



REPAIR MANUAL

7FG 10, 15, 18, 20, 25, 30
7FD 10, 15, 18, 20, 25, 30
7FGK 20, 25, 30 7FGJ 35
7FDK 20, 25, 30 7FDJ 35

Supplement

CB-1016

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FOREWORD

This manual covers the service procedures of the TOYOTA FORKLIFT 7FG/7FD10 ~ 30 series. Please use this manual for providing quick, correct servicing of the corresponding forklift models.

This manual deals with the above models as of September 2000. Please understand that disagreement can take place between the descriptions in the manual and actual vehicles due to change in design and specifications. Any change or modifications thereafter will be informed by Toyota Industrial Equipment Parts & Service News.

For the service procedures of the mounted engine, read the repair manuals listed below as reference together with this manual.

(Reference)

Repair manuals related to this manual are as follows:

TOYOTA INDUSTRIAL EQUIPMENT
7FG10~30, 7FD10~30, 7FGK20~30, 7FGJ35,
7FDK20~30, 7FDJ35
REPAIR MANUAL (No. CE024)

TOYOTA INDUSTRIAL EQUIPMENT 5K ENGINE
REPAIR MANUAL (No. CE617)

TOYOTA INDUSTRIAL EQUIPMENT 4Y ENGINE
REPAIR MANUAL (No. CE602-1)

TOYOTA INDUSTRIAL EQUIPMENT 1DZ-II ENGINE
REPAIR MANUAL (No. CE618-1)

TOYOTA INDUSTRIAL EQUIPMENT 2Z ENGINE
REPAIR MANUAL (No. CE625-1)

TOYOTA INDUSTRIAL EQUIPMENT 4Y ENGINE
Supplement 4Y-ECS
REPAIR MANUAL (No. CU642)

TOYOTA MOTOR CORPORATION

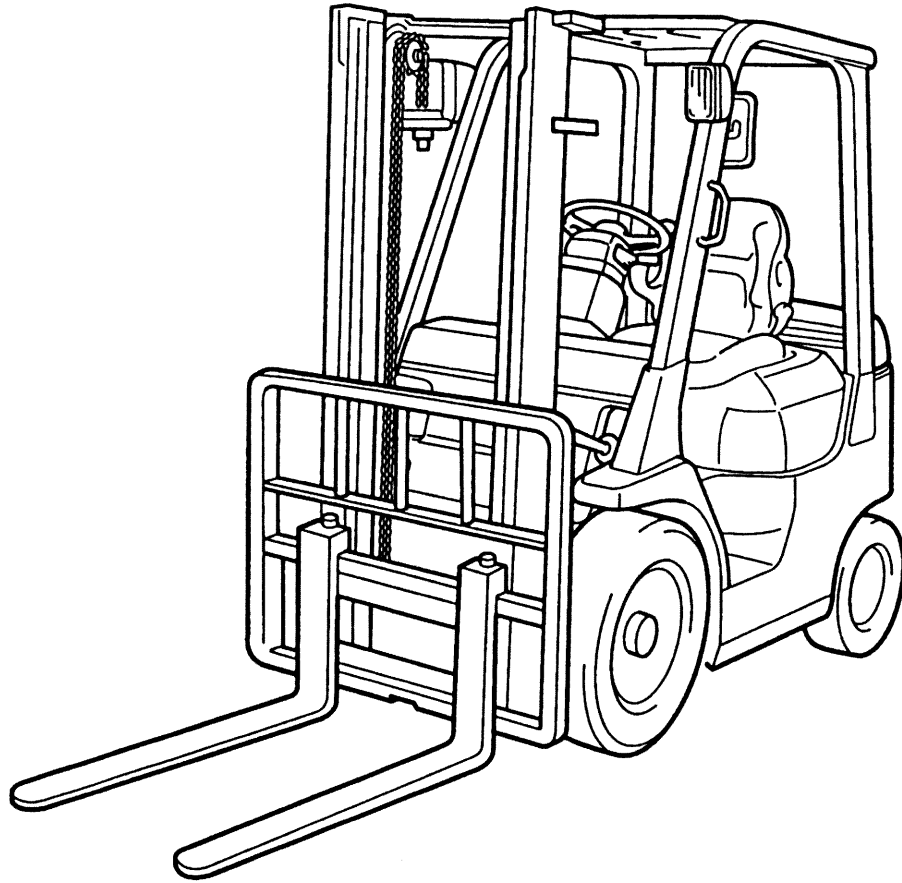
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GENERAL

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EXTERIOR VIEWS



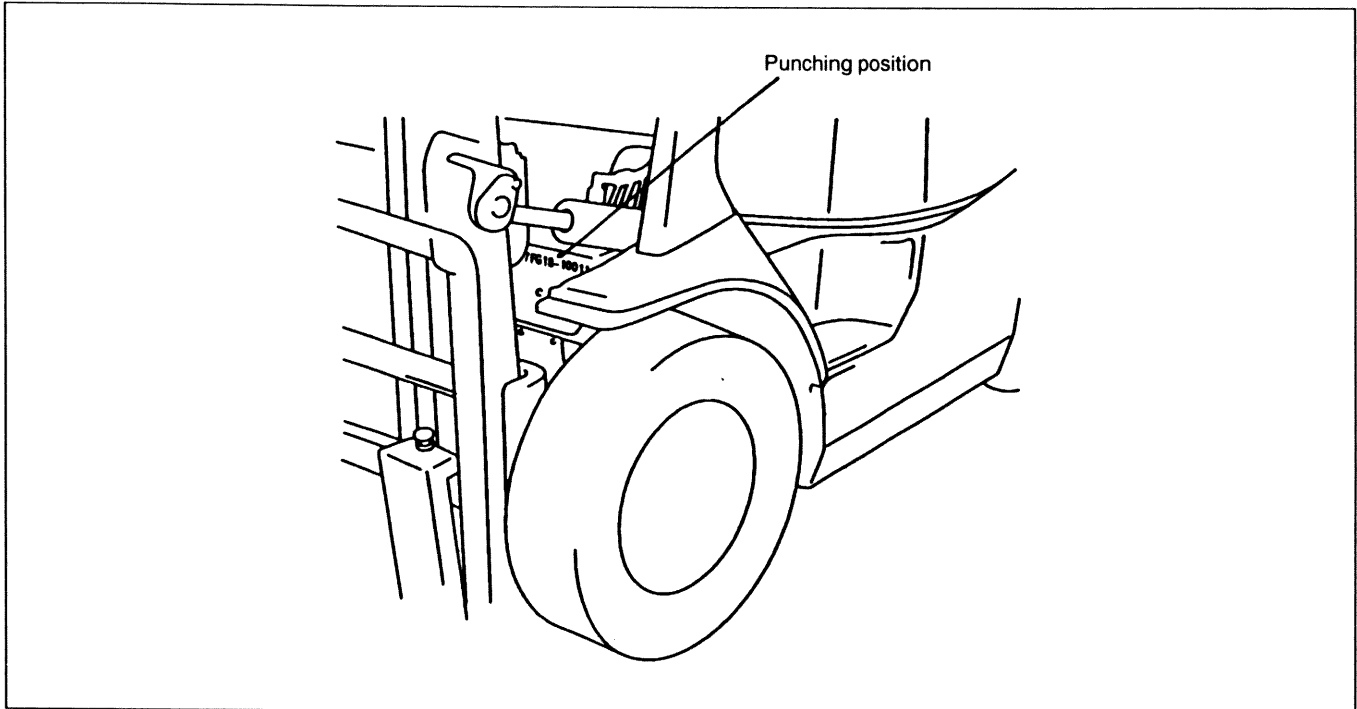
VEHICLE MODEL

Classification		Vehicle Model	Transmission Type	Engine	
Series	Model				
1 ton series	1.0 ton model	7FG10	M/T	5K	Gasoline
		02-7FG10	T/C		
		7FD10	M/T	1DZ-II	Diesel
		02-7FD10	T/C		
	1.5 ton model	7FG15	M/T	5K	Gasoline
		02-7FG15	T/C		
		40-7FG15	M/T	4Y	Gasoline
		42-7FG15	T/C		
		7FD15	M/T	1DZ-II	Diesel
		02-7FD15	T/C		
	1.75 ton model	42-7FG18	T/C	4Y	Gasoline
		02-7FD18	T/C	1DZ-II	Diesel
2 ton series	2.0 ton model	7FG20	M/T	5K	Gasoline
		02-7FG20	T/C		
		40-7FG20	M/T	4Y	Gasoline
		42-7FG20	T/C		
		60-7FD20	M/T	1DZ-II	Diesel
		62-7FD20	T/C		
		7FD20	M/T	2Z	Diesel
		02-7FD20	T/C		
	2.5 ton model	7FG25	M/T	5K	Gasoline
		02-7FG25	T/C		
		40-7FG25	M/T	4Y	Gasoline
		42-7FG25	T/C		
		60-7FD25	M/T	1DZ-II	Diesel
		62-7FD25	T/C		
		7FD25	M/T	2Z	Diesel
		02-7FD25	T/C		

Classification		Vehicle Model	Transmission Type	Engine	
Series	Model				
3 ton series	3.0 ton model	7FG30	M/T	4Y	Gasoline
		02-7FG30	T/C		
		60-7FD30	M/T	1DZ-II	Diesel
		62-7FD30	T/C		
		7FD30	M/T	2Z	Diesel
		02-7FD30	T/C		
K2 ton series	K2.0 ton model	7FGK20	M/T	5K	Gasoline
		02-7FGK20	T/C		
		40-7FGK20	M/T	4Y	Gasoline
		42-7FGK20	T/C		
		7FDK20	M/T	1DZ-II	Diesel
		02-7FDK20	T/C		
	K2.5 ton model	7FGK25	M/T	5K	Gasoline
		02-7FGK25	T/C		
		40-7FGK25	M/T	4Y	Gasoline
		42-7FGK25	T/C		
		7FDK25	M/T	1DZ-II	Diesel
		02-7FDK25	T/C		
K3 ton series	K3.0 ton model	7FGK30	M/T	4Y	Gasoline
		02-7FGK30	T/C		
		7FDK30	M/T	1DZ-II	Diesel
		02-7FDK30	T/C		
J3.5 ton series	J3.5 ton model	7FGJ35	M/T	4Y	Gasoline
		02-7FGJ35	T/C		
		7FDJ35	M/T	2Z	Diesel
		02-7FDJ35	T/C		

FRAME NUMBER

Frame No. Punching Position



0

Series	Engine	Vehicle model	Punching format
1 ton series	5K	7FG10	7FG18-10011
		02-7FG10	
		7FG15	
		02-7FG15	
		40-7FG15	407FG18-10011
	4Y	42-7FG15	
		42-7FG18	
		7FD10	7FD18-10011
	1DZ-II	02-7FD10	
		7FD15	
		02-7FD15	
		02-7FD18	

2 ton series	5K	7FG20	7FG25-10011
		02-7FG20	
		7FG25	
		02-7FG25	
	4Y	40-7FG20	407FG25-10011
		42-7FG20	
		40-7FG25	
		42-7FG25	
	2Z	7FD20	7FD25-10011
		02-7FD20	
		7FD25	
		02-7FD25	
	1DZ-II	60-7FD20	607FD25-10011
		62-7FD20	
		60-7FD25	
		62-7FD25	

	Engine	Vehicle model	Punching format
3 ton, J3.5 ton series	4Y	7FG30	7FGJ35-10011
		02-7FG30	
		7FGJ35	
		02-7FGJ35	
	2Z	7FD30	7FDJ35-10011
		02-7FD30	
		7FDJ35	
		02-7FDJ35	
	1DZ-II	60-7FD30	607FD30-10011
		62-7FD30	
K2 ton series	5K	7FGK20	7FGK25-10011
		02-7FGK20	
		7FGK25	
		02-7FGK25	
	4Y	40-7FGK20	7FGK30-10011
		42-7FGK20	
		40-7FGK25	
		42-7FGK25	
	1DZ-II	60-7FDK20	7FDK30-10011
		62-7FDK20	
		60-7FDK25	
		62-7FDK25	
K3 ton series	4Y	7FGK30	7FGK30-10011
		02-7FGK30	
	1DZ-II	7FDK30	7FDK30-10011
		02-7FDK30	

HOW TO USE THIS MANUAL

EXPLANATION METHOD

1. Operation procedure

(1) The operation procedure is described in either pattern A or pattern B below.

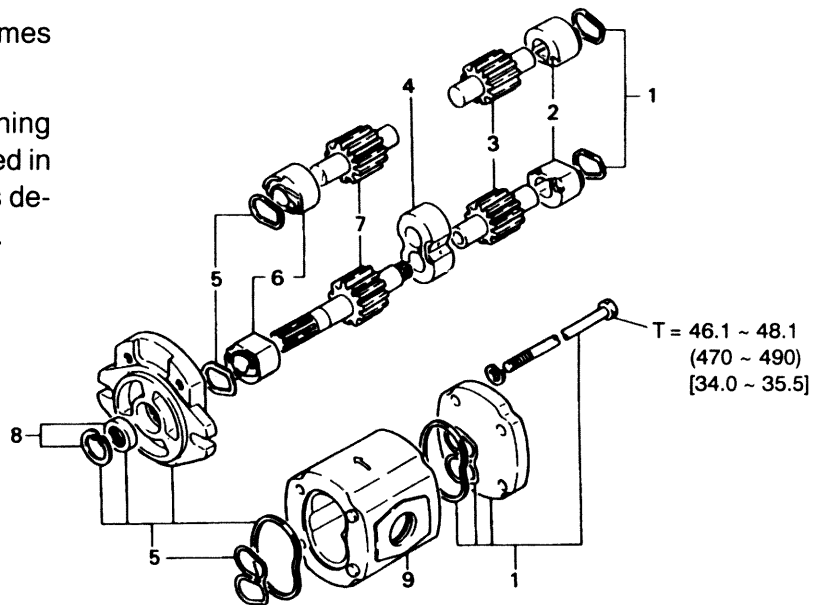
Pattern A: Explanation of each operation step with illustration.

Pattern B: Explanation of operation procedure by indicating step numbers in one illustration, followed by explanation of cautions and notes summarized as point operations.

Example of description in pattern B

DISASSEMBLY·INSPECTION·REASSEMBLY Tightening torque unit T = N·m (kgf-cm) [ft-lbf]

- Step Nos. are partially sometimes omitted in illustrations.
- When a part requiring tightening torque instruction is not indicated in the illustration, the part name is described in the illustration frame.



Disassembly Procedure

- 1 Remove the cover. **[Point 1]**
- 2 Remove the bushing **[Point 2]** ← Operation explained later
- 3 Remove the gear.

Point Operations Explanation of key point for operation with an illustration

[Point 1]

Disassembly: Put a match mark when removing the pump cover.

[Point 2]

Inspection: Measure the bush inside diameter.

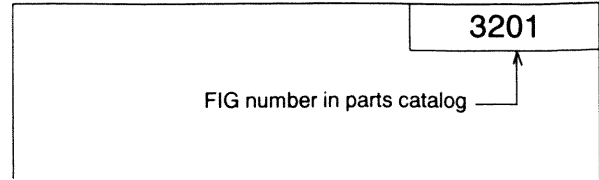
Limit: 19.12 mm (0.7528 in)

2. How to read components figures

(Example)

- (1) The components figure uses the illustration in the parts catalog for the vehicle model. Please refer to the catalog for checking the part name.

The number at the right shoulder of each components figure indicates the Fig. number in the parts catalog.



3. Matters omitted in this manual

- (1) This manual omits description of the following jobs, but perform them in actual operation:

- ① Cleaning and washing of removed parts as required
- ② Visual inspection (partially described)

TERMINOLOGY**Caution:**

Important matters of which negligence may cause accidents. Be sure to observe them.

Note:

Important items of which negligence may cause accidents, or matters in operation procedure requiring special attention.

Standard: Values showing allowable range in inspection and adjustment.

Limit: Maximum or minimum allowable value in inspection or adjustment.

ABBREVIATIONS

Abbreviation (code)	Meaning	Abbreviation (code)	Meaning
ASSY	Assembly	SAS	System of active stability
LH	Left hand	SST	Special service tool
LLC	Long life coolant	STD	Standard
M/T	Manual transmission	T =	Tightening torque
OPT	Option	T/C	Torque converter & transmission
O/S	Oversize	○ ○ T	Number of teeth (○ ○)
PS	Power steering	U/S	Undersize
RH	Right hand	W/	With
SAE	Society of Automotive Engineers (USA)	L/	Less

OPERATIONAL TIPS

1. Safe operation

- (1) After jacking up, always support with wooden blocks or rigid stands.
- (2) When hoisting the vehicle or its heavy component, use wire rope(s) with a sufficient reserve in load capacity.
- (3) Always disconnect the battery terminal before the inspection or servicing of electrical parts.

2. Tactful operation

- (1) Prepare the mechanic tools, necessary measuring instruments (circuit tester, megger, oil pressure gauge, etc.) and SSTs before starting operation.
- (2) Before disconnecting wiring, always check the cable color and wiring state.
- (3) When overhauling functional parts, complicated portions or related mechanisms, arrange the parts neatly to prevent confusion.
- (4) When disassembling and inspecting such a precision part as the control valve, use clean tools and operate in a clean location.
- (5) Follow the described procedures for disassembly, inspection and reassembly.
- (6) Replace, gaskets, packings and O-rings with new ones each time they are disassembled.
- (7) Use genuine Toyota parts for replacement.
- (8) Use specified bolts and nuts. Observe the specified tightening torque at the time of reassembly. Tighten to the center of the specified tightening torque range.
If no tightening torque is specified, tighten the bolt or nut according to the standard tightening torque table.

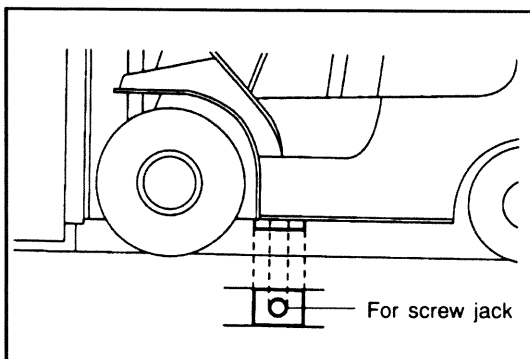
3. Grasping the trouble state

When a trouble occurs, do not attempt immediate disassembly or replacement but first check if the trouble requires disassembly or replacement for remedying.

4. Disposal of waste fluid, etc.

When draining waste fluid from the vehicle, receive it in a container.

If any oil, fuel, coolant, oil filter, battery or other harmful substance is directly discharged or scrapped without permission, it will either adversely affect human health or destroy the environment. Always sort waste fluids, etc. and treat them properly by requesting disposal by specialized companies.



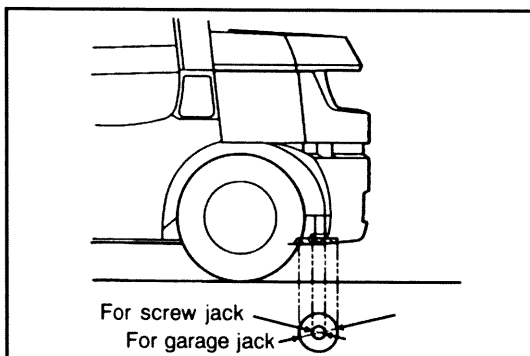
5. Jack up points

Jack up points are provided in the front and rear portions of the vehicle. Always apply jacks at the jack up points.

Front side:

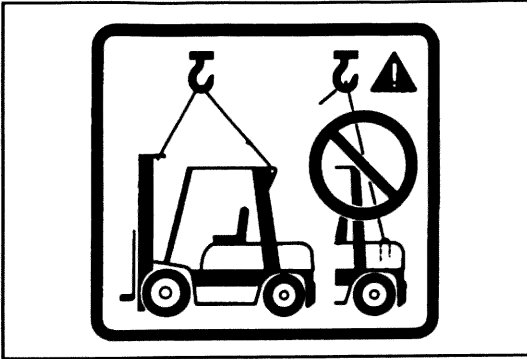
A circular groove to accept a screw jack is provided under the front side of the frame.

When a garage jack is used, jack up at the bottom surface of the frame.



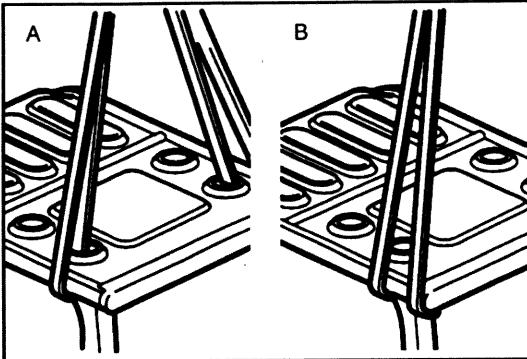
Rear side:

A circular groove to accept a screw or garage jack is provided at the bottom surface of the counterweight.



HOISTING THE VEHICLE

When hoisting the vehicle, sling with wire rope(s) at the mast hook holes and the rear side of the head guard.



Slinging at the head guard is done in two ways.

Method A:

Sling after removing the head guard seat.

Method B:

Carefully sling so as not to damage rear combination lamps.

CIRCUIT TESTER

Circuit testers are available in both the analog and digital types. They should be used selectively according to the purpose of measurement.

Analog type: This type is convenient for observing movement during operation, but the measured value should only be used for reference or rough judgement.

Digital type: Fairly accurate reading is possible, but it is difficult to observe the variation or movement.

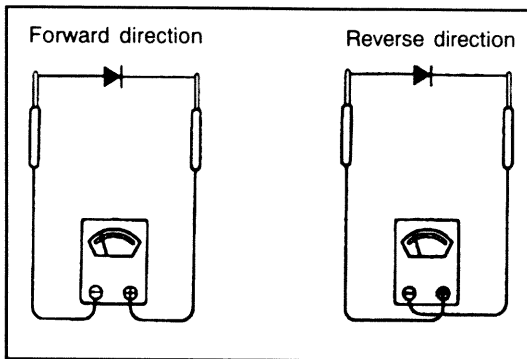
1. Difference in measurement results with the digital type and analog type

- * The result may be different between measurements with the analog type and digital type.

Always use a circuit tester according to its operation manual.

Cautions when the polarities are different between the analog type and digital type are described below.

(1) Analog circuit tester

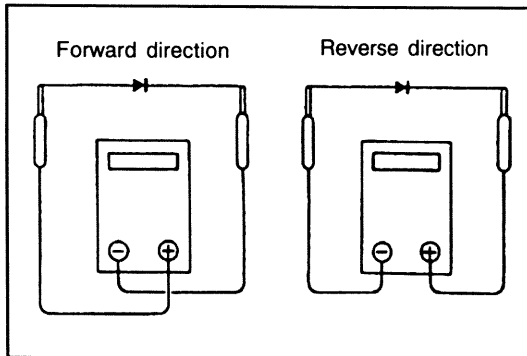


Measurement result example

Tester range: $k\Omega$ range

	Analog type
Forward	Continuity exists 11 $k\Omega$
Reverse	No continuity ∞

(2) Digital circuit tester



Measurement result example

Tester range: $M\Omega$ range

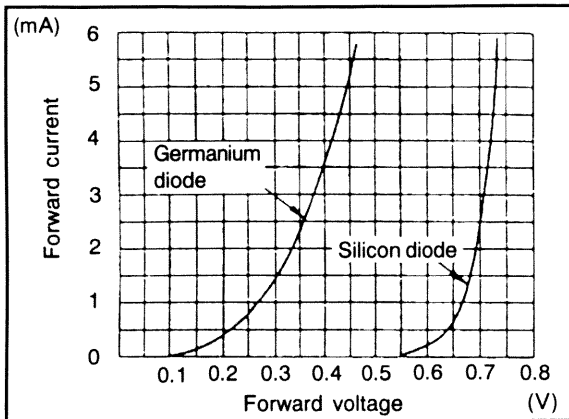
	Digital type
Forward	No continuity 1
Reverse	Continuity exists 2 $M\Omega$

2. Difference in result of measurement with circuit tester

The circuit tester power supply voltage depends on the tester type. 1.5 V, 3.0 V or 6.0 V is used.

The resistance of a semiconductor such as a diode varies with the circuit tester power supply voltage.

The diode characteristics are shown in the figure below.

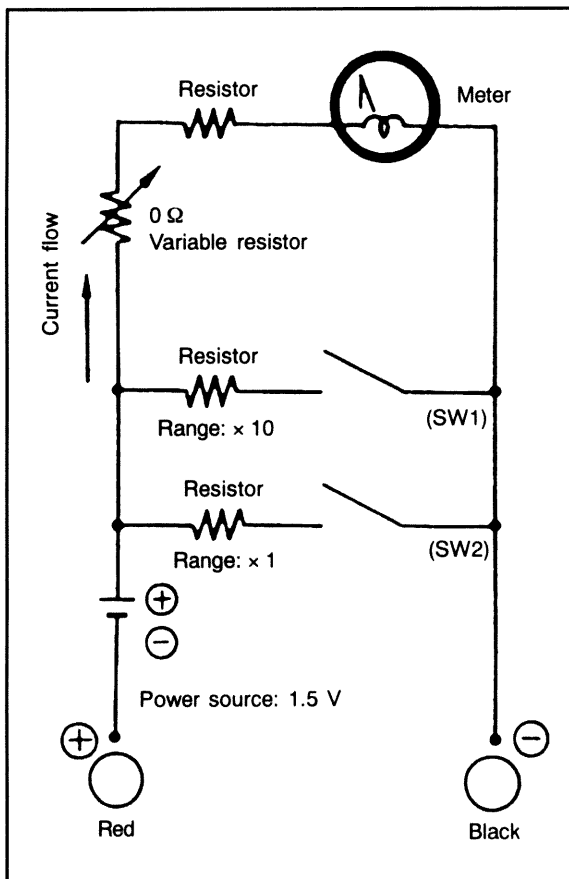


The resistance values of the same semiconductor measured with two types of circuit testers having different power supply voltages are different.

This manual describes the results of measurement with a circuit tester whose power supply voltage is 3.0 V.

3. Difference in measurement result by measurement range (analog type)

In the analog type circuit tester, changing the measurement range switches over the internal circuit to vary the circuit resistance. Even when the same diode is measured, the measurement result varies with the measurement range.



Always use the range described in the repair manual for measurement.

STANDARD BOLT & NUT TIGHTENING TORQUE

Standard bolt and tightening torques are not indicated.
Judge the standard tightening torque as shown below.

1. Find out the type of the bolt from the list below and then find the bolt tightening torque from the table.
2. The nut tightening torque can be judged from the mating bolt type.

BOLT STRENGTH TYPE IDENTIFICATION METHOD

1. Identification by bolt shape

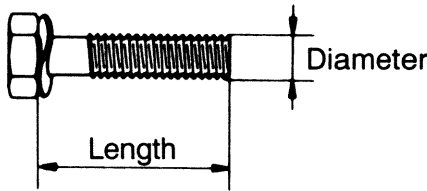
	Shape and class	Class
Hexagon head bolt	 Bolt head No. 4 = 4T 5 = 5T 6 = 6T 7 = 7T 8 = 8T	
	 No mark	4T
Hexagon flange bolt	 No mark	4T
Hexagon head bolt	 Two protruding lines	5T
Hexagon flange bolt	 Two protruding lines	6T
Hexagon head bolt	 Three protruding lines	7T
Hexagon head bolt	 Four protruding lines	8T
Welded bolt		4T
Stud bolt	 No mark	4T
	 Grooved	6T

2. Identification by part No.

Hexagon head bolt

Parts No.
91611-40625

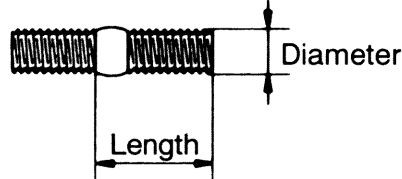
Length (mm)
Diameter (mm)
Class



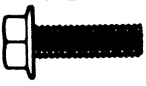
Stud bolt

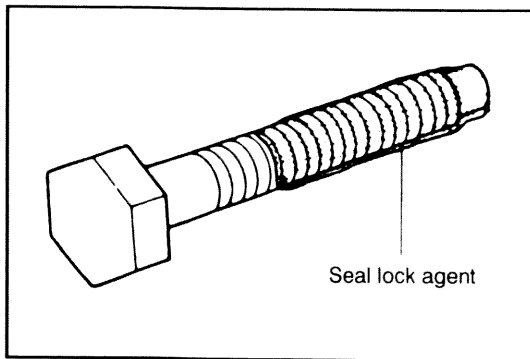
Part No.
92132-40614

Length (mm)
Diameter (mm)
Class



TIGHTENING TORQUE TABLE

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt 			Hexagon flange bolt 		
			N·m	kgf-cm	ft-lbf	N·m	kgf-cm	ft-lbf
4T	6	1.0	5.4	55	48 in-lbf	5.9	60	52 in-lbf
	8	1.25	13	130	9	14	145	10
	10	1.25	25	260	19	28	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	75	760	55	83	850	61
	16	1.5	113	1150	83	—	—	—
5T	6	1.0	6.4	65	56 in-lbf	7.5	75	65 in-lbf
	8	1.25	16	160	12	18	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1050	76
	16	1.5	137	1400	101	157	1600	116
6T	6	1.0	7.8	80	69 in-lbf	8.8	90	78 in-lbf
	8	1.25	19	195	14	21	215	16
	10	1.25	38	400	29	43	440	32
	12	1.25	72	730	53	79	810	59
	14	1.5	110	1100	80	123	1250	90
	16	1.5	170	1750	127	191	1950	141
7T	6	1.0	11	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	103	1050	76
	14	1.5	147	1500	108	167	1700	123
	16	1.5	226	2300	166	—	—	—
8T	6	1.0	12	125	9	14	145	9
	8	1.25	29	300	22	32	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	108	1100	80	123	1250	90
	14	1.5	172	1750	127	196	2000	145
	16	1.5	265	2700	195	299	3050	221



PRECOAT BOLTS

(Bolts with seal lock agent coating on threads)

1. Do not use the precoat bolt as it is in either of the following cases:
 - (a) After it is removed.
 - (b) When the precoat bolt is moved (loosened or tightened) by tightness check, etc.

Note:

For torque check, use the lower limit of the allowable tightening torque range. If the bolt moves, re-tighten it according to the steps below.

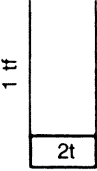
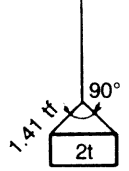
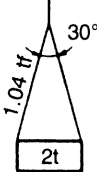
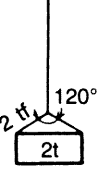
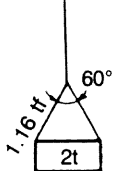
2. Method for reuse of precoat bolts
 - (1) Wash the bolt and threaded hole. (The threaded hole must be washed even for replacement of the bolt.)
 - (2) Perfectly dry the washed parts by air blowing.
 - (3) Coat the specified seal lock agent to the threaded portion of the bolt.

HIGH PRESSURE HOSE FITTING TIGHTENING TORQUE

1. When connecting a high pressure hose, wipe the hose fitting and mating nipple contact surfaces with clean cloth to remove foreign matters and dirt. Also check no dent or other damage on the contact surfaces before installation.
2. When connecting a high pressure hose, hold the hose to align the fitting with the nipple and tighten the fitting.
3. The maximum tightening torque must not exceed twice the standard tightening torque.

Nominal diameter of screw	Standard tightening torque N·m (kgf·cm) [ft·lbf]		Hose inside diameter mm (in)
	Standard	Tightening range	
7/16 — 20UNF	25 (250) [18.1]	24 ~ 26 (240 ~ 270) [17.4 ~ 19.5]	6 (0.24)
9/16 — 18UNF	49 (500) [36.2]	47 ~ 52 (480 ~ 530) [34.7 ~ 38.3]	9 (0.35)
3/4 — 16UNF	59 (600) [43.4]	56 ~ 62 (570 ~ 630) [41.2 ~ 45.6]	12 (0.47)
7/8 — 14UNF	59 (600) [43.4]	56 ~ 62 (570 ~ 630) [41.2 ~ 45.6]	12 (0.47), 15 (0.59)
1-1/16 — 12UNF	118 (1200) [86.8]	112 ~ 123 (1140 ~ 1250) [82.5 ~ 90.4]	19 (0.75)
1-5/16 — 12UNF	137 (1400) [101.3]	130 ~ 144 (1330 ~ 1470) [96.2 ~ 106.4]	25 (0.98)
PF1/4	25 (250) [18.1]	24 ~ 26 (240 ~ 270) [17.4 ~ 19.5]	6 (0.24)
PF3/8	49 (500) [36.2]	47 ~ 52 (480 ~ 530) [34.7 ~ 38.3]	9 (0.35)
PF1/2	59 (600) [43.4]	56 ~ 62 (570 ~ 630) [41.2 ~ 45.6]	12 (0.47)
PF3/4	118 (1200) [86.8]	112 ~ 123 (1140 ~ 1250) [82.5 ~ 90.4]	19 (0.75)
PF1	137 (1400) [101.3]	130 ~ 144 (1330 ~ 1470) [96.2 ~ 106.4]	25 (0.98)

WIRE ROPE SUSPENSION ANGLE LIST

Lifting angle	Tension	Compression	Suspension method	Lifting angle	Tension	Compression	Suspension method
0°	1.00 time	0 time		90°	1.41 time	1.00 time	
30°	1.04 time	0.27 time		120°	2.00 time	1.73 time	
60°	1.16 time	0.58 time					

SAFE LOAD FOR EACH WIRE ROPE SUSPENSION ANGLE

Unit: N (tf) [lbf]

Rope diameter	Cutting load	Single-rope suspension	Two-rope suspension					Four-rope suspension			
		0°	0°	30°	60°	90°	0°	30°	60°	90°	
6mm (0.24 in)	21380 (2.18) [4807]	3040 (0.31) [683.6]	6080 (0.62) [1367]	5880 (0.6) [1323]	5200 (0.53) [1169]	4310 (0.44) [970]	12160 (1.24) [2734]	11770 (1.2) [2646]	10400 (1.06) [2337]	8630 (0.88) [1940]	
8 mm (0.32 in)	31480 (3.21) [7078]	4410 (0.45) [992.3]	8830 (0.9) [1985]	8530 (0.87) [1918]	7650 (0.78) [1720]	6280 (0.64) [1411]	17650 (1.8) [3969]	17060 (1.74) [3937]	15300 (1.56) [3440]	12550 (1.28) [2322]	
10 mm (0.4 in)	49230 (5.02) [11.69]	6960 (0.71) [1565.6]	14020 (1.43) [3153]	13440 (1.37) [3021]	11770 (1.2) [2646]	9810 (1.0) [2205]	27460 (2.8) [6174]	26480 (2.7) [5954]	23540 (2.4) [5292]	19610 (2.0) [4410]	
12.5 mm (0.5 in)	76880 (7.84) [17387]	10980 (1.12) [2469.5]	21570 (2.2) [4851]	21280 (2.1) [4631]	18630 (1.9) [4190]	14710 (1.5) [3308]	43150 (4.4) [9702]	41190 (4.2) [9261]	37270 (3.8) [8379]	29420 (3.0) [6615]	
14 mm (0.56 in)	96400 (9.83) [21675]	13730 (1.4) [3087]	27460 (2.8) [6174]	26480 (2.7) [5954]	23540 (2.4) [5292]	18630 (1.9) [4190]	54920 (5.6) [12348]	52960 (5.4) [11907]	47070 (4.8) [10584]	37270 (3.8) [8379]	

COMPONENTS WEIGHT

Component		Weight kg (lb)
Engine	5K	97 (214)
	4Y	134 (295)
	1DZ-II	176 (388)
	2Z	240 (529)
Transmission	M/T	75 (165)
	T/C (1 speed)	124 (273)
	T/C (2 speeds)	153 (337)
Counter weight	1.0 ton model	Approx. 400 (880)
	1.5 ton model	Approx. 745 (1640)
	1.75 ton model	Approx. 880 (1940)
	2.0 ton model	Approx. 1150 (2535)
	2.5 ton model	Approx. 1500 (3300)
	3.0 ton model	Approx. 1800 (4000)
	K2.0 ton model	Approx. 1140 (2510)
	K2.5 ton model	Approx. 1550 (3410)
	K3.0 ton model	Approx. 1925 (4240)
	J3.5 ton model	Approx. 2135 (4700)
V mast ASSY L/backrest and fork (with lift cylinder, max. lifting height: 3000 mm (118 in))	1 ton series	Approx. 410 (900)
	2 ton series	Approx. 505 (1110)
	3 ton, K3 ton series	Approx. 570 (1260)
	K2 ton series	Approx. 465 (1030)
	J3.5 ton series	Approx. 680 (1500)

RECOMMENDED LUBRICANT QUANTITY & TYPES

Description		Application	Quantity ℓ (US gal)	Classification	Type
Engine	Gasoline	5K	4.0 (1.06)	API SH, SJ	Motor oil SAE30 (SAE20 in cold area)
		4Y	4.0 (1.06)		SAE20W-40 (SAE10W-30 in cold area)
	Diesel	1DZ-II	7.9 (2.09)	API CE, CF	Diesel engine oil SAE30 (SAE20 in cold area)
		2Z	9.0 (2.38)		SAE10W-30
Transmission		M/T	3.8 (1.0)	API GL-4, GL-5	Hypoid gear oil SAE85W-90
		T/C (1 speed)	9.0 (2.38)	ATF	GM Dexron® II
		T/C (2 speeds)	10.5 (2.77)		
Differential		1 ton series	6.3 (1.66)	API GL-4, GL-5	Hypoid gear oil SAE85W-90
		2 ton series, K2 ton series, K3 ton series	7.1 (1.87)		
		3 ton series, J3.5 ton series	7.7 (2.03)		
Hydraulic oil		Attached Table 1 Hydraulic oil volume		ISO VG32	Hydraulic oil
Fuel tank		1 ton series	45 (11.9)	—	—
		K2 ton series	55 (14.5)		
		Other series	65 (17.2)		
Brake and clutch line		All models	Proper quantity Reservoir Tank 0.2 (0.05)	—	SAE J-1703 DOT-3
Chassis parts		All models	Proper quantity	—	• MP grease • Molybdenum disulfide grease
Coolant (excluding reservoir tank)		Attached Table 2 Coolant volume		LLC	• LLC 30-50% mixture (for winter or all-season) • Coolant with rust-inhibitor (for spring, summer and autumn)
Coolant (Reservoir Tank)		All models	0.6 (0.16) (at Full level)	↑	↑

Attached Table 1 Hydraulic oil volume [V mast, max. lifting height 3000 mm (118 in)] Unit: ℓ (US gal)

Model	1 ton series	2 ton series	3 ton series	K2·K3 ton series	J3.5 ton series
5K engine models	27 (7.1)	34 (9.0)		30 (7.9)	
4Y engine models	27 (7.1)	34 (9.0)	36 (9.5)	30 (7.9)	36 (9.5)
1DZ-II engine models	27 (7.1)	34 (9.0)	36 (9.5)	30 (7.9)	
2Z engine models		39 (10.3)	41 (10.8)		41 (10.8)

Note:

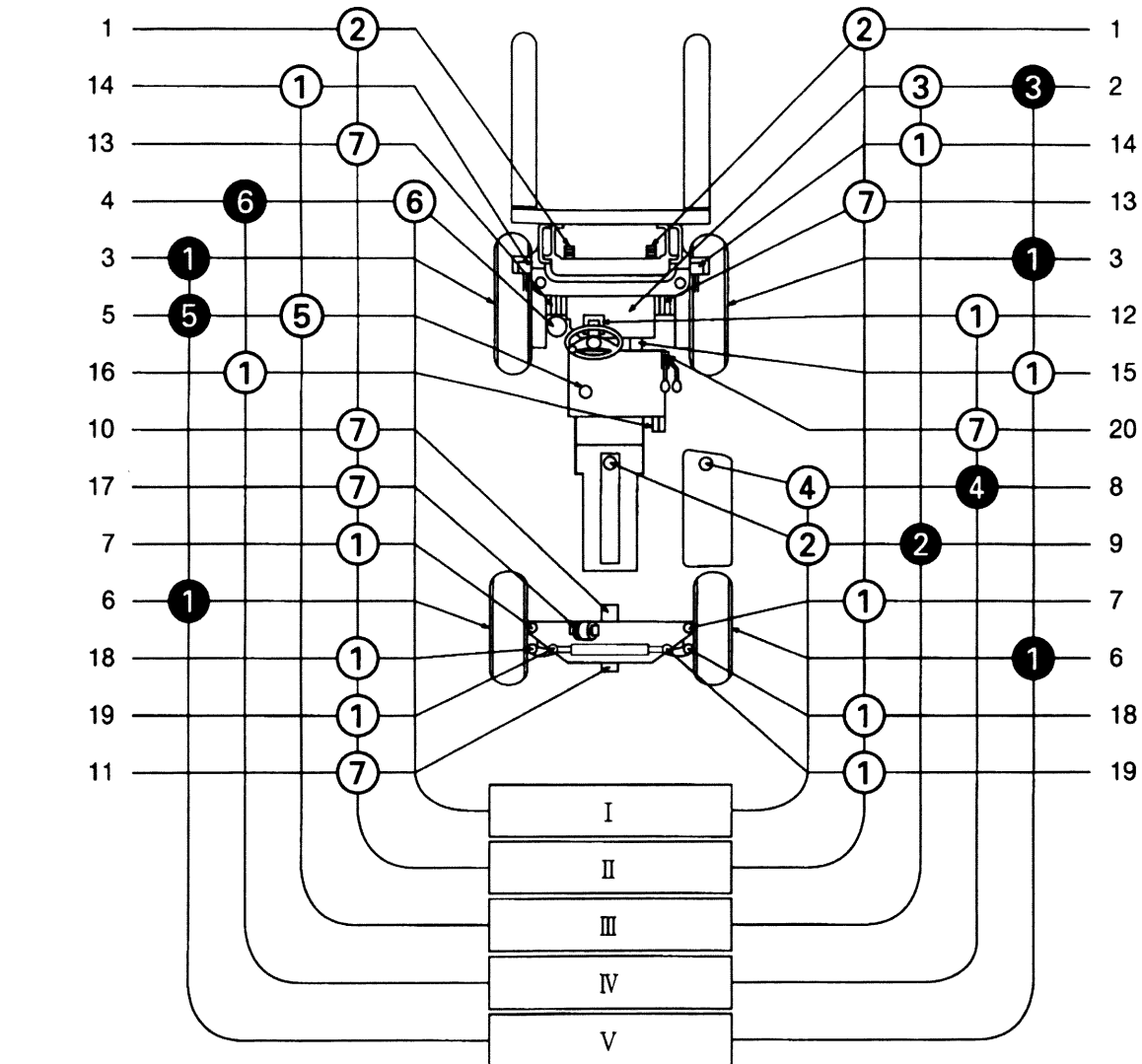
Since the hydraulic oil volume varies with the mast specification, be sure to check finally with the level gauge.

Attached Table 2 Coolant volume Unit: ℓ (US gal)

Engine	Transmission	1 ton series	K2·K3 ton series	2·3·J3.5 ton series
5K	M/T	6.0 (1.58)	6.0 (1.58)	6.1 (1.61)
	T/C	6.5 (1.72)	6.5 (1.72)	7.6 (2.01)
4Y	M/T	7.0 (1.85)	8.2 (2.16)	8.4 (2.22)
	T/C	8.5 (2.24)	8.5 (2.24)	9.6 (2.53)
1DZ-II	M/T	6.7 (1.77)	6.9 (1.82)	7.1 (1.87)
	T/C	7.2 (1.90)	7.2 (1.90)	8.3 (2.19)
2Z	M/T			8.1 (2.14)
	T/C			9.3 (2.46)

LUBRICATION CHART

Manual Transmission Model

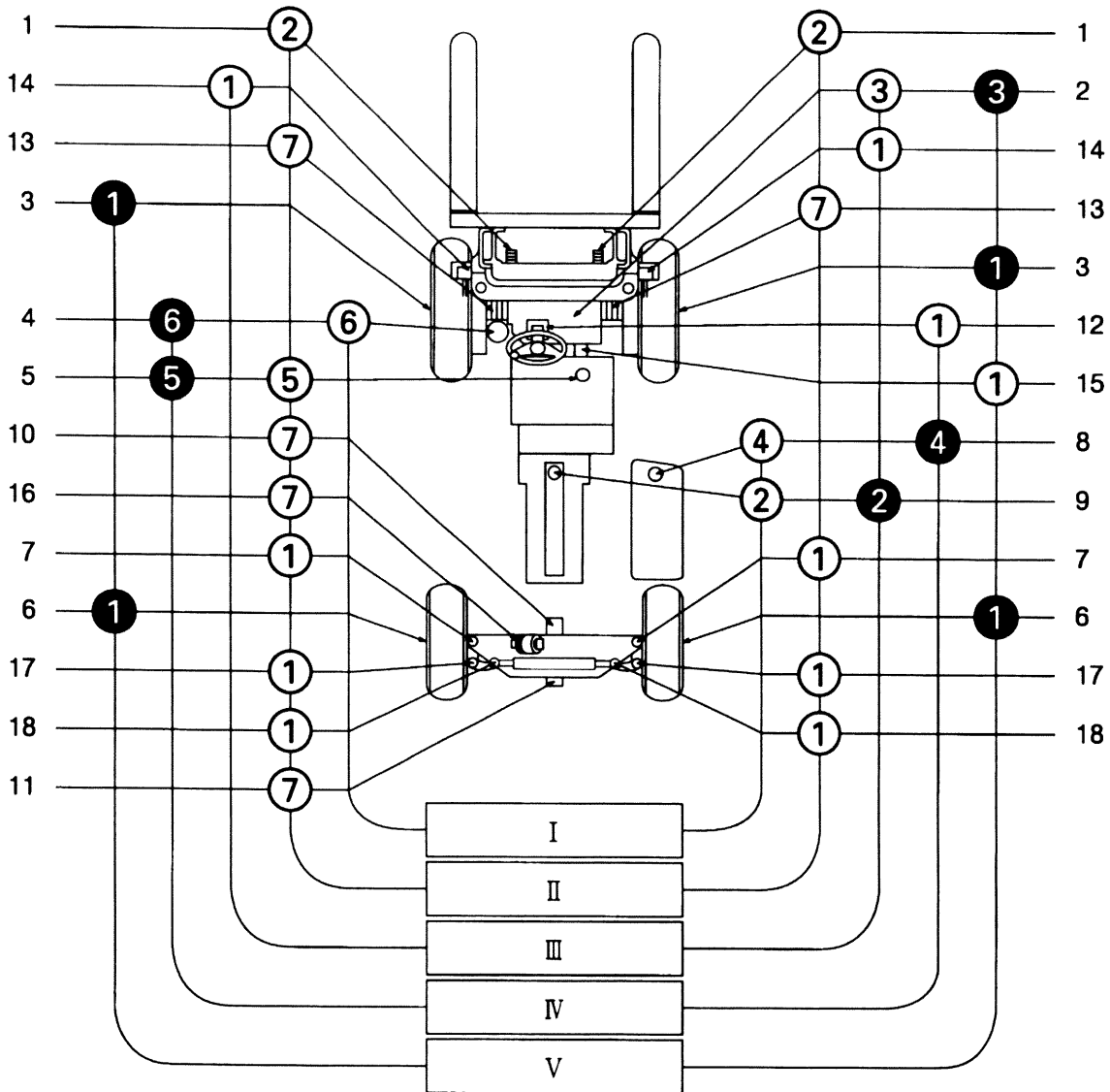


- Inspection
- Replacement
- ① MP grease
- ② Engine oil
- ③ Hypoid gear oil
- ④ Hydraulic oil
- ⑤ Hypoid gear oil
- ⑥ Brake fluid
- ⑦ Molybdenum disulfide grease

- I. Inspect every 8 hours (daily)
- II. Inspect every 40 hours (weekly)
- III. Inspect every 170 hours (monthly)
- IV. Inspect every 1000 hours (6 monthly)
- V. Inspect every 2000 hours (annual)

- | | |
|------------------------------------|------------------------------------|
| 1 Chain | 11 Rear axle beam rear pin |
| 2 Differential | 12 Tilt steering locking mechanism |
| 3 Front wheel bearing | 13 Mast support bushing |
| 4 Brake and clutch master cylinder | 14 Tilt cylinder front pin |
| 5 Transmission case | 15 Propeller shaft |
| 6 Rear wheel bearing | 16 Gear shift link |
| 7 Steering knuckle king pin | 17 Swing lock cylinder lower pin |
| 8 Oil tank | 18 Tie rod end pin |
| 9 Engine crank case | 19 Rear axle cylinder end pin |
| 10 Rear axle beam front pin | 20 Gear shift lever |

Torque Converter & Transmission Model



- Inspection
- Replacement
- ① MP grease
- ② Engine oil
- ③ Hypoid gear oil
- ④ Hydraulic oil
- ⑤ Automatic transmission fluid
- ⑥ Brake fluid
- ⑦ Molybdenum disulfide grease

- I. Inspect every 8 hours (daily)
- II. Inspect every 40 hours (weekly)
- III. Inspect every 170 hours (monthly)
- IV. Inspect every 1000 hours (6 monthly)
- V. Inspect every 2000 hours (annual)

- | | |
|-----------------------------|------------------------------------|
| 1 Chain | 10 Rear axle beam front pin |
| 2 Differential | 11 Rear axle beam rear pin |
| 3 Front wheel bearing | 12 Tilt steering locking mechanism |
| 4 Brake master cylinder | 13 Mast support bushing |
| 5 Torque converter case | 14 Tilt cylinder front pin |
| 6 Rear wheel bearing | 15 Propeller shaft |
| 7 Steering knuckle king pin | 16 Swing lock cylinder lower pin |
| 8 Oil tank | 17 Tie rod end pin |
| 9 Engine crank case | 18 Rear axle cylinder end pin |

PERIODIC MAINTENANCE

INSPECTION METHOD

I : Inspection. Repair or replacement if required.
 M : Measurement. Repair or adjustment if required.
 T : Retightening C : Cleaning L : Lubrication
 * : For new vehicle *1 : Flaw detector

Item \ Inspection Period		Every 1 month	Every 3 months	Every 6 months	Every 12 months
		Every 170 hours	Every 500 hours	Every 1000 hours	Every 2000 hours
ENGINE					
Main body	Proper starting and abnormal noise	I	←	←	←
	Rotating condition at idling	M	←	←	←
	Rotating condition during acceleration	M	←	←	←
	Exhaust gas condition	I	←	←	←
	Air cleaner element	C	←	←	←
	Valve clearance	M*			M
	Compression				M
	Cylinder head bolt loosening				T
	Muffler rubber mount				I
PCV system	Clogging and damage in PCV valve and piping	I	←	←	←
Governor	No-load maximum rpm	M	←	←	←
Lubrication system	Oil leak	I	←	←	←
	Oil level	I	←	←	←
	Clogging and dirt of oil filter	I	←	←	←
Fuel system	Fuel leak	I	←	←	←
	Operation of carburetor link mechanism	I	←	←	←
	Dirt and clogging of fuel filter and element	I	←	←	←
	Injection timing			M	←
	Injection nozzle injection pressure and spray status				M
	Draining of sedimenter			I	←
Cooling system	Coolant level in radiator and leak	I	←	←	←
	Rubber hose degradation	I	←	←	←
	Radiator cap condition	I	←	←	←
	Fan belt tension, looseness and damage	I	←	←	←
	Radiator rubber mount				I

Inspection Period Item		Every 1 month	Every 3 months	Every 6 months	Every 12 months
		Every 170 hours	Every 500 hours	Every 1000 hours	Every 2000 hours
POWER TRANSMISSION SYSTEM					
Clutch	Clutch pedal play	M	←	←	←
	Abnormal sound and functioning (connection)	I	←	←	←
	Clutch master cylinder function and leak	I	←	←	←
	Fluid level	I	←	←	←
	Oil clutch mechanism function and leak (OPT)			I	←
Manual transmission	Leak	I	←	←	←
	Fluid level	I	←	←	←
	Gear function and abnormal noise	I	←	←	←
	Damage of shift lever cable boot				I
	Damage of cable outer				I
Differential	Leak	I	←	←	←
	Oil level	I	←	←	←
	Bolt loosening				T
Torque converter & transmission	Leak	I	←	←	←
	Fluid level	I	←	←	←
	Operating mechanism function and looseness	I	←	←	←
	Control valve and clutch functions	I	←	←	←
	Inching valve function	I	←	←	←
	Stall and hydraulic pressure measurement			M	←
Propeller shaft and axle shaft	Loose joint		T	←	←
	Looseness at spline connections				I
	Looseness of universal joint				I
	Twisting and cracks of axle shaft				I
DRIVE SYSTEM					
Wheels	Tire inflation pressure	M	←	←	←
	Tire cuts, damage and uneven wearing	I	←	←	←
	Loose rim and hub nuts	T	←	←	←
	Tire groove depth	M	←	←	←
	Metal chips, pebbles and other foreign matter trapped in tire grooves	I	←	←	←

Item		Inspection Period	Every 1 month	Every 3 months	Every 6 months	Every 12 months
		Every 170 hours	Every 500 hours	Every 1000 hours	Every 2000 hours	
Wheels	Rim, side bearing and disc wheel damage	I	←	←	←	
	Abnormal sound and looseness of front wheel bearing	I	←	←	←	
	Abnormal sound and looseness of rear wheel bearing	I	←	←	←	
Front axle	Cracks, damage and deformation of housing				I	
Rear axle	Cracks, damage and deformation of beam				I	
	Looseness of axle beam in vehicle longitudinal direction	M*			M	
STEERING SYSTEM						
Steering wheel	Play and looseness	I	←	←	←	
	Function	I	←	←	←	
Steering valve	Oil leak	I	←	←	←	
	Looseness of mounting	T	←	←	←	
Power Steering	Oil leak	I	←	←	←	
	Mounting and linkage looseness	I	←	←	←	
	Damage of power steering hose				I	
Knuckle	King pin looseness	I	←	←	←	
	Cranks and deformation				I	
BRAKING SYSTEM						
Brake pedal	Play and reserve	M	←	←	←	
	Braking effect	I	←	←	←	
Parking brake	Operating force	I	←	←	←	
	Braking effect	I	←	←	←	
	Rod and cable looseness and damage	I	←	←	←	
Brake pipe	Leak, damage and mounting condition	I	←	←	←	
Reservoir tank	Leak and fluid level	I	←	←	←	
Master cylinder and wheel cylinder	Function, wear, damage, leak and mounting looseness				I	

Item		Inspection Period	Every 1 month	Every 3 months	Every 6 months	Every 12 months
		Every 170 hours	Every 500 hours	Every 1000 hours	Every 2000 hours	
Brake drum and brake shoe	Clearance between drum and lining	M	←	←	←	
	Wear of shoe sliding portion and lining				I	
	Drum wear and damage				I	
	Shoe operating condition				I	
	Anchor pin rusting				I	
	Return spring fatigue				M	
	Automatic adjuster function				I	
Backing plate	Deformation, cracks and damage				I	
	Loose mounting				T	
MATERIAL HANDLING SYSTEM						
Forks	Abnormality of fork and stopper pin	I	←	←	←	
	Misalignment between left and right fork fingers	I	←	←	←	
	Cracks at fork root and welded part				I ¹⁾	
Mast and lift bracket	Deformation and damage of each part and crack at welded part	I	←	←	←	
	Mast and lift bracket looseness	I	←	←	←	
	Wear and damage of mast support bushing				I	
	Wear, damage and rotating condition of rollers	I	←	←	←	
	Wear and damage of roller pins				I	
	Wear and damage of mast trip	I	←	←	←	
Chain and chain wheel	Tension, deformation and damage of chain	I	←	←	←	
	Chain lubrication	I	←	←	←	
	Abnormality of chain anchor bolt	I	←	←	←	
	Wear, damage and rotating condition of chain wheel	I	←	←	←	
Various attachments	Abnormality and mounting condition of each part	I	←	←	←	
HYDRAULIC SYSTEM						
Cylinder	Loosening and damage of cylinder mounting	T	←	←	←	
	Deformation and damage of rod, rod screw and rod end	I	←	←	←	
	Cylinder operation	I	←	←	←	
	Natural drop and natural forward tilt (hydraulic drift)	M	←	←	←	

Item		Inspection Period	Every 1 month	Every 3 months	Every 6 months	Every 12 months
		Every 170 hours	Every 500 hours	Every 1000 hours	Every 2000 hours	
Cylinder	Oil leak and damage	I	←	←	←	
	Wear and damage of pin and cylinder bearing	I	←	←	←	
	Lifting speed	M	←	←	←	
	Uneven movement	I	←	←	←	
Oil pump	Oil leak and abnormal sound	I	←	←	←	
Hydraulic oil tank	Oil level and contamination	I	←	←	←	
	Tank and oil strainer			C	←	
	Oil leak	I	←	←	←	
Control lever	Loose linkage	I	←	←	←	
	Operation	I	←	←	←	
Oil control valve	Oil leak	I	←	←	←	
	Relief pressure measurement				M	
	Relief valve and tilt lock valve functions	I	←	←	←	
Hydraulic piping	Oil leak	I	←	←	←	
	Deformation and damage	I	←	←	←	
	Loose joint	T	←	←	←	
ELECTRICAL SYSTEM						
Ignition timing	Cracks on distributor cap	I	←	←	←	
	Spark plug burning and gap	I	←	←	←	
	Distributor side terminal burning	I	←	←	←	
	Distributor cap center piece wear and damage	I	←	←	←	
	Plug cord internal discontinuity				I	
	Ignition timing			M	←	
Starting motor	Pinion gear meshing status	I	←	←	←	
Charger	Charging function	I	←	←	←	
Battery	Battery fluid level	I	←	←	←	
	Battery fluid specific gravity			M	←	
Electrical wiring	Damage of wiring harness	I	←	←	←	
	Fuses	I	←	←	←	

Item		Inspection Period	Every 1 month	Every 3 months	Every 6 months	Every 12 months
			Every 170 hours	Every 500 hours	Every 1000 hours	Every 2000 hours
Preheater	Open-circuit in glow plug					←
	Open-circuit in intake heater					←
Engine stop- ping system	Diesel engine key stop device function			←	←	←
DPF Mafler	Filter					←
	Inline filter (for back pressure sensor)				←	←
SAFETY DEVICES, ETC.						
Head guard	Cracks at welded portion			←	←	←
	Deformation and damage			←	←	←
Back-rest	Loosening of mounting		T	←	←	←
	Deformation, crack and damage			←	←	←
Lighting system	Function and mounting condition			←	←	←
Horn	Function and mounting condition			←	←	←
Direction indicator	Function and mounting condition			←	←	←
Instruments	Functions			←	←	←
Backup buzzer	Function and mounting condition			←	←	←
Rear-view mirror	Dirt, damage			←	←	←
	Rear reflection status			←	←	←
Seat	Loosening and damage of mounting			←	←	←
	Seatbelt damage and function			←	←	←
Body	Damage and cracks of frame, cross members, etc.					
	Bolt looseness					T
SAS	Functions			←	←	←
	Loosening and damage at sensor mounting portion			←	←	←
	Damage, deformation, oil leakage and loosening of the mounting of functional parts			←	←	←
	Loosening and damage of wire harnesses			←	←	←
	Lock cylinder accumulator performance					
	Rusting and corrosion of load sensor					
Others	Grease up		L	←	←	←

PERIODIC REPLACEMENT OF PARTS AND LUBRICANTS

● : Replacement

Item	Interval	Every 1 month	Every 3 months	Every 6 months	Every 12 months
		Every 170 hours	Every 500 hours	Every 1000 hours	Every 2000 hours
Engine oil		●	←	←	←
Engine oil filter		● *1	●	←	←
Engine coolant (every 2 years for LLC)			●	←	←
Fuel filter				●	←
Torque converter oil				●	←
Torque converter oil filter				●	←
Manual transmission oil					●
Differential oil					●
Hydraulic oil				●	←
Hydraulic oil filter		● *1		●	←
Wheel bearing grease					●
Spark plugs				●	←
Air cleaner element					●
Cups and seals for brake master and wheel cylinders					●
Brake fluid				●	←
Power steering hoses					● *2
Power steering rubbers parts					● *2
Hydraulic hoses					● *2
Brake fluid reservoir tank hose					● *2
Fuel hoses					● *2
Torque converter rubber hoses					● *2
Chains					● *3
DPF Mafler filter (OPT)					● *3
DPF Mafler back pressure sensor inline filter (OPT)				●	←
DPF Air cleaner (OPT)					● *2
SAS Swing lock cylinder					● *5

*1: for new vehicle *2: Every 2 years *3: Every 3 years *5: Every 10000 hours

Replacement shall be made upon arrival of the operation hours or months, whichever is earlier.

FEATURES

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Refer to the latest data in the Toyota Industrial Equipment Product Information and Toyota I.E. Specification Manual for the main vehicle specifications.

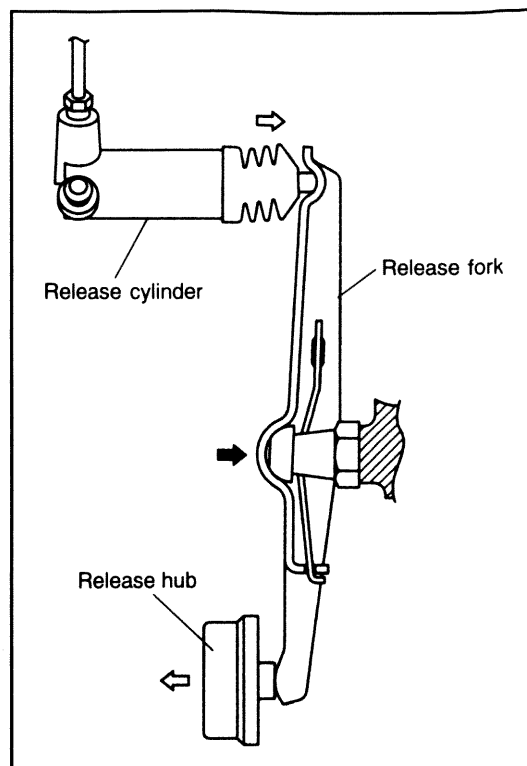
CLUTCH

GENERAL

The clutch release hub link mechanism has been modified. On conventional vehicles, the pedal depression force was transmitted from the clutch release cylinder to the clutch cover through the release fork shaft, release fork and release hub. The same is transmitted from the release cylinder to the clutch cover through the release fork and release hub after the modification made this time.

The clutch system, therefore, has been simplified.

Vehicles with the 4Y-ECS engine consisting of the 4Y engine and ECS are newly added.

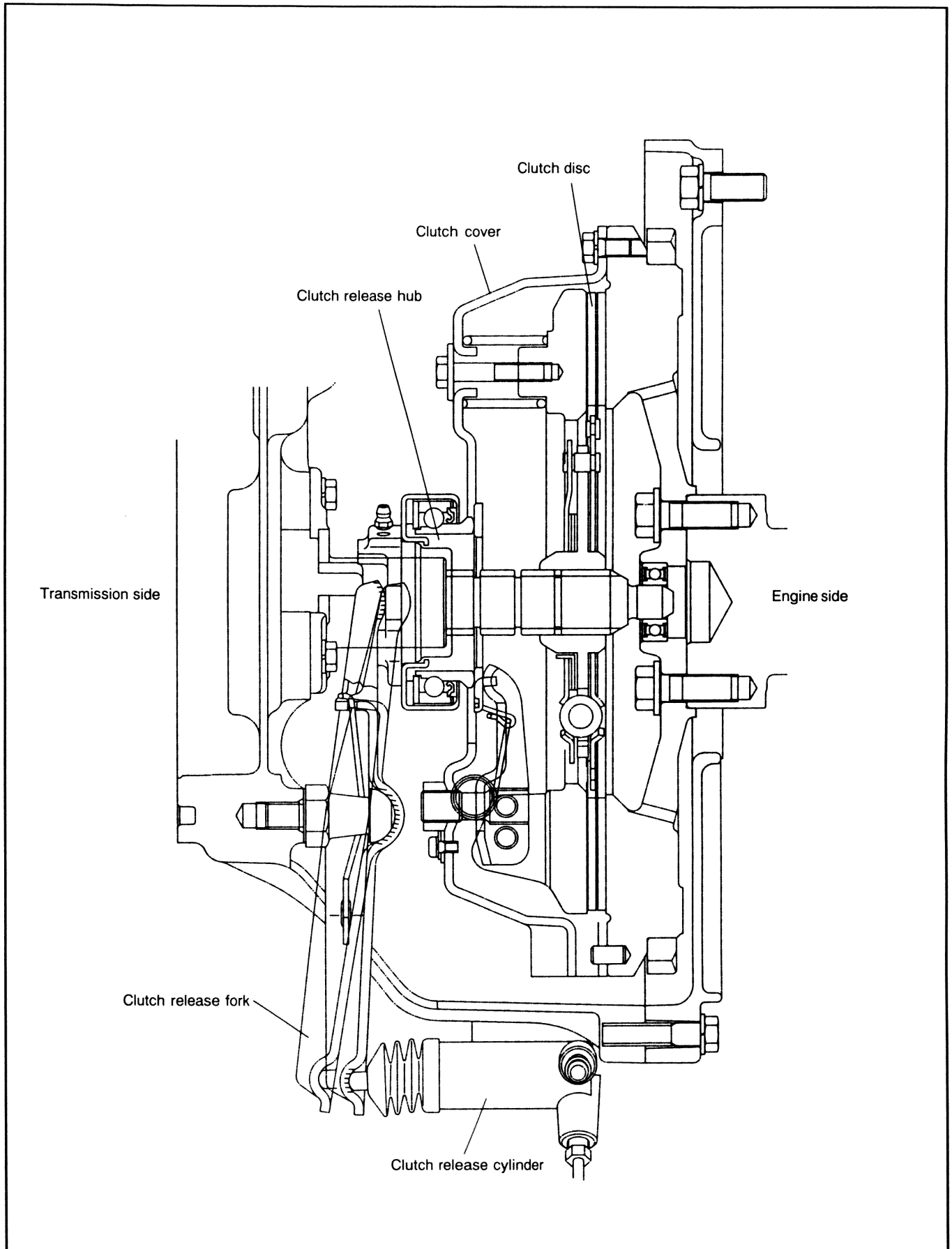


CLUTCH SPECIFICATIONS

		5K	4Y-1DZ-II	2Z
Clutch	Type	Dry, single-plate, spring type	←	←
	Operating method	Hydraulic	←	←
Clutch cover	Size mm	278	←	←
	Installation load N (kg)	2,354 (240)	3,236 (330)	3,923 (400)
	O.D. × I.D. × thickness (mm)	275 × 175 × 3.5	←	←
Clutch disc	Front frictional area (cm ²)	300.5 × 2	←	←
	Material	Special woven	←	←
Master cylinder	Type	Conventional	←	←
	Inside diameter mm	15.87	←	←
Release cylinder	Type	Adjust-free type	←	←
	Inside diameter mm	20.64	←	←
Applicable oil		Brake fluid 2500H	←	←

Note: Power-assist type clutch is adopted on vehicles installed with the optional oil clutch. The power-assist type clutch, however, is not provided as an individual option.

CLUTCH MECHANISM SECTIONAL VIEW



OIL CLUTCH (OPTION)

The oil clutch vehicles remain unchanged from the old models.

The 4Y-ECS engine vehicles are newly added.

CLUTCH SPECIFICATIONS

		5K·4Y·1DZ-II	2Z
Clutch	Type	Wet, single-plate, coil spring type	←
	Operating method	Hydraulic	←
Clutch cover	Size mm	278	←
	Installation load N (kg)	5,070 (517)	6865 (700)
Clutch disc	O.D. × I.D. mm	275 × 175	←
	Front frictional area cm ²	300.5 × 2	←
	Material	Special cork	←
Master cylinder	Type	Portless with hydraulic booster	←
	Inside diameter mm	25.4	←
Release cylinder	Type	Adjustable type	←
	Inside diameter mm	20.64	←
Applicable oil		Hydraulic oil ISO VG32	←

MANUAL TRANSMISSION

GENERAL

The transmission case has been changed from conventional cast iron to aluminum die-casting. In place of the clutch housing and transmission case independent from each other on conventional vehicles, the transmission case is divided into the front and rear cases. In the case of dry clutch vehicles, the front case is integrated with the clutch housing.

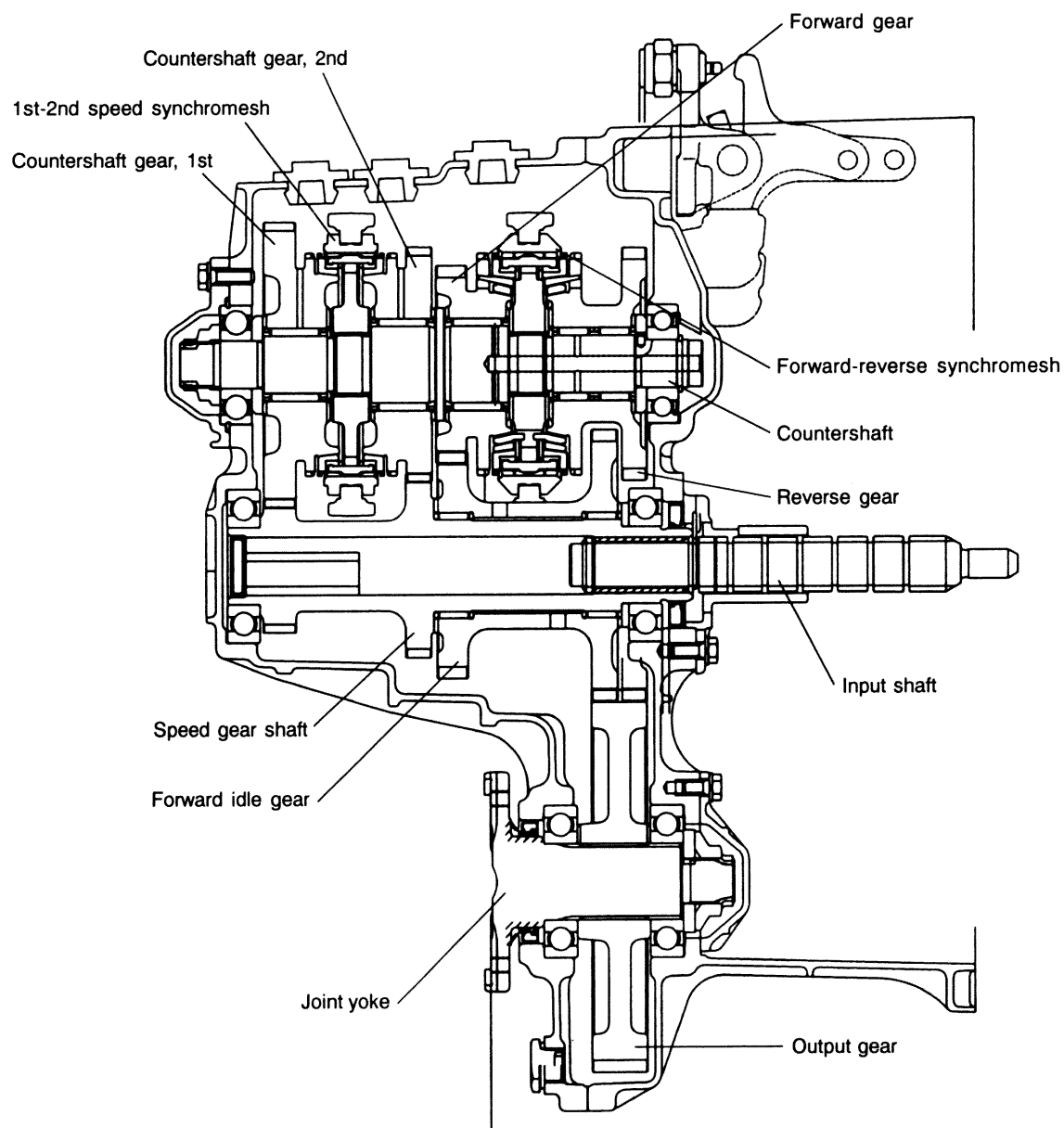
MANUAL TRANSMISSION SPECIFICATIONS

Transmission type	Synchromesh
Operating method	Floor shift link
Transmission case oil capacity ℓ (US gal)	3.8 (1.0)
Applicable oil	Hypoid gear oil SAE85W-90

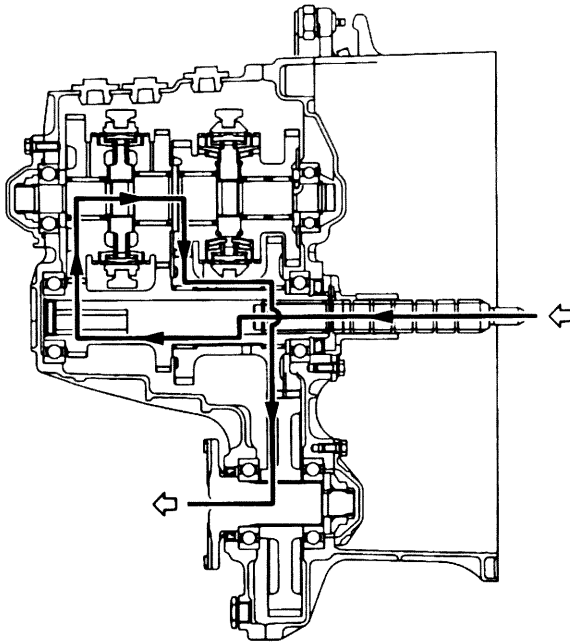
Change Gear Ratio

Vehicle model	Engine	Change gear ratio			
		Forward		Reverse	
		1st speed	2nd speed	1st speed	2nd speed
1 ton series	5K	3.715	2.127	3.722	2.132
	*4Y·1DZ-II	3.541	1.564	3.548	1.567
K2 ton series	5K	3.715	2.127	3.722	2.132
	*4Y·1DZ-II	3.541	1.564	3.548	1.567
2 ton series	5K	3.715	2.127	3.722	2.132
	*4Y·1DZ-II	3.541	1.564	3.548	1.567
	2Z	3.379	1.355	3.385	1.358
K3 ton series	*4Y·1DZ-II	3.541	1.564	3.548	1.567
3 ton series	4Y	↑	↑	↑	↑
	2Z	3.379	1.355	3.385	1.358
J3.5 ton series	4Y	3.541	1.564	3.548	1.567
	2Z	3.379	1.355	3.385	1.358

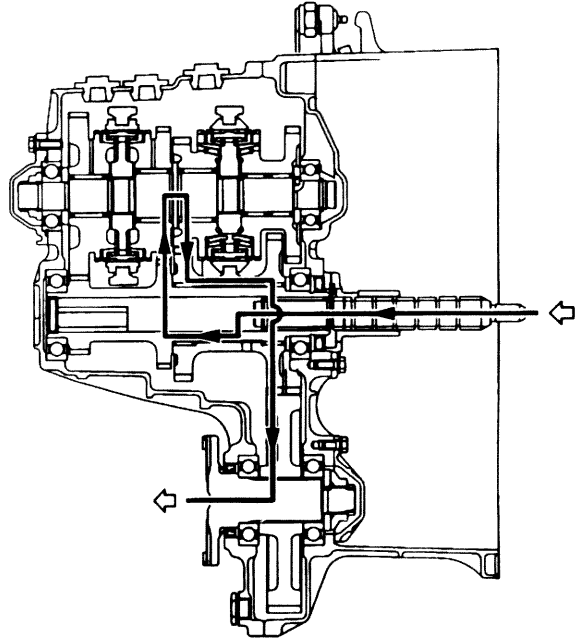
*The gear ratios of the 4Y-ECS engine vehicles are the same as those of the 4-Y engine vehicles.

MANUAL TRANSMISSION SECTIONAL VIEW

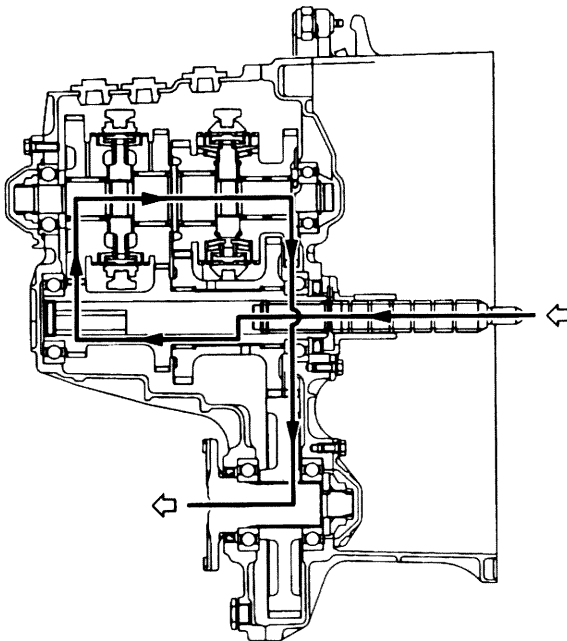
POWER TRANSMISSION CHARTS



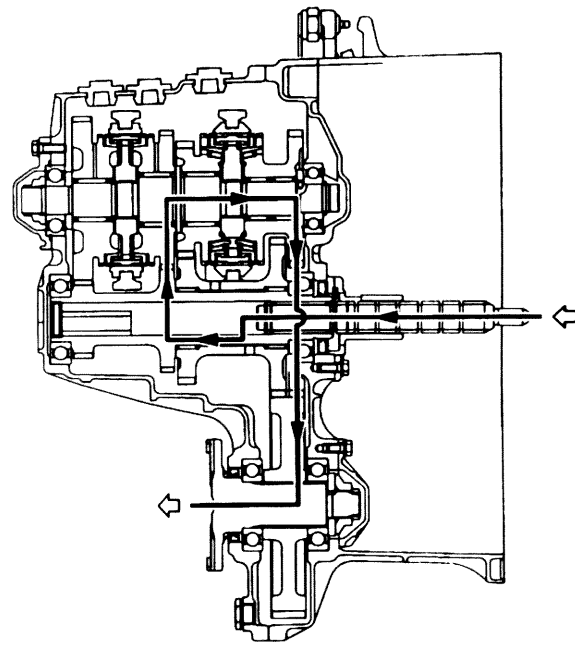
Forward 1st speed



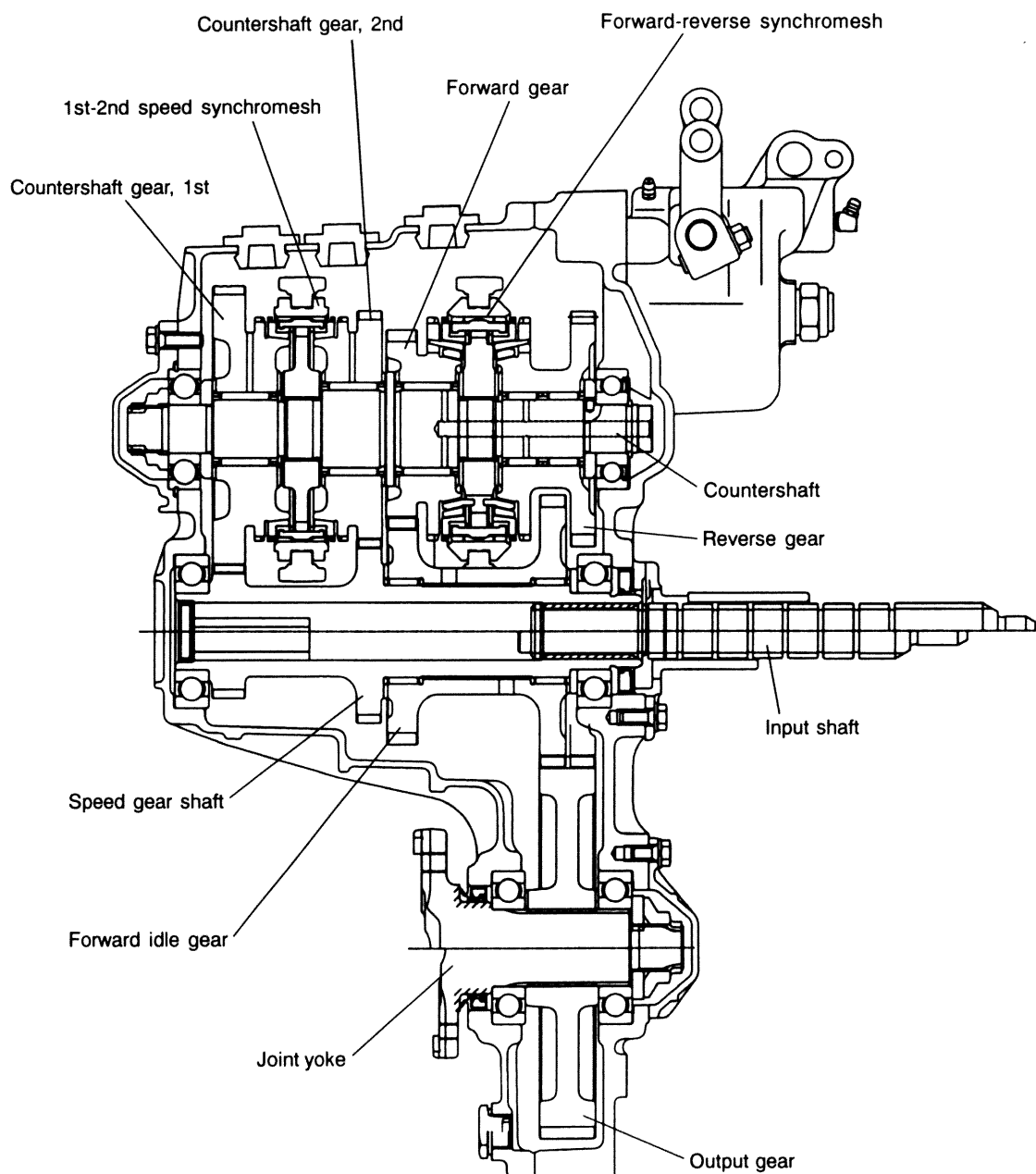
Forward 2nd speed



Reverse 1st speed



Reverse 2nd speed

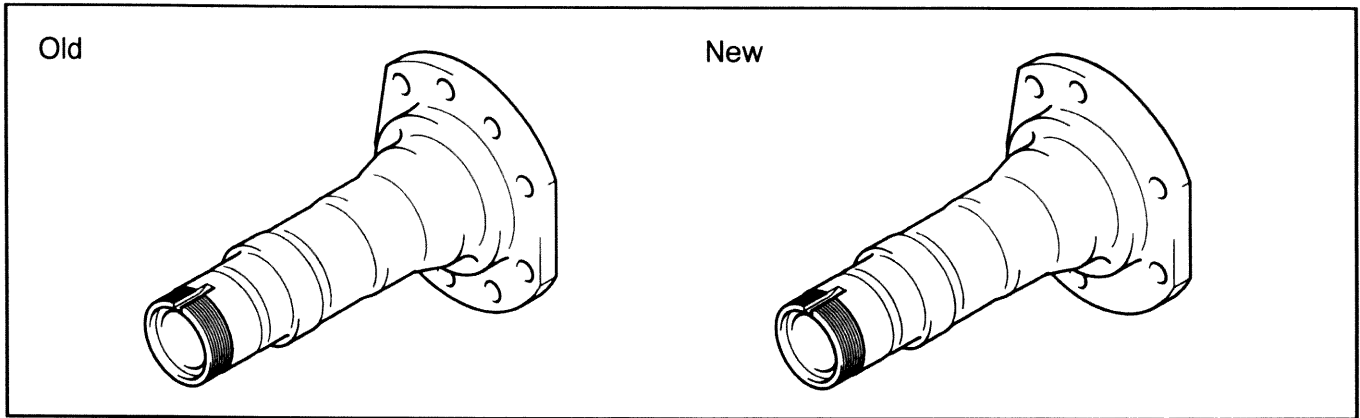
MANUAL TRANSMISSION SECTIONAL VIEW (OIL CLUTCH VEHICLE)

FRONT AXLE-DIFFERENTIAL

MAJOR MODIFICATIONS

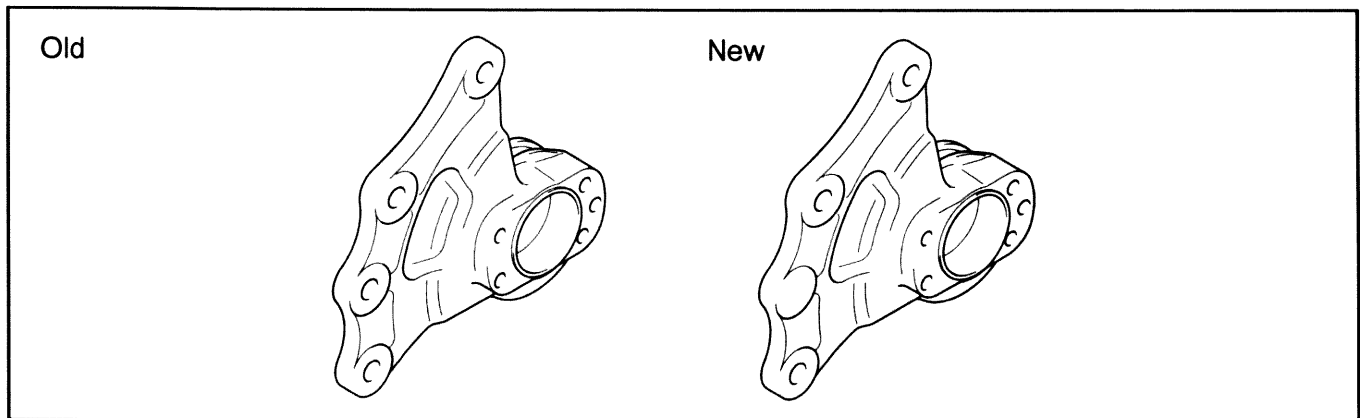
FRONT AXLE HOUSING

The number of front axle housing bolts has been changed from 16 to 12 pcs./vehicle.



FRONT AXLE BRACKET

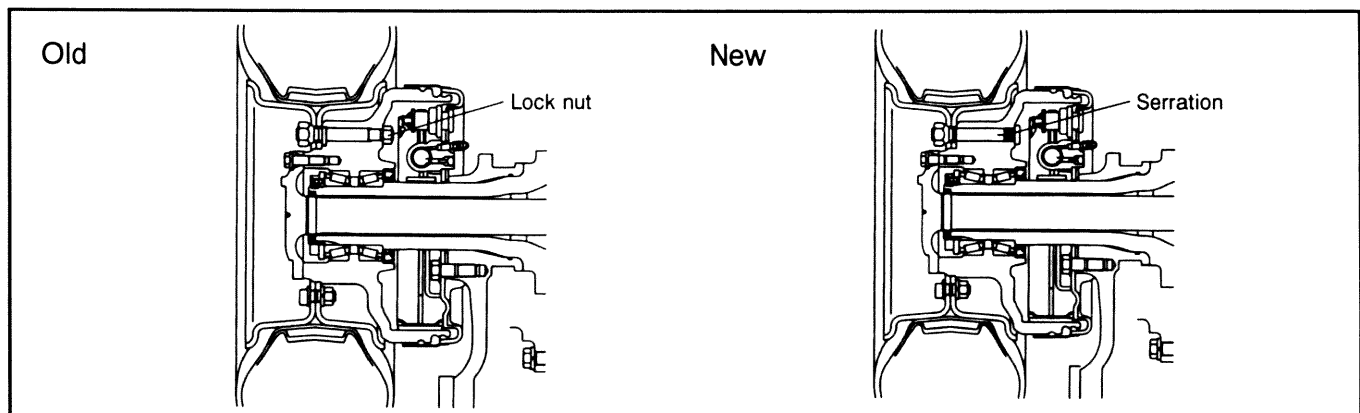
The number of front axle bracket set bolts has been changed from 8 to 6 pcs./vehicle.



ADOPTION OF SERRATION FOR HUB BOLTS

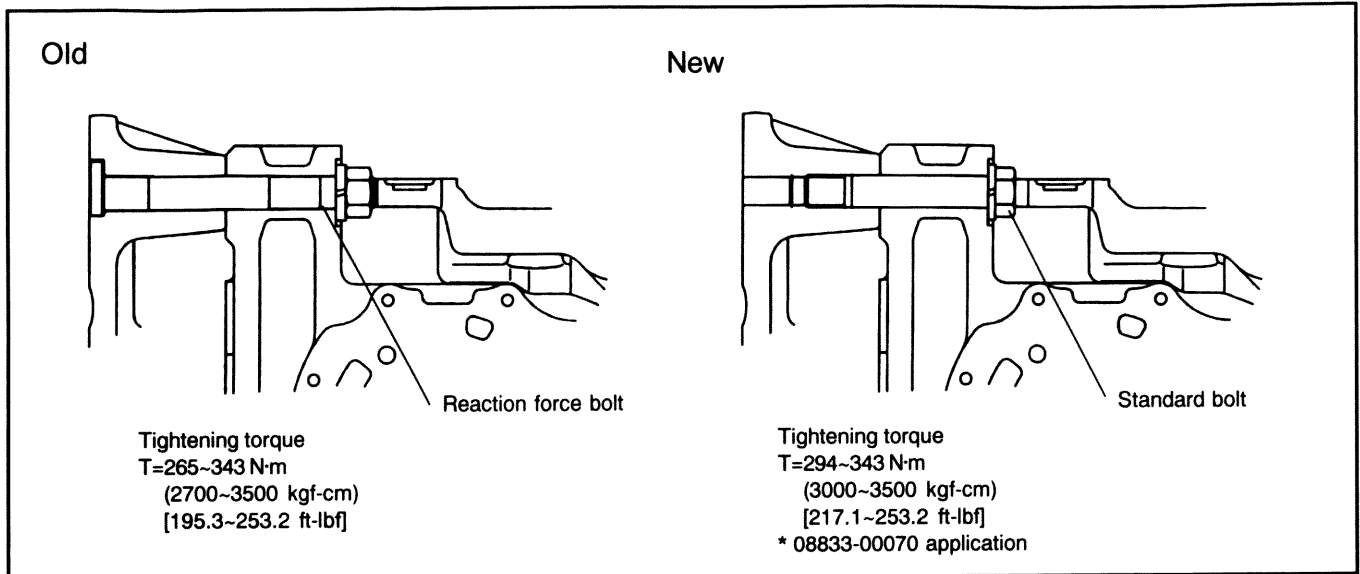
(1.2-TON VEHICLE WITH SINGLE TIRES)

The hub bolts were fastened by lock nuts on the inner side of the brake drum on the conventional vehicles. Serration is adopted for fixing hub bolts on the brake drum this time.



FRONT AXLE BRACKET REACTION FORCE BOLT

The reaction force bolt used for fixing the front axle bracket on the differential housing has been changed to a standard bolt. (Excluding 3.0-ton and J3.5-ton vehicles)

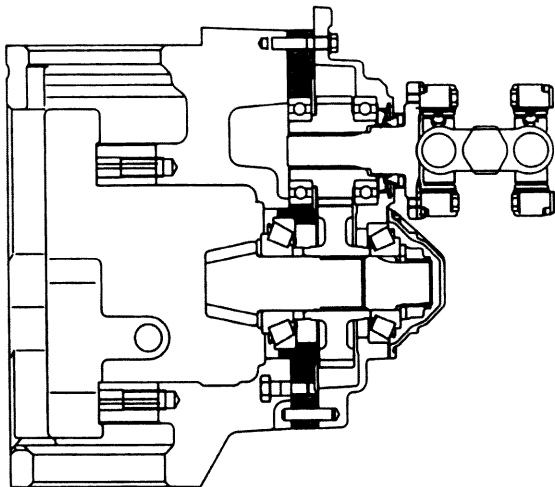


DIFFERENTIAL

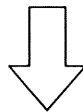
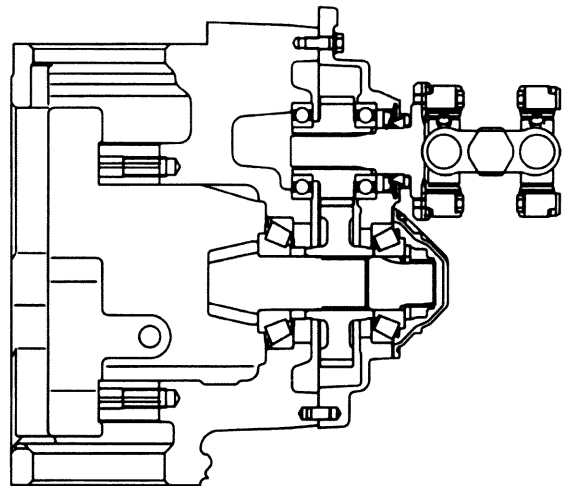
The differential reduction gear portion has been modified in the differential section.

The retainer used in the drive pinion and reduction gear mounting portion has been discontinued and the differential carrier shape has been changed. The spacer under the neck of the drive pinion has also been discontinued.

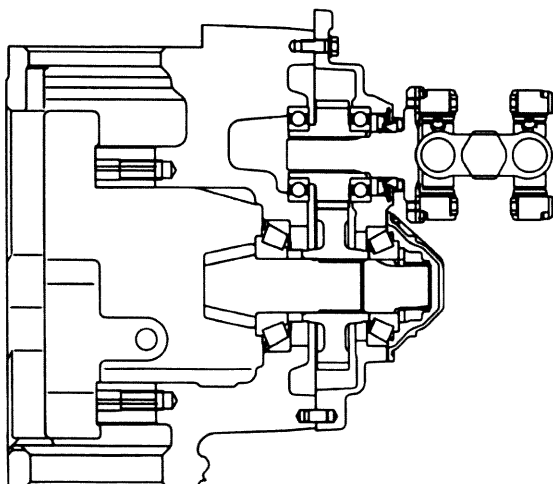
Old



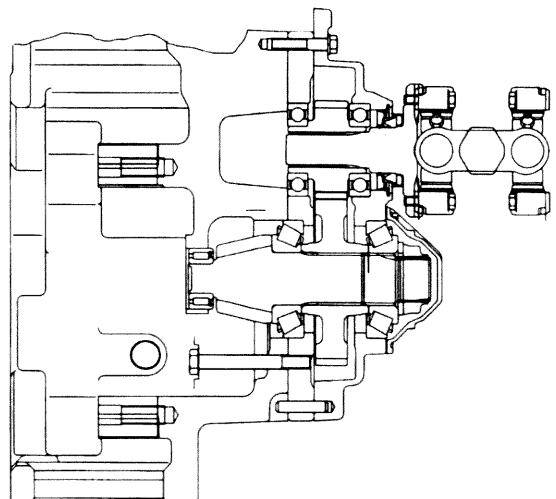
New



1 to 1.8 ton series



2-3 ton series, J3.5 ton series



DIFFERENTIAL REDUCTION GEAR RATIO SPECIFICATIONS

	Tonnage	1.0 ton, 1.35 ton		1.5 ton, 1.75 ton	
	Engine	5K	1DZ-II	5K	4Y·1DZ-II
6.50-10	M/T vehicle	1.741	1.586	1.741	1.586
	1-speed T/C vehicle	2.363		2.363	
		2-speed T/C vehicle	Not provided		
21 × 8-9	M/T Vehicle	1.642			
4.50-12	1-speed T/C vehicle	2.363	1.586	2.217	1.586
6.00-9	2-speed T/C vehicle	—	—	—	—

	Tonnage	K2 ton series			K3 ton series	
	Engine	5K	4Y	1DZ-II	4Y	1DZ-II
With STD tires	M/T vehicle	1.642	1.586			
	1-speed T/C vehicle	2.217				
	2-speed T/C vehicle	Not provided				

	Tonnage	2 ton series		
	Engine	5K	4Y·1DZ-II	2Z
With STD tires	M/T vehicle	2.00	1.846	
	1-speed T/C vehicle	2.75		
	2-speed T/C vehicle	Not provided	2.75	2.363

	Tonnage	3.0 ton series		J3.5 ton series	
	Engine	4Y·1DZ-II	2Z	4Y·1DZ-II	2Z
With STD tires	M/T vehicle	2.00		2.083	
	1-speed T/C vehicle				
	2-speed T/C vehicle	2.75	2.363	2.75	2.217

WHEELS

TIRE TABLE

● : Indicates STD tire for model

○ : Indicates STD tire for each type

△ : Indicates OPT tire

– : Not applicable

1.0 Ton Vehicle

Component			Rim	Pneumatic Tire		Pneumatic Type Solid Tire				
				Tire Size	J-Lug	Tire Size	J-Lug Non-Puncture	Soft Non-Puncture	White Non-Puncture	Green Non-Puncture
Front Tires	Single	Standard	Divided *1	6.00-9-10	●	6.00-9	△	△		
		Side ring *1	△							
		Oversize		Divided *1	6.50-10-10	6.50-10		—		
	Standard Double		Side ring *1	4.50-12-8	○	4.50-12				
	Special Double			6.00-9-10	△	6.00-9				
	Rear Tires			Divided *2	5.00-8-8	●		5.00-8	△	
Side ring *2				△						

1.5 Ton & 1.75 Ton Vehicle

Component			Rim	Pneumatic Tire		Pneumatic Type Solid Tire				
				Tire Size	J-Lug	Tire Size	J-Lug Non-Puncture	Soft Non-Puncture	White Non-Puncture	Green Non-Puncture
Front Tires	Single	Standard	Divided *1	6.50-10-10	●	6.50-10	△	△		
		Side ring *1	6.00-9-10 *3	△	6.00-9 *3	—				
	21×8-9-10		△	21×8-9						
	Standard Double		4.50-12-8	○	4.50-12					
	Special Double		6.00-9-10	△	6.00-9					
Rear Tires			Divided *2	5.00-8-8	●			5.00-8	△	
			Side ring *2		△	—				

- *1 • Divided rims and side ring rims are a set with their respective exclusive hubs.
 • Tires are interchangeable between divided rims, or between side ring rims, but are not interchangeable between divided rims and side ring rims.
- *2 • Divided rims and side ring rims are a set with their respective exclusive hobs.
 • Divided rims and side ring rims are not interchangeable.
- *3 • 6.00-9 is only set as STD for the 1.5 ton series with 5K.

K2.0 Ton & K2.5 Ton Vehicle

Component	Rim	Pneumatic Tire		Pneumatic Type Solid Tire						
		Tire Size	J-Lug	Tire Size	J-Lug Non-Puncture	Soft Non-Puncture	White Non-Puncture	Green Non-Puncture		
Front Tires	Divided * ¹	21×8-9-14	●	21×8-9	△		△			
	Side ring * ¹	21×8-9-14	△							
Rear Tires	Divided * ²	18×7-8-10	●	18×7-8			△		—	
	Side ring * ²	18×7-8-16	△							

*1 • Divided rims and side ring rims are not interchangeable.

*2 • Divided rims and side ring rims are a set with their respective exclusive hubs.

• Divided rims and side ring rims are not interchangeable.

2.0 Ton & 2.5 Ton Vehicle

Component		Rim	Pneumatic Tire		Pneumatic Type Solid Tire				
	Type		Tire Size	J-Lug	Tire Size	J-Lug Non-Puncture	Soft Non-Puncture	White Non-Puncture	Green Non-Puncture
Front Tires	Single	Divided * ¹	7.00-12-12	●	7.00-12	Δ	Δ		
		Side ring * ¹		Δ			—		
		Center disc type side ring* ²	—	—					
	Standard Double	Side ring * ¹	5.50-15-8	○	5.50-15				
	Special Double		7.00-12-12	Δ	7.00-12				
Rear Tires		Divided	6.00-9-10	●	6.00-9		Δ		
		Side ring * ³		Δ			—		
		Oversize	Divided * ⁴		6.50-10-10 * ⁴		6.50-10 * ⁴	Δ	

*1 • Divided rims and side ring rims are a set with their respective exclusive hubs.

• Tires are interchangeable between divided rims, or between side ring rims, but are not interchangeable between divided rims and side ring rims.

*2 • Center disc type side ring rims are interchangeable with divided rims.

*3 • Side ring rims are a set with their exclusive rear hubs. There is no interchangeability with divided rims.

*4 • Option for 2.5 ton vehicle only.

K3.0 Ton Vehicle

Component	Rim	Pneumatic Tire		Pneumatic Type Solid Tire				
		Tire Size	J-Lug	Tire Size	J-Lug Non-Puncture	Soft Non-Puncture	White Non-Puncture	Green Non-Puncture
Front Tires	Side ring	23x9-10-16	●	23x9-10	△			
Rear Tires	Side ring	18x7-8-16		18x7-8				

3.0 Ton Vehicle

Component		Rim	Pneumatic Tire		Pneumatic Type Solid Tire							
	Type		Tire Size	J-Lug	Tire Size	J-Lug Non-Puncture	Soft Non-Puncture	White Non-Puncture	Green Non-Puncture			
Front Tire	Single	Side ring	28×9-15-12	●	28×9-15	△		△				
	Standard Double		6.00-15-10	○	6.00-15							
	Special Double		28×8-15-12	△	7.00-15							
Rear Tires		Divided	6.50-10-10	●	6.50-10						△	
		Side ring *1		△								
		Divided	6.50-10-12		—	—	—					

*1 • Divided rims are interchangeable.

J3.5 Ton Vehicle

Component		Rim	Pneumatic Tire		Pneumatic Type Solid Tire				
	Type		Tire Size	J-Lug	Tire Size	J-Lug Non-Puncture	Soft Non-Puncture	White Non-Puncture	Green Non-Puncture
Front Tire	Single	Side ring	250-15-16	●	250-15	△		△	
	Standard Double		6.00-15-10	○	6.00-15			-	
	Special Double		28×8-15-12	△	7.00-15				
Rear Tires			6.50-10-12	●	6.50-10			△	

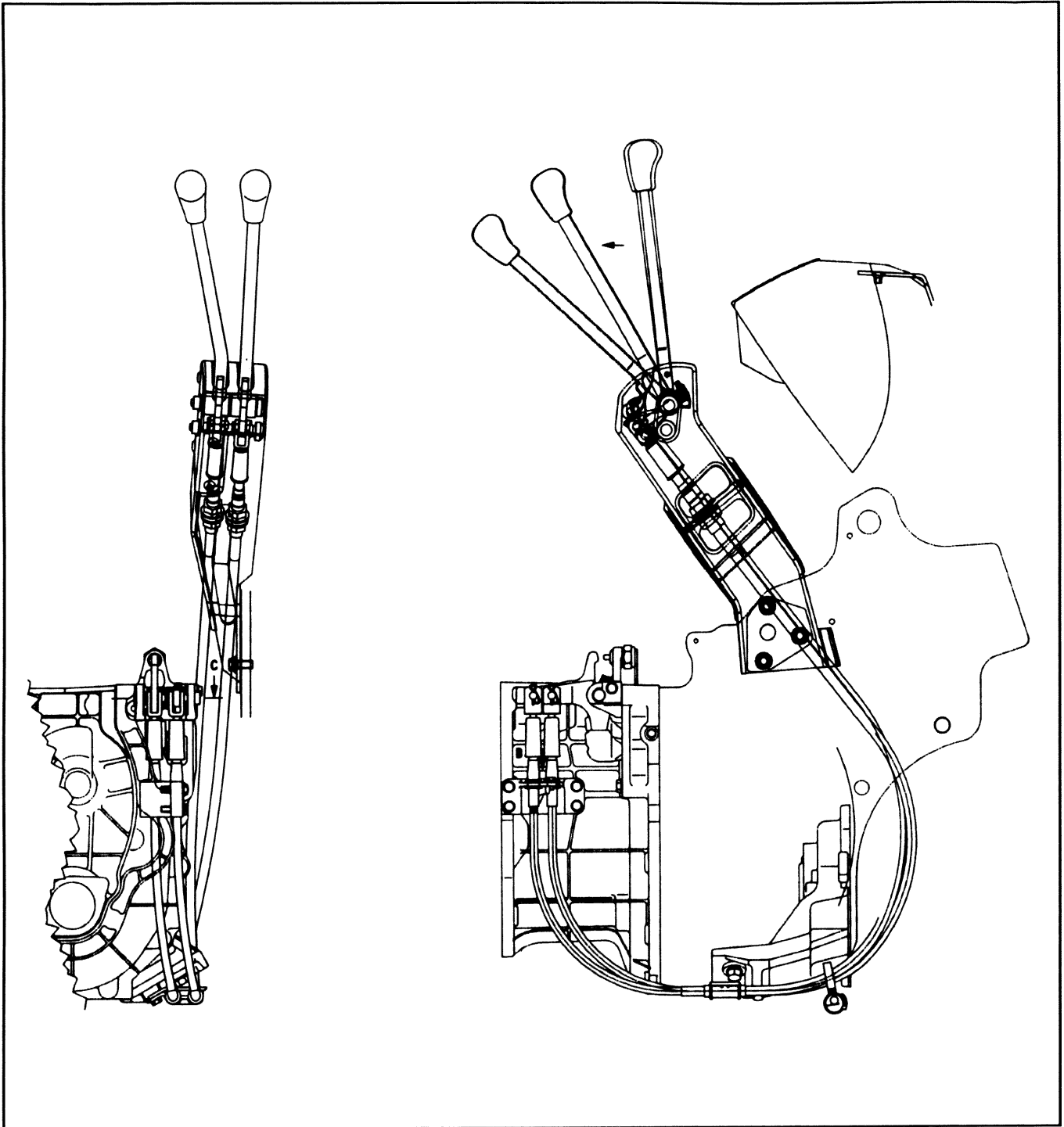
CHANGE LEVER

GENERAL

The shift mechanism on manual transmission vehicles is changed from the conventional link type to the cable type.

Adoption of the cable type has reduced lever vibration and stroke, resulting in easier operation.

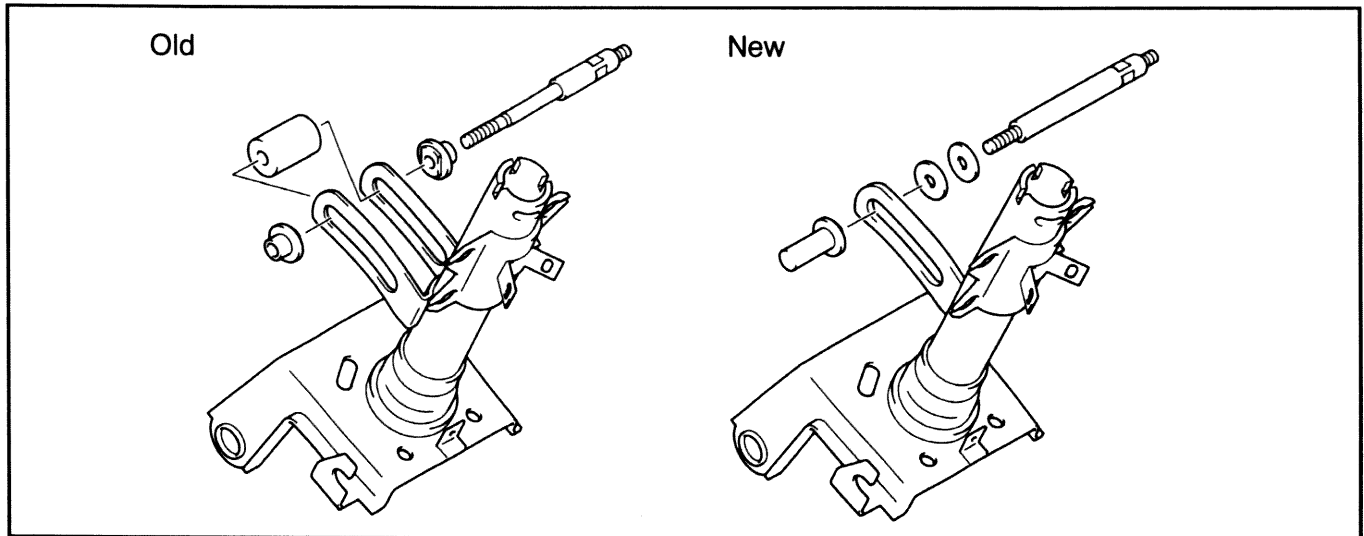
The brace rod used in the link type is also eliminated.



STEERING

TILT STEERING LOCK MECHANISM

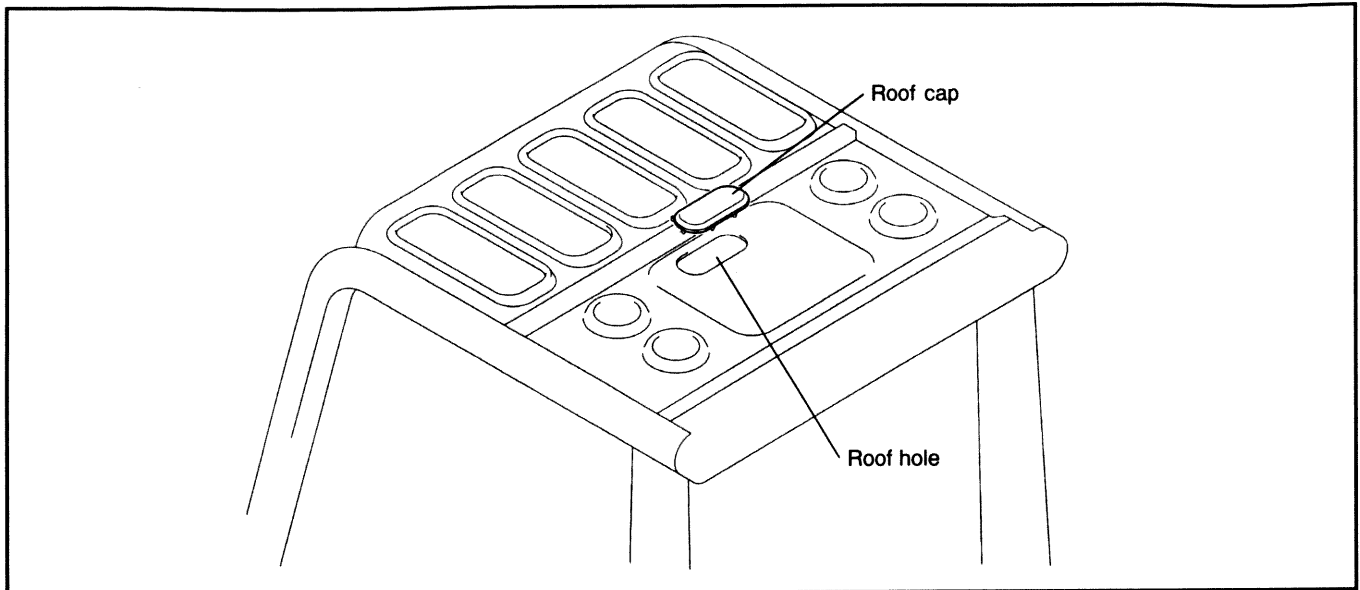
The structure of the tilt steering lock mechanism has been changed as shown below.



FRAME-WEIGHT

HEAD GUARD

For easier material handling in an elevated location, a roof hole is provided in the head guard roof . A roof cap is also provided for operation under rainy weather.



WEIGHT

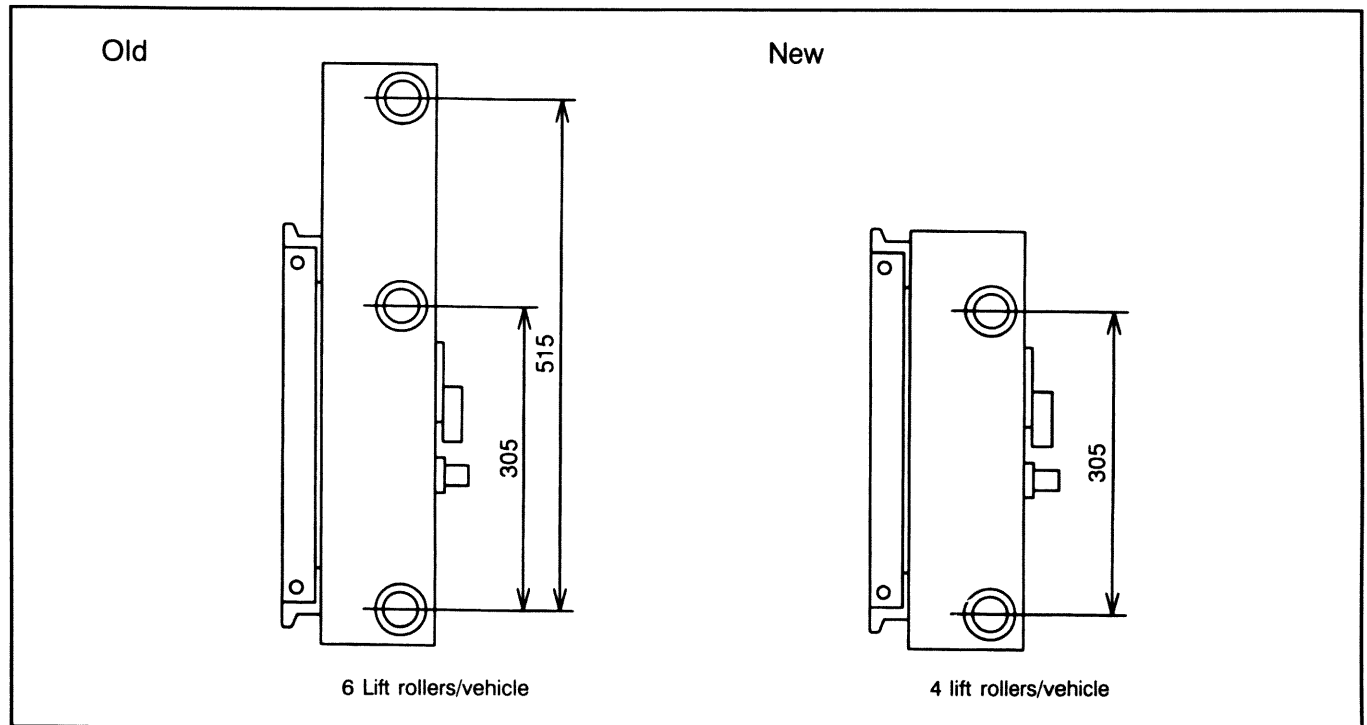
The weight mass has been changed.

Vehicle model	Tonnage	Weight (kg)
1 ton series	1.0	400
	1.35	610
	1.5	745
	1.75	880
Compact 2-3 ton	2.0	1,140
	2.5	1,550
	3.0	1,925
Standard 2 ton series	2.0	1,150
	2.25	1,360
	2.5	1,500
3 ton series	2.75	1,650
	3.0	1,800
	3.5	2,135

V MAST

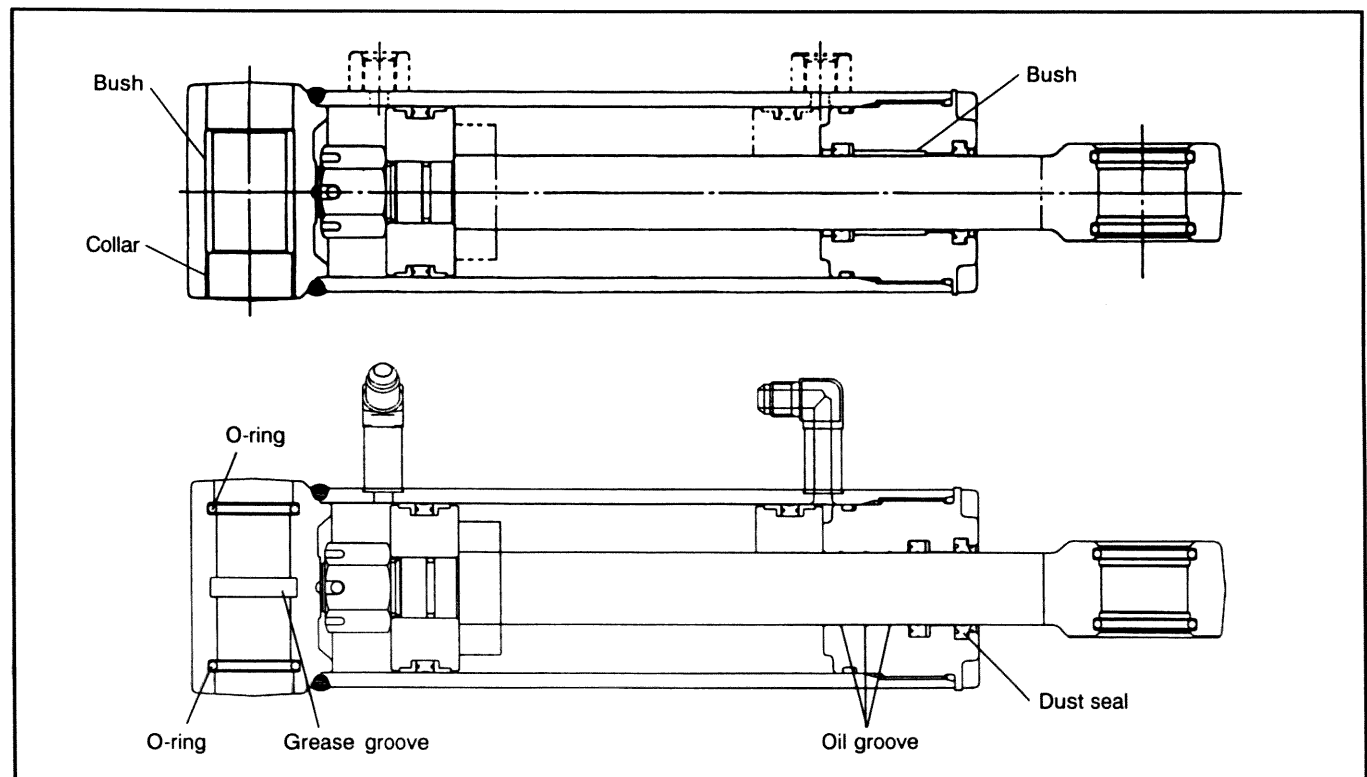
LIFT BRACKET

The V mast lift bracket for the 1.35 and 1.5 ton vehicles has been changed as shown below.



TILT CYLINDER

The tilt cylinder rod guide and cylinder bottom end structures have been changed as shown below.



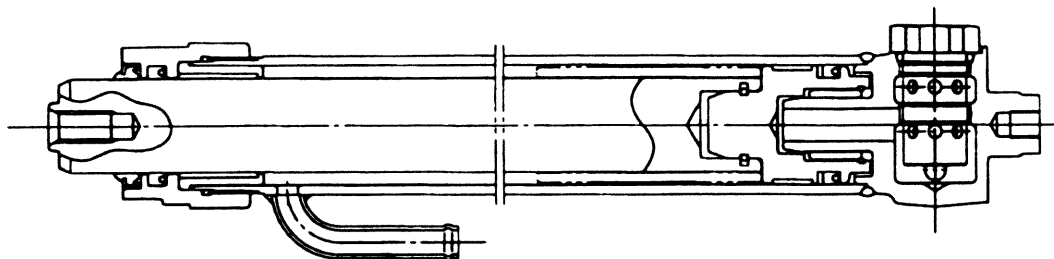
LIFT CYLINDER

LIFT CYLINDER

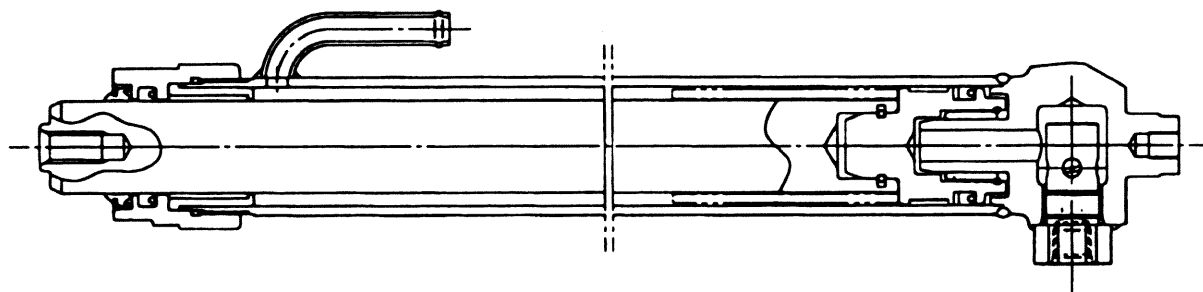
The piston rod guide structure in the lift cylinder ASSY has been changed partially.

Old

RH

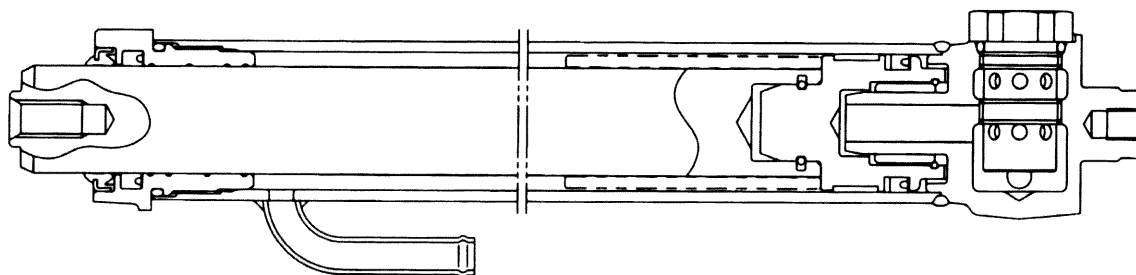


LH



New

RH



LH

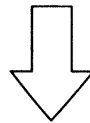
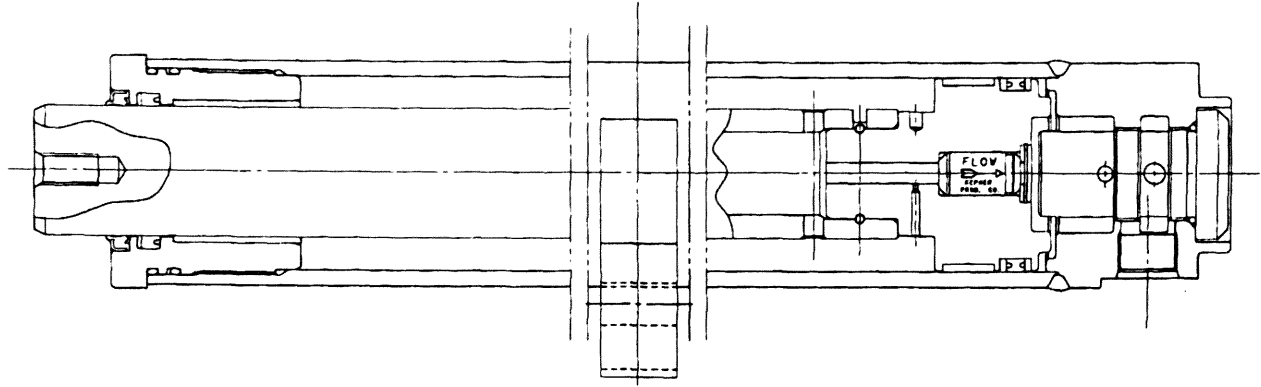
The structural change is the same also for the LH.

FSV·FV FRONT CYLINDER

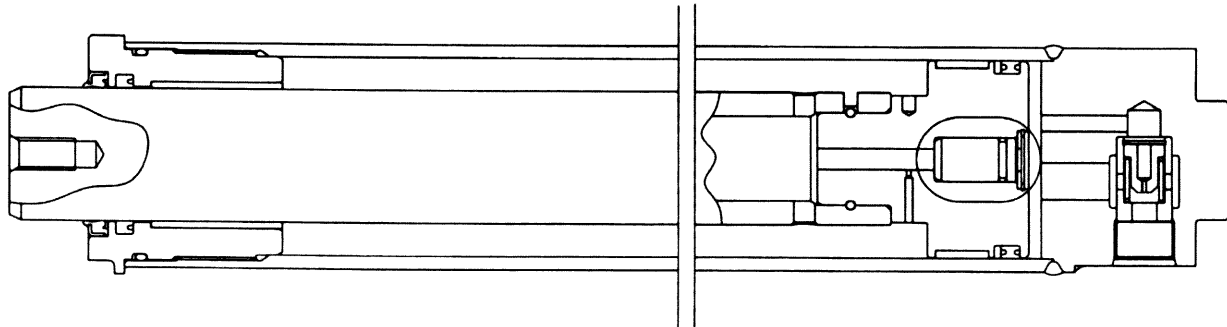
FRONT CYLINDER

The front cylinder structure has been changed partially.

Old



New



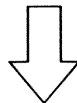
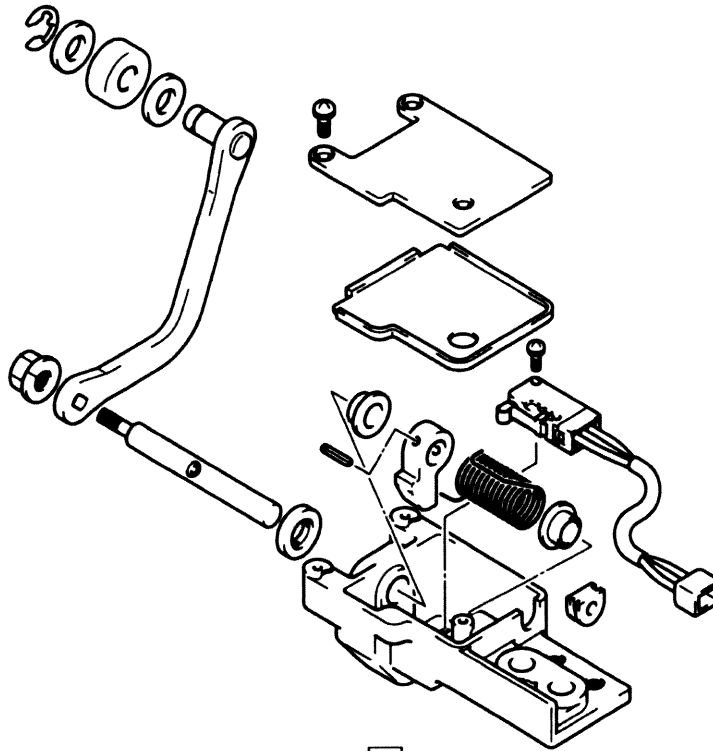
SAS

LIFTING HEIGHT SWITCH

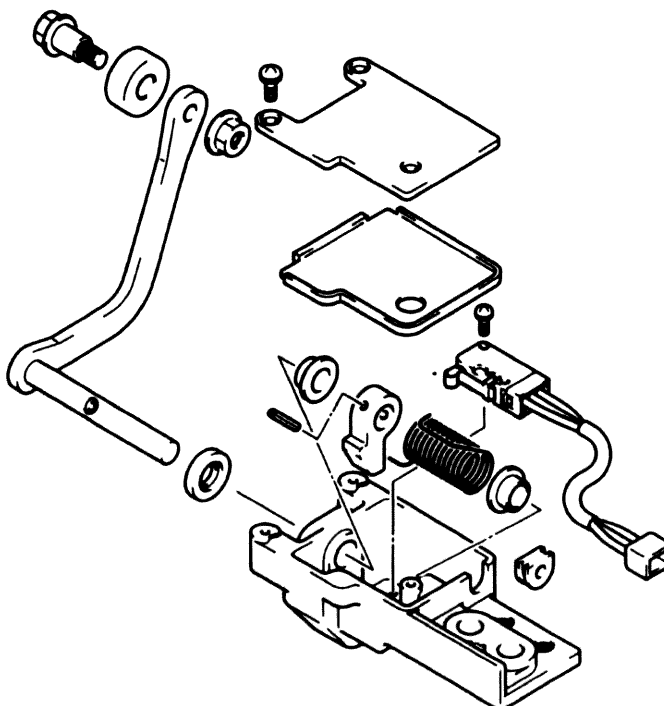
1. Switch Lever

The switch lever roller structure has been changed in the lifting height switch for durability improvement.

Old

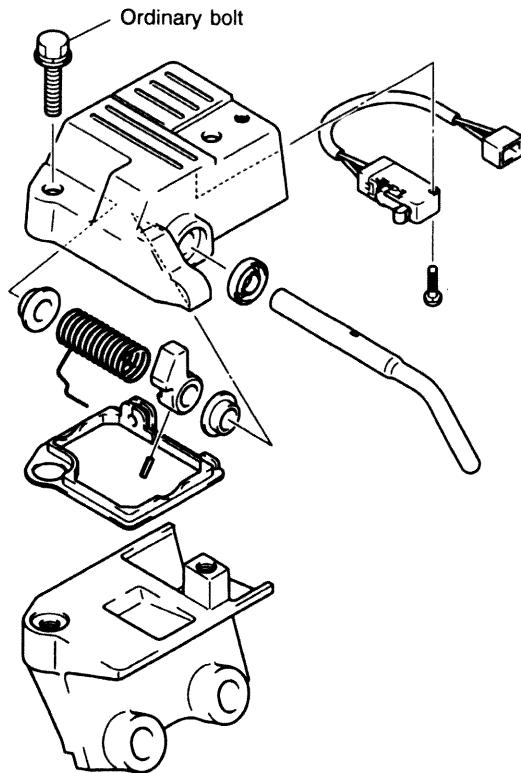


New

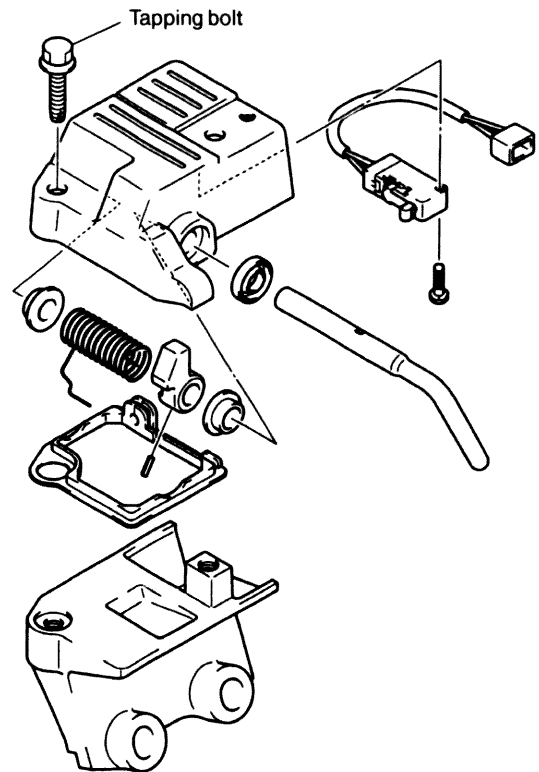


2. Switch Case

The lifting height switch case set bolt has been changed from an ordinary to a tapping bolt.



Ordinary bolt
 T=9.8~15.7 N·m
 (100~160 kgf·cm)
 [7.23~11.57 ft-lbf]



Tapping bolt
 T=22~25 N·m
 (224~225 kgf·cm)
 [16.21~18.45 ft-lbf]

[Caution]

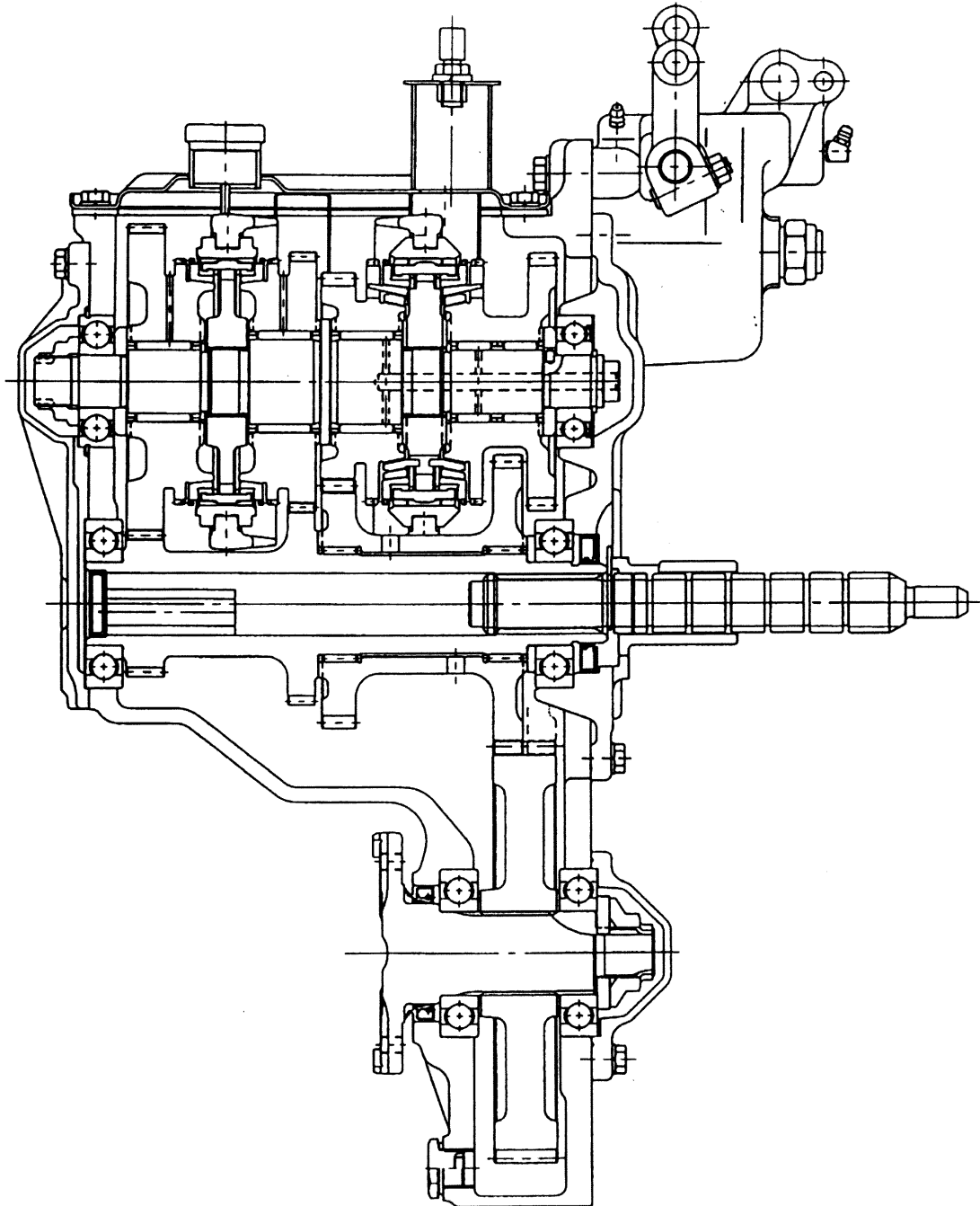
When the tapping bolt is loosened or removed,
 remove remaining aluminum particles.

MANUAL TRANSMISSION

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REMOVAL·INSTALLATION	2-23

GENERAL

* SEE C13-1016



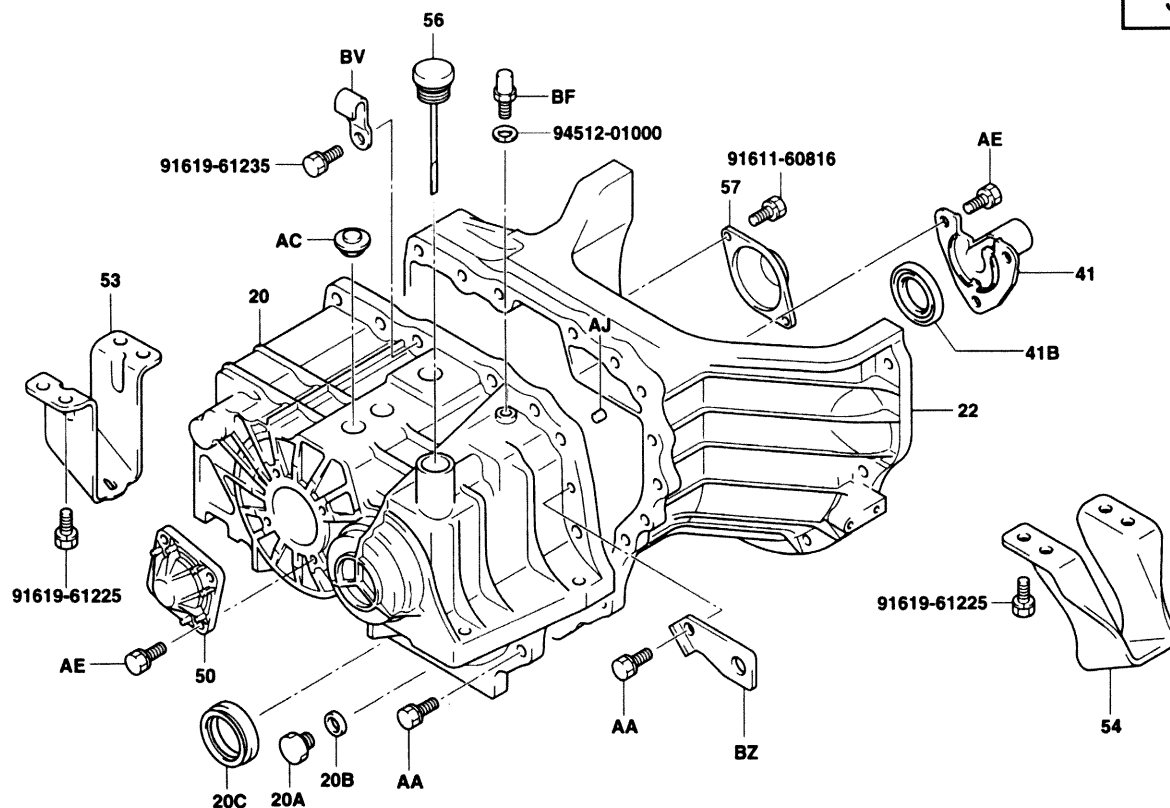
SPECIFICATIONS

Transmission type	Full synchromesh type
Operating method	Floor shift link method
Transmission case oil capacity ℓ (US gal)	3.8 (1.0)
Transmission oil	Hypoid gear oil

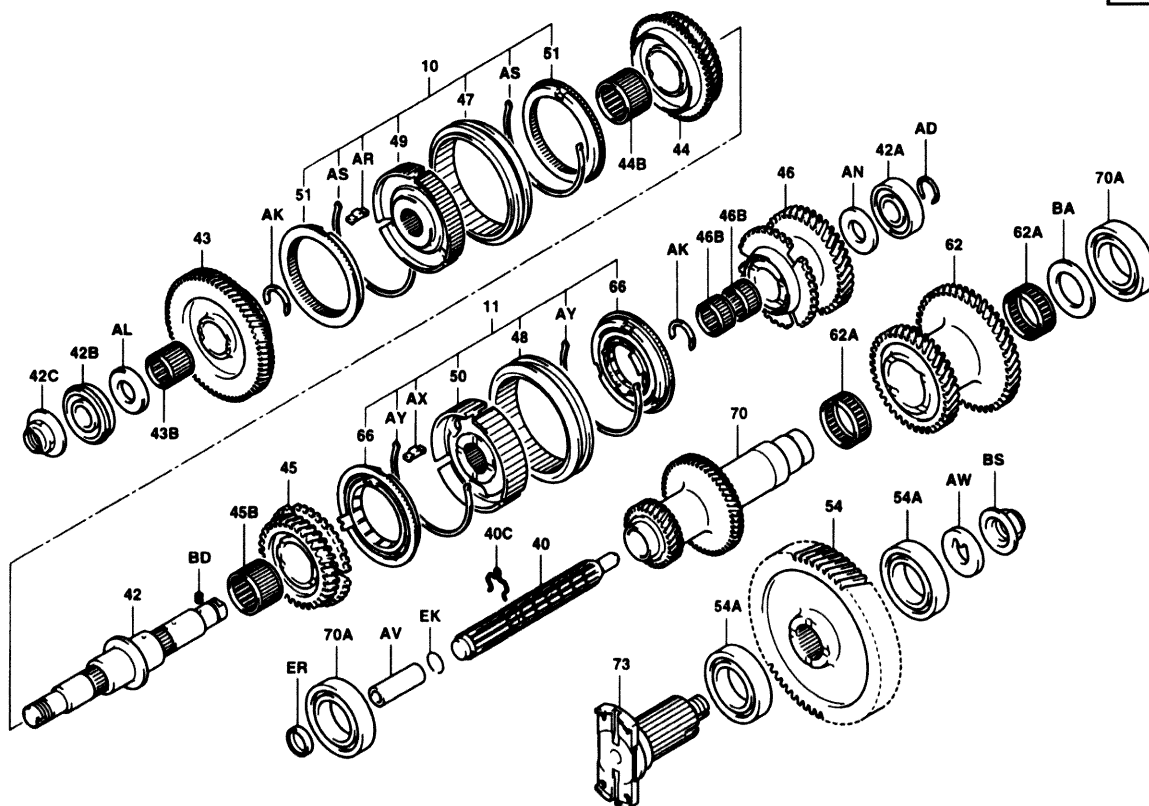
Gear ratio

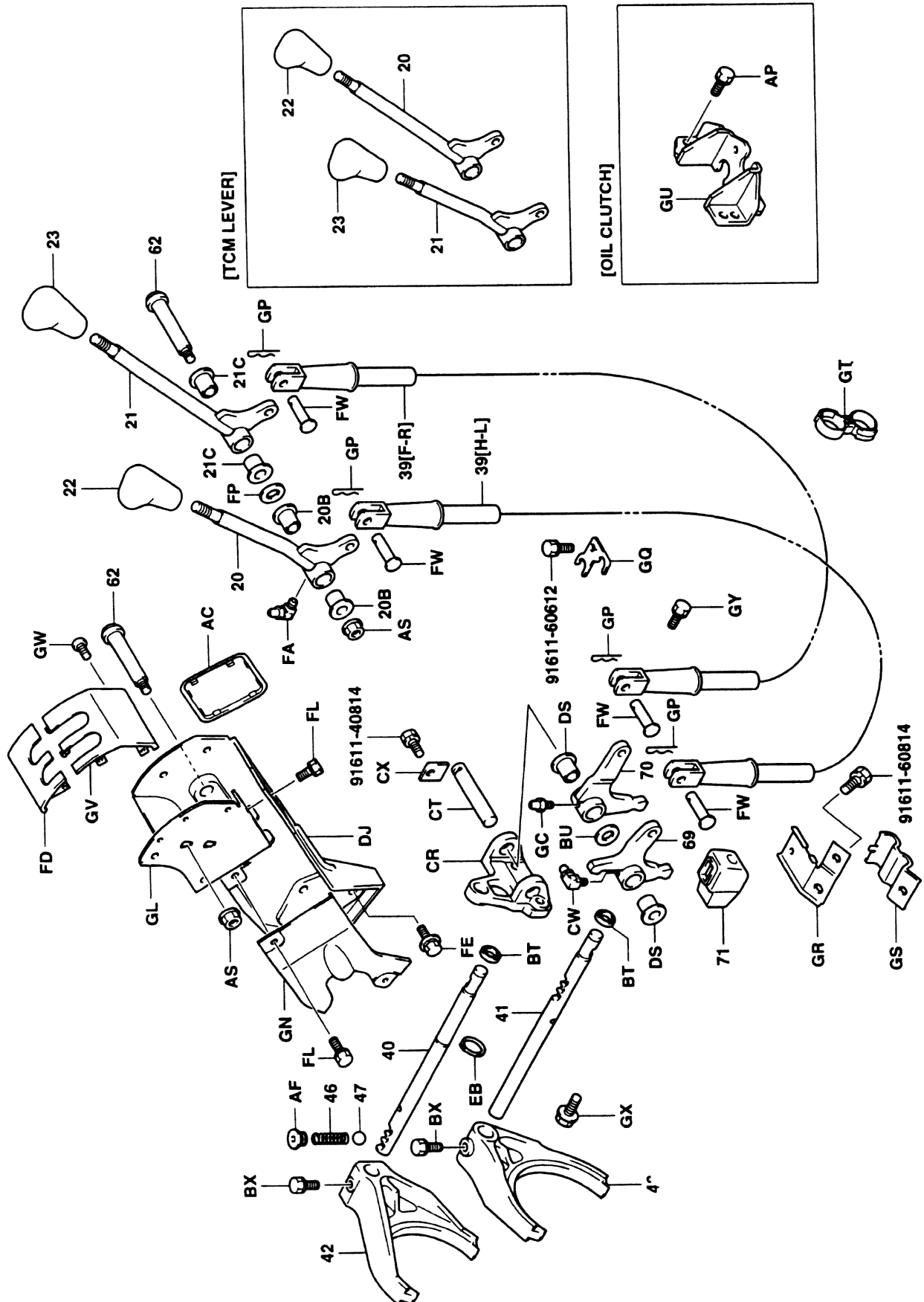
2

Vehicle model	Engine	Gear ratio			
		Forward		Reverse	
		1st speed	2nd speed	1st speed	2nd speed
1 ton series	5K	3.715	2.127	3.722	2.132
	4Y·1DZ-II	3.541	1.564	3.548	1.567
K2 ton series	5K	3.715	2.127	3.722	2.132
	4Y·1DZ-II	3.541	1.564	3.548	1.567
2 ton series	5K	3.715	2.127	3.722	2.132
	4Y·1DZ-II	3.541	1.564	3.548	1.567
	2Z	3.379	1.355	3.385	1.358
K3 ton series	4Y·1DZ-II	3.541	1.564	3.548	1.567
3 ton series	4Y·1DZ-II	↑	↑	↑	↑
	2Z	3.379	1.355	3.385	1.358
J3.5 ton series	4Y	3.541	1.564	3.548	1.567
	2Z	3.379	1.355	3.385	1.358

COMPONENTS**3301**

3301-064A

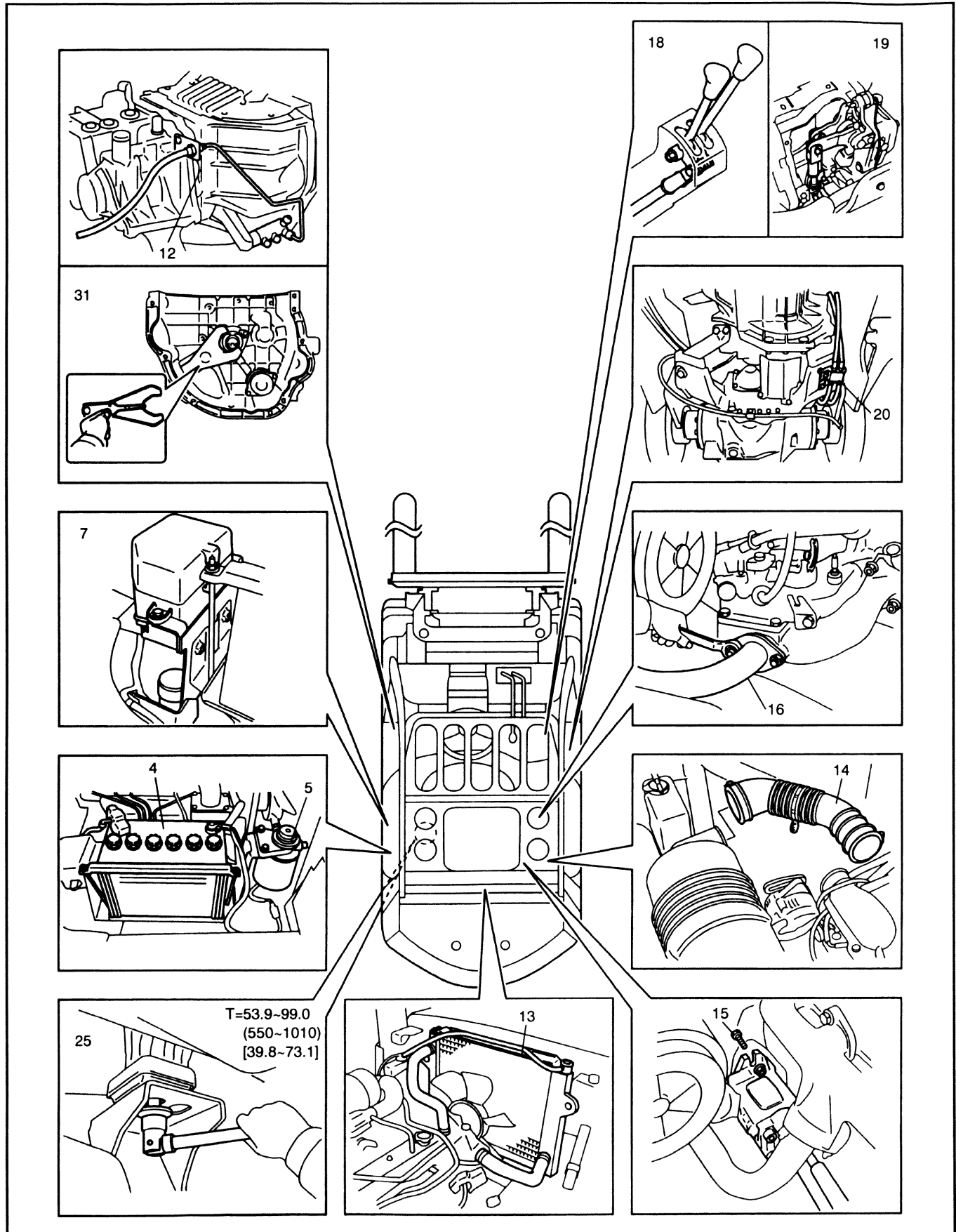
3302



MANUAL TRANSMISSION ASSY

REMOVAL·INSTALLATION

T = N·m (kgf·cm) [ft·lbf]

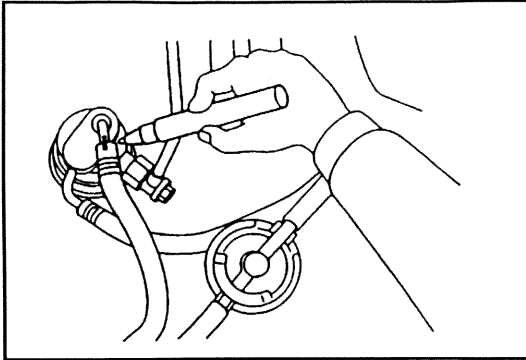


Removal Procedure

- 1 Remove the engine hood. (Refer to page 11-5 in the 7FG/7FD Series Repair Manual (No. CE024))
- 2 Remove the toe board.
- 3 Drain coolant.
- 4 Remove the battery and battery tray.
- 5 Diesel engine vehicle:
Remove the sedimenter bracket set bolt for freeing.
- 6 Disconnect the accelerator wire and fuel hose. **[Point 1]**
- 7 Remove the fuse box and electrical parts plate set bolts for freeing.
- 8 Disconnect connectors and wire harness clamps around the engine and transmission.
- 9 Remove the horn W/bracket.
- 10 Vehicle with oil clutch:
Disconnect the oil clutch pipe.
- 11 Disconnect the clutch release cylinder push rod.
- 12 Remove the clutch release cylinder set bolts and hydraulic piping clamps set bolts, and keep them in free state.
- 13 Remove the radiator.
- 14 Disconnect the air cleaner hose.
- 15 Remove the oil pump set bolt for freeing.
- 16 Disconnect the exhaust pipe.
- 17 Vehicle with oil clutch:
Disconnect the oil clutch hose.
- 18 Remove the F/R and 1/2 shift levers and disconnect the shift lever cables. **[Point 2]**
- 19 Disconnect the cable from the shift link and remove the cable.
- 20 Remove the clamp under the shift lever cable on the lower side of the vehicle. **[Point 5]**
- 21 Disconnect the oil control valve inlet pipe.
- 22 Remove the under cover.
- 23 Remove the propeller shaft. (Refer to page 5-3 in the 7FG/7FD Series Repair Manual (No. CE024))
- 24 Remove the transmission mount bolts and pin bolts. **[Point 3]**
- 25 Remove the engine mount nuts.
- 26 Remove the engine W/transmission. **[Point 4]**
- 27 Remove the clutch housing cover.
- 28 Remove the lock ring and slide the input shaft fully toward the front. (Refer to page 2-9 in the 7FG/7FD Series Repair Manual (No. CE024))
- 29 Remove the clutch housing (front case) set bolts.
- 30 Remove the transmission ASSY and release hub W/bearing.
- 31 Remove the clutch release fork.
- 32 Remove the clutch release hub W/bearing.

Installation Procedure

The installation procedure is the reverse of the removal procedure.



Point Operations

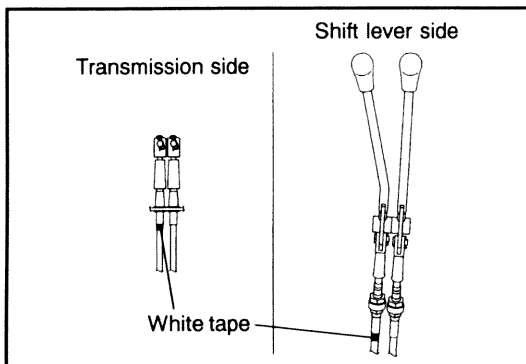
[Point 1]

Removal:

Put a match mark on the fuel hose and joint.

Installation:

Check the match mark.



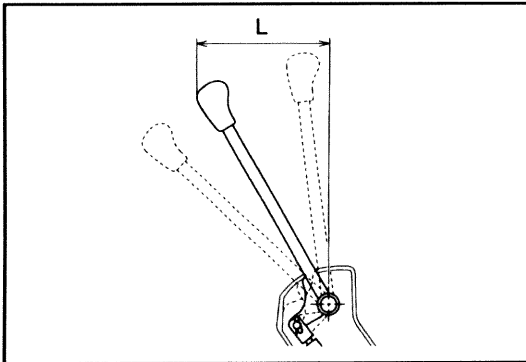
[Point 2]

Reassembly :

1. Connect the cable to the 1st/2nd lever by checking the identification mark (white tape).

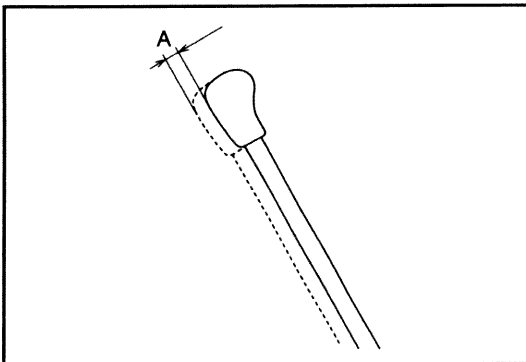
2. Adjust the shift lever neutral position while adjusting the cable length to make the distance between the center of the shift lever shaft and the lever knob satisfy the following standard:

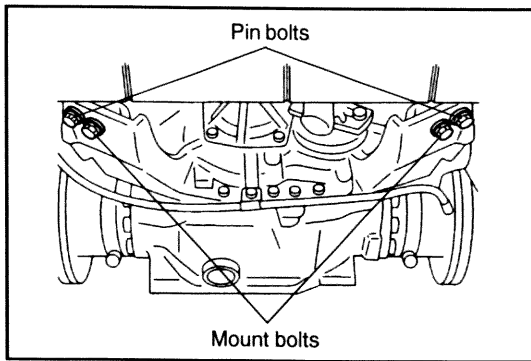
$$L = 180^{+5}_0 \text{ mm } (7.1^{+0.197}_0 \text{ in})$$



3. Inspect the offset between the F/R and 1st/2nd lever knobs with shift levers in the neutral positions.

Knob offset A: 5 mm (0.197 in) or less

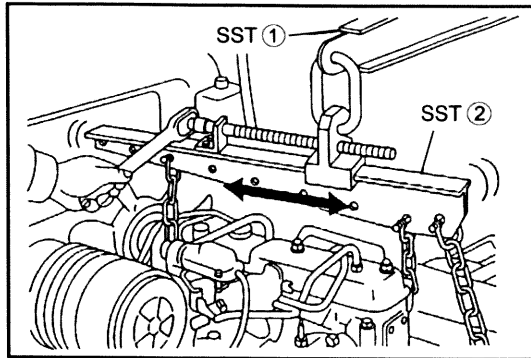




[Point 3]

Installation:

After installing the mount bolt and pin bolt on the right side, install those on the left side.

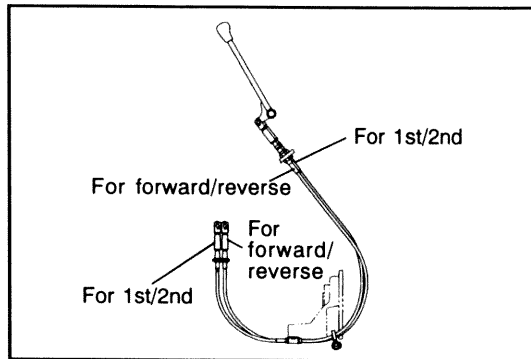


[Point 4]

Removal-Installation:

SST 09010-20111-71 --- ①

09010-23320-71 --- ②



[Point 5]

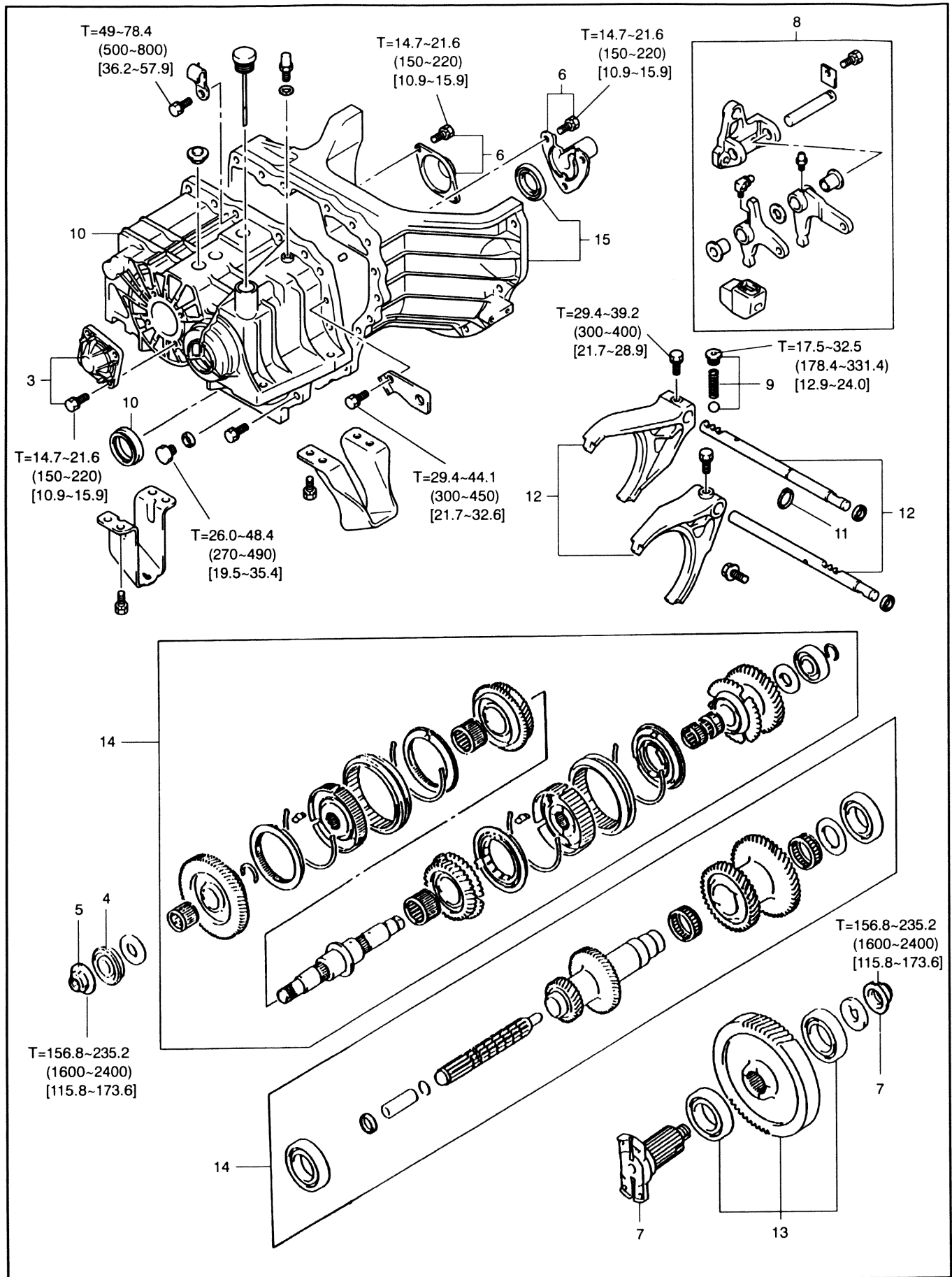
Reassembly:

After clamping shift lever cables under the differential, lead them to the shift lever side by crossing with the F/R cable on the front side.

*Do not cross the TCM arrangement.

DISASSEMBLY·INSPECTION·REASSEMBLY

T = N·m (kgf·cm) [ft·lbf]



Disassembly Procedure

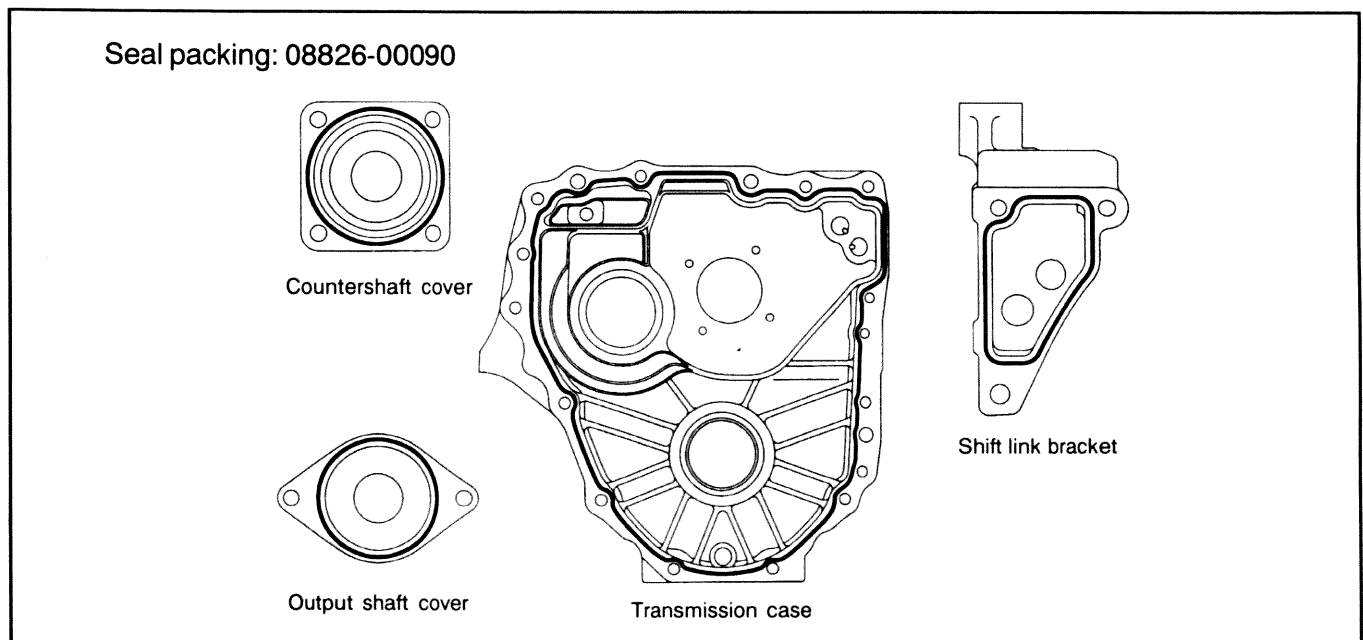
- 1 Extract the oil level gauge and drain transmission oil.
- 2 Measure the thrust clearances of the 1st, 2nd and forward gears. **[Point 1]**
- 3 Remove the front cover.
- 4 Remove the countershaft bearing snap ring. **[Point 2]**
- 5 Remove the lock nut. **[Point 3]**
- 6 Remove the rear cover and rear lower cover.
- 7 Remove the output shaft. **[Point 4]**
- 8 Remove the shift link bracket ASSY. **[Point 5]**
- 9 Remove the detent spring and steel ball.
- 10 Remove the transmission front case. **[Point 6]**
- 11 Remove the speed fork shaft snap ring.
- 12 Remove the shift fork and fork shaft.
- 13 Remove the output gear and bearing.
- 14 Remove the countershaft ASSY and speed shaft ASSY.
- 15 Remove the transmission rear case. **[Point 7]**

Reassembly Procedure

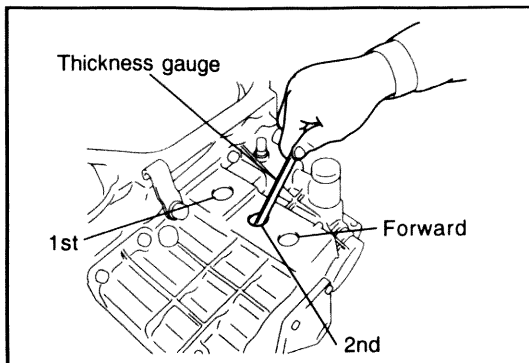
The reassembly procedure is the reverse of the disassembly procedure.

Notes

- Remove the sealing agent applied on the mating surfaces of the transmission case and each cover.
- Apply new sealing agent by referring to the illustrations below.



- Apply sealing agent also on the threaded portions of set bolts at the time of reassembly.



Point Operations

[Point 1]

Inspection:

Measure the clearance between the synchronizer ring and each gear.

Standard:

1st-2nd gear: 1.25 - 2.05 mm

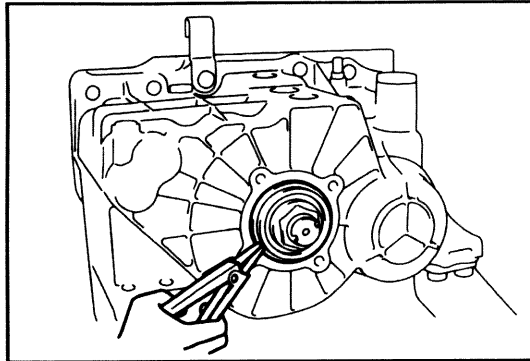
Forward gear: 1.15 - 2.15 mm

Limit:

1st-2nd gear: 0.6 mm

Forward gear: 0.6 mm

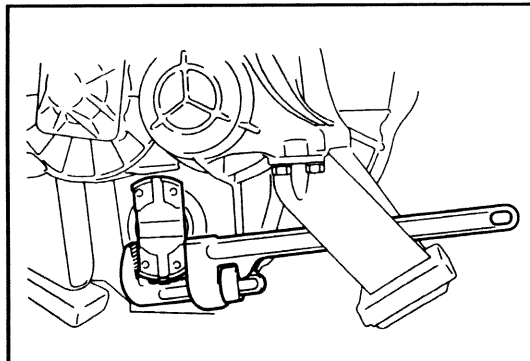
The clearance is immeasurable for the reverse gear.



[Point 2]

Disassembly:

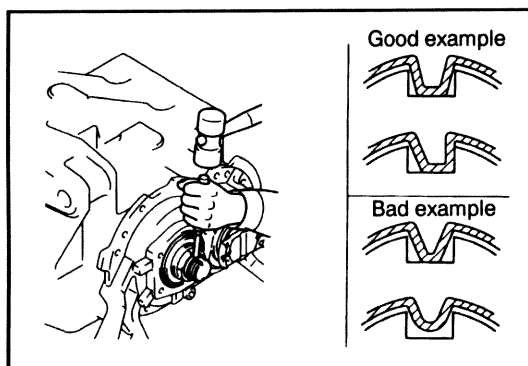
SST 09905-00012



[Point 3-4]

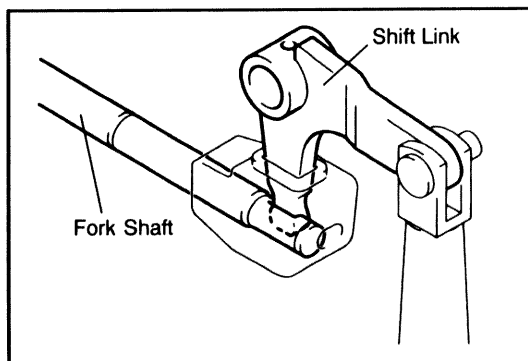
Disassembly-Reassembly:

Lock the output shaft with a pipe wrench when removing or installing the countershaft or output shaft lock nut.



Reassembly:

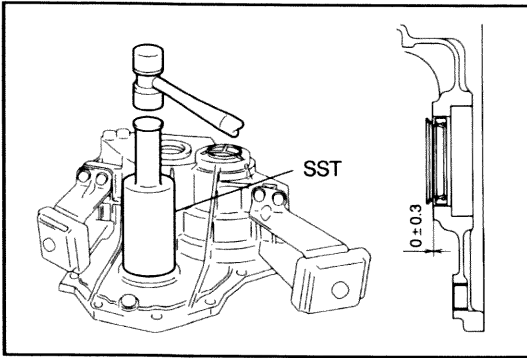
After tightening each lock nut to the specified torque, lock it securely (in two places each).



[Point 5]

Reassembly:

Install by aligning the tip end of the F/R or 1/2 shift link with the groove on each shift fork shaft for assembly. Install the rubber boot on the link side beforehand.



[Point 6]

Inspection:

Inspect the output shaft oil seal lip for wear or damage. If any excessive wear or damage is found, replace the oil seal.

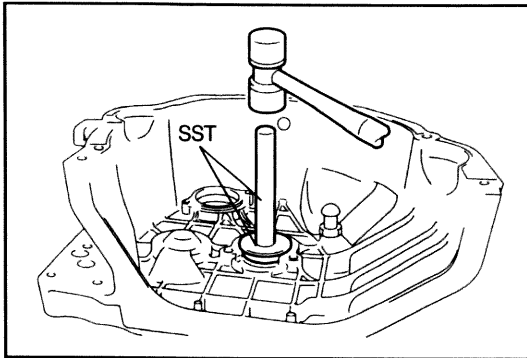
Removal:

Use a screwdriver and brass bar for removal.

Reassembly:

SST 09370-10410-71

Apply MP grease on the outer periphery and lip of the oil seal before reassembly.



[Point 7]

Inspection:

Inspect the output shaft oil seal lip for wear or damage. If any excessive wear or damage is found, replace the oil seal.

Removal:

Use a screwdriver and brass bar for removal.

Reassembly:

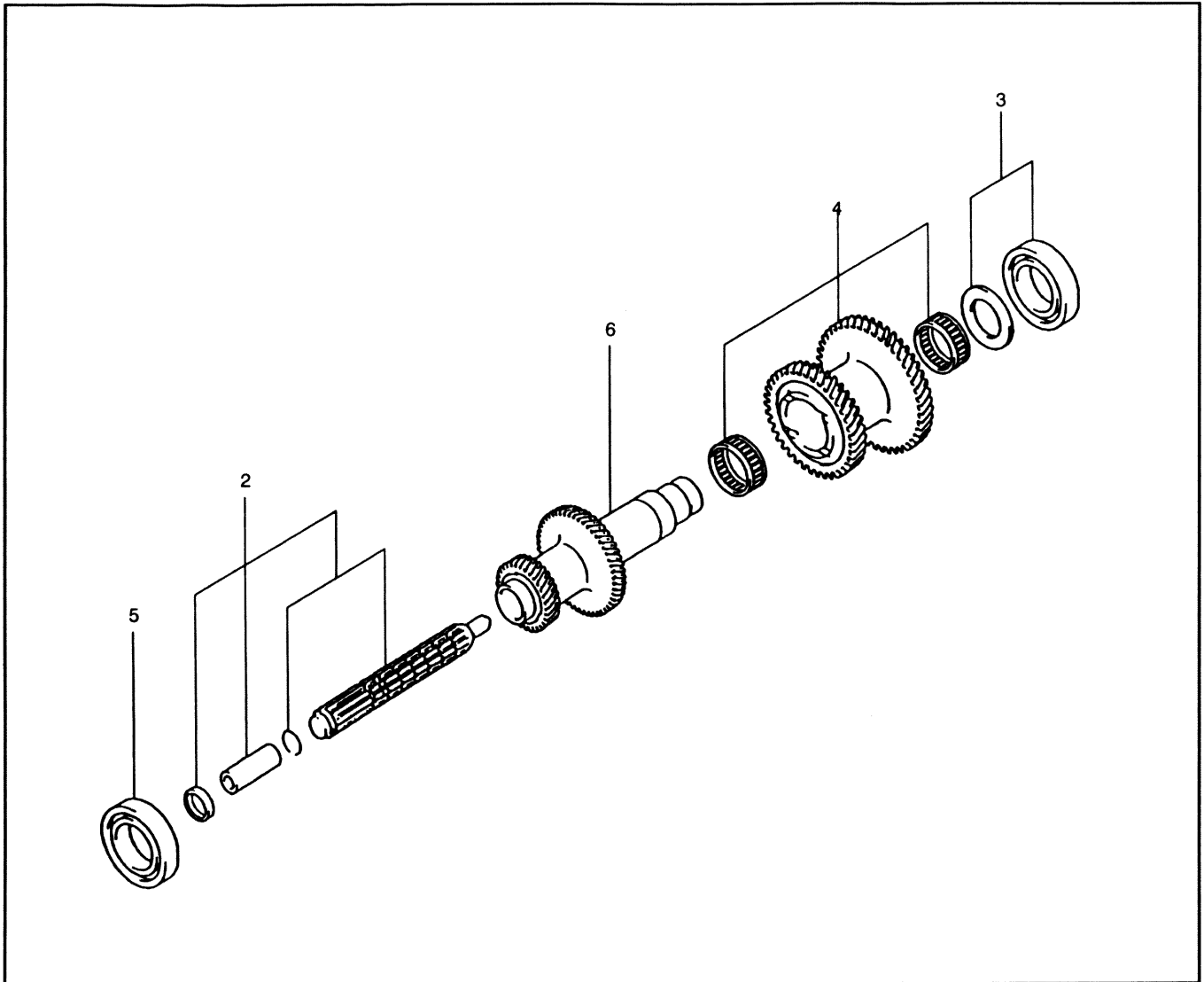
SST 09950-70010

09950-60010

Apply MP grease on the outer periphery and lip of the oil seal before reassembly.

SPEED SHAFT ASSY

DISASSEMBLY·INSPECTION·REASSEMBLY



Disassembly Procedure

- 1 Inspect the forward idle gear clearance. **[Point 1]**
- 2 Remove the tight plug, spacer and input shaft. **[Point 2]**
- 3 Remove the rear bearing and thrust washer. **[Point 3]**
- 4 Remove the forward idle gear and needle roller bearing. **[Point 4]**
- 5 Remove the front bearing. **[Point 5]**
- 6 Inspect the speed shaft. **[Point 6]**

Reassembly Procedure

The reassembly procedure is the reverse of the disassembly procedure.
Apply gear oil on each sliding contact surface.

Point Operations

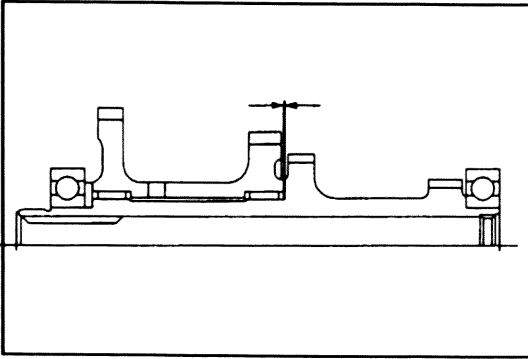
[Point 1]

Inspection:

Measure the forward idle gear thrust clearance.

Standard: 0.15 ~ 0.40 mm (0.0059 ~ 0.0157 in)

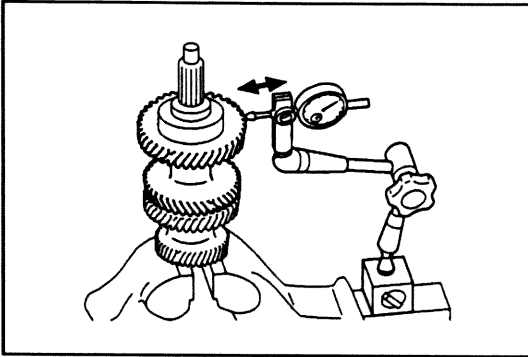
Limit: 0.7 mm (0.028 in)



Inspection:

Measure the forward idle gear radial clearance.

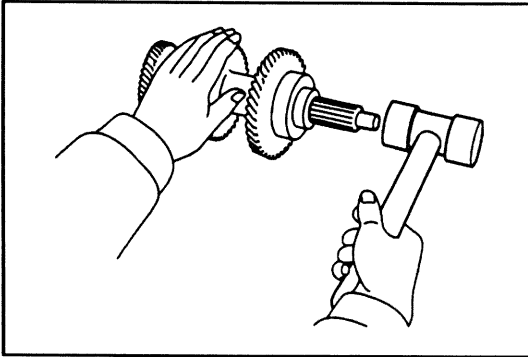
Standard: 0.010 ~ 0.052 mm (0.00039 ~ 0.00205 in)



[Point 2]

Disassembly:

Use a plastic hammer and tap the input shaft to remove the spacer and input shaft together with the tight plug.

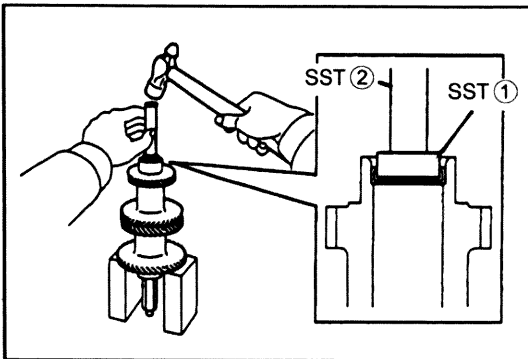


Reassembly:

After installing the input shaft and spacer, use the SST and install the tight plug.

SST 09950-60010 --- ①

09950-70010 --- ②

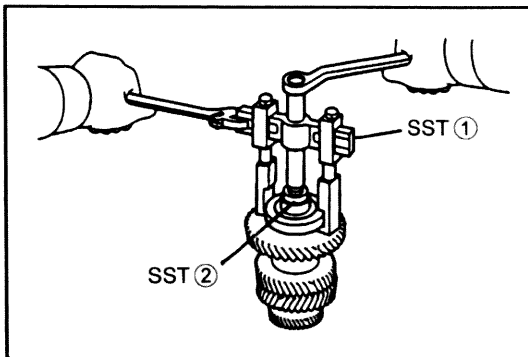


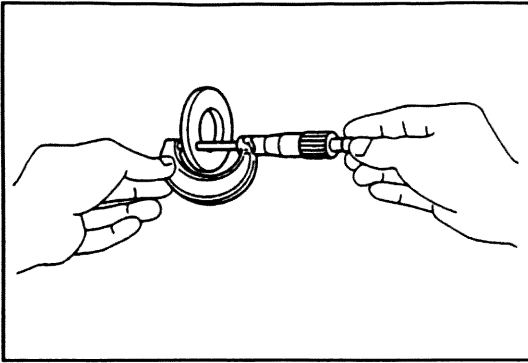
[Point 3]

Disassembly:

SST 09950-40011

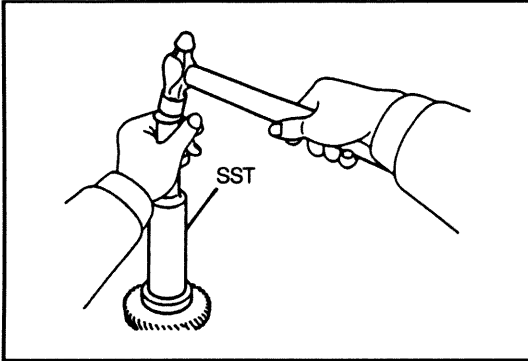
09950-60010



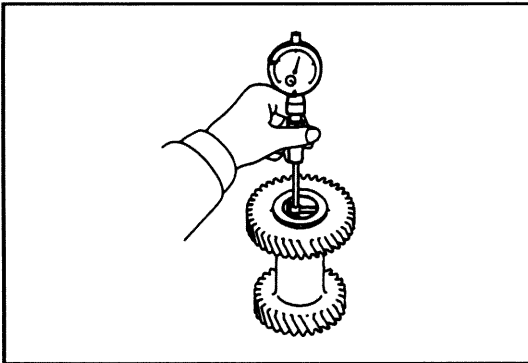


Inspection:
Measure the thrust washer thickness.

Limit: 3.7 mm (0.146 in)

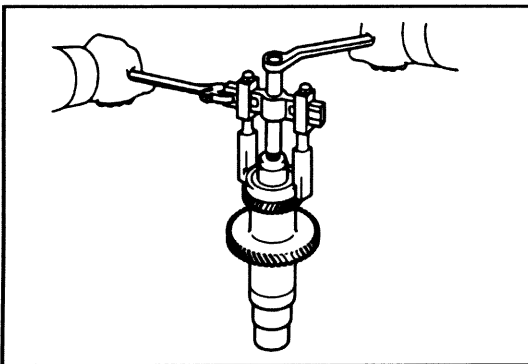


Reassembly:
SST 09370-20270-71

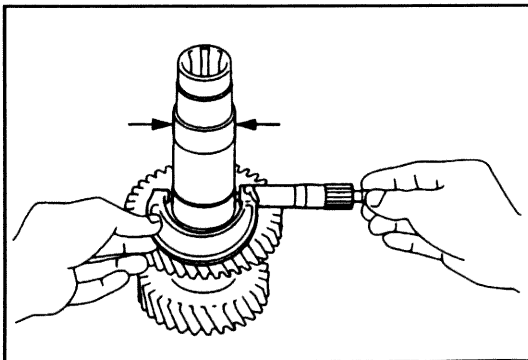


[Point 4]
Inspection:
Measure the inside diameter of the forward idle gear.

Limit: 55.1 mm (2.169 in)



[Point 5]
Disassembly:
SST 09950-40011 --- ①
09950-60010 --- ②

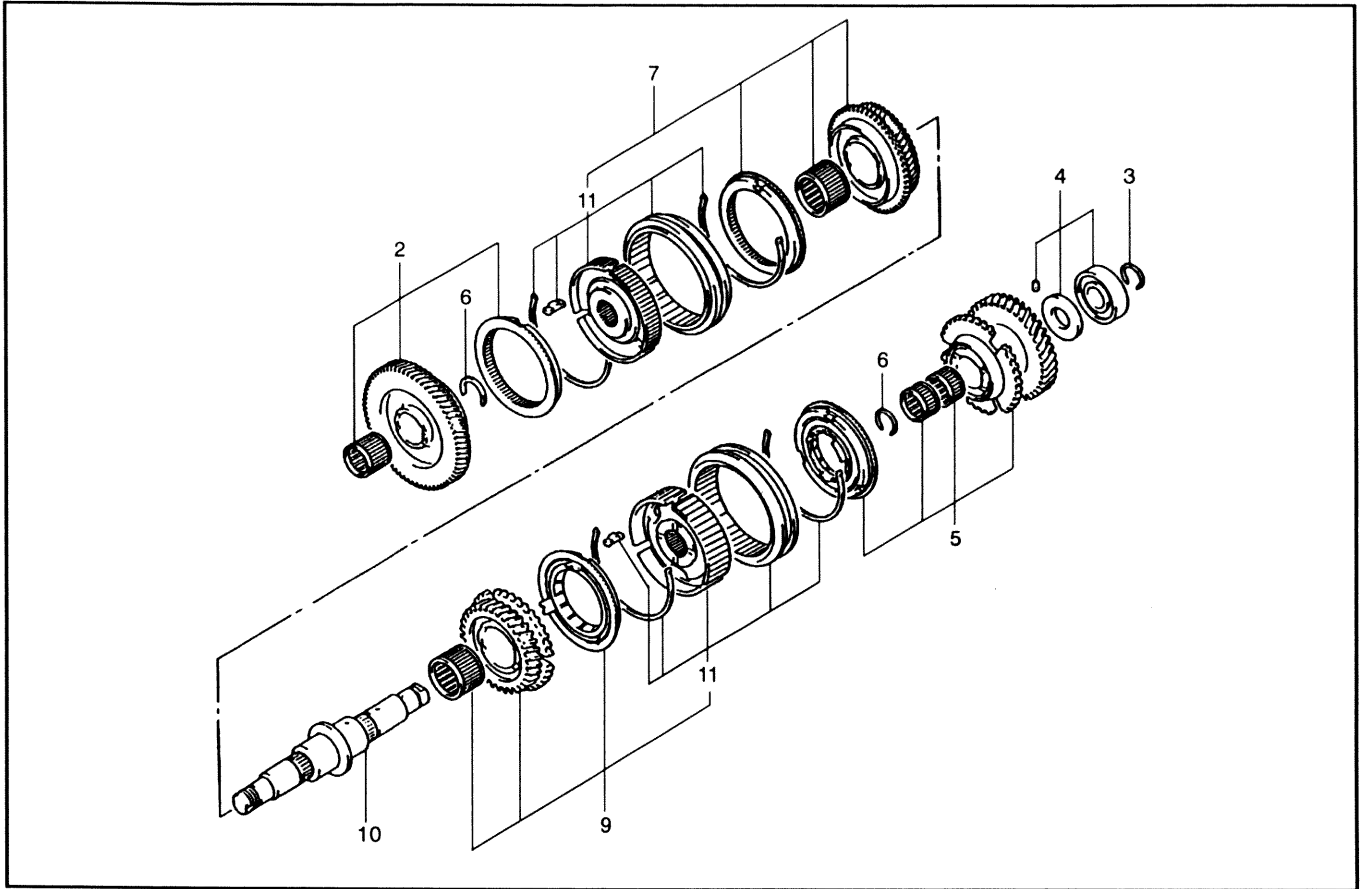


[Point 6]
Inspection:
Measure the outside diameter of the speed shaft journal.

Limit: 47.9 mm (1.886 in)

COUNTERSHAFT ASSY

DISASSEMBLY·INSPECTION·REASSEMBLY

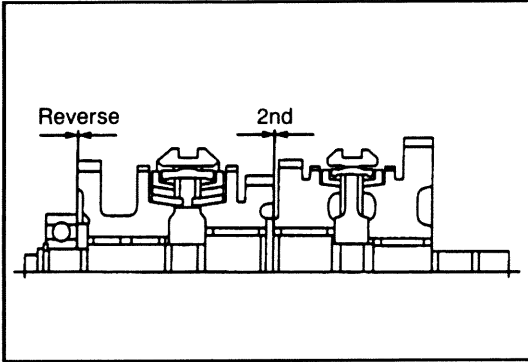


Disassembly Procedure

- 1 Inspect each gear clearance. **[Point 1]**
- 2 Remove the 1st gear, synchronizer ring and needle roller bearing.
- 3 Remove the rear bearing snap ring. **[Point 2]**
- 4 Remove the rear bearing, thrust washer and pin. **[Point 3]**
- 5 Remove the reverse gear, synchronizer ring and needle roller bearing.
- 6 Remove the clutch hub snap ring. **[Point 4]**
- 7 Remove the clutch hub No.1 ASSY, synchronizer ring, 2nd gear and needle roller bearing. **[Point 5]**
- 8 Inspect the forward gear thrust clearance. **[Point 6]**
- 9 Remove the clutch hub No.2 ASSY, synchronizer ring, forward gear and needle roller bearing. **[Point 7]**
- 10 Inspect the countershaft and each gear. **[Point 8]**
- 11 Disassemble the clutch hub No.1 ASSY and No.2 ASSY. **[Point 9]**
- 12 Inspect the shift fork and hub sleeve clearance. **[Point 10]**
- 13 Inspect the synchronizer ring. **[Point 11]**

Reassembly Procedure

The reassembly procedure is the reverse of the disassembly procedure.



Point Operations

[Point 1]

Inspection:

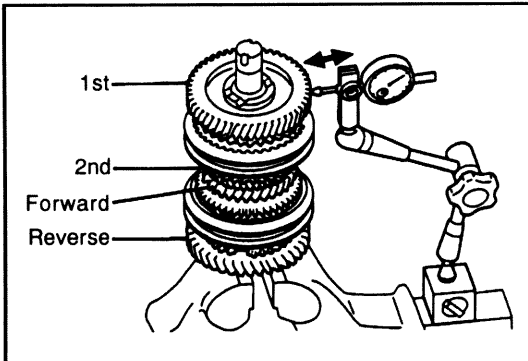
Measure the thrust clearances of the 2nd gear and reverse gear.

2nd gear:

Standard: 0.15 ~ 0.40 mm (0.0059 ~ 0.0157 in)

Reverse gear:

Standard: 0.10 ~ 0.45 mm (0.0039 ~ 0.0177 in)



Inspection:

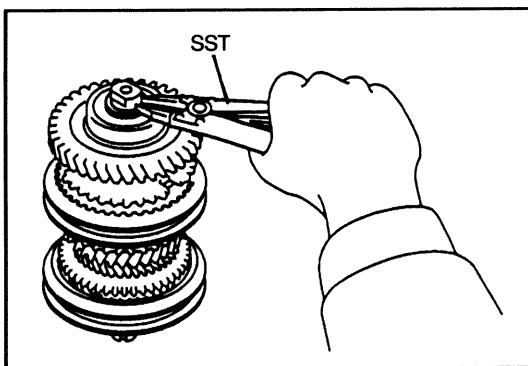
Measure the radial clearance of each gear.

1st gear · reverse gear:

Standard: 0.016 ~ 0.057 mm (0.00063 ~ 0.00224 in)

2nd gear · forward gear:

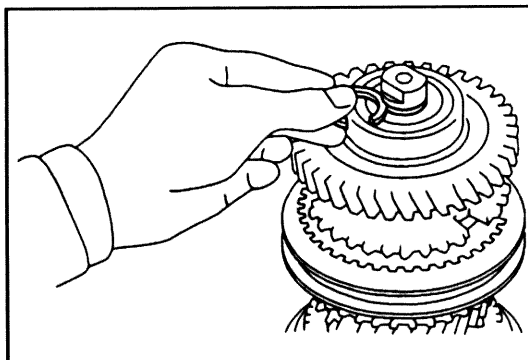
Standard: 0.018 ~ 0.062 mm (0.00071 ~ 0.00244 in)



[Point 2]

Disassembly·Reassembly:

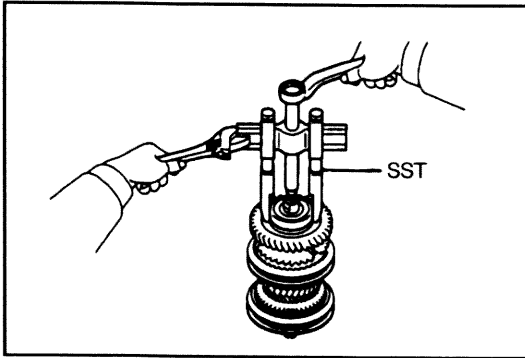
SST 09905-00012



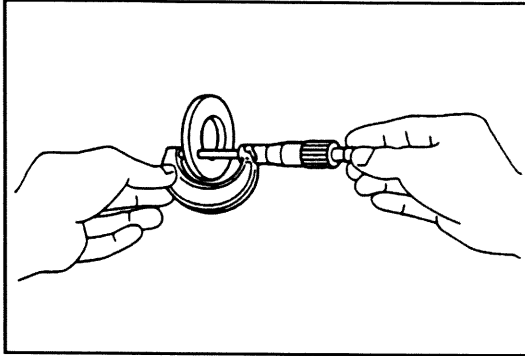
Reassembly:

Select and install the thickest snap ring that can be installed to make the rear bearing thrust clearance 0.1 mm (0.04 in) or less.

Mark	Thickness	mm (in)
A	2.15 ~ 2.20 (0.0846 ~ 0.0866)	
B	2.25 ~ 2.30 (0.0886 ~ 0.0906)	
C	2.35 ~ 2.40 (0.0925 ~ 0.0945)	
D	2.45 ~ 2.50 (0.0965 ~ 0.0984)	
E	2.55 ~ 2.60 (0.1004 ~ 0.1024)	

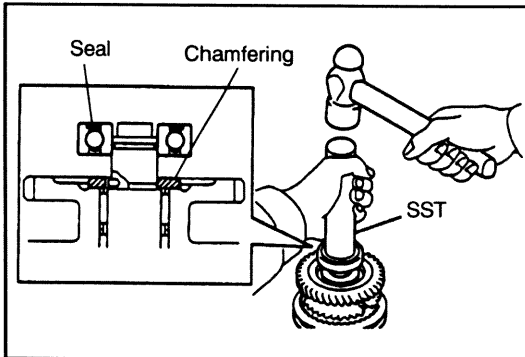


[Point 3]
Disassembly:
SST 09950-40011

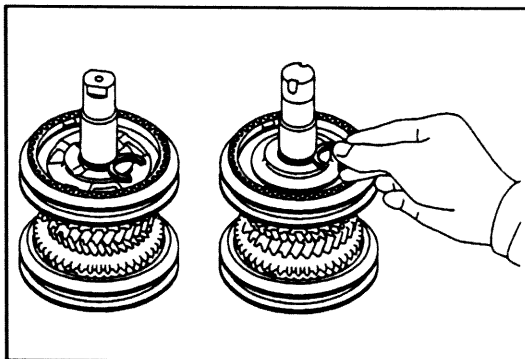


Inspection:
Measure the thrust washer thickness.

Limit: 5.9 mm (0.232 in)

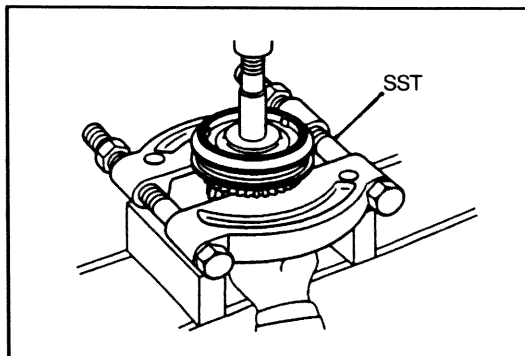


Reassembly:
Install the thrust washer and rear bearing by checking the directions.
SST 09608-04031

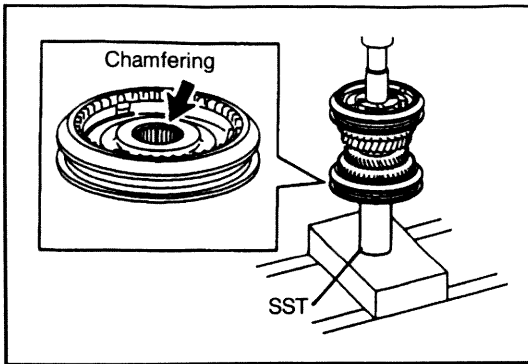


[Point 4]
Reassembly:
Select and install the thickest snap ring that can be installed to make the clutch hub clearance 0.1 mm or less.

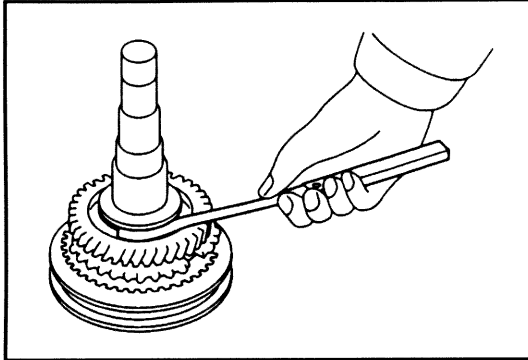
Mark	Thickness	mm (in)
A	1.85 ~ 1.90 (0.0728 ~ 0.0748)	
B	1.95 ~ 2.00 (0.0768 ~ 0.0787)	
C	2.05 ~ 2.10 (0.0807 ~ 0.0827)	
D	2.15 ~ 2.20 (0.0846 ~ 0.0866)	



[Point 5]
Disassembly:
SST 09420-23000-71

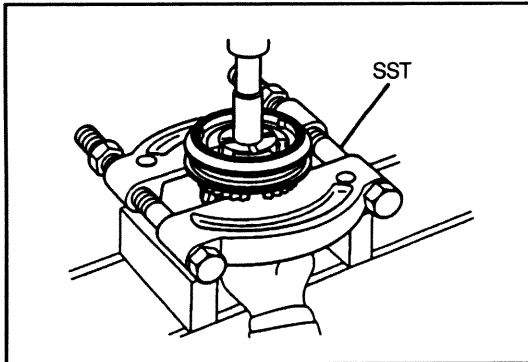
**Reassembly:**

Press in after matching the chamfered side of the hub spline with the shaft spline inlet.
SST 09608-04031

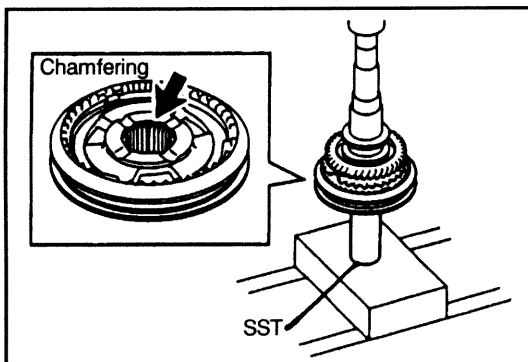
**[Point 6]****Inspection:**

Measure the forward gear thrust clearance.

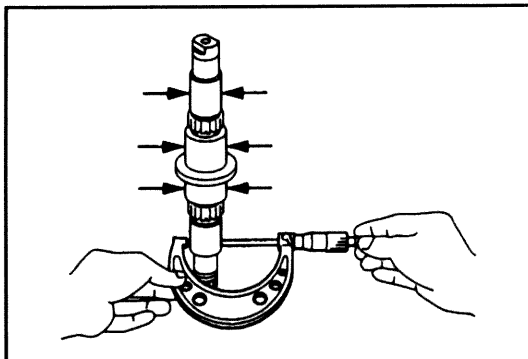
Standard: 0.15 ~ 0.40 mm (0.0059 ~ 0.0157 in)

**[Point 7]****Disassembly:**

SST 09420-23000-71

**Reassembly:**

Press in after matching the chamfered side of hub spline with the shaft spline inlet.
SST 09608-04031

**[Point 8]****Inspection:**

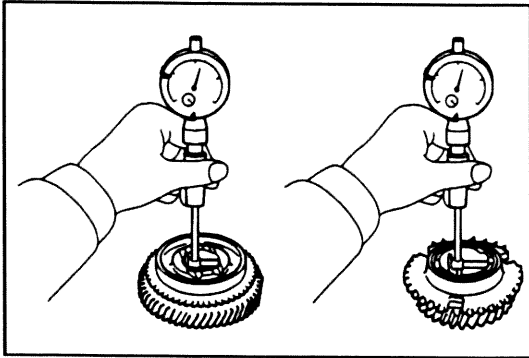
Measure the countershaft journal outside diameter.

1st gear · reverse gear:

Limit: 29.9 mm (1.177 in)

2nd gear · forward gear:

Limit: 39.9 mm (1.571 in)



Inspection:

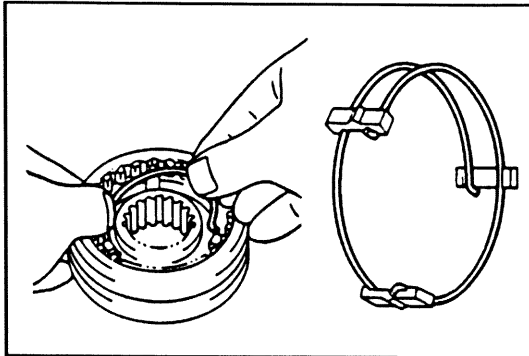
Measure the inside diameter of each gear.

1st gear · reverse gear:

Limit: 38.1 mm (1.500 in)

2nd gear · forward gear:

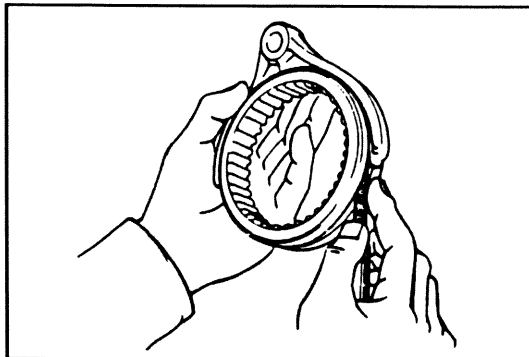
Limit: 48.1 mm (1.894 in)



[Point 9]

Reassembly:

When reassembling the clutch hub ASSY, never align two key spring opening positions.

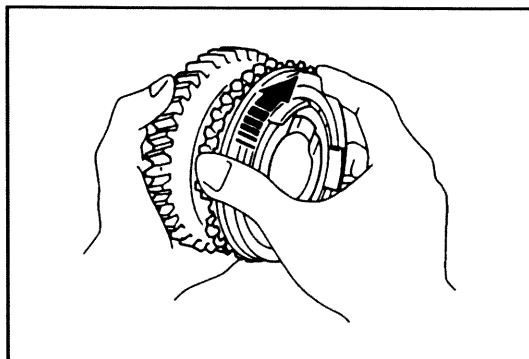


[Point 10]

Inspection:

Measure the clearance between the shift fork and hub sleeve.

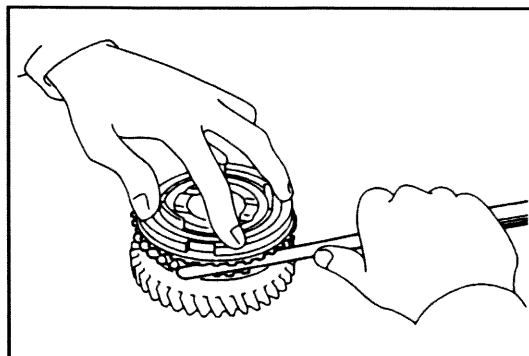
Limit: 1.0 mm (0.039 in)



[Point 11]

Inspection:

Apply gear oil on the tapered portion of each gear. When the synchronizer ring is brought into close contact and rotated, it shall not slip.



Inspection:

Measure the clearance between the synchronizer ring and each gear.

1st gear · 2nd gear:

Standard: 1.25 ~ 2.05 mm (0.0492 ~ 0.0807 in)

Limit: 0.6 mm (0.024 in)

Forward gear · reverse gear:

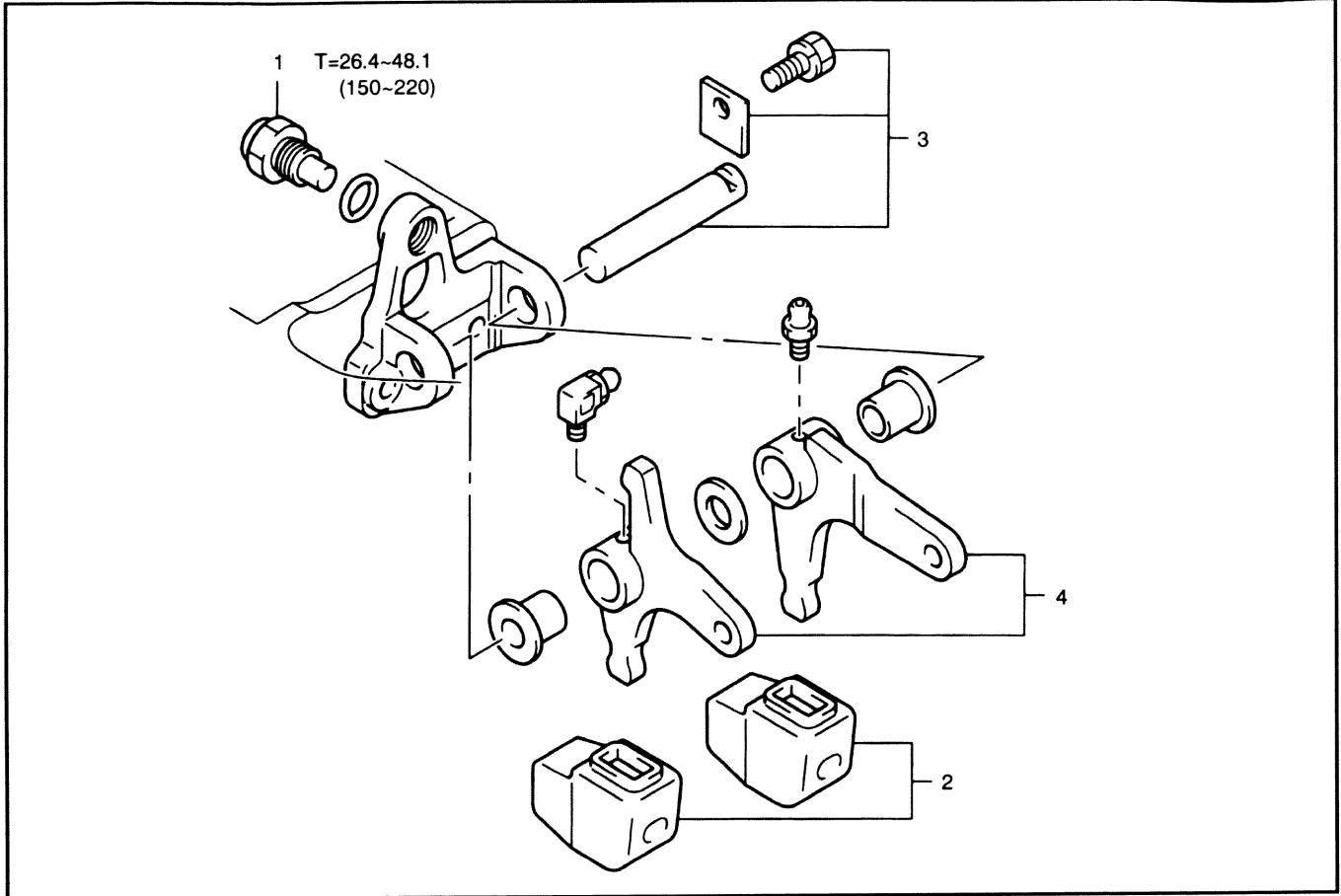
Standard: 1.15 ~ 2.15 mm (0.0453 ~ 0.0846 in)

Limit: 0.6 mm (0.024 in)

SHIFT LINK BRACKET ASSY

DISASSEMBLY·INSPECTION·REASSEMBLY

T = N·m (kgf·cm)



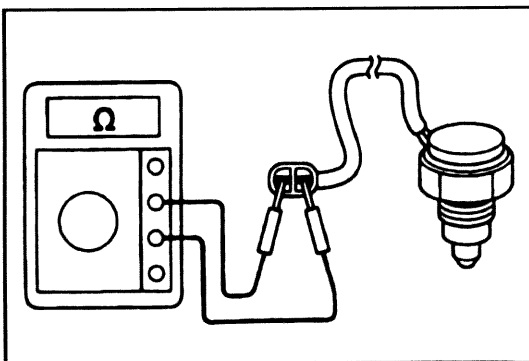
Disassembly Procedure

- 1 Remove the back-up lamp switch. **[Point 1]**
- 2 Remove the dust boot.
- 3 Remove the shift link shaft.
- 4 Remove the F/R shift link and 1st/2nd shift link.

Fill grease through the grease fitting.

Reassembly Procedure

The reassembly procedure is the reverse of the disassembly procedure.



Point Operations

[Point 1]

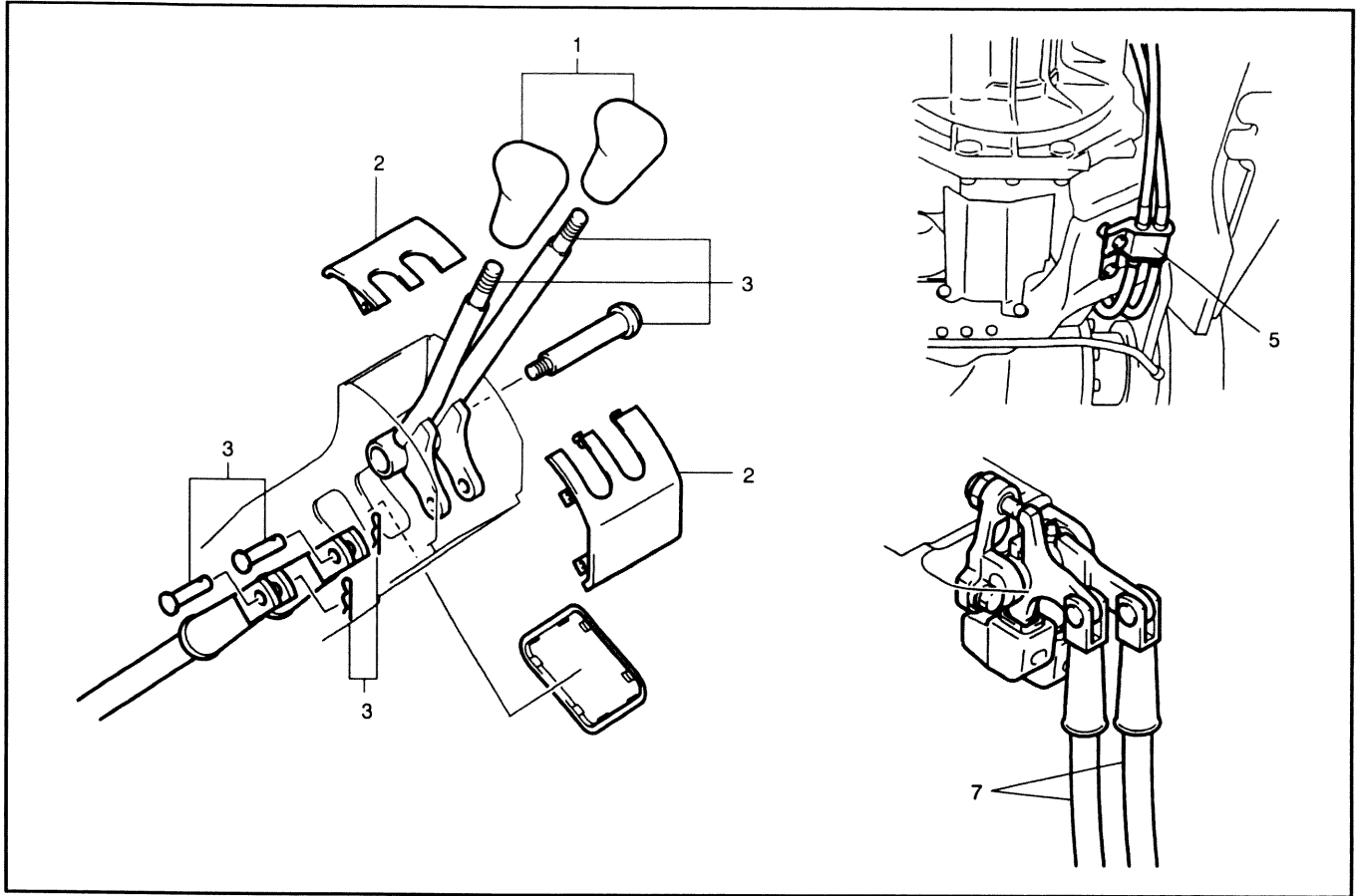
Inspection:

Inspect the backup lamp switch for continuity.

Switch position	Standard
Free	No continuity
Pressed	Continuity shall exist

SHIFT LEVER·WIRE CABLE

REMOVAL·INSTALLATION



Removal Procedure

- 1 Remove the shift lever knob.
- 2 Remove the shift lever cover.
- 3 Remove the shift lever.
- 4 Remove the service cover, and loosen the cable lock nut.
- 5 Remove the clamp on the lower side of the vehicle.
- 6 Disconnect the cable from the transmission side.
- 7 Remove the shift lever cable.

Installation Procedure

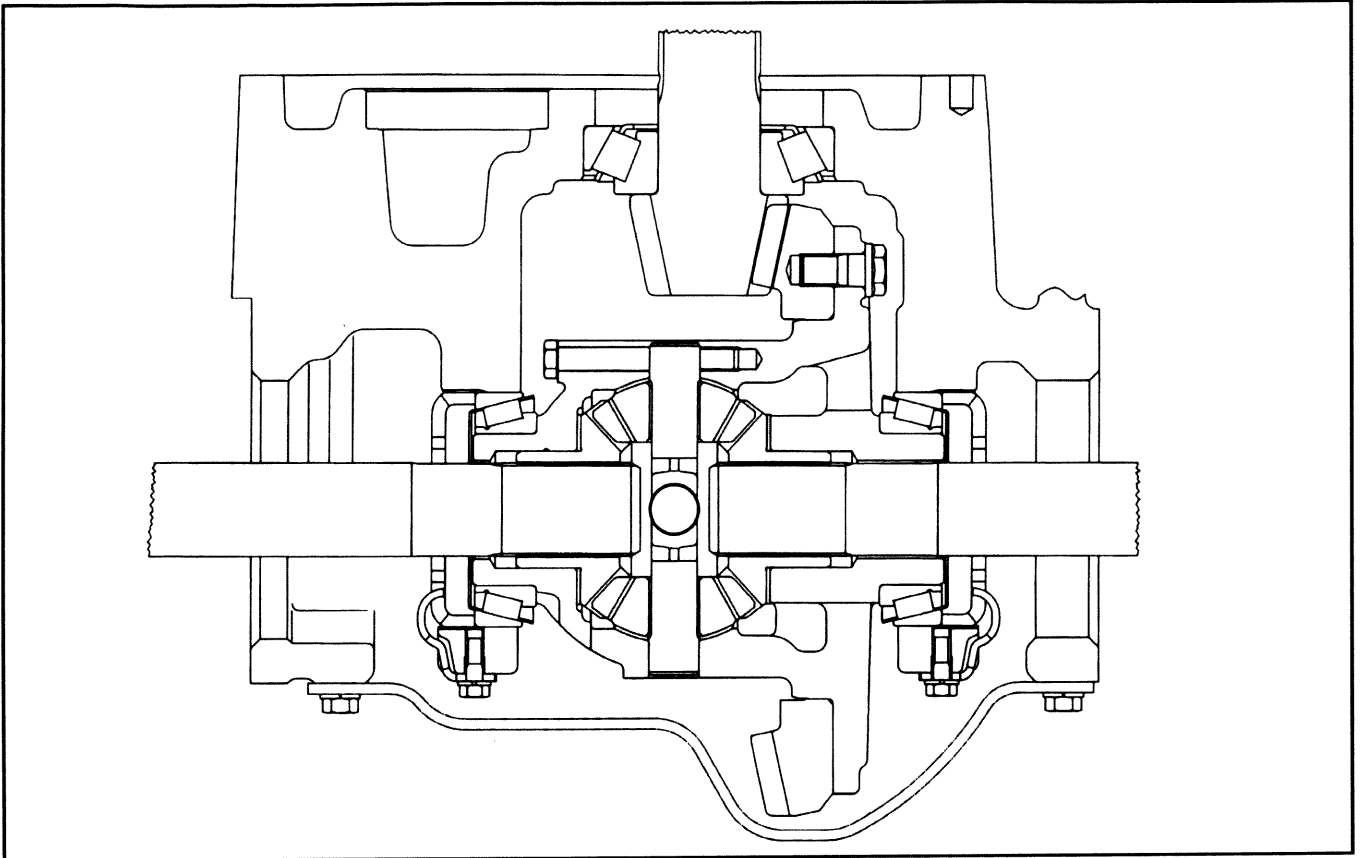
The installation procedure is the reverse of the removal procedure.

DIFFERENTIAL

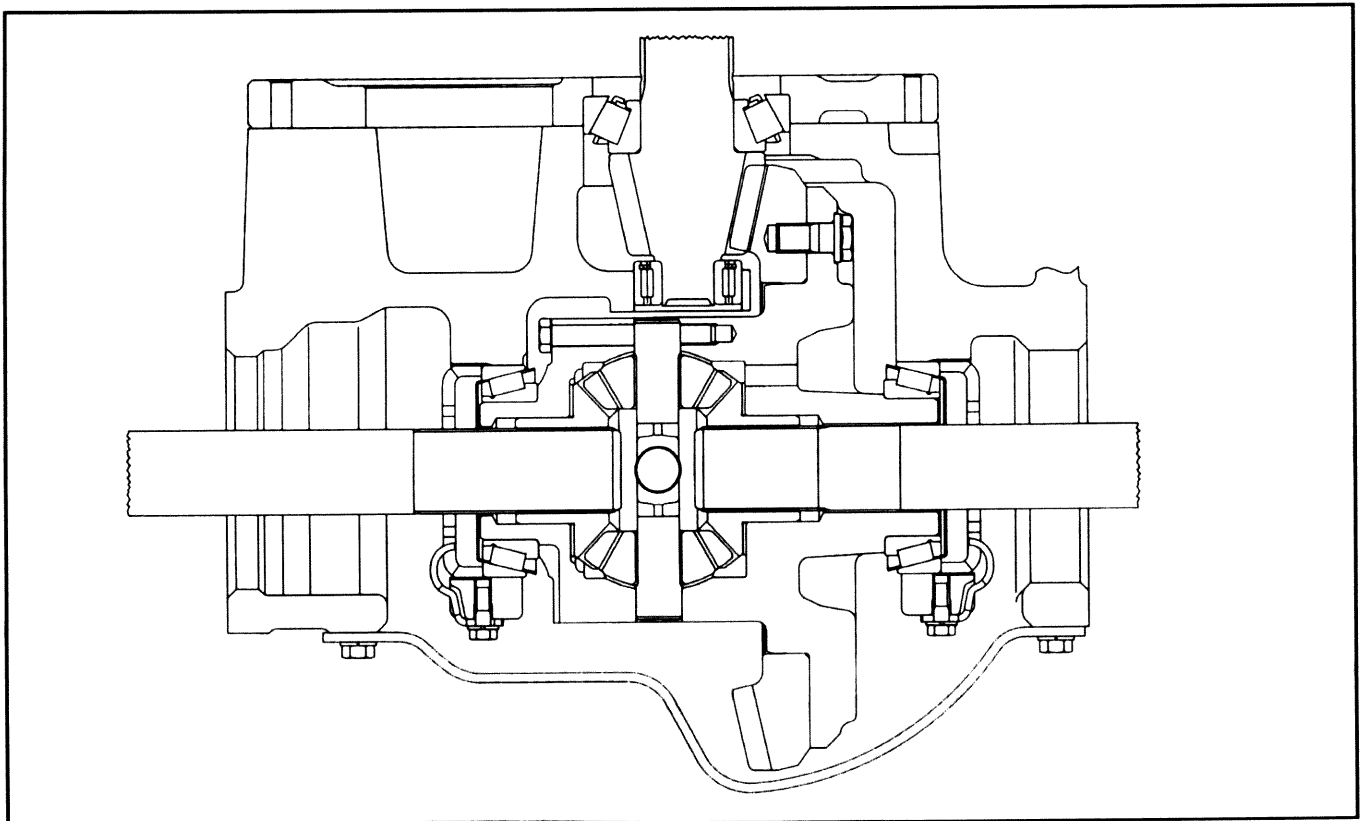
	Page
GENERAL	3-2
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DISASSEMBLY·INSPECTION·REASSEMBLY (1 ton series)	3-11
DISASSEMBLY·INSPECTION·REASSEMBLY (2~3 ton series, J3.5 ton)	3-16
DIFFERENTIAL CASE ASSY	3-19
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DISASSEMBLY·INSPECTION·REASSEMBLY	3-22

GENERAL

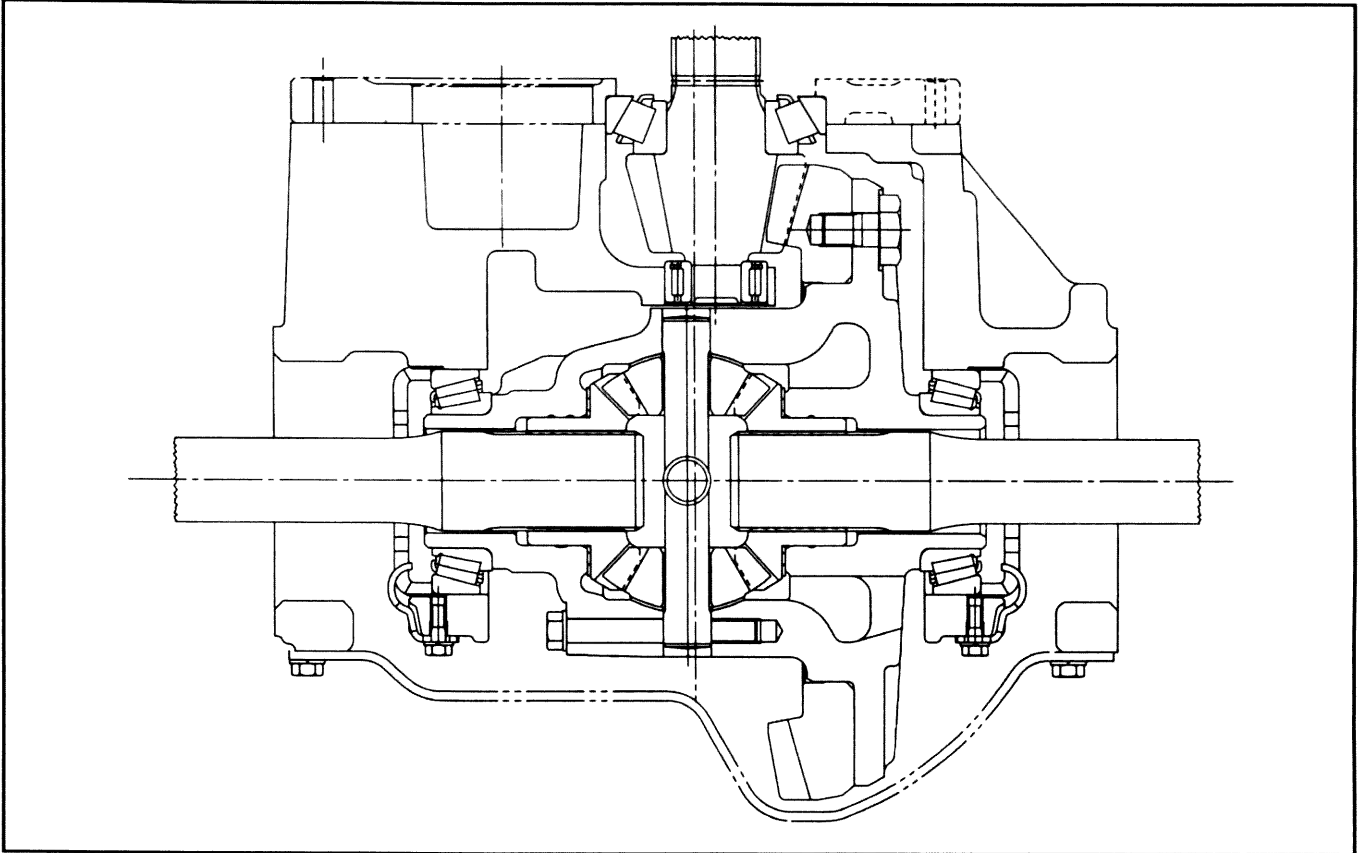
Differential (1 Ton Series)



Differential (2·K2·K3 Ton Series)

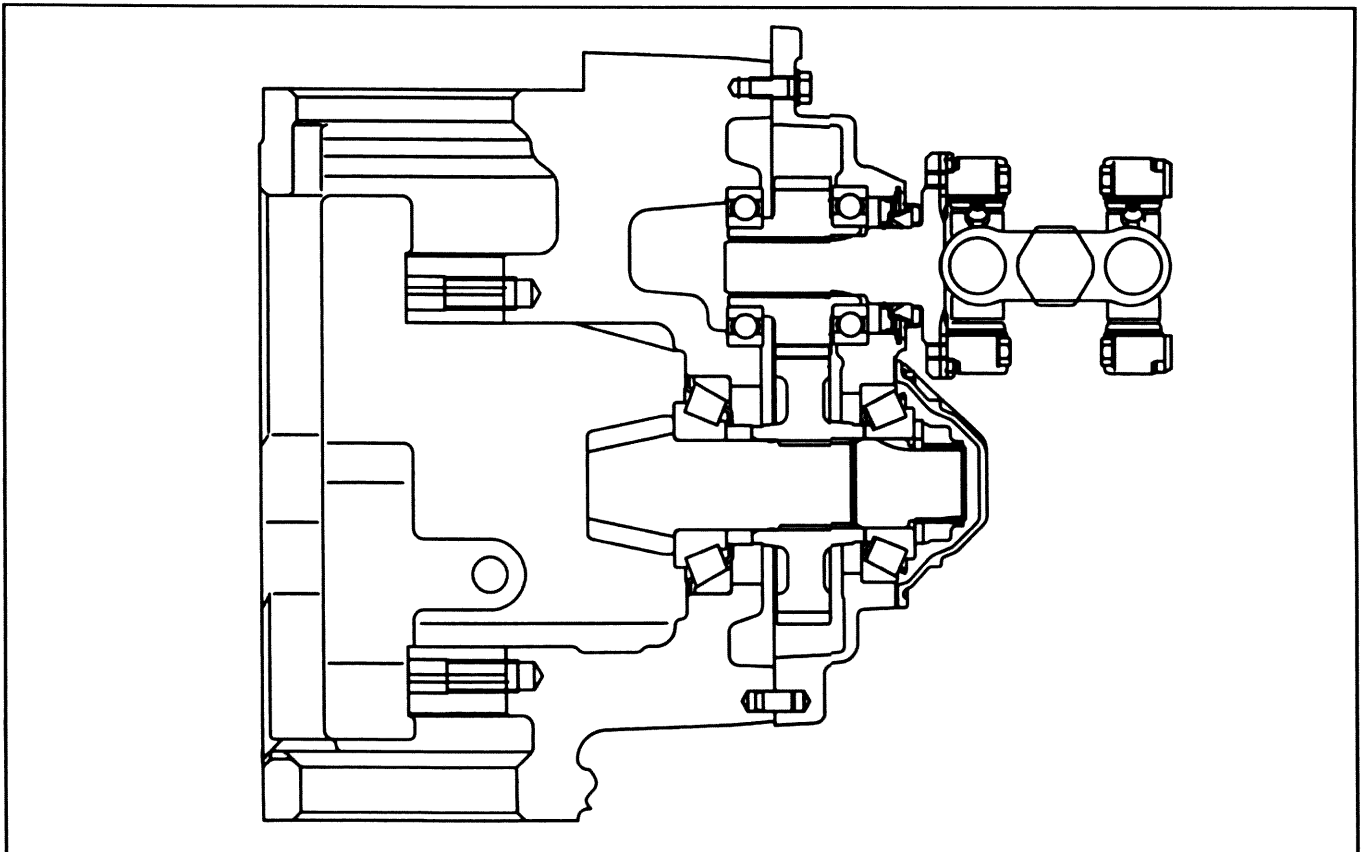


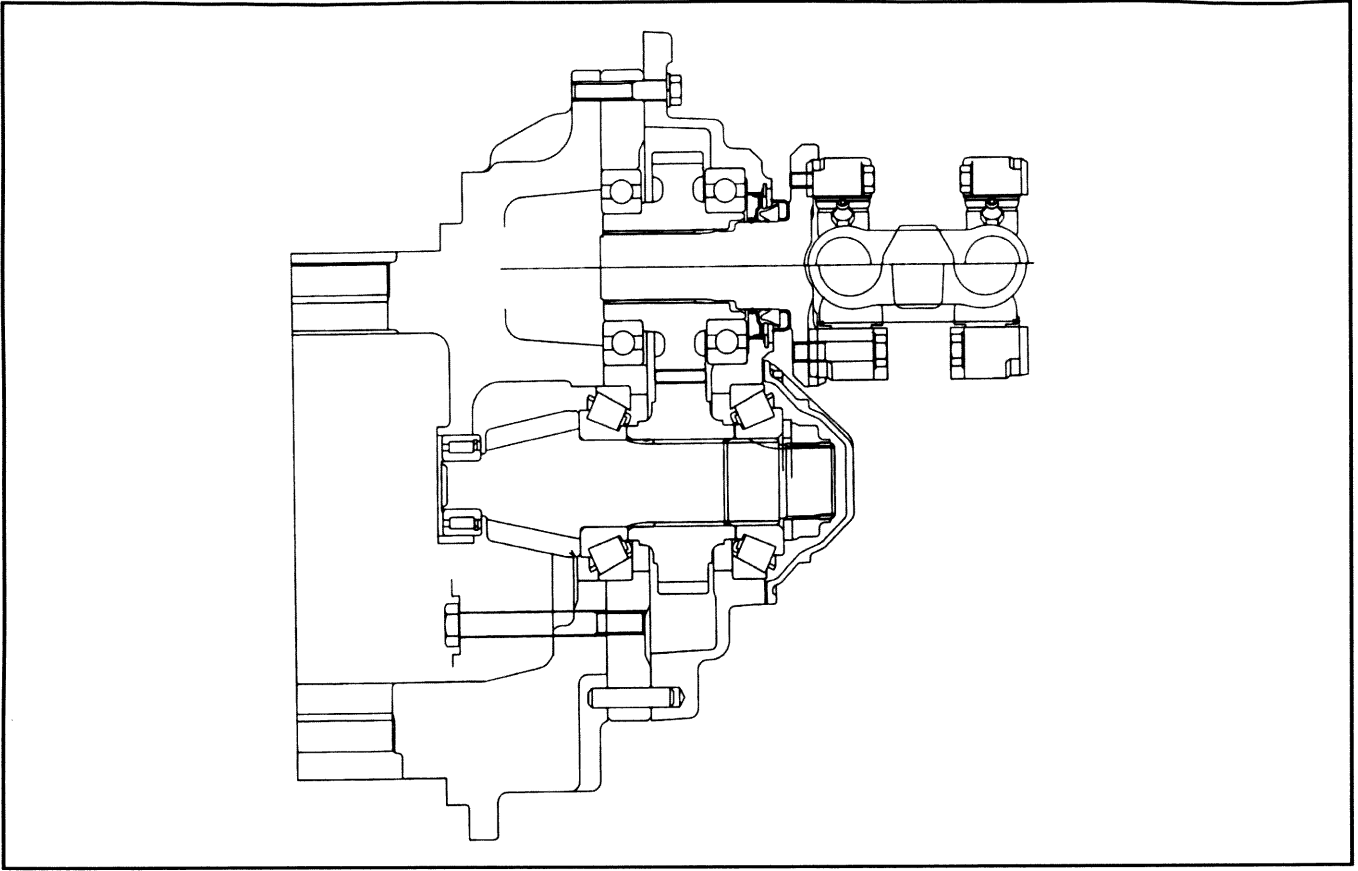
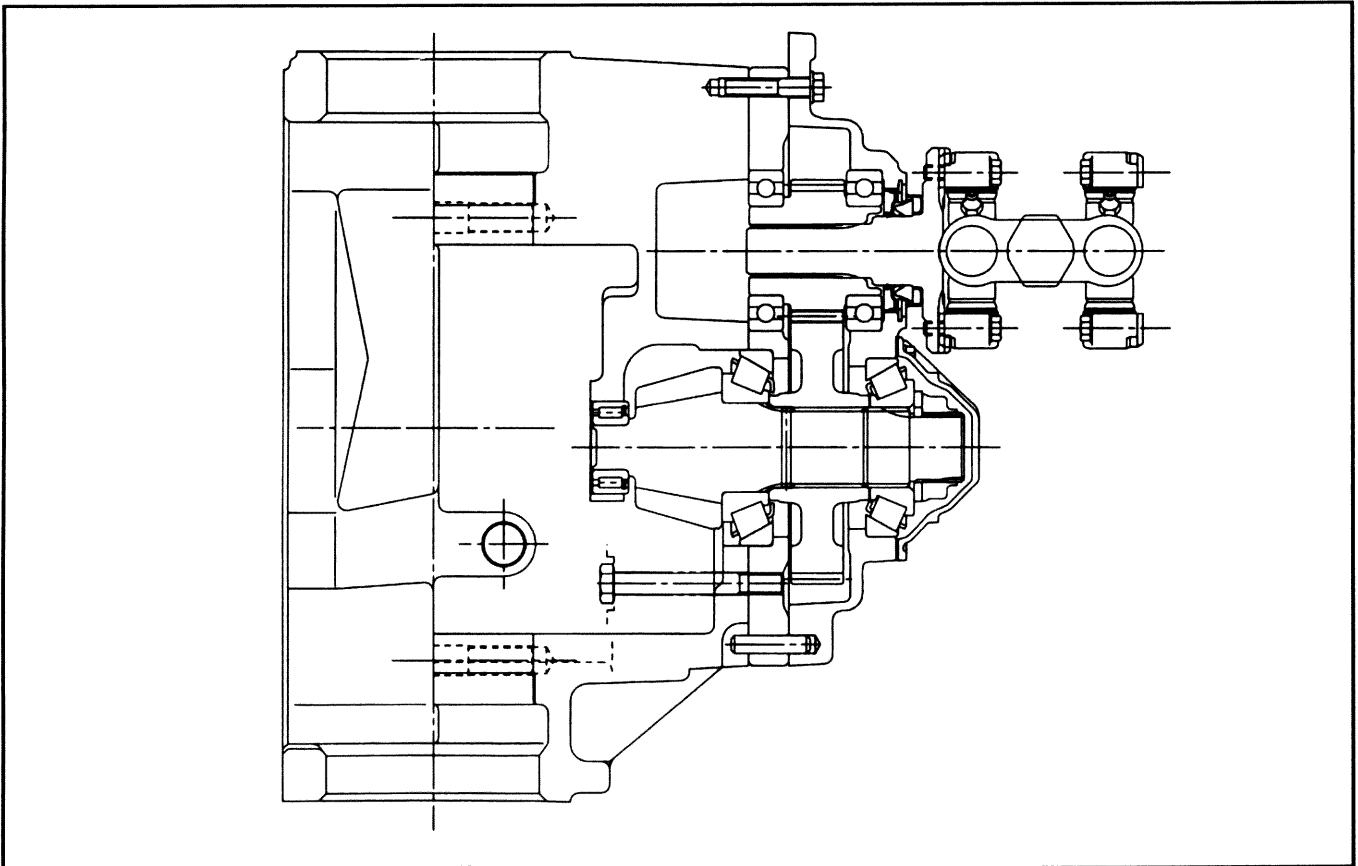
Differential (3·J3.5 Ton Series)



3

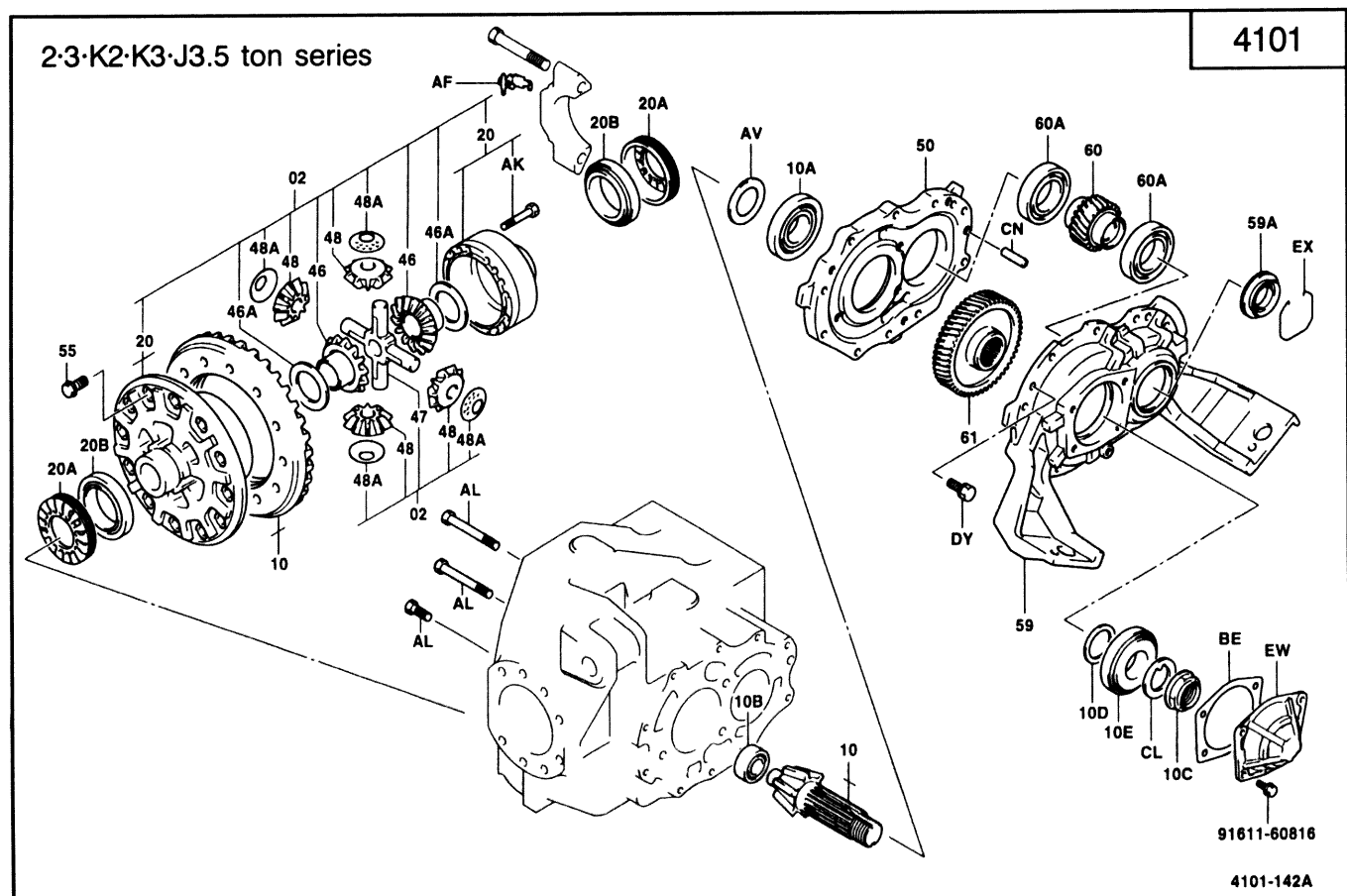
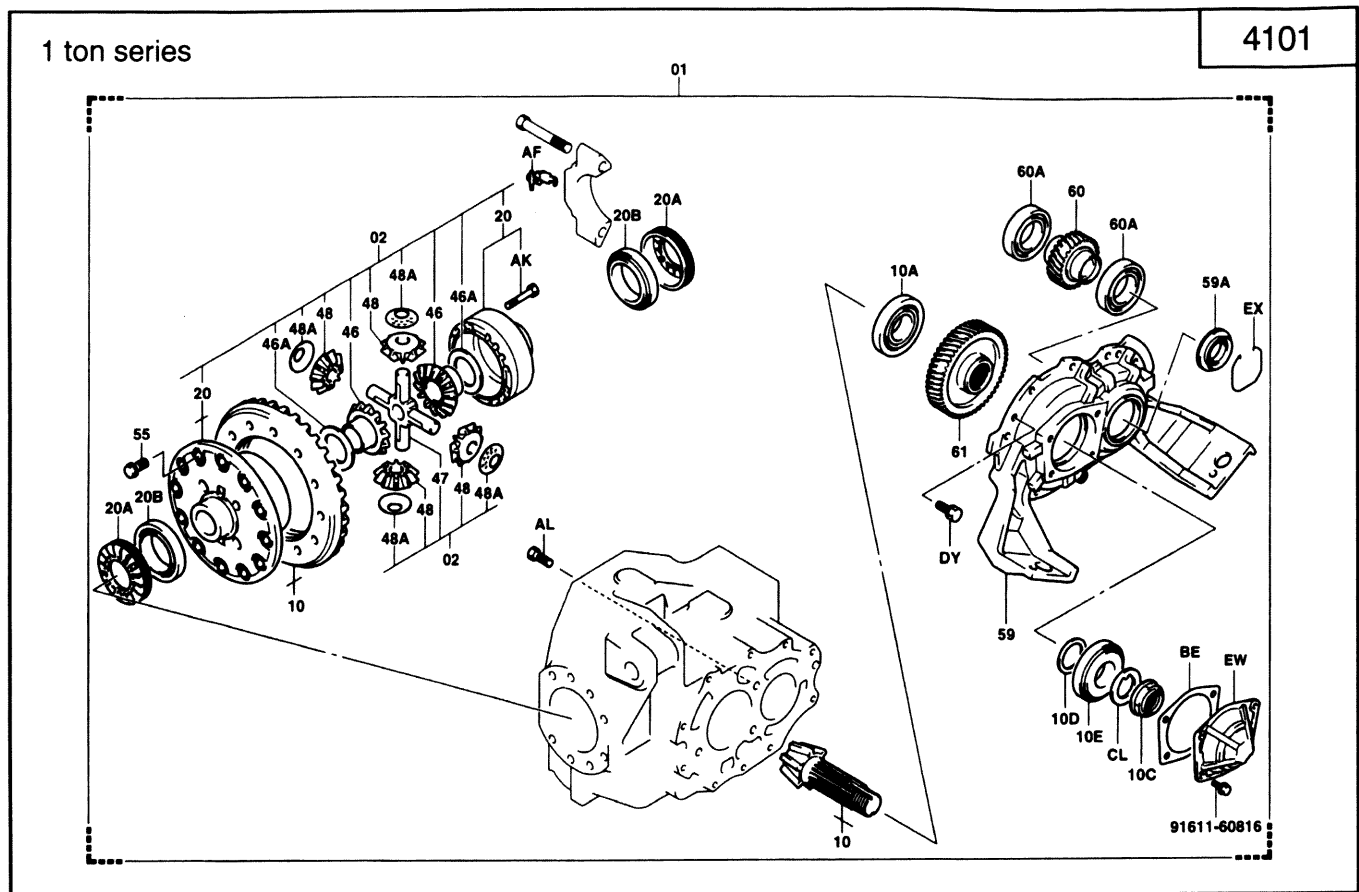
Reduction Gear (1 Ton Series)



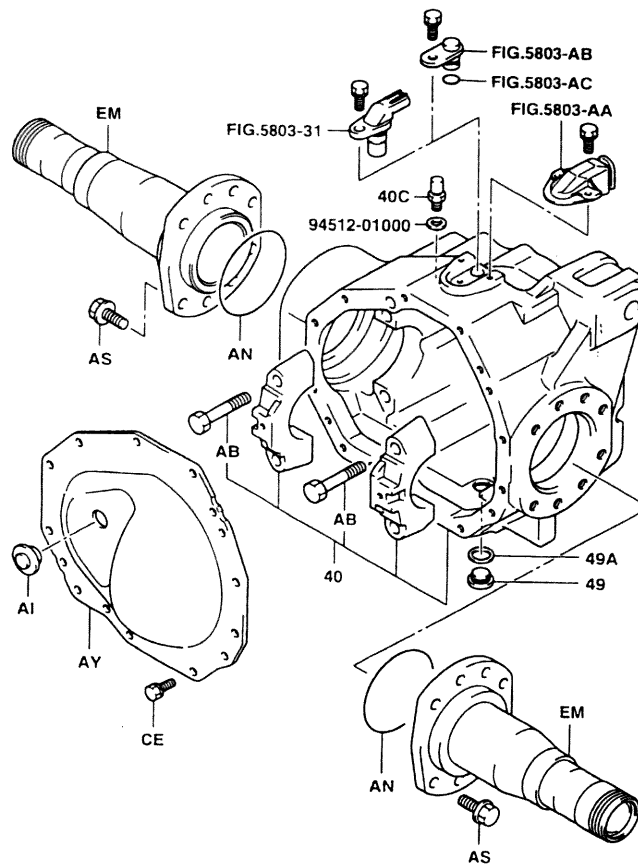
Reduction Gear (2·K2·K3 Ton Series)**Reduction Gear (3·J3.5 Ton Series)**

SPECIFICATIONS

Item			Vehicle model	1 ton series		2·K2·K3 ton series 3·J3.5 ton series
				1.0 ton models	1.5·1.75 ton models	
Differential	Differential case type		Banjo type	←	←	
	Reduction ratio (ring gear/drive pinion)		5.833	←	←	
	Number of teeth	Drive pinion	6	←	←	
		Ring gear	35	←	←	
	Number of teeth × quantity	Pinion gear	10 × 2 (M/T models with 5K engine) 10 × 4 (M/T models with 1DZ-II engine) (All T/C models)	10 × 4	←	
		Side gear	14 × 2	←	←	
Differential oil quantity ℓ (US gal)			6.3 (1.66)	←	2·K2 ton series: 7.1 (1.87) K3·3·J3.5 ton series: 7.7 (2.03)	

COMPONENTS

4101

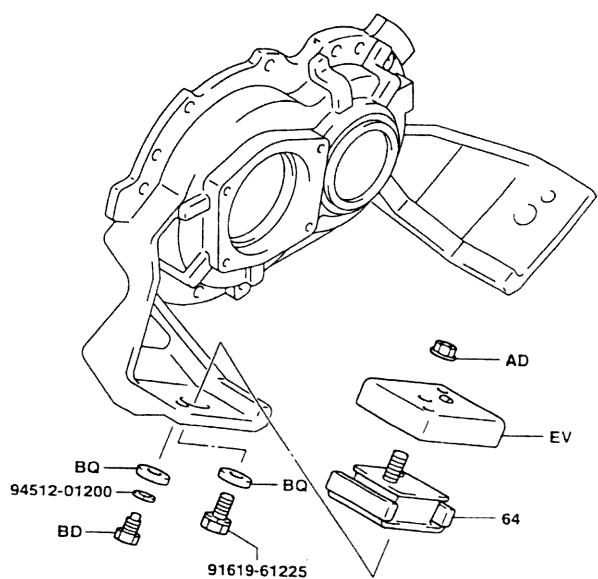


4101-144

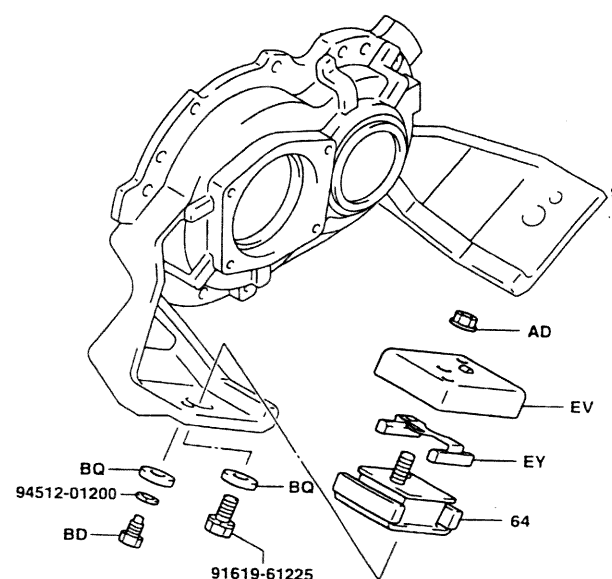
5K-4Y-1DZ-II
2Z (T/C)

2Z (M/T)

4101



4101-145



4101-146

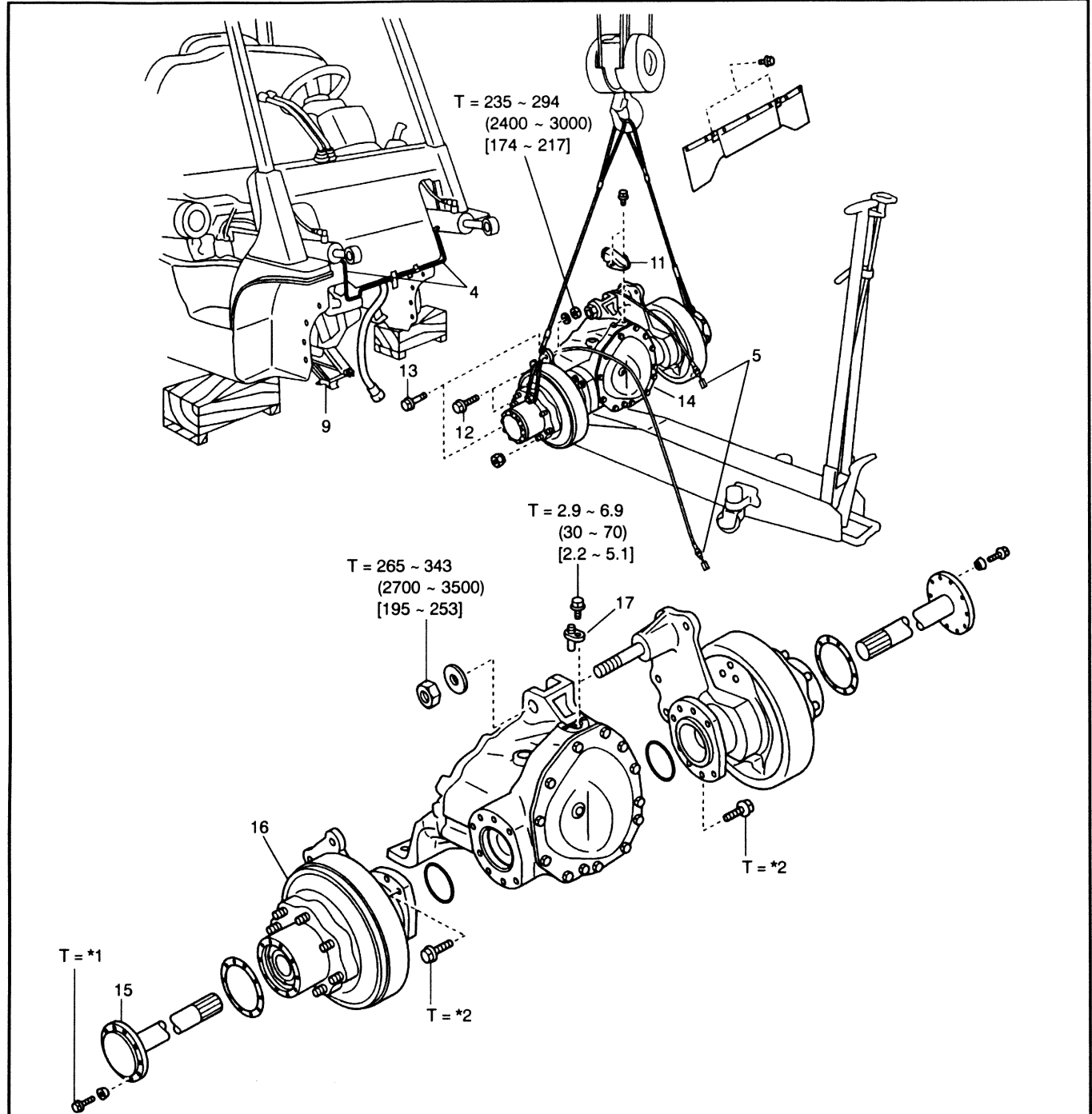
DIFFERENTIAL ASSY

REMOVAL·INSTALLATION

Note:

Never apply impact to the frame at the time of removal or installation to protect the SAS controller from damage. (SAS specification)

T = N·m (kgf·cm) [ft·lbf]



*1 Axle shaft set bolt	3·J3.5 ton series	T = 98.07 ~ 127.5 (1000 ~ 1300) [72.35 ~ 94.06]
	Other	T = 68.6 ~ 88.3 (700 ~ 900) [50.6 ~ 65.1]
*2 Front axle ASSY set bolts	1·2 ton series, K2·K3 ton series	T = 107.9 ~ 137.3 (1100 ~ 1400) [79.59 ~ 101.3]
	3 ton series, J3.5 ton series	T = 127.5 ~ 166.7 (1300 ~ 1700) [94.06 ~ 123.0]

Removal Procedure

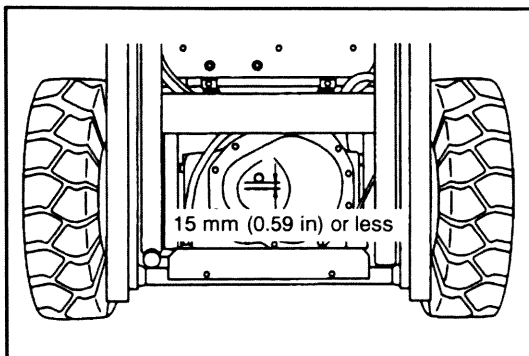
- 1 Remove the mast. (Refer to page 13-11 in the 7FG/7FD Series Repair Manual (No. CE024))
- 2 Drain differential oil. **[Point 1]**
- 3 Jack up the vehicle and remove the front wheels.
- 4 Drain brake fluid, and disconnect the brake pipe (from the wheel cylinder).
- 5 Disconnect the parking brake cable (from the lever).
- 6 Remove the parking brake cable clamp.
- 7 Remove the propeller shaft. (Refer to page 5-3 in the 7FG/7FD Series Repair Manual (No. CE024))
- 8 Remove the transmission mount bolts and pin bolts. **[Point 2]**
- 9 Support the lower side of the transmission with a pantograph jack or wooden block.
- 10 Support the front axle & differential ASSY with a hoist and garage jack. **[Point 3]**
- 11 Remove the speed sensor cover and disconnect the connector.
- 12 Remove the front axle bracket through bolt.
- 13 Remove the front axle bracket reamer bolt. **[Point 4]**
- 14 Remove the front axle & differential ASSY.
- 15 Remove the front axle shaft. **[Point 5]**
- 16 Remove the front axle W/bracket.
- 17 Remove the speed sensor.

Installation Procedure

The installation procedure is the reverse of the removal procedure.

Note:

Bleed air from the brake system after installation. (Refer to page 10-24 in the 7FG/7FD Series Repair Manual (No. CE024))

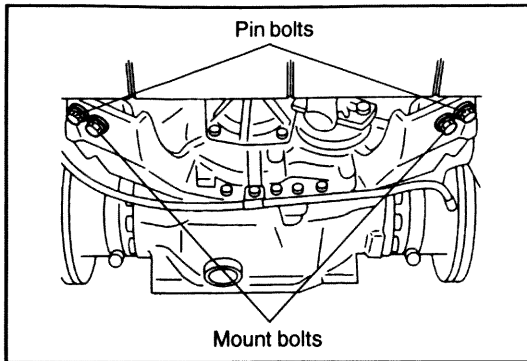


Point Operations

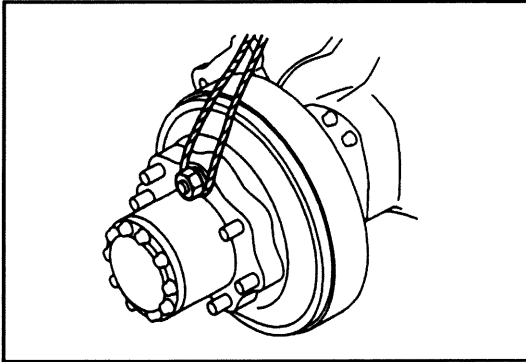
[Point 1]

Installation:

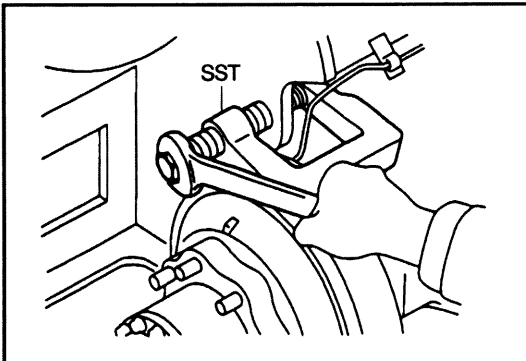
After reassembly, fill hypoid gear oil to the specified level.

**[Point 2]****Installation:**

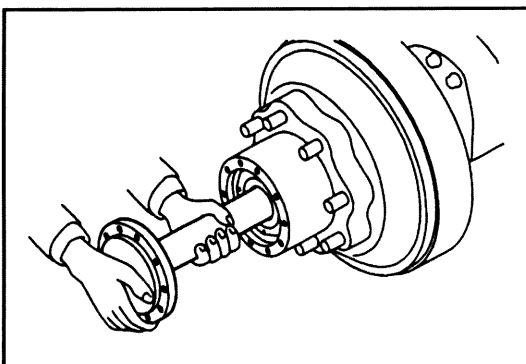
After installing the mount bolt and pin bolt on the right side, install those on the left side.

**[Point 3]****Removal-Installation:**

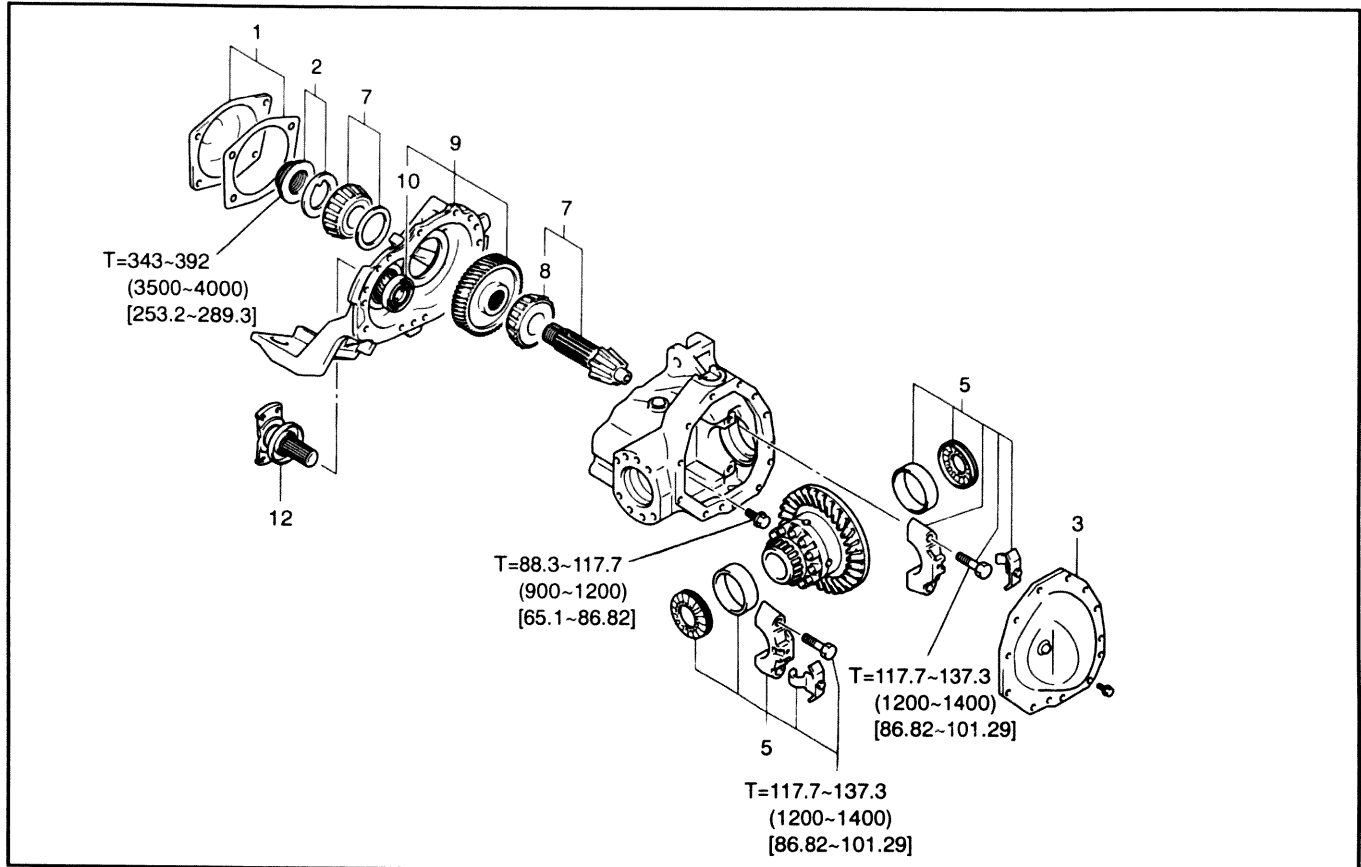
Install hub nuts on hub bolts on the left and right sides, and sling wire at the tapered portion.

**[Point 4]****Removal:**

SST 09310-23320-71

**[Point 5]****Removal-Installation:**

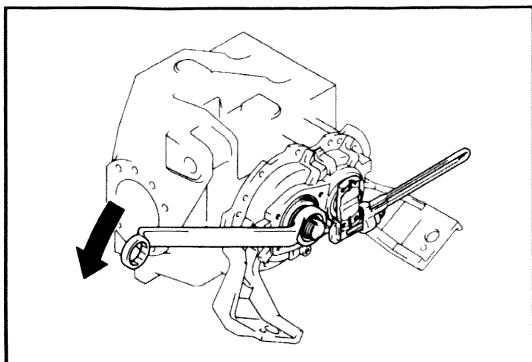
Operate carefully so as not to bring the axle shaft into contact with the oil seal lip to damage it.

DISASSEMBLY·INSPECTION·REASSEMBLY (1 ton series)**Disassembly Procedure**

- 1 Remove the drive pinion rear cover and the gasket.
- 2 Remove the lock nut and washer. **[Point 1]**
- 3 Remove the differential cover. **[Point 2]**
- 4 Measure the ring gear backlash. **[Point 3]**
- 5 Remove the bearing cap and adjusting nut. **[Point 4]**
- 6 Remove the differential case ASSY. (See page 3-20 for the disassembly, inspection and reassembly.)
- 7 Remove the drive pinion W/bearing. **[Point 5]**
- 8 Remove the drive pinion bearing. **[Point 6]**
- 9 Remove the output gear and reduction gear W/carrier cover. **[Point 7]**
- 10 Remove the reduction gear W/bearing. **[Point 8]**
- 11 Remove the drive pinion outer race from the carrier cover.
- 12 Remove the input shaft dust deflector. **[Point 9]**

Reassembly Procedure

The reassembly procedure is the reverse of disassembly procedure.



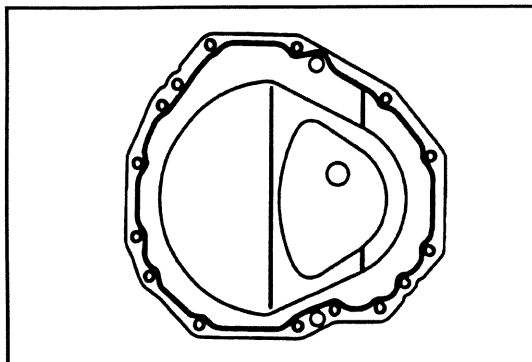
Point Operations

[Point 1]

Disassembly:

Remove the lock nut, washer, rear bearing roller and shim.

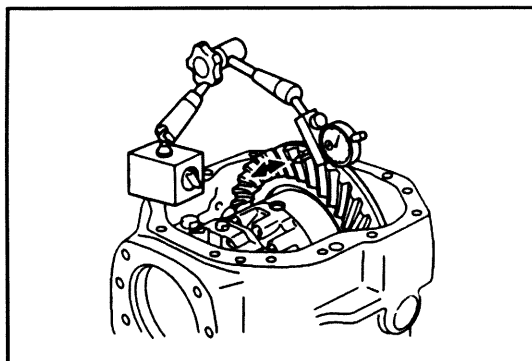
1. Unlock the lock nut.
2. Install the input shaft and use a pipe wrench to lock the gear from rotation.
3. Remove the lock nut and washer.



[Point 2]

Reassembly:

Apply sealing agent (Three Bond 1217C or equivalent) on the differential cover surface to be in contact with the differential housing.

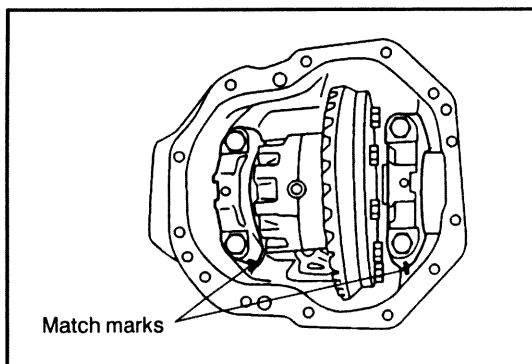


[Point 3]

Inspection:

Measure the ring gear backlash.

Standard: 0.2 ~ 0.3 mm (0.008 ~ 0.012 in)



[Point 4]

Disassembly:

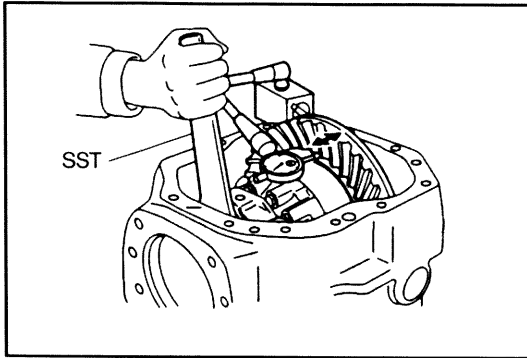
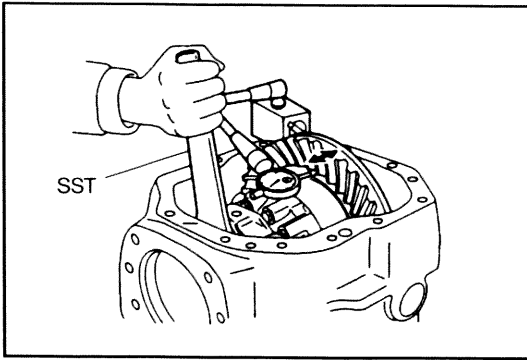
provide match marks on the bearing cap and differential housing.

Reassembly:

Install the adjusting nut and bearing cap.

1. Install the adjusting nut.
2. Install the bearing cap by aligning the match marks and temporarily tighten the set bolts.

T = 19.6 N·m (200 kgf·cm) [14.5 ft·lbf]



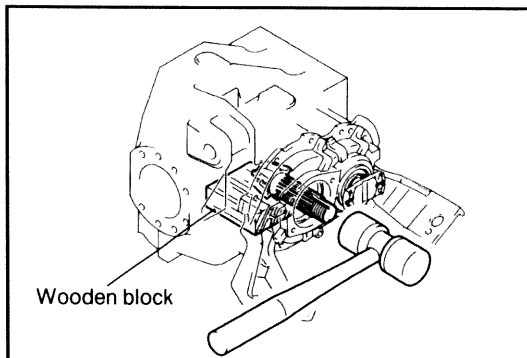
3. Set a dial gauge in the thrust direction of the differential case.
4. Use the SST and tighten until the thrust clearance is eliminated.
SST 09630-10110-71
5. Tighten both adjusting nuts by one notch each.
6. Set the dial gauge vertically to the ring gear tooth flanks and measure the backlash.

Standard: 0.2 ~ 0.3 mm (0.008 ~ 0.012 in)

If the standard is not satisfied, make adjustment by moving the differential case ASSY in the thrust direction by means of the adjusting nuts.

- ① When the backlash is excessive:
Loosen the adjusting nut on the tooth flanks side of the ring gear and tighten the adjusting nut on the rear side equally to bring the ring gear closer to the drive pinion.
- ② When the backlash is insufficient:
Loosen the adjusting nut on the rear side of the ring gear and tighten the adjusting nut on the tooth flank side equally to bring the ring gear away from the drive pinion.
7. Tighten the adjusting nut on the rear side of the ring gear further by 1.5 to 2 notches.
8. Install the adjusting nut lock plate.
9. Finally tighten the bearing cap set bolts.

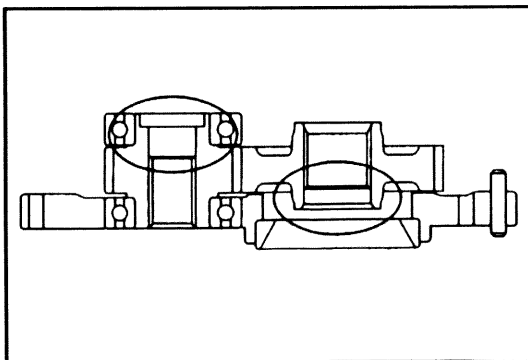
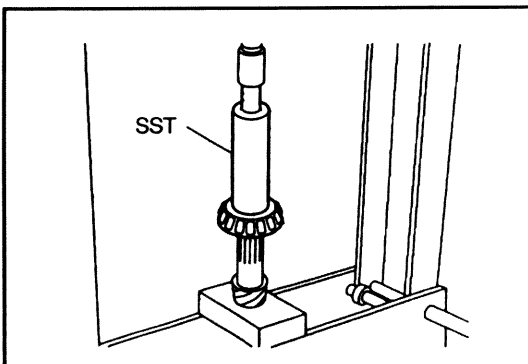
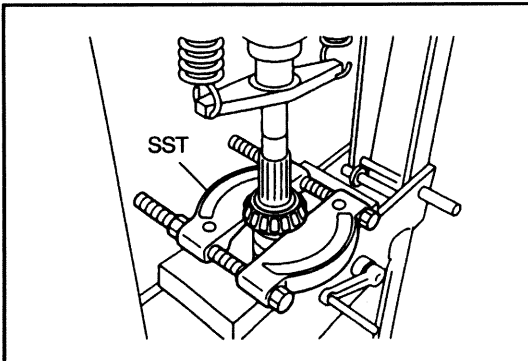
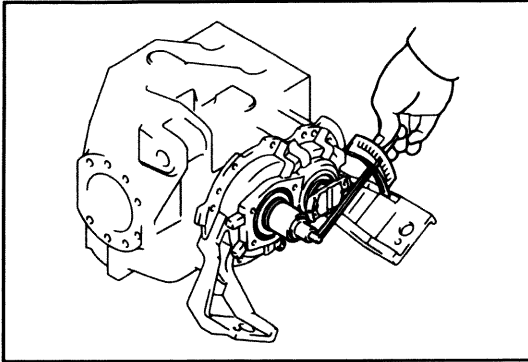
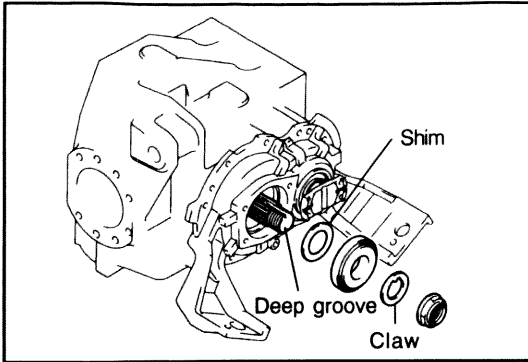
**T = 117.7 ~ 137.3 N·m (1200 ~ 1400 kgf-cm)
[86.82 ~ 101.30 ft-lbf]**



[Point 5]

Disassembly:

1. Prevent the drive pinion from damage by inserting a wooden block in the differential housing.
2. Use a plastic hammer and remove the drive pinion W/ bearing.

**Reassembly:**

Assemble the shim, rear bearing roller, washer and lock nut.

1. While supporting the drive pinion, assemble the shim, rear bearing, washer and lock nut. The washer claw shall face the deep groove side.
2. Use the input shaft to prevent the gear from rotation.
3. Tighten the lock nut to the specified torque.
4. Measure the drive pinion starting torque.

Standard:

8.82 ~ 13.23 N·m (90 ~ 135 kgf·cm)

[6.51 ~ 9.77 ft·lbf]

If the standard is not satisfied, increase or decrease the shim thickness for adjustment.

Shim thickness:

0.13, 0.1, 0.15, 0.35 and 0.4 mm

5. Securely lock the lock nut.

[Point 6]**Disassembly:**

SST 09420-23000-71

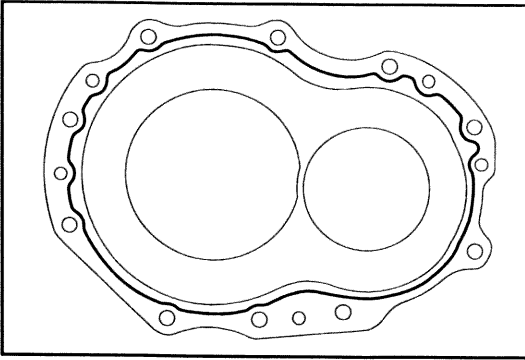
Reassembly:

Install the drive pinion front bearing.

1. Use the SST for front bearing installation.
SST 09316-60011

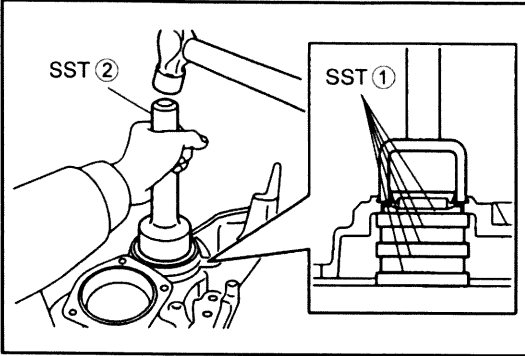
[Point 7]**Reassembly:**

Check the mounting directions of the output gear and reduction gear.



Reassembly:

Apply sealing agent (Three Bond No. 1281 or equivalent) on the bearing retainer surface to be in contact with the differential carrier cover.



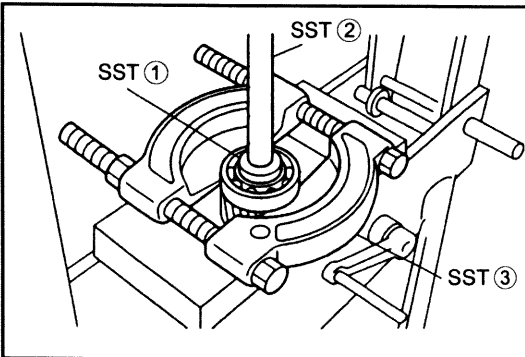
Reassembly:

Use the SST and drive a new oil seal to be in flush with the inside surface of the differential carrier cover.

SST 09950-60020 ----- ①

09150-10170-71 --- ②

After assembly, apply grease on the oil seal lip portion.



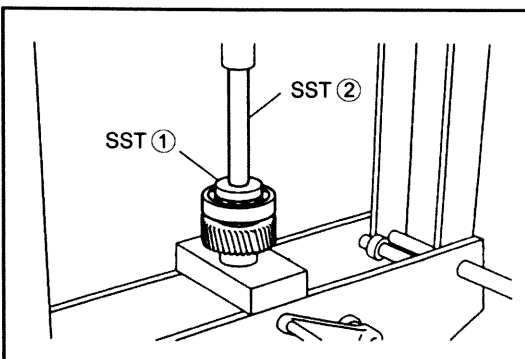
[Point 8]

Disassembly:

SST 09950-60010 ----- ①

09950-70010 ----- ②

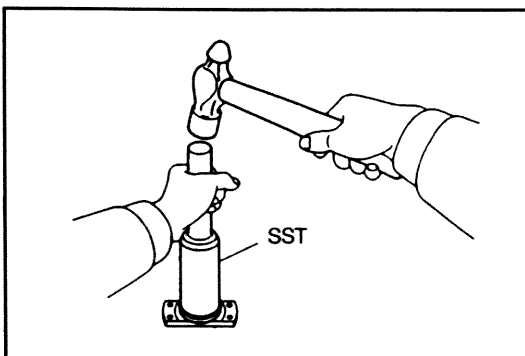
09420-23000-71 --- ③



Reassembly:

SST 09950-60010 --- ①

09950-70010 --- ②

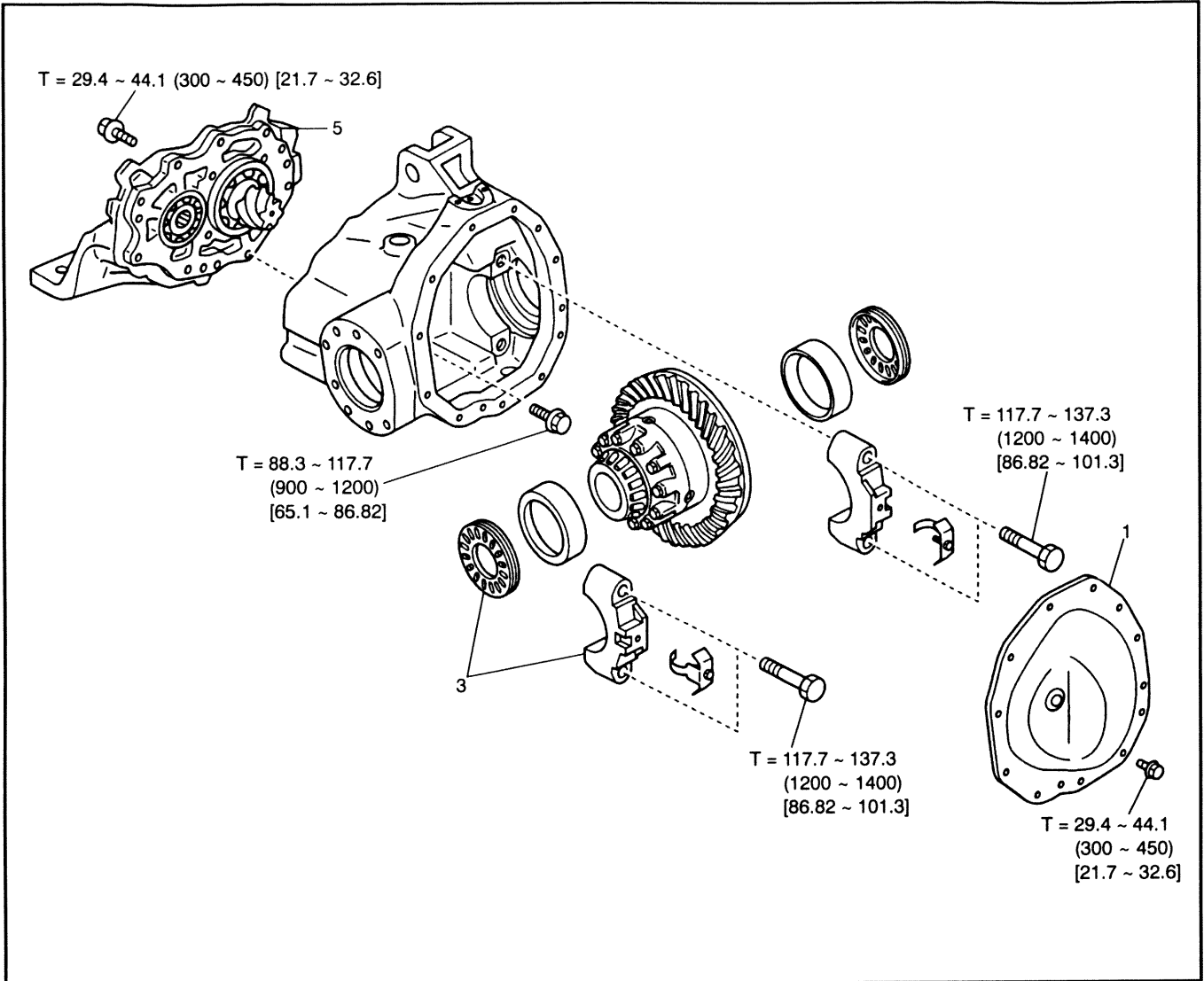


[Point 9]

Reassembly:

SST 09370-20270-71

DISASSEMBLY·INSPECTION·REASSEMBLY (2~3 ton series, J3.5 ton) N·m (kgf·cm) [ft·lbf]

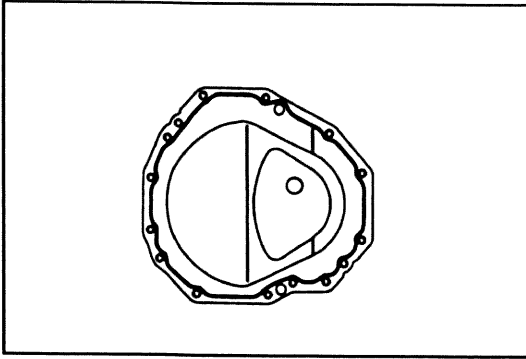


Disassembly Procedure

- 1 Remove the differential cover. **[Point 1]**
- 2 Measure the ring gear backlash. **[Point 2]**
- 3 Remove the bearing cap and adjusting nut. **[Point 3]**
- 4 Remove the differential case ASSY. (See page 3-20 for the disassembly, inspection and reassembly procedure.)
- 5 Remove the differential carrier. **[Point 4]** (See page 3-23 for the disassembly, inspection and reassembly procedure.)

Installation Procedure

The reassembly procedure is the reverse of the disassembly procedure.

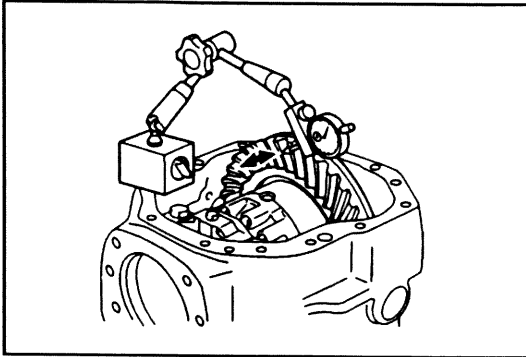


Point Operations

[Point 1]

Reassembly:

Apply sealing agent (Three Bond's No.1217C or the equivalent) on the mating surfaces of the differential cover and housing before reassembly.



[Point 2]

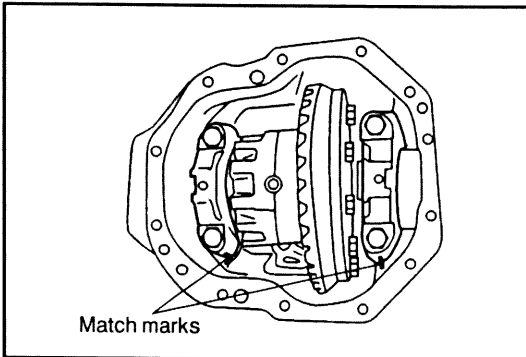
Inspection:

Measure the ring gear backlash.

Standard:

2 ton series, K2·K3 ton series: 0.2 ~ 0.3 mm
(0.008 ~ 0.012 in)

3 ton series, J3.5 ton series: 0.3 ~ 0.4 mm
(0.012 ~ 0.016 in)



[Point 3]

Disassembly:

Put match marks on the bearing cap and differential housing.

Reassembly:

Install the adjusting nuts and bearing cap.

1. Install the adjusting nuts.
2. Install the bearing cap by aligning the match marks and temporarily tighten the set bolt.
3. Set the dial gauge in the thrust direction of the differential case.

T = 19.6 N·m (200 kgf-cm) [14.5 ft-lbf]

4. Use the SST and tighten until the thrust clearance is eliminated.

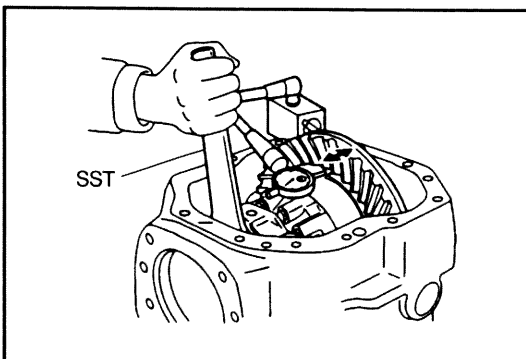
SST 09630-10110-71

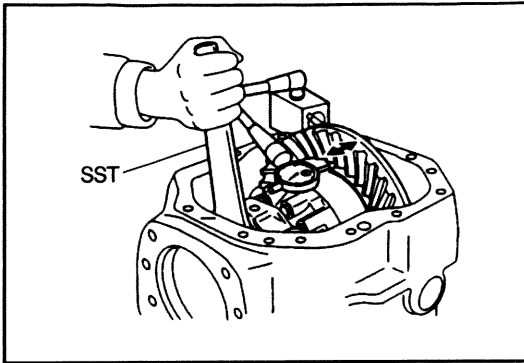
5. Tighten adjusting nuts on both sides by one notch each.
6. Set the dial gauge vertical to the ring gear tooth surface, and measure the backlash.

Standard:

2 ton series, K2·K3 ton series: 0.2 ~ 0.3 mm
(0.008 ~ 0.012 in)

3 ton series, J3.5 ton series: 0.3 ~ 0.4 mm
(0.012 ~ 0.016 in)

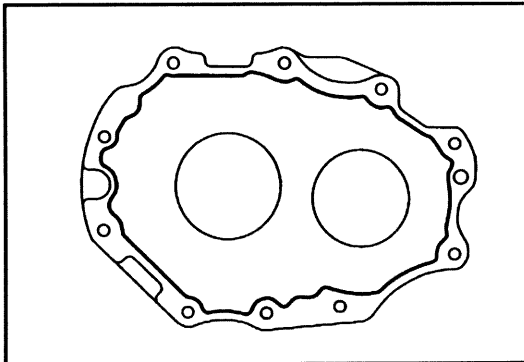




If the standard is not satisfied, adjust by turning the adjusting nut to move the differential case ASSY in the thrust direction.

- (1) When the backlash is excessive:
Loosen the adjusting nut on the ring gear teeth side and tighten the adjusting nut on the rear side as much to bring the ring gear closer to the drive pinion.
- (2) When the backlash is insufficient:
Loosen the adjusting nut of the rear side of the ring gear and tighten the adjusting nut on the teeth side as much to bring the ring gear away from the drive pinion.
7. Tighten the adjusting nut on the rear side of the ring gear further by 1.5 to 2 notches.
8. Install the adjusting nut lock plate.
9. Finally tighten the bearing cap set bolts.

T = 117.7 ~ 137.3 N·m (1200 ~ 1400 kgf-cm)
[86.82 ~ 101.3 ft-lbf]



[Point 4]

Reassembly:

Apply sealing agent (08826-00090) on the mating surfaces of the differential carrier and housing before reassembly.

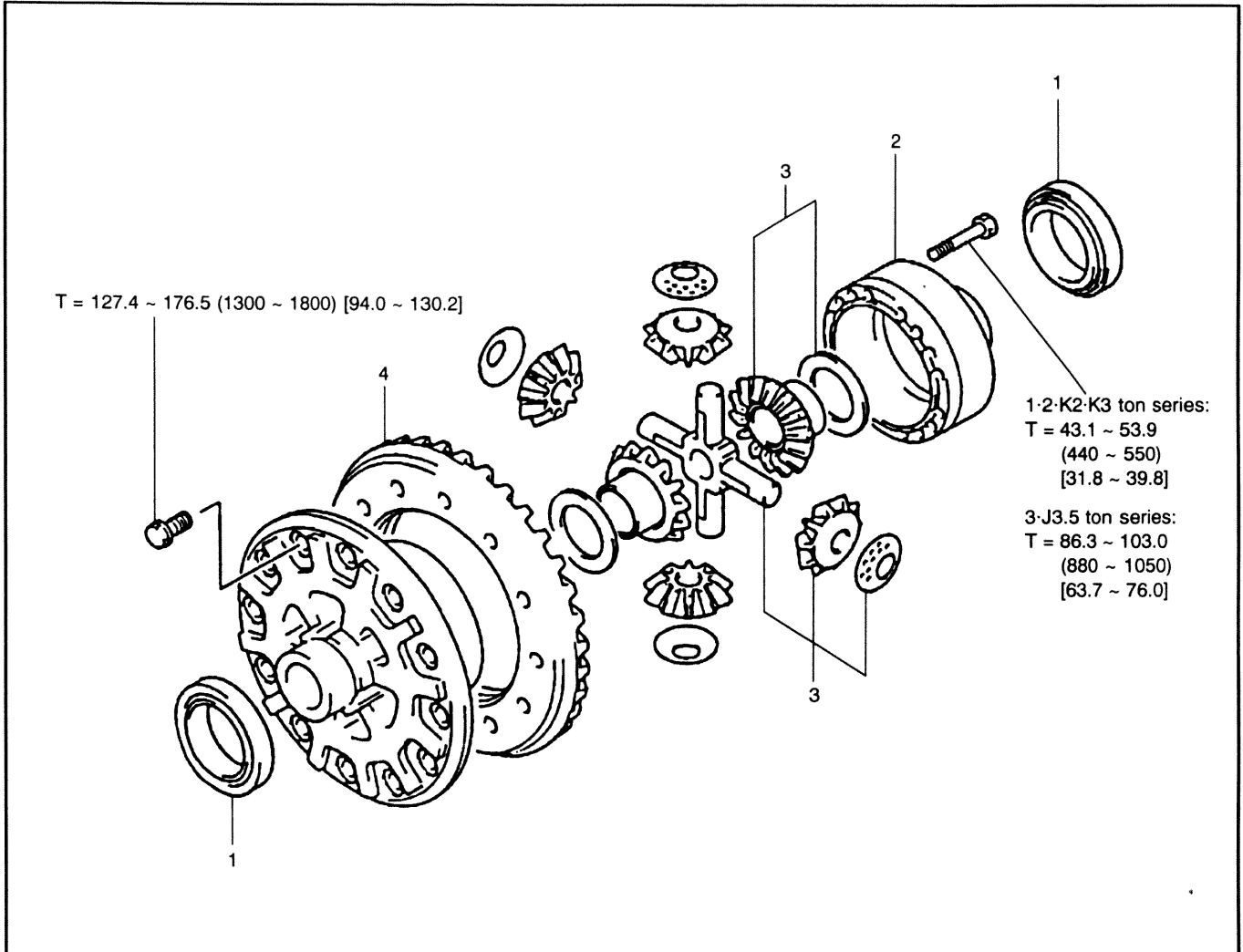
Reassembly:

Coat thread tightener (08833-00080) on the differential carrier set bolts before tightening it.

DIFFERENTIAL CASE ASSY

DISASSEMBLY·INSPECTION·REASSEMBLY

T = N·m (kgf·cm) [ft·lbf]

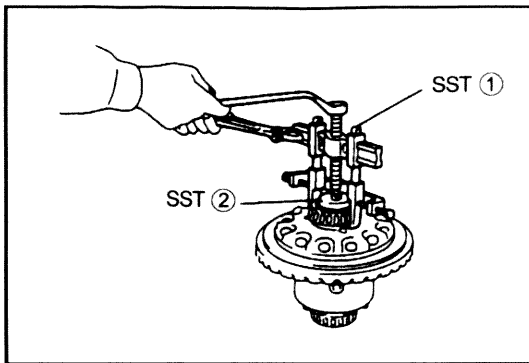


Disassembly Procedure

- 1 Remove the differential case bearings. **[Point 1]**
- 2 Remove the differential upper case. **[Point 2]**
- 3 Remove the side gear and pinion gear. **[Point 3]**
- 4 Remove the ring gear. **[Point 4]**

Reassembly Procedure

The reassembly procedure is the reverse of the disassembly procedure.



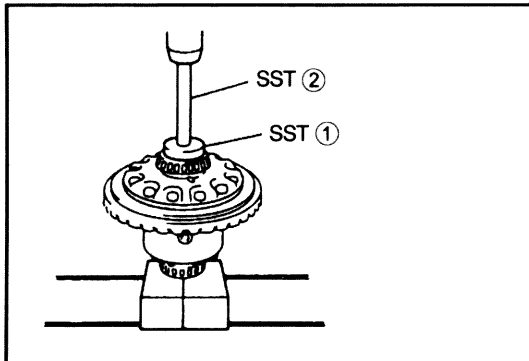
Point Operations

[Point 1]

Disassembly:

SST 09950-40011 --- ①

09950-60010 --- ②



Reassembly:

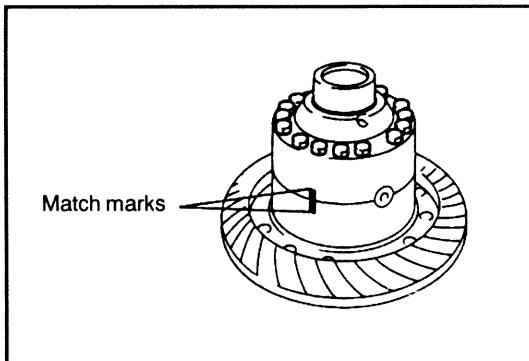
Install the side bearing.

1. Use the SST and drive in the side bearing to the end surface.

SST 09950-60020 --- ①

09950-70010 --- ②

2. Use a striking driver and fully drive in the bearing.



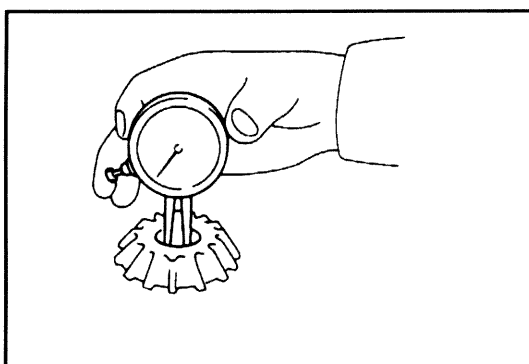
[Point 2]

Disassembly-Reassembly:

Check the match marks.

Reassembly:

Apply locking agent (08833-00070) on the set bolt threaded portion before reassembly.



[Point 3]

Inspection:

Measure the inside diameter of the differential pinion.

1·2·K2·K3 ton series

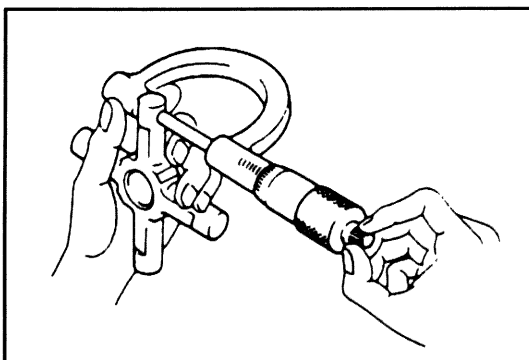
Standard: 22.12 mm (0.8709 in)

Limit: 22.22 mm (0.8748 in)

3·J3.5 ton series

Standard: 24.67 mm (0.9713 in)

Limit: 24.77 mm (0.9752 in)



Inspection:

Measure the spider outside diameter.

1·2·K2·K3 ton series

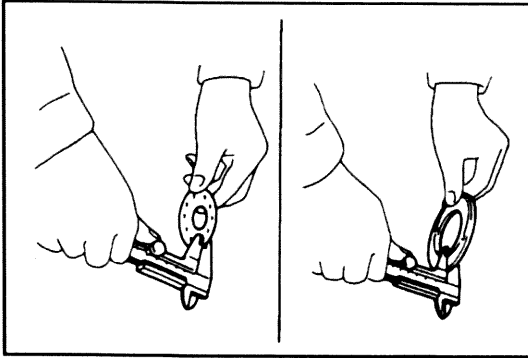
Standard: 22.00 mm (0.8661 in)

Limit: 21.75 mm (0.8563 in)

3·J3.5 ton series

Standard: 24.50 mm (0.9646 in)

Limit: 24.25 mm (0.9547 in)



Inspection:

Measure the side gear thrust washer thickness.

Standard: 1.6 mm (0.063 in)

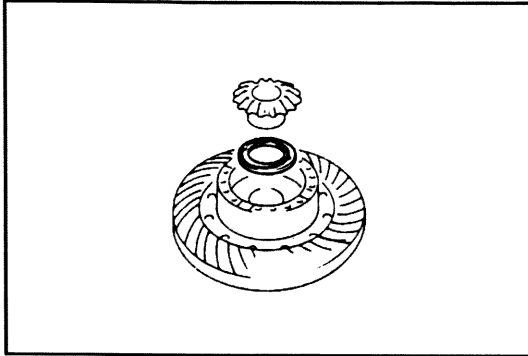
Limit: 1.3 mm (0.051 in)

Inspection:

Measure the pinion gear thrust washer thickness.

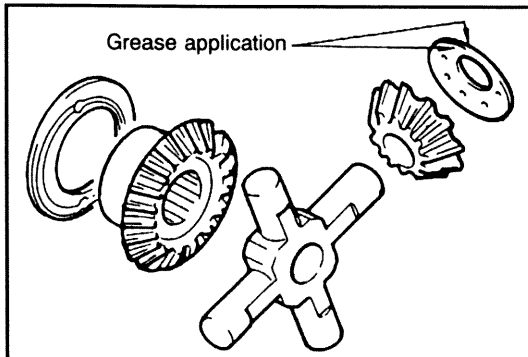
Standard: 1.6 mm (0.063 in)

Limit: 1.0 mm (0.039 in)



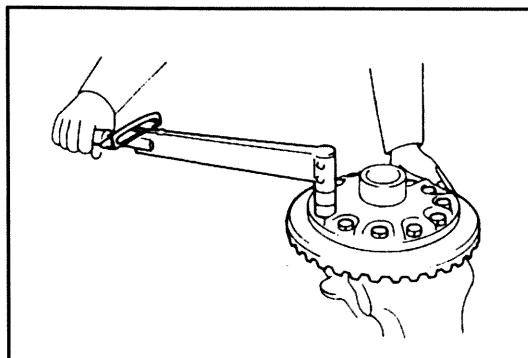
Reassembly:

Install the side gear thrust washer with its oil groove facing the gear.



Reassembly:

Apply chassis grease (molybdenum disulfide grease) on both sides of the spider pinion thrust washer before reassembly.



[Point 4]

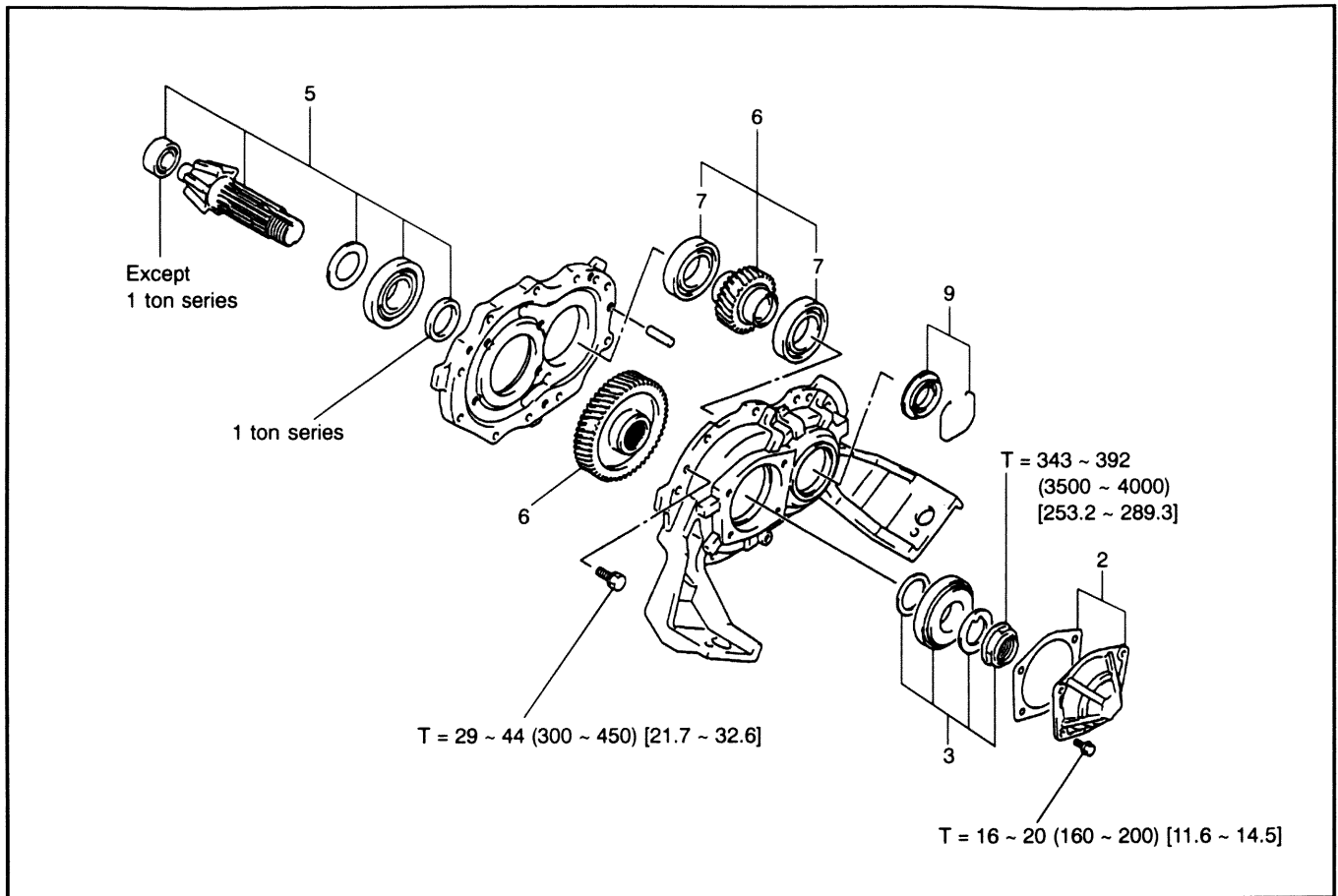
Reassembly:

Apply locking agent (08833-00070) on the set bolt threaded portion before reassembly. Tighten the set bolts gradually in the diagonal order, and finally tighten in the circular order to the specified torque.

DIFFERENTIAL CARRIER (2~3 ton series, J3.5 ton)

DISASSEMBLY·INSPECTION·REASSEMBLY

T = N·m (kgf·cm) [ft·lbf]

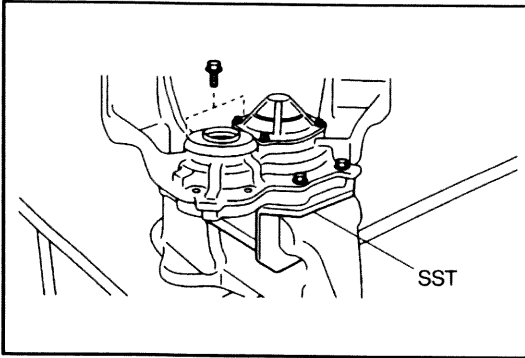


Disassembly Procedure

- 1 Fix the differential carrier ASSY in a vise. **[Point 1]**
- 2 Remove the drive pinion rear cover and gasket.
- 3 Remove the lock nut, washer, rear bearing roller and shim. **[Point 2]**
- 4 Remove the differential carrier ASSY from the vise. **[Point 3]**
- 5 Remove the bearing spacer (1 ton series), front bearing roller, spacer and pilot bearing (excluding 1 ton series) from the drive pinion. **[Point 4]**
- 6 Remove the differential carrier cover, output gear and reduction gear W/bearing. **[Point 5]**
- 7 Remove the reduction gear bearing. **[Point 6]**
- 8 Remove the drive pinion bearing outer race.
- 9 Remove the input shaft oil seal. **[Point 7]**
- 10 Remove the input shaft dust deflector. **[Point 8]**

Reassembly Procedure

The reassembly procedure is the reverse of the disassembly procedure.



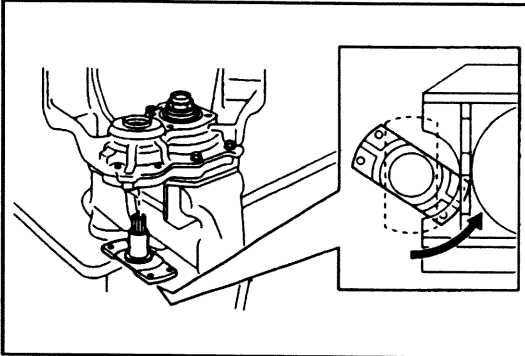
Point Operations

[Point 1]

Disassembly:

Fix the differential carrier ASSY in a vise.

1. Fix the SST in the vise.
SST 09410-23320-71
2. Use the service bolt and install the differential carrier ASSY on the SST.

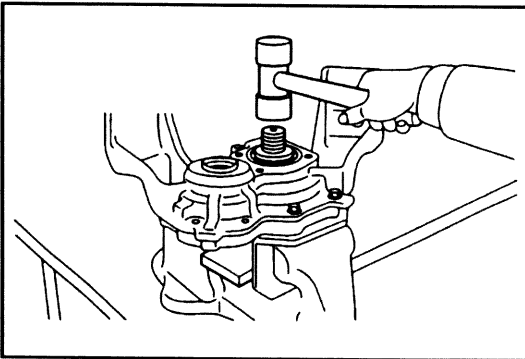


[Point 2]

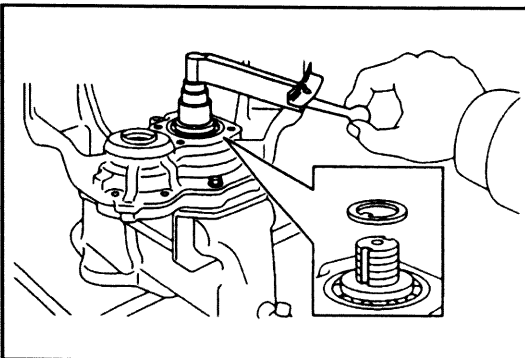
Disassembly:

Remove the lock nut, washer, rear bearing roller and shim(s).

1. Unlock the lock nut.
2. Use the input shaft to stop the gear from rotation.
3. Remove the lock nut and washer.



4. Apply a wooden block under the drive pinion to prevent it from damage.
5. Use a plastic hammer and remove the rear bearing roller.
6. Remove the shim(s).



Reassembly:

Install the shim(s), rear bearing roller, washer and lock nut.

1. While supporting the drive pinion, install the shim(s), rear bearing, washer and lock nut. Place the washer with its claw on the deep groove side.
2. Use the input shaft to stop the gear from rotation.
3. Tighten the lock nut to the specified torque.
4. Remove the input shaft.
5. Measure the drive pinion starting torque.

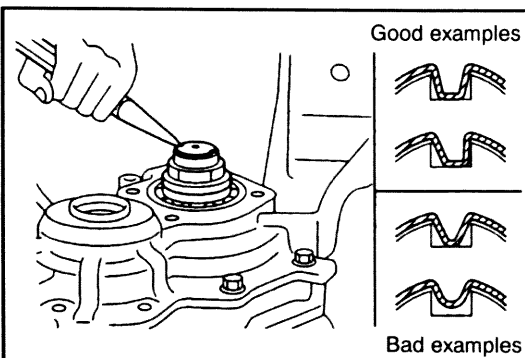
Standard: 8.82 ~ 13.23 N·m (90 ~ 135 kgf-cm)

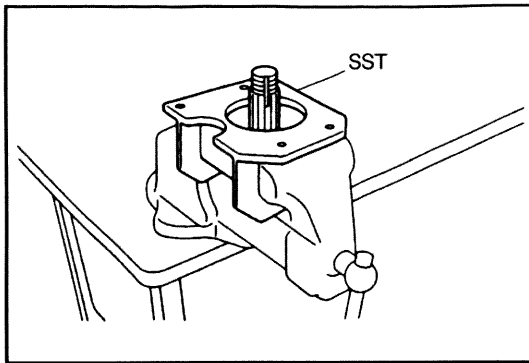
If the standard is not satisfied, make adjustment by increasing or decreasing the shim thickness.

Shim thickness:

**0.13, 0.10, 0.15, 0.35 and 0.40 mm
(0.0051, 0.0039, 0.0059, 0.018 and 0.016 in)**

6. Securely swage the lock nut.



**[Point 3]**

Reassembly:

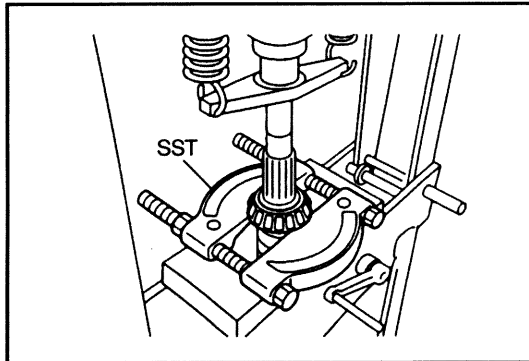
Fix the differential carrier ASSY in a vise.

1. Fix the SST in the vise.

SST 09410-23320-71

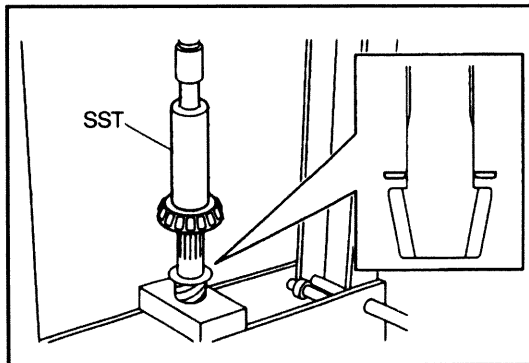
2. Place the drive pinion in the center of the service hole.

3. Use the service bolts and install the differential carrier ASSY on the SST

**[Point 4]**

Disassembly:

SST 09420-23000-71



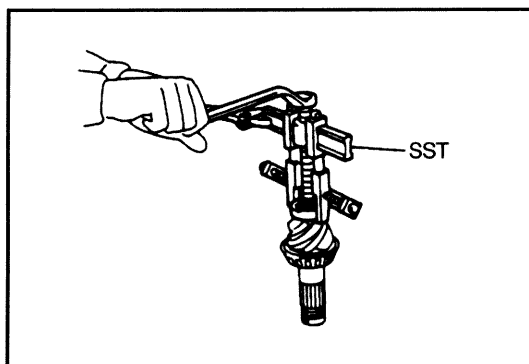
Reassembly:

Install the drive pinion front bearing.

1. Check correctness of spacer direction at the time of installation.

2. Use the SST and install the front bearing.

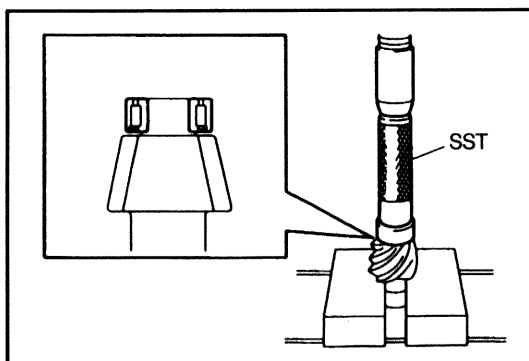
SST 09316-60011



Excluding 1 ton series

Disassembly:

SST 09950-40011



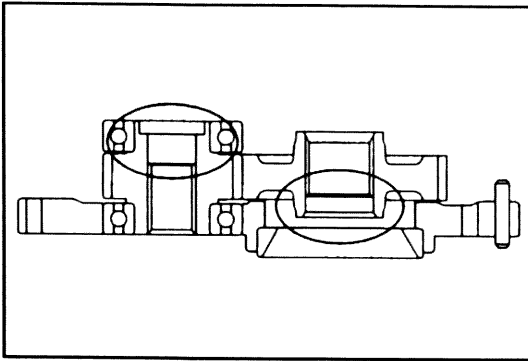
Excluding 1 ton series

Reassembly:

Use the SST and install the pilot bearing.

SST 09608-04031

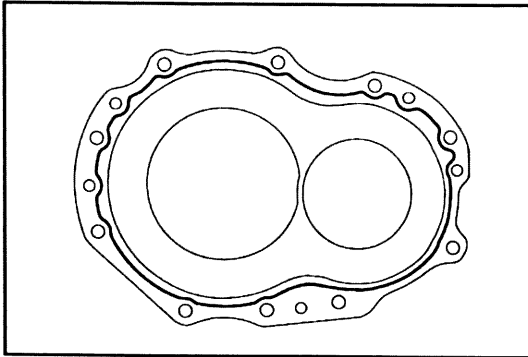
Check the installed direction.



[Point 5]

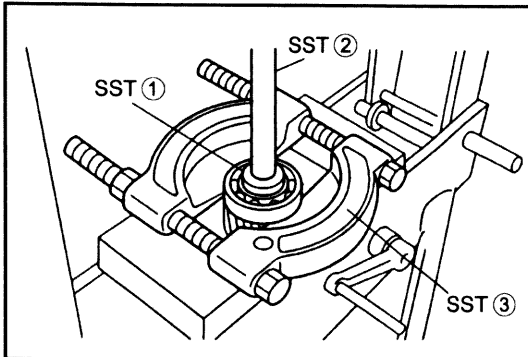
Reassembly:

Check the installing directions of the output gear and reduction gear.



Reassembly:

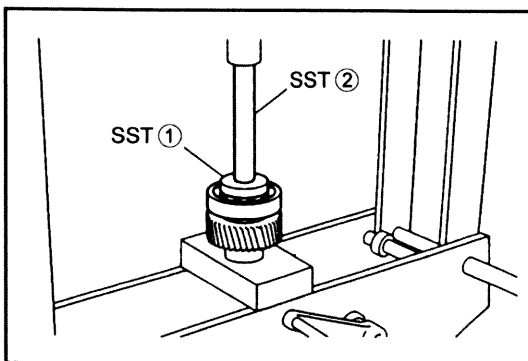
Apply sealing agent (08826-00090) on the bearing retainer surface to come into contact with the differential carrier cover.



[Point 6]

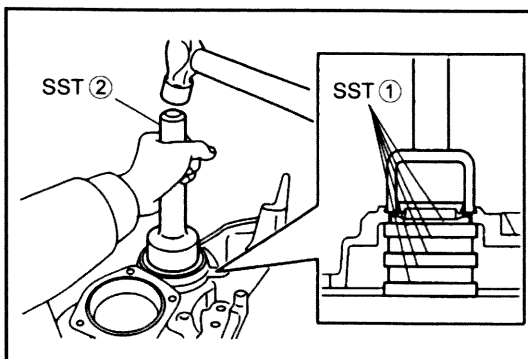
Disassembly:

SST 09950-60010 ----- ①
09950-70010 ----- ②
09420-23000-71 --- ③



Reassembly:

SST 09950-60010 --- ①
09950-70010 --- ②



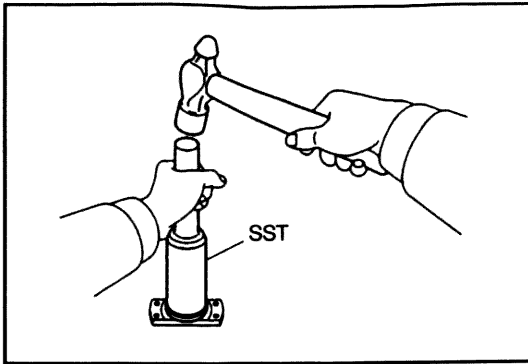
[Point 7]

Reassembly:

Use the SST to drive in the new oil seal to be flush with the inside end face of the differential carrier cover.

SST 09950-60020 ----- ①
09150-10170-71 --- ②

After installation, apply grease on the oil seal lip portion.



[Point 8]
Reassembly:
SST 09370-20270-71

APPENDIX

	Page
SST LIST	4-2
SERVICE STANDARD LIST	4-4

SST LIST

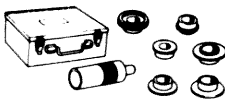
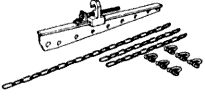
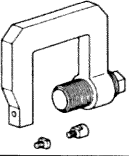
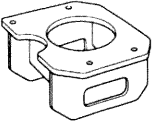
Illustration	Part No.	Part Name	Section	
			2	3
	09316-60011	Transmission & transfer bearing replacer	○	○
	09608-04031	Front hub inner bearing cone replacer	○	○
	09905-00012	Snap ring No. 1 expander	○	
	09950-40011	Puller B set	○	○
	09950-60010	Replacer set	○	○
	09950-60020	Replacer set No. 2		○
	09950-70010	Handle set	○	○
	09010-20111-71	Engine unit hanger	○	
	09010-23320-71	Engine with transmission hanger	○	
	09150-10170-71	Transmission bearing replacer		○

Illustration	Part No.	Part Name	Section	
			2	3
	09310-23320-71	Reamer bolt remover		○
	09370-10410-71	Front axle bearing replacer	○	
	09370-20270-71	Drive pinion bearing replacer	○	○
	09410-23320-71	Differential carrier stand		○
	09420-23000-71	Bearing remover	○	○
	09630-10110-71	Tilt cylinder cap remover and replacer		○

SERVICE STANDARD LIST

TRANSMISSION ASSY

Transmission ASSY			
Forward idle gear thrust clearance	mm (in)	Standard	0.15~0.40 (0.0059~0.0157)
		Limit	0.70 (0.0276)
Forward idle gear radial clearance	mm (in)	Standard	0.010~0.052 (0.00039~0.00205)
Forward idle gear thrust washer thickness	mm (in)	Limit	3.7 (0.146)
Forward idle gear inside diameter	mm (in)	Limit	55.1 (2.169)
Speed shaft journal outside diameter	mm (in)	Limit	47.9 (1.886)
Second gear thrust clearance	mm (in)	Standard	0.15~0.40 (0.0059~0.0157)
Reverse gear thrust clearance	mm (in)	Standard	0.10~0.45 (0.0039~0.0177)
First gear-reverse gear radial clearance	mm (in)	Standard	0.016~0.057 (0.00063~0.00224)
Second gear-forward gear radial clearance	mm (in)	Standard	0.018~0.062 (0.00071~0.00244)
Forward gear thrust clearance	mm (in)	Standard	0.15~0.40 (0.0059~0.0157)
Countershaft gear thrust washer thickness	mm (in)	Limit	5.9 (0.232)
Countershaft journal outside diameter	First gear-reverse gear	Limit	29.9 (1.177)
	Second gear-forward gear	Limit	39.9 (1.571)
First gear-reverse gear inside diameter	mm (in)	Limit	38.1 (1.500)
Second gear-forward gear inside diameter	mm (in)	Limit	48.1 (1.894)
Shift fork to hub grease clearance	mm (in)	Limit	1.0 (0.039)
Synchronizer ring to gear clearance	First gear-reverse gear	Standard	1.25~2.05 (0.0492~0.0807)
		Limit	0.6 (0.024)
	Forward gear	Standard	1.15~2.15 (0.0453~0.0846)
		Limit	0.6 (0.024)
Shift lever neutral position	mm (in)	Standard	Between center of shift lever and lever knob: 180^{+5}_0 (7.086 ^{+0.197})
Shift lever knob offset	mm (in)	Standard	5 (0.197) or less
Tightening Torque Unit: N·m (kgf·cm) [ft·lbf]			
Transmission front case × rear case set bolt		Standard	29.4~44.1 (300~450) [21.7~32.6]
Transmission front case × rear case set bolt (when fastening the hanger at the same time)		Standard	49~78.5 (500~800) [36.2~57.9]
Output shaft lock nut		Standard	156.9~235.4 (1600~2400) [115.8~173.6]
Countershaft lock nut		Standard	156.9~235.4 (1600~2400) [115.8~173.6]
Release bearing hub guide set bolt		Standard	14.7~21.6 (150~220) [10.9~15.9]

Output shaft cover set bolt	Standard	14.7~21.6 (150~220) [10.9~15.9]
Countershaft cover set bolt	Standard	14.7~21.6 (150~220) [10.9~15.9]
Fork set bolt	Standard	29.4~39.2 (300~400) [21.7~32.5]
Shift ring bracket set bolt	Standard	29.4~44.1 (300~450) [21.7~32.6]
Backup lamp switch	Standard	26.4~48.1 (270~490) [19.5~35.5]
Shift lever pin set nut	Standard	21.6~50.4 (220~490) [15.9~35.4]

DIFFERENTIAL

Differential			
Ring gear backlash mm (in)	1·2·K2·K3 ton	Standard	0.2~0.3 (0.008~0.012)
	3·J3.5 ton	Standard	0.3~0.4 (0.012~0.016)
Differential pinion inside diameter mm (in)	1·2·K2·K3 ton	Standard	22.12 (0.8709)
		Limit	22.22 (0.8748)
	3·J3.5 ton	Standard	24.67 (0.9713)
		Limit	24.77 (0.9752)
Spider outside diameter mm (in)	1·2·K2·K3 ton	Standard	22.00 (0.8661)
		Limit	21.75 (0.8563)
	3·J3.5 ton	Standard	24.50 (0.9646)
		Limit	24.25 (0.9547)
Side gear thrust washer thickness			

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