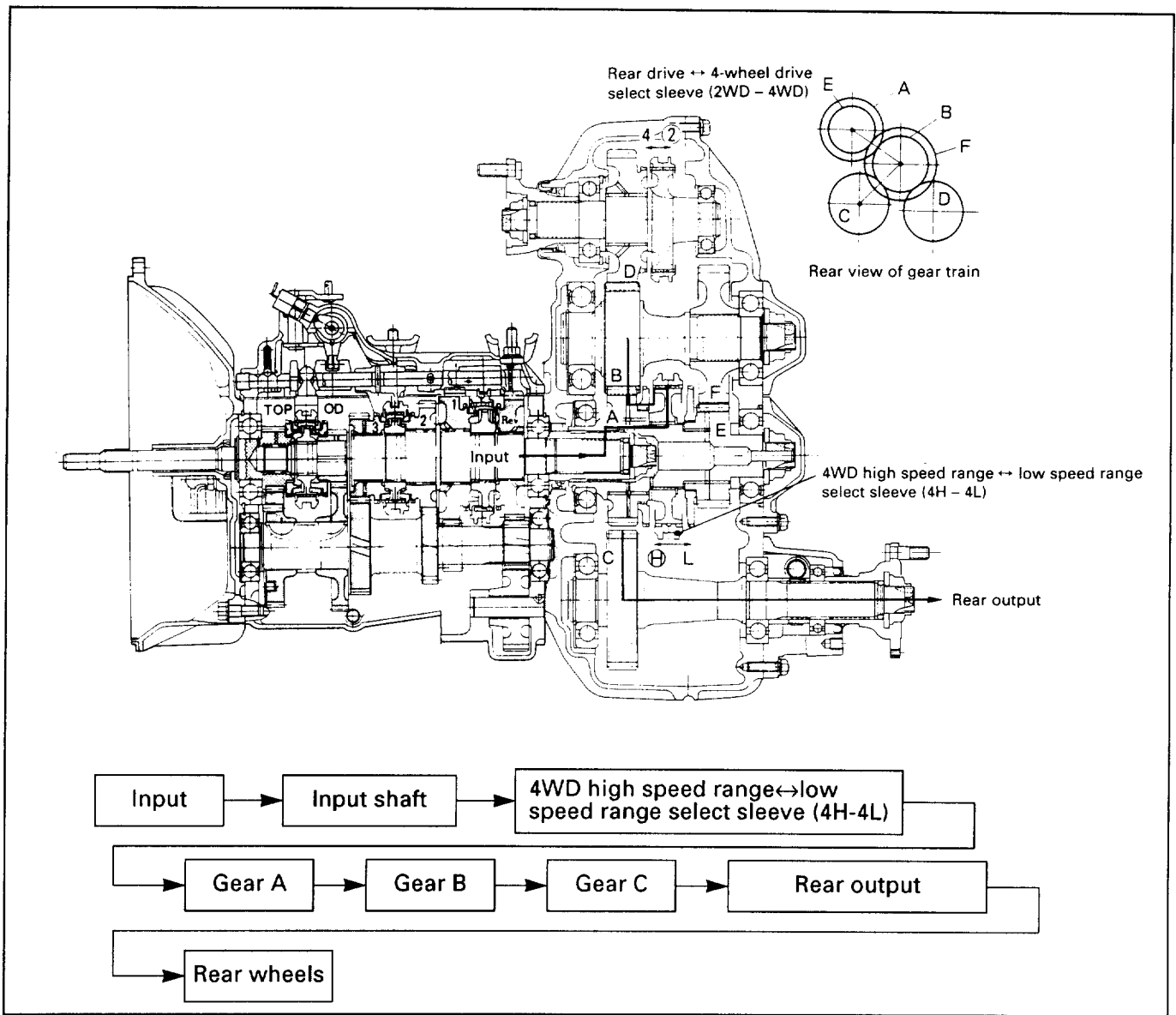
Besides use of M10x1.25 screws to clamp the transmission and transfer, a clutch housing made of cast iron is employed to increase joint rigidity and strength.

In the transfer, selection of rear drive (2WD) or 4-wheel drive (4WD) is done with vacuum actuator by one-touch switch operation, and selection of 4WD high speed range (4H) or 4WD low speed range (4L) is done with cable by column lever operation. Selection of 4-wheel drive low speed range (4L) during rear drive (2WD) causes a drive system trouble or motor trouble. To avoid this, a mechanical interlock system is employed between rear drive (2WD) 4-wheel drive (4WD) select rod and 4-wheel drive high speed range (4H) low speed range (4L) select rod, so that the 4-wheel drive low speed range (4L) cannot be selected during rear drive (2WD).

TRANSFER OPERATION

1) Normal rear drive (2H)

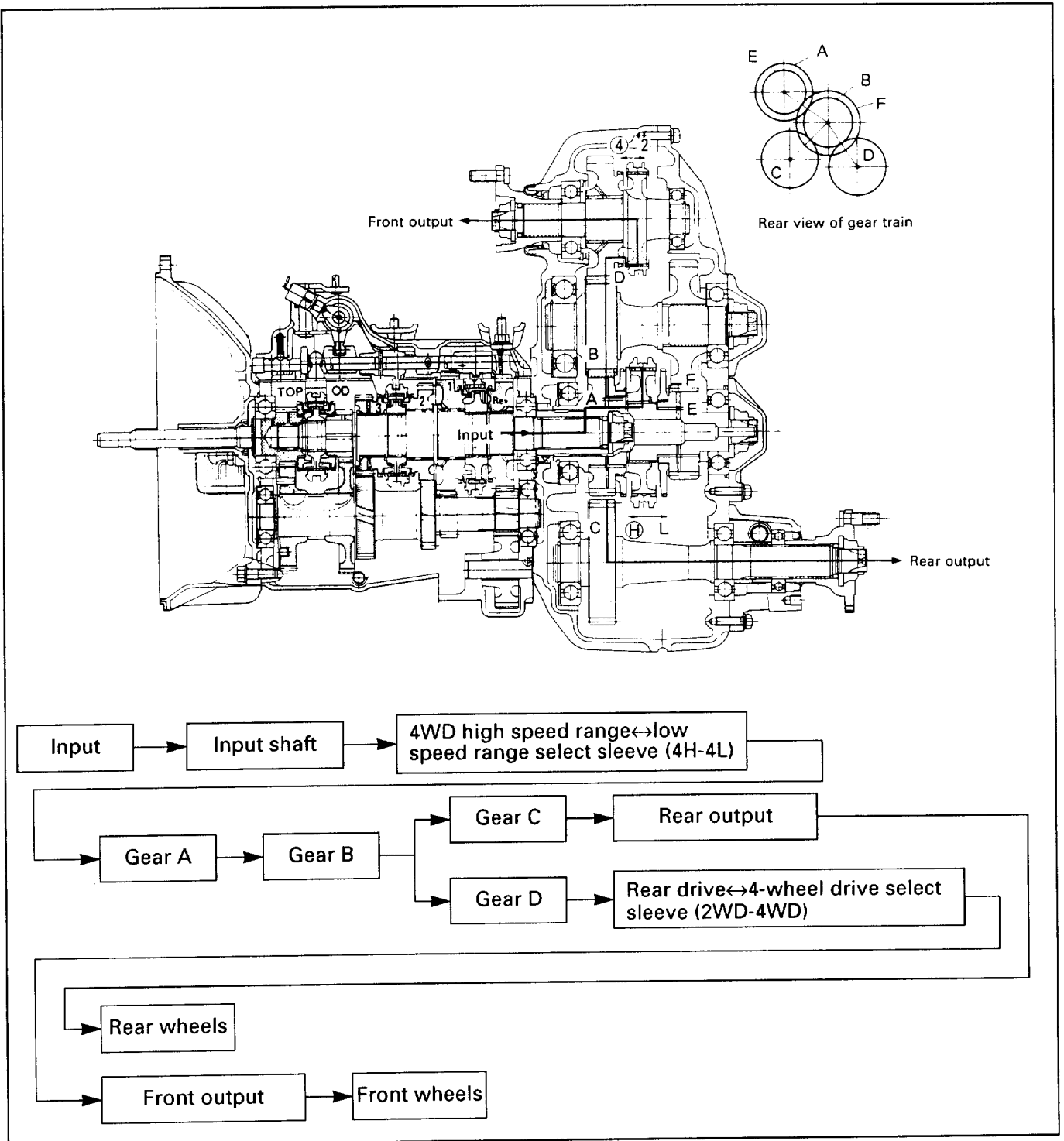
The drive force is transmitted to the rear wheels as shown below.





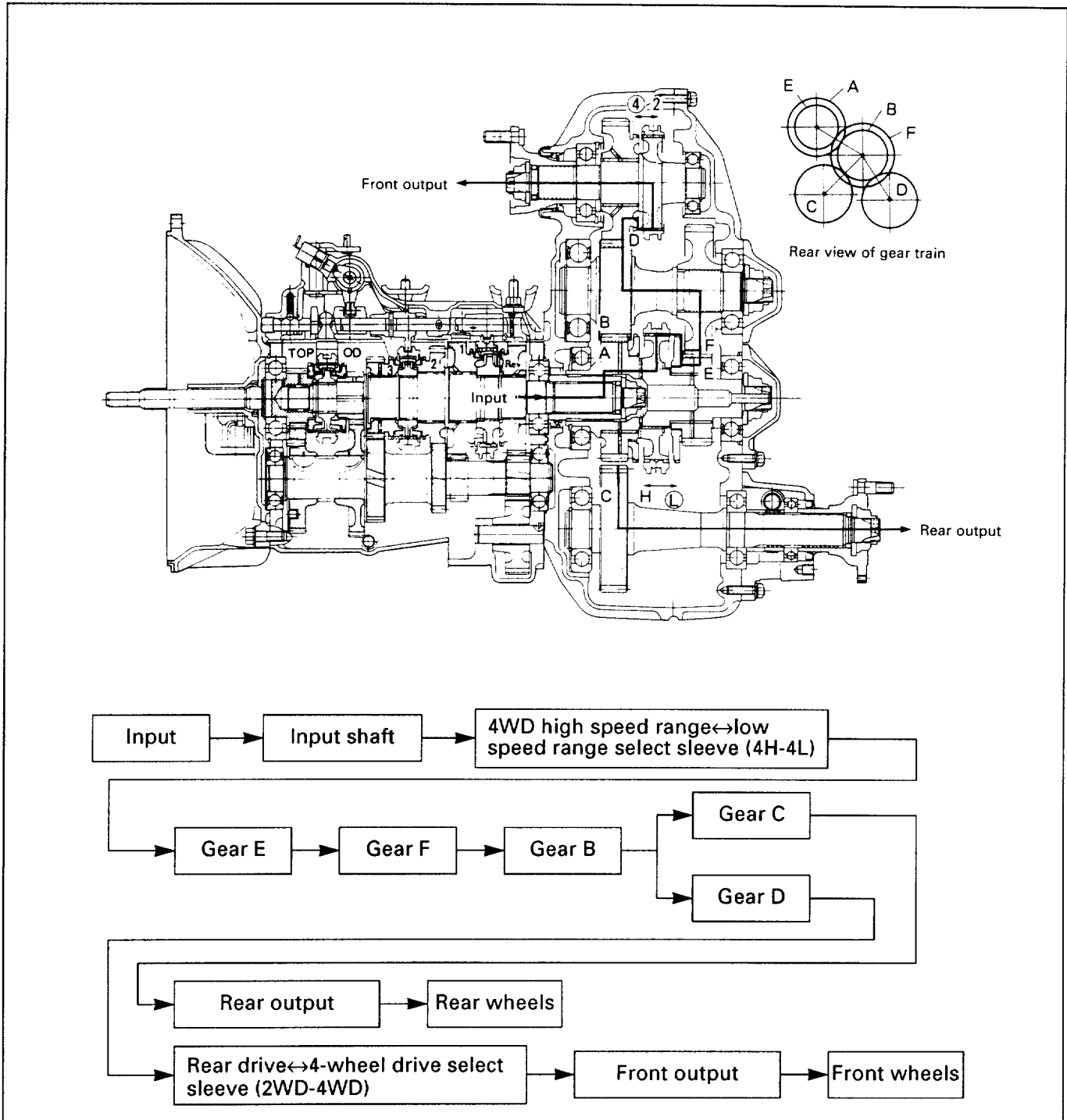
## 2) 4-wheel drive high speed range (4H)

The drive force is transmitted to both rear wheels and front wheels as shown below.



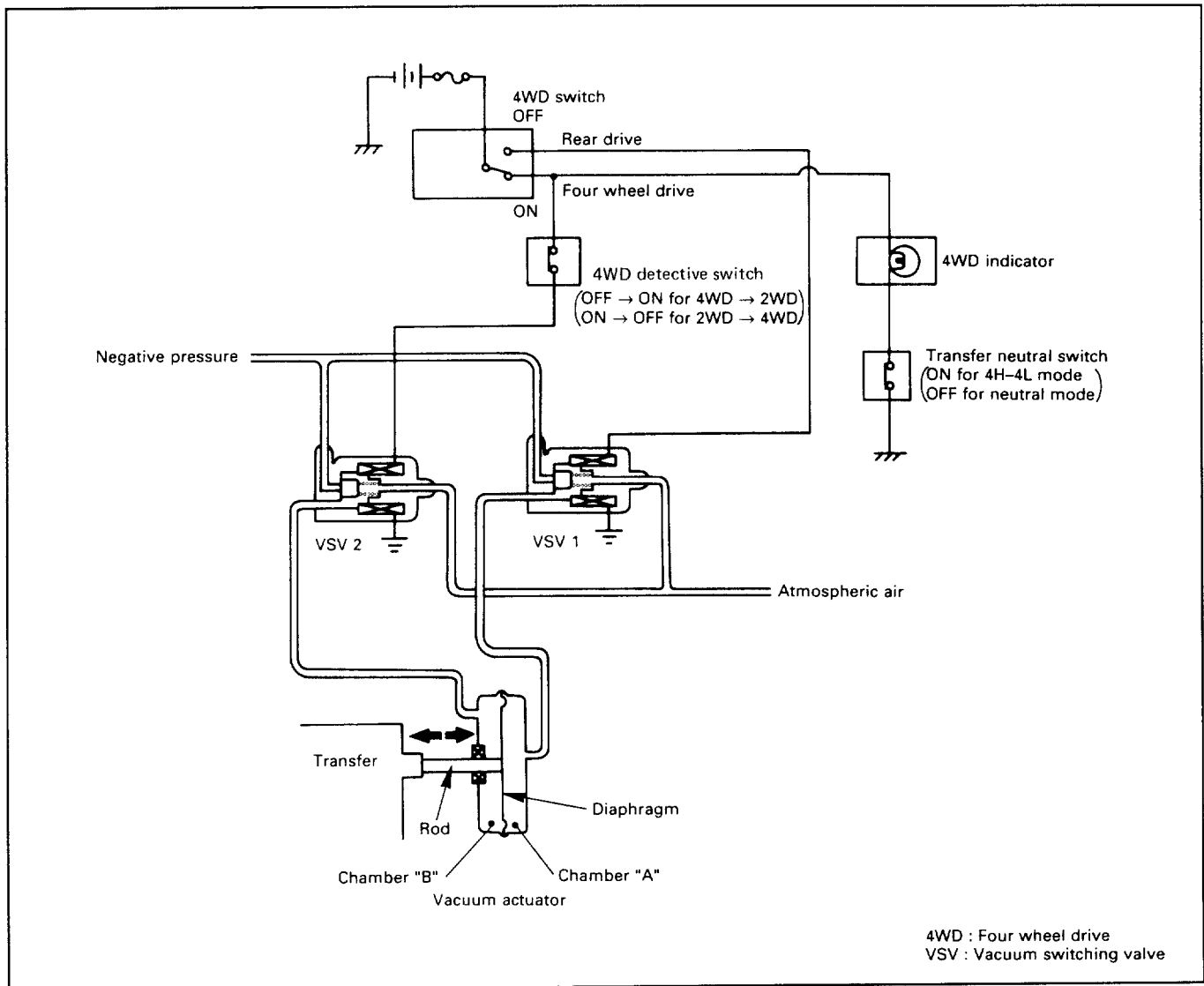
### 3) 4-wheel drive low speed range (4L)

The drive force is reduced by one-step and transmitted to both rear wheels and front wheels as shown below:



## TRANSFER CONTROL VACUUM ACTUATOR

### Operational circuit diagram



### Operational Description of Vacuum Actuator

When the 4WD switch turns off, the VSV 1 turns ON and the VSV 2 OFF. The chamber "A" of the actuator is applied with a negative pressure through the VSV 1 and the chamber "B" with the atmospheric air pressure through the VSV 2. This causes the actuator diaphragm to be pulled toward the chamber "A" side and held in the rear drive mode by the actuator rod.

When the 4WD switch turns on, the VSV 1 turns OFF with the VSV 2 ON, and chamber "A" of the actuator is applied with the atmospheric pressure and the chamber "B" with the negative pressure, thus the actuator diaphragm being pulled toward the chamber "B" side and set to the four-wheel drive mode by the actuator rod.

In accordance with this operation, the 4WD detective switch turns off and the circuit of the VSV 2 is cut off to turn the VSV 2 OFF. But the actuator rod maintains the 4WD mode by the detent ball.

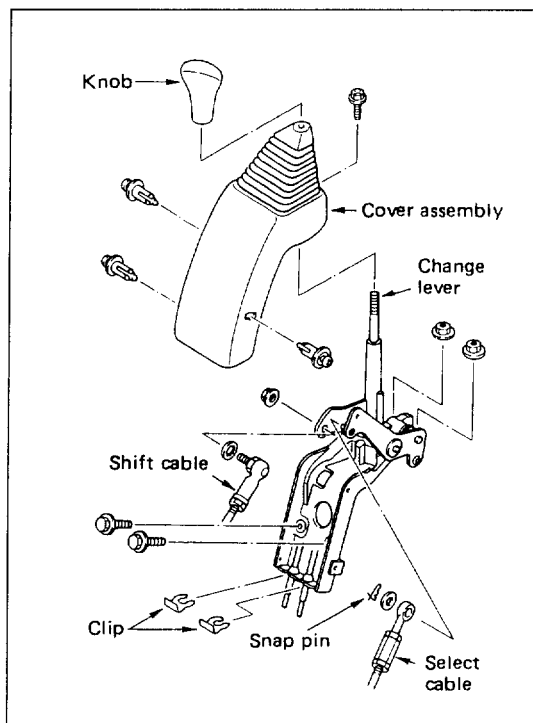
In this operation, the 4WD indicator lights also turns on.

# ON-VEHICLE SERVICE

## CHANGE LEVER ASSEMBLY REPLACEMENT



### Removal Steps



1. **Change Lever Knob**
2. **Cover Assembly**
  - Remove the fixing screw and three clips.
3. **Shift Cable and Select Cable**
  - Disconnect the cables from the change lever.
  - Remove the clips and disconnect the cables from bracket.
4. **Change Lever Assembly**



### Installation Steps

1. **Change Lever Assembly**
2. **Shift Cable and Select Cable**



When connecting the shift cable and the select cable to the change lever, adjust the cable.

Refer to "GEAR CONTROL CABLE ADJUSTMENT" given previously in section 00.



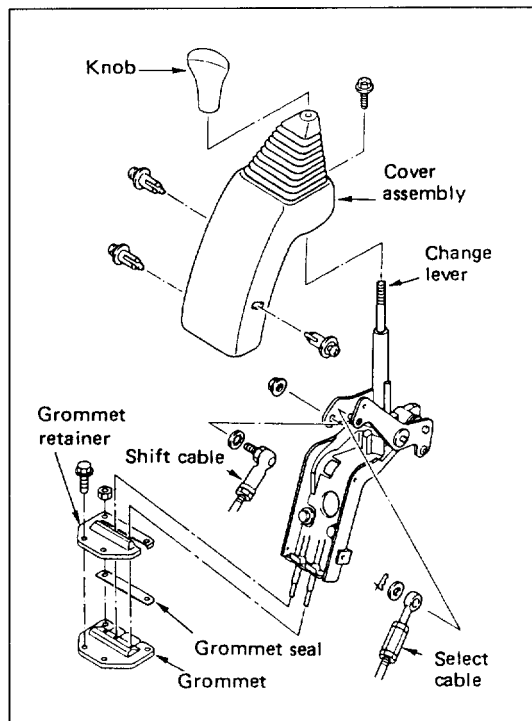
Lock nut torque	N·m (kg·m/lb·ft)
	21 (2.1/15.2)

3. **Cover Assembly**
4. **Change Lever Knob**

## GEAR CONTROL CABLE REPLACEMENT



### Removal Steps

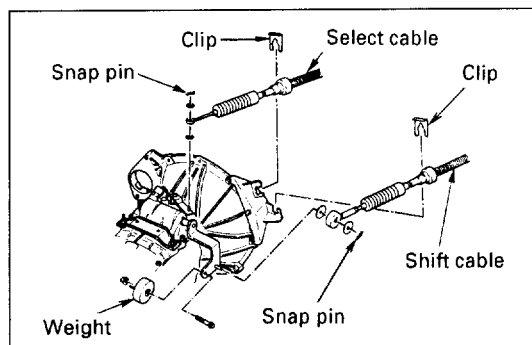


#### 1. Change Lever Knob

#### 2. Cover Assembly

#### 3. Shift Cable and Select Cable

- 1) Disconnect the shift and select cables from change lever.
- 2) Remove the clips and disconnect the cables from change lever bracket.
- 3) Remove the grommet retainer, grommet seal and grommet.
- 4) Raise vehicle and support with suitable safety stands.
- 5) Tilt the cab.
- 6) Disconnect the shift cable and the select cable on the transmission side.
- 7) Remove the c-clips and disconnect the shift cable and the select cable from the bracket.
- 8) Remove the clips that fix the cables to the frames.
- 9) Remove the shift and select cable assemblies.

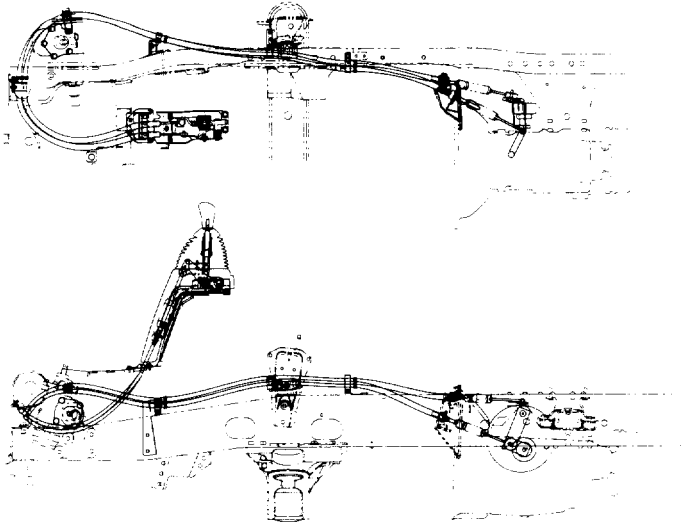


### Inspection and Repair

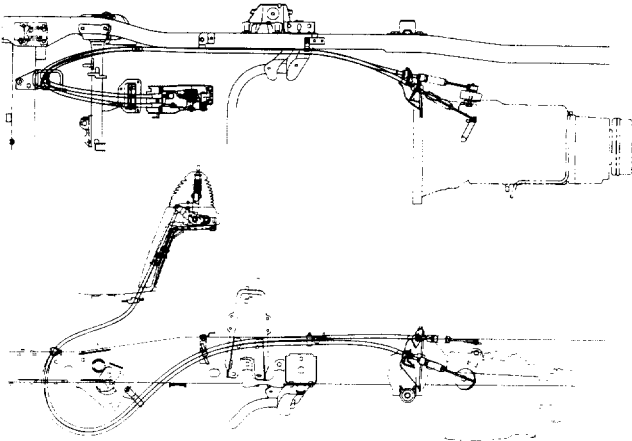
Check the cables for any deformation, damage or rust, and also check the sliding portion for any abnormal condition.

When there is any abnormal condition found, replace it with a new one.

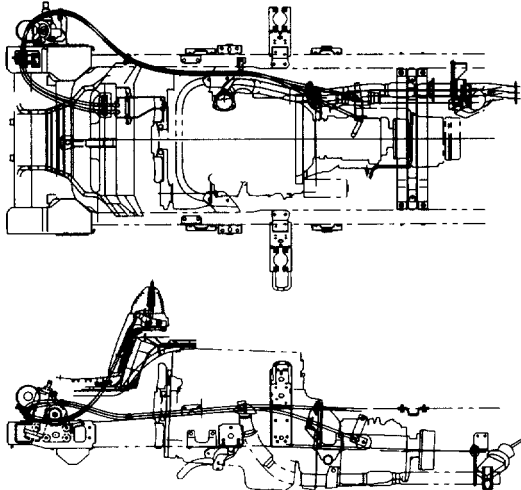
NKR



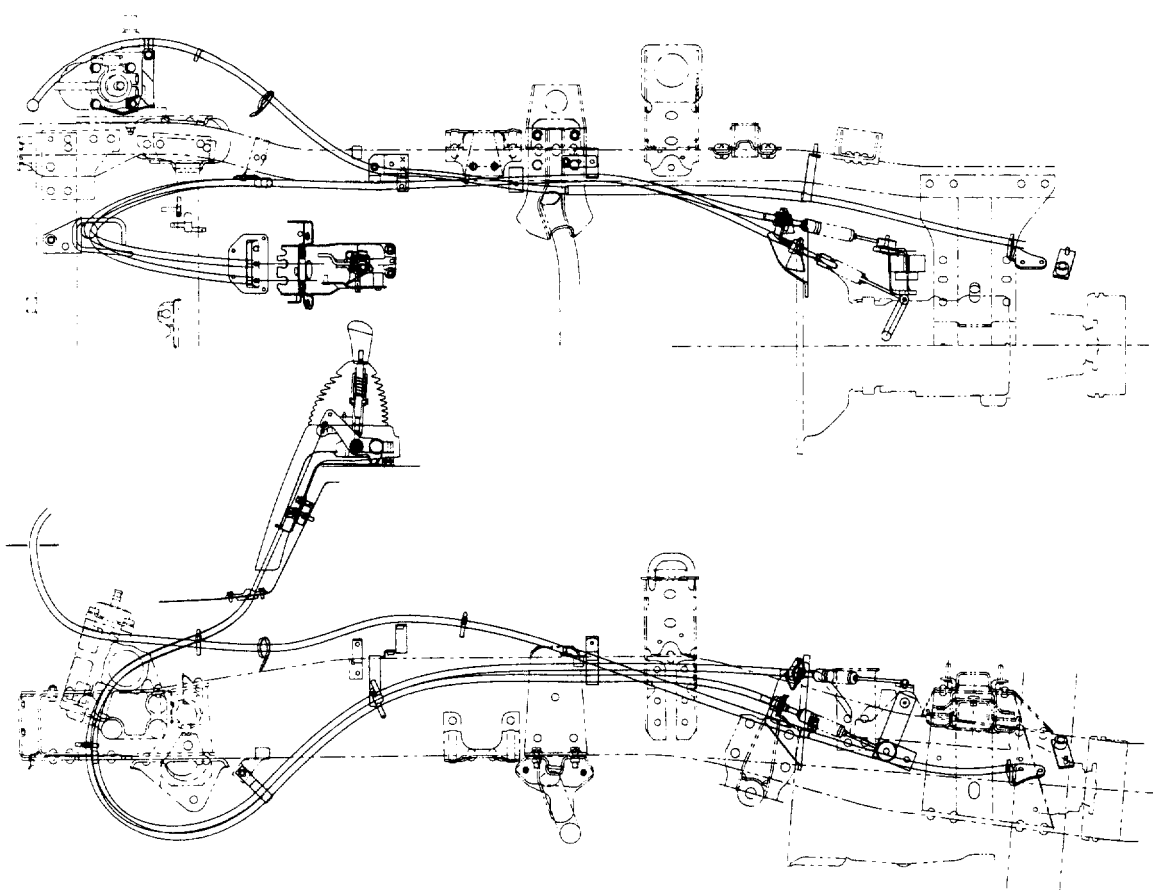
NPR



NQR



NPS



## Installation Steps

### 1. Shift Cable and Select Cable

- 1) Install temporarily that the shift cable and the select cable.



### CAUTION:

**Never bend the cables to radius less than 450 mm (18 in) unless it is necessary to do so for wiring purposes. And never bend the cables to radius less than 180 mm (7 in) even during wiring.**

**Install the cables carefully without unnecessary twisting the cable boots.**

- 2) Fasten the cables with clips to the brackets on the transmission side.
- 3) Fasten the cables with clips to the change lever bracket.
- 4) Fasten the cables with clips to the frames. At this time, take care that the select cable comes above the shift cable.

- 5) Connect the shift cable and the select cable to the transmission.



Select Cable Nut Torque	N·m(kg·m/lb·ft)
21 (2.1/15)	



Shift Weight Fixing Nut Torque	N·m(kg·m/lb·ft)
103 (10.5/76)	

- 6) Install the grommet, grommet seal and grommet retainer.



Fixing Bolt & Nut Torque	N·m(kg·m/lb·ft)
11 (1.1/8)	



- 7) When connecting the shift cable and the select cable to the change lever, adjust the cables.  
Refer to "GEAR CONTROL CABLE ADJUSTMENT" given previously in section 00.

## 2. Cover Assembly

## 3. Change Lever Knob

# TRANSFER CONTROL LEVER AND CONTROL CABLE REPLACEMENT



## Removal Steps

### 1. Switch Cover

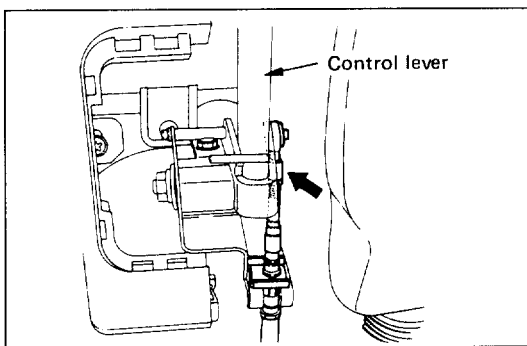
- Pull the switch cover to remove.

### 2. Steering Cowl

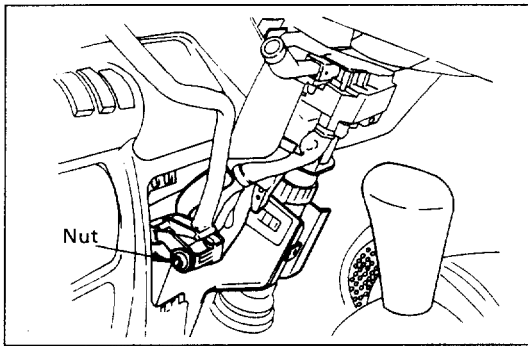
### 3. Split Pin

- Remove the split pin from the control lever, then disconnect the control cable.

### 4. Control Lever Assembly







- Remove the fulcrum pin nut.
- Remove the control lever assembly with bush.

### 5. Clip

- Remove the clips from the select bracket (transfer side) and the bracket (control lever side).

### 6. Adjust Nut

- Loosen the adjust nut.

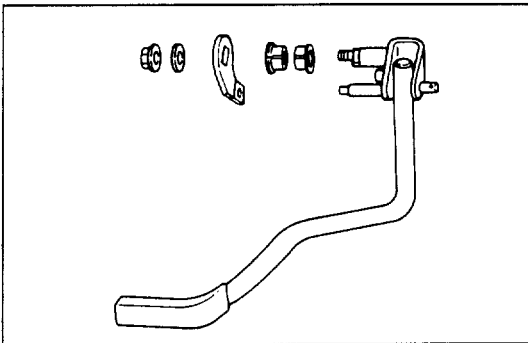
### 7. Split Pin

- Remove the fixing bolt.

### 8. Clip and Clamp

- Remove the clips and the clamp that fix the control cable to the frames.

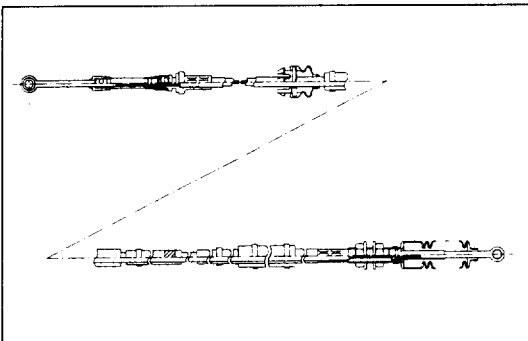
### 9. Control Cable Assembly



## Inspection and Repair

Check the cables for any deformation, damage or rust, and also check the sliding portion for any abnormal condition.

When there is any abnormal condition found, replace it with a new one.

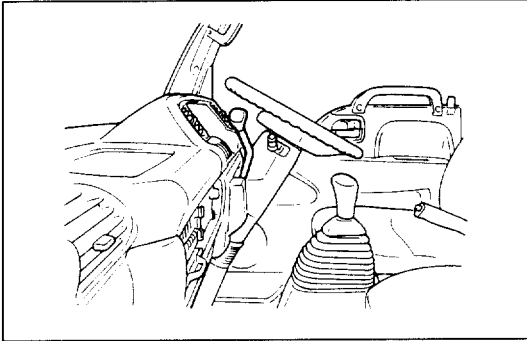


## Installation Steps

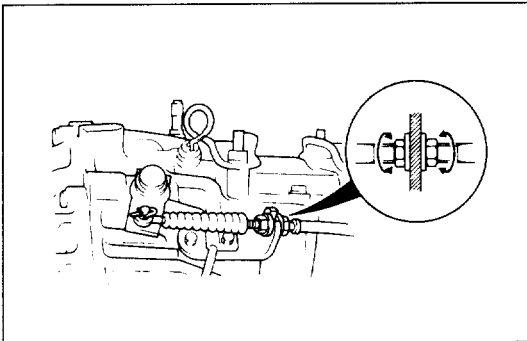
1. Control Cable Assembly
2. Clip and Clamp
3. Clip
4. Control Lever Assembly
5. Split Pin
6. Steering Cowl
7. Switch Cover
8. Adjust Nut



- 1) Set the transfer control lever in the high speed range (4H) position.



- 2) Set the external shift lever of transfer in the high speed range (4H) position.
- 3) Adjust the position of the control cable eye end, then connect the control cable to the external shift lever
- 4) Tighten the adjust nut.

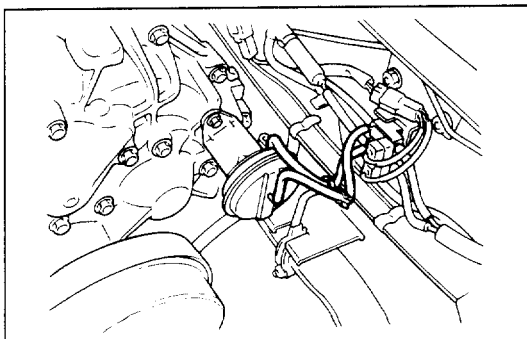


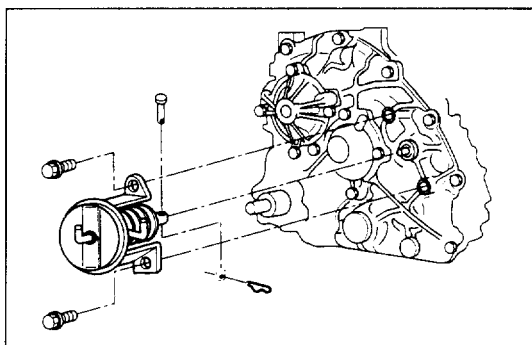
9. Washer and Split Pin.

## TRANSFER CONTROL VACUUM ACTUATOR REPLACEMENT

### Removal Steps

1. Vacuum Hose
  - Attach a tag to the vacuum hose, then note current position for proper installation.





## 2. Snap Pin and Joint Pin

- Turn over the dust boot, then remove the snap pin and the joint pin.

## 3. Vacuum Actuator



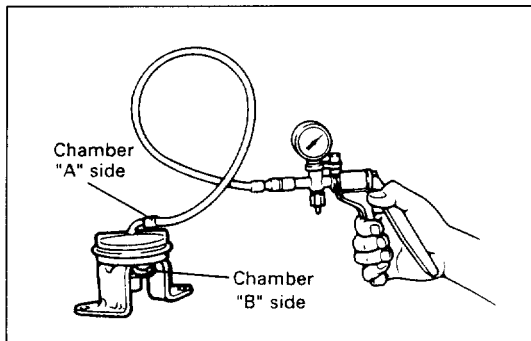
## Inspection and Repair

Make necessary adjustments, repairs, and part replacements if excessive wear, or damage is discovered during inspection.

### Inspection of the Vacuum Actuator

#### 1. Unit Inspection

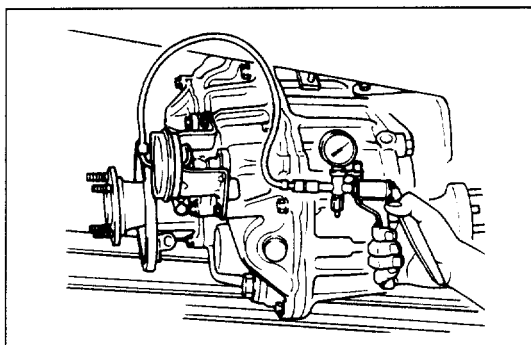
- 1) Install the mighty bag to the chamber "A" side.
- 2) Operate the mighty bag to apply a negative pressure to the chamber "A". Check to see if the vacuum actuator rod moves toward the chamber "A" side.
- 3) And then, install the mighty bag to the chamber "B" side and apply a negative pressure to it. Check to see if the vacuum actuator rod moves toward the chamber "B" side.



#### 2. Inspection When Installed

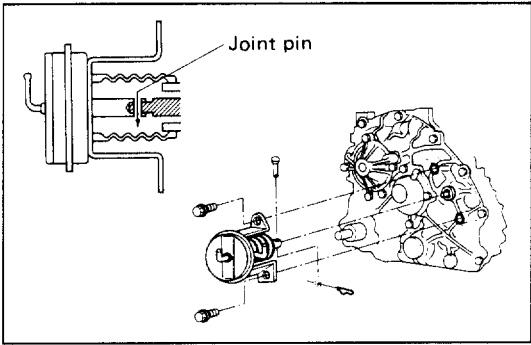
The inspection should be performed so that the operation of the shift rod can be confirmed by turning over the dust boot.

- 1) Install the mighty bag to the chamber "A" side.
- 2) With the negative pressure applied to the chamber "A" while operating the mighty bag, check to see if the shift rod moves toward the rear drive side .  
At this time, the shift rod should be fixed to the four-wheel drive side.
- 3) Under the same conditions as 2) above, install the mighty bag to the chamber "B" side and apply a negative pressure in the same way. Check to see if the shift rod moves toward the four-wheel drive side.





## Installation Steps



1. Vacuum Actuator
2. Snap Pin and Joint Pin

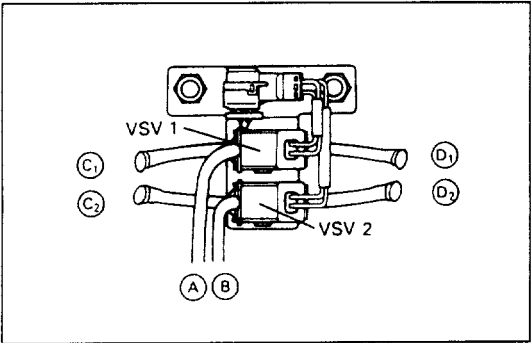
3. Vacuum Hose

- Reference the tag previously noted during removal.

## TRANSFER CONTROL VACUUM SWITCHING VALVE (VSV) INSPECTION



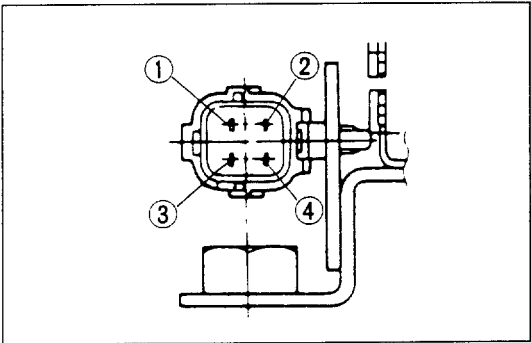
### Inspection and Repair



1. Check continuity between hoses.

4WD SW (with key SW is ON position)	VSV 1			VSV 2		
	(A)	(C1)	(D1)	(B)	(C2)	(D2)
ON	○	—	○	○	—	○
OFF	○	○		○	—	○

- (A),(B).... Vacuum hose from the vacuum actuator.  
(C1),(C2).... Negative pressure side hose.  
(D1),(D2).... Atmospheric pressure side hose.

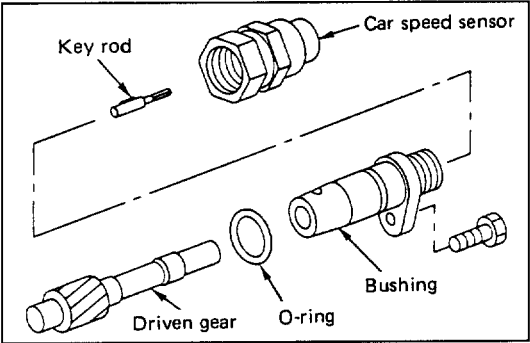
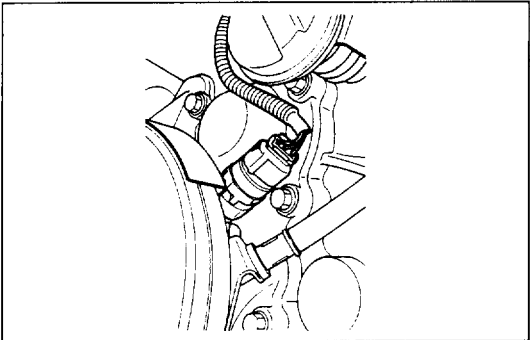
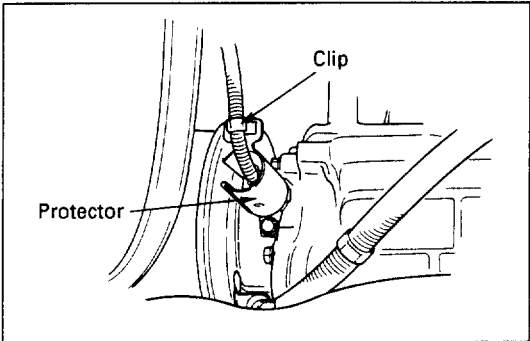


2. Check continuity between terminals.

Condition	Terminal No.	①	②	③	④
VSV 1 (Resistance approx. 137Ω)		○	—		
VSV 2 (Resistance approx. 137Ω)				○	—

CAR SPEED SENSOR DRIVEN GEAR REPLACEMENT

Removal Steps



1. Protector (for without transfer type only)
2. Wiring Connector
3. Car Speed Sensor with Key Rod
4. Car Speed Sensor Driven Gear Assembly
  - Remove the fixing bolt.
  - Remove the driven gear assembly.

Installation Steps

1. Car Speed Sensor Driven Gear Assembly



Fixing Bolt Torque	N·m(kg·m/lb·ft)
15 (1.5/11)	

2. Car speed Sensor with Key Rod



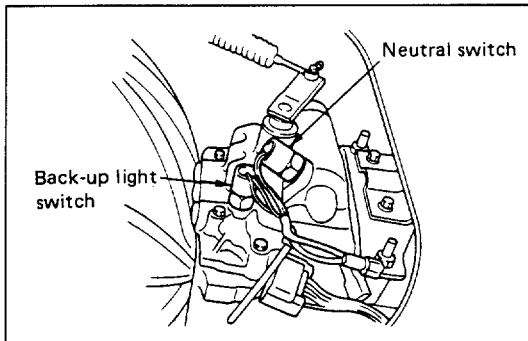
Fixing Bolt Torque	N·m(kg·m/lb·ft)
25 (2.5/18)	

3. Wiring Connector
4. Protector (for without transfer type only)

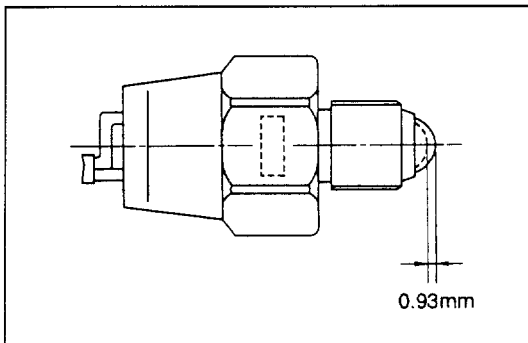
## BACK-UP LIGHT SWITCH AND NEUTRAL SWITCH REPLACEMENT



### Removal Steps



1. Wiring Connector
2. Switch



### Inspection and Repair

- When there is continuity between the terminals in the condition as it is, and when the continuity between the terminals is turned off by pressing the ball of the switch, the switch is normal.

Switch Operating Stroke	mm (in)
0.93 (0.037)	



### Installation Steps

#### 1. Switch



- Apply liquid gasket (Three Bond 1141 or equivalent) to the switch's threaded portion to prevent oil leakage, and install the switch to the control box.



- Color of Connector
  - Back-up Light Switch: Brown
  - Neutral Switch: Gray

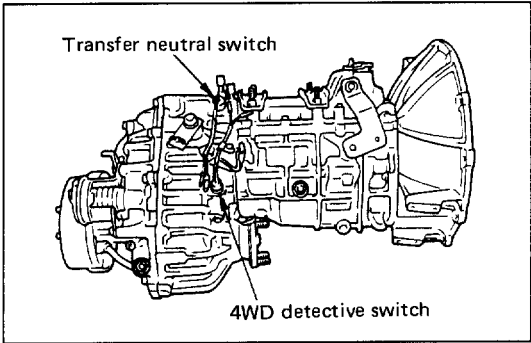
Switch Torque	N·m (kg·m/lb·ft)
34 (3.5/25)	



#### 2. Wiring Connector

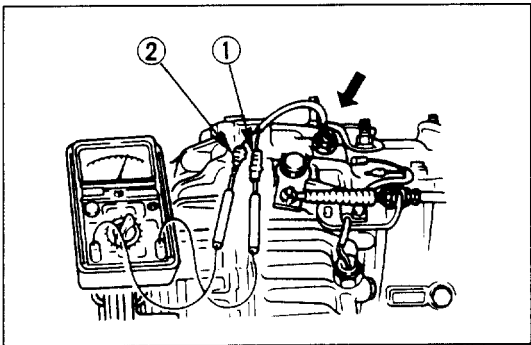
TRANSFER NEUTRAL SWITCH AND  
4WD DETECTIVE SWITCH  
REPLACEMENT

↔
Removal Steps



1. Wiring Connector
2. Switch

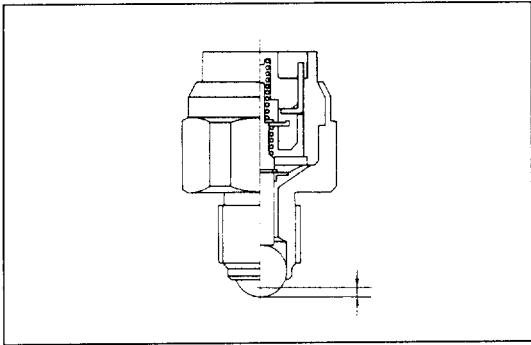
🔍
Inspection and Repair



Transfer Neutral Switch

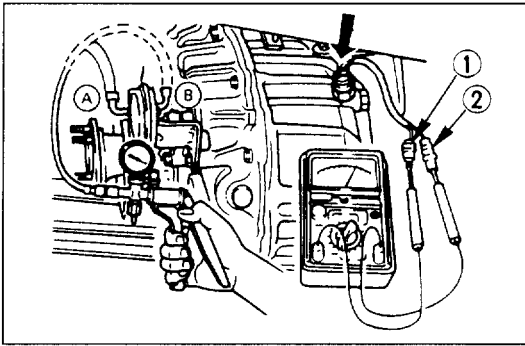
Inspect the switch continuity using this table.

Transfer gear shift lever position \ Terminal No.	①	②
2H • 4H or 4L	○ — ○	
N (neutral)		



Transfer Neutral Switch Unit Inspection

If continuity exists when the ball of the transfer neutral switch is pushed up over 1.53mm (0.060 in), the transfer neutral switch is judged to be normal.



#### 4WD Detective Switch

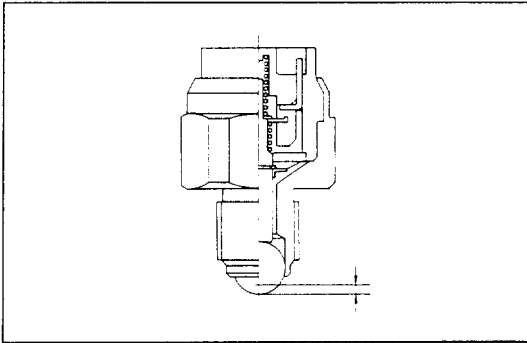
When the vacuum actuator's A chamber or B chamber is vacuumized with the vacuum pump and the transfer switch indicates conductivity as shown below, both the transfer switch and vacuum actuator are functioning properly.

Vacuum condition of vacuum actuator	Terminal No.	①	②
		①	②
A chamber vacuum		○	○
B chamber vacuum			

When the switch is not functioning properly, peel off the dust boot and vacuumize the vacuum actuator to verify whether the actuator rod is functioning.

Actuator rod is functioning : The transfer switch is defective

Actuator rod is not functioning : The actuator is defective.



#### 4WD Detective Switch Unit Inspection

If continuity exists when the ball of the 4WD detective switch is pushed up over 1.53mm (0.060 in), the 4WD detective switch is judged to be normal.

### Installation Steps

#### 1. Switch

- Apply liquid gasket (Three Bond 1141 or equivalent) to the switch's threaded portion to prevent oil leakage, and install the switch to the control box.

Switch Torque	N·m (kg·m/lb·ft)
	34 (3.5/25)



#### 2. Wiring Connector



## REAR OIL SEAL REPLACEMENT

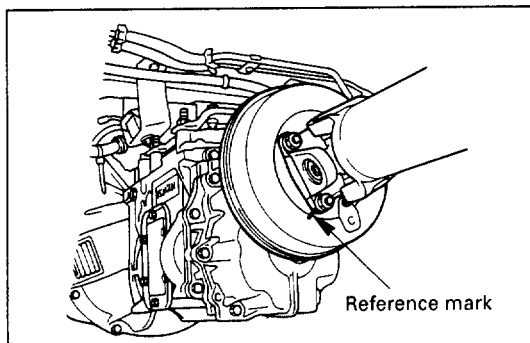


### Removal Steps

- Raise vehicle and support with suitable safety stands.

#### 1. Propeller Shaft

- Scribe reference mark to the flange yoke and the parking brake drum for proper installation.
- Disconnect the propeller shaft at flange yoke.
- Put aside the propeller shaft and tie it to the frame so it does not interfere with servicing work.

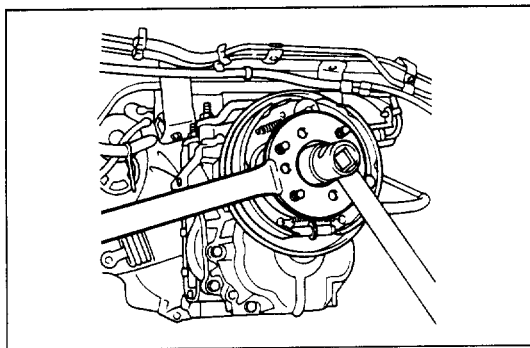


#### 2. Parking Brake Drum

- Remove the screw and the adjust hole cover.
- It may be necessary to back off the shoe adjuster.

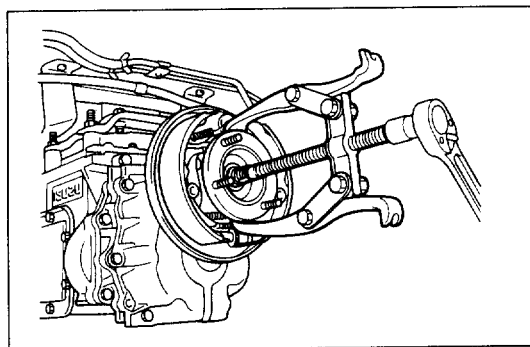
#### 3. Lock Nut

- Make sure to raise the caulking of the coupling driver lock nut, then remove the lock nut.
- Use the handle to remove the lock nut.  
Handle: 5-8840-2043-0

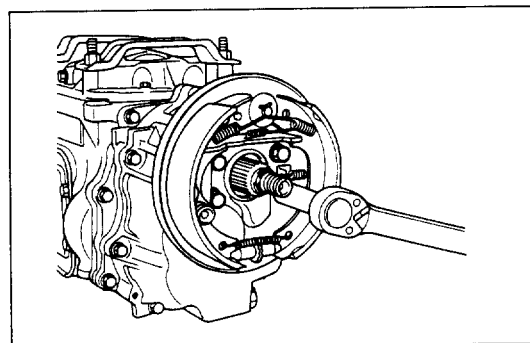


#### 4. Coupling Driver

- Remove the coupling driver using the universal puller.  
Universal Puller: 5-8840-2027-0
- Remove the conical washer and the o-ring.



#### 5. Parking Brake Assembly



## 6. Oil Seal

- Use the screwdriver to remove the oil seal from the rear cover.

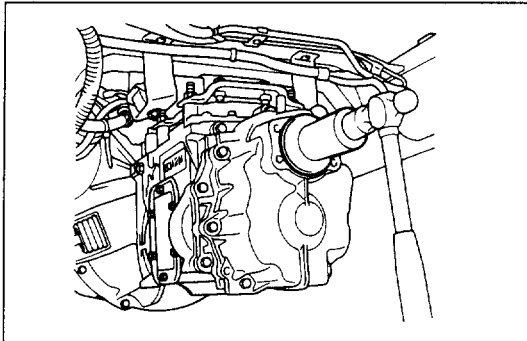


### CAUTION:

Take care not to damage the sealing seat of the rear cover.



## Installation Steps

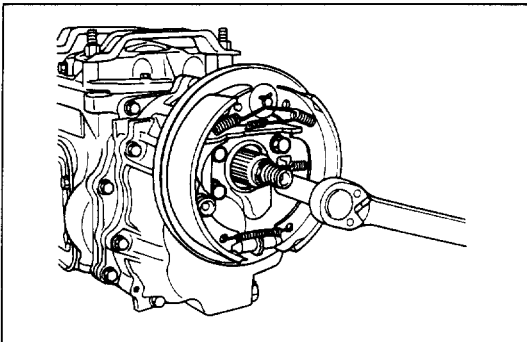


### 1. Oil Seal



- Apply engine oil to the new oil seal outer circumference and apply multi-purpose grease to the oil seal lip.
- Use the oil seal installer to install the oil seal to the rear cover.

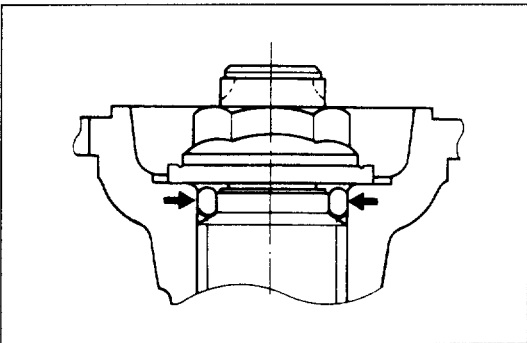
Oil Seal Installer: 5-8840-2242-0



### 2. Parking Brake Assembly



Parking Brake Bolts Torque	N·m (kg·m/lb·ft)
83 (8.5/61)	



### 3. Coupling Driver

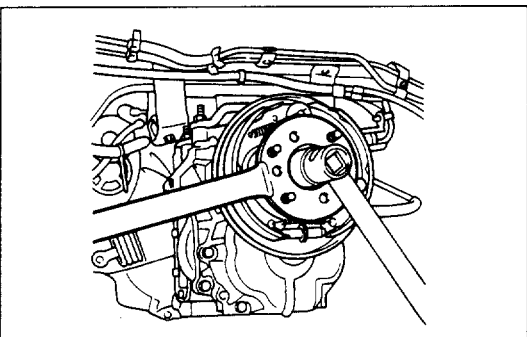
### 4. Lock Nut



- Install the o-ring and the conical washer.
- The conical washer is to be set up with its identification groove to the nut side.

### CAUTION:

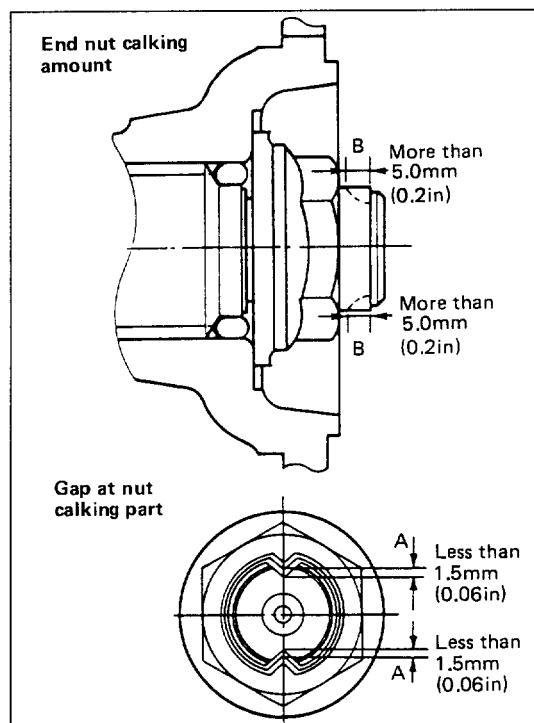
Do not reuse the lock nut.



- Apply the engine oil to the setting face of the new lock nut and tighten it up at the specified torque.

Handle: 5-8840-2043-0

Lock Nut Torque	N·m (kg·m/lb·ft)
226 (23.0/166)	



- align the lock nut with the V-shaped groove at the tip of the main shaft, and caulk the nut lip portion by using a chisel.  
(Round edge approximately 1 mm (0.04 in)×60°).
- As shown in the illustration, be sure to caulk the nut lip so that the clearance between the V-shaped groove portion at the tip of the main shaft and the caulked up lip(A) is less than 1.5 mm (0.06 in), and the caulking length(B) is 5 mm (0.2 in) or more.

#### CAUTION:

Be sure to confirm that there is no crack at the caulked portion of the end nut after caulking.

### 5. Parking Brake Drum



- Adjust the parking brake after installation.
  - Rotate the brake drum to align the adjust hole with the adjuster.
  - Move the camshaft lever from side to side several times to center the brake shoes.
  - Insert a screwdriver into the hole and rotate the adjuster by pushing it upward until the shoes drag on the drum.
  - Back off the adjuster 30 notches.
- Install the adjust hole cover.

Adjust Cover Hole Bolt Torque	N·m (kg·m/lb·in)
8 (0.8/69)	



### 6. Propeller Shaft



- Align reference marks previously made during removal.

Propeller Shaft Bolt Torque	N·m (kg·m/lb·ft)
103 (10.5/76)	



- Remove the safety stands.

# TRANSMISSION ASSEMBLY REPLACEMENT



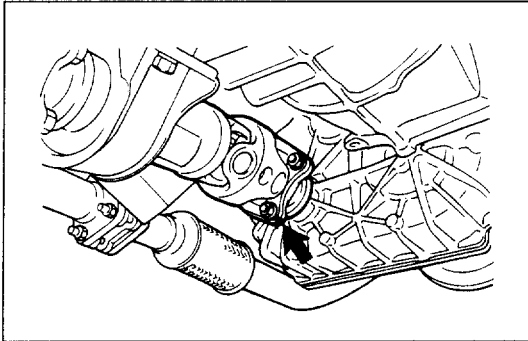
## Removal Steps

- Raise vehicle and support with suitable safety stands.

### 1. Front Exhaust Pipe (for with transfer type only)

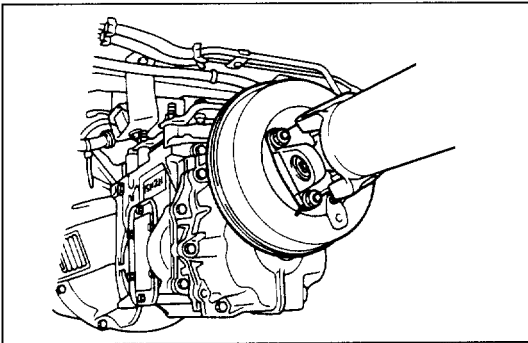
### 2. Front Propeller Shaft (for with transfer type only)

- Scribe reference mark to the flange yoke and the transfer flange for proper installation.
- Disconnect the propeller shaft at flange yoke.
- Put aside the propeller shaft and tie it to the frame so that it does not interfere with servicing work.



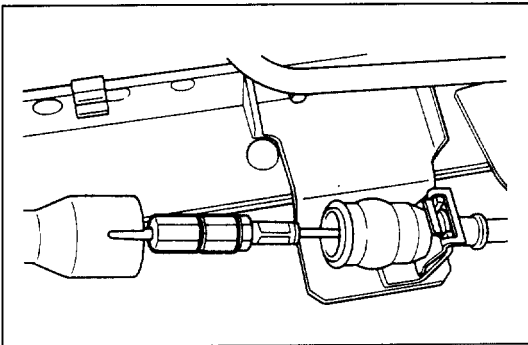
### 3. Rear Propeller Shaft

- Scribe reference mark to the flange yoke and the parking brake drum for proper installation.
- Disconnect the propeller shaft at flange yoke.
- Put aside the propeller shaft and tie it to the frame so that it does not interfere with servicing work.



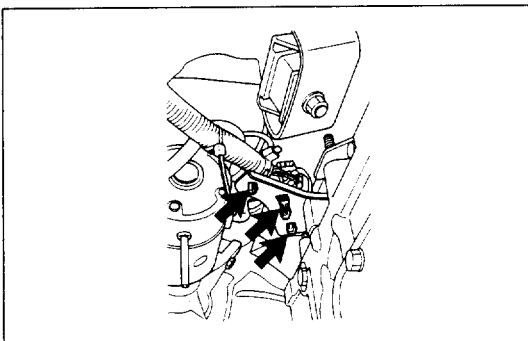
### 4. Parking Brake Cable

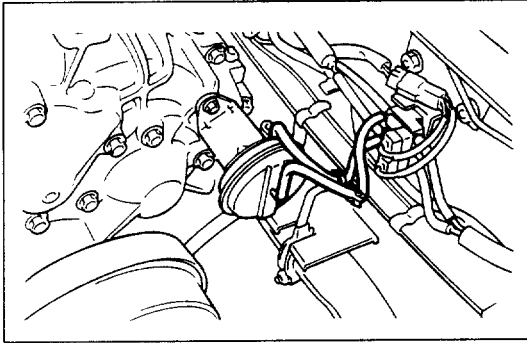
- Move the joint cover.
- Disconnect the joint bolt.
- Remove the c-clip then disconnect the cable from the bracket.



### 5. Wiring Connector

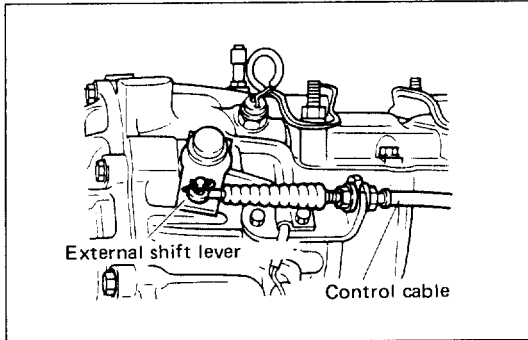
- Disconnect the wiring connectors from the car speed sensor, the neutral switch, the back-up light switch, the transfer neutral switch and the 4WD switch.



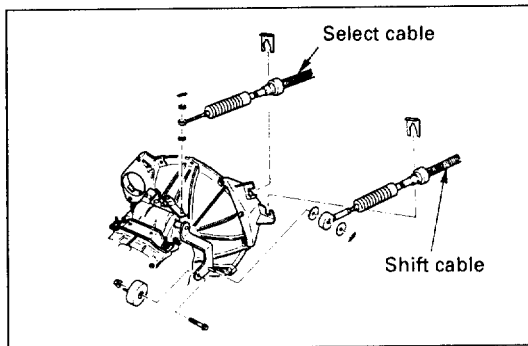


**6. Vacuum Hose (for with transfer type only)**

- Disconnect the vacuum hose from the actuator.

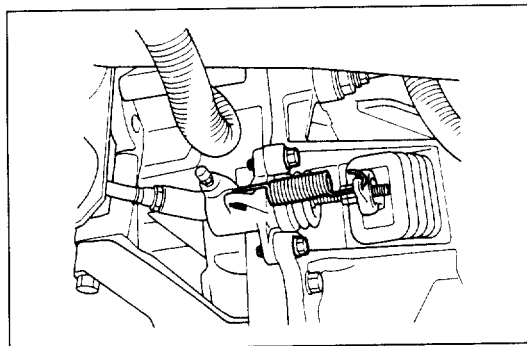


**7. Transfer Control Cable (for with transfer type only)**



**8. Shift Cable and Select Cable**

- Disconnect the shift cable and select cable on the transmission side.



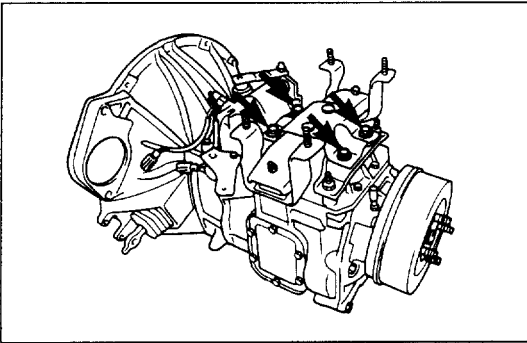
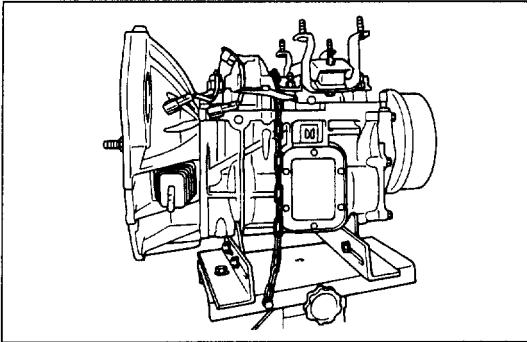
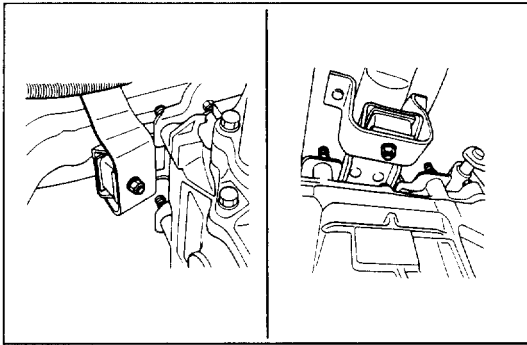
**9. Clutch Slave Cylinder**

- Remove the slave cylinder assembly with the flexible hose attached, and then tie it to the frame so that it does not interfere with servicing work.

**10. Starter Motor Ground Cable**

**11. Starter Motor**

- Remove the starter motor, and then tie it to the frame so that it does not interfere with servicing work.



## 12. Transmission Assembly

### NOTE:

The exhaust pipe bracket, the gear control bracket and the clips are sometimes installed in the wrong position or direction confusedly. To prevent incorrect installation of these parts, put a correct installation mark on them.

- Support the transmission with mission jack.



### CAUTION:

To prevent the falling of the transmission, tie it firmly to the jack with a chain or belt.

Do not allow transmission to hang unsupported from clutch. Damage to the clutch assembly will result.

- Remove the nuts of the transmission mounting bracket on the crossmember side.
- Remove transmission fastening bolts.
- Pull out the transmission assembly rearward.

## 13 Mounting Bracket



## Installation steps

### 1. Mounting Bracket

Mounting Bracket Nuts Torque	N·m (kg·m/lb·ft)
40 (4.1/30)	



### 2. Transmission Assembly


- Support the transmission with mission jack.




### CAUTION:


To prevent the falling of the transmission, tie it securely to the jack with a chain or belt.

- Shift transmission into high gear.
- Align transmission with engine slope.
- Turn output parking brake drum to aid clutch spline engagement.


	Clutch Housing to Flywheel Hosing Bolts Torque	N·m (kg·m/lb·ft)
	46 (4.7/34)	

	Transmission Mounting Nuts Torque	N·m (kg·m/lb·ft)
	40 (4.1/30)	


**3. Starter Motor**

	Starter Motor Bolts Torque	N·m (kg·m/lb·ft)
	76 (7.7/56)	

**4. Starter Motor Ground Cable**


	Ground Cable Nuts Torque	N·m (kg·m/lb·ft)
	39 (4.0/29)	

**5. Clutch Slave Cylinder**

	Slave Cylinder Bolts Torque	N·m (kg·m/lb·ft)
	16 (1.6/12)	



- Perform slave cylinder adjustment before installation of the return spring.
- 1) Loosen the lock nut of the push rod.
  - 2) Turn the adjust nut until it reaches the shift fork.
  - 3) Back off the adjust nut 1.5 turns.(shift fork free play Approximately 2 mm).
  - 4) Tighten the lock nut.


	Push Rod Lock Nut Torque	N·m(kg·m/lb·ft)
	19 (1.9/14)	

**6. Shift Cable and Select Cable****7. Transfer Control Cable (for with transfer type only)****8. Vacuum Hose (for with transfer type only)****9. Wiring Connector**

- Color of Connector
- Back-up Light Switch : Brown
- Neutral Switch : Gray

**10. Parking Brake Cable****11. Rear Propeller Shaft**

- Align reference marks previously made during removal.

	Propeller Shaft Nuts Torque	N·m (kg·m/lb·ft)
	103 (10.5/76)	

## 12. Front Propeller Shaft (for with transfer type only)



- Align reference marks previously made during removal.

Propeller Shaft Nuts Torque	N·m (kg·m/lb·ft)
103 (10.5/76)	



## 13. Front Exhaust Pipe (for with transfer type only)

Nuts Torque	N·m (kg·m/lb·ft)
50 (5.1/37)	



# FRONT OIL SEAL REPLACEMENT

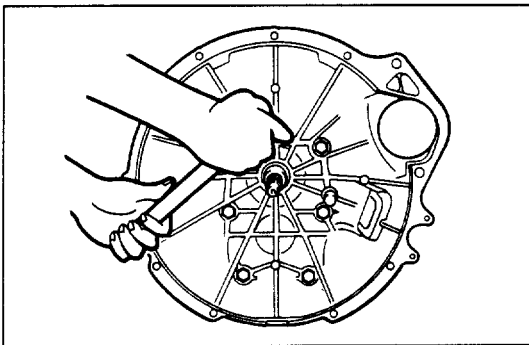


## Removal Steps

### 1. Transmission Assembly

Refer to "ON-VEHICLE SERVICE: TRANSMISSION ASSEMBLY REPLACEMENT" previously in this section.

### 2. Clutch Housing



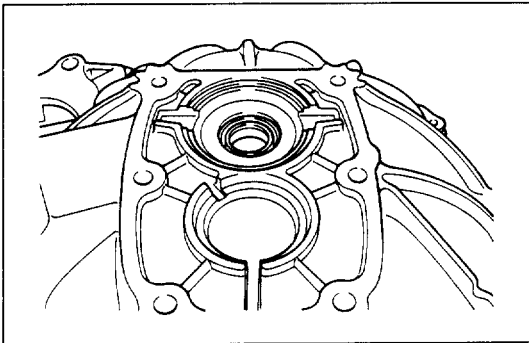
### 3. Oil Seal

- Use the screwdriver to remove the oil seal from the clutch housing.



### CAUTION:

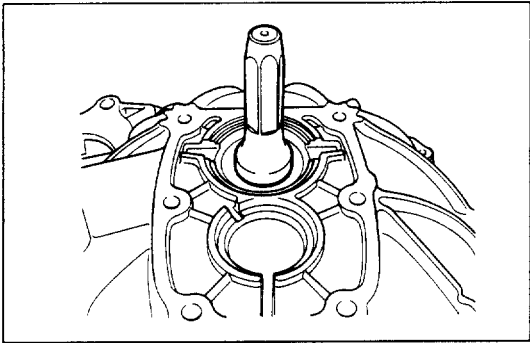
Take care not to damage the sealing seat of the clutch housing.







## Installation Steps

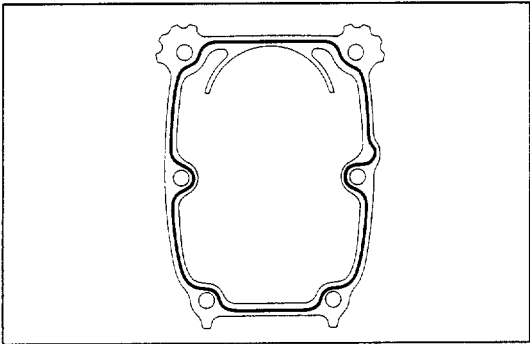


### 1. Oil Seal



- Apply engine oil to the new oil seal outer circumference and apply multi-purpose grease to the oil seal lip.
- Use the oil seal installer to install the oil seal to the clutch housing.

Oil Seal Installer: 5-8840-2243-0



### 2. Clutch Housing

- Remove water and oil on the mating face before applying the sealant.
- Apply a  $\varnothing$  2 mm (0.08 in) bead of the liquid gasket (Three Bond 1215 or equivalent) to the clutch housing surface shown in the illustration.

#### NOTE:

**Install the clutch housing on the transmission case within 30 minutes after liquid gasket application.**

Clutch Housing to Transmission

Case Bolts Torque

N·m (kg·m/lb·ft)



81 (8.3/60)

### 3. Transmission Assembly

Refer to "TRANSMISSION ASSEMBLY REPLACEMENT" previously in this section.

Clutch Housing to Flywheel

Housing Bolts Torque

N·m (kg·m/lb·ft)



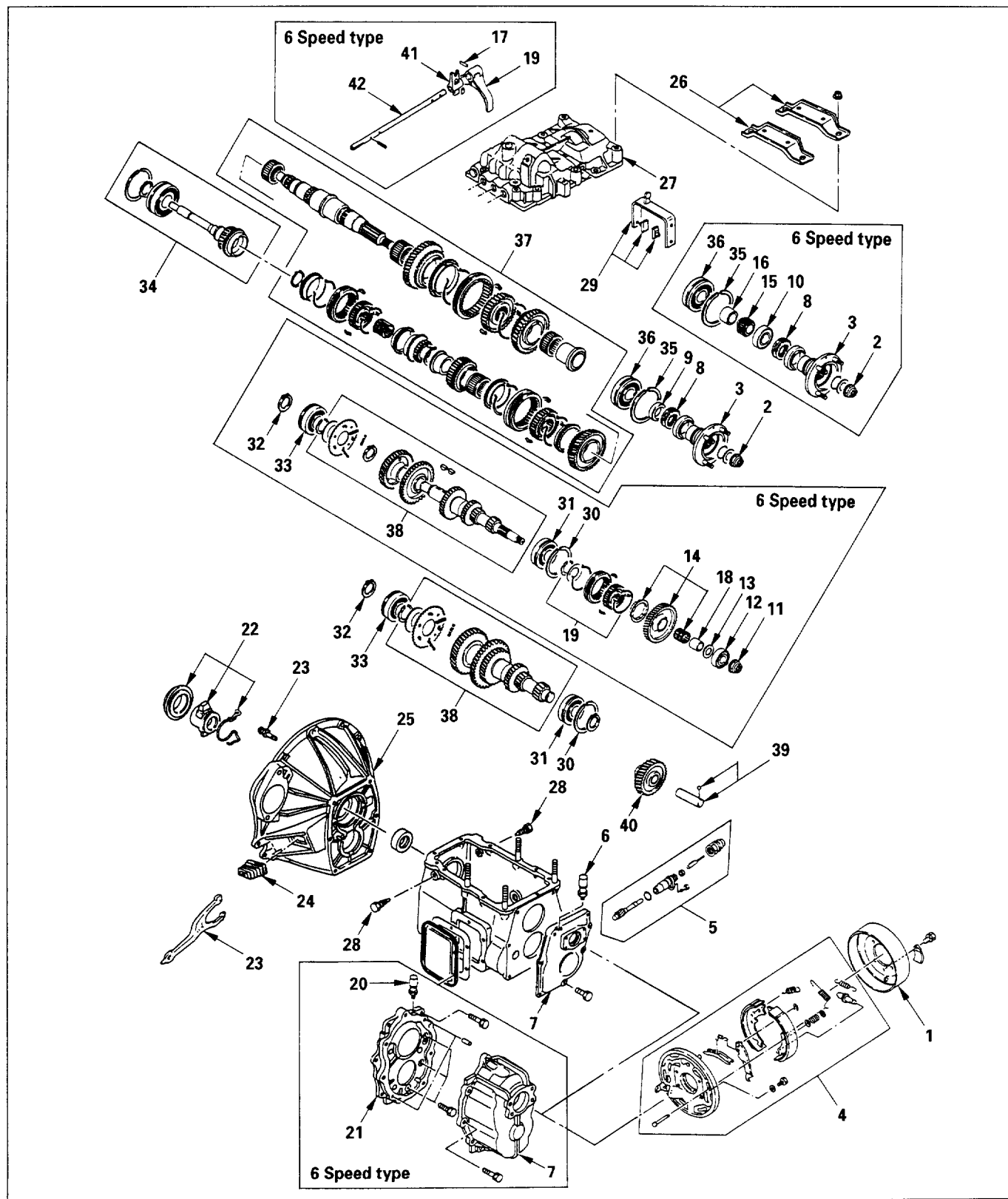
46 (4.7/34)



# UNIT REPAIR

## MAJOR COMPONENTS

### DISASSEMBLY



## Disassembly step

1. Parking brake drum
2. Lock nut
3. Coupling driver
4. Parking brake assembly
5. Car speed sensor driven gear assembly
6. Breather (for 5 speed type only)
7. Rear cover
8. Car speed sensor drive gear
9. Spacer (for 5 speed type only)
10. Ball Bearing (for 6 speed type only)
11. Lock nut (for 6 speed type only)
12. Ball Bearing (for 6 speed type only)
13. Plate (for 6 speed type only)
14. Counter 6th gear assembly (for 6 speed type only)
15. Main 6th gear (for 6 speed type only)
16. Spacer (for 6 speed type only)
17. Spring pin (for 6 speed type only)
18. Collar (for 6 speed type only)
19. Synchronizer assembly & shift arm
20. Breather (for 6 speed type only)
21. Intermediate plate
22. Shift block assembly
23. Shift fork and support bolt
24. Dust cover
25. Clutch housing
26. Mounting bracket
27. Control box assembly
28. Fulcrum bolt
29. 4th/5th shift arm & shift piece
30. Snap ring
31. Counter shaft rear bearing
32. Snap ring
33. Counter shaft front bearing
34. Top gear shaft assembly
35. Snap ring
36. Main shaft rear bearing
37. Main shaft assembly
38. Counter shaft assembly
39. Reverse idle gear shaft & lock ball
40. Reverse idle gear
41. 6th shift block (for 6 speed type only)
42. 6th shift rod (for 6 speed type only)

## Disassembly Step

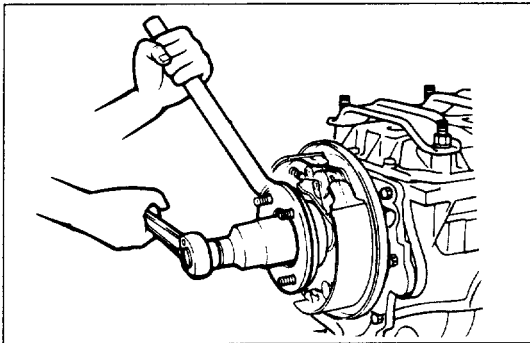
### 1. Parking Brake Drum

- Remove the screw and the adjust hole cover.
- It may be necessary to back off the shoe adjuster.

### 2. Lock Nut

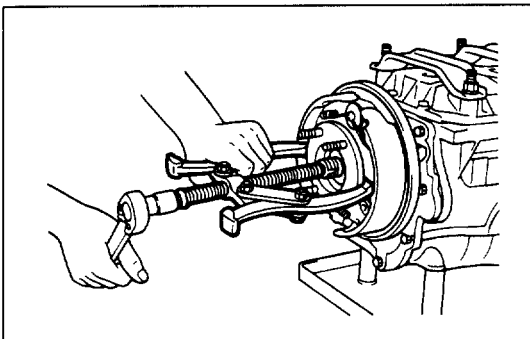
- Make sure to rise the caulking of the coupling driver lock nut.
- Use the handle to remove the lock nut.

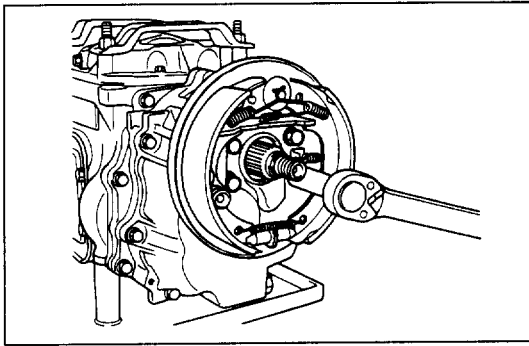
Handle : 5-8840-2043-0



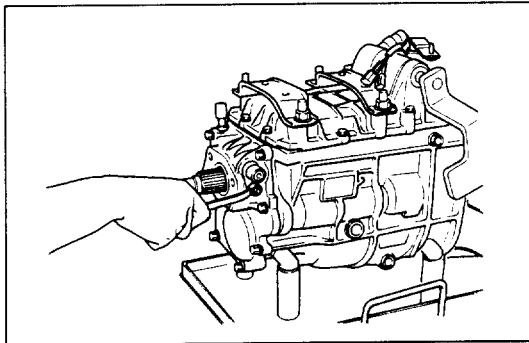
### 3. Coupling Driver

- Remove coupling driver using the bearing remover
- Bearing Remover : 5-8840-2198-0
- Remove conical washer and o-ring.



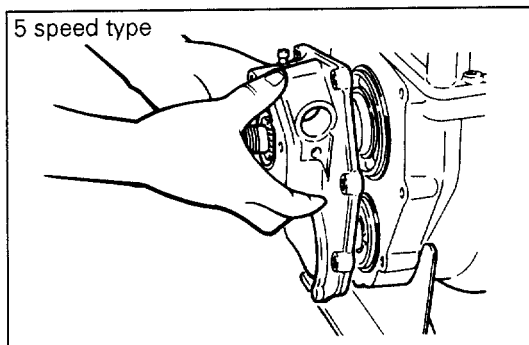


#### 4. Parking Brake Assembly



#### 5. Car Speed Sensor Driven Gear Assembly

- Remove the car speed sensor with the key rod.
- Remove the fixing bolt
- Remove the driven gear assembly.



#### 6. Breather (for 5 speed type only)

#### 7. Rear Cover

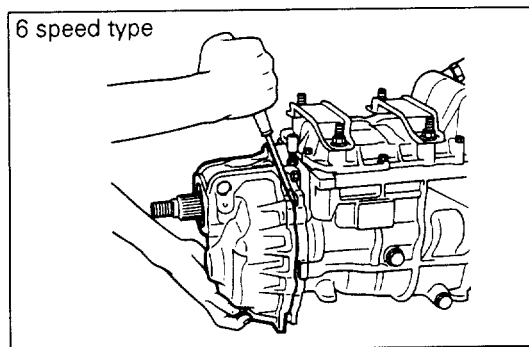
##### • 5 speed type

Remove 7 fixing bolts. Tap the rear cover with a copper or plastic hammer to remove it. The rear cover is provided with lugs for hammering both side.

##### • 6 speed type

Remove 7 fixing bolts. Prize off the rear cover with a screwdriver.

- Remove the oil seal using the screwdriver.



#### CAUTION:

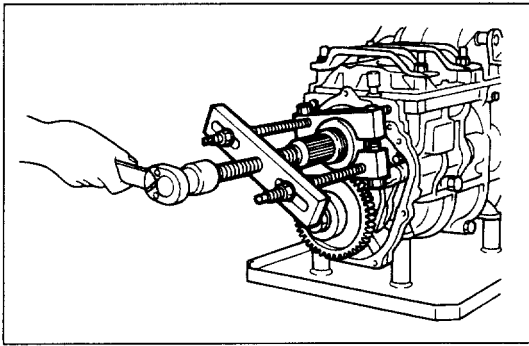
Take care not to damage the sealing seat of the rear cover with the screwdriver.

#### 8. Car Speed Sensor Drive Gear

##### • 6 speed type

Remove car speed sensor drive gear together with ball bearing(10).

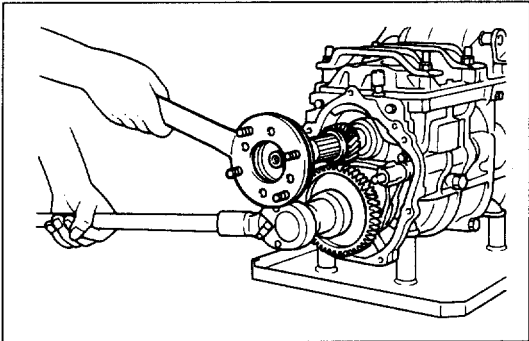
#### 9. Spacer (for 5 speed type only)



**10. Ball Bearing (for 6 speed type only)**



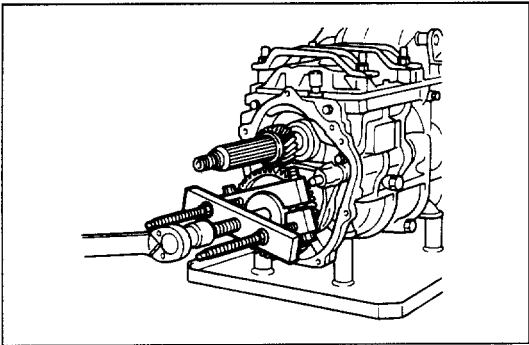
- Remove ball bearing using the bearing remover.  
Bearing Remover : 5-8840-2112-0  
Universal Puller : 5-8840-2027-0
- Remove car speed sensor drive gear and ball bearing



**11. Lock Nut (for 6 speed type only)**



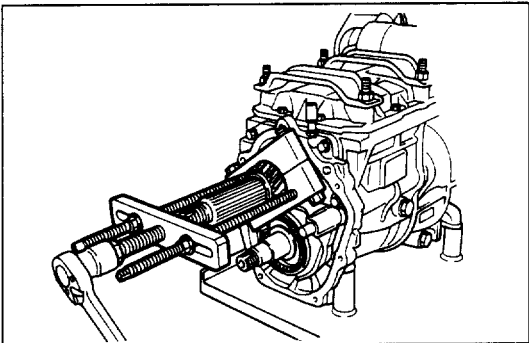
- Make sure to rise the caulking of the lock nut.
- Use the handle to remove the lock nut.  
Handle : 5-8840-2043-0



**12. Ball Bearing (for 6 speed type only)**



- Remove ball bearing using the bearing remover.  
Bearing Remover : 5-8840-2112-0  
Universal Puller : 5-8840-2027-0



**13. Plate (for 6 speed type only)**

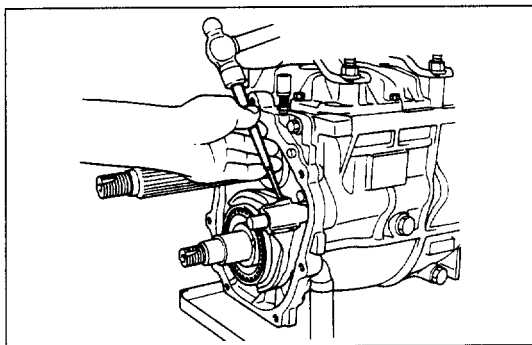
**14. Counter 6th Gear Assembly (for 6 speed type only)**

**15. Main 6th Gear (for 6 speed type only)**



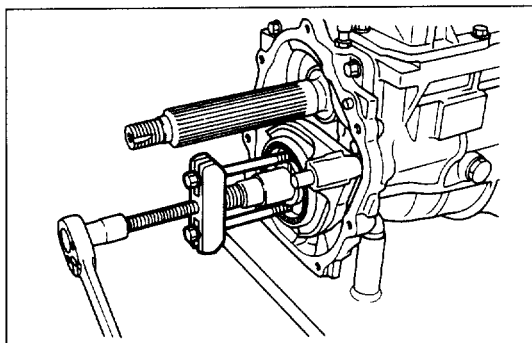
- Remove the 6th gear using the gear remover.  
Gear Remover : 5-8840-2341-0  
Universal Puller : 5-8840-2027-0

**16. Spacer (for 6 speed type only)**



**17. Spring Pin (for 6 speed type only)**

Spring Pin Remover: 9-8592-2201-0

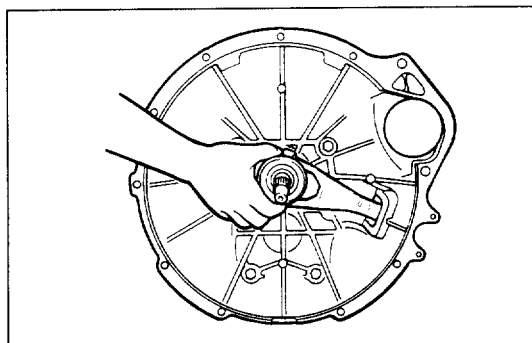


**18. Collar (for 6 speed type only)**

- Remove the collar together with the synchronizer assembly(19).

**19. Synchronizer Assembly & Shift Arm (for 6 speed type only)**

- Remove the synchronizer assembly using the universal puller.
- Screw the universal puller bolts (M8×1.25) to the clutch hub.

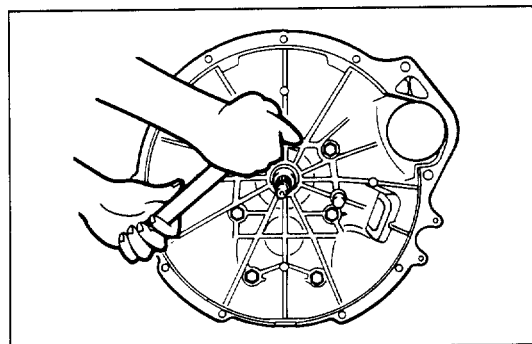


**20. Breather(for 6 speed type only)**

**21. Intermediate Plate (for 6 speed type only)**

- Tap the intermediate plate with a copper or plastic hammer to remove it.

**22. Shift Block Assembly**



**23. Shift Fork and Support Bolt**

**24. Dust Cover**

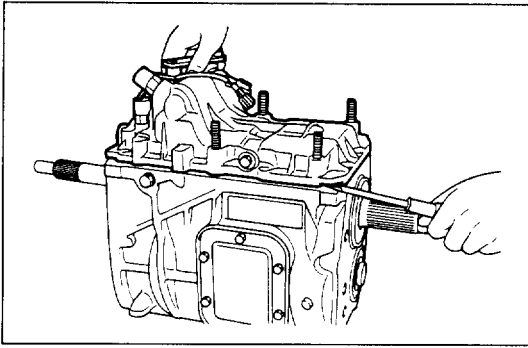
**25. Clutch Housing**

- Tap the clutch housing with a copper or plastic hammer to remove it.
- Use the screwdriver to remove the oil seal from the clutch housing.

**CAUTION:**

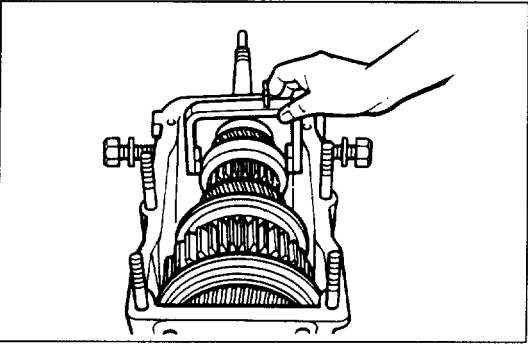
Take care not to damage the sealing seat of the clutch housing.

**26. Mounting Bracket**



### 27. Control Box Assembly

- Remove 10 control box fixing bolts, and then prize open the four corners of the control box with a screwdriver to remove the control box assembly.

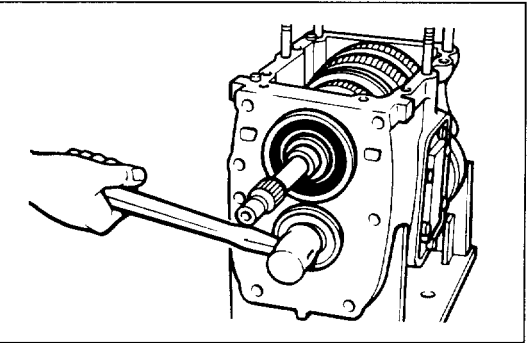


### 28. Fulcrum Bolt

- Remove the fulcrum bolts from 4th/5th shift arm on both sides.

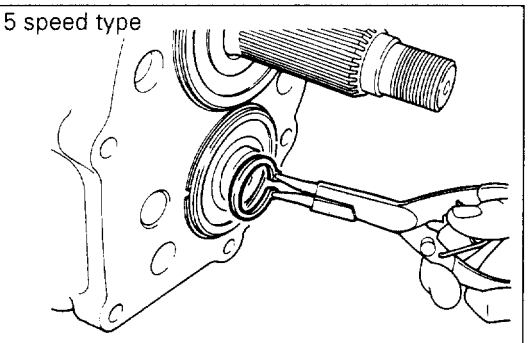
### 29. 4th/5th Shift Arm & Shift Piece

- Take out the shift arm and shift pieces together.



### 30. Snap Ring

- Move the countershaft approximately 3 mm (0.12 inch) rearward by tapping on its front end with brass or plastic hammer.
- Remove the snap ring from the counter shaft rear bearing outer circumference.

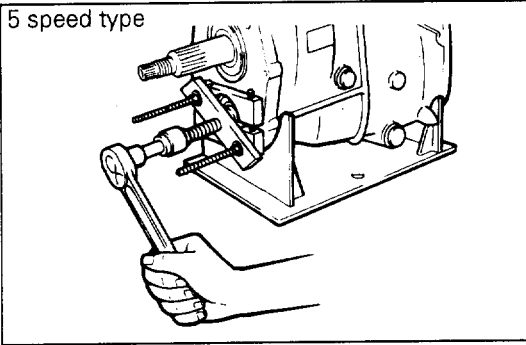


### 31. Counter Shaft Rear Bearing

- **5 speed type**
- 1) Remove the snap ring from the counter shaft rear end.



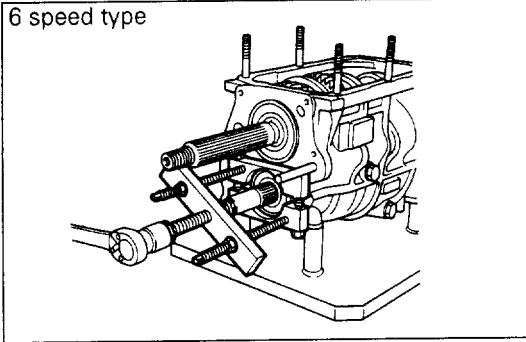
5 speed type



- 2) Set the bearing remover to the snap ring groove to remove the rear bearing.

Bearing Remover : 5-8840-2042-0  
Universal Puller : 5-8840-2027-0

6 speed type

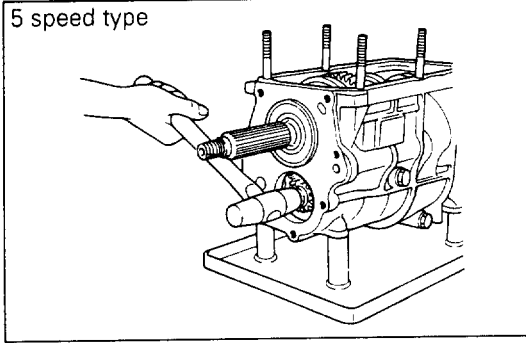


- **6 speed type**

Set the bearing remover to the snap ring groove to remove the rear bearing.

Bearing Remover : 5-8840-2042-0  
Universal Puller : 5-8840-2027-0

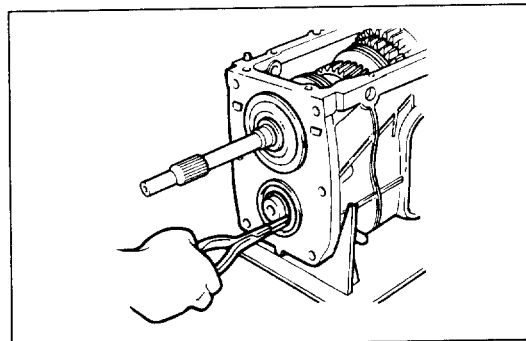
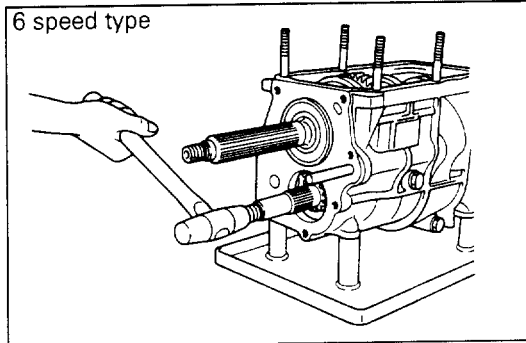
5 speed type



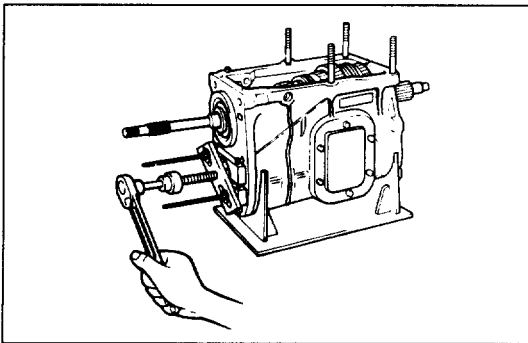
### 32. Snap Ring

- Move the countershaft approximately 3 mm (0.12 inch) forward by tapping on its rear end with brass or plastic hammer.

6 speed type



- Remove the snap ring from the countershaft front end.



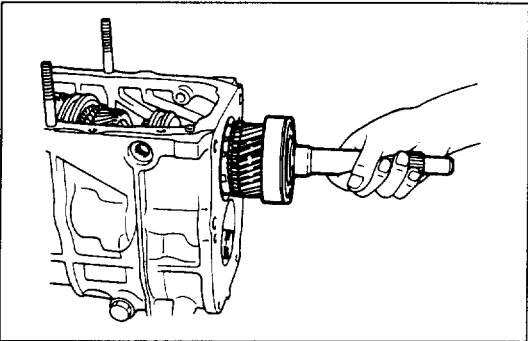
### 33. Counter Shaft Front Bearing



- Set the bearing remover to the snap ring groove to remove the front bearing.

Bearing Remover : 5-8840-2042-0

Universal Puller : 5-8840-2027-0



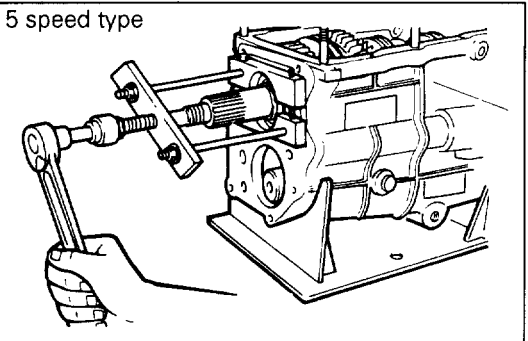
### 34. Top Gear Shaft Assembly

- Remove the top gear shaft bearing outer race toward front end using a hammer and soft metal bar.
- Remove the block ring and needle bearing.

### 35. Snap Ring

- Move the main shaft approximately 3 mm (0.12 inch) rearward by tapping on its front end with brass or plastic hammer.
- Remove the snap ring from the counter shaft front bearing outer circumference.

5 speed type



### 36. Main Shaft Rear Bearing

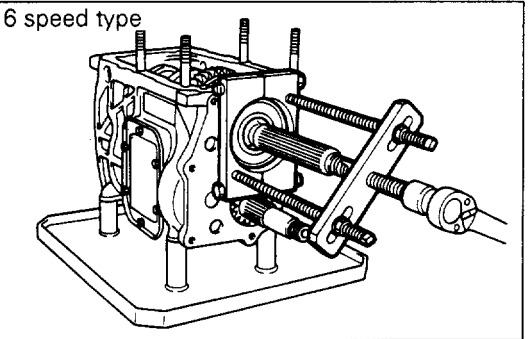


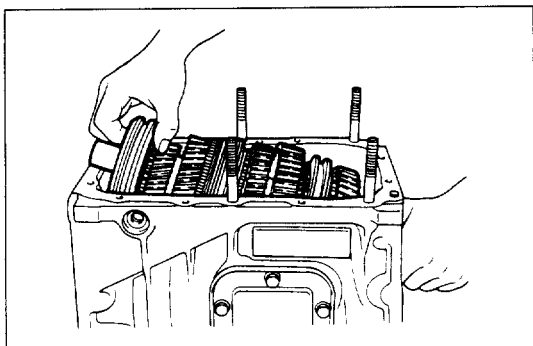
- Set the bearing remover to the snap ring groove to remove the bearing.

Bearing Remover : 5-8840-2342-0

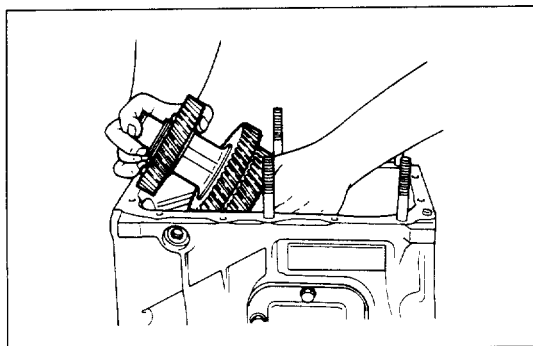
Bolt & Nut : 5-8840-2344-0

6 speed type

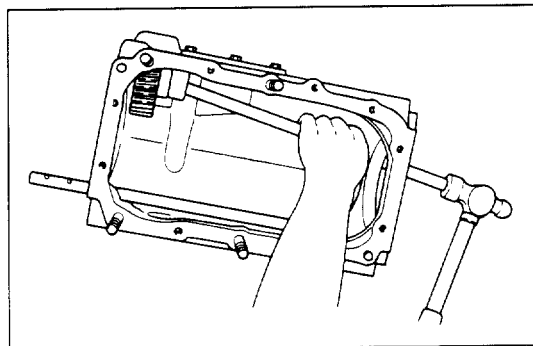




**37. Main Shaft Assembly**

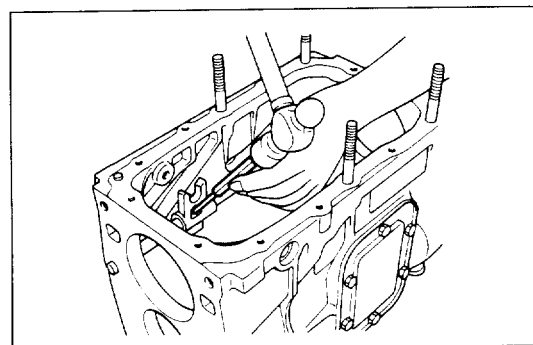


**38. Counter Shaft Assembly**



**39. Reverse Idle Gear Shaft & Lock Ball**

- Drive out the reverse gear shaft by tapping on its front end with a suitable bar and hammer.
- Be careful not to lose the lock ball.



**40. Reverse Idle Gear**

**41. 6th Shift Block (for 6 speed type only)**

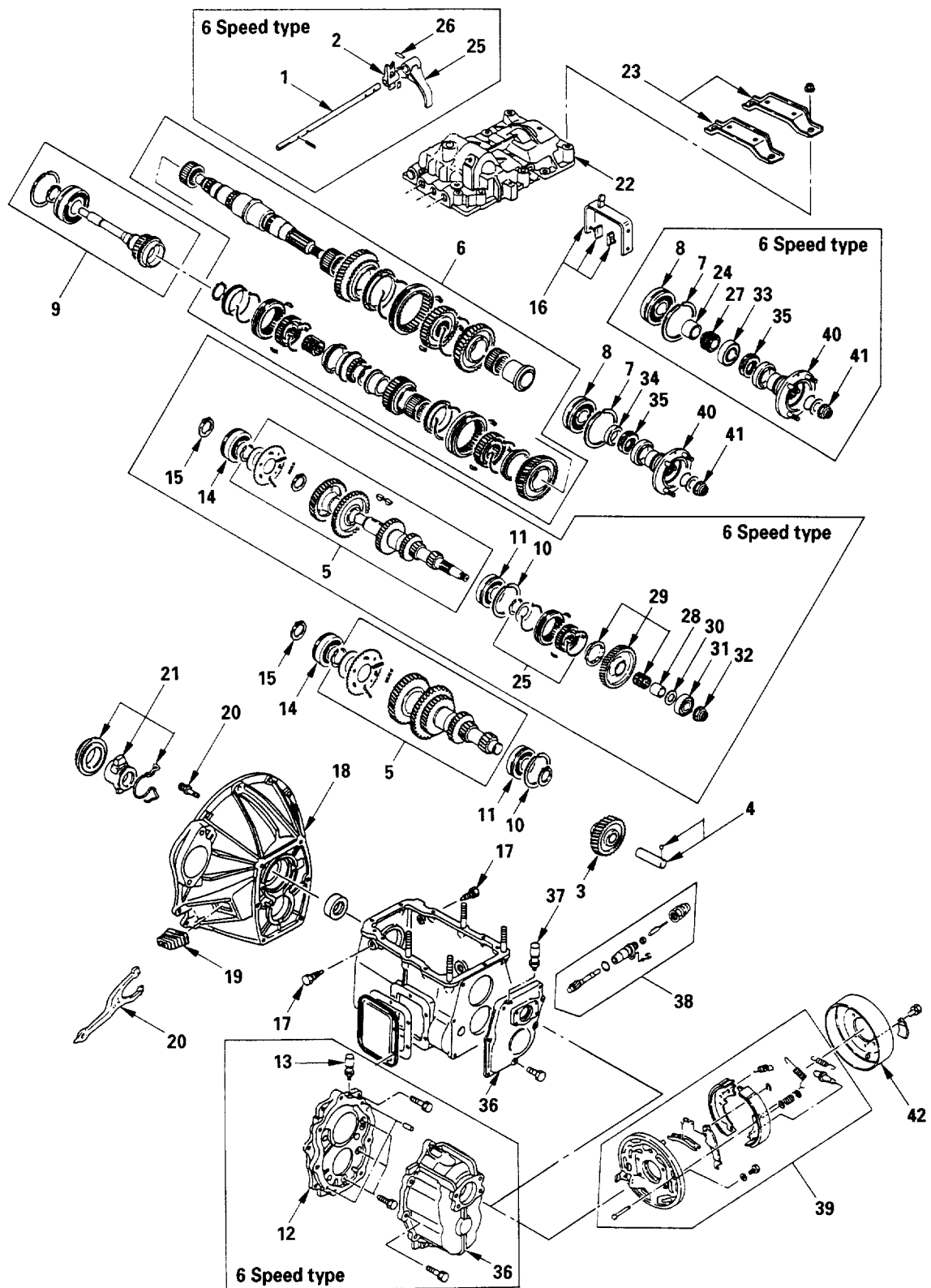


Spring Pin Remover: 9-8529-2201-0

**42. 6th shift rod (for 6 speed type only)**



# REASSEMBLY



## Reassembly steps

1. 6th shift rod (for 6 speed type only)
2. 6th shift block (for 6 speed type only)
3. Reverse idle gear
4. Reverse idle gear shaft & lock ball
5. Counter shaft assembly
6. Main shaft assembly
7. Snap ring
8. Main shaft rear bearing
9. Top gear shaft assembly
10. Snap ring
11. Counter shaft rear bearing
12. Intermediate plate (for 6 speed type only)
13. Breather (for 6 speed type only)
14. Counter shaft front bearing
15. Snap ring
16. 4th/5th shift arm & shift piece
17. Fulcrum bolt
18. Clutch housing
19. Dust cover
20. Shift fork and support bolt
21. Shift block assembly
22. Control box assembly
23. Mounting bracket
24. Spacer (for 6 speed type only)
25. Synchronizer assembly & shift arm (for 6 speed type only)
26. Spring pin (for 6 speed type only)
27. Main 6th gear (for 6 speed type only)
28. Collar (for 6 speed type only)
29. Counter 6th gear assembly (for 6 speed type only)
30. Plate (for 6 speed type only)
31. Ball Bearing (for 6 speed type only)
32. Lock nut (for 6 speed type only)
33. Ball Bearing (for 6 speed type only)
34. Spacer (for 5 speed type only)
35. Car speed sensor drive gear
36. Rear cover
37. Breather (for 5 speed type only)
38. Car speed sensor driven gear assembly
39. Parking brake assembly
40. Coupling driver
41. Lock nut
42. Parking brake drum



## Reassembly Steps

### NOTE:

Clean each part thoroughly.

When assembling parts, apply clean engine oil (SAE 5W-30) to their sliding and mating sections.

### 1. 6th Shift Rod (for 6 speed type only)



- Insert the 6th shift rod with the filed side at the front

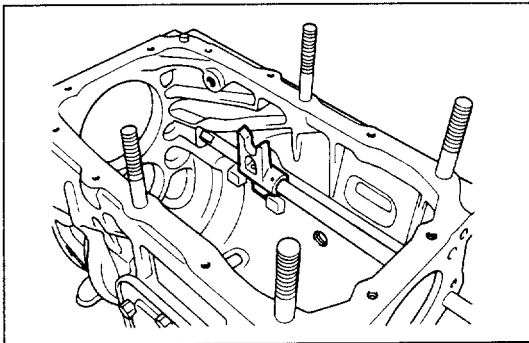
### 2. 6th Shift Block (for 6 speed type only)

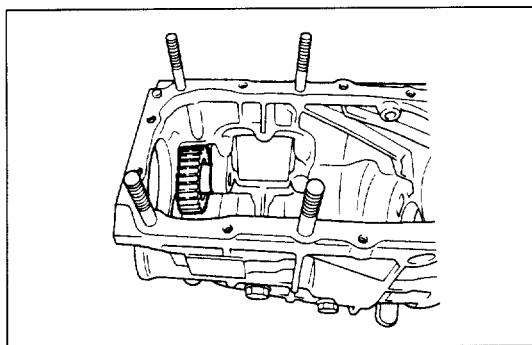


- The 6th shift block should be installed with the projection side of boss turned to the rearward

### NOTE:

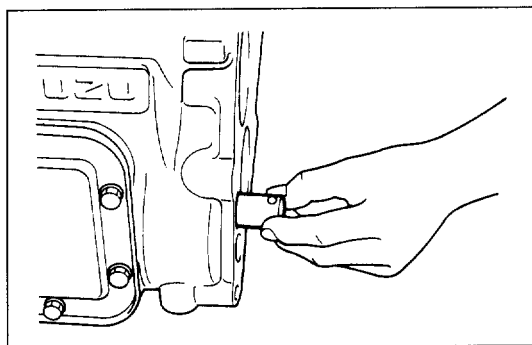
Install a new spring pin properly with the slit inline with the shaft centerline.





### 3. Reverse Idle Gear

- The reverse idle gear should be installed with longer boss side turned to the forward



### 4. Reverse Idle Gear Shaft

- With the ball built in the shaft rear section, install the reverse idle gear shaft from the rear side of the transmission.

### 5. Countershaft Assembly

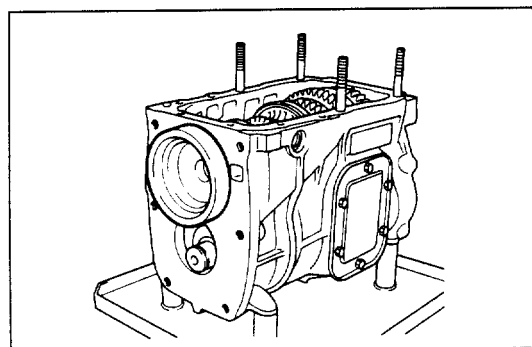
- Place the counter shaft assembly in the bottom of the transmission case.

### 6. Mainshaft Assembly

- Take care that the thrust washer of the reverse gear does not drop off.

### 7. Snap Ring

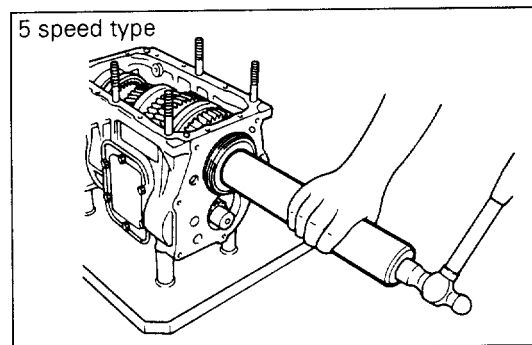
- Install the snap ring to the main shaft rear bearing outer circumference.



### 8. Main Shaft Rear Bearing

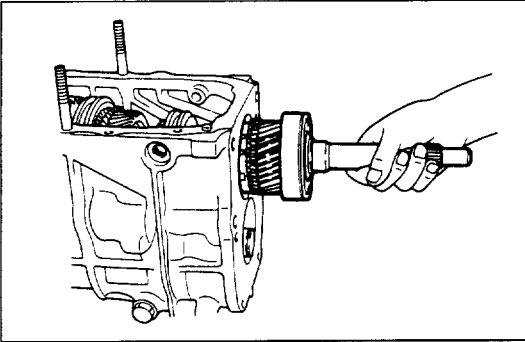
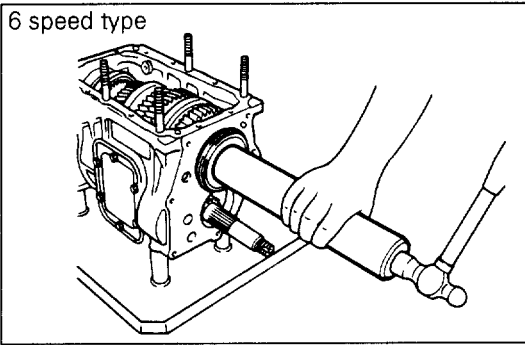
- Apply engine oil to the main shaft front end.
- Hold the main shaft using the main shaft holder.  
Main Shaft Holder : 5-8840-2347-0

5 speed type



- Install the rear bearing using the bearing installer.  
Bearing Installer : 5-8840-2345-0

6 speed type



#### 9. Top Gear Shaft Assembly

- Install the needle bearing to the top gear shaft.
- Install the top gear shaft assembly into the transmission case.
- Check to be certain the block ring on the 4th gear side fitted properly to the inserts.
- Press in the bearing until the snap ring of the bearing outer circumference comes into contact with the transmission case.

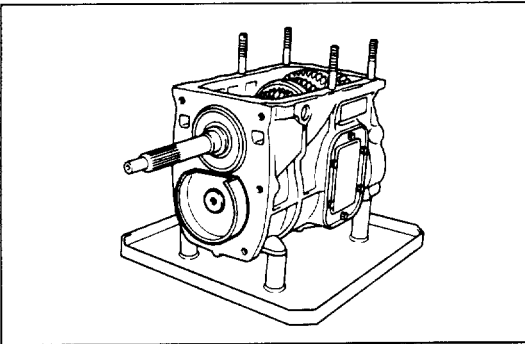
#### 10. Snap Ring

- Install the snap ring to the counter shaft rear bearing outer circumference.

#### 11. Counter Shaft Rear Bearing

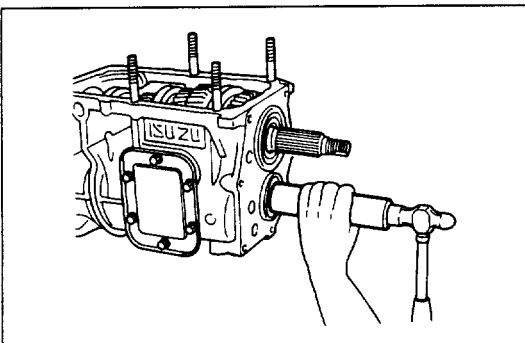


- Hold the counter shaft using counter shaft holder.  
Counter Shaft Holder : 5-8840-2348-0

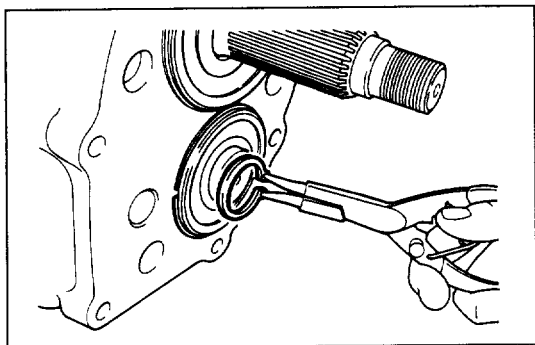


- Install the counter shaft rear bearing using bearing installer.

Bearing Installer: 5-8840-2244-0

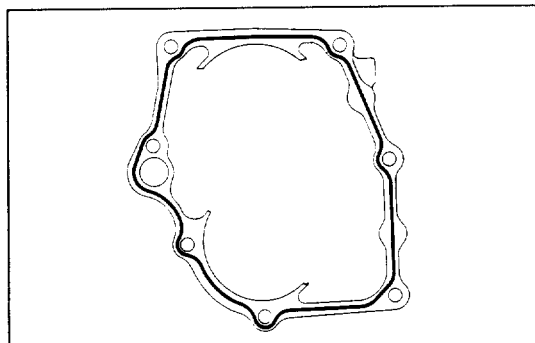






- **5 speed type**

Install the counter shaft rear bearing snap ring



## 12. Intermediate Plate (for 6 speed type only)

- Remove water and oil on the mating face before applying the liquid gasket.
- Apply a  $\varnothing$  2 mm (0.08 inch) bead of the liquid gasket (Three Bond 1215 or equivalent) to the front surface of intermediate plate shown in the illustration.



### CAUTION:

Install the intermediate plate on the transmission case within 30 minutes after liquid gasket application.

Intermediate plate to Transmission Case Bolts(A) Torque	N·m(kg·m/lb·ft)
46 (4.7/34.0)	



Intermediate plate to Transmission Case Bolts(B) Torque	N·m(kg·m/lb·ft)
40 (4.1/29.7)	



### CAUTION:

Do not reuse the bolts (A).

## 13. Breather (for 6 speed type only)

## 14. Countershaft Front Bearing



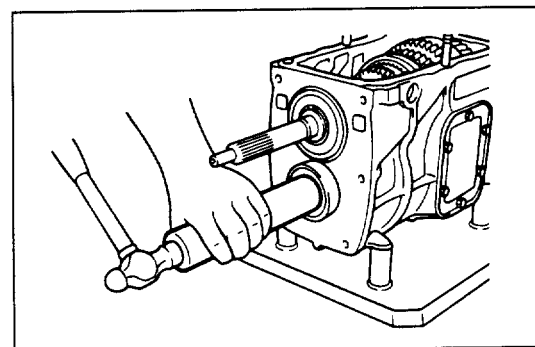
- Use the bearing installer to install the front bearing.

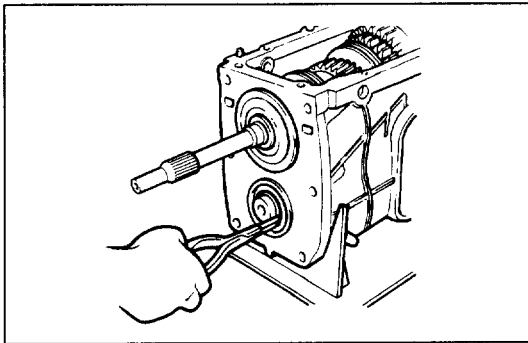
Bearing Installer : 5-8840-2244-0

### NOTE:

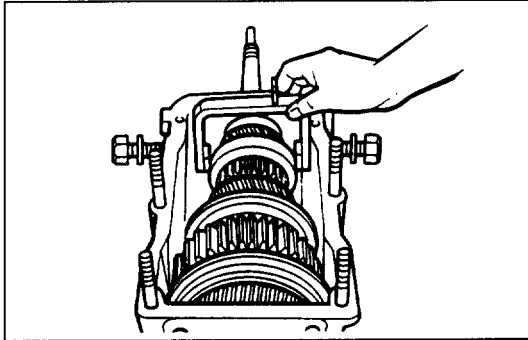
With each gear set to the neutral position, check to see if the shaft and each gear rotate smoothly.

Check to see if each block ring is free. When it gets caught and stuck in the taper cone, use a screwdriver to make it free.





### 15. Snap Ring



### 16. 4th/5th Shift Arm Assembly

- Install the shift pieces to the shift arm.
- Install the shift arm by moving projected portion (to be fitted into the shift block) all the way to the right.



#### NOTE:

Take care not to drop the shift pieces in the transmission case.

### 17. Fulcrum Bolt



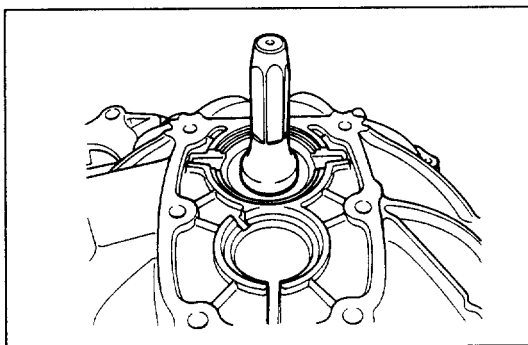
- Remove sealant from the bolts and the female threaded surfaces and the surfaces must be perfectly dry.



- Apply liquid gasket (LOCTITE 242 or equivalent) to the bolt's threaded area.



Fulcrum Bolts Torque	N·m (kg·m/lb·ft)
79 (8.1/59)	

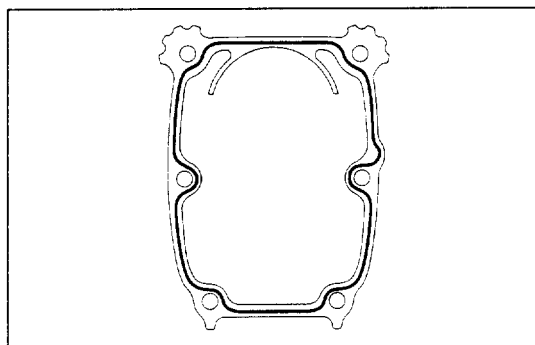


### 18. Clutch Housing



- Apply engine oil to the new oil seal outer circumference and apply multi-purpose grease to the oil seal lip.
- Use the oil seal installer to install the oil seal to the clutch housing.

Oil Seal Installer : 5-8840-2243-0



- Remove water and oil on the mating face before applying the liquid gasket.
- Apply a  $\varnothing$  2 mm (0.08 inch) bead of the liquid gasket (Three Bond 1215 or equivalent) to the clutch housing surface shown in the illustration.

#### CAUTION:

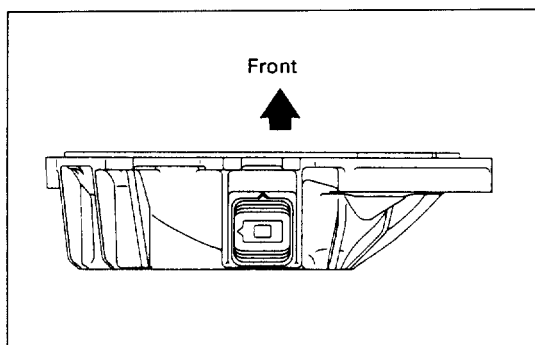
**Install the clutch housing on the transmission case within 30 minutes after liquid gasket application.**

Clutch Housing to Transmission

Case Bolts Torque

N·m(kg·m/lb·ft)

81 (8.3/60)



#### 19. Dust Cover

- Install the dust cover with its arrow mark face the clutch housing front side.

#### 20. Shift Fork and Support Bolt

Support Bolts Torque

N·m(kg·m/lb·ft)

52 (5.2/38)



#### 21. Shift Block Assembly

#### 22. Control Box Assembly



- Remove water and oil on the mating face before applying the liquid gasket.
- Apply a  $\varnothing$  2 mm (0.08 inch) bead of the liquid gasket (Three Bond 1215 or equivalent) to the control box surface shown in the illustration.

#### CAUTION:

**Install the control box assembly on the transmission case within 30 minutes after liquid gasket application.**

- Fixing bolt length  
Front side (2 pieces): 45 mm (1.77 inch)  
Rear side (5 pieces): 25 mm (0.98 inch)

Control Box to Transmission

Case Bolts Torque

N·m (kg·m/lb·ft)

20 (2.0/14)

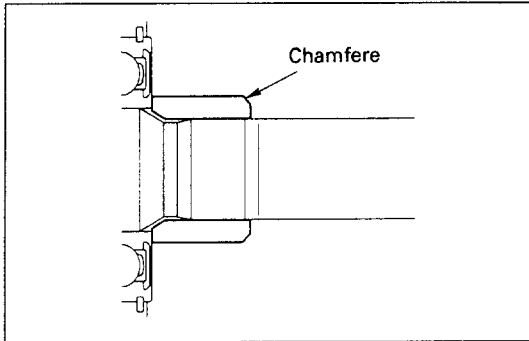


#### NOTE:

**Operating the shift lever and the select lever, make sure that they shift to each position smoothly.**

### 23. Mounting Bracket

Mounting Bracket Bolts Torque	N·m(kg·m/lb·ft)
	69 (7.0/51)



### 24. Spacer (for 6 speed type only)

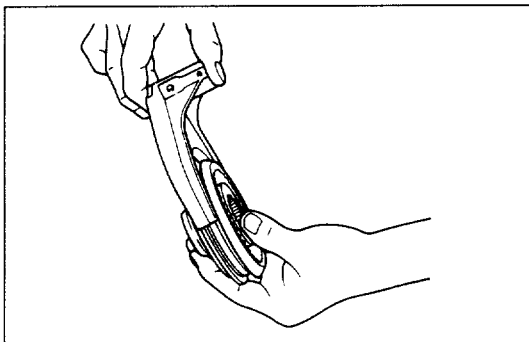


- Install the spacer with its chamfered side face to the rearward.

### 25. Synchronizer Assembly & Shift Arm (for 6 speed type only)

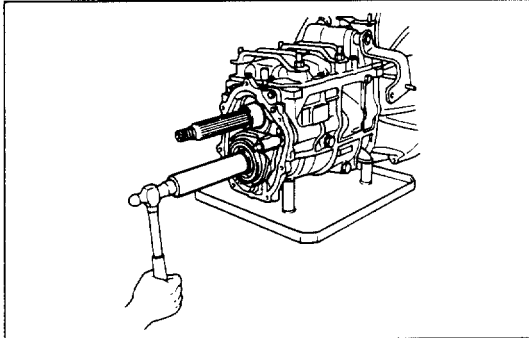


- Set the shift arm to the synchronizer assembly so that the oil groove of the clutch hub boss end face and the projection side of the shift arm boss point to the rearward .



- Use the installer to install the 6th synchronizer assembly & shift arm to the counter shaft and 6th shift rod.

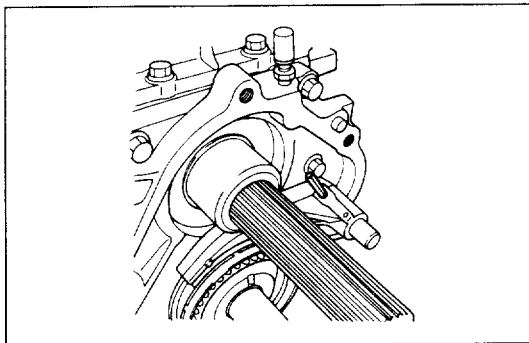
Installer : 5-8840-2244-0

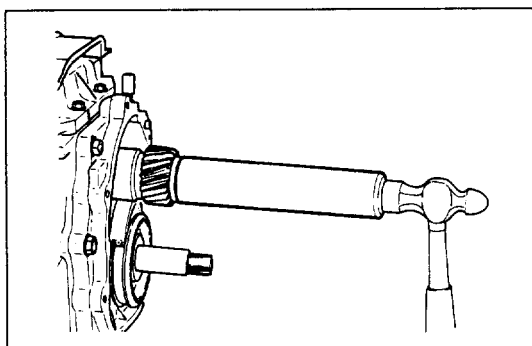


### 26. Spring Pin (for 6 speed type only)

#### NOTE:

Install a new spring pin properly with the slit inline with the shaft center line.





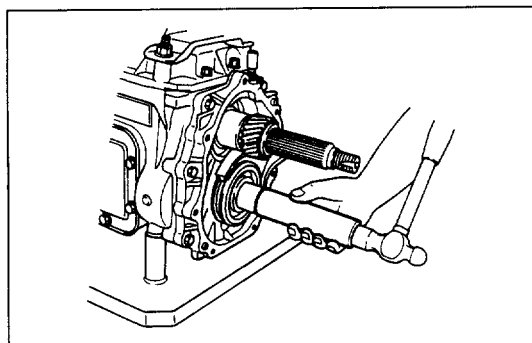
### 27. Main 6th Gear (for 6 speed type only)



- Tap the main 6th gear with installer and a hammer to press it in until the spacer contacts closely with the bearing.

Installer : 5-8840-2244-0

- When it is difficult to engage the collar with the main shaft, heat the collar to a temperature between 80 and 120°C (176 and 248°F) with the piston heater before assembling.



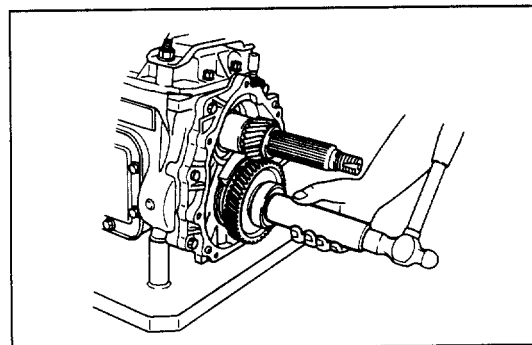
### 28. Collar (for 6 speed type only)



- Tap the collar with the gear collar installer and a hammer to press it in until it contacts closely with the clutch hub.

Gear Collar Installer : 5-8840-2346-0

- When it is difficult to engage the collar with the main shaft, heat the collar to a temperature between 80 and 120°C (176 and 248°F) with the piston heater before assembling.



### 39. Counter 6th Gear Assembly (for 6 speed type only)



- Apply the engine oil to the block ring and the needle bearing.

### 30. Plate (for 6 speed type only)



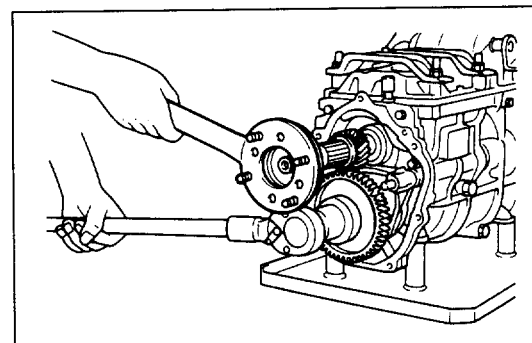
- Apply the engine oil to the plate.

### 31. Ball Bearing (for 6 speed type only)



- Tap the ball bearing with the gear collar installer and a hammer to press it in until it contacts closely with the plate.

Gear Collar Installer : 5-8840-2346-0



### 32. Lock Nut (for 6 speed type only)



- Apply the engine oil to the setting face of the new lock nut and tighten it up at the specified torque.

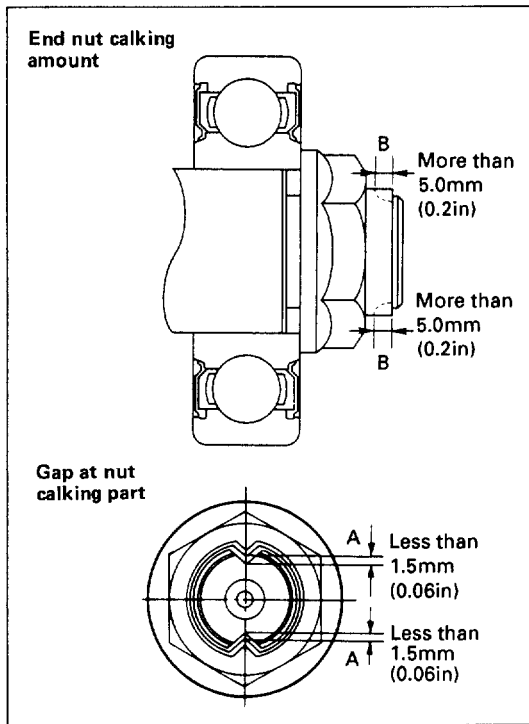
Handle: 5-8840-2043-0



Lock Nut Torque	N·m (kg·m/lb·ft)
226 (23.0/166)	

### CAUTION:

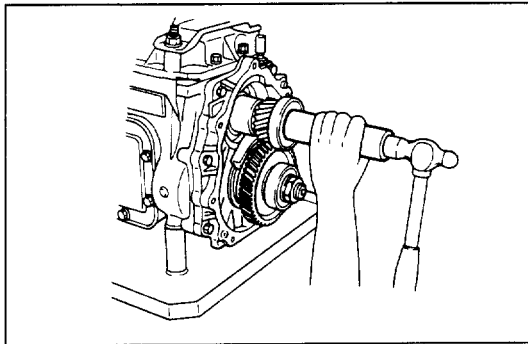
Do not reuse the lock nut.



- Align the lock nut with the V-shaped groove at the tip of the main shaft, and caulk the nut lip portion by using a chisel.  
(Round edge approximately 1 mm (0.04 in)×60°).
- As shown in the illustration, be sure to caulk the nut lip so that the clearance between the V-shaped groove portion at the tip of the main shaft and the caulked up lip(A) is less than 1.5 mm (0.06 in), and the caulking length(B) is 5 mm (0.2 in) or more.

**CAUTION:**

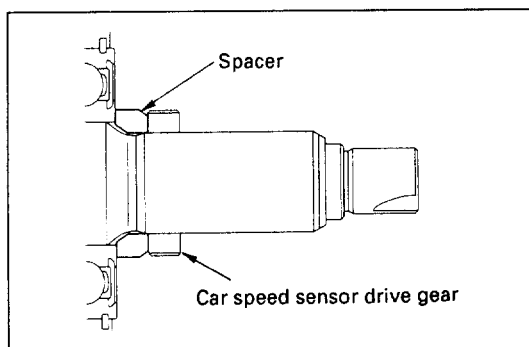
Be sure to confirm that there is no crack at the caulked portion of the end nut after caulking.



**33. Ball Bearing (for 6 speed type only)**

- Tap the ball bearing with installer and a hammer to press it in until it contacts closely with the main 6th gear.

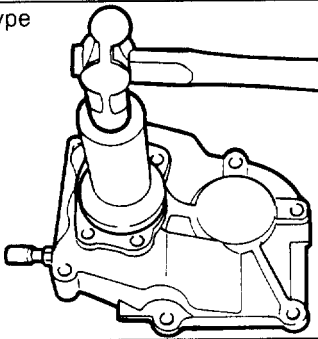
Installer : 5-8840-2244-0



**34. Spacer (for 5 speed type only)**

**35. Car Speed Sensor Drive Gear**

5 speed type

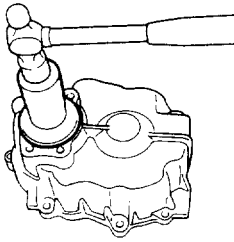


**36. Rear Cover**

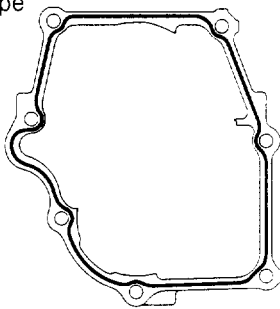
- Apply engine oil to the new oil seal outer circumference and apply multi-purpose grease to the oil seal lip.
- Use the oil seal installer install the oil seal to the rear cover.

Oil Seal Installer: 5-8840-2242-0

6 speed type



5 speed type



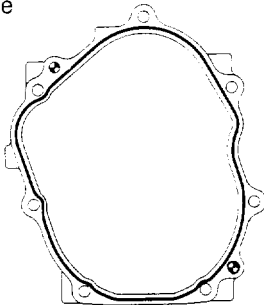
- Remove water and oil on the mating face before applying the liquid gasket.
- Apply a  $\varnothing$  2 mm (0.08 inch) bead of the liquid gasket (Three Bond 1215 or equivalent) to the rear cover surface shown in the illustration.

**CAUTION:**

**Install the rear cover on the transmission case within 30 minutes after liquid gasket application.**

Rear Cover Bolts Torque	N·m (kg·m/lb·ft)
	40 (4.1/30)

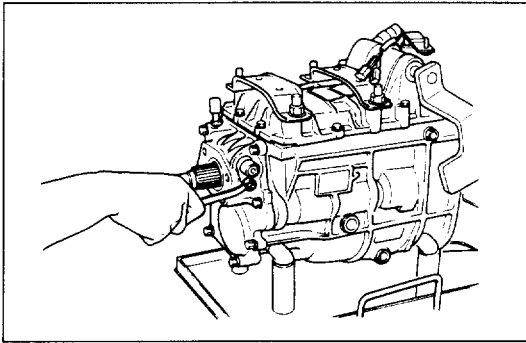
6 speed type



**37. Breather (for 5 speed type only)**

Breather Torque	N·m (kg·m/lb·ft)
	5 (0.5/3.6)



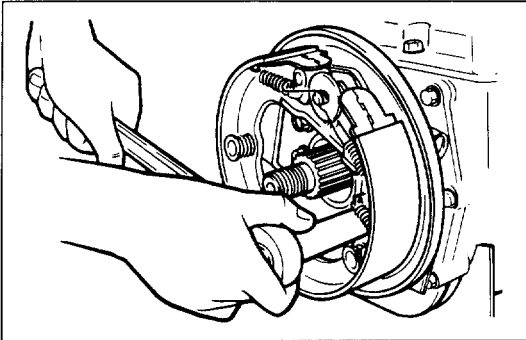


### 38. Car Speed Sensor Driven Gear Assembly

Driven Gear Lock Plate Bolt Torque	N·m (kg·m/lb·ft)
15 (1.5/11)	

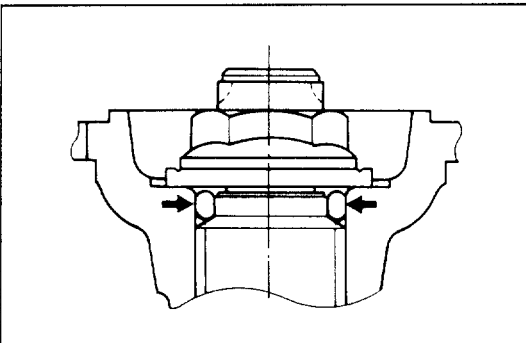
- Install the car speed sensor with key rod.

Car Speed Sensor Torque	N·m (kg·m/lb·ft)
25 (2.5/18)	



### 39. Parking Brake Assembly

Parking Brake Bolts Torque	N·m (kg·m/lb·ft)
83 (8.5/61)	

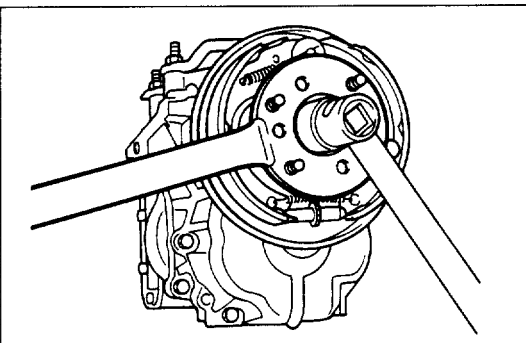


### 40. Coupling Driver

#### 41. Lock Nut

- Install the o-ring and conical washer. The conical washer is to be set up with its identification groove to the nut side.
- Apply the engine oil to the setting face of the new lock nut and tighten it up at the specified torque.  
Handle: 5-8840-2043-0

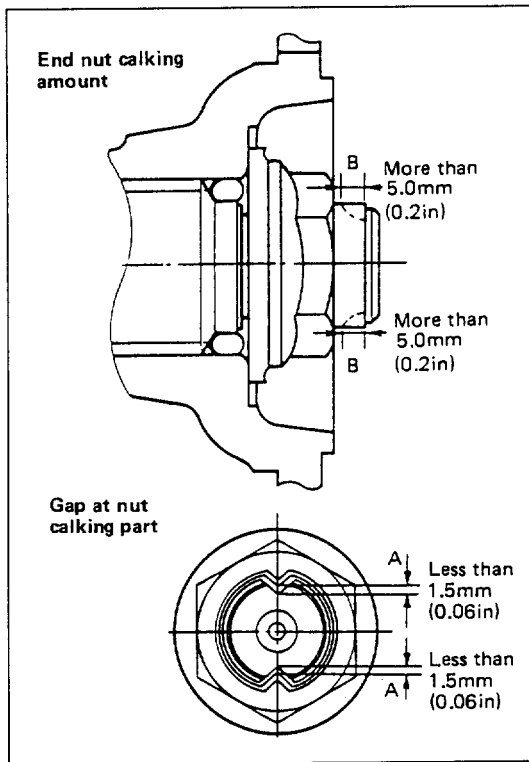
Lock Nut Torque	N·m (kg·m/lb·ft)
226 (23.0/166)	



### CAUTION:

Do not reuse the lock nut.





- Align the lock nut with the V-shaped groove at the tip of the main shaft, and caulk the nut lip portion by using a chisel.  
(Round edge approximately 1 mm (0.04 in)×60°).
- As shown in the illustration, be sure to caulk the nut lip so that the clearance between the V-shaped groove portion at the tip of the main shaft and the caulked up lip(A) is less than 1.5 mm (0.06 in), and the caulking length(B) is 5 mm (0.2 in) or more.

#### CAUTION:

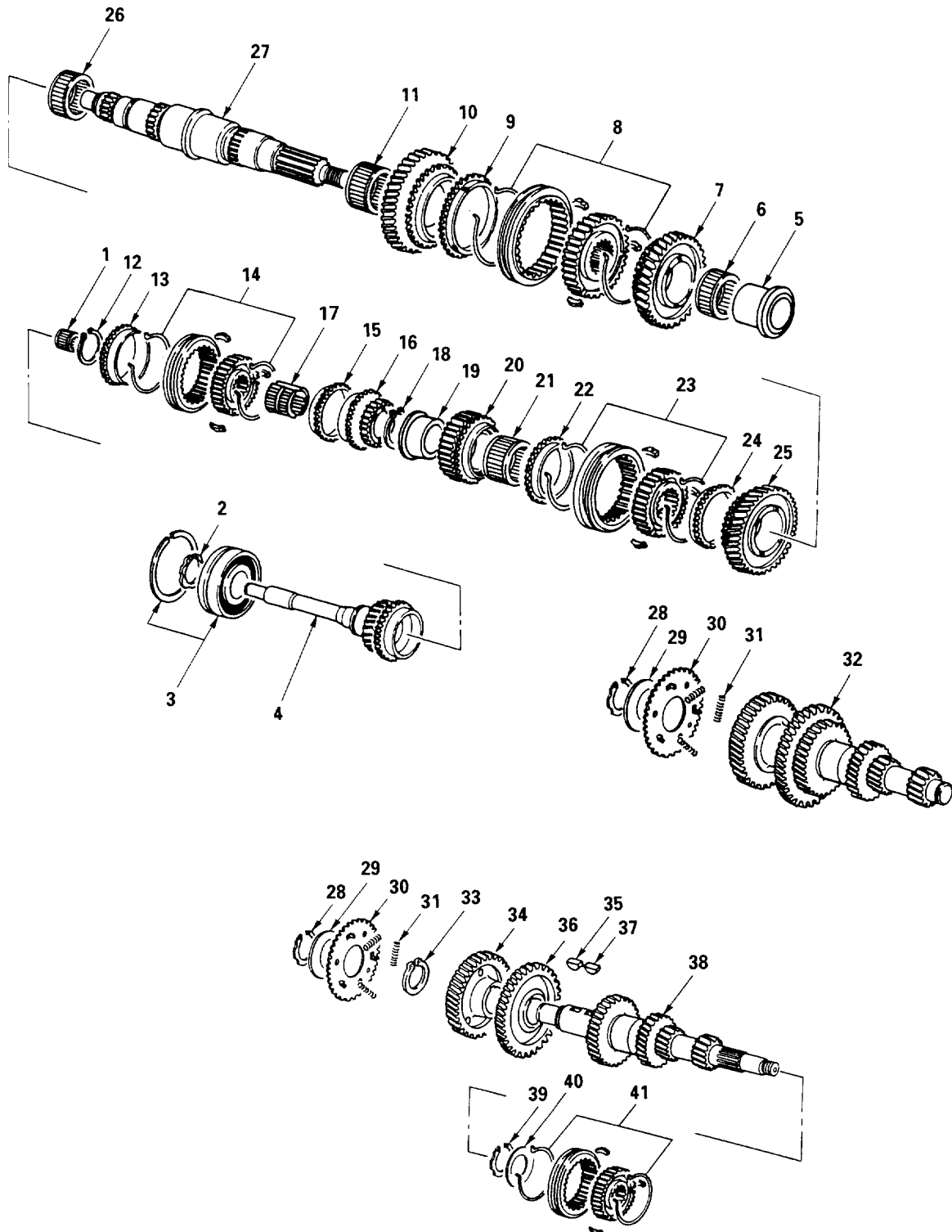
Be sure to confirm that there is no crack at the caulked portion of the end nut after caulking.

#### 42. Parking Brake Drum

# MEMO

# TOP GEAR SHAFT ASSEMBLY, MAIN SHAFT ASSEMBLY AND COUNTER SHAFT ASSEMBLY

## DISASSEMBLY



## Disassembly step

### Top Gear Shaft Assembly

1. Needle bearing
2. Snap ring
3. Ball bearing
4. Top gear shaft

### Main Shaft Assembly

5. Collar
6. Needle bearing
7. Reverse gear
8. 1st/reverse synchronizer assembly
9. Block ring
10. 1st gear
11. Needle bearing
12. Snap ring
13. Block ring
14. 4th/5th synchronizer assembly
15. Block ring
16. 5th gear
17. Needle bearing
18. Snap ring
19. Collar
20. 3rd gear
21. Needle bearing
22. Block ring

23. 2nd/3rd synchronizer assembly
24. Block ring
25. 2nd gear
26. Needle bearing
27. Main shaft

### Counter Shaft Assembly

28. Snap ring
29. Conical washer
30. Anti-lash plate
31. Spring
32. Counter shaft (for 5 speed type only)
33. Snap ring
34. Counter shaft drive gear (for 6 speed type only)
35. Key (for 6 speed type only)
36. Counter shaft 5th gear (for 6 speed type only)
37. Key (for 6 speed type only)
38. Counter shaft (for 6 speed type only)

### Counter Shaft Assembly

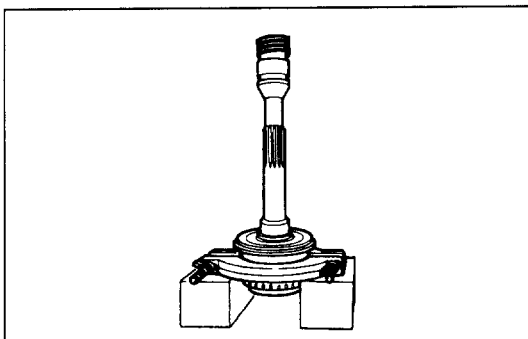
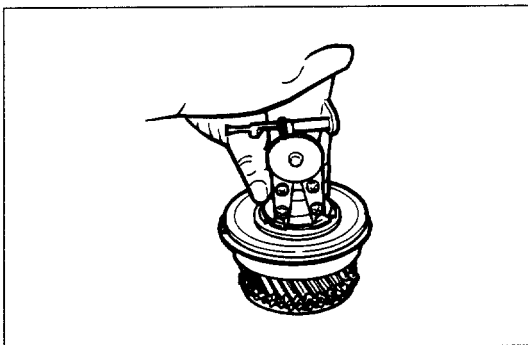
39. Snap ring
40. Conical washer
41. 6th synchronizer assembly



## Disassembly Step

### Top Gear Shaft Assembly

1. Needle Bearing
2. Snap Ring



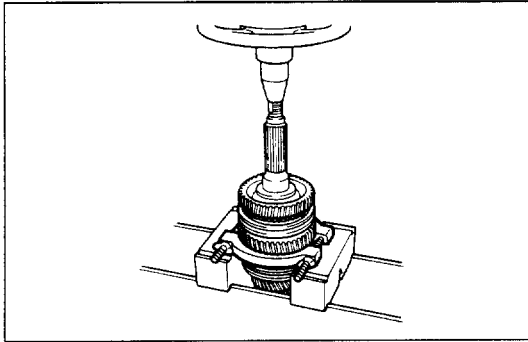
### 3. Ball Bearing



- Use the bearing remover to remove the bearing from top gear shaft.

Bearing Remover: 5-8840-0587-0

### 4. Top Gear Shaft



### Main Shaft Assembly

5. Collar
6. Needle Bearing
- 7 Reverse Gear
8. 1st/Reverse Synchronizer Assembly
9. Block Ring
10. 1st Gear



- Use a bench press and the bearing remover to remove the 1st gear together with the collar, the needle bearing, the reverse gear, the 1st/reverse synchronizer assembly and the block ring.

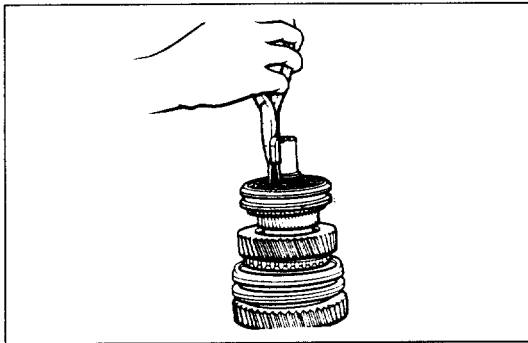
Bearing Remover: 5-8840-0587-0

- Disassembly synchronizer assemblies into the clutch hub, sliding sleeve, inserts (3 pieces) and insert springs (2 pieces).

### 11. Needle Bearing

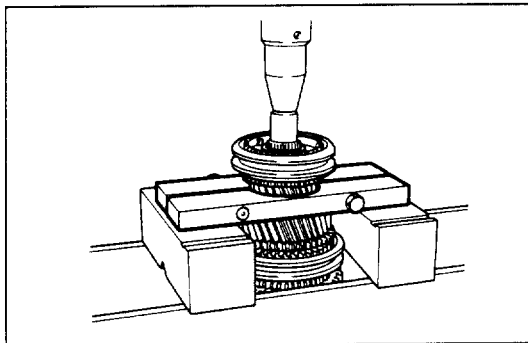
### 12. Snap Ring

- Attach a backing plate to the vise, secure the main shaft at the spline end, and remove the snap ring at the end.



### NOTE:

Snap ring of appropriate sizes are combined to fill the gap to the clutch hub. Never mix them with other snap rings.



### 13. Block Ring

### 14. 4th/5th Synchronizer Assembly

### 15. Block Ring

### 16. 5th Gear



- Use a bench press and the bearing remover to remove 5th gear together with the 4th/5th synchronizer assembly and the block ring.

Bearing Remover: 5-8840-0587-0

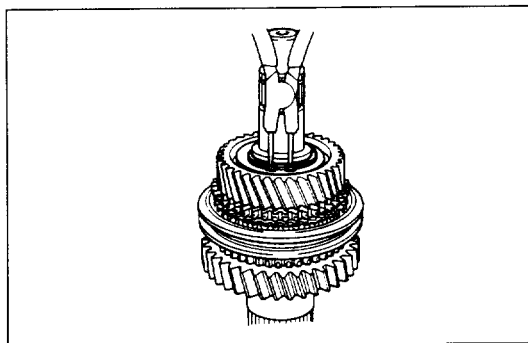
- Disassembly synchronizer assemblies into the clutch hub, sliding sleeve, inserts (3 pieces) and insert springs (2 pieces).

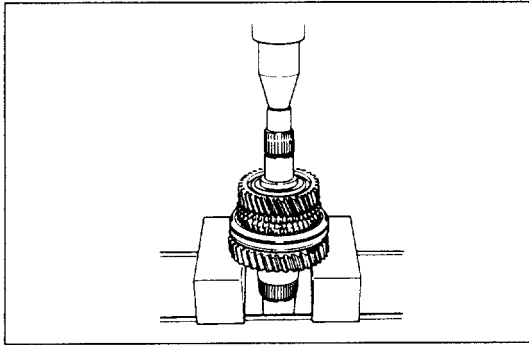
### 17. Needle Bearing

### 18. Snap Ring

### NOTE:

Snap ring of appropriate sizes are combined to fill the gap to the clutch hub. Never mix them with other snap rings.





- 19. Collar
- 20. 3rd Gear
- 21. Needle Bearing
- 22. Block Ring



- Use a bench press and the bearing remover to remove the 3rd gear together with the collar, the needle bearing and the block ring.

Bearing Remover: 5-8840-0587-0

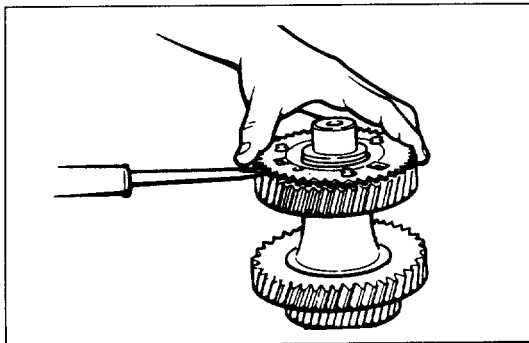
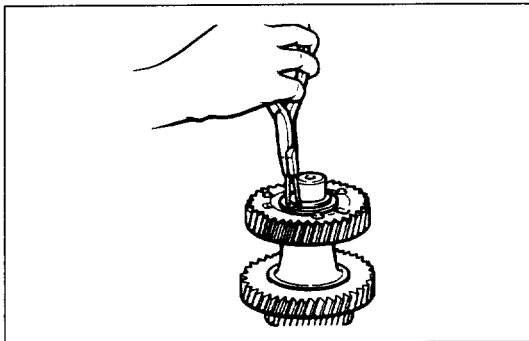
- 23. 2nd/3rd Synchronizer Assembly
- 24. Block Ring
- 25. 2nd Gear
- 26. Needle Bearing

- Use a bench press to remove the 2nd gear together with the 2nd/3rd synchronizer assembly and the block ring.
- Disassembly synchronizer assemblies into the clutch hub, sliding sleeve, inserts (3 pieces) and insert springs (2 pieces).

## 27. Main Shaft

### Counter Shaft Assembly

## 28. Snap Ring



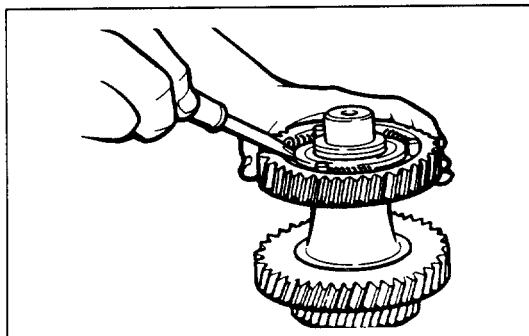
- 29. Conical Washer
- 30. Anti-lash Plate

- Insert a flat-end screwdriver between the anti-lash plate and the counter drive gear, and remove the anti-lash plate.

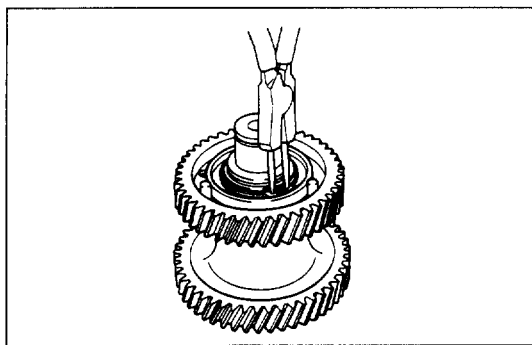


### WARNING:

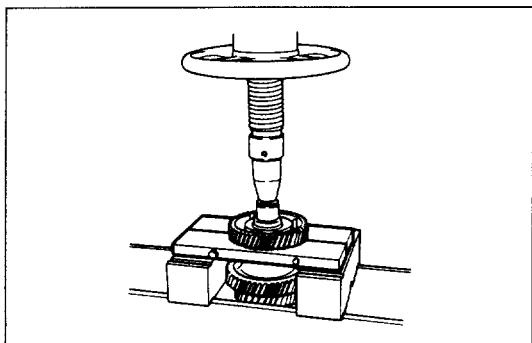
THE ANTI-LASH PLATE SHOULD BE REMOVED VERY SLOWLY WITH SPECIAL CARE OTHERWISE SOME SPRINGS INSTALLED INSIDE THE PLATE COULD POP OUT AND CAUSE INJURY.



- 31. Spring
- Remove the three springs that are assembled to the counter drive gear side.
- 32. Counter Shaft (for 5 speed type only)



### 33. Snap Ring



### 34. Counter Shaft Drive Gear

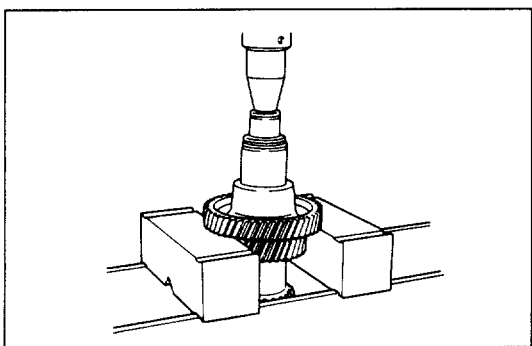


- Use a bench press and the bearing remover to remove the counter drive gear.

Bearing Remover: 5-8840-0587-0

#### NOTE

Do not disassemble the counter drive gear and the counter 5th gear if no fault is apparent.



### 35. Key

### 36. Counter Shaft 5th Gear

- Use a bench press to remove the counter shaft 5th gear.

### 37. Key

### 38. Counter Shaft

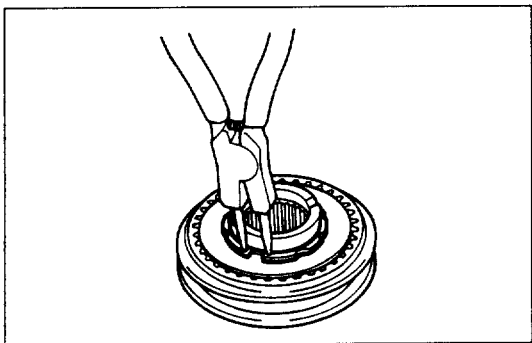
### 6th Synchronizer Assembly

### 39. Snap Ring

### 40. Conical Washer

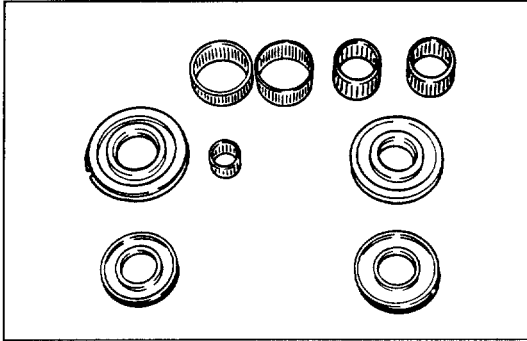
### 41. 6th Synchronizer Assembly

- Disassembly synchronizer assemblies into the clutch hub, sliding sleeve, inserts (3 pieces) and insert springs (2 pieces).



## INSPECTION AND REPAIR

Make the necessary adjustment, repairs, and part replacements if excessive wear or damage is discovered during inspection.

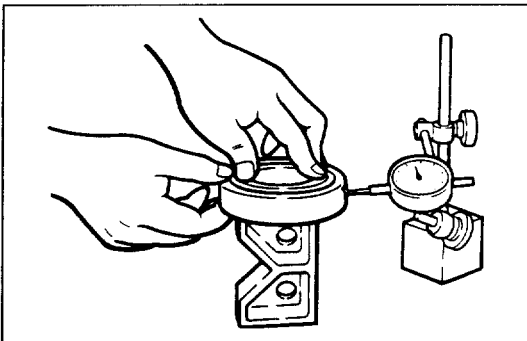


### Bearings



Check each bearing, and replace in either of the following cases.

- Rotation is not smooth.
- Abnormal sound is generated.
- There is extreme damage or rust.
- Rolling element or rolling contact surface of needle roller bearing is discolored, extremely worn or pitted.

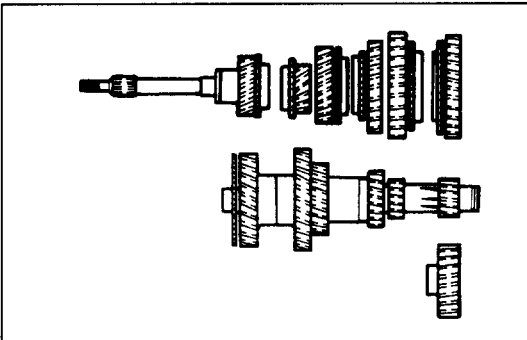


### Ball Bearing Run-out

mm (in)



Limit	0.2 (0.008)
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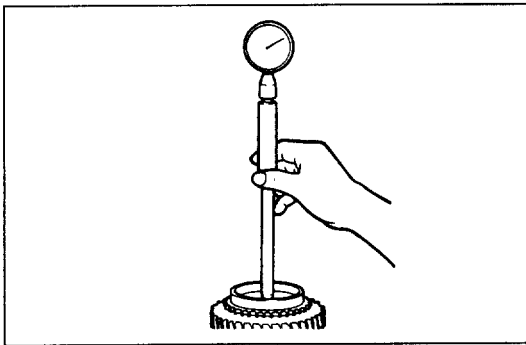
### Gears



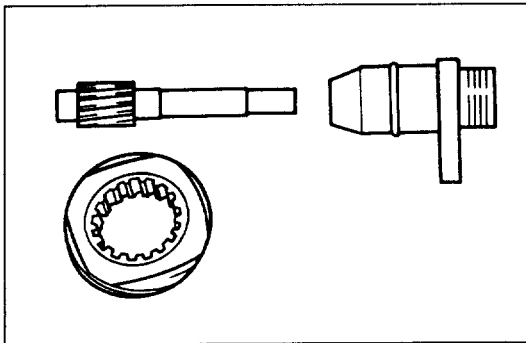
Check each gear for the following points. Correct a slight stepped wear or surface roughness with an oil stone or pencil grinder, or replace the gear if unrecoverable damage is found.

- Break or damage of tooth.
- Roughness or damage of taper cone (contact surface with block ring).
- Extreme wear of tooth.
- Inspect the dog gear teeth, and replace if hard contact is found on the force receive side (coast side) during engine braking.

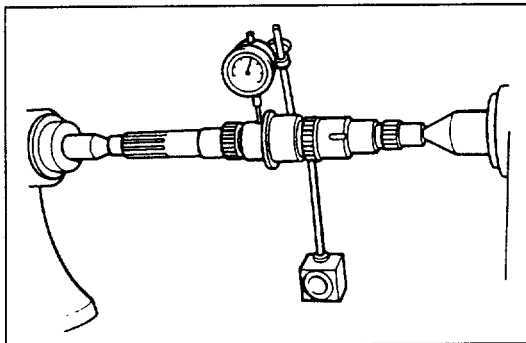




Gear Inside Diameter		mm (in)
Gear	Nominal	Limit
6th Gear	42 (1.654)	42.1 (1.657)
5th Gear	42 (1.654)	42.1 (1.657)
3rd Gear	61 (2.402)	61.1 (2.406)
2nd Gear	61 (2.402)	61.1 (2.406)
1st Gear	61 (2.402)	61.1 (2.406)
Reverse Gear	61 (2.402)	61.1 (2.406)



- Wear or damage of car speed sensor drive gear and driven gear bushing.

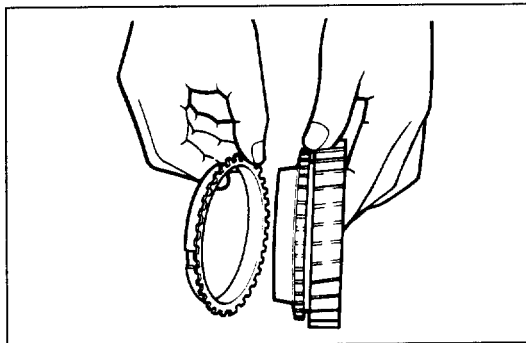


#### Main Shaft

Check the main shaft external surface for any damage or wear, and its spline sections for wear, damage or bent. When there is any abnormal condition found, or when it is used excessively beyond a proper use limit, replace it with new one.



Main Shaft Run-out		mm (in)
Standard	Limit	
0.05 (0.002) or Less	0.2 (0.008)	

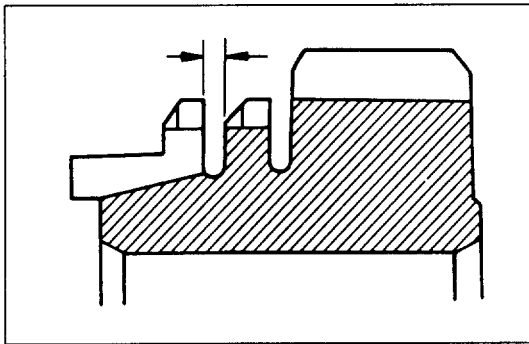


#### Synchronmesh

Check the components of the synchronizer for any abnormal conditions. When there are uneven slight wears or rough surfaces found, improve them with an oil stone or pencil grinder.

When they are abnormally damaged, or when they are used excessively beyond a proper use limit, replace them with new one.

- Damages or wears found on the taper, gear and insert groove sections of the block ring.



Block Ring and Dog Gear Teeth Clearance mm (in)

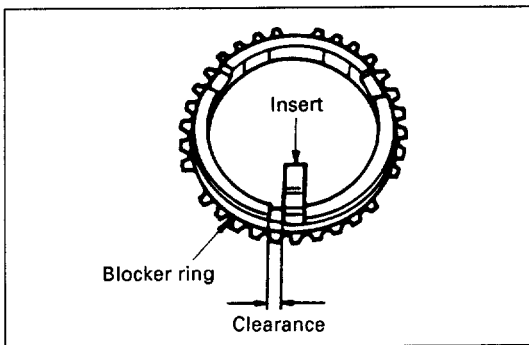
Gear	Nominal	Limit
6th	1.4 (0.055)	0.5 (0.02)
4th/5th	1.4 (0.059)	0.5 (0.02)
2nd/3rd	1.5 (0.059)	0.5 (0.02)
1st	1.5 (0.059)	0.5 (0.02)



- Wears or damages found on the clutch hub, the sliding sections of the sliding sleeve, the spline sections and insert grooves.

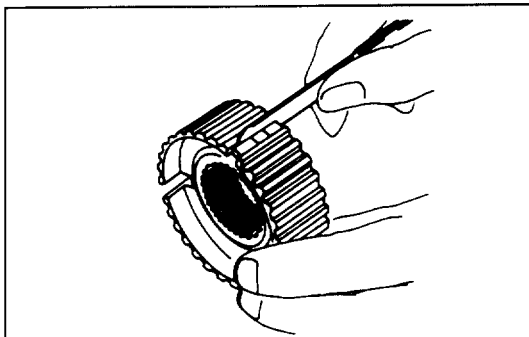
Clutch Hub Spline Play  
(At clutch hub outer circumference) mm (in)

Standard	Limit
Less than 0.05 (0.0197)	0.3 (0.0118)



Block Ring Groove and Insert Clearance mm (in)

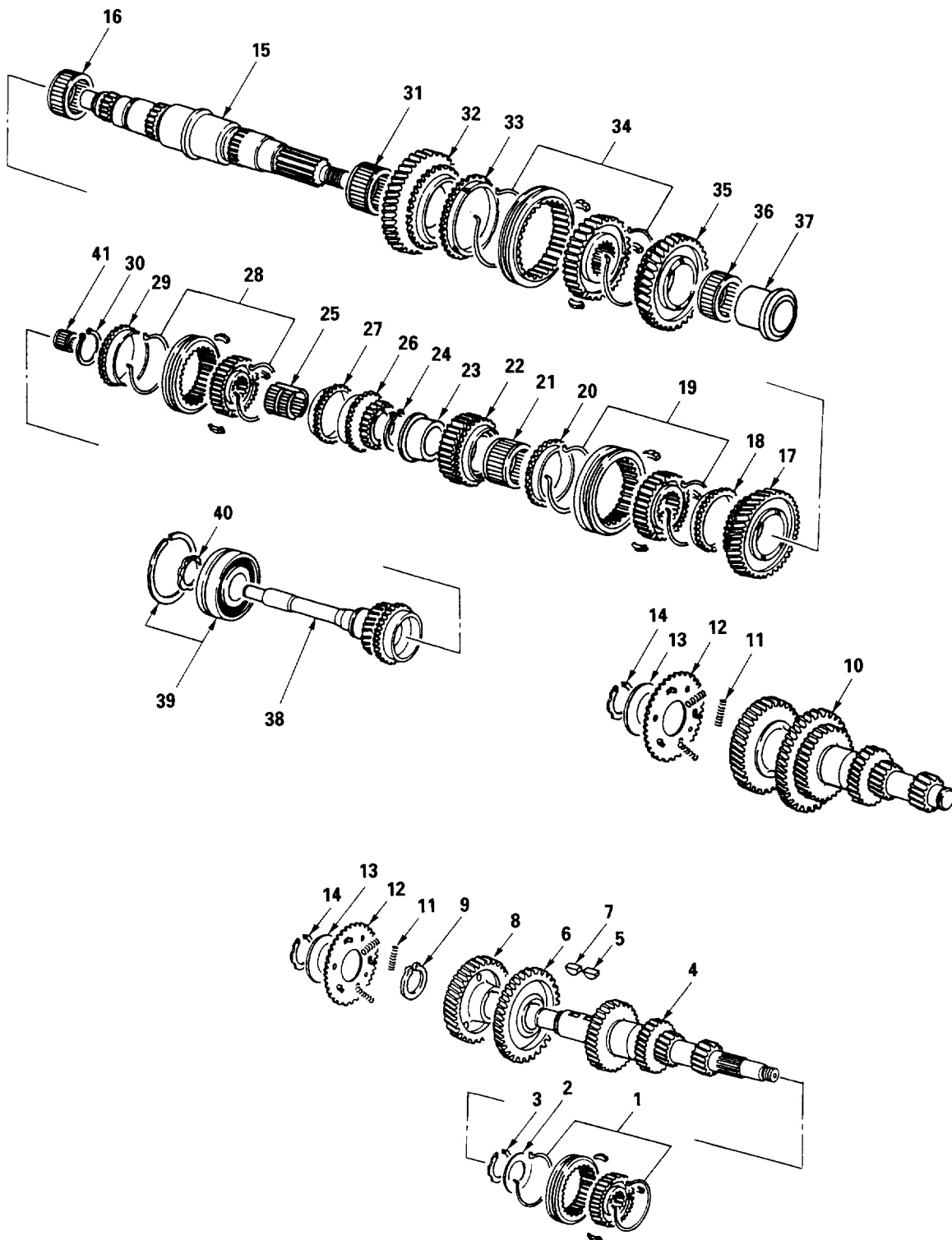
Gear	Standard
6th	3.59 – 3.91 (0.141 – 0.154)
4th/5th	3.59 – 3.91 (0.141 – 0.154)
2nd/3rd	3.59 – 3.91 (0.141 – 0.154)
1st	3.54 – 3.86 (0.139 – 0.152)



Clutch Hub Groove and Insert Clearance mm (in)

Gear	Standard
6th	0.09 – 0.31 (0.0035 – 0.0122)
4th/5th	0.09 – 0.31 (0.0035 – 0.0122)
2nd/3rd	0.09 – 0.31 (0.0035 – 0.0122)
1st/Reverse	0.09 – 0.31 (0.0035 – 0.0122)

# REASSEMBLY



## Reassembly steps

### 6th Synchronizer Assembly (for 6 speed type only)

1. 6th synchronizer assembly
2. Conical washer
3. Snap ring

### Counter Shaft Assembly

4. Counter shaft (for 6 speed type only)
5. Key (for 6 speed type only)
6. Counter shaft 5th gear (for 6 speed type only)
7. Key (for 6 speed type only)
8. Counter shaft drive gear (for 6 speed type only)
9. Snap ring (for 6 speed type only)
10. Counter shaft (for 5 speed type only)
11. Spring
12. Anti-lash plate
13. Conical washer
14. Snap ring

### Main Shaft Assembly

15. Main shaft
16. Needle bearing

17. 2nd gear
18. Block ring
19. 2nd/3rd synchronizer assembly
20. Block ring
21. Needle bearing
22. 3rd gear
23. Collar
24. Snap Ring
25. Needle bearing
26. 5th gear
27. Block ring
28. 4th/5th synchronizer assembly
29. Block ring
30. Snap ring
31. Needle bearing
32. 1st gear
33. Block Ring
34. 1st/reverse synchronizer assembly
35. Reverse gear
36. Needle bearing
37. Collar

### Top Gear Shaft Assembly

38. Top gear shaft
39. Ball bearing
40. Snap ring
41. Needle bearing



## Reassembly Step

### NOTE:

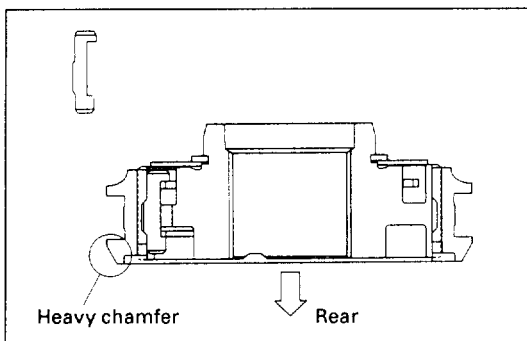
Clean each part thoroughly.

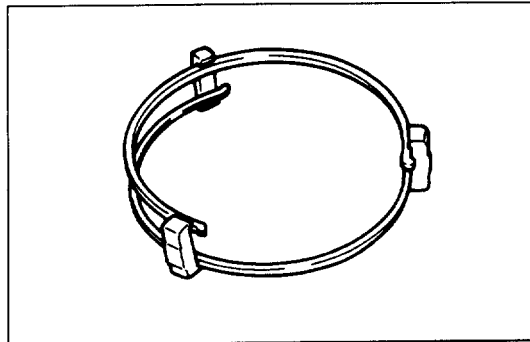
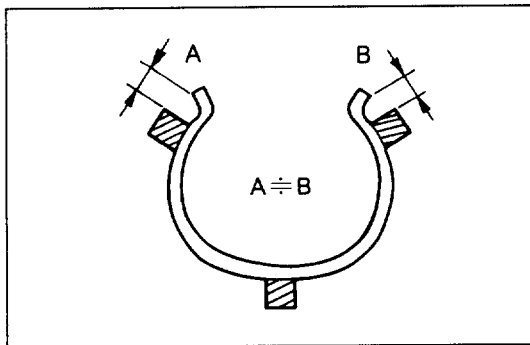
When assembling parts, apply clean engine oil (SAE 5W-30) to their sliding and mating sections.

### 6th Synchronizer Assembly (for 6 speed type only)

#### 1. 6th Synchronizer Assembly

- Mate the clutch hub and the sleeve so that the oil groove of the clutch hub boss end face and the heavy chamfered side of the sleeve outer circumference point to the same direction.
- Put the inserts into the clutch hub groove so that big end of the insert turns to the 6th gear, and install the insert spring.





- Assemble the insert springs so that the distances (A and B) between inserts and the opening of the spring can be nearly equal, and also this opening may not be the same direction on both side.

2. Conical Washer

3. Snap Ring

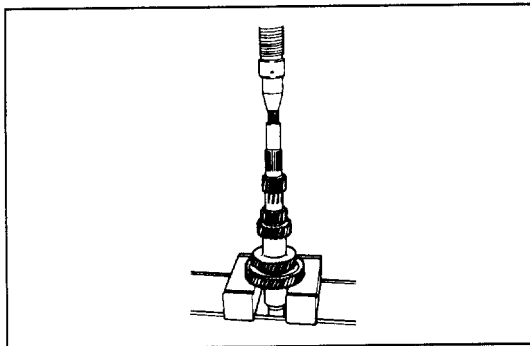
#### Counter Shaft Assembly

4. Counter Shaft (for 6 speed type only)

5. Key (for 6 speed type only)

6. Counter Shaft 5th Gear (for 6 speed type only)

- Align the key groove of the 5th gear with the key.
- Use a bench press to install the 5th gear.



7. Key (for 6 speed type only)

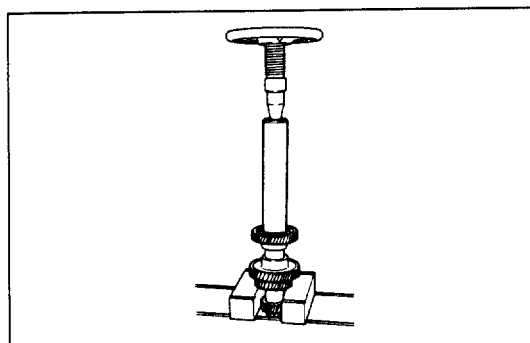
8. Counter Shaft Drive Gear (for 6 speed type only)

- Align the key groove of the counter shaft drive gear with the key.
- Use a bench press and the clutch hub & collar installer to install the counter shaft drive gear.

Clutch Hub & Collar Installer : 5-8840-2345-0

#### NOTE:

When replacing the pin with a new one, hammer it in until its height becomes 3 mm (0.12 in) from the gear end face.



**9. Snap Ring (for 6 speed type only)**

- Use a new snap ring to fix the counter drive gear.

**NOTE:**

- **Avoid the reuse of snap ring.**

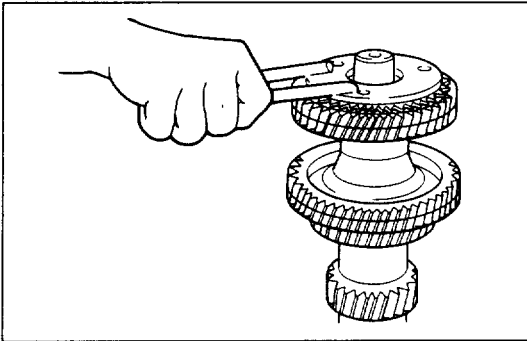
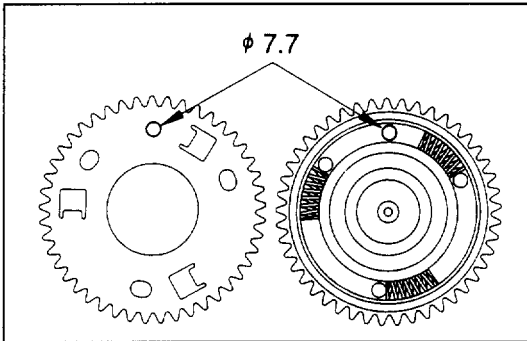
**10. Counter Shaft (for 5 speed type only)**

**11. Spring**

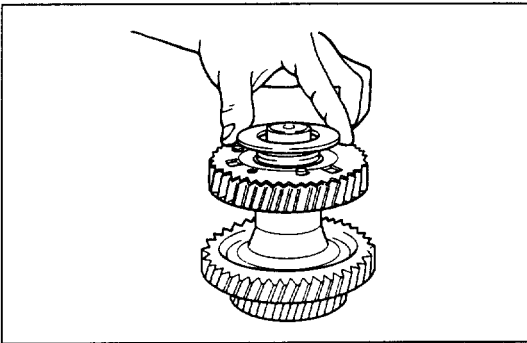
- The spring should be installed to the left of the inside counter drive gear pin.

**12. Anti-lash Plate**

- Assemble the anti-lash plate to the drive gear so that the drive gear hole ( $\phi 7.7$  mm/0.3 in) comes roughly in line with the hole of the anti-lash plate ( $\phi 7.7$  mm/0.3 in).

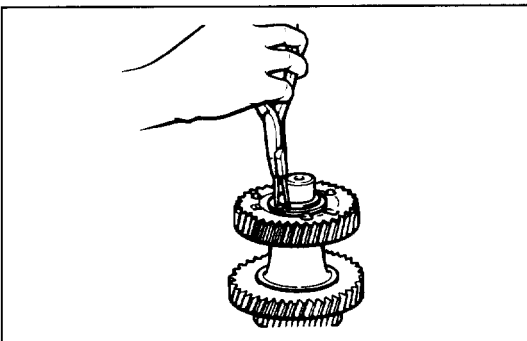


- With the guide pin aligned with the drive gear hole ( $\phi 7.7$  mm/0.3 in), set the installer to the guide pin.  
Anti-lash Plate Installer: 5-8840-2045-0
- Turn the installer clockwise. When the drive gear pin comes to the position where it can be seen fully, put the installer into the drive gear side to fix the anti-lash plate to the drive gear.



**13. Conical Washer**

- Install the conical washer above the anti-lash plate with the convex side (front side) up.



**14. Snap Ring**

- Use a new snap ring to fix the conical washer.

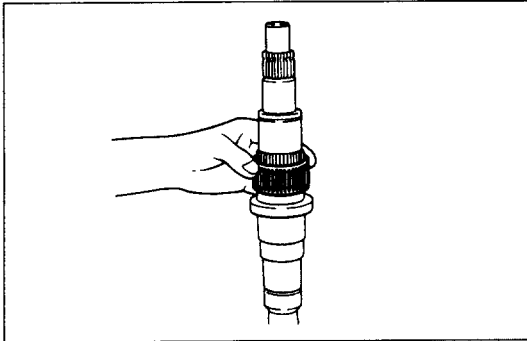
**NOTE:**

- **Avoid the reuse of snap ring.**
- **Check visually the anti-lash plate for a warp or curve after assembly.**

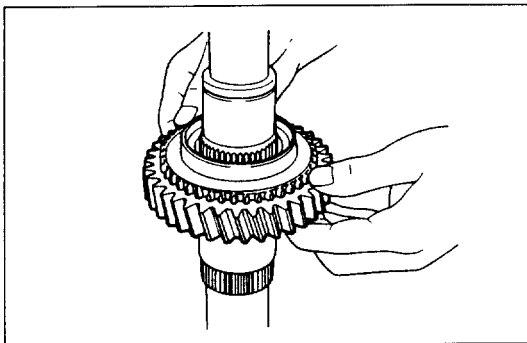
## Main Shaft Assembly

### 15. Main Shaft

- Attach a backing plate to the vise, secure the main shaft at the spline end.



### 16. Needle Bearing



### 17. 2nd Gear

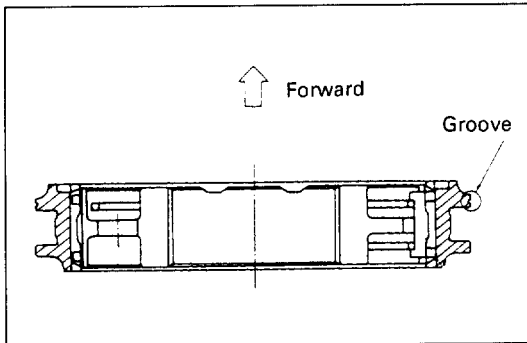


- Install the 2nd gear with its taper cone side upward (front of transmission).

### 18. Block Ring



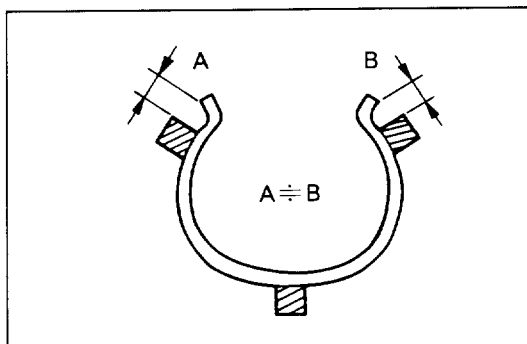
- Align the insert with the insert groove of the block ring.



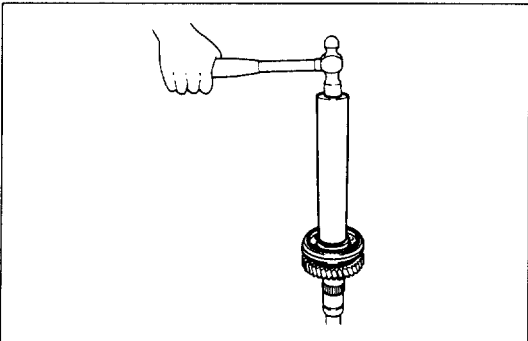
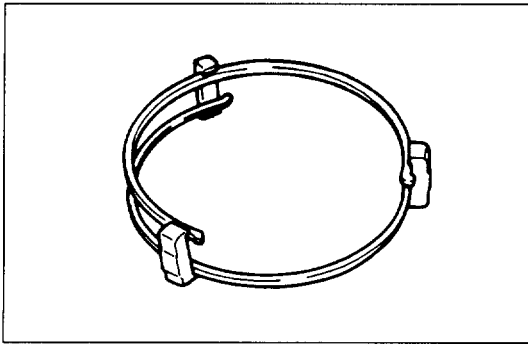
### 19. 2nd/3rd Synchronizer Assembly



- Mate the clutch hub and the sleeve so that the white painted side of the clutch hub boss and the identification groove of the sleeve outer circumference point to the same direction.



- Put the inserts into the clutch hub groove, and install the insert spring.
- Assemble the insert springs so that the distances (A and B) between inserts and the opening of the spring can be nearly equal, and also this opening may not be the same direction on both side.



- Grooved side of the sliding sleeve should be positioned toward the 3rd gear side (front of transmission).
- Align the insert with the insert groove of the block ring.
- Tap the clutch hub boss section with the clutch hub & collar installer and a hammer to press it in until it contacts closely with the main shaft stepped section.

Clutch Hub & Collar Installer : 5-8840-2345-0

- When it is difficult to engage the clutch hub boss with the main shaft spline, heat the clutch hub boss section to a temperature between 80 and 120 °C (176 and 248°F) with the piston heater before assembling.



- Check to see if the 2nd gear rotates smoothly.

## 20. Block Ring



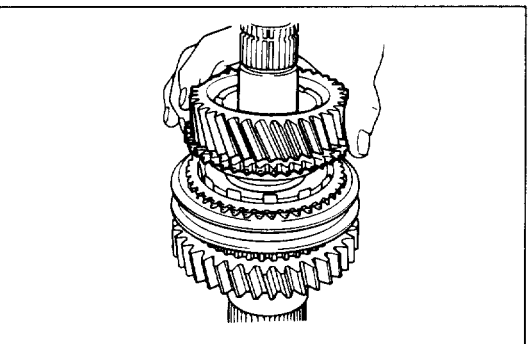
- Align the insert with the insert groove of the block ring.

## 21. Needle Bearing

## 22. 3rd Gear



- Install the 3rd gear with the taper cone side turned to the 2nd gear side (to the bottom).



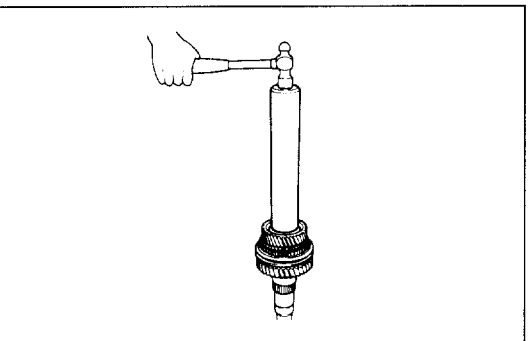
## 23. 3rd Gear Collar



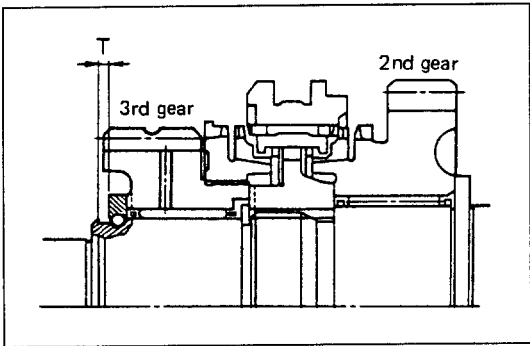
- Tap the collar with the clutch hub & collar installer and a hammer to press it in until it contacts closely with the main shaft stepped section.

Clutch Hub & Collar Installer : 5-8840-2345-0

- When it is difficult to engage the collar with the main shaft, heat the collar to a temperature between 80 and 120°C (176 and 248°F) with the piston heater before assembling.





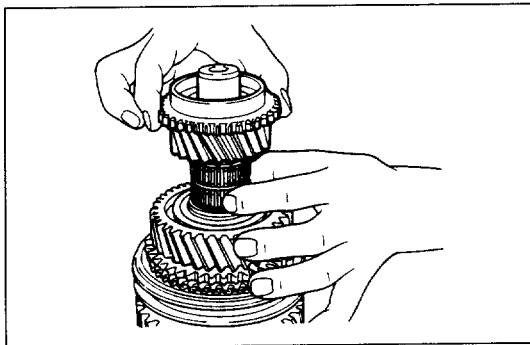


**24. Snap Ring**



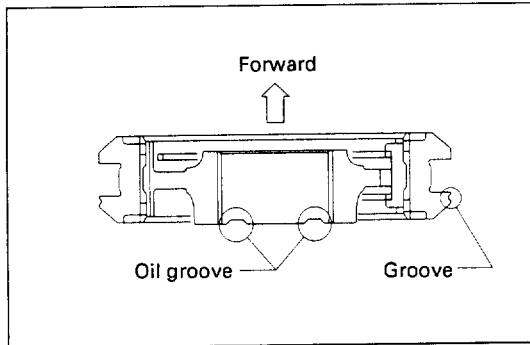
- After installation, measure distance (T) and select the optimum snap ring from the table.

Snap Ring		mm (in)
Distance (T)	Color	Thickness (Reference)
2.20 – 2.27 (0.087 – 0.089)	Yellow	1.85 – 1.90 (0.073 – 0.075)
2.27 – 2.32 (0.089 – 0.091)	Blue	1.90 – 1.95 (0.075 – 0.077)
2.32 – 2.37 (0.091 – 0.093)	Brown	1.95 – 2.00 (0.077 – 0.079)
2.37 – 2.43 (0.093 – 0.096)	Green	2.00 – 2.05 (0.079 – 0.081)



**25. Needle Bearing**

**26. 5th Gear**

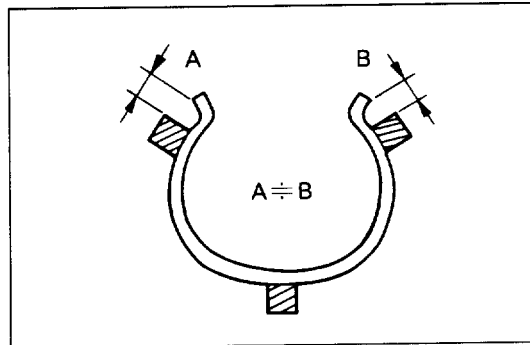


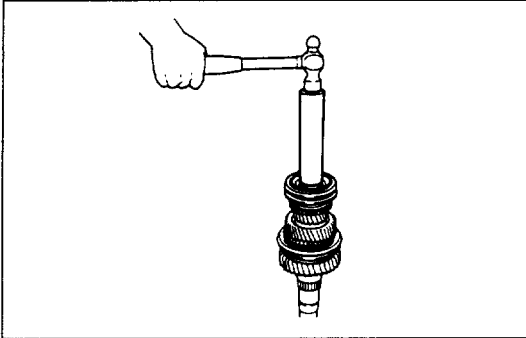
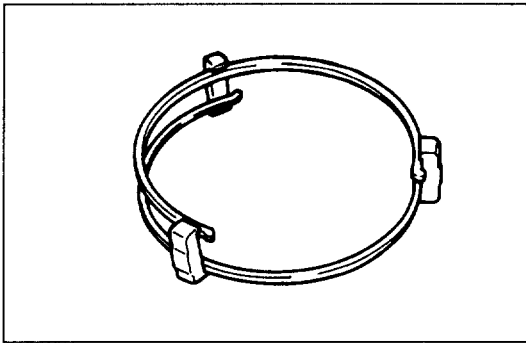
**27. Block Ring**

**28. 4th/5th Synchronizer Assembly**



- Mate the clutch hub and the sleeve so that the larger diameter side of the clutch hub boss and the identification groove of the sleeve outer circumference point to the same direction.
- Put the inserts into the clutch hub groove, and install the insert spring.
- Assemble the insert springs so that the distances (A and B) between inserts and the opening of the spring can be nearly equal, and also this opening may not be the same direction on both side.





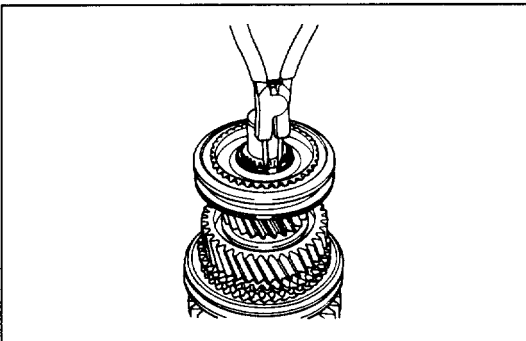
- Grooved face of the sliding sleeve should be positioned toward the 5th gear (rear of transmission).
- Align the insert with the insert groove of the block ring.
- Tap the clutch hub boss section with the bearing installer and a hammer to press it in until it contacts closely with the main shaft stepped section.

Bearing Installer : 5-8840-2244-0

- When it is difficult to engage the clutch hub boss with the main shaft spline, heat the clutch hub boss section to a temperature between 80 and 120 °C (176 and 248°F) with the piston heater before assembling.



- Check to see if the 5th gear rotates smoothly.



## 29. Block Ring

## 30. Snap Ring

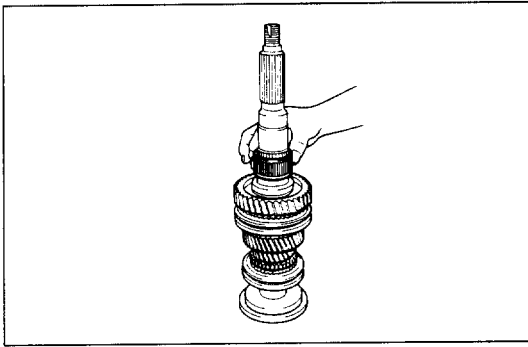


- Install the built-in snap ring and measure the clearance between the snap ring and the clutch hub.

Clutch Hub and Snap Ring Clearance	mm (in)
0 – 0.09 (0 – 0.0035)	

- When the clearance is out of the reference value, select a snap ring with the maximum thickness that can be inserted from among the following three types, and built it in.

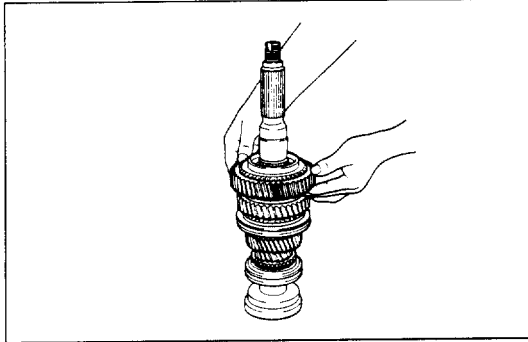
Snap Ring		mm (in)
color	Thickness (Reference)	
Pink	1.75 – 1.80 (0.0689 – 0.0709)	
White	1.80 – 1.85 (0.0709 – 0.0728)	
Yellow	1.85 – 1.90 (0.0728 – 0.0748)	



### 31. Needle Bearing



- Stand the main shaft on the main shaft holder.  
Main Shaft Holder : 5-8840-2347-0

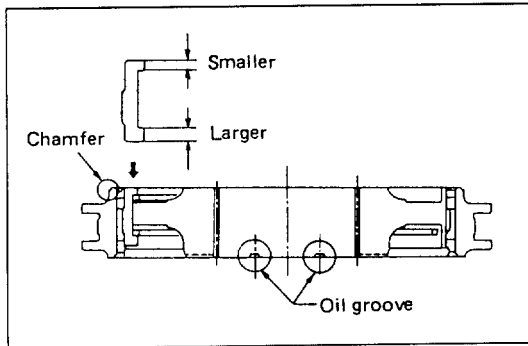


### 32. 1st Gear



- Install with the taper cone side turned upward (rear of transmission).

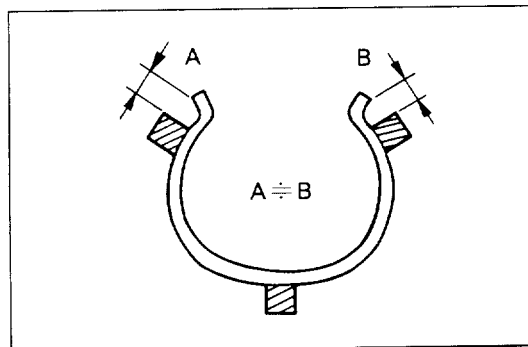
### 33. Block Ring



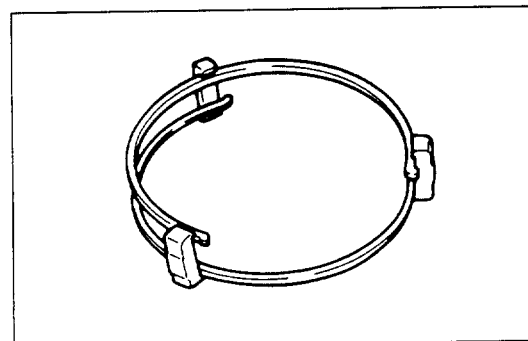
### 34. 1st/Reverse Synchronizer Assembly

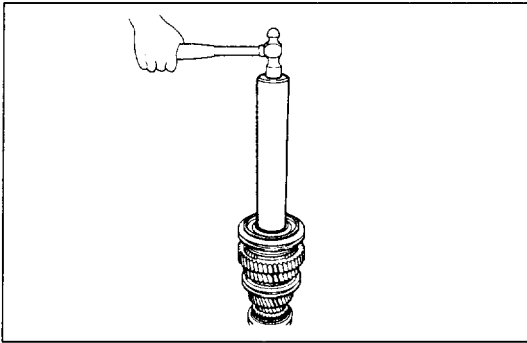


- Mate the clutch hub and the sleeve so that the oil groove of the clutch hub boss end face points to the direction opposite to that of the chamfer of the sleeve outer circumference.
- Larger width side of insert should be positioned toward front of transmission.



- Put the inserts into the clutch hub groove, and install the insert spring.
- Assemble the insert springs so that the distances (A and B) between inserts and the opening of the spring can be nearly equal, and also this opening may not be the same direction on both side.





- Face of the clutch hub with two-oil grooves should be positioned toward 1st gear (front of transmission).
- Align the insert with the insert groove of the block ring.
- Tap the clutch hub boss section with the clutch hub & collar installer and a hammer to press it in until it contacts closely with the main shaft stepped section.

Clutch Hub & Collar Installer : 5-8840-2345-0

- When it is difficult to engage the clutch hub boss with the main shaft spline, heat the clutch hub boss section to a temperature between 80 and 120 °C (176 and 248°F) with the piston heater before assembling.
- Check to see if the 1st gear rotates smoothly.

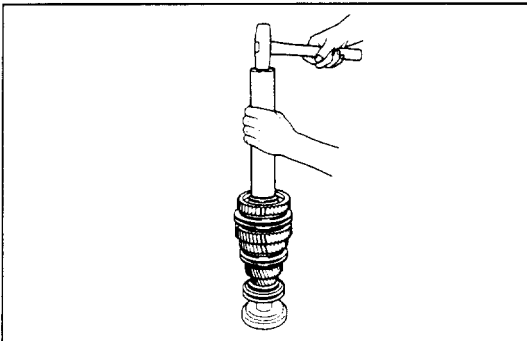
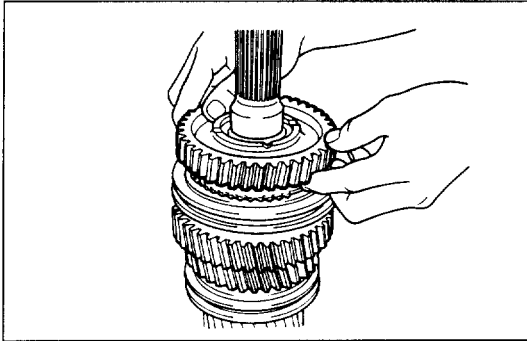


### 35. Reverse Gear



- Install with the dog gear side turned down (rear of transmission).

### 36. Needle Bearing



### 37. Collar



- Tap the collar with the clutch hub & collar installer and a hammer to press it in until it contacts closely with the main shaft stepped section.
- Clutch Hub & Collar Installer : 5-8840-2345-0
- When it is difficult to engage the clutch hub boss with the main shaft spline, heat the clutch hub boss section to a temperature between 80 and 120 °C (176 and 248°F) with the piston heater before assembling.

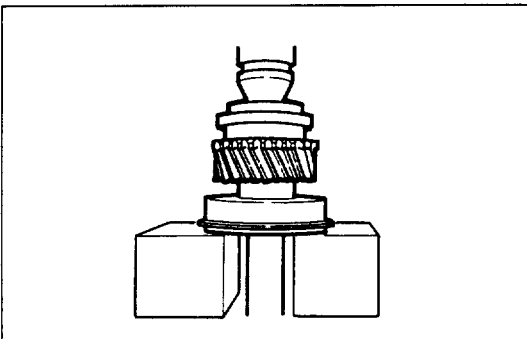
## Top Gear Shaft Assembly

### 38. Top Gear Shaft

### 39. Ball bearing



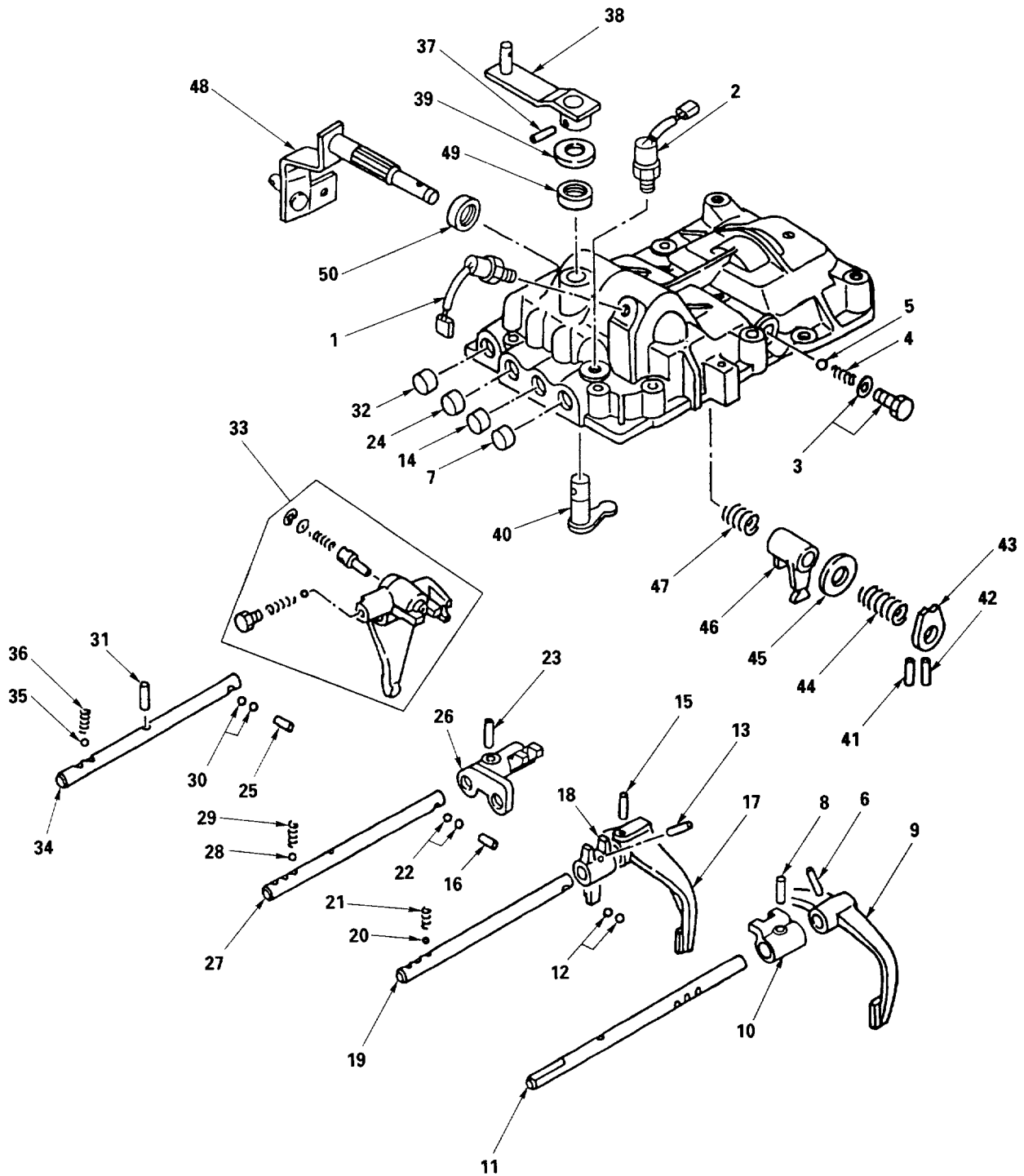
- Install the ball bearing to the top gear shaft so that the outer circumference snap ring side turns to the front side.
- Use a bench press to install the ball bearing until it contacts closely with the top gear shaft stepped section.



### 40. Snap Ring

### 41. Needle Bearing

## CONTROL BOX DISASSEMBLY

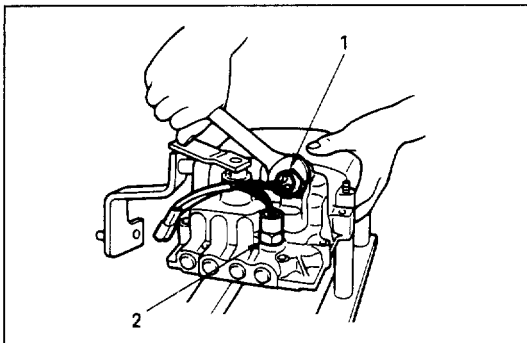


## Disassembly Steps

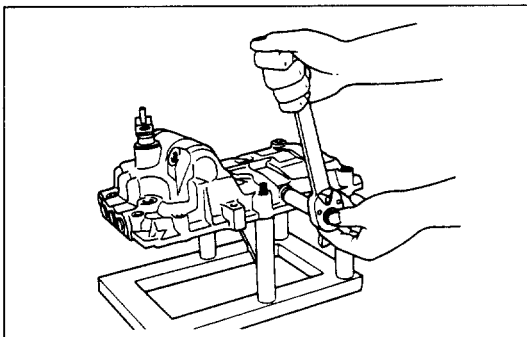
1. Neutral switch
2. Back-up light switch
3. Plug and gasket
4. Detent spring
5. Detent ball
6. Spring pin
7. Shift rod cap
8. Spring pin
9. 1st/reverse shift arm
10. 1st/reverse shift block
11. 1st/reverse shift rod
12. Interlock ball
13. Spring pin
14. Shift rod cap
15. Spring pin
16. Interlock pin
17. 2nd/3rd shift arm
18. 2nd/3rd shift block
19. 2nd/3rd shift rod
20. Detent ball
21. Detent spring
22. Interlock ball
23. Spring pin
24. Shift rod cap
25. Interlock pin
26. Shift block
27. 4th/5th shift rod
28. Detent ball
29. Detent spring
30. Interlock ball
31. Spring pin (for 6 speed type only)
32. Shift rod cap (for 6 speed type only)
33. Shift block assembly (for 6 speed type only)
34. Shift rod (for 6 speed type only)
35. Detent ball (for 6 speed type only)
36. Detent spring (for 6 speed type only)
38. Spring pin
38. Select external lever
39. Washer
40. Select internal lever
41. Spring pin
42. Spring pin
43. Stopper ring
44. Spring (long)
45. Washer
46. Shift internal lever
47. Spring (short)(for 5 speed type only)
48. Shift lever shaft
49. Select lever shaft oil seal
50. Shift lever shaft oil seal



## Disassembly Steps



1. Neutral Switch
2. Back-up Light Switch

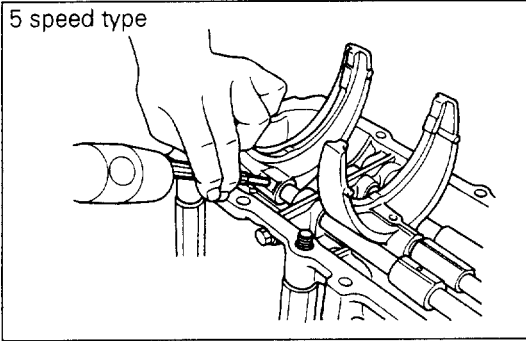


3. Plug and Gasket
4. Detent Spring
5. Detent Ball

### NOTE:

Be careful not to lose the detent ball and spring.

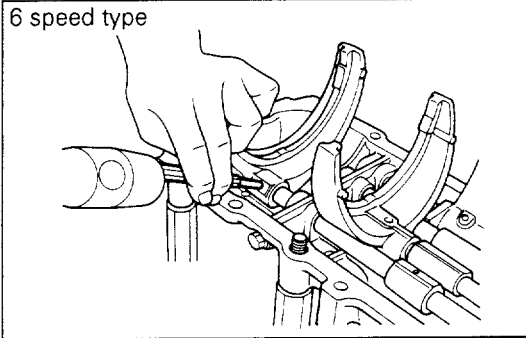
5 speed type



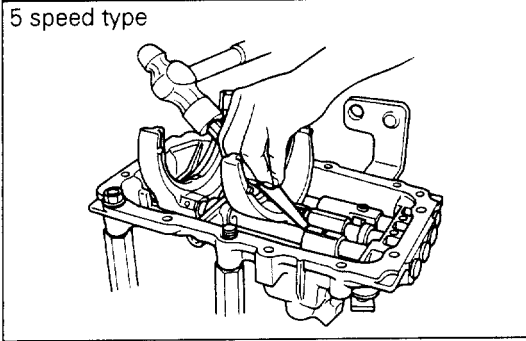
## 6. Spring Pin

Spring Pin Remover : 9-8529-2201-0

6 speed type



5 speed type



## 7. Shift Rod Cap

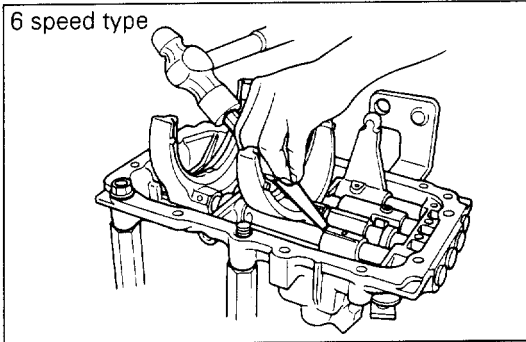
- Move the shift rod forward by tapping on shift block rear end with brass bar and hammer.



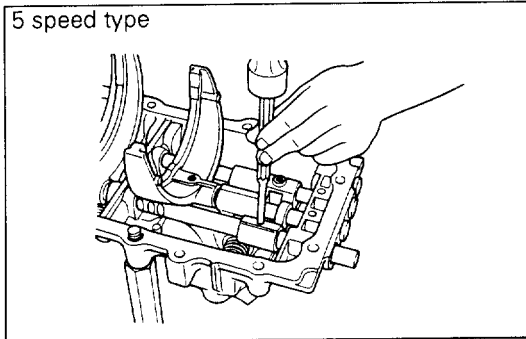
### CAUTION:

Before removal, set all shift rods in neutral position.

6 speed type



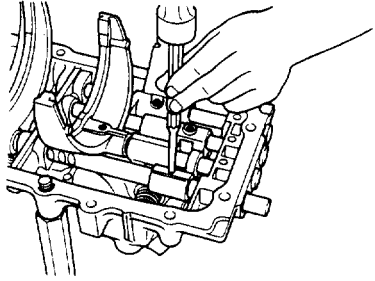
5 speed type



## 8. Spring Pin

Spring Pin Remover : 9-8529-2201-0

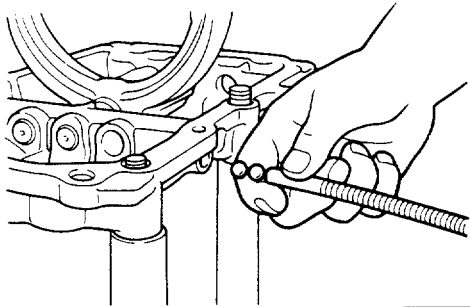
6 speed type



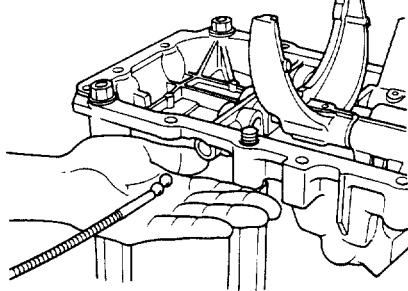
- 9. 1st/Reverse Shift Arm**
- 10. 1st/Reverse Shift Block**
- 11. 1st/Reverse Shift Rod**
- 12. Interlock Ball**

- Take out the two interlock balls from between the 1st/reverse shift rod and the 2nd/3rd shift rod.

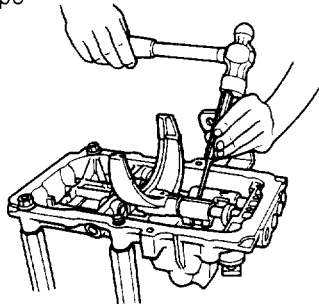
5 speed type



6 speed type



5 speed type



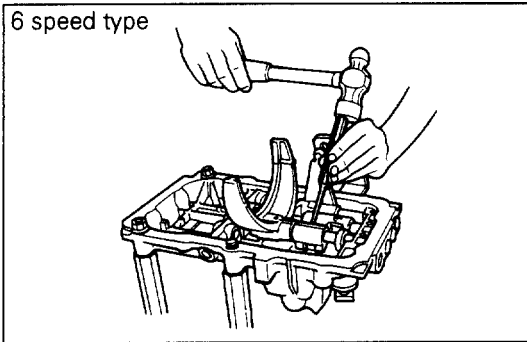
### 13. Spring Pin



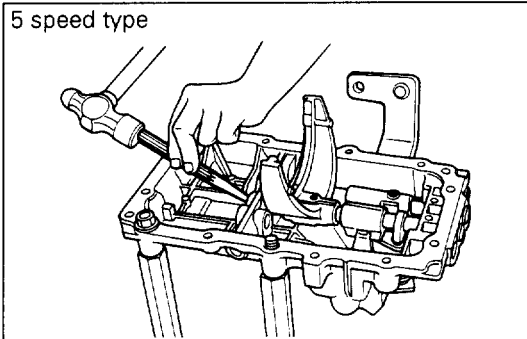
Spring Pin Remover : 9-8529-2201-0



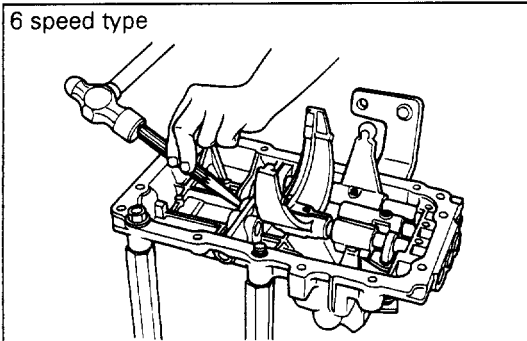
6 speed type



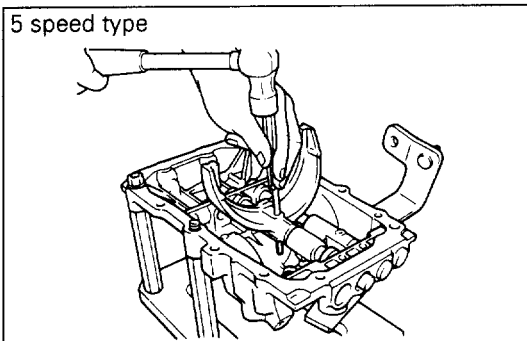
5 speed type



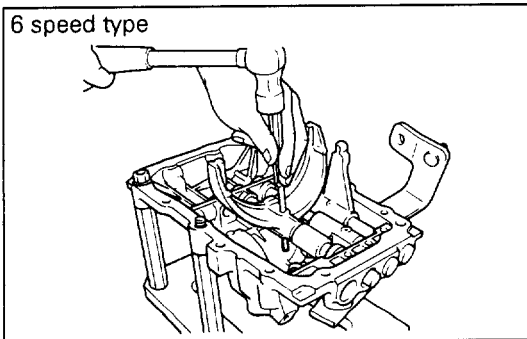
6 speed type



5 speed type



6 speed type



#### 14. Shift Rod Cap

- Move the shift rod forward by tapping on its rear end. Then, remove the cap.



#### CAUTION:

Take care not to damage the shift rod hole of the control box when tapping the shift rod.

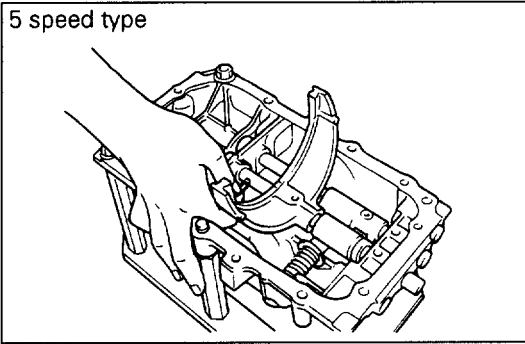
#### 15. Spring Pin



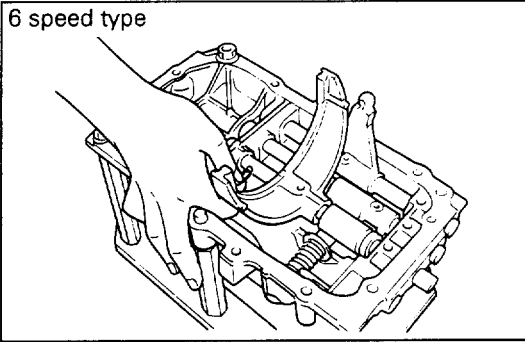
- Move the shift rod forward (about 20 mm) by tapping on its rear end. Then, remove the spring pin using the spring pin remover.

Spring Pin Remover : 9-8529-2201-0

5 speed type



6 speed type



## 16. Interlock Pin

## 17. 2nd/3rd Shift Arm

## 18. 2nd/3rd Shift Block

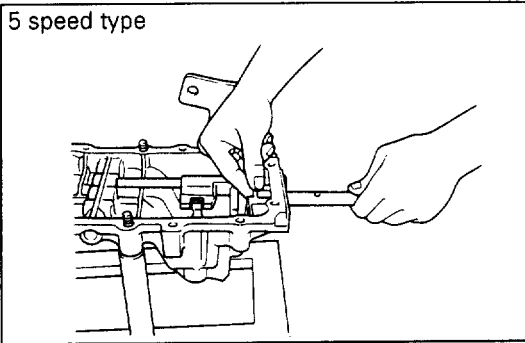
- Move the shift rod forward by tapping on its rear end. Then, remove the each parts.



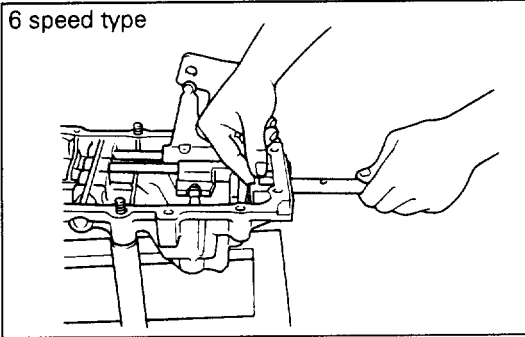
## CAUTION:

Take care not to damage the shift rod hole of the control box when tapping the shift rod.

5 speed type

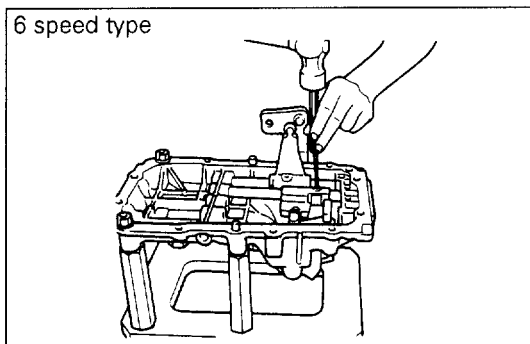
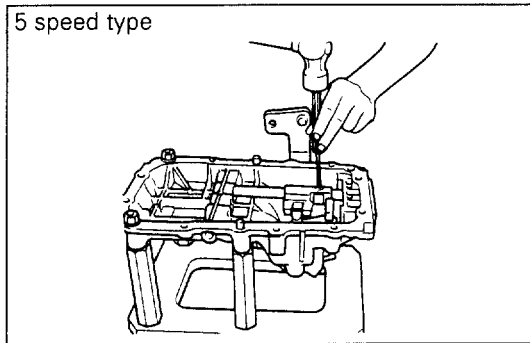


6 speed type



## 19. 2nd/3rd Shift Rod

- Close the shift rod hole of the control box with finger to avoid losing the detent ball when removing the shift rod.



**20. Detent Ball**

**21. Detent Spring**

- Take out the detent ball and spring from the control box.

**22. Interlock Ball**

- Take out the two interlock balls from between the 2nd/3rd shift rod and 4th/5th shift rod.

**23. Spring Pin**

Spring Pin Remover: 9-8529-2201-0



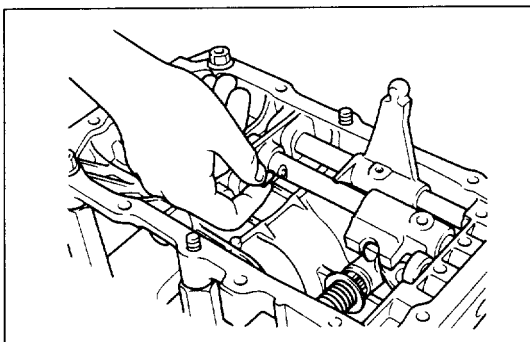
**24. Shift Rod Cap**

- Move the shift rod forward by tapping on its rear end. Then, remove the cap.



**CAUTION:**

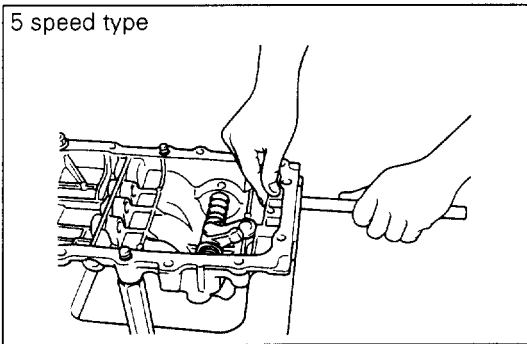
Take care not to damage the shift rod hole of the control box when tapping the shift rod.



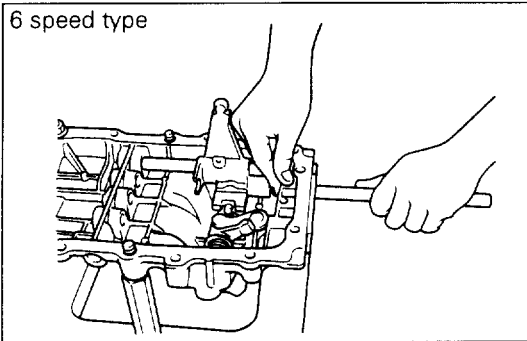
**25. Interlock Pin (for 6 speed type only)**

**26. Shift Block**

5 speed type



6 speed type



## 27. 4th/5th Shift Rod

- Close the shift rod hole of the control box with finger to avoid losing the detent ball when removing the shift rod.

## 28. Detent Ball

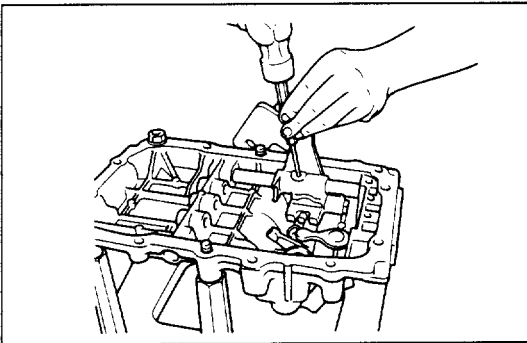
## 29. Detent Spring

## 30. Interlock Ball

- Take out the two interlock balls from between the 4th/5th shift rod and 6th shift rod.

## 31. Spring Pin (for 6 speed type only)

Spring Pin Remover : 9-8529-2201-0



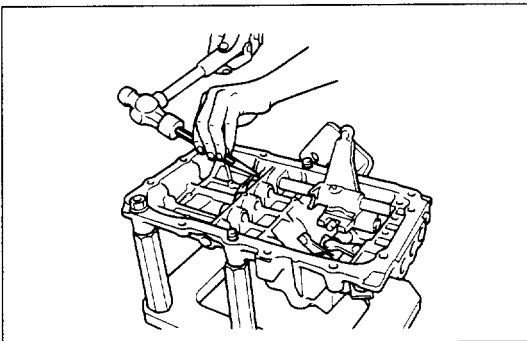
## 32. Shift Rod Cap (for 6 speed type only)

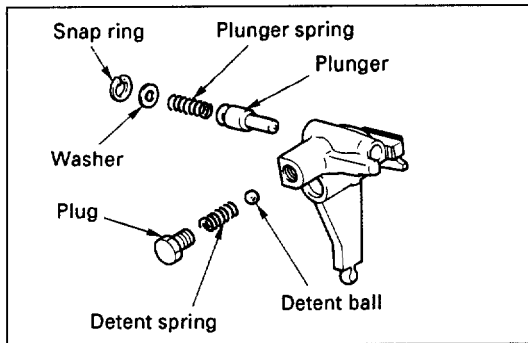
- Move the shift rod forward by tapping on its rear end. Then, remove the cap and the shift block assembly.



## CAUTION:

Take care not to damage the shift rod hole of the control box when tapping the shift rod.





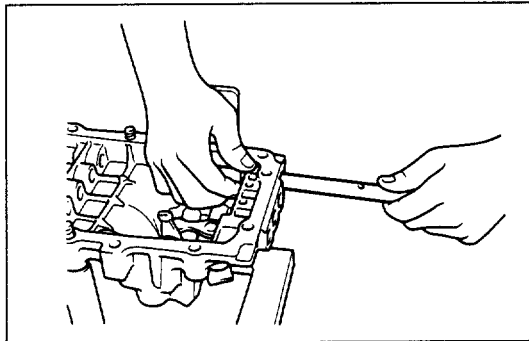
### 33. Shift Block Assembly (for 6 speed type only)



#### CAUTION:

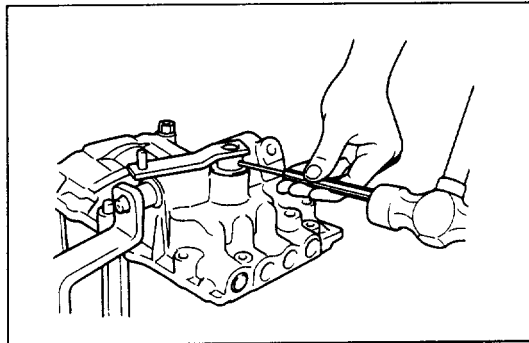
Shift Block Assembly contains the springs under tension. Take care to spring the parts when disassembling the shift block assembly.

- Remove the plug. Then, take out the detent spring and the detent ball.
- Remove the snap ring. Then, take out the washer, the plunger spring and the plunger.



### 34. Shift Rod (for 6 speed type only)

- Close the shift rod hole of the control box with finger to avoid spring the detent ball when removing the shift rod.



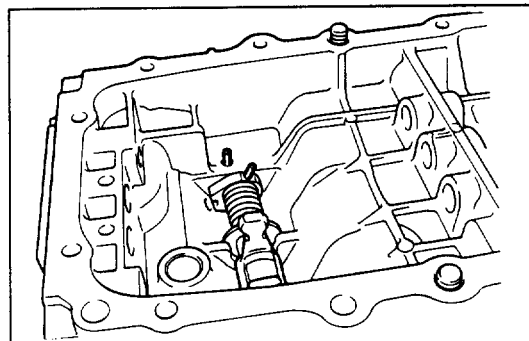
### 35. Detent Ball (for 6 speed type only)

### 36. Detent Spring (for 6 speed type only)

### 37. Spring Pin



Spring Pin Remover : 9-8529-2201-0



### 38. Select External Lever

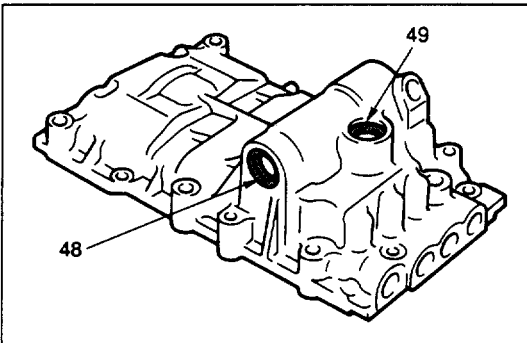
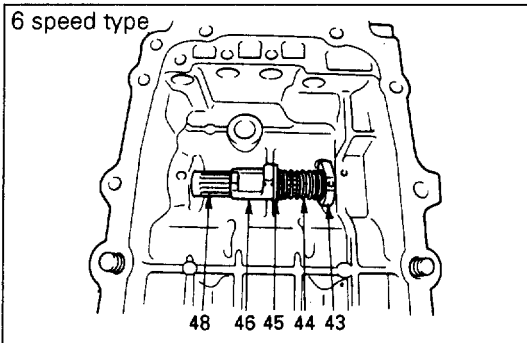
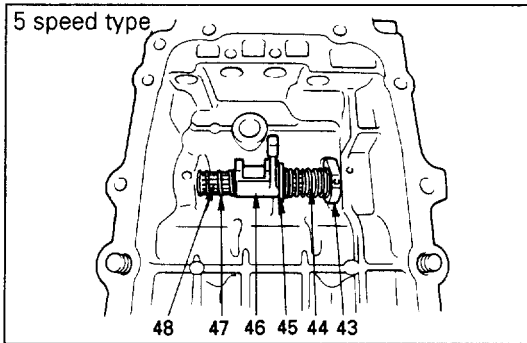
### 39. Washer

### 40. Select Internal Lever

### 41. Spring Pin

### 42. Spring Pin

- Pull out the spring pin with a pair of pliers.



**43. Stopper Ring**

- With pull out the shift lever shaft, remove the each parts.

**44. Spring**

**45. Washer**

**46. Shift Internal Lever**

**47. Spring (for 5 speed type only)**

**48. Shift Lever Shaft**

**49. Select Lever Shaft Oil Seal**

**50. Shift Lever Shaft Oil Seal**

- Use the screwdriver to remove the oil seal from the control box.



**CAUTION:**

Take care not to damage the sealing seat of the control box.

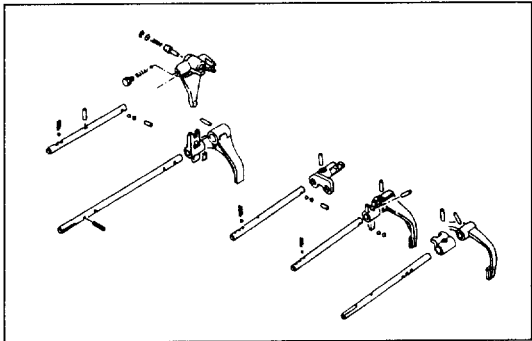
# INSPECTION AND REPAIR

Make the necessary adjustments, repairs, and part replacement if excessive wear or damage is discovered during inspection.

**Visual Check**



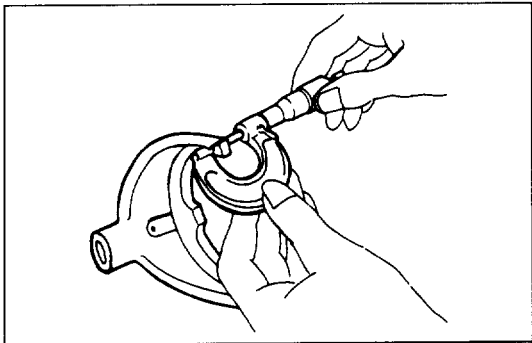
Inspect all disassembled parts for wear, damage or other abnormal conditions.



**Shift Rod**



Check the shift rod wear, bent and damage.



**Shift Arm**



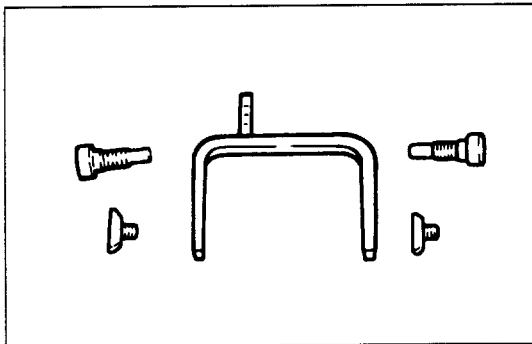
Inspect the shift arms for wear, distortion or scoring. Replace it these conditions are present.

**Shift Arm Thickness**



Use a micrometer to measure the shift arm and shift pieces thickness.

If the measured value is less than the specified limit, the shift arm must be replaced.

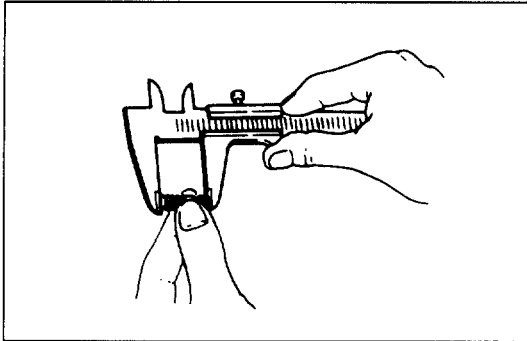


Shift Arm Thickness		mm (in)
Nominal		Limit
10.0 (0.394)		9.0 (0.354)

### Detent Spring



Inspect the detent springs for wear, distortion or cracks. Replace detent spring if these conditions are present.

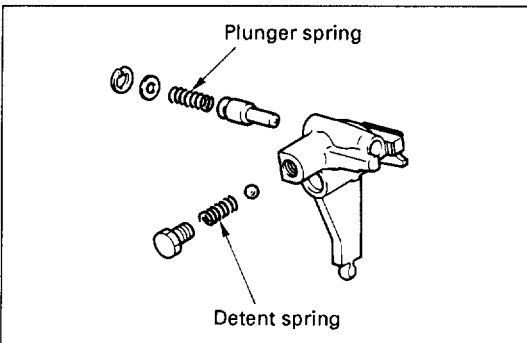


### Detent Spring Free Length



Use a vernier caliper to measure the detent spring free length. If the measured value is less than the specified limit, the detent spring must be replaced.

Free Length of Detent Spring		mm (in)
Nominal		Limit
31.6 (1.244)		30.1 (1.185)



### Plunger Spring and Detent Spring Free Length (for 6 speed only)



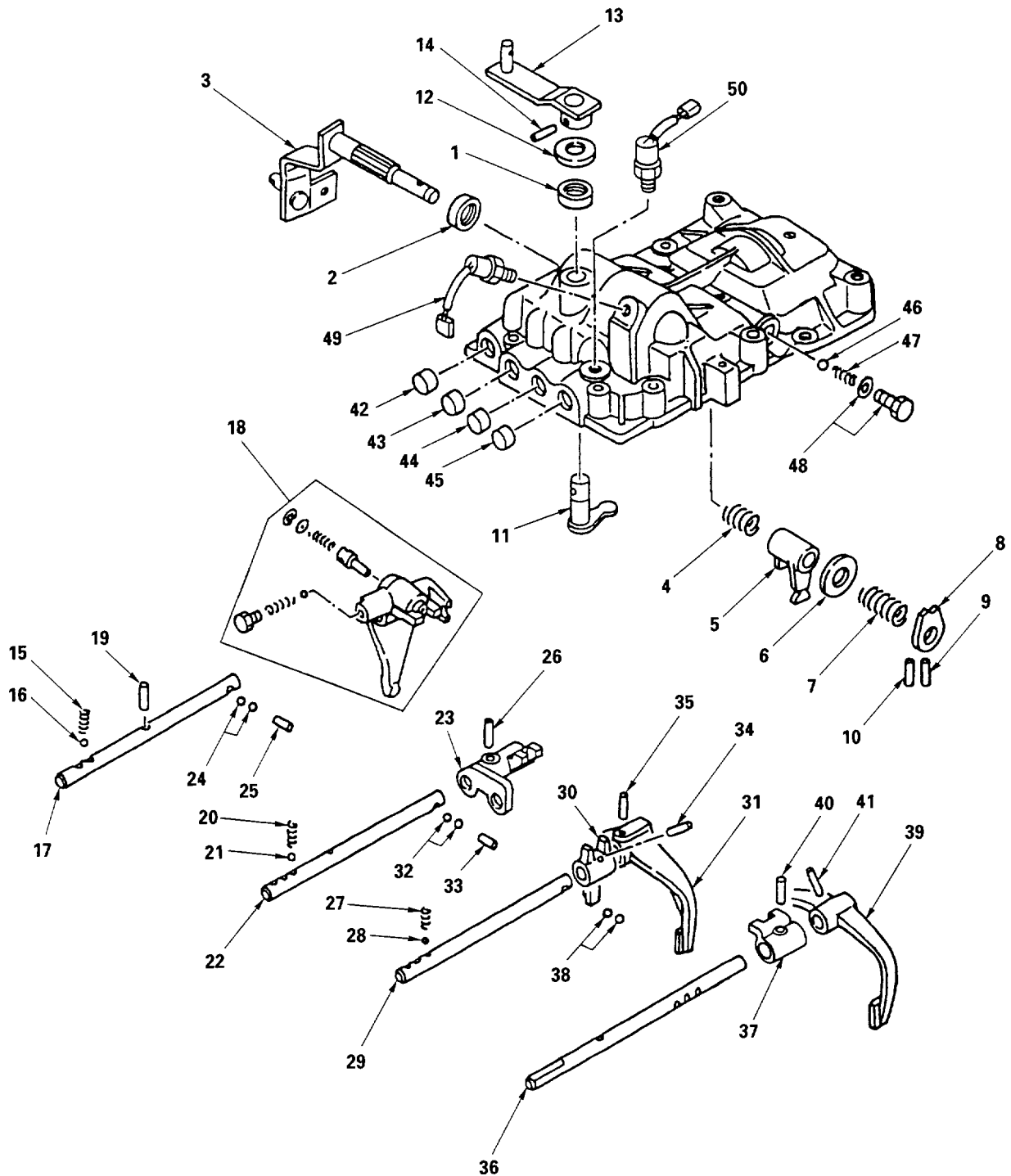
Use a vernier caliper to measure the detent spring free length. If the measured value is less than the specified limit, the detent spring must be replaced.

Free Length of Plunger Spring		mm (in)
Nominal		Limit
35.1 (1.382)		34.0 (1.339)

Free Length of Detent Spring		mm (in)
Nominal		Limit
24.2 (0.953)		23.0 (0.906)



# REASSEMBLY



## Reassembly Step

- |   |   |
|---|---|
| 1. Select lever shaft oil seal              | 24. Interlock ball                            |
| 2. Shift lever shaft oil seal               | 25. Interlock pin                             |
| 3. Shift lever shaft                        | 26. Spring pin                                |
| 4. Spring (Short)(for 5 speed type only)    | 27. Detent spring                             |
| 5. Shift internal lever                     | 28. Detent ball                               |
| 6. Washer                                   | 29. 2nd/3rd shift rod                         |
| 7. Spring (Long)                            | 30. 2nd/3rd shift block                       |
| 8. Stopper ring                             | 31. 2nd/3rd shift arm                         |
| 9. Spring pin                               | 32. Interlock ball                            |
| 10. Spring pin                              | 33. Interlock pin                             |
| 11. Select internal lever                   | 34. Spring pin                                |
| 12. Washer                                  | 35. Spring pin                                |
| 13. Select external lever                   | 36. 1st/reverse shift rod                     |
| 14. Spring pin                              | 37. 1st/reverse shift block                   |
| 15. Detent spring (for 6 speed type only)   | 38. Interlock ball                            |
| 16. Detent ball (for 6 speed type only)     | 39. 1st/reverse shift arm                     |
| 17. 6th shift rod (for 6 speed type only)   | 40. Spring pin                                |
| 18. 6th Shift Block (for 6 speed type only) | 41. Spring pin                                |
| 19. Spring pin                              | 42. 6th shift rod cap (for 6 speed type only) |
| 20. Detent Spring                           | 43. 4th/5th shift rod cap                     |
| 21. Detent Ball                             | 44. 2nd/3rd shift rod cap                     |
| 22. 4th/5th Shift Rod                       | 45. 1st/reverse shift rod cap                 |
| 23. 4th/5th Shift Block                     | 46. Detent ball                               |
|   | 47. Detent spring                             |
|   | 48. Plug and gasket                           |
|   | 49. Neutral switch                            |
|   | 50. Back-up light switch                      |



## Reassembly Step

### NOTE:

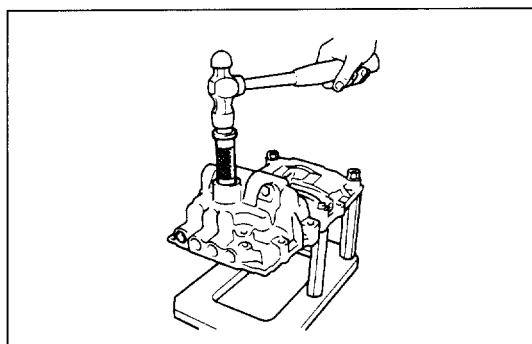
Clean each part thoroughly.

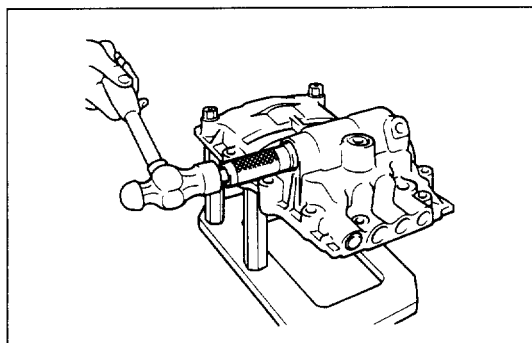
When assembling parts, apply clean engine oil (SAE 5W-30) to their sliding and mating section.

#### 1. Select Lever Shaft Oil Seal

- Apply engine oil to the new oil seal outer circumference and apply multi-purpose grease on the oil seal lip.
- Use oil seal installer to install the oil seal to the control box.

Oil Seal Installer: 5-8840-2245-0

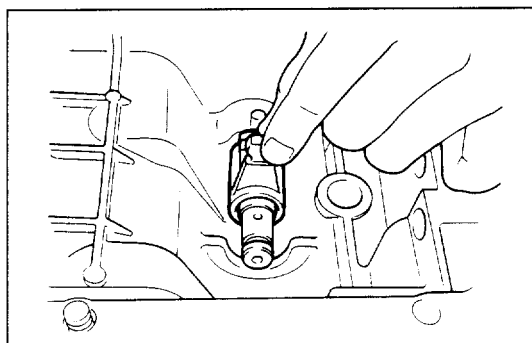




## 2. Shift Lever Shaft Oil Seal

- Apply engine oil to the new oil seal outer circumference and apply multi-purpose grease on the oil seal lip.
- Use oil seal installer to install the oil seal to the control box.

Oil Seal Installer: 5-8840-2245-0



## 3. Shift Lever Shaft

- Apply engine oil to the shift lever shaft.

## 4. Spring (short)(for 5 speed type only)

## 5. Shift Internal Lever



- With the shift external lever turned down (to the transmission side), insert it into the control box.
- Assemble the shift internal lever so that its direction points to the same direction as that of the stopper ring fixing pin hole.



## 6. Washer

## 7. Spring (long)

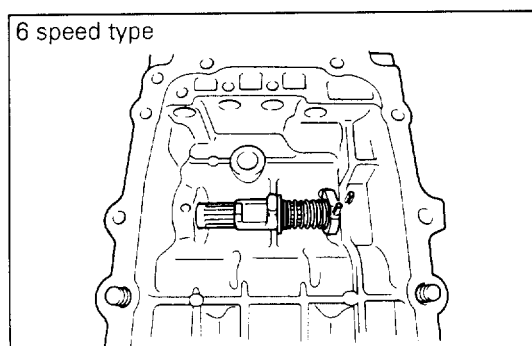
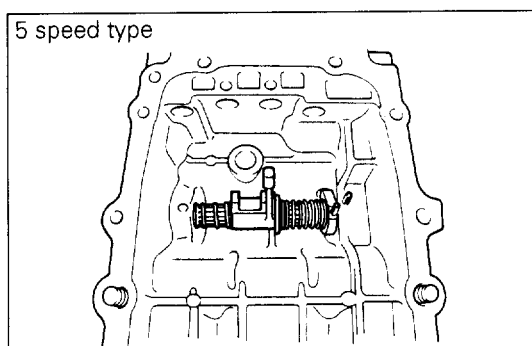
## 8. Stopper Ring

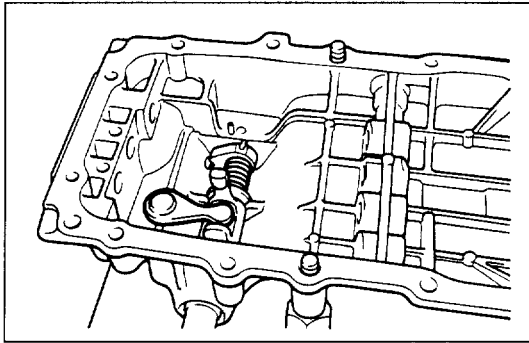
## 9. Spring Pin

- With the stopper ring pin hole set on that of the shift lever shaft, hammer a new spring pin into the holes.

## 10. Spring Pin

- Setting the control box pin hole to the shift lever shaft groove, hammer a new spring pin into the hole.





#### 11. Select Internal Lever



- Apply engine oil to the select internal lever shaft.
- With the select internal lever paired with the shift internal lever, build them into the control box.

#### 12. Washer

#### 13. Select External Lever

#### 14. Spring Pin

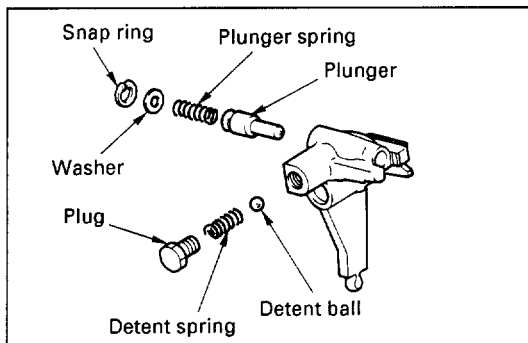
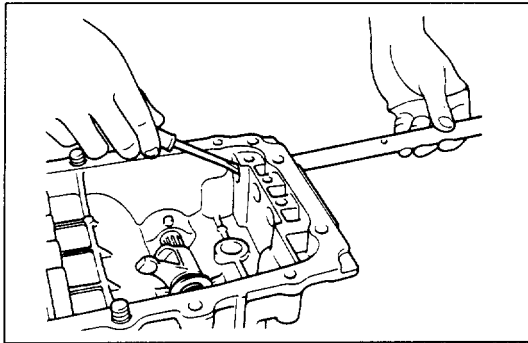
- With the select external lever turned to the shift external lever side, fix it with a new pin after assembling.

#### 15. Detent Spring (for 6 speed type only)

#### 16. Detent Ball (for 6 speed type only)

#### 17. 6th Shift Rod (for 6 speed type only)

- Press down the detent ball with a screwdriver to prevent it from jumping out.

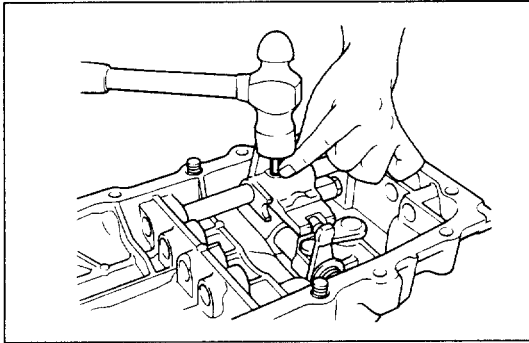


#### 18. 6th Shift Block (for 6 speed type only)



- Install plunger, plunger spring, plate and snap ring into the shift block.
- Remove sealant from the plug and the female threaded surfaces and the surfaces must be perfectly dry.
- Apply liquid gasket (LOCTITE 242 or equivalent) to the bolt's threaded area.
- Install detent ball and detent spring into the shift block. Then, tighten plug to the specified torque.

Plug Torque	N·m (kg·m/lb·ft)
13 (1.3/9.4)	

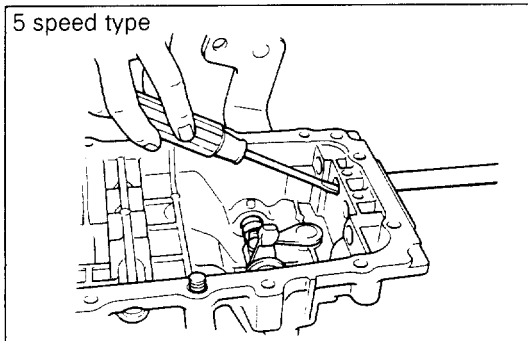


**19. Spring Pin (for 6 speed type only)**

- Setting the hole of the 6th shift block to that of the shift rod, fix them with a new spring pin (25 mm/0.98 in).

**NOTE:**

**Install spring pin properly with the slit inline with the shaft centerline.**

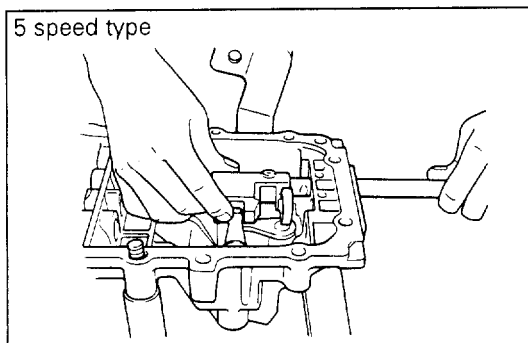
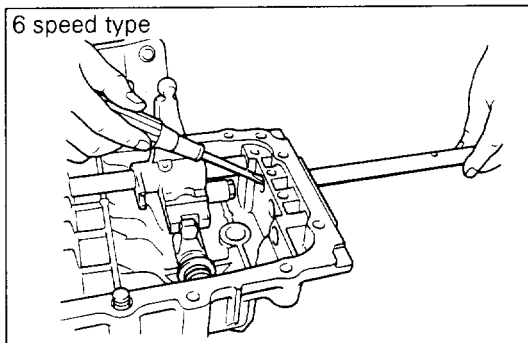


**20. Detent Spring**

**21. Detent Ball**

**22. 4th/5th Shift Rod**

- Press down the detent ball with a screwdriver to prevent it from jumping out.

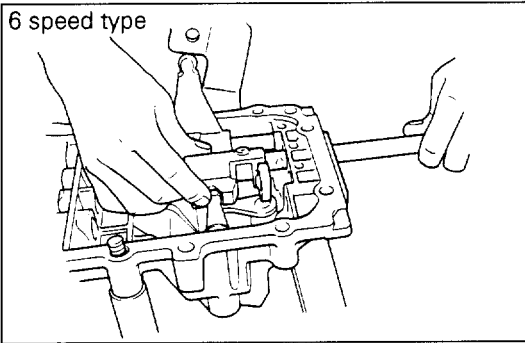


**23. 4th/5th Shift Block**



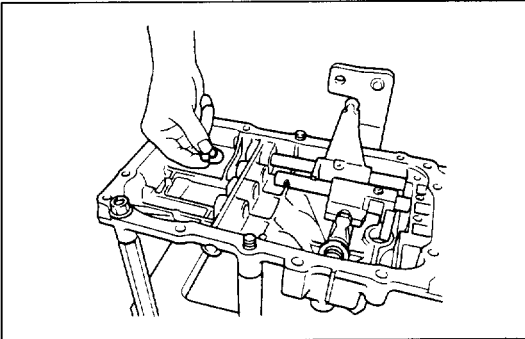
- With the spectacle detent side turned to the front, put the shift block through the rod.

6 speed type



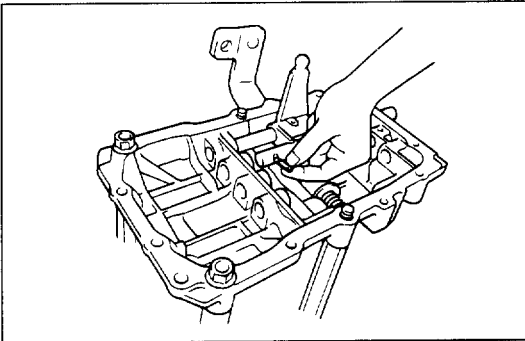
**24. Interlock Ball (for 6 speed type only)**

- Install 2 interlock balls in position between the 4th/5th shift rod and 6th shift rod.

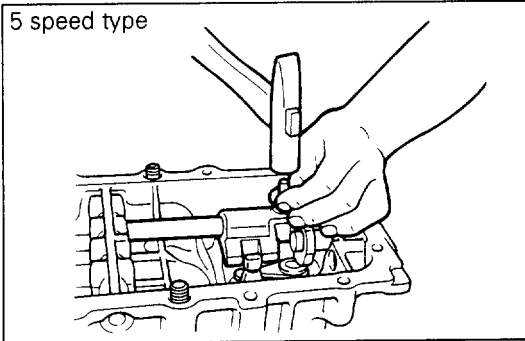


**25. Interlock Pin (for 6 speed type only)**

- Install the interlock pin in position the pin hole of 4th/5th shift rod.



5 speed type



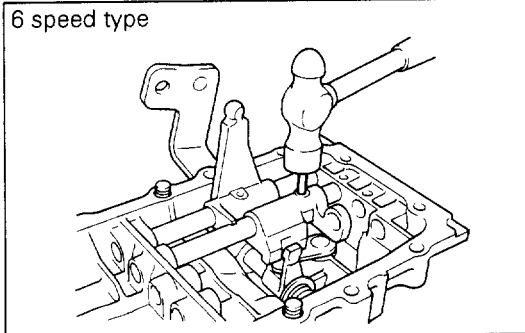
**26. Spring Pin**

- Setting the hole of the 4th/5th shift block shift arm to that of the shift rod, fix them with a new spring pin (25 mm/0.98 in).

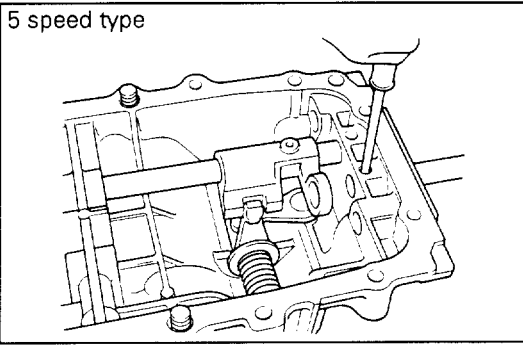
**NOTE:**

Install spring pin properly with the slit inline with the shaft centerline.

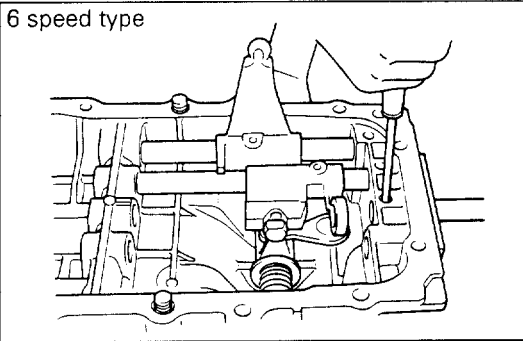
6 speed type



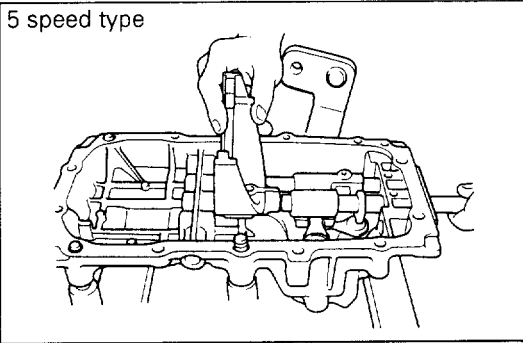
5 speed type



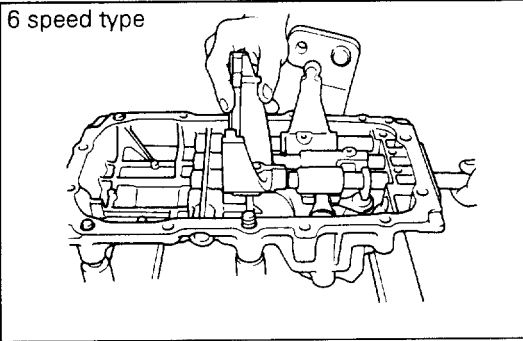
6 speed type



5 speed type



6 speed type



**27. Detent Spring**

**28. Detent Ball**

**29. 2nd/3rd Shift Rod**

- Press down the detent ball with a screwdriver to prevent it from jumping out.

**30. 2nd/3rd Shift Block**

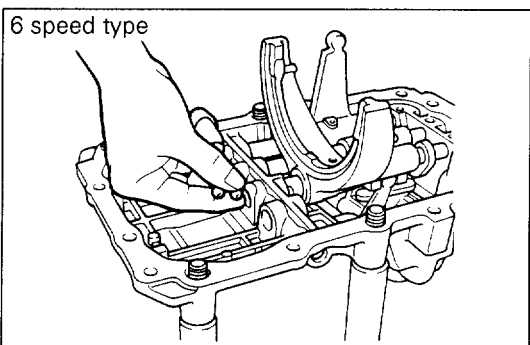
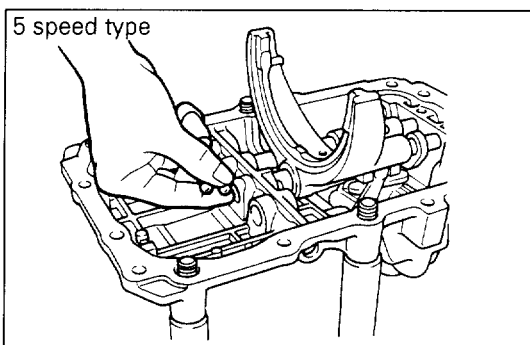
- Put the shift rod through the spectacle detent of 4th/5th shift block and 2nd/3rd shift block.
- Assemble the 2nd/3rd shift block so that the shift block pin hole is inclined to the 4th/5th shift rod side.



**31. 2nd/3rd Shift Arm**

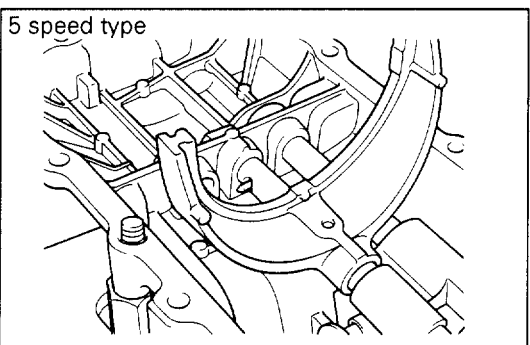
- With the projection side of the boss set to the front, put the 2nd/3rd shift arm through the shift rod.





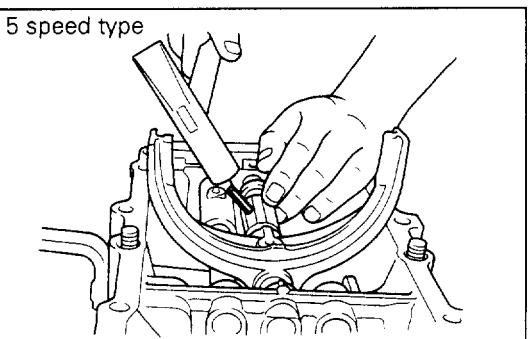
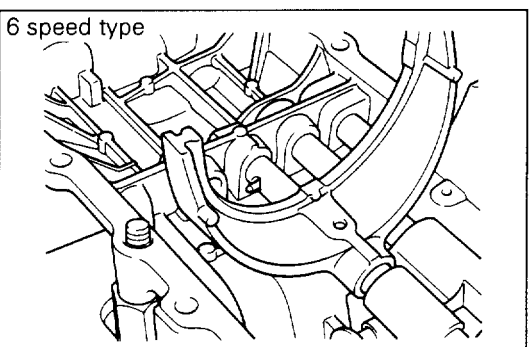
### 32. Interlock Ball

- Install 2 interlock balls in position between the 2nd/3rd shift rod and 4th/5th shift rod.



### 33. Interlock Pin

- Install the interlock pin in position the pin hole of 2nd/3rd shift rod.



### 34. Spring Pin

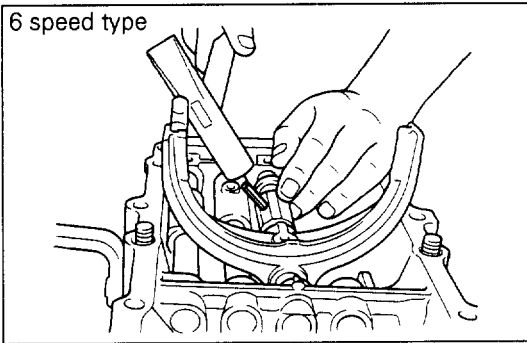
- Setting the hole of the 2nd/3rd shift block to that of the shift rod, fix them with a new spring pin (25 mm/0.98 in).

#### NOTE:

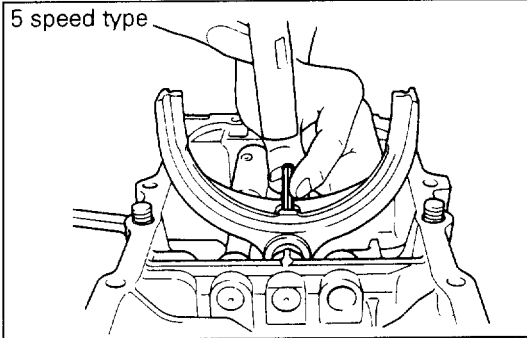
Install spring pin properly with the slit inline with the shaft centerline.



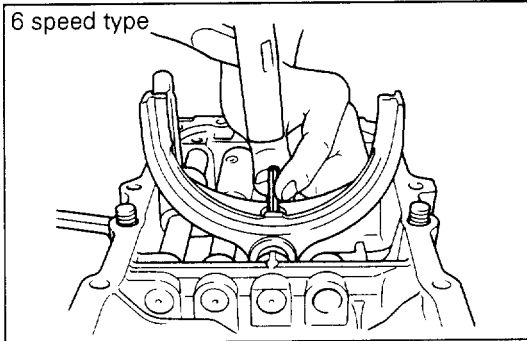
6 speed type



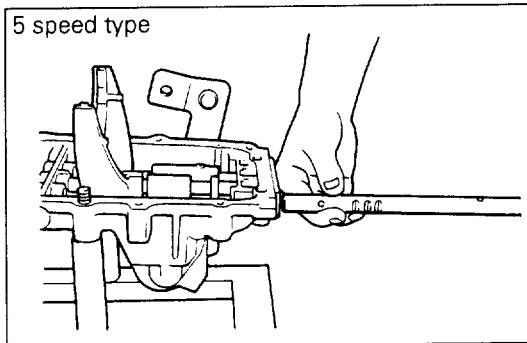
5 speed type



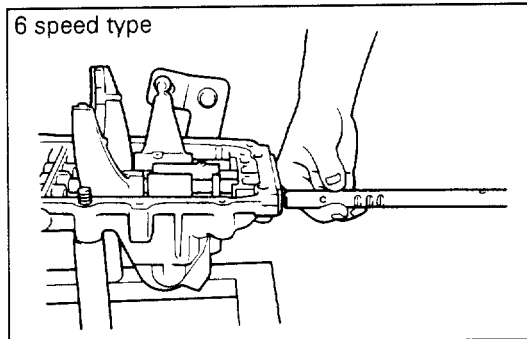
6 speed type



5 speed type



6 speed type



### 35. Spring Pin

- Setting the hole of the 2nd/3rd shift arm to that of the shift rod, fix them with a new spring pin (32 mm/1.26 in.).

#### NOTE:

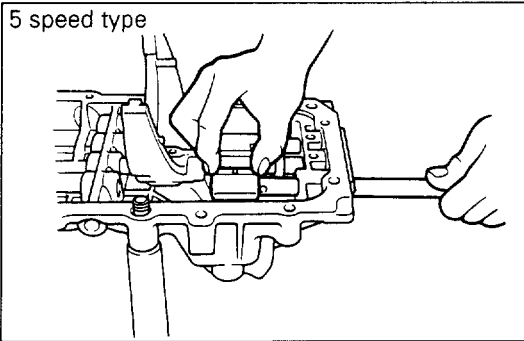
Install spring pin properly with the slit inline with the shaft centerline.

### 36. 1st/Reverse Shift Rod

- Before reassembly, set the 4th/5th and 2nd/3rd shift rods already reassembled in neutral position.
- Insert the 1st/reverse shift rod so that the three detent ball grooves comes to the out side.



5 speed type

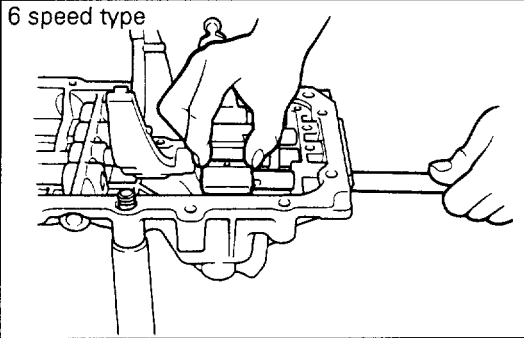


### 37. 1st/Reverse Shift Block

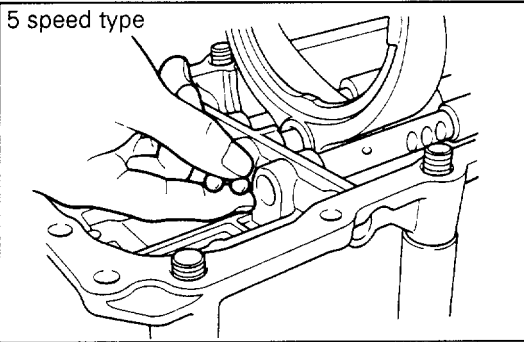


- Put the 1st/reverse shift block through the rod so that the catch turns up.

6 speed type



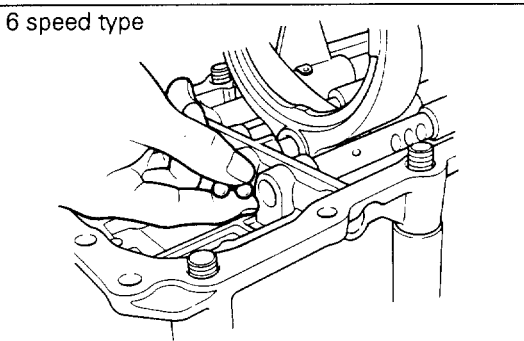
5 speed type



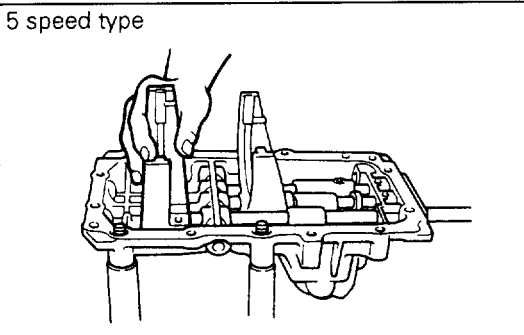
### 38. Interlock Ball

- Install 2 interlock balls in position between the 2nd/3rd shift rod and 1st/Reverse shift rod.

6 speed type



5 speed type

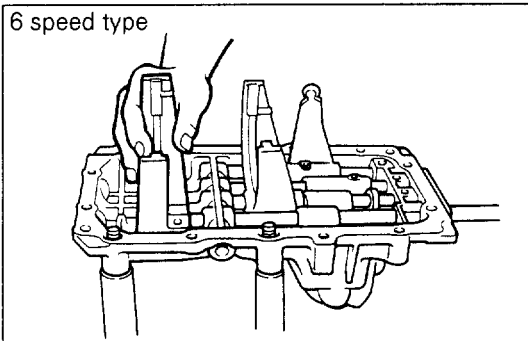


### 39. 1st/Reverse Shift Arm

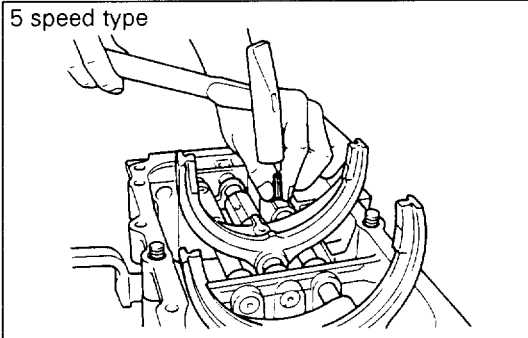


- With the wider side of the arm section turned to the 2nd/3rd shift rod side, put the 1st/reverse shift arm through the shift rod.

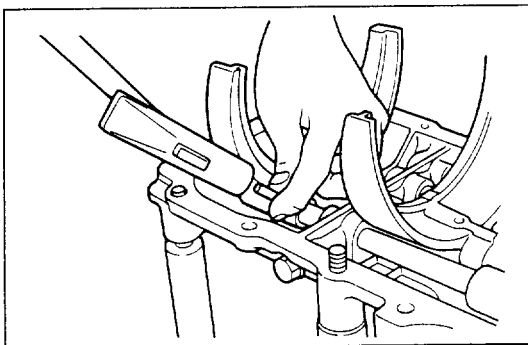
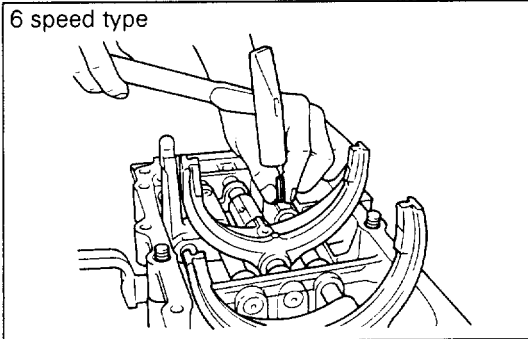
6 speed type



5 speed type



6 speed type



#### 40. Spring Pin

- Setting the hole of the 1st/reverse shift block to that of the shift rod, fix them with a new spring pin (25 mm/0.98 in.).

#### NOTE:

Install spring pin properly with the slit inline with the shaft centerline.

#### 41. Spring Pin

- Setting the hole of the 1st/reverse shift arm to that of the shift rod, fix them with a new spring pin (32 mm/1.26 in.).

#### NOTE:

Install spring pin properly with the slit inline with the shaft centerline.

**42. Shift Rod Cap (for 6 speed type only)**



- Apply liquid gasket (Three Bond 1141 or equivalent) to the cap outer circumference, and hammer it in with something soft such as a plastic hammer.

**NOTE:**

When there is any warp or flaw found with the shift rod cap, replace it with a new one.

**43. 4th/5th Shift Rod Cap**

**44. 2nd/3rd Shift Rod Cap**

**45. 1st/Reverse Shift Rod Cap**

**46. Detent Ball**

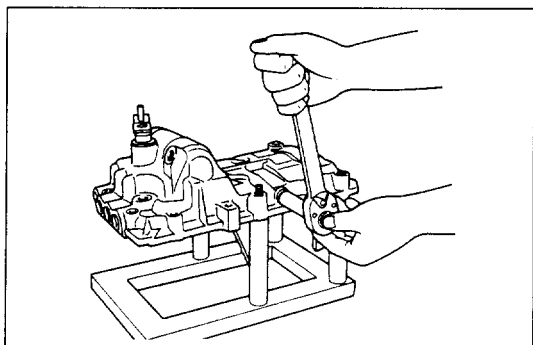
**47. Detent Spring**

**48. Plug and Gasket**



- With a new gasket, tighten plug to the specified torque.

Detent Ball Plug Torque	N·m (kg·m/lb·ft)
25 (2.5/18)	



**49. Neutral Switch**

**50. Back-up Light Switch**

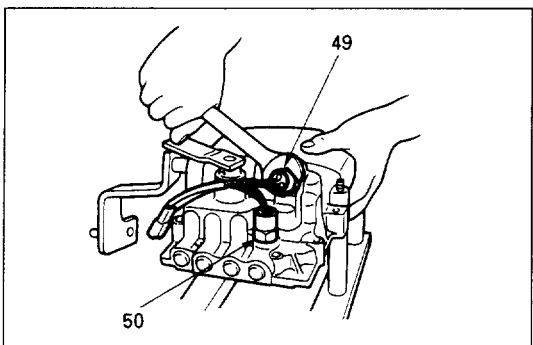


- Apply liquid gasket (Three Bond 1141 or equivalent) to the switch's threaded portion and install the switches to the control box.

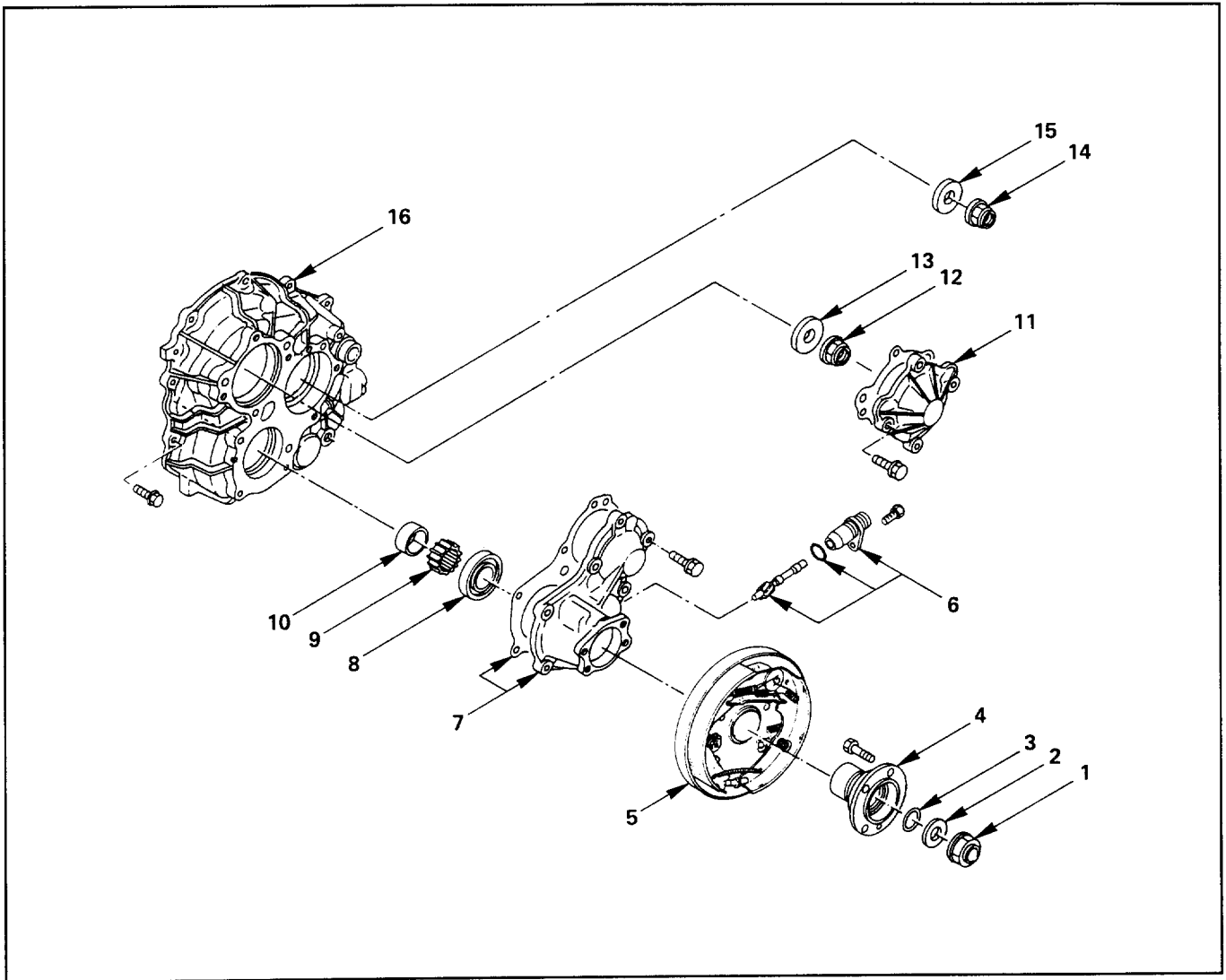


- Color of connector  
Back-up light switch : Brown  
neutral switch : Gray

Neutral and Back-up Light Switch Torque	N·m (kg·m/lb·ft)
34 (3.5/25)	

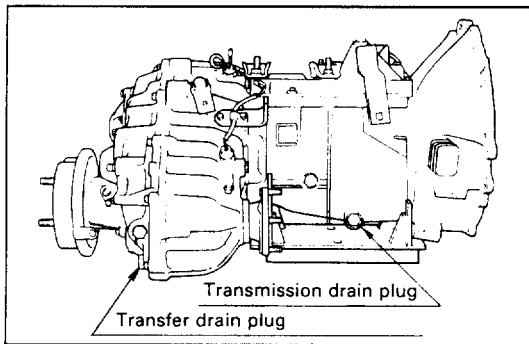


## TRANSFER TRANSFER REAR CASE DISASSEMBLY



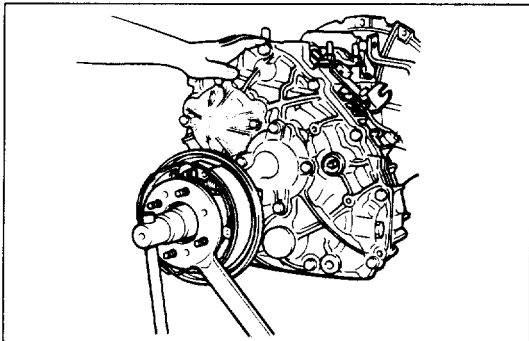
### Disassembly Steps

- |                                     |                             |
|-------------------------------------|-----------------------------|
| 1. Rear drive shaft end nut         | 9. Speedometer drive gear   |
| 2. Coupling driver washer           | 10. Rear drive shaft collar |
| 3. O-ring                           | 11. P.T.O cover             |
| 4. Coupling driver                  | 12. Input shaft end nut     |
| 5. Center brake back plate assembly | 13. Input shaft washer      |
| 6. Speedometer driven gear assembly | 14. Idle shaft end nut      |
| 7. Rear cover assembly              | 15. Idle shaft washer       |
| 8. Rear drive shaft bearing         | 16. Transfer rear case      |



## Disassembly Steps

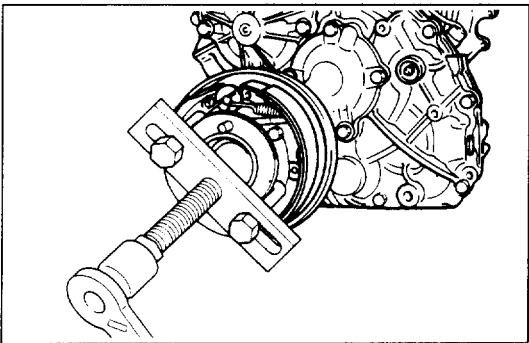
Place the transmission and transfer assembly on the bench, and drain oil by removing respective drain plugs on the transmission and transfer.



### 1. Rear Drive Shaft End Nut

Erect a calking part, then remove the rear drive shaft end nut in the coupling driver on the rear drive side by holding the coupling driver with the handle: main shaft flange.

Handle: main shaft flange : 5-8840-2043-0



### 2. Coupling Drive Washer

### 3. O-ring

### 4. Coupling Drive

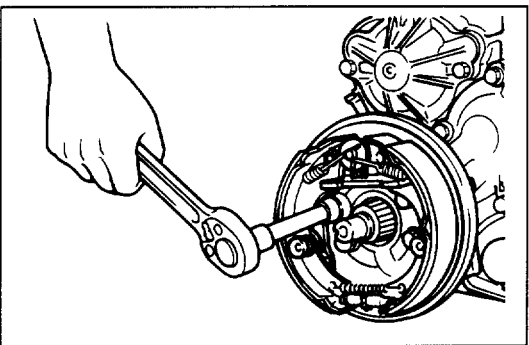
Remove the coupling driver using the universal puller. At the same time, a washer and O-ring will be removed.

Universal puller : 5-8840-2027-0



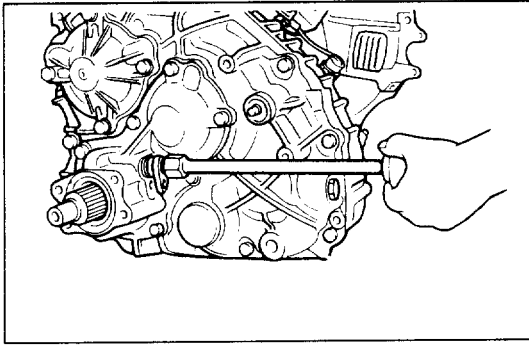
### CAUTION:

Take care not to damage the O-ring.



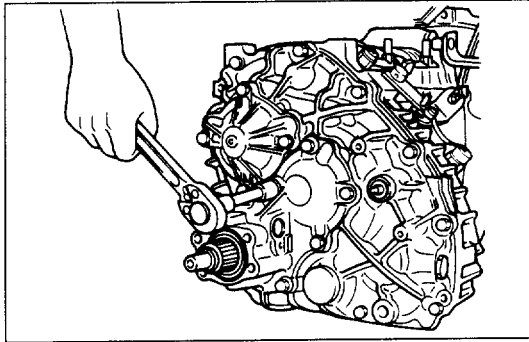
### 5. Center Brake Back Plate Assembly

Remove bolts on the center brake back plate assembly, then remove the back plate assembly.



**6. Speedometer Driven Gear Assembly**

- Remove a speedometer driven gear fixing bolt, and remove the speedometer driven gear using the remover.



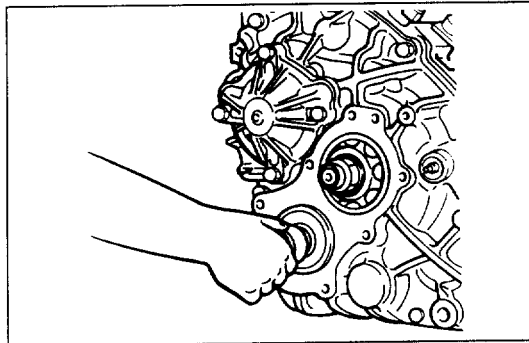
**7. Rear Cover Assembly**

- Remove rear cover fixing bolts, then remove the rear cover assembly.



**CAUTION:**

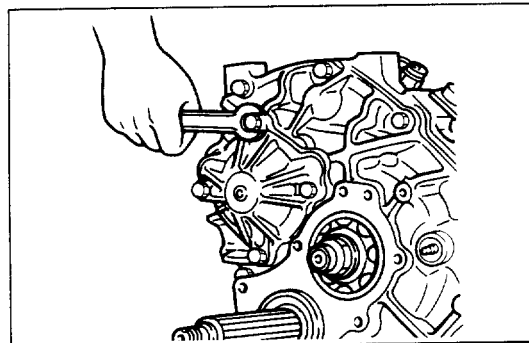
Take care not to damage the lip of oil seal.



**8. Rear Drive Shaft Bearing**

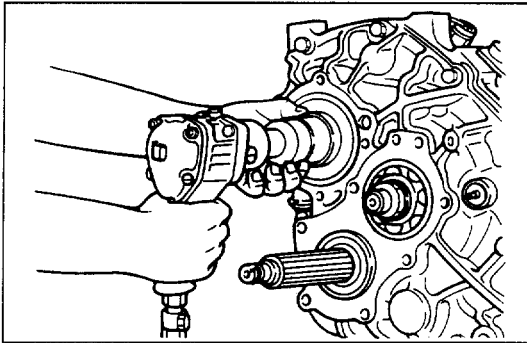
**9. Speedometer Drive Gear**

**10. Rear Drive Shaft Collar**



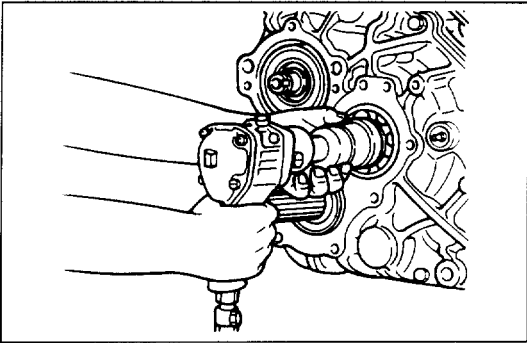
**11. P.T.O Cover**

- Remove P.T.O cover fixing bolts, then remove the P.T.O cover.



## 12. Input Shaft End Nut

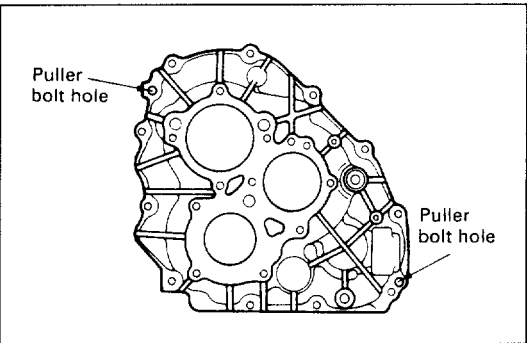
- Shift the shift external lever to L or H to place the transmission gear in a double meshing status. Then, erect a calking part and remove the input shaft end nut using the nut runner.



## 13. Input Shaft Washer

## 14. Idle Shaft End Nut

- Shift the shift external lever to L or H to place the transmission gear in a double meshing status. Then, erect a calking part and remove the idle shaft end nut using the nut runner.



## 15. Idle Shaft Washer

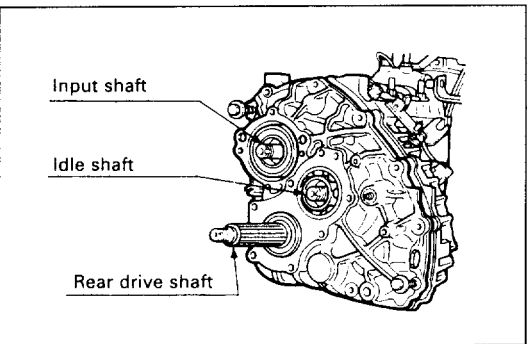
## 16. Transfer Rear Case

- Remove transfer rear case fixing bolts, and insert bolts (M10 x 1.25, length=about 50mm, 2 pcs) into puller bolt holes and tighten bolts evenly to separate the transfer rear case and transfer front case by about 25mm.



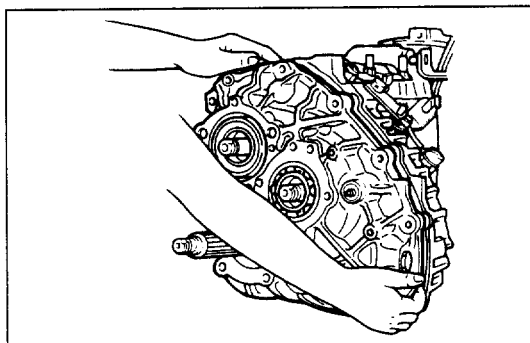
### CAUTION:

**Tighten puller bolts (2 pcs) evenly; do not tighten extremely either bolt only.**



- Hit lightly the idle shaft, input shaft and rear drive shaft respectively with a copper hammer (or plastic hammer) to insert into the transfer front case.

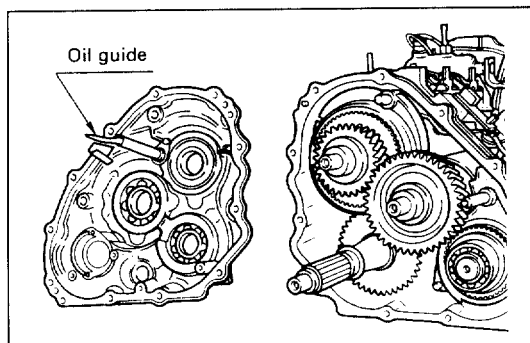




3) Pull the transfer rear case with both hands to remove.

**CAUTION:**

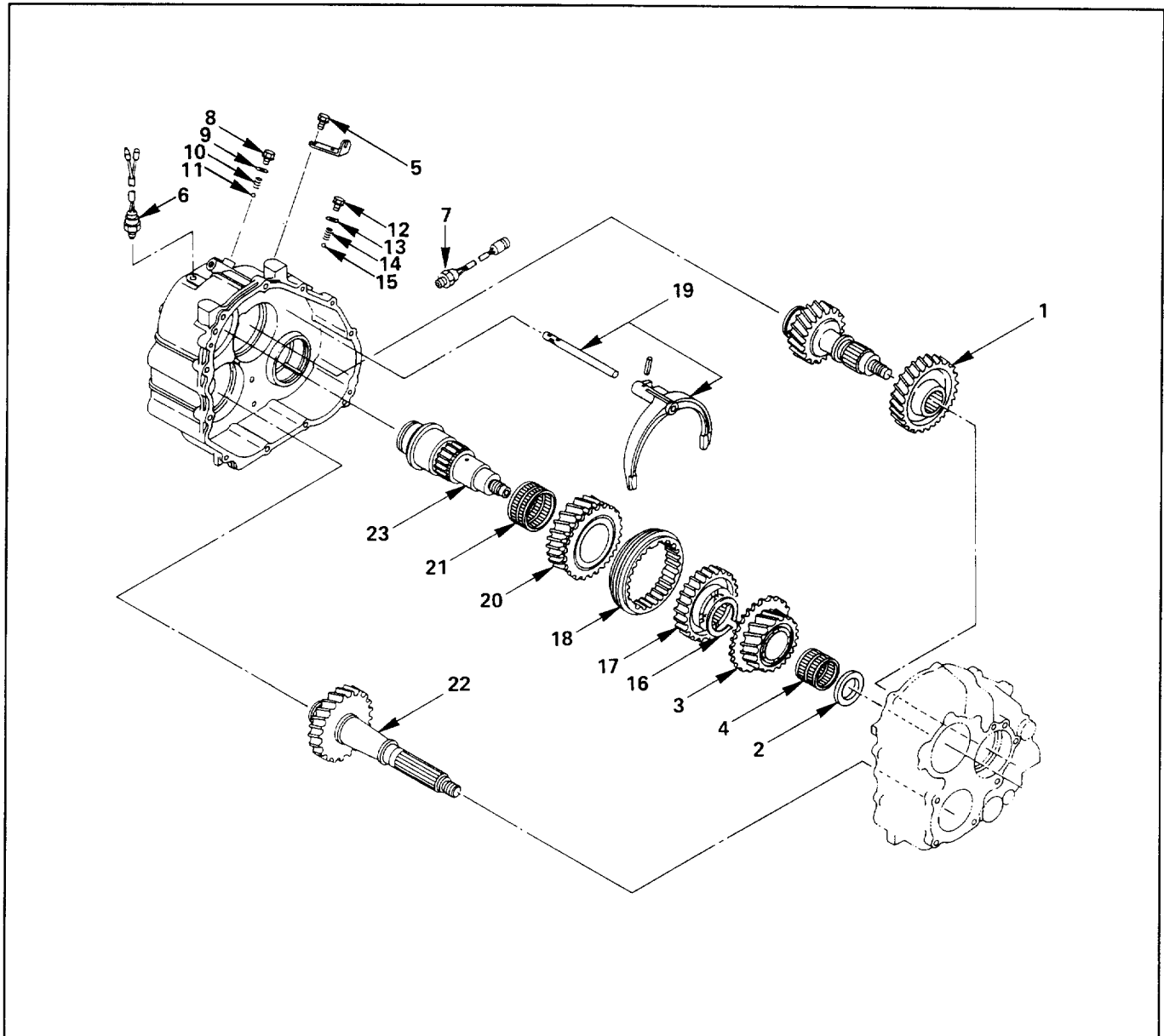
Take care not to allow shift rod for 4WD high speed range ↔ low speed range and the shift rod for rear drive ↔ 4WD to be removed.



**CAUTION:**

Take care not to deform the oil guide fixed with a bolt internally when placing the transfer rear case.

## REAR DRIVE SHAFT, INPUT SHAFT DISASSEMBLY

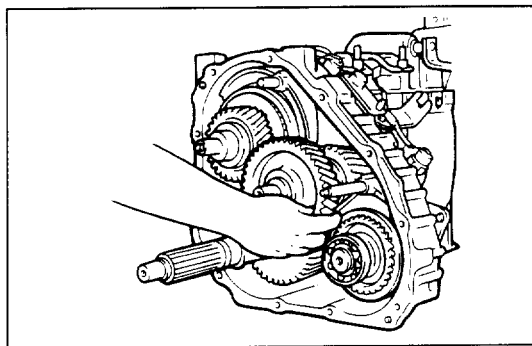


### Disassembly Steps

- |  |  |
|--|--|
| 1. Low range idle gear                 | 12. Detent spring plug                   |
| 2. Thrust washer                       | 13. Detent spring plug gasket            |
| 3. Input shaft low gear                | 14. Detent spring                        |
| 4. Input shaft low gear needle bearing | 15. Detent ball                          |
| 5. Bracket bolt                        | 16. Clutch hub snap ring                 |
| 6. Transfer neutral switch             | 17. Clutch hub                           |
| 7. 4WD detective switch                | 18. Sleeve                               |
| 8. Detent spring plug                  | 19. Shift arm and shift rod              |
| 9. Detent spring plug gasket           | 20. Input shaft high gear                |
| 10. Detent spring                      | 21. Input shaft high gear needle bearing |
| 11. Detent ball                        | 22. Rear drive shaft                     |
|  | 23. Input shaft                          |

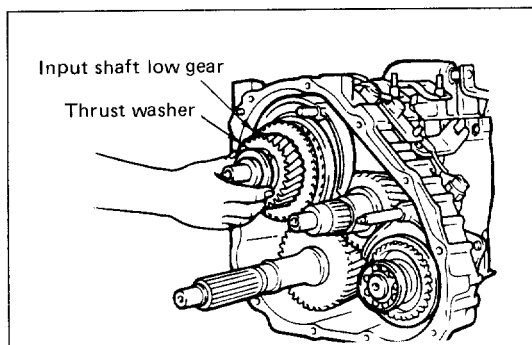


## Disassembly Steps



### 1. Low Range Idle Gear

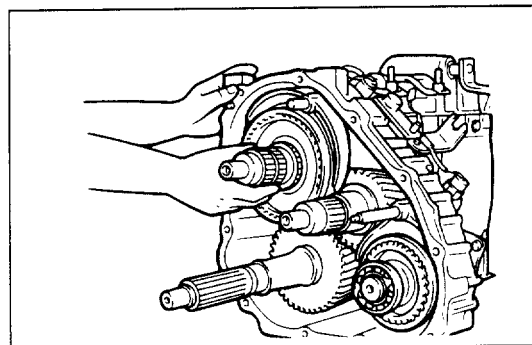
- Remove the low range idle gear.



### 2. Thrust Washer

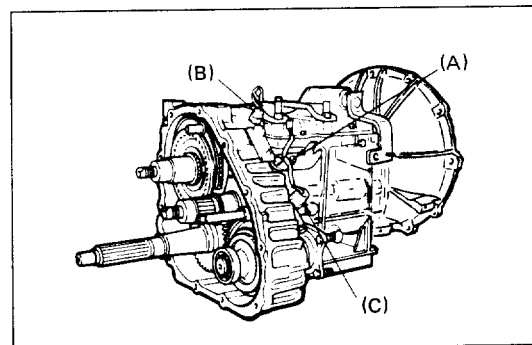
### 3. Input Shaft Low Gear

- Remove a thrust washer. Then, remove the input shaft low gear.



### 4. Input Shaft Low Gear Needle Bearing

- Remove the input shaft low gear needle bearing.

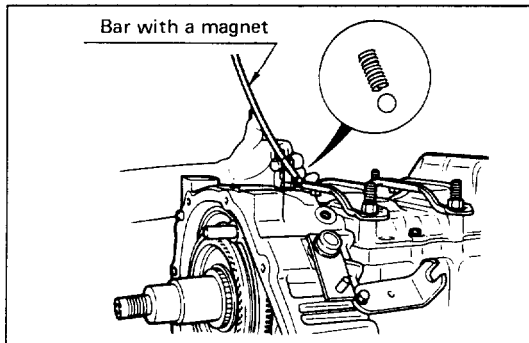


### 5. Bracket Bolt

### 6. Transfer Neutral Switch

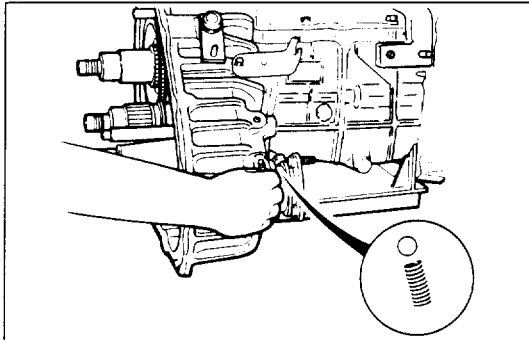
### 7. 4WD Detective Switch

- Remove the bolt (A) to fix the push-pull cable clamping bracket on the transfer front case, transfer neutral switch (B) and 4WD detective switch (C).



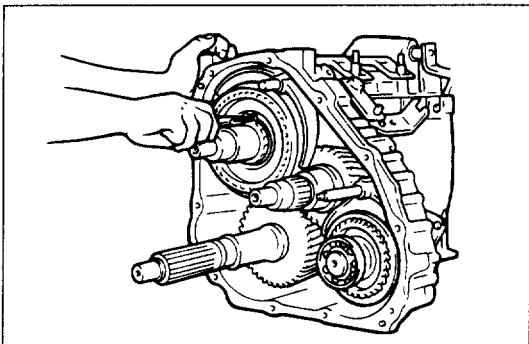
8. Detent Spring Plug
9. Detent Spring Plug Gasket
10. Detent Spring
11. Detent Ball

- Remove a detent spring plug and gasket on the 4-wheel drive high speed range (4H) ↔ low speed range (4L) shift rod, then take out a detent spring and detent ball.



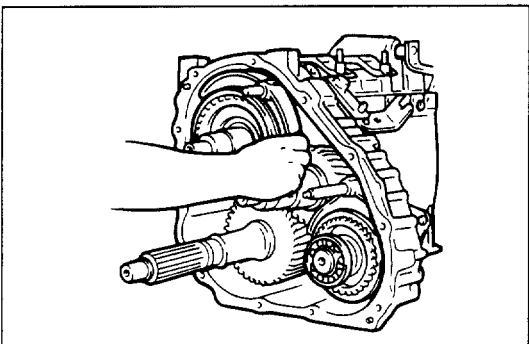
12. Detent Spring Plug
13. Detent Spring Plug Gasket
14. Detent Spring
15. Detent Ball

- Remove a detent spring plug and gasket on the rear drive (2WD) ↔ 4-wheel drive (4WD) shift rod, then take out a detent spring and detent ball.



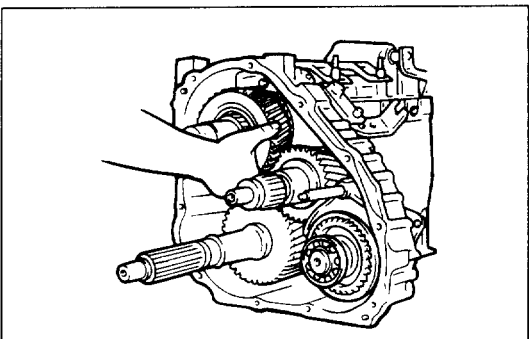
16. Clutch Hub Snap Ring

- Remove a clutch hub snap ring on the 4-wheel drive high speed range (4H) ↔ low speed range (4L) select clutch hub using snap ring pliers.



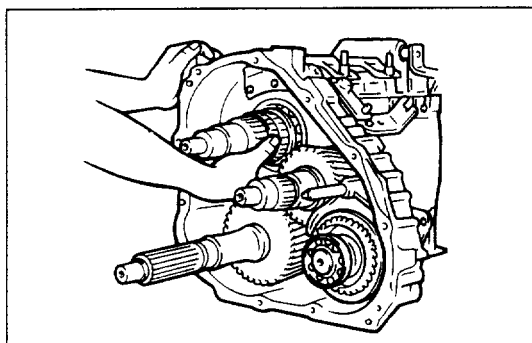
17. Clutch Hub
18. Sleeve
19. Shift Arm and Shift Rod

- Remove 4-wheel drive high speed range (4H) ↔ low speed range select clutch hub, sleeve and shift arm and shift rod at a time.



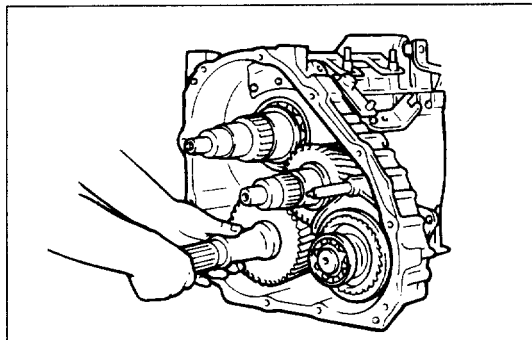
20. Input Shaft High Gear

- Remove the input shaft high gear.



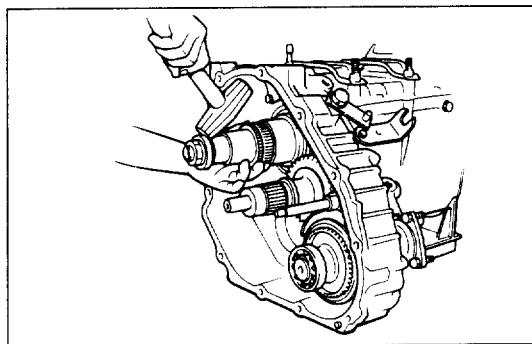
**21. Input Shaft High Gear Needle Bearing**

- Remove the input shaft high gear needle bearing.



**22. Rear Drive Shaft**

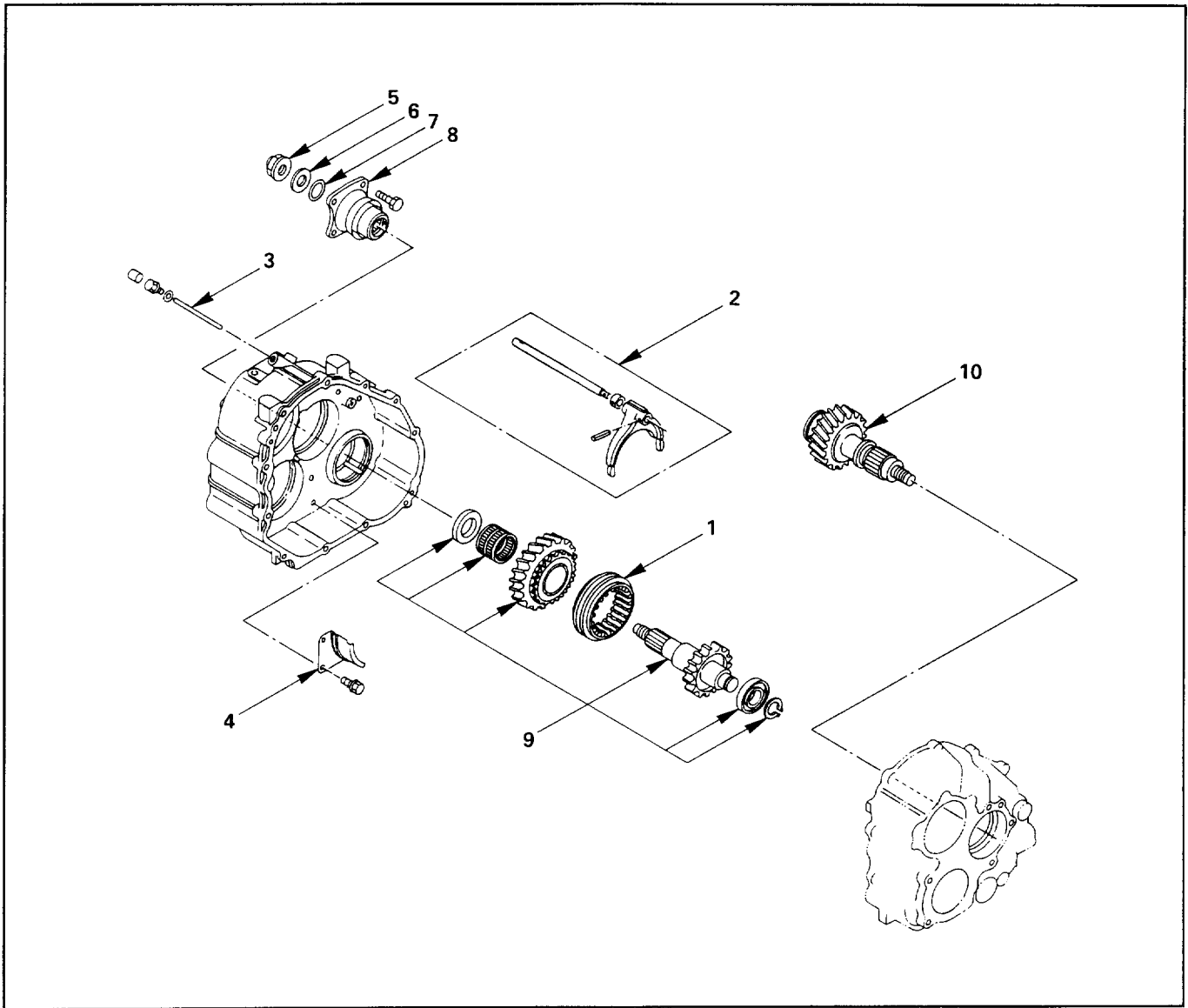
- Pull out the rear drive shaft.



**23. Input Shaft**

- Tighten temporarily the end nut and washer to the input shaft end, and pull out the input shaft by hitting lightly the washer with a copper hammer.

## FRONT DRIVE SHAFT, IDLE SHAFT DISASSEMBLY

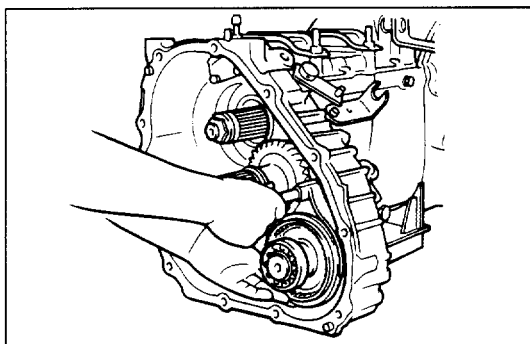


### Disassembly Steps

- |                                     |                               |
|-------------------------------------|-------------------------------|
| 1. Sleeve                           | 6. Coupling driver washer     |
| 2. Shift arm and shift rod assembly | 7. O-ring                     |
| 3. Interlock rod                    | 8. Coupling driver            |
| 4. Guide plate:B                    | 9. Front drive shaft assembly |
| 5. End nut                          | 10. Idle shaft                |



## Disassembly Steps

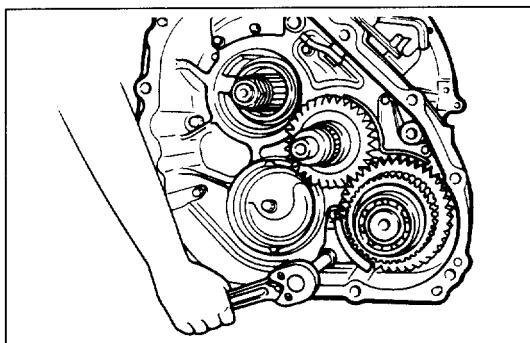


### 1. Sleeve

### 2. Shift Arm and Shift Rod Assembly

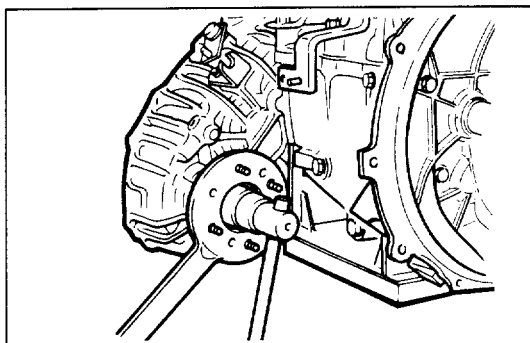
### 3. Interlock Rod

- Remove the sleeve, shift arm and shift rod for rear drive (2WD) ↔ 4-wheel drive (4WD) selection at a time, and pull the interlock rod off the detent spring hole.



### 4. Guide Plate:B

- Remove the guide plate : B fixing bolts in the transfer front case, then take out the guide plate : B.

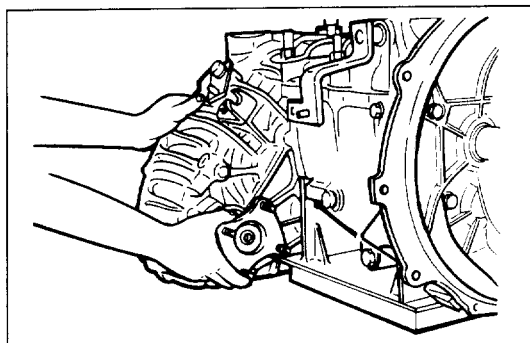


### 5. End Nut



- Erect a calking part and remove a coupling driver end nut on the leading end of front drive shaft. Then, remove the coupling driver using the handle: main shaft flange.

Handle: main shaft flange : 5-8840-2043-0



### 6. Coupling Drive Washer

### 7. O-ring

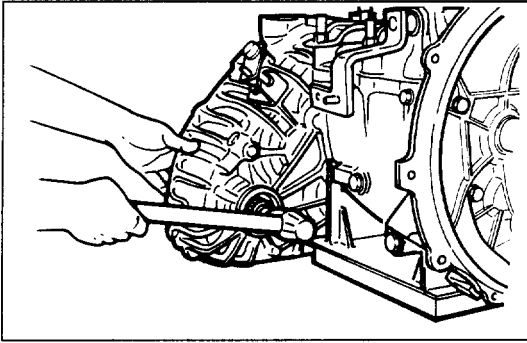
### 8. Coupling Driver

- Pull off the coupling driver, washer and O-ring.



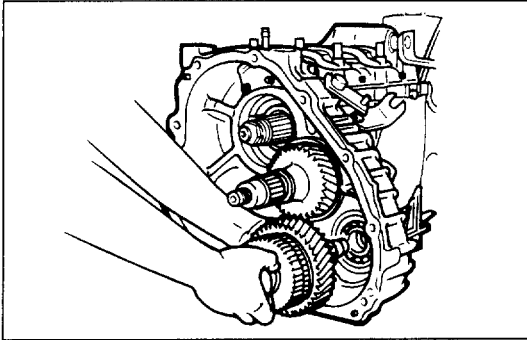
### CAUTION:

Take care not to damage the O-ring.

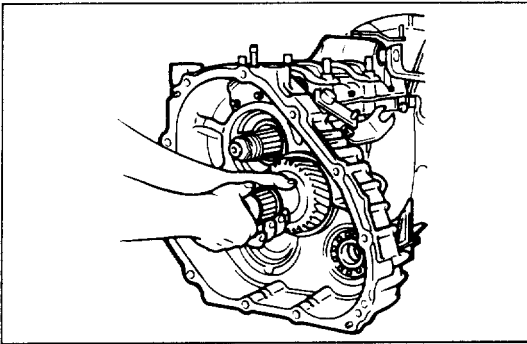


#### 9. Front Drive Shaft Assembly

- 1) Hit lightly the front drive shaft end with a copper hammer to remove from the bearing.



- 2) Remove the front drive shaft assembly.

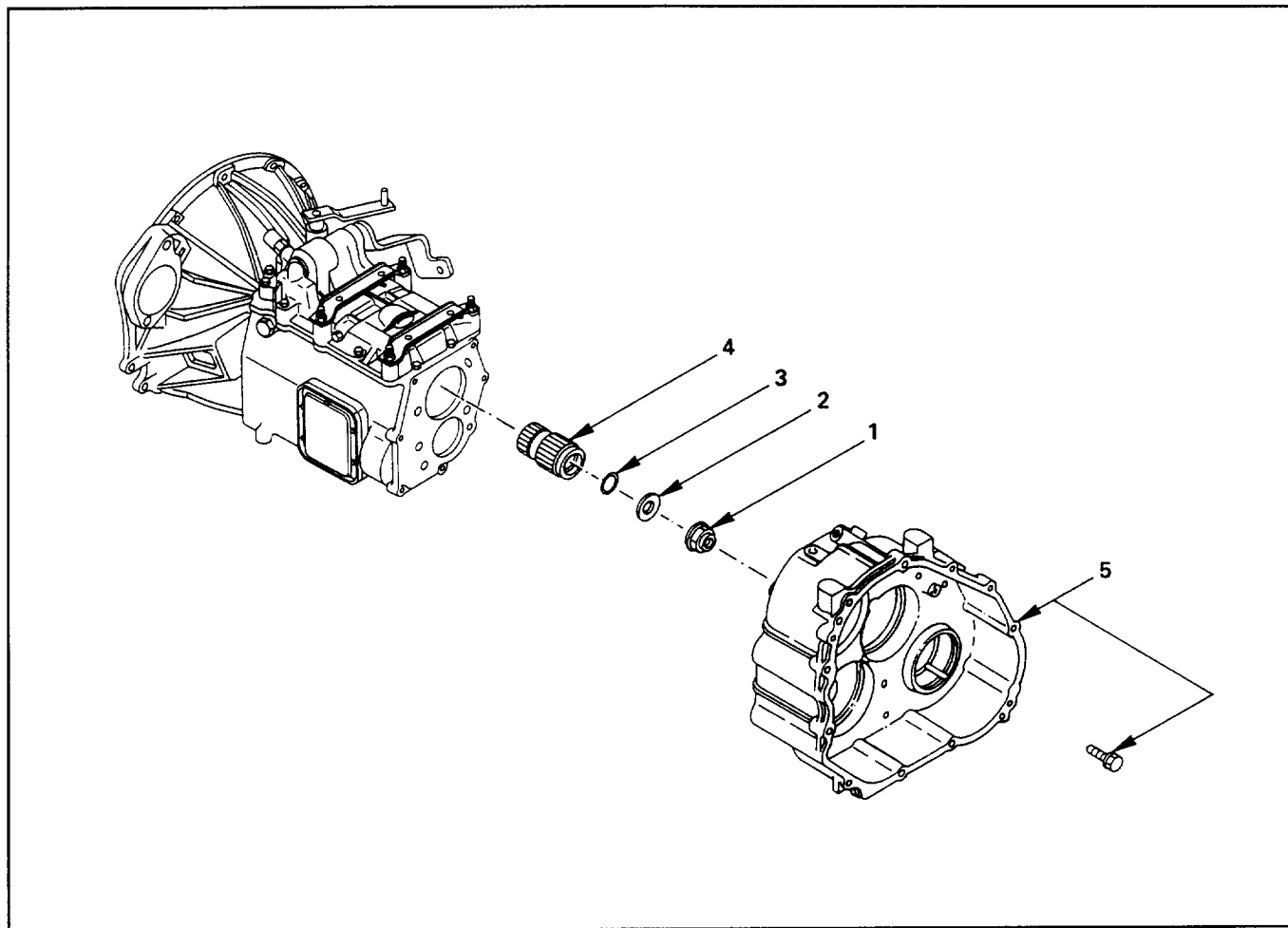


#### 10. Idle Shaft

- Remove the idle shaft.



## TRANSFER FRONT CASE DISASSEMBLY

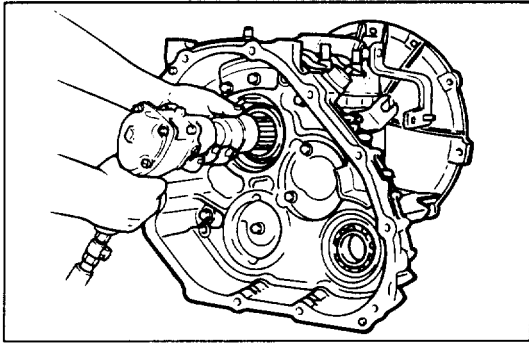


### Disassembly Steps

1. Main shaft end nut
2. Washer
3. O-ring
4. Main shaft joint pipe
5. Transfer front case

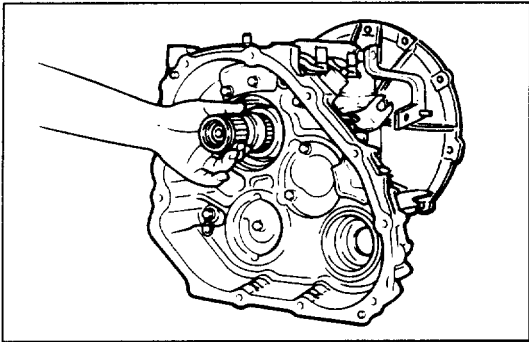


## Disassembly Steps



### 1. Main Shaft End Nut

- Place the transmission gear in a double meshing status, erect a calking part and remove the main shaft end nut using the nut runner.



### 2. Washer

### 3. O-ring

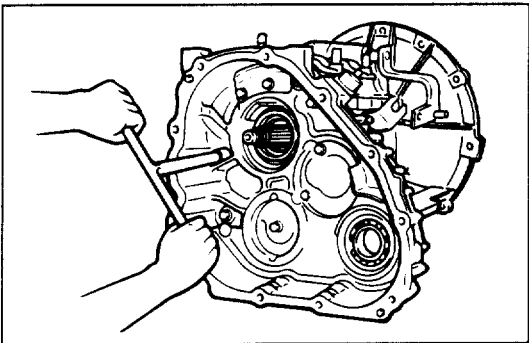
### 4. Main Shaft Joint Pipe

- Remove a washer and main shaft joint pipe. The O-ring will come out simultaneously.



### CAUTION:

Take care not to damage the O-ring.



### 5. Transfer Front Case

- Remove transfer front case fixing bolts, and hold the transfer front case with both hands to remove to your side.

### Completion of Transfer Disassembly

For disassembly and reassembly of transmission, refer to "TRANSMISSION" described previously in this manual.

## INSPECTION AND REPAIR

Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

### Shift Arm

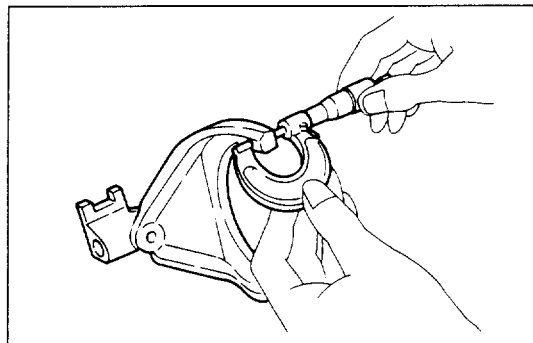


Inspect the shift arms for wear, distortion or scoring. Replace it these conditions are present.

### Shift Arm Thickness



Use a micrometer to measure the shift arm thickness. If the measured value is less than the specified limit, the shift arm must be replaced.



Shift Arm Thickness		mm(in.)
	Standard	Limit
Shift arm ; 2WD ~ 4WD	10.0 (0.394)	9.0 (0.355)
Shift arm ; High speed ~ Low speed	10.5 (0.413)	9.5 (0.374)

### Detent Spring

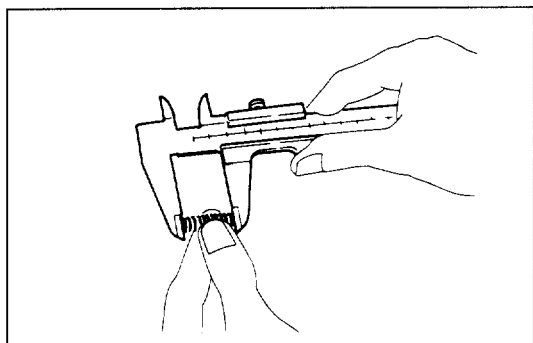


Inspect the detent springs for wear, distortion or cracks. Replace detent spring if these conditions are present.

### Detent Spring Free Length



Use a vernier caliper to measure the detent spring free length. If the measured value is less than the specified limit, the detent spring must be replaced.



Detent Spring Free Length		mm (in.)
	Standard	Limit
	31.6 (1.245)	30.1 (1.186)

### Front Drive Shaft, Rear Drive Shaft Run-Out



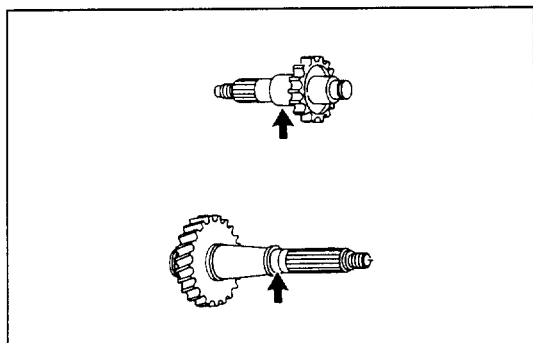
Replace the drive shaft if the run-out is more than specified limit.

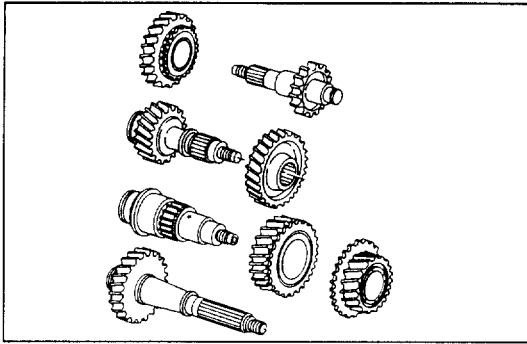
Front Drive Shaft, Rear Drive Shaft Run-Out		mm(in.)
	Limit	0.1 (0.0039)

In reference of both center holes,

Front drive shaft is measured at  $\varnothing 40$  bearing mounting part.

Rear drive shaft is measured at  $\varnothing 40$  bearing mounting part.



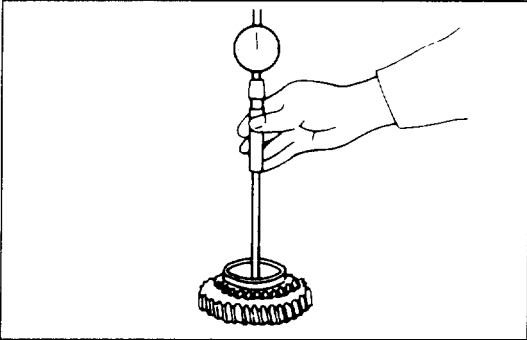


### Gears



Check each gear for the following points. Correct a slight stepped wear or surface roughness with an oil stone or pencil grinder, or replace the gear if unrecoverable damage is found.

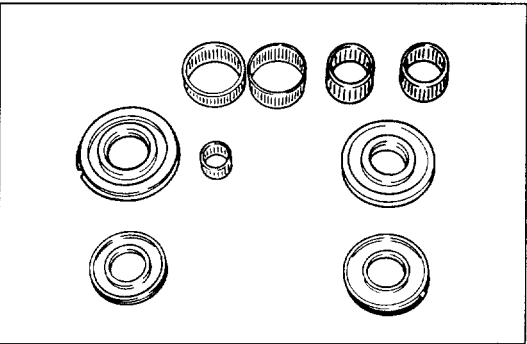
- 1) Break or damage of tooth
- 2) Extreme wear of tooth
- 3) Inspect the dog clutch teeth, and replace if hard contact is found on the force-receive side (coast side) during engine braking.



- 4) Measure inner diameter of input shaft high gear, input shaft low gear and front drive gear, and replace the gear if it exceeds the limit.

Gear inner diameter mm(in.)

	Standard	Limit
Input shaft high gear	81 (3.189)	81.1 (3.193)
Input shaft low gear	58 (2.283)	58.1 (2.287)
Front drive gear	55 (2.165)	55.1 (2.169)

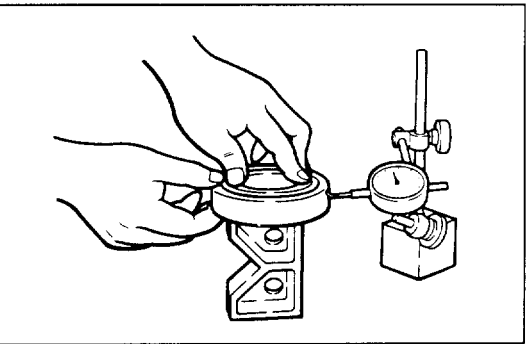


### Bearings



Check each bearing, and replace in either of the following cases:

- 1) Rotation is not smooth.
- 2) Abnormal sound is generated.
- 3) There is extreme damage or rust.
- 4) Rolling element or rolling contact surface of needle roller bearing is discolored, extremely worn or pitted.



### Ball bearing run-out



Replace the drive shaft if the run-out is more than specified limit.

Ball bearing run-out mm(in.)

Limit	0.2 (0.0079)
-------	--------------

The above value shows play in radial direction.

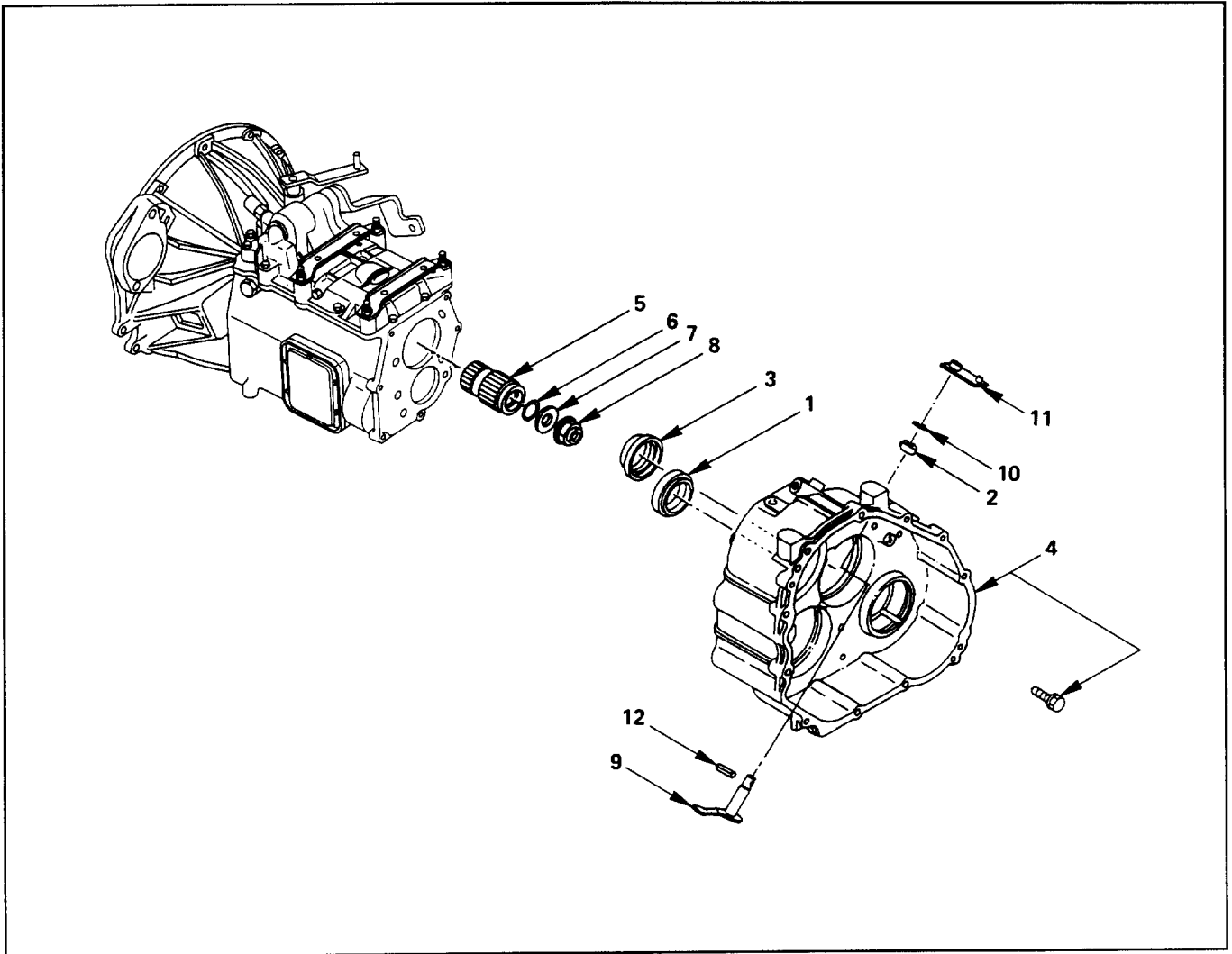
### Oil seal



#### CAUTION:

Oil seal must be replaced by new one, once it removed.

## TRANSFER FRONT CASE REASSEMBLY

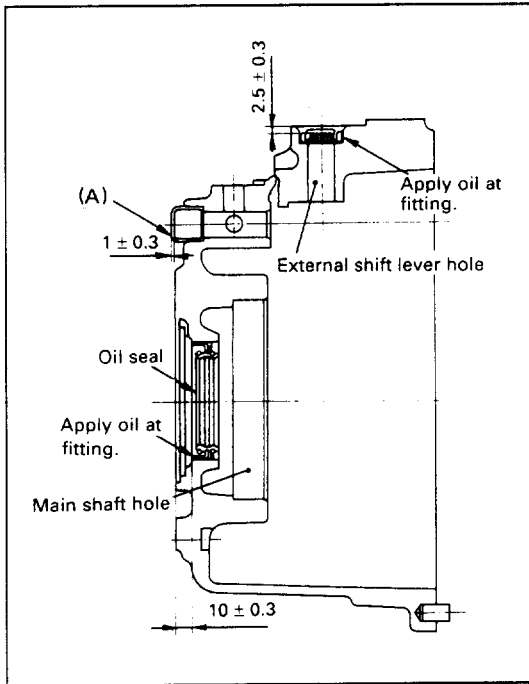


### Reassembly Steps

- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| 1. Transfer front case oil seal:A | 7. Washer                           |
| 2. Internal shift lever oil seal  | 8. Main shaft end nut               |
| 3. Transfer front case oil seal:B | 9. Internal shift lever assembly    |
| 4. Transfer front case            | 10. Plane washer                    |
| 5. Main shaft joint pipe          | 11. External shift lever assembly   |
| 6. O-ring                         | 12. External shift lever spring pin |



## Reassembly Steps



### 1. Transfer Front Case Oil Seal:A

### 2. Internal Shift Lever Oil Seal



- Reassemble the front transfer case oil seal:A and internal shift lever oil seal in the front transfer case, as shown to the left.

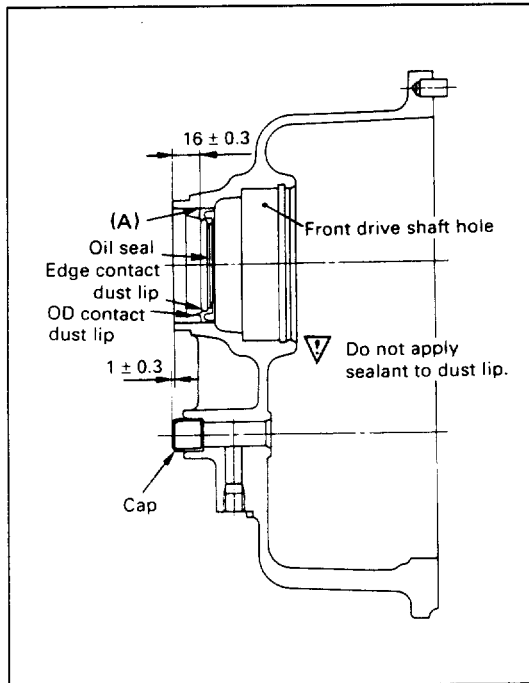
Oil seal installer : transfer front case

: 5-8840-2148-0

: 5-8840-2149-0



- Apply sealant (ThreeBond 1141 or equivalent) to rod cap side face (A) at fitting.



### 3. Transfer Front Case Oil Seal:B



- Reassemble the front transfer case oil seal:B and cap in the transfer front case, as shown to the left.

Oil seal installer : transfer front case

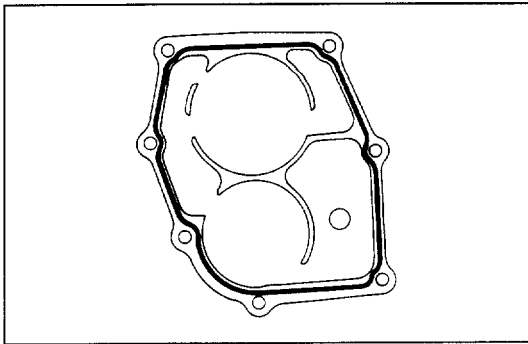
: 5-8840-2150-0

Cap installer : transfer front case

: 5-8840-2151-0

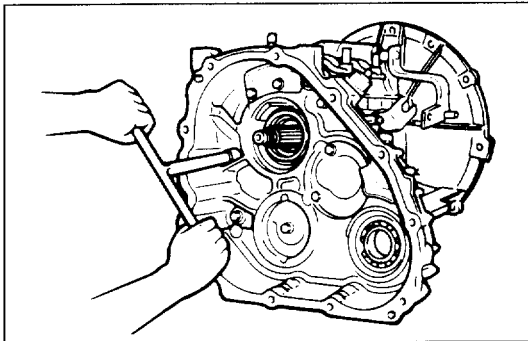


- Apply sealant (ThreeBond 1207 or equivalent) to the new oil seal outer circumference (A).



#### 4. Transfer Front Case

- Apply sealant Three Bond 1215 or equivalent to the front transfer case where it meets with transmission case.

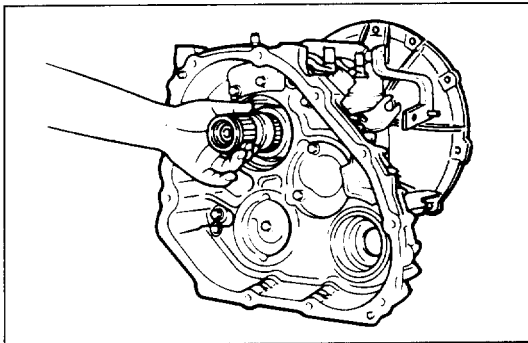


- Install the transfer front case and fix with bolts applied with an adhesive.

#### CAUTION:

Use new bolts applied with an adhesive.

Transfer Case Bolt Torque	N·m(kg·m/lb·ft)
46 (4.7/34)	



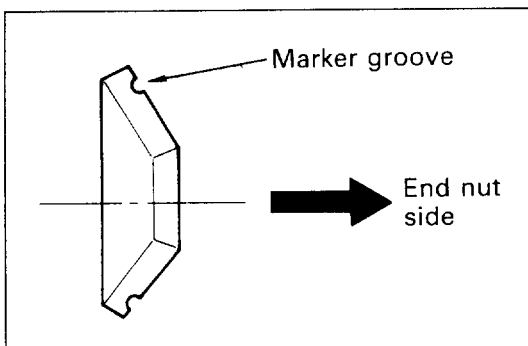
#### 5. Main Shaft Joint Pipe

#### 6. O-ring

- Insert the main shaft joint pipe into the main shaft with its spline facing the main shaft end nut side, then insert the O-ring between main shaft and main shaft joint pipe.

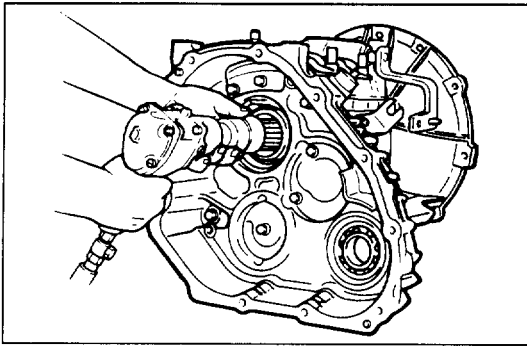
#### CAUTION:

Take care not to damage the oil seal on the rear side during installation of main shaft joint pipe. Replace O-ring with new one, if damaged.



#### 7. Washer

- The washer insert direction must be as shown to the left.



## 8. Main Shaft End Nut

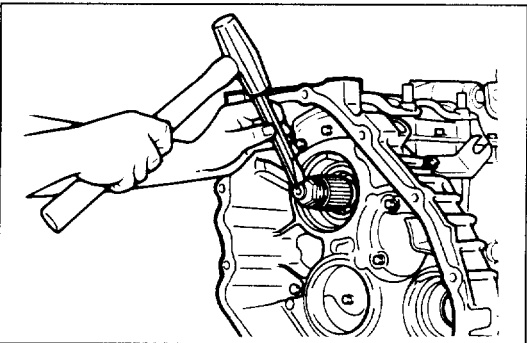
- Place the transmission gear in a double meshing status, insert a washer so that a marker groove faces the end nut side, and tighten the main shaft end nut with the nut runner.

### CAUTION:

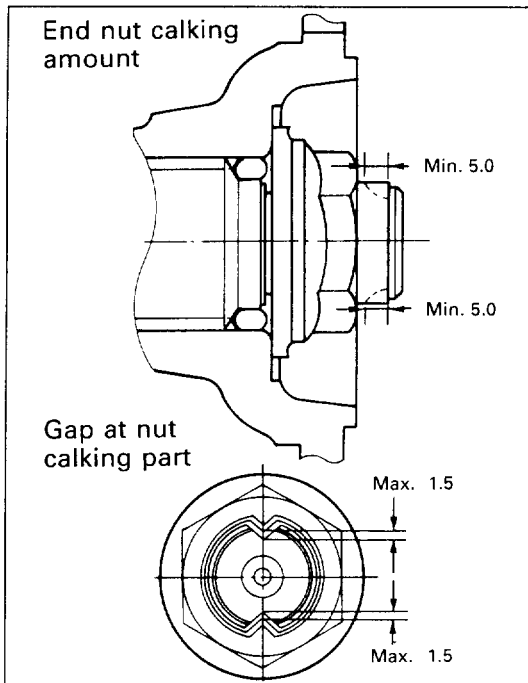
Use a new main shaft end nut.

- Apply engine oil to the seat face of main shaft end nut when tightening the nut.

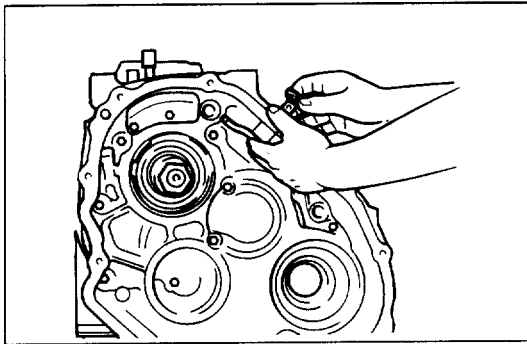
Main Shaft End Nut Torque	N·m(kg·m/lb·ft)
221 (22.5/163)	



- Meet the flange of main shaft end nut with a V-groove of main shaft end, and calk two points with a chisel (edge form R1x60°) until a gap between main shaft groove bottom and nut is below 1.5mm at the calking point. Also, make sure after calking that no crack is found in the calking part of nut.



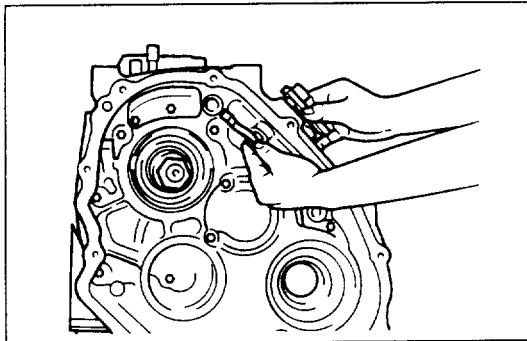




**9. Internal Shift Lever Assembly**

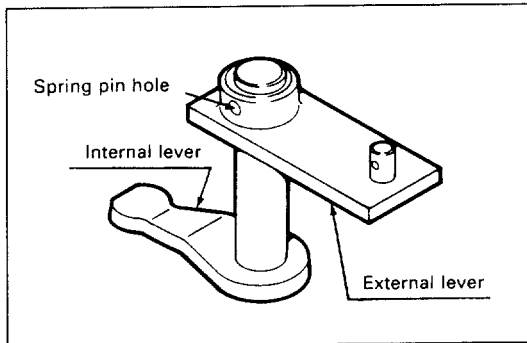
**10. Plane Washer**

- Insert the internal shift lever assembly from inside of transfer front case, and install a plain washer on the shaft protruding from the case.

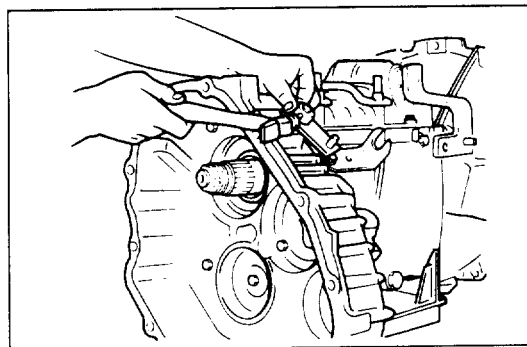


**11. External Shift Lever Assembly**

- Install the external shift lever assembly on the internal shift lever shaft with its boss (spring pin hole side) facing up.



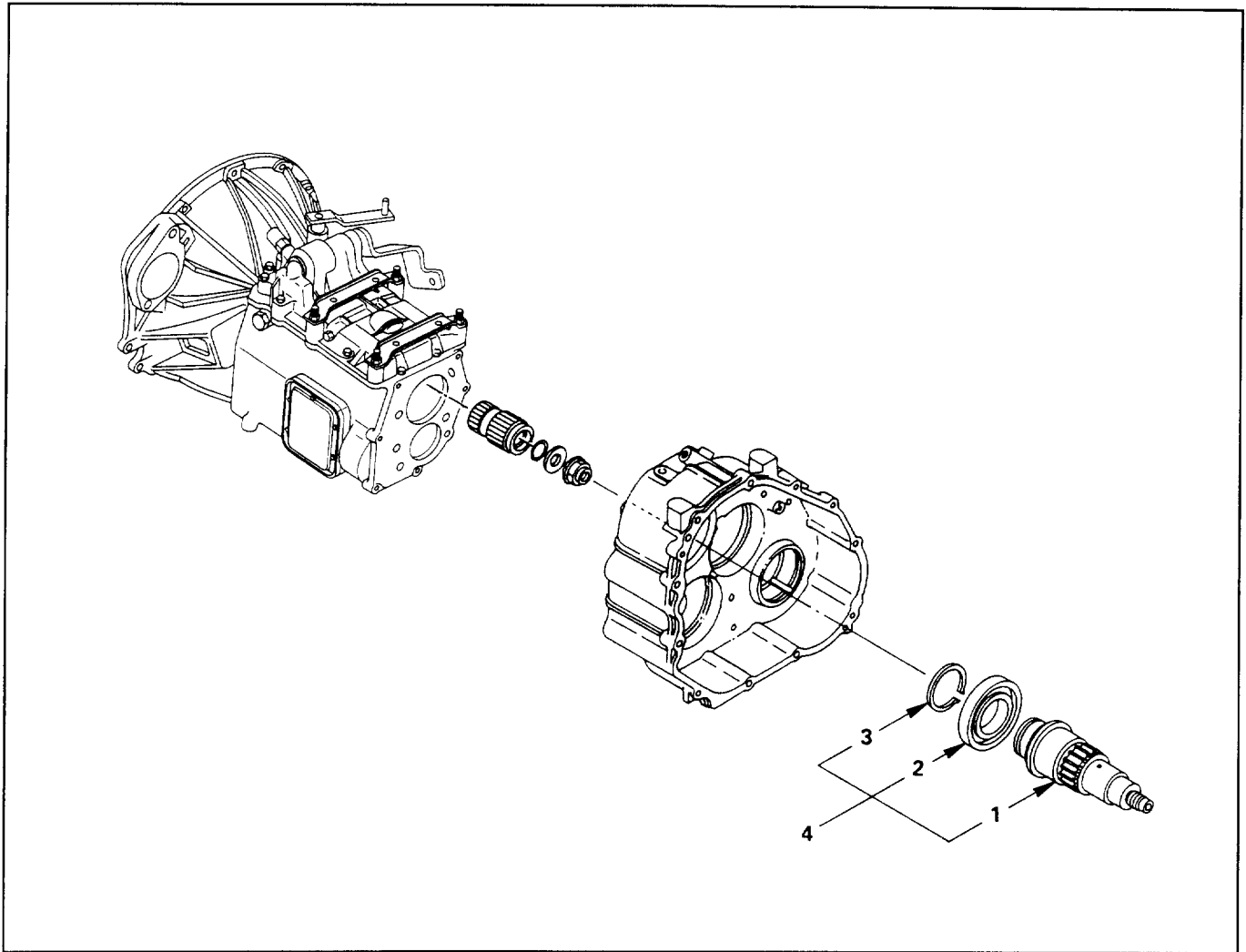
- The external shift lever assembly must be installed so that the internal lever and external lever are facing opposite direction (180° direction) each other.



**12. External Shift Lever Spring Pin**

- Drive in a spring pin with a hammer until it is flushed with the external shift lever boss.

# INPUT SHAFT ASSEMBLY REASSEMBLY



## Reassembly Steps

1. Input shaft
2. Input shaft bearing
3. Snap ring
4. Input shaft assembly

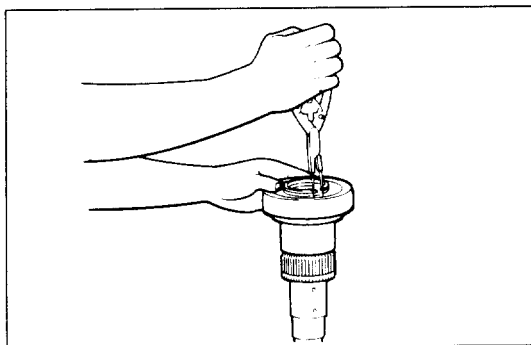
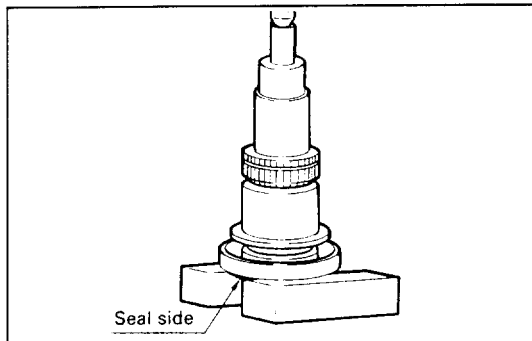


## Reassembly Steps

### 1. Input Shaft

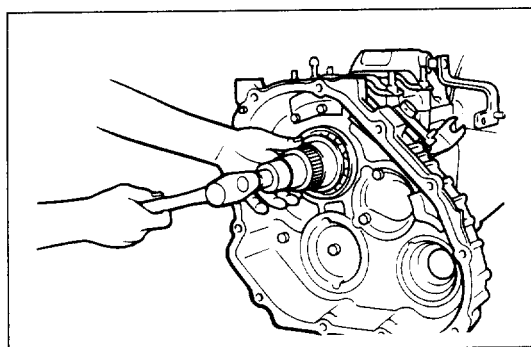
### 2. Input Shaft Bearing

- Fit the input shaft bearing (one-side sealed bearing) on the input shaft using a press.
- The bearing must be installed so that its seal side faces the opposite side of main shaft nut (outside of shaft).



### 3. Snap Ring

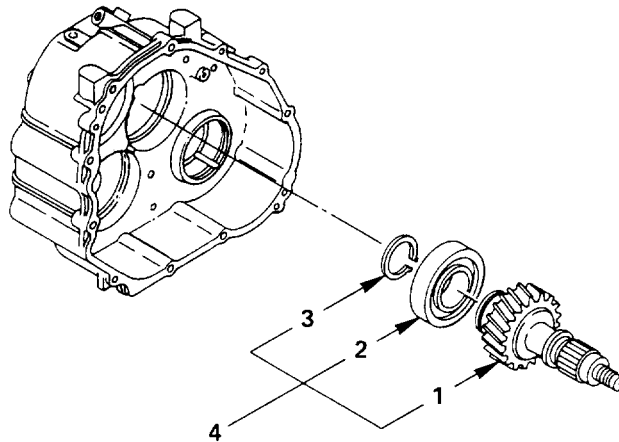
- Insert a snap ring in the input shaft using the snap ring pliers.



### 4. Input Shaft Assembly

- Install the input shaft assembly so that it meshes with the joint pipe spline on the main shaft, and hit lightly with a copper hammer until the bearing cannot move in axial direction.

## IDLE SHAFT ASSEMBLY REASSEMBLY



### Reassembly Steps

- |                       |                         |
|-----------------------|-------------------------|
| 1. Idle shaft         | 3. Idle shaft snap ring |
| 2. Idle shaft bearing | 4. Idle shaft assembly  |

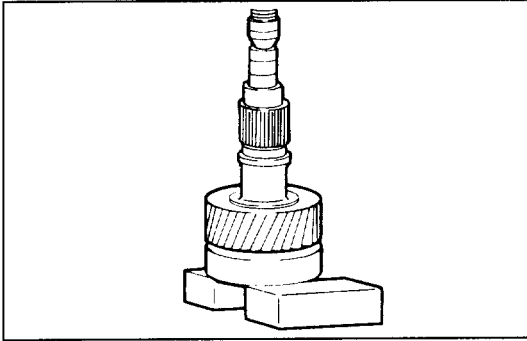


## Reassembly Steps

### 1. Idle Shaft

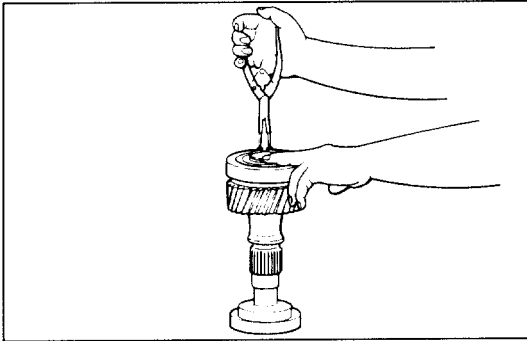
### 2. Idle Shaft Bearing

- Fit the idle shaft bearing (both-side sealed bearing) on the idle shaft using a press.



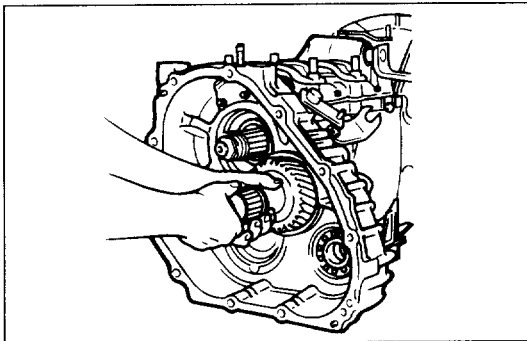
### 3. Idle Shaft Snap Ring

- Insert a snap ring in the idle shaft using the snap ring pliers.

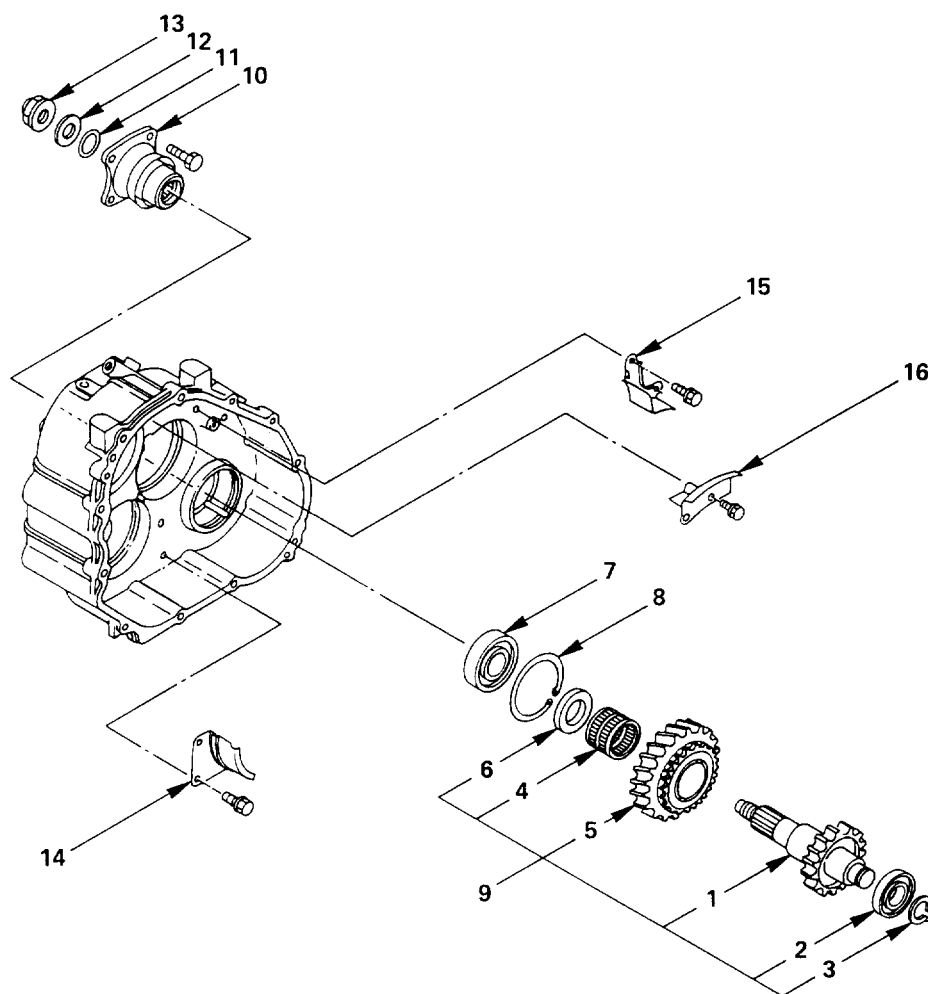


### 4. Idle Shaft Assembly

- Install the idle shaft assembly.



## FRONT DRIVE SHAFT ASSEMBLY REASSEMBLY



### Reassembly Steps

- |                                     |                               |
|-------------------------------------|-------------------------------|
| 1. Front drive shaft                | 9. Front drive shaft assembly |
| 2. Front drive shaft bearing        | 10. Coupling driver           |
| 3. Snap ring                        | 11. O-ring                    |
| 4. Front drive shaft needle bearing | 12. Coupling driver washer    |
| 5. Front drive gear                 | 13. End nut                   |
| 6. Thrust washer                    | 14. Guide plate:B             |
| 7. Front drive shaft bearing        | 15. Guide plate:A             |
| 8. Snap ring                        | 16. Baffle plate              |

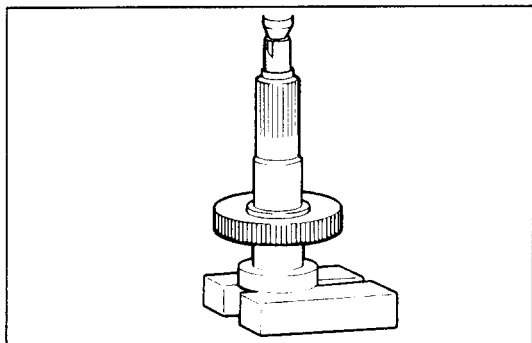


## Reassembly Steps

### 1. Front Drive Shaft

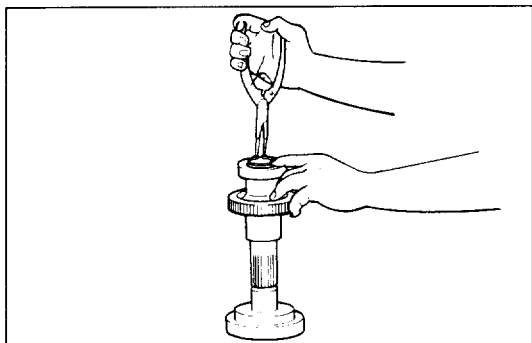
### 2. Front Drive Shaft Bearing

- Fit the front drive shaft bearing (open type bearing) on the front drive shaft using a press.



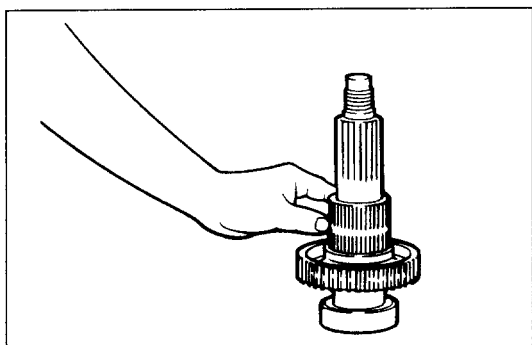
### 3. Snap Ring

- Insert a snap ring in the front drive shaft using the snap ring pliers.



### 4. Front Drive Shaft Needle Bearing

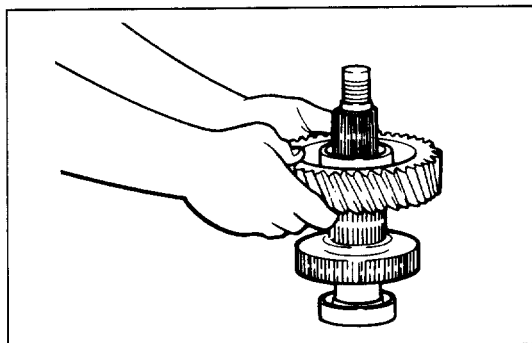
- Insert a needle bearing into the front drive shaft.
- Apply engine oil to the front drive shaft bearing part.

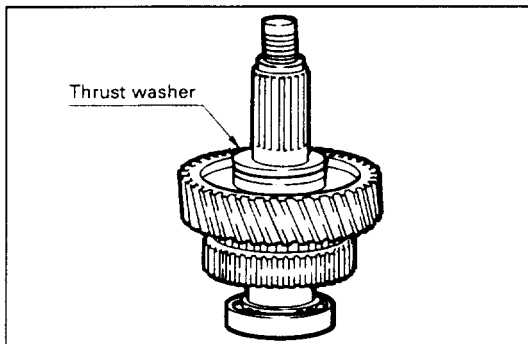


### 5. Front Drive Gear

Reassemble the front drive gear in the needle bearing part of front drive shaft.

- In reassembling the front drive gear, its dog teeth must face the needle bearing side.
- Apply engine oil to the inner diameter of front drive gear.





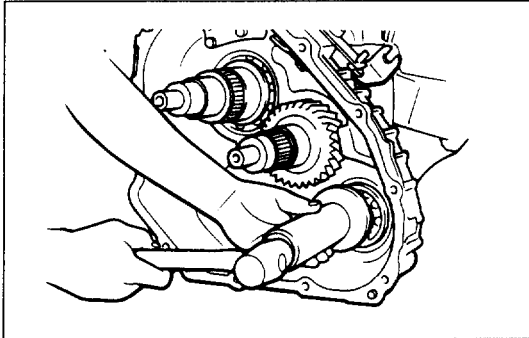
#### 6. Thrust Washer

- Fit a thrust washer on the front drive shaft using a press.



#### CAUTION:

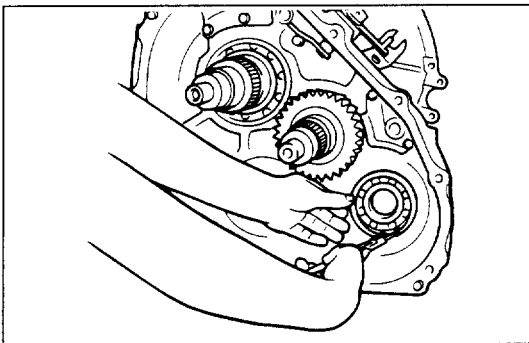
Make sure, after fitting, that the front drive gear rotates smoothly.



#### 7. Front Drive Shaft Bearing

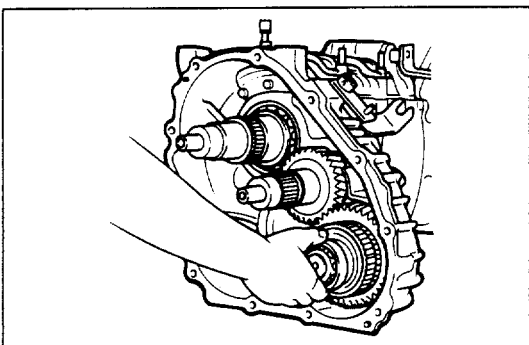
- Install the bearing in the front drive shaft hole of transfer front case using the bearing installer; front drive shaft.

Bearing installer ; front drive shaft : 5-8840-2144-0



#### 8. Snap Ring

- Insert a snap ring in the front drive shaft hole of transfer front case using the snap ring pliers.

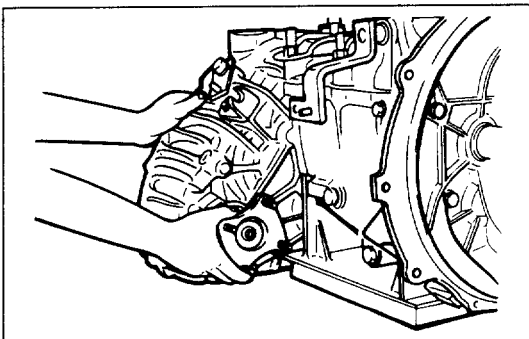


#### 9. Front Drive Shaft Assembly

- Install the front drive shaft assembly with the ball bearing facing the rear side.

#### CAUTION:

Take care not to damage the oil seal lip.



#### 10. Coupling Driver

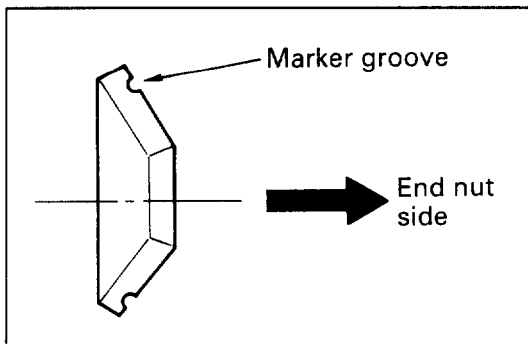
#### 11. O-ring

- Install the coupling driver so that it engages with the front drive shaft spline, and insert O-ring between coupling driver and front drive shaft.
- Replace O-ring with a new one, if damaged.

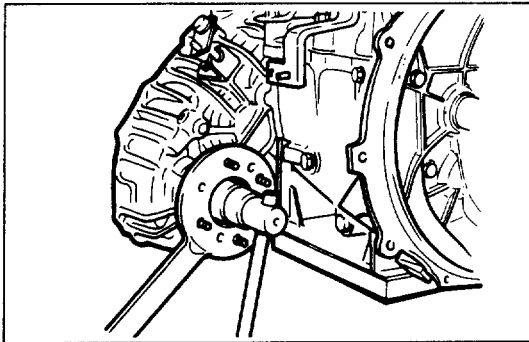
#### CAUTION:

Take care not to damage O-ring during installation.



**12. Coupling Driver Washer**

- The coupling driver washer insert direction must be as shown to the left.

**13. End Nut**

- Insert a coupling driver washer into the front drive shaft so that its marker groove faces the end nut side, hold the coupling driver with the handle; main shaft flange, and tighten the end nut.

**CAUTION:**

Use a new end nut.



- Apply engine oil to the seat face of end nut when tightening the end nut.



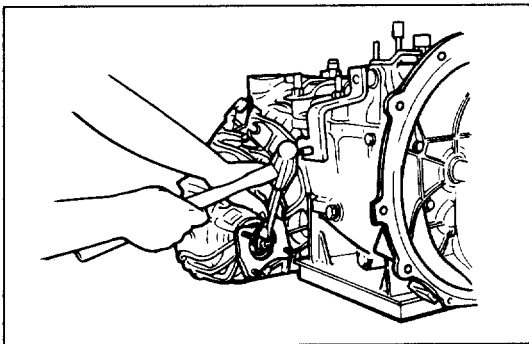
Handle; main shaft flange : 5-8840-2043-0



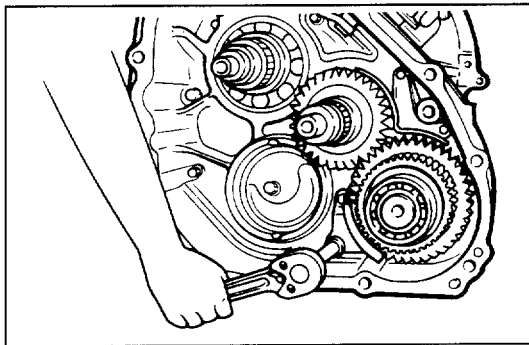
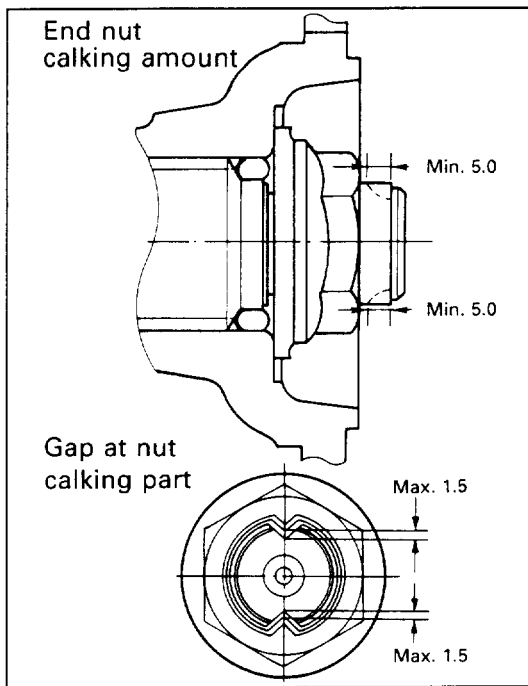
Flange Nut Torque

N·m(Kg·m/lb·ft)

221 (22.5/163)



- Meet the flange of end nut with a V-groove of front drive shaft end, and calk two points with a chisel (edge form R1 x 60°) until a gap between shaft groove bottom and nut is below 1.5mm at the calking point. Also, make sure after calking that no crack is found in the calking part of nut.



#### 14. Guide Plate:B

- Using the bolts applied with an adhesive, fix the guide plate surrounding the front drive gear in the transfer front case.

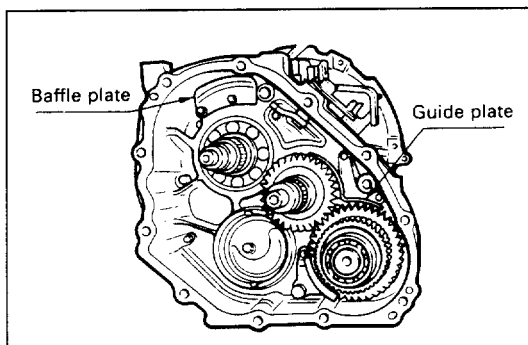


#### CAUTION:

Use new bolts since they are applied with an adhesive.



Guide Plate : B Bolt Torque	N·m(kg·m/lb·ft)
23.0 (2.3/17.0)	

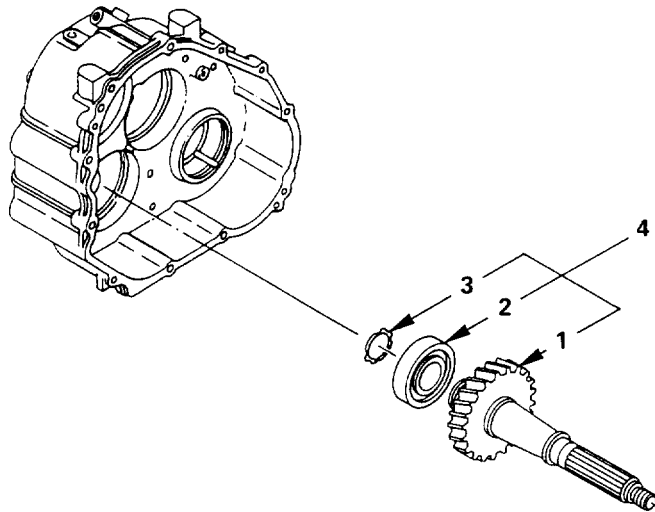


#### 15. Guide Plate:A

#### 16. Baffle Plate

Tighten the bolts to the torque specified above to fix the guide plate : A surrounding the idle gear and front drive gear and the baffle plate on the top of the transfer front case.

## REAR DRIVE SHAFT ASSEMBLY REASSEMBLY



### Reassembly Steps

1. Rear drive shaft
2. Rear drive shaft bearing
3. Snap ring
4. Rear drive shaft assembly

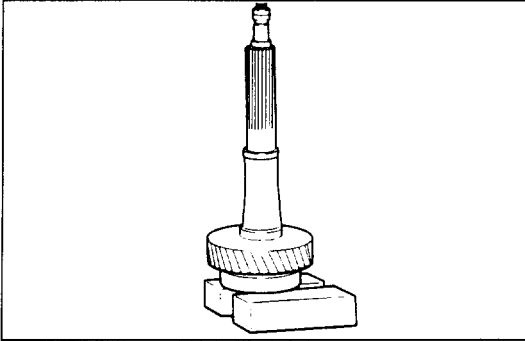


## Reassembly Steps

### 1. Rear Drive Shaft

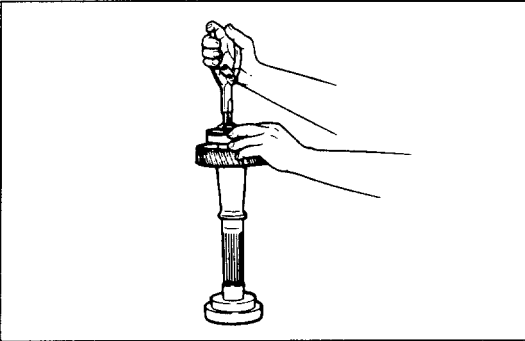
### 2. Rear Drive Shaft Bearing

- Fit the rear drive shaft bearing on the rear drive shaft using a press.



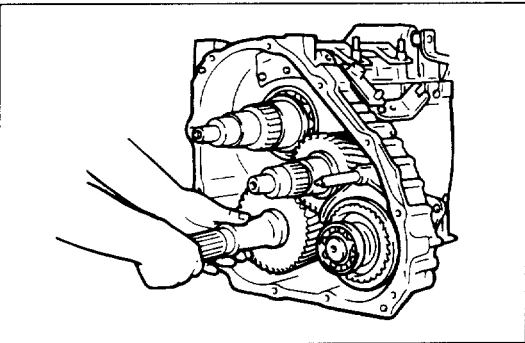
### 3. Snap Ring

- Insert a snap ring into the rear drive shaft using the snap ring pliers.



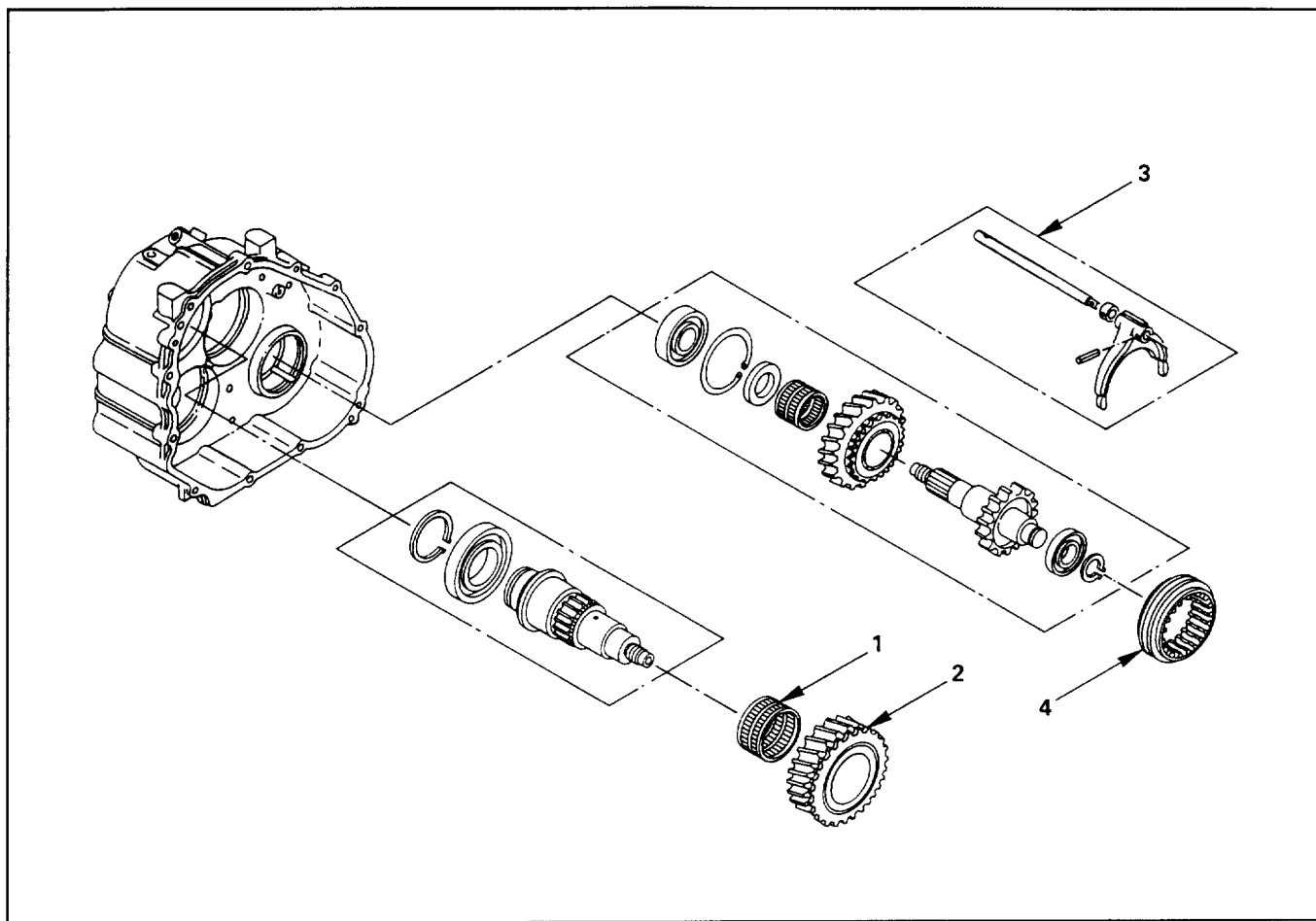
### 4. Rear Drive Shaft Assembly

- Install the rear drive shaft assembly.



## REAR DRIVE (2WD) ↔ FOUR WHEEL DRIVE (4WD) SELECT MECHANISM

### REASSEMBLY

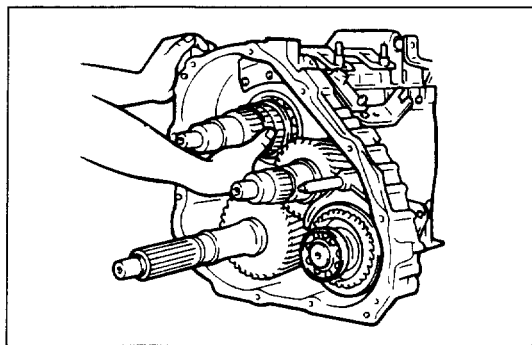


#### Reassembly Steps

1. Input shaft high gear needle bearing
2. Input shaft high gear
3. Shift arm and shift rod assembly
4. Sleeve



## Reassembly Steps

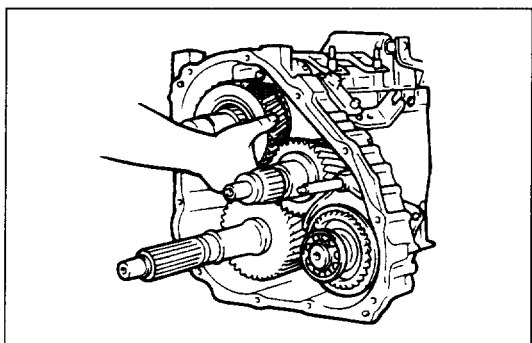


### 1. Input Shaft High Gear Needle Bearing

Install the input shaft high gear needle bearing on the input shaft.



- Apply engine oil to the shaft.

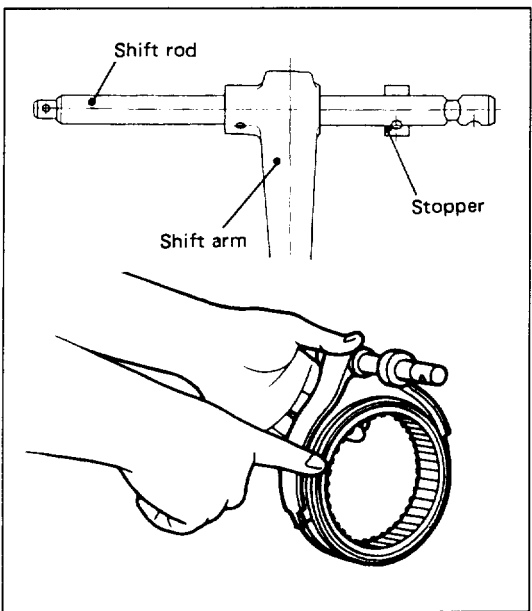


### 2. Input Shaft High Gear

Install the input shaft high gear on the input shaft so that its dog teeth face the end nut side.



- Apply engine oil to the inner diameter of input shaft high gear.
- Make sure, after installation, that the input shaft high gear rotates smoothly.



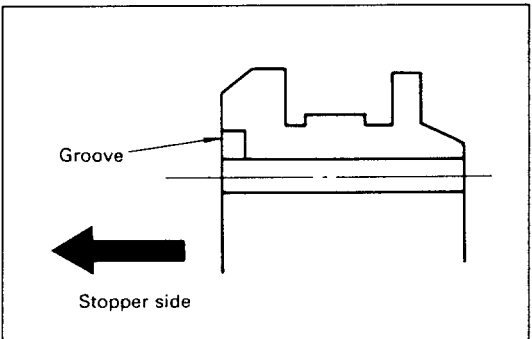
### 3. Shift Arm and Shift Rod Assembly

#### 4. Sleeve

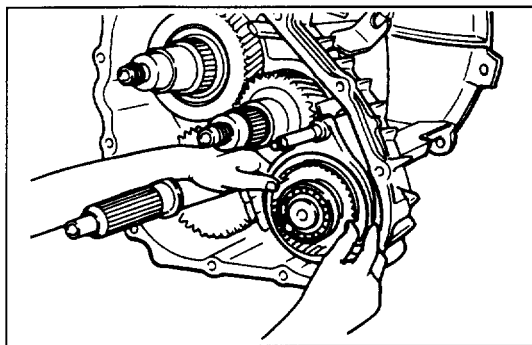
- 1) Install the rear drive (2WD) ↔ 4-wheel drive (4WD) select sleeve on the rear drive (2WD) ↔ 4-wheel drive (4WD) select shift arm and shift rod assembly.



- The sleeve must be installed so that the groove of the sleeve spline is positioned on the stopper side of shift rod.



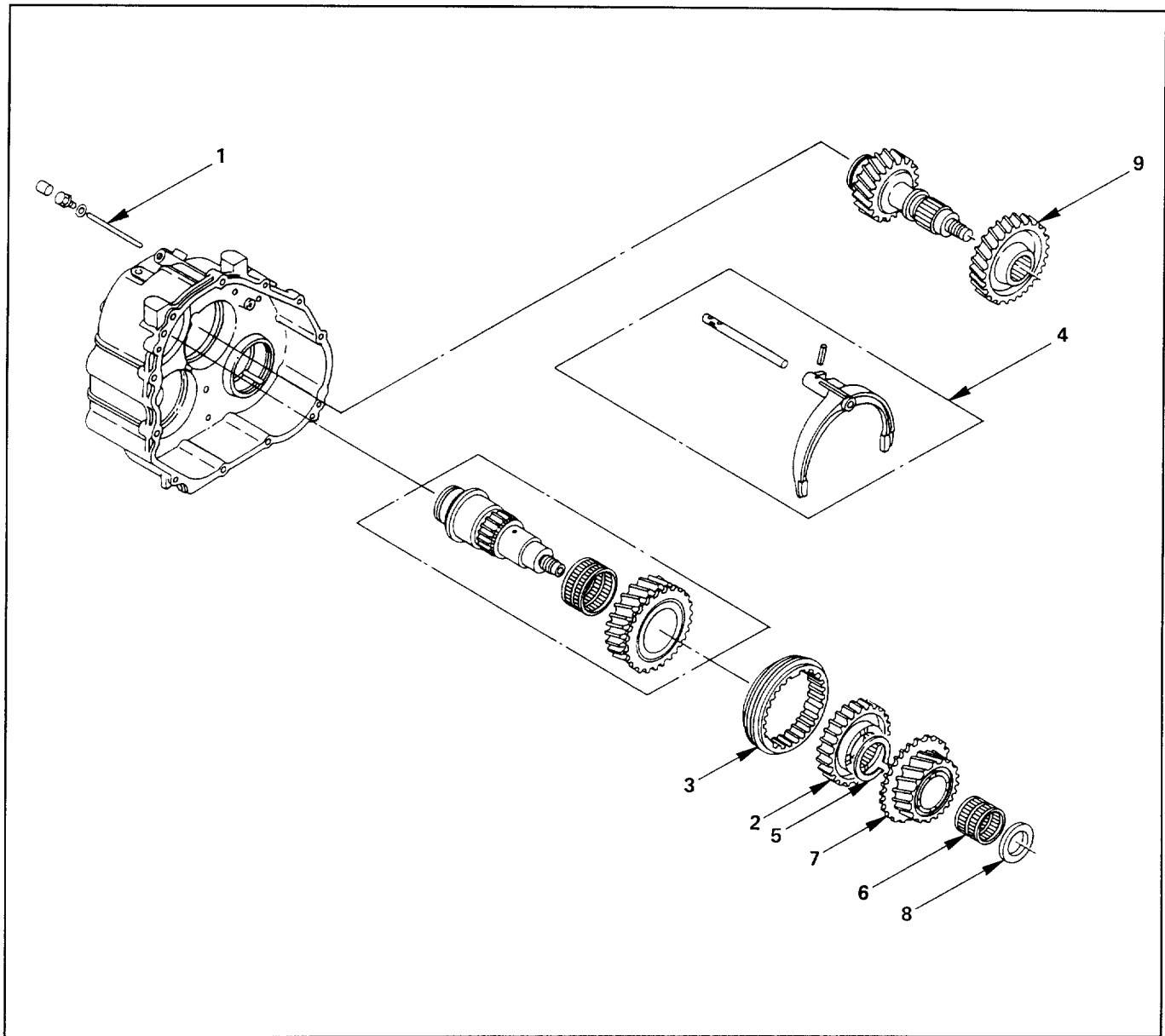
- The left figure shows the sleeve mounting direction.



- 2) Install the rear drive (2WD) ↔ 4-wheel drive (4WD) select shift arm and shift rod assembly on the front drive shaft spline and in the rear drive (2WD) ↔ 4-wheel drive (4WD) select shift rod hole simultaneously.

The shift arm and sleeve should be pushed in until they engage with the front drive gear dog teeth (in the 4WD status).

# FOUR WHEEL DRIVE HIGH SPEED RANGE (4H) ↔ LOW SPEED RANGE SELECT MECHANISM REASSEMBLY



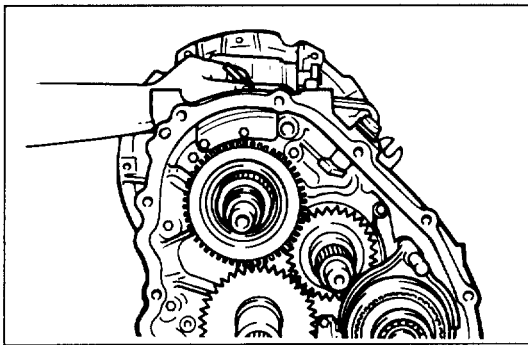
## Reassembly Steps

1. Inter lock rod
2. Clutch hub
3. Sleeve
4. Shift arm and shift rod assembly
5. Clutch hub snap ring
6. Input shaft low gear needle bearing
7. Input shaft low gear
8. Input shaft low gear thrust washer
9. Low range idle gear



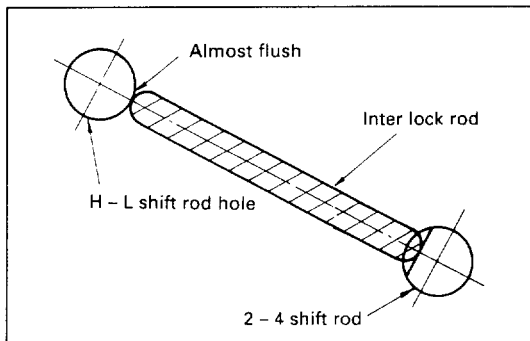


## Reassembly Steps



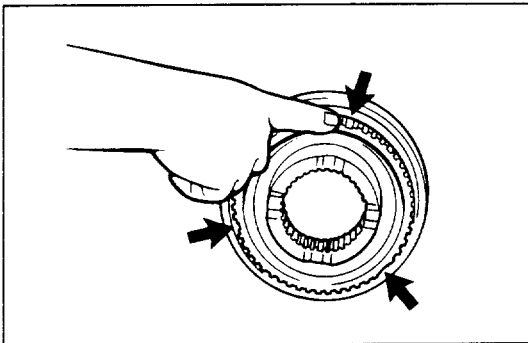
### 1. Inter Lock Rod

- Insert the inter lock rod into the transfer front case from the top.



### CAUTION:

Make sure that the leading end of inter lock rod almost flushes with the outer diameter of 4WD high speed ranged (4H) ↔ low speed range (4L) select shift rod hole.

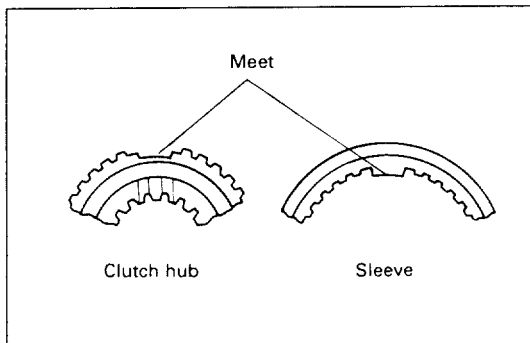


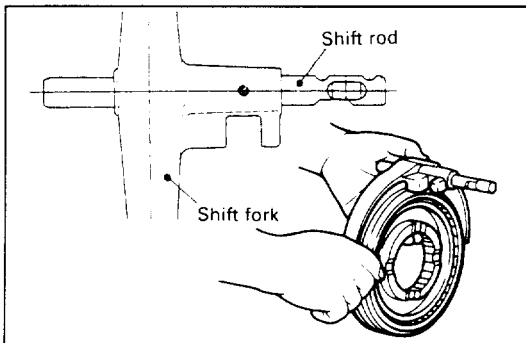
### 2. Clutch Hub

### 3. Sleeve

Reassemble the sleeve with the 2WD high speed range (4H) ↔ low speed range (4L) select clutch hub.

- Meet non-tooth portions (3 places) on the clutch hub outer diameter with stoppers (3 places) on sleeve teeth inner diameter.
- Make sure that the sleeve moves smoothly in axial direction.

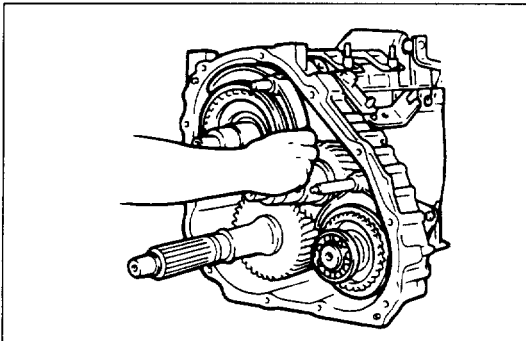




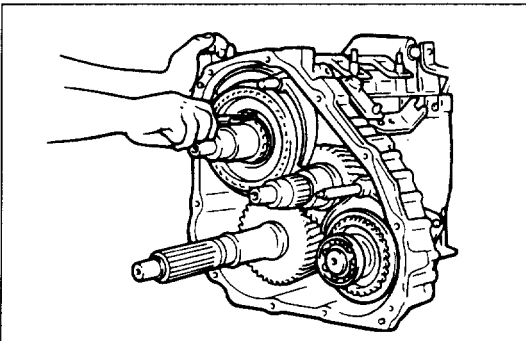
#### 4. Shift Arm and Shift Rod Assembly

- 1) Install the 4WD high speed range (4H) ↔ low speed range (4L) select shift rod and shift arm assembly in the 4WD high speed range (4H) ↔ low speed range (4L) select sleeve hub assembly.

In installing the assembly, the groove of shift arm boss must be positioned on the oil groove side of clutch hub boss.

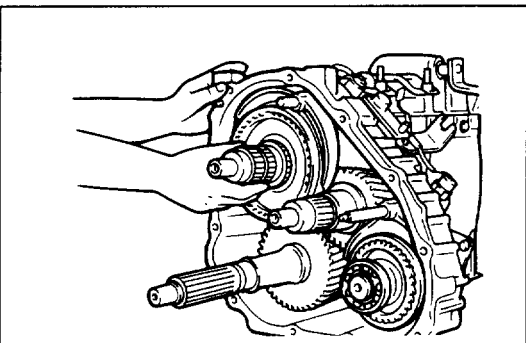


- 2) Moving the 4WD high speed range (4H) ↔ low speed range (4L) select external shift lever to the left or right, insert a spherical part of internal lever into the groove of shift arm, and push in the sleeve, hub and shift arm until they cannot move in axial direction.



#### 5. Clutch Hub Snap Ring

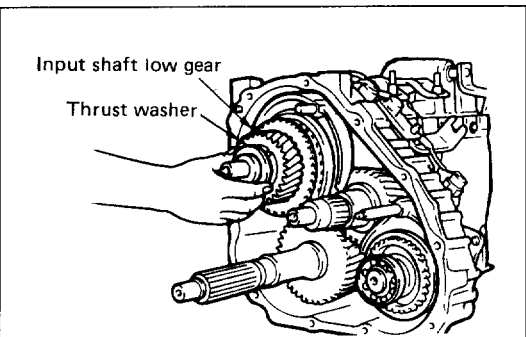
- Insert a snap ring into the input shaft spline using the snap ring pliers.



#### 6. Input Shaft Low Gear Needle Bearing

Insert the input shaft low gear needle bearing into the input shaft.

- Apply engine oil to the input shaft.



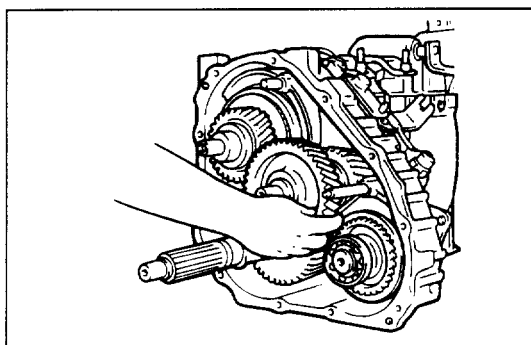
#### 7. Input Shaft Low Gear

#### 8. Input Shaft Low Gear Thrust Washer

Insert the input shaft low gear and thrust washer into the input shaft.

- Installing the input shaft low gear, its dog teeth must be positioned on the rear side (transmission side).
- Apply engine oil to the inner diameter of gear.

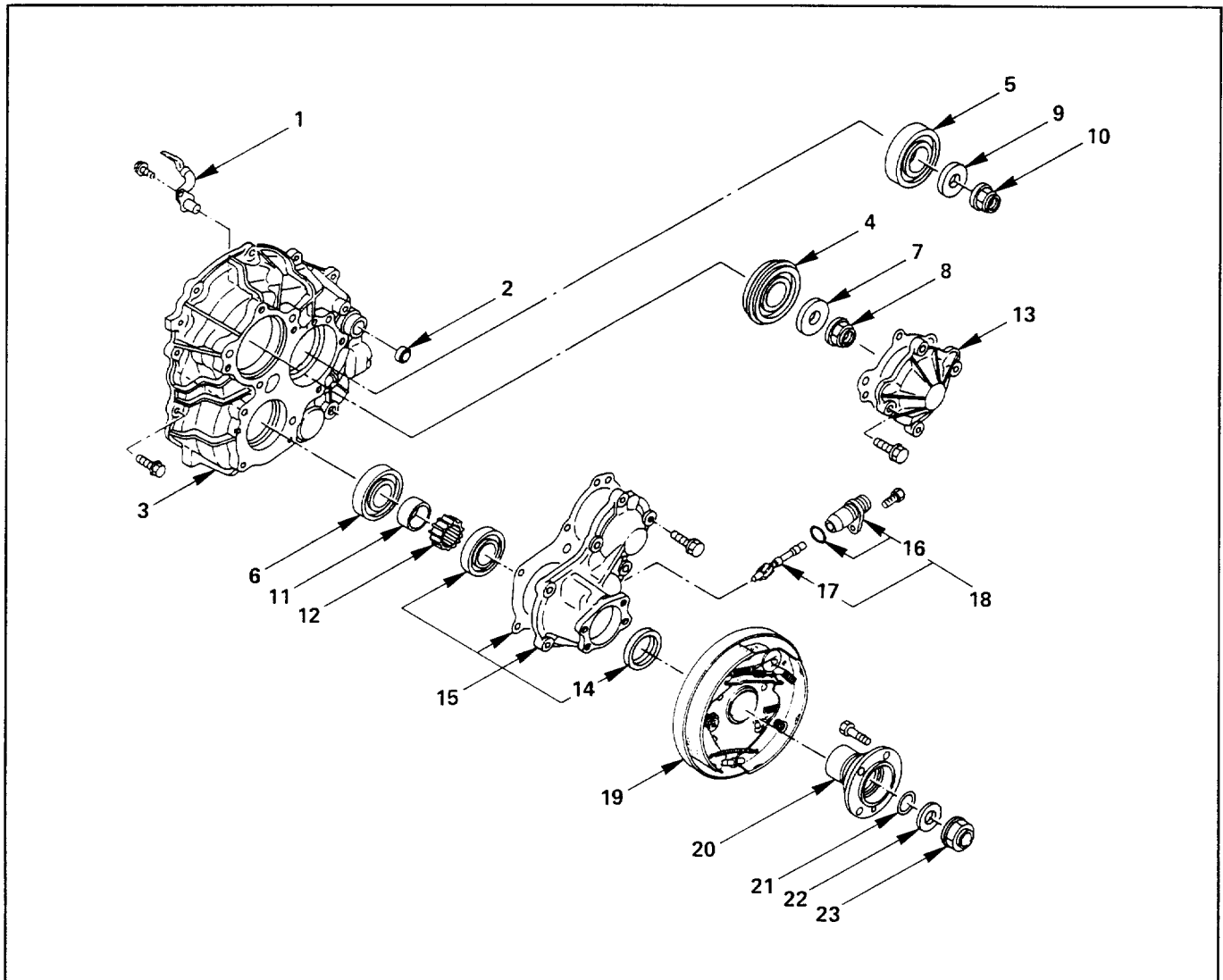




#### 9. Low Range Idle Gear

- Reassemble the low range idle gear with the idle shaft spline.
- There is no direction in idle gear installation.

## TRANSFER REAR CASE REASSEMBLY

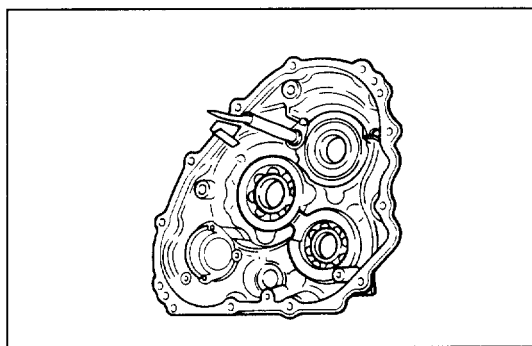


### Reassembly Steps

- |                             |                                      |
|-----------------------------|--------------------------------------|
| 1. Oil guide                | 13. P.T.O cover                      |
| 2. Shift rod oil seal       | 14. Rear cover oil seal              |
| 3. Transfer rear case       | 15. Rear cover assembly              |
| 4. Input shaft bearing      | 16. Speedometer driven gear bushing  |
| 5. Idle shaft bearing       | 17. Speedometer driven gear          |
| 6. Rear drive shaft bearing | 18. Speedometer driven gear assembly |
| 7. Input shaft washer       | 19. Center brake assembly            |
| 8. Input shaft end nut      | 20. Coupling driver                  |
| 9. Idle shaft washer        | 21. O-ring                           |
| 10. Idle shaft end nut      | 22. Coupling driver washer           |
| 11. Rear drive shaft collar | 23. Rear drive shaft end nut         |
| 12. Speedometer drive gear  |                                      |



## Reassembly Steps



### 1. Oil Guide

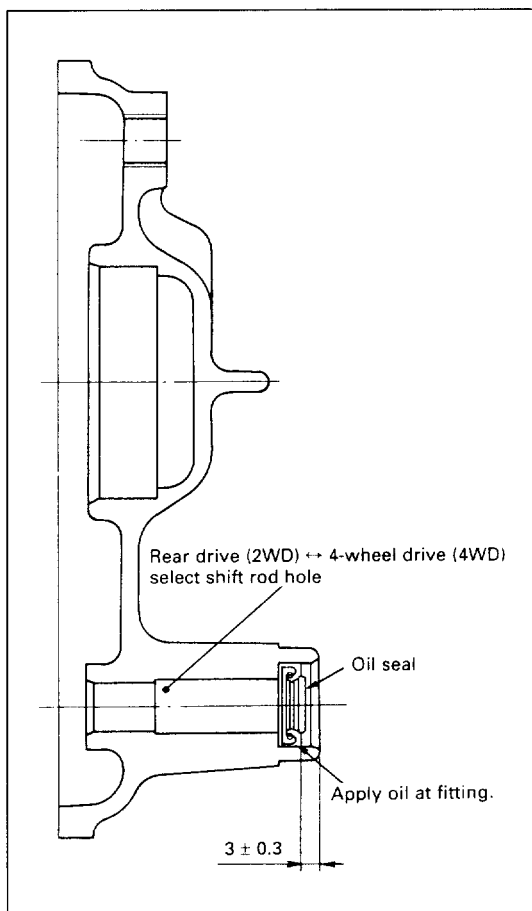
- Fix the oil guide in the transfer rear case with bolts applied with an adhesive, if it is replaced.



#### CAUTION:

Use new bolts since they are applied with an adhesive.

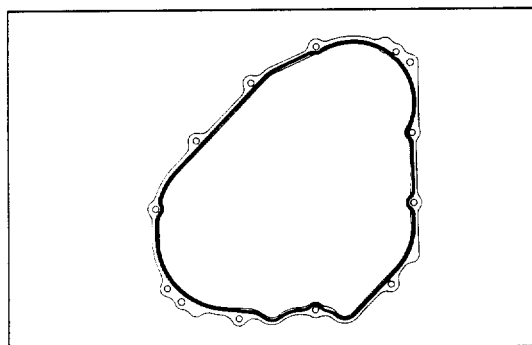
Oil Guide Bolt Torque	N·m(kg·m/lb·ft)
23 (2.3/17)	



### 2. Shift Rod Oil Seal

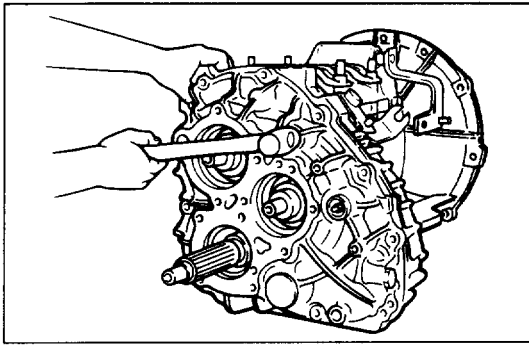
Reassemble the shift rod oil seal in the transfer rear case.

Oil seal installer; transfer rear case : 5-8840-2146-0



### 3. Transfer Rear Case

- 1) Apply sealant Three Bond 1215 (or equivalent) to the mating face of transfer rear case.

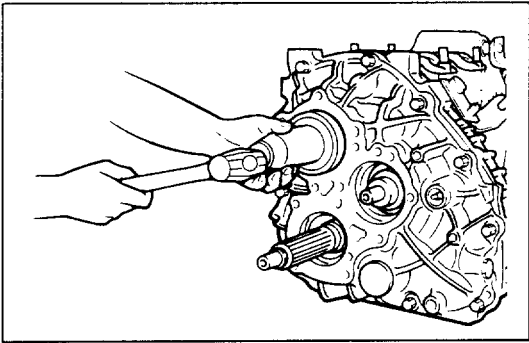


- 2) Install the transfer rear case while hitting lightly with a copper hammer.
  - Take care not to damage the oil seal lip on the leading end of rear drive (2WD) ↔ 4-wheel drive (4WD) select shift rod.
  - Each portion of transfer rear case should be hit evenly to avoid slant installation.
  - Gap in a mating surface of transfer rear case and transfer front case should be almost zero.
- 3) Tighten the bolts on transfer rear case.

Transfer Rear Case Bolt Torque	N·m (kg·m/lb·ft)
	40 (4.1/30)

**CAUTION:**

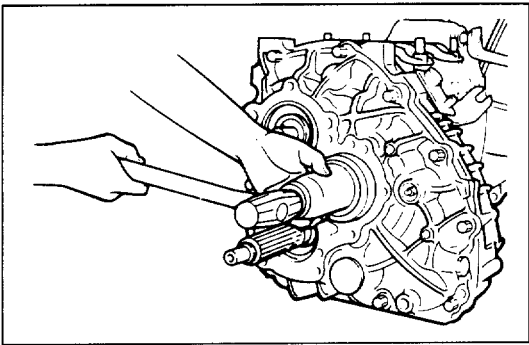
Remove puller bolts that were used for disassembly.



**4. Input Shaft Bearing**

- Drive the input shaft bearing (both-side sealed bearing) in the bearing hole on the input shaft using the bearing installer until it flushes with the mating face of the case.

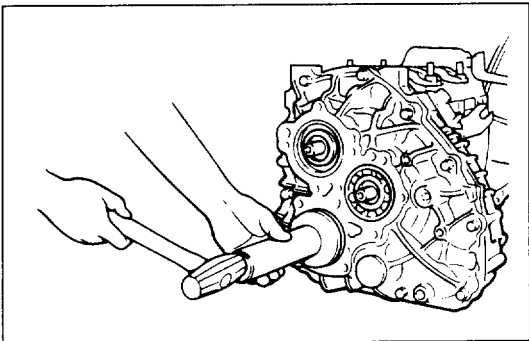
Bearing Installer : 9-8522-1615-0



**5. Idle Shaft Bearing**

- Drive the idle shaft bearing in the bearing hole on the idle shaft using the bearing installer until it flushes with the mating face of the case.

Bearing Installer : 9-8522-1615-0

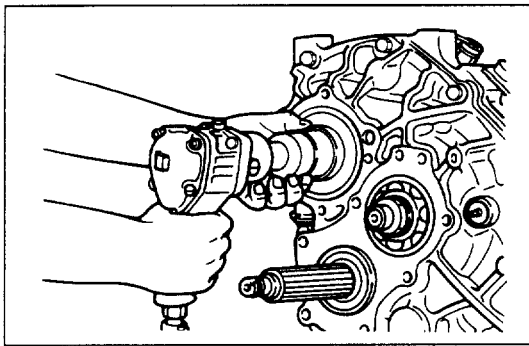


**6. Rear Drive Shaft Bearing**

- Drive the rear drive shaft bearing (one-side sealed bearing) with the seal positioned on the end nut side in the bearing hole on the rear drive shaft using the bearing installer; front drive shaft until the bearing cannot move in axial direction.

Bearing Installer : 5-8840-2144-0

- The bearing will protrude by about 5mm from the case mating face.



### 7. Input Shaft Washer

### 8. Input Shaft End Nut

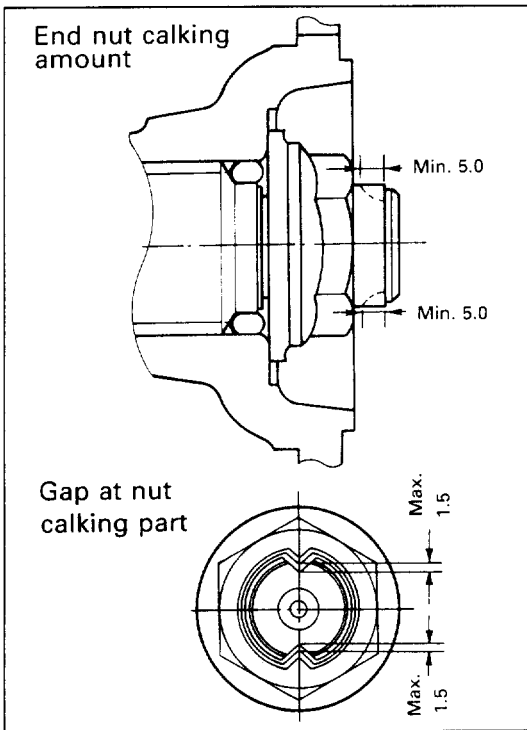
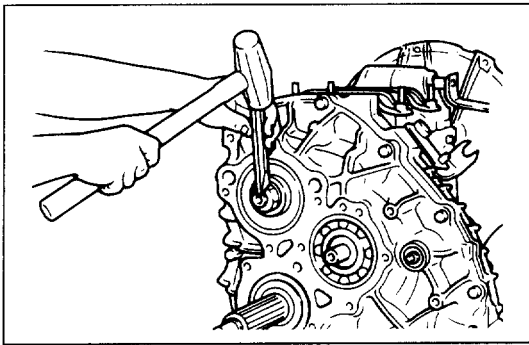
Shift the shift external lever to either L or H to place the transmission gear in a double meshing status, insert a plain washer into the input shaft, and tighten the end nut using the nut runner.

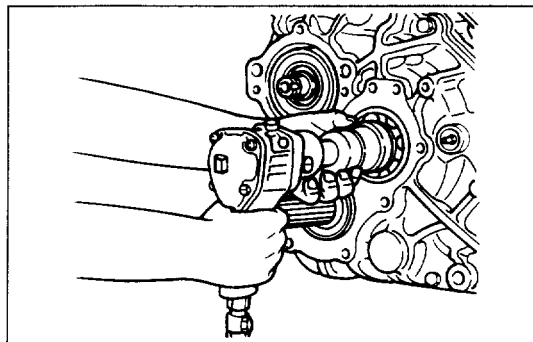
Input Shaft End Nut Torque	N·m(kg·m/lb·ft)
221(22.5/163)	

### CAUTION:

#### Use new end nut.

- Apply engine oil to the seat face of end nut when tightening the end nut.
- Meet the flange of end nut with a V-groove of input drive shaft end, and calk two points with a chisel (edge form R1x60°) until a gap between shaft groove bottom and nut is below 1.5mm at the calking point. Also, make sure after calking that no crack is found in the calking part of nut.





### 9. Idle Shaft Washer

### 10. Idle Shaft End Nut

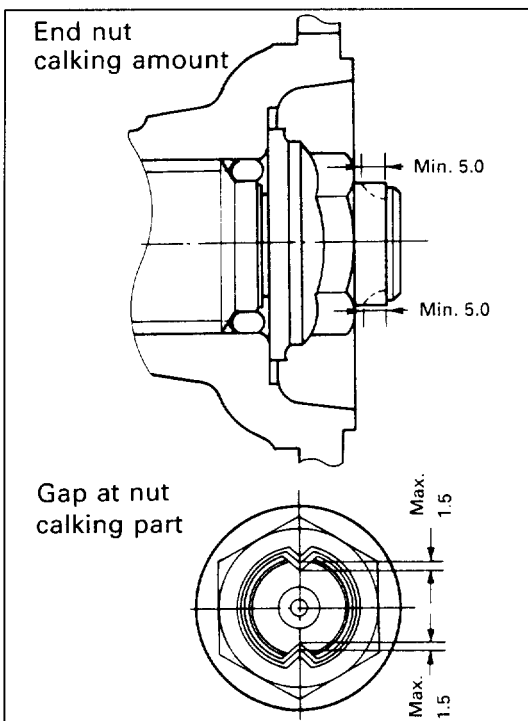
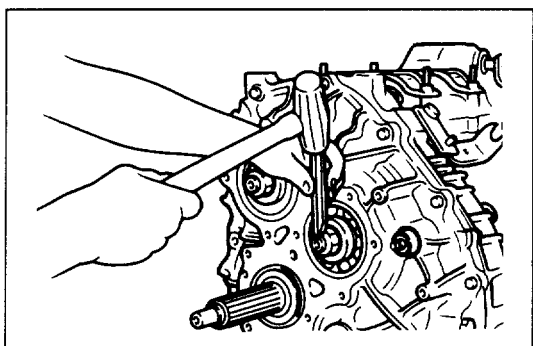
Shift the shift external lever to either L or H to place the transmission gear in a double meshing status, insert a plain washer into the idle shaft, and tighten the end nut using the nut runner.

Idle Shaft End Nut Torque	N·m(kg·m/lb·ft)
221 (22.5/163)	

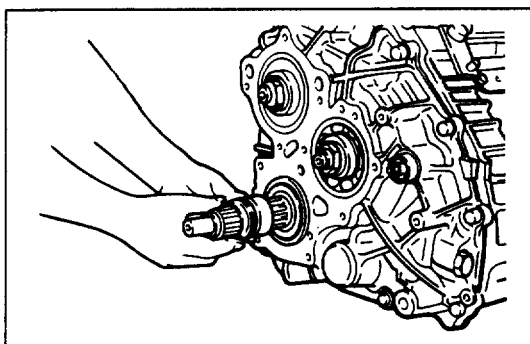
### CAUTION:

#### Use new end nut.

- Apply engine oil to the seat face of end nut when tightening the end nut.
- Meet the flange of end nut with a V-groove of idle shaft end, and calk two points with a chisel (edge form R1x60°) until a gap between shaft groove bottom and nut is below 1.5mm at the calking point. Also, make sure after calking that no crack is found in the calking part of nut.



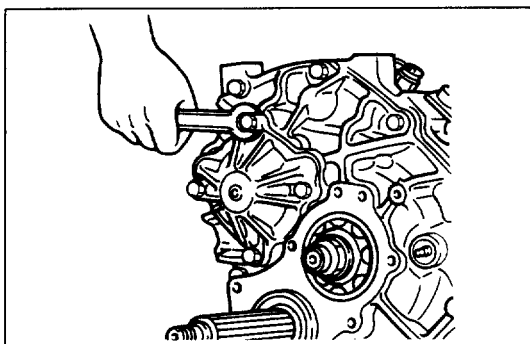




# 11. Rear Drive Shaft Collar

## 12. Speedometer Drive Gear

- Install the rear drive shaft collar and speedometer drive gear in this order on the rear drive shaft spline.
- In installing the speedometer drive gear, its boss must be positioned on the end nut side.



## 13. P.T.O Cover

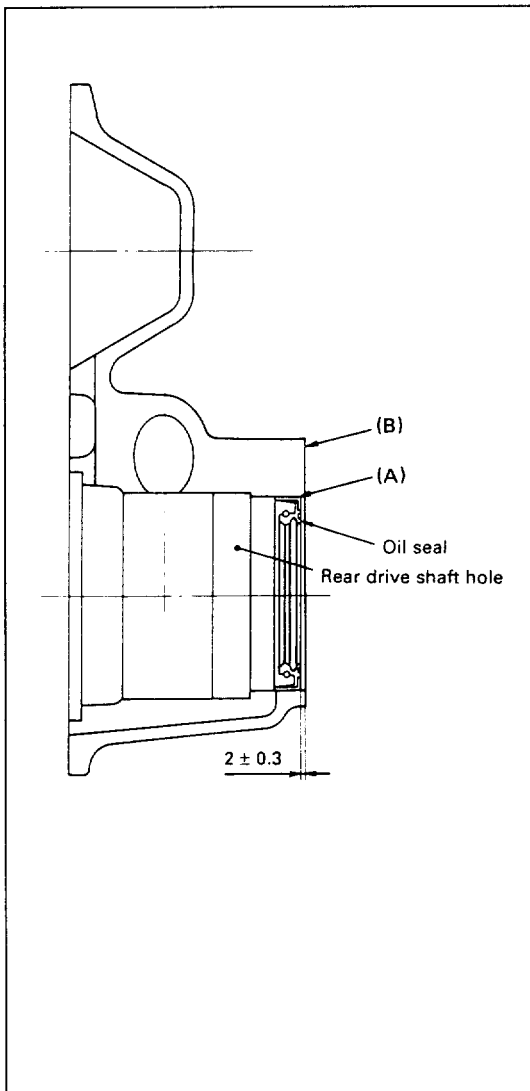
Attach a gasket to the P.T.O cover mating face of transfer rear case, and fix the P.T.O cover with bolts.

P.T.O Cover Bolt Torque	N·m(kg·m/lb·ft)
40 (4.1/30)	



### CAUTION:

Use a new gasket.



## 14. Rear Cover Oil Seal

- Insert the oil seal in the rear cover as shown to the left.
- Oil seal installer; rear cover : 5-8840-2147-0

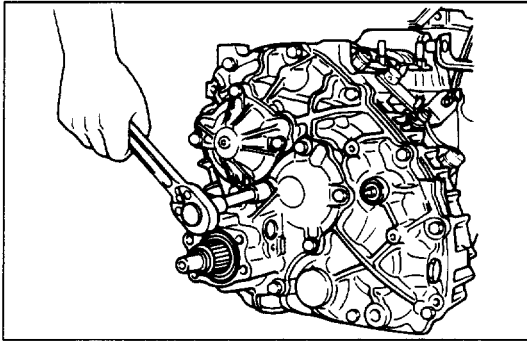


- Apply sealant (ThreeBond 1207 or equivalent) (A) part.



### CAUTION:

Do not apply sealant to flange surface (B).



### 15. Rear Cover Assembly

Attach a gasket to the rear cover mating face of transfer rear case, and fix the rear cover with bolts.

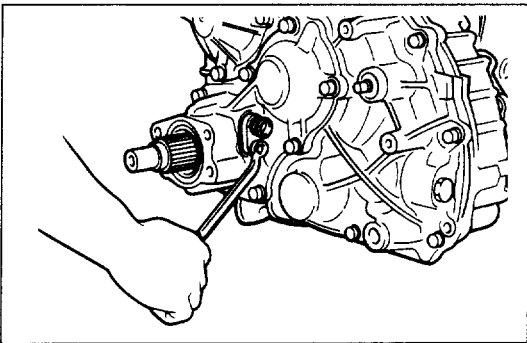
Rear Cover Bolt Torque	N·m(kg·m/lb·ft)
40 (4.1/30)	

- Before installing the rear cover, make sure that the ball bearing is in the rear cover.
- If there is no ball bearing in the rear cover, install the ball bearing on the rear drive shaft spline, then install the rear cover.



### CAUTION:

Take care not to damage the oil seal lip during installation of rear cover.



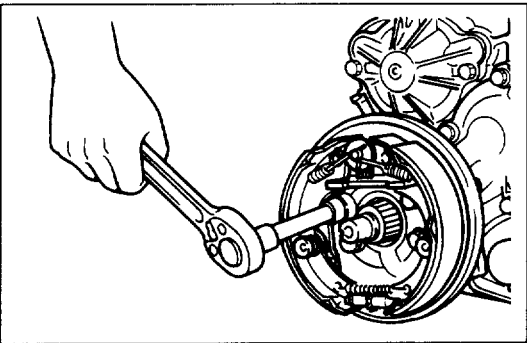
### 16. Speedometer Driven Gear Bushing

### 17. Speedometer Driven Gear

### 18. Speedometer Driven Gear Assembly

Insert the speedometer driven gear into the speedometer driven gear bushing, and fix the speedometer driven gear assembly to the rear cover assembly with bolts.

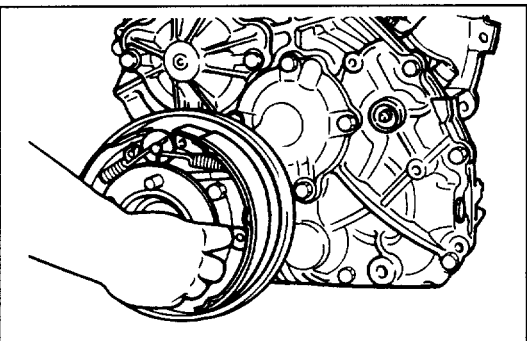
Speedometer Driven Gear Assembly Bolt Torque	N·m(kg·m/lb·ft)
15 (1.5/11)	



### 19. Center Brake Assembly

Fix the center brake assembly to the rear cover with bolts.

Center Brake Assembly Bolt Torque	N·m(kg·m/lb·ft)
83 (8.5/61)	



### 20. Coupling Driver

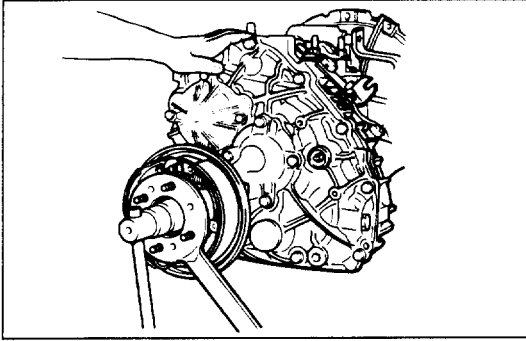
### 21. O-ring

- Drive the coupling driver into the rear drive shaft using a proper length of tube and a hammer, then insert O-ring between coupling driver and rear drive shaft.
- Replace O-ring with a new one if it is damaged.



### CAUTION:

Take care not to damage the O-ring during installation.



22. Coupling Driver Washer

23. Rear Drive Shaft End Nut

- 1) Insert a coupling driver washer into the rear drive shaft with a marker groove facing the end nut side, and tighten the rear drive shaft end nut by holding the coupling driver with handle ; the main shaft flange.

Rear Drive Shaft End Nut Torque	N·m(kg·m/lb·ft)
221 (22.5/163)	



**CAUTION:**

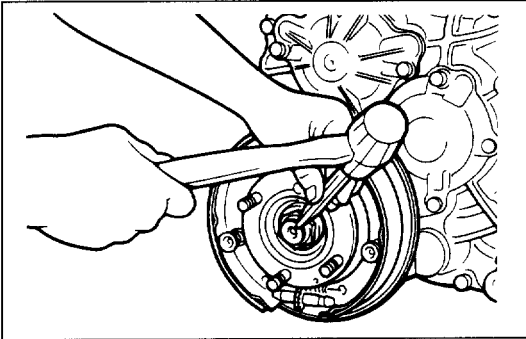
Use new end nut.



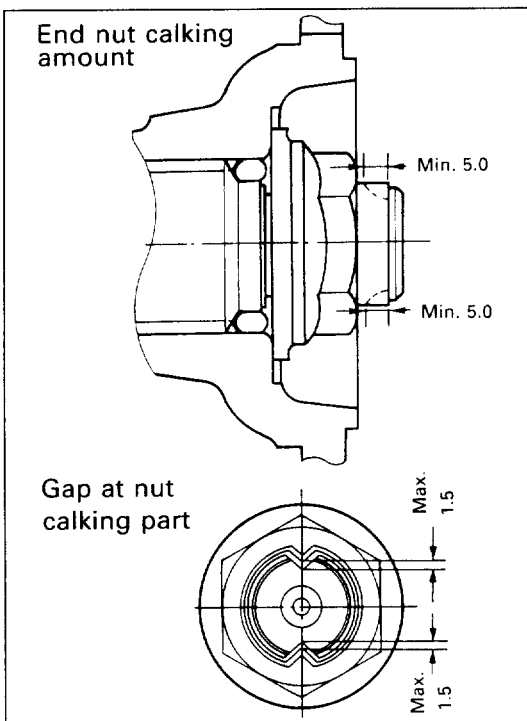
- Apply engine oil to the seat face of end nut when tightening the end nut.



Handle; main shaft flange : 5-8840-2043-0

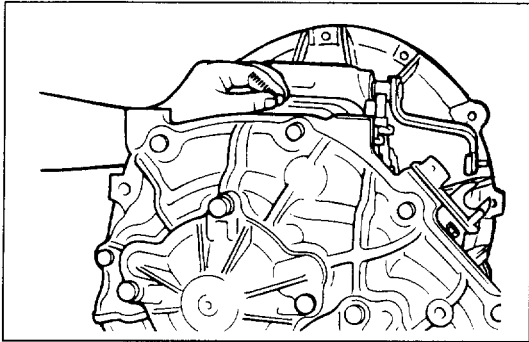


- 2) Meet the flange of end nut with a V-groove of rear drive shaft end, and calk two points with a chisel (edge form R1x60°) until a gap between shaft groove bottom and nut is below 1.5mm at the calking point. Also, make sure after calking that no crack is found in the calking part of nut.



## OTHER PARTS REASSEMBLY

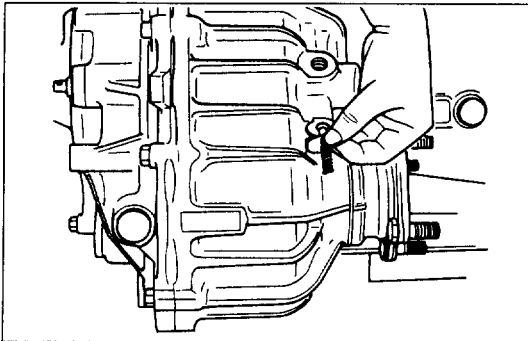
### Installation Steps



1. Detent Ball
2. Detent Spring
3. Detent Spring Plug Gasket
4. Detent Spring Plug

Install the detent ball and spring for 4WD high speed range (4H) ↔ low speed range selection in the hole drilled in 45° direction at the upper left side of transfer front case, then fix them with the plug and gasket.

Detent Spring Plug Torque	N·m(kg·m/lb·ft)
25 (2.5/18)	



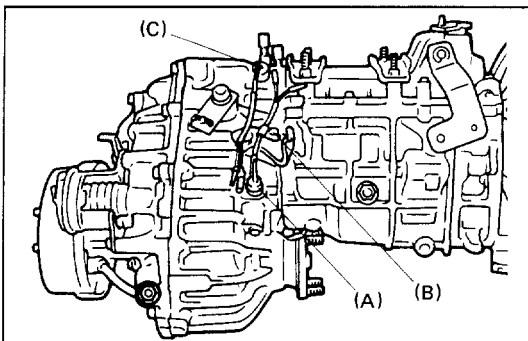
5. Detent Ball
6. Detent Spring
7. Detent Spring Plug Gasket
8. Detent Spring Plug

Install the detent ball and spring for rear drive (2WD) ↔ 4-wheel drive (4WD) selection in the hole drilled in 45° direction at the bottom right side of transfer front case, then fix them with the plug and gasket.

Detent Spring Plug Torque	N·m(kg·m/lb·ft)
25 (2.5/18)	



Take care not to drop parts.



9. 4WD Detective Switch
10. Harness Clip
11. Transfer Neutral Switch

Fix the 4WD detective switch (A), harness clip clamp bolt (B) and transfer neutral switch (C) to the transfer front case.

Torque	N·m(kg·m/lb·ft)
4WD Detective Switch	34 (3.5/25)
Harness Clip	20 (2.0/14)
Transfer Neutral Switch	34 (3.5/25)

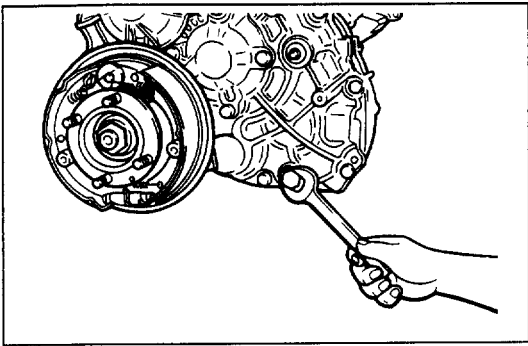


Apply sealant Three Bond 1141 (or equivalent) to the threads of 4WD detective switch and neutral switch before tightening.

12. Breather

Breather Torque	N·m(kg·m/lb·ft)
4.9 ( 0.5/3.6)	





**13. Drain Plug Gasket**

**14. Drain Plug**

Fix the drain plug to the transfer rear case.

Drain Plug Torque	N·m(kg·m/lb·ft)
49 (5.0/36)	



**15. Filler Plug Gasket**

**16. Filler Plug**

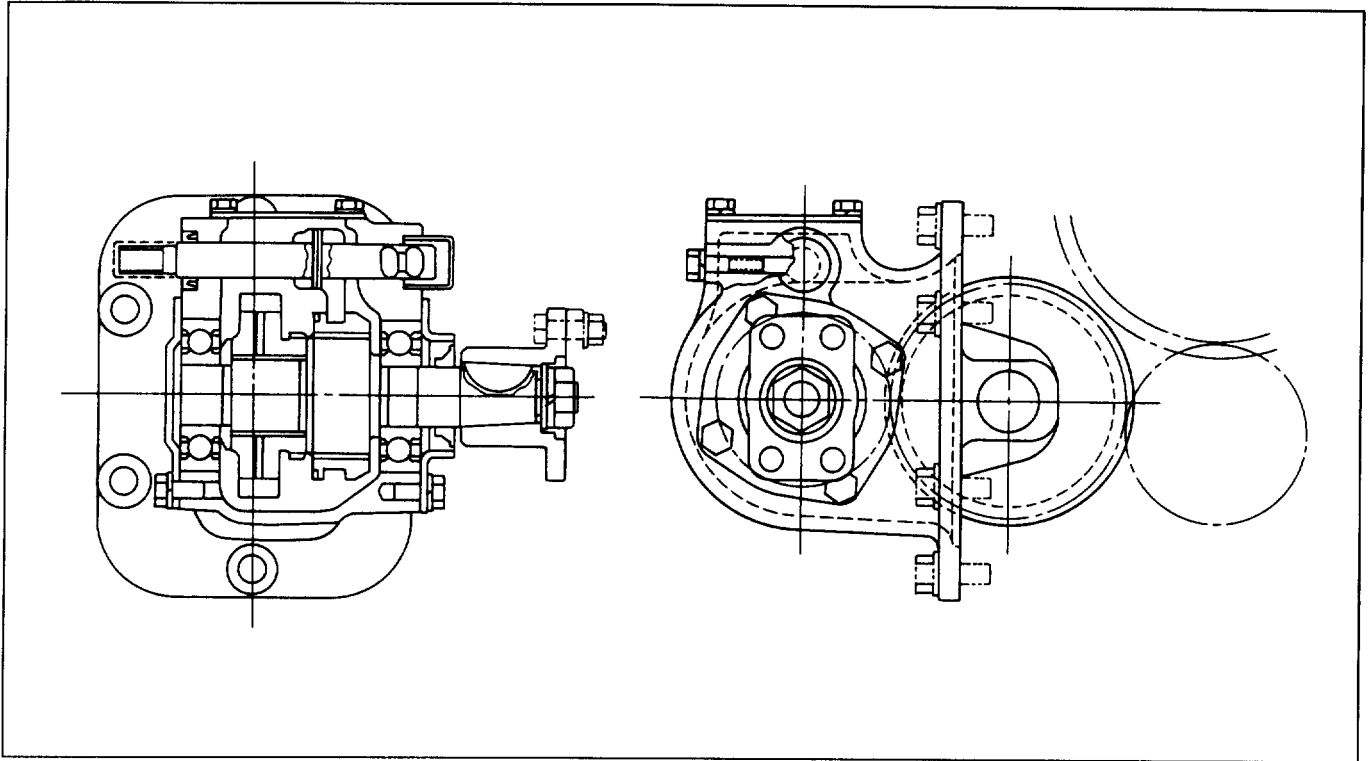
Supply engine oil from a filler port, then tighten gasket and plug.

Filler Plug Torque	N·m(kg·m/lb·ft)
49 (5.0/36)	



Oil Capacity	Liters (US qt/Imp.qt)
2.0 (2.11/1.76)	

## POWER TAKE OFF (PTO) GENERAL DESCRIPTION



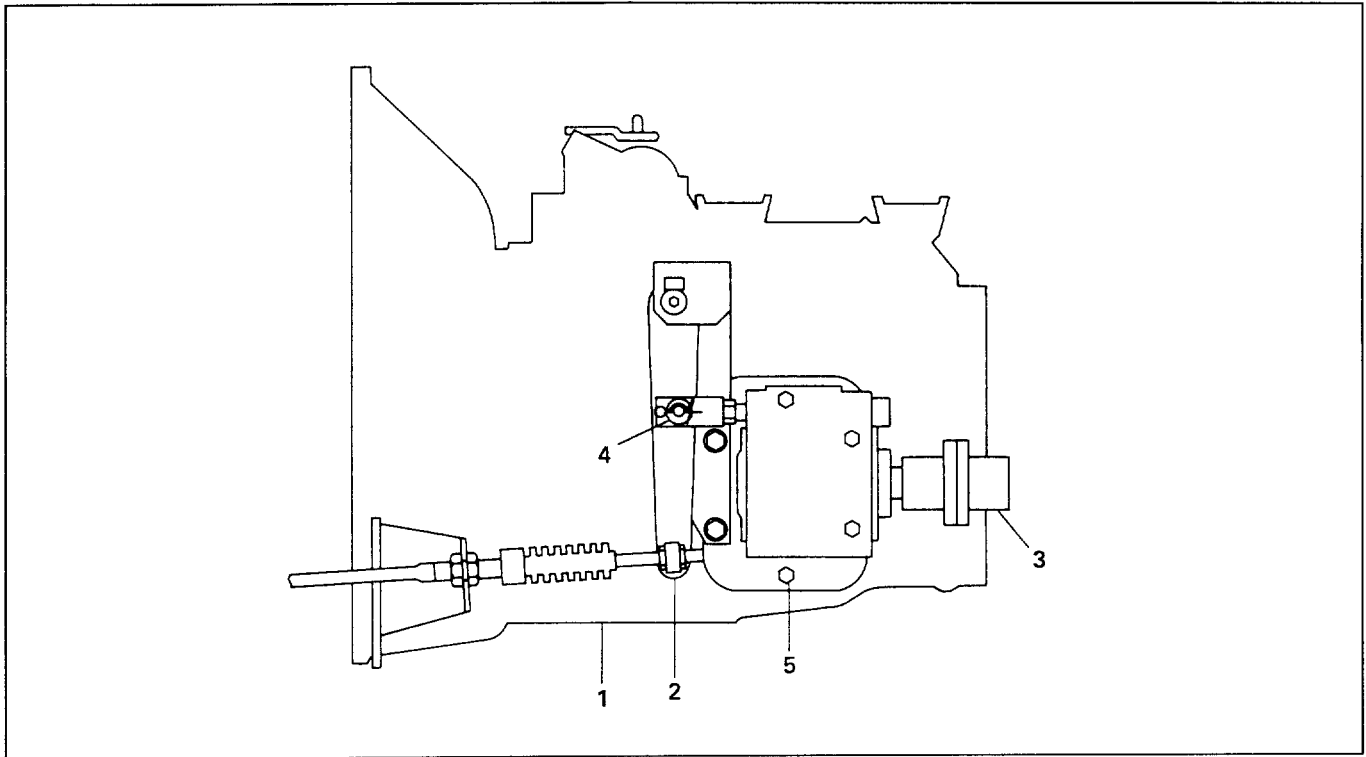
The side PTO is provided at the left side of the transmission.

For the gear, the same helical gear as the one used for the transmission is employed to reduce noises.

The roller type needle bearing is employed for the idle shaft and the ball bearing for the output shaft to obtain the increased durability and quietness.

The gear employed is of a constant-engagement type. The gear engagement control (ON/OFF) by a cable is made by the shift rod provided at the upper section of the case, which slides the sleeve above the output shaft through the shaft arm.

## POWER TAKE OFF (PTO) REPLACEMENT REMOVAL



### Removal Steps

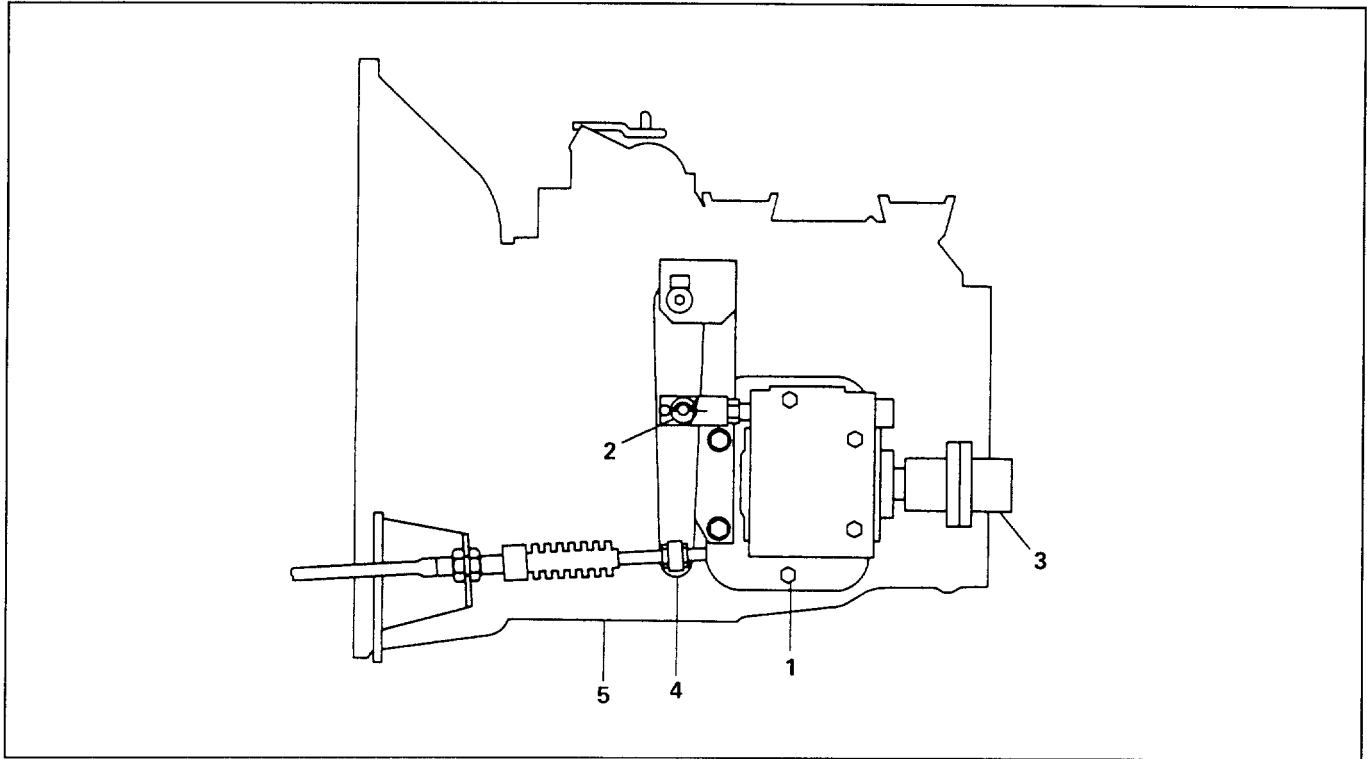
- |                               |                   |
|-------------------------------|-------------------|
| 1. Transmission oil           | 4. Connecting pin |
| 2. Control cable              | 5. PTO assembly   |
| 3. PTO output propeller shaft |                   |



### Removal Steps

1. **Transmission Oil**
  - Remove the drain plug from the transmission case and drain the oil.
2. **Control Cable**
  - Disconnect the control cable from the PTO shift lever.
3. **PTO Output Propeller Shaft**
  - Disconnect the propeller shaft from the PTO output flange.
4. **Connecting Pin**
  - Remove the snap pin, washer and the connecting pin from the shift rod and the shift lever.
5. **PTO Assembly**
  - Remove 6 PTO fixing bolts, and PTO assembly.

## INSTALLATION



### Installation Steps

1. PTO assembly
2. Connecting pin
3. PTO output propeller shaft
4. Control cable
5. Transmission oil



### Installation Steps

#### 1. PTO Assembly



- Clean on the mating faces before applying the liquid gasket.



- Apply liquid gasket (Three Bond 1141E or equivalent) to the PTO and transmission surfaces, and both sides of the distance piece (if installed).
- Install the distance piece (if installed) and PTO with new gasket(s).



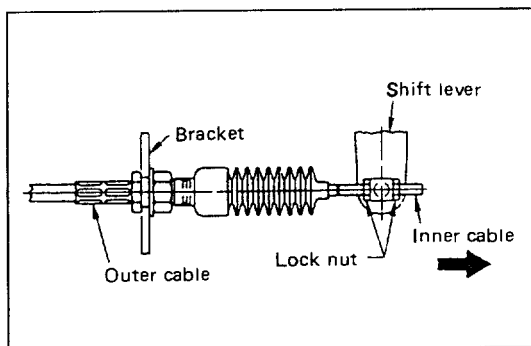
PTO Bolt Torque	N·m (kg·m/lb·ft)
	37 (3.8/27)

#### 2. Connecting Pin

- Install the connecting pin to the shift rod and shift lever and install the snap pin with washer.

#### 3. PTO Output Propeller Shaft

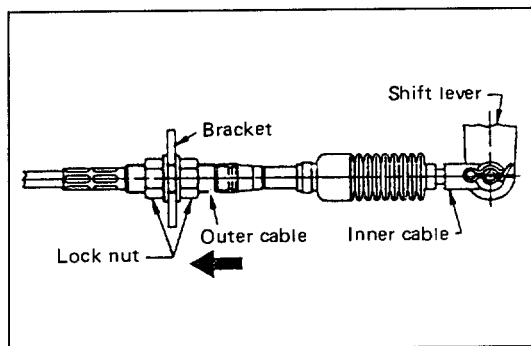




#### 4. Control Cable

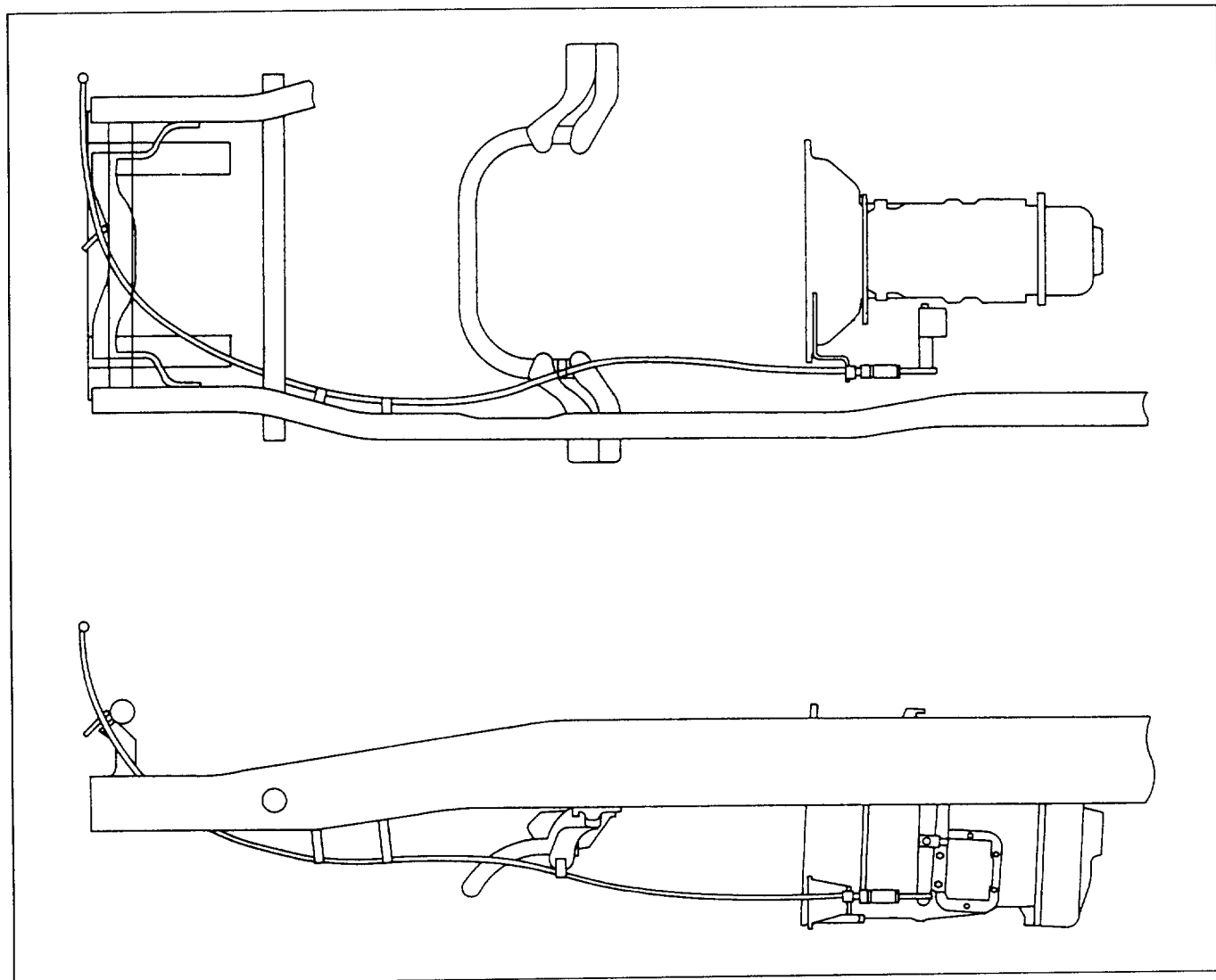
##### Inner Cable Adjustment Type

- 1) Fix the outer cable.
- 2) Set the PTO shift lever in the OFF position. Be sure to confirm the PTO control lever is in the OFF position (PTO indicator light turned off).
- 3) Remove slack from the inner cable by pulling the inner cable in the direction of the arrow.
- 4) Tighten the lock nuts.



##### Outer Cable Adjustment Type

- 1) Set the PTO shift lever in the OFF position. Be sure to confirm the PTO control lever is in the OFF position (PTO indicator light turned off).
- 2) Connect the inner cable to the PTO shift lever.
- 3) Remove slack from the inner cable by pulling the outer cable in the direction of the arrow.
- 4) Tighten the lock nuts.



**5. Transmission Oil**

- 1) Install the drain plug.

Drain Plug Torque N·m (kg·m/lb·ft)



49 (5.0/36)

- 2) Remove the filler plug and fill the transmission case with the specified engine oil through the filler plug hole.

Oil Capacity Litres (US qt/Imp.qt)

5-Speed Type	3.2 (3.38/2.82)
6-Speed Type	4.0 (4.23/3.52)

**CAUTION:**

**Use ENGINE OIL SAE 5W-30 for transmission case.**

- 3) Install the filler plug.

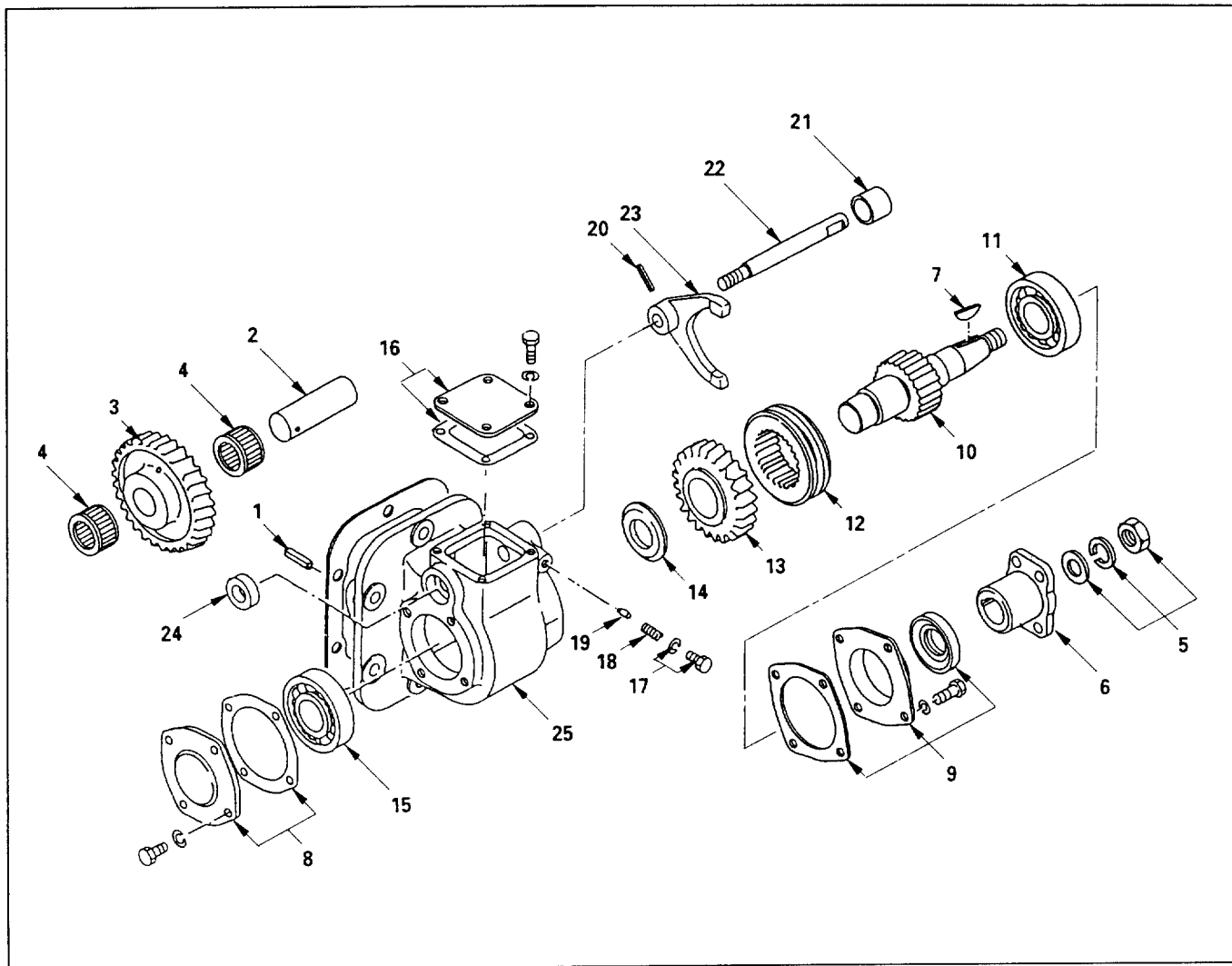
Filler Plug Torque N·m (kg·m/lb·ft)



49 (5.0/36)

# UNIT REPAIR

## DISASSEMBLY

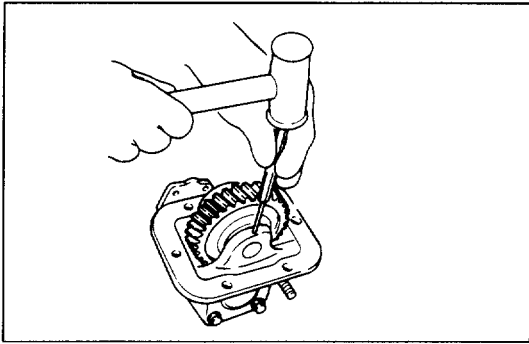


### Disassembly Steps

1. Spring pin
2. Idle gear shaft
3. Idle gear
4. Needle bearing
5. Lock nut and washer
6. Coupling driver
7. Key
8. Front cover
9. Rear cover with oil seal
10. Output shaft
11. Rear bearing
12. Sleeve
13. Output gear with bushing
14. Thrust collar
15. Front bearing
16. Upper cover
17. Plug and spring washer
18. Detent spring
19. Detent pin
20. Spring pin
21. Shift rod cap
22. Shift rod
23. Shift arm
24. Shift rod oil seal
25. Gear case



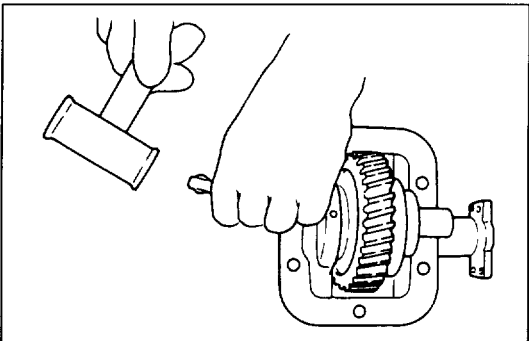
## Disassembly Steps



### 1. Spring Pin

- Tap the spring pin into the idle shaft.

Spring Pin Remover: 9-8529-2201-0



### 2. Idle Gear Shaft

- Drive out the idle gear shaft by tapping on its front end with a suitable bar and hammer.

- Remove the spring pin from the idle gear shaft.

Spring Pin Remover: 9-8529-2201-0

### 3. Idle Gear

### 4. Needle Bearing

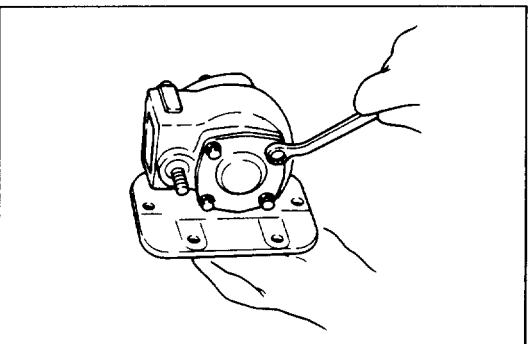
### 5. Lock Nut and Washer

- Attach a backing plate to the vice, secure the coupling driver, and remove the lock nut, spring washer and plane washer.

### 6. Coupling Driver

### 7. Key

### 8. Front Cover



### 9. Rear Cover (with Oil Seal)

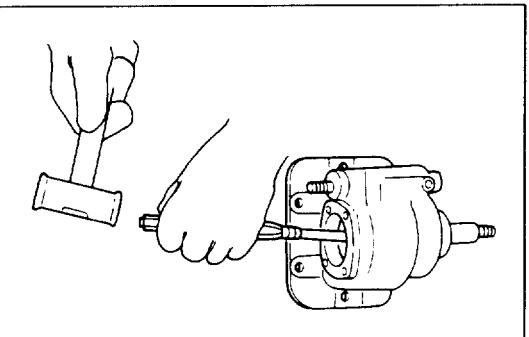
- Remove the oil seal from the rear cover.

### 10. Output Shaft

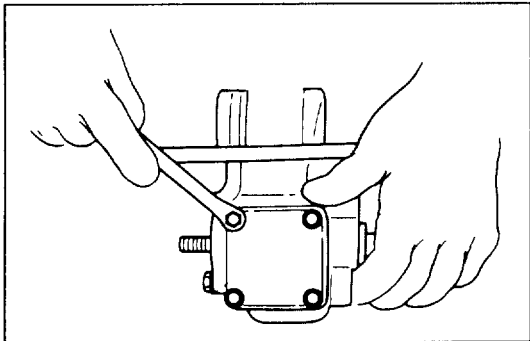
### 11. Rear Bearing

- Drive out the output shaft by tapping on its front end with a suitable bar and hammer.

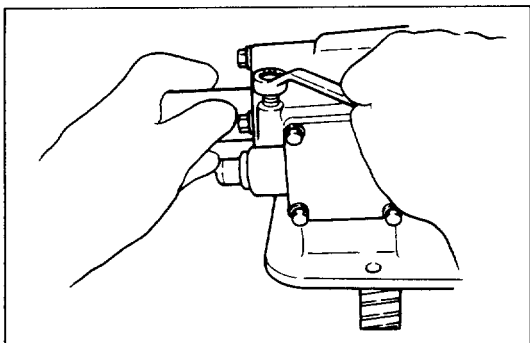
- Remove the rear bearing from the output shaft.



12. Sleeve
13. Output Gear with Bushing
14. Thrust Collar
15. Front Bearing
16. Upper Cover

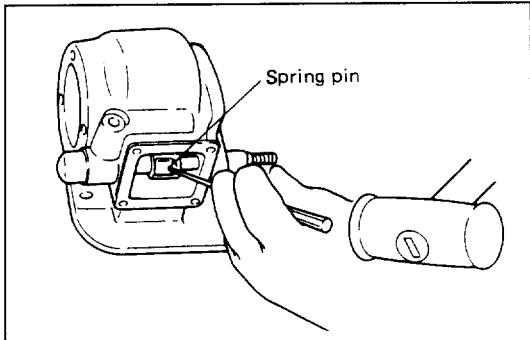


17. Plug and Spring Washer
18. Detent Spring
19. Detent Pin



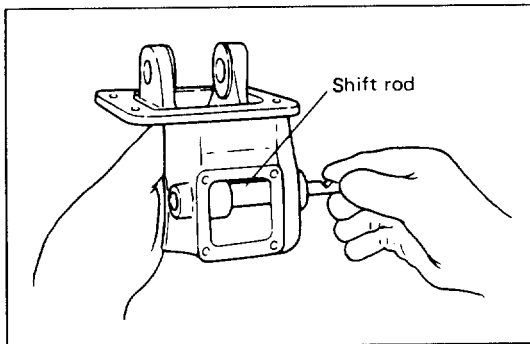
#### 20. Spring Pin

Spring Pin Remover: 9-8529-2201-0



21. Shift Rod Cap
22. Shift Rod
23. Shift Arm

- Move the shift rod rearward by tapping on its front end, then, remove the each parts.



24. Shift Rod Oil Seal
25. Gear Case

# INSPECTION AND REPAIR

Make the necessary adjustments, repairs and part replacement if excessive wear or damage is discovered during inspection.

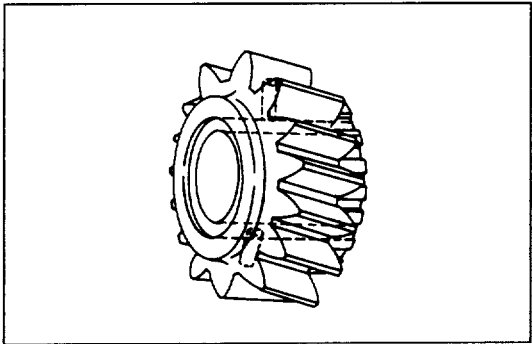
## Bearings

Check the each bearing, and replace in either of the following cases.

- Rotation is not smooth.
- Abnormal sound is generated.
- There is extreme damage or rust.
- Rolling element or rolling contact surface of needle roller bearing is discolored, extremely worn or pitted.



Ball Bearing Run-out	mm(in)
Limit	
0.2 (0.01)	



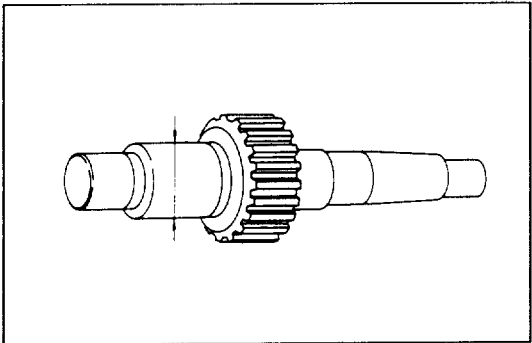
## Gears

Check each gear for the following points. Correct a slight stepped wear or surface roughness with an oil stone or pencil grinder, or replace the gear if unrecoverable damage is found.

- Break or damage of tooth.
- Extreme wear of tooth.



Output Shaft and Output Gear Bushing Clearance	mm(in)
Limit	
0.2 (0.01)	



**Idle Gear Shaft and Output Shaft**

Check the shaft external surface for any damage or wear, and its spline section for wear, damage or bent.

When there is any abnormal condition found, or when it is used excessively beyond a proper use limit, replace it with new one.

**Shift Mechanism**

Inspect all disassembled parts for wear, damage or other abnormal conditions.

- Check the shift rod for wear, bent and damage.
- Check the shift arm for wear or deformation.

Shift Arm Thickness mm(in)



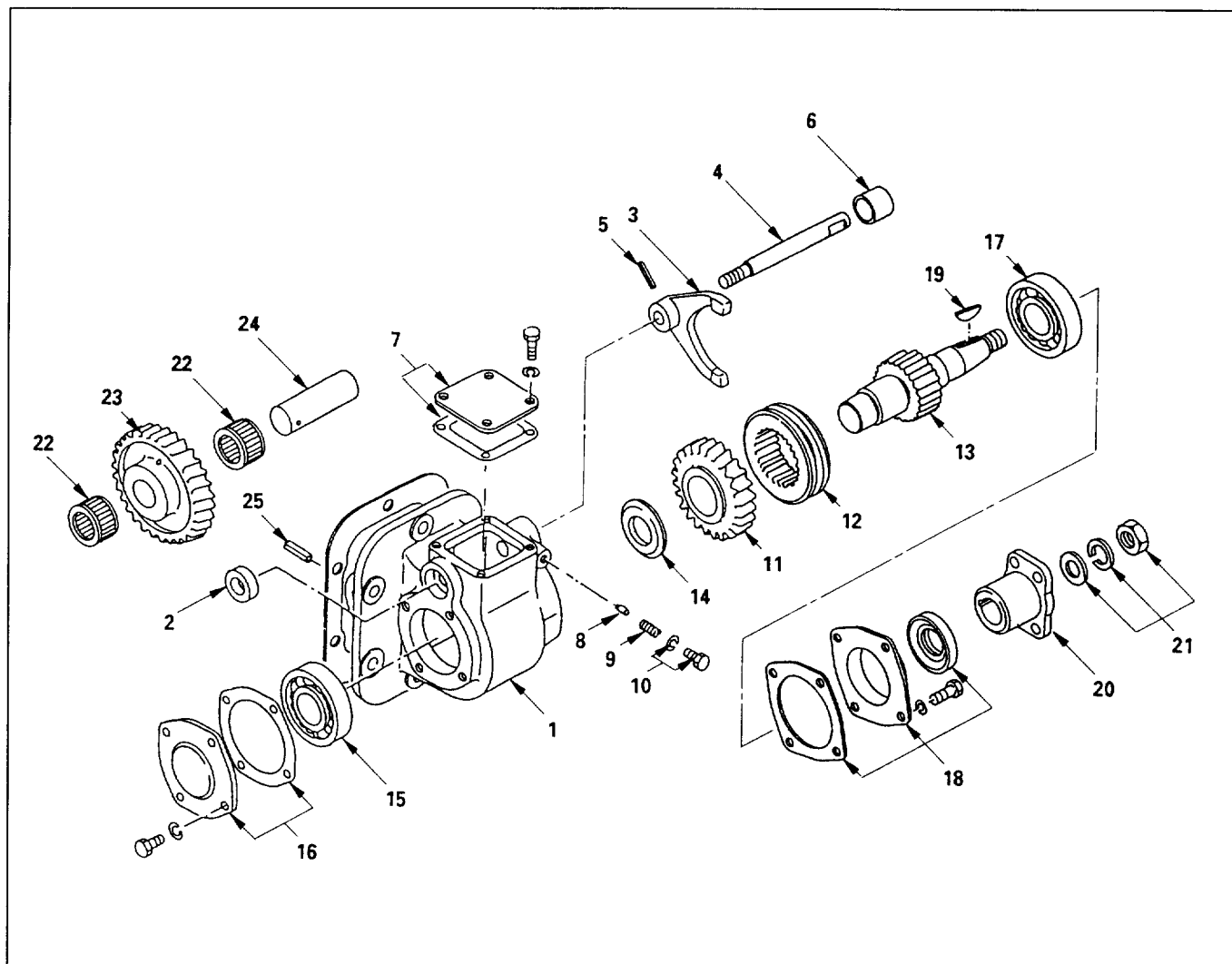
Nominal	Limit
9.0 (0.35)	8.0 (0.31)

- Check the detent spring and detent pin for wear, weakening and deformation.
- The wear of the shift rod, and the awkward operation of the gear case.

**Sleeve**

Check the sleeve for any abnormal conditions. Correct a slight stepped wear or surface roughness with an oil stone or pencil grinder, or replace the sleeve if unrecoverable damage is found.

## REASSEMBLY



### Reassembly Step

- |                              |                         |
|------------------------------|-------------------------|
| 1. Gear Case                 | 14. Thrust Collar       |
| 2. Shift Rod Oil Seal        | 15. Front Bearing       |
| 3. Shift Arm                 | 16. Front Cover         |
| 4. Shift Rod                 | 17. Rear Bearing        |
| 5. Spring Pin                | 18. Rear Cover          |
| 6. Shift Rod Cap             | 19. Key                 |
| 7. Upper Cover               | 20. Coupling Driver     |
| 8. Detent Pin                | 21. Lock Nut and Washer |
| 9. Detent Spring             | 22. Needle Bearing      |
| 10. Plug and Spring Washer   | 23. Idle Gear           |
| 11. Output Gear with Bushing | 24. Idle Gear Shaft     |
| 12. Sleeve                   | 25. Spring Pin          |
| 13. Output Shaft             |                         |





## Reassembly Steps

### NOTE:

Clean each part thoroughly.

When assembling parts, apply clean engine oil (SAE 5W-30) to their sliding and mating sections.

#### 1. Gear Case

#### 2. Shift Rod Oil Seal



- Clean and dry on the mating faces before applying the liquid gasket.
- Apply liquid gasket (Three Bond 1141E or equivalent) to the new oil seal outer circumference and apply multi-purpose grease to the oil seal lip.
- Use the oil seal installer to install the oil seal to the gear case.

Oil Seal Installer: 5-8840-2065-0

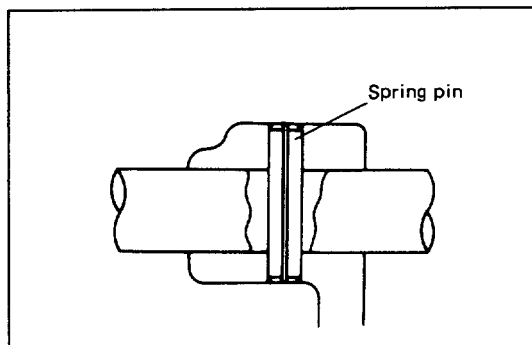
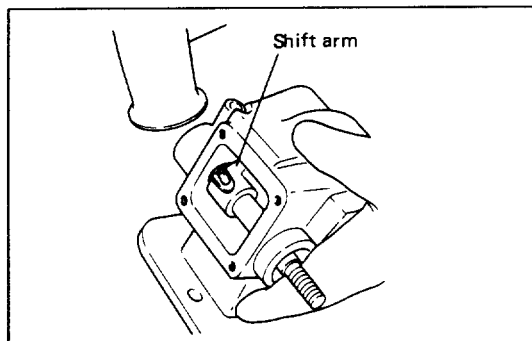
#### 3. Shift Arm



#### 4. Shift Rod



- With the boss side of the shift arm set to the rear.
- Turning the detent groove to the outside (detent pin side), insert the shift rod from the front side with the detent groove side at the front.



#### 5. Spring Pin

- Setting the hole of the shift arm to that of the shift rod, fix them with a new spring pin.

#### 6. Shift Rod Cap

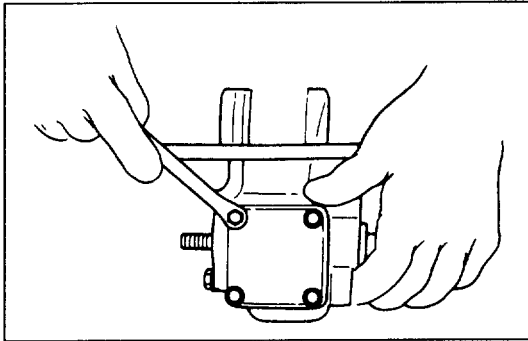


- Clean and dry on the mating faces before applying the liquid gasket.
- Apply liquid gasket (Three Bond 1141E or equivalent) to the cap outer circumference.
- Use the plug installer to install the shift rod cap.

Plug Installer: 5-8840-2067-0

### NOTE:

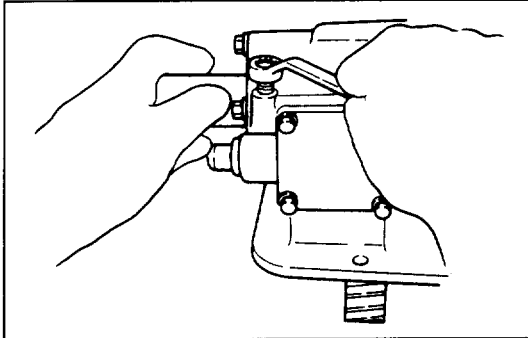
When there is any warp or flaw found with the shift rod cap, replace it with new one.



#### 7. Upper Cover

- Clean and dry on the mating faces before applying the liquid gasket.
- Apply liquid gasket (Three Bond 1141E or equivalent) to the gear case and upper cover surfaces.
- Install the upper cover with new gasket.

Upper Cover Bolt Torque	N·m (kg·m/lb·ft)
	18 (1.8/13)



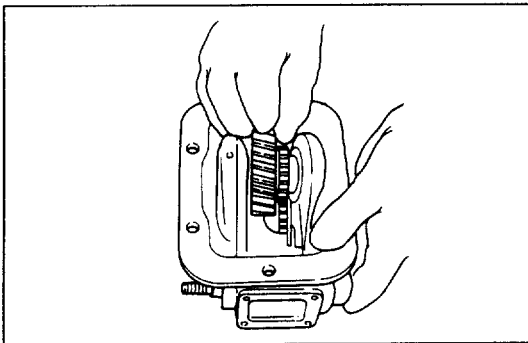
#### 8. Detent Pin

#### 9. Detent Spring

#### 10. Plug and Spring Washer

- Remove sealant from the plug and female threaded surfaces and the surfaces must be perfectly dry.
- Apply liquid gasket (LOCTITE 242 or equivalent) to the plug's threaded portion.

Detent Pin Plug Torque	N·m (kg·m/lb·ft)
	25 (2.5/18)



#### 11. Output Gear with Bushing

- Install with the dog gear side turned to the coupling driver side (to the rear).

#### 12. Sleeve



- Chamfer face of the sleeve outer circumference should be positioned toward the coupling driver and assemble the sleeve groove to the shift arm.

#### 13. Output Shaft

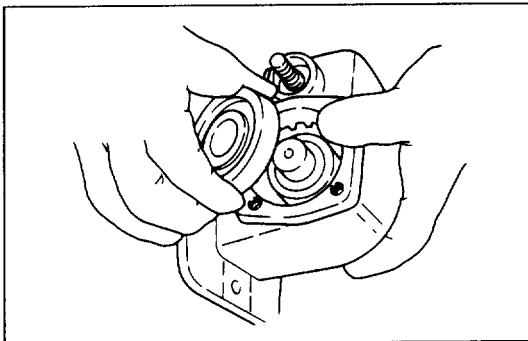
#### 14. Thrust Collar

#### 15. Front Bearing



- Install the thrust collar and front bearing using bearing installer.

Bearing Installer: 5-8840-2066-0



16. Front Cover



- Clean and dry on the mating faces before applying the liquid gasket.



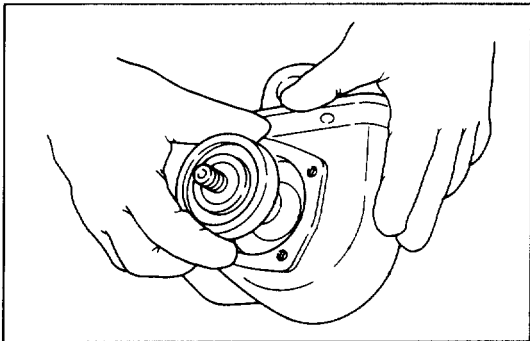
- Apply liquid gasket (Three Bond 1141E or equivalent) to the gear case and front cover surfaces.



- Install the front cover with new gasket.
- Apply liquid gasket (LOCTITE 242 or equivalent) to the fixing bolts threaded portion.



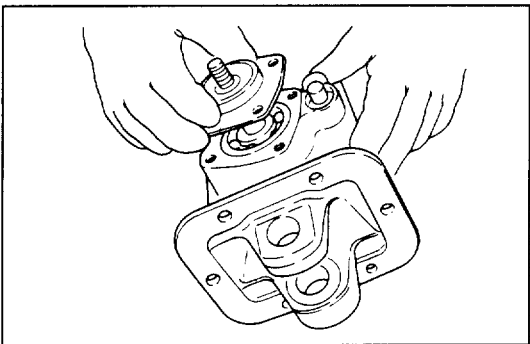
Upper Cover Bolt Torque	N·m (kg·m/lb·ft)
18 (1.8/13)	



17. Rear Bearing



- Use the bearing installer to install the rear bearing to the gear case.  
Bearing Installer:5-8840-2066-0



18. Rear Cover



- Apply liquid gasket (Three Bond 1141E or equivalent) to the new oil seal outer circumference and apply multi-purpose grease to the oil seal lip.



- Use oil seal installer to install the oil seal to the rear cover.

Oil Seal Installer: 5-8840-2064-0



- Apply approx. 3 grams (0.1 ounce) of the Multi-purpose with MoS<sup>2</sup> type grease to the inside of rear cover.



- Clean on the mating faces before applying the liquid gasket.

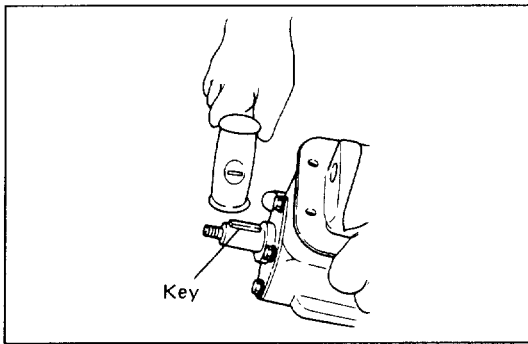


- Apply liquid gasket (Three Bond 1141E or equivalent) to the rear cover and gear case surfaces.

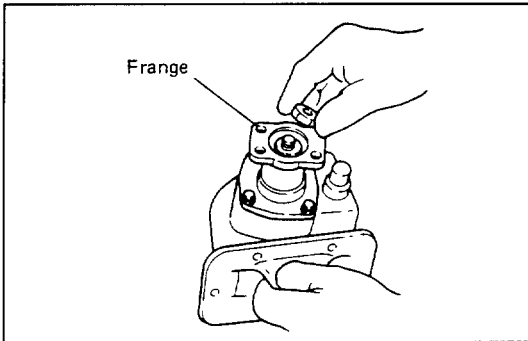
- Install the rear cover with new gasket.



Rear Cover Bolt Torque	N·m (kg·m/lb·ft)
18 (1.8/13)	



**19. Key**



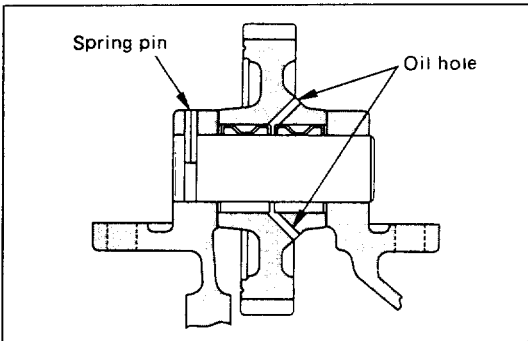
**20. Coupling Driver**

**21. Lock Nut and Washer**

- Attach a backing plate to the vice, secure the coupling driver, and tighten the lock nut.



Lock Nut Torque	N·m (kg·m/lb·ft)
	105 (10.7/77)



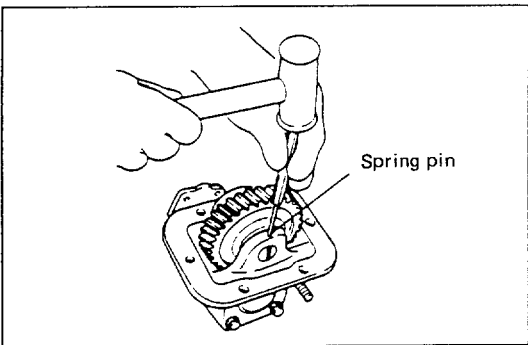
**22. Needle Bearing**

**23. Idle Gear**

- Install with the oil holes side turned to the rear.



**24. Idle Gear Shaft**



**25. Spring Pin**

## SECTION 7C

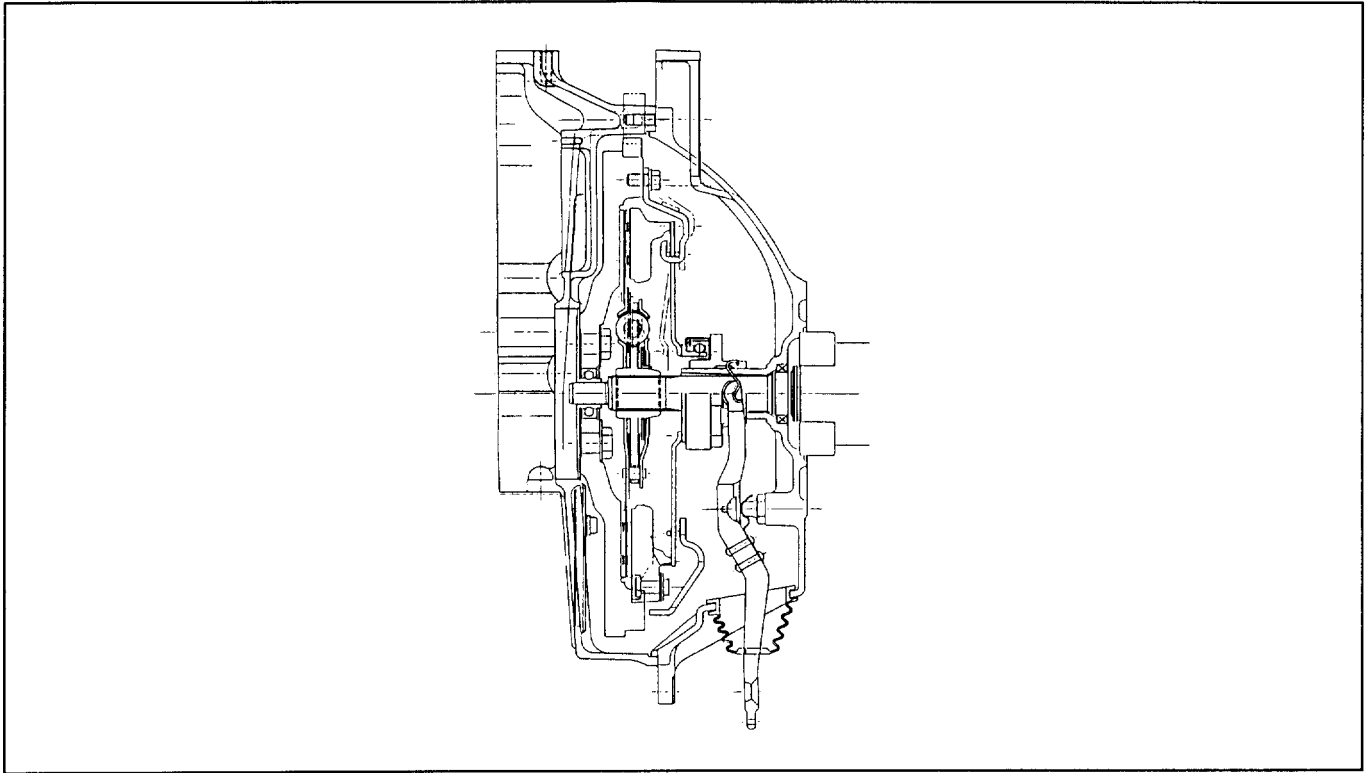
# CLUTCH

## CONTENTS

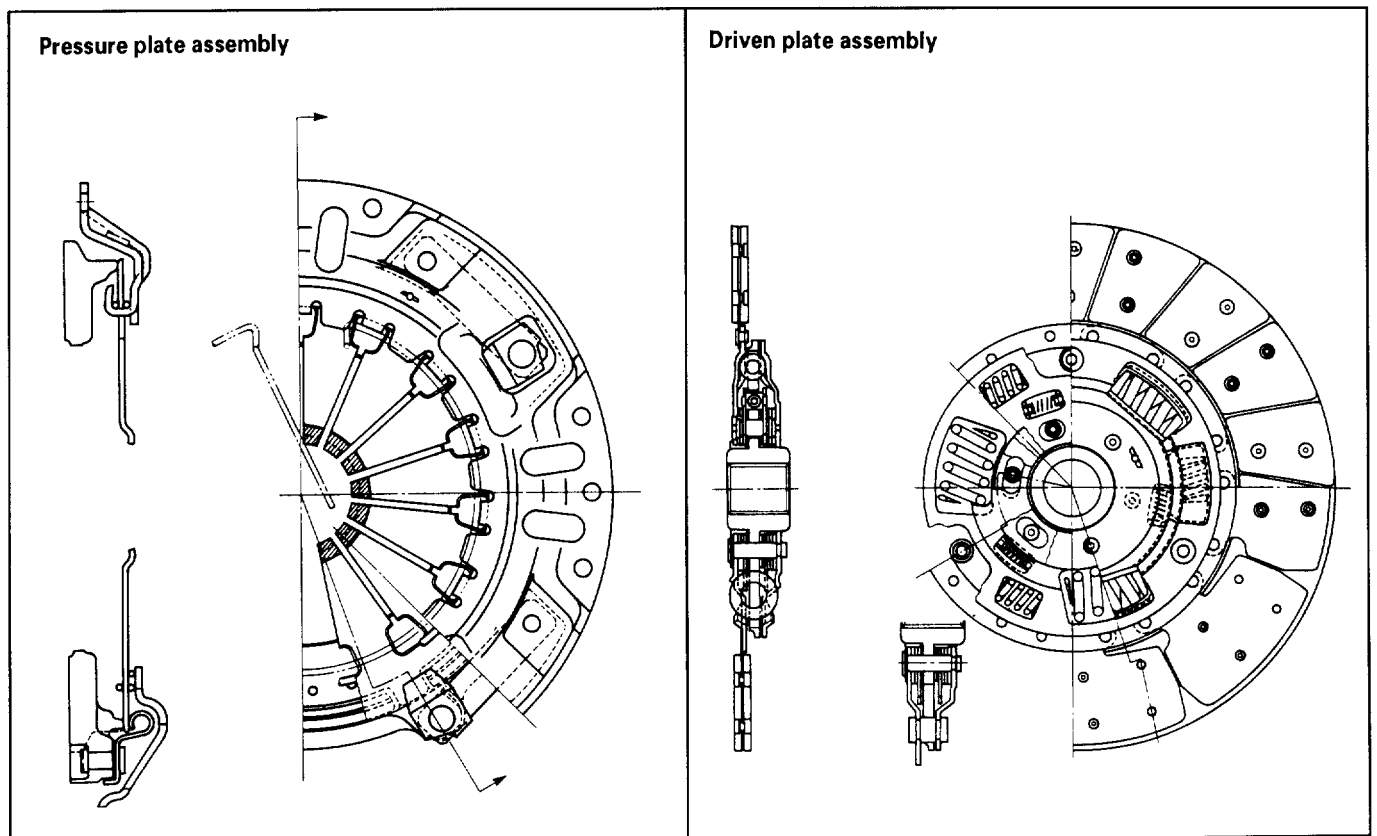
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## GENERAL DESCRIPTION

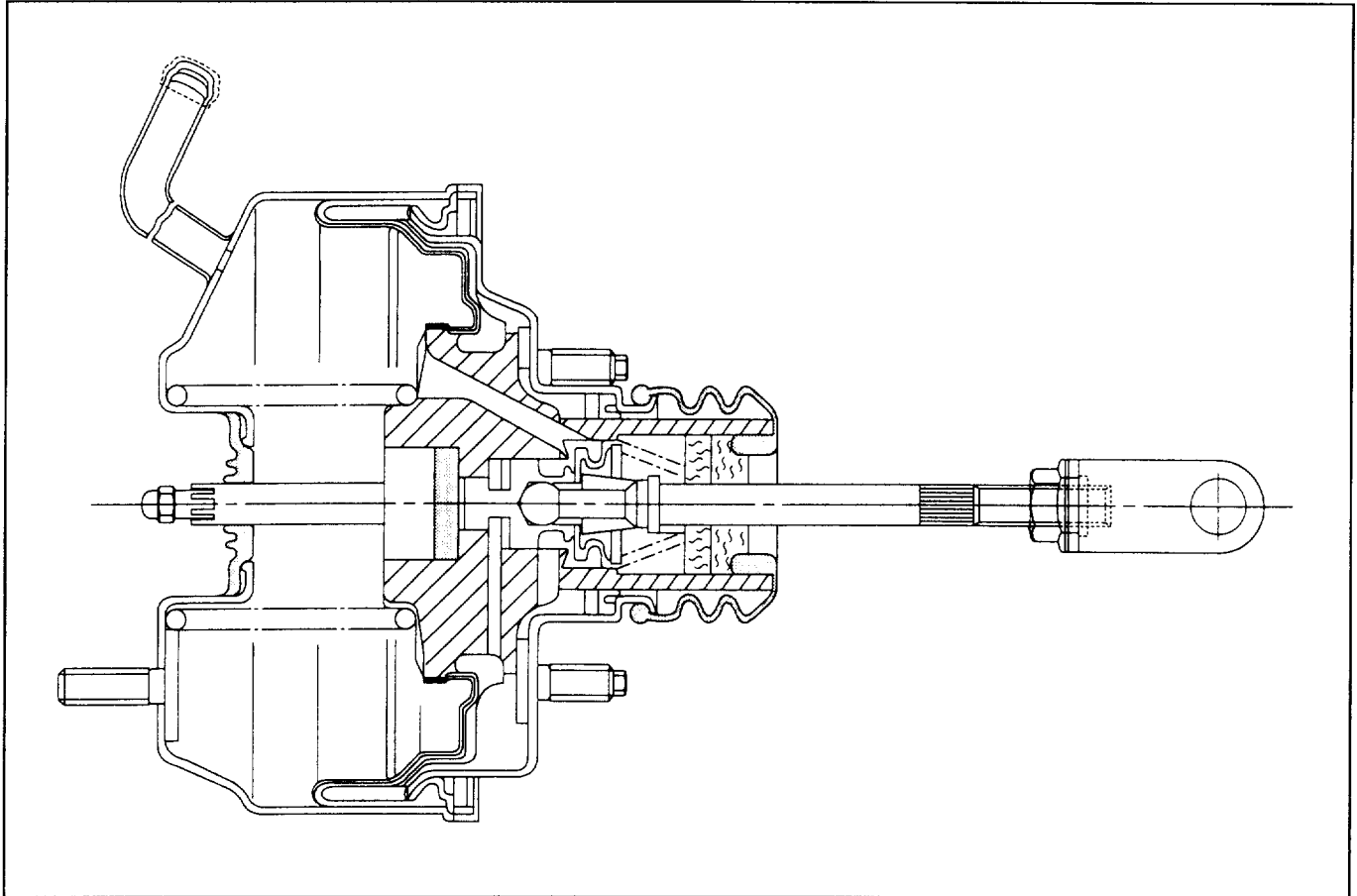
### CLUTCH ASSEMBLY



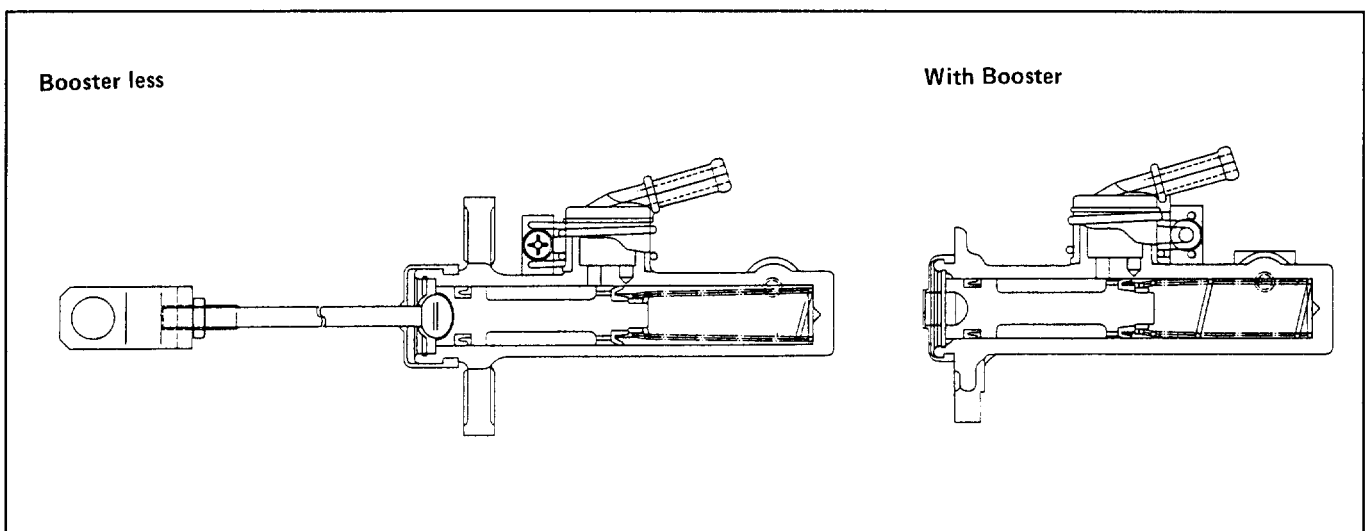
### PRESSURE PLATE ASSEMBLY AND DRIVEN PLATE



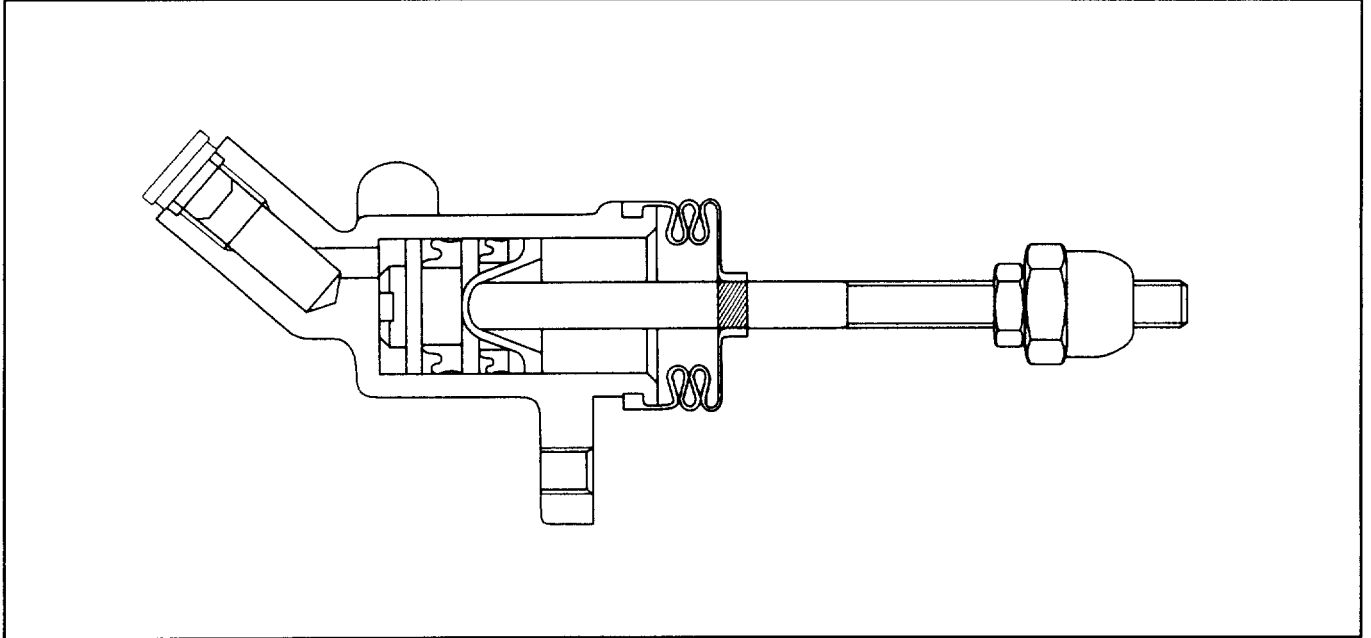
## CLUTCH BOOSTER



## MASTER CYLINDER



## SLAVE CYLINDER

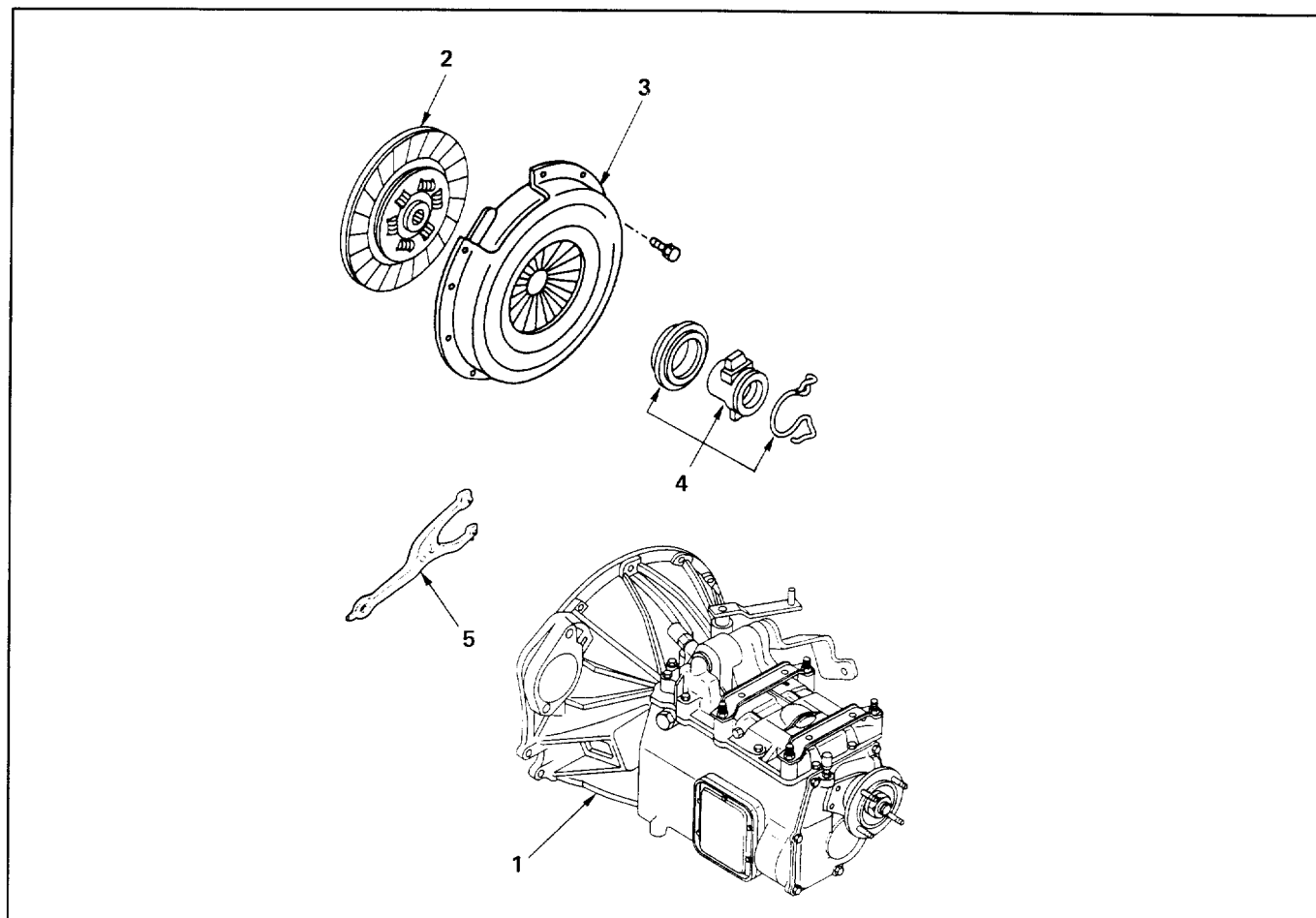




# ON-VEHICLE SERVICE

## CLUTCH ASSEMBLY

### REMOVAL



### Removal Steps

1. Transmission assembly
2. Pressure plate assembly
3. Driven plate assembly
4. Shift block assembly
5. Shift fork



## Removal Steps

- Raise vehicle and support with suitable safety stands.



### CAUTION

**Do not let clutch fluid remain on a painted surface. Wash it off immediately.**

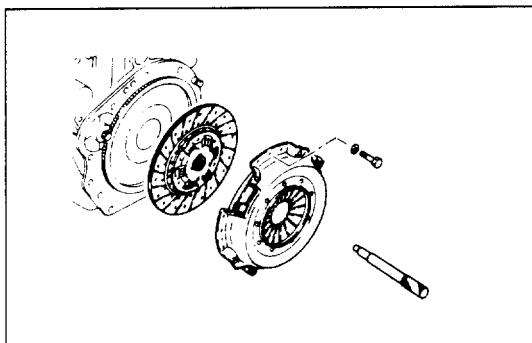
#### 1. Transmission Assembly

Refer to "SECTION 7B ON-VEHICLE SERVICE: TRANSMISSION ASSEMBLY REPLACEMENT" in this manual.

#### 2. Pressure Plate Assembly

#### 3. Driven Plate Assembly

- Use the pilot aligner to prevent the driven plate assembly from falling free.  
Pilot Aligner: 5-8840-2240-0
- Mark the flywheel and pressure plate lug for alignment when installing.



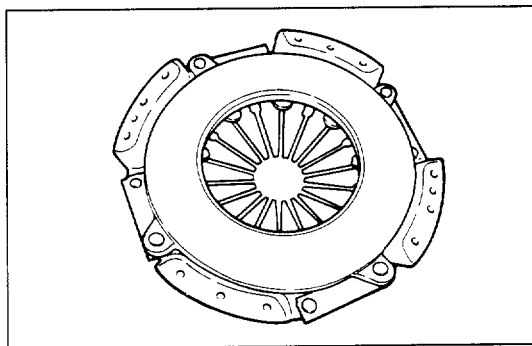
#### 4. Shift Fork

#### 5. Shift Block Assembly

- Take out the shift block and support spring together.

## INSPECTION AND REPAIR

Make the necessary adjustments, repairs, and part replacement if excessive wear or damage is discovered during inspection.



### Pressure Plate Assembly

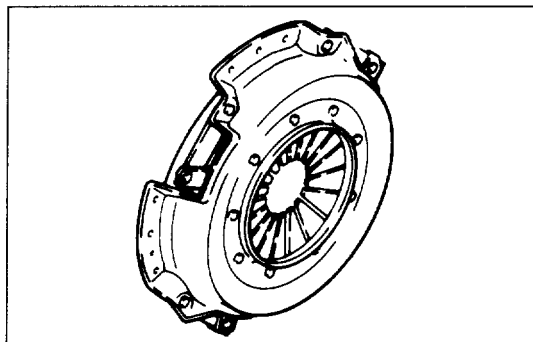
- Visually inspect the pressure plate friction surface for excessive wear and heat cracks. If excessive wear or deep heat cracks are present, the pressure plate must be replaced.

**Pressure Plate Warpage**

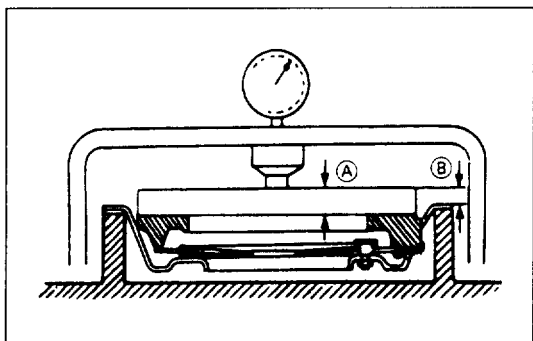
- Use a straight edge and a feeler gauge to measure the pressure plate friction surface flatness in four directions.

If any of the measured values exceed the specified limit, the pressure plate assembly must be replaced.

Pressure Plate Warpage	mm (in)
Limit	
0.3 (0.012)	

**Clutch Cover**

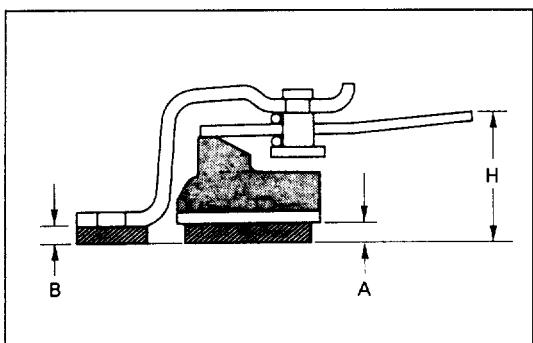
- Visually inspect the entire clutch cover for excessive wear, cracking, and other damage.
- The Pressure plate assembly must be replaced if any of these conditions are present.

**Clutch Set Force**

- Invert the pressure plate.
- Place a metal sheet with "A" thickness of 8.6 mm (0.339 in) on the pressure plate.
- Compress the pressure plate assembly until the distance "B" becomes 19 mm (0.748 in).
- Note the pressure plate gauge reading.



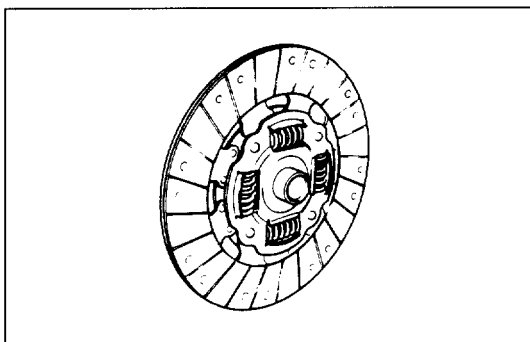
Clutch Set Force	N (kg/lb)
Standard	
8,336 (850/1,874)	

**Diaphragm Spring Finger Height**

- Place a metal sheet with "A" thickness of 8.6 mm (0.339 in) under the pressure plate.
- Compress the pressure plate assembly until the distance "B" becomes 19 mm (0.748 in). There are two ways to do this.
  - Use a bench press to press down on the pressure plate assembly from the top.
  - Tighten the pressure plate assembly fixing bolts.
- Measure the spring finger height "H" from base to spring tip.



Spring Finger Height	mm (in)
Standard	
49.0 - 51.0 (1.929 - 2.008)	



### Driven Plate Assembly



- visually inspect the torsion spring for looseness, breakage, and weakening.

If any of these conditions are discovered, the driven plate assembly must be replaced.

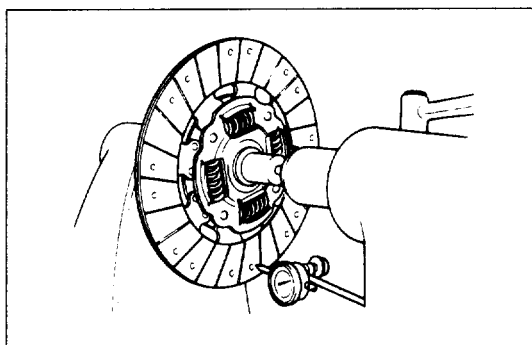
- Visually inspect the facing surfaces for cracking and excessive scorching.

Visually inspect the facing surfaces for the presence of oil or grease.

If any of these conditions are discovered, the facing must be cleaned or the driven plate assembly replaced.

- Check that the driven plate moves smoothly on the transmission top gear shaft spline.

Minor ridges on the top gear shaft spline may be removed with an oil stone.



### Driven Plate Warpage

- Insert the pilot aligner into the driven plate spline hub.

The pilot aligner must be held perfectly horizontal.  
Pilot Aligner: 5-8840-2240-0

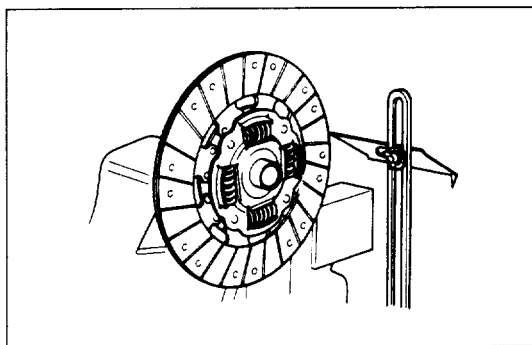
- Set a dial indicator to the driven plate outside circumference.



- Slowly turn the driven plate.

Read the dial indicator as you turn the driven plate.  
If the measured value exceeds the specified limit, the driven plate assembly.

Driven Plate Warpage		mm (in)
Standard	Limit	
0.7 (0.028)	1.0 (0.039)	



### Driven Plate Splined Hub Spline Wear

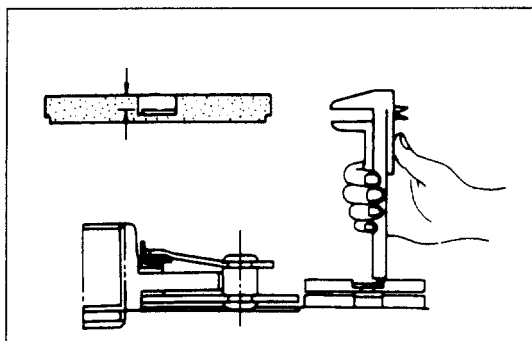
- Clean the driven plate splined hub.
- Install the driven plate to the transmission top gear shaft spline.

- Set a surface gauge to the driven plate outside circumference.

- Slowly turn the driven plate. Measure the spline rotation play as you turn the driven plate.

If the measured value exceeds the specified limit, the driven plate assembly must be replaced.

Driven Plate Splined Hub Spline Wear		mm (in)
Standard	Limit	
0.5 (0.020)	1.0 (0.039)	



### Driven Plate Rivet Head Depression

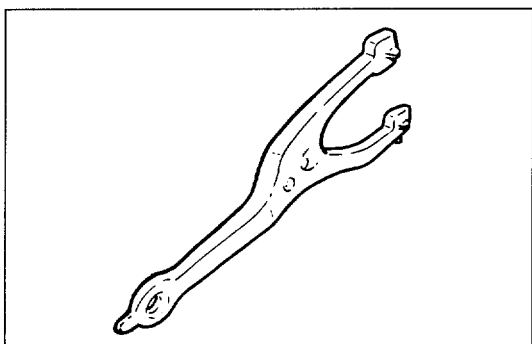


- Use the depth gauge or a straight edge with steel rule to measure the rivet head depression from the facing surface.

Be sure to measure the rivet head depression on both sides of the driven plate.

If the measured value is less than the specified limit, the driven plate must be replaced.

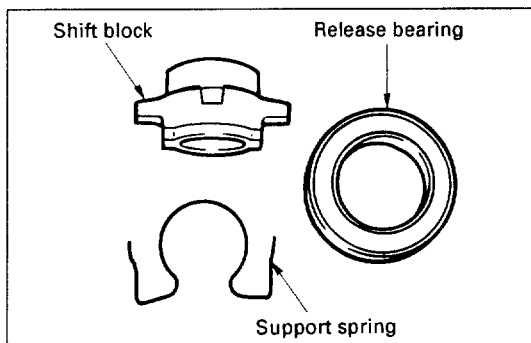
Rivet Head Depression		mm (in)
Standard	Limit	
1.6 (0.063)	0.2 (0.008)	



### Shift Fork and Pivot



- Visually inspect the surfaces of the shift fork making contact with the shift block and pivot.
- Correct a slight stepped wear or surfaces roughness with an oil stone or pencil grinder, or replace the shift fork and/or pivot if unrecoverable damage is found.



### Shift Block Assembly



- Before disassembly, check the shift block assembly for the following point. Correct a slight stepped wear or surface roughness with an oil stone or pencil grinder, or replace the part if unrecoverable damage is found.
  - Release bearing for roughness or noise by rotating the bearing race under light pressure.
  - Roughness or damage of shift block (contact surfaces with shift fork or front cover).



### CAUTION

The release bearing is permanently packed with lubricant and should not be soaked in cleaning solvent, as this will dissolve the lubricant.

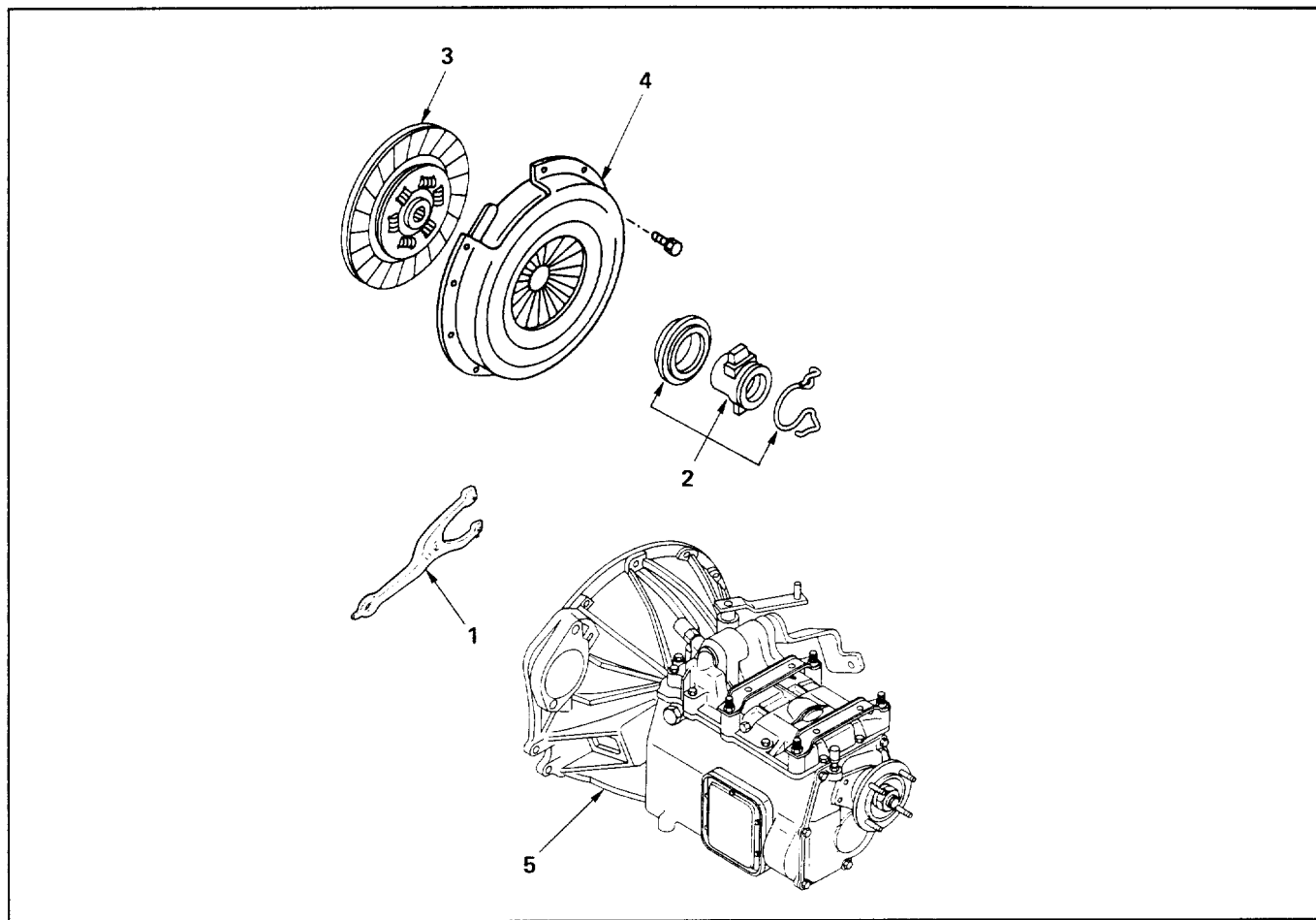
### NOTE

Do not disassemble the shift block assembly if no fault is apparent.



- Visually inspect the support spring for breakage and weakening. If any of these condition are discovered, parts must be replaced.

## INSTALLATION

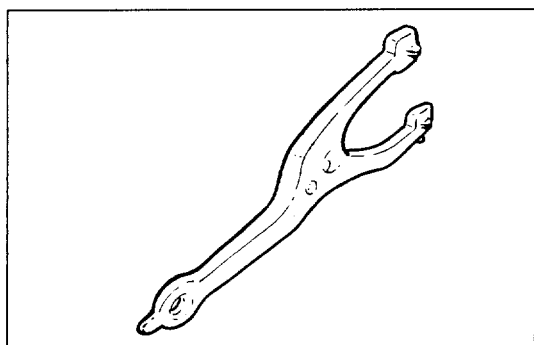


### Installation Steps

1. Shift fork
2. Shift block assembly
3. Driven plate assembly
4. Pressure plate assembly
5. Transmission assembly



## Installation Steps

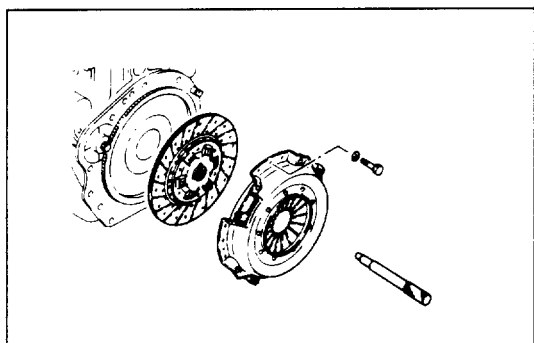


### 1. Shift Fork

- Apply multi-purpose with MoS<sup>2</sup> type grease to the contact surfaces with the shift block and pivot.

### 2. Shift Block Assembly

- Install the shift block and support spring together.



### 3. Driven Plate Assembly

### 4. Pressure Plate Assembly

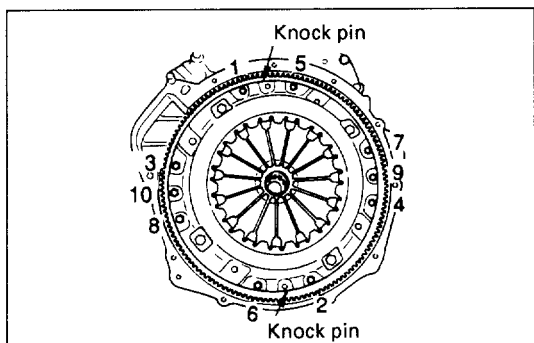
- Apply multi-purpose with MoS<sup>2</sup> type grease to the driven plate hub spline.
- Use the pilot aligner to install the driven plate assembly.

Pilot Aligner : 5-8840-2240-0



- Tighten pressure plate assembly fixing bolts in numerical order.

Pressure Plate Fixing Bolt Torque	N·m (kg·m/lb·ft)
40 (4.1/29.7)	



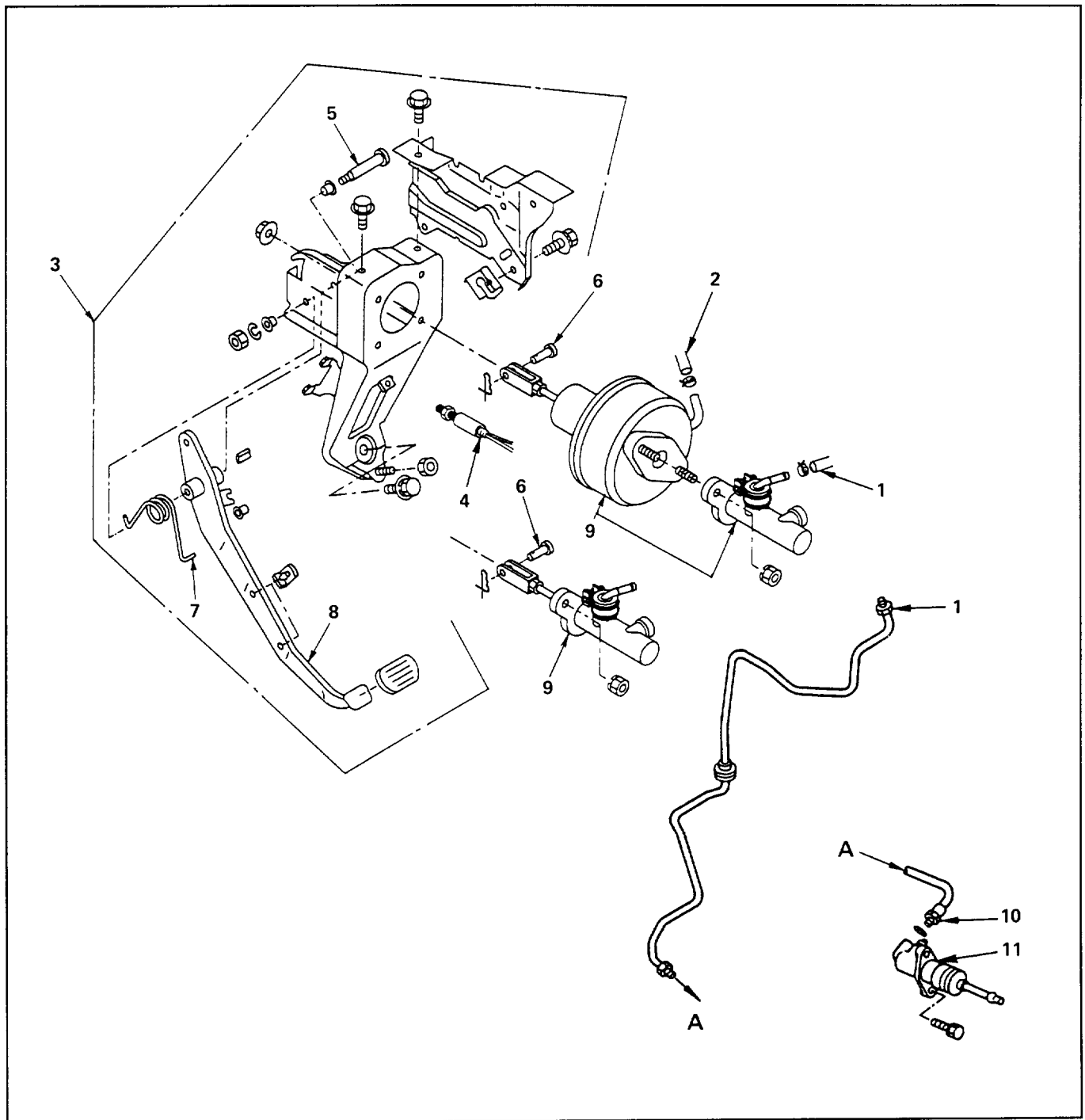
### CAUTION:

In case a new pressure plate assembly is mounted, after tightening a pressure plate at the specified torque, be sure to remove the wire for protection of a diaphragm spring.

### 6. Transmission Assembly

Refer to "SECTION 7B ON-VEHICLE SERVICE: TRANSMISSION ASSEMBLY REPLACEMENT" in this manual.

## CLUTCH CONTROL REMOVAL



### Removal Steps

1. Clutch pipe and hose
2. Vacuum hose
3. Clutch pedal and bracket assembly
4. Clutch switch or stopper bolt
5. Shaft
6. Clevis pin
7. Return spring
8. Clutch pedal
9. Clutch booster with master cylinder or master cylinder
10. Flexible hose
11. Slave cylinder



## Preparation

### 1. Remove Meter Cluster

- Pull out the meter cluster and disconnect the harness connectors.

### 2. Meter Assembly

- Remove the 5 fixing screws, then remove the meter assembly and disconnect the harness connector.



## Removal Steps

- Drain the clutch fluid from the clutch hydraulic line.



### CAUTION

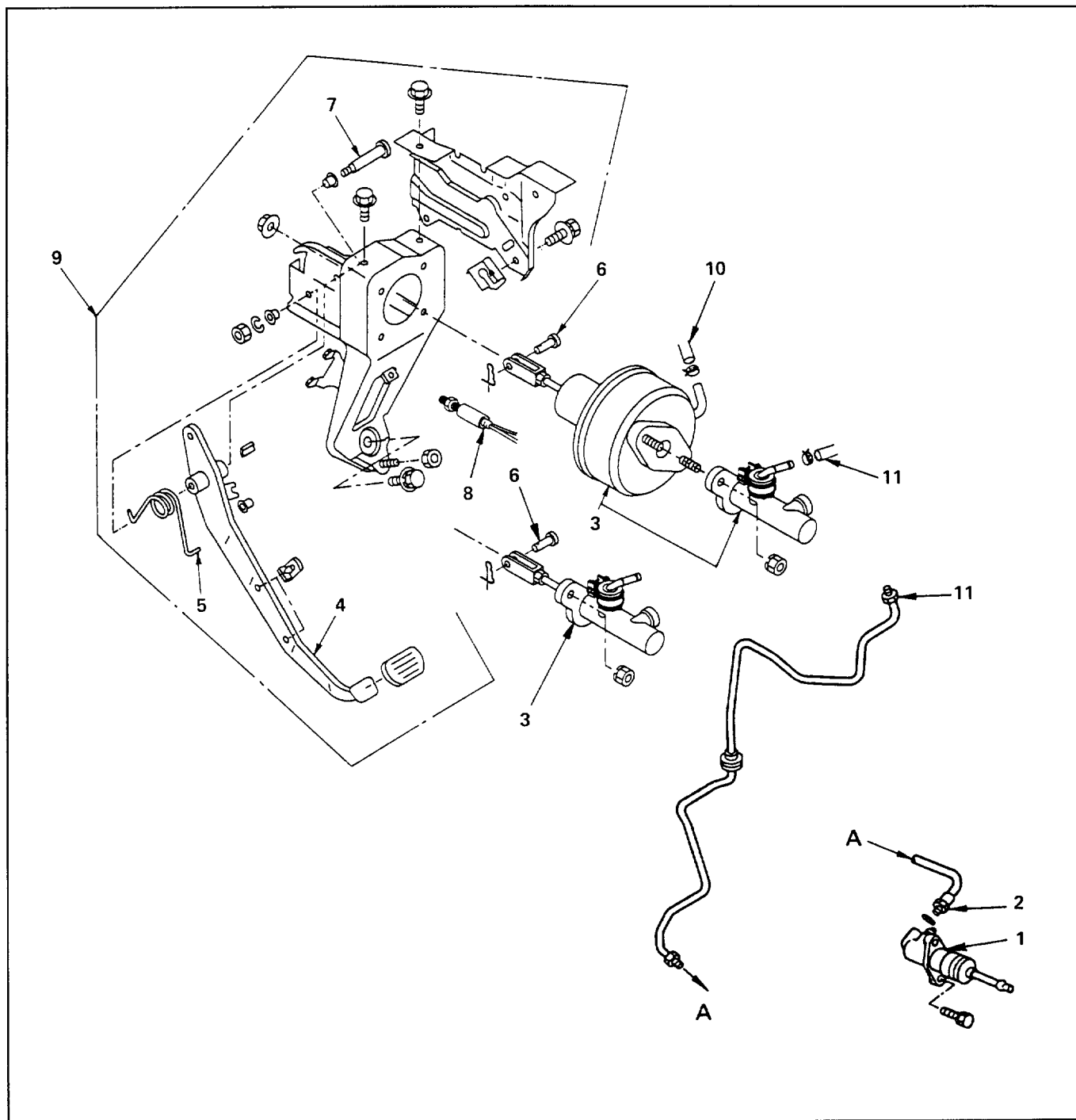
Do not let clutch fluid remain on a painted surface.  
Wash it off immediately.

1. Clutch Pipe and Hose
2. Vacuum Hose
3. Clutch Pedal and Bracket Assembly
4. Clutch Switch or Stopper Bolt
5. Shaft
6. Clevis Pin
7. Return Spring
8. Clutch Pedal
9. Clutch Booster with Master Cylinder or Master Cylinder
10. Flexible Hose
11. Slave Cylinder

## INSPECTION AND REPAIR

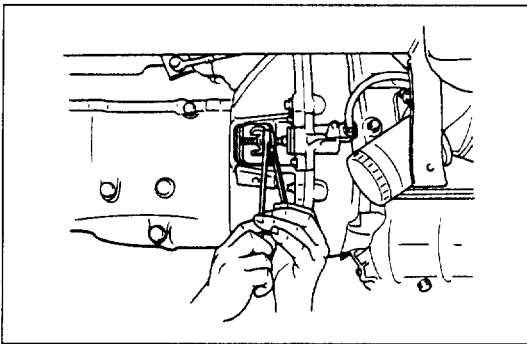
Make the necessary adjustment, repairs, and part replacement if excessive wear or damage is discovered during inspection.

## INSTALLATION



### Installation Steps

1. Slave cylinder
2. Flexible hose
3. Clutch booster with master cylinder or master cylinder
4. Clutch pedal
5. Return spring
6. Clevis pin
7. Shaft
8. Clutch switch or stopper bolt
9. Clutch pedal and bracket assembly
10. Vacuum hose
11. Clutch pipe and hose



## Installation Steps

### 1. Slave Cylinder



Slave Cylinder Bolt Torque	N·m (Kg·m/lb·ft)
16 (1.6/12)	

- Perform slave cylinder adjustment before installation of the return spring.
- 1) Loosen the lock nut of the push rod.
  - 2) Turn the adjust but until it reaches the shift fork.
  - 3) Back off the adjust nut 1.5 turns. (shift fork free play approximately 2 mm).
  - 4) Tighten the lock nut.



Push Rod Lock Nut Torque	N·m (kg·m/lb·ft)
19 (1.9/14)	

### 2. Flexible Hose

### 3. Clutch Booster with Master Cylinder or Master Cylinder

- Install the clutch booster with master cylinder assembly or the master cylinder assembly to the clutch pedal bracket.



Fixing Nuts Torque	N·m (kg·m/lb·in)
13 (1.3/113)	

### 4. Clutch Pedal

### 5. Return Spring

### 6. Clevis Pin

### 7. Shaft

### 8. Clutch Switch or Stopper Bolt

### 9. Clutch Pedal and Bracket Assembly



Clutch Bracket Bolts Torque	N·m (kg·m/lb·ft)
37 (3.8/27)	

- Perform the clutch pedal adjustment after installation of clutch control.

### Clutch Pedal Height and Stroke

- 1) Loosen the lock nut of the clutch booster operating rod or the master cylinder push rod.
- 2) Adjust the pedal height by turning operating rod or push rod.

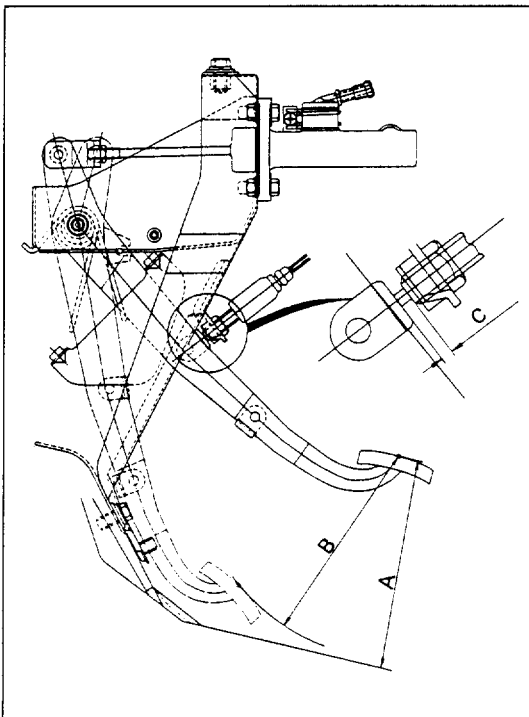


Clutch Pedal Height and Stroke	mm (in)
Height(A) : 160 – 170 (6.30 – 6.69)	
Stroke(B) : 159 – 169 (6.26 – 6.65)	



- 3) Tighten the lock nut.

Lock Nut Torque	N·m (kg·m/lb·ft)
With Booster: 20 (2.0/14)	
Booster Less : 13 (1.3/9.4)	



- 4) Install the meter assembly and meter cluster.

### Clutch Pedal Free Play

### Clutch Switch or Stopper Bolt

After completion of clutch pedal height and slave cylinder adjustment, adjust the clutch switch or stopper bolt clearance.

- 1) Loosen the lock nut of clutch switch or stopper bolt.
- 2) Adjust the clutch switch or stopper bolt clearance by turning clutch switch or stopper bolt.



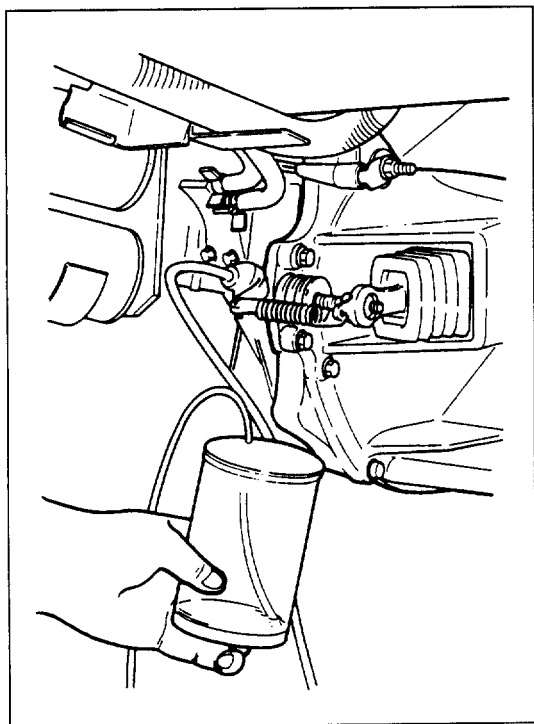
Clutch Switch or Stopper Bolt Clearance(C)	mm (in)
0.5 – 1.0 (0.02 – 0.04)	

Clutch Pedal Free Play	mm (in)
15 – 25 (0.59 – 0.98)	



- 3) Tighten the lock nut.

Lock Nut Torque	N·m (kg·m/lb·ft)
19 (1.9/14)	



## 10. Vacuum hose

## 11. Clutch Pipe and Hose

- Perform the clutch hydraulic circuit bleeding after installation of the clutch control.

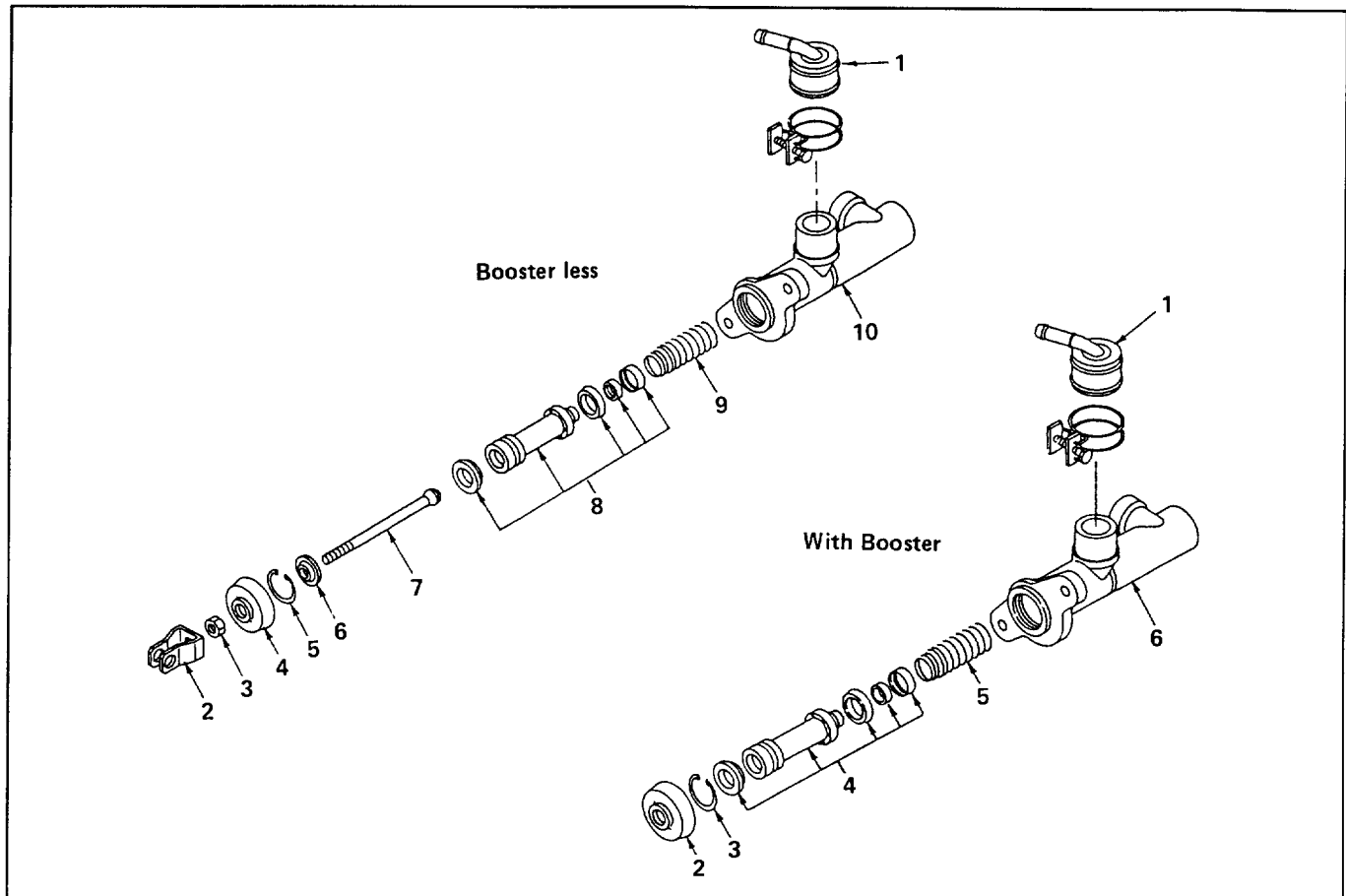
Bleeding operation calls for cooperative action of two men.

- 1) Check the level of clutch fluid in the reservoir and replenish if necessary.
- 2) Remove the rubber cap from the bleeder screw and wipe clean the bleeder screw.  
Connect a vinyl tube to the bleeder screw and insert the other end of the vinyl tube into a transparent container.
- 3) Pump the clutch pedal repeatedly and hold it depressed.
- 4) Loosen the bleeder screw on the clutch slave cylinder to release clutch fluid with air bubbles into the container and tighten the bleeder screw immediately.
- 5) Release the clutch pedal carefully. Repeat the above operation until air bubbles disappear from the clutch fluid being pumped out into the container. During the bleeding operation, keep the clutch fluid reservoir filled to the specified level. Reinstall the rubber cap.

# UNIT REPAIR

## MASTER CYLINDER

### DISASSEMBLY



### Removal Steps

#### Booster Less

1. Pipe joint
2. Clevis yoke
3. Lock nut
4. Dust cover
5. Snap ring
6. Stopper
7. Push rod
8. Piston assembly
9. Return spring
10. Cylinder body

#### With Booster

1. Pipe joint
2. Dust cover
3. Snap ring
4. Piston assembly
5. Return spring
6. Cylinder body



### Disassembly Steps

#### Booster Less

1. Pipe Joint
2. Clevis Yoke

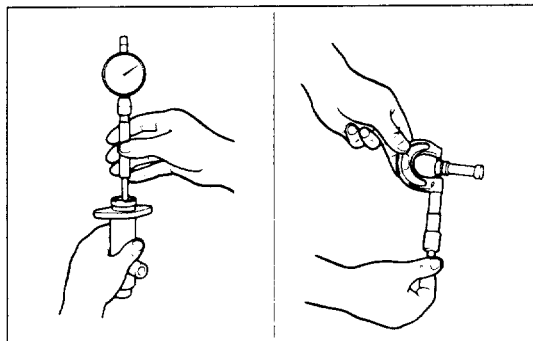
3. Lock Nut
4. Dust Cover
5. Snap Ring
  - Press down the piston with your finger to prevent it from jumping out.
6. Stopper
7. Push Rod
8. Piston Assembly
9. Return Spring
10. Cylinder Body

**With Booster**

1. Pipe Joint
2. Dust Cover
3. Snap Ring
  - Press down the piston with your finger to prevent it from jumping out.
4. Piston Assembly
5. Return Spring
6. Cylinder Body

## INSPECTION AND REPAIR

Make the necessary adjustments, repairs, and parts replacements if excessive wear or damage is discovered during inspection.

**Cylinder Body**

- Wash clean the cylinder body in brake fluid.
- Check the fluid return port for restrictions and clean it if necessary.
- Measure the cylinder inside diameter.



Master Cylinder Inside Diameter mm (in)

Standard
With Booster : $\varnothing$ 20.640 – 20.692 (0.8126 – 0.8146)
Booster Less : $\varnothing$ 19.050 – 19.102 (0.7500 – 0.7520)

Clearance between Cylinder Bore  
and Piston Clearance mm (in)

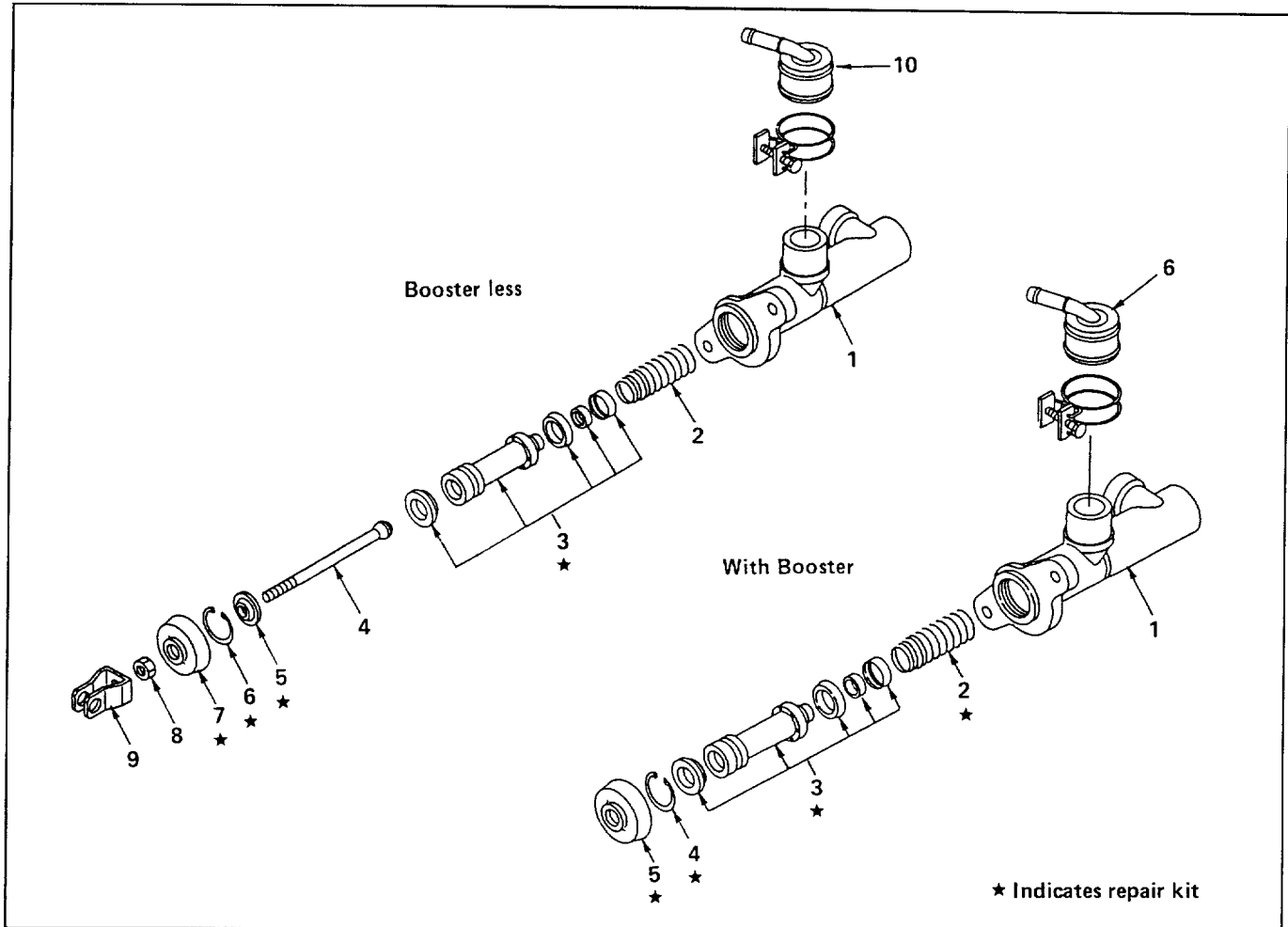
Standard	Limit
0.03 – 0.11 (0.0012 – 0.0043)	0.12 (0.0047)

- If excessive wear or any abnormal conditions are present, the master cylinder assembly must be replaced with new one.

**CAUTION**

If the master cylinder has been disassembled, the repair kit must be replaced with new one.

## REASSEMBLY



### Reassembly Step

#### Booster Less

1. Cylinder body
2. Return spring
3. Piston assembly
4. Push rod
5. Stopper
6. Snap ring
7. Dust cover
8. Lock nut
9. Clevis yoke
10. Pipe joint

#### With Booster

1. Cylinder body
2. Return spring
3. Piston assembly
4. Snap ring
5. Dust cover
6. Pipe joint



## Reassembly Step

### Booster Less

#### 1. Cylinder Body

- Immerse the cylinder body in clean brake fluid.

#### 2. Return Spring

- Install the return spring to the piston assembly.

#### 3. Piston Assembly

- Before installing, apply a thin coat of rubber grease to the piston.



### CAUTION

Use care to prevent damaging the lip of the piston cup.

#### 4. Push Rod

#### 5. Stopper

#### 6. Snap Ring

#### 7. Dust Cover

#### 8. Lock Nut

Lock Nut Torque	N·m (kg·m/lb·in)
-----------------	------------------



13 (1.3/113)
--------------

#### 9. Clevis Yoke

#### 10. Pipe Joint

Pipe Joint Torque	N·m (kg·m/lb·in)
-------------------	------------------



5 (0.5/43)
------------

### With Booster

#### 1. Cylinder Body

- Immerse the cylinder body in clean brake fluid.

#### 2. Return Spring

- Install the return spring to the piston assembly.

#### 3. Piston Assembly

- Before installing, apply a thin coat of rubber grease to the piston.



### CAUTION

Use care to prevent damaging the lip of the piston cup.

#### 4. Snap Ring

#### 5. Dust Cover

#### 6. Pipe Joint

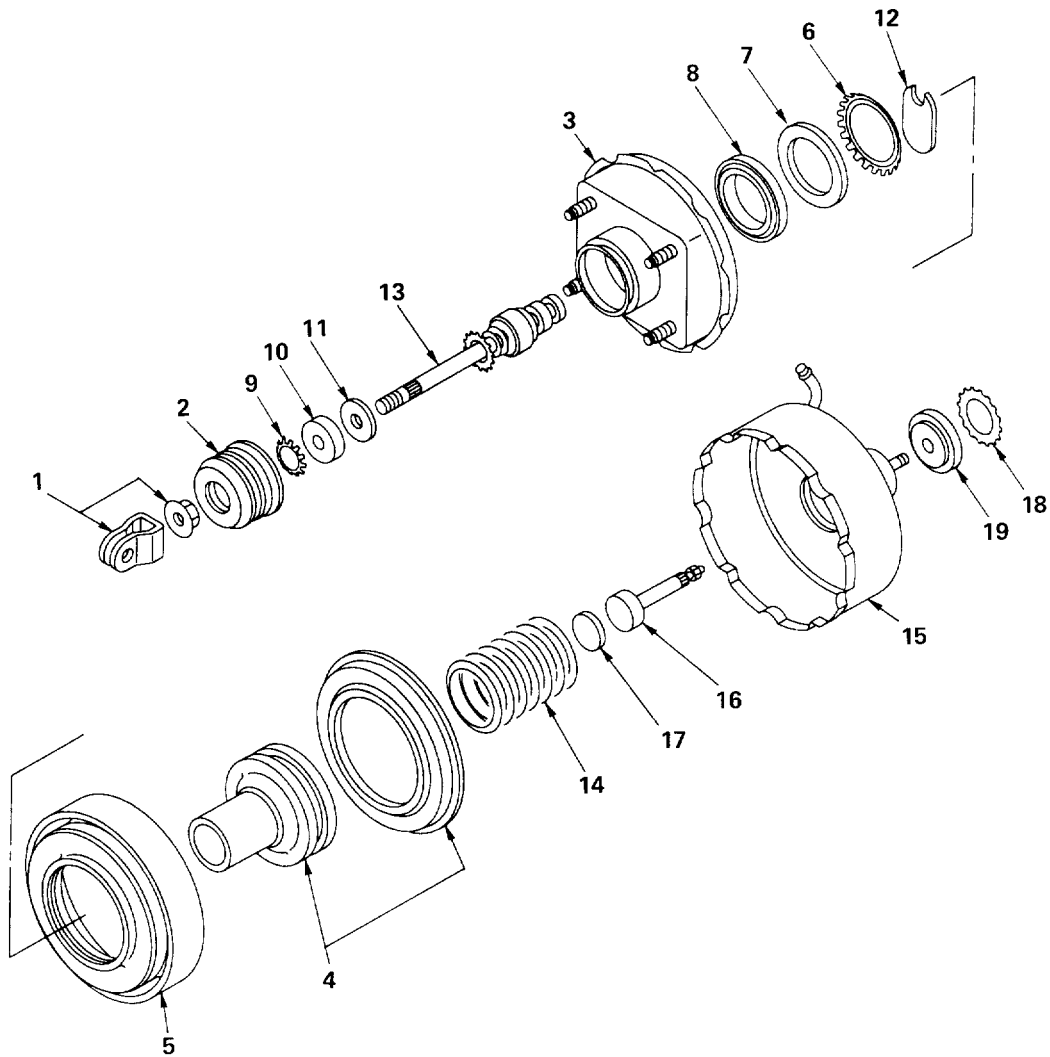
Pipe Joint Torque	N·m (kg·m/lb·in)
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5 (0.5/43)
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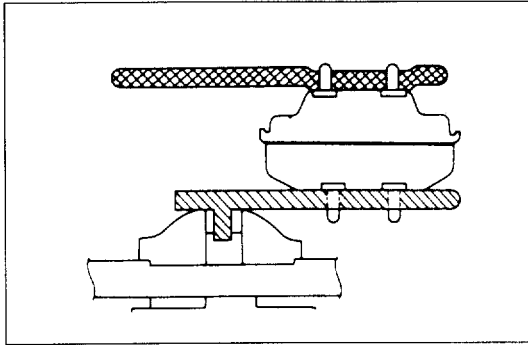


## CLUTCH BOOSTER DISASSEMBLY



### Disassembly Steps

- |                             |                            |
|-----------------------------|----------------------------|
| 1. Clevis yoke              | 11. Filter                 |
| 2. Boot                     | 12. Stopper key            |
| 3. Rear shell               | 13. Valve Plunger assembly |
| 4. Diaphragm plate assembly | 14. Return spring          |
| 5. Diaphragm                | 15. Front shell            |
| 6. Bearing retainer         | 16. Push rod               |
| 7. Bearing                  | 17. Reaction disc          |
| 8. Seal                     | 18. Retainer               |
| 9. Silencer retainer        | 19. Push rod seal          |
| 10. Silencer                |                            |



## Disassembly Steps

1. Clevis Yoke
2. Boot
3. Rear Shell
  - Apply setting marks to the front shell and rear shell.
  - Install the support plate to the front shell.
  - Install the handle to the rear shell.



Support Plate : 5-8840-2056-0  
Handle : 9-8523-1733-0

- Rotate the handle arrow direction.

### NOTE

Note that the diaphragm spring pops out of position as the rear shell is removal.

4. Diaphragm Plate Assembly
5. Diaphragm
6. Bearing Retainer
7. Bearing
8. seal
9. Silencer Retainer
10. Silencer
11. Filter
12. Stopper Key
13. Valve Plunger Assembly
14. Return Spring
15. Front Shell
16. Push Rod
17. Reaction Disc
18. Retainer
19. Push Rod Seal

## INSPECTION AND REPAIR

Make the necessary adjustments, repairs, and parts replacements if excessive wear or damage is discovered during inspection.



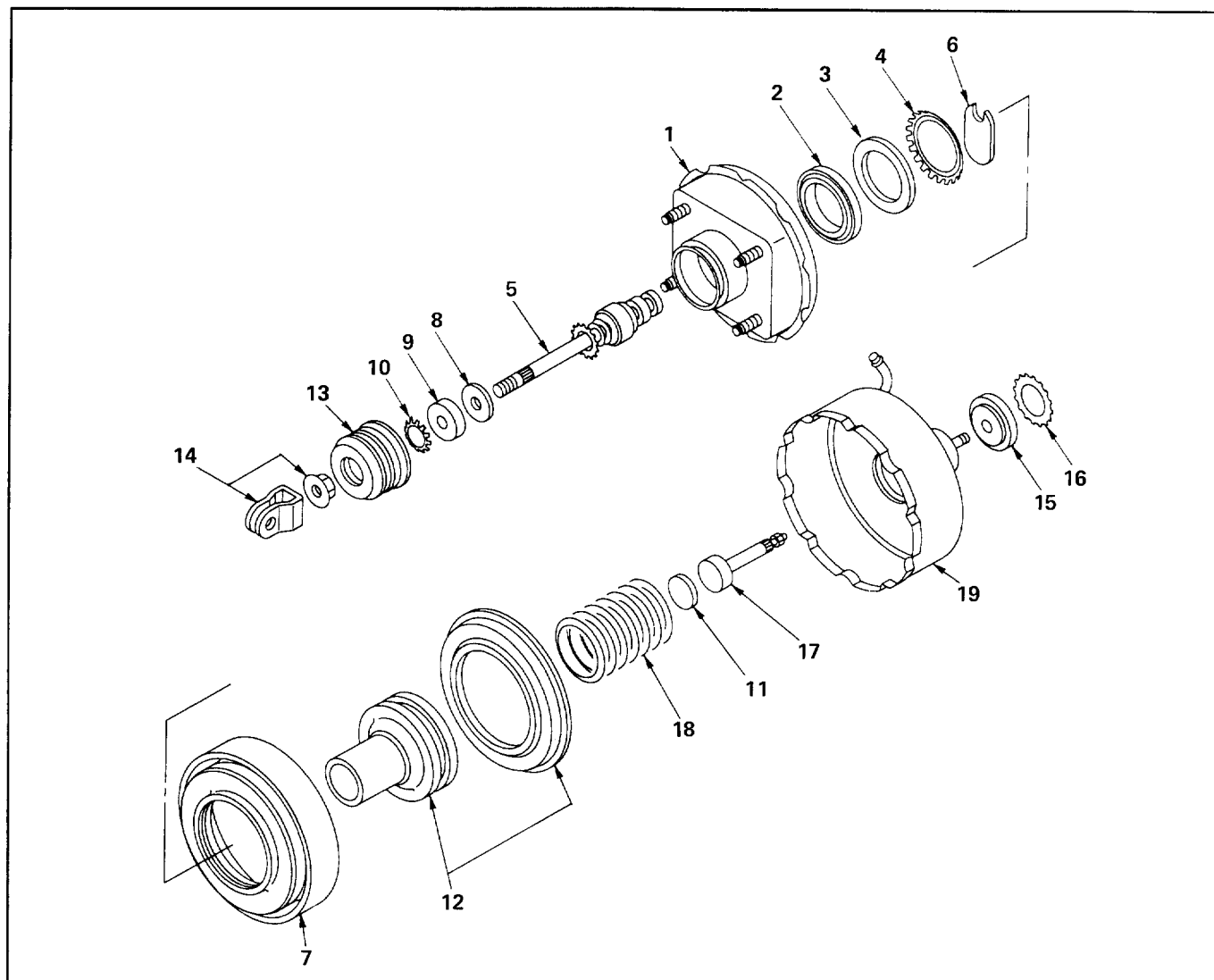
### CAUTION:

If the clutch booster has been disassembled, the repair kit must be replaced with new one.

### NOTE:

Before inspection, wash metal parts in metal cleaner, and wash rubber or resin parts in alcohol.

## REASSEMBLY



### Reassembly Step

- |                           |                              |
|---------------------------|------------------------------|
| 1. Rear shell             | 11. Reaction disc            |
| 2. Seal                   | 12. Diaphragm plate assembly |
| 3. Bearing                | 13. Boot                     |
| 4. Bearing retainer       | 14. Clevis yoke              |
| 5. Valve plunger assembly | 15. Push rod seal            |
| 6. Stopper key            | 16. Retainer                 |
| 7. Diaphragm              | 17. Push rod                 |
| 8. Filter                 | 18. Return spring            |
| 9. Silencer               | 19. Front shell              |
| 10. Silencer retainer     |                              |



## Reassembly Steps

### 1. Rear Shell



- Apply silicone grease to the portions of the rear shell in contact with the seal and lip.

### 2. Seal

### 3. Bearing

### 4. Bearing Retainer

### 5. Valve Plunger Assembly



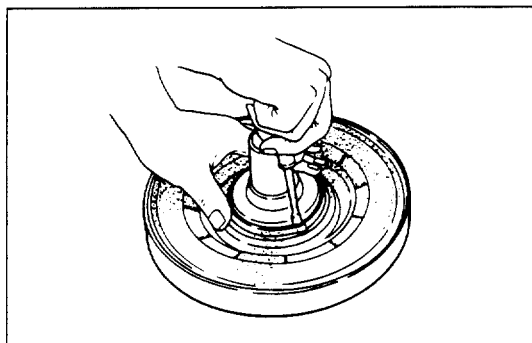
- Apply silicone grease to the valve body outside surfaces and the plunger sliding surfaces.

### 6. Stopper Key

### 7. Diaphragm



- Apply silicone grease to the outside and inside surfaces of the diaphragm in contact with the rear shell and front shell.



### 8. Filter

### 9. Silencer

### 10. Silencer Retainer

### 11. Reaction Disc



- Apply silicone grease to the reaction disc surfaces.

### 12. Diaphragm Plate Assembly



- Apply silicone grease to the outside and inside surfaces of the Diaphragm plate.

### 13. Boot

### 14. Clevis Yoke

### 15. Push Rod Seal

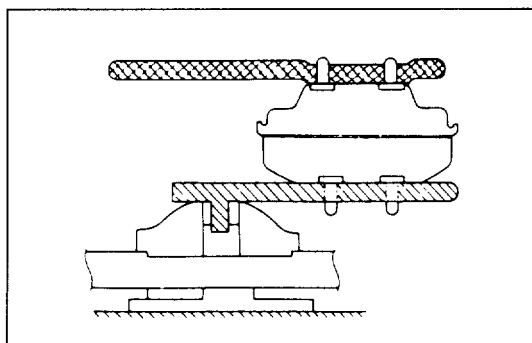
### 16. Retainer

### 17. Push Rod



- Apply silicone grease to the push rod sliding surfaces.

### 18. Return Spring

**19. Front Shell**

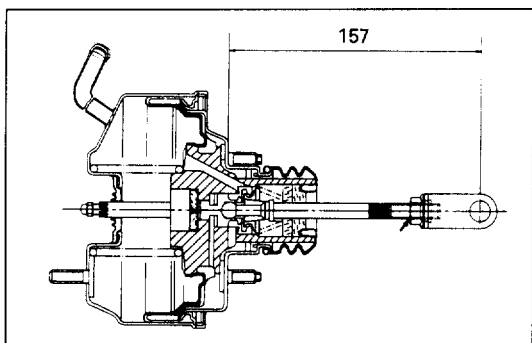
- Apply silicone grease to the sliding surfaces of the front shell with the push rod.



- Install the support plate and handle.
- Rotate handle to align the setting mark.

Support Plate : 5-8840-2056-0

Handle : 5-8523-1733-0



- Measure the push rod distance between pin center of clevis and rear shell.

If the distance is not equal to the specification, it must be adjusted.



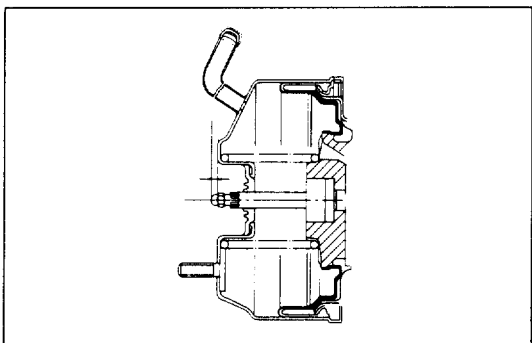
Distance between Pin Center and Rear Shell    mm (in)

157 (6.18)

Lock Nut Torque

N·m (kg·m/lb·ft)

20 (2.0/14)



- Apply 66.66 kPa (500 mmHg) of negative pressure to the clutch booster.

- Measure the push rod distance between end of push rod and rear shell flange face.

If the distance is not equal to the specification, it must be adjusted.

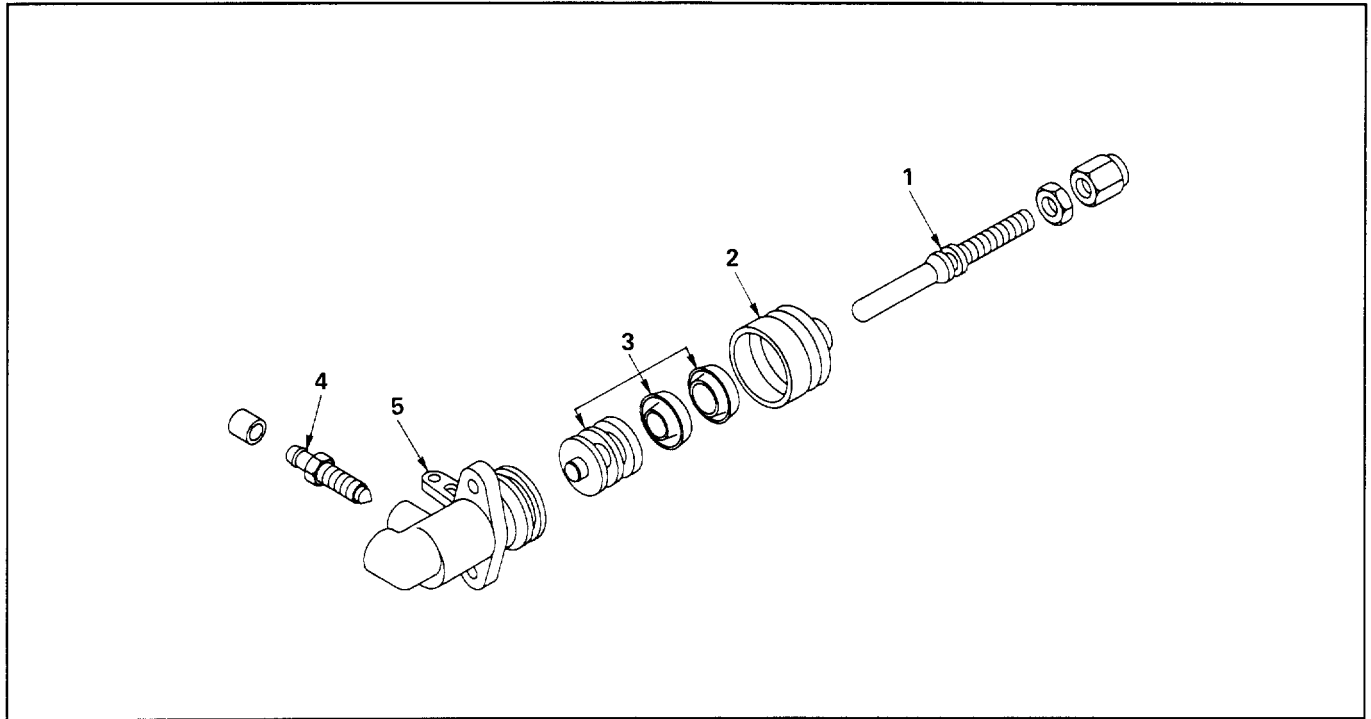


Distance between Push Rod End and  
Rear Shell

mm (in)

3.75 – 4.00 (0.148 – 0.157)

## SLAVE CYLINDER DISASSEMBLY



### Disassembly Steps

1. Push rod
2. Boot
3. Piston assembly
4. Bleeder screw
5. Cylinder body

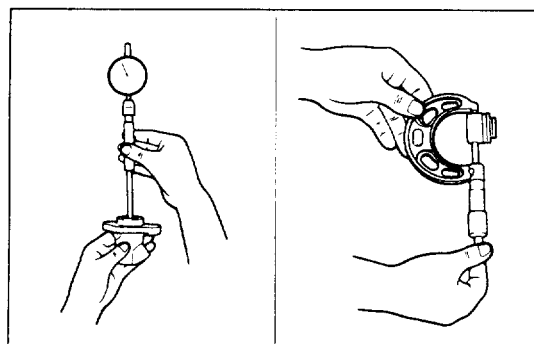


### Disassembly Steps

1. Push Rod
2. Boot
3. Piston Assembly
4. Bleeder Screw
5. Cylinder Body

## INSPECTION AND REPAIR

Make the necessary adjustments, repairs, and parts replacements if excessive wear or damage is discovered during inspection.



### Cylinder Body



- Wash clean the cylinder body in brake fluid.



- Measure the cylinder inside diameter.

Master Cylinder Inside Diameter	mm (in)
Standard	
$\varnothing$ 25.400 – 25.452 (1.0000 – 1.0020)	

Clearance between Cylinder Bore  
and Piston Clearance

Standard	Limit
0.02 – 0.10 (0.0008 – 0.0039)	0.11 (0.0043)

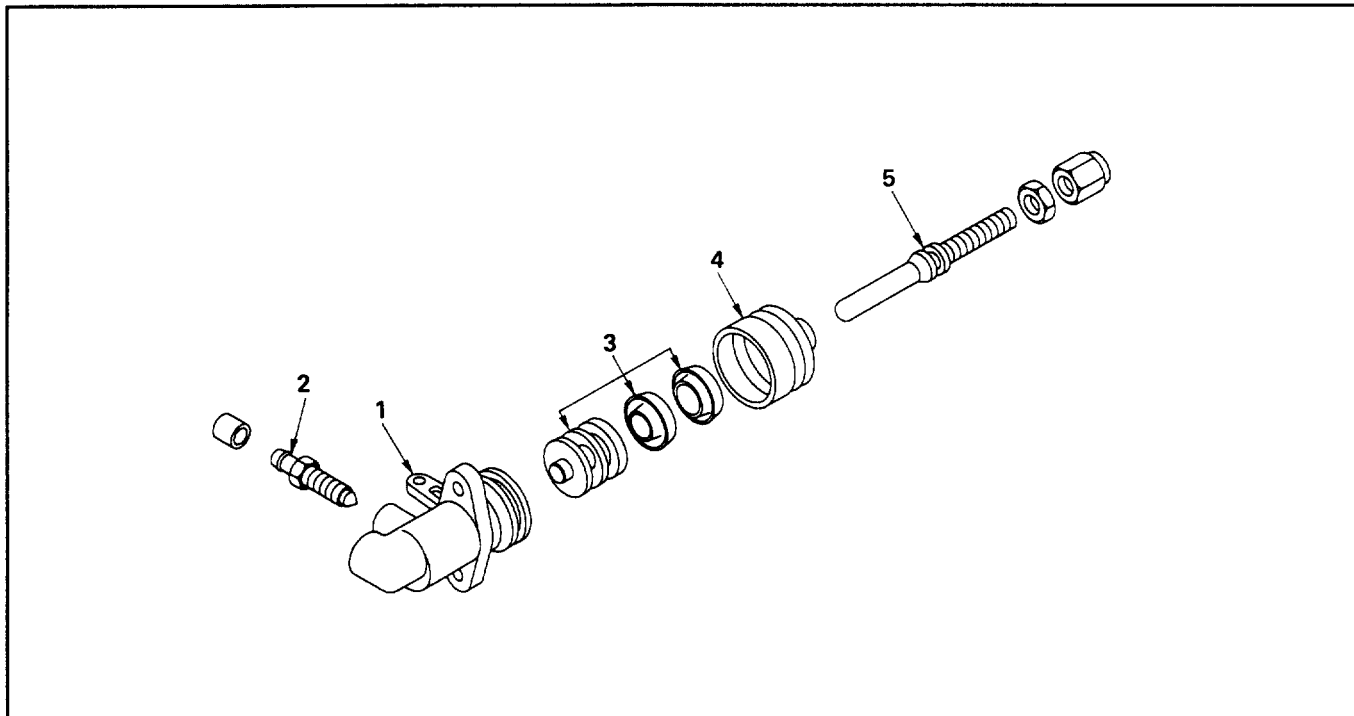
- If excessive wear or any abnormal conditions are present, the master cylinder assembly must be replaced with new one.



### CAUTION

**If the master cylinder has been disassembled, the repair kit must be replaced with new one.**

## REASSEMBLY



### Reassembly Steps

1. Cylinder body
2. Bleeder screw
3. Piston assembly
4. Boot
5. Push rod



### Reassembly Step

1. Cylinder Body
2. Bleeder Screw
3. Piston Assembly



- Before installing, apply a thin coat of rubber grease to the piston.



### CAUTION

Use care to prevent damaging the lip of the piston cup.

4. Boot
5. Push Rod



## **LGMXA-WE-461**

You are requested to order this manual using the manual number that is shown above.

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