FOREWORD

This workshop manual covers Disassembly, Inspection and Assembly procedures for the following Manual Transmission:

Manual Transmission: H260

For On−vehicle Servicing (Inspection, Adjustment, Troubleshooting, Removal and installation) of the Manual transmission, refer to the repair manual for the applicable model.

All information in this manual is based on the latest product information at the time of publication. However, specifications and procedures are subject to change without notice.

CAUTION

This manual does not include all the necessary items about repair and service. This manual is made for the purpose of the use for the persons who have special techniques and certifications. In the cases that non−specialized or uncertified technicians perform repair or service only using this manual or without proper equipment or tool, that may cause severe injury to you or other people around and also cause damage to your customer's vehicle.

In order to prevent dangerous operation and damages to your customer's vehicle, be sure to follow the instruction shown below.

- Must read this manual thoroughly. It is especially important to have a good understanding of all the contents written in the PRECAUTION of "IN" section.
- The service method written in this manual is very effective to perform repair and service. When performing the operations following the procedures using this manual, be sure to use tools specified and recommended. If using non−specified or recommended tools and service method, be sure to confirm safety of the technicians and any possibility of causing personal injury or damage to the customer's vehicle before starting the operation.
- If part replacement is necessary, must replace the part with the same part number or equivalent part. Do not replace it with inferior quality.
- It is important to note that this manual contains various "Cautions" and "Notices" that must be carefully observed in order to reduce the risk of personal injury during service or repair, or the possibility that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that these "Cautions" and "Notices" are not exhaustive, because it is important to warn of all the possible hazardous consequences that might result from failure to follow these instructions.

INTRODUCTION

HOW TO USE THIS MANUAL TRANSMISSION WORKSHOP MANUAL

010CW–03

GENERAL INFORMATION

1. GENERAL DESCRIPTION

(a) This manual is made in accordance with SAE J2008.

(b) Generally repair operations can be separated in the following 3 main processes:
1. Diagnosis
2. Removing and Installing, Replacing, Disassembling, Installing and Checking, Adjusting
3. Final Inspection

(c) This manual explains ”Removing and Installing, Replacing, Disassembling, Installing and Checking, Adjusting”, but ”Final Inspection” is omitted.

(d) The following essential operations are not written in this manual, however these operations must be done in the practical situation.
(1) Operation with a jack or lift
(2) Cleaning of a removed part when necessary
(3) Visual check

2. INDEX

(a) An alphabetical INDEX is provided as a section on the end of the book to guide you to the item to be repaired.

3. PREPARATION

(a) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the repairing condition. Be sure to use SST and SSM when they are required and follow the working procedure properly. A list of SST and SSM is in the Preparation section of this manual.

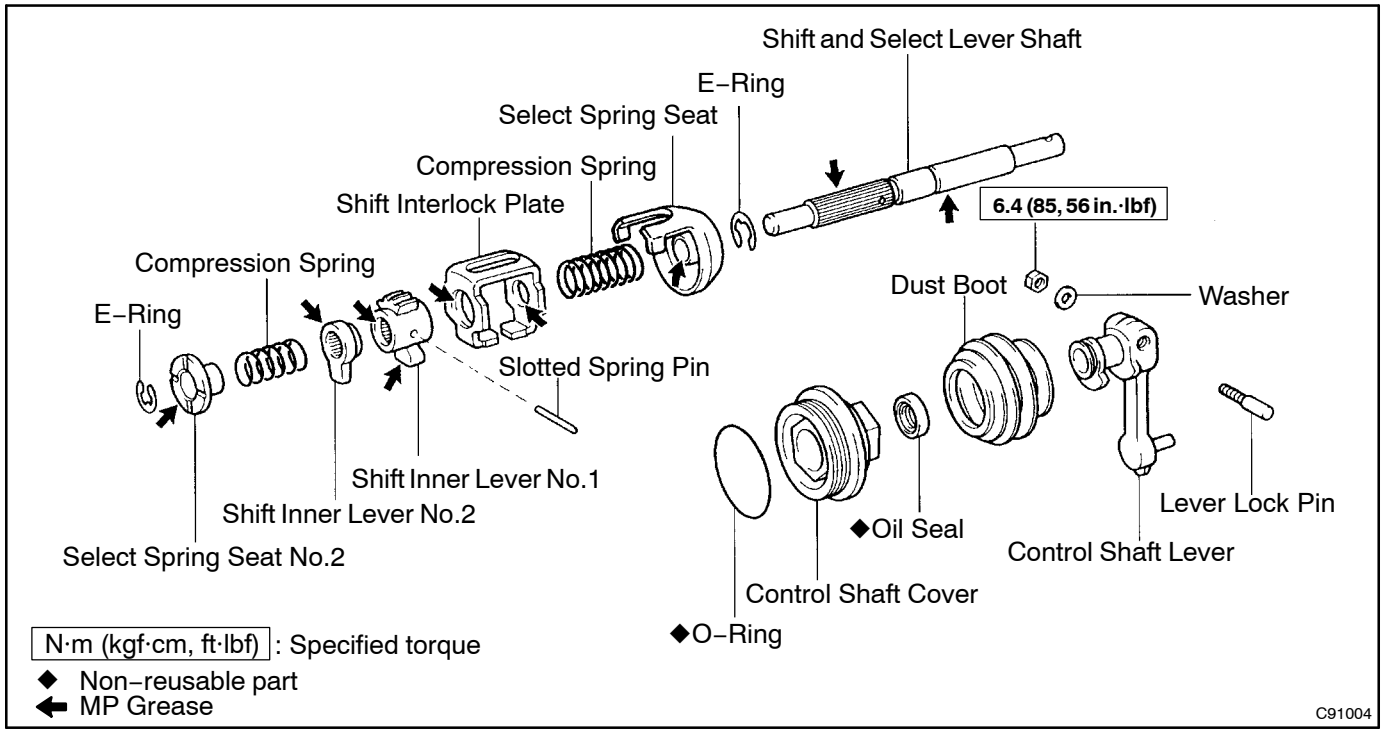
4. REPAIR PROCEDURES

(a) Component drawing is placed as the section or title when necessary.

(b) Illustrations of the parts catalog are placed as the ”disassembled parts drawing” so that it enables you to understand the fitting condition of the components.

(c) Non–reusable parts, grease applied parts, precoated parts and tightening torque are specified in the components drawing.

Example:



(d) Tightening torque, oil applying position, and non–reusable parts are described as important points in the procedure.

NOTICE:

There are cases where such information can only be indicated by an illustration. In that case, all the information such as torque, oil, etc. are described in the illustration.

(e) Installing procedure of operation items is performed in the reverse order of the removing, and only the important points are described.

(f) Only items with points are described in the procedure, and the operational portion and content are placed using an illustration. In the explanations, details of the operational method, standard value and notice are placed.

(g) There may be a case where the illustrations of similar models are used. In that case the details may be different from the actual vehicle.

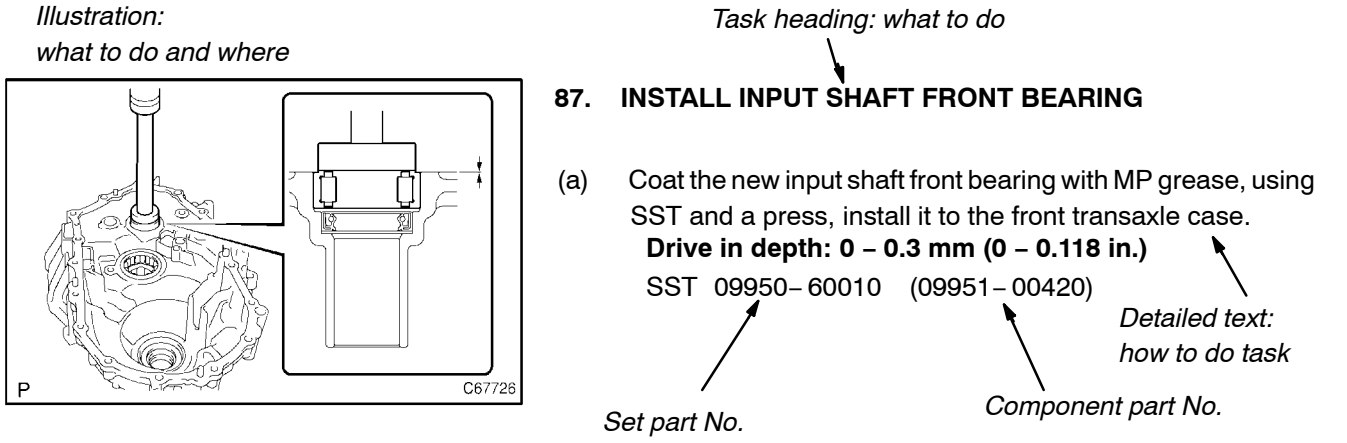
(h) The procedures are presented in a step–by–step format:

(1) The illustration shows what to do and where to do it.

(2) The task heading tells what to do.

(3) The detailed text tells how to perform the task and gives other information such as specifications and warnings.

Example:



HINT:

This format provides an experienced technician with a FAST TRACK to the necessary information. The task heading can be read at a glance when necessary, and the text below provides detailed information. Important specifications and warnings always stand out in bold type.

5. SERVICE SPECIFICATIONS

(a) Specifications are presented in bold type throughout the manual. You never have to leave the procedure to look up your specifications. The specifications are also found in the Service Specifications section for a quick reference.

6. TERMS DEFINITION

CAUTION	Indicate the possibility of injury to you or other people.
NOTICE	Indicate the possibility of damage to the components being repaired.
HINT	Provide additional information to help you perform the repair efficiently.

7. SI UNIT

(a) The UNITS given in this manual are primarily expressed according to the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the English System.

Example:

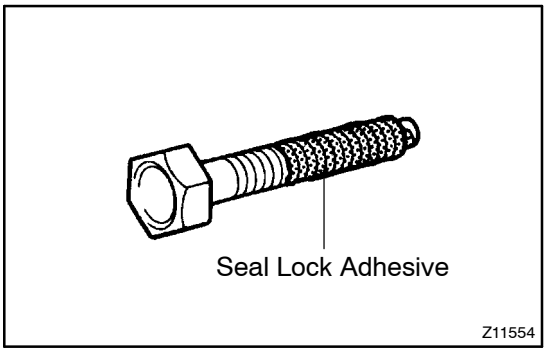
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)

REPAIR INSTRUCTION FOR MANUAL TRANSMISSION WORKSHOP MANUAL

010CX–03

PRECAUTION

1. BASIC REPAIR HINT



(a) PRECOATED PARTS

(1) Precoated parts are bolts, nuts, etc. that are coated with a seal lock adhesive at the factory.

(2) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.

(3) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.

NOTICE:

Do the torque checking with the lower limit value of the torque tolerance.

(4) Depending on the seal lock agent to apply, there may be a case where it is necessary to leave it for a specified time until it hardens.

(b) GASKETS

When necessary, use a sealer on gaskets to prevent leaks.

(c) BOLTS, NUTS AND SCREWS

Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.

TERMS FOR MANUAL TRANSMISSION WORKSHOP MANUAL

ABBREVIATIONS USED IN THIS MANUAL

010CY–02

Abbreviations	Meaning
FIPG	Formed In Plce Gasket
Max	Maximum
Min	Minimum
MP	Multipurpose
No.	Number
RR	Rear
SSM	Special Service Materials
SST	Special service Tools
STD	Standard
1st	First
2nd	Second
3rd	Third
5th	Fifth

010CZ–02

GLOSSARY OF SAE AND HINO TERMS

This glossary lists all SAE–J1930 terms and abbreviations used in this manual in compliance with SAE recommendations, as well as their Hino equivalents.

SAE ABBREVIATIONS	SAE TERMS	HINO TERMS ( )––ABBREVIATIONS
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	–
B+	Battery Positive Voltage	+B, Battery Voltage
BARO	Barometric Pressure	–
CAC	Charge Air Cooler	Inter cooler
CARB	Carburettor	Carburettor
CFI	Continuous Fuel Injection	–
CKP	Crankshaft Position	Crank Angle
CL	Closed Loop	Closed Loop
CMP	Camshaft position	Cam Angle
CPP	Clutch Pedal Position	–
CTOX	Continuous Trap Oxidizer	–
CTP	Closed Throttle Potion	–
DFI	Direct Fuel Injection (Diesel)	Direct Injection (DI)
DI	Distributor Ignition	–
DLC1 DLC2 DLC3	Data Link Connector 1 Data Link Connector 2 Data Link Connector 3	1: Check Connector 2: Total Diagnosis Communication Link (TDCL) 3: OBD II Diagnostic Connector
DTC	Diagnostic Trouble Code	Diagnostic Code
DTM	Diagnostic Test Mode	–
ECL	Engine Control Level	–
ECM	Engine Control Module	Engine ECU (Electronic Control Unit)
ECT	Engine Control Temperature	Coolant Temperature, Water Temperature (THW)
EEPROM	Electrically Erasable Programmable Read Only memory	Electrically Erasable Programmable Read Only memory (EEPROM), Erasable Programmable Read Only memory (EPROM)
EFE	Early Fuel Evaporation	Cold Mixture Heater (CMH), Heat Control Valve (HCV)
EGR	Exhaust Gas Recirculation	Exhaust Gas Recirculation (EGR)
EI	Electronic Ignition	Distributorless Ignition (DI)
EM	Engine Modification	Engine Modification (EM)
EPROM	Erasable Programmable Read Only Memory	Programmable Read Only Memory (PROM)
EVAP	Evaporative Emission	Evaporative Emission Control (EVAP)
FC	Fan Control	–
FEEPROM	Flash Electrically Erasable Programmable Read Only Memory	–
FEPROM	Flash Erasable Programmable Read Only Memory	–
FF	Flexible Fuel	–
FP	Fuel Pump	Fuel Pump
GEN	Generator	Alternator
GND	Ground	Ground (GND)
HO2S	Heated Oxygen Sensor	Heated Oxygen Sensor (HO2S)
IAC	Idol Air Control	Idol Speed Control (ISC)
IAT	Intake Air Temperature	Intake or Inlet Air Temperature
ICM	Ignition Control Module	–
IFI	Indirect Fuel Injection	Indirect Injection
IFS	Inertia Fuel–Shutoff	–

ISC	Idle Speed Control	–
KS	Knock Sensor	Knock Sensor
MAF	Mass Air Flow	Air Flow Meter
MAP	Manifold Absolute Pressure	Manifold Pressure Intake Vacuum
MC	Mixture Control	Electric Bleed Air Control Valve (EBCV) Mixture Control Valve (MCV) Electric Air Control Valve (EACV)
MDP	Manifold Differential Pressure	–
MFI	Multiport Fuel Injection	Electronic Fuel Injection (EFI)
MIL	Malfunction Indicator Lamp	Check Engine Light
MST	Manifold Surface temperature	–
MVZ	Manifold Vacuum Zone	–
NVRAM	Non–Volatile Random Access Memory	–
O2S	Oxygen Sensor	Oxygen Sensor, O_2 Sensor (O_{2S})
OBD	On–Board Diagnostic	On–Board Diagnostic (OBD)
OC	Oxidation Catalytic Converter	Oxidation Catalyst Converter (OC), CC_0
OP	Open Loop	Open Loop
PAIR	Pulsed Secondary Air Injection	Air Suction (AS)
PCM	Powertrain Control Module	–
PNP	Park/Neutral Position	–
PROM	Programmable Read Only Memory	–
PSP	Power Steering Pressure	–
PTOX	Periodic Trap Oxidizer	Diesel Particulate Filter (DPF) Diesel Particulate Trap (DPT)
RAM	Random Access Memory	Random Access Memory (RAM)
RM	Relay Module	–
ROM	Read Only Memory	Read Only Memory (ROM)
RPM	Engine Speed	Engine Speed
SC	Supercharger	Supercharger
SCB	Supercharger Bypass	–
SFI	Sequential Multiport Fuel Injection	Electronic Fuel Injection (EFI), Sequential Injection
SPL	Smoke Puff Limiter	–
SRI	Service Reminder Indicator	–
SRT	System Readiness Test	–
ST	Scan Tool	–
TB	Throttle Body	Throttle Body
TBI	Throttle Body Fuel Injection	Single Point Injection Central Fuel Injection (Ci)
TC	Turbocharger	Turbocharger
TCC	Torque Converter Clutch	Torque Converter
TCM	Transmission Control Module	Transmission ECU (Electronic Control Unit)
TP	Throttle Position	Throttle Position
TR	Transmission Range	–
TVV	Thermal Vacuum Valve	Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three–Way Catalytic Converter	Three–Way Catalytic (TWC) CC_{RO}
TWC+OC	Three–Way + Oxidation Catalytic Converter	$CC_R + CC_O$
VAF	Volume Air Flow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor (Read Switch Type)
WOT	Wide Open Throttle	Full Throttle

WU–OC	Warm Up Oxidation Catalytic Converter	–
WU–TWC	Warm Up Three–Way Catalytic Converter	Manifold Converter
3GR	Third Gear	–
4GR	Fourth Gear	–

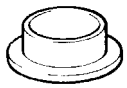
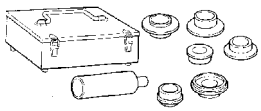
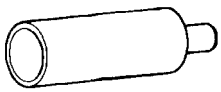
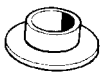
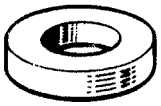
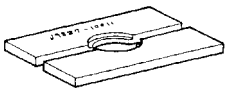
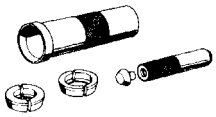
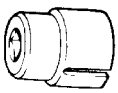
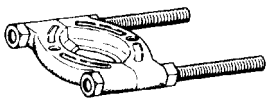
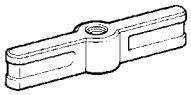
PREPARATION

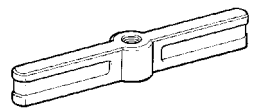
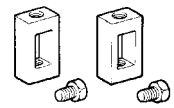
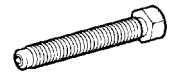
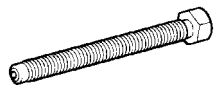
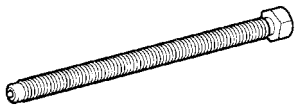
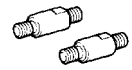
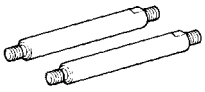
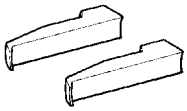
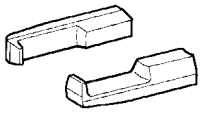
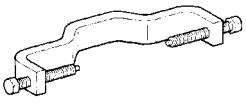
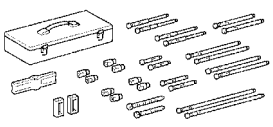
MANUAL TRANSMISSION/TRANSAXLE

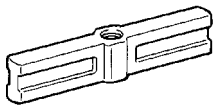
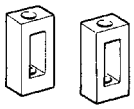
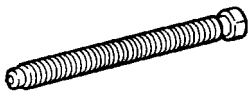
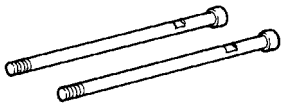
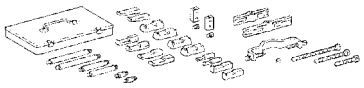
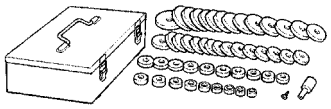
022DN–01

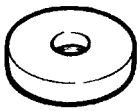
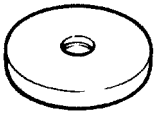
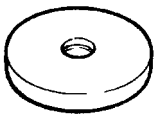
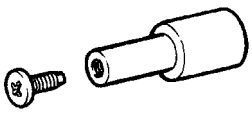
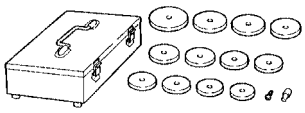
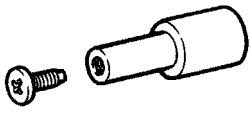
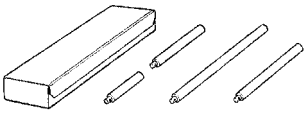
PREPARATION

SST

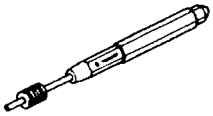
	09316–20011	Transfer Bearing Replacer	MANUAL TRANSMISSION ASSY OUTPUT SHAFT ASSY
	09316–60011	Transmission & Transfer Bearing Replacer	MANUAL TRANSMISSION ASSY INPUT SHAFT ASSY OUTPUT SHAFT ASSY
	(09316–00011)	Replacer Pipe	MANUAL TRANSMISSION ASSY
	(09316–00031)	Replacer ”B”	INPUT SHAFT ASSY OUTPUT SHAFT ASSY
	(09316–00041)	Replacer ”C”	MANUAL TRANSMISSION ASSY OUTPUT SHAFT ASSY
	09515–21010	Rear Axle Shaft Bearing Replacer	COUNTER GEAR ASSY
	09527–10011	Rear Axle Shaft Bearing Remover	MANUAL TRANSMISSION ASSY INPUT SHAFT ASSY OUTPUT SHAFT ASSY
	09613–26010	Steering Worm Bearing Cone Remover	MANUAL TRANSMISSION ASSY
	09817–16011	Back–up Light Switch Tool	MANUAL TRANSMISSION ASSY
	09950–00020	Bearing Remover	OUTPUT SHAFT ASSY COUNTER GEAR ASSY
	09950–40011	Puller B Set	MANUAL TRANSMISSION ASSY
	(09951–04010)	Hanger 150	MANUAL TRANSMISSION ASSY

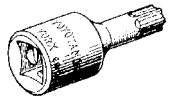
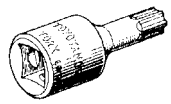
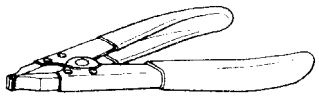
	(09951–04020)	Hanger 200	MANUAL TRANSMISSION ASSY
	(09952–04010)	Slide Arm	MANUAL TRANSMISSION ASSY
	(09953–04010)	Center Bolt 100	MANUAL TRANSMISSION ASSY
	(09953–04020)	Center Bolt 150	MANUAL TRANSMISSION ASSY
	(09953–04030)	Center Bolt 200	MANUAL TRANSMISSION ASSY
	(09954–04010)	Arm 25	MANUAL TRANSMISSION ASSY
	(09954–04020)	Arm 100	MANUAL TRANSMISSION ASSY
	(09954–04030)	Arm 150	MANUAL TRANSMISSION ASSY
	(09955–04011)	Claw No.1	MANUAL TRANSMISSION ASSY
	(09955–04061)	Claw No.6	MANUAL TRANSMISSION ASSY
	(09957–04010)	Attachment	MANUAL TRANSMISSION ASSY
	(09958–04011)	Holder	MANUAL TRANSMISSION ASSY
	09950–50013	Puller C Set	MANUAL TRANSMISSION ASSY

	(09951–05010) Hanger 150	MANUAL TRANSMISSION ASSY
	(09952–05010) Slide Arm	MANUAL TRANSMISSION ASSY
	(09953–05020) Center Bolt 150	MANUAL TRANSMISSION ASSY
	(09954–05040) Claw No.4	MANUAL TRANSMISSION ASSY
	09950–40011 Puller B Set	MANUAL TRANSMISSION ASSY
	(09957–04010) Attachment	MANUAL TRANSMISSION ASSY
	09950–60010 Replacer Set	MANUAL TRANSMISSION ASSY INPUT SHAFT ASSY COUNTER GEAR ASSY SHIFT LEVER SHAFT HOUSING ASSY
	(09951–00180) Replacer 18	MANUAL TRANSMISSION ASSY
	(09951–00200) Replacer 20	SHIFT LEVER SHAFT HOUSING ASSY
	(09951–00220) Replacer 22	SHIFT LEVER SHAFT HOUSING ASSY
	(09951–00290) Replacer 29	COUNTER GEAR ASSY
	(09951–00300) Replacer 30	MANUAL TRANSMISSION ASSY
	(09951–00320) Replacer 32	SHIFT LEVER SHAFT HOUSING ASSY

	(09951–00330)	Replacer 33	MANUAL TRANSMISSION ASSY
	(09951–00430)	Replacer 43	MANUAL TRANSMISSION ASSY
	(09951–00480)	Replacer 48	MANUAL TRANSMISSION ASSY
	(09951–00570)	Replacer 57	INPUT SHAFT ASSY
	(09951–00620)	Replacer 62	MANUAL TRANSMISSION ASSY
	(09952–06010)	Adapter	MANUAL TRANSMISSION ASSY
	09950–60020	Replacer Set No.2	SHIFT LEVER SHAFT HOUSING ASSY
	(09952–06010)	Adapter	SHIFT LEVER SHAFT HOUSING ASSY
	09950–70010	Handle Set	MANUAL TRANSMISSION ASSY INPUT SHAFT ASSY COUNTER GEAR ASSY SHIFT LEVER SHAFT HOUSING ASSY
	(09951–07100)	Handle 100	INPUT SHAFT ASSY COUNTER GEAR ASSY
	(09951–07150)	Handle 150	MANUAL TRANSMISSION ASSY SHIFT LEVER SHAFT HOUSING ASSY
	09555–55010	Differential Drive Pinion Bearing Replacer	OUTPUT SHAFT ASSY

Recomended Tools

	09031–00040	Pin Punch .	MANUAL TRANSMISSION ASSY

	09042–00010	Torx Socket T30	MANUAL TRANSMISSION ASSY
	09042–00020	Torx Socket T40	MANUAL TRANSMISSION ASSY
	09905–00012	Snap Ring No.1 Expander	MANUAL TRANSMISSION ASSY INPUT SHAFT ASSY OUTPUT SHAFT ASSY COUNTER GEAR ASSY

Equipment

Cylinder gauge	
Dial indicator or dial indicator with magnetic base	
Feeler gauge	
Micrometer	
Plastic hammer	
Press	
Torque wrench	

Lubricant

Manual transmission oil	4.2 liters (4.4 US qts, 3.7 Imp. qts)	APL GL–4 or GL–5 SAE 75W–90

SSM (Special Service Materials)

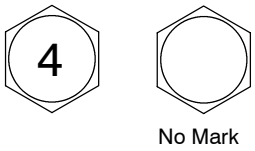
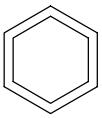
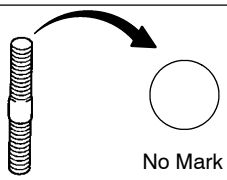
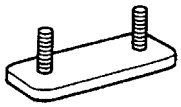
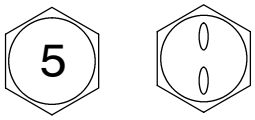
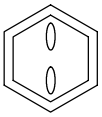
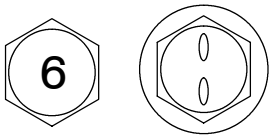
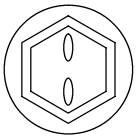
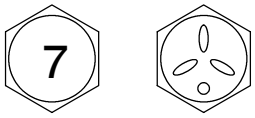
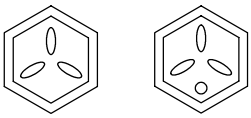
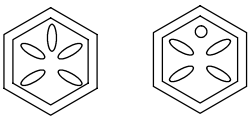
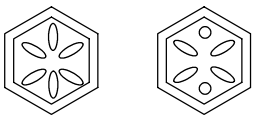
	08826–00090	”Seal Packing 1281,” THREE BOND 1281 or equivalent (FIPG)
	08833–00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent

SERVICE SPECIFICATIONS

STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

031BW–01

Bolt Type				Class
Hexagon Head Bolt		Stud Bolt	Weld Bolt	
Normal Recess Bolt	Deep Recess Bolt			
 No Mark	 No Mark	 No Mark		4T
				5T
 w/ Washer	 w/ Washer			6T
				7T
				8T
				9T
				10T
				11T

B06431

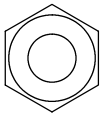
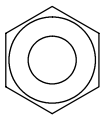
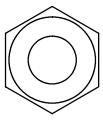
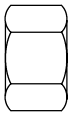
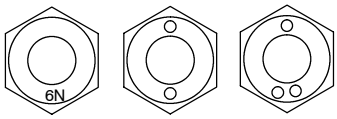
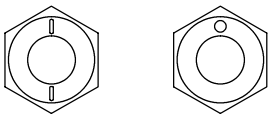
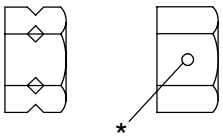
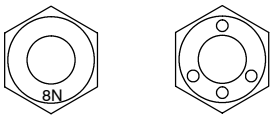
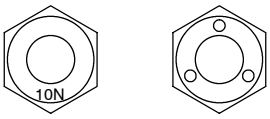
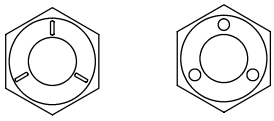
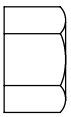
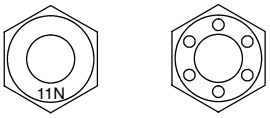
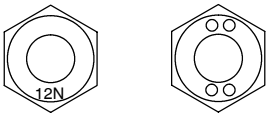
031BX–01

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N·m	kgf·cm	ft·lbf	N·m	kgf·cm	ft·lbf
4T	6	1	5	55	48 in.·lbf	6	60	52 in.·lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	–	–	–
5T	6	1	6.5	65	56 in.·lbf	7.5	75	65 in.·lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	–	–	–
6T	6	1	8	80	69 in.·lbf	9	90	78 in.·lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	–	–	–
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	–	–	–
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

031BY–01

HOW TO DETERMINE NUT STRENGTH

Nut Type			Class
Present Standard Hexagon Nut	Old Standard Hexagon Nut		
	Cold Forging Nut	Cutting Processed Nut	
 No Mark			4N
 No Mark (w/ Washer)	 No Mark (w/ Washer)	 No Mark	5N (4T)
 6N			6N
		 *	7N (5T)
 8N			8N
 10N		 No Mark	10N (7T)
 11N			11N
 12N			12N

*: Nut with 1 or more marks on one side surface of the nut.

B06432

HINT:

Use the nut with the same number of the nut strength classification or the greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example: Bolt = 4T

Nut = 4N or more

MANUAL TRANSMISSION / TRANSAXLE

SERVICE DATA

031BZ-01

Oil pump driven rotor to pump cover clearance	STD	0.02 – 0.17 mm (0.0008 – 0.0067 in.)
	Max.	0.17 mm (0.0067 in.)
Oil pump drive to driven rotor tip clearance	STD	0.05 – 0.15 mm (0.0020 – 0.0059 in.)
	Max.	0.15 mm (0.0059 in.)
Reverse idler gear thrust clearance	STD	0.10 – 0.55 mm (0.0039 – 0.0217 in.)
	Max.	0.55 mm (0.0217 in.)
6th gear thrust clearance	STD	0.10 – 0.57 mm (0.0039 – 0.0224 in.)
	Max.	0.57 mm (0.0224 in.)
Reverse gear thrust clearance	STD	0.10 – 0.45 mm (0.0039 – 0.0177 in.)
	Max.	0.45 mm (0.0177 in.)
6th gear radial clearance	STD	0.020 – 0.073 mm (0.0008 – 0.0029 in.)
	Max.	0.073 mm (0.0029 in.)
Reverse gear gear radial clearance	STD	0.015 – 0.067 mm (0.0006 – 0.0026 in.)
	Max.	0.067 mm (0.0026 in.)
6th gear inside diameter	STD	46.015 – 46.040 mm (1.8116 – 1.8126 in.)
	Max.	46.040 mm (1.8126 in.)
Reverse gear inside diameter	STD	45.015 – 45.040 mm (1.7722 – 1.7732 in.)
	Max.	45.040 mm (1.7732 in.)
Shift fork to hub sleeve clearance	1st – 2nd, 3rd – 4th Max.	0.35 mm (0.0138 in.)
	5th Max.	0.84 mm (0.0331 in.)
Synchronizer ring to gear clearance (Input Shaft)	Min.	0.8 mm (0.0315 in.)
Synchronizer ring to gear clearance (Output Shaft)		
	1st gear Min.	1.25 mm (0.0492 in.)
	2nd gear Min.	1.23 mm (0.0484 in.)
	3rd gear Min.	1.15 mm (0.0453 in.)
	5th gear Min.	0.8 mm (0.0315 in.)
	6th gear Min.	1.1 mm (0.0433 in.)
	Reverse gear Min.	0.9 mm (0.0354 in.)
Output shaft center bearing shaft snap ring thickness		
	Mark A	2.40 – 2.45 mm (0.0945 – 0.0965 in.)
	Mark B	2.45 – 2.50 mm (0.0965 – 0.0984 in.)
	Mark C	2.50 – 2.55 mm (0.0984 – 0.1004 in.)
	Mark D	2.55 – 2.60 mm (0.1004 – 0.1024 in.)
	Mark E	2.60 – 2.65 mm (0.1024 – 0.1044 in.)
	Mark F	2.65 – 2.70 mm (0.1044 – 0.1063 in.)
	Mark G	2.70 – 2.75 mm (0.1063 – 0.1083 in.)
	Mark H	2.75 – 2.80 mm (0.1083 – 0.1102 in.)
6th counter gear front bearing snap ring No. 2 thickness	Mark A	2.30 – 2.35 mm (0.0906 – 0.0925 in.)
	Mark B	2.35 – 2.40 mm (0.0925 – 0.0945 in.)
	Mark C	2.40 – 2.45 mm (0.0945 – 0.0965 in.)
	Mark D	2.45 – 2.50 mm (0.0965 – 0.0984 in.)
	Mark E	2.50 – 2.55 mm (0.0984 – 0.1004 in.)
	Mark F	2.55 – 2.60 mm (0.1004 – 0.1024 in.)
	Mark G	2.60 – 2.65 mm (0.1024 – 0.1043 in.)
Counter gear snap ring thickness		
	Mark A	2.40 – 2.45 mm (0.0945 – 0.0965 in.)
	Mark B	2.45 – 2.50 mm (0.0965 – 0.0984 in.)
	Mark C	2.50 – 2.55 mm (0.0984 – 0.1004 in.)
	Mark D	2.55 – 2.60 mm (0.1004 – 0.1024 in.)
	Mark E	2.60 – 2.65 mm (0.1024 – 0.1043 in.)
	Mark F	2.65 – 2.70 mm (0.1043 – 0.1063 in.)
	Mark G	2.70 – 2.75 mm (0.1063 – 0.1083 in.)

Oil seal drive in depth		
Output shaft rear bearing retainer		0 – 0.5 mm (0 – 0.0197 in.)
Select outer lever		0 – 1.0 mm (0 – 0.039 in.)
Shift outer lever		–0.2 – 0.6 mm (–0.008 – 0.024 in.)
Input shaft snap ring thickness		
	Mark A	2.50 – 2.55 mm (0.0984 – 0.1004 in.)
	Mark B	2.55 – 2.60 mm (0.1004 – 0.1024 in.)
	Mark C	2.60 – 2.65 mm (0.1024 – 0.1044 in.)
	Mark D	2.65 – 2.70 mm (0.1044 – 0.1063 in.)
	Mark E	2.70 – 2.75 mm (0.1063 – 0.1083 in.)
	Mark F	2.75 – 2.80 mm (0.1083 – 0.1102 in.)
Gear thrust clearance 1st and 3rd	STD	0.10 – 0.45 mm (0.0039 – 0.0177 in.)
	Max.	0.45 mm (0.0177 in.)
Gear thrust clearance 2nd and 5th	STD	0.10 – 0.35 mm (0.0039 – 0.0138 in.)
	Max.	0.35 mm (0.0138 in.)
Gear radial clearance 1st and 3rd	STD	0.020 – 0.073 mm (0.0008 – 0.0029 in.)
	Max.	0.073 mm (0.0029 in.)
Gear radial clearance 2nd and 5th	STD	0.015 – 0.068 mm (0.0006 – 0.0027 in.)
	Max.	0.068 mm (0.0027 in.)
Output shaft flange thickness	Min.	4.725 mm (0.1860 in.)
Output shaft 1st gear journal diameter	Min.	49.979 mm (1.9677 in.)
Output shaft 2nd gear journal diameter	Min.	57.984 mm (2.2828 in.)
Output shaft 3rd gear journal diameter	Min.	37.979 mm (1.4952 in.)
Output shaft 5th gear journal diameter	Min.	45.984 mm (1.8104 in.)
Output shaft runout	Max.	0.03 mm (0.0012 in.)
Output shaft snap ring thickness		
Clutch hub No. 3 and No. 4	Mark A	2.40 – 2.45 mm (0.0945 – 0.0965 in.)
	Mark B	2.45 – 2.50 mm (0.0965 – 0.0984 in.)
	Mark C	2.50 – 2.55 mm (0.0984 – 0.1004 in.)
	Mark D	2.55 – 2.60 mm (0.1004 – 0.1024 in.)
	Mark E	2.60 – 2.65 mm (0.1024 – 0.1044 in.)
	Mark F	2.65 – 2.70 mm (0.1044 – 0.1063 in.)
Output shaft snap ring thickness		
Clutch hub No. 2	Mark 4	1.90 – 1.95 mm (0.0748 – 0.0768 in.)
	Mark 5	1.95 – 2.00 mm (0.0768 – 0.0787 in.)
	Mark 6	2.00 – 2.05 mm (0.0787 – 0.0807 in.)
	Mark 7	2.05 – 2.10 mm (0.0807 – 0.0827 in.)
	Mark 8	2.10 – 2.15 mm (0.0827 – 0.0847 in.)
	Mark 9	2.15 – 2.20 mm (0.0847 – 0.0866 in.)
Output shaft snap ring thickness		
Clutch hub No. 1	Mark A	2.90 – 2.95 mm (0.1142 – 0.1161 in.)
	Mark B	2.95 – 3.00 mm (0.1161 – 0.1181 in.)
	Mark C	3.00 – 3.05 mm (0.1181 – 0.1201 in.)
	Mark D	3.05 – 3.10 mm (0.1201 – 0.1220 in.)
	Mark E	3.10 – 3.15 mm (0.1220 – 0.1240 in.)
	Mark F	3.15 – 3.20 mm (0.1240 – 0.1260 in.)
Output shaft snap ring thickness		
	Mark A	2.40 – 2.45 mm (0.0945 – 0.0965 in.)
	Mark B	2.45 – 2.50 mm (0.0965 – 0.0984 in.)
	Mark C	2.50 – 2.55 mm (0.0984 – 0.1004 in.)
	Mark D	2.55 – 2.60 mm (0.1004 – 0.1024 in.)
	Mark E	2.60 – 2.65 mm (0.1024 – 0.1044 in.)
	Mark F	2.65 – 2.70 mm (0.1044 – 0.1063 in.)
	Mark G	2.70 – 2.75 mm (0.1063 – 0.1083 in.)
	Mark H	2.75 – 2.80 mm (0.1083 – 0.1102 in.)

Counter gear roller bearing journal diameter	A: STD	35.957 – 35.970 mm (1.4156 – 1.4161 in.)
	Max.	35.970 mm (1.4161 in.)
	B: STD	32.002 – 32.015 mm (1.2599 – 1.2604 in.)
	Max.	32.015 mm (1.2604 in.)
Counter gear front bearing snap ring thickness	Mark A	2.45 – 2.50 mm (0.0970 – 0.0984 in.)
	Mark B	2.50 – 2.55 mm (0.0984 – 0.1004 in.)
	Mark C	2.55 – 2.60 mm (0.1004 – 0.1024 in.)
	Mark D	2.60 – 2.65 mm (0.1024 – 0.1044 in.)
	Mark E	2.65 – 2.70 mm (0.1044 – 0.1063 in.)
	Mark F	2.70 – 2.75 mm (0.1063 – 0.1083 in.)

031C0–01

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Bearing retainer CTR x Intermediate plate	18	185	13
No. 1 front shift fork x No. 2 shift fork shaft	36	370	27
No. 1 rear shift fork x No. 1 shift fork shaft	34	350	25
No. 2 shift fork x No. 3 shift fork shaft	36	370	27
Inter lock hole plug	19	190	14
Case receiver x Transmission	18	185	13
Rear case oil strainer sub–assy x Transmission case RR	12	120	9
Transmission case RR x Transmission case (Front)	37	380	27
Oil pump cover x Rear bearing retainer	3.9	40	35 in.·lbf
Plug x Rear bearing retainer	19	190	14
Rear bearing retainer x Transmission case RR	37	380	27
Front bearing retainer x Transmission case (Front)	17	170	12
Power take–off cover x Transmission case (Front)	14	145	10
Shift lever shaft housing x Transmission case (Front)	17	170	12
Clutch housing x Transmission	37	380	27
Speedometer driven gear x Rear bearing retainer	11	115	8
Exhaust brake neutral switch assy x Shift lever shaft housing	39	400	29
Back–up light switch x Transmission case (Front)	44	450	33
Clutch release fork support x Transmission case (Front)	47	480	35
Filler, Drain plug x Transmission	37	380	27
Plug x Shift lever shaft housing	19	190	14
Shift outer lever set nut	20	204	15
Select outer lever set nut	7.8	80	69 in.·lbf

MANUAL TRANSMISSION/TRANSAXLE

MANUAL TRANSMISSION SYSTEM

410CG–01

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

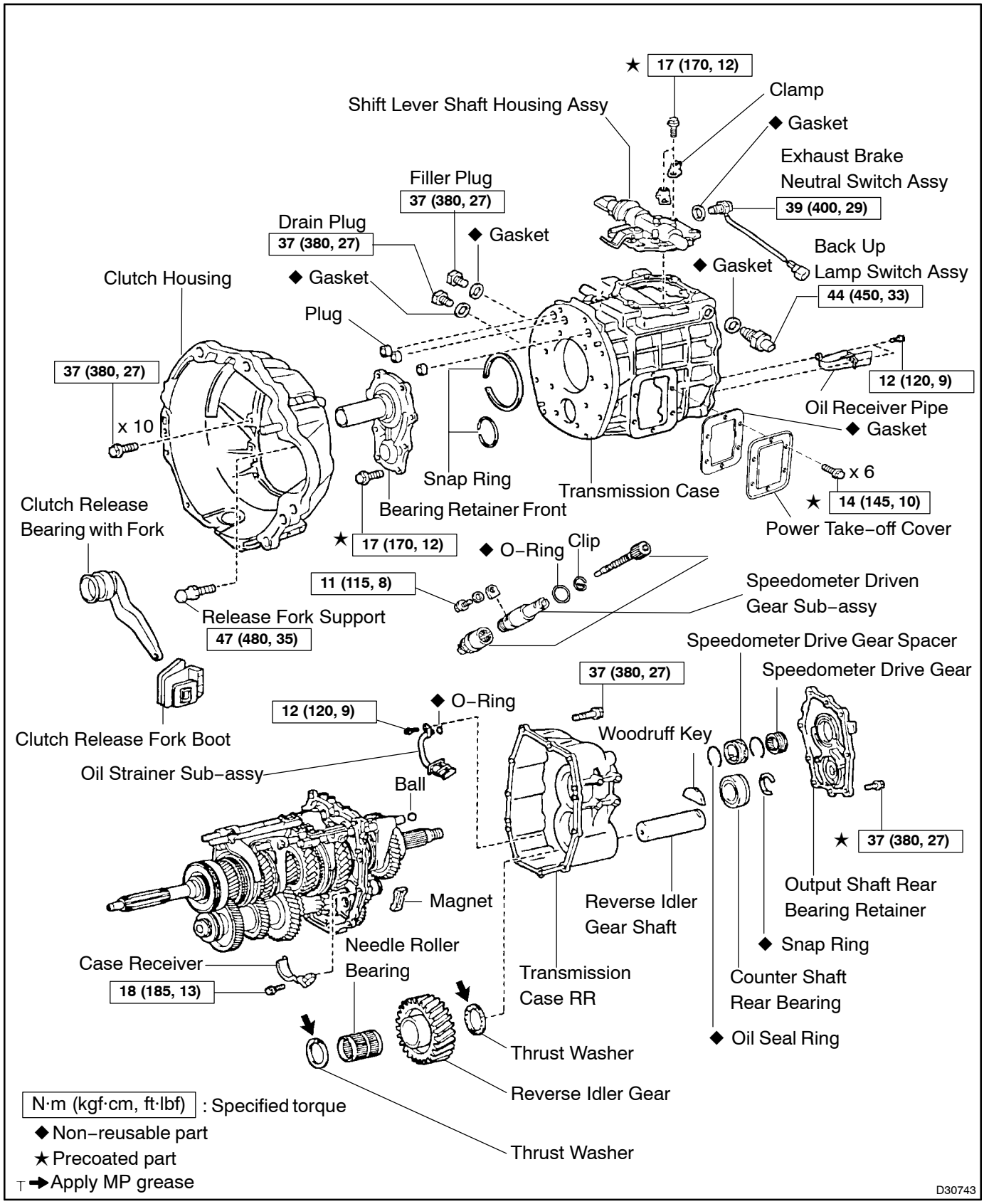
Symptom	Suspect Area	See page
Noise	1. Oil (Level low)	★
	2. Oil (Wrong)	★
	3. Gear (Worn or damaged)	41–5 41–30 41–33 41–44
	4. Bearing (Worn or damaged)	41–5 41–30 41–33 41–44
Oil leakage	1. Oil (Level too high)	★
	2. Gasket (Damaged)	41–5
	3. Oil seal (Worn or damaged)	41–5
	4. O–Ring (Worn or damaged)	41–5
Hard to shift or will not shift	1. Synchronizer ring (Worn or damaged)	41–5 41–30 41–33
	2. Shift key spring (Damaged)	41–5 41–33
Jumps out of gear	1. Locking ball spring (Damaged)	41–5
	2. Shift fork (Worn)	41–5 41–33
	3. Gear (Worn or damaged)	41–5 41–30 41–33 41–44
	4. Bearing (Worn or damaged)	41–5 41–30 41–33 41–44

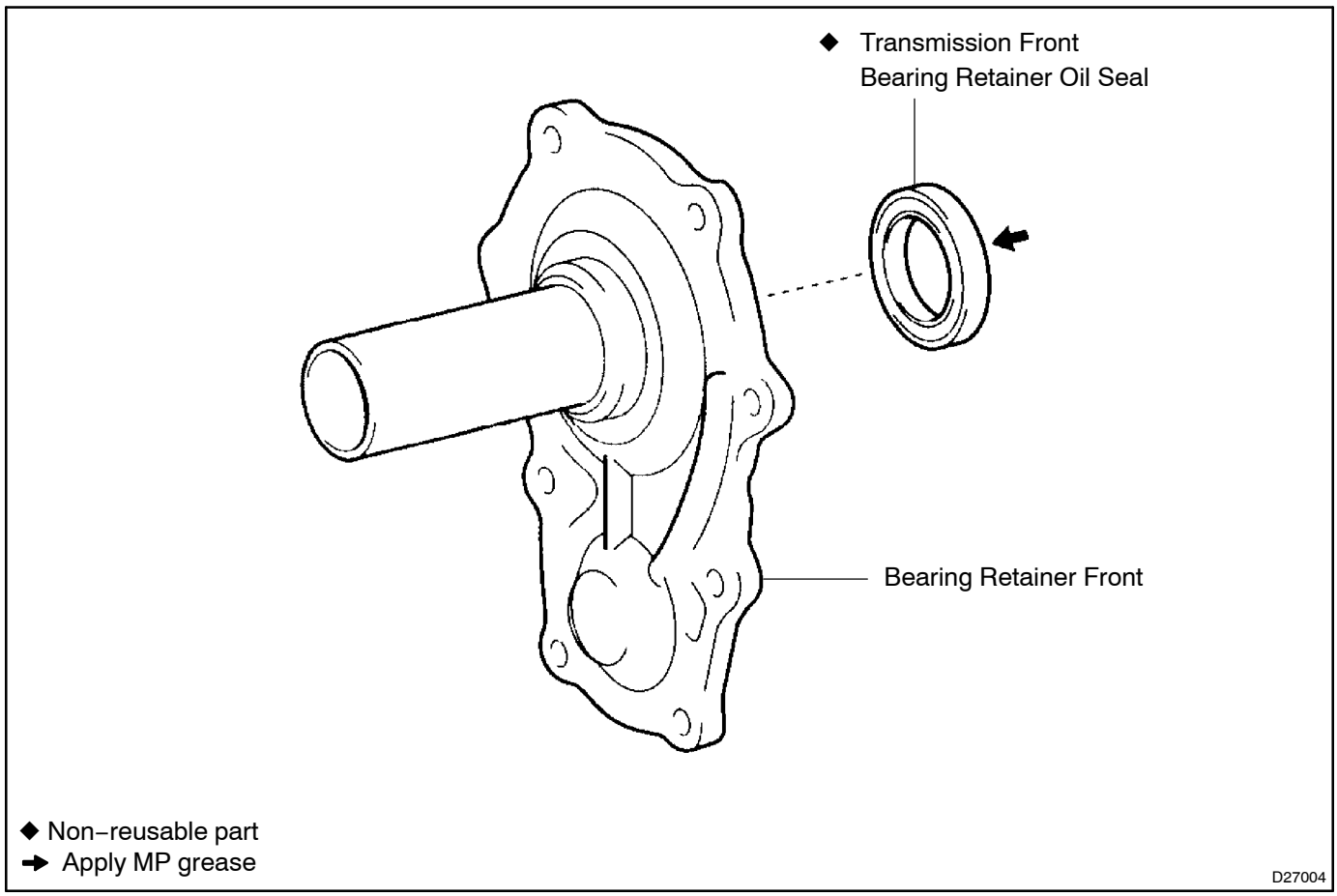
HINT:★ See pub. No.S1–YXZE05A

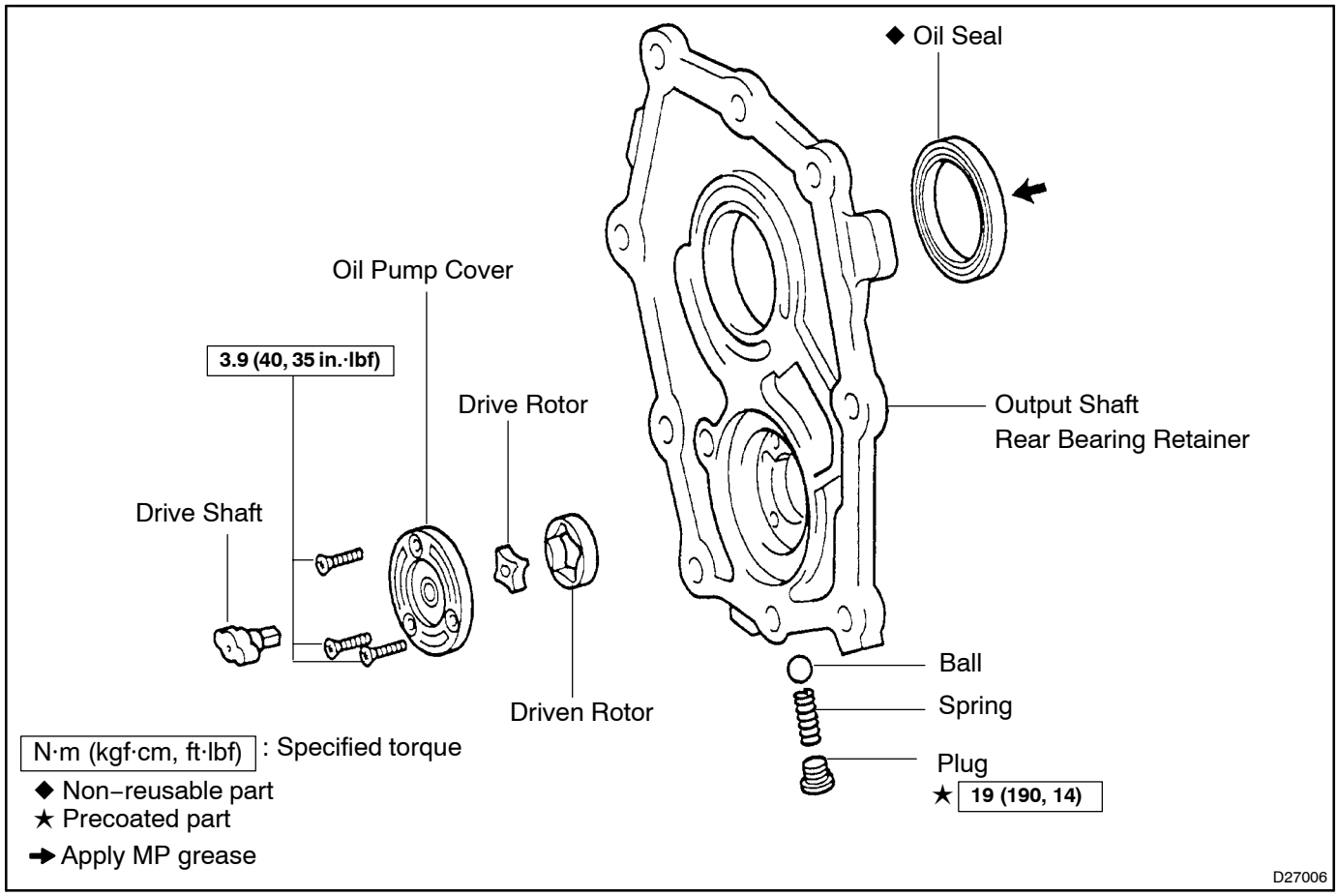
MANUAL TRANSMISSION ASSY

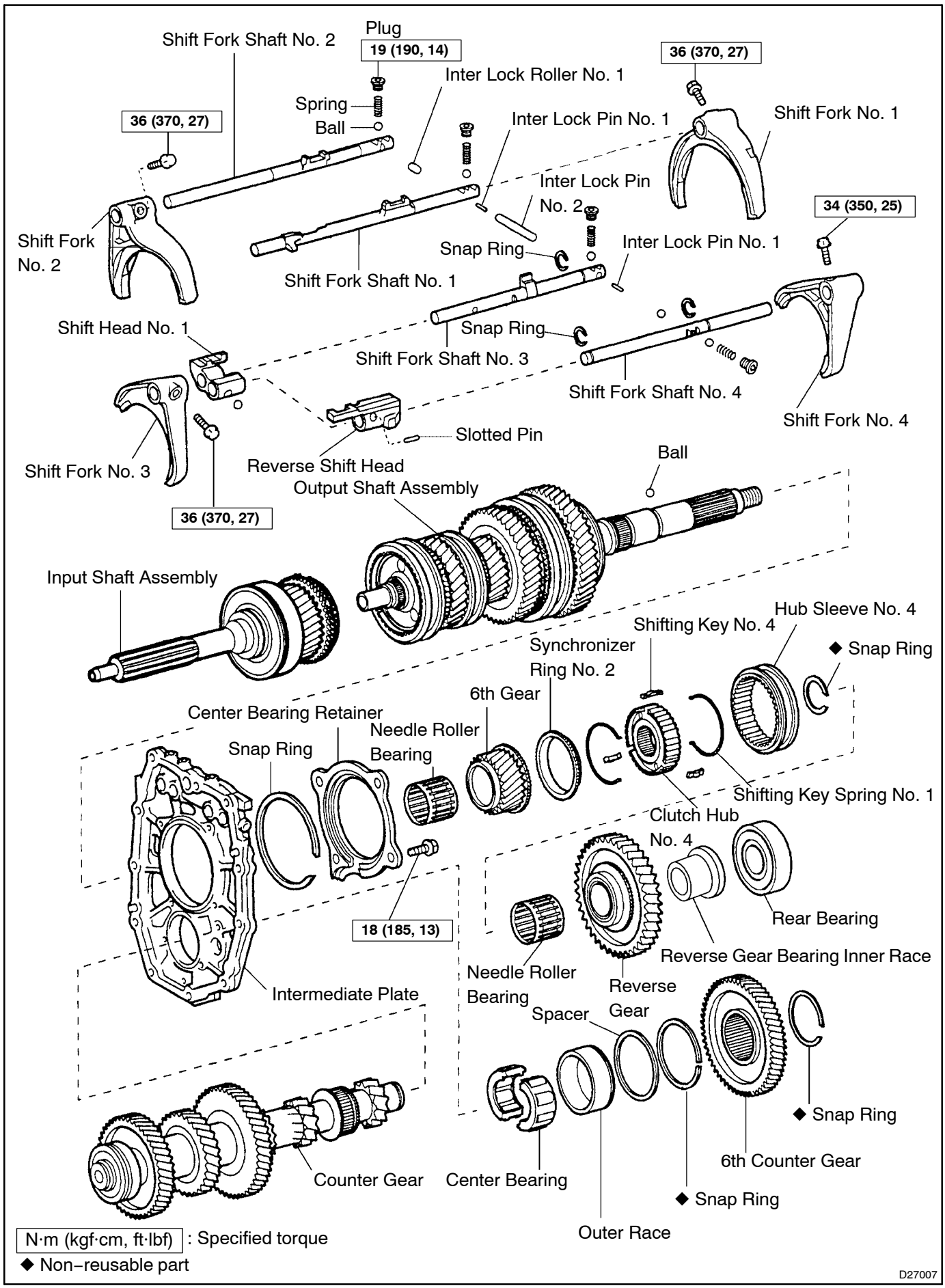
COMPONENTS

410CH–01




◆ Transmission Front
Bearing Retainer Oil Seal
Bearing Retainer Front
◆ Non–reusable part
➔ Apply MP grease
D27004


◆ Oil Seal
Oil Pump Cover
3.9 (40, 35 in.·lbf)
Drive Rotor
Output Shaft
Rear Bearing Retainer
Drive Shaft
Ball
Spring
Driven Rotor
Plug
★ 19 (190, 14)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part
➔ Apply MP grease
D27006


Shift Fork Shaft No. 2
Plug
19 (190, 14)
Inter Lock Roller No. 1
36 (370, 27)
Spring
Ball
Inter Lock Pin No. 1
Shift Fork No. 1
36 (370, 27)
Inter Lock Pin No. 2
34 (350, 25)
Shift Fork No. 2
Snap Ring
Inter Lock Pin No. 1
Shift Fork Shaft No. 1
Shift Head No. 1
Snap Ring
Shift Fork Shaft No. 3
Shift Fork Shaft No. 4
Shift Fork No. 4
Slotted Pin
Shift Fork No. 3
Reverse Shift Head
Ball
Output Shaft Assembly
36 (370, 27)
Input Shaft Assembly
Hub Sleeve No. 4
Shifting Key No. 4
Synchronizer Ring No. 2
◆ Snap Ring
6th Gear
Center Bearing Retainer
Needle Roller Bearing
Snap Ring
Shifting Key Spring No. 1
Clutch Hub No. 4
Rear Bearing
18 (185, 13)
Reverse Gear Bearing Inner Race
Needle Roller Bearing
Reverse Gear
Intermediate Plate
Spacer
◆ Snap Ring
6th Counter Gear
Counter Gear
Center Bearing
◆ Snap Ring
Outer Race
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
D27007

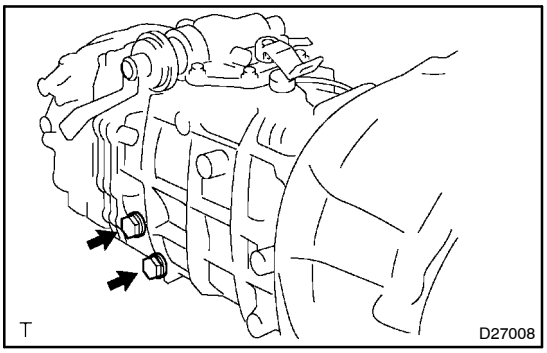
410CI–01

OVERHAUL

NOTICE:

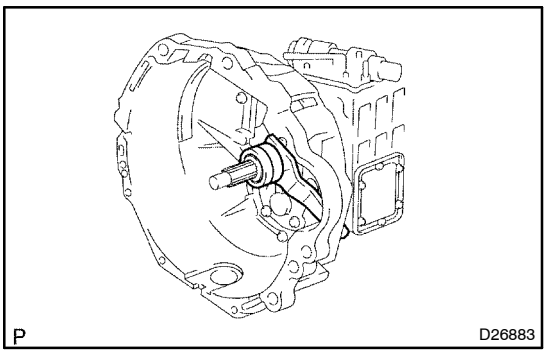
When working with FIPG (Seal packing) material, you must observe the following items.

- **Using a razor blade and gasket scraper, remove all the old FIPG material from the gasket surfaces.**
- **Thoroughly clean all components to remove all the loose material.**
- **Clean both sealing surfaces with a non–residue solvent.**
- **Apply FIPG in an approx. 1.2 mm (0.05 in.) wide bead along the sealing surface.**
- **Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.**



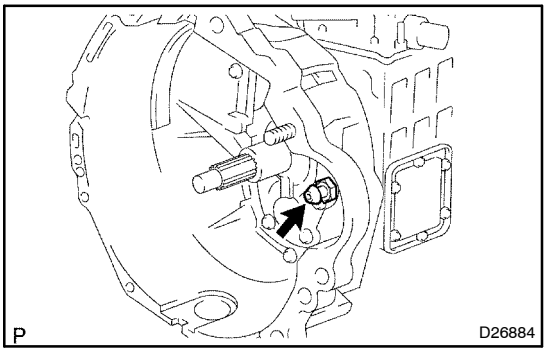
1. REMOVE DRAIN PLUG

2. REMOVE FILLER PLUG



3. REMOVE CLUTCH RELEASE BEARING ASSY

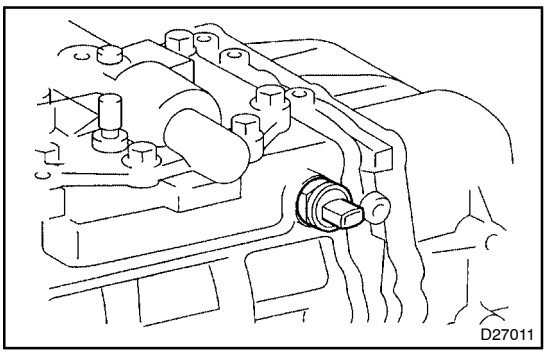
4. REMOVE CLUTCH RELEASE FORK SUB–ASSY



5. REMOVE RELEASE FORK SUPPORT

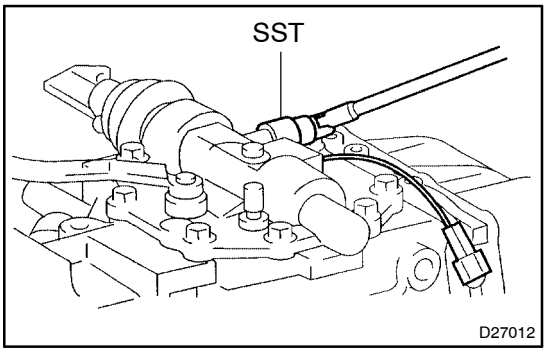
(a) Using a socket wrench (19 mm), remove the release fork support.

6. REMOVE CLUTCH RELEASE FORK BOOT



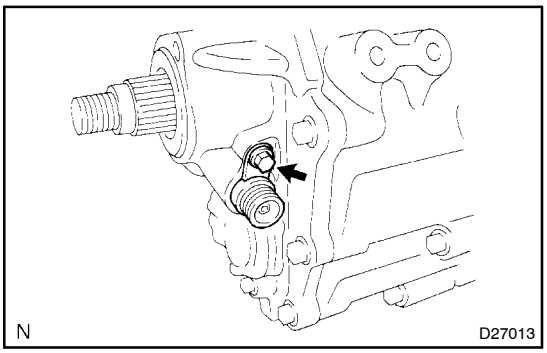
7. REMOVE BACK UP LAMP SWITCH ASSY

(a) Remove the back up lamp switch and gasket.



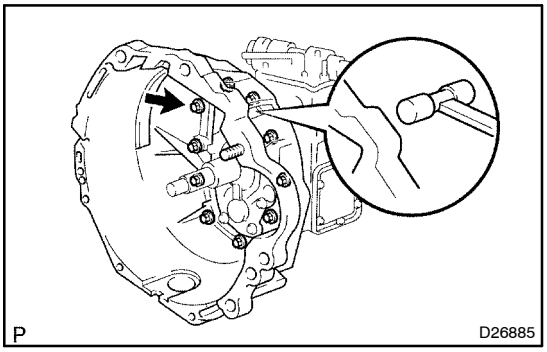
8. REMOVE EXHAUST BRAKE NEUTRAL SWITCH ASSY

(a) Using SST, remove the neutral switch and gasket.
SST 09817–16011



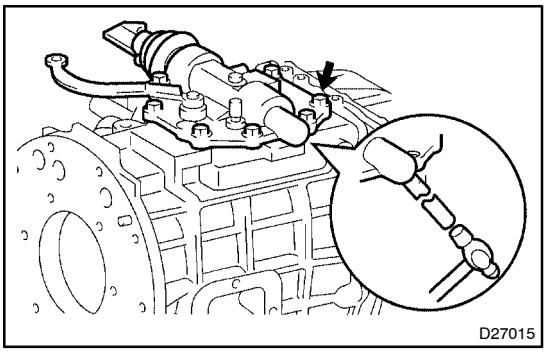
9. REMOVE SPEEDOMETER DRIVEN (MTM) GEAR SUB–ASSY

(a) Remove the bolt, lock plate driven gear sub–assy and O–ring.



10. REMOVE CLUTCH HOUSING

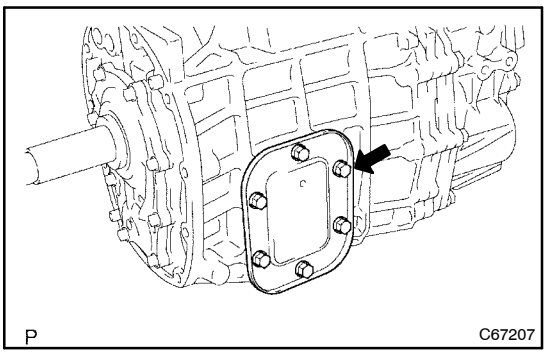
(a) Remove the 10 bolts.
(b) Using a plastic hammer, tap out the clutch housing.



11. REMOVE SHIFT LEVER SHAFT HOUSING ASSY

HINT:
The lever must be removed after shifting it in the neutral position.

(a) Remove the 8 bolts and 2 clamps.
(b) Using a plastic hammer, carefully tap out the shift lever shaft housing.

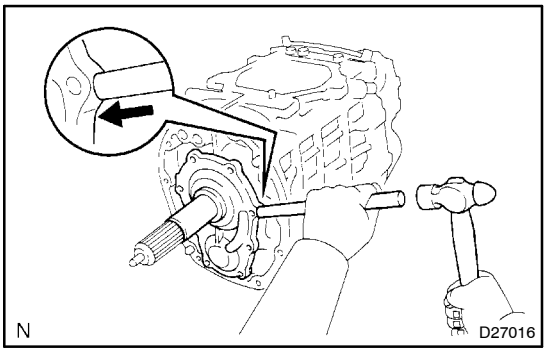


12. REMOVE MANUAL TRANSMISSION POWER TAKE–OFF COVER

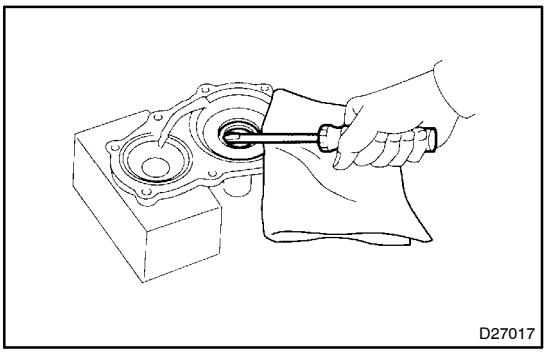
(a) Remove the 6 bolts, cover and gasket.

13. REMOVE BEARING RETAINER FRONT (MTM)

(a) Remove the 8 bolts.



(b) Using a brass bar and a hammer, carefully tap out the front bearing retainer.

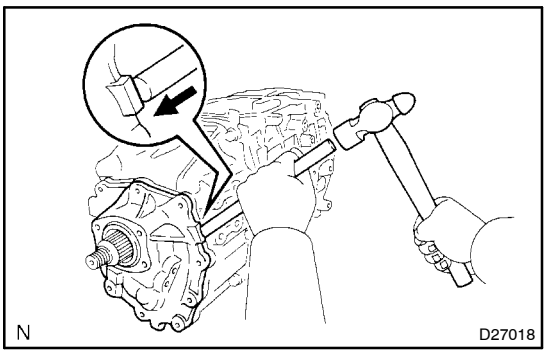


14. REMOVE TRANSMISSION FRONT BEARING RETAINER OIL SEAL

(a) Using a screwdriver, pry out the oil seal.

15. REMOVE OUTPUT SHAFT REAR BEARING (MTM) RETAINER

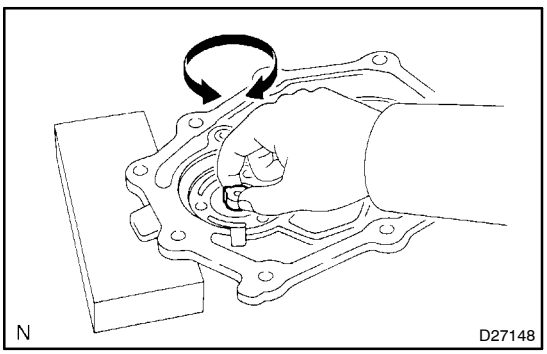
(a) Remove the 9 bolts.



(b) Using a brass bar and a hammer, carefully tap out the rear bearing retainer.

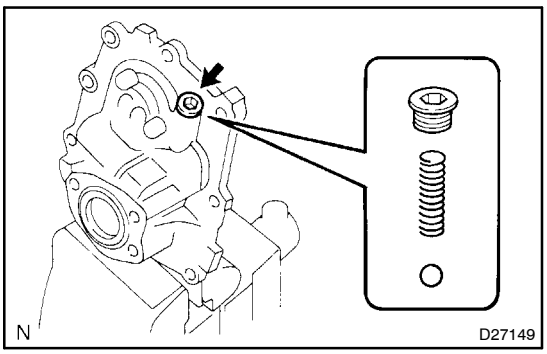
HINT:

Make the brass bar touched the lib portion of the case.



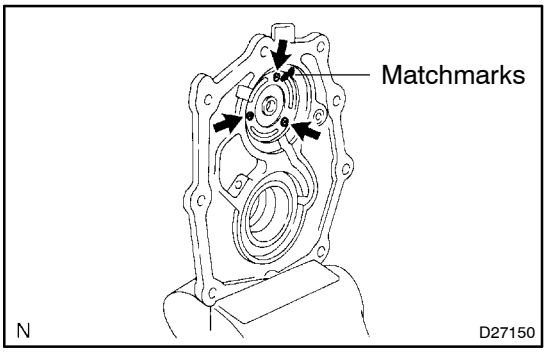
16. INSPECT OIL PUMP

(a) Rotate the oil pump drive shaft lightly, and check that the drive rotor turns smoothly.

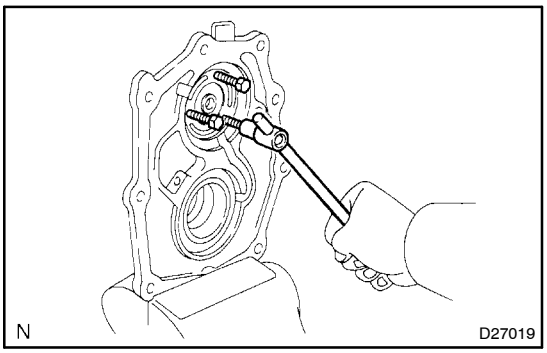


17. REMOVE OIL PUMP ASSY

(a) Remove the plug, compression spring and ball.
  (1) Fix the rear bearing retainer onto a vise through the aluminium plate.
  (2) Using a torx socket wrench (T40), remove the plug.
  (3) Using a magnetic finger, remove the spring and ball.

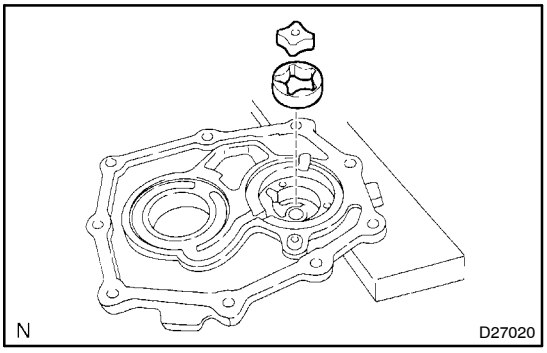


(b) Remove the oil pump cover.
  (1) Remove the oil pump drive shaft.
  (2) Place matchmarks on the oil pump cover and rear bearing retainer.
  (3) Using a torx socket wrench (T30), remove the 3 screws.



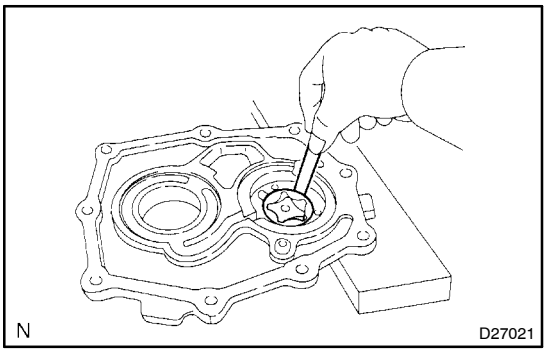
  (4) Install 3 bolts (normal diameter 8 mm, pitch 1.25 mm, length under the neck 35 mm) on the oil pump cover and tighten them equally, and then remove the oil pump cover.

NOTICE:
Do not force in the bolts.



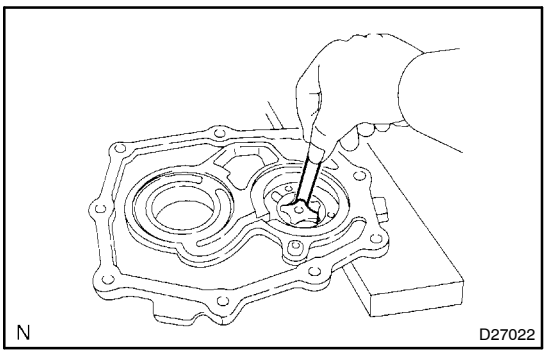
(c) Remove the drive and driven rotors.

HINT:
If the teeth section of the drive and driven rotors have scratches, replace them with new ones.

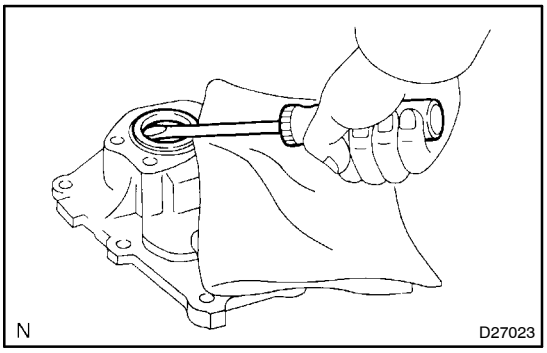


18. INSPECT ROTOR

(a) Inspect the driven rotor for body clearance.
  Using a feeler gauge, measure the clearance between the driven rotor and body.
  Standard body clearance:
  0.02 – 0.17 mm (0.0008 – 0.0067 in.)
  Maximum body clearance: 0.17 mm (0.0067 in.)



(b) Inspect the rotors for tip clearance.
Using a feeler gauge, measure the clearance between the drive rotor and driven rotor.
Standard tip clearance:
0.05 – 0.15 mm (0.0020 – 0.0059 in.)
Maximum tip clearance: 0.15 mm (0.0059 in.)

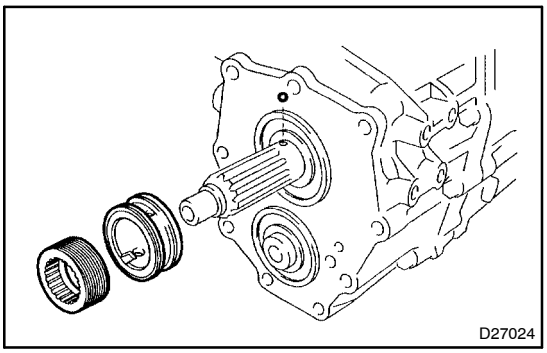


19. REMOVE TYPE T OIL SEAL

(a) Using a screwdriver, pry out the oil seal.

NOTICE:

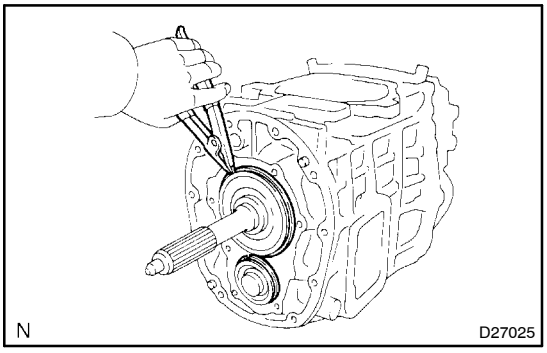
Protect the bearing retainer with a shop rag so as not to damage it.



20. REMOVE SPEEDOMETER DRIVE (MTM) GEAR

21. REMOVE SPEEDOMETER DRIVE GEAR SPACER

22. REMOVE SPEEDOMETER DRIVE GEAR (MTM) KEY OR BALL

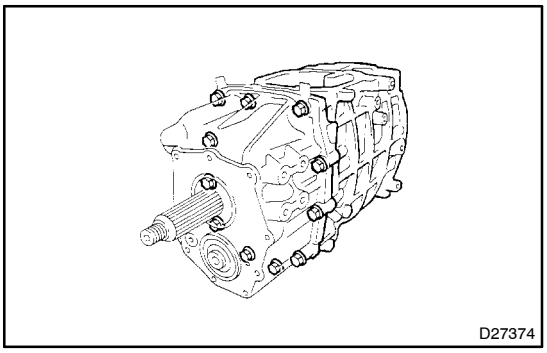


23. REMOVE FRONT BEARING SHAFT SNAP RING

(a) Using snap ring pliers (expander), remove the snap ring.

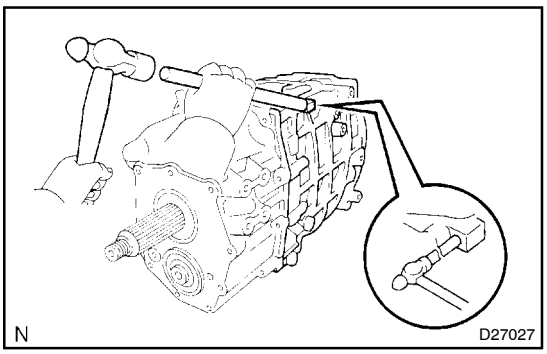
24. REMOVE COUNTER GEAR FRONT BEARING SNAP RING NO.1

(a) Using snap ring pliers (expander), remove the snap ring.



25. REMOVE MANUAL TRANSMISSION CASE

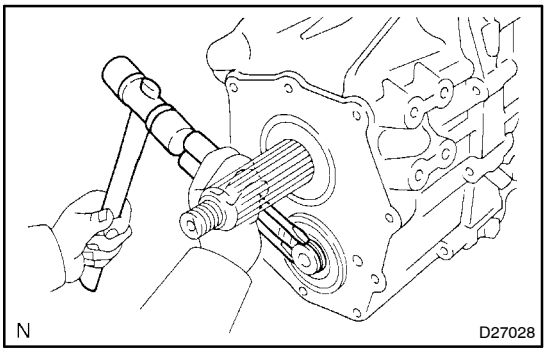
(a) Remove the 11 bolts and 2 clamps.



(b) Using a brass bar and a hammer, carefully tap out the transmission case.

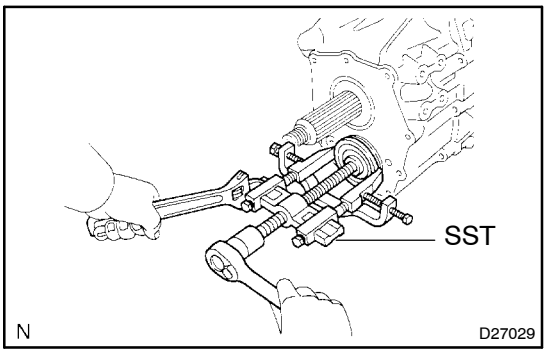
HINT:

Make the brass bar touched the lib portion of the case.



26. REMOVE SNAP RING COUNTER GEAR REAR BEARING

(a) Using 2 screwdrivers and a hammer, tap out the snap ring.



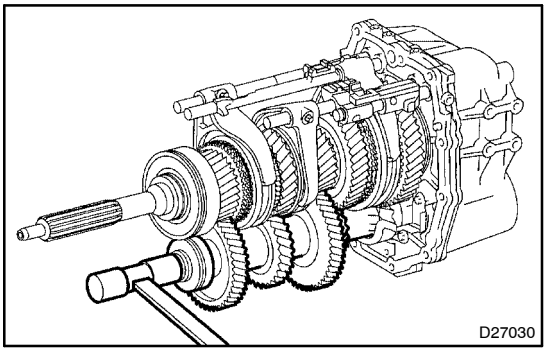
27. REMOVE COUNTER SHAFT REAR BEARING

(a) Using SST, remove the counter shaft rear bearing.

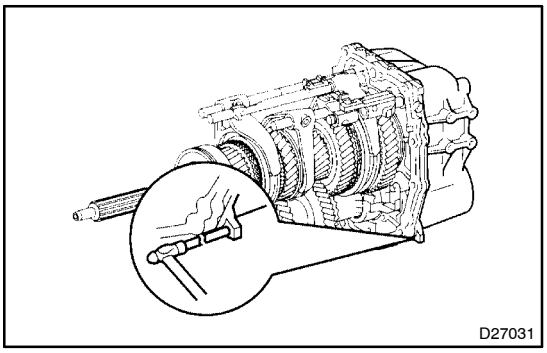
SST 09950–40011 (09951–04010, 09952–04010, 09953–04030, 09954–04010, 09955–04011, 09958–04011)

HINT:

- Use it after applying the gear oil to the screw of SST center bolt and the attachment.



- Remove the bearing while tapping the tip of the counter gear with a plastic hammer to prevent the counter gear from being pushed to the front and attaching to the side of the gear.

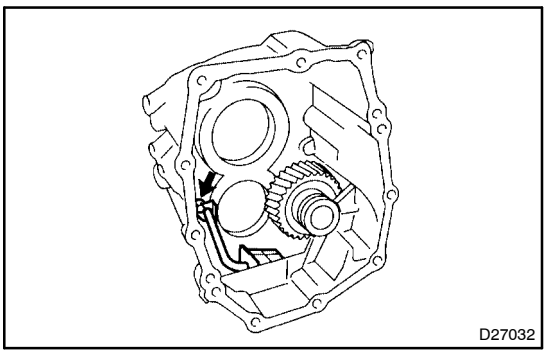


28. REMOVE TRANSMISSION CASE RR

(a) Using a brass bar and a hammer, tap out the transmission case.

NOTICE:

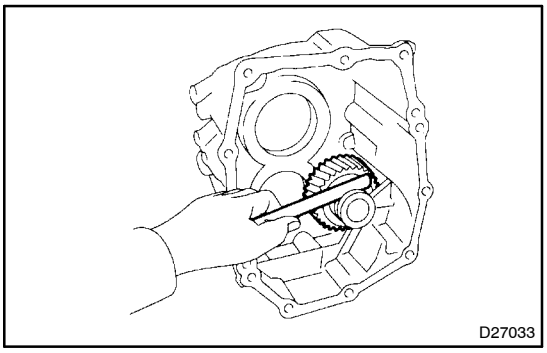
Attach the brass bar to the rib of the case.



29. REMOVE REAR CASE MANUAL TRANSMISSION OIL STRAINER SUB–ASSY

(a) Remove the bolt and oil strainer.

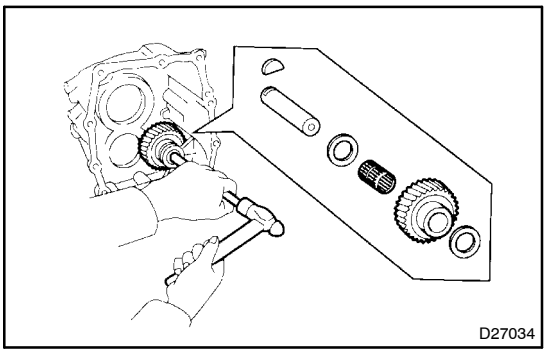
(b) Remove the O–ring from the oil strainer.



30. INSPECT REVERSE IDLER GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the thrust clearance of the reverse idler gear.

Standard thrust clearance:
0.10 – 0.55 mm (0.0039 – 0.0217 in.)
Maximum thrust clearance:
0.55 mm (0.0217 in.)



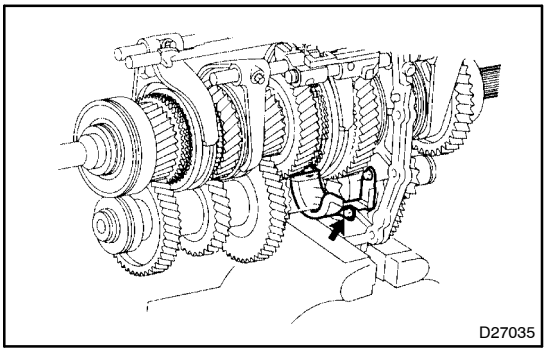
31. REMOVE REVERSE IDLER GEAR

(a) Remove the key from the reverse idler gear shaft.

(b) Using a brass bar and a hammer, tap out the reverse idler gear shaft.

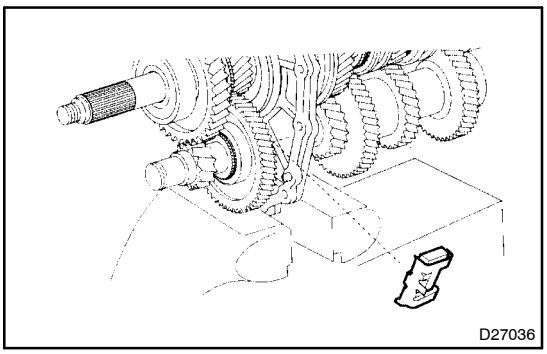
(c) Remove the reverse idler gear, 2 thrust washers and needle roller bearing.

32. FIX TRANSMISSION INTERMEDIATE PLATE

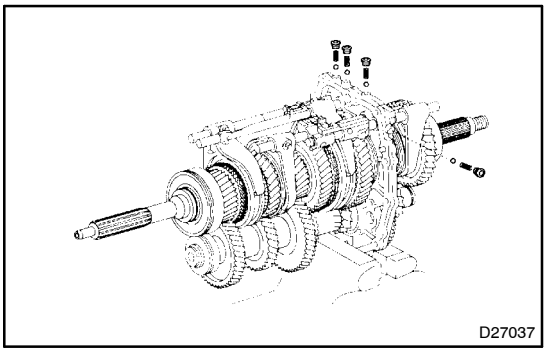


33. REMOVE MANUAL TRANSMISSION CASE RECEIVER

(a) Remove the 3 bolts and case receiver.



34. REMOVE TRANSMISSION MAGNET



35. REMOVE INTER LOCK HOLE PLUG

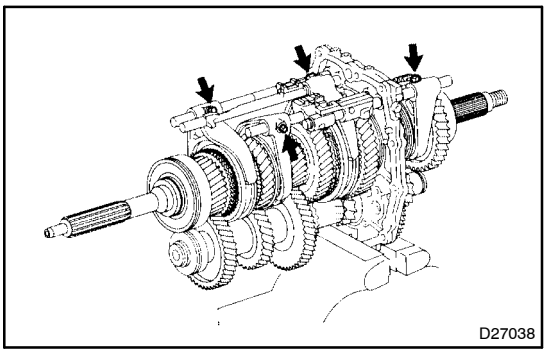
(a) Using a torx wrench (T40), remove the 4 plugs.

36. REMOVE SHIFT DETENT BALL LOW SIDE COMPRESSION SPRING

(a) Using a magnetic finger, remove the 4 springs.

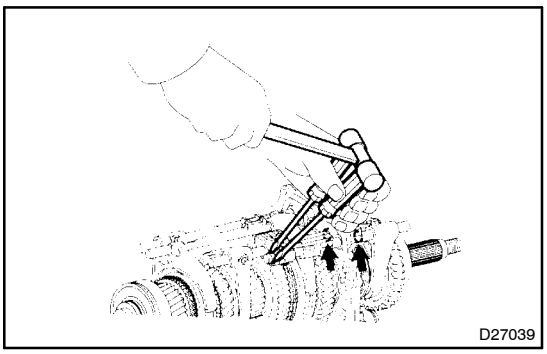
37. REMOVE SHIFT INTER LOCK BALL

(a) Using a magnetic finger, remove the 4 balls.

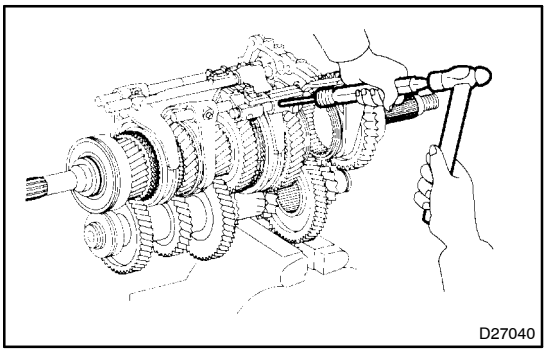


38. REMOVE GEAR SHIFT FORK SHAFT NO.4

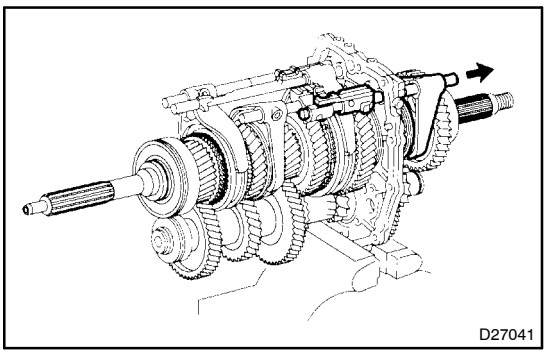
(a) Remove the 4 shift fork bolts.



(b) Using 2 screwdrivers and a hammer, tap out the 3 snap rings.



(c) Using a pin punch and a hammer, tap out the slotted pin.

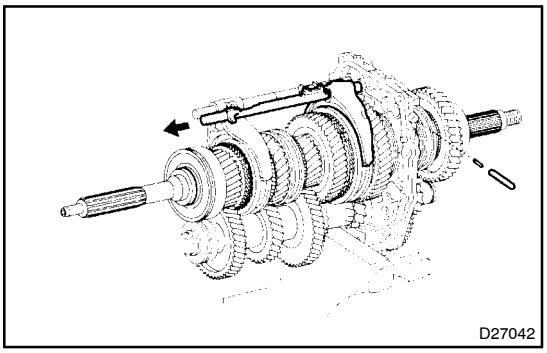


(d) Pull out the shift fork shaft No. 4 to the rear, and remove the shift fork No. 4 and reverse shift head.

39. REMOVE GEAR SHIFT FORK SHAFT NO.3

(a) Using a magnetic finger, remove the inter lock pin No. 1 and 2 balls.

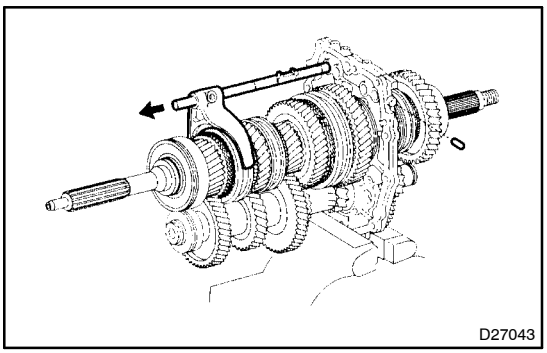
(b) Remove the shift fork shaft No. 3, shift fork No. 3 and shift head No. 1.



40. REMOVE GEAR SHIFT FORK SHAFT NO.1

(a) Using a magnetic finger, remove the inter lock pin No. 1 and No. 2.

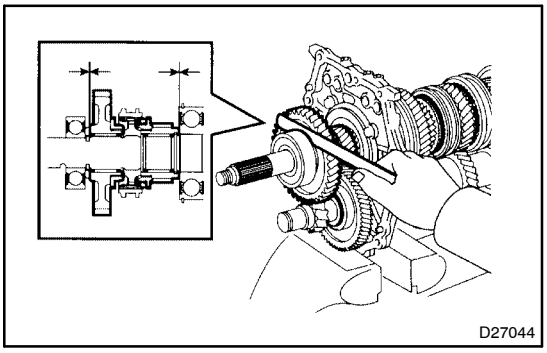
(b) Remove the shift fork shaft No. 1 and shift fork No. 1.



41. REMOVE GEAR SHIFT FORK SHAFT NO.2

(a) Using a magnetic finger, remove the inter lock roller No. 1.

(b) Pull out the shift fork shaft No. 2 to the front, and remove the shift fork No. 2.



42. INSPECT REVERSE GEAR AND 6TH GEAR THRUST CLEARANCE

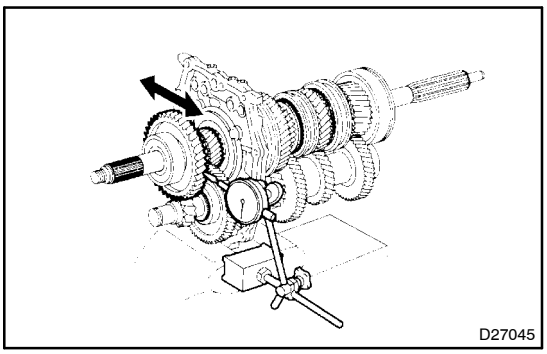
(a) Using a feeler gauge, measure the thrust clearance.

Standard thrust clearance:

Gear	Clearance mm (in.)
6th	0.10 – 0.57 (0.0039 – 0.0098)
Reverse	0.10 – 0.25 (0.0039 – 0.0098)

Maximum thrust clearance:

Gear	Clearance mm (in.)
6th	0.57 (0.0224)
Reverse	0.25 (0.0098)



43. INSPECT REVERSE GEAR AND 6TH GEAR RADIAL CLEARANCE

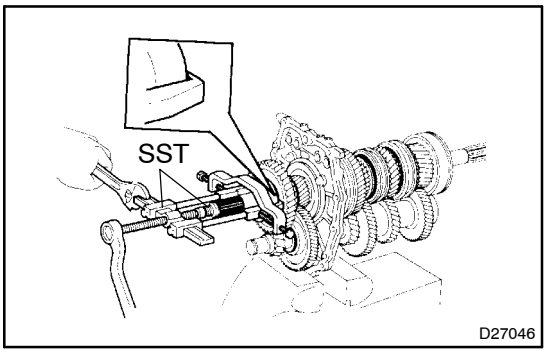
(a) Using a dial indicator, measure the radial clearance between the gear and shaft.

Standard radial clearance:

Gear	Clearance mm (in.)
6th	0.020 – 0.073 (0.0008 – 0.0029)
Reverse	0.015 – 0.067 (0.0006 – 0.0026)

Maximum radial clearance:

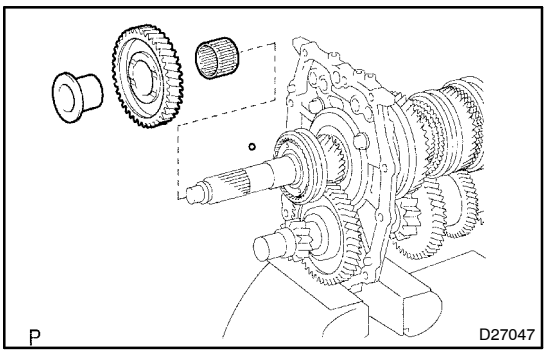
Gear	Clearance mm (in.)
6th	0.073 (0.0029)
Reverse	0.067 (0.0026)



44. REMOVE OUTPUT SHAFT REAR BEARING

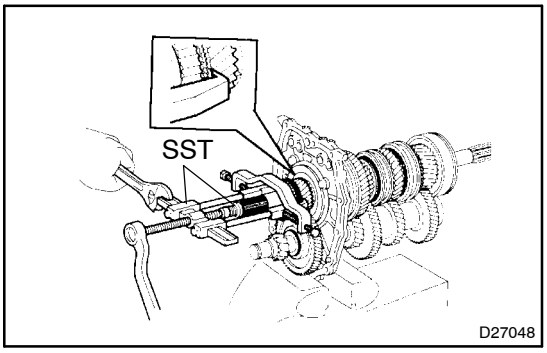
(a) Using SST, remove the rear bearing.

SST 09950–40011 (09951–04020, 09952–04010, 09953–04020, 09954–04020, 09955–04061, 09957–04010, 09958–04011) 09950–60010 (09951–00180)



45. REMOVE REVERSE GEAR

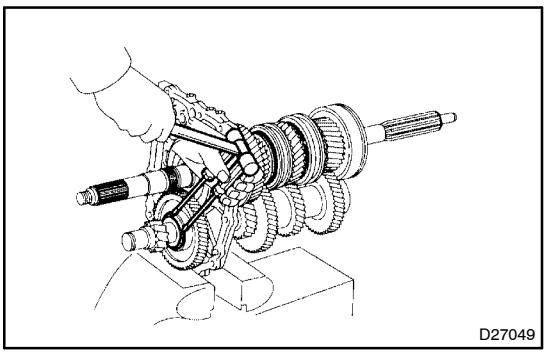
(a) Remove the bearing inner race, ball, reverse gear and needle roller bearing.



46. REMOVE 6TH GEAR SUB–ASSY

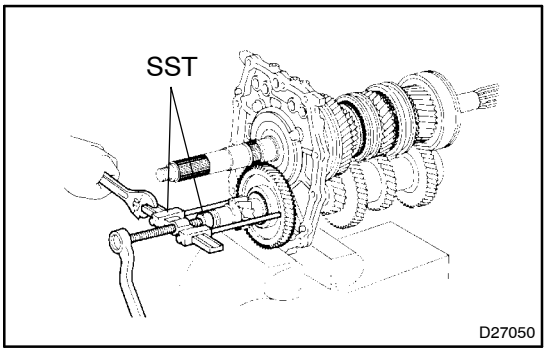
(a) Using SST, remove the clutch hub No. 4, synchronizer ring No. 2, 6 th gear and needle roller bearing.

SST 09950–40011 (09951–04020, 09952–04010, 09953–04020, 09954–04030, 09955–04061, 09957–04010, 09958–04011) 09950–60010 (09951–00180)



47. REMOVE COUNTER GEAR FRONT BEARING SNAP RING NO.2

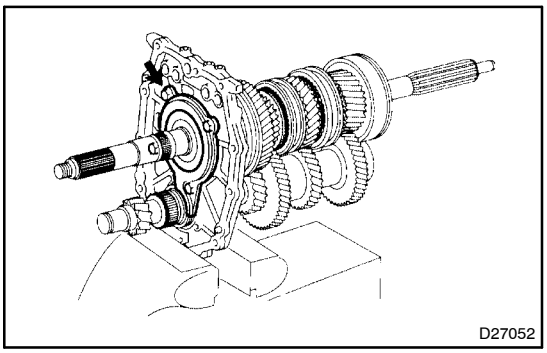
(a) Using 2 screwdrivers and a hammer, tap out the snap ring.



48. REMOVE COUNTER GEAR 6TH

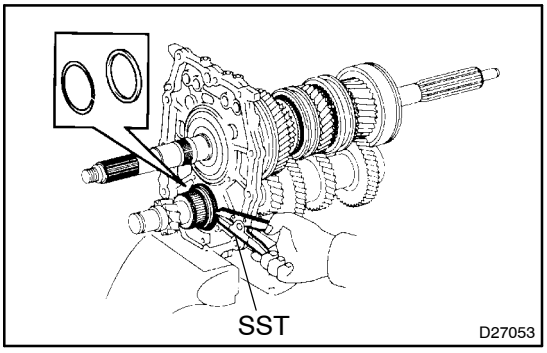
(a) Using SST, remove the counter gear 6th.

SST 09950–50013 (09951–05010, 09952–05010, 09953–05020, 09954–05040) 09950–40011 (09957–04010) 09950–60010 (09951–00300)



49. REMOVE BEARING RETAINER CTR

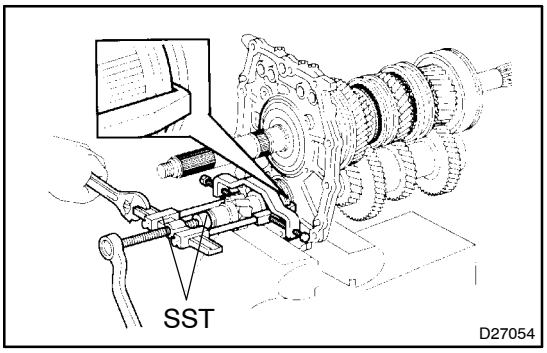
(a) Remove the 4 bolts and bearing retainer.



50. REMOVE COUNTER GEAR CENTER BEARING OUTER RACE

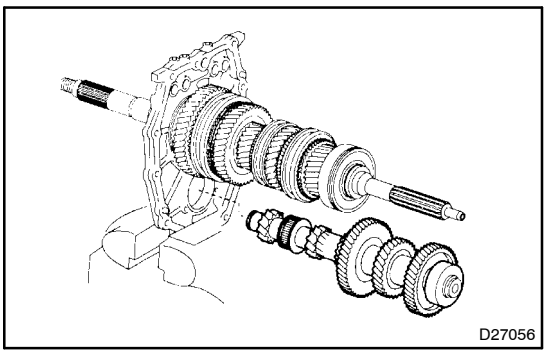
(a) Using snap ring pliers (expander), remove the snap ring.

(b) Remove the spacer.



(c) Using SST, remove the outer race.

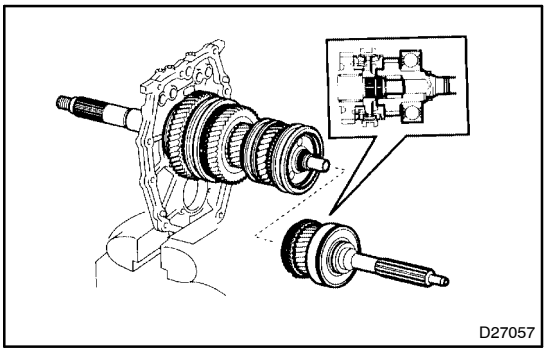
SST 09950–40011 (09951–04020, 09952–04010, 09953–04020, 09954–04020, 09955–04011, 09957–04010, 09958–04011) 09950–60010 (09951–00300)



51. REMOVE COUNTER GEAR ASSY

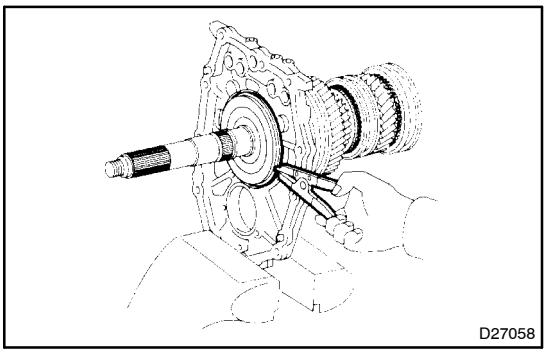
(a) Remove the counter gear from the intermediate plate.
SST 09950–40011 (09951–04010, 09952–04010, 09953–04010, 09954–04010, 09955–04011, 09958–04011)

(b) Remove the counter gear center bearing from the counter gear.



52. REMOVE INPUT SHAFT ASSY

(a) Remove the input shaft assembly from the output shaft.

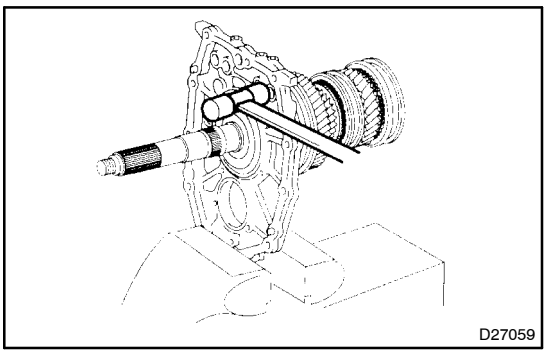


53. REMOVE OUTPUT SHAFT CENTER BEARING SHAFT SNAP RING

(a) Using snap ring pliers (expander), remove the snap ring.

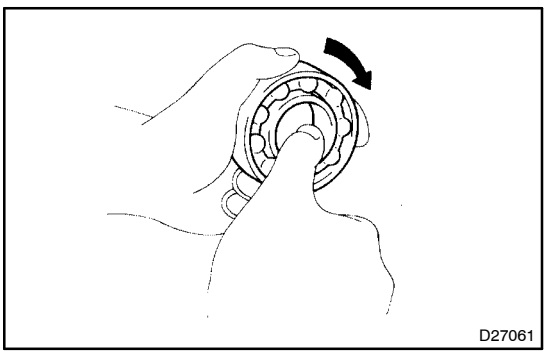
NOTICE:

Do not expand the snap ring excessively.



54. REMOVE OUTPUT SHAFT ASSY

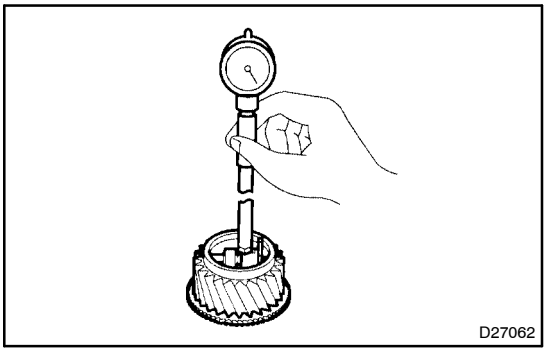
(a) Using a plastic hammer, remove the output shaft assy by tapping the the intermediate plate.



55. INSPECT OUTPUT SHAFT REAR BEARING

(a) Check that the bearing turns freely.

If the bearing is damaged, worn, or does not turn freely, replace it.


D27062

56. INSPECT 6TH GEAR AND REVERSE GEAR

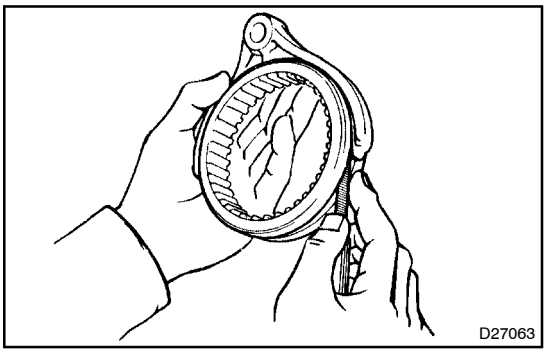
(a) Using a cylinder gauge, measure the inside diameter of the gear.

Standard inside diameter:

Gear	Diameter mm (in.)
6th	46.015 – 46.040 (1.8116 – 1.8126)
Reverse	54.015 – 540.40 (2.1266 – 2.1276)

Maximum inside diameter:

Gear	Diameter mm (in.)
6th	46.040 (1.8126)
Reverse	540.40 (2.1276)

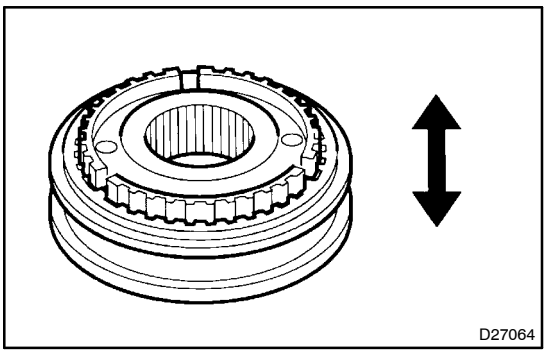

D27063

57. INSPECT GEAR SHIFT FORK AND HUB SLEEVE CLEARANCE

(a) Using a feeler gauge, measure the clearance between the hub sleeve and gear shift fork.

Maximum clearance: 0.35 mm (0.0138 in.)

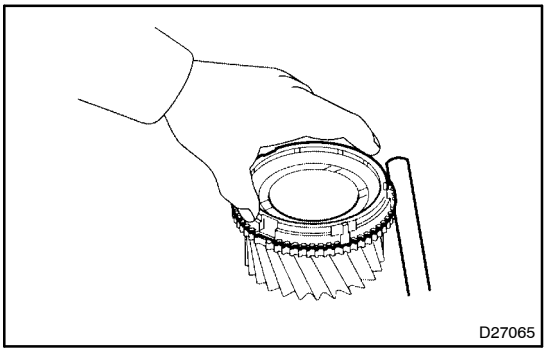
If the clearance is greater than the maximum, replace the gear shift fork or hub sleeve.


D27064

58. INSPECT CLUTCH HUB NO. 4 AND HUB SLEEVE NO. 4

(a) Check that the spline gear tip of the hub sleeve No. 4 is not worn out.

(b) Install the hub sleeve No. 4 to the clutch hub No. 4, and check that it slides smoothly.


D27065

59. INSPECT SYNCHRONIZER RING SET NO.2

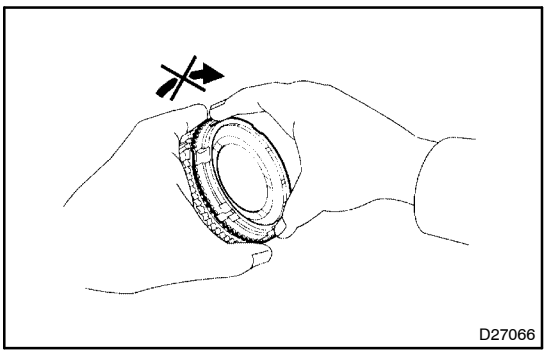
(a) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 1.1 mm (0.0433 in.)

If the clearance is less than the minimum, replace the synchronizer ring, and apply a small amount of the fine lapping compound on the gear cone.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.


D27066

(b) Check for wear or damage.
(c) Check the braking effect of the synchronizer ring.
Turn the synchronizer ring in one direction while pushing it to the gear one. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.

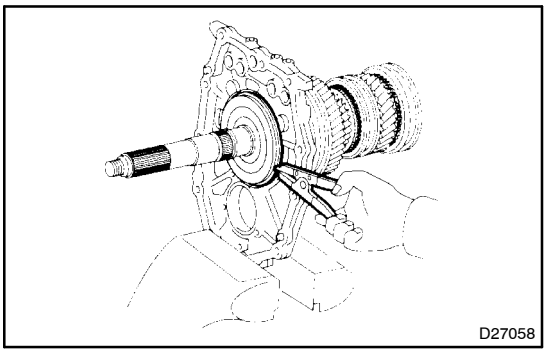
NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

(d) Check again the braking effect of the synchronizer ring.

60. INSTALL OUTPUT SHAFT ASSY

(a) Install the output shaft assy to the intermediate plate.

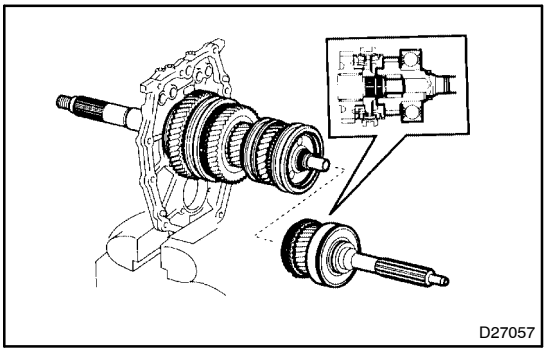

D27058

61. INSTALL OUTPUT SHAFT CENTER BEARING SHAFT SNAP RING

(a) Select a snap ring by making the thrust clearance of the bearing by 0 to 0.1mm (0.004 in.).

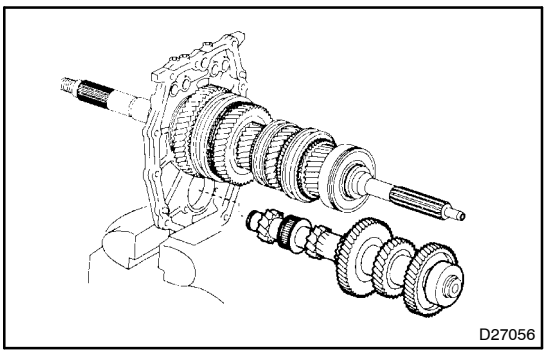
Mark	Thickness mm (in.)
A	2.40 – 2.45 (0.0945 – 0.0965)
B	2.45 – 2.50 (0.0965 – 0.0984)
C	2.50 – 2.55 (0.0984 – 0.1004)
D	2.55 – 2.60 (0.1004 – 0.1024)
E	2.60 – 2.65 (0.1024 – 0.1043)
F	2.65 – 2.70 (0.1043 – 0.1063)
G	2.70 – 2.75 (0.1063 – 0.1083)
H	2.75 – 2.80 (0.1083 – 0.1102)

(b) Using snap ring pliers (expander), install the snap ring.


D27057

62. INSTALL INPUT SHAFT ASSY

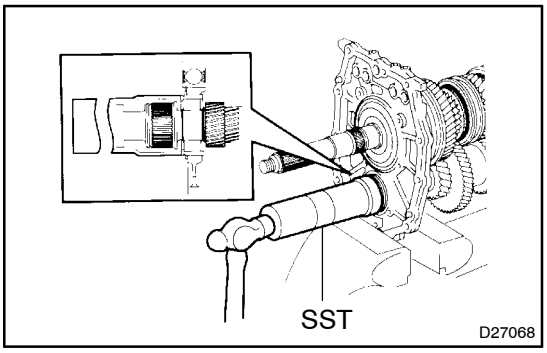
(a) Install the input shaft assy to the output shaft.



63. INSTALL COUNTER GEAR ASSY

(a) Install the counter shaft center bearing to counter gear.

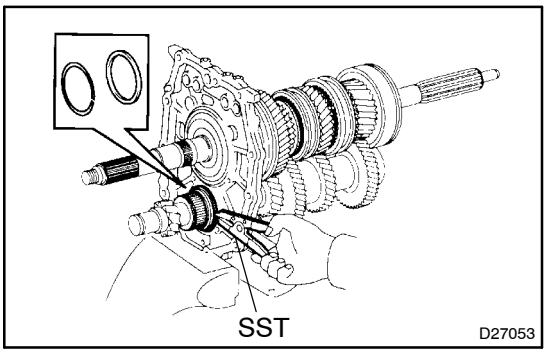
(b) Install the counter gear to intermediate plate.



64. INSTALL COUNTER GEAR CENTER BEARING OUTER RACE

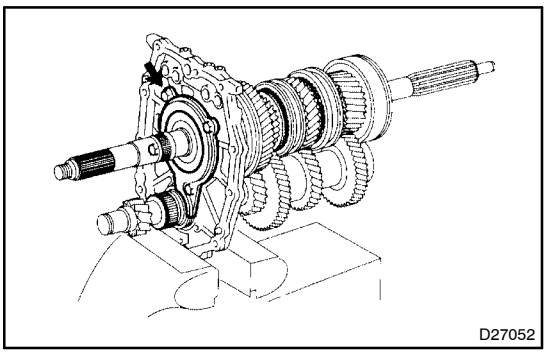
(a) Using a hammer and SST, tap in a new center bearing outer race.

SST 09316–60011 (09316–00011)



(b) Install the spacer.

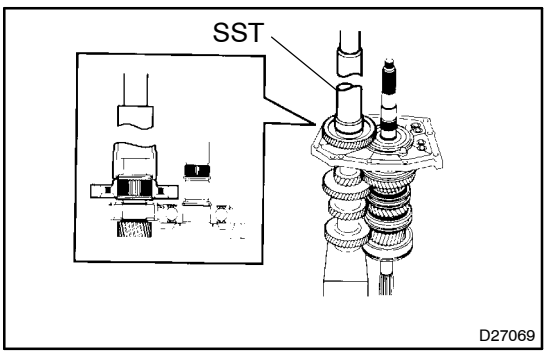
(c) Using snap ring pliers (expander), install the snap ring.



65. INSTALL BEARING RETAINER CTR

(a) Install the bearing retainer with the 4 bolts.

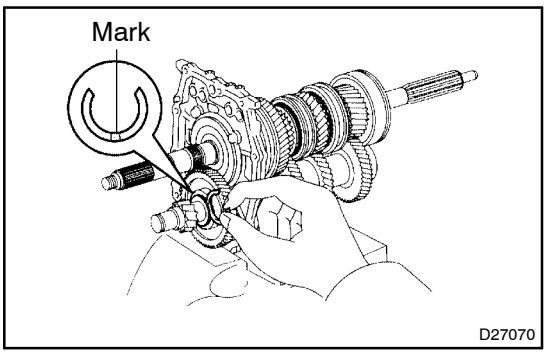
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



66. INSTALL COUNTER GEAR 6TH

(a) Using a press and SST, press in the counter gear 6th.

SST 09316–26010

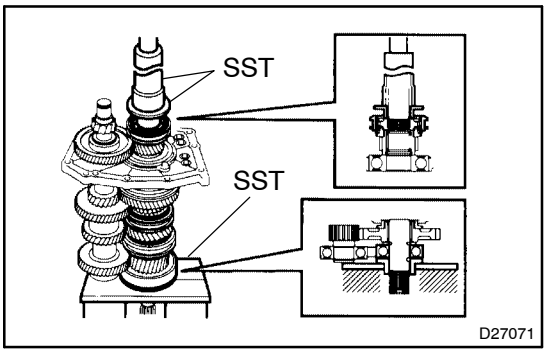


67. INSTALL COUNTER GEAR FRONT BEARING SNAP RING NO.2

(a) Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)
A	2.30 – 2.35 (0.0906 – 0.0925)
B	2.35 – 2.40 (0.0925 – 0.0945)
C	2.40 – 2.45 (0.0945 – 0.0965)
D	2.45 – 2.50 (0.0965 – 0.0984)
E	2.50 – 2.55 (0.0984 – 0.1004)
F	2.55 – 2.60 (0.1004 – 0.1024)
G	2.60 – 2.65 (0.1024 – 0.1043)

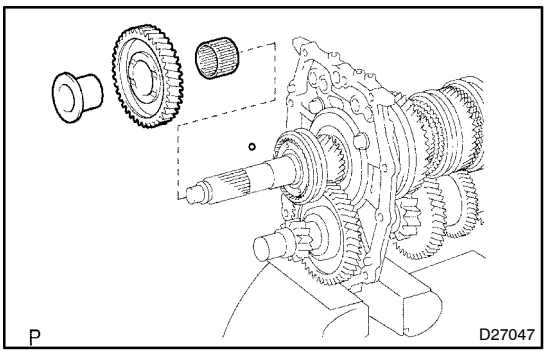
(b) Using a screwdriver and a hammer, tap in the snap ring.



68. INSTALL 6TH GEAR SUB–ASSY

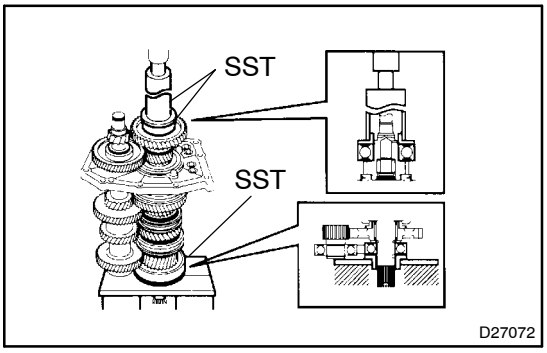
(a) Using a press and SST, press in the clutch hub No. 4.
SST 09316–20011, 09316–60011 (09316–00041), 09527–10011

(b) Install the synchronizer ring No. 2, 6th gear and needle roller bearing.



69. INSTALL REVERSE GEAR

(a) Install the ball, needle roller bearing, reverse gear and bearing inner race.



70. INSTALL OUTPUT SHAFT REAR BEARING

(a) using a press and SST, press in the rear bearing.
SST 09316–20011, 09316–60011 (09316–00011, 09316–00041) 09527–10011

71. INSTALL GEAR SHIFT FORK SHAFT NO.2

(a) Install the shift fork shaft No. 2 and shift fork No. 2.

(b) Using a screwdriver, install the inter lock roller No. 1.

72. INSTALL GEAR SHIFT FORK SHAFT NO.1

(a) Install the shift fork shaft No. 1 and shift fork No. 1.

(b) Using a screwdriver, install the inter lock roller No. 1 and No. 2.

73. INSTALL GEAR SHIFT FORK SHAFT NO.3

(a) Install the shift fork shaft No. 3, shift fork No. 3 and shift head No. 1.

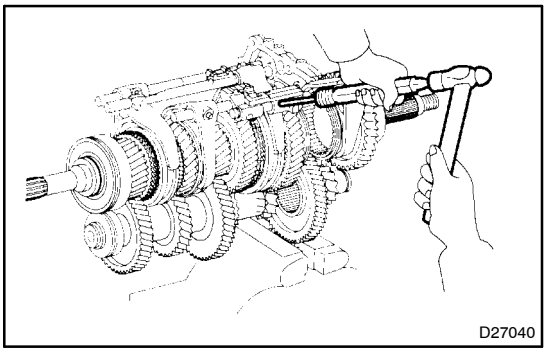
(b) Using a screwdriver, install the inter lock roller No. 1 and 2 balls.

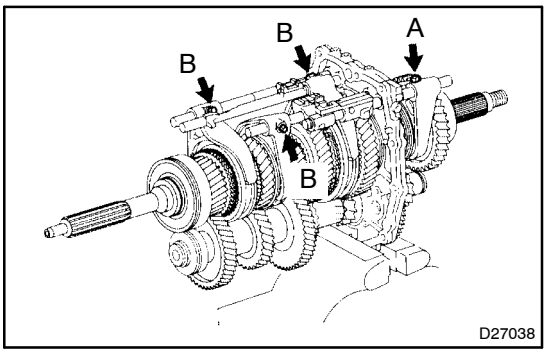
74. INSTALL GEAR SHIFT FORK SHAFT NO.4

(a) Install the shift fork shaft No. 4, shift fork No. 4 and reverse shift head.

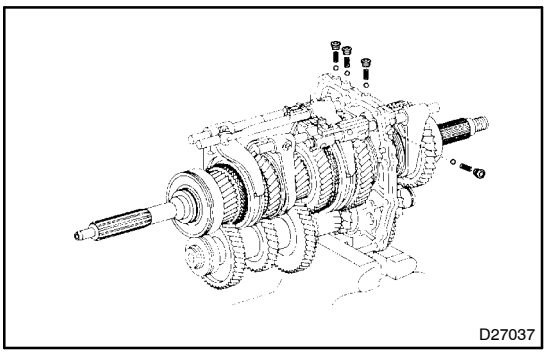
(b) Using a pin punch and a hammer, tap in the slotted pin.

(c) Using a hammer, tap the 3 snap rings.





(d) Install the 4 shift fork bolts.
Torque:
Bolt A: 34 N·m (350 kgf·cm, 25 ft·lbf)
Bolt B: 36 N·m (370 kgf·cm, 27 ft·lbf)



75. INSTALL SHIFT INTER LOCK BALL

(a) Install the 4 balls

76. INSTALL SHIFT DETENT BALL LOW SIDE COMPRESSION SPRING

(a) Install the 4 spring.

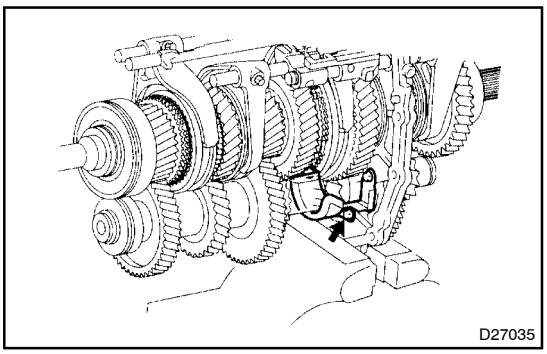
77. INSTALL INTER LOCK HOLE PLUG

(a) Using a torx wrench (T40), install the 4 plugs.
Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)

78. INSPECT REVERSE GEAR AND 6TH GEAR THRUST CLEARANCE (See step 42)

79. INSPECT REVERSE GEAR AND 6TH GEAR RADIAL CLEARANCE (See step 43)

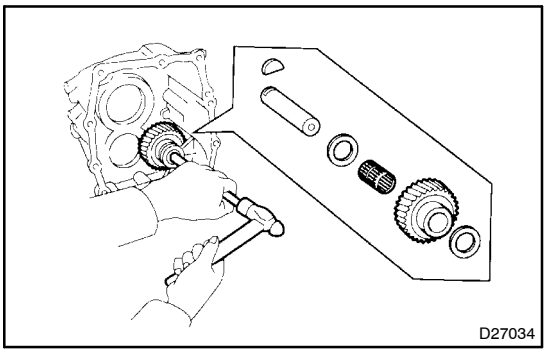
80. INSTALL TRANSMISSION MAGNET



81. INSTALL MANUAL TRANSMISSION CASE RECEIVER

(a) Install the case receiver with the 3 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

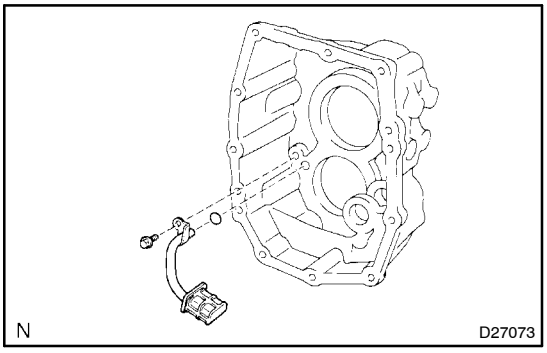
82. INSTALL INTERMEDIATE PLATE



83. INSTALL REVERSE IDLER GEAR

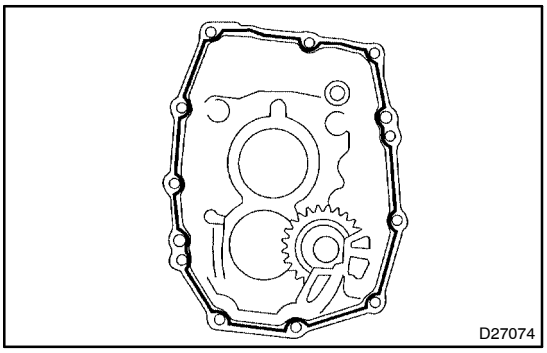
(a) Install the reverse idler gear, 2 thrust washers and the needle roller bearing.
(b) Using a brass bar and a hammer, tap in the reverse idler gear shaft.
(c) Install the key to the reverse idler gear shaft.

84. INSPECT REVERSE IDLER GEAR THRUST CLEARANCE (See step 30)



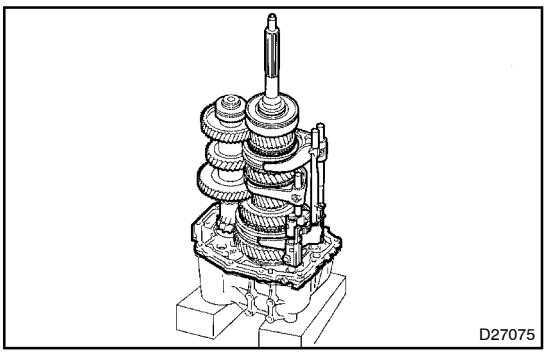
85. INSTALL REAR CASE MANUAL TRANSMISSION OIL STRAINER SUB–ASSY

(a) Install a new O–ring to the oil strainer.
(b) Install the oil strainer with the bolt.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



86. INSTALL TRANSMISSION CASE RR

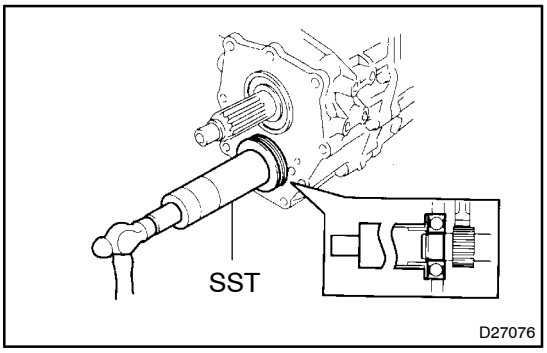
(a) Apply FIPG (Seal packing) to the transmission case.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent



(b) Fix the transmission case through a wooden block.
(c) Using a plastic hammer, lightly tap the intermediate plate to press–fit the plate with the case.

NOTICE:
Install the intermediate plate straight so as not to put excessive force onto the bearing.

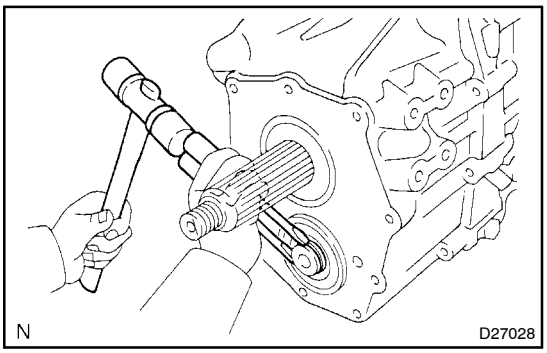
(d) Lay down the transmission.



87. INSTALL COUNTER SHAFT REAR BEARING

(a) Using SST, tap in the bearing.
SST 09316–60011 (09316–00011, 09316–00041)

HINT:
Fit a press to the inner race of the bearing.

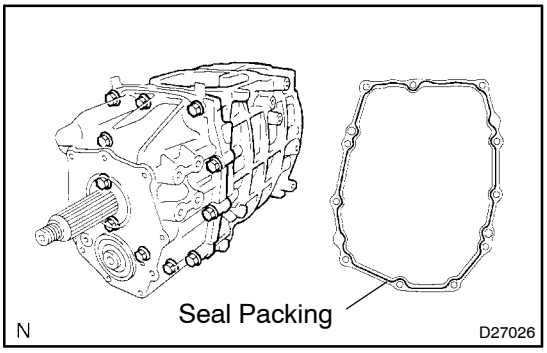


88. INSTALL SNAP RING COUNTER GEAR REAR BEARING

(a) Select a snap ring by making the thrust clearance of the bearing by 0 to 0.1mm (0.004 in.).

Mark	Thickness mm (in.)
A	2.40 – 2.45 (0.0945 – 0.0965)
B	2.45 – 2.50 (0.0965 – 0.0984)
C	2.50 – 2.55 (0.0984 – 0.1004)
D	2.55 – 2.60 (0.1004 – 0.1024)
E	2.60 – 2.65 (0.1024 – 0.1043)
F	2.65 – 2.70 (0.1043 – 0.1063)
G	2.70 – 2.75 (0.1063 – 0.1083)

(b) Using 2 screwdrivers and a hammer, tap the snap ring.



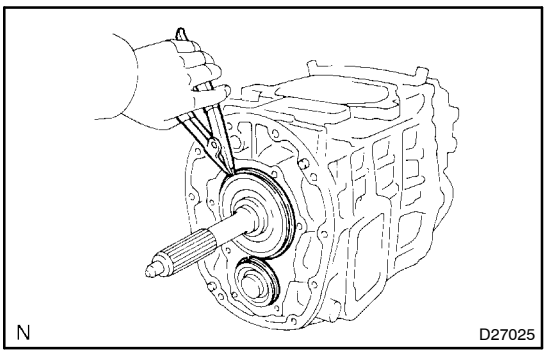
89. INSTALL MANUAL TRANSMISSION CASE

(a) Apply adhesive to the 11 bolts.
Adhesive:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Apply FIPG (Seal packing) to the transmission case.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent

(c) Install the transmission case.

(d) Install the 2 clamps and 11 bolts.
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

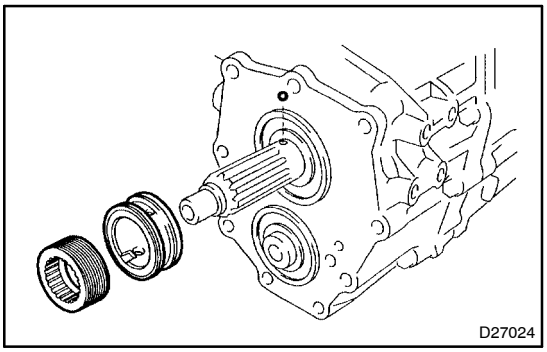


90. INSTALL FRONT BEARING SHAFT SNAP RING

(a) Using snap ring pliers (expander), install the snap ring.

91. INSTALL COUNTER GEAR FRONT BEARING SNAP RING NO.1

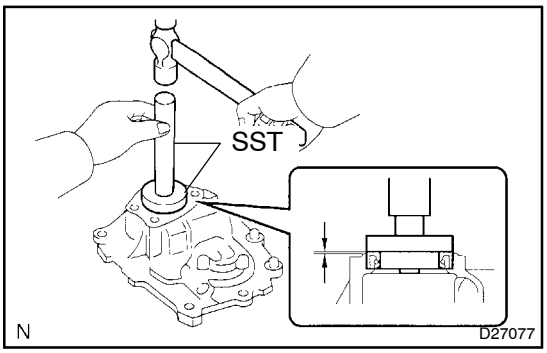
(a) Using snap ring pliers (expander), install the snap ring.



92. INSTALL SPEEDOMETER DRIVE GEAR (MTM) KEY OR BALL

93. INSTALL SPEEDOMETER DRIVE GEAR SPACER

94. INSTALL SPEEDOMETER DRIVE (MTM) GEAR



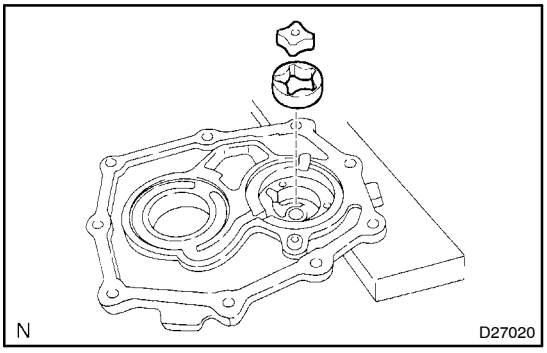
95. INSTALL TYPE T OIL SEAL

(a) Using SST and a hammer, tap in a new oil seal.

SST 09950–60010 (09951–00430, 09951–00620, 09952–06010) 09950–70010 (09951–07150)

Standard protrusion: 0 – 0.5 mm (0 – 0.0197 in.)

(b) Apply MP grease to the oil seal lip.

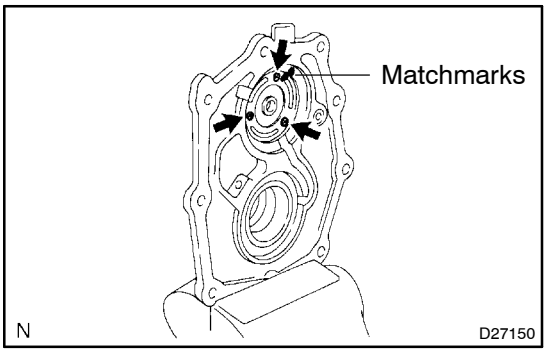


96. INSTALL OIL PUMP ASSY

(a) Install the drive and driven rotors.

(1) Apply gear oil to the rear bearing retainer, the drive and driven rotors.

(2) Install the drive and driven rotors.



(b) Install the oil pump cover.

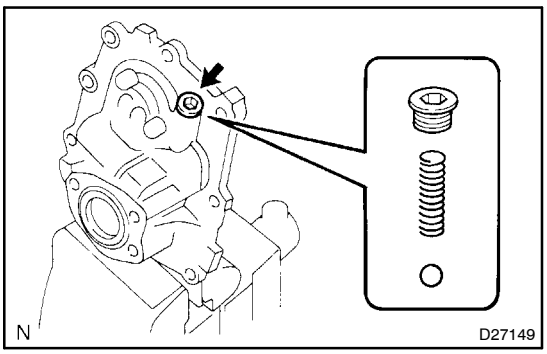
(1) Align the matchmarks, and install the oil pump cover.

(2) Fix the rear bearing retainer on to a vise through the aluminum plate.

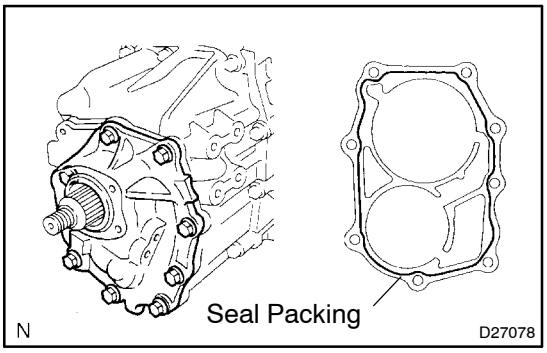
(3) Using a torx socket wrench (T30), install the 3 bolts.

Torque: 3.9 N·m (40 kgf·cm, 35 in.·lbf)

(4) Install the oil pump drive shaft.

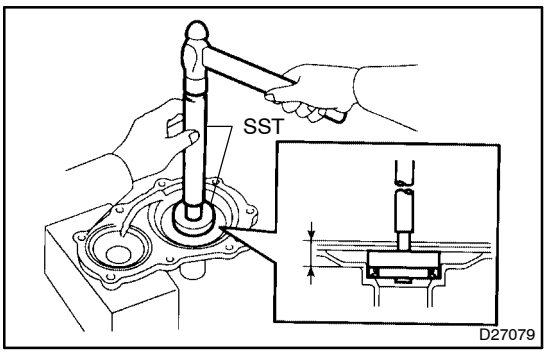


(c) Install the ball, compression spring and plug.
(1) Insert the ball and spring into the rear bearing retainer.
(2) Using a torx socket wrench (T40), install the plug.
Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)
(3) Rotate the oil pump drive shaft lightly, and check that the drive rotor turns smoothly.



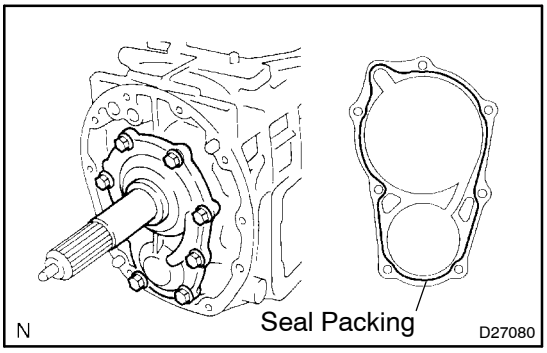
97. INSTALL OUTPUT SHAFT REAR BEARING (MTM) RETAINER

(a) Apply adhesive to the 9 bolts.
Adhesive:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
(b) Apply FIPG (Seal packing) to the rear bearing retainer.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent
(c) Install the 9 bolts.
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)



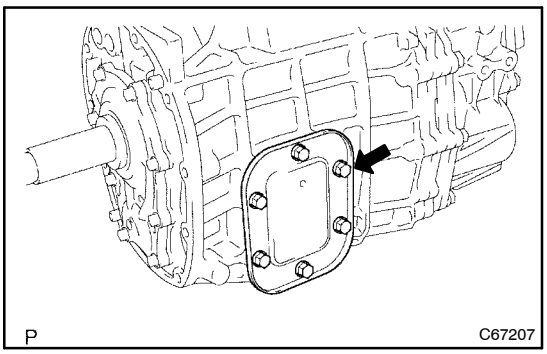
98. INSTALL TRANSMISSION FRONT BEARING RETAINER OIL SEAL

(a) Using SST and a hammer, tap in a new oil seal.
SST 09950–60010 (09951–00330, 09951–00480, 09952–06010), 09950–70010 (09951–07150)



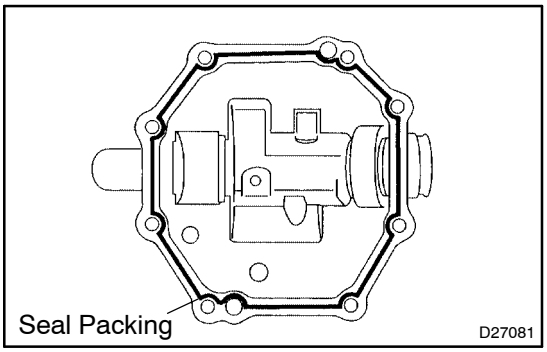
99. INSTALL BEARING RETAINER FRONT (MTM)

(a) Apply adhesive to the 8 bolts.
Adhesive:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
(b) Apply FIPG (Seal packing) to the bearing retainer.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent
(c) Install the 8 bolts.
Torque: 17 N·m (170 kgf·cm, 12 ft·lbf)



100. INSTALL MANUAL TRANSMISSION POWER TAKE–OFF COVER

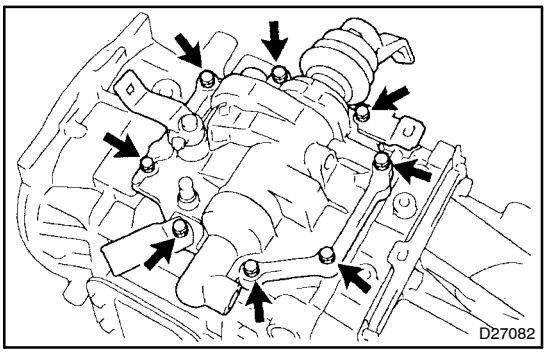
(a) Install the new gasket, cover and 6 bolts.
Torque: 14 N·m (145 kgf·cm, 10 ft·lbf)



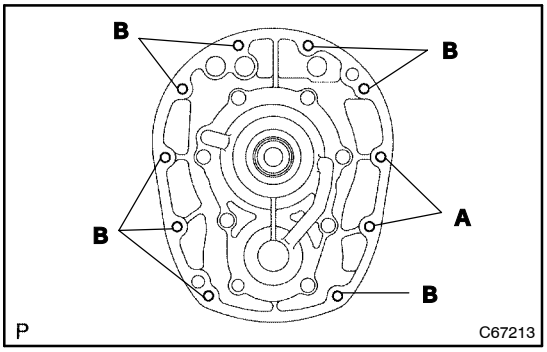
101. INSTALL SHIFT LEVER SHAFT HOUSING ASSY

(a) Apply adhesive to the 8 bolts.
Adhesive:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Apply FIPG (Seal packing) to the shift lever shaft housing assy.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent

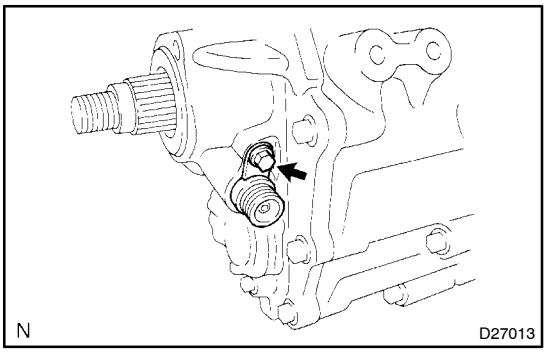


(c) Install the 8 bolts and 2 clamps.
Torque: 17 N·m (170 kgf·cm, 12 ft·lbf)



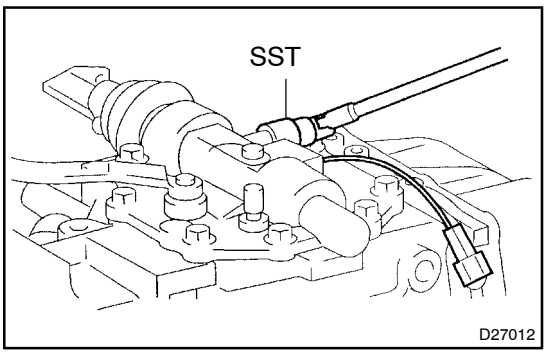
102. INSTALL CLUTCH HOUSING

(a) Install the 10 bolts.
Bolt A: 35 mm (1.38 in.) x 2
Bolt B: 45 mm (1.77 in.) x 8
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)



103. INSTALL SPEEDOMETER DRIVEN (MTM) GEAR SUB–ASSY

(a) Apply gear oil to a new O–ring.
(b) Install the O–ring to the driven gear sub–assy.
(c) Install the driven gear sub–assy with the lock plate and bolt.
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)



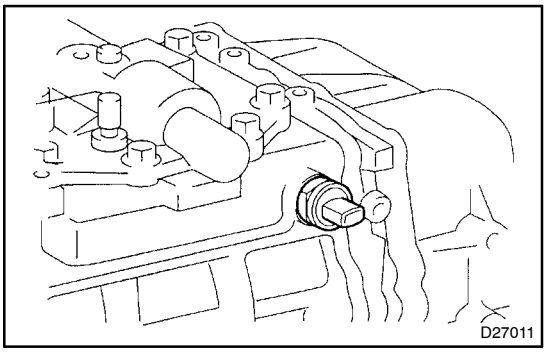
104. INSTALL EXHAUST BRAKE NEUTRAL SWITCH ASSY

(a) Install a new gasket to the neutral switch.

(b) Using SST, install the neutral switch.

SST 09817–16011

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)



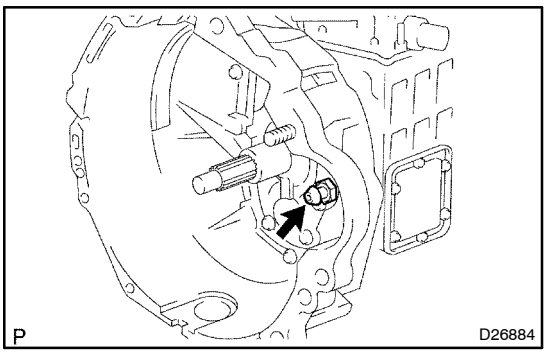
105. INSTALL BACK UP LAMP SWITCH ASSY

(a) Install a new gasket to the back up lamp switch.

(b) Install the back up lamp switch.

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

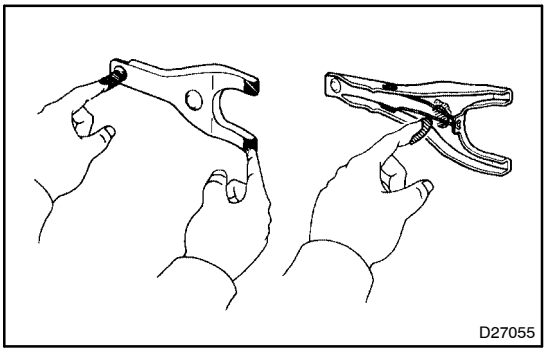
106. INSTALL CLUTCH RELEASE FORK BOOT



107. INSTALL RELEASE FORK SUPPORT

(a) Using a socket wrench (19 mm), install the release fork support.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

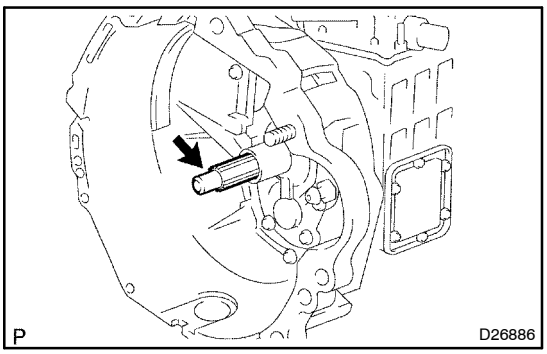


108. INSTALL CLUTCH RELEASE FORK SUB–ASSY

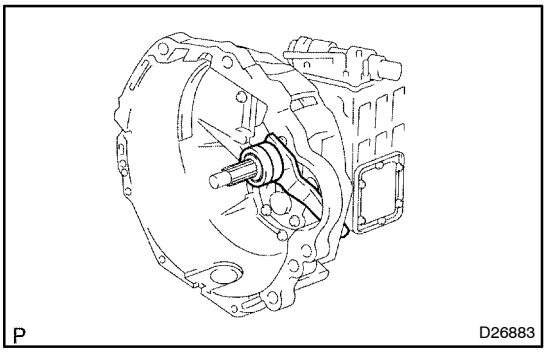
(a) Apply release hub grease to the release fork and hub contact, release fork and push rod contact and release fork pivot points.

Grease:

Part No. 08887–01806, RELEASE HUB GREASE or equivalent

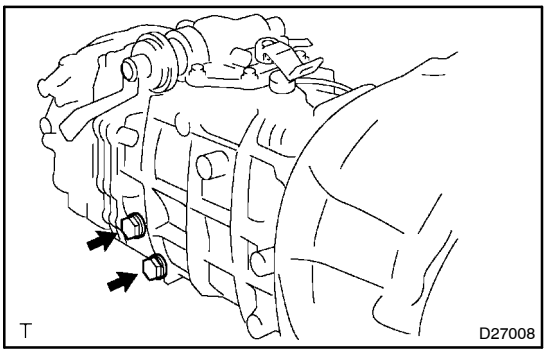


(b) Apply clutch spline grease to the input shaft spline.
Grease:
Part No. 08887–01706, CLUTCH SPLINE GREASE or equivalent



109. INSTALL CLUTCH RELEASE BEARING ASSY

(a) Install the bearing to the release fork, and then install them to the transmission.



110. INSTALL FILLER PLUG

(a) Install a new gasket and the filler plug.
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

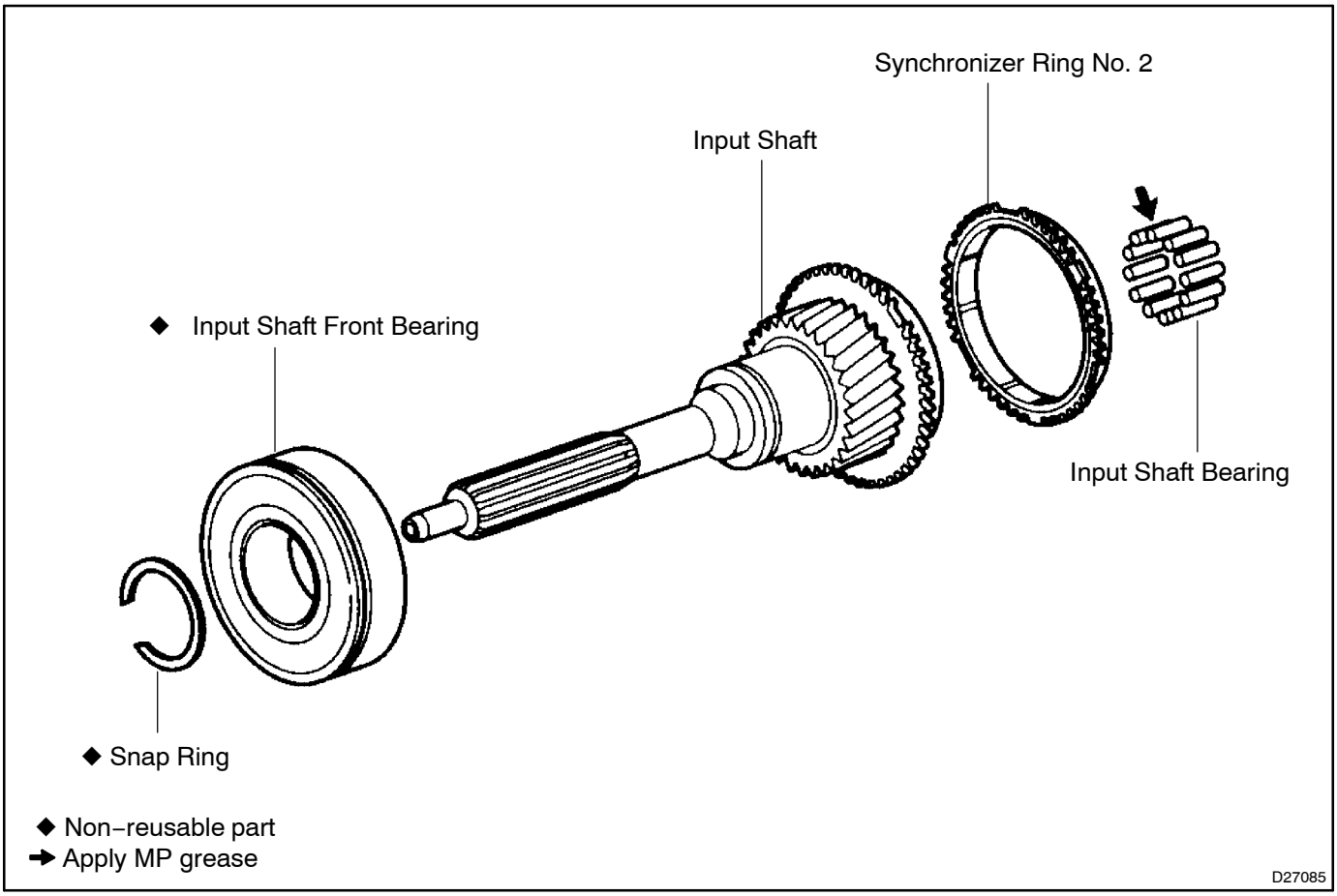
111. INSTALL DRAIN PLUG

(a) Install a new gasket and the drain plug.
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

INPUT SHAFT ASSY

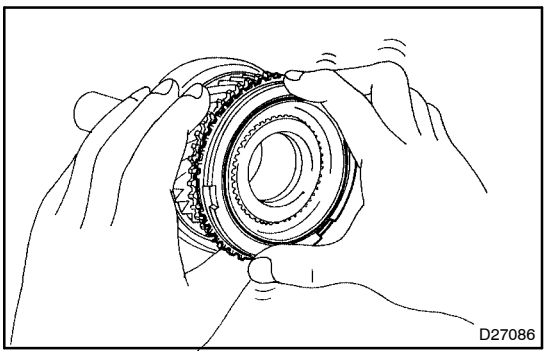
COMPONENTS

410CJ-01



410CK–01

OVERHAUL


D27086

1. INSPECT SYNCHRONIZER RING SET NO.2

(a) Check for wear or damage.

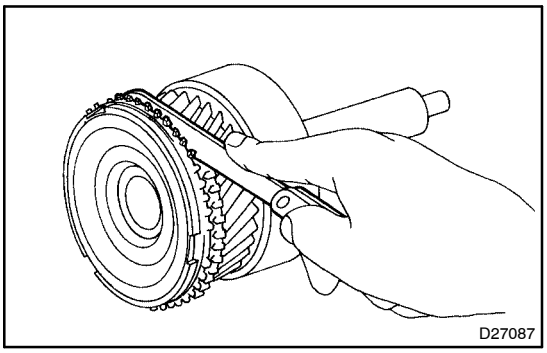
(b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

(c) Check again the braking effect of the synchronizer ring.


D27087

(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.8 mm (0.0315 in.)

If the clearance is less than the minimum, replace the synchronizer ring, and apply a small amount of the fine lapping compound to the gear cone.

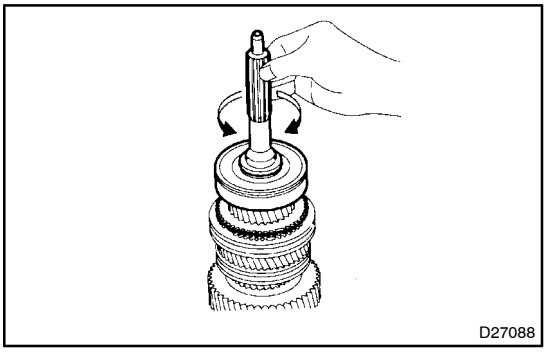
NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

2. REMOVE SYNCHRONIZER RING SET NO.2

3. REMOVE INPUT SHAFT BEARING

(a) Remove the 12 rollers.


D27088

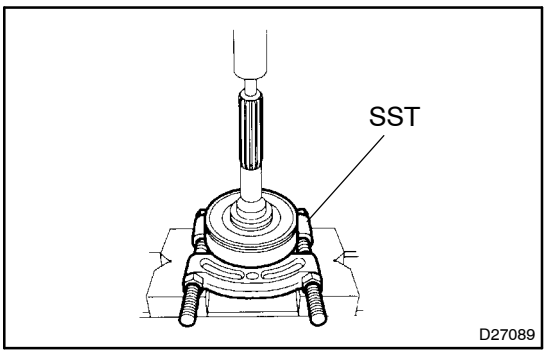
4. INSPECT INPUT SHAFT FRONT BEARING

(a) Check that the input shaft turns freely.

If the input shaft does not turn freely, replace the bearing.

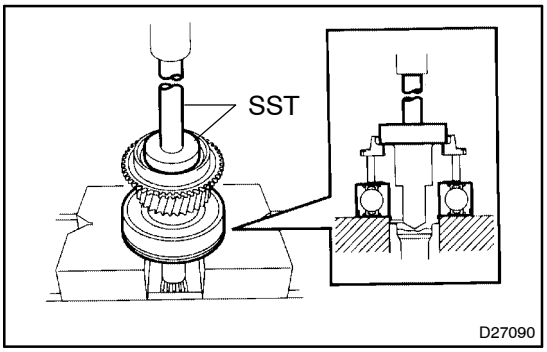
5. REMOVE SHAFT SNAP RING

(a) Using snap ring pliers (expander), remove the snap ring.



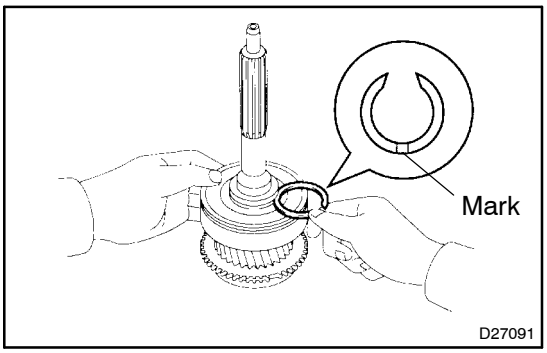
6. REMOVE INPUT SHAFT FRONT BEARING

(a) Using SST and a press, press out the bearing.
SST 09950–00020



7. INSTALL INPUT SHAFT FRONT BEARING

(a) Using SST and a press, press in a new bearing.
SST 09950–60010 (09951–00570), 09950–70010 (09951–07100)



8. INSTALL SHAFT SNAP RING

(a) Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)
A	2.50 – 2.55 (0.0984 – 0.1004)
B	2.55 – 2.60 (0.1004 – 0.1024)
C	2.60 – 2.65 (0.1024 – 0.1044)
D	2.65 – 2.70 (0.1044 – 0.1063)
E	2.70 – 2.75 (0.1063 – 0.1083)
F	2.75 – 2.80 (0.1083 – 0.1102)

(b) Using snap ring pliers (expander), install the snap ring.

9. INSTALL SYNCHRONIZER RING SET NO.2

10. INSPECT SYNCHRONIZER RING SET NO.2 (See step 1)

11. INSTALL INPUT SHAFT BEARING

(a) Install the 12 rollers.

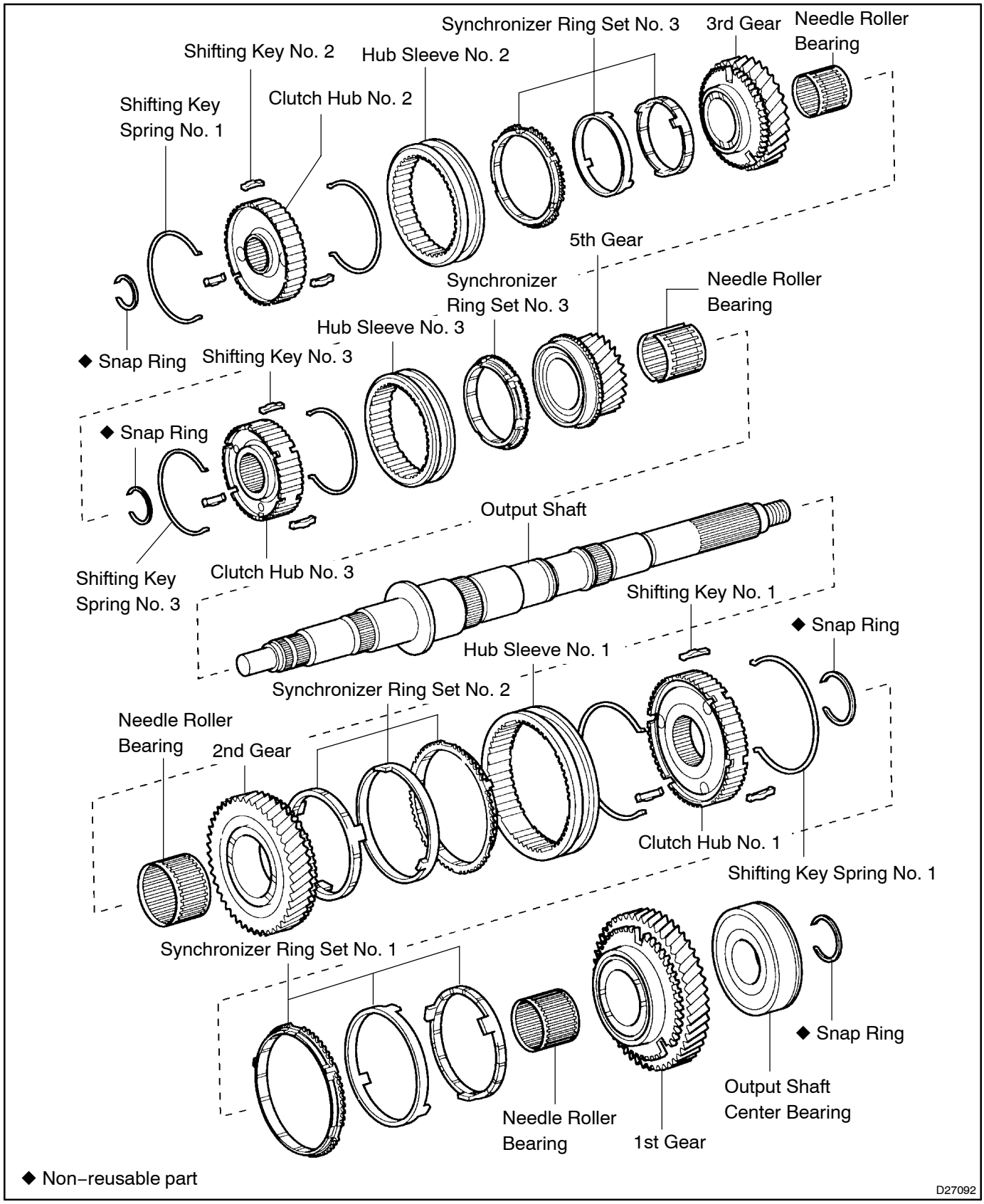
HINT:

Apply MP grease to the 12 rollers, and install it into the input shaft.

OUTPUT SHAFT ASSY

COMPONENTS

410CL-01



◆ Non–reusable part

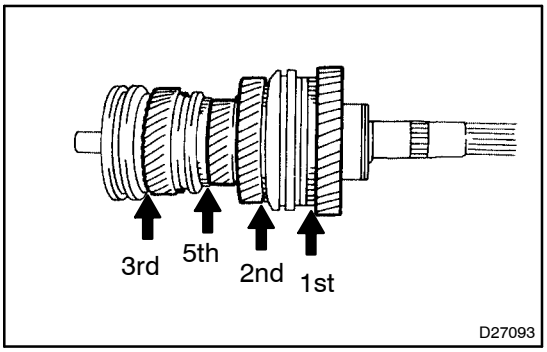
D27092

410CM–01

OVERHAUL

HINT:

When placing a part in a vise, be sure to use a cloth or something similar.



1. INSPECT EACH GEAR THRUST CLEARANCE

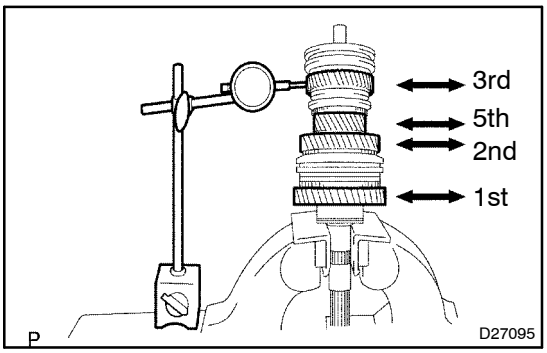
(a) Using a feeler gauge, measure the thrust clearance of each gear.

Standard thrust clearance

Gear	Clearance mm (in.)
1st and 3rd	0.10 – 0.45 (0.0039 – 0.0177)
2nd and 5th	0.10 – 0.35 (0.0039 – 0.0138)

Maximum thrust clearance

Gear	Clearance mm (in.)
1st and 3rd	0.45 (0.0177)
2nd and 5th	0.35 (0.0138)



2. INSPECT EACH GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance of each gear.

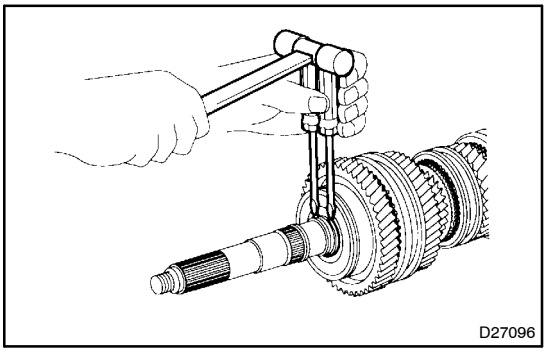
Standard radial clearance

Gear	Clearance mm (in.)
1st and 3rd	0.020 – 0.073 (0.0079 – 0.0029)
2nd and 5th	0.015 – 0.068 (0.0006 – 0.0027)

Maximum radial clearance

Gear	Clearance mm (in.)
1st and 3rd	0.073 (0.0029)
2nd and 5th	0.068 (0.0027)

If the clearance is greater than the maximum, replace the gear, needle roller bearing or shaft.

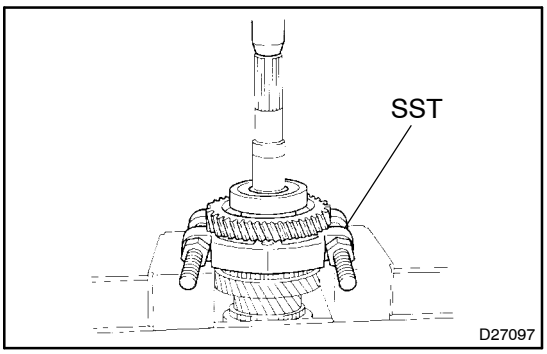


3. REMOVE OUTPUT SHAFT CENTER BEARING SHAFT SNAP RING

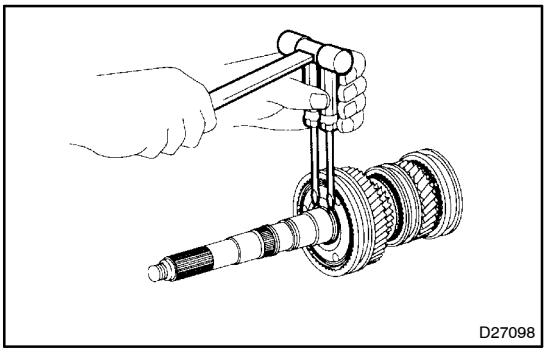
(a) Using 2 screwdrivers and a hammer, tap out the snap ring.

4. REMOVE 1ST GEAR

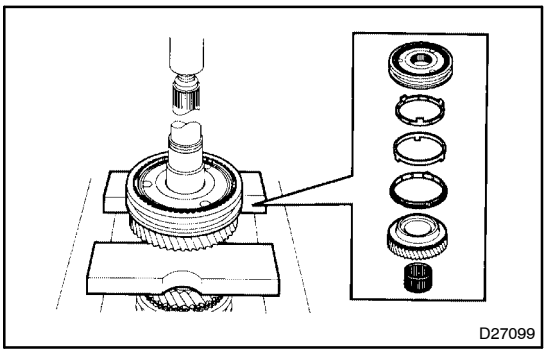
(a) Shift the hub sleeve No. 1 onto the 2nd gear.



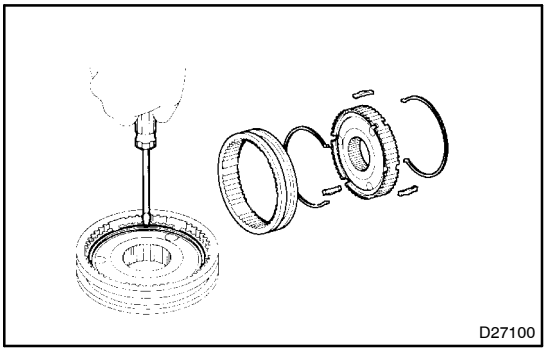
(b) Using SST and a press, press out the output shaft center bearing, 1st gear and synchronizer ring set No. 1.
SST 09555–55010
(c) Remove the needle roller bearing.



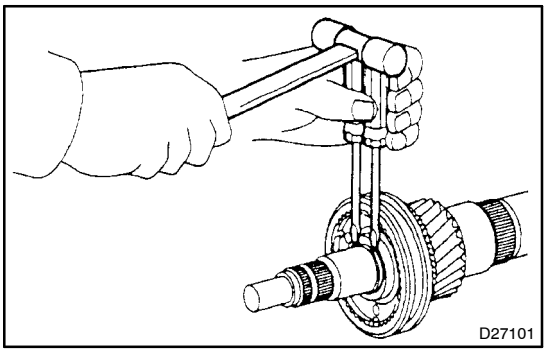
5. REMOVE CLUTCH HUB NO.1 SHAFT SNAP RING
(a) Using 2 screwdrivers and a hammer, tap out the snap ring.



6. REMOVE 2ND GEAR
(a) Using a press, press out the hub sleeve No. 1 assembly, synchronizer rings No. 2 and 2nd gear.
(b) Remove the needle roller bearing.

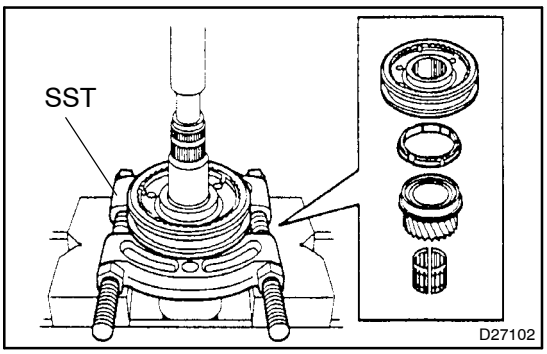


7. REMOVE TRANSMISSION HUB SLEEVE NO.1
(a) Using a screwdriver, remove the hub sleeve No. 2, 3 shifting keys and 2 springs from the clutch hub No. 1.



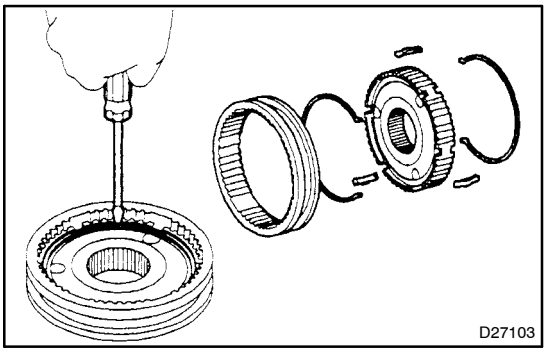
8. REMOVE CLUTCH HUB NO.2 SETTING SHAFT SNAP RING
(a) Using 2 screwdrivers and a hammer, tap out the snap ring.

9. REMOVE 3RD GEAR
(a) Shift the hub sleeve No. 3 onto the 5th gear.



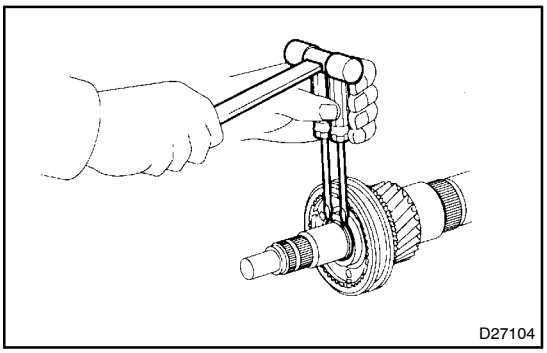
(b) Using SST and a press, press out the hub sleeve No. 2 assembly, synchronizer ring set No. 3 and 3rd gear.
SST 09555–55010

(c) Remove the needle roller bearing.



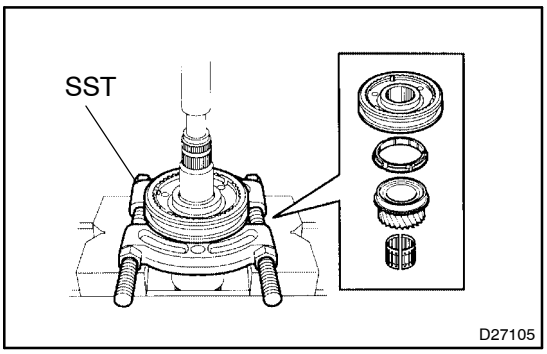
10. REMOVE TRANSMISSION HUB SLEEVE NO.2

(a) Using a screwdriver, remove the 3 shifting keys and 2 springs from the clutch hub No. 2.



11. REMOVE TRANSMISSION CLUTCH HUB NO.3 SHAFT SNAP RING

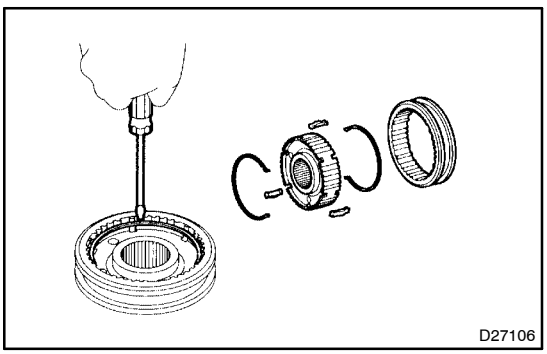
(a) Using 2 screwdrivers and a hammer, tap out the snap ring.



12. REMOVE 5TH GEAR

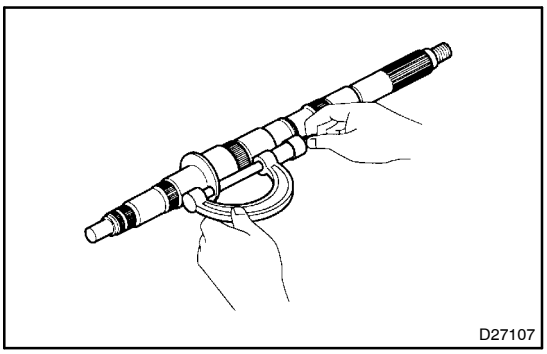
(a) Using SST and a press, press out the hub sleeve No. 3 assembly, synchronizer ring No. 3 and 5th gear.
SST 09555–55010

(b) Remove the needle roller bearing.



13. REMOVE TRANSMISSION HUB SLEEVE NO.3

(a) Using a screwdriver, remove the 3 shifting keys and 2 springs from the clutch hub No. 3.

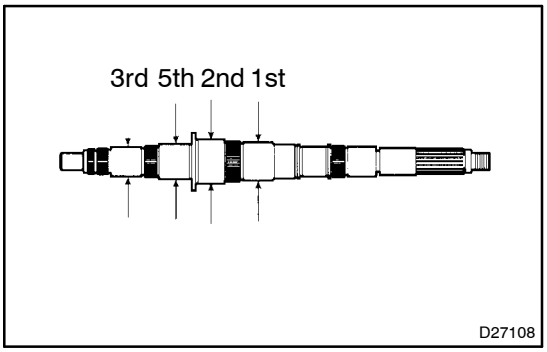

D27107

14. INSPECT OUTPUT SHAFT

(a) Using micrometer, measure the flange thickness.

Minimum flange thickness: 4.725 mm (0.1860 in.)

If the flange thickness is less than the minimum, replace the output shaft.



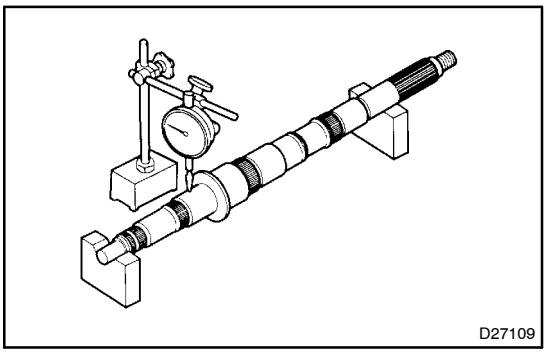
D27108

(b) Using a micrometer, measure the journal diameter.

Minimum journal diameter:

Gear	Diameter mm (in.)
1st	49.979 (1.9677)
2nd	57.984 (2.2828)
3rd	37.979 (1.4952)
5th	45.984 (1.8104)

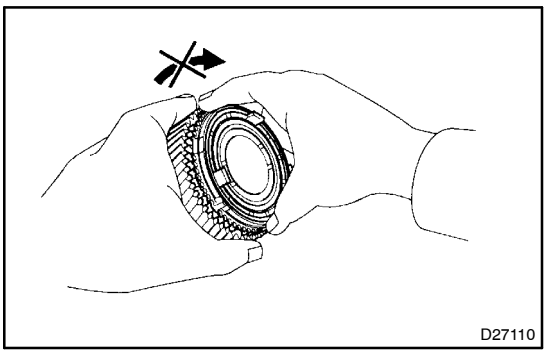
If the journal diameter is less than the minimum, replace the output shaft.


D27109

(c) Using a dial indicator, measure the shaft runout.

Maximum runout: 0.03 mm (0.0012 in.)

If the runout is greater than the maximum, replace the output shaft.


D27110

15. INSPECT SYNCHRONIZER RING

(a) Check for wear or damage.

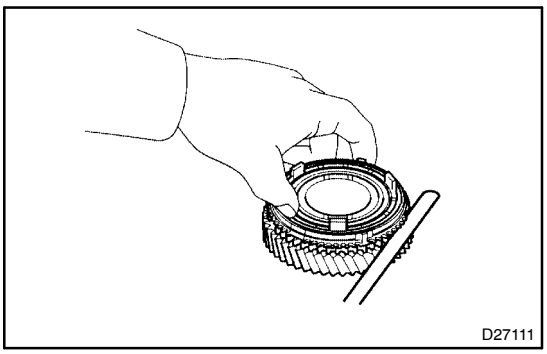
(b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.

NOTICE:

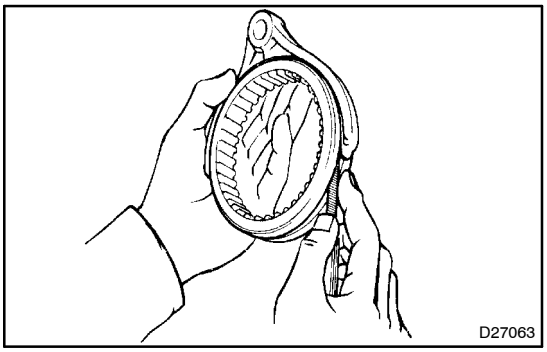
Ensure the fine lapping compound is completely washed off after rubbing.

(c) Check again the braking effect of the synchronizer ring.


D27111

(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and the gear spline end.
Minimum clearance:

Gear	Clearance mm (in.)
1st	1.25 (0.0492)
2nd	1.23 (0.0484)
3rd	1.15 (0.0453)
5th	0.80 (0.0315)


D27063

16. INSPECT SHIFT FORK AND HUB SLEEVE CLEARANCE

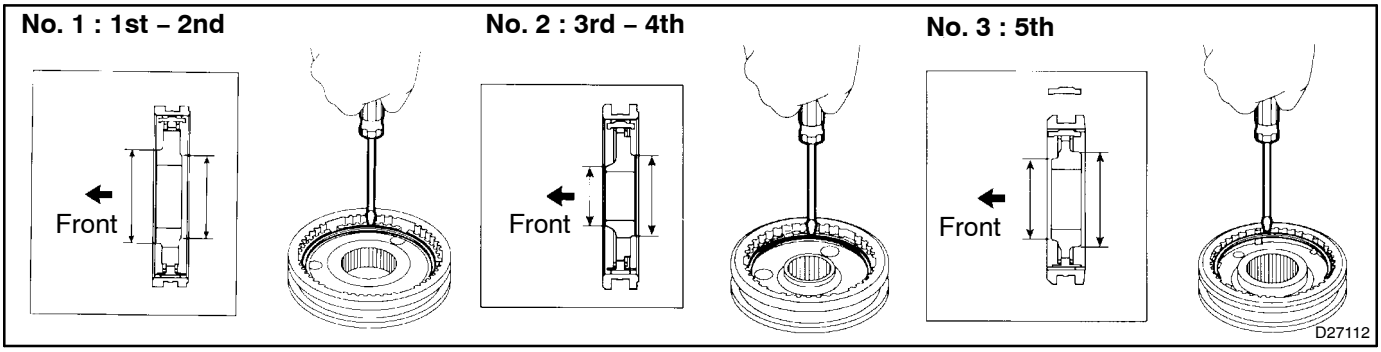
(a) Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.
Maximum clearance:

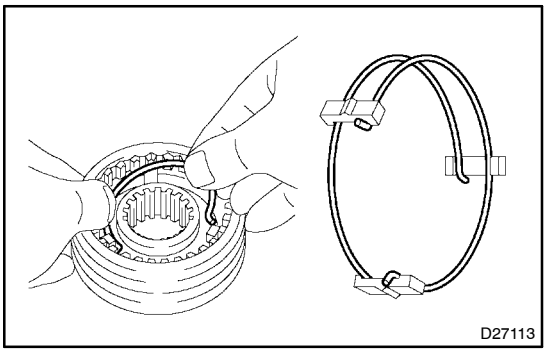
Gear	Clearance mm (in.)
1st–2nd, 3rd–4th	0.35 (0.0138)
5th	0.84 (0.0331)

If the clearance is greater than the maximum, replace the shift fork or hub sleeve.

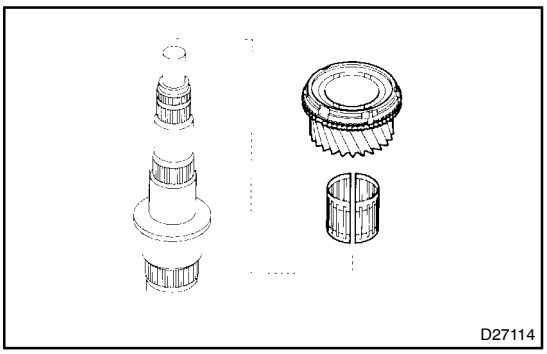
17. INSTALL CLUTCH HUB NO. 1, NO. 2 AND NO. 3 INTO HUB SLEEVE

(a) Install the clutch hub and 3 shifting keys to the hub sleeve.
(b) Install the 2 springs under the shifting keys.




D27113

NOTICE:
Position the key springs so that their end gaps are not aligned.

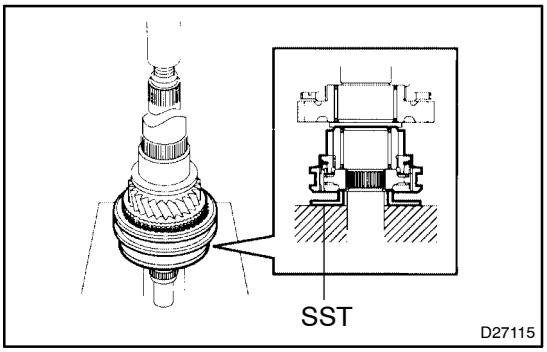


18. INSTALL 5TH GEAR

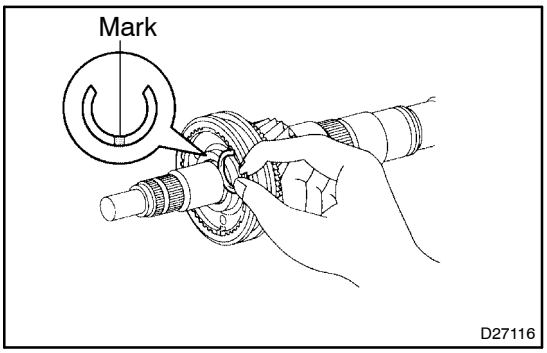
(a) Apply gear oil to the shaft and needle roller bearing.

(b) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.

(c) Install the needle roller bearing in the 5th gear.



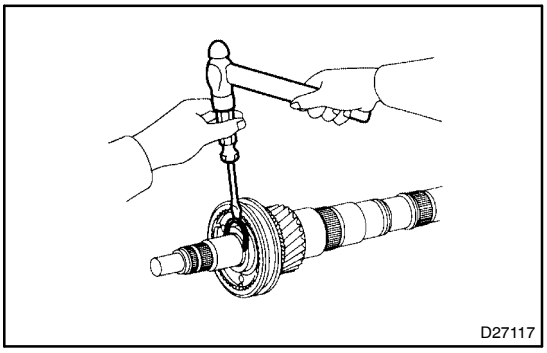
(d) Using SST and a press, press in the 5th gear and hub sleeve No. 3 assembly.
SST 09316–60011 (09316–00041)



19. INSTALL TRANSMISSION CLUTCH HUB NO.3 SHAFT SNAP RING

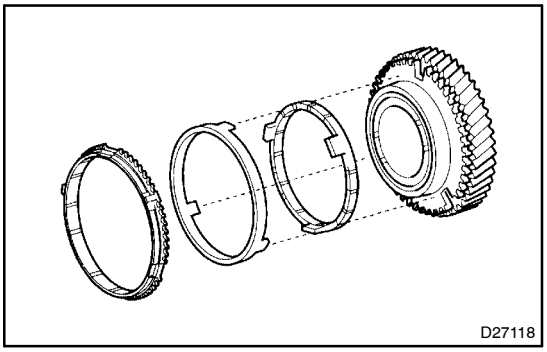
(a) Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)
A	2.40 – 2.45 (0.0945 – 0.0965)
B	2.45 – 2.50 (0.0965 – 0.0984)
C	2.50 – 2.55 (0.0984 – 0.1004)
D	2.55 – 2.60 (0.1004 – 0.1024)
E	2.60 – 2.65 (0.1024 – 0.1044)
F	2.65 – 2.70 (0.1044 – 0.1063)



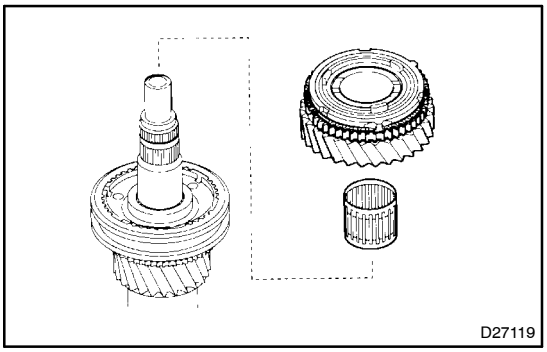
(b) Using a screwdriver and a hammer, tap in the snap ring.

20. INSPECT 5TH GEAR THRUST CLEARANCE (See step 1)



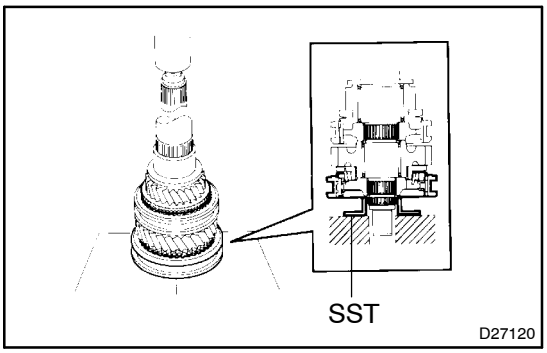
21. INSTALL 3RD GEAR

(a) Place the synchronizer ring on the gear, and align the ring slots with the shifting keys.

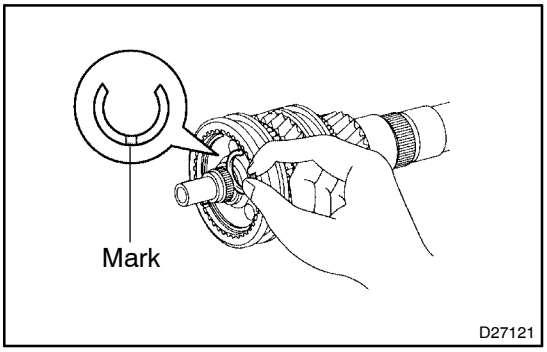


(b) Apply gear oil to the shaft and needle roller bearing.

(c) Install the needle roller bearing in the 3rd gear.



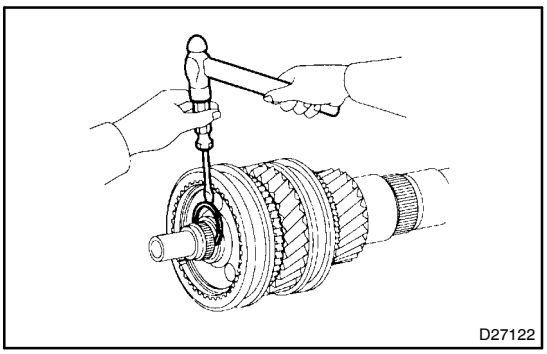
(d) Using SST and a press, press in the 3rd gear and hub sleeve No. 2 assembly.
SST 09316–60011 (09316–00031)



22. INSTALL CLUTCH HUB NO.2 SETTING SHAFT SNAP RING

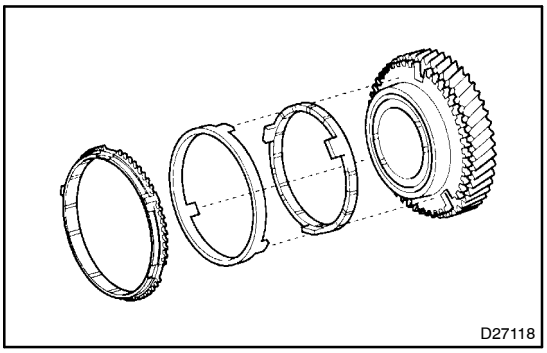
(a) Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)
4	1.90 – 1.95 (0.0748 – 0.0768)
5	1.95 – 2.00 (0.0768 – 0.0787)
6	2.00 – 2.05 (0.0787 – 0.0807)
7	2.05 – 2.10 (0.0807 – 0.0827)
8	2.10 – 2.15 (0.0827 – 0.0847)
9	2.15 – 2.20 (0.0847 – 0.0866)



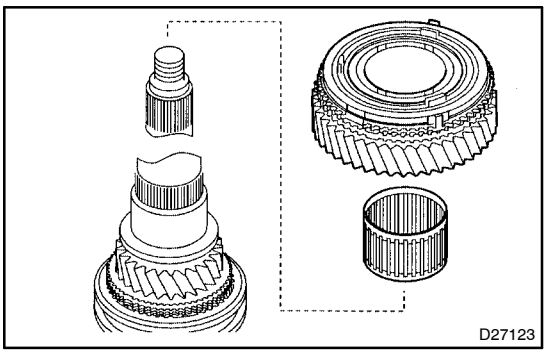
(b) Using a screwdriver and a hammer, tap in the snap ring.

23. INSPECT 3RD GEAR THRUST CLEARANCE (See step 1)



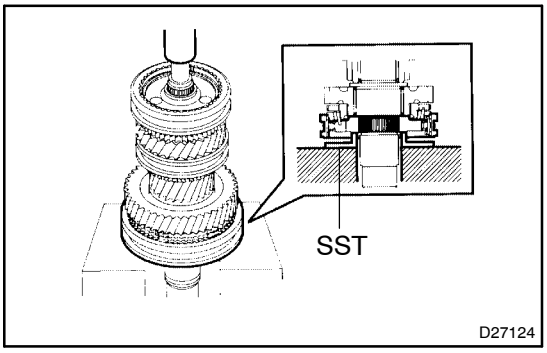
24. INSTALL 2ND GEAR

(a) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.

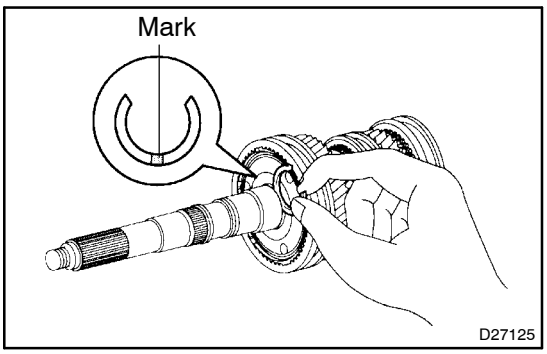


(b) Apply gear oil to the shaft and needle roller bearing.

(c) Install the needle roller bearing in the 2nd gear.



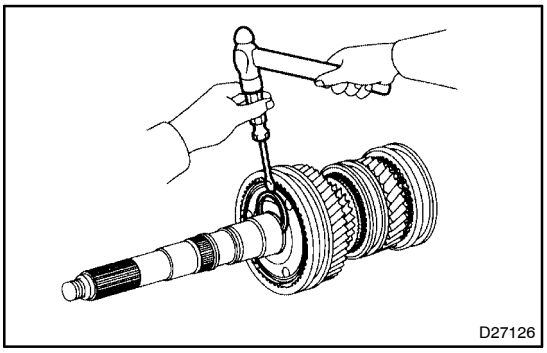
(d) Using SST and a press, press in the 2nd gear and hub sleeve No. 1 assembly.



25. INSTALL CLUTCH HUB NO.1 SHAFT SNAP RING

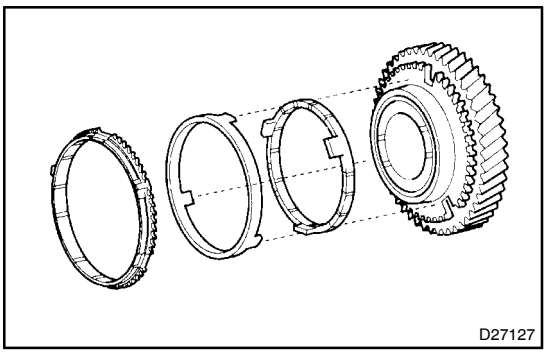
(a) Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)
A	2.90 – 2.95 (0.1142 – 0.1161)
B	2.95 – 3.00 (0.1161 – 0.1181)
C	3.00 – 3.05 (0.1181 – 0.1201)
D	3.05 – 3.10 (0.1201 – 0.1220)
E	3.10 – 3.15 (0.1220 – 0.1240)
F	3.15 – 3.20 (0.1240 – 0.1260)



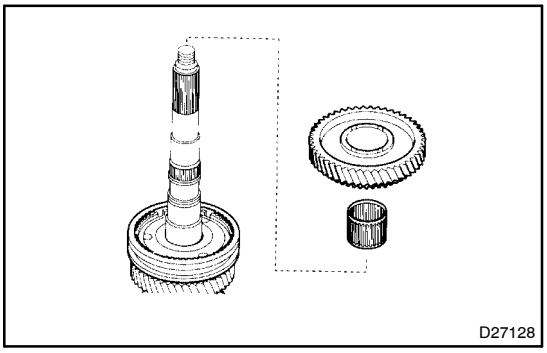
(b) Using a screwdriver and hammer, tap in the snap ring.

26. INSPECT 2ND GEAR THRUST CLEARANCE (See step 1)

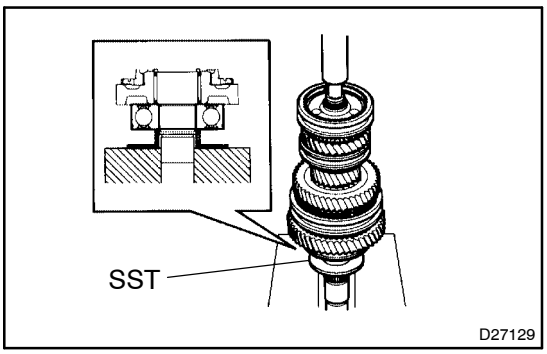


27. INSTALL 1ST GEAR

(a) Place the synchronizer ring on the gear, and align the ring slots with shifting keys.

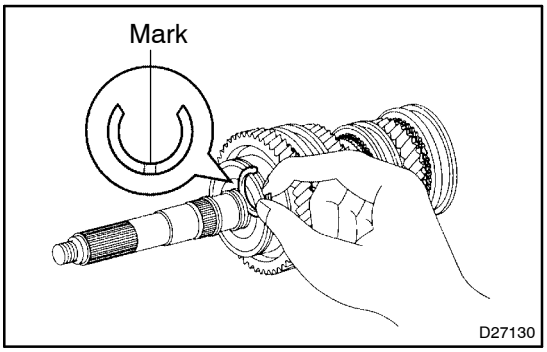


(b) Apply gear oil to the shaft and needle roller bearing.
(c) Install the needle roller bearing in the 1st gear.
(d) Install the 1st gear to the output shaft.



28. INSTALL OUTPUT SHAFT CENTER BEARING

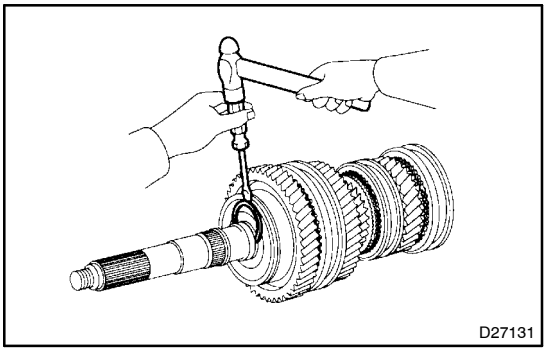
(a) Using SST and a press, press in the center bearing.
SST 09316–20011



29. INSTALL OUTPUT SHAFT CENTER BEARING SHAFT SNAP RING

(a) Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)
A	2.40 – 2.45 (0.0945 – 0.0965)
B	2.45 – 2.50 (0.0965 – 0.0984)
C	2.50 – 2.55 (0.0984 – 0.1004)
D	2.55 – 2.60 (0.1004 – 0.1024)
E	2.60 – 2.65 (0.1024 – 0.1044)
F	2.65 – 2.70 (0.1044 – 0.1063)
G	2.70 – 2.75 (0.1063 – 0.1083)
H	2.75 – 2.80 (0.1083 – 0.1102)



(b) Using a screwdriver and a hammer, tap in the snap ring.

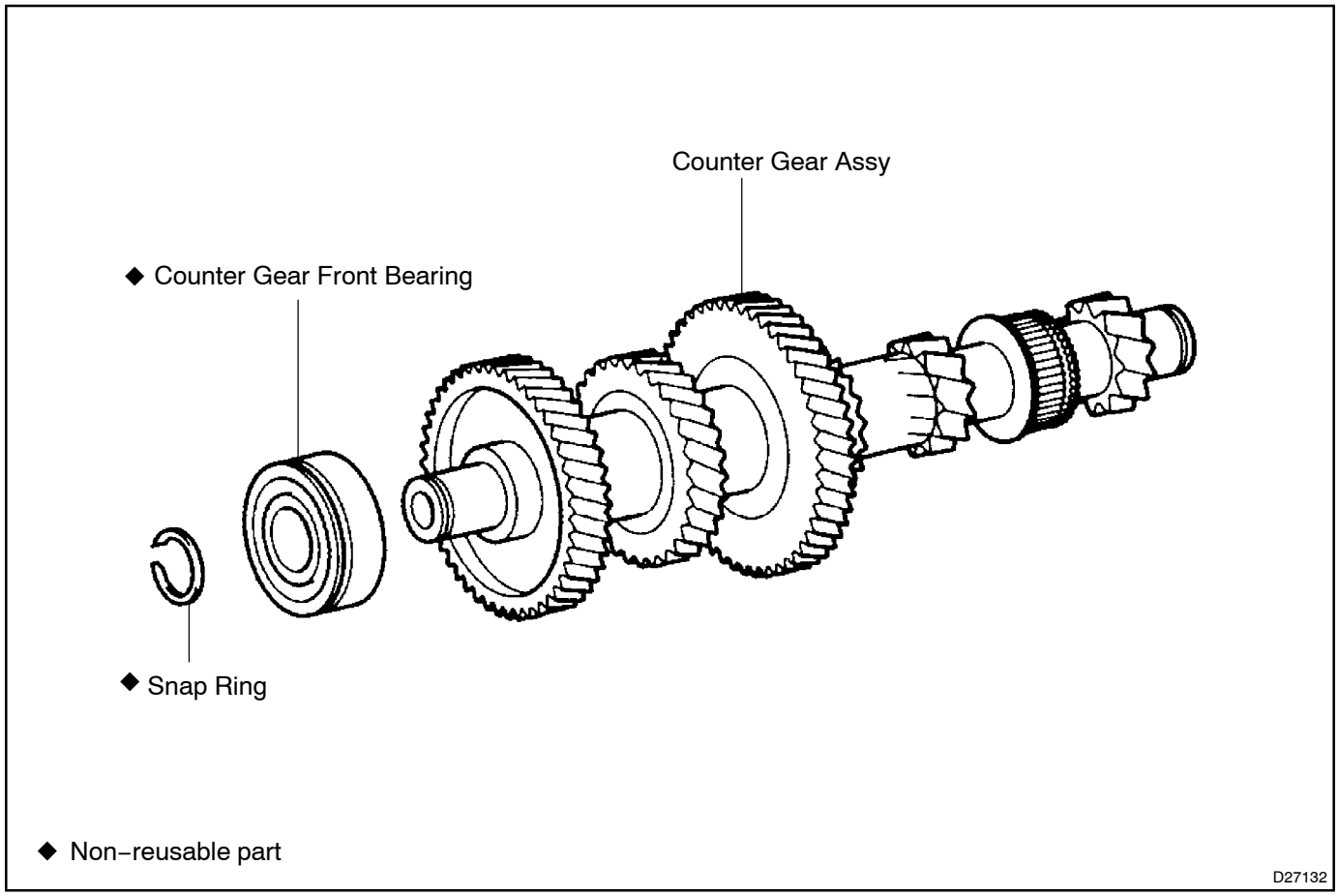
30. INSPECT 1ST GEAR THRUST CLEARANCE (See step 1)

31. INSPECT EACH GEAR RADIAL CLEARANCE (See step 2)

COUNTER GEAR ASSY

COMPONENTS

410CN–01

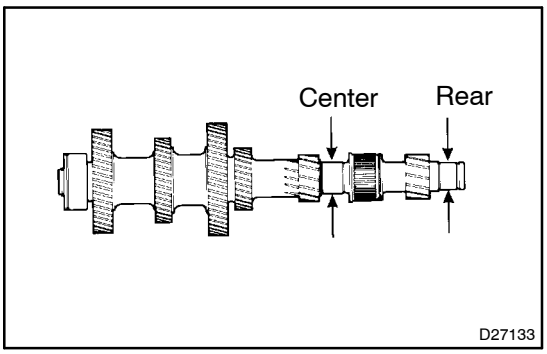


◆ Non–reusable part

D27132

410CO–01

OVERHAUL



1. INSPECT COUNTER GEAR ASSY

(a) Using a micrometer, measure the out side diameter of needle roller bearing race.

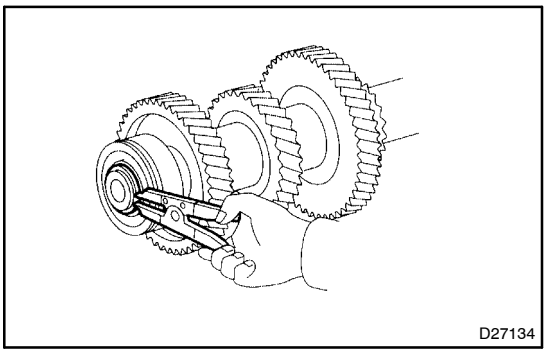
Standard outside diameter:

Position	mm (in.)
Center	35.957 – 35.970 (1.4156 – 1.4161)
Rear	32.002 – 32.015 (1.2599 – 1.2604)

Maximum outside diameter:

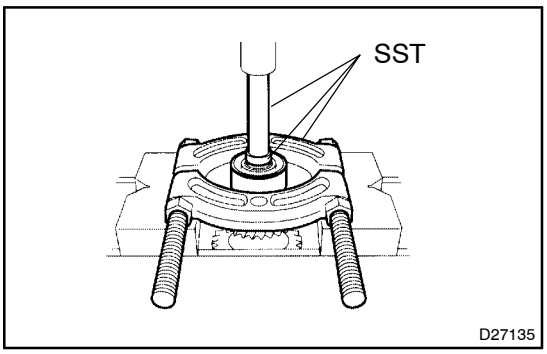
Position	mm (in.)
Center	35.970 (1.4161)
Rear	32.015 (1.2604)

If the clearance greater than the maximum, replace the gear bearing or shaft.



2. REMOVE COUNTER GEAR FRONT BEARING SNAP RING NO.1

(a) Using snap ring pliers (expander), remove the snap ring.

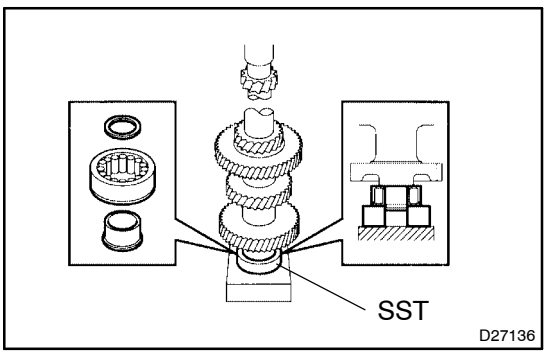


3. REMOVE COUNTER GEAR FRONT BEARING OR ROLLER

(a) Using SST and a press, press out the front bearing.
SST 09950–00020, 09950–60010 (09951–00290), 09950–70010 (09951–07100)

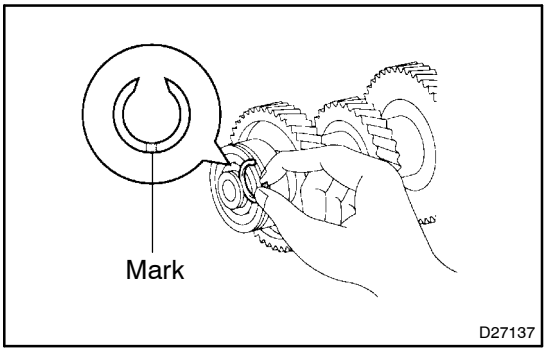
4. INSTALL COUNTER GEAR FRONT BEARING OR ROLLER

(a) Apply gear oil to the side race and bearing.



(b) Install the inner race and side race to the bearing as shown.

(c) Using SST and a press, press the bearing.
SST 09515–21010



5. INSTALL COUNTER GEAR FRONT BEARING SNAP RING NO.1

(a) Select a snap ring that allows the minimum axial play.

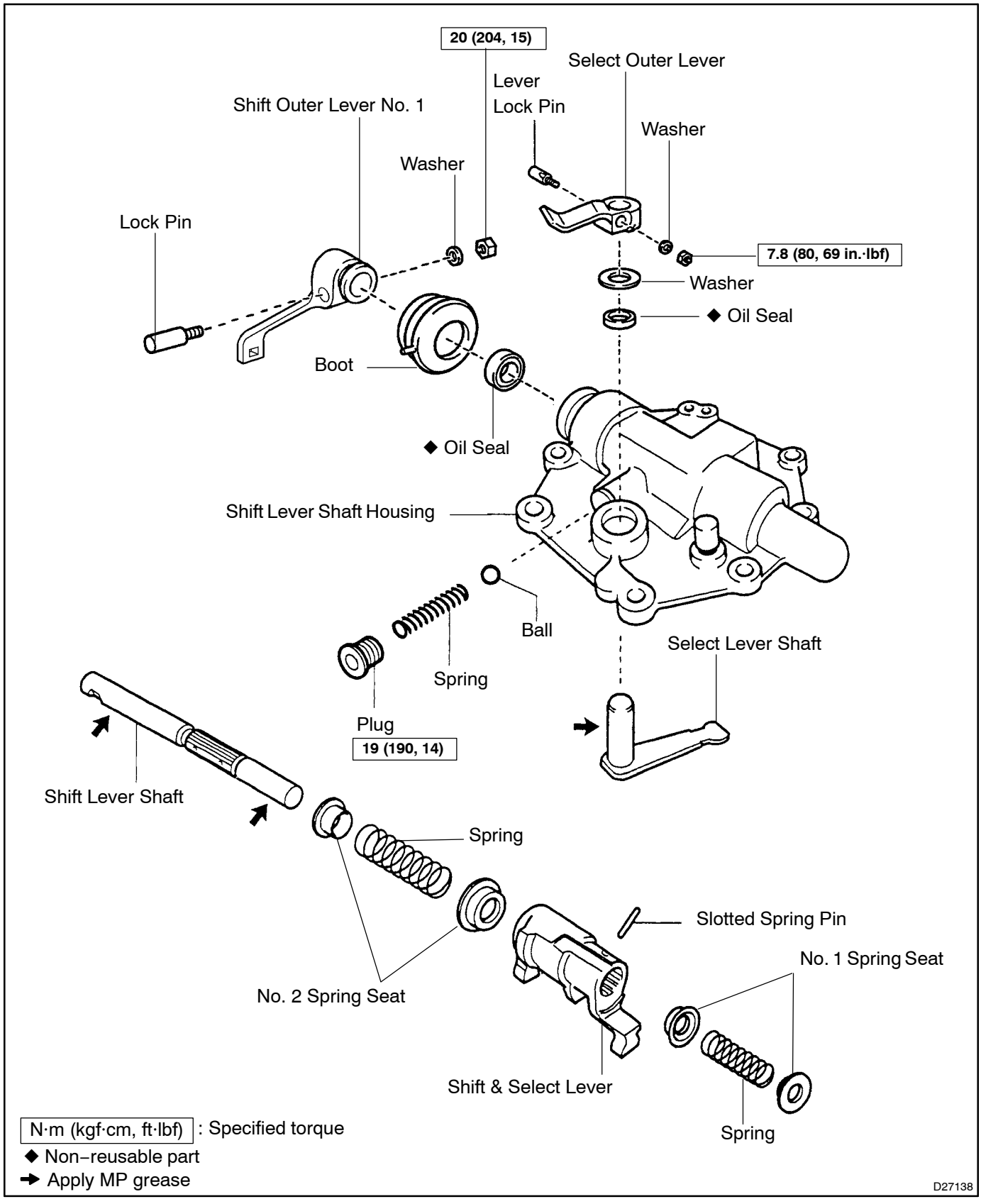
Mark	Thickness mm (in.)
A	2.45 – 2.50 (0.0970 – 0.0984)
B	2.50 – 2.55 (0.0984 – 0.1004)
C	2.55 – 2.60 (0.1004 – 0.1024)
D	2.60 – 2.65 (0.1024 – 0.1044)
E	2.65 – 2.70 (0.1044 – 0.1063)
F	2.70 – 2.75 (0.1063 – 0.1083)

(b) Using snap ring pliers (expander), install the snap ring.

SHIFT LEVER SHAFT HOUSING ASSY

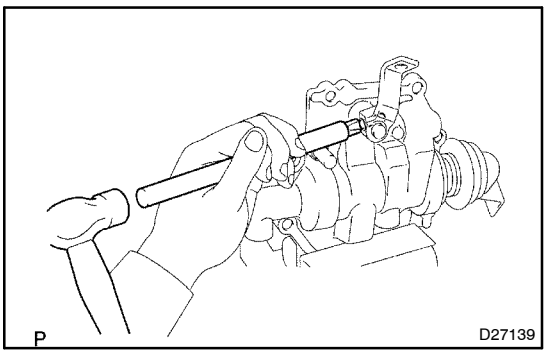
410CP–01

COMPONENTS



410CQ–01

OVERHAUL



1. REMOVE SELECT OUTER LEVER

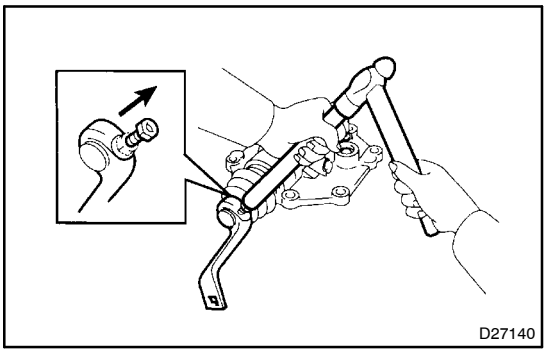
(a) Remove the nut and washer.

(b) Using a brass bar and a hammer, tap out the lever lock pin.

(c) Remove the select outer lever and washer from the select lever shaft.

2. REMOVE SELECT LEVER SHAFT

(a) Remove the select lever shaft from the shift lever housing.

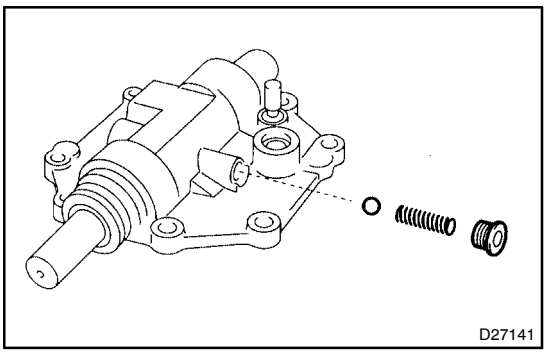


3. REMOVE SHIFT OUTER LEVER NO.1

(a) Remove the nut and washer.

(b) Using a brass bar and a hammer, tap out the lever lock pin.

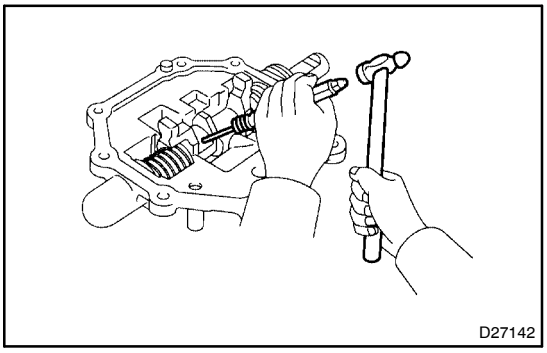
(c) Pull out the shift outer lever and boot from the shift lever shaft.



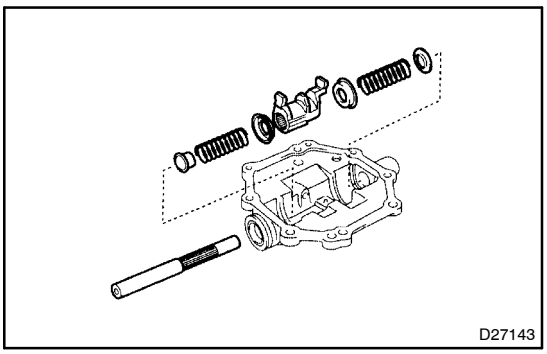
4. REMOVE SHIFT & SELECT LEVER SHAFT ASSY

(a) Using a torx wrench (T40), remove the plug.

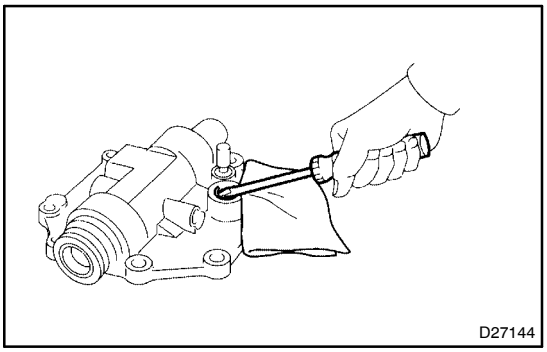
(b) Using a magnetic finger, remove the spring and ball.



(c) Using a pin punch and a hammer, tap out the slotted spring pin.

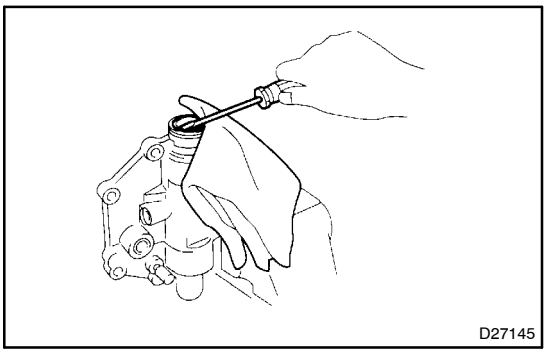


(d) Remove the shift lever shaft.
(e) Remove the shift & select lever, 4 spring seats and 2 springs.



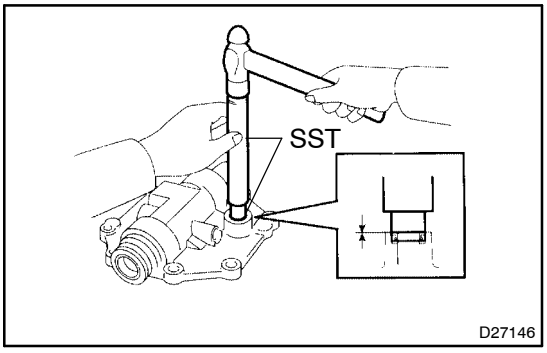
5. REMOVE SELECT OUTER LEVER OIL SEAL

(a) Using a screwdriver, pry out the oil seal.



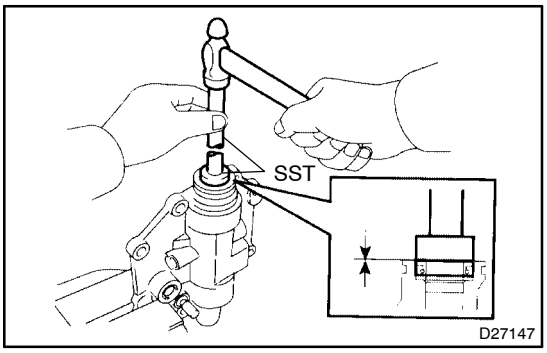
6. REMOVE SHIFT OUTER LEVER OIL SEAL

(a) Using a screwdriver, pry out the oil seal.



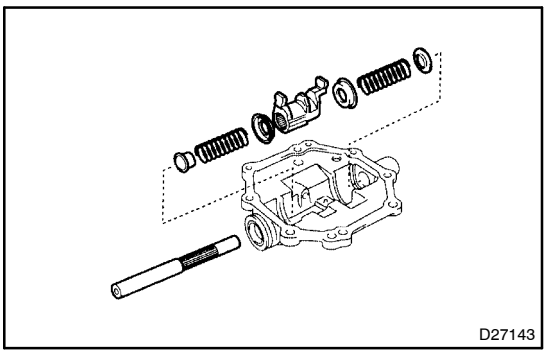
7. INSTALL SELECT OUTER LEVER OIL SEAL

(a) Using SST and a hammer, tap in a new oil seal.
SST 09950–60010 (09951–00200), 09950–70010 (09951–07150)
Tap in depth: 0 – 1.0 mm (0 – 0.039 in.)
(b) Apply MP grease to the oil seal.



8. INSTALL SHIFT OUTER LEVER OIL SEAL

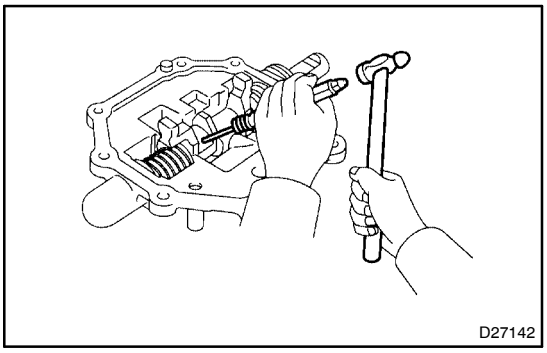
(a) Using SST and a hammer, tap in a new oil seal.
SST 09950–60010 (09951–00220, 09951–00320), 09950–60020 (09952–06010), 09950–70010 (09951–07150)
Tap in depth: –0.2 – 0.6 mm (–0.008 – 0.024 in.)
(b) Apply MP grease to the oil seal.



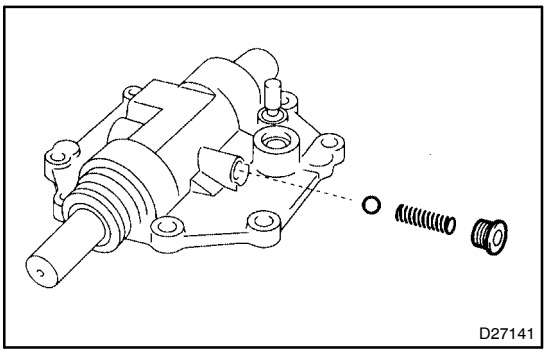
9. INSTALL SHIFT & SELECT LEVER SHAFT ASSY

(a) Install the shift lever shaft.

(b) Install the shift & select lever, 4 spring seats and 2 springs.



(c) Using a pin punch and a hammer, install the slotted spring pin.



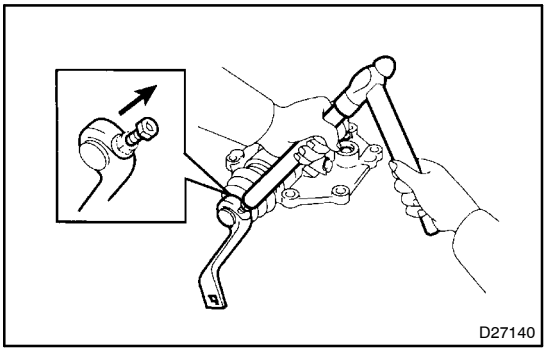
(d) Install the ball and spring.

(e) Using a torx wrench (T40), install the plug.

Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)

10. INSTALL SHIFT OUTER LEVER NO.1

(a) Install the shift outer lever and boot to the shift lever shaft.



(b) Using a brass bar and hammer, install the lever lock pin.

(c) Install the washer and nut.

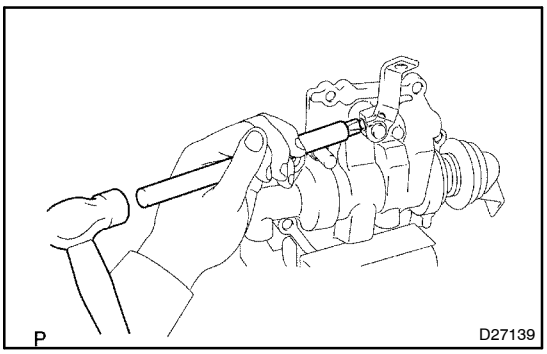
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

11. INSTALL SELECT LEVER SHAFT

(a) Install the select lever shaft to the shift lever housing.

12. INSTALL SELECT OUTER LEVER

(a) Install the washer and select outer lever to the select lever shaft.



(b) Using a brass bar and a hammer, install the lever lock pin.
(c) Install the washer and nut.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

ALPHABETICAL INDEX

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