

Manual Transmission Workshop Manual M66M-D

FOREWORD

This manual explains the service points for the above-indicated automotive system. This manual covers all models with the above-indicated automotive system, not any one specific model.

In order to do these procedures safely, quickly, and correctly, you must first read this manual and any other relevant service materials carefully.

All the contents of this manual, including drawings and specifications, are the latest available at the time of printing. As modifications affecting repair or maintenance occur, relevant information supplementary to this volume will be made available at Mazda dealers. This manual should be kept up-to-date.

Mazda Motor Corporation reserves the right to alter the specifications and contents of this manual without obligation or advance notice.

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**Mazda Motor Corporation
Hiroshima, Japan**

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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

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GENERAL INFORMATION

HOW TO USE THIS MANUAL

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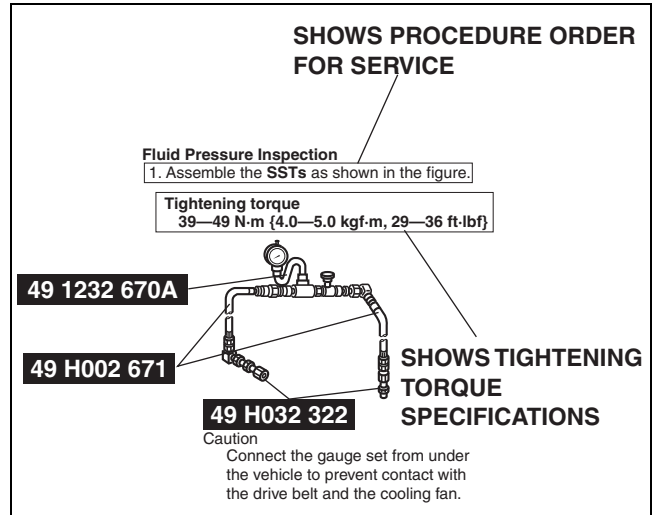
Range of Topics

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

Service Procedure

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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GENERAL INFORMATION

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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 that 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.

Procedure

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"Removal/Installation" Portion

"Inspection After Installation" Portion

INSTALL THE PARTS BY PERFORMING STEPS 1—3 IN REVERSE ORDER

SHOWS SERVICE ITEM (S)

INDICATES ANY RELEVANT REFERENCES WHICH NEED TO BE FOLLOWED DURING INSTALLATION

SHOWS SPECIAL SERVICE TOOL (SST) FOR SERVICE OPERATION

SHOWS APPLICATION POINTS OF GREASE, ETC.

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SHOWS REFERRAL NOTES FOR SERVICE

LOWER TRAILING LINK, UPPER TRAILING LINK REMOVAL/INSTALLATION

1. Jack up the rear of the vehicle and support it with safety stands.
2. Remove the undercover. (See 01-10-4 Undercover Removal)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Inspect the rear wheel alignment and adjust it if necessary.

1	Split pin
2	Nut
3	Lower trailing link ball joint (See 02-14-5 Lower Trailing Link Ball Joint Removal Note)
4	Bolt
5	Lower trailing link
6	Dust boot (lower trailing link)

7	Split pin
8	Nut
9	Upper trailing link ball joint (See 02-14-5 Upper Trailing Link Ball Joint Removal Note)
10	Nut
11	Upper trailing link
12	Dust boot (upper trailing link)

Lower Trailing Link Ball Joint, Upper Trailing Link Ball Joint Removal Note

- Remove the ball joint using the SSTs.

SHOWS SPECIAL SERVICE TOOL (SST) NO.

49 T028 304 UPPER TRAILING LINK
49 T028 305 LOWER TRAILING LINK

49 T028 303









KNUCKLE

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GENERAL INFORMATION

Symbols

- 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

- 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.

Specification

- 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.

GENERAL INFORMATION

UNITS

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Electric 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)
Positive pressure	kPa (kilo pascal)
	kgf/cm ² (kilogram force per square centimeter)
	psi (pounds per square inch)
Number of revolutions	rpm (revolutions per minute)
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)
	fl oz (fluid ounce)
Weight	g (gram)
	oz (ounce)

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Conversion From 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.

Number Of Digits For Converted Values

- The number digits for converted values is the same as the number of significant figures^{*1} of the SI unit.
- For the torque value, the number of significant figures is, in principle, is 2 digits, in consideration of market practicalities. However, if the number of decimal places at the upper and lower limits of the converted value differs, the one with least number of decimal places is used. In addition, if the integer part is 3 digits or more, the integer part becomes the significant number of figures.

*1 : The number of significant figures is the number of digits from the left-most non-zero digit to the right-most digit including 0. (Example: 0.12 is 2 digits, 41.0 is 3 digits)

Converted Value Rounding Off And Rounding Up/down

- If there is no tolerance in the SI unit value, after conversion, rounding off is to within the number of significant digits.
- If there is tolerance in the SI unit value and the figure after conversion indicates the upper limit, the number of digits is rounded down to within the number of significant figures. If it indicates the lower limit, they are rounded up to within the number of significant figures.
- Even if the SI unit value is the same, the converted value may differ based on whether that value is the upper or lower limit.

ABBREVIATIONS

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SST	Special Service Tool
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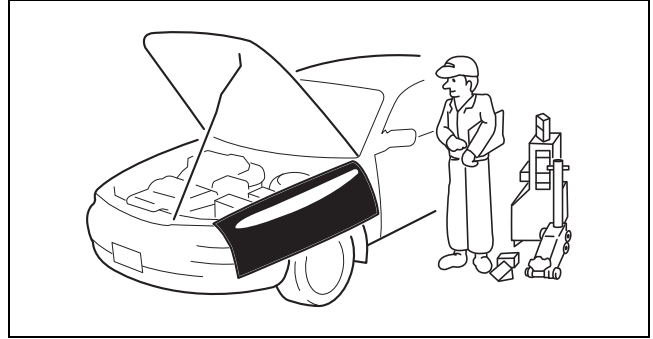
GENERAL INFORMATION

FUNDAMENTAL PROCEDURES

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Preparation of Tools and Measuring Equipment

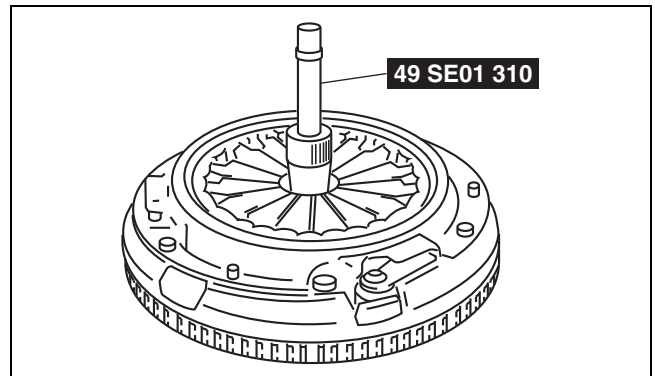
- Be sure that all necessary tools and measuring equipment are available before starting any work.



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Special Service Tools

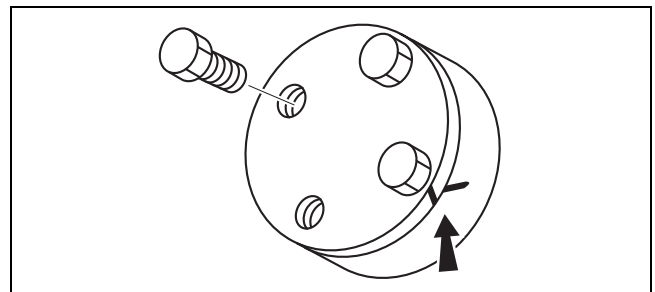
- Use special service tools or equivalent when they are required.



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Disassembly

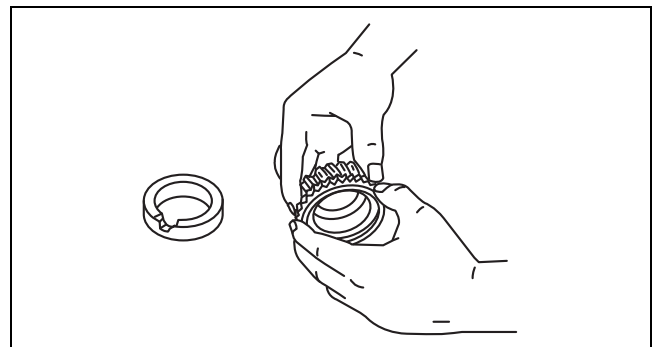
- If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be marked in a place that will not affect their performance or external appearance and identified so that reassembly can be performed easily and efficiently.



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Inspection During Removal, Disassembly

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

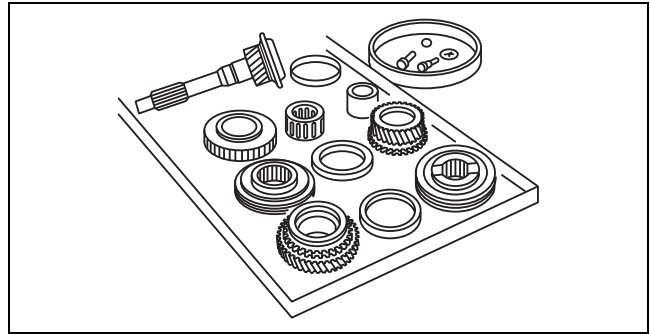


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GENERAL INFORMATION

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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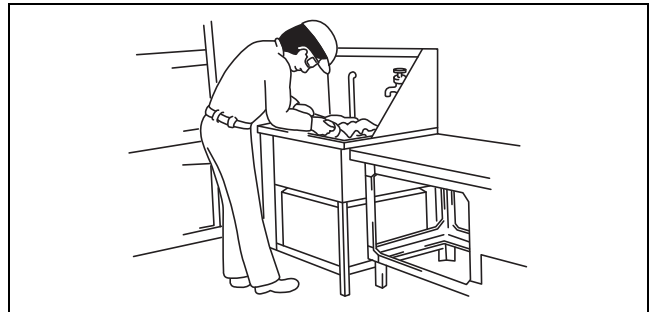
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Cleaning of Parts

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

Warning

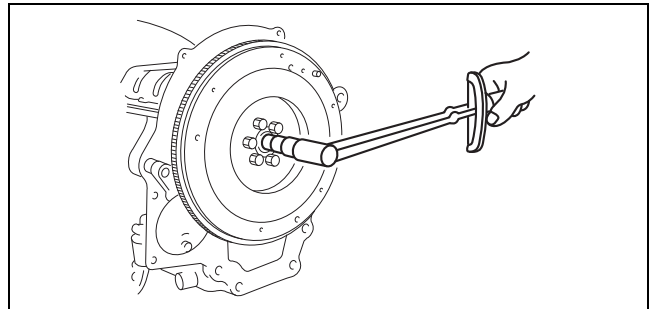
- **Using compressed air can cause dirt and other particles to fly out causing injury to the eyes. Wear protective eye wear whenever using compressed air.**



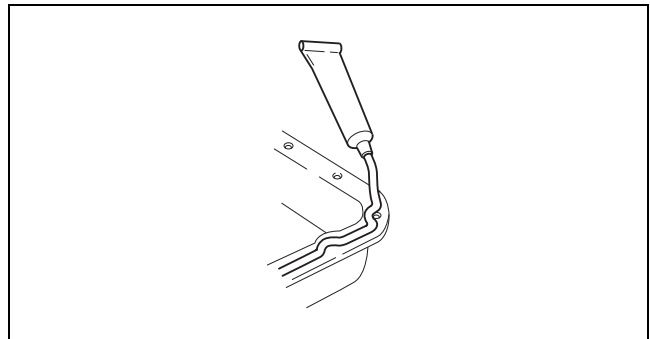
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Reassembly

- Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.
- If removed, the following 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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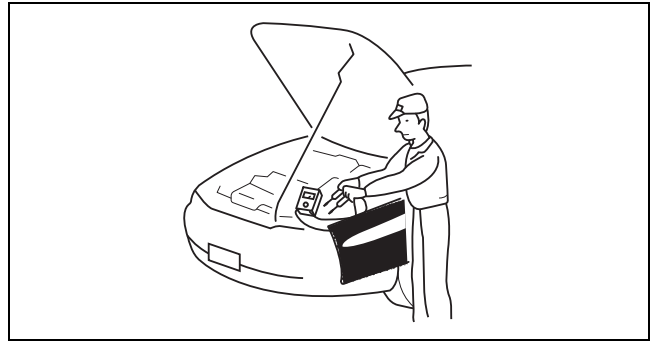


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GENERAL INFORMATION

Adjustment

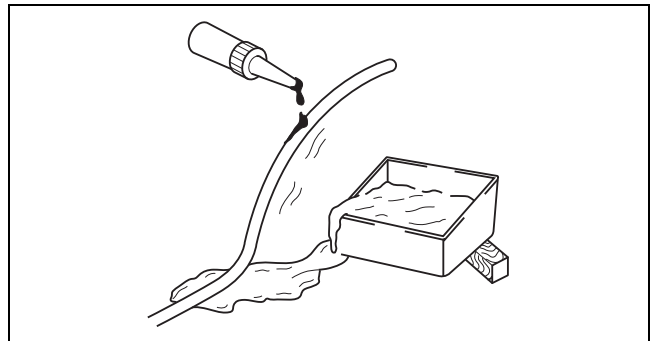
- Use suitable gauges and testers when making adjustments.



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Rubber Parts and Tubing

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

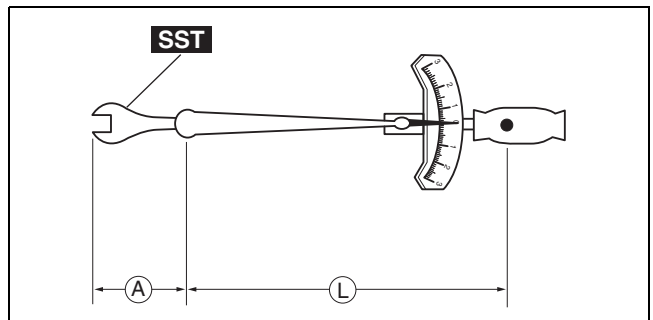


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Torque Formulas

- 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 by 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	$in \cdot lbf \times [L / (L + A)]$

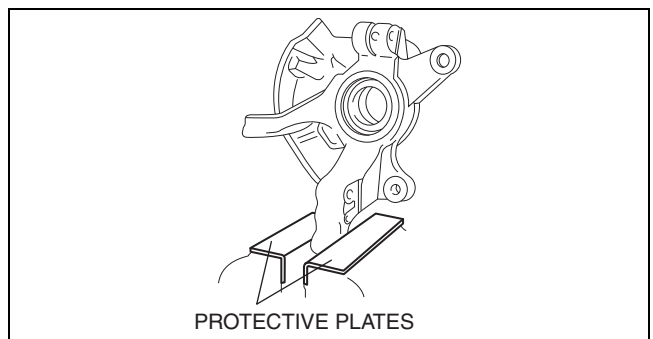


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A : The length of the **SST** past the torque wrench drive.
 L : The length of the torque wrench.

Vise

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



PROTECTIVE PLATES

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TRANSMISSION/TRANSAXLE

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PRECAUTION

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Warning

- **Always wear protective eye wear when using an air compressor. Otherwise, dirt particles blown off by the air compressor could get into the eyes.**

Service Caution

Disassembly

1. Clean the outside of the transmission using steam or degreaser before disassembly.
2. To prevent dust penetration into the transmission, perform overhaul servicing in a dust free room.
3. Clean the disassembled parts using degreaser and dry them using an air compressor.
4. Clean the oil hole and hydraulic passage using an air compressor and verify that they are not obstructed.
5. Always wear protective eye wear when using compressed air.
6. When disassembling a connecting part of a light-alloy part for the transmission case, use a plastic hammer.
7. Organize and store the disassembled parts to protect them from dirt.
8. If using a vise, always secure the component using an aluminum plate to prevent component damage.
9. Disassemble while verifying damage, cracks, deformation, scratches, and the assembly condition of each part.

Cleaning

1. Thoroughly wash the exterior of the transmission using steam or degreaser before disassembly.
2. Clean the removed parts using degreaser and dry them using an air compressor. Clean the oil hole and hydraulic passage using an air compressor.

Assembly

1. Before assembly, verify that each part is clean and dried.
2. Apply a sufficient amount of the specified oil (long-life gear oil IS) to the moving parts and sliding surfaces when performing assembly.
3. For parts such as snap rings and gaskets which are designated for replacement with every disassembly, always use a new part.
4. Clean away the remaining silicone sealant before applying new silicone sealant.
5. After applying the silicone sealant, install the transmission case before the applied silicone sealant starts to harden, wait for 30 min or more, and then add oil.
6. If using a vise, always secure the component using an aluminum plate to prevent component damage.

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MANUAL TRANSMISSION

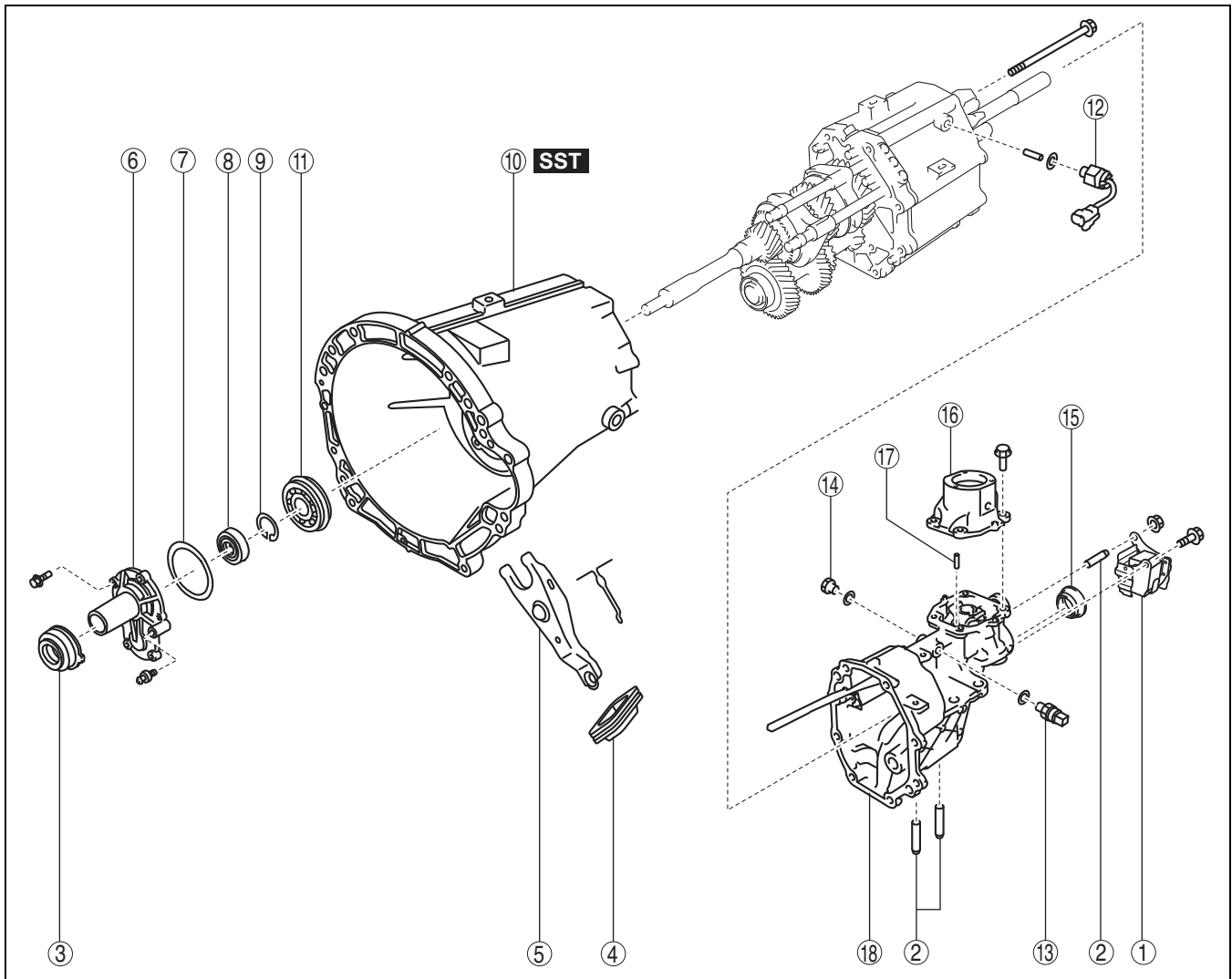
HOUSING COMPONENTS DISASSEMBLY

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Note

- Remove the oil seal (front/rear) only if there is any malfunction.

1. Disassemble in the order shown in the figure.



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1	Dynamic damper
2	Stud bolt
3	Clutch release collar
4	Boot
5	Clutch release fork
6	Front cover
7	Adjustment shim
8	Oil seal (front) (See 05-11-5 Oil Seal (Front) Disassembly Note.)
9	Snap ring
10	Transmission case (See 05-11-5 Transmission Case Disassembly Note.)

11	Main drive gear bearing
12	Back-up light switch (See 05-11-5 Back-up Light Switch Disassembly Note.)
13	Neutral switch
14	Plug
15	Oil seal (rear) (See 05-11-6 Oil Seal (Rear) Disassembly Note.)
16	Control case
17	Roll pin
18	Extension housing

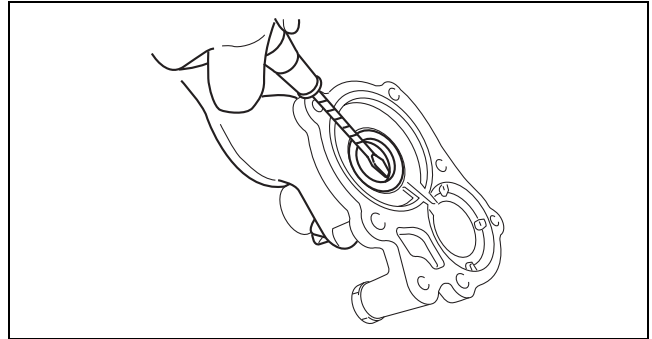
MANUAL TRANSMISSION

Oil Seal (Front) Disassembly Note

Note

- Remove the oil seal (front) only if there is any malfunction.

1. Remove the oil seal (front) using a tape-wrapped flathead screwdriver.

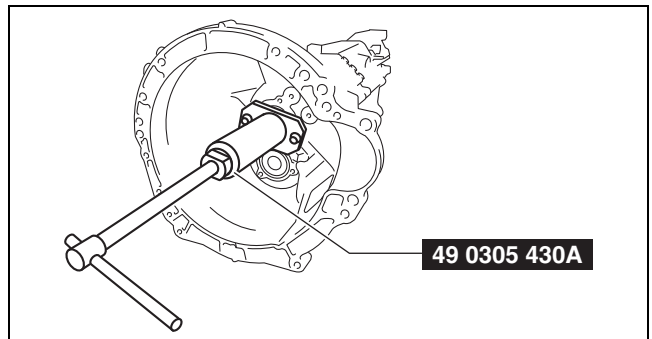


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Transmission Case Disassembly Note

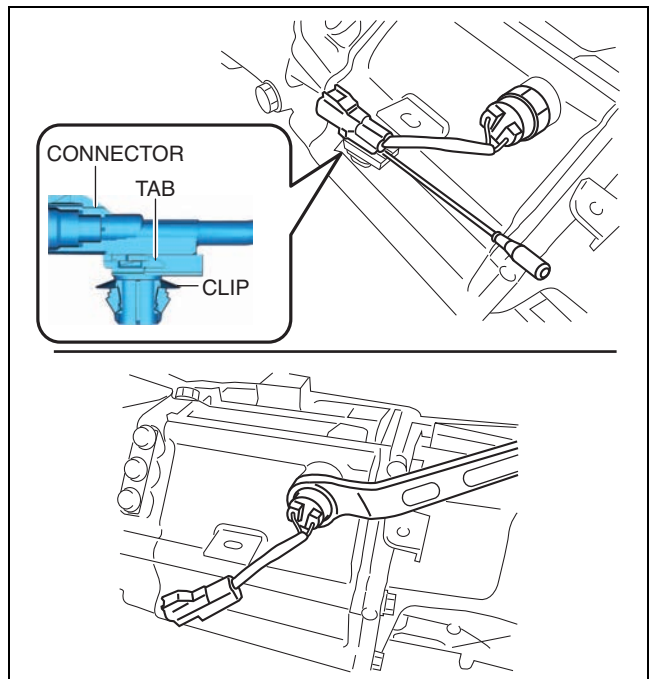
1. Remove the transmission case from the intermediate housing using the SST.



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Back-up Light Switch Disassembly Note

1. Detach the clip and disconnect the back-up light switch connector from the transmission.
2. Detach the clip tab and remove the clip from the back-up light switch connector.
3. Remove the back-up light switch.

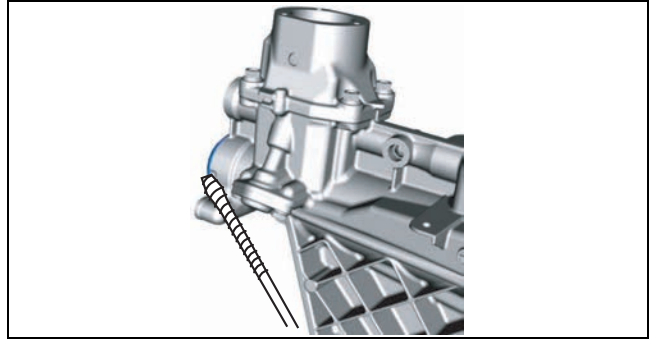


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Oil Seal (Rear) Disassembly Note

1. Press the position of the oil seal shown in the figure with a flathead screwdriver and raise the oil seal.



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2. Insert the flathead screwdriver into the gap made in Step 1 and remove the oil seal.

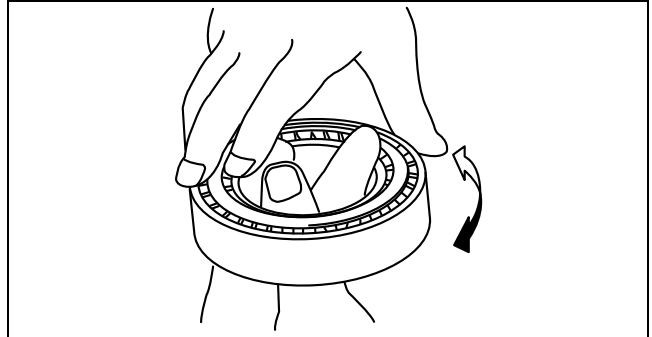


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HOUSING COMPONENTS INSPECTION

Bearing Inspection

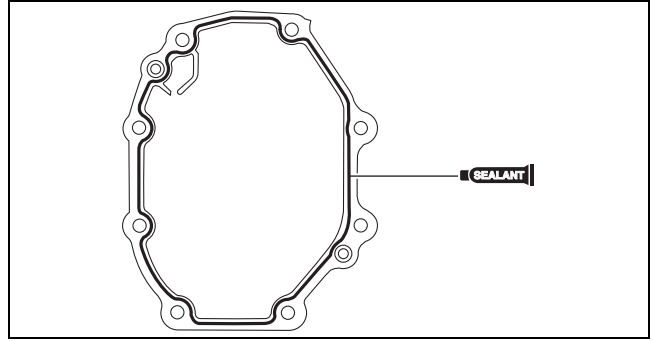
1. Inspect for damage and the rotation condition.
 - If there is any malfunction, replace the bearing.



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Extension Housing Assembly Note

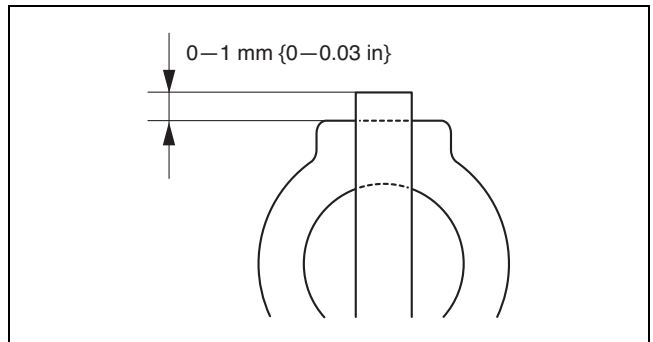
1. Apply silicone sealant TB1217E to the extension housing as shown in the figure.
2. Assemble the extension housing.



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Roll Pin Assembly Note

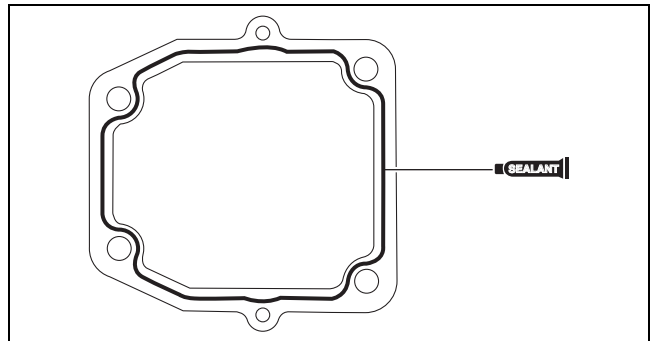
1. Assemble a new roll pin using a pin punch and a hammer.



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Control Case Assembly Note

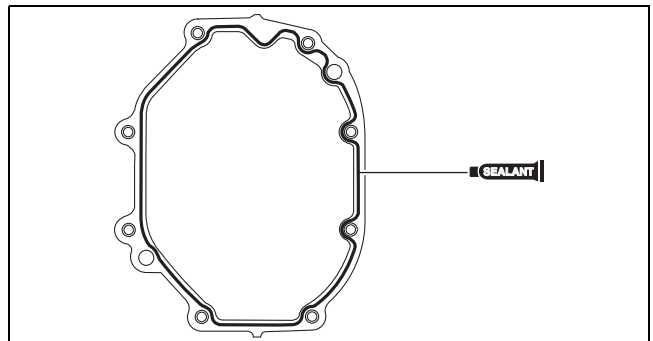
1. Apply silicone sealant TB1217E to the control case as shown in the figure.
2. Assemble the control case.



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Transmission Case Assembly Note

1. Apply silicone sealant TB1217E to the transmission case as shown in the figure.
2. Assemble the transmission case.

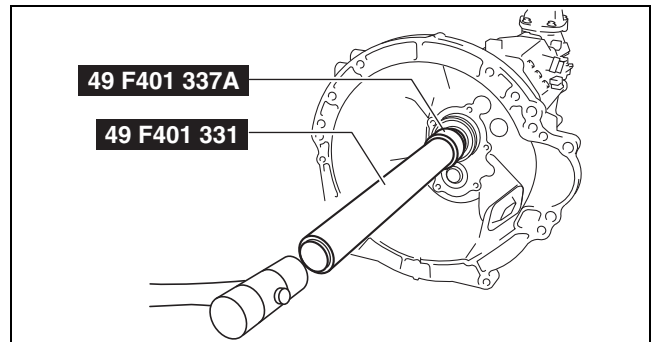


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MANUAL TRANSMISSION

Main Drive Gear Bearing Assembly Note

1. Assemble the main drive gear bearing using the **SSTs** and a hammer.

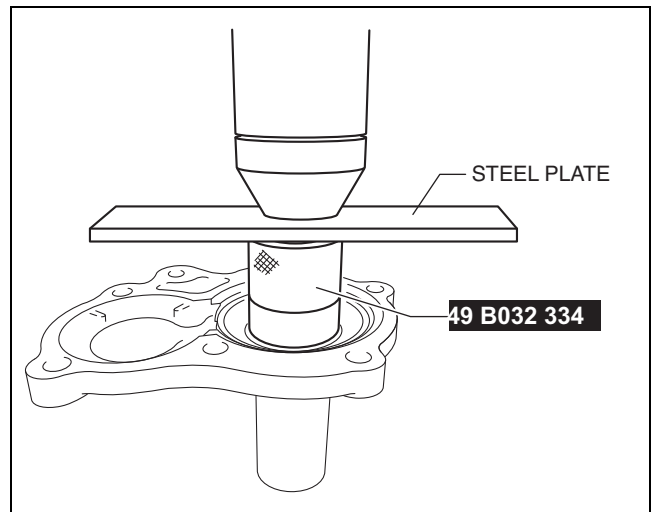


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05-11

Oil Seal (Front) Assembly Note

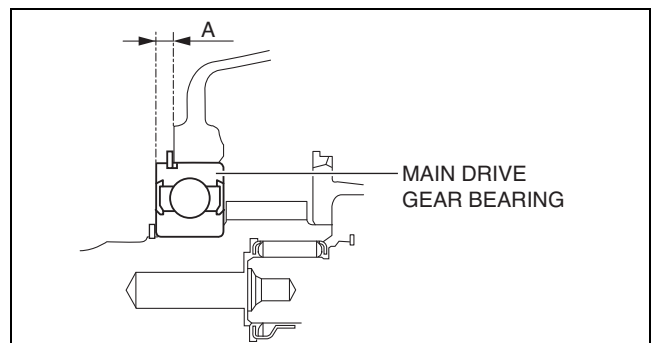
1. Assemble the oil seal (front) using the **SST** and the press.



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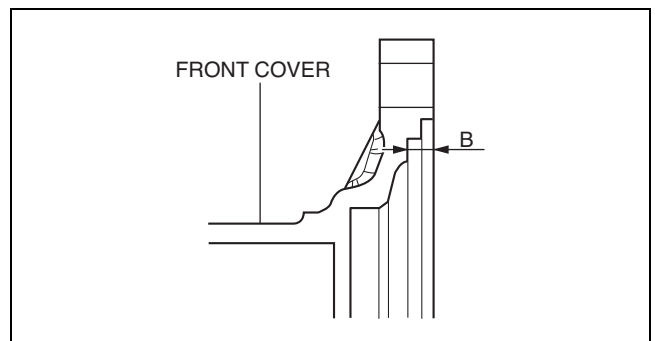
Adjustment Shim Assembly Note

1. Measure dimensions A and B shown in the figure.



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2. Subtract dimension A from dimension B and calculate the bearing end play.



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MANUAL TRANSMISSION

3. Select an adjustment shim so that the bearing end play is within the standard.

Bearing end play

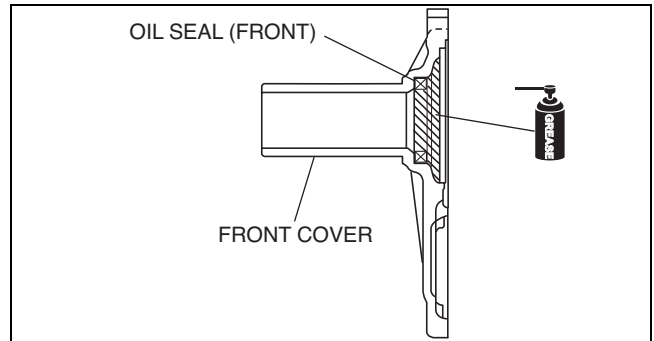
Standard: 0.13 mm {0.0051 in} or less

Adjustment shims for bearing end play adjustment

Thickness (mm {in})
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 {0.032}
0.85 {0.034}
0.90 {0.036}
0.95 {0.038}
1.00 {0.040}

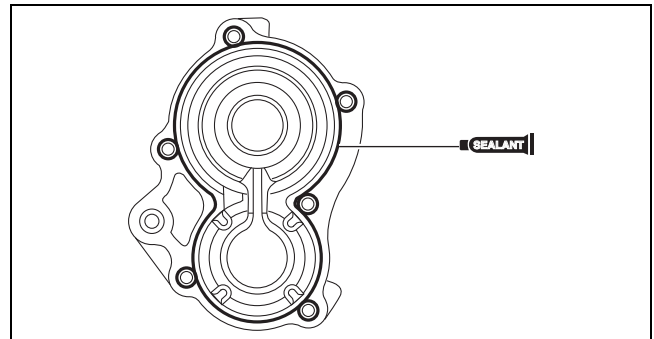
Front Cover Assembly Note

1. Apply lithium grease to the position of the front cover shown in the figure.



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2. Apply silicone sealant TB1217E to the front cover as shown in the figure.
3. Assemble the front cover.

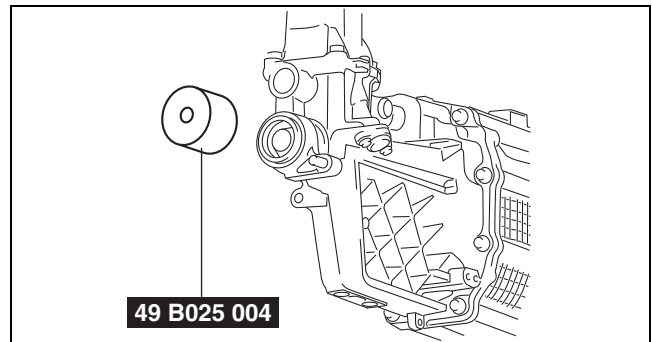


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MANUAL TRANSMISSION

Oil Seal (Rear) Assembly Note

1. Using the **SST** and a hammer, assemble the oil seal (rear).



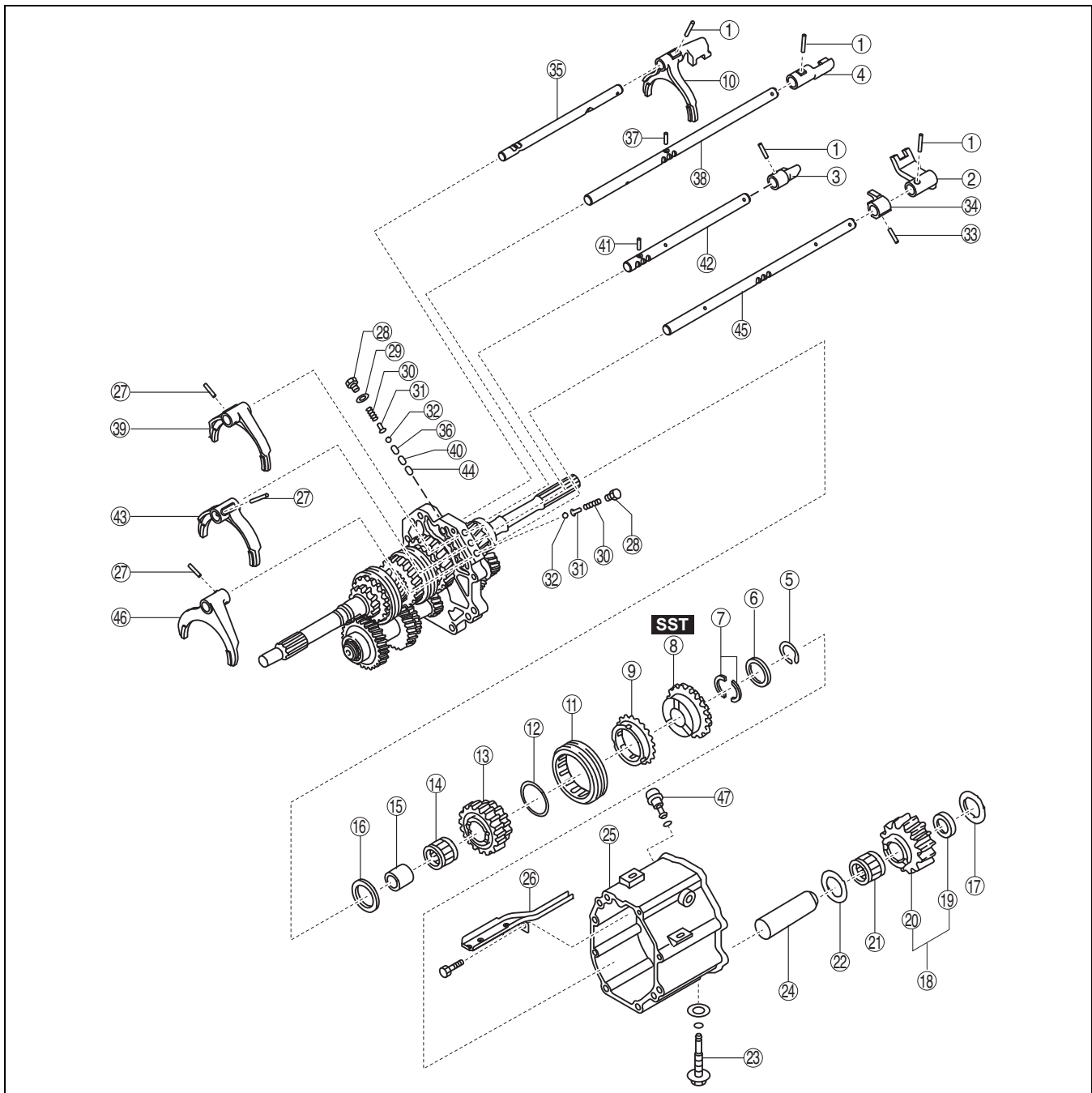
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05-11

SHIFT FORK, SHIFT ROD AND REVERSE GEAR PARTS DISASSEMBLY

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1. Disassemble in the order shown in the figure.



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05-11-11

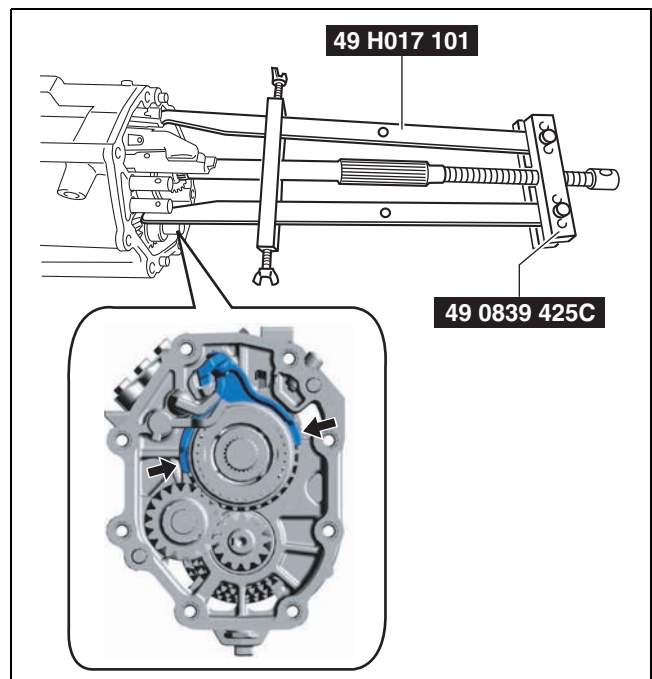
MANUAL TRANSMISSION

1	Roll pin
2	5th/6th shift rod end
3	3rd/4th shift rod end
4	1st/2nd shift rod end
5	Snap ring
6	Washer
7	C-washer
8	Reverse synchronizer cone (See 05-11-12 Reverse Synchronizer Cone Disassembly Note.)
9	Reverse synchronizer ring
10	Reverse shift fork
11	Reverse clutch hub sleeve
12	Reverse synchronizer key spring
13	Reverse gear
14	Bearing
15	Bearing race
16	Washer
17	Washer
18	Reverse idle gear component
19	Friction damper (See 05-11-13 Friction Damper Disassembly Note.)
20	Reverse idle gear
21	Bearing
22	Washer
23	Idle shaft pin
24	Reverse idle gear shaft
25	Intermediate housing
26	Oil guide
27	Roll pin

28	Cap plug
29	Washer
30	Spring
31	Spring seat
32	Detent ball
33	Roll pin
34	Stopper block
35	Reverse shift rod
36	Interlock pin (short) (See 05-11-13 Interlock Pin (Short) and Interlock Pin (Long) Disassembly Note.)
37	Interlock pin (long) (See 05-11-13 Interlock Pin (Short) and Interlock Pin (Long) Disassembly Note.)
38	1st/2nd shift rod
39	1st/2nd shift fork
40	Interlock pin (short) (See 05-11-13 Interlock Pin (Short) and Interlock Pin (Long) Disassembly Note.)
41	Interlock pin (long) (See 05-11-13 Interlock Pin (Short) and Interlock Pin (Long) Disassembly Note.)
42	3rd/4th shift rod
43	3rd/4th shift fork
44	Interlock pin (short) (See 05-11-13 Interlock Pin (Short) and Interlock Pin (Long) Disassembly Note.)
45	5th/6th shift rod
46	5th/6th shift fork
47	Breather (See 05-11-13 Breather Disassembly Note.)

Reverse Synchronizer Cone Disassembly Note

1. Install the **SST** tabs to the positions on the reverse shift fork shown in the figure.
2. Remove the reverse synchronizer cone, reverse synchronizer ring and reverse shift fork as a single unit using the **SSTs**.

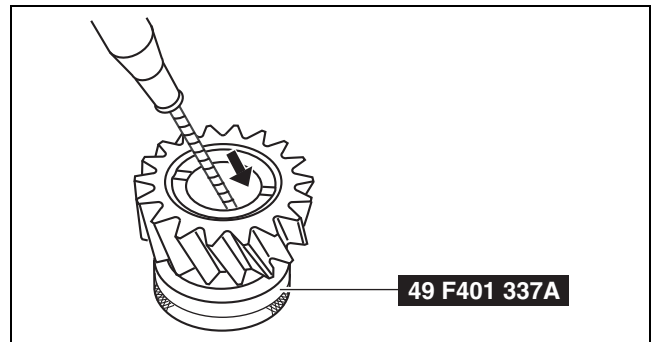


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MANUAL TRANSMISSION

Friction Damper Disassembly Note

1. Remove the friction damper using the **SST** and a tape-wrapped flathead screwdriver.

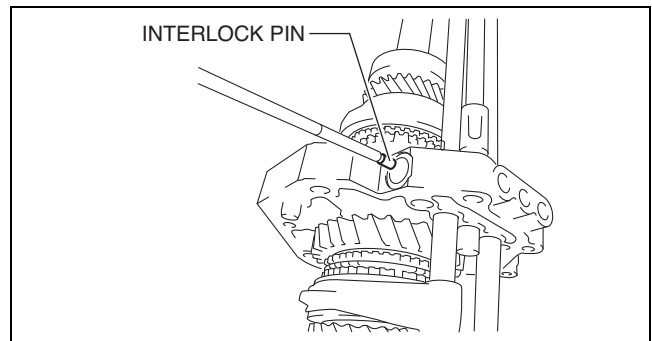


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05-11

Interlock Pin (Short) and Interlock Pin (Long) Disassembly Note

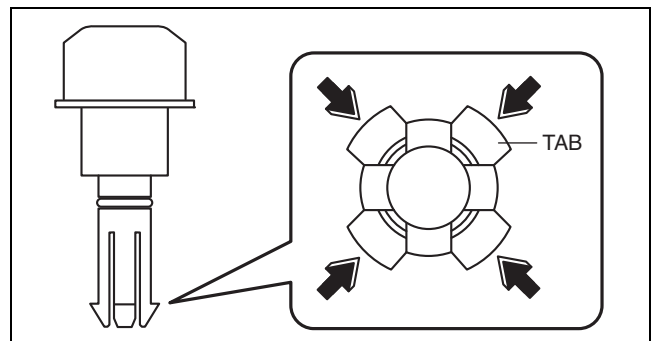
1. Remove the short and long interlock pins using a magnet.



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Breather Disassembly Note

1. Detach tabs shown in the figure and remove the breather.



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SHIFT FORK, SHIFT ROD AND REVERSE GEAR PARTS INSPECTION

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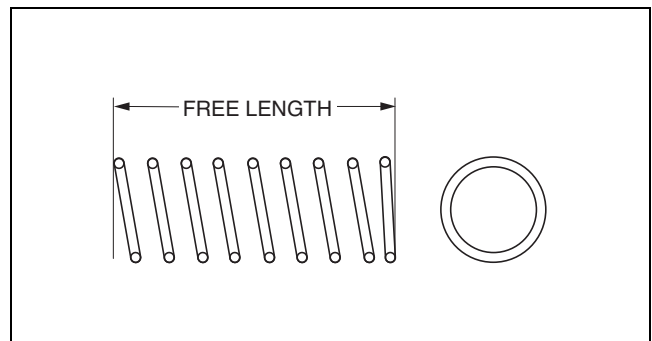
Spring Inspection

1. Measure the free length of the spring.

Spring for detent ball

Standard: 19.1 mm {0.751 in}

- If not within the standard, replace the spring.



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MANUAL TRANSMISSION

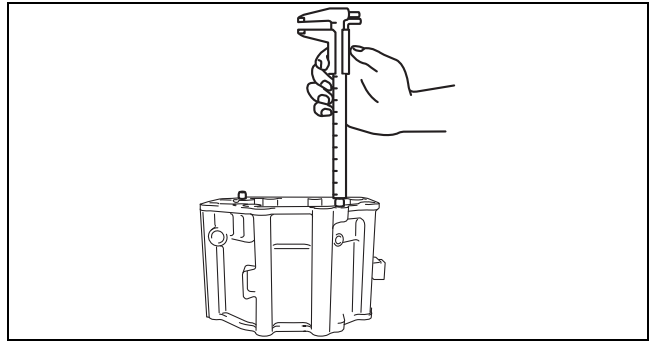
Intermediate Housing Inspection

1. Measure the height of the intermediate housing pin.

Intermediate housing pin height

Standard: 9—10 mm {0.36—0.39 in}

- If not within the standard, replace the intermediate housing.



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Shift Fork (Reverse) Inspection

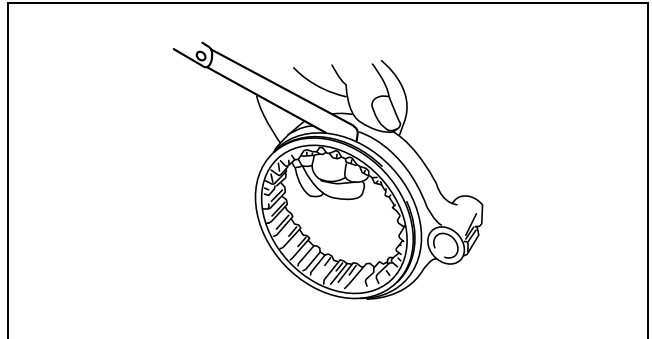
1. Using a thickness gauge, measure the clearance between the shift fork and clutch hub sleeve groove.

Clearance between clutch hub sleeve and shift fork

Standard: 0.2—0.3 mm {0.008—0.011 in}

Maximum: 0.5 mm {0.02 in}

- If it exceeds the maximum specification, replace the shift fork and clutch hub sleeve.



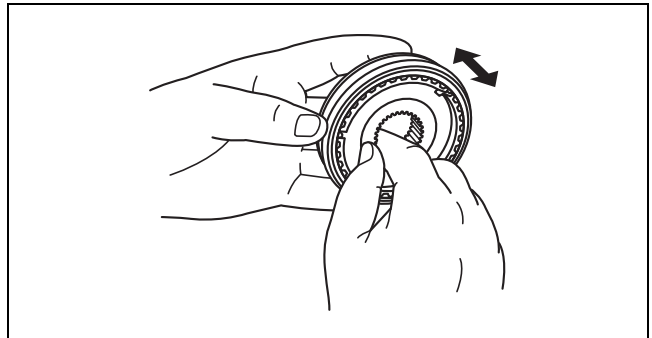
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Each Gear Inspection

1. Inspect the following: If there is any malfunction, replace the malfunctioning part.
 - Inspect the wear of the synchronizer cone.
 - Inspect the teeth of each gear for damage, wear, or loss.
 - Inspect for wear and damage to and around the hub sleeve.
 - Inspect the teeth of the synchronizer ring for damage, wear, or loss.

Clutch Hub Component Inspection

1. Inspect the following: If there is any malfunction, replace the clutch hub component.
 - Inspect the list of operations when installing the clutch hub sleeve to the hub (reverse gear).
 - Inspect the teeth of each gear for damage, wear, or loss.



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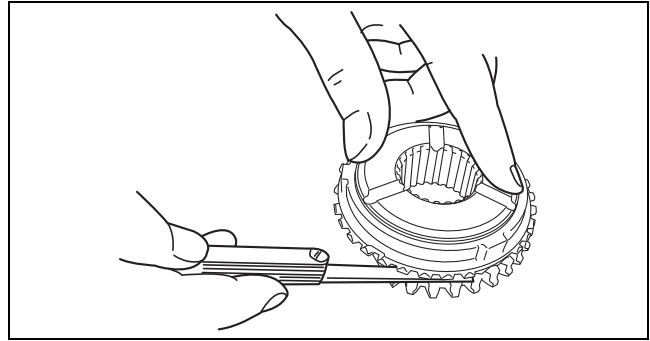
MANUAL TRANSMISSION

Synchronizer Ring (Reverse) Inspection

- Inspect the following: If there is any malfunction, replace the synchronizer ring.
 - Inspect the teeth of the synchronizer ring for damage, wear, or loss.
 - Inspect the taper surface for wear or loss.
- Measure the clearance between the sides of the synchronizer ring (reverse) and the reverse synchronizer cone around the entire circumference using a thickness gauge.

Clearance between sides of synchronizer ring (reverse) and reverse synchronizer cone
Standard: 1.5 mm {0.059 in}
Maximum: 0.8 mm {0.031 in}

- If it exceeds the maximum specification, replace the synchronizer ring.



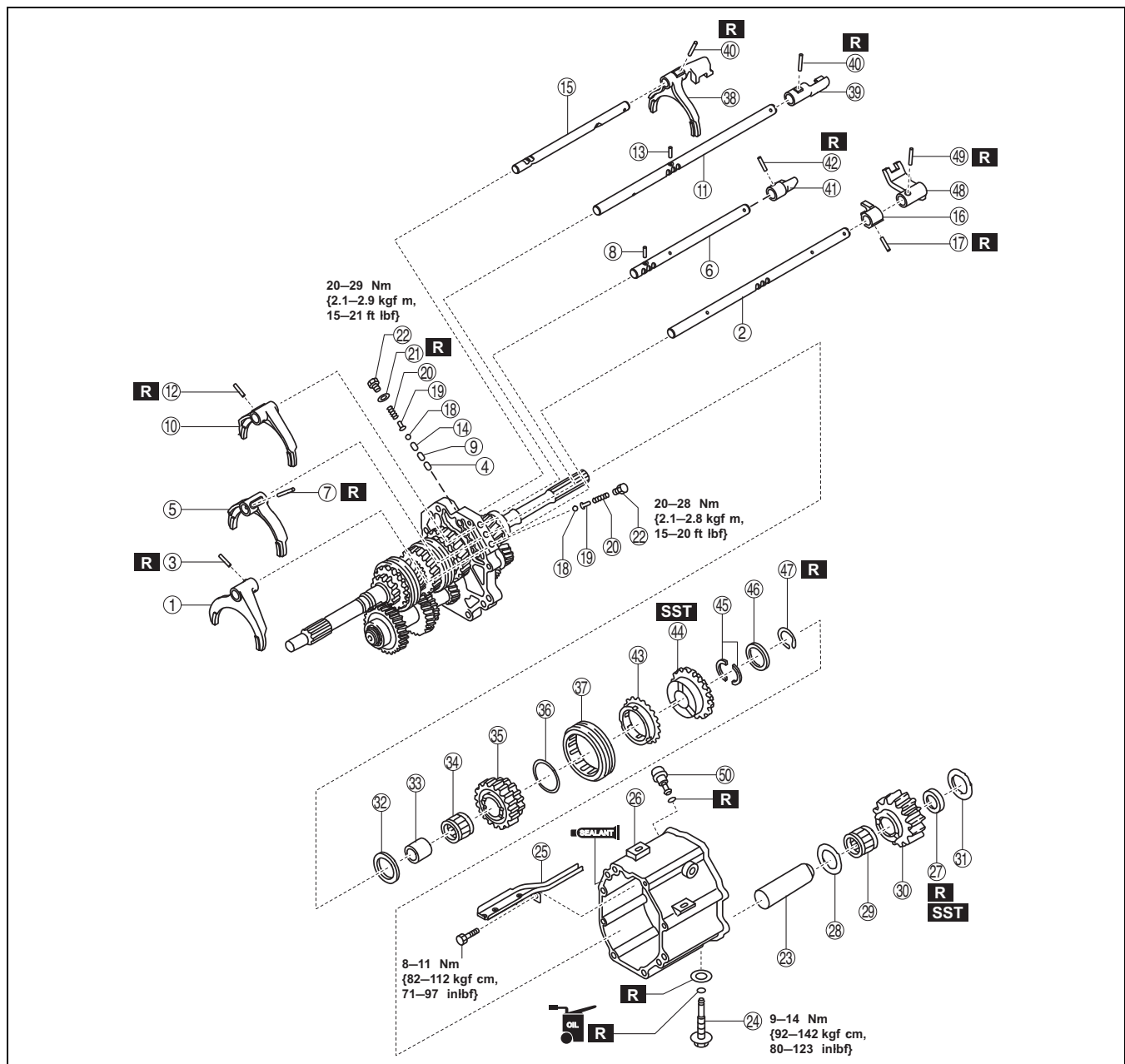
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05-11

SHIFT FORK, SHIFT ROD AND REVERSE GEAR PARTS ASSEMBLY

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- Assemble in the order shown in the figure.



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MANUAL TRANSMISSION

1	5th/6th shift fork
2	5th/6th shift rod
3	Roll pin (See 05-11-16 Roll Pin Assembly Note.)
4	Interlock pin (short) (See 05-11-17 Interlock Pin (Short)/(Long) Assembly Note.)
5	3rd/4th shift fork
6	3rd/4th shift rod
7	Roll pin (See 05-11-16 Roll Pin Assembly Note.)
8	Interlock pin (long) (See 05-11-17 Interlock Pin (Short)/(Long) Assembly Note.)
9	Interlock pin (short) (See 05-11-17 Interlock Pin (Short)/(Long) Assembly Note.)
10	1st/2nd shift fork
11	1st/2nd shift rod
12	Roll pin (See 05-11-16 Roll Pin Assembly Note.)
13	Interlock pin (long) (See 05-11-17 Interlock Pin (Short)/(Long) Assembly Note.)
14	Interlock pin (short) (See 05-11-17 Interlock Pin (Short)/(Long) Assembly Note.)
15	Reverse shift rod
16	Stopper block
17	Roll pin (See 05-11-16 Roll Pin Assembly Note.)
18	Detent ball
19	Spring seat
20	Spring
21	Washer
22	Cap plug
23	Reverse idle gear shaft
24	Idle shaft pin (See 05-11-17 Idle Shaft Pin Assembly Note.)

25	Oil guide
26	Intermediate housing (See 05-11-17 Intermediate Housing Assembly Note.)
27	Friction damper (See 05-11-18 Friction Damper Assembly Note.)
28	Washer
29	Bearing
30	Reverse idle gear
31	Washer
32	Washer
33	Bearing race
34	Bearing
35	Reverse gear
36	Reverse synchronizer key spring
37	Reverse clutch hub sleeve (See 05-11-18 Reverse Clutch Hub Sleeve Assembly Note.)
38	Reverse shift fork
39	1st/2nd shift rod end
40	Roll pin (See 05-11-16 Roll Pin Assembly Note.)
41	3rd/4th shift rod end
42	Roll pin (See 05-11-16 Roll Pin Assembly Note.)
43	Reverse synchronizer ring
44	Reverse synchronizer cone (See 05-11-18 Reverse Synchronizer Cone Assembly Note.)
45	C-washer (See 05-11-19 C-washer Assembly Note.)
46	Washer
47	Snap ring
48	5th/6th shift rod end
49	Roll pin (See 05-11-16 Roll Pin Assembly Note.)
50	Breather

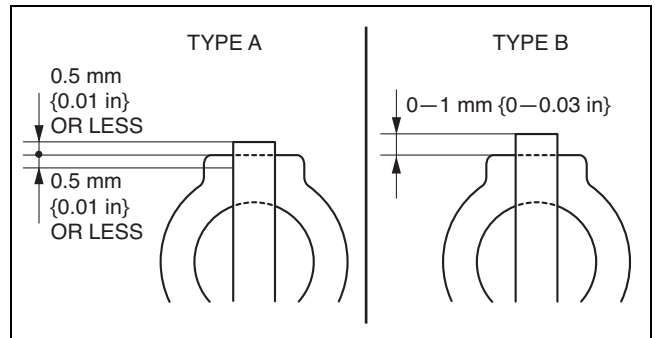
Roll Pin Assembly Note

- Assemble the new roll pins using a pin punch and a hammer.

Note

- The tap-in amount of the roll pins varies depending on their location of use. Verify the type with the table, and assemble as shown in the figure.

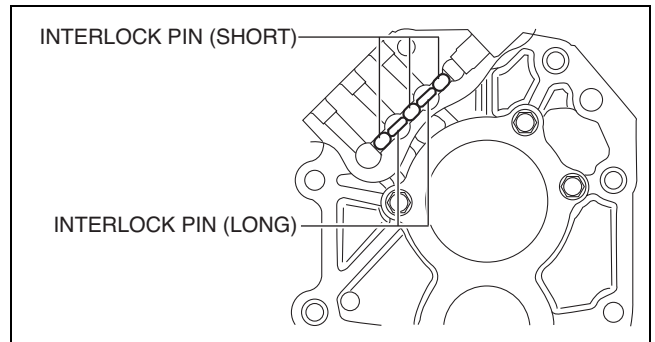
Roll pin location of use	Tap-in amount type
5th/6th shift fork	Type A
1st/2nd shift fork	Type A
3rd/4th shift fork	Type A
Stopper block	Type A
1st/2nd shift rod end	Type B
3rd/4th shift rod end	Type B
5th/6th shift rod end	Type B
Reverse shift fork	Type B



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Interlock Pin (Short)/(Long) Assembly Note

1. Assemble the interlock pins (short)/(long) to the positions on the bearing housing shown in the figure.



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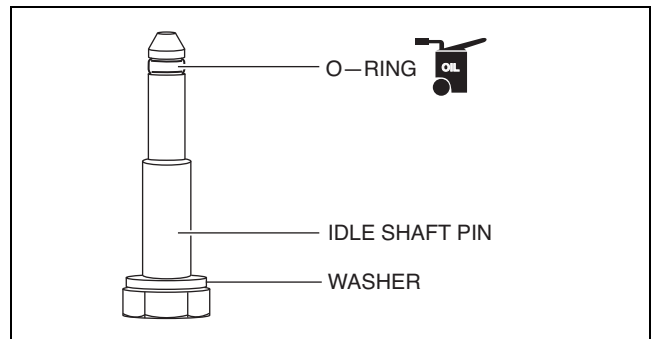
05-11

Idle Shaft Pin Assembly Note

1. Assemble the new O-ring to the end of the idle shaft pin, and apply transmission oil (long-life gear oil IS).
2. Assemble the idle shaft pin through the new washer.

Tightening torque

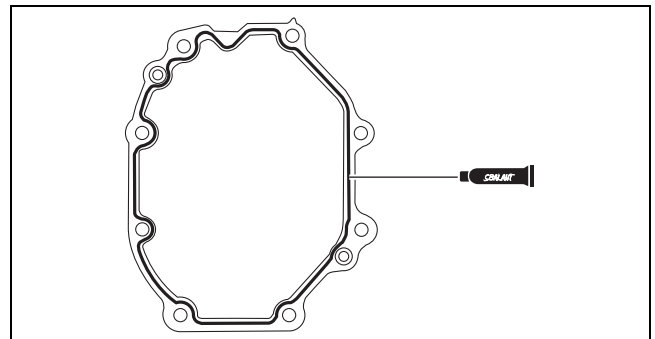
9—14 N·m {92—142kgf·cm, 80—123 in·lbf}



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Intermediate Housing Assembly Note

1. Apply silicone sealant TB1217E to the intermediate housing as shown in the figure.
2. Assemble the intermediate housing.

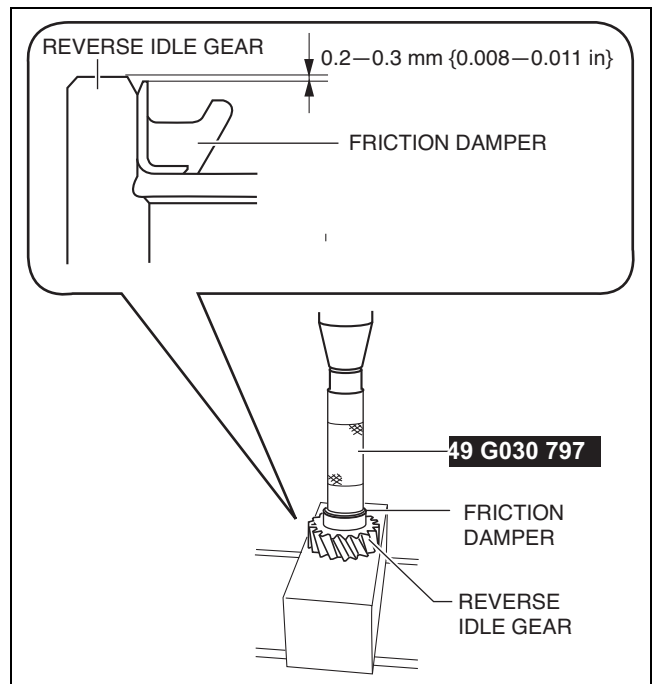


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MANUAL TRANSMISSION

Friction Damper Assembly Note

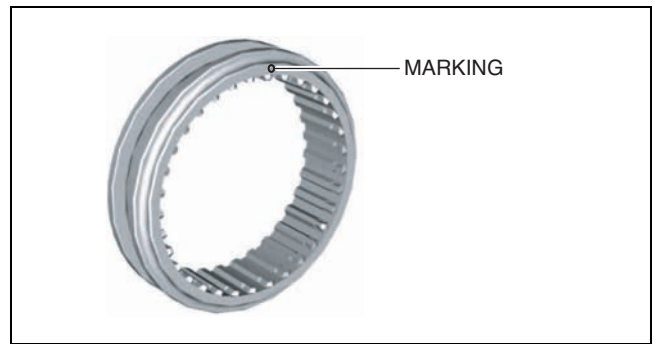
1. Assemble the new friction damper to the reverse idle gear using the **SST** and the press.



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Reverse Clutch Hub Sleeve Assembly Note

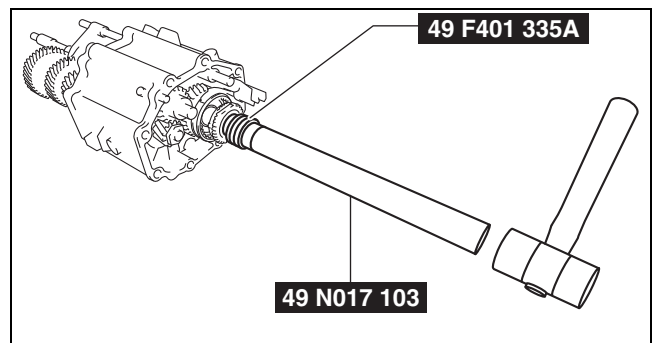
1. Assemble so that the reverse clutch hub sleeve marking is pointing toward the extension housing side.



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Reverse Synchronizer Cone Assembly Note

1. Assemble the reverse synchronizer cone using the **SSTs** and a hammer.



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MANUAL TRANSMISSION

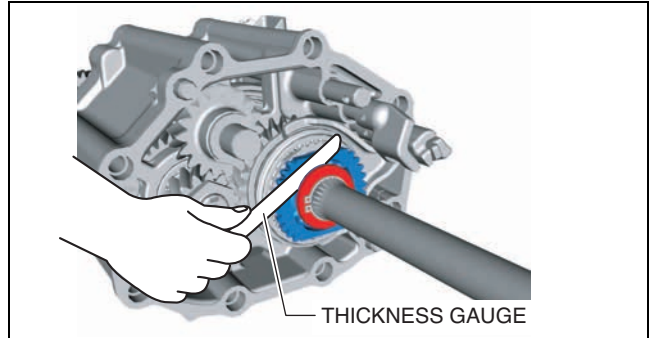
C-washer Assembly Note

1. Assemble the removed C-washer during disassembly to the washer, and assemble the snap ring.
2. Measure the clearance between the reverse synchronizer cone and C-washer with a thickness gauge.

Clearance between reverse synchronizer cone and C-washer

Standard: 0—0.14 mm {0—0.0055 in}

- If not within the standard, adjust the clearance by choosing the proper C-washer.



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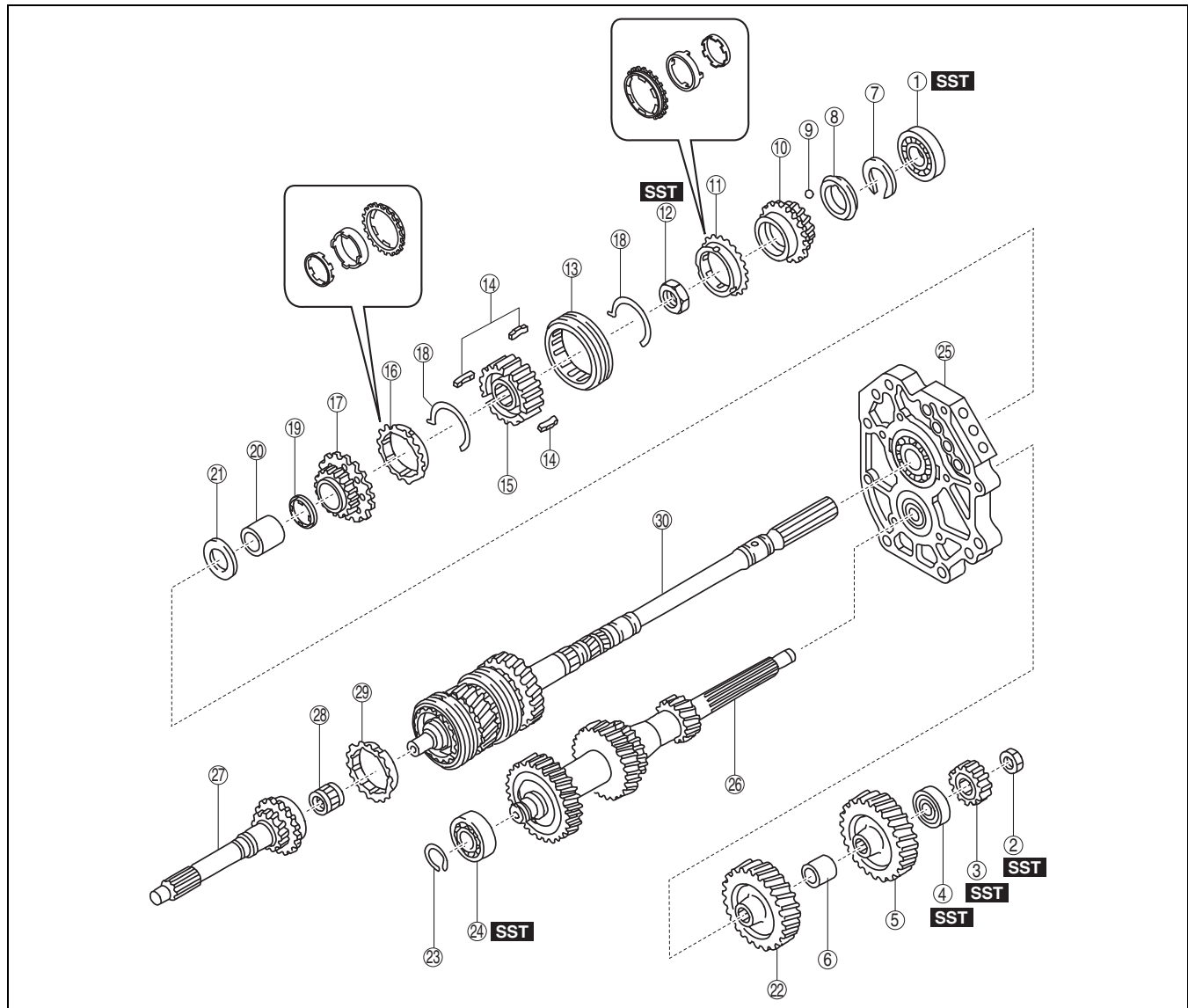
C-washer thickness (mm {in})
3.1 {0.123}
3.2 {0.126}
3.3 {0.130}
3.4 {0.134}

3. Assemble the adjusted C-washer to the washer and assemble the new snap ring.

MAINSHAFT AND COUNTERSHAFT PARTS DISASSEMBLY

id051100010600

1. Disassemble in the order shown in the figure.



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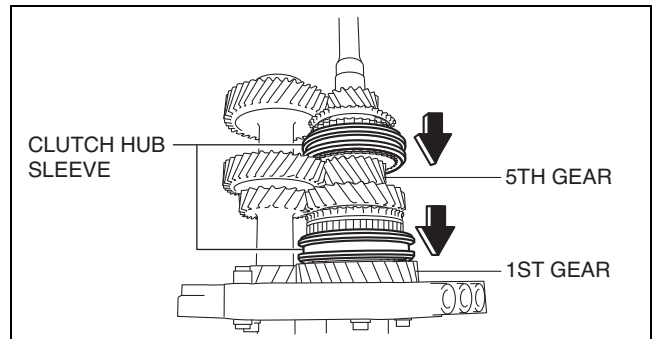
MANUAL TRANSMISSION

1	Main shaft rear bearing (See 05-11-20 Main Shaft Rear Bearing Disassembly Note.)
2	Locknut (countershaft) (See 05-11-21 Locknut (Countershaft) Disassembly Note.)
3	Counter reverse gear (See 05-11-21 Counter Reverse Gear and Countershaft Rear Bearing Disassembly Note.)
4	Countershaft rear bearing (See 05-11-21 Counter Reverse Gear and Countershaft Rear Bearing Disassembly Note.)
5	Counter 3rd gear
6	Spacer
7	Snap ring (See 05-11-22 Snap Ring Disassembly Note.)
8	Washer
9	Steel ball
10	3rd gear
11	3rd synchronizer component
12	Locknut (main shaft) (See 05-11-22 Locknut (Main Shaft) Disassembly Note.)
13	3rd/4th clutch hub sleeve
14	Synchronizer key

15	3rd/4th clutch hub (See 05-11-22 3rd/4th Clutch Hub, 4th Synchronizer Component and 4th Gear Disassembly Note.)
16	4th synchronizer component (See 05-11-22 3rd/4th Clutch Hub, 4th Synchronizer Component and 4th Gear Disassembly Note.)
17	4th gear (See 05-11-22 3rd/4th Clutch Hub, 4th Synchronizer Component and 4th Gear Disassembly Note.)
18	Synchronizer key spring
19	Friction damper
20	Gear sleeve
21	Washer
22	Counter 4th gear
23	Snap ring
24	Countershaft front bearing (See 05-11-23 Countershaft Front Bearing Disassembly Note.)
25	Bearing housing component (See 05-11-23 Bearing Housing Component Disassembly Note.)
26	Countershaft
27	Main drive gear
28	Bearing
29	6th synchronizer ring
30	Main shaft gear component

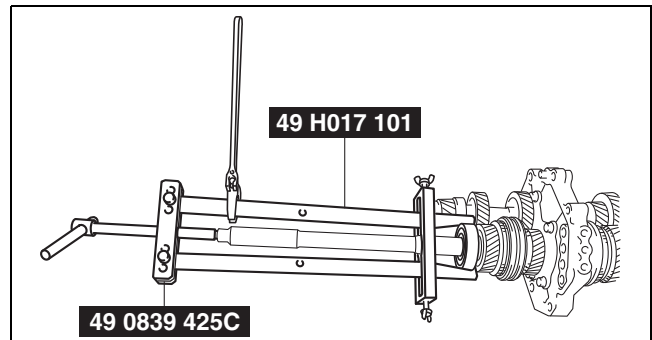
Main Shaft Rear Bearing Disassembly Note

1. Operate the clutch hub sleeve, align the 1st gear and 5th gear and lock the countershaft against rotation.



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2. Remove the main shaft bearing using the **SSTs**.

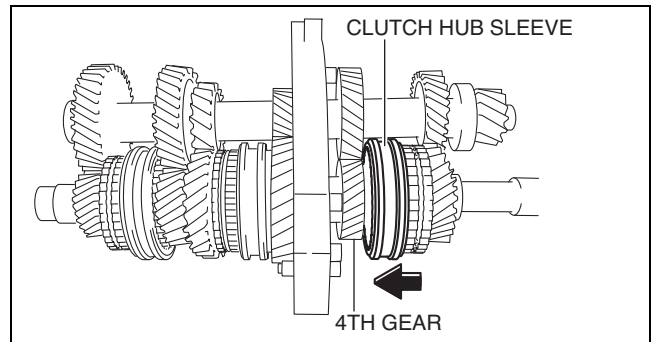


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MANUAL TRANSMISSION

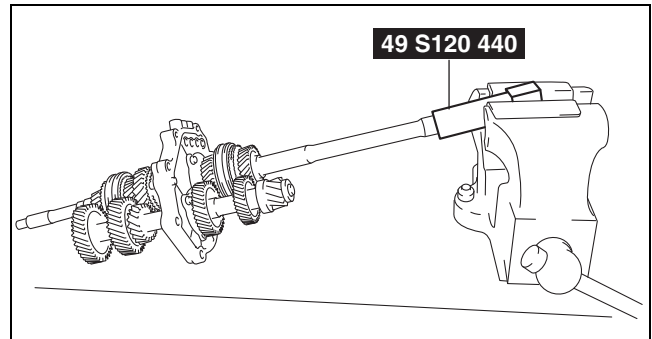
Locknut (Countershaft) Disassembly Note

1. Operate the clutch hub sleeve, align the 4th gear and lock the countershaft against rotation.



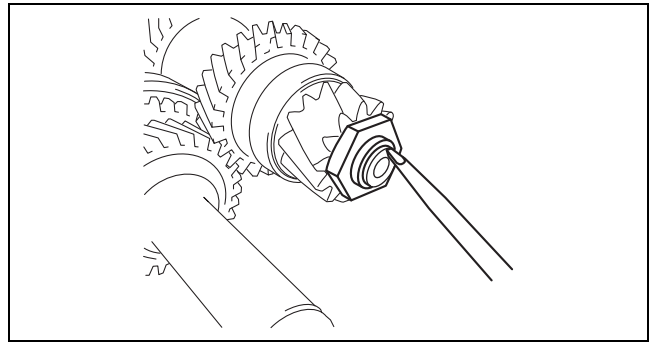
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2. Install the **SST** to the main shaft and secure it to the vice.



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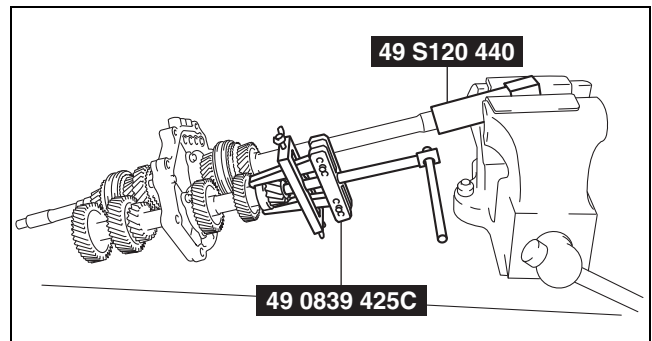
3. Remove the crimp of the locknut (countershaft) using a flathead screwdriver.
4. Remove the locknut.



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Counter Reverse Gear and Countershaft Rear Bearing Disassembly Note

1. Remove the counter reverse gear and countershaft rear bearing using the **SSTs**.



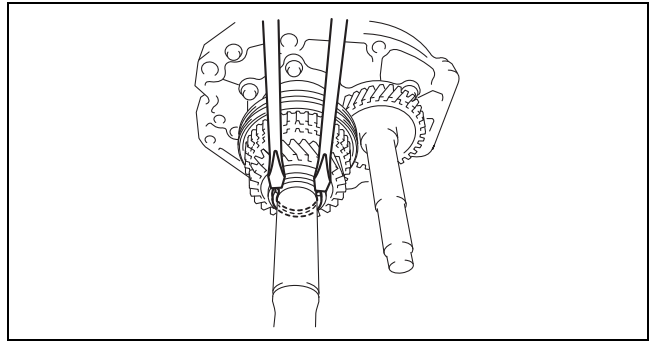
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05-11

MANUAL TRANSMISSION

Snap Ring Disassembly Note

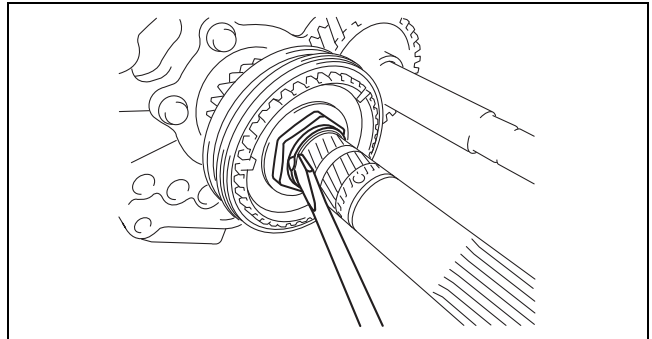
1. Remove the snap ring using 2 flathead screwdrivers.



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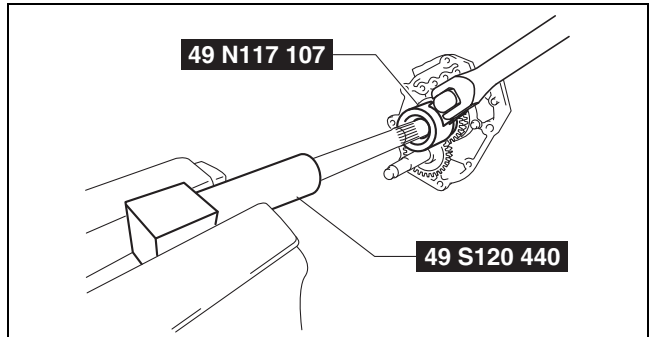
Locknut (Main Shaft) Disassembly Note

1. Remove the crimp of the locknut (main shaft) using a flathead screwdriver.



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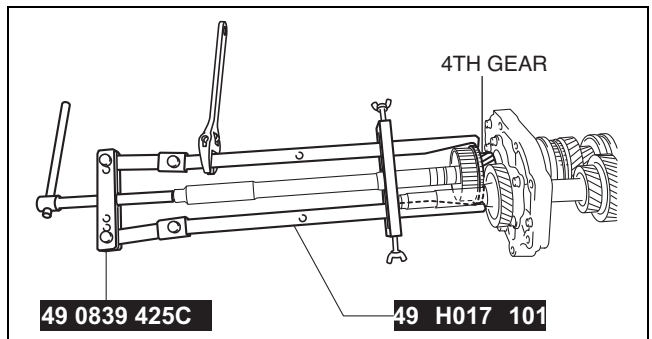
2. Remove the locknut (main shaft) using the **SSTs**.



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

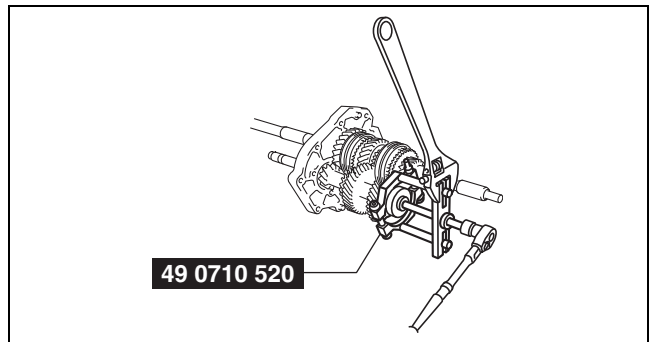
1. Install the SST tabs to the 4th gear chamfer.
2. Remove the 3rd/4th clutch hub, 4th synchronizer component and 4th gear using the **SSTs**.



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Countershaft Front Bearing Disassembly Note

1. Remove the countershaft front bearing using the SST.

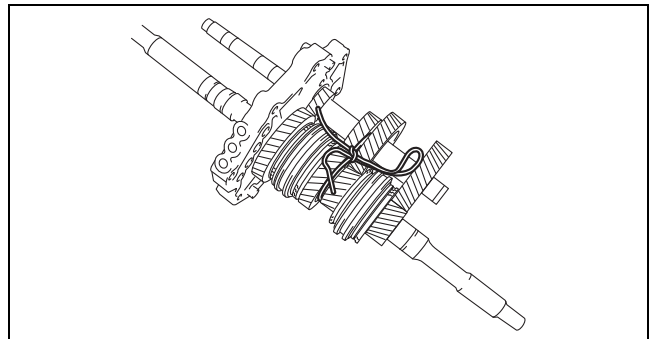


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Bearing Housing Component Disassembly Note

1. Tie the main shaft and the countershaft with string as shown in the figure.

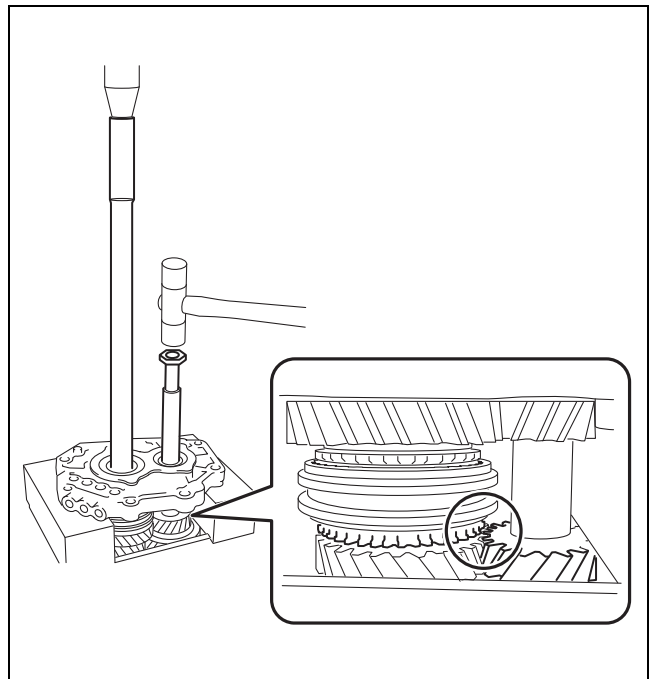


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2. Set the main shaft, countershaft and bearing housing component to the press as shown in the figure.
3. While gradually pressing out the main shaft with the press, lightly tap the countershaft using a plastic hammer to remove them from the bearing housing component.

Caution

- Remove the main shaft and countershaft from the bearing housing component while being careful not to interfere with the gears shown in the figure.



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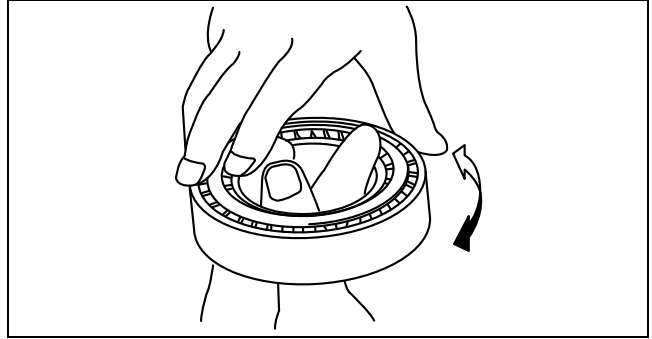
MANUAL TRANSMISSION

MAINSHAFT AND COUNTERSHAFT PARTS INSPECTION

id051100010700

Bearing Inspection

1. Inspect for damage and the rotation condition.
 - If there is any malfunction, replace the bearing.



bmm6jm000002

Each Gear, Main Drive Gear Inspection

1. Inspect the following. If there is any malfunction, replace the malfunctioning part.
 - Inspect for wear of the synchronizer cone.
 - Inspect the teeth of each gear for damage, wear, or loss.
 - Inspect the connection part of the hub sleeve for wear or damage.
 - Inspect the teeth of the synchronizer ring for damage, wear, or loss.
 - Inspect the main drive gear spline for damage, wear, or loss.

Shift Fork (3rd/4th) Inspection

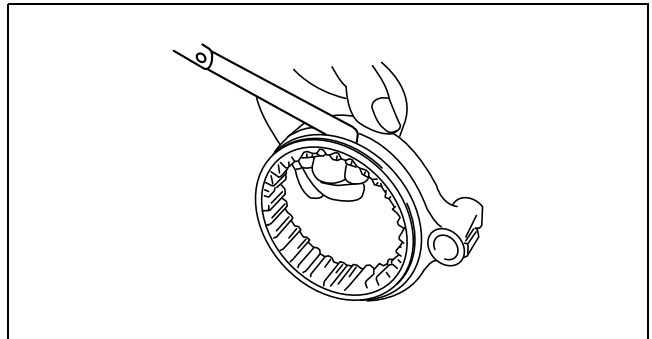
1. Using a thickness gauge, measure the clearance between each shift fork and the clutch hub sleeve groove.

Clearance between clutch hub sleeve and shift fork

Standard: 0.2—0.3 mm {0.008—0.011 in}

Maximum: 0.5 mm {0.02 in}

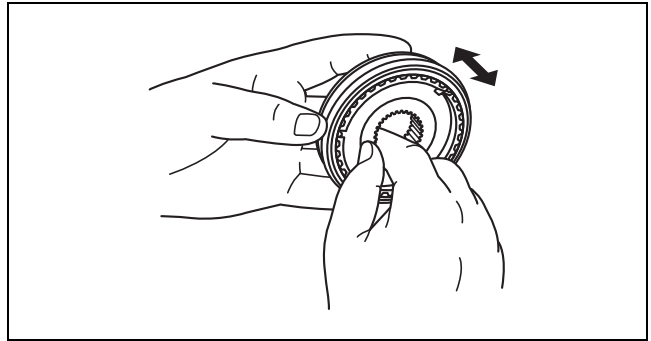
- If it exceeds the maximum specification, replace the shift fork and clutch hub sleeve.



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Clutch Hub Component (3rd/4th) Inspection

1. Inspect the following. If there is any malfunction, replace the clutch hub component.
 - Inspect the list of operations when the clutch hub sleeve is installed to the hub.
 - Inspect the teeth of each gear for damage, wear, or loss.
 - Inspect the synchronizer key groove for wear or loss.



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Synchronizer ring (3rd/4th/6th) Inspection

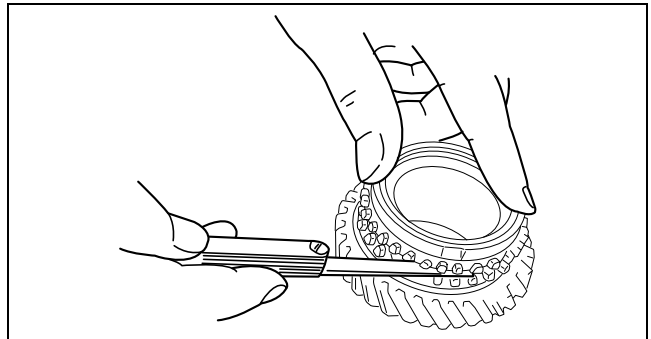
1. Inspect the following. If there is any malfunction, replace the synchronizer ring.
 - Inspect the teeth of the synchronizer ring for damage, wear, or loss.
 - Inspect the taper surface for wear or loss.
2. Measure the clearance of the synchronizer ring and gear side surface around the entire circumference using a thickness gauge.

Clearance of synchronizer ring (3rd/4th/6th) and gear side surface

Standard: 1.5 mm {0.059 in}

Maximum: 0.8 mm {0.031 in}

- If it exceeds the maximum specification, replace the synchronizer ring.



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Countershaft Inspection

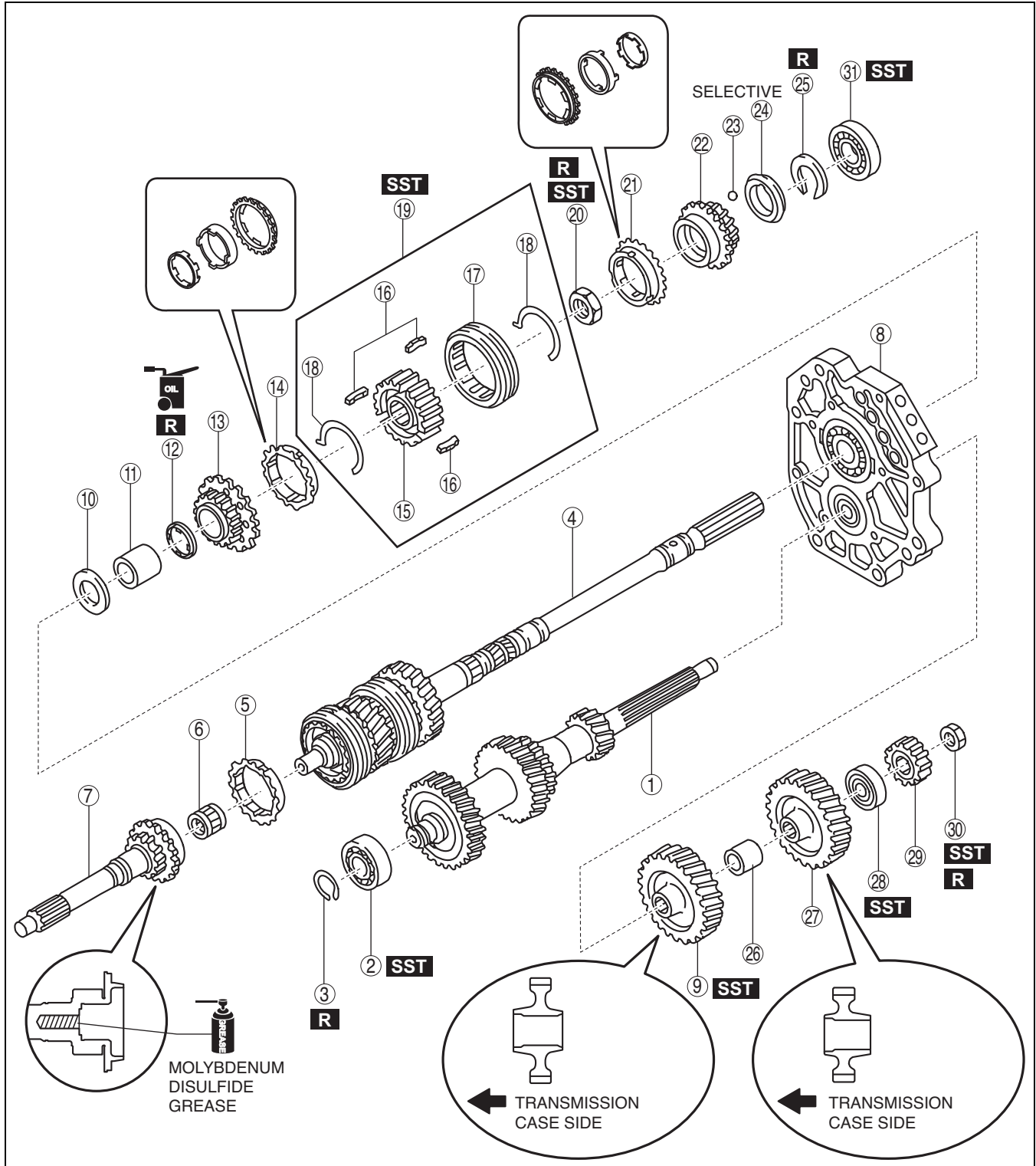
1. Inspect the following. If there is any malfunction, replace the countershaft.
 - Inspect the teeth of each gear for damage, wear, or loss.
 - Inspect the spline for damage, wear, or loss.

MANUAL TRANSMISSION

MAINSHAFT AND COUNTERSHAFT PARTS ASSEMBLY

id051100010800

1. Assemble using the procedure shown in the figure.



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1	Countershaft
2	Countershaft front bearing (See 05-11-27 Countershaft Front Bearing Assembly Note.)
3	Snap ring
4	Main shaft gear component
5	6th synchronizer ring

6	Bearing
7	Main drive gear
8	Bearing housing component (See 05-11-27 Bearing Housing Component Assembly Note.)
9	Counter 4th gear (See 05-11-28 Counter 4th Gear Assembly Note.)

MANUAL TRANSMISSION

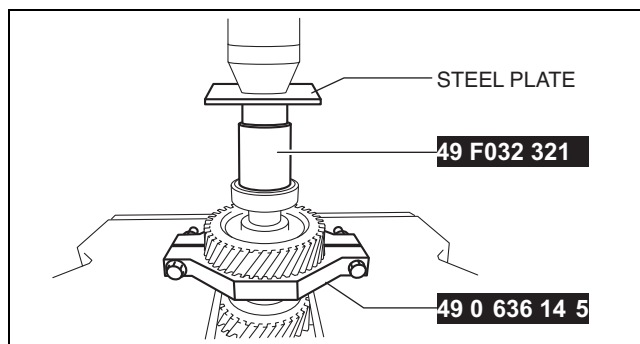
10	Washer
11	Gear sleeve
12	Friction damper
13	4th gear
14	4th synchronizer component (See 05-11-29 4th Synchronizer Component, 3rd Synchronizer Component Assembly Note.)
15	3rd/4th clutch hub (See 05-11-29 3rd/4th Clutch Hub, 3rd/4th Clutch Hub Sleeve Assembly Note.)
16	Synchronizer key
17	3rd/4th clutch hub sleeve (See 05-11-29 3rd/4th Clutch Hub, 3rd/4th Clutch Hub Sleeve Assembly Note.)
18	Synchronizer key spring
19	3rd/4th clutch hub component (See 05-11-29 3rd/4th Clutch Hub Component Assembly Note.)
20	Locknut (main shaft) (See 05-11-30 Locknut (Main Shaft) Assembly Note.)

21	3rd synchronizer component (See 05-11-29 4th Synchronizer Component, 3rd Synchronizer Component Assembly Note.)
22	3rd gear
23	Steel ball
24	Washer (See 05-11-31 Washer Assembly Note.)
25	Snap ring
26	Spacer
27	Counter 3rd gear
28	Countershaft rear bearing (See 05-11-31 Countershaft Rear Bearing Assembly Note.)
29	Counter reverse gear
30	Locknut (countershaft) (See 05-11-31 Locknut (Countershaft) Assembly Note.)
31	Main shaft rear bearing (See 05-11-32 Main Shaft Rear Bearing Assembly Note.)

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Countershaft Front Bearing Assembly Note

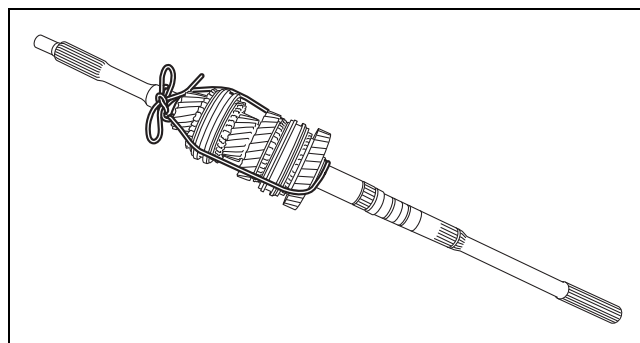
1. Assemble the countershaft front bearing using the **SST** and the press.



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Bearing Housing Component Assembly Note

1. Assemble the 6th synchronizer ring, bearing, and main drive gear to the main shaft gear component and secure them using a rope.
2. Set the bearing housing component, main shaft gear component, and countershaft to the press.



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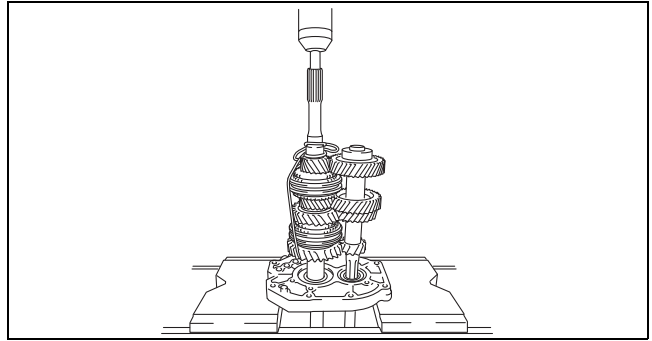
MANUAL TRANSMISSION

3. While gradually pressing the main shaft using a press, lightly tap the countershaft using a plastic hammer to install the main shaft and the countershaft to the bearing housing component.

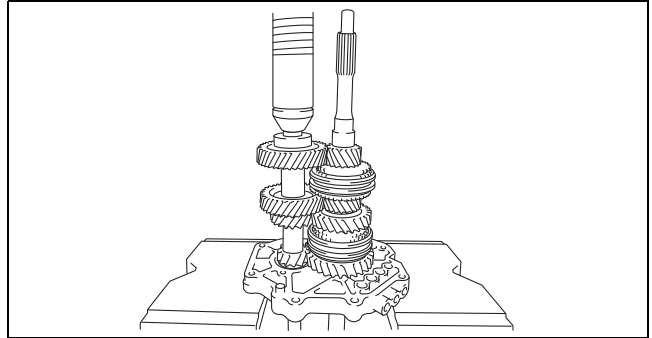
Caution

- Remove the rope before the 1st gear contacts the bearing housing.
- Assemble the main shaft and the countershaft to the bearing housing component while being careful not to allow the gear of the main shaft to contact the gear of the countershaft.

4. Assemble the main shaft completely, and then press the countershaft using a press to assemble the countershaft completely.



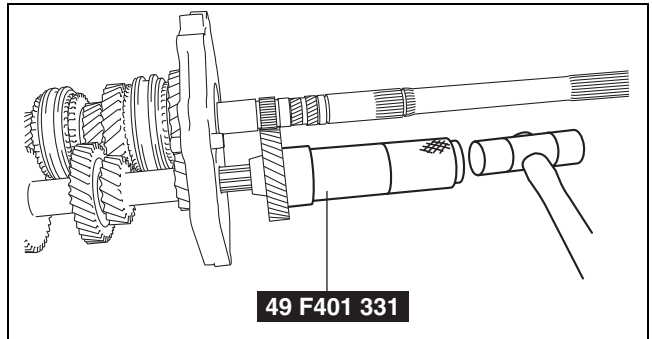
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Counter 4th Gear Assembly Note

1. Assemble the counter 4th gear using the SST and a hammer.

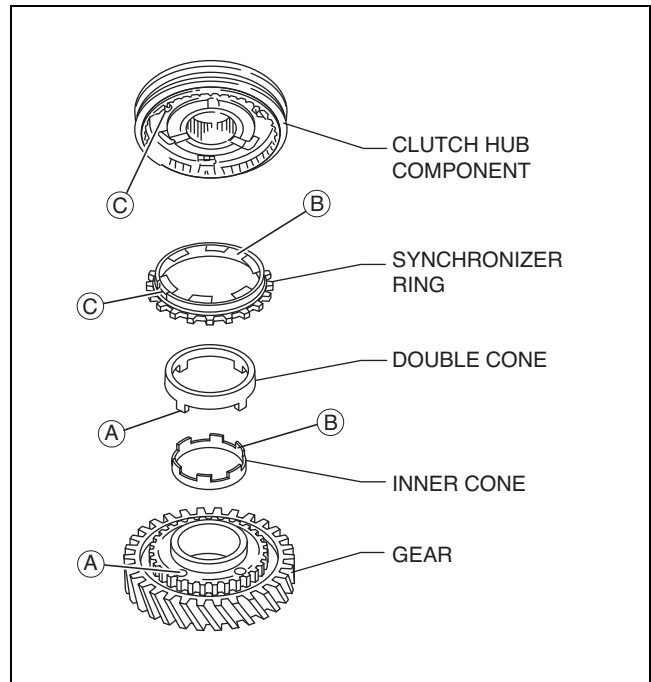


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MANUAL TRANSMISSION

4th Synchronizer Component, 3rd Synchronizer Component Assembly Note

1. Align the projections of each synchronizer cone with the positions of the gear and clutch hub grooves as shown in the figure and assemble.

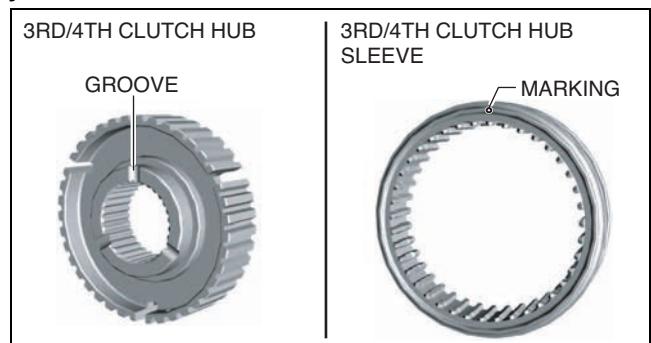


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3rd/4th Clutch Hub, 3rd/4th Clutch Hub Sleeve Assembly Note

1. Assemble so that the surface with the 3rd/4th clutch hub groove is facing the transmission case side.
2. Assemble so that the surface with the 3rd/4th clutch hub sleeve marking is facing the extension housing side.



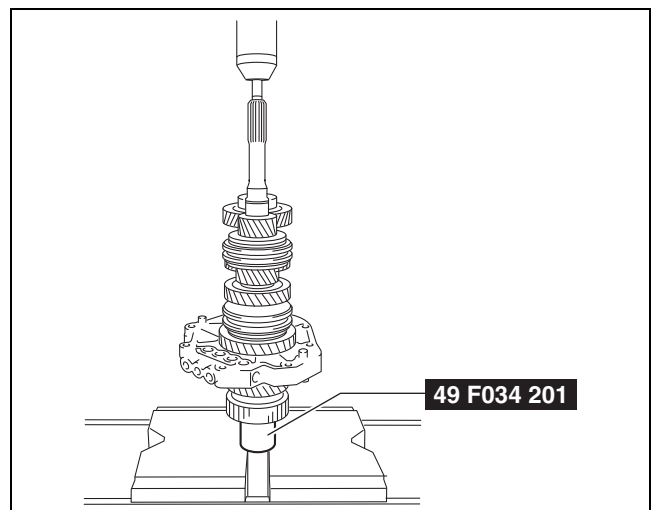
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3rd/4th Clutch Hub Component Assembly Note

1. Assemble the 3rd/4th clutch hub component using the **SST** and the press.

Note

- Use the **SST** with the larger inner diameter facing the 3rd/4th clutch hub component side.

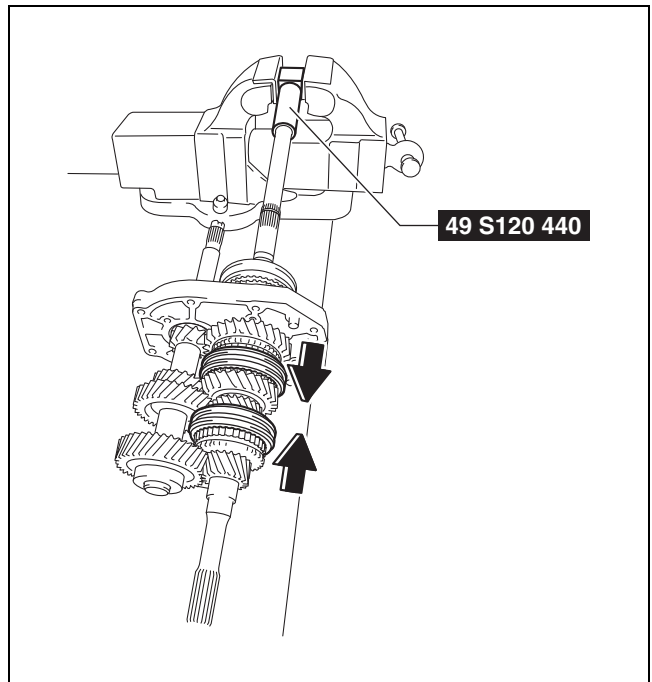


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MANUAL TRANSMISSION

Locknut (Main Shaft) Assembly Note

1. Install the **SST** to the main shaft and secure it to the vise.
2. Operate the clutch hub sleeves to engage them with the 5th gear and 2nd gear, and lock the rotation of the main shaft.

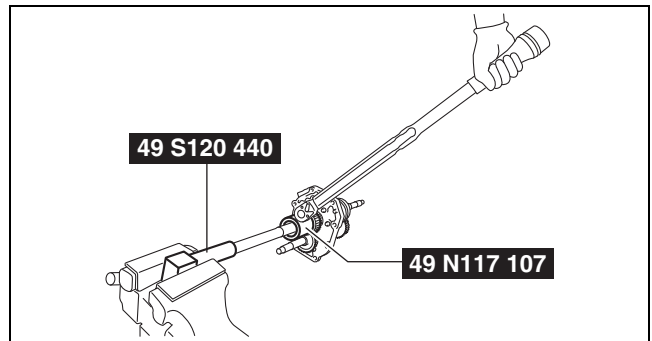


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3. Tighten a new locknut (main shaft) using the **SST**.

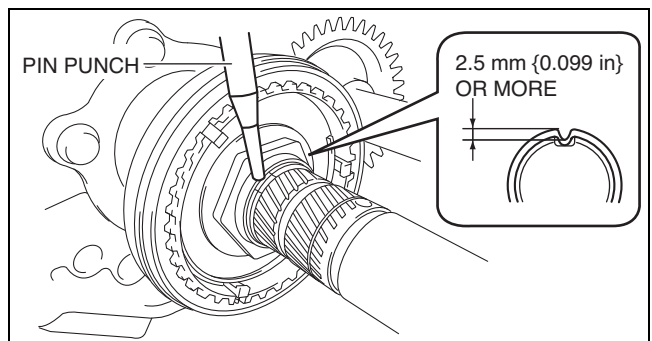
Tightening torque

157—235 N·m {17—23 kgf·m, 116—173 ft·lbf}



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4. Crimp the locknut (main shaft).



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Washer Assembly Note

1. Assemble the washer which was removed during disassembly and a new snap ring.

Note

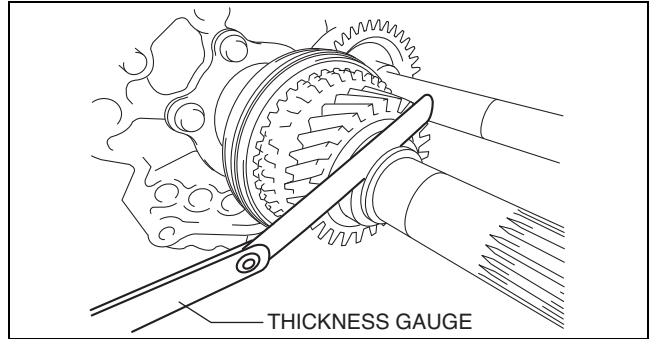
- Assemble the washer so that the side with its groove is facing the 3rd gear.

2. Using a thickness gauge, measure the clearance between the snap ring and the washer.

Clearance between snap ring and washer Standard: 0.1—0.3 mm {0.004—0.011 in}

- If not within the standard, adjust the clearance by choosing the washer.

Washer thickness (mm {in})
6.2 {0.244}
6.3 {0.248}
6.4 {0.252}
6.5 {0.256}
6.6 {0.260}
6.7 {0.264}



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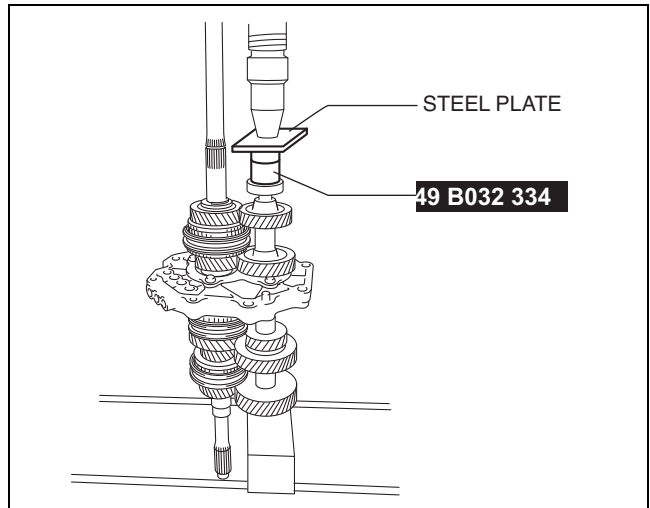
05-11

Countershaft Rear Bearing Assembly Note

1. Assemble the countershaft rear bearing using the SST and the press.

Note

- Use the SST with the side which has no height difference facing the countershaft rear bearing side.



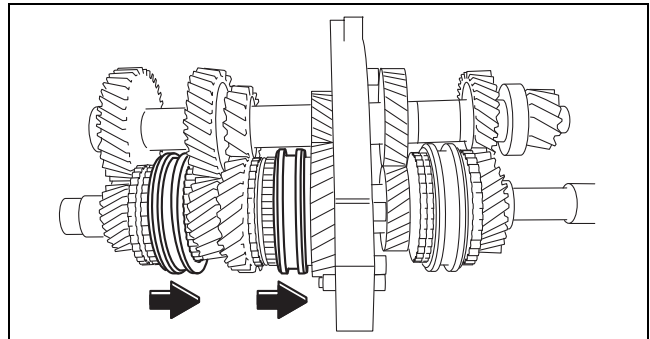
bmm8um000000

Locknut (Countershaft) Assembly Note

1. Install the SST (49 S120 440) to the main shaft and secure it to the vise.
2. Operate the clutch hub sleeves to engage them with the 5th gear and 1st gear, and lock the rotation of the countershaft.
3. Tighten a new locknut (countershaft).

Tightening torque

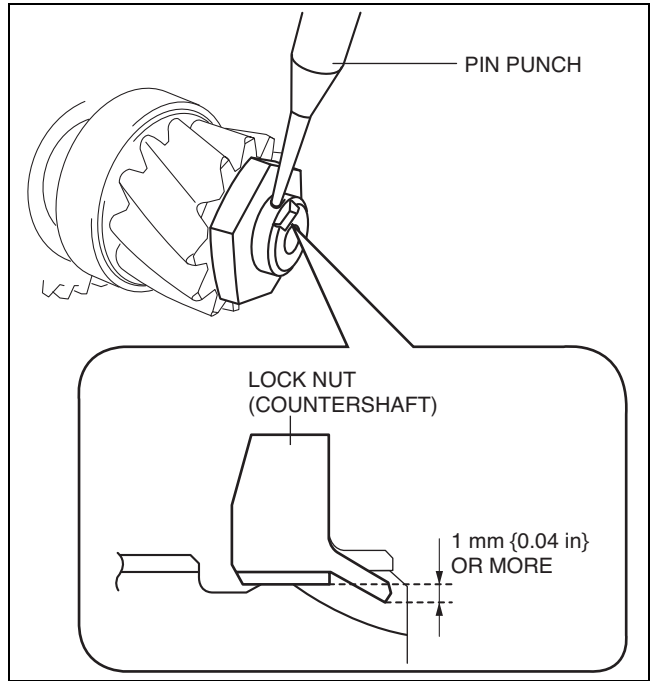
127—186 N·m {13—18 kgf·m, 94—137 ft·lbf}



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MANUAL TRANSMISSION

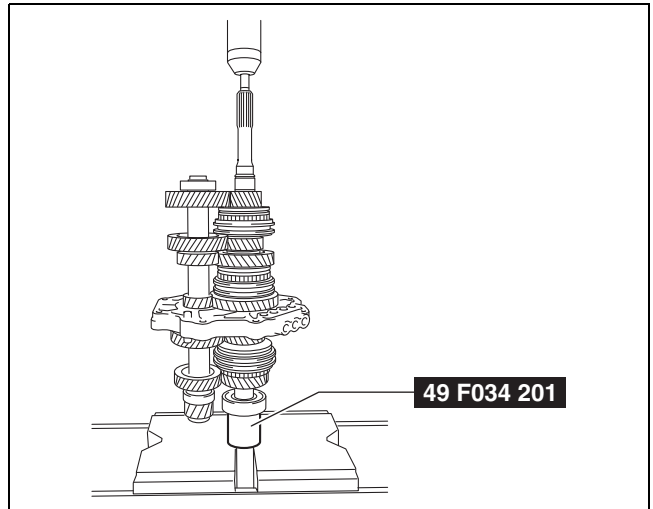
4. Crimp the locknut (countershaft).



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Main Shaft Rear Bearing Assembly Note

1. Assemble the main shaft rear bearing using the SST.



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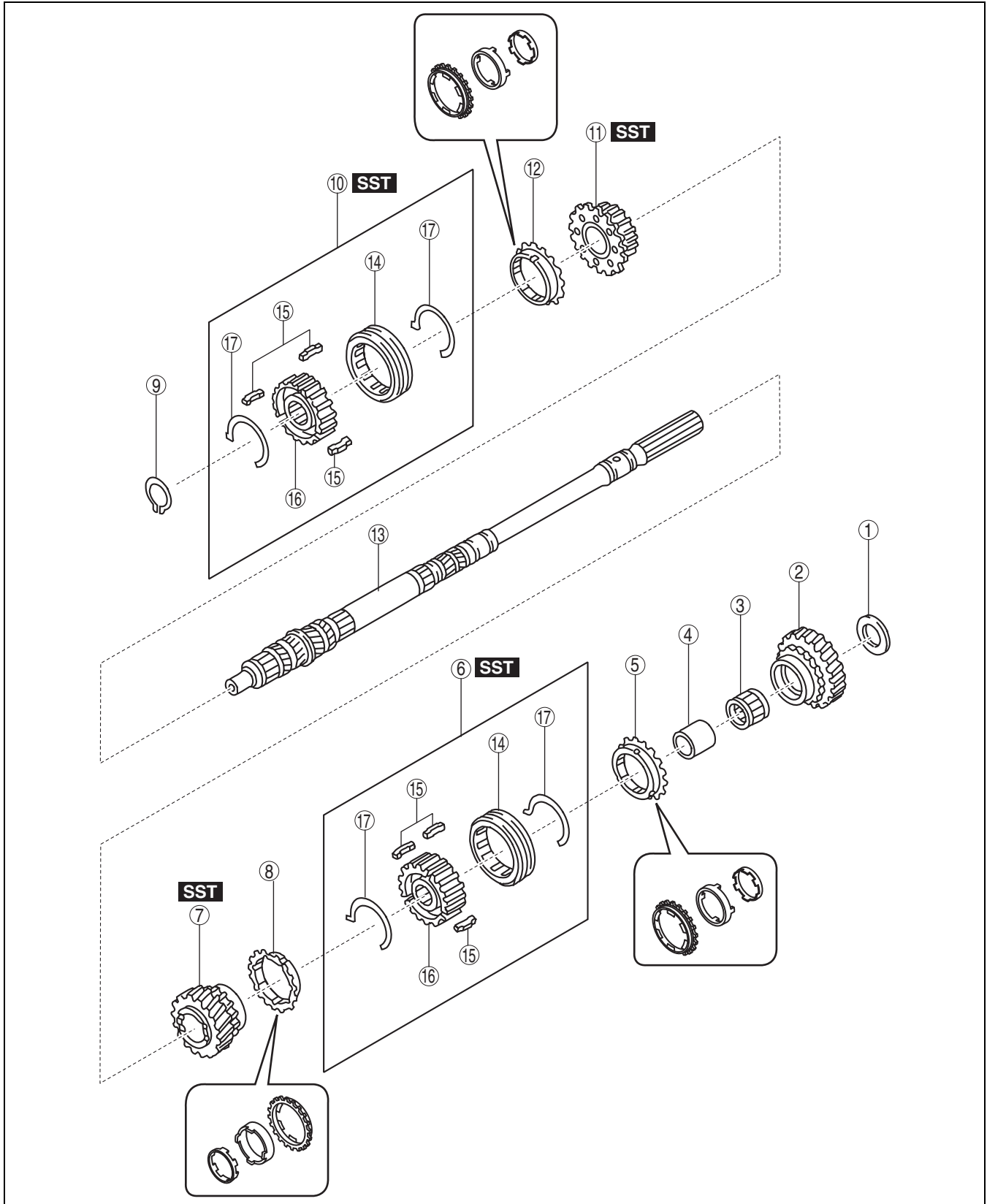
MANUAL TRANSMISSION

MAINSHAFT PARTS DISASSEMBLY

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1. Disassemble in the order shown in the figure.

05-11



bmm6jm000003

1	Washer
2	1st gear
3	Bearing

4	Bearing race
5	1st synchronizer component

MANUAL TRANSMISSION

6	1st/2nd clutch hub component (See 05-11-34 1st/2nd Clutch Hub Component, 2nd Gear Disassembly Note.)
7	2nd gear (See 05-11-34 1st/2nd Clutch Hub Component, 2nd Gear Disassembly Note.)
8	2nd synchronizer component
9	Snap ring
10	5th/6th clutch hub component (See 05-11-34 5th/6th Clutch Hub Component, 5th Gear Disassembly Note.)

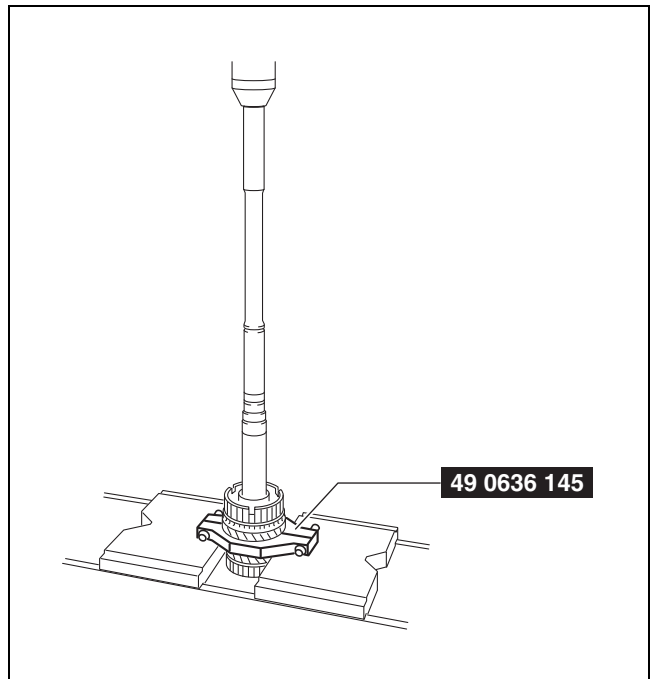
11	5th gear (See 05-11-34 5th/6th Clutch Hub Component, 5th Gear Disassembly Note.)
12	5th synchronizer component
13	Main shaft
14	Clutch hub sleeve
15	Synchronizer key
16	Clutch hub
17	Synchronizer key spring

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

1. Remove the 1st/2nd clutch hub component and the 2nd gear using the **SST** and a press.

Note

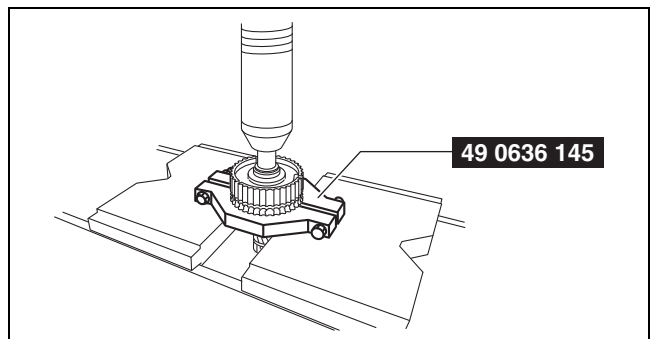
- Use the **SST** with the side which has no height difference facing the 2nd gear.



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5th/6th Clutch Hub Component, 5th Gear Disassembly Note

1. Remove the 5th/6th clutch hub component and the 5th gear using the **SST** and a press.



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MAINSHAFT PARTS INSPECTION

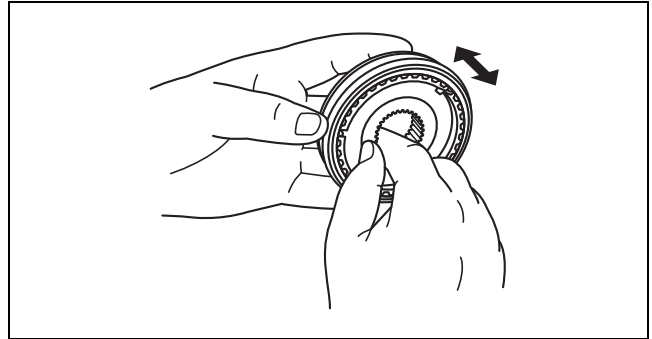
id051100011000

Each Gear Inspection

1. Inspect the following. If there is any malfunction, replace the malfunctioning part.
 - Inspect the synchronizer cone for wear.
 - Inspect the teeth of each gear for damage, wear, or loss.
 - Inspect the hub sleeve connecting part for wear or damage.
 - Inspect the teeth of the synchronizer ring for damage, wear, or loss.

Clutch Hub Component Inspection

1. Inspect the following. If there is any malfunction, replace the clutch hub component.
 - Inspect the list of operations when installing the clutch hub sleeve to the hub.
 - Inspect the teeth of each gear for damage, wear, or loss.
 - Inspect the synchronizer key groove for wear or loss.



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Shift Fork (1st/2nd, 5th/6th) Inspection

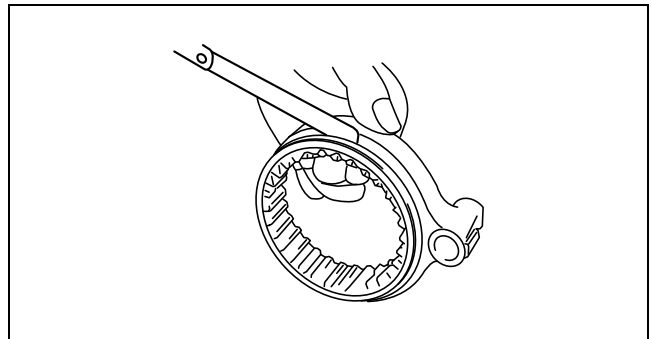
1. Using a thickness gauge, measure the clearance between each shift fork and the clutch hub sleeve groove.

Clearance between clutch hub sleeve and shift fork

Standard: 0.2—0.3 mm {0.008—0.011 in}

Maximum: 0.5 mm {0.02 in}

- If it exceeds the maximum specification, replace the shift fork and the clutch hub sleeve.



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MANUAL TRANSMISSION

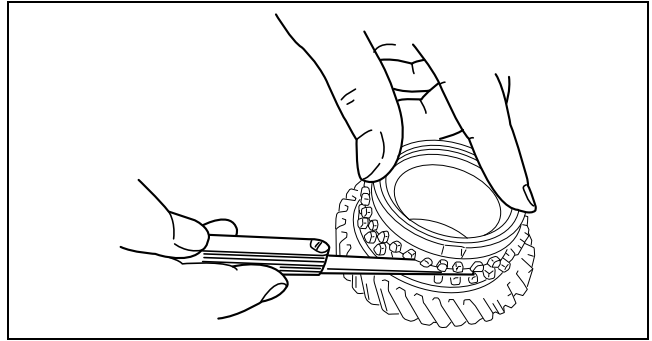
Synchronizer Ring (1st, 2nd, 5th) Inspection

1. Inspect the following. If there is any malfunction, replace the synchronizer ring.
 - Inspect the teeth of the synchronizer ring for damage, wear, or loss.
 - Inspect the taper surface for wear or loss.
2. Using a thickness gauge, measure the clearance of the synchronizer ring and gear side surface around the entire circumference.

Clearance of synchronizer ring (1st, 2nd, 5th) and gear side surface

Standard: 1.5 mm {0.059 in}
Maximum: 0.8 mm {0.031 in}

- If it exceeds the maximum specification, replace the synchronizer ring.



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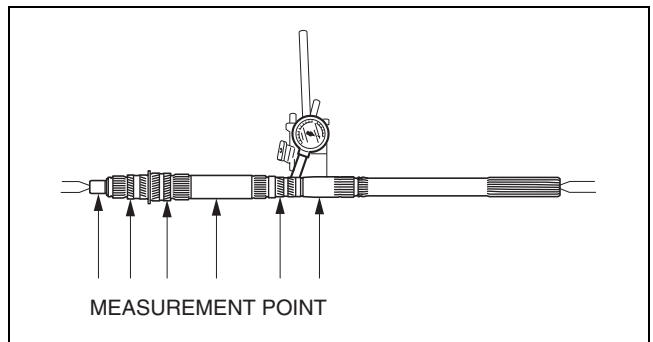
Main Shaft Inspection

1. Measure the main shaft runout using a dial gauge.

Runout of main shaft

Maximum: 0.03 mm {0.0012 in}

- If it exceeds the maximum specification, replace the main shaft.
2. Inspect the spline for damage and wear.
 3. Inspect the main shaft connecting part for wear or damage.
 4. Measure the clearance between the main shaft and gear (or bearing race).



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Clearance between main shaft and gear (or bearing race)

Maximum: 0.15 mm {0.0059 in}

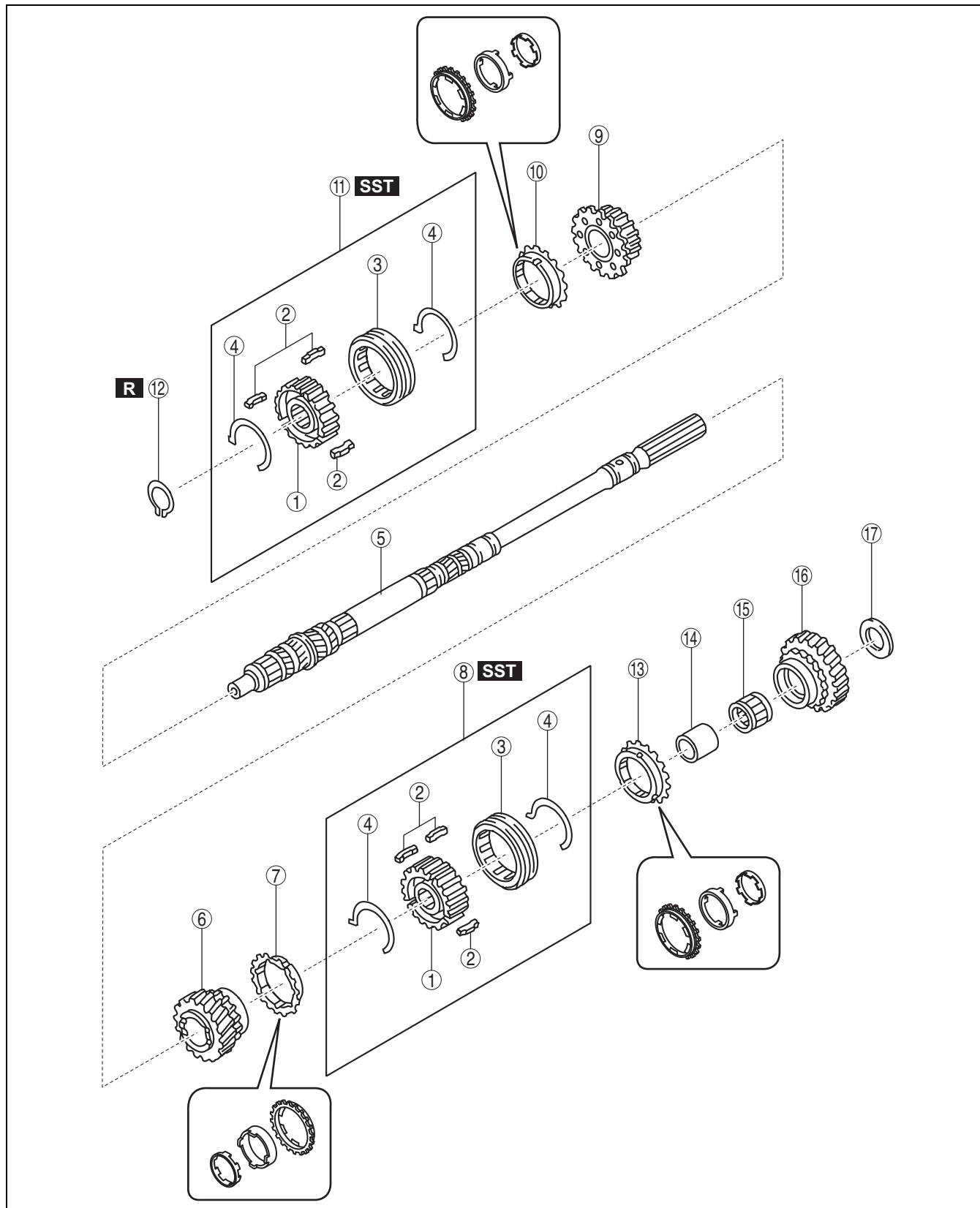
- If it exceeds the maximum specification, replace the main shaft.

MANUAL TRANSMISSION

MAINSHAFT PARTS ASSEMBLY

id051100011100

1. Disassemble in the order shown in the figure.



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MANUAL TRANSMISSION

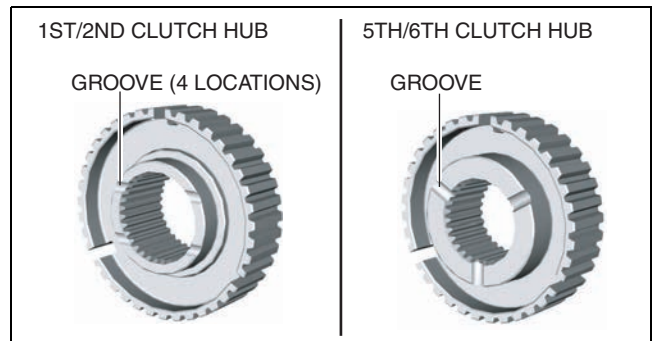
1	Clutch hub (See 05-11-38 Clutch Hub, Clutch Hub Sleeve Assembly Note.)
2	Synchronizer key
3	Clutch hub sleeve (See 05-11-38 Clutch Hub, Clutch Hub Sleeve Assembly Note.)
4	Synchronizer key spring
5	Main shaft
6	2nd gear
7	2nd synchronizer component (See 05-11-39 1st Synchronizer Component, 2nd Synchronizer Component Assembly Note.)
8	1st/2nd clutch hub component (See 05-11-39 1st/2nd Clutch Hub Component Assembly Note.)

9	5th gear
10	5th synchronizer component
11	5th/6th clutch hub component (See 05-11-39 5th/6th Clutch Hub Component Assembly Note.)
12	Snap ring
13	1st synchronizer component (See 05-11-39 1st Synchronizer Component, 2nd Synchronizer Component Assembly Note.)
14	Bearing race
15	Bearing
16	1st gear
17	Washer

Clutch Hub, Clutch Hub Sleeve Assembly Note

1. Assemble the clutch hub with the surface which has the clutch hub groove facing the direction shown in the figure.

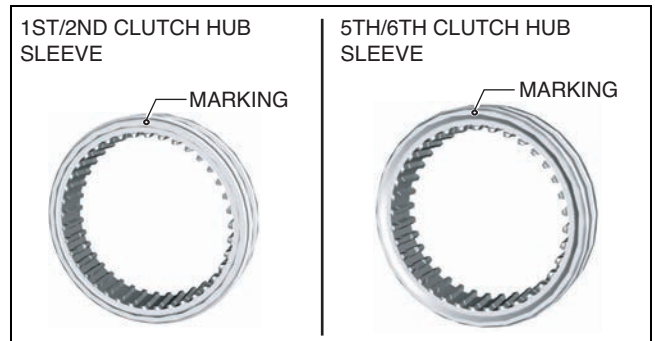
- 1st/2nd clutch hub: Transmission case side
- 5th/6th clutch hub: Extension housing side



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2. Assemble the clutch hub sleeve with the surface which has the clutch hub sleeve marking facing the direction shown in the figure.

- 1st/2nd clutch hub sleeve: Transmission case side
- 5th/6th clutch hub sleeve: Extension housing side

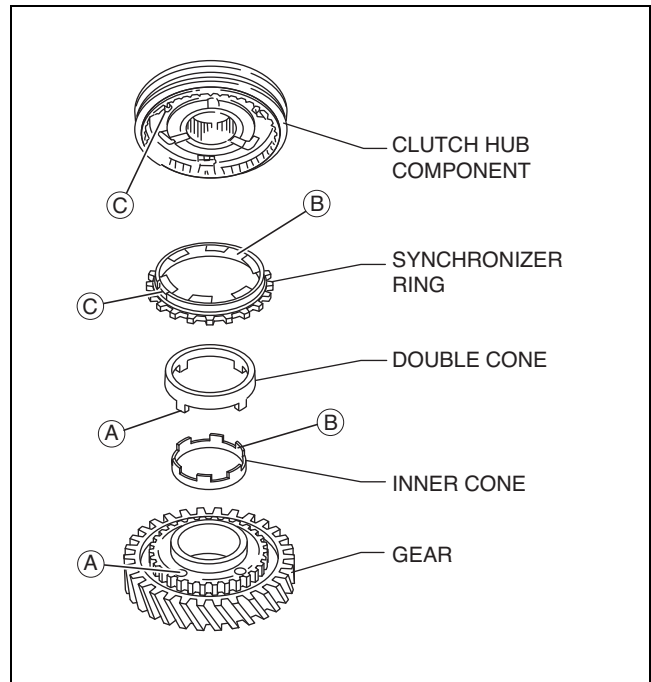


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MANUAL TRANSMISSION

1st Synchronizer Component, 2nd Synchronizer Component Assembly Note

1. Align the projection of each synchronizer cone with the positions of the gear and clutch hub grooves as shown in the figure and assemble.

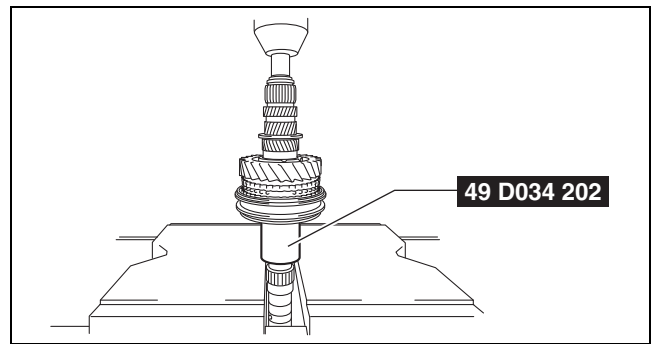


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1st/2nd Clutch Hub Component Assembly Note

1. Assemble the 1st/2nd clutch hub component using the **SST** and a press.



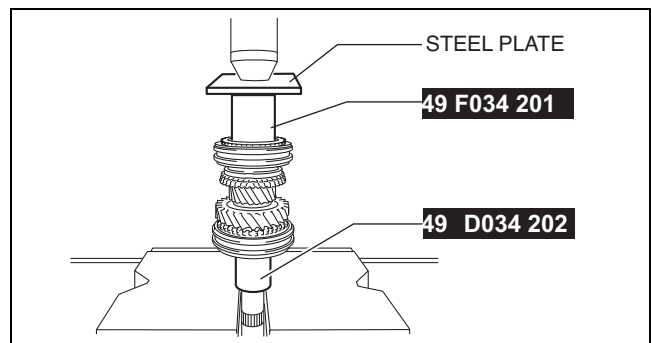
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5th/6th Clutch Hub Component Assembly Note

1. Assemble the 5th/6th clutch hub component using the **SST** and a press.

Caution

- While lifting up the 5th synchronizer component to verify the position of the 5th synchronizer component, assemble the 5th/6th clutch hub component. If it is assembled with the position of the 5th synchronizer component deviated, the 5th synchronizer component could be damaged.



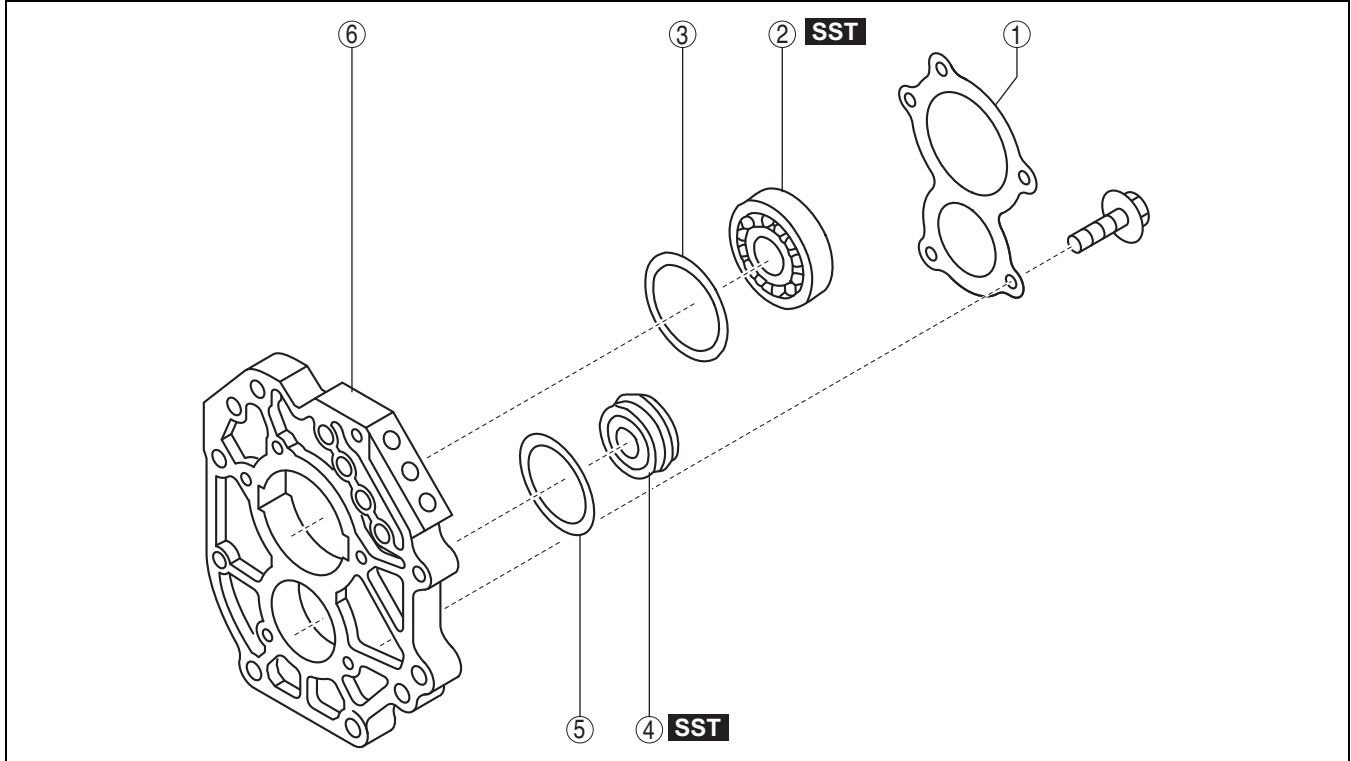
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MANUAL TRANSMISSION

BEARING HOUSING COMPONENT DISASSEMBLY

id051100011200

1. Disassemble in the order shown in the figure.



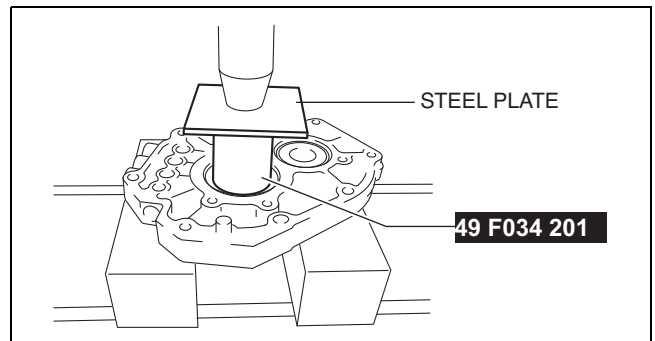
bmm6jm0000003

1	Bearing cover
2	Main shaft front bearing (See 05-11-40 Main Shaft Front Bearing Disassembly Note.)
3	Main shaft front bearing adjustment shim

4	Countershaft center bearing (See 05-11-41 Countershaft Center Bearing Disassembly Note.)
5	Countershaft center bearing adjustment shim
6	Bearing housing

Main Shaft Front Bearing Disassembly Note

1. Remove the main shaft front bearing using the SST and a press.

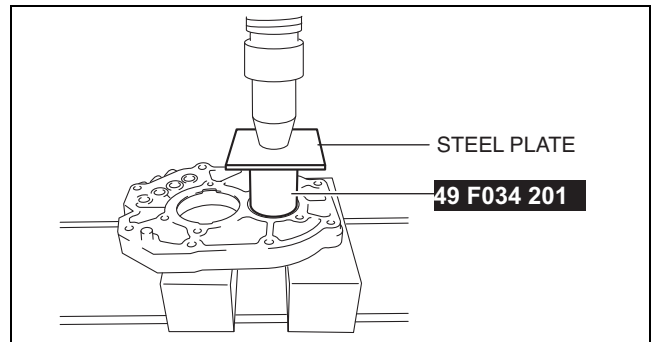


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MANUAL TRANSMISSION

Countershaft Center Bearing Disassembly Note

1. Remove the countershaft center bearing using the **SST** and a press.



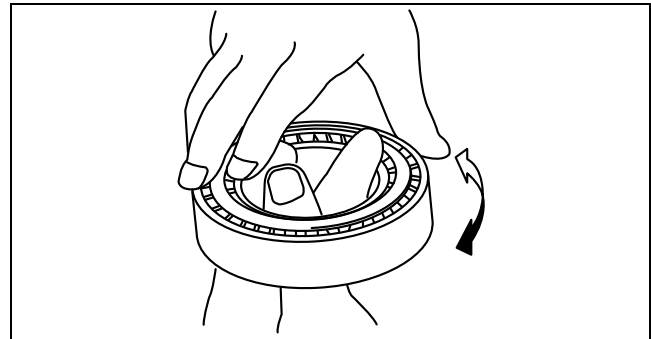
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05-11

BEARING HOUSING COMPONENT INSPECTION

Bearing Inspection

1. Inspect for damage and the rotation condition.
 - If there is any malfunction, replace the bearing.

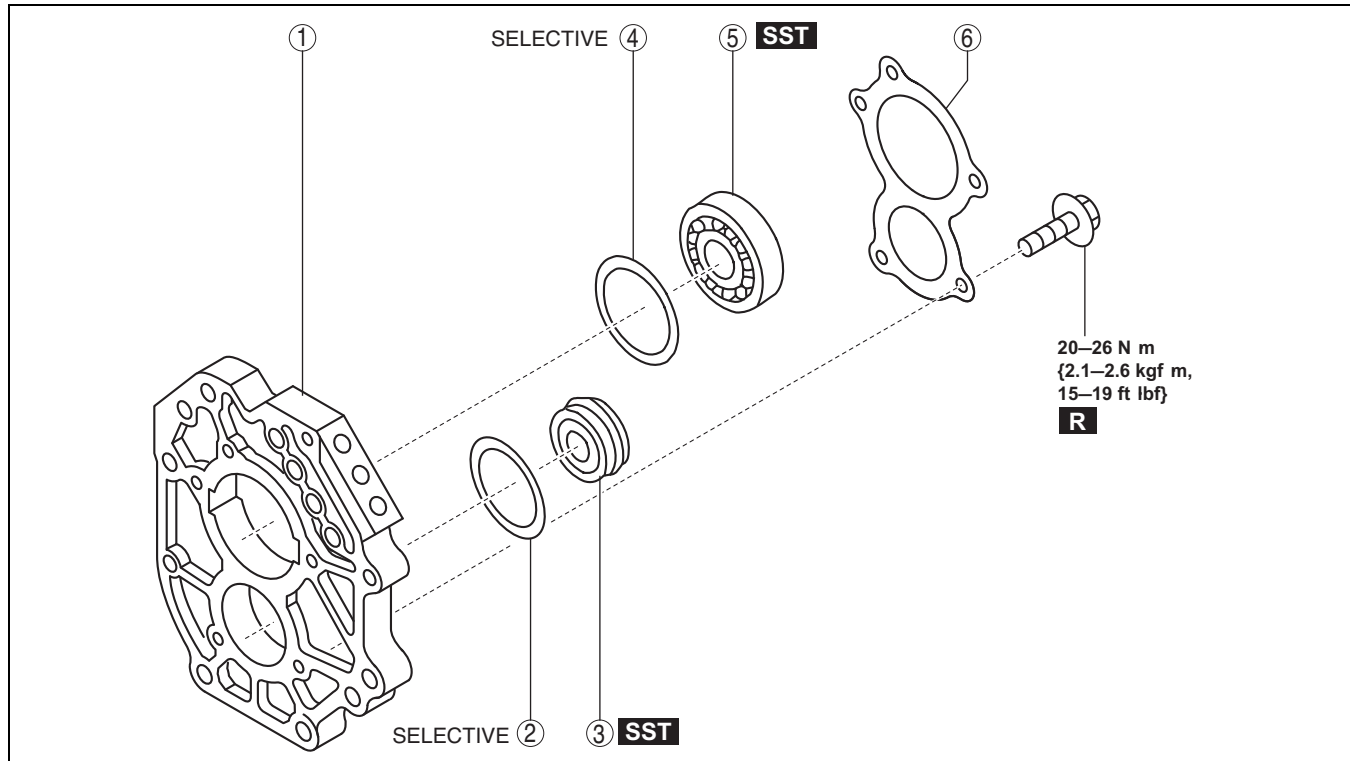


bmm6jm000002

BEARING HOUSING COMPONENT ASSEMBLY

1. Assemble in the order shown in the figure.

id051100011400



bmm8um000000

1	Bearing housing
2	Countershaft center bearing adjustment shim

3	Countershaft center bearing (See 05-11-42 Countershaft Center Bearing Assembly Note.)
4	Main shaft front bearing adjustment shim

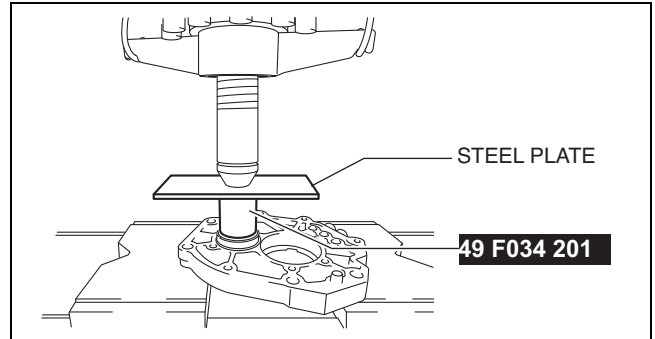
MANUAL TRANSMISSION

5	Main shaft front bearing (See 05-11-42 Main Shaft Center Bearing Assembly Note.)
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6	Bearing cover
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Countershaft Center Bearing Assembly Note

1. Assemble the countershaft center bearing using the SST and a press.



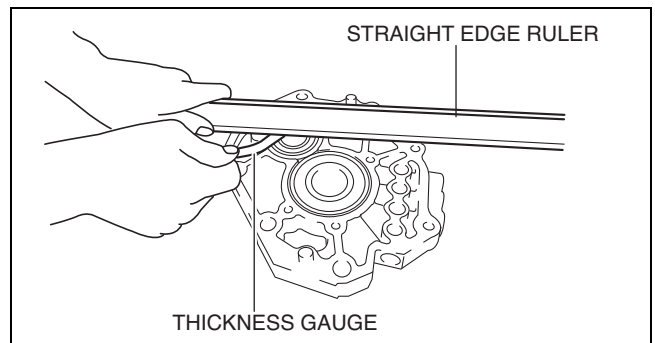
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2. Using a straight edge ruler and thickness gauge, measure the clearance between the countershaft center bearing and bearing housing.

Clearance between countershaft center bearing and bearing housing Standard: 0.1 mm {0.004 in} or less

- If not within the standard, adjust the clearance by choosing the adjustment shim.

Adjust shim thickness (mm {in})
0.1 {0.004}
0.2 {0.008}
0.3 {0.012}
0.4 {0.016}



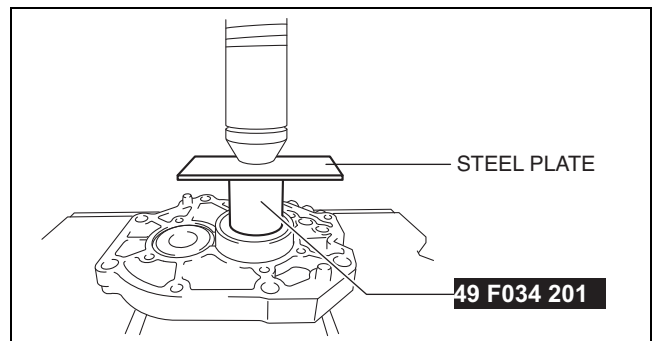
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Note

- If the clearance is within the standard, do not use the adjustment shim.

Main Shaft Center Bearing Assembly Note

1. Assemble the main shaft center bearing using the SST and a press.



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MANUAL TRANSMISSION

- Using a straight edge ruler and thickness gauge, measure the clearance between the main shaft center bearing and bearing housing.

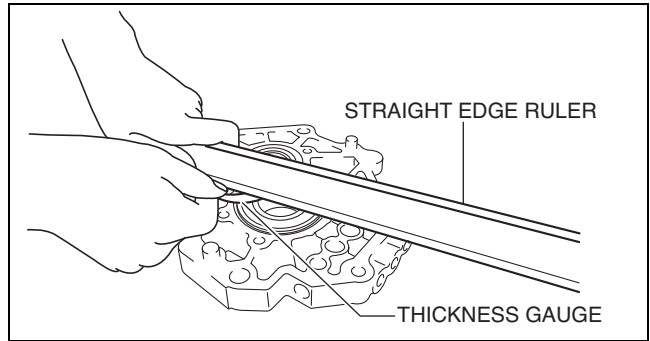
Clearance between main shaft center bearing and bearing housing
Standard: 0.1 mm {0.004 in} or less

- If not within the standard, adjust the clearance by choosing the adjustment shim.

Adjust shim thickness (mm {in})
0.1 {0.004}
0.2 {0.008}
0.3 {0.012}

Note

- If the clearance is within the standard, do not use the adjustment shim.



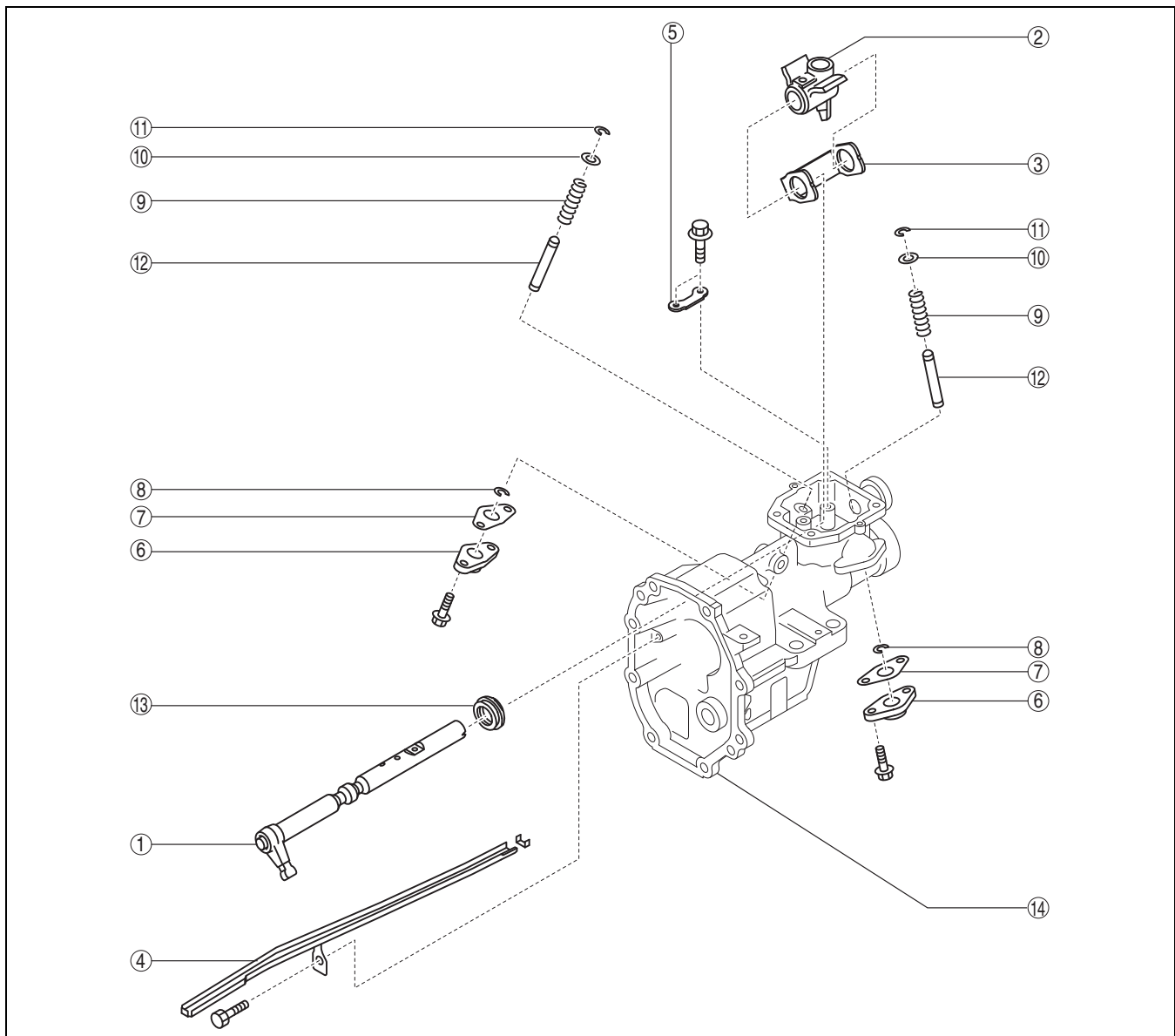
bmm8um000000

05-11

EXTENSION HOUSING PARTS DISASSEMBLY

id051100011500

- Disassemble in the order shown in the figure.



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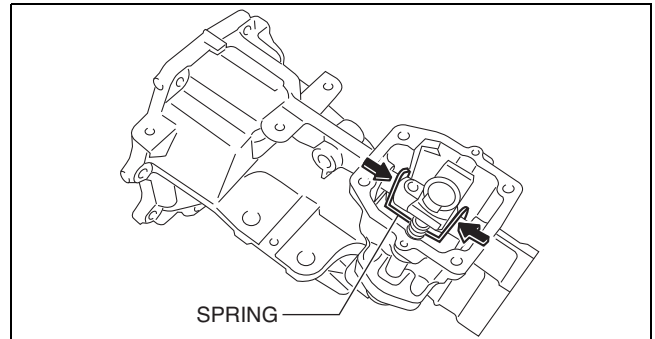
MANUAL TRANSMISSION

1	Control rod (See 05-11-44 Control Rod Disassembly Note.)
2	Control rod end
3	Spring
4	Oil guide
5	Guide plate
6	Spring cap
7	Gasket

8	Snap ring (See 05-11-44 Snap Ring Disassembly Note.)
9	Spring
10	Washer
11	Snap ring
12	Spindle
13	Oil seal (control rod) (See 05-11-44 Oil Seal (Control Rod) Disassembly Note.)
14	Extension housing

Control Rod Disassembly Note

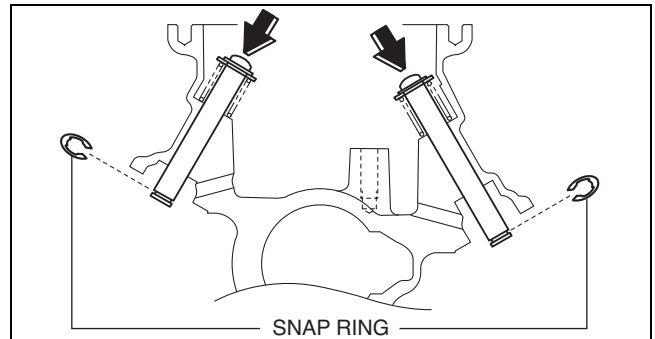
1. While compressing the spring in the direction of the arrow, pull out the control rod.



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Snap Ring Disassembly Note

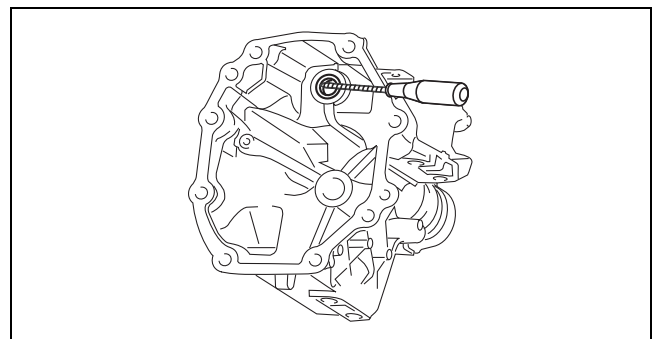
1. While pressing the spindle in the direction of the arrow, remove the snap ring.



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Oil Seal (Control Rod) Disassembly Note

1. Remove the oil seal (control rod) using a tape-wrapped flathead screwdriver.



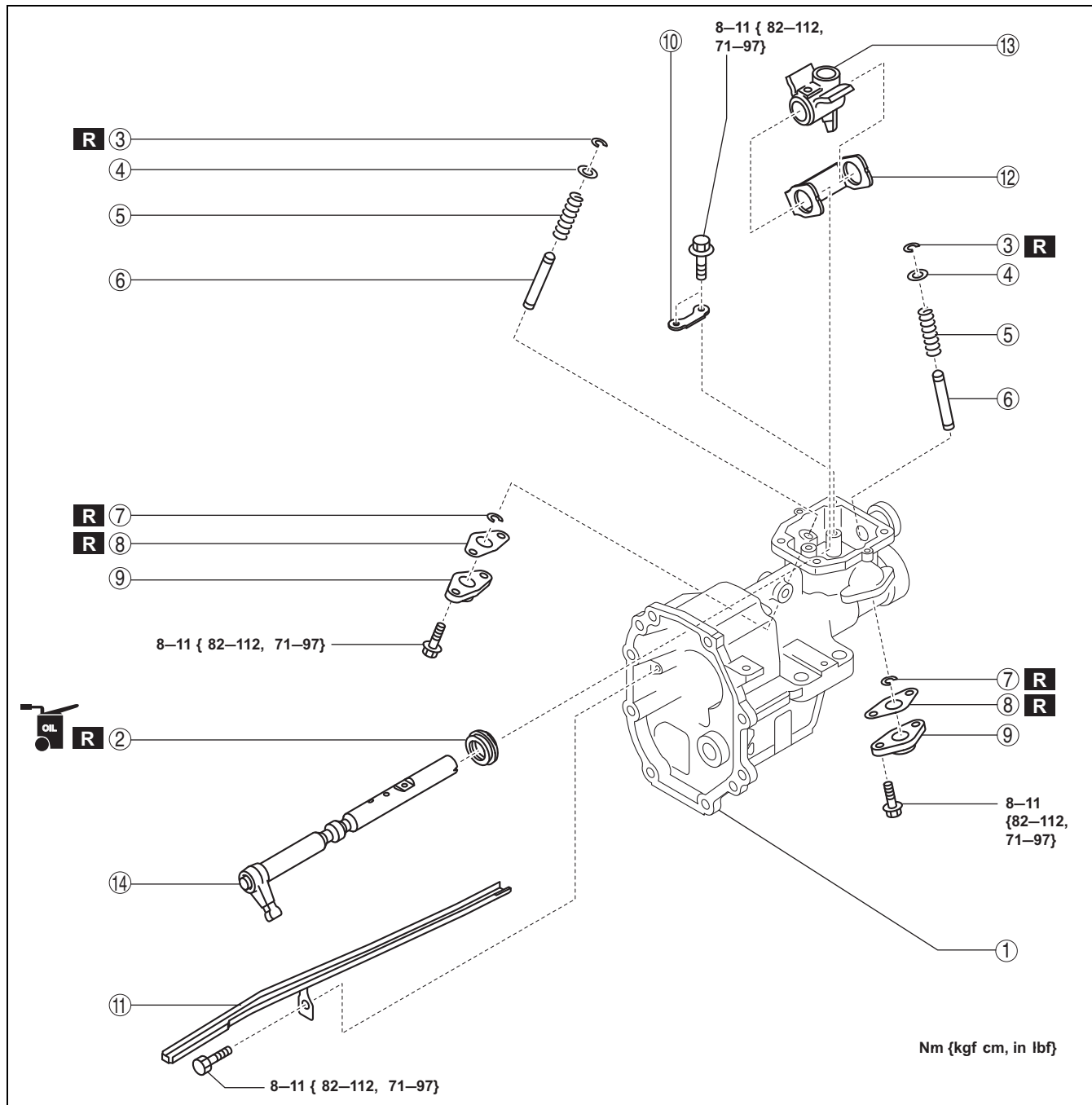
bmm6jm000004

MANUAL TRANSMISSION

EXTENSION HOUSING PARTS ASSEMBLY

id051100011600

1. Assemble in the order shown in the figure.



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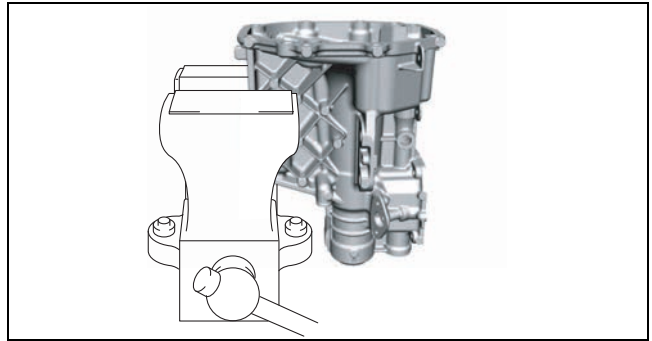
1	Extension housing
2	Oil seal (control rod) (See 05-11-46 Oil Seal (Control Rod) Assembly Note.)
3	Snap ring
4	Washer
5	Spring (See 05-11-46 Spring, Spindle Assembly Note.)
6	Spindle (See 05-11-46 Spring, Spindle Assembly Note.)

7	Snap ring (See 05-11-47 Snap Ring Assembly Note.)
8	Gasket
9	Spring cap
10	Guide plate
11	Oil guide
12	Spring
13	Control rod end
14	Control rod (See 05-11-47 Control Rod Assembly Note.)

MANUAL TRANSMISSION

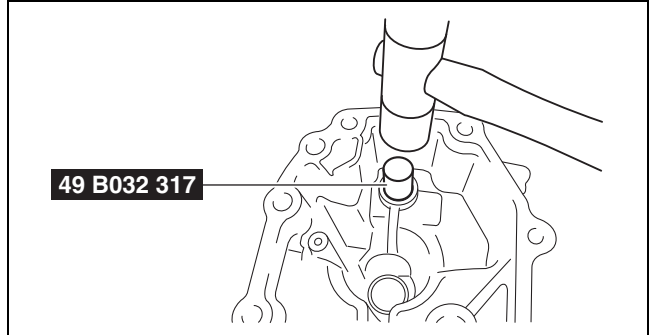
Oil Seal (Control Rod) Assembly Note

1. Secure the extension housing to the vice.



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2. Assemble the new oil seal (control rod) using the SST and a hammer.



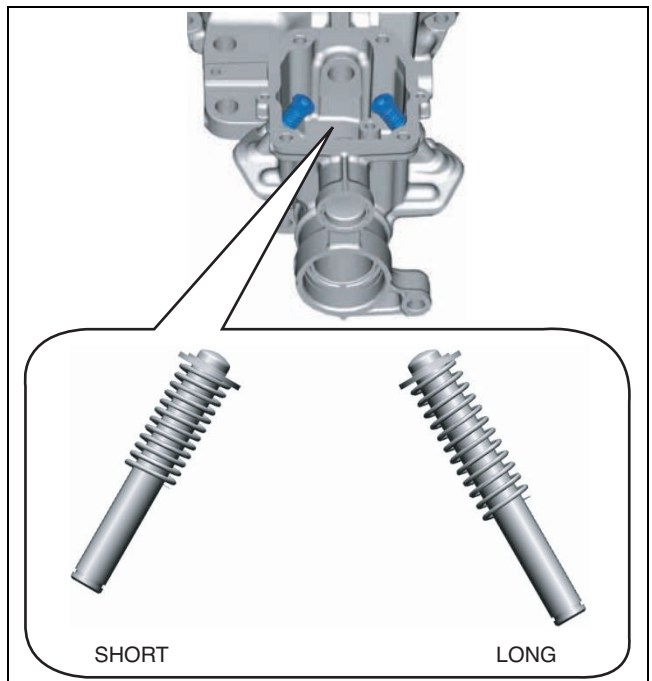
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Spring, Spindle Assembly Note

Note

- Verify the length during assembly because the left and right parts of the spring and spindle have different lengths.

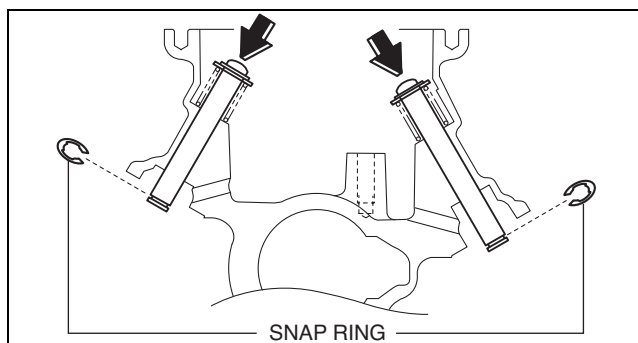
1. Verify the length of the spring and spindle and assemble the shorter one to the left side shown in the figure and the longer one to the right side shown in the figure.



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Snap Ring Assembly Note

1. While pressing the spindle in the direction of the arrow, assemble a new snap ring.

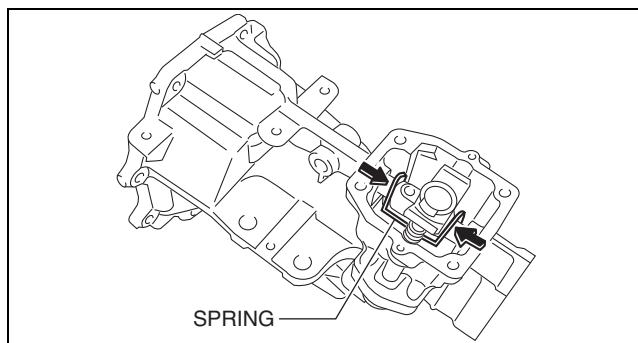


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05-11

Control Rod Assembly Note

1. While compressing the spring in the direction of the arrow, assemble the control rod to the spring and the control rod end.



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05-50 TECHNICAL DATA

TRANSMISSION/TRANSAXLE

TECHNICAL DATA 05-50-1
 Manual Transmission 05-50-1
 Free Length of the Spring 05-50-1
 Intermediate Housing Pin Height 05-50-1
 Clearance Between Clutch
 Hub Sleeve and Shift Fork 05-50-1

Clearance of Synchronizer Ring
 and Gear Side Surface 05-50-1
 Main Shaft 05-50-1
 Adjust Shim Size 05-50-2
 C-washer Size 05-50-2

05-50

TRANSMISSION/TRANSAXLE TECHNICAL DATA

id055000800100

Manual Transmission

Item	Specification
Manual transmission oil grade	Mazda Original Long Life Gear Oil IS *1
Manual transmission oil capacity (approx. quantity)	2.0 L {2.1 US qt, 1.8 Imp qt}
Shift control case oil grade	Mazda Original Long Life Gear Oil IS *1
Shift control case oil capacity (approx. quantity)	270—310 ml {270—310 cc, 16.5—18.9 cu in}

*1 : Mazda Original Long Life Gear Oil IS is superior oil for optimum shift-feel. Using Mazda Original Long Life Gear Oil IS is recommended. If Mazda Original Long Life Gear Oil IS cannot be obtained, use standard oil (API Service GL-4 (SAE 75W-90)). However, shifting in very low temperatures may become difficult.

Free Length of the Spring

Measurement location	Specification (mm {in})
Spring for detent ball	19.1 {0.751}

Intermediate Housing Pin Height

Measurement location	Specification (mm {in})
Intermediate housing pin	9—10 mm {0.36—0.39 in}

Clearance Between Clutch Hub Sleeve and Shift Fork

Measurement location	Specification (mm {in})	Maximum (mm {in})
Clearance between clutch hub sleeve and shift fork	0.2—0.3 {0.008—0.011}	0.5 {0.02}

Clearance of Synchronizer Ring and Gear Side Surface

Measurement location	Specification (mm {in})	Minimum (mm {in})
Clearance of synchronizer ring (3rd/4th/6th) and gear side surface	1.5 {0.059}	0.8 {0.031}

Main Shaft

Measurement location	Maximum (mm {in})
Runout of main shaft	0.03 {0.0012}
Clearance between main shaft and gear (or bearing race)	0.15 {0.0059}

TECHNICAL DATA

Adjust Shim Size

Bearing end play adjustment (mm {in})

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 {0.032}	0.85 {0.034}
0.90 {0.036}	0.95 {0.038}	1.00 {0.040}	-

Countershaft center bearing (mm {in})

0.1 {0.004}	0.2 {0.008}	0.3 {0.012}	0.4 {0.016}
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Main shaft center bearing (mm {in})

0.1 {0.004}	0.2 {0.008}	0.3 {0.012}	-
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C-washer Size

Reverse synchronizer cone (mm {in})

3.1 {0.123}	3.2 {0.126}	3.3 {0.130}	3.4 {0.134}
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SERVICE TOOLS

05-60 SERVICE TOOLS

TRANSMISSION/TRANSAXLE SST. . . . 05-60-1

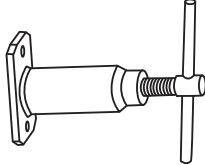
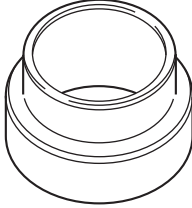
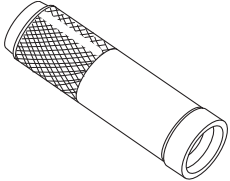
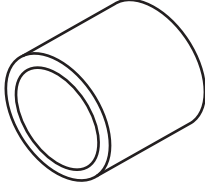
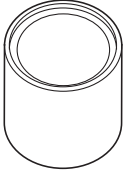
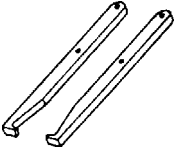
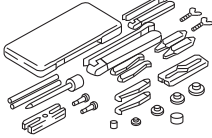
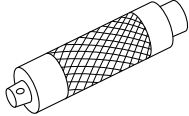

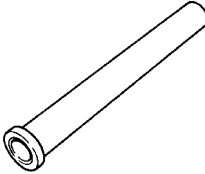
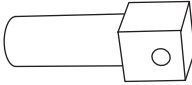
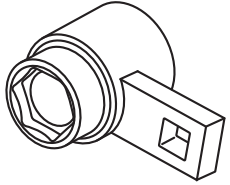
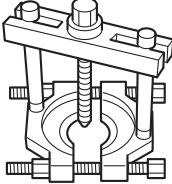
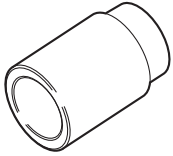

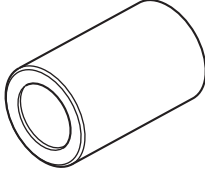
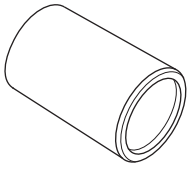
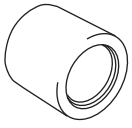

Manual Transmission [M66M-D]05-60-1

TRANSMISSION/TRANSAXLE SST

id056000804200

Manual Transmission [M66M-D]

05-60

<p>49 0305 430A</p> <p>Main drive shaft pusher</p> 	<p>49 F401 337A</p> <p>Attachment</p> 	<p>49 F401 331</p> <p>Body</p> 
<p>49 B032 334</p> <p>Installer bearing</p> 	<p>49 B025 004</p> <p>Body</p> 	<p>49 H017 101</p> <p>Hook</p> 
<p>49 0839 425C</p> <p>Bearing puller set</p> 	<p>49 G030 797</p> <p>Handle</p> 	<p>49 F401 335A</p> <p>Attachment</p> 
<p>49 N017 103</p> <p>Gear installer</p> 	<p>49 S120 440</p> <p>Mainshaft holder</p> 	<p>49 N117 107</p> <p>Hex socket</p> 
<p>49 0710 520</p> <p>Bearing puller</p> 	<p>49 F032 321</p> <p>Installer</p> 	<p>49 0636 145</p> <p>Fan pulley boss puller</p> 
<p>49 F034 201</p> <p>Dust boot installer</p> 	<p>49 D034 202</p> <p>Support block</p> 	<p>49 W034 201</p> <p>Dust boot installer</p> 
<p>49 B032 317</p> <p>Bearing and oil seal remover</p> 	—	—

