

Manual Transaxle Workshop Manual G35M–R

FOREWORD

This manual explains the mechanism, operation, and service points for the above-indicated manual transaxle. In order to do these procedures safely, quickly, and correctly, you must first read this manual and any other relevant service materials carefully.

The information in this manual is current up to March, 2002. Any changes that occur after that time will not be reflected in this particular manual. Therefore, the contents of this manual may not exactly match the mechanism that you are currently serving.

**Mazda Motor Corporation
HIROSHIMA, JAPAN**

CONTENTS

Title	Section
General Information	GI
Manual Transaxle	J
Technical Data	TD
Special Tools	ST

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WARNING

Servicing a vehicle can be dangerous. If you have not received service-related training, the risks of injury, property damage, and failure of servicing increase. The recommended servicing procedures for the vehicle in this workshop manual were developed with Mazda-trained technicians in mind. This manual may be useful to non-Mazda trained technicians, but a technician with our service-related training and experience will be at less risk when performing service operations. However, all users of this manual are expected to at least know general safety procedures.

This manual contains "Warnings" and "Cautions" applicable to risks not normally encountered in a general technician's experience. They should be followed to reduce the risk of injury and the risk that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that the "Warnings" and "Cautions" are not exhaustive. It is impossible to warn of all the hazardous consequences that might result from failure to follow the procedures.

The procedures recommended and described in this manual are effective methods of performing service and repair. Some require tools specifically designed for a specific purpose. Persons using procedures and tools which are not recommended by Mazda Motor Corporation must satisfy themselves thoroughly that neither personal safety nor safety of the vehicle will be jeopardized.

The contents of this manual, including drawings and specifications, are the latest available at the time of printing, and Mazda Motor Corporation reserves the right to change the vehicle designs and alter the contents of this manual without notice and without incurring obligation.

Parts should be replaced with genuine Mazda replacement parts or with parts which match the quality of genuine Mazda replacement parts. Persons using replacement parts of lesser quality than that of genuine Mazda replacement parts must satisfy themselves thoroughly that neither personal safety nor safety of the vehicle will be jeopardized.

Mazda Motor Corporation is not responsible for any problems which may arise from the use of this manual. The cause of such problems includes but is not limited to insufficient service-related training, use of improper tools, use of replacement parts of lesser quality than that of genuine Mazda replacement parts, or not being aware of any revision of this manual.

GENERAL INFORMATION

HOW TO USE THIS MANUAL	GI-2
RANGE OF TOPICS	GI-2
SERVICING PROCEDURE	GI-2
SYMBOLS	GI-4
ADVISORY MESSAGES	GI-4
UNITS	GI-5
UNITS TABLE	GI-5
FUNDAMENTAL PROCEDURES	GI-6
PREPARATION OF TOOLS AND MEASURING	
EQUIPMENT	GI-6
SPECIAL SERVICE TOOLS	GI-6
DISASSEMBLY	GI-6
INSPECTION DURING REMOVAL,	
DISASSEMBLY	GI-6
ARRANGEMENT OF PARTS	GI-7
CLEANING OF PARTS	GI-7
REASSEMBLY	GI-7
ADJUSTMENT	GI-8
RUBBER PARTS AND TUBING	GI-8
HOSE CLAMPS	GI-8
TORQUE FORMULAS	GI-8
VISE	GI-9
ELECTRICAL SYSTEM	GI-9
CONNECTORS	GI-9
NEW STANDARDS	GI-12
NEW STANDARDS TABLE	GI-12
ABBREVIATIONS	GI-14
ABBREVIATIONS TABLE	GI-14

HOW TO USE THIS MANUAL

HOW TO USE THIS MANUAL

RANGE OF TOPICS

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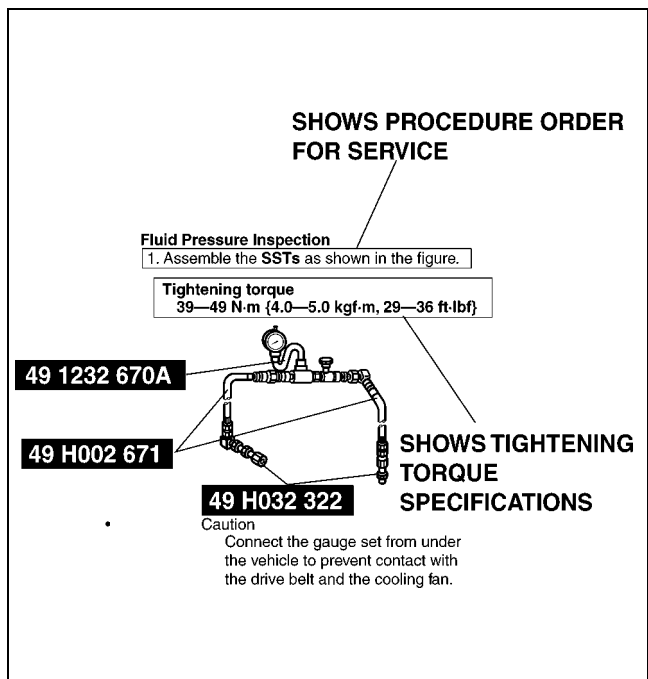
- This manual contains procedures for performing all required service operations. The procedures are divided into the following five basic operations:
 - Removal/Installation
 - Disassembly/Assembly
 - Replacement
 - Inspection
 - Adjustment
- Simple operations which can be performed easily just by looking at the vehicle (i.e., removal/installation of parts, jacking, vehicle lifting, cleaning of parts and visual inspection) have been omitted.

SERVICING PROCEDURE

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Inspection, Adjustment

- Inspection and adjustment procedures are divided into steps. Important points regarding the location and contents of the procedures are explained in detail and shown in the illustrations.

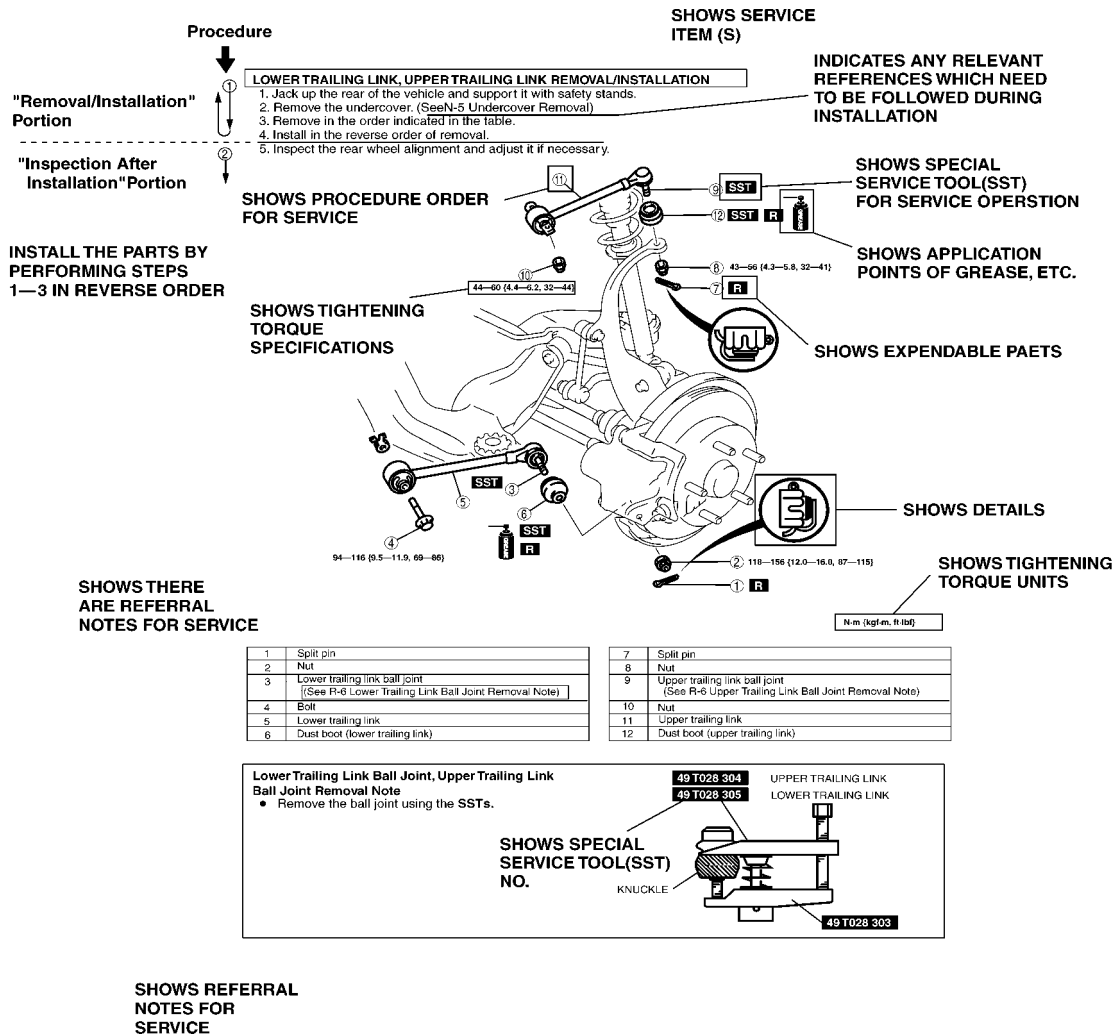


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HOW TO USE THIS MANUAL

Repair Procedure

1. Most repair operations begin with an overview illustration. It identifies the components, shows how the parts fit together, and describes visual part inspection. However, only removal/installation procedures that need to be performed methodically have written instructions.
2. Expendable parts, tightening torques, and symbols for oil, grease, and sealant are shown in the overview illustration. In addition, symbols indicating parts requiring the use of special service tools or equivalent are also shown.
3. Procedure steps are numbered and the part that is the main point of the procedure is shown in the illustration with the corresponding number. Occasionally, there are important points or additional information concerning a procedure. Refer to this information when servicing the related part.











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HOW TO USE THIS MANUAL

SYMBOLS

A6E201000001M03

- There are eight symbols indicating oil, grease, fluids, sealant, and the use of **SST** or equivalent. These symbols show application points or use of these materials during service.

Symbol	Meaning	Kind
	Apply oil	New appropriate engine oil or gear oil
	Apply brake fluid	New appropriate brake fluid
	Apply automatic transaxle/transmission fluid	New appropriate automatic transaxle/transmission fluid
	Apply grease	Appropriate grease
	Apply sealant	Appropriate sealant
	Apply petroleum jelly	Appropriate petroleum jelly
	Replace part	O-ring, gasket, etc.
	Use SST or equivalent	Appropriate tools

ADVISORY MESSAGES

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- You will find several **Warnings**, **Cautions**, **Notes**, **Specifications** and **Upper and Lower Limits** in this manual.

Warning

- A Warning indicates a situation in which serious injury or death could result if the warning is ignored.

Caution

- A Caution indicates a situation in which damage to the vehicle or parts could result if the caution is ignored.

Note

- A Note provides added information that will help you to complete a particular procedure.

Specifications

- The values indicate the allowable range when performing inspections or adjustments.

Upper and Lower Limits

- The values indicate the upper and lower limits that must not be exceeded when performing inspections or adjustments.

UNITS

UNITS

UNITS TABLE

A6E201200002M01

Electrical current	A (ampere)
Electric power	W (watt)
Electric resistance	ohm
Electric voltage	V (volt)
Length	mm (millimeter)
	in (inch)
Negative pressure	kPa (kilo pascal)
	mmHg (millimeters of mercury)
	inHg (inches of mercury)
Number of revolutions	rpm (revolutions per minute)
Positive pressure	kPa (kilo pascal)
	kgf/cm ² (kilogram force per square centimeter)
	psi (pounds per square inch)
Torque	N·m (Newton meter)
	kgf·m (kilogram force meter)
	kgf·cm (kilogram force centimeter)
	ft·lbf (foot pound force)
	in·lbf (inch pound force)

Volume	L (liter)
	US qt (U.S. quart)
	imp qt (Imperial quart)
	ml (milliliter)
	cc (cubic centimeter)
	cu in (cubic inch)
Weight	fl oz (fluid ounce)
	N (Newton)
	g (gram)
	oz (ounce)

Conversion to SI Units (Système International d'Unités)

- All numerical values in this manual are based on SI units. Numbers shown in conventional units are converted from these values.

Rounding Off

- Converted values are rounded off to the same number of places as the SI unit value. For example, if the SI unit value is 17.2 and the value after conversion is 37.84, the converted value will be rounded off to 37.8.

Upper and Lower Limits

- When the data indicates upper and lower limits, the converted values are rounded down if the SI unit value is an upper limit and rounded up if the SI unit value is a lower limit. Therefore, converted values for the same SI unit value may differ after conversion. For example, consider 2.7 kgf/cm² in the following specifications:

210—260 kPa {2.1—2.7 kgf/cm², 30—38 psi}
270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}

- The actual converted values for 2.7 kgf/cm² are 265 kPa and 38.4 psi. In the first specification, 2.7 is used as an upper limit, so the converted values are rounded down to 260 and 38. In the second specification, 2.7 is used as a lower limit, so the converted values are rounded up to 270 and 39.

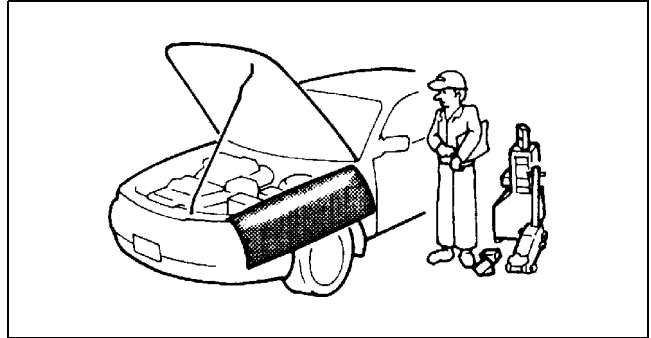
FUNDAMENTAL PROCEDURES

FUNDAMENTAL PROCEDURES

PREPARATION OF TOOLS AND MEASURING EQUIPMENT

- Be sure that all necessary tools and measuring equipment are available before starting any work.

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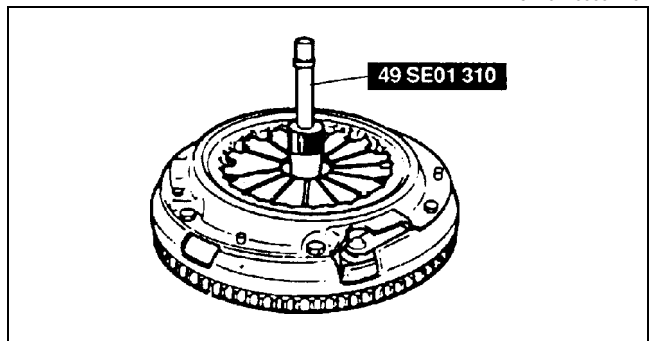


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SPECIAL SERVICE TOOLS

- Use special service tools or equivalent when they are required.

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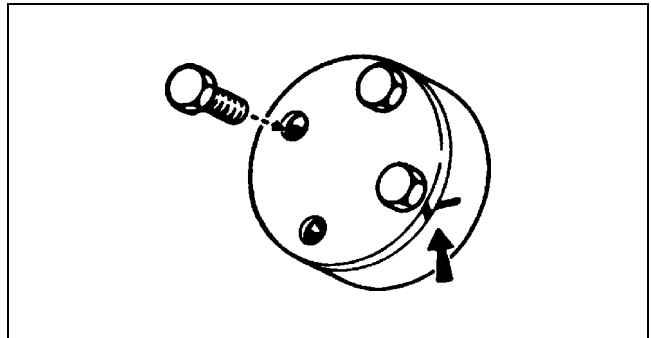


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DISASSEMBLY

- If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be marked in a place that will not affect their performance or external appearance and identified so that reassembly can be performed easily and efficiently.

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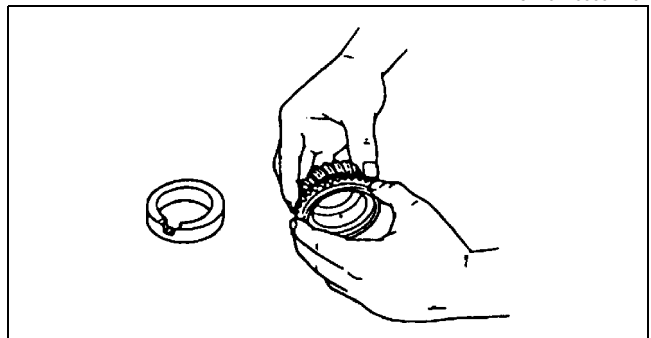


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INSPECTION DURING REMOVAL, DISASSEMBLY

- When removed, each part should be carefully inspected for malfunction, deformation, damage, and other problems.

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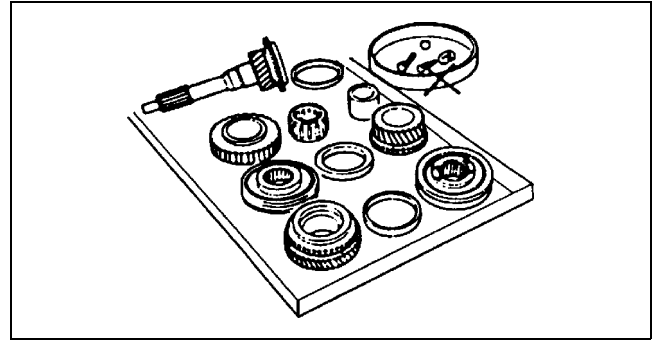
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FUNDAMENTAL PROCEDURES

ARRANGEMENT OF PARTS

- All disassembled parts should be carefully arranged for reassembly.
- Be sure to separate or otherwise identify the parts to be replaced from those that will be reused.

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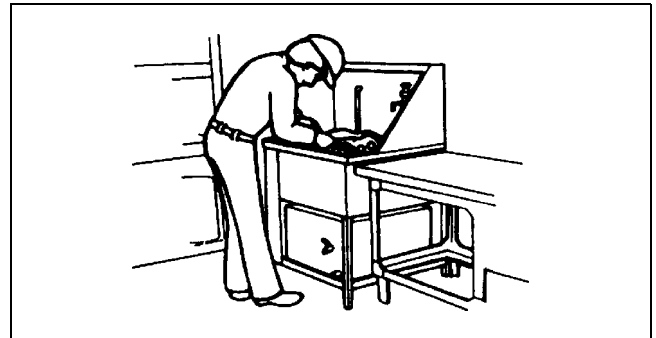
CLEANING OF PARTS

- All parts to be reused should be carefully and thoroughly cleaned in the appropriate method.

Warning

- **Using compressed air can cause dirt and other particles to fly out causing injury to the eyes. Wear protective eye wear whenever using compressed air.**

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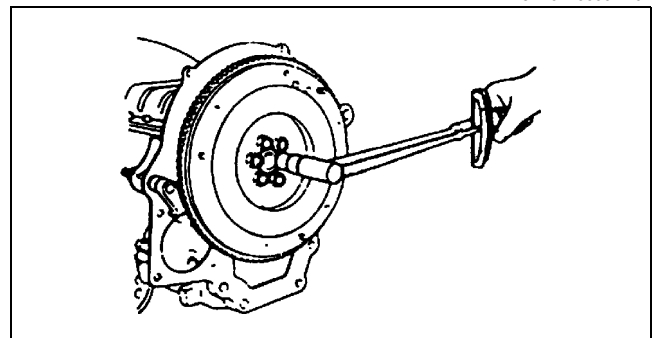


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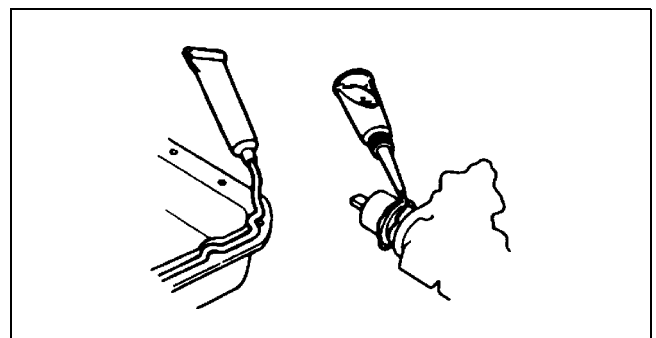
REASSEMBLY

- Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.
- If removed, these parts should be replaced with new ones:
 - Oil seals
 - Gaskets
 - O-rings
 - Lockwashers
 - Cotter pins
 - Nylon nuts
- Depending on location:
 - Sealant and gaskets, or both, should be applied to specified locations. When sealant is applied, parts should be installed before sealant hardens to prevent leakage.
 - Oil should be applied to the moving components of parts.
 - Specified oil or grease should be applied at the prescribed locations (such as oil seals) before reassembly.

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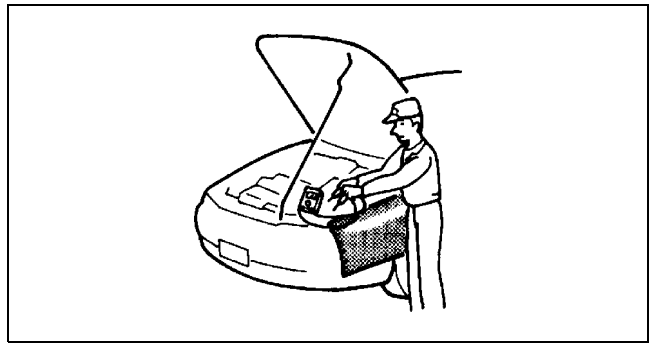
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FUNDAMENTAL PROCEDURES

ADJUSTMENT

- Use suitable gauges and/or testers when making adjustments.

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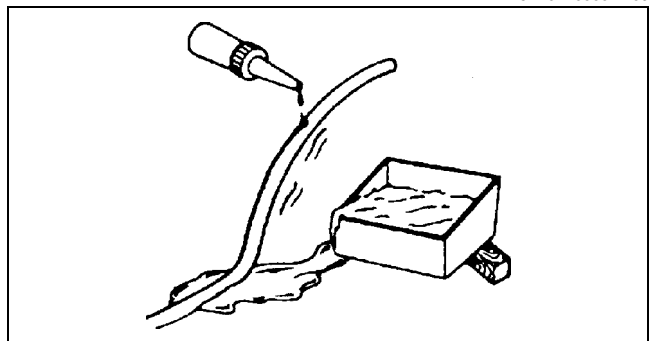


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RUBBER PARTS AND TUBING

- Prevent gasoline or oil from getting on rubber parts or tubing.

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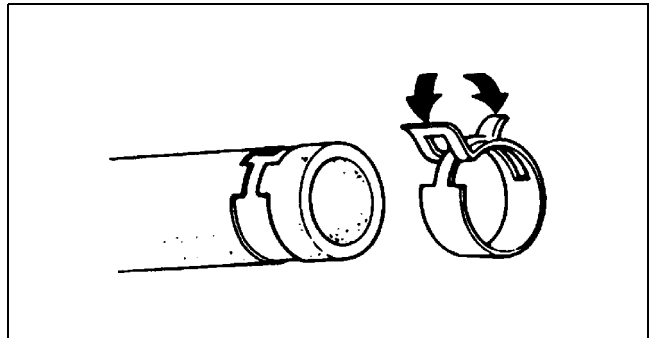


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HOSE CLAMPS

- When reinstalling, position the hose clamp in the original location on the hose and squeeze the clamp lightly with large pliers to ensure a good fit.

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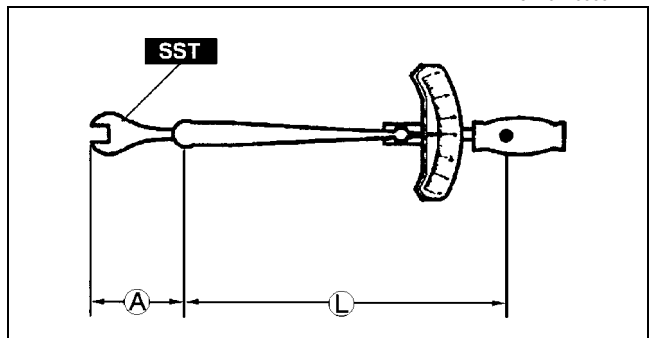
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TORQUE FORMULAS

- When using a torque wrench-SST or equivalent combination, the written torque must be recalculated due to the extra length that the SST or equivalent adds to the torque wrench. Recalculate the torque using the following formulas. Choose the formula that applies to you.

Torque Unit	Formula
N·m	$N \cdot m \times [L/(L+A)]$
kgf·m	$kgf \cdot m \times [L/(L+A)]$
kgf·cm	$kgf \cdot cm \times [L/(L+A)]$
ft·lbf	$ft \cdot lbf \times [L/(L+A)]$
in·lbf	$in \cdot lbf \times [L/(L+A)]$

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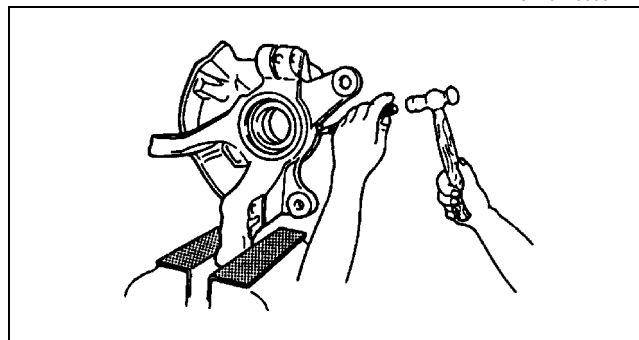
A : The length of the **SST** past the torque wrench drive
L : The length of the torque wrench

FUNDAMENTAL PROCEDURES, ELECTRICAL SYSTEM

WISE

- When using a vise, put protective plates in the jaws of the vise to prevent damage to parts.

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ELECTRICAL SYSTEM

CONNECTORS

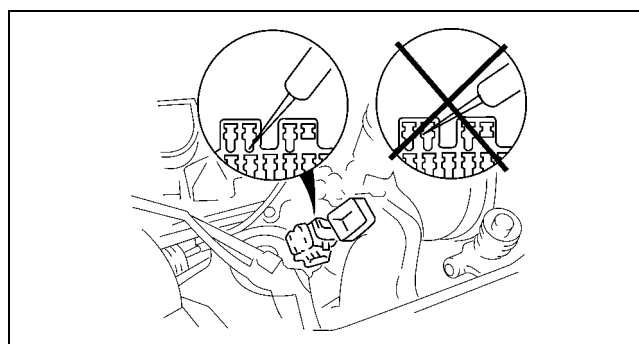
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Data Link Connector

- Insert the probe into the service hole when connecting a jumper wire to the data link connector.

Caution

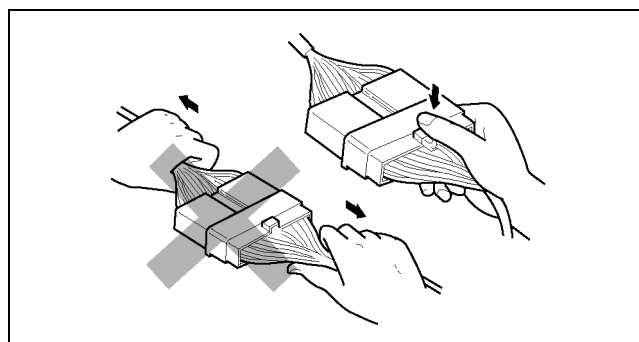
- Inserting a jumper wire probe into the data link connector terminal may damage the terminal.



X3U000WAY

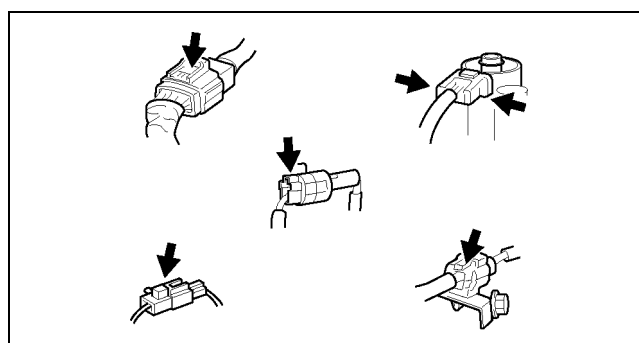
Disconnecting Connectors

- When disconnecting connector, grasp the connectors, not the wires.



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- Connectors can be disconnected by pressing or pulling the lock lever as shown.

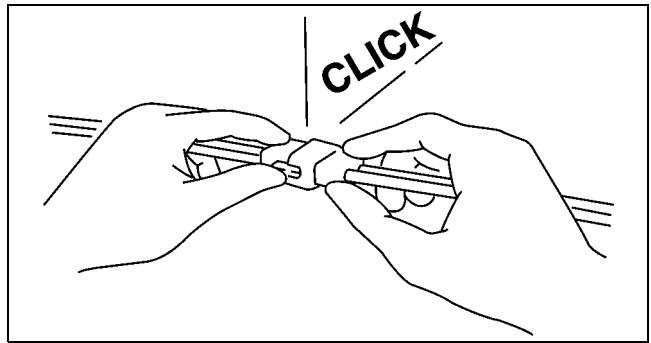


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ELECTRICAL SYSTEM

Locking Connector

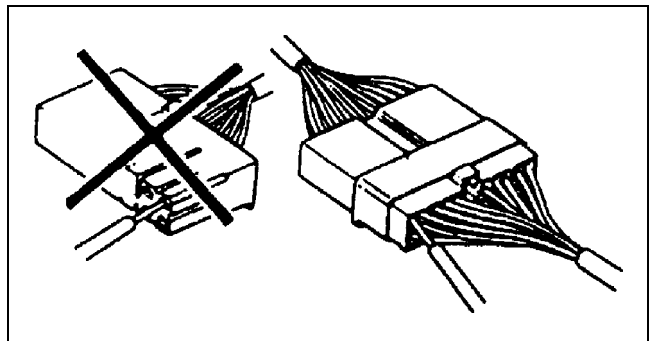
- When locking connectors, listen for a click indicating they are securely locked.



X3U000WB1

Inspection

- When a tester is used to inspect for continuity or measuring voltage, insert the tester probe from the wiring harness side.

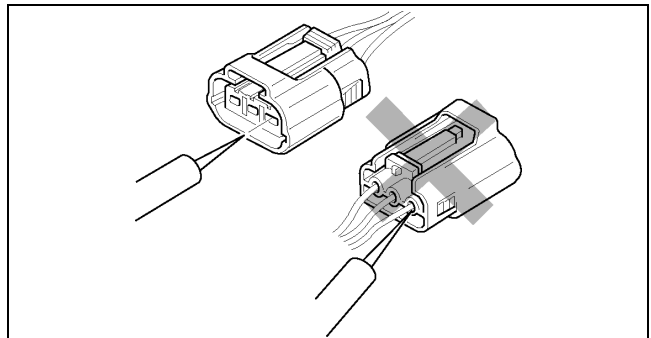


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- Inspect the terminals of waterproof connectors from the connector side since they cannot be accessed from the wiring harness side.

Caution

- To prevent damage to the terminal, wrap a thin wire around the tester probe before inserting into terminal.

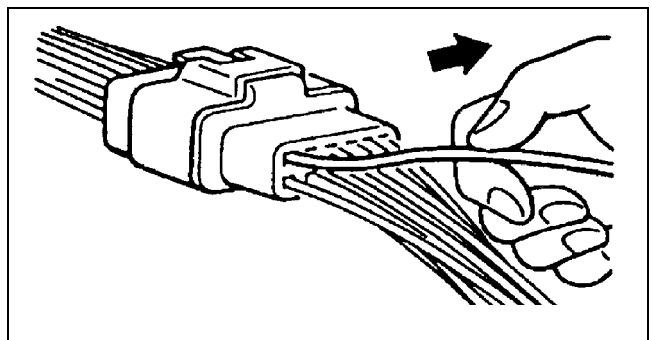


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Terminals

Inspection

- Pull lightly on individual wires to verify that they are secured in the terminal.

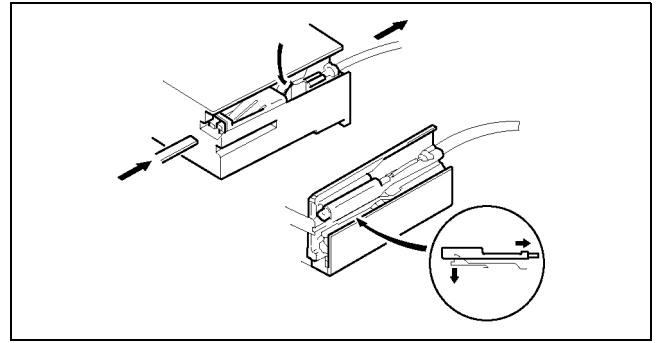


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ELECTRICAL SYSTEM

Replacement

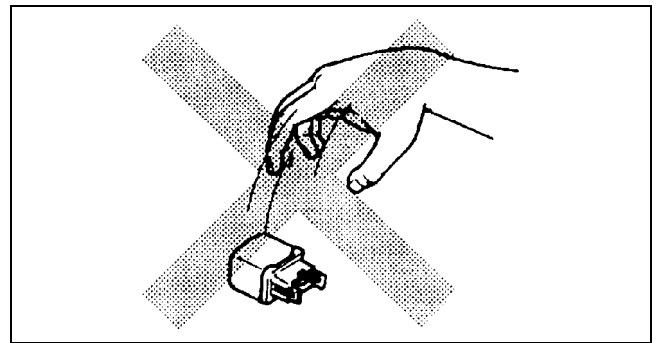
- Use the appropriate tools to remove a terminal as shown. When installing a terminal, be sure to insert it until it locks securely.
- Insert a thin piece of metal from the terminal side of the connector and with the terminal locking tab pressed down, pull the terminal out from the connector.



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Sensors, Switches, and Relays

- Handle sensors, switches, and relays carefully. Do not drop them or strike them against other objects.



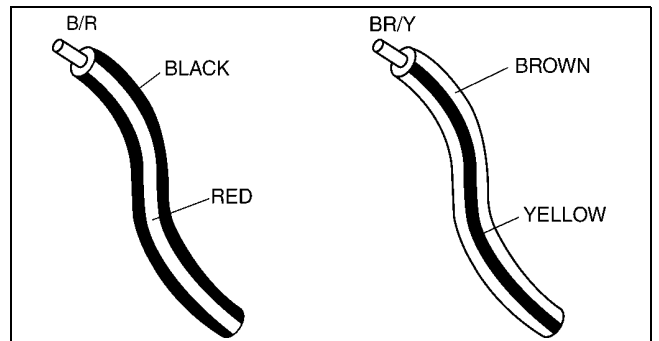
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Wiring Harness

Wiring color codes

- Two-color wires are indicated by a two-color code symbol.
- The first letter indicates the base color of the wire and the second the color of the stripe.

CODE	COLOR	CODE	COLOR
B	Black	O	Orange
BR	Brown	P	Pink
G	Green	R	Red
GY	Gray	V	Violet
L	Blue	W	White
LB	Light Blue	Y	Yellow
LG	Light Green		



X3U000WB7

NEW STANDARDS

NEW STANDARDS

NEW STANDARDS TABLE

A6E202800020M01

- Following is a comparison of the previous standard and the new standard.

New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
AP	Accelerator Pedal	—	Accelerator Pedal	
ACL	Air Cleaner	—	Air Cleaner	
A/C	Air Conditioning	—	Air Conditioning	
BARO	Barometric Pressure	—	Atmospheric Pressure	
B+	Battery Positive Voltage	V _B	Battery Voltage	
—	Brake Switch	—	Stoplight Switch	
—	Calibration Resistor	—	Corrected Resistance	#6
CMP sensor	Camshaft Position Sensor	—	Crank Angle Sensor	
CAC	Charge Air Cooler	—	Intercooler	
CLS	Closed Loop System	—	Feedback System	
CTP	Closed Throttle Position	—	Fully Closed	
CPP	Clutch Pedal Position	—	Idle Switch	
CIS	Continuous Fuel Injection System	—	Clutch Position	
CS sensor	Control Sleeve Sensor	CSP sensor	Control Sleeve Position Sensor	#6
CKP sensor	Crankshaft Position Sensor	—	Crank Angle Sensor 2	
DLC	Data Link Connector	—	Diagnosis Connector	
DTM	Diagnostic Test Mode	—	Test Mode	#1
DTC	Diagnostic Trouble Code(s)	—	Service Code(s)	
DI	Distributor Ignition	—	Spark Ignition	
DLI	Distributorless Ignition	—	Direct Ignition	
EI	Electronic Ignition	—	Electronic Spark Ignition	#2
ECT	Engine Coolant Temperature	—	Water Thermo	
EM	Engine Modification	—	Engine Modification	
—	Engine Speed Input Signal	—	Engine RPM Signal	
EVAP	Evaporative Emission	—	Evaporative Emission	
EGR	Exhaust Gas Recirculation	—	Exhaust Gas Recirculation	
FC	Fan Control	—	Fan Control	
FF	Flexible Fuel	—	Flexible Fuel	
4GR	Fourth Gear	—	Overdrive	
—	Fuel Pump Relay	—	Circuit Opening Relay	#3
FSO solenoid	Fuel Shut Off Solenoid	FCV	Fuel Cut Valve	#6
GEN	Generator	—	Alternator	
GND	Ground	—	Ground/Earth	
HO2S	Heated Oxygen Sensor	—	Oxygen Sensor	With heater
IAC	Idle Air Control	—	Idle Speed Control	
—	IDM Relay	—	Spill Valve Relay	#6
—	Incorrect Gear Ratio	—	—	
—	Injection Pump	FIP	Fuel Injection Pump	#6
—	Input/Turbine Speed Sensor	—	Pulse Generator	
IAT	Intake Air Temperature	—	Intake Air Thermo	
KS	Knock Sensor	—	Knock Sensor	
MIL	Malfunction Indicator Lamp	—	Malfunction Indicator Light	
MAP	Manifold Absolute Pressure	—	Intake Air Pressure	
MAF sensor	Mass Air Flow Sensor	—	Airflow Sensor	
MFL	Multiport Fuel Injection	—	Multiport Fuel Injection	
OBD	On-Board Diagnostic	—	Diagnosis/Self Diagnosis	
OL	Open Loop	—	Open Loop	

NEW STANDARDS

New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
—	Output Speed Sensor	—	Vehicle Speed Sensor 1	
OC	Oxidation Catalytic Converter	—	Catalytic Converter	
O2S	Oxygen Sensor	—	Oxygen Sensor	
PNP	Park/Neutral Position	—	Park/Neutral Range	
—	PCM Control Relay	—	Main Relay	#6
PSP	Power Steering Pressure	—	Power Steering Pressure	
PCM	Powertrain Control Module	ECU	Engine Control Unit	#4
—	Pressure Control Solenoid	—	Line Pressure Solenoid Valve	
PAIR	Pulsed Secondary Air Injection	—	Secondary Air Injection System	Pulsed injection
—	Pump Speed Sensor	—	NE Sensor	#6
AIR	Secondary Air Injection	—	Secondary Air Injection System	Injection with air pump
SAPV	Secondary Air Pulse Valve	—	Reed Valve	
SFI	Sequential Multipoint Fuel Injection	—	Sequential Fuel Injection	
—	Shift Solenoid A	—	1-2 Shift Solenoid Valve	
		—	Shift A Solenoid Valve	
—	Shift Solenoid B	—	2-3 Shift Solenoid Valve	
		—	Shift B Solenoid Valve	
—	Shift Solenoid C	—	3-4 Shift Solenoid Valve	
3GR	Third Gear	—	3rd Gear	
TWC	Three Way Catalytic Converter	—	Catalytic Converter	
TB	Throttle Body	—	Throttle Body	
TP sensor	Throttle Position Sensor	—	Throttle Sensor	
TCV	Timer Control Valve	TCV	Timing Control Valve	#6
TCC	Torque Converter Clutch	—	Lockup Position	
TCM	Transmission (Transaxle) Control Module	—	ECAT Control Unit	
—	Transmission (Transaxle) Fluid Temperature Sensor	—	ATF Thermosensor	
TR	Transmission (Transaxle) Range	—	Inhibitor Position	
TC	Turbocharger	—	Turbocharger	
VSS	Vehicle Speed Sensor	—	Vehicle Speed Sensor	
VR	Voltage Regulator	—	IC Regulator	
VAF sensor	Volume Air Flow Sensor	—	Air flow Sensor	
WUTWC	Warm Up Three Way Catalytic Converter	—	Catalytic Converter	#5
WOT	Wide Open Throttle	—	Fully Open	

#1 : Diagnostic trouble codes depend on the diagnostic test mode

#2 : Controlled by the PCM

#3 : In some models, there is a fuel pump relay that controls pump speed. That relay is now called the fuel pump relay (speed).

#4 : Device that controls engine and powertrain

#5 : Directly connected to exhaust manifold

#6 : Part name of diesel engine

ABBREVIATIONS

ABBREVIATIONS

ABBREVIATIONS TABLE

A6E203000011M01

SST	Special service tool
1st GR	First gear
2nd GR	Second gear
3rd GR	Third gear
4th GR	Forth gear
5th GR	Fifith gear

MANUAL TRANSAXLE

J

MANUAL TRANSAXLE	J-2
PRECAUTION.....	J-2
5TH GEAR THRUST CLEARANCE	
PREINSPECTION.....	J-2
5TH/REVERSE GEAR AND HOUSING PARTS	
DISASSEMBLY.....	J-3
5TH/REVERSE GEAR AND HOUSING PARTS	
INSPECTION.....	J-6
CLUTCH HOUSING AND TRANSAXLE CASE	
COMPONENTS DISASSEMBLY.....	J-8
PRIMARY SHAFT COMPONENTS	
PREINSPECTION.....	J-12
PRIMARY SHAFT COMPONENTS	
DISASSEMBLY.....	J-13
PRIMARY SHAFT COMPONENTS	
INSPECTION.....	J-14
PRIMARY SHAFT COMPONENTS	
ASSEMBLY.....	J-16
SECONDARY SHAFT COMPONENTS	
PREINSPECTION.....	J-18
SECONDARY SHAFT COMPONENTS	
DISASSEMBLY.....	J-20
SECONDARY SHAFT COMPONENTS	
INSPECTION.....	J-21
SECONDARY SHAFT COMPONENTS	
ASSEMBLY.....	J-24
DIFFERENTIAL PREINSPECTION.....	J-27
DIFFERENTIAL DISASSEMBLY.....	J-28
DIFFERENTIAL ASSEMBLY.....	J-29
BEARING PRELOAD ADJUSTMENT.....	J-30
CLUTCH HOUSING AND TRANSAXLE CASE	
COMPONENTS ASSEMBLY.....	J-36
5TH/REVERSE GEAR AND HOUSING PARTS	
ASSEMBLY.....	J-38

MANUAL TRANSAXLE

MANUAL TRANSAXLE

PRECAUTION

A6E511201029M01

1. Clean the transaxle exterior thoroughly using a steam cleaner or cleaning solvents before disassembly.

Warning

- Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eye wear whenever using compressed air.

Caution

- Cleaning sealed bearings using cleaning fluids or a steam cleaner can wash the grease out of the bearing.

2. Clean the removed parts using cleaning solvent, and dry them using compressed air.
3. Clean out all holes and passages using compressed air, and check that there are no obstructions.
4. Use a plastic hammer when disassembling the transaxle case and other light alloy metal parts.
5. Make sure each part is cleaned before assembling.
6. Coat all movable parts with the specified oil.
7. Replace parts whenever required.
8. Remove old sealant from contact surfaces before applying new sealant.
9. Assemble the parts within **10 minutes** after applying sealant. Allow all sealant to cure at least **30 minutes** after assembly before filling the transaxle with transaxle oil.

Warning

- Although the stand has a self-locking brake system, there is a possibility that the brake may not hold when the transaxle is held in a lopsided position on the stand. This would cause the transaxle to turn suddenly, causing serious injury. Never keep the transaxle tilted to one side. Always hold the rotating handle firmly when turning the transaxle.

5TH GEAR THRUST CLEARANCE PREINSPECTION

A6E511201029M02

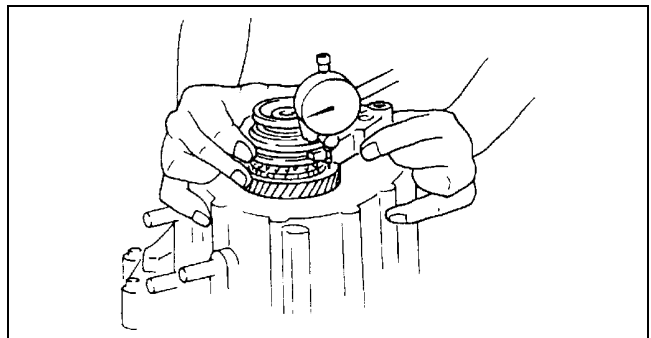
1. Remove the rear cover.
2. Measure the 5th gear thrust clearance using a dial indicator.
 - If the clearance exceeds the maximum, check the contact surfaces of 5th gear and the clutch hub. Replace worn or damaged parts.

Clearance

0.100—0.220 mm {0.0040—0.0086 in}

Maximum

0.270 mm {0.0106 in}



Z4F5112M001

MANUAL TRANSAXLE

5TH/REVERSE GEAR AND HOUSING PARTS DISASSEMBLY

A6E511201029M03

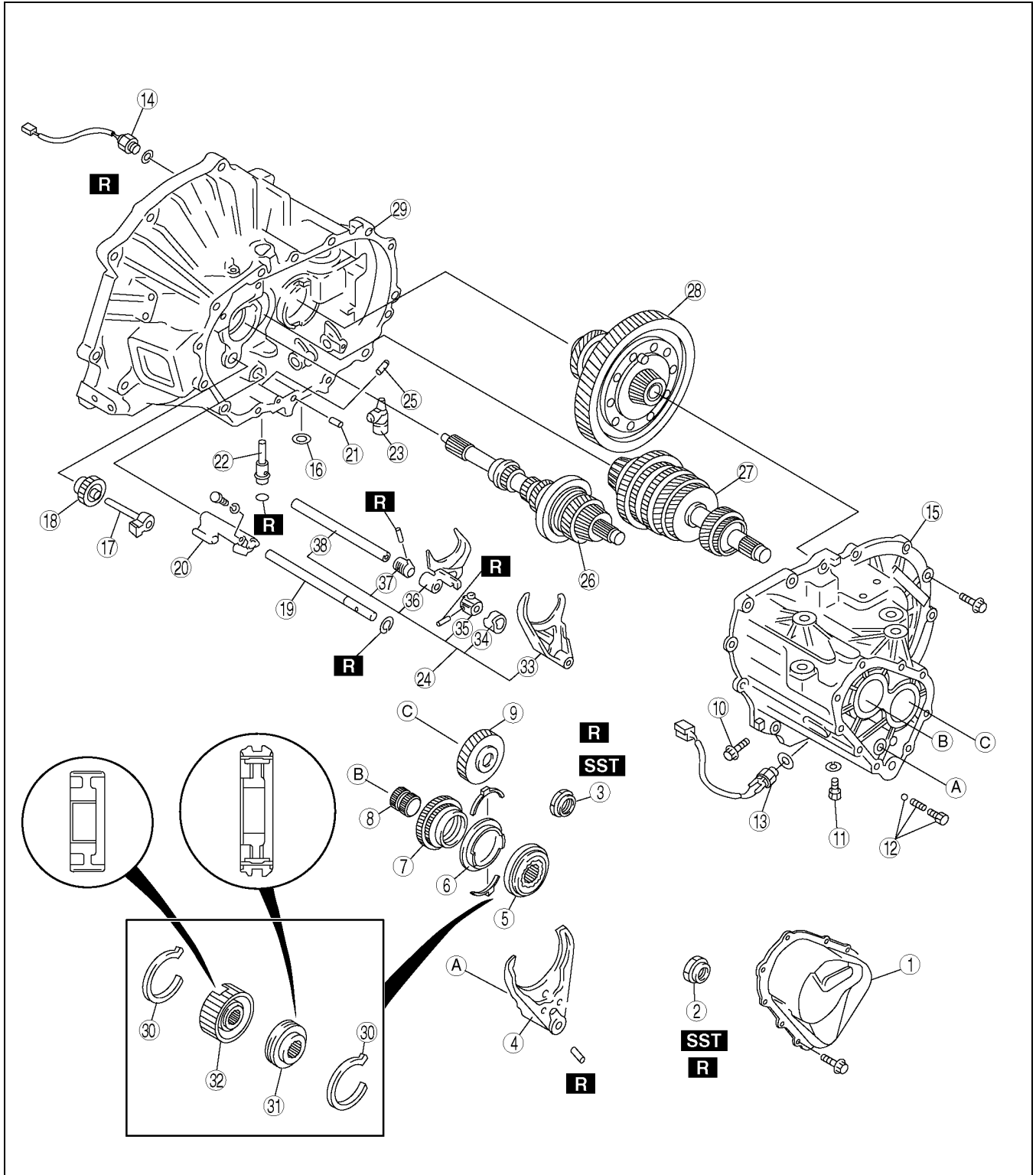
1. Disassemble in the order shown in the figure.

Caution

- If any old sealant gets into the transaxle during installation of the transaxle case, trouble may occur in the transaxle. Remove any old sealant from the transaxle case and clutch housing, and with cleaning fluids.

J

MANUAL TRANSAXLE



A6E5112M117

1	Rear cover
2	Locknut (primary shaft) (See J-5 Locknut Disassembly Note)
3	Locknut (secondary shaft) (See J-5 Locknut Disassembly Note)
4	5th/reverse shift fork
5	5th/reverse clutch hub component
6	5th synchronizer ring
7	5th gear

8	Gear sleeve
9	Secondary 5th gear
10	Lock bolt
11	Guide bolt
12	Lock bolt, ball, and spring
13	Back-up light switch
14	Neutral switch
15	Transaxle case component
16	Magnet

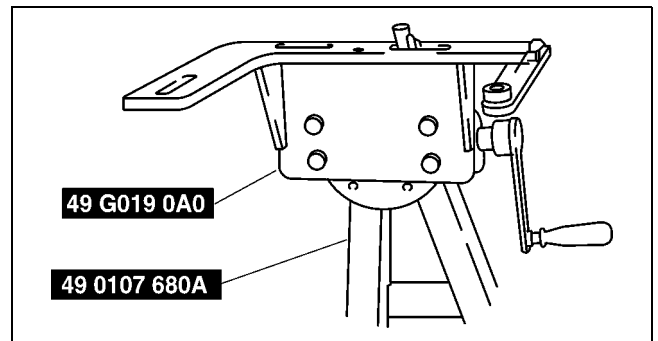
MANUAL TRANSAXLE

17	Reverse idler shaft
18	Reverse idler gear
19	5th/reverse shift rod
20	5th/reverse shift rod end
21	Pin
22	Crank lever shaft
23	Crank lever component
24	Shift fork and shift rod component (See J-5 Shift Fork and Shift Rod Component Disassembly Note)
25	Push pin
26	Primary shaft gear component

27	Secondary shaft gear component
28	Differential component
29	Clutch housing
30	Synchronizer key springs
31	Clutch hub sleeve
32	Clutch hub
33	3rd/4th shift fork
34	Interlock sleeve
35	Control lever
36	1st/2nd shift fork
37	Control end
38	Control rod

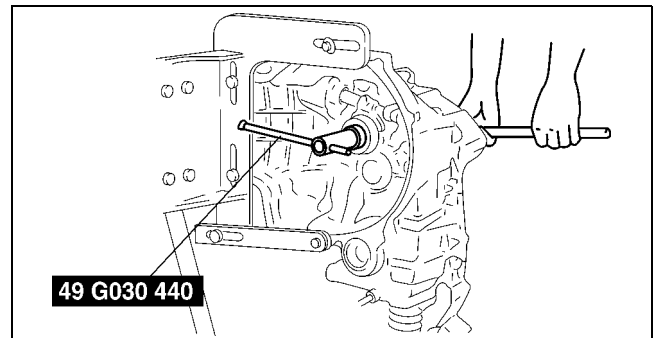
Locknut Disassembly Note

1. Assemble the **SST**.
2. Lift the transaxle and mount it on the **SST**.



A6E5112M108

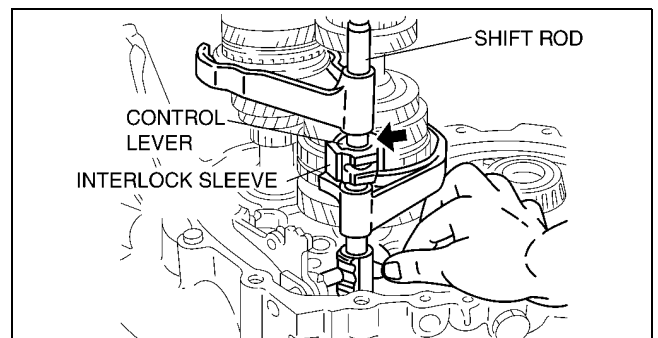
3. Lock the primary shaft with the **SST**.
4. Shift to 1st gear to lock the rotation of the primary shaft.
5. Bend back the caulking of locknuts using a chisel.
6. Remove the locknuts from the primary and secondary shafts.



Z4F5112M004

Shift Fork and Shift Rod Component Disassembly Note

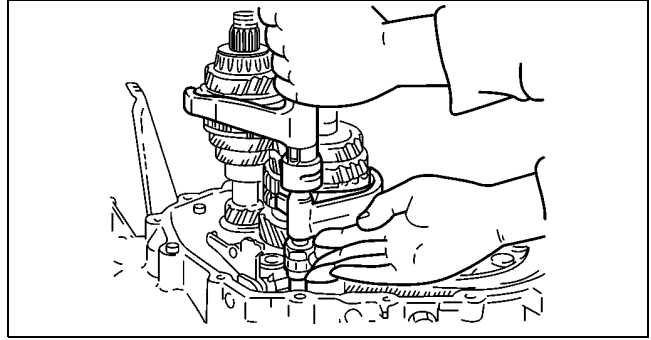
1. Align the ends of the interlock sleeve and of the control lever (arrow). Turn the shift rod counterclockwise.
2. While holding the 1st/2nd shift fork with one hand and the 3rd/4th shift fork with the other, raise them both at the same time and shift each of the clutch hub sleeves.



Z4F5112M005

MANUAL TRANSAXLE

3. Lift the control end and remove the steel, and at the same time, remove the control rod from the clutch housing.
4. Separate the shift rod and shift fork component from each of the clutch hub sleeves.



A6E5112M006

5TH/REVERSE GEAR AND HOUSING PARTS INSPECTION

5th and Reverse Gear Inspection

A6E511201029M04

1. Inspect the synchronizer cones for wear.
 - If there is malfunction, replace parts as necessary.
2. Inspect the gear teeth for damage, wear, and cracks.
 - If there is malfunction, replace parts as necessary.
3. Inspect the synchronizer ring matching teeth for damage and wear.
 - If there is malfunction, replace the synchronizer ring.

Synchronizer Ring Inspection

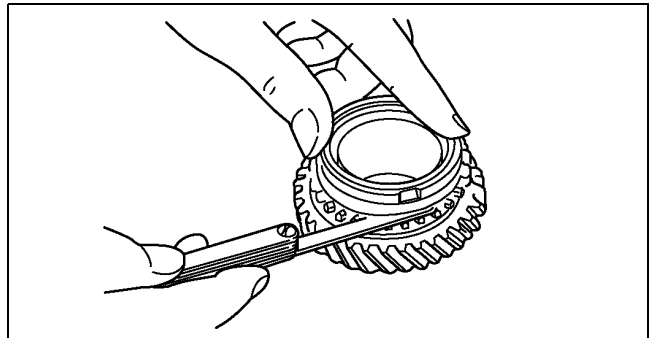
1. Inspect the synchronizer ring teeth for damage, wear, and cracks.
 - If there is malfunction, replace parts as necessary.
2. Inspect the tapered surface for wear and cracks.
 - If there is malfunction, replace parts as necessary.
3. Measure the clearance between the synchronizer ring and the flank surface of the gear.
 - If not as specified, replace the synchronizer ring.

Note

- Set the synchronizer ring squarely in the gear; then measure around the circumference.

Standard clearance
1.50 mm {0.059 in}

Minimum
0.80 mm {0.031 in}



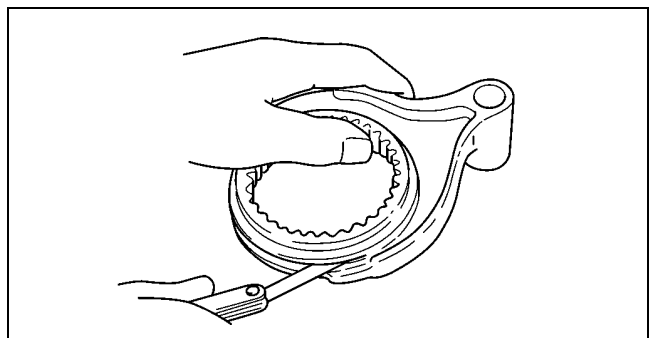
A6E5112M118

Clutch Hub Component Inspection

1. Inspect the clutch hub sleeve and hub operation.
 - If there is malfunction, replace parts as necessary.
2. Inspect the gear teeth for damage, wear, and cracks.
 - If there is malfunction, replace parts as necessary.
3. Inspect the synchronizer keys for damage, wear, and cracks.
 - If there is malfunction, replace parts as necessary.
4. Measure the clearance between the hub sleeve and shift fork.
 - If the clearance exceeds the maximum, replace the hub sleeve and shift fork as a set.

Standard clearance
0.10—0.36 mm {0.004—0.014 in}

Maximum clearance
0.86 mm {0.034 in}



A6E5112M008

MANUAL TRANSAXLE

Reverse Idle Gear and Reverse Lever Inspection

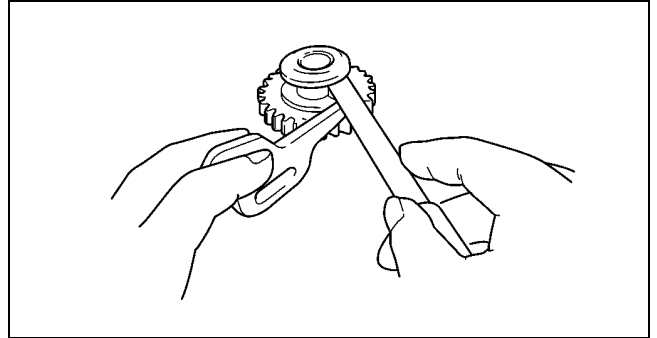
1. Inspect the gear teeth for damage, wear, and cracks.
 - If there is malfunction, replace the reverse idle gear.
2. Measure the clearance between the reverse idle gear bushing and the reverse lever.
 - If not as specified, replace as necessary.

Standard clearance

0.10—0.35 mm {0.004—0.013 in}

Maximum Clearance

0.85 mm {0.033 in}



A6E5112M009

5th Gear and Sleeve Inspection

1. Measure the clearance between the 5th gear and the Sleeve.
 - If not as specified, replace parts as necessary.

5th gear inner diameter

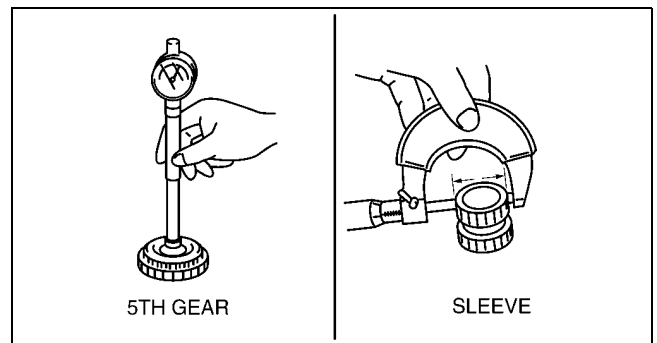
34.000—34.025 mm {1.3386—1.3395 in}

Sleeve outer diameter

33.945—33.970 mm {1.3365—1.3373 in}

Clearance

0.030—0.080 mm {0.0012—0.0031 in}



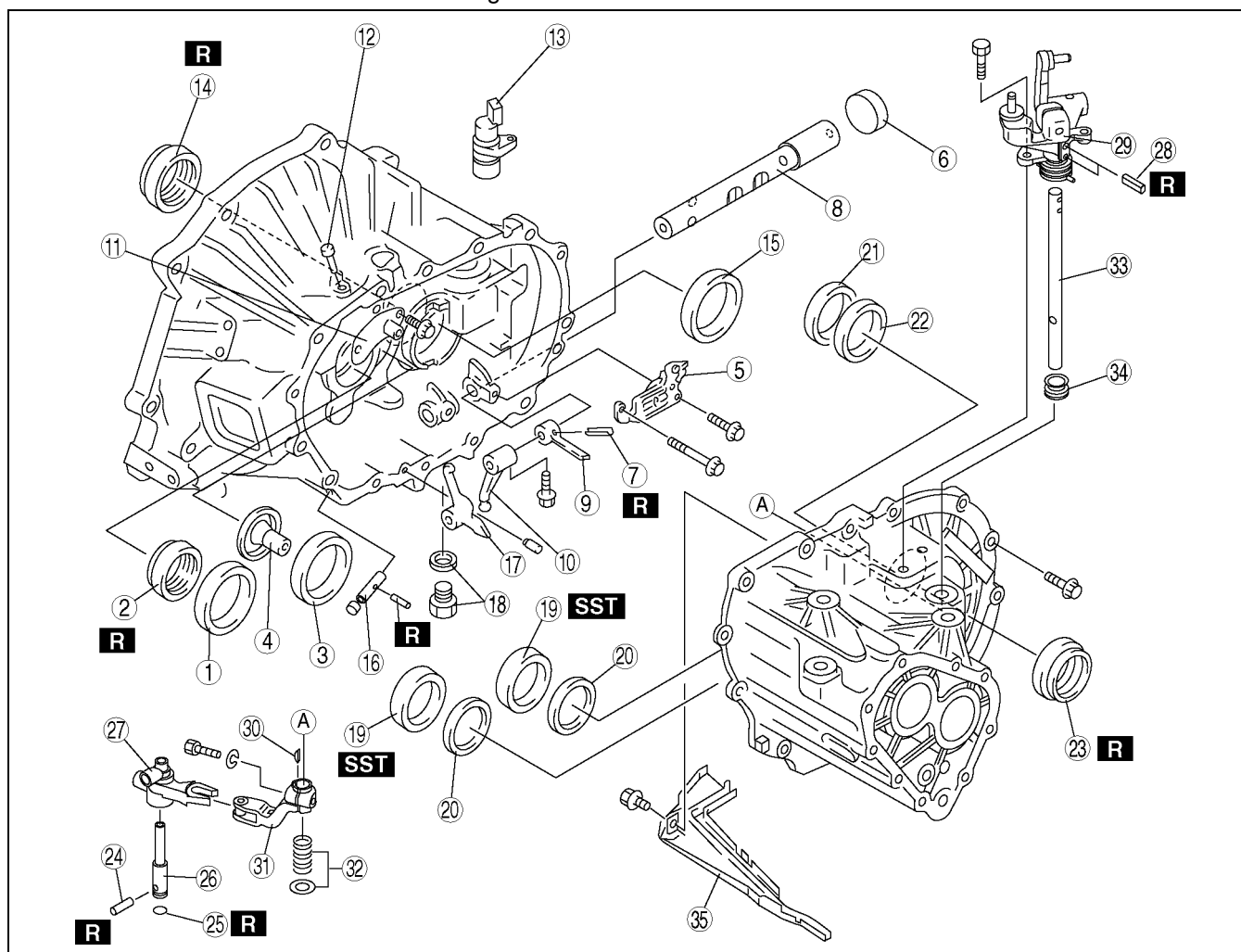
Z4F5112M010

MANUAL TRANSAXLE

CLUTCH HOUSING AND TRANSAXLE CASE COMPONENTS DISASSEMBLY

A6E511217010M01

1. Disassemble in the order shown in the figure.



A6E5112M113

1	Bearing race (primary shaft)
2	Oil seal (primary shaft) (See J-9 Oil Seal (Primary Shaft) Disassembly Note)
3	Bearing race (secondary shaft) (See J-9 Bearing Race (Secondary Shaft) Disassembly Note)
4	Funnel
5	Guide plate component
6	Sealing cap
7	Roll pin (See J-9 Roll Pin Disassembly Note)
8	Control rod (See J-9 Control Rod Disassembly Note)
9	Selector
10	Change arm
11	Bleather cover component
12	Bleather
13	Hole cover
14	Oil seal (differential) (See J-10 Oil Seal (Differential) Disassembly Note)
15	Bearing race (differential) (See J-11 Bearing Race (Differential) Disassembly Note)

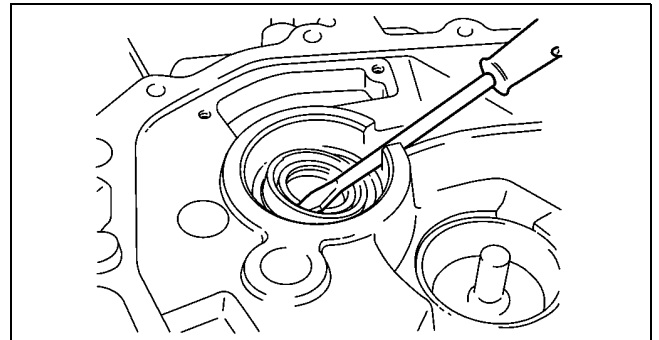
16	Reverse lever shaft
17	Reverse lever
18	Drain plug and washer
19	Bearing race (transaxle case) (See J-11 Bearing Race (Transaxle Case) Disassembly Note)
20	Adjustment shim(s)
21	Bearing race (differential) (See J-11 Bearing Race (Differential) Disassembly Note)
22	Adjustment shim(s)
23	Oil seal (differential) (See J-10 Oil Seal (Differential) Disassembly Note)
24	Dowel pin
25	O-ring
26	Crank lever shaft
27	Clank component lever
28	Roll pin
29	Shift lever component
30	Key
31	Control end
32	Spring and washer
33	Shift lever shaft

MANUAL TRANSAXLE

34	Boots
35	Oil passage

Oil Seal (Primary Shaft) Disassembly Note

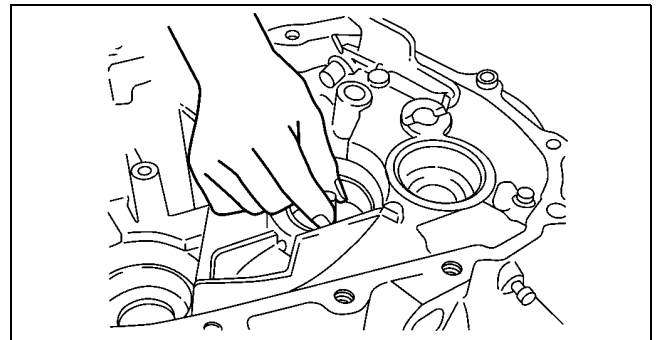
1. Remove the oil seal using screwdriver.



A6E5112M012

Bearing Race (Secondary Shaft) Disassembly Note

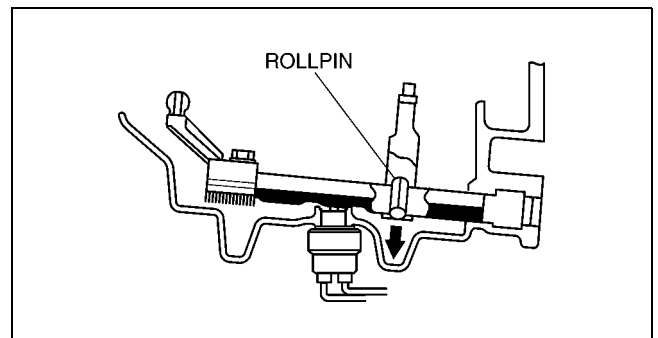
1. Remove the bearing race by lifting it and the funnel out together.



A6E5112M013

Roll Pin Disassembly Note

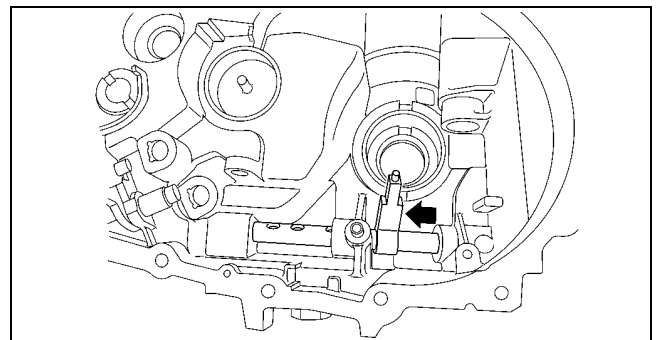
1. Align the groove for removal of the clutch housing pin with the position of the roll pin, then tap the pin out using a pin punch.



Z4F5112M014

Control Rod Disassembly Note

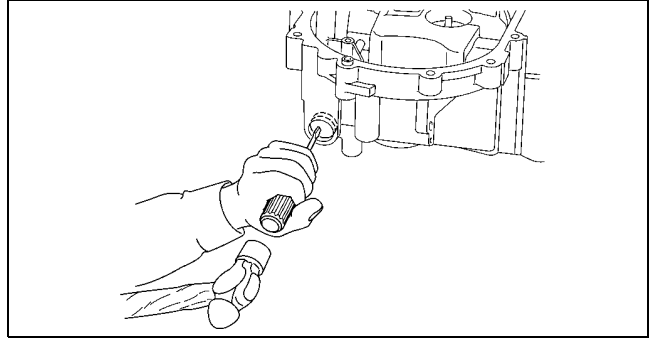
1. Move the control rod in the direction of arrow.



A6E5112M005

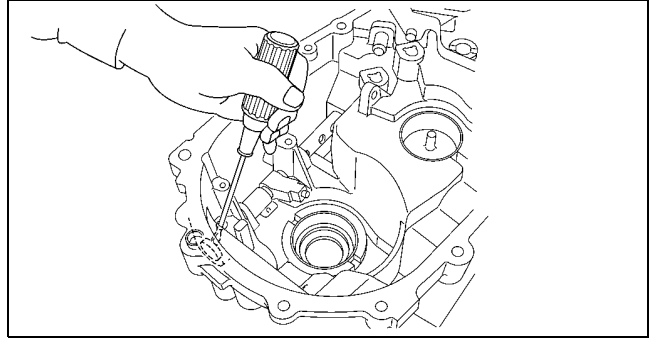
MANUAL TRANSAXLE

2. Using a flathead screwdriver and hammer, make a hole on the cap.



A6E5112M106

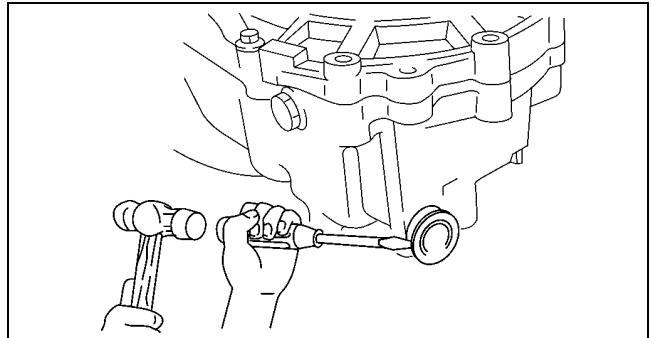
3. Pthe seal cap off, putting the flathead screwdriver into the hole, made in Step 2, from the inside of the transmission.



A6E5112M107

Oil Seal (Change Rod Component) Disassembly Note

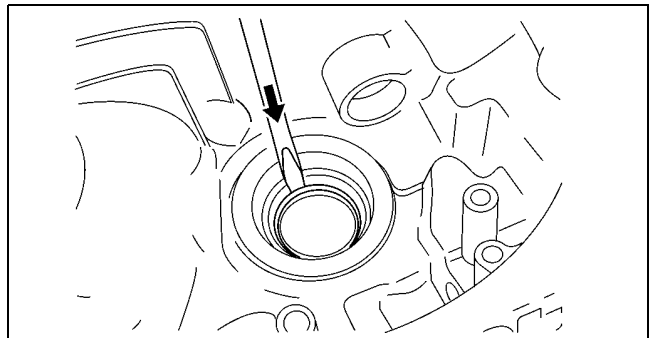
1. Remove the oil seal using the screwdriver.



A6E5112M015

Oil Seal (Differential) Disassembly Note

1. Remove the oil seal using the screwdriver.

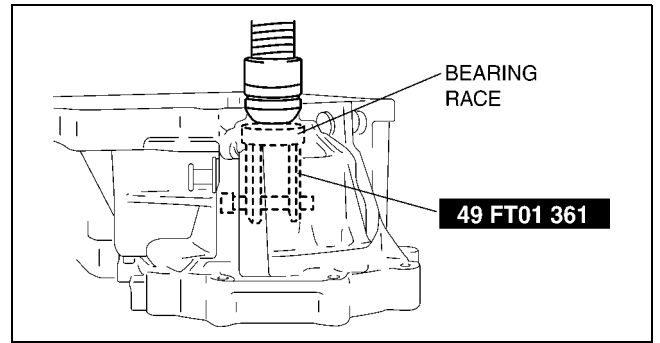


A6E5112M016

MANUAL TRANSAXLE

Bearing Race (Differential) Disassembly Note

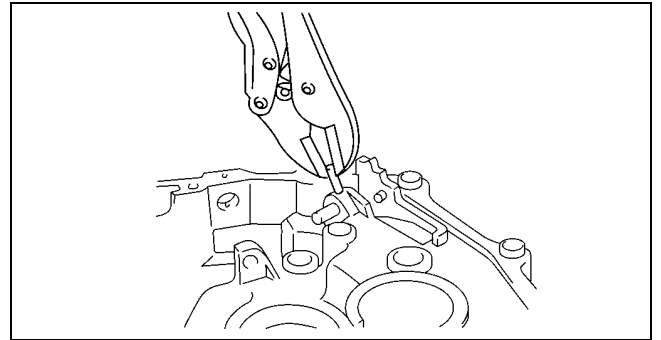
1. Remove the bearing outer race using the **SST**.



Z4F5112M017

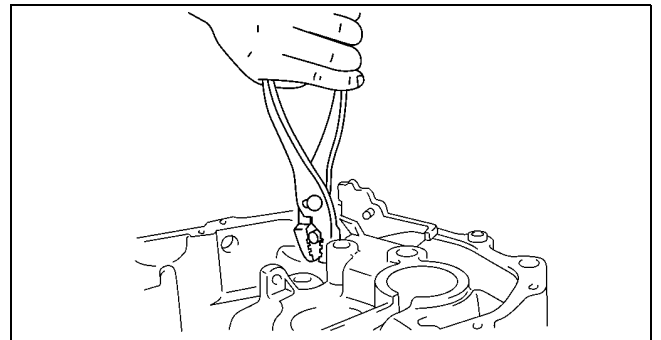
Reverse Lever Shaft Disassembly Note

1. Remove the roll pin using pliers.



A6E5112M018

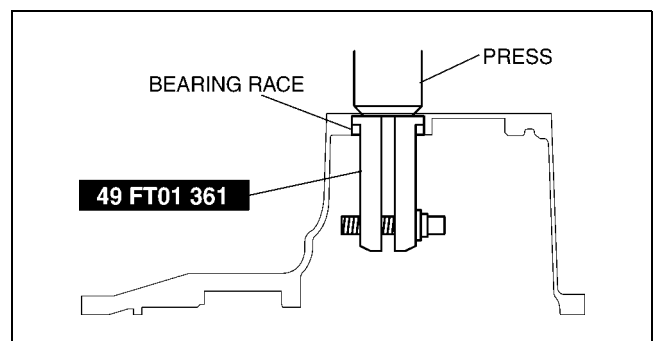
2. Protect the reverse lever shaft with a rag and use pliers to remove the shaft.



A6E5112M019

Bearing Race (Transaxle Case) Disassembly Note

1. Remove the bearing race using the **SST**.



Z4F5112M020

MANUAL TRANSAXLE

PRIMARY SHAFT COMPONENTS PREINSPECTION

A6E511217201M01

3rd Gear Thrust Clearance

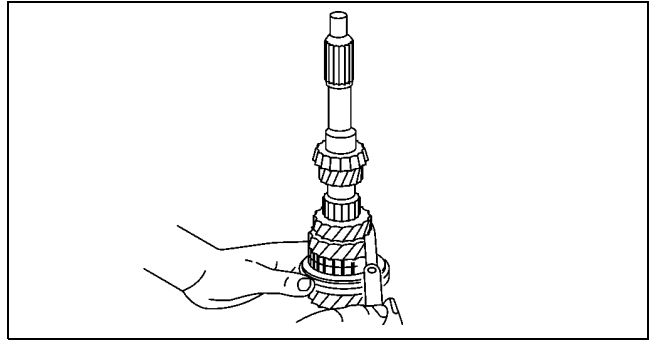
1. Measure the clearance between 3rd gear and 2nd gear.
 - If the clearance exceeds the maximum, check the contact surfaces of the 3rd gear, 2nd gear and 3rd/4th clutch hub. Replace worn and damaged parts.

Clearance

0.05—0.20 mm {0.002—0.007 in}

Maximum

0.25 mm {0.010 in}



A6E5112M021

4th Gear Thrust Clearance

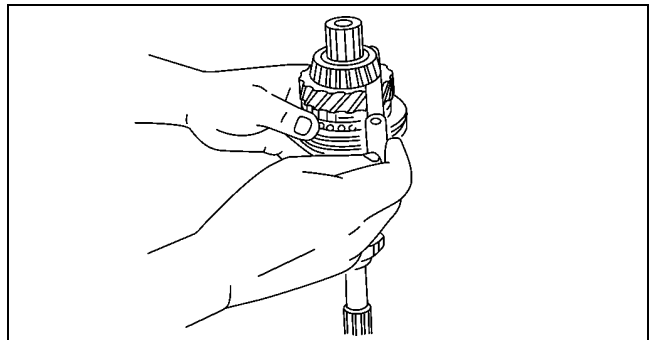
1. Measure the clearance between 4th gear and the bearing.
 - If the clearance exceeds the maximum, check the contact surfaces of the 4th gear, bearing, and 3rd/4th clutch hub. Replace worn and damaged parts.

Clearance

0.17—0.37 mm {0.007—0.014 in}

Maximum

0.42 mm {0.017 in}



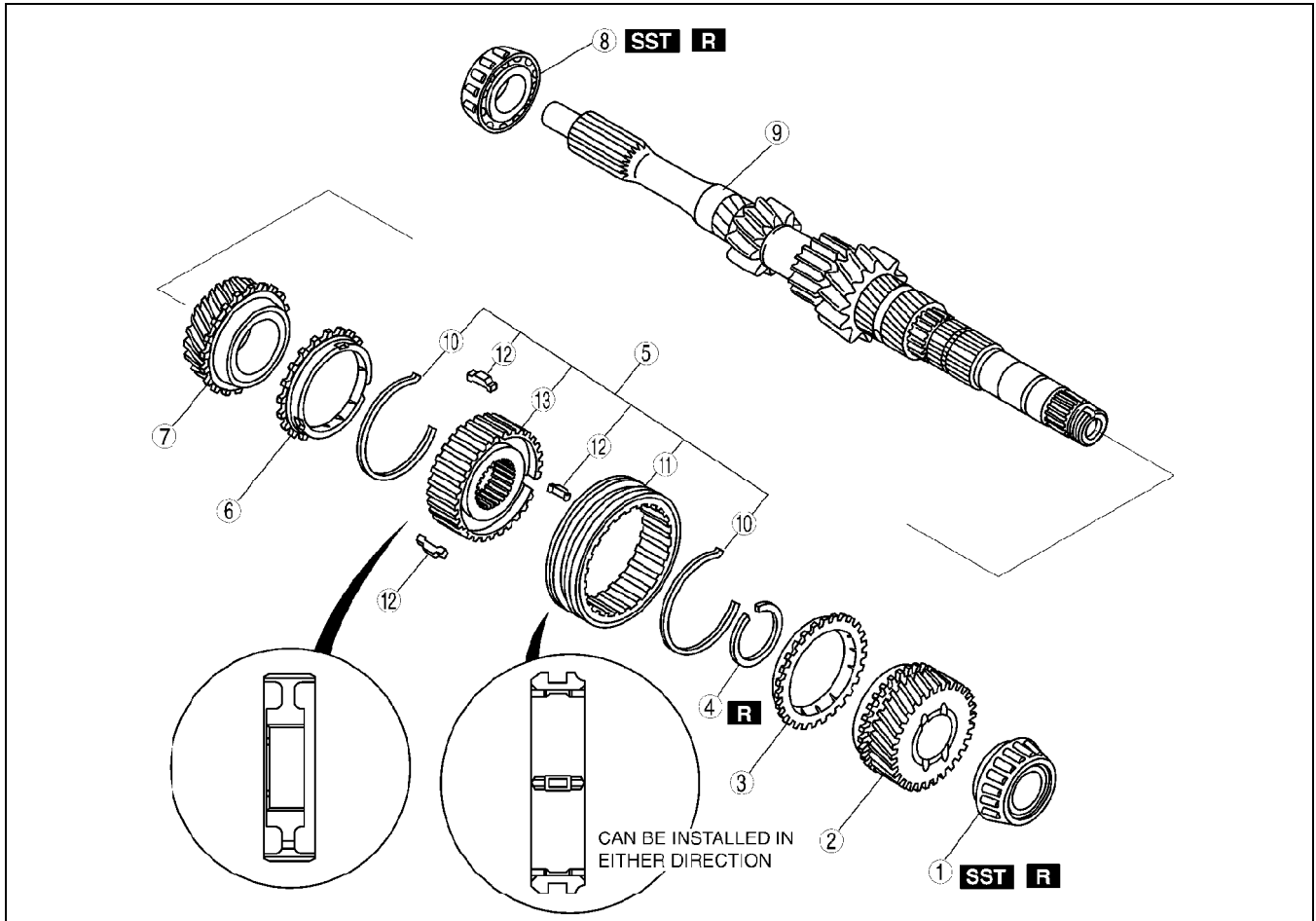
A6E5112M022

MANUAL TRANSAXLE

PRIMARY SHAFT COMPONENTS DISASSEMBLY

A6E511217201M02

1. Disassemble in the order shown in the figure.



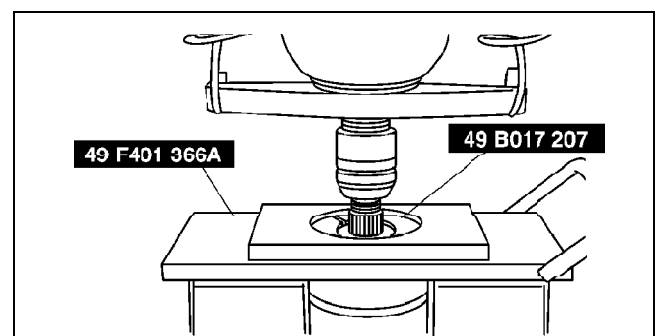
Z4F5112M023

1	Bearing (4th gear end) (See J-13 Bearing (4th Gear End) Disassembly Note)
2	4th gear
3	4th synchronizer ring
4	Retaining ring
5	3rd/4th clutch hub component (See J-14 3rd/4th Clutch Hub Component, 3rd Synchronizer Ring and 3rd Gear Disassembly Note)
6	3rd synchronizer ring (See J-14 3rd/4th Clutch Hub Component, 3rd Synchronizer Ring and 3rd Gear Disassembly Note)

7	3rd gear (See J-14 3rd/4th Clutch Hub Component, 3rd Synchronizer Ring and 3rd Gear Disassembly Note)
8	Bearing (primary shaft end) (See J-14 Bearing (Primary Shaft End) Disassembly Note)
9	Primary shaft gear
10	Synchronizer key springs
11	3rd/4th clutch hub sleeve
12	Synchronizer keys
13	3rd/4th clutch hub

Bearing (4th Gear End) Disassembly Note

1. Remove the bearing using the SST.

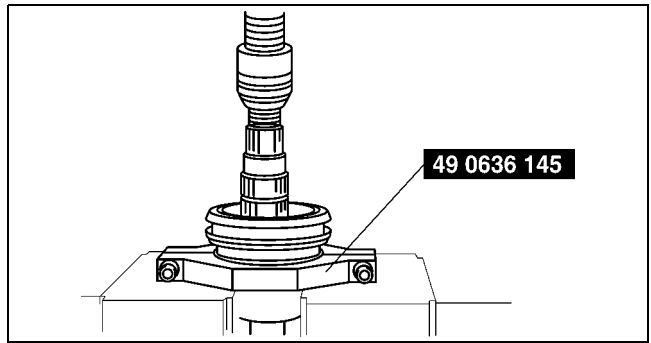


Z4F5112M024

MANUAL TRANSAXLE

3rd/4th Clutch Hub Component, 3rd Synchronizer Ring and 3rd Gear Disassembly Note

1. Remove the retaining ring.
2. Remove the 3rd/4th clutch hub component, 3rd synchronizer ring, and 3rd gear using the **SST**.



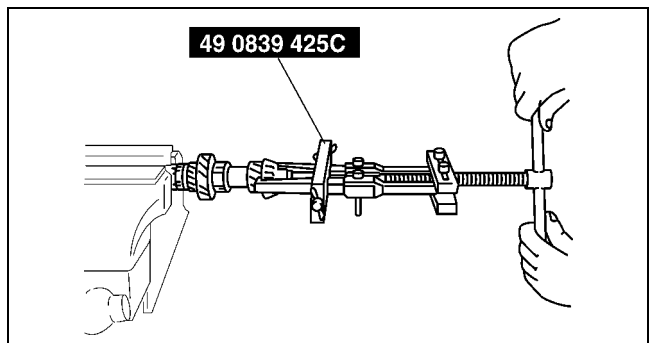
Z4F5112M025

Bearing (Primary Shaft End) Disassembly Note

1. Remove the bearing using the **SST**.

Caution

- Use protective plates in the vise to prevent damage to the primary shaft gear.



Z4F5112M026

PRIMARY SHAFT COMPONENTS INSPECTION

A6E511217201M03

4th Gear, 3rd Gear Inspection

1. Inspect the synchronizer cones for wear.
 - If there is malfunction, replace parts as necessary.
2. Inspect the gear teeth for damage, wear, and cracks.
 - If there is malfunction, replace parts as necessary.
3. Inspect the synchronizer ring matching teeth for damage and wear.
 - If there is malfunction, replace the synchronizer ring.

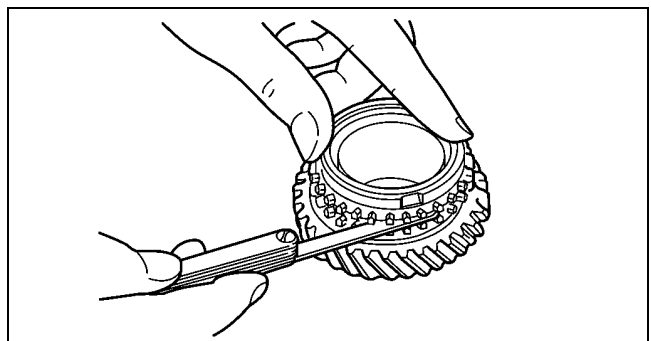
4th Synchronizer Ring, 3rd Synchronizer Ring Inspection

1. Inspect the synchronizer ring teeth for damage, wear, and cracks.
 - If there is malfunction, replace parts as necessary.
2. Inspect the tapered surface for wear and cracks.
 - If there is malfunction, replace parts as necessary.
3. Measure the clearance between the synchronizer ring and the flank surface of the gear.
 - If not as specified, replace the synchronizer ring.

Note

- Set the synchronizer ring squarely in the gear; then measure around the circumference.

Standard clearance
1.50 mm {0.059 in}
Minimum
0.80 mm {0.031 in}



A6E5112M027

MANUAL TRANSAXLE

3rd/4th Clutch Hub Component Inspection

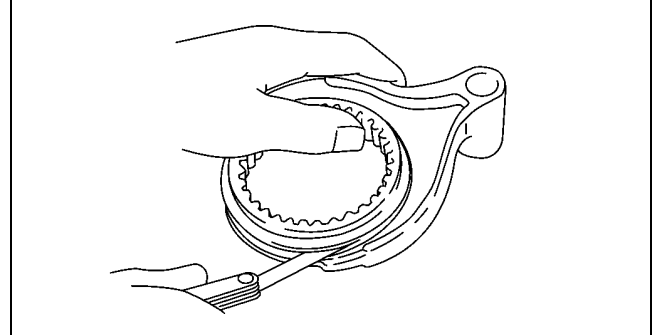
1. Inspect the clutch hub sleeve and hub operation.
 - If there is malfunction, replace parts as necessary.
2. Inspect the gear teeth for damage, wear, and cracks.
 - If there is malfunction, replace parts as necessary.
3. Inspect the synchronizer keys for damage, wear, and cracks.
 - If there is malfunction, replace parts as necessary.
4. Measure the clearance between the hub sleeve and shift forks.
 - If the clearance exceeds the maximum, replace the hub sleeve and shift fork as a set.

Standard

0.10—0.40 mm {0.004—0.015 in}

Maximum

0.90 mm {0.035 in}



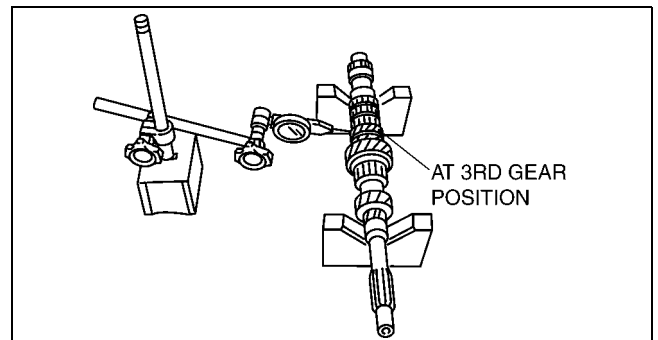
A6E5112M028

Primary Shaft Gear Inspection

1. Inspect the gear contact surface for damage and wear.
 - If there is malfunction, replace the primary shaft.
2. Inspect the splines for damage and wear.
 - If there is malfunction, replace the primary shaft.
3. Inspect the gear teeth for damage, wear, and cracks.
 - If there is malfunction, replace the primary shaft.
4. Inspect the oil passage for clogging.
 - If there is malfunction, replace the primary shaft.
5. Measure the shaft gear runout.
 - If not as specified, replace the primary shaft.

Primary shaft runout

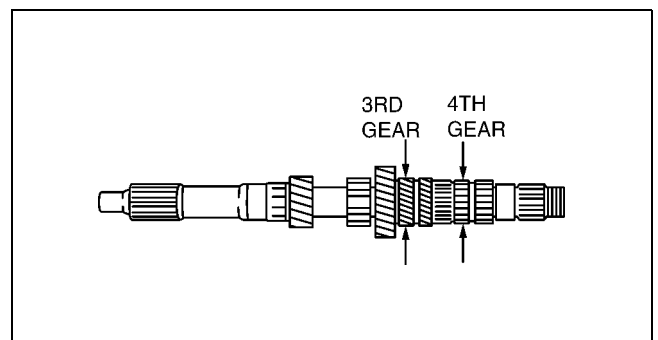
0.050 mm {0.0020 in} max.



Z4F5112M029

6. Measure the clearance between the shaft gears and the gears.
 - If not as specified, replace parts as necessary.

Gear	Shaft (Outer dia.)	Gear (Inner dia.)	Clearance
3rd	35.945—35.970 {1.415—1.416}	36.000—36.025 {1.417—1.418}	0.030—0.080 {0.001—0.003}
4th	30.945—30.970 {1.218—1.219}	31.000—31.025 {1.220—1.221}	



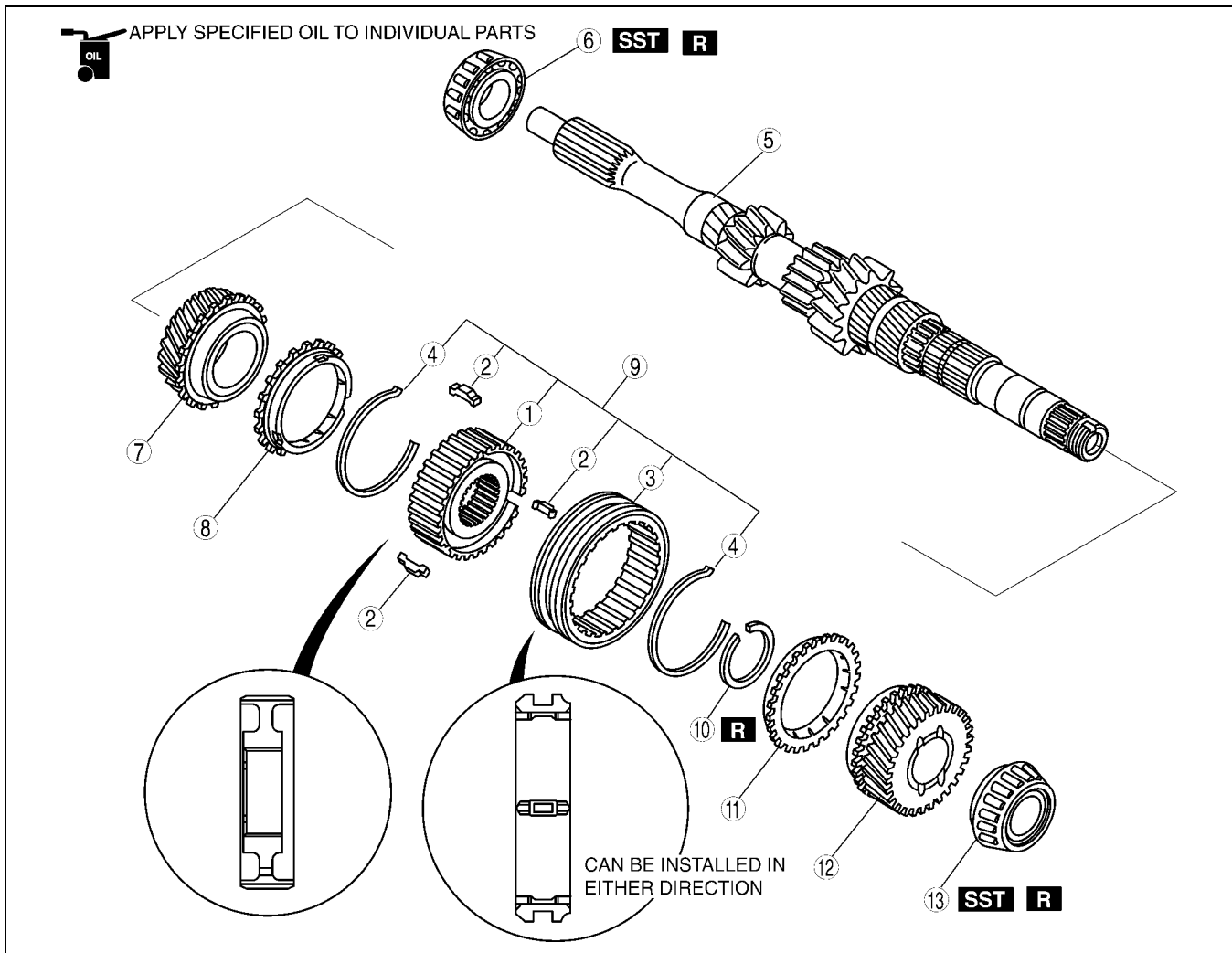
Z4F5112M030

MANUAL TRANSAXLE

PRIMARY SHAFT COMPONENTS ASSEMBLY

A6E511217201M04

1. Assemble in the order shown in the figure.



Z4F5112M031

1	3rd/4th clutch hub (See J-17 3rd/4th Clutch Hub Assembly Note)
2	Synchronizer keys
3	3rd/4th clutch hub sleeve
4	Synchronizer key springs
5	Primary shaft gear
6	Bearing (primary shaft end) (See J-17 Bearing (Primary Shaft End) Assembly Note)
7	3rd gear (See J-17 3rd Gear, 3rd Synchronizer Ring, and 3rd/4th Clutch Hub Component Assembly Note)
8	3rd synchronizer ring (See J-17 3rd Gear, 3rd Synchronizer Ring, and 3rd/4th Clutch Hub Component Assembly Note)

9	3rd/4th clutch hub component (See J-17 3rd Gear, 3rd Synchronizer Ring, and 3rd/4th Clutch Hub Component Assembly Note)
10	Retaining ring
11	4th synchronizer ring (See J-18 4th Synchronizer Ring, 4th Gear, and Bearing (4th Gear End) Assembly Note)
12	4th gear (See J-18 4th Synchronizer Ring, 4th Gear, and Bearing (4th Gear End) Assembly Note)
13	Bearing (4th gear end) (See J-18 4th Synchronizer Ring, 4th Gear, and Bearing (4th Gear End) Assembly Note)

MANUAL TRANSAXLE

3rd/4th Clutch Hub Assembly Note

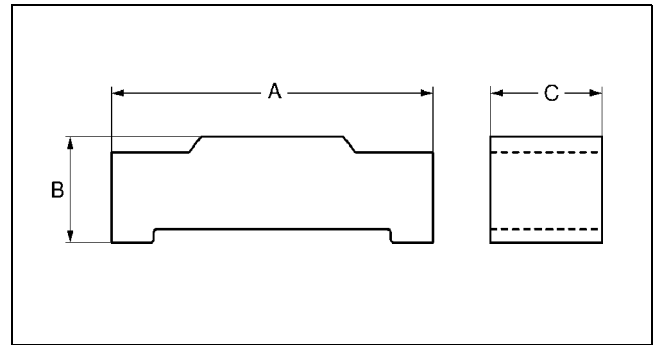
1. Install the synchronizer key springs in the clutch hub with the hooks in the grooves to hold the three synchronizer key in place.

Synchronizer key size

A: 17.0 mm {0.669 in}

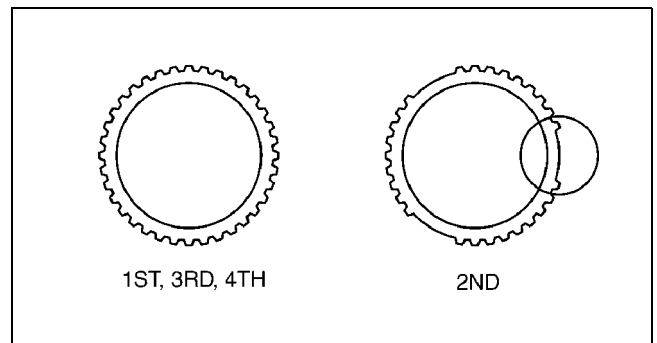
B: 4.3 mm {0.17 in}

C: 5.0 mm {0.20 in}



A6E5110M131

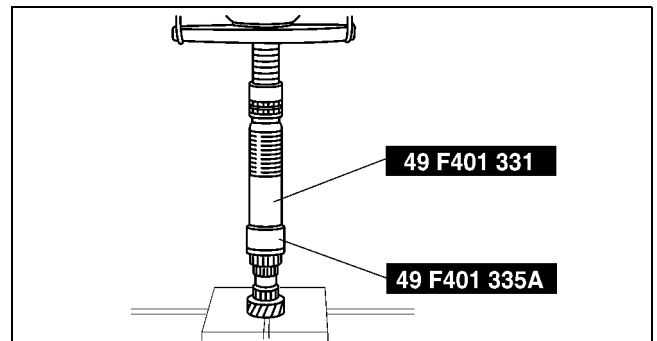
2. Align the synchronizer ring grooves with the synchronizer key during assembly.



Z4F5112M032

Bearing (Primary Shaft End) Assembly Note

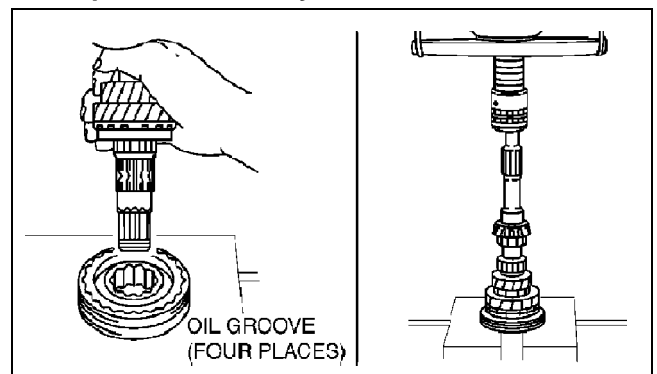
1. Install the new bearing using the SST.



Z4F5112M033

3rd Gear, 3rd Synchronizer Ring, and 3rd/4th Clutch Hub Component Assembly Note

1. Install the 3rd gear, 3rd synchronizer ring, and 3rd/4th clutch hub component using a press.

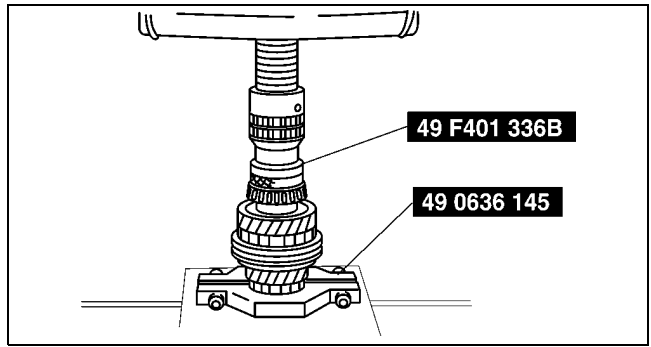


Z4F5112M034

MANUAL TRANSAXLE

4th Synchronizer Ring, 4th Gear, and Bearing (4th Gear End) Assembly Note

1. Install the 4th synchronizer ring, 4th gear, and a new bearing using the **SST**.



Z4F5112M035

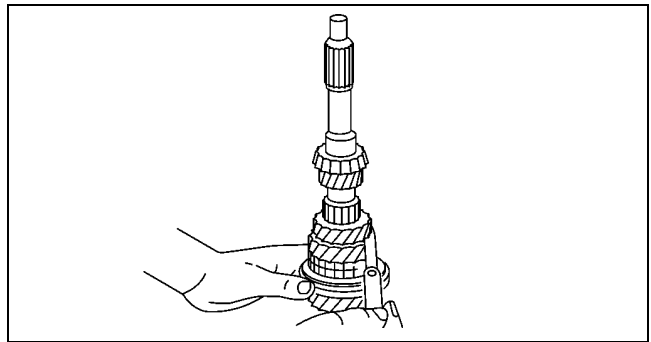
2. Measure the clearance between the 3rd gear and 2nd gear.
 - If not as specified, reassemble the primary shaft component.

Clearance

0.05—0.20 mm {0.002—0.007 in}

Maximum

0.25 mm {0.010 in}



A6E5112M036

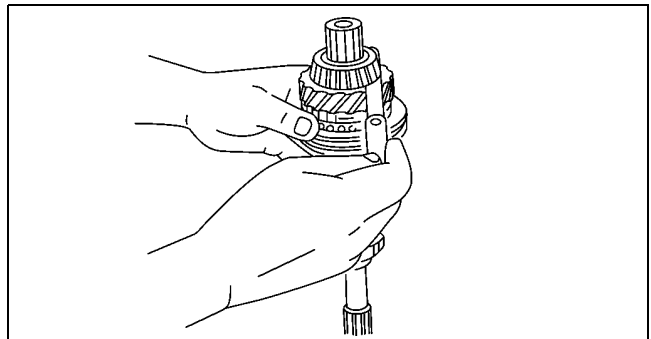
3. Measure the clearance between the 4th gear and bearing.
 - If not as specified, reassemble the primary shaft component.

Clearance

0.17—0.37 mm {0.007—0.014 in}

Maximum

0.42 mm {0.017 in}



A6E5112M037

SECONDARY SHAFT COMPONENTS PREINSPECTION

A6E511217301M01

1st Gear Thrust Clearance Inspection

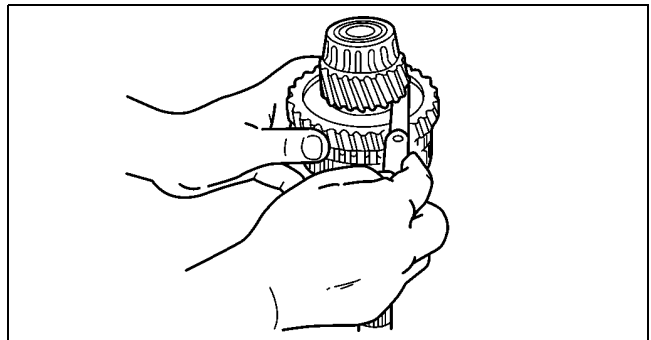
1. Measure the clearance between 1st gear and the differential drive gear.
 - If the clearance exceeds the maximum, check the contact surfaces of the 1st gear, differential drive gear of the secondary shaft gear, and 1st/2nd clutch hub component. Replace worn and damaged parts.

Clearance

0.05—0.28 mm {0.002—0.011 in}

Maximum

0.33 mm {0.013 in}



A6E5112M038

MANUAL TRANSAXLE

2nd Gear Thrust Clearance Inspection

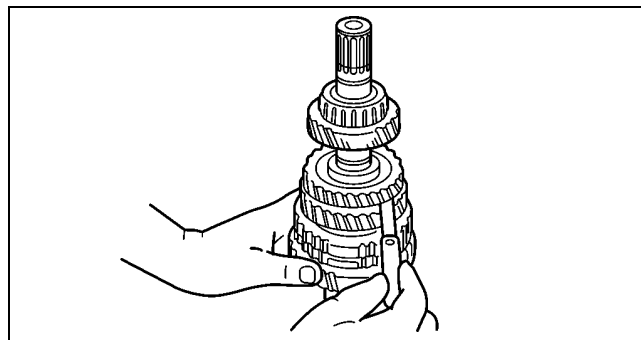
1. Measure the clearance between 2nd gear and secondary 3rd gear.
 - If the clearance exceeds the maximum, check the contact surfaces of the 2nd gear, secondary 3rd gear, and 1st/2nd clutch hub component. Replace worn and damaged parts.

Clearance

0.18—0.46 mm {0.007—0.018 in}

Maximum

0.51 mm {0.020 in}



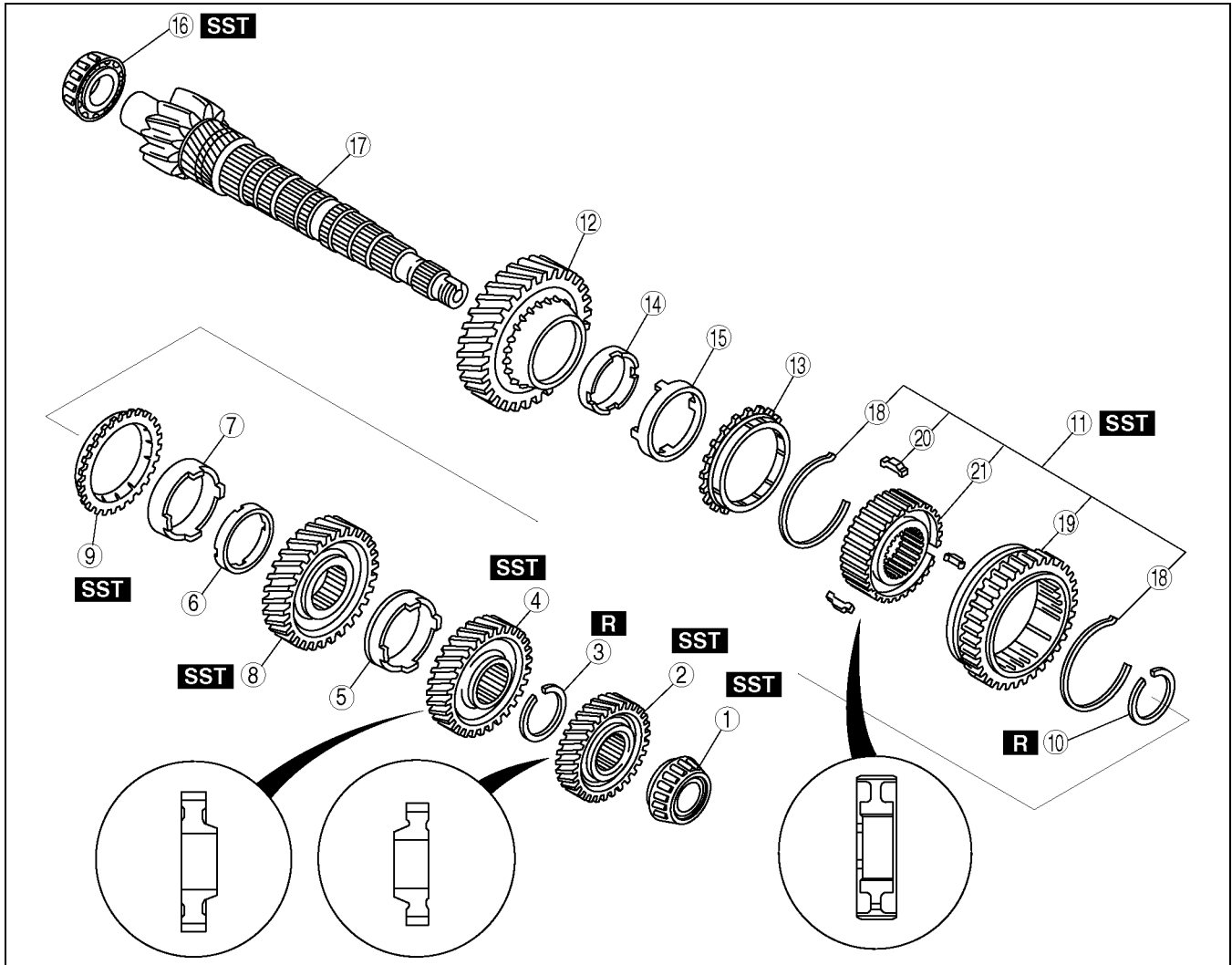
A6E5112M039

MANUAL TRANSAXLE

SECONDARY SHAFT COMPONENTS DISASSEMBLY

A6E511217301M02

1. Disassemble in the order shown in the figure.



A6E5112M111

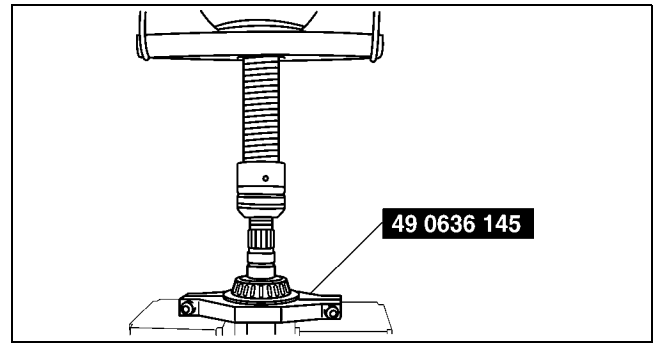
1	Bearing (See J-21 Bearing and Secondary 4th Gear Disassembly Note)
2	Secondary 4th gear
3	Retaining ring
4	Secondary 3rd gear (See J-21 Secondary 3rd Gear and 2nd Gear Disassembly Note)
5	Friction damper
6	Inner cone
7	Double cone
8	2nd gear
9	Synchronizer ring
10	Retaining ring

11	1st/2nd clutch hub component (See J-21 1st/2nd Clutch Hub Component, 1st Synchronizer Ring, and 1st Gear Disassembly Note)
12	1st gear
13	Synchronizer ring
14	Inner cone
15	Double cone
16	Bearing (See J-21 Bearing (Secondary Shaft End) Disassembly Note)
17	Secondary shaft gear
18	Synchronizer key springs
19	Clutch hub sleeve (reverse gear)
20	Synchronizer keys
21	1st/2nd clutch hub

MANUAL TRANSAXLE

Bearing and Secondary 4th Gear Disassembly Note

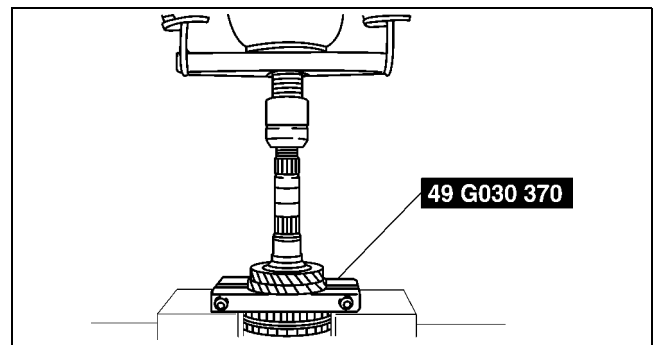
1. Remove the bearing and secondary 4th gear using the **SST**.



Z4F5112M041

Secondary 3rd Gear and 2nd Gear Disassembly Note

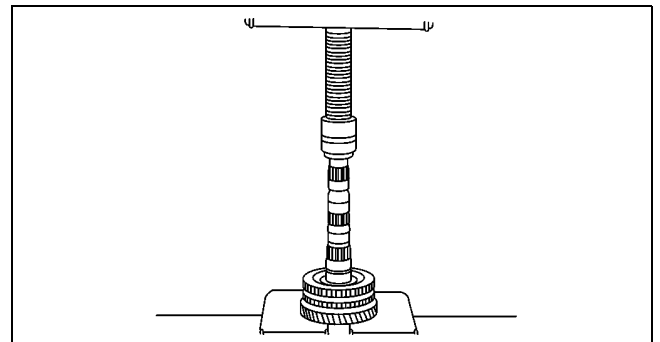
1. Remove the retaining ring.
2. Shift the gears to 1st gear.
3. Remove the secondary 3rd gear and 2nd gear using the **SST**.



Z4F5112M042

1st/2nd Clutch Hub Component, 1st Synchronizer Ring, and 1st Gear Disassembly Note

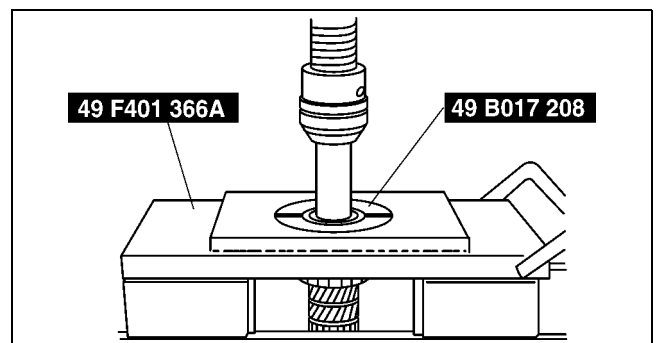
1. Remove the retaining ring.
2. Remove the 1st/2nd clutch hub component, 1st synchronizer ring, and 1st gear using a press.



A6E5112M043

Bearing (Secondary Shaft End) Disassembly Note

1. Remove the bearing using the **SST**.



Z4F5112M044

MANUAL TRANSAXLE

SECONDARY SHAFT COMPONENTS INSPECTION

A6E511217301M03

Gears Inspection

1. Inspect the synchronizer cones for wear.
 - If there is malfunction, replace parts as necessary.
2. Inspect the gear teeth for damage, wear, and cracks.
 - If there is malfunction, replace parts as necessary.
3. Inspect the synchronizer ring matching teeth for damage and wear.
 - If there is malfunction, replace the synchronizer ring.

Synchronizer Ring Inspection

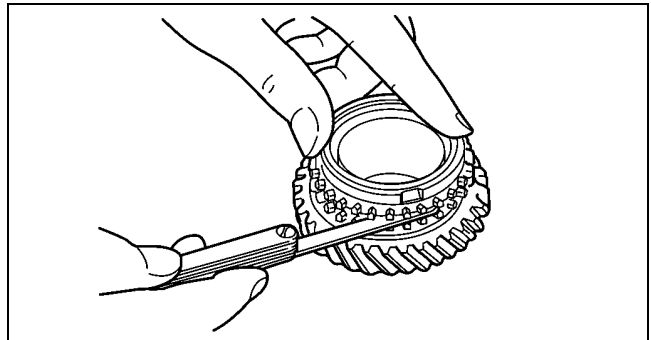
1. Inspect the synchronizer ring teeth for damage, wear, and cracks.
 - If there is malfunction, replace parts as necessary.
2. Inspect the tapered surface for wear and cracks.
 - If there is malfunction, replace parts as necessary.
3. Measure the clearance between the synchronizer ring and the side of gear circumferentially using a feeler gauge.
 - If the clearance is exceed the minimum, replace the synchronizer ring.

Standard clearance

1.50 mm {0.059 in}

Minimum

0.80 mm {0.031 in}



A6E5112M047

Clutch Hub Component Inspection

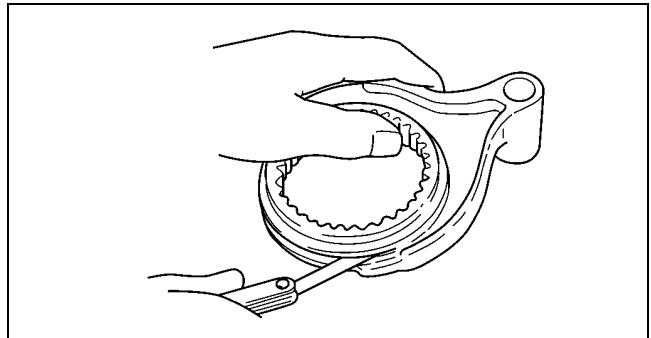
1. Inspect the clutch hub sleeve and hub operation.
 - If there is malfunction, replace parts as necessary.
2. Inspect the gear teeth for damage, wear, and cracks.
 - If there is malfunction, replace parts as necessary.
3. Inspect the synchronizer keys for damage, wear, and cracks.
 - If there is malfunction, replace parts as necessary.
4. Measure the clearance between the hub sleeve and shift fork.
 - If the clearance exceeds the maximum, replace the hub sleeve and shift fork as a set.

Standard clearance

0.10—0.45 mm {0.004—0.017 in}

Maximum clearance

0.95 mm {0.037 in}



A6E5112M049

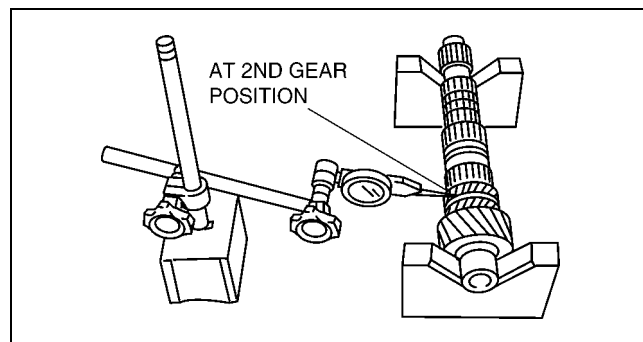
Secondary Shaft Gear Inspection

1. Inspect the gear contact surface for damage and wear.
 - If there is malfunction, replace the secondary shaft.
2. Inspect the splines for damage and wear.
 - If there is malfunction, replace the secondary shaft.
3. Inspect the gear teeth for damage, wear, and cracks.
 - If there is malfunction, replace the secondary shaft.
4. Inspect the oil passage for clogging.
 - If there is malfunction, replace the secondary shaft.

MANUAL TRANSAXLE

5. Measure the shaft gear runout.
- If not as specified, replace the secondary shaft.

Secondary shaft gear runout
0.015 mm {0.0006 in} max.

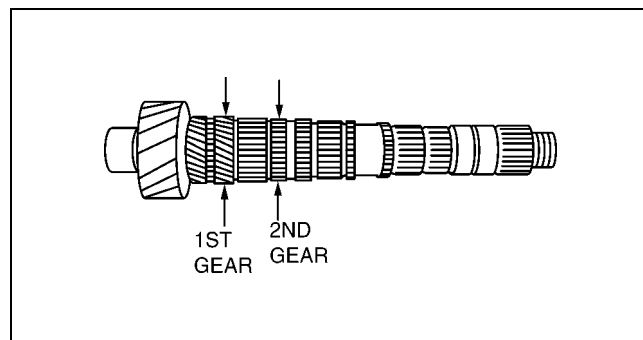


A6E5112M050

6. Measure the clearance between the shaft gears and the gears.
- If not as specified, replace parts as necessary.

mm{in}

Gear	Shaft (outer dia.)	Gear (inner dia.)	Clearance
1st	39.445—39.470 {1.553—1.554}	39.500—39.525 {1.555—1.556}	0.030—0.080 {0.002—0.003}
2nd	34.945—34.905 {1.376—1.374}	35.015—35.035 {1.378—1.379}	0.05—0.09 {0.002—0.003}



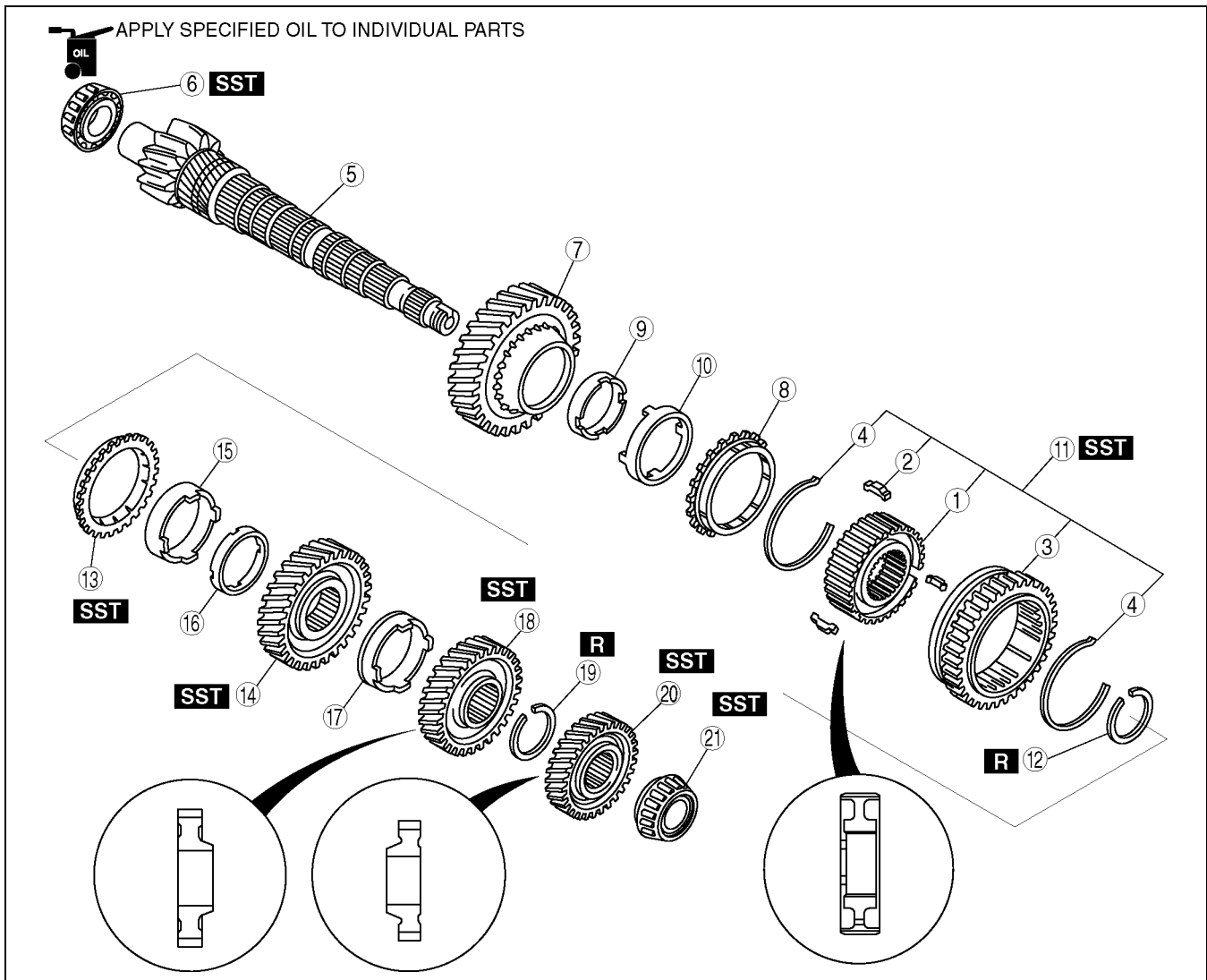
Z4F5112M102

MANUAL TRANSAXLE

SECONDARY SHAFT COMPONENTS ASSEMBLY

A6E511217301M04

1. Assemble in the order shown in the figure.



A6E5112M110

1	1st/2nd clutch hub (See J-25 1st/2nd Clutch Hub Assembly Note)
2	Synchronizer keys
3	Clutch hub sleeve (reverse gear)
4	Synchronizer key spring
5	Secondary shaft gear
6	Bearing (secondary shaft end) (See J-25 Bearing (Secondary Shaft End) Assembly Note)
7	1st gear (See J-25 1st Gear, 1st Synchronizer Ring, and 1st/2nd Clutch Hub Component Assembly Note)
8	Synchronizer ring
9	Inner cone

10	Double cone
11	1st/2nd clutch hub component
12	Retaining ring
13	Synchronizer ring
14	2nd gear
15	Double cone
16	Inner cone
17	Friction damper
18	Secondary 3rd gear
19	Retaining ring
20	Secondary 4th gear (See J-26 Secondary 4th Gear and Bearing Assembly Note)
21	Bearing

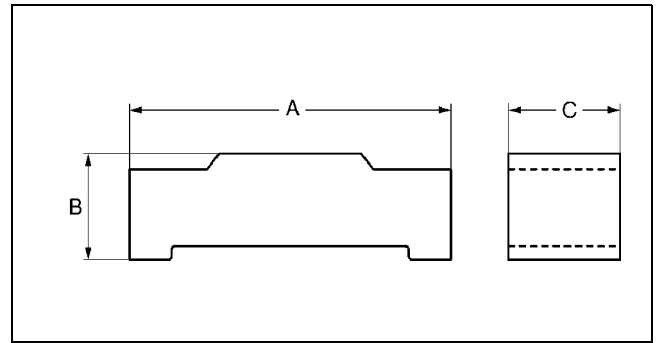
MANUAL TRANSAXLE

1st/2nd Clutch Hub Assembly Note

1. Install the synchronizer key springs in the clutch hub with the hooks in the grooves to hold the three synchronizer keys in place.

Synchronizer key

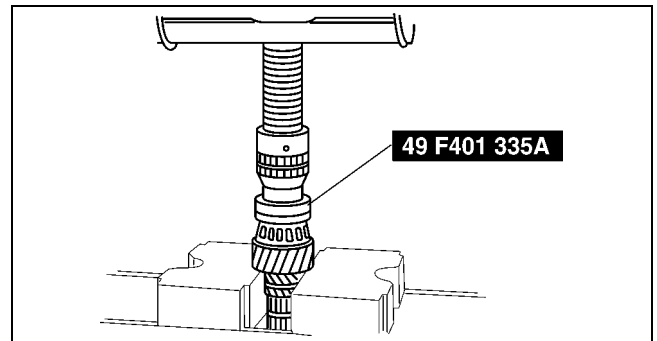
- A: 19.0 mm {0.748 in}**
B: 4.3 mm {0.17 in}
C: 5.0 mm {0.20 in}



A6E5110M131

Bearing (Secondary Shaft End) Assembly Note

1. Install the new bearing using the SST.

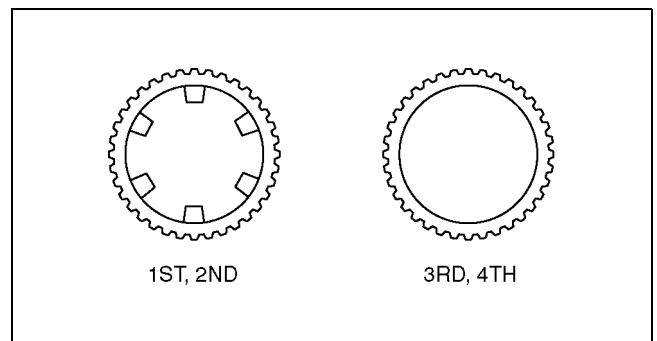


Z4F5112M052

1st Gear, 1st Synchronizer Ring, and 1st/2nd Clutch Hub Component Assembly Note

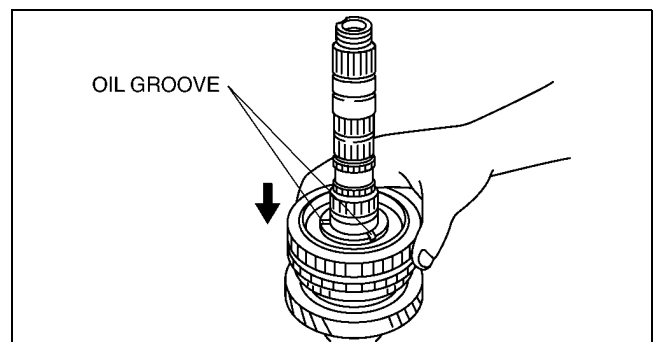
Note

- The size of the 1st, 2nd, 3rd, and 4th synchronizer rings are the same.



A6E5112M114

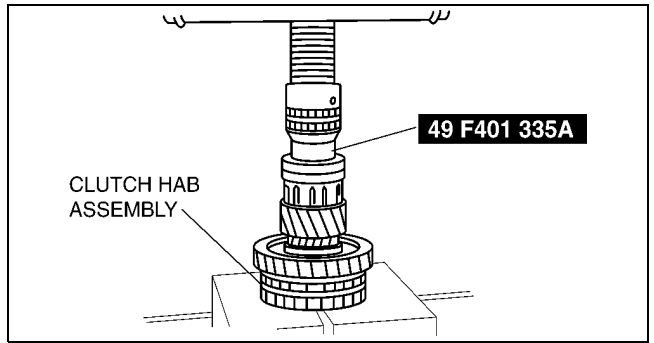
1. Assemble the 1st gear, 1st synchronizer ring, and 1st/2nd clutch hub component, as shown in the figure.



Z4F5112M054

MANUAL TRANSAXLE

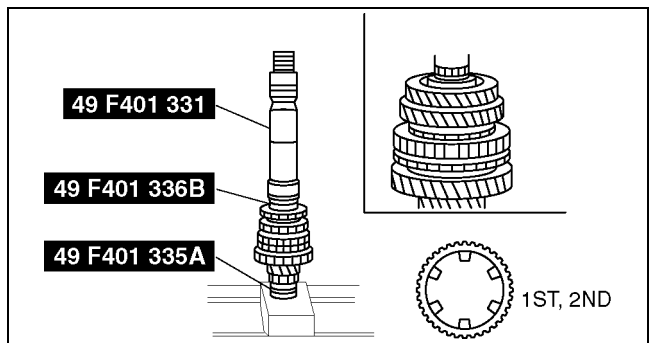
2. Press the 1st/2nd clutch hub component on using the **SST**.



Z4F5112M055

2nd Synchronizer Ring, 2nd Gear, and Secondary 3rd Gear Assembly Note

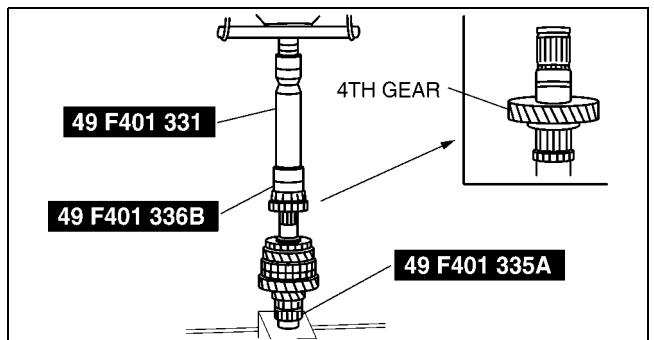
1. Install the 2nd synchronizer ring and 2nd gear.
2. Install the secondary 3rd gear using the **SST**.



A6E5112M115

Secondary 4th Gear and Bearing Assembly Note

1. Install the secondary 4th gear and the bearing using the **SST**.



Z4F5112M057

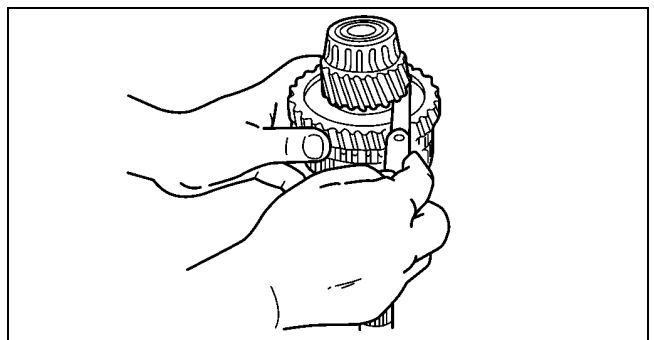
2. Measure the clearance between the 1st gear and the differential drive gear.

Clearance

0.05—0.28 mm {0.002—0.011 in}

Maximum

0.33 mm {0.013 in}



A6E5112M058

MANUAL TRANSAXLE

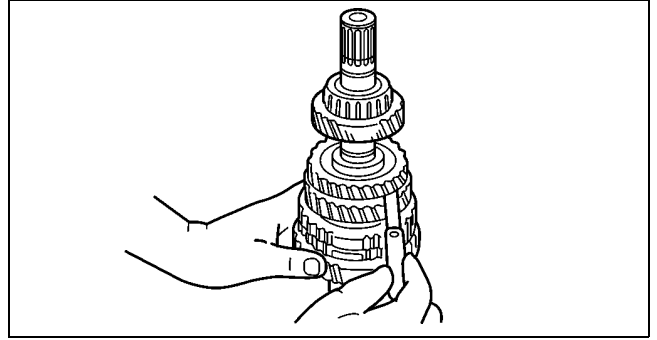
3. Measure the clearance between the 2nd gear and the secondary 3rd gear.
 - If not as specified, reassemble the secondary shaft component.

Clearance

0.18—0.46 mm {0.007—0.018 in}

Maximum

0.51 mm {0.020 in}



A6E5112M059

DIFFERENTIAL PREINSPECTION

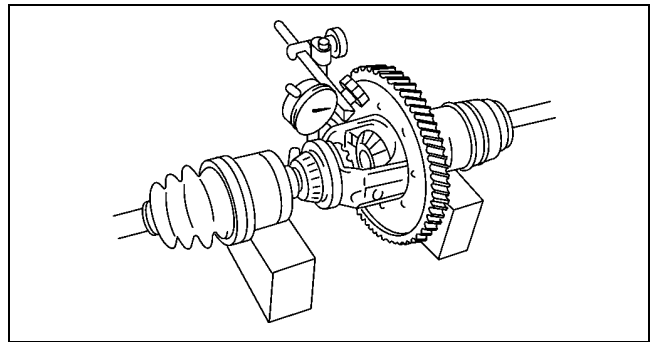
A6E511227100M01

Backlash Inspection

1. Measure the backlash of the side gear.
 - If not as specified, replace parts as necessary.

Standard

0.050—0.150 mm{0.0020—0.059 in}



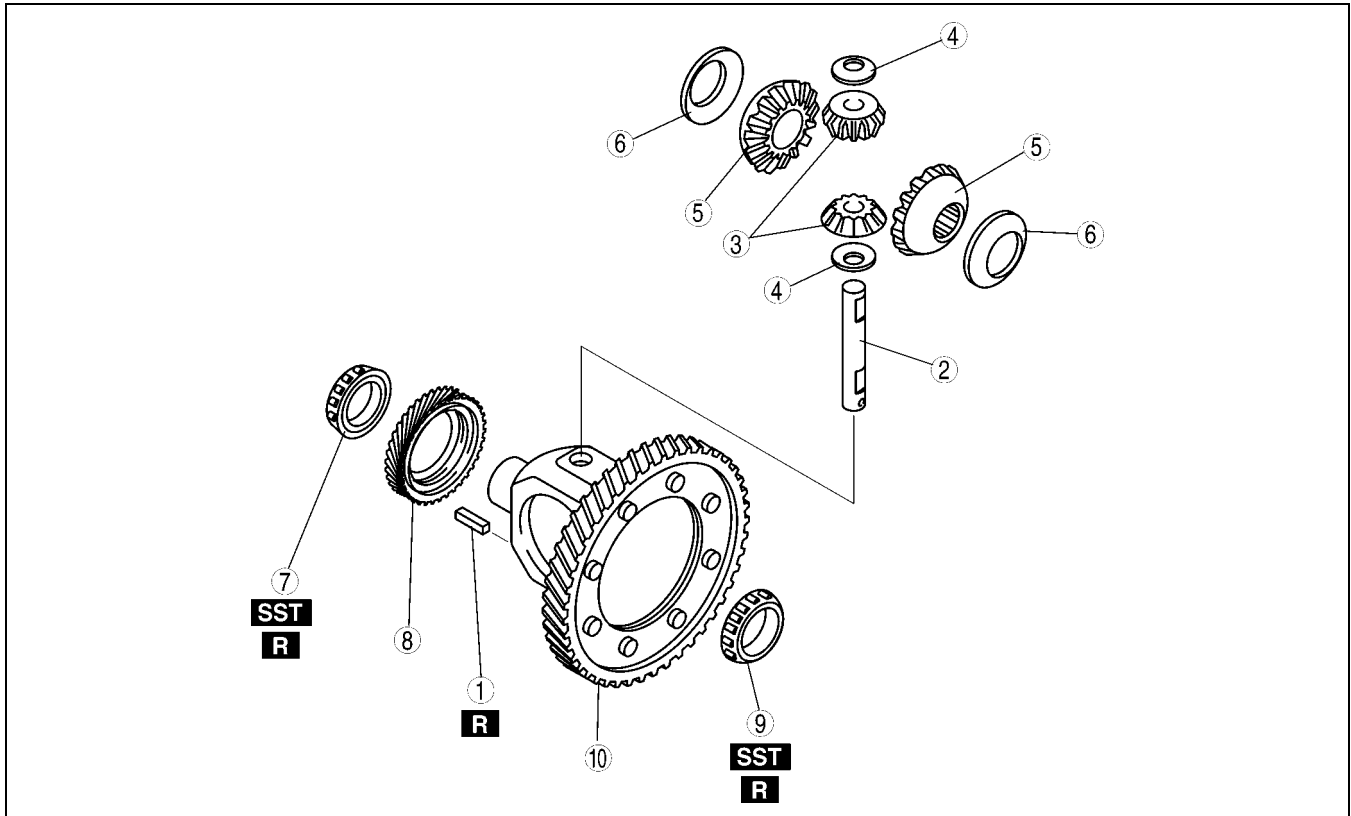
A6E5112M060

MANUAL TRANSAXLE

DIFFERENTIAL DISASSEMBLY

A6E511227100M02

1. Disassemble in the order shown in the figure.



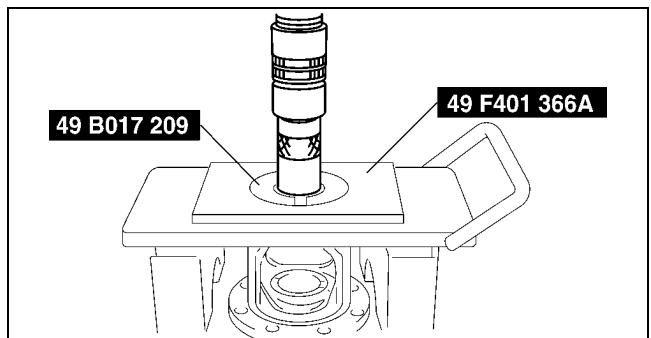
Z4F5112M061

1	Roll pin
2	Pinion shaft
3	Pinion gear
4	Thrust washer
5	Side gear
6	Thrust washer

7	Bearing (side opposite ring gear) (See J-28 Bearing (Side Opposite Ring Gear) Disassembly Note)
8	Speedometer drive gear
9	Bearing (ring gear side) (See J-29 Bearing (Ring Gear Side) Disassembly Note)
10	Ring gear and gear case component

Bearing (Side Opposite Ring Gear) Disassembly Note

1. Remove the bearing using the SSTs.

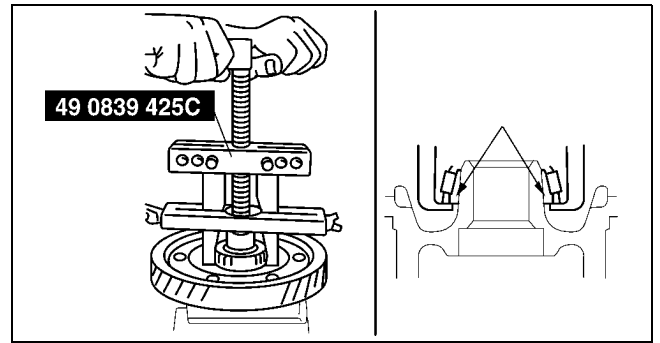


Z4F5112M062

MANUAL TRANSAXLE

Bearing (Ring Gear Side) Disassembly Note

1. Remove the bearing using the SST.

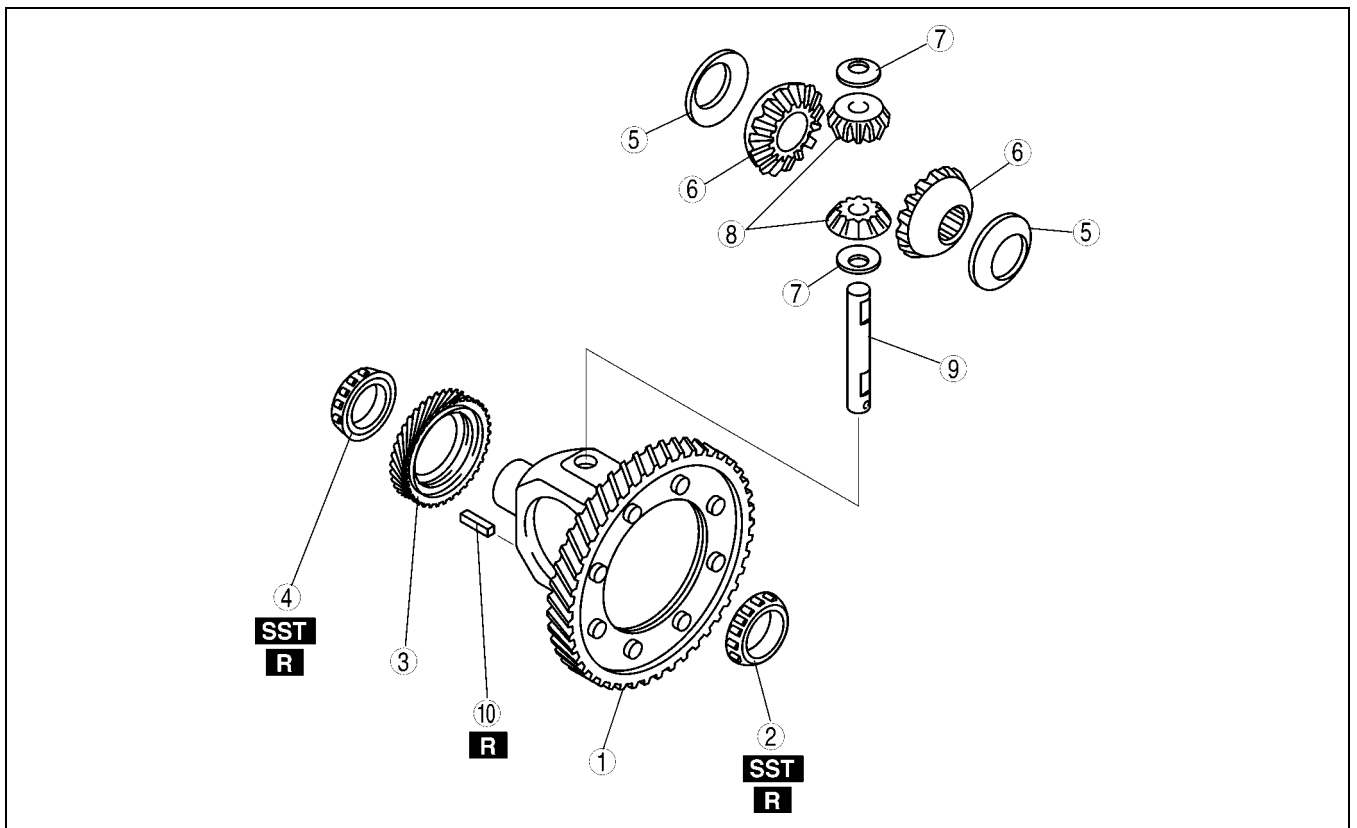


Z4F5112M063

DIFFERENTIAL ASSEMBLY

A6E511227100M03

1. Assemble in the order shown in the figure.



Z4F5112M064

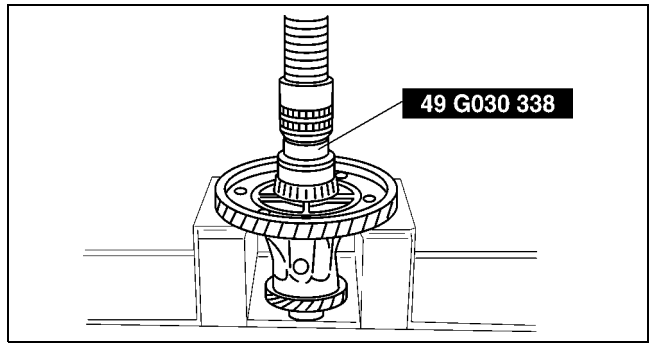
1	Ring gear and gear case component
2	Bearing (ring gear side) (See J-30 Bearing (Ring Gear Side) Assembly Note)
3	Speedometer drive gear
4	Bearing (side opposite ring gear) (See J-30 Bearing (Side Opposite Ring Gear) Assembly Note)
5	Thrust washer

6	Side gear
7	Thrust washer
8	Pinion gear
9	Pinion shaft
10	Roll pin (See J-30 Roll Pin Assembly Note)

MANUAL TRANSAXLE

Bearing (Ring Gear Side) Assembly Note

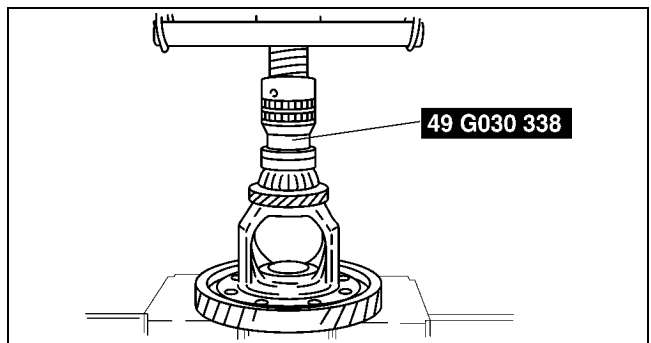
1. Install the new bearing using the **SST**.



Z4F5112M065

Bearing (Side Opposite Ring Gear) Assembly Note

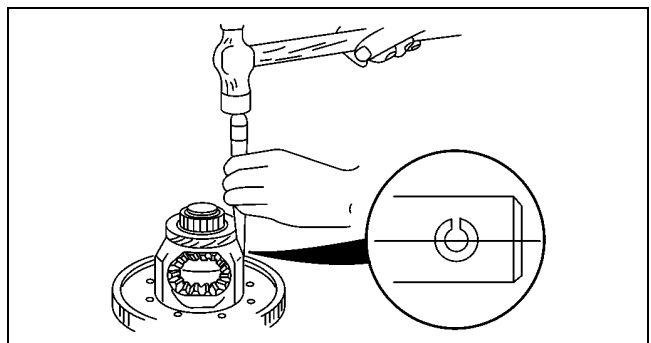
1. Install the speedometer drive gear.
2. Install the new bearing using the **SST**.



Z4F5112M066

Roll Pin Assembly Note

1. Install the new roll pin as shown in the figure to hold the pinion shaft.

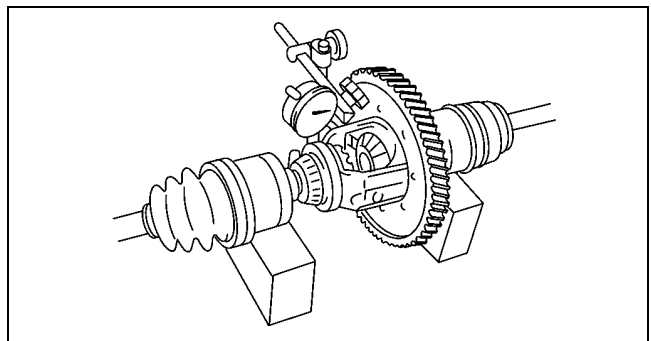


A6E5112M067

2. Measure the backlash by the following procedure.
 - (1) Install the left and right drive shafts in the differential component.
 - (2) Support the drive shaft on V-blocks as shown in the figure.
 - (3) Measure the backlash of both pinion gears.
 - If not as specified, replace worn and damage parts.

Backlash

0.050—0.150 mm {0.0020—0.059 in}



A6E5112M068

BEARING PRELOAD ADJUSTMENT

1. Install the primary and secondary shaft bearing races into the transaxle case (shims removed).
2. Mount the clutch housing onto the transaxle hanger, and set the differential bearing race into the clutch housing. Position a piece of pipe against the bearing race and tap it in until it contacts the clutch housing.

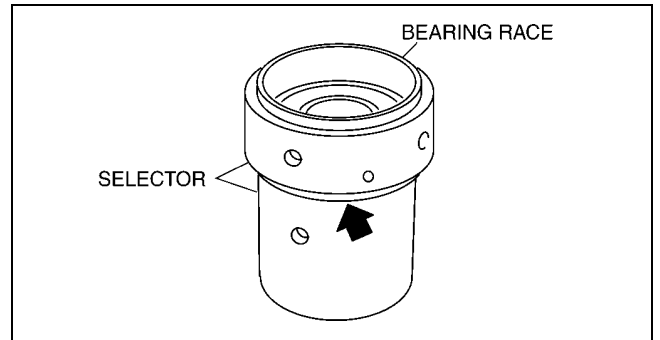
A6E511201029M05

MANUAL TRANSAXLE

- Set the bearing races into the **SSTs (selector)** as shown in the figure.

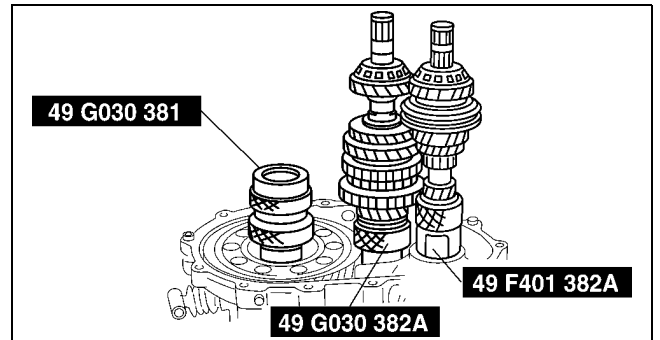
Note

- Turn the selector to eliminate the gap indicated by the arrow in the figure.



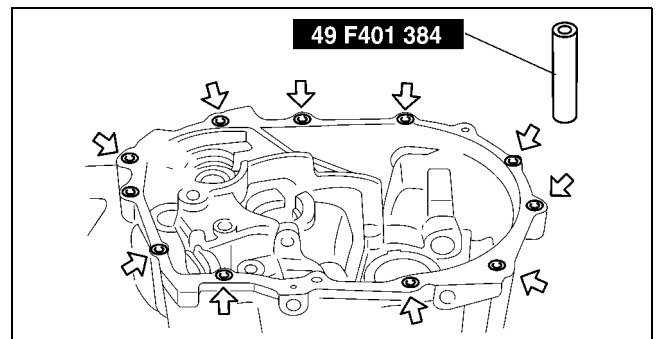
Z4F5112M069

- Set the differential component into the clutch housing, and set the bearing race and the SST (selector) on the differential. Set the SSTs (selector) for the primary and secondary shaft in the clutch housing. Mount the shaft gear assemblies as shown in the figure.



Z4F5112M070

- Set the **SST (collars)** in the positions shown in the figure.

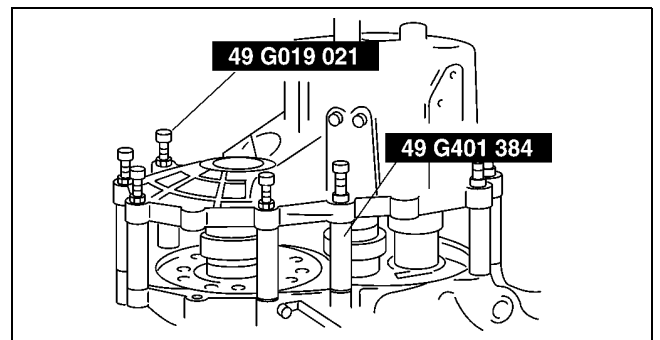


Z4F5112M071

- Install the transaxle case and tighten the **SST (bolts)** to the specified torque.

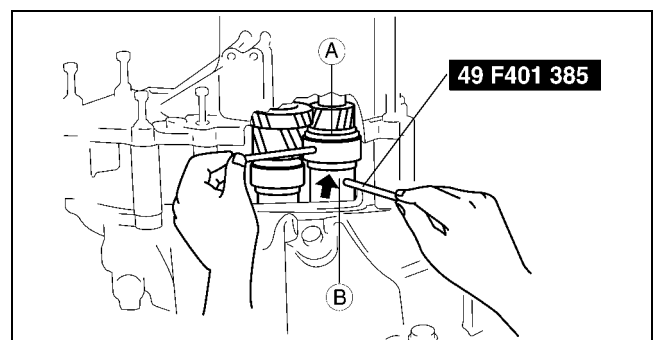
Tightening torque

37.3—52.0 N·m {3.9—5.3 kgf·m, 28.2—38.3 ft·lbf}



Z4F5112M072

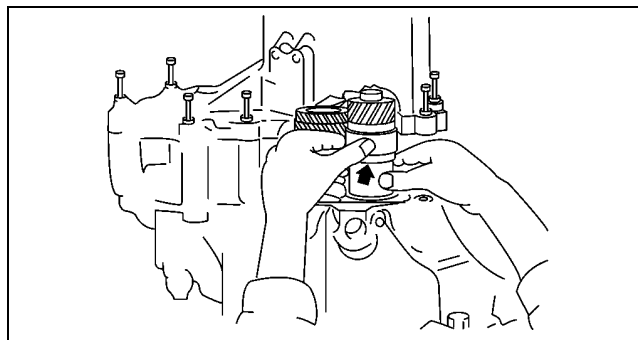
- To seat the bearings, mount the SST (bars) on parts A and B of the selectors, and turn the selectors so the gaps are widened. Then turn the **SST** in the reverse direction until the gaps are eliminated.



Z4F5112M073

MANUAL TRANSAXLE

8. Manually expand the selector until it no longer turns by hand.



A6E5112M074

9. Use a feeler gauge to measure the gap in the SST (selector).

Caution

- Measure the gap around the entire circumference of the selector.

10. Take the maximum reading and determine the shim to used as follows.

Primary shaft adjustment shim

- Select the thinnest allowable shim from the table to obtain standard clearance.

Standard clearance

0—0.05 mm {0—0.002 in}

Example

Reading from step 9: 0.57 mm {0.022 in}

Shim selecting range

$(0.57 \text{ mm } \{0.022 \text{ in}\} - 0.05 \text{ mm } \{0.002 \text{ in}\}) - (0.57 \text{ mm } \{0.022 \text{ in}\} - 0 \text{ mm } \{0 \text{ in}\}) = 0.52 \text{ mm } \{0.020 \text{ in}\} - 0.57 \text{ mm } \{0.022 \text{ in}\}$

Shim

0.55 mm {0.022 in}

Secondary shaft adjustment shim

- Select the thinnest allowable shim from the table to obtain standard clearance.

Tightening amount

0.03—0.08 mm {0.001—0.003 in}

Example

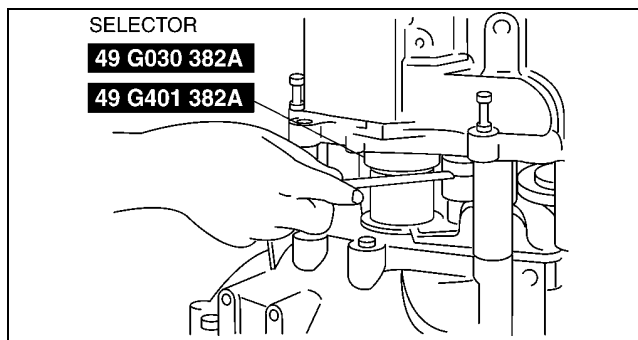
Reading from step 9: 0.57 mm {0.022 in}

Shim selecting range

$(0.57 \text{ mm } \{0.022 \text{ in}\} + 0.03 \text{ mm } \{0.001 \text{ in}\}) - (0.57 \text{ mm } \{0.022 \text{ in}\} + 0.08 \text{ mm } \{0.003 \text{ in}\}) = 0.60 \text{ mm } \{0.024 \text{ in}\} - 0.65 \text{ mm } \{0.026 \text{ in}\}$

Shim

0.60 mm {0.024 in}



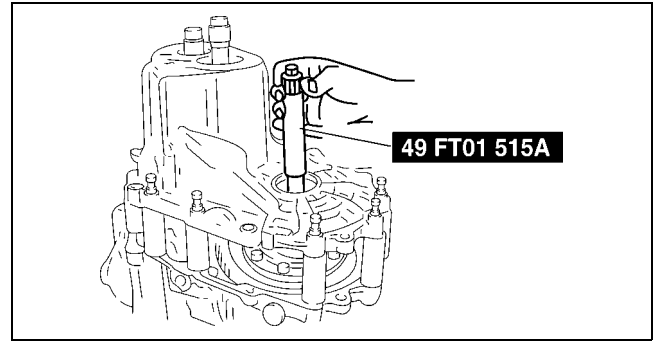
Z4F5112M075

Thickness of shim

mm{in}			
0.20 {0.008}	0.25 {0.010}	0.30 {0.012}	0.35 {0.014}
0.40 {0.016}	0.45 {0.018}	0.50 {0.020}	0.55 {0.022}
0.60 {0.024}	0.65 {0.026}	0.70 {0.028}	—

MANUAL TRANSAXLE

11. Install the **SST** and a pull scale or torque wrench.



Z4F5112M076

12. Adjust the clearance of the **SST (selector)** to obtain the specified preload/pull scale reading.

Note

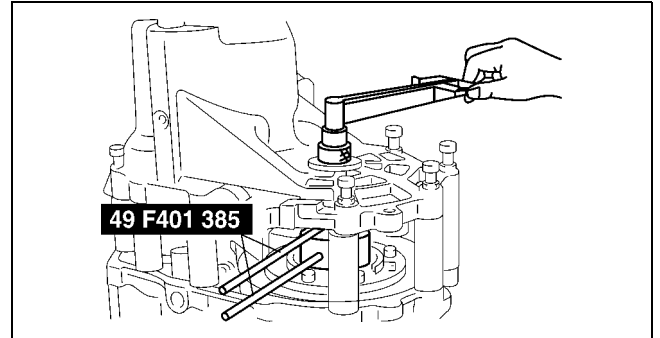
- Read the preload when the differential starts to turn.
- Measure several times and calculate the average value.

Preload

0.5 N·m {5.0 kgf·cm, 4.3 in·lbf}

Reading on pull scale

5 N {0.5 kgf, 1.1 lbf}



Z4F5112M077

13. Use a feeler gauge to measure the gap in the selector for the differential.

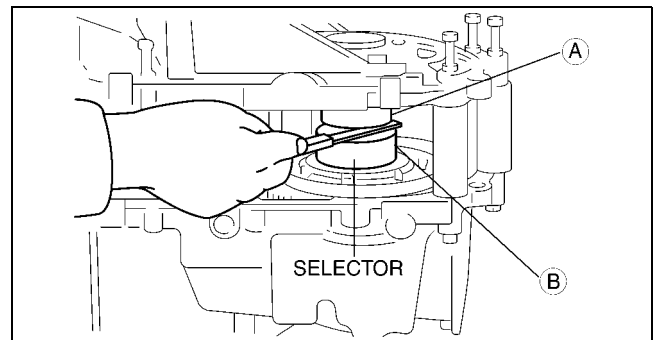
14. Add **0.15 mm {0.006 in}** to the measured clearance and select the combination of shims closest in value to that measurement.

Example

0.32 mm {0.013 in}

0.32 mm {0.013 in} + 0.15 mm {0.006 in} = 0.47 mm {0.019 in}

Nearest shim (on thick side) to 0.47 mm {0.019 in} is 0.50 mm {0.020 in}



Z4F5112M078

Thickness of shim

mm{in}			
0.1 {0.004}	0.20 {0.008}	0.25 {0.010}	0.30 {0.012}
0.35 {0.014}	0.40 {0.016}	0.45 {0.018}	0.50 {0.020}
0.55 {0.022}	0.60 {0.024}	0.65 {0.026}	0.70 {0.028}
0.75 {0.030}	0.80 {0.031}	0.85 {0.033}	0.90 {0.035}
0.95 {0.037}	1.0 {0.039}	1.05 {0.041}	1.10 {0.043}
1.15 {0.045}	1.20 {0.047}	—	—

15. Remove the transaxle case and the **SST**.

16. Remove the selectors, the primary shaft component, and the differential.

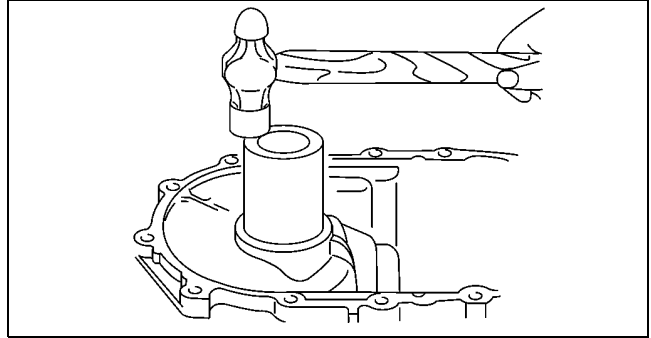
17. Remove the bearing races.

MANUAL TRANSAXLE

18. Install the adjustment shim(s) and install the bearing race using a suitable pipe.

Caution

- Use the adjustment shim(s) selected during bearing preload adjustment.

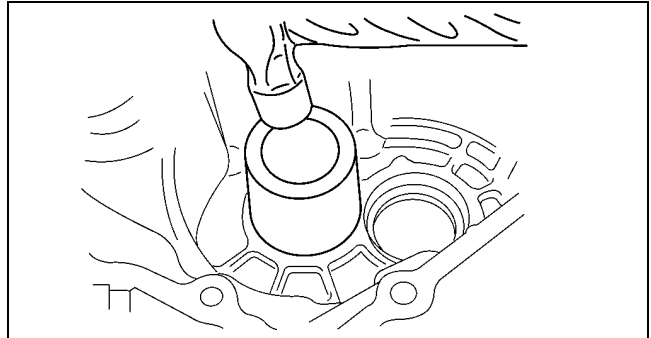


A6E5112M079

19. Install the adjustment shim(s) and install the bearing race using a suitable pipe.

Caution

- Use the adjustment shim(s) selected during bearing preload adjustment.

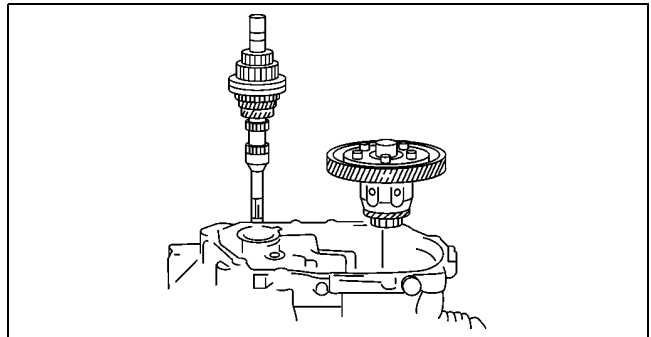


A6E5112M103

20. Set the primary shaft gear component and the differential into the clutch housing.
21. Install the transaxle case, and tighten to the specified torque.

Tightening torque

37.3—52.0 N·m {3.8—5.3 kgf·m, 27.5—38.3 ft·lbf}



A6E5112M080

22. Install the **SST** and a pull scale or torque wrench.
23. Verify that the preload is within the specification.
• If not as specified, return to Step 1.

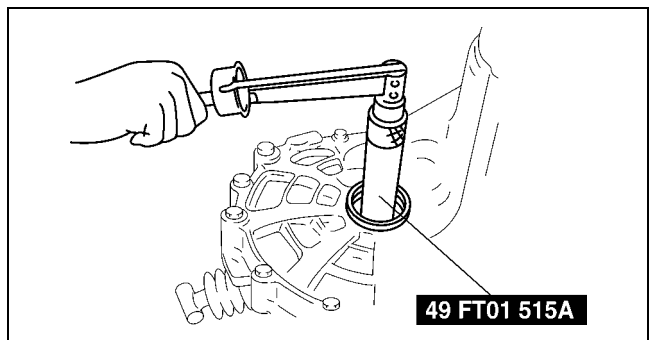
Preload

1.4—1.9 Nm {14—20 kgf·cm, 13—17 in·lbf}

Reading on pull scale

14—19 N {1.4—2.0 kgf, 3.1—4.4 lbf}

24. Remove the **SST**.



A6E5112M081

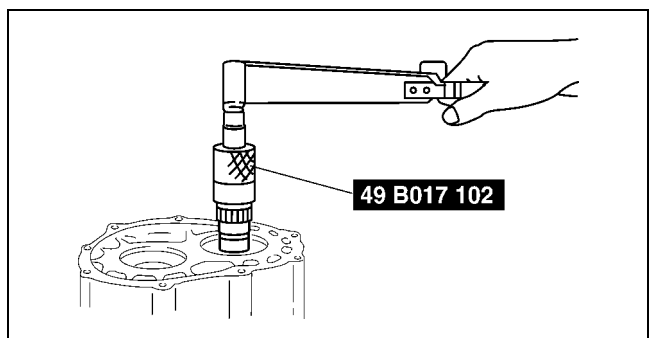
25. With the transaxle facing in the direction shown in the figure, install the **SST** to the primary shaft gear component.
26. Verify that the preload is within the specification.
• If not as specified, return to Step 1.

Preload

0.12—0.39 N·m {1.2—4.0 kgf·cm, 1.05—3.47 in·lbf}

Reading on pull scale

1.2—3.9 N {0.12—0.40 kgf, 0.27—0.88 lbf}



A6E5112M082

27. Remove the **SST**, transaxle case, primary shaft gear component and differential.

MANUAL TRANSAXLE

28. Install the secondary shaft gear component and transaxle case, then tighten to the specified torque.

Tightening torque

37.3—52.0 N·m {3.8—5.3 kgf·m, 27.5—38.3 ft·lbf}

29. Install the **SST** and a pull scale or torque wrench.

30. Verify that the preload is within the specification.

- If not as specification, return to Step 1.

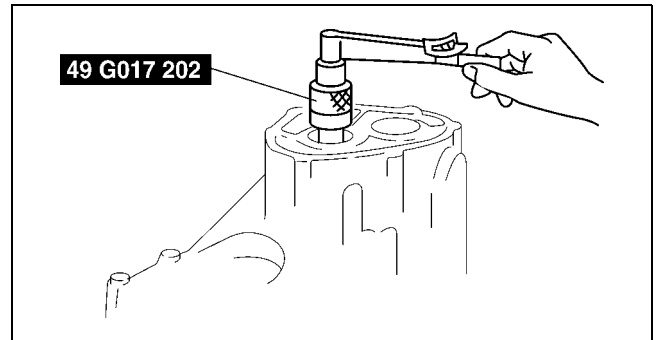
Preload

0.2—0.3 N·m {2.0—4.0 kgf·cm, 1.8—3.4 in·lbf}

Reading on pull scale

2—3 N {0.2—0.4 kgf, 0.5—0.8 lbf}

31. Remove the **SST** and transaxle case.



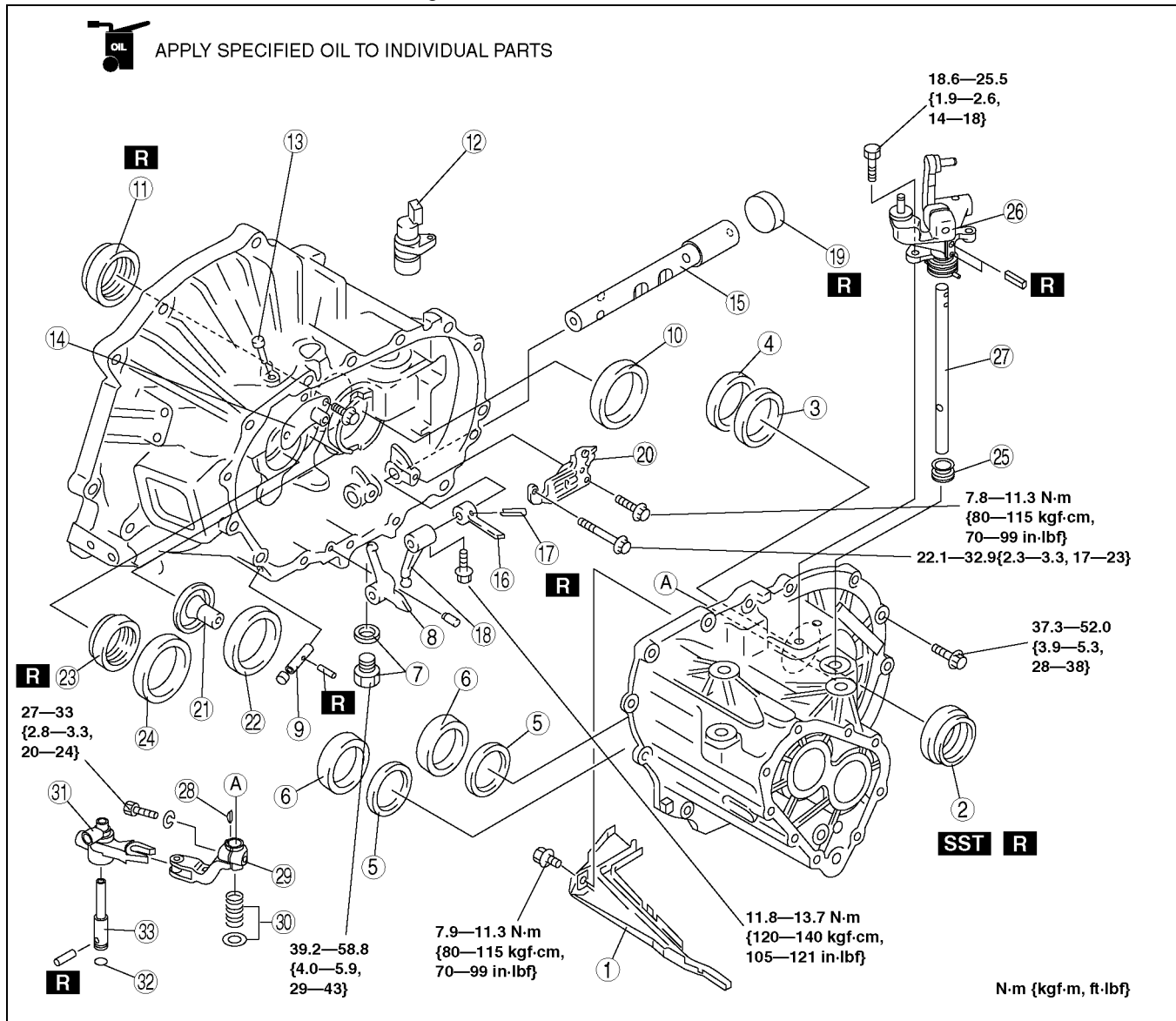
Z4F5112M083

MANUAL TRANSAXLE

CLUTCH HOUSING AND TRANSAXLE CASE COMPONENTS ASSEMBLY

A6E511217010M02

1. Assemble in the order shown in the figure..



A6E5112M112

1	Oil passage
2	Oil seal (differential) (See J-37 Oil Seal (Differential) Assembly Note)
3	Adjustment shim(s)
4	Bearing race (differential) (See J-37 Bearing Race (Differential) Assembly Note)
5	Adjustment shim(s)
6	Bearing race (transaxle case) (See J-37 Bearing Race (Transaxle Case) Assembly Note)
7	Drain plug and washer
8	Reverse lever
9	Reverse lever shaft
10	Bearing race (differential) (See J-37 Bearing Race (Differential) Assembly Note)
11	Oil seal (differential) (See J-37 Oil Seal (Differential) Assembly Note)
12	Hole cover
13	Bleather

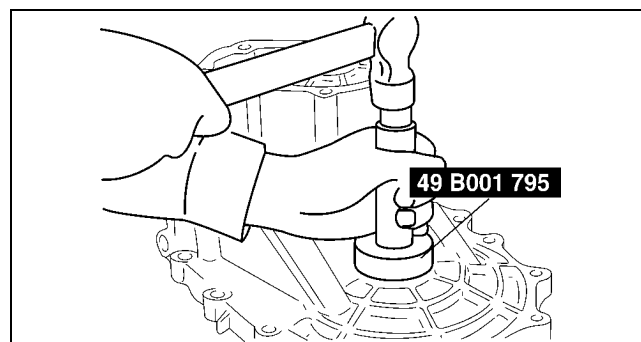
14	Bleather cover component
15	Control rod
16	Selector
17	Roll pin
18	Change arm
19	Sealing cap
20	Guide plate component
21	Funnel
22	Bearing race (secondary shaft)
23	Oil seal (primary shaft) (See J-38 Oil Seal (Primary Shaft) Assembly Note)
24	Bearing race (primary shaft)
25	Boots
26	Shift lever component
27	shift lever shaft
28	Key
29	Control end
30	Spring and washer
31	Clank component lever

MANUAL TRANSAXLE

32	O-ring
33	Crank lever shaft

Oil Seal (Differential) Assembly Note

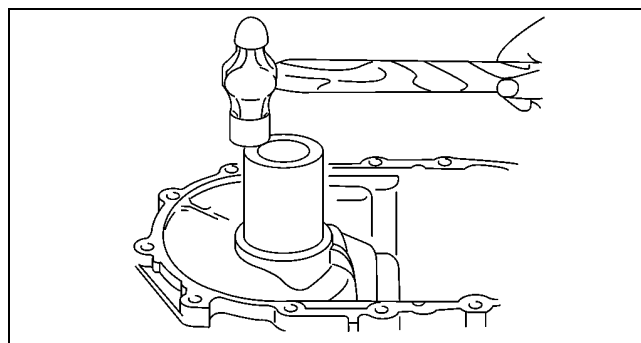
1. Apply transaxle oil to the new oil seal lip.
2. Install the oil seal using the **SST**.



Z4F5112M085

Bearing Race (Differential) Assembly Note

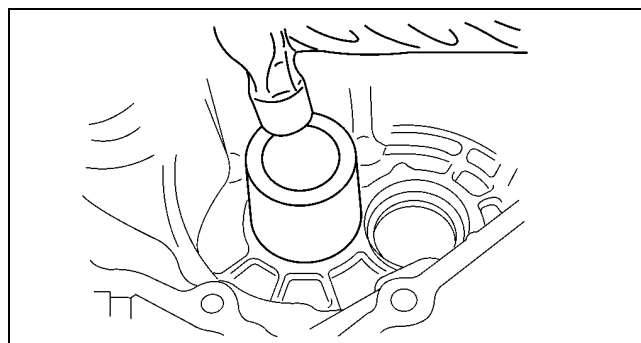
1. Install the adjustment shim(s) and install the bearing race using a suitable pipe.



A6E5112M079

Bearing Race (Transaxle Case) Assembly Note

1. Install the adjustment shim(s) and install the bearing race using a suitable pipe.

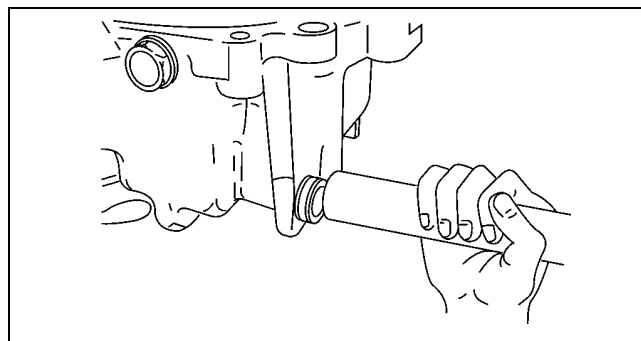


A6E5112M103

Oil Seal (Change Rod Component) Assembly Note

1. Apply transaxle oil to the new oil seal lip.
2. Install the oil seal using a suitable pipe.

Outer diameter of pipe
26.0 mm {1.02 in}

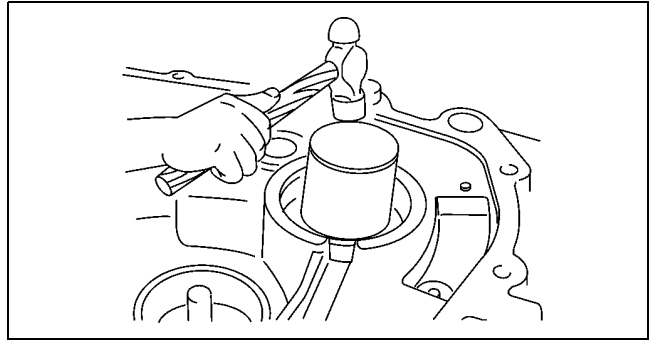


A6E5112M086

MANUAL TRANSAXLE

Oil Seal (Primary Shaft)Assembly Note

1. Apply transaxle oil to outer circumference of the oil seal.
2. Install the new oil seal using a suitable pipe.

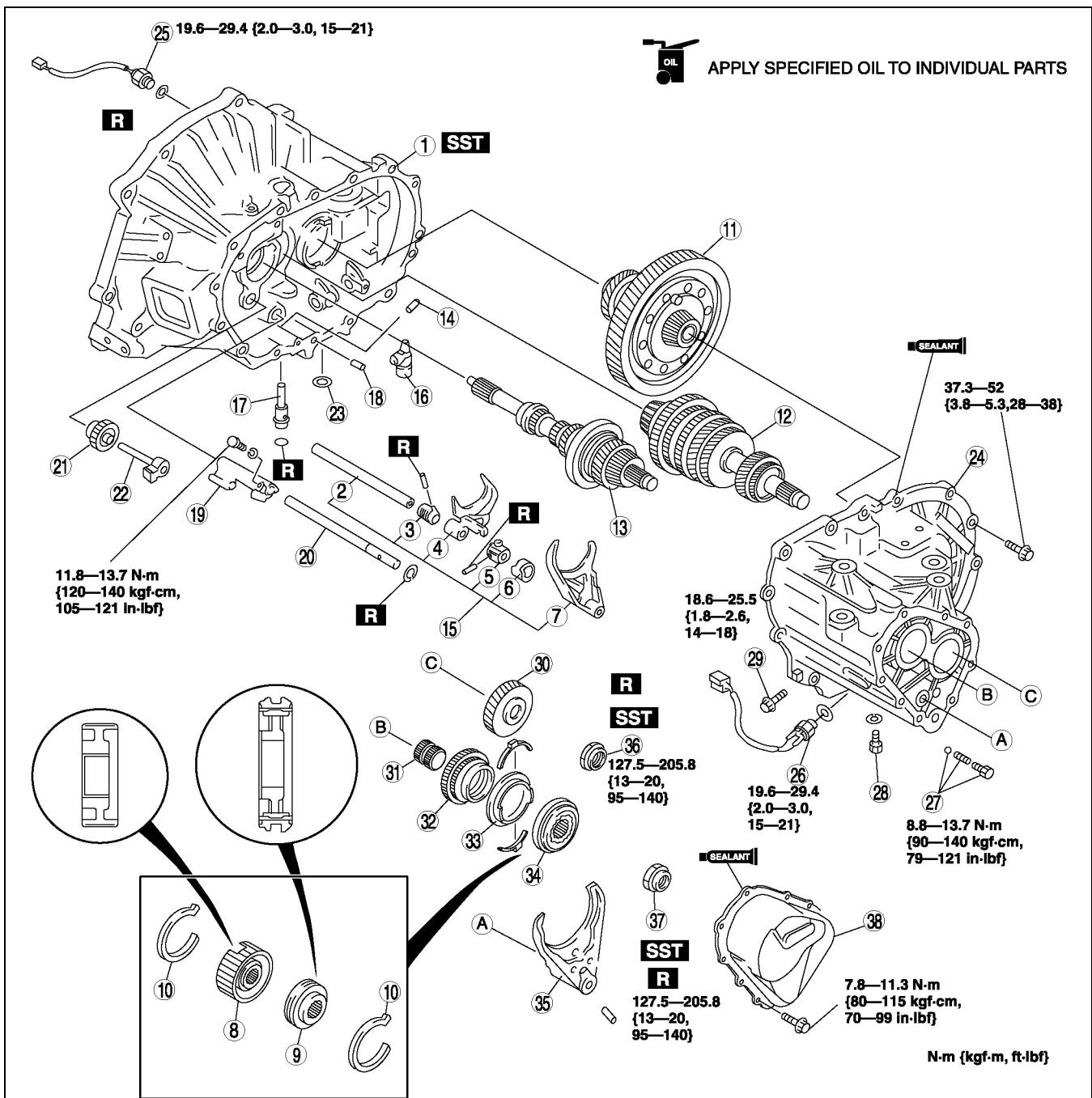


A6E5112M088

5TH/REVERSE GEAR AND HOUSING PARTS ASSEMBLY

1. Assemble in the order shown in the figure.

A6E511201029M06



A6E5112M119

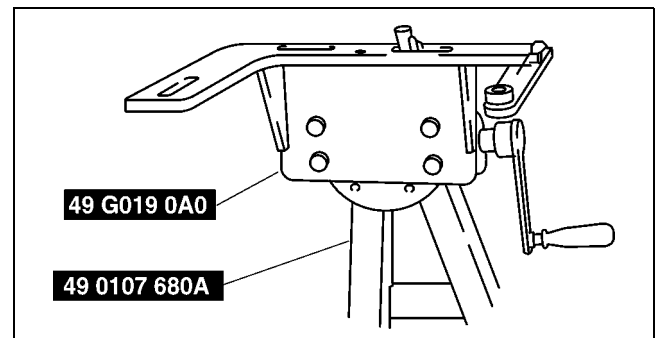
MANUAL TRANSAXLE

1	Clutch housing (See J-39 Clutch Housing Assembly Note)
2	Control rod
3	Control end
4	1st/2nd shift fork
5	Control lever
6	Interlock lever
7	3rd/4th shift fork
8	Clutch hub
9	Clutch hub sleeve
10	Synchronizer key springs
11	Differential component
12	Secondary shaft gear component (See J-40 Primary Shaft Gear Component and Secondary Shaft Gear Component Assembly Note)
13	Primary shaft gear component (See J-40 Primary Shaft Gear Component and Secondary Shaft Gear Component Assembly Note)
14	Push pin
15	Shift fork and shift rod component (See J-40 Shift Fork and Shift Rod Component Assembly Note)
16	Crank lever component (See J-40 Crank Lever Component and Crank Lever Shaft Assembly Note)
17	Crank lever shaft (See J-40 Crank Lever Component and Crank Lever Shaft Assembly Note)
18	Pin
19	5th/reverse shift rod end (See J-41 5th/Reverse Shift Rod End and 5th/Reverse Shift Rod Assembly Note)

20	5th/reverse shift rod (See J-41 5th/Reverse Shift Rod End and 5th/Reverse Shift Rod Assembly Note)
21	Reverse idle gear (See J-41 Reverse Idle Gear and Reverse Idle Shaft Assembly Note)
22	Reverse idle shaft (See J-41 Reverse Idle Gear and Reverse Idle Shaft Assembly Note)
23	Magnet
24	Transaxle case component (See J-41 Transaxle Case Component Assembly Note)
25	Neutral switch
26	Back-up light switch
27	Lock bolt, ball and spring
28	Guide bolt
29	Lock bolt
30	Secondary 5th gear (See J-42 Secondary 5th Gear Assembly Note)
31	Gear sleeve
32	5th gear
33	5th synchronizer ring
34	5th/reverse clutch hub component (See J-42 5th/Reverse Clutch Hub Component and 5th/Reverse Shift Fork Assembly Note)
35	5th/reverse shift fork (See J-42 5th/Reverse Clutch Hub Component and 5th/Reverse Shift Fork Assembly Note)
36	Locknut (secondary shaft) (See J-42 Locknut Assembly Note)
37	Locknut (primary shaft) (See J-42 Locknut Assembly Note)
38	Rear cover

Clutch Housing Assembly Note

1. Assemble the **SST**.
2. Assembly clutch housing on the **SST**.



A6E5112M108

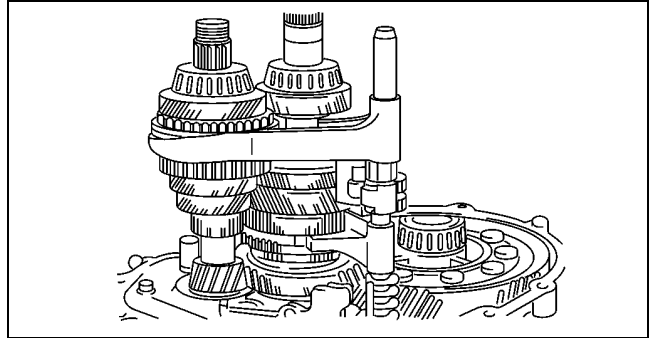
MANUAL TRANSAXLE

Primary Shaft Gear Component and Secondary Shaft Gear Component Assembly Note

1. Install the primary shaft gear component and the secondary shaft gear component together.

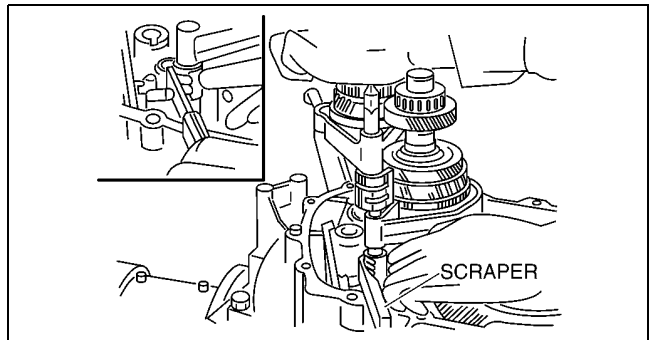
Shift Fork and Shift Rod Component Assembly Note

1. Shift to 2nd gear and position the shift fork and shift rod component as shown.



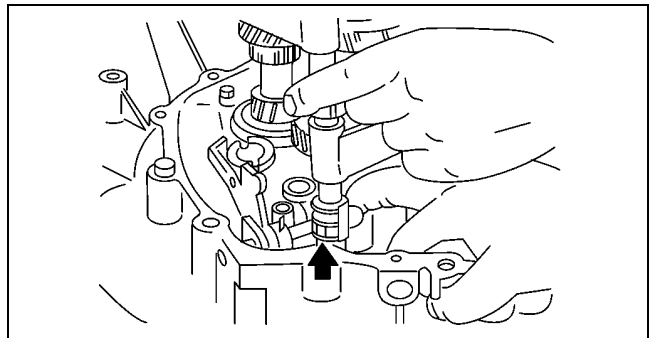
A6E5112M091

2. Insert the spring seat and spring into the reverse lever shaft, install the steel ball, and place a scraper so that it contacts the steel ball.
3. With the edge of the control end against the scraper, when the control end is pushed in the direction of the arrow in the figure so that the ball goes into the shaft, the rod will at the same time line up with the shift rod coupling hole in the clutch housing.



Z4F5112M092

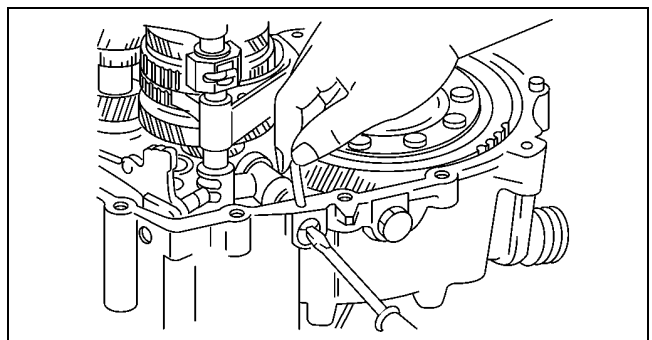
4. Set each clutch hub sleeve to the neutral position, and tap the shift rod from above so that the steel ball goes into the center groove (of the three grooves in the control end).
5. Pull the ball part of the control end forward so that the steel ball goes into the detent in the groove.



A6E5112M093

Crank Lever Component and Crank Lever Shaft Assembly Note

1. Fit the crank lever between the change arm and the control end, and connect the crank lever shaft to the crank lever.
2. Align the pin holes of the crank lever shaft and the clutch housing, and insert a new pin.



A6E5112M094

MANUAL TRANSAXLE

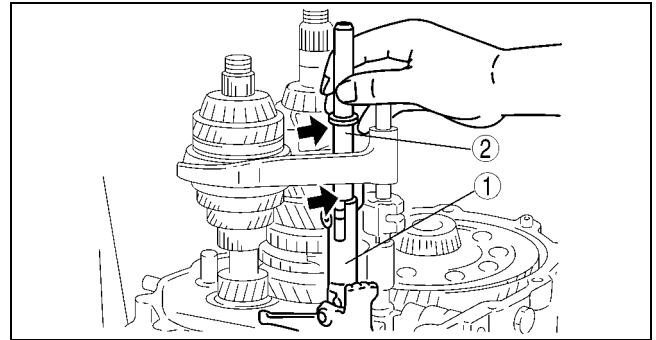
5th/Reverse Shift Rod End and 5th/Reverse Shift Rod Assembly Note

Note

- The mark (indicated by the arrow in the figure) and the shift rod end mounting bolt hole must be aligned.
1. Install shift rod end 1 and the shift rod 2, and tighten the gate mounting bolt.

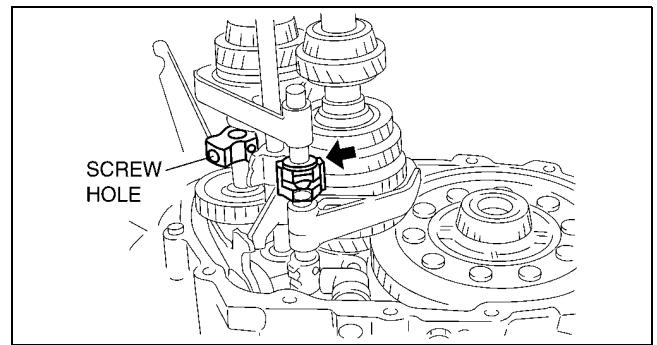
Tightening torque

11.8—13.7 N·m {120—140 kgf·cm, 105—121 in·lbf}



Reverse Idle Gear and Reverse Idle Shaft Assembly Note

1. Install the reverse idle gear and the reverse idler shaft.
2. Attach the magnet to the clutch housing.
3. Align the end of the interlock sleeve with the control lever (arrow), and at the same time, face the reverse idle shaft screw hole in the direction shown in the figure.



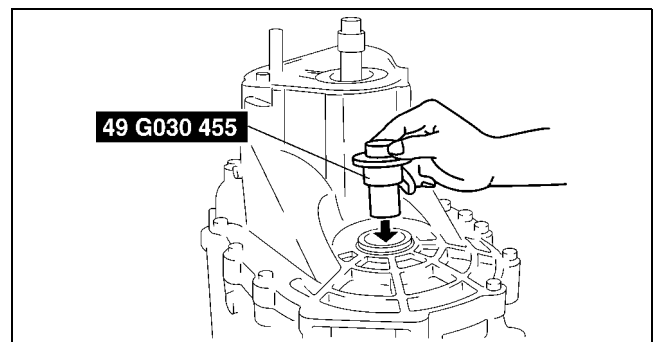
Transaxle Case Component Assembly Note

1. Apply a thin coat of sealant to the contact surfaces of the clutch housing and transaxle case, and tighten the transaxle case installation bolts to the specified torque.

Tightening torque

37.3—52.0 N·m {3.8—5.3 kgf·m, 28—38 ft·lbf}

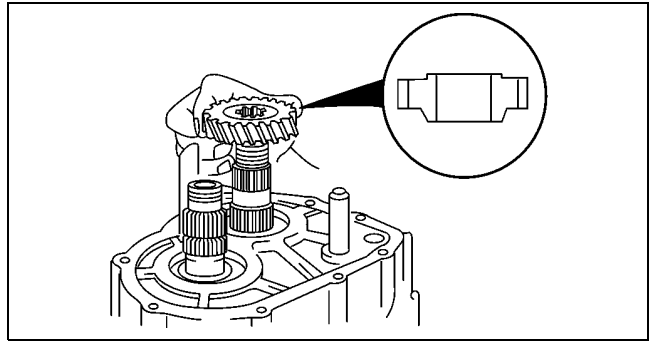
2. Install the **SSTs** through the drive shaft and joint shaft hole.



MANUAL TRANSAXLE

Secondary 5th Gear Assembly Note

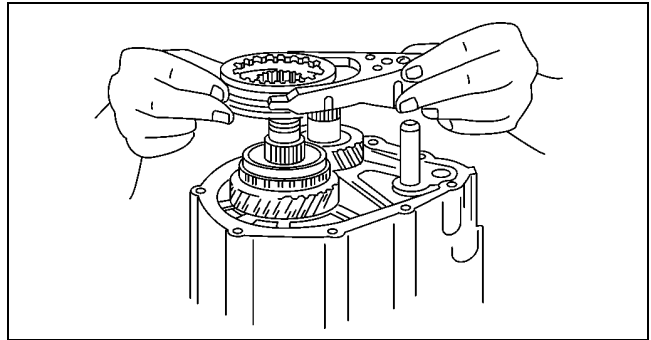
1. Install the secondary 5th gear as shown.



A6E5112M098

5th/Reverse Clutch Hub Component and 5th/Reverse Shift Fork Assembly Note

1. Install the 5th/reverse clutch hub component and the 5th/reverse shift fork together.



A6E5112M099

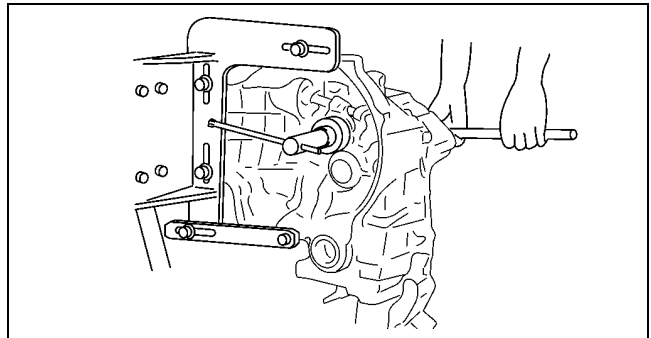
Locknut Assembly Note

1. Shift to 1st gear.
2. Lock the primary shaft using the **SST**.
3. Tighten new lock nuts onto the primary and secondary shafts.

Tightening torque

127.5—205.8 N·m {13.0—20.0 kgf·m, 95—144 ft·lbf}

4. Stake the locknuts.



A6E5112M100

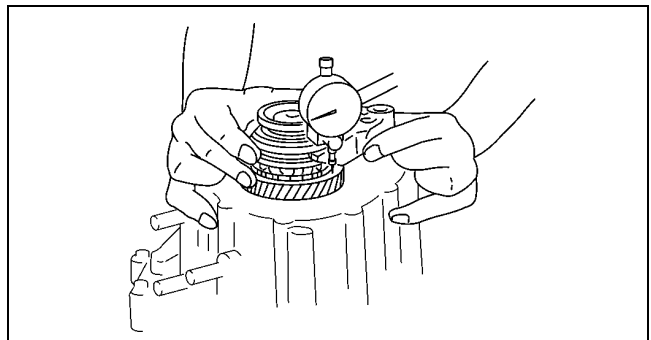
5. Measure the 5th gear thrust clearance using a dial indicator.
 - If not as specified, reassemble the transaxle.

Clearance

0.100—0.220 mm {0.0039—0.0087 in}

Maximum

0.270 mm {0.0106 in}



A6E5112M101

TECHNICAL DATA

TECHNICAL DATA	TD-2
MANUAL TRANSAXLE	TD-2

TD

TECHNICAL DATA

TECHNICAL DATA

MANUAL TRANSAXLE

A6E931001029M01

Item			Specification
Transaxle type			G35M-R
Thrust clearance	1st gear	Clearance (mm {in})	0.05—0.28 {0.002—0.011}
		Maximum (mm {in})	0.33 {0.013}
	2nd gear	Clearance (mm {in})	0.18—0.46 {0.007—0.018}
		Maximum (mm {in})	0.51 {0.020}
	3rd gear	Clearance (mm {in})	0.05—0.20 {0.002—0.007}
		Maximum (mm {in})	0.25 {0.010}
	4th gear	Clearance (mm {in})	0.17—0.37 {0.007—0.014}
		Maximum (mm {in})	0.42 {0.017}
	5th gear	Clearance (mm {in})	0.100—0.220 {0.0040—0.0086}
		Maximum (mm {in})	0.270 {0.0106}
Oil clearance	1st gear	1st gear inner diameter (mm {in})	39.500—39.525 {1.555—1.556}
		Secondary shaft outer diameter (mm {in})	39.445—39.470 {1.553—1.554}
		Clearance (mm {in})	0.030—0.080 {0.002—0.003}
	2nd gear	2nd gear inner diameter (mm {in})	35.015—35.035 {1.378—1.379}
		Secondary shaft outer diameter (mm {in})	34.945—34.905 {1.376—1.374}
		Clearance (mm {in})	0.05—0.09 {0.002—0.003}
	3rd gear	3rd gear inner diameter (mm {in})	36.000—36.025 {1.417—1.418}
		Primary shaft outer diameter (mm {in})	35.945—35.970 {1.415—1.416}
		Clearance (mm {in})	0.030—0.080 {0.001—0.003}
	4th gear	4th gear inner diameter (mm {in})	31.000—31.025 {1.220—1.221}
		Primary shaft outer diameter (mm {in})	30.945—30.970 {1.218—1.219}
		Clearance (mm {in})	0.030—0.080 {0.001—0.003}
	5th gear	5th gear inner diameter (mm {in})	34.000—34.025 {1.3386—1.3395}
		Sleeve outer diameter (mm {in})	33.945—33.970 {1.3365—1.3373}
		Clearance (mm {in})	0.030—0.080 {0.0012—0.0031}
Shift fork and hub sleeve	Clearance between 1st/2nd shift fork and hub sleeve	Standard (mm {in})	0.10—0.45 {0.004—0.017}
		Maximum (mm {in})	0.95 {0.037}
	Clearance between 3rd/4th shift fork and hub sleeve	Standard (mm {in})	0.10—0.40 {0.004—0.015}
		Maximum (mm {in})	0.90 {0.035}
	Clearance between 5th shift fork and hub sleeve	Standard (mm {in})	0.10—0.36 {0.004—0.014}
		Maximum (mm {in})	0.86 {0.034}
Synchronizer ring	Clearance between synchronizer ring and flank surface of gear	Standard (mm {in})	1.50 {0.059}
		Maximum (mm {in})	0.80 {0.031}
Reverse idle gear and reverse lever	Clearance between reverse idle gear bushing and reverse lever	Standard (mm {in})	0.10—0.35 {0.004—0.013}
		maximum (mm {in})	0.85 {0.033}

TECHNICAL DATA

Item			Specification
Primary shaft gear	Runout	(mm {in})	0.050 {0.0020}max.
	Bearing preload	(N·m {kgf·cm, in·lbf})	0.12—0.39 {1.2—4.0, 1.05—3.47}
	Preload adjust shims	(mm {in})	0.20 {0.008}, 0.25 {0.010}, 0.30 {0.012}, 0.35 {0.014}, 0.40 {0.016}, 0.45 {0.018}, 0.50 {0.020}, 0.55 {0.022}, 0.60 {0.024}, 0.65 {0.026}, 0.70 {0.028}
Secondary shaft gear	Runout	(mm {in})	0.015 {0.0006}max.
	Bearing preload	(N·m {kgf·cm, in·lbf})	0.2—0.3 {2.0—4.0, 1.8—3.4}
	Preload adjust shims	(mm {in})	0.20 {0.008}, 0.25 {0.010}, 0.30 {0.012}, 0.35 {0.014}, 0.40 {0.016}, 0.45 {0.018}, 0.50 {0.020}, 0.55 {0.022}, 0.60 {0.024}, 0.65 {0.026}, 0.70 {0.028}
Differential	Differential bearing preload	(N·m {kgf·cm, in·lbf})	1.4—1.9 {14—20, 13—17}
	Preload adjust shims	(mm {in})	0.1 {0.004}, 0.20 {0.008}, 0.25 {0.010}, 0.30 {0.012}, 0.35 {0.014}, 0.40 {0.016}, 0.45 {0.018}, 0.50 {0.020}, 0.55 {0.022}, 0.60 {0.024}, 0.65 {0.026}, 0.70 {0.028}, 0.75 {0.030}, 0.80 {0.031}, 0.85 {0.033}, 0.90 {0.035}, 0.95 {0.037}, 1.0 {0.039}, 1.05 {0.041}, 1.10 {0.043}, 1.15 {0.045}, 1.20 {0.047}
	Backlash of side gear and pinion gear	Standard (mm {in})	0.050—0.150 {0.0020—0.059}

TD

SPECIAL TOOLS

SPECIAL TOOLSST-2
MANUAL TRANSAXLE.....ST-2

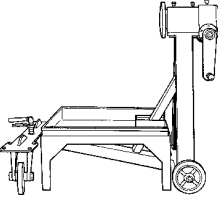
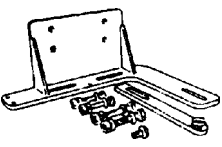
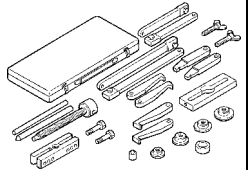
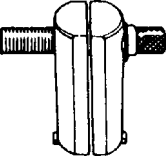
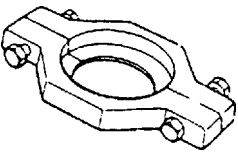
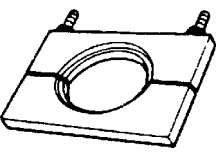
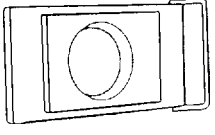

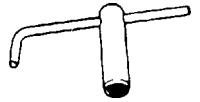
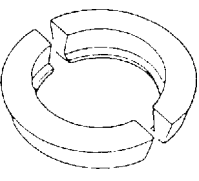
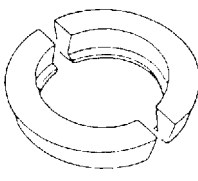
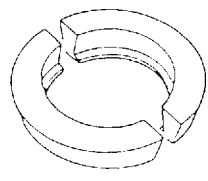
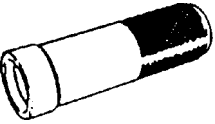

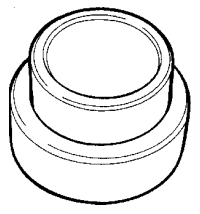

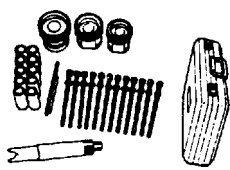
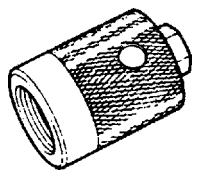
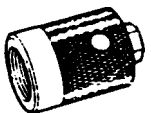
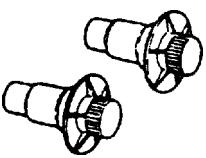
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SPECIAL TOOLS

SPECIAL TOOLS

MANUAL TRANSAXLE

A6E941001029M01

<p>49 0107 680A</p> <p>Engine stand</p> 	<p>49 G019 0A0</p> <p>Transaxle hanger set</p> 	<p>49 0839 425C</p> <p>Bearing puller set</p> 
<p>49 FT01 361</p> <p>Bearing remover</p> 	<p>46 0636 145</p> <p>Fan pulley boss puller</p> 	<p>498 G030 370</p> <p>Removing plate</p> 
<p>49 F401 366A</p> <p>Plate</p> 	<p>49 G030 795</p> <p>Oil seal installer</p> 	<p>49 G030 440</p> <p>Primary shaft holder</p> 
<p>49 B017 207</p> <p>Attachment G</p> 	<p>49 B017 208</p> <p>Attachment H</p> 	<p>49 B017 209</p> <p>Attachment J</p> 
<p>49 F401 331</p> <p>Body</p> 	<p>49 F401 335A</p> <p>Attachment A</p> 	<p>49 F401 336B</p> <p>Attachment B</p> 
<p>49 G030 338</p> <p>Attachment E</p> 	<p>49 G030 380D</p> <p>Shim selector set</p> 	<p>49 G017 202</p> <p>Preload adapter</p> 
<p>49 B017 102</p> <p>Preload adapter</p> 	<p>49 G030 455</p> <p>Diff. side gear holder</p> 	<p>—</p>