Impreza 2001-2002
(STI Supplement)

SUBARU

Exit

SUBARU

IMPREZA

2002 Model Year

PDF Service Manual
Supplement For STi Model

GENERAL INFORMATION SECTION (Pub.No.G1841GE1)

ENGINE 2 SECTION (Pub.No.G1841GE3)

TRANSMISSION SECTION (Pub.No.G1841GE4)

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BODY SECTION (Pub.No.G1841GE6)

WIRING SYSTEM SECTION (Pub.No.G1841GE7)

GENERAL INFORMATION SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD. G1841GE1

SPECIFICATIONS

SPC

1. Impreza

A: DIMENSIONS

Model			Sedan	Wagon	OUTBACK	STi
Overall length		mm (in)	4,405 (173.4)			
Overall width		mm (in)	1,730 (68.1)	1,695 (66.7)	1,710 (67.3)	1,730 (68.1)
Overall height (at C.W.)		mm (in)	1,440 (56.7)	1,465 (57.7), 1,485 (58.5)★4	1,475 (58.1), 1,495 (58.9)★4	1,440 (56.7)
Compartment	Length	mm (in)	1,890 (74.4)	1,845 (72.6)		1,890 (74.4)
	Width	mm (in)	1,380 (54.3)			
	Height	mm (in)	1,180 (46.5), 1,125 (44.3)★5	1,200 (47.2), 1,150 (45.3)★5	1,200 (47.2), 1,150 (45.3)★5	1,180 (46.5)
Wheelbase		mm (in)	2,525 (99.4)			
Tread	Front	mm (in)	1,485 (58.5)	1,460 (57.5)★1, 1,465 (57.7)	1,460 (57.5)	1,490 (58.7)
	Rear	mm (in)	1,475 (58.1), 1,480 (58.3)★3	1,450 (57.1)★1, 1,455 (57.3)	1,455 (57.3)	1,480 (58.3)
Minimum road clearance	Without catalytic converter	mm (in)	150 (5.9), 155 (6.1)★2	150 (5.9), 155 (6.1)★2	160 (6.3)	—
	With catalytic converter	mm (in)	150 (5.9), 155 (6.1)★3	150 (5.9), 155 (6.1)★3	160 (6.3)	155 (6.1)

★1: 1.6 L
★2: 2.0 L
★3: 2.0 L Turbo
★4: With roof rail
★5: With sun roof

B: ENGINE

Model	1.6 L	Non-Turbo 2.0 L	Turbo 2.0 L	2.5 L	STi
Engine type	Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gasoline engine				
Valve arrangement	Overhead camshaft type				
Bore × Stroke mm (in)	87.9 × 65.8 (3.461 × 2.591)	92 × 75 (3.62 × 2.95)		99.5 × 79 (3.92 × 3.11)	92 × 75 (3.62 × 2.95)
Displacement cm^3 (cu in)	1,597 (97.45)	1,994 (121.67)		2,475 (151.02)	1,994 (121.67)
Compression ratio	10.0 ± 0.2		8.0 ± 0.2	10.0 ± 0.2	8.0 ± 0.2
Firing order	1 — 3 — 2 — 4				
Idle speed at Park/Neutral position rpm	700 ± 100		750 ± 100	700 ± 100	700 ± 100
Maximum output kW (HP)/rpm	70 (94)/5,200	92 (123)/5,600	160 (215)/5,600	112 (150)/5,600	195 (261)/6,000
Maximum torque N·m (kgf-m, ft-lb) /rpm	143 (14.6, 105.5) /3,600	184 (18.8, 136.0) /3,600	292 (29.8, 215.4) /3,600	223 (22.7, 164.5) /3,600	343 (35.0, 253.0) /4,000

C: ELECTRICAL

Model			1.6 L	Non-turbo 2.0 L	Turbo 2.0 L	2.5 L	STi
Ignition timing at idling speed BTDC/rpm			5°±10°/700	10°±10°/700	12°±10°/750	MT: 10°±10°/700 AT: 15°±10°/700	12°±10°/700
Spark plug	Type and manufacturer	Without OBD	NGK: BKR6E (without catalyst) CHAMPION: RC8YC4 (with catalyst) NGK: BKR6E-11 (with catalyst)	NGK: BKR6E (without catalyst) CHAMPION: RC10YC4 (with catalyst) NGK: BKR5E-11 (with catalyst)	—	NGK: BKR6E (without catalyst) CHAMPION: RC10YC4 (with catalyst) NGK: BKR5E-11 (with catalyst)	—
		With OBD	CHAMPION: RC8YC4 **Alternate** NGK: BKR6E-11	CHAMPION: RC10YC4 **Alternate** NGK: BKR5E-11	NGK: PFR6G	CHAMPION: RC10YC4 **Alternate** NGK: BKR6E-11	NGK: PFR6G
Generator			12V — 75A				
Battery	Type and capacity (5HR)	For Europe and South America	12V — 48AH (55D23L)	MT: 12V — 48AH (55D23L) AT: 12V — 52AH (65D23L)		MT: 12V — 48AH (55D23L) AT: 12V — 52AH (75D23L)	12V — 48AH (55D23L)
		Others	12V — 27AH (34B19L)				—

D: TRANSMISSION

Model			1.6 L		Non-turbo 2.0 L		Turbo 2.0 L		2.5 L		STi
Transmission type			5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	6MT
Clutch type			DSPD	TCC	DSPD	TCC	DSPD	TCC	DSPD	TCC	DSPD
Gear ratio		1st	3.454	2.785	3.454	2.785	3.454, 3.166★1	2.785	3.454	2.785	3.636
		2nd	2.062	1.545	2.062	1.545	1.947, 1.882★1	1.545	2.062	1.545	2.375
		3rd	1.448	1.000	1.448	1.000	1.366, 1.296★1	1.000	1.448	1.000	1.761
		4th	1.088	0.694	1.088	0.694	0.972	0.694	1.088	0.694	1.346
		5th	0.825	—	0.825	—	0.738	—	0.871, 0.780★1	—	0.971, 1.062★1
		6th	—	—	—	—	—	—	—	—	0.756, 0.842★1
		Reverse	3.333	2.272	3.333	2.272	3.333	2.272	3.333	2.272	3.545
		Dual range	1.447	—	1.447	—	—	—	—	—	—
Reduction gear (Front drive)	1st reduction	Type of gear	—	Helical	—	Helical	—	Helical	—	Helical	—
		Gear ratio	—	1.000	—	1.000	—	1.000	—	1.000	—
	Final reduction	Type of gear	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid
		Gear ratio	4.111	4.444	3.900	4.111	3.900, 4.444★1	4.111	3.700, 4.111★1	4.111	3.900
Reduction gear (Rear drive)	Transfer reduction	Type of gear	Helical	—	Helical	—	Helical	—	Helical	—	Helical
		Gear ratio	1.000	—	1.000	—	1.100, 1.000★1	—	1.000	—	1.100, 1.000★1
	Final reduction	Type of gear	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid
		Gear ratio	4.111	4.444	3.900	4.111	3.545, 4.444★1	4.111	3.700, 4.111★1	4.111	3.545, 3.900★1

5MT: 5-forward speeds with synchromesh and 1-reverse
4AT: Electronically controlled fully-automatic, 4-forward speeds and 1-reverse
6MT: 6-forward speeds with synchromesh and 1-reverse
DSPD: Dry Single Plate Diaphragm
TCC: Torque Converter Clutch
★1: Australia spec vehicle

E: STEERING

Model		Turbo 2.0 L, 2.5 L	OUTBACK	OTHERS	STi
Type		Rack and Pinion			
Turns, lock to lock		RHD: 2.7 LHD: 3.0	3.0	3.2	2.7
Minimum turning circle m (ft)	Curb to curb	11.0 (36.1)	10.8 (35.4)	10.4 (34.1)	11.0
	Wall to wall	12.0 (39.4)	11.6 (38.1)	11.2 (36.7)	12.0

F: SUSPENSION

Front	Macpherson strut type, Independent, Coil spring
Rear	Dual-link type, Independent, Coil spring

G: BRAKE

Model	1.6 L	Non-turbo 2.0 L, 2.5 L	Turbo 2.0 L, STi
Service brake system	Dual circuit hydraulic with vacuum suspended power unit		
Front	Ventilated disc brake		
Rear	Drum brake	Disc brake	Ventilated disc brake
Parking brake	Mechanical on rear brakes		

H: TIRE

Rim size	$14 \times 5^1/_2$JJ	15×6JJ	$16 \times 6^1/_2$JJ	17×7JJ	$17 \times 7^1/_2$JJ
Tire size	175/70R14 84T 185/70R14 88H	185/65R15 88H 195/60R15 88H	P205/55R16 89V 205/50R16 87V	215/45R17 87W	225/45R17 90W 215/45R17 87W
Type	Steel belted radial, Tubeless				

I: CAPACITY

Model			1.6 L		Non-turbo 2.0 L		Turbo 2.0 L		2.5 L		STi
			5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	6MT
Fuel tank		ℓ (US gal, Imp gal)	50 (13.2, 11.0)		50 (13.2, 11.0)		60 (15.9, 13.2)				
Engine oil	Total capacity	ℓ (US qt, Imp qt)	4.0 (4.2, 3.5)				4.5 (4.8, 4.0)		4.0 (4.2, 3.5)		4.5 (4.8, 4.0)
	Engine oil amount for refill	ℓ (US qt, Imp qt)	Approx. 4.0 (4.2, 3.5)				Approx. 4.5 (4.8, 4.0)		Approx. 4.0 (4.2, 3.5)		Approx. 4.5 (4.8, 4.0)
Transmission gear oil		ℓ (US qt, Imp qt)	3.5 (3.7, 3.1), 4.0 (4.2, 3.5) ★1	—	3.5 (3.7, 3.1), 4.0 (4.2, 3.5) ★1	—	3.5 (3.7, 3.1)	—	3.5 (3.7, 3.1)	—	4.1 (4.3, 3.6)
Automatic transmission fluid		ℓ (US qt, Imp qt)	—	8.4 (8.9, 7.4)	—	8.4 (8.9, 7.4)	—	9.3 (9.8, 8.2)	—	9.3 (9.8, 8.2)	—
AT differential gear oil		ℓ (US qt, Imp qt)	—	1.2 (1.3, 1.1)	—	1.2 (1.3, 1.1)	—	1.2 (1.3, 1.1)	—	1.2 (1.3, 1.1)	—
AWD rear differential gear oil		ℓ (US qt, Imp qt)	0.8 (0.8, 0.7)								1.0 (1.1, 0.9)
Power steering fluid		ℓ (US qt, Imp qt)	0.7 (0.7, 0.6)								
Engine coolant		ℓ (US qt, Imp qt)	7.4 (7.8, 6.5)	7.3 (7.7, 6.4)	7.0 (7.4, 6.2)	6.9 (7.3, 6.1)	7.7 (8.1, 6.8)	7.7 (8.1, 6.8)	7.0 (7.4, 6.2)	6.9 (7.3, 6.1)	7.7 (8.1, 6.8)

★1: Dual range

J: WEIGHT

1. LHD VEHICLE

Sedan

Option code★1			EC		K4		K0		KS	
Model			1.6 L							
			AWD							
			TS							
			5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front	kgf (lb)	730 (1,609)	750 (1,654)	750 (1,654)	770 (1,698)	750 (1,654)	770 (1,698)	740 (1,631)	760 (1,676)
	Rear	kgf (lb)	520 (1,146)	520 (1,146)	520 (1,146)	520 (1,146)	520 (1,146)	520 (1,146)	535 (1,179)	535 (1,179)
	Total	kgf (lb)	1,250 (2,755)	1,270 (2,800)	1,270 (2,800)	1,290 (2,844)	1,270 (2,800)	1,290 (2,844)	1,275 (2,810)	1,295 (2,855)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)
	Rear	kgf (lb)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)
Option	Air conditioner		—	—	❍	❍	❍	❍	❍	❍
	Cruise control		—	—	—	—	—	—	—	—
	ABS		—	—	—	—	—	—	—	—
	Aluminium wheel		—	—	—	—	—	—	—	—
	Rear spoiler		—	—	—	—	—	—	—	—
	Spoiler pac		—	—	—	—	—	—	—	—

Option code★1			EC		K4		K0		KS	
Model			2.0 L							
			AWD							
			GX							
			5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front	kgf (lb)	745 (1,643)	770 (1,698)	765 (1,687)	790 (1,742)	760 (1,676)	795 (1,753)	750 (1,653)	780 (1,720)
	Rear	kgf (lb)	535 (1,179)	530 (1,168)	530 (1,168)	525 (1,157)	525 (1,157)	530 (1,168)	550 (1,213)	545 (1,202)
	Total	kgf (lb)	1,280 (2,822)	1,300 (2,866)	1,295 (2,855)	1,315 (2,899)	1,285 (2,833)	1,325 (2,921)	1,300 (2,866)	1,325 (2,922)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)
	Rear	kgf (lb)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)
Option	Air conditioner		—	—	❍	❍	❍	❍	❍	❍
	Cruise control		—	—	—	—	—	—	—	—
	ABS		—	—	❍	❍	❍	❍	—	❍
	Aluminium wheel		—	—	❍	❍	—	—	❍	❍
	Rear spoiler		—	—	—	—	—	—	❍	❍
	Spoiler pac		—	—	—	—	—	—	—	—

★1: For option code, refer to ID section. <Ref. to ID-5, Option code.>

Option code★1			EC			
Model			2.5 L		2.0 L Turbo	
			AWD			
			RS		WRX	STi
			5MT	4AT	5MT	6MT
Curb weight (C.W.)	Front	kgf (lb)	760 (1,676)	785 (1,731)	815 (1,797)	875 (1,929)
	Rear	kgf (lb)	535 (1,179)	530 (1,168)	550 (1,213)	575 (1,268)
	Total	kgf (lb)	1,295 (2,855)	1,315 (2,899)	1,365 (3,009)	1,450 (3,197)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	930 (2,050)	930 (2,050)	970 (2,138)	1,030 (2,271)
	Rear	kgf (lb)	910 (2,006)	910 (2,006)	920 (2,028)	920 (2,028)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,780 (3,924)	1,780 (3,924)	1,850 (4,079)	1,880 (4,145)
Option	Air conditioner		—	—	—	—
	Cruise control		—	—	—	—
	ABS		❍	❍	❍	❍
	Aluminium wheel		—	—	—	—
	Rear spoiler		—	—	—	—
	Spoiler pac		—	—	—	—

★1: For option code, refer to ID section. <Ref. to ID-5, Option code.>

Wagon

Option code★1		EC		K4		K0		KS	
Model		1.6 L							
		AWD							
		TS							
		D/R	4AT	D/R	4AT	D/R	4AT	D/R	4AT
Curb weight (C.W.)	Front kgf (lb)	735 (1,620)	750 (1,653)	755 (1,664)	770 (1,698)	755 (1,664)	770 (1,698)	745 (1,642)	760 (1,676)
	Rear kgf (lb)	545 (1,202)	545 (1,202)	545 (1,202)	545 (1,202)	545 (1,202)	545 (1,202)	560 (1,235)	560 (1,235)
	Total kgf (lb)	1,280 (2,822)	1,295 (2,855)	1,300 (2,866)	1,315 (2,900)	1,300 (2,866)	1,315 (2,900)	1,305 (2,877)	1,320 (2,911)
Maximum permissible axle weight (M.P.A.W.)	Front kgf (lb)	900 (1,984)	900 (1,984)	900 (1,984)	900 (1,984)	900 (1,984)	900 (1,984)	900 (1,984)	900 (1,984)
	Rear kgf (lb)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)
Maximum permissible weight (M.P.W.)	Total kgf (lb)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)
Option	Air conditioner	—	—	❍	❍	❍	❍	❍	❍
	Cruise control	—	—	—	—	—	—	—	—
	ABS	—	—	—	—	—	—	—	—
	Aluminium wheel	—	—	—	—	—	—	—	—
	Rear spoiler	—	—	—	—	—	—	—	—
	Spoiler pac	—	—	—	—	—	—	—	—

Option code★1		EC		K4		K0		KS	
Model		2.0 L							
		AWD							
		GX							
		D/R	4AT	D/R	4AT	D/R	4AT	D/R	4AT
Curb weight (C.W.)	Front kgf (lb)	755 (1,664)	770 (1,698)	775 (1,709)	790 (1,742)	780 (1,720)	795 (1,753)	760 (1,676)	780 (1,720)
	Rear kgf (lb)	570 (1,257)	565 (1,246)	565 (1,246)	560 (1,235)	570 (1,257)	565 (1,246)	580 (1,279)	575 (1,268)
	Total kgf (lb)	1,325 (2,921)	1,335 (2,944)	1,340 (2,955)	1,350 (2,977)	1,350 (2,977)	1,360 (2,999)	1,340 (2,955)	1,355 (2,988)
Maximum permissible axle weight (M.P.A.W.)	Front kgf (lb)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)
	Rear kgf (lb)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)
Maximum permissible weight (M.P.W.)	Total kgf (lb)	1,800 (3,969)	1,800 (3,969)	1,800 (3,969)	1,800 (3,969)	1,800 (3,969)	1,800 (3,969)	1,800 (3,969)	1,800 (3,969)
Option	Air conditioner	—	—	❍	❍	❍	❍	❍	❍
	Cruise control	—	—	—	—	—	—	—	—
	ABS	—	—	❍	❍	❍	❍	—	❍
	Aluminium wheel	—	—	❍	❍	—	—	❍	❍
	Rear spoiler	—	—	—	—	—	—	—	—
	Spoiler pac	—	—	—	—	—	—	—	—

D/R: Dual range
★1: For option code, refer to ID section. <Ref. to ID-5, Option code.>

Option code★1			EC	K4
Model			2.0 L Turbo	
			AWD	
			WRX	
			5MT	
Curb weight (C.W.)	Front	kgf (lb)	805 (1,775)	825 (1,819)
	Rear	kgf (lb)	585 (1,290)	585 (1,290)
	Total	kgf (lb)	1,390 (3,065)	1,410 (3,109)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	970 (2,138)	970 (2,138)
	Rear	kgf (lb)	950 (2,094)	950 (2,094)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,860 (4,101)	1,860 (4,101)
Option	Air conditioner		—	❍
	Cruise control		—	—
	ABS		❍	❍
	Aluminium wheel		—	—
	Rear spoiler		—	—
	Spoiler pac		—	—

D/R: Dual range
★1: For option code, refer to ID section. <Ref. to ID-5, Option code.>

2. RHD VEHICLE

Sedan

Option code★1			EK		K1	
Model			1.6 L			
			AWD			
			TS			
			5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front	kgf (lb)	735 (1,621)	755 (1,665)	750 (1,654)	770 (1,698)
	Rear	kgf (lb)	520 (1,146)	520 (1,146)	520 (1,146)	520 (1,146)
	Total	kgf (lb)	1,255 (2,767)	1,275 (2,811)	1,270 (2,800)	1,290 (2,844)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)
	Rear	kgf (lb)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)
Option	Air conditioner		—	—	❍	❍
	Cruise control		—	—	—	—
	ABS		❍	❍	—	—
	Aluminium wheel		—	—	—	—
	Rear spoiler		—	—	—	—
	Spoiler pac		❍	❍	—	—

Option code★1			EK		K1	
Model			2.0 L			
			AWD			
			GX			
			5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front	kgf (lb)	765 (1,687)	790 (1,742)	770 (1,698)	795 (1,753)
	Rear	kgf (lb)	535 (1,179)	530 (1,168)	535 (1,179)	530 (1,168)
	Total	kgf (lb)	1,300 (2,866)	1,320 (2,910)	1,305 (2,877)	1,325 (2,921)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)
	Rear	kgf (lb)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)
Option	Air conditioner		❍	❍	❍	❍
	Cruise control		—	—	—	—
	ABS		❍	❍	❍	❍
	Aluminium wheel		❍	❍	—	—
	Rear spoiler		❍	❍	—	—
	Spoiler pac		❍	❍	—	—

★1: For option code, refer to ID section. <Ref. to ID-5, Option code.>

Option code★1			KA						
Model			2.0 L		2.0 L Turbo		2.5 L		2.0 L Turbo
			AWD						
			GX		WRX		RS		STi
			5MT	4AT	5MT	4AT	5MT	4AT	6MT
Unladen mass (U.M.)	Front	kgf (lb)	750 (1,654)	775 (1,709)	830 (1,830)	855 (1,885)	780 (1,720)	805 (1,775)	895 (1,973)
	Rear	kgf (lb)	535 (1,179)	530 (1,168)	560 (1,235)	555 (1,224)	540 (1,191)	535 (1,179)	575 (1,268)
	Total	kgf (lb)	1,285 (2,833)	1,305 (2,877)	1,390 (3,065)	1,410 (3,109)	1,320 (2,910)	1,340 (2,954)	1,470 (3,241)
Gross vehicle mass (G.V.M.)	Front	kgf (lb)	920 (2,028)	920 (2,028)	970 (2,138)	970 (2,138)	930 (2,050)	930 (2,050)	1,030 (2,271)
	Rear	kgf (lb)	910 (2,006)	910 (2,006)	920 (2,028)	920 (2,028)	910 (2,006)	910 (2,006)	920 (2,028)
	Total	kgf (lb)	1,760 (3,880)	1,760 (3,880)	1,850 (4,079)	1,850 (4,079)	1,780 (3,924)	1,780 (3,924)	1,880 (4,145)
Option	Air conditioner		—	—	❍	❍	❍	❍	❍
	Cruise control		❍	❍	❍	❍	❍	❍	❍
	ABS		❍	❍	❍	❍	❍	❍	❍
	Aluminium wheel		—	—	—	—	—	—	—
	Rear spoiler		—	—	❍	❍	❍	❍	—
	Spoiler pac		—	—	—	—	—	—	—

Option code★1			EK	
Model			2.0 L Turbo	
			AWD	
			WRX	STi
			5MT	6MT
Curb weight (C.W.)	Front	kgf (lb)	830 (1,830)	895 (1,973)
	Rear	kgf (lb)	560 (1,235)	575 (1,268)
	Total	kgf (lb)	1,390 (3,065)	1,470 (3,241)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	970 (2,138)	1,030 (2,271)
	Rear	kgf (lb)	920 (2,028)	920 (2,028)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,850 (4,079)	1,880 (4,145)
Option	Air conditioner		❍	❍
	Cruise control		—	—
	ABS		❍	❍
	Aluminium wheel		—	—
	Rear spoiler		❍	—
	Spoiler pac		—	—

★1: For option code, refer to ID section. <Ref. to ID-5, Option code.>

Wagon

Option code★1			EK		K1	
Model			1.6 L			
			AWD			
			TS			
			D/R	4AT	D/R	4AT
Curb weight (C.W.)	Front	kgf (lb)	740 (1,631)	755 (1,664)	755 (1,664)	770 (1,698)
	Rear	kgf (lb)	545 (1,202)	545 (1,202)	545 (1,202)	545 (1,202)
	Total	kgf (lb)	1,285 (2,833)	1,300 (2,866)	1,300 (2,866)	1,315 (2,900)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	900 (1,984)	900 (1,984)	900 (1,984)	900 (1,984)
	Rear	kgf (lb)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)
Option	Air conditioner		—	—	❍	❍
	Cruise control		—	—	—	—
	ABS		❍	❍	—	—
	Aluminium wheel		—	—	—	—
	Rear spoiler		—	—	—	—
	Spoiler pac		—	—	—	—

Option code★1			EK		K1	
Model			2.0 L			
			AWD			
			GX			
			D/R	4AT	D/R	4AT
Curb weight (C.W.)	Front	kgf (lb)	775 (1,709)	790 (1,742)	780 (1,720)	795 (1,753)
	Rear	kgf (lb)	570 (1,257)	565 (1,246)	570 (1,257)	565 (1,246)
	Total	kgf (lb)	1,345 (2,965)	1,355 (2,987)	1,350 (2,977)	1,360 (2,999)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)
	Rear	kgf (lb)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,800 (3,968)	1,800 (3,968)	1,800 (3,968)	1,800 (3,968)
Option	Air conditioner		❍	❍	❍	❍
	Cruise control		—	—	—	—
	ABS		❍	❍	❍	❍
	Aluminium wheel		❍	❍	—	—
	Rear spoiler		—	—	—	—
	Spoiler pac		❍	❍	—	—

D/R: Dual range
★1: For option code, refer to ID section. <Ref. to ID-5, Option code.>

Option code★1			KA					
Model			2.0 L				2.0 L Turbo	
			AWD					
			GX		OUTBACK		WRX	
			D/R	4AT	D/R	4AT	5MT	4AT
Unladen mass (U.M.)	Front	kgf (lb)	760 (1,676)	775 (1,709)	750 (1,653)	765 (1,687)	825 (1,819)	850 (1,874)
	Rear	kgf (lb)	570 (1,257)	565 (1,246)	570 (1,257)	570 (1,257)	585 (1,290)	585 (1,290)
	Total	kgf (lb)	1,330 (2,932)	1,340 (2,954)	1,320 (2,910)	1,335 (2,943)	1,410 (3,109)	1,435 (3,164)
Gross vehicle mass (G.V.M.)	Front	kgf (lb)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	970 (2,138)	970 (2,138)
	Rear	kgf (lb)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)	950 (2,094)	950 (2,094)
	Total	kgf (lb)	1,800 (3,968)	1,800 (3,968)	1,800 (3,968)	1,800 (3,968)	1,860 (4,101)	1,860 (4,101)
Option	Air conditioner		—	—	—	—	❍	❍
	Cruise control		❍	❍	❍	❍	❍	❍
	ABS		❍	❍	❍	❍	❍	❍
	Aluminium wheel		—	—	—	—	—	—
	Rear spoiler		—	—	—	—	—	—
	Spoiler pac		—	—	—	—	—	—

Option code★1			EK
Model			2.0 L Turbo
			AWD
			WRX
			5MT
Curb weight (C.W.)	Front	kgf (lb)	825 (1,819)
	Rear	kgf (lb)	585 (1,290)
	Total	kgf (lb)	1,410 (3,109)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	970 (2,138)
	Rear	kgf (lb)	950 (2,094)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,860 (4,101)
Option	Air conditioner		❍
	Cruise control		—
	ABS		❍
	Aluminium wheel		—
	Rear spoiler		—
	Spoiler pac		—

D/R: Dual range
★1: For option code, refer to ID section. <Ref. to ID-5, Option code.>

IDENTIFICATION

ID

1. Identification

A: IDENTIFICATION

2. MEANING OF V.I.N.

The meaning of the VIN is as follows:

• Europe, Australia and General (Except GCC)

]JF1GD5LJ32G002001[

The starting and ending brackets ( ][ ) are stop marks.

Digits	Code	Meaning	Details
1 to 3	JF1	Manufacturer body area	JF1: Passenger car, FHI made
4	G	Car line	IMPREZA
5	D	Body type	D: 4 Door Sedan G: Wagon
6	5	Displacement	5: 1.6 L AWD 9: 2.0 L AWD A: 2.0 L AWD Turbo B: 2.0 L AWD High-power Turbo E: 2.5 L AWD
7	L	Steering position	K: RHD (Right-hand drive) L: LHD (Left-hand drive)
8	J	Engine & transmission	R: SOHC MPI 4-speed AT J: SOHC MPI Full-time AWD 5-speed MT K: SOHC MPI Full-time AWD 5-speed MT Dual range D: DOHC Turbo Full-time AWD 5-speed MT H: DOHC Turbo Full-time AWD 6-speed MT P: DOHC Turbo 4-speed AT
9	3	Drive type	3: Full-time AWD Single range 4: Full-time AWD Dual range 5: AWD AT
10	2	Model year	2: 2002MY 3: 2003MY
11	G	Factory location	G: FHI (Gunma)
12 to 17	002001	Serial number	—

• GCC countries (Saudi Arabia, etc.)

]JF1GD45MX2G002001[

The starting and ending brackets ( ][ ) are stop marks.

Digits	Code	Meaning	Details
1 to 3	JF1	Manufacturer body area	JF1: Passenger car, FHI made
4	G	Car line	IMPREZA
5	D	Body type	D: 4 Door Sedan G: Wagon
6	4	Displacement	4: 1.6 L AWD 8: 2.0 L AWD
7	5	Grade	5: TS 7: GX
8	M	Restraint	M: Manual belts, dual airbag
9	X	Check digit	—
10	2	Model year	2: 2002MY 3: 2003MY
11	G	Transmission type	G: Full-time AWD 5-speed MT single range H: Full-time AWD 4-speed AT J: Full-time AWD 5-speed MT dual range
12 to 17	002001	Serial number	—

3. MODEL NUMBER PLATE

The model number plate indicates: the applied model, the option code, the trim code, the engine type, the transmission type, and the exterior color code. This information is helpful when placing orders for parts.

GD9BL7R

Digits	Code	Meaning	Details
1	G	Series	IMPREZA
2	D	Body style	D: 4 Door Sedan G: Wagon
3	9	Engine displacement Drive system Suspension system	5: 1.6 L AWD 9: 2.0 L AWD A: 2.0 L AWD Turbo B: 2.0 L AWD High-power Turbo E: 2.5 L AWD
4	B	Minor change	2002MY
5	L	Destination	K: Right-hand drive market L: Left-hand drive market
6	7	Grade	4: TS 5: GX 6: RS 7: OUTBACK 8: WRX E: STi
7	R	Transmission, fuel feed system	R: SOHC MPI 4-speed AT J: SOHC MPI 5-speed MT AWD K: SOHC MPI 5-speed MT Dual range P: DOHC B MPI 4-speed AT D: DOHC B MPI 5-speed MT AWD H: DOHC B MPI 6-speed MT AWD

The engine and transmission type are as follows:

- **Engine**

EJ161RX3AA

Digits	Code	Meaning	Details
1 and 2	EJ	Engine type	EJ: 4 cylinders
3 and 4	16	Displacement	16: 1.6 L 20: 2.0 L 25: 2.5 L
5	1	Fuel feed system	1: D-MPI SOHC-A 5: MPI Turbo 7: MPI High-power Turbo
6	R	Detailed specifications	Used when ordering parts. See the parts catalog for details.
7	X	Transmission	W: MT X: AT
8 to 10	3AA	Detailed specifications	Used when ordering parts. See the parts catalog for details.

• Transmission

TY856WN2AA

Digits	Code	Meaning	Details	
1	T	Transmission	T: Transmission	
2	Y	Transmission type	Y: Full-time AWD MT center differential V: Full-time AWD AT center differential Z: Full-time AWD AT MPT	
3 and 4	85	Classification	75: 5MT 85: 6MT 1B: AT	
5	6	Series	MT	4: 5MT 6: 6MT
			AT	4: AT
6	W	Transmission specifications	V: Full-time AWD 5-speed MT with viscous coupling center differential single range X: Full-time AWD 5-speed MT with viscous coupling center differential dual range W: Full-time AWD 6-speed MT with viscous coupling center differential single range Z: Full-time AWD 4-speed AT with MPT Y: Full-time AWD 4-speed AT with VTD	
7 to 10	N2AA	Detailed specifications	Used when ordering parts. See the parts catalog for details.	

• Rear differential 1

VA1REJ

Digits	Code	Meaning	Details
1	V	For AWD	V: AWD
2	A	Type	A: A type
3	1	Hypoid gear diameter mm (in)	1: 152 (6.0) dia. 2: 160 (6.3) dia.
4	R	Installation position	R: Rear
5	E	Reduction gear ratio	B: 3.900 E: 4.111 F: 4.444
6	J	Specification differences	J: Case B

• Rear differential 2

EG

Code	Reduction gear ratio	LSD
EG	3.900	No
ER	3.700	Viscous
EM	4.444	SURETRAC®
EJ	4.111	Viscous
EF	3.545	Viscous
HG	3.500	SURETRAC®
HJ	3.545	SURETRAC®

• Option code

ECPS

Digits	Code	Meaning	Details
1 to 2	EC	Destination	EC: EC KO: KO K4: K4 KS: KS EK: EK KA: KA K1: K1
3 to 4	PS	Main option of vehicle	—

ENGINE 2 SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD. G1841GE3

FUEL INJECTION (FUEL SYSTEMS)

FU(TURBO)

13. Tumble Generator Valve Assembly

A: REMOVAL

2. STI MODEL

NOTE:
Tumble generator valve actuator and sensor are not applied to STi model.

B: INSTALLATION

2. STI MODEL

NOTE:
Tumble generator valve actuator and sensor are not applied to STi model.

14.Tumble Generator Valve Actuator

A: REMOVAL

3. STI MODEL

NOTE:
Tumble generator valve actuator is not applied to STi model.

B: INSTALLATION

3. STI MODEL

NOTE:
Tumble generator valve actuator is not applied to STi model.

18.Exhaust Temperature Sensor

A: REMOVAL

2. STI MODEL

NOTE:
Exhaust temperature sensor is not applied to STi model.

B: INSTALLATION

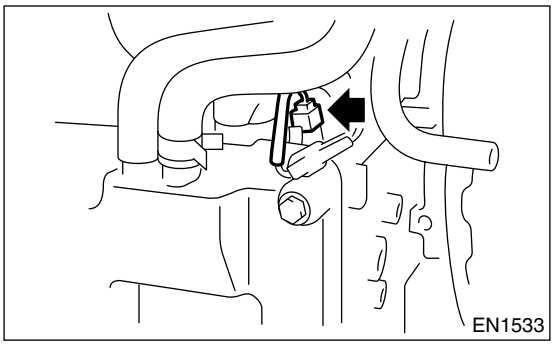
2. STI MODEL

NOTE:
Exhaust temperature sensor is not applied to STi model.

34. Variable Valve Timing Camshaft Positon Sensor

A: REMOVAL

1) Disconnect the ground cable from battery.
2) Remove the intercooler. <Ref. to IN(TURBO)-10, REMOVAL, Intercooler.>
3) Remove the intake manifold. <Ref. to FU(TURBO)-15, REMOVAL, Intake Manifold.>
4) Disconnect the variable valve timing camshaft position sensor connector.
5) Remove the variable valve timing camshaft position sensor.



B: INSTALLATION

Install in the reverse order of removal.

35. Variable Valve Timing Solenoid Valve

A: REMOVAL

Refer to following procedure for removal. <Ref. to ME(STi)-59, REMOVAL, Camshaft.>

B: INSTALLATION

Install in the reverse order of removal.

EMISSION CONTROL
(AUX. EMISSION CONTROL DEVICES)
EC(TURBO)

Page

4. Precatalytic Converter

A: REMOVAL

2. STI MODEL

NOTE:
Precatalytic converter is not applied to STi model.

B: INSTALLATION

2. STI MODEL

NOTE:
Precatalytic converter is not applied to STi model.

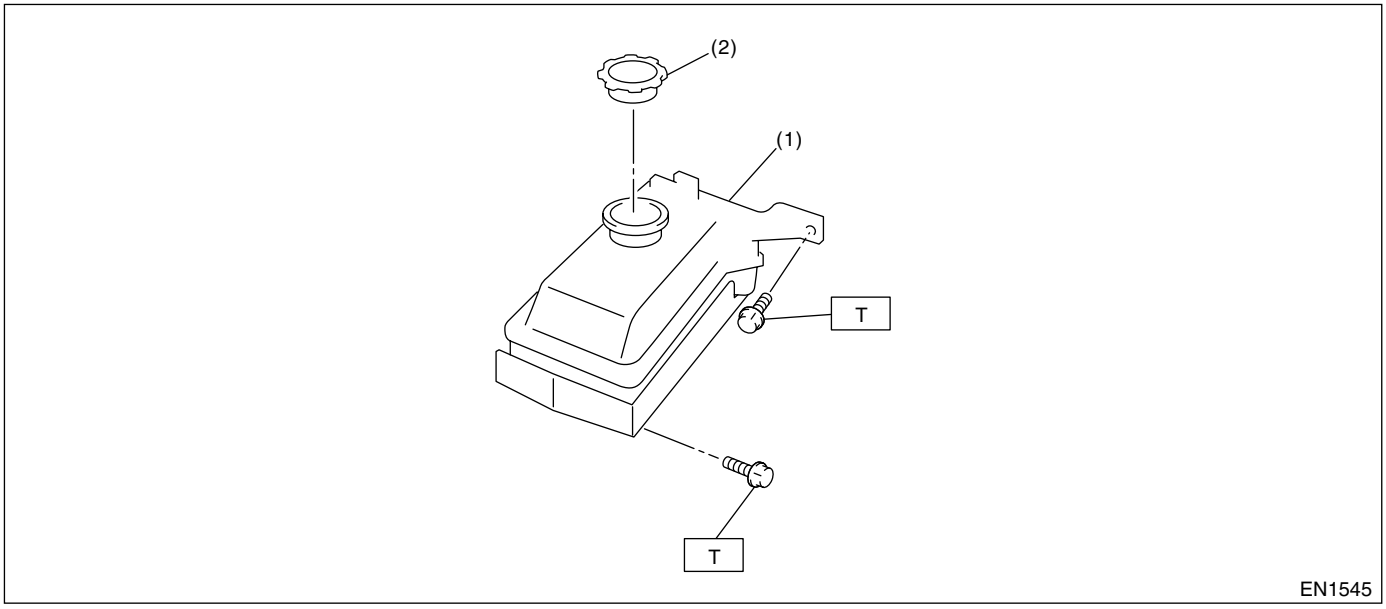
INTAKE (INDUCTION)

IN(TURBO)

1. General Description

A: COMPONENT

5. INTERCOOLER WATER TANK



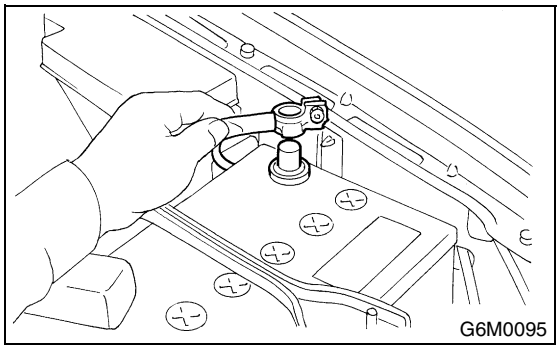
(1) Water tank assembly
(2) Water tank cap

Tightening torque: N·m (kgf-m, ft-lb)
T: 6.0 (0.61, 4.4)

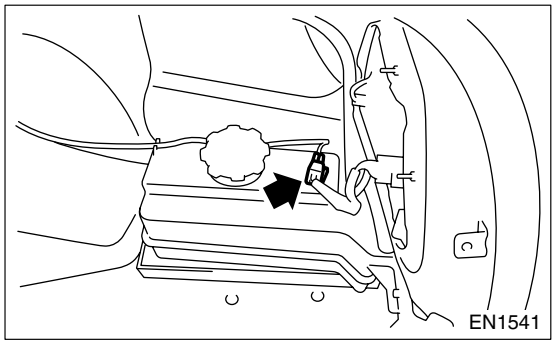
9. Intercooler Water Tank

A: REMOVAL

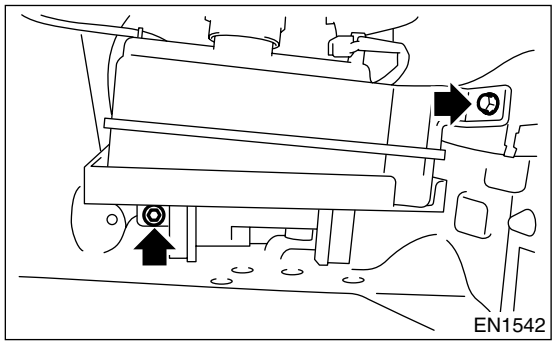
1) Disconnect the ground cable from battery.



2) Remove the trunk trim. <Ref. to EI-52, REMOVAL, Trunk Trim.>
3) Disconnect the water tank connector.



4) Remove the two water tank installation bolts.



5) Remove the hose between body and water tank, then remove the water tank.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
6.0 N·m (0.61 kgf-m, 4.4 ft-lb)

C: INSPECTION

1) Make sure the hose is not deformed, damaged, cracked or clogged.
2) Make sure the water tank is not damaged or cracked

MECHANICAL

ME(STi)

1. General Description

A: SPECIFICATIONS

Engine	Type		Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gasoline engine	
	Valve arrangement		Belt driven, double overhead camshaft, 4-valve/cylinder	
	Bore x Stroke mm (in)		92 x 75 (3.62 x 2.95)	
	Piston displacement cm^3 (cu in)		1,994 (121.67)	
	Compression ratio		8.0	
	Compression pressure (at 200 — 300 rpm) kPa (kg/cm^2, psi)		981 — 1,177 (10 — 12, 142 — 171)	
	Number of piston rings		Pressure ring: 2, Oil ring: 1	
	Intake valve timing	Opening	Max. retard	ATDC 6°
			Min. advance	BTDC 29°
		Closing	Max. retard	ABDC 68°
			Min. advance	ABDC 33°
	Exhaust valve timing	Opening	58° BBDC	
		Closing	10° ATDC	
	Valve clearance	Intake mm (in)	0.20±0.02 (0.0079±0.0008)	
		Exhaust mm (in)	0.25±0.02 (0.0098±0.0008)	
	Idling speed [At neutral position] rpm		700±50 (No load) 750±50 (A/C switch ON)	
	Firing order		1 → 3 → 2 → 4	
	Ignition timing BTDC/rpm		12°±3°/700 rpm	

NOTE:
STD: Standard I.D.: Inner Diameter O.D.: Outer Diameter OS: Oversize US: Undersize

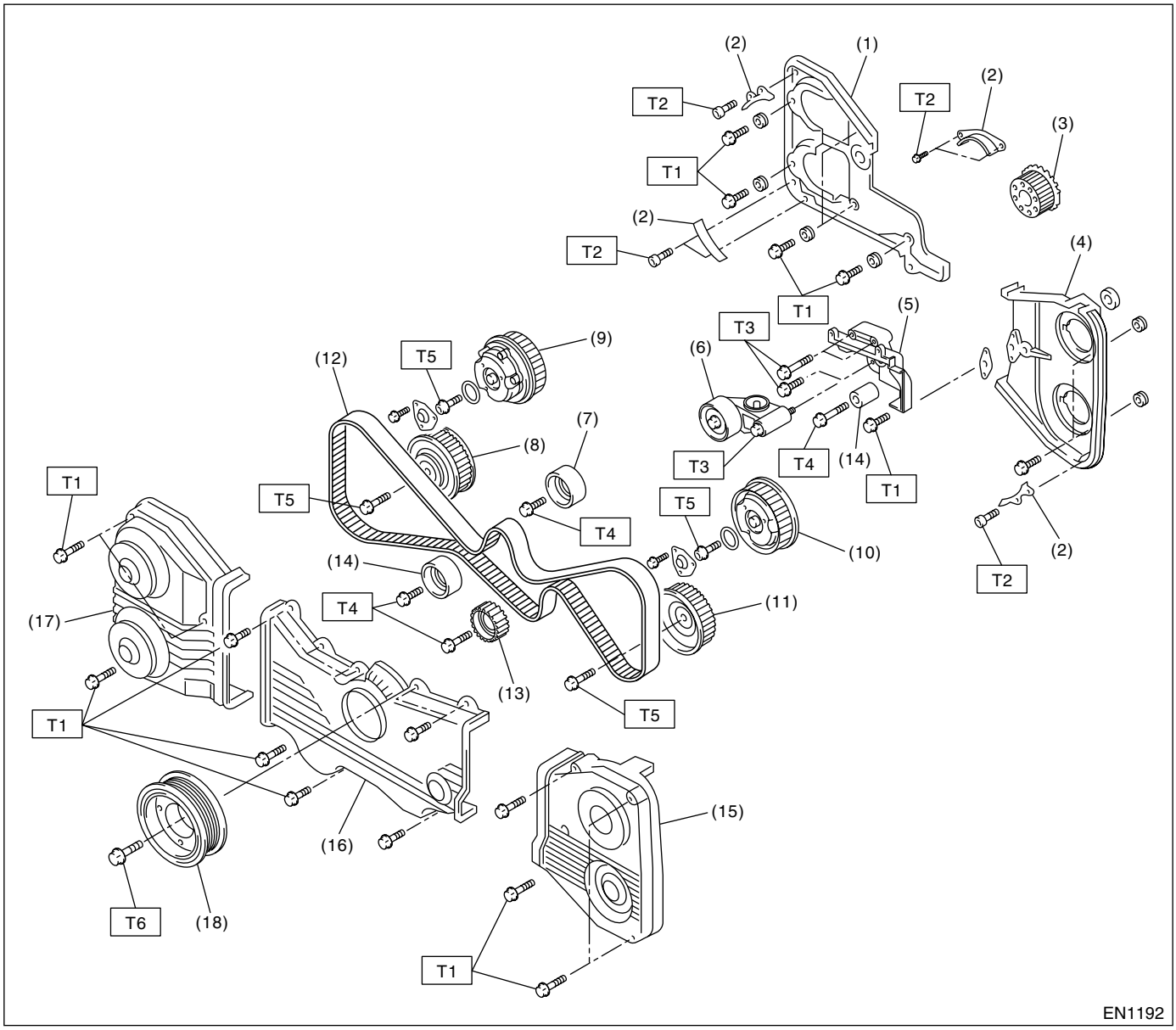
Belt tension adjuster	Protrusion of adjuster rod			5.2 — 6.2 mm (0.205 — 0.244 in)
Belt tensioner	Spacer O.D.			17.955 — 17.975 mm (0.7069 — 0.7077 in)
	Tensioner bush I.D.			18.0 — 18.08 mm (0.7087 — 0.7118 in)
	Clearance between spacer and bush		STD	0.025 — 0.125 mm (0.0010 — 0.0049 in)
			Limit	0.175 mm (0.0069 in)
	Side clearance of spacer		STD	0.2 — 0.55 mm (0.0079 — 0.0217 in)
			Limit	0.81 mm (0.0319 in)
Camshaft	Bend limit			0.020 mm (0.0079 in)
	Thrust clearance		STD	0.015 — 0.070 mm (0.0006 — 0.0028 in)
			Limit	0.10 mm (0.0039 in)
	Cam lobe height	Intake	STD	45.25 — 45.35 mm (1.781 — 1.785 in)
			Limit	45.15 mm (1.778 in)
		Exhaust	STD	45.60 — 45.70 mm (1.795 — 1.799 in)
			Limit	45.50 mm (1.791 in)
	Journal O.D.	STD	Front	37.946 — 37.963 mm (1.4939 — 1.4946 in)
			Center rear	29.946 — 29.963 mm (1.1790 — 1.1796 in)
	Oil clearance		STD	0.037 — 0.072 mm (0.0015 — 0.0028 in)
			Limit	0.10 mm (0.0039 in)
Cylinder head	Surface warpage limit			0.05 mm (0.0020 in)
	Surface grinding limit			0.1 mm (0.004 in)
	Standard height			127.5 mm (5.02 in)
Valve seat	Refacing angle			90°
	Contacting width	Intake	STD	1.0 mm (0.039 in)
			Limit	1.7 mm (0.067 in)
		Exhaust	STD	1.5 mm (0.059 in)
			Limit	2.2 mm (0.087 in)
Valve guide	Inner diameter			6.000 — 6.012 mm (0.2362 — 0.2367 in)
	Protrusion above head			12.0 — 12.4 mm (0.472 — 0.488 in)
Valve	Head edge thickness	Intake	STD	1.2 mm (0.047 in)
			Limit	0.8 mm (0.031 in)
		Exhaust	STD	1.5 mm (0.059 in)
			Limit	0.8 mm (0.031 in)
	Stem diameter		Intake	5.962 — 5.970 mm (0.2347 — 0.2350 in)
			Exhaust	5.945 — 5.960 mm(0.2341 — 0.2346 in)
	Stem oil clearance	STD	Intake	0.030 — 0.050 mm (0.0012 — 0.0020 in)
			Exhaust	0.040 — 0.050 mm (0.0016 — 0.0020 in)
		Limit	—	0.15 mm (0.0059 in)
	Overall length		Intake	104.4 mm (4.110 in)
			Exhaust	104.7 mm (4.122 in)
Valve spring	Free length			43.89 mm (1.7279 in)
	Squareness			2.5°, 1.9 mm (0.075 in)
	Tension/spring height		Set	220.7±15.7 N (22.5±1.6 kgf, 49.6±3.5 lb)/36.0 mm (1.417 in)
			Lift	582±29 N (59.3±3.0 kgf, 130.8±6.5 lb)/24.65 mm (0.970 in)

Cylinder block	Surface warpage limit (mating with cylinder head)			0.05 mm (0.0020 in)
	Surface grinding limit			0.1 mm (0.004 in)
	Cylinder bore	STD	A	92.005 — 92.015 mm (3.6222 — 3.6226 in)
			B	91.995 — 92.005 mm (3.6218 — 3.6222 in)
	Taper		STD	0.015 mm (0.0006 in)
			Limit	0.050 mm (0.0020 in)
	Out-of-roundness		STD	0.010 mm (0.0004 in)
			Limit	0.050 mm (0.0020 in)
	Piston clearance		STD	0.010 — 0.030 mm (0.0004 — 0.0012 in)
			Limit	0.050 mm (0.0020 in)
	Enlarging (boring) limit			0.5 mm (0.020 in)
Piston	Outer diameter	STD	A	91.985 — 91.995 mm (3.6214 — 3.6218 in)
			B	91.975 — 91.985 mm (3.6211 — 3.6214 in)
		0.25 mm (0.0098 in) OS		92.225 — 92.235 mm (3.6309 — 3.6313 in)
		0.50 mm (0.0197 in) OS		92.475 — 92.485 mm (3.6407 — 3.6411 in)
Piston pin	Standard clearance between piston pin and hole in piston		STD	0.004 — 0.008 mm (0.0002 — 0.0003 in)
			Limit	0.020 mm (0.0008 in)
	Degree of fit			Piston pin must be fitted into position with thumb at 20°C (68°F).
Piston ring	Piston ring gap	Top ring	STD	0.20 — 0.25 mm (0.0079 — 0.0098 in)
			Limit	1.0 mm (0.039 in)
		Second ring	STD	0.35 — 0.50 mm (0.0138 — 0.0197 in)
			Limit	1.0 mm (0.039 in)
		Oil ring	STD	0.20 — 0.50 mm (0.0079 — 0.0197 in)
			Limit	1.5 mm (0.059 in)
	Clearance between piston ring and piston ring groove	Top ring	STD	0.040 — 0.080 mm (0.0016 — 0.0031 in)
			Limit	0.15 mm (0.0059 in)
		Second ring	STD	0.030 — 0.070 mm (0.0012 — 0.0028 in)
			Limit	0.15 mm (0.0059 in)
Connecting rod	Bend twist per 100 mm (3.94 in) in length		Limit	0.10 mm (0.0039 in)
	Side clearance		STD	0.070 — 0.330 mm (0.0028 — 0.0130 in)
			Limit	0.4 mm (0.016 in)
Connecting rod bearing	Oil clearance		STD	0.020 — 0.046 mm (0.0008 — 0.0018 in)
			Limit	0.05 mm (0.0020 in)
	Thickness at center portion		STD	1.486 — 1.498 mm (0.0585 — 0.0590 in)
			0.03 mm (0.0012 in) US	1.505 — 1.509 mm (0.0593 — 0.0594 in)
			0.05 mm (0.0020 in) US	1.515 — 1.519 mm (0.0596 — 0.0598 in)
			0.25 mm (0.0098 in) US	1.615 — 1.619 mm (0.0636 — 0.0637 in)
Connecting rod bushing	Clearance between piston pin and bushing		STD	0 — 0.022 mm (0 — 0.0009 in)
			Limit	0.030 mm (0.0012 in)

Crankshaft	Bend limit			0.035 mm (0.0014 in)
	Crank pin and crank journal	Out-of-roundness		0.020 mm (0.0008 in) or less
		Grinding limit		0.25 mm (0.0098 in)
	Crank pin outer diameter		STD	51.984 — 52.000 mm (2.0466 — 2.0472 in)
			0.03 mm (0.0012 in) US	51.954 — 51.970 mm (2.0454 — 2.0461 in)
			0.05 mm (0.0020 in) US	51.934 — 51.950 mm (2.0446 — 2.0453 in)
			0.25 mm (0.0098 in) US	51.734 — 51.750 mm (2.0368 — 2.0374 in)
	Crank journal outer diameter	#1, #3, #5	STD	59.992 — 60.008 mm (2.3619 — 2.3625 in)
			0.03 mm (0.0012 in) US	59.962 — 59.978 mm (2.3607 — 2.3613 in)
			0.05 mm (0.0020 in) US	59.942 — 59.958 mm (2.3599 — 2.3605 in)
			0.25 mm (0.0098 in) US	59.742 — 59.758 mm (2.3520 — 2.3527 in)
		#2, #4	STD	59.992 — 60.008 mm (2.3619 — 2.3625 in)
			0.03 mm (0.0012 in) US	59.962 — 59.978 mm (2.3607 — 2.3613 in)
			0.05 mm (0.0020 in) US	59.942 — 59.958 mm (2.3599 — 2.3605 in)
			0.25 mm (0.0098 in) US	59.742 — 59.758 mm (2.3520 — 2.3527 in)
	Thrust clearance		STD	0.030 — 0.115 mm (0.0012 — 0.0045 in)
			Limit	0.25 mm (0.0098 in)
	Oil clearance		STD	0.010 — 0.030 mm (0.0004 — 0.0012 in)
			Limit	0.040 mm (0.0016 in)
Crankshaft bearing	Crankshaft bearing thickness	#1, #3	STD	1.998 — 2.011 mm (0.0787 — 0.0792 in)
			0.03 mm (0.0012 in) US	2.017 — 2.020 mm (0.0794 — 0.0795 in)
			0.05 mm (0.0020 in) US	2.027 — 2.030 mm (0.0798 — 0.0799 in)
			0.25 mm (0.0098 in) US	2.127 — 2.130 mm (0.0837 — 0.0839 in)
		#2, #4, #5	STD	2.000 — 2.013 mm (0.0787 — 0.0793 in)
			0.03 mm (0.0012 in) US	2.019 — 2.022 mm (0.0795 — 0.0796 in)
			0.05 mm (0.0020 in) US	2.029 — 2.032 mm (0.0799 — 0.0800 in)
			0.25 mm (0.0098 in) US	2.129 — 2.132 mm (0.0838 — 0.0839 in)

B: COMPONENT

1. TIMING BELT

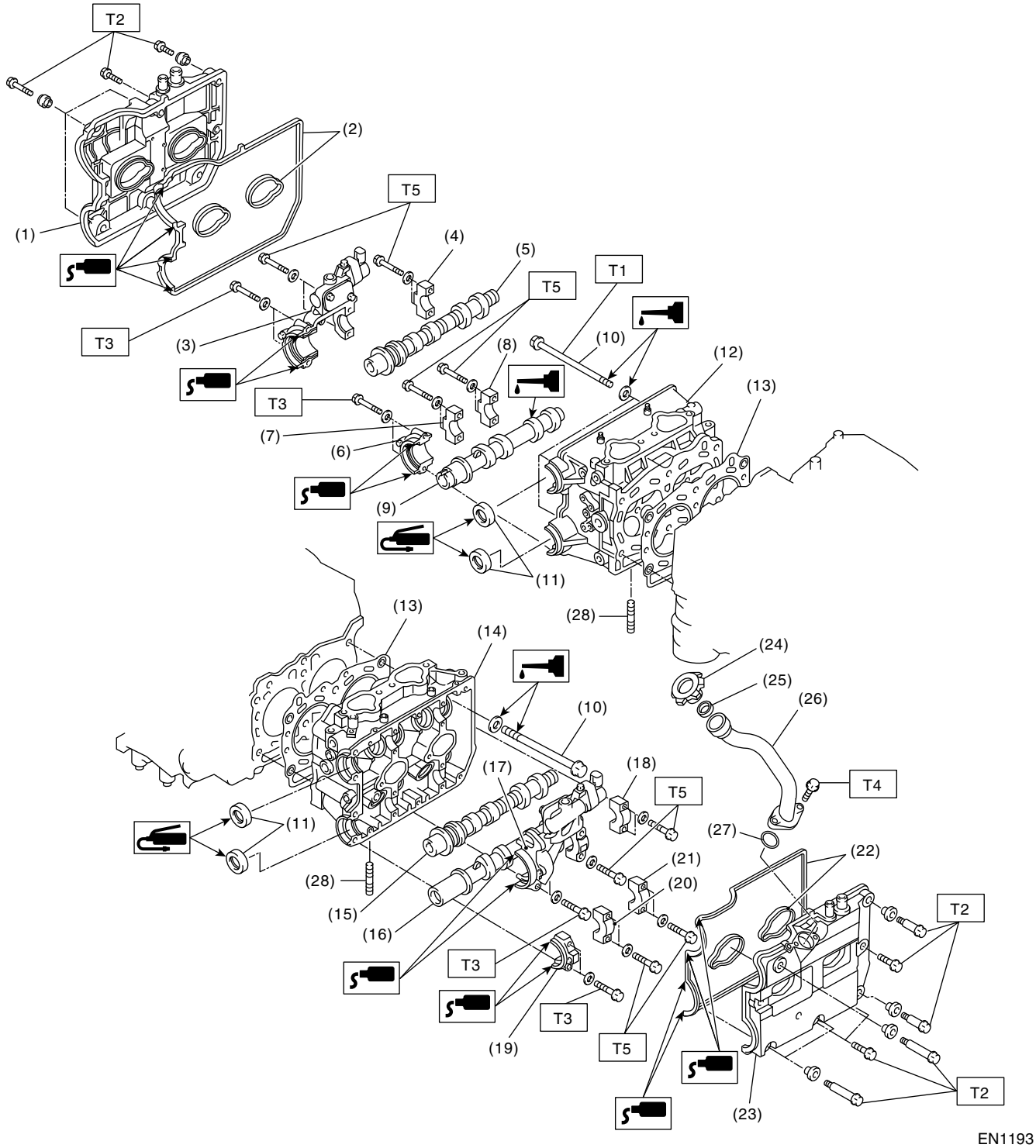


(1) Right-hand belt cover No. 2
(2) Timing belt guide
(3) Crankshaft sprocket
(4) Left-hand belt cover No. 2
(5) Tensioner bracket
(6) Automatic belt tension adjuster ASSY
(7) Belt idler
(8) Right-hand exhaust camshaft sprocket
(9) Right-hand intake camshaft sprocket
(10) Left-hand intake camshaft sprocket
(11) Left-hand exhaust camshaft sprocket
(12) Timing belt
(13) Belt idler No. 2
(14) Belt idler
(15) Left-hand belt cover
(16) Front belt cover
(17) Right-hand belt cover
(18) Crankshaft pulley

Tightening torque: N·m (kgf-m, ft-lb)

T1: 5 (0.5, 3.6)
T2: 10 (1.0, 7)
T3: 25 (2.5, 18.1)
T4: 39 (4.0, 28.9)
T5: 98 (10, 72.4)
T6: <Ref. to ME(STi)-45, Installation, Crankshaft Pulley.>

2. CYLINDER HEAD AND CAMSHAFT

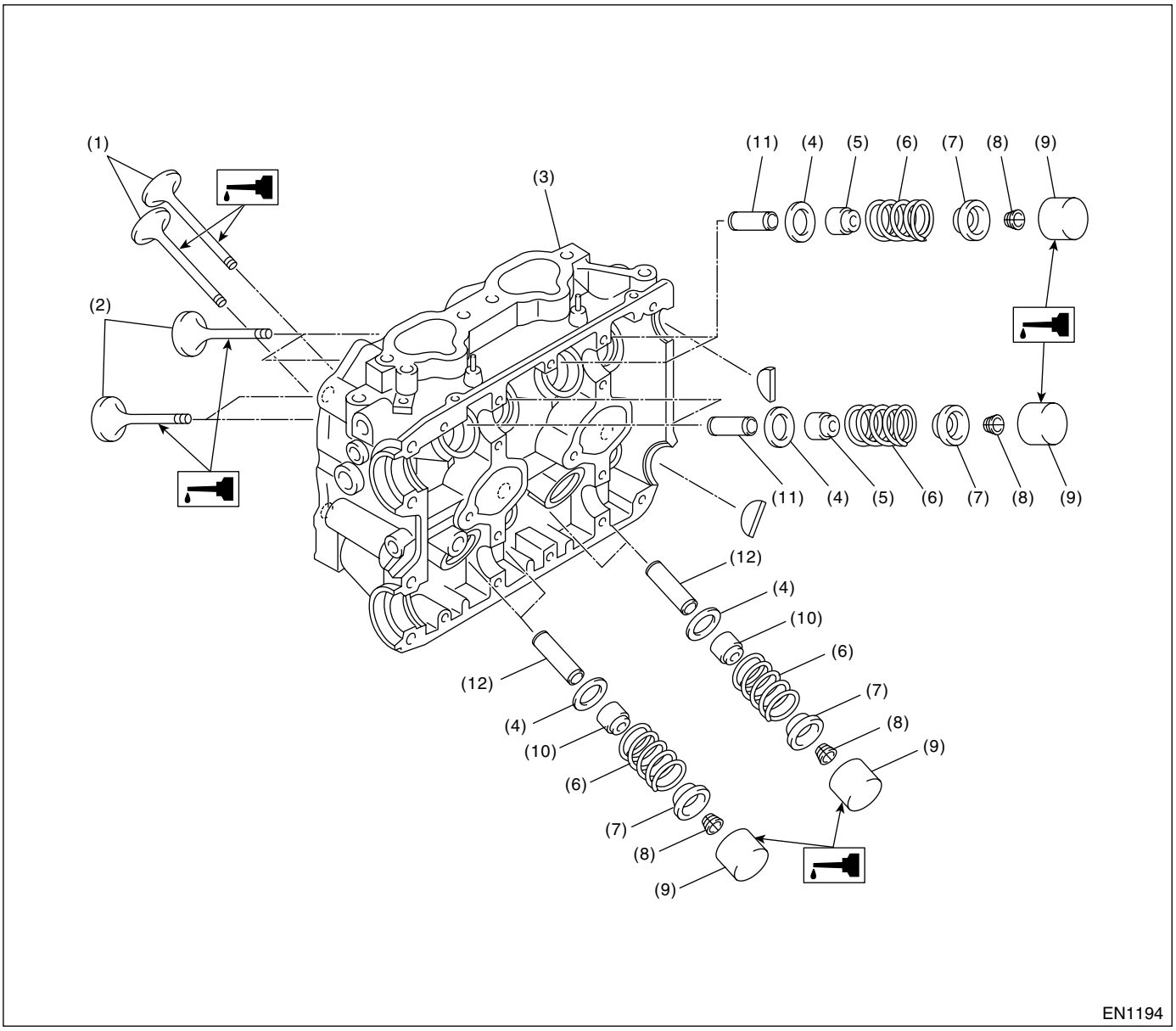


(1) Rocker cover (RH)
(2) Rocker cover gasket (RH)
(3) Variable valve timing solenoid valve assembly (RH)
(4) Intake camshaft cap (RH)
(5) Intake camshaft (RH)
(6) Exhaust camshaft cap (Front RH)
(7) Exhaust camshaft cap (Center RH)
(8) Exhaust camshaft cap (Rear RH)
(9) Exhaust camshaft (RH)
(10) Cylinder head bolt
(11) Oil seal
(12) Cylinder head (RH)
(13) Cylinder head gasket
(14) Cylinder head (LH)
(15) Intake camshaft (LH)
(16) Exhaust camshaft (LH)
(17) Variable valve timing solenoid valve assembly (LH)
(18) Intake camshaft cap (LH)
(19) Exhaust camshaft cap (Front LH)
(20) Exhaust camshaft cap (Center LH)
(21) Exhaust camshaft cap (Rear LH)
(22) Rocker cover gasket (LH)
(23) Rocker cover (LH)
(24) Oil filler cap
(25) Gasket
(26) Oil filler duct
(27) O-ring
(28) Stud bolt

Tightening torque: N·m (kgf-m, ft-lb)

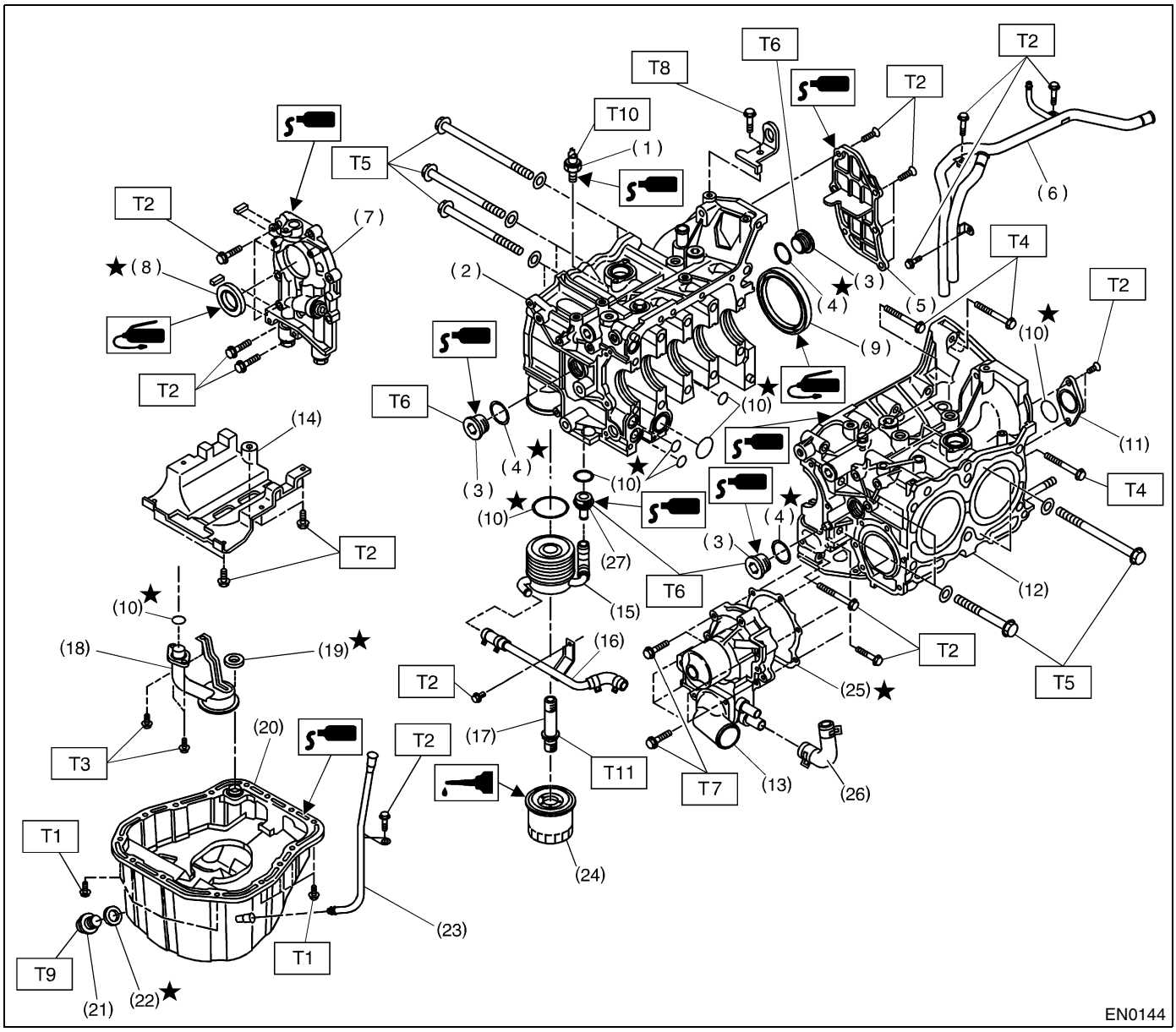
T1: <Ref. to ME(STi)-65, Installation, Cylinder Head Assembly.>
T2: 5 (0.5, 3.6)
T3: 10 (1.0, 7)
T4: 6.4 (0.65, 4.7)
T5: 20 (2.0, 14.5)

3. CYLINDER HEAD AND VALVE ASSEMBLY



(1) Exhaust valve
(2) Intake valve
(3) Cylinder head
(4) Valve spring seat
(5) Intake valve oil seal
(6) Valve spring
(7) Retainer
(8) Retainer key
(9) Valve lifter
(10) Exhaust valve oil seal
(11) Intake valve guide
(12) Exhaust valve guide

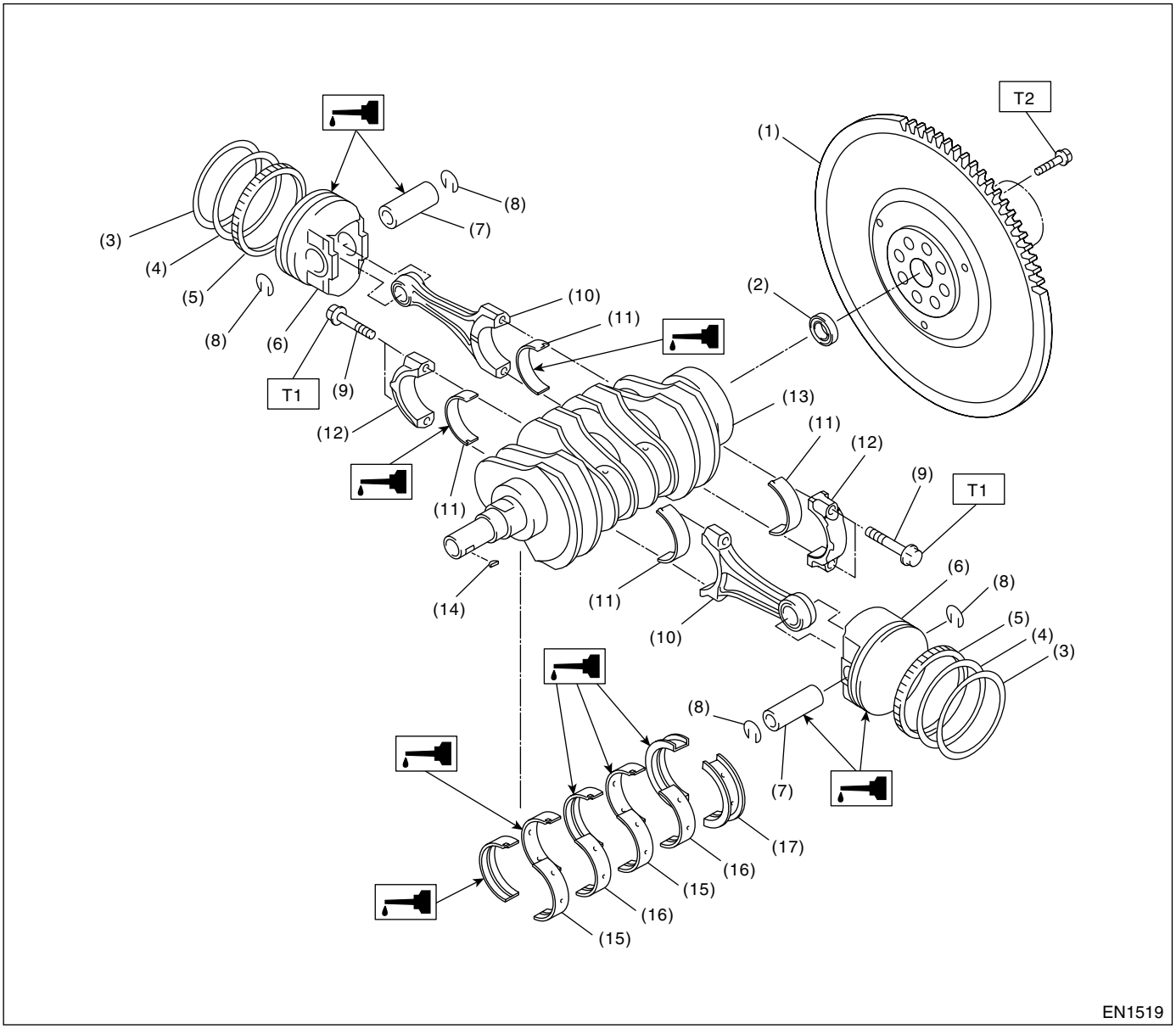
4. CYLINDER BLOCK



(1) Oil pressure switch
(2) Cylinder block (RH)
(3) Service hole plug
(4) Gasket
(5) Oil separator cover
(6) Water by-pass pipe
(7) Oil pump
(8) Front oil seal
(9) Rear oil seal
(10) O-ring
(11) Service hole cover
(12) Cylinder block (LH)
(13) Water pump
(14) Baffle plate
(15) Oil cooler
(16) Waster by-pass pipe
(17) Connector
(18) Oil strainer
(19) Gasket
(20) Oil pan
(21) Drain plug
(22) Metal gasket
(23) Oil level gauge guide
(24) Oil filter
(25) Gasket
(26) Water pump hose
(27) Plug

Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.6)
T2: 6.4 (0.65, 4.7)
T3: 10 (1.0, 7)
T4: 25 (2.5, 18.1)
T5: 47 (4.8, 34.7)
T6: 69 (7.0, 50.6)
T7: First 12 (1.2, 8.7)
Second 12 (1.2, 8.7)
T8: 16 (1.6, 11.6)
T9: 44 (4.5, 33)
T10: 25 (2.5, 18.1)
T11: 55 (5.5, 40)

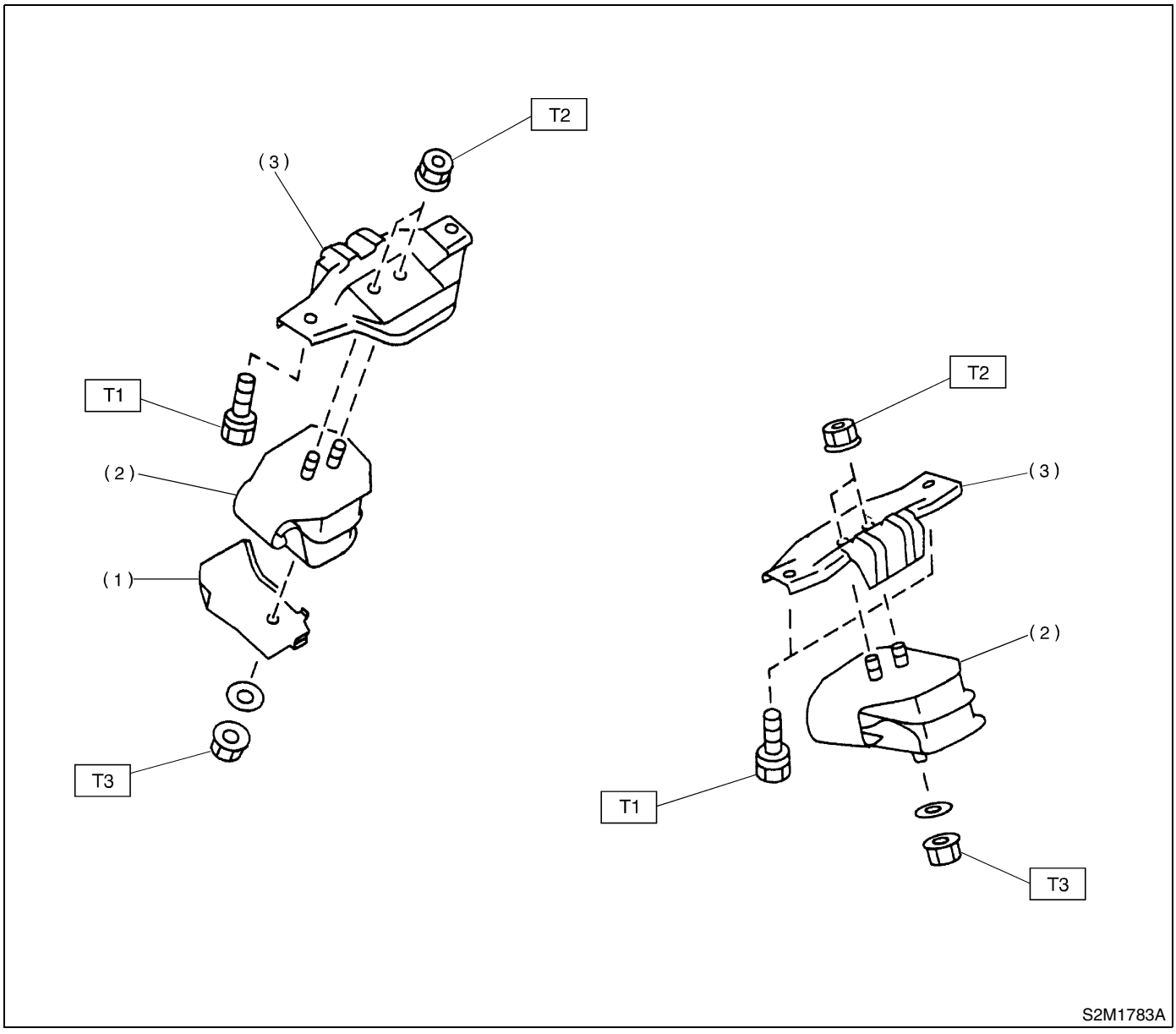
5. CRANKSHAFT AND PISTON



(1) Flywheel
(2) Ball bearing
(3) Top ring
(4) Second ring
(5) Oil ring
(6) Piston
(7) Piston pin
(8) Circlip
(9) Connecting rod bolt
(10) Connecting rod
(11) Connecting rod bearing
(12) Connecting rod cap
(13) Crankshaft
(14) Woodruff key
(15) Crankshaft bearing #1, #3
(16) Crankshaft bearing #2, #4
(17) Crankshaft bearing #5

Tightening torque: N·m (kgf-m, ft-lb)
T1: 52 (5.3, 38.4)
T2: 72 (7.3, 52.8)

6. ENGINE MOUNTING



(1) Heat shield cover
(2) Front cushion rubber
(3) Front engine mounting bracket

Tightening torque: N·m (kgf-m, ft-lb)
T1: 35 (3.6, 25.8)
T2: 42 (4.3, 30.9)
T3: 85 (8.7, 62.7)

C: CAUTION

• Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
• Remove contamination including dirt and corrosion before removal, installation or disassembly.
• Keep the disassembled parts in order and protect them from dust or dirt.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
• Be careful not to burn your hands, because each part in the vehicle is hot after running.
• Be sure to tighten fasteners including bolts and nuts to the specified torque.
• Place shop jacks or safety stands at the specified points.
• Before disconnecting electrical connectors of sensors or units, be sure to disconnect negative terminal from battery.
• All parts should be thoroughly cleaned, paying special attention to the engine oil passages, pistons and bearings.
• Rotating parts and sliding parts such as piston, bearing and gear should be coated with oil prior to assembly.
• Be careful not to let oil, grease or coolant contact the timing belt, clutch disc and flywheel.
• All removed parts, if to be reused, should be reinstalled in the original positions and directions.
• Bolts, nuts and washers should be replaced with new ones as required.
• Even if necessary inspections have been made in advance, proceed with assembly work while making rechecks.
• Remove or install engine in an area where chain hoists, lifting devices, etc. are available for ready use.
• Be sure not to damage coated surfaces of body panels with tools or stain seats and windows with coolant or oil. Place a cover over fenders, as required, for protection.
• Prior to starting work, prepare the following:
Service tools, clean cloth, containers to catch coolant and oil, wire ropes, chain hoist, transmission jacks, etc.
• Lift-up or lower the vehicle when necessary. Make sure to support the correct positions.

D: PREPARATION TOOL

1. SPECIAL TOOLS

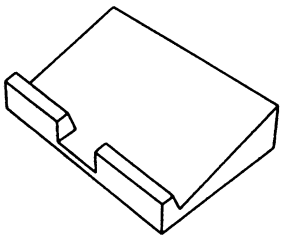
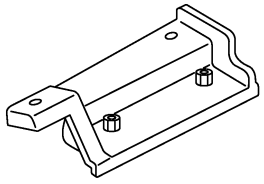
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 EN0147	498267600	CYLINDER HEAD TABLE	• Used for replacing valve guides. • Used for removing and installing valve springs.
 B2M3851	498457000	ENGINE STAND ADAPTER RH	Used with ENGINE STAND (499817000).

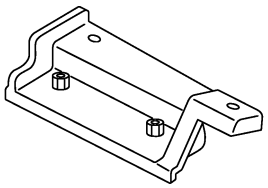
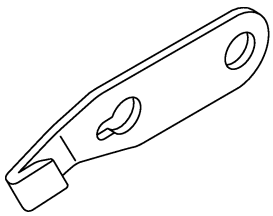
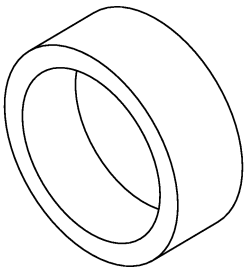
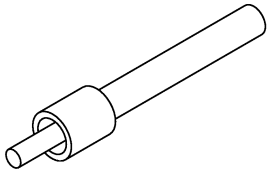
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3852	498457100	ENGINE STAND ADAPTER LH	Used with ENGINE STAND (499817000).
 B2M3853	498497100	CRANKSHAFT STOPPER	Used for stopping rotation of flywheel when loosening and tightening crankshaft pulley bolt, etc.
 B2M3854	398744300	PISTON GUIDE	Used for installing piston in cylinder.
 B2M3855	498857100	VALVE OIL SEAL GUIDE	Used for press-fitting of intake and exhaust valve guide oil seals.

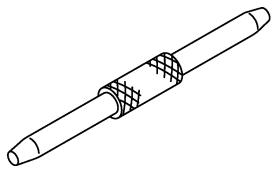
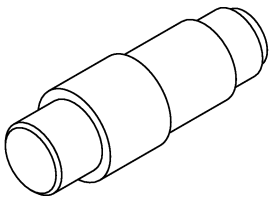
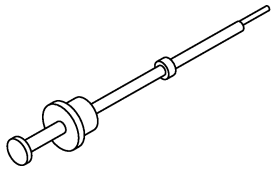
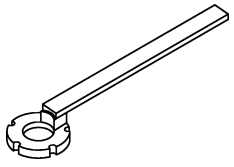
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3856	499017100	PISTON PIN GUIDE	Used for installing piston pin, piston and connecting rod.
 B2M3857	499037100	CONNECTING ROD BUSHING REMOVER & INSTALLER	Used for removing and installing connecting rod bushing.
 B2M3858	499097700	PISTON PIN REMOVER ASSY	Used for removing piston pin.
 B2M4158	499207400	CAMSHAFT SPROCKET WRENCH	Used for removing and installing exhaust camshaft sprocket.

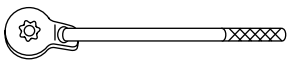
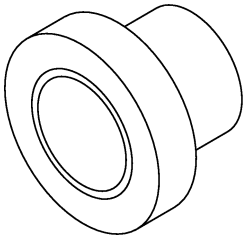
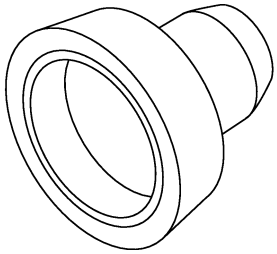
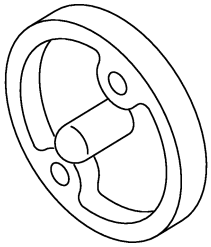
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 EN1195	499977500 (Newly adopted tool)	CAMSHAFT SPROCKET WRENCH	Used for removing and installing intake camshaft.
 B2M3860	499587700	CAMSHAFT OIL SEAL INSTALLER	Used for installing camshaft oil seal.
 B2M3861	499587200	CRANKSHAFT OIL SEAL INSTALLER	• Used for installing crankshaft oil seal. • Used with CRANKSHAFT OIL SEAL GUIDE (499597100).
 B2M3863	499597100	CRANKSHAFT OIL SEAL GUIDE	• Used for installing crankshaft oil seal. • Used with CRANKSHAFT OIL SEAL INSTALLER (499587200).

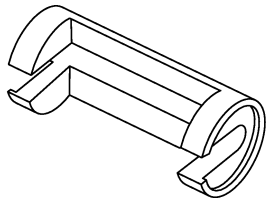
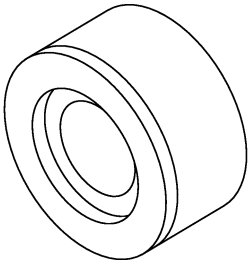
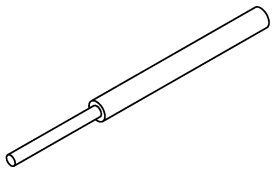
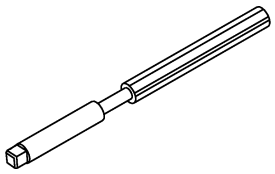
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3864	499718000	VALVE SPRING REMOVER	Used for removing and installing valve spring.
 B2M3865	498267700	VALVE GUIDE ADJUSTER	Used for installing intake and exhaust valve guides.
 B2M3867	499767200	VALVE GUIDE REMOVER	Used for removing valve guides.
 B2M3868	499767400	VALVE GUIDE REAMER	Used for reaming valve guides.

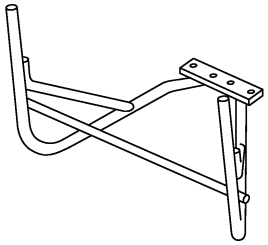
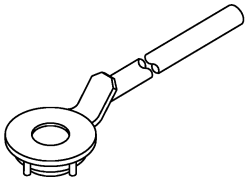
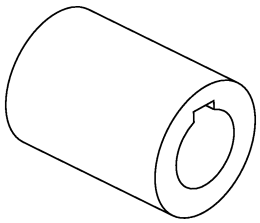
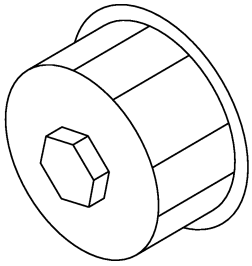
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3869	499817000	ENGINE STAND	• Stand used for engine disassembly and assembly. • Used with ENGINE STAND ADAPTER RH (498457000) & LH (498457100).
 B2M4157	499977300	CRANK PULLEY WRENCH	Used for stopping rotation of crankshaft pulley when loosening and tightening crankshaft pulley bolts.
 B2M3871	499987500	CRANKSHAFT SOCKET	Used for rotating crankshaft.
 B2M3872	498547000	OIL FILTER WRENCH	Used for removing and installing oil filter.

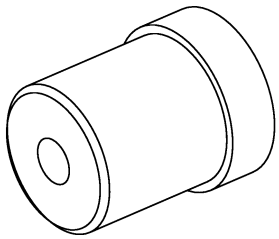
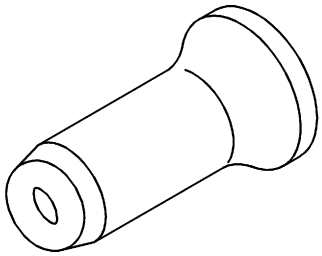
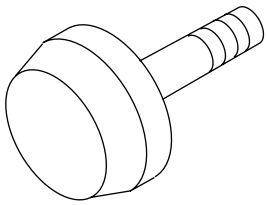
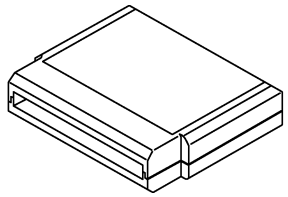
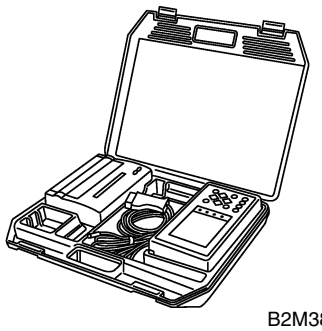
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3875	499587100	OIL SEAL INSTALLER	Used for installing oil pump oil seal.
 S1H0136	499587600	OIL SEAL GUIDE	Used for installing camshaft oil seal.
 EN0168	499597200	OIL SEAL GUIDE	Used for installing camshaft oil seal. Used with OIL SEAL GUIDE (499587600).
 EN1196	499897200	PISTON CIR-CLIP PLIER	Used for removing and installing piston pin.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3876	24082AA190	CARTRIDGE	Troubleshooting for electrical systems.
 B2M3877	22771AA030	SELECT MONITOR KIT	Troubleshooting for electrical systems. • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)

2. GENERAL PURPOSE TOOLS

TOOL NAME	REMARKS
Compression Gauge	Used for measuring compression.
Timing Light	Used for measuring ignition timing.

E: PROCEDURE

It is possible to conduct the following service procedures with engine on the vehicle, however, the procedures described in this section are based on the condition that the engine is removed from the vehicle.

- V-belt
- Timing Belt
- Camshaft
- Cylinder Head

2. Compression

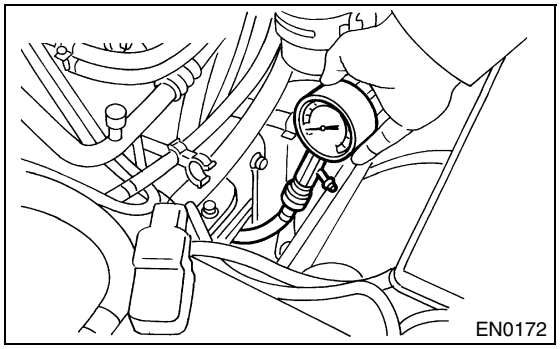
A: INSPECTION

CAUTION:
After warming-up, engine becomes very hot. Be careful not to burn yourself during measurement.

1) After warming-up the engine, turn the ignition switch to OFF.
2) Make sure that the battery is fully charged.
3) Release fuel pressure. <Ref. to FU(TURBO)-53, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
4) Remove all the spark plugs. <Ref. to IG(TURBO)-4, REMOVAL, Spark Plug.>
5) Fully open the throttle valve.
6) Check the starter motor for satisfactory performance and operation.
7) Hold the compression gauge tight against the spark plug hole.

CAUTION:
When using a screw-in type compression gauge, the screw (put into cylinder head spark plug hole) should be less than 18 mm (0.71 in) long.

8) Crank the engine by means of the starter motor, and read the maximum value on the gauge when the pointer is steady.



9) Perform at least two measurements per cylinder, and make sure that the values are correct.

Compression (350 rpm and fully open throttle):
Standard;
951 — 1,147 kPa (9.7 — 11.7 kg/cm^2, 138 — 166 psi)
Limit;
883 kPa (9.0 kg/cm^2, 128 psi)
Difference between cylinders;
49 kPa (0.5 kg/cm^2, 7 psi)

3. Idle Speed

A: INSPECTION

1) Before checking idle speed, check the following:
   (1) Ensure that air cleaner element is free from clogging, ignition timing is correct, spark plugs are in good condition, and that hoses are connected properly.
   (2) Ensure that malfunction indicator light (CHECK ENGINE light) does not illuminate.
2) Warm-up the engine.
3) Stop the engine, and turn the ignition switch to OFF.
4) Insert the cartridge to SUBARU SELECT MONITOR.
5) Connect SUBARU SELECT MONITOR to the data link connector.
6) Turn the ignition switch to ON, and SUBARU SELECT MONITOR switch to ON.
7) Select {2. Each System Check} in Main Menu.
8) Select {Engine Control System} in Selection Menu.
9) Select {1. Current Data Display & Save} in Engine Control System Diagnosis.
10) Select {1.12 Data Display} in Data Display Menu.
11) Start the engine, and read engine idle speed.
12) Check the idle speed when unloaded. (With headlights, heater fan, rear defroster, radiator fan, air conditioning, etc. OFF)

Idle speed (No load and gears in neutral):
700±50 rpm

13) Check the idle speed when loaded. (Turn air conditioning switch to “ON” and operate compressor for at least one minute before measurement.)

Idle speed [A/C “ON”, no load and gears in neutral]:
750±50 rpm

CAUTION:
Never rotate the idle adjusting screw. If the idle speed is out of specifications, refer to General On-board Diagnosis Table under “Engine Control System”. <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>

4. Ignition Timing

A: INSPECTION

1) Before checking ignition timing speed, check the following:
   (1) Ensure that air cleaner element is free from clogging, spark plugs are in good condition, and that hoses are connected properly.
   (2) Ensure that malfunction indicator light (CHECK ENGINE light) does not illuminate.
2) Warm-up the engine.
3) Stop the engine, and turn the ignition switch to OFF.
4) Insert the cartridge to SUBARU SELECT MONITOR.
5) Connect SUBARU SELECT MONITOR to the data link connector.
6) Turn the ignition switch to ON, and SUBARU SELECT MONITOR switch to ON.
7) Select {2. Each System Check} in Main Menu.
8) Select {Engine Control System} in Selection Menu.
9) Select {1. Current Data Display & Save} in Engine Control System Diagnosis.
10) Select {1.12 Data Display} in Data Display Menu.
11) Start the engine, at idle speed and check the ignition timing.

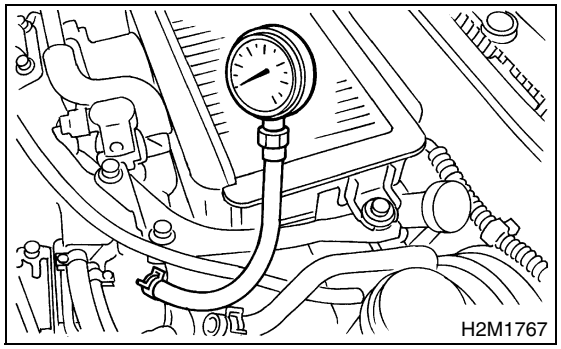
Ignition timing [BTDC/rpm]:
12°±3°/700

If the timing is not correct, check the ignition control system. Refer to Engine Control System. <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>

5. Intake Manifold Vacuum

A: INSPECTION

1) Warm-up the engine.
2) Disconnect the brake vacuum hose and install the vacuum gauge to the hose fitting on the manifold.
3) Keep the engine at the idle speed and read the vacuum gauge indication.
By observing the gauge needle movement, the internal condition of the engine can be diagnosed as described below.



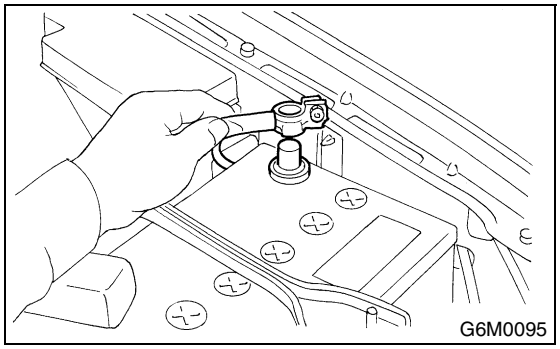
Vacuum pressure (at idling, A/C "OFF"): Less than –64.0 kPa (–480 mmHg, –18.90 in-Hg)

Diagnosis of engine condition by measurement of manifold vacuum	
Vacuum gauge indication	Possible engine condition
1. Needle is steady but lower than normal position. This tendency becomes more evident as engine temperature rises.	Leakage around intake manifold gasket or disconnection or damaged vacuum hose
2. When engine speed is reduced slowly from higher speed, needle stops temporarily when it is lowering or becomes steady above normal position.	Back pressure too high, or exhaust system clogged
3. Needle intermittently drops to position lower than normal position.	Leakage around cylinder
4. Needle drops suddenly and intermittently from normal position.	Sticky valves
5. When engine speed is gradually increased, needle begins to vibrate rapidly at certain speed, and then vibration increases as engine speed increases.	Weak or broken valve springs
6. Needle vibrates above and below normal position in narrow range.	Defective ignition system or throttle chamber idle adjustment

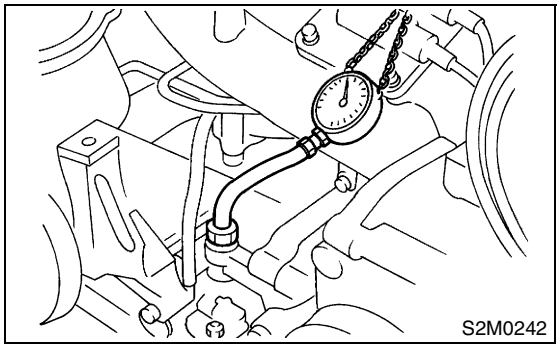
6. Engine Oil Pressure

A: INSPECTION

1) Remove the oil pressure switch from engine cylinder block. <Ref. to LU-21, REMOVAL, Oil Pressure Switch.>
2) Connect the oil pressure gauge hose to cylinder block.
3) Connect the battery ground cable.


G6M0095

4) Start the engine, and measure the oil pressure.


S2M0242

Oil pressure:
98 kPa (1.0 kg/cm^2, 14 psi) or more at 800 rpm
294 kPa (3.0 kg/cm^2, 43 psi) or more at 5,000 rpm

CAUTION:
• If the oil pressure is out of specification, check oil pump, oil filter and lubrication line. <Ref. to LU-25, INSPECTION, Engine Lubrication System Trouble in General.>
• If the oil pressure warning light is turned ON and oil pressure is in specification, replace the oil pressure switch. <Ref. to LU-25, INSPECTION, Engine Lubrication System Trouble in General.>

NOTE:
The specified data is based on an engine oil temperature of 80°C (176°F).

5) After measuring the oil pressure, install the oil pressure switch. <Ref. to LU-21, INSTALLATION, Oil Pressure Switch.>

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)

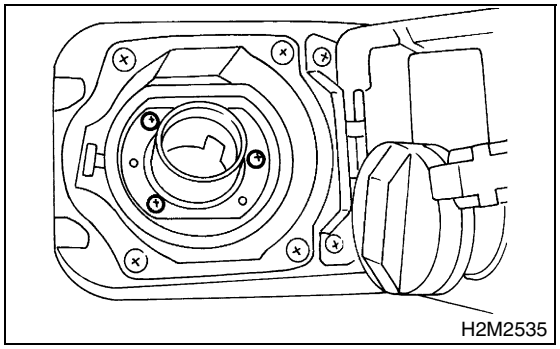
7. Fuel Pressure

A: INSPECTION

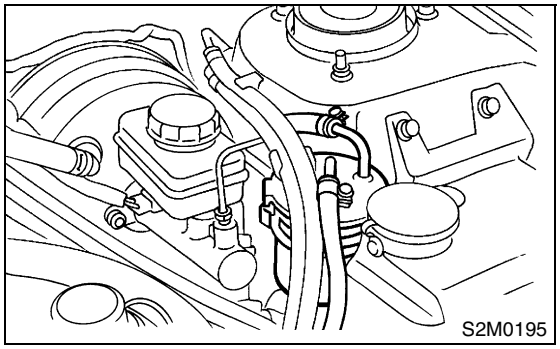
WARNING:
Before removing the fuel pressure gauge, release fuel pressure.

NOTE:
If out of specification, check or replace the pressure regulator and pressure regulator vacuum hose.

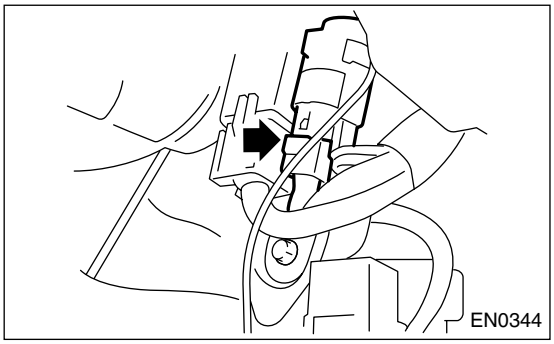
1) Release fuel pressure. <Ref. to FU(TURBO)-53, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Open the fuel flap lid, and remove the fuel filler cap.


H2M2535

3) Disconnect the fuel delivery hoses from fuel filter, and connect the fuel pressure gauge.

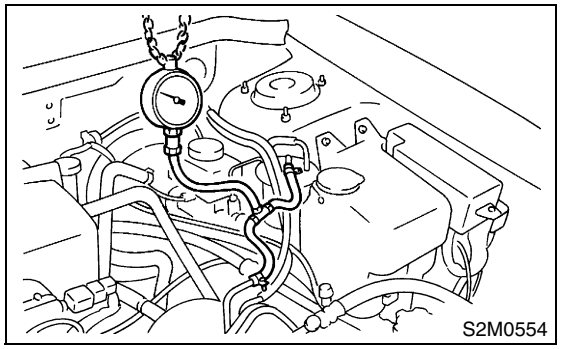

S2M0195

4) Connect the connector of fuel pump relay.


EN0344

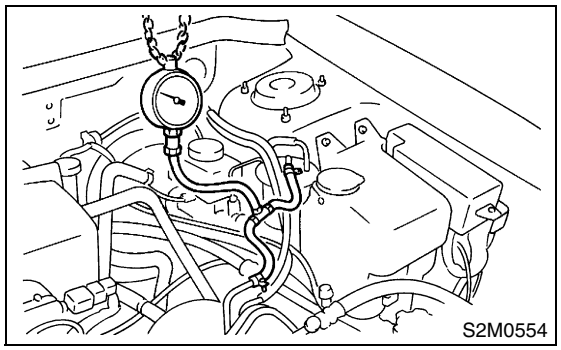
5) Start the engine.
6) Measure the fuel pressure while disconnecting pressure regulator vacuum hose from intake manifold.

Fuel pressure:
Standard; 284 — 314 kPa (2.9 — 3.2 kg/cm^2, 41 — 46 psi)


S2M0554

7) After connecting the pressure regulator vacuum hose, measure the fuel pressure.

Fuel pressure:
Standard; 230 — 260 kPa (2.35 — 2.65 kg/cm^2, 33 — 38 psi)


S2M0554

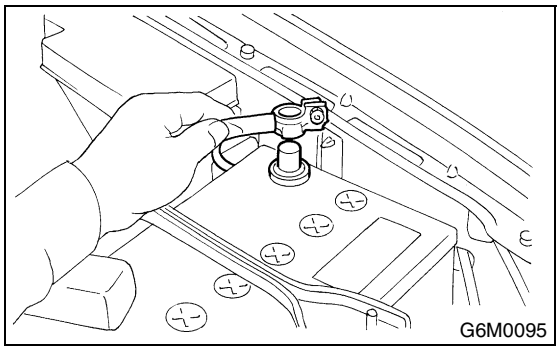
NOTE:
The fuel pressure gauge registers 10 to 20 kPa (0.1 to 0.2 kg/cm^2, 1 to 3 psi) higher than standard values during high-altitude operations.

8. Valve Clearance

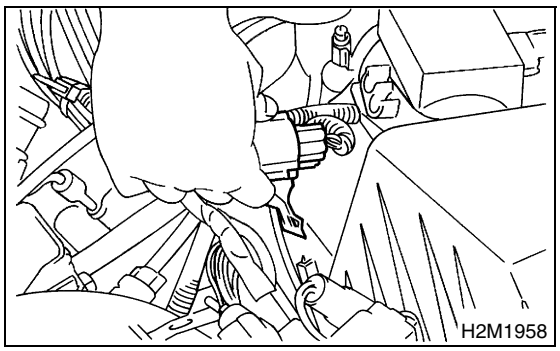
A: INSPECTION

CAUTION:
Inspection and adjustment of valve clearance should be performed while engine is cold.

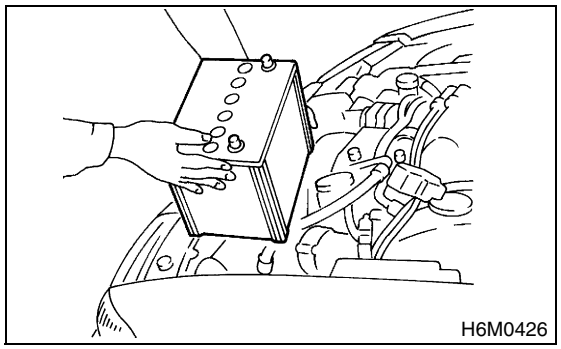
1) Set the vehicle on a lift.
2) Disconnect the battery ground cable.


G6M0095

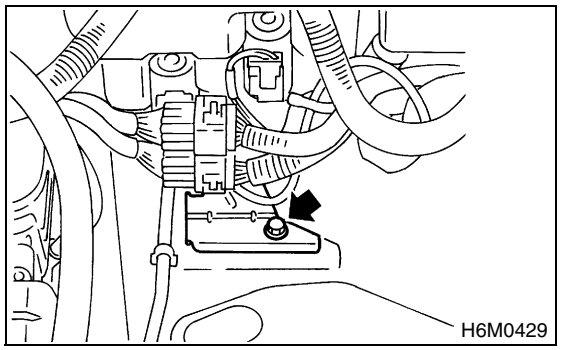
3) Remove the air intake duct. <Ref. to IN(TURBO)-8, REMOVAL, Air Intake Duct.>
4) Remove one bolt which secures the timing belt cover (RH).
5) Lift-up the vehicle.
6) Remove the under cover.
7) Loosen the remaining bolts which secure timing belt cover (RH), then remove the belt cover.
8) Lower the vehicle.
9) When inspecting #1 and #3 cylinders:
(1) Pull out the engine harness connector with bracket from air cleaner upper cover.


H2M1958

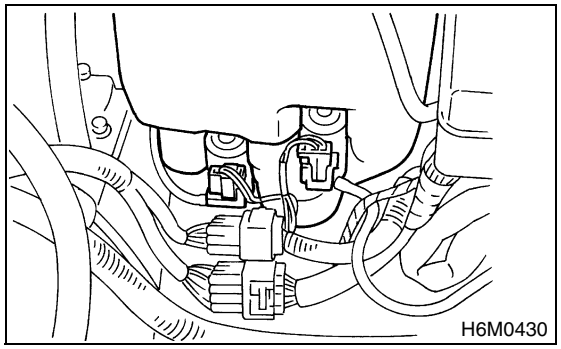
(2) Remove the air cleaner case. <Ref. to IN(TURBO)-7, REMOVAL, Air Cleaner.>
(3) Disconnect the spark plug cords from spark plugs (#1 and #3 cylinders).
(4) Place a suitable container under the vehicle.
(5) Disconnect the PCV hose from rocker cover (RH).
(6) Remove the bolts, then remove the rocker cover (RH).
10) When inspecting #2 and #4 cylinders:
(1) Disconnect the battery cables, and then remove the battery and battery carrier.


H6M0426

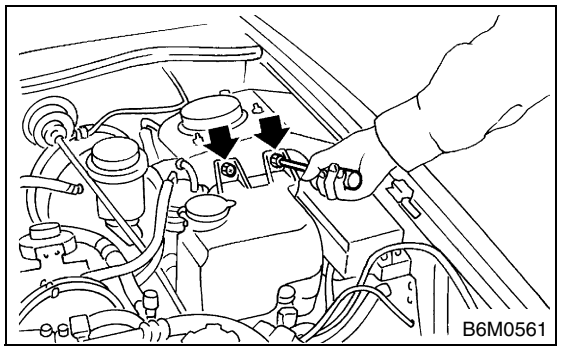
(2) Remove the bolt which secures engine harness bracket onto body.


H6M0429

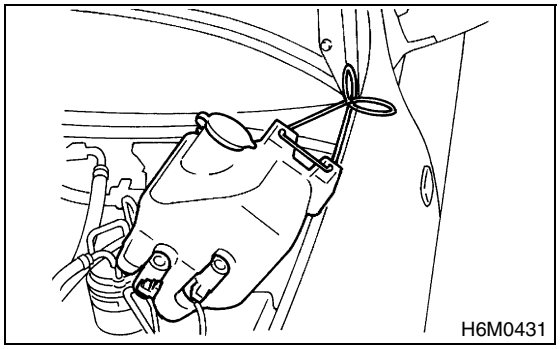
(3) Disconnect the washer motor connectors.


H6M0430

(4) Remove the washer tank mounting bolts.


B6M0561

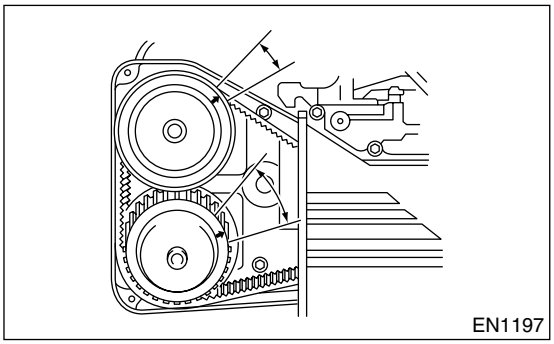
(5) Move the washer tank upward.



(6) Disconnect the spark plug cords from spark plugs (#2 and #4 cylinders).
(7) Place a suitable container under the vehicle.
(8) Disconnect the PCV hose from rocker cover (LH).
(9) Remove the bolts, then remove the rocker cover (LH).

11) Turn the crankshaft pulley clockwise until arrow mark on camshaft sprocket is set to position shown in the figure.

NOTE:
Turn the crankshaft using ST.
ST 499987500 CRANKSHAFT SOCKET

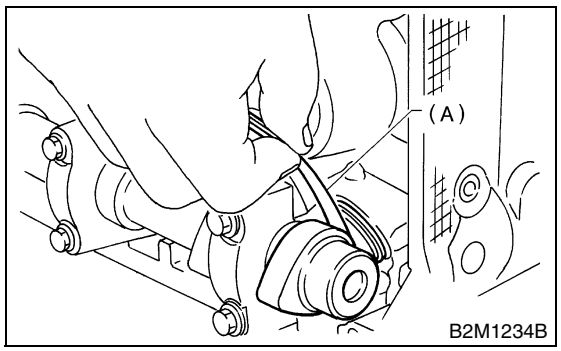


12) Measure the #1 cylinder intake valve and #3 cylinder exhaust valve clearance by using thickness gauge (A).

CAUTION:
• Insert the thickness gauge in direction as horizontal as possible with respect to the shim.
• Measure the exhaust valve clearances while lifting-up the vehicle.

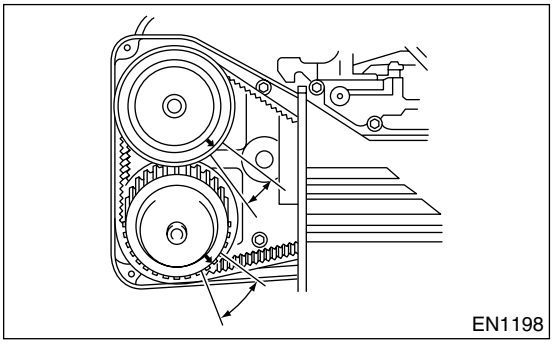
Valve clearance:
Intake: 0.20±0.02 mm (0.0079±0.0008 in)
Exhaust: 0.25±0.02 mm (0.0098±0.0008 in)

NOTE:
If the measured value is not within specification, take notes of the value in order to adjust the valve clearance later on.

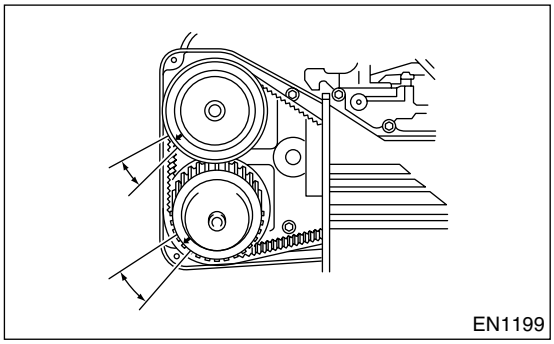


13) If necessary, adjust the valve clearance. <Ref. to ME(STi)-30, ADJUSTMENT, Valve Clearance.>
14) Further turn the crankshaft pulley clockwise.
Using the same procedures described previously, then measure the valve clearances again.

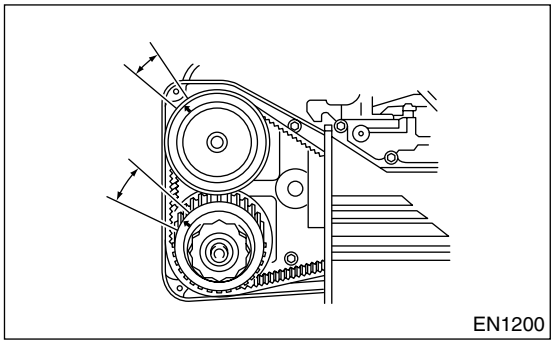
(1) Set the arrow mark on camshaft sprocket to position shown in the figure, and measure #2 cylinder exhaust valve and #3 cylinder intake valve clearances.



(2) Set the arrow mark on camshaft sprocket to position shown in the figure, and measure #2 cylinder intake valve and #4 cylinder exhaust valve clearances.

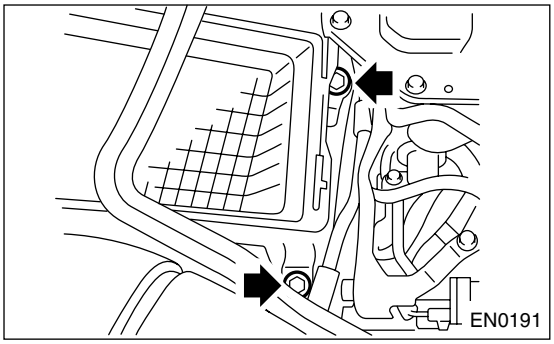


(3) Set the arrow mark on camshaft sprocket to position shown in the figure, and measure #1 cylinder exhaust valve and #4 cylinder intake valve clearances.


EN1200

15) After inspection, install the related parts in the reverse order of removal.

Tightening torque:
32 N·m (3.3 kgf-m, 24 ft-lb)

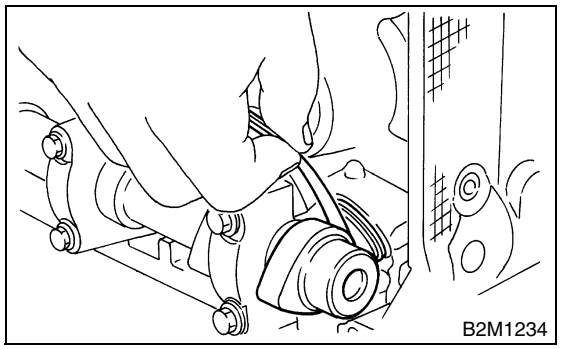

EN0191

B: ADJUSTMENT

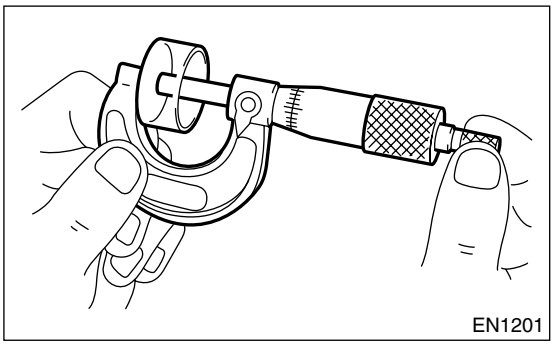
CAUTION:
Adjustment of valve clearance should be performed while engine is cold.

1) Measure all valve clearances. <Ref. to ME(STi)-28, INSPECTION, Valve Clearance.>

NOTE:
Record each valve clearance after it has been measured.


B2M1234

2) Remove the camshaft. <Ref. to ME(STi)-59, REMOVAL, Camshaft.>
3) Remove the valve lifter.
4) Measure the thickness of valve lifter with micrometer.


EN1201

5) Select a valve lifter of suitable thickness using measured valve clearance and valve lifter thickness, by referring to the following table.

Unit: mm
Intake valve: S =(V + T) - 0.20 Exhaust valve: S =(V + T) - 0.25
S: Valve lifter thickness to be used V: Measured valve clearance T: Removed valve lifter thickness

Part No.	Thickness mm (in)
13228 AA100	4.68 (0.1843)
13228 AA110	4.69 (0.1846)
13228 AA120	4.70 (0.1850)
13228 AA130	4.71 (0.1854)
13228 AA140	4.72 (0.1858)
13228 AA150	4.73 (0.1862)
13228 AA160	4.74 (0.1866)
13228 AA170	4.75 (0.1870)
13228 AA180	4.76 (0.1874)
13228 AA190	4.77 (0.1878)
13228 AA200	4.78 (0.1882)
13228 AA210	4.79 (0.1886)
13228 AA220	4.80 (0.1890)
13228 AA230	4.81 (0.1894)
13228 AA240	4.82 (0.1898)
13228 AA250	4.83 (0.1902)
13228 AA260	4.84 (0.1906)
13228 AA270	4.85 (0.1909)
13228 AA280	4.86 (0.1913)
13228 AA290	4.87 (0.1917)
13228 AA300	4.88 (0.1921)
13228 AA310	4.89 (0.1925)
13228 AA320	4.90 (0.1929)
13228 AA330	4.91 (0.1933)
13228 AA340	4.92 (0.1937)
13228 AA350	4.93 (0.1941)
13228 AA360	4.94 (0.1945)
13228 AA370	4.95 (0.1949)
13228 AA380	4.96 (0.1953)
13228 AA390	4.97 (0.1957)
13228 AA400	4.98 (0.1961)
13228 AA410	4.99 (0.1965)
13228 AA420	5.00 (0.1969)
13228 AA430	5.01 (0.1972)
13228 AA440	5.02 (0.1976)
13228 AA450	5.03 (0.1980)
13228 AA460	5.04 (0.1984)
13228 AA470	5.05 (0.1988)
13228 AA480	5.06 (0.1992)
13228 AA490	5.07 (0.1996)
13228 AA500	5.08 (0.2000)
13228 AA510	5.09 (0.2004)
13228 AA520	5.10 (0.2008)
13228 AA530	5.11 (0.2012)
13228 AA540	5.12 (0.2016)
13228 AA550	5.13 (0.2020)
13228 AA560	5.14 (0.2024)
13228 AA570	5.15 (0.2028)
13228 AA580	5.16 (0.2031)
13228 AA590	5.17 (0.2035)
13228 AA600	5.18 (0.2039)

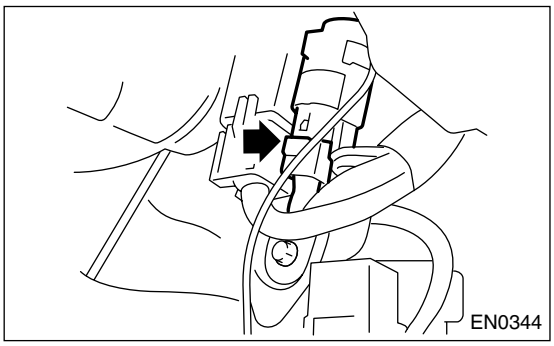
Part No.	Thickness mm (in)
13228 AA610	5.19 (0.2043)
13228 AA620	5.20 (0.2047)
13228 AA630	5.21 (0.2051)
13228 AA640	5.22 (0.2055)
13228 AA650	5.23 (0.2059)
13228 AA660	5.24 (0.2063)
13228 AA670	5.25 (0.2067)
13228 AA680	5.26 (0.2071)
13228 AA690	5.27 (0.2075)
13228 AA700	4.38 (0.1724)
13228 AA710	4.40 (0.1732)
13228 AA720	4.42 (0.1740)
13228 AA730	4.44 (0.1748)
13228 AA740	4.46 (0.1756)
13228 AA750	4.48 (0.1764)
13228 AA760	4.50 (0.1772)
13228 AA770	4.52 (0.1780)
13228 AA780	4.54 (0.1787)
13228 AA790	4.56 (0.1795)
13228 AA800	4.58 (0.1803)
13228 AA810	4.60 (0.1811)
13228 AA820	4.62 (0.1819)
13228 AA830	4.64 (0.1827)
13228 AA840	4.66 (0.1835)
13228 AA850	5.29 (0.2083)
13228 AA860	5.31 (0.2091)
13228 AA870	5.33 (0.2098)
13228 AA880	5.35 (0.2106)
13228 AA890	5.37 (0.2114)
13228 AA900	5.39 (0.2122)
13228 AA910	5.41 (0.2130)
13228 AA920	5.43 (0.2138)
13228 AA930	5.45 (0.2146)
13228 AA940	5.47 (0.2154)
13228 AA950	5.49 (0.2161)
13228 AA960	5.51 (0.2169)
13228 AA970	5.53 (0.2177)
13228 AA980	5.55 (0.2185)
13228 AA990	5.57 (0.2193)
13228 AB000	5.59 (0.2201)
13228 AB010	5.61 (0.2209)
13228 AB020	5.63 (0.2217)
13228 AB030	5.65 (0.2224)

6) Inspect all valves for clearance again at this stage. If the valve clearance is not correct, repeat the procedure over again from the first step.
7) After inspection, install the related parts in the reverse order of removal.

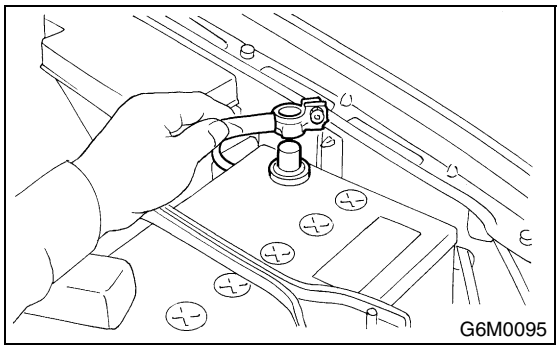
9. Engine Assembly

A: REMOVAL

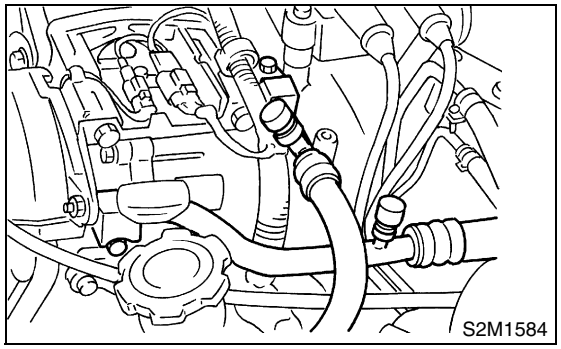
1) Set the vehicle on lift arms.
2) Open the front hood fully and support with stay.
3) Raise the rear seat, and turn floor mat up.
4) Release the fuel pressure.
   (1) Disconnect the fuel pump relay connector.



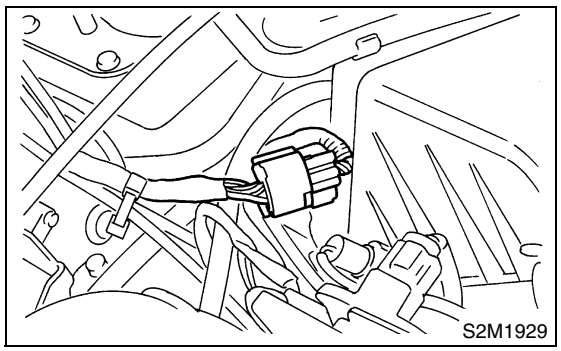
   (2) Start the engine, and run until it stalls.
   (3) After the engine stalls, crank it for five seconds more.
   (4) Turn the ignition switch to “OFF”.
5) Remove the filler cap.
6) Disconnect the battery ground terminal.



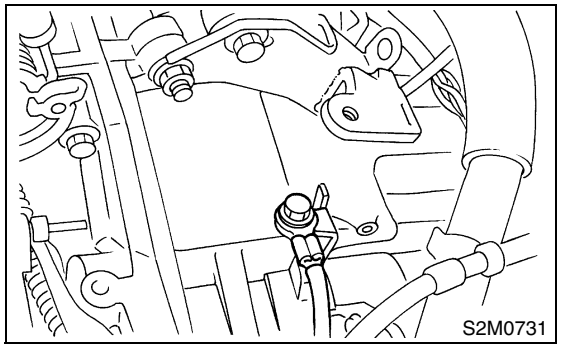
7) Remove the radiator from vehicle. <Ref. to CO-39, REMOVAL, Radiator.>
8) Remove the coolant filler tank. <Ref. to CO-53, REMOVAL, Coolant Filler Tank.>
9) Collect the refrigerant, and remove the pressure hoses.
   (1) Place and connect the attachment hose to the refrigerant recycle system.
   (2) Collect the refrigerant from A/C system.
   (3) Disconnect the A/C pressure hoses from A/C compressor.



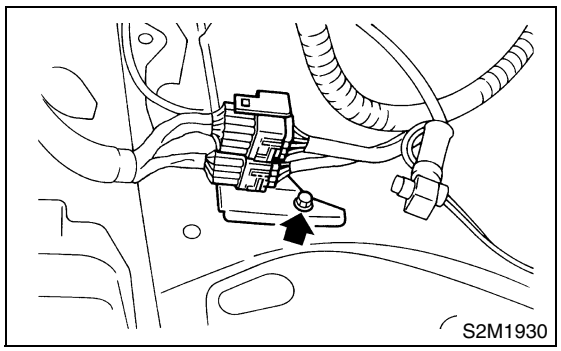
10) Remove the intercooler. <Ref. to IN(TURBO)-10, REMOVAL, Intercooler.>
11) Disconnect the following connectors and cable.
   (1) Engine harness connector



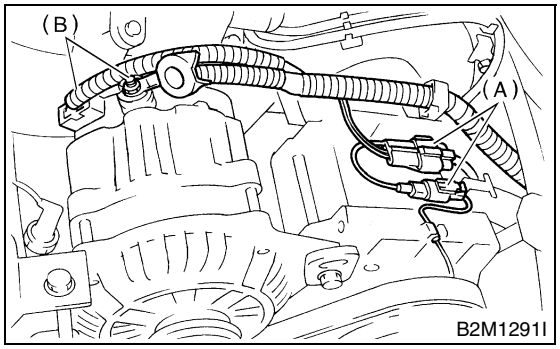
   (2) Engine ground terminal



   (3) Engine harness connector

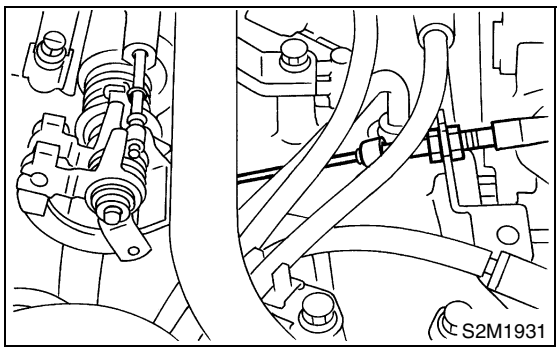


(4) Generator connector, terminal and A/C compressor connectors

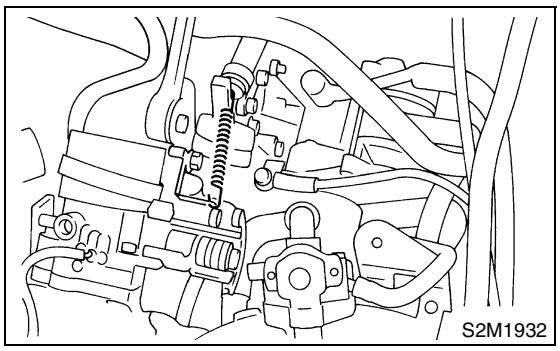


(A) A/C compressor connector
(B) Generator connector and terminal

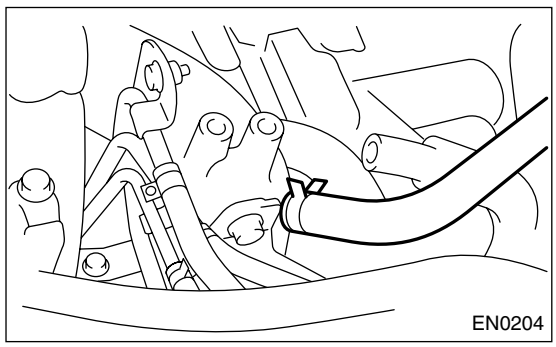
(5) Accelerator cable



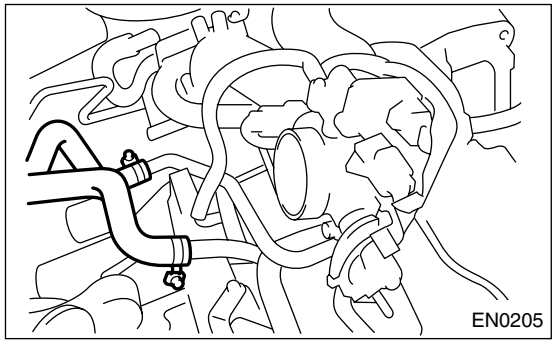
(6) Clutch release spring



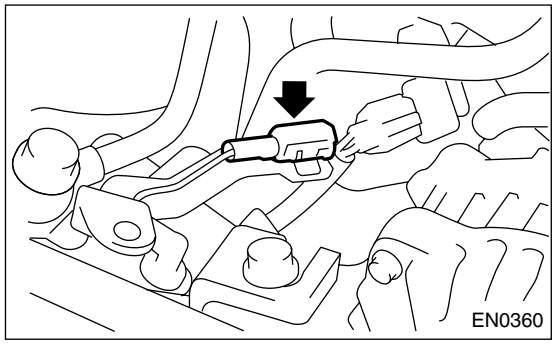
12) Disconnect the following hoses.
(1) Brake booster vacuum hose



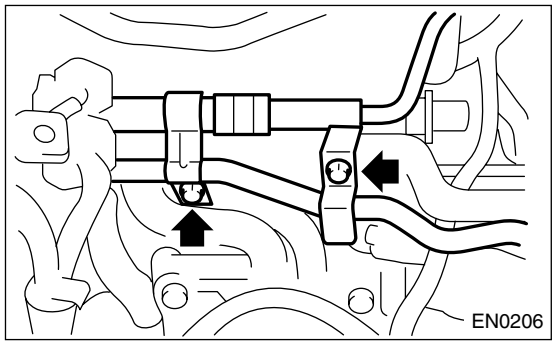
(2) Heater inlet outlet hose



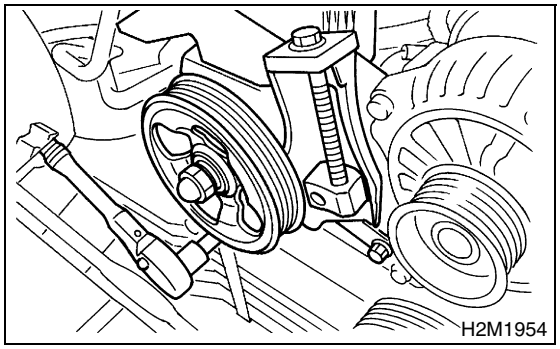
13) Remove the power steering pump from bracket.
(1) Loosen the lock bolt and slider bolt, and remove the front side V-belt. <Ref. to ME(STi)-43, FRONT SIDE BELT, REMOVAL, V-belt.>
(2) Disconnect the power steering switch connector.



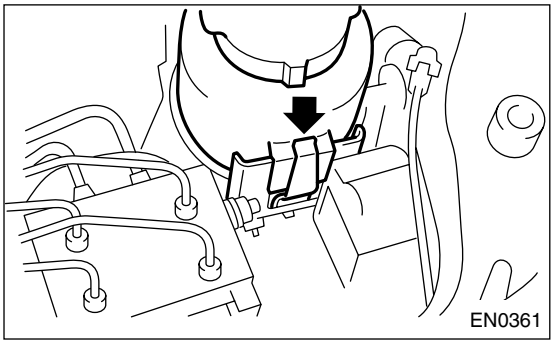
(3) Remove the pipe with bracket from intake manifold.



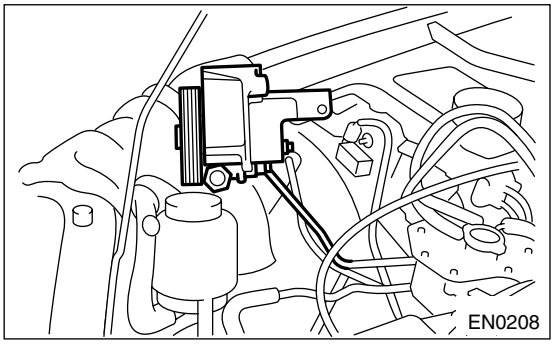
(4) Remove the power steering pump from engine.


H2M1954

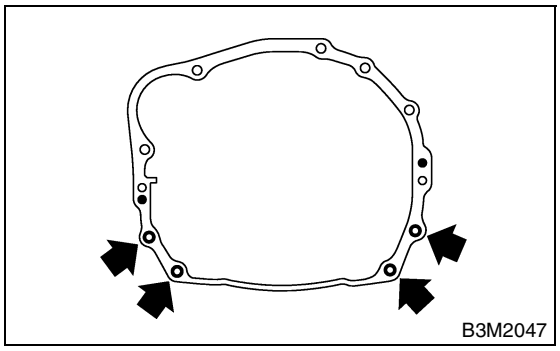
(5) Remove the power steering tank from the bracket by pulling it upward.


EN0361

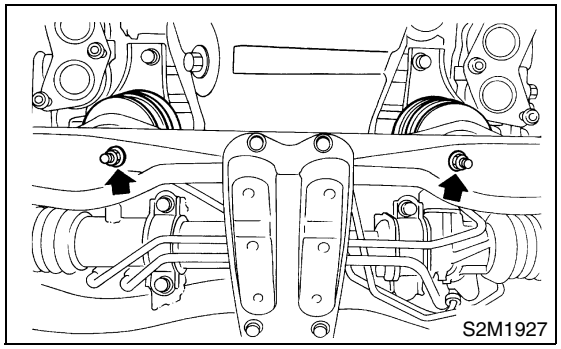
(6) Place the power steering pump on the right side wheel apron.


EN0208

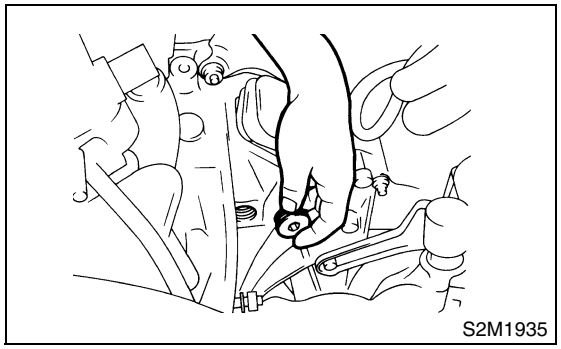
14) Remove the center exhaust pipe. <Ref. to EX(TURBO)-8, REMOVAL, Center Exhaust Pipe.>
15) Remove the nuts which hold lower side of transmission to engine.


B3M2047

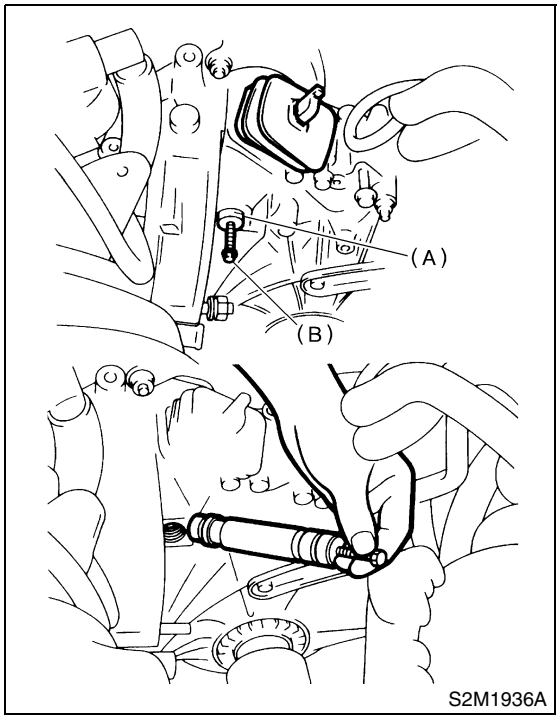
16) Remove the nuts which install front cushion rubber onto front crossmember.


S2M1927

17) Separate the clutch release fork from release bearing.
(1) Remove the clutch operating cylinder from transmission.
(2) Remove the plug using 10 mm hexagon wrench.


S2M1935

(3) Screw 6 mm dia. bolt into release fork shaft, and remove it.

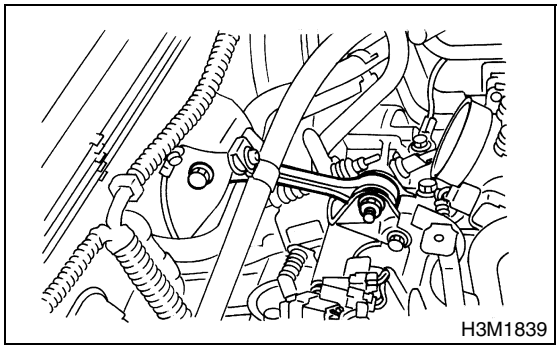


(A) Shaft
(B) Bolt

(4) Raise the release fork and unfasten release bearing tabs to free release fork.

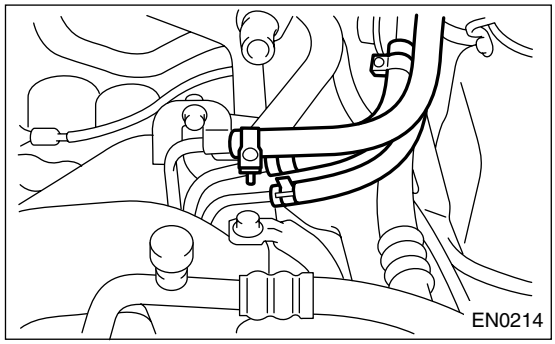
CAUTION:
Step (4) is required to prevent interference with engine when removing the engine from transmission.

18) Remove the pitching stopper.

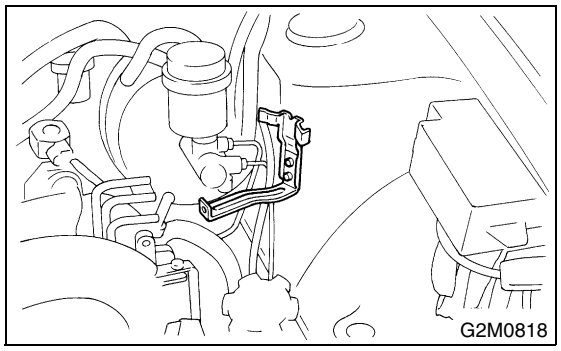


19) Disconnect the fuel delivery hose, return hose and evaporation hose.

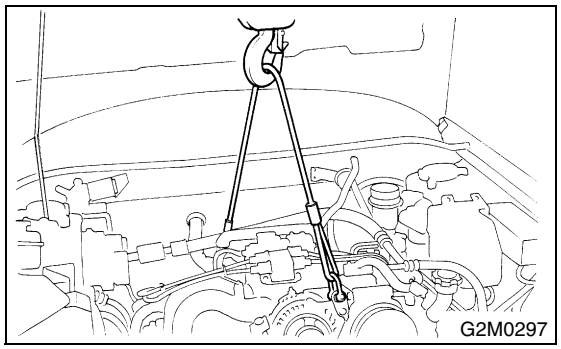
CAUTION:
- **Catch fuel from hose into container.**
- **Disconnect the hose with its end wrapped with cloth to prevent fuel from splashing.**



20) Remove the fuel filter and bracket.

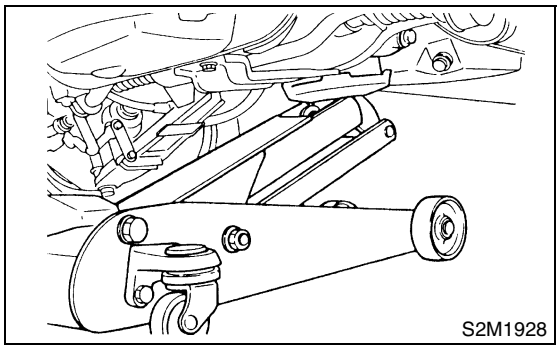


21) Support the engine with a lifting device and wire ropes.

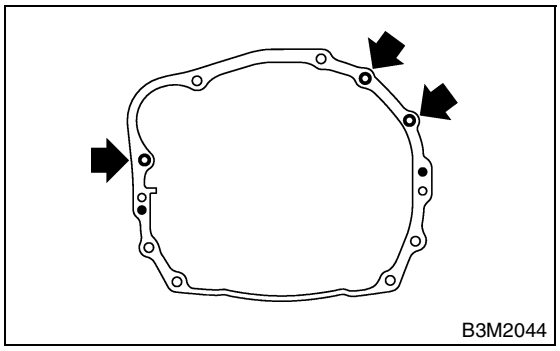


22) Support the transmission with a garage jack.

CAUTION:
Before moving the engine away from transmission, check to be sure no work has been overlooked. Doing this is very important in order to facilitate re-installation and because transmission lowers under its own weight.


S2M1928

23) Separation of engine and transmission.
(1) Remove the starter. <Ref. to SC-5, REMOVAL, Starter.>
(2) Remove the bolt which holds right upper side of transmission to engine.


B3M2044

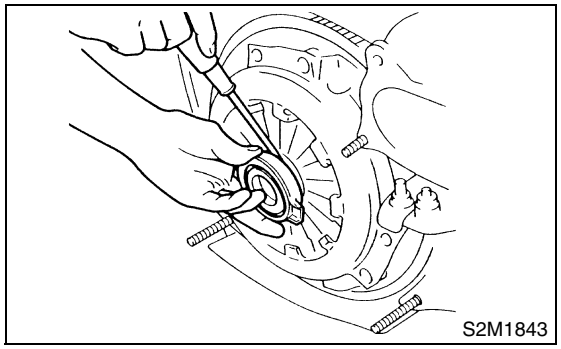
24) Remove the engine from vehicle.
(1) Slightly raise the engine.
(2) Raise the transmission with garage jack.
(3) Move the engine horizontally until mainshaft is withdrawn from clutch cover.
(4) Slowly move the engine away from engine compartment.

CAUTION:
Be careful not to damage adjacent parts or body panels with crank pulley, oil pressure gauge, etc.

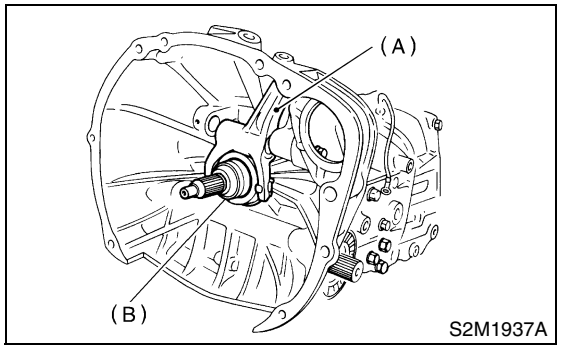
25) Remove the front cushion rubbers.

B: INSTALLATION

1) Install the clutch release fork and bearing onto transmission.
(1) Remove the release bearing from clutch cover with flat type screw driver.


S2M1843

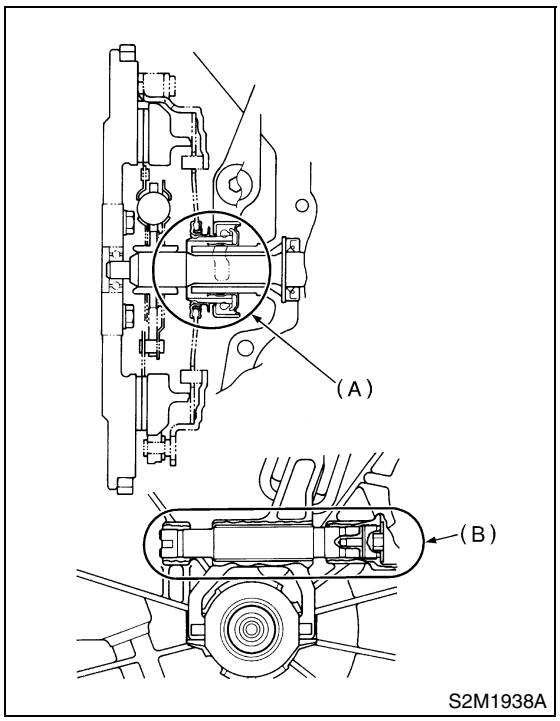
(2) Install the release bearing on transmission.
(3) Install the release fork into release bearing tab.



S2M1937A

(A) Release fork
(B) Release bearing

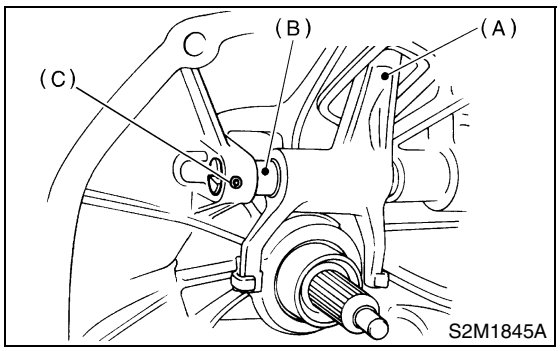
(4) Apply grease to the specified points.
- Spline FX2200
- Shaft SUNLIGHT 2



(A) Spline (FX2200)
(B) Shaft (SUNLIGHT 2)

(5) Insert the release fork shaft into release fork.

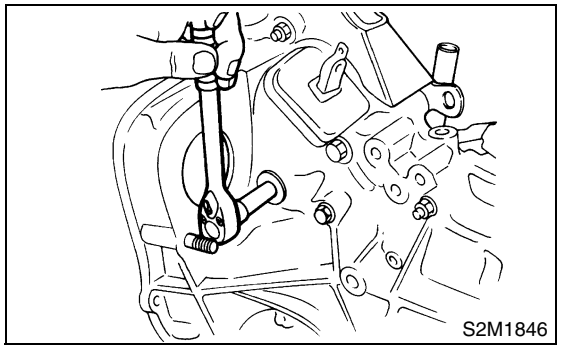
CAUTION:
Be sure to fit groove on clutch release lever shaft into pin located at through-hole.



(A) Release fork
(B) Release shaft
(C) Spring pin

(6) Tighten the plug.

Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb)



2) Install the front cushion rubbers to engine.

Tightening torque:
34 N·m (3.5 kgf-m, 25.3 ft-lb)

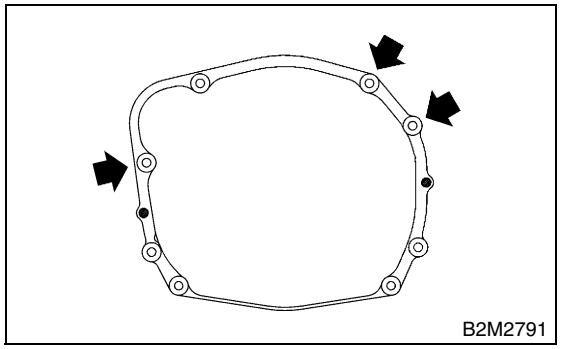
3) Install the engine onto transmission.
(1) Position the engine in engine compartment and align it with transmission.

CAUTION:
Be careful not to damage adjacent parts or body panels with crank pulley, oil pressure gauge, etc.

(2) Apply a small amount of grease to splines of mainshaft.

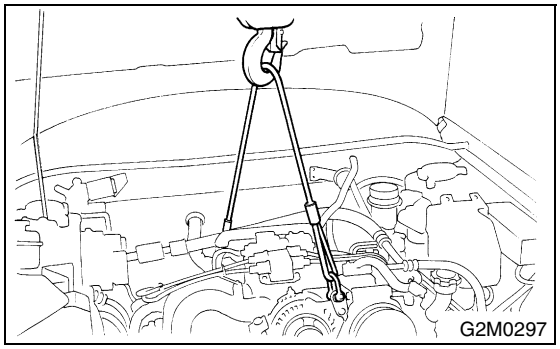
4) Tighten the bolt which holds right upper side of transmission to engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



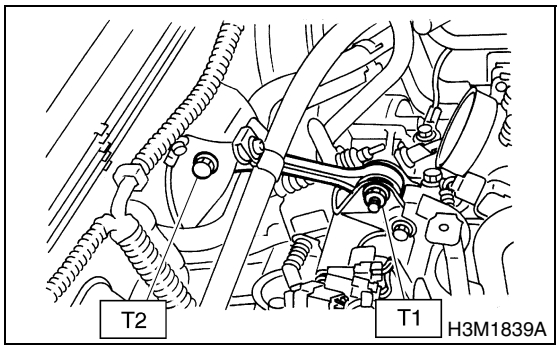
5) Remove the lifting device and wire ropes.

6) Remove the garage jack.

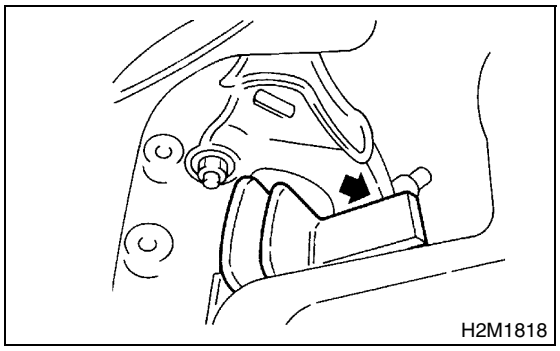


7) Install the pitching stopper.

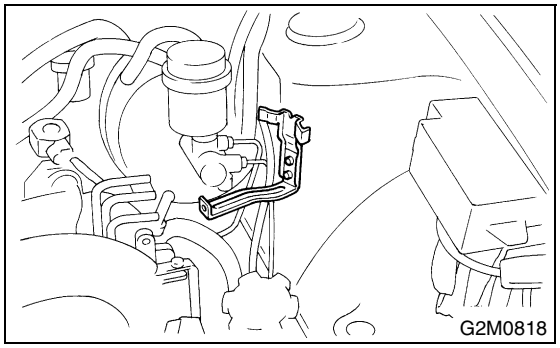
Tightening torque:
T1: 50 N·m (5.1 kgf-m, 37 ft-lb)
T2: 58 N·m (5.9 kgf-m, 43 ft-lb)



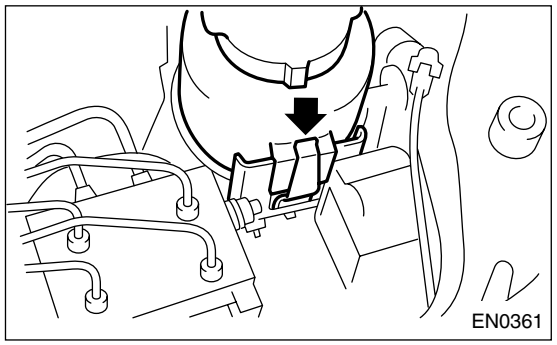
8) Install the starter. <Ref. to SC-6, INSTALLATION, Starter.>
9) Push the clutch release lever to fit bearing into clutch cover.



10) Install the fuel filter and bracket.

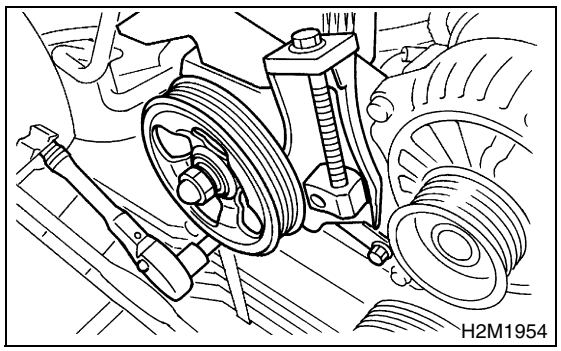


11) Install the power steering pump on bracket.
(1) Install the power steering tank on bracket.

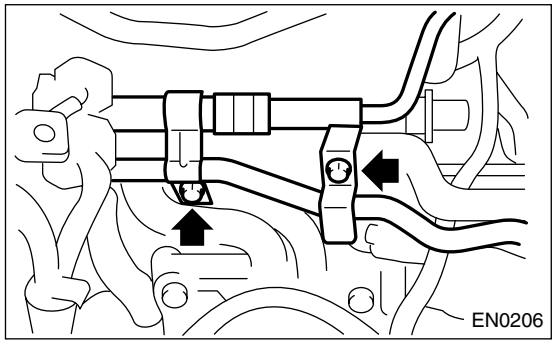


(2) Install the power steering pump on bracket, and tighten bolts.

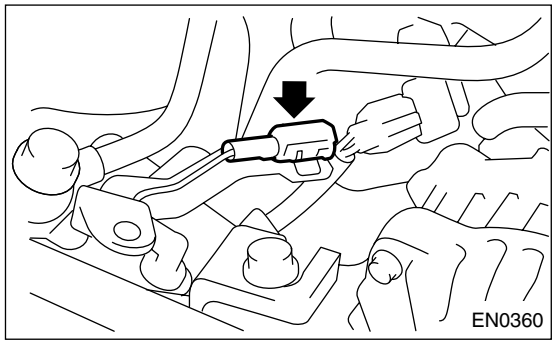
Tightening torque:
20.1 N·m (2.05 kgf-m, 14.8 ft-lb)



(3) Install the power steering pipe bracket on right side intake manifold, and install the spark plug cords.



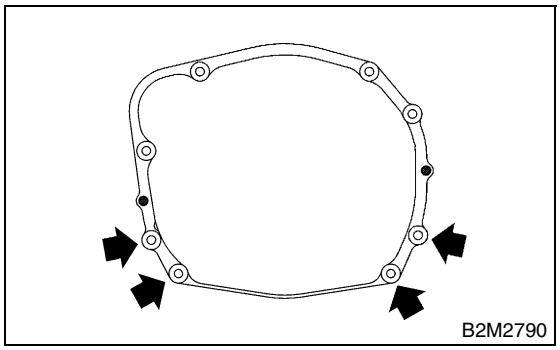
(4) Connect the power steering switch connector.



(5) Install the front side V-belt, and adjust it. <Ref. to ME-44, FRONT SIDE BELT, INSTALLATION, V-belt.>

12) Tighten the nuts which hold lower side of transmission to engine.

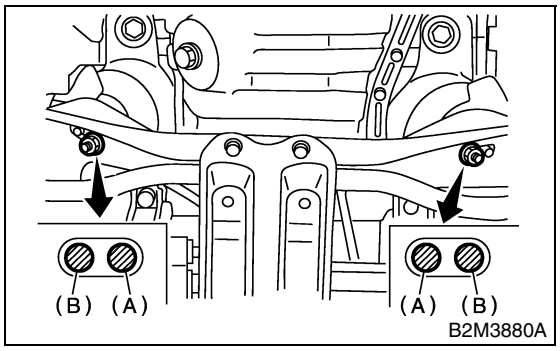
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



13) Tighten the nuts which install front cushion rubber onto crossmember.

Tightening torque:
85 N·m (8.7 kgf-m, 62.7 ft-lb)

CAUTION:
Make sure the front cushion rubber mounting bolts (A) and locator (B) are securely installed.



14) Install the center exhaust pipe. <Ref. to EX(TURBO)-9, INSTALLATION, Center Exhaust Pipe.>

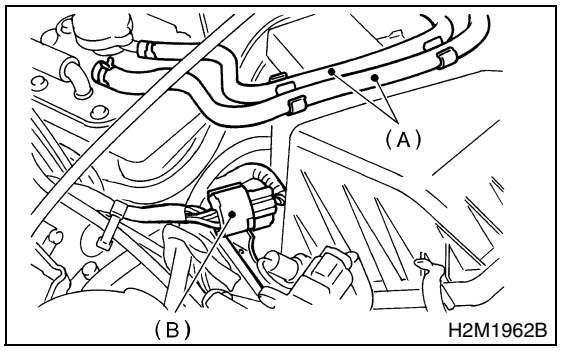
15) Connect the following hoses.
(1) Fuel delivery hose, return hose and evaporation hose
(2) Heater inlet and outlet hoses
(3) Brake booster vacuum hose

16) Connect the following connectors and terminals.
(1) Engine ground terminal
(2) Engine harness connectors
(3) Generator connector and terminal
(4) A/C compressor connectors (With A/C)

17) Connect the following cables.
(1) Accelerator cable
(2) Clutch release spring

CAUTION:
After connecting each cable, adjust them.

18) Install the air intake system.
(1) Install the intercooler. <Ref. to IN(TURBO)-11, INSTALLATION, Intercooler.>
(2) Install the air cleaner element and air cleaner upper cover.
(3) Install the engine harness connector bracket.
(4) Install the filler hose to air cleaner case.

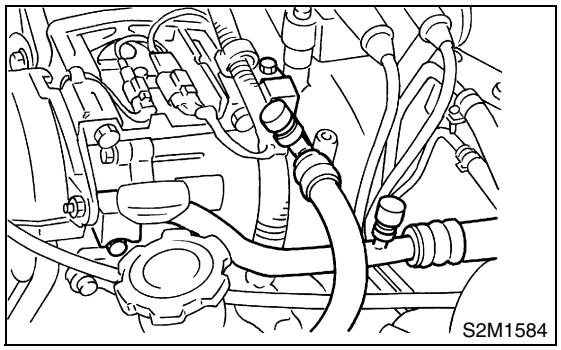


(A) Filler hose
(B) Connector bracket

19) Install the A/C pressure hoses. (With A/C)

CAUTION:
Use new O-rings.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



20) Install the radiator. <Ref. to CO-42, INSTALLATION, Radiator.>

21) Install the coolant filler tank. <Ref. to CO-53, INSTALLATION, Coolant Filler Tank.>

22) Install the window washer tank.

23) Install the battery in vehicle, and connect the cables.

24) Fill coolant. <Ref. to CO-26, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

25) Charge the A/C system with refrigerant. <Ref. to AC-22, OPERATION, Refrigerant Charging Procedure.>
26) Remove the front hood stay, and close the front hood.
27) Take off the vehicle from lift arms.

10.Engine Mounting

A: REMOVAL

1) Remove the engine assembly. <Ref. to ME(STi)-32, REMOVAL, Engine Assembly.>
2) Remove the engine mounting from engine assembly.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:
Engine mounting;
35 N·m (3.6 kgf-m, 25.8 ft-lb)

C: INSPECTION

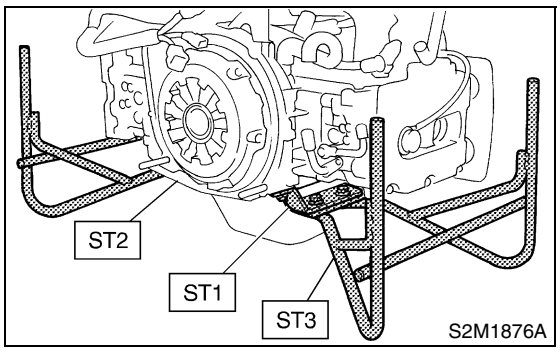
Make sure there are no cracks or other damage.

11.Preparation for Overhaul

A: PROCEDURE

1) After removing the engine from the body, secure it in the ST shown below.

ST1	498457000	ENGINE STAND ADAPTER RH
ST2	498457100	ENGINE STAND ADAPTER LH
ST3	499817000	ENGINE STAND



2) In this section the procedures described under each index are all connected and stated in order. It will be the complete procedure for overhauling of the engine itself when you go through all steps in the process.
Therefore, in this section, to conduct the particular procedure within the flow of a section, you need to go back and conduct the procedure described previously in order to do that particular procedure.

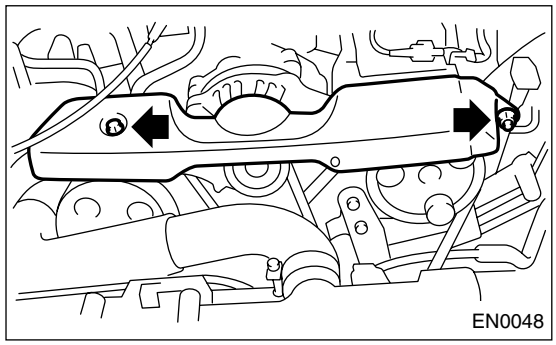
12.V-belt

A: REMOVAL

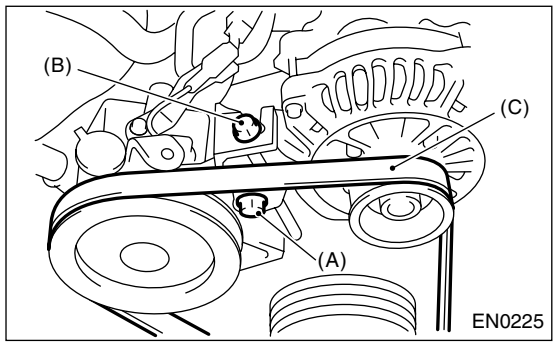
1. FRONT SIDE BELT

NOTE:
Perform the following procedures 1) to 4) with the engine installed to the body.

1) Remove the V-belt cover.

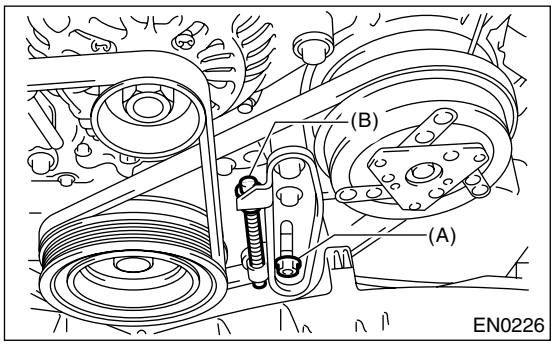


2) Loosen the lock bolt (A).
3) Loosen the slider bolt (B).
4) Remove the front side belt (C).

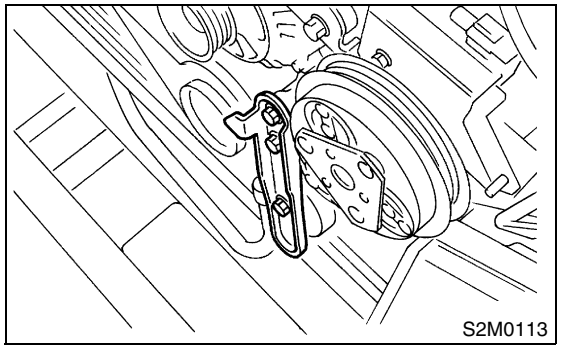


2. REAR SIDE BELT

1) Loosen the lock nut (A).
2) Loosen the slider bolt (B).



3) Remove the rear side belt.
4) Remove the rear side belt tensioner.



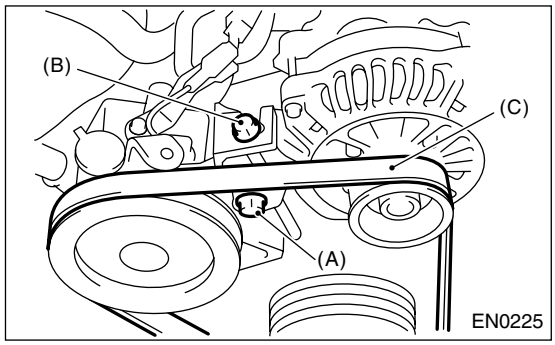
B: INSTALLATION

1. FRONT SIDE BELT

CAUTION:
Wipe off any oil or water on the belt and pulley.

1) Install the front side belt (C), and tighten the slider bolt so as to obtain the specified belt tension <Ref. to ME(STi)-44, INSPECTION, V-belt.>
2) Tighten the lock bolt (A)
3) Tighten slider bolt (B).

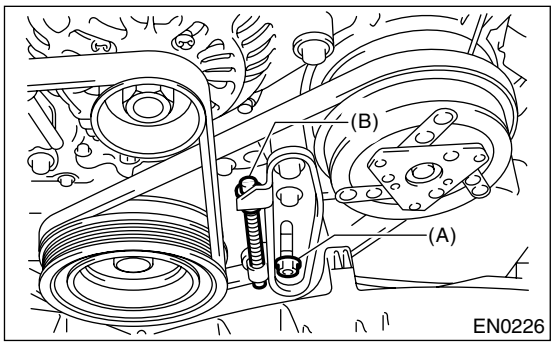
Tightening torque:
Lock bolt through bolt:
25 N·m (2.5 kgf-m, 18 ft-lb)
Slider bolt:
8 N·m (0.8 kgf-m, 5.5 ft-lb)



2. REAR SIDE BELT

1) Install the rear side belt, and tighten the slider bolt (B) so as to obtain the specified belt tension. <Ref. to ME(STi)-44, INSPECTION, V-belt.>
2) Tighten the lock nut (A).

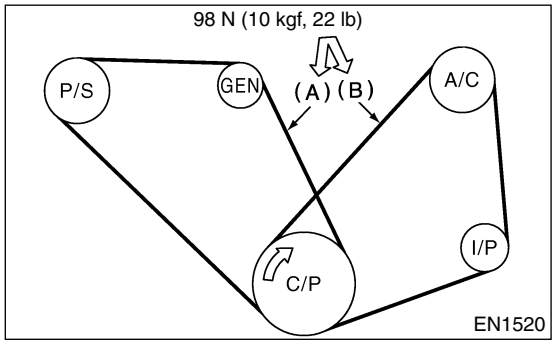
Tightening torque:
Lock nut (A);
22.6 N·m (2.3 kgf-m, 16.6 ft-lb)



C: INSPECTION

1) Replace the belts, if cracks, fraying or wear is found.
2) Check the drive belt tension and adjust it if necessary by changing generator installing position and/or idler pulley installing position.

Belt tension
(A)
replaced: 7 — 9 mm (0.276 — 0.354 in)
reused: 9 — 11 mm (0.354 — 0.433 in)
(B)*
replaced: 7.5 — 8.5 mm (0.295 — 0.335 in)
reused: 9.0 — 10.0 mm (0.354 — 0.394 in)
****: With Air conditioner***

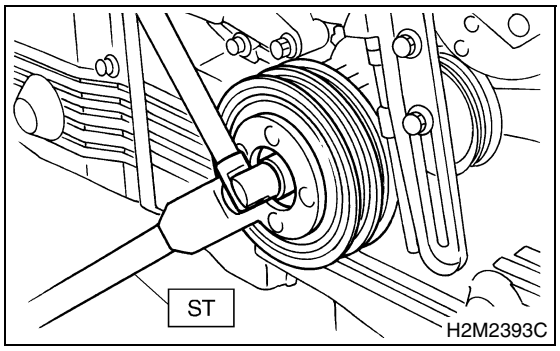


C/P	Crankshaft pulley
GEN	Generator
P/S	Power steering oil pump pulley
A/C	Air conditioning compressor pulley
I/P	Idler pulley

13.Crankshaft Pulley

A: REMOVAL

1) Remove the V-belt. <Ref. to ME(STi)-43, REMOVAL, V-belt.>
2) Remove the crankshaft pulley bolt. To lock the crankshaft, use ST.
ST 499977300
CRANK PULLEY WRENCH

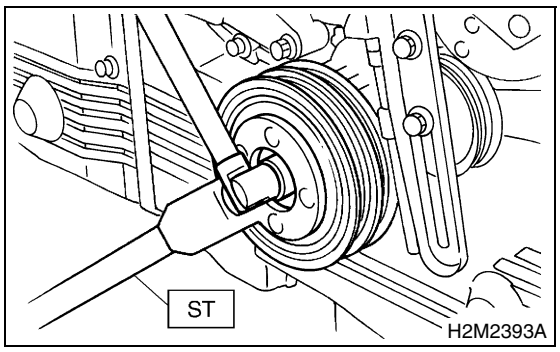


3) Remove the crankshaft pulley.

B: INSTALLATION

1) Install the crankshaft pulley.
2) Install the pulley bolt.
To lock the crankshaft, use ST.
ST 499977300 CRANK PULLEY WRENCH
(1) Clean the crankshaft pulley thread using an air gun.
(2) Apply engine oil to the crankshaft pulley bolt seat, thread and washer.
(3) Tighten the bolts with tightening torque of 157 N·m (16.0 kgf-m, 116 ft-lb).
(4) Loosen the bolts by 180°.
(5) Tighten the crankshaft pulley bolts.

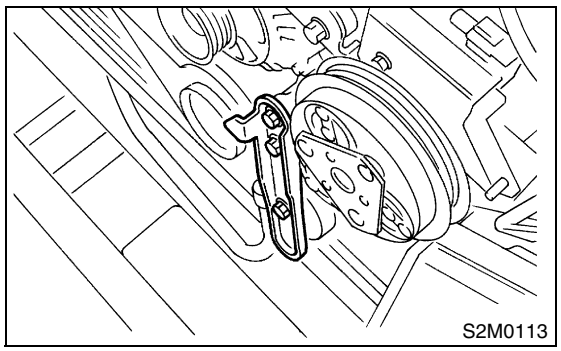
Tightening torque:
157 N·m (16 kgf-m, 116 ft-lb)



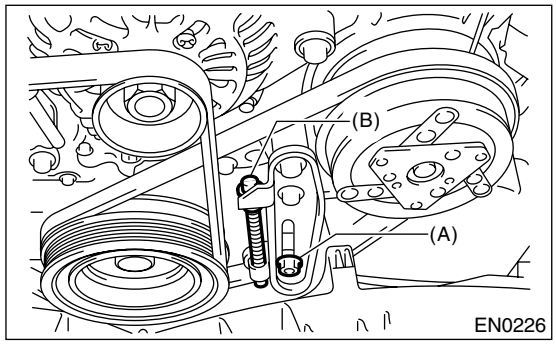
3) Confirm that the tightening angle of the crankshaft pulley bolt is 45° or more. If not, conduct the following procedures (1) through (4).
• Replace the crankshaft pulley bolts and clean them.

CAUTION:
Conduct the tightening procedures by confirming the turning angle of the crankshaft pulley bolt referring to the gauge indicated on the belt cover.

4) Install the rear side belt tensioner.



5) Install the rear side belt.



(A) Lock nut
(B) Slider bolt

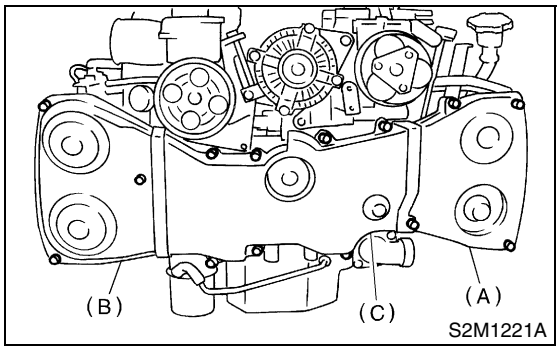
C: INSPECTION

1) Make sure the V-belt is not worn or otherwise damaged.
2) Check the tension of the belt. <Ref. to ME(STi)-44, INSPECTION, V-belt.>

14.Belt Cover

A: REMOVAL

1) Remove the V-belt. <Ref. to ME(STi)-43, REMOVAL, V-belt.>
2) Remove the crankshaft pulley. <Ref. to ME(STi)-45, REMOVAL, Crankshaft Pulley.>
3) Remove the left-hand belt cover (A).
4) Remove the right-hand belt cover (B).
5) Remove the front belt cover (C).



B: INSTALLATION

1) Install the front belt cover (C).

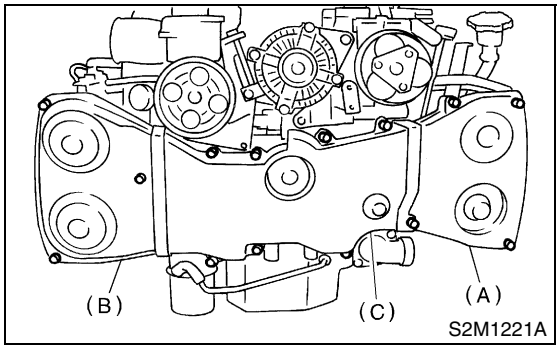
Tightening torque:
5 N·m (0.5 kgf-m, 3.6 ft-lb)

2) Install the right-hand belt cover (B).

Tightening torque:
5 N·m (0.5 kgf-m, 3.6 ft-lb)

3) Install the left-hand belt cover (A).

Tightening torque:
5 N·m (0.5 kgf-m, 3.6 ft-lb)



4) Install the crankshaft pulley. <Ref. to ME(STi)-45, INSTALLATION, Crankshaft Pulley.>
5) Install the V-belt. <Ref. to ME(STi)-43, INSTALLATION, V-belt.>

C: INSPECTION

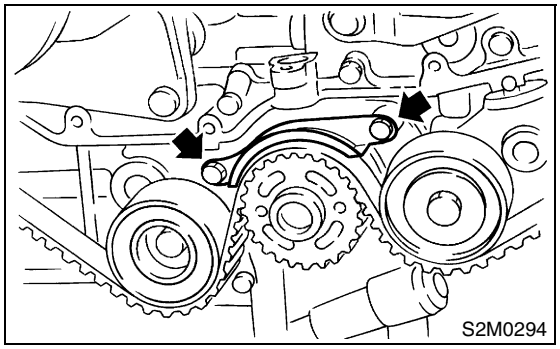
Make sure the cover is not damaged.

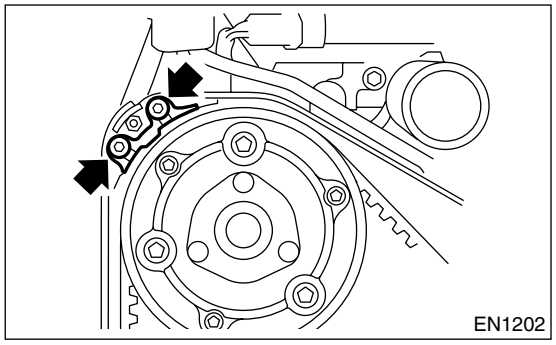
15.Timing Belt Assembly

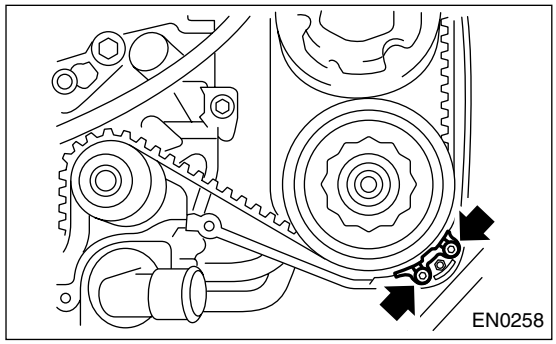
A: REMOVAL

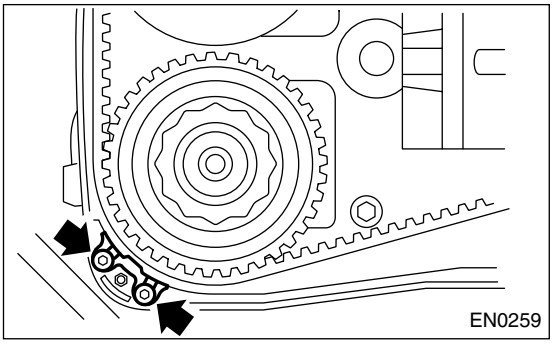
1. TIMING BELT

1) Remove the V-belt. <Ref. to ME(STi)-43, REMOVAL, V-belt.>
2) Remove the crankshaft pulley. <Ref. to ME(STi)-45, REMOVAL, Crankshaft Pulley.>
3) Remove the belt cover. <Ref. to ME(STi)-46, REMOVAL, Belt Cover.>
4) Remove the timing belt guides.


S2M0294

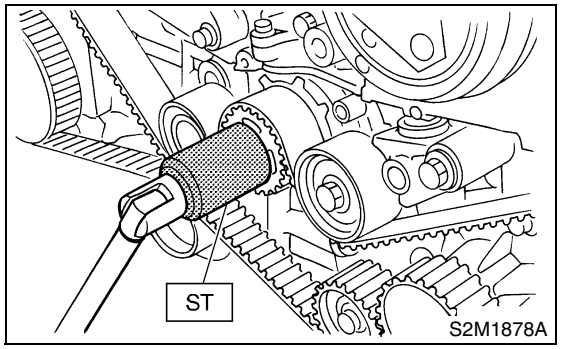

EN1202


EN0258


EN0259

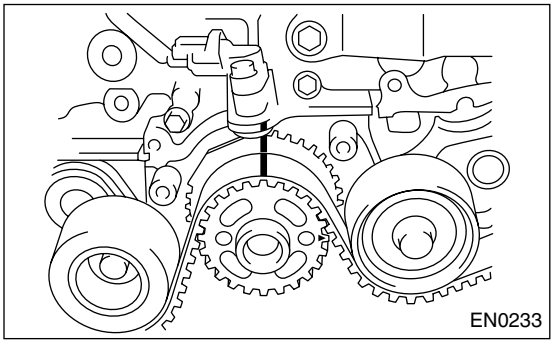
5) If the alignment mark and/or arrow mark (which indicates rotation direction) on timing belt fade away, put new marks before removing the timing belt as follows:
   (1) Turn the crankshaft using ST, and align alignment marks on crankshaft sprocket, left-hand intake camshaft sprocket, left-hand exhaust camshaft sprocket, right-hand intake camshaft sprocket and right hand exhaust camshaft sprocket with notches of belt cover and cylinder block.

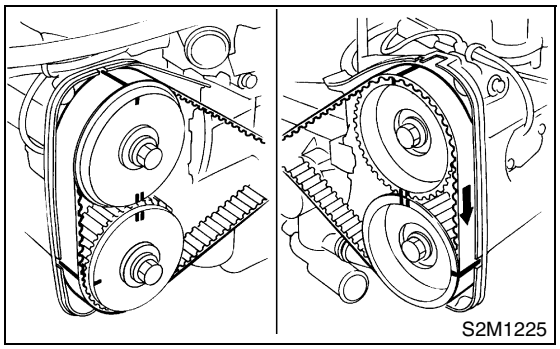
ST 499987500 CRANKSHAFT SOCKET



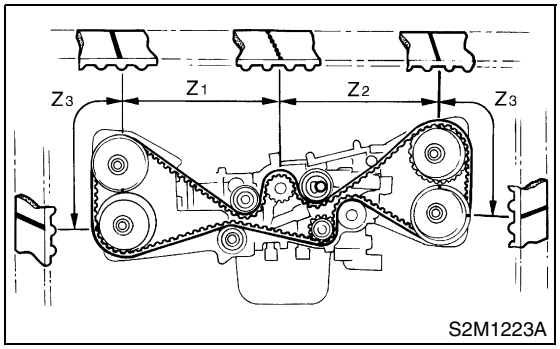
S2M1878A

(2) Using a white paint, put alignment and/or arrow marks on timing belts in relation to the sprockets.


EN0233

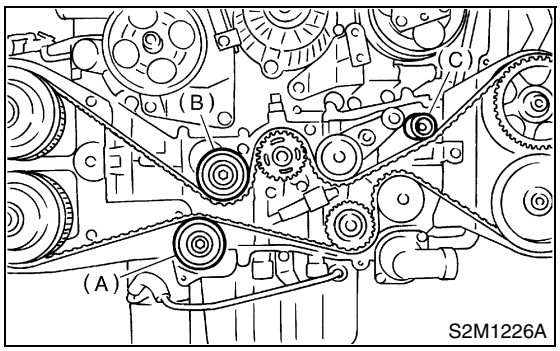

S2M1225

Z_1: 54.5 tooth length
Z_2: 51 tooth length
Z_3: 28 tooth length



S2M1223A

6) Remove the belt idler (A).



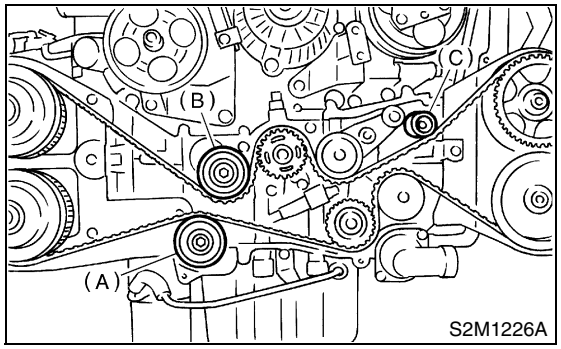
S2M1226A

7) Remove the timing belt.

CAUTION:
After the timing belt has been removed, never rotate intake and exhaust, camshaft sprocket. If the camshaft sprocket is rotated, the intake and exhaust valve heads strike together and valve stems are bent.

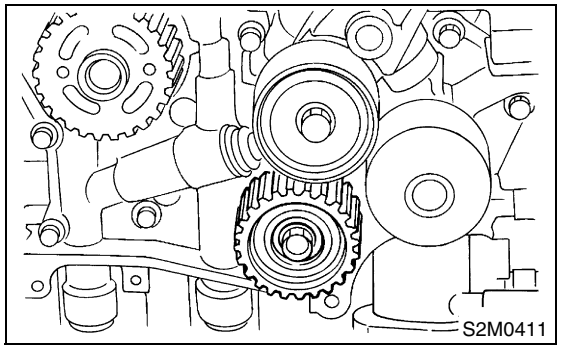
2. BELT IDLER AND AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY

1) Remove the belt idler (B) and (C).

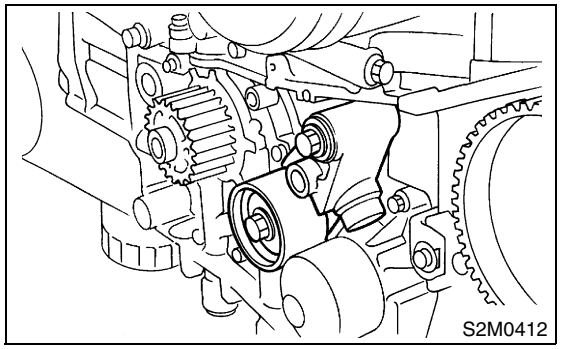


S2M1226A

2) Remove the belt idler No. 2.


S2M0411

3) Remove the automatic belt tension adjuster assembly.


S2M0412

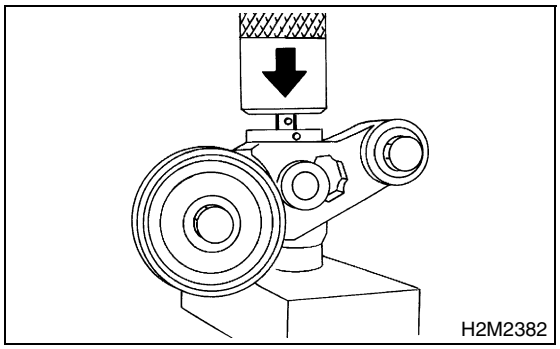
B: INSTALLATION

1. AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY AND BELT IDLER

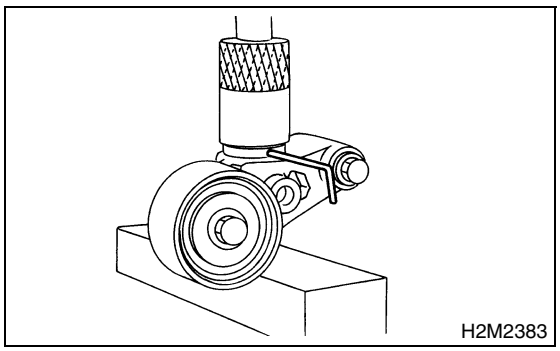
1) Preparation for installation of automatic belt tension adjuster assembly:

CAUTION:
• Always use a vertical type pressing tool to move the adjuster rod down.
• Do not use a lateral type vise.
• Push the adjuster rod vertically.
• Be sure to slowly move the adjuster rod down applying a pressure of 294 N (30 kgf, 66 lb).
• Press-in the push adjuster rod gradually taking more than three minutes.
• Do not allow press pressure to exceed 9,807 N (1,000 kgf, 2,205 lb).
• Press the adjuster rod as far as the end surface of the cylinder. Do not press the adjuster rod into the cylinder. Doing so may damage the cylinder.
• Do not release press pressure until stopper pin is completely inserted.

(1) Attach the automatic belt tension adjuster assembly to the vertical pressing tool.
(2) Slowly move the adjuster rod down with a pressure of 294 N (30 kgf, 66 lb) until the adjuster rod is aligned with the stopper pin hole in the cylinder.

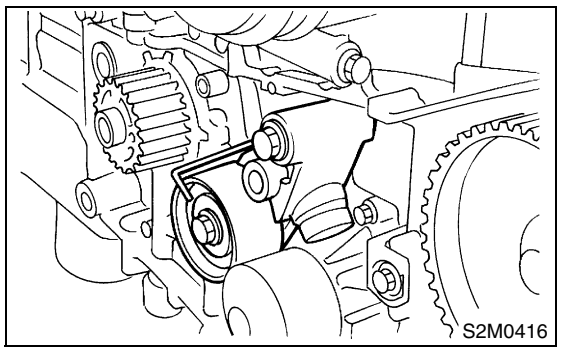

H2M2382

(3) With a 2 mm (0.08 in) dia. stopper pin or a 2 mm (0.08 in) (nominal) dia. hex bar wrench inserted into the stopper pin hole in the cylinder, secure the adjuster rod.


H2M2383

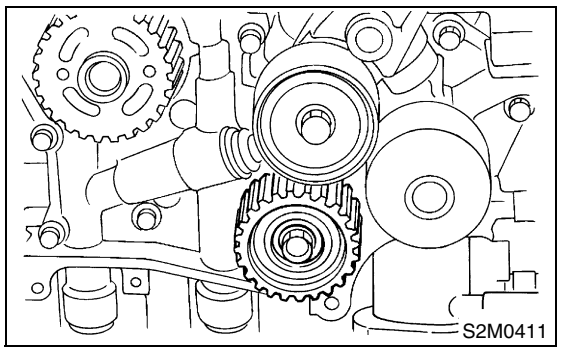
2) Install the automatic belt tension adjuster assembly.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)


S2M0416

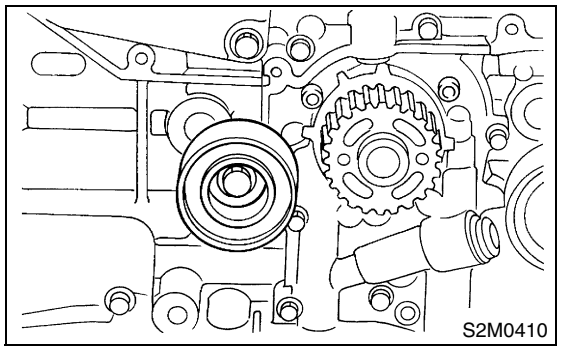
3) Install the belt idler No. 2.

Tightening torque:
39 N·m (4.0 kgf-m, 28.9 ft-lb)


S2M0411

4) Install the belt idler.

Tightening torque:
39 N·m (4.0 kgf-m, 28.9 ft-lb)

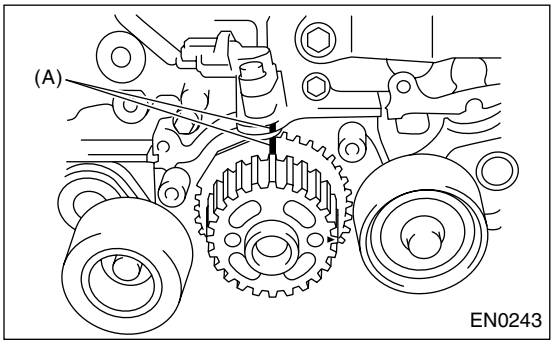

S2M0410

2. TIMING BELT

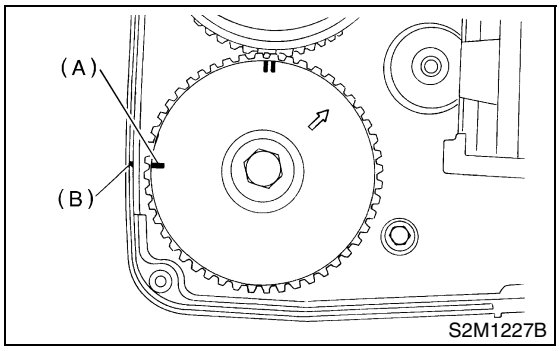
1) Preparation for installation of automatic belt tension adjuster assembly. <Ref. to ME(STi)-49, AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY AND BELT IDLER, Timing Belt Assembly.>

2) Crankshaft and camshaft sprocket alignment.

(1) Align mark (A) on the crankshaft sprocket with mark on the oil pump cover at cylinder block.

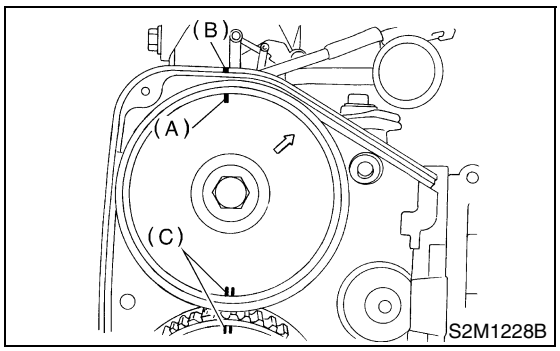


(2) Align single line mark (A) on the right-hand exhaust camshaft sprocket with notch (B) on belt cover.

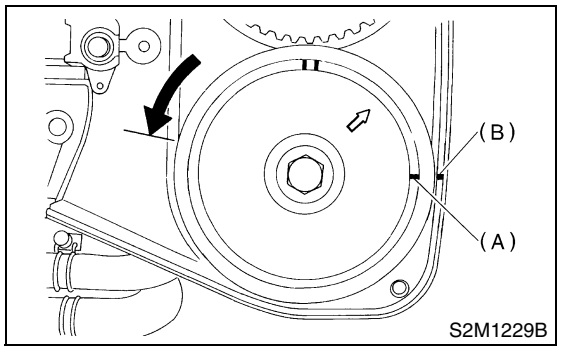


(3) Align single line mark (A) on the right-hand intake camshaft sprocket with notch (B) on belt cover.

(Ensure sure double lines (C) on the intake camshaft and exhaust camshaft sprockets are aligned.)

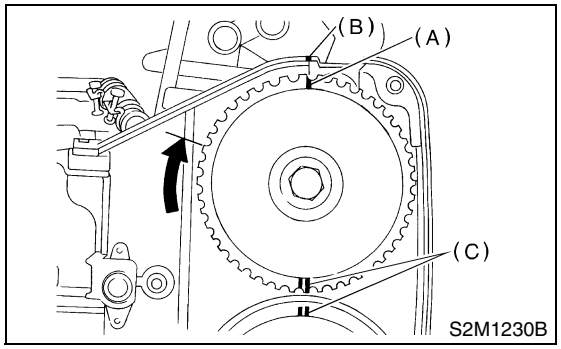


(4) Align single line mark (A) on the left-hand exhaust camshaft sprocket with notch (B) on belt cover by turning sprocket counterclockwise (as viewed from front of engine).



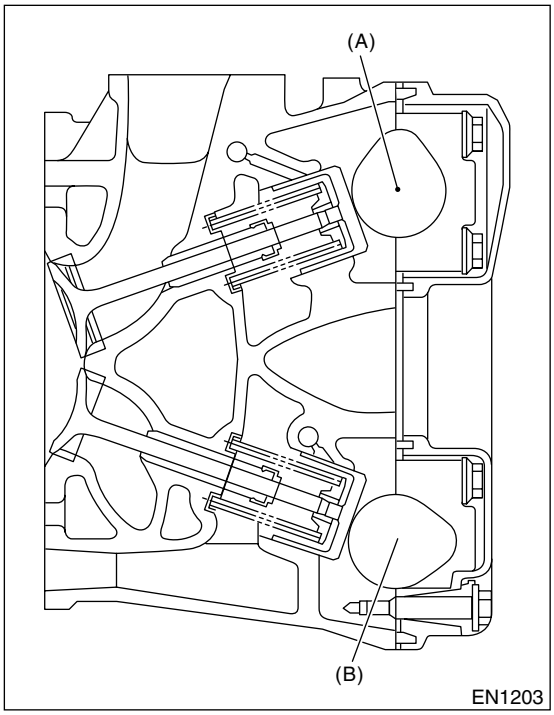
(5) Align single line mark (A) on the left-hand intake camshaft sprocket with notch (B) on belt cover by turning sprocket clockwise (as viewed from front of engine).

Ensure double lines (C) on the intake and exhaust camshaft sprockets are aligned.



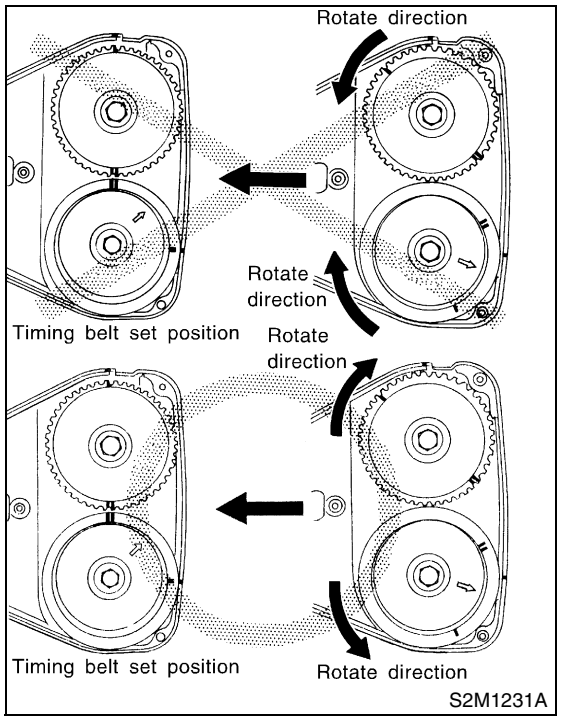
(6) Ensure the camshaft and crankshaft sprockets are positioned properly.

CAUTION:
• Intake and exhaust camshafts for this DOHC engine can be independently rotated with timing belts removed. As can be seen from the figure, if intake and exhaust valves are lifted simultaneously, their heads will interfere with each other, resulting in bent valves.

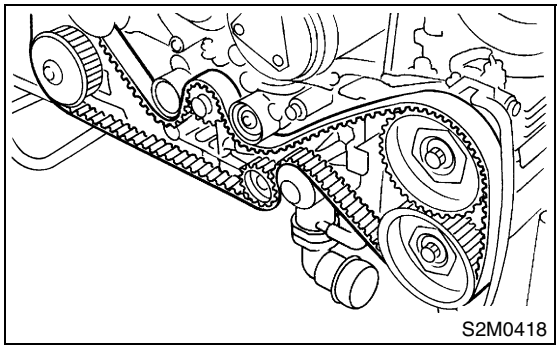


(A) Intake camshaft
(B) Exhaust camshaft

• When the timing belts are not installed, four camshafts are held at the "zero-lift" position, where all cams on camshafts do not push intake and exhaust valves down. (Under this condition, all valves remain unlifted.)
• When the camshafts are rotated to install timing belts, #2 intake and #4 exhaust cam of left-hand camshafts are held to push their corresponding valves down. (Under this condition, these valves are held lifted.) Right-side camshafts are held so that their cams do not push valves down.
• Left-hand camshafts must be rotated from the "zero-lift" position to the position where timing belt is to be installed at as small an angle as possible, in order to prevent mutual interference of intake and exhaust valve heads.
• Do not allow the camshafts to rotate in the direction shown in the figure as this causes both intake and exhaust valves to lift simultaneously, resulting in interference with their heads.

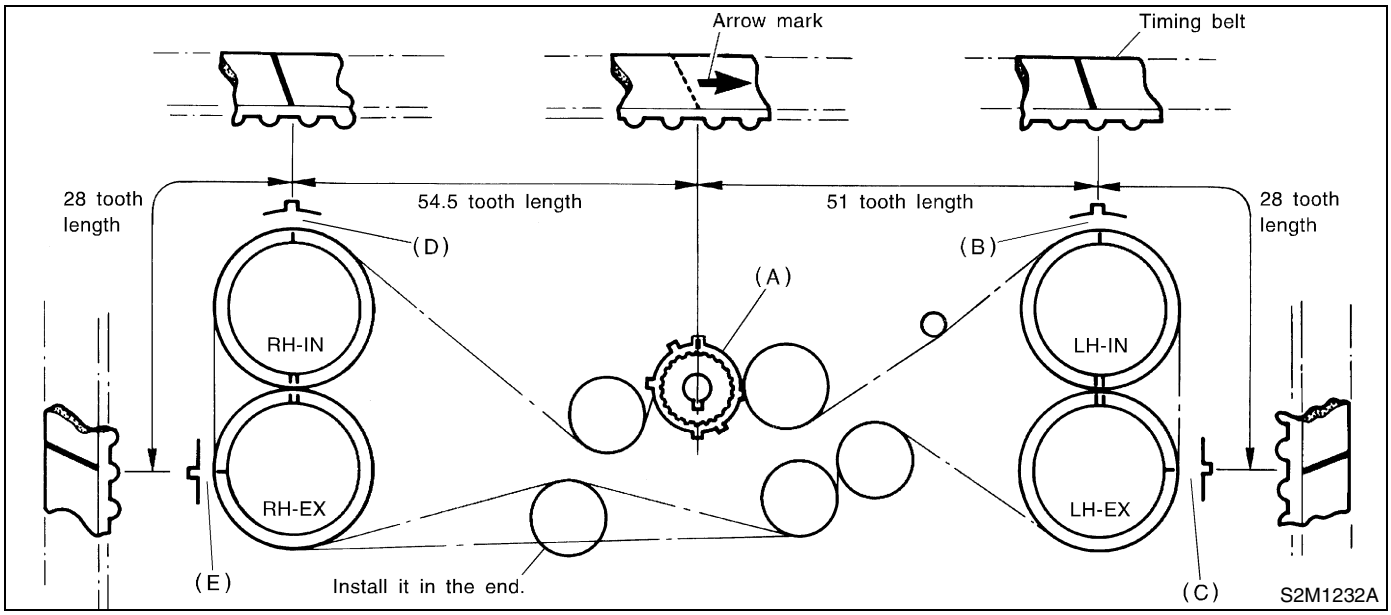


3) Installation of timing belt:



Align alignment mark on the timing belt with marks on sprockets in the alphabetical order shown in the figure. While aligning marks, position the timing belt properly.

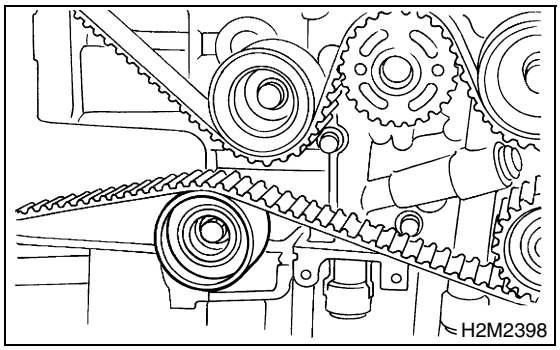
CAUTION:
• Disengagement of more than three timing belt teeth may result in interference between the valve and piston.
• Ensure the belt's rotating direction is correct.



4) Install the belt idlers.

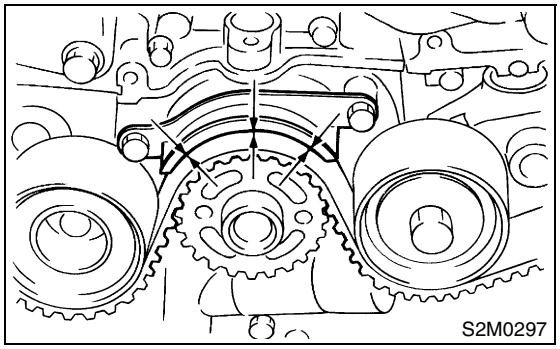
Tightening torque:
39 N·m (4.0 kgf-m, 28.9 ft-lb)

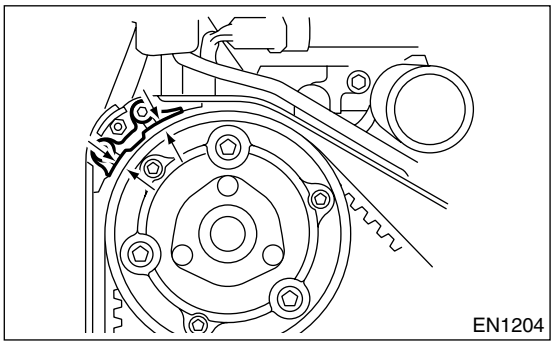
CAUTION:
Make sure that the marks on timing belt and sprockets are aligned.

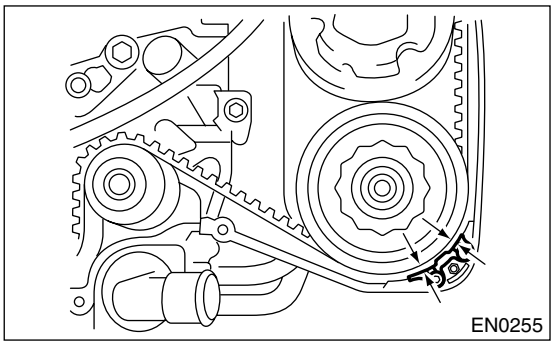


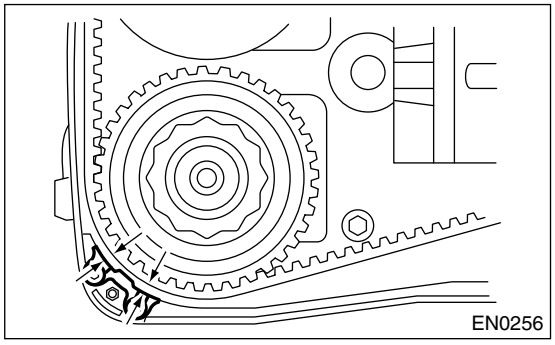
5) After ensuring that the marks on the timing belt and sprockets are aligned, remove the stopper pin from tensioner adjuster.
6) Install the timing belt guide.
(1) Temporarily tighten the remaining bolts.
(2) Check and adjust clearance between the timing belt and timing belt guide.

Clearance:
1.0±0.5 mm (0.039±0.020 in)



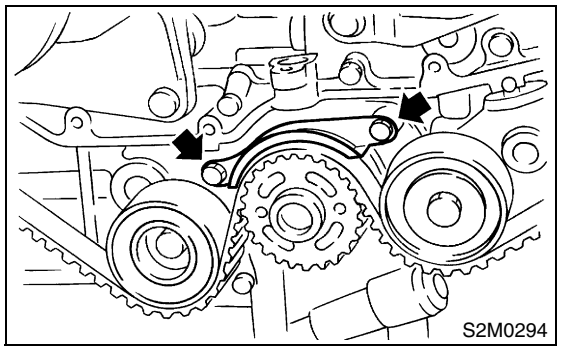


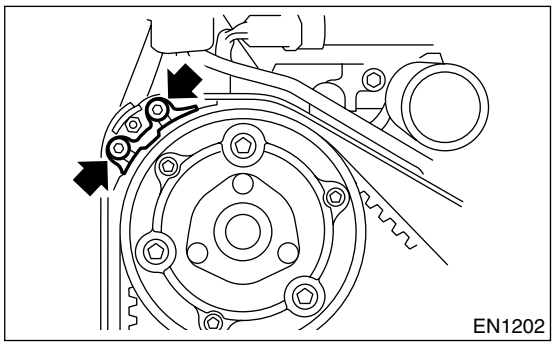


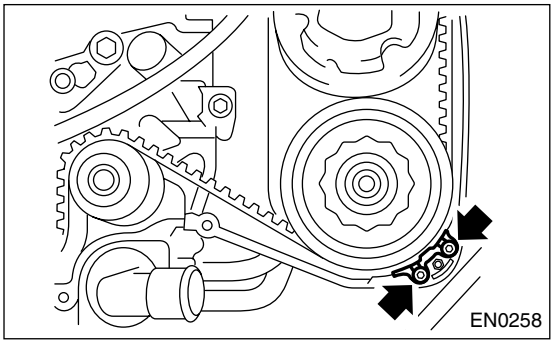


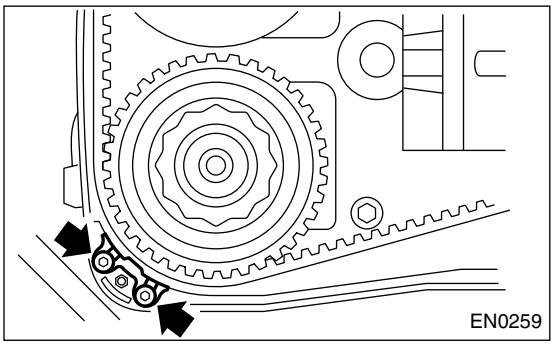
(3) Tighten the remaining bolts.

Tightening torque:
9.8 N·m (1.0 kgf-m, 7.2 ft-lb)









7) Install the belt cover. <Ref. to ME(STi)-46, INSTALLATION, Belt Cover.>
8) Install the crankshaft pulley. <Ref. to ME(STi)-45, REMOVAL, Crankshaft Pulley.>
9) Install the V-belt. <Ref. to ME(STi)-43, INSTALLATION, V-belt.>

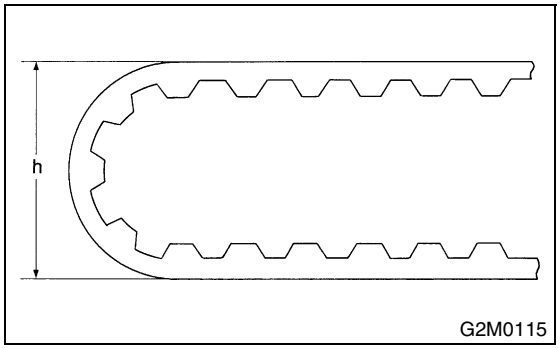
C: INSPECTION

1. TIMING BELT

1) Check the timing belt teeth for breaks, cracks, and wear. If any fault is found, replace the belt.
2) Check the condition of back side of belt; if any crack is found, replace the belt.

CAUTION:
• Be careful not to let oil, grease or coolant contact the belt. Remove quickly and thoroughly if this happens.
• Do not bend the belt sharply.

Bending radius: h
60 mm (2.36 in) or more



2. AUTOMATIC BELT TENSION ADJUSTER

1) Visually check oil seals for leaks, and rod ends for abnormal wear or scratches. If necessary, replace the automatic belt tension adjuster assembly.

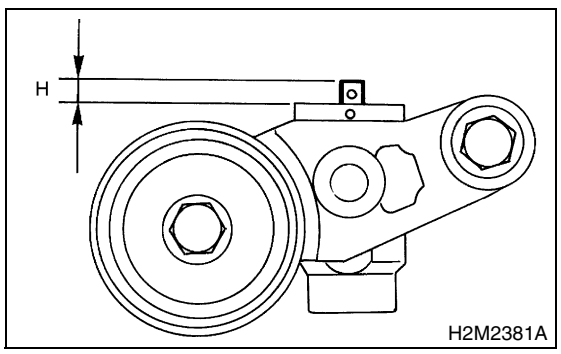
CAUTION:
Slight traces of oil at rod's oil seal does not indicate a problem.

2) Check that the adjuster rod does not move when a pressure of 294 N (30 kgf, 66 lb) is applied to it. This is to check adjuster rod stiffness.
3) If the adjuster rod is not stiff and moves freely when applying 294 N (30 kgf, 66 lb), check it using the following procedures:
(1) Slowly press the adjuster rod down to the end surface of the cylinder. Repeat this motion 2 or 3 times.
(2) With the adjuster rod moved all the way up, apply a pressure of 294 N (30 kgf, 66 lb) to it. Check adjuster rod stiffness.
(3) If the adjuster rod is not stiff and moves down, replace the automatic belt tension adjuster assembly with a new one.

CAUTION:
• Always use a vertical type pressing tool to move the adjuster rod down.
• Do not use a lateral type vise.
• Push the adjuster rod vertically.
• Press-in the push adjuster rod gradually taking more than three minutes.
• Do not allow press pressure to exceed 9,807 N (1,000 kgf, 2,205 lb).
• Press the adjuster rod as far as the end surface of the cylinder. Do not press the adjuster rod into the cylinder. Doing so may damage the cylinder.

4) Measure the extension of rod beyond the body. If it is not within specifications, replace with a new one.

Rod extension: H
5.7±0.5 mm (0.224±0.020 in)



3. BELT TENSION PULLEY

1) Check the mating surfaces of timing belt and contact point of adjuster rod for abnormal wear or scratches. Replace the belt tension pulley if faulty.
2) Check the belt tension pulley for smooth rotation. Replace if noise or excessive play is noted.
3) Check the belt tension pulley for grease leakage.

4. BELT IDLER

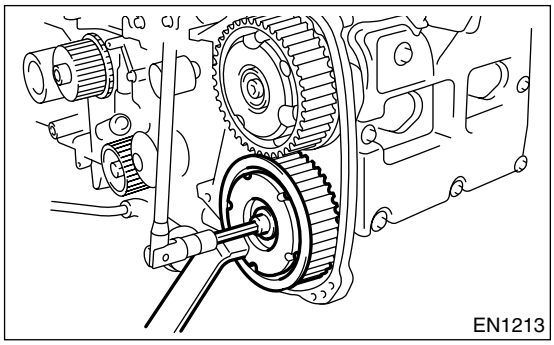
1) Check the idler for smooth rotation. Replace if noise or excessive play is noted.
2) Check the outer contacting surfaces of idler pulley for abnormal wear and scratches.
3) Check the idler for grease leakage.

16.Camshaft Sprocket

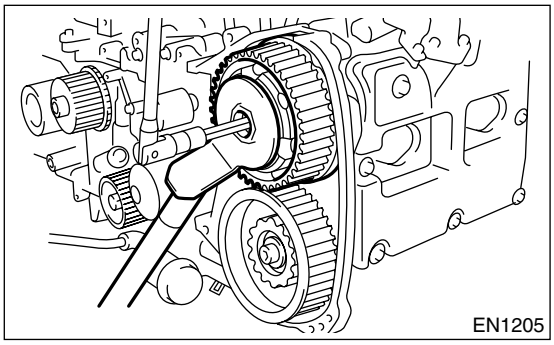
A: REMOVAL

1) Remove the V-belt. <Ref. to ME(STi)-43, REMOVAL, V-belt.>
2) Remove the crankshaft pulley. <Ref. to ME(STi)-45, REMOVAL, Crankshaft Pulley.>
3) Remove the belt cover. <Ref. to ME(STi)-46, REMOVAL, Belt Cover.>
4) Remove the timing belt assembly. <Ref. to ME(STi)-47, REMOVAL, Timing Belt Assembly.>
5) Remove the camshaft position sensor. <Ref. to FU(TURBO)-31, REMOVAL, Camshaft Position Sensor.>
6) Remove the camshaft sprockets. To lock the camshaft, use ST.

ST 499207400 CAMSHAFT SPROCKET WRENCH



ST 499977500 CAMSHAFT SPROCKET WRENCH



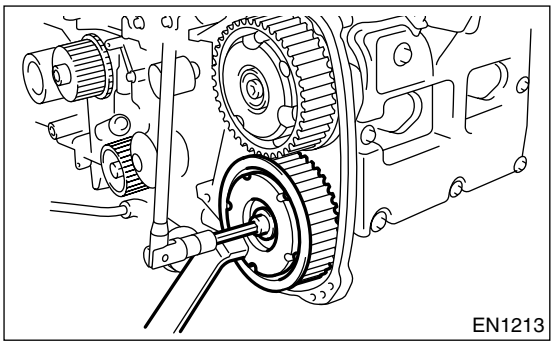
B: INSTALLATION

1) Install the camshaft sprocket No. 1. and No. 2. To lock the camshaft, use ST.

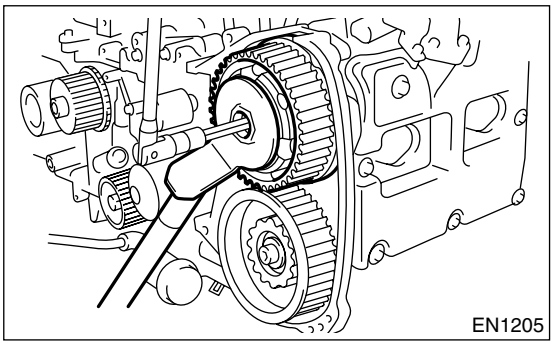
ST 499207400 CAMSHAFT SPROCKET WRENCH

Tightening torque:
98 N·m (10 kgf-m, 72.4 ft-lb)

CAUTION:
Do not confuse right and left side camshaft sprockets during installation. The camshaft sprocket No. 2 is identified by a projection used to monitor camshaft position sensor.



ST 499977500 CAMSHAFT SPROCKET WRENCH



2) Install the camshaft position sensor. <Ref. to FU(TURBO)-31, INSTALLATION, Camshaft Position Sensor.>
3) Install the timing belt assembly. <Ref. to ME(STi)-49, INSTALLATION, Timing Belt Assembly.>
4) Install the belt cover. <Ref. to ME(STi)-46, INSTALLATION, Belt Cover.>
5) Install the crankshaft pulley. <Ref. to ME(STi)-45, INSTALLATION, Crankshaft Pulley.>
6) Install the V-belt. <Ref. to ME(STi)-43, INSTALLATION, V-belt.>

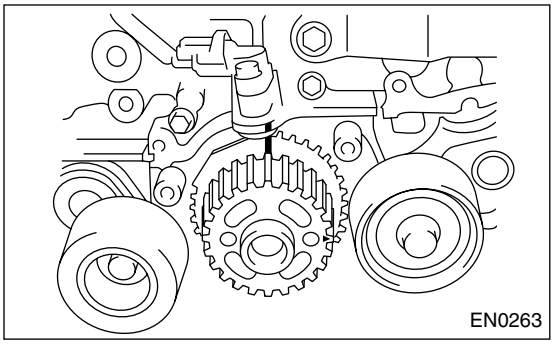
C: INSPECTION

1) Check the sprocket teeth for abnormal wear and scratches.
2) Make sure there is no free play between the sprocket and key.
3) Check the crankshaft sprocket notch for sensor for damage and contamination of foreign matter.

17.Crankshaft Sprocket

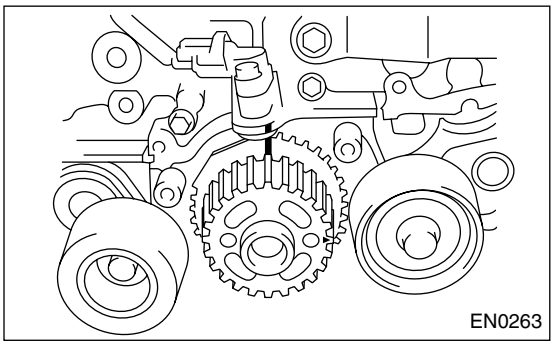
A: REMOVAL

1) Remove the V-belt. <Ref. to ME(STi)-43, REMOVAL, V-belt.>
2) Remove the crankshaft pulley. <Ref. to ME(STi)-45, REMOVAL, Crankshaft Pulley.>
3) Remove the belt cover. <Ref. to ME(STi)-46, REMOVAL, Belt Cover.>
4) Remove the timing belt assembly. <Ref. to ME(STi)-47, REMOVAL, Timing Belt Assembly.>
5) Remove the camshaft sprocket. <Ref. to ME(STi)-56, REMOVAL, Camshaft Sprocket.>
6) Remove the crankshaft sprocket.



B: INSTALLATION

1) Install the crankshaft sprocket.



2) Install the camshaft sprocket. <Ref. to ME(STi)-56, INSTALLATION, Camshaft Sprocket.>
3) Install the timing belt assembly. <Ref. to ME(STi)-49, INSTALLATION, Timing Belt Assembly.>
4) Install the belt cover. <Ref. to ME(STi)-46, INSTALLATION, Belt Cover.>
5) Install the crankshaft pulley. <Ref. to ME(STi)-45, INSTALLATION, Crankshaft Pulley.>
6) Install the V-belt. <Ref. to ME(STi)-43, INSTALLATION, V-belt.>

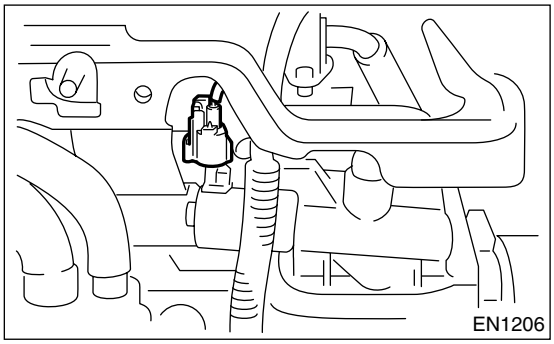
C: INSPECTION

1) Check the sprocket teeth for abnormal wear and scratches.
2) Make sure there is no free play between the sprocket and key.
3) Check the crankshaft sprocket notch for sensor for damage and contamination of foreign matter.

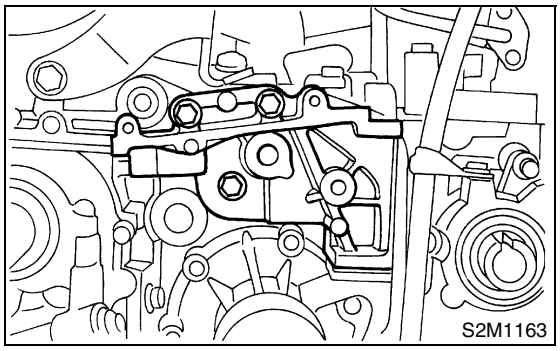
18.Camshaft

A: REMOVAL

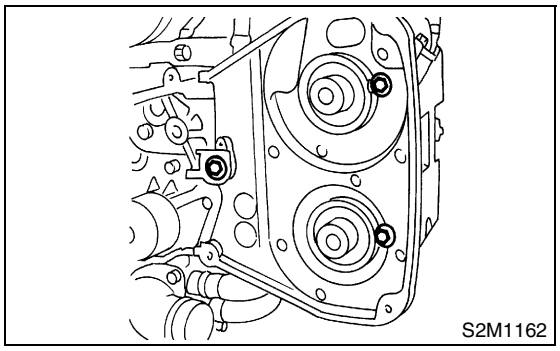
1) Remove the V-belt. <Ref. to ME(STi)-43, INSTALLATION, V-belt.>
2) Remove the crankshaft pulley. <Ref. to ME(STi)-45, REMOVAL, Crankshaft Pulley.>
3) Remove the belt cover. <Ref. to ME(STi)-46, REMOVAL, Belt Cover.>
4) Remove the timing belt assembly. <Ref. to ME(STi)-47, REMOVAL, Timing Belt Assembly.>
5) Remove the camshaft sprocket. <Ref. to ME(STi)-56, REMOVAL, Camshaft Sprocket.>
6) Remove the crankshaft sprocket. <Ref. to ME(STi)-58, REMOVAL, Crankshaft Sprocket.>
7) Disconnect the variable valve timing solenoid valve assembly connector.


EN1206

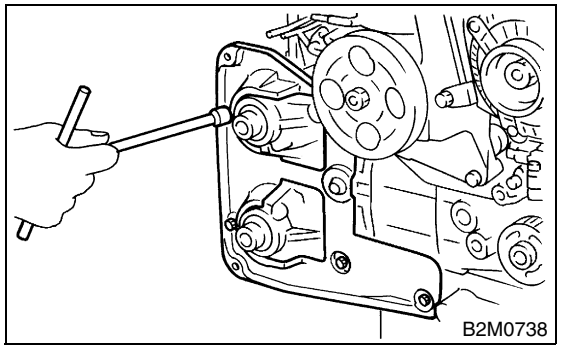
8) Remove the tensioner bracket.


S2M1163

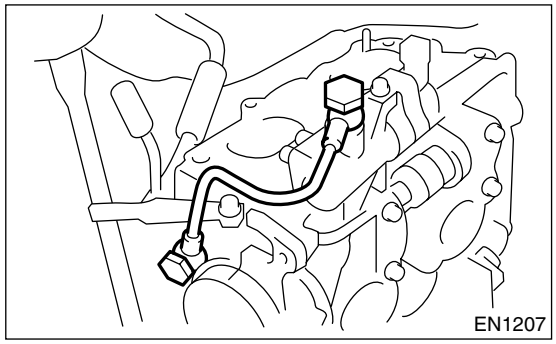
9) Remove the left-hand belt cover No. 2.


S2M1162

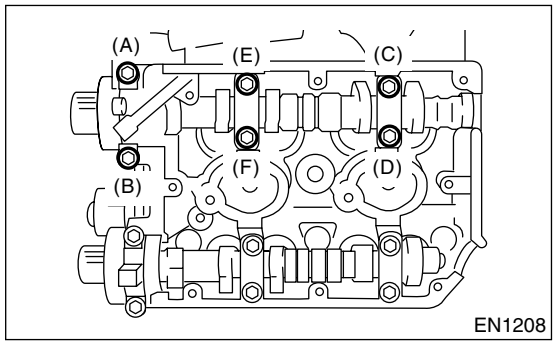
10) Remove the right-hand belt cover No.2.


B2M0738

11) Remove the spark plug cord.
12) Remove the oil level gauge guide. (LH side only)
13) Remove the rocker cover and gasket.
14) Remove the oil pipe.


EN1207

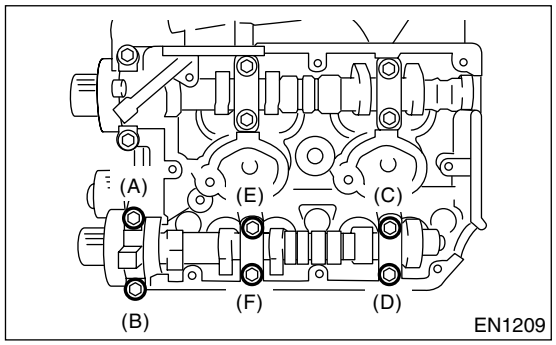
15) Loosen the variable valve timing solenoid valve assembly and intake camshaft cap bolts equally, a little at a time in alphabetical sequence shown in the figure.



EN1208

16) Remove the oil control valve assembly, intake camshaft cap, and camshaft.

17) Loosen the exhaust camshaft cap bolts equally, a little at a time in alphabetical sequence shown in the figure.



18) Remove the exhaust camshaft cap and camshaft.

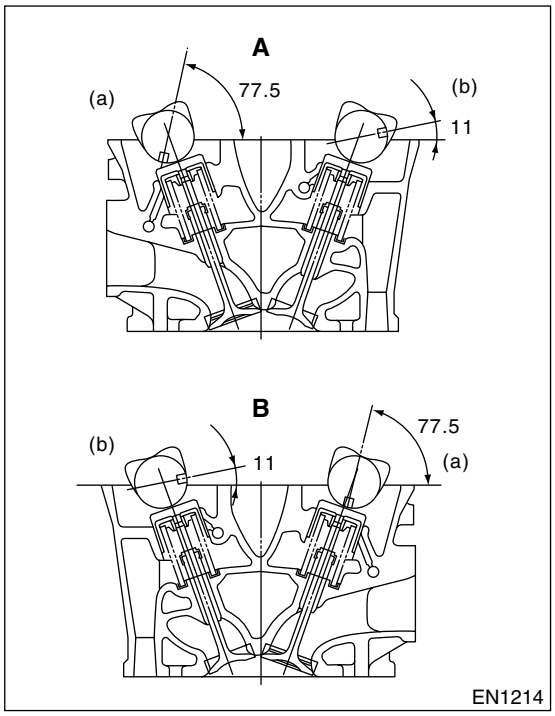
CAUTION:
Arrange the camshaft caps in order so that they can be installed in their original positions.

19) Similarly, remove the right-hand camshafts and related parts.

B: INSTALLATION

1) Camshaft installation:
Apply engine oil to cylinder head at camshaft bearing location before installing the camshaft. Install the camshaft so that each valve is close to or in contact with “base circle” of cam lobe.

CAUTION:
• When the camshafts are positioned as shown in the figure, camshafts need to be rotated at a minimum to align with the timing belt during installation.
• Right-hand camshaft need not be rotated when set at position shown in the figure.
Left-hand intake camshaft: Rotate 80° clockwise.
Left-hand exhaust camshaft: Rotate 45° counterclockwise.



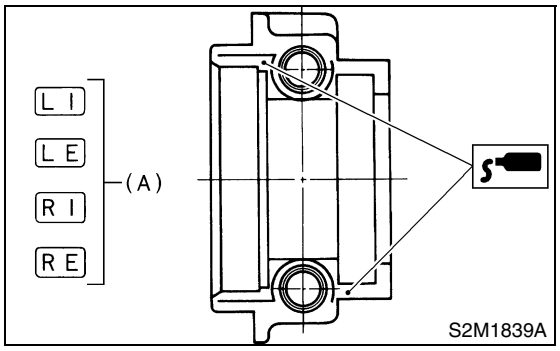
A Left side cylinder head
B Right side cylinder head
(a) Intake camshaft
(b) Exhaust camshaft

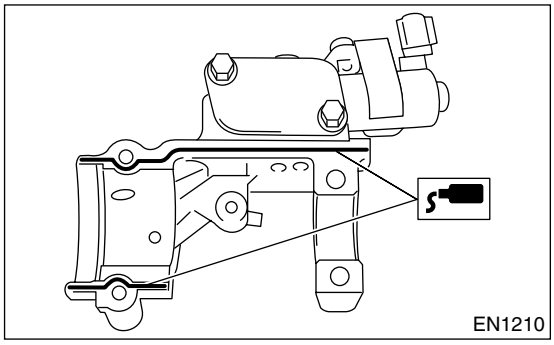
2) Camshaft cap and variable valve timing solenoid valve assembly installation:

(1) Apply fluid packing sparingly to cap mating surface.

CAUTION:
Do not apply fluid packing excessively. Failure to do so may cause excess packing to come out and flow toward the oil seal, resulting in oil leaks.

Fluid packing:
THREE BOND 1215 or equivalent

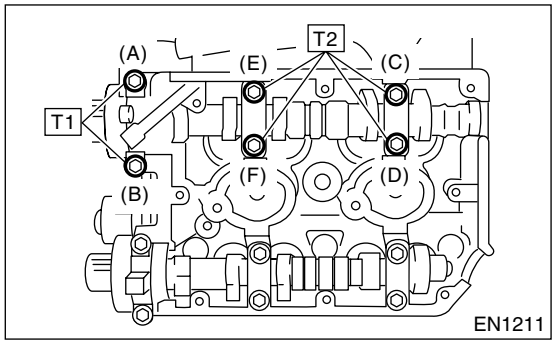




(2) Apply engine oil to cap bearing surface and install the cap on camshaft as shown by identification mark (A).

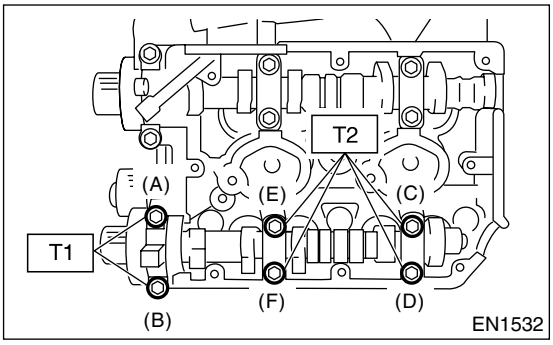
(3) Gradually tighten the camshaft cap and oil control valve assembly in at least two stages in alphabetical sequence shown in the figure, and then tighten to specified torque.

Tightening torque:
T1: 10 N·m (1.0 kgf-m, 7 ft-lb)
T2: 20 N·m (2.0 kgf-m, 14.5 ft-lb)



(4) Similarly, tighten cap on the exhaust side. After tightening cap, ensure the camshaft rotates only slightly while holding it at “base” circle.

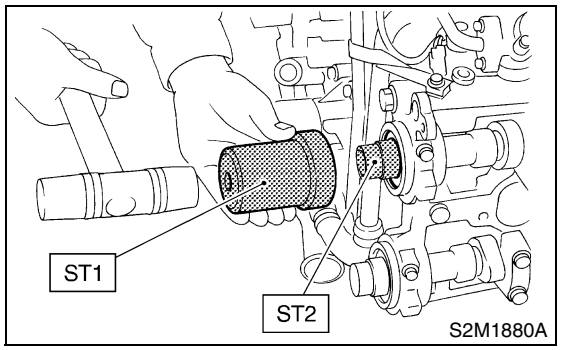
Tightening torque:
T1: 10 N·m (1.0 kgf-m, 7 ft-lb)
T2: 20 N·m (2.0 kgf-m, 14.5 ft-lb)



3) Camshaft oil seal installation:
Apply grease to new oil seal lips and press onto front end of camshaft by using ST1 and ST2.

NOTE:
Use a new oil seal.

ST1	499587600	OIL SEAL GUIDE
ST2	499597200	OIL SEAL GUIDE

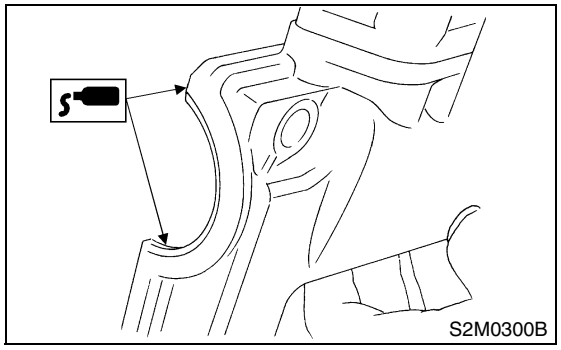


4) Rocker cover installation:

(1) Install the gasket on rocker cover.
Install the peripheral gasket and ignition coil gasket.

(2) Apply fluid packing to four front open edges of peripheral gasket.

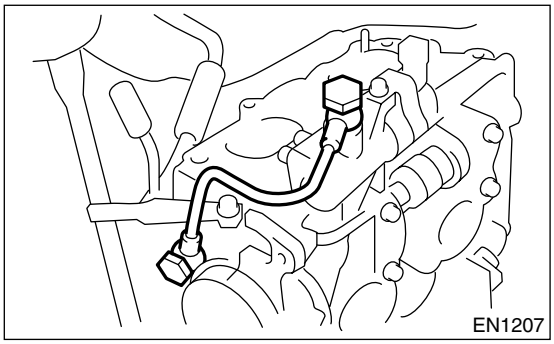
Fluid packing:
THREE BOND 1215 or equivalent



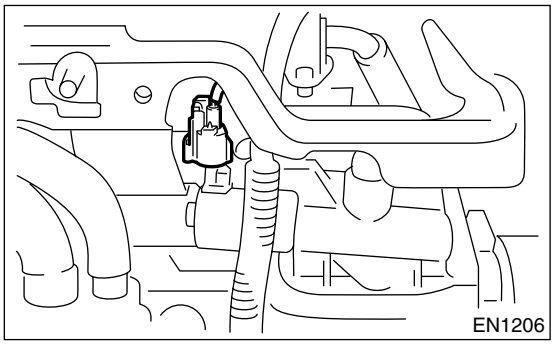
(3) Install the rocker cover on cylinder head. Ensure the gasket is properly positioned during installation.

5) Install the oil pipe.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)

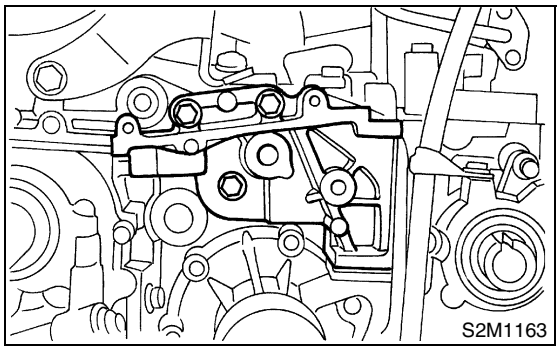


6) Connect the variable valve timing solenoid valve connector.



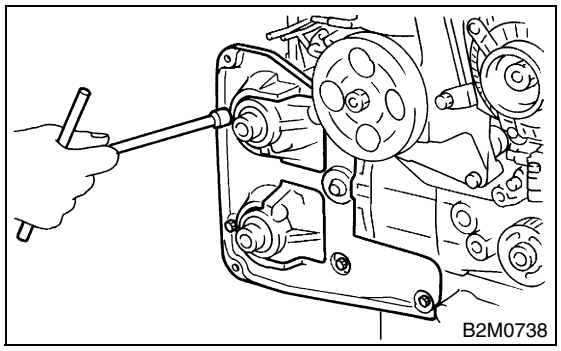
7) Install the spark plug cord.
8) Similarly, install the parts on right-hand side.
9) Install the tensioner bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



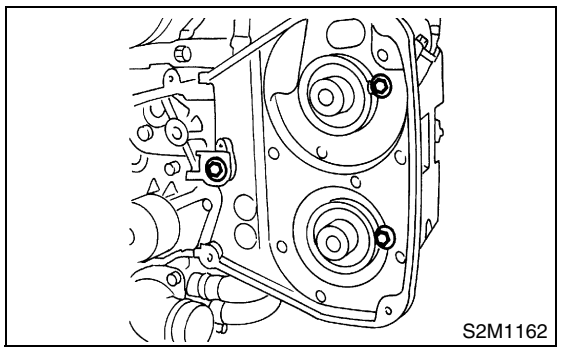
10) Install the right-hand belt cover No. 2.

Tightening torque:
5 N·m (0.5 kgf-m, 3.6 ft-lb)



11) Install the left-hand belt cover No. 2.

Tightening torque:
5 N·m (0.5 kgf-m, 3.6 ft-lb)

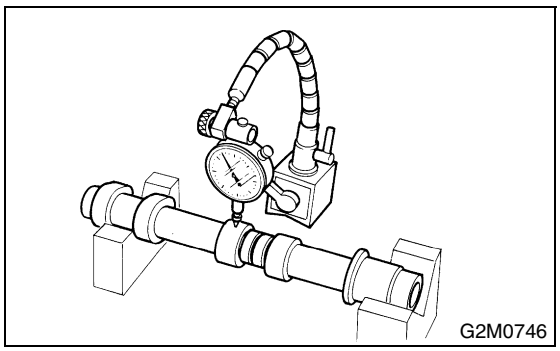


12) Install the crankshaft sprocket. <Ref. to ME(STi)-56, INSTALLATION, Camshaft Sprocket.>
13) Install the camshaft sprockets. <Ref. to ME(STi)-56, INSTALLATION, Camshaft Sprocket.>
14) Install the timing belt assembly. <Ref. to ME(STi)-49, INSTALLATION, Timing Belt Assembly.>
15) Install the belt cover. <Ref. to ME(STi)-46, INSTALLATION, Belt Cover.>
16) Install the crankshaft pulley. <Ref. to ME(STi)-45, INSTALLATION, Crankshaft Pulley.>
17) Install the V-belt. <Ref. to ME(STi)-43, INSTALLATION, V-belt.>

C: INSPECTION

1) Measure the bend, and repair or replace if necessary.

Limit:
0.020 mm (0.0008 in)

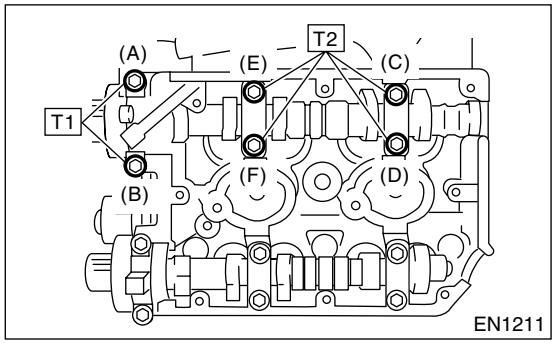


2) Check the journal for damage and wear. Replace if faulty.
3) Measure the outside diameter of camshaft journal. If the jounal diameter is not as specified, check the oil clearance.

	Camshaft journal	
	Front	Center, rear
Standard	37.946 — 37.9635 mm (1.4939 — 1.4946 in)	29.946 — 29.963 mm (1.1790 — 1.1796 in)

4) Measurement of the camshaft journal oil clearance:
(1) Clean the bearing caps and camshaft journals.
(2) Place the camshafts on the cylinder head. (Without installing valve rocker.)
(3) Place a plastigauge across each of the camshaft jounals.
(4) Gradually tighten the cap in at least two stages in alphabetical sequence shown in the figure, and then tighten to specified torque.

Tightening torque:
T1: 10 N·m (1.0 kgf-m, 7 ft-lb)
T2: 20 N·m (2.0 kgf-m, 14.5 ft-lb)

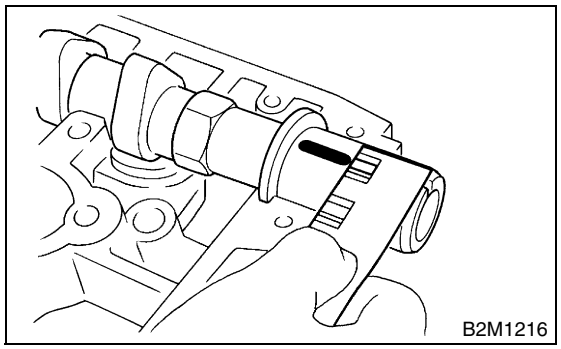


CAUTION:
Do not turn the camshaft.

(5) Remove the bearing caps.
(6) Measure the widest point of the plastigauge on each journal.
If the oil clearance exceeds the limit, replace the camshaft. If necessary, replace the camshaft caps and cylinder head as a set.

Standard:
0.037 — 0.072 mm (0.0015 — 0.0028 in)

Limit:
0.10 mm (0.0039 in)

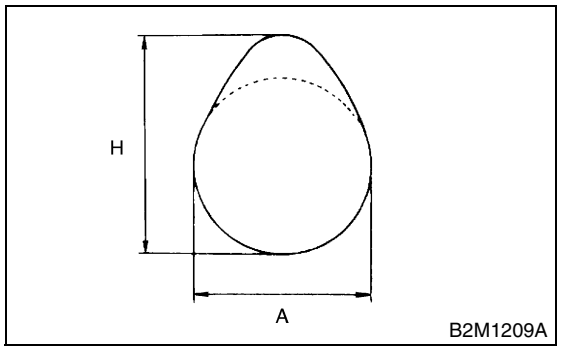


(7) Completely remove the plastigauge.
5) Check cam face condition; remove minor faults by grinding with oil stone. Measure the cam height H; replace if the limit has been exceeded.

Cam height: H
Standard:
Intake:
45.25 — 45.35 mm (1.781 — 1.785 in)
Exhaust:
45.60 — 45.70 mm (1.795 — 1.799 in)

Limit:
Intake:
45.15 mm (1.778 in)
Exhaust:
45.50 mm (1.791 in)

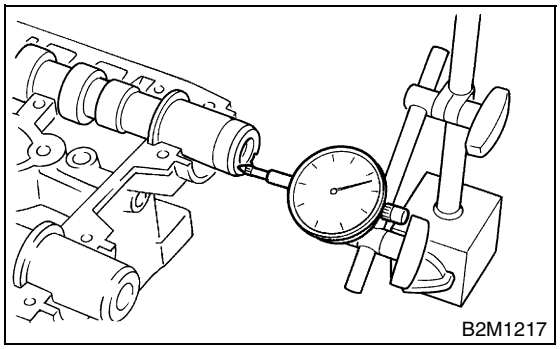
Cam base circle diameter A:
37.0 mm (1.457 in)



6) Measure the thrust clearance of camshaft with dial gauge. If the clearance exceeds the limit, replace caps and cylinder head as a set. If necessary replace the camshaft.

Standard:
0.015 — 0.070 mm (0.0006 — 0.0028 in)

Limit:
0.1 mm (0.004 in)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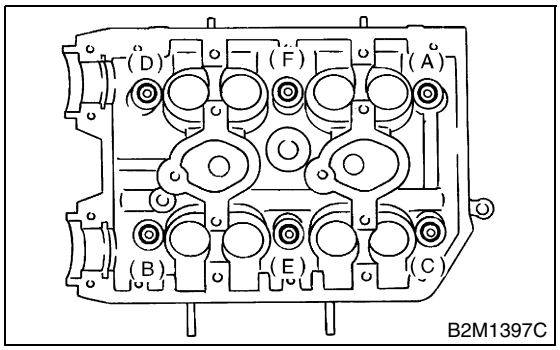
19.Cylinder Head Assembly

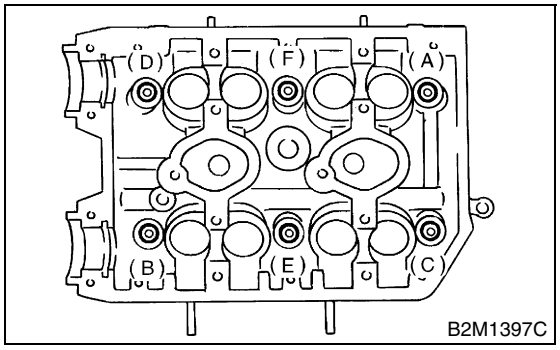
A: REMOVAL

1) Remove the V-belt. <Ref. to ME(STi)-43, REMOVAL, V-belt.>
2) Remove the crankshaft pulley. <Ref. to ME(STi)-45, REMOVAL, Crankshaft Pulley.>
3) Remove the belt cover. <Ref. to ME(STi)-46, REMOVAL, Belt Cover.>
4) Remove the timing belt assembly. <Ref. to ME(STi)-47, REMOVAL, Timing Belt Assembly.>
5) Remove the camshaft sprocket. <Ref. to ME(STi)-56, REMOVAL, Camshaft Sprocket.>
6) Remove the intake manifold. <Ref. to FU(TURBO)-15, REMOVAL, Intake Manifold.>
7) Remove the bolt which installs A/C compressor bracket on cylinder head.
8) Remove the camshaft. <Ref. to ME(STi)-59, REMOVAL, Camshaft.>
9) Remove the cylinder head bolts in alphabetical sequence shown in the figure.

CAUTION:
Leave bolts (A) and (D) engaged by three or four threads to prevent the cylinder head from falling.



10) While tapping the cylinder head with a plastic hammer, separate it from cylinder block.
Remove bolts (A) and (D) to remove the cylinder head.



11) Remove the cylinder head gasket.

CAUTION:
Do not scratch the mating surface of the cylinder head and cylinder block.

12) Similarly, remove the right side cylinder head.

B: INSTALLATION

1) Install the cylinder head and gaskets on cylinder block.

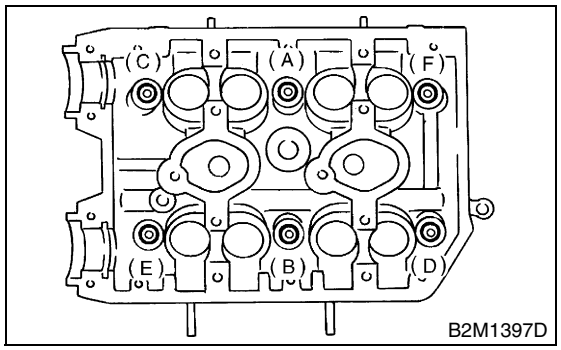
CAUTION:
- **Use new cylinder head gaskets.**
- **Be careful not to scratch the mating surface of the cylinder head and cylinder block.**

2) Tighten cylinder head bolts.
(1) Apply a coat of engine oil to washers and bolt threads.
(2) Tighten all bolts to 29 N·m (3.0 kgf-m, 22 ft-lb) in alphabetical sequence.
Then tighten all bolts to 69 N·m (7.0 kgf-m, 51 ft-lb) in alphabetical sequence.
(3) Loosen all bolts by 180° in reverse order, and then loosen the bolts by 180° again.
(4) Tighten all bolts to 39 N·m (4.0 kgf-m, 29 ft-lb) in alphabetical sequence.
(5) Tighten all bolts by 80 to 90° in alphabetical sequence.
(6) Additionally, tighten all bolts by 40 to 45° in alphabetical sequence.

CAUTION:
Do not tighten the bolts more than 45°.

(7) Tighten bolts (A) and (B) by 45°.

CAUTION:
Ensure that the total "re-tightening angle" [in the two previous step] does not exceed 90°.



3) Install the camshaft. <Ref. to ME(STi)-60, INSTALLATION, Camshaft.>
4) Install the A/C compressor bracket on cylinder head.
5) Install the intake manifold. <Ref. to FU(TURBO)-18, INSTALLATION, Intake Manifold.>
6) Install the camshaft sprocket. <Ref. to ME(STi)-56, INSTALLATION, Camshaft Sprocket.>
7) Install the timing belt assembly. <Ref. to ME(STi)-49, INSTALLATION, Timing Belt Assembly.>
8) Install the belt cover. <Ref. to ME(STi)-46, INSTALLATION, Belt Cover.>

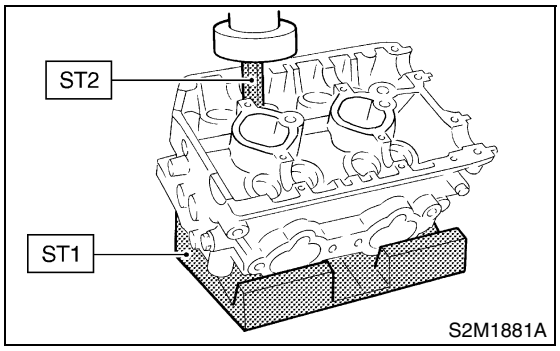
9) Install the crankshaft pulley. <Ref. to ME(STi)-45, INSTALLATION, Crankshaft Pulley.>
10) Install the V-belt. <Ref. to ME(STi)-43, INSTALLATION, V-belt.>

C: DISASSEMBLY

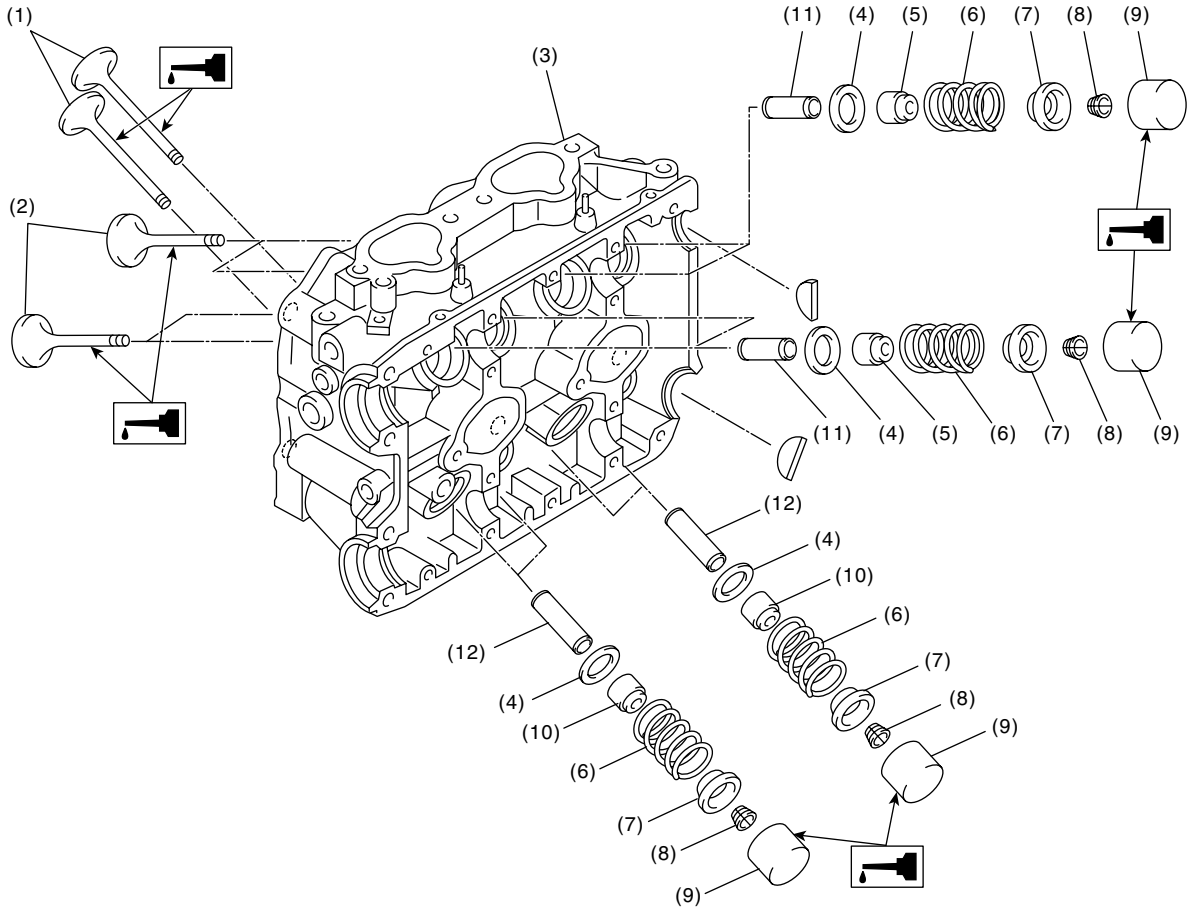
1) Remove the valve lifters.
2) Compress the valve spring and remove the valve spring retainer key. Remove each valve and valve spring.

ST 498267600 CYLINDER HEAD TABLE
ST 499718000 VALVE SPRING REMOVER

CAUTION:
• Metallic sodium is enclosed in the exhaust valve; therefore, use extreme care when handling and discarding them. <Ref. to ME(STi)-71, DISPOSAL, Cylinder Head Assembly.>
• Keep the removed parts in order for re-installing in their original positions.
• Mark each valve to prevent confusion.
• Use extreme care not to damage the lips of the intake valve oil seals and exhaust valve oil seals.



D: ASSEMBLY



(1) Exhaust valve
(2) Intake valve
(3) Cylinder head
(4) Valve spring seat
(5) Intake valve oil seal
(6) Valve spring
(7) Retainer
(8) Retainer key
(9) Valve lifter
(10) Exhaust valve oil seal
(11) Intake valve guide
(12) Exhaust valve guide

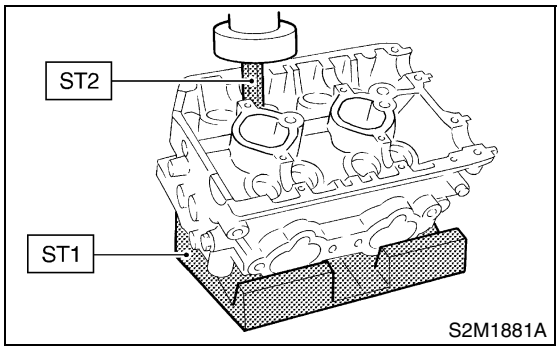
1) Installation of valve spring and valve:
(1) Coat the stem of each valve with engine oil and insert the valve into valve guide.

CAUTION:
When inserting the valve into valve guide, use special care not to damage the oil seal lip.

(2) Set the cylinder head on ST1.
(3) Install the valve spring and retainer using ST2.

ST1 498267600 CYLINDER HEAD TABLE
ST2 499718000 VALVE SPRING REMOVER

CAUTION:
Be sure to install the valve springs with their close-coiled end facing the seat on the cylinder head.



(4) Compress the valve spring and fit valve spring retainer key.
(5) After installing, tap the valve spring retainers lightly with wooden hammer for better seating.

2) Apply oil to the surface of the valve lifter.
3) Install the valve lifter.

E: INSPECTION

1. CYLINDER HEAD

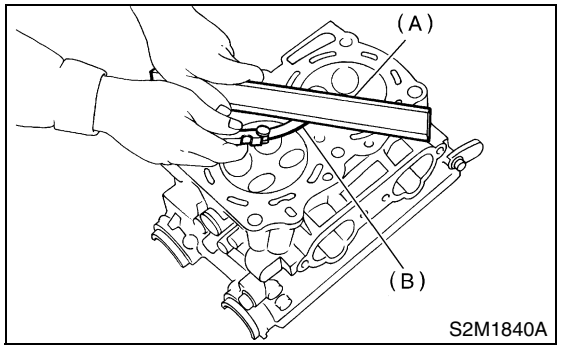
1) Make sure that no crack or other damage exists. In addition to visual inspection, inspect important areas by means of red check.
2) Measure the warping of the cylinder head surface that mates with crankcase by using a straight edge (A) and thickness gauge (B).
If the warping exceeds 0.05 mm (0.0020 in), regrind the surface with a surface grinder.

Warping limit:
0.05 mm (0.0020 in)

Grinding limit:
0.1 mm (0.004 in)

Standard height of cylinder head:
127.5 mm (5.02 in)

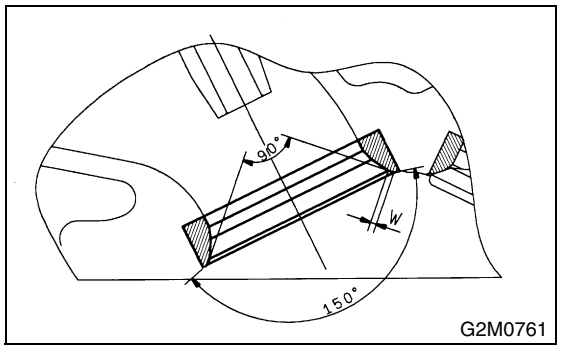
CAUTION:
Uneven torque for the cylinder head nuts can cause warping. When reassembling, pay special attention to the torque so as to tighten evenly.



2. VALVE SEAT

Inspect intake and exhaust valve seats, and correct the contact surfaces with valve seat cutter if they are defective or when valve guides are replaced.

Valve seat width: W
Intake
Standard
1.0 mm (0.039 in)
Limit
1.7 mm (0.067 in)
Exhaust
Standard
1.5 mm (0.059 in)
Limit
2.2 mm (0.087 in)



3. VALVE GUIDE

1) Check the clearance between valve guide and stem. The clearance can be checked by measuring the outside diameter of valve stem and the inside diameter of valve guide with outside and inside micrometers respectively.

Clearance between the valve guide and valve stem:
Standard
Intake
0.030 — 0.050 mm (0.0012 — 0.0020 in)
Exhaust
0.040 — 0.050 mm (0.0016 — 0.0020 in)
Limit
0.15 mm (0.0059 in)

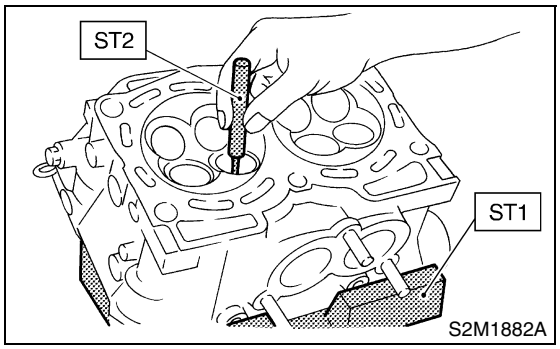
2) If the clearance between valve guide and stem exceeds the limit, replace the valve guide or valve itself whichever shows greater amount of wear. See the following procedure for valve guide replacement.

Valve guide inner diameter:
6.000 — 6.012 mm (0.2362 — 0.2367 in)

Valve stem outer diameters:
Intake
5.962 — 5.970 mm (0.2347 — 0.2350 in)
Exhaust
5.952 — 5.960 mm (0.2343 — 0.2346 in)

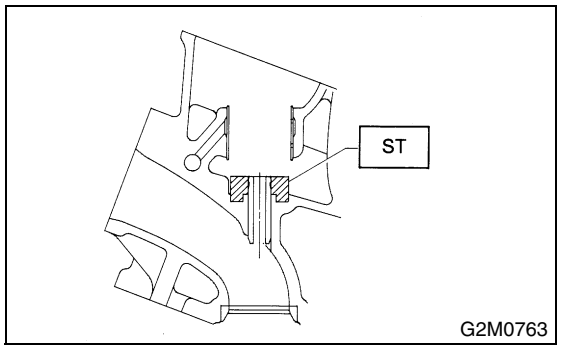
(1) Place the cylinder head on ST1 with the combustion chamber upward so that valve guides enter the holes in ST1.
(2) Insert the ST2 into valve guide and press it down to remove the valve guide.

ST1 498267600 CYLINDER HEAD TABLE
ST2 499767200 VALVE GUIDE REMOVER



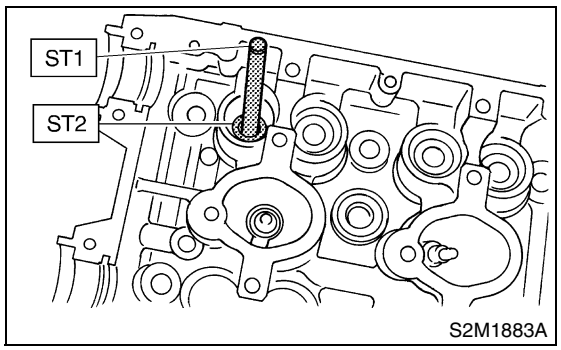
(3) Turn the cylinder head upside down and place ST as shown in the figure.

ST 498267700 VALVE GUIDE ADJUSTER



(4) Before installing the new valve guide, make sure that neither scratches nor damages exist on the inside surface of the valve guide holes in cylinder head.
(5) Put new valve guide, coated with sufficient oil, in cylinder, and insert ST1 into the valve guide. Press in until the valve guide upper end is flush with the upper surface of ST2.

ST1 499767200 VALVE GUIDE REMOVER
ST2 498267700 VALVE GUIDE ADJUSTER



(6) Check the valve guide protrusion.

Valve guide protrusion: L
12.0 — 12.4 mm (0.472 — 0.488 in)

(7) Ream the inside of valve guide with ST. Gently rotate the reamer clockwise while pressing it lightly into valve guide, and return it also rotating clockwise. After reaming, clean the valve guide to remove chips.

ST 499767400 VALVE GUIDE REAMER

CAUTION:
• Apply engine oil to the reamer when reaming.
• If the inner surface of the valve guide is torn, the edge of the reamer should be slightly ground with an oil stone.
• If the inner surface of the valve guide becomes lustrous and the reamer does not chips, use a new reamer or remedy the reamer.

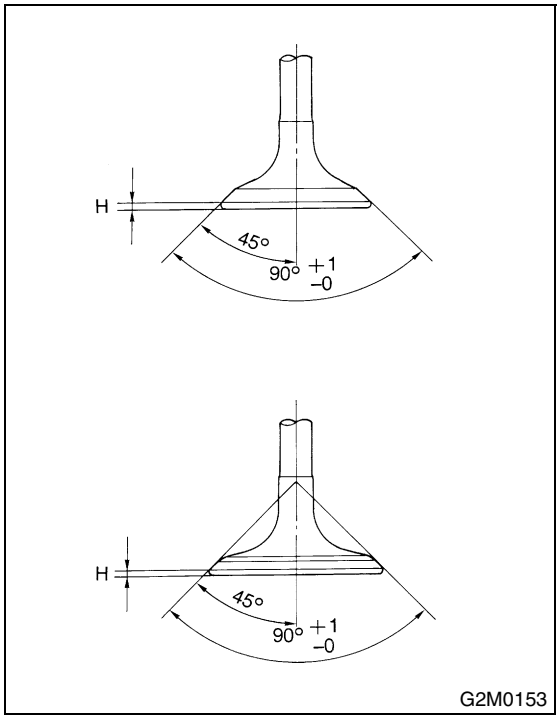
(8) Recheck the contact condition between valve and valve seat after replacing the valve guide.

4. INTAKE AND EXHAUST VALVE

1) Inspect the flange and stem of valve, and replace if damaged, worn, or deformed, or if "H" is less than the specified limit.

H:
Intake
Standard
1.2 mm (0.047 in)
Limit
0.8 mm (0.031 in)
Exhaust
Standard
1.5 mm (0.059 in)
Limit
0.8 mm (0.031 in)

Valve overall length:
Intake
104.4 mm (4.110 in)
Exhaust
104.7 mm (4.122 in)

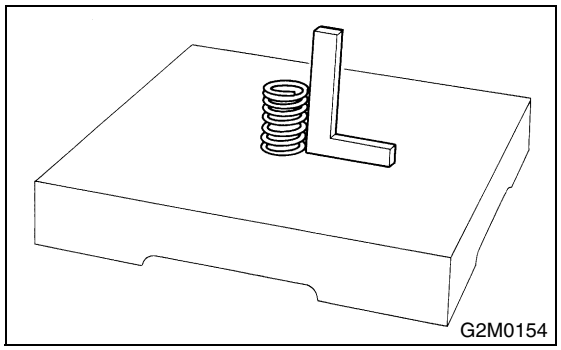


2) Put a small amount of grinding compound on the seat surface and lap the valve and seat surface. Install a new intake valve oil seal after lapping.

5. VALVE SPRINGS

1) Check valve springs for damage, free length, and tension. Replace the valve spring if it is not within the specifications presented in the table.
2) To measure the squareness of the valve spring, stand the spring on a surface plate and measure its deflection at the top using a try square.

	Valve spring
Free length	44.67 mm (1.7587 in)
Tension/spring height	220.7±15.7 N (22.5 ± 1.6 kgf, 49.6±3.5 lb)/36.0 mm (1.417 in)
	582±29 N (59.3±3.0 kgf, 130.8±6.6 lb)/26.45 mm (1.041 in)
Squareness	2.5°, 1.9 mm (0.075 in)



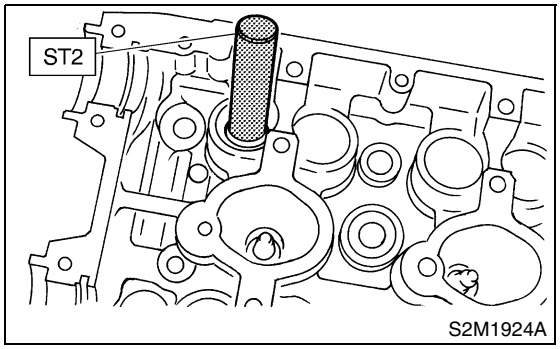
6. INTAKE AND EXHAUST VALVE OIL SEAL

Replace the oil seal with new one, if lip is damaged or spring out of place, or when the surfaces of intake valve and valve seat are reconditioned or intake valve guide is replaced.
1) Place the cylinder head on ST1.
2) Press in oil seal to the specified dimension indicated in the figure by using ST2.
ST1 498267600 CYLINDER HEAD TABLE
ST2 498857100 VALVE OIL SEAL GUIDE

CAUTION:
• Apply engine oil to the oil seal before force-fitting.
• Differentiate between intake valve oil seal and exhaust valve oil seal by noting their difference in color.

Color of rubber part:
Intake [Black]
Exhaust [Brown]

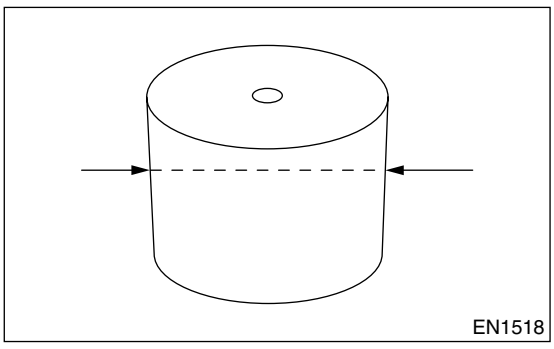
Color of spring part:
Intake [Silver]
Exhaust [Silver]



7. VALVE LIFTER

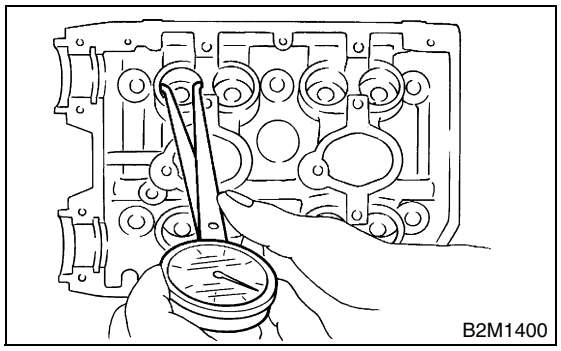
1) Check the valve lifter visually.
2) Measure the outer diameter of valve lifter.

Outer diameter:
34.965 — 34.975 mm (1.3766 — 1.3770 in)



3) Measure the inner diameter of valve lifter mating part on cylinder head.

Inner diameter:
34.994 — 35.016 mm (1.3777 — 1.3786 in)



CAUTION:
If difference between outer diameter of valve lifter and inner diameter of valve lifter mating part is over the limit, replace the cylinder head.

Standard:
0.019 — 0.051 mm (0.0007 — 0.0020 in)

Limit:
0.100 mm (0.0039 in)

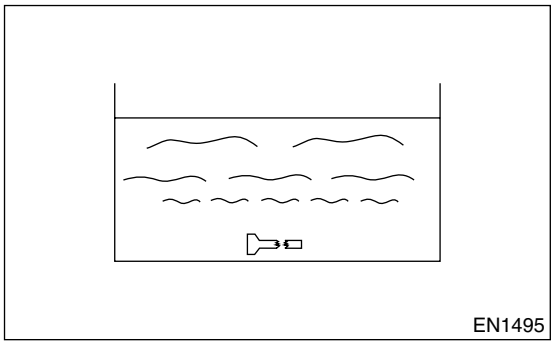
F: DISPOSAL

CAUTION:
• Metallic sodium is enclosed in the exhaust valve. Metallic sodium is extremely alkaline and may produce severe chemical reactions. Full consideration must therefore be given to the following points when handing or disposing of the valve.
• Since metallic sodium may cause blindness if contacted with the eyes, burns if contacted with the skin, and fire, do not deliberately take the valve apart and remove the metallic sodium.
1) If the valve is damaged, remove the valve and neutralize it by immersing it in water, and dispose of it in the same way that general steel materials are disposed of. The disposal method is described in the following.
(1) Wearing rubber gloves, remove the damaged valve from the cylinder head.
(2) Prepare a large receptacle (bucket or other container) in a well ventilated location, and fill the receptacle with water (at least 10 liters).
(3) Immerse the damaged valve in the receptacle.

CAUTION:
A severe reaction may occur, so stand at least 2 — 3 m from the receptacle. Because the reaction will produce hydrogen gas, moreover, keep the receptacle away from sparks or flames.

(4) Once the reaction is completed (about 4 — 5 hours have elapsed), carefully remove the valve using large pincers so that the reaction liquid does not contact your skin, and dispose of it with other parts that are being disposed of.
(5) The reaction liquid is a strong alkaline solution, so it must be disposed of in accordance with local regulations.

CAUTION:
Make sure the reaction liquid does not contact your skin. If contact with skin occurs, immediately wash the affected area with large quantities of water.

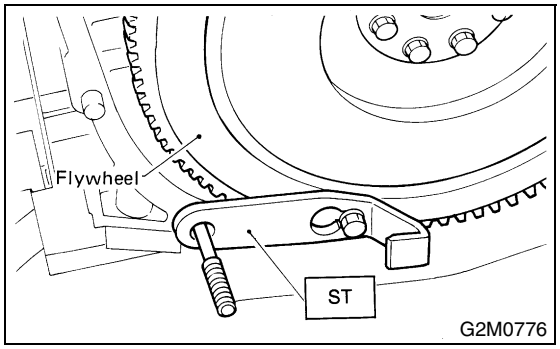

EN1495

20.Cylinder Block

A: REMOVAL

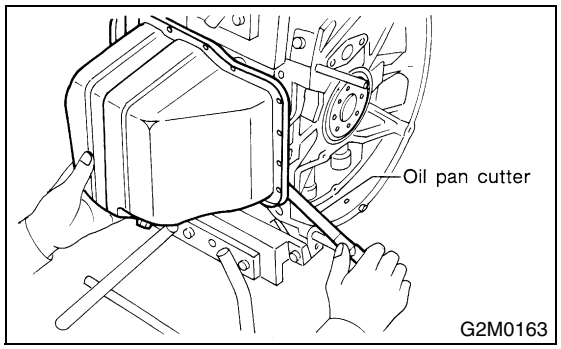
NOTE:
Before conducting this procedure, drain the engine oil completely if applicable.

1) Remove the intake manifold. <Ref. to FU(TURBO)-15, REMOVAL, Intake Manifold.>
2) Remove the V-belt. <Ref. to ME(STi)-43, REMOVAL, V-belt.>
3) Remove the crankshaft pulley. <Ref. to ME(STi)-45, REMOVAL, Crankshaft Pulley.>
4) Remove the belt cover. <Ref. to ME(STi)-46, REMOVAL, Belt Cover.>
5) Remove the timing belt assembly. <Ref. to ME(STi)-47, REMOVAL, Timing Belt Assembly.>
6) Remove the camshaft sprocket. <Ref. to ME(STi)-56, REMOVAL, Camshaft Sprocket.>
7) Remove the crankshaft sprocket. <Ref. to ME(STi)-58, REMOVAL, Crankshaft Sprocket.>
8) Remove the generator and A/C compressor with their brackets.
9) Remove the cylinder head assembly. <Ref. to ME(STi)-65, REMOVAL, Cylinder Head Assembly.>
10) Remove the clutch housing cover.
11) Remove the flywheel.
Using the ST, lock the crankshaft.
ST 498497100 CRANKSHAFT STOPPER



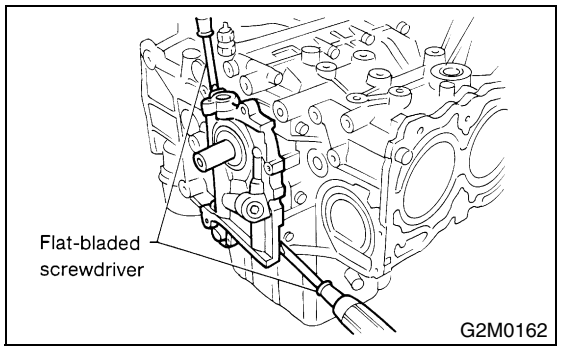
12) Remove the oil separator cover.
13) Remove the water by-pass pipe for heater.
14) Removal of oil pan:
(1) Turn the cylinder block with #2 and #4 piston sides facing upward.
(2) Remove the bolts which secure oil pan to cylinder block.
(3) Insert a oil pan cutter blade between cylinder block-to-oil pan clearance and remove the oil pan.

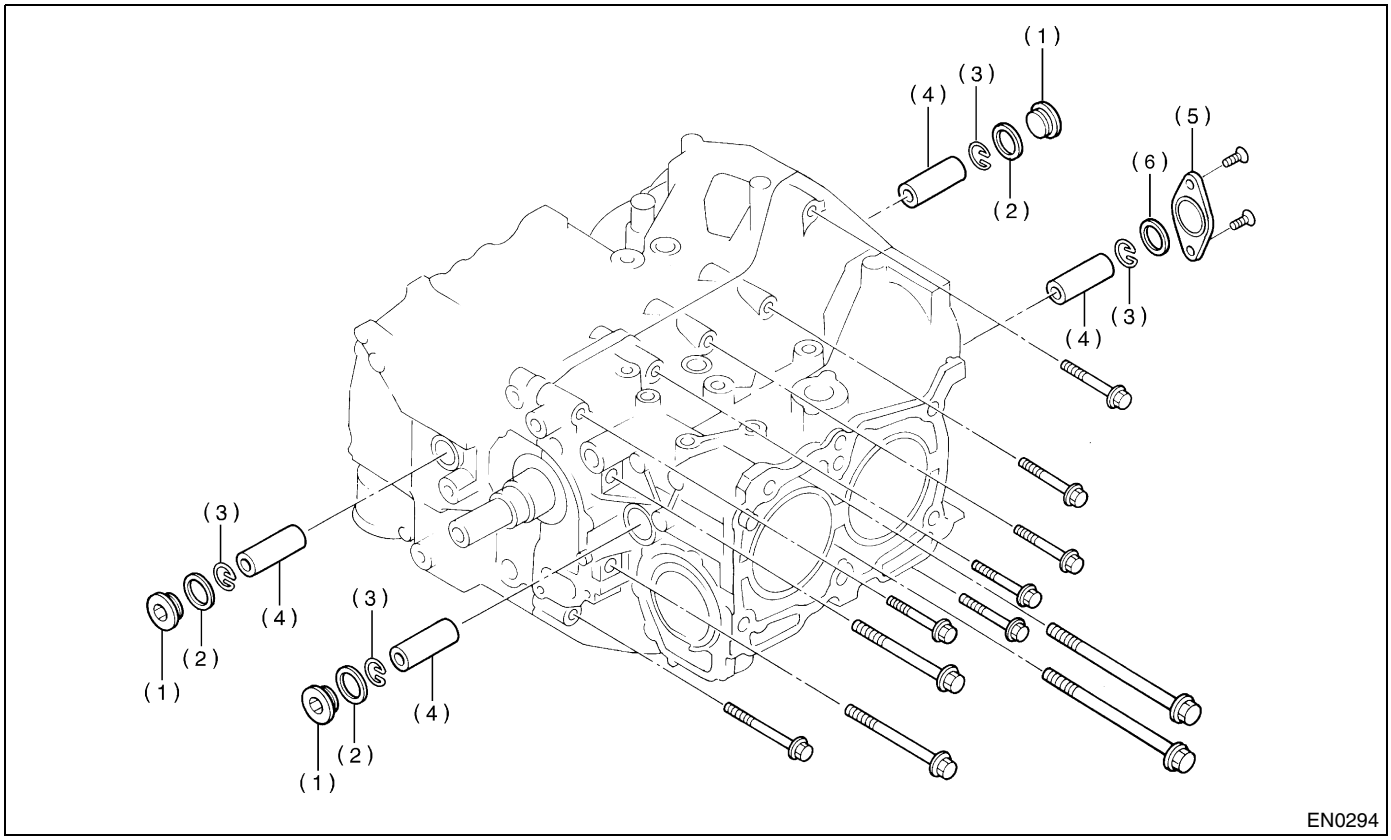
CAUTION:
Do not use a screwdriver or similar tool in place of oil pan cutter.



15) Remove the oil strainer stay.
16) Remove the oil strainer.
17) Remove the baffle plate.
18) Remove the water pipes.
19) Remove the water pump.
20) Remove the oil pump from cylinder block.
Use a flat-bladed screwdriver as shown in the figure when removing oil pump.

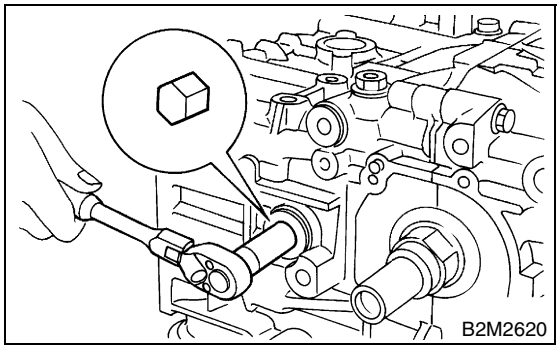
CAUTION:
Be careful not to scratch the mating surface of cylinder block and oil pump.





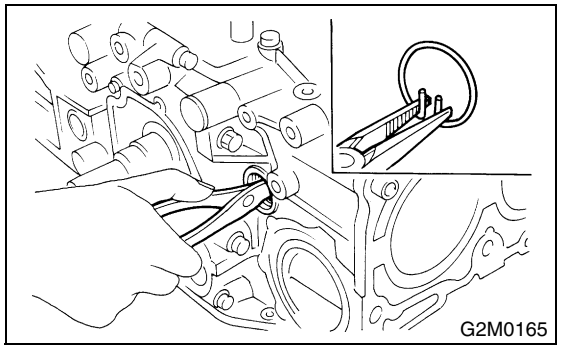
(1) Service hole plug
(2) Gasket
(3) Circlip
(4) Piston pin
(5) Service hole cover
(6) O-ring

21) Remove the service hole cover and service hole plugs using hexagon wrench [14 mm (0.55 in)].



22) Rotate the crankshaft to bring #1 and #2 pistons to bottom dead center position, then remove the piston circlip through service hole of #1 and #2 cylinders.

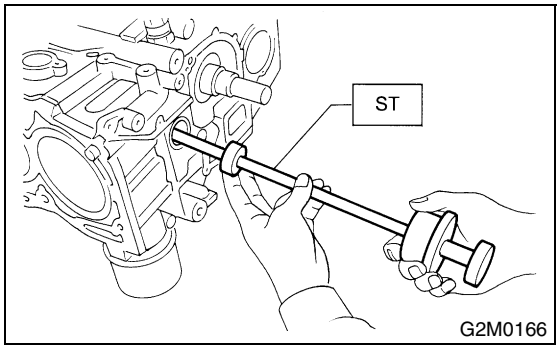
ST 499897200 PISTON CIRCLIP PLIER



23) Draw out the piston pin from #1 and #2 pistons using ST.

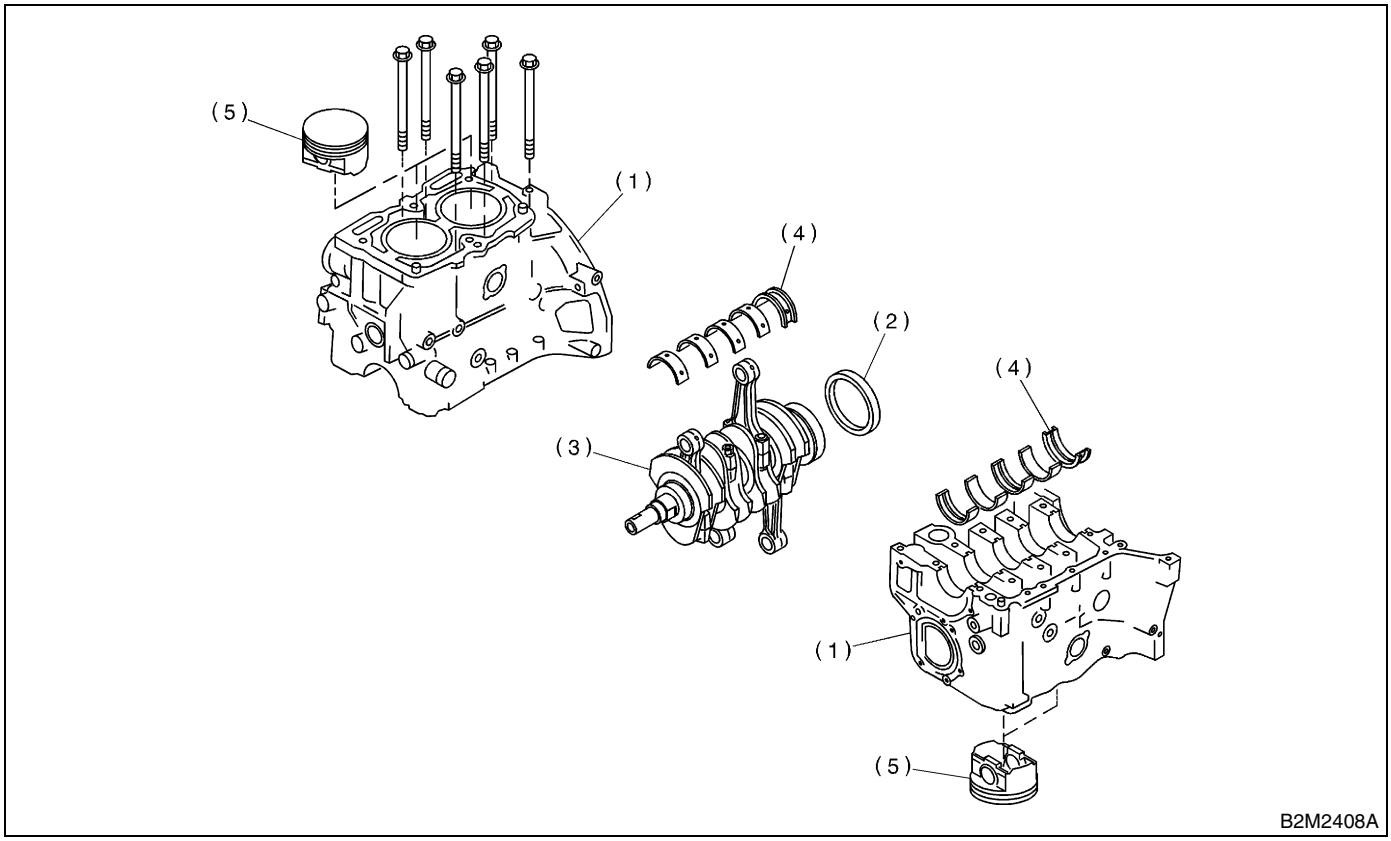
ST 499097700 PISTON PIN REMOVER ASSY

CAUTION:
Be careful not to confuse original combination of piston, piston pin and cylinder.



24) Similarly remove the piston pins from #3 and #4 pistons.
25) Remove the bolts which connect cylinder block on the side of #2 and #4 cylinders.
26) Loosen the bolts which connect cylinder block on the side of #1 and #3 cylinders two or three turns.
27) Set up the cylinder block so that #1 and #3 cylinders are on the upper side, then remove the cylinder block connecting bolts.
28) Separate the right-hand and left-hand cylinder blocks.

CAUTION:
When separating the cylinder block, do not allow the connecting rod to fall and damage the cylinder block.



(1) Cylinder block
(2) Rear oil seal
(3) Crankshaft
(4) Crankshaft bearing
(5) Piston

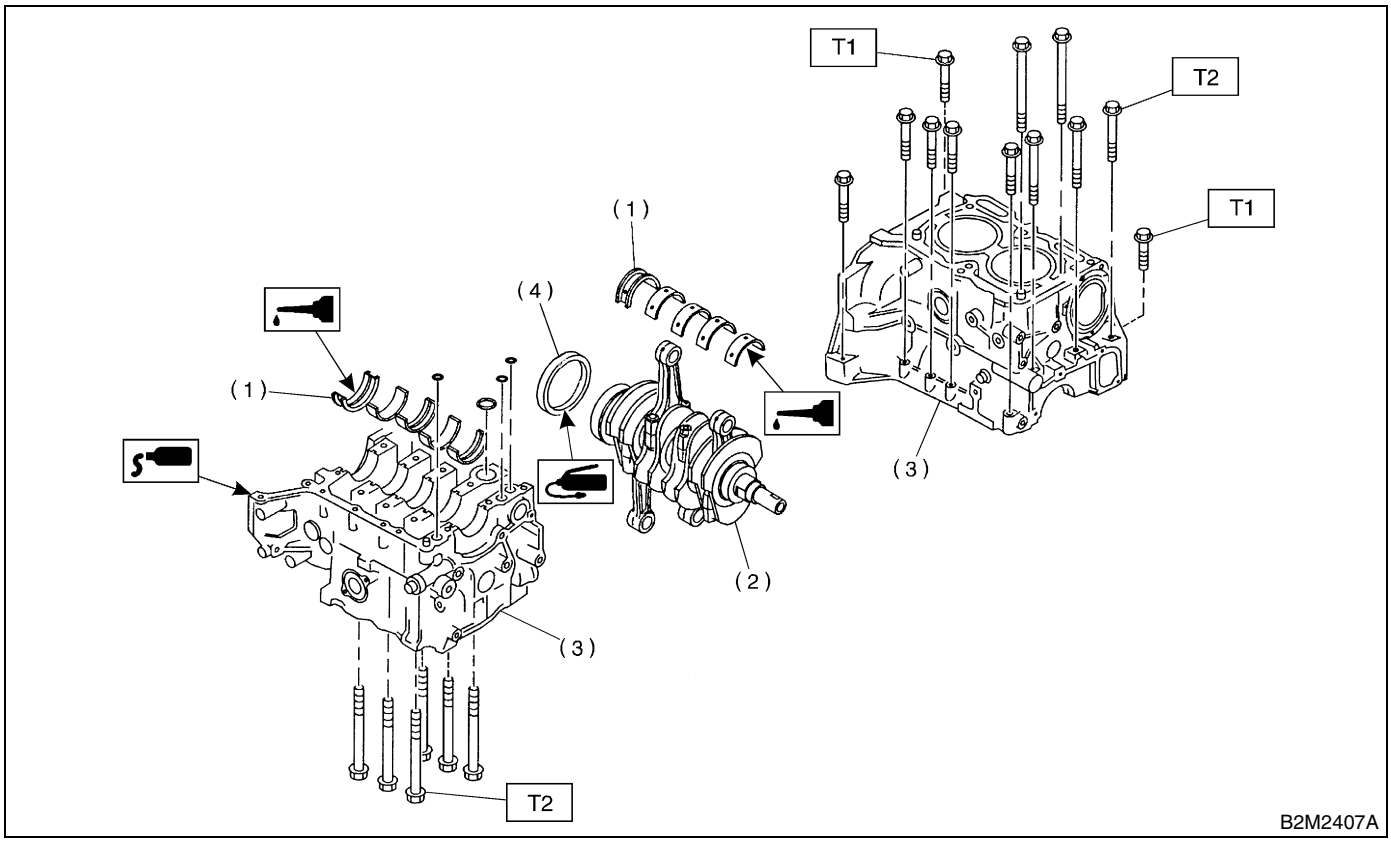
29) Remove the rear oil seal.
30) Remove the crankshaft together with connecting rod.
31) Remove the crankshaft bearings from cylinder block using hammer handle.

CAUTION:
Do not confuse the combination of crankshaft bearings. Press the bearing at the end opposite to locking lip.

32) Draw out each piston from the cylinder block using wooden bar or hammer handle.

CAUTION:
Do not confuse the combination of piston and cylinder.

B: INSTALLATION



(1) Crankshaft bearing
(2) Crankshaft
(3) Cylinder block
(4) Rear oil seal

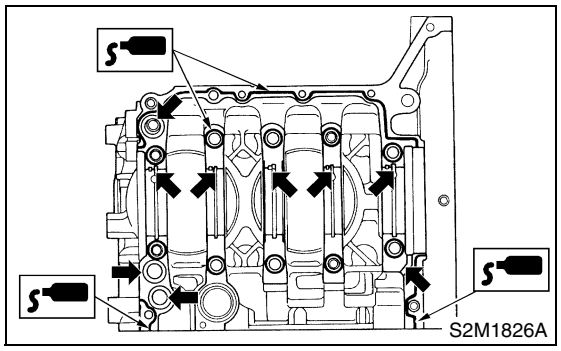
Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.1)
T2: 47 (4.8, 34.7)

CAUTION:
Remove oil in the mating surface of bearing and cylinder block before installation. Also apply a coat of engine oil to the crankshaft pins.

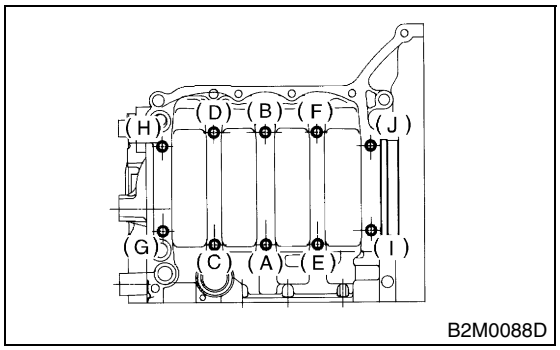
1) Position the crankshaft on the #2 and #4 cylinder block.
2) Apply fluid packing to the mating surface of #1 and #3 cylinder block, and position it on #2 and #4 cylinder block.

Fluid packing:
THREE BOND 1215 or equivalent

CAUTION:
Do not allow fluid packing to jut into O-ring grooves, oil passages, bearing grooves, etc.

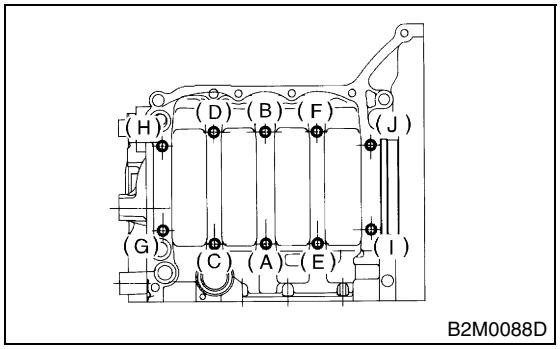


3) Temporarily tighten the 10 mm cylinder block connecting bolts in alphabetical sequence shown in the figure.



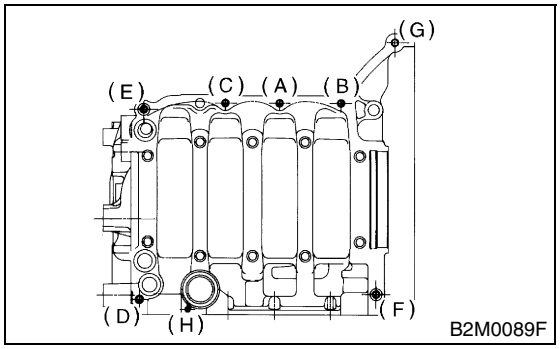
4) Tighten the 10 mm cylinder block connecting bolts in alphabetical sequence.

Tightening torque:
47 N·m (4.8 kgf-m, 34.7 ft-lb)



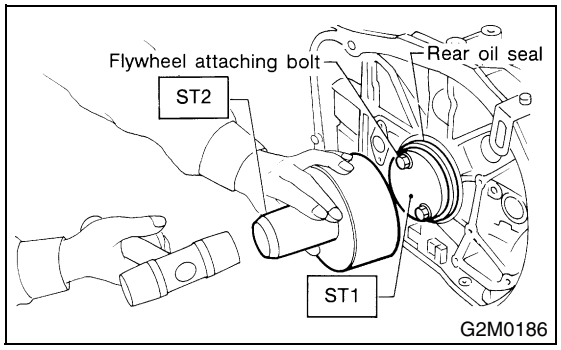
5) Tighten the 8 mm and 6 mm cylinder block connecting bolts in alphabetical sequence shown in the figure.

Tightening torque:
(A) — (G): 25 N·m (2.5 kgf-m, 18.1 ft-lb)
(H): 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

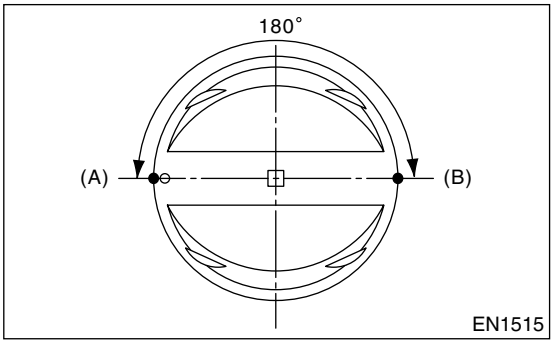


6) Install the rear oil seal using ST1 and ST2.

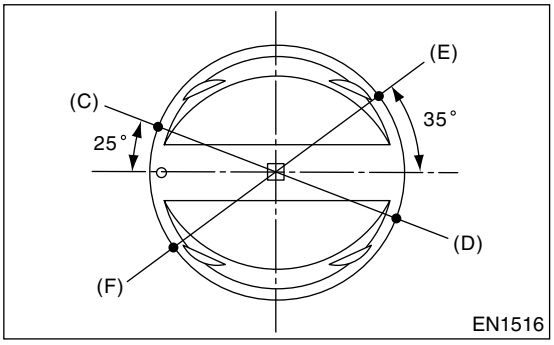
ST1	499597100	CRANKSHAFT OIL SEAL GUIDE
ST2	499587200	CRANKSHAFT OIL SEAL INSTALLER



7) Position the top ring gap at (A) or (B) in the figure.



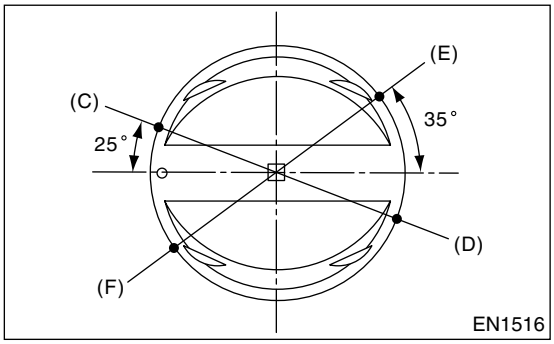
8) Position the second ring gap at 180° on the reverse side for the top ring gap.
9) Position the upper rail gap at (C) or (D) in the figure.



10) Position the expander gap at 180° of the reverse side for the upper rail gap.

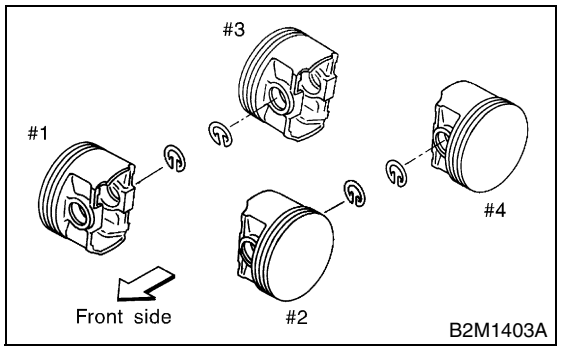
11) Position the lower rail gap at (E) or (F) in the figure.

CAUTION:
• Ensure the ring gaps do not face the same direction.
• Ensure the ring gaps are not within the piston skirt area.

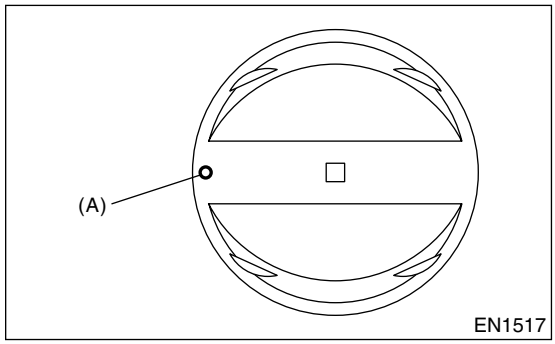


12) Install the circlip.
Install the circlips in piston holes located opposite service holes in cylinder block, when positioning all pistons in the corresponding cylinders.

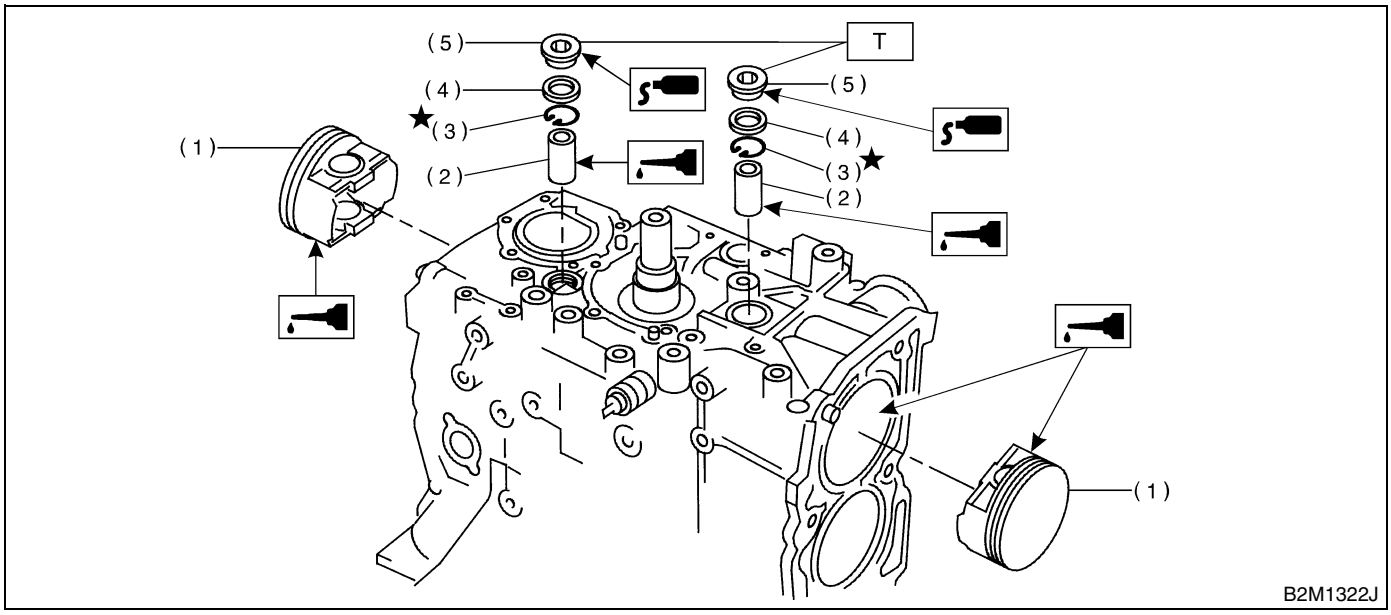
CAUTION:
Use new circlips.



CAUTION:
Piston front mark faces towards the front of the engine.



(A) Front mark



(1) Piston
(2) Piston pin
(3) Circlip
(4) Gasket
(5) Service hole plug

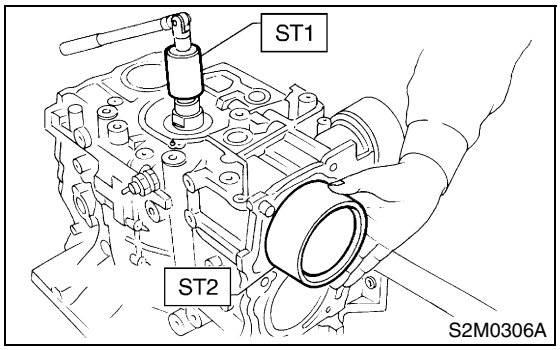
Tightening torque: N·m (kgf-m, ft-lb)
T: 69 (7.0, 50.6)

13) Installing piston:
(1) Turn the cylinder block so that #1 and #2 cylinders face upward.
(2) Using the ST1, turn the crankshaft so that #1 and #2 connecting rods are set at bottom dead center.

ST1 499987500 CRANKSHAFT SOCKET

(3) Apply a coat of engine oil to the pistons and cylinders and insert pistons in their cylinders using ST2.

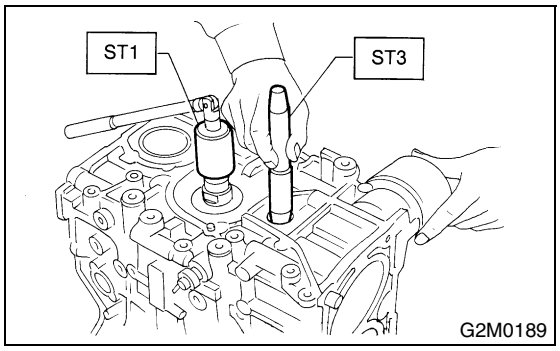
ST2 398744300 PISTON GUIDE



14) Installing piston pin:
(1) Insert ST3 into the service hole to align piston pin hole with connecting rod small end.

CAUTION:
Apply a coat of engine oil to ST3 before insertion.

ST3 499017100 PISTON PIN GUIDE

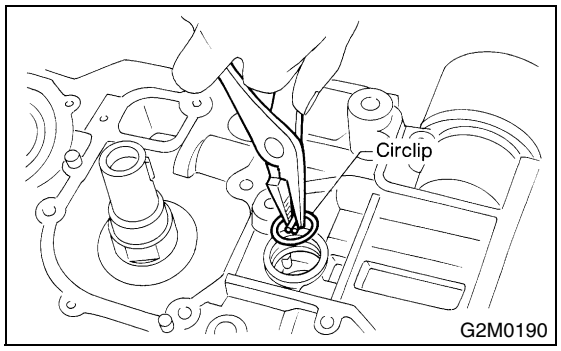


(2) Apply a coat of engine oil to the piston pin and insert piston pin into piston and connecting rod through service hole.

(3) Install the circlip using ST.

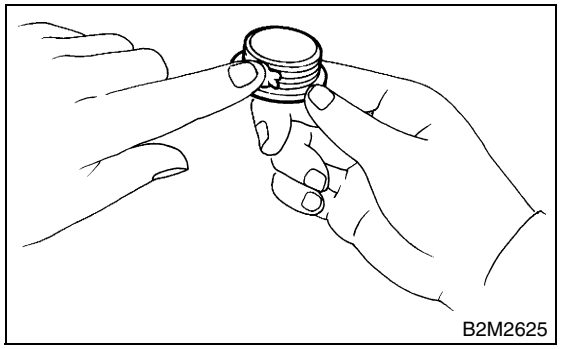
NOTE:
Use new circlips.

ST 499897200 PISTON CIRCLIP PLIER



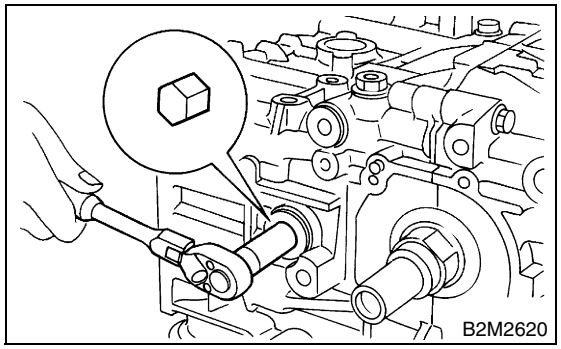
(4) Apply fluid packing around the service hole plug.

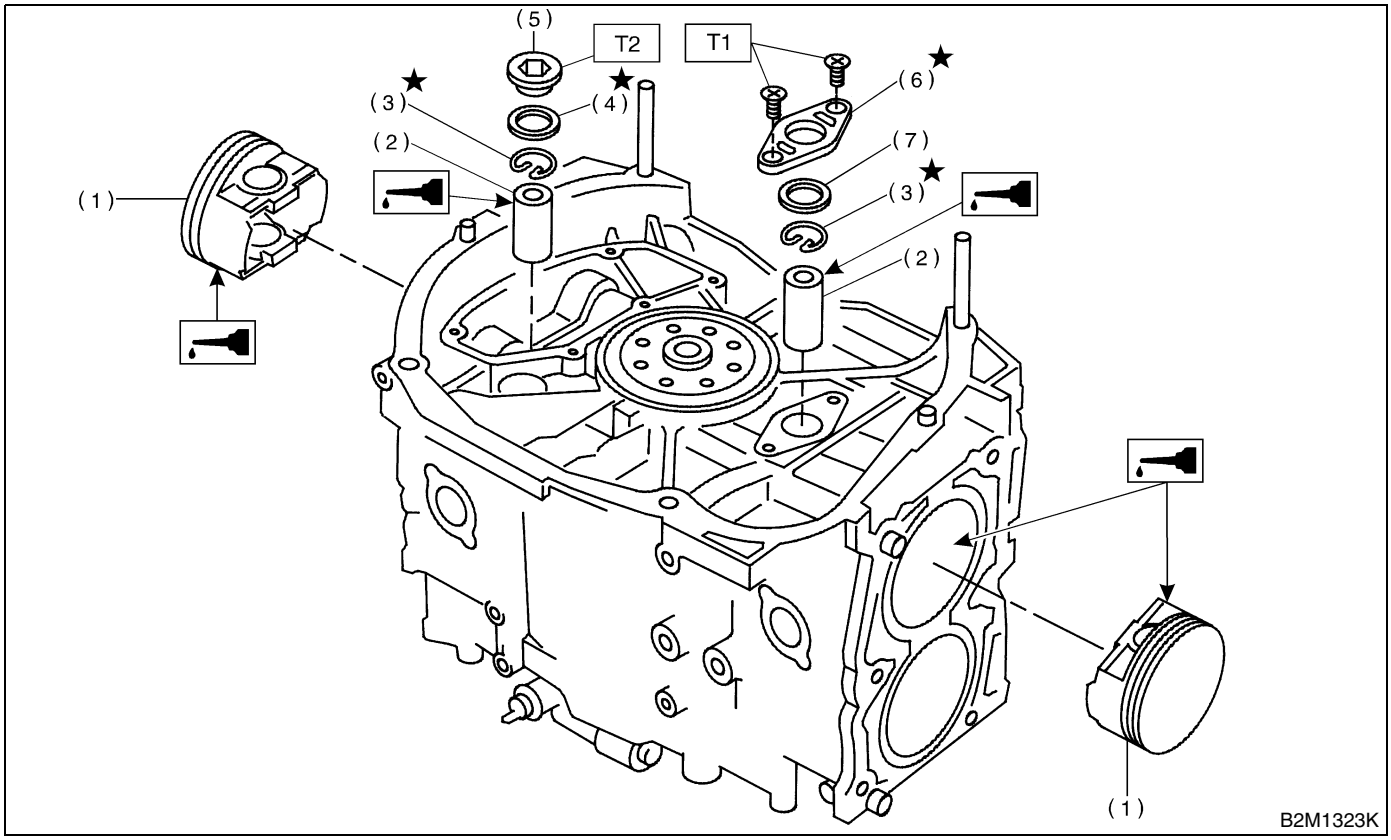
Fluid packing:
THREE BOND 1215 or equivalent



(5) Install the service hole plug and gasket.

CAUTION:
Use a new gasket.





(1) Piston
(2) Piston pin
(3) Circlip
(4) Gasket
(5) Service hole plug
(6) Service hole cover
(7) O-ring

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 69 (7.0, 50.6)

(6) Turn the cylinder block so that #3 and #4 cylinders face upward. Using the same procedures as used for #1 and #2 cylinders, install the pistons and piston pins.

15) Install the water pipe.

16) Install the baffle plate.

Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

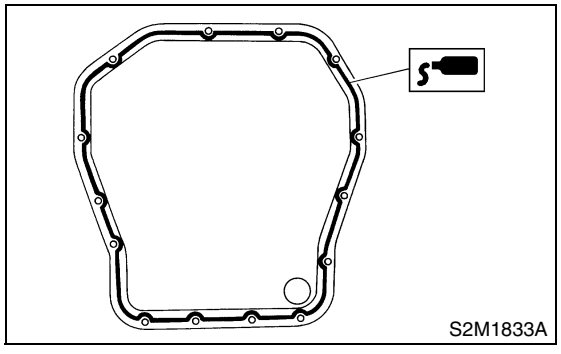
17) Install the oil strainer and O-ring

Tightening torque:
10 N·m (1.0 kgf-m, 7 ft-lb)

18) Install the oil strainer stay.

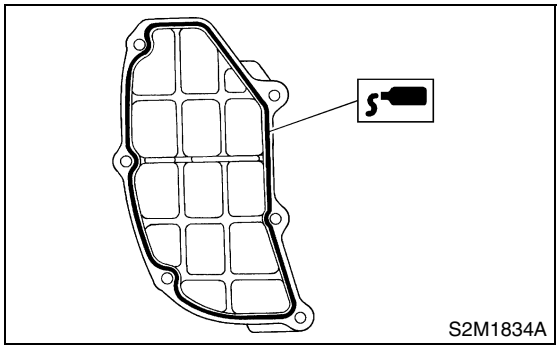
19) Apply fluid packing to matching surfaces and install the oil pan.

Fluid packing:
THREE BOND 1215 or equivalent



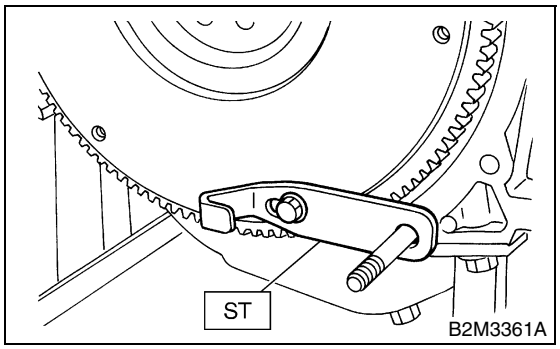
20) Apply fluid packing to matching surfaces and install the oil separator cover.

Fluid packing:
THREE BOND 1215 or equivalent

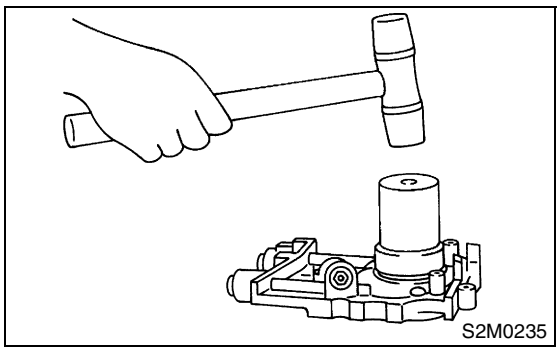


21) Install the flywheel.
To lock the crankshaft, use ST.
ST 498497100 CRANKSHAFT STOPPER

Tightening torque:
72 N·m (7.3 kgf-m, 52.8 ft-lb)

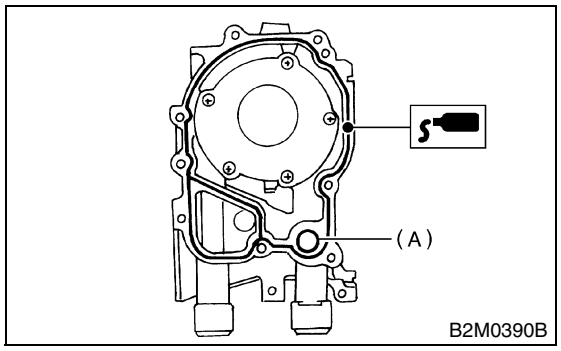


22) Install the housing cover.
23) Installation of oil pump:
(1) Discard the front oil seal after removal. Replace with a new one using ST.
ST 499587100 OIL SEAL INSTALLER



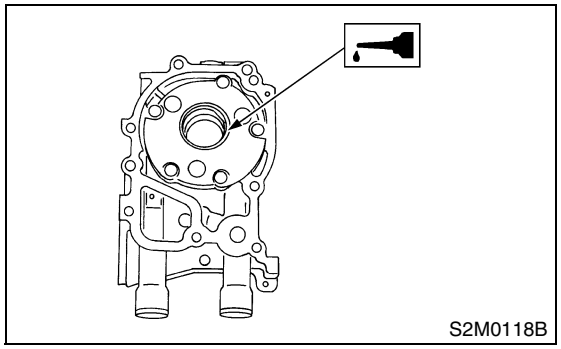
(2) Apply fluid packing to matching surface of the oil pump.

Fluid packing:
THREE BOND 1215 or equivalent



(A) O-ring

(3) Apply a coat of engine oil to the inside of the oil seal.



(4) Install the oil pump on cylinder block. Be careful not to damage the oil seal during installation.

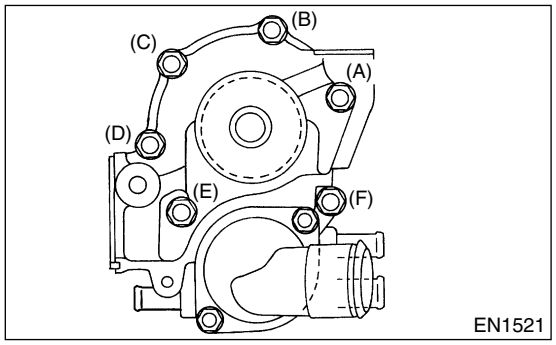
Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

CAUTION:
• Do not forget to install the O-ring and seal when installing the oil pump.
• Align the flat surface of oil pump's inner rotor with crankshaft before installation.

24) Install the water pump and gasket.

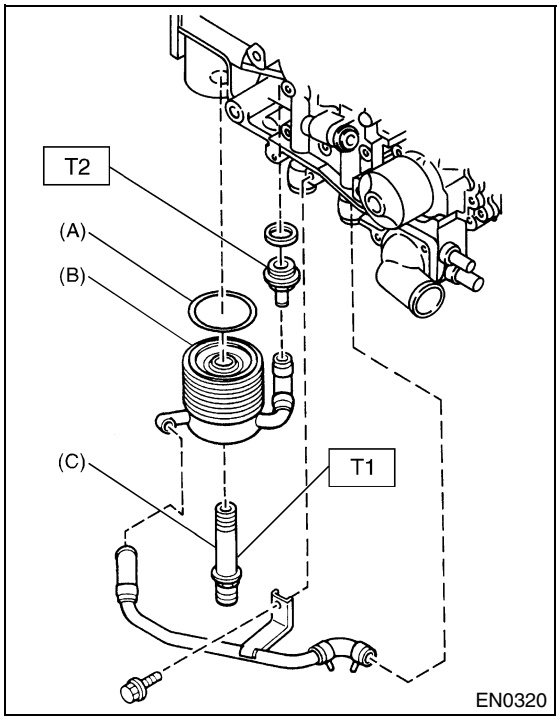
Tightening torque:
First; 12 N·m (1.2 kgf-m, 8.7 ft-lb)
Second; 12 N·m (1.2 kgf-m, 8.7 ft-lb)

CAUTION:
- **Be sure to use a new gasket.**
- **When installing the water pump, tighten bolts in two stages in alphabetical sequence as shown in the figure.**



25) Install the water by-pass pipe for heater.
26) Install the oil cooler.

Tightening torque:
T1: 55 N·m (5.5 kgf-m, 40 ft-lb)
T2: 69 N·m (7.0 kgf-m, 50.6 ft-lb)

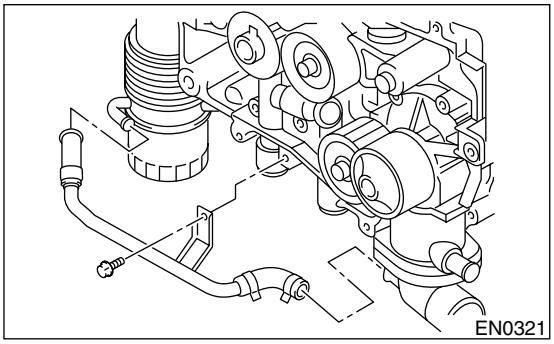


(A) O-ring
(B) Oil cooler
(C) Connector

27) Install the oil filter using ST.
ST 498547000 OIL FILTER WRENCH

28) Install the water by-pass pipe between oil cooler and water pump.

Tightening torque:
6.4 N·m (0.65 kgf-m, 4.72 ft-lb)

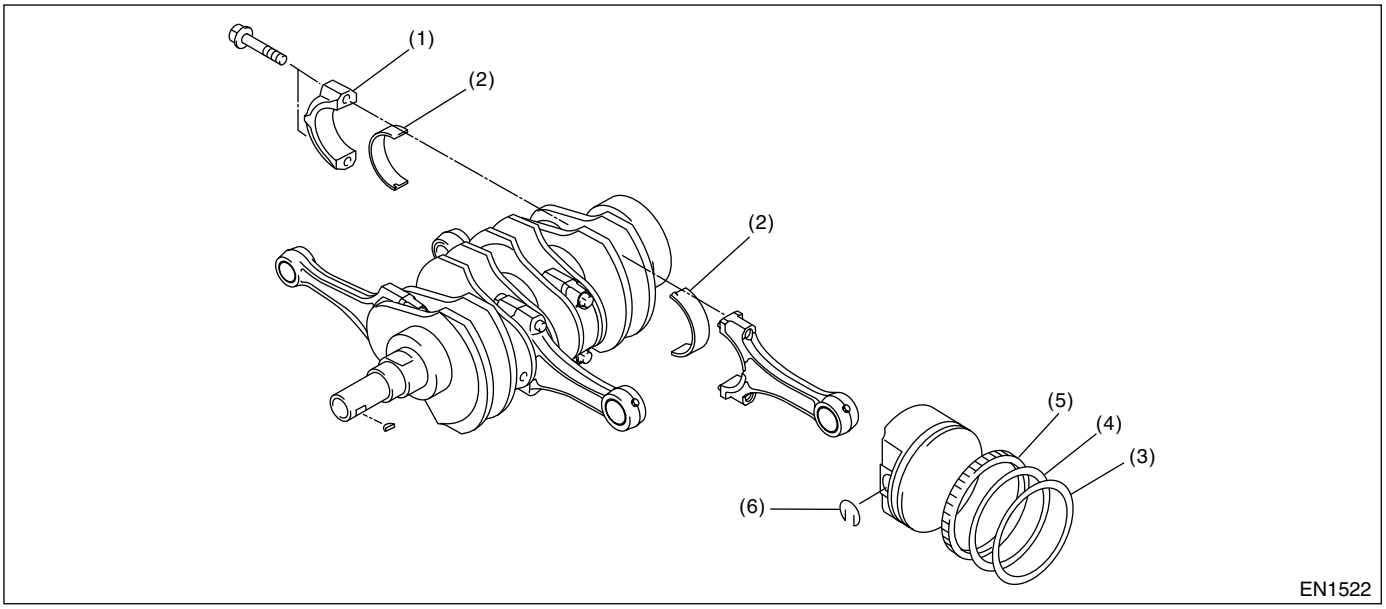


29) Install the water pipe.

NOTE:
Always use a new O-ring.

30) Install the cylinder head assembly. <Ref. to ME(STi)-65, INSTALLATION, Cylinder Head Assembly.>
31) Install the oil level gauge guide and tighten attaching bolt (left side only).
32) Install the rocker cover.
33) Install the crankshaft sprocket. <Ref. to ME(STi)-58, INSTALLATION, Crankshaft Sprocket.>
34) Install the camshaft sprocket. <Ref. to ME(STi)-56, INSTALLATION, Camshaft Sprocket.>
35) Install the timing belt assembly. <Ref. to ME(STi)-49, INSTALLATION, Timing Belt Assembly.>
36) Install the belt cover. <Ref. to ME(STi)-46, INSTALLATION, Belt Cover.>
37) Install the crankshaft pulley. <Ref. to ME(STi)-45, INSTALLATION, Crankshaft Pulley.>
38) Install the generator and A/C compressor brackets on cylinder head.
39) Install the V-belt. <Ref. to ME(STi)-43, INSTALLATION, V-belt.>
40) Install the intake manifold. <Ref. to FU(TURBO)-15, REMOVAL, Intake Manifold.>

C: DISASSEMBLY



(1) Connecting rod cap
(2) Connecting rod bearing
(3) Top ring
(4) Second ring
(5) Oil ring
(6) Circlip

1) Remove the connecting rod cap.
2) Remove the connecting rod bearing.

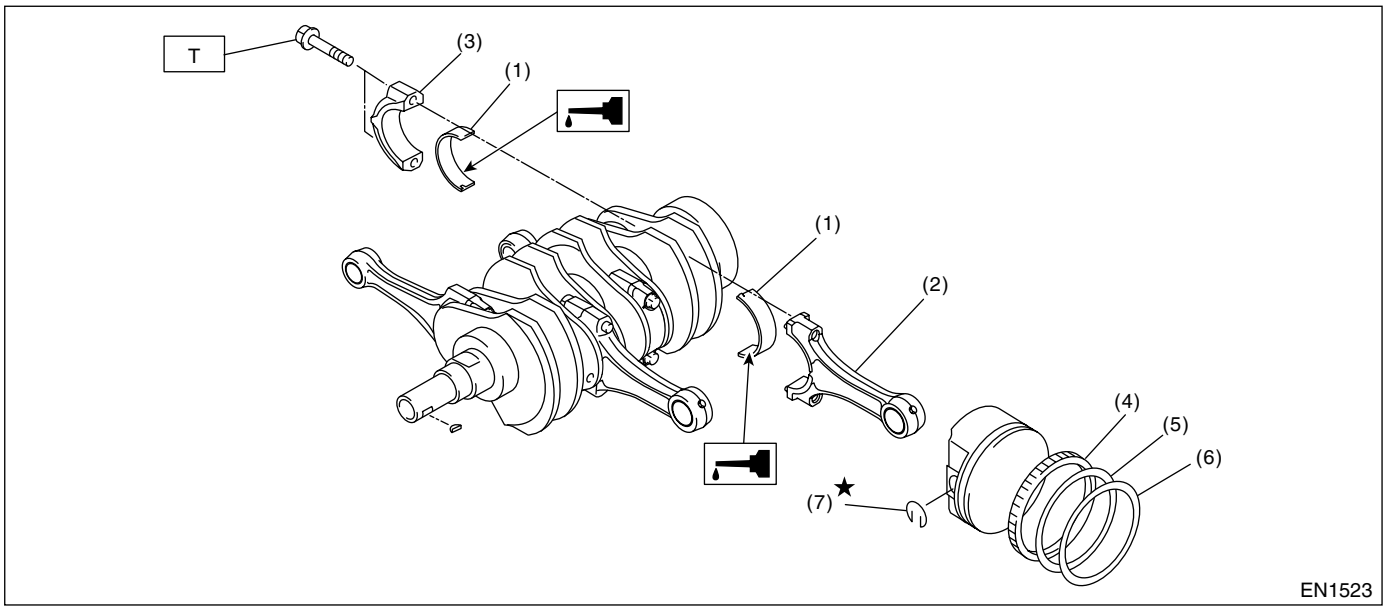
CAUTION:
Arrange removed connecting rod, connecting rod cap and bearing in order to prevent confusion.

3) Remove the piston rings using the piston ring expander.
4) Remove the oil ring by hand.

CAUTION:
Arrange the removed piston rings in good order to prevent confusion.

5) Remove the circlip.

D: ASSEMBLY



(1) Connecting rod bearing
(2) Connecting rod
(3) Connecting rod cap
(4) Oil ring
(5) Second ring
(6) Top ring
(7) Circlip

Tightening torque: N·m (kgf-m, ft-lb)
T: 52 (5.3, 38.4)

1) Install the connecting rod bearings on connecting rods and connecting rod caps.

CAUTION:
Apply oil to the surfaces of the connecting rod bearings.

2) Install the connecting rod on crankshaft.

CAUTION:
Position each connecting rod with the side mark facing forward.

3) Install the connecting rod cap with connecting rod nut.
Ensure the arrow on connecting rod cap faces the front during installation.

CAUTION:
• Each connecting rod has its own mating cap. Make sure that they are assembled correctly by checking their matching number.
• When tightening the connecting rod nuts, apply oil on the threads.

4) Install the oil ring spacer, upper rail and lower rail in this order by hand. Then install the second ring and top ring with a piston ring expander.

E: INSPECTION

1. CYLINDER BLOCK

1) Visually check for cracks and damage. Especially, inspect important parts by means of red lead check.
2) Check the oil passages for clogging.
3) Inspect crankcase surface that mates with cylinder head for warping by using a straight edge, and correct by grinding if necessary.

Warping limit:
0.05 mm (0.0020 in)

Grinding limit:
0.1 mm (0.004 in)

Standard height of cylinder block:
201.0 mm (7.91 in)

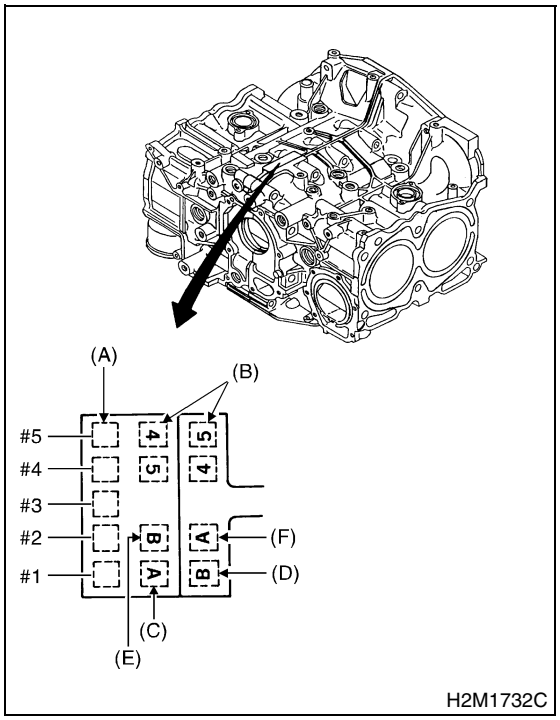
2. CYLINDER AND PISTON

1) The cylinder bore size is stamped on the cylinder block's front upper surface.

CAUTION:
Measurement should be performed at a temperature of 20°C (68°F).

NOTE:
Standard sized pistons are classified into two grades, “A” and “B”. These grades should be used as a guide line in selecting a standard piston.

Standard diameter:
A: 92.005 — 92.015 mm (3.6222 — 3.6226 in)
B: 91.995 — 92.005 mm (3.6218 — 3.6222 in)



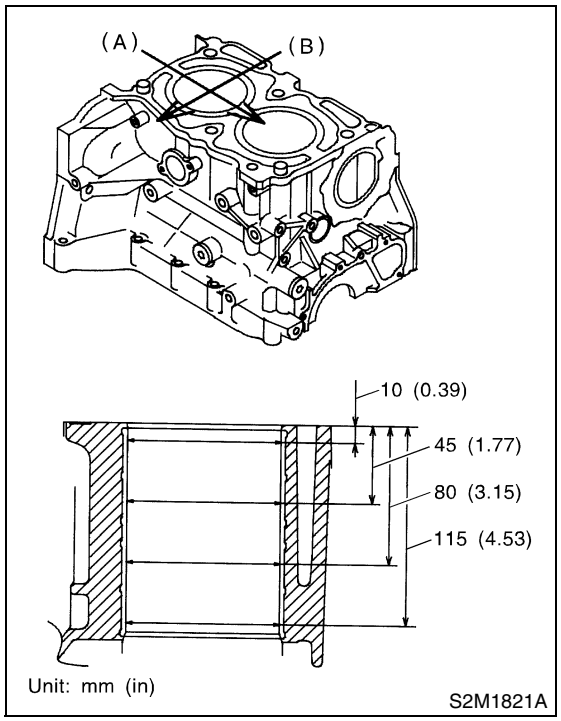
(A) Main journal size mark
(B) Cylinder block RH-LH combination mark
(C) #1 cylinder bore size mark
(D) #2 cylinder bore size mark
(E) #3 cylinder bore size mark
(F) #4 cylinder bore size mark

2) How to measure the inner diameter of each cylinder:
Measure the inner diameter of each cylinder in both the thrust and piston pin directions at the heights shown in the figure, using a cylinder bore gauge.

CAUTION:
Measurement should be performed at a temperature of 20°C (68°F).

Taper:
Standard
0.015 mm (0.0006 in)
Limit
0.050 mm (0.0020 in)

Out-of-roundness:
Standard
0.010 mm (0.0004 in)
Limit
0.050 mm (0.0020 in)



(A) Piston pin direction
(B) Thrust direction

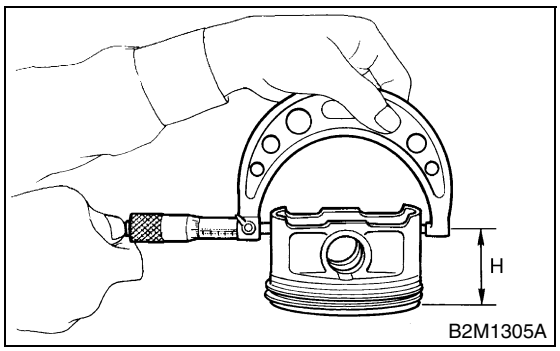
3) When the piston is to be replaced due to general or cylinder wear, determine a suitable sized piston by measuring the piston clearance.

4) How to measure the outer diameter of each piston:
Measure the outer diameter of each piston at the height shown in the figure. (Thrust direction)

CAUTION:
Measurement should be performed at a temperature of 20°C (68°F).

Piston grade point H:
37.0 mm (1.457 in)

Piston outer diameter:
Standard
A: 91.985 — 91.995 mm
(3.6214 — 3.6218 in)
B: 91.975 — 91.985 mm
(3.6211 — 3.6214 in)
0.25 mm (0.0098 in) oversize
92.225 — 92.235 mm
(3.6309 — 3.6313 in)
0.50 mm (0.0197 in) oversize
92.475 — 92.485 mm
(3.6407 — 3.6411 in)



5) Calculate the clearance between cylinder and piston.

CAUTION:
Measurement should be performed at a temperature of 20°C (68°F).

Cylinder to piston clearance at 20°C (68°F):
Standard
0.010 — 0.030 mm (0.0004 — 0.0012 in)
Limit
0.050 mm (0.0020 in)

6) Boring and honing:
(1) If the value of taper, out-of-roundness, or cylinder-to-piston clearance measured exceeds the specified limit or if there is any damage on the cylinder wall, rebore it to use an oversize piston.

CAUTION:
When any of the cylinders needs reboring, all other cylinders must be bored at the same time, and use oversize pistons. Do not perform boring on one cylinder only, nor use an oversize piston for one cylinder only.

(2) If the cylinder inner diameter exceeds the limit after boring and honing, replace the crankcase.

CAUTION:
Immediately after reboring, the cylinder diameter may differ from its real diameter due to temperature rise. Thus, pay attention to this when measuring the cylinder diameter.

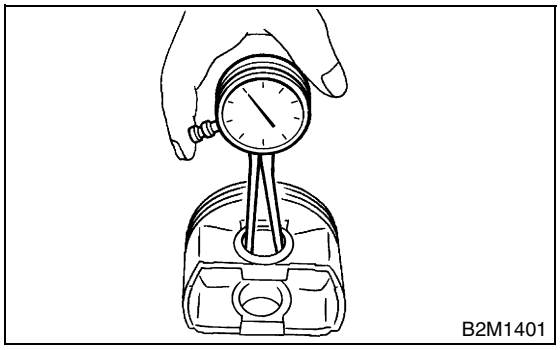
Limit of cylinder enlarging (boring):
0.5 mm (0.020 in)

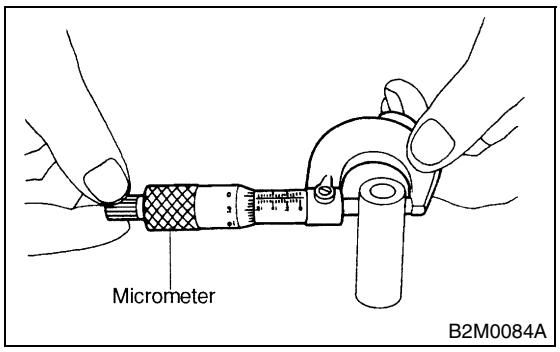
3. PISTON AND PISTON PIN

1) Check the pistons and piston pins for damage, cracks, and wear and the piston ring grooves for wear and damage. Replace if defective.
2) Measure the piston-to-cylinder clearance at each cylinder. <Ref. to ME(STi)-85, CYLINDER AND PISTON, INSPECTION, Cylinder Block.> If any of the clearances is not within specification, replace the piston or bore the cylinder to use an oversize piston.

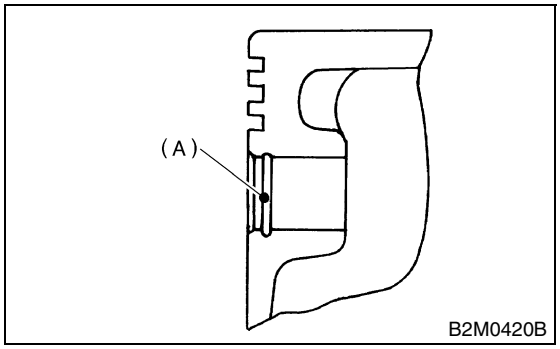
3) Make sure that the piston pin can be inserted into the piston pin hole with a thumb at 20°C (68°F). Replace if defective.

Standard clearance between piston pin and hole in piston:
Standard
0.004 — 0.008 mm (0.0002 — 0.0003 in)
Limit
0.020 mm (0.0008 in)





4) Check the circlip installation groove on the piston for burr (A). If necessary, remove burr from the groove so that the piston pin can lightly move.

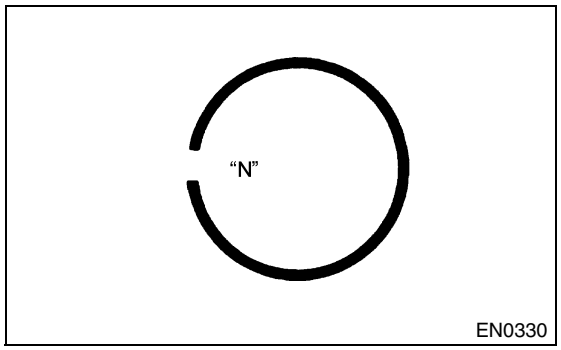


5) Check the piston pin circlip for distortion, cracks and wear.

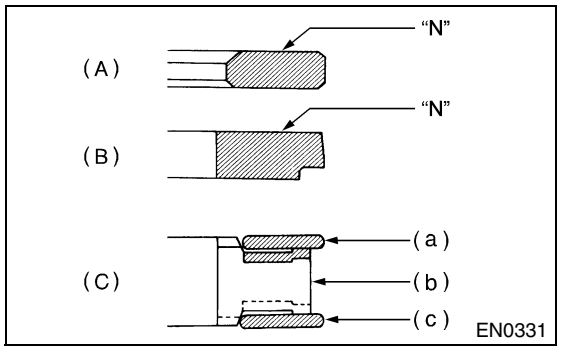
4. PISTON RING

1) If the piston ring is broken, damaged, or worn, or if its tension is insufficient, or when the piston is replaced, replace the piston ring with a new one of the same size as the piston.

CAUTION:
• "N" is marked on the end of the top and second rings. When installing the rings to the piston, face this mark upward.



• The oil ring is a combined ring consisting of two rails and a spacer in between. When installing, be careful to assemble correctly.

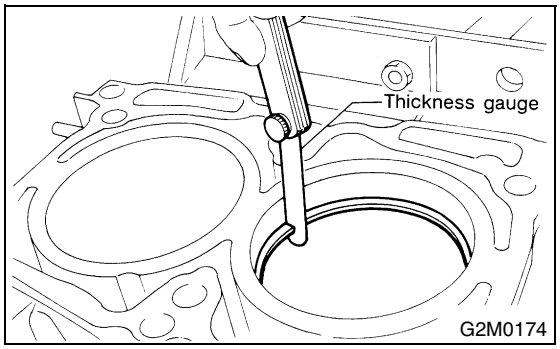


(A) Top ring
(B) Second ring
(C) Oil ring
(a) Upper rail
(b) Spacer
(c) Lower rail

2) Squarely place the piston ring and oil ring in cylinder, and measure the piston ring gap with a thickness gauge.

Unit: mm (in)

		Standard	Limit
Piston ring gap	Top ring	0.20 — 0.25 (0.0079 — 0.0098)	1.0 (0.039)
	Second ring	0.35 — 0.50 (0.0138 — 0.0197)	1.0 (0.039)
	Oil ring rail	0.20 — 0.50 (0.0079 — 0.0197)	1.5 (0.059)

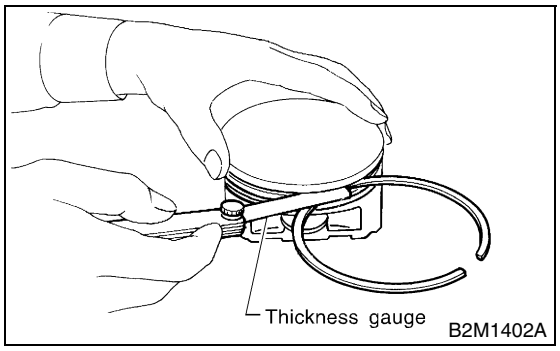


3) Measure the clearance between piston ring and piston ring groove with a thickness gauge.

CAUTION:
Before measuring the clearance, clean the piston ring groove and piston ring.

Unit: mm (in)

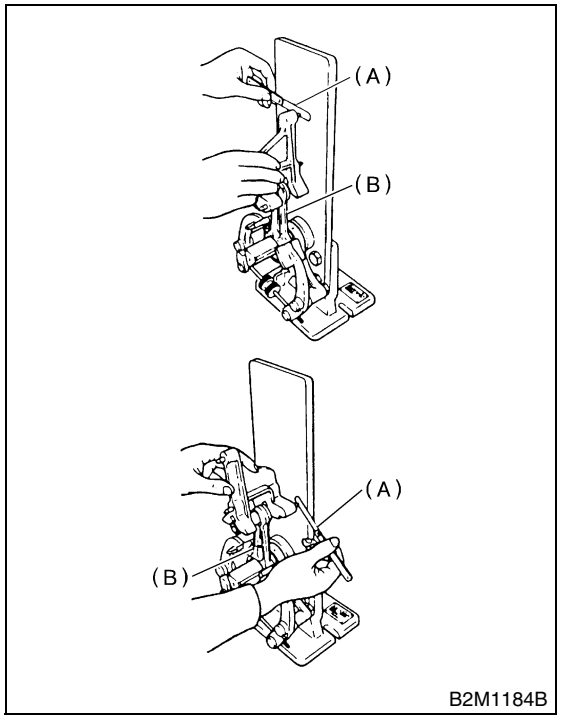
		Standard	Limit
Clearance between piston ring and piston ring groove	Top ring	0.040 — 0.080 (0.0016 — 0.0031)	0.15 (0.0059)
	Second ring	0.030 — 0.070 (0.0012 — 0.0028)	0.15 (0.0059)



5. CONNECTING ROD

1) Replace the connecting rod, if the large or small end thrust surface is damaged.
2) Check for bend or twist using a connecting rod aligner. Replace the connecting rod if the bend or twist exceeds the limit.

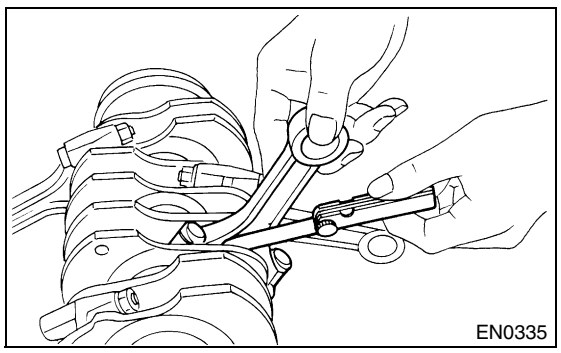
Limit of bend or twist per 100 mm (3.94 in) in length:
0.10 mm (0.0039 in)



(A) Thickness gauge
(B) Connecting rod

3) Install the connecting rod fitted with bearing to crankshaft and measure the side clearance (thrust clearance). Replace the connecting rod if the side clearance exceeds the specified limit.

Connecting rod side clearance:
Standard
0.070 — 0.330 mm (0.0028 — 0.0130 in)
Limit
0.4 mm (0.016 in)



4) Inspect the connecting rod bearing for scar, peeling, seizure, melting, wear, etc.
5) Measure the oil clearance on individual connecting rod bearings by means of plastigauge. If any oil clearance is not within specification, replace the defective bearing with a new one of standard size or undersize as necessary. (See the table below.)

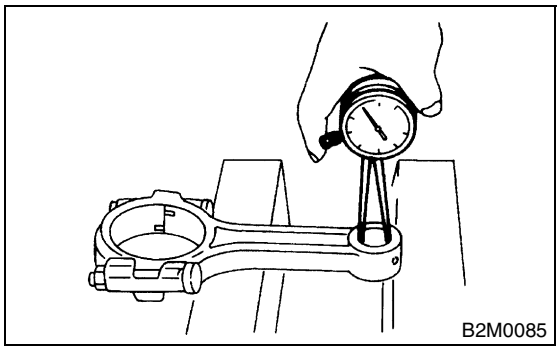
Connecting rod oil clearance:
Standard
0.020 — 0.046 mm (0.0008 — 0.0018 in)
Limit
0.05 mm (0.0020 in)

Unit: mm (in)

Bearing	Bearing size (Thickness at center)	Outer diameter of crank pin
Standard	1.486 — 1.498 (0.0585 — 0.0590)	51.984 — 52.000 (2.0466 — 2.0472)
0.03 (0.0012) undersize	1.505 — 1.509 (0.0593 — 0.0594)	51.954 — 51.970 (2.0454 — 2.0461)
0.05 (0.0020) undersize	1.515 — 1.519 (0.0596 — 0.0598)	51.934 — 51.950 (2.0446 — 2.0453)
0.25 (0.0098) undersize	1.615 — 1.619 (0.0636 — 0.0637)	51.734 — 51.750 (2.0368 — 2.0374)

6) Inspect the bushing at connecting rod small end, and replace if worn or damaged. Also measure the piston pin clearance at the connecting rod small end.

Clearance between piston pin and bushing:
Standard
0 — 0.022 mm (0 — 0.0009 in)
Limit
0.030 mm (0.0012 in)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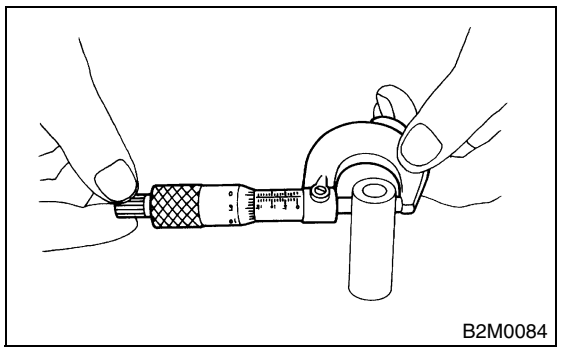
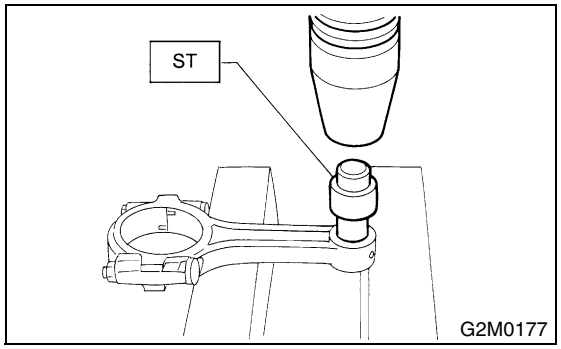

B2M0084

7) Replacement procedure is as follows:
(1) Remove the bushing from connecting rod with ST and press.
(2) Press the bushing with ST after applying oil on the periphery of bushing.

ST 499037100 CONNECTING ROD BUSHING REMOVER AND INSTALLER



G2M0177

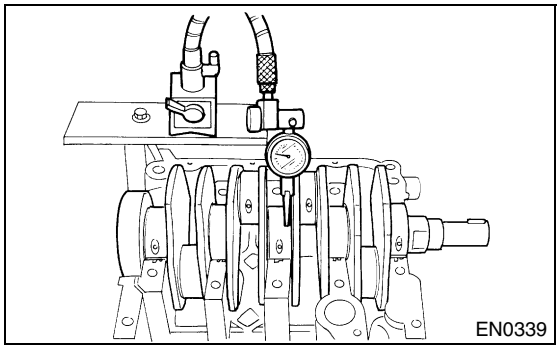
(3) Make two 3 mm (0.12 in) holes in the bushing. Ream the inside of bushing.
(4) After completion of reaming, clean the bushing to remove chips.

6. CRANKSHAFT AND CRANKSHAFT BEARING

1) Clean the crankshaft completely and check for cracks by means of red lead check etc., and replace if defective.
2) Measure the crankshaft bend, and correct or replace if it exceeds the limit.

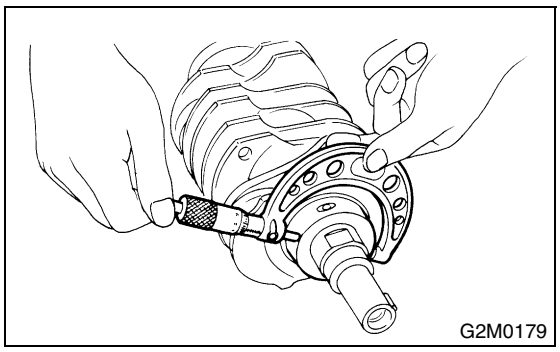
CAUTION:
If a suitable V-block is not available, install #1 and #5 crankshaft bearing on the cylinder block, position the crankshaft on these bearings and measure crankshaft bend using a dial gauge.

Crankshaft bend limit:
0.035 mm (0.0014 in)


EN0339

3) Inspect the crank journal and crank pin for wear. If they are not within the specifications, replace the bearing with a suitable (undersize) one, and replace or recondition the crankshaft as necessary. When grinding the crank journal or crank pin, finish them to the specified dimensions according to the undersize bearing to be used.

Crank pin and crank journal:
Out-of-roundness
0.020 mm (0.0008 in) or less
Taper limit
0.07 mm (0.0028 in)
Grinding limit
0.250 mm (0.0098 in)


G2M0179

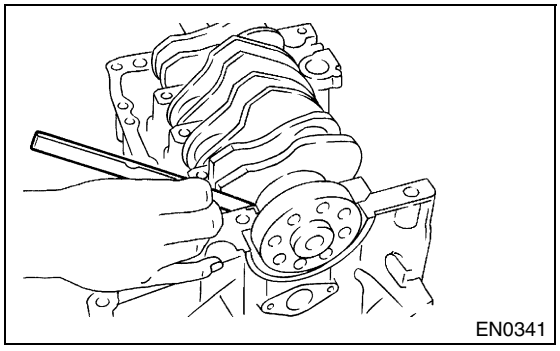
Unit: mm (in)

		Crank journal diameter		Crank pin diameter
		#1, #3, #5	#2, #4	
Standard	Journal O.D.	59.992 — 60.008 (2.3619 — 2.3625)	59.992 — 60.008 (2.3619 — 2.3625)	51.984 — 52.000 (2.0466 — 2.0472)
	Bearing size (Thickness at center)	1.998 — 2.011 (0.0787 — 0.0792)	2.000 — 2.013 (0.0787 — 0.0793)	1.486 — 1.498 (0.0585 — 0.0590)
0.03 (0.0012) undersize	Journal O.D.	59.962 — 59.978 (2.3607 — 2.3613)	59.962 — 59.978 (2.3607 — 2.3613)	51.954 — 51.970 (2.0454 — 2.0461)
	Bearing size (Thickness at center)	2.017 — 2.020 (0.0794 — 0.0795)	2.019 — 2.022 (0.0795 — 0.0796)	1.505 — 1.509 (0.0593 — 0.0594)
0.05 (0.0020) undersize	Journal O.D.	59.942 — 59.958 (2.3599 — 2.3605)	59.942 — 59.958 (2.3599 — 2.3605)	51.934 — 51.950 (2.0446 — 2.0453)
	Bearing size (Thickness at center)	2.027 — 2.030 (0.0798 — 0.0799)	2.029 — 2.032 (0.0799 — 0.0800)	1.515 — 1.519 (0.0596 — 0.0598)
0.25 (0.0098) undersize	Journal O.D.	59.742 — 59.758 (2.3520 — 2.3527)	59.742 — 59.758 (2.3520 — 2.3527)	51.734 — 51.750 (2.0368 — 2.0374)
	Bearing size (Thickness at center)	2.127 — 2.130 (0.0837 — 0.0839)	2.129 — 2.132 (0.0838 — 0.0839)	1.615 — 1.619 (0.0636 — 0.0637)

O.D.: Outer Diameter

4) Measure the thrust clearance of crankshaft at center bearing. If the clearance exceeds the limit, replace the bearing.

Crankshaft thrust clearance:
Standard
0.030 — 0.115 mm (0.0012 — 0.0045 in)
Limit
0.25 mm (0.0098 in)


EN0341

5) Inspect individual crankshaft bearings for signs of flaking, seizure, melting, and wear.

6) Measure the oil clearance on each crankshaft bearing by means of plastigauge. If the measurement is not within the specification, replace the defective bearing with an undersize one, and replace or recondition the crankshaft as necessary.

Unit: mm (in)

Crankshaft oil clearance	
Standard	0.010 — 0.030 (0.0004 — 0.0012)
Limit	0.040 (0.0016)

21.Engine Trouble in General

A: INSPECTION

NOTE:
"RANK" shown in the chart refer to the possibility of reason for the trouble in order ("Very often" to "Rarely")

A — Very often
B — Sometimes
C — Rarely

Trouble	Problem Parts, etc.	Possible Cause	Rank
1. Engine will not start.			
1) Starter does not turn.	• Starter	• Defective battery-to-starter harness	B
		• Defective starter switch	C
		• Defective inhibitor switch or neutral switch	C
		• Defective starter	B
	• Battery	• Poor terminal connection	A
		• Run-down battery	A
		• Defective charging system	B
	• Friction	• Seizure of crankshaft and connecting rod bearing	C
		• Seized camshaft	C
		• Seized or stuck piston and cylinder	C
2) Initial combustion does not occur.	• Starter	• Defective starter	C
	• Engine control system <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>		A
	• Fuel line	• Defective fuel pump and relay	A
		• Lack of or insufficient fuel	B
	• Belt	• Defective	B
		• Defective timing	B
	• Compression	• Incorrect valve clearance	C
		• Loosened spark plugs or defective gasket	C
		• Loosened cylinder head bolts or defective gasket	C
		• Improper valve seating	C
		• Defective valve stem	C
		• Worn or broken valve spring	B
		• Worn or stuck piston rings, cylinder and piston	C
		• Incorrect valve timing	B
		• Improper engine oil (low viscosity)	B
3) Initial combustion occur.	• Engine control system <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>		A
	• Intake system	• Defective intake manifold gasket	B
		• Defective throttle body gasket	B
	• Fuel line	• Defective fuel pump and relay	C
		• Clogged fuel line	C
		• Lack of or insufficient fuel	B
	• Belt	• Defective	B
		• Defective timing	B
	• Compression	• Incorrect valve clearance	C
		• Loosened spark plugs or defective gasket	C
		• Loosened cylinder head bolts or defective gasket	C
		• Improper valve seating	C
		• Defective valve stem	C
		• Worn or broken valve spring	B
		• Worn or stuck piston rings, cylinder and piston	C
		• Incorrect valve timing	B
		• Improper engine oil (low viscosity)	B

Trouble	Problem Parts, etc.	Possible Cause	Rank
4) Engine stalls after initial combustion.	• Engine control system <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>		A
	• Intake system	• Loosened or cracked intake duct	B
		• Loosened or cracked PCV hose	C
		• Loosened or cracked vacuum hose	C
		• Defective intake manifold gasket	B
		• Defective throttle body gasket	B
		• Dirty air cleaner element	C
	• Fuel line	• Clogged fuel line	C
		• Lack of or insufficient fuel	B
	• Belt	• Defective	B
		• Defective timing	B
	• Compression	• Incorrect valve clearance	C
		• Loosened spark plugs or defective gasket	C
		• Loosened cylinder head bolts or defective gasket	C
		• Improper valve seating	C
		• Defective valve stem	C
		• Worn or broken valve spring	B
		• Worn or stuck piston rings, cylinder and piston	C
		• Incorrect valve timing	B
		• Improper engine oil (low viscosity)	B
2. Rough idle and engine stall	• Engine control system <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>		A
	• Intake system	• Loosened or cracked intake duct	A
		• Loosened or cracked PCV hose	A
		• Loosened or cracked vacuum hose	A
		• Defective intake manifold gasket	B
		• Defective throttle body gasket	B
		• Defective PCV valve	C
		• Loosened oil filler cap	B
		• Dirty air cleaner element	C
	• Fuel line	• Defective fuel pump and relay	C
		• Clogged fuel line	C
		• Lack of or insufficient fuel	B
	• Belt	• Defective timing	C
	• Compression	• Incorrect valve clearance	B
		• Loosened spark plugs or defective gasket	B
		• Loosened cylinder head bolts or defective gasket	B
		• Improper valve seating	B
		• Defective valve stem	C
		• Worn or broken valve spring	B
		• Worn or stuck piston rings, cylinder and piston	B
		• Incorrect valve timing	A
		• Improper engine oil (low viscosity)	B
	• Lubrication system	• Incorrect oil pressure	B
		• Defective rocker cover gasket	C
	• Cooling system	• Overheating	C
	• Others	• Malfunction of evaporative emission control system	A
		• Stuck or damaged throttle valve	B
		• Accelerator cable out of adjustment	C

Trouble	Problem Parts, etc.	Possible Cause	Rank
3. Low output, hesitation and poor acceleration	• Engine control system <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>		A
	• Intake system	• Loosened or cracked intake duct	A
		• Loosened or cracked PCV hose	A
		• Loosened or cracked vacuum hose	B
		• Defective intake manifold gasket	B
		• Defective throttle body gasket	B
		• Defective PCV valve	B
		• Loosened oil filler cap	B
		• Dirty air cleaner element	A
	• Fuel line	• Defective fuel pump and relay	B
		• Clogged fuel line	B
		• Lack of or insufficient fuel	C
	• Belt	• Defective timing	B
	• Compression	• Incorrect valve clearance	B
		• Loosened spark plugs or defective gasket	B
		• Loosened cylinder head bolts or defective gasket	B
		• Improper valve seating	B
		• Defective valve stem	C
		• Worn or broken valve spring	B
		• Worn or stuck piston rings, cylinder and piston	C
		• Incorrect valve timing	A
		• Improper engine oil (low viscosity)	B
	• Lubrication system	• Incorrect oil pressure	B
	• Cooling system	• Overheating	C
		• Over cooling	C
	• Others	• Malfunction of evaporative emission control system	A
4. Surging	• Engine control system <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>		A
	• Intake system	• Loosened or cracked intake duct	A
		• Loosened or cracked PCV hose	A
		• Loosened or cracked vacuum hose	A
		• Defective intake manifold gasket	B
		• Defective throttle body gasket	B
		• Defective PCV valve	B
		• Loosened oil filler cap	B
		• Dirty air cleaner element	B
	• Fuel line	• Defective fuel pump and relay	B
		• Clogged fuel line	B
		• Lack of or insufficient fuel	C
	• Belt	• Defective timing	B
	• Compression	• Incorrect valve clearance	B
		• Loosened spark plugs or defective gasket	C
		• Loosened cylinder head bolts or defective gasket	C
		• Improper valve seating	C
		• Defective valve stem	C
		• Worn or broken valve spring	C
		• Worn or stuck piston rings, cylinder and piston	C
		• Incorrect valve timing	A
		• Improper engine oil (low viscosity)	B
	• Cooling system	• Overheating	B
	• Others	• Malfunction of evaporative emission control system	C

Trouble	Problem Parts, etc.	Possible Cause	Rank
5. Engine does not return to idle.	• Engine control system <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>		A
	• Intake system	• Loosened or cracked vacuum hose	A
	• Others	• Stuck or damaged throttle valve	A
		• Accelerator cable out of adjustment	B
6. Dieseling (Run-on)	• Engine control system <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>		A
	• Cooling system	• Overheating	B
	• Others	• Malfunction of evaporative emission control system	B
7. After burning in exhaust system	• Engine control system <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>		A
	• Intake system	• Loosened or cracked intake duct	C
		• Loosened or cracked PCV hose	C
		• Loosened or cracked vacuum hose	B
		• Defective PCV valve	B
		• Loosened oil filler cap	C
	• Belt	• Defective timing	B
	• Compression	• Incorrect valve clearance	B
		• Loosened spark plugs or defective gasket	C
		• Loosened cylinder head bolts or defective gasket	C
		• Improper valve seating	B
		• Defective valve stem	C
		• Worn or broken valve spring	C
		• Worn or stuck piston rings, cylinder and piston	C
		• Incorrect valve timing	A
	• Lubrication system	• Incorrect oil pressure	C
	• Cooling system	• Over cooling	C
	• Others	• Malfunction of evaporative emission control system	C
8. Knocking	• Engine control system <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>		A
	• Intake system	• Loosened oil filler cap	B
	• Belt	• Defective timing	B
	• Compression	• Incorrect valve clearance	C
		• Incorrect valve timing	B
	• Cooling system	• Overheating	A
9. Excessive engine oil consumption	• Intake system	• Loosened or cracked PCV hose	A
		• Defective PCV valve	B
		• Loosened oil filler cap	C
	• Compression	• Defective valve stem	A
		• Worn or stuck piston rings, cylinder and piston	A
	• Lubrication system	• Loosened oil pump attaching bolts and defective gasket	B
		• Defective oil filter seal	B
		• Defective crankshaft oil seal	B
		• Defective rocker cover gasket	B
		• Loosened oil drain plug or defective gasket	B
		• Loosened oil pan fitting bolts or defective oil pan	B

Trouble	Problem Parts, etc.	Possible Cause	Rank
10. Excessive fuel consumption	• Engine control system <Ref. to EN(TURBO)-2, Basic Diagnostic Procedure.>		A
	• Intake system	• Dirty air cleaner element	A
	• Belt	• Defective timing	B
	• Compression	• Incorrect valve clearance	B
		• Loosened spark plugs or defective gasket	C
		• Loosened cylinder head bolts or defective gasket	C
		• Improper valve seating	B
		• Defective valve stem	C
		• Worn or broken valve spring	C
		• Worn or stuck piston rings, cylinder and piston	B
		• Incorrect valve timing	B
	• Lubrication system	• Incorrect oil pressure	C
	• Cooling system	• Over cooling	C
	• Others	• Accelerator cable out of adjustment	B

22.Engine Noise

A: INSPECTION

Type of sound	Condition	Possible cause
Regular clicking sound	Sound increases as engine speed increases.	• Valve mechanism is defective. • Incorrect valve clearance • Worn valve rocker • Worn camshaft • Broken valve spring
Heavy and dull clank	Oil pressure is low.	• Worn crankshaft main bearing • Worn connecting rod bearing (big end)
	Oil pressure is normal.	• Loose flywheel mounting bolts • Damaged engine mounting
High-pitched clank (Spark knock)	Sound is noticeable when accelerating with an overload.	• Ignition timing advanced • Accumulation of carbon inside combustion chamber • Wrong spark plug • Improper gasoline
Clank when engine speed is medium (1,000 to 2,000 rpm).	Sound is reduced when fuel injector connector of noisy cylinder is disconnected. (NOTE*)	• Worn crankshaft main bearing • Worn bearing at crankshaft end of connecting rod
Knocking sound when engine is operating under idling speed and engine is warm	Sound is reduced when fuel injector connector of noisy cylinder is disconnected. (NOTE*)	• Worn cylinder liner and piston ring • Broken or stuck piston ring • Worn piston pin and hole at piston end of connecting rod
	Sound is not reduced if each fuel injector connector is disconnected in turn. (NOTE*)	• Unusually worn valve lifter • Worn cam gear • Worn camshaft journal bore in crankcase
Squeaky sound	—	• Insufficient generator lubrication
Rubbing sound	—	• Defective generator brush and rotor contact
Gear scream when starting engine	—	• Defective ignition starter switch • Worn gear and starter pinion
Sound like polishing glass with a dry cloth	—	• Loose drive belt • Defective water pump shaft
Hissing sound	—	• Loss of compression • Air leakage in air intake system, hoses, connections or manifolds
Timing belt noise	—	• Loose timing belt • Belt contacting case/adjacent part
Valve tappet noise	—	• Incorrect valve clearance

NOTE*:
When disconnecting fuel injector connector, Malfunction Indicator Light (CHECK ENGINE light) illuminates and trouble code is stored in ECM memory.
Therefore, carry out the CLEAR MEMORY MODE <Ref. to EN(TURBO)-45, OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(TURBO)-42, OPERATION, Inspection Mode.> after connecting fuel injector connector.

ENGINE (DIAGNOSTICS)

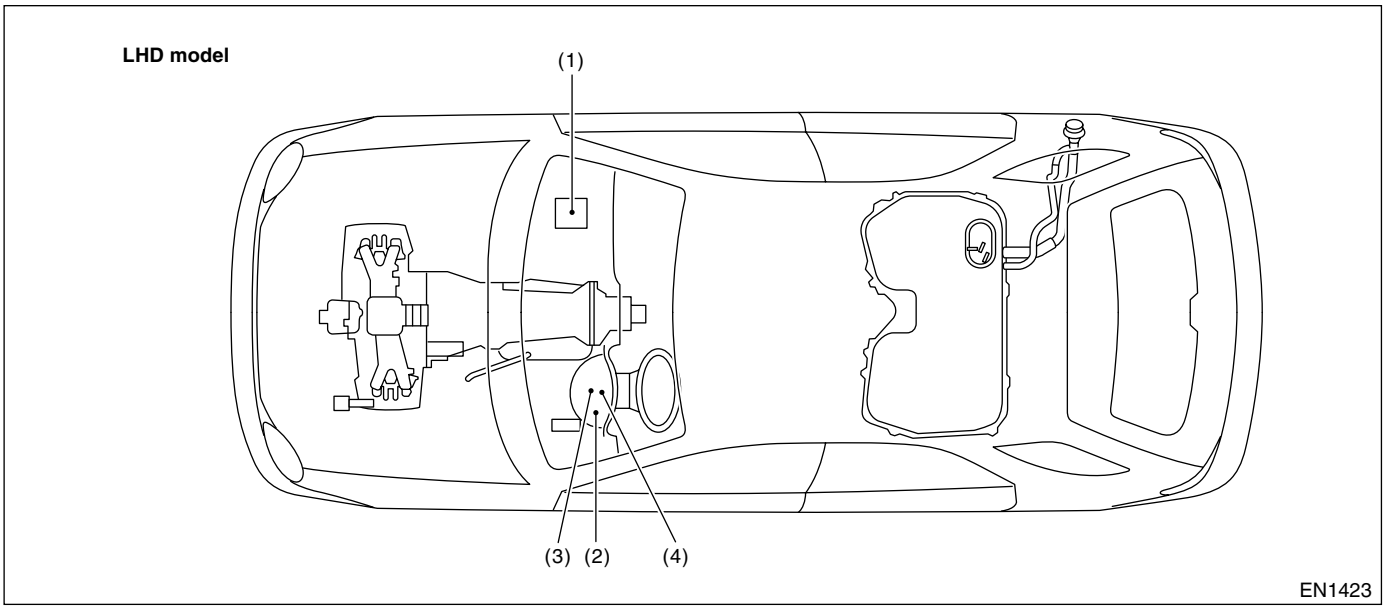
EN(TURBO)

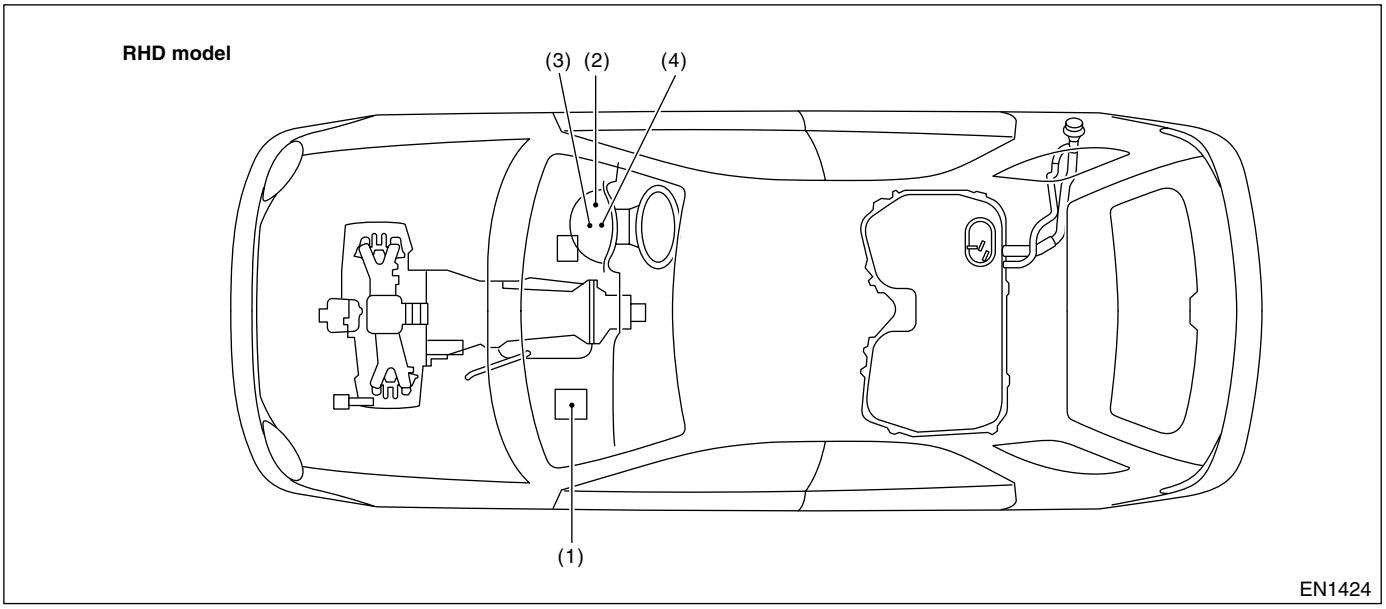
4. Electrical Components Location

A: LOCATION

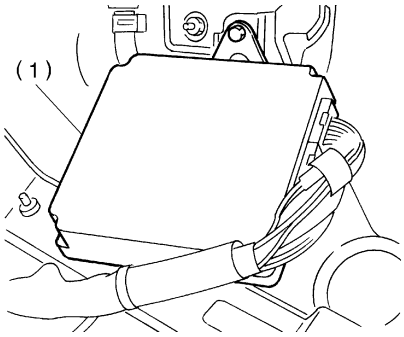
1. ENGINE

• Module





(1) Engine control module (ECM)
(2) CHECK ENGINE malfunction indicator lamp (MIL)
(3) Test mode connector
(4) Data link connector



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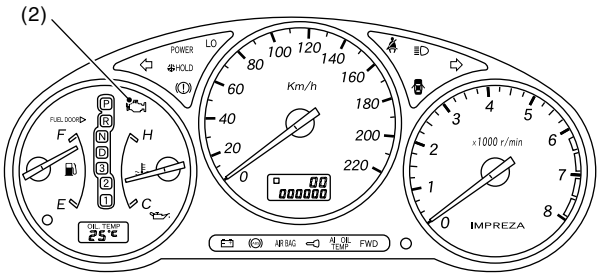
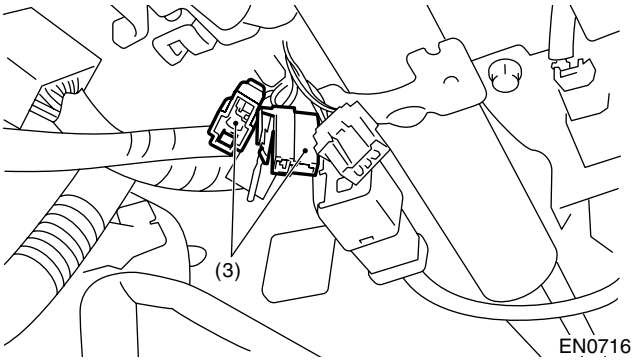


EN0718



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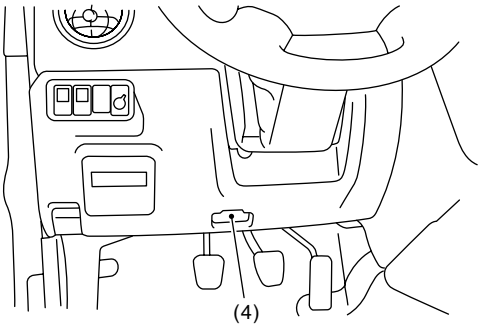
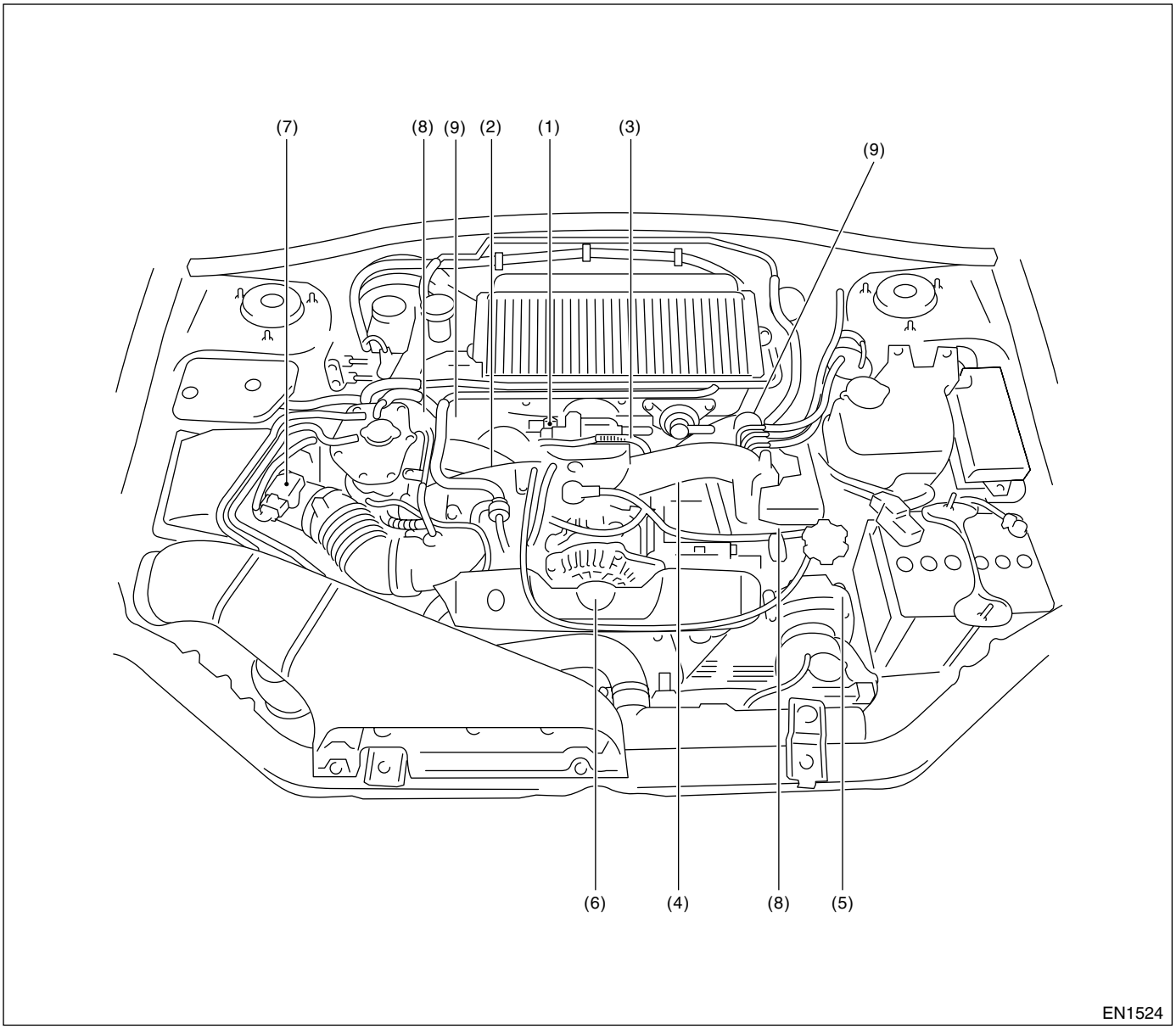
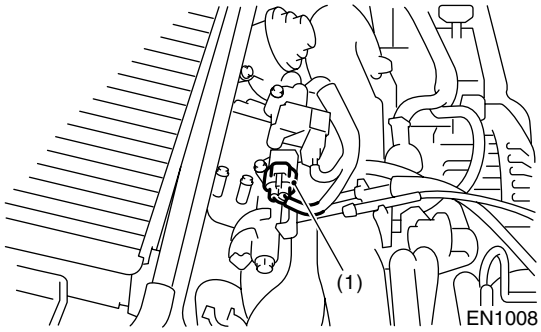


EN1425

• Sensor



(1) Pressure sensor
(2) Engine coolant temperature sensor
(3) Throttle position sensor
(4) Knock sensor
(5) Camshaft position sensor
(6) Crankshaft position sensor
(7) Mass air flow and intake air temperature sensor
(8) Tumble generator valve position sensor (Except STi model)
(9) Variable valve timing camshaft position sensor (STi model)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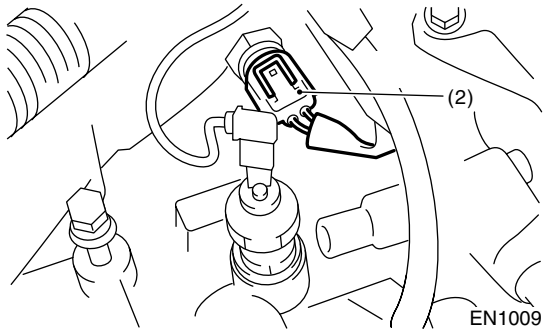
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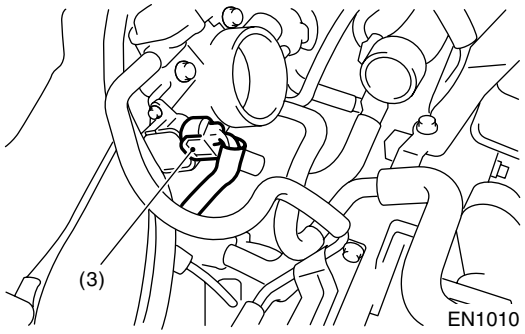
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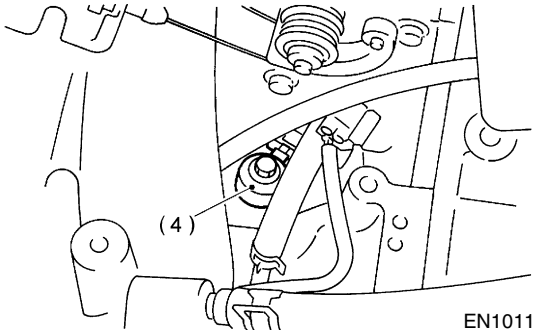
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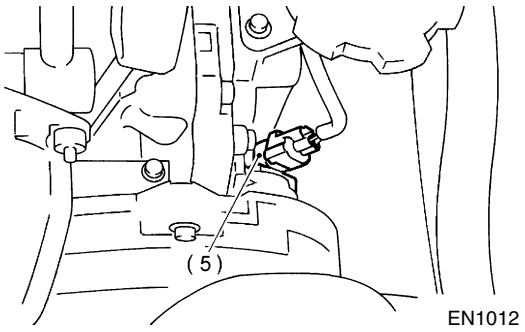
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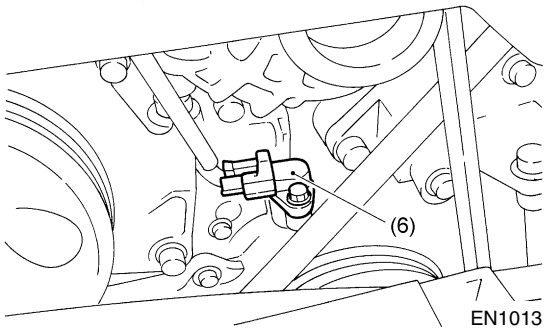
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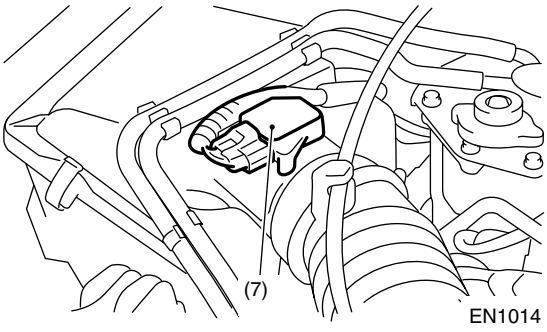
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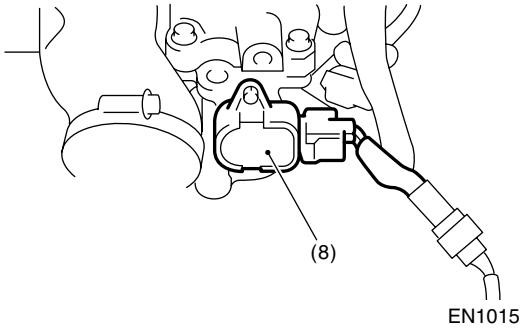
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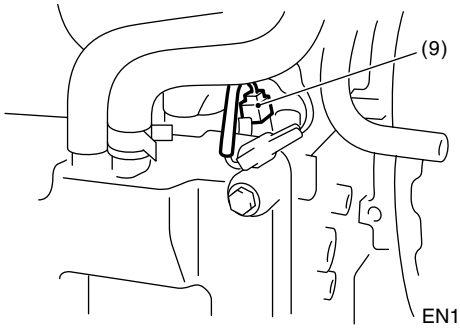
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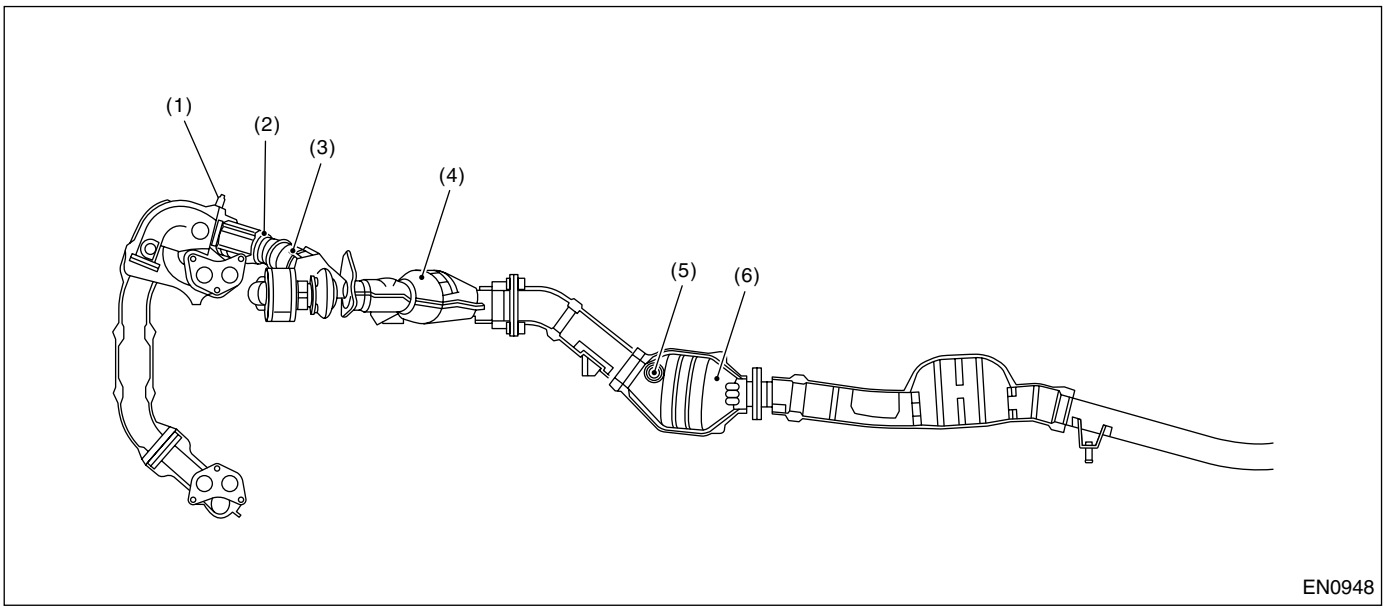
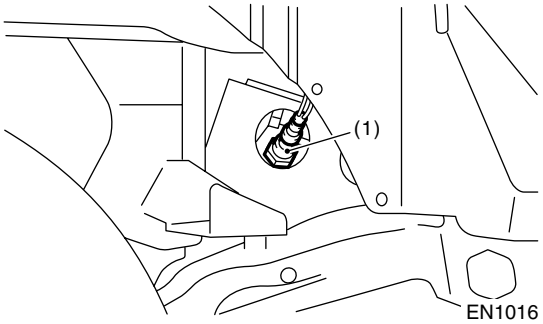


(1) Front oxygen (A/F) sensor
(2) Precatalytic converter (Except STi model)
(3) Exhaust temperature sensor (Except STi model)
(4) Front catalytic converter
(5) Rear oxygen sensor
(6) Rear catalytic converter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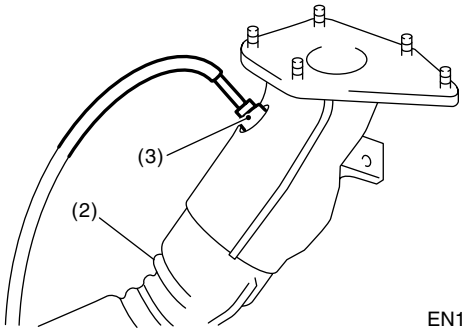
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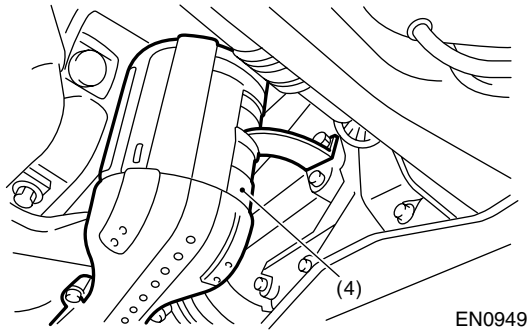
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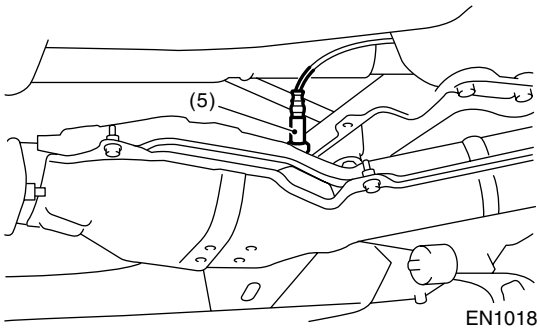
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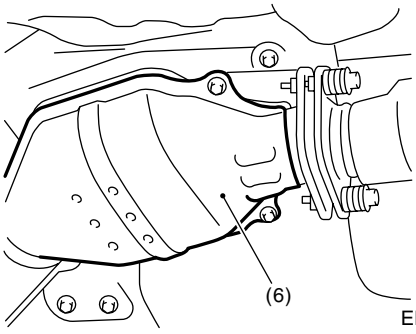
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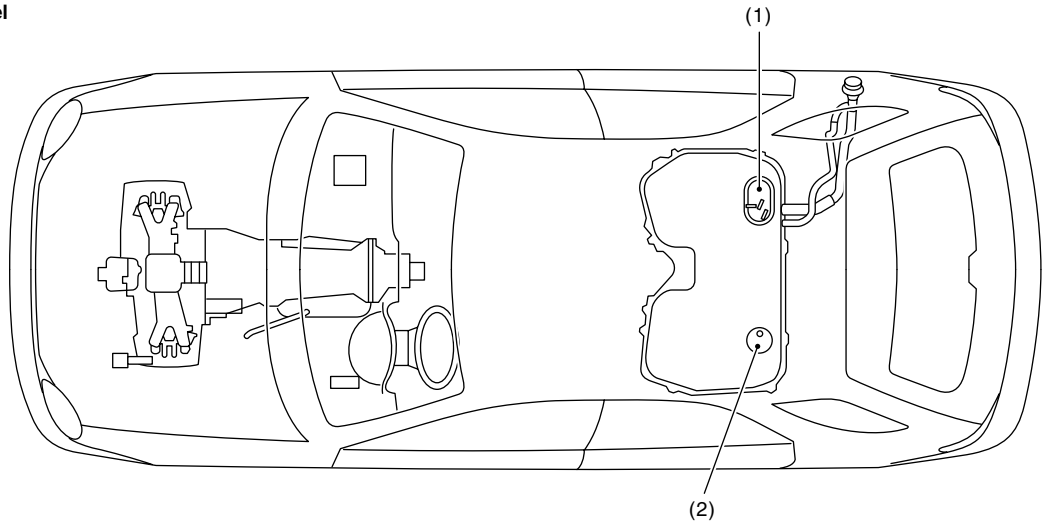
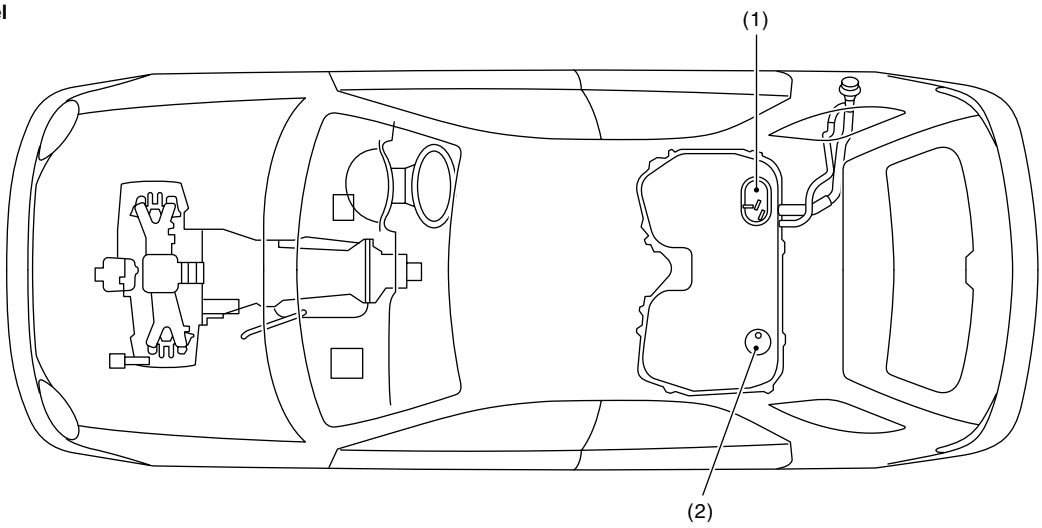
LHD model



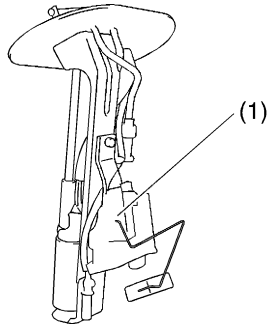
EN1019

RHD model

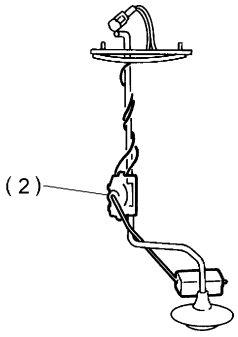


EN1020

(1) Fuel level sensor (2) Fuel sub level sensor

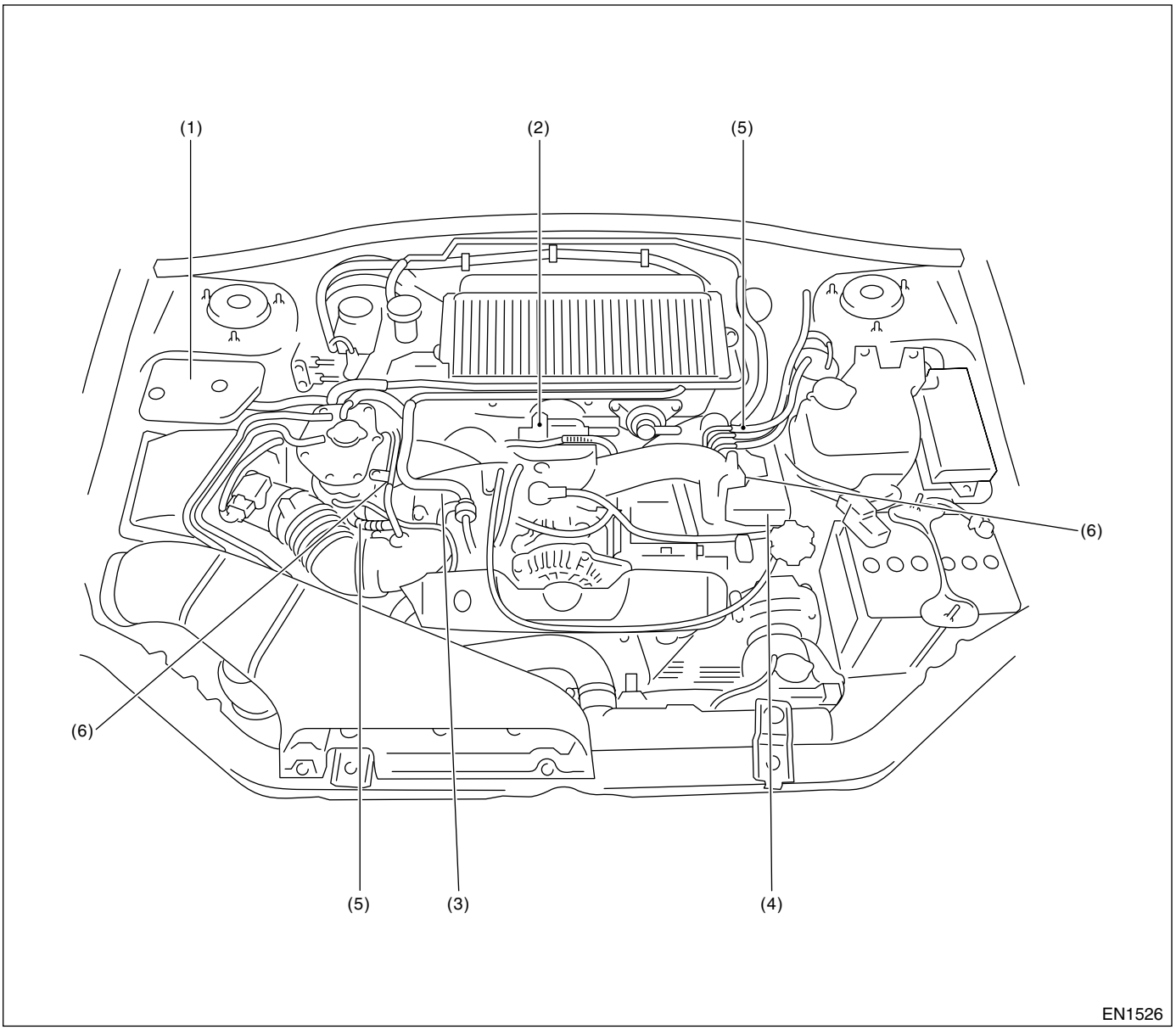


EN1036

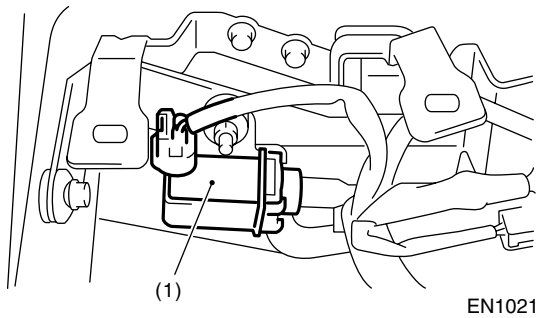


EN1037

• Solenoid Valve, Actuator, Emission Control System Parts and Ignition System Parts



(1) Wastegate control solenoid valve
(2) Idle air control solenoid valve
(3) Purge control solenoid valve
(4) Ignition coil
(5) Tumble generator valve actuator (Except STi model)
(6) Variable valve timing solenoid valve (STi model)



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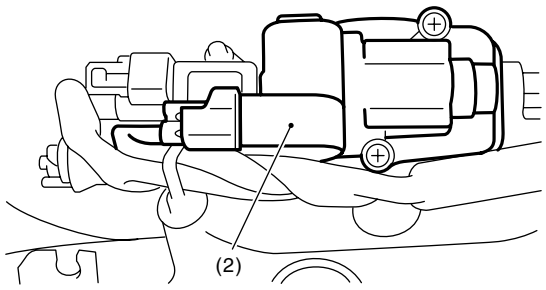
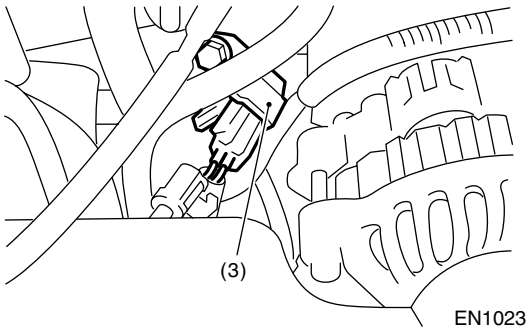
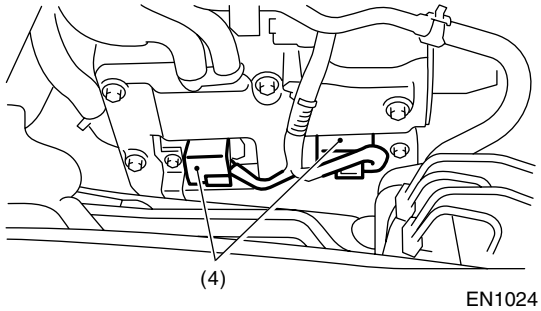


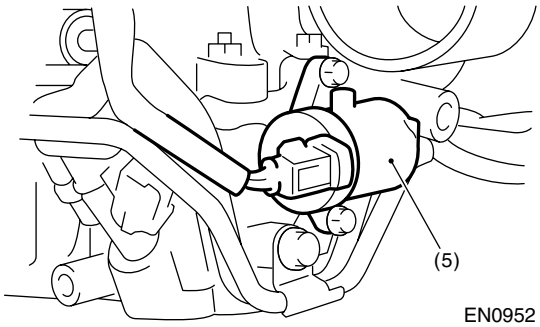
EN1022



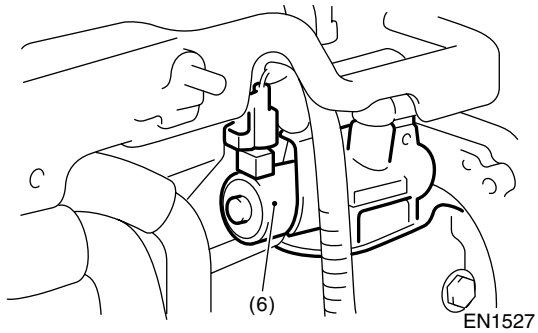
EN1023



EN1024

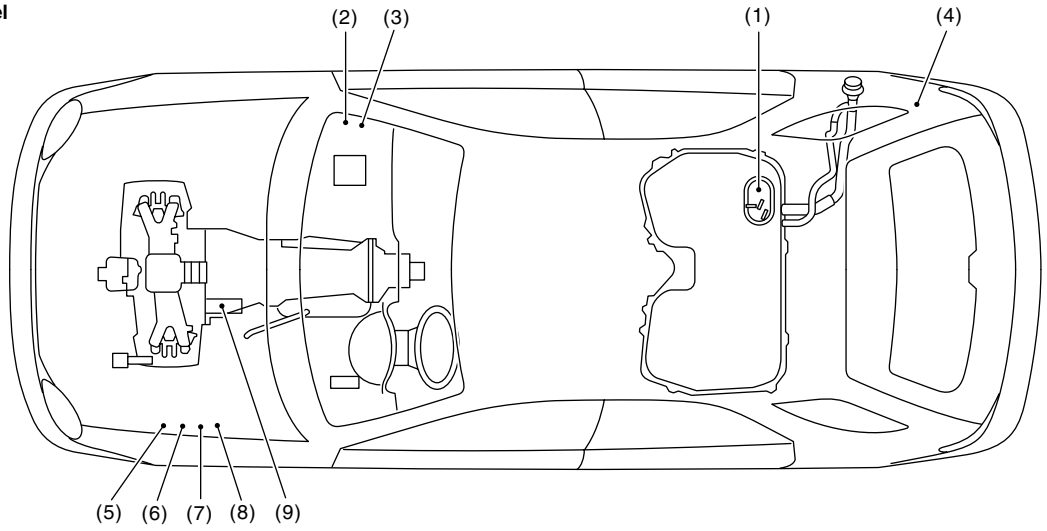


EN0952



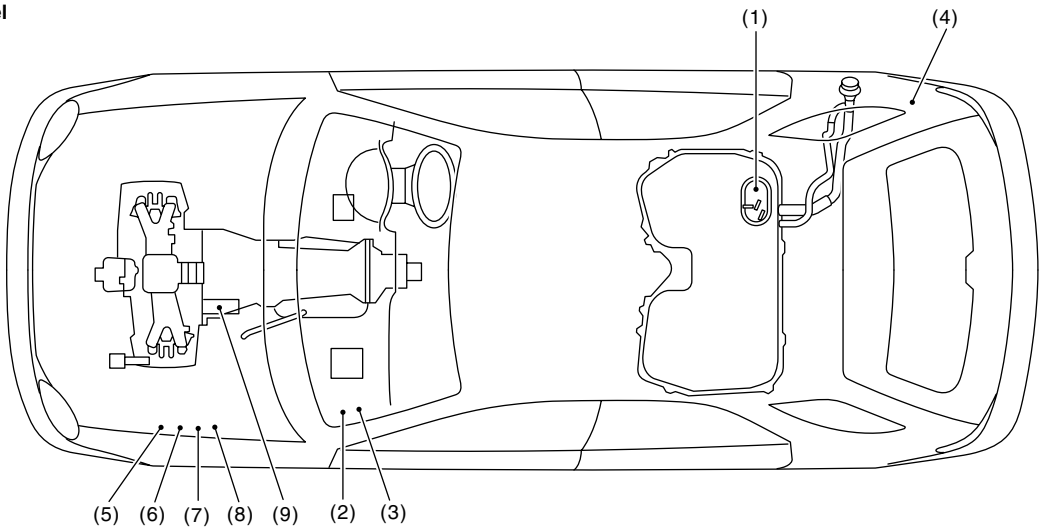
EN1527

LHD model



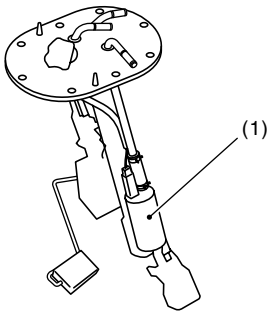
EN1025

RHD model



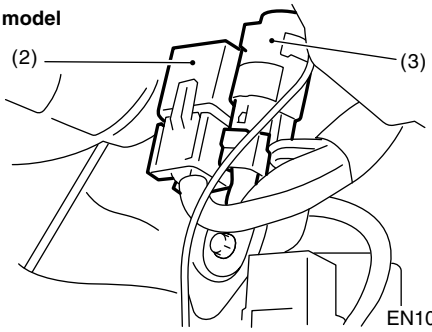
EN1026

(1) Fuel pump
(2) Main relay
(3) Fuel pump relay
(4) Fuel pump controller
(5) Radiator main fan relay 1
(6) Radiator main fan relay 2
(7) Radiator sub fan relay 1
(8) Radiator sub fan relay 2
(9) Starter



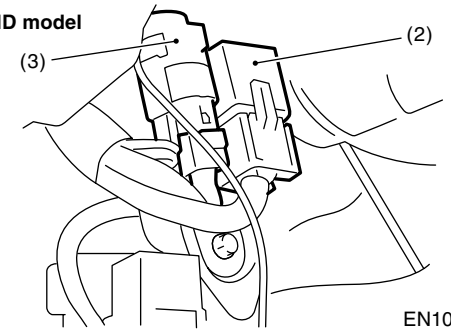
EN0953

LHD model



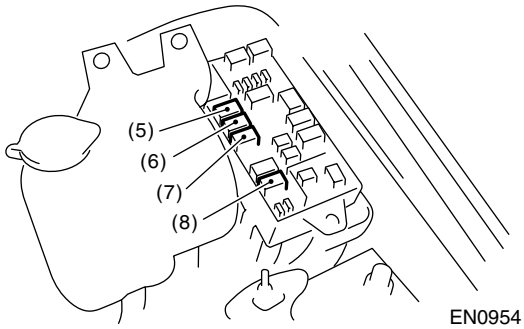
EN1027

RHD model

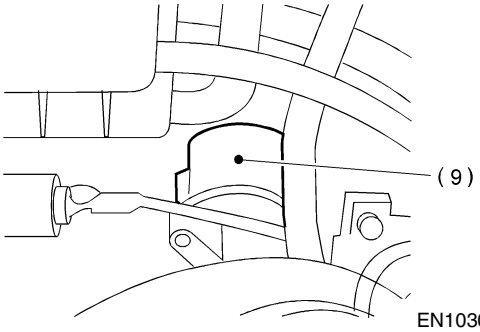


EN1028

EN1029



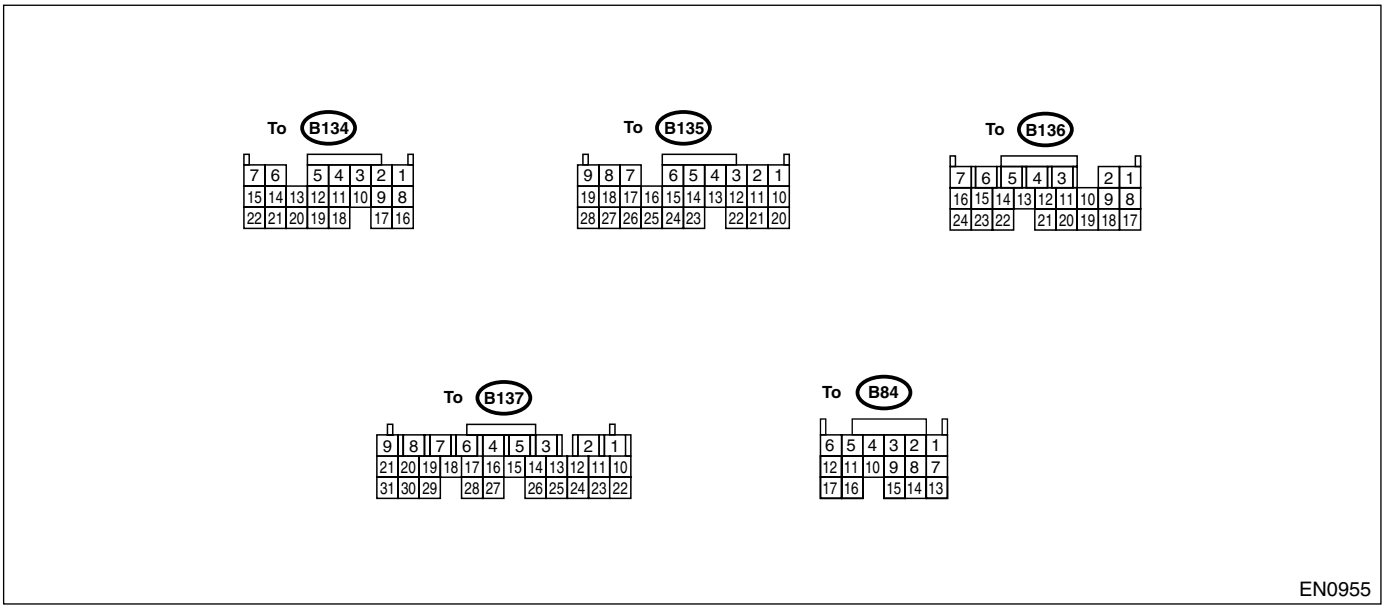
EN0954



EN1030

5. Engine Control Module (ECM) I/O Signal

A: ELECTRICAL SPECIFICATION



Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Crankshaft position sensor	Signal (+)	B135	2	0	–7 — +7	Sensor output waveform
	Signal (–)	B135	11	0	0	—
	Shield	B135	21	0	0	—
Camshaft position sensor	Signal (+)	B135	1	0	–7 — +7	Sensor output waveform
	Signal (–)	B135	10	0	0	—
	Shield	B135	21	0	0	—
Throttle position sensor	Signal	B135	7	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	B135	9	5	5	—
	GND (sensor)	B135	19	0	0	—
Rear oxygen sensor	Signal	B135	17	0	0 — 0.9	—
	Shield	B135	26	0	0	—
	GND (sensor)	B135	19	0	0	—
Front oxygen (A/F) sensor heater	Signal 1	B137	4	0 — 1.0	0 — 1.0	—
	Signal 2	B137	5	0 — 1.0	0 — 1.0	—
Rear oxygen sensor heater signal		B136	13	0 — 1.0	0 — 1.0	—
Engine coolant temperature sensor	Signal	B135	18	1.0 — 1.4	1.0 — 1.4	After warm-up the engine.
	GND (sensor)	B135	19	0	0	After warm-up the engine.
Vehicle speed signal		B134	1	0 or 5	0 or 5	“5” and “0” are repeatedly displayed when vehicle is driven.

Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Mass air flow sensor	Signal	B84	13	—	0.3 — 4.5	—
	Shield	B84	8	0	0	—
	GND	B84	7	0	0	—
Intake air temperature sensor signal		B135	27	—	—	—
Variable valve timing solenoid valve LH (+) *1		B84	17	ON: 0 OFF: 10 — 13	ON: 0 OFF: 10 — 13	—
Variable valve timing solenoid valve LH (–) *1		B84	16	0	0	—
Variable valve timing solenoid valve RH (+) *1		B84	6	ON: 0 OFF: 10 — 13	ON: 0 OFF: 10 — 13	—
Variable valve timing solenoid valve RH (–) *1		B84	12	0	0	—
Exhaust gas temperature sensor *2	Signal	B135	16	—	—	—
	GND (sensor)	B135	19	0	0	—
Tumble generator valve position sensor RH *2	Signal	B84	23	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	B135	9	5	5	—
	GND (sensor)	B135	19	0	0	—
Tumble generator valve position sensor LH *2	Signal	B84	13	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	B135	9	5	5	—
	GND (sensor)	B135	19	0	0	—
Tumble generator valve RH (open) *2		B84	4	0 or 5	0 or 5	—
Tumble generator valve RH (close) *2		B84	5	0 or 5	0 or 5	—
Tumble generator valve LH (open) *2		B84	11	0 or 5	0 or 5	—
Tumble generator valve LH (close) *2		B84	10	0 or 5	0 or 5	—
Wastegate control solenoid valve		B137	24	10 — 13	13 — 14	—
Starter switch		B134	16	0	0	Cranking: 8 — 14
A/C switch		B134	6	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Ignition switch		B134	14	10 — 13	13 — 14	—
Neutral position switch		B134	8	ON: 12±0.5 OFF: 0		Switch is ON when gear is in neutral position.
Test mode connector		B134	5	5	5	When connected: 0
Knock sensor	Signal	B135	4	2.8	2.8	—
	Shield	B135	22	0	0	—
Back-up power supply		B137	10	10 — 13	13 — 14	Ignition switch “OFF”: 10 — 13
Control unit power supply		B137	2	10 — 13	13 — 14	—
		B137	3	10 — 13	13 — 14	—

Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Sensor power supply		B135	9	5	5	—
Line end check 1		B134	10	0	0	—
Ignition control	#1	B136	24	0	13 — 14	Waveform
	#2	B136	23	0	13 — 14	Waveform
	#3	B136	22	0	13 — 14	Waveform
	#4	B136	21	0	13 — 14	Waveform
Fuel injector	#1	B137	1	10 — 13	1 — 14	Waveform
	#2	B136	6	10 — 13	1 — 14	Waveform
	#3	B136	5	10 — 13	1 — 14	Waveform
	#4	B136	4	10 — 13	1 — 14	Waveform
Idle air control solenoid valve	Signal	B136	10	0 or 13 — 14	0 or 13 — 14	Waveform
Fuel pump controller	Signal 1	B134	13	—	—	—
	Signal 2	B136	16	—	—	—
A/C relay control		B137	27	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Radiator fan relay 1 control		B137	17	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Radiator fan relay 2 control		B137	28	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	With A/C vehicles only
Malfunction indicator lamp		B137	15	—	—	Light “ON”: 1, or less Light “OFF”: 10 — 14
Engine speed output		B136	9	—	0 — 13, or more	Waveform
Purge control solenoid valve		B137	16	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
Pressure sensor	Signal	B135	8	1.7 — 2.4	1.1 — 1.6	—
	Power supply	B135	9	5	5	
	GND (sensor)	B135	19	0	0	
Fuel level sensor		B135	25	0.12 — 4.75	0.12 — 4.75	—
Small light switch		B134	17	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Blower fan switch		B134	9	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Rear defogger switch		B134	3	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Power steering oil pressure switch		B135	24	10 — 13	ON: 0 OFF: 13 — 14	—
Front oxygen (A/F) sensor signal (+)		B137	19	2.8 — 3.2	2.8 — 3.2	—
Front oxygen (A/F) sensor signal (–)		B137	29	2.4 — 2.7	2.4 — 2.7	—
Front oxygen (A/F) sensor shield		B136	7	0	0	—
SSM/GST communication line		B134	21	Less than 1 ←→ More than 4	Less than 1 ←→ More than 4	—
Torque control 1 signal		B134	19	More than 4	More than 4	—
Torque control 2 signal		B134	18	More than 4	More than 4	—
Torque control cut signal		B136	14	8	8	—

Content	Connector No.	Terminal No.	Signal (V)		Note
			Ignition SW ON (Engine OFF)	Engine ON (Idling)	
AT diagnosis input signal *2	B135	20	Less than 1 ←→ More than 4	Less than 1 ←→ More than 4	Waveform
AT load signal *2	B135	28	4.3 — 4.4	0.9 — 1.4	—
GND (sensors)	B135	19	0	0	—
GND (injectors)	B136	8	0	0	—
GND (ignition system)	B136	18	0	0	—
GND (power supply)	B136	17	0	0	—
	B134	22	0	0	—
GND (control systems)	B134	7	0	0	—
	B134	15	0	0	—
GND (oxygen sensor heater 1)	B137	9	0	0	—
GND (oxygen sensor heater 2)	B137	8	0	0	—

*1: STi model
*2: Except STi model

17.List of Diagnostic Trouble Code (DTC)

A: LIST

2. STI MODEL

Following DTCs are only for STi model. Refer to normal turbo model for DTCs except following.

DTC No.	Item	Index
P0011	Variable valve timing system 1 (RH).	<Ref. to EN(TURBO)-19, DTC P0011 — VARIABLE VALVE TIMING SYSTEM 1 (RH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0021	Variable valve timing system 2 (LH).	<Ref. to EN(TURBO)-20, DTC P0021 — VARIABLE VALVE TIMING SYSTEM 2 (LH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0365	Variable valve timing camshaft position sensor B circuit malfunction 1 (RH).	<Ref. to EN(TURBO)-22, DTC P0365 — VARIABLE VALVE TIMING CAMSHAFT POSITION SENSOR B CIRCUIT MALFUNCTION 1 (RH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0390	Variable valve timing camshaft position sensor B circuit malfunction 2 (LH).	<Ref. to EN(TURBO)-26, DTC P0390 — VARIABLE VALVE TIMING CAMSHAFT POSITION SENSOR B CIRCUIT MALFUNCTION 2 (LH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1306	Variable valve timing solenoid valve 1 circuit low input (RH)	<Ref. to EN(TURBO)-30, DTC P1306 — VARIABLE VALVE TIMING SOLENOID VALVE 1 CIRCUIT LOW INPUT (RH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1307	Variable valve timing solenoid valve 1 circuit high input (RH)	<Ref. to EN(TURBO)-32, DTC P1307 — VARIABLE VALVE TIMING SOLENOID VALVE 1 CIRCUIT HIGH INPUT (RH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1308	Variable valve timing solenoid valve 2 circuit low input (LH)	<Ref. to EN(TURBO)-34, DTC P1308 — VARIABLE VALVE TIMING SOLENOID VALVE 2 CIRCUIT LOW INPUT (LH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1309	Variable valve timing solenoid valve 2 circuit high input (LH)	<Ref. to EN(TURBO)-36, DTC P1309 — VARIABLE VALVE TIMING SOLENOID VALVE 2 CIRCUIT HIGH INPUT (LH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

18.Diagnostic Procedure with Diagnostic Trouble Code (DTC)

DI: DTC P0011
— VARIABLE VALVE TIMING SYSTEM 1 (RH) —

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
  - Engine stalls.
  - Erroneous idling

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(TURBO)-45, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(TURBO)-42, Inspection Mode.>.

	Step	Check	Yes	No
1	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.**	Is any other DTC displayed?	Inspect the relevant DTC using "List of Diagnostic Trouble Code (DTC)".<Ref. to EN(TURBO)-18, List of Diagnostic Trouble Code (DTC).>	Go to step **2.**
2	**CHECK CURRENT DATA.** 1)Start the engine and let it idle. 2)Inspect the variable valve timing system operating angle and variable valve timing solenoid valve duty output using Subaru Select Monitor and OBD-II general scan tool. Specification: •Variable valve timing system operating angle: Approx. 0 degree •Variable valve timing solenoid valve duty output: Approx. 10% NOTE: •Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN(TURBO)-34, Subaru Select Monitor.> •OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the measured value largely out of specification?	Inspect the following items and repair or replace if necessary. • Engine oil (amount, contamination) • Oil pipe (clog) • Variable valve timing solenoid valve (clog or contamination in oil passage, settling at spring, stuck at valve) • Intake camshaft (sludge, damage at camshaft) • Timing belt (timing mark aligning)	A temporary malfunction. Conduct the following to clean the oil passage. Replace the engine oil and idle the engine for 5 minutes, then replace the oil filter and engine oil.

DJ:DTC P0021
— VARIABLE VALVE TIMING SYSTEM 2 (LH) —

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
  - Engine stalls.
  - Erroneous idling

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(TURBO)-45, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(TURBO)-42, Inspection Mode.>.

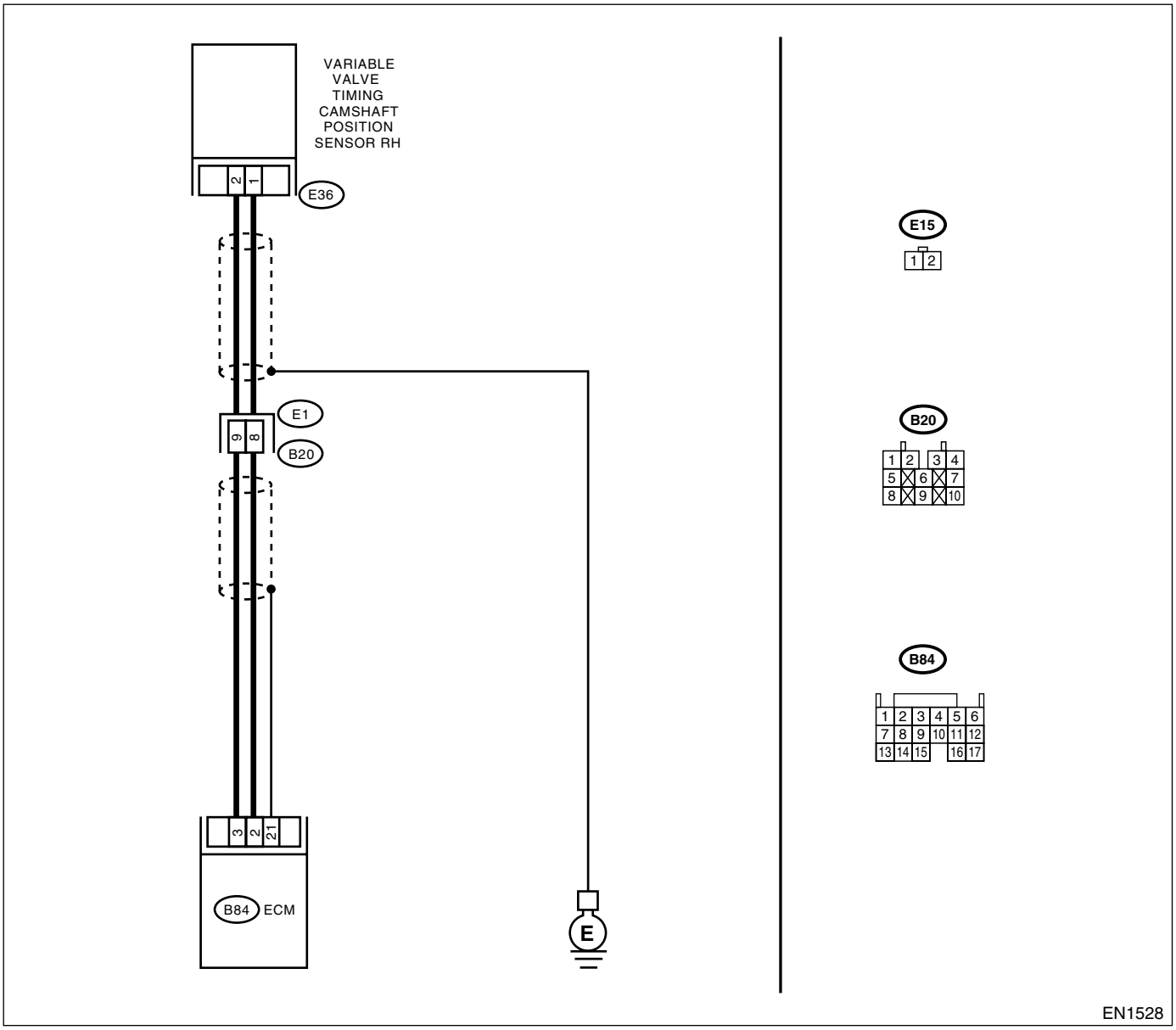
	Step	Check	Yes	No
1	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.**	Is any other DTC displayed?	Inspect the relevant DTC using "List of Diagnostic Trouble Code (DTC)".<Ref. to EN(TURBO)-18, List of Diagnostic Trouble Code (DTC).>	Go to step **2.**
2	**CHECK CURRENT DATA.** 1)Start the engine and let it idle. 2)Inspect the variable valve timing system operating angle and variable valve timing solenoid valve duty output using Subaru Select Monitor and OBD-II general scan tool. Specification: •Variable valve timing system operating angle: Approx. 0 degree •Variable valve timing solenoid valve duty output: Approx. 10% NOTE: •Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN(TURBO)-34, Subaru Select Monitor.> •OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the measured value largely out of specification?	Inspect the following items and repair or replace if necessary. • Engine oil (amount, contamination) • Oil pipe (clog) • Variable valve timing solenoid valve (clog or contamination in oil passage, settling at spring, stuck at valve) • Intake camshaft (sludge, damage at camshaft) • Timing belt (timing mark aligning)	A temporary malfunction. Conduct the following to clean the oil passage. Replace the engine oil and idle the engine for 5 minutes, then replace the oil filter and engine oil.

DK:DTC P0365
— VARIABLE VALVE TIMING CAMSHAFT POSITION SENSOR B CIRCUIT MALFUNCTION 1 (RH) —

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
  - Engine stalls.
  - Failure of engine to start

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(TURBO)-45, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(TURBO)-42, Inspection Mode.>.

- **WIRING DIAGRAM:**



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1)Start the engine. 2)Measure the ignition timing advance using Subaru Select Monitor or OBD-II general scan tool, while running the vehicle at approx. 30 km/h (19 MPH). NOTE: •Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN(TURBO)-34, Subaru Select Monitor.> •OBD-II scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Does the ignition timing advance smoothly change, according to engine output change? Idling: –2 — +2 degree Vehicle running: –2 — +50 degree	Repair the poor contact in connector. NOTE: In this case, repair the following: • Poor contact in variable valve timing camshaft position sensor • Poor contact in ECM connector	Go to step **2.**
2	**CHECK HARNESS BETWEEN VARIABLE VALVE TIMING CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from variable valve timing camshaft position sensor and ECM. 3)Measure the resistance of harness between variable valve timing camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E36) No. 1 — (B84) No. 2:*** ***(E36) No. 2 — (B84) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair the harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between variable valve timing camshaft position sensor and ECM connector • Poor contact in ECM connector • Poor contact in coupling connector
3	**CHECK HARNESS BETWEEN VARIABLE VALVE TIMING CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.** Measure the resistance of harness between variable valve timing camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E36) No. 1 — Engine ground:*** ***(E36) No. 2 — Engine ground:***	Is the resistance more than 1M Ω?	Go to step **4.**	Repair the ground short circuit in harness between variable valve timing camshaft position sensor and ECM connector. NOTE: The harness between both connectors are shielded. Repair the ground short circuit in harness together with shield.
4	**CHECK CONDITION OF VARIABLE VALVE TIMING CAMSHAFT POSITION SENSOR.**	Is the variable valve timing camshaft position sensor installation bolt tightened securely?	Go to step **5.**	Tighten the variable valve timing camshaft position sensor installation bolt securely.

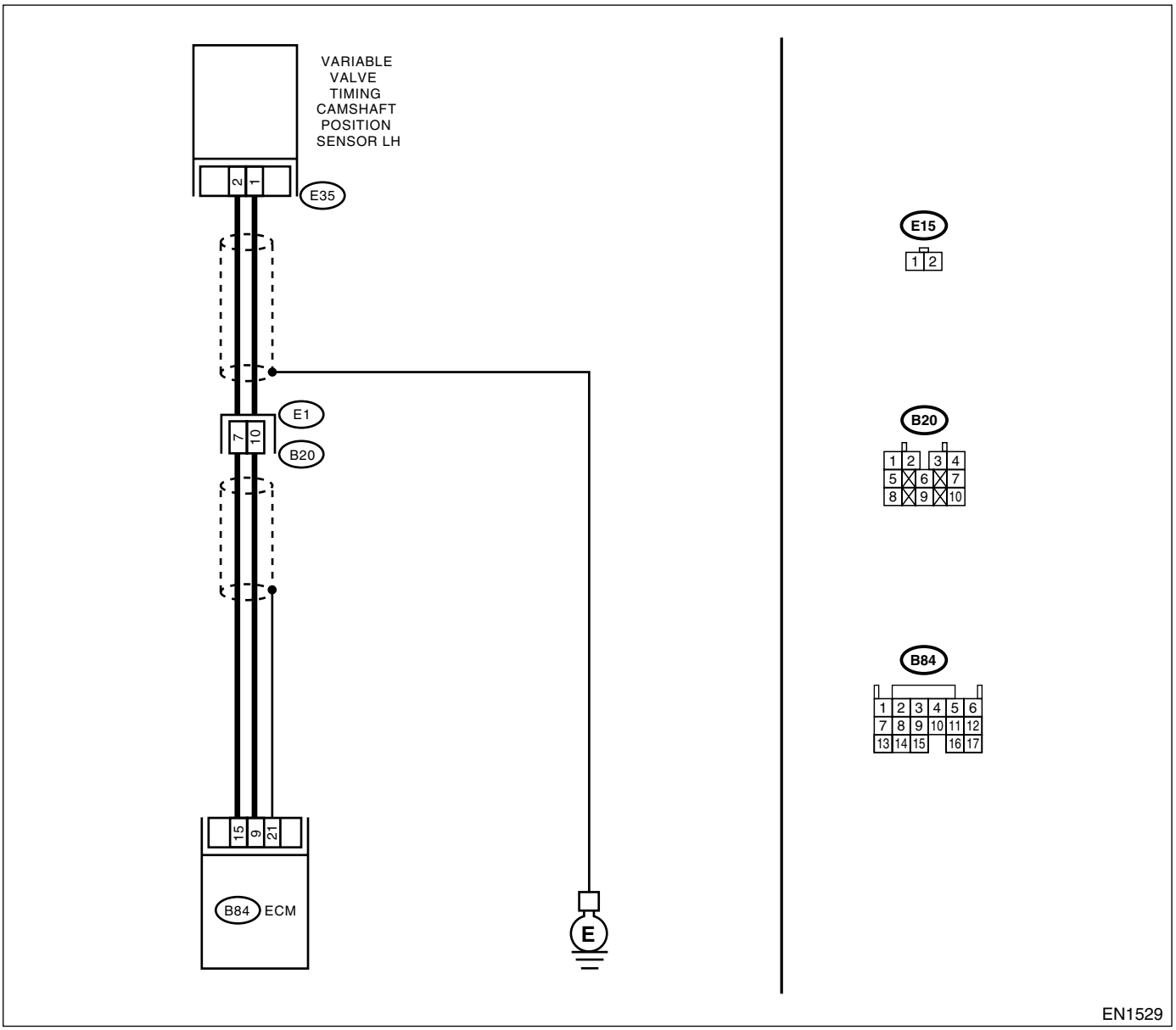
	Step	Check	Yes	No
5	**CHECK VARIABLE VALVE TIMING CAMSHAFT POSITION SENSOR.** 1)Remove the variable valve timing camshaft position sensor. 2)Measure the resistance between connector terminals of variable valve timing camshaft position sensor. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 1 and 4 kΩ?	Check oil pressure passage and stuck of variable valve timing solenoid valve.	Replace the variable valve timing camshaft position sensor. <Ref. to FU(TURBO)-31, Variable Valve Timing Camshaft Position Sensor.>

DL:DTC P0390
— VARIABLE VALVE TIMING CAMSHAFT POSITION SENSOR B CIRCUIT MALFUNCTION 2 (LH) —

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
  - Engine stalls.
  - Failure of engine to start

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(TURBO)-45, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(TURBO)-42, Inspection Mode.>.

- **WIRING DIAGRAM:**



	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1)Start the engine. 2)Measure the ignition timing advance using Subaru Select Monitor or OBD-II general scan tool, while running the vehicle at approx. 30 km/h (19 MPH). NOTE: •Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN(TURBO)-34, Subaru Select Monitor.> •OBD-II scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Does the ignition timing advance smoothly change, according to engine output change? Idling: −2 — +2 degree Vehicle running: −2 — +50 degree	Repair the poor contact in connector. NOTE: In this case, repair the following: • Poor contact in variable valve timing camshaft position sensor • Poor contact in ECM connector	Go to step **2.**
2	**CHECK HARNESS BETWEEN VARIABLE VALVE TIMING CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from variable valve timing camshaft position sensor and ECM. 3)Measure the resistance of harness between variable valve timing camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E35) No. 1 — (B84) No. 9:*** ***(E35) No. 2 — (B84) No. 15:***	Is the resistance less than 1 Ω?	Go to step **3.**	Repair the harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between variable valve timing camshaft position sensor and ECM connector • Poor contact in ECM connector • Poor contact in coupling connector
3	**CHECK HARNESS BETWEEN VARIABLE VALVE TIMING CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.** Measure the resistance of harness between variable valve timing camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E35) No. 1 — Engine ground:*** ***(E35) No. 2 — Engine ground:***	Is the resistance more than 1M Ω?	Go to step **4.**	Repair the ground short circuit in harness between variable valve timing camshaft position sensor and ECM connector. NOTE: The harness between both connectors are shielded. Repair the ground short circuit in harness together with shield.
4	**CHECK CONDITION OF VARIABLE VALVE TIMING CAMSHAFT POSITION SENSOR.**	Is the variable valve timing camshaft position sensor installation bolt tightened securely?	Go to step **5.**	Tighten the variable valve timing camshaft position sensor installation bolt securely.

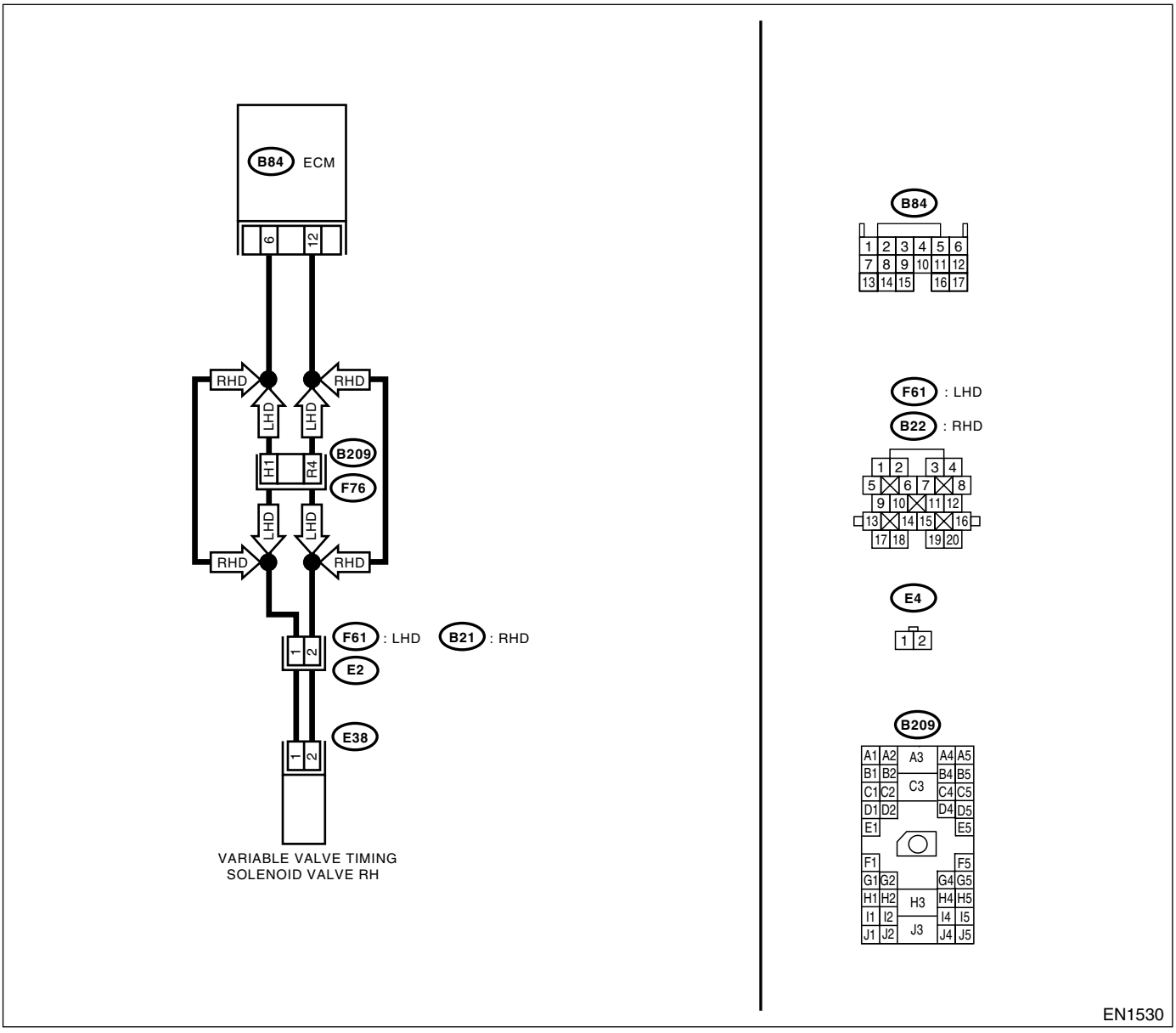
	Step	Check	Yes	No
5	**CHECK VARIABLE VALVE TIMING CAMSHAFT POSITION SENSOR.** 1)Remove the variable valve timing camshaft position sensor. 2)Measure the resistance between connector terminals of variable valve timing camshaft position sensor. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 1 and 4 kΩ?	Check oil pressure passage and stuck of oil variable valve timing solenoid valve.	Replace the variable valve timing camshaft position sensor. <Ref. to FU(TURBO)-31, Variable Valve Timing Camshaft Position Sensor.>

DM:DTC P1306 — VARIABLE VALVE TIMING SOLENOID VALVE 1 CIRCUIT LOW INPUT (RH) —

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
  - Erroneous idling

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(TURBO)-45, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(TURBO)-42, Inspection Mode.>.

- **WIRING DIAGRAM:**



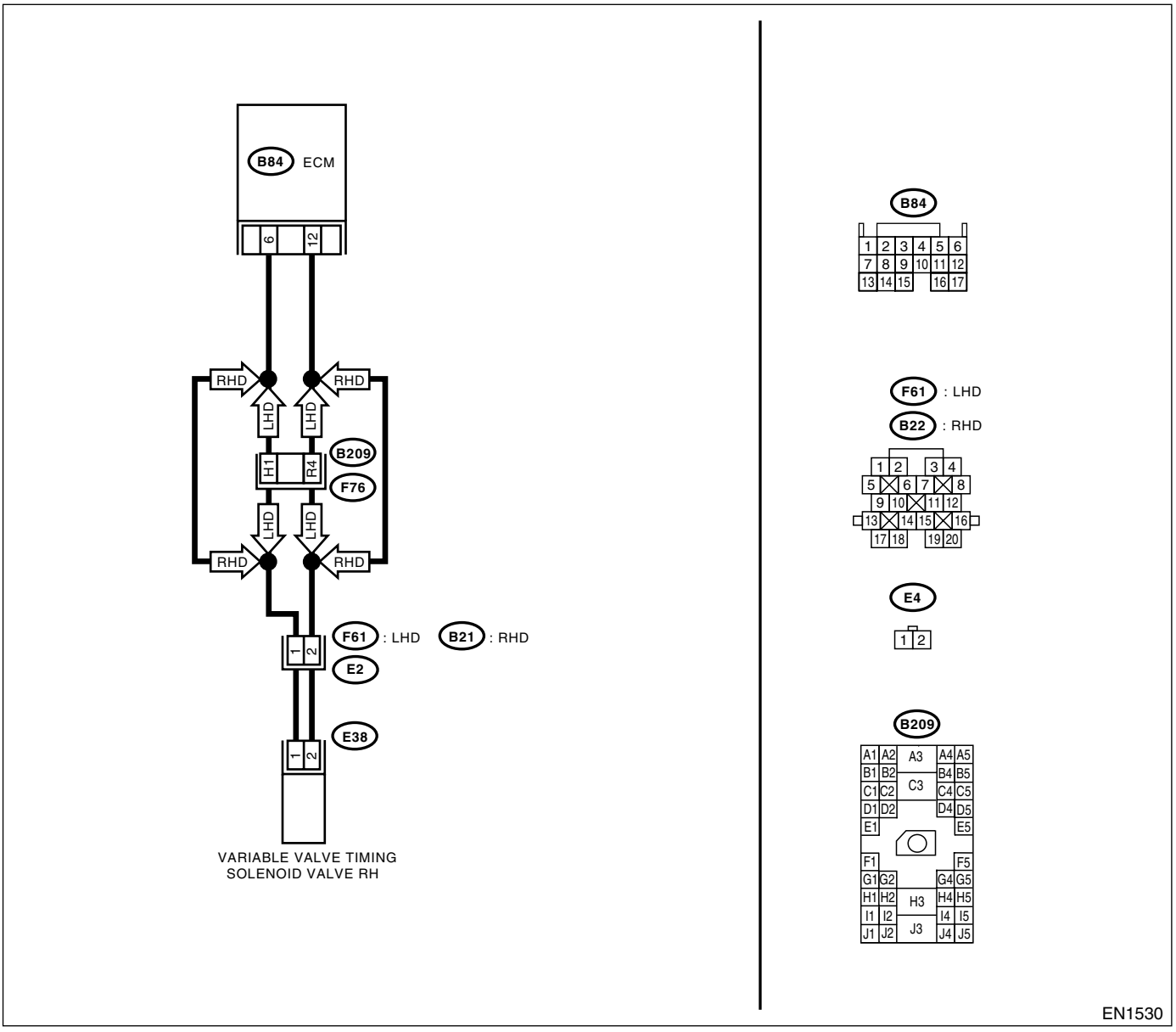
	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND VARIABLE VALVE TIMING SOLENOID VALVE.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ECM and variable valve timing solenoid valve. 3)Measure the resistance between ECM and variable valve timing solenoid valve. ***Connector & terminal*** ***(B84) No. 6 — (E38) No. 1:*** ***(B84) No. 12 — (E38) No. 2:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit in harness between ECM and variable valve timing solenoid valve connector. NOTE: In this case, repair the following: • Open circuit in harness between ECM and variable valve timing solenoid valve connector • Poor contact in coupling connector.
2	**CHECK HARNESS BETWEEN ECM AND VARIABLE VALVE TIMING SOLENOID VALVE.** Measure the resistance between ECM and variable valve timing solenoid valve. ***Connector & terminal*** ***(E38) No. 1 — Engine ground:*** ***(E38) No. 2 — Engine ground:***	Is the resistance more than 1M Ω?	Go to step **3.**	Repair the short circuit between ECM and variable valve timing solenoid valve connector.
3	**CHECK VARIABLE VALVE TIMING SOLENOID VALVE.** 1)Remove the variable valve timing solenoid valve. 2)Measure the resistance between variable valve timing solenoid valve terminal.	Is the resistance between 6 and 12 Ω?	Repair the poor contact in ECM and variable valve timing solenoid valve.	Replace the variable valve timing solenoid valve. <Ref. to ME(STi)-59, Camshaft.>

DN:DTC P1307 — VARIABLE VALVE TIMING SOLENOID VALVE 1 CIRCUIT HIGH INPUT (RH) —

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
  - Erroneous idling

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(TURBO)-45, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(TURBO)-42, Inspection Mode.>.

- **WIRING DIAGRAM:**



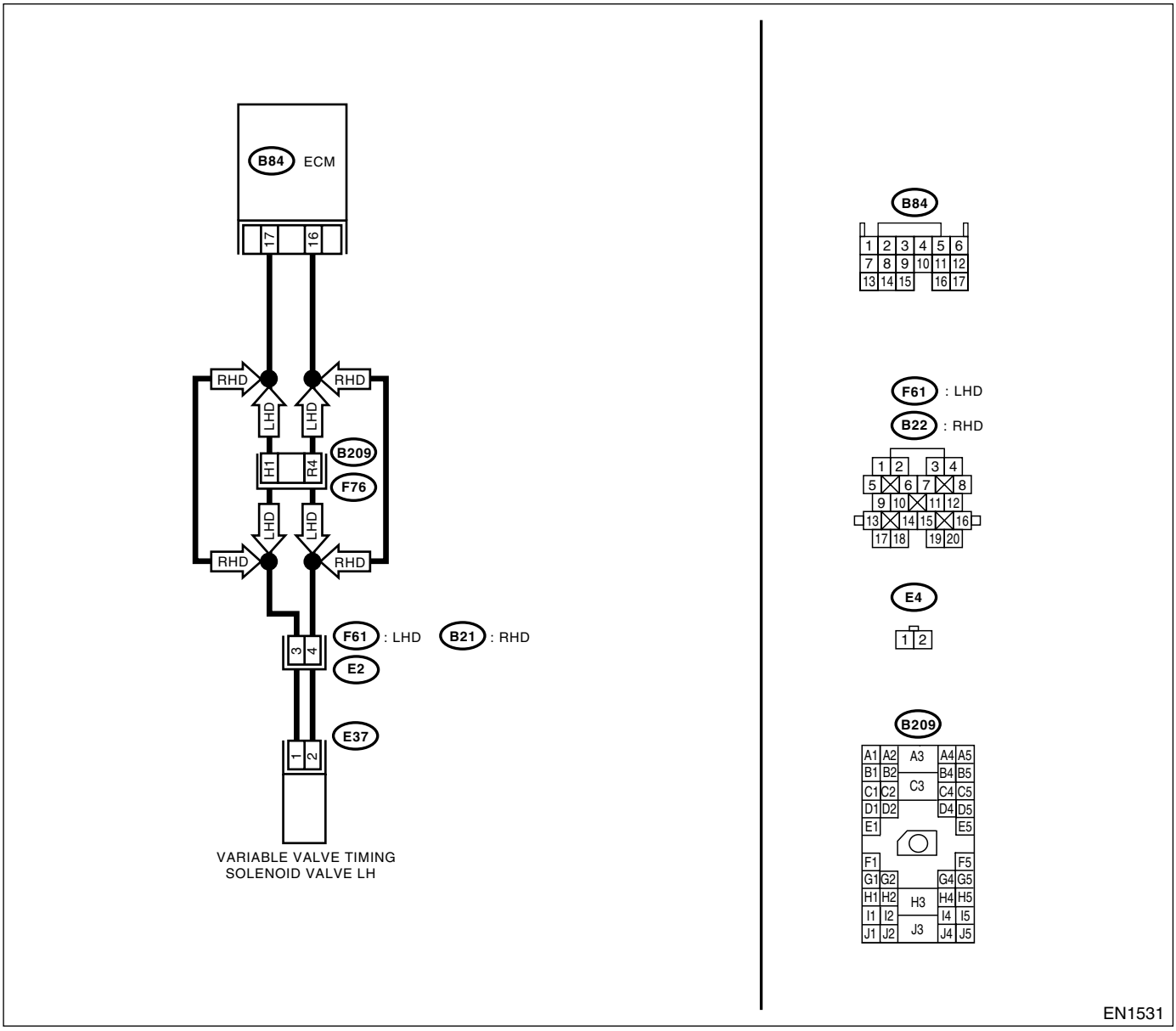
	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND VARIABLE VALVE TIMING SOLENOID VALVE.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ECM and variable valve timing solenoid valve. 3)Measure the resistance between ECM and variable valve timing solenoid valve. ***Connector & terminal*** ***(B84) No. 6 — (E38) No. 1:*** ***(B84) No. 12 — (E38) No. 2:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit in harness between ECM and variable valve timing solenoid valve connector. NOTE: In this case, repair the following: • Open circuit in harness between ECM and variable valve timing solenoid valve connector • Poor contact in coupling connector.
2	**CHECK HARNESS BETWEEN ECM AND VARIABLE VALVE TIMING SOLENOID VALVE.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ECM and variable valve timing solenoid valve. 3)Measure the resistance between ECM and variable valve timing solenoid valve. ***Connector & terminal*** ***(E38) No. 1 — Engine ground:*** ***(E38) No. 2 — Engine ground:***	Is the resistance more than 1M Ω?	Go to step **3.**	Repair the short circuit between ECM and variable valve timing solenoid valve connector.
3	**CHECK VARIABLE VALVE TIMING SOLENOID VALVE.** 1)Remove the variable valve timing solenoid valve. 2)Measure the resistance between variable valve timing solenoid valve terminal.	Is the resistance between 6 and 12 Ω?	Repair the poor contact in ECM and variable valve timing solenoid valve.	Replace the variable valve timing solenoid valve.<Ref. to ME(STi)-59, Camshaft.>

DO:DTC P1308 — VARIABLE VALVE TIMING SOLENOID VALVE 2 CIRCUIT LOW INPUT (LH) —

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
  - Erroneous idling

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(TURBO)-45, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(TURBO)-42, Inspection Mode.>.

- **WIRING DIAGRAM:**



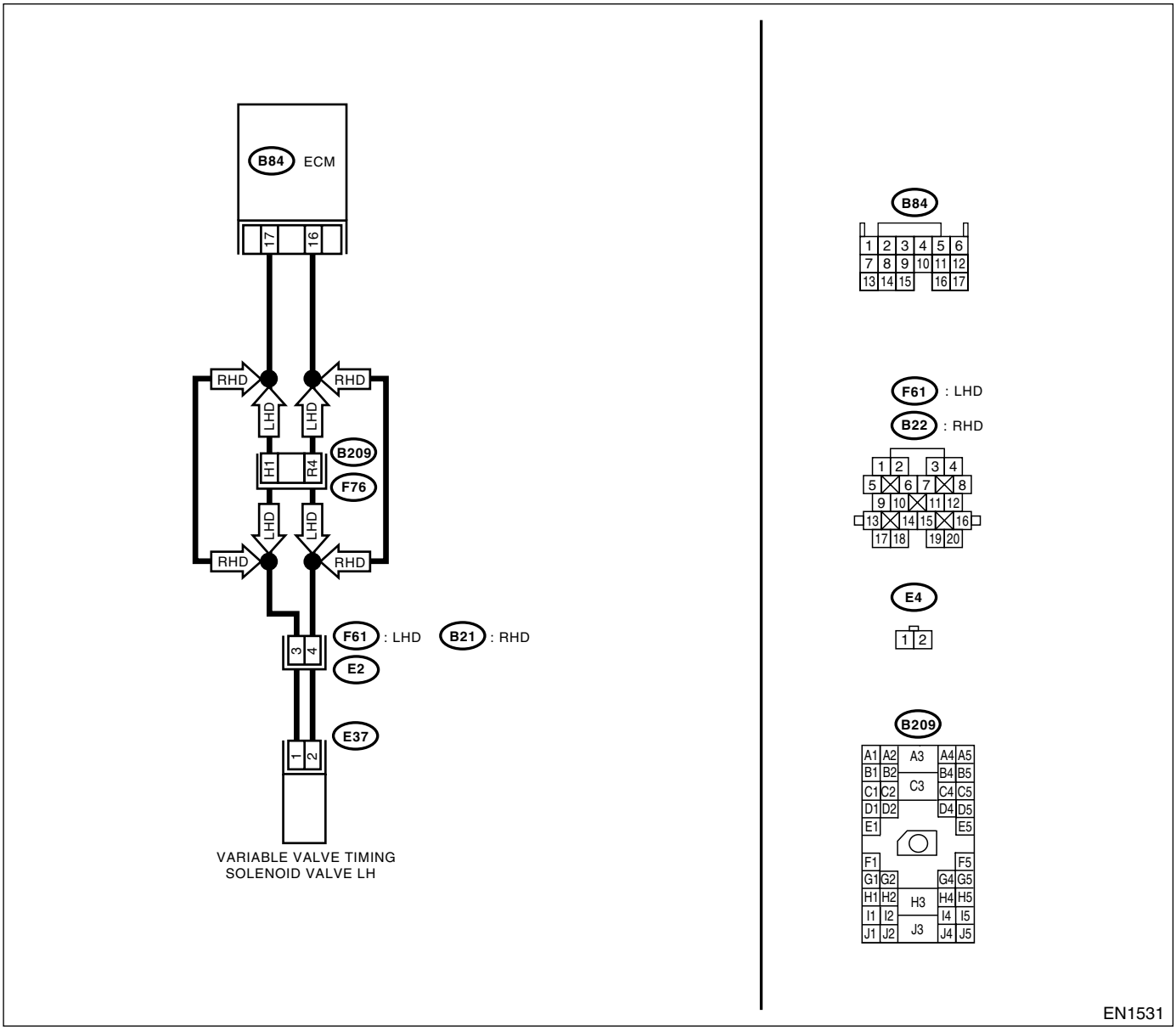
	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND VARIABLE VALVE TIMING SOLENOID VALVE.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ECM and variable valve timing solenoid valve. 3)Measure the resistance between ECM and variable valve timing solenoid valve. ***Connector & terminal*** ***(B84) No. 17 — (E37) No. 1:*** ***(B84) No. 16 — (E37) No. 2:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit in harness between ECM and variable valve timing solenoid valve connector. NOTE: In this case, repair the following: • Open circuit in harness between ECM and variable valve timing solenoid valve connector • Poor contact in coupling connector.
2	**CHECK HARNESS BETWEEN ECM AND VARIABLE VALVE TIMING SOLENOID VALVE.** Measure the resistance between ECM and variable valve timing solenoid valve. ***Connector & terminal*** ***(E37) No. 1 — Engine ground:*** ***(E37) No. 2 — Engine ground:***	Is the resistance more than 1M Ω?	Go to step **3.**	Repair the short circuit between ECM and variable valve timing solenoid valve connector.
3	**CHECK VARIABLE VALVE TIMING SOLENOID VALVE.** 1)Remove the variable valve timing solenoid valve. 2)Measure the resistance between variable valve timing solenoid valve terminal.	Is the resistance between 6 and 12 Ω?	Repair the poor contact in ECM and variable valve timing solenoid valve.	Replace the variable valve timing solenoid valve.<Ref. to ME(STi)-59, Camshaft, .>

DP:DTC P1309 — VARIABLE VALVE TIMING SOLENOID VALVE 2 CIRCUIT HIGH INPUT (LH) —

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
  - Erroneous idling

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(TURBO)-45, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(TURBO)-42, Inspection Mode.>.

- **WIRING DIAGRAM:**



	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND VARIABLE VALVE TIMING SOLENOID VALVE.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ECM and variable valve timing solenoid valve. 3)Measure the resistance between ECM and variable valve timing solenoid valve. ***Connector & terminal*** ***(B84) No. 17 — (E37) No. 1:*** ***(B84) No. 16 — (E37) No. 2:***	Is the resistance less than 1 Ω?	Go to step **2.**	Repair the open circuit in harness between ECM and variable valve timing solenoid valve connector. NOTE: In this case, repair the following: • Open circuit in harness between ECM and variable valve timing solenoid valve connector • Poor contact in coupling connector.
2	**CHECK HARNESS BETWEEN ECM AND VARIABLE VALVE TIMING SOLENOID VALVE.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ECM and variable valve timing solenoid valve. 3)Measure the resistance between ECM and variable valve timing solenoid valve. ***Connector & terminal*** ***(E37) No. 1 — Engine ground:*** ***(E37) No. 2 — Engine ground:***	Is the resistance more than 1M Ω?	Go to step **3.**	Repair the short circuit between ECM and variable valve timing solenoid valve connector.
3	**CHECK VARIABLE VALVE TIMING SOLENOID VALVE.** 1)Remove the variable valve timing solenoid valve. 2)Measure the resistance between variable valve timing solenoid valve terminal.	Is the resistance between 6 and 12 Ω?	Repair the poor contact in ECM and variable valve timing solenoid valve.	Replace the variable valve timing solenoid valve. <Ref. to ME(STi)-59, Camshaft.>

TRANSMISSION SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD. G1841GE4

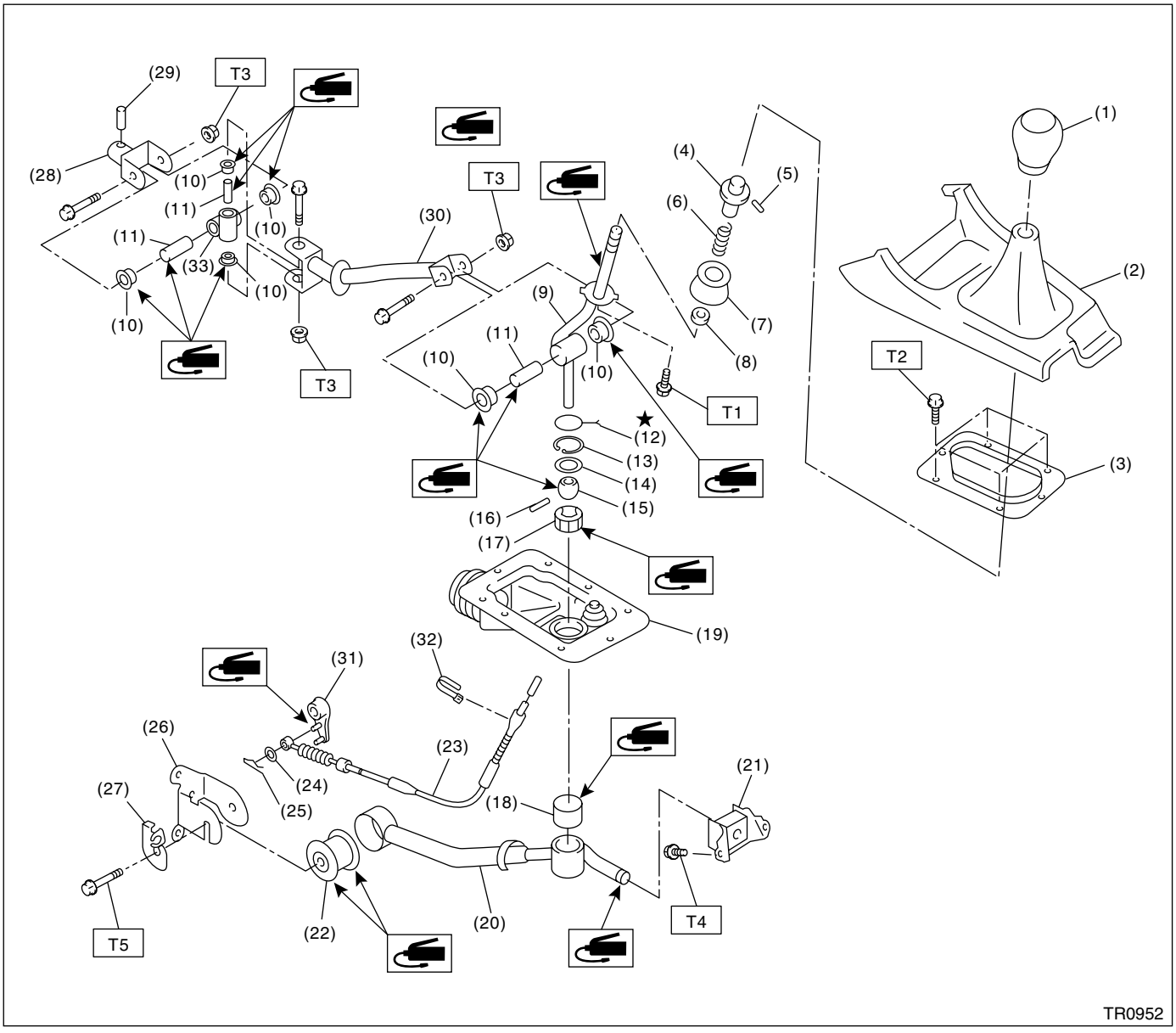
CONTROL SYSTEMS

CS

1. General Description

B: COMPONENT

4. 6MT GEAR SHIFT LEVER



(1) Gear shift knob
(2) Console box front
(3) Boot plate
(4) Slider
(5) Spring pin
(6) Spring
(7) Holder
(8) Spring seat
(9) Gear shift lever
(10) Bush
(11) Spacer
(12) Lock wire
(13) Snap ring
(14) Washer
(15) Lever bush
(16) Spring pin
(17) Bush
(18) Boot
(19) Inner boot
(20) Stay
(21) Cushion rubber
(22) Bush
(23) Reverse check cable
(24) Washer
(25) Snap pin
(26) Bracket
(27) Cable plate
(28) Joint
(29) Spring pin
(30) Shift rod
(31) Reverse check lever
(32) Band clip
(33) Boss

Tightening torque: N·m (kgf-m, ft-lb)
T1: 1.3 (0.13, 0.96)
T2: 7.5 (0.76, 5.5)
T3: 11.8 (1.2, 8.7)
T4: 18 (1.8, 13.0)
T5: 32 (3.3, 23.6)

7. General Diagnostic

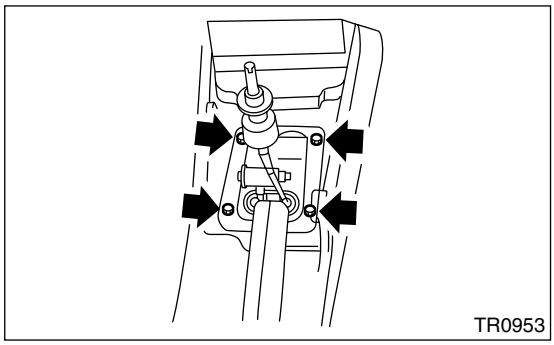
A: INSPECTION

Symptom	Possible cause	Remedy
1. Select lever	(1) Starter does not run.	Adjust the select cable and inhibitor switch, or inspect circuit.
	(2) Back-up light does not light up.	Adjust the select cable and inhibitor switch, or inspect circuit.
2. MT Gear shift lever (6MT)	(1) Can not shift to reverse.	Adjust the reverse check cable.
	(2) Can shift to reverse without pulling up the slider.	Adjust or replace the reverse check cable.
	(3) Slider can not be pulled up or is stuck pulled up.	• Check the reverse check system of transmission. • Adjust or replace the reverse check cable.

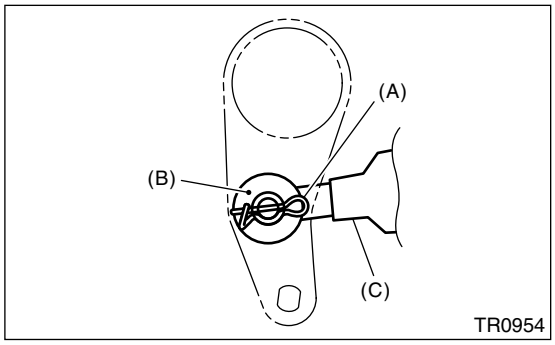
8. 6MT Gear Shift Lever

A: REMOVAL

1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.
3) Remove the gear shift knob.
4) Remove the console box front. <Ref. to EI-40, REMOVAL, Console Box.>
5) Remove the boot plate from body.



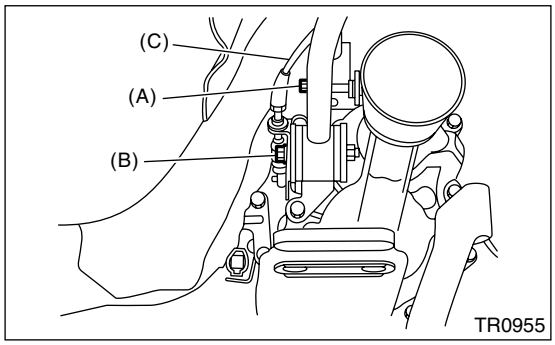
6) Lift-up the vehicle.
7) Remove the under cover.
8) Remove the rear exhaust pipe and muffer. <Ref to EX(TURBO)-13, REMOVAL, Rear Exhaust Pipe.>, <Ref to EX(TURBO)-14, REMOVAL, Muffer.>
9) Remove the crossmember. <Ref. to 6MT-35, REMOVAL, Transmission Mounting System.>
10) Remove the snap pin and washer, and then remove the reverse check cable from reverse check lever.



(A) Snap pin
(B) Washer
(C) Reverse check cable

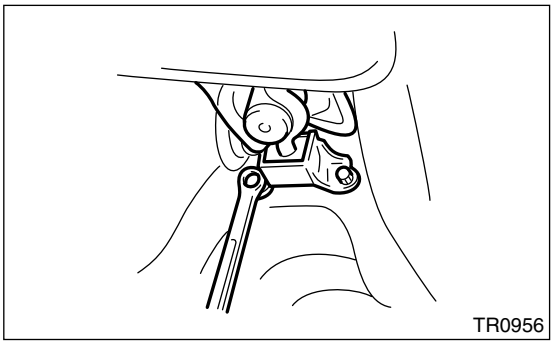
11) Move the transmission to right side, and then remove the joint COMPL, stay bolt and reverse check cable.

NOTE:
If the transmission is not moved, the joint COMPL and stay bolt will contact body and damage may occur.



(A) Joint COMPL bolt
(B) Stay bolt
(C) Reverse check cable

12) Remove the cushion rubber from body.



13) Lower the vehicle.
14) Remove the gear shift lever.

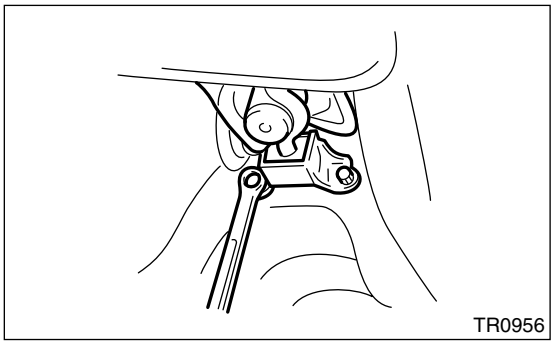
B: INSTALLATION

1) Insert the gear shift lever from room side.

NOTE:
After inserting the rod and stay, temporarily put them onto transmission mount.

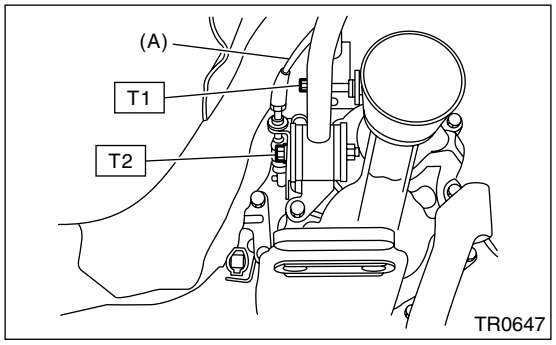
2) Mount the cushion rubber on body.

Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)



3) Move the transmission to right side, and then install the joint COMPL and stay.

Tightening torque:
T1: 11.8 N·m (1.2 kgf-m, 8.7 ft-lb)
T2: 32 N·m (3.3 kgf-m, 23.6 ft-lb)

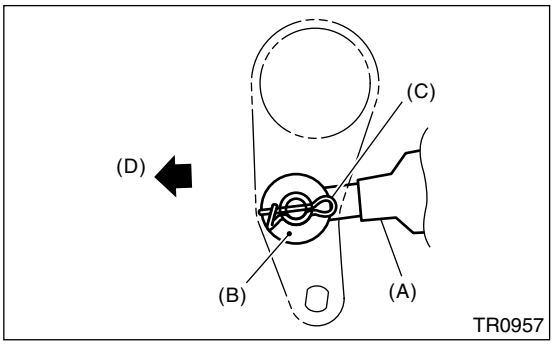


(A) Reverse check cable

4) Install the crossmember. <Ref. to 6MT-35, INSTALLATION, Transmission Mounting System.>

5) Install the reverse check cable end, washer and snap pin to reverse check lever.

NOTE:
• Take care to install the snap pin in proper direction.
• Conduct the adjustment of reverse check cable before installation. <Ref. to CS-16, ADJUSTMENT, Reverse Check Cable.>

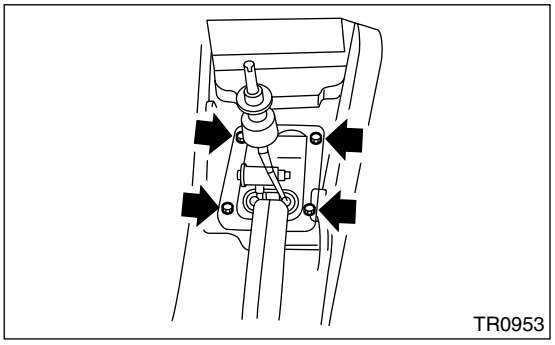


(A) Reverse check cable
(B) Washer
(C) Snap pin
(D) Front side

6) Install the rear exhaust pipe and muffer. <Ref. to EX(TURBO)-13, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(TURBO)-14, INSTALLATION, Muffer.>
7) Install the under cover.
8) Install the boot plate.

NOTE:
Install the inner boot without any twist.

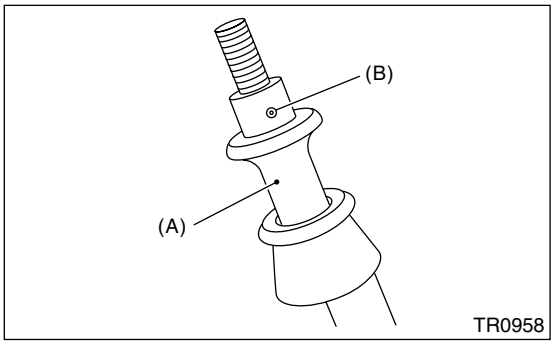
Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



9) Install the console box. <Ref. to EI-40, INSTALLATION, Console box.>
10) Check that the gear shift is correctly shifted to each gear.

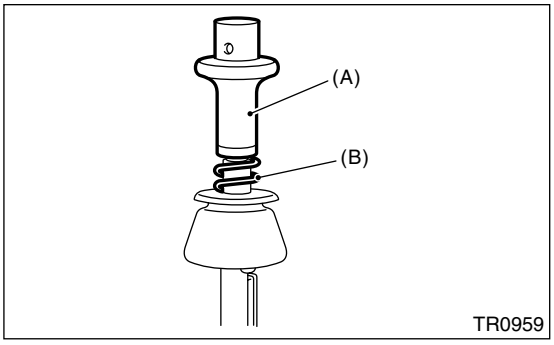
C: DISASSEMBLY

1) Remove the spring pin from slider.



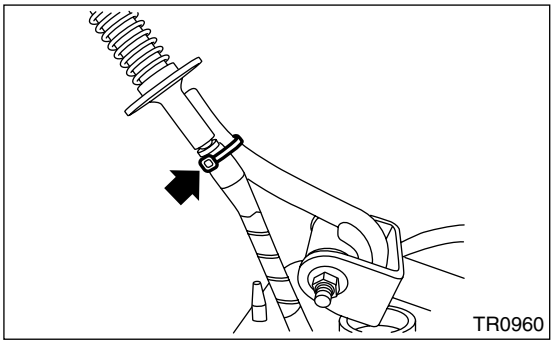
(A) Slider
(B) Spring pin

2) Remove the slider and spring.

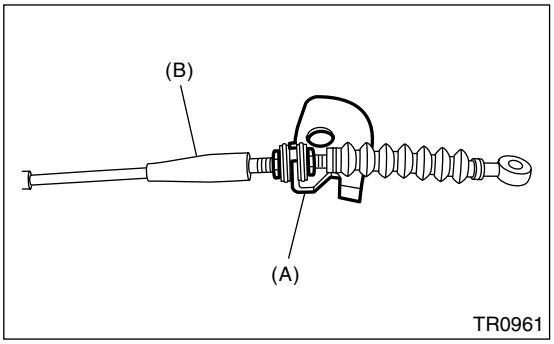


(A) Slider
(B) Spring

3) Cut the band clip.

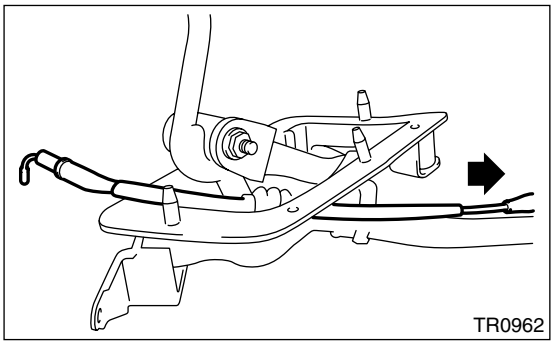


4) Remove the reverse check cable from cable plate.

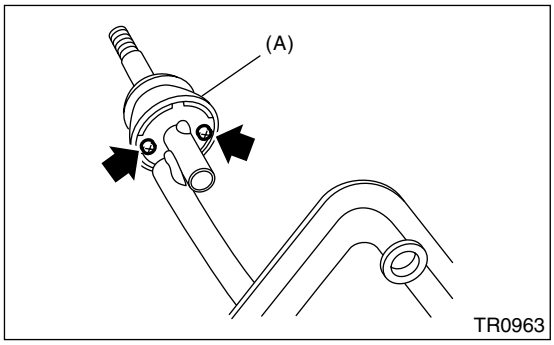


(A) Cable plate
(B) Reverse check cable

5) Remove the reverse check cable from gear shift assembly.



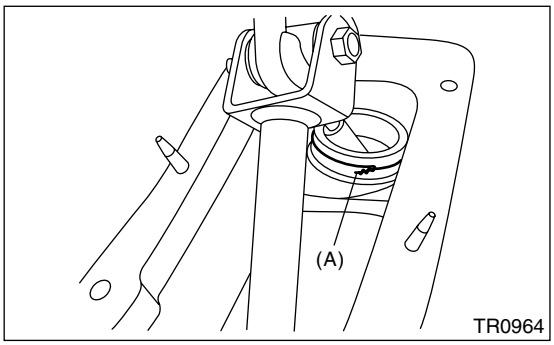
6) Remove the holder and spring seat.



(A) Holder

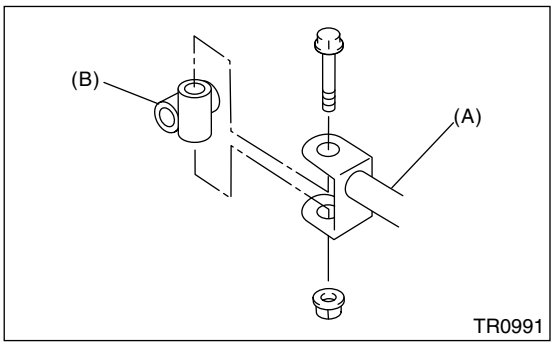
7) Disassemble the lock wire.

NOTE:
Do not reuse the lock wire.



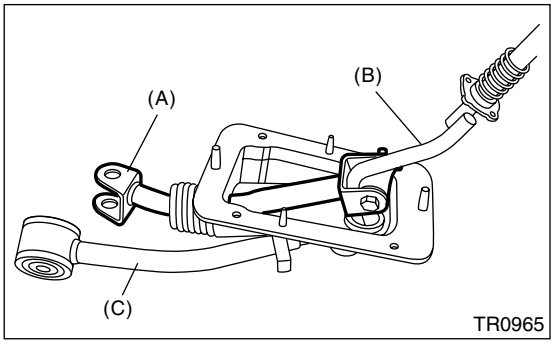
(A) Lock wire

8) Remove the boss from rod.



(A) Rod
(B) Boss

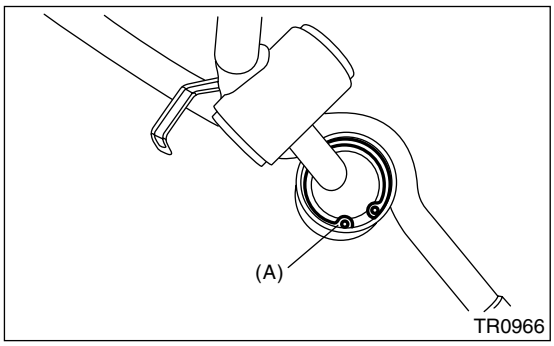
9) Remove the rod from lever.



(A) Rod
(B) Lever
(C) Stay

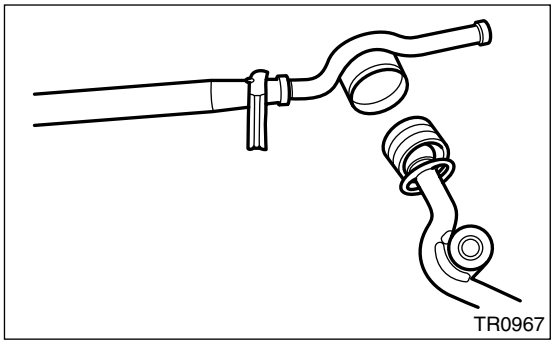
10) Separate the rod and inner boot.

11) Remove the snap ring from stay.

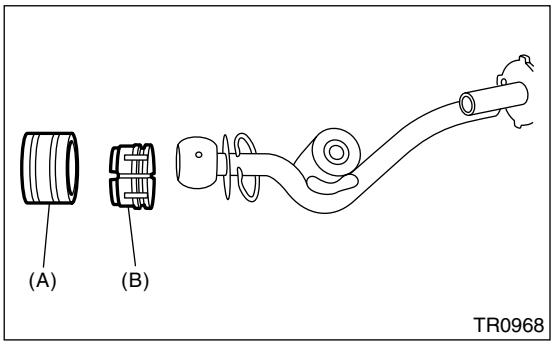


(A) Snap ring

12) Separate the gear shift lever and stay.

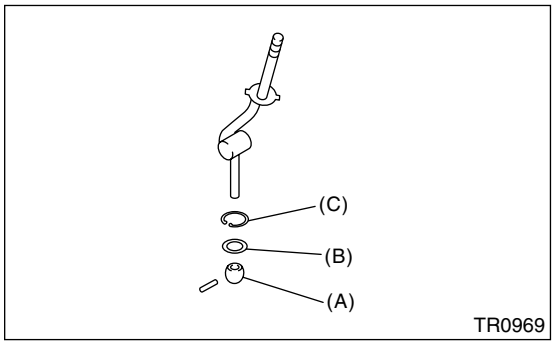


13) Remove the boot and bush from gear shift lever.



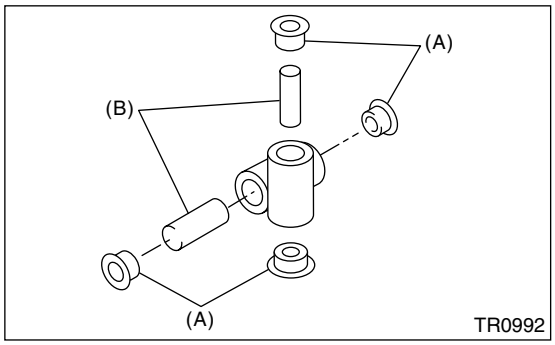
(A) Boot
(B) Bush

14) Remove the spring pin, and then remove the bush, washer and snap ring.



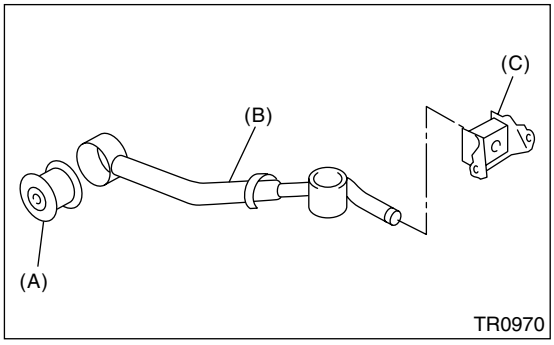
(A) Bush
(B) Washer
(C) Snap ring

15) Remove the bush and spacer from boss.



(A) Bush
(B) Spacer

16) Remove the bush and cushion rubber from stay.

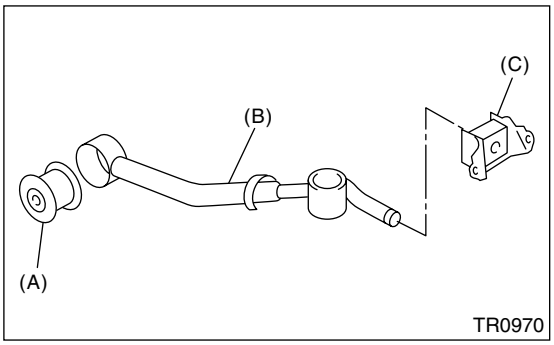


(A) Bush
(B) Stay
(C) Cushion rubber

D: ASSEMBLY

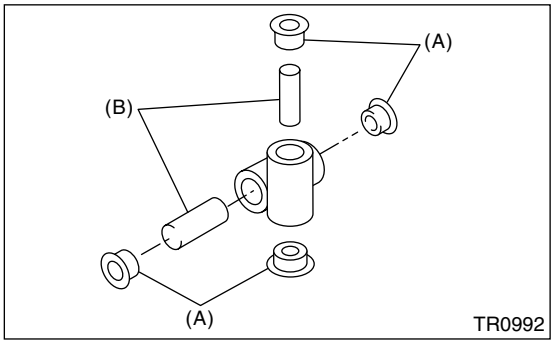
NOTE:
- Clean all parts before assembly.
- Apply NIGTIGHT LYW No.2 grease or equivalent to each parts.

1) Mount the bush and cushion rubber on the stay.



(A) Bush
(B) Stay
(C) Cushion rubber

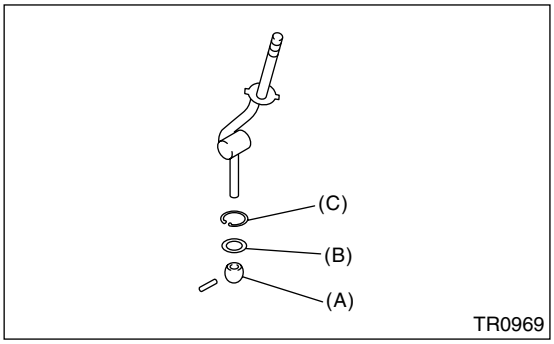
2) Install the bush and spacer to boss.



(A) Bush
(B) Spacer

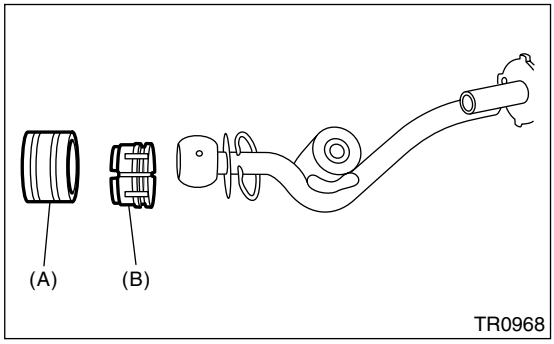
3) Install the snap ring and washer to gear shift lever, and then install the bush.

NOTE:
Apply grease to the bush.



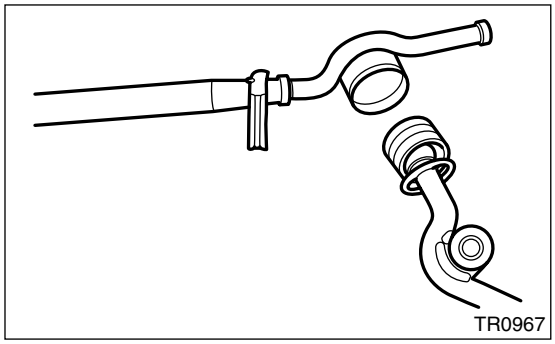
(A) Bush
(B) Washer
(C) Snap ring

4) Apply grease to the bush and boot, and then install to the gear shift lever.

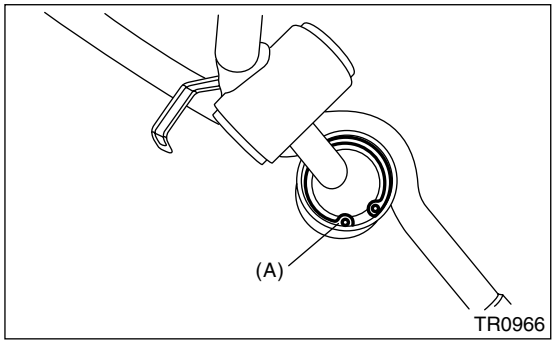


(A) Boot
(B) Bush

5) Apply sufficient grease into the boss, and then install the gear shift lever to stay.



6) Install the washer and snap ring.

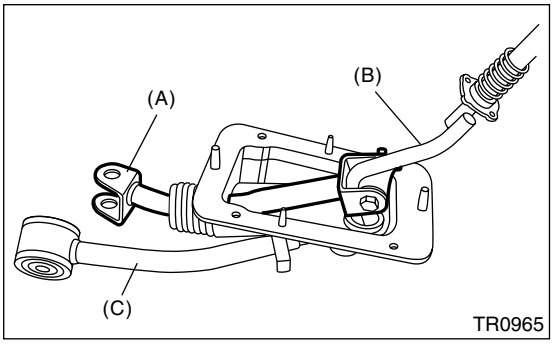


(A) Snap ring

7) Insert the gear shift lever and rod into boot hole.

8) Install the rod.

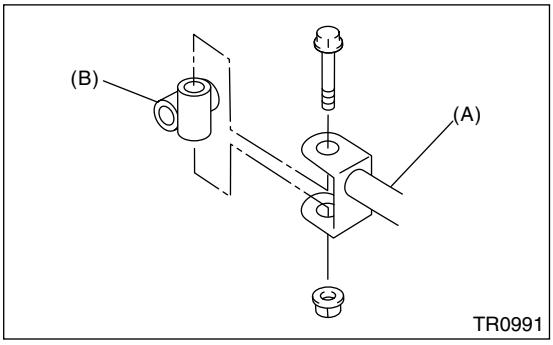
Tightening torque:
11.8 N·m (1.2 kgf-m, 8.7 ft-lb)



(A) Rod
(B) Lever
(C) Stay

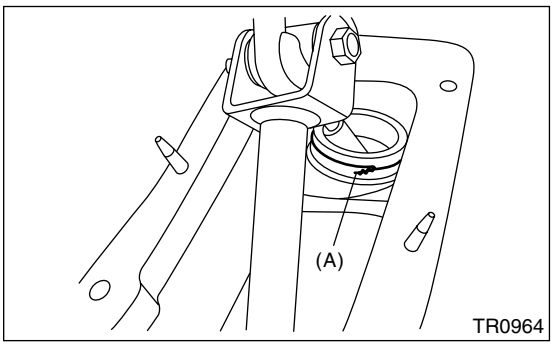
9) Install the boss to rod.

Tightening torque:
11.8 N·m (1.2 kgf-m, 8.7 ft-lb)



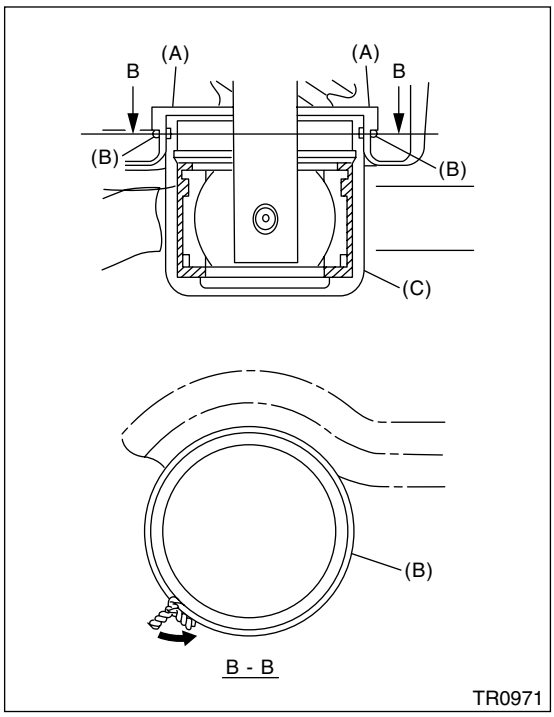
(A) Rod
(B) Boss

10) Install a new lock wire.



(A) Lock wire

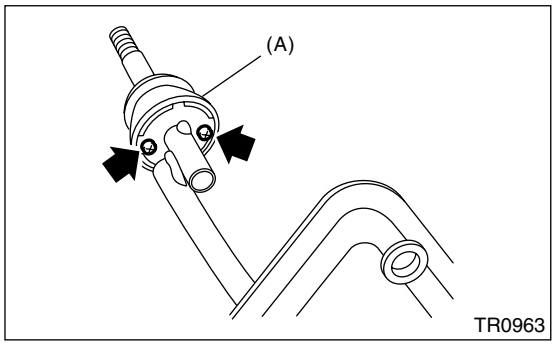
NOTE:
- Install the lock wire to stay groove.
- Bend the extra wire to same direction of lock wire winding.



(A) Inner boot
(B) Wire
(C) Stay

11) Install the holder.

Tightening torque:
1.3 N·m (0.13 kgf-m, 0.96 ft-lb)

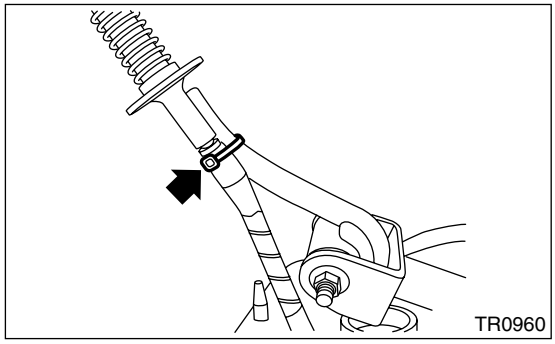


(A) Holder

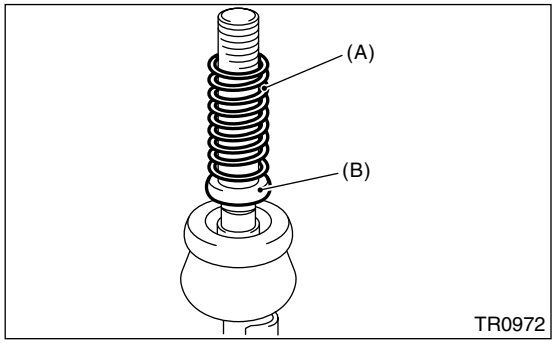
12) Insert the reverse check cable into boot hole.

13) Insert the reverse check cable into gear shift assembly, and fix with band clip.

NOTE:
- Cut off the extra band clip.
- Make sure that the reverse check cable is inserted into gear shift lever assembly without any clearance.



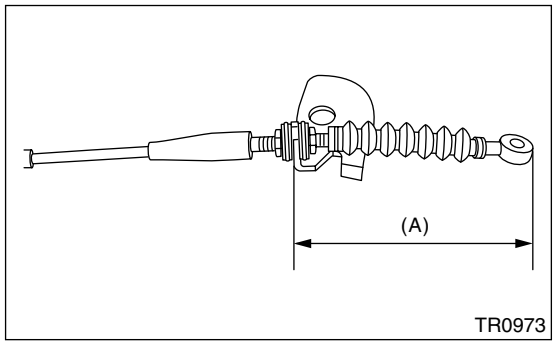
14) Install the spring seat and spring.



(A) Spring
(B) Spring seat

15) Adjust the length between end of cable plate and reverse check cable to 84 mm (3.31 in), and then tighten the lock nut.

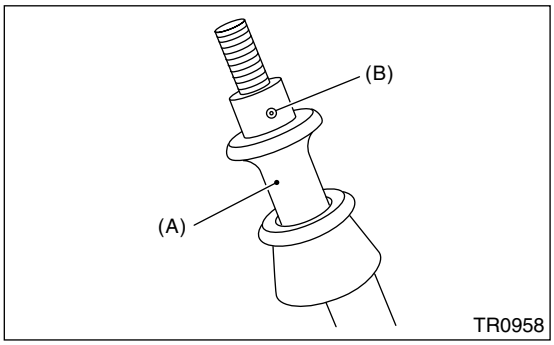
Tightening torque:
6 N·m (0.6 kgf-m, 4.4 ft-lb)



(A) 84 mm (3.31 in)

16) Fix the slider and reverse check cable end with spring pin.

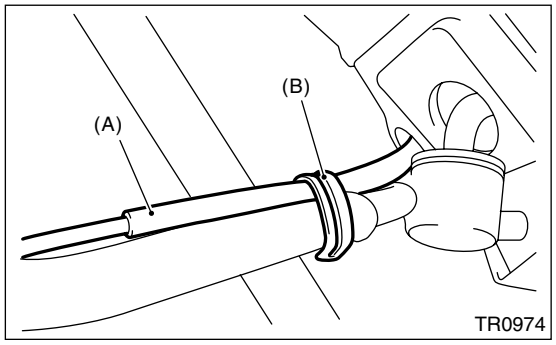
NOTE:
Apply grease to the sliding part of slider.



(A) Slider
(B) Spring pin

17) Fix the reverse check cable to clip of stay.

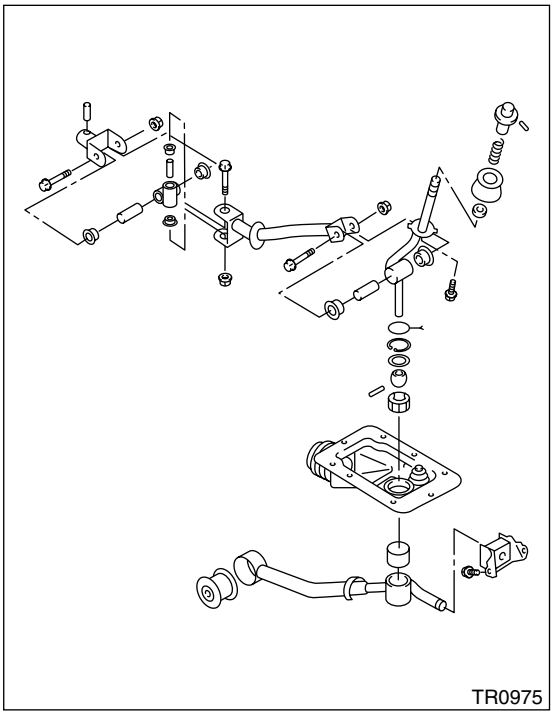
NOTE:
Install the reverse check cable to upper side of stay.



(A) Reverse check cable
(B) Clip

E: INSPECTION

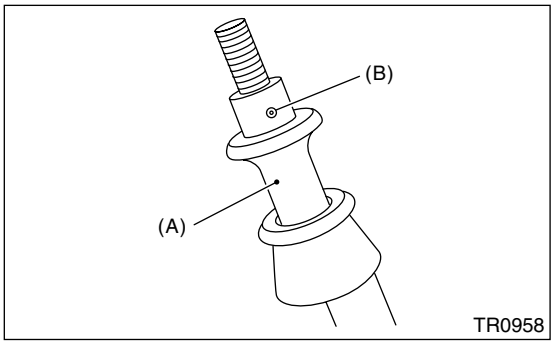
1) Check each part (bushing, cushion rubber, spacer, boot, stay and rod, etc.) for deformation, damage and wear. Repair or replace any defective part. Determine defective parts by comparing with new parts.



9. Reverse Check Cable

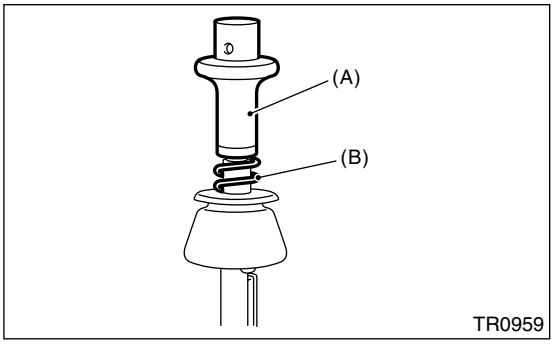
A: REMOVAL

1) Set the vehicle on a lift.
2) Remove the gear shift knob.
3) Remove the console box front. <Ref. to EI-40, REMOVAL, Console Box.>
4) Remove the spring pin from slider.



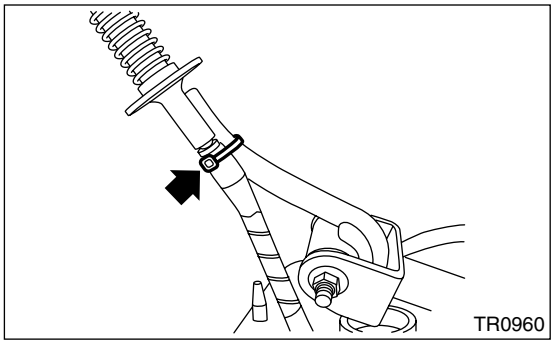
(A) Slider
(B) Spring pin

5) Remove the slider and spring.

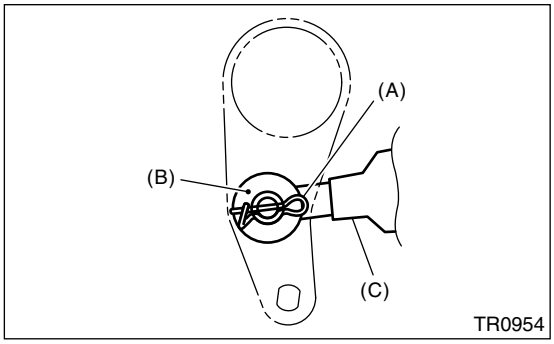


(A) Slider
(B) Spring

6) Cut the band clip, and then separate the reverse check cable from gear shift lever.



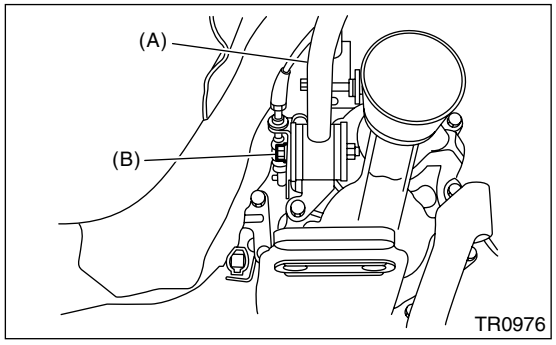
7) Lift-up the vehicle.
8) Remove the under cover.
9) Remove the rear exhaust pipe and muffer. <Ref. to EX(TURBO)-13, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(TURBO)-14, REMOVAL, Muffer.>
10) Remove the crossmember. <Ref. to 6MT-35, REMOVAL, Transmission Mounting System.>
11) Remove the snap pin and washer, and then separate the reverse check cable from reverse check lever.



(A) Snap pin
(B) Washer
(C) Reverse check cable

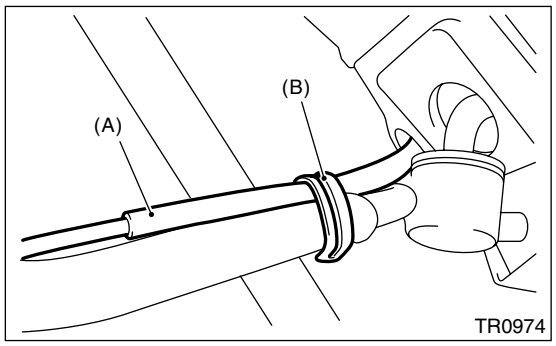
12) Move the transmission to right side, and then remove the stay bolt and reverse check cable.

NOTE:
If the transmission is not moved, stay bolt will contact body and damage may occur.



(A) Stay
(B) Stay bolt

13) Raise the clip of stay, and then separate the stay and reverse check cable.

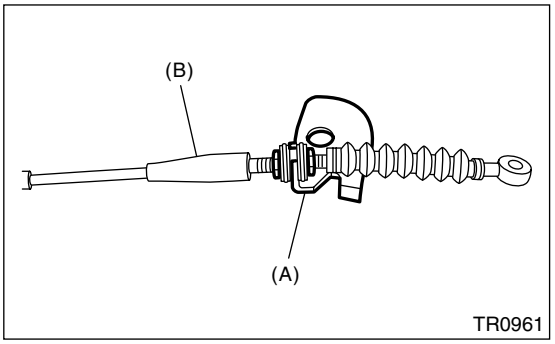


(A) Reverse check cable
(B) Clip

14) Remove the reverse check cable by pulling from underneath the vehicle.

NOTE:
Take care not to damage the inner boot.

15) Loosen the lock nut, then remove the reverse check cable from cable plate.

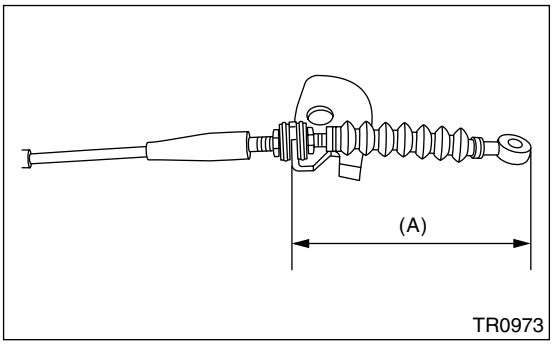


(A) Cable plate
(B) Reverse check cable

B: INSTALLATION

1) Adjust the length between end of cable plate and reverse check cable to 84 mm (3.31 in), and then tighten the lock nut.

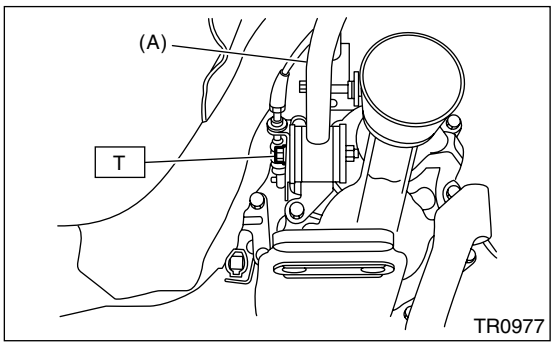
Tightening torque:
6 N·m (0.6 kgf-m, 4.4 ft-lb)



(A) 84 mm (3.31 in)

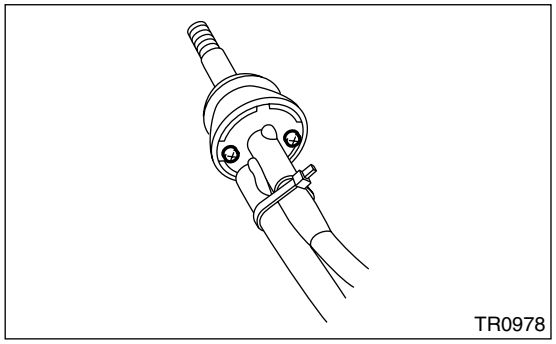
2) Insert the reverse check cable to the hole of inner boots from underneath the vehicle.
3) Move the transmission to right side, and then install the stay.

Tightening torque:
T: 32 N·m (3.3 kgf-m, 23.6 ft-lb)

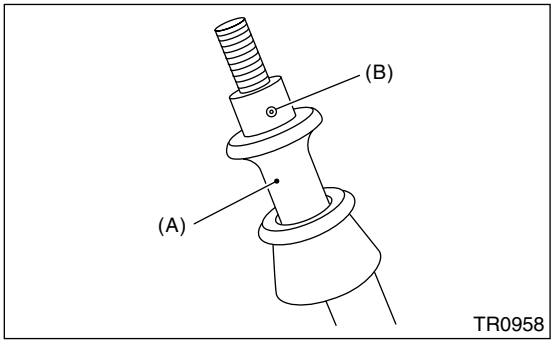


(A) Stay

4) Lower the vehicle.
5) Insert the reverse check cable to the gear shift lever assembly, then fix with the band clip.
NOTE:
• Cut off the extra band clip.
• Make sure that the reverse check cable is inserted into gear shift lever assembly without any clearance.



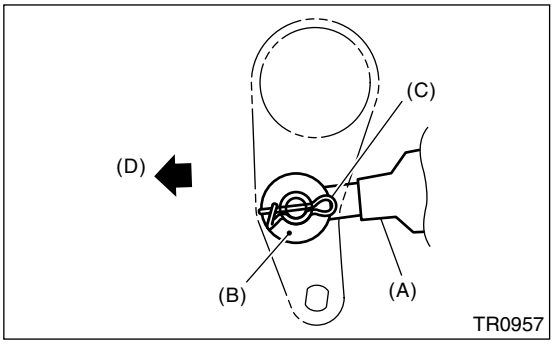
6) Fix the slider and reverse check cable end with spring pin.
NOTE:
Apply grease to the sliding part of slider.



(A) Slider
(B) Spring pin

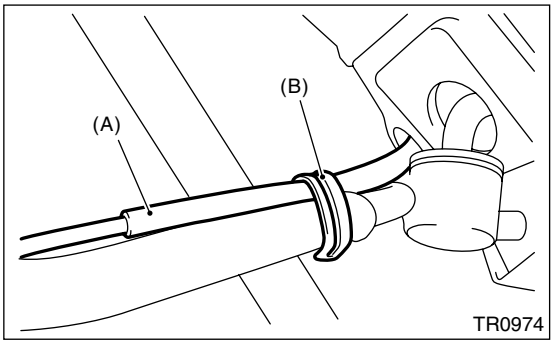
7) Lift-up the vehicle.

8) Install the reverse check cable end, washer and snap pin to reverse check lever.
NOTE:
Take care to install the snap pin in proper direction.



(A) Reverse check cable
(B) Washer
(C) Snap pin
(D) Front side

9) Fix the reverse check cable to clip of stay.
NOTE:
Install the reverse check cable to upper side of stay.



(A) Reverse check cable
(B) Clip

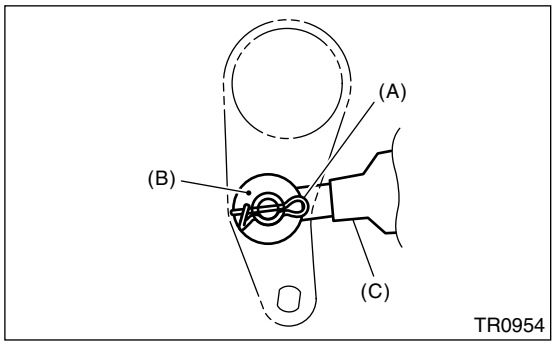
10) Install the rear exhaust pipe and muffler. <Ref. to EX(TURBO)-13, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(TURBO)-14, INSTALLATION, Muffler.>
11) Install the console box. <Ref. to EI-40, INSTALLATION, Console Box.>

C: INSPECTION

1) Verify whether the slider moves smoothly. If not, adjust the reverse check cable or check damage of slider. <Ref. to CS-16, ADJUSTMENT, Reverse Check Cable.>
2) Check that the gear can be shift to reverse, when the slider is pulled up. If the gear can not be shift to reverse, adjust the reverse check cable. <Ref. to CS-16, ADJUSTMENT, Reverse Check Cable.>
3) Check that the gear can not be shift to reverse, when the slider is not pulled up. If the gear can be shift to reverse, adjust or replace the reverse check cable. <Ref. to CS-16, ADJUSTMENT, Reverse Check Cable.>

D: ADJUSTMENT

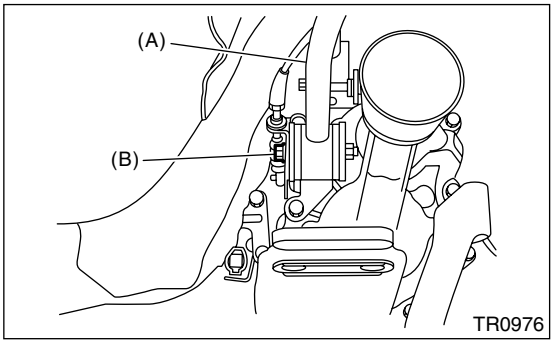
1) Set the vehicle on a lift.
2) Remove the under cover.
3) Remove the rear exhaust pipe and muffer. <Ref. to EX(TURBO)-13, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(TURBO)-14, REMOVAL, Muffler.>
4) Remove the crossmember. <Ref. to 6MT-35, REMOVAL, Transmission Mounting System.>
5) Remove the snap pin and washer, and then separate the reverse check cable from reverse check lever.



(A) Snap pin
(B) Washer
(C) Reverse check cable

6) Move the transmission to right side, and then remove the stay bolt and reverse check cable.

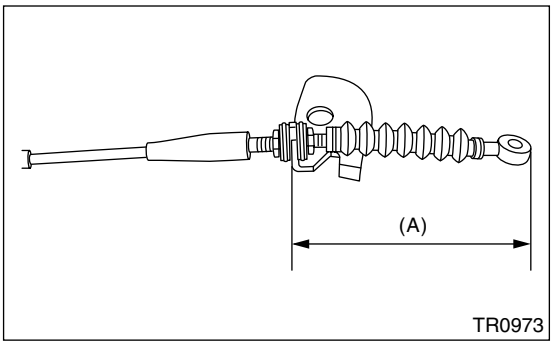
NOTE:
If the transmission is not moved, stay bolt will contact body and damage may occur.



(A) Stay
(B) Stay bolt

7) Adjust the length between end of cable plate and reverse check cable to 84 mm (3.31 in), and then tighten the lock nut.

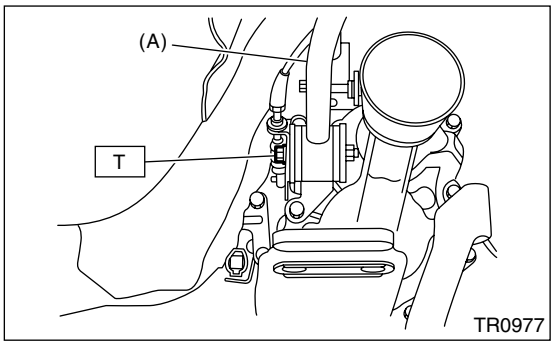
Tightening torque:
6 N·m (0.6 kgf-m, 4.4 ft-lb)



(A) 84 mm (3.31 in)

8) Move the transmission to right side, and then install the stay.

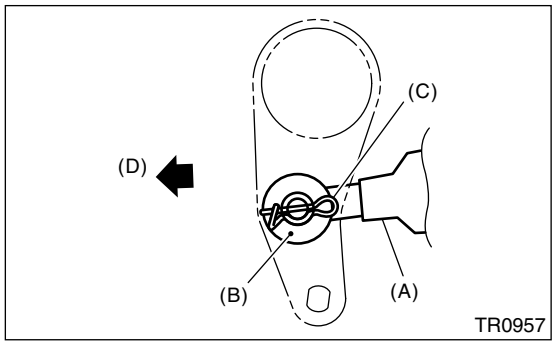
Tightening torque:
T: 32 N·m (3.3 kgf-m, 23.6 ft-lb)



(A) Stay

9) Install the crossmember. <Ref. to 6MT-35, INSTALLATION, Transmission Mounting System.>
10) Install the rear exhaust pipe and muffer. <Ref. to EX(TURBO)-13, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(TURBO)-14, INSTALLATION, Muffer.>
11) Install the reverse check cable end, washer and snap pin to reverse check lever.

NOTE:
Take care to install the snap pin in proper direction.



(A) Reverse check cable
(B) Washer
(C) Snap pin
(D) Front side

12) Install the under cover.

MANUAL TRANSMISSION AND DIFFERENTIAL

6MT

1. General Description

A: SPECIFICATION

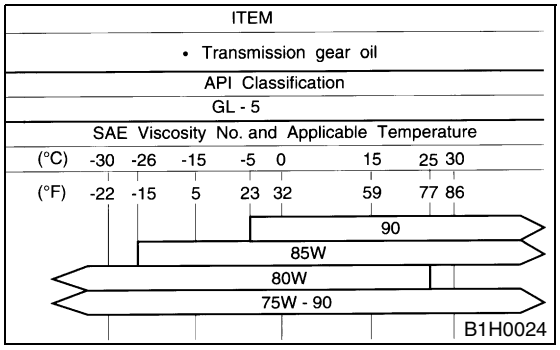
1. MANUAL TRANSMISSION AND FRONT DIFFERENTIAL

Item			STD	OP
Type			6-forward speeds and 1-reverse	
Transmission gear ratio		1st	3.636	
		2nd	2.375	
		3rd	1.761	
		4th	1.346	
		5th	0.971 [1.062]	
		6th	0.756 [0.842]	
		Reverse	3.545	
Front reduction gear	Final	Type of gear	Hypoid	
		Gear ratio	3.900	
Rear reduction gear	Transfer	Type of gear	Helical	
		Gear ratio	1.100 [1.000]	
	Final	Type of gear	Hypoid	
		Gear ratio	3.545 [3.900]	
Front differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)	SURETRAC®
Center differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2 and viscous coupling)	
Transmission gear oil			GL-5	
Transmission gear oil capacity			4.1 ℓ (4.3 US qt, 3.6 Imp qt)	

[ ]: Australia model

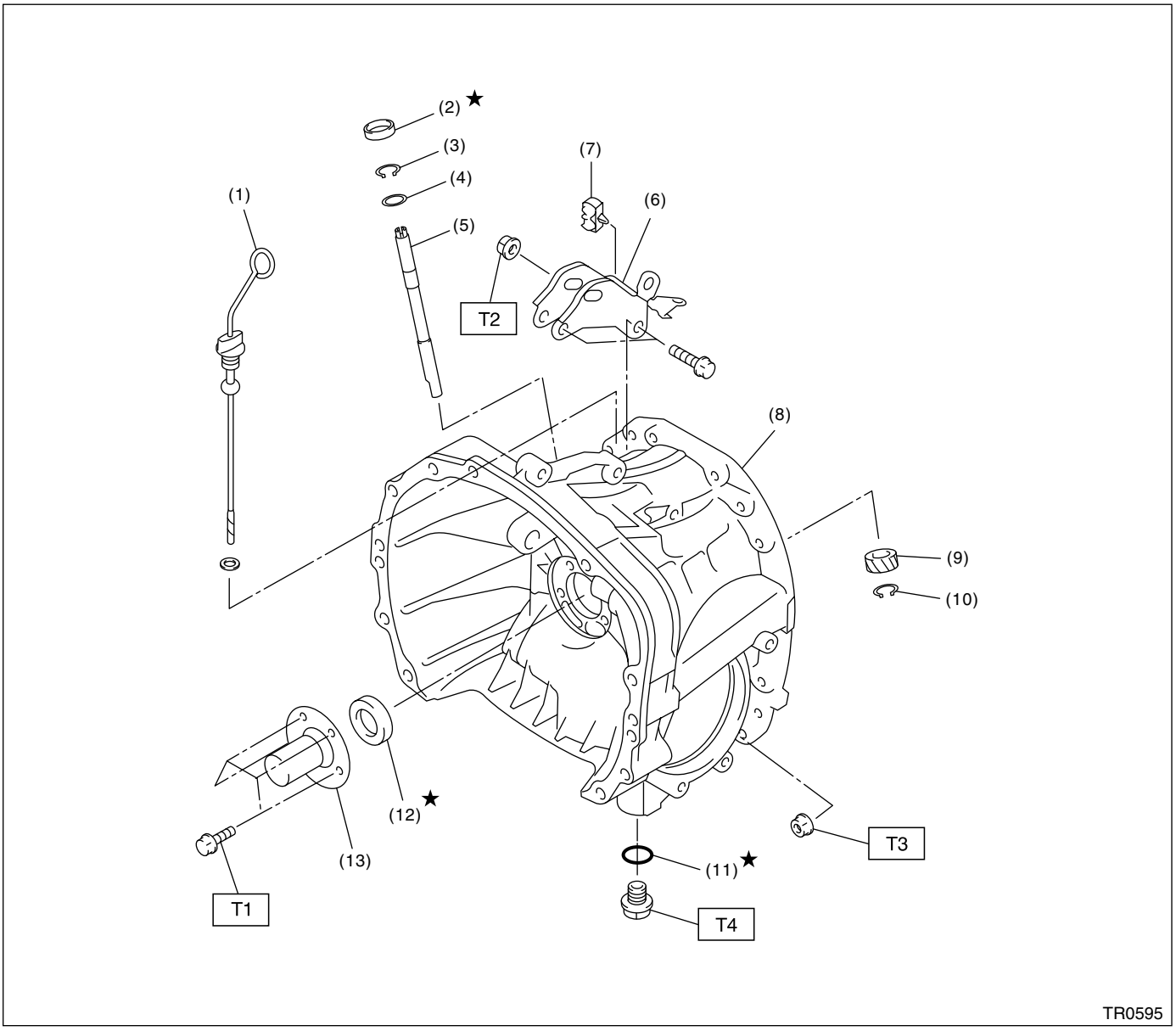
2. TRANSMISSION GEAR OIL

Recommended oil



B: COMPONENT

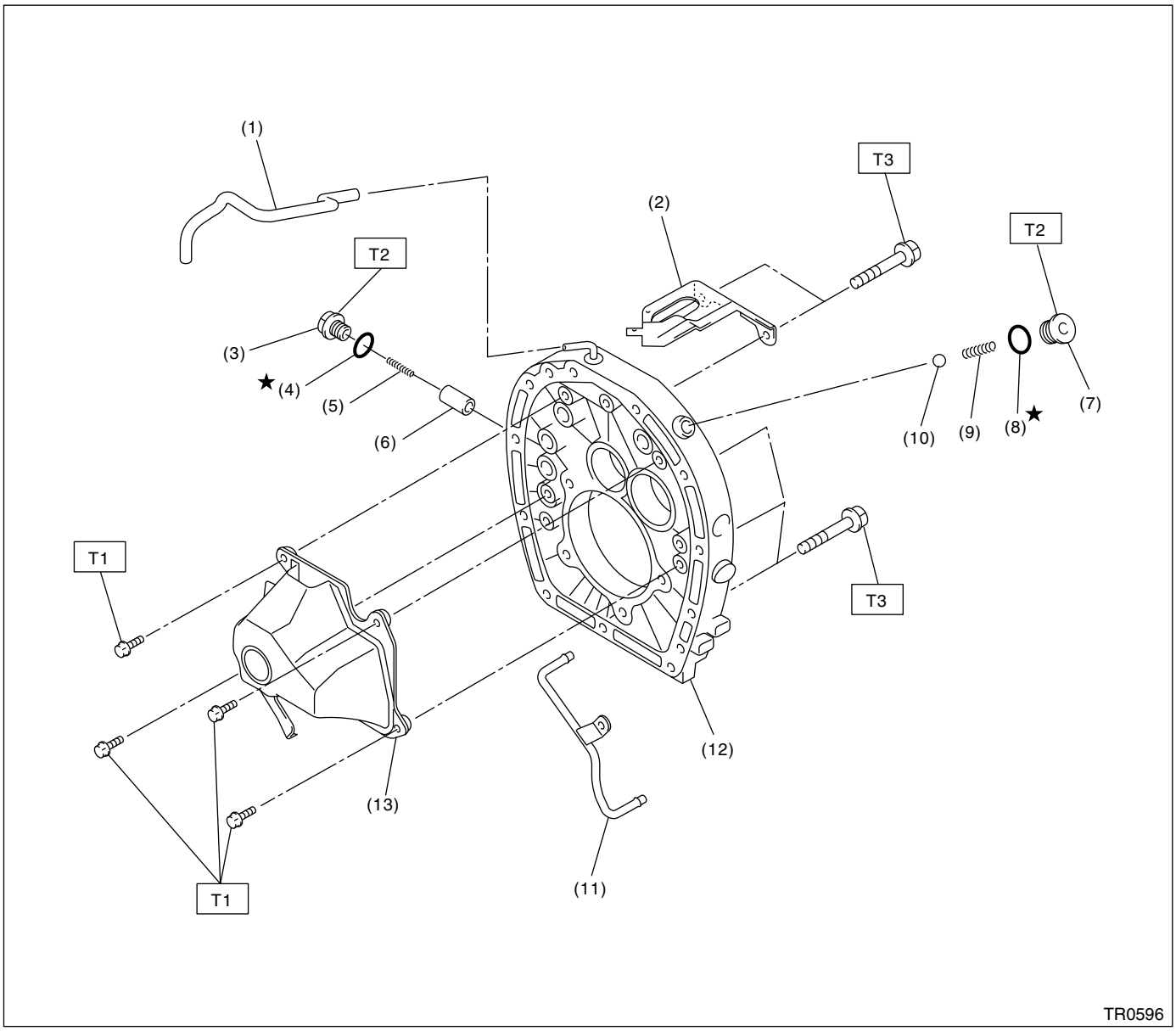
1. CLUTCH HOUSING



(1)	Oil level gauge	(9)	Speedometer driven gear
(2)	Oil seal	(10)	Snap ring
(3)	Snap ring	(11)	Gasket
(4)	Washer	(12)	Oil seal
(5)	Speedometer gear shaft	(13)	Clutch release bearing guide
(6)	Pitching stopper bracket		
(7)	Clip		
(8)	Clutch housing		

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 41 (4.2, 30.2)
T3: 50 (5.1, 36.9)
T4: 70 (7.1, 51.6)

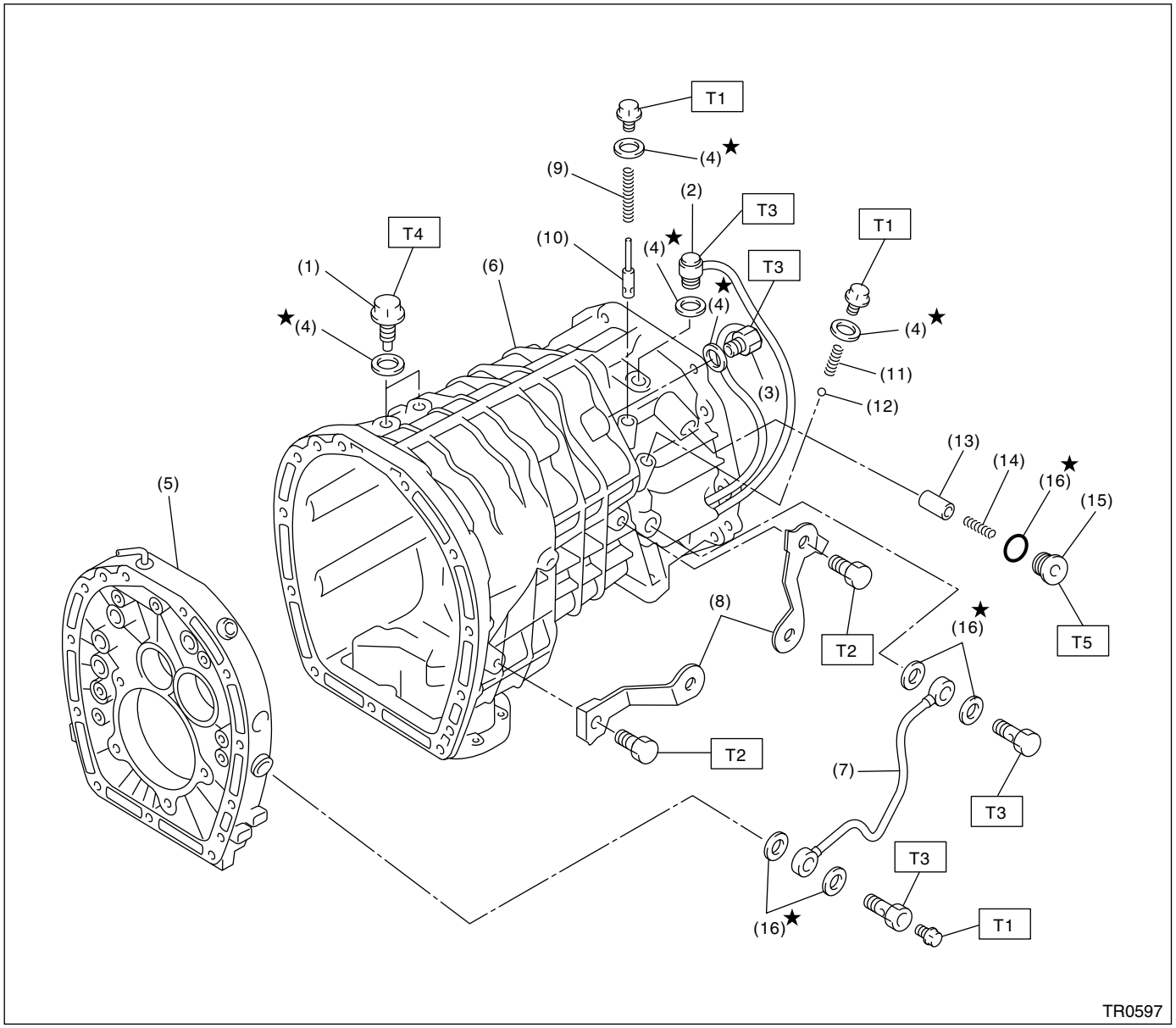
2. ADAPTER PLATE



(1) Breather hose
(2) Transmission harness stay
(3) Plug
(4) Gasket
(5) Spring
(6) Plunger
(7) Plug
(8) Gasket
(9) Spring
(10) Ball
(11) Lubrication pipe
(12) Adapter plate
(13) Oil chamber

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 37 (3.8, 27.3)
T3: 50 (5.1, 36.9)

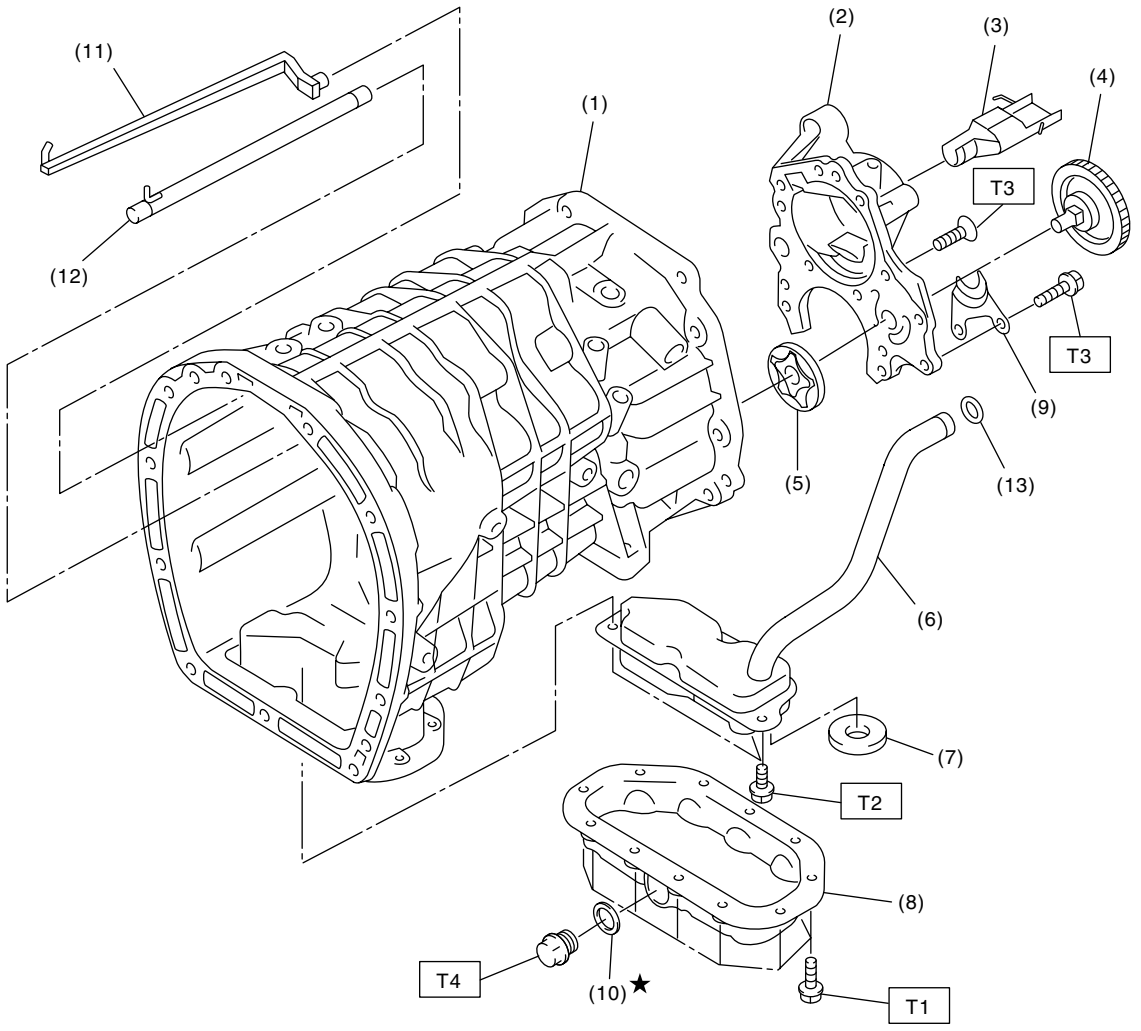
3. TRANSMISSION CASE



(1)	Pilot bolt	(9)	Return spring
(2)	Neutral switch	(10)	Pressure relief valve
(3)	Back-up light switch	(11)	Return spring
(4)	O-ring	(12)	Ball
(5)	Adapter plate	(13)	Plunger
(6)	Transmission case	(14)	Spring
(7)	Oil pipe	(15)	Plug
(8)	Harness bracket	(16)	Gasket

Tightening torque: N·m (kgf-m, ft-lb)
T1: 13 (1.3, 9.6)
T2: 16 (1.6, 11.8)
T3: 32 (3.3, 23.6)
T4: 34 (3.5, 25.1)
T5: 41 (4.2, 30.2)

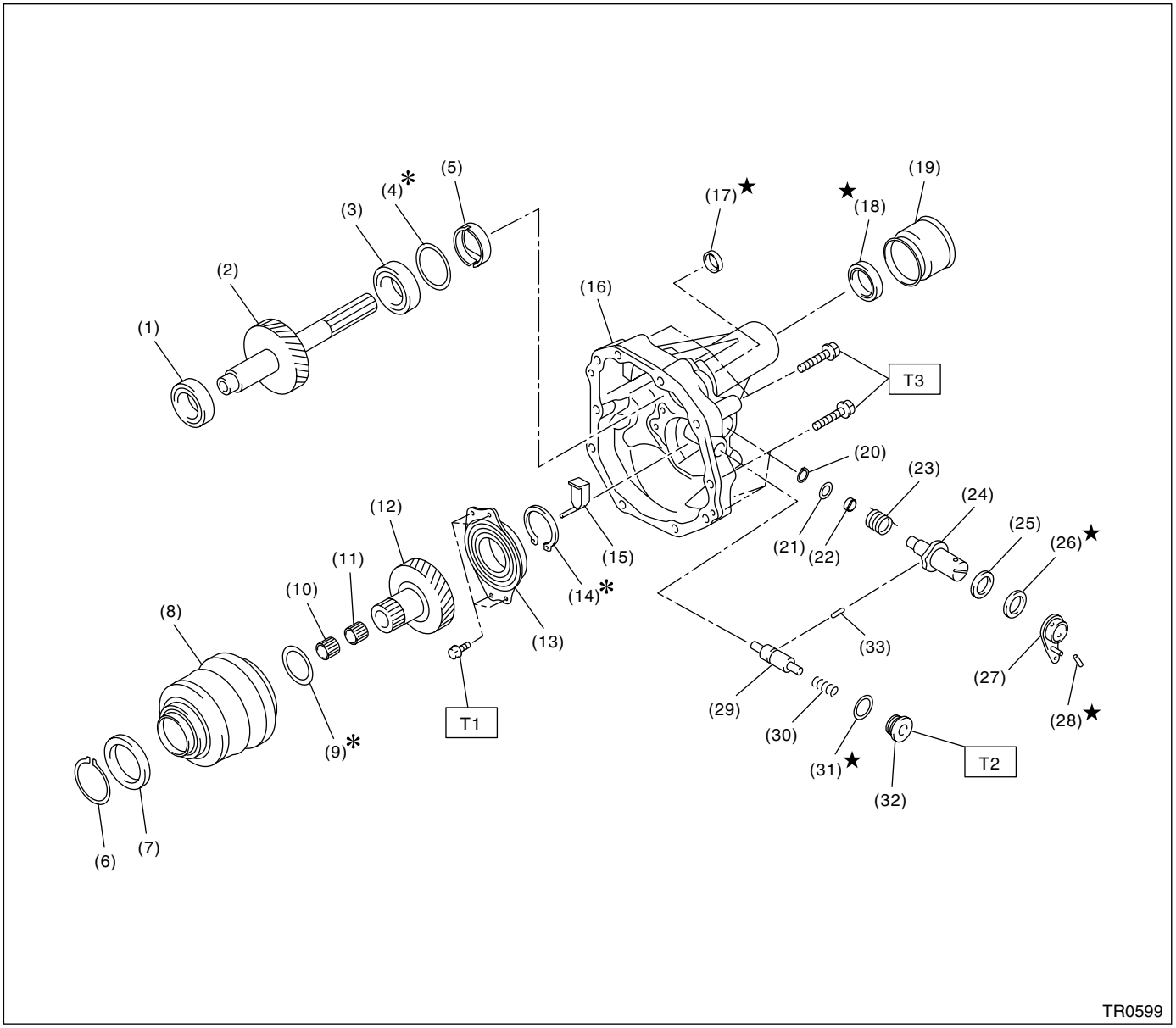
4. OIL PAN AND OIL PUMP



(1)	Main case	(8)	Oil pan
(2)	Oil pump cover	(9)	Plate
(3)	Oil guide	(10)	Gasket
(4)	Oil pump driven gear ASSY	(11)	Oil guide
(5)	Oil pump rotor ASSY	(12)	Oil pipe
(6)	Strainer ASSY	(13)	O-ring
(7)	Magnet		

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 10 (1.0, 7.4)
T3: 25 (2.5, 18.1)
T4: 44 (4.5, 32.5)

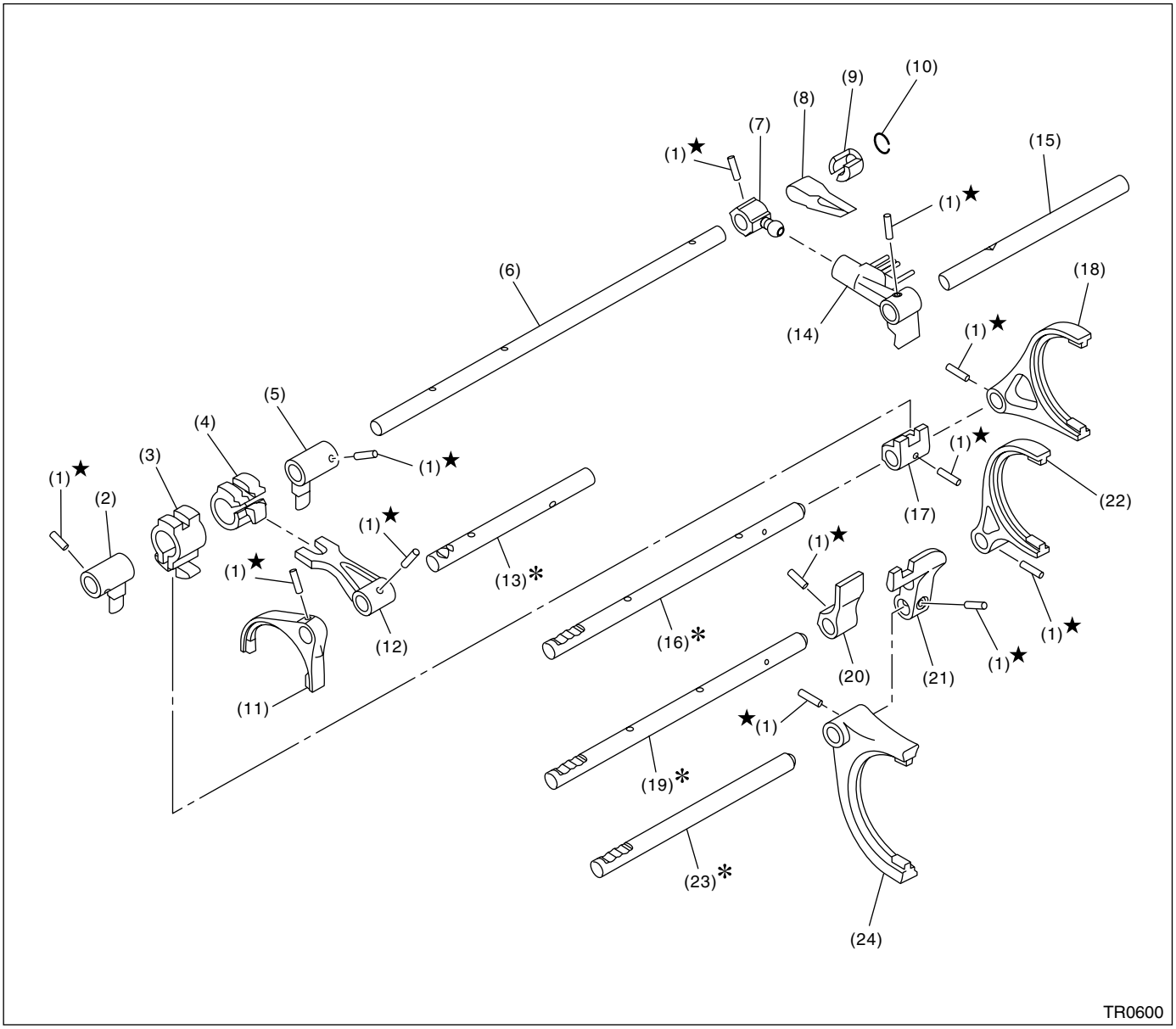
5. EXTENSION CASE AND CENTER DIFFERENTIAL



(1) Taper roller bearing
(2) Transfer driven gear
(3) Taper roller bearing
(4) Shim
(5) Oil plate
(6) Snap ring
(7) Oil pump drive gear
(8) Center differential
(9) Shim
(10) Needle bearing
(11) Needle bearing
(12) Transfer drive gear
(13) Ball bearing (with flange)
(14) Snap ring
(15) Extension guide
(16) Extension case
(17) Oil seal
(18) Oil seal
(19) Dust cover
(20) Snap ring
(21) Washer
(22) Bush
(23) Spring
(24) Reverse check shaft
(25) Ball bearing
(26) Oil seal
(27) Reverse check lever COMPL
(28) Straight pin
(29) Reverse check plug
(30) Spring
(31) Gasket
(32) Plug
(33) Plunger

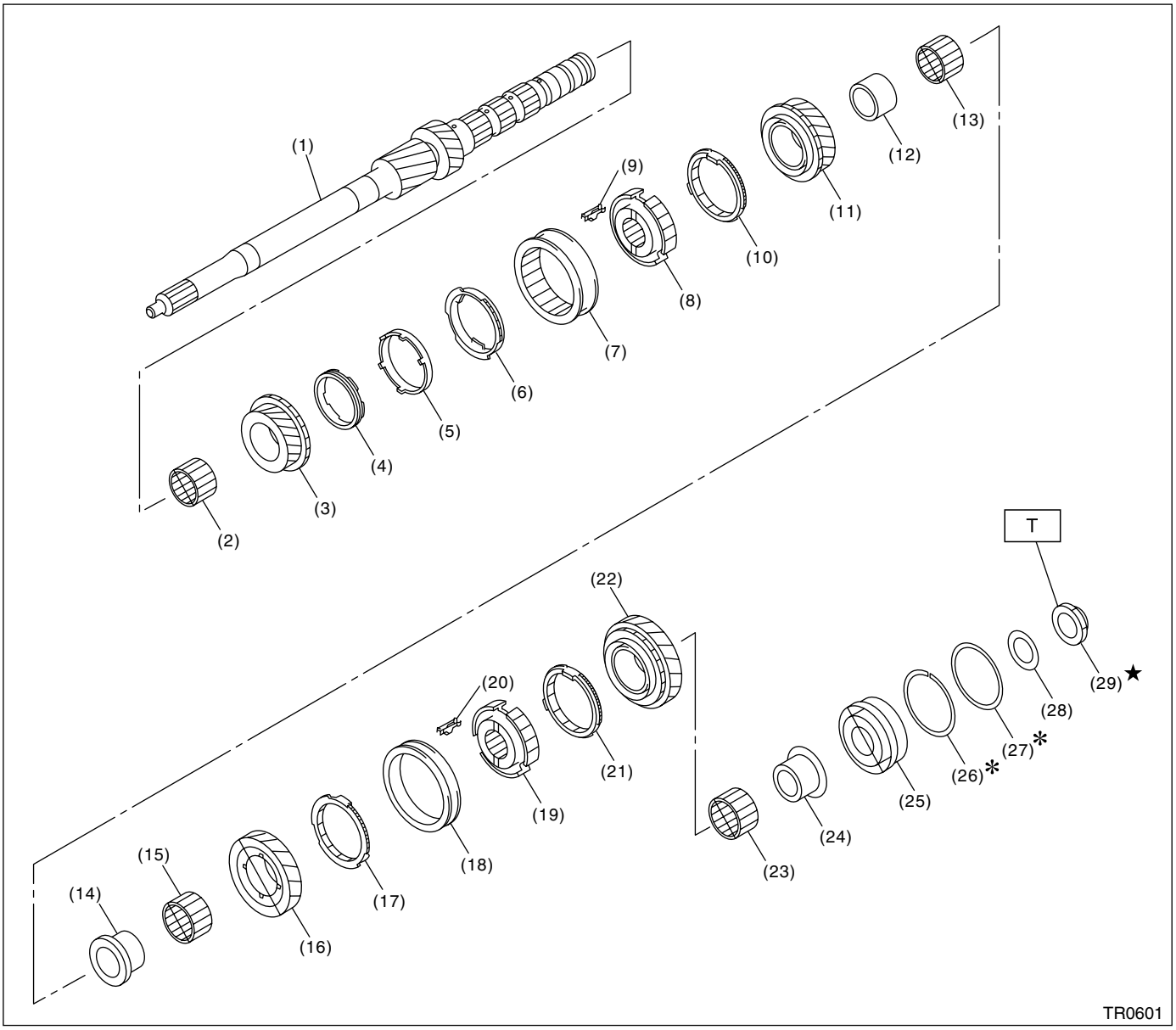
Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.1)
T2: 41 (4.2, 30.2)
T3: 48 (4.9, 35.4)

6. SHIFTER FORK AND FORK ROD



(1)	Spring pin	(9)	Support	(17)	5th-6th shifter arm
(2)	Interlock arm	(10)	Snap ring	(18)	5th-6th fork COMPL
(3)	Interlock block	(11)	Reverse fork COMPL	(19)	3rd-4th fork rod
(4)	Reverse interlock block	(12)	Reverse shifter arm	(20)	3rd-4th shifter arm
(5)	Interlock arm	(13)	Reverse fork rod	(21)	1st-2nd shifter arm
(6)	Striking rod	(14)	Selector arm COMPL	(22)	3rd-4th fork COMPL
(7)	Selector arm No.2	(15)	Shifter arm shaft	(23)	1st-2nd fork rod
(8)	Neutral set spring	(16)	5th-6th fork rod	(24)	1st-2nd fork COMPL

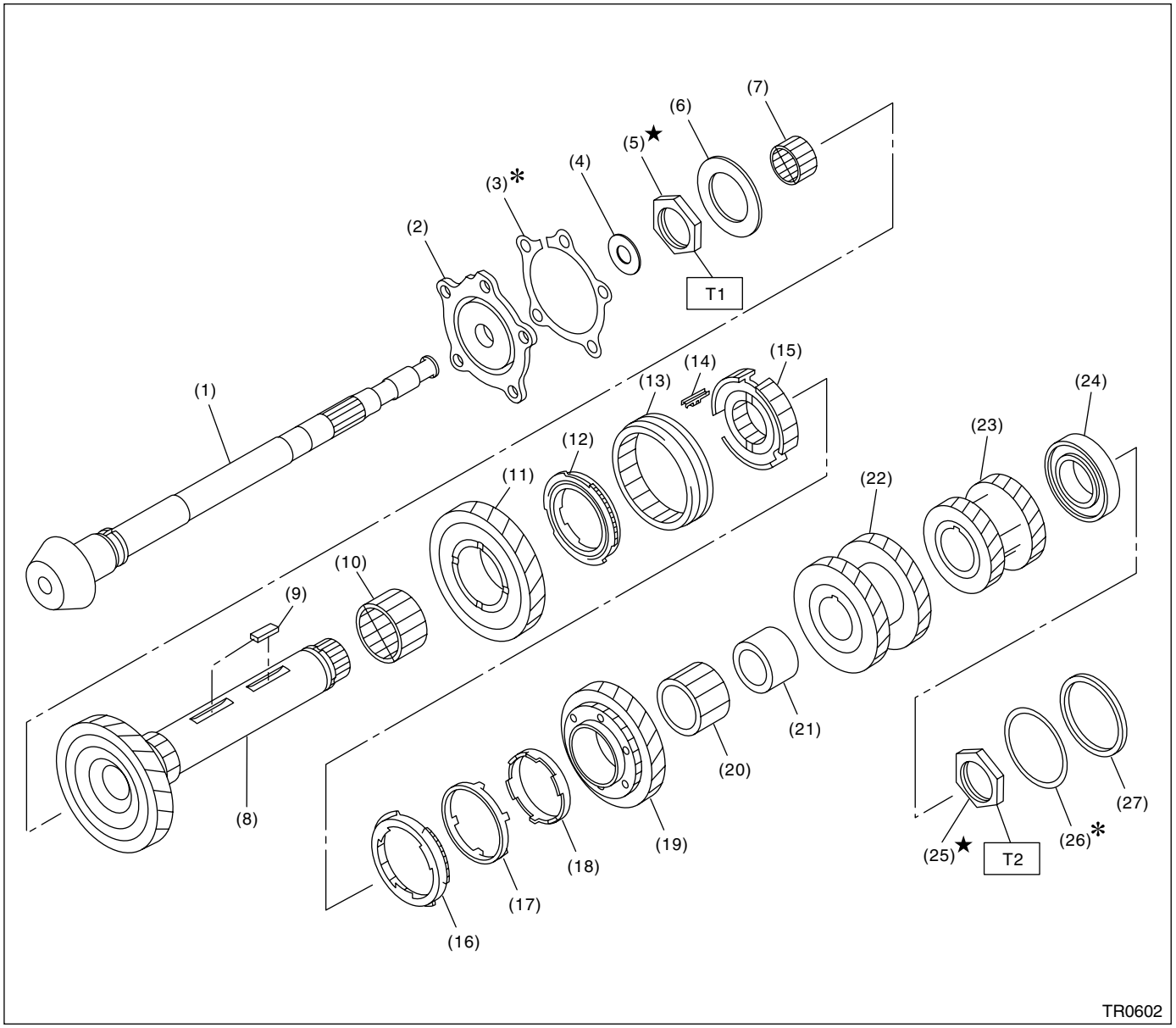
7. MAIN SHAFT ASSY



(1) Main shaft
(2) Needle bearing
(3) 3rd drive gear
(4) Inner baulk ring
(5) Synchro cone
(6) Outer baulk ring
(7) 3rd-4th sleeve
(8) 3rd-4th hub
(9) Shifting insert
(10) 4th baulk ring
(11) 4th gear
(12) 4th bush
(13) Needle bearing
(14) 5th bush
(15) Needle bearing
(16) 5th drive gear
(17) 5th baulk ring
(18) 5th-6th sleeve
(19) 5th-6th hub
(20) Shifting sleeve
(21) 6th baulk ring
(22) 6th drive gear
(23) 6th bush
(24) 6th bush
(25) Taper roller bearing
(26) Snap ring
(27) Washer
(28) Washer
(29) Lock nut

Tightening torque: N·m (kgf-m, ft-lb)
T: 392 (40.0, 289)

8. DRIVE PINION AND DRIVEN SHAFT ASSY

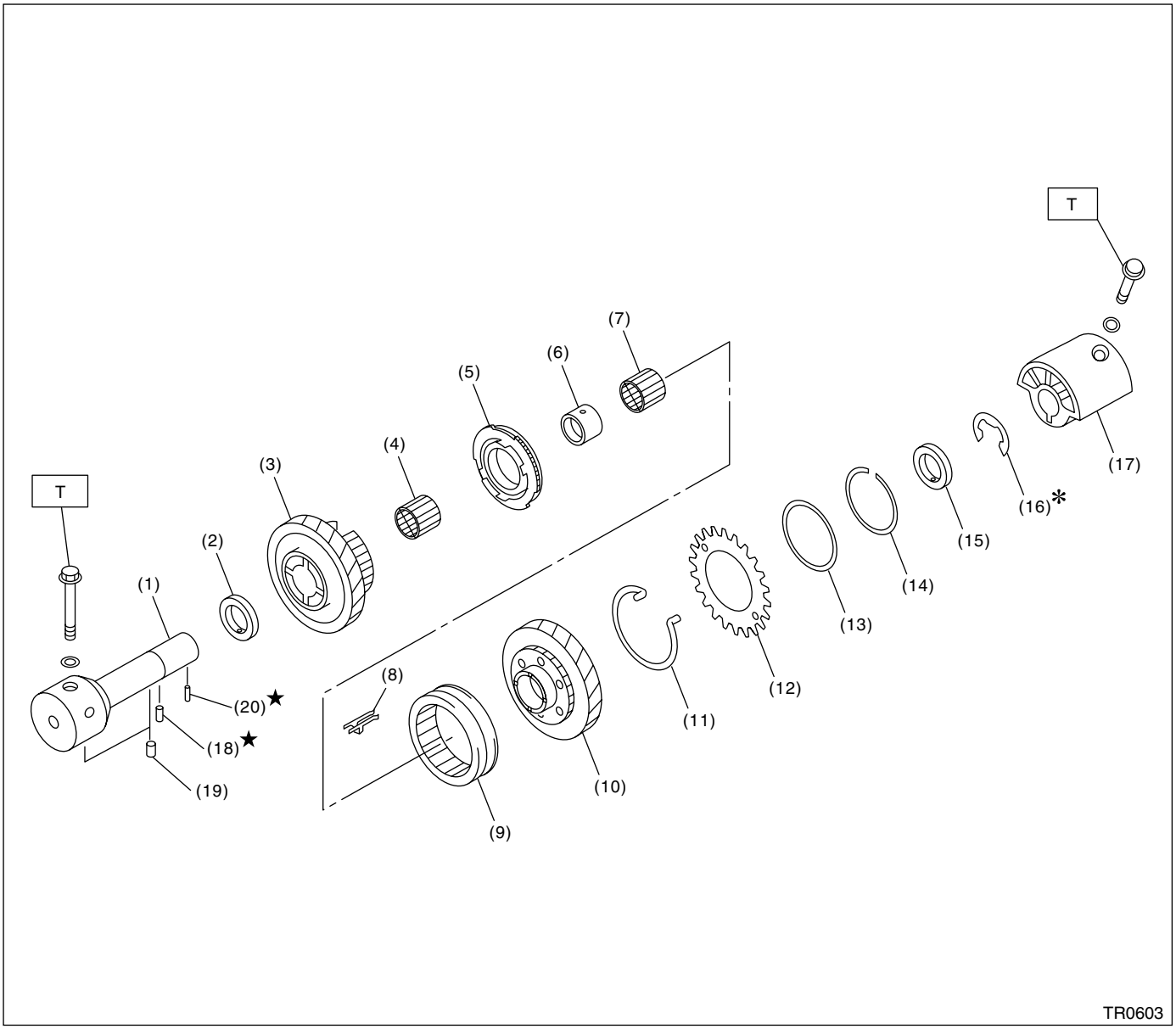


(1) Drive pinion shaft
(2) Taper roller bearing
(3) Shim
(4) Washer
(5) Lock nut
(6) Thrust bearing
(7) Needle bearing
(8) Driven shaft
(9) Key
(10) Needle bearing
(11) 1st driven gear
(12) 1st synchro ring ASSY
(13) 1st-2nd sleeve
(14) Shifting insert
(15) 1st-2nd hub
(16) Outer baulk ring
(17) Synchro cone
(18) Inner baulk ring
(19) 2nd driven gear
(20) Needle bearing
(21) 2nd bush
(22) 3rd-4th driven gear
(23) 5th-6th driven gear
(24) Ball bearing
(25) Lock nut
(26) Shim
(27) Collar

Tightening torque: N·m (kgf-m, ft-lb)
T1: 285 (29.1, 210)
**** 265 (27.0, 195)***
T2: 570 (58.1, 420)
**** 530 (54.0, 391)***

* Tightening torque when ST used.

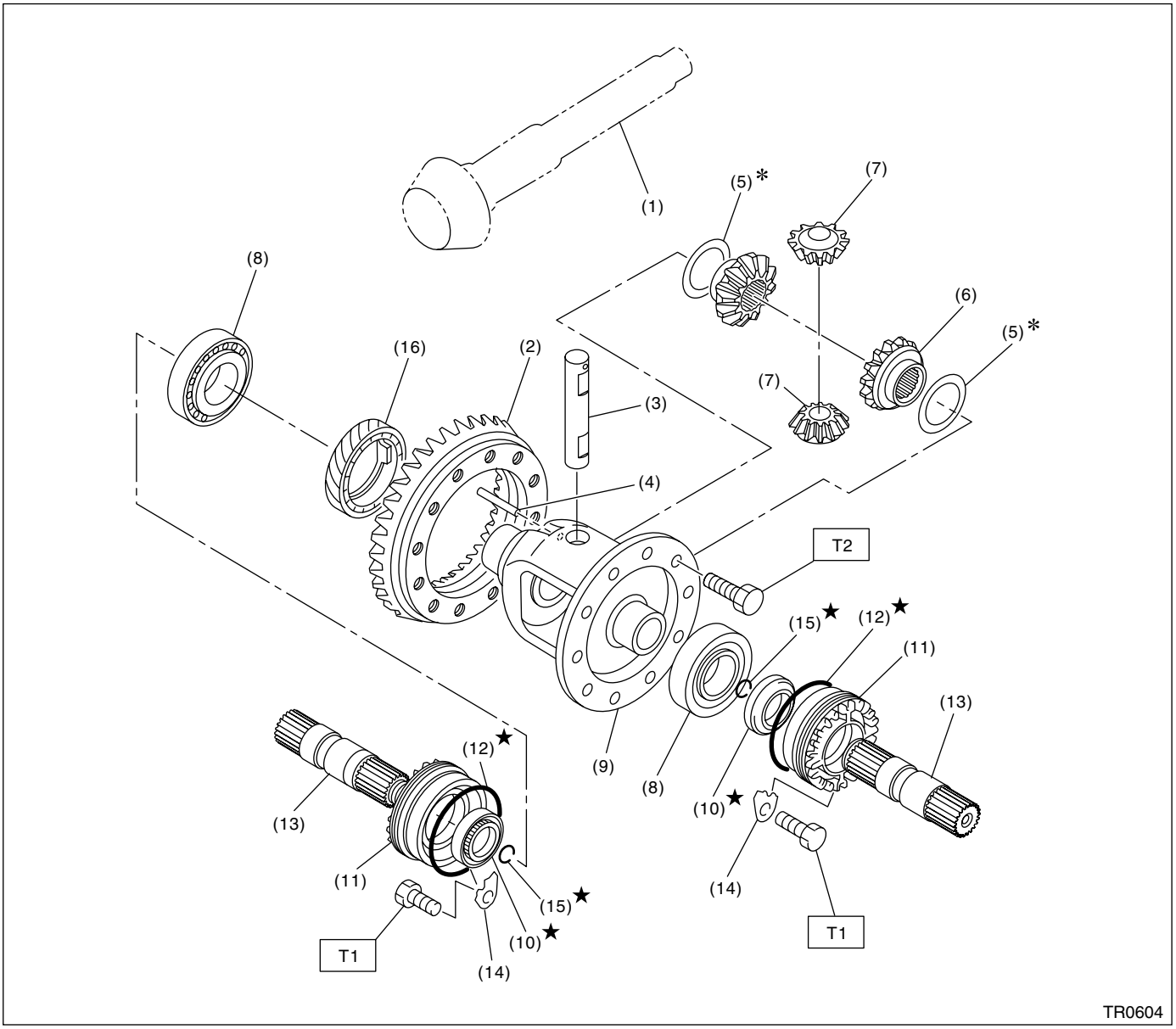
9. REVERSE IDLER GEAR ASSY



(1) Base COMPL
(2) Washer
(3) Reverse idler gear No.2
(4) Needle bearing
(5) Reverse idler synchro set
(6) Reverse idler gear bush
(7) Needle bearing
(8) Shifting insert
(9) Reverse coupling sleeve
(10) Reverse idler gear
(11) Spring
(12) Sub gear
(13) Friction plate
(14) Snap ring
(15) Washer
(16) Snap ring
(17) Reverse idler holder
(18) Spring pin
(19) Knock pin
(20) Spring pin

Tightening torque: N·m (kgf-m, ft-lb)
T: 25 (2.5, 18.1)

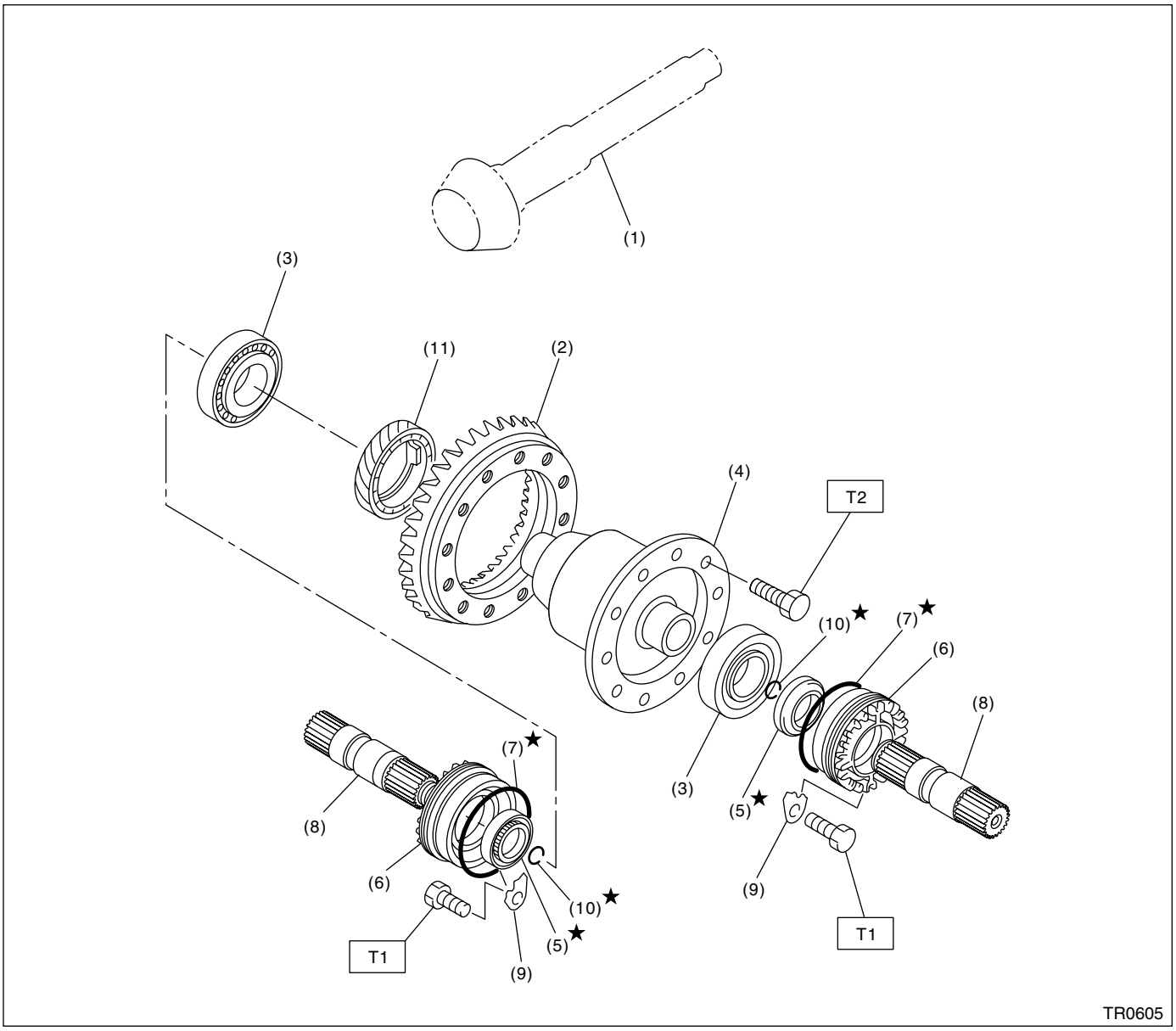
10.FRONT DIFFERENTIAL WITHOUT LSD



(1) Drive pinion shaft
(2) Hypoid driven gear
(3) Pinion shaft
(4) Straight pin
(5) Washer
(6) Differential bevel gear
(7) Differential bevel pinion
(8) Roller bearing
(9) Differential case
(10) Oil seal
(11) Differential side retainer
(12) O-ring
(13) Axle drive shaft
(14) Retainer lock plate
(15) Circlip
(16) Speedometer drive gear

Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.1)
T2: 69 (7.0, 50.9)

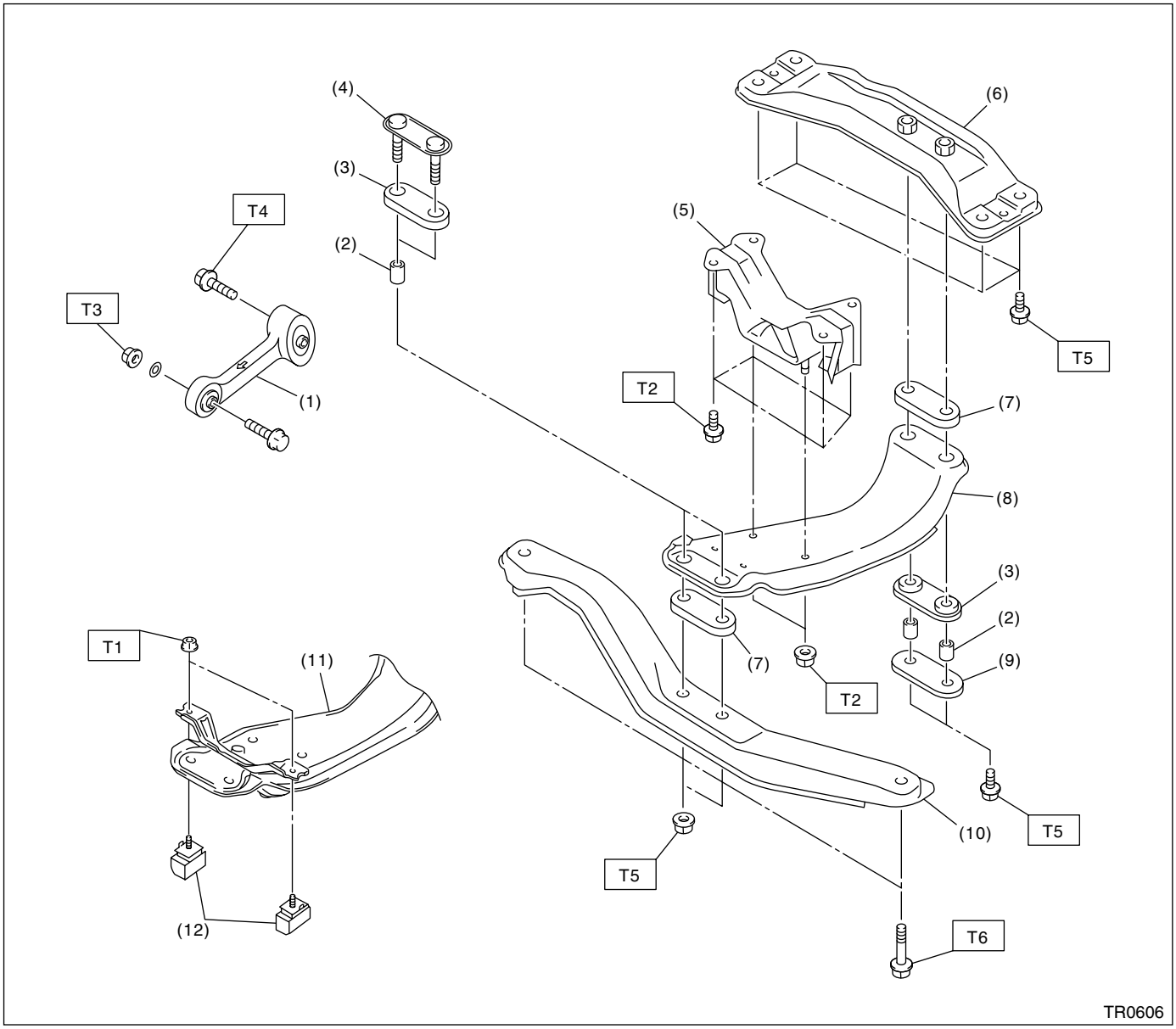
11.FRONT DIFFERENTIAL WITH LSD



(1) Drive pinion shaft
(2) Hypoid driven gear
(3) Roller bearing
(4) Differential case ASSY
(5) Oil seal
(6) Differential side retainer
(7) O-ring
(8) Axle drive shaft
(9) Retainer lock plate
(10) Circlip
(11) Speedometer drive gear

Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.1)
T2: 69 (7.0, 50.9)

12.TRANSMISSION MOUNTING



(1)	Pitching stopper	(8)	Center crossmember (Except EUROPE model)
(2)	Spacer		
(3)	Cushion C	(9)	Rear plate
(4)	Front plate	(10)	Front crossmember
(5)	Rear cushion rubber	(11)	Center crossmember (EUROPE model)
(6)	Rear crossmember		
(7)	Cushion D	(12)	Dynamic damper (EUROPE model)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 35 (3.6, 25.8)
T3: 50 (5.1, 36.9)
T4: 58 (5.9, 42.8)
T5: 70 (7.1, 51.6)
T6: 140 (14.3, 103)

C: CAUTION

• Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
• Remove contamination including dirt and corrosion before removal, installation, and disassembly.
• Keep the disassembled parts in order and protect them from dust or dirt.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
• When disassembling the case and other light alloy parts, use a plastic hammer to force it apart. Do not pry it apart with a screwdriver or other tool.
• Be careful not to burn your hands, because each part on the vehicle is hot after running.
• Use SUBARU genuine gear oil, grease etc. or the equivalent. Do not mix gear oil, grease etc. with that of another grade or from other manufacturers.
• Be sure to tighten fasteners including bolts and nuts to the specified torque.
• Place shop jacks or safety stands at the specified points.
• Apply gear oil onto sliding or revolution surfaces before installation.
• Replace deformed or otherwise damaged snap rings with new ones.
• Before installing O-rings or oil seals, apply sufficient amount of gear oil to avoid damage and deformation.
• Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
• Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vise.
• Avoid damaging the mating surface of the case.
• Before applying sealant, completely remove the old seal.

D: PREPARATION TOOL

1. SPECIAL TOOLS

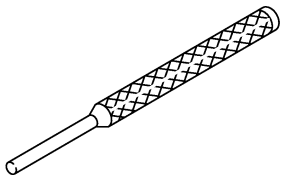
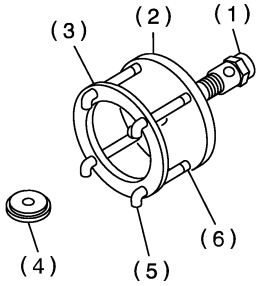
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1938	398791700	REMOVER	Used for removing and installing spring pin (6 mm).
 B3M1940A	399527700	PULLER SET	Used for removing and installing roller bearing (Differential). (1) BOLT (899521412) (2) PULLER (399527702) (3) HOLDER (399527703) (4) ADAPTER (398497701) (5) BOLT (899520107) (6) NUT (021008000)

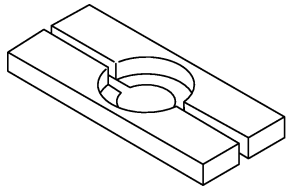
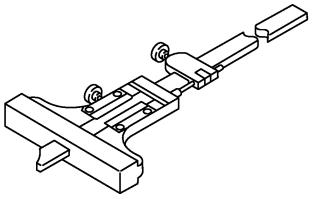
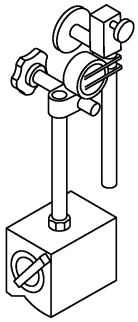
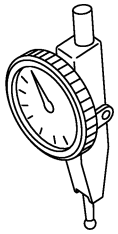
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1942	498515700	REMOVER	Used for removing roller bearing of drive pinion shaft.
 B3M1944	498147000	DEPTH GAUGE	Used for adjusting main shaft axial end play.
 B3M1945	498247001	MAGNET BASE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used with DIAL GAUGE (498247100).
 B3M1946	498247100	DIAL GAUGE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used with MAGNET BASE (498247001).

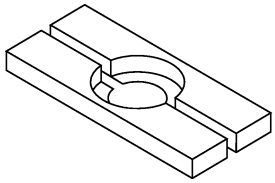
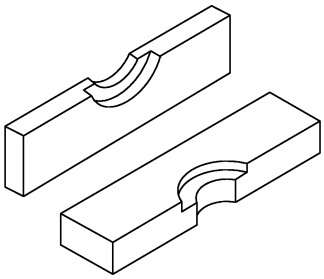
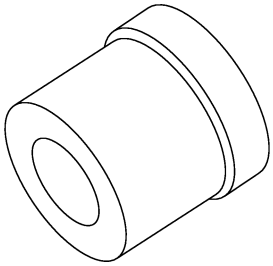
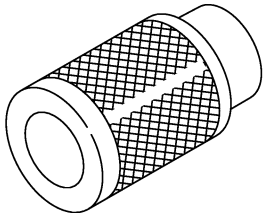
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1998	498077000	REMOVER	Used for removing differential taper roller bearing.
 B3M2125	899858600	REMOVER	Used for removing roller bearing.
 B3M2129	399513600	INSTALLER	Used for installing oil seal.
 B3M1952	499757002	INSTALLER	Used for installing bearing cone of transfer driven gear (extension core side).

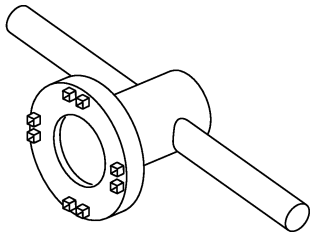
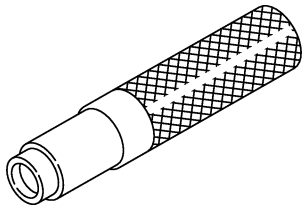
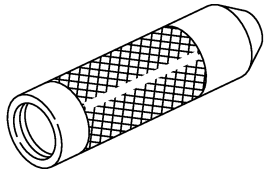
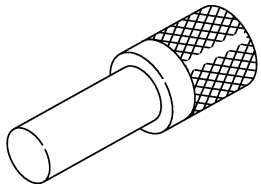
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1953	499787000	WRENCH ASSY	Used for removing and installing differential side retainer (right side).
 B3M1954	499827000	PRESS	Used for installing speedometer oil seal when installing speedometer cable to transmission.
 B3M1956	499877000	RACE 4-5 INSTALLER	Used for disassembling driven shaft and transfer driven gear.
 B3M1963	899864100	REMOVER	Used for removing parts on transmission main shaft and drive pinion.

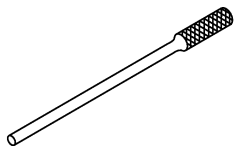
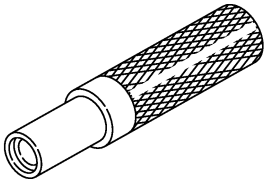
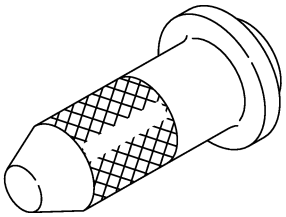
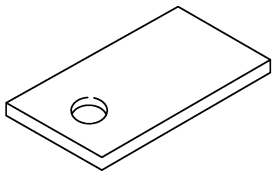
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1965	899904100	REMOVER	Used for removing and installing straight pin.
 B3M1969	899824100	PRESS	Used for installing speedometer shaft oil seal.
 B3M1972	498057300	INSTALLER	Used for installing extension oil seal.
 B3M1973	498255400	PLATE	Used for measuring backlash.

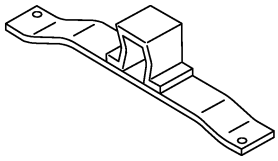
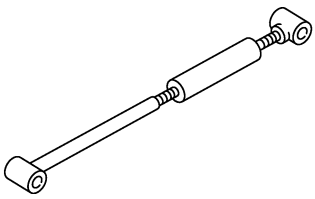
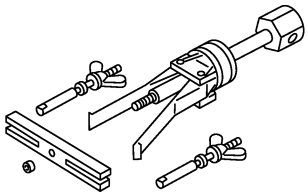
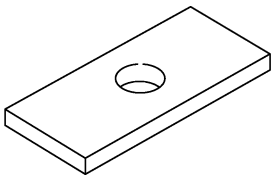
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1975	41099AA010	ENGINE SUPPORT BRACKET	Used for supporting engine.
 B3M1976	41099AA020	ENGINE SUPPORT	Used for supporting engine.
 B3M1977	398527700	PULLER ASSY	Used for removing extension case oil seal and clutch housing oil seal.
 B3M1978	398643600	GAUGE	Used for measuring total end play, extension end play and drive pinion height.

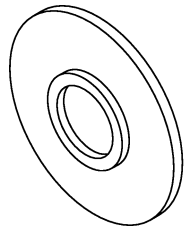
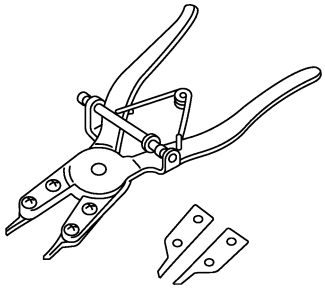
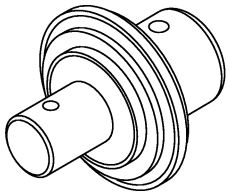
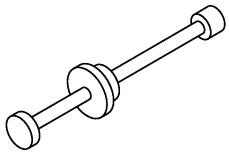
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1905	398177700	INSTALLER	Used for assembling main shaft.
 B3M2123	398663600	PLIERS	• Used for removing and installing neutral set spring. • Used with claw (18756AA000).
 B3M2007	499247300	INSTALLER	• Used for removing axle shaft. • Used with REMOVER ASSY (499095500).
 B3M2006	499095500	REMOVER ASSY	• Used for removing axle shaft. • Used with INSTALLER (499247300).

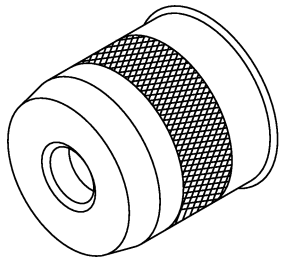
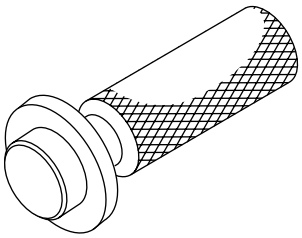
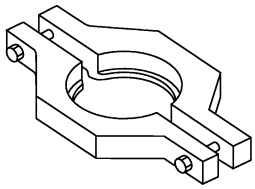
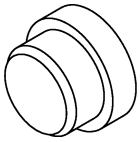
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1999	499247400	INSTALLER	Used for installing transfer drive gear ball bearing.
 B3M2197	499797000	OIL SEAL INSTALLER	Used for installing differential side retainer oil seal.
 B3M2015	498077610	REMOVER	Used for removing speedometer drive gear.
 B4M2397	398497701	SEAT	Used for installing transfer drive gear ball bearing.

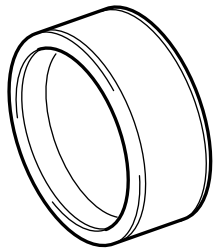
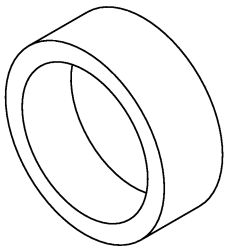
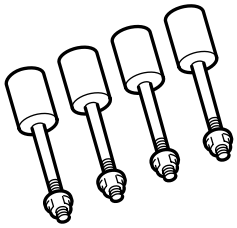
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 TR0939	398437700	INSTALLER	Used for installing front differential side bearing.
 B4M2498	498745600	INSTALLER	Used for installing oil pump drive gear.
 TR0607	18632AA000 (Newly adopted tool)	STAND ASSY	Used for disassembling and assembling transmission.
 TR0608	18671AA000 (Newly adopted tool)	OIL SEAL GUIDE	• Used for installing oil seal to reverse check. • Used with INSTALLER (18657AA010).

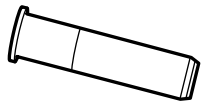
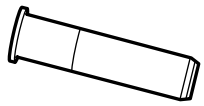
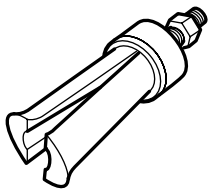
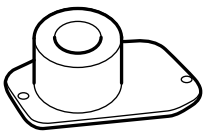
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 TR0610	18657AA010 (Newly adopted tool)	INSTALLER	• Used for installing oil seal to reverse check. • Used with OIL SEAL GUIDE (18671AA000).
 TR0610	18657AA000 (Newly adopted tool)	INSTALLER	Used for installing oil seal to shift rod.
 TR0611	18758AA000 (Newly adopted tool)	PULLER	Used for removing extension taper roller bearing outer race.
 TR0612	18831AA000 (Newly adopted tool)	GAUGE	Used for measuring extension taper roller bearing.

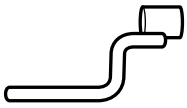
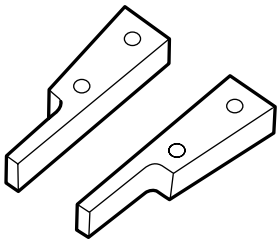
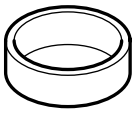
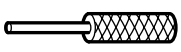
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 TR0613	18631AA000 (Newly adopted tool)	HANDLE	Used for measuring front differential backlash.
 TR0614	18756AA000 (Newly adopted tool)	CLAW	• Used for installing and removing neutral set spring. • Used with INSTALLER (399893600).
 TR0615	18754AA000 (Newly adopted tool)	REMOVER	Used for removing each parts of driven gear.
 TR0616	18757AA000 (Newly adopted tool)	STRAIGHT PIN REMOVER	Used for installing reverse idler gear.

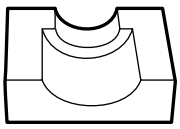
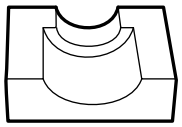
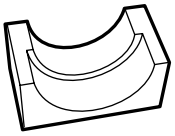
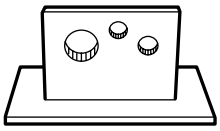
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 TR0940	18665AA000 (Newly adopted tool)	HOLDER	• Used for installing and removing main shaft lock nut. • Used with BASE (18664AA000).
 TR0617	18666AA000 (Newly adopted tool)	HOLDER	• Used for installing and removing driven shaft lock nut. • Used with BASE (18664AA000).
 TR0618	18667AA000 (Newly adopted tool)	HOLDER	• Used for installing and removing drive pinion shaft lock nut. • Used with BASE (18664AA000).
 TR0620	18664AA000 (Newly adopted tool)	BASE	• Used for installing and removing main shaft lock nut. • Used for installing and removing drive pinion shaft lock nut. • Used for installing and removing driven shaft lock nut.

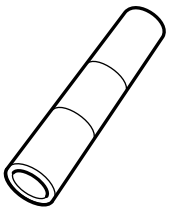
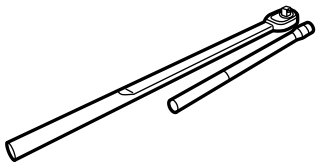
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 TR0621	18722AA000 (Newly adopted tool)	REMOVER	Used for disassembling main shaft.
 TR0622	18651AA000 (Newly adopted tool)	INSTALLER	Used for assembling main shaft.
 TR0623	18852AA000 (Newly adopted tool)	TORQUE WRENCH	• Used for tightening main shaft lock nut. • Used for tightening drive pinion shaft lock nut. • Used for tightening driven shaft lock nut.
 TR0624	18668AA000 (Newly adopted tool)	PUNCH	Used for caulking main shaft lock nut.

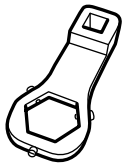
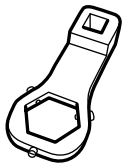
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 TR0624	18669AA000 (Newly adopted tool)	PUNCH	Used for caulking driven shaft lock nut.
 TR0624	18670AA000 (Newly adopted tool)	PUNCH	Used for caulking drive pinion shaft lock nut.
 TR0625	18620AA000 (Newly adopted tool)	ADAPTER WRENCH	Used for installing and removing driven gear shaft lock nut.
 TR0625	18621AA000 (Newly adopted tool)	ADAPTER WRENCH	Used for installing and removing drive pinion shaft lock nut.

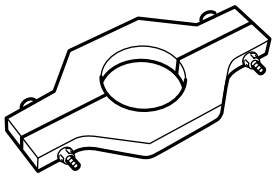
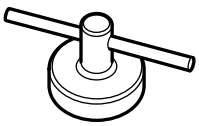
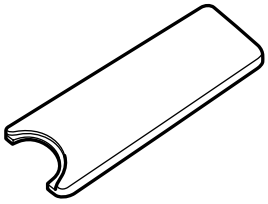
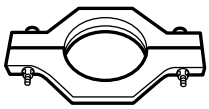
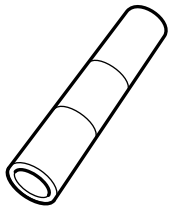
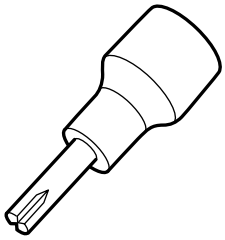
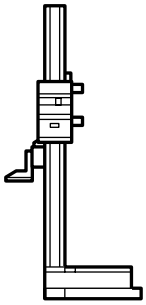
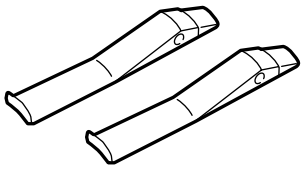
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 TR0626	18723AA000 (Newly adopted tool)	REMOVER	Used for disassembling the driven shaft.
 TR0627	18630AA000 (Newly adopted tool)	WRENCH ASSY	Used for removing and installing differential side retainer (left side).
 TR0628	18672AA000 (Newly adopted tool)	GUIDE CLIP	Used for installing reverse idler gear snap ring.
 TR0629	18720AA000 (Newly adopted tool)	REMOVER	Used for disassembling main shaft.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 TR0630	18654AA000 (Newly adopted tool)	INSTALLER	Used for assembling driven shaft.
 TR0631	18663AA000 (Newly adopted tool)	SOCKET	Used for installing and removing oil pump cover.
 TR0632	18853AA000 (Newly adopted tool)	HEIGHT GAUGE	Used for selecting shift rod.
 TR0929	18760AA000 (Newly adopted tool)	CLAW	• Used for removing front side retainer bearing outer race. • Used with PULLER ASSEMBLY (398527705).

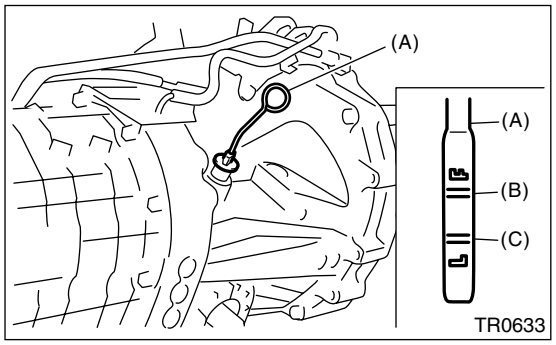
2. GENERAL PURPOSE TOOLS

TOOL NAME	REMARKS
Circuit Tester	Used for measuring resistance, voltage and ampere.

2. Transmission Gear Oil

A: INSPECTION

1) Park the vehicle on a level surface.
2) Turn the ignition switch to OFF, and wait until the engine cools.
3) Remove the oil level gauge and wipe it clean.
4) Reinsert the level gauge all the way. Be sure that the level gauge is correctly inserted and in the proper direction.
5) Pull out the oil level gauge again and check the oil level on it. If it is below the lower level, add oil through the oil level gauge hole to bring the level up to the upper level.



(A) Oil level gauge
(B) Upper level
(C) Low level

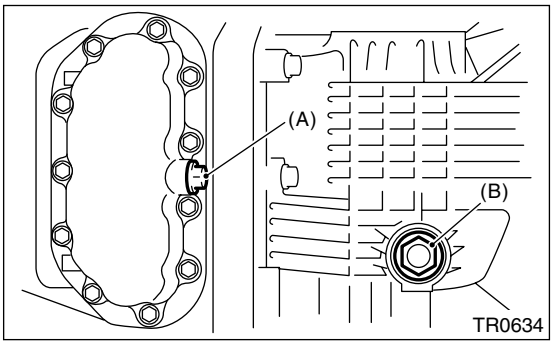
B: REPLACEMENT

1) Pull out the oil level gauge.
2) Lift-up the vehicle.
3) Remove the transmission under cover.
4) Drain the transmission gear oil completely.

CAUTION:
Directly after the engine has been running, the transmission gear oil is hot. Be careful not to burn yourself.

NOTE:
• Tighten the transmission gear oil drain plug after draining transmission gear oil.
• Always use a new gasket.

Tightening torque:
Oil pan side
44 N·m (4.5 kgf-m, 32.5 ft-lb)
Clutch housing side
70 N·m (7.1 kgf-m, 51.6 ft-lb)



(A) Drain plug (Oil pan side)
(B) Drain plug (Clutch housing side)

5) Lower the vehicle.
6) Pour gear oil into the gauge hole.

Recommended gear oil:
Use GL-5 or equivalent.

Gear oil capacity:
4.1 ℓ (4.3 US qt, 3.6 Imp qt)

7) Check the level of the transmission gear oil.

CAUTION:
When inserting the level gauge into transmission gear, align the protrusion on the side of the top part of the level gauge with the notch in the gauge hole.

NOTE:
The level should be within the specified range marked on the gauge.

3. Oil Seal

A: INSPECTION

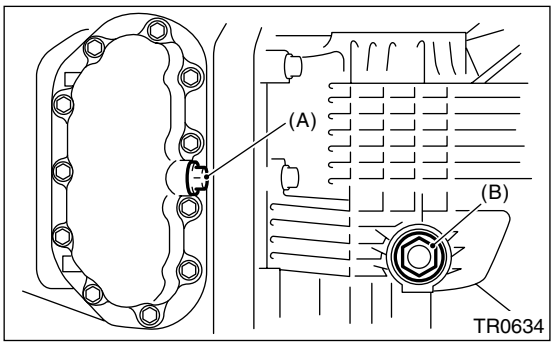
Inspect for oil leakage from the oil seal. Replace the oil seal if the lips is deformed, hardened, damaged, worn or defective if any.

B: REPLACEMENT

1) Clean the transmission exterior.
2) Drain the gear oil completely.

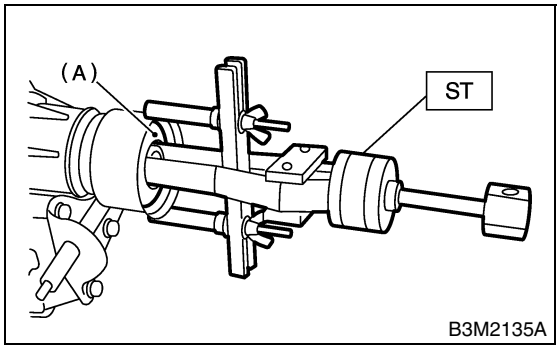
NOTE:
- Tighten the drain plug after draining gear oil.
- Always use a new gasket.

Tightening torque:
Oil pan side
44 N·m (4.5 kgf-m, 32.5 ft-lb)
Clutch housing side
70 N·m (7.1 kgf-m, 51.6 ft-lb)



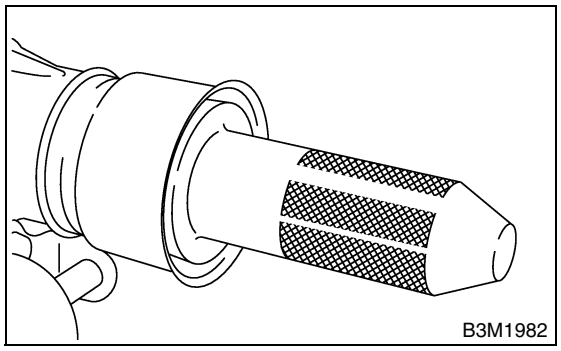
(A) Drain plug (Oil pan side)
(B) Drain plug (Clutch housing side)

3) Remove the rear exhaust pipe and muffler.
4) Remove the propeller shaft. <Ref. to DS-15, REMOVAL, Propeller Shaft.>
5) Using the ST, remove the oil seal.
ST 398527700 PULLER ASSY



(A) Oil seal

6) Using the ST, install the oil seal.
ST 498057300 INSTALLER

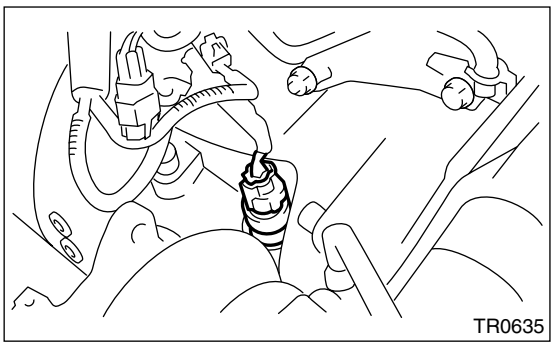


7) Install the propeller shaft. <Ref. to DS-16, INSTALLATION, Propeller Shaft.>
8) Install the rear exhaust pipe and muffler.
9) Pour gear oil and check the oil level. <Ref. to 6MT-32, REPLACEMENT, Transmission Gear Oil.>

4. Vehicle Speed Sensor

A: REMOVAL

1) Disconnect the ground cable from battery.
2) Remove the intercooler. <Ref. to IN(TURBO)-10, REMOVAL, Intercooler.>
3) Disconnect the vehicle speed sensor connector.



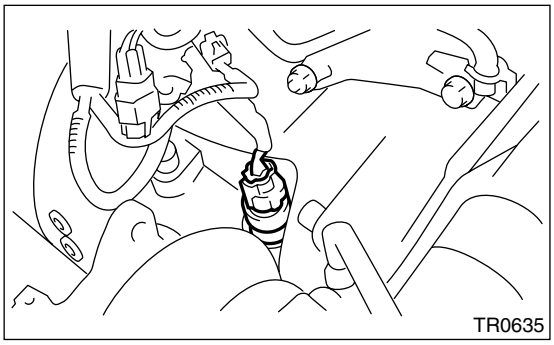
4) Remove the vehicle speed sensor.

B: INSTALLATION

1) Align the tip end of vehicle speed sensor key with key groove on the end of speedometer shaft, and then install.

Tightening torque:
5.9 N·m (0.6 kgf-m, 4.4 ft-lb)

NOTE:
• Ensure the sensor mounting hole is clean and free of foreign matter.
• Discard the vehicle speed sensor and after removal, replace with a new one.



2) Connect the connector to vehicle speed sensor.
3) Install the intercooler. <Ref. to IN(TURBO)-11, INSTALLATION, Intercoooler.>

C: INSPECTION

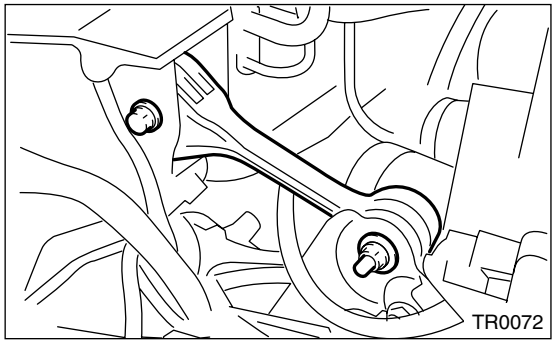
Inspect that the speedometer is normally operated, because vehicle speed sensor cannot be inspected as single part. If it is not normally operated, inspect the combination meter system. <Ref. to IDI-5, INSPECTION, Combination Meter System.>

5. Transmission Mounting System

A: REMOVAL

1. PITCHING STOPPER

1) Disconnect the ground cable from battery.
2) Remove the intercooler. <Ref. to IN(TURBO)-10, REMOVAL, Intercooler.>
3) Remove the pitching stopper.

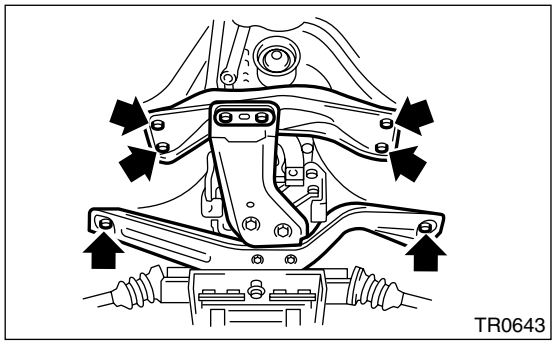


2. CROSSMEMBER AND CUSHION RUBBER

1) Disconnect the ground cable from battery.
2) Jack-up the vehicle and support it with sturdy racks.
3) Remove the center exhaust pipe. <Ref. to EX(TURBO)-8, REMOVAL, Center Exhaust Pipe.>
4) Remove the rear exhaust pipe and muffler.
5) Remove the heat shield cover.
6) Set the transmission jack under the transmission body.

CAUTION:
Always support the transmission case with a transmission jack.

7) Remove the rear crossmember.



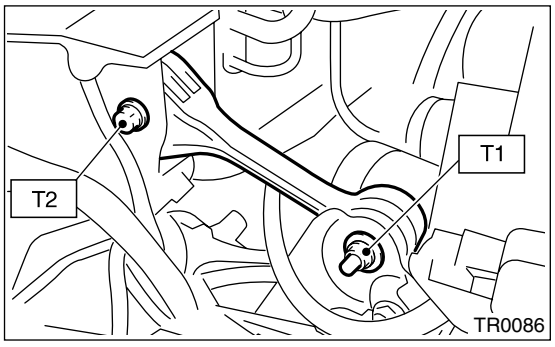
8) Remove the rear cushion rubber.

B: INSTALLATION

1. PITCHING STOPPER

1) Install the pitching stopper.

Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



2) Install the intercooler.
<Ref. to IN(TURBO)-11, INSTALLATION, Intercooler.>
3) Connect the battery ground cable to battery.

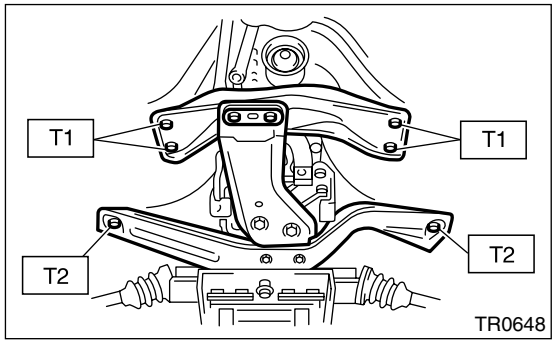
2. CROSSMEMBER AND CUSHION RUBBER

1) Install the rear cushion rubber.

Tightening torque:
35 N·m (3.6 kgf-m, 25.8 ft-lb)

2) Install the crossmember.

Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103 ft-lb)



3) Remove the transmission jack.
4) Install the center exhaust pipe. <Ref. to EX(TURBO)-9, INSTALLATION, Center Exhaust Pipe.>
5) Install the rear exhaust pipe and muffler.

C: INSPECTION

Repair or replace parts if the results of the inspection below are not satisfactory.

1. PITCHING STOPPER

Make sure that the pitching stopper is not bent or damaged. Make sure that the rubber is not stiff, cracked, or otherwise damaged.

2. CROSSMEMBER AND CUSHION RUBBER

Make sure that the crossmember is not bent or damaged. Make sure that the cushion rubber is not stiff, cracked, or otherwise damaged.

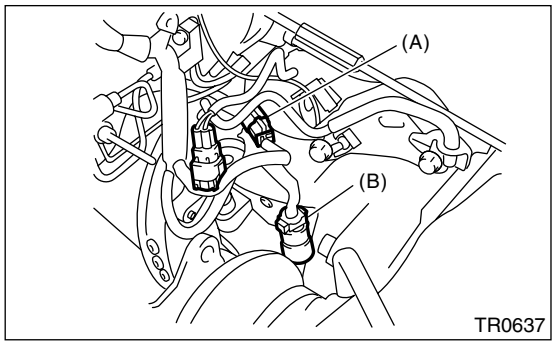
6. Manual Transmission Assembly

A: REMOVAL

1) Set the vehicle on a lift, then open the front hood and support with hood stay.

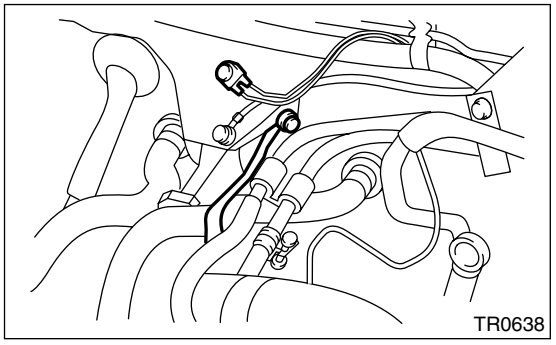
NOTE:
Set the hood stay to its specified hole.

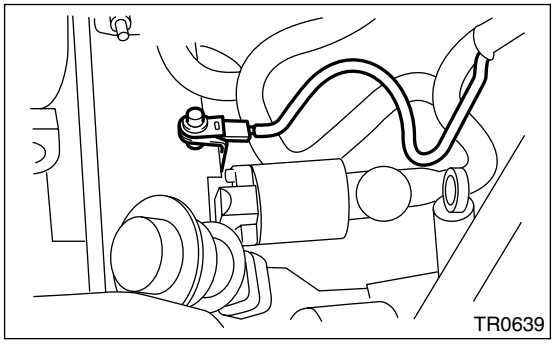
2) Remove the front wheel.
3) Disconnect the ground cable from battery.
4) Remove the intercooler assembly. <Ref. to IN(TURBO)-10, REMOVAL, Intercooler.>
5) Lift-up the vehicle and remove the under cover.
6) Remove the steering universal joint. <Ref. to PS-27, REMOVAL, Universal Joint.>
7) Lower the vehicle and disconnect the connector located on upper side of transmission.



(A) Vehicle speed sensor connector
(B) Transmission connector

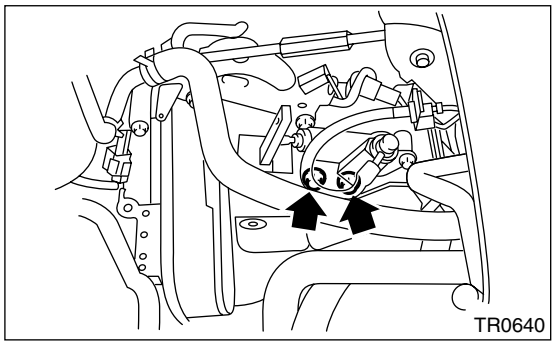
8) Disconnect the ground cable at upper side of transmission case and body.





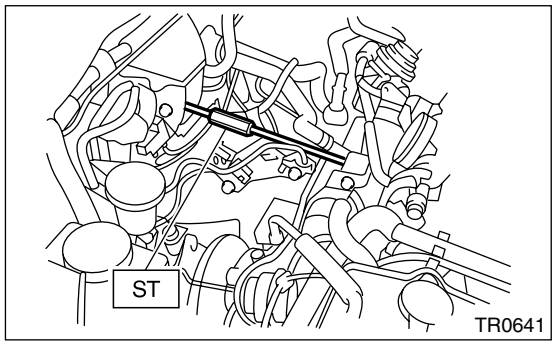
9) Remove the starter assembly. <Ref. to SC-5, REMOVAL, Starter.>
10) Remove the clutch operating cylinder.

NOTE:
Hang the removed operating cylinder with wire.



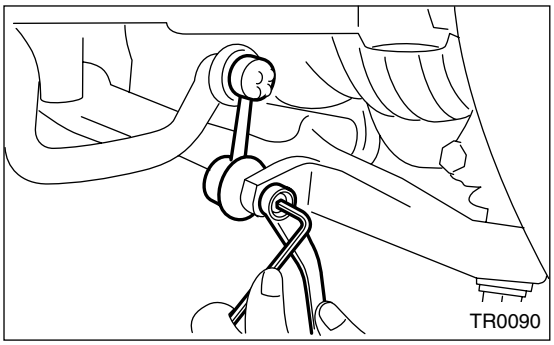
11) Remove the clutch release shaft.
(1) Remove the plug with hexagon wrench.
(2) Install a 6 mm (0.24 in) bolt to the release shaft, then pull out the release shaft.
(3) Lift up the release fork, and then remove it from the release bearing claw. Pull it to the engine side and set it free.
12) Remove the pitching stopper and remove the pitching stopper bracket.
13) Set the ST.

NOTE:
Also Part No. 41099AA010 can be used.
ST 41099AA020 ENGINE SUPPORT

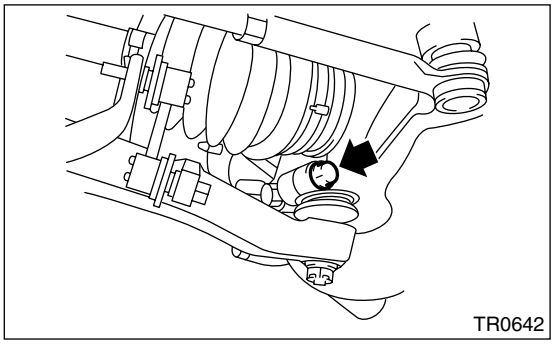


14) Remove the center and rear exhaust pipe and muffler. <Ref. to EX(TURBO)-8, REMOVAL, Center Exhaust Pipe.>, <Ref. to EX(TURBO)-13, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(TURBO)-12, REMOVAL, Joint Pipe.>
15) Remove the propeller shaft. <Ref. to DS-15, REMOVAL, Propeller Shaft.>

16) Remove the front stabilizer bolt.

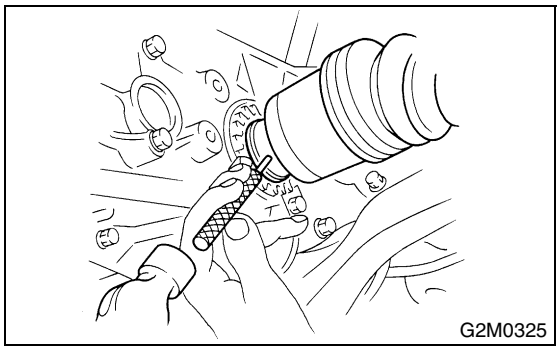


17) Remove the ball joint of transverse link from housing.



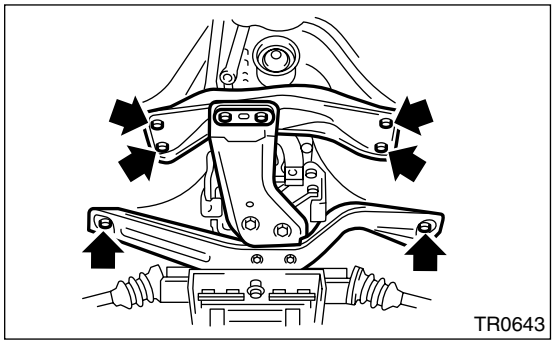
18) Using the ST, remove the spring pin of front drive shaft.
ST 398791700 REMOVER

NOTE:
Do not reuse the spring pin.



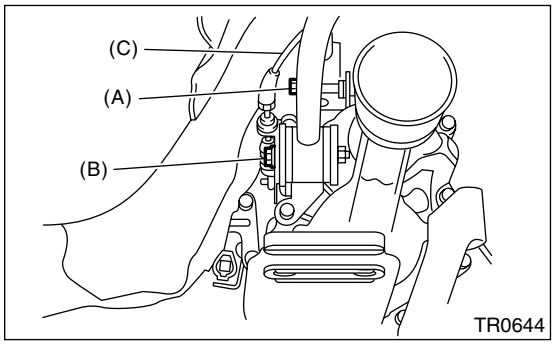
19) Remove the front drive shaft.

20) Set the transmission jack under the transmission, then remove the front crossmember and rear crossmember.



21) Move the transmission to right side, then remove the joint COMPL, stay bolt and reverse check cable.

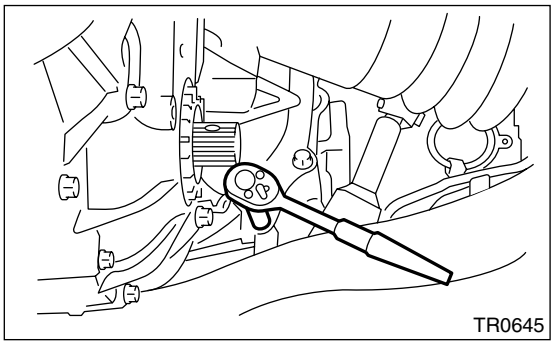
NOTE:
If the transmission is not moved, the joint COMPL and stay bolt will contact body and damage may occur.

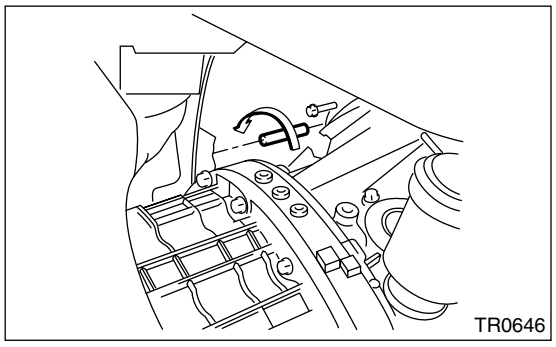


(A) Joint COMPL bolt
(B) Stay bolt
(C) Reverse check cable

22) Remove the fixing bolt of engine and transmission, then remove the transmission from vehicle.

NOTE:
• Rotate the ST (ENGINE SUPPORT ASSY) counterclockwise (to shorter the ST) and lower the rear side of engine to facilitate removal.
• Take care not to contact the transmission with body when pulling backward to remove.
• Remove carefully. The clutch pipe and breather pipe may interfere each other.


TR0645

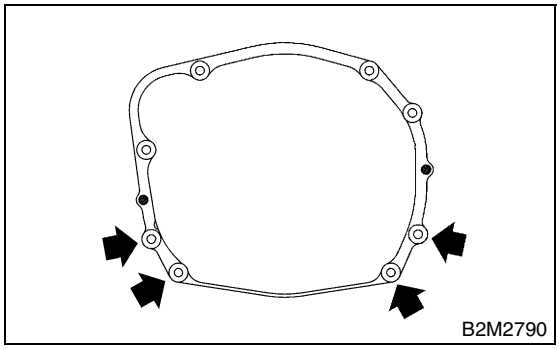

TR0646

B: INSTALLATION

1) Set the release fork, release bearing and release shaft to transmission. <Ref. to CL-26, INSTALLATION, Release Bearing and Lever.>
2) Install the transmission.

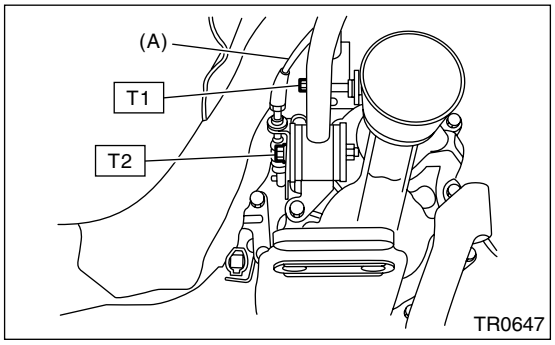
NOTE:
• Make sure the main shaft spline part is inserted completely.
• Make sure the rear side of engine is lowered.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)


B2M2790

3) Move the transmission to the right side, then install the joint COMPL bolt, stay bolt and reverse check cable.

Tightening torque:
T1: 11.8 N·m (1.2 kgf-m, 8.7 ft-lb)
T2: 32 N·m (3.3 kgf-m, 23.6 ft-lb)



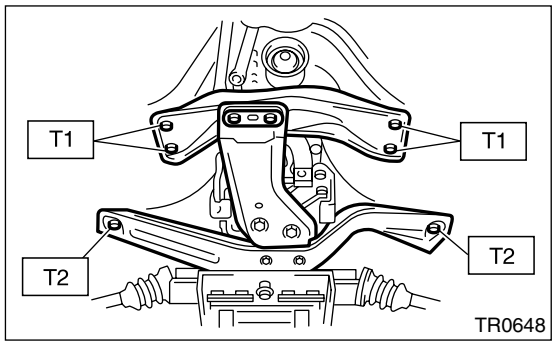
TR0647

(A) Reverse check cable

4) Install the front crossmember and rear crossmember.

NOTE:
Rotate the ST (ENGINE SUPPORT ASSY) turn buckle clockwise (make longer the ST) and lift up the rear side of engine to facilitate installation.

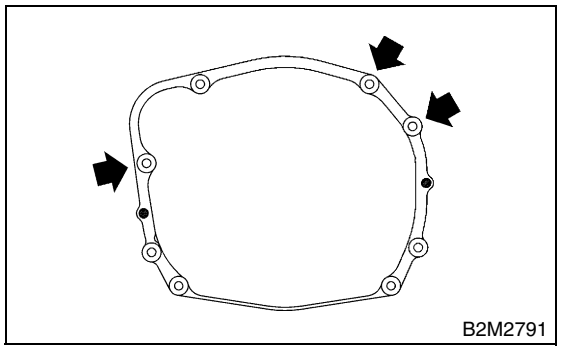
Tightening torque:
T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)
T2: 140 N·m (14.3 kgf-m, 103 ft-lb)



TR0648

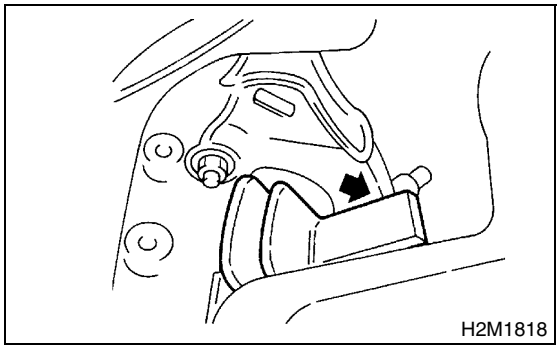
5) Lower the vehicle and install the fixing bolt.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)


B2M2791

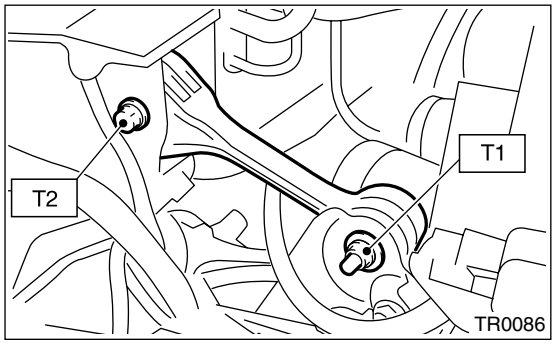
6) Make sure the release bearing is installed completely.

NOTE:
• Push the release fork to operating cylinder side until you hear a “click” sound. Pull the release fork to engine side. Setting is completed if the release fork does not contact case.
• Make sure the boot cover is firmly set.



7) Install the pitching stopper bracket, and then install the pitching stopper.

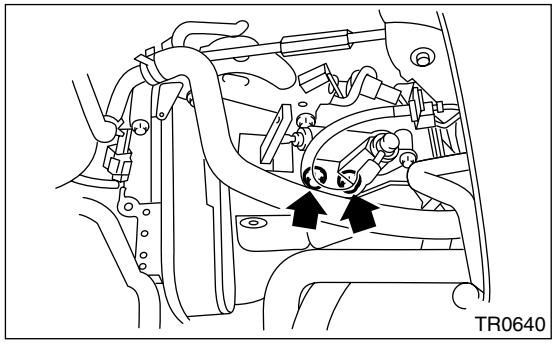
Tightening torque:
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



8) Install the clutch operating cylinder.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

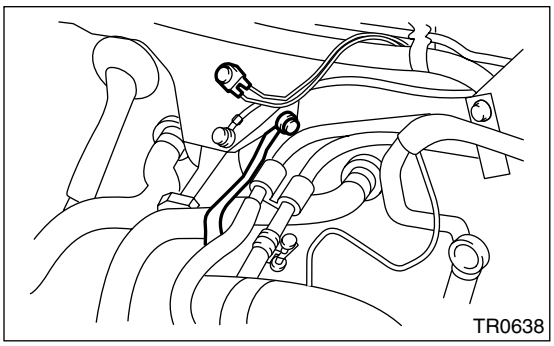
NOTE:
Check that the clutch hose is routed properly.

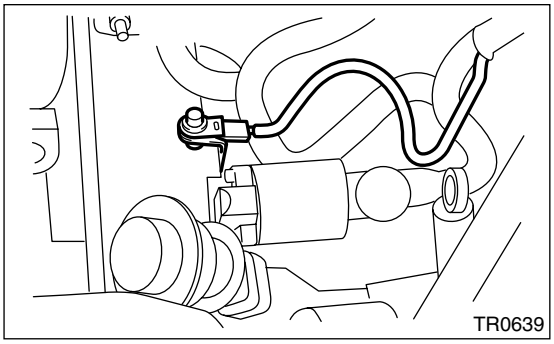


9) Install the starter assembly.

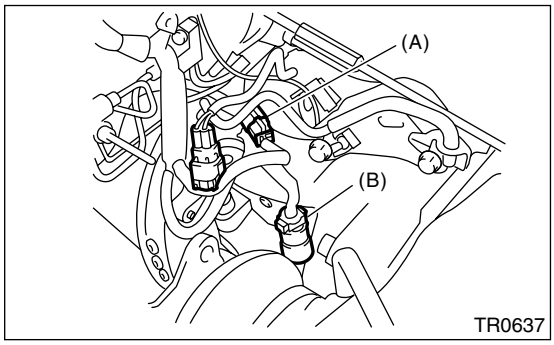
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

10) Install the transmission and body ground cable.





11) Connect the connector located on the upper side of transmission.

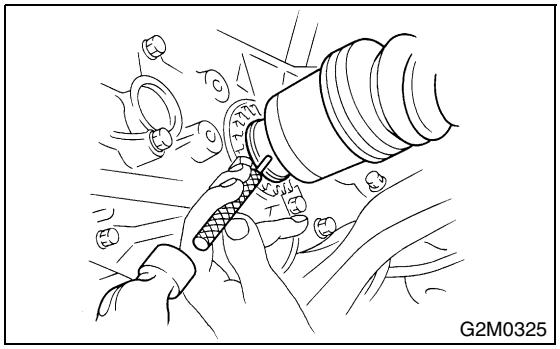


(A) Vehicle speed sensor connector
(B) Transmission connector

12) Lift-up the vehicle and install the drive shaft.

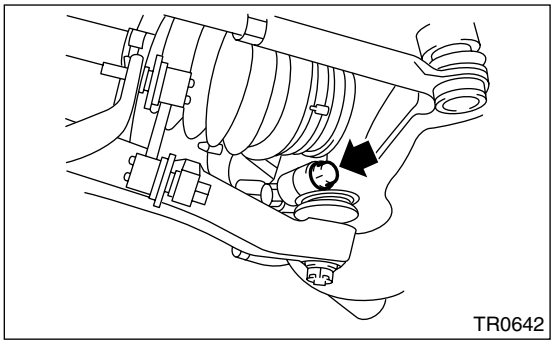
13) Using the ST, install the spring pin of front drive shaft.
ST 398791700 REMOVER

NOTE:
Align each chamfered part of front drive shaft and axle drive shaft spring pin hole, and assemble them. Then insert the spring pin.


G2M0325

14) Install the ball joint of transverse link to housing.

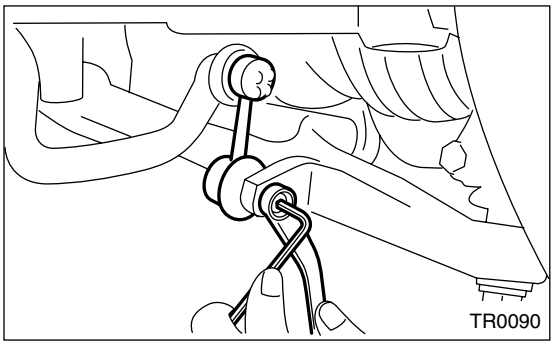
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)


TR0642

15) Install the stabilizer nut.

Tightening torque:
45 N·m (4.6 kgf-m, 33.2 ft-lb)

NOTE:
Discard the loosened self-locking nut and replace with a new one.


TR0090

16) Install the propeller shaft. <Ref. to DS-16, INSTALLATION, Propeller Shaft.>

17) Install the center exhaust pipe. <Ref. to EX(TURBO)-9, INSTALLATION, Center Exhaust Pipe.>
18) Install the rear exhaust pipe and muffler. <Ref. to EX(TURBO)-13, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(TURBO)-12, INSTALLATION, Joint Pipe.>
19) Install the universal joint. <Ref. to PS-27, INSTALLATION, Universal Joint.>
20) Install the under cover.
21) Install the intercooler assembly. <Ref. to IN(TURBO)-11, INSTALLATION, Intercooler.>
22) Connect the battery ground cable to battery.

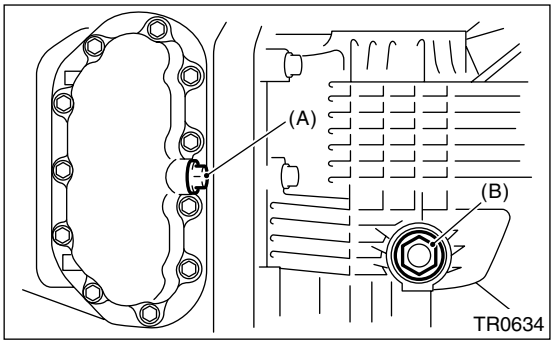
7. Preparation for Overhaul

A: PROCEDURE

1) Clean oil, grease, dirt and dust from transmission.
2) Remove the drain plug to drain oil. After draining, retighten it as before.

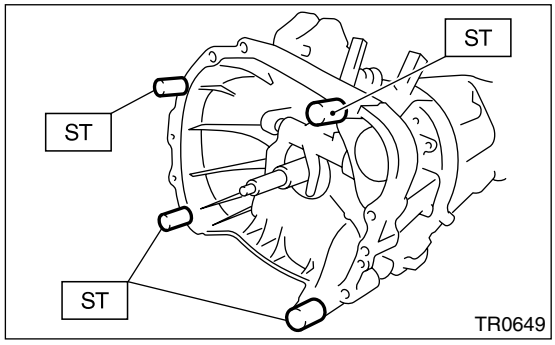
NOTE:
Replace the gasket with a new one.

Tightening torque:
Oil pan side
44 N·m (4.5 kgf-m, 32.5 ft-lb)
Clutch housing
70 N·m (7.1 kgf-m, 51.6 ft-lb)



(A) Drain plug (Oil pan side)
(B) Drain plug (Clutch housing side)

3) Attach the transmission to ST.
ST 18632AA000 STAND ASSY

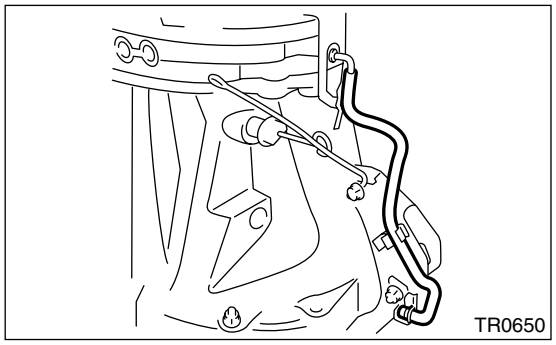


4) Rotating parts should be coated with oil prior to assembly.
5) All disassembled parts, if to be reused, should be reinstalled in the original positions and directions.
6) Gaskets, lock washers and lock nut must be replaced with new ones.
7) Liquid gasket should be used where specified to prevent leakage.

8. Air Breather Hose

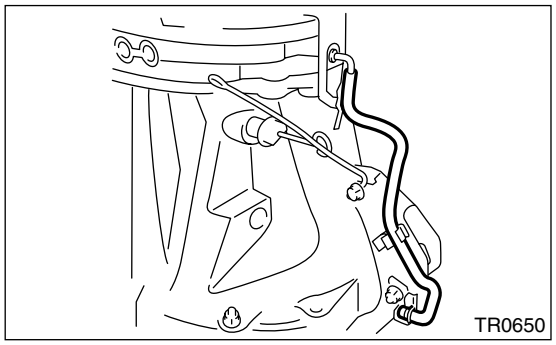
A: REMOVAL

Disconnect the air breather hose.



B: INSTALLATION

Install the air breather hose.



C: INSPECTION

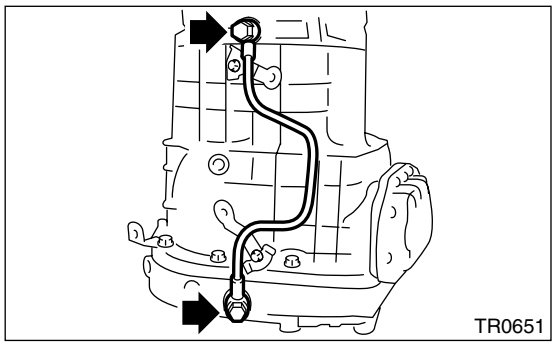
Make sure the hose is not cracked or clogged.

9. Oil Pipe

A: REMOVAL

Remove the oil pipe.

NOTE:
Do not reuse the gasket.

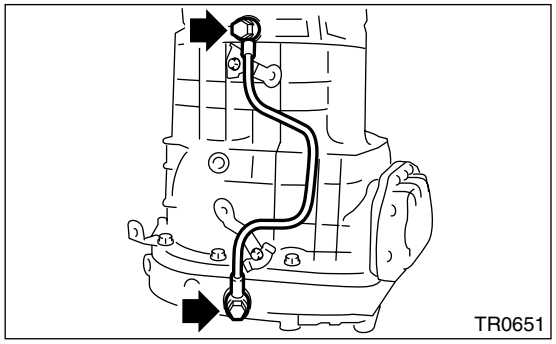


B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Always use a new gasket.

Tightening torque:
32 N·m (3.3 kgf-m, 23.6 ft-lb)



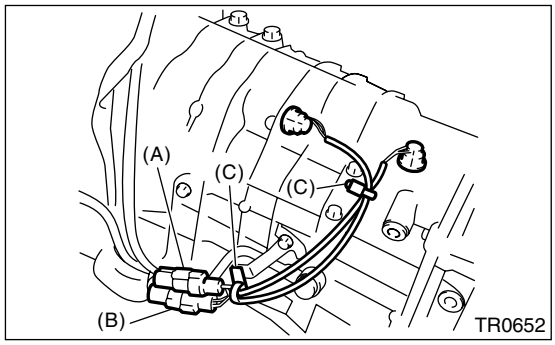
C: INSPECTION

1) Make sure there is no damage on pipe. If there is damage, replace the pipe.
2) Check the joint parts of pipe for oil leakage. If there is oil leakage, replace the gasket.

10.Back-up Light Switch

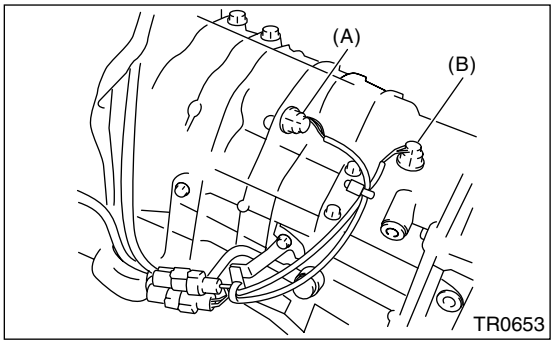
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Disconnect the back-up light switch connector.



(A) Back-up light switch connector (White)
(B) Neutral position switch connector (Black)
(C) Clip

3) Remove the back-up light switch.

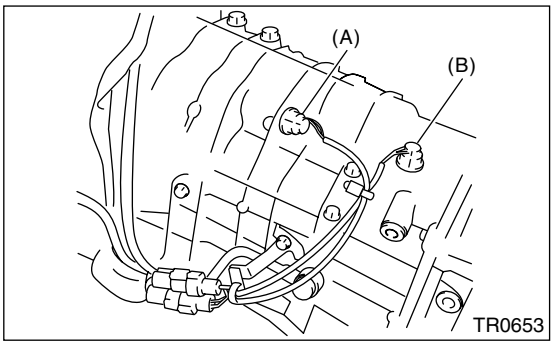


(A) Back-up light switch
(B) Neutral position switch

B: INSTALLATION

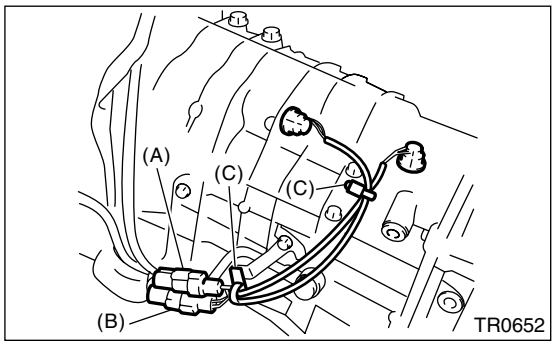
1) Install the back-up light switch.

Tightening torque:
32 N·m (3.3 kgf-m, 23.6 ft-lb)



(A) Back-up light switch
(B) Neutral position switch

2) Connect the back-up light switch connector.

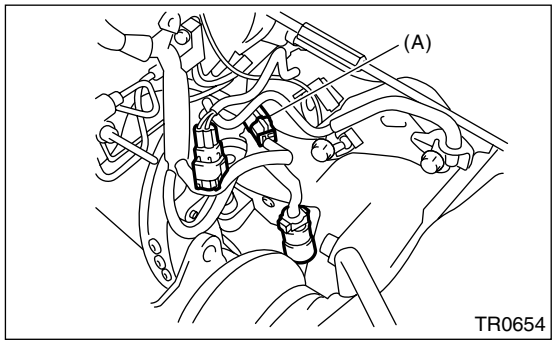


(A) Back-up light switch connector (White)
(B) Neutral position switch connector (Black)
(C) Clip

3) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

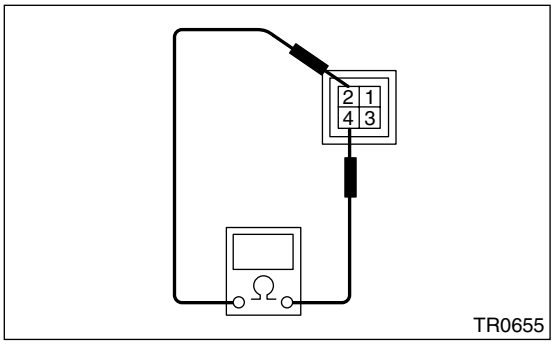
1) Disconnect the ground cable from battery.
2) Remove the intercooler. <Ref. to IN(TURBO)-10, REMOVAL, Intercooler.>
3) Disconnect the transmission harness and chassis harness.



(A) Transmission connector

4) Measure the resistance between back-up light switch terminals. If it is not within specifications, replace the back-up light switch.

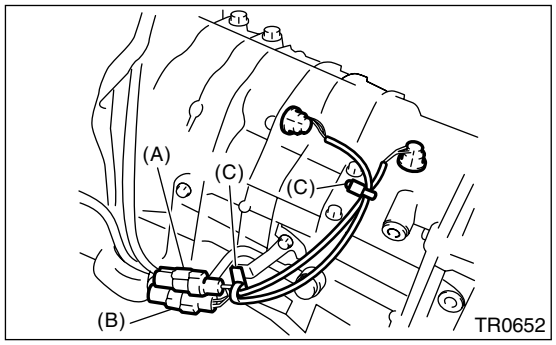
Gear shift position	Terminal No.	Specified resistance
Back-up position	2 and 4	Less than 1 Ω
Other positions		More than 1 M Ω



11.Neutral Position Switch

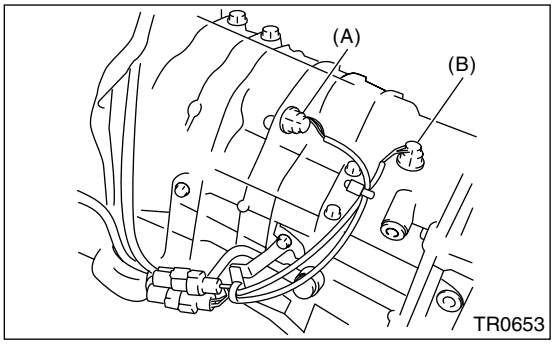
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Disconnect the neutral position switch connector and clip.



(A) Back-up light switch connector (White)
(B) Neutral position switch connector (Black)
(C) Clip

3) Remove the neutral position switch.

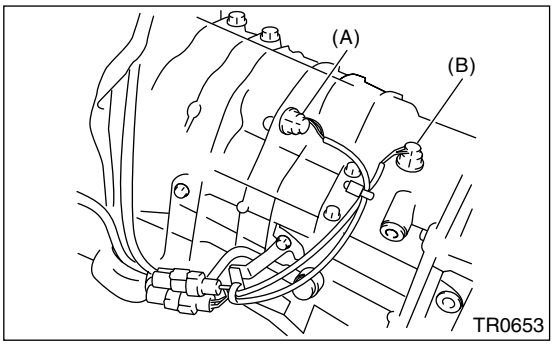


(A) Back-up light switch
(B) Neutral position switch

B: INSTALLATION

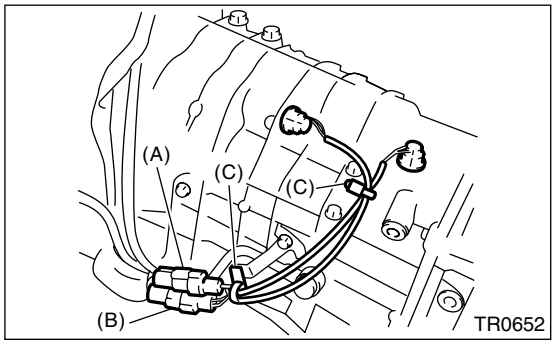
1) Install the neutral position switch.

Tightening torque:
32 N·m (3.3 kgf-m, 23.6 ft-lb)



(A) Back-up light switch
(B) Neutral position switch

2) Connect the neutral position switch connector and clip.

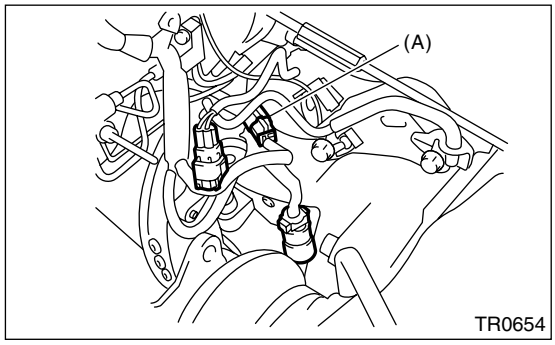


(A) Back-up light switch connector (White)
(B) Neutral position switch connector (Black)
(C) Clip

3) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

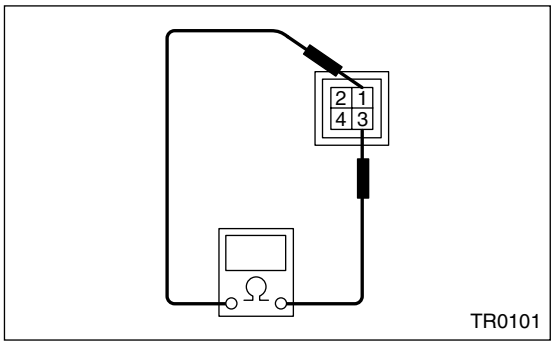
1) Disconnect the ground cable from battery.
2) Remove the intercooler. <Ref. to IN(TURBO)-10, REMOVAL, Intercooler.>
3) Disconnect the transmission harness and chassis harness.



(A) Transmission connector

4) Measure the resistance between neutral position switch terminals. If it is not within specifications, replace the neutral position switch.

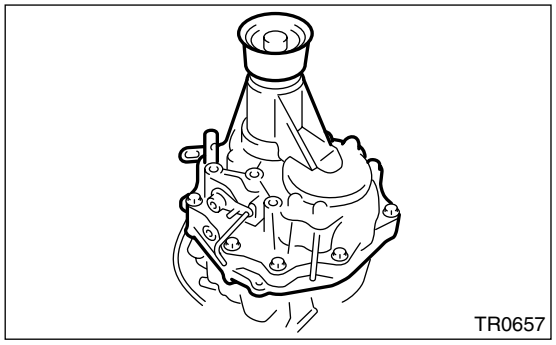
Gear shift position	Terminal No.	Specified resistance
Neutral position	1 and 3	Less than 1 Ω
Other positions		More than 1 M Ω



12.Extension Case

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the extension case.

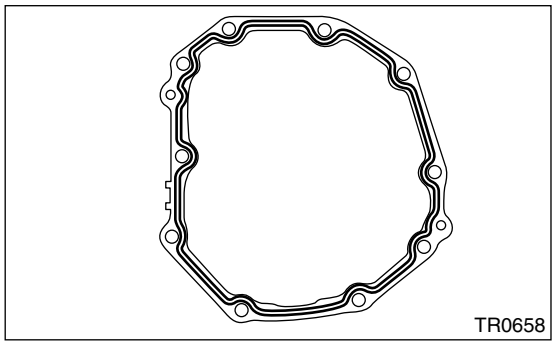

TR0657

4) Completely remove the remaining liquid gasket from the extension case and transmission case.

B: INSTALLATION

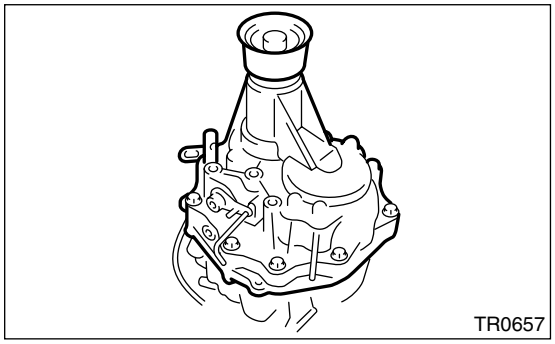
1) Select the transfer driven gear thrust washer, and then install to extension case. <Ref. to 6MT-51, ADJUSTMENT, Extension Case.>
2) Apply oil lightly to the outer periphery of bearing cone, and then install to extension case.
3) Select the thrust washer of transfer drive gear, and then install to center differential.
4) Apply liquid gasket to the transmission case.

Liquid gasket:
THREE BOND 1215


TR0658

5) Install the extension case.

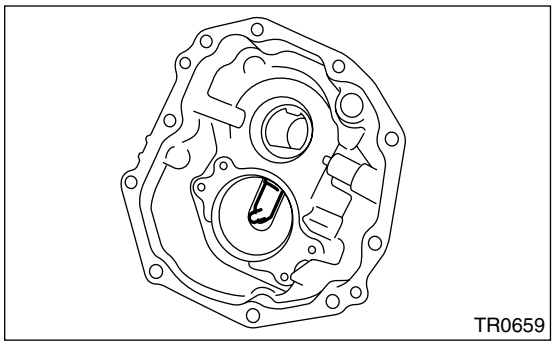
Tightening torque:
48 N·m (4.9 kgf-m, 35.4 ft-lb)


TR0657

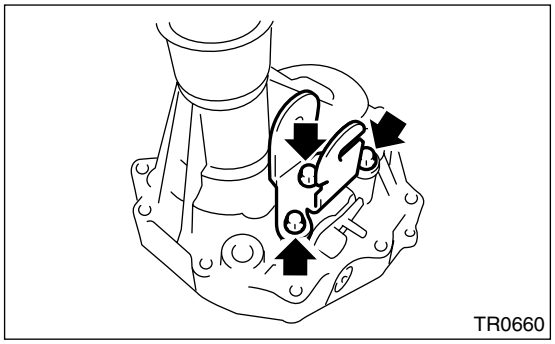
6) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

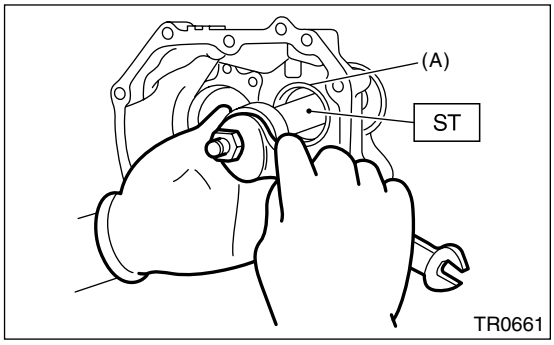
1) Remove the transfer drive gear. <Ref. to 6MT-58, REMOVAL, Transfer Drive Gear.>
2) Remove the extension guide.


TR0659

3) Remove the shift bracket.

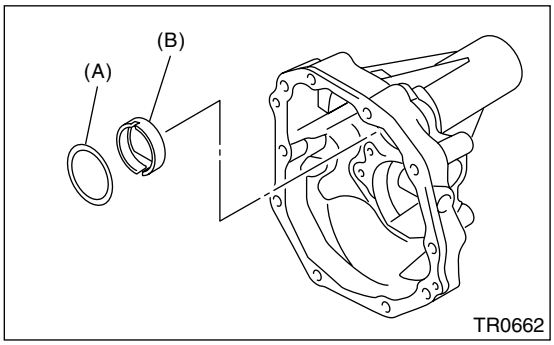

TR0660

4) Using the ST, remove the bearing cone.
ST 18758AA000 PULLER



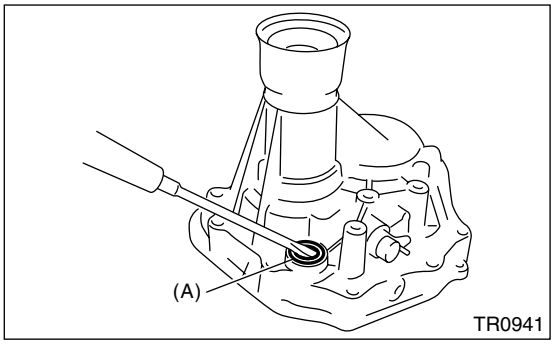
(A) Bearing cone

5) Remove the thrust washer and oil plate.



(A) Thrust washer
(B) Oil plate

6) Remove the shifter arm oil seal.

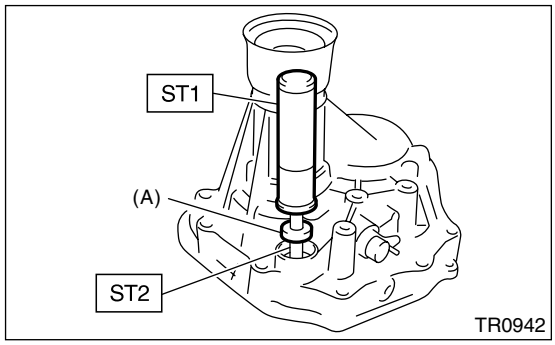


(A) Oil seal

7) Remove the reverse checking system. <Ref. to 6MT-55, REMOVAL, Reverse Checking System.>
8) Remove the extension oil seal. <Ref. to 6MT-33, REPLACEMENT, Oil Seal.>

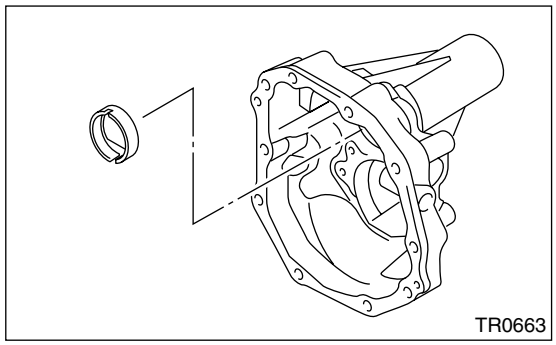
D: ASSEMBLY

1) Install the reverse checking system. <Ref. to 6MT-56, INSTALLATION, Reverse Checking System.>
2) Install the extension case oil seal. <Ref. to 6MT-33, REPLACEMENT, Oil Seal.>
3) Using the ST, install the shifter arm oil seal.
ST1 18657AA000 INSTALLER
ST2 18671AA000 OIL SEAL GUIDE



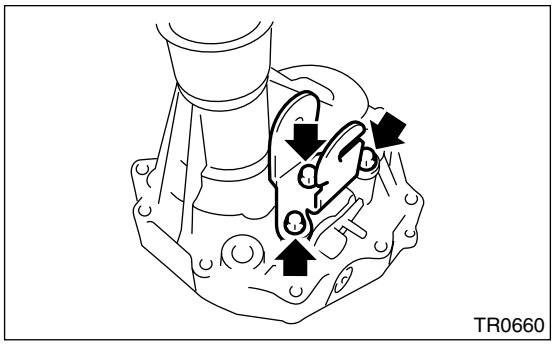
(A) Oil seal

4) Install the oil plate.



5) Select the bearing thrust washer, and then install to extension case. <Ref. to 6MT-51, ADJUSTMENT, Extension Case.>
6) Apply oil lightly to the outer periphery of bearing cone, and then install to extension case.
7) Install the shift bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



8) Install the extension guide, and then install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Drive Gear.>

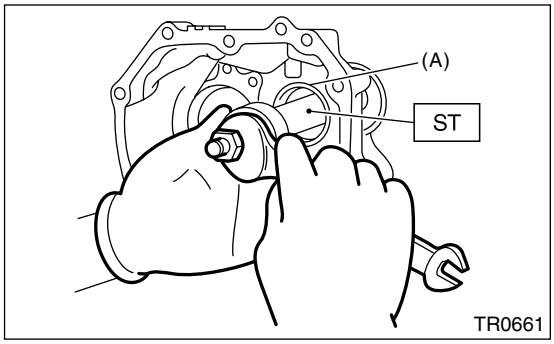
E: INSPECTION

1) Make sure there is no damage or crack on extension case. If there is damage or crack, replace the extension case.
2) Check each oil seal and joint part of extension case and transmission case for oil leakage. If there is oil leakage, replace the oil seal and liquid gasket.

F: ADJUSTMENT

1. TRANSFER DRIVEN GEAR BEARING THRUST WASHER ADJUSTMENT

1) Using the ST, remove the bearing cone from extension case.
ST 18758AA000 PULLER

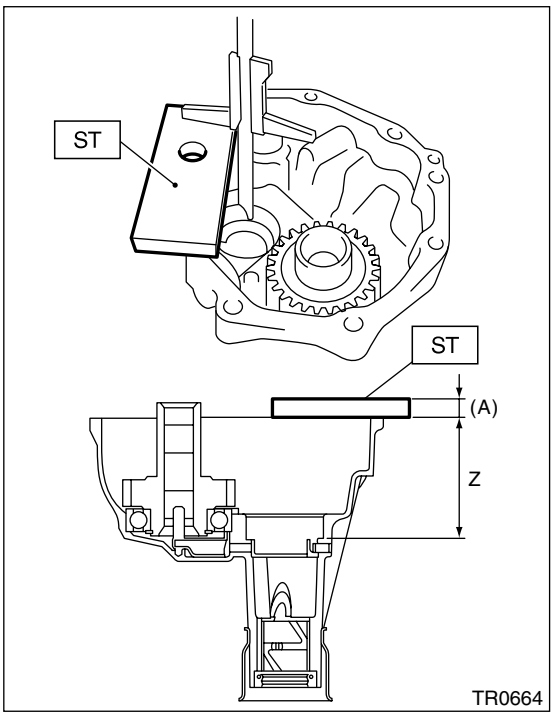


(A) Bearing cone

2) Remove the thrust washer.

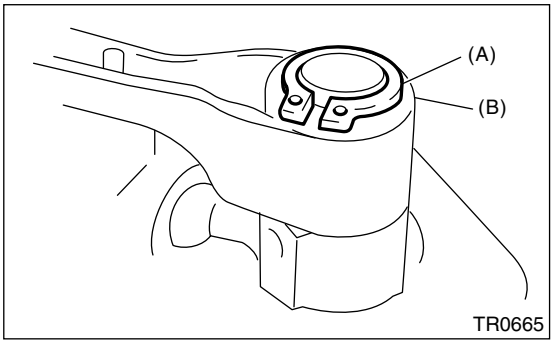
3) Measure the depth "Z" between end of extension case and contact point of bearing cone.
ST 398643600 GAUGE

NOTE:
To measure the depth "Z", subtract the thickness of ST [15 mm (0.59 in)] from the measured value.



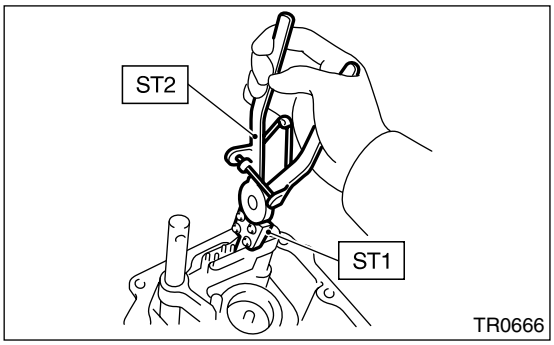
(A) 15 mm (0.59 in)

4) Remove the transfer driven gear. <Ref. to 6MT-60, REMOVAL, Transfer Driven Gear.>
5) Remove the center differential. <Ref. to 6MT-62, REMOVAL, Center Differential.>
6) Remove the snap ring and support from selector arm part.

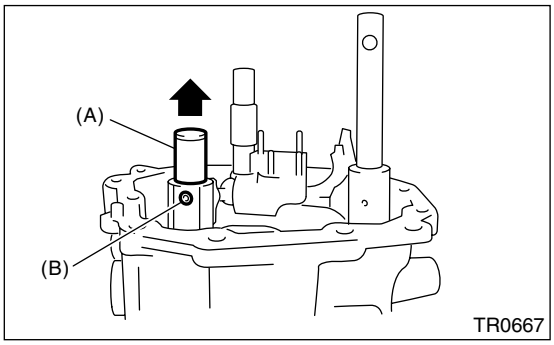


(A) Snap ring
(B) Support

7) Using the ST, remove the neutral set spring and support.
ST1 18756AA000 CLAW
ST2 398663600 PLIERS

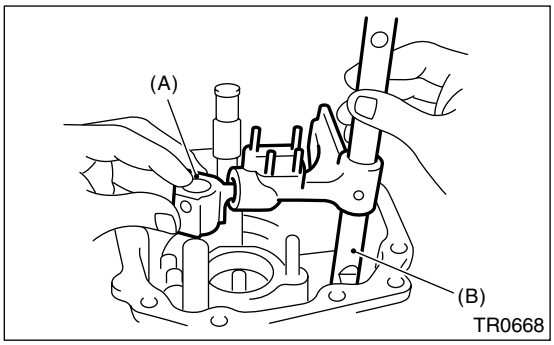


8) Lift-up the striking rod and remove spring pin.



(A) Striking rod
(B) Spring pin

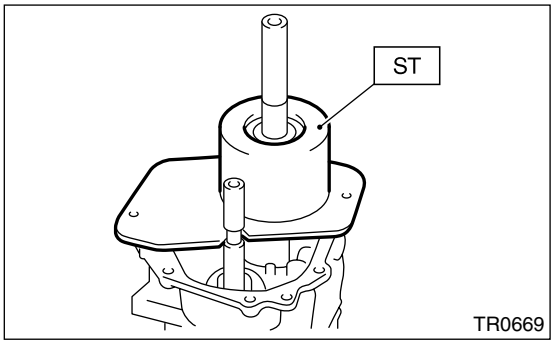
9) Remove the selector arm No.2 and shifter arm.



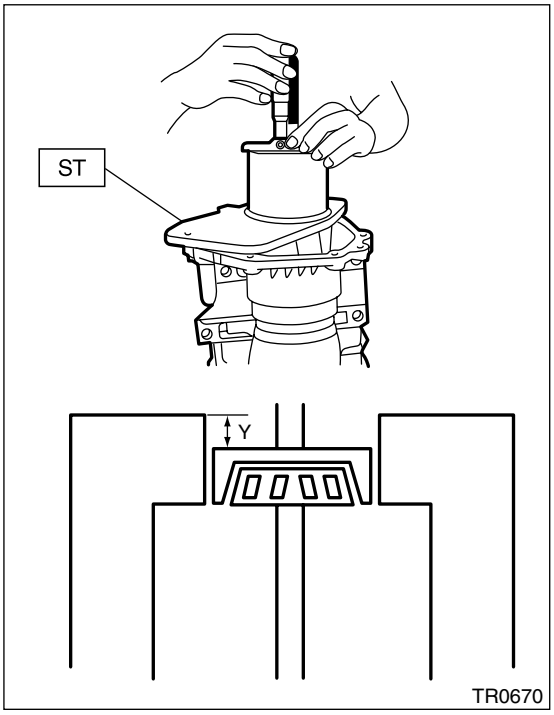
(A) Selector arm No.2
(B) Shifter arm

10) Install the bearing cone to transfer driven gear.

11) Set the ST.
ST 18831AA000 GAUGE



12) Rotate the transfer driven gear approx. ten times to get the bearing accustomed.
13) Measure the depth “Y” between end of ST and bearing cone.
ST 18831AA000 GAUGE



14) Calculate the value “t” of transfer driven gear bearing thrust washer using the following equation.
t = Z – (100 – Y) – { – 0.04 to 0.11 mm (– 0.0016 to 0.0043 in)}

t mm (in)	Thickness of transfer driven gear bearing thrust washer.
Y mm (in)	Depth from end of ST to bearing cone.
Z mm (in)	Depth from end of extension case to contact point of bearing cone.
– 0.04 — 0.11 mm (– 0.0016 — 0.0043 in)	Standard clearance between thrust washer and taper roller bearing.
100 mm (3.94 in)	Height of ST.

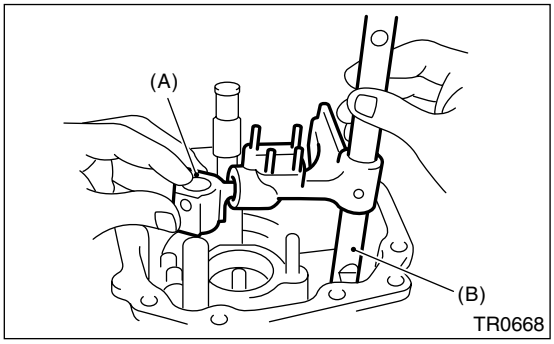
15) Select the nearest thrust washer from the following table, according to the calculated value "t".

Standard clearance between thrust washer and taper roller bearing:
– 0.04 — 0.11 mm T (– 0.0016 — 0.0043 in T)

NOTE:
T: Tight

Thrust washer (50 × 61 × t)	
Part No.	Thickness t mm (in)
803050060	0.50 (0.0197)
803050062	0.60 (0.0236)
803050064	0.70 (0.0276)
803050066	0.80 (0.0315)
803050068	0.90 (0.0354)
803050070	1.00 (0.0394)
803050072	1.10 (0.0433)
803050074	1.20 (0.0472)
803050076	1.30 (0.0512)
803050078	1.40 (0.0551)

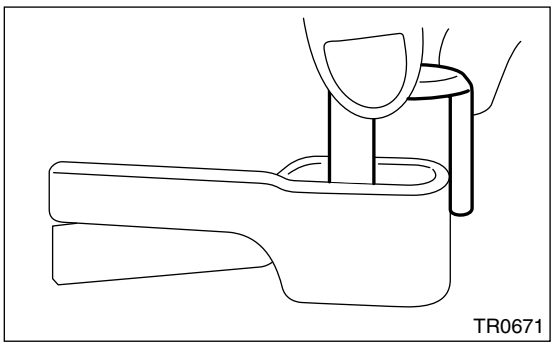
16) Install the selector arm No.2 and shifter arm.



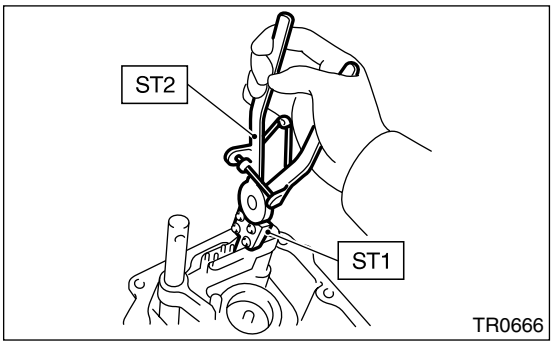
(A) Selector arm No. 2
(B) Shifter arm

17) Install a new spring pin.
18) Install the support to neutral set spring.

NOTE:
Make sure to install the support in proper direction.



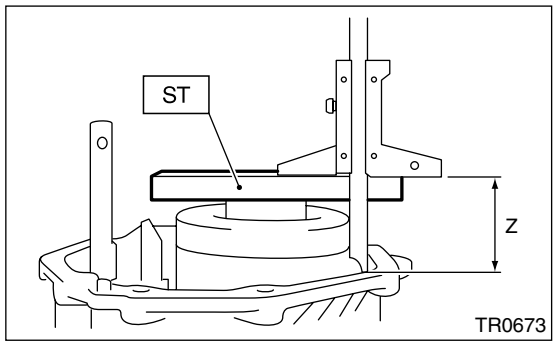
19) Using the ST, install the neutral set spring and support.
ST1 18756AA000 CLAW
ST2 398663600 PLIERS



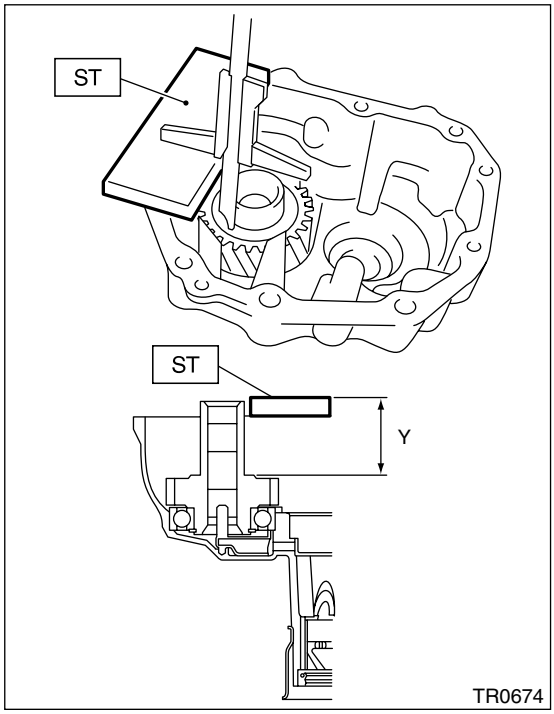
20) Install the snap ring.
21) Install the center differential.

2. SELECTING THE TRANSFER DRIVE GEAR THRUST WASHER

1) Measure the height "Z" between end of transmission case and end of ST.
ST 398643600 GAUGE



2) Measure the depth "Y" between end of ST and transfer drive gear.
ST 398643600 GAUGE



3) Calculate the value "t" of transfer drive gear thrust washer using the following equation.
t = {Y – 15 mm (1.18 in)} – {Z – 15 mm (1.18 in)} – 0.45 to 0.65 mm (0.018 to 0.026 in)

t mm (in)	Thickness of transfer drive gear thrust washer
Y mm (in)	Depth from end of ST to transfer drive gear
Z mm (in)	Height from end of transmission case to the end of ST
0.45 — 0.65 mm (0.018 — 0.026 in)	Standard clearance between thrust washer and transfer drive gear.
15 mm (1.18 in)	Thickness of ST

4) Select the nearest thrust washer from the following table, according to the calculated value "t".

Standard clearance between thrust washer and transfer drive gear:
0.45 — 0.65 mm (0.018 — 0.026 in)

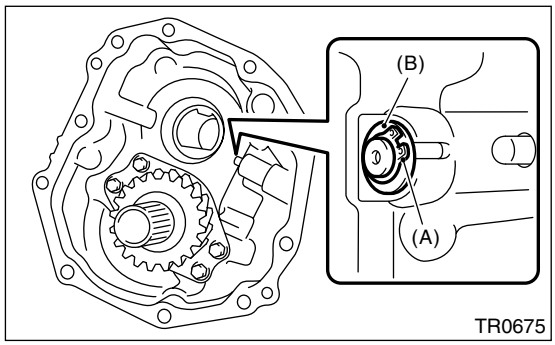
Thrust washer (36.3 × 52 × t)	
Part No.	Thickness mm (in)
803036070	0.80 (0.0315)
803036071	0.95 (0.0374)
803036072	1.10 (0.0433)
803036073	1.25 (0.0492)
803036074	1.40 (0.0551)
803036075	0.65 (0.0256)

5) Install the selected thrust washer.

13.Reverse Checking System

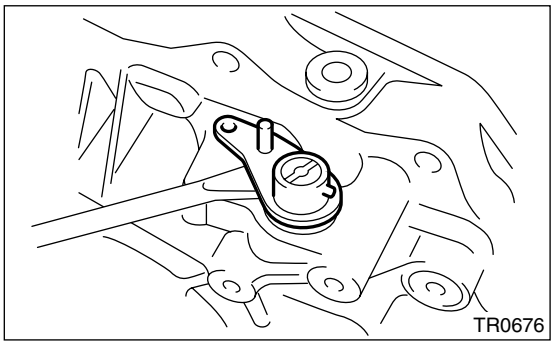
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
4) Remove the snap ring and washer from reverse check shaft.



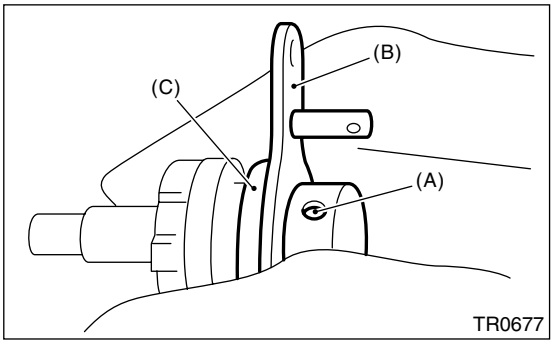
(A) Snap ring
(B) Washer

5) Remove the reverse check shaft and spring from the extension case.



6) Remove the spring pin, then remove the reverse check lever and oil seal from reverse check shaft.

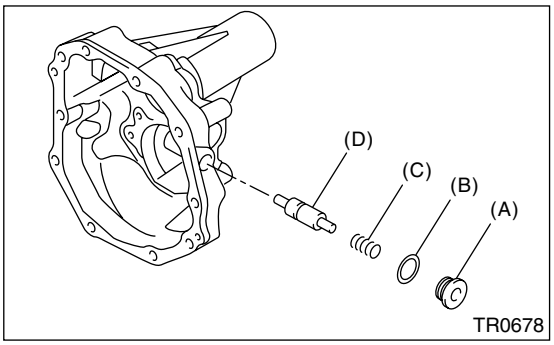
NOTE:
Do not reuse the oil seal.



(A) Spring pin
(B) Reverse check lever
(C) Oil seal

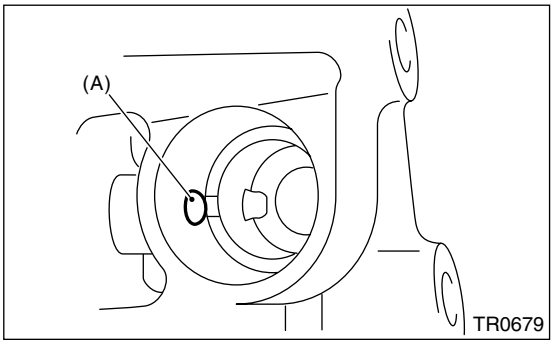
7) Remove the plug from extension case, then remove the gasket, spring and plunger.

NOTE:
Do not reuse the gasket.



(A) Plug
(B) Gasket
(C) Spring
(D) Plunger

8) Remove the reverse lock plunger.

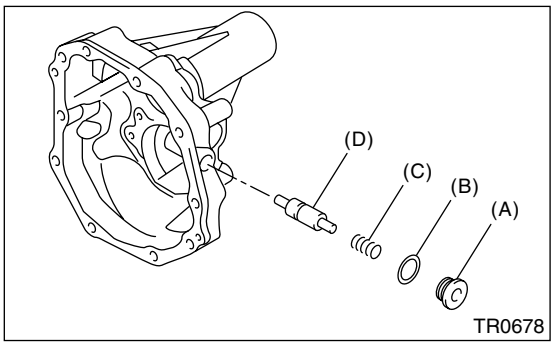


(A) Reverse lock plunger

B: INSTALLATION

1) Insert the reverse lock plunger.
2) Install in the order of reverse check plug, spring, gasket and plug.

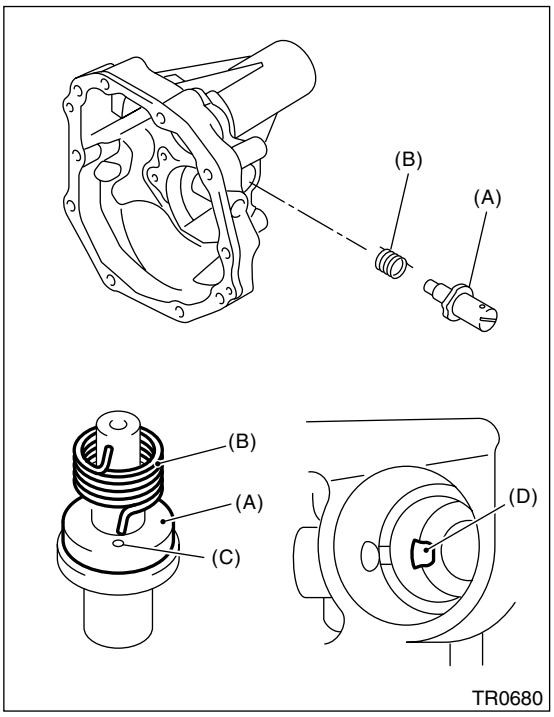
Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)



(A) Plug
(B) Gasket
(C) Spring
(D) Reverse check plug

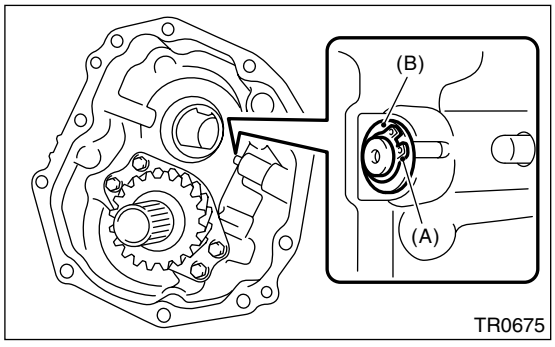
3) Install the spring and reverse check shaft to extension case.

NOTE:
Be sure the spring end aligns with the hole of reverse check shaft and cutout portion of extension case.



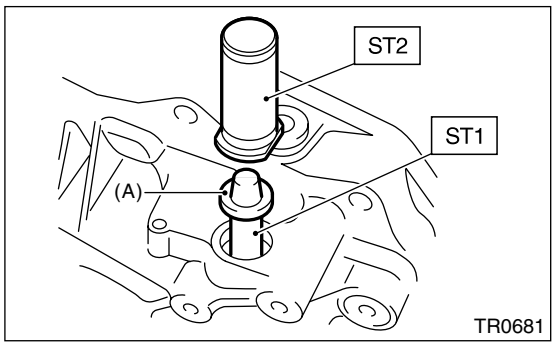
(A) Reverse check shaft
(B) Spring
(C) Hole
(D) Cutout portion

4) Install the washer and snap ring.



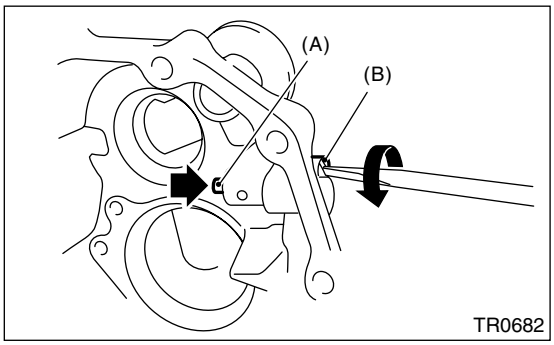
(A) Snap ring
(B) Washer

5) Set the ST1 to reverse check shaft. Install a new oil seal, then press with ST2.
ST1 18671AA000 OIL SEAL GUIDE
ST2 18657AA010 INSTALLER



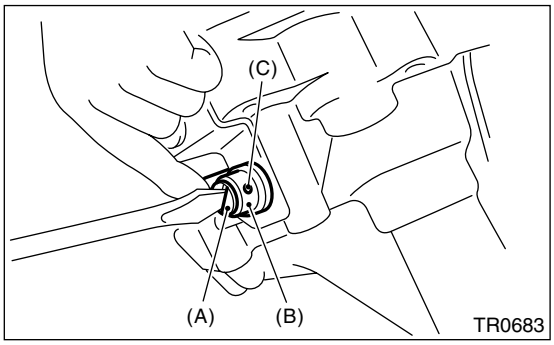
(A) Oil seal

6) Insert the reverse check lever, then rotate the reverse check shaft until the plunger can be pushed in first.



(A) Plunger
(B) Reverse check shaft

7) Align the hole of reverse check lever and reverse check shaft, then install the spring pin.



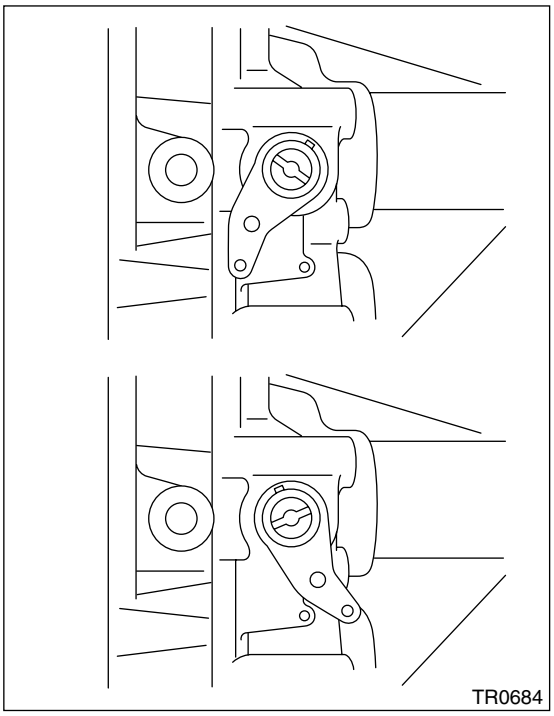
(A) Reverse check shaft
(B) Reverse check lever
(C) Hole

8) Make sure the reverse check operates correctly. <Ref. to 6MT-57, INSPECTION, Reverse Checking System.>

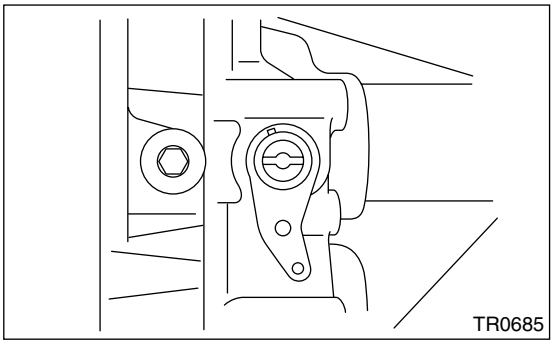
9) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
10) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

1) Make sure there is no damage on each parts.
2) Make sure the reverse check lever operates smoothly.
3) Make sure there is no oil leakage on oil seal part of reverse check shaft. If there is oil leakage, replace the oil seal.
4) Inspect the reverse check operation.
(1) The plunger can be pushed or the gear can be shifted to reverse, when reverse check lever is in the following position.



(2) The plunger cannot be pushed or the gear cannot be shifted to reverse, when reverse check lever is in the following position.

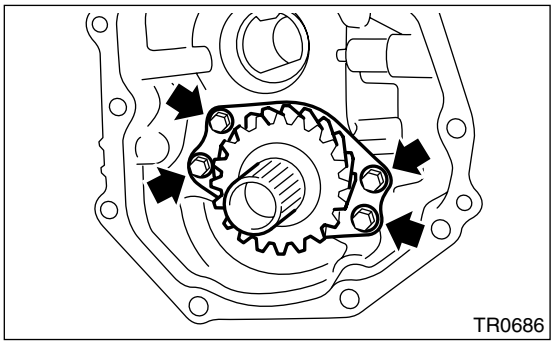


5) If not as specified, reassemble the reverse check system.

14.Transfer Drive Gear

A: REMOVAL

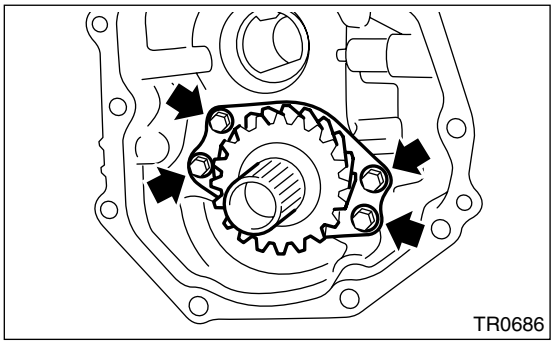
1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
4) Remove the transfer drive gear.


TR0686

B: INSTALLATION

1) Install the transfer drive gear.

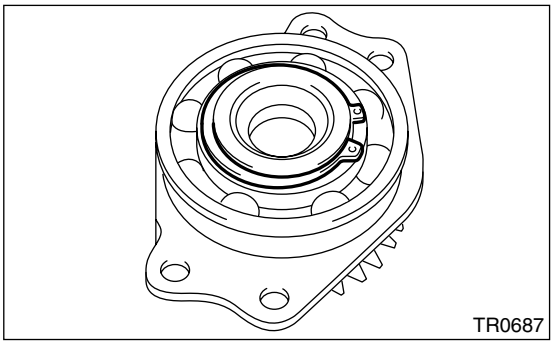
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)


TR0686

2) If the ball bearing, transfer drive gear or snap ring is replaced, select the transfer drive gear thrust washer. <Ref. to 6MT-50, ASSEMBLY, Extension Case.>
3) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
4) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

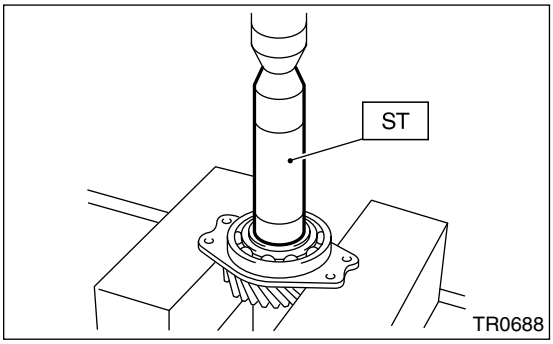
C: DISASSEMBLY

1) Remove the snap ring.


TR0687

2) Using the ST, remove the ball bearing.
ST 499877000 RACE 4-5 INSTALLER

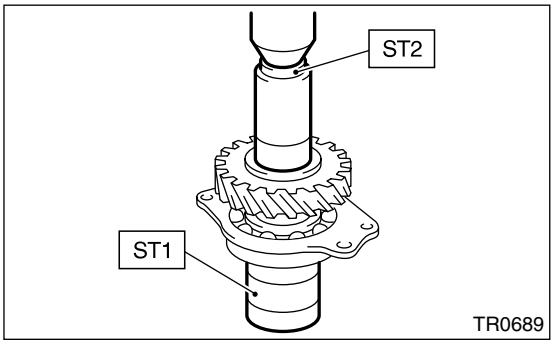
NOTE:
Do not reuse the ball bearing.



TR0688

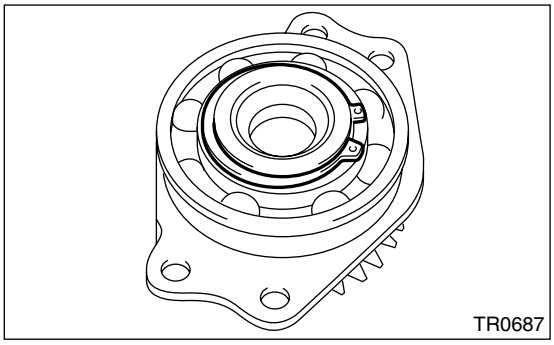
D: ASSEMBLY

1) Using the ST, install the ball bearing.
ST1 499247400 INSTALLER
ST2 398497701 SEAT



TR0689

2) Install the snap ring.



3) Inspect the clearance between snap ring and ball bearing. <Ref. to 6MT-59, INSPECTION, Transfer Drive Gear.>

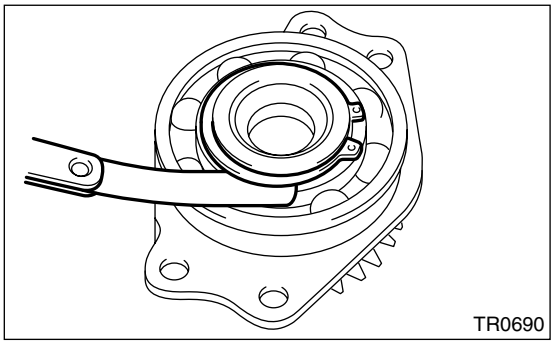
E: INSPECTION

1) Bearings
Replace the bearings in the following cases:
- Broken or rusty bearings
- Worn or damaged
- Bearings that fail to turn smoothly or make abnormal noise.

2) Drive gear
Replace the drive gear in the following cases:
- If their tooth surface and shaft are excessively broken or damaged.

3) Measure the clearance between snap ring and inner race of ball bearing with a thickness gauge:

Standard clearance between snap ring and inner race:
0 — 0.15 mm (0 — 0.0059 in)



4) If the measurement is not within specifications, select suitable snap ring.

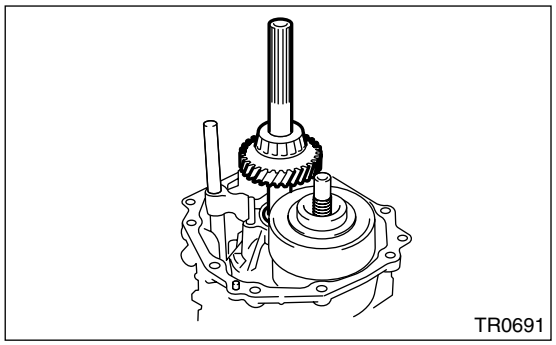
Thrust washer	
Part No.	Thickness mm (in)
805045050	1.76 (0.069)
805045060	1.88 (0.074)
805045070	2.00 (0.079)

After replacement of the snap ring, inspect the clearance again.

15.Transfer Driven Gear

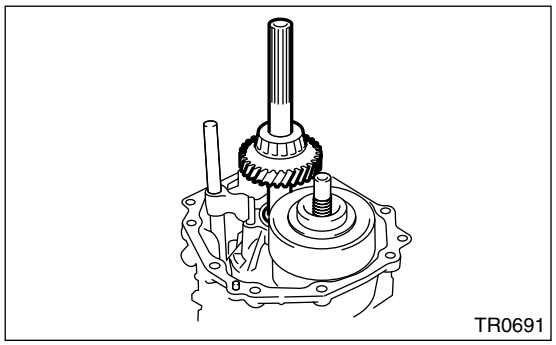
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
4) Remove the transfer driven gear.



B: INSTALLATION

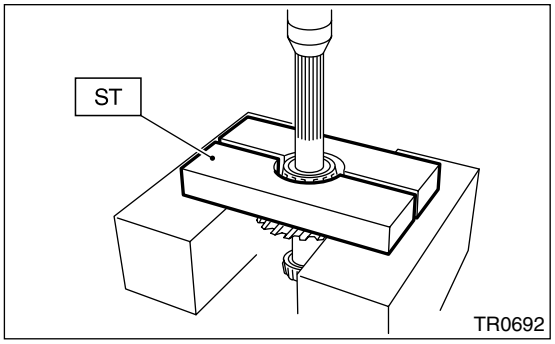
1) Install the transfer driven gear.



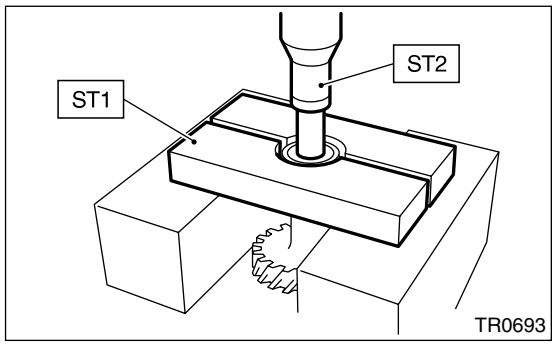
2) If the bearing or transfer driven gear is replaced, select the transfer driven thrust washer. <Ref. to 6MT-51, ADJUSTMENT, Extension Case.>
3) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
4) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1) Using the ST, remove the roller bearing of extension case side.
ST 498515700 REMOVER



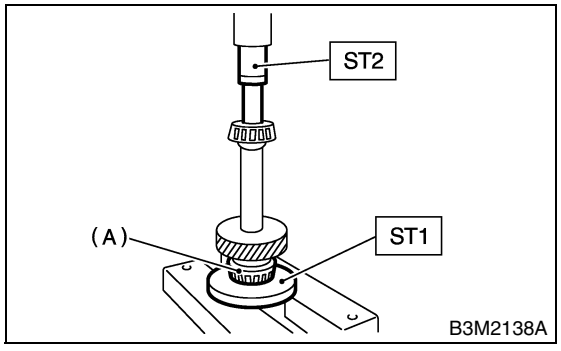
2) Using the ST, remove the roller bearing of transmission case side.
ST1 899858600 REMOVER
ST2 899864100 REMOVER



D: ASSEMBLY

1) Using the ST, install the roller bearing of extension case side.
ST1 398177700 INSTALLER
ST2 899864100 REMOVER

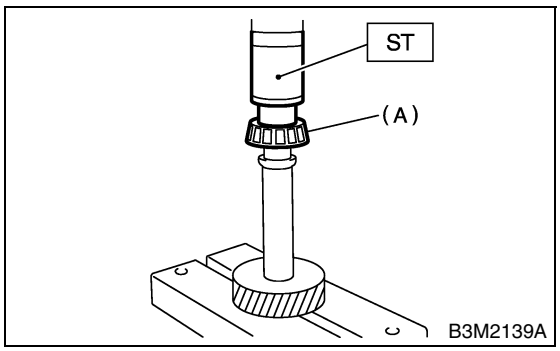
CAUTION:
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).



(A) Roller bearing

2) Using the ST, install the roller bearing of transmission case side.
ST 499757002 INSTALLER

CAUTION:
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).



(A) Roller bearing

E: INSPECTION

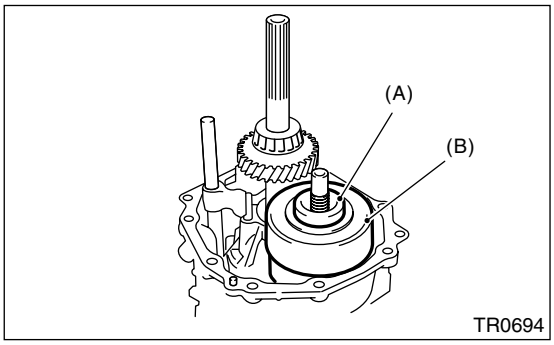
1) Bearings
Replace the bearing in following cases:
- Broken or rusty bearings
- Worn or damaged
- Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.

2) Driven gear
Replace the driven gear in following case.
- If their tooth surfaces and shaft are excessively broken or damaged.

16.Center Differential

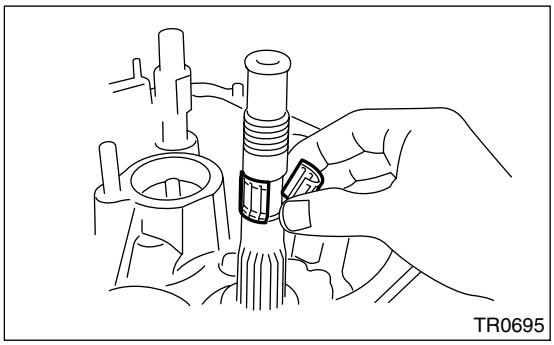
A: REMOVAL

1) Remove the manual transmission case assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
4) Remove the transfer driven gear. <Ref. to 6MT-60, REMOVAL, Transfer Driven Gear.>
5) Remove the thrust washer and center differential.



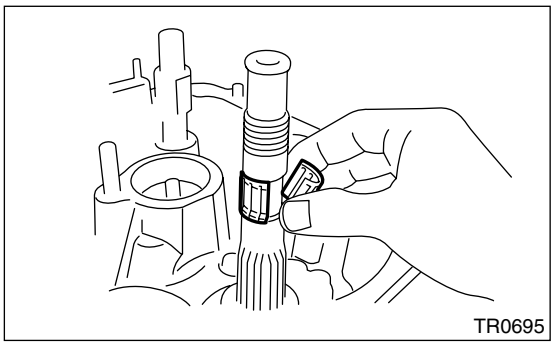
(A) Thrust washer
(B) Center differential

6) Remove the needle bearing.

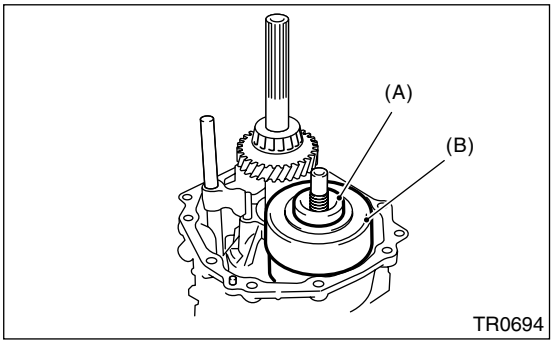


B: INSTALLATION

1) Install the needle bearing.



2) Install the thrust washer and center differential.



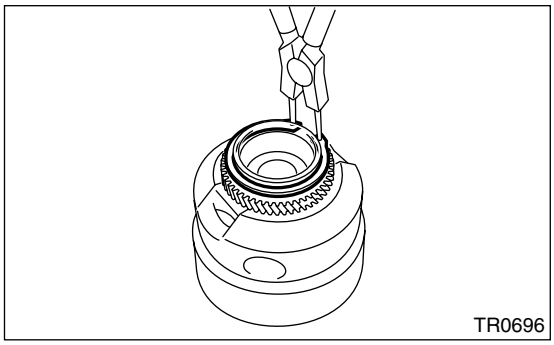
(A) Thrust washer
(B) Center differential

3) If replacing the center differential, select the transfer drive gear and thrust washer and install. <Ref. to 6MT-51, ADJUSTMENT, Extension Case.>
4) Install the transfer driven gear. <Ref. to 6MT-60, INSTALLATION, Transfer Driven Gear.>
5) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
6) Install the manual transmission case assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

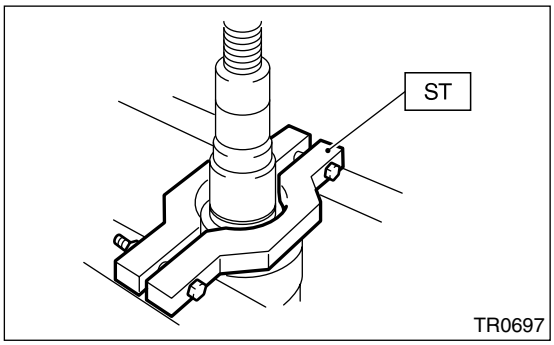
C: DISASSEMBLY

NOTE:
Do not disassemble the center differential because it is a non-disassemble part.

1) Remove the snap ring.



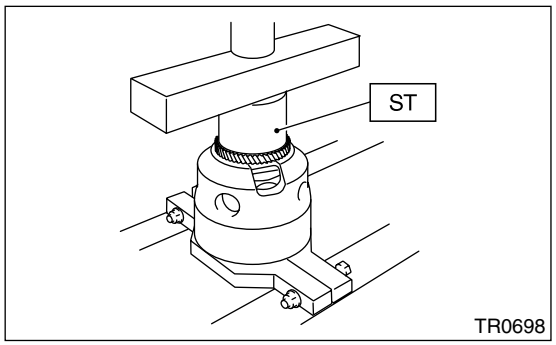
2) Using the ST, remove the oil pump drive gear.
ST 498077610 REMOVER



D: ASSEMBLY

1) Using the ST, install the oil pump drive gear.
ST 498745600 INSTALLER

CAUTION:
Do not apply pressure in excess of 20 kN (2.0 ton, 2.2 US ton, 2.0 Imp ton).



2) Install the snap ring.

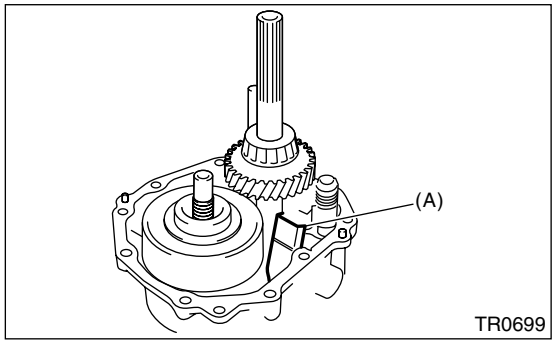
E: INSPECTION

1) Make sure there is no damage on the center differential. Replace if damaged.
2) Make sure there is no excessive damage or wear on the oil pump drive gear. Replace if damaged or worn.

17.Oil Pump

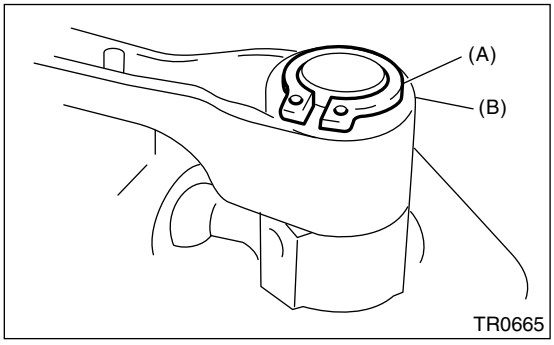
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
4) Remove the transfer driven gear. <Ref. to 6MT-60, REMOVAL, Transfer Driven Gear.>
5) Remove the center differential. <Ref. to 6MT-62, REMOVAL, Center Differential.>
6) Remove the oil guide.



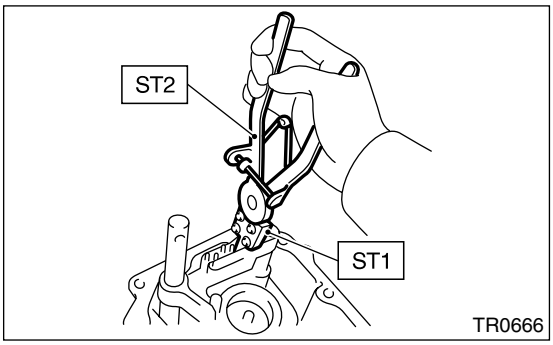
(A) Oil guide

7) Remove the snap ring.

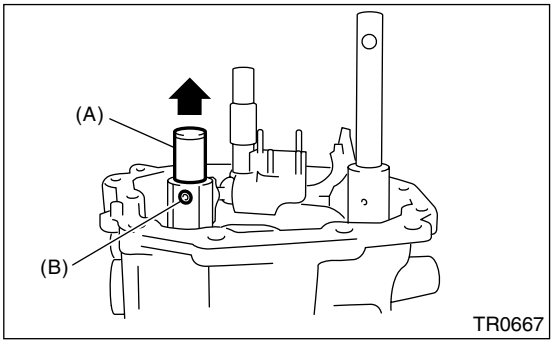


(A) Snap ring
(B) Support

8) Using the ST, remove the neutral set spring and support.
ST1 18756AA000 CLAW
ST2 398663600 PLIERS

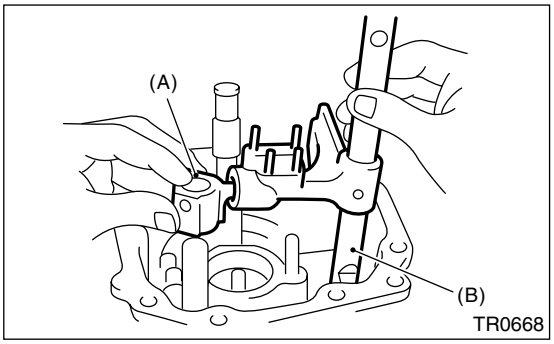


9) Raise the striking rod up, then remove the spring pin.



(A) Striking rod
(B) Spring pin

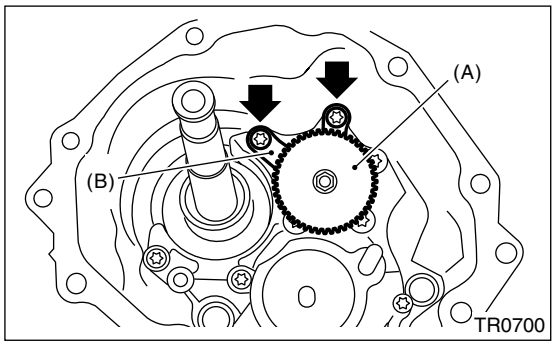
10) Remove the selector arm No.2 and shifter arm.



(A) Selector arm No. 2
(B) Shifter arm

11) Remove the oil pump shaft assembly and plate.

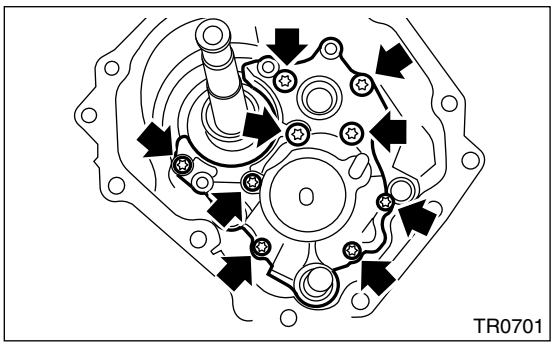
NOTE:
Remove the bolts using ST, because tool may break if general tool is used.
ST 18663AA000 SOCKET



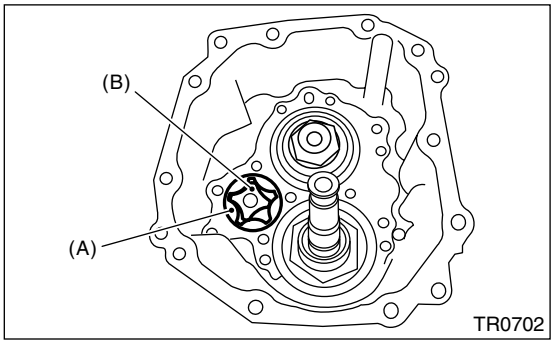
(A) Oil pump shaft assembly
(B) Plate

12) Remove the oil pump cover assembly.

NOTE:
Remove the bolts using ST, because tool may break if general tool is used.
ST 18663AA000 SOCKET



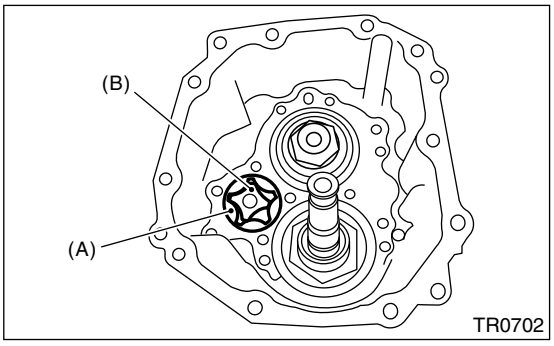
13) Remove the thrust washer on main shaft part.
14) Remove the oil pump rotor.



(A) Outer rotor
(B) Inner rotor

B: INSTALLATION

1) Apply oil to the outer periphery of outer rotor, then install to transmission case.

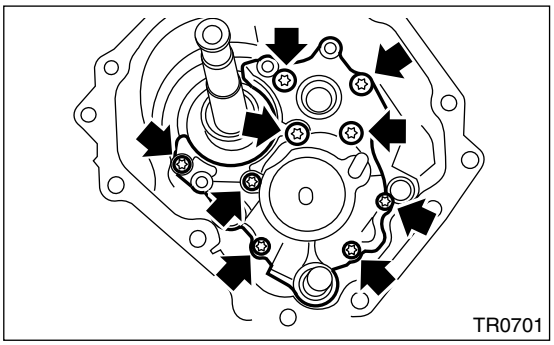


(A) Outer rotor
(B) Inner rotor

2) Install the thrust washer to main shaft part.
3) Install the oil pump cover assembly.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)

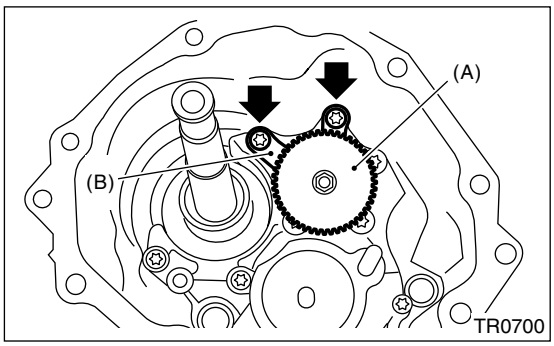
ST 18663AA000 SOCKET



4) Install the oil pump shaft assembly and plate.

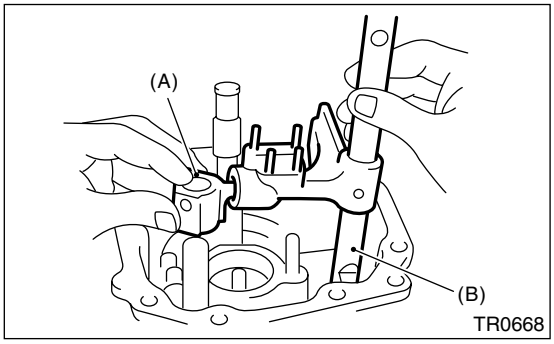
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)

ST 18663AA000 SOCKET



(A) Oil pump shaft assembly
(B) Plate

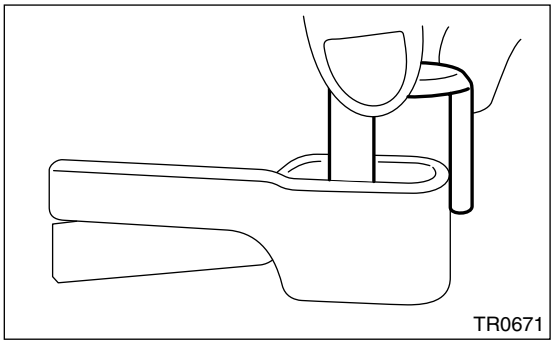
5) If replacing the oil pump cover assembly, select the transfer driven gear and thrust washer, then install them to the extension case. <Ref. to 6MT-51, ADJUSTMENT, Extension Case.>
6) Install the selector arm No.2 and shifter arm.



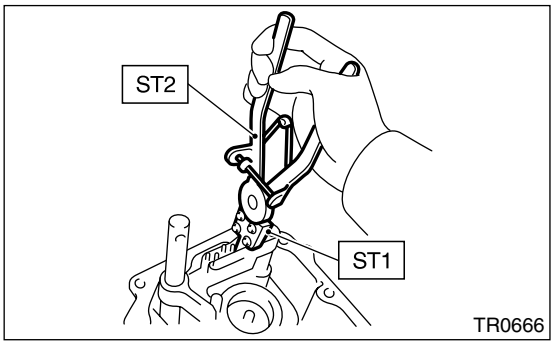
(A) Selector arm No. 2
(B) Shift arm

7) Install a new spring pin.
8) Install the support to neutral set spring.

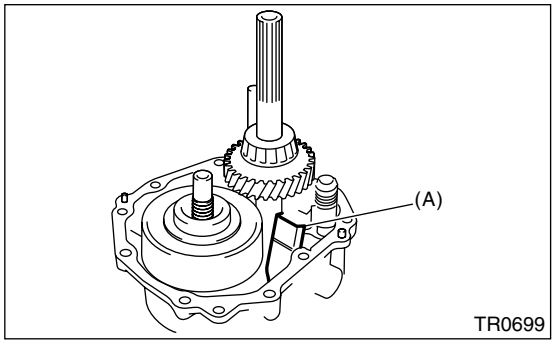
NOTE:
Make sure to install the support in proper direction.



9) Using the ST, install the neutral set spring and support.
ST1 18756AA000 CLAW
ST2 398663600 PLIERS



10) Install the snap ring.
11) Install the oil guide.



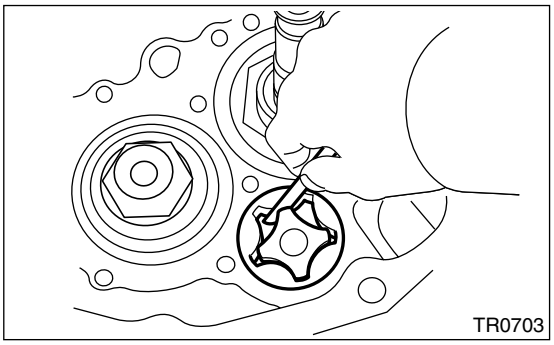
(A) Oil guide

12) Install the center differential. <Ref. to 6MT-62, INSTALLATION, Center Differential.>
13) Install the transfer driven gear. <Ref. to 6MT-60, INSTALLATION, Transfer Driven Gear.>
14) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
15) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

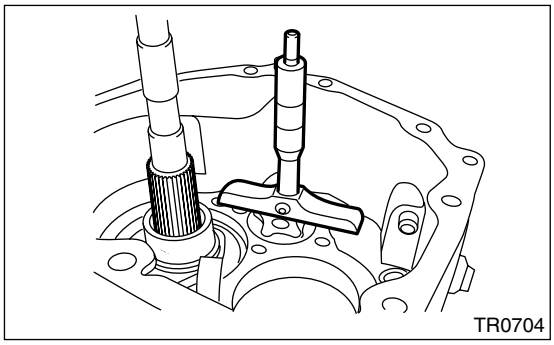
1) Make sure there is no damage on the inner rotor and outer rotor. Replace the inner rotor and outer rotor as assembly if damaged.
2) Clearance at tip
Install the inner rotor and outer rotor to transmission case. Align tip of the inner rotor and outer rotor, then measure the clearance. Replace the inner rotor and outer rotor as a set if clearance exceeds specification.

Specification of clearance at tip:
Less than 0.15 mm (0.0059 in)



3) Side clearance
Measure to the transmission case and rotor. Replace the inner rotor and outer rotor as a set if clearance exceeds specification.

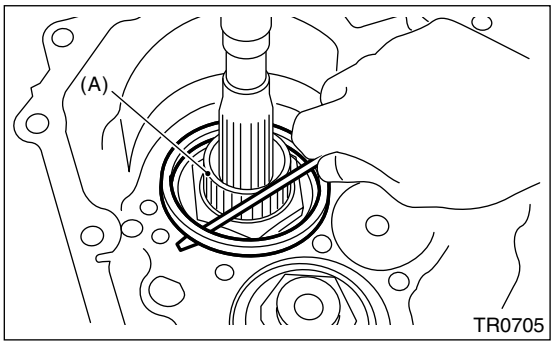
Specification of clearance at tip:
0.03 — 0.10 mm (0.0012 — 0.0039 in)



18.Transmission Case

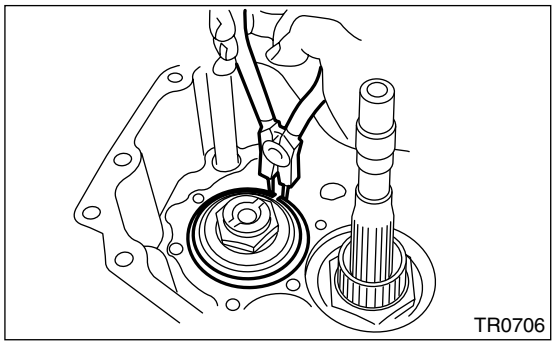
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, REMOVAL, Oil Pipe.>, <Ref. to 6MT-47, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-45, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-60, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-62, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-64, REMOVAL, Oil Pump.>
8) Remove the shim and spacer of driven gear assembly.

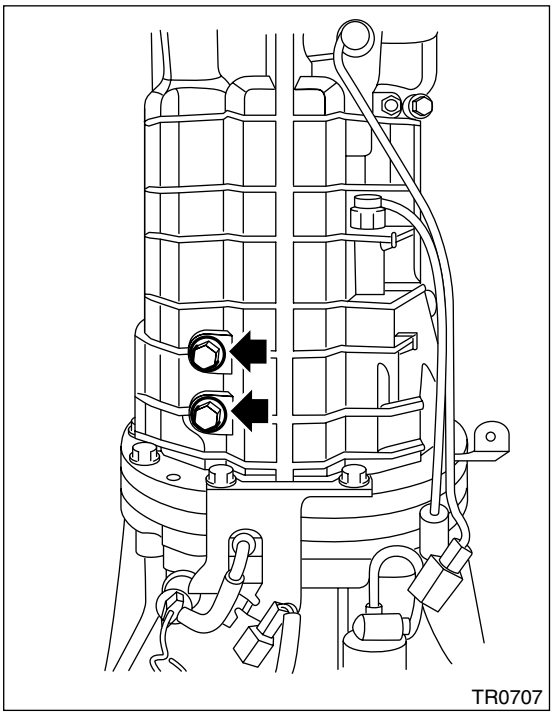


(A) Driven gear assembly

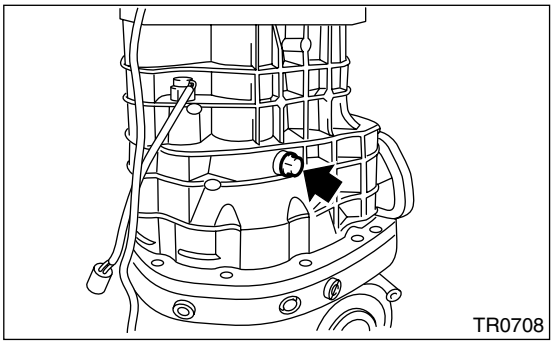
9) Remove the snap ring.



10) Remove the pilot bolt.

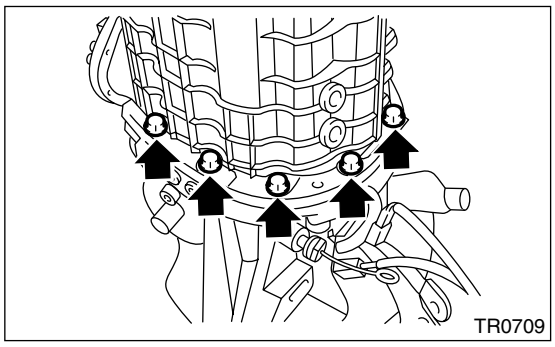


11) Remove the holder reverse bolt.



12) Remove the transmission case.

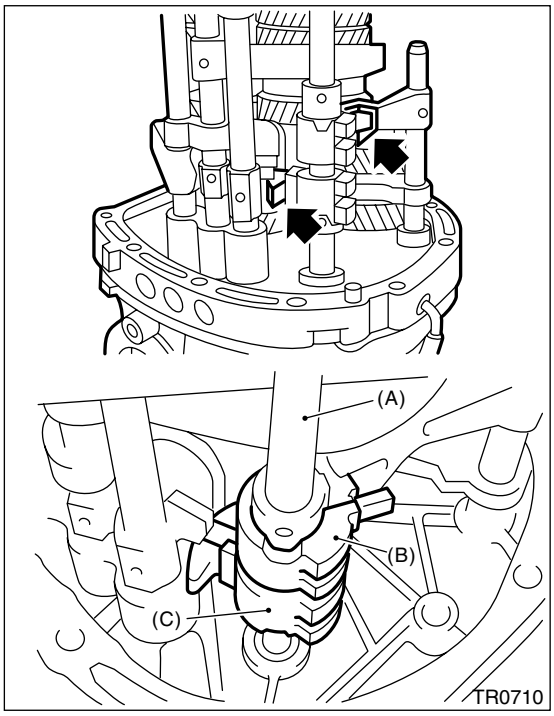
NOTE:
If the oil guide catches on shift fork, the transmission case may be difficult to be removed. Move the oil guide right and left to remove. Do not pull the transmission case by force.



13) Completely remove the remaining liquid gasket on transmission case and adapter plate.

B: INSTALLATION

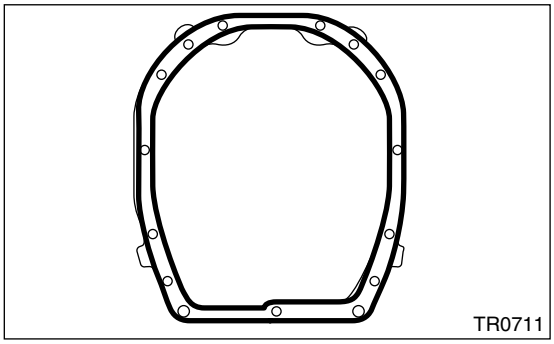
1) Make sure that each shifter fork and interlock block is shifted to neutral position. If not, shift to neutral position.



(A) Striking rod
(B) Reverse interlock block
(C) Interlock block

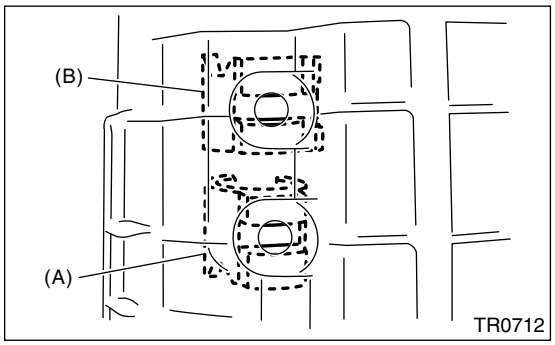
2) Apply liquid gasket to the adapter plate.

Liquid gasket:
THREE BOND 1215



3) Install the transmission case.

4) Make sure the interlock block and reverse interlock block are aligned in neutral position by inspecting through the pilot bolt installation hole. If not aligned, remove the transmission case, then shift each shifter fork and interlock block to neutral position.



(A) Interlock block
(B) Reverse interlock block

5) Using a new gasket, install the pilot bolts temporarily.
6) Tighten the transmission case with bolts and nuts.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

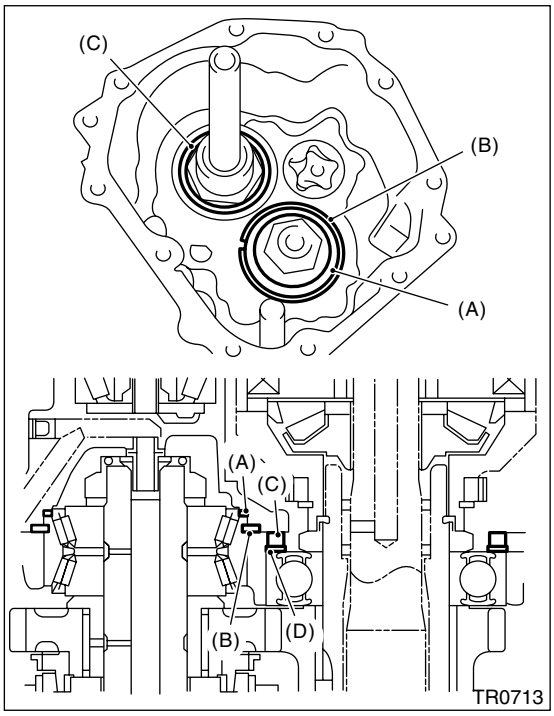
7) Tighten the pilot bolts.

Tightening torque:
34 N·m (3.5 kgf-m, 25.1 ft-lb)

8) Tighten the holder reverse bolt.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)

9) Install the snap ring, washer and collar of driven gear assembly.

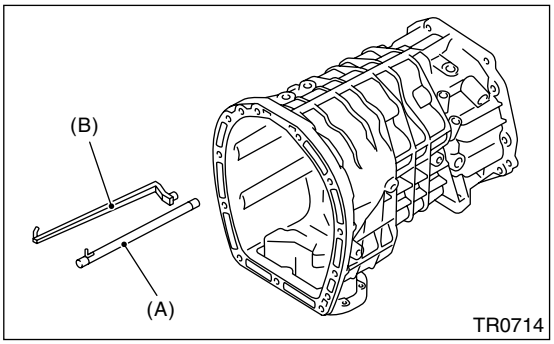


(A) Washer
(B) Snap ring
(C) Collar
(D) Washer

10) Install the oil pump. <Ref. to 6MT-65, INSTALLATION, Oil Pump.>
11) Install the center differential. <Ref. to 6MT-62, INSTALLATION, Center Differential.>
12) Install the transfer driven gear. <Ref. to 6MT-60, INSTALLATION, Transfer Driven Gear.>
13) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
14) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-47, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-45, INSTALLATION, Back-up Light Switch.>
15) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

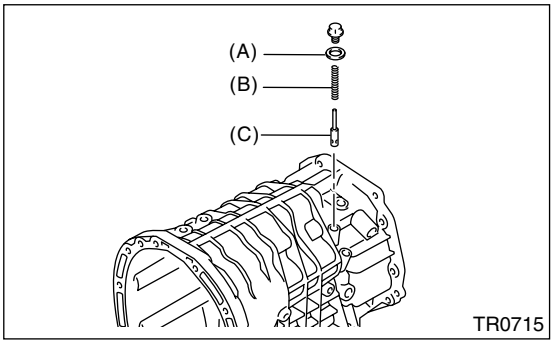
C: DISASSEMBLY

1) Remove the oil pipe and oil guide.



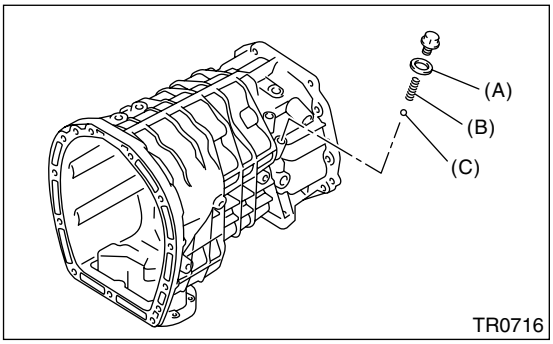
(A) Oil pipe
(B) Oil guide

2) Remove the bolt, then remove the O-ring, relief spring and relief valve.



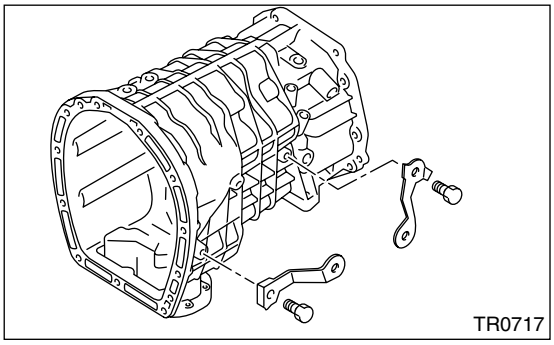
(A) O-ring
(B) Relief valve spring
(C) Relief valve

3) Remove the bolt, then remove the O-ring, valve spring and ball.

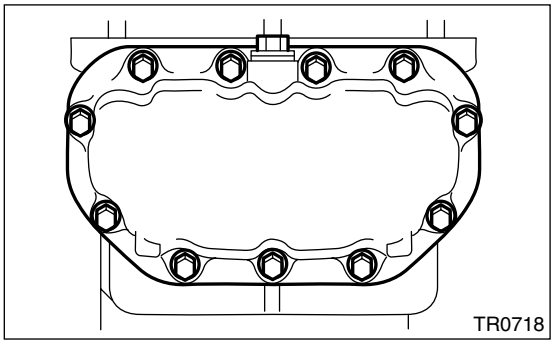


(A) O-ring
(B) Valve spring
(C) Ball

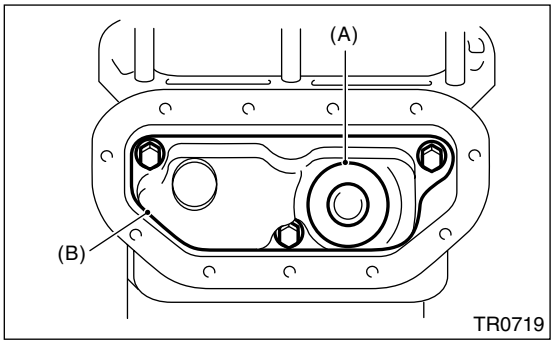
4) Remove the harness bracket.



5) Remove the oil pan.



6) Completely remove the remaining liquid gasket on transmission case and oil pan.
7) Remove the oil pan magnet, then remove the oil strainer.

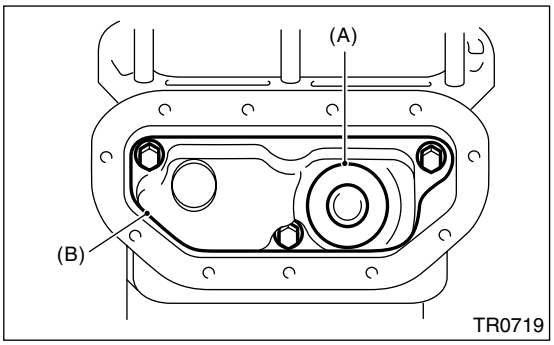


(A) Oil pan magnet
(B) Oil strainer

D: ASSEMBLY

1) Install the oil strainer and magnet.

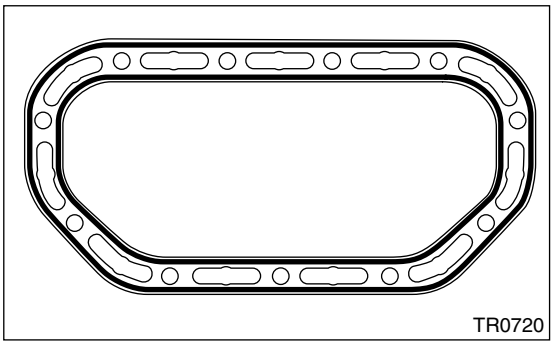
Tightening torque:
10 N·m (1.0 kgf-m, 7.4 ft-lb)



(A) Oil pan magnet
(B) Oil strainer

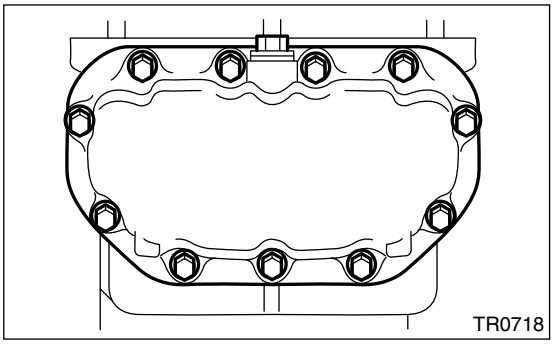
2) Apply liquid gasket to the oil pan.

Liquid gasket:
THREE BOND 1215



3) Install the oil pan.

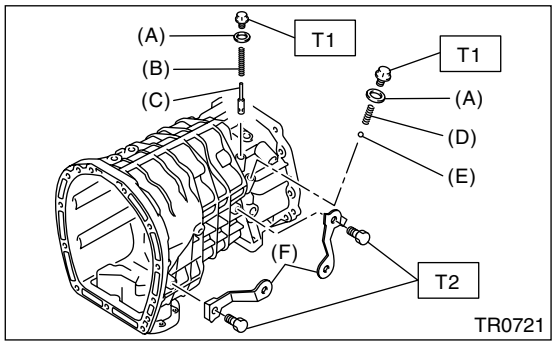
Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



4) Install the relief valve, relief valve spring and new washer.

5) Install the ball, valve spring and new O-ring.

Tightening torque:
T1: 13 N·m (1.3 kgf-m, 9.6 ft-lb)
T2: 16 N·m (1.6 kgf-m, 11.8 ft-lb)



(A) O-ring
(B) Relief valve spring
(C) Relief valve
(D) Valve spring
(E) Ball
(F) Harness bracket

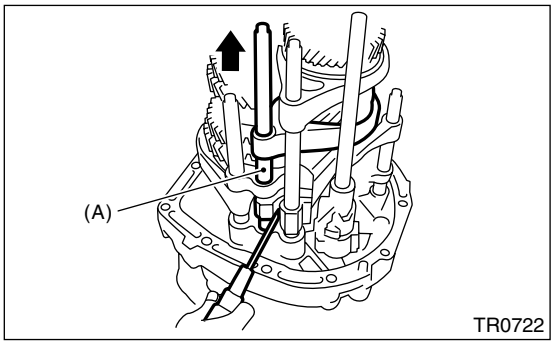
E: INSPECTION

1) Completely remove with shop cloth if sludge is adhered to the oil pan magnet.
2) Make sure there is no clog on the oil strainer. If clogged, remove clog or replace the oil strainer.
3) Make sure there is no damage on each parts. Replace damaged parts with new parts.

19.Main Shaft Assembly

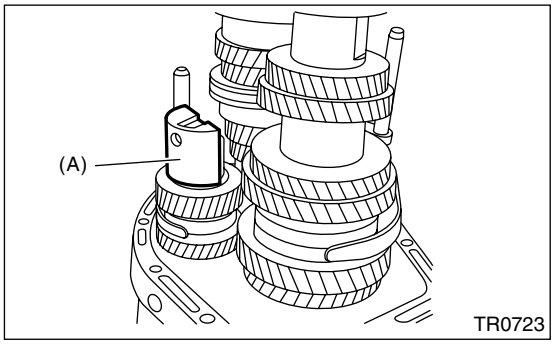
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, REMOVAL, Oil Pipe.>, <Ref. to 6MT-47, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-45, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-60, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-62, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-64, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-68, REMOVAL, Transmission Case.>
9) Remove the striking rod.
10) Using a screwdriver, shift to 4th gear position.



(A) 3rd-4th shift rod

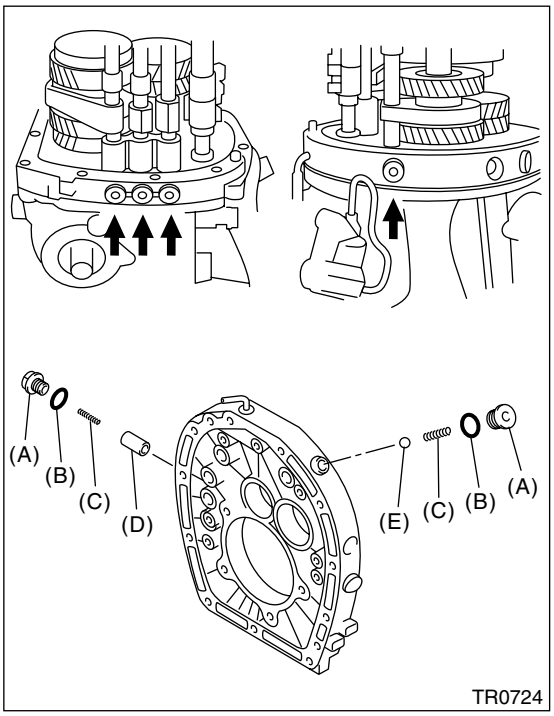
11) Remove the reverse idler holder.



(A) Reverse idler holder

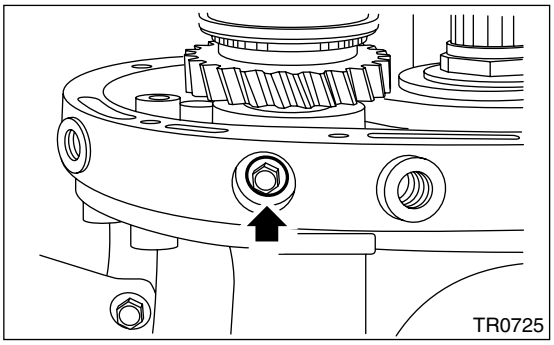
12) Remove all checking plug, gasket, checking spring, plunger and checking ball from adapter plate.

NOTE:
Do not reuse the gasket.



(A) Checking plug
(B) Gasket
(C) Checking spring
(D) Plunger
(E) Checking ball

13) Remove the bolt and gasket installing reverse idler shaft.

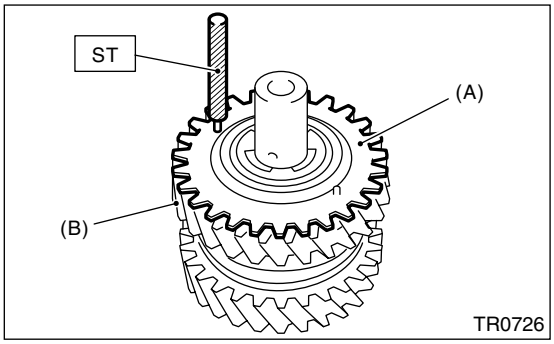


14) Press the main shaft assembly, driven gear assembly, reverse idler gear and each shifter fork, then remove from the adapter plate at once.

NOTE:
• Two people should do the work.

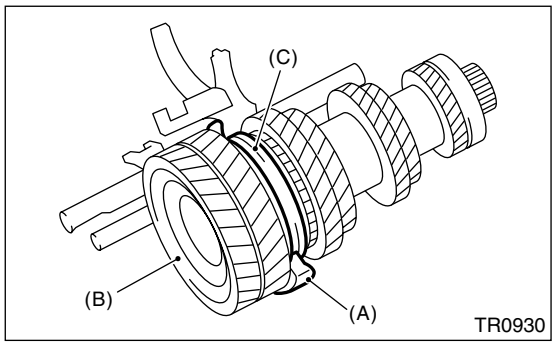
B: INSTALLATION

1) Adjust the 3rd-4th, and 5th-6th shifter fork rod. <Ref. to 6MT-123, ADJUSTMENT, Shifter Fork and Rod.>
2) Turn the sub gear counterclockwise for approx. three teeth. Align the sub gear and reverse idler gear hole, then insert the ST.
ST 18757AA000 STRAIGHT PIN



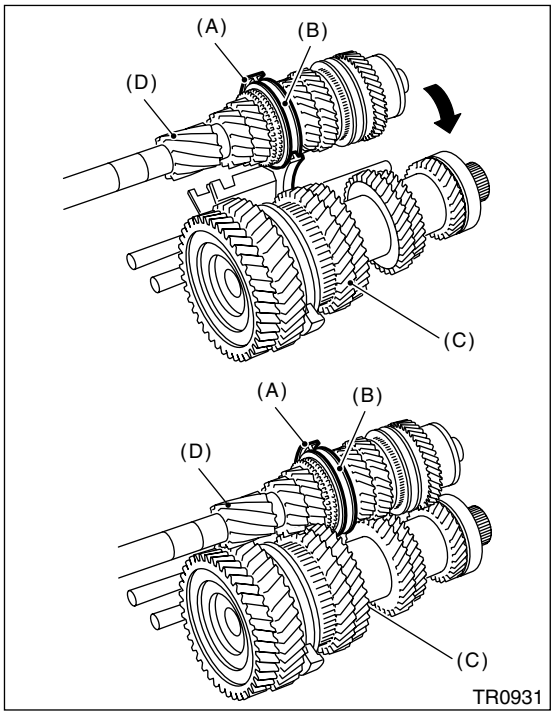
(A) Sub gear
(B) Reverse idler gear

3) Install the driven gear assembly to 1st-2nd shifter fork assembly.



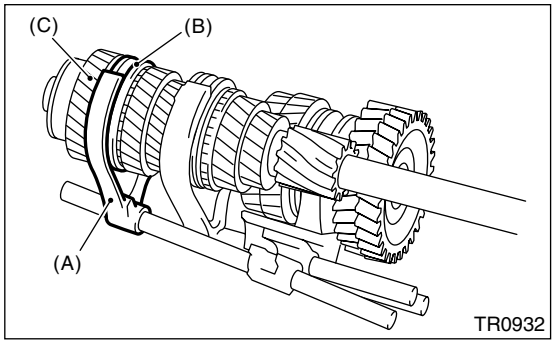
(A) 1st-2nd shifter fork
(B) Driven gear assembly
(C) 1st-2nd sleeve

4) Install the main shaft assembly to 3rd-4th shifter fork, and then assemble to driven gear assembly.



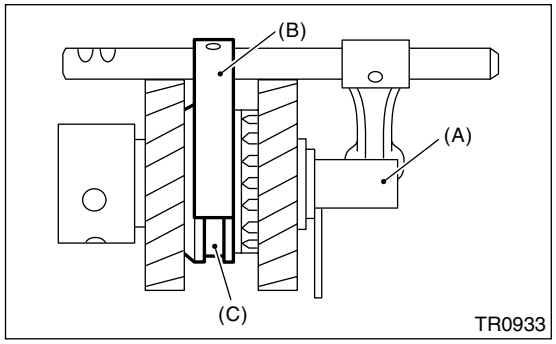
(A) 3rd-4th shifter fork
(B) 3rd-4th sleeve
(C) Driven gear assembly
(D) Main shaft assembly

5) Install the 5th-6th shifter fork assembly to main shaft assembly.



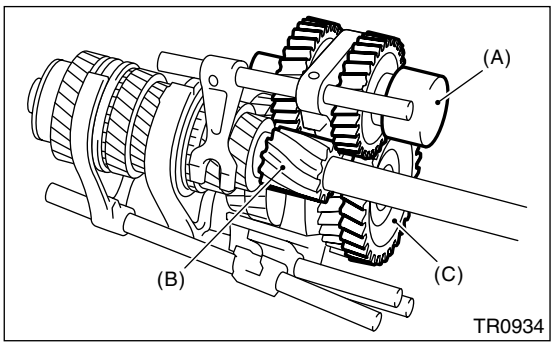
(A) 5th-6th shifter fork
(B) 5th-6th sleeve
(C) Main shaft assembly

6) Install the reverse shifter fork assembly to reverse idler gear assembly.



(A) Reverse idler gear assembly
(B) Reverse shifter fork
(C) Reverse sleeve

7) Install the reverse idler gear assembly.



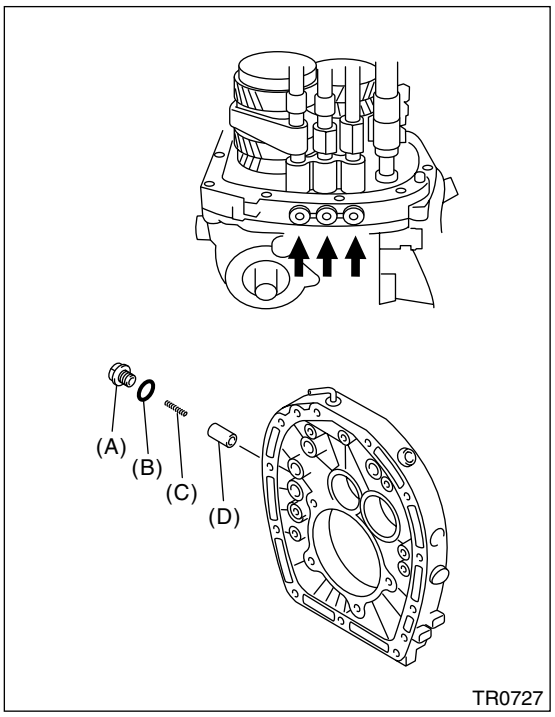
(A) Reverse idler gear assembly
(B) 1st drive gear
(C) Reverse gear

8) Install the thrust bearing of driven gear assembly.
9) Press each shifter fork, main shaft assembly, driven gear assembly and reverse idler gear assembly, then install to the adapter plate at once.

NOTE:
• Two people should do the work.

10) Install the plunger, checking spring, new gasket and checking plug.

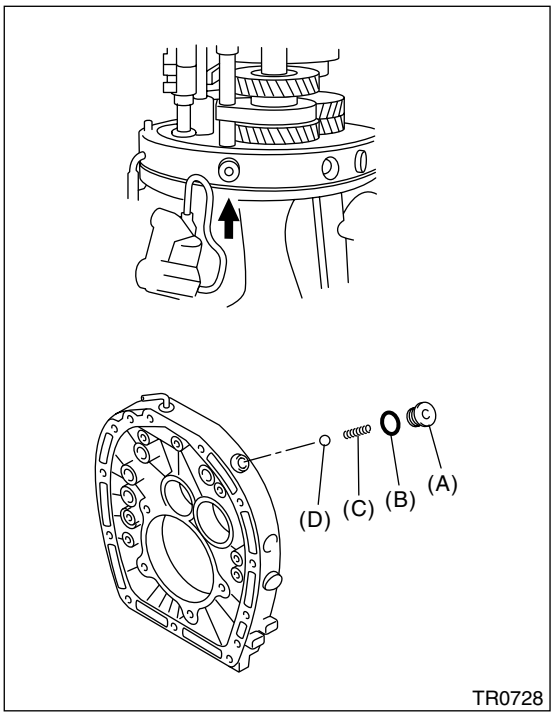
Tightening torque:
37 N·m (3.8 kgf-m, 27.3 ft-lb)



(A) Checking plug
(B) Gasket
(C) Checking spring
(D) Plunger

11) Install the checking ball, checking spring, new gasket and checking plug.

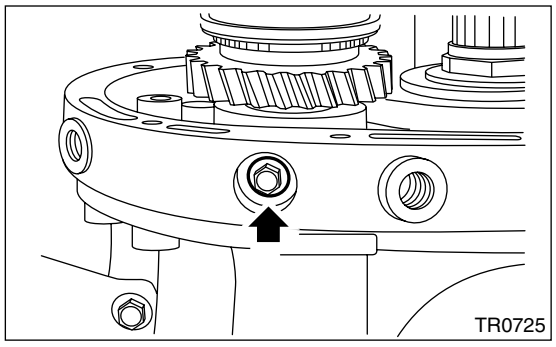
Tightening torque:
37 N·m (3.8 kgf-m, 27.3 ft-lb)



(A) Checking plug
(B) Gasket
(C) Checking spring
(D) Checking ball

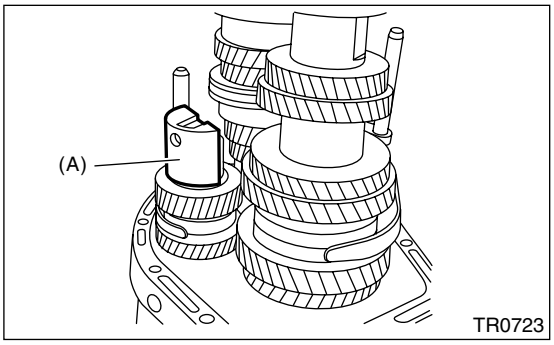
12) Install the bolt and new gasket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



13) Using a screwdriver, shift to 4th gear position.

14) Install the reverse idler holder



(A) Reverse idler holder

15) Install the striking rod.
16) Install the transmission case. <Ref. to 6MT-69, INSTALLATION, Transmission Case.>
17) Install the selected main shaft snap ring and washer.
18) Install the oil pump. <Ref. to 6MT-65, INSTALLATION, Oil Pump.>
19) Install the center differential. <Ref. to 6MT-62, INSTALLATION, Center Differential.>
20) Install the transfer driven gear. <Ref. to 6MT-60, INSTALLATION, Transfer Driven Gear.>
21) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
22) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-47, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-45, INSTALLATION, Back-up Light Switch.>
23) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

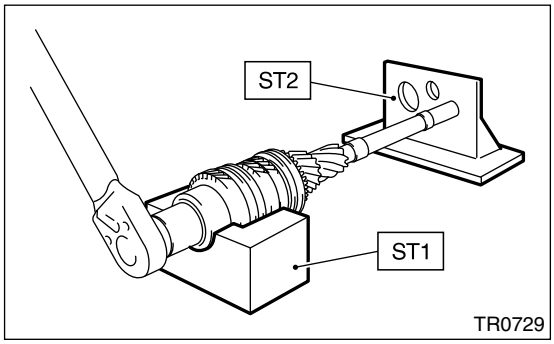
C: DISASSEMBLY

NOTE:
Each sleeve and hub engage at a specified point. Mark an engagement point on the sleeve and hub before disassembly.

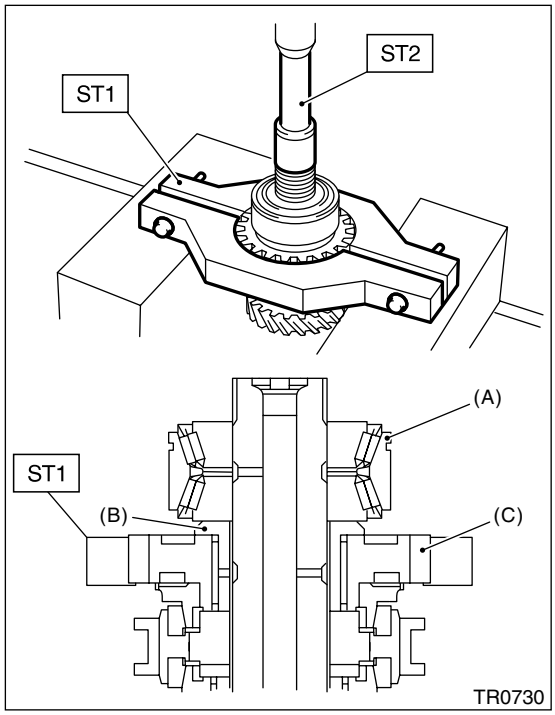
1) Secure the ST on workbench.
ST 18664AA000 BASE
2) Lift the caulking of lock nut.

3) Set the main shaft assembly on ST, then remove the lock nut and washer.
ST1 18665AA000 HOLDER
ST2 18664AA000 BASE

NOTE:
Use a 38 mm (1.50 in) socket wrench.

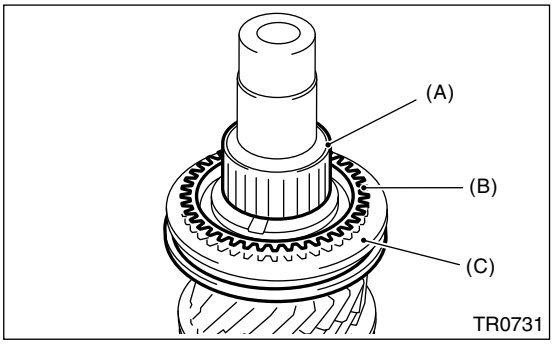


4) Remove the main shaft assembly from ST.
5) Set the ST1 on 6th drive gear, then remove the taper roller bearing, bush and 6th drive gear using press.
ST1 18722AA000 REMOVER
ST2 899864100 REMOVER



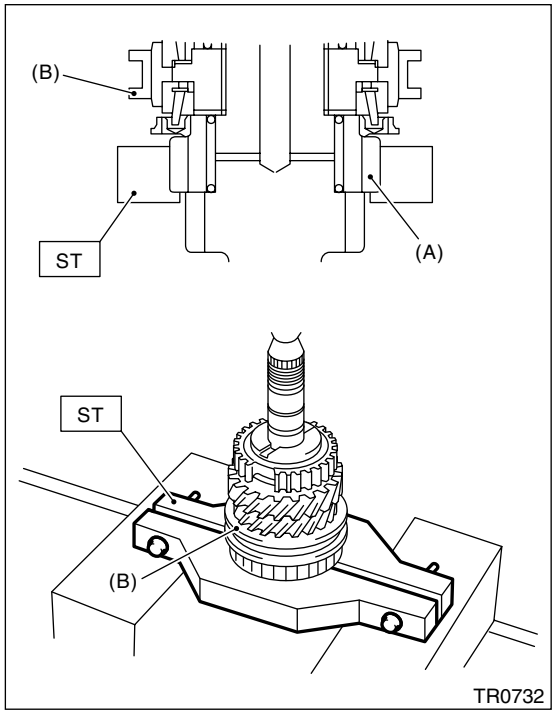
(A) Taper roller bearing
(B) Bush
(C) 6th drive gear

6) Remove the 5th-6th sleeve, 6th needle bearing and 6th baulk ring.



(A) Needle bearing
(B) 6th baulk ring
(C) 5th-6th sleeve

7) Set the ST on 3rd drive gear, then remove each part using press.
ST 18720AA000 REMOVER

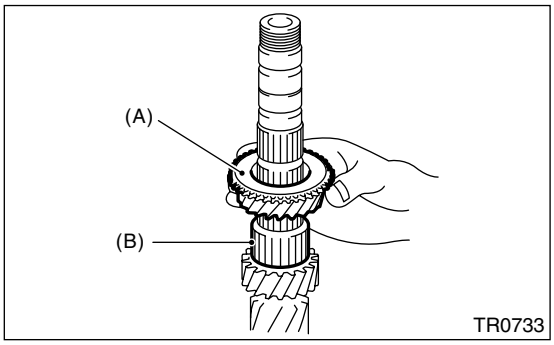


(A) 3rd drive gear
(B) 3rd-4th sleeve

D: ASSEMBLY

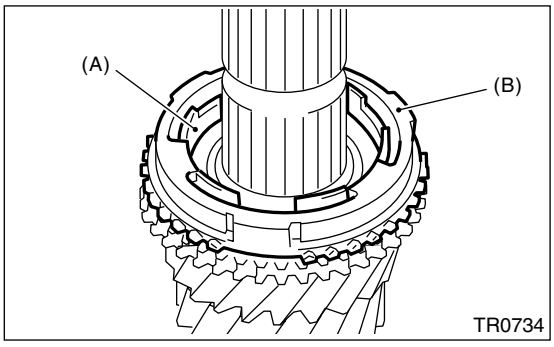
NOTE:
Replace the following parts as a set.
- Sleeve and hub
- Outer baulk ring, 3rd synchro cone and inner baulk ring
- Taper roller bearing

1) Sufficiently apply gear oil to the main shaft, 3rd needle bearing and inner periphery of 3rd drive gear.
2) Install the 3rd needle bearing and 3rd drive gear to main shaft.



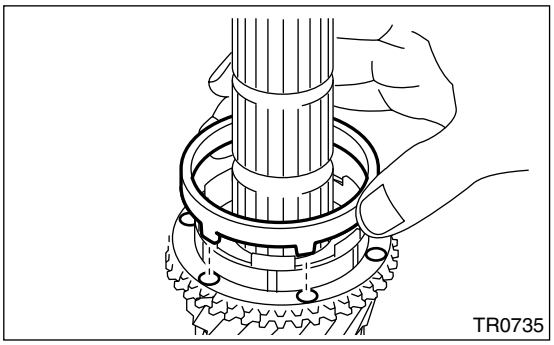
(A) 3rd needle bearing
(B) 3rd drive gear

3) Install the inner baulk ring, 3rd synchro cone and outer baulk ring.

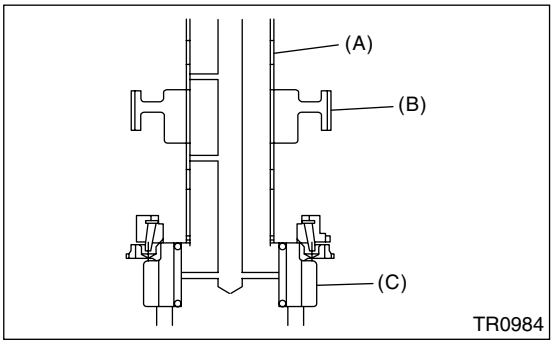


(A) Inner baulk ring
(B) Outer baulk ring

NOTE:
Install the 3rd synchro cone, by aligning protrusion portions of the 3rd synchro cone with 3rd drive gear hole portion.

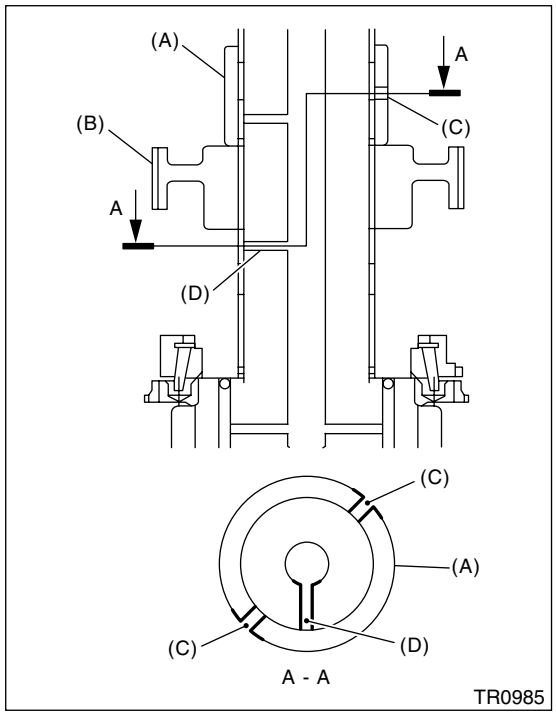


4) Install the 3rd-4th hub and 4th bush.
(1) Set to the main shaft, taking care of 3rd-4th hub installing direction.



(A) Main shaft
(B) 3rd-4th hub
(C) 3rd drive gear

(2) Set to the main shaft, taking care not to overlap the main shaft oil hole and 4th bush oil hole.



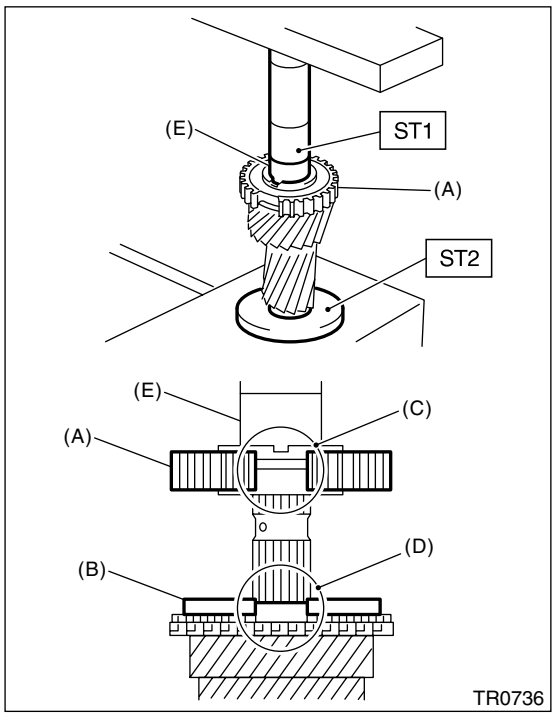
(A) 4th bush
(B) 3rd-4th hub
(C) 4th bush oil hole
(D) Main shaft oil hole

(3) Using the ST, press in the 3rd-4th hub and 4th bush at once.

ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:
When pressing in 3rd-4th hub and 4th bush, align the protrusion portion of outer baulk ring and cutout portion of 3rd-4th bush by moving the outer baulk ring.

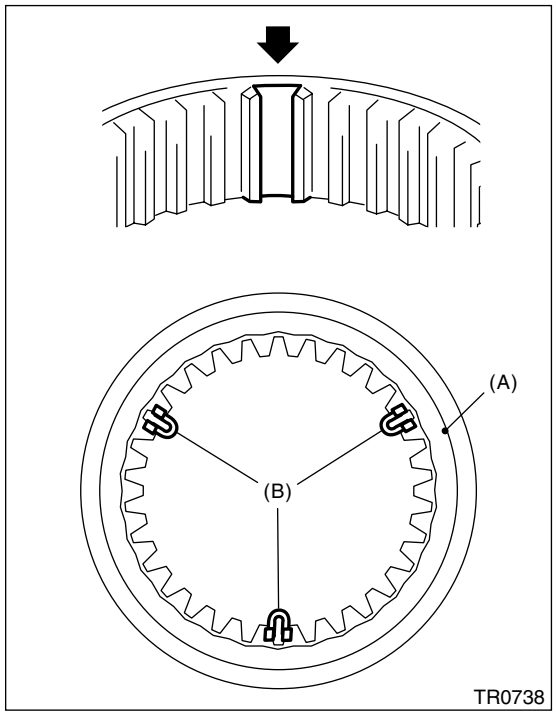


(A) 3rd-4th hub
(B) Outer baulk ring
(C) Cutout portion of 3rd-4th hub
(D) Protrusion portion of outer baulk ring
(E) 4th bush

5) Make sure the 3rd drive gear is smoothly turned by hand. If not, reassemble.

6) Install the 3rd-4th shifting insert key in proper place of 3rd-4th sleeve.

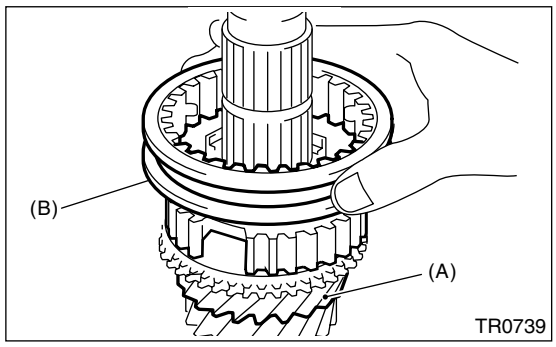
NOTE:
Angle of each shifting insert key is 120° apart.



(A) 3rd-4th sleeve
(B) 3rd-4th shifting insert key

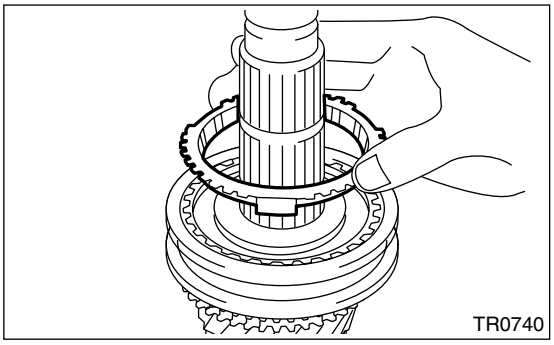
7) Install the 3rd-4th sleeve to 3rd-4th hub.

NOTE:
- 3rd-4th sleeve has a groove for identification.
- Install the 3rd-4th sleeve with groove facing to 3rd drive gear side.

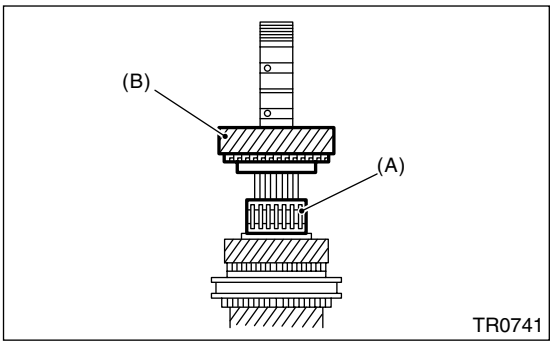


(A) 3rd drive gear
(B) Groove (1) for identification of 3rd-4th sleeve

8) Install the 4th baulk ring.

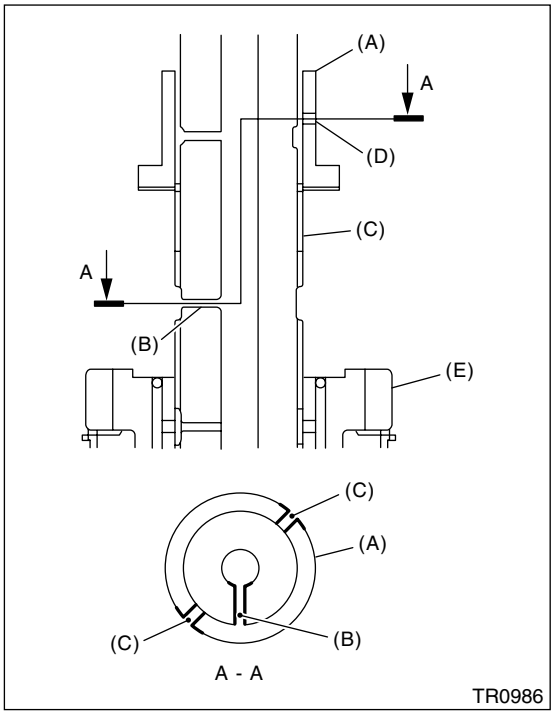


9) Sufficiently apply gear oil to the main shaft, 4th needle bearing and inner periphery of 4th drive gear.
10) Install the 4th needle bearing and 4th drive gear.



(A) 4th needle bearing
(B) 4th drive gear

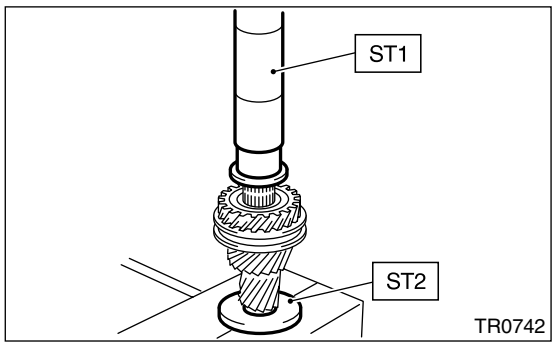
11) Install the 5th bush.
(1) Set to the main shaft, taking care not to overlap the main shaft oil hole and 5th bush oil hole.



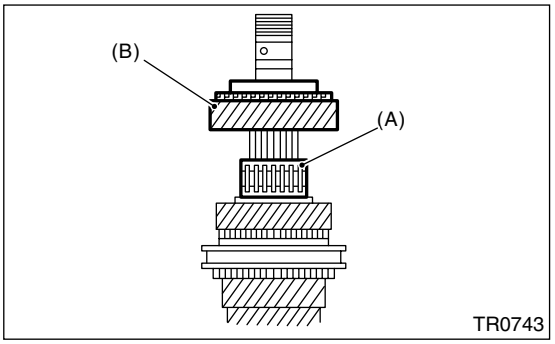
(A) 5th bush
(B) Main shaft oil hole
(C) Main shaft
(D) 5th bush oil hole
(E) 4th drive gear

(2) Using the ST, press in the 5th bush.
ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

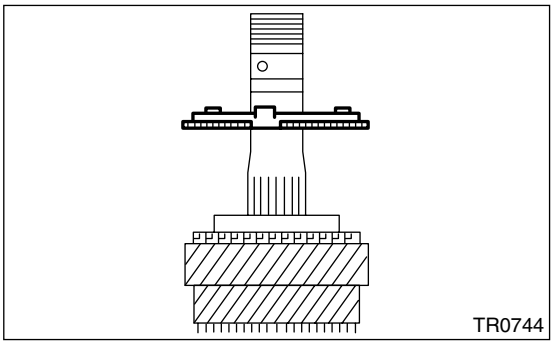


12) Make sure the 4th drive gear is smoothly turned by hand. If not, reassemble.
13) Sufficiently apply gear oil to the main shaft, 5th needle bearing and inner periphery of 5th drive gear.
14) Install the 5th needle bearing and 5th drive gear.

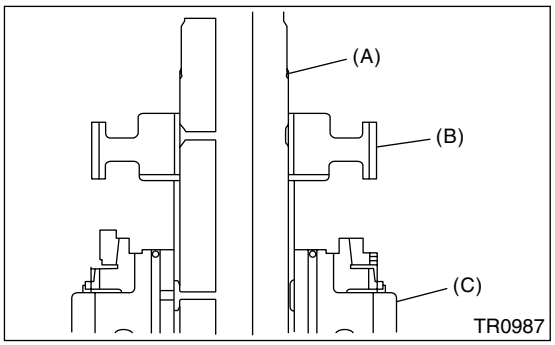


(A) 5th needle bearing
(B) 5th drive gear

15) Install the 5th baulk ring.



16) Install the 5th-6th hub.
(1) Set to the main shaft, taking care of 5th-6th hub installing direction.

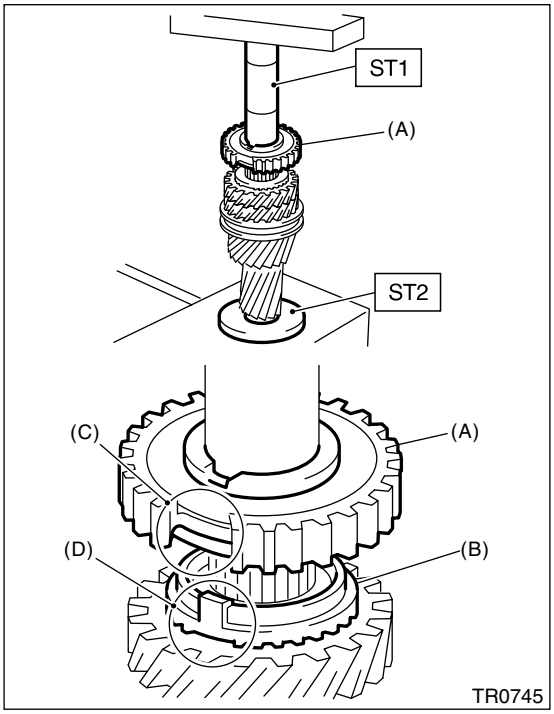


(A) Main shaft
(B) 5th-6th hub
(C) 5th drive gear

(2) Using the ST, press in the 5th-6th hub.
ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:
When pressing in 5th-6th hub, align the protrusion portion of outer baulk ring and cutout portion of 5th-6th bush by moving the outer baulk ring.

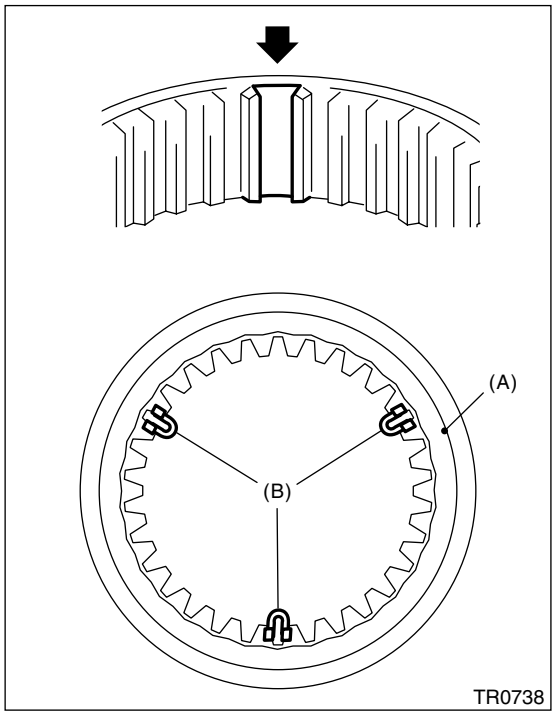


(A) 5th-6th hub
(B) Outer baulk ring
(C) Cutout portion of 5th-6th hub
(D) Protrusion portion of outer baulk ring

17) Make sure the 5th drive gear is smoothly turned by hand. If not, reassemble.

18) Install the 5th-6th shifting insert key in proper place of 5th-6th sleeve.

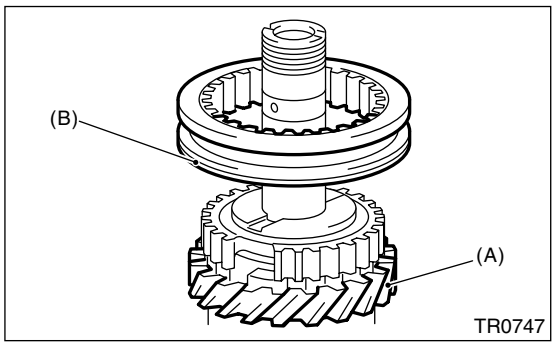
NOTE:
Angle of each shifting insert key is 120° apart.



(A) 5th-6th sleeve
(B) Shifting insert key

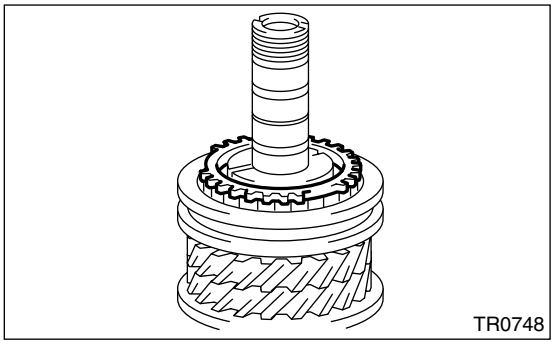
19) Install the 5th-6th sleeve to 5th-6th hub.

NOTE:
• 5th-6th sleeve has two grooves for identification.
• Install the 5th-6th sleeve with the groove facing to 5th drive gear side.

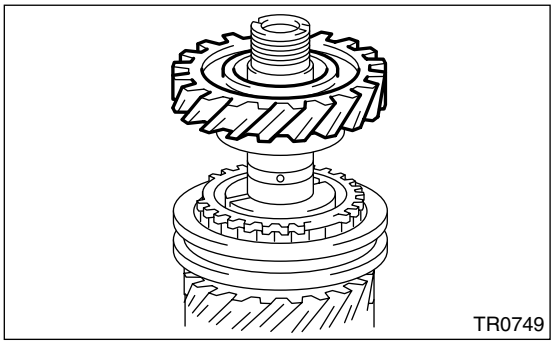


(A) 5th drive gear
(B) Groove (2) for identification of 5th-6th sleeve

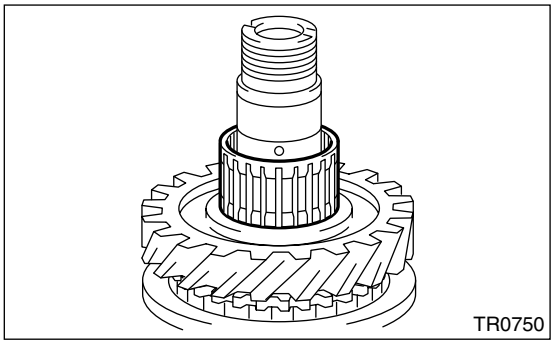
20) Install the 6th baulk ring.



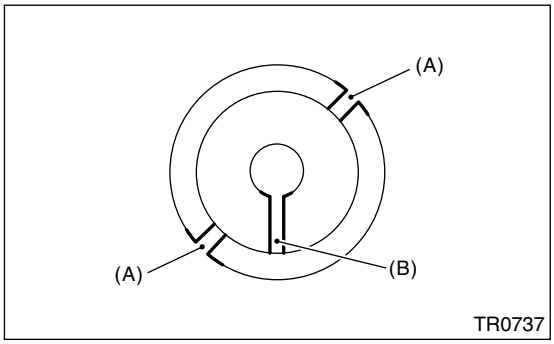
21) Sufficiently apply gear oil to the main shaft, 6th needle bearing and inner periphery of 6th drive gear.
22) Install the 6th drive gear.



23) Install the 6th needle bearing.



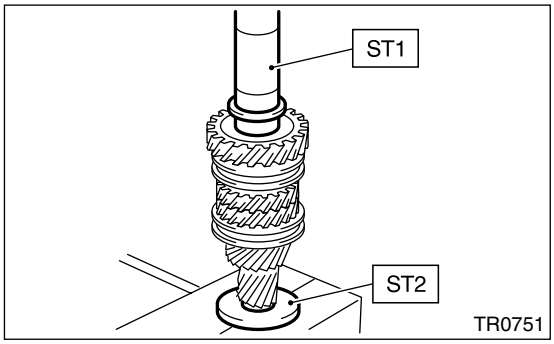
24) Set the 6th bush to main shaft, taking care not to overlap the 6th bush oil hole and main shaft oil hole.



(A) 6th bush oil hole
(B) Main shaft oil hole

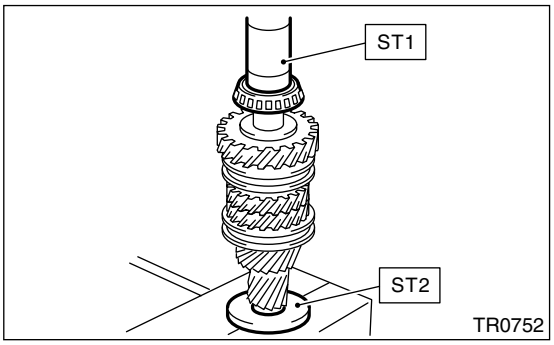
25) Using the ST, install the 6th bush.
ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



26) Make sure the 6th drive gear is smoothly turned by hand. If not, reassemble.
27) Using the ST, install the inner bearing inner race.
ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

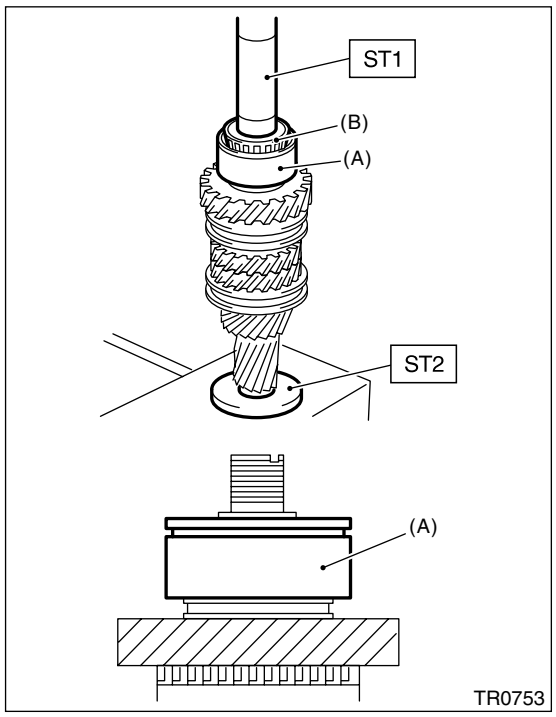
CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



28) Using the ST, install the retainer and outer bearing inner race.
ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

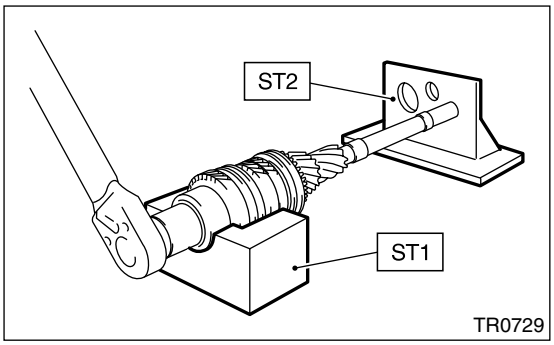
NOTE:
• Make sure to install the retainer in proper direction.
• Press in until there is no backlash in retainer and where bearing is smoothly turned by hand.



(A) Retainer
(B) Outer bearing inner race

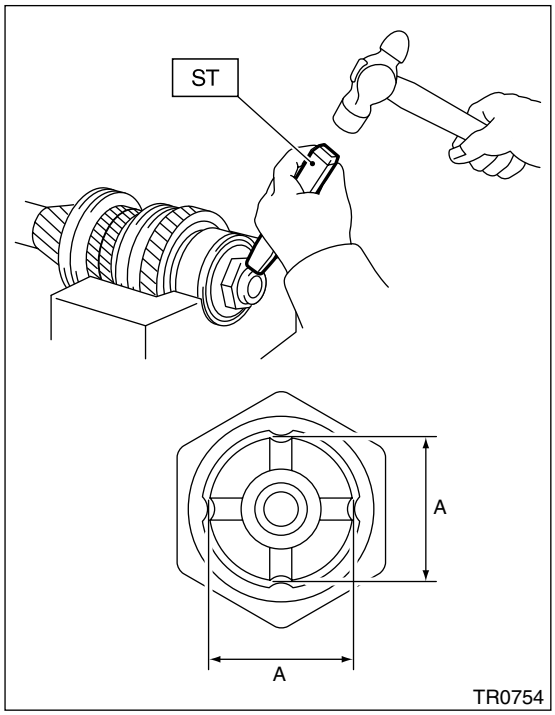
29) Make sure the taper roller bearing is smoothly turned by hand. If not, replace the taper roller bearing as a set and reassemble.
30) Install the lock washer and new lock nut.
31) Set the main shaft assembly to ST, then tighten the lock nut.
ST1 18665AA000 HOLDER
ST2 18664AA000 BASE

Tightening torque:
392 N·m (40.0 kgf-m, 289 ft-lb)



32) Using the ST, caulk four portions on the lock nut to obtain dimension A 27 ± 0.3 mm (1.06 ± 0.01 in).
ST 18668AA000 PUNCH

NOTE:
Do not crack the caulking part of lock nut.



E: INSPECTION

Disassembled parts should be washed clean first and then inspected carefully.

1) Bearing

Replace the bearings in the following cases:

- Worn, rusted and damaged bearing
- Bearings that fail to turn smoothly or make abnormal noise when turned
- Bearings having other defects

2) Bushing (each gear)

Replace the bushings in the following case:

- When the sliding surface is damaged or abnormally worn.

3) Gears

Replace the gears in the following cases:

- Gear teeth surfaces are broken or excessively worn.
- Parts that contact the baulk ring is damaged.
- The inner surface of gear is damaged.

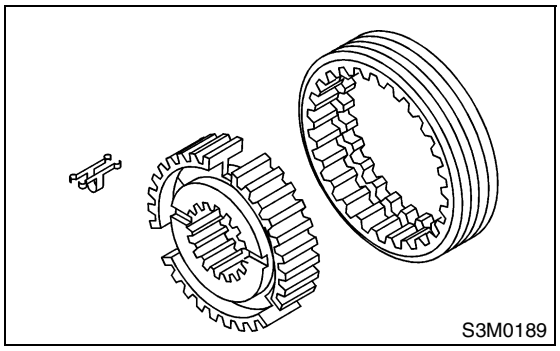
4) Baulk ring, synchro cone

Replace the baulk ring and synchro cone in the following case:

- Worn, rusted and damaged baulk ring

5) Shifting insert key

Replace the shifting insert key if deformed, excessively worn or defective in any way.



F: ADJUSTMENT

1. SELECTION OF MAIN SHAFT SNAP RING AND WASHER

NOTE:

Perform the following procedures when:

- Replacing the 1st to 6th driven gear.
- Replacing the 1st and 2nd synchro ring assembly.
- Replacing the ball bearing.
- Replacing the adapter plate.
- Replacing the driven shaft.

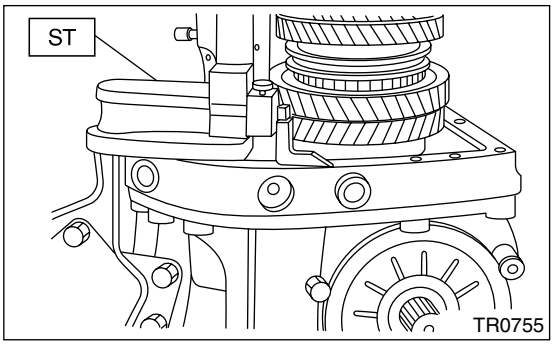
1) Insert the drive pinion assembly in adapter plate.

NOTE:

Make sure the thrust bearing outer race is not removed and drive pinion is not lift-up.

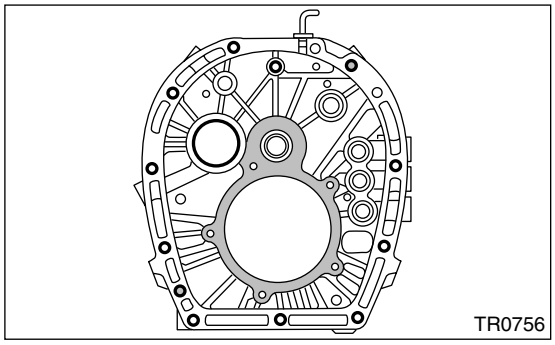
2) Set the height gauge to adapter plate. Lower the indicator of height gauge to mating surface of adapter plate and case, then set to zero point.

ST 18853AA000 HEIGHT GAUGE

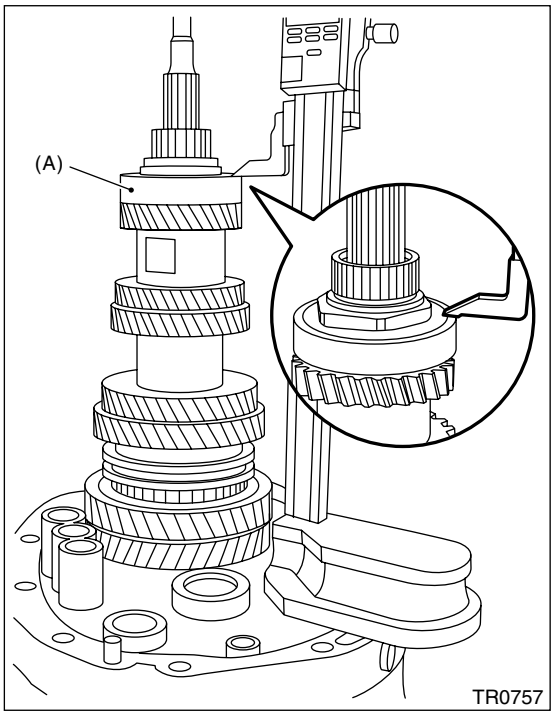


NOTE:

- Remove the remaining gasket on edge surface with scraper, since the adapter plate is base point of measurement.
- Do not place the height gauge on shaded area in the figure during measurement.

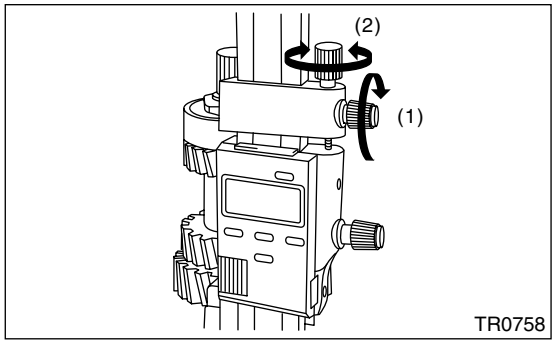


3) Measure the height to edge surface of ball bearing (height A1).



(A) Ball bearing

NOTE:
Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of bearing.



Measure five points of the ball bearing turning every approx. 120°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.

4) According to measurement value, select the snap ring and washer from the following table.

Snap ring

A1: mm (in)	Part No.	Thickness: mm (in)
270.83 — 271.40 (10.66 — 10.69)	805072010	1.65 (0.065)
271.41 — 271.98 (10.69 — 10.71)	805072011	1.95 (0.077)
271.99 — 272.56 (10.71 — 10.73)	805072012	2.25 (0.089)

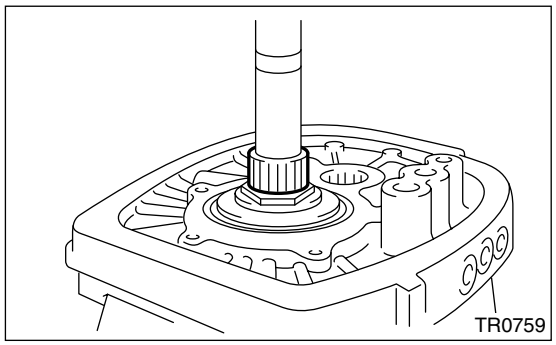
Washer

A1: mm (in)	Part No.	Thickness: mm (in)
270.83 — 271.40 (10.66 — 10.69)	803067012	1.6 (0.063)
271.41 — 271.98 (10.69 — 10.71)	803067011	1.3 (0.051)
271.99 — 272.56 (10.71 — 10.73)	803067010	1.0 (0.039)

20.Driven Gear Assembly

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, REMOVAL, Oil Pipe.>, <Ref. to 6MT-47, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-45, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-60, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-62, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-64, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-68, REMOVAL, Transmission Case.>
9) Remove the driven gear assembly. <Ref. to 6MT-73, REMOVAL, Main Shaft Assembly.>
10) Remove the 1st needle bearing.

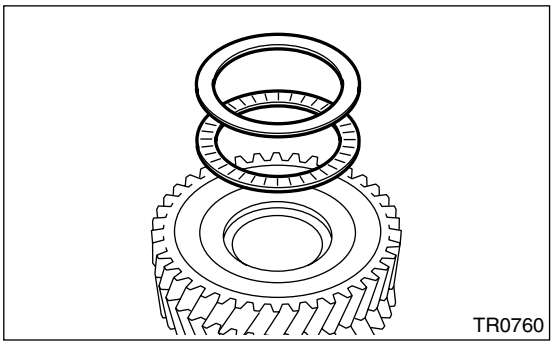

TR0759

11) Remove the thrust needle bearing.

B: INSTALLATION

1) Adjust the main shaft snap ring. <Ref. to 6MT-85, ADJUSTMENT, Main Shaft Assembly.>
2) Adjust the 1st-2nd shifter rod. <Ref. to 6MT-123, ADJUSTMENT, Shifter Fork and Rod.>
3) Install the thrust needle bearing

NOTE:
Make sure to install the thrust needle bearing in proper direction.

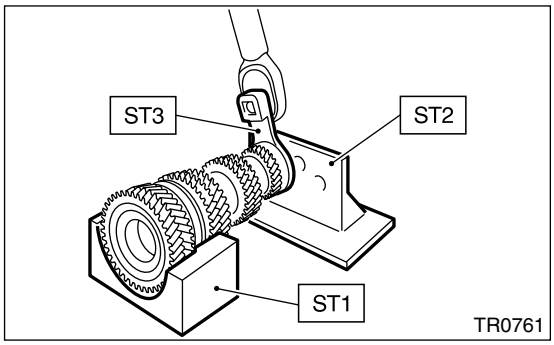

TR0760

4) Install the 1st needle bearing.
5) Install the driven gear assembly. <Ref. to 6MT-74, INSTALLATION, Main Shaft Assembly.>
6) Install the transmission case. <Ref. to 6MT-69, INSTALLATION, Transmission Case.>
7) Adjust backlash at axial direction of driven gear assembly. <Ref. to 6MT-95, ADJUSTMENT, Driven Gear Assembly.>
8) Install the oil pump. <Ref. to 6MT-65, INSTALLATION, Oil Pump.>
9) Install the center differential. <Ref. to 6MT-62, INSTALLATION, Center Differential.>
10) Install the transfer driven gear. <Ref. to 6MT-60, INSTALLATION, Transfer Driven Gear.>
11) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
12) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-47, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-45, INSTALLATION, Back-up Light Switch.>
13) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

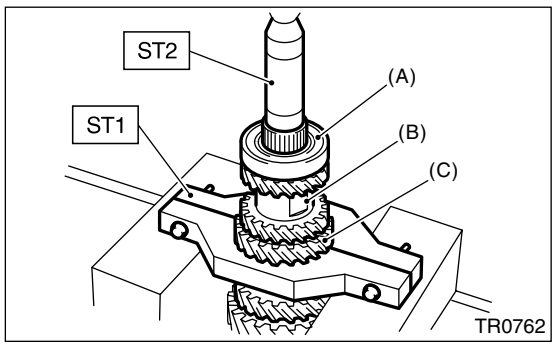
C: DISASSEMBLY

NOTE:
Each sleeve and hub engage at a specified point. Mark an engagement point on the sleeve and hub before disassembly.

1) Secure the ST on workbench.
ST 18664AA000 BASE
2) Lift the caulking of lock nut.
3) Install the ST3 to lock nut, set the driven gear assembly on ST, then remove the lock nut and washer.
ST1 18666AA000 HOLDER
ST2 18664AA000 BASE
ST3 18620AA000 ADAPTER WRENCH

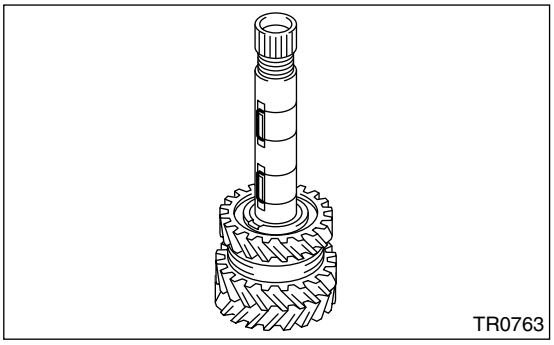


4) Install the ST1 to 4th gear, then remove the ball bearing, 5th-6th driven gear and 3rd-4th driven gear.
ST1 18723AA000 REMOVER
ST2 499877000 REMOVER

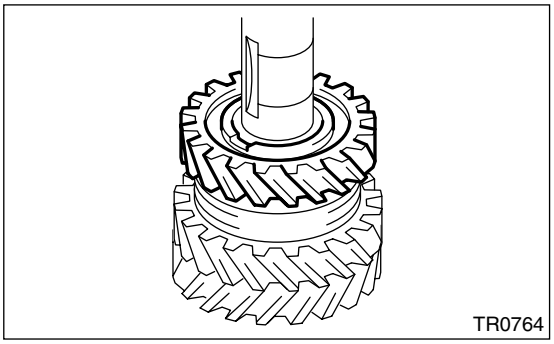


(A) Ball bearing
(B) 5th-6th driven gear
(C) 3rd-4th driven gear

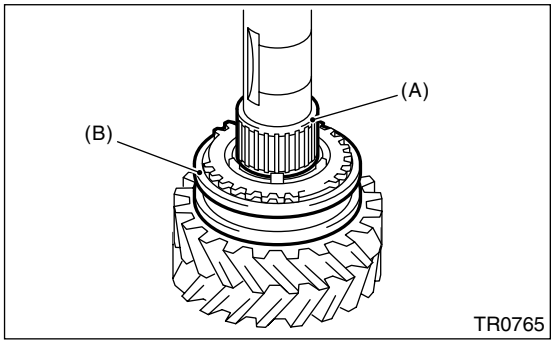
5) Remove the driven gear key.



6) Remove the 2nd gear.

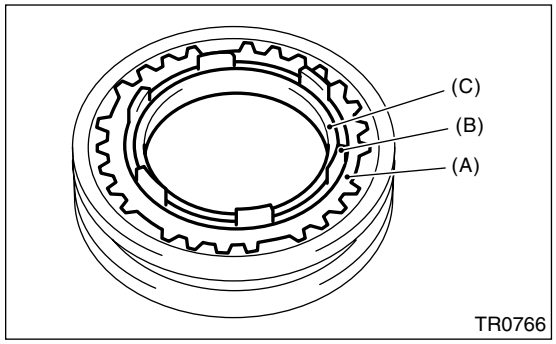


7) Remove the needle bearing and 1st-2nd sleeve.



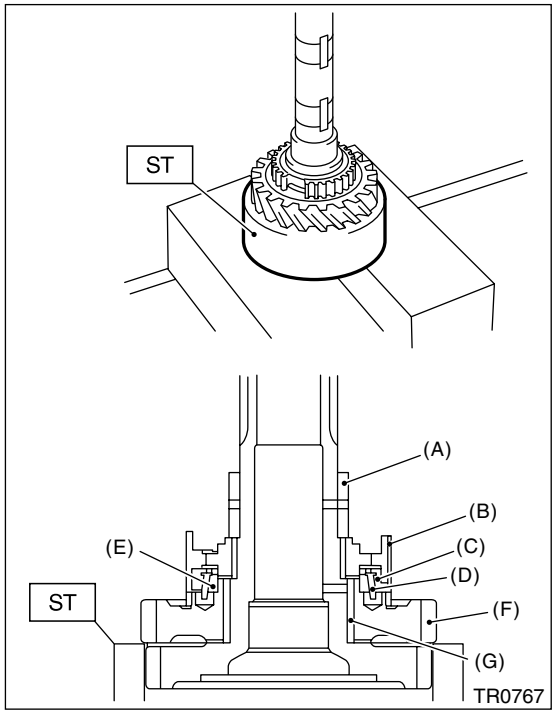
(A) Needle bearing
(B) 1st-2nd sleeve

8) Remove the outer baulk ring, 2nd synchro cone and inner baulk ring.



(A) Outer baulk ring
(B) 2nd synchro cone
(C) Inner baulk ring

9) Using the ST, remove each parts.
ST 18754AA000 REMOVER

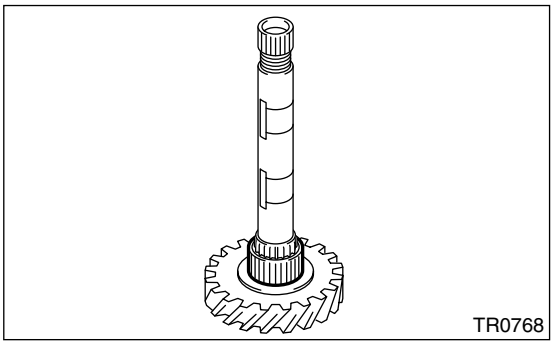


(A) 2nd bush
(B) 1st-2nd hub
(C) Outer baulk ring
(D) 1st synchro cone
(E) Inner baulk ring
(F) 1st driven gear
(G) 1st needle bearing

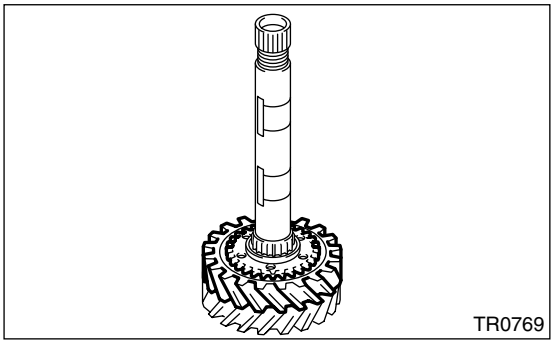
D: ASSEMBLY

NOTE:
Replace the following parts as a set:
• Sleeve and hub
• Outer baulk ring, 1st synchro cone, inner baulk ring
• Outer baulk ring, 2nd synchro cone, inner baulk ring

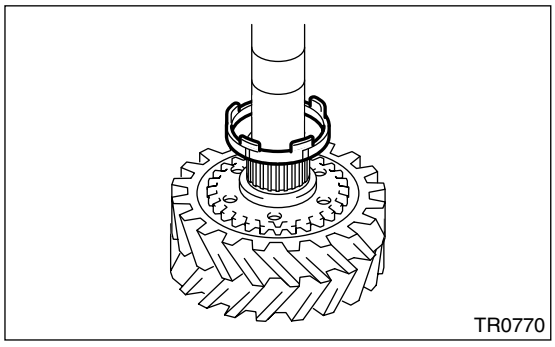
1) Sufficiently apply gear oil to the drive shaft, 1st needle bearing and inner periphery of 1st driven gear.
2) Install the 1st needle bearing.



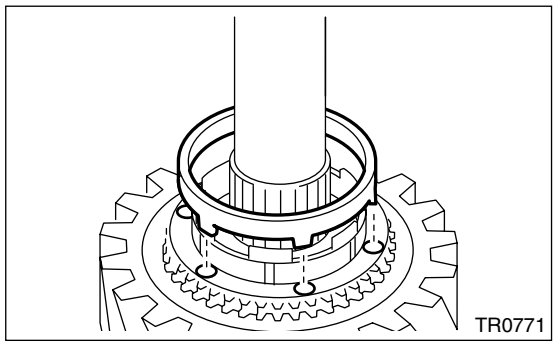
3) Install the 1st driven gear to driven shaft.



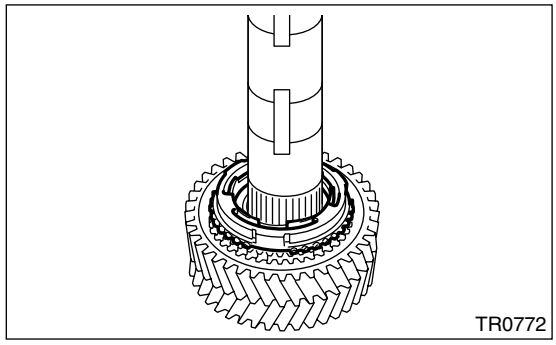
4) Install the inner baulk ring.



5) Align protrusion portions of the 1st synchro cone to the holes of 1st drive gear to install.



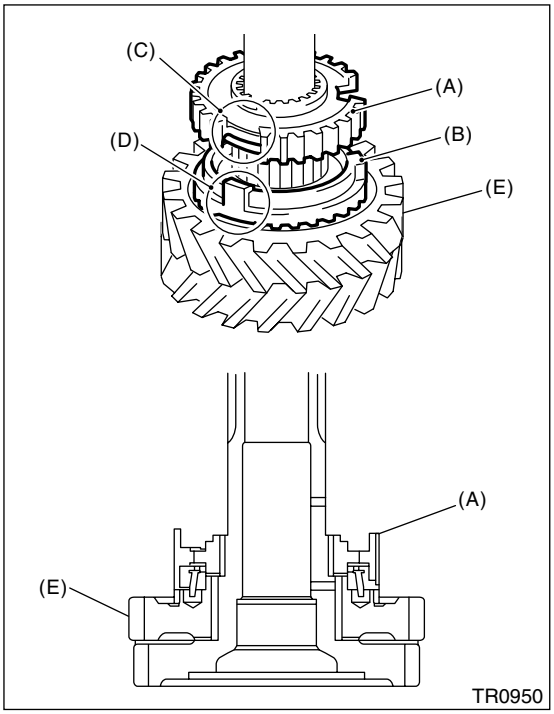
6) Install the outer baulk ring.



7) Install the 1st-2nd hub.

NOTE:
• Align the protrusion portion of outer baulk ring and cutout portion of 1st-2nd hub, then install.

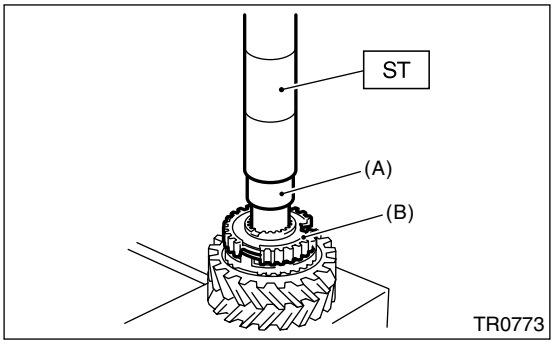
• Make sure to install the 1st-2nd hub in proper direction.



(A) 1st-2nd hub
(B) Outer baulk ring
(C) Cutout portion of 1st-2nd hub
(D) Protrusion portion of outer baulk ring
(E) 1st driven gear

8) Using the ST, install the 2nd hub.
ST 18654AA000 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

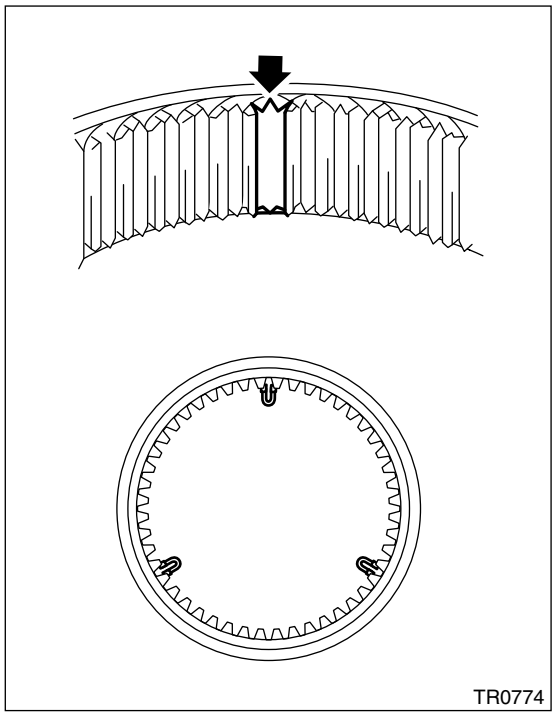


(A) 2nd bush
(B) 1st-2nd hub

9) Make sure the 1st drive gear is smoothly turned by hand. If not, reassemble.

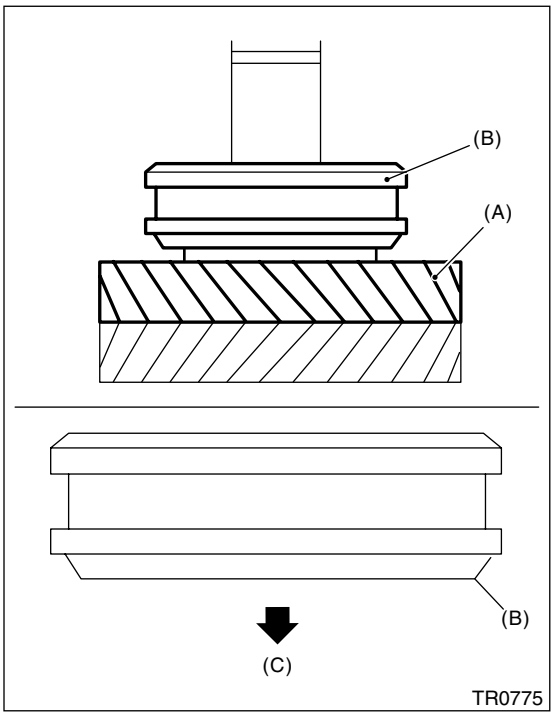
10) Install the shifting insert key in proper place of 1st-2nd sleeve.

NOTE:
Angle of each shifting insert key is 120° apart.



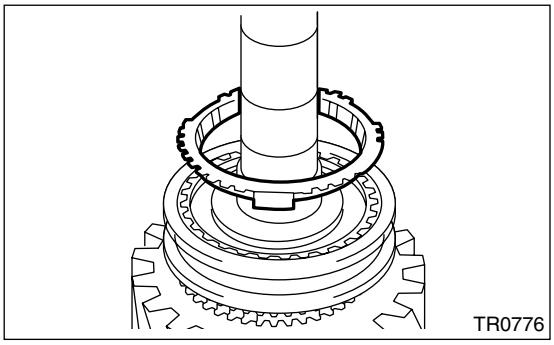
11) Install the 1st-2nd sleeve to 1st-2nd hub.

NOTE:
Make sure to install the 1st-2nd sleeve in proper direction.

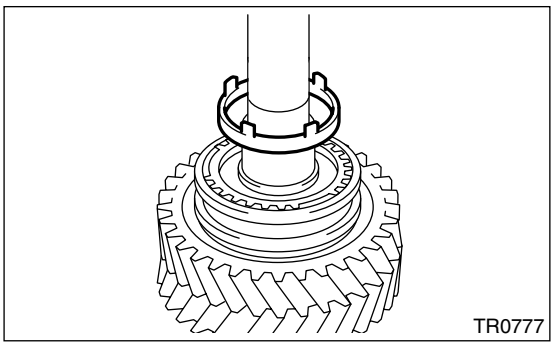


(A) 1st driven gear
(B) 1st-2nd sleeve
(C) 1st driven gear side

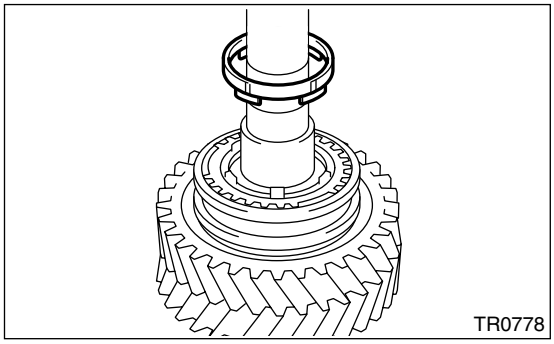
12) Install the outer baulk ring.



13) Install the 2nd synchro cone.

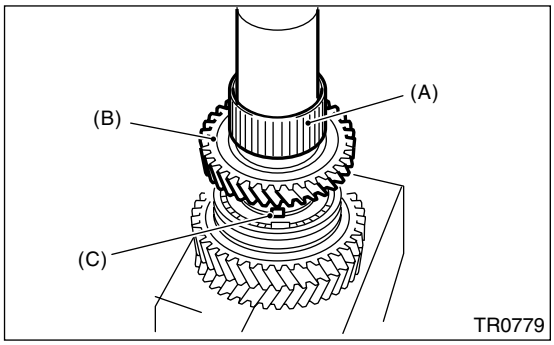


14) Install the inner baulk ring.



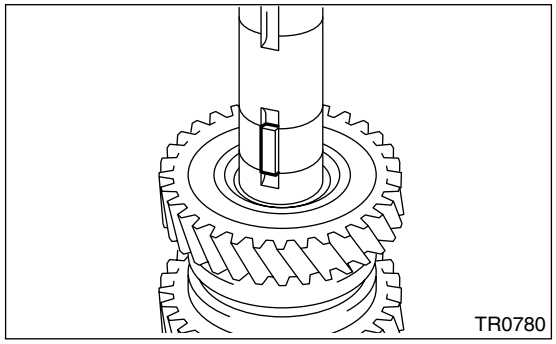
15) Sufficiently apply gear oil to the bush, 2nd needle bearing and inner periphery of 2nd drive gear.
16) Install the 2nd needle bearing and 2nd driven gear.

NOTE:
Align the protrusion portion of 2nd synchro cone with 2nd driven gear hole, then install.



(A) 2nd needle bearing
(B) 2nd driven gear
(C) Protrusion portion of 2nd synchro cone

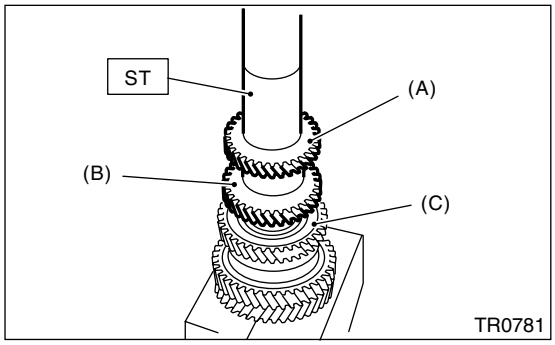
17) Install the key.



18) Using the ST, install the 3rd-4th driven gear.
ST 18654AA000 INSTALLER

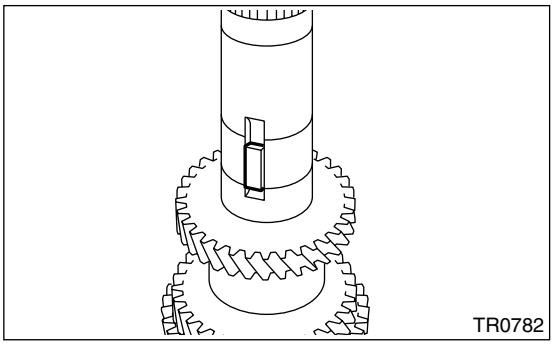
CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:
• Make sure to install the 3rd-4th driven gear in proper direction.
• Align the groove of 3rd-4th driven gear with key.



(A) 4th gear
(B) 3rd gear
(C) 2nd gear

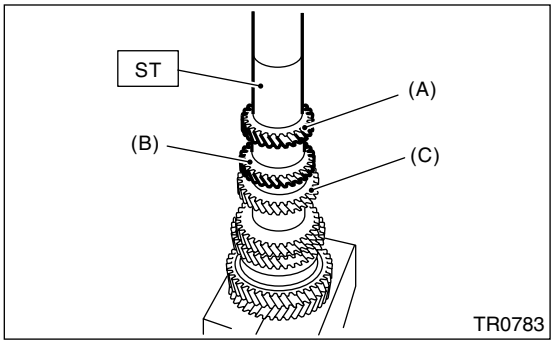
19) Make sure the 2nd driven gear is smoothly turned by hand. If not, reassemble.
20) Install the key.



21) Using the ST, install the 5th-6th driven gear.
ST 18654AA000 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:
• Make sure to install the 5th-6th driven gear in proper direction.
• Align the groove of 5th-6th driven gear with key.

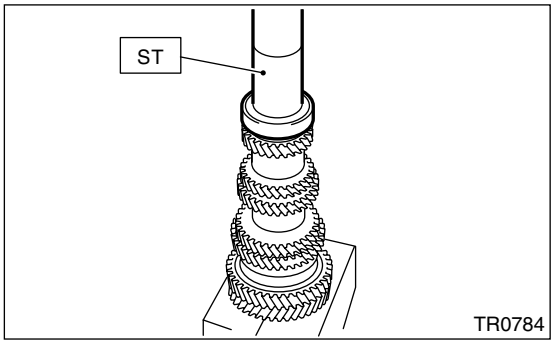


(A) 6th gear
(B) 5th gear
(C) 4th gear

22) Using the ST, install the ball bearing.
ST 18654AA000 INSTALLER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

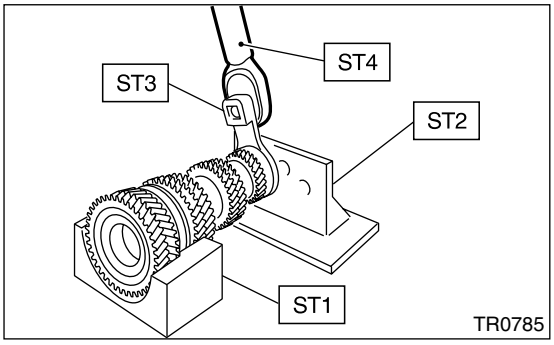
NOTE:
Make sure to install the ball bearing in proper direction.



23) Make sure the ball bearing is smoothly turned by hand. If not, reassemble.
24) Install a new lock nut.

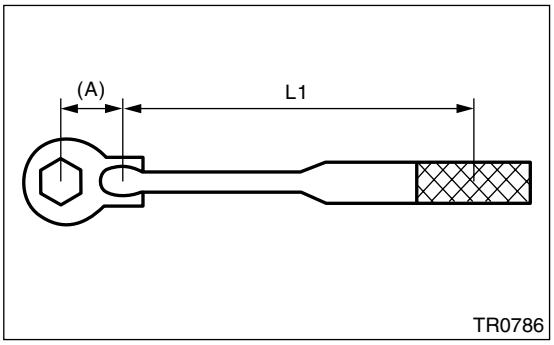
25) Install the ST3 to lock nut, then install the ST to driven gear assembly and tighten lock nut.
ST1 18666AA000 HOLDER
ST2 18664AA000 BASE
ST3 18620AA000 ADAPTER WRENCH
ST4 18852AA000 TORQUE WRENCH

Tightening torque:
530 N·m (54.0 kgf-m, 391 ft-lb)



NOTE:
If torque wrench except ST4 is used, calculate the following equation, then tighten the lock nut.
T=L1/(0.1 + L1)×570

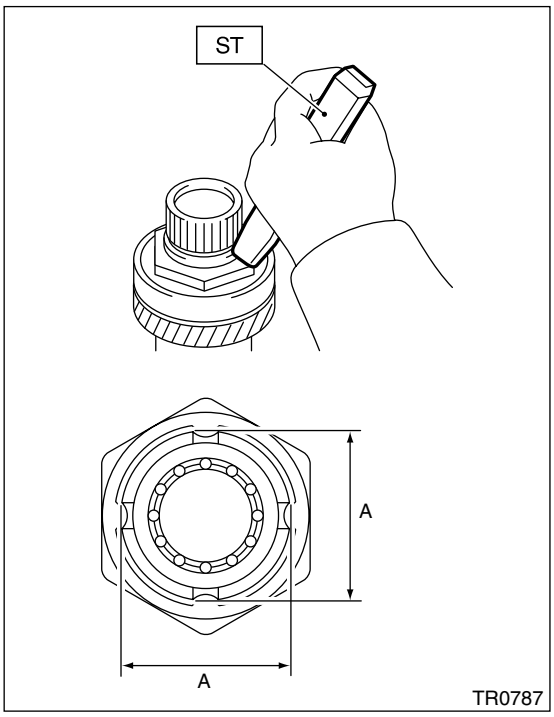
T N·m (kgf-m, ft-lb)	Setting value of torque wrench
L1 m (in)	Torque wrench length
0.1 m (3.94 in)	ST length
570 N·m (58.1 kgf-m, 420 ft-lb)	Tightening torque of lock nut



(A) 0.1 m (3.94 in)

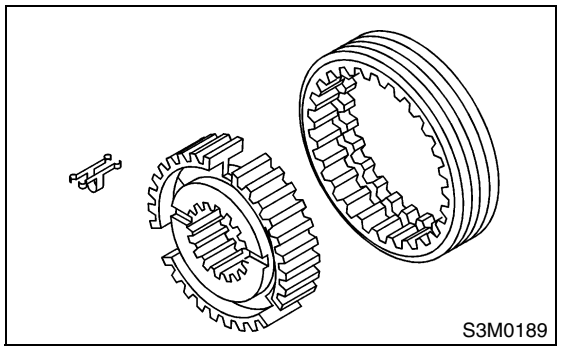
26) Using the ST, caulk four portions on the lock nut to obtain dimension A 44 ± 0.5 mm (1.73 ± 0.02 in).
ST1 18669AA000 PUNCH DRIVEN SHAFT

CAUTION:
Do not crack the caulking part of lock nut.



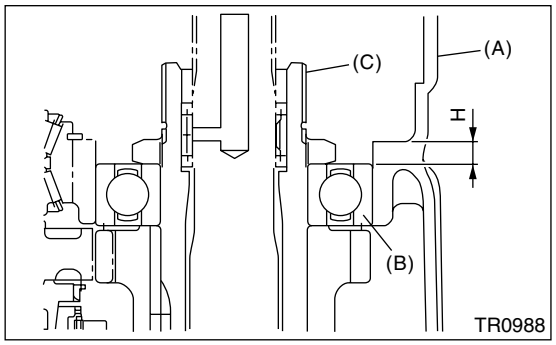
E: INSPECTION

Disassembled parts should be washed clean first and then inspected carefully.
1) Bearing
Replace the bearings in the following cases:
• Worn, rusted and damaged bearing
• Bearings that fail to turn smoothly or make abnormal noise when turned
• Bearings having other defects
2) Bushing (each gear)
Replace the bushings in the following case:
• When the sliding surface is damaged or abnormally worn.
3) Gears
Replace the gears in the following cases:
• Gear teeth surfaces are broken or excessively worn.
• Parts that contact the baulk ring is damaged.
• The inner surface of gear is damaged.
4) Baulk ring, synchro cone
Replace the baulk ring and synchro cone in the following case:
• Worn, rusted and damaged baulk ring
5) Shifting insert key
Replace the shifting insert key if deformed, excessively worn or defective in any way.



F: ADJUSTMENT

1) Measure length “H”, which is from transmission case and oil pump cover mating surface to ball bearing edge.



(A) Transmission case
(B) Ball bearing
(C) Driven gear assembly

2) Using the following equation, calculate the washer thickness of driven gear assembly.
T=H – {5.8 ± 0.05 mm (0.23 ± 0.002 in)} – {0.1 to 0.3 mm (0.0039 to 0.0118 in)}

t	Thickness of washer
H	Length from transmission case and oil pump cover mating surface to ball bearing edge
5.8 ± 0.05 mm (0.23 ± 0.002 in)	Thickness of collar
0.1 to 0.3 mm (0.0039 to 0.0118 in)	Backlash specification at axial direction of driven gear assembly

3) Select 0 to 3 washers from the following table to adjust backlash closest to specification.

Backlash specification at axial direction of driven gear assembly:
0.1 — 0.3 mm (0.0039 — 0.0118 in)

Washer	
Part No.	Thickness t mm (in)
803072030	0.15 (0.0059)
803072031	0.30 (0.0118)
803072032	0.45 (0.0177)
803072033	0.60 (0.0236)

21.Reverse Idler Gear Assembly

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, REMOVAL, Oil Pipe.>, <Ref. to 6MT-47, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-45, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-60, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-62, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-64, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-68, REMOVAL, Transmission Case.>
9) Remove the reverse idler gear assembly. <Ref. to 6MT-73, REMOVAL, Main Shaft Assembly.>

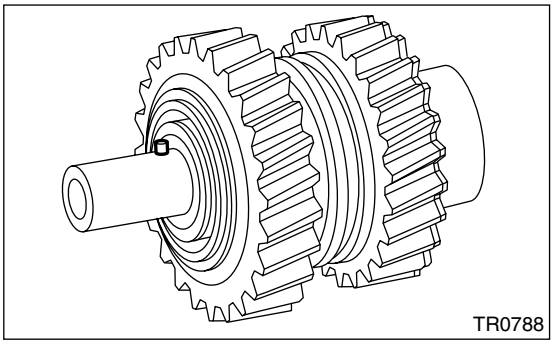
B: INSTALLATION

1) Select the reverse fork rod. <Ref. to 6MT-123, ADJUSTMENT, Shifter Fork and Rod.>
2) Install the reverse idler gear assembly. <Ref. to 6MT-74, INSTALLATION, Main Shaft Assembly.>
3) Install the transmission case. <Ref. to 6MT-69, INSTALLATION, Transmission Case.>
4) Install the oil pump. <Ref. to 6MT-65, INSTALLATION, Oil Pump.>
5) Install the center differential. <Ref. to 6MT-62, INSTALLATION, Center Differential.>
6) Install the transfer driven gear. <Ref. to 6MT-60, INSTALLATION, Transfer Driven Gear.>
7) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
8) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-47, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-45, INSTALLATION, Back-up Light Switch.>
9) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

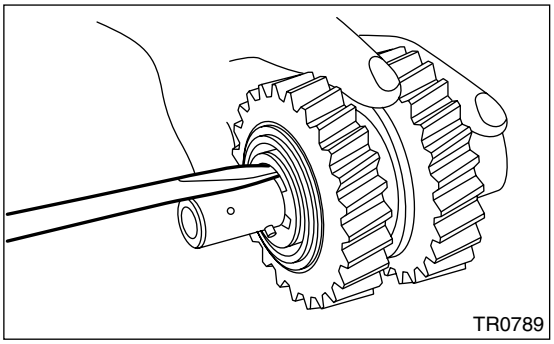
C: DISASSEMBLY

NOTE:
The sleeve and reverse gear engage at a specified point. Mark an engagement point on the sleeve and hub before disassembly.

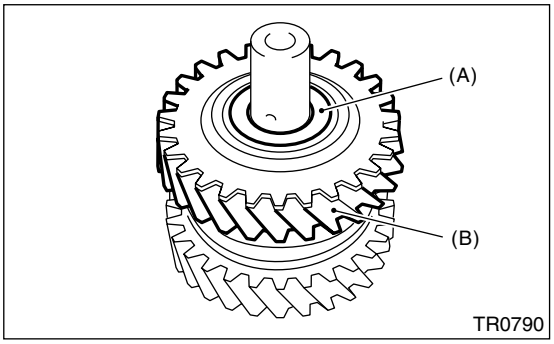
1) Remove the spring pin.


TR0788

2) Remove the snap ring.


TR0789

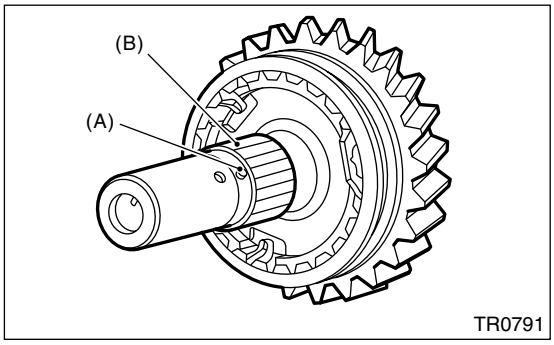
3) Remove the washer and reverse idler gear.



TR0790

(A) Washer
(B) Reverse idler gear

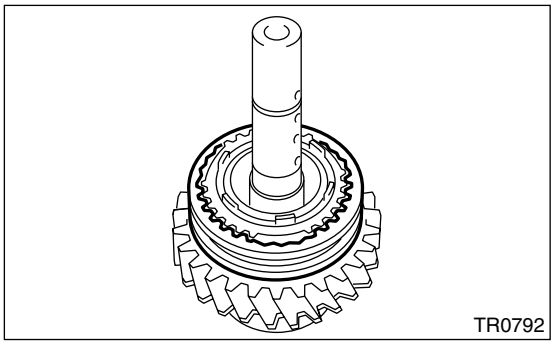
4) Remove the knock pin and reverse idler gear needle bearing.



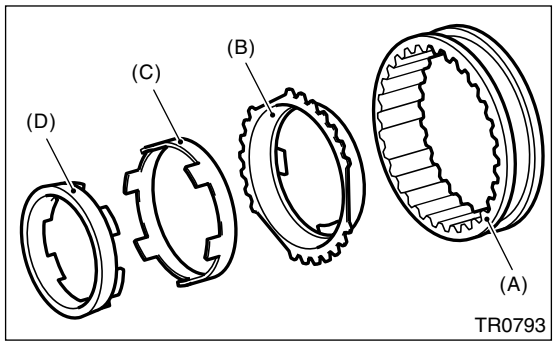
TR0791

(A) Knock pin
(B) Reverse idler gear needle bearing

5) Remove the collar.
6) Remove the reverse sleeve.

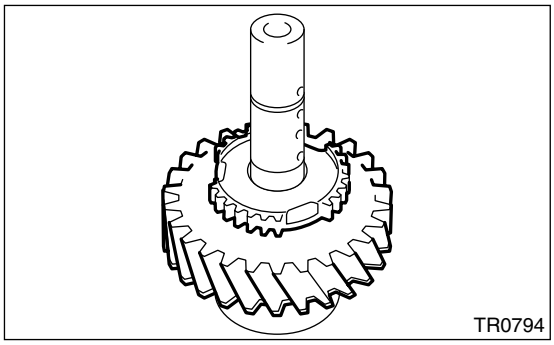


7) Remove the outer baulk ring, reverse synchro cone and inner baulk ring from reverse sleeve.

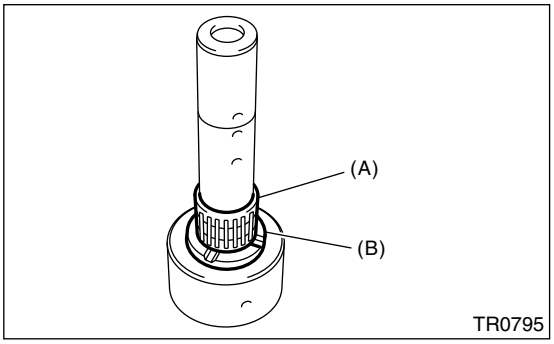


(A) Reverse sleeve
(B) Outer baulk ring
(C) Reverse synchro cone
(D) Inner baulk ring

8) Remove the reverse idler gear No.2.

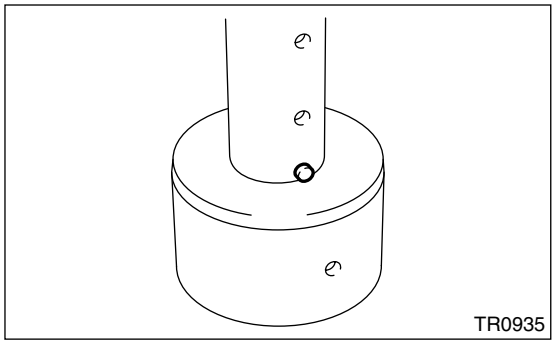


9) Remove the washer and needle bearing.

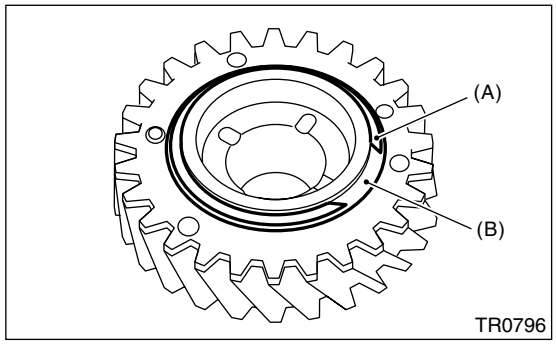


(A) Needle bearing
(B) Washer

10) Remove the knock pin.

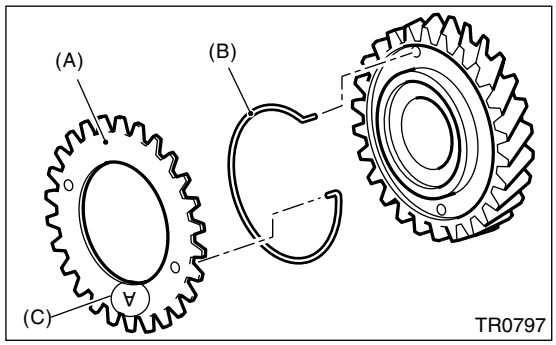


11) Remove the snap ring and friction plate from reverse gear.



(A) Snap ring
(B) Friction plate

12) Remove the sub gear and spring.

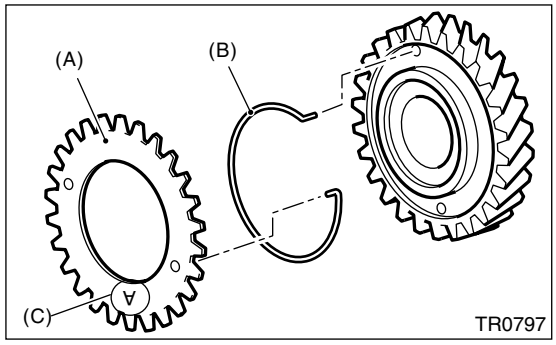


(A) Sub gear
(B) Spring
(C) Punch mark (mark A)

D: ASSEMBLY

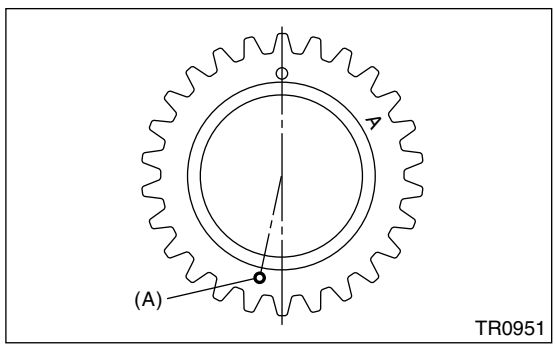
1) Install the sub gear and spring.

NOTE:
• Install the spring with white marking on hook part facing to sub gear side.
• Install the sub gear with punch mark (mark A) facing outside.



(A) Sub gear
(B) Spring
(C) Punch mark (mark A)

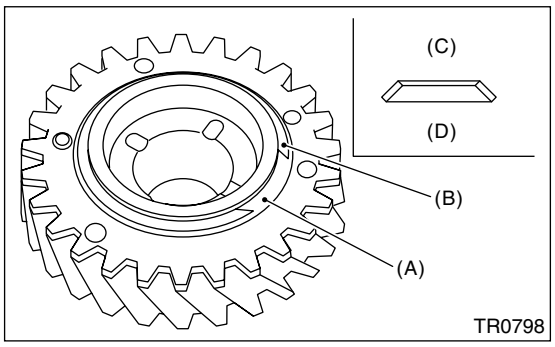
• Install the spring and sub gear, taking care to install the sub gear installation hole in proper direction.



(A) Installation hole

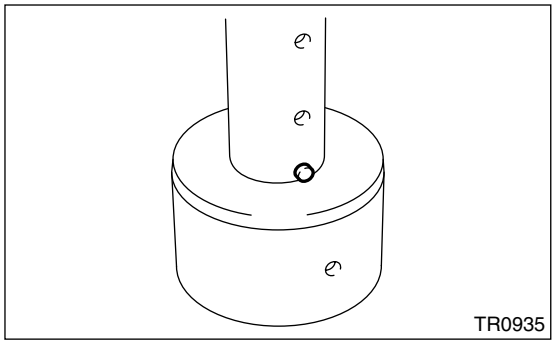
2) Install the friction plate and snap ring.

NOTE:
Make sure to install the friction plate in proper direction.



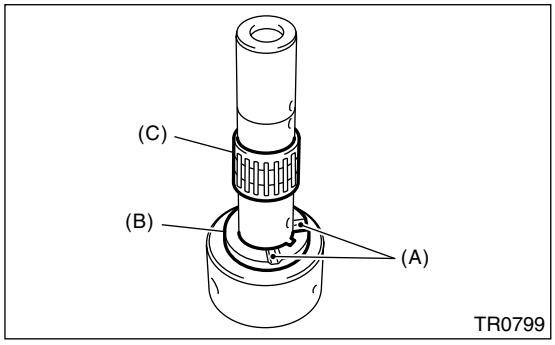
(A) Friction plate
(B) Snap ring
(C) Snap ring side
(D) Sub gear side

3) Sufficiently apply gear oil to the shaft, needle bearing and inner periphery of reverse drive gear.
4) Install the knock pin.



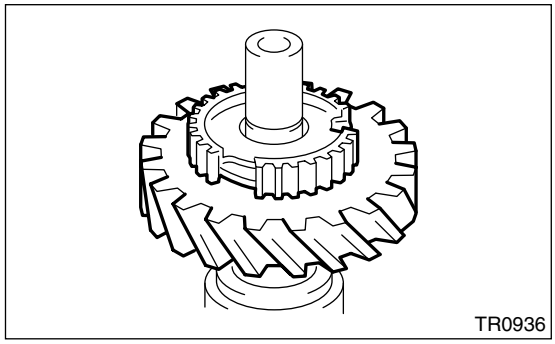
5) Install the washer and needle bearing.

NOTE:
Install the washer with groove facing to reverse idler gear.



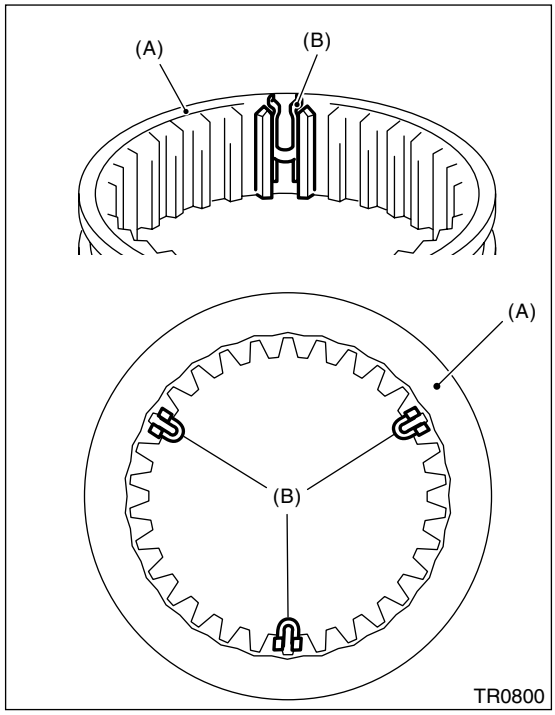
(A) Groove
(B) Washer
(C) Needle bearing

6) Install the reverse idler gear No.2.



7) Install the shifting insert key in proper place of reverse sleeve.

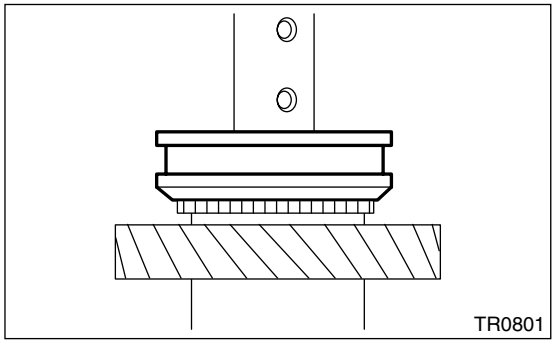
NOTE:
Angle of each shifting insert key is 120° apart.



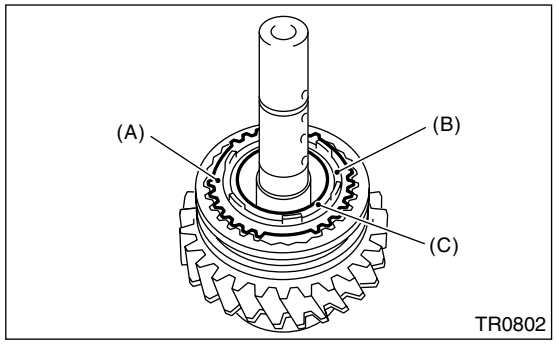
(A) Reverse sleeve
(B) Shifting in sert key

8) Install the reverse sleeve to reverse idler gear No.2.

NOTE:
Make sure to install the reverse sleeve in proper direction.

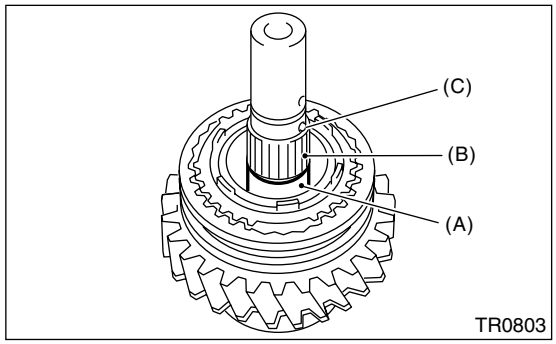


9) Sufficiently apply gear oil to the collar, needle bearing and inner periphery of reverse drive gear.
10) Install the outer baulk ring, reverse synchro cone and inner baulk ring.



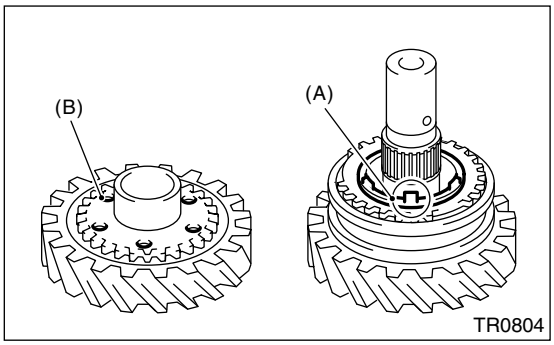
(A) Outer baulk ring
(B) Reverse synchro cone
(C) Inner baulk ring

11) Install the collar and needle bearing, then install the knock pin.



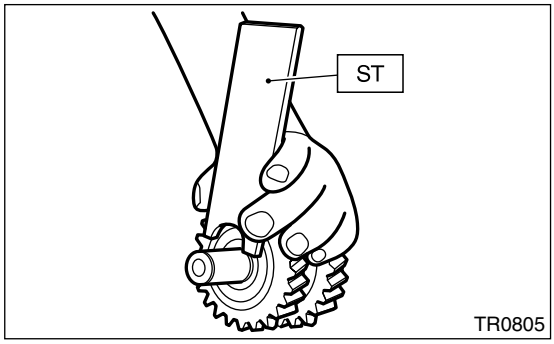
(A) Collar
(B) Needle bearing
(C) Knock pin

12) Align the protrusion portion of reverse synchro cone with reverse idler gear hole, then install the reverse idler gear.



(A) Protrusion portion of reverse synchro cone
(B) Reverse idler gear hole

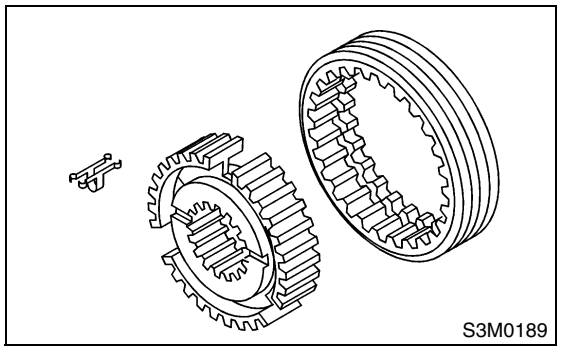
13) Install the washer with groove facing to reverse idler gear.
14) Using the ST, install the snap ring.
ST 18672AA000 GUIDE CLIP



15) Inspect and adjust the clearance between snap ring and washer. <Ref. to 6MT-100, INSPECTION, Reverse Idler Gear Assembly.>
16) Install a new spring pin.

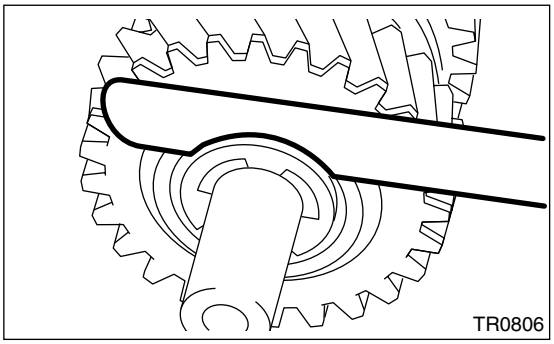
E: INSPECTION

Disassembled parts should be washed clean first and then inspected carefully.
1) Bearings
Replace the bearings in the following cases:
• Worn, rusted and damaged bearing
• Bearings that fail to turn smoothly or make abnormal noise when turned
• Bearings having other defects
2) Bushing (each gear)
Replace the bushings in the following case:
• When the sliding surface is damaged or abnormally worn.
3) Gears
Replace the gears in the following cases:
• The gear teeth surfaces are broken or excessively worn.
• The parts that contact the baulk ring is damaged.
• The inner surface of gear is damaged.
4) Baulk ring, synchro cone
Replace the baulk ring and synchro cone in the following case:
• Worn, rusted and damaged baulk ring
5) Shifting insert key
Replace the shifting insert key if deformed, excessively worn or defective in any way.



6) Inspect the clearance between snap ring and washer.

Specification of clearance:
0.1—0.3 mm (0.0039—0.0118 in)



Select and replace the snap ring from the following table if clearance is out of specification.

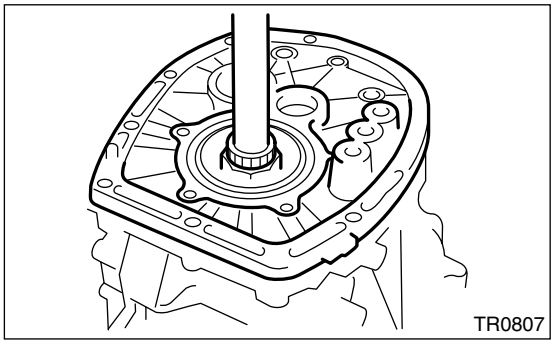
Snap ring	
Parts No.	Thickness mm (in)
031319000	1.50 (0.059)
805019030	1.60 (0.062)
805019010	1.72 (0.068)

Inspect the clearance again after replacing snap ring.

22.Drive Pinion Shaft Assembly

A: REMOVAL

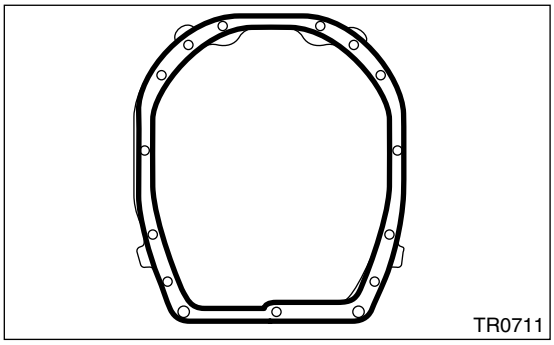
1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, REMOVAL, Oil Pipe.>, <Ref. to 6MT-47, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-45, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-60, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-62, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-64, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-68, REMOVAL, Transmission Case.>
9) Remove each gear assembly. <Ref. to 6MT-73, REMOVAL, Main Shaft Assembly.>
10) Remove the drive pinion shaft assembly.


TR0807

B: INSTALLATION

1) Completely remove the remaining gasket on drive plate and clutch housing.
2) Apply liquid gasket to the clutch housing.

Liquid gasket:
THREE BOND 1215

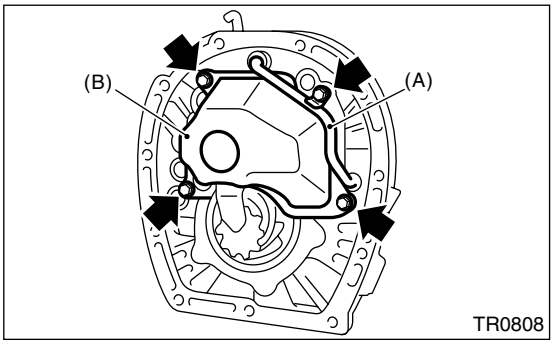

TR0711

3) Install each gear assembly. <Ref. to 6MT-74, INSTALLATION, Main Shaft Assembly.>
4) Install the transmission case. <Ref. to 6MT-69, INSTALLATION, Transmission Case.>
5) Install the oil pump. <Ref. to 6MT-65, INSTALLATION, Oil Pump.>
6) Install the center differential. <Ref. to 6MT-62, INSTALLATION, Center Differential.>
7) Install the transfer driven gear. <Ref. to 6MT-60, INSTALLATION, Transfer Driven Gear.>
8) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
9) Install the oil pipe, neutral position switch, baack-up light switch and harness. <Ref. to 6MT-44, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-47, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-45, INSTALLATION, Back-up Light Switch.>
10) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:
Replace the drive pinion shaft as a set with hypoid driven gear.

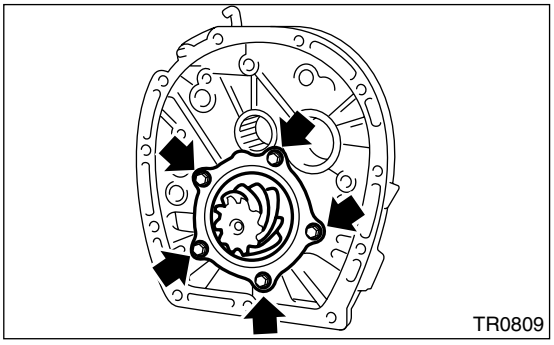
1) Remove the pipe and oil chamber.



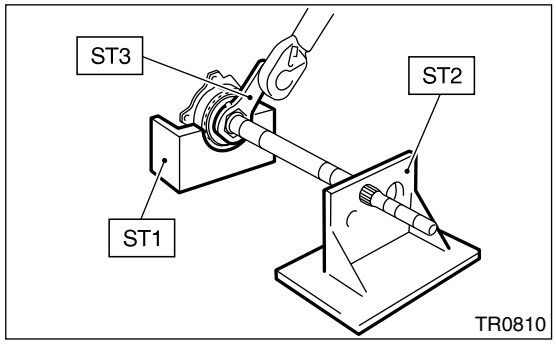
TR0808

(A) Pipe
(B) Oil chamber

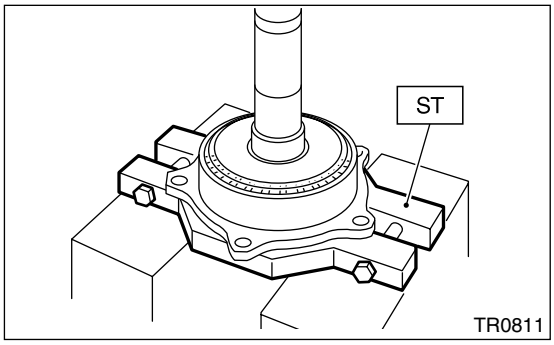
2) Remove the drive pinion shaft and shim from adapter plate.


TR0809

3) Secure the ST on workbench.
ST 18664AA000 BASE
4) Lift the caulking of lock nut.
5) Install the ST3 to lock nut, then set drive pinion shaft to ST. Remove the lock nut and washer.
ST1 18667AA000 HOLDER
ST2 18664AA000 BASE
ST3 18621AA000 ADAPTER WRENCH



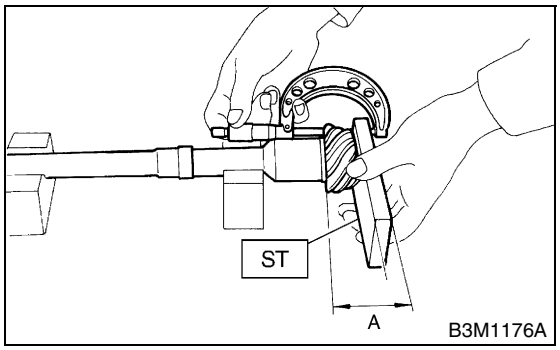
6) Using the ST, remove the taper roller bearing assembly.
ST 18723AA000 REMOVER



D: ASSEMBLY

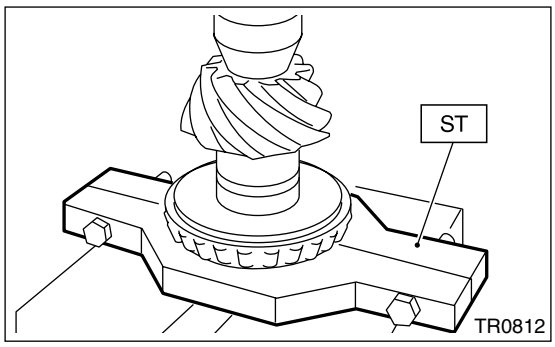
1) Using the ST, measure dimension A of drive pinion.

NOTE:
Note dimension A for selection of drive pinion shim.
ST 398643600 GAUGE



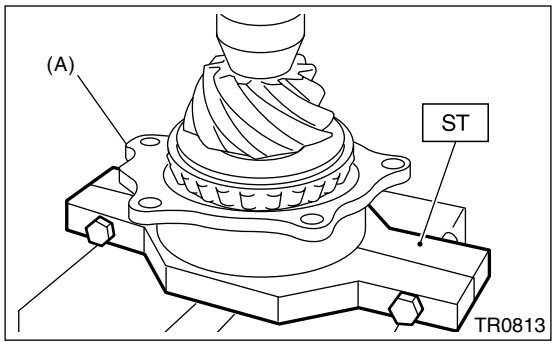
2) Install the inner bearing inner race to drive pinion shaft using ST and press.
ST 18723AA000 REMOVER

CAUTION:
Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



3) Install the retainer and outer bearing inner race to drive pinion shaft using ST and press.
ST 18723AA000 REMOVER

NOTE:
Press to the point where bearing is turned smoothly without slack.



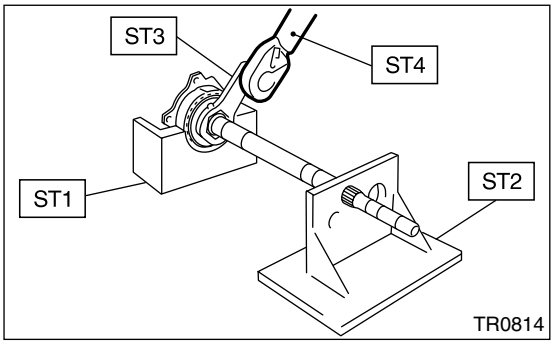
(A) Retainer

4) Install the washer and new lock nut.

5) Set the ST to drive pinion, then tighten the lock nut.
ST1 18667AA000 HOLDER
ST2 18664AA000 BASE
ST3 18621AA000 ADAPTER WRENCH
ST4 18852AA000 TORQUE WRENCH

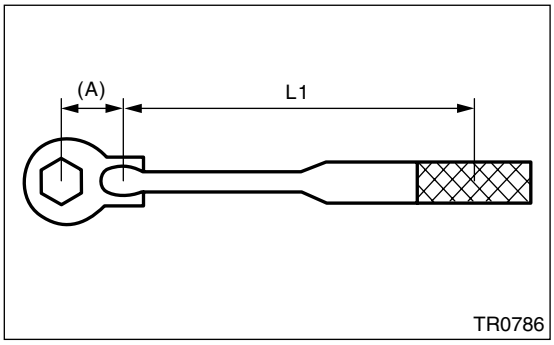
NOTE:
Tighten with the ST and torque wrench straight-lined.

Tightening torque:
265 N·m (27.0 kgf-m, 195 ft-lb)



NOTE:
• If torque wrench except ST4 is used, calculate the following equation, then tighten the lock nut.
• Tighten with the ST and torque wrench straight-lined.
T=L1/(0.1 + L1)×285

T N·m (kgf-m, ft-lb)	Setting value of torque wrench
L1 m (in)	Torque wrench length
0.1 m (3.94 in)	ST length
285 N·m (29.0 kgf-m, 210 ft-lb)	Tightening torque of lock nut

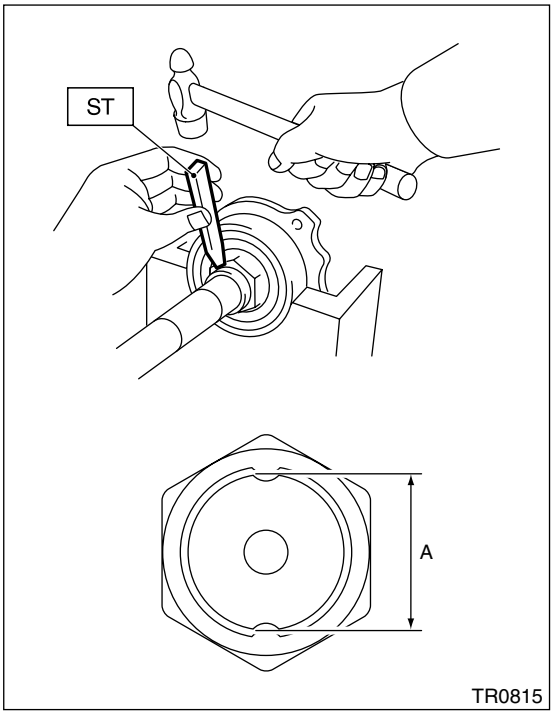


(A) 0.1 m (3.94 in)

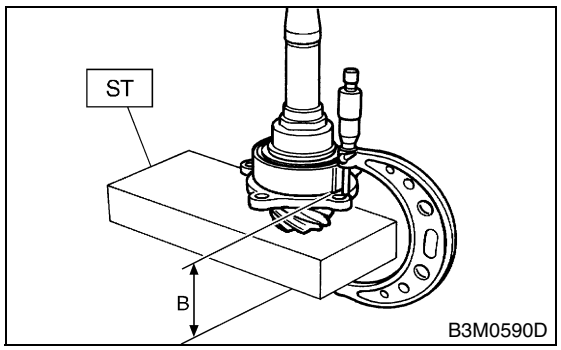
6) Measure the starting torque. <Ref. to 6MT-104, INSPECTION, Drive Pinion Shaft Assembly.>

7) Using the ST, caulk two portions on the lock nut to obtain dimension A 37 ± 0.5 mm (1.46 ± 0.02 in).
ST 18670AA000 PUNCH

CAUTION:
Do not crack the caulking part of lock nut.



8) Using the ST, measure dimension B of the drive pinion.
ST 398643600 GAUGE



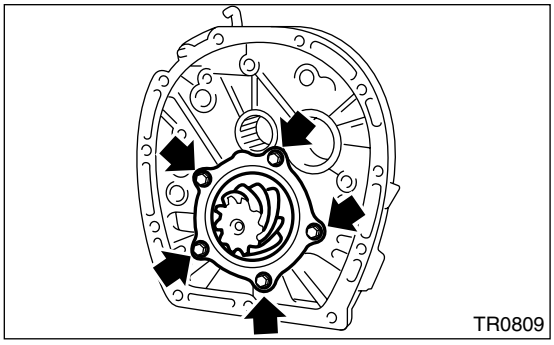
9) Calculate the following equation, then select one or two pieces of drive pinion shim from the table below.
6.5 ± 0.0625 mm — (B—A) [0.26 ± 0.0025 in — (B—A)]

NOTE:
A: Measured value from step 1).
B: Measured value from step 8).

Drive pinion shim	
Part No.	Thickness mm (in)
32295AA270	0.15 (0.0059)
32295AA280	0.175 (0.0069)
32295AA290	0.20 (0.0079)
32295AA300	0.225 (0.0089)
32295AA310	0.25 (0.0098)
32295AA320	0.275 (0.0108)

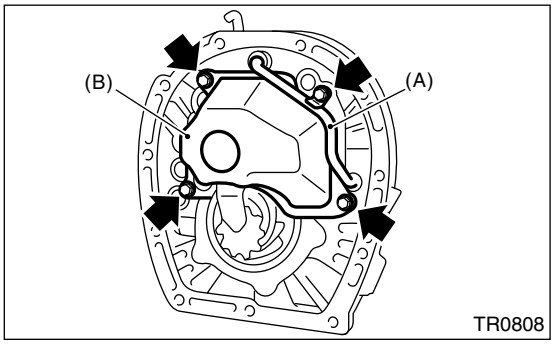
10) Apply gear oil to the side face of taper roller bearing, then install the drive pinion shaft and selected shim to adapter plate.

Tightening torque:
54 N·m (5.5 kgf-m, 40 ft-lb)


TR0809

11) Install the oil chamber and pipe.

Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



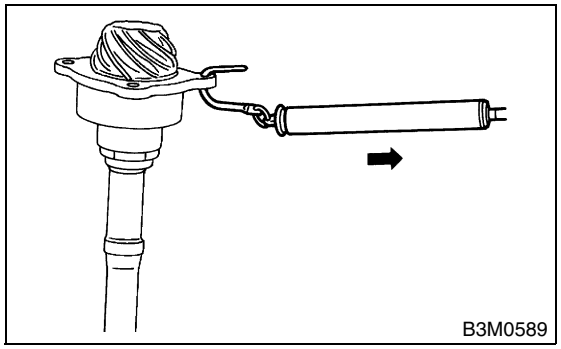
TR0808

(A) Pipe
(B) Oil chamber

E: INSPECTION

1) Using the spring balancer, measure the starting torque. If the starting torque is out of specification, replace the taper roller bearing.

Starting torque:
0 — 0.95 N (0 — 0.097 kgf, 0 — 0.21 lb)


B3M0589

2) Gears
Replace the gears in the following case:
• Gear teeth surfaces are broken or excessively worn.

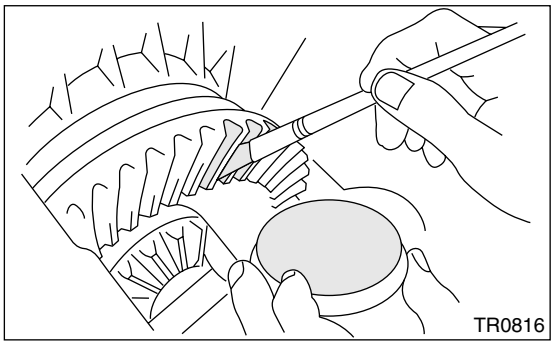
3) Bearings
Replace the bearings in the following cases:
• Worn, rusted and damaged bearing
• Bearings that fail to turn smoothly or make abnormal noise when turned

4) Adapter plate
Replace the adapter plate in the following cases:
• Worn, rusted and damaged bearing
• Damaged adapter plate

5) Make sure the pipe and pipe chamber is not damaged or clogged. Repair or replace if damaged or clogged.

F: ADJUSTMENT

1) Inspect and adjust the backlash between hypoid driven gear and drive pinion. <Ref. to 6MT-114, HYPOID GEAR BACKLASH, ADJUSTMENT, Front Differential Assembly.>
2) Apply a uniform thin coat of red lead on both teeth surfaces of three or four teeth of the hypoid driven gear.

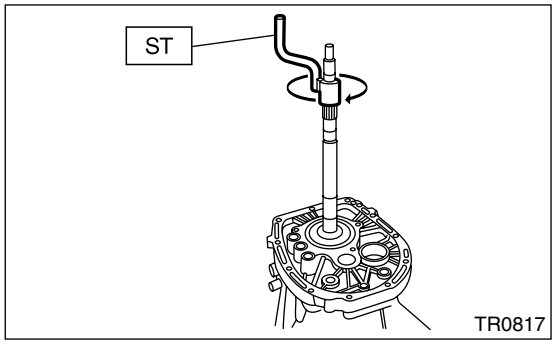


3) Install the drive pinion shaft assembly to clutch housing, then tighten at least four bolts.

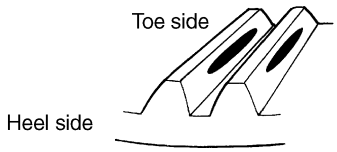
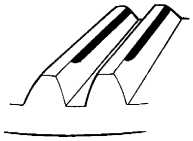
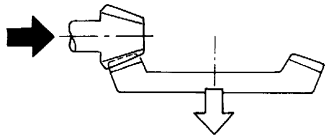
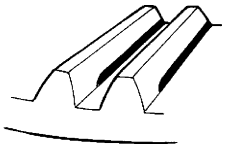
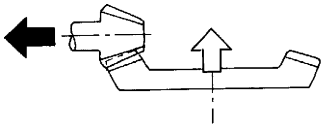
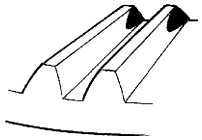
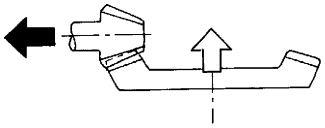
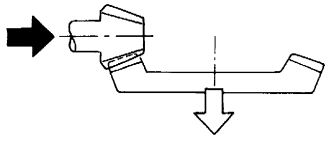
NOTE:
Install with the liquid gasket remaining to prevent the mating surface of clutch housing and adapter plate from damaging.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

4) Using the ST, rotate several times.
ST 18631AA000 HANDLE



5) Remove the drive pinion shaft assembly, and then check tooth contact. If it is inaccurate, adjust the backlash or thickness of shim.

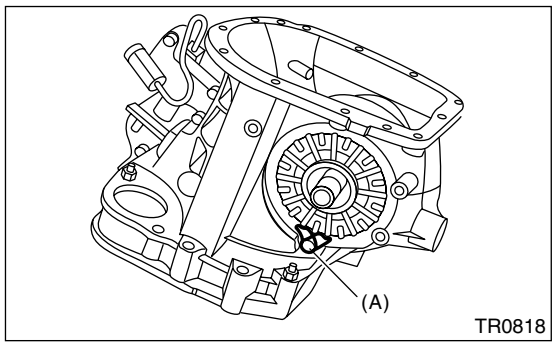
Checking item	Contact pattern	Corrective action
Tooth contact Tooth contact pattern is slightly shifted toward to under no-load rotation. [When loaded, contact pattern moves toward heel.]	 B3M0317A	—
Face contact Backlash is too large.	This may cause noise and chipping at tooth ends.  B3M0319	Increase thickness of drive pinion height adjusting shim in order to bring drive pinion close to crown gear.  B3M0323
Flank contact backlash is too small.	This may cause noise and stepped wear on surfaces.  B3M0320	Reduce thickness of drive pinion height adjusting shim in order to move drive pinion away from crown gear.  B3M0324
Toe contact (Inside end contact) Contact areas is small.	This may cause chipping at toe.  B3M0321	Adjust as for flank contact.  B3M0324
Heel contact (outside end contact) Contact area is small.	This may cause chipping at heel ends.  B3M0322	Adjust as for face contact.  B3M0323

➡ : Adjusting direction of drive pinion
⇨ : Adjusting direction of crown gear

23.Front Differential Assembly

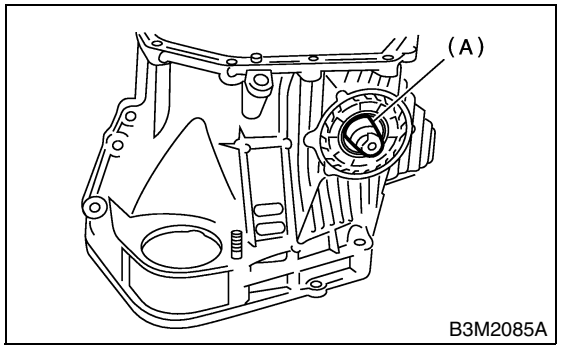
A: REMOVAL

1) Remove the manual transmission assembly. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, REMOVAL, Oil Pipe.>, <Ref. to 6MT-47, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-45, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-60, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-62, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-64, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-68, REMOVAL, Transmission Case.>
9) Remove each gear assembly. <Ref. to 6MT-73, REMOVAL, Main Shaft Assembly.>
10) Remove the drive pinion shaft assembly. <Ref. to 6MT-101, REMOVAL, Drive Pinion Shaft Assembly.>
11) Remove the lock plates on both side.



(A) Lock plate

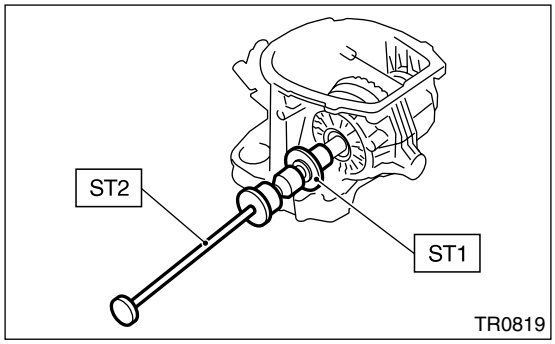
12) Wrap vinyl tape around the spline part of axle shaft.



(A) Vinyl tape

13) Using the ST, remove the axle shaft.
ST1 499247300 INSTALLER
ST2 499095500 REMOVER ASSY

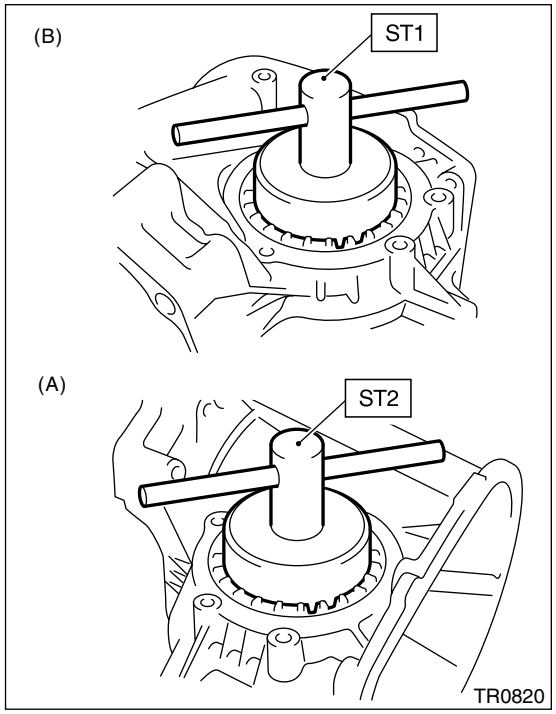
NOTE:
- Do not reuse the circlip.
- Mark to identify the right and left axle shaft.



14) Using the ST, remove the differential side retainer on both side.

ST1	499787000	WRENCH ASSY (RIGHT SIDE)
ST2	18630AA000	WRENCH ASSY (LEFT SIDE)

NOTE:
Be careful not to damage the part of clutch case where the retainer is to be installed.



(A) Right side
(B) Left side

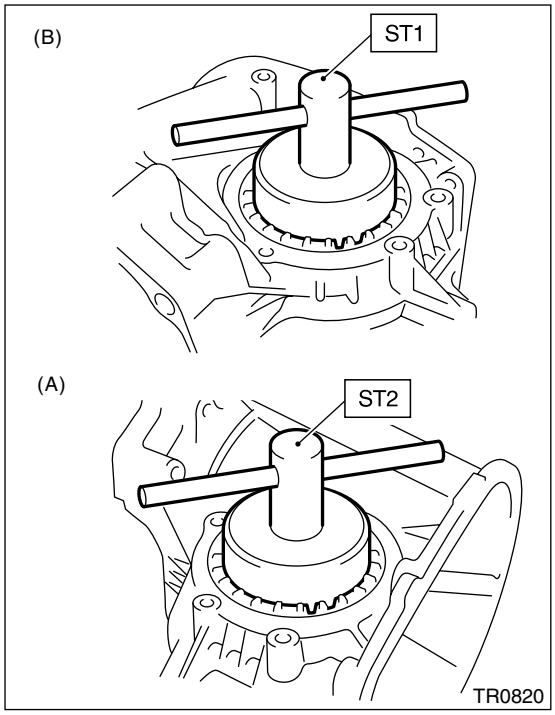
15) Remove the front differential.

B: INSTALLATION

1) Install the differential assembly into clutch housing.
2) Apply oil to the threaded portion part of side retainer.
3) Remove the O-ring from side retainer of both side.
4) Using the ST, install the differential side retainer to both side.

ST1	499787000	WRENCH ASSY (RIGHT SIDE)
ST2	18630AA000	WRENCH ASSY (LEFT SIDE)

NOTE:
Be careful not to damage the oil seal.



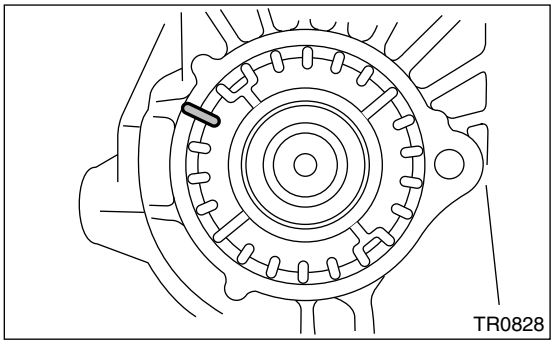
(A) Right side
(B) Left side

5) Install the axle shaft.

NOTE:
- Replace the circlip with a new one.
- Be careful not to confuse right and left axle shaft.
- Wrap vinyl tape around the spline part of axle shaft.

6) Check and adjust the hypoid gear backlash. <Ref. to 6MT-113, HYPOID GEAR BACKLASH, INSPECTION, Front Differential Assembly.>
7) Check and adjust the tooth contact. <Ref. to 6MT-105, ADJUSTMENT, Drive Pinion Shaft Assembly.>

8) Mark an engagement point on the right and left side retainer and clutch housing.



9) Remove the differential side retainer from both side.

NOTE:
Note the rotating number of time till removal, when removing the side retainer.

10) Install a new O-ring to side retainer of both side.

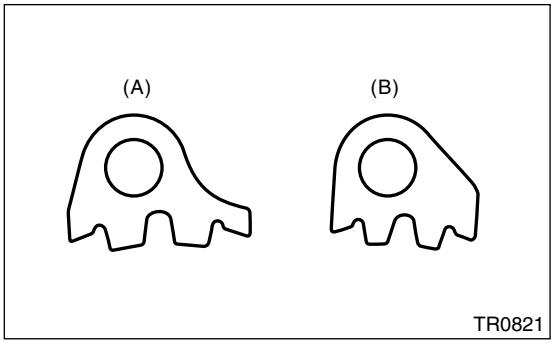
11) Install the differential side retainer to both side.

NOTE:
Install the side retainer by screwing in the same rotating number of time till removal, and then align the mark.

12) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)

NOTE:
Be careful not to confuse right and left lock plate.

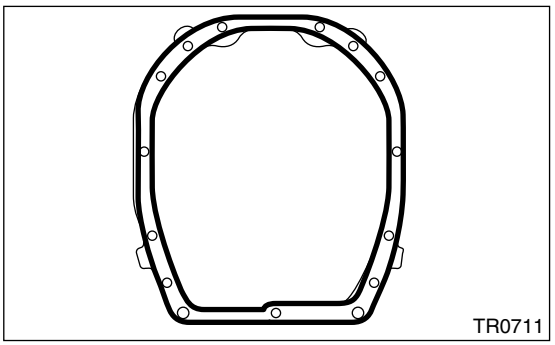


(A) Left
(B) Right

13) Completely remove the remaining gasket from the clutch housing and adapter plate.

14) Apply liquid gasket to the clutch housing.

Liquid gasket:
THREE BOND 1215

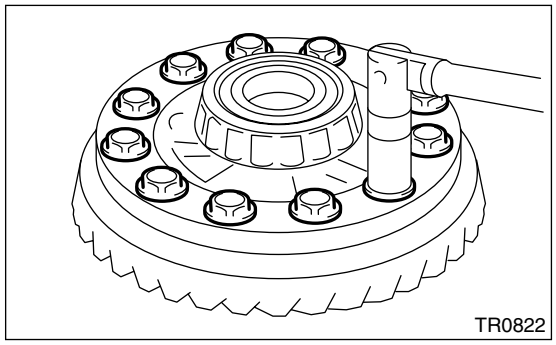


15) Install the drive pinion shaft assembly. <Ref. to 6MT-101, INSTALLATION, Drive Pinion Shaft Assembly.>
16) Install each gear assembly at once. <Ref. to 6MT-74, INSTALLATION, Main Shaft Assembly.>
17) Install the transmission case. <Ref. to 6MT-69, INSTALLATION, Transmission Case.>
18) Install the oil pump. <Ref. to 6MT-65, INSTALLATION, Oil Pump.>
19) Install the center differential. <Ref. to 6MT-62, INSTALLATION, Center Differential.>
20) Install the transfer driven gear. <Ref. to 6MT-60, INSTALLATION, Transfer Driven Gear.>
21) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
22) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-47, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-45, INSTALLATION, Back-up Light Switch.>
23) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

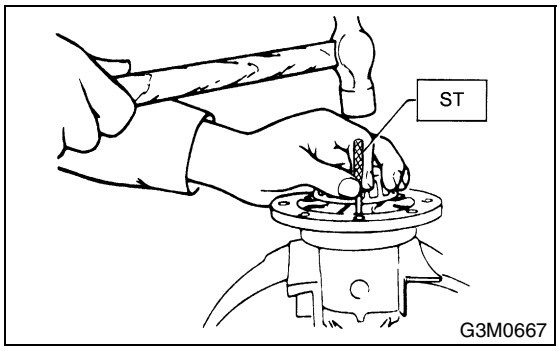
C: DISASSEMBLY

1. DIFFERENTIAL CASE

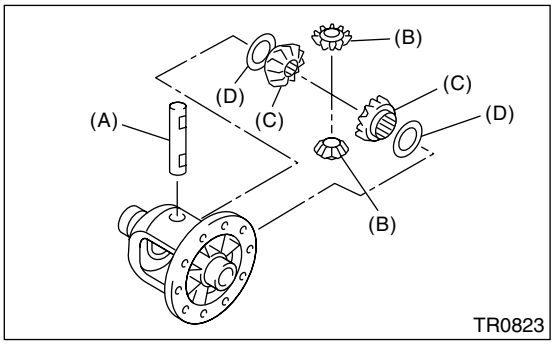
1) Secure the differential assembly on a vise, then remove the hypoid driven gear.



2) Drive out straight pin from the differential assembly toward hypoid driven gear. (Without LSD)
ST 899904100 REMOVER

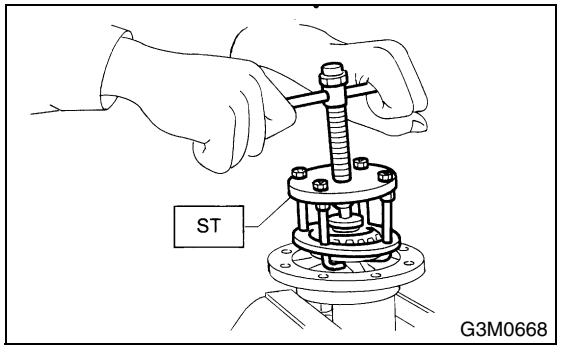


3) Pull out the pinion shaft, and remove the bevel pinion gear and bevel gear and washer. (Without LSD)



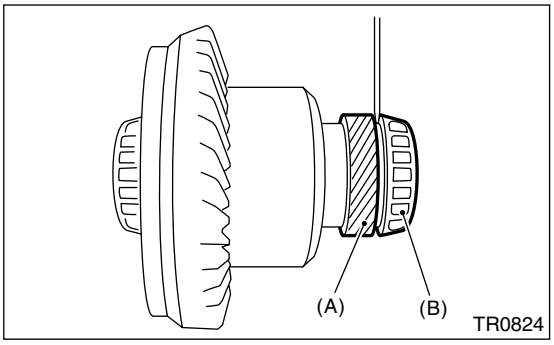
(A) Pinion shaft
(B) Bevel pinion gear
(C) Bevel gear
(D) Washer

4) Using the ST, remove the hypoid driven gear side bearing.
ST 399527700 PULLER SET



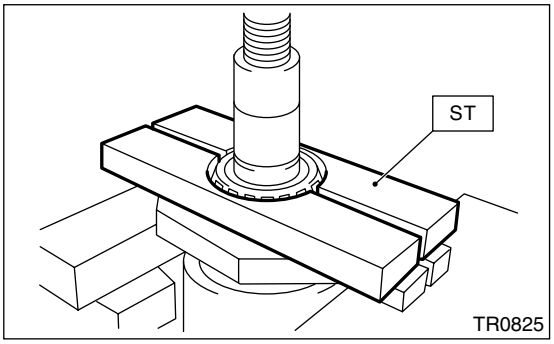
5) Using a screw driver, make clearance of 2—3 mm (0.079—0.118 in) between the speedometer drive gear and roller bearing.

NOTE:
Be careful not to damage the differential case.



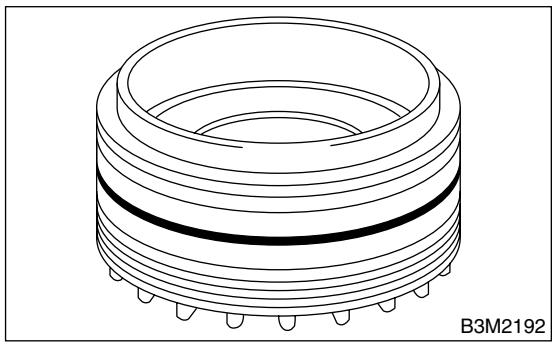
(A) Speedometer drive gear
(B) Roller bearing

6) Using the ST, remove the roller bearing.
ST 498077000 REMOVER

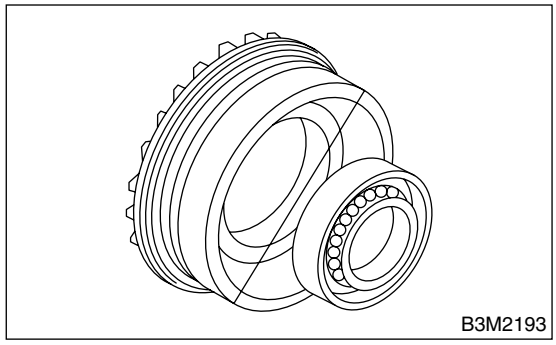


2. SIDE RETAINER

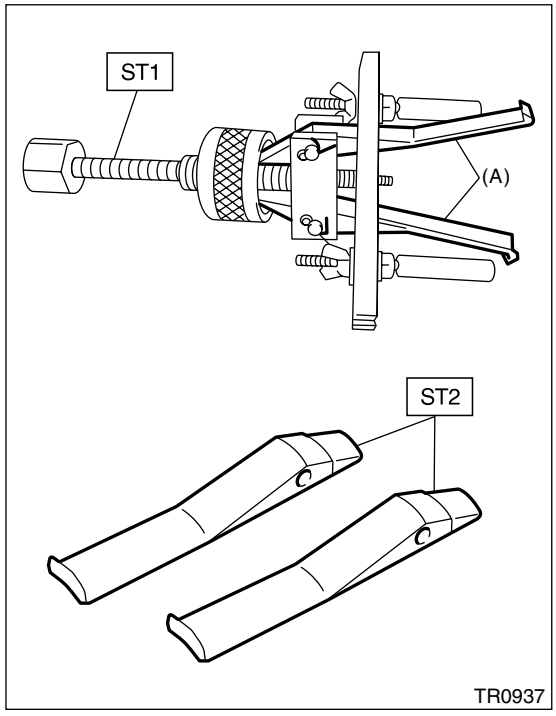
1) Remove the O-ring from side retainer.



2) Remove the oil seal from side retainer.

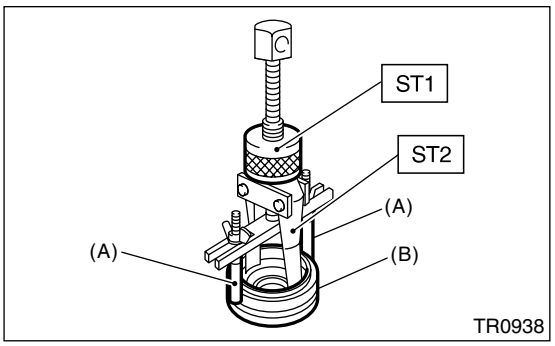


3) Remove the claw of ST1, and then install the claw of ST2.
ST1 398527700 PULLER ASSY
ST2 18760AA000 CLAW



(A) Claw

4) Remove the bearing outer race from side retainer.
ST1 398527700 PULLER ASSY
ST2 398527705 CLAW



(A) Shaft
(B) Side retainer

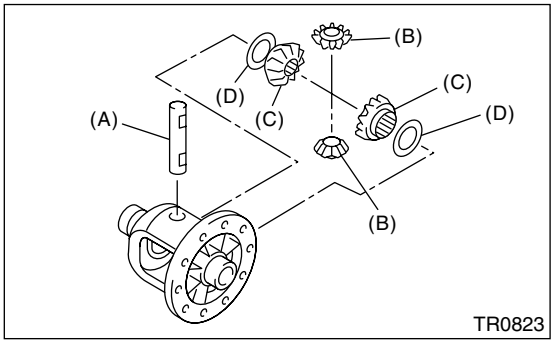
D: ASSEMBLY

1. DIFFERENTIAL CASE

1) Install the washer to bevel gear.

NOTE:
Face the chamfered side of washer toward gear.

2) Install the bevel gear and bevel pinion gear washer to differential case, and then insert the pinion shaft.

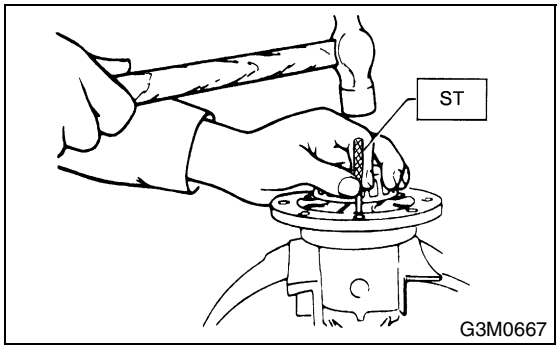


(A) Pinion shaft
(B) Bevel pinion gear
(C) Bevel gear
(D) Washer

3) Check the bevel pinion gear backlash. <Ref. to 6MT-113, BEVEL PINION GEAR BACKLASH, INSPECTION, Front Differential Assembly.>

4) Using the ST, align the pinion shaft and differential case at their holes, and drive straight pin into holes.

ST 899904100 REMOVER

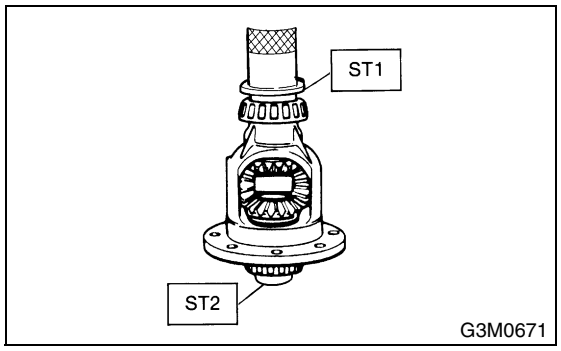


5) Using the ST, install a new speedometer drive gear and right and left side bearing inner race to differential case.

ST1 398437700 INSTALLER
ST2 398497701 SEAT

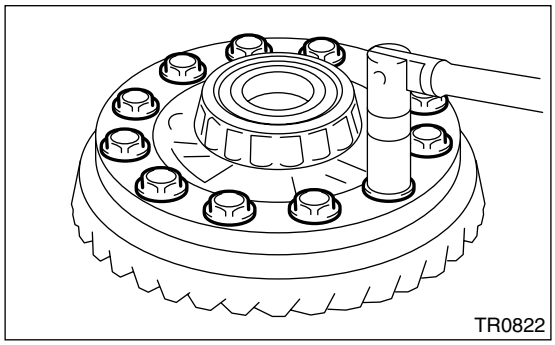
CAUTION:
Do not apply pressure in excess of 20 kN (2.0 ton, 2.2 US ton, 2.0 Imp ton).

NOTE:
Always replace the inner race and outer race as a set.



6) Install the hypoid driven gear to differential case.

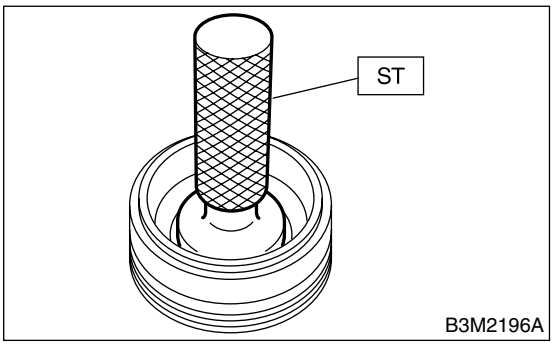
Tightening torque:
69 N·m (7.0 kgf-m, 50.9 ft-lb)



2. SIDE RETAINER

1) Using the ST, install the oil seal.

ST 499797000 OIL SEAL INSTALLER



2) Install the bearing outer race to retainer on both side.

3) Install the O-ring to retainer on both side.

NOTE:
- Be careful not to damage the O-ring.

E: INSPECTION

Repair or replace the front differential in following cases:
• Each gear is damaged, seized, or excessively worn.
• Sliding surfaces of the differential case is damaged, seized or excessively worn.
• Bearings and bearings part is damaged, rusted or worn.
• Bearings that fail to turn smoothly or make abnormal noise when turned.

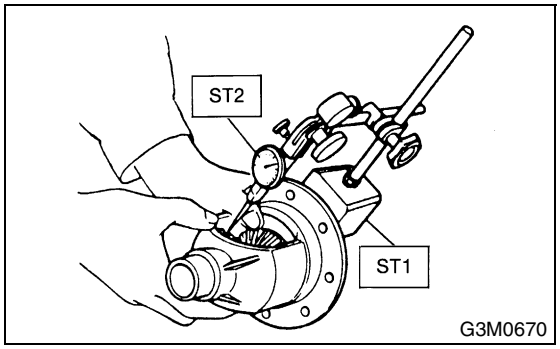
1. BEVEL PINION GEAR BACKLASH

Measure the bevel pinion gear backlash. If it is not within specifications, install a suitable washer to adjust it. <Ref. to 6MT-114, ADJUSTMENT, Front Differential Assembly.>

NOTE:
• Be sure the pinion gear teeth contacts adjacent gear teeth during measurement.
• Before measuring the backlash, rotate each gear to get each part accustomed.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

Standard backlash:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



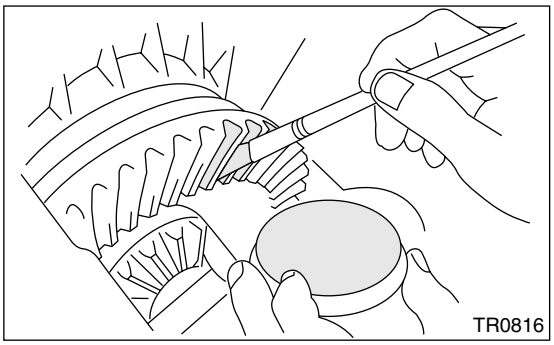
2. HYPOID GEAR BACKLASH

Check the hypoid gear backlash. If it is not within specifications, adjust it. <Ref. to 6MT-114, HYPOID GEAR BACKLASH, Front Differential Assembly.>

3. TOOTH CONTACT OF HYPOID GEAR

1) Be sure the hypoid gear backlash is within specifications. If it is not within specifications, adjust it. <Ref. to 6MT-114, HYPOID GEAR BACKLASH, Front Differential Assembly.>

2) Apply a uniform thin coat of red lead on both tooth surfaces of three or four teeth of the hypoid driven gear.



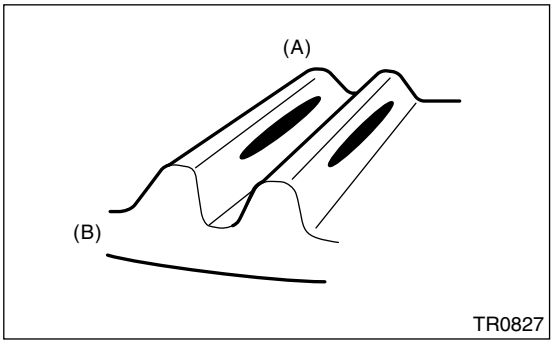
3) Install the drive pinion shaft assembly, and then secure with four bolts.

NOTE:
Use the old gasket and washer to prevent the mating surface of housing from damaging.

Tightening torque:
69 N·m (7.0 kgf-m, 50.9 ft-lb)

4) Rotate the drive pinion shaft to right and left for several times.
5) Remove the drive pinion shaft assembly, and then check tooth contact. If tooth contact is inaccurate, adjust it. <Ref. to 6MT-105, ADJUSTMENT, Drive Pinion Shaft Assembly.>
• Correct tooth contact.

NOTE:
Under no load, tooth contacts 50—60% from center to toe side (tooth contact shifts to heel side when driving).

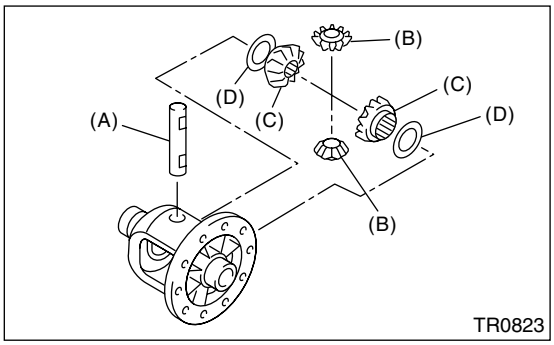


(A) Toe side
(B) Heel side

F: ADJUSTMENT

1. BEVEL PINION GEAR BACKLASH

1) Measure the bevel pinion gear backlash. <Ref. to 6MT-113, BEVEL PINION GEAR BACKLASH, INSPECTION, Front Differential Assembly.>
2) Disassemble the differential case. <Ref. to 6MT-110, DIFFERENTIAL CASE, DISASSEMBLY, Front Differential Assembly.>
3) Select a washer from the following table, and then assemble the differential case. <Ref. to 6MT-112, DIFFERENTIAL CASE, ASSEMBLY, Front Differential Assembly.>



(A) Pinion shaft
(B) Bevel pinion gear
(C) Bevel gear
(D) Washer

NOTE:
If the backlash is excessive, select a thicker shim. If the backlash is insufficient, select a thinner new shim.

Washer	
Part No.	Thickness mm (in)
803038021	0.925 — 0.950 (0.0364 — 0.0374)
803038022	0.975 — 1.000 (0.0384 — 0.0394)
803038023	1.025 — 1.050 (0.0404 — 0.0413)

2. HYPOID GEAR BACKLASH

1) Install the right and left side retainer.
ST1 499787000 WRENCH ASSY (RIGHT SIDE)
ST2 18630AA000 WRENCH ASSY (LEFT SIDE)

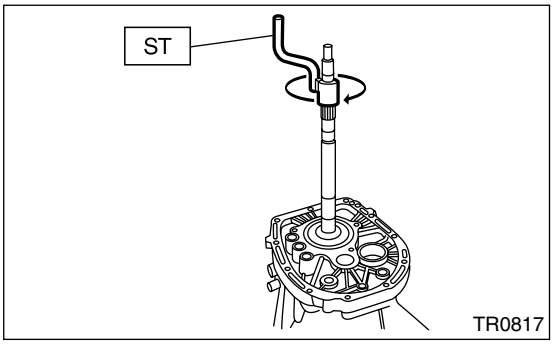
NOTE:
Screw in the right side retainer a bit further than left side.

2) Install the drive pinion shaft assembly, and then secure with four bolts.

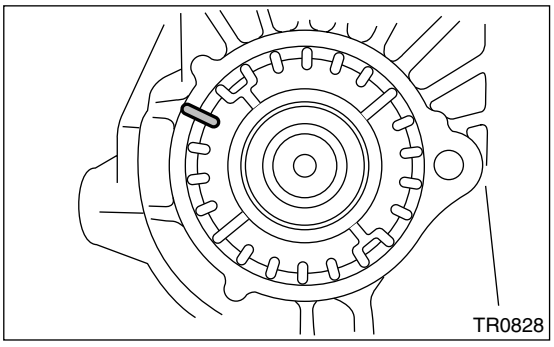
NOTE:
Use the old gasket and washer to prevent the mating surface of housing from damaging.

Tightening torque:
69 N·m (7.0 kgf-m, 50.9 ft-lb)

3) Using the ST, screw in the left side retainer until the drive pinion and hypoid driven gear contacts lightly. Then loosen the right side retainer.
ST1 499787000 WRENCH ASSY (RIGHT SIDE)
ST2 18630AA000 WRENCH ASSY (LEFT SIDE)
4) Using the ST, rotate the drive pinion shaft several times.
ST 18631AA000 HANDLE

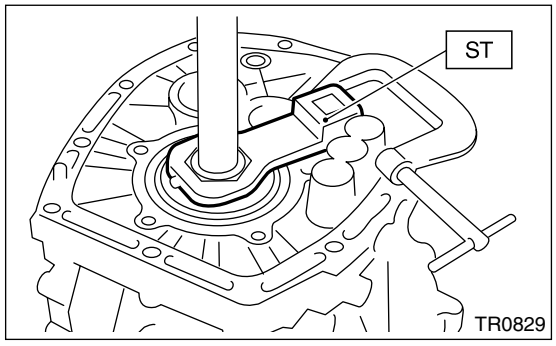


5) Repeat step 3) and 4) until the left side retainer can not be rotated. For the right side retainer, screw in until the inner race and outer race contacts lightly. This condition is “0” backlash.
6) Mark an engagement point on the right and left side retainer and clutch housing.



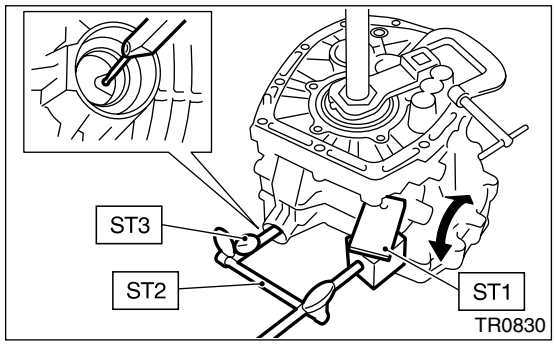
7) Return the left side retainer for three teeth, and screw in the right side retainer for three teeth.

8) Using the ST, secure the drive pinion shaft.
ST 18621AA000 ADAPTER WRENCH



9) After rotating the drive pinion shaft several times, measure the hypoid gear backlash using the ST.
ST1 498255400 PLATE
ST2 498247001 MAGNET BASE
ST3 498247100 DIAL GAUGE

Hypoid gear backlash:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



10) If the backlash is out of specification, adjust it by turning the right and left side retainers.
11) Screw in the right side retainer for further 1.75 teeth.

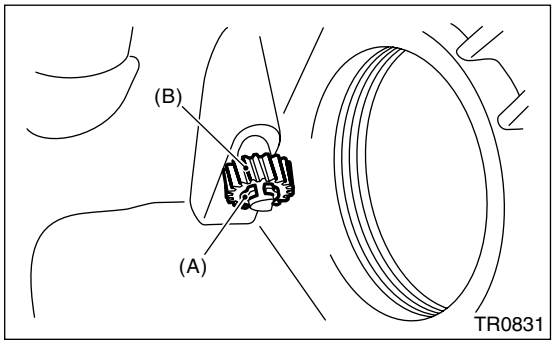
3. TOOTH CONTACT OF HYPOID GEAR

Refer to the section of drive pinion shaft for checking of tooth contact. <Ref. to 6MT-113, TOOTH CONTACT OF HYPOID GEAR, INSPECTION, Front Differential Assembly.>

24.Speedometer Gear

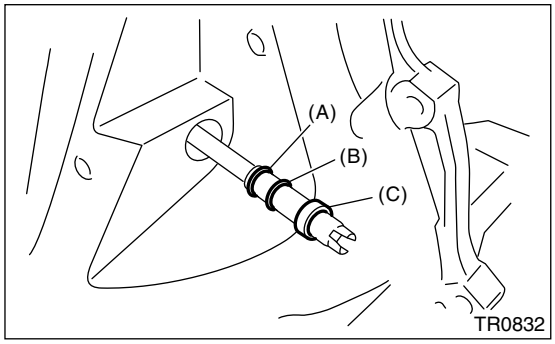
A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, REMOVAL, Oil Pipe.>, <Ref. to 6MT-47, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-45, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-60, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-62, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-64, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-68, REMOVAL, Transmission Case.>
9) Remove each gear assembly. <Ref. to 6MT-73, REMOVAL, Main Shaft Assembly.>
10) Remove the drive pinion shaft assembly. <Ref. to 6MT-101, REMOVAL, Drive Pinion Shaft Assembly.>
11) Remove the front differential assembly. <Ref. to 6MT-107, REMOVAL, Front Differential Assembly.>
12) Remove the vehicle speed sensor. <Ref. to 6MT-34, REMOVAL, Vehicle Speed Sensor.>
13) Remove the snap ring, and then remove the speedometer driven gear.



(A) Snap ring
(B) Speedometer driven gear

14) Remove the speedometer shaft from clutch housing.
15) Remove the oil seal, speedometer shaft and washer.

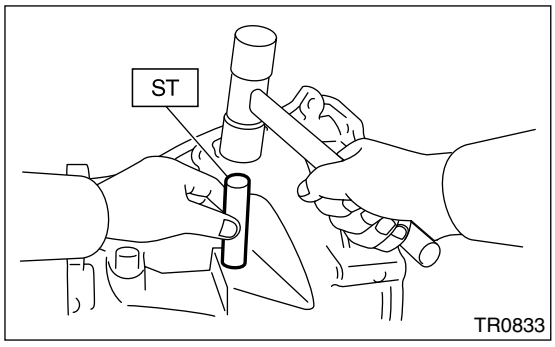


(A) Washer
(B) Snap ring
(C) Oil seal

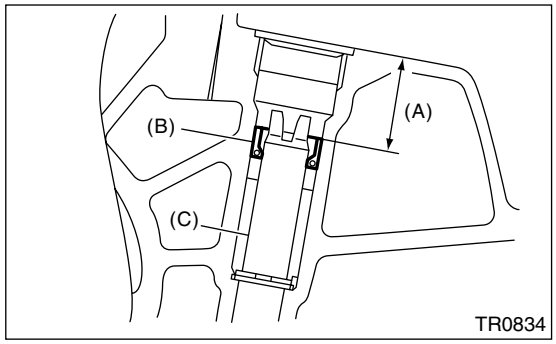
16) Remove the snap ring from speedometer shaft.

B: INSTALLATION

1) Install the oil seal, washer and snap ring to speedometer shaft.
2) Insert the speedometer shaft. Using the ST, press the oil seal.
ST 899824100 or 499827000 PRESS

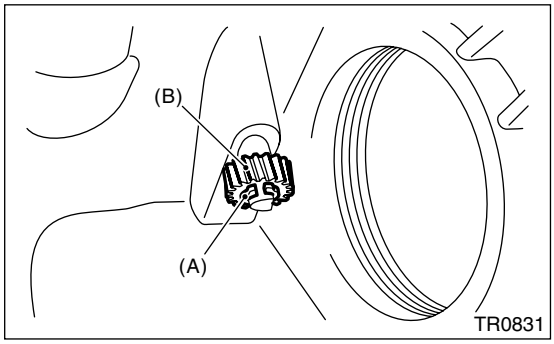


NOTE:
• Replace the oil seal with a new one.
• Insert the oil seal approx. 24 mm (0.94 in) from the edge of clutch case.



(A) Approx. 24 mm (0.94 in)
(B) Oil seal
(C) Speedometer shaft

3) Install the speedometer driven gear and snap ring.



(A) Snap ring
(B) Speedometer driven gear

4) Install the vehicle speed sensor. <Ref. to 6MT-34, INSTALLATION, Vehicle Speed Sensor.>
5) Install the front differential assembly. <Ref. to 6MT-108, INSTALLATION, Front Differential Assembly.>
6) Install the drive pinion shaft assembly. <Ref. to 6MT-101, INSTALLATION, Drive Pinion Shaft Assembly.>
7) Install each gear assembly at once. <Ref. to 6MT-74, INSTALLATION, Main Shaft Assembly.>
8) Install the transmission case. <Ref. to 6MT-69, INSTALLATION, Transmission Case.>
9) Install the oil pump. <Ref. to 6MT-65, INSTALLATION, Oil Pump.>
10) Install the center differential. <Ref. to 6MT-62, INSTALLATION, Center Differential.>
11) Install the transfer driven gear. <Ref. to 6MT-60, INSTALLATION, Transfer Driven Gear.>
12) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
13) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-47, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-45, INSTALLATION, Back-up Light Switch.>
14) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

25.Shifter Fork and Rod

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, REMOVAL, Oil Pipe.>, <Ref. to 6MT-47, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-45, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-60, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-62, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-64, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-68, REMOVAL, Transmission Case.>
9) Remove each gear assembly. <Ref. to 6MT-73, REMOVAL, Main Shaft Assembly.>

B: INSTALLATION

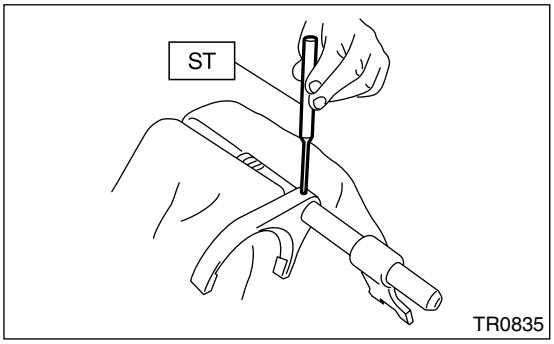
1) Install each gear assembly at once. <Ref. to 6MT-74, INSTALLATION, Main Shaft Assembly.>
2) Install the transmission case. <Ref. to 6MT-69, INSTALLATION, Transmission Case.>
3) Install the oil pump. <Ref. to 6MT-65, INSTALLATION, Oil Pump.>
4) Install the center differential. <Ref. to 6MT-62, INSTALLATION, Center Differential.>
5) Install the transfer driven gear. <Ref. to 6MT-60, INSTALLATION, Transfer Driven Gear.>
6) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
7) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-47, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-45, INSTALLATION, Back-up Light Switch.>
8) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

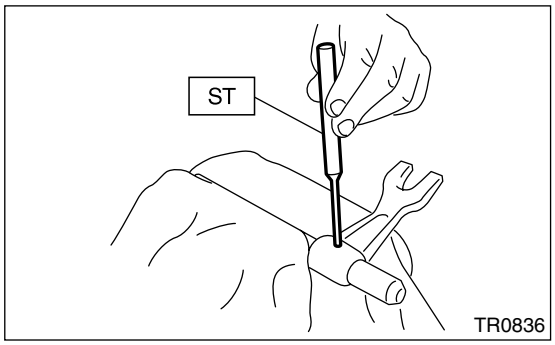
NOTE:
Discard the removed spring pin and replace with a new one.

1. REVERSE SHIFTER FORK

1) Using the ST, remove the reverse fork.
ST 398791700 REMOVER

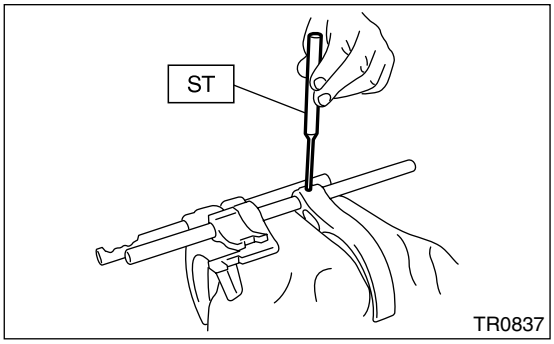


2) Using the ST, remove the reverse shifter arm.
ST 398791700 REMOVER

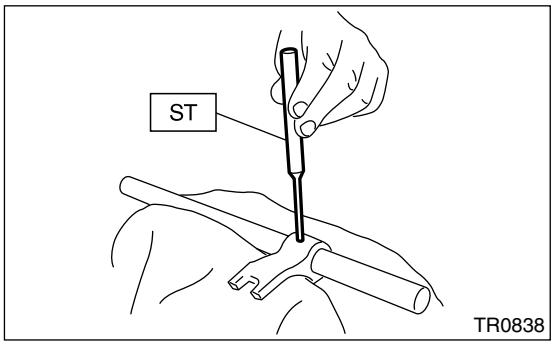


2. 1ST-2ND, 3RD-4TH SHIFTER FORK

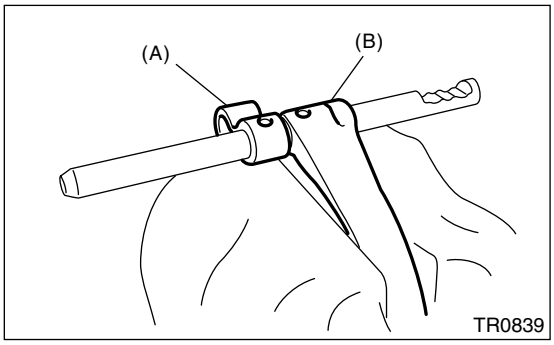
1) Using the ST, remove the 3rd-4th shifter fork.
ST 398791700 REMOVER



2) Using the ST, remove the 3rd-4th shifter arm.
ST 398791700 REMOVER



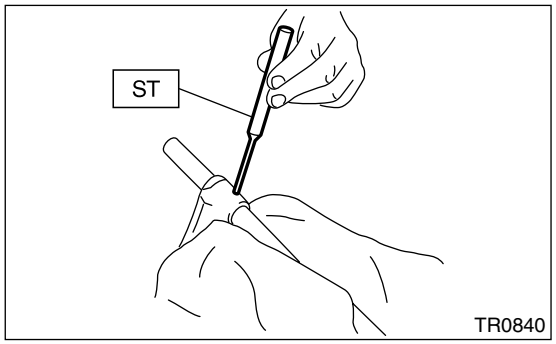
3) Using the ST, remove the 1st-2nd shifter arm and 1st-2nd shifter fork.
ST 398791700 REMOVER



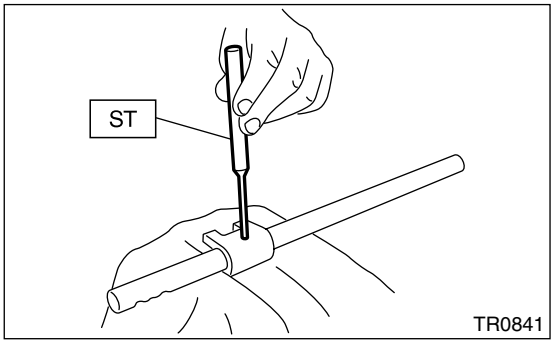
(A) 1st-2nd shifter arm
(B) 1st-2nd shifter fork

3. 5TH-6TH SHIFTER FORK

1) Using the ST, remove the 5th-6th shifter fork.
ST 398791700 REMOVER

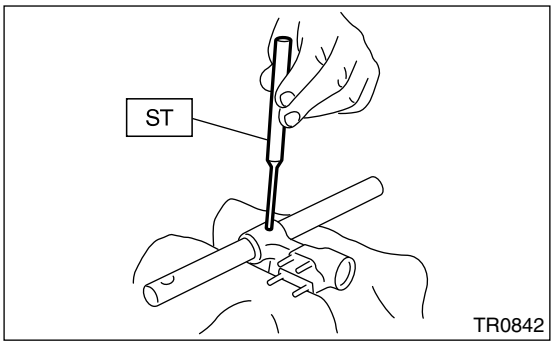


2) Using the ST, remove the 5th-6th shifter arm.
ST 398791700 REMOVER



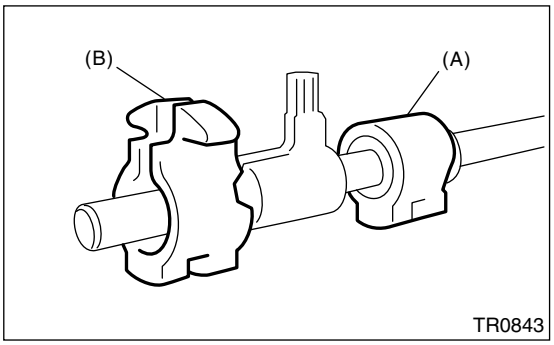
4. SHIFT ARM SHAFT

Using the ST, remove the selector arm.
ST 398791700 REMOVER



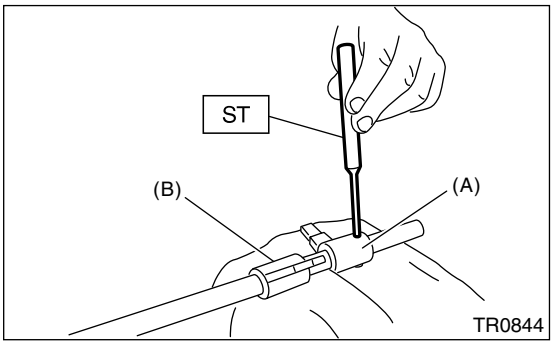
5. STRIKING ROD

1) Remove the reverse interlock block and interlock block from striking rod.



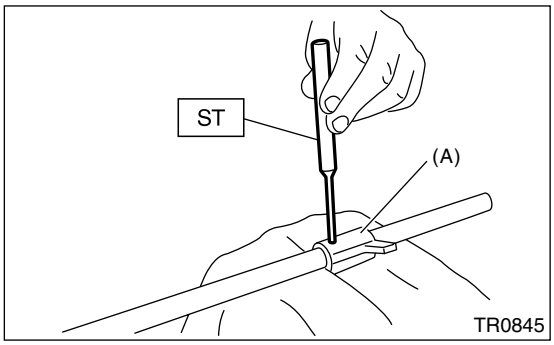
(A) Reverse interlock block
(B) Interlock block

2) Using the ST, remove the reverse interlock arm.
ST 398791700 REMOVER



(A) Reverse interlock arm
(B) Interlock arm

3) Using the ST, remove the interlock arm.
ST 398791700 REMOVER



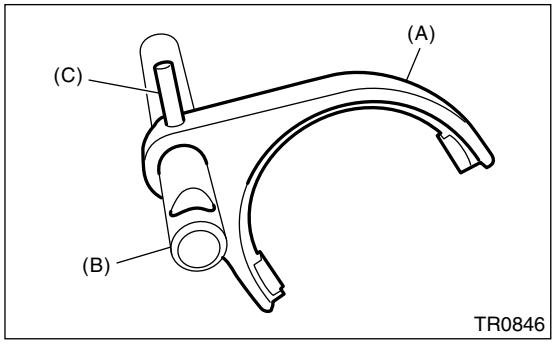
(A) Interlock arm

D: ASSEMBLY

1. REVERSE SHIFTER FORK

1) Using the ST, install the reverse fork.
ST 398791700 REMOVER

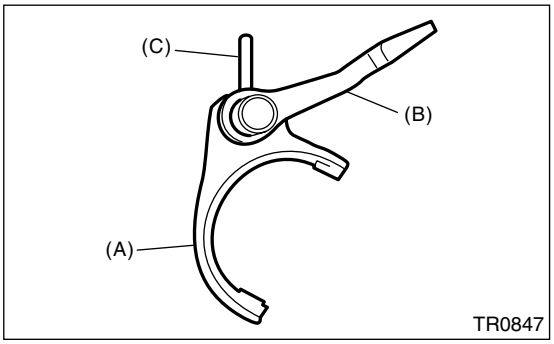
NOTE:
Make sure to install the reverse fork and rod in proper direction.



(A) Reverse fork
(B) Reverse rod
(C) Spring pin

2) Using the ST, install the reverse arm.
ST 398791700 REMOVER

NOTE:
Make sure to install the reverse arm and rod in proper direction.

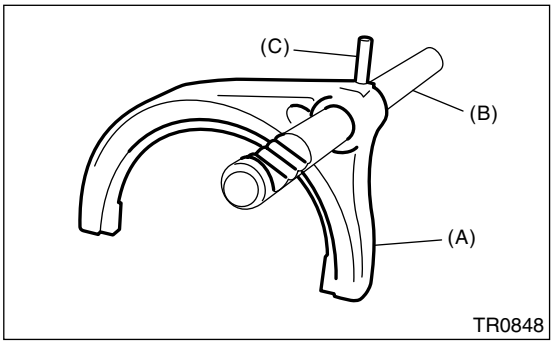


(A) Reverse arm
(B) Reverse rod
(C) Spring pin

2. 1ST-2ND, 3RD-4TH SHIFTER FORK

1) Using the ST, install the 1st-2nd shifter fork.
ST 398791700 REMOVER

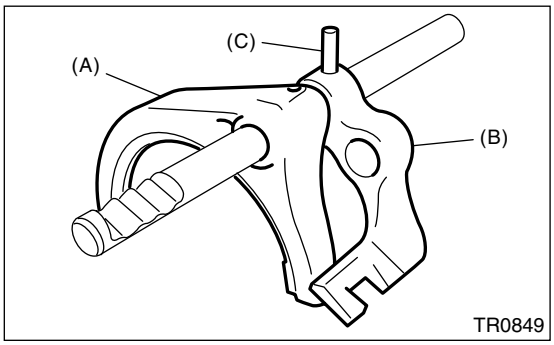
NOTE:
Make sure to install the 1st-2nd shifter fork and rod in proper direction.



(A) 1st-2nd shifter fork
(B) 1st-2nd shifter rod
(C) Spring pin

2) Using the ST, install the 1st-2nd shifter arm.
ST 398791700 REMOVER

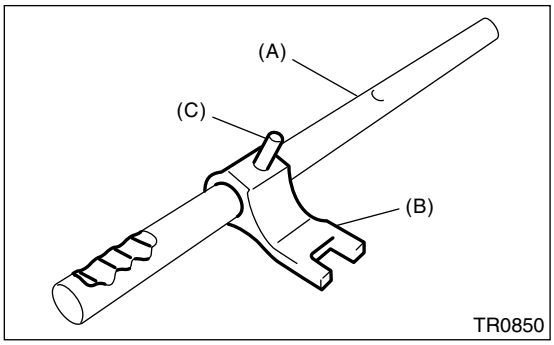
NOTE:
Make sure to install the 1st-2nd shifter arm and fork in proper direction.



(A) 1st-2nd shifter fork
(B) 1st-2nd shifter arm
(C) Spring pin

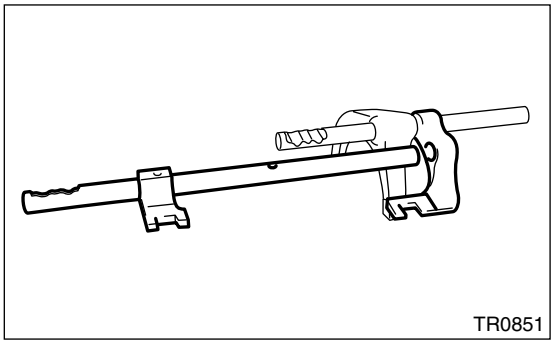
3) Using the ST, install the 3rd-4th shifter arm.
ST 398791700 REMOVER

NOTE:
Make sure to install the 3rd-4th shifter arm and rod in proper direction.



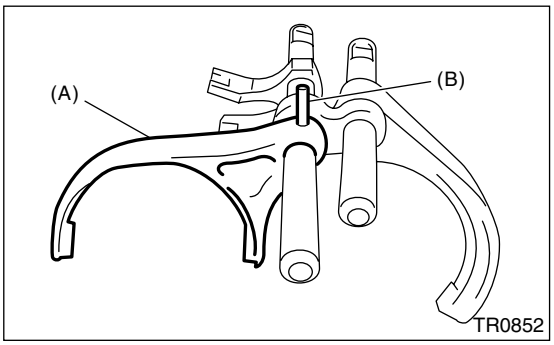
(A) 3rd-4th shifter rod
(B) 3rd-4th shifter arm
(C) Spring pin

4) Install the 3rd-4th fork rod into 1st-2nd shifter arm.



5) Using the ST, install the 3rd-4th shifter fork.
ST 398791700 REMOVER

NOTE:
Make sure to install the 3rd-4th shifter fork in proper direction.

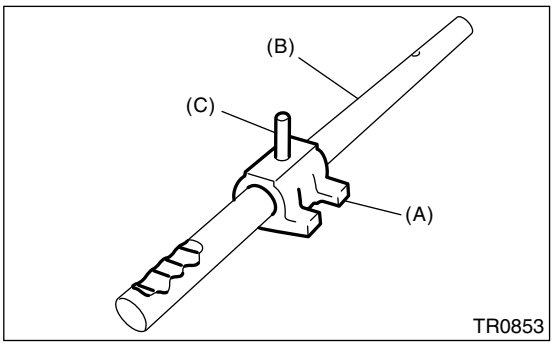


(A) 3rd-4th shifter fork
(B) Spring pin

3. 5TH-6TH SHIFTER FORK

1) Using ST, install the 5th-6th shifter arm.
ST 398791700 REMOVER

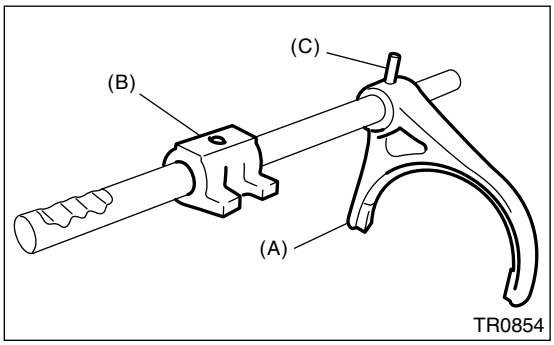
NOTE:
Make sure to install the 5th-6th shifter arm and rod in proper direction.



(A) 5th-6th shifter arm
(B) 5th-6th shifter rod
(C) Spring pin

2) Using the ST, install the 5th-6th shifter fork.
ST 398791700 REMOVER

NOTE:
Make sure to install the 5th-6th shifter fork and arm in proper direction.

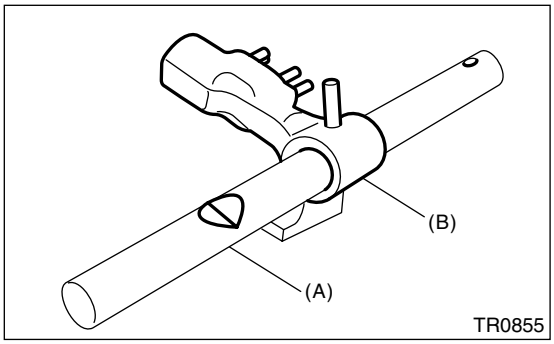


(A) 5th-6th shifter fork
(B) 5th-6th shifter arm
(C) Spring pin

4. SHIFT ARM SHAFT

Using the ST, install the selector arm.
ST 398791700 REMOVER

NOTE:
Make sure to install the selector arm and rod in proper direction.

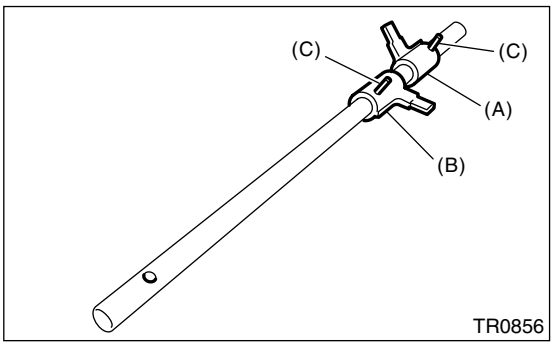


(A) Selector rod
(B) Selector arm

5. STRIKING ROD

1) Using the ST, install the reverse interlock arm and interlock arm.
ST 398791700 REMOVER

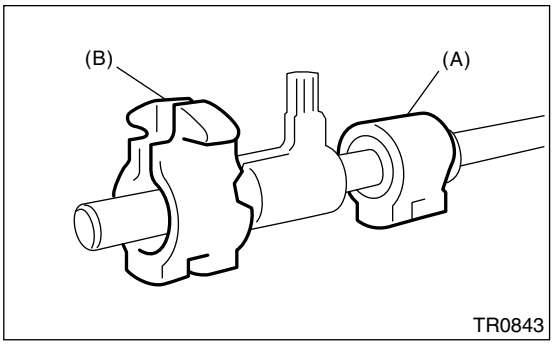
NOTE:
• Make sure to install the reverse interlock arm and rod in proper direction.
• Make sure to install the interlock arm and rod in proper direction.



(A) Reverse interlock arm
(B) Interlock arm
(C) Spring pin

2) Install the reverse interlock block and interlock block to striking rod.

NOTE:
Make sure to install the reverse interlock block and interlock block in proper direction.



(A) Reverse interlock block
(B) Interlock block

E: INSPECTION

1) Check the shift shaft and shift rod for damage. Replace if damaged.
2) Repair or replace the gearshift mechanism if excessively worn, bent, or defective in any way.

F: ADJUSTMENT

1. SELECTION OF 1ST-2ND FORK ROD

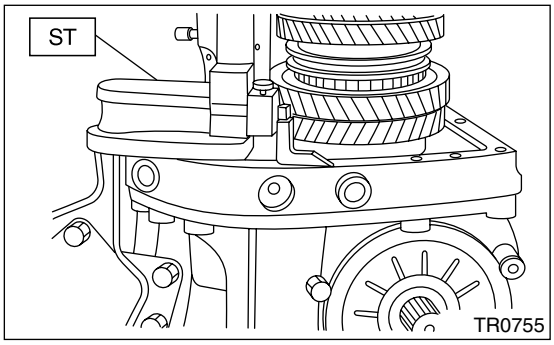
NOTE:
Perform the following procedures when:

- Replacing the 1st, 2nd driven gear.
- Replacing the 1st, 2nd synchro ring assembly.
- Replacing the adapter plate.
- Replacing the driven shaft.

1) Insert the drive pinion assembly in adapter plate.

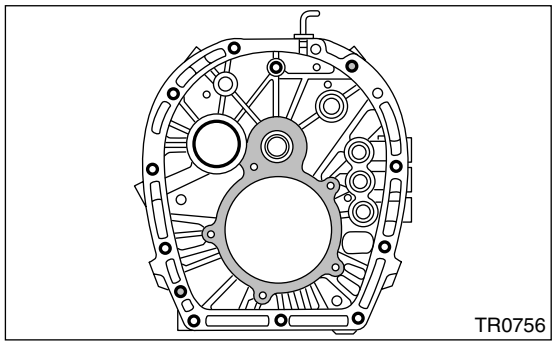
NOTE:
Make sure the thrust bearing outer race is not removed and drive pinion is not lift-up.

2) Set the height gauge to adapter plate. Lower the indicator of height gauge to mating surface of adapter plate and case, then set to zero point.
ST 18853AA000HEIGHT GAUGE



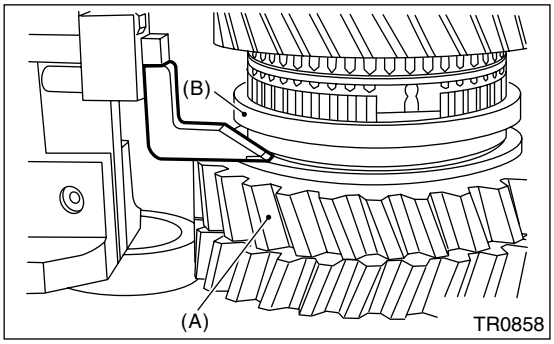
NOTE:

- Remove the remaining gasket on edge surface with scraper, since the adapter plate is base point of measurement.
- Do not place the height gauge on shaded area in the figure during measurement.



3) Select the main shaft snap ring. <Ref. to 6MT-85, ADJUSTMENT, Main Shaft Assembly.>

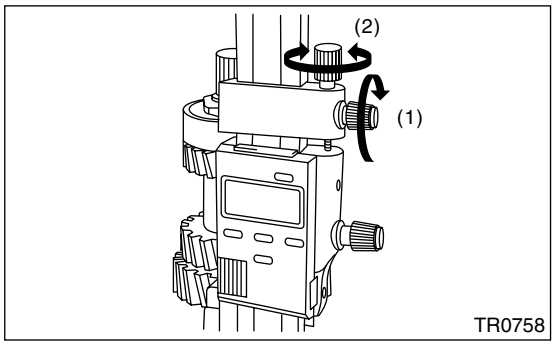
4) Shift the 1st-2nd sleeve to 1st driven gear side, then press down to the stopper and measure “B1”.



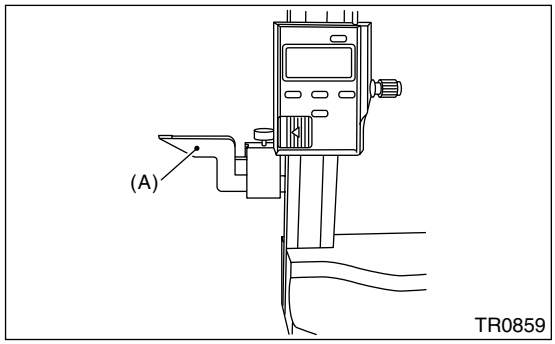
(A) 1st driven gear
(B) 1st-2nd sleeve

NOTE:

- Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 1st side.
- Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.

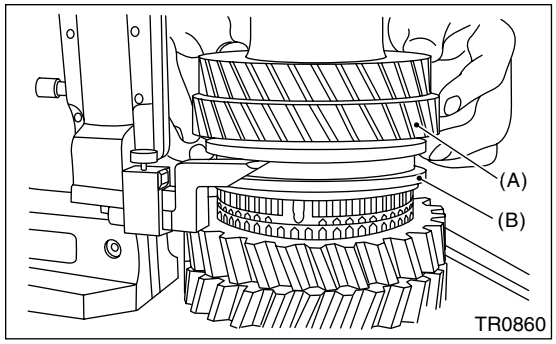


5) Set the height gauge indicator upside down.



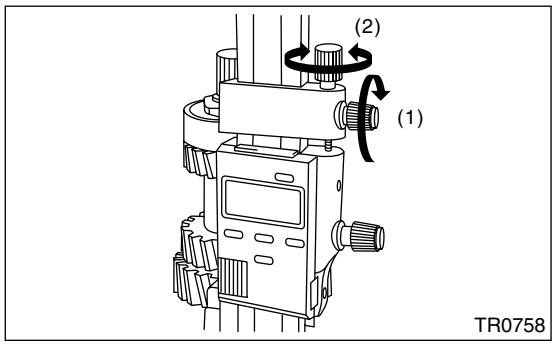
(A) Indicator

6) Shift the 1st-2nd sleeve to 2nd driven gear side, then press down to the stopper and measure “B2”.



(A) 2nd driven gear
(B) 1st-2nd sleeve

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 2nd side.
• Perform the measuring procedure with two people, and measure the sleeve lifted up straight.
• Measure five points of the ball bearing turning every approx. 72° apart. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.

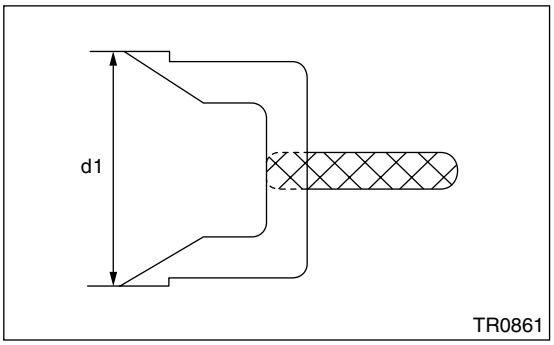


7) According to both measurements, calculate the 1st-2nd sleeve neutral position. Select the fork rod which applies to the calculated value from following equation.

Equation: T = (B1 + B2) / 2

T : 1st-2nd sleeve center position
B1: Height from adapter plate edge to sleeve edge when shifted to 1st gear.
B2: Height from adapter plate edge to sleeve edge when shifted to 2nd gear. [measurement value + 55 mm (2.17 in)]

NOTE:
The indicator is installed upside down compared to the setting procedure of zero point. Add d1 [fixing value: 55 mm (2.17 in)] from the following figure to “B2”, to obtain measurement value of “B2”.

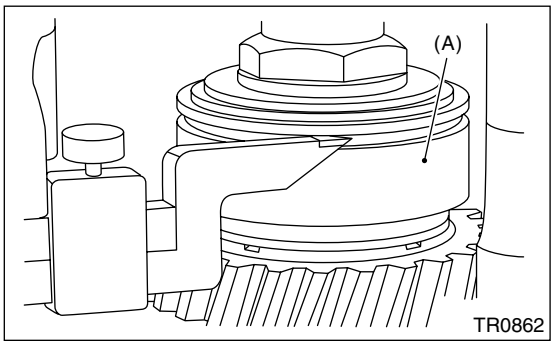


T mm (in)	Lot No. (Mark)
62.93 — 63.23 (2.4776 — 2.4894)	32801AA111 (1)
63.23 — 63.53 (2.4894 — 2.5012)	32801AA131 (None)
63.53 — 63.83 (2.5012 — 2.5130)	32801AA141 (2)

2. SELECTION OF 3RD-4TH FORK ROD

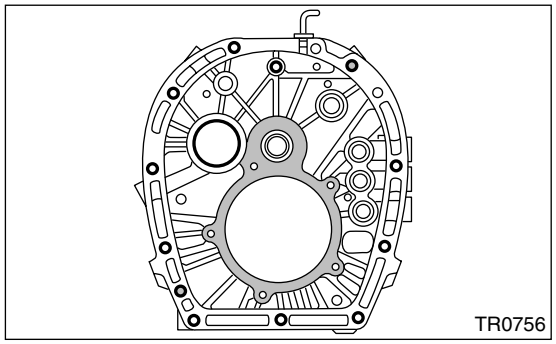
NOTE:
Perform the following procedures when:
- Replacing the main shaft.
- Replacing the 3rd, 3rd to 6th drive gear and bush.
- Replacing the 3rd, 3rd to 6th synchro assembly.

1) Insert the main shaft assembly in adapter plate.
2) Set the height gauge to adapter plate. Lower the indicator of height gauge to upper surface of snap ring groove, on the upper side of main rear bearing, then set to zero point.
ST 18853AA000 HEIGHT GAUGE

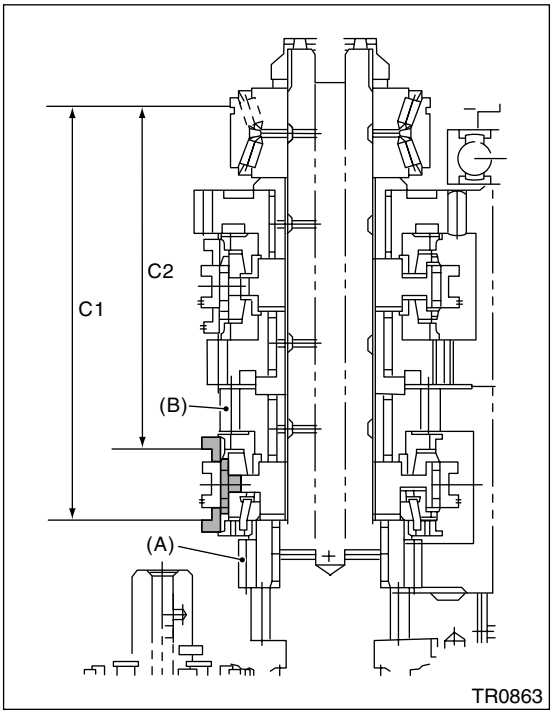


(A) Ball bearing

NOTE:
- Remove the remaining gasket on edge surface with scraper, since the height gauge is set on adapter plate during measurement.
- Do not put the height gauge on shaded area in the figure during the measurement.

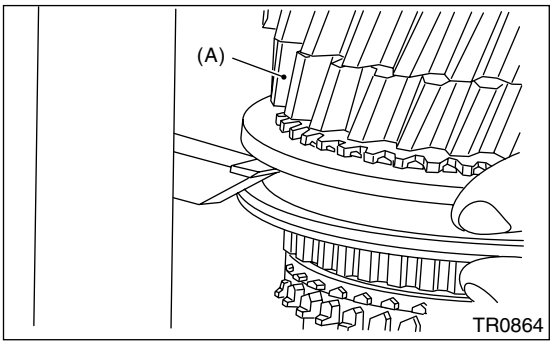


3) Using the height gauge, measure “C1” and “C2” shown in the figure.



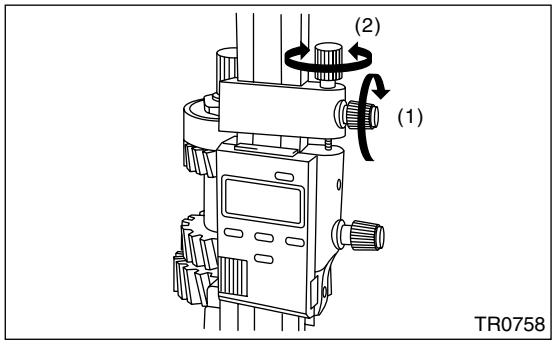
(A) 3rd main gear
(B) 4th main gear

(1) Shift the 3rd-4th sleeve to 4th gear side, then press down to the stopper and measure “C2”.

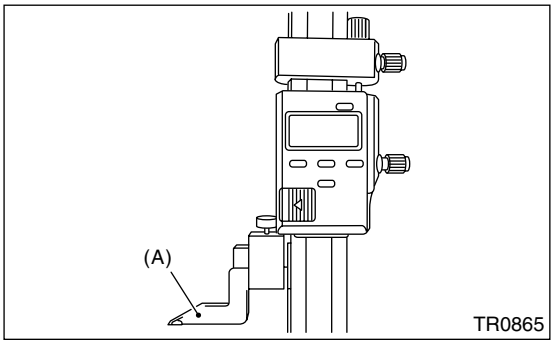


(A) 4th main gear

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure.
• Turn dial (2) to set the indicator to edge surface of sleeve 4th side.
• Perform the measuring procedure with two people, and measure the sleeve lifted up straight.
• Measure five points of the ball bearing turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.

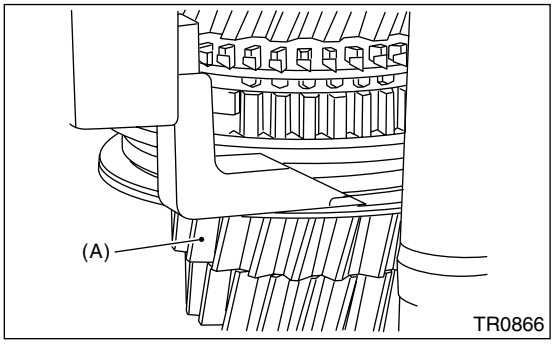


(2) Set the height gauge indicator upside down.



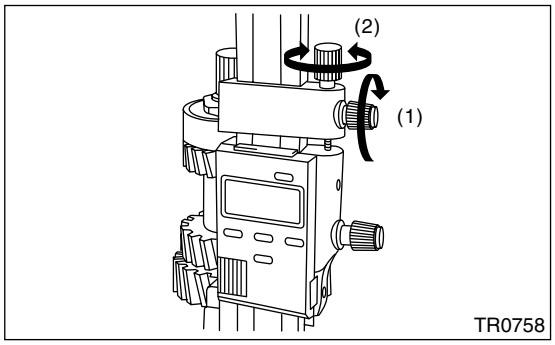
(A) Indicator

(3) Shift the 3rd-4th sleeve to 3rd main gear side, then press down to the stopper and measure “C1”.



(A) 3rd main gear

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 3rd side.
• Measure five points of the ball bearing turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.

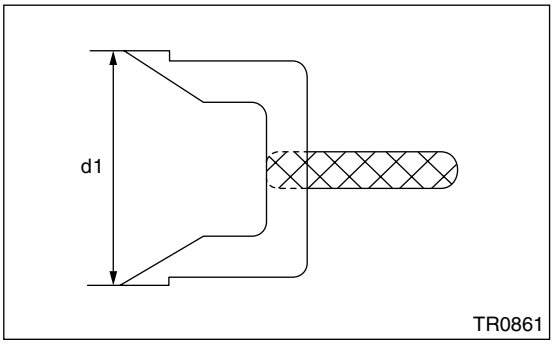


4) According to both measurements, calculate the 3rd-4th sleeve neutral position. Select the fork rod which applies to the calculated value from following equation.

Equation: T = (C1 + C2) / 2

T : 3rd-4th sleeve center position
C1: Length from main shaft rear bearing snap ring groove to sleeve edge when shifted to 3rd gear. [measurement value +55 mm (2.17 in)]
C2: Length from main shaft rear bearing snap ring groove to sleeve edge when shifted to 4th gear.

NOTE:
The indicator is installed upside down compared to the setting procedure of zero point. Add d1 [fixing value: 55 mm (2.17 in)] from the following figure to “C1”, to obtain measurement value of “C1”.



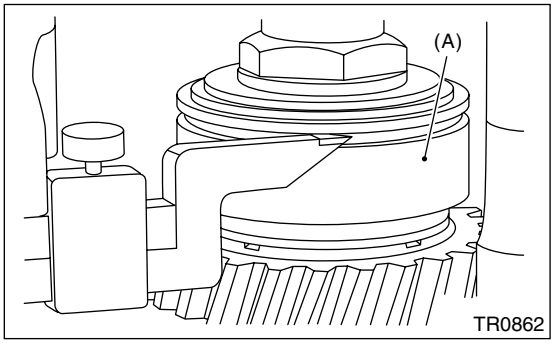
T mm (in)	Lot No. (Mark)		
	M.SFT Snap ring 805072010 [t=1.65 mm (0.065 in)]	M.SFT Snap ring 805072011 [t=1.95 mm (0.077 in)]	M.SFT Snap ring 805072012 [t=2.25 mm (0.089 in)]
137.22—137.52 (5.4024—5.4142)	32809AA171 (None)	32809AA181 (2)	32809AA191 (4)
137.52—137.82 (5.4142—5.4260)	32809AA161 (1)	32809AA171 (None)	32809AA181 (2)
137.82—138.12 (5.4260—5.4379)	32809AA141 (3)	32809AA161 (1)	32809AA171 (None)

T = Thickness

3. SELECTION OF 5TH-6TH FORK ROD

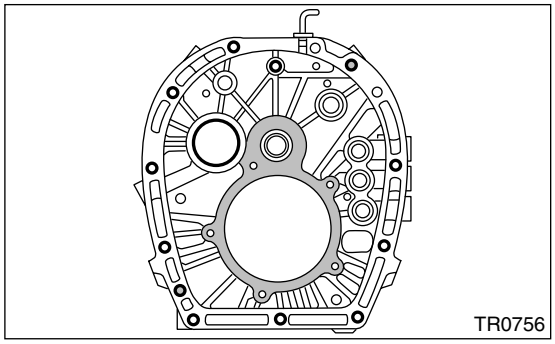
NOTE:
Perform the following procedures when:
- Replacing the main shaft.
- Replacing the 3rd to 6th drive gear and bush.
- Replacing the 3rd to 6th synchro ring assembly.

1) Insert the main shaft assembly in adapter plate.
2) Set the height gauge to adapter plate. Lower the indicator of height gauge to upper surface of snap ring groove, or the upper side of main rear bearing. Then set to zero point.
ST 18853AA000 HEIGHT GAUGE

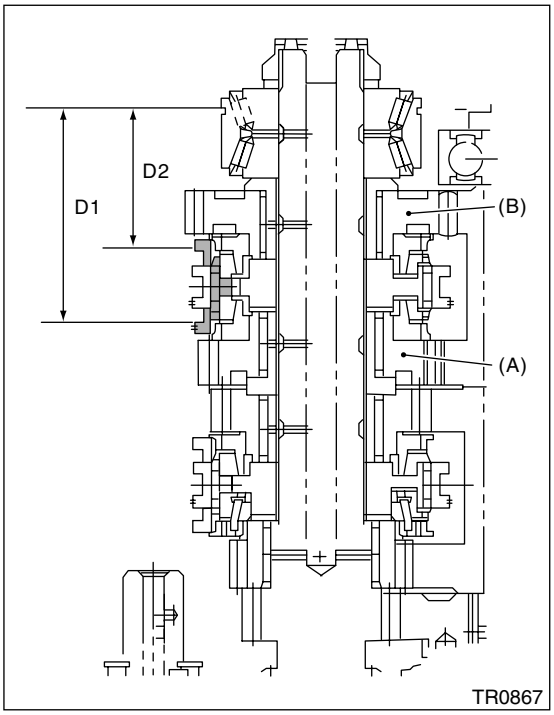


(A) Ball bearing

NOTE:
- Remove the remaining gasket on edge surface with scraper, since the height gauge is set on adapter plate during measurement.
- Do not place the height gauge on shaded area in the figure during the measurement.

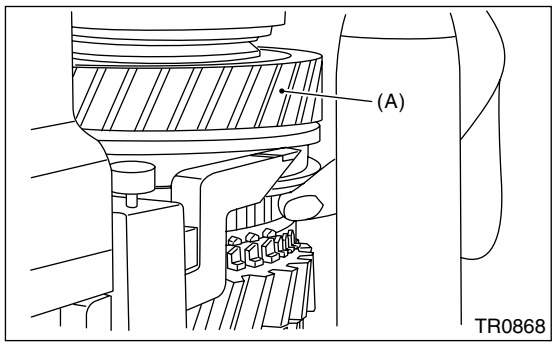


3) Using the height gauge, measure “D1” and “D2” shown in the figure.



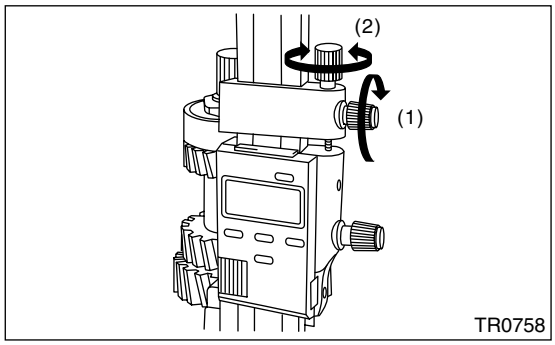
(A) 5th main gear
(B) 6th main gear

(1) Shift the 5th-6th sleeve to 6th main gear side, then press down to the stopper and measure “D2”.

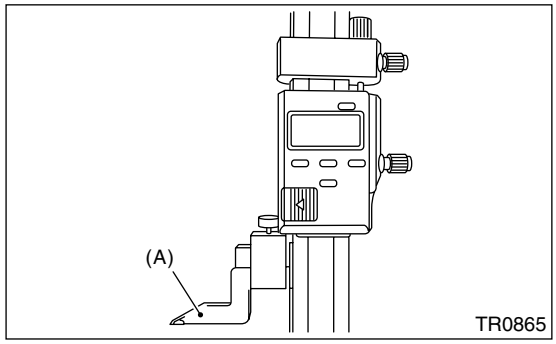


(A) 6th main gear

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 6th side.
• Perform the measuring procedure with two people, and measure the sleeve lifted up straight.
• Measure five points of the ball bearing turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.

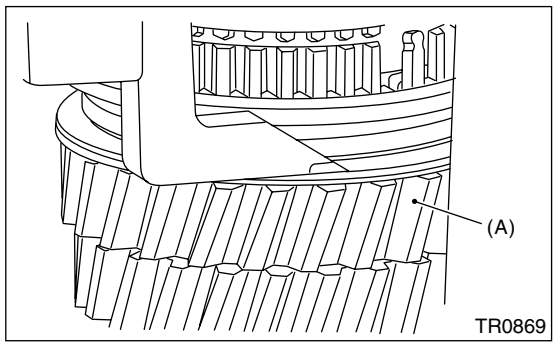


(2) Set the height gauge indicator upside down.



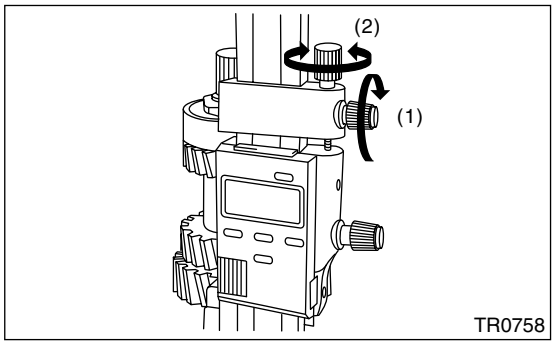
(A) Indicator

(3) Shift the 5th-6th sleeve to 5th main gear side, then press down to the stopper and measure “D2”.



(A) 5th main gear

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of sleeve 5th side.
• Measure five points of the ball bearing turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.

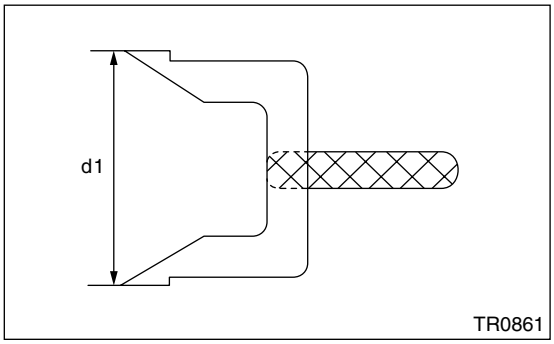


4) According to both measurements, calculate the 5th-6th sleeve neutral position. Select the fork rod, which applies to the calculated value from following equation.

Equation: T = (D1 + D2) / 2

T : 5th-6th sleeve center position
D1: Length from the shaft rear bearing snap ring groove to sleeve groove edge when shifted to 5th gear. [measurement value + 55 mm (2.17 in)]
D2: Length from main shaft rear bearing snap ring groove to sleeve groove edge when shifted to 6th gear.

NOTE:
The indicator is installed upside down compared to the setting procedure of zero point. Add d1 [fixing value: 55 mm (2.17 in)] from the following figure to “D1”, to obtain measurement value of “D1”.



T mm (in)	Lot No. (Mark)		
	M.SFT Snap ring 805072010 [t=1.65 mm (0.065 in)]	M.SFT Snap ring 805072011 [t=1.95 mm (0.077 in)]	M.SFT Snap ring 805072012 [t=2.25 mm (0.089 in)]
64.12—64.42 (2.5244—2.5362)	32945AA021 (None)	32945AA031 (2)	32945AA041 (4)
64.42—64.72 (2.5362—2.5480)	32945AA011 (1)	32945AA021 (None)	32945AA031 (2)
64.72—65.02 (2.5480—2.5598)	32945AA001 (3)	32945AA011 (1)	32945AA021 (None)

T = Thickness

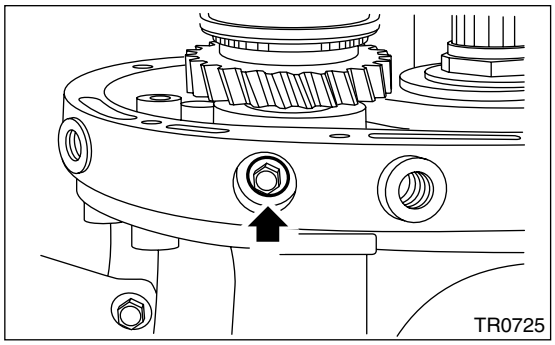
4. SELECTION OF REVERSE FORK ROD

NOTE:
Perform the following procedures when:
- Replacing the reverse idler gear.
- Replacing the reverse idler gear No.2.
- Replacing the adapter plate.
- Replacing the base.

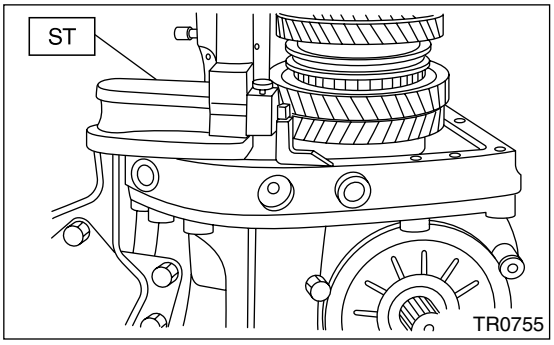
1) Insert the reverse idler gear assembly in adapter plate.

2) Tighten the base COMPL fixing bolt.

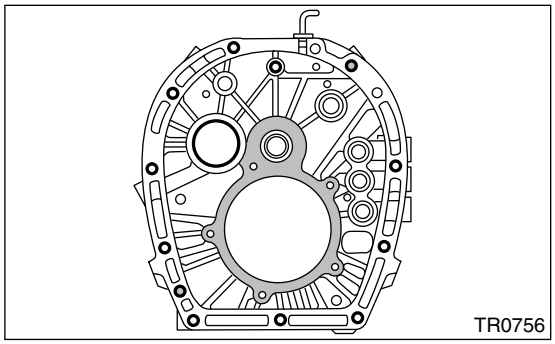
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



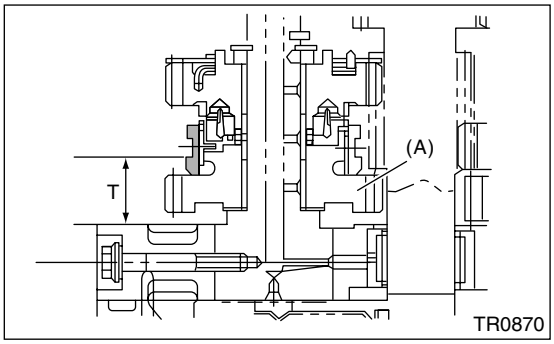
3) Set the height gauge to adapter plate. Lower the indicator of height gauge to mating surface of adapter plate and case, then set to zero point.
ST 18853AA000 HEIGHT GAUGE



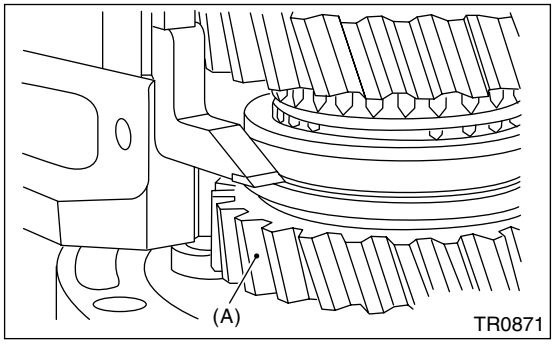
NOTE:
- Remove the remaining gasket on edge surface with scraper, since the adapter plate is base point of measurement.
- Do not place the height gauge on shaded area in the figure during measurement.



4) Press the reverse sleeve to reverse side idler gear No.2, then measure “T”.

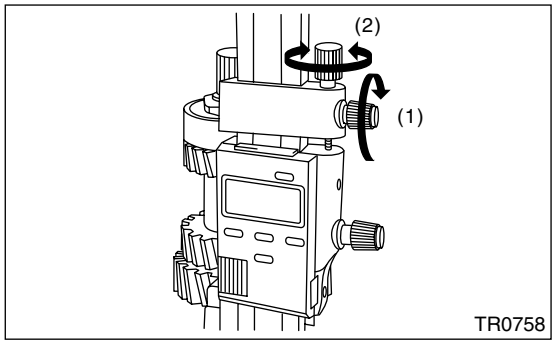


(A) Reverse idler gear No.2



(A) Reverse idler gear No.2

NOTE:
• Set the indicator of height gauge near measuring object, then lock the dial (1) as shown in the figure. Turn dial (2) to set the indicator to edge surface of reverse sleeve side.
• Measure five points of the sleeve turning every approx. 72°. Round off each two upper and lower measurement value. Use the remaining center value as measurement value.



5) According to measurement, calculate the reverse sleeve neutral position. Select the fork rod which applies to the calculated value from following equation.

Equation: T + 4.8 mm (0.189 in)

T+4.8 mm (0.189 in) mm (in)	Lot No. (Mark)
33.50—33.80 (1.3189—1.3307)	32816AA110 (1)
33.80—34.10 (1.3307—1.3425)	32816AA130 (None)
34.10—34.40 (1.3425—1.3543)	32816AA140 (2)

T = Thickness

26.Clutch Housing

A: REMOVAL

1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-37, REMOVAL, Manual Transmission Assembly.>
2) Prepare the transmission for overhaul. <Ref. to 6MT-42, Preparation for Overhaul.>
3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, REMOVAL, Oil Pipe.>, <Ref. to 6MT-47, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-45, REMOVAL, Back-up Light Switch.>
4) Remove the extension case. <Ref. to 6MT-49, REMOVAL, Extension Case.>
5) Remove the transfer driven gear. <Ref. to 6MT-60, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential. <Ref. to 6MT-62, REMOVAL, Center Differential.>
7) Remove the oil pump. <Ref. to 6MT-64, REMOVAL, Oil Pump.>
8) Remove the transmission case. <Ref. to 6MT-68, REMOVAL, Transmission Case.>
9) Remove each gear assembly. <Ref. to 6MT-73, REMOVAL, Main Shaft Assembly.>
10) Remove the drive pinion shaft assembly. <Ref. to 6MT-101, REMOVAL, Drive Pinion Shaft Assembly.>
11) Remove the front differential assembly. <Ref. to 6MT-107, REMOVAL, Front Differential Assembly.>
12) Remove the vehicle speed sensor. <Ref. to 6MT-34, REMOVAL, Vehicle Speed Sensor.>
13) Remove the speedometer gear. <Ref. to 6MT-116, REMOVAL, Speedometer Gear.>

B: INSTALLATION

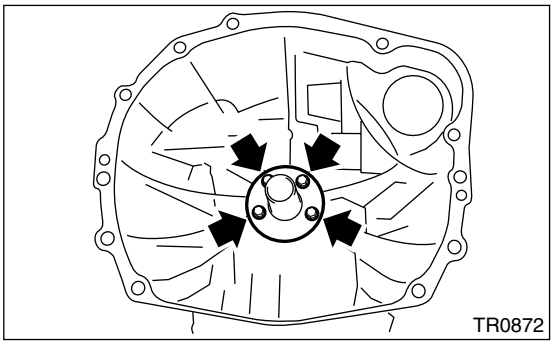
1) Install the pitching stopper bracket.

Tightening torque:
41 N·m (4.2 kgf-m, 30.2 ft-lb)

2) Install the speedometer gear. <Ref. to 6MT-116, INSTALLATION, Speedometer Gear.>
3) Install the vehicle speed sensor. <Ref. to 6MT-34, INSTALLATION, Vehicle Speed Sensor.>
4) Install the front differential assembly. <Ref. to 6MT-108, INSTALLATION, Front Differential Assembly.>
5) Install the drive pinion shaft assembly. <Ref. to 6MT-101, INSTALLATION, Drive Pinion Shaft Assembly.>
6) Install each gear assembly at once. <Ref. to 6MT-74, INSTALLATION, Main Shaft Assembly.>
7) Install the transmission case. <Ref. to 6MT-69, INSTALLATION, Transmission Case.>
8) Install the oil pump. <Ref. to 6MT-65, INSTALLATION, Oil Pump.>
9) Install the center differential. <Ref. to 6MT-62, INSTALLATION, Center Differential.>
10) Install the transfer driven gear. <Ref. to 6MT-60, INSTALLATION, Transfer Driven Gear.>
11) Install the extension case. <Ref. to 6MT-49, INSTALLATION, Extension Case.>
12) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-44, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-47, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-45, INSTALLATION, Back-up Light Switch.>
13) Install the manual transmission assembly to vehicle. <Ref. to 6MT-39, INSTALLATION, Manual Transmission Assembly.>

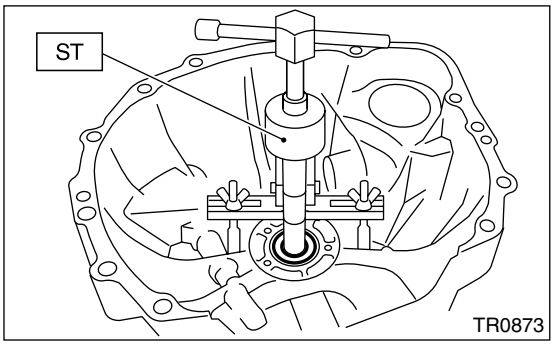
C: DISASSEMBLY

1) Remove the clutch release bearing guide.



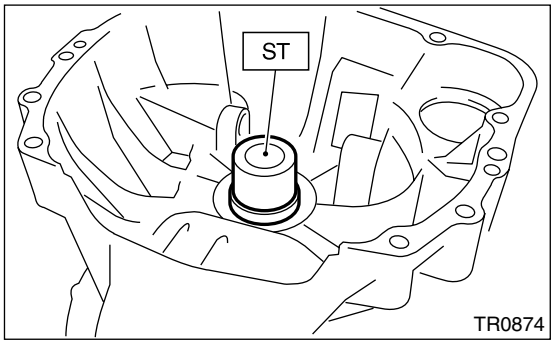
2) Remove the oil seal.
ST 398527700 PULLER ASSY

NOTE:
Do not reuse the oil seal.



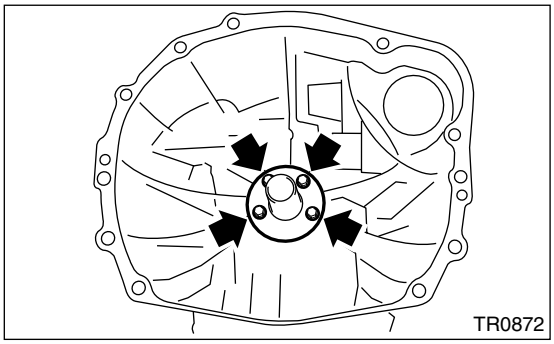
D: ASSEMBLY

1) Install the oil seal into clutch housing without damaging.
ST 399513600 INSTALLER



2) Install the clutch release bearing guide.

Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



E: INSPECTION

1) Make sure there is no damage or crack on the clutch housing. Replace the clutch housing with a new one if there is excessive damage.
2) Check the clutch housing for gear oil leakage. If there is oil leakage, repair or replace the leakage part.

27.General Diagnostic Table

A: INSPECTION

1. MANUAL TRANSMISSION

Symptom	Possible cause	Remedy
1. Gears are difficult to intermesh. NOTE: The cause for difficulty in shifting gears can be classified into two kinds: one is malfunction of the gear shift system and the other is malfunction of the transmission. However, if the operation is heavy and engagement of the gears is difficult, defective clutch disengagement may also be responsible. Check whether the clutch is correctly functioning, before checking the gear shift system and transmission.	(a) Worn, damaged or burred chamfer of internal spline of sleeve and reverse driven gear	Replace.
	(b) Worn, damaged or burred chamfer of spline of gears	Replace.
	(c) Worn or scratched bushings	Replace.
	(d) Incorrect contact between synchronizer ring and gear cone or wear	Correct or replace.
2. Gear slips out. • Gear slips out when coasting on rough road. • Gear slips out during acceleration.	(a) Defective pitching stopper adjustment	Adjust.
	(b) Loose engine mounting bolts	Tighten or replace.
	(c) Worn fork shifter, broken shifter fork rail spring	Replace.
	(d) Worn or damaged ball bearing	Replace.
	(e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve	Replace.
	(f) Worn tooth step of synchronizer hub (responsible for slip-out of 3rd gear)	Replace.
	(g) Worn 1st driven gear, needle bearing and race	Replace.
	(h) Worn 2nd driven gear, needle bearing and race	Replace.
	(i) Worn 3rd drive gear and bushing	Replace.
	(j) Worn 4th drive gear and bushing	Replace.
	(k) Worn 5th drive gear and bushing	Replace.
	(l) Worn 6th drive gear and bushing	Replace.
	(m) Worn reverse idler gear and bushing	Replace.
3. Unusual noise comes from transmission. NOTE: If an unusual noise is heard when the vehicle is parked with its engine idling and if the noise ceases when the clutch is disengaged, it may be considered that the noise comes from the transmission.	(a) Insufficient or improper lubrication	Lubricate or replace with specified oil.
	(b) Worn or damaged gears and bearings NOTE: If the trouble is only wear of the tooth surfaces, merely a high roaring noise will occur at high speeds, but if any part is broken, rhythmical knocking sound will be heard even at low speeds.	Replace.

2. DIFFERENTIAL

Symptom	Possible cause	Remedy
1. Broken differential (case, gear, bearing, etc.) NOTE: Abnormal noise will develop and finally it will become impossible to continue to run due to broken pieces obstructing the gear revolution.	(a) Insufficient or improper oil	Disassemble differential and replace broken components and at the same time check other components for any trouble, and replace if necessary.
	(b) Use of vehicle under severe conditions such as excessive load and improper use of clutch	Readjust bearing preload and backlash and face contact of gears.
	(c) Improper adjustment of taper roller bearing	Adjust.
	(d) Improper adjustment of drive pinion and hypoid driven gear	Adjust.
	(e) Excessive backlash due to worn differential side gear, washer or differential pinion vehicle under severe operating conditions.	Add recommended oil to specified level. Do not use vehicle under severe operating conditions.
	(f) Loose hypoid driven gear clamping bolts	Tighten.
2. Differential and hypoid gear noises Troubles of the differential and hypoid gear always appear as noise problems. Therefore noise is the first indication of the trouble. However noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are the following four kinds of noises. • Gear noise when driving: If noise increases as the vehicle speed increases it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc. • Gear noise when coasting: Damaged gears due to maladjusted bearings and incorrect shim adjustment • Bearing noise when driving or when coasting: Cracked, broken or damaged bearings • Noise which mainly occurs when turning: Unusual noise from the differential side gear, differential pinion, differential pinion shaft, etc.	(a) Insufficient oil	Lubricate.
	(b) Improper adjustment of hypoid driven gear and drive pinion	Check tooth contact.
	(c) Worn teeth of hypoid driven gear and drive pinion	Replace as a set. Readjust bearing preload.
	(d) Loose roller bearing	Readjust hypoid driven gear to drive pinion backlash and check tooth contact.
	(e) Distorted hypoid driven gear or differential case	Replace.
	(f) Worn washer and differential pinion shaft	Replace.

CLUTCH SYSTEM

CL

1. General Description

A: SPECIFICATIONS

Model			1.6 L	2.0 L NON-TURBO	2.0 L TURBO	2.5 L
Clutch cover	Type		Push type		Pull type	Push type
	Diaphragm set load	kgf (lb)	450 (992)		830 (1,830)	550 (1,213)
Clutch disc	Facing material		Woven (Non asbestos)			
	O.D. x I.D. x thickness	mm (in)	225 x 150 x 3.5 (8.86 x 5.91 x 0.138)		230 x 150 x 3.5 (9.06 x 5.91 x 0.138)	228.6 x 155 x 6.6 (9.00 x 6.10 x 0.260)
	Spline O.D.	mm (in)	25.2 (0.992), (No. of teeth: 24)			
Clutch release lever ratio			3.0	1.6	1.7	1.6
Release bearing			Grease-packed self-aligning			
Clutch pedal	Full stroke	mm (in)	130 — 135 (5.12 — 5.31)			
	Free play	mm (in)	10 — 20 (0.39 — 0.79)		3 — 13 (0.12 — 0.51)	10 — 12 (0.39 — 0.79)
Clutch disc	Stroke	mm (in)	24 — 26 (0.94 — 1.02)		13.3 — 14.7 (0.524 — 0.579)	24 — 26 (0.94 — 1.02)
	Play at release lever center	mm (in)	3 — 4 (0.12 — 0.16)		—	3 — 4 (0.12 — 0.16)
	Depth of rivet head mm (in)	Standard	1.3 — 1.9 (0.051 — 0.075)			
		Limit of sinking	0.3 (0.012)			
	Limit for deflection	mm (in)	0.8 (0.031) at R = 107 (4.21)	0.8 (0.031) at R = 110 (4.33)		1.0 (0.039) at R = 110 (4.33)

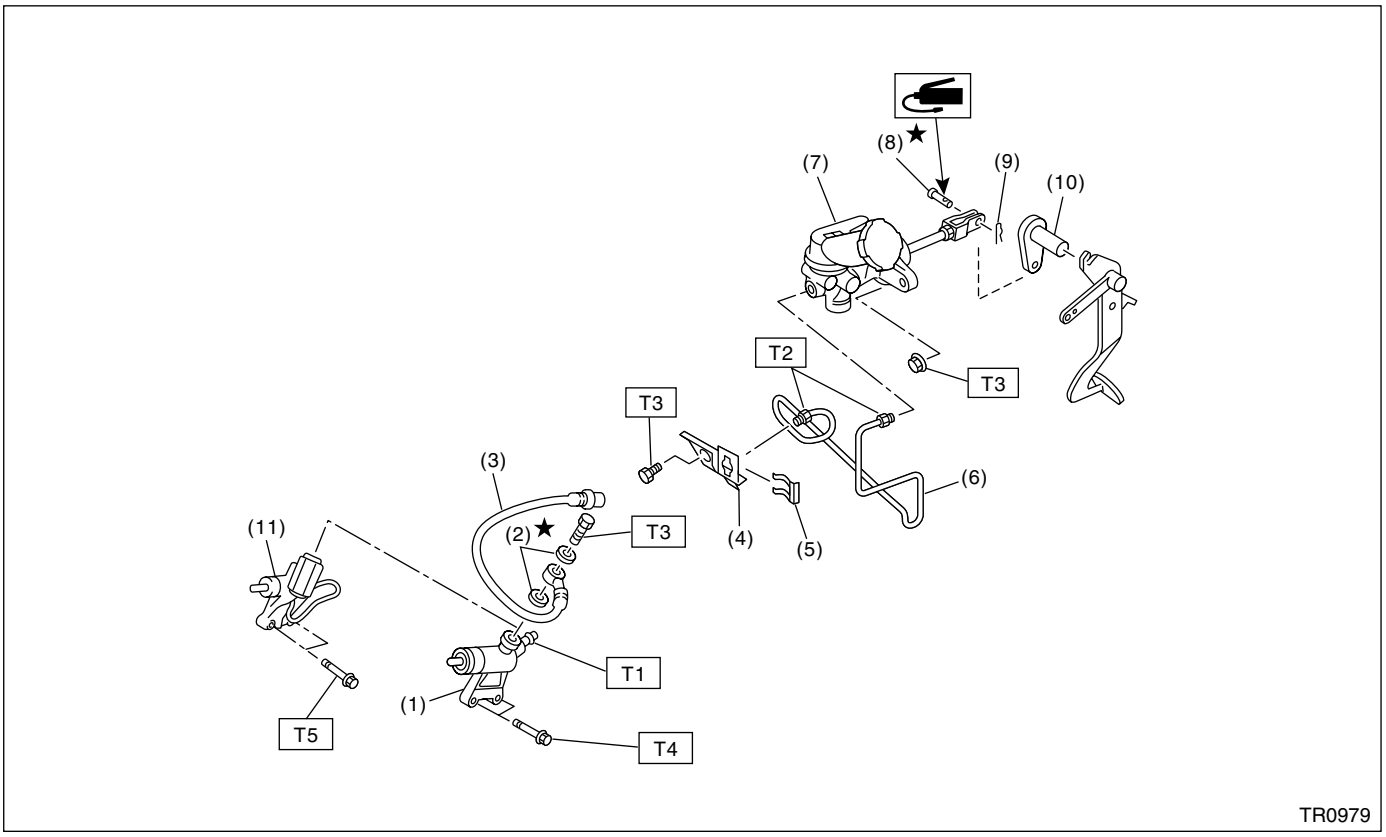
Model			2.0 L TURBO STi
Clutch cover	Type		Pull type
	Diaphragm set load	kgf (lb)	930 (2,050)
Clutch disc	Facing material		Woven (Non asbestos)
	O.D. x I.D. x thickness	mm (in)	240 x 160 x 3.5 (9.45 x 6.30 x 0.138)
	Spline O.D.	mm (in)	25.2 (0.992), (No. of teeth: 24)
Clutch release lever ratio			1.7
Release bearing			Grease-packed self-aligning
Clutch pedal	Full stroke	mm (in)	130 — 135 (5.12 — 5.31)
	Free play	mm (in)	3 — 13 (0.12 — 0.51)
Clutch disc	Stroke	mm (in)	13.3 — 14.7 (0.524 — 0.579)
	Play at release lever center	mm (in)	—
	Depth of rivet head mm (in)	Standard	1.3 — 1.9 (0.051 — 0.075)
		Limit of sinking	0.3 (0.012)
	Limit for deflection	mm (in)	0.8 (0.031) at R = 110 (4.33)

I.D.: Inner diameter
O.D.: Outer diameter

B: COMPONENT

6. CLUTCH PIPE AND HOSE FOR TURBO MODEL

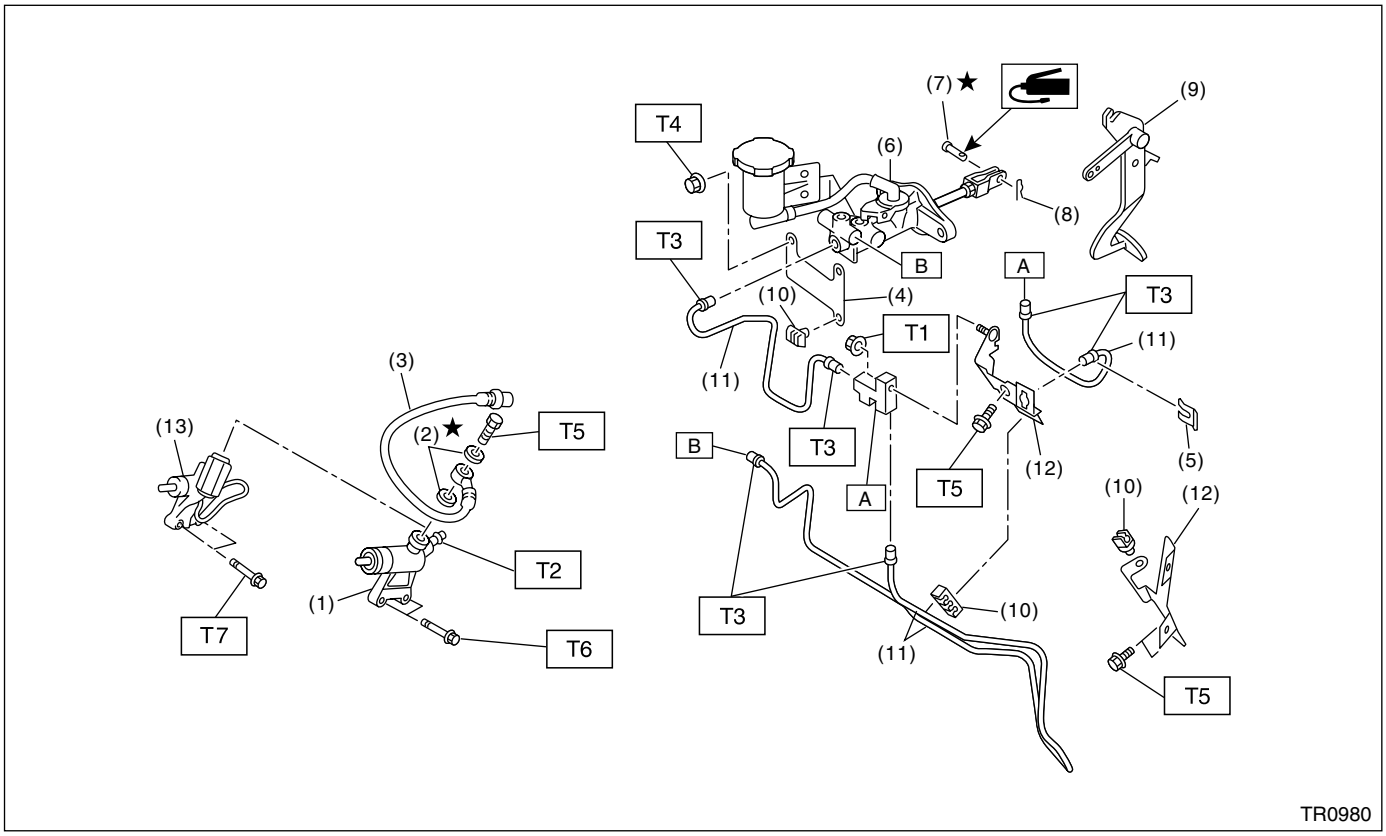
• LHD MODEL



(1)	Operating cylinder (Except STi model)	(6)	Pipe
(2)	Washer	(7)	Master cylinder ASSY
(3)	Clutch hose	(8)	Clevis pin
(4)	Bracket	(9)	Snap pin
(5)	Clip	(10)	Lever
		(11)	Operating cylinder (STi model)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.8)
T2: 15 (1.5, 10.8)
T3: 18 (1.8, 13.0)
T4: 37 (3.8, 27.5)
T5: 41 (4.2, 30.2)

• RHD MODEL



(1)	Operating cylinder (Except STi model)	(7)	Clevis pin
(2)	Washer	(8)	Snap pin
(3)	Clutch hose	(9)	Pedal
(4)	Bracket	(10)	Clamp
(5)	Clip	(11)	Clutch pipe
(6)	Master cylinder ASSY	(12)	Bracket
		(13)	Operating cylinder (STi model)

Tightening torque: N·m (kgf-m, ft-lb)

T1: 7.5 (0.76, 5.53)
T2: 8 (0.8, 5.8)
T3: 15 (1.5, 10.8)
T4: 18 (1.8, 13.0)
T5: 25 (2.5, 18.1)
T6: 37 (3.8, 27.5)
T7: 41 (4.2, 30.2)

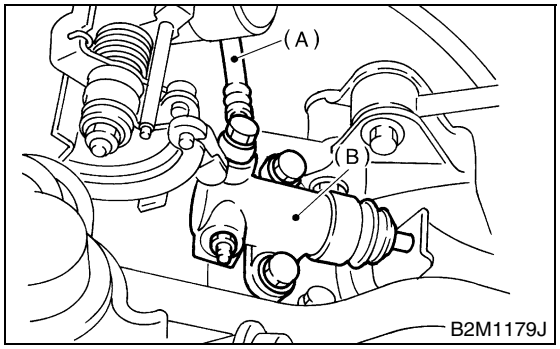
5. Operating Cylinder

A: REMOVAL

1) Remove the air cleaner case and air intake duct (Non-turbo model). <Ref. to IN-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN-7, REMOVAL, Air Intake Duct.>
2) Remove the intercooler (Turbo model). <Ref. to IN(TURBO)-10, REMOVAL, Intercooler.>
3) Remove the clutch hose from operating cylinder.

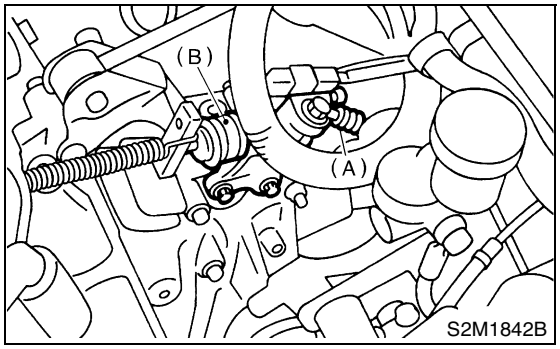
CAUTION:
Cover the hose joint to prevent clutch fluid from flowing out.

- Non-turbo model



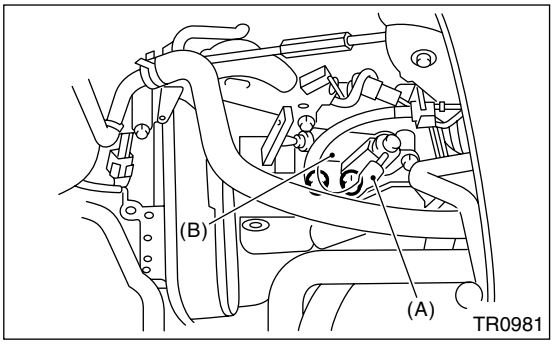
(A) Clutch hose
(B) Operating cylinder

- Turbo model except STi model



(A) Clutch hose
(B) Operating cylinder

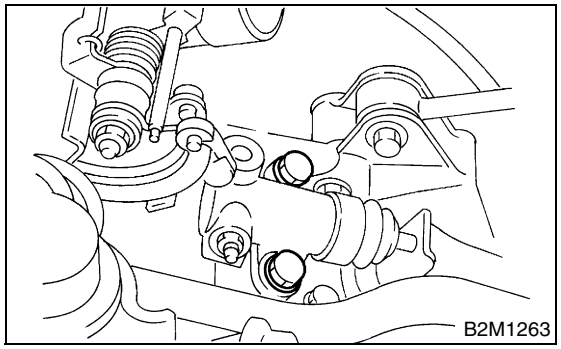
- STi model



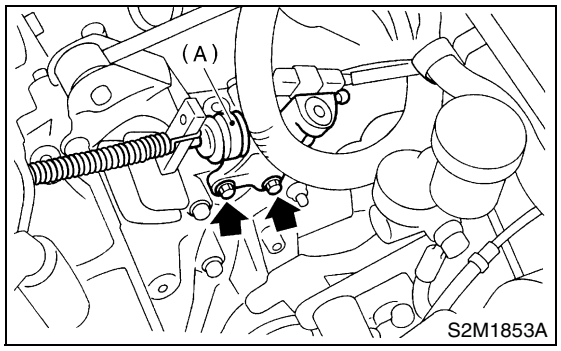
(A) Clutch hose
(B) Operating cylinder

4) Remove the operating cylinder from transmission.

- Non-turbo model

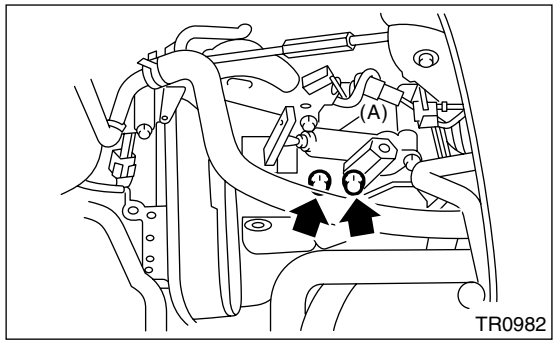


- Turbo model except STi model



(A) Operating cylinder

• STi model



(A) Operating cylinder

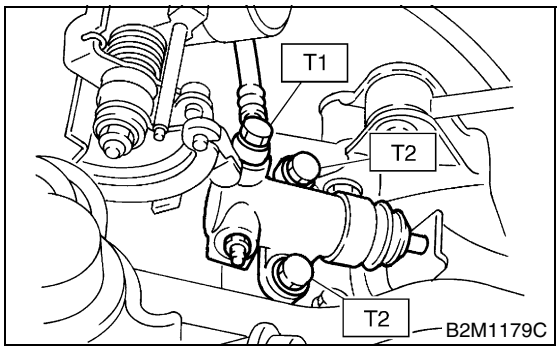
B: INSTALLATION

1) Install in the reverse order of removal.

NOTE:
Before installing the operating cylinder, apply grease (SUNLIGHT 2: P/N 003602010) to contact point of the release lever and operating cylinder.

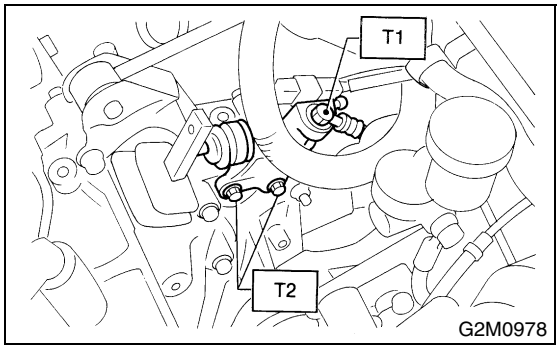
• Non-turbo model

Tightening torque:
T1: 18 N·m (1.8 kgf-m, 13.0 ft-lb)
T2: 37 N·m (3.8 kgf-m, 27.5 ft-lb)



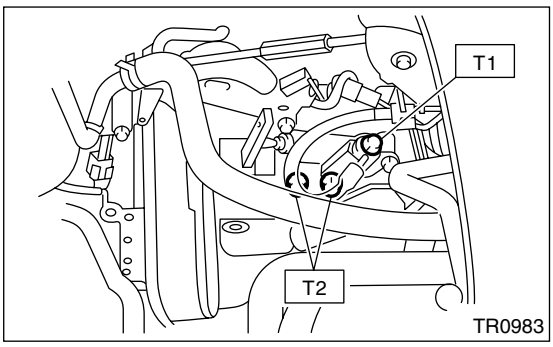
• Turbo model except STi model

Tightening torque:
T1: 18 N·m (1.8 kgf-m, 13.0 ft-lb)
T2: 37 N·m (3.8 kgf-m, 27.5 ft-lb)

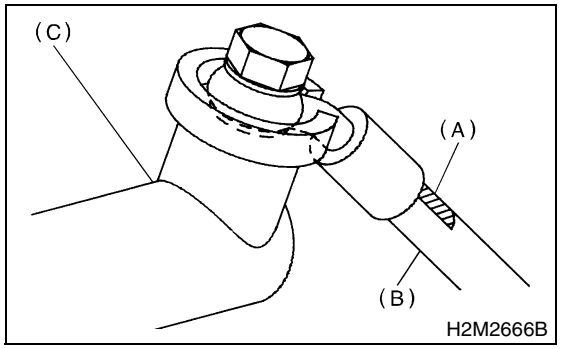


• STi model

Tightening torque:
T1: 18 N·m (1.8 kgf-m, 13.0 ft-lb)
T2: 41 N·m (4.2 kgf-m, 30.2 ft-lb)



NOTE:
• Be sure to install the clutch hose with the mark side facing upward.
• Be careful not to twist the clutch hose during installation.



(A) Marking
(B) Clutch hose
(C) Operating cylinder

2) After bleeding air from the operating cylinder, ensure that clutch operates properly.
<Ref. to CL-38, Clutch Fluid Air Bleeding.>

C: INSPECTION

1) Check the operating cylinder for damage. If operating cylinder is damaged, replace it.
2) Check the operating cylinder for fluid leakage or damage on boot. If any leakage or damage is found, replace the operating cylinder.

CHASSIS SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD. G1841GE5

FRONT SUSPENSION

FS

Page

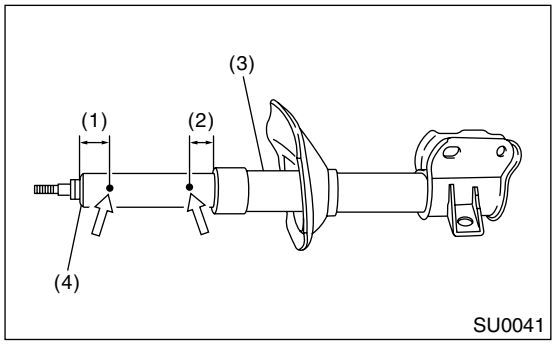
5. Front Strut

F: DISPOSAL

2. STI MODEL

CAUTION:
• Before handling gas filled struts, be sure to wear goggles to protect eyes from gas, oil and/or filings.
• Do not disassemble the strut damper or place into a fire.
• Drill holes before disposing of gas filled struts.

1) Place the gas filled strut on a flat and level surface with damping tube fully extended.
2) Using a 2 to 3 mm (0.08 to 0.12 in) dia. drill, drill a hole in location (1) first and then drill a hole in location (2).



(1) 20 mm (0.78 in)
(2) 10 mm (0.39 in)
(3) Strut
(4) Damping tube

REAR SUSPENSION

RS

Page

5. Rear Strut

F: DISPOSAL

2. STI MODEL

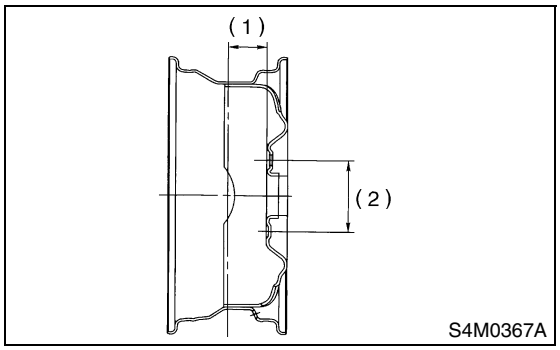
Refer to Front Strut as a guide for disposal procedures. <Ref. to FS-2, STI MODEL, DISPOSAL, Front Strut.>

WHEEL AND TIRE SYSTEM

WT

1. General Description

A: SPECIFICATIONS



(1) Offset
(2) P.C.D.

		Tire size	Rim size	Rim offset mm (in)	P.C.D. mm (in)
Front and rear	Except OUTBACK	185/70R14 88H	14 × 5 1/2JJ	55 (2.17)	100 (3.94) dia.
		195/60R15 88H	15 × 6JJ		
		205/50 R16 87V	16 × 6 1/2JJ		
		215/45 R17 87W	17 × 7JJ		
	OUTBACK	P205/55 R16 89V	16 × 6 1/2JJ		
	STi	225/45 R17 90W	17 × 7 1/2JJ	53 (2.09)	
T-type tire		T125/70 D15 95M	15 × 4T		
		T135/70 D16 100M	16 × 4T	50 (1.97)	
		T135/70 D17 102M	17 × 4T	40 (1.57)	

		Tire size	Tire inflation pressure kPa (kg/cm^2, psi)	
			Light load	Full load
Front and rear	Except OUTBACK	185/70 R14 88H	Fr: 220 (2.2, 32) Rr: 200 (2.0, 29)	Fr: 220 (2.2, 32) Rr: 220 (2.2, 32)
		195/60 R15 88H		
		205/50 R16 87V	Fr: 220 (2.2, 32) Rr: 200 (2.0, 29)	
		215/45 R17 87W	Fr: 230 (2.3, 33) Rr: 220 (2.2, 32)	
	OUTBACK	P205/55 R16 89V	Fr: 220 (2.2, 32) Rr: 200 (2.0, 29)	
	STi	225/45 R17 90W	Fr: 230 (2.3, 33) Rr: 190 (1.9, 28)	
T-type tire		T125/70 D15 95M	420 (4.2, 60)	
		T135/70 D16 100M		
		T135/70 D17 102M		

NOTE:
• “T-type” tire for temporary use is supplied as a spare tire.
• At trailer towing, rear inflation pressure is 250 kPa (2.5 kg/cm^2, 36 psi).

DIFFERENTIALS

DI

1. General Description

A: SPECIFICATIONS

When replacing a rear differential assembly, select the correct one according to the following table.

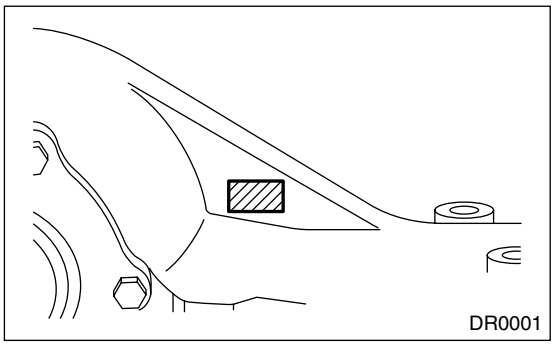
NOTE:
Using the different rear differential assembly causes the drive line and tires to “drag” or emit abnormal noise when AWD is selected.

MODEL	1.6 L		2.0 L	
	AT	MT	AT	MT
Rear differential type	VA-type without LSD			T-type without LSD
Identification	XP	XN		EG
Type of gear	Hypoid gear			
Gear ratio (Number of gear teeth)	4.444 (40/9)	4.111 (37/9)		3.900 (39/10)
Oil capacity	0.8 ℓ (0.8 US qt, 0.7 Imp qt)			
Rear differential gear oil	GL-5			

MODEL	2.5 L			2.0 L Turbo	
	AT	MT		AT	MT
		Except Australia	Australia		Except Australia / Australia
Rear differential type	T-type with LSD				
LSD type	Viscous coupling				SURETRAC®
Identification	EJ	ER	EJ	EF	EM
Type of gear	Hypoid gear				
Gear ratio (Number of gear teeth)	4.111 (37/9)	3.700 (37/10)	4.111 (37/9)	3.545 (39/11)	4.444 (40/9)
Oil capacity	0.8 ℓ (0.8 US qt, 0.7 Imp qt)				
Rear differential gear oil	GL-5				

MODEL	2.0 L Turbo STi	
	MT	
	Except Australia	Australia
Rear differential type	T-type with LSD	
LSD type	SURETRAC®	
Identification	HJ	HG
Type of gear	Hypoid gear	
Gear ratio (Number of gear teeth)	3.545 (39/11)	3.900 (39/10)
Oil capacity	0.9 — 1.1 ℓ (1.0 — 1.2 US qt, 0.8 — 1.0 Imp qt)	
Rear differential gear oil	GL-5	

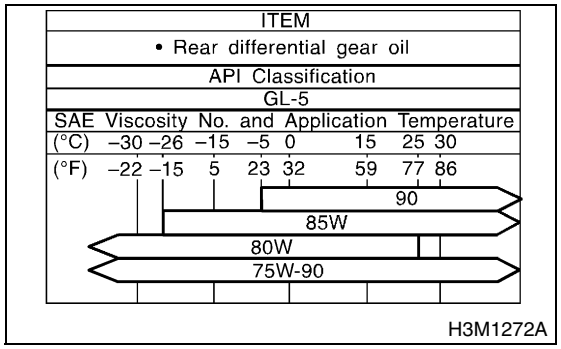
• Identification



• Rear differential gear oil

Recommended oil

CAUTION:
Each oil manufacturer has its base oil and additives. Thus, do not mix two or more brands.



1. SERVICE DATA

Front and rear bearing preload at companion flange bolt hole N (kgf, lb)	New bearing	T-type	Except STi model	19 — 26 (1.9 — 2.6, 4.3 — 5.8)
			STi model	31.1 — 59.5 (3.17 — 6.07, 7.0 — 13.4)
		VA-type		12.7 — 32.4 (1.3 — 3.3, 2.9 — 7.3)
	Used bearing	T-type		8 — 16 (0.8 — 1.6, 1.8 — 3.6)
Side gear backlash mm (in)		T-type		0.10 — 0.20 (0.0039 — 0.0079)
		VA-type		0.05 — 0.15 (0.0020 — 0.0059)
Side bearing standard width mm (in)				20.00 (0.7874)
Crown gear to drive pinion backlash mm (in)		T-type		0.10 — 0.20 (0.0039 — 0.0079)
		VA-type		0.10 — 0.15 (0.0039 — 0.0059)
Crown gear runout on its back surface mm (in)				Less than 0.05 (0.0020)

2. ADJUSTING PARTS

• VA-type

Front and rear bearing preload at companion flange bolt hole N (kgf, lb)	New bearing	12.7 — 32.4 (1.3 — 3.3, 2.9 — 7.3)
Preload adjusting spacer	Part No.	Length
	32288AA040	52.3 mm (2.059 in)
	32288AA050	52.5 mm (2.067 in)
	31454AA100	52.6 mm (2.071 in)
	32288AA060	52.7 mm (2.075 in)
	31454AA110	52.8 mm (2.079 in)
	32288AA070	52.9 mm (2.083 in)
	31454AA120	53.0 mm (2.087 in)
	32288AA080	53.1 mm (2.091 in)
	32288AA090	53.3 mm (2.098 in)
Preload adjusting washer	Part No.	Thickness
	38336AA000	1.500 mm (0.0591 in)
	38336AA120	1.513 mm (0.0596 in)
	38336AA010	1.525 mm (0.0600 in)
	38336AA130	1.538 mm (0.0606 in)
	38336AA020	1.550 mm (0.0610 in)
	38336AA140	1.563 mm (0.0615 in)
	38336AA030	1.575 mm (0.0620 in)
	38336AA150	1.588 mm (0.0625 in)
	38336AA040	1.600 mm (0.0630 in)
	38336AA160	1.613 mm (0.0635 in)
	38336AA050	1.625 mm (0.0640 in)
	38336AA170	1.638 mm (0.0645 in)
	38336AA060	1.650 mm (0.0650 in)
	38336AA180	1.663 mm (0.0655 in)
	38336AA070	1.675 mm (0.0659 in)
	38336AA190	1.688 mm (0.0665 in)
	38336AA080	1.700 mm (0.0669 in)
	38336AA200	1.713 mm (0.0674 in)
	38336AA090	1.725 mm (0.0679 in)
	38336AA210	1.738 mm (0.0684 in)
	38336AA100	1.750 mm (0.0689 in)
	38336AA220	1.763 mm (0.0694 in)
	38336AA110	1.775 mm (0.0699 in)
Pinion height adjusting shim	Part No.	Thickness
	32295AA200	0.150 mm (0.0059 in)
	32295AA210	0.175 mm (0.0069 in)
	32295AA220	0.200 mm (0.0079 in)
	32295AA230	0.225 mm (0.0089 in)
	32295AA240	0.250 mm (0.0098 in)
	32295AA250	0.275 mm (0.0108 in)
Side gear backlash mm (in)	0.05 — 0.15 (0.0020 — 0.0059)	

Side gear thrust washer	803135011	0.925 — 0.950 mm (0.0364 — 0.0374 in)
	803135012	0.950 — 0.975 mm (0.0374 — 0.0384 in)
	803135013	0.975 — 1.000 mm (0.0384 — 0.0394 in)
	803135014	1.000 — 1.025 mm (0.0394 — 0.0404 in)
	803135015	1.025 — 1.050 mm (0.0404 — 0.0413 in)
Crown gear to drive pinion backlash mm (in)	Limit	0.10 — 0.15 (0.0039 — 0.0059)
Crown gear runout on its back surface mm (in)		0.05 (0.0020)

• T-type

Front and rear bearing preload at companion flange bolt hole N (kgf, lb)	New bearing	19 — 26 (1.9 — 2.6, 4.3 — 5.8)
	Used bearing	8 — 16 (0.8 — 1.6, 1.8 — 3.6)
Preload adjusting spacer	Part No.	Length
	383695201	56.2 mm (2.213 in)
	383695202	56.4 mm (2.220 in)
	383695203	56.6 mm (2.228 in)
	383695204	56.8 mm (2.236 in)
	383695205	57.0 mm (2.244 in)
	383695206	57.2 mm (2.252 in)
Preload adjusting washer	Part No.	Length
	383705200	2.59 mm (0.1020 in)
	383715200	2.57 mm (0.1012 in)
	383725200	2.55 mm (0.1004 in)
	383735200	2.53 mm (0.0996 in)
	383745200	2.51 mm (0.0988 in)
	383755200	2.49 mm (0.0980 in)
	383765200	2.47 mm (0.0972 in)
	383775200	2.45 mm (0.0965 in)
	383785200	2.43 mm (0.0957 in)
	383795200	2.41 mm (0.0949 in)
	383805200	2.39 mm (0.0941 in)
	383815200	2.37 mm (0.0933 in)
	383825200	2.35 mm (0.0925 in)
	383835200	2.33 mm (0.0917 in)
	383845200	2.31 mm (0.0909 in)

Pinion height adjusting shim	Part No.	Thickness
	383495200	3.09 mm (0.1217 in)
	383505200	3.12 mm (0.1228 in)
	383515200	3.15 mm (0.1240 in)
	383525200	3.18 mm (0.1252 in)
	383535200	3.21 mm (0.1264 in)
	383545200	3.24 mm (0.1276 in)
	383555200	3.27 mm (0.1287 in)
	383565200	3.30 mm (0.1299 in)
	383575200	3.33 mm (0.1311 in)
	383585200	3.36 mm (0.1323 in)
	383595200	3.39 mm (0.1335 in)
	383605200	3.42 mm (0.1346 in)
	383615200	3.45 mm (0.1358 in)
	383625200	3.48 mm (0.1370 in)
	383635200	3.51 mm (0.1382 in)
	383645200	3.54 mm (0.1394 in)
	383655200	3.57 mm (0.1406 in)
	383665200	3.60 mm (0.1417 in)
	383675200	3.63 mm (0.1429 in)
	383685200	3.66 mm (0.1441 in)
Side gear backlash mm (in)	0.1 — 0.2 (0.0039 — 0.0079)	
Side gear thrust washer (Model without LSD)	Part No.	Thickness
	383445201	0.75 — 0.80 mm (0.0295 — 0.0315 in)
	383445202	0.80 — 0.85 mm (0.0315 — 0.0335 in)
	383445203	0.85 — 0.90 mm (0.0335 — 0.0354 in)
Side bearing standard width mm (in)	—	20.00 (0.7874)
Side bearing retainer shim	Part No.	Thickness
	383475201	0.20 mm (0.0079 in)
	383475202	0.25 mm (0.0098 in)
	383475203	0.30 mm (0.0118 in)
	383475204	0.40 mm (0.0157 in)
	383475205	0.50 mm (0.0197 in)
Crown gear to drive pinion backlash mm (in)	Limit	0.10 — 0.20 (0.0039 — 0.0079)
Crown gear runout on its back surface mm (in)		0.05 (0.0020)

• STi model

Front and rear bearing preload at companion flange bolt hole N (kgf, lb)	31.1 — 59.5 (3.17 — 6.07, 7.0 — 13.4)	
Preload adjusting spacer	Part No.	Length
	31454AA130	52.2 mm (2.055 in)
	31454AA140	52.4 mm (2.063 in)
	31454AA150	52.6 mm (2.071 in)
	31454AA160	52.8 mm (2.079 in)
	31454AA170	53.0 mm (2.087 in)
	31454AA180	53.2 mm (2.094 in)

Preload adjusting washer	Part No.	Length
	383705200	2.59 mm (0.1020 in)
	383715200	2.57 mm (0.1012 in)
	383725200	2.55 mm (0.1004 in)
	383735200	2.53 mm (0.0996 in)
	383745200	2.51 mm (0.0988 in)
	383755200	2.49 mm (0.0980 in)
	383765200	2.47 mm (0.0972 in)
	383775200	2.45 mm (0.0965 in)
	383785200	2.43 mm (0.0957 in)
	383795200	2.41 mm (0.0949 in)
	383805200	2.39 mm (0.0941 in)
	383815200	2.37 mm (0.0933 in)
	383825200	2.35 mm (0.0925 in)
	383835200	2.33 mm (0.0917 in)
	383845200	2.31 mm (0.0909 in)
Pinion height adjusting shim	Part No.	Length
	38336AA230	3.09 mm (0.1217 in)
	38336AA240	3.12 mm (0.1228 in)
	38336AA250	3.15 mm (0.1240 in)
	38336AA260	3.18 mm (0.1252 in)
	38336AA270	3.21 mm (0.1264 in)
	38336AA280	3.24 mm (0.1276 in)
	38336AA290	3.27 mm (0.1287 in)
	38336AA300	3.30 mm (0.1299 in)
	38336AA310	3.33 mm (0.1311 in)
	38336AA320	3.36 mm (0.1323 in)
	38336AA330	3.39 mm (0.1335 in)
	38336AA340	3.42 mm (0.1346 in)
	38336AA350	3.45 mm (0.1358 in)
	38336AA360	3.48 mm (0.1370 in)
	38336AA370	3.51 mm (0.1382 in)
	38336AA380	3.54 mm (0.1394 in)
	38336AA390	3.57 mm (0.1406 in)
	38336AA400	3.60 mm (0.1417 in)
	38336AA410	3.63 mm (0.1429 in)
	38336AA420	3.66 mm (0.1441 in)
Side bearing standard width mm (in)	20.00 (0.7874)	
Side bearing retainer shim	Part No.	Thickness
	383475201	0.20 mm (0.0079 in)
	383475202	0.25 mm (0.0098 in)
	383475203	0.30 mm (0.0118 in)
	383475204	0.40 mm (0.0157 in)
	383475205	0.50 mm (0.0197 in)
Crown gear to drive pinion backlash mm (in)	Limit	0.10 — 0.20 (0.0039 — 0.0079)
Crown gear runout on its back surface mm (in)		0.05 (0.0020)

D: PREPARATION TOOL

1. SPECIAL TOOLS

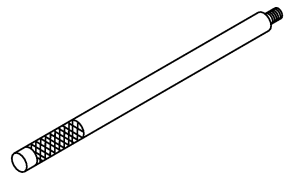
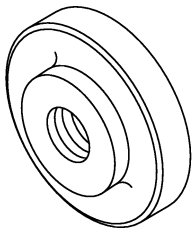
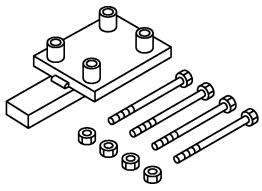
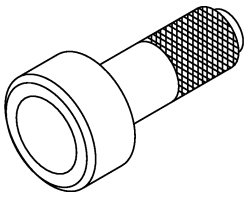
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1893	398477701	HANDLE	Used for installing front and rear bearing cone.
 B3M1894	398477702	DRIFT	Used press-fitting the bearing cone of differential carrier (rear).
 B3M1895	398217700	ATTACHMENT SET	Stand for rear differential carrier disassembly and assembly.
 B3M1896	498447120	DRIFT	Used for installing front oil seal.

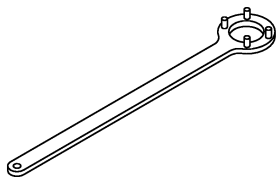
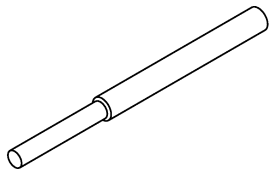
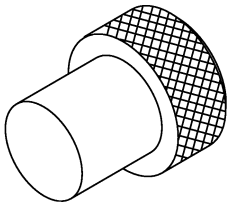
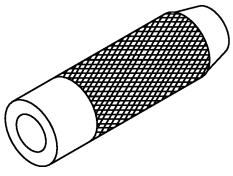
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1897	498427200	FLANGE WRENCH	Used for stopping rotation of companion flange when loosening and tightening self-lock nut.
 B3M1898	398467700	DRIFT	Used for removing pinion, pilot bearing and front bearing cone.
 B3M1899	399780104	WEIGHT	Used for installing front bearing cone, pilot bearing companion flange.
 B3M1900	899580100	INSTALLER	Used for press-fitting the front bearing cone, pilot bearing.

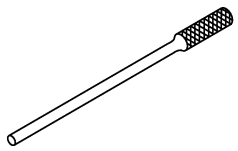
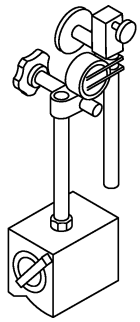
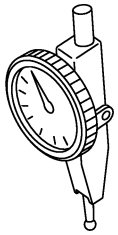
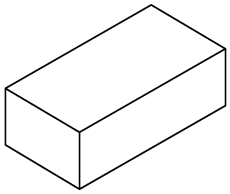
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1901	899904100	STRAIGHT PIN REMOVER	Used for driving out differential pinion shaft lock pin.
 B3M1902	498247001	MAGNET BASE	• Used for measuring backlash between side gear and pinion, and hypoid gear. • Used with DIAL GAUGE (498247100).
 B3M1903	498247100	DIAL GAUGE	• Used measuring backlash between side gear and pinion, hypoid gear. • Used with MAGNET BASE (498247001).
 B3M1904	398507704	BLOCK	Used for adjusting pinion height and preload.

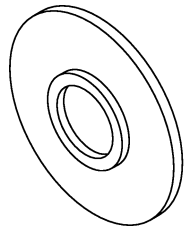
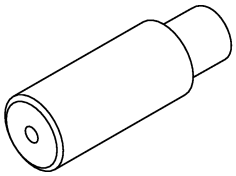
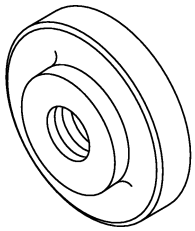
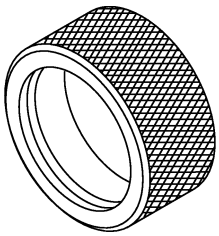
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1905	398177700	INSTALLER	• Used for installing rear bearing cone. • For T-type.
 B3M1906	398457700	ATTACHMENT	• Used for removing side bearing retainer. • For T-type.
 B3M1907	398477703	DRIFT2	• Used for press-fitting the bearing race (rear) of differential carrier. • For T-type.
 B3M1908	398437700	DRIFT	• Used for installing side oil seal. • For T-type.

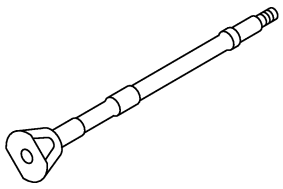
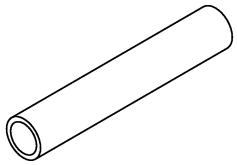
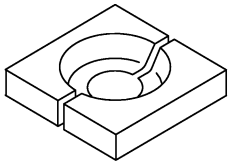
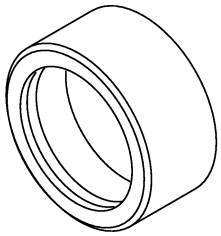
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1909	398507702	DUMMY SHAFT	• Used for adjusting pinion height and preload. • For T-type.
 B3M1910	398507703	DUMMY COLLAR	• Used for adjusting pinion height and preload. • For T-type.
 B3M1911	398517700	REPLACER	• Used for removing rear bearing cone. • For T-type.
 B3M1912	398487700	DRIFT	• Used for press-fitting the side bearing cone. • For T-type.

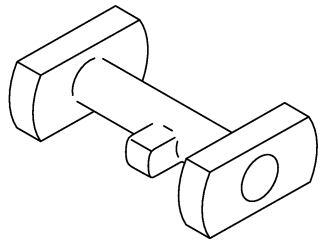
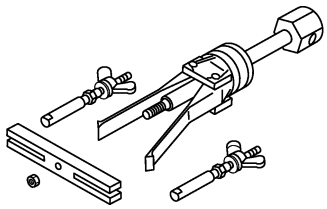
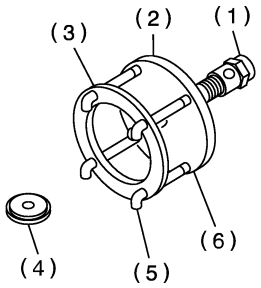
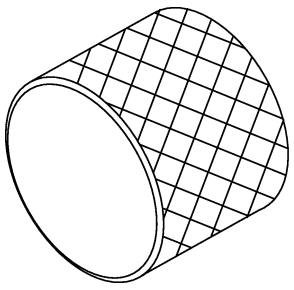
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1913	398507701	DIFFERENTIAL CARRIER GAUGE	• Used for adjusting pinion height. • For T-type.
 B3M1914	398527700	PULLEY ASSY	• Used for removing front oil seal. • Used for removing side bearing cup. (T-type)
 B3M1915A	398527700	PULLER SET	• Used for extracting side bearing cone. (1) BOLT (899521412) (2) PULLER (399527702) (3) HOLDER (399527703) (4) ADAPTER (398497701) (5) BOLT (899520107) (6) NUT (021008000) • For T-type.
 B3M1916	398227700	WEIGHT	• Used for installing side bearing. • For T-type.

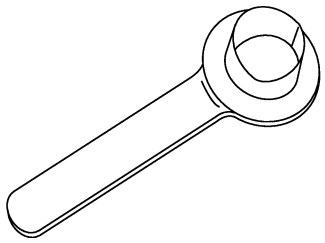
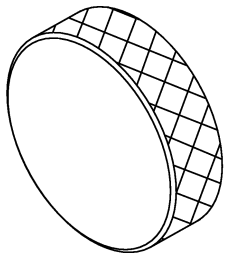
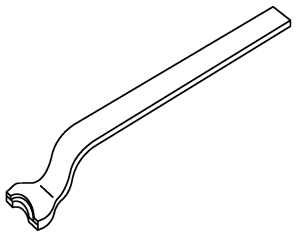
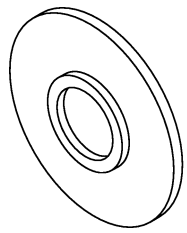
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1917	28099PA090	OIL SEAL PROTECTOR	• Used for installing rear drive shaft into rear differential. • For protecting oil seal.
 B3M1918	398237700	GAUGE	• Used for installing side bearing. • For T-type.
 B3M1919	28099PA100	DRIVE SHAFT REMOVER	• Used for removing rear drive shaft from rear differential. • For T-type.
 B3M1920	498175500	INSTALLER	• Used for installing rear bearing cone. • For VA-type.

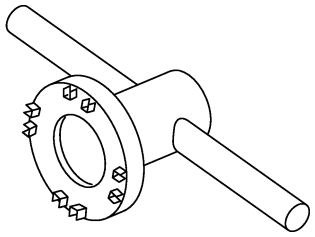
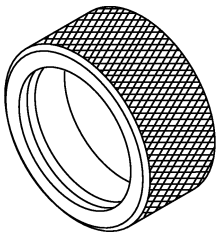
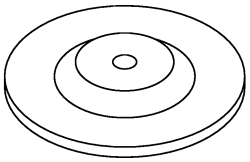
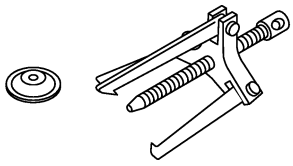
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1921	499785500	WRENCH ASSY	• Used for removing and installing side oil seal holder. • For VA-type.
 B3M1922	498447100	DRIFT	• Used for installing oil seal. • For VA-type.
 B3M1923	399520105	SEAT	• Used for removing side bearing cone. • Used with PULLER SET (899524100). • For VA-type.
 B3M1930	399703602	PULLEY ASSY	• Used for removing companion flange

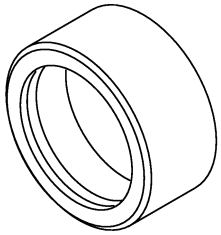
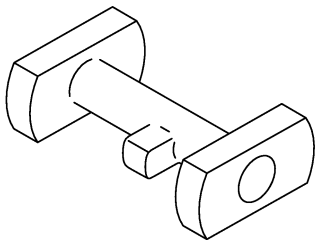
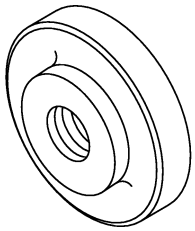
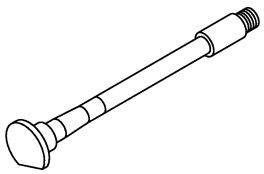
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1924	498485400	DRIFT	• Used for installing side bearing cone. • For VA-type.
 B3M1925	498505501	DIFFERENTIAL CARRIER GAUGE	• Used for adjusting pinion height. • For VA-type.
 B3M1926	498447110	DRIFT	• Used for press-fitting the bearing race (front) of differential carrier. • For VA-type.
 B3M1927	498447150	DUMMY SHAFT	• Used for adjusting pinion height and preload. • For VA-type.

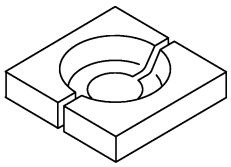
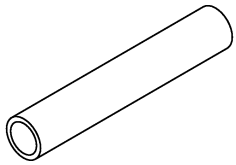
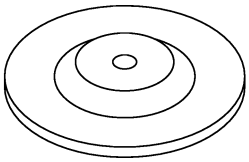
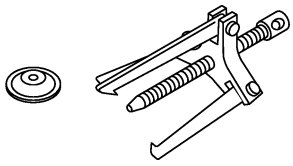
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1911	498515500	REPLACER	• Used for removing rear bearing cone. • For VA-type.
 B3M1977	32285AA000	DUMMY COLLAR	• Used for adjusting pinion height and preload. • For VA-type.
 B3M1928	499705404	SEAT	• Used for removing side bearing race. • Used with PULLEY ASSY (499705401). • For VA-type.
 B3M1930	499705401	PULLEY ASSY	• Used for removing side bearing race. • Used with SEAT (499705404). • For VA-type.

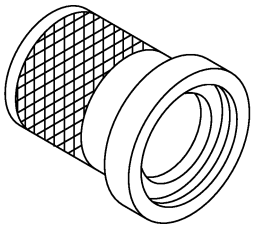
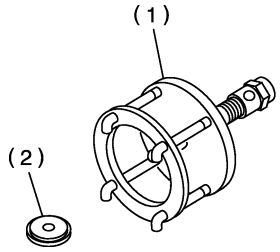
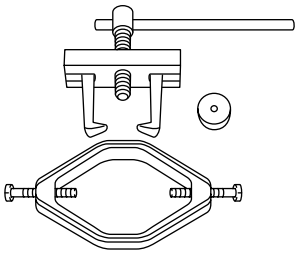
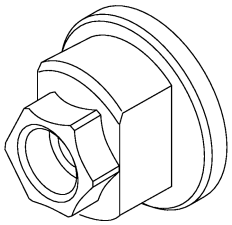
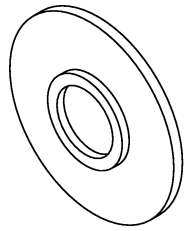
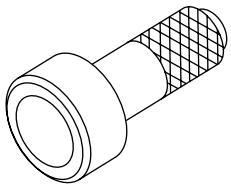
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1931	899874100	INSTALLER	• Used for installing companion flange.
 B3M1932A	899524100	PULLER SET	• Used for removing side bearing cone of differential. • For VA-type. (1) Puller (2) Cap
 DR0029	18759AA000	PULLER ASSY (Newly adopted tool)	• Used for removing side bearing cone of differential. • For T-type. (STi model)
 B3M2016	498937110	HOLDER DRIVE PINION (This special tool is used for current automatic transmission.)	• Used for installing pilot bearing. • For T-type. (STi model)

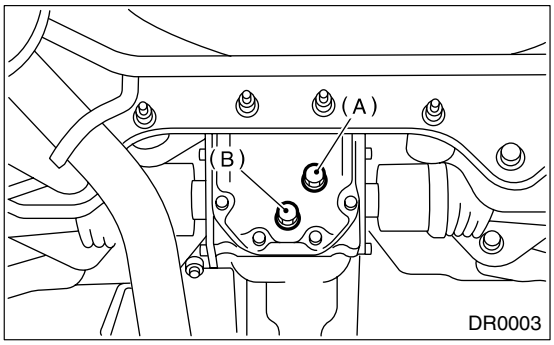
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B3M1905	18674AA000	INSTALLER (Newly adopted tool)	• Used for installing rear bearing cone. • For T-type. (STi model)
 DR0030	398417700	DRIFT (This special tool was prepared for the vehicles of 92MY and before.)	• Used for installing side bearing race.

2. Differential Gear Oil

B: REPLACEMENT

1) Jack-up the vehicle and support it with sturdy racks.
2) Remove the oil drain plug and filler plug, and drain the gear oil.

CAUTION:
Be careful not to burn your hands, because gear oil becomes extremely hot after running.



(A) Filler plug
(B) Drain plug

3) Tighten the oil drain plug.

NOTE:
- Apply fluid packing to the drain plug for T-type.
- Use a new aluminum gasket for VA-type.

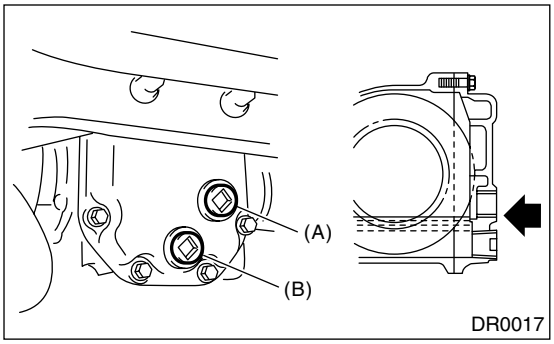
Fluid packing:
THREE BOND 1105 or equivalent

Tightening torque:
T-type;
49 N·m (5.0 kgf-m, 36.2 ft-lb)
VA-type;
34 N·m (3.5 kgf-m, 25.3 ft-lb)

4) Fill the differential carrier with gear oil to the upper plug level.

NOTE:
Carefully refill oil while watching the level. Excess or insufficient oil must be avoided.

Oil capacity:
Except STi model;
0.8 ℓ (0.8 US qt, 0.7 Imp qt)
STi model;
0.9 —1.1 ℓ (1.0 — 1.2 US qt, 0.8 — 1.0 Imp qt)



(A) Filler plug
(B) Drain plug

5) Install the filler plug.

NOTE:
- Apply fluid packing to the filler plug for T-type.
- Use a new aluminum gasket for VA-type.

Fluid packing:
THREE BOND 1105 or equivalent

Tightening torque:
T-type;
49 N·m (5.0 kgf-m, 36.2 ft-lb)
VA-type;
34 N·m (3.5 kgf-m, 25.3 ft-lb)

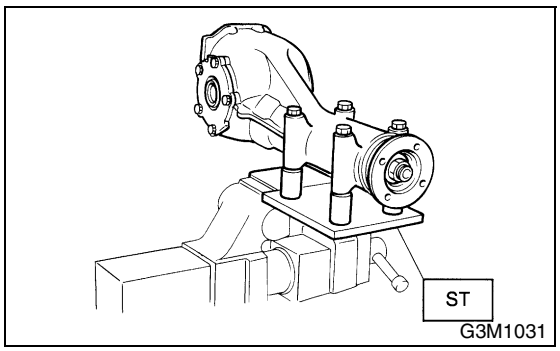
4. Rear Differential for T-type

C: DISASSEMBLY

2. STI MODEL

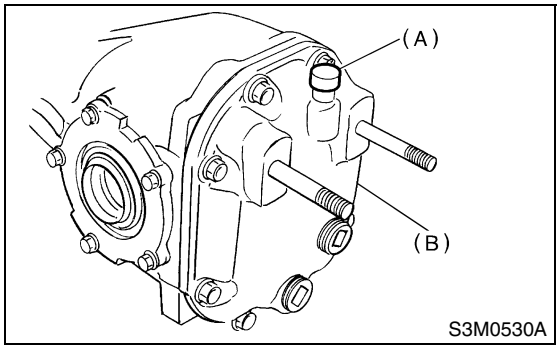
To detect the real cause of trouble, inspect the following items before disassembling.
- Tooth contact of crown gear and pinion, and backlash
- Runout of crown gear at its back surface
- Turning resistance of drive pinion

1) Set the ST on vise and install the differential assembly to ST.
ST 398217700 ATTACHMENT SET



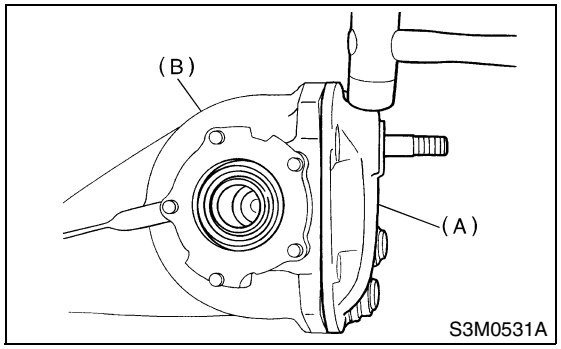
2) Drain the gear oil by removing the plug.
3) Remove the air breather cap.

NOTE:
Do not attempt to replace the air breather cap unless necessary.



(A) Air breather cap
(B) Rear cover

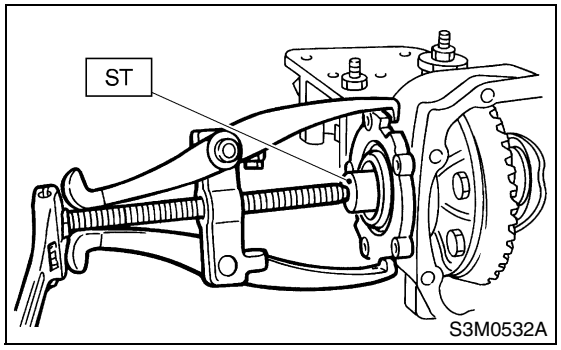
4) Remove the rear cover by loosening the retaining bolts.



(A) Rear cover
(B) Differential carrier

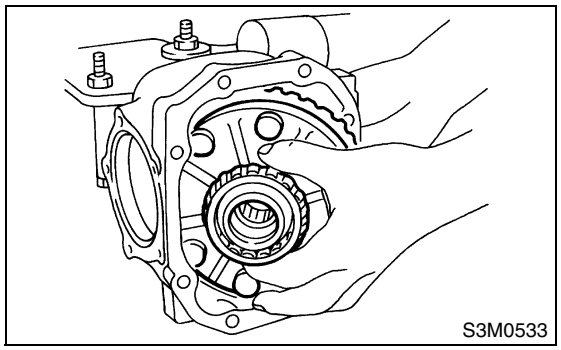
5) Make right and left side bearing retainers in order to identify them at reassembly. Remove the side bearing retainer attaching bolts, set the ST to differential case, and extract right and left side bearing retainers with a puller.

NOTE:
Each shim, which is installed to adjust the side bearing preload, should be kept together with its mating retainer.
ST 398457700 ATTACHMENT

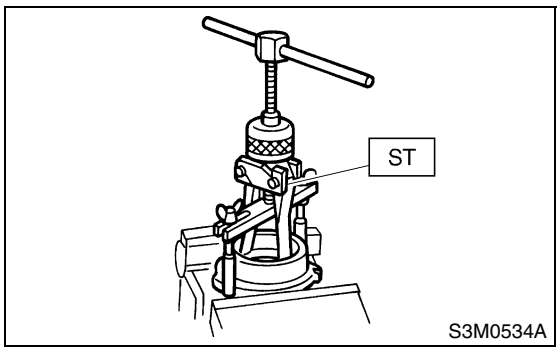


6) Pull out the differential case assembly from differential carrier.

NOTE:
Be careful not to hit the teeth against the case.

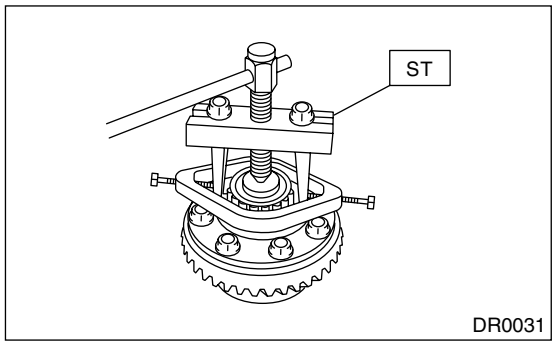


7) When replacing the side bearing, pull the bearing cup from side bearing retainer using ST.
ST 398527700 PULLER ASSY



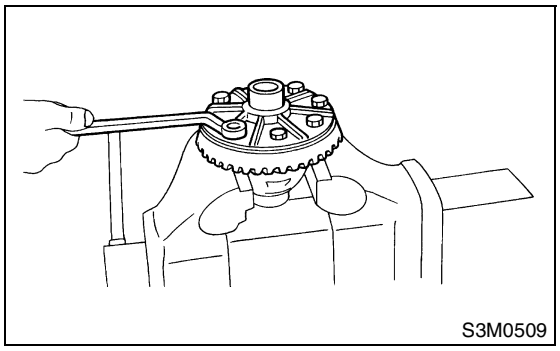
8) Extract the bearing cone with ST.

NOTE:
• Do not attempt to disassemble the parts unless necessary.
• Set the puller so that its claws catch the edge of bearing cone.
• Never mix up the right and left hand bearing races and cones.
ST 18759AA000 PULLER ASSY

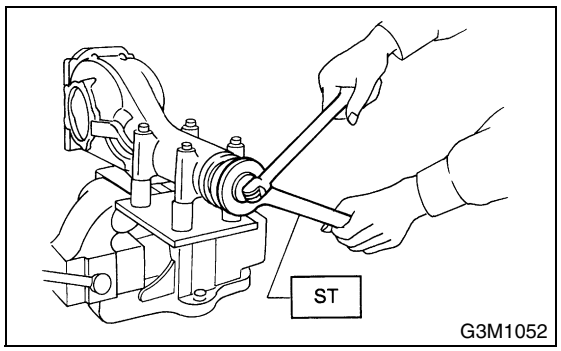


9) Remove the crown gear by loosening the crown gear bolts.

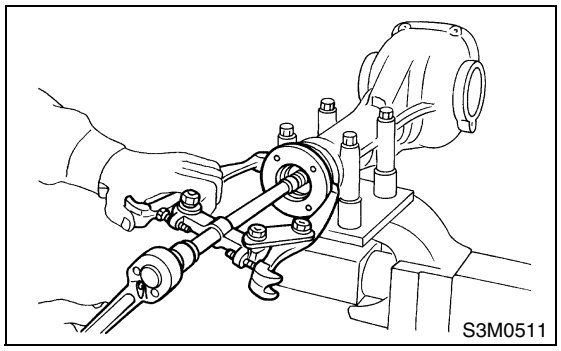
NOTE:
Further disassembling is not allowed.



10) Hold the companion flange with ST and remove the drive pinion nut.
ST 498427200 FLANGE WRENCH

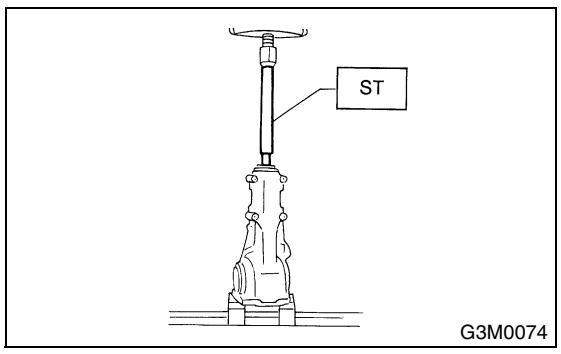


11) Extract the companion flange with a puller.

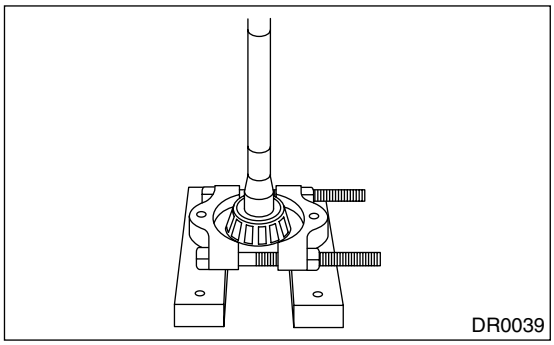


12) Press-fit the end of drive pinion shaft and extract it together with the rear bearing cone, preload adjusting spacer and washer.

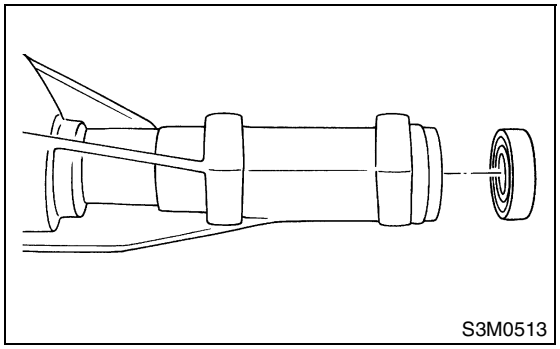
NOTE:
Hold the drive pinion so as not to drop it.
ST 398467700 DRIFT



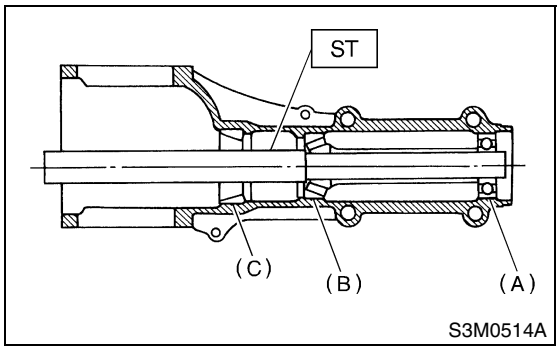
13) Remove the rear bearing cone from drive pinion.



14) Remove the front oil seal from differential carrier using ST.
ST 398527700 PULLER ASSY

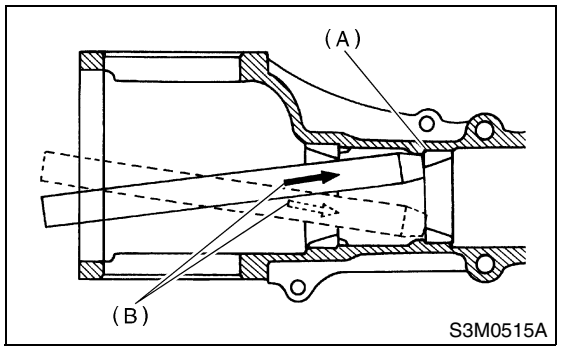


15) Remove the pilot bearing together with front bearing cone using ST.
ST 398467700 DRIFT



(A) Pinion bearing
(B) Front bearing
(C) Rear bearing cup

16) When replacing the bearings, tap the front bearing cup and rear bearing cup in this order out of case by using a brass bar.

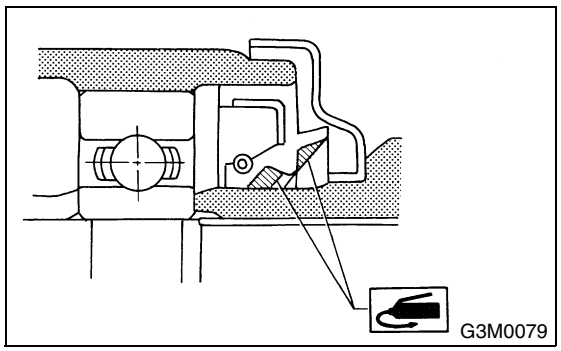


(A) 2 cutouts along diagonal lines
(B) Tap alternately with brass bar.

D: ASSEMBLY

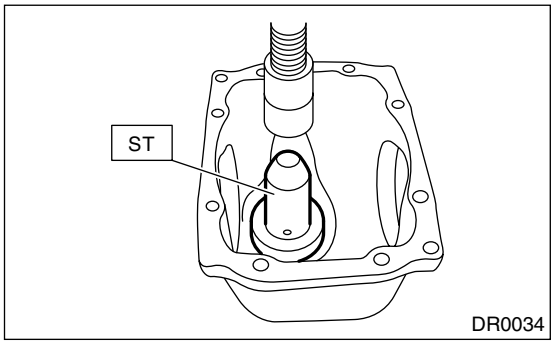
2. STI MODEL

1) Precautions for assembling
- Assemble in the reverse order of disassembling.
- Check and adjust each part during assembly.
- Keep the shims and washers in order, so that they are not improperly installed.
- Thoroughly clean the surfaces on which the shims, washers and bearings are to be installed.
- Apply gear oil when installing the bearings and thrust washers.
- Be careful not to mix up the right and left hand races of the bearings.
- Replace the oil seal with a new one at every disassembly. Apply chassis grease between the lips when installing the oil seal.

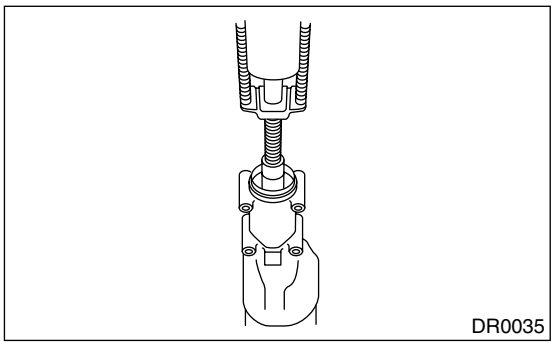


- Adjust the bearing preload with spacer and washer between front and rear bearings. Pinion height adjusting washer are not affected by this adjustment. The adjustment must be carried out without oil seal inserted.

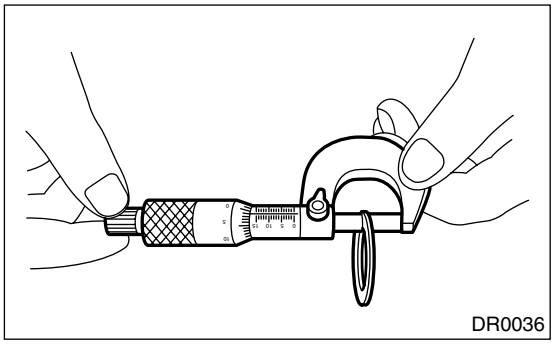
2) Press-fit the rear bearing race into differential carrier using ST.
ST 398417700 DRIFT



3) Press-fit the front bearing race into differential carrier using ST.
ST 398477702 DRIFT

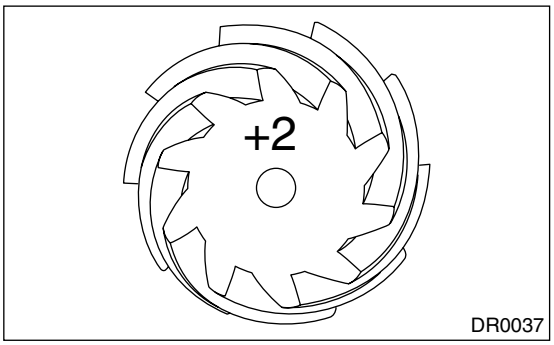


4) Pinion height adjusting shim selection.
(1) Measure the thickness of inserted pinion height adjusting shim.



(2) Read the punch mark of installed drive pinion gear and new one.

NOTE:
If there is no punch mark, it means 0 (zero).



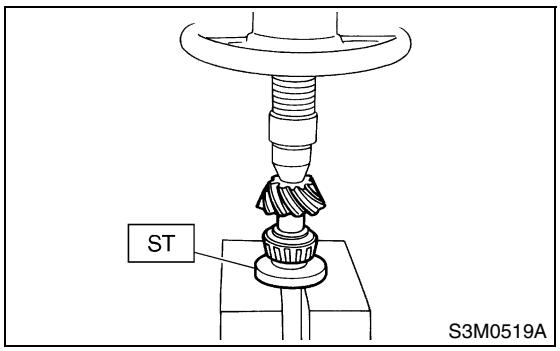
(3) Obtain the thickness of pinion height adjust shim to be inserted from the following formula, and replace the inserted shim with this one.
$T = T1 + (T2 \times 0.01 - T3 \times 0.01)$

T mm	Thickness of selected pinion height adjusting shim.
T1 mm	Thickness of inserted pinion height adjusting shim.
T2 mm	Punch mark number on installed drive pinion gear.
T3 mm	Punch mark number on new drive pinion gear.

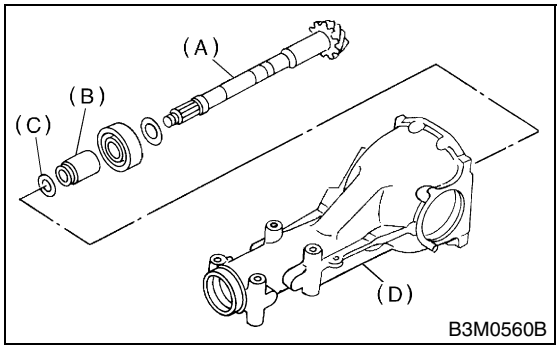
(Example of calculation)
$T1 = 3.30, T2 = +2, T3 = -1$
$T = 3.30 + \{(2 \times 0.01) - (-1 \times 0.01)\} = 3.33$
Result: Thickness = 3.33 mm
Therefore use the shim 38336AA310.

Pinion height adjusting shim	
Part No.	Thickness T mm (in)
38336AA230	3.09 (0.1217)
38336AA240	3.12 (0.1228)
38336AA250	3.15 (0.1240)
38336AA260	3.18 (0.1252)
38336AA270	3.21 (0.1264)
38336AA280	3.24 (0.1276)
38336AA290	3.27 (0.1287)
38336AA300	3.30 (0.1299)
38336AA310	3.33 (0.1311)
38336AA320	3.36 (0.1323)
38336AA330	3.39 (0.1335)
38336AA340	3.42 (0.1346)
38336AA350	3.45 (0.1358)
38336AA360	3.48 (0.1370)
38336AA370	3.51 (0.1382)
38336AA380	3.54 (0.1394)
38336AA390	3.57 (0.1406)
38336AA400	3.60 (0.1417)
38336AA410	3.63 (0.1429)
38336AA420	3.66 (0.1441)

5) Install the selected pinion height adjusting shim on drive pinion, and press-fit the rear bearing cone into position with ST.
ST 18674AA000 INSTALLER

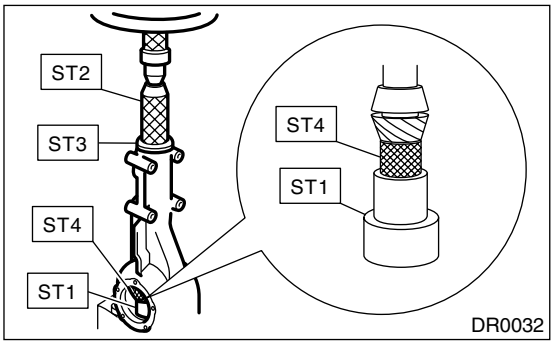


6) Insert the drive pinion into differential carrier, install the previously selected bearing preload adjusting spacer and washer.



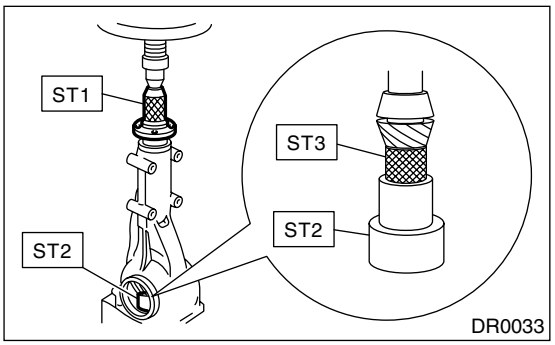
(A) Drive pinion
(B) Bearing adjusting spacer
(C) Washer
(D) Differential carrier

7) Insert the spacer, then press-fit the pilot bearing with STs.
ST1 399780104 WEIGHT
ST2 899580100 INSTALLER
ST3 398507703 DUMMY COLLER
ST4 498937110 HOLDER DRIVE PINION



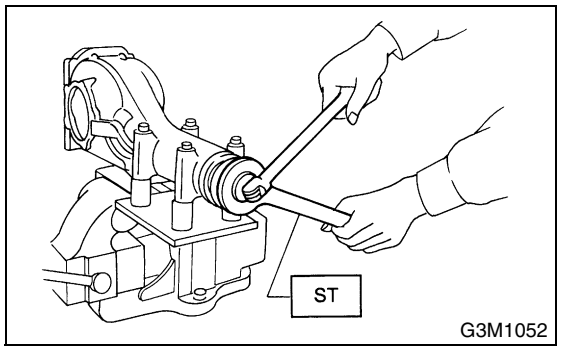
8) Press-fit the companion flange with ST1, ST2 and ST3.

NOTE:
Be careful not to damage the bearing.
ST1 899874100 INSTALLER
ST2 399780104 WEIGHT
ST3 498937110 HOLDER DRIVE PINION



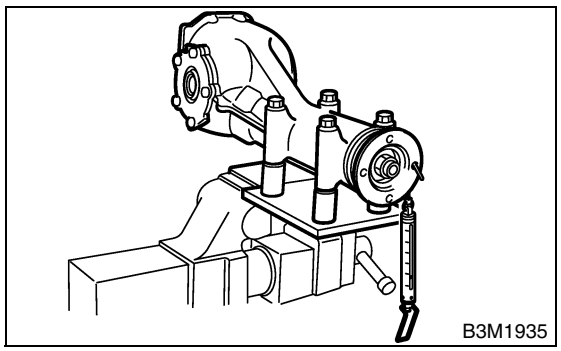
9) Install the self-locking nut. Then tighten it with the ST.
ST 498427200 FLANGE WRENCH

Tightening torque:
181 N·m (18.5 kgf-m, 134 ft-lb)



10) Rotate the drive pinion shaft more than ten times to accustom each taper roller bearing, and then measure the preload.

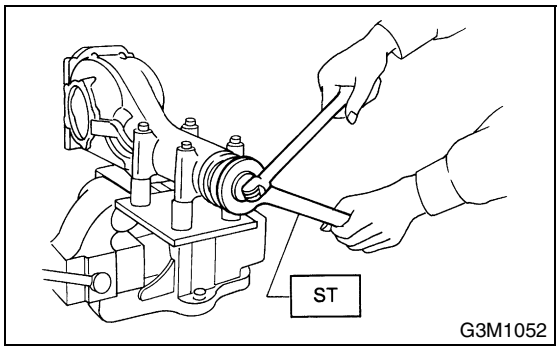
Bearing preload:
25.9 — 41.4 N (2.64 — 4.22 kgf, 5.8 — 9.3 lb)



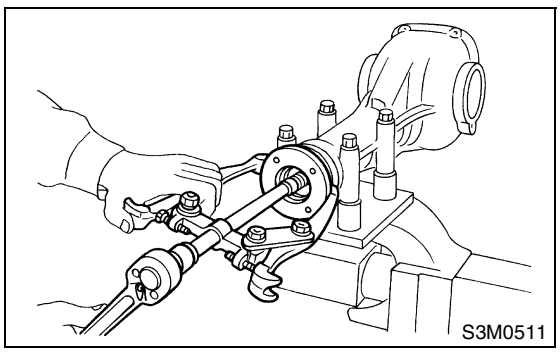
11) If bearing preload is out of specification, adjust to specification by selecting preload adjusting washer and spacer from the following table.

	Part No.	Thickness mm (in)
Preload adjusting washer	383705200	2.59 (0.1020)
	383715200	2.57 (0.1012)
	383725200	2.55 (0.1004)
	383735200	2.53 (0.0996)
	383745200	2.51 (0.0988)
	383755200	2.49 (0.0980)
	383765200	2.47 (0.0972)
	383775200	2.45 (0.0965)
	383785200	2.43 (0.0957)
	383795200	2.41 (0.0949)
	383805200	2.39 (0.0941)
	383815200	2.37 (0.0933)
	383825200	2.35 (0.0925)
	383835200	2.33 (0.0917)
	383845200	2.31 (0.0909)
	Part No.	Length mm (in)
Preload adjusting spacer	31454AA130	52.2 (2.055)
	31454AA140	52.4 (2.063)
	31454AA150	52.6 (2.071)
	31454AA160	52.8 (2.079)
	31454AA170	53.0 (2.087)
	31454AA180	53.2 (2.094)

12) Hold the companion flange with ST and remove the self-lock nut.
ST 498427200 FRANGE WRENCH



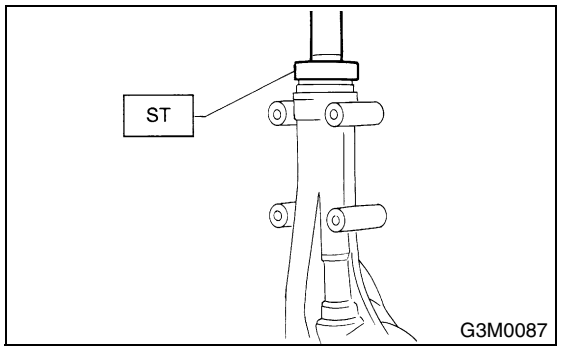
13) Extract the companion flange with a puller.



14) Fit a new oil seal with ST.

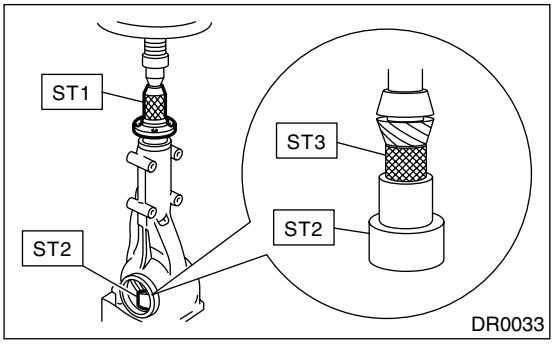
NOTE:
- Press-fit until the end of oil seal is 1 mm (0.04 in) inward from end of carrier.
- Apply grease between the oil seal lips.

ST 498447120 DRIFT

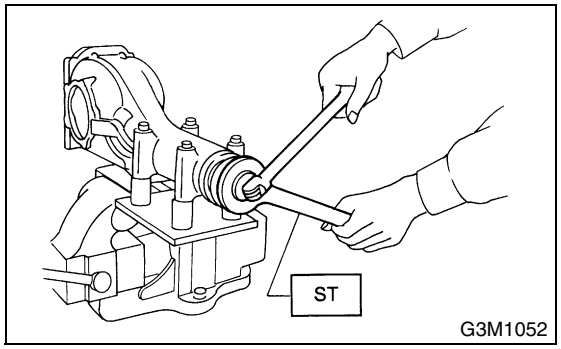


15) Press-fit the companion flange with ST1, ST2 and ST3.
ST1 899874100 INSTALLER
ST2 399780104 WEIGHT
ST3 498937110 HOLDER DRIVE PINION

NOTE:
Be careful not to damage the bearing.



16) Install the self-lock nut. Then tighten it with the ST.
ST 498427200 FRANGE WRENCH



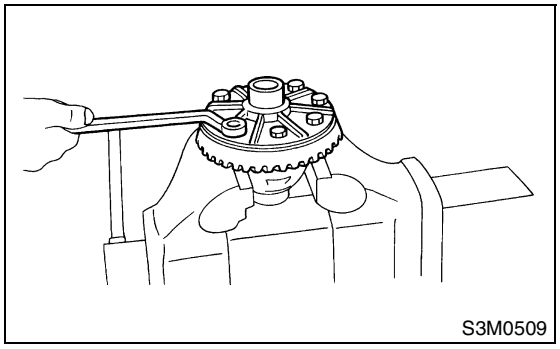
17) Install the crown gear on differential case.

NOTE:
Before installing the bolts, apply Lock Tite to bolt threads.

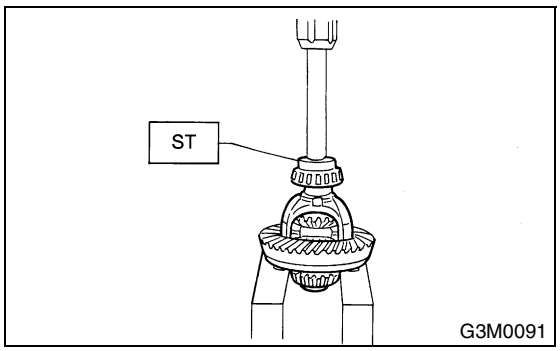
Lock Tite:
THREE BOND 1324 or equivalent

NOTE:
Tighten diagonally while tapping the bolt heads.

Tightening torque:
105 N·m (10.7 kgf-m, 77.4 ft-lb)

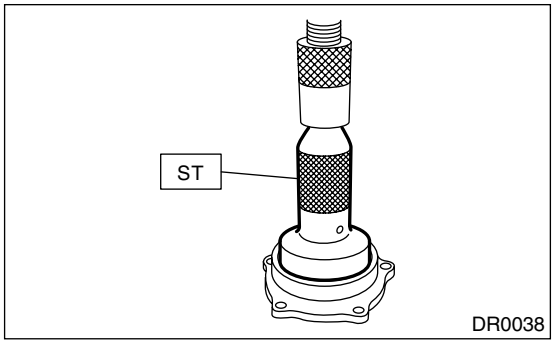

S3M0509

18) Press-fit the side bearing cone onto differential case with ST.
ST 398487700 DRIFT



G3M0091

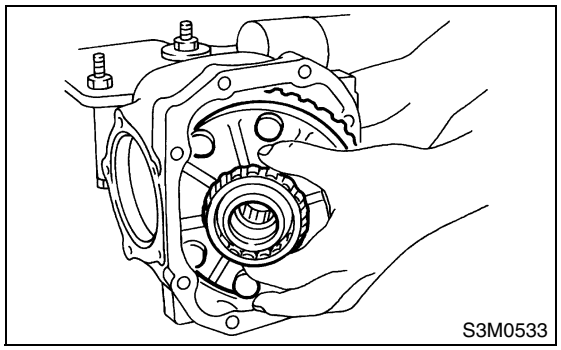
19) Assembling side retainer.
(1) Press-fit the side bearing outer race with press and ST.
ST 398417700 DRIFT



DR0038

(2) Install the oil seal. <Ref. to DI-58, REPLACEMENT, Rear Differential Side Oil Seal.>

20) Adjusting side bearing retainer shims
(1) The driven gear backlash and side bearing preload can be determined by the side bearing retainer shim thickness.
(2) Install the differential case assembly into differential carrier in the reverse order of disassembly.


S3M0533

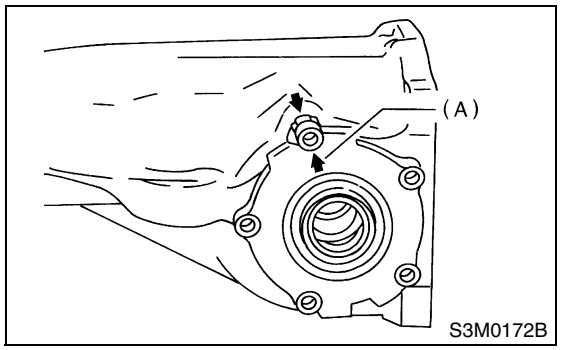
(3) Install the side retainer shims and O-rings to the right and left retainers from which they were removed.

NOTE:
• Replace the broken or cracked O-ring with new one.
• Replace the broken or corroded side retainer shim with a new one of same thickness.

Side bearing retainer shim	
Part No.	Thickness mm (in)
383475201	0.20 (0.0079)
383475202	0.25 (0.0098)
383475203	0.30 (0.0118)
383475204	0.40 (0.0157)
383475205	0.50 (0.0197)

(4) Align the arrow mark on differential carrier with the mark on side retainer during installation.

NOTE:
Be careful that side bearing outer race is not damaged by bearing roller.

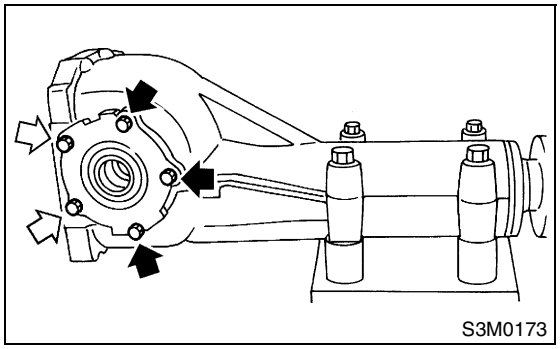


S3M0172B

(A) Arrow mark

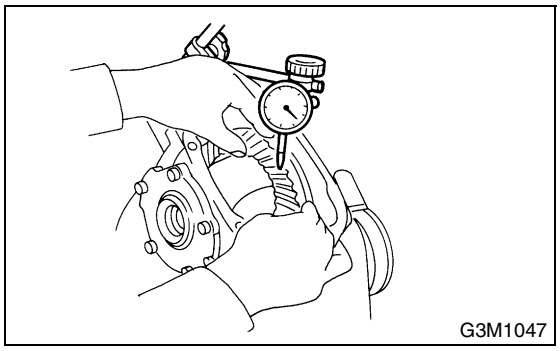
(5) Tighten the side bearing retainer bolts.

Tightening torque:
10.3 N·m (1.05 kgf-m, 7.6 ft-lb)


S3M0173

(6) Measure the crown gear-to-drive pinion backlash. Set the magnet base on differential carrier. Align the contact point of dial gauge with tooth face of crown gear, and move the crown gear while holding drive pinion still. Read the value indicated on dial gauge.

Backlash:
0.10 — 0.20 mm (0.0039 — 0.0079 in)

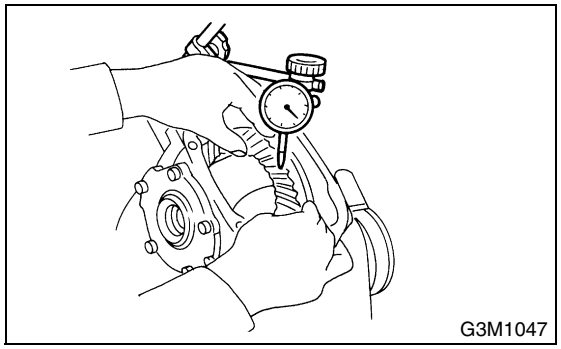

G3M1047

(7) At the same time, measure the turning resistance of drive pinion. Compared with the resistance when differential case is not installed, if the increase of the resistance is not within the specified range, readjust side bearing retainer shims.

Turning resistance increase:
31.1 — 59.5 N (3.17 — 6.07 kgf, 7.0 — 13.4 lb)

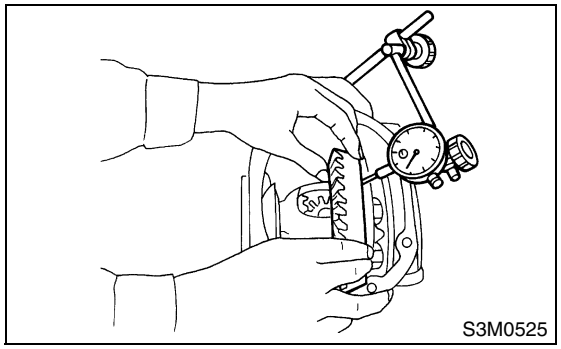
21) Re-check the crown gear-to-pinion backlash.

Backlash:
0.10 — 0.20 mm (0.0039 — 0.0079 in)


G3M1047

22) Check the crown gear runout on its back surface, and make sure that pinion and crown gear rotate smoothly.

Limit of runout:
Less than 0.05 mm (0.0020 in)

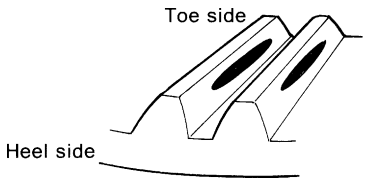
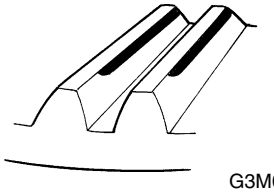
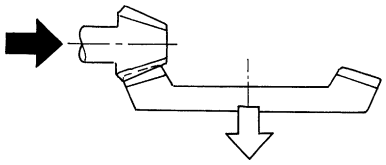
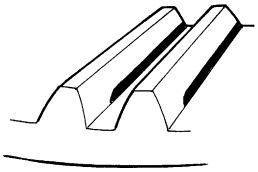
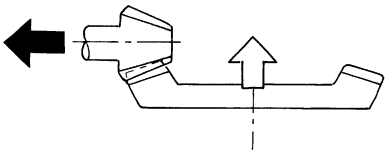
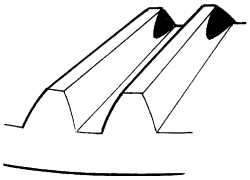
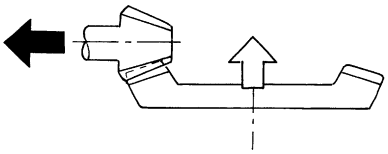
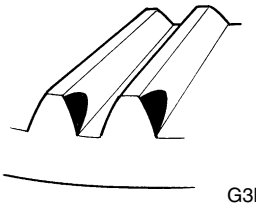
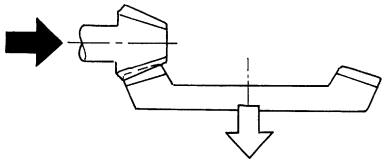

S3M0525

23) Checking and adjusting tooth contact of crown gear

(1) Apply an even coat of red lead on both sides of three or four teeth on the crown gear. Check the contact pattern after rotating the crown gear several revolutions back and forth until a definite contact pattern appears on the crown gear.

(2) When the contact pattern is incorrect, readjust according to the instructions given in “TOOTH CONTACT PATTERN”.

NOTE:
Be sure to wipe off red lead completely after adjustment is completed.

TOOTH CONTACT PATTERN		
Condition	Contact pattern	Adjustment
Correct tooth contact Tooth contact pattern slightly shifted towards toe under no load rotation. (When loaded, contact pattern moves toward heel.)	 G3M0098A	—
Face contact Backlash is too large.	This may cause noise and chipping at tooth ends.  G3M0098B	Increase thickness of drive pinion height adjusting shim in order to bring drive pinion closer to crown gear center.  G3M0098F
Flank contact Backlash is too small.	This may cause noise and stepped wear on surfaces.  G3M0098C	Reduce thickness of drive pinion height adjusting shim in order to move drive pinion away from crown gear.  G3M0098G
Toe contact Contact area is small.	This may cause chipping at toe ends.  G3M0098D	Adjust as for flank contact.  G3M0098G
Heel contact Contact area is small.	This may cause chipping at heel ends.  G3M0098E	Adjust as for face contact.  G3M0098F

➡ : Adjusting direction of drive pinion
⇨ : Adjusting direction of crown gear

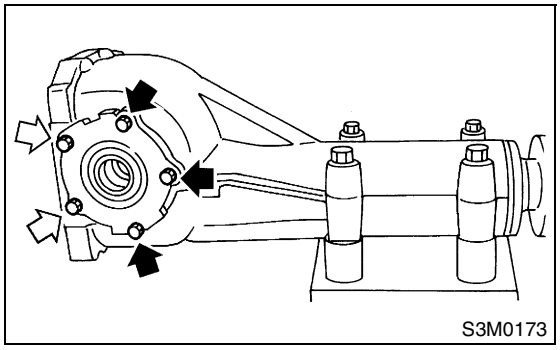
24) Remove the right and left side bearing retainers.
25) Install the new O-ring to side bearing retainers.

26) Tighten the side bearing retainer bolts.

NOTE:
Before tightening the two side bearing retainer bolts, apply Lock Tite to bolt threads.

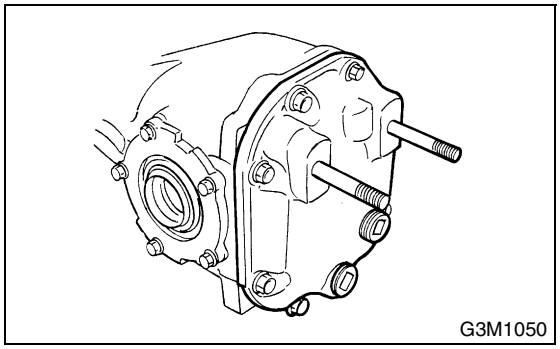
Lock Tite:
THREE BOND 1105 or equivalent

Tightening torque:
10.3 N·m (1.05 kgf-m, 7.6 ft-lb)


S3M0173

27) Install the rear cover and tighten the bolts to specified torque.

Tightening torque:
29 N·m (3.0 kgf-m, 21.7 ft-lb)


G3M1050

TRANSFER CASE

TC

1. General Description

A: NOTE

For general description refer to “AUTOMATIC TRANSMISSION” (a separate publication: Pub. No. G0864ZE) and “AT”, “MT” or “6MT” section.
AT model:
<Ref. to AT-2, General Description.>
MT model:
<Ref. to MT-2, General Description.>
6MT model:
<Ref. to 6MT-2, General Description.>

4. Oil Seal

A: NOTE

For removal, installation and inspection work, refer to “AT”, “MT” or “6MT” section.
AT model:
<Ref. to AT-27, Extension Case Oil Seal.>
MT model:
<Ref. to MT-42, Oil Seal.>
6MT model:
<Ref. to 6MT-33, Oil Seal.>

5. Transfer Drive Gear (MT)

A: NOTE

For removal, installation and inspection work, refer to “MT” or “6MT” section.
MT model:
<Ref. to MT-52, Transfer Drive Gear.>
6MT model:
<Ref. to 6MT-58, Transfer Drive Gear.>

6. Transfer Driven Gear (MT)

A: NOTE

For removal, installation and inspection work, refer to “MT” or “6MT” section.
MT model:
<Ref. to MT-54, Transfer Driven Gear.>
6MT model:
<Ref. to 6MT-60, Transfer Driven Gear.>

11.Center Differential

A: NOTE

For removal, installation and inspection work, refer to “MT” or “6MT” section.
MT model:
<Ref. to MT-56, Center Differential.>
6MT model:
<Ref. to 6MT-62, Center Differential.>

14.Extension Case for 6MT

A: NOTE

For removal, installation and inspection work, refer to “6MT” section. <Ref. to 6MT-49, Extension Case.>

DRIVE SHAFT SYSTEM

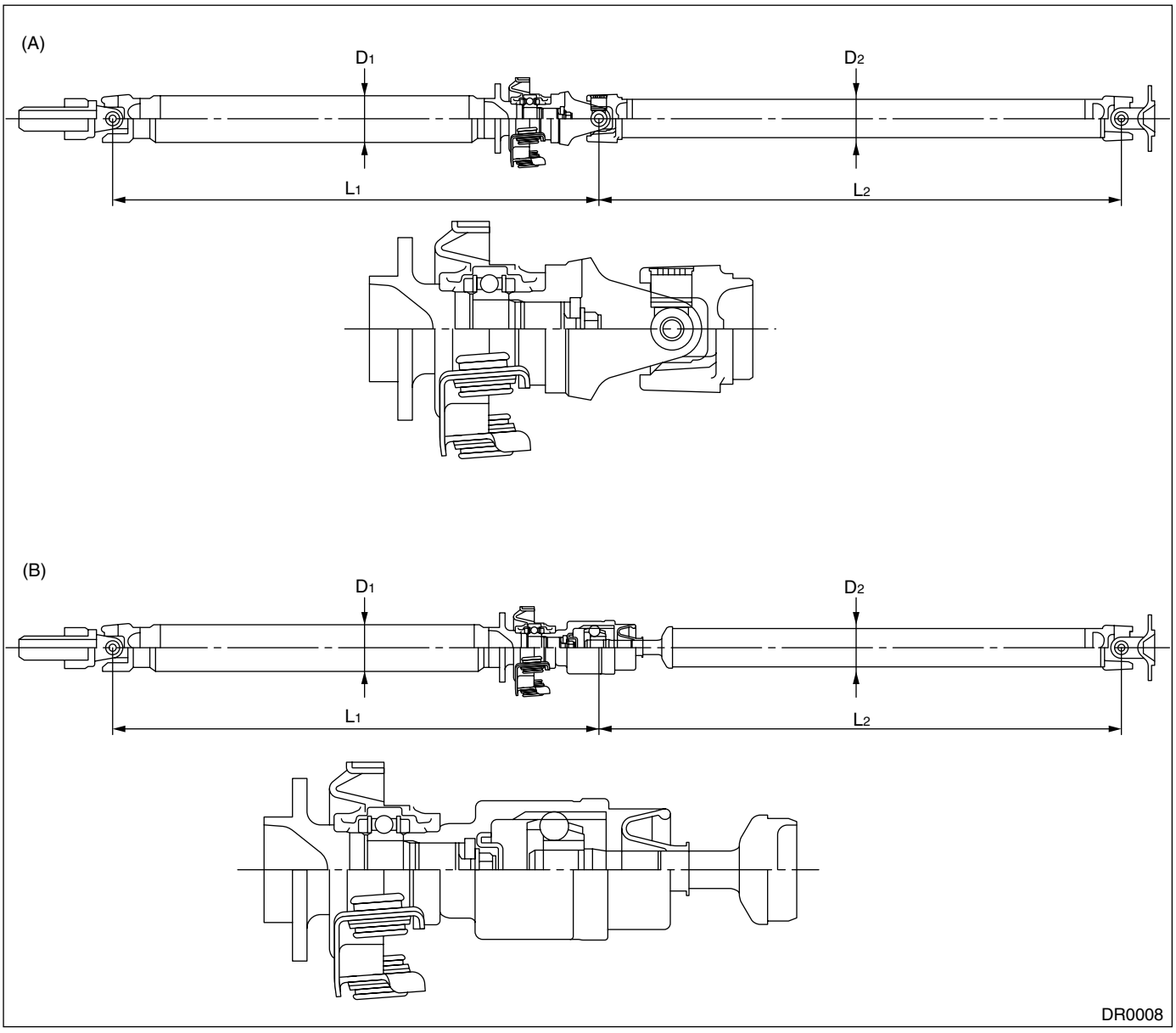
DS

1. General Description

A: SPECIFICATIONS

1. PROPELLER SHAFT

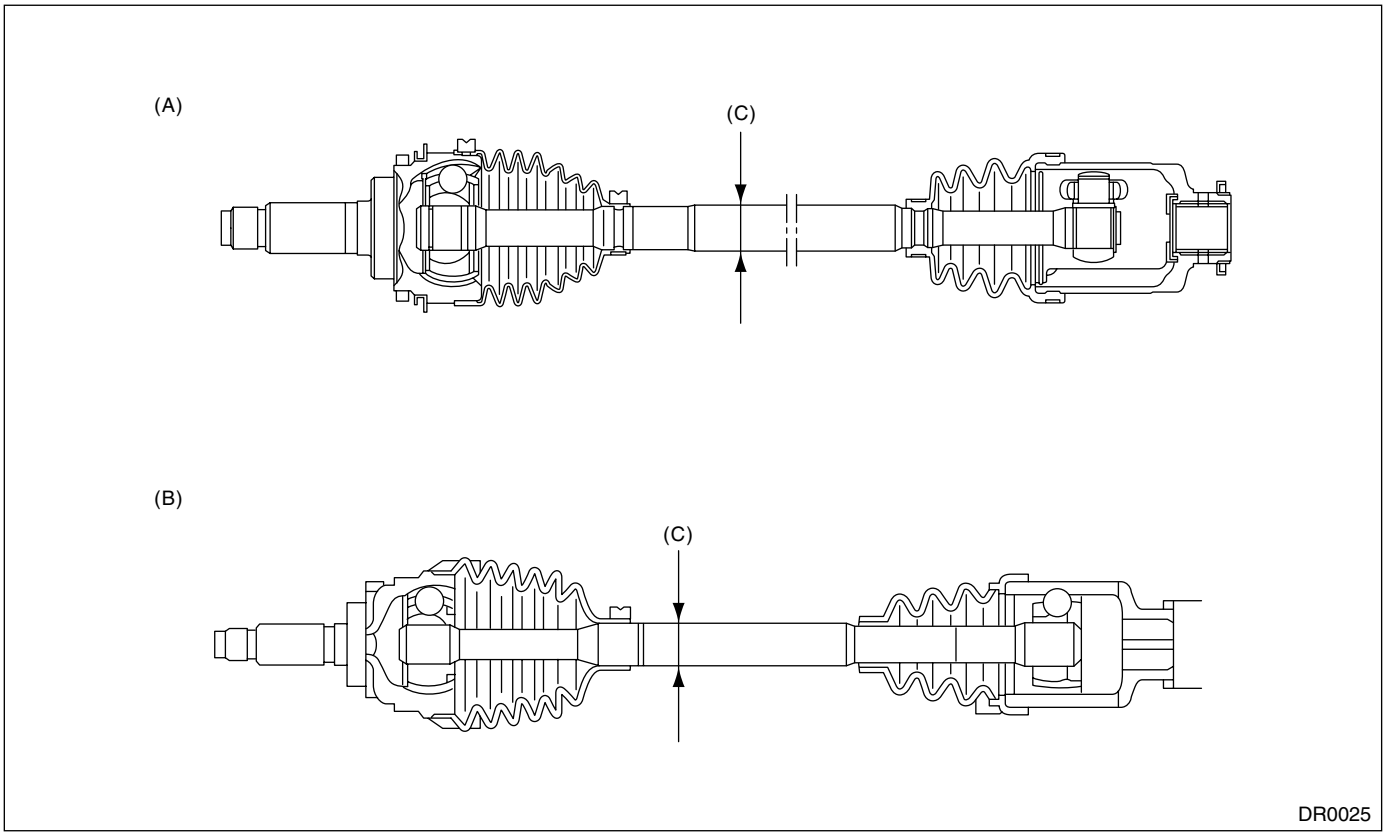
Model			Turbo	Non-turbo	STi
Propeller shaft type			DOJ type	UJ type	
Front propeller shaft Joint-to-joint length: L_1	mm (in)	AT	579 (22.79)	584 (22.99)	—
		MT	638 (25.12)	643 (25.32)	584 (22.99)
Rear propeller shaft Joint-to-joint length: L_2		mm (in)	713 (28.07)	708 (27.87)	
Outside diameter of tube:	mm (in)	D_1	63.5 (2.500)		
		D_2	57.0 (2.244)		



(A) UJ type (B) DOJ type

2. FRONT DRIVE SHAFT ASSEMBLY

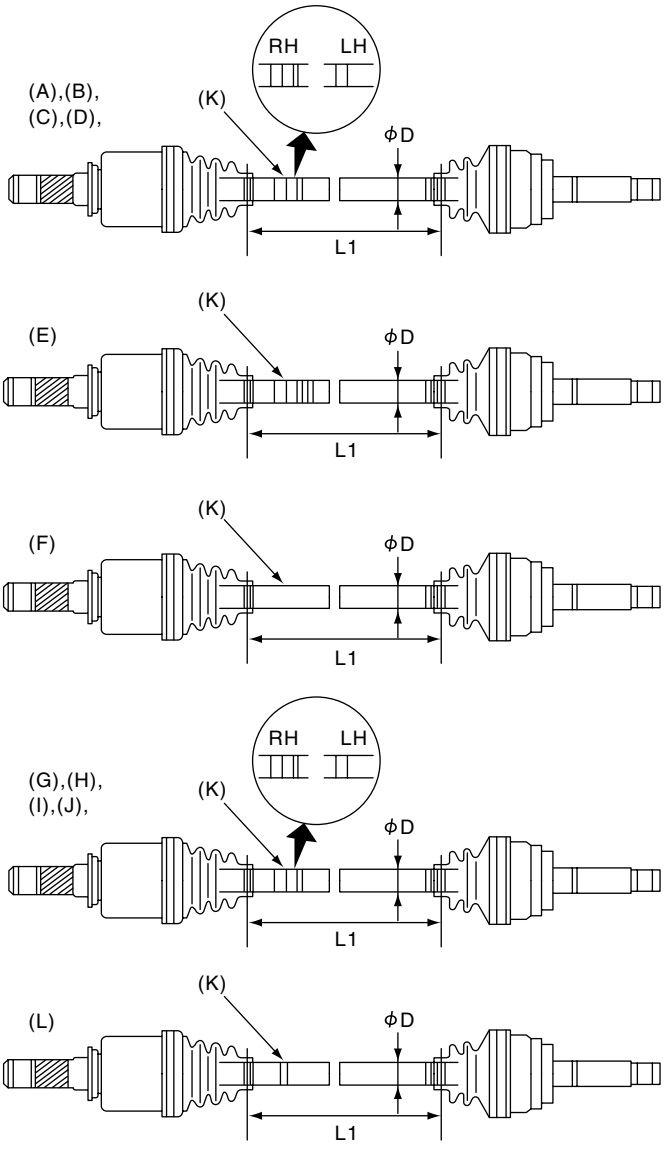
Model	Type of drive shaft assembly	SHAFT	
		Shaft diameter	
Except STi	EBJ87+SFJ82	Non-turbo	26 mm (1.02 in)
		Turbo	28 mm (1.10 in)
STi	BJ92+DOJ87	28 mm (1.10 in)	



(A) EBJ87+SFJ82 (B) BJ92+DOJ87 (C) Measuring point

3. REAR DRIVE SHAFT ASSEMBLY

	Size	Model	No. of identification protrusion on shaft	L1 (mm)	ϕ D (mm)
A	EBJ82/DOJ82 Sedan RH	Sedan Turbo	2 (Two)	363	24
B	EBJ82/DOJ82 Sedan LH		1 (One)	353	24
C	BJ79/DOJ79 Sedan R160RH	Sedan 2.0 L NA MT	2 (Two)	368	23
D	BJ79/DOJ79 Sedan R160LH		1 (One)	358	23
E	BJ79/DOJ79 Sedan R152R/L	Sedan 1.6 L, 2.0 L NA AT	3 (Three)	363	23
F	BJ79/DOJ79 Wagon R152R/L	Wagon 1.6 L, 2.0 L NA AT	None	355	23
G	EBJ82/DOJ82 Wagon RH	Wagon Turbo	2 (Two)	353	24
H	EBJ82/DOJ82 Wagon LH		1 (One)	343	24
I	BJ79/DOJ79 Wagon R160RH	Wagon 2.0 L NA MT	2 (Two)	358	23
J	BJ79/DOJ79 Wagon R160LH		1 (One)	348	23
L	BJ87/DOJ87 R/L	STi model	1 (One)	295.2	25

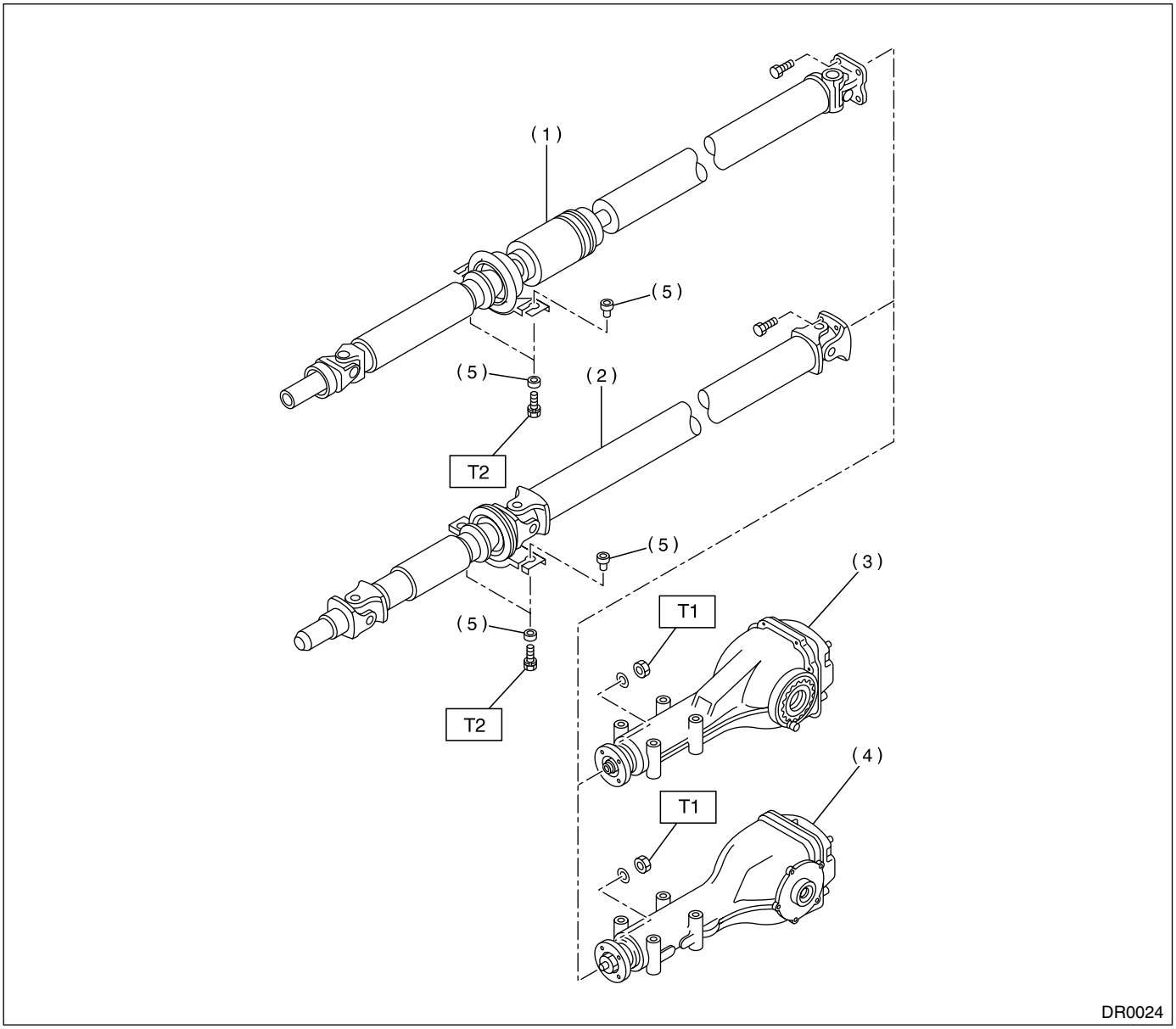


DR0026

(A) EBJ82/DOJ82 Sedan RH
(B) EBJ82/DOJ82 Sedan LH
(C) BJ79/DOJ79 Sedan R160RH
(D) BJ79/DOJ79 Sedan R160LH
(E) BJ79/DOJ79 Sedan R152R/L
(F) BJ79/DOJ79 Wagon R152R/L
(G) EBJ82/DOJ82 Wagon RH
(H) EBJ82/DOJ82 Wagon LH
(I) BJ79/DOJ79 Wagon R160RH
(J) BJ79/DOJ79 Wagon R160LH
(K) Identification protrusion
(L) BJ87/DOJ87 R/L

B: COMPONENT

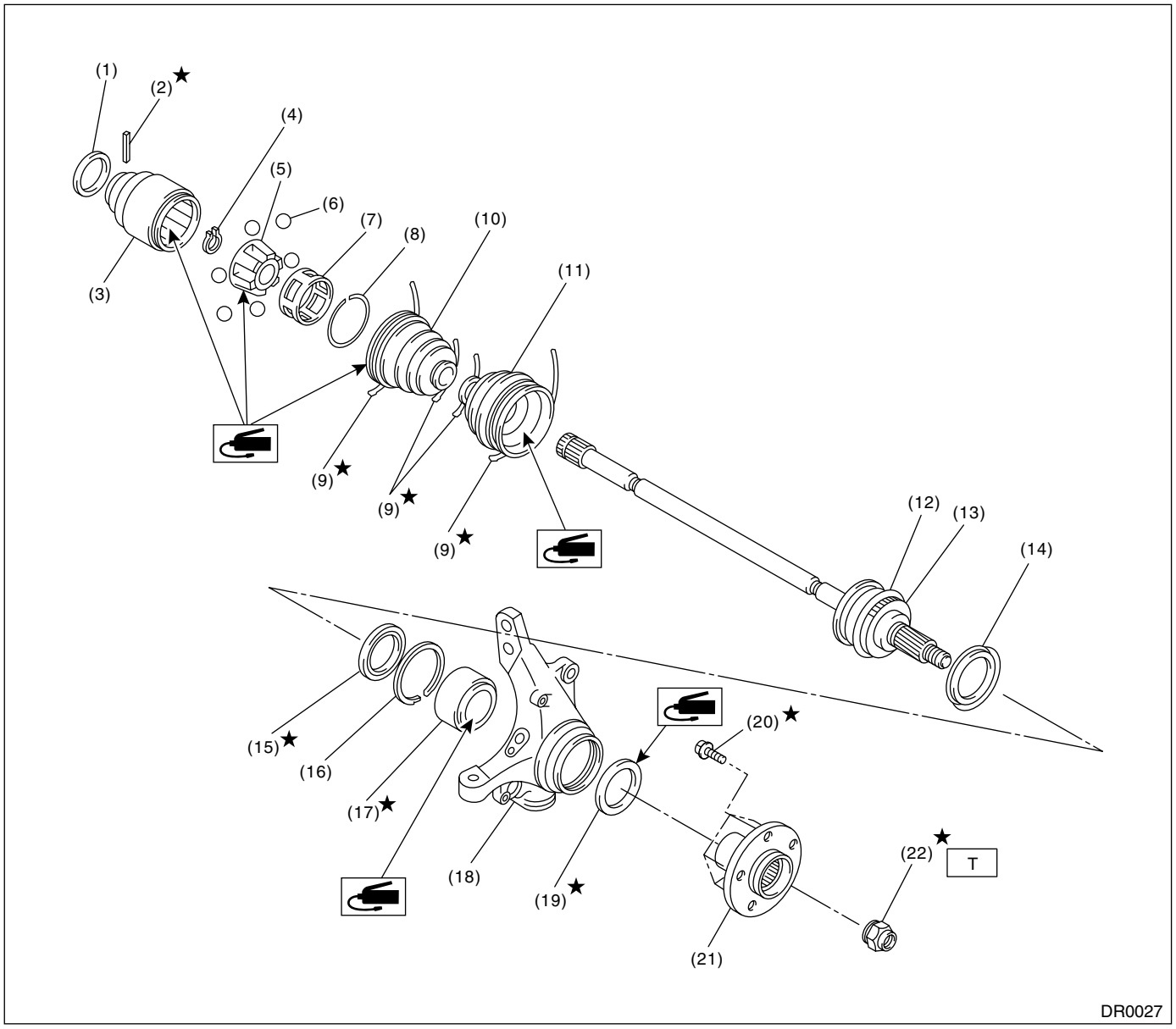
1. PROPELLER SHAFT



(1) Propeller shaft (Turbo model)
(2) Propeller shaft (Non-turbo model, STi model)
(3) Rear differential (VA-type)
(4) Rear differential (T-type)
(5) Bush

Tightening torque: N·m (kgf-m, ft-lb)
T1: 31 (3.2, 23.1)
T2: 52 (5.3, 38.3)

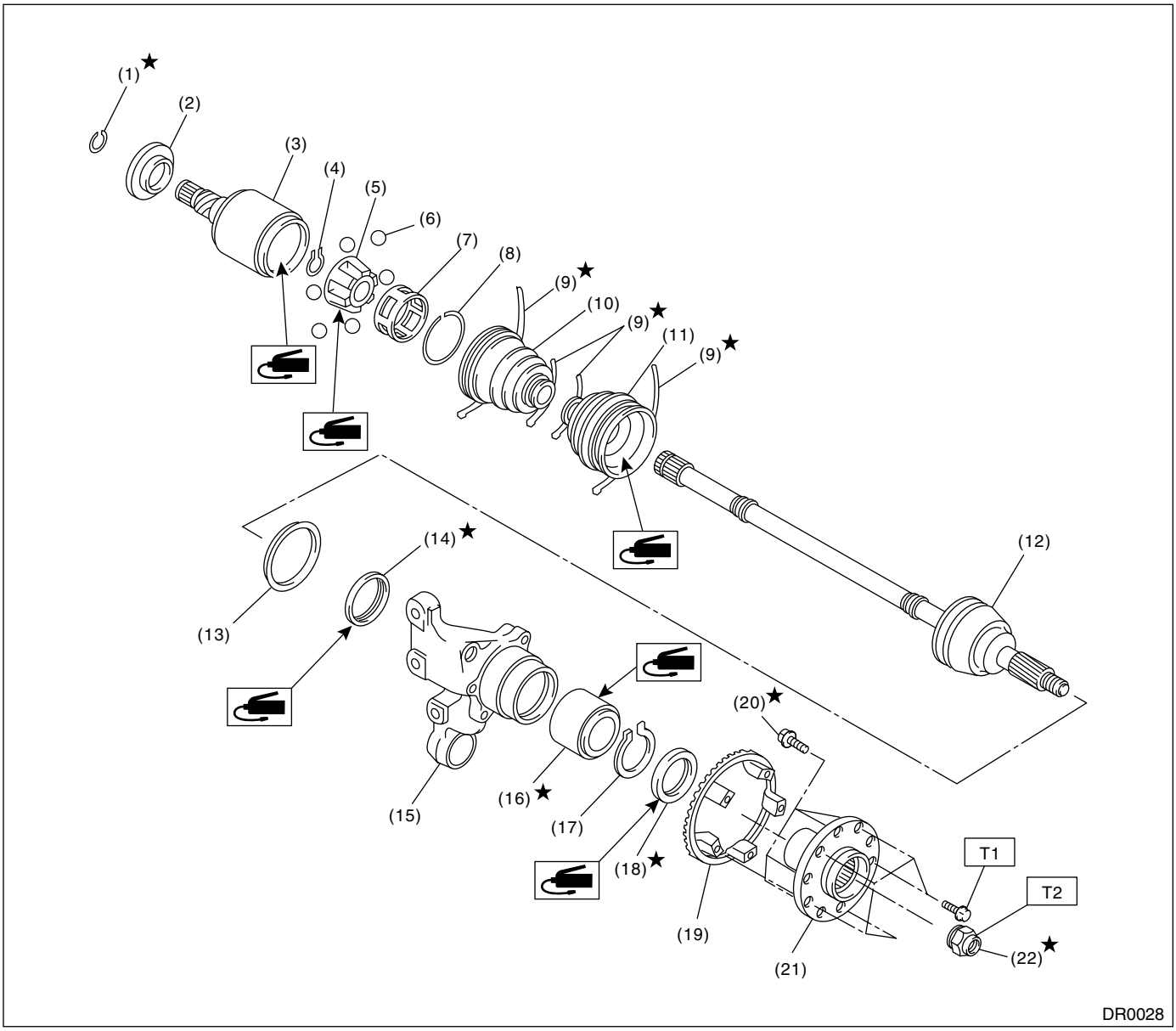
4. FRONT AXLE (STI MODEL)



(1) Baffle plate (DOJ)
(2) Spring pin
(3) Outer race (DOJ)
(4) Snap ring
(5) Inner race
(6) Ball
(7) Cage
(8) Circlip
(9) Boot band
(10) Boot (DOJ)
(11) Boot (BJ)
(12) BJ ASSY
(13) Tone wheel (With ABS)
(14) Baffle plate
(15) Oil seal (IN)
(16) Snap ring
(17) Bearing
(18) Housing
(19) Oil seal (OUT)
(20) Hub bolt
(21) Hub
(22) Axle nut

Tightening torque: N·m (kgf-m, ft-lb)
T: 186 (19, 137)

5. REAR AXLE (STI MODEL)



(1) Circlip
(2) Baffle plate (DOJ)
(3) Outer race (DOJ)
(4) Snap ring
(5) Inner race
(6) Ball
(7) Cage
(8) Circlip
(9) Boot band
(10) Boot (DOJ)
(11) Boot (BJ)
(12) BJ ASSY
(13) Baffle plate
(14) Oil seal
(15) Housing
(16) Bearing
(17) Snap ring
(18) Oil seal (OUT)
(19) Tone wheel (With ABS)
(20) Hub bolt
(21) Hub
(22) Axle nut

Tightening torque: N·m (kgf-m, ft-lb)
T1: 13 (1.3, 9.4)
T2: 186 (19, 137)

5. Front Drive Shaft

C: DISASSEMBLY

2. STI MODEL

Refer to Rear Drive Shaft as a guide for disassembly procedures. <Ref. to DS-40, DISASSEMBLY, Rear Drive Shaft.>

D: ASSEMBLY

2. STI MODEL

Refer to Rear Drive Shaft as a guide for assembly procedures. <Ref. to DS-41, ASSEMBLY, Rear Drive Shaft.>

ABS

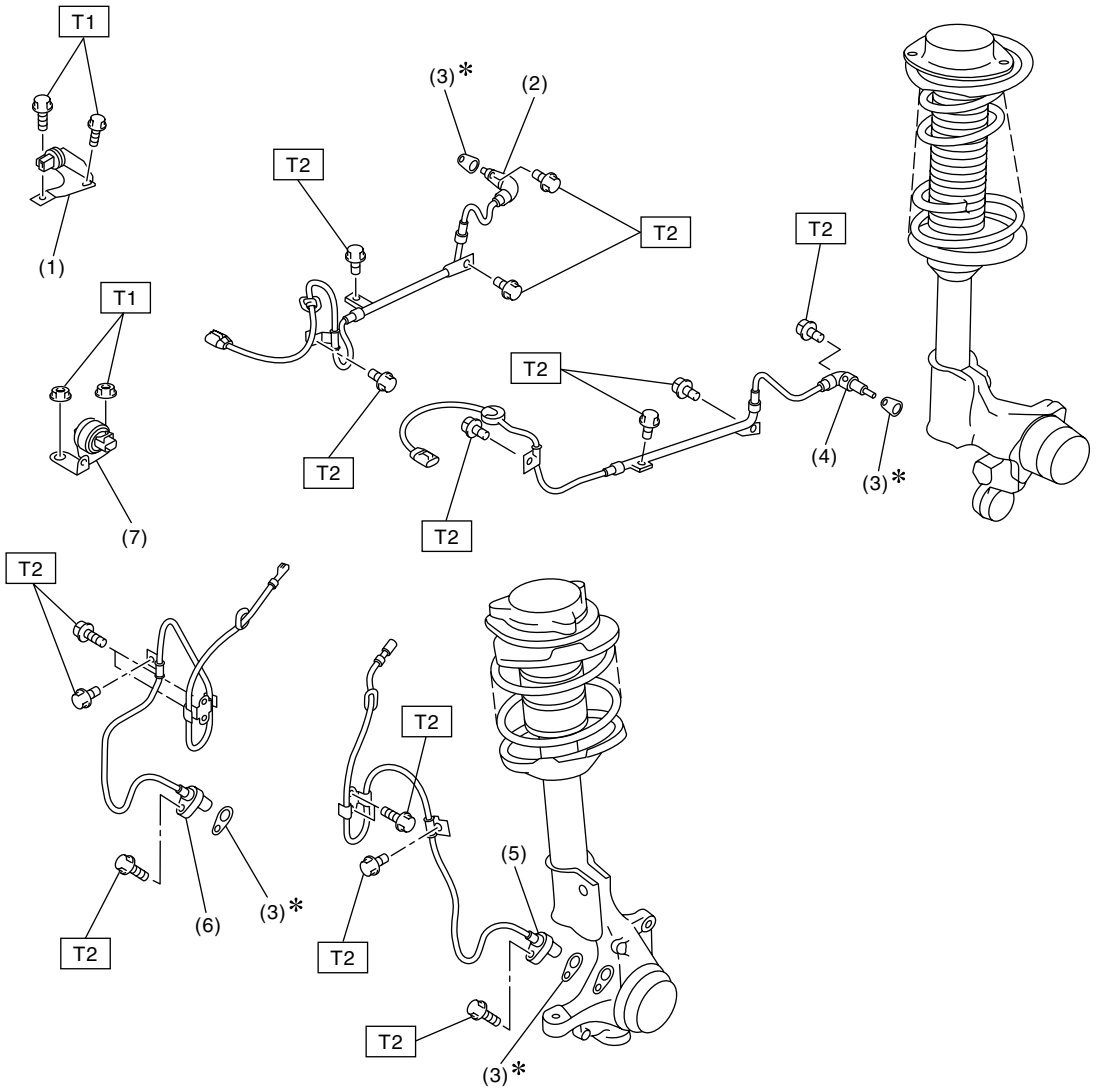
1. General Description

A: SPECIFICATIONS

Item				Standard or remarks
ABS sensor	ABS sensor gap		Front	0.3 — 0.8 mm (0.012 — 0.031 in)
			Rear	0.7 — 1.2 mm (0.028 — 0.047 in)
	ABS sensor resistance		Front	1.25±0.25 kΩ
			Rear	1.0±0.2 kΩ
	Marks of the harness	Front	RH	White
			LH	Yellow
		Rear	RH	Light blue
			LH	Brown
G sensor	G sensor voltage			2.3±0.2 V
Lateral G sensor (STi model only)	G sensor voltage			2.5±0.2 V
ABS control module and hydraulic control unit (ABSCM&H/U) marks	Rear drum brake model		AT	CC
			MT	CD
	Rear disc brake model		AT	CM
			MT	CN
			MT (STi)	C9

B: COMPONENT

1. SENSOR



(1) G sensor
(2) Rear ABS sensor RH
(3) ABS spacer
(4) Rear ABS sensor LH
(5) Front ABS sensor LH
(6) Front ABS sensor RH
(7) Lateral G sensor (STi model only)

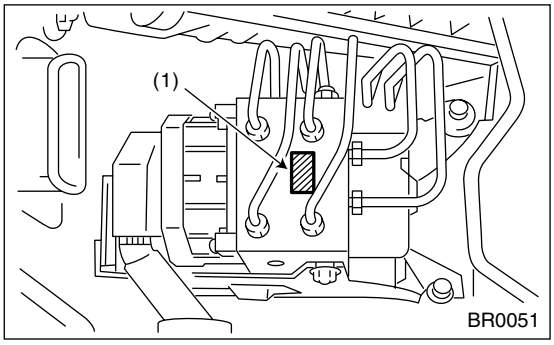
Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.4 (0.75, 5.4)
T2: 32 (3.3, 24)

2. ABS Control Module and Hydraulic Control Unit (ABSCM&H/U)

C: INSPECTION

1) Check the connected and fixed condition of connector.
2) Check specifications of the mark with ABSCM&H/U.

Mark	Model
CC	AT (Rear drum brake)
CD	MT (Rear drum brake)
CM	AT (Rear disc brake)
CN	MT (Rear disc brake)
C9	MT (STi)

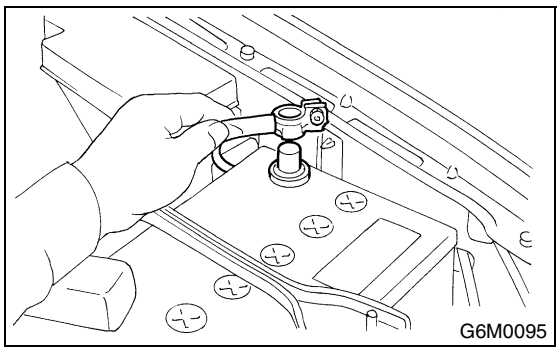


(1) Mark

9. Lateral G Sensor

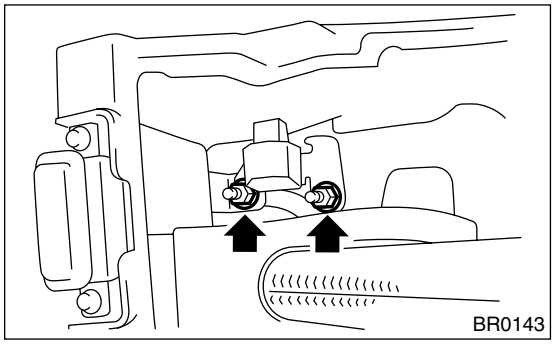
A: REMOVAL

1) Disconnect the ground cable from battery.



2) Remove the console cover.
<Ref. to EI-40, Console Box.>
3) Disconnect the connector from lateral G sensor.
4) Remove the lateral G sensor from body.

CAUTION:
Do not drop or bump the lateral G sensor.



B: INSTALLATION

1) Install in the reverse order of removal.

CAUTION:
Do not drop or bump the lateral G sensor.

C: INSPECTION

	Step	Check	Yes	No
1	**CHECK SUBARU SELECT MONITOR.**	Do you have a SUBARU SELECT MONITOR?	Go to step **5.**	Go to step **2.**
2	**CHECK LATERAL G SENSOR.** 1)Turn the ignition switch to OFF. 2)Remove the lateral G sensor from vehicle. 3)Connect the connector to lateral G sensor. 4)Turn the ignition switch to ON. 5)Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal:*** ***(B257) No. 2 (+) — No. 3 (–)***	Is the voltage 2.5±0.2 V when lateral G sensor is horizontal?	Go to step **3.**	Replace the lateral G sensor.
3	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal:*** ***(B257) No. 2 (+) — No. 3 (–)***	Is the voltage 3.5±0.2 V when lateral G sensor is inclined forwards to 90°?	Go to step **4.**	Replace the lateral G sensor.
4	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal:*** ***(B257) No. 2 (+) — No. 3 (–)***	Is the voltage 1.5±0.2 V when lateral G sensor is inclined backwards to 90°?	Lateral G sensor is normal.	Replace the lateral G sensor.
5	**CHECK LATERAL G SENSOR.** 1)Turn the ignition switch to OFF. 2)Connect the select monitor connector to data link connector. 3)Turn the select monitor into {BRAKE CONTROL} mode. 4)Set the display in the {Current Data Display & Save} mode. 5)Read the lateral G sensor output voltage.	Is the indicated reading 2.5±0.2 V when the vehicle is in horizontal position?	Go to step **6.**	Replace the lateral G sensor.
6	**CHECK LATERAL G SENSOR.** 1)Remove the console box. 2)Remove the lateral G sensor from vehicle. (Do not disconnect the connector.) 3)Read the select monitor display.	Is the indicated reading 3.5±0.2 V when lateral G sensor is inclined forwards to 90°?	Go to step **7.**	Replace the lateral G sensor.
7	**CHECK LATERAL G SENSOR.** Read the select monitor display.	Is the indicated reading 1.5±0.2 V when lateral G sensor is inclined backwards to 90°?	Lateral G sensor is normal.	Replace the lateral G sensor.

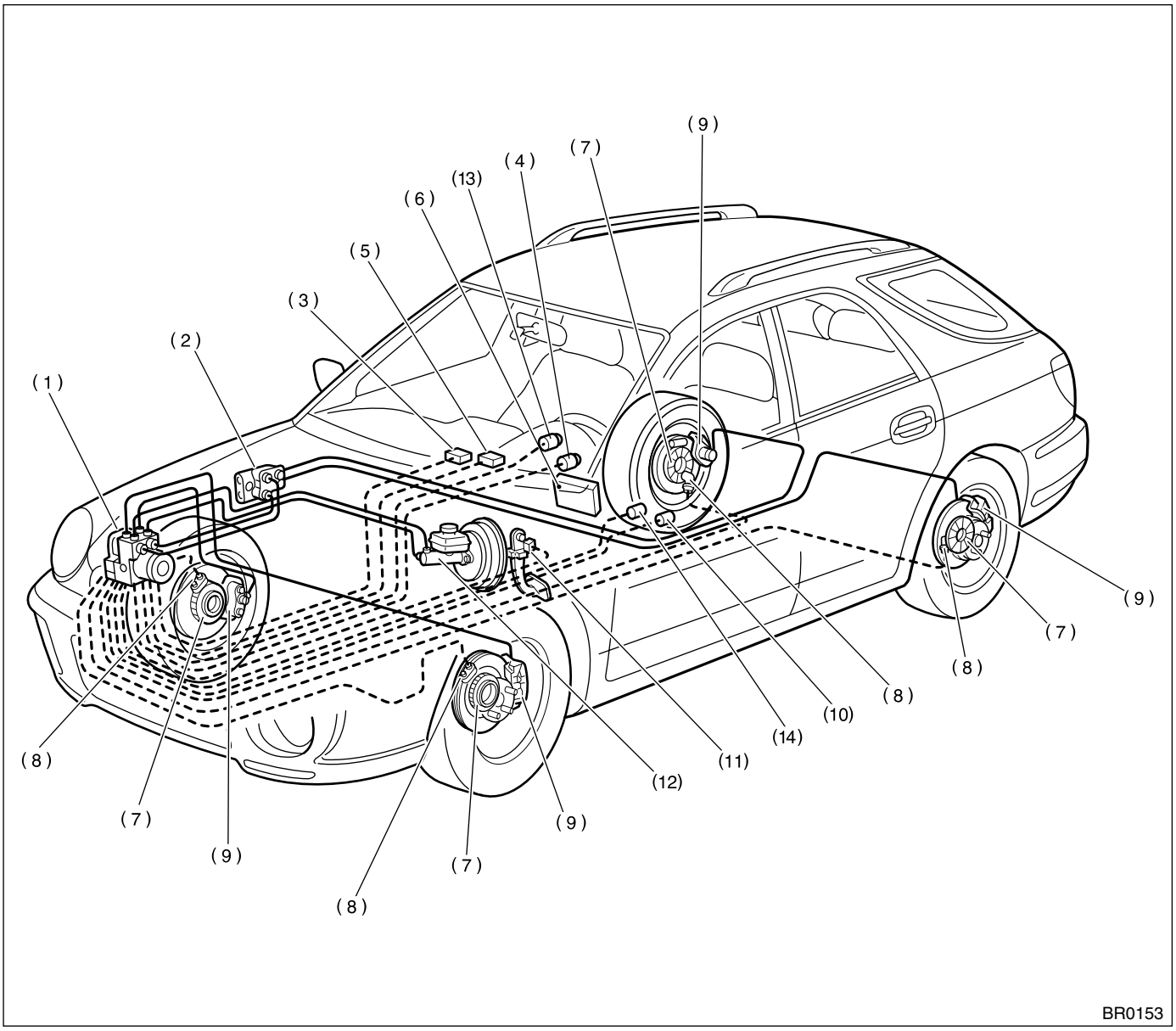
ABS (DIAGNOSTICS)

ABS

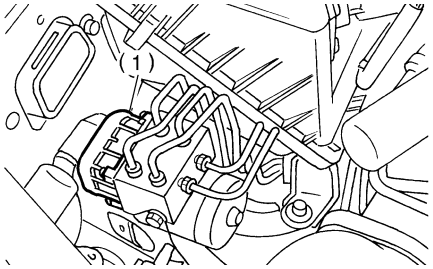
Page

4. Electrical Components Location

A: LOCATION



(1) ABS control module and hydraulic control unit (ABSCM&H/U)
(2) Rear drum brake: Proportioning valve
Rear disc brake: Joint connector
(3) Diagnosis connector
(4) ABS warning light
(5) Data link connector (for Subaru Select Monitor)
(6) Transmission control module (only AT vehicle)
(7) Tone wheel
(8) ABS sensor
(9) Wheel cylinder
(10) Lateral G sensor (only STi model)
(11) Stop light switch
(12) Master cylinder
(13) Brake warning light
(14) G sensor



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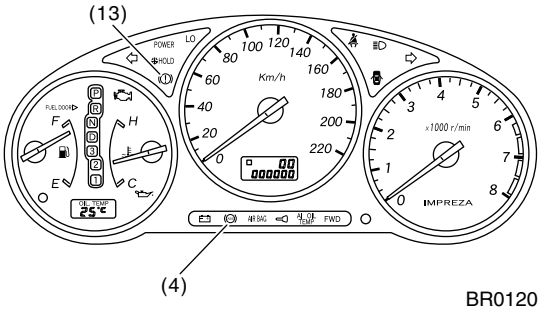
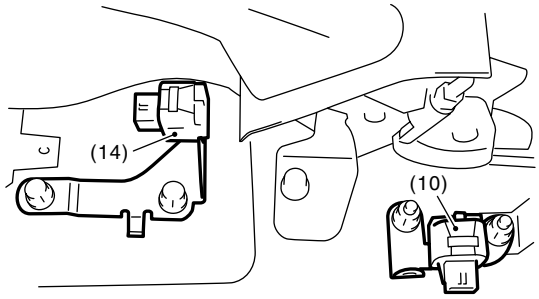
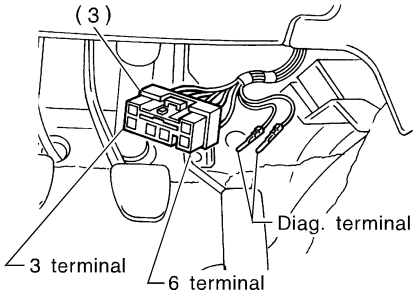


BR0120



BR0154



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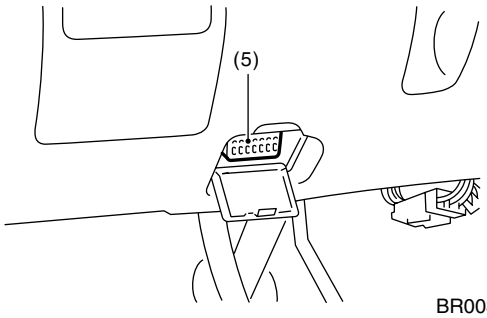
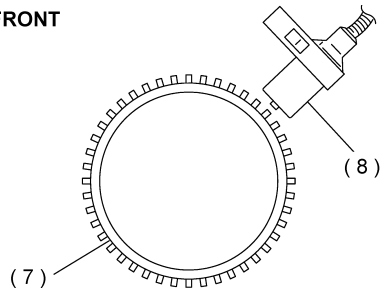


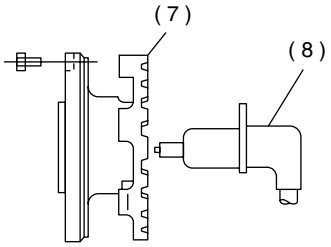
BR0033

FRONT



BR0057

REAR

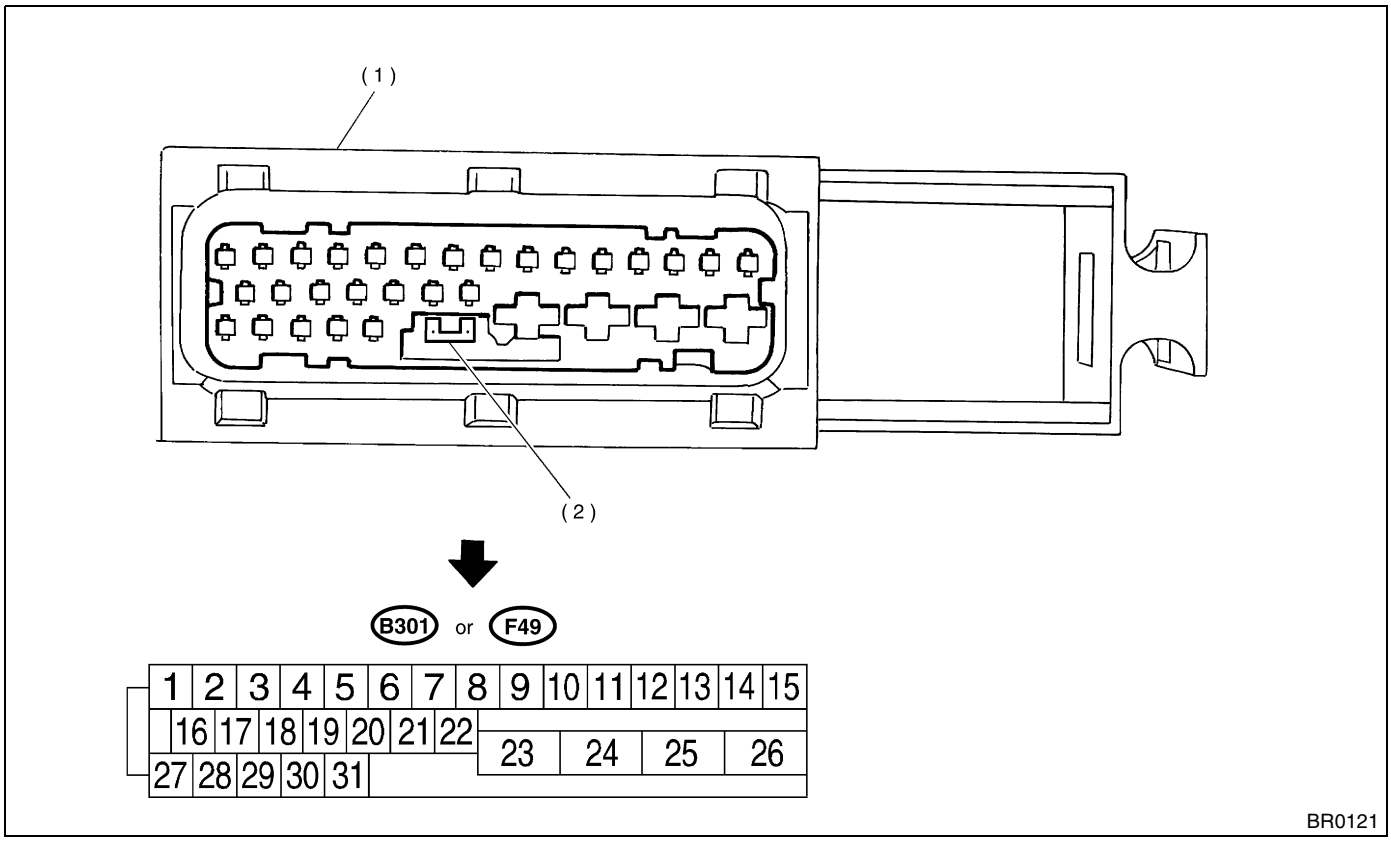


BR0058

SUBARU

5. Control Module I/O Signal

A: ELECTRICAL SPECIFICATION



1) ABS control module and hydraulic control unit (ABSCM&H/U) connector
2) Connector switch

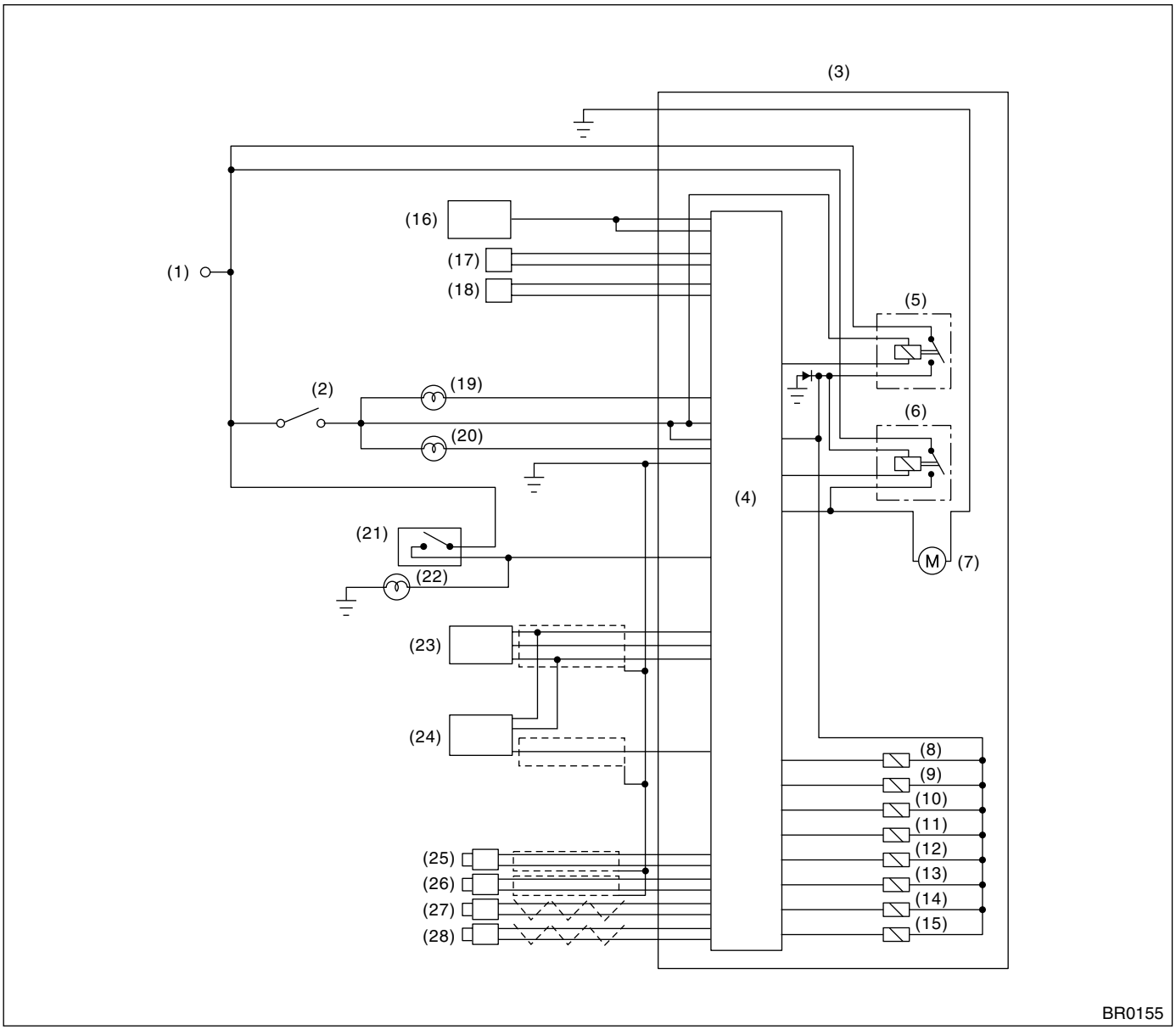
NOTE:
- The terminal numbers in ABSCM&H/C connector are as shown in the figure.
- When the connector is removed from ABSCM&H/U, the connector switch closes the circuit between terminal No. 22 and No. 23. The ABS warning light illuminates.

CONTROL MODULE I/O SIGNAL

Contents		Terminal No. (+)—(−)	Input/Output signal Measured value and measuring conditions
ABS sensor*2 (Wheel speed sensor)	Front left wheel	9—10	0.12 — 1 V (When it is 20 Hz.)
	Front right wheel	11—12	
	Rear left wheel	7—8	
	Rear right wheel	14—15	
Valve relay power supply		24—23	10 — 15 V
Motor relay power supply		25—23	10 — 15 V
G sensor*2 (AWD model only)	Power supply	30—28	4.75 — 5.25 V
	Ground	28	—
	Output	6—28	2.3±0.2 V when vehicle is in horizontal position.
Lateral G sensor*2 (STi model only)	Power supply	30—28	4.75 — 5.25 V
	Ground	28	—
	Output	29—28	2.5±0.2 V when vehicle is in horizontal position.
Stop light switch*1		2—23	Less than 1.5 V when the stop light is OFF and, 10 — 15 V when the stop light is ON.
ABS warning light*2		22—23	Less than 1.5 V during 1.5 seconds when ignition switch is ON, and 10 — 15 V after 1.5 seconds.
AT ABS signal*2 (AT model only)		31—23	Less than 1.5 V when the ABS control still operates and more than 5.5 V when ABS does not operate.
ABS operation signal monitor*2		3—23	Less than 1.5 V when the ABS control still operates and more than 5.5 V when ABS does not operate.
Select monitor*2	Data is received.	20—23	Less than 1.5 V when no data is received.
	Data is sent.	5—23	4.75 — 5.25 V when no data is sent.
ABS diagnosis connector*2	Terminal No. 3	29—23	10 — 15 V when ignition switch is ON.
	Terminal No. 6	4—23	10 — 15 V when ignition switch is ON.
Power supply*1		1—23	10 — 15 V when ignition switch is ON.
Grounding line		23	—
Grounding line		26	—

*1: Measure the I/O signal voltage after removing the connector from the ABSCM&H/U terminal.
*2: Measure the I/O signal voltage at connector (B200) or (F74).

B: SCHEMATIC



(1) Battery
(2) IGN
(3) ABS control module and hydraulic control unit (ABSCM&H/U)
(4) ABS control module area
(5) Valve relay
(6) Motor relay
(7) Motor
(8) Front left inlet solenoid valve
(9) Front left outlet solenoid valve
(10) Front right inlet solenoid valve
(11) Front right outlet solenoid valve
(12) Rear left inlet solenoid valve
(13) Rear left outlet solenoid valve
(14) Rear right inlet solenoid valve
(15) Rear right outlet solenoid valve
(16) Transmission control module (only AT vehicle)
(17) Diagnosis connector
(18) Data link connector (for Subaru Select Monitor)
(19) Brake warning light
(20) ABS warning light
(21) Stop light switch
(22) Stop light
(23) G sensor
(24) Lateral G sensor (only STi model)
(25) Front left ABS sensor
(26) Front right ABS sensor
(27) Rear left ABS sensor
(28) Rear right ABS sensor

11.List of Diagnostics Trouble Code (DTC)

A: LIST

1. WITHOUT SUBARU SELECT MONITOR

DTC No.	Contents of diagnosis		Index No.
11	Start code • DTC is shown after start code. • Only start code is shown in normal condition.		—
21	Abnormal ABS sensor (Open circuit or input voltage too high)	Front right ABS sensor	<Ref. to ABS-39, DTC 21 — ABNORMAL ABS SENSOR (OPEN CIRCUIT OR INPUT VOLTAGE TOO HIGH) (FRONT RH) —, Diagnostics Chart with Diagnosis Connector.>
23		Front left ABS sensor	<Ref. to ABS-39, DTC 23 — ABNORMAL ABS SENSOR (OPEN CIRCUIT OR INPUT VOLTAGE TOO HIGH) (FRONT LH) —, Diagnostics Chart with Diagnosis Connector.>
25		Rear right ABS sensor	<Ref. to ABS-39, DTC 25 — ABNORMAL ABS SENSOR (OPEN CIRCUIT OR INPUT VOLTAGE TOO HIGH) (REAR RH) —, Diagnostics Chart with Diagnosis Connector.>
27		Rear left ABS sensor	<Ref. to ABS-40, DTC 27 — ABNORMAL ABS SENSOR (OPEN CIRCUIT OR INPUT VOLTAGE TOO HIGH) (REAR LH) —, Diagnostics Chart with Diagnosis Connector.>
22	Abnormal ABS sensor (Abnormal ABS sensor signal)	Front right ABS sensor	<Ref. to ABS-46, DTC 22 — ABNORMAL ABS SENSOR (ABNORMAL ABS SENSOR SIGNAL) (FRONT RH) —, Diagnostics Chart with Diagnosis Connector.>
24		Front left ABS sensor	<Ref. to ABS-46, DTC 24 — ABNORMAL ABS SENSOR (ABNORMAL ABS SENSOR SIGNAL) (FRONT LH) —, Diagnostics Chart with Diagnosis Connector.>
26		Rear right ABS sensor	<Ref. to ABS-46, DTC 26 — ABNORMAL ABS SENSOR (ABNORMAL ABS SENSOR SIGNAL) (REAR RH) —, Diagnostics Chart with Diagnosis Connector.>
28		Rear left ABS sensor	<Ref. to ABS-47, DTC 28 — ABNORMAL ABS SENSOR (ABNORMAL ABS SENSOR SIGNAL) (REAR LH) —, Diagnostics Chart with Diagnosis Connector.>
29		Any one of four	<Ref. to ABS-52, DTC 29 — ABNORMAL ABS SENSOR (ABNORMAL ABS SENSOR SIGNAL) (ANY ONE OF FOUR) —, Diagnostics Chart with Diagnosis Connector.>

LIST OF DIAGNOSTICS TROUBLE CODE (DTC)

DTC No.	Contents of diagnosis		Index No.
31	Abnormal solenoid valve circuit(s) in ABS control module and hydraulic unit	Front right inlet valve	<Ref. to ABS-57, DTC 31 — ABNORMAL INLET SOLENOID VALVE CIRCUIT(S) IN ABSCM&H/U (FRONT RH) —, Diagnostics Chart with Diagnosis Connector.>
32		Front right outlet valve	<Ref. to ABS-61, DTC 32 — ABNORMAL OUTLET SOLENOID VALVE CIRCUIT(S) IN ABSCM&H/U (FRONT RH) —, Diagnostics Chart with Diagnosis Connector.>
33		Front left inlet valve	<Ref. to ABS-57, DTC 33 — ABNORMAL INLET SOLENOID VALVE CIRCUIT(S) IN ABSCM&H/U (FRONT LH) —, Diagnostics Chart with Diagnosis Connector.>
34		Front left outlet valve	<Ref. to ABS-61, DTC 34 — ABNORMAL OUTLET SOLENOID VALVE CIRCUIT(S) IN ABSCM&H/U (FRONT LH) —, Diagnostics Chart with Diagnosis Connector.>
35		Rear right inlet valve	<Ref. to ABS-57, DTC 35 — ABNORMAL INLET SOLENOID VALVE CIRCUIT(S) IN ABSCM&H/U (REAR RH) —, Diagnostics Chart with Diagnosis Connector.>
36		Rear right outlet valve	<Ref. to ABS-61, DTC 36 — ABNORMAL OUTLET SOLENOID VALVE CIRCUIT(S) IN ABSCM&H/U (REAR RH) —, Diagnostics Chart with Diagnosis Connector.>
37		Rear left inlet valve	<Ref. to ABS-58, DTC 37 — ABNORMAL INLET SOLENOID VALVE CIRCUIT(S) IN ABSCM&H/U (REAR LH) —, Diagnostics Chart with Diagnosis Connector.>
38		Rear left outlet valve	<Ref. to ABS-62, DTC 38 — ABNORMAL OUTLET SOLENOID VALVE CIRCUIT(S) IN ABSCM&H/U (REAR LH) —, Diagnostics Chart with Diagnosis Connector.>
41	Abnormal ABS control module		<Ref. to ABS-66, DTC 41 — ABNORMAL ABS CONTROL MODULE —, Diagnostics Chart with Diagnosis Connector.>
42	Source voltage is abnormal.		<Ref. to ABS-68, DTC 42 — SOURCE VOLTAGE IS ABNORMAL. —, Diagnostics Chart with Diagnosis Connector.>
44	A combination of AT control abnormal		<Ref. to ABS-72, DTC 44 — A COMBINATION OF AT CONTROL ABNORMAL —, Diagnostics Chart with Diagnosis Connector.>
51	Abnormal valve relay		<Ref. to ABS-75, DTC 51 — ABNORMAL VALVE RELAY —, Diagnostics Chart with Diagnosis Connector.>
52	Abnormal motor and/or motor relay		<Ref. to ABS-79, DTC 52 — ABNORMAL MOTOR AND/OR MOTOR RELAY —, Diagnostics Chart with Diagnosis Connector.>
54	Abnormal stop light switch		<Ref. to ABS-84, DTC 54 — ABNORMAL STOP LIGHT SWITCH —, Diagnostics Chart with Diagnosis Connector.>
56	Abnormal G sensor output voltage		<Ref. to ABS-11, DTC 56 — ABNORMAL G SENSOR OUTPUT VOLTAGE —, Diagnostics Chart with Diagnosis Connector.>
73	Abnormal lateral G sensor output voltage		<Ref. to ABS-15, DTC 73 — ABNORMAL LATERAL G SENSOR OUTPUT VOLTAGE —, Diagnostics Chart with Diagnosis Connector.>

2. WITH SUBARU SELECT MONITOR

DTC No.	Display screen	Contents of diagnosis	Index No.
—	Communication for initializing impossible	Select monitor communication failure	<Ref. to ABS-92, COMMUNICATION FOR INITIALIZING IMPOSSIBLE, Diagnostics Chart with Subaru Select Monitor.>
—	No trouble code	Although no trouble code appears on the select monitor display, the ABS warning light remains on.	<Ref. to ABS-96, NO TROUBLE CODE, Diagnostics Chart with Subaru Select Monitor.>
21	Open or short circuit in front right ABS sensor circuit	Open or short circuit in front right ABS sensor circuit	<Ref. to ABS-100, DTC 21 — OPEN OR SHORT CIRCUIT IN FRONT RIGHT ABS SENSOR CIRCUIT —, Diagnostics Chart with Subaru Select Monitor.>
22	Front right ABS sensor abnormal signal	Front right ABS sensor abnormal signal	<Ref. to ABS-107, DTC 22 — FRONT RIGHT ABNORMAL ABS SENSOR SIGNAL —, Diagnostics Chart with Subaru Select Monitor.>
23	Open or short circuit in front left ABS sensor circuit	Open or short circuit in front left ABS sensor circuit	<Ref. to ABS-100, DTC 23 — OPEN OR SHORT CIRCUIT IN FRONT LEFT ABS SENSOR CIRCUIT —, Diagnostics Chart with Subaru Select Monitor.>
24	Front left ABS sensor abnormal signal	Front left ABS sensor abnormal signal	<Ref. to ABS-107, DTC 24 — FRONT LEFT ABNORMAL ABS SENSOR SIGNAL —, Diagnostics Chart with Subaru Select Monitor.>
25	Open or short circuit in rear right ABS sensor circuit	Open or short circuit in rear right ABS sensor circuit	<Ref. to ABS-100, DTC 25 — OPEN OR SHORT CIRCUIT IN REAR RIGHT ABS SENSOR CIRCUIT —, Diagnostics Chart with Subaru Select Monitor.>
26	Rear right ABS sensor abnormal signal	Rear right ABS sensor abnormal signal	<Ref. to ABS-107, DTC 26 — REAR RIGHT ABNORMAL ABS SENSOR SIGNAL —, Diagnostics Chart with Subaru Select Monitor.>
27	Open or short circuit in rear left ABS sensor circuit	Open or short circuit in rear left ABS sensor circuit	<Ref. to ABS-101, DTC 27 — OPEN OR SHORT CIRCUIT IN REAR LEFT ABS SENSOR CIRCUIT —, Diagnostics Chart with Subaru Select Monitor.>
28	Rear left ABS sensor abnormal signal	Rear left ABS sensor abnormal signal	<Ref. to ABS-108, DTC 28 — REAR LEFT ABNORMAL ABS SENSOR SIGNAL —, Diagnostics Chart with Subaru Select Monitor.>
29	Abnormal ABS sensor signal on any one of four sensor	Abnormal ABS sensor signal on any one of four	<Ref. to ABS-114, DTC 29 — ABNORMAL ABS SENSOR SIGNAL ON ANY ONE OF FOUR SENSOR —, Diagnostics Chart with Subaru Select Monitor.>
31	Front right inlet valve malfunction	Front right inlet valve malfunction	<Ref. to ABS-118, DTC 31 — FRONT RIGHT INLET VALVE MALFUNCTION —, Diagnostics Chart with Subaru Select Monitor.>
32	Front right outlet valve malfunction	Front right outlet valve malfunction	<Ref. to ABS-123, DTC 32 — FRONT RIGHT OUTLET VALVE MALFUNCTION —, Diagnostics Chart with Subaru Select Monitor.>
33	Front left inlet valve malfunction	Front left inlet valve malfunction	<Ref. to ABS-118, DTC 33 — FRONT LEFT INLET VALVE MALFUNCTION —, Diagnostics Chart with Subaru Select Monitor.>
34	Front left outlet valve malfunction	Front left outlet valve malfunction	<Ref. to ABS-123, DTC 34 — FRONT LEFT OUTLET VALVE MALFUNCTION —, Diagnostics Chart with Subaru Select Monitor.>
35	Rear right inlet valve malfunction	Rear right inlet valve malfunction	<Ref. to ABS-118, DTC 35 — REAR RIGHT INLET VALVE MALFUNCTION —, Diagnostics Chart with Subaru Select Monitor.>
36	Rear right outlet valve malfunction	Rear right outlet valve malfunction	<Ref. to ABS-123, DTC 36 — REAR RIGHT OUTLET VALVE MALFUNCTION —, Diagnostics Chart with Subaru Select Monitor.>
37	Rear left inlet valve malfunction	Rear left inlet valve malfunction	<Ref. to ABS-120, DTC 37 — REAR LEFT INLET VALVE MALFUNCTION —, Diagnostics Chart with Subaru Select Monitor.>
38	Rear left outlet valve malfunction	Rear left outlet valve malfunction	<Ref. to ABS-124, DTC 38 — REAR LEFT OUTLET VALVE MALFUNCTION —, Diagnostics Chart with Subaru Select Monitor.>
41	ABS control module malfunction	ABS control module and hydraulic control unit malfunction	<Ref. to ABS-128, DTC 41 — ABS CONTROL MODULE MALFUNCTION —, Diagnostics Chart with Subaru Select Monitor.>
42	Power supply voltage too low	Power supply voltage too low	<Ref. to ABS-130, DTC 42 — POWER SUPPLY VOLTAGE TOO LOW —, Diagnostics Chart with Subaru Select Monitor.>
42	Power supply voltage too high	Power supply voltage too high	<Ref. to ABS-132, DTC 42 — POWER SUPPLY VOLTAGE TOO HIGH —, Diagnostics Chart with Subaru Select Monitor.>

LIST OF DIAGNOSTICS TROUBLE CODE (DTC)

DTC No.	Display screen	Contents of diagnosis	Index No.
44	ABS-AT control (Non Controlled)	ABS-AT control (Non Controlled)	<Ref. to ABS-136, DTC 44 — ABS-AT CONTROL (NON CONTROLLED) —, Diagnostics Chart with Subaru Select Monitor.>
44	ABS-AT control (Controlled)	ABS-AT control (Controlled)	<Ref. to ABS-138, DTC 44 — ABS-AT CONTROL (CONTROLLED) —, Diagnostics Chart with Subaru Select Monitor.>
51	Valve relay malfunction	Valve relay malfunction	<Ref. to ABS-141, DTC 51 — VALVE RELAY MALFUNCTION —, Diagnostics Chart with Subaru Select Monitor.>
51	Valve relay ON failure	Valve relay ON failure	<Ref. to ABS-145, DTC 51 — VALVE RELAY ON FAILURE —, Diagnostics Chart with Subaru Select Monitor.>
52	Open circuit in motor relay circuit	Open circuit in motor relay circuit	<Ref. to ABS-149, DTC 52 — OPEN CIRCUIT IN MOTOR RELAY CIRCUIT —, Diagnostics Chart with Subaru Select Monitor.>
52	Motor relay ON failure	Motor relay ON failure	<Ref. to ABS-153, DTC 52 — MOTOR RELAY ON FAILURE —, Diagnostics Chart with Subaru Select Monitor.>
52	Motor malfunction	Motor malfunction	<Ref. to ABS-157, DTC 52 — MOTOR MALFUNCTION —, Diagnostics Chart with Subaru Select Monitor.>
54	Stop light switch signal circuit malfunction	Stop light switch signal circuit malfunction	<Ref. to ABS-160, DTC 54 — STOP LIGHT SWITCH SIGNAL CIRCUIT MALFUNCTION —, Diagnostics Chart with Subaru Select Monitor.>
56	Open or short circuit in G sensor circuit	Open or short circuit in G sensor circuit	<Ref. to ABS-162, DTC 56 — OPEN OR SHORT CIRCUIT IN G SENSOR CIRCUIT —, Diagnostics Chart with Subaru Select Monitor.>
56	Battery short in G sensor circuit	Battery short in G sensor circuit	<Ref. to ABS-166, DTC 56 — BATTERY SHORT IN G SENSOR CIRCUIT —, Diagnostics Chart with Subaru Select Monitor.>
56	Abnormal G sensor high μ output	Abnormal G sensor high μ output	<Ref. to ABS-171, DTC 56 — ABNORMAL G SENSOR HIGH μ OUTPUT —, Diagnostics Chart with Subaru Select Monitor.>
56	Detection of G sensor stick	Detection of G sensor stick	<Ref. to ABS-175, DTC 56 — DETECTION OF G SENSOR STICK —, Diagnostics Chart with Subaru Select Monitor.>
73	Open or short circuit in lateral G sensor circuit	Open or short circuit in lateral G sensor circuit	<Ref. to ABS-19, DTC 73 — OPEN OR SHORT CIRCUIT IN LATERAL G SENSOR CIRCUIT —, Diagnostics Chart with Subaru Select Monitor.>
73	Battery short in lateral G sensor circuit	Battey short in lateral G sensor circuit	<Ref. to ABS-23, DTC 73 — BATTERY SHORT IN LATERAL G SENSOR CIRCUIT —, Diagnostics Chart with Subaru Select Monitor.>
73	Abnormal lateral G sensor high μ output	Abnormal lateral G sensor high μ output	<Ref. to ABS-28, DTC 73 — ABNORMAL LATERAL G SENSOR HIGH m OUTPUT —, Diagnostics Chart with Subaru Select Monitor.>
73	Detection of lateral G sensor stick	Detection of lateral G sensor stick	<Ref. to ABS-32, DTC 73 — DETECTION OF LATERAL G SENSOR STICK —, Diagnostics Chart with Subaru Select Monitor.>

NOTE:
High μ means high friction coefficient against road surface.

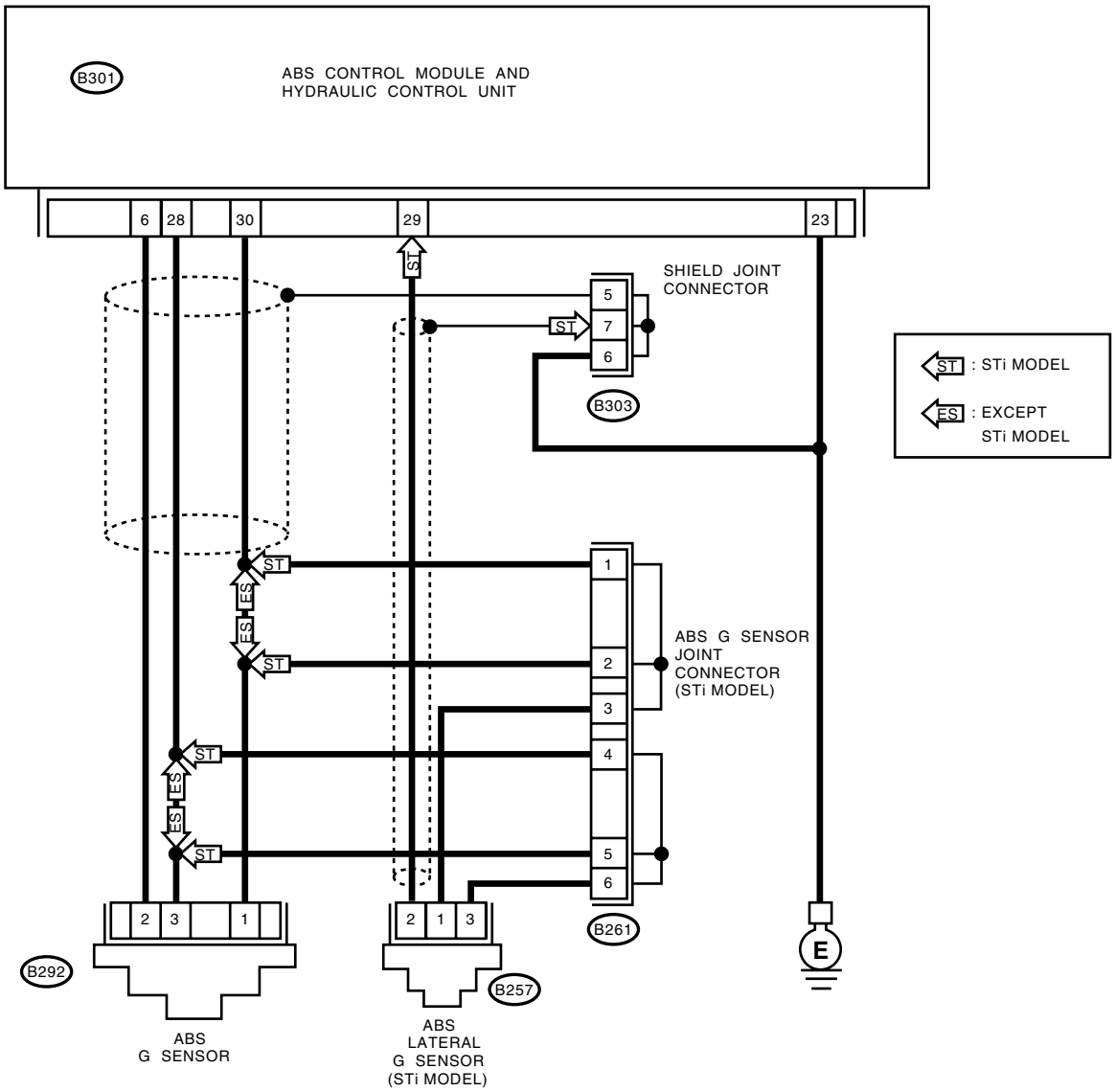
12.Diagnostics Chart with Diagnosis Connector

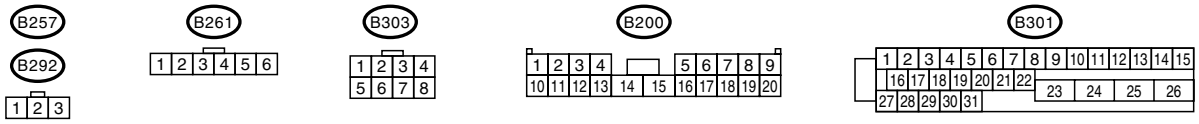
AA:DTC 56
— ABNORMAL G SENSOR OUTPUT VOLTAGE —

DIAGNOSIS:
- Faulty G sensor output voltage

TROUBLE SYMPTOM:
- ABS does not operate.

WIRING DIAGRAM: LHD MODEL





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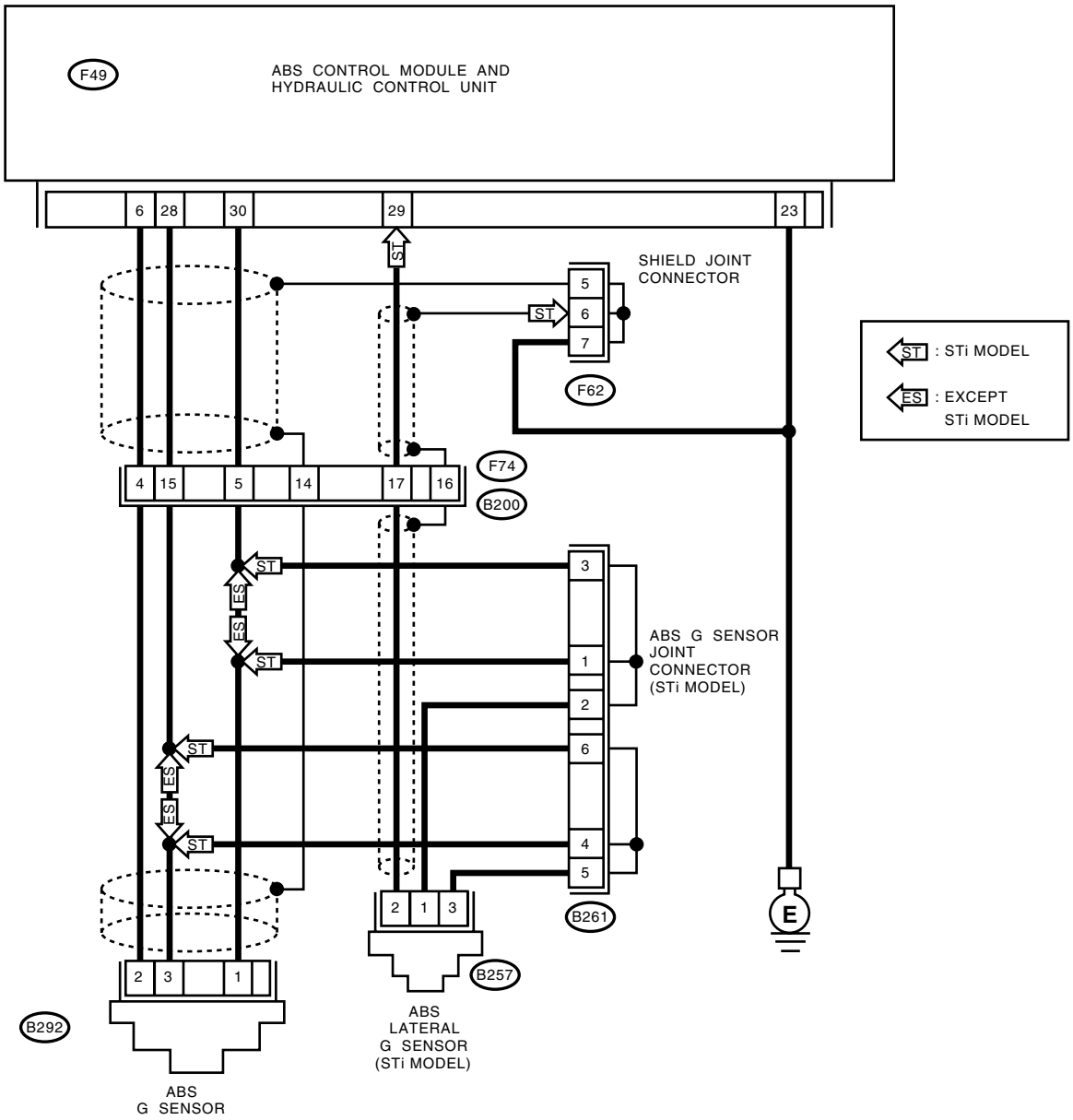
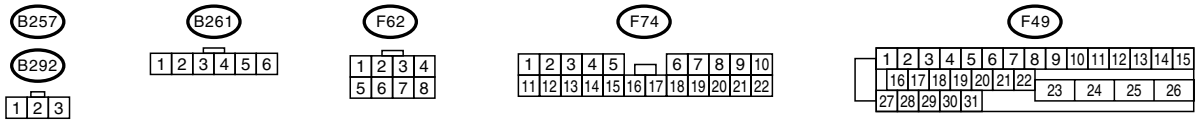
WIRING DIAGRAM: RHD MODEL





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Step		Check	Yes	No
1	**CHECK ALL FOUR WHEELS FOR FREE TURNING.**	Have the wheels been turned freely such as when the vehicle is lifted up, or operated on a rolling road?	The ABS is normal. Erase the DTC.	Go to step **2.**

	Step	Check	Yes	No
2	**CHECK SPECIFICATIONS OF ABSCM&H/U.** Check the specifications mark on ABSCM&H/U. ***CM: AT (Rear disc brake)*** ***CN: MT (Rear disc brake)*** ***CC: AT (Rear drum brake)*** ***CD: MT (Rear drum brake)*** ***C9: MT (STi model)***	Does the vehicle specification and ABSCM&H/U specification match?	Go to step **3.**	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).> **CAUTION:** **Be sure to turn the ignition switch to OFF when removing ABSCM&H/U.**
3	**CHECK INPUT VOLTAGE OF G SENSOR.** 1)Turn the ignition switch to OFF. 2)Remove the console box. 3)Remove the G sensor from vehicle. (Do not disconnect the connector.) 4)Turn the ignition switch to ON. 5)Measure the voltage between G sensor connector terminals. ***Connector & terminal*** ***(B292) No. 1 (+) — No. 3 (–):***	Is the voltage between 4.75 and 5.25 V?	Go to step **4.**	Repair the harness/connector between G sensor and ABSCM&H/U.
4	**CHECK OPEN CIRCUIT IN G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ABSCM&H/U. 3)Measure the resistance between ABSCM&H/U connector terminals. ***Connector & terminal*** ***LHD: (B301) No. 6 — No. 28:*** ***RHD: (F49) No. 6 — No. 28:***	Is the resistance between 5.0 and 5.6 kΩ?	Go to step **5.**	Repair the harness/connector between G sensor and ABSCM&H/U.
5	**CHECK GROUND SHORT IN G SENSOR OUTPUT HARNESS.** 1)Disconnect the connector from G sensor. 2)Measure the resistance between ABSCM&H/U connector and chassis ground. ***Connector & terminal*** ***LHD: (B301) No. 6 — Chassis ground:*** ***RHD: (F49) No. 6 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair the harness between G sensor and ABSCM&H/U.
6	**CHECK BATTERY SHORT OF HARNESS.** Measure the voltage between ABSCM&H/U connector and chassis ground. ***Connector & terminal*** ***LHD: (B301) No. 6 (+) — Chassis ground (–):*** ***RHD: (F49) No. 6 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **7.**	Repair the harness between G sensor and ABSCM&H/U.
7	**CHECK BATTERY SHORT OF HARNESS.** 1)Turn the ignition switch to ON. 2)Measure the voltage between ABSCM&H/U connector and chassis ground. ***Connector & terminal*** ***LHD: (B301) No. 6 (+) — Chassis ground (–):*** ***RHD: (F49) No. 6 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **8.**	Repair the harness between G sensor and ABSCM&H/U.

	Step	Check	Yes	No
8	**CHECK GROUND SHORT OF HARNESS.** Measure the resistance between ABSCM&H/U connector and chassis ground. ***Connector & terminal*** ***LHD: (B301) No. 28 — Chassis ground:*** ***RHD: (F49) No. 28 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **9.**	Repair the harness between G sensor and ABSCM&H/U. Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>
9	**CHECK G SENSOR.** 1)Turn the ignition switch to OFF. 2)Remove the G sensor from vehicle. 3)Connect the connector to G sensor. 4)Connect the connector to ABSCM&H/U. 5)Turn the ignition switch to ON. 6)Measure the voltage between G sensor connector terminals. ***Connector & terminal*** ***(B292) No. 2 (+) — No. 3 (–):***	Is the voltage between 2.1 and 2.4 V when G sensor is horizontal?	Go to step **10.**	Replace the G sensor. <Ref. to ABS-22, G Sensor.>
10	**CHECK G SENSOR.** Measure the voltage between G sensor connector terminals. ***Connector & terminal*** ***(B292) No. 2 (+) — No. 3 (–):***	Is the voltage between 3.7 and 4.1 V when G sensor is inclined forwards to 90°?	Go to step **11.**	Replace the G sensor. <Ref. to ABS-22, G Sensor.>
11	**CHECK G SENSOR.** Measure the voltage between G sensor connector terminals. ***Connector & terminal*** ***(B292) No. 2 (+) — No. 3 (–):***	Is the voltage between 0.5 and 0.9 V when G sensor is inclined backwards to 90°?	Go to step **12.**	Replace the G sensor. <Ref. to ABS-22, G Sensor.>
12	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connector between ABSCM&H/U and G sensor?	Repair the connector.	Go to step **13.**
13	**CHECK ABSCM&H/U.** 1)Connect all connectors. 2)Erase the memory. 3)Perform inspection mode. 4)Read out the DTC.	Is the same DTC as in the current diagnosis still being output?	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>	Go to step **14.**
14	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES (DTCs) APPEARANCE.**	Are other DTCs being output?	Proceed with the diagnosis corresponding to DTC.	A temporary poor contact.

AI: DTC 73
— ABNORMAL LATERAL G SENSOR OUTPUT VOLTAGE —

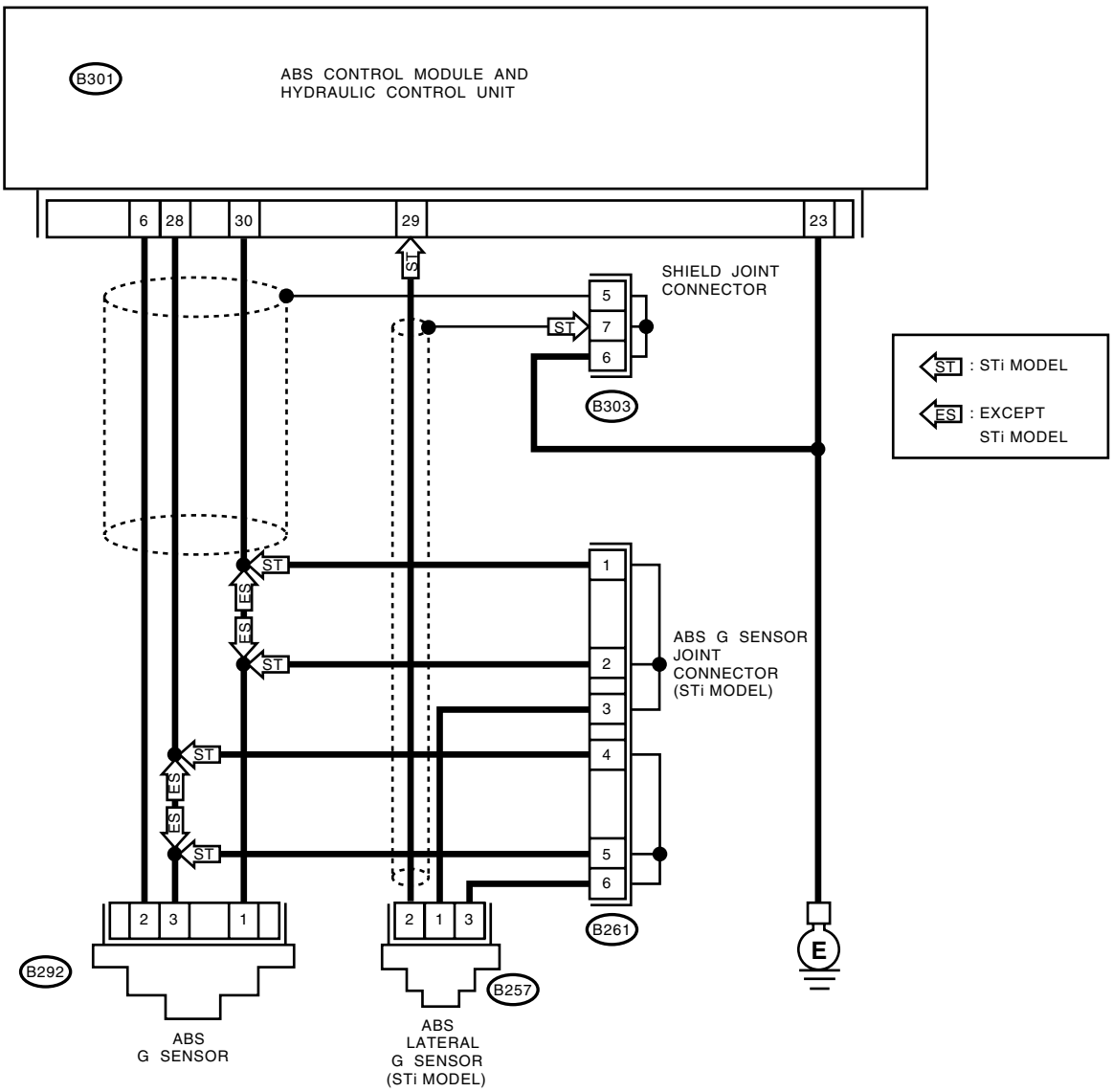
DIAGNOSIS:

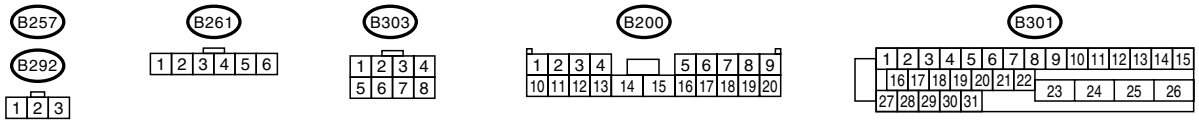
- Faulty lateral G sensor output voltage

TROUBLE SYMPTOM:

- ABS does not operate.

WIRING DIAGRAM: LHD MODEL





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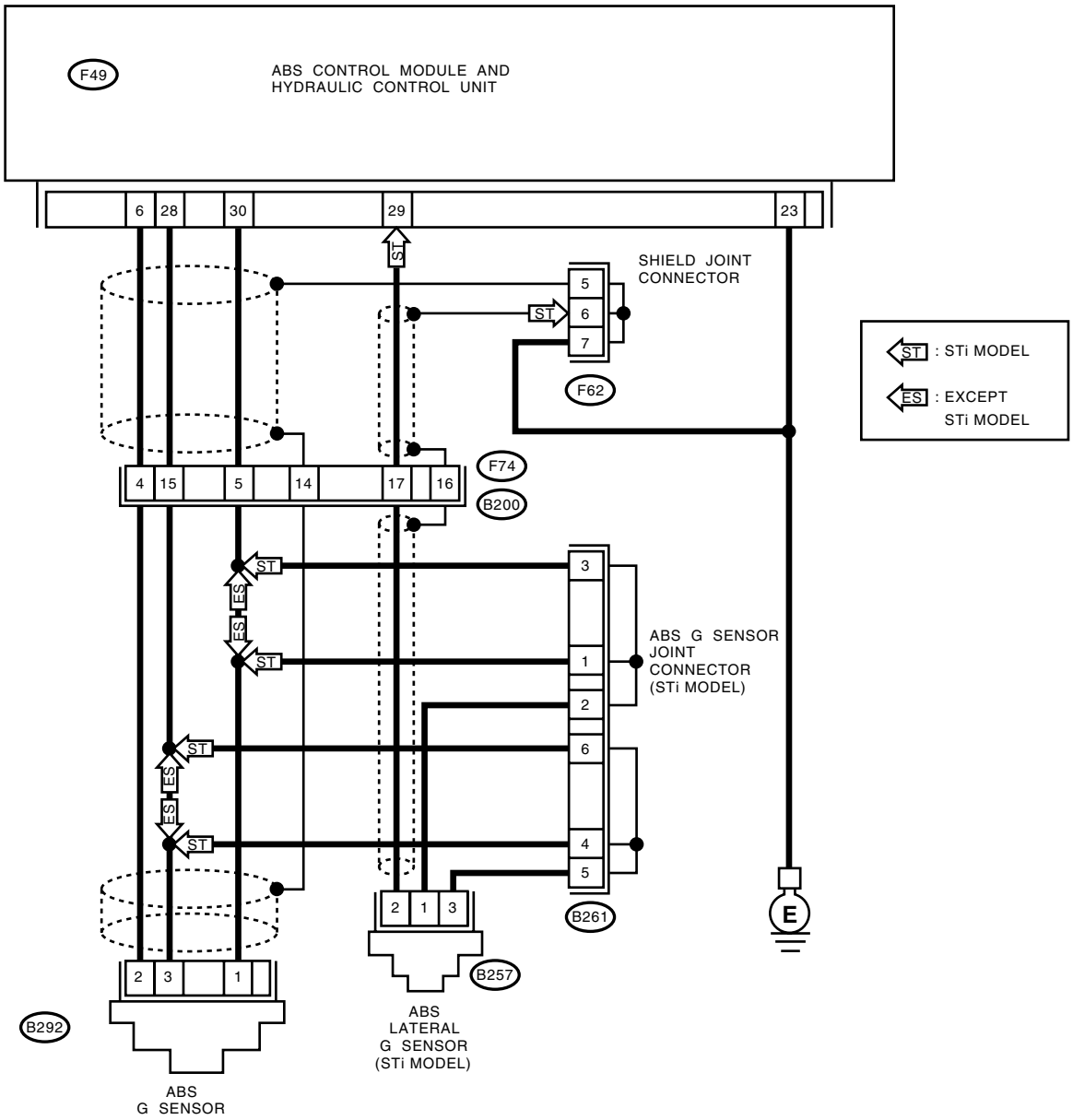
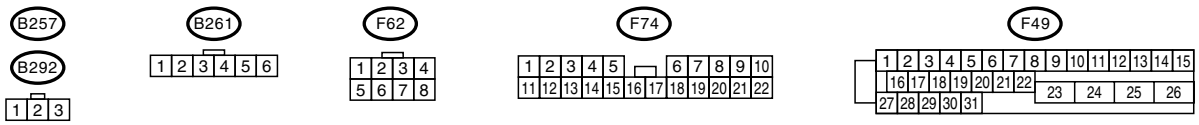
WIRING DIAGRAM: RHD MODEL





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Step		Check	Yes	No
1	**CHECK ALL FOUR WHEELS FOR FREE TURNING.**	Have the wheels been turned freely such as when the vehicle is lifted up, or operated on a rolling road?	The ABS is normal. Erase the DTC.	Go to step **2.**

	Step	Check	Yes	No
2	**CHECK SPECIFICATIONS OF ABSCM&H/U.** Check the specifications mark on ABSCM&H/U. ***C9: MT (STi model)***	Does the vehicle specification and ABSCM&H/U specification match?	Go to step **3.**	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).> **CAUTION:** **Be sure to turn the ignition switch to OFF when removing ABSCM&H/U.**
3	**CHECK INPUT VOLTAGE OF LATERAL G SENSOR.** 1)Turn the ignition switch to OFF. 2)Remove the console box. 3)Remove the lateral G sensor from vehicle. (Do not disconnect the connector.) 4)Turn the ignition switch to ON. 5)Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 1 (+) — No. 3 (–):***	Is the voltage between 4.75 and 5.25 V?	Go to step **4.**	Repair the harness/connector between lateral G sensor and ABSCM&H/U.
4	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ABSCM&H/U. 3)Measure the resistance between ABSCM&H/U connector terminals. ***Connector & terminal*** ***LHD: (B301) No. 29 — No. 28:*** ***RHD: (F49) No. 29 — No. 28:***	Is the resistance between 5.0 and 5.6 kΩ?	Go to step **5.**	Repair the harness/connector between lateral G sensor and ABSCM&H/U.
5	**CHECK GROUND SHORT IN LATERAL G SENSOR OUTPUT HARNESS.** 1)Disconnect the connector from lateral G sensor. 2)Measure the resistance between ABSCM&H/U connector and chassis ground. ***Connector & terminal*** ***LHD: (B301) No. 29 — Chassis ground:*** ***RHD: (F49) No. 29 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6.**	Repair the harness between lateral G sensor and ABSCM&H/U.
6	**CHECK BATTERY SHORT OF HARNESS.** Measure the voltage between ABSCM&H/U connector and chassis ground. ***Connector & terminal*** ***LHD: (B301) No. 29 (+) — Chassis ground (–):*** ***RHD: (F49) No. 29 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **7.**	Repair the harness between lateral G sensor and ABSCM&H/U.

	Step	Check	Yes	No
7	**CHECK BATTERY SHORT OF HARNESS.** 1)Turn the ignition switch to ON. 2)Measure the voltage between ABSCM&H/U connector and chassis ground. ***Connector & terminal*** ***LHD: (B301) No. 29 (+) — Chassis ground (–):*** ***RHD: (F49) No. 29 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **8.**	Repair the harness between lateral G sensor and ABSCM&H/U.
8	**CHECK GROUND SHORT OF HARNESS.** Measure the resistance between ABSCM&H/U connector and chassis ground. ***Connector & terminal*** ***LHD: (B301) No. 28 — Chassis ground:*** ***RHD: (F49) No. 28 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **9.**	Repair the harness between lateral G sensor and ABSCM&H/U. Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>
9	**CHECK LATERAL G SENSOR.** 1)Turn the ignition switch to OFF. 2)Remove the lateral G sensor from vehicle. 3)Connect the connector to lateral G sensor. 4)Connect the connector to ABSCM&H/U. 5)Turn the ignition switch to ON. 6)Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 2.3 and 2.7 V when lateral G sensor is horizontal?	Go to step **10.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
10	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 3.3 and 3.7 V when lateral G sensor is inclined forwards to 90°?	Go to step **11.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
11	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 1.3 and 1.7 V when lateral G sensor is inclined backwards to 90°?	Go to step **12.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
12	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connector between ABSCM&H/U and lateral G sensor?	Repair the connector.	Go to step **13.**
13	**CHECK ABSCM&H/U.** 1)Connect all connectors. 2)Erase the memory. 3)Perform inspection mode. 4)Read out the DTC.	Is the same DTC as in the current diagnosis still being output?	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>	Go to step **14.**
14	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES (DTCs) APPEARANCE.**	Are other DTCs being output?	Proceed with the diagnosis corresponding to DTC.	A temporary poor contact.

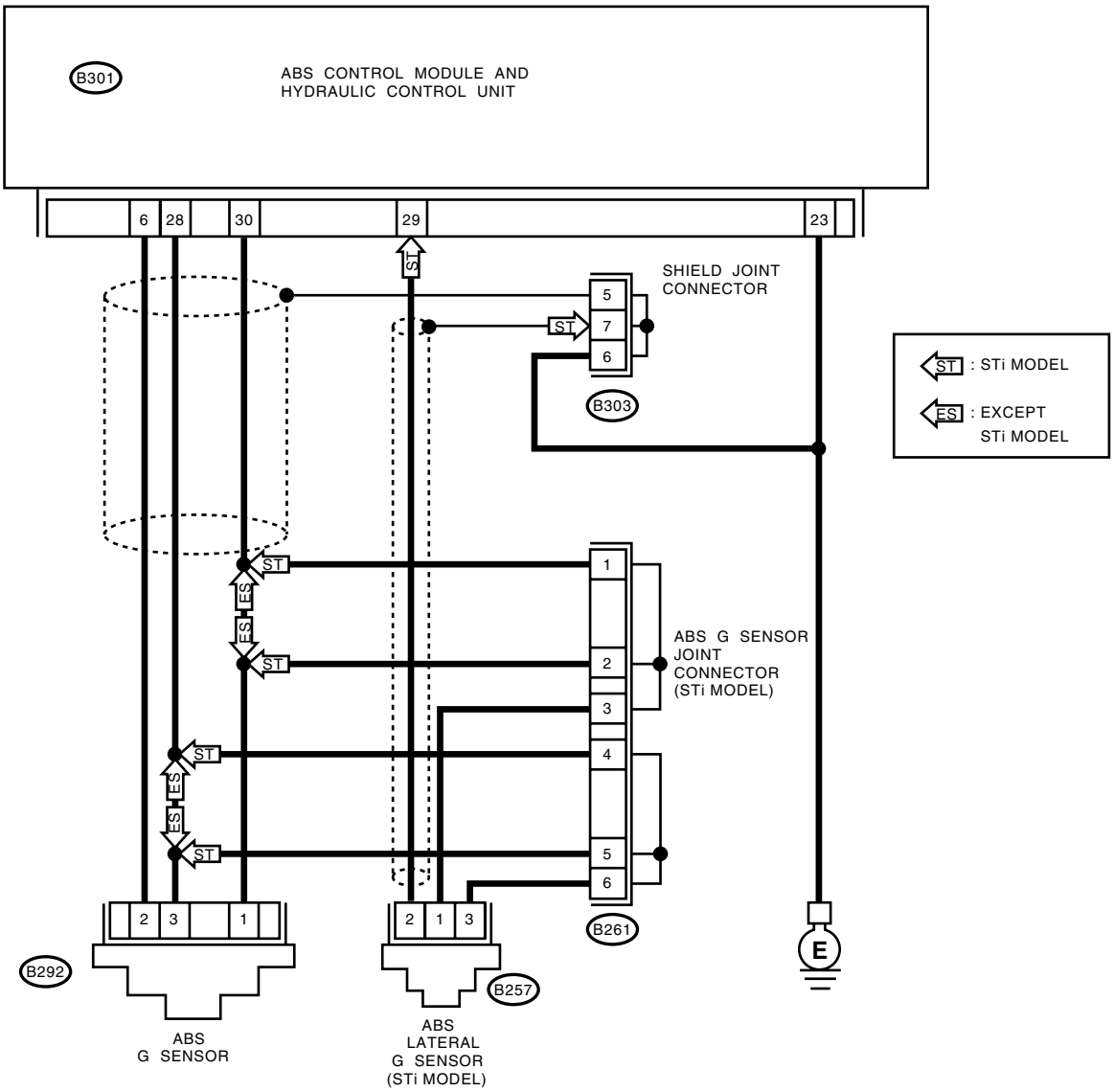
13.Diagnostics Chart with Subaru Select Monitor

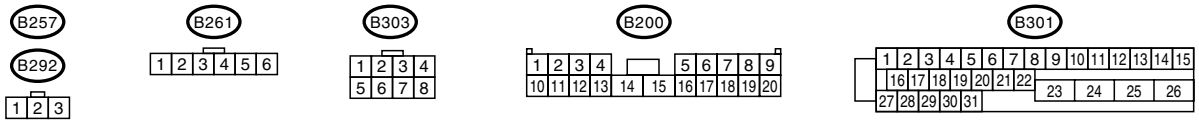
AI: DTC 73
— OPEN OR SHORT CIRCUIT IN LATERAL G SENSOR CIRCUIT —

DIAGNOSIS:
- Faulty lateral G sensor output voltage

TROUBLE SYMPTOM:
- ABS does not operate.

WIRING DIAGRAM: LHD MODEL





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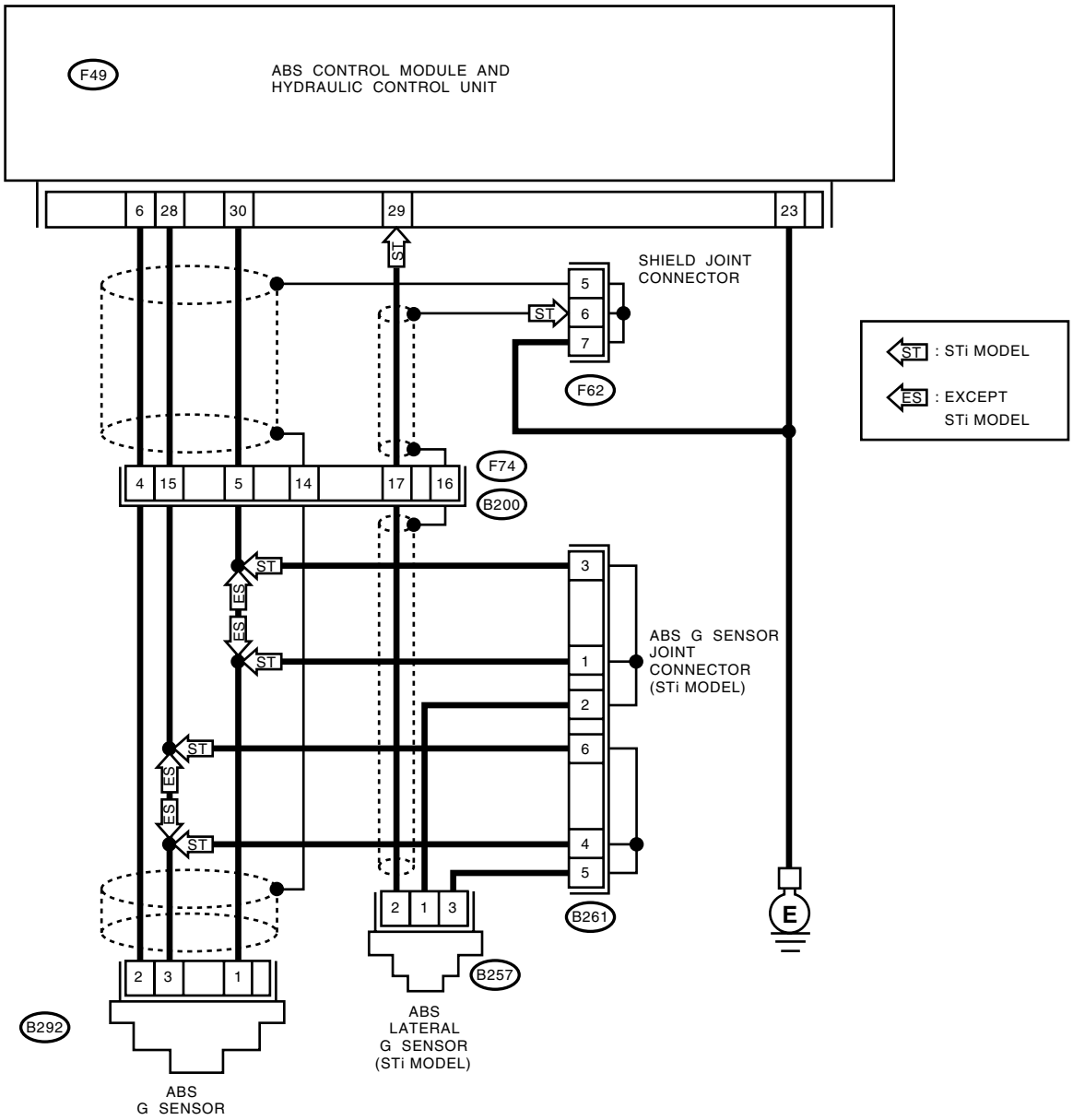
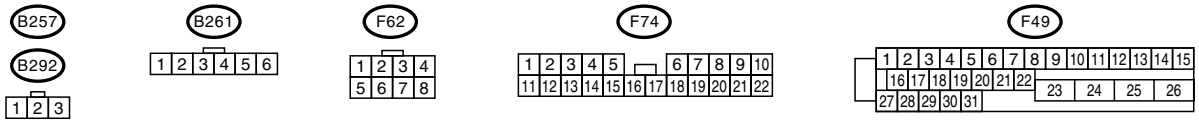
WIRING DIAGRAM: RHD MODEL





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	Step	Check	Yes	No
1	**CHECK OUTPUT OF LATERAL G SENSOR USING SELECT MONITOR.** 1)Select “Current data display & Save” on the select monitor. 2)Read the lateral G sensor output in select monitor data display.	Is the lateral G sensor output on monitor display between 2.3 and 2.7 V when lateral G sensor is in horizontal position?	Go to step **2.**	Go to step **5.**

	Step	Check	Yes	No
2	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connector between ABSCM&H/U and lateral G sensor?	Repair the connector.	Go to step **3.**
3	**CHECK ABSCM&H/U.** 1)Connect all connectors. 2)Erase the memory. 3)Perform the inspection mode. 4)Read out the DTC.	Is the same DTC as in the current diagnosis still being output?	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>	Go to step **4.**
4	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES (DTCs) APPEARANCE.**	Are other DTCs being output?	Proceed with the diagnosis corresponding to DTC.	A temporary poor contact.
5	**CHECK INPUT VOLTAGE OF LATERAL G SENSOR.** 1)Turn the ignition switch to OFF. 2)Remove the console box. 3)Remove the lateral G sensor from vehicle. (Do not disconnect the connector.) 4)Turn the ignition switch to ON. 5)Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 1 (+) — No. 3 (–):***	Is the voltage between 4.75 and 5.25 V?	Go to step **6.**	Repair the harness/connector between lateral G sensor and ABSCM&H/U.
6	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ABSCM&H/U. 3)Measure the resistance between ABSCM&H/U connector terminals. ***Connector & terminal*** ***LHD: (B301) No. 29 — No. 28:*** ***RHD: (F49) No. 29 — No. 28:***	Is the resistance between 5.0 and 5.6 kΩ?	Go to step **7.**	Repair the harness/connector between lateral G sensor and ABSCM&H/U.
7	**CHECK GROUND SHORT IN LATERAL G SENSOR OUTPUT HARNESS.** 1)Disconnect the connector from lateral G sensor. 2)Measure the resistance between ABSCM&H/U connector and chassis ground. ***Connector & terminal*** ***LHD: (B301) No. 29 — Chassis ground:*** ***RHD: (F49) No. 29 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8.**	Repair the harness between lateral G sensor and ABSCM&H/U.
8	**CHECK LATERAL G SENSOR.** 1)Connect the connector to lateral G sensor. 2)Connect the connector to ABSCM&H/U. 3)Turn the ignition switch to ON. 4)Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 2.3 and 2.7 V when lateral G sensor is horizontal?	Go to step **9.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
9	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 3.3 and 3.7 V when lateral G sensor is inclined forwards to 90°?	Go to step **10.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>

	Step	Check	Yes	No
10	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal (B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 1.3 and 1.7 V when lateral G sensor is inclined backwards to 90°?	Go to step **11.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
11	**CHECK POOR CONTACT IN CONNECTORS.** Turn the ignition switch to OFF.	Is there poor contact in connector between ABSCM&H/U and lateral G sensor?	Repair the connector.	Go to step **12.**
12	**CHECK ABSCM&H/U.** 1)Connect all connectors. 2)Erase the memory. 3)Perform the inspection mode. 4)Read out the DTC.	Is the same DTC as in current diagnosis still being output?	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>	Go to step **13.**
13	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES (DTCs) APPEARANCE.**	Are other DTCs being output?	Proceed with the diagnosis corresponding to DTC.	A temporary poor contact.

AJ:DTC 73
— BATTERY SHORT IN LATERAL G SENSOR CIRCUIT —

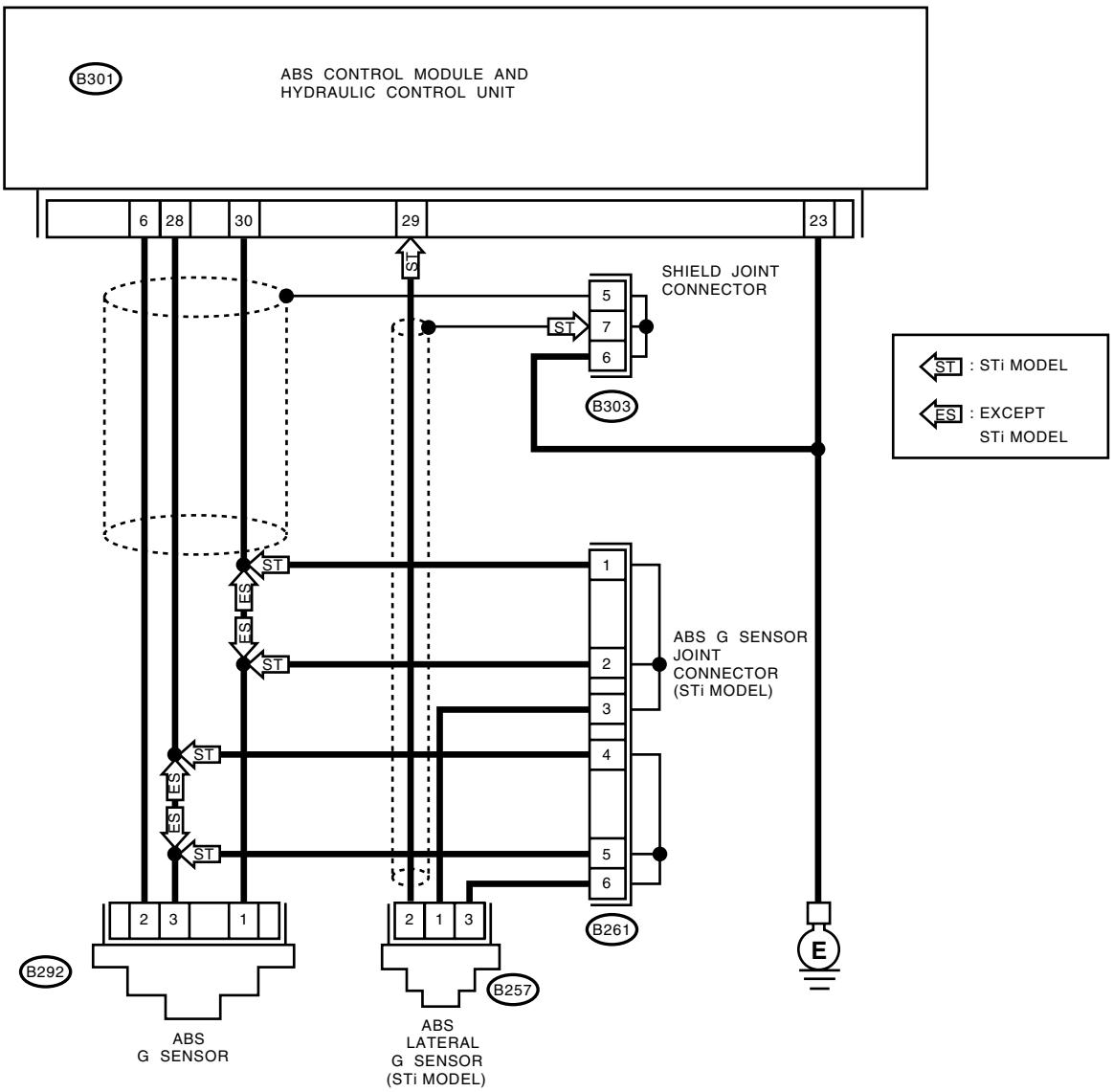
DIAGNOSIS:

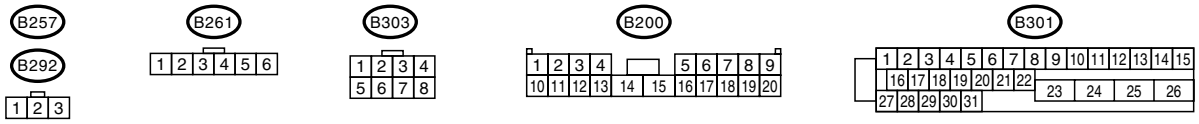
- Faulty lateral G sensor output voltage

TROUBLE SYMPTOM:

- ABS does not operate.

WIRING DIAGRAM: LHD MODEL





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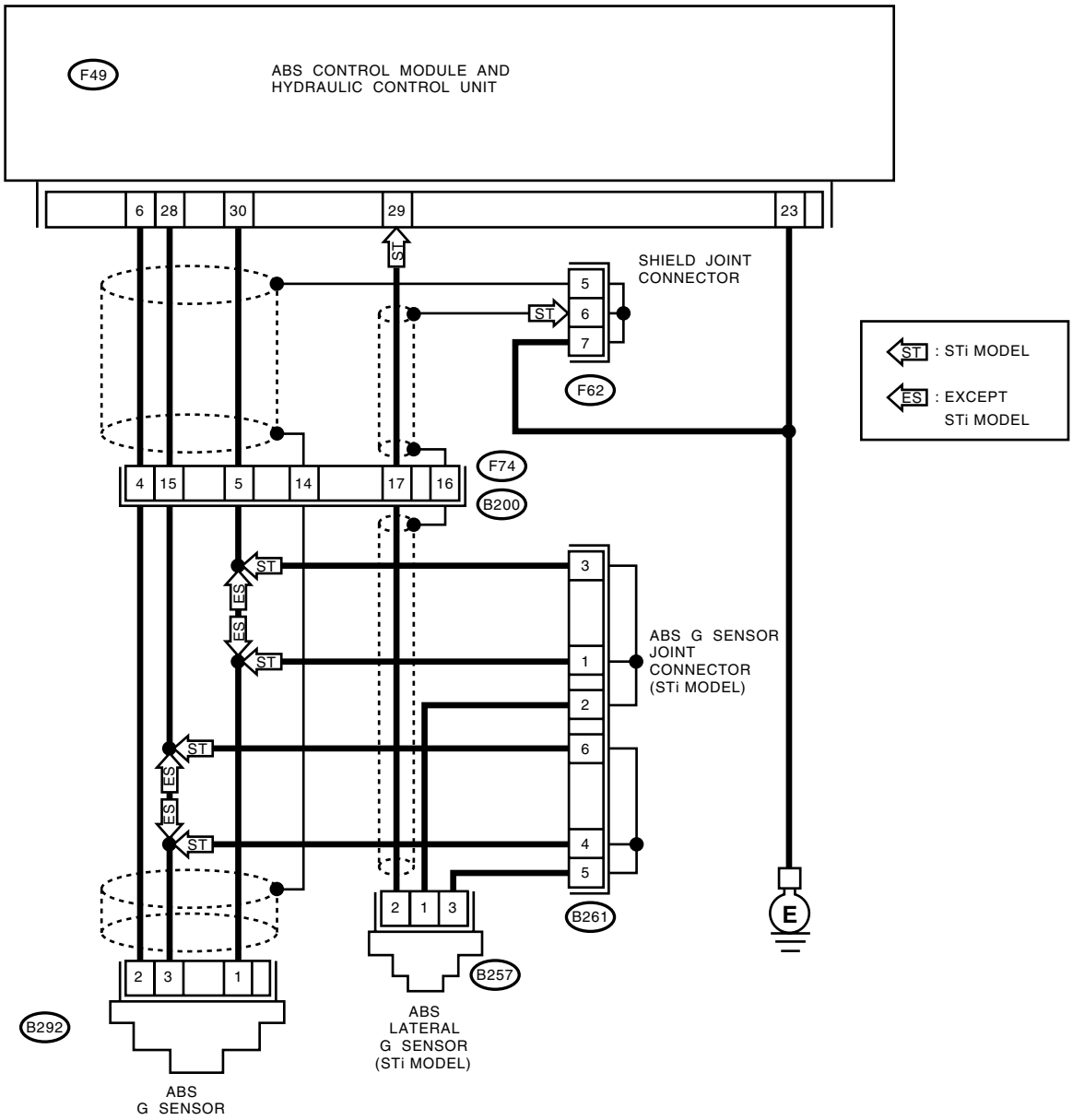
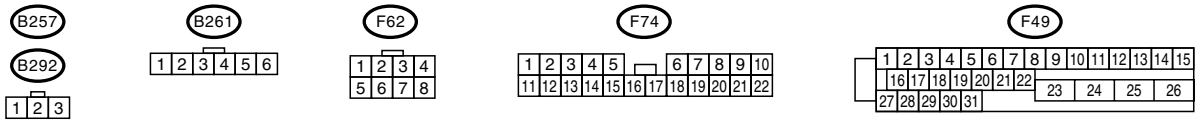
WIRING DIAGRAM: RHD MODEL





BR0157

Step		Check	Yes	No
1	**CHECK OUTPUT OF LATERAL G SENSOR USING SELECT MONITOR.** 1)Select “Current data display & Save” on the select monitor. 2)Read the lateral G sensor output in select monitor data display.	Is the lateral G sensor output on monitor display between 2.3 and 2.7 V when lateral G sensor is in horizontal position?	Go to step **2.**	Go to step **5.**

	Step	Check	Yes	No
2	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connector between ABSCM&H/U and lateral G sensor?	Repair the connector.	Go to step **3.**
3	**CHECK ABSCM&H/U.** 1)Connect all connectors. 2)Erase the memory. 3)Perform the inspection mode. 4)Read out the DTC.	Is the same DTC as in current diagnosis still being output?	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>	Go to step **4.**
4	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES (DTCs) APPEARANCE.**	Are other DTCs being output?	Proceed with the diagnosis corresponding to DTC.	A temporary poor contact.
5	**CHECK FREEZE FRAME DATA.** 1)Select “Freeze frame data” on the select monitor. 2)Read front right wheel speed on the select monitor display.	Is the front right wheel speed on monitor display 0 km?	Go to step **6.**	Go to step **16.**
6	**CHECK FREEZE FRAME DATA.** Read front left wheel speed on the select monitor display.	Is the front left wheel speed on monitor display 0 km?	Go to step **7.**	Go to step **16.**
7	**CHECK FREEZE FRAME DATA.** Read rear right wheel speed on the select monitor display.	Is the rear right wheel speed on monitor display 0 km?	Go to step **8.**	Go to step **16.**
8	**CHECK FREEZE FRAME DATA.** Read rear left wheel speed on the select monitor display.	Is the rear left wheel speed on monitor display 0 km?	Go to step **9.**	Go to step **16.**
9	**CHECK FREEZE FRAME DATA.** Read lateral G sensor output on the select monitor display.	Is the lateral G sensor output on monitor display more than 3.65 V?	Go to step **10.**	Go to step **16.**
10	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ABSCM&H/U. 3)Measure the resistance between ABSCM&H/U connector terminals. ***Connector & terminal*** ***LHD: (B301) No. 29 — No. 28:*** ***RHD: (F49) No. 29 — No. 28:***	Is the resistance between 5.0 and 5.6 kΩ?	Go to step **11.**	Repair the harness/connector between lateral G sensor and ABSCM&H/U.
11	**CHECK BATTERY SHORT OF HARNESS.** 1)Turn the ignition switch to OFF. 2)Remove the console box. 3)Disconnect the connector from lateral G sensor. 4)Disconnect the connector from ABSCM&H/U. 5)Measure the voltage between ABSCM&H/U connector and chassis ground. ***Connector & terminal*** ***LHD: (B301) No. 29 (+) — Chassis ground (–):*** ***RHD: (F49) No. 29 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **12.**	Repair the harness between lateral G sensor and ABSCM&H/U.

	Step	Check	Yes	No
12	**CHECK BATTERY SHORT OF HARNESS.** 1)Turn the ignition switch to ON. 2)Measure the voltage between ABSCM&H/U connector and chassis ground. ***Connector & terminal*** ***LHD: (B301) No. 29 (+) — Chassis ground (–):*** ***RHD: (F49) No. 29 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **13.**	Repair the harness between lateral G sensor and ABSCM&H/U.
13	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connector between ABSCM&H/U and lateral G sensor?	Repair the connector.	Go to step **14.**
14	**CHECK ABSCM&H/U.** 1)Connect all connectors. 2)Erase the memory. 3)Perform the inspection mode. 4)Read out the DTC.	Is the same DTC as in current diagnosis still being output?	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>	Go to step **15.**
15	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES (DTCs) APPEARANCE.**	Are other DTCs being output?	Proceed with the diagnosis corresponding to DTC.	A temporary poor contact.
16	**CHECK INPUT VOLTAGE OF LATERAL G SENSOR.** 1)Turn the ignition switch to OFF. 2)Remove the console box. 3)Remove the lateral G sensor from vehicle. (Do not disconnect the connector.) 4)Turn the ignition switch to ON. 5)Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 1 (+) — No. 3 (–):***	Is the voltage between 4.75 and 5.25 V?	Go to step **17.**	Repair the harness/connector between lateral G sensor and ABSCM&H/U.
17	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ABSCM&H/U. 3)Measure the resistance between ABSCM&H/U connector terminals. ***Connector & terminal*** ***LHD: (B301) No. 29 — No. 28:*** ***RHD: (F49) No. 29 — No. 28:***	Is the resistance between 5.0 and 5.6 kΩ?	Go to step **18.**	Repair the harness/connector between lateral G sensor and ABSCM&H/U.
18	**CHECK LATERAL G SENSOR.** 1)Connect the connector to lateral G sensor. 2)Connect the connector to ABSCM&H/U. 3)Turn the ignition switch to ON. 4)Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 2.3 and 2.7 V when lateral G sensor is horizontal?	Go to step **19.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
19	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 3.3 and 3.7 V when lateral G sensor is inclined forwards to 90°?	Go to step **20.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>

	Step	Check	Yes	No
20	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal (B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 1.3 and 1.7 V when lateral G sensor is inclined backwards to 90°?	Go to step **21.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
21	**CHECK POOR CONTACT IN CONNECTORS.** Turn the ignition switch to OFF.	Is there poor contact in connector between ABSCM&H/U and lateral G sensor?	Repair the connector.	Go to step **22.**
22	**CHECK ABSCM&H/U.** 1)Connect all connectors. 2)Erase the memory. 3)Perform the inspection mode. 4)Read out the DTC.	Is the same DTC as in current diagnosis still being output?	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>	Go to step **23.**
23	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES (DTCs) APPEARANCE.**	Are other DTCs being output?	Proceed with the diagnosis corresponding to DTC.	A temporary poor contact.

AK:DTC 73
— ABNORMAL LATERAL G SENSOR HIGH μ OUTPUT —

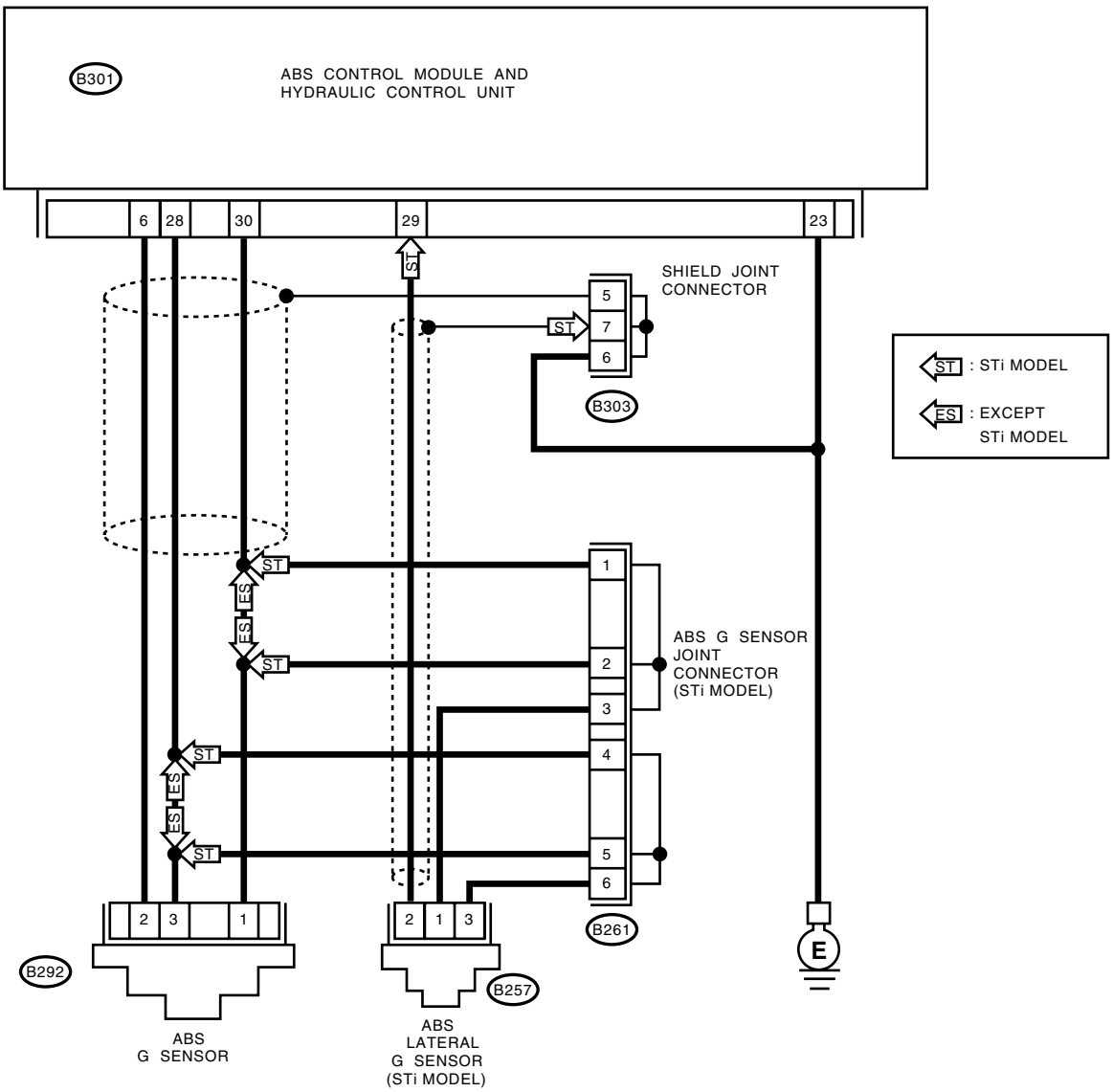
DIAGNOSIS:

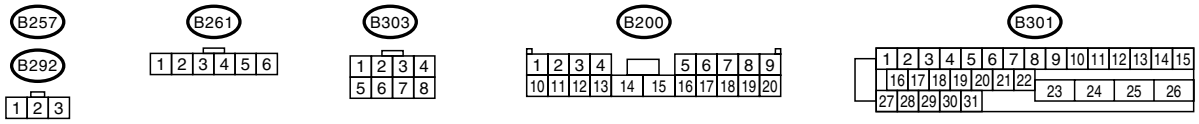
- Faulty lateral G sensor output voltage

TROUBLE SYMPTOM:

- ABS does not operate.

WIRING DIAGRAM: LHD MODEL





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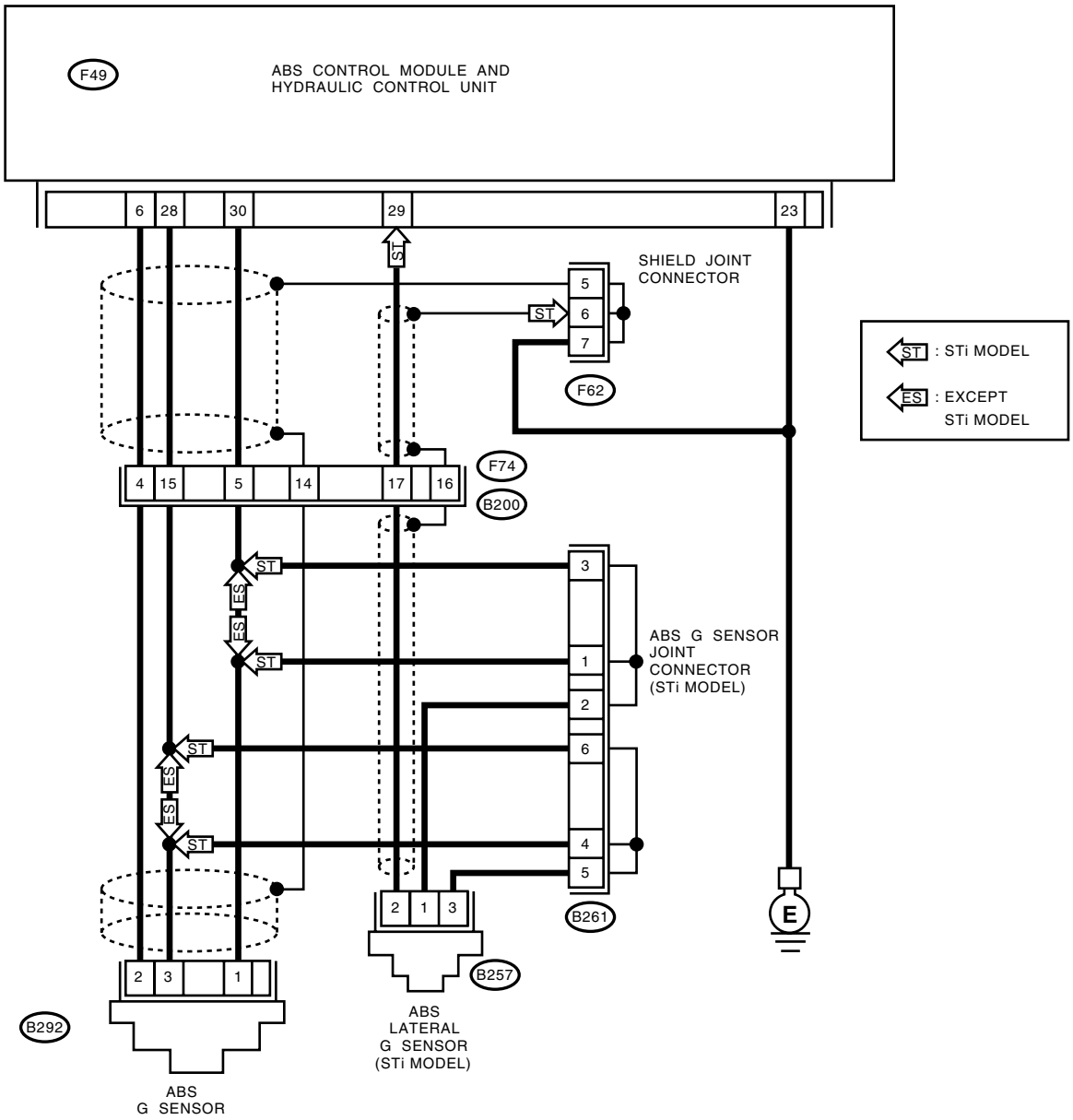
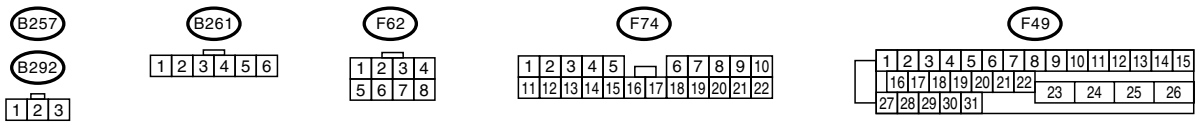
WIRING DIAGRAM: RHD MODEL





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Step		Check	Yes	No
1	**CHECK OUTPUT OF LATERAL G SENSOR USING SELECT MONITOR.** 1)Select “Current data display & Save” on the select monitor. 2)Read lateral G sensor output on the select monitor display.	Is the lateral G sensor output on monitor display between 2.3 and 2.7 V when lateral G sensor is in horizontal position?	Go to step **2.**	Go to step **6.**

	Step	Check	Yes	No
2	**CHECK POOR CONTACT IN CONNECTORS.** Turn the ignition switch to OFF.	Is there poor contact in connector between ABSCM&H/U and lateral G sensor?	Repair the connector.	Go to step **3.**
3	**CHECK ABSCM&H/U.** 1)Connect all connectors. 2)Erase the memory. 3)Perform the inspection mode. 4)Read out the DTC.	Is the same DTC as in current diagnosis still being output?	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>	Go to step **4.**
4	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES (DTCs) APPEARANCE.**	Are other DTCs being output?	Proceed with the diagnosis corresponding to DTC.	Go to step **5.**
5	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ABSCM&H/U. 3)Measure the resistance between ABSCM&H/U connector terminals. ***Connector & terminal*** ***LHD: (B301) No. 29 — No. 28:*** ***RHD: (F49) No. 29 — No. 28:***	Is the resistance between 5.0 and 5.6 kΩ?	Go to step **6.**	Repair the harness/connector between lateral G sensor and ABSCM&H/U.
6	**CHECK GROUND SHORT OF HARNESS.** Measure the resistance between ABSCM&H/U connector and chassis ground. ***Connector & terminal*** ***LHD: (B301) No. 28 — Chassis ground:*** ***RHD: (F49) No. 28 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **7.**	Repair the harness between lateral G sensor and ABSCM&H/U. Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>
7	**CHECK LATERAL G SENSOR.** 1)Remove the console box. 2)Remove the lateral G sensor from vehicle. 3)Connect the connector to lateral G sensor. 4)Connect the connector to ABSCM&H/U. 5)Turn the ignition switch to ON. 6)Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 2.3 and 2.7 V when lateral G sensor is horizontal?	Go to step **8.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
8	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 3.3 and 3.7 V when lateral G sensor is inclined forwards to 90°?	Go to step **9.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
9	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 1.3 and 1.7 V when lateral G sensor is inclined backwards to 90°?	Go to step **10.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>

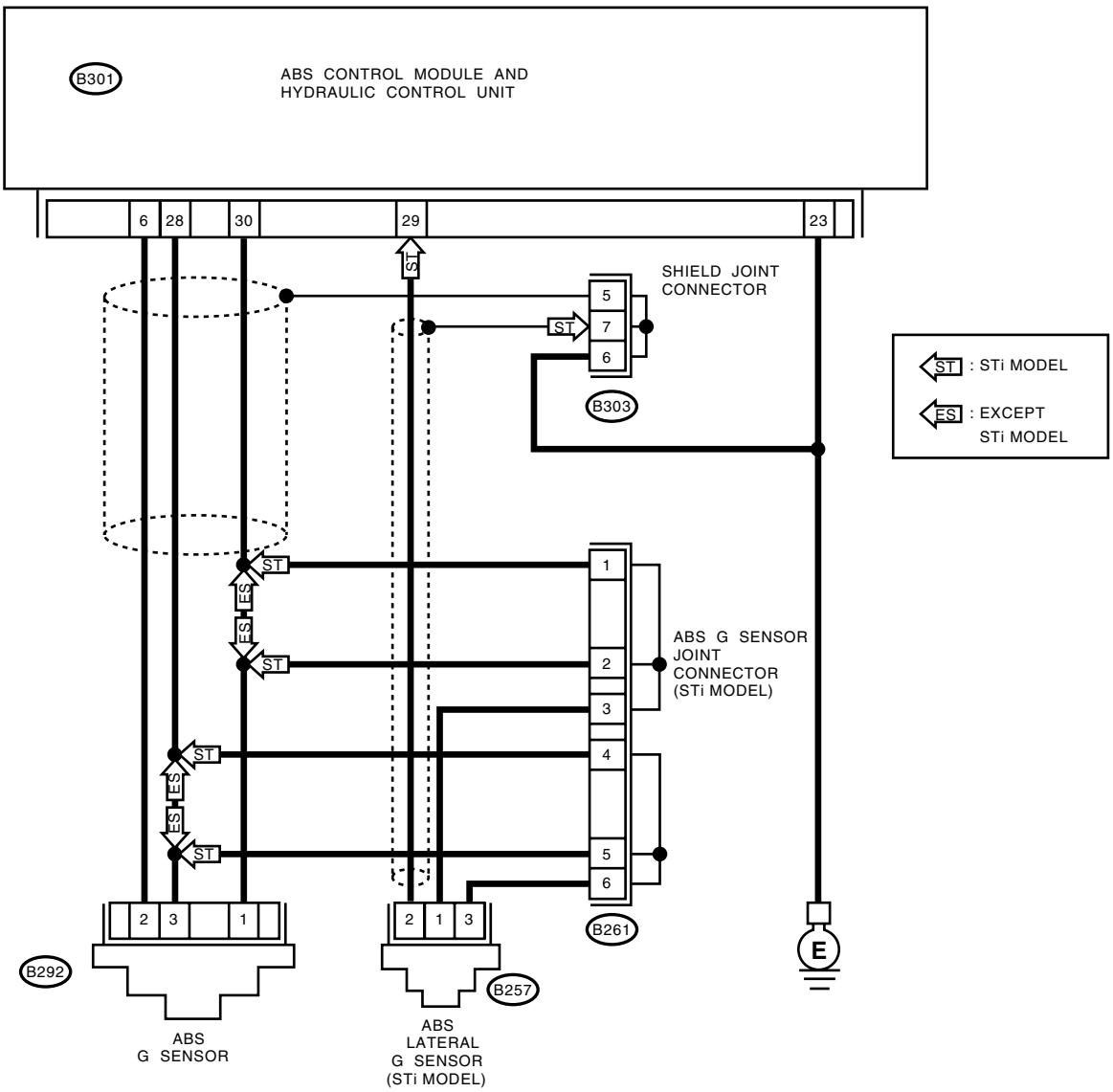
	Step	Check	Yes	No
10	**CHECK ABSCM&H/U.** 1)Turn the ignition switch to OFF. 2)Connect all connectors. 3)Erase the memory. 4)Perform the inspection mode. 5)Read out the DTC.	Is the same DTC as in current diagnosis still being output?	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>	Go to step **11.**
11	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES (DTCs) APPEARANCE.**	Are other DTCs being output?	Proceed with the diagnosis corresponding to DTC.	A temporary poor contact.

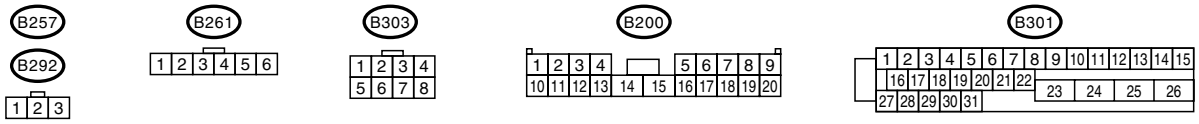
AL:DTC 73
— DETECTION OF LATERAL G SENSOR STICK —

DIAGNOSIS:
- Faulty lateral G sensor output voltage

TROUBLE SYMPTOM:
- ABS does not operate.

WIRING DIAGRAM: LHD MODEL





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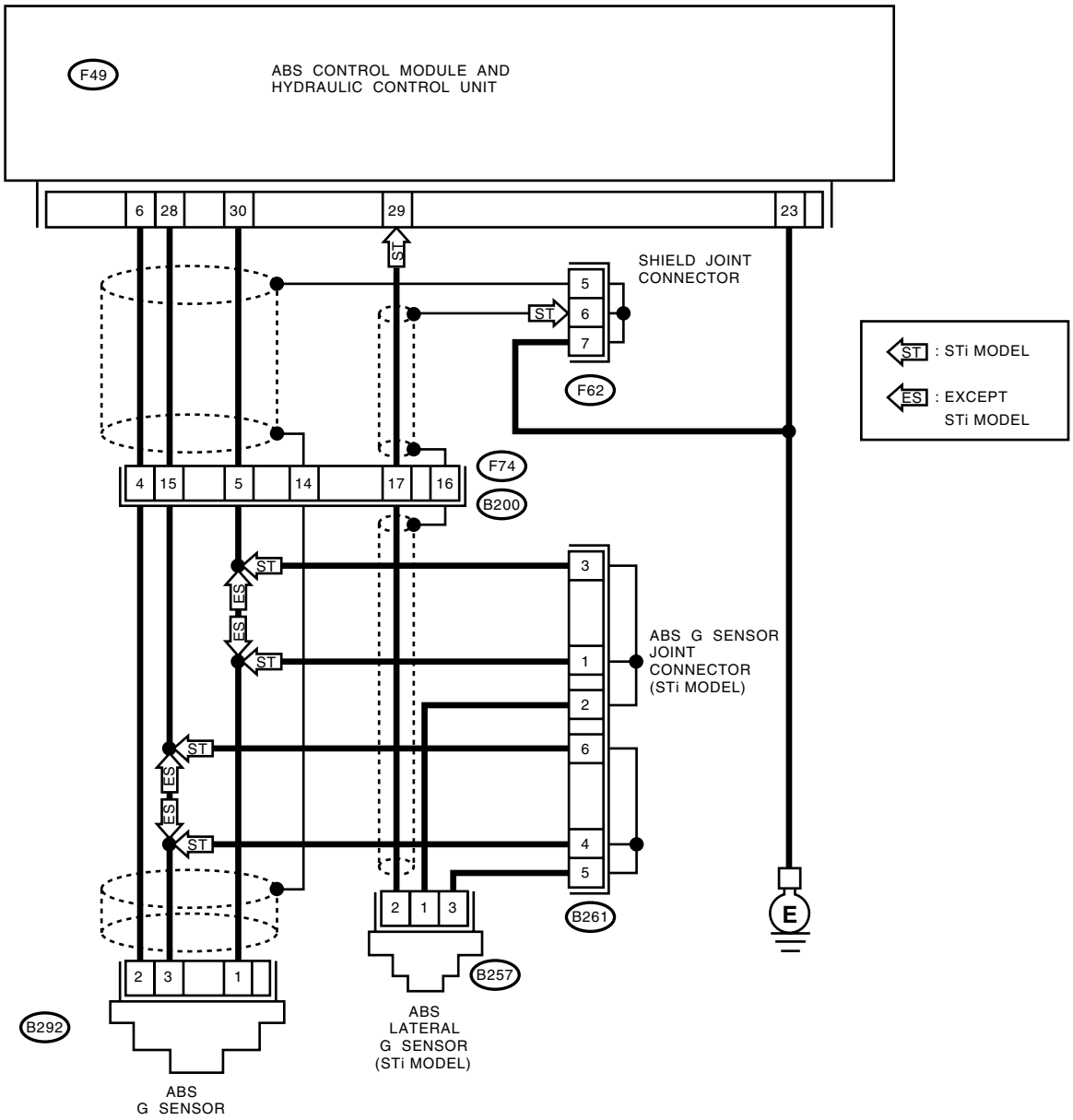
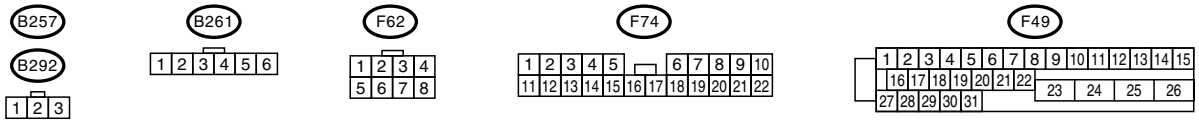
WIRING DIAGRAM: RHD MODEL





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Step		Check	Yes	No
1	**CHECK ALL FOUR WHEELS FOR FREE TURNING.**	Have the wheels been turned freely such as when vehicle is lifted up, or operated on a rolling road?	The ABS is normal. Erase the DTC.	Go to step **2.**

	Step	Check	Yes	No
2	**CHECK OUTPUT OF LATERAL G SENSOR USING SELECT MONITOR.** 1)Select “Current data display & Save” on the select monitor. 2)Read the select monitor display.	Is the lateral G sensor output on monitor display between 2.3 and 2.7 V when the vehicle is in horizontal position?	Go to step **3.**	Go to step **8.**
3	**CHECK OUTPUT OF LATERAL G SENSOR USING SELECT MONITOR.** 1)Turn the ignition switch to OFF. 2)Remove the console box. 3)Remove the lateral G sensor from vehicle. (Do not disconnect the connector.) 4)Turn the ignition switch to ON. 5)Select “Current data display & Save” on the select monitor. 6)Read the select monitor display.	Is the lateral G sensor output on monitor display between 3.3 and 3.7 V when lateral G sensor is inclined forwards to 90°?	Go to step **4.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
4	**CHECK OUTPUT OF LATERAL G SENSOR USING SELECT MONITOR.** Read the select monitor display.	Is the lateral G sensor output on the monitor display between 1.3 and 1.7 V when lateral G sensor is inclined backwards to 90°?	Go to step **5.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
5	**CHECK POOR CONTACT IN CONNECTORS.** Turn the ignition switch to OFF.	Is there poor contact in connector between ABSCM&H/U and lateral G sensor?	Repair the connector.	Go to step **6.**
6	**CHECK ABSCM&H/U.** 1)Connect all connectors. 2)Erase the memory. 3)Perform the inspection mode. 4)Read out the DTC.	Is the same DTC as in current diagnosis still being output?	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>	Go to step **7.**
7	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES (DTCs) APPEARANCE.**	Are other DTCs being output?	Proceed with the diagnosis corresponding to DTC.	Go to step **8.**
8	**CHECK OPEN CIRCUIT IN LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1)Turn the ignition switch to OFF. 2)Disconnect the connector from ABSCM&H/U. 3)Measure the resistance between ABSCM&H/U connector terminals. ***Connector & terminal*** ***LHD: (B301) No. 29 — No. 28:*** ***RHD: (F49) No. 29 — No. 28:***	Is the resistance between 5.0 and 5.6 kΩ?	Go to step **9.**	Repair the harness/connector between lateral G sensor and ABSCM&H/U.
9	**CHECK LATERAL G SENSOR.** 1)Remove the console box. 2)Remove the lateral G sensor from vehicle. 3)Connect the connector to lateral G sensor. 4)Connect the connector to ABSCM&H/U. 5)Turn the ignition switch to ON. 6)Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 2.3 and 2.7 V when lateral G sensor is horizontal?	Go to step **10.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
10	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal*** ***(B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 3.3 and 3.7 V when lateral G sensor is inclined forwards to 90°?	Go to step **11.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>

	Step	Check	Yes	No
11	**CHECK LATERAL G SENSOR.** Measure the voltage between lateral G sensor connector terminals. ***Connector & terminal (B257) No. 2 (+) — No. 3 (–):***	Is the voltage between 1.3 and 1.7 V when lateral G sensor is inclined backwards to 90°?	Go to step **12.**	Replace the lateral G sensor. <Ref. to ABS-5, Lateral G Sensor.>
12	**CHECK ABSCM&H/U.** 1)Turn the ignition switch to OFF. 2)Connect all connectors. 3)Erase the memory. 4)Perform the inspection mode. 5)Read out the DTC.	Is the same DTC as in current diagnosis still being output?	Replace the ABSCM&H/U. <Ref. to ABS-4, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>	Go to step **13.**
13	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES (DTCs) APPEARANCE.**	Are other DTCs being output?	Proceed with the diagnosis corresponding to DTC.	A temporary poor contact.

BRAKE

BR

1. General Description

A: SPECIFICATIONS

Model		TS	GX, RS, OBK	WRX	STi
Front disc brake	Size	14 inch type	15 inch type	16 inch type	17 inch type
	Type	Disc (Floating type, ventilated)		Disc (Fixed type, ventilated)	
	Effective disc diameter	210 mm (8.27 in)	228 mm (8.98 in)	255 mm (10.04 in)	268 mm (10.55 in)
	Disc thickness × Outer diameter	24 × 260 mm (0.94 × 10.24 in)	24 × 277 mm (0.94 × 10.91 in)	24 × 294 mm (0.94 × 11.57 in)	30 × 326 mm (1.18 × 12.83 in)
	Effective cylinder diameter	57.2 mm (2.252 in)	42.8 mm (1.685 in) × 2	40.4 mm (1.591 in) × 4	40.0 mm × 2, 46.0 mm × 2 (1.575 in × 2, 1.811 in × 2)
	Pad dimensions (length × width × thickness)	112.4 × 44.3 × 11.0 mm (4.425 × 1.744 × 0.433 in)	112.3 × 50.0 × 11.0 mm (4.421 × 1.969 × 0.433 in)	116.0 × 48.3 × 10.0 mm (4.567 × 1.902 × 0.394 in)	129.8 × 60.5 × 9.2 mm (5.110 × 2.382 × 0.362 in)
	Clearance adjustment	Automatic adjustment			
Rear disc brake	Size	—	14 inch type	15 inch type	17 inch type
	Type	—	Disc (Floating type)	Disc (Fixed type, ventilated)	
	Effective disc diameter	—	230 mm (9.06 in)	261 mm (10.28 in)	268 mm (10.55 in)
	Disc thickness × Outer diameter	—	10 × 266 mm (0.39 × 10.47 in)	18 × 290 mm (0.71 × 11.42 in)	20 × 316 mm (0.79 × 12.44 in)
	Effective cylinder diameter	—	38.1 mm (1.500 in)		36.0 mm (1.417 in)
	Pad dimensions (length × width × thickness)	—	82.4 × 33.7 × 9.0 mm (3.244 × 1.327 × 0.354 in)	71.8 × 35.0 × 11.5 mm (2.827 × 1.378 × 0.453 in)	74.8 × 45.0 × 9.0 mm (2.945 × 1.772 × 0.354 in)
	Clearance adjustment	—	Automatic adjustment		
Rear drum brake	Type	Drum (Leading-Trailing type)	—	—	—
	Effective drum diameter	228.6 mm (9 in)	—	—	—
	Effective cylinder diameter	17.5 mm (0.689 in)	—	—	—
	Lining dimensions (length × width × thickness)	218.8 × 35.0 × 4.1 mm (8.61 × 1.378 × 0.161 in)	—	—	—
	Clearance adjustment	Automatic adjustment	—	—	—
Master cylinder	Type	Tandem			
	Effective diameter	23.81 mm (0.9374 in) [25.4 mm (1 in)]	26.99 mm (1-1/16 in)		
	Reservoir type	Sealed type			
	Brake fluid reservoir capacity	205 cm^3 (12.51 cu in)			
Brake booster	Type	Vacuum suspended			
	Effective diameter	230 mm (9.06 in) [180 + 205 mm (7.09 + 8.07 in)]	205 + 230 mm (8.07 + 9.06 in)		

Model		TS	GX, RS, OBK	WRX	STi
Proportioning valve	Split point	1,961 kPa (20 kg/cm^2, 285 psi)		—	—
	Reducing ratio	0.4	0.3	—	—
Brake line		Dual circuit system			
Brake fluid **CAUTION:** **• Avoid mixing brake fluid of different brands to prevent the fluid performance from degrading.** **• When brake fluid is supplemented, be careful not to allow any dust into the reservoir.** **• Use fresh DOT3 or 4 brake fluid when replacing or refilling the fluid.**		FMVSS No. 116, DOT3 or DOT4			

[ ] : ABS equipped vehicle.

NOTE:
Refer to “PB section” for parking brake SPECIFICATIONS. <Ref. to PB-2, SPECIFICATIONS, General Description.>

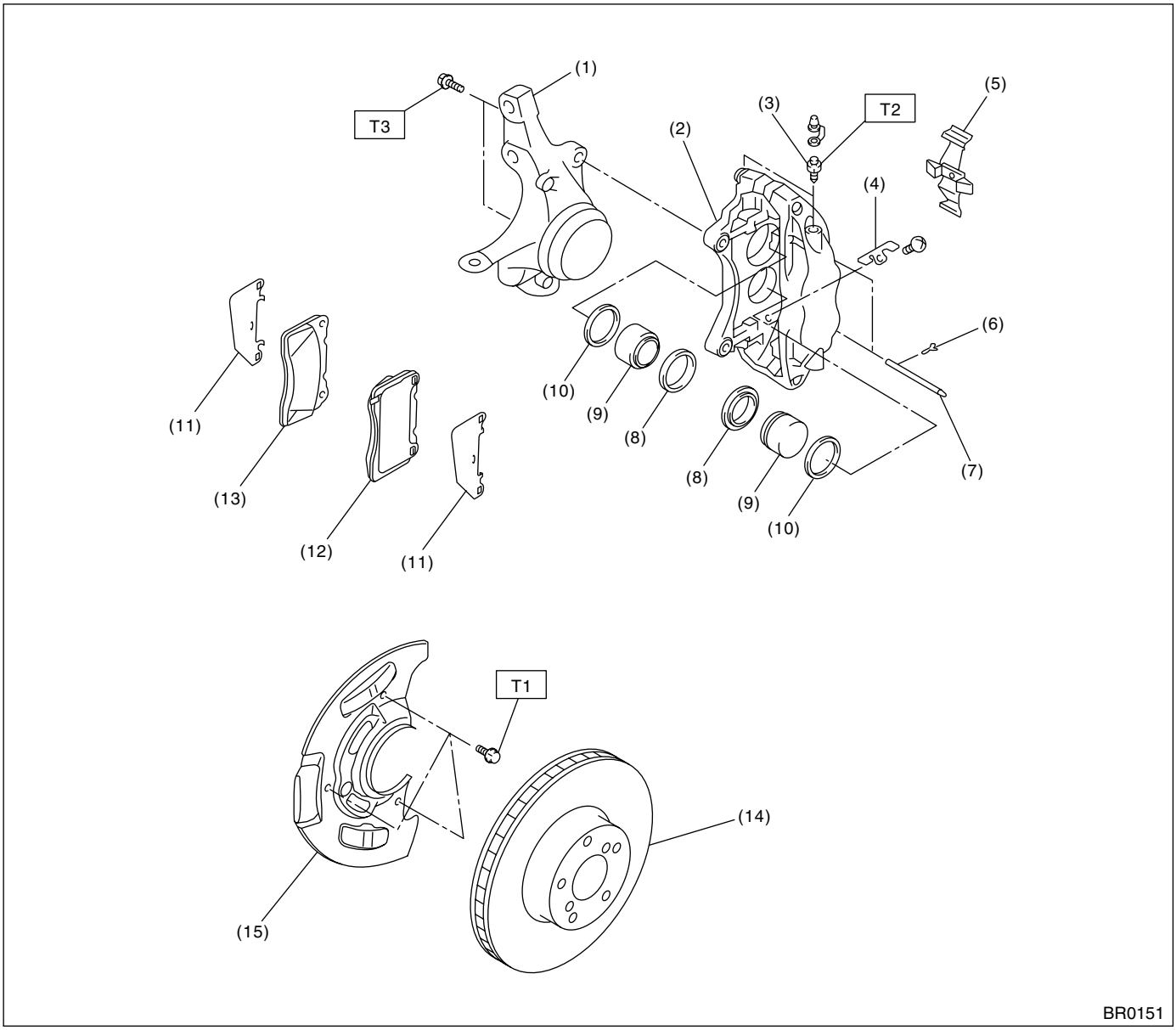
ITEM			STANDARD	SERVICE LIMIT
Front brake	Pad thickness (including back metal)	14”,15”	17 mm (0.67 in)	7.5 mm (0.295 in)
		16”	14.5 mm (0.571 in)	6.0 mm (0.236 in)
		17”	14.2 mm (0.559 in)	6.2 mm (0.244 in)
	Disc thickness	Except 17”	24 mm (0.94 in)	22 mm (0.87 in)
		17”	30 mm (1.18 in)	28 mm (1.10 in)
	Disc runout		—	0.075 mm (0.0030 in)
Rear brake (Disc type)	Pad thickness (including back metal)	14”	14 mm (0.55 in)	6.5 mm (0.256 in)
		15”	16 mm (0.63 in)	6.0 mm (0.236 in)
		17”	13.5 mm (0.531 in)	6.2 mm (0.244 in)
	Disc thickness	14”	10 mm (0.39 in)	8.5 mm (0.335 in)
		15”	18 mm (0.71 in)	16.0 mm (0.63 in)
		17”	20 mm (0.79 in)	18 mm (0.71 in)
	Disc runout		—	0.07 mm (0.0028 in)
Rear brake (Drum type)	Inside diameter		228.6 mm (9 in)	230.6 mm (9.08 in)
	Lining thickness		4.1 mm (0.161 in)	1.5 mm (0.059 in)
Rear brake (Disc type parking)	Inside diameter		170 mm (6.69 in)	171 mm (6.73 in)
	Lining thickness		3.2 mm (0.126 in)	1.5 mm (0.059 in)
Parking brake	Lever stroke		7 to 8 notches/196 N (20 kgf, 44 lb)	

		Brake pedal force	Fluid pressure				
			TS		GX, RS, OBK	WRX	STi
			Without ABS	With ABS			
Brake booster	Brake fluid pressure without engine running	147 N (15 kgf, 33 lb)	686 kPa (7 kg/cm^2, 100 psi)	686 kPa (7 kg/cm^2, 100 psi)	588 kPa (6 kg/cm^2, 85 psi)		
		294 N (30 kgf, 66 lb)	1,961 kPa (20 kg/cm^2, 284 psi)	1,961 kPa (20 kg/cm^2, 284 psi)	1,471 kPa (15 kg/cm^2, 213 psi)		
	Brake fluid pressure with engine running and vacuum at 66.7 kPa (500 mmHg, 19.69 inHg)	147 N (15 kgf, 33 lb)	5,982 kPa (61 kg/cm^2, 868 psi)	5,982 kPa (61 kg/cm^2, 868 psi)	5,296 kPa (54 kg/cm^2, 768 psi)	4,707 kPa (48 kg/cm^2, 683 psi)	4,021 kPa (41 kg/cm^2, 583 psi)
		294 N (30 kgf, 66 lb)	7,649 kPa (78 kg/cm^2, 1,109 psi)	8,434 kPa (86 kg/cm^2, 1,223 psi)	9,120 kPa (93 kg/cm^2, 1,323 psi)		8,336 kPa (85 kg/cm^2, 1,209 psi)

Brake pedal	Free play	1 — 3 mm (0.04 — 0.12 in) [Depress brake pedal pad with a force of less than 10 N (1 kgf, 2 lb).]

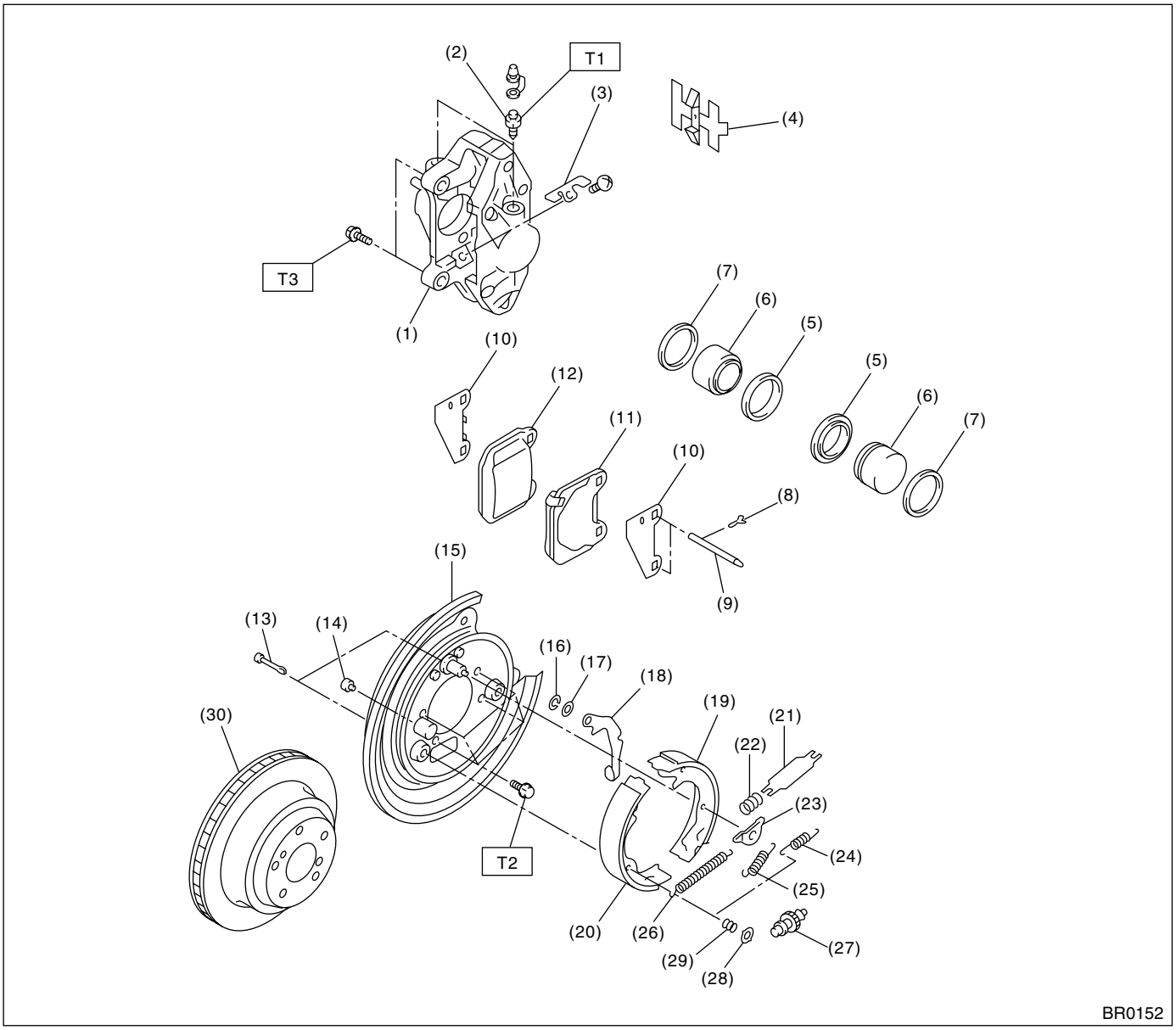
B: COMPONENT

15.17 INCH TYPE



(1)	Housing	(8)	Piston boot	(15)	Disc cover
(2)	Caliper body	(9)	Piston		
(3)	Air bleeder screw	(10)	Piston seal	***Tightening torque: N·m (kgf-m, ft-lb)***	
(4)	Guide plate	(11)	Pad shim	***T1:***	***18 (1.8, 13.3)***
(5)	Cross spring	(12)	Pad (Outside)	***T2:***	***20 (2.0, 14.8)***
(6)	Clip	(13)	Pad (Inside)	***T3:***	***155 (15.8, 114.3)***
(7)	Pad pin	(14)	Disc rotor		

16.REAR DISC BRAKE (17 INCH TYPE)



(1) Caliper body
(2) Air bleeder screw
(3) Guide plate
(4) Cross spring
(5) Piston boot
(6) Piston
(7) Piston seal
(8) Clip
(9) Pad pin
(10) Pad shim
(11) Pad (Outside)
(12) Pad (Inside)
(13) Shoe hold-down pin
(14) Cover
(15) Back plate
(16) Retainer
(17) Spring washer
(18) Parking brake lever
(19) Parking brake shoe (Secondary)
(20) Parking brake shoe (Primary)
(21) Strut
(22) Strut shoe spring
(23) Shoe guide plate
(24) Secondary shoe return spring
(25) Primary shoe return spring
(26) Adjusting spring
(27) Adjuster
(28) Shoe hold-down cup
(29) Shoe hold-down spring
(30) Disc rotor

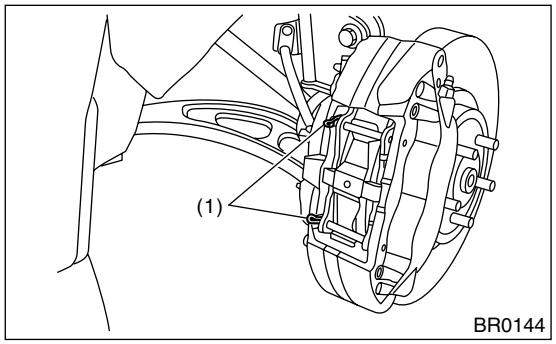
Tightening torque: N·m (kgf-m, ft-lb)
T1: 20 (2.0, 14.8)
T2: 52 (5.3, 38.3)
T3: 65 (6.6, 47.9)

2. Front Brake Pad

A: REMOVAL

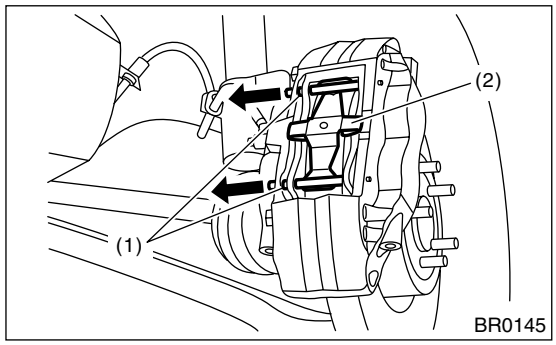
3. 17 INCH TYPE

1) Set the vehicle on a lift.
2) Loosen the wheel nuts.
3) Jack-up the vehicle, and then remove the front wheel.
4) Remove the clip.



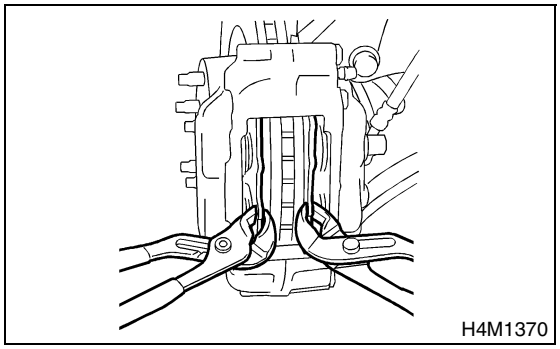
(1) Clip

5) Remove the pad pins and cross spring.

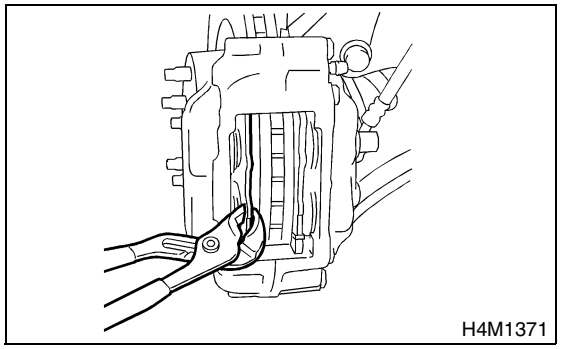


(1) Pad pin
(2) Cross spring

6) Use a wrench to expand the pads, then push the piston back.



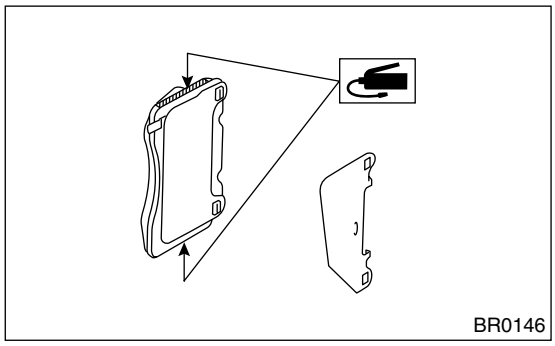
7) Remove the pad.



B: INSTALLATION

3. 17 INCH TYPE

1) Apply a thin coat of Molykote AS880N (Part No. 26298AC000) to each pad side.

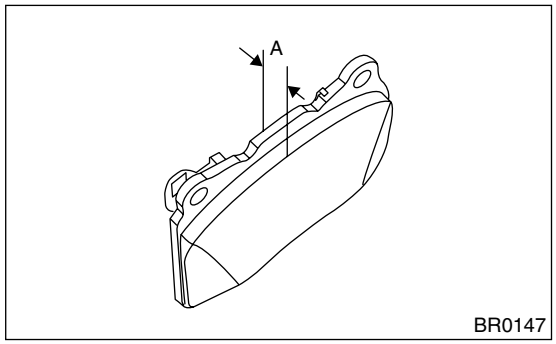


2) Install the pads on caliper body.
3) Install the cross spring.
4) Install the pad pins.
5) Install the crip.

C: INSPECTION

3. 17 INCH TYPE

Check the pad thickness A.



Pad thickness (including back metal)	Standard value	14.2 mm (0.559 in)
	Wear limit	6.2 mm (0.244 in)

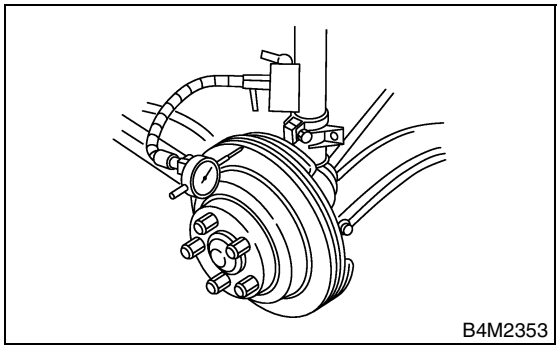
CAUTION:
• Always replace the pads for both right and left wheels at the same time. Also replace the pad clips if they are twisted or worn.
• A wear indicator is provided on the outer disc brake pad. If the pad wears down to such an extent that the end of wear indicator contacts disc rotor, a squeaking sound is produced as the wheel rotates. If this sound is heard, replace the pad.
• Replace the pad if there is oil or grease on it.

3. Front Disc Rotor

C: INSPECTION

1) Secure the disc rotor by tightening five wheel nuts.
2) Set a dial gauge on the disc rotor. Turn the disc rotor to check runout.

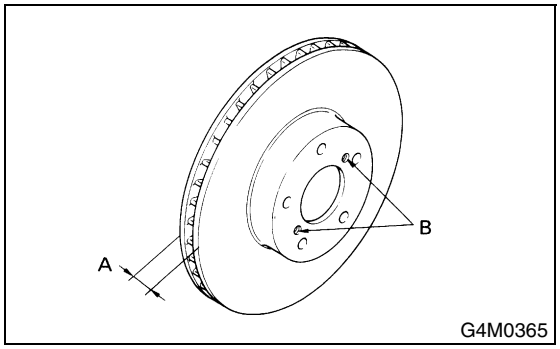
CAUTION:
Securely fix the disc rotor to hub.


B4M2353

NOTE:
• Make sure that the dial gauge is set 5 mm (0.20 in) inward of rotor outer perimeter.
• If the disc rotor runout is above standard value, inspect the play of hub bearing axial direction and runout of axle hub. <Ref. to DS-23, INSPECTION, Front Axle.> If the bearing and hub are normal, replace the disc rotor.

Disc rotor runout limit:
0.075 mm (0.0030 in)

3) Measure the disc rotor thickness.
If the thickness of disc rotor is outside the standard value, replace the disc rotor.



G4M0365

NOTE:
Make sure that a micrometer is set 5 mm (0.20 in) inward of the rotor outer perimeter.

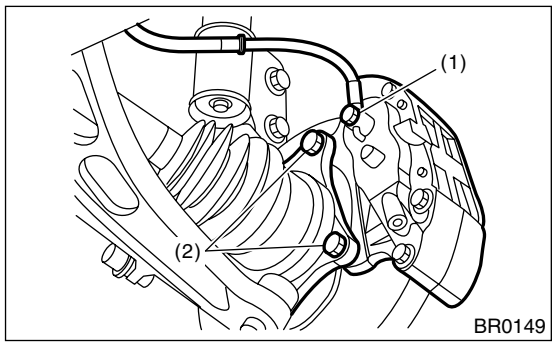
		Standard value	Service limit	Disc outer dia.
Disc rotor thickness A	14″	24 mm (0.94 in)	22 mm (0.87 in)	260 mm (10.24 in)
	15″	24 mm (0.94 in)	22 mm (0.87 in)	277 mm (10.91 in)
	16″	24 mm (0.94 in)	22 mm (0.87 in)	294 mm (11.57 in)
	17″	30 mm (1.18 in)	28 mm (1.10 in)	326 mm (12.83 in)

4. Front Disc Brake Assembly

A: REMOVAL

3. 17 INCH TYPE

1) Set the vehicle on a lift.
2) Loosen the wheel nuts.
3) Jack-up the vehicle, and then remove the front wheel.
4) Remove the brake pads from caliper body. <Ref. to BR-7, 17 INCH TYPE, REMOVAL, Front Brake Pad.>.
5) Remove the union bolt and brake hose from caliper body assembly.
6) Remove two installation bolts from housing.



(1) Union bolt
(2) Installation bolt

7) Clean mud and foreign particles from the caliper body assembly.

B: INSTALLATION

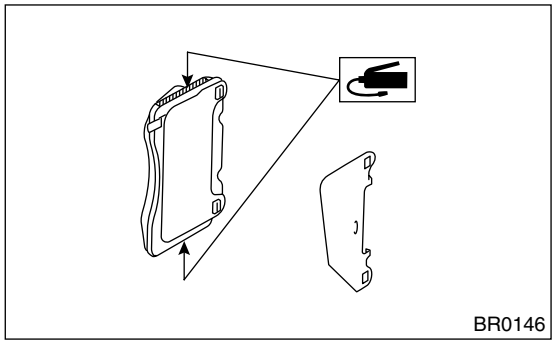
3. 17 INCH TYPE

1) Install the caliper body assembly on housing.

Tightening torque:
155 N·m (15.8 kgf-m, 114.3 ft-lb)

CAUTION:
• Always replace the pads for both right and left wheels at the same time. Also replace the pad clips if they are twisted or worn.
• A wear indicator is provided on the inner disc brake pad. If the pad wears down to such an extent that the end of wear indicator contacts the disc rotor, a squeaking sound is produced as the wheel rotates. If this sound is heard, replace the pad.

2) Apply a thin coat of Molykote AS880N (Part No. 26298AC000) to each pad side.



3) Install the pads on caliper body.
4) Install the cross spring.
5) Install the pad pins.
6) Install the clip.
7) Connect the brake hose.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

CAUTION:
• The brake hose must be connected without any twist.
• Replace the brake hose gaskets with new ones.

8) Bleed air from the brake system.

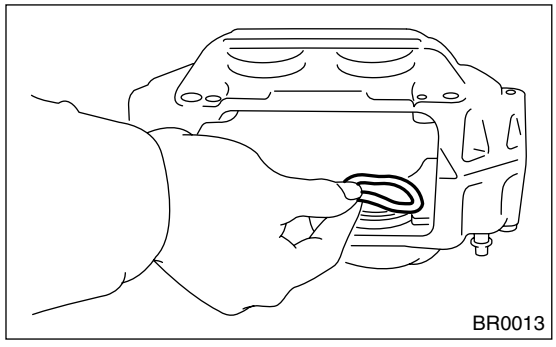
C: DISASSEMBLY

3. 17 INCH TYPE

1) Clean mud and foreign particles from the caliper body assembly.

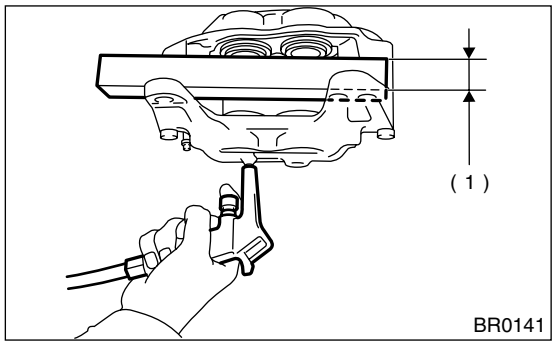
CAUTION:
Be careful not to allow foreign particles to enter inlet (at brake hose connector).

2) Remove the piston boots from each piston end.



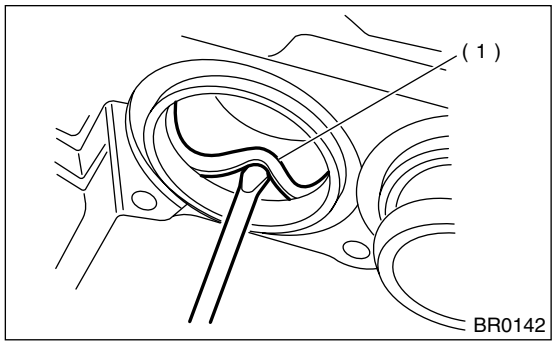
3) Gradually supply compressed air via inlet of the brake hose to force piston out.

CAUTION:
Place a wooden block as shown in the figure to prevent damage to piston.



- Place a 30 mm (1.18 in) wide wood block here.

4) Remove the piston seal from caliper body cylinder.



(1) Piston seal

D: ASSEMBLY

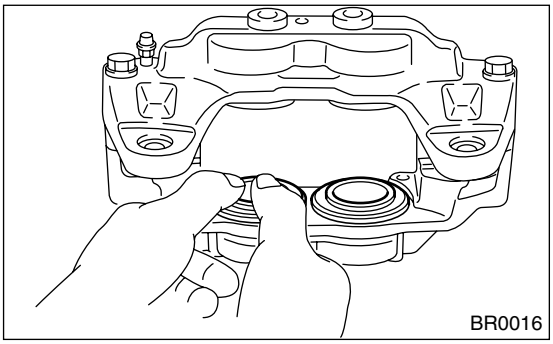
3. 17 INCH TYPE

1) Clean the caliper body interior using brake fluid.
2) Apply a coat of brake fluid to the piston seal and fit piston seal in groove on caliper body.
3) Apply a coat of brake fluid to the entire inner surface of cylinder and outer surface of piston.
4) Apply a coat of specified grease to the boot and fit in to the groove on ends of cylinder and piston.

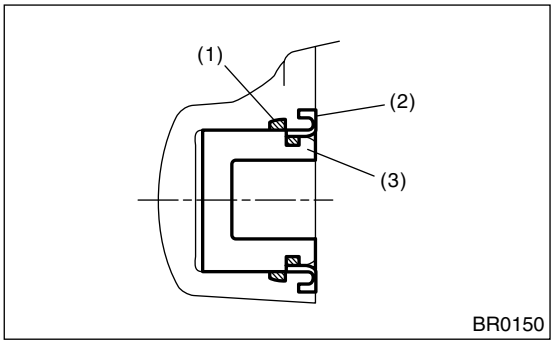
Grease:
NIGLUBE RX-2 (Part No. 003606000)

5) Insert the piston into cylinder.

CAUTION:
Do not force the piston into cylinder.



6) Position the boot in grooves on cylinder and piston.



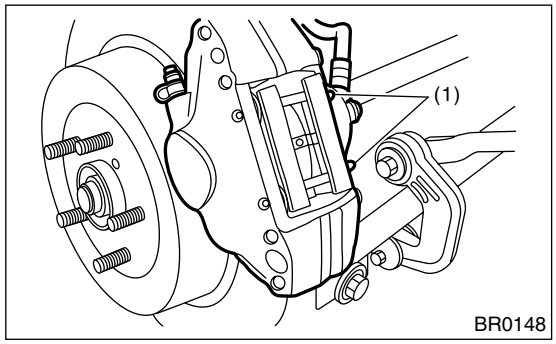
(1) Piston seal
(2) Piston boot
(3) Piston

5. Rear Brake Pad

A: REMOVAL

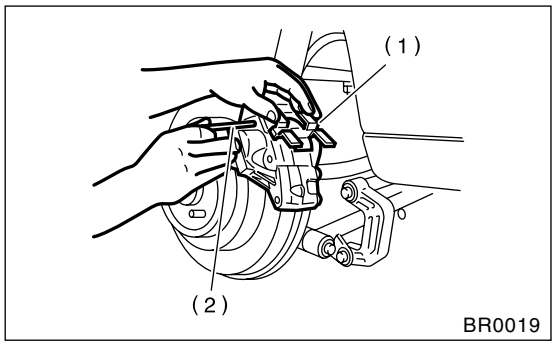
3. 17 INCH TYPE

1) Set the vehicle on a lift.
2) Loosen the wheel nuts.
3) Jack-up the vehicle, and then remove the front wheel.
4) Remove the clip.



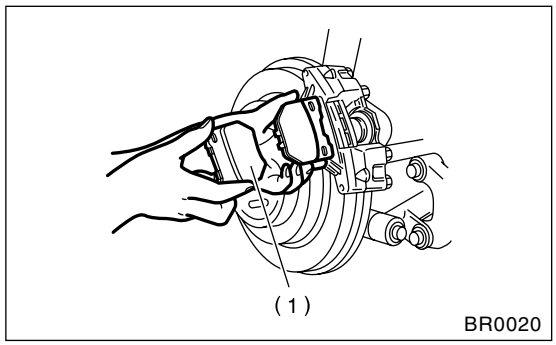
(1) Clip

5) Remove the pad pins and cross spring.



(1) Cross spring
(2) Pad pin

6) Expand the pads and push piston back.
7) Remove the pad.



(1) Rear brake pad

B: INSTALLATION

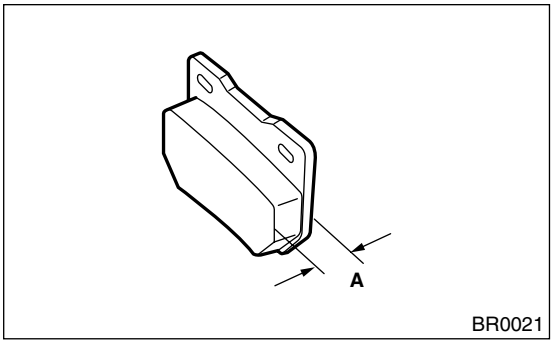
3. 17 INCH TYPE

1) Apply a thin coat of Molykote AS880N (Part No. 26298AC000) to frictional portion between pad and pad inner shim.
2) Install the pads on caliper body.
3) Install the cross spring and pad pins.
4) Install the Clip.

C: INSPECTION

3. 17 INCH TYPE

Check the pad thickness A.



Pad thickness (including back metal)	Standard value	13.5 mm (0.531 in)
	Wear limit	6.2 mm (0.244 in)

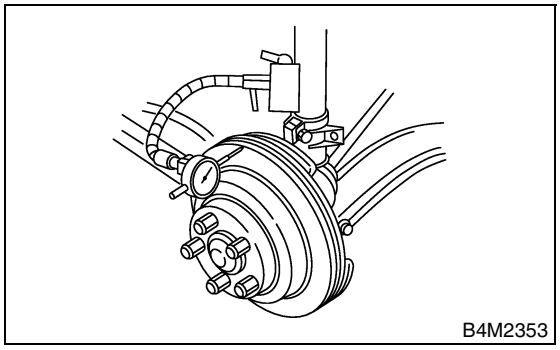
CAUTION:
• Always replace the pads for both right and left wheels at the same time. Also replace the pad clips if they are twisted or worn.
• A wear indicator is provided on the outer disc brake pad. If the pad wears down to such an extent that the end of wear indicator contacts the disc rotor, a squeaking sound is produced as the wheel rotates. If this sound is heard, replace the pad.
• Replace the pad if there is oil or grease on it.

6. Rear Disc Rotor

C: INSPECTION

1) Secure the disc rotor by tightening five wheel nuts.
2) Set a dial gauge on the disc rotor. Turn the disc rotor to check runout.

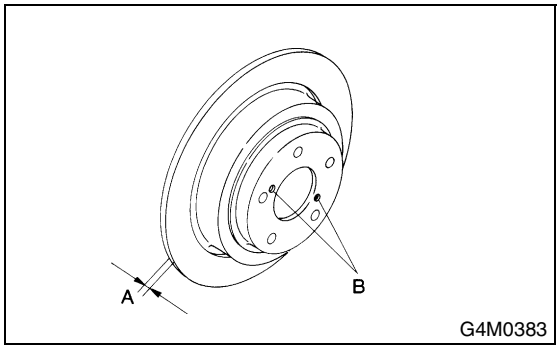
CAUTION:
Securely fix the disc rotor to hub.


B4M2353

NOTE:
• Make sure that the dial gauge is set 5 mm (0.20 in) inward of rotor outer perimeter.
• If the disc rotor runout is above standard value, inspect the play of hub bearing axial direction and runout of axle hub. <Ref. to DS-31, INSPECTION, Rear Axle.> If the bearing and hub are normal, replace the disc rotor.

Disc rotor runout limit:
0.070 mm (0.0028 in)

3) Measure the disc rotor thickness.
If the thickness of disc rotor is outside the standard value, replace the disc rotor.



G4M0383

NOTE:
Make sure that a micrometer is set 5 mm (0.20 in) inward of the rotor outer perimeter.

		Standard value	Service limit	Disc outer dia.
Disc rotor thickness A	14″	10 mm (0.39 in)	8.5 mm (0.335 in)	266 mm (10.47 in)
	15″	18 mm (0.71 in)	16 mm (0.63 in)	290 mm (11.42 in)
	17″	20 mm (0.79 in)	18 mm (0.71 in)	316 mm (12.44 in)

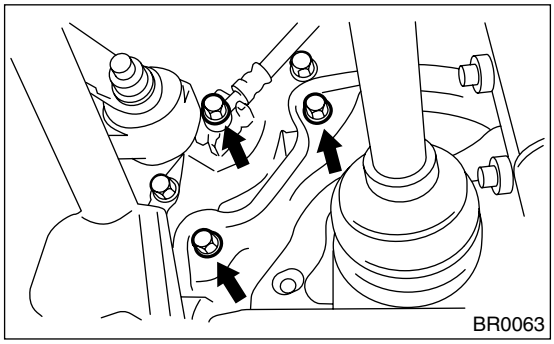
7. Rear Disc Brake Assembly

A: REMOVAL

3. 17 INCH TYPE

CAUTION:
Do not allow brake fluid to come in contact with vehicle body; wipe off completely if spilled.

1) Set the vehicle on a lift.
2) Loosen the wheel nuts.
3) Lift-up the vehicle, and then remove the wheels.
4) Remove the brake pads from caliper body. <Ref. to BR-12, 17 INCH TYPE, REMOVAL, Rear Brake Pad.>
5) Disconnect the brake hose from caliper body.
6) Remove the caliper body from housing.


BR0063

7) Clean mud and foreign particles from the caliper body.

CAUTION:
Be careful not to allow foreign particles to enter inlet (at brake hose connector).

B: INSTALLATION

3. 17 INCH TYPE

1) Install the caliper body on housing.

Tightening torque:
65 N·m (6.6 kgf-m, 47.9 ft-lb)

CAUTION:
• Always replace the pads for both right and left wheels at the same time. Also replace the pad clips if they are twisted or worn.
• A wear indicator is provided on the outer disc brake pad. If the pad wears down to such an extent that the end of wear indicator contacts the disc rotor, a squeaking sound is produced as the wheel rotates. If this sound is heard, replace the pad.

2) Install the pads on caliper body.
3) Connect the brake hose.

Tightening torque:
18 N·m (1.8 kgf-m, 13.3 ft-lb)

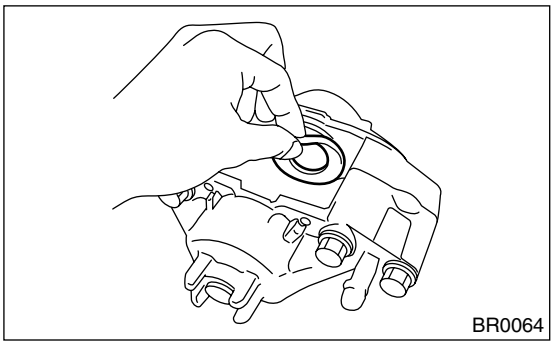
CAUTION:
• The brake hose must be connected without any twist.
• Replace the brake hose gaskets with new ones.

4) Bleed air from the brake system.

C: DISASSEMBLY

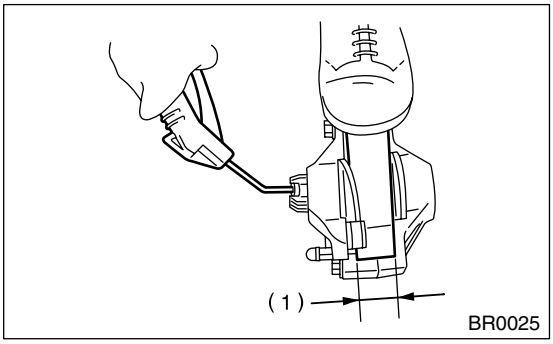
3. 17 INCH TYPE

1) Remove the piston boot from piston end.


BR0064

2) Gradually supply compressed air via inlet of the brake hose to force piston out.

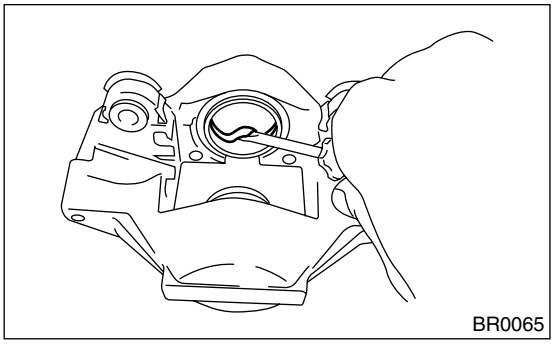
CAUTION:
Place a wooden block as shown in the figure to prevent damage to piston.



BR0025

• Place a 20 mm (0.79 in) wide wooden block here.

3) Remove the piston seal from caliper body cylinder.


BR0065

D: ASSEMBLY

3. 17 INCH TYPE

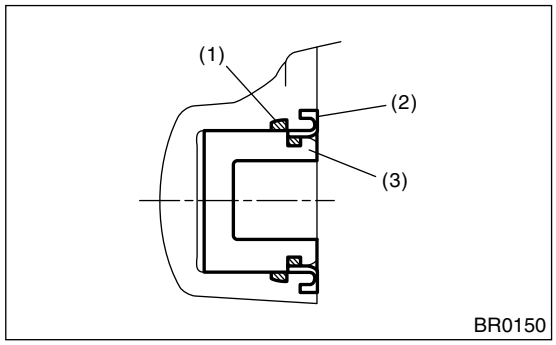
1) Clean the caliper body interior using brake fluid.
2) Apply a coat of brake fluid to the piston seal and fit piston seal in groove on caliper body.
3) Apply a coat of brake fluid to the entire inner surface of cylinder and outer surface of piston.
4) Apply a coat of specified grease to the boot and fit in to the groove on ends of cylinder and piston.

Grease:
NIGLUBE RX-2 (Part No. 003606000)

5) Insert the piston into cylinder.

CAUTION:
Do not force the piston into cylinder.

6) Position the boot in grooves on cylinder and piston.



(1) Piston seal
(2) Piston boot
(3) Piston

PARKING BRAKE

PB

1. General Description

A: SPECIFICATIONS

Model		Rear drum brake	Rear disc brake	Rear disc brake (STi model)
Type		Mechanical on rear brakes	Mechanical on rear brakes, drum in disc	
Effective drum diameter	mm (in)	228.6 (9)	170 (6.69)	190 (7.48)
Lining dimensions (length × width × thickness)	mm (in)	218.8 × 35.0 × 4.1 (8.61 × 1.378 × 0.161)	162.6 × 30.0 × 3.2 (6.40 × 1.181 × 0.126)	182.3 × 30.0 × 3.2 (7.18 × 1.181 × 0.126)
Clearance adjustment		Automatic adjustment	Manual adjustment	
Lever stroke	notches/N (kgf, lb)	7 to 8/196 (20, 44)		

BODY SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD. G1841GE6

LIGHTING SYSTEM

LI

1. General Description

A: SPECIFICATIONS

Headlight	Except STi model		12 V — 55 W/60 W (Halogen)
	STi model	High beam	12 V — 55 W (Halogen)
		Low beam	12 V — 60 W (Halogen)
Front turn signal light			12 V — 21 W
Side turn signal light			12 V — 5 W
Parking light			12 V — 5 W
Front fog light			12 V — 55 W
Rear fog light			12 V — 21 W
Rear combination light	Tail/Stop light		12 V — 5/21 W
	Turn signal light		12 V — 21 W
	Back-up light		12 V — 21 W
License plate light			12 V — 5 W
High-mounted stop light	Sedan	Standard type	12 V — 21 W
		Rear spoiler built-in type	12 V — 1.2 W
	Wagon		12 V — 10 W
Room light			12 V — 8 W
Spot light			12 V — 8 W
Luggage room light			12 V — 13 W
Trunk room light			12 V — 5 W
Glove box light			12 V — 1.4 W

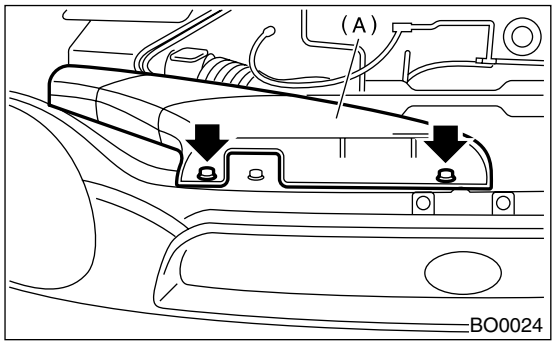
12.Headlight Bulb

A: REMOVAL

2. STI MODEL

CAUTION:
• Because the tungsten halogen bulb operates at a high temperature, dirt and oil on the bulb surface reduces the bulb's service life. Hold the flange portion when replacing the bulb. Never touch the glass portion.
• Do not leave the headlight without a bulb for a long time. Dust, moisture, etc. entering the headlight may affect its performance.

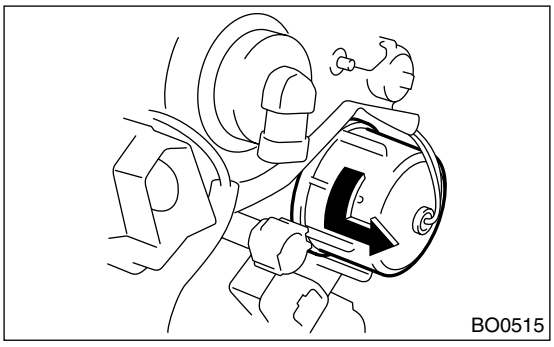
1) Disconnect the ground cable from battery.
2) Remove the duct (A) (when right side headlight is removed).



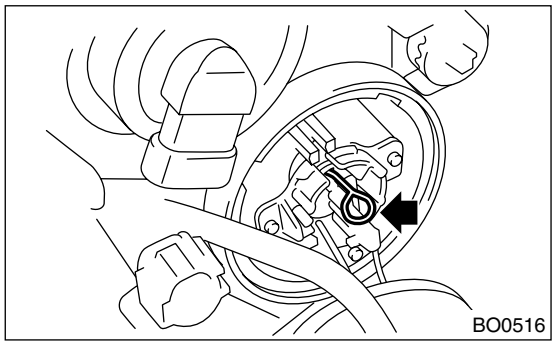
3) Disconnect the harness connector.

LOW BEAM BULB

4) Remove the bulb cover.

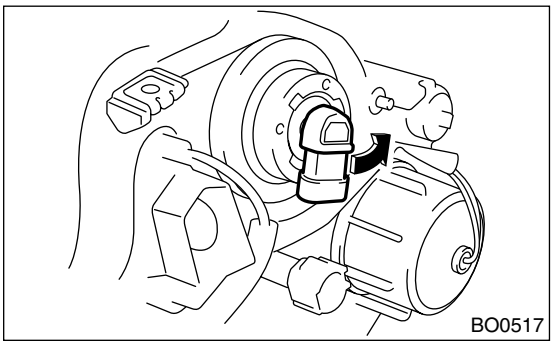


5) Remove the light bulb retaining spring to remove the bulb.



HIGH BEAM BULB

6) Remove the bulb by turning it counterclockwise.

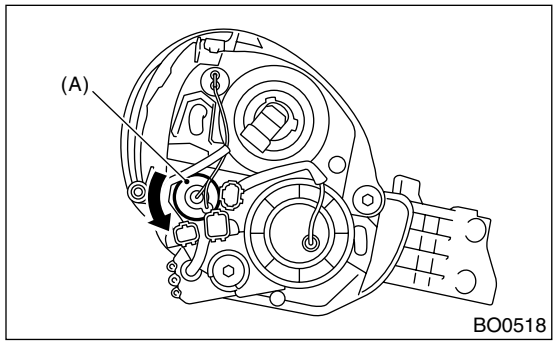


13.Front Turn Signal Light Bulb

A: REMOVAL

2. STI MODEL

1) Remove the headlight assembly. <Ref. to LI-13, REMOVAL, Headlight Assembly.>
2) Turn the socket (A) and remove the bulb.

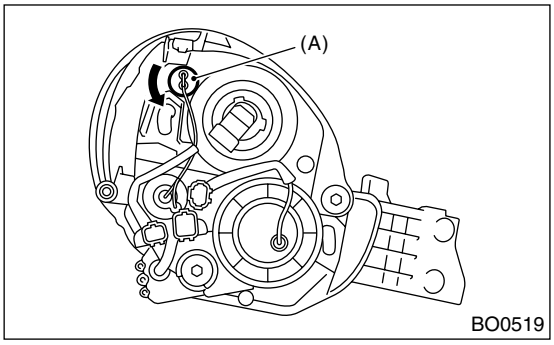


14.Clearance/Parking Light Bulb

A: REMOVAL

2. STI MODEL

1) Remove the headlight assembly. <Ref. to LI-13, REMOVAL, Headlight Assembly.>
2) Turn the socket (A) and remove the bulb.



INSTRUMENTATION/DRIVER INFO

IDI

1. General Description

A: SPECIFICATIONS

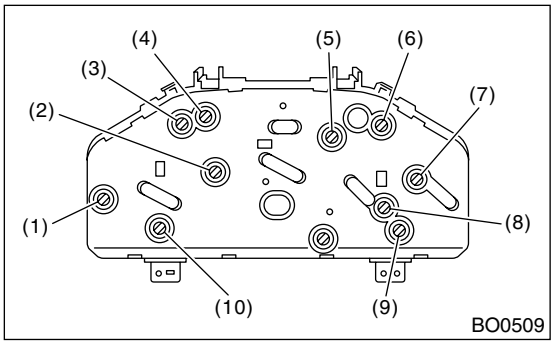
2. STI MODEL

Combination meter	Speedometer	Electric pulse type
	Temperature gauge	Thermistor cross coil type
	Fuel gauge	Resistance cross coil type
	Tachometer	Electric impulse type
	Turn signal indicator light	14 V — 1.4 W
	Charge indicator light	LED
	Oil pressure indicator light	LED
	ABS warning light	LED
	CHECK ENGINE warning light (Malfunction indicator light)	LED
	HI-beam indicator light	14 V — 1.4 W
	Door open warning light	LED
	Seat belt warning light	LED
	Brake fluid and parking brake warning light	LED
	AIRBAG warning light	LED
	Meter illumination light	14 V — 3 W, 14 V — 2 W
	Immobilizer indicator light	LED
	Low fuel warning light	LED
	LCD back light	14 V — 1.4 W
	Intercooler water spray warning light	LED
	REV indicator light	LED

3. Combination Meter Assembly

C: DISASSEMBLY

2. BULB REPLACEMENT (STI MODEL)



(1) Speedometer
(2) Speedometer and tachometer
(3) Turn RH
(4) HI-beam
(5) Tachometer
(6) Turn LH
(7) Fuel gauge
(8) Temperature gauge
(9) LCD (Outside temperature indicator)
(10) LCD (Odometer and tripmeter)

EXTERIOR/INTERIOR TRIM

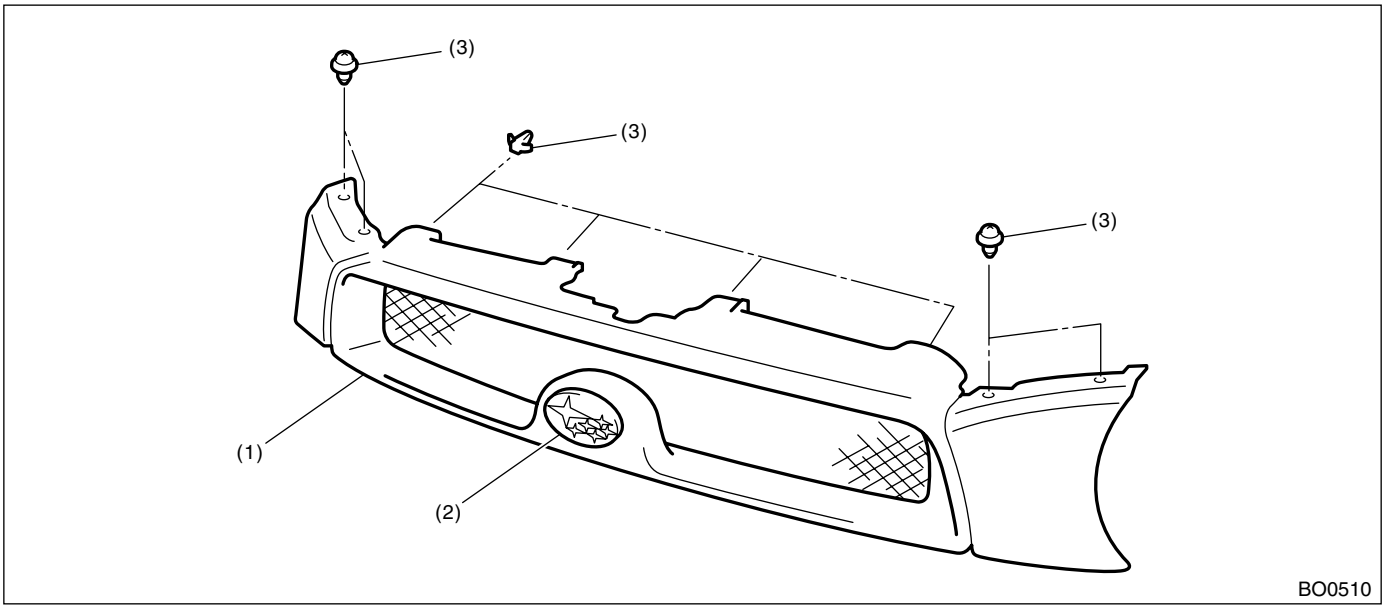
EI

1. General Description

A: COMPONENT

1. FRONT GRILLE

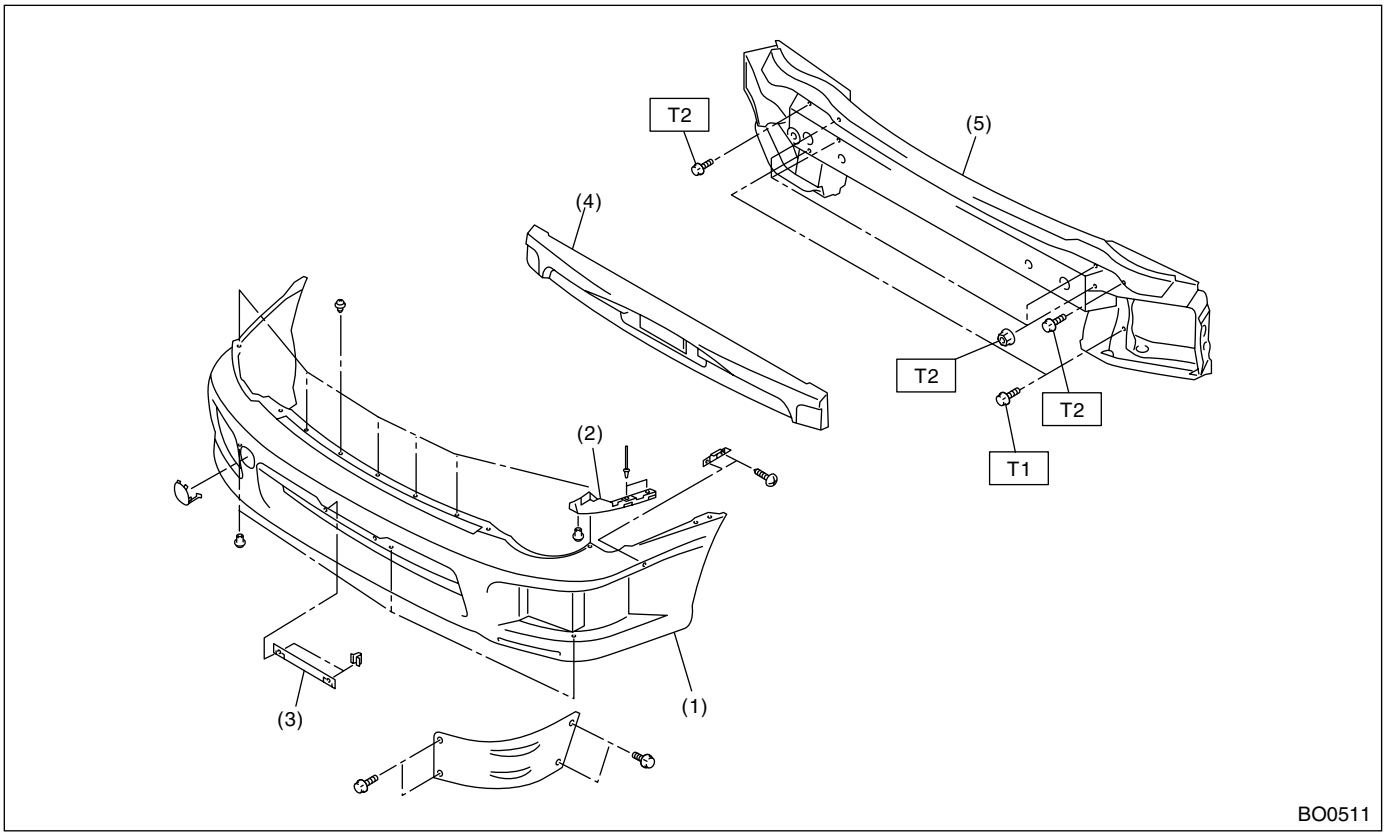
• STi model



(1) Front grille
(2) Front grille emblem
(3) Clip

4. FRONT BUMPER

• STi model

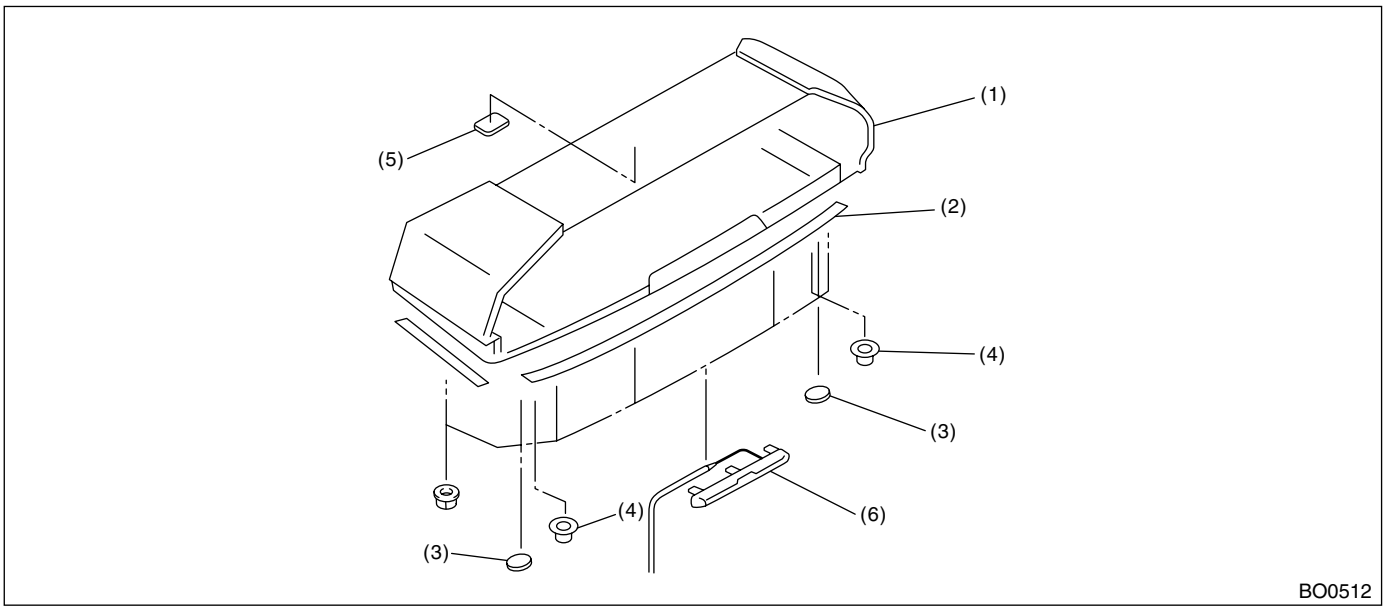


(1)	Bumper face	(4)	Bumper energy absorber
(2)	Bumper corner bracket	(5)	Bumper back beam
(3)	License plate bracket		

Tightening torque: N·m (kgf-m, ft-lb)
T1: 32 (3.3, 24)
T2: 69 (7.0, 51)

9. REAR SPOILER

• STi model



(1) Rear spoiler
(2) Protector
(3) Cap
(4) Grommet
(5) Seal (only RH side)
(6) High mount stop lamp

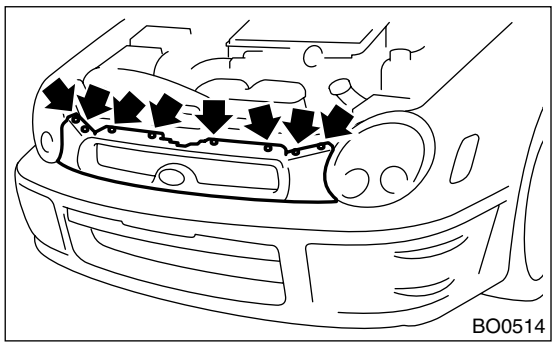
Tightening torque: N·m (kgf-m, ft-lb)
T: 7.4 (0.75, 5.46)

2. Front Grille

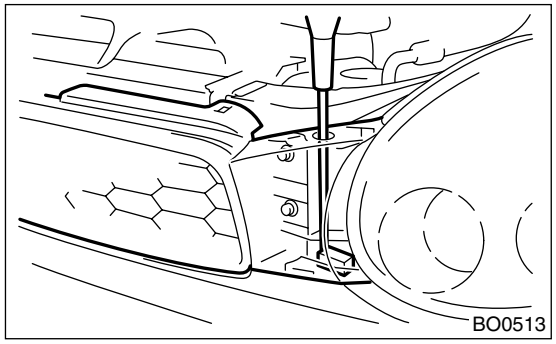
A: REMOVAL

2. STI MODEL

1) Open the hood.
2) Remove the eight clips.



3) Remove the two hooks.



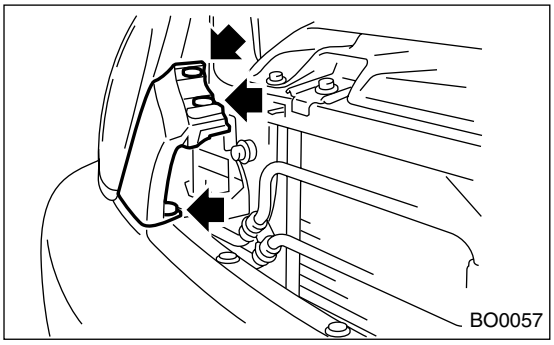
5. Front Bumper

A: REMOVAL

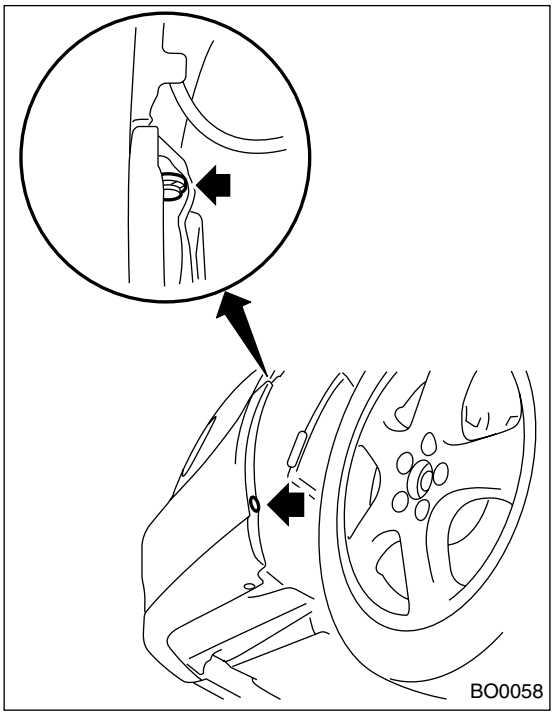
2. STI MODEL

CAUTION:
• Handle the bumper carefully to avoid damage to bumper face.
• Do not damage the body during removal or installation of bumper.
• To avoid damage to bumper, lay the removed bumper on sheet spread on the floor. Do not lay it directly on the floor.

1) Disconnect the ground cable from battery.
2) Remove the front grille. <Ref. to EI-5, REMOVAL, Front Grille.>
3) Loosen the three clips to remove the front grille side. (Except STi model)

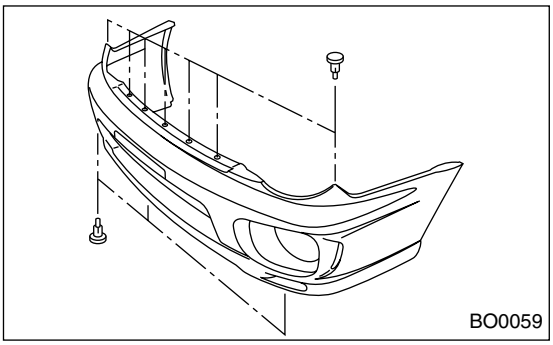

BO0057

4) Pull off the front side of front mud guard to remove clip.


BO0058

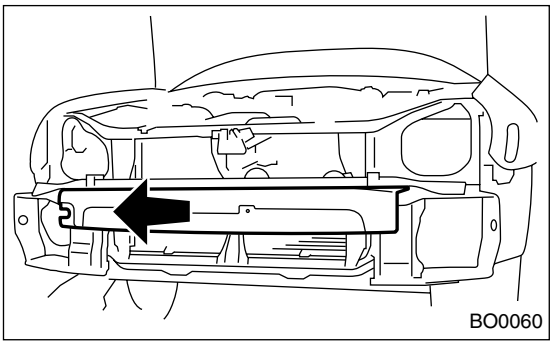
5) Remove the clips, and pull out the bumper slightly.

6) Disconnect the fog light connector to remove bumper.

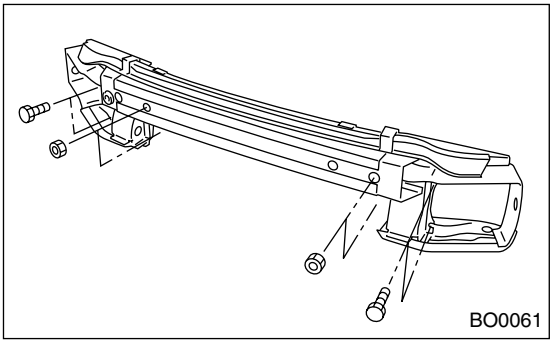

BO0059

7) Remove the E/A FORM from bumper beam.

CAUTION:
• E/A FORM may easily break. Do not apply excessive force to it during removal.


BO0060

8) Remove the bumper beam.


BO0061

WIRING SYSTEM SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD. G1841GE7

WIRING SYSTEM

WI

Page

4. Power Supply Routing

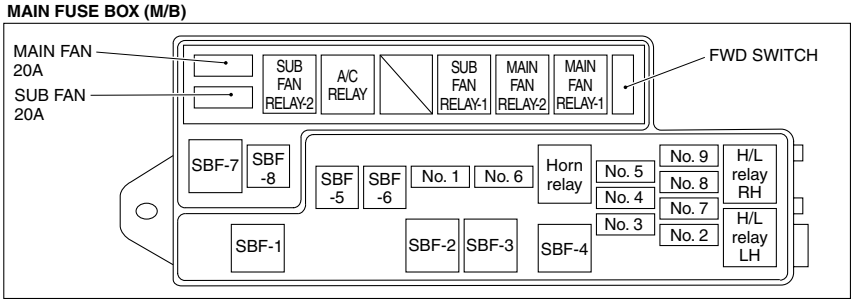
A: SCHEMATIC

1. LHD MODEL

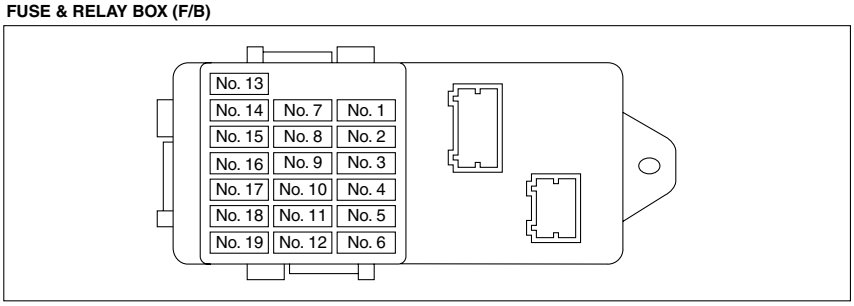
P-SUP(L)-01

P-SUP(L)-01

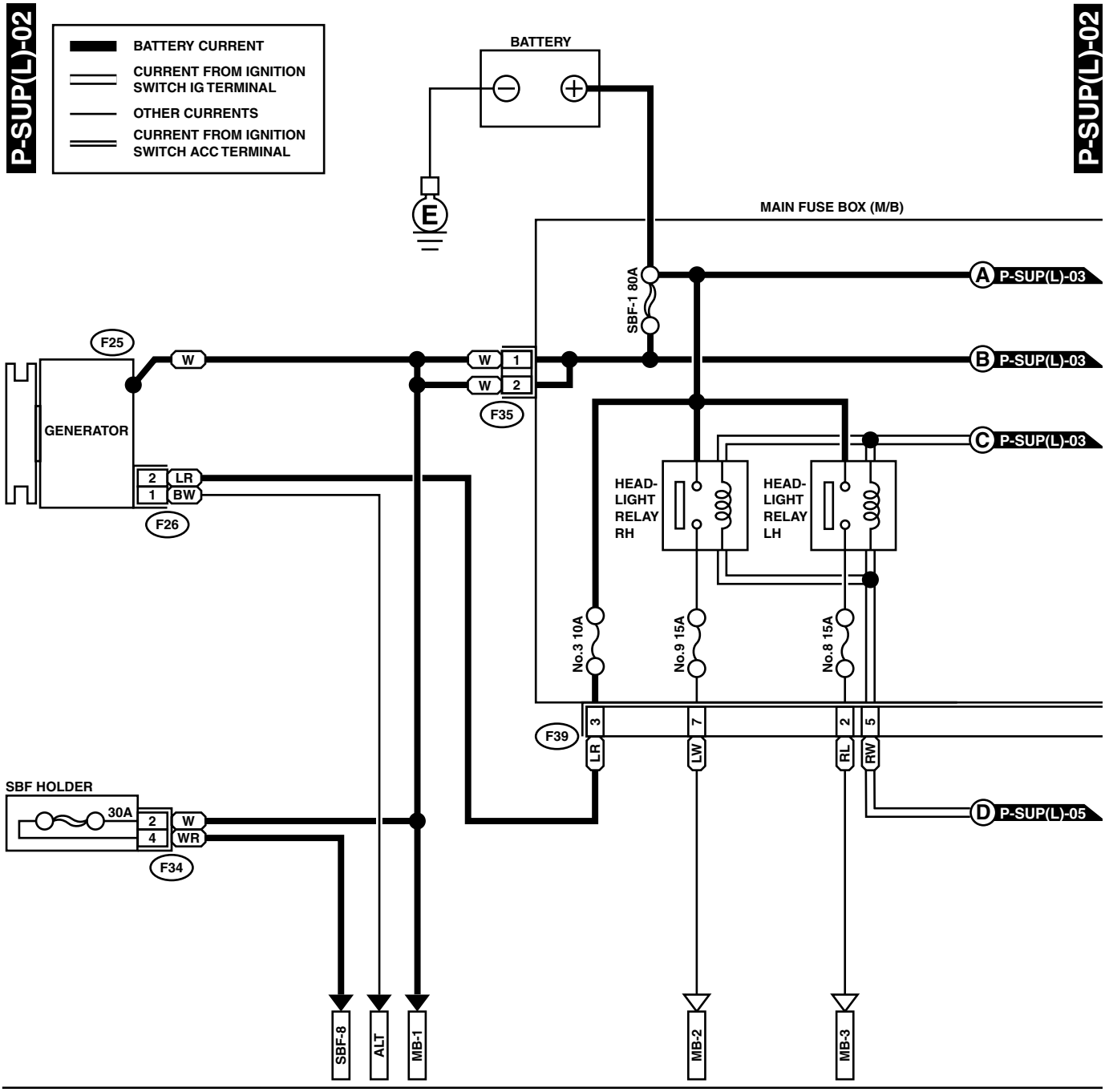
MAIN FUSE BOX (M/B)

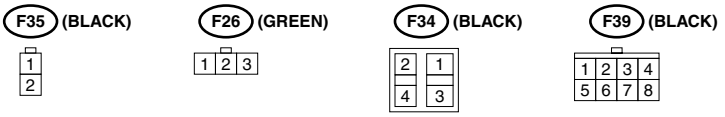


FUSE & RELAY BOX (F/B)

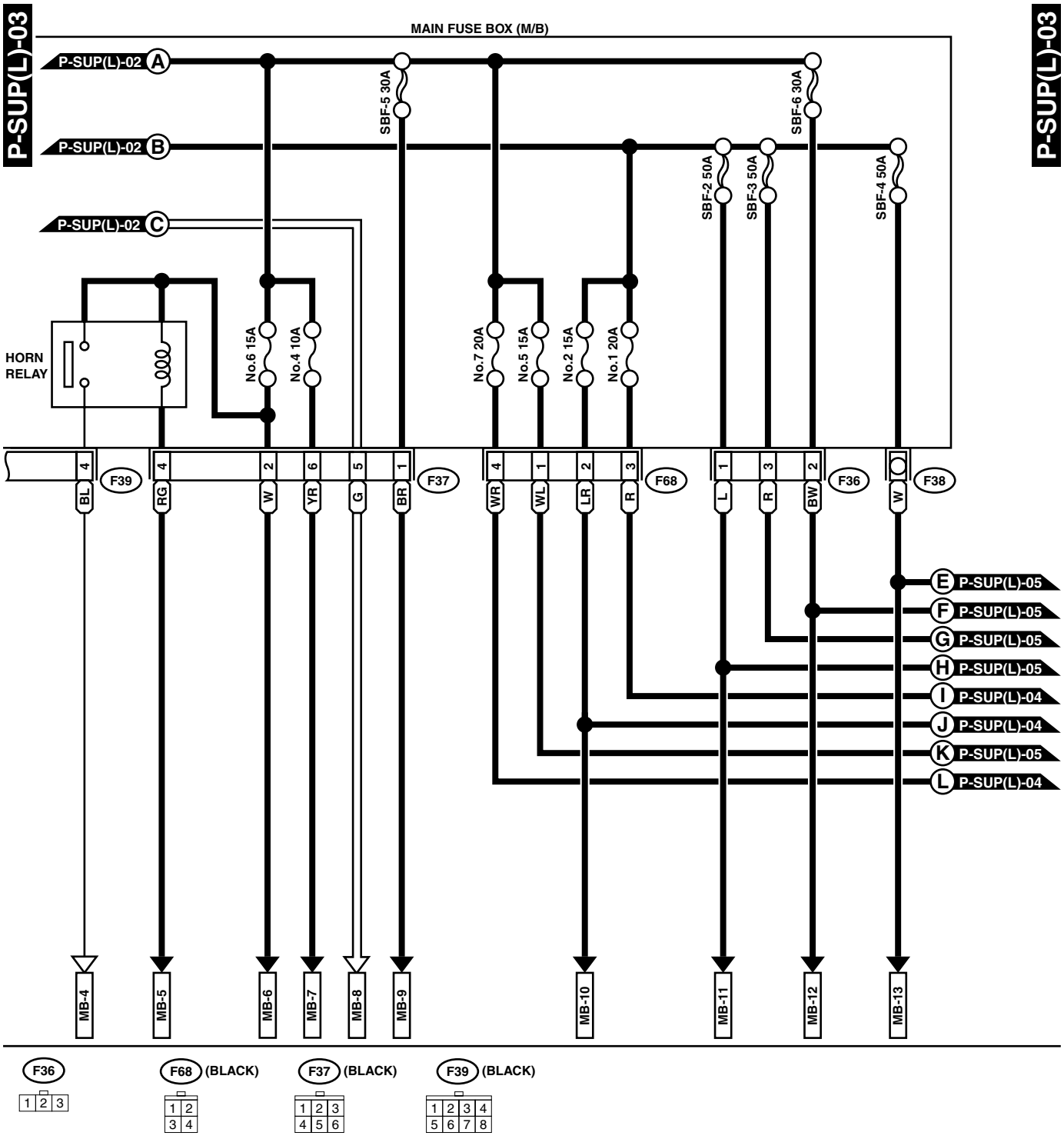


GL01-21A

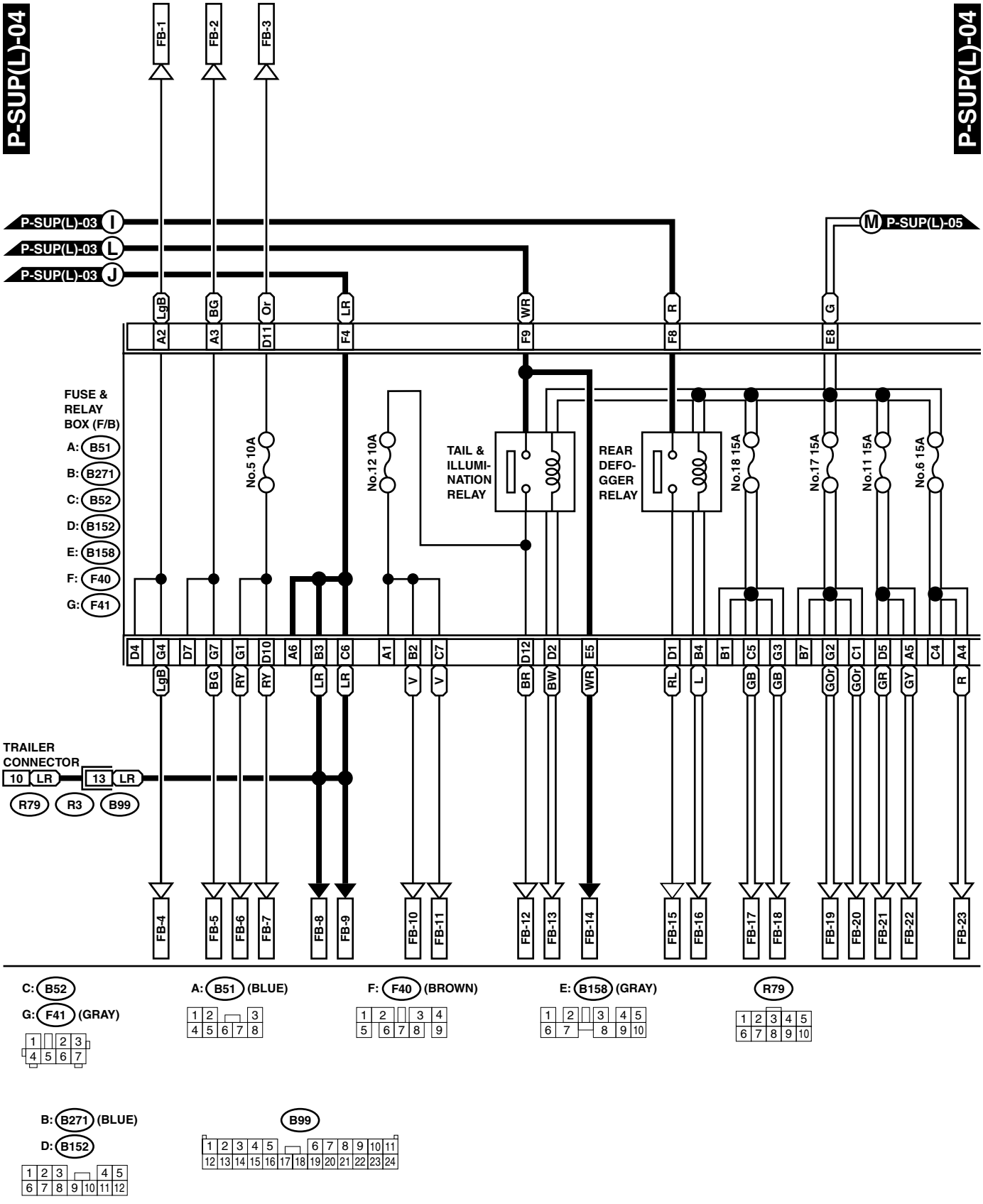

P-SUP(L)-02
BATTERY CURRENT
CURRENT FROM IGNITION SWITCH IG TERMINAL
OTHER CURRENTS
CURRENT FROM IGNITION SWITCH ACC TERMINAL
BATTERY
E
MAIN FUSE BOX (M/B)
SBF-1 80A
A P-SUP(L)-03
B P-SUP(L)-03
C P-SUP(L)-03
D P-SUP(L)-05
F25
W
GENERATOR
2 LR
1 BW
F26
W 1
W 2
F35
HEAD-LIGHT RELAY RH
HEAD-LIGHT RELAY LH
No.3 10A
No.9 15A
No.8 15A
F39
3 LR
7 LW
2 RL
5 RW
SBF HOLDER
30A
2 W
4 WR
F34
SBF-8
ALT
MB-1
MB-2
MB-3


F35 (BLACK)
F26 (GREEN)
F34 (BLACK)
F39 (BLACK)

GL01-21B

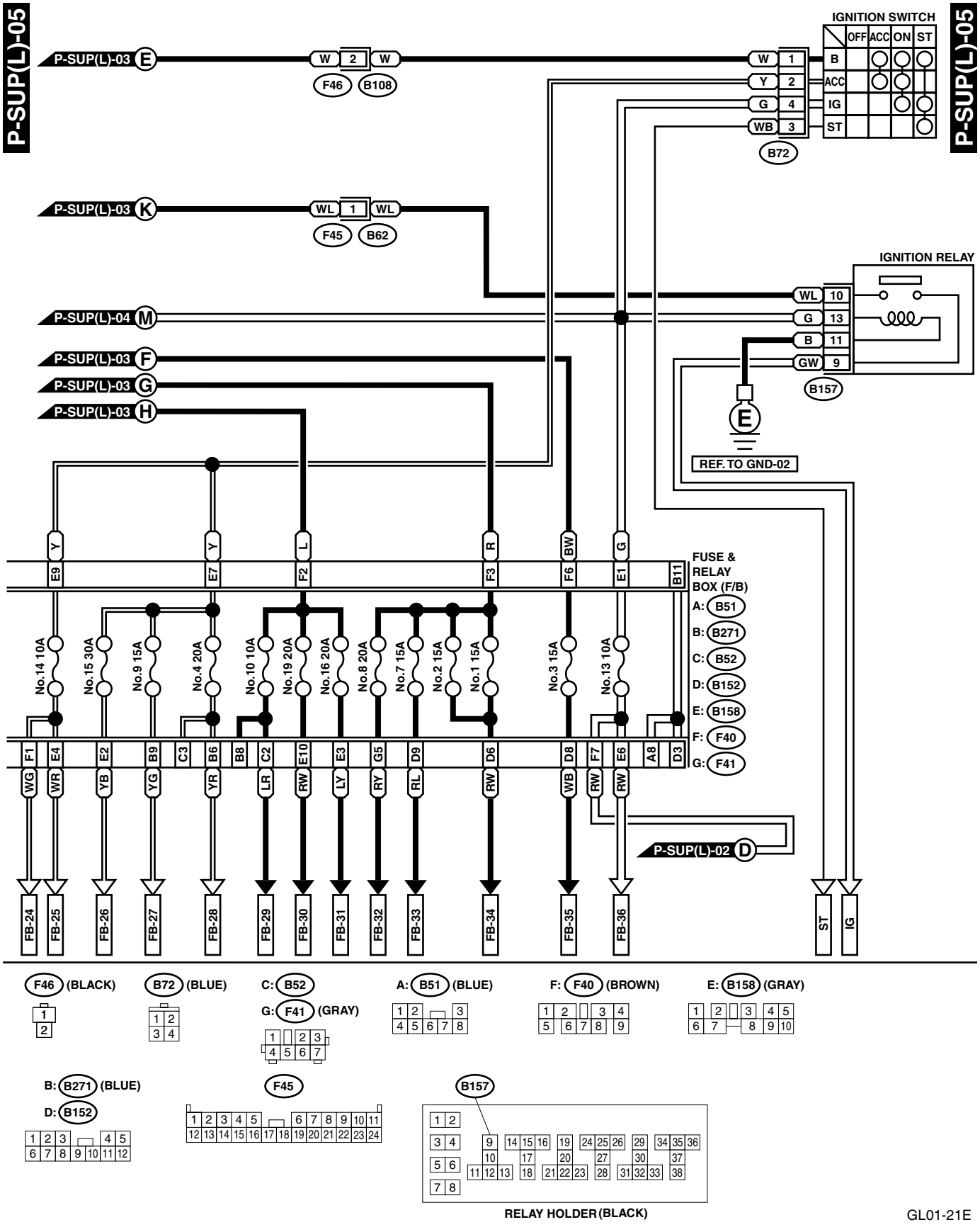

P-SUP(L)-03
P-SUP(L)-03
MAIN FUSE BOX (M/B)
P-SUP(L)-02 A
P-SUP(L)-02 B
P-SUP(L)-02 C
SBF-5 30A
SBF-6 30A
SBF-2 50A
SBF-3 50A
SBF-4 50A
HORN RELAY
No.6 15A
No.4 10A
No.7 20A
No.5 15A
No.2 15A
No.1 20A
F39
F37
F68
F36
F38
BL
RG
W
YR
G
BR
WR
WL
LR
R
L
R
BW
W
E P-SUP(L)-05
F P-SUP(L)-05
G P-SUP(L)-05
H P-SUP(L)-05
I P-SUP(L)-04
J P-SUP(L)-04
K P-SUP(L)-05
L P-SUP(L)-04
MB-4
MB-5
MB-6
MB-7
MB-8
MB-9
MB-10
MB-11
MB-12
MB-13
F36
F68 (BLACK)
F37 (BLACK)
F39 (BLACK)

GL01-21C


P-SUP(L)-04
P-SUP(L)-04
FB-1
FB-2
FB-3
P-SUP(L)-03 I
P-SUP(L)-03 L
P-SUP(L)-03 J
M P-SUP(L)-05
LgB
BG
Or
LR
WR
R
G
A2
A3
D11
F4
F9
F8
E8
FUSE & RELAY BOX (F/B)
A: B51
B: B271
C: B52
D: B152
E: B158
F: F40
G: F41
No.5 10A
No.12 10A
TAIL & ILLUMI-NATION RELAY
REAR DEFO-GGER RELAY
No.18 15A
No.17 15A
No.11 15A
No.6 15A
D4 G4 D7 G7 G1 D10 A6 B3 C6 A1 B2 C7 D12 D2 E5 D1 B4 B1 C5 G3 B7 G2 C1 D5 A5 C4 A4
LgB BG RY RY LR LR V V BR BW WR RL L GB GB GOr GOr GR GY R
TRAILER CONNECTOR
10 LR
13 LR
R79 R3 B99
FB-4 FB-5 FB-6 FB-7 FB-8 FB-9 FB-10 FB-11 FB-12 FB-13 FB-14 FB-15 FB-16 FB-17 FB-18 FB-19 FB-20 FB-21 FB-22 FB-23
C: B52
G: F41 (GRAY)
A: B51 (BLUE)
F: F40 (BROWN)
E: B158 (GRAY)
R79
B: B271 (BLUE)
D: B152
B99

GL01-21D

POWER SUPPLY ROUTING



GL01-21E

No.	Load
MB-1	Air conditioning relay holder
MB-2	Combination meter Headlight RH
MB-3	Headlight LH
MB-4	Horn
MB-5	Cruise control sub switch Horn switch
MB-6	Hazard switch Key warning switch
MB-7	Transmission control module
MB-8	Diode (With rear fog light model) Lighting switch
MB-9	Data link connector Engine control module Fuel pump relay Immobilizer control module Main relay
MB-12	Power window circuit breaker
MB-13	Relay holder
SBF-8	ABS control module
IG	Hazard switch Power window relay
ST	Engine control module Inhibitor switch (AT) Starter motor (MT)
FB-1	Hazard switch Rear turn signal light RH Trailer connector Turn signal switch
FB-2	Hazard switch Rear turn signal light LH Trailer connector Turn signal switch
FB-3	Parking switch
FB-4	Front turn signal light RH Side turn signal light RH
FB-5	Front turn signal light LH Side turn signal light LH
FB-6	Front clearance light LH Front clearance light RH Headlight leveler LH (Except STi) Headlight leveler RH (Except STi)
FB-7	License plate light Tail light LH Tail light RH Trailer connector
FB-8 FB-9	Auto A/C control module Combination meter Door lock timer Keyless entry control module Luggage room light (Wagon) Radio Room light Spot light Trunk room light (Sedan)

No.	Load
FB-10 FB-11	Bright switch Combination meter Front fog light relay Front fog light switch Headlight leveling switch Illumination light Rear fog light relay Rear fog light switch Intercooler water spray switch (STi)
FB-12	Parking switch
FB-13	Engine control module Lighting switch
FB-14	Parking switch
FB-15	Mirror heater relay Rear defogger Rear defogger switch
FB-16	Engine control module Rear defogger timer
FB-17	ABS relay Back-up light switch (MT) Check connector Cruise control actuator Cruise control main switch Cruise control module Inhibitor switch (AT) Seat belt timer Vehicle speed sensor (MT)
FB-18	Main relay Headlight leveler LH (STi) Headlight leveler RH (STi)
FB-19	Air conditioning relay Sub fan relay Thermal protector
FB-20	AUTO A/C control module Blower motor relay Rear defogger timer Manual A/C switch
FB-21	Engine control module Fuel pump relay Ignition coil and ignitor Immobilizer control module Transmission control module
FB-22	Airbag control module
FB-23	Airbag control module
FB-24	Rear washer motor
FB-25	Rear wiper intermittent module Rear wiper motor
FB-26	Front washer motor Front wiper motor Front wiper switch
FB-27	Auto A/C control module Radio
FB-28	Front accessory power supply socket Remote controlled rearview mirror switch Intercooler water spray timer (STi) Intercooler water spray switch (STi)
FB-29	Rear fog light relay

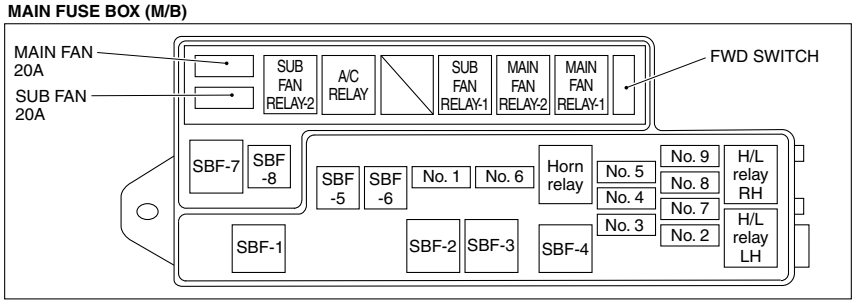
No.	Load
FB-30	Mirror heater relay
FB-31	Stop light switch
FB-32	ABS control module
FB-33	Front fog light relay
FB-34	Blower motor relay
FB-35	Door lock timer Keyless entry control module
FB-36	Combination meter

2. RHD MODEL

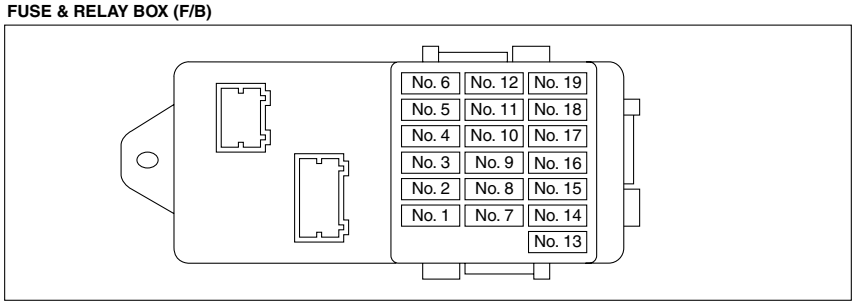
P-SUP(R)-01

P-SUP(R)-01

MAIN FUSE BOX (M/B)

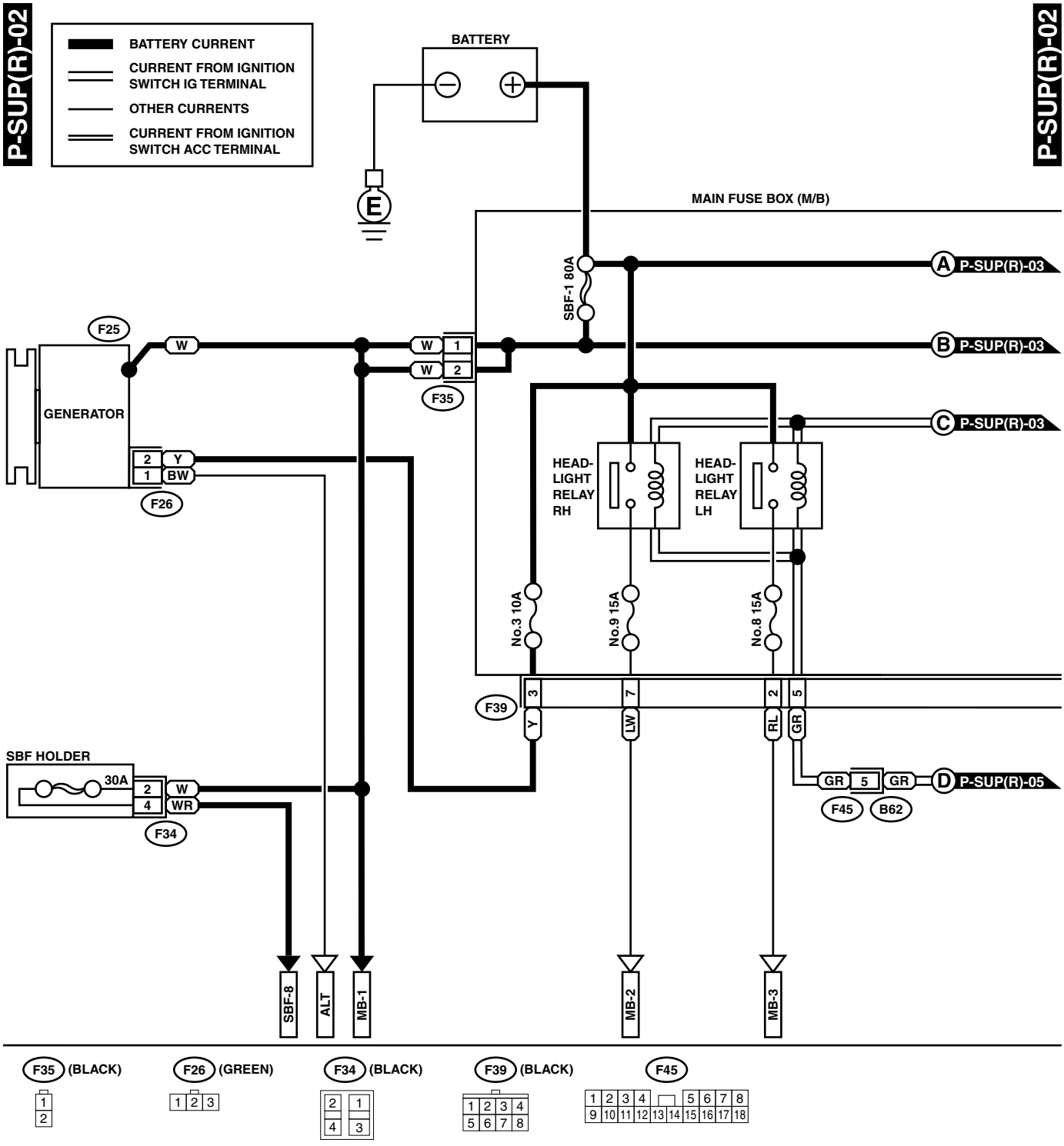


FUSE & RELAY BOX (F/B)

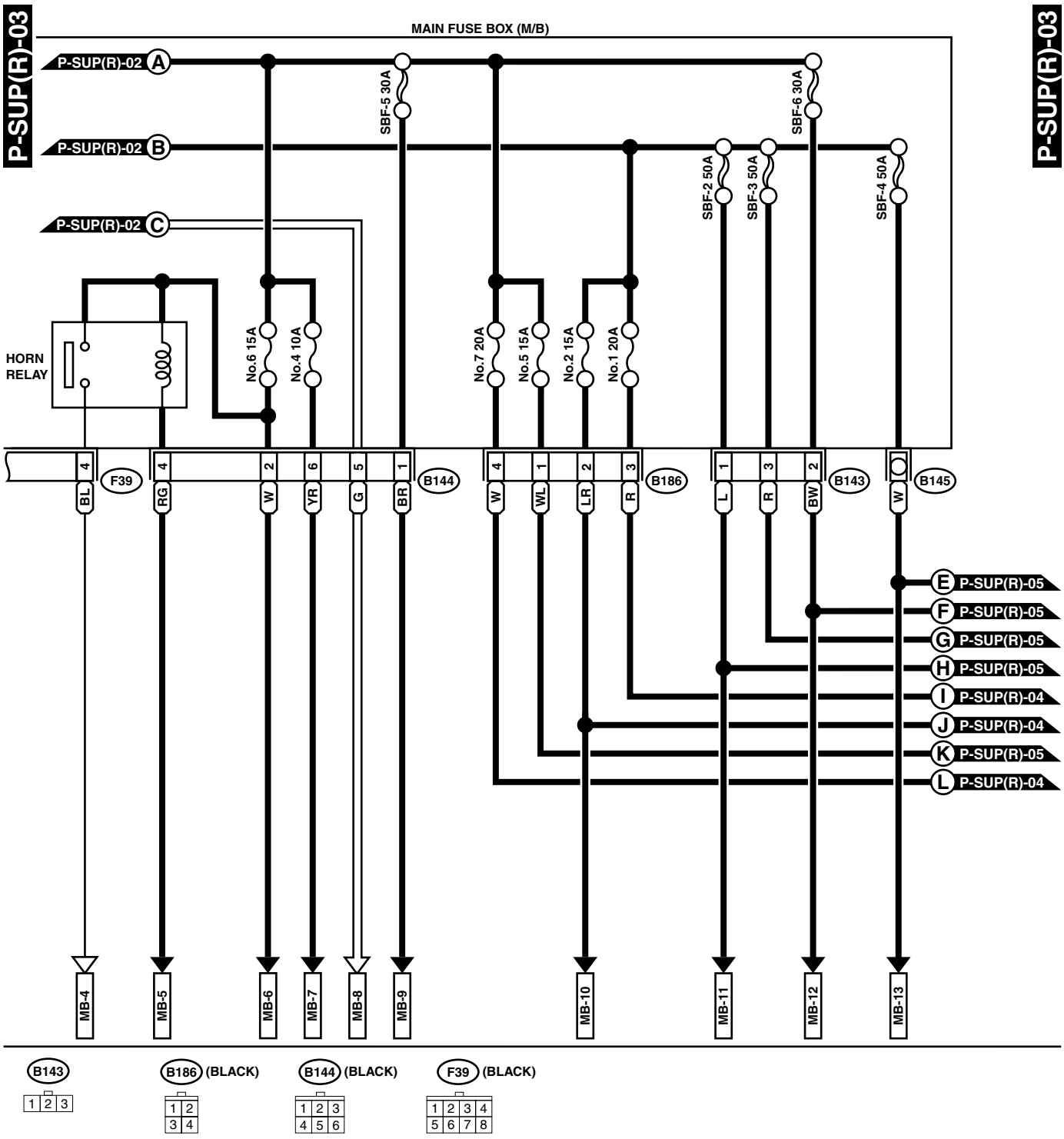


GR01-21A

POWER SUPPLY ROUTING

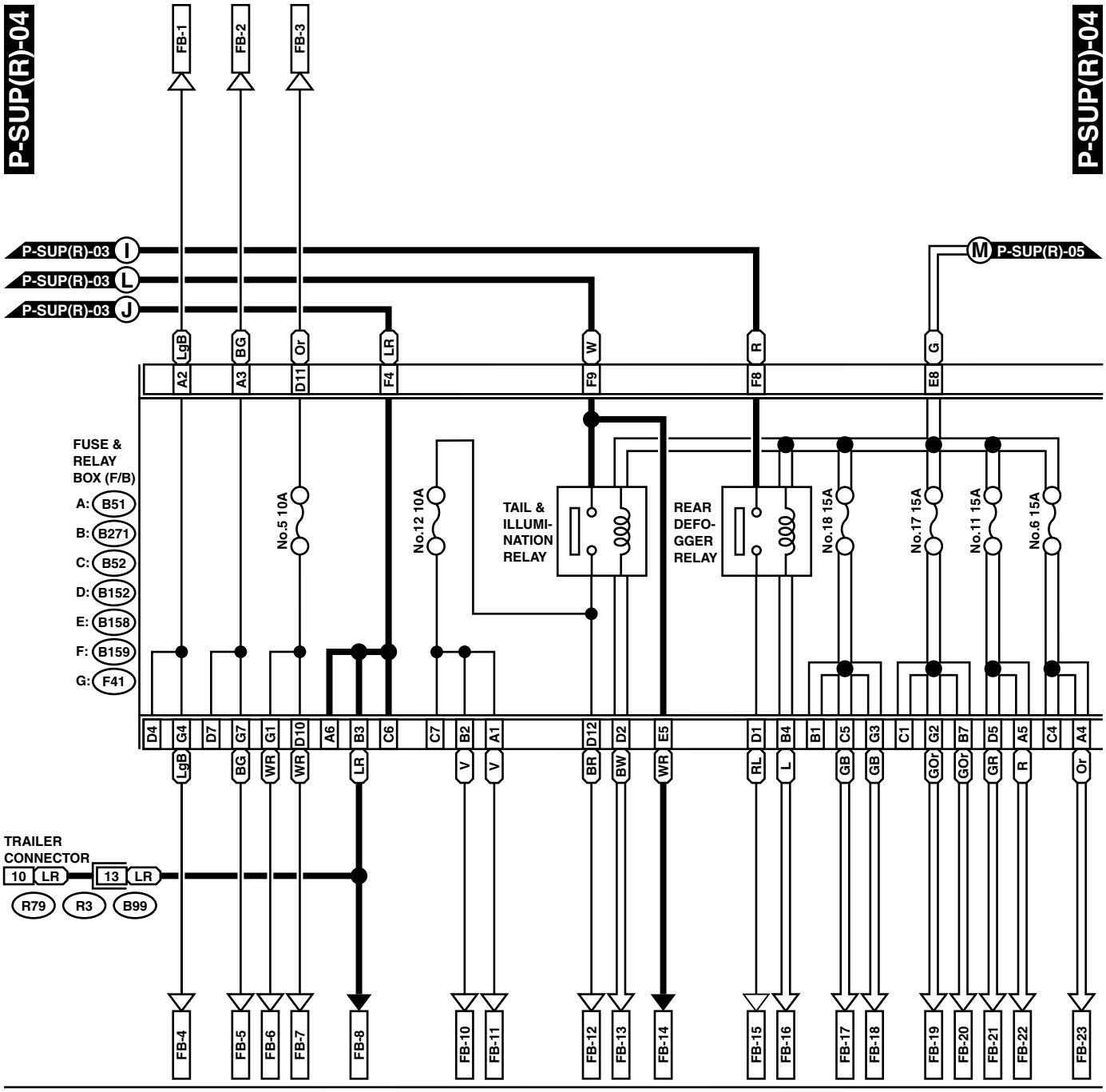


GR01-21B

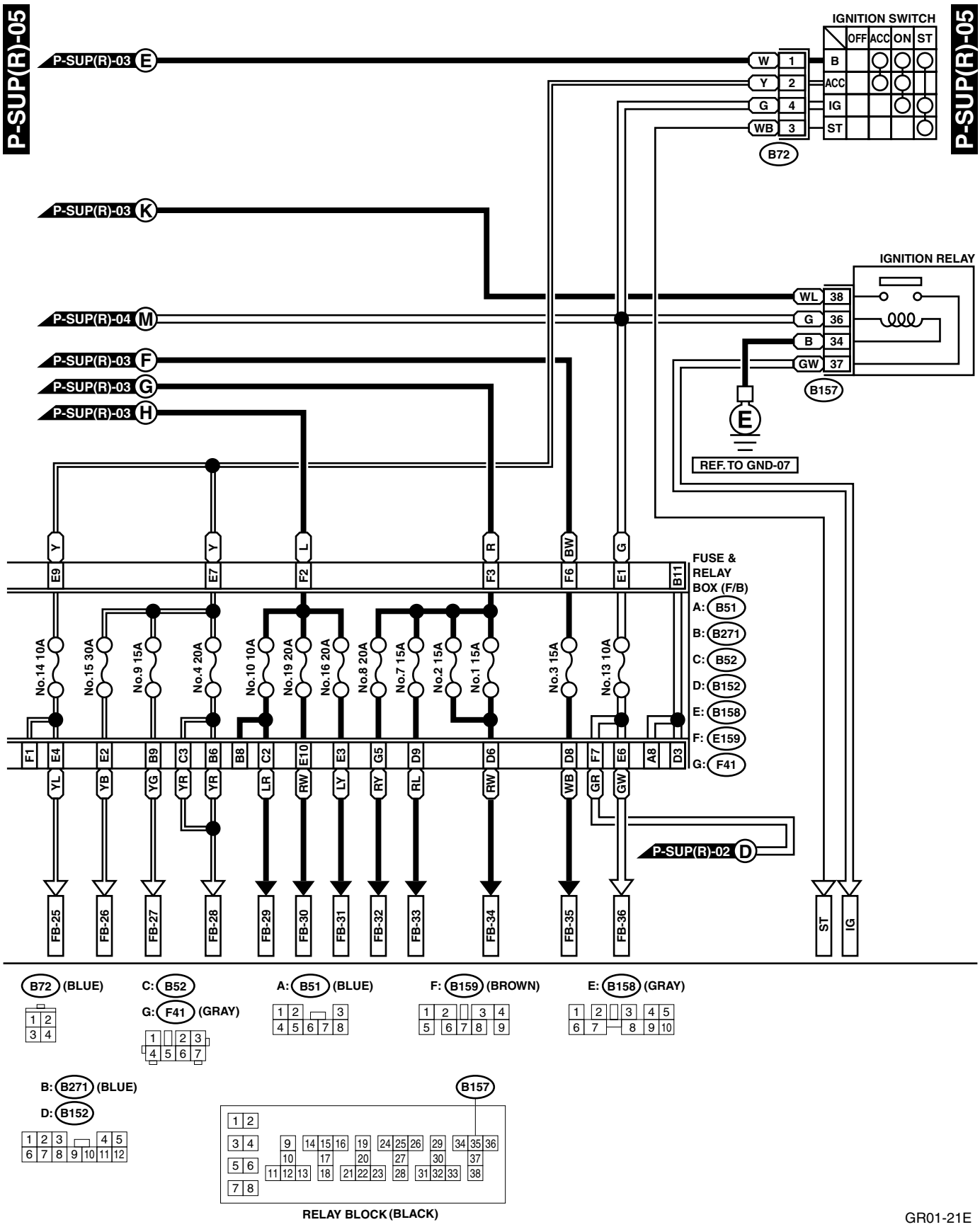

P-SUP(R)-03
P-SUP(R)-03
MAIN FUSE BOX (M/B)
P-SUP(R)-02 A
P-SUP(R)-02 B
P-SUP(R)-02 C
SBF-5 30A
SBF-6 30A
SBF-2 50A
SBF-3 50A
SBF-4 50A
HORN RELAY
No.6 15A
No.4 10A
No.7 20A
No.5 15A
No.2 15A
No.1 20A
F39
B144
B186
B143
B145
BL
RG
W
YR
G
BR
WL
LR
R
L
BW
E P-SUP(R)-05
F P-SUP(R)-05
G P-SUP(R)-05
H P-SUP(R)-05
I P-SUP(R)-04
J P-SUP(R)-04
K P-SUP(R)-05
L P-SUP(R)-04
MB-4
MB-5
MB-6
MB-7
MB-8
MB-9
MB-10
MB-11
MB-12
MB-13
B143
B186 (BLACK)
B144 (BLACK)
F39 (BLACK)

GR01-21C

POWER SUPPLY ROUTING



GR01-21D


P-SUP(R)-05
P-SUP(R)-05
P-SUP(R)-03 E
P-SUP(R)-03 K
P-SUP(R)-04 M
P-SUP(R)-03 F
P-SUP(R)-03 G
P-SUP(R)-03 H
IGNITION SWITCH
OFF ACC ON ST
B
ACC
IG
ST
W 1
Y 2
G 4
WB 3
B72
IGNITION RELAY
WL 38
G 36
B 34
GW 37
B157
E
REF. TO GND-07
Y E9
Y E7
L F2
R F3
BW F6
G E1
B11
FUSE & RELAY BOX (F/B)
A: B51
B: B271
C: B52
D: B152
E: B158
F: E159
G: F41
No.14 10A
No.15 30A
No.9 15A
No.4 20A
No.10 10A
No.19 20A
No.16 20A
No.8 20A
No.7 15A
No.2 15A
No.1 15A
No.3 15A
No.13 10A
F1 E4 YL
E2 YB
B9 YG
C3 YR
B6 YR
B8
C2 LR
E10 RW
E3 LY
G5 RY
D9 RL
D6 RW
D8 WB
F7 GR
E6 GW
A8
D3
P-SUP(R)-02 D
FB-25
FB-26
FB-27
FB-28
FB-29
FB-30
FB-31
FB-32
FB-33
FB-34
FB-35
FB-36
ST
IG
B72 (BLUE)
C: B52
G: F41 (GRAY)
A: B51 (BLUE)
F: B159 (BROWN)
E: B158 (GRAY)
B: B271 (BLUE)
D: B152
B157
RELAY BLOCK (BLACK)

GR01-21E

No.	Load
MB-1	Air conditioning relay holder
MB-2	Combination meter Headlight RH
MB-3	Headlight LH
MB-4	Horn
MB-5	Cruise control sub switch Horn switch
MB-6	Hazard swtich Keyless entry control module Key warning switch
MB-7	Transmission control module
MB-8	Diode (With rear fog light model) Lighting switch
MB-9	Data link connector Engine control module Fuel pump relay Immobilizer control module Main relay
MB-10	Auto A/C Control module Combination meter Door lock timer Keyless entry control module Luggage room light (Wagon) Radio Room light Spot light Trunk room light (Sedan)
MB-12	Power window circuit breaker
MB-13	Relay holder
SBF-8	ABS control module
IG	Hazard switch
ST	Engine control module Inhibitor switch (AT) Starter motor (MT)
FB-1	Hazard switch Rear turn signal light RH Trailer connector Turn signal switch
FB-2	Hazard switch Rear turn signal light LH Side turn signal light LH Trailer connector Turn signal switch
FB-3	Parking switch
FB-4	Front turn signal light RH Side turn signal light RH
FB-5	Front turn signal light LH
FB-6	Front clearance light LH Front clearance light RH Headlight leveler LH (Except STi) Headlight leveler RH (Except STi)
FB-7	License plate light Tail light LH Tail light RH Trailer connector

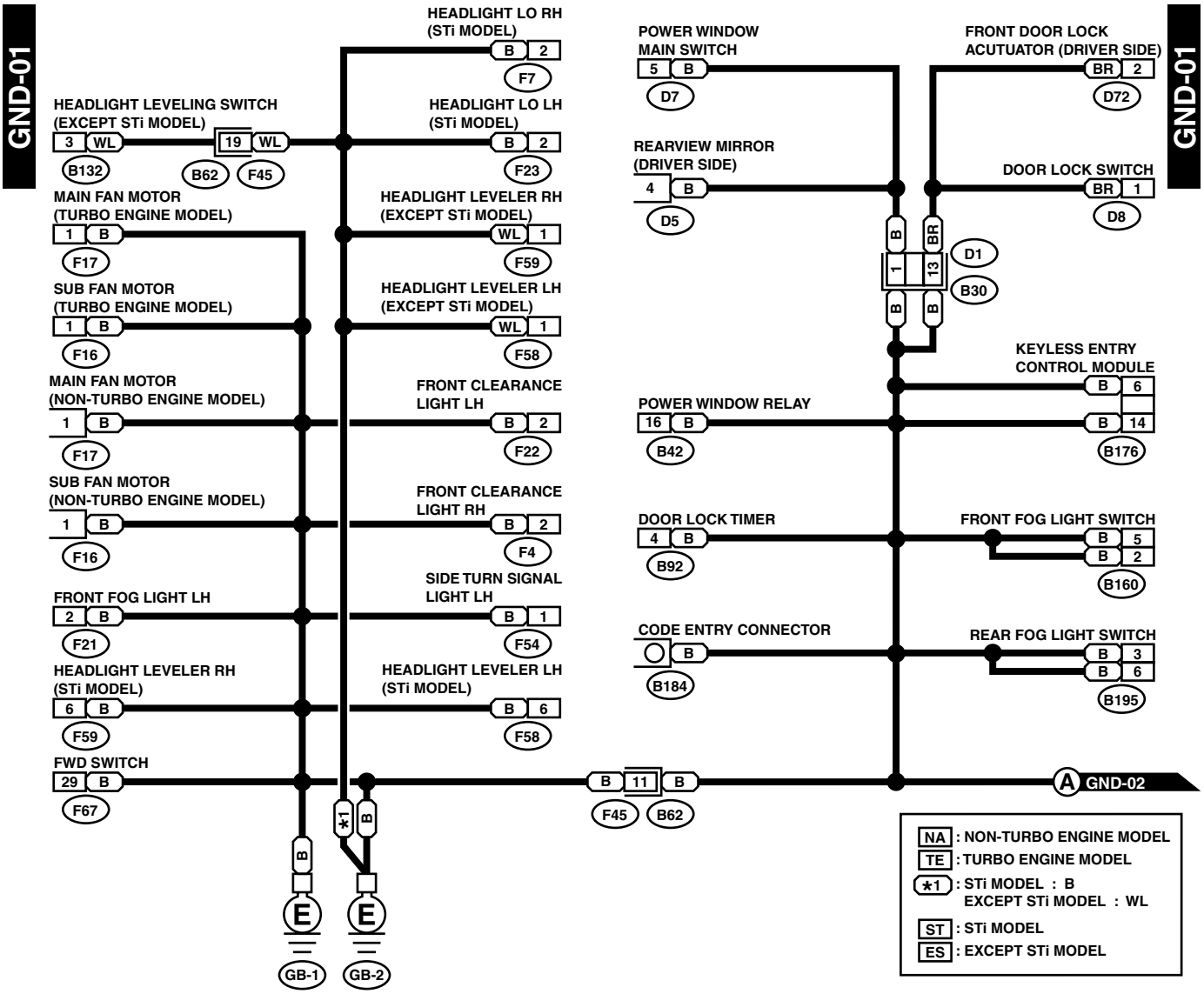
No.	Load
FB-10 FB-11	Bright switch Combination meter Front fog light relay Front fog light switch Headlight leveling switch Illumination control module Illumination light Rear fog light relay Rear fog light switch Intercooler water spray switch (STi)
FB-12	Parking switch
FB-13	Engine control module Lighting switch
FB-14	Parking switch
FB-15	Mirror heater relay Rear defogger Rear defogger switch
FB-16	Engine control module Rear defogger timer
FB-17	ABS relay Back-up light switch (MT) Check connector Cruise control actuator Cruise control main switch Cruise control module Inhibitor switch (AT) Power window relay Rear defogger timer Vehicle speed sensor (MT)
FB-18	Main relay Headlight leveler LH (STi) Headlight leveler RH (STi)
FB-19	Air conditioning relay Pressure switch Sub fan relay
FB-20	AUTO A/C control module Blower motor relay Manual A/C switch
FB-21	Engine control module Fuel pump relay Ignition coil and ignitor Immobilizer control module Transmission control module
FB-22	Airbag control module
FB-23	Airbag control module
FB-25	Rear washer motor Rear wiper intermittent module Rear wiper motor
FB-26	Front washer motor Front wiper motor Front wiper switch
FB-27	Auto A/C control module Radio
FB-28	Front accessory power supply socket Remote controlled rearview mirror switch Intercooler water spray timer (STi) Intercooler water spray switch (STi)
FB-29	Rear fog light relay

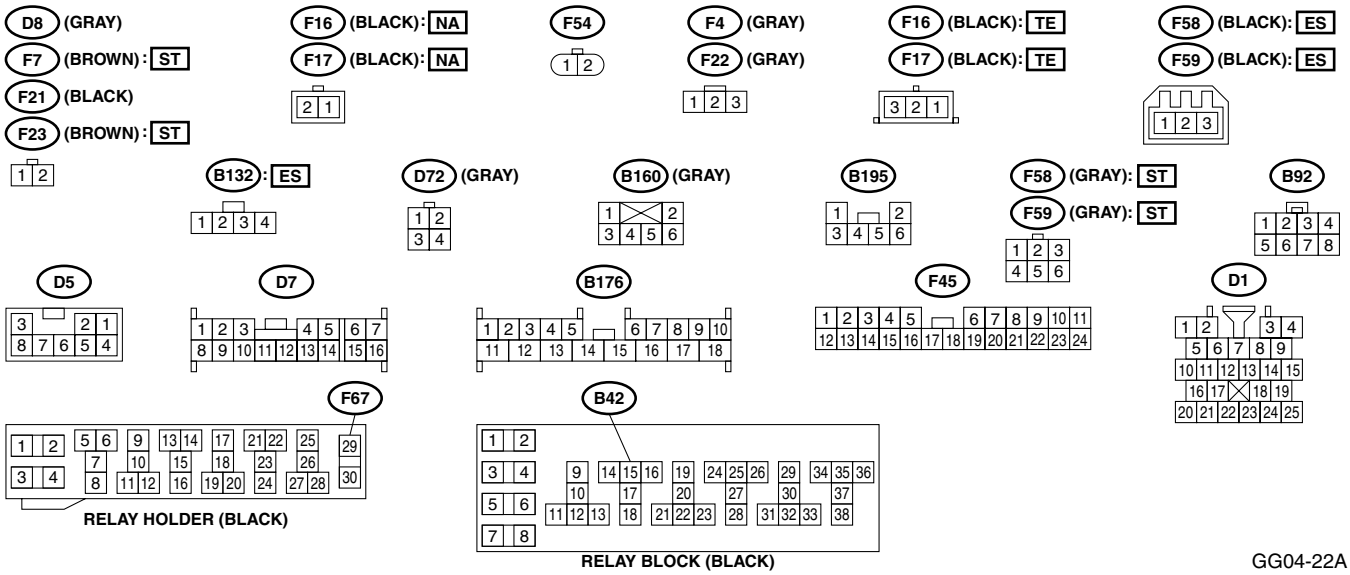
No.	Load
FB-30	Mirror heater relay
FB-31	Stop light switch
FB-32	ABS control module
FB-33	Front fog light relay
FB-34	Blower motor relay
FB-35	Door lock timer Keyless entry control module
FB-36	Combination meter

5. Ground Distribution

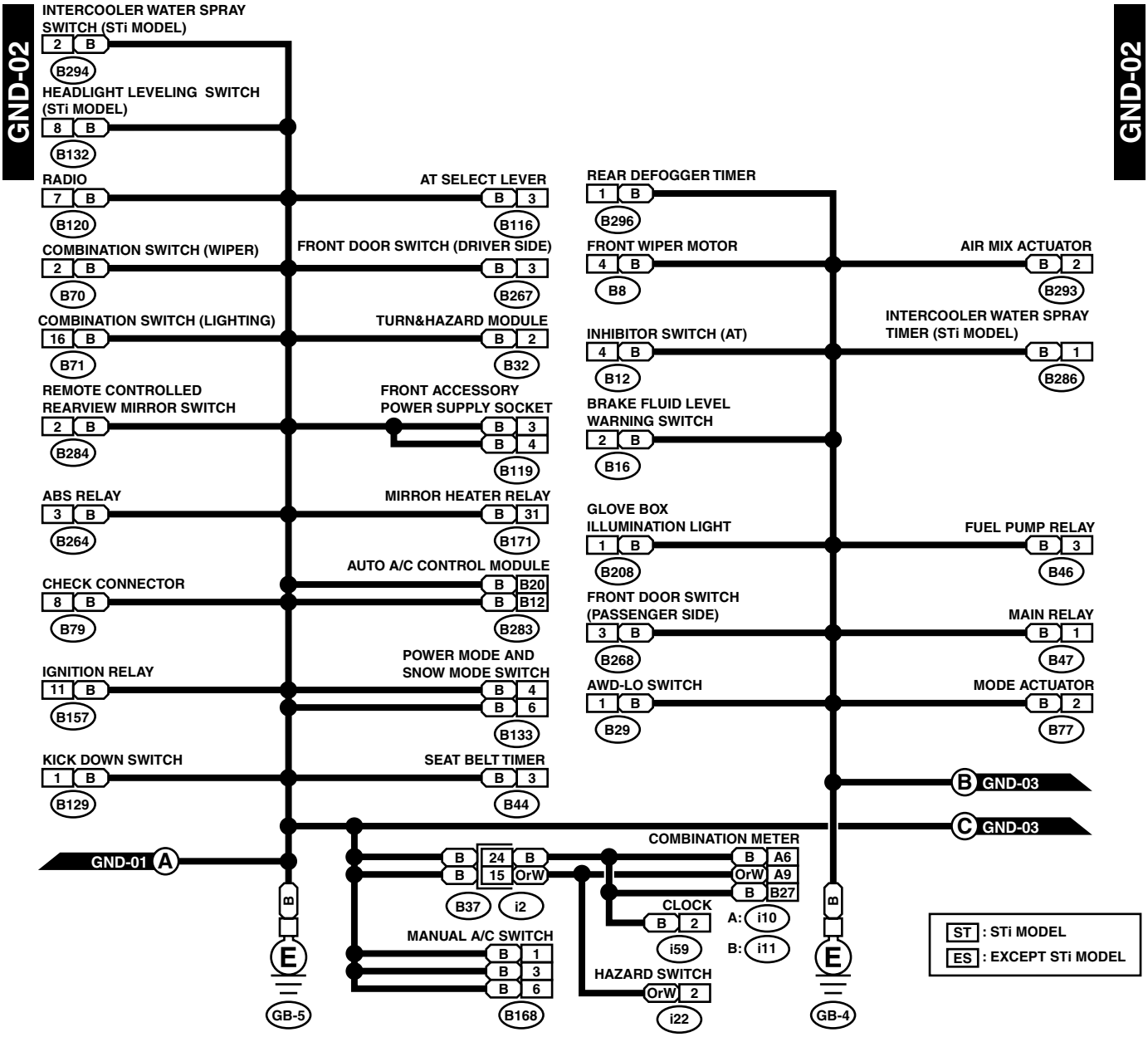
A: SCHEMATIC

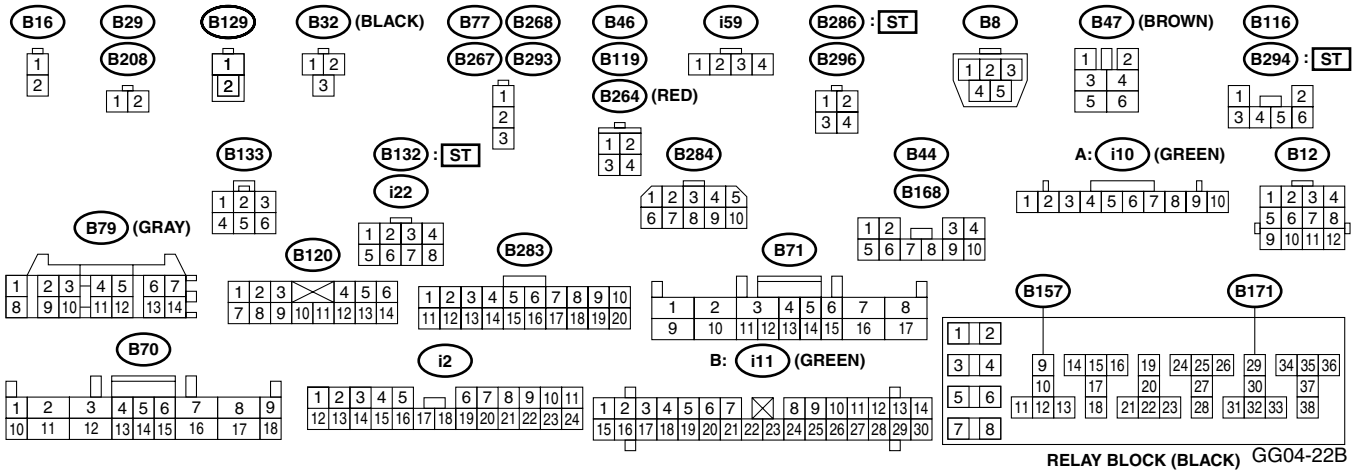
1. LHD MODEL (GENERAL)

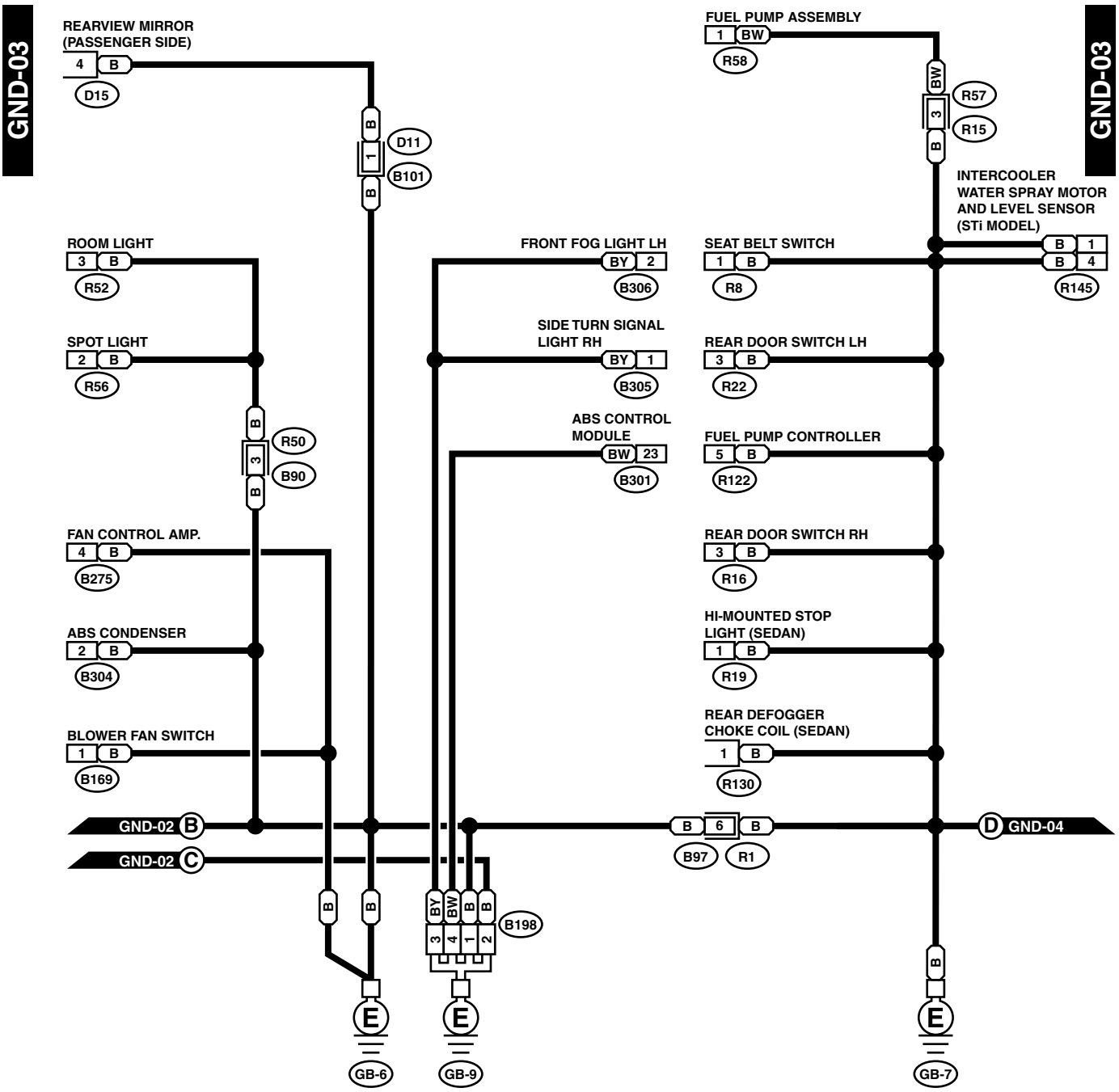


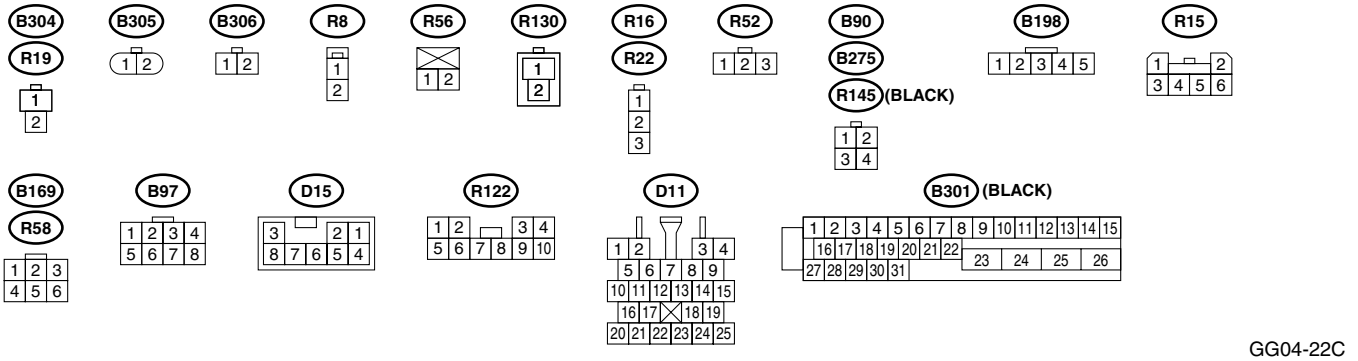


GG04-22A

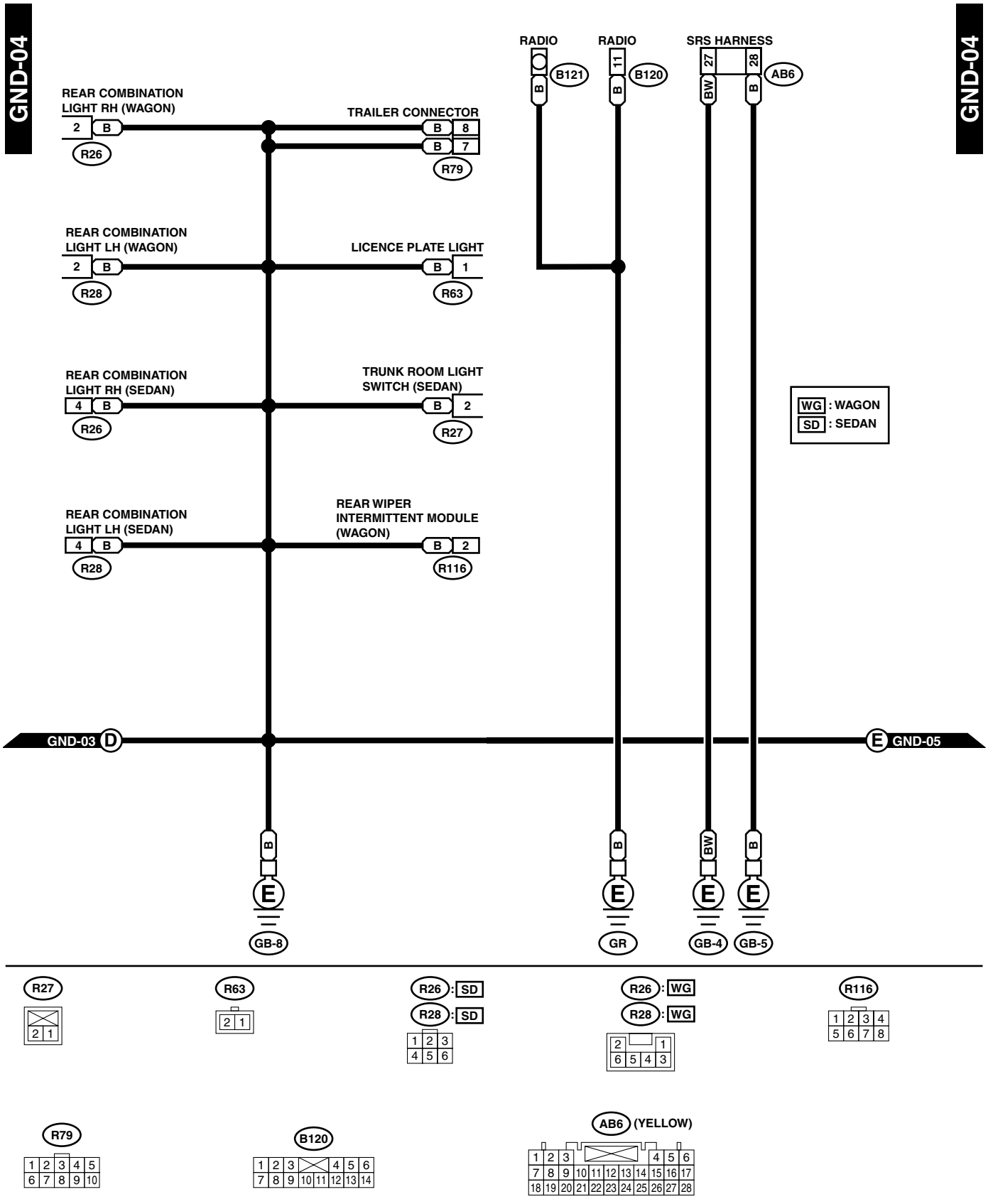

GND-02
GND-02
INTERCOOLER WATER SPRAY SWITCH (STi MODEL)
2 B
B294
HEADLIGHT LEVELING SWITCH (STi MODEL)
8 B
B132
RADIO
7 B
B120
COMBINATION SWITCH (WIPER)
2 B
B70
COMBINATION SWITCH (LIGHTING)
16 B
B71
REMOTE CONTROLLED REARVIEW MIRROR SWITCH
2 B
B284
ABS RELAY
3 B
B264
CHECK CONNECTOR
8 B
B79
IGNITION RELAY
11 B
B157
KICK DOWN SWITCH
1 B
B129
AT SELECT LEVER
B 3
B116
FRONT DOOR SWITCH (DRIVER SIDE)
B 3
B267
TURN&HAZARD MODULE
B 2
B32
FRONT ACCESSORY POWER SUPPLY SOCKET
B 3
B 4
B119
MIRROR HEATER RELAY
B 31
B171
AUTO A/C CONTROL MODULE
B B20
B B12
B283
POWER MODE AND SNOW MODE SWITCH
B 4
B 6
B133
SEAT BELT TIMER
B 3
B44
REAR DEFOGGER TIMER
1 B
B296
FRONT WIPER MOTOR
4 B
B8
INHIBITOR SWITCH (AT)
4 B
B12
BRAKE FLUID LEVEL WARNING SWITCH
2 B
B16
GLOVE BOX ILLUMINATION LIGHT
1 B
B208
FRONT DOOR SWITCH (PASSENGER SIDE)
3 B
B268
AWD-LO SWITCH
1 B
B29
AIR MIX ACTUATOR
B 2
B293
INTERCOOLER WATER SPRAY TIMER (STi MODEL)
B 1
B286
FUEL PUMP RELAY
B 3
B46
MAIN RELAY
B 1
B47
MODE ACTUATOR
B 2
B77
B GND-03
C GND-03
GND-01 A
B 24 B
B 15 OrW
B37 i2
COMBINATION METER
B A6
OrW A9
B B27
CLOCK
B 2
i59
A: i10
B: i11
MANUAL A/C SWITCH
B 1
B 3
B 6
B168
HAZARD SWITCH
OrW 2
i22
B
E
GB-5
GB-4
ST : STi MODEL
ES : EXCEPT STi MODEL


B16
B29
B208
B129
B32 (BLACK)
B77
B268
B267
B293
B46
B119
B264 (RED)
i59
B286 : ST
B296
B8
B47 (BROWN)
B116
B294 : ST
B133
B132 : ST
i22
B284
B44
B168
A: i10 (GREEN)
B12
B79 (GRAY)
B120
B283
B71
B157
B171
B70
i2
B: i11 (GREEN)
RELAY BLOCK (BLACK)
GG04-22B


GND-03
REARVIEW MIRROR (PASSENGER SIDE)
4 B
D15
B D11
1
B B101
ROOM LIGHT
3 B
R52
SPOT LIGHT
2 B
R56
B R50
3
B B90
FAN CONTROL AMP.
4 B
B275
ABS CONDENSER
2 B
B304
BLOWER FAN SWITCH
1 B
B169
GND-02 B
GND-02 C
B B
FRONT FOG LIGHT LH
BY 2
B306
SIDE TURN SIGNAL LIGHT RH
BY 1
B305
ABS CONTROL MODULE
BW 23
B301
BY BW B B
3 4 1 2
B198
E GB-6
E GB-9
FUEL PUMP ASSEMBLY
1 BW
R58
BW R57
3
B R15
INTERCOOLER WATER SPRAY MOTOR AND LEVEL SENSOR (STi MODEL)
SEAT BELT SWITCH
1 B
R8
B 1
B 4
R145
REAR DOOR SWITCH LH
3 B
R22
FUEL PUMP CONTROLLER
5 B
R122
REAR DOOR SWITCH RH
3 B
R16
HI-MOUNTED STOP LIGHT (SEDAN)
1 B
R19
REAR DEFOGGER CHOKE COIL (SEDAN)
1 B
R130
B 6 B
B97 R1
D GND-04
B
E GB-7
GND-03


B304
R19
B305
B306
R8
R56
R130
R16
R22
R52
B90
B275
R145 (BLACK)
B198
R15
B169
R58
B97
D15
R122
D11
B301 (BLACK)

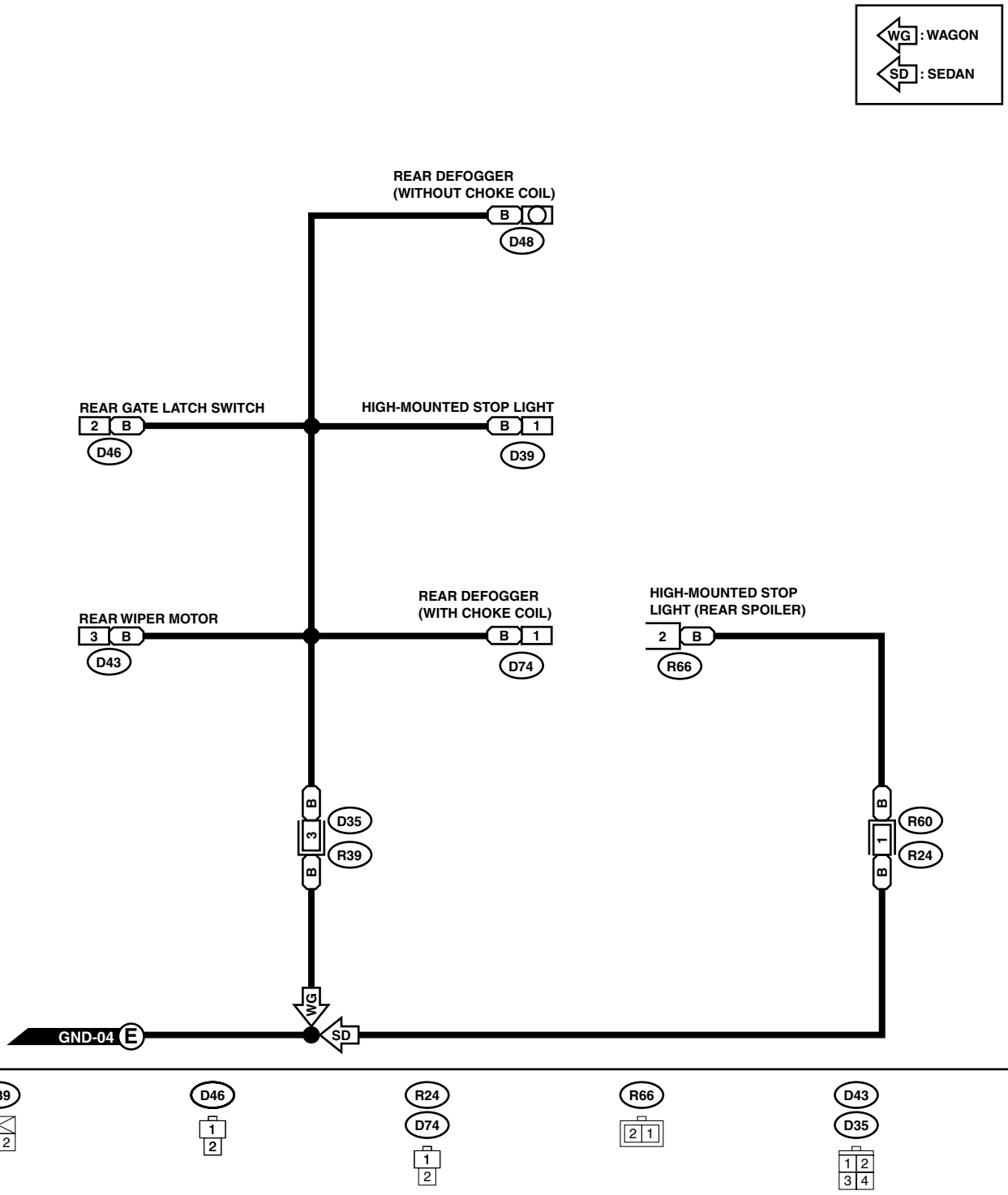
GG04-22C


GND-04
GND-04
RADIO
B121
RADIO
B120
SRS HARNESS
AB6
REAR COMBINATION LIGHT RH (WAGON)
R26
TRAILER CONNECTOR
R79
REAR COMBINATION LIGHT LH (WAGON)
R28
LICENCE PLATE LIGHT
R63
REAR COMBINATION LIGHT RH (SEDAN)
R26
TRUNK ROOM LIGHT SWITCH (SEDAN)
R27
REAR COMBINATION LIGHT LH (SEDAN)
R28
REAR WIPER INTERMITTENT MODULE (WAGON)
R116
WG : WAGON
SD : SEDAN
GND-03 D
E GND-05
GB-8
GR
GB-4
GB-5
R27
R63
R26 : SD
R28 : SD
R26 : WG
R28 : WG
R116
R79
B120
AB6 (YELLOW)

GG04-22D

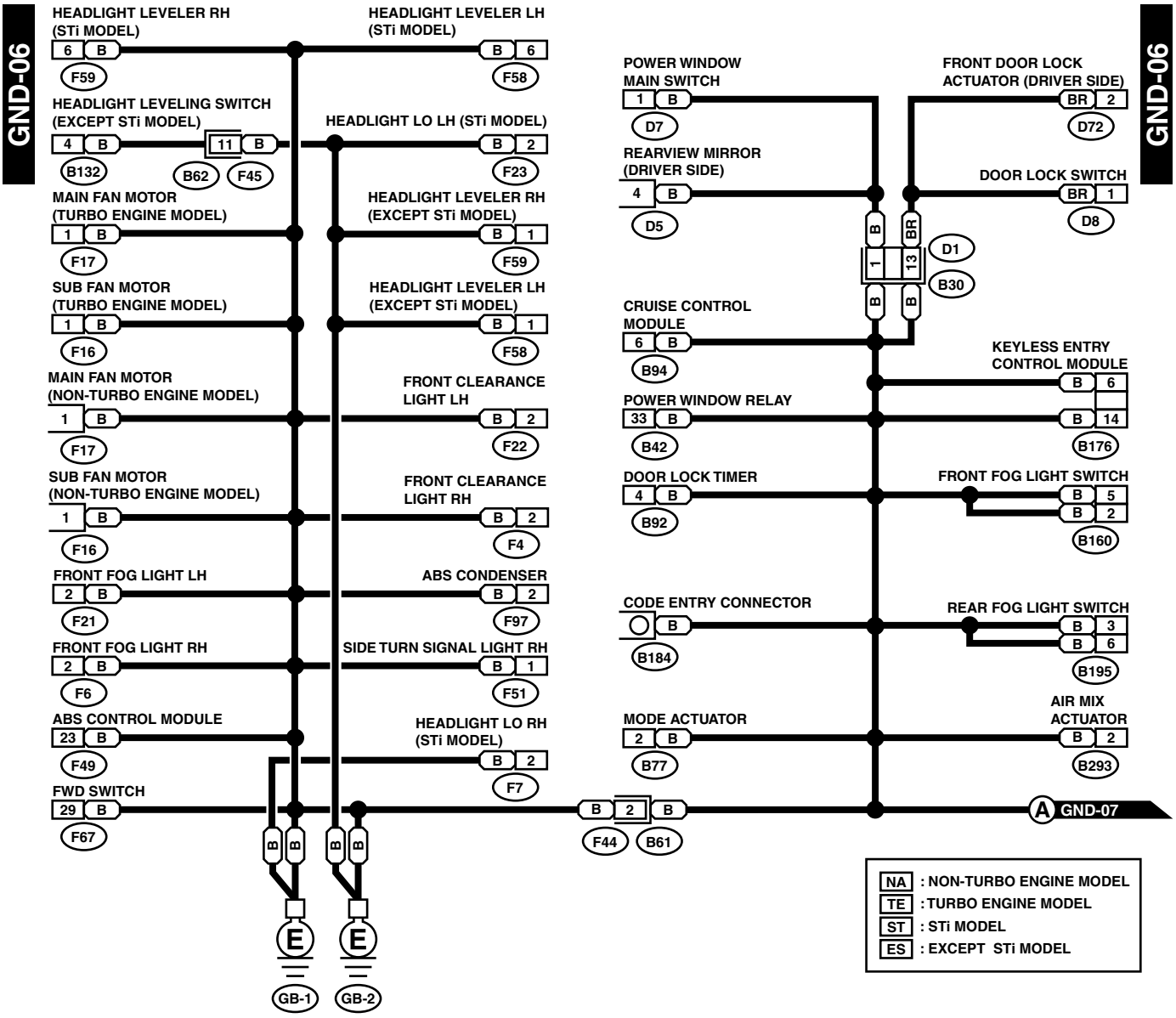
GND-05

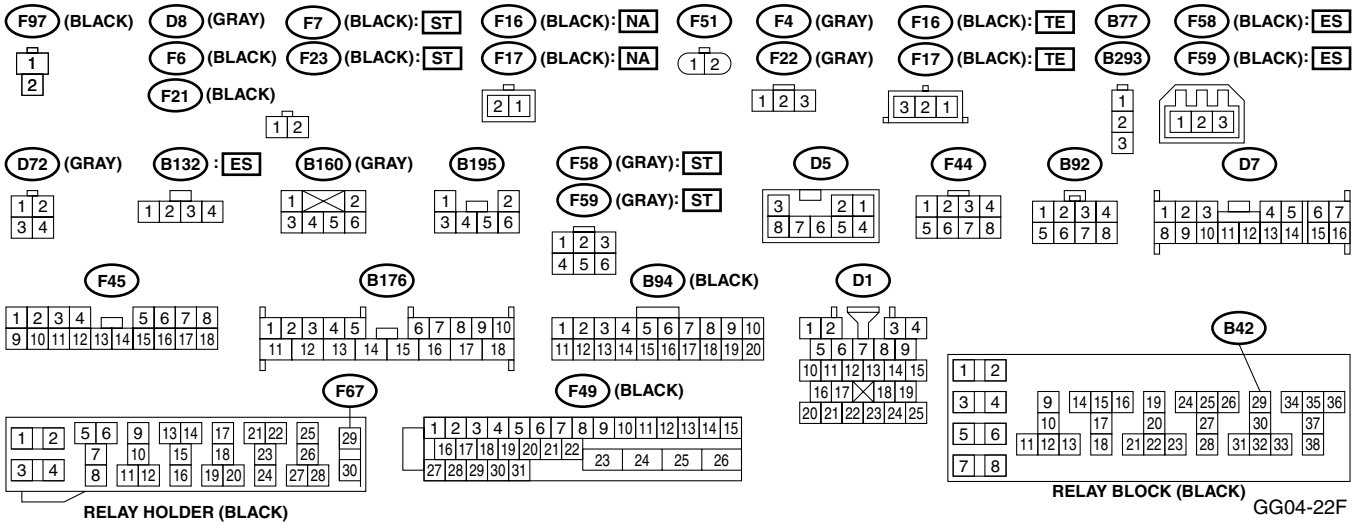
GND-05



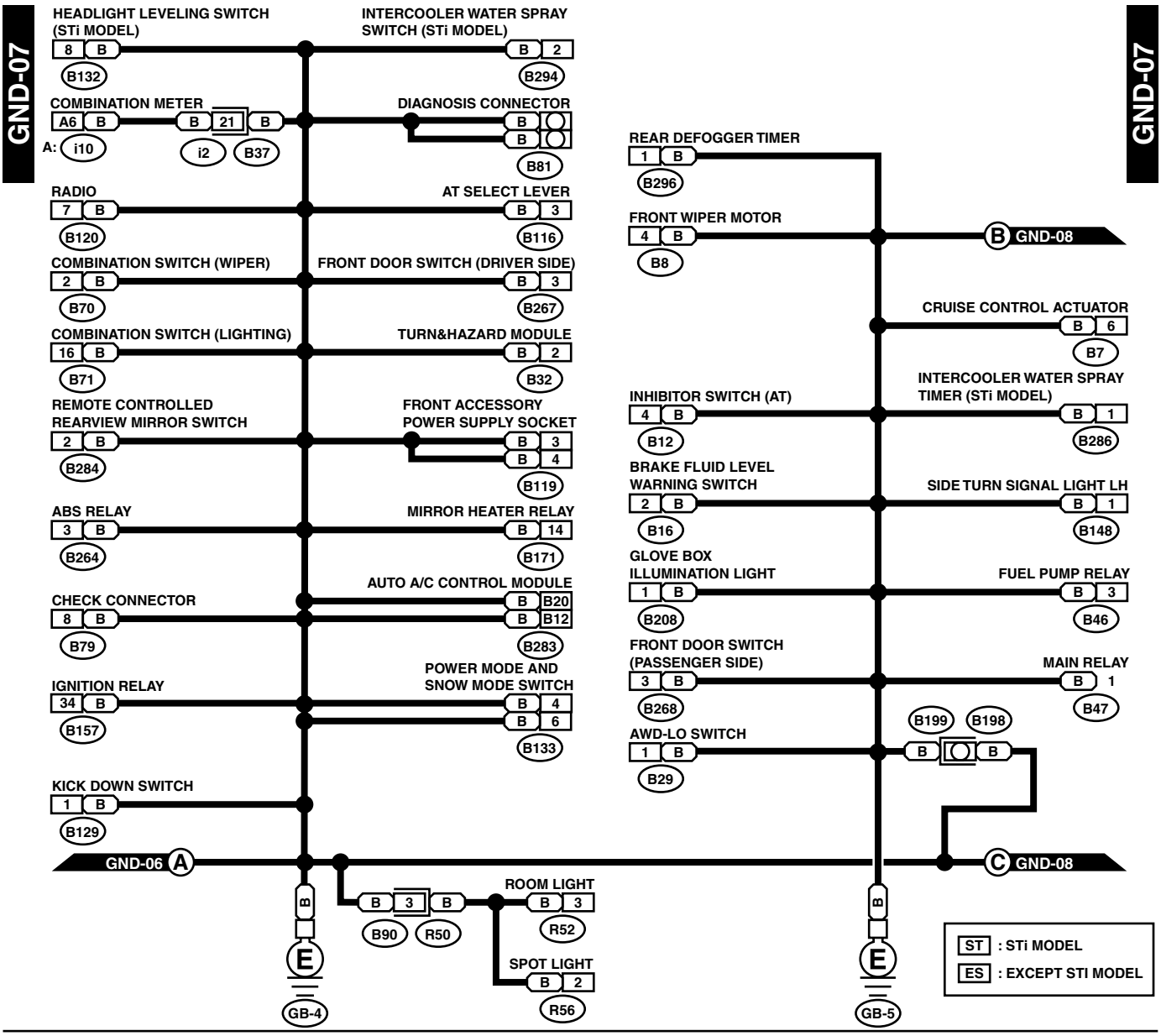
GG04-22E

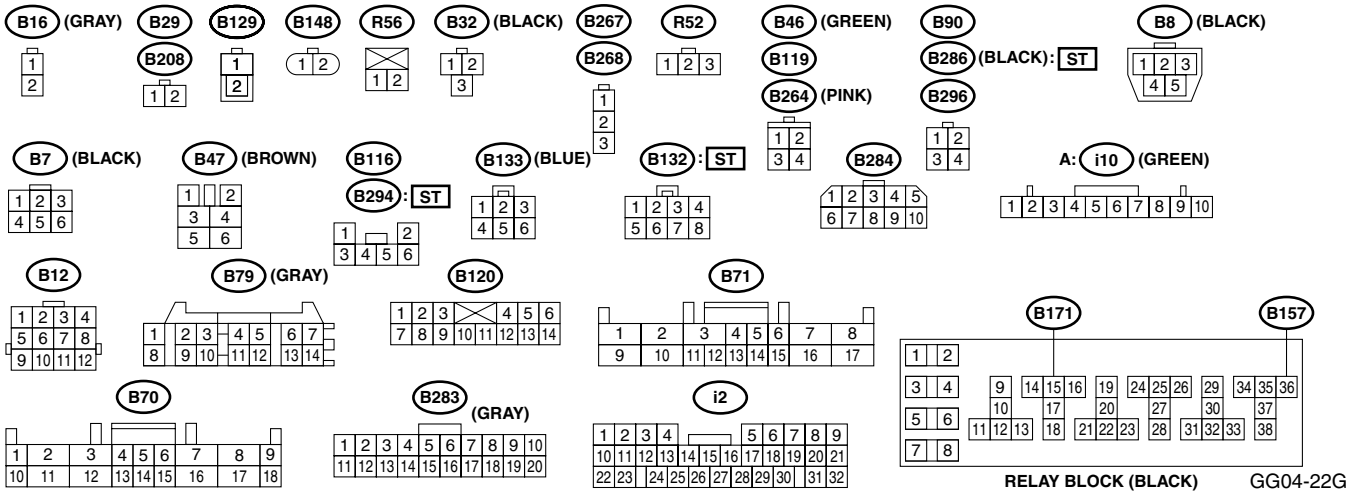
2. RHD MODEL (GENERAL)

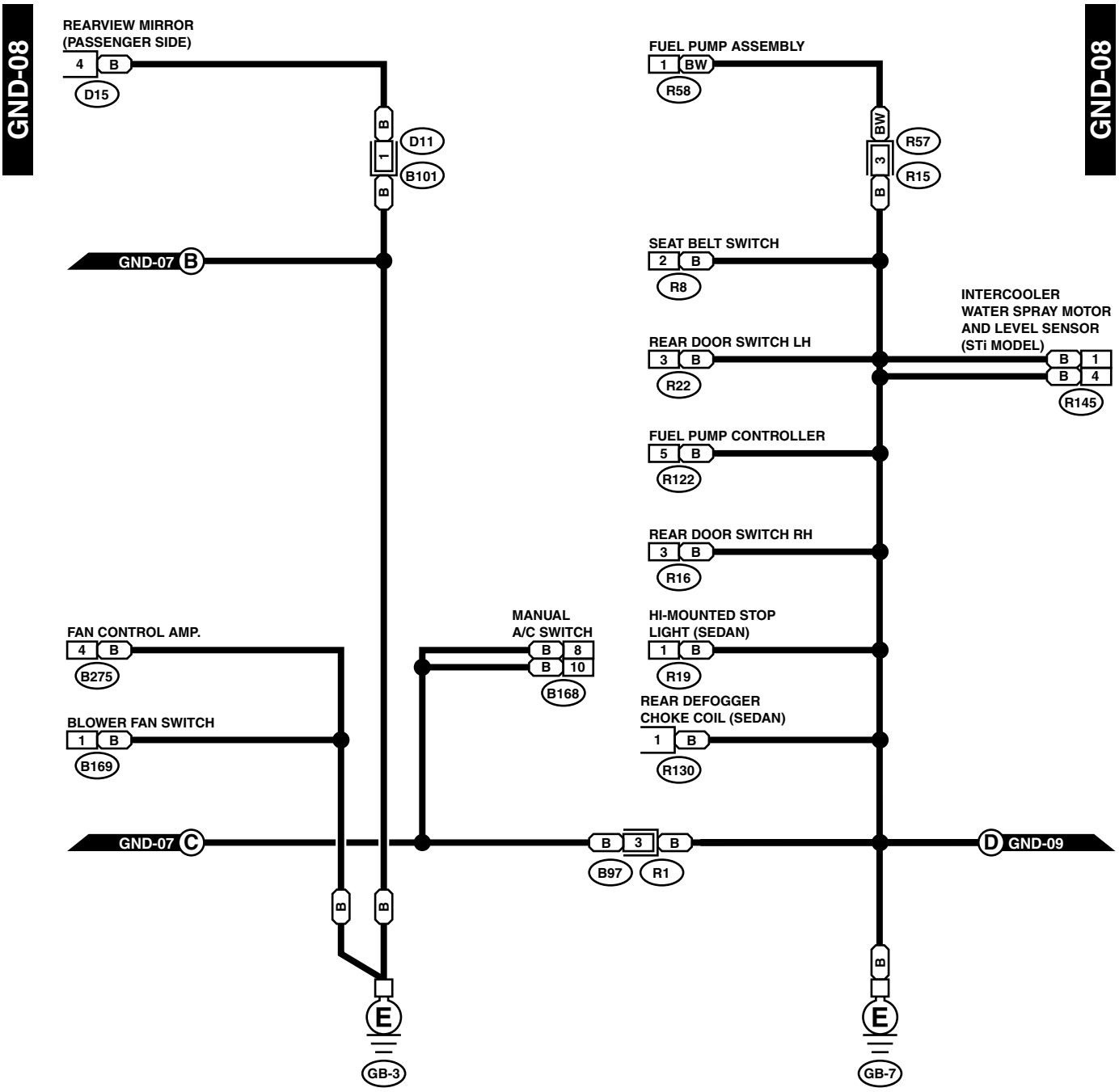




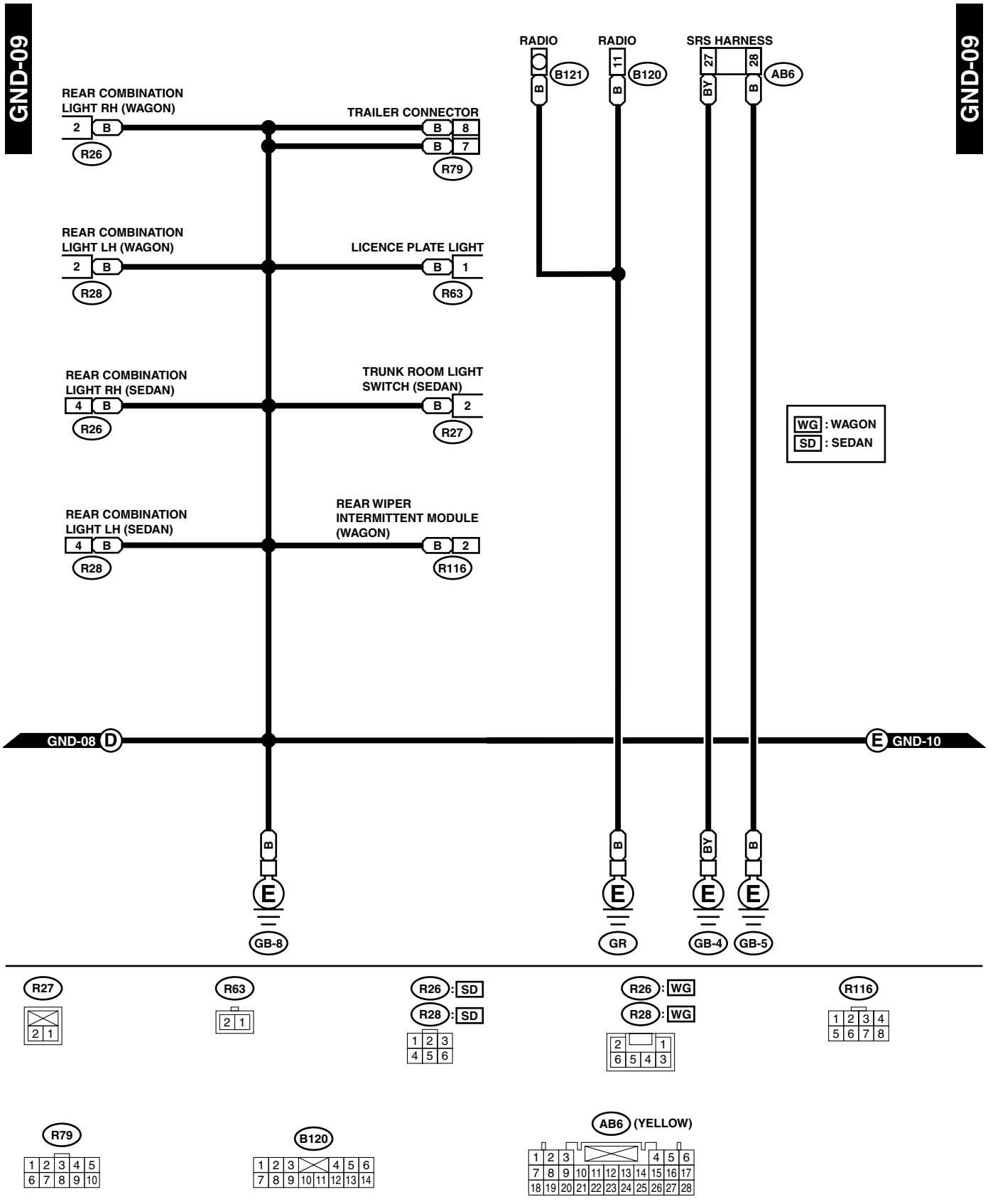
GG04-22F


GND-07
GND-07
HEADLIGHT LEVELING SWITCH (STi MODEL)
8 B
B132
INTERCOOLER WATER SPRAY SWITCH (STi MODEL)
B 2
B294
COMBINATION METER
A6 B
B 21 B
A: i10
i2
B37
DIAGNOSIS CONNECTOR
B
B
B81
RADIO
7 B
B120
AT SELECT LEVER
B 3
B116
COMBINATION SWITCH (WIPER)
2 B
B70
FRONT DOOR SWITCH (DRIVER SIDE)
B 3
B267
COMBINATION SWITCH (LIGHTING)
16 B
B71
TURN&HAZARD MODULE
B 2
B32
REMOTE CONTROLLED REARVIEW MIRROR SWITCH
2 B
B284
FRONT ACCESSORY POWER SUPPLY SOCKET
B 3
B 4
B119
ABS RELAY
3 B
B264
MIRROR HEATER RELAY
B 14
B171
AUTO A/C CONTROL MODULE
CHECK CONNECTOR
8 B
B79
B 20
B 12
B283
POWER MODE AND SNOW MODE SWITCH
IGNITION RELAY
34 B
B157
B 4
B 6
B133
KICK DOWN SWITCH
1 B
B129
GND-06 A
B
E
GB-4
B 3 B
B90
R50
ROOM LIGHT
B 3
R52
SPOT LIGHT
B 2
R56
REAR DEFOGGER TIMER
1 B
B296
FRONT WIPER MOTOR
4 B
B8
B GND-08
CRUISE CONTROL ACTUATOR
B 6
B7
INTERCOOLER WATER SPRAY TIMER (STi MODEL)
INHIBITOR SWITCH (AT)
4 B
B12
B 1
B286
BRAKE FLUID LEVEL WARNING SWITCH
2 B
B16
SIDE TURN SIGNAL LIGHT LH
B 1
B148
GLOVE BOX ILLUMINATION LIGHT
1 B
B208
FUEL PUMP RELAY
B 3
B46
FRONT DOOR SWITCH (PASSENGER SIDE)
3 B
B268
MAIN RELAY
B 1
B47
B199 B198
AWD-LO SWITCH
1 B
B29
B B
C GND-08
B
E
GB-5
ST : STi MODEL
ES : EXCEPT STI MODEL


B16 (GRAY)
B29
B208
B129
B148
R56
B32 (BLACK)
B267
B268
R52
B46 (GREEN)
B119
B264 (PINK)
B90
B286 (BLACK): ST
B296
B8 (BLACK)
B7 (BLACK)
B47 (BROWN)
B116
B294: ST
B133 (BLUE)
B132: ST
B284
A: i10 (GREEN)
B12
B79 (GRAY)
B120
B71
B70
B283 (GRAY)
i2
B171
B157
RELAY BLOCK (BLACK)
GG04-22G


GND-08
GND-08
REARVIEW MIRROR (PASSENGER SIDE)
4 B
D15
B
1
B
D11
B101
GND-07 B
FUEL PUMP ASSEMBLY
1 BW
R58
BW
3
B
R57
R15
SEAT BELT SWITCH
2 B
R8
INTERCOOLER WATER SPRAY MOTOR AND LEVEL SENSOR (STi MODEL)
B 1
B 4
R145
REAR DOOR SWITCH LH
3 B
R22
FUEL PUMP CONTROLLER
5 B
R122
REAR DOOR SWITCH RH
3 B
R16
MANUAL A/C SWITCH
B 8
B 10
B168
HI-MOUNTED STOP LIGHT (SEDAN)
1 B
R19
REAR DEFOGGER CHOKE COIL (SEDAN)
1 B
R130
FAN CONTROL AMP.
4 B
B275
BLOWER FAN SWITCH
1 B
B169
GND-07 C
B 3 B
B97 R1
D GND-09
B
B
E
GB-3
B
E
GB-7
R8
R19
R130
R16
R22
B275
R145 (BLACK)
R15 (BLACK)
B169
R58
B97
D15
B168
R122 (BLACK)
D11

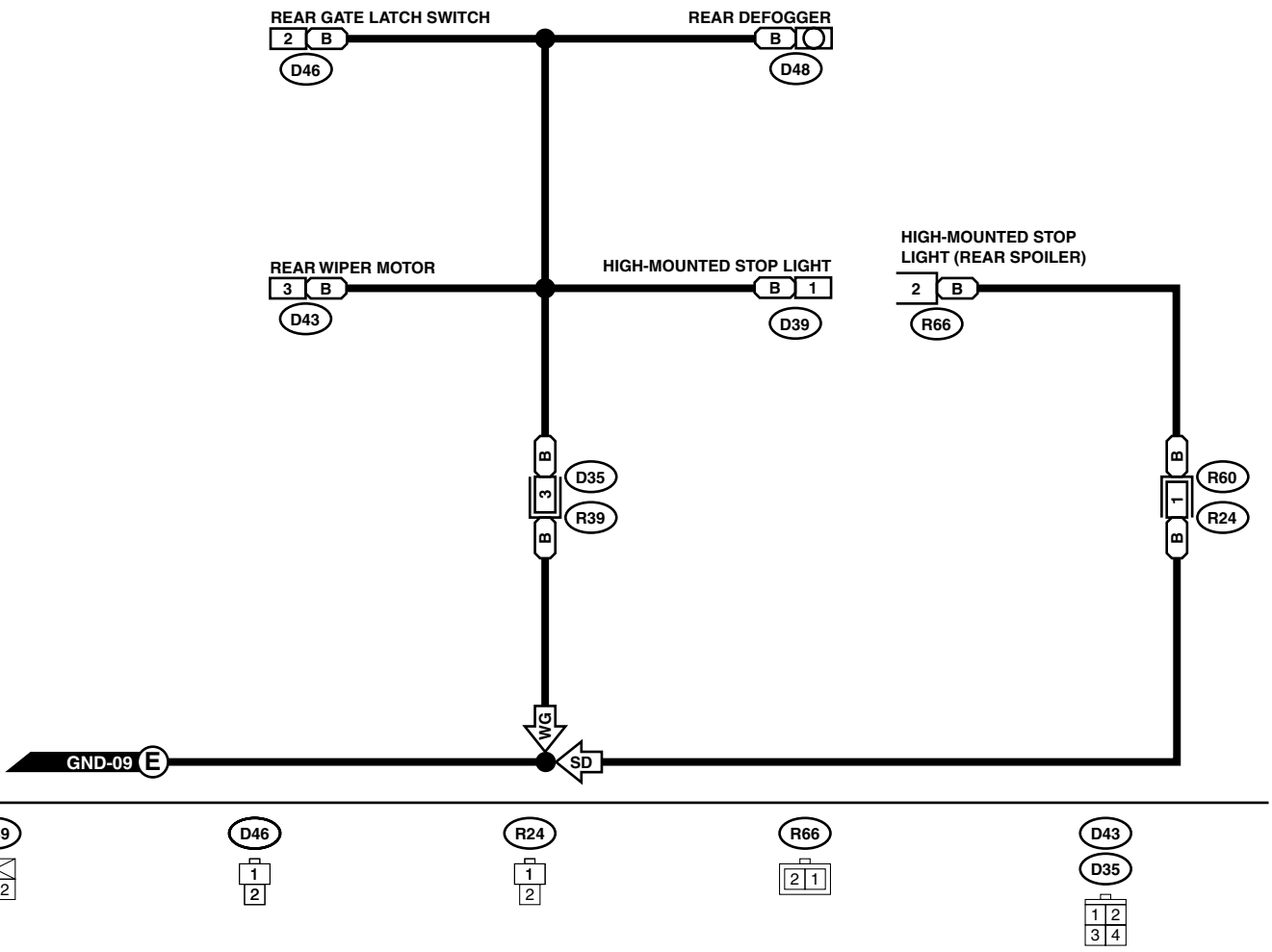
GG04-22H


GND-09
GND-09
RADIO
B121
RADIO
B120
SRS HARNESS
AB6
REAR COMBINATION LIGHT RH (WAGON)
R26
TRAILER CONNECTOR
R79
REAR COMBINATION LIGHT LH (WAGON)
R28
LICENCE PLATE LIGHT
R63
REAR COMBINATION LIGHT RH (SEDAN)
R26
TRUNK ROOM LIGHT SWITCH (SEDAN)
R27
REAR COMBINATION LIGHT LH (SEDAN)
R28
REAR WIPER INTERMITTENT MODULE (WAGON)
R116
WG : WAGON
SD : SEDAN
GND-08 D
E GND-10
GB-8
GR
GB-4
GB-5
R27
R63
R26 : SD
R28 : SD
R26 : WG
R28 : WG
R116
R79
B120
AB6 (YELLOW)

GG04-22I

GND-10

GND-10

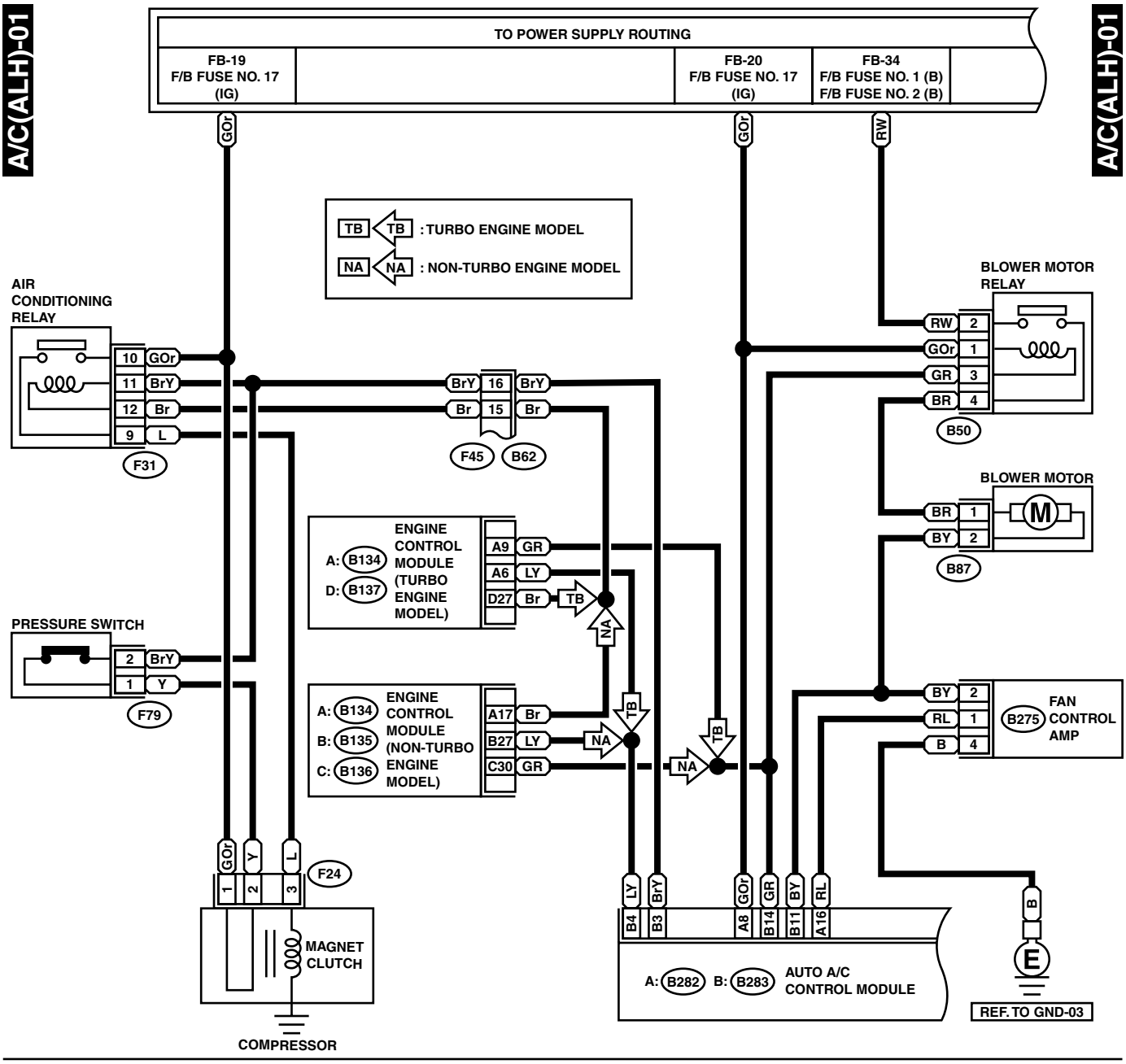


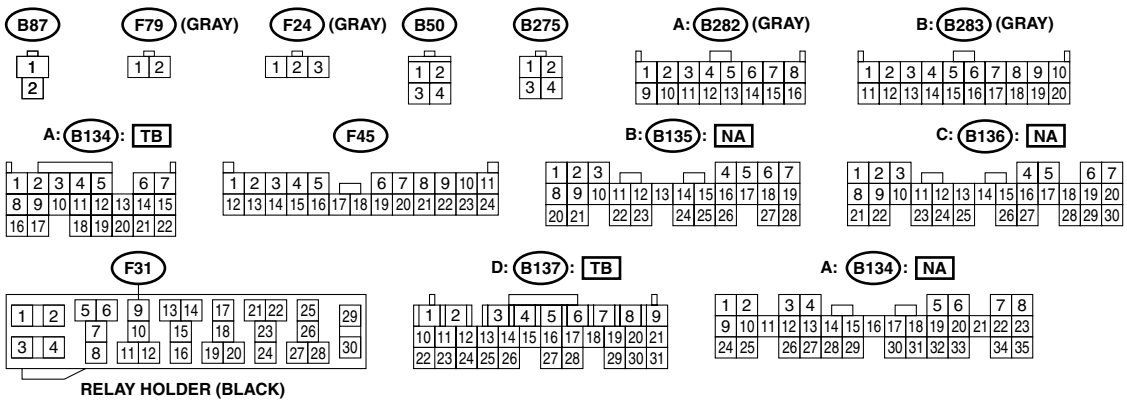
GG04-22J

7. Air Conditioning System

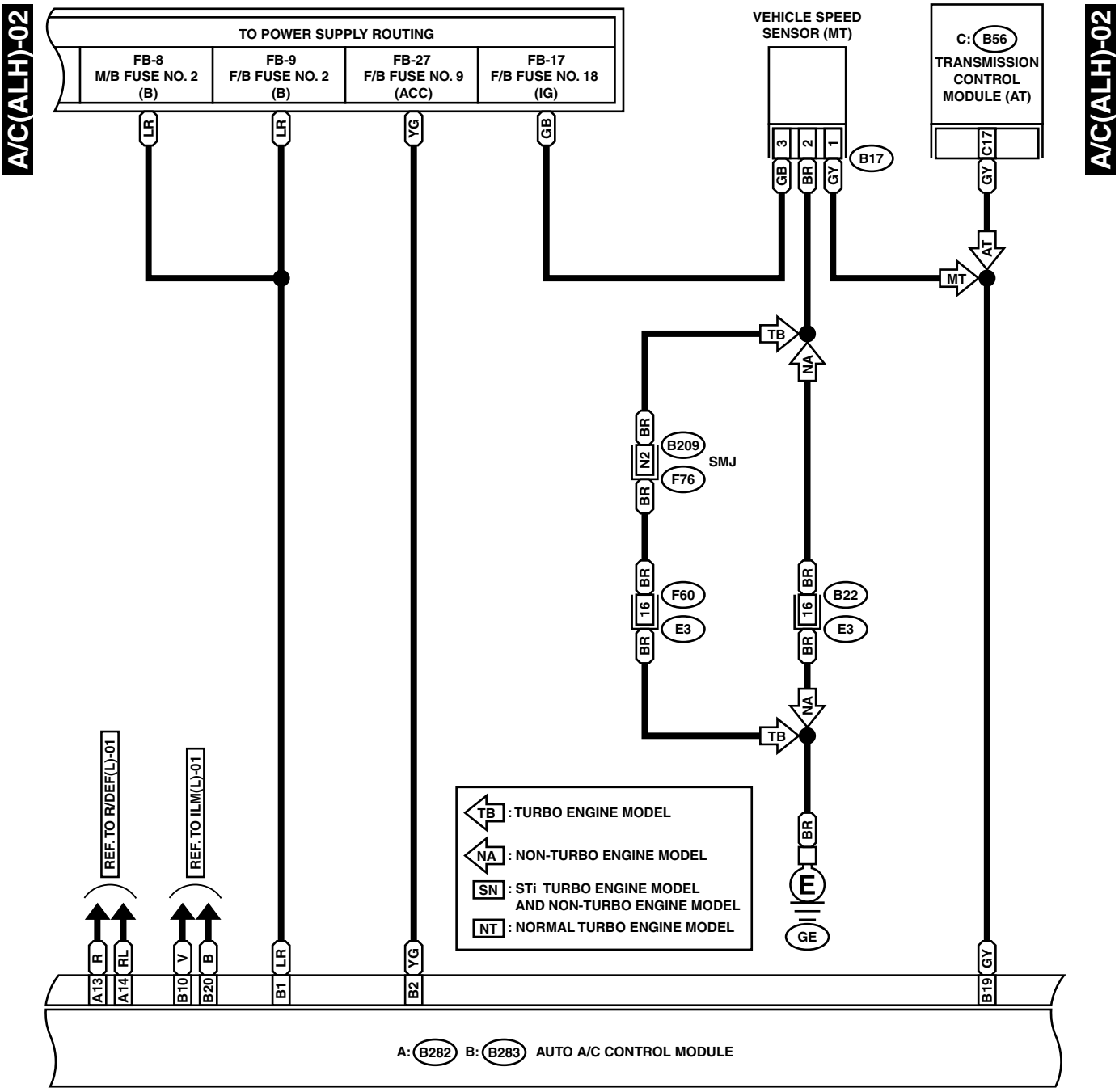
A: SCHEMATIC

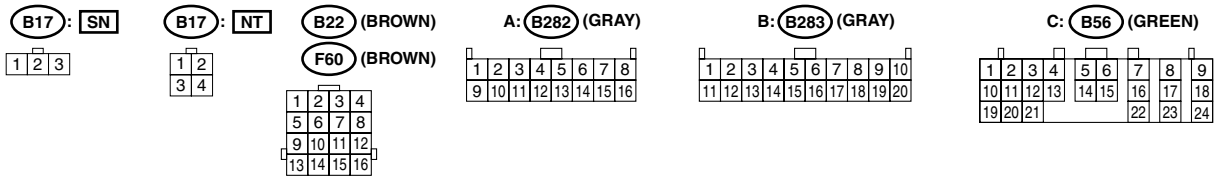
1. AUTO A/C LHD MODEL



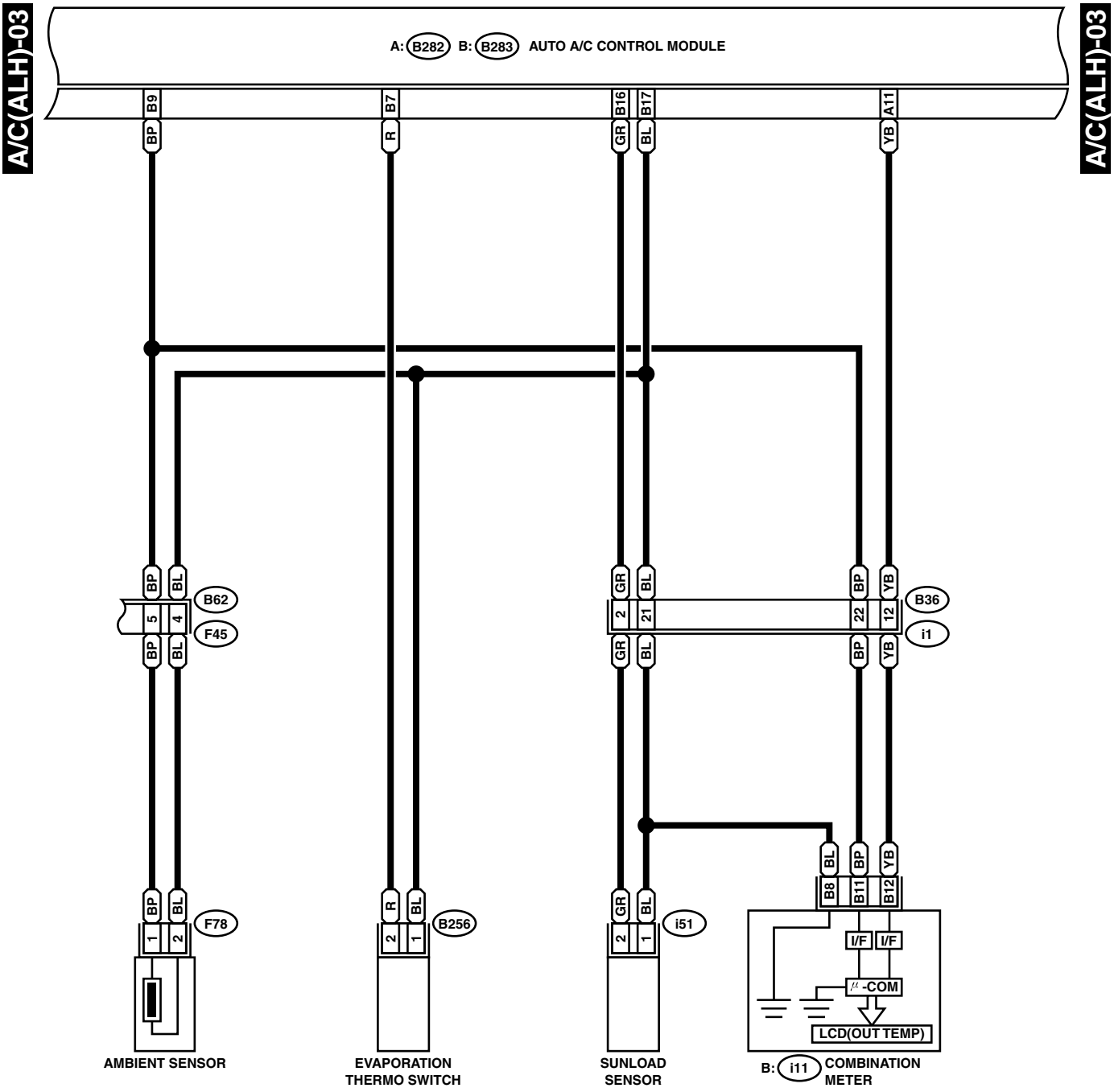


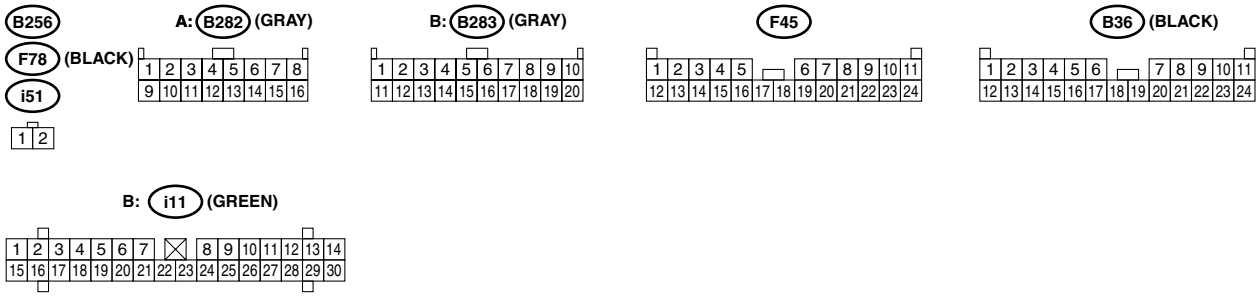
GL46-22A


A/C(ALH)-02
A/C(ALH)-02
TO POWER SUPPLY ROUTING
FB-8
M/B FUSE NO. 2
(B)
FB-9
F/B FUSE NO. 2
(B)
FB-27
F/B FUSE NO. 9
(ACC)
FB-17
F/B FUSE NO. 18
(IG)
VEHICLE SPEED
SENSOR (MT)
C: B56
TRANSMISSION
CONTROL
MODULE (AT)
B17
C17
AT
MT
TB
NA
B209
SMJ
F76
F60
E3
B22
E3
REF. TO R/DEF(L)-01
REF. TO ILM(L)-01
TB : TURBO ENGINE MODEL
NA : NON-TURBO ENGINE MODEL
SN : STi TURBO ENGINE MODEL
AND NON-TURBO ENGINE MODEL
NT : NORMAL TURBO ENGINE MODEL
A: B282 B: B283 AUTO A/C CONTROL MODULE

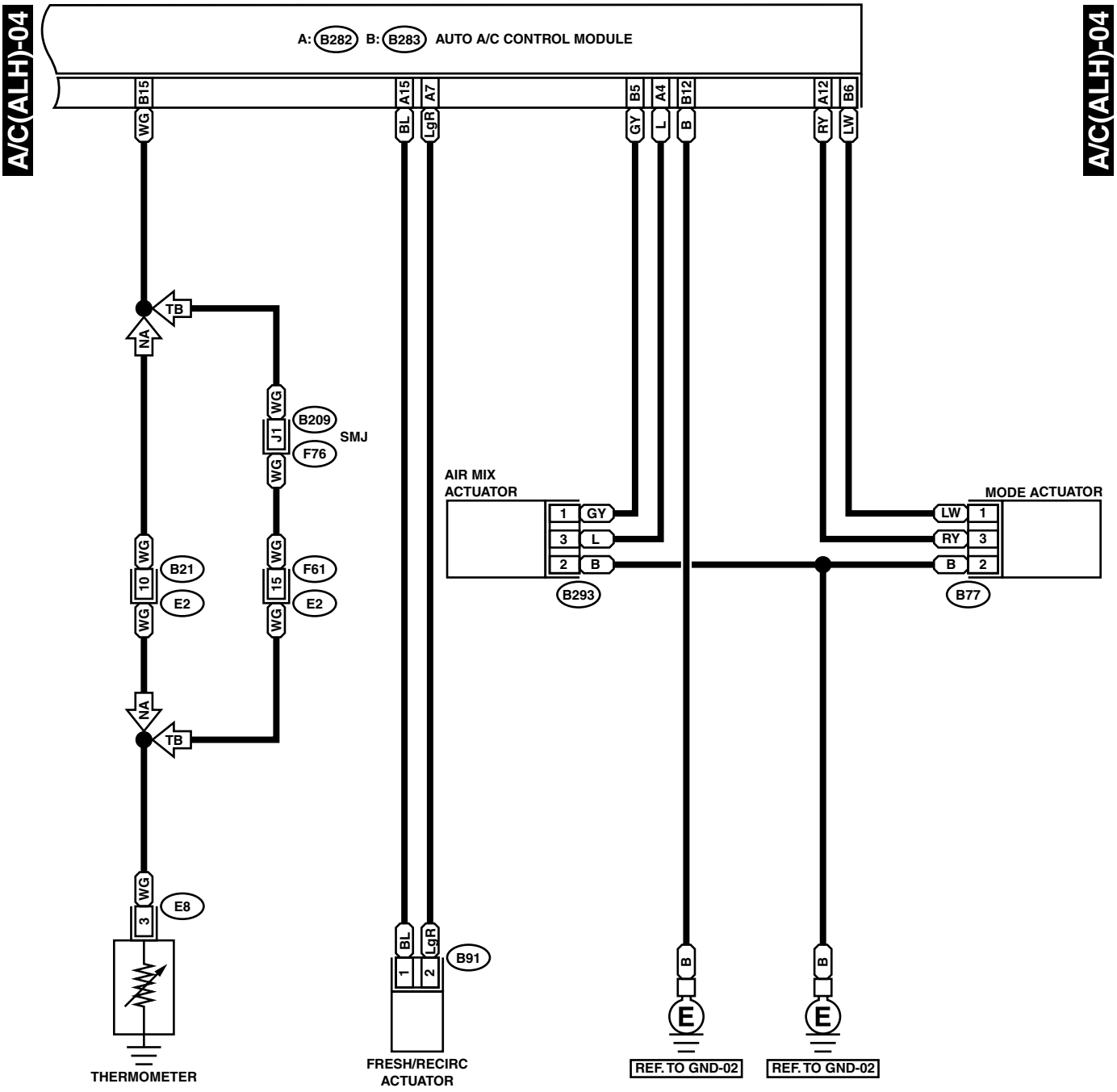

B17 : SN
B17 : NT
B22 (BROWN)
F60 (BROWN)
A: B282 (GRAY)
B: B283 (GRAY)
C: B56 (GREEN)

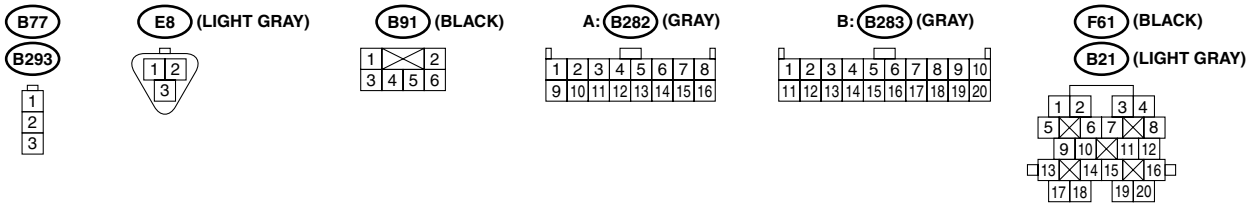
GL46-22B


A/C(ALH)-03
A/C(ALH)-03
A: B282 B: B283 AUTO A/C CONTROL MODULE
B9
B7
B16
B17
A11
BP
R
GR
BL
YB
B62
F45
B36
i1
F78
B256
i51
B8
B11
B12
I/F
I/F
-COM
LCD(OUT TEMP)
AMBIENT SENSOR
EVAPORATION THERMO SWITCH
SUNLOAD SENSOR
B: i11 COMBINATION METER


B256
F78 (BLACK)
i51
A: B282 (GRAY)
B: B283 (GRAY)
F45
B36 (BLACK)
B: i11 (GREEN)

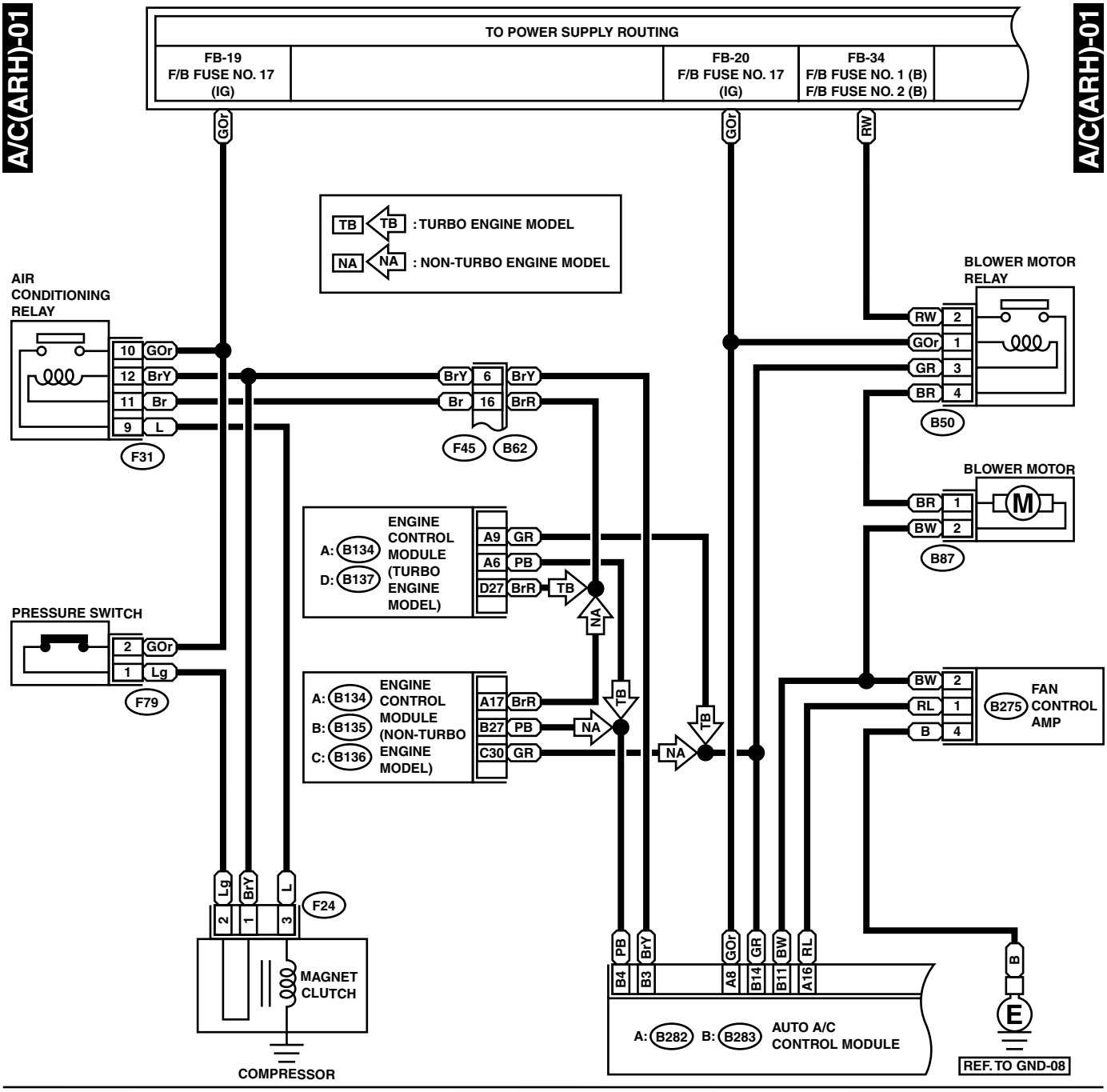
GL46-22C

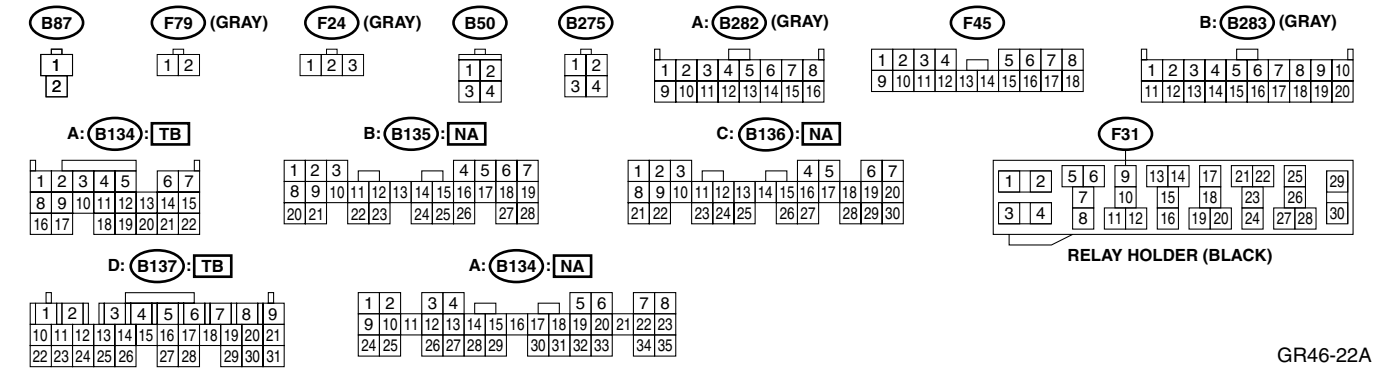

A/C(ALH)-04
A/C(ALH)-04
A: B282 B: B283 AUTO A/C CONTROL MODULE
B15
A15
A7
B5
A4
B12
A12
B6
WG
BL
LgR
GY
L
B
RY
LW
TB
NA
WG
J1
B209
SMJ
F76
WG
AIR MIX ACTUATOR
MODE ACTUATOR
1 GY
3 L
2 B
B293
LW 1
RY 3
B 2
B77
WG
10
B21
E2
WG
WG
15
F61
E2
WG
NA
TB
WG
3
E8
THERMOMETER
BL
LgR
1
2
B91
FRESH/RECIRC ACTUATOR
B
B
E
E
REF. TO GND-02
REF. TO GND-02


B77
B293
1
2
3
E8 (LIGHT GRAY)
1 2
3
B91 (BLACK)
1 2
3 4 5 6
A: B282 (GRAY)
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
B: B283 (GRAY)
1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
F61 (BLACK)
B21 (LIGHT GRAY)
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
17 18 19 20

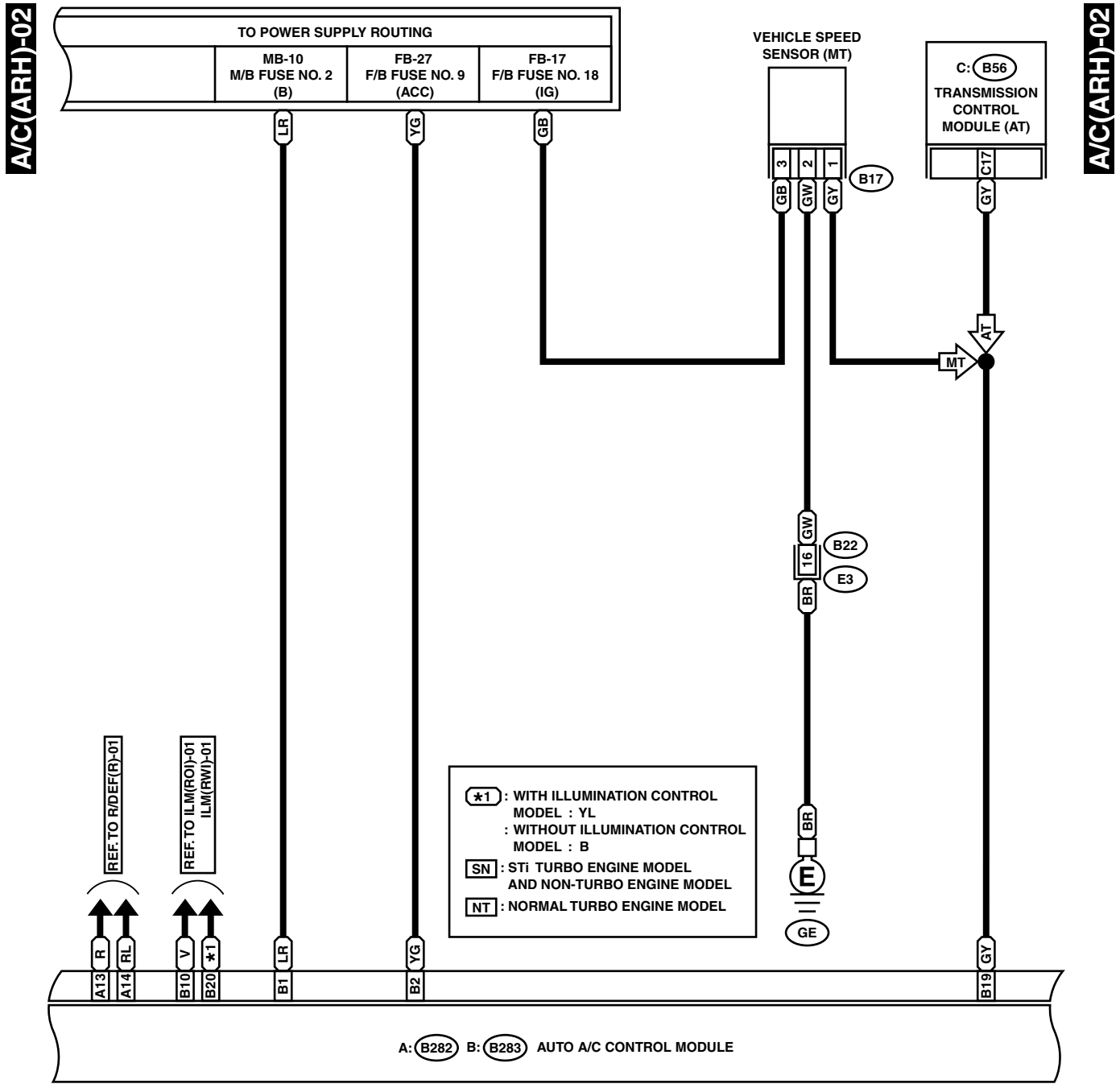
GL46-22D

2. AUTO A/C RHD MODEL





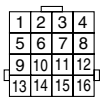
GR46-22A



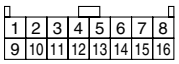
B17 (BLACK): SN

B17 (BLACK): NT

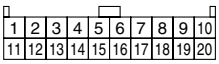
B22 (BROWN)



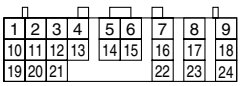
A: B282 (GRAY)



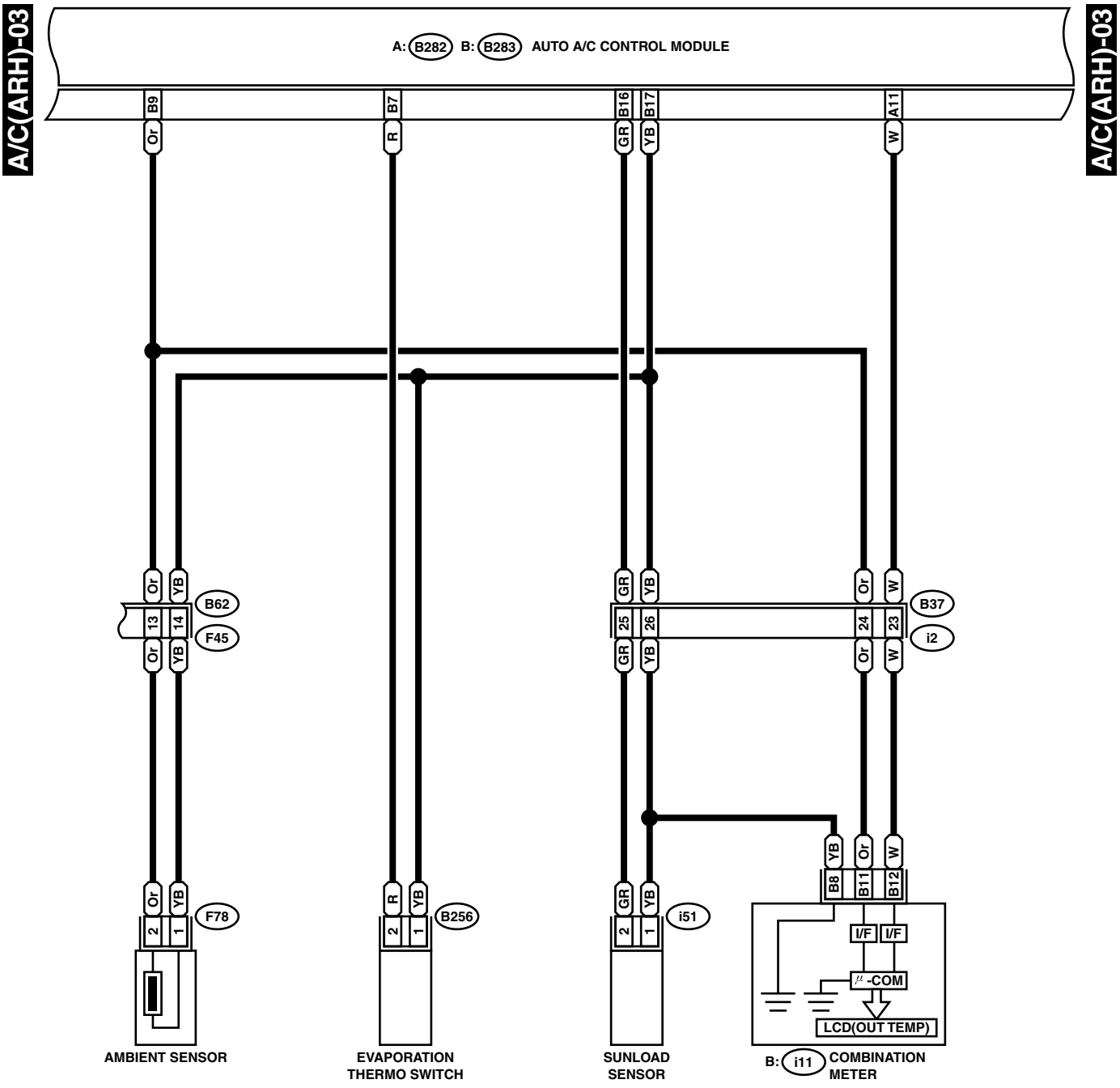
B: B283 (GRAY)

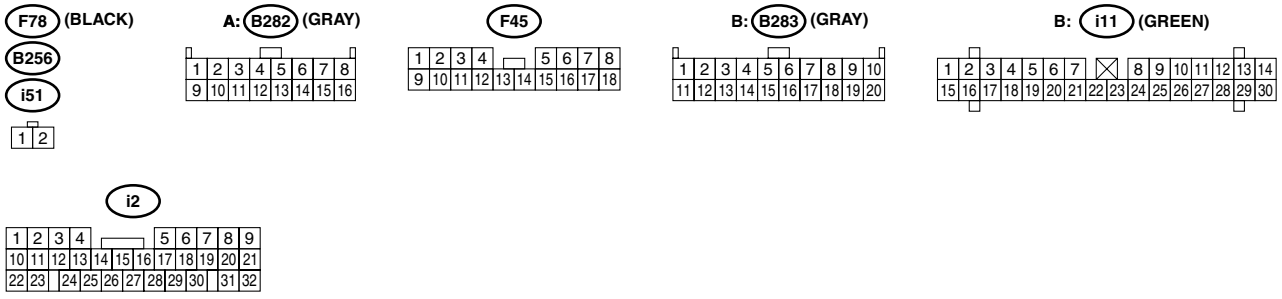


C: B56 (GREEN)

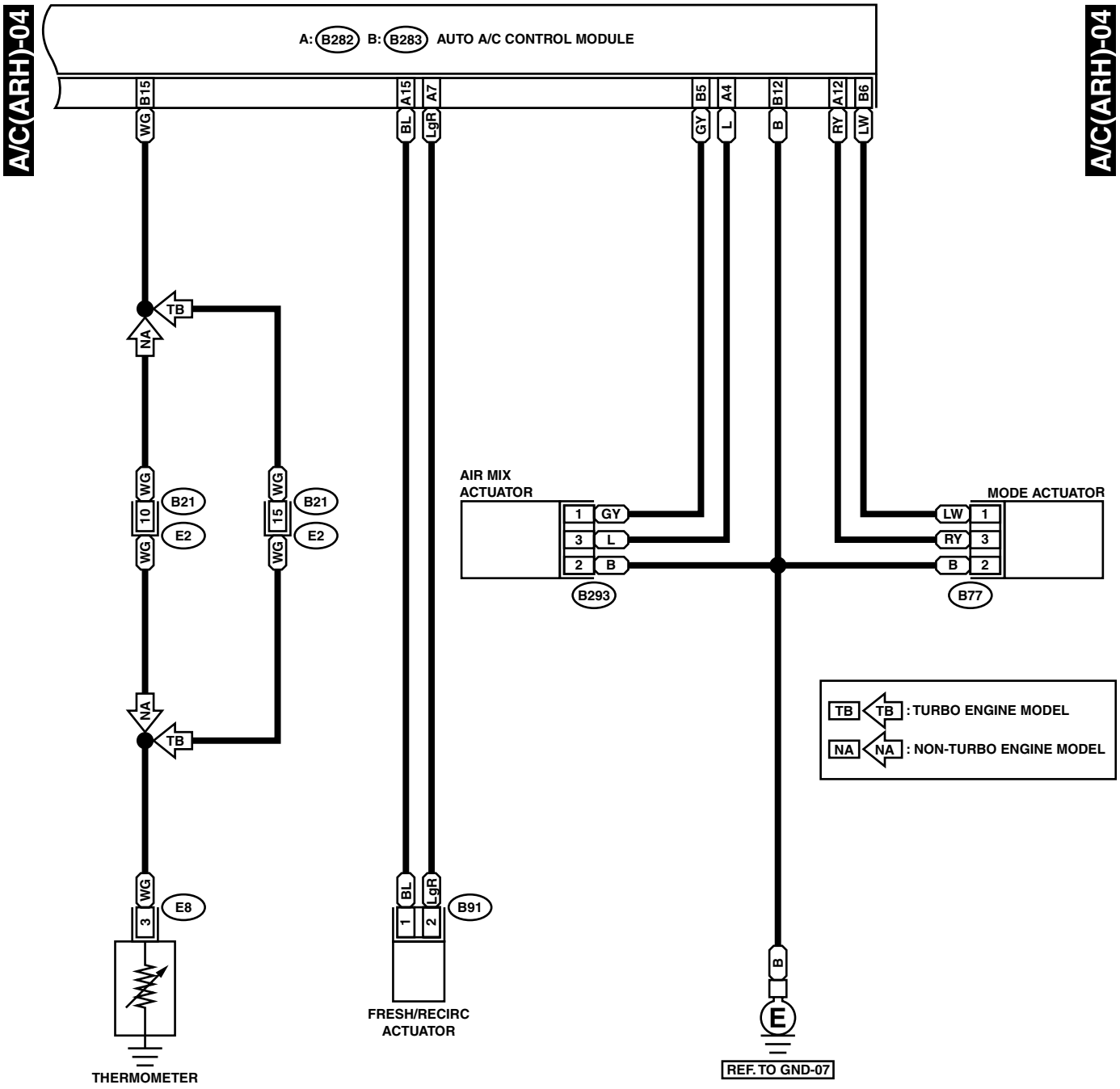


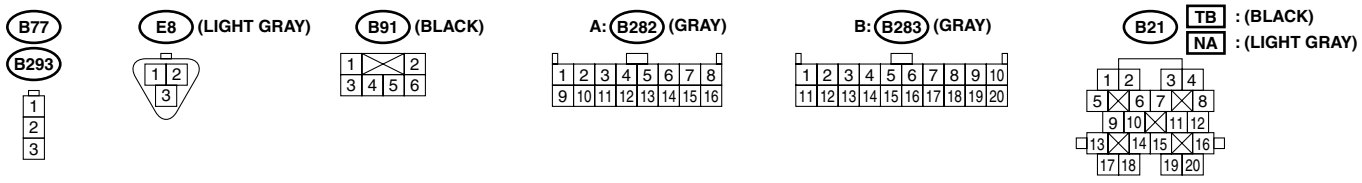
GR46-22B


A/C(ARH)-03
A/C(ARH)-03
A: B282 B: B283 AUTO A/C CONTROL MODULE
B9
B7
B16
B17
A11
Or
R
GR
YB
W
B62
F45
B37
i2
F78
B256
i51
B8
B11
B12
I/F
I/F
-COM
LCD(OUT TEMP)
AMBIENT SENSOR
EVAPORATION THERMO SWITCH
SUNLOAD SENSOR
B: i11 COMBINATION METER


F78 (BLACK)
B256
i51
A: B282 (GRAY)
F45
B: B283 (GRAY)
B: i11 (GREEN)
i2

GR46-22C


A/C(ARH)-04
A/C(ARH)-04
A: B282 B: B283 AUTO A/C CONTROL MODULE
B15
A15
A7
B5
A4
B12
A12
B6
WG
BL
LgR
GY
L
B
RY
LW
TB
NA
B21
E2
AIR MIX ACTUATOR
MODE ACTUATOR
B293
B77
E8
B91
FRESH/RECIRC ACTUATOR
THERMOMETER
REF. TO GND-07
TB : TURBO ENGINE MODEL
NA : NON-TURBO ENGINE MODEL

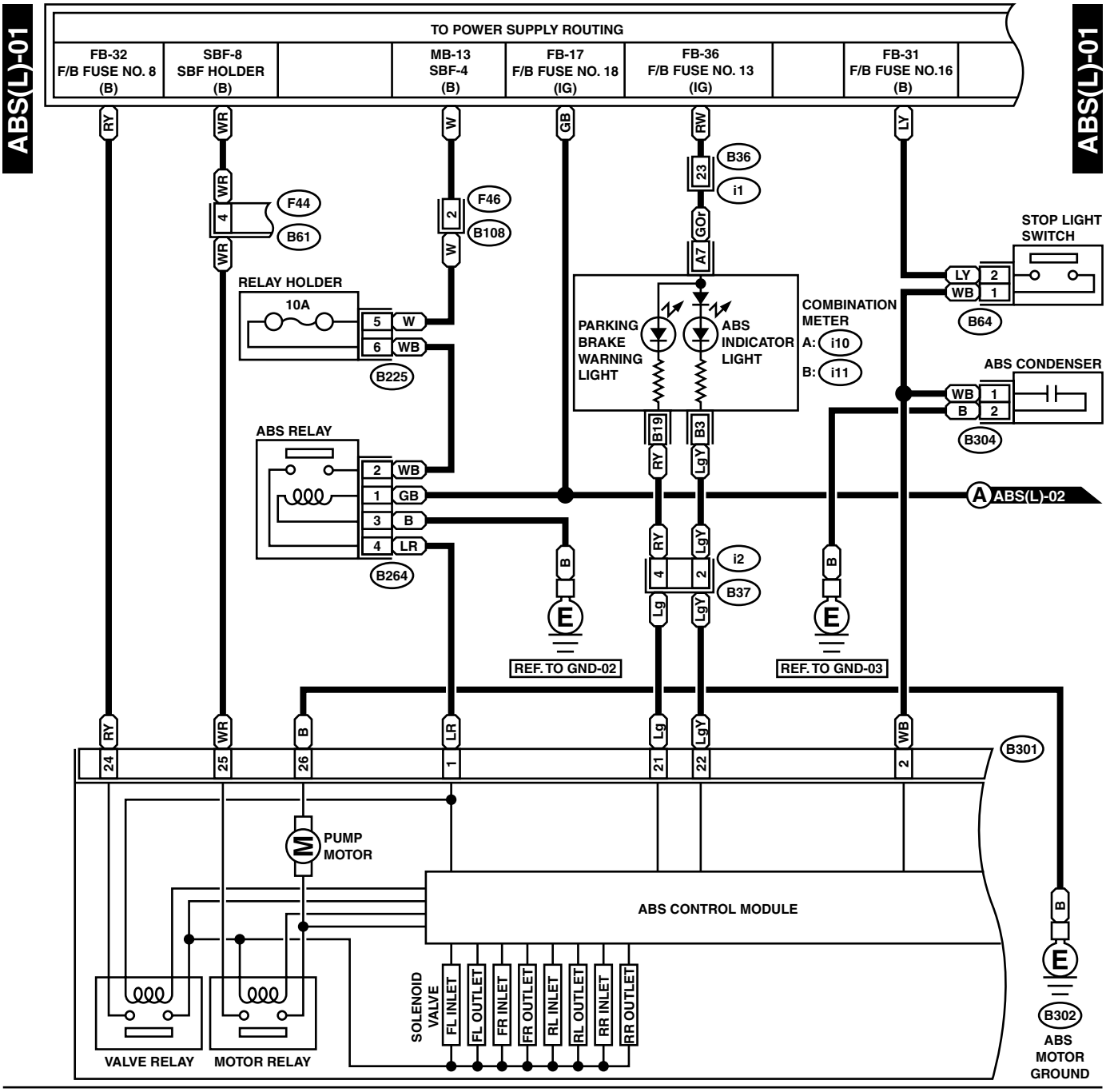

B77
B293
E8 (LIGHT GRAY)
B91 (BLACK)
A: B282 (GRAY)
B: B283 (GRAY)
B21
TB : (BLACK)
NA : (LIGHT GRAY)

GR46-22D

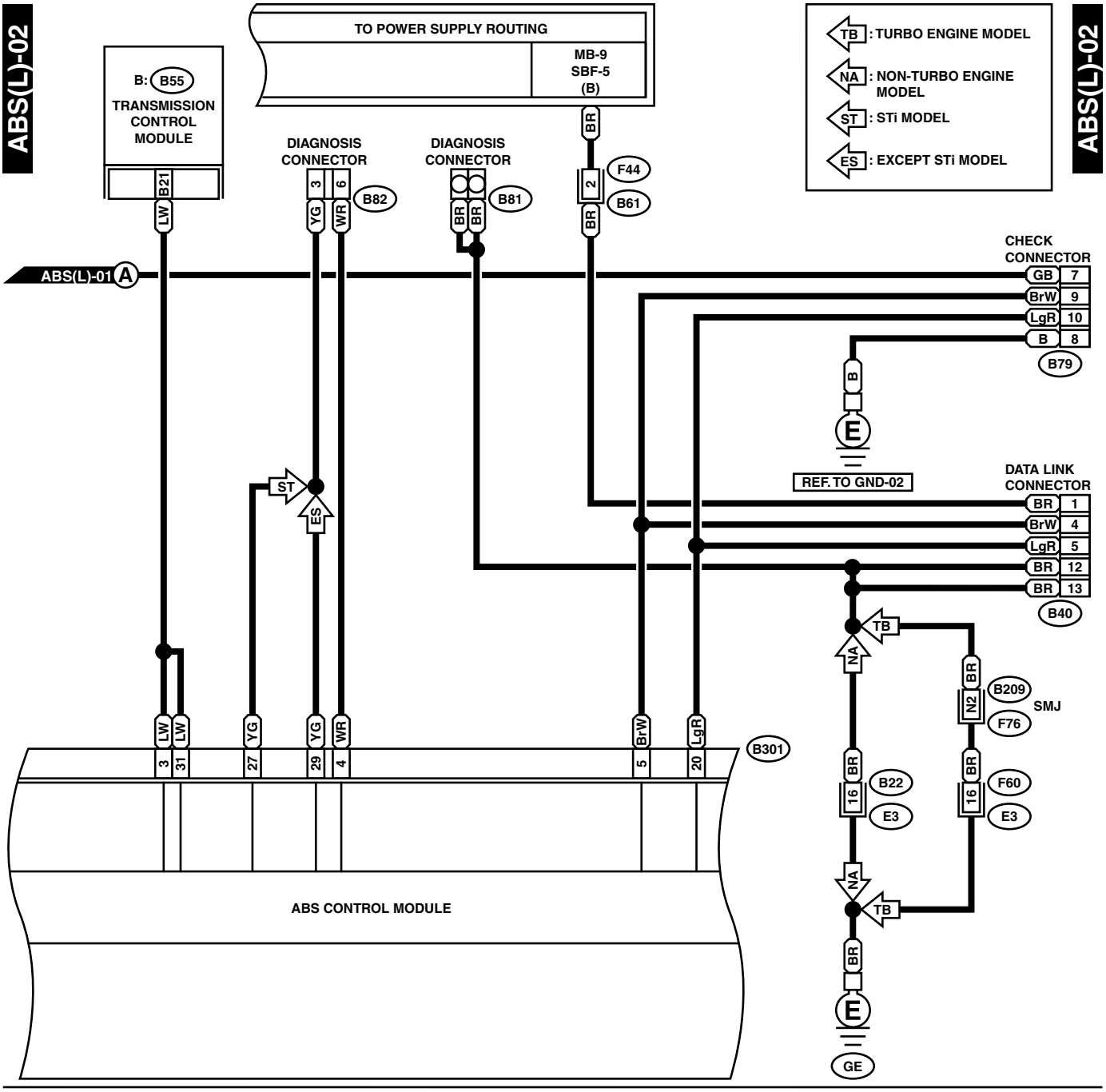
8. Anti-lock Brake System

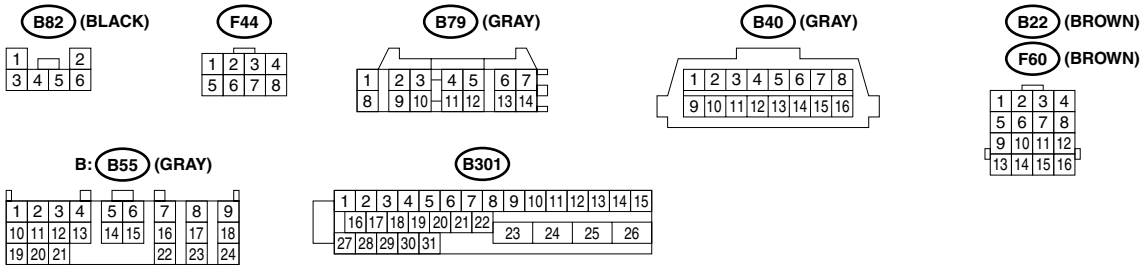
A: SCHEMATIC

1. LHD MODEL

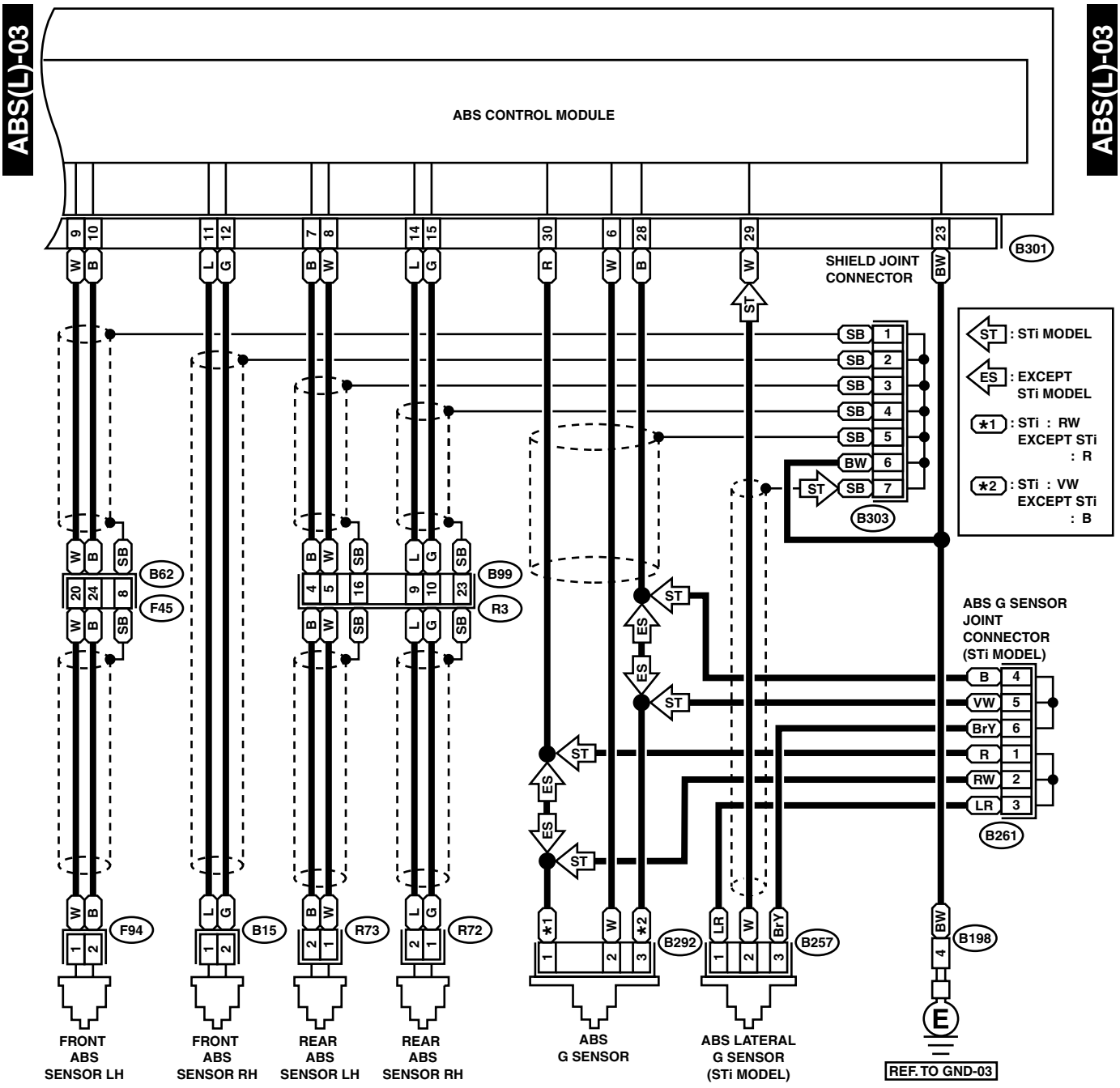


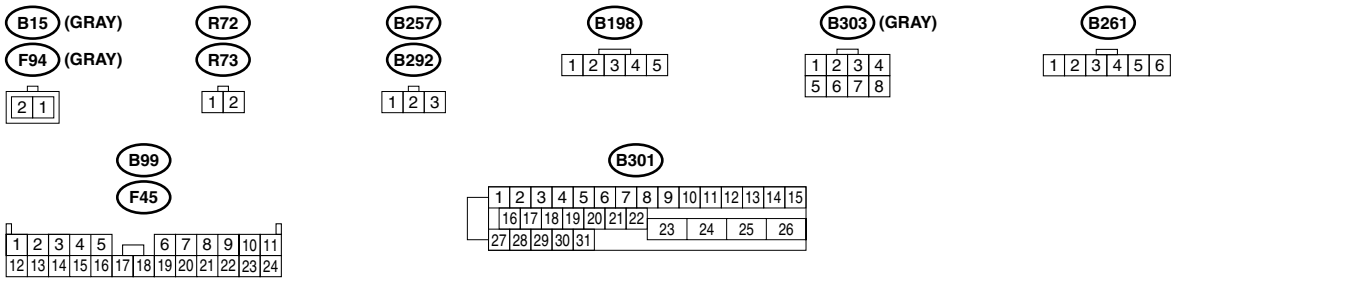
GL82-22A


ABS(L)-02
TO POWER SUPPLY ROUTING
MB-9
SBF-5
(B)
TB : TURBO ENGINE MODEL
NA : NON-TURBO ENGINE MODEL
ST : STi MODEL
ES : EXCEPT STi MODEL
B: B55
TRANSMISSION CONTROL MODULE
B21
DIAGNOSIS CONNECTOR
B82
B81
F44
B61
CHECK CONNECTOR
GB 7
BrW 9
LgR 10
B 8
B79
ABS(L)-01 A
REF. TO GND-02
DATA LINK CONNECTOR
BR 1
BrW 4
LgR 5
BR 12
BR 13
B40
ST
ES
TB
NA
B209
SMJ
F76
B22
E3
F60
B301
ABS CONTROL MODULE
GE


B82 (BLACK)
F44
B79 (GRAY)
B40 (GRAY)
B22 (BROWN)
F60 (BROWN)
B: B55 (GRAY)
B301

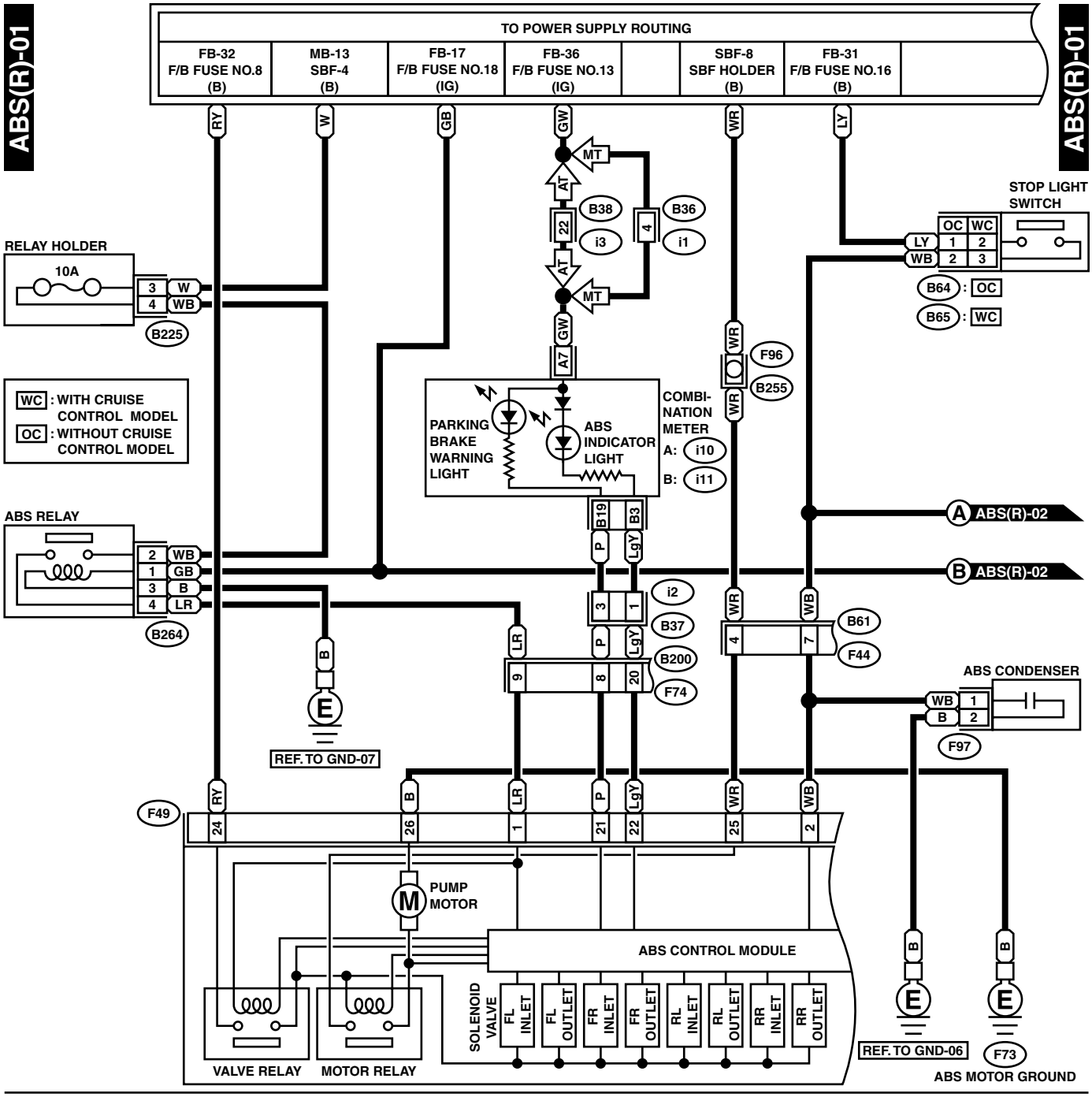
GL82-22B

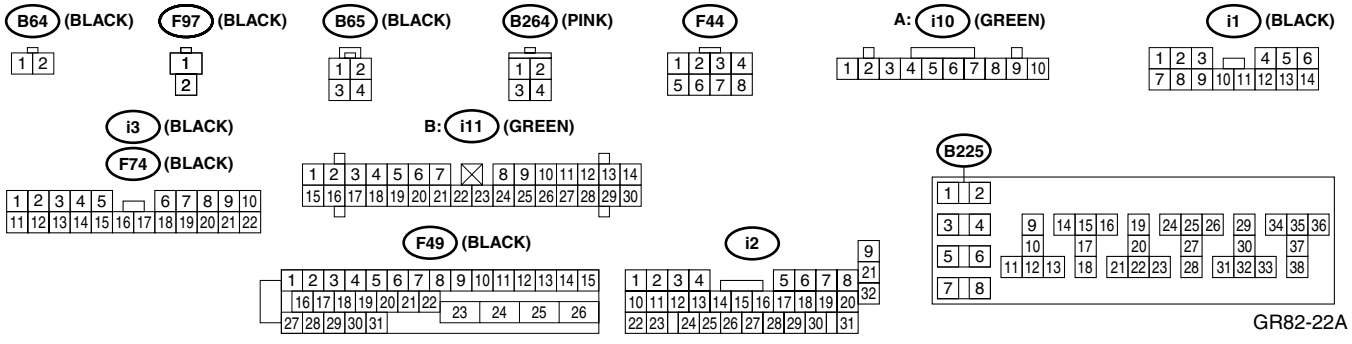

ABS(L)-03
ABS(L)-03
ABS CONTROL MODULE
B301
SHIELD JOINT CONNECTOR
B303
ST : STi MODEL
ES : EXCEPT STi MODEL
*1 : STi : RW EXCEPT STi : R
*2 : STi : VW EXCEPT STi : B
ABS G SENSOR JOINT CONNECTOR (STi MODEL)
B261
B62
F45
B99
R3
F94
B15
R73
R72
B292
B257
B198
REF. TO GND-03
FRONT ABS SENSOR LH
FRONT ABS SENSOR RH
REAR ABS SENSOR LH
REAR ABS SENSOR RH
ABS G SENSOR
ABS LATERAL G SENSOR (STi MODEL)


B15 (GRAY)
F94 (GRAY)
R72
R73
B257
B292
B198
B303 (GRAY)
B261
B99
F45
B301

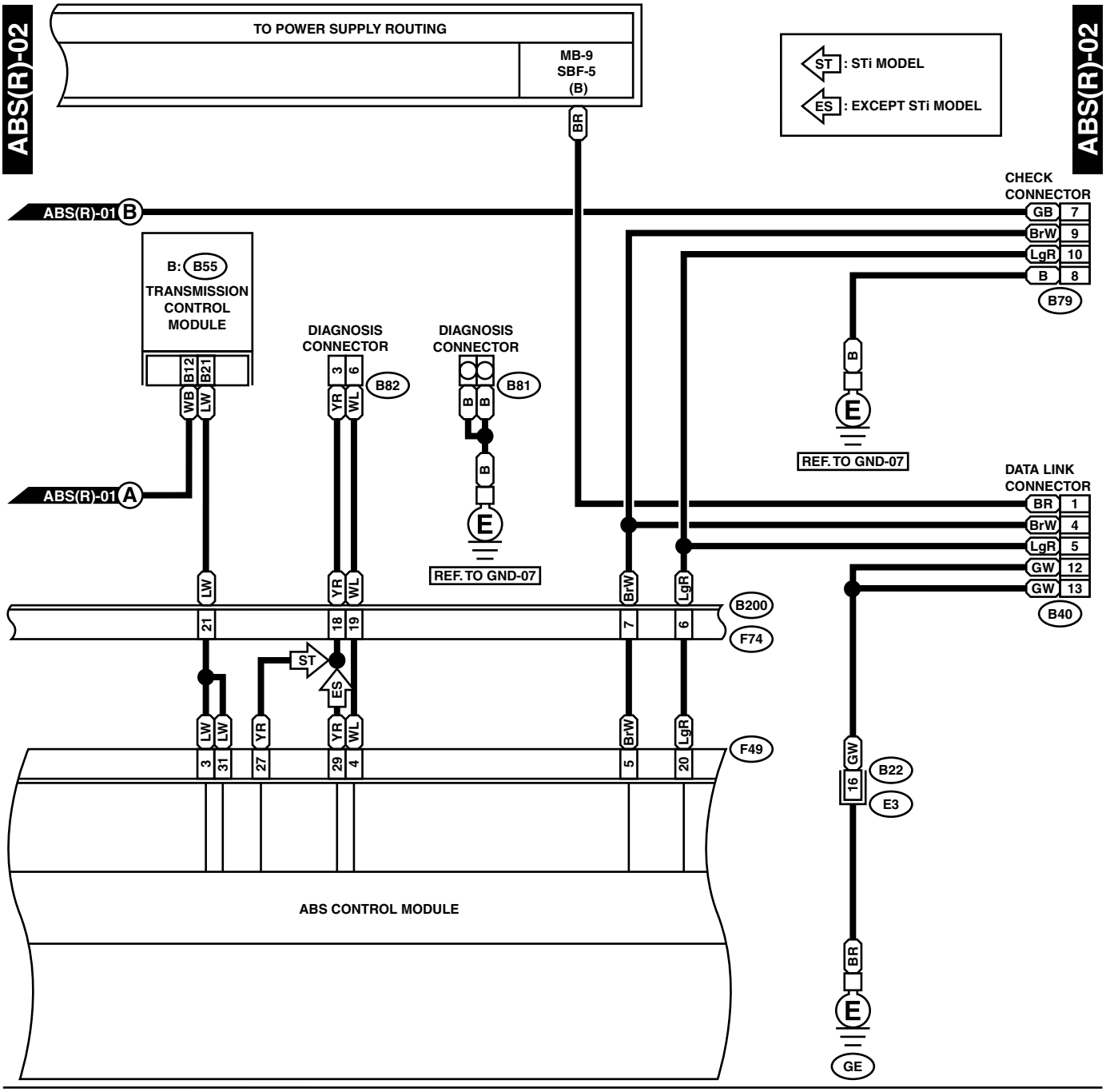
GL82-22C

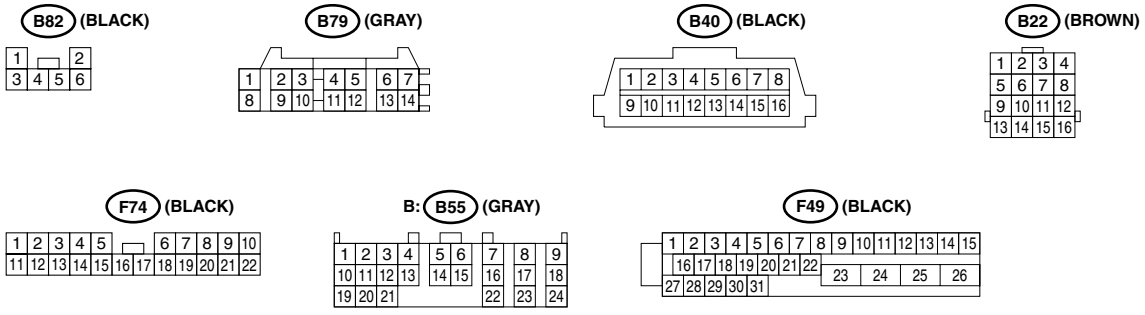
2. RHD MODEL



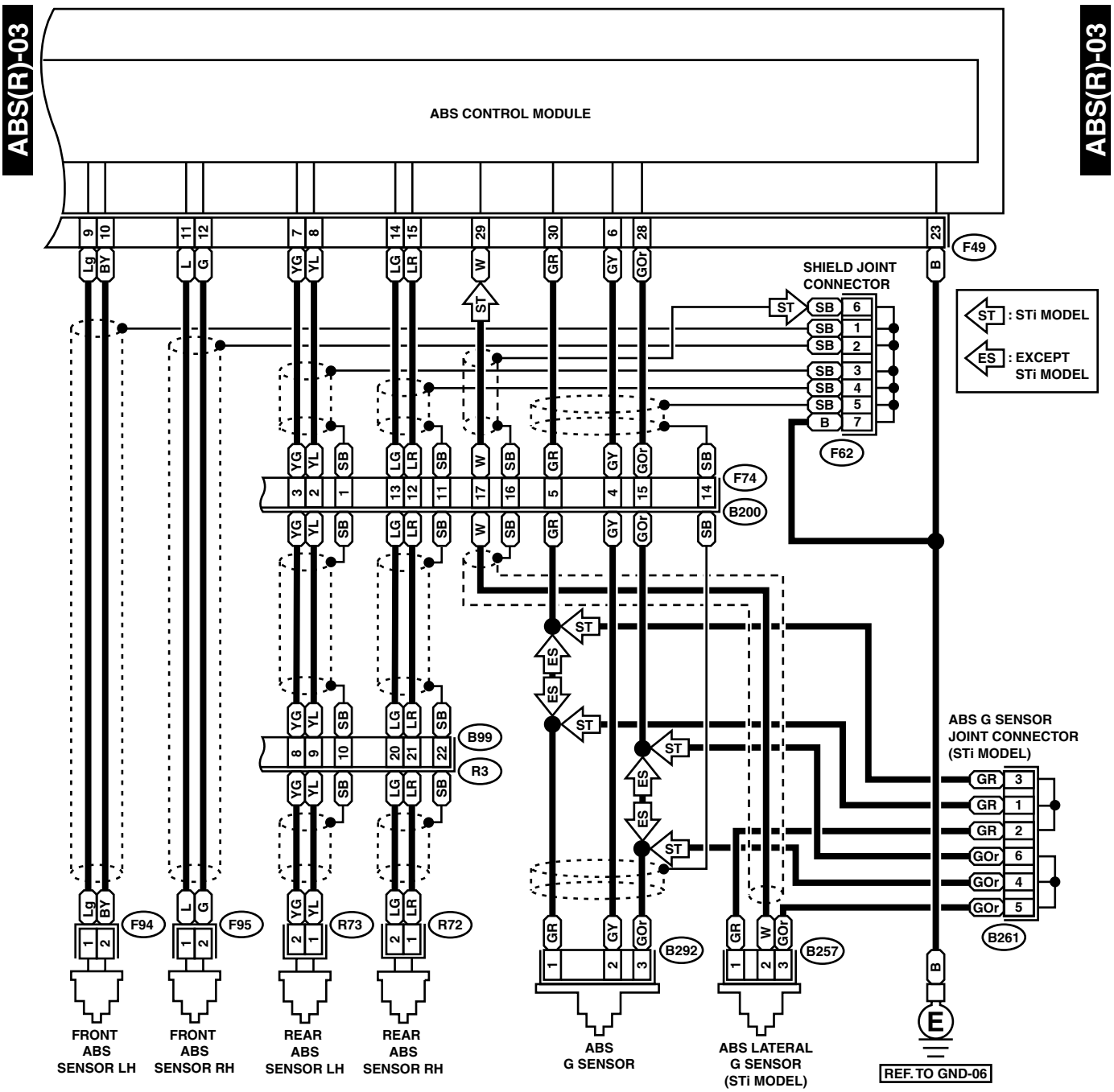


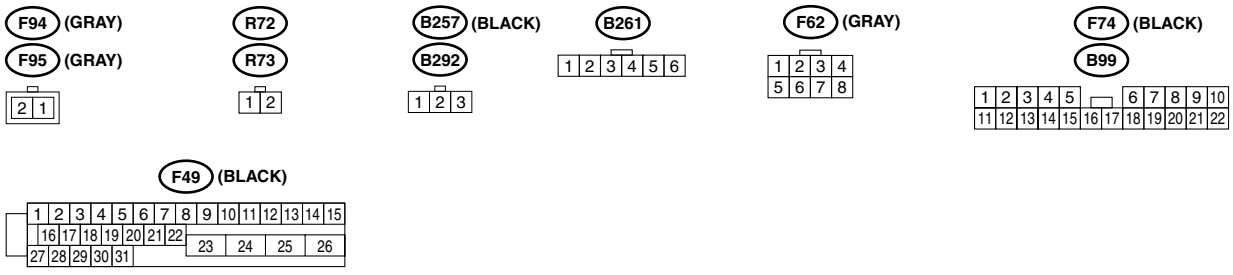
GR82-22A


ABS(R)-02
TO POWER SUPPLY ROUTING
MB-9
SBF-5
(B)
ST : STi MODEL
ES : EXCEPT STi MODEL
ABS(R)-02
BR
CHECK CONNECTOR
GB 7
BrW 9
LgR 10
B 8
B79
ABS(R)-01 B
B: B55
TRANSMISSION CONTROL MODULE
B12
B21
WB
LW
DIAGNOSIS CONNECTOR
3
6
YR
WL
B82
DIAGNOSIS CONNECTOR
B
B
B81
B
E
REF. TO GND-07
B
E
REF. TO GND-07
ABS(R)-01 A
DATA LINK CONNECTOR
BR 1
BrW 4
LgR 5
GW 12
GW 13
B40
LW
YR
WL
BrW
LgR
B200
21
18
19
7
6
F74
ST
ES
LW
LW
YR
YR
WL
BrW
LgR
F49
3
31
27
29
4
5
20
GW
16
B22
E3
ABS CONTROL MODULE
BR
E
GE


B82 (BLACK)
B79 (GRAY)
B40 (BLACK)
B22 (BROWN)
F74 (BLACK)
B: B55 (GRAY)
F49 (BLACK)

GR82-22B


ABS(R)-03
ABS(R)-03
ABS CONTROL MODULE
F49
SHIELD JOINT CONNECTOR
F62
ST : STi MODEL
ES : EXCEPT STi MODEL
F74
B200
B99
R3
ABS G SENSOR JOINT CONNECTOR (STi MODEL)
B261
F94
F95
R73
R72
B292
B257
FRONT ABS SENSOR LH
FRONT ABS SENSOR RH
REAR ABS SENSOR LH
REAR ABS SENSOR RH
ABS G SENSOR
ABS LATERAL G SENSOR (STi MODEL)
REF. TO GND-06


F94 (GRAY)
F95 (GRAY)
R72
R73
B257 (BLACK)
B292
B261
F62 (GRAY)
F74 (BLACK)
B99
F49 (BLACK)

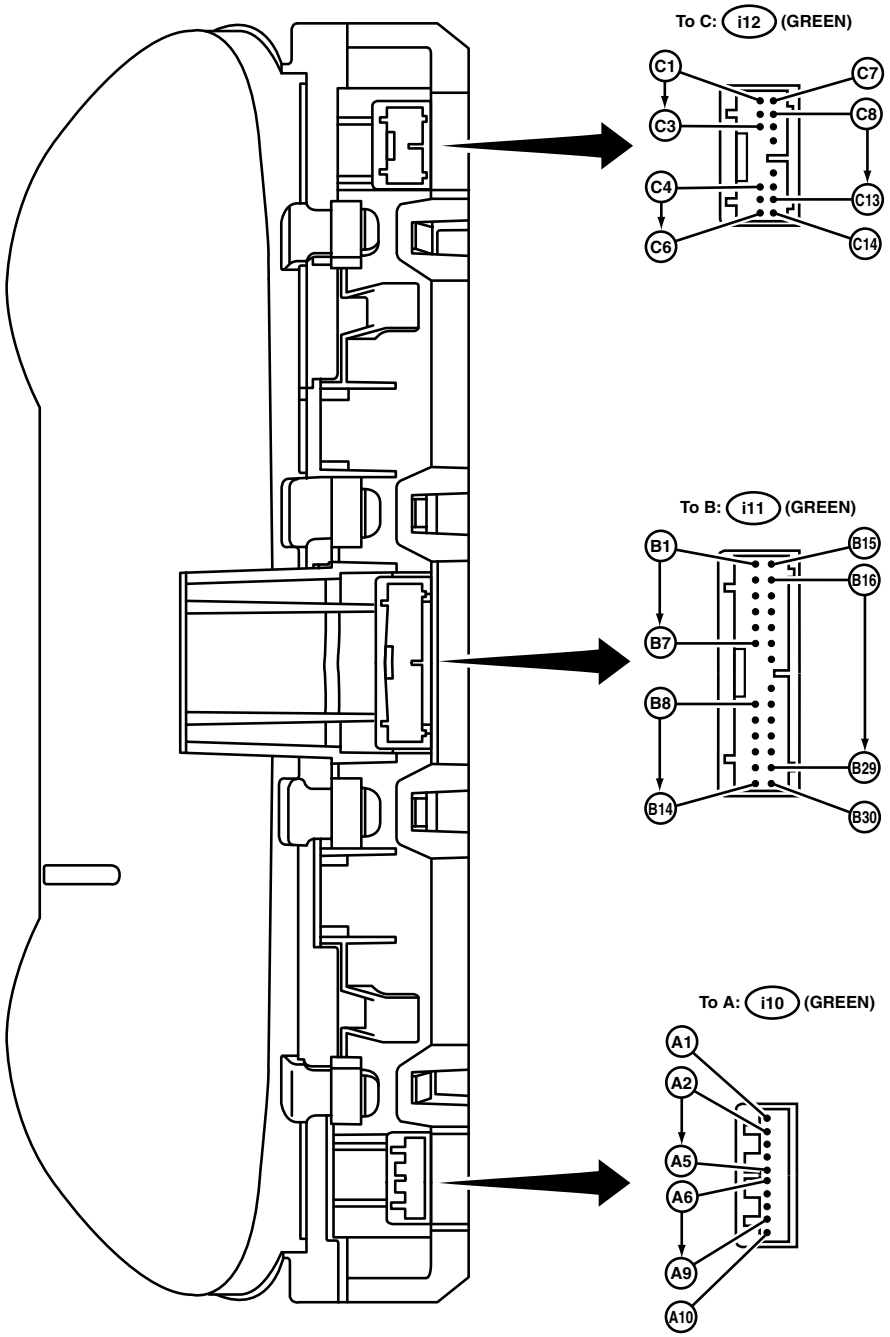
GR82-22C

12.Combination Meter

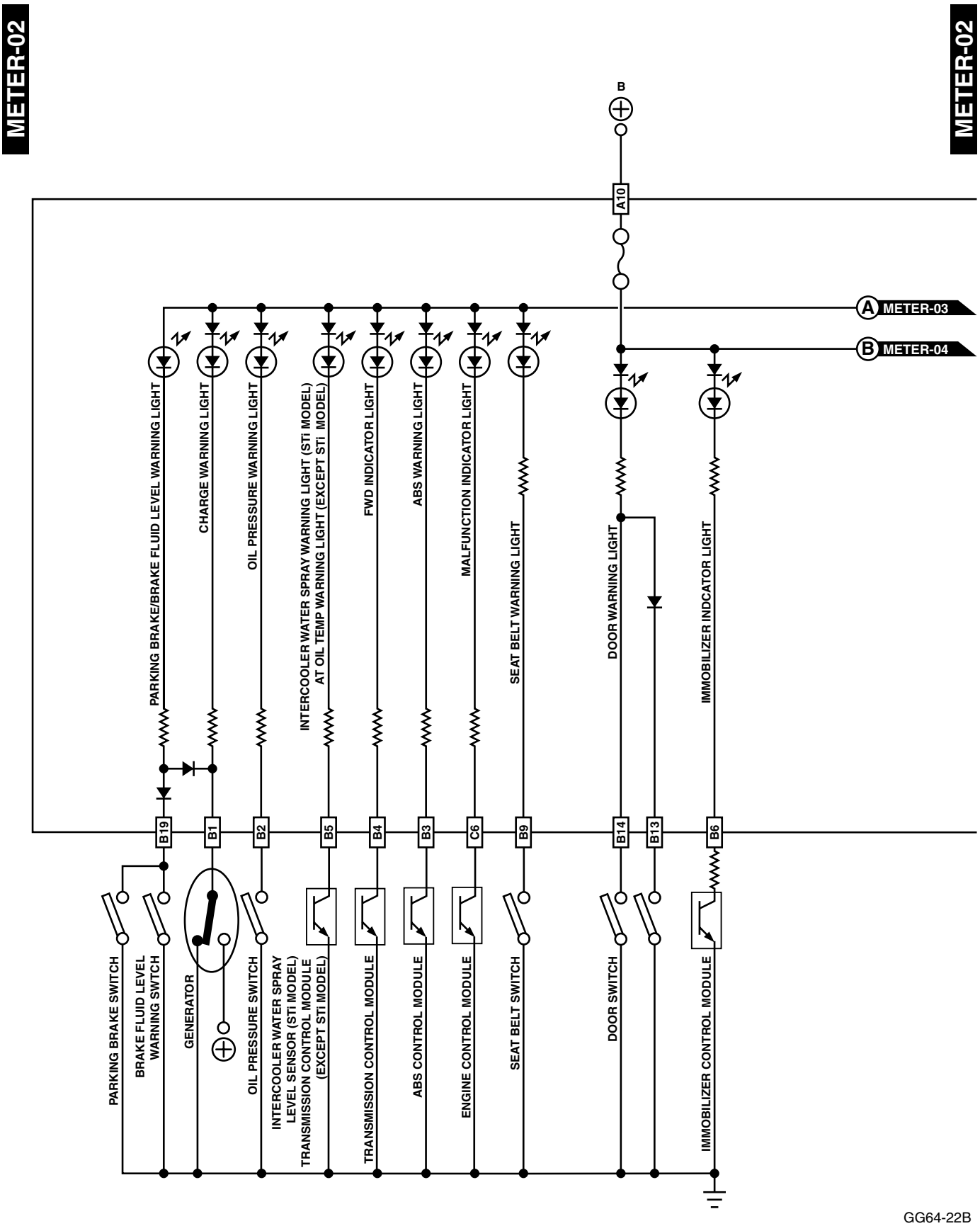
A: SCHEMATIC

METER-01

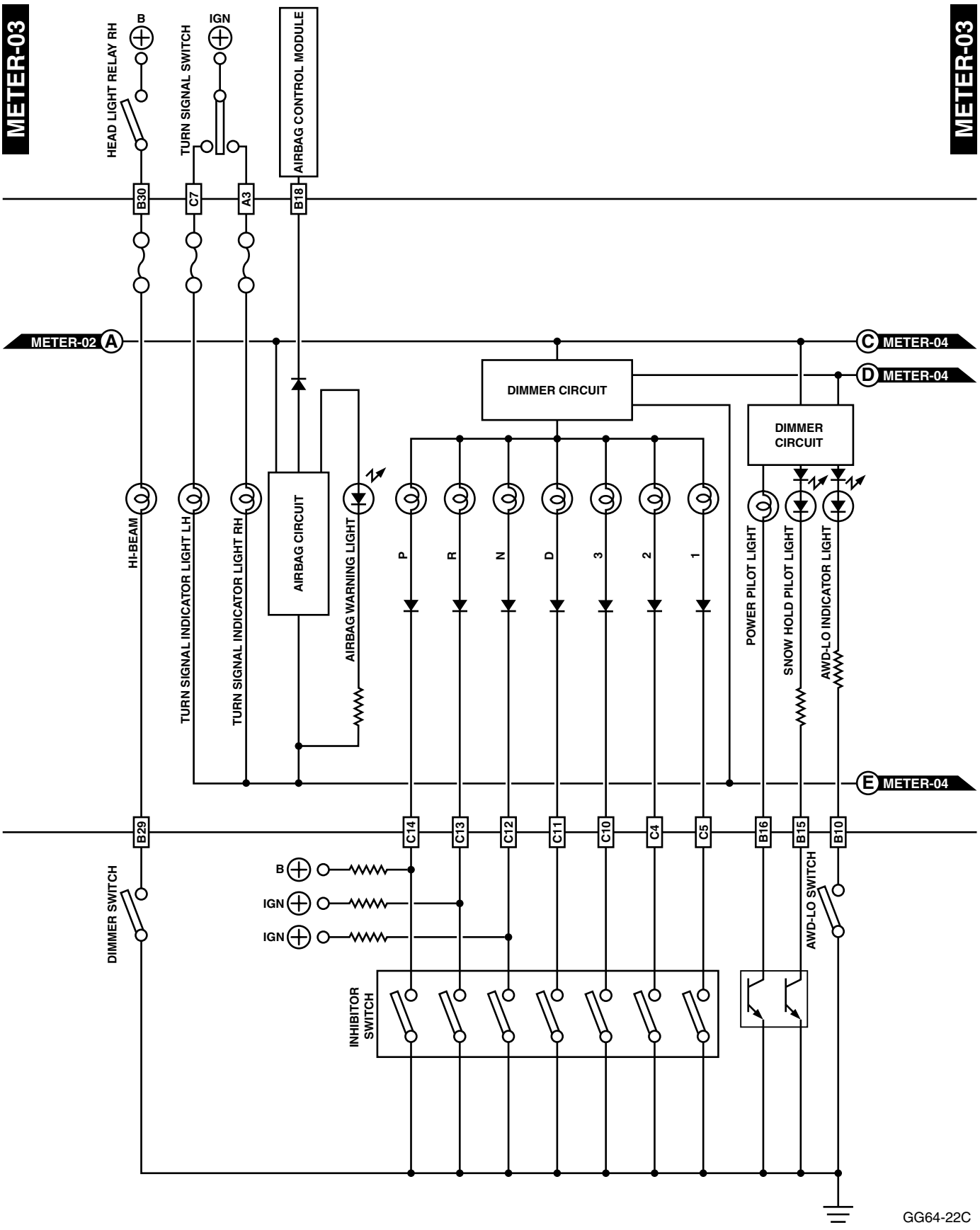
METER-01

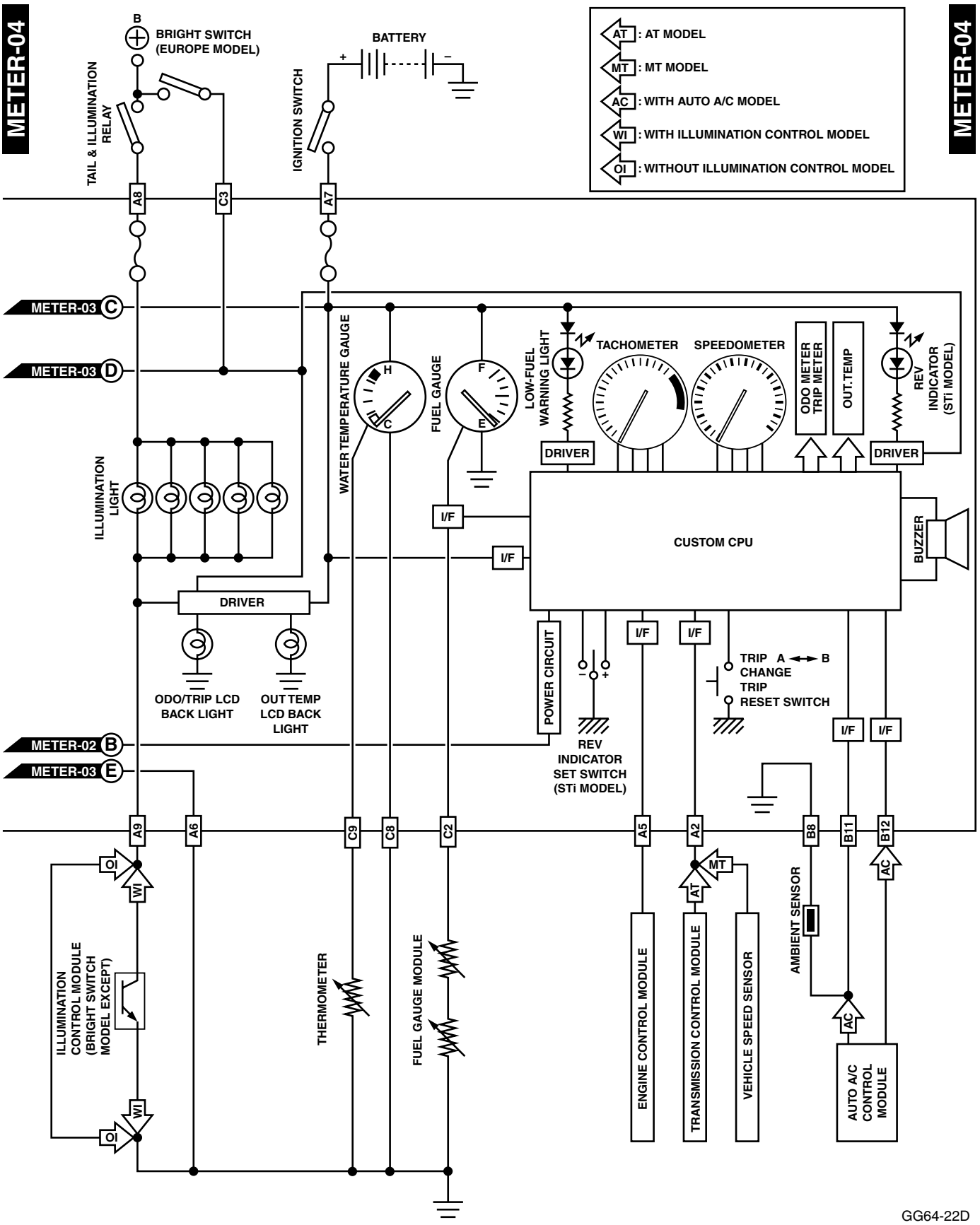


GG64-22A


METER-02
METER-02
B
A10
A METER-03
B METER-04
PARKING BRAKE/BRAKE FLUID LEVEL WARNING LIGHT
CHARGE WARNING LIGHT
OIL PRESSURE WARNING LIGHT
INTERCOOLER WATER SPRAY WARNING LIGHT (STi MODEL)
AT OIL TEMP WARNING LIGHT (EXCEPT STi MODEL)
FWD INDICATOR LIGHT
ABS WARNING LIGHT
MALFUNCTION INDICATOR LIGHT
SEAT BELT WARNING LIGHT
DOOR WARNING LIGHT
IMMOBILIZER INDCATOR LIGHT
B19
B1
B2
B5
B4
B3
C6
B9
B14
B13
B6
PARKING BRAKE SWITCH
BRAKE FLUID LEVEL WARNING SWTCH
GENERATOR
OIL PRESSURE SWITCH
INTERCOOLER WATER SPRAY LEVEL SENSOR (STi MODEL)
TRANSMISSION CONTROL MODULE (EXCEPT STi MODEL)
TRANSMISSION CONTROL MODULE
ABS CONTROL MODULE
ENGINE CONTROL MODULE
SEAT BELT SWITCH
DOOR SWITCH
IMMOBILIZER CONTROL MODULE

GG64-22B

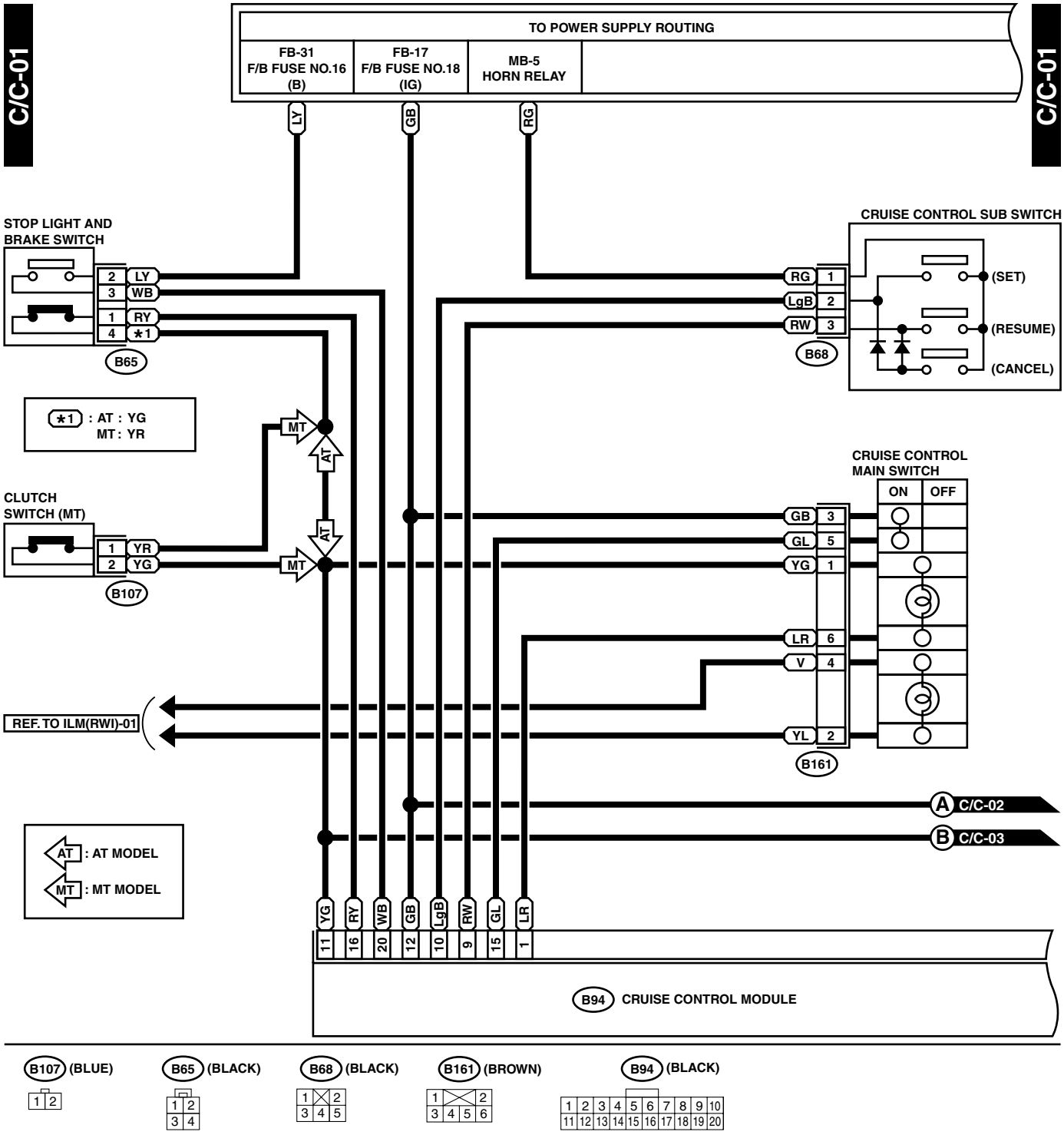

METER-03
METER-03
HEAD LIGHT RELAY RH
B
IGN
TURN SIGNAL SWITCH
AIRBAG CONTROL MODULE
B30
C7
A3
B18
METER-02 A
C METER-04
D METER-04
E METER-04
DIMMER CIRCUIT
DIMMER CIRCUIT
HI-BEAM
TURN SIGNAL INDICATOR LIGHT LH
TURN SIGNAL INDICATOR LIGHT RH
AIRBAG CIRCUIT
AIRBAG WARNING LIGHT
P
R
N
D
3
2
1
POWER PILOT LIGHT
SNOW HOLD PILOT LIGHT
AWD-LO INDICATOR LIGHT
B29
C14
C13
C12
C11
C10
C4
C5
B16
B15
B10
B
IGN
IGN
DIMMER SWITCH
AWD-LO SWITCH
INHIBITOR SWITCH
GG64-22C


METER-04
METER-04
AT : AT MODEL
MT : MT MODEL
AC : WITH AUTO A/C MODEL
WI : WITH ILLUMINATION CONTROL MODEL
OI : WITHOUT ILLUMINATION CONTROL MODEL
B
BRIGHT SWITCH (EUROPE MODEL)
BATTERY
TAIL & ILLUMINATION RELAY
IGNITION SWITCH
A8
C3
A7
METER-03 C
METER-03 D
METER-02 B
METER-03 E
ILLUMINATION LIGHT
WATER TEMPERATURE GAUGE
FUEL GAUGE
LOW-FUEL WARNING LIGHT
TACHOMETER
SPEEDOMETER
ODO METER TRIP METER
OUT.TEMP
REV INDICATOR (STi MODEL)
DRIVER
DRIVER
DRIVER
I/F
I/F
CUSTOM CPU
BUZZER
ODO/TRIP LCD BACK LIGHT
OUT TEMP LCD BACK LIGHT
POWER CIRCUIT
REV INDICATOR SET SWITCH (STi MODEL)
TRIP A ↔ B CHANGE TRIP RESET SWITCH
I/F
I/F
I/F
I/F
A9
A6
C9
C8
C2
A5
A2
B8
B11
B12
ILLUMINATION CONTROL MODULE (BRIGHT SWITCH MODEL EXCEPT)
THERMOMETER
FUEL GAUGE MODULE
ENGINE CONTROL MODULE
TRANSMISSION CONTROL MODULE
VEHICLE SPEED SENSOR
AMBIENT SENSOR
AUTO A/C CONTROL MODULE

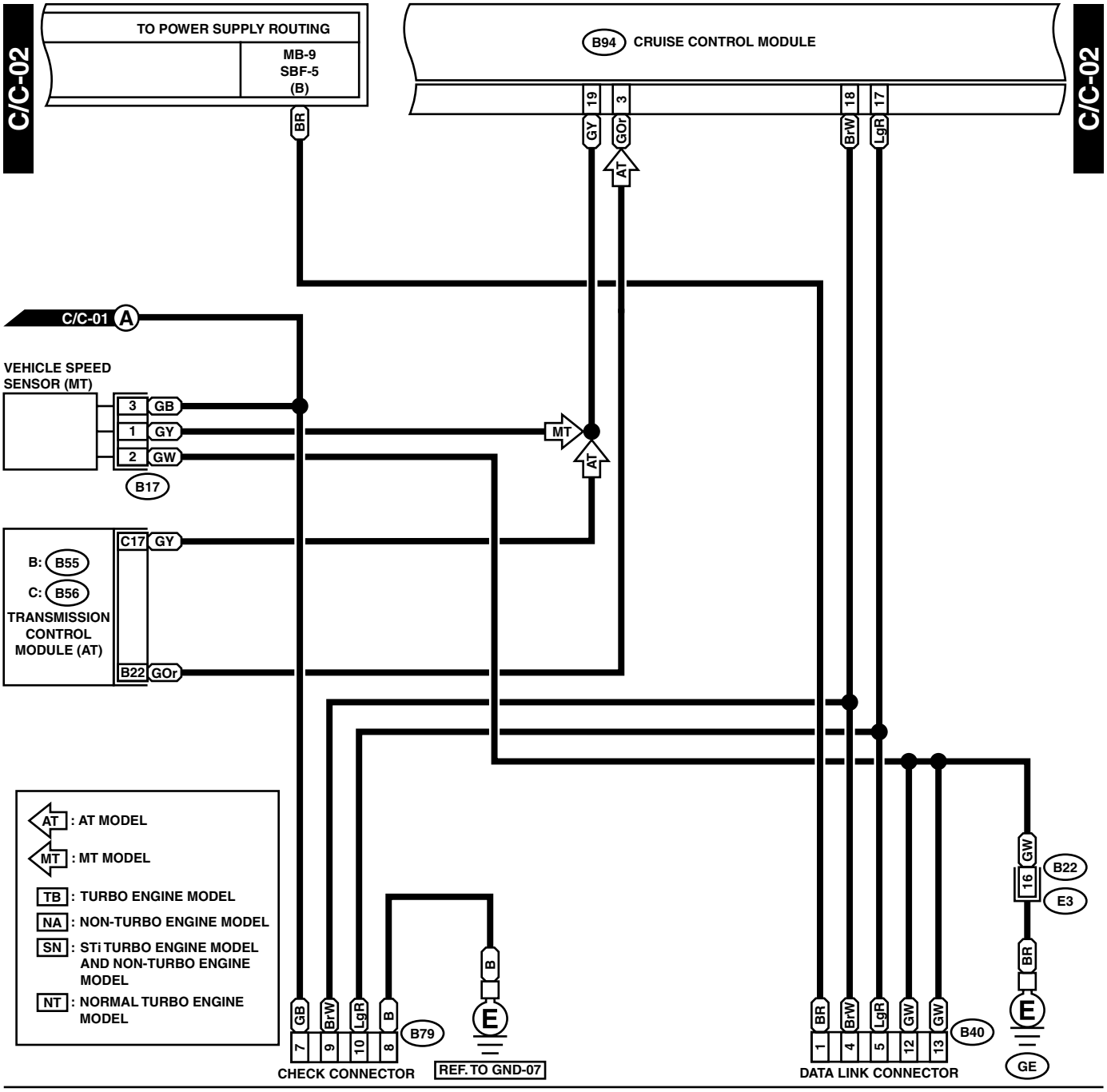
GG64-22D

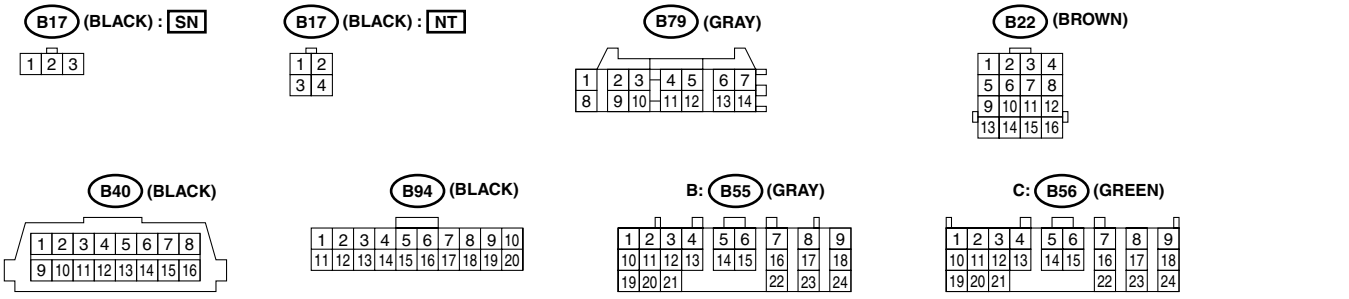
13.Cruise Control System

A: SCHEMATIC

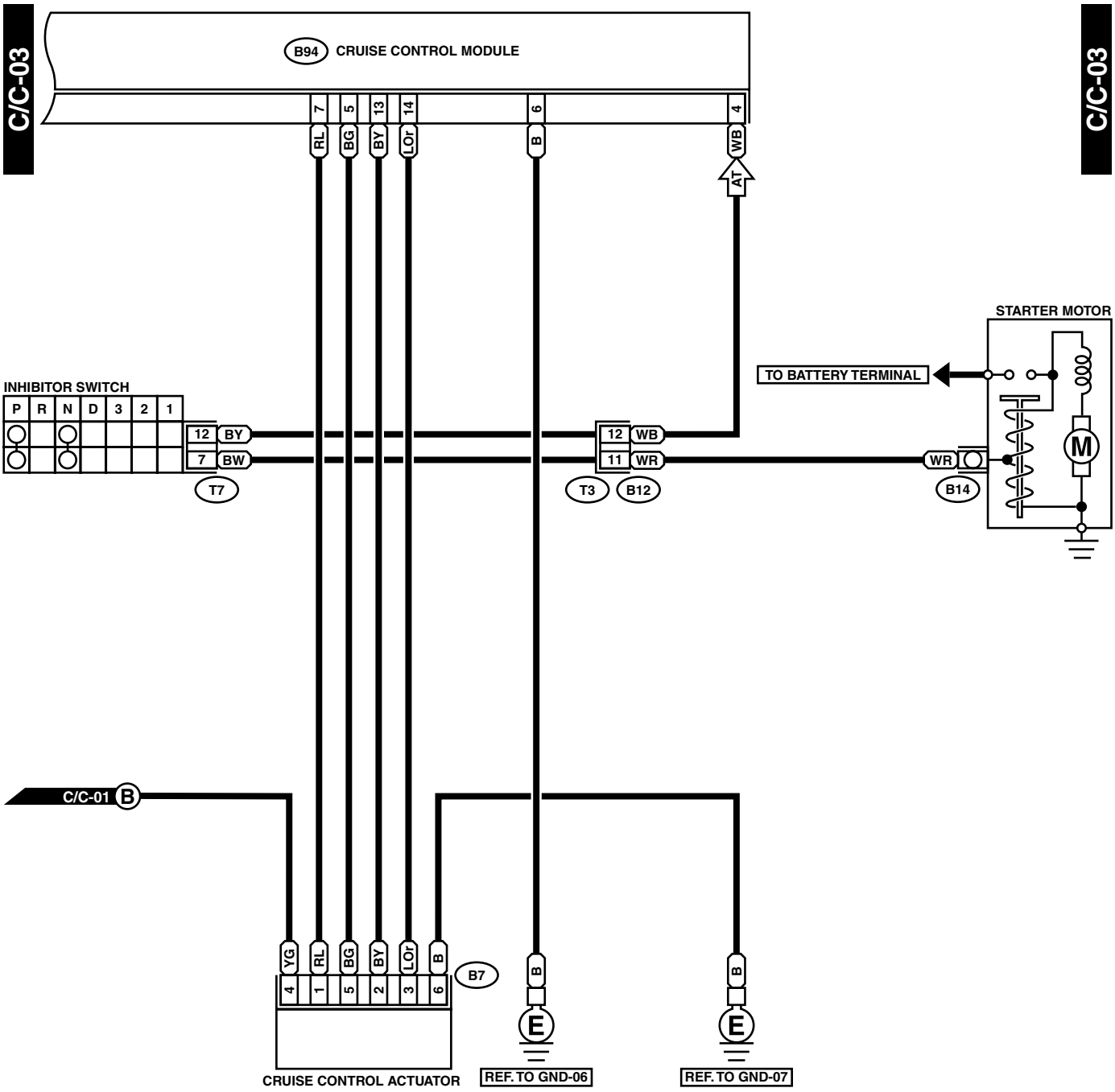


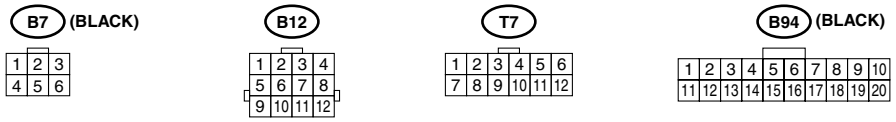
GG71-22A


C/C-02
TO POWER SUPPLY ROUTING
MB-9
SBF-5
(B)
B94 CRUISE CONTROL MODULE
C/C-02
BR
19
3
18
17
GY
GOr
BrW
LgR
AT
C/C-01 A
VEHICLE SPEED SENSOR (MT)
3 GB
1 GY
2 GW
B17
MT
AT
C17 GY
B: B55
C: B56
TRANSMISSION CONTROL MODULE (AT)
B22 GOr
AT : AT MODEL
MT : MT MODEL
TB : TURBO ENGINE MODEL
NA : NON-TURBO ENGINE MODEL
SN : STi TURBO ENGINE MODEL AND NON-TURBO ENGINE MODEL
NT : NORMAL TURBO ENGINE MODEL
GB
BrW
LgR
B
7
9
10
8
B79
B
E
CHECK CONNECTOR
REF. TO GND-07
BR
BrW
LgR
GW
GW
1
4
5
12
13
B40
GW
16
B22
E3
BR
E
GE
DATA LINK CONNECTOR


B17 (BLACK) : SN
1 2 3
B17 (BLACK) : NT
1 2
3 4
B79 (GRAY)
1 2 3 4 5 6 7
8 9 10 11 12 13 14
B22 (BROWN)
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
B40 (BLACK)
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
B94 (BLACK)
1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
B: B55 (GRAY)
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18
19 20 21 22 23 24
C: B56 (GREEN)
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18
19 20 21 22 23 24

GG71-22B


C/C-03
C/C-03
B94 CRUISE CONTROL MODULE
7 5 13 14 6 4
RL BG BY LOr B WB
AT
STARTER MOTOR
TO BATTERY TERMINAL
INHIBITOR SWITCH
P R N D 3 2 1
12 BY
7 BW
T7
12 WB
11 WR
T3 B12
WR
B14
M
C/C-01 B
YG RL BG BY LOr B
4 1 5 2 3 6
B7
B B
E E
CRUISE CONTROL ACTUATOR
REF. TO GND-06
REF. TO GND-07

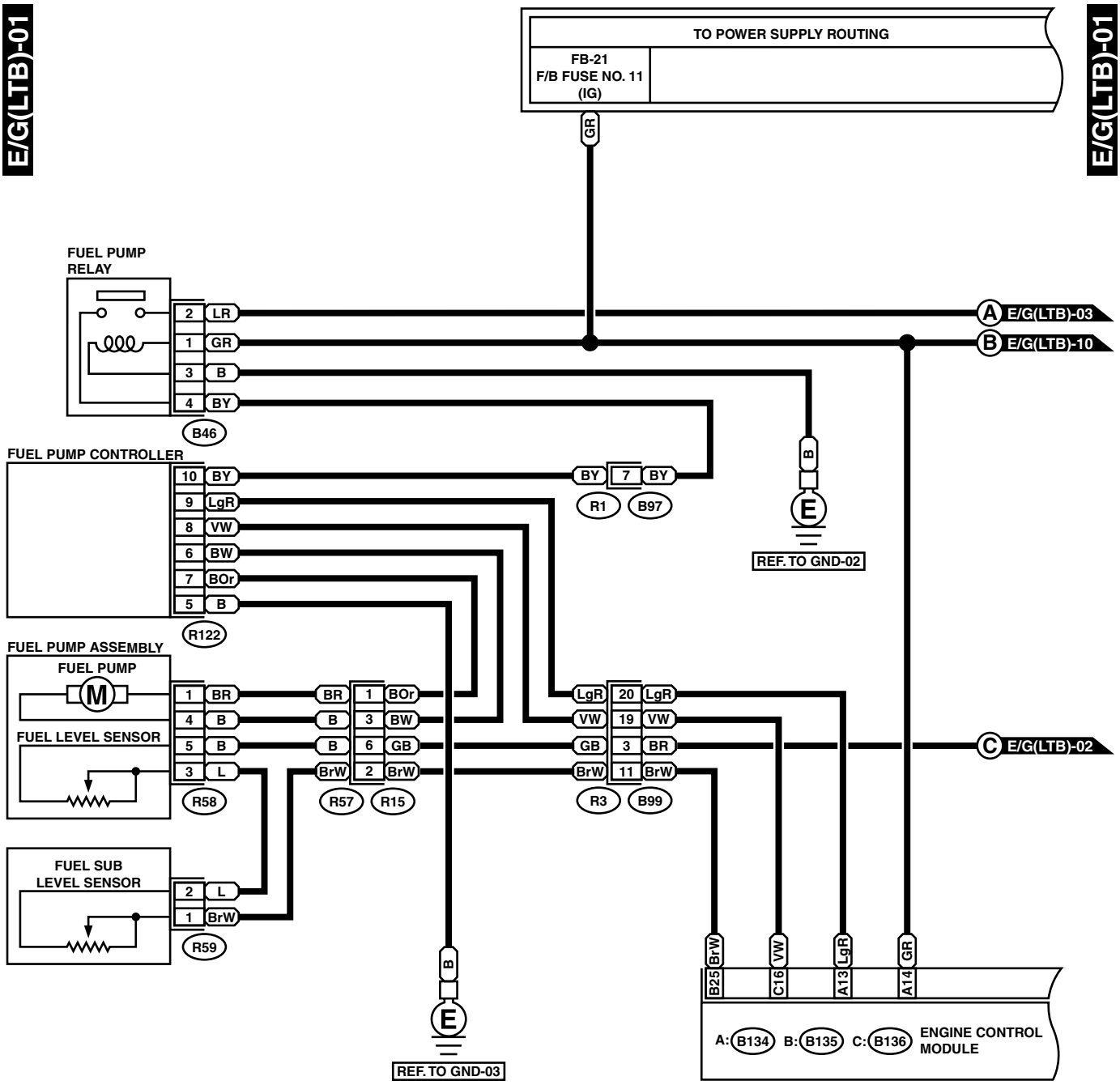

B7 (BLACK)
1 2 3
4 5 6
B12
1 2 3 4
5 6 7 8
9 10 11 12
T7
1 2 3 4 5 6
7 8 9 10 11 12
B94 (BLACK)
1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20

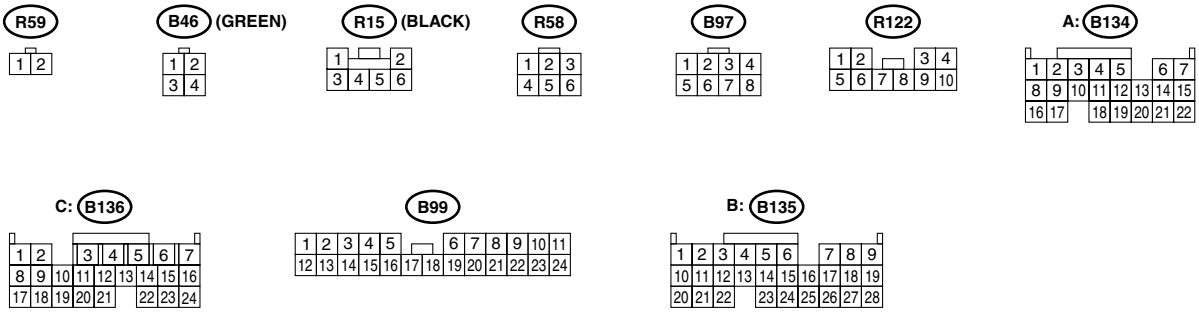
GG71-22C

16.Engine Electrical System

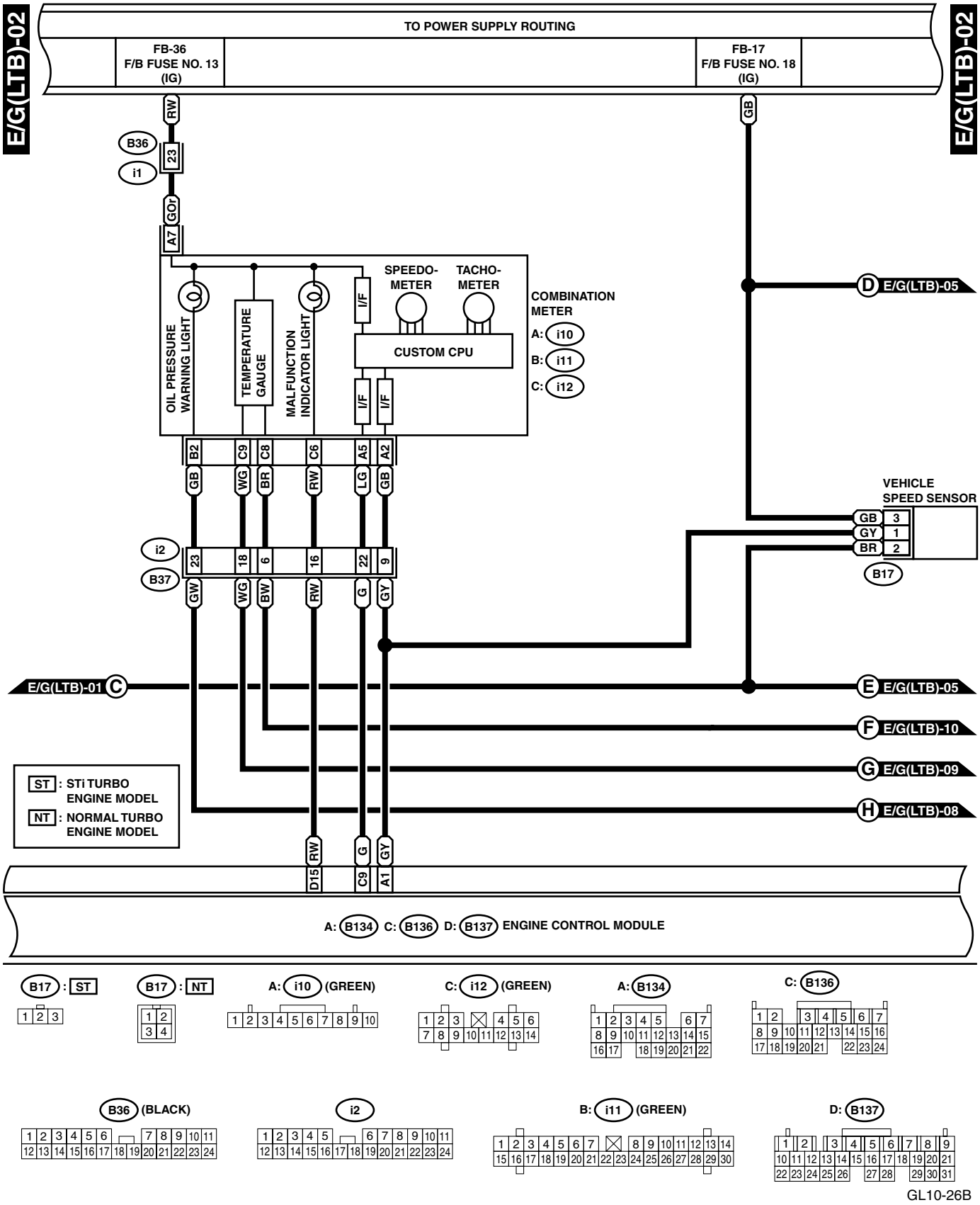
A: SCHEMATIC

3. LHD DOHC TURBO MODEL

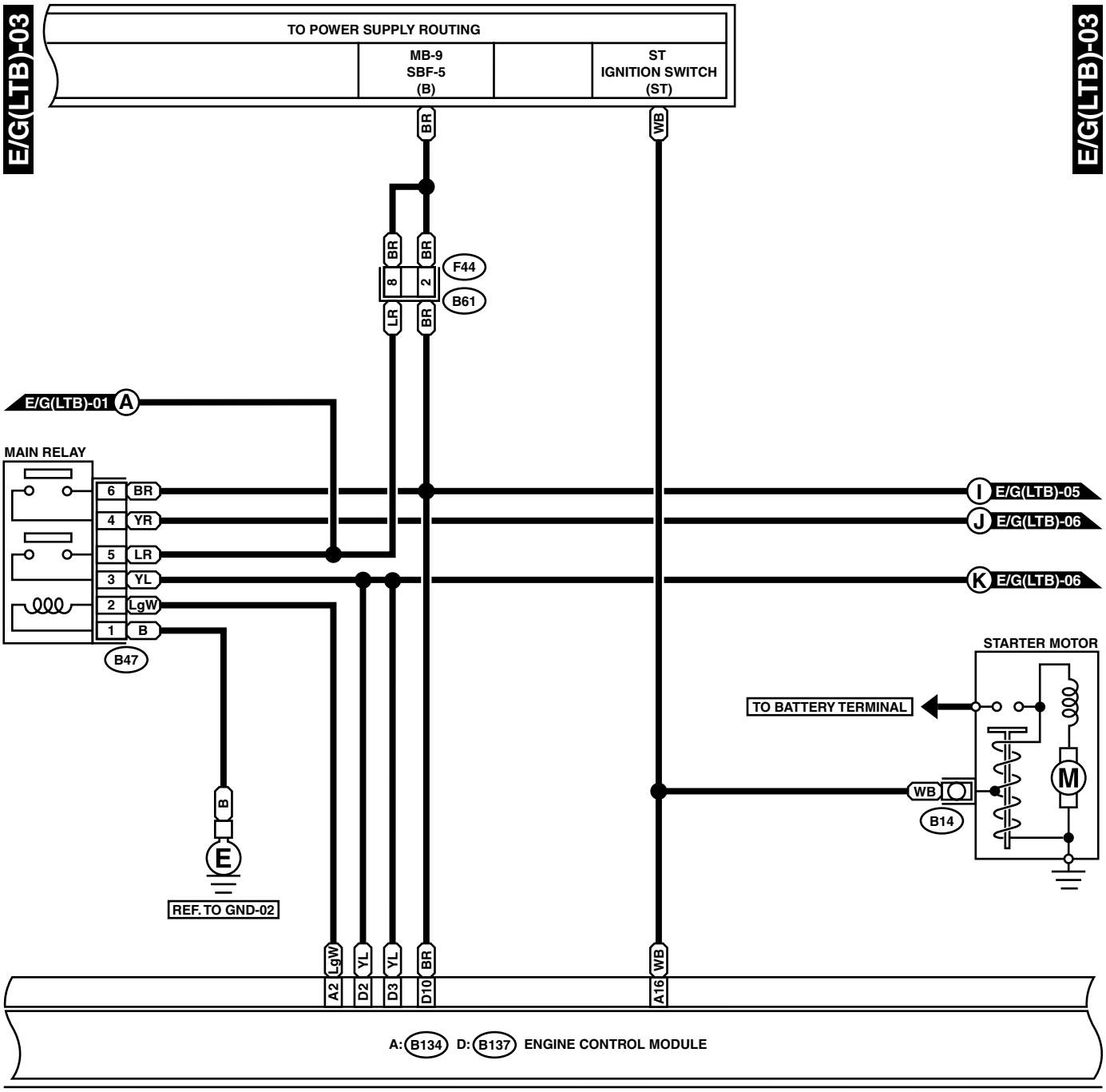


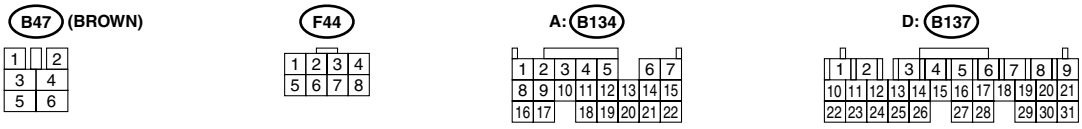


GL10-26A


E/G(LTB)-02
E/G(LTB)-02
TO POWER SUPPLY ROUTING
FB-36
F/B FUSE NO. 13
(IG)
FB-17
F/B FUSE NO. 18
(IG)
RW
GB
B36
i1
23
GOr
A7
SPEEDO-METER
TACHO-METER
COMBINATION METER
A: i10
B: i11
C: i12
I/F
CUSTOM CPU
OIL PRESSURE WARNING LIGHT
TEMPERATURE GAUGE
MALFUNCTION INDICATOR LIGHT
D E/G(LTB)-05
B2
C9
C8
C6
A5
A2
GB
WG
BR
RW
LG
GB
VEHICLE SPEED SENSOR
GB 3
GY 1
BR 2
B17
i2
B37
23
18
6
16
22
9
GW
WG
BW
RW
G
GY
E/G(LTB)-01 C
E E/G(LTB)-05
F E/G(LTB)-10
G E/G(LTB)-09
H E/G(LTB)-08
ST : STi TURBO ENGINE MODEL
NT : NORMAL TURBO ENGINE MODEL
RW
G
GY
D15
C9
A1
A: B134 C: B136 D: B137 ENGINE CONTROL MODULE
B17 : ST
B17 : NT
A: i10 (GREEN)
C: i12 (GREEN)
A: B134
C: B136
B36 (BLACK)
i2
B: i11 (GREEN)
D: B137

GL10-26B

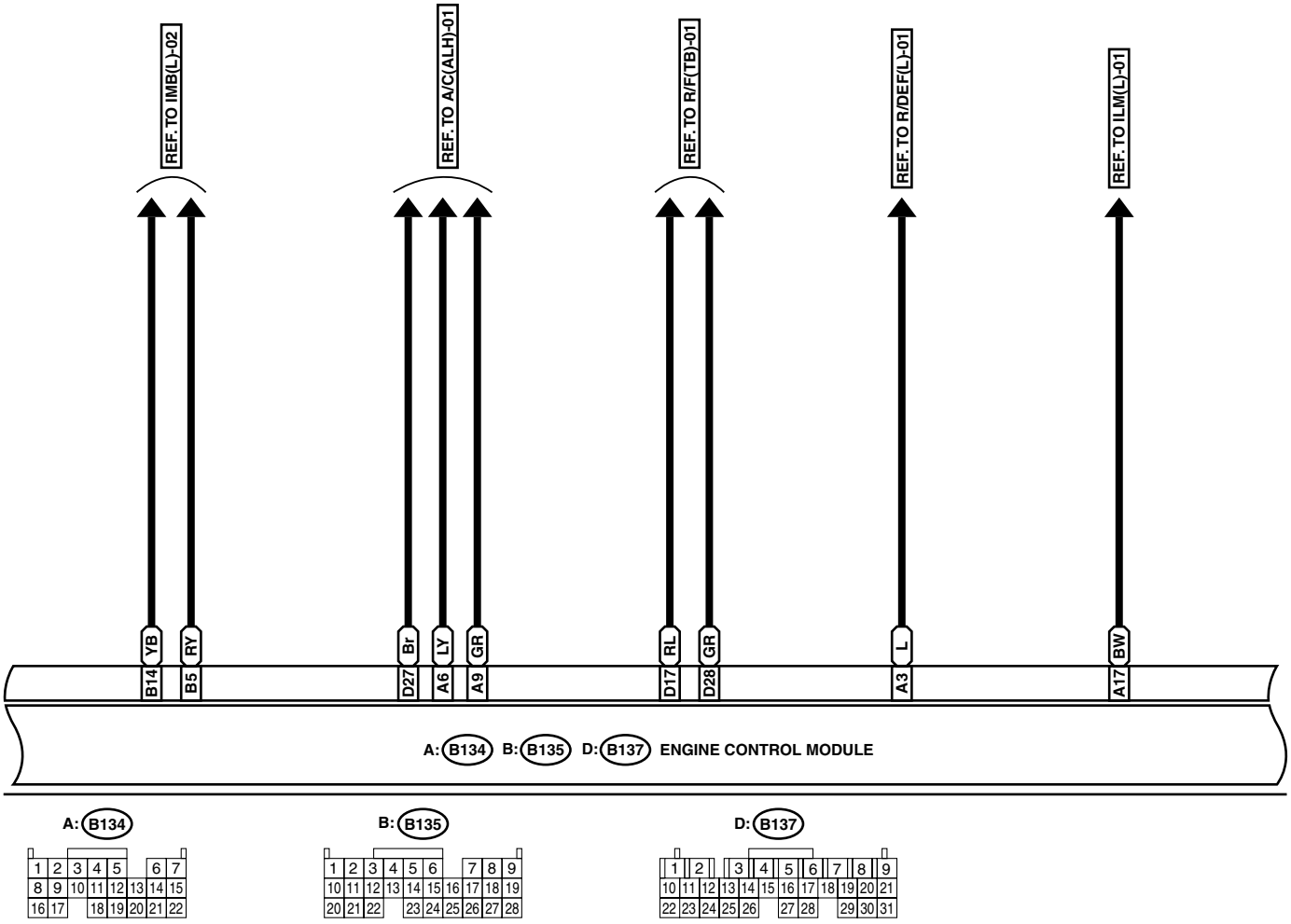

E/G(LTB)-03
TO POWER SUPPLY ROUTING
MB-9
SBF-5
(B)
ST
IGNITION SWITCH
(ST)
BR
WB
F44
B61
LR
E/G(LTB)-01 A
MAIN RELAY
6 BR
4 YR
5 LR
3 YL
2 LgW
1 B
B47
I E/G(LTB)-05
J E/G(LTB)-06
K E/G(LTB)-06
STARTER MOTOR
TO BATTERY TERMINAL
M
B14
E
REF. TO GND-02
A2 LgW
D2 YL
D3 YL
D10 BR
A16 WB
A: B134 D: B137 ENGINE CONTROL MODULE


B47 (BROWN)
F44
A: B134
D: B137

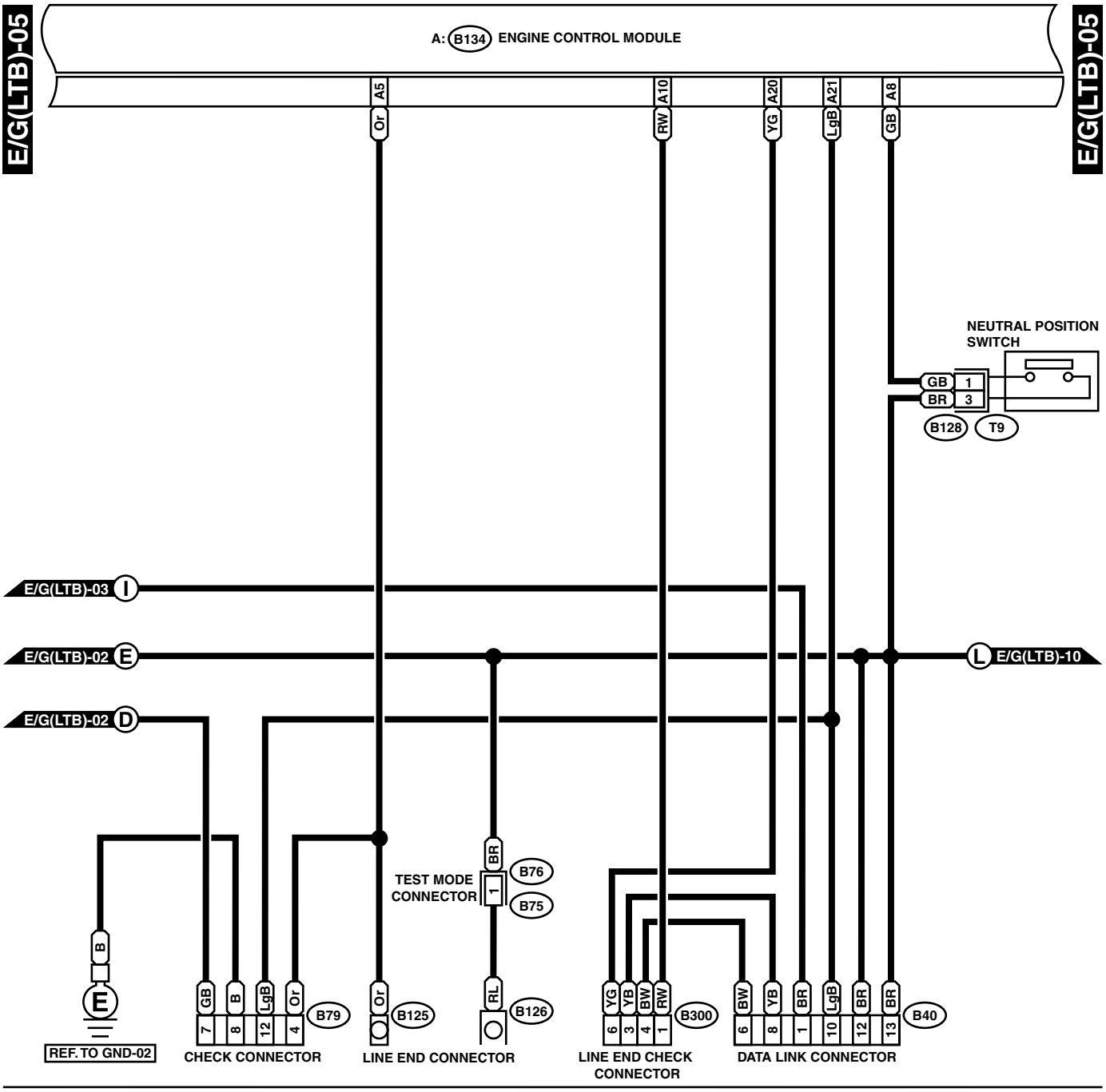
GL10-26C

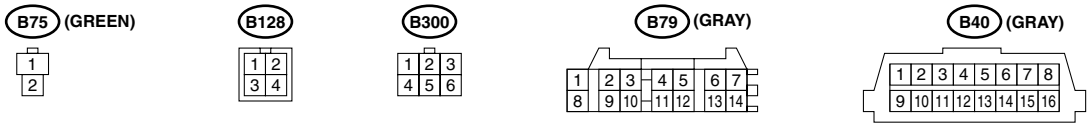
E/G(LTB)-04

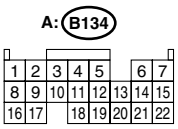
E/G(LTB)-04



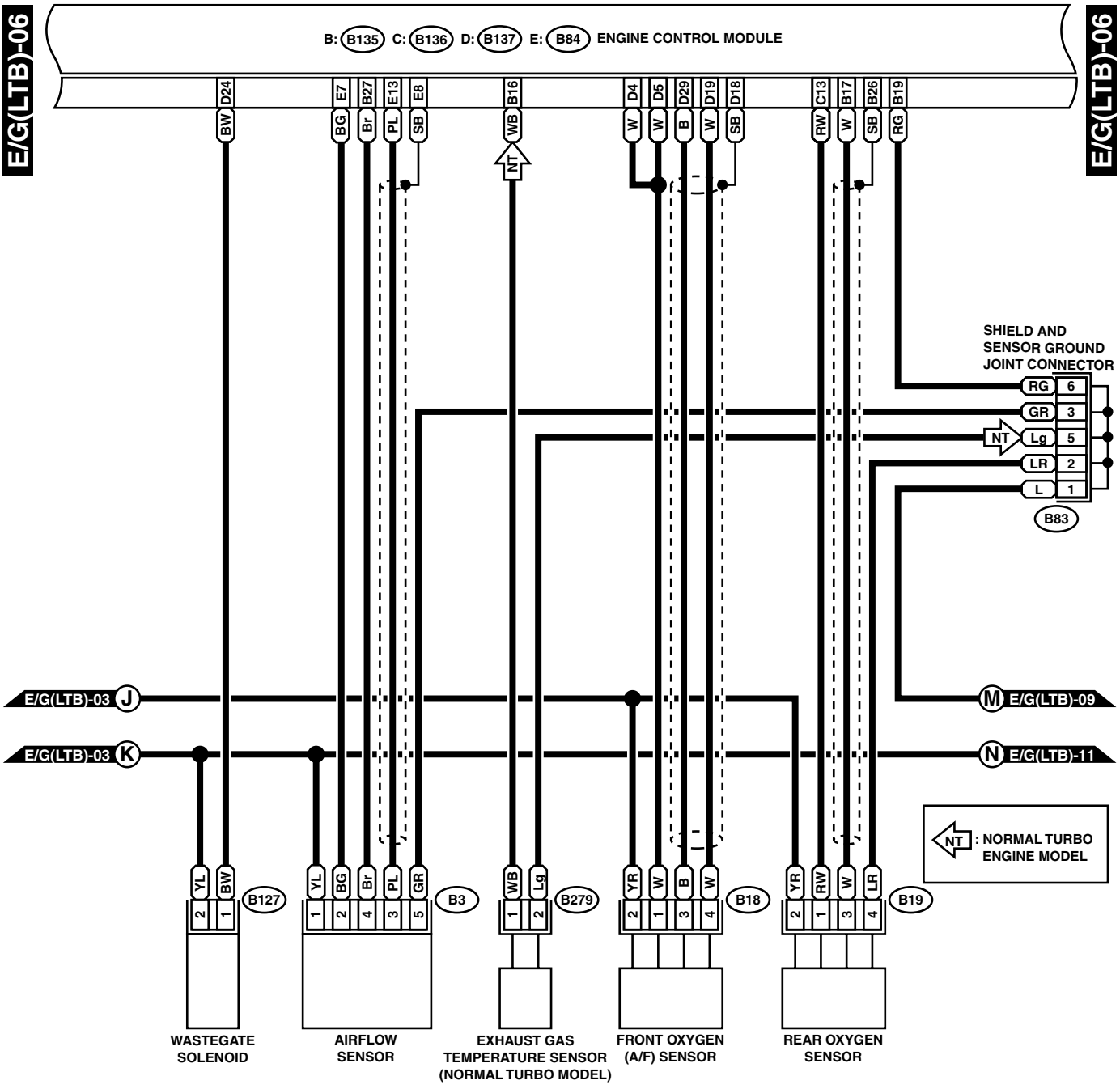
GL10-26D

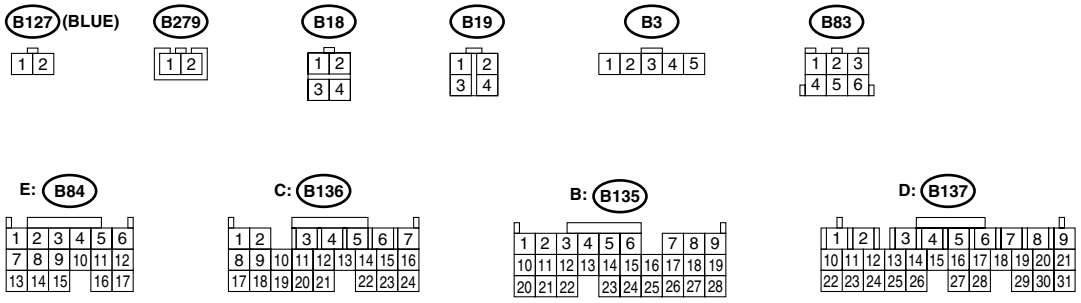

E/G(LTB)-05
A: B134 ENGINE CONTROL MODULE
A5
A10
A20
A21
A8
Or
RW
YG
LgB
GB
NEUTRAL POSITION SWITCH
GB
BR
1
3
B128
T9
E/G(LTB)-03 I
E/G(LTB)-02 E
E/G(LTB)-02 D
L E/G(LTB)-10
TEST MODE CONNECTOR
BR
B76
B75
B
REF. TO GND-02
GB
B
LgB
Or
B79
CHECK CONNECTOR
Or
B125
LINE END CONNECTOR
RL
B126
YG
YB
BW
RW
B300
LINE END CHECK CONNECTOR
BW
YB
BR
LgB
BR
BR
B40
DATA LINK CONNECTOR


B75 (GREEN)
B128
B300
B79 (GRAY)
B40 (GRAY)

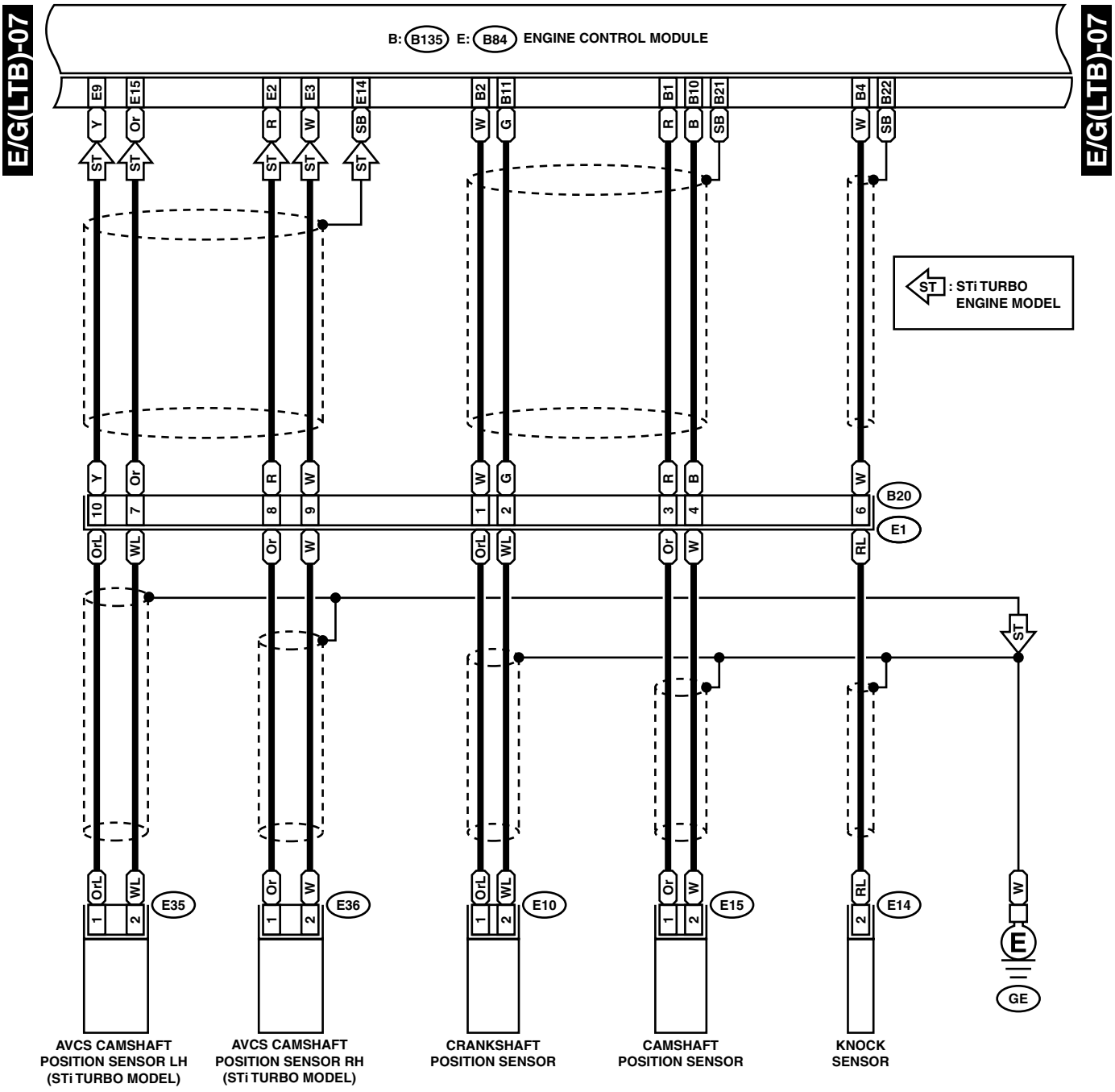

A: B134

GL10-26E


E/G(LTB)-06
B: B135 C: B136 D: B137 E: B84 ENGINE CONTROL MODULE
D24 BW
E7 BG
B27 Br
E13 PL
E8 SB
B16 WB
NT
D4 W
D5 W
D29 B
D19 W
D18 SB
C13 RW
B17 W
B26 SB
B19 RG
SHIELD AND SENSOR GROUND JOINT CONNECTOR
RG 6
GR 3
NT Lg 5
LR 2
L 1
B83
E/G(LTB)-03 J
E/G(LTB)-03 K
M E/G(LTB)-09
N E/G(LTB)-11
NT : NORMAL TURBO ENGINE MODEL
YL BW B127
YL BG Br PL GR B3
WB Lg B279
YR W B W B18
YR RW W LR B19
WASTEGATE SOLENOID
AIRFLOW SENSOR
EXHAUST GAS TEMPERATURE SENSOR (NORMAL TURBO MODEL)
FRONT OXYGEN (A/F) SENSOR
REAR OXYGEN SENSOR

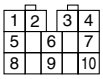

B127 (BLUE)
B279
B18
B19
B3
B83
E: B84
C: B136
B: B135
D: B137

GL10-26F

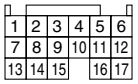


E10 (LIGHT GRAY)
E14 (GRAY)
E15 (LIGHT GRAY)
E35
E36

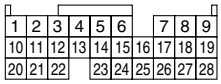
B20 (LIGHT GRAY)



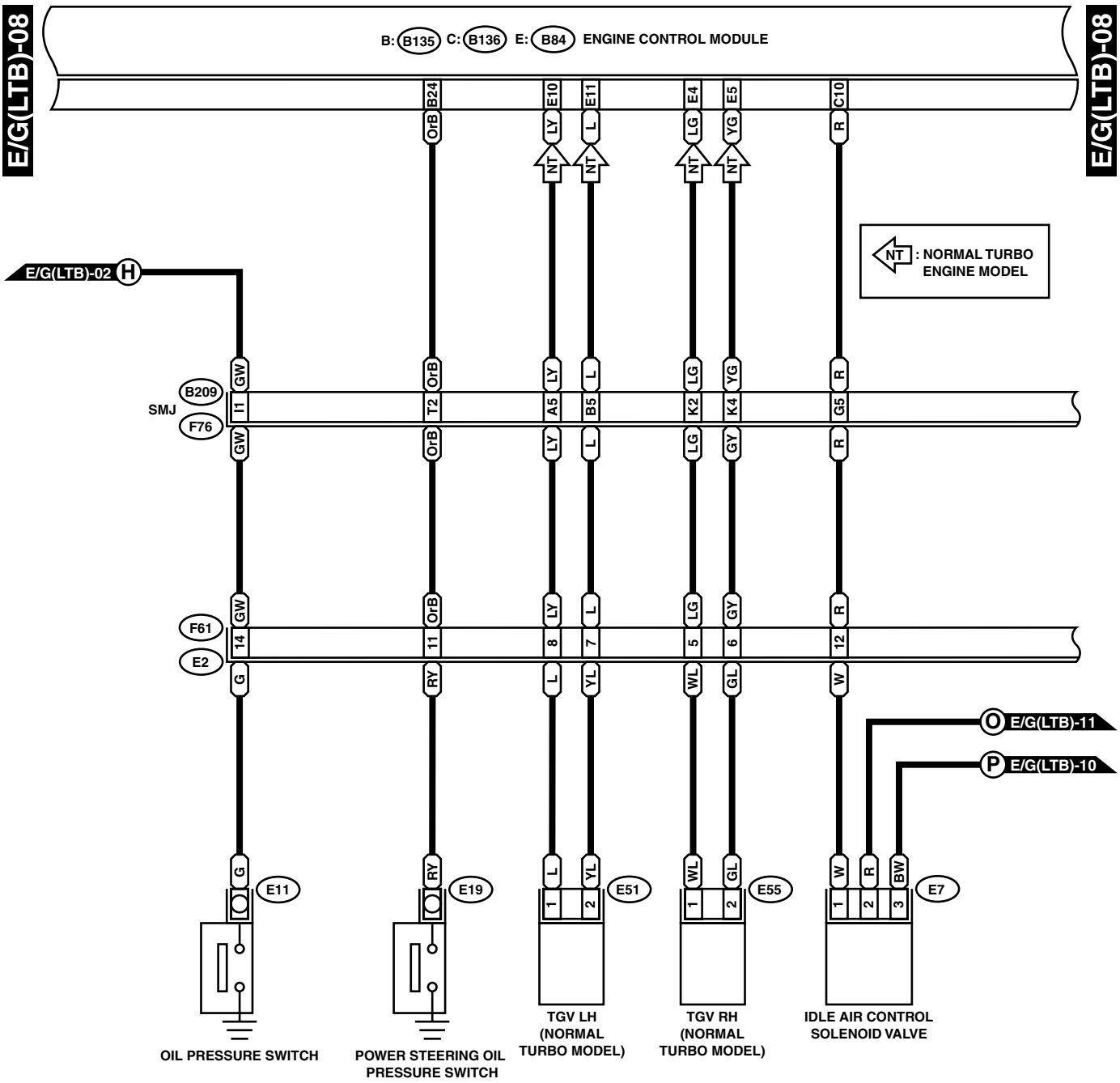
E: B84

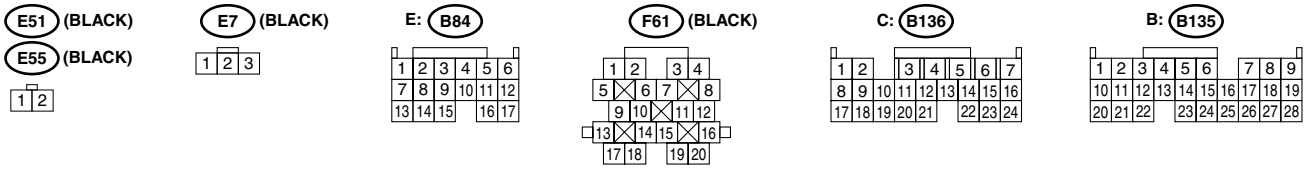


B: B135

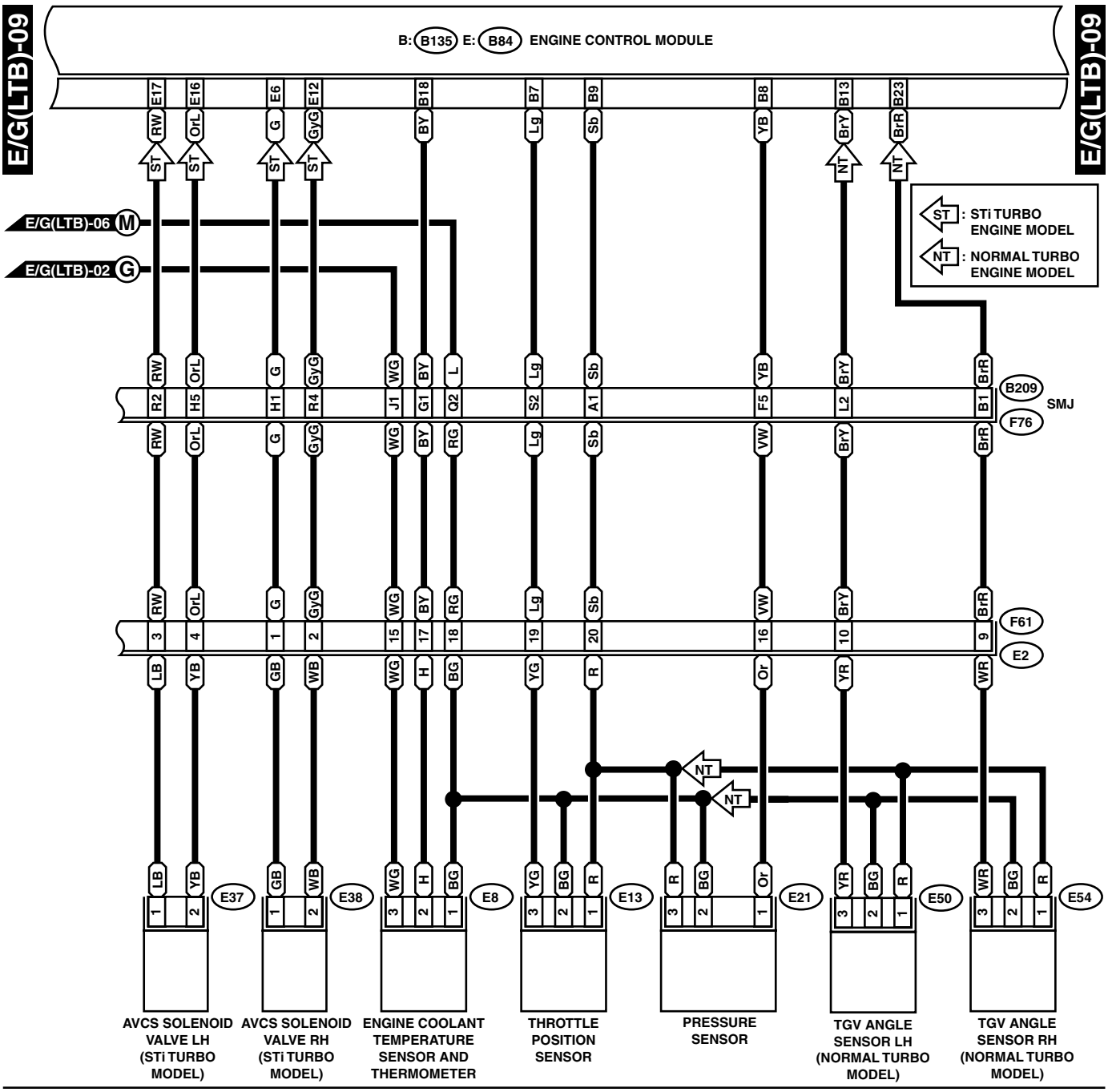


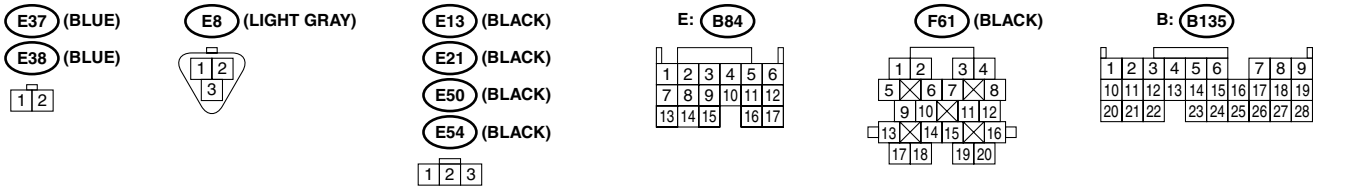
GL10-26G


E/G(LTB)-08
B: B135 C: B136 E: B84 ENGINE CONTROL MODULE
E/G(LTB)-08
NT : NORMAL TURBO ENGINE MODEL
E/G(LTB)-02 H
SMJ
B209
F76
F61
E2
E/G(LTB)-11 O
E/G(LTB)-10 P
E11
E19
E51
E55
E7
OIL PRESSURE SWITCH
POWER STEERING OIL PRESSURE SWITCH
TGV LH (NORMAL TURBO MODEL)
TGV RH (NORMAL TURBO MODEL)
IDLE AIR CONTROL SOLENOID VALVE

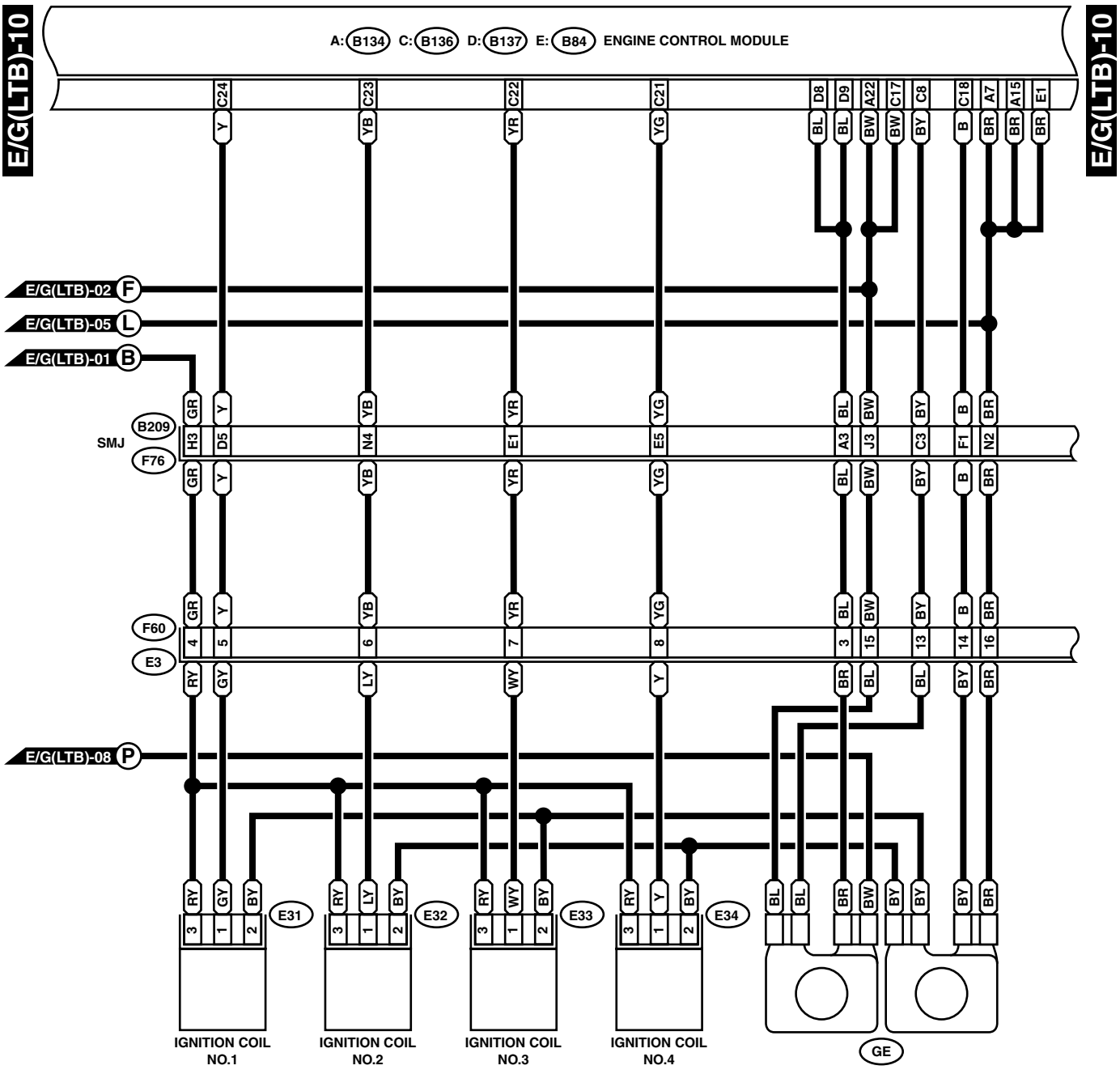

E51 (BLACK)
E55 (BLACK)
E7 (BLACK)
E: B84
F61 (BLACK)
C: B136
B: B135

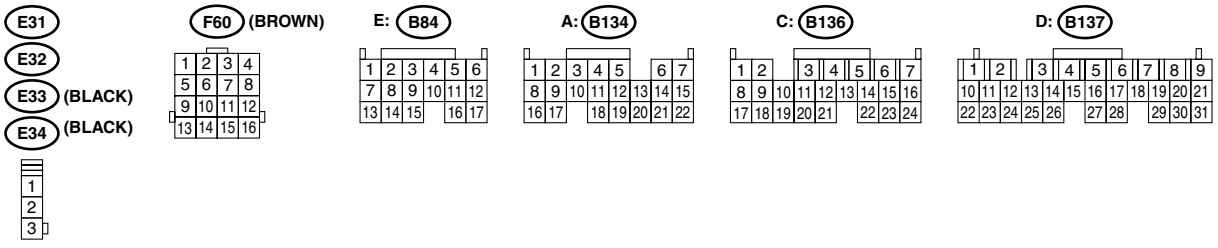
GL10-26H


E/G(LTB)-09
E/G(LTB)-09
B: B135 E: B84 ENGINE CONTROL MODULE
E17 E16 E6 E12 B18 B7 B9 B8 B13 B23
RW OrL G GyG BY Lg Sb YB BrY BrR
ST ST ST ST NT NT
E/G(LTB)-06 M
E/G(LTB)-02 G
ST : STi TURBO ENGINE MODEL
NT : NORMAL TURBO ENGINE MODEL
B209
SMJ
F76
F61
E2
R2 H5 H1 R4 J1 G1 Q2 S2 A1 F5 L2 B1
3 4 1 2 15 17 18 19 20 16 10 9
WG H
LB YB GB WB WG H BG YG R R BG Or YR BG R WR BG R
E37 E38 E8 E13 E21 E50 E54
AVCS SOLENOID VALVE LH (STi TURBO MODEL)
AVCS SOLENOID VALVE RH (STi TURBO MODEL)
ENGINE COOLANT TEMPERATURE SENSOR AND THERMOMETER
THROTTLE POSITION SENSOR
PRESSURE SENSOR
TGV ANGLE SENSOR LH (NORMAL TURBO MODEL)
TGV ANGLE SENSOR RH (NORMAL TURBO MODEL)

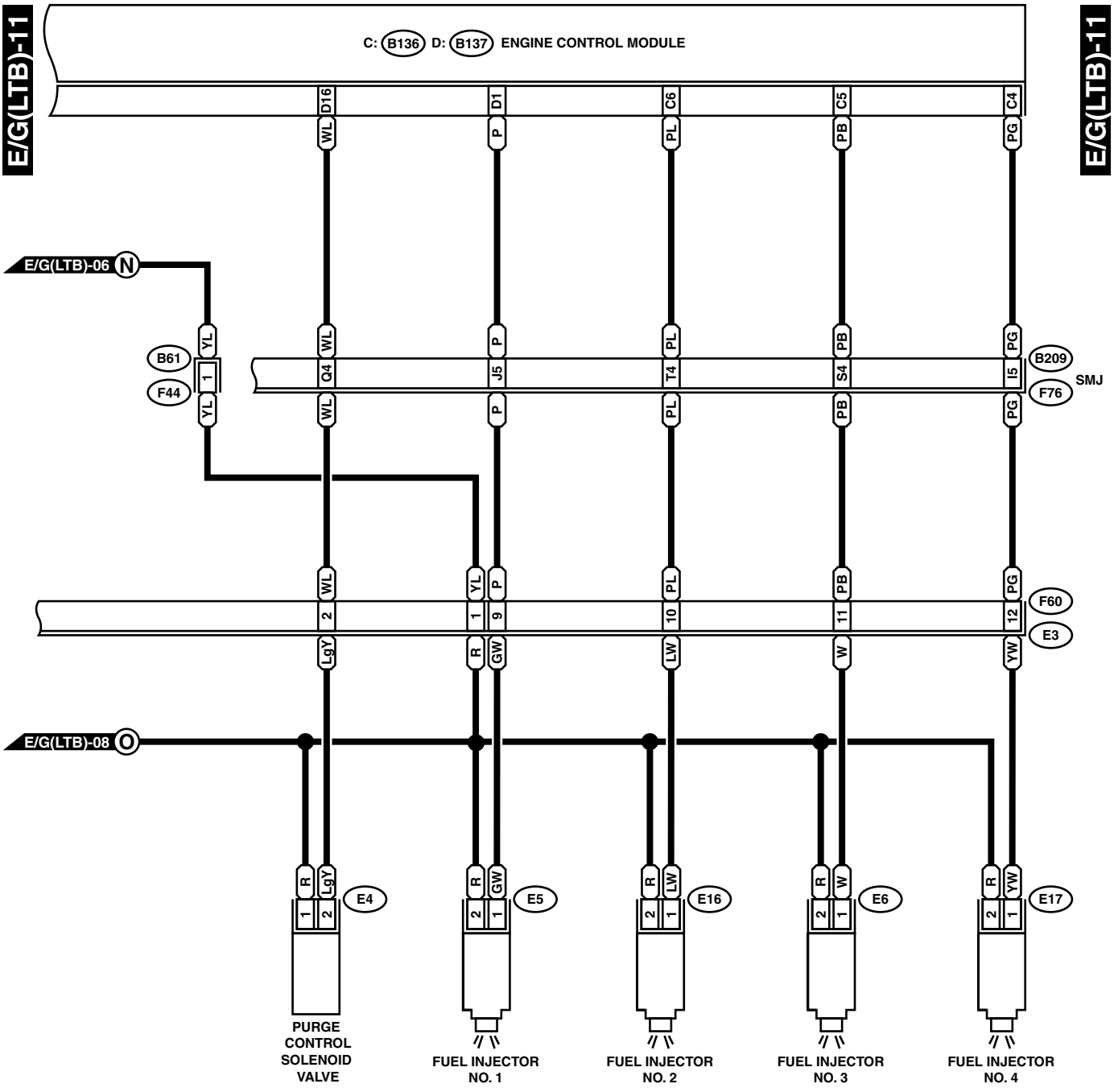

E37 (BLUE)
E38 (BLUE)
E8 (LIGHT GRAY)
E13 (BLACK)
E21 (BLACK)
E50 (BLACK)
E54 (BLACK)
E: B84
F61 (BLACK)
B: B135

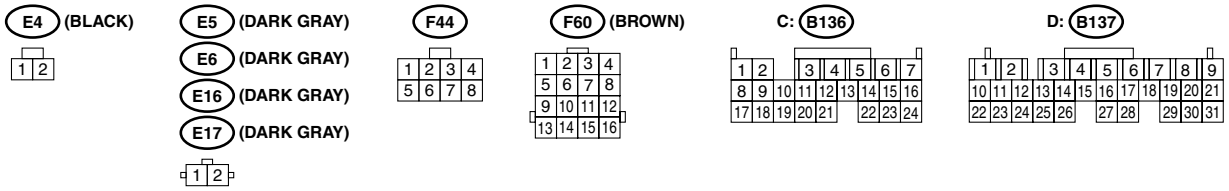
GL10-26I


E/G(LTB)-10
A: B134 C: B136 D: B137 E: B84 ENGINE CONTROL MODULE
E/G(LTB)-10
E/G(LTB)-02 F
E/G(LTB)-05 L
E/G(LTB)-01 B
SMJ
B209
F76
F60
E3
E/G(LTB)-08 P
E31
E32
E33
E34
IGNITION COIL NO.1
IGNITION COIL NO.2
IGNITION COIL NO.3
IGNITION COIL NO.4
GE


E31
E32
E33 (BLACK)
E34 (BLACK)
F60 (BROWN)
E: B84
A: B134
C: B136
D: B137

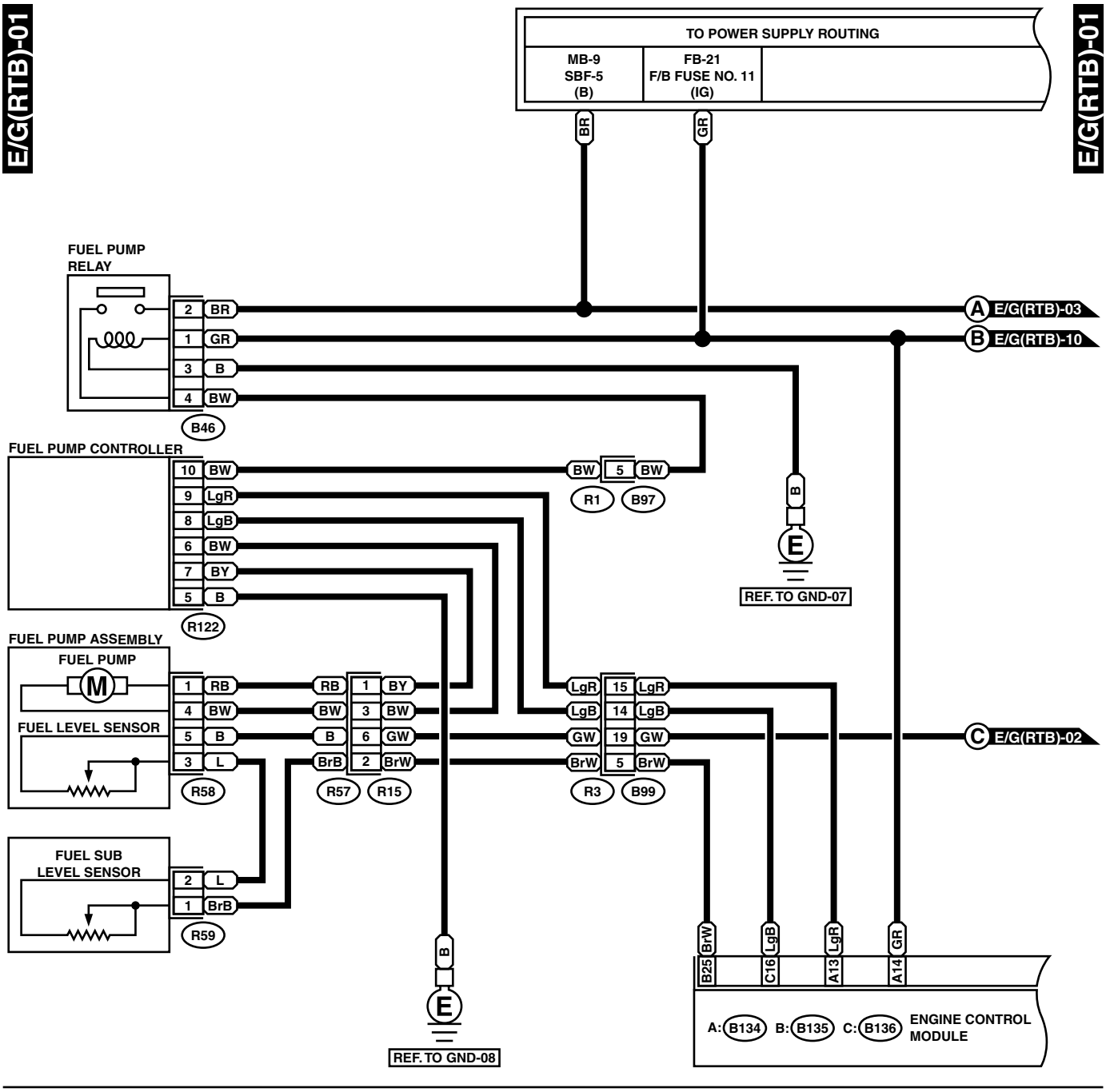
GL10-26J

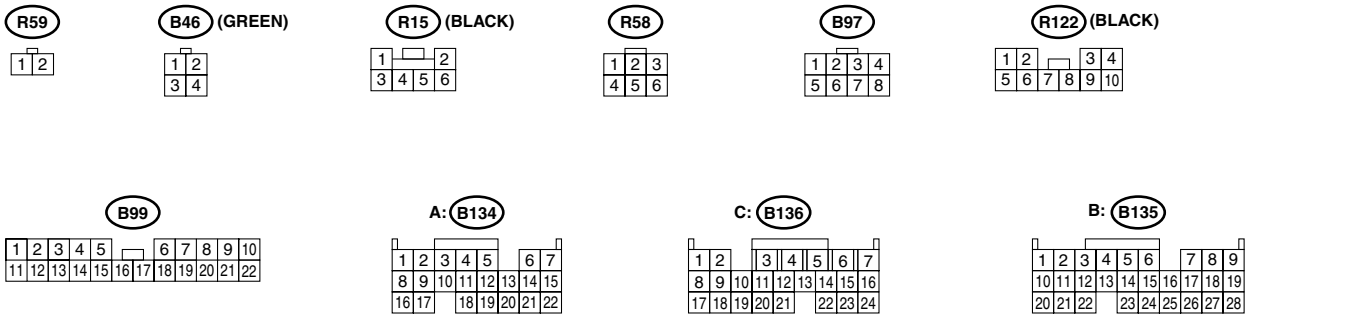

E/G(LTB)-11
C: B136 D: B137 ENGINE CONTROL MODULE
D16
D1
C6
C5
C4
WL
P
PL
PB
PG
E/G(LTB)-06 N
B61
F44
YL
1
Q4
J5
T4
S4
I5
B209
F76
SMJ
2
9
10
11
12
F60
E3
LgY
R
GW
LW
W
YW
E/G(LTB)-08 O
E4
E5
E16
E6
E17
PURGE CONTROL SOLENOID VALVE
FUEL INJECTOR NO. 1
FUEL INJECTOR NO. 2
FUEL INJECTOR NO. 3
FUEL INJECTOR NO. 4


E4 (BLACK)
E5 (DARK GRAY)
E6 (DARK GRAY)
E16 (DARK GRAY)
E17 (DARK GRAY)
F44
F60 (BROWN)
C: B136
D: B137

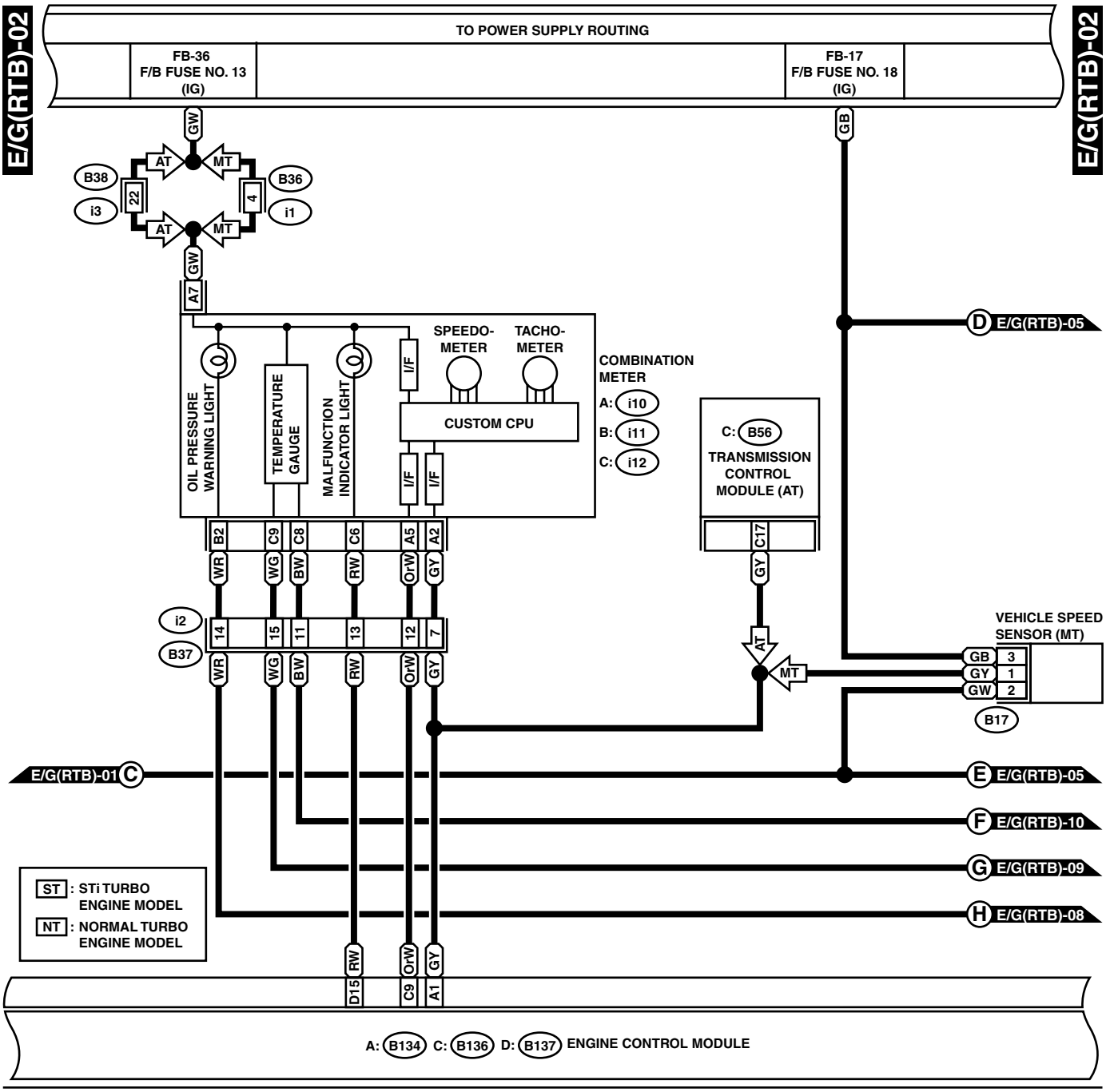
GL10-26K

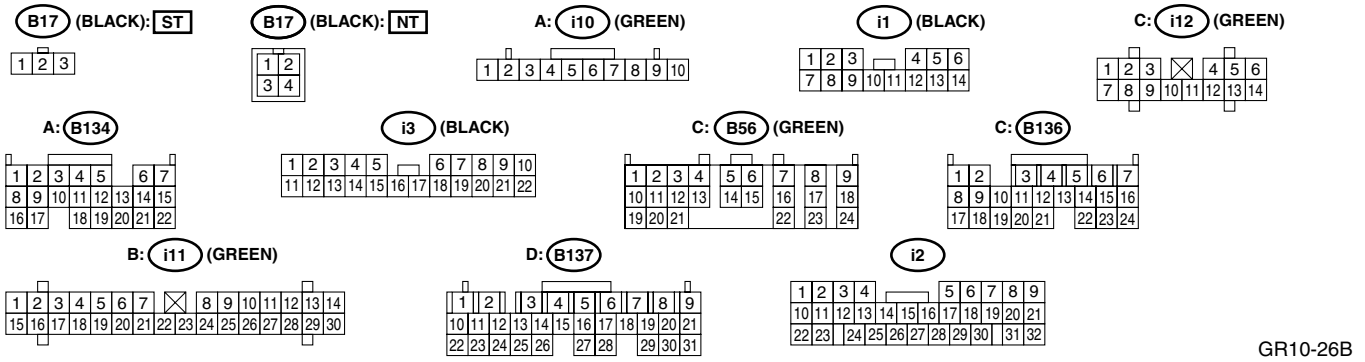
6. RHD DOHC TURBO MODEL



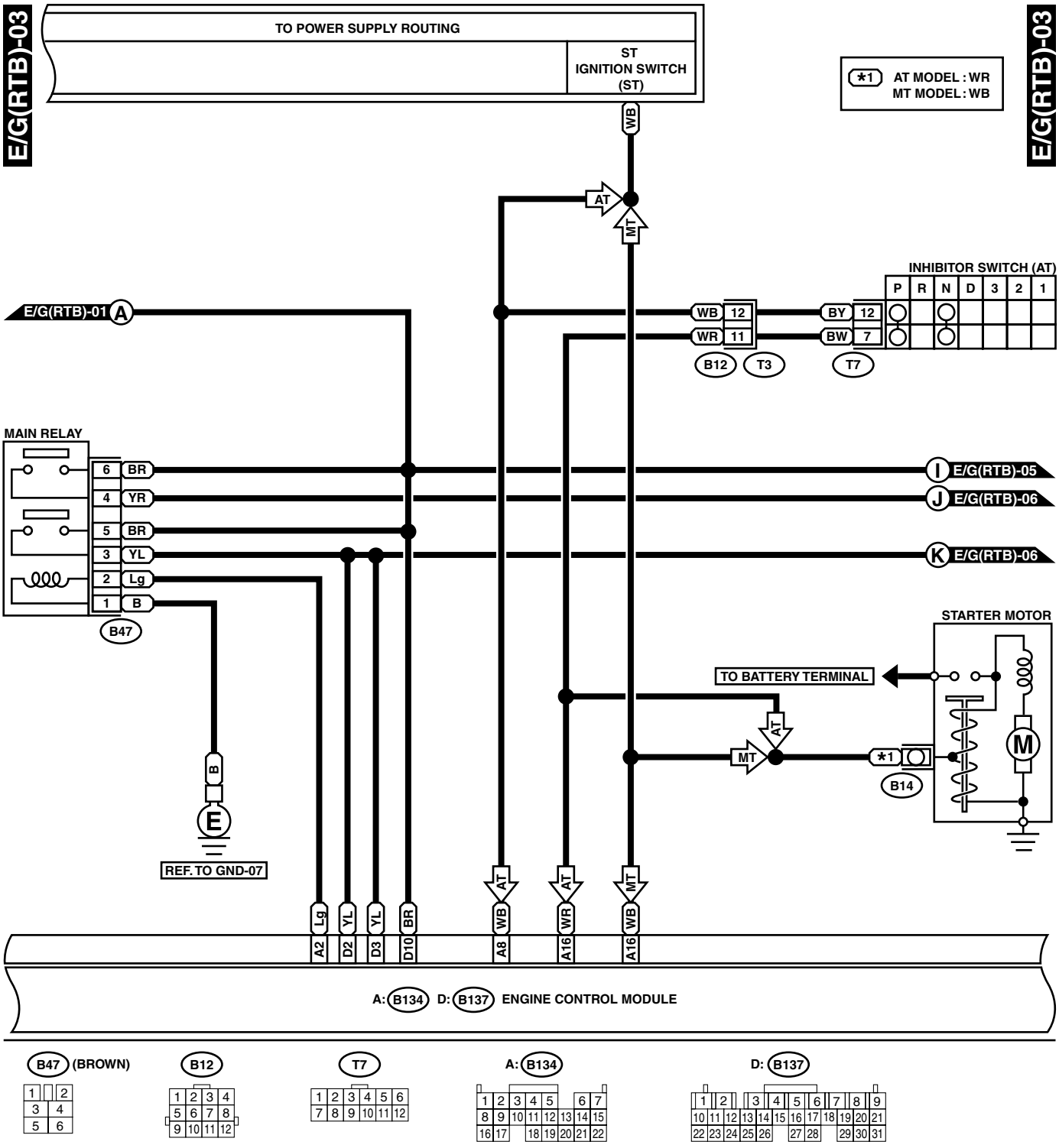


GR10-26A


E/G(RTB)-02
TO POWER SUPPLY ROUTING
FB-36
F/B FUSE NO. 13
(IG)
FB-17
F/B FUSE NO. 18
(IG)
GW
GB
AT
MT
B38
B36
i3
i1
22
4
A7
SPEEDO-METER
TACHO-METER
COMBINATION METER
A: i10
B: i11
C: i12
OIL PRESSURE WARNING LIGHT
TEMPERATURE GAUGE
MALFUNCTION INDICATOR LIGHT
I/F
CUSTOM CPU
C: B56
TRANSMISSION CONTROL MODULE (AT)
C17
D E/G(RTB)-05
B2
C9
C8
C6
A5
A2
WR
WG
BW
RW
OrW
GY
i2
B37
14
15
11
13
12
7
VEHICLE SPEED SENSOR (MT)
GB 3
GY 1
GW 2
B17
E/G(RTB)-01 C
E E/G(RTB)-05
F E/G(RTB)-10
G E/G(RTB)-09
H E/G(RTB)-08
ST : STi TURBO ENGINE MODEL
NT : NORMAL TURBO ENGINE MODEL
D15
C9
A1
A: B134 C: B136 D: B137 ENGINE CONTROL MODULE


B17 (BLACK): ST
B17 (BLACK): NT
A: i10 (GREEN)
i1 (BLACK)
C: i12 (GREEN)
A: B134
i3 (BLACK)
C: B56 (GREEN)
C: B136
B: i11 (GREEN)
D: B137
i2

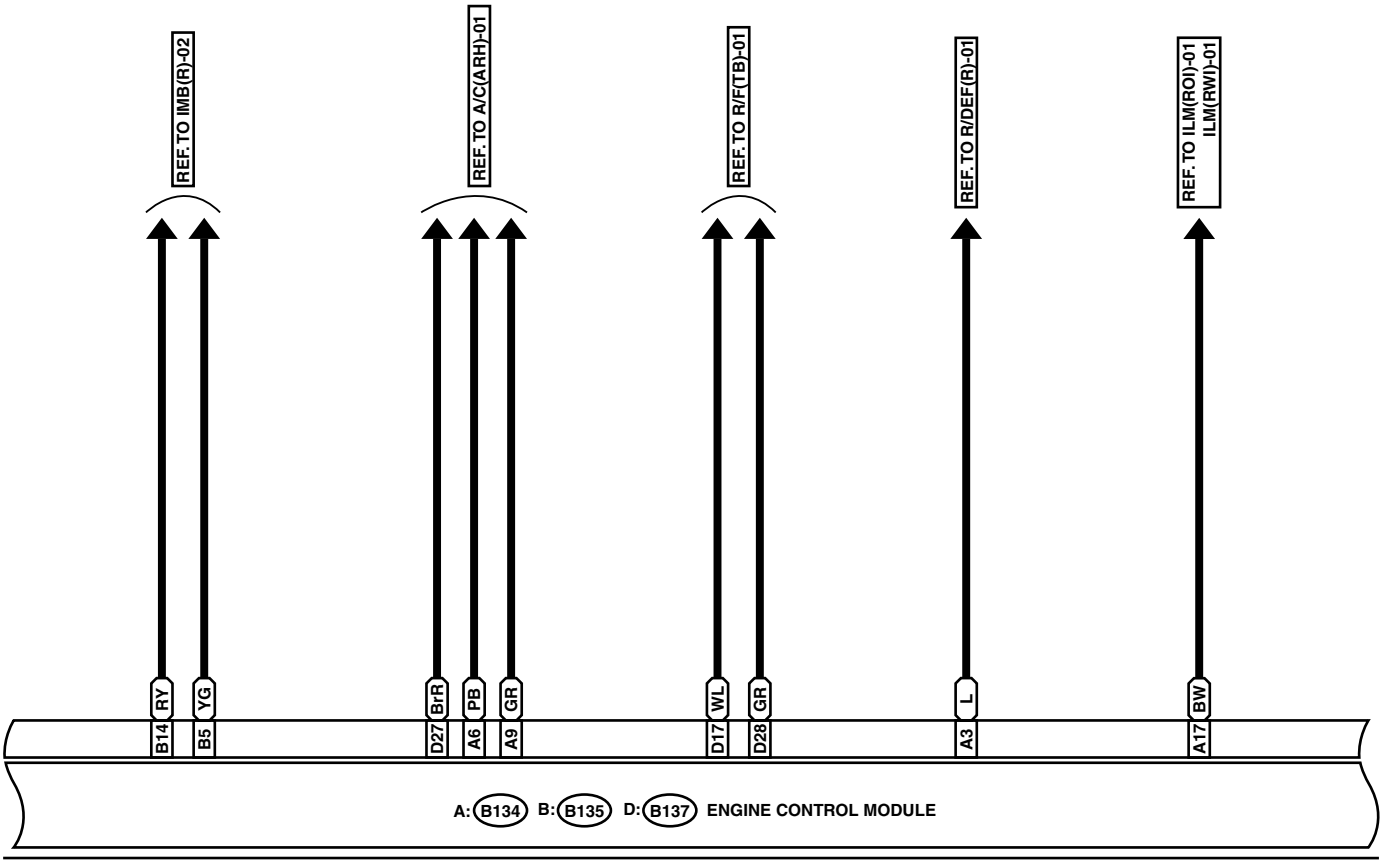
GR10-26B

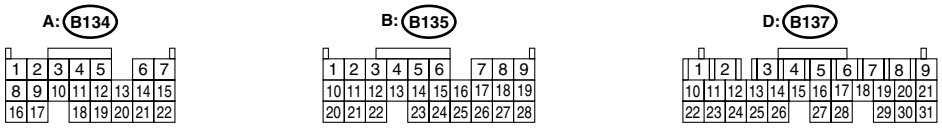

E/G(RTB)-03
TO POWER SUPPLY ROUTING
ST
IGNITION SWITCH
(ST)
*1 AT MODEL : WR
MT MODEL : WB
WB
AT
MT
INHIBITOR SWITCH (AT)
P R N D 3 2 1
E/G(RTB)-01 A
WB 12
WR 11
BY 12
BW 7
B12
T3
T7
MAIN RELAY
6 BR
4 YR
5 BR
3 YL
2 Lg
1 B
B47
I E/G(RTB)-05
J E/G(RTB)-06
K E/G(RTB)-06
STARTER MOTOR
TO BATTERY TERMINAL
*1
B14
M
B
E
REF. TO GND-07
Lg
YL
YL
BR
WB
WR
WB
A2
D2
D3
D10
A8
A16
A16
A: B134 D: B137 ENGINE CONTROL MODULE
B47 (BROWN)
B12
T7
A: B134
D: B137

GR10-26C

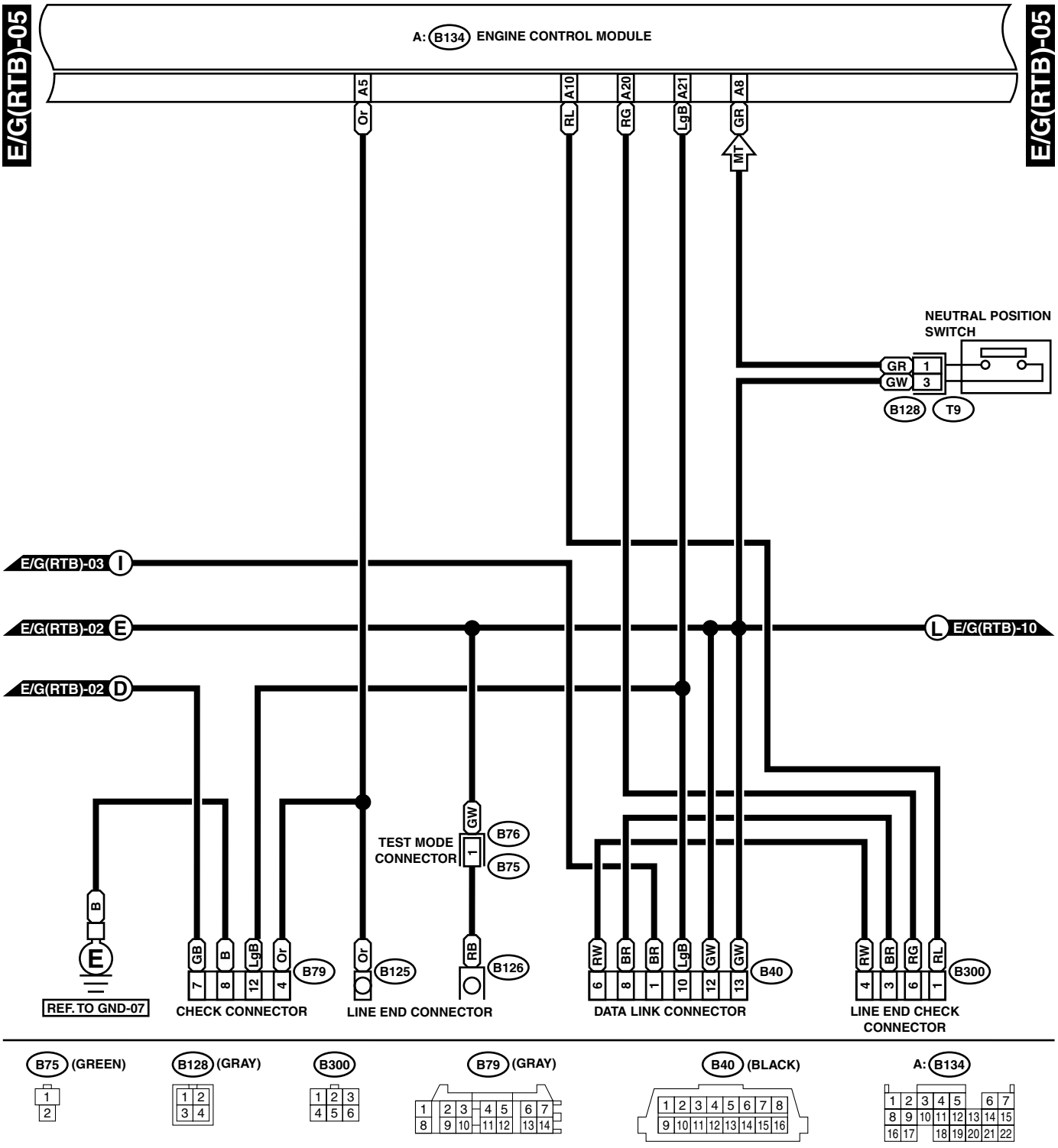
E/G(RTB)-04

E/G(RTB)-04



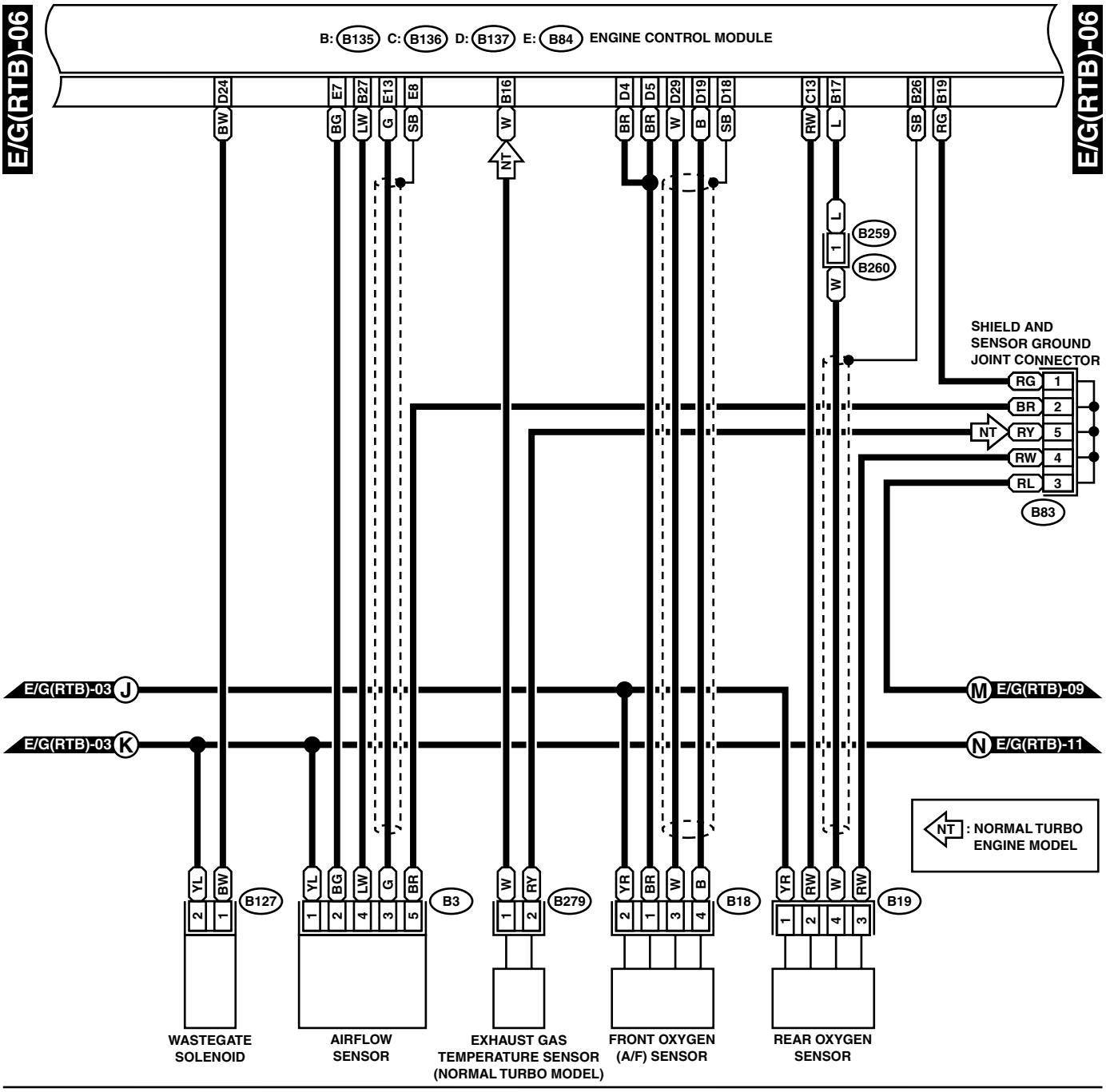


GR10-26D

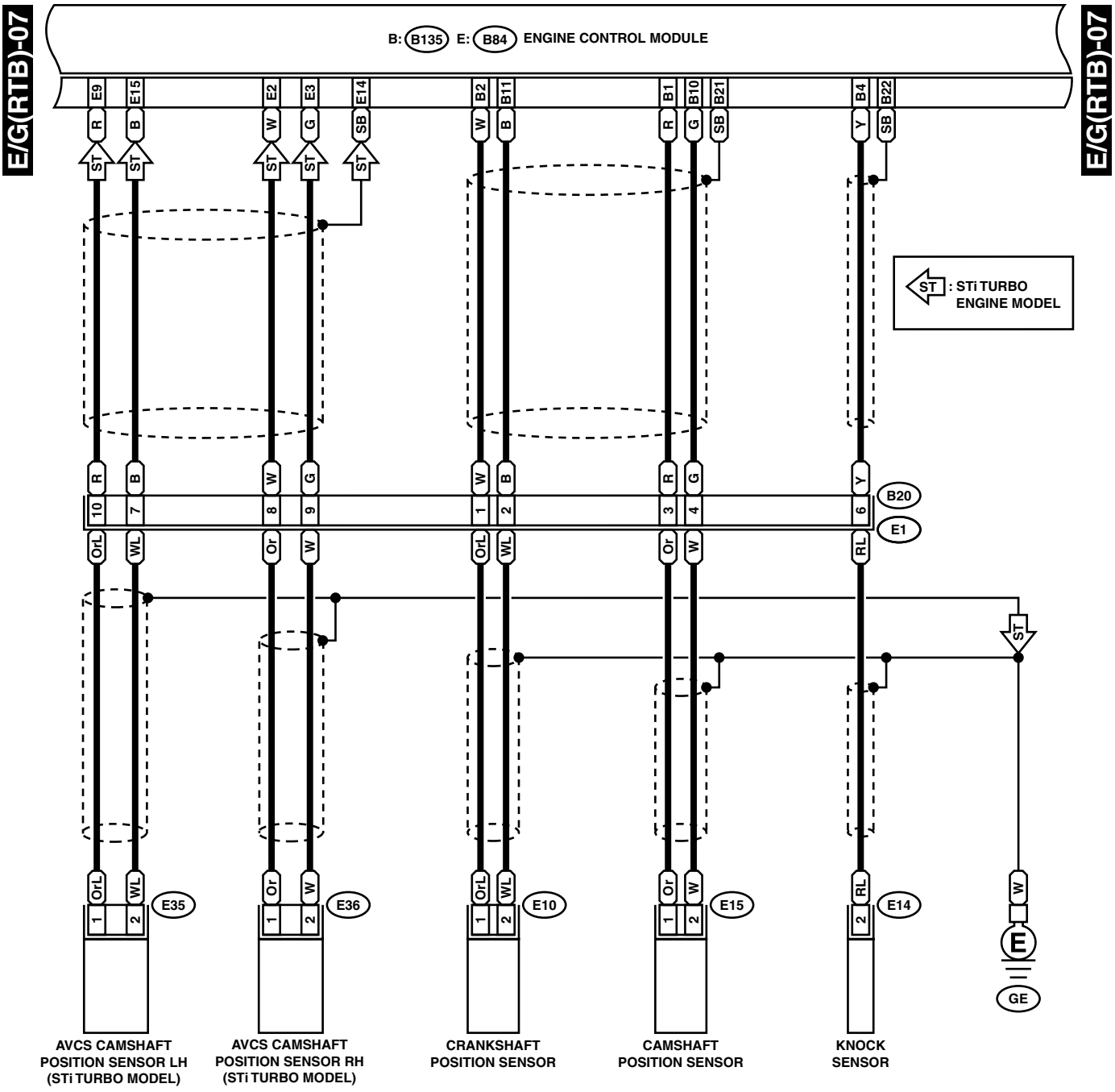

E/G(RTB)-05
A: B134 ENGINE CONTROL MODULE
A5 Or
A10 RL
A20 RG
A21 LgB
A8 GR
MT
NEUTRAL POSITION SWITCH
GR 1
GW 3
B128
T9
E/G(RTB)-03 I
E/G(RTB)-02 E
E/G(RTB)-02 D
L E/G(RTB)-10
TEST MODE CONNECTOR
GW
B76
B75
B
REF. TO GND-07
GB 7
B 8
LgB 12
Or 4
B79
CHECK CONNECTOR
Or
B125
LINE END CONNECTOR
RB
B126
RW 6
BR 8
BR 1
LgB 10
GW 12
GW 13
B40
DATA LINK CONNECTOR
RW 4
BR 3
RG 6
RL 1
B300
LINE END CHECK CONNECTOR

B75 (GREEN)
B128 (GRAY)
B300
B79 (GRAY)
B40 (BLACK)
A: B134

GR10-26E

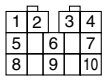

E/G(RTB)-06
B: B135 C: B136 D: B137 E: B84 ENGINE CONTROL MODULE
D24 BW
E7 BG
B27 LW
E13 G
E8 SB
B16 W NT
D4 BR
D5 BR
D29 W
D19 B
D18 SB
C13 RW
B17 L
B26 SB
B19 RG
L 1 B259
B260 W
SHIELD AND SENSOR GROUND JOINT CONNECTOR
RG 1
BR 2
NT RY 5
RW 4
RL 3
B83
E/G(RTB)-03 J
E/G(RTB)-03 K
M E/G(RTB)-09
N E/G(RTB)-11
NT : NORMAL TURBO ENGINE MODEL
YL BW B127
YL BG LW G BR B3
W RY B279
YR BR W B B18
YR RW W RW B19
WASTEGATE SOLENOID
AIRFLOW SENSOR
EXHAUST GAS TEMPERATURE SENSOR (NORMAL TURBO MODEL)
FRONT OXYGEN (A/F) SENSOR
REAR OXYGEN SENSOR
B127 B259
B279
B18
B19
B3 (BLACK)
B83 (GLAY)
E: B84
C: B136
B: B135
D: B137

GR10-26F

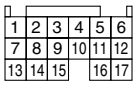


E10 (LIGHT GRAY)
E14 (GRAY)
E15 (LIGHT GRAY)
E35
E36

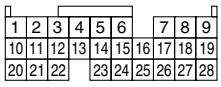
B20 (LIGHT GRAY)



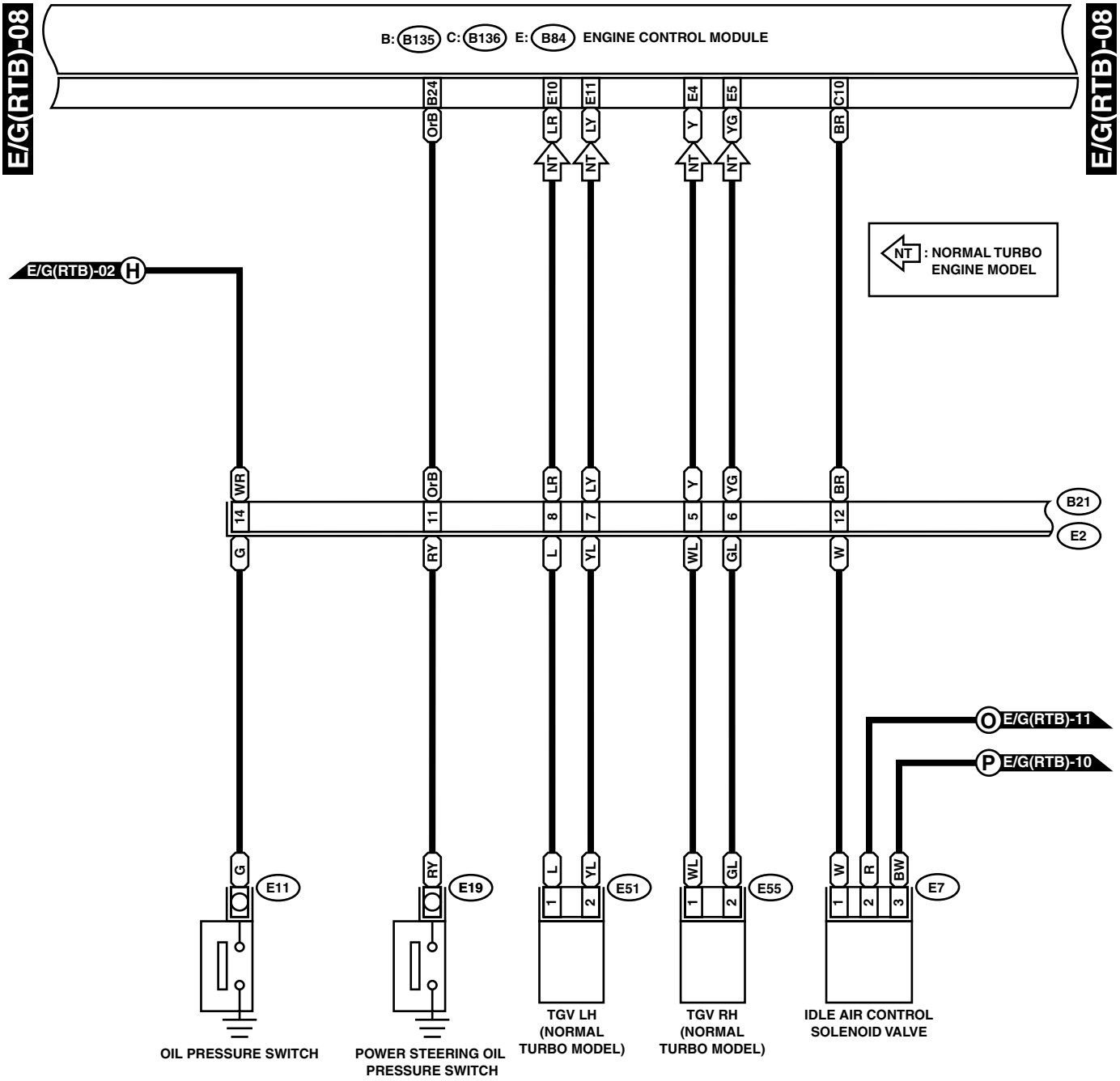
E: B84

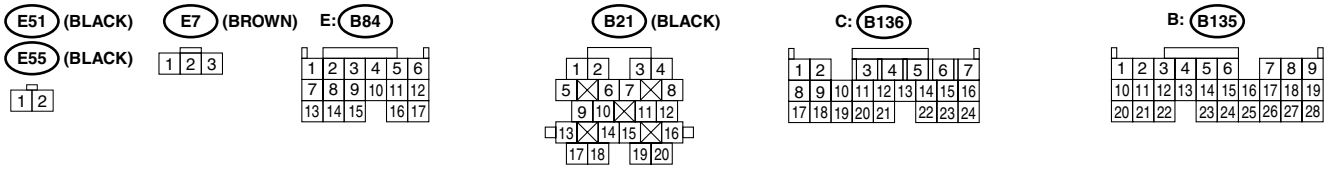


B: B135

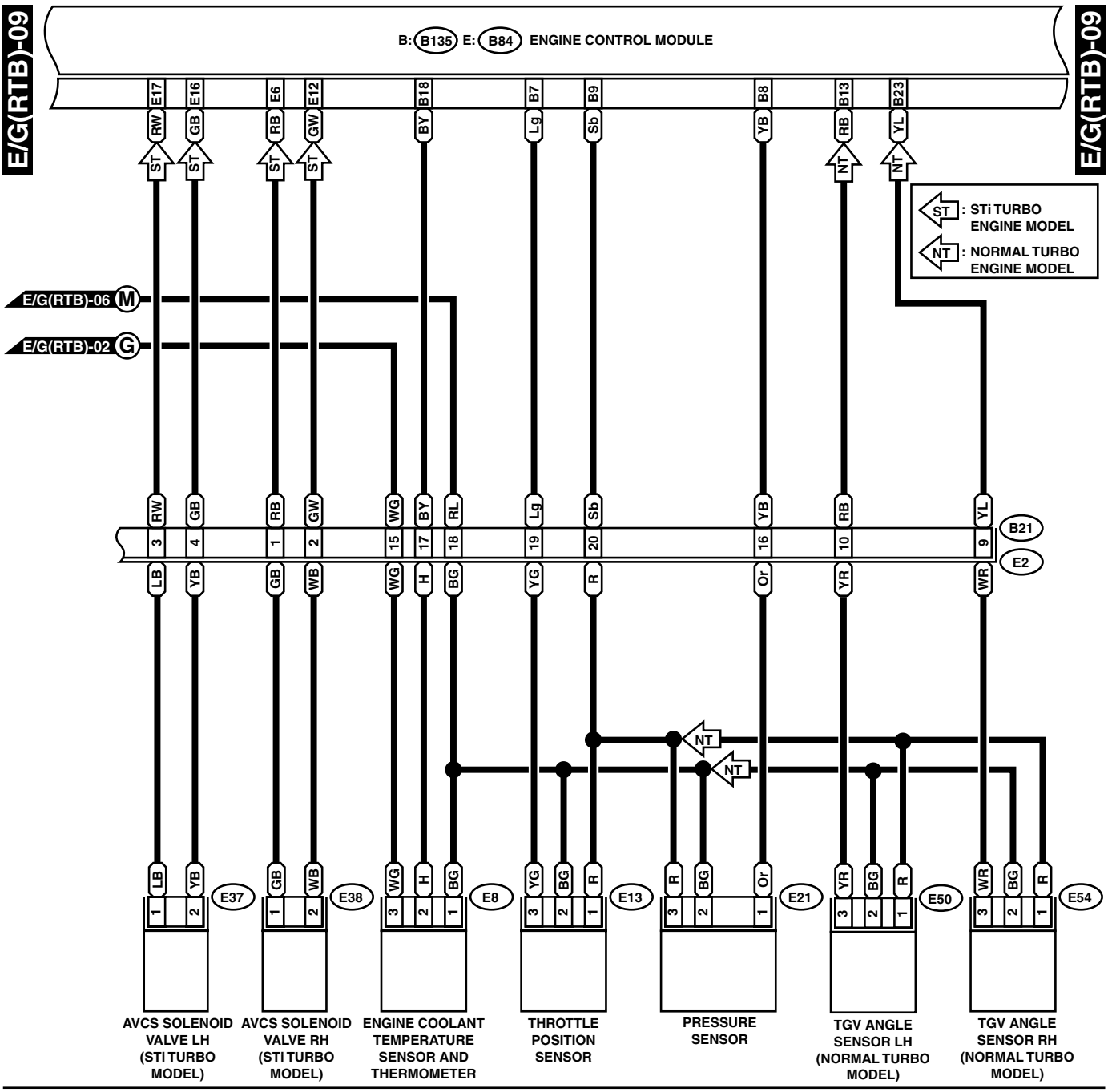


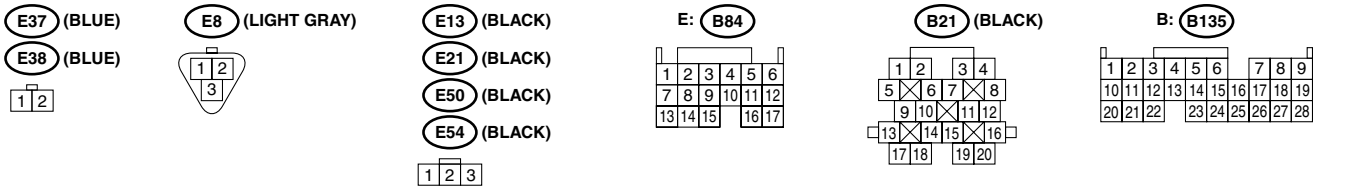
GR10-26G


E/G(RTB)-08
E/G(RTB)-08
B: B135 C: B136 E: B84 ENGINE CONTROL MODULE
B24 E10 E11 E4 E5 C10
OrB LR LY Y YG BR
NT NT NT NT
NT : NORMAL TURBO ENGINE MODEL
E/G(RTB)-02 H
WR OrB LR LY Y YG BR
14 11 8 7 5 6 12
B21
E2
G RY L YL WL GL W
E/G(RTB)-11 O
E/G(RTB)-10 P
G RY L YL WL GL W R BW
E11 E19 E51 E55 E7
1 2 1 2 1 2 1 2 3
OIL PRESSURE SWITCH
POWER STEERING OIL PRESSURE SWITCH
TGV LH (NORMAL TURBO MODEL)
TGV RH (NORMAL TURBO MODEL)
IDLE AIR CONTROL SOLENOID VALVE

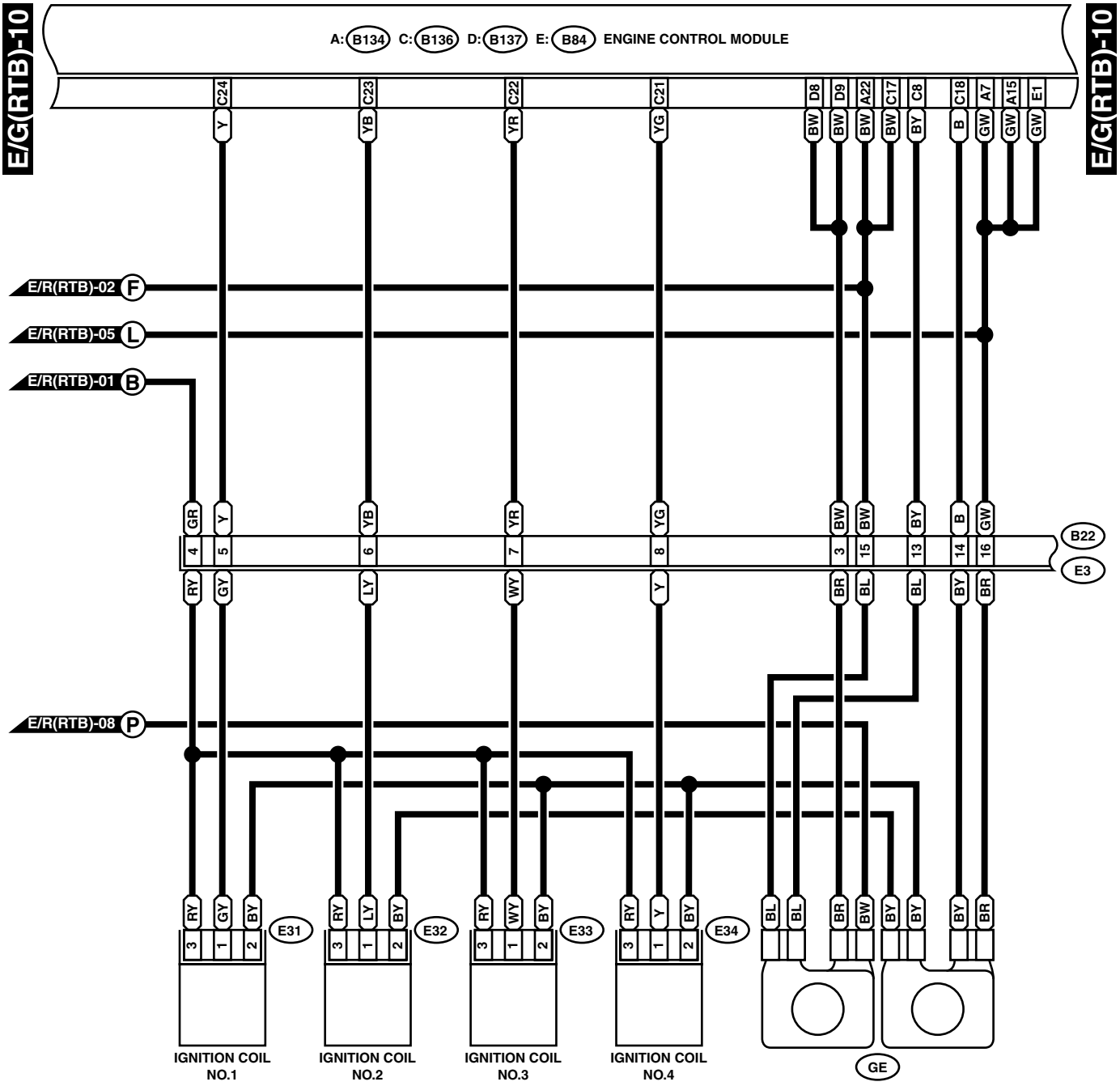

E51 (BLACK)
E55 (BLACK)
E7 (BROWN)
E: B84
B21 (BLACK)
C: B136
B: B135

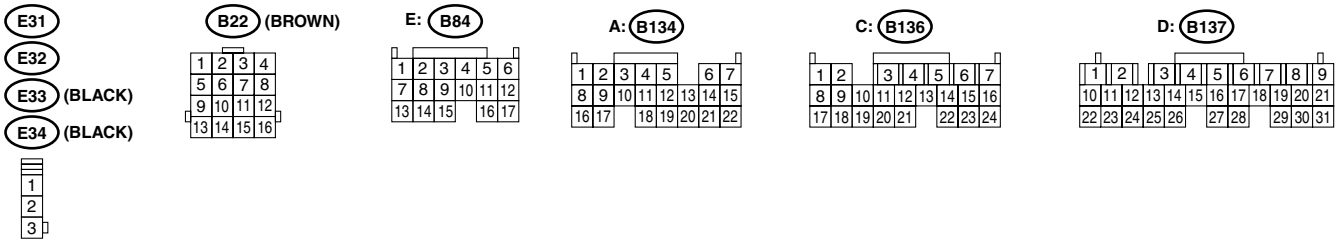
GR10-26H


E/G(RTB)-09
E/G(RTB)-09
B: B135 E: B84 ENGINE CONTROL MODULE
E17 E16 E6 E12 B18 B7 B9 B8 B13 B23
RW GB RB GW BY Lg Sb YB RB YL
ST ST ST ST NT NT
ST : STi TURBO ENGINE MODEL
NT : NORMAL TURBO ENGINE MODEL
E/G(RTB)-06 M
E/G(RTB)-02 G
RW GB RB GW WG BY RL Lg Sb YB RB YL
3 4 1 2 15 17 18 19 20 16 10 9
B21
E2
LB YB GB WB WG H BG YG R Or YR WR
NT
NT
LB YB GB WB WG H BG YG BG R R BG Or YR BG R WR BG R
E37 E38 E8 E13 E21 E50 E54
1 2 1 2 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1
AVCS SOLENOID VALVE LH (STi TURBO MODEL)
AVCS SOLENOID VALVE RH (STi TURBO MODEL)
ENGINE COOLANT TEMPERATURE SENSOR AND THERMOMETER
THROTTLE POSITION SENSOR
PRESSURE SENSOR
TGV ANGLE SENSOR LH (NORMAL TURBO MODEL)
TGV ANGLE SENSOR RH (NORMAL TURBO MODEL)

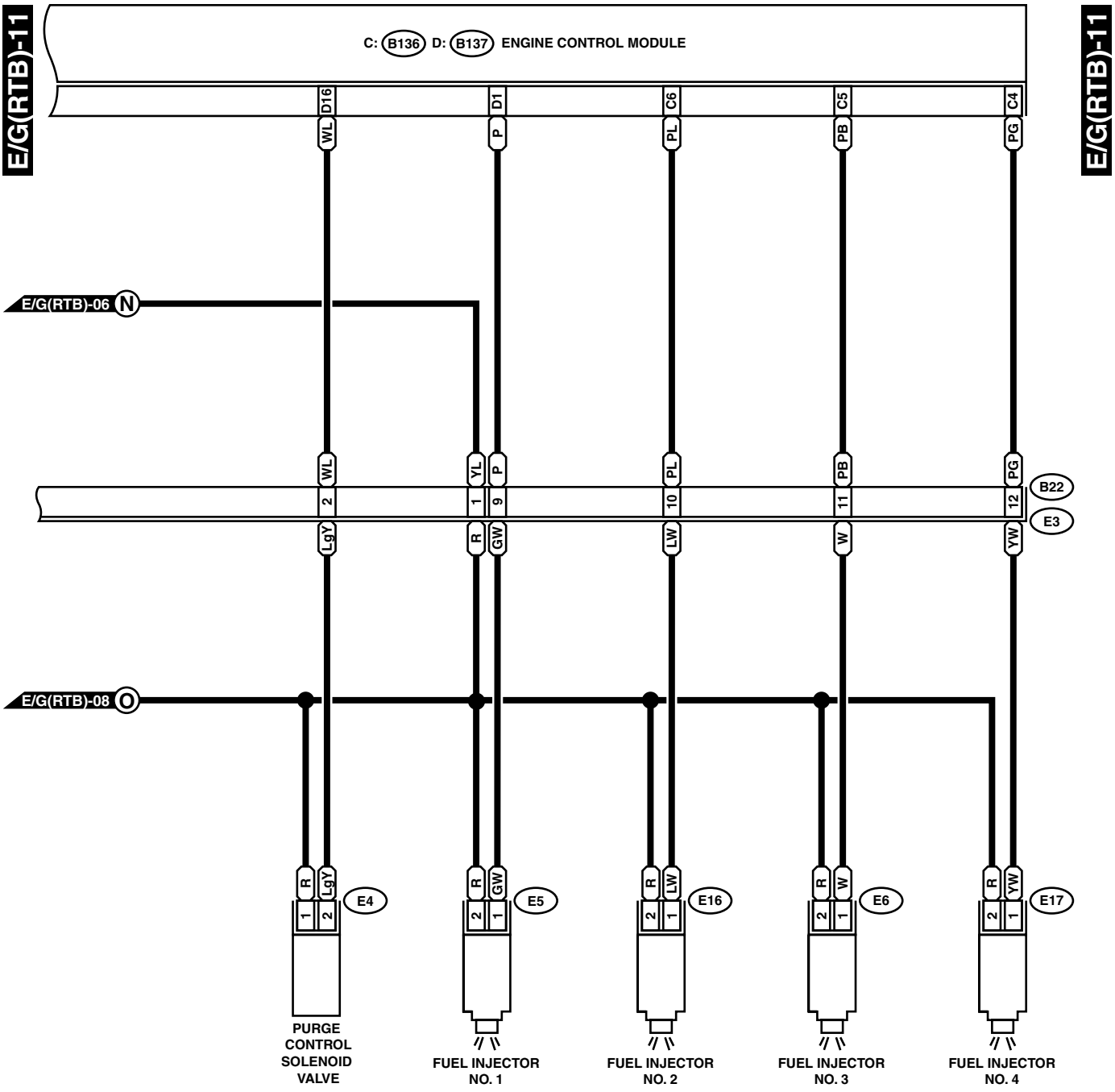

E37 (BLUE)
E38 (BLUE)
1 2
E8 (LIGHT GRAY)
1 2
3
E13 (BLACK)
E21 (BLACK)
E50 (BLACK)
E54 (BLACK)
1 2 3
E: B84
1 2 3 4 5 6
7 8 9 10 11 12
13 14 15 16 17
B21 (BLACK)
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
17 18 19 20
B: B135
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28

GR10-26I


E/G(RTB)-10
A: B134 C: B136 D: B137 E: B84 ENGINE CONTROL MODULE
E/G(RTB)-10
C24 C23 C22 C21 D8 D9 A22 C17 C8 C18 A7 A15 E1
Y YB YR YG BW BW BW BW BY B GW GW GW
E/R(RTB)-02 F
E/R(RTB)-05 L
E/R(RTB)-01 B
GR Y YB YR YG BW BW BY B GW
4 5 6 7 8 3 15 13 14 16
B22
E3
RY GY LY WY Y BR BL BL BY BR
E/R(RTB)-08 P
RY GY BY E31
RY LY BY E32
RY WY BY E33
RY Y BY E34
BL BL BR BW BY BY BY BR
3 1 2
IGNITION COIL NO.1
IGNITION COIL NO.2
IGNITION COIL NO.3
IGNITION COIL NO.4
GE


E31
E32
E33 (BLACK)
E34 (BLACK)
B22 (BROWN)
E: B84
A: B134
C: B136
D: B137

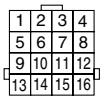
GR10-26J



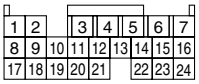
E5 (DARK GRAY)
E6 (DARK GRAY)
E16 (DARK GRAY)
E17 (DARK GRAY)

E4 (BLACK)

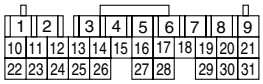
B22 (BROWN)



C: B136



D: B137

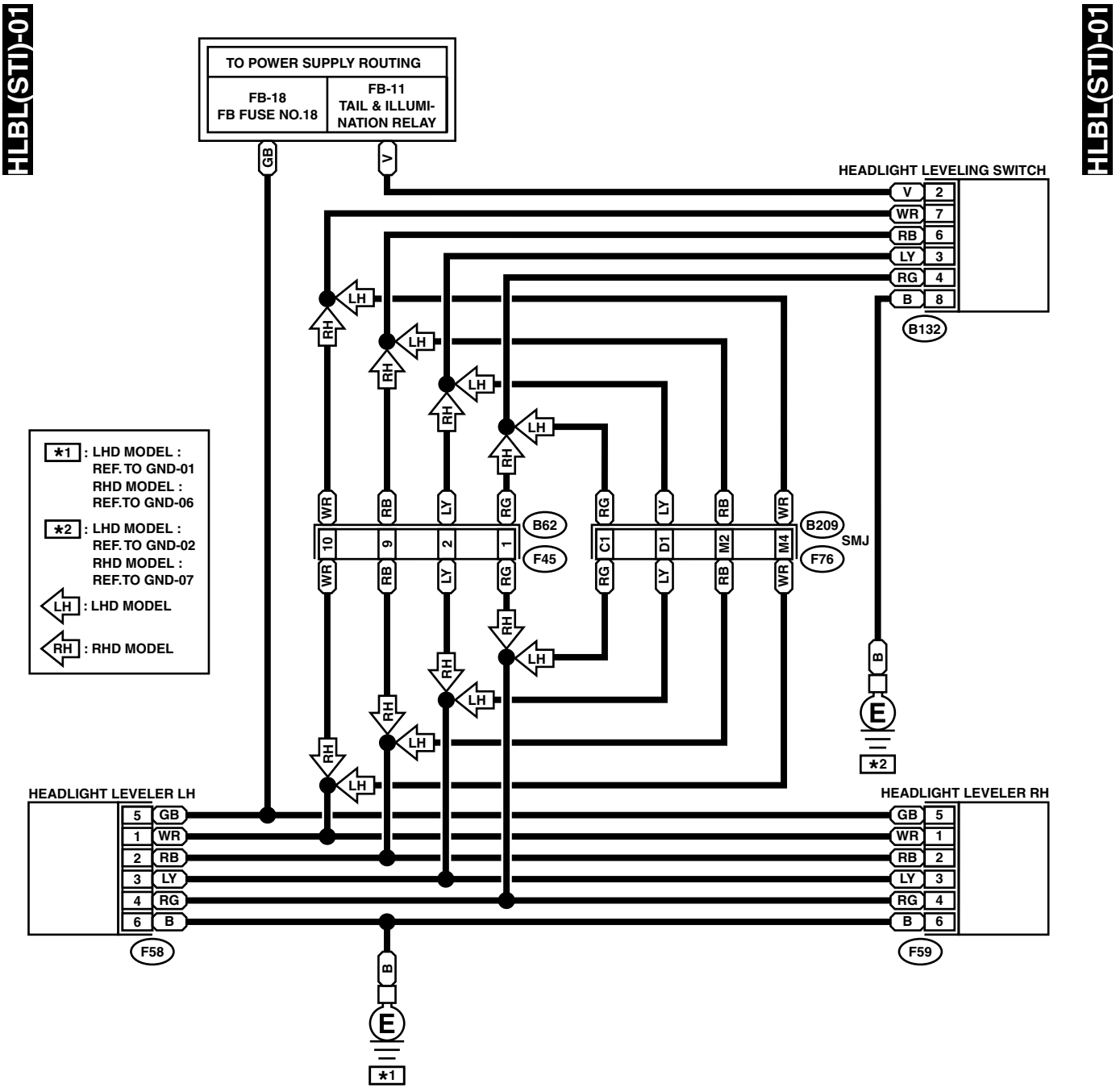


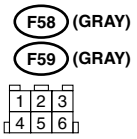
GR10-26K

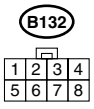
20.Headlight Beam Leveler System

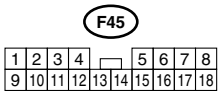
A: SCHEMATIC

2. STI MODEL







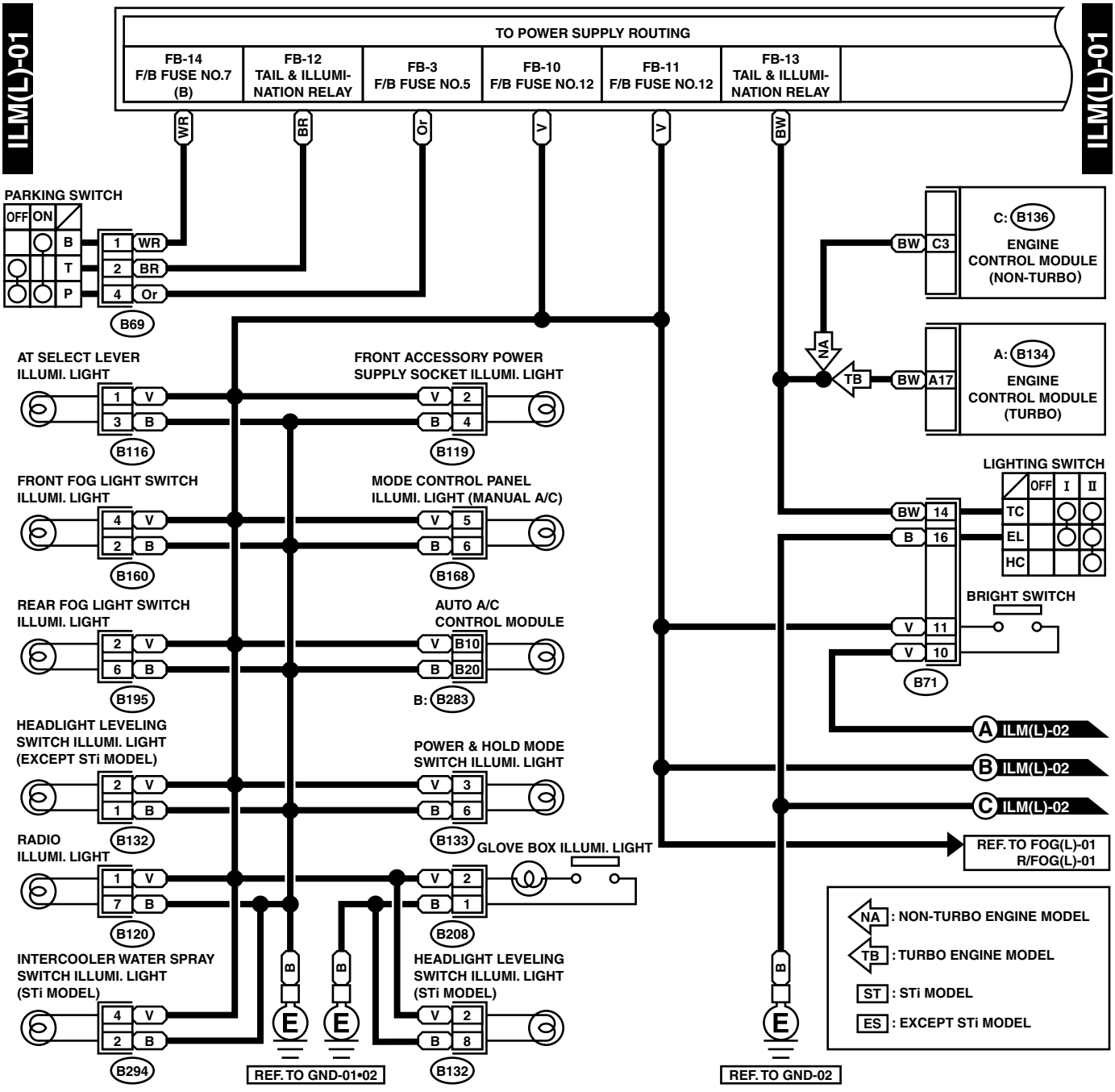


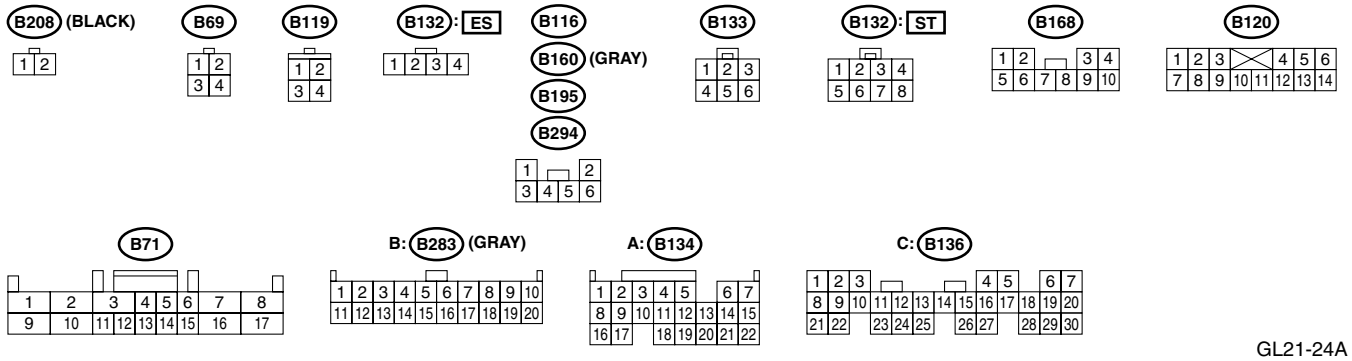
GG83-22

25.Clearance Light and Illumination Light System

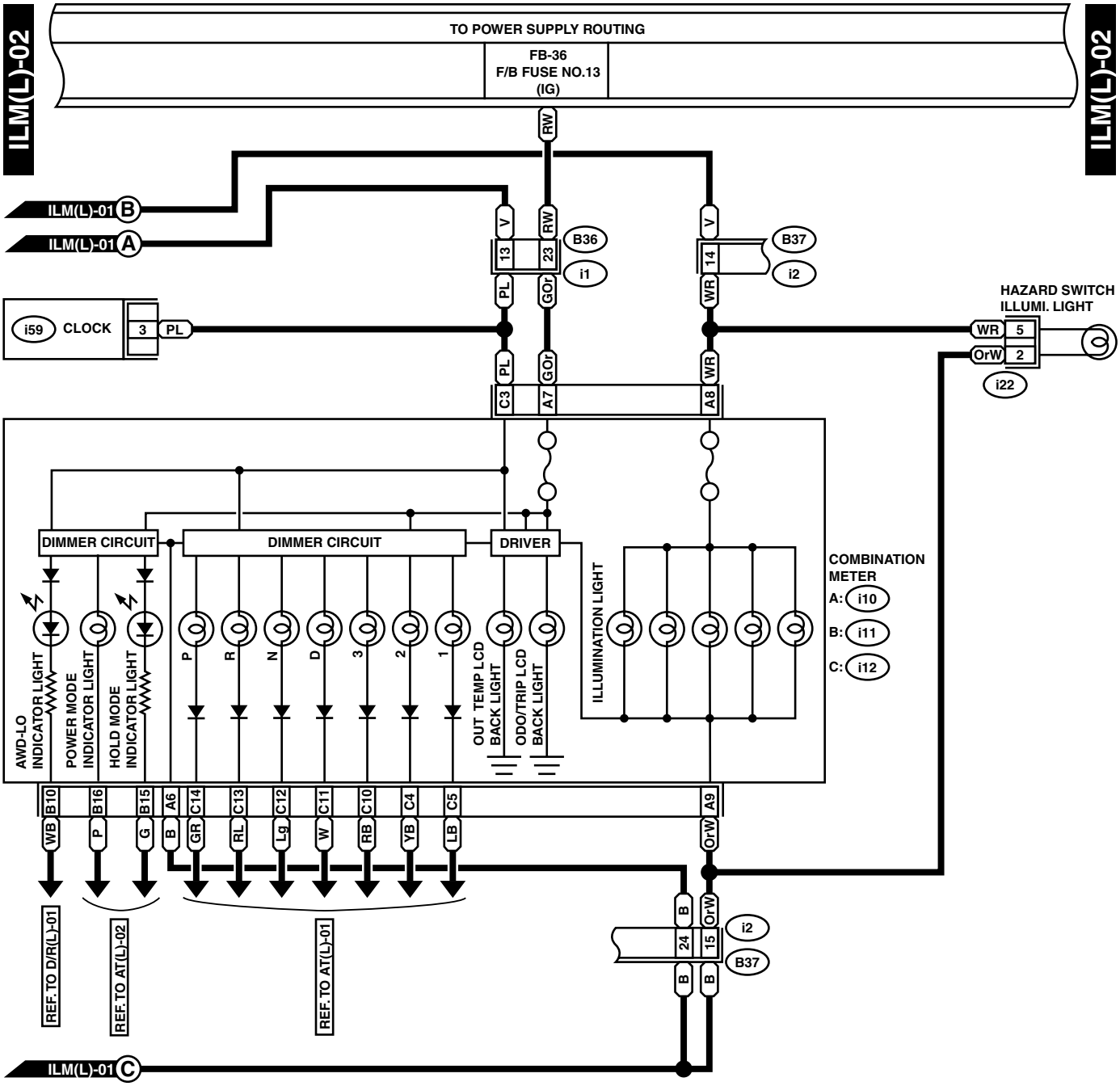
A: SCHEMATIC

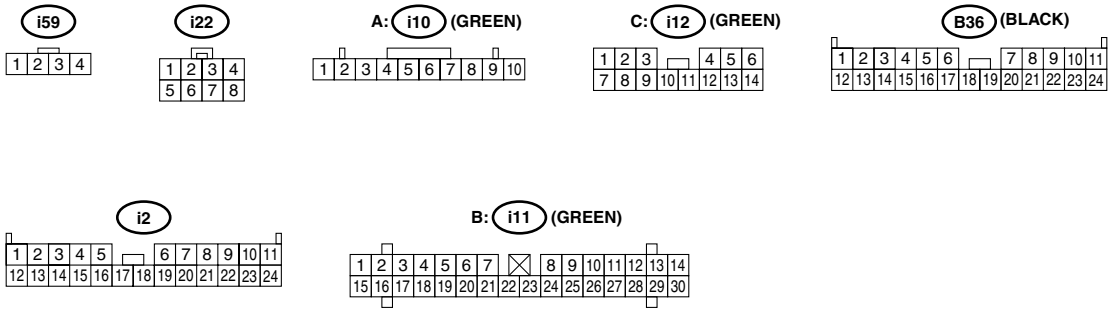
1. LHD MODEL



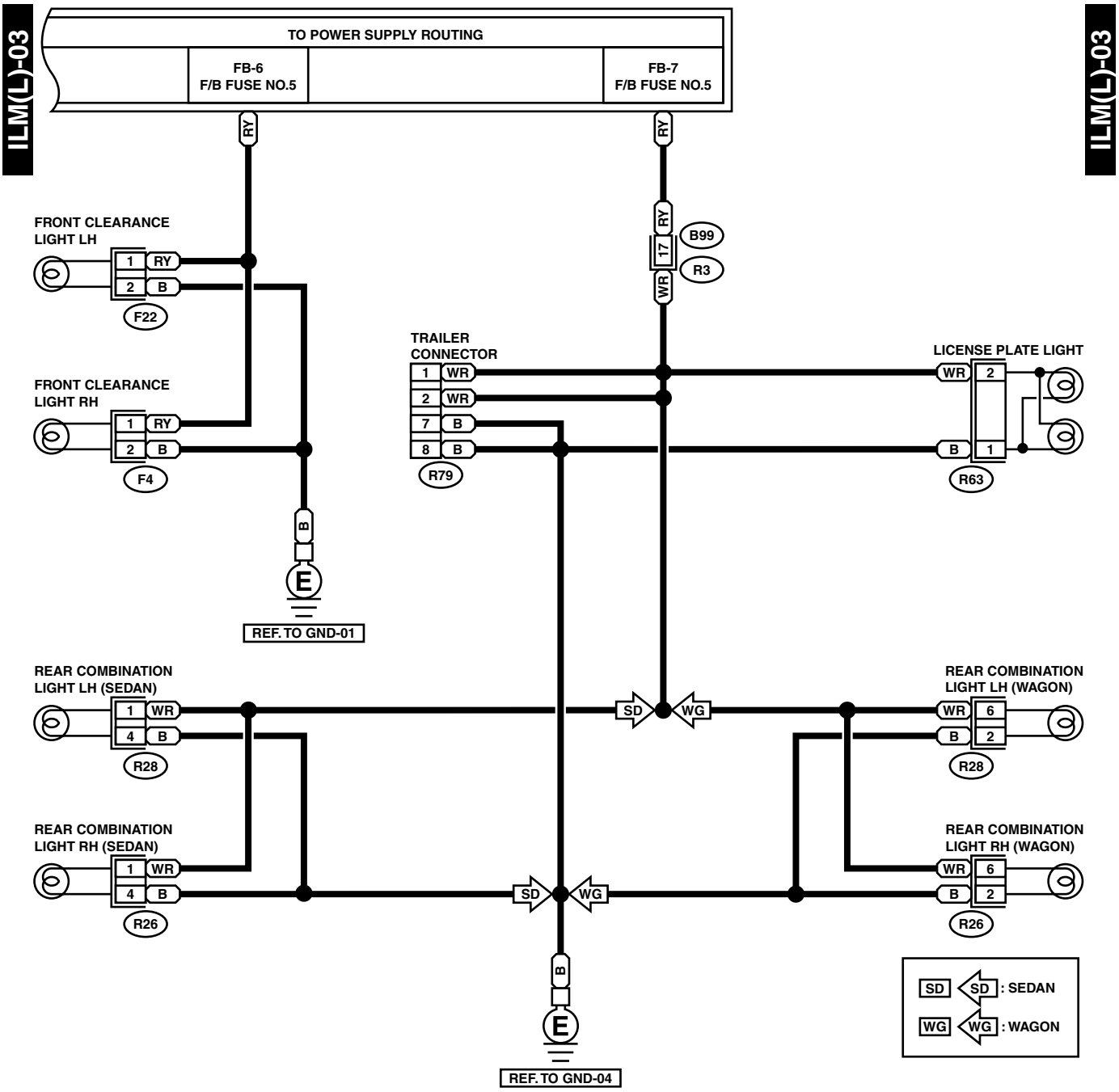


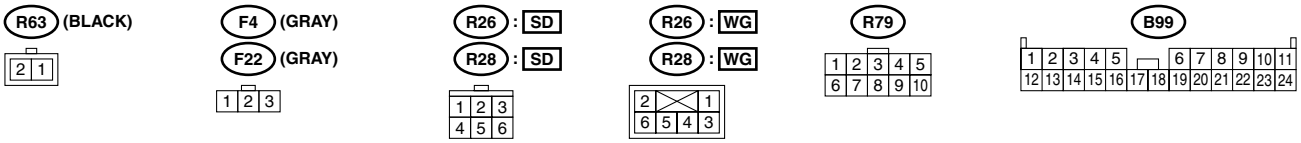
GL21-24A


ILM(L)-02
TO POWER SUPPLY ROUTING
FB-36
F/B FUSE NO.13
(IG)
RW
ILM(L)-01 B
ILM(L)-01 A
V
RW
13
23
B36
i1
V
14
B37
i2
PL
GOr
WR
i59 CLOCK
3
PL
HAZARD SWITCH
ILLUMI. LIGHT
WR 5
OrW 2
i22
C3
A7
A8
DIMMER CIRCUIT
DIMMER CIRCUIT
DRIVER
COMBINATION
METER
A: i10
B: i11
C: i12
AWD-LO
INDICATOR LIGHT
POWER MODE
INDICATOR LIGHT
HOLD MODE
INDICATOR LIGHT
P
R
N
D
3
2
1
OUT TEMP LCD
BACK LIGHT
ODO/TRIP LCD
BACK LIGHT
ILLUMINATION LIGHT
B10
B16
B15
A6
C14
C13
C12
C11
C10
C4
C5
A9
WB
P
G
B
GR
RL
Lg
W
RB
YB
LB
OrW
REF.TO D/R(L)-01
REF.TO AT(L)-02
REF.TO AT(L)-01
B
OrW
24
15
i2
B37
B
B
ILM(L)-01 C


i59
i22
A: i10 (GREEN)
C: i12 (GREEN)
B36 (BLACK)
i2
B: i11 (GREEN)

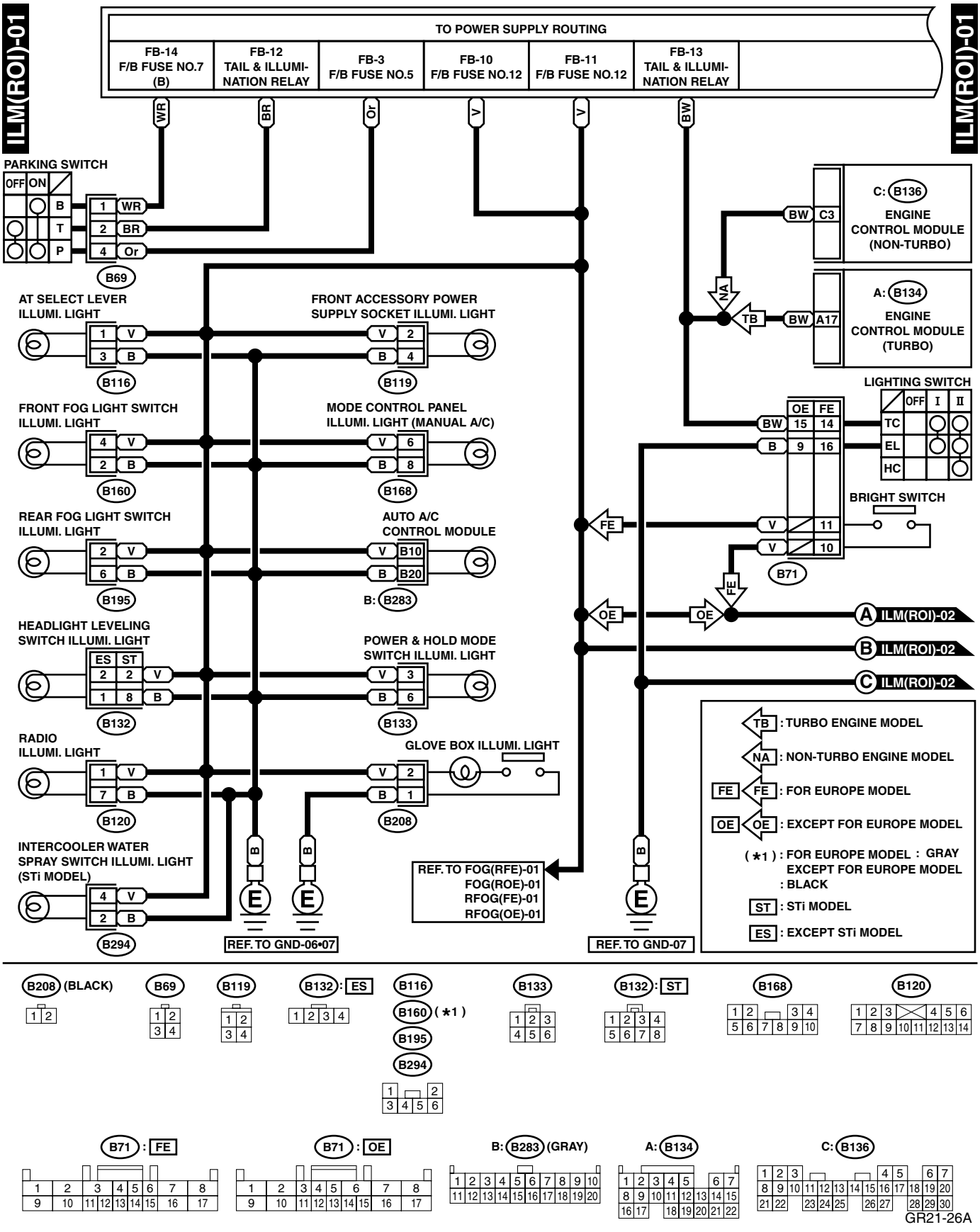
GL21-24B

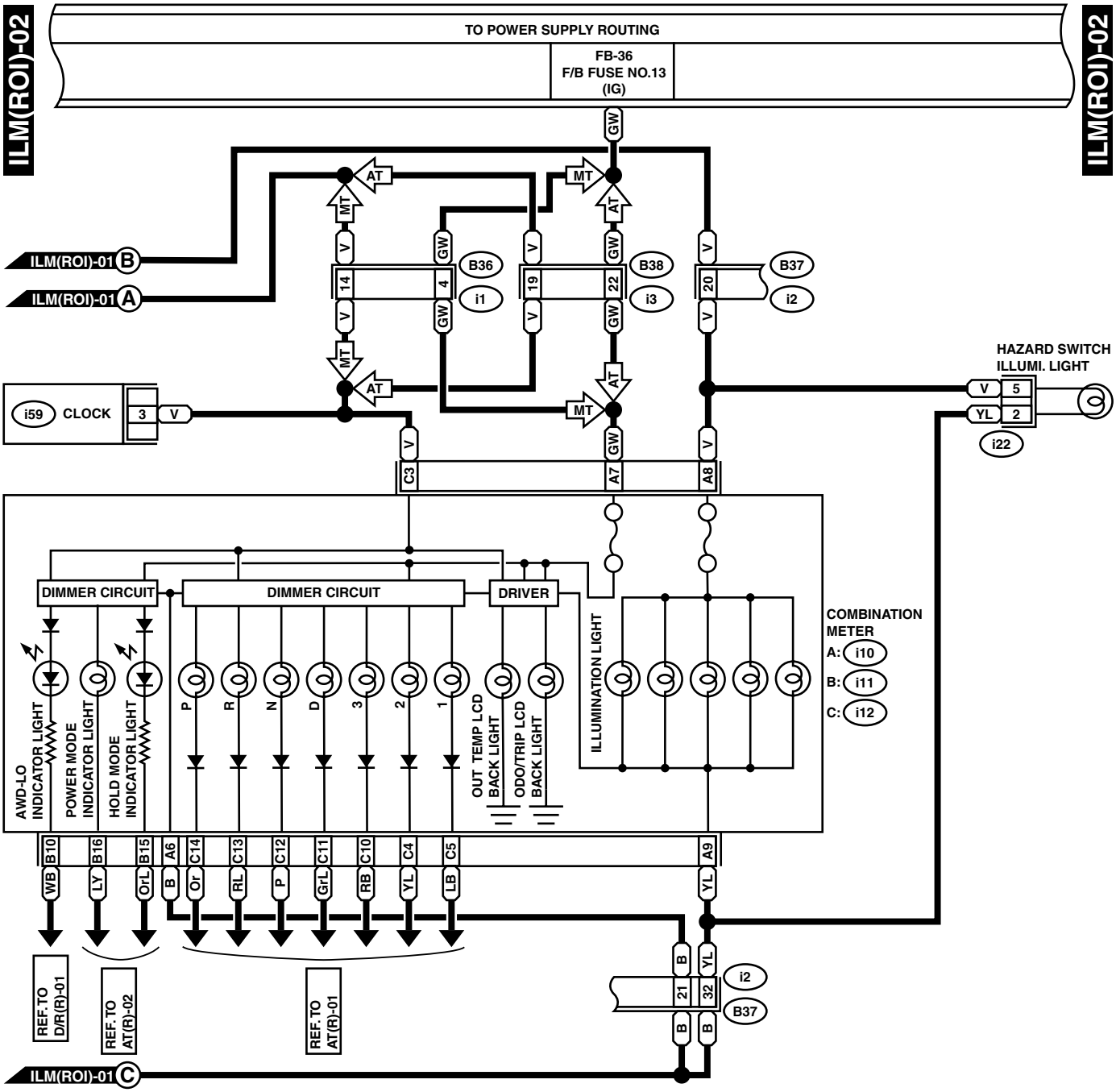

ILM(L)-03
ILM(L)-03
TO POWER SUPPLY ROUTING
FB-6
F/B FUSE NO.5
FB-7
F/B FUSE NO.5
RY
RY
FRONT CLEARANCE
LIGHT LH
1 RY
2 B
F22
FRONT CLEARANCE
LIGHT RH
1 RY
2 B
F4
RY
17
WR
B99
R3
TRAILER
CONNECTOR
1 WR
2 WR
7 B
8 B
R79
LICENSE PLATE LIGHT
WR 2
B 1
R63
B
E
REF. TO GND-01
REAR COMBINATION
LIGHT LH (SEDAN)
1 WR
4 B
R28
REAR COMBINATION
LIGHT RH (SEDAN)
1 WR
4 B
R26
SD
WG
REAR COMBINATION
LIGHT LH (WAGON)
WR 6
B 2
R28
REAR COMBINATION
LIGHT RH (WAGON)
WR 6
B 2
R26
B
E
REF. TO GND-04
SD SD : SEDAN
WG WG : WAGON

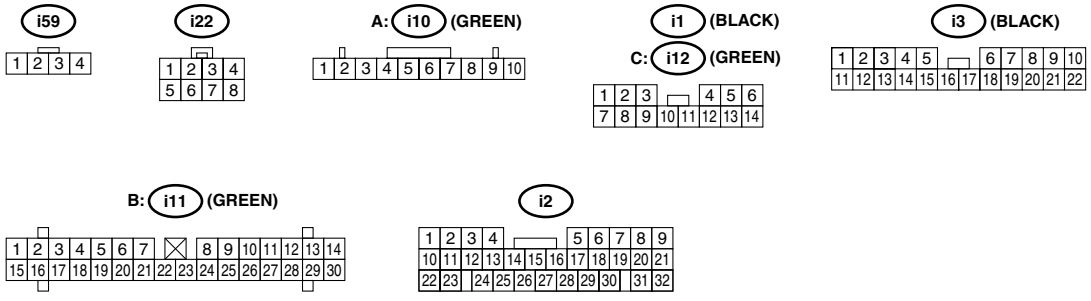

R63 (BLACK)
2 1
F4 (GRAY)
F22 (GRAY)
1 2 3
R26 : SD
R28 : SD
1 2 3
4 5 6
R26 : WG
R28 : WG
2 1
6 5 4 3
R79
1 2 3 4 5
6 7 8 9 10
B99
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22 23 24

GL21-24C

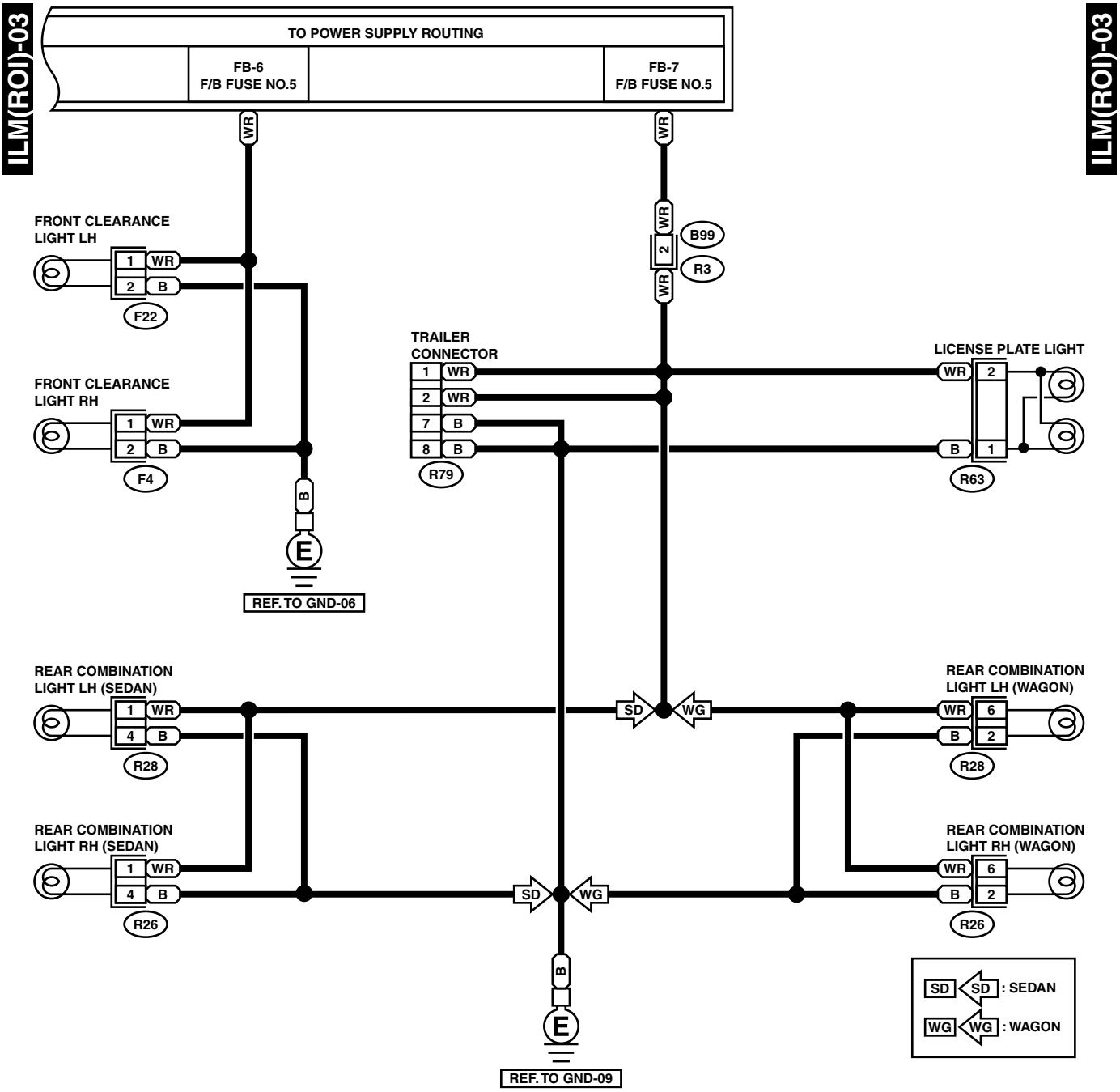
2. RHD WITHOUT ILLUMINATION CONTROL MODEL

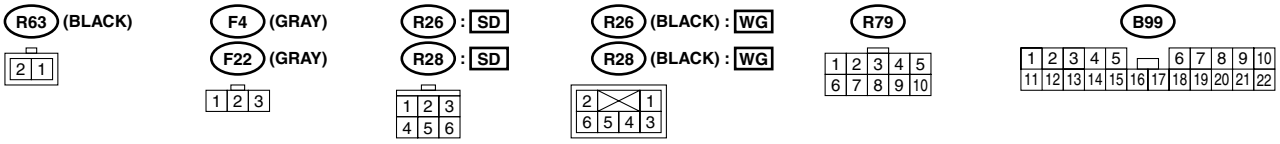



ILM(ROI)-02
TO POWER SUPPLY ROUTING
FB-36
F/B FUSE NO.13
(IG)
ILM(ROI)-01 B
ILM(ROI)-01 A
B36
B38
B37
i1
i3
i2
i59 CLOCK
HAZARD SWITCH
ILLUMI. LIGHT
i22
C3
A7
A8
DIMMER CIRCUIT
DIMMER CIRCUIT
DRIVER
COMBINATION
METER
A: i10
B: i11
C: i12
AWD-LO
INDICATOR LIGHT
POWER MODE
INDICATOR LIGHT
HOLD MODE
INDICATOR LIGHT
P
R
N
D
3
2
1
OUT TEMP LCD
BACK LIGHT
ODO/TRIP LCD
BACK LIGHT
ILLUMINATION LIGHT
B10
B16
B15
A6
C14
C13
C12
C11
C10
C4
C5
A9
WB
LY
OrL
B
Or
RL
P
GrL
RB
YL
LB
YL
REF.TO
D/R(R)-01
REF.TO
AT(R)-02
REF.TO
AT(R)-01
i2
B37
ILM(ROI)-01 C


i59
i22
A: i10 (GREEN)
i1 (BLACK)
C: i12 (GREEN)
i3 (BLACK)
B: i11 (GREEN)
i2

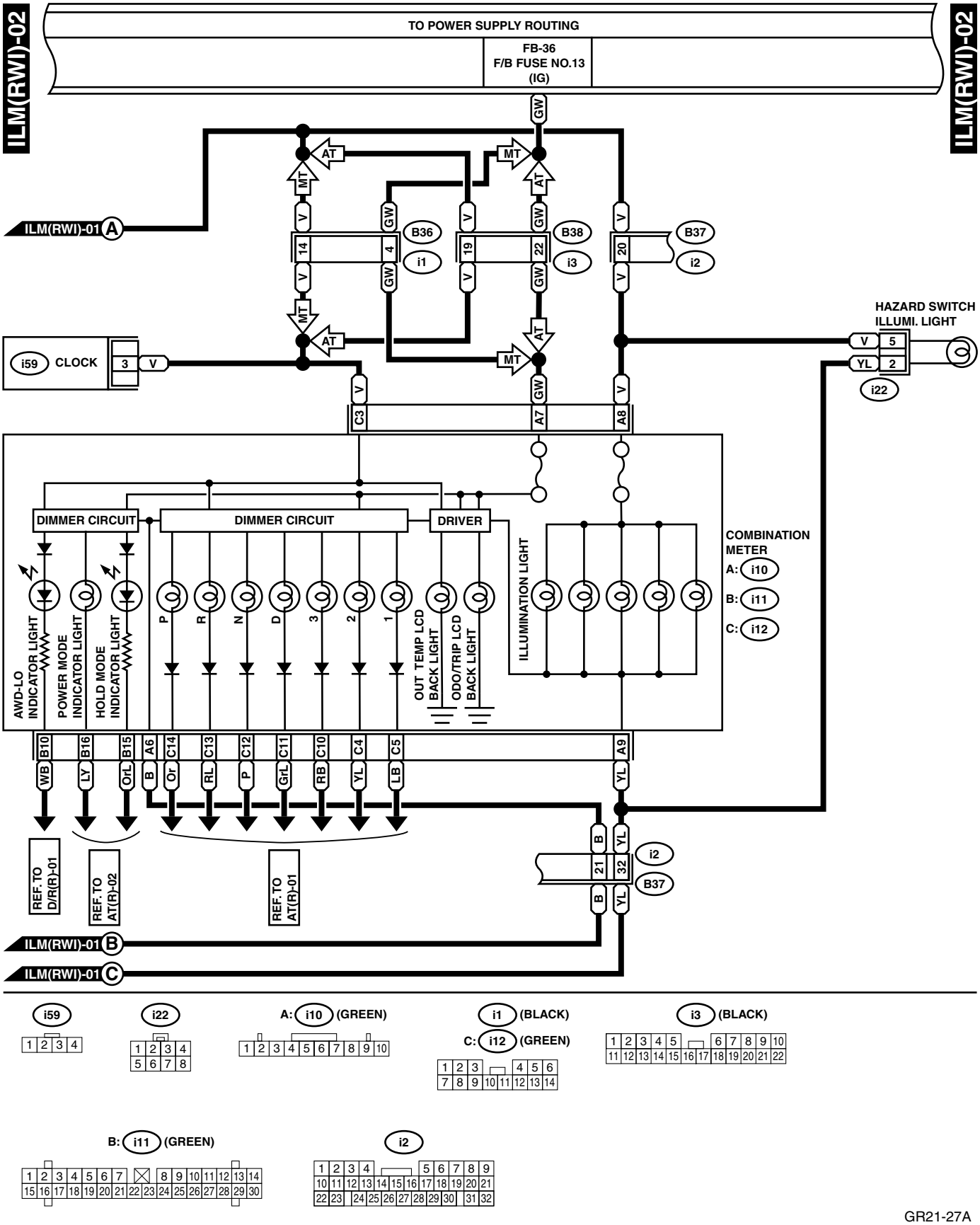
GR21-26B


ILM(ROI)-03
ILM(ROI)-03
TO POWER SUPPLY ROUTING
FB-6
F/B FUSE NO.5
FB-7
F/B FUSE NO.5
WR
FRONT CLEARANCE LIGHT LH
FRONT CLEARANCE LIGHT RH
F22
F4
B99
R3
R79
R63
TRAILER CONNECTOR
LICENSE PLATE LIGHT
REAR COMBINATION LIGHT LH (SEDAN)
REAR COMBINATION LIGHT RH (SEDAN)
REAR COMBINATION LIGHT LH (WAGON)
REAR COMBINATION LIGHT RH (WAGON)
R28
R26
SD
WG
B
E
REF. TO GND-06
REF. TO GND-09
SD : SEDAN
WG : WAGON

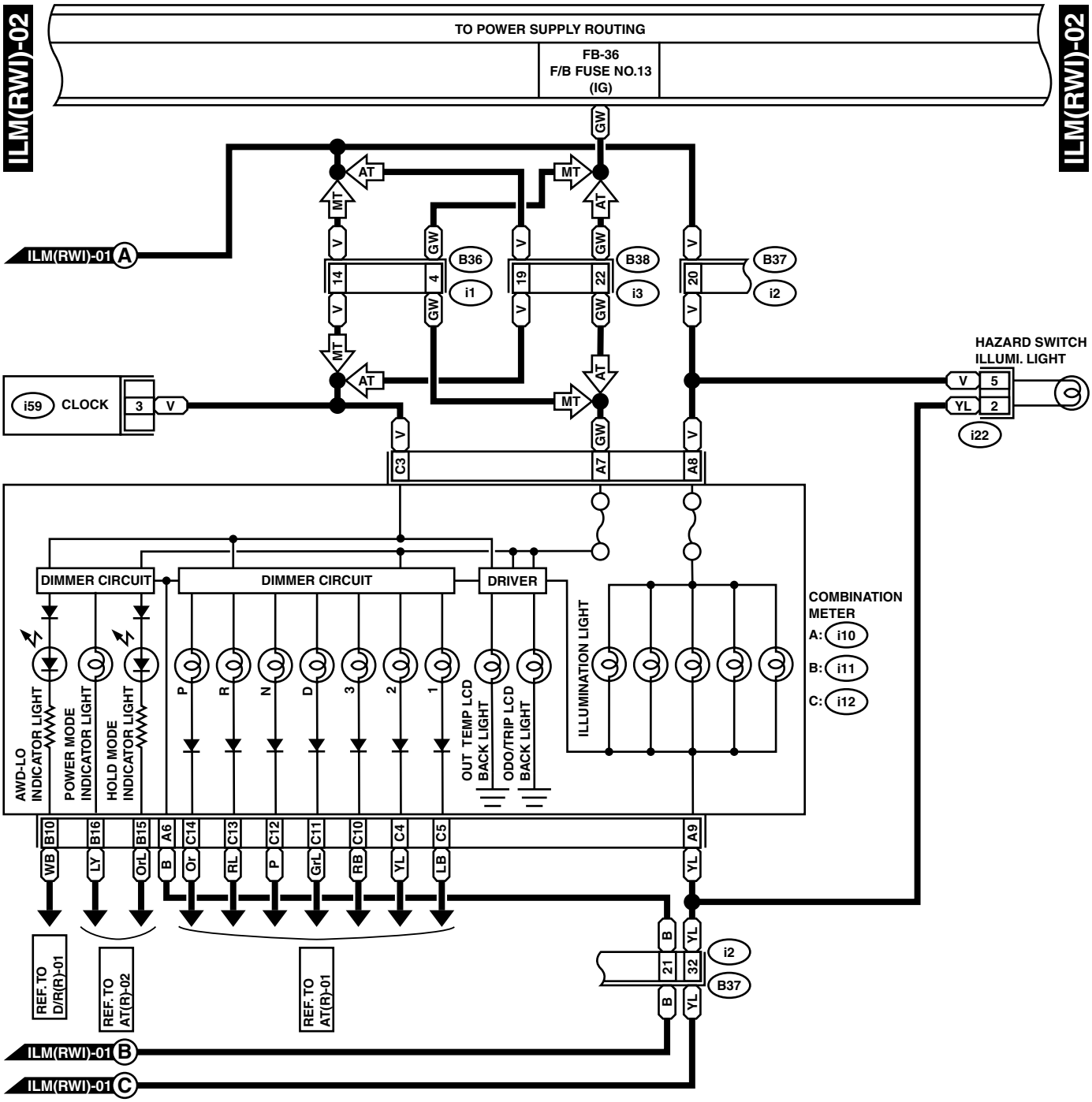

R63 (BLACK)
F4 (GRAY)
F22 (GRAY)
R26 : SD
R28 : SD
R26 (BLACK) : WG
R28 (BLACK) : WG
R79
B99

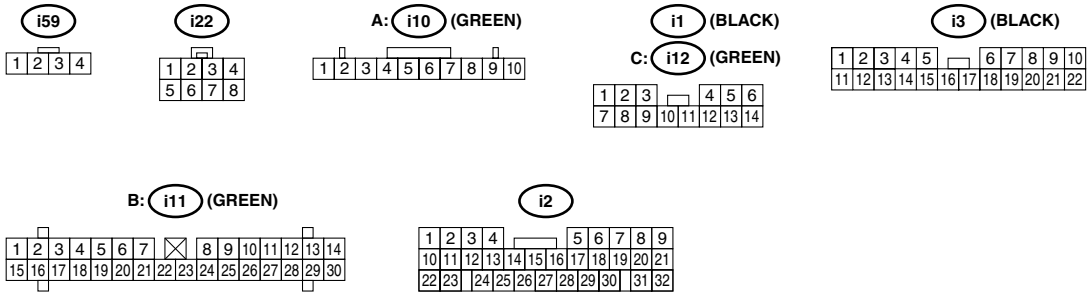
GR21-26C

3. RHD WITH ILLUMINATION CONTROL MODEL

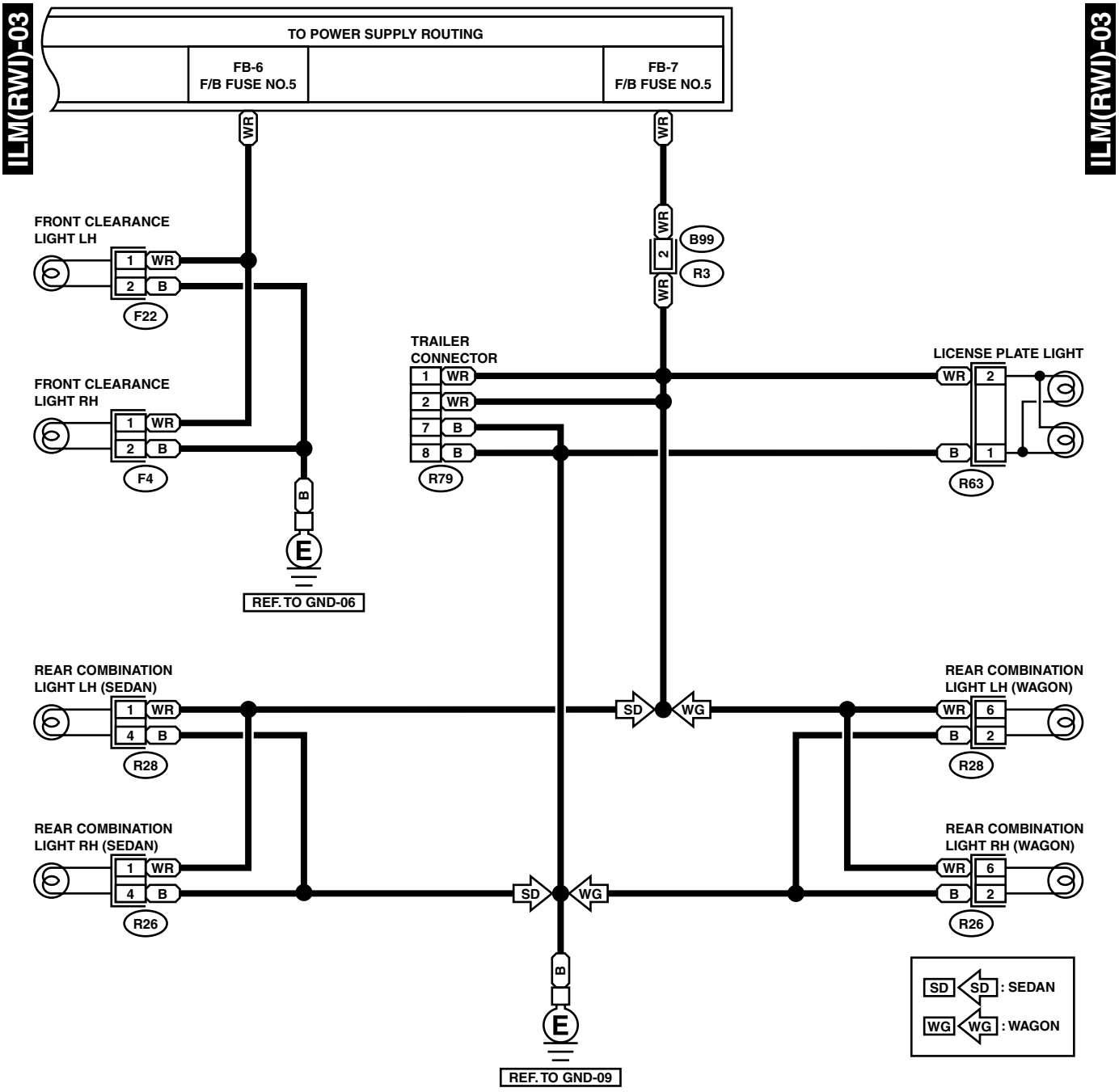


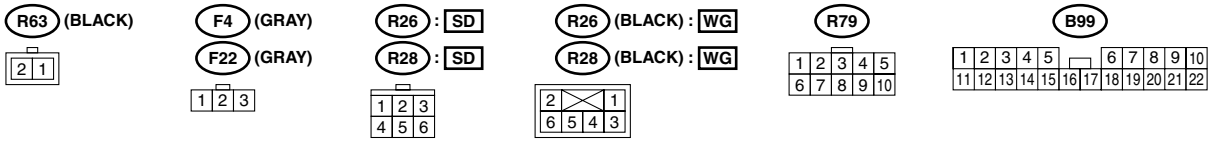
GR21-27A


ILM(RWI)-02
ILM(RWI)-02
TO POWER SUPPLY ROUTING
FB-36
F/B FUSE NO.13
(IG)
GW
AT
MT
V
B36
B38
B37
i1
i3
i2
14
4
19
22
20
ILM(RWI)-01 A
HAZARD SWITCH
ILLUMI. LIGHT
i59 CLOCK
3
V
5
YL
2
i22
C3
A7
A8
DIMMER CIRCUIT
DIMMER CIRCUIT
DRIVER
COMBINATION
METER
A: i10
B: i11
C: i12
AWD-LO
INDICATOR LIGHT
POWER MODE
INDICATOR LIGHT
HOLD MODE
INDICATOR LIGHT
P
R
N
D
3
2
1
OUT TEMP LCD
BACK LIGHT
ODO/TRIP LCD
BACK LIGHT
ILLUMINATION LIGHT
B10
B16
B15
A6
C14
C13
C12
C11
C10
C4
C5
A9
WB
LY
OrL
B
Or
RL
P
GrL
RB
YL
LB
YL
B
YL
21
32
i2
B37
REF. TO
D/R(R)-01
REF. TO
AT(R)-02
REF. TO
AT(R)-01
ILM(RWI)-01 B
ILM(RWI)-01 C


i59
i22
A: i10 (GREEN)
i1 (BLACK)
C: i12 (GREEN)
i3 (BLACK)
B: i11 (GREEN)
i2

GR21-27B


ILM(RWI)-03
ILM(RWI)-03
TO POWER SUPPLY ROUTING
FB-6
F/B FUSE NO.5
FB-7
F/B FUSE NO.5
WR
FRONT CLEARANCE LIGHT LH
1 WR
2 B
F22
FRONT CLEARANCE LIGHT RH
1 WR
2 B
F4
B
REF. TO GND-06
2 WR
B99
R3
TRAILER CONNECTOR
1 WR
2 WR
7 B
8 B
R79
LICENSE PLATE LIGHT
WR 2
B 1
R63
REAR COMBINATION LIGHT LH (SEDAN)
1 WR
4 B
R28
REAR COMBINATION LIGHT RH (SEDAN)
1 WR
4 B
R26
SD
WG
REAR COMBINATION LIGHT LH (WAGON)
WR 6
B 2
R28
REAR COMBINATION LIGHT RH (WAGON)
WR 6
B 2
R26
REF. TO GND-09
SD SD : SEDAN
WG WG : WAGON

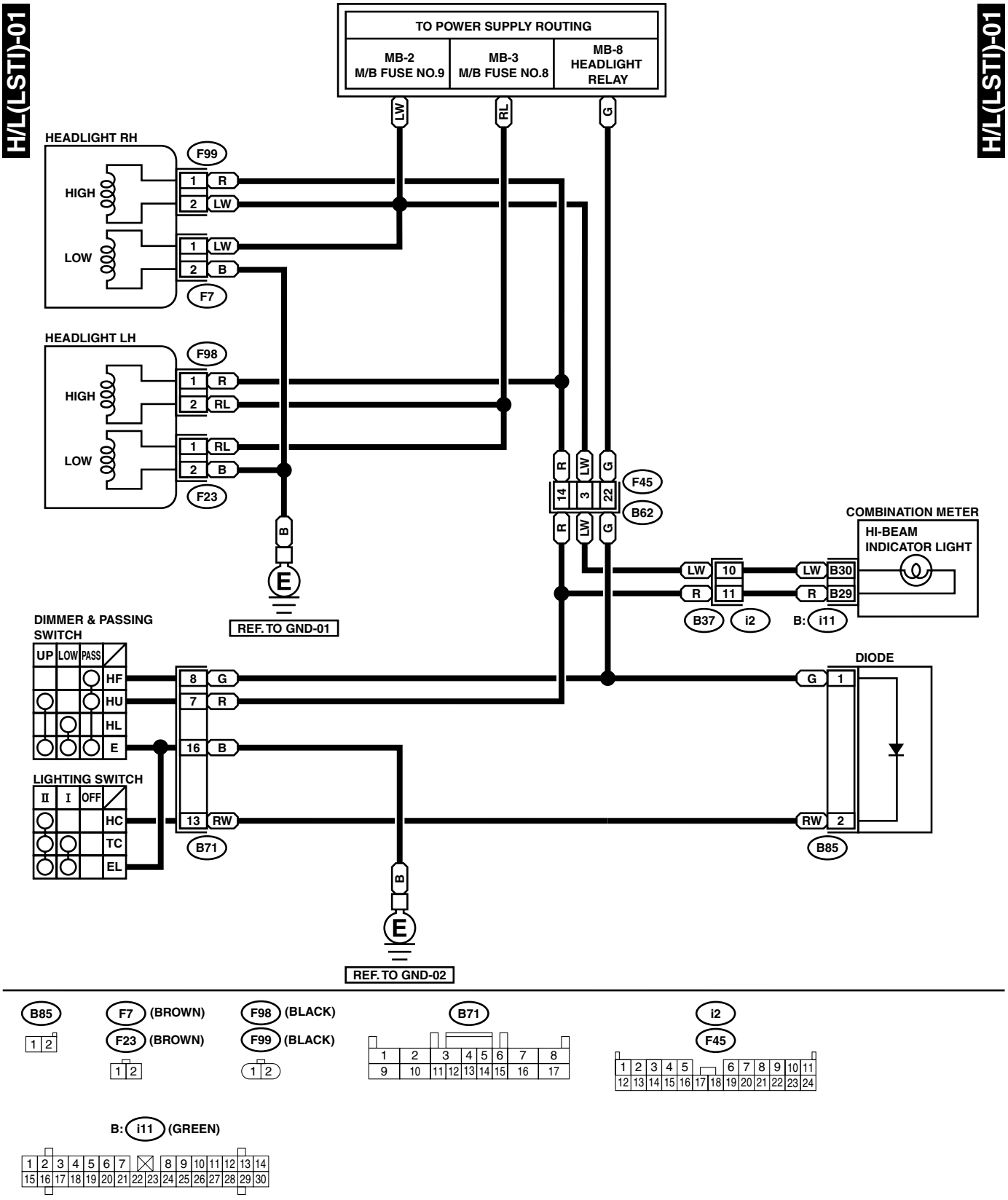

R63 (BLACK)
F4 (GRAY)
F22 (GRAY)
R26 : SD
R28 : SD
R26 (BLACK) : WG
R28 (BLACK) : WG
R79
B99

GR21-27C

27.Headlight System

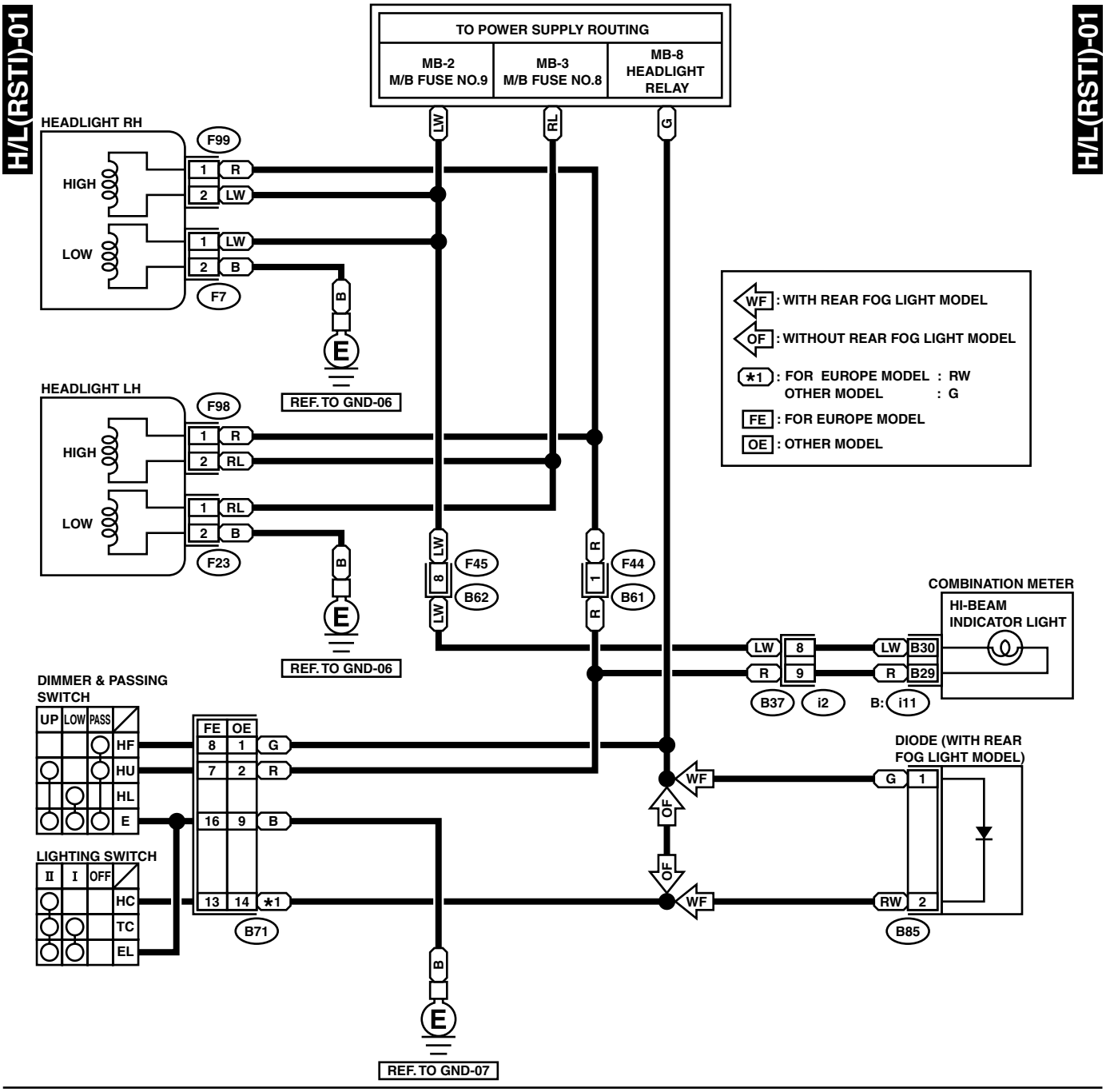
A: SCHEMATIC

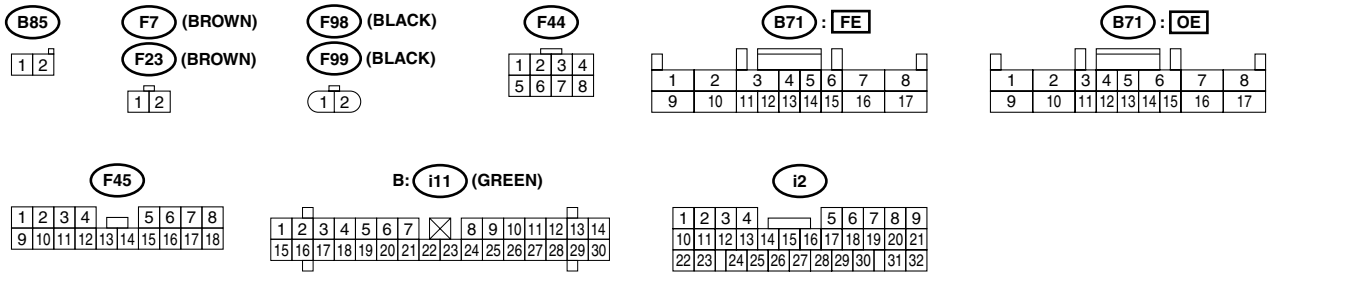
3. LHD 4-LIGHTS MODEL



GL19-22

4. RHD 4-LIGHTS MODEL





GR19-22

45.Front Wiring Harness

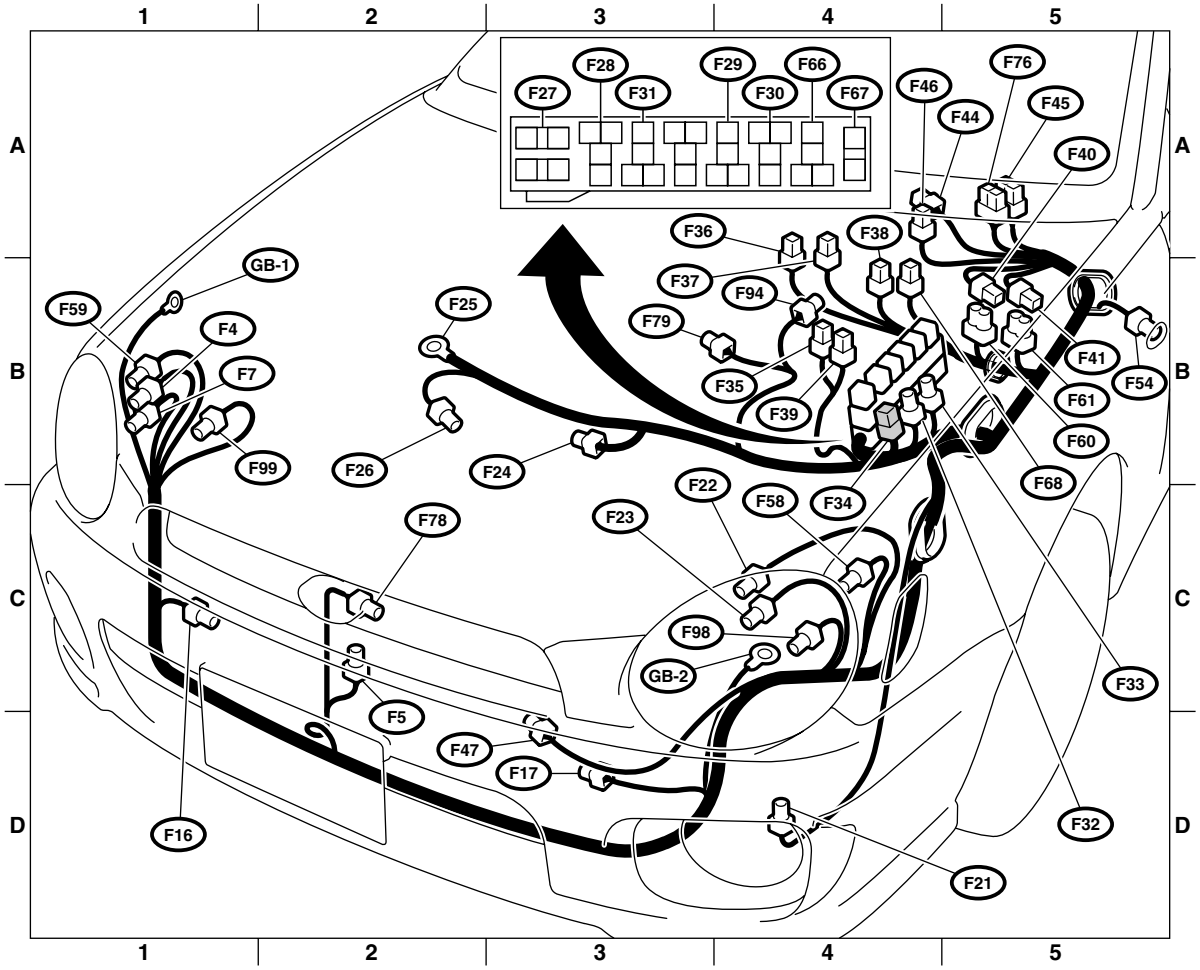
A: LOCATION

1. LHD MODEL

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
F4	3	Gray	B-1		Front clearance light RH and front turn signal light RH
F5	1	Black	C-2		Horn
F7	3	★	B-1		Headlight RH (2-Lights)
	2	Brown	B-1		Headlight RH (4-Lights Lo)
F16	2	Black	D-1		Sub fan motor (Non-turbo model)
	3	Black	D-1		Sub fan motor (Turbo model)
F17	2	Black	D-3		Radiator main fan motor (Non-turbo model)
	3	Black	D-3		Radiator main fan motor (Turbo model)
F21	2	Black	D-4		Front fog light LH
F22	3	Gray	C-4		Front clearance light LH and front turn signal light LH
F23	3	★	C-4		Headlight LH (2-Lights)
	2	Brown	C-4		Headlight LH (4-Lights Lo)
F24	3	Gray	B-3		A/C compressor
F25	1	★	B-2		Generator
F26	3	Green	B-2		
F27	4	Black	B-4		A/C fuse (Relay holder)
F28	4	Black	B-4		A/C sub fan relay-1 (Relay holder-Turbo model)
F29	4	Black	B-4		A/C sub fan relay (Relay holder-Non-turbo model)
	4	Black	B-4		A/C sub fan relay-2 (Relay holder-Turbo model)
F30	4	Black	B-4		Radiator main fan relay-2 (Relay holder-Turbo model)
F31	4	Black	B-4		A/C relay (Relay holder)
F32	2	Green	B-4		Front washer motor
F33	2	★	B-4		Rear washer motor
F34	4	Black	B-4		SBF holder
F35	2	Black	B-4		M/B
F36	3	★	A-4		
F37	6	Black	A-4		
F38	1	★	D-4		
F39	8	Black	B-4		
F40	9	Brown	B-5		F/B
F41	7	Gray	B-5		
F44	8	★	A-4	B61	Bulkhead wiring harness
F45	24	★	A-5	B62	Bulkhead wiring harness
F46	2	Black	A-4	B108	Bulkhead wiring harness
F47	1	Black	D-3		Horn
F54	2	★	B-5		Side turn signal light LH
F58	3	Black	C-4		Headlight leveler LH (Except STi)
	6	Gray	C-4		Headlight leveler LH (Sti)
F59	3	Black	B-1		Headlight leveler RH (Except STi)
	6	Gray	B-1		Headlight leveler RH (Sti)
F60	16	Brown	B-5	E3	Engine wiring harness (Turbo model)
F61	20	Black	B-5	E2	Engine wiring harness (Turbo model)
F66	4	Black	B-4		Radiator main fan relay (Relay holder-Non-turbo model)
	4	Black	B-4		Radiator main fan relay-1 (Relay holder-Turbo model)
F67	2	Black	B-4		FWD switch (AWD AT model)

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
F68	4	Black	B-4		M/B
F76	40	Gray	A-5	B209	Bulkhead wiring harness (SMJ)
F78	2	Black	C-2		Ambient sensor
F79	2	Gray	B-4		A/C pressure switch
F94	2	Gray	B-3		ABS front sensor LH
F98	2	Black	C-4		Headlight LH (4-Lights Hi)
F99	2	Black	B-1		Headlight RH (4-Lights Hi)
★: Non-colored					

FRONT WIRING HARNESS



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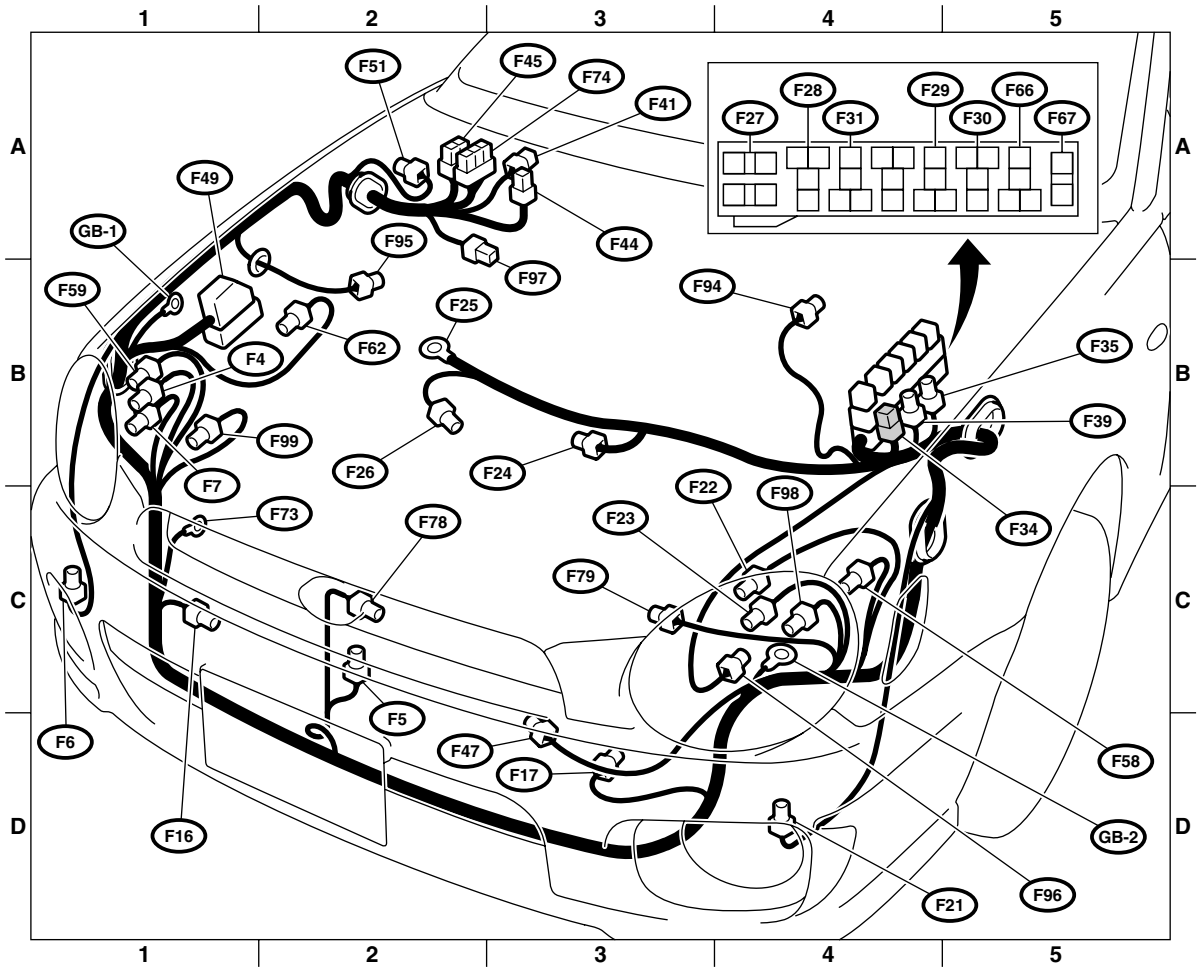
2. RHD MODEL

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
F4	3	Gray	B-1		Front clearance light RH and front turn signal light RH
F5	1	Black	C-2		Horn
F6	2	Black	C-1		Front fog light RH
F7	3	★	B-1		Headlight RH (2-Lights)
	2	Black	B-1		Headlight RH (4-Lights Lo)
F16	2	Black	C-1		Sub fan motor (Non-turbo model)
	3	Black	C-1		Sub fan motor (Turbo model)
F17	2	Black	D-3		Radiator main fan motor (Non-turbo model)
	3	Black	D-3		Radiator main fan motor (Turbo model)
F21	2	Black	D-4		Front fog light LH
F22	3	Gray	C-4		Front clearance light LH and front turn signal light LH
F23	3	★	C-4		Headlight LH (2-Lights)
	2	Black	C-4		Headlight LH (4-Lights Lo)
F24	3	Gray	B-3		A/C compressor
F25	1	★	B-2		Generator
F26	3	Green	B-2		
F27	4	Black	B-4		A/C fuse (Relay holder)
F28	4	Black	B-4		A/C sub fan relay-1 (Relay holder-Turbo model)
F29	4	Black	B-4		A/C sub fan relay (Relay holder-Non-turbo model)
	4	Black	B-4		A/C sub fan relay-2 (Relay holder-Turbo model)
F30	4	Black	B-4		Radiator main fan relay-2 (Relay holder-Turbo model)
F31	4	Black	B-3		A/C relay (Relay holder)
F34	4	Black	B-4		SBF holder
F35	2	Black	B-4		M/B
F39	8	Black	B-4		
F41	7	Gray	A-3		F/B
F44	8	★	A-3	B61	Bulkhead wiring harness
F45	18	★	A-2	B62	Bulkhead wiring harness
F47	1	★	D-3		Horn
F49	31	Black	B-1		ABS control module
F51	2	★	A-2		Side turn signal light RH
F58	3	Black	C-4		Headlight leveler LH (Except STi)
	6	Gray	C-4		Headlight leveler LH (Sti)
F59	3	Black	B-1		Headlight leveler RH (Except STi)
	6	Gray	B-1		Headlight leveler RH (Sti)
F62	8	Gray	B-2		Shield joint connector (ABS)
F66	4	Black	B-4		Radiator main fan relay (Relay holder-Non-turbo model)
	4	Black	B-4		Radiator main fan relay-1 (Relay holder)
F67	2	Black	B-4		FWD switch (AWD AT model)
F73	1	★	C-1		ABS motor ground
F74	22	Black	A-2	B200	Bulkhead wiring harness (ABS)
F78	2	Black	C-2		Ambient sensor
F79	2	Gray	C-3		A/C pressure switch
F94	2	Gray	B-4		ABS front sensor LH
F95	2	Gray	B-2		ABS front sensor RH
F96	1	White	C-4	B255	Bulkhead wiring harness
F97	2	Black	A-2		ABS condenser
F98	2	Black	C-4		Headlight LH (4-Lights Hi)

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
F99	2	Black	B-1		Headlight RH (4-Lights Hi)
★: Non-colored					


1
2
3
4
5
A
B
C
D
F51
F45
F74
F41
F28
F29
F66
F27
F31
F30
F67
F49
GB-1
F95
F44
F97
F59
F94
F25
F62
F4
F35
F99
F39
F26
F24
F7
F22
F98
F73
F78
F23
F34
F79
F5
F6
F47
F58
F17
F16
GB-2
F21
F96

BO0488

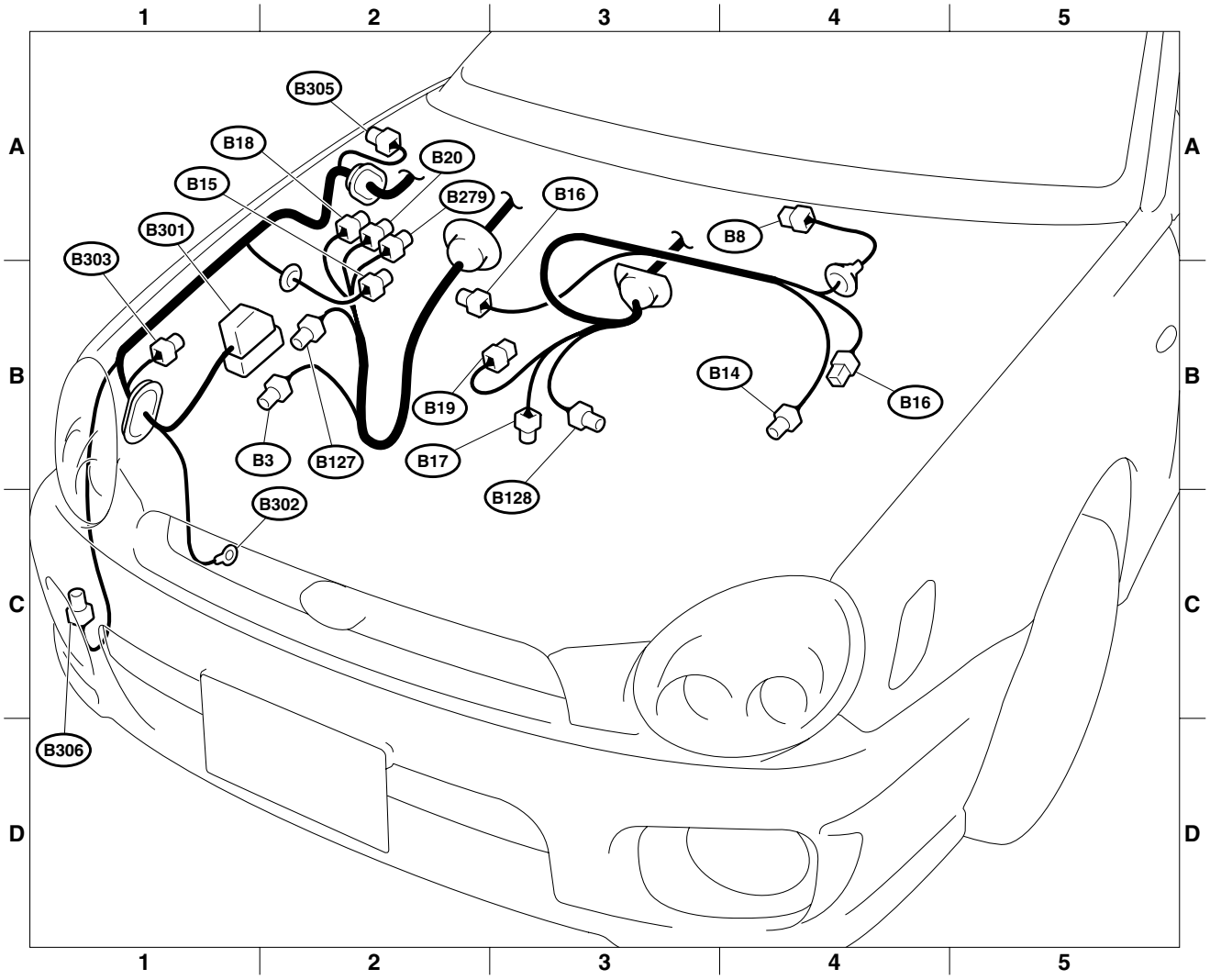
46.Bulkhead Wiring Harness (In Engine Room)

A: LOCATION

2. LHD TURBO ENGINE MODEL

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B3	5	Gray	B-2		Mass airflow sensor
B8	5	★	A-4		Front wiper motor
B14	1	★	B-4		Starter (Magnet)
B15	2	Gray	B-2		ABS front sensor RH
B16	2	Gray	B-4		Brake fluid level switch
B17	3	★	B-3		Vehicle speed sensor (MT-STi)
	4	★	B-3		Vehicle speed sensor (MT-Except STi)
B18	4	★	A-2		Front oxygen (A/F) sensor
B19	4	★	A-3		Rear oxygen sensor
B20	10	★	A-2	E1	Engine wiring harness
B127	2	Blue	B-2		Wastegate control solenoid valve
B128	4	★	B-3	T9	Transmission (MT)
B279	2	★	A-2		Exhaust temperature sensor
B301	31	Black	B-1		ABS control module
B302	1	★	C-1		ABS motor ground
B303	8	Gray	B-1		Shield joint connector (ABS)
B305	2	★	A-2		Side turn signal light RH
B306	2	Black	C-1		Front fog light RH
★: Non-colored					

BULKHEAD WIRING HARNESS (IN ENGINE ROOM)



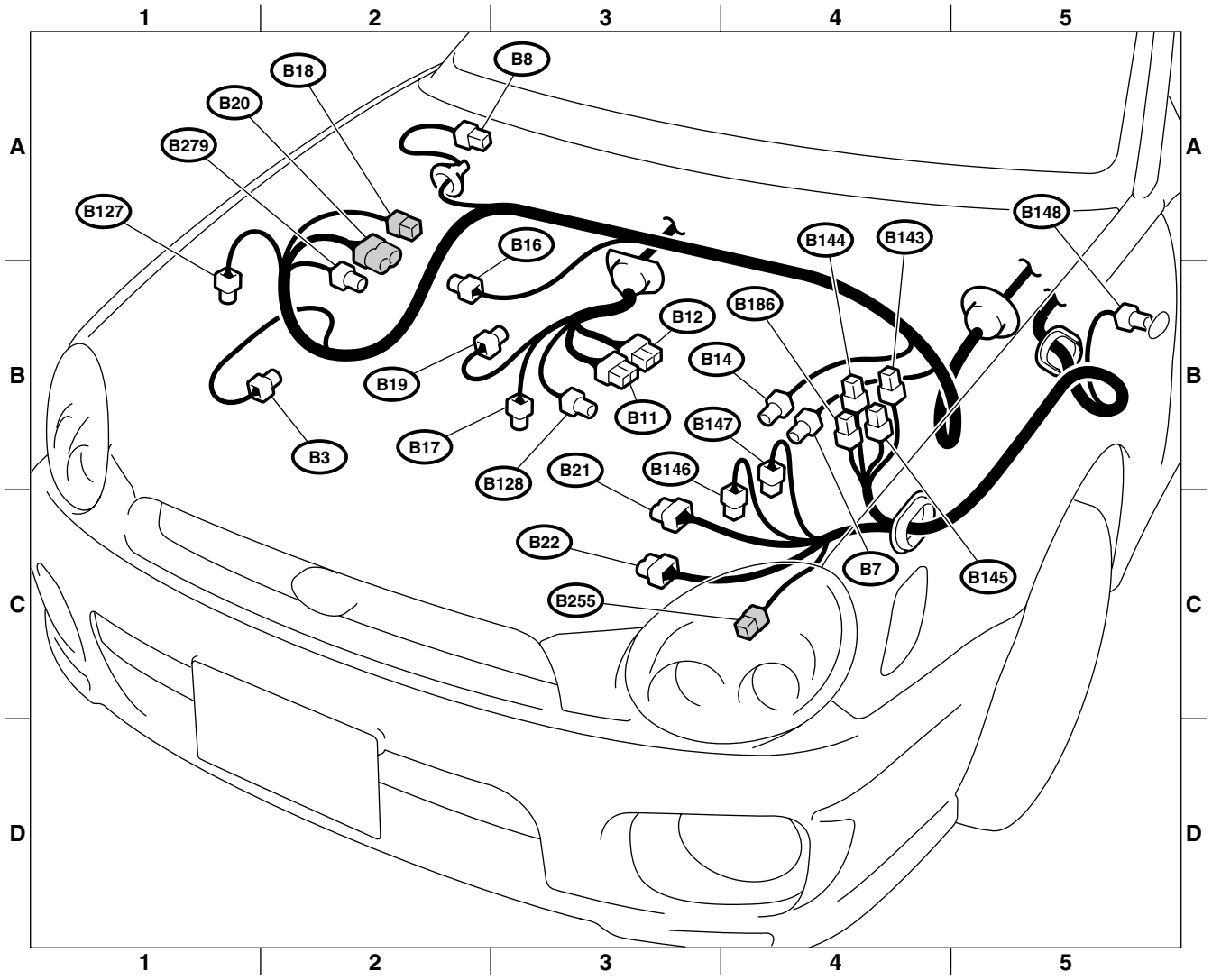
BO0470

4. RHD TURBO ENGINE MODEL

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B3	5	Gray	B-2		Mass airflow sensor
B7	6	Black	C-4		Cruise control actuator
B8	5	Gray	A-2		Front wiper motor
B11	20	Black	B-3	T4	Transmission (AT)
B12	12	White	B-3	T3	
B14	1	★	B-3		Starter (Magnet)
B16	2	Gray	B-2		Brake fluid level switch
B17	3	★	B-2		Vehicle speed sensor (MT-STi)
	4	★	B-2		Vehicle speed sensor (MT-Except STi)
B18	4	★	A-1		Front oxygen (A/F) sensor
B19	4	★	B-2		Oxygen sensor
B20	10	★	A-1	E1	Engine wiring harness
B21	20	Black	B-2	E2	Engine wiring harness
B22	16	Brown	C-2	E3	
B127	2	★	A-1		Wastegate control solenoid valve
B128	4	Gray	C-2	T9	Transmission (MT)
B143	3	★	A-3		M/B
B144	6	Black	A-3		
B145	1	★	C-4		
B146	2	Green	B-3		Front washer motor
B147	2	★	B-3		Rear washer motor
B148	2	★	A-4		Side turn signal light LH
B186	4	Black	B-3		M/B
B255	1	White	C-2	F96	Front wiring harness (With ABS)
B279	2	★	A-1		Exhaust temperature sensor

★: Non-colored

BULKHEAD WIRING HARNESS (IN ENGINE ROOM)



BO0478

47.Bulkhead Wiring Harness (In Compartment)

A: LOCATION

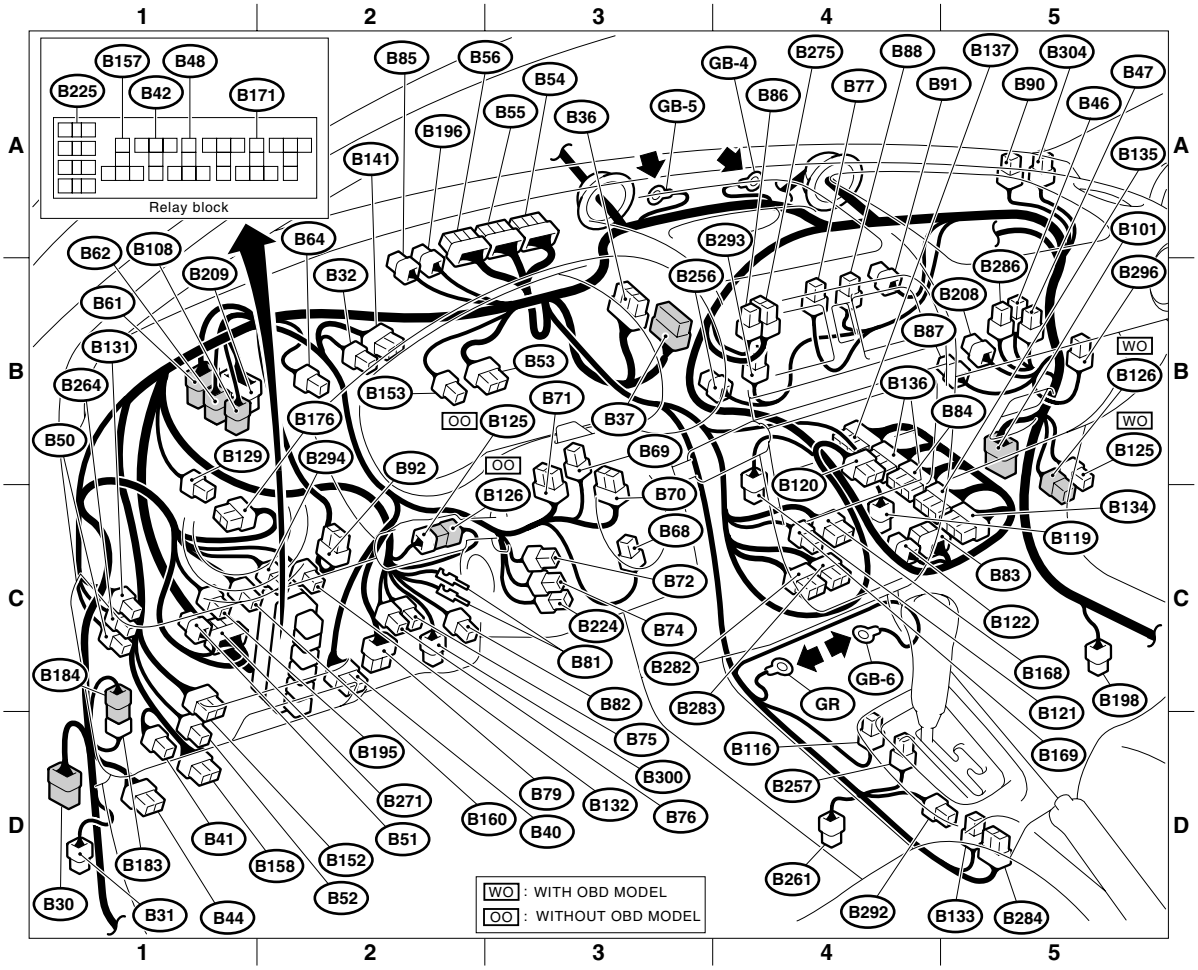
1. LHD MODEL

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B30	25	★	D-1	D1	Front door cord LH
B31	6	Yellow	D-1	AB1	SRS (Airbag) harness
B32	3	Black	B-2		Turn & hazard module
B36	24	Black	B-3	i1	Instrument panel wiring harness
B37	24	★	B-3	i2	
B40	16	Gray	C-2		Data link connector
B41	2	★	D-1		Power window
B42	5	★	C-2		Power window
B44	10	★	D-1		Seat belt warning module
B46	4	Green	C-5		Fuel pump relay
B47	6	Brown	C-5		Main relay
B48	5	★	C-2		Front fog light
B50	4	★	C-1		Blower fan motor relay
B51	8	Blue	C-1		F/B
B52	7	★	D-1		
B53	12	Black	B-2		Shield joint connector (AT)
B54	24	★	A-3		Transmission control module
B55	24	Gray	A-2		
B56	24	Green	A-2		
B61	8	★	B-1	F44	Front wiring harness
B62	24	★	B-1	F45	
B64	2	Black	B-2		Stop light switch
B68	5	Black	C-3		Steering roll connector
B69	4	★	B-2		Combination switch
B70	18	★	C-2		
B71	17	★	C-2		
B72	4	Blue	C-3		Ignition switch
B74	2	Black	C-3		Key warning switch
B75	2	Green	C-2		Test mode connector
B76	2	Green	C-2		
B77	3	★	B-4		Mode actuator
B79	14	Gray	C-2		Check connector
B81	1×2	★	C-2		Diagnosis terminal (Ground)
B82	6	Black	C-2		Diagnosis connector
B83	6	★	C-4		Shield & sensor ground joint connector (E/G) (With OBD)
	8	★	C-4		Shield & sensor ground joint connector (E/G) (Without OBD)
B84	17	★	B-4		Engine control module
B85	2	★	B-2		Diode (Rear fog light)
B86	4	Brown	B-4		Blower fan resistor

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B87	2	★	B-5		Blower fan motor
B88	4	Brown	B-4		Evaporator thermoswitch
B90	4	★	B-5	R50	Roof cord
B91	6	Black	B-4		FRESH/RECIRC actuator
B92	8	★	C-2		Door lock timer
B101	25	★	B-5	D11	Front door cord RH
B108	2	★	B-1	F46	Front wiring harness
B116	6	★	D-4		Select lever illumination
B119	4	★	C-4		Cigarette lighter (Power)
B120	14	★	B-4		Radio
B121		★	B-4		Audio ground
B122	6	★	C-4		Sensor ground joint connector
B125	1	Black	C-5		Read memory connector
B126	1	Black	C-5		
B129	2	★	B-1		Kick down switch (AT)
B131	4	★	C-1		Rear fog light relay
B132	4	★	C-2		Headlight leveling switch (Except STi)
	8	★	C-2		Headlight leveling switch (STi)
B133	6	★	D-5		AT power mode & hold mode switch
B134	35	★	C-4		Engine control module
B135	28	★	C-4		
B136	30	★	B-4		
B137	31	★	B-4		
B141	12	★	B-2		Immobilizer control module
B152	12	★	C-1		F/B
B157	5	★	C-2		Ignition relay (Relay block)
B158	10	Gray	D-1		F/B
B160	6	Gray	C-1		Front fog light switch
B168	16	★	C-4		Air conditioning switch (Manual A/C)
B169	6	★	C-4		Blower fan switch (Manual A/C)
B171	5	★	C-2		Mirror heated relay
B176	18	★	C-1		Keyless entry control module
B183	1	★	D-1		Joint connector (Keyless entry)
B184	1	★	C-1		
B195	6	★	C-1		Rear fog light switch

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B196	3	★	B-2		Diode (Rear fog light)
B198	5	★	C-5	GB-9	Ground joint connector
B208	2	★	B-5		Glove box light
B209	40	★	B-1	F76	Front wiring harness (SMJ)
B224	2	★	C-3		Ignition switch illumination
B225	8	★	C-2		Fuse (Relay box)
B256	2	★	B-4		Evaporator sensor
B257	3	★	D-4		ABS lateral G sensor (STi)
B261	6	★	D-4		ABS G sensor joint connector (STi)
B264	4	Red	C-1		ABS relay
B271	12	Blue	C-1		F/B
B275	4	★	B-4		Fan control amp.
B282	16	Gray	C-4		Auto A/C control module
B283	20	Gray	C-4		
B284	10	★	D-5		Remote control rear-view mirror switch
B286	4	★	B-5		Intercooler water spray timer (STi)
B292	3	★	D-4		ABS G sensor
B293	3	★	B-4		Air mix actuator (Auto A/C)
B294	6	★	C-2		Intercooler water spray switch (STi)
B296	4	★	B-5		Rear defogger timer
B300	6	★	C-2		Line end check connector
B304	2	Black	A-5		ABS condenser
★: Non-colored					

BULKHEAD WIRING HARNESS (IN COMPARTMENT)



BO0482

2. RHD MODEL

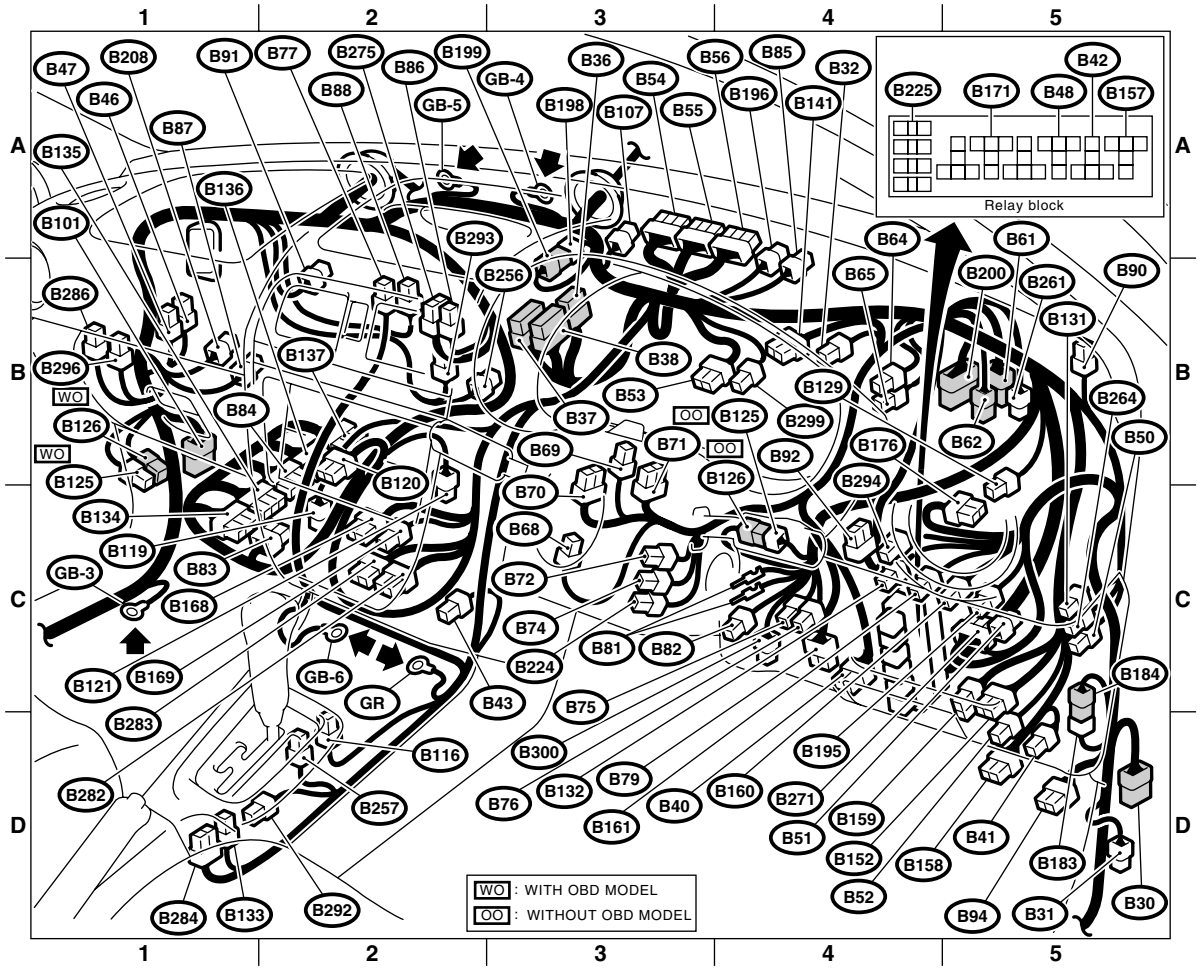
Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B30	25	★	D-5	D1	Front door cord RH
B31	6	Yellow	D-5	AB1	SRS (Airbag) harness
B32	3	Black	B-4		Turn & hazard module
B36	14	Black	B-3	i1	Instrument panel wiring harness
B37	32	★	B-3	i2	
B38	22	Black	B-3	i3	
B40	16	Black	C-4		Data link connector
B41	2	★	D-5		Power window circuit
B42	5	Black	C-4		Power window relay (Relay block)
B43	6	Black	C-2		Illumination control module
B46	4	Green	C-1		Fuel pump relay
B47	6	★	C-1		Main relay
B48	5	★	C-4		Front fog light relay (Relay block)
B50	4	★	C-5		Blower fan motor relay
B51	8	Blue	C-5		F/B
B52	7	★	D-5		
B53	6	★	B-3		Shield joint connector (AT) (Turbo model)
	12	Black	B-3		Shield joint connector (AT) (Non-turbo model)
B54	24	★	A-3		Transmission control module
B55	24	Gray	A-3		
B56	24	Green	A-4		
B61	8	★	B-5	F44	Front wiring harness
B62	18	★	B-5	F45	
B64	2	Black	B-4		Stop light switch
B65	4	Black	B-4		Stop&brake switch (With cruise control)
B68	5	Black	C-3		Cruise control sub switch
B69	4	★	B-3		Combination switch
B70	18	★	B-3		
B71	17	★	B-3		
B72	4	Blue	C-3		Ignition switch
B74	2	Black	C-3		Key warning switch
B75	2	Green	C-4		Test mode connector
B76	2	Green	C-4		
B77	3	★	B-2		Mode actuator
B79	14	Gray	C-4		Check connector
B81	1×2	★	C-4		Diagnosis terminal (Ground)
B82	6	Black	C-4		Diagnosis connector

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B83	4	★	C-2		Shield&sensor ground joint connector (E/G) (Non-turbo with OBD model)
	6	★	C-2		Shield & sensor ground joint connector (E/G) (Turbo model)
	12	Black	C-2		Shield & sensor ground joint connector (E/G) (Non-turbo without OBD model)
B84	17	★	B-2		Engine control module
B85	2	Black	B-4		Diode (Rear fog light)
B86	4	Brown	B-2		Blower fan resistor
B87	2	★	B-1		Blower fan motor
B88	4	Brown	B-2		Evaporator thermoswitch
B90	6	★	B-5	R50	Roof cord
B91	6	Black	B-2		FRESH/RECIRC actuator
B92	8	★	C-4		Door lock timer
B94	20	Black	D-5		Cruise control module
B101	25	★	B-1	D11	Front door cord LH
B107	2	★	A-3		Clutch switch (Cruise control)
B116	6	★	D-2		Select lever illumination light (AT)
B119	4	★	C-2		Cigarette lighter (Power)
B120	14	★	B-2		Radio
B121	1	★	B-2		Audio ground
B125	1	Black	B-1		Read memory connector (With OBD model)
	1	Black	C-4		Read memory connector (Without OBD model)
B126	1	Black	B-1		Read memory connector (With OBD model)
	1	Black	C-4		Read memory connector (Without OBD model)
B129	2	★	B-5		Kick down switch (AT)
B131	4	Blue	C-5		Rear fog light relay
B132	4	★	C-4		Headlight leveling switch (Except STi)
	8	★	C-4		Headlight leveling switch (STi)
B133	6	Blue	D-1		AT power mode & hold mode switch

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B134	22	★	C-1		Engine control module
B135	28	★	C-2		
B136	24	★	B-2		
B137	31	★	B-2		
B141	14	★	B-4		Immobilizer control module
B152	12	★	C-5		F/B
B157	4	★	C-4		Ignition relay (Relay block)
B158	10	Gray	D-5		F/B
B159	9	Brown	C-5		F/B
B160	6	Gray	C-5		Front fog light switch
B161	6	Brown	C-4		Cruise control sub switch
B168	10	★	C-2		Air conditioning switch (Manual A/C)
B169	6	★	C-2		Blower fan switch (Manual A/C)
B171	5	★	C-4		Mirror heated relay
B176	18	★	C-5		Keyless entry control module
B183	1	★	D-5		Joint connector (Keyless entry)
B184	1	★	C-5		
B195	6	★	C-5		Rear fog light switch
B196	3	Black	A-4		Diode (Rear fog light)
B198	1	★	A-3	B199	Joint connection (Ground)
B199	1	★	B-3	B198	
B200	22	Black	B-5	F74	Front wiring harness
B208	2	★	B-1		Glove box light
B224	2	★	C-3		Ignition switch illumination
B225	8	Black	C-4		Fuse (Relay box)
B256	2	★	B-2		Evaporator sensor
B257	3	Black	D-2		ABS lateral G sensor (STi)
B261	6	★	B-5		ABS G sensor joint connector (STi)
B264	4	Pink	C-5		ABS relay
B271	12	Blue	C-5		F/B
B275	4	★	B-2		Fan control amp
B282	16	Gray	C-2		Auto A/C control module
B283	20	Gray	C-2		
B284	10	★	D-1		Remote control rearview mirror switch
B286	4	★	B-1		Intercooler water spray timer (STi)
B292	3	★	D-1		ABS sensor
B293	3	★	B-2		Air mix actuator (Auto A/C)
B294	6	★	C-4		Intercooler water spray switch (STi)
B296	4	★	B-1		Rear defogger timer

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B299	6	★	B-4		Shield joint connector (AT) (Turbo model)
B300	6	★	C-4		Line end check connector
★: Non-colored					

BULKHEAD WIRING HARNESS (IN COMPARTMENT)



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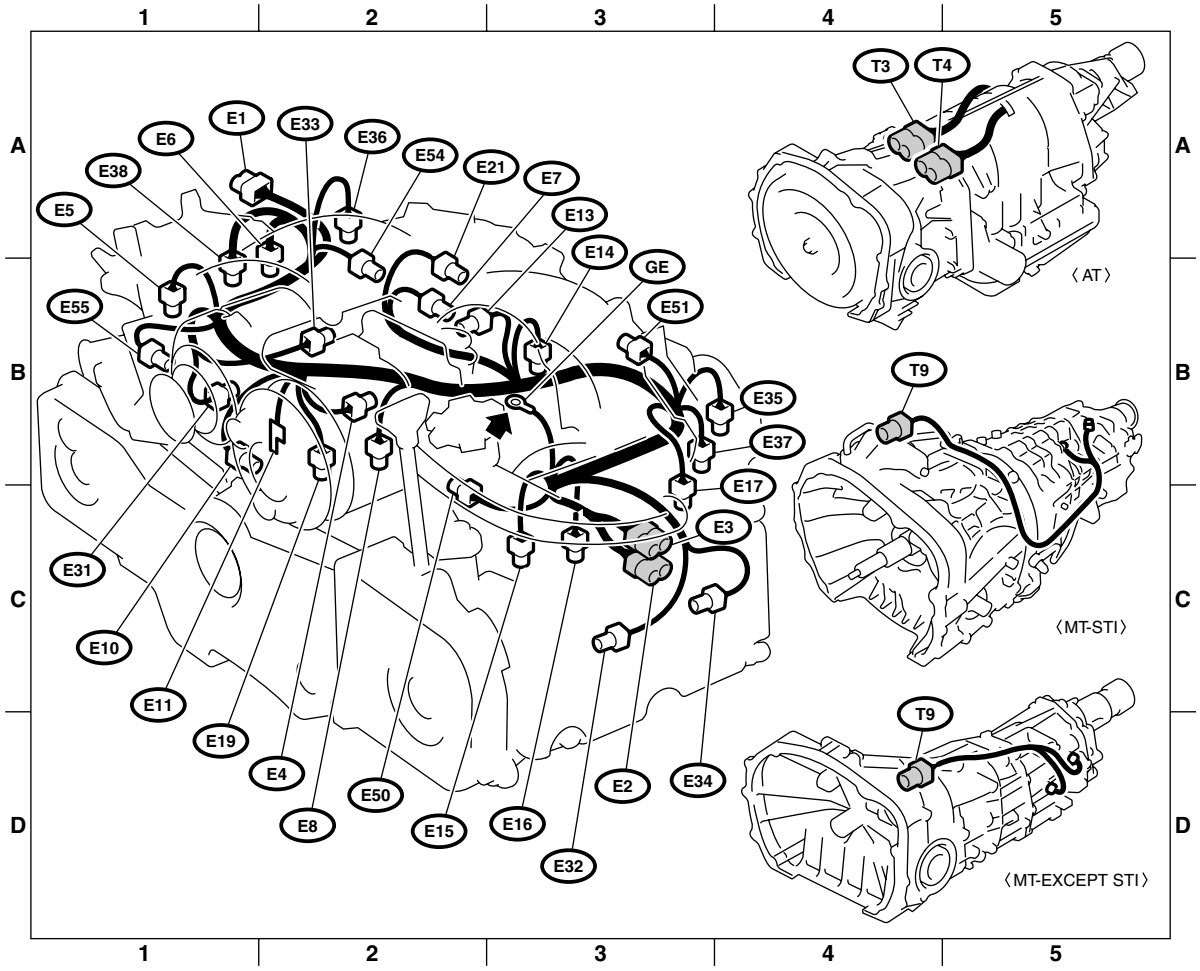
48.Engine Wiring Harness and Transmission Cord

A: LOCATION

3. DOHC TURBO MODEL

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
E1	10	Light gray	A-1	B20	Bulkhead wiring harness
E2	20	Black	C-3	F61	Front wiring harness (LHD model)
				B21	Bulkhead wiring harness (RHD model)
E3	16	Brown	C-3	F60	Front wiring harness (LHD model)
				B22	Bulkhead wiring harness (RHD model)
E4	2	Black	B-2		Purge control solenoid valve
E5	2	Dark gray	B-1		Fuel injector No.1
E6	2	Dark gray	B-2		Fuel injector No.3
E7	3	Black	B-2		Idle air control solenoid valve
E8	3	Light gray	B-2		Engine coolant temperature sensor and thermometer
E10	2	Light gray	B-1		Crankshaft position sensor
E11	1	★	B-2		Oil pressure switch
E13	3	Black	B-2		Throttle position sensor
E14	2	Gray	B-3		Knock sensor
E15	2	Light gray	C-3		Camshaft position sensor
E16	2	Dark gray	C-3		Fuel injector No.2
E17	2	Dark gray	C-3		Fuel injector No.4
E19	1	★	B-2		Power steering oil pressure switch
E21	3	Black	B-2		Pressure sensor
E31	3	★	B-1		Ignition coil No.1
E32	3	★	C-3		Ignition coil No.2
E33	3	Black	B-2		Ignition coil No.3
E34	3	Black	C-3		Ignition coil No.4
E35	2	★	B-4		AVCS camshaft position sensor LH (STi)
E36	2	★	A-2		AVCS camshaft position sensor RH (STi)
E37	2	Blue	B-3		AVCS solenoid valve LH (STi)
E38	2	Blue	B-1		AVCS solenoid valve RH (STi)
E50	3	Black	C-2		TGV angle sensor LH (Except STi)
E51	2	Black	B-3		TGV LH (Except STi)
E54	3	Black	B-2		TGV angle sensor RH (Except STi)
E55	2	Black	B-1		TGV RH (Except STi)
★: Non-colored					

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
T3	12	★	A-4	B12	Bulkhead wiring harness (RHD model)
T4	20	Black	A-4	B11	Bulkhead wiring harness (RHD model)
T9	4	★	D-4	B128	Bulkhead wiring harness (MT-Except STi)
T9	4	★	B-4	B128	Bulkhead wiring harness (MT-STi)
★: Non-colored					


1
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3
4
5
A
B
C
D
T3
T4
〈AT〉
T9
〈MT-STI〉
T9
〈MT-EXCEPT STI〉
E1
E33
E36
E54
E21
E7
E13
E14
GE
E51
E6
E38
E5
E55
E35
E37
E17
E3
E31
E10
E11
E19
E4
E50
E8
E15
E16
E32
E2
E34

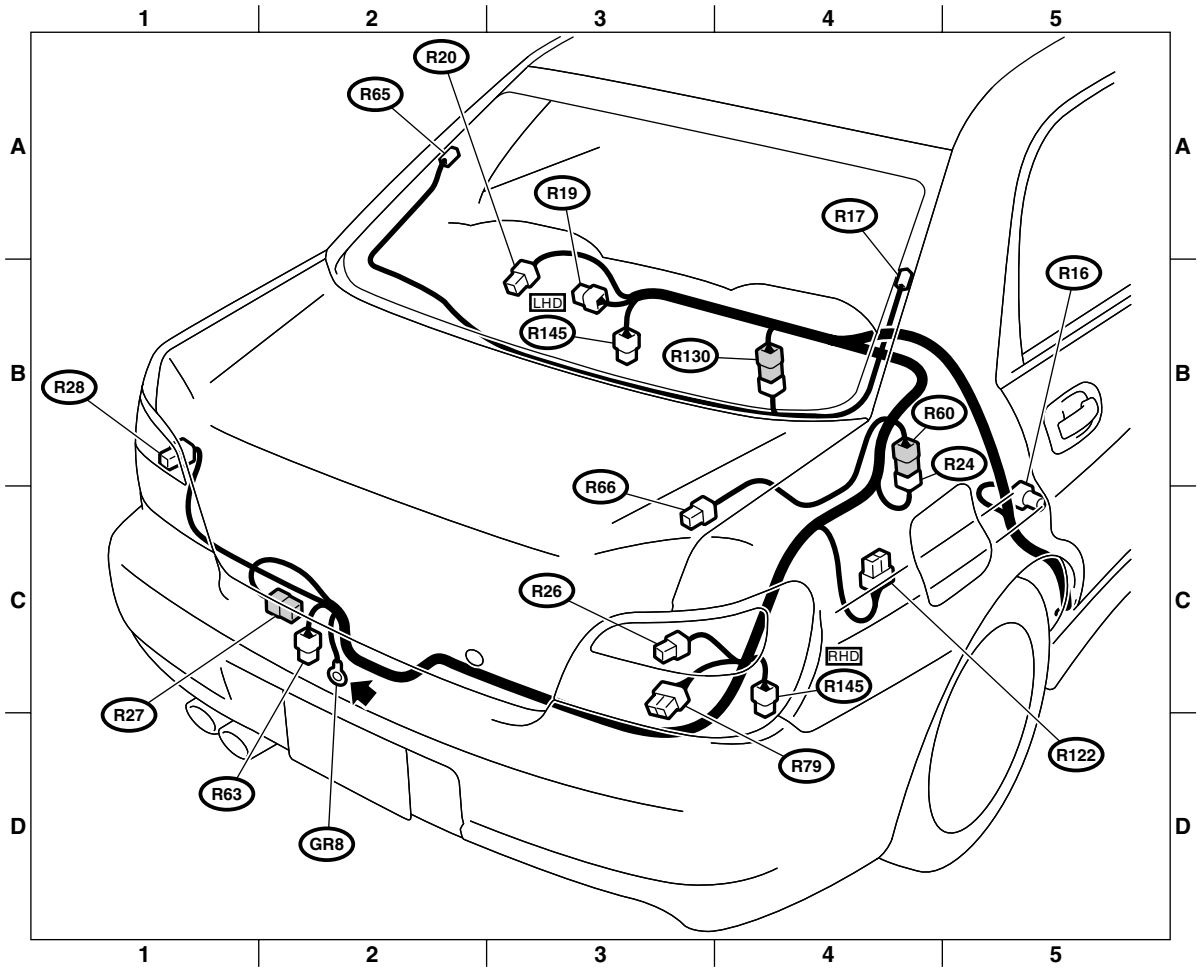
BO0484

52.Rear Wiring Harness and Trunk Lid Cord

A: LOCATION

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
R16	3	★	C-5		Rear door switch RH
R17	1	Black	B-4		Rear defogger
R19	2	★	B-3		High-mounted stop light
R20	2	Black	B-3		Trunk room light
R24	2	★	B-4	R60	Trunk lid cord
R26	6	★	C-3		Rear combination light RH
R27	2	★	C-2		Trunk room light switch
R28	6	★	B-1		Rear combination light LH
R60	2	★	B-4	R24	Rear wiring harness
R63	2	★	C-2		License plate light
R65	1	Black	A-2		Rear defogger
R66	2	★	C-3		High-mounted stop light (Rear spoiler)
R79	10	★	C-3		Trailer connector
R122	10	Black	C-4		Fuel pump control (Turbo Model)
R130	2	★	B-4		Rear defogger choke coil
R145	4	★	B-3		Intercooler water spray motor and level sensor (STi-LHD)
			C-4		Intercooler water spray motor and level sensor (STi-RHD)

★: Non-colored


1
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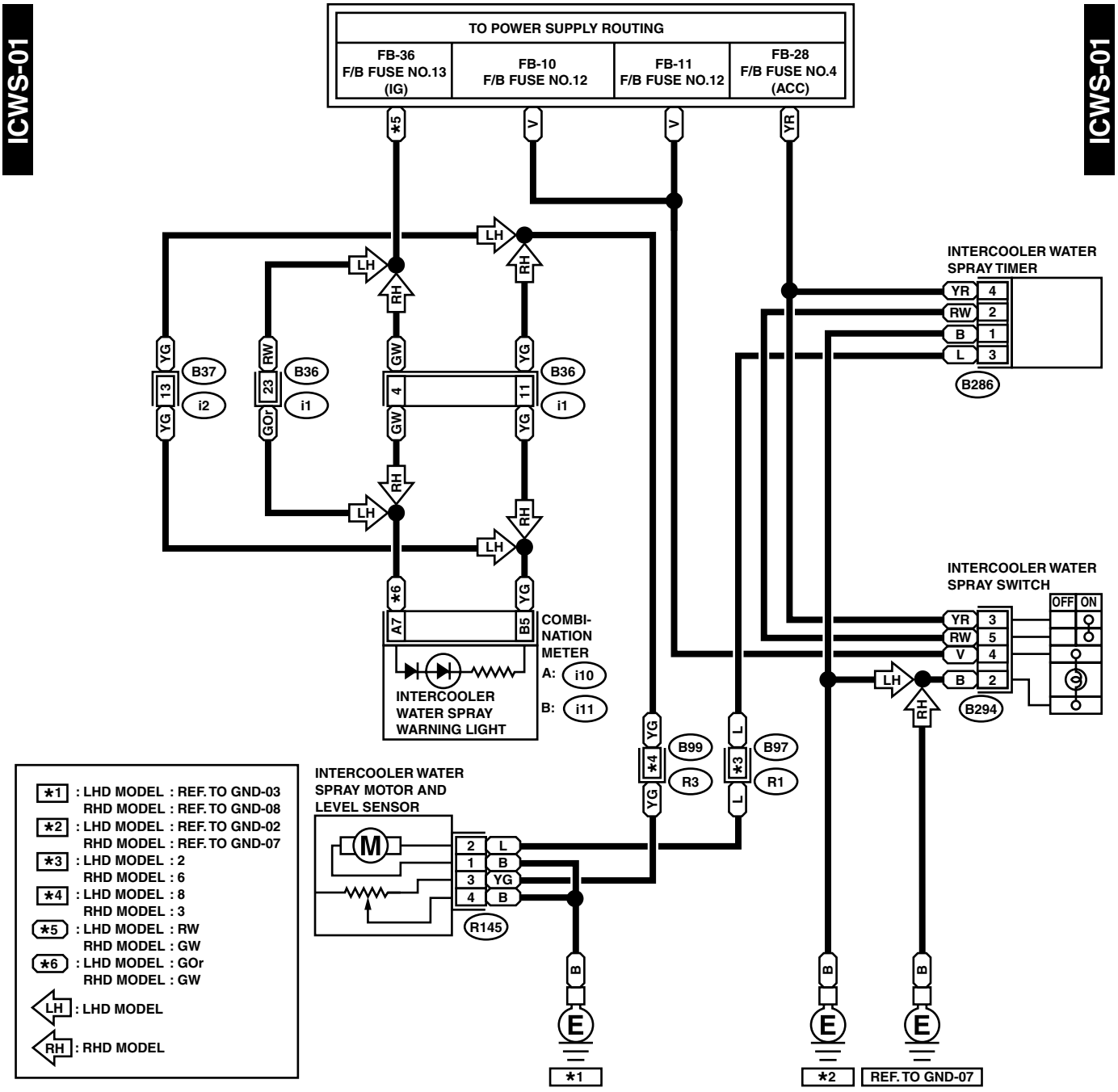
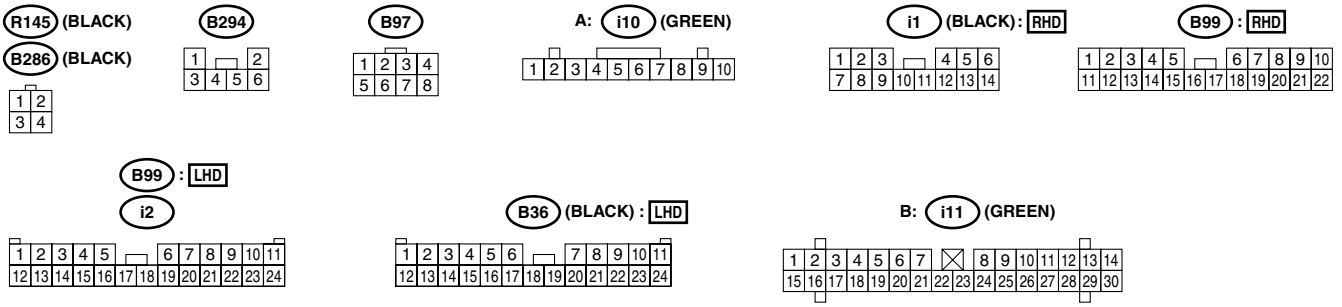
4
5
A
B
C
D
R20
R65
R19
R17
R16
LHD
R145
R130
R28
R60
R24
R66
R26
RHD
R145
R27
R79
R122
R63
GR8

BO0485

54.Intercooler Water Spray System

A: SCHEMATIC





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QUICK REFERENCE INDEX

NEW CAR INFORMATION SECTION

FOREWORD

This manual has been prepared to provide information for the construction, operation and other technical details of SUBARU vehicles.
Read this manual thoroughly and make the most of it to give better service to your customers and improve your knowledge of vehicle maintenance.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD.

FOREWORD

SPECIFICATIONS SPC

1. Impreza

A: DIMENSIONS

Model			Sedan	Wagon	OUTBACK	STi
Overall length		mm (in)	4,405 (173.4)			
Overall width		mm (in)	1,730 (68.1)	1,695 (66.7)	1,710 (67.3)	1,730 (68.1)
Overall height (at CW)		mm (in)	1,440 (56.7)	1,465 (57.7), 1,485 (58.5)★4	1,475 (58.1), 1,495 (58.9)★4	1,440 (56.7)
Compartment	Length	mm (in)	1,890 (74.4)	1,845 (72.6)		1,890 (74.4)
	Width	mm (in)	1,380 (54.3)			
	Height	mm (in)	1,180 (46.5), 1,125 (44.3)★5	1,200 (47.2), 1,150 (45.3)★5	1,200 (47.2), 1,150 (45.3)★5	1,180 (46.5)
Wheelbase		mm (in)	2,525 (99.4)			
Tread	Front	mm (in)	1,485 (58.5)	1,460 (57.5)★1, 1,465 (57.7)	1,460 (57.5)	1,490 (58.7)
	Rear	mm (in)	1,475 (58.1), 1,480 (58.3)★3	1,450 (57.1)★1, 1,455 (57.3)	1,455 (57.3)	1,480 (58.3)
Minimum road clearance	Without catalytic converter	mm (in)	150 (5.9), 155 (6.1)★2	150 (5.9), 155 (6.1)★2	160 (6.3)	—
	With catalytic converter	mm (in)	150 (5.9), 155 (6.1)★3	150 (5.9), 155 (6.1)★3	160 (6.3)	155 (6.1)

★1:1.6 L
★2:2.0 L
★3:2.0 L Turbo
★4:With roof rail
★5:With sun roof

B: ENGINE

Model	1.6 L	Non-Turbo 2.0 L	Turbo 2.0 L	2.5 L	STi
Engine type	Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gasoline engine				
Valve arrangement	Overhead camshaft type				
Bore x Stroke mm (in)	87.9 x 65.8 (3.461 x 2.591)	92 x 75 (3.62 x 2.95)		99.5 x 79 (3.92 x 3.11)	92 x 75 (3.62 x 2.95)
Displacement cm^3 (cu in)	1,597 (97.45)	1,994 (121.67)		2,475 (151.02)	1,994 (121.67)
Compression ratio	10.0 ± 0.2		8.0 ± 0.2	10.0 ± 0.2	8.0 ± 0.2
Firing order	1 — 3 — 2 — 4				
Idle speed at Park/Neutral position rpm	700 ± 100		750 ± 100	700 ± 100	700 ± 100
Maximum output kW (HP)/rpm	70 (94)/5,200	92 (123)/5,600	160 (215)/5,600	112 (150)/5,600	195 (261)/600
Maximum torque N.m (kgf-m, ft-lb)/rpm	143 (14.6, 105.5)/3,600	184 (18.8, 136.0)/3,600	292 (29.8, 215.4)/3,600	223 (22.7, 164.5)/3,600	343 (35.0, 253.0)/4,000

C: ELECTRICAL

Model			1.6 L	Non-Turbo 2.0 L	Turbo 2.0 L	2.5 L	STi
Ignition timing at idling speed BTDC/rpm			5° ± 10°/700	10° ± 10°/700	12° ± 10°/750	MT: 10° ± 10°/700 AT: 15° ± 10°/700	12° ± 10°/700
Spark plug	Type and manufacturer	Without OBD	NGK: BKR6E (without catalyst) CHAMPION: RC8YC4 (with catalyst) NGK: BKR6E-11 (with catalyst)	NGK: BKR6E (without catalyst) CHAMPION: RC10YC4 (with catalyst) NGK: BKR5E-11 (with catalyst)	—	NGK: BKR6E (without catalyst) CHAMPION: RC10YC4 (with catalyst) NGK: BKR5E-11 (with catalyst)	—
		With OBD	CHAMPION: RC8YC4	CHAMPION: RC10YC4	NGK: PFR6G	CHAMPION: RC10YC4	NGK: PFR6G
			Alternate NGK: BKR6E-11	**Alternate** NGK: BKR5E-11		**Alternate** NGK: BKR6E-11	
Generator			12V — 75A				
Battery	Type and capacity (5HR)	For Europe and South America	12V — 48AH (55D23L)	MT: 12V — 48AH (55D23L) AT: 12V — 52AH (65D23L)		MT: 12V — 48AH (55D23L) AT: 12V — 52AH (75D23L)	12V — 48AH (55D23L)
		Others	12V — 27AH (34B19L)				—

D: TRANSMISSION

Model			1.6 L		Non-Turbo 2.0 L		Turbo 2.0 L		2.5 L		STi
Transmission type			5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	6MT
Clutch type			DSPD	TCC	DSPD	TCC	DSPD	TCC	DSPD	TCC	DSPD
Gear ratio		1st	3.454	2.785	3.454	2.785	3.454, 3.166★1	2.785	3.454	2.785	3.636
		2nd	2.062	1.545	2.062	1.545	1.947, 1.882★1	1.545	2.062	1.545	2.375
		3rd	1.448	1.000	1.448	1.000	1.366, 1.296★1	1.000	1.448	1.000	1.761
		4th	1.088	0.694	1.088	0.694	0.972	0.694	1.088	0.694	1.346
		5th	0.825	—	0.825	—	0.738	—	0.871, 0.780★1	—	0.971, 1.062 ★1
		6th	—	—	—	—	—	—	—	—	0.756, 0.842 ★1
		Reverse	3.333	2.272	3.333	2.272	3.333	2.272	3.333	2.272	3.545
		Dual range	1.447	—	1.447	—	—	—	—	—	—
Reduction gear (Front drive)	1st reduction	Type of gear	—	Helical	—	Helical	—	Helical	—	Helical	—
		Gear ratio	—	1.000	—	1.000	—	1.000	—	1.000	—
	Final reduction	Type of gear	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid
		Gear ratio	4.111	4.444	3.900	4.111	3.900, 4.444★1	4.111	3.700, 4.111★1	4.111	3.900
Reduction gear (Rear drive)	Transfer reduction	Type of gear	Helical	—	Helical	—	Helical	—	Helical	—	Helical
		Gear ratio	1.000	—	1.000	—	1.100, 1.000★1	—	1.000	—	1.100, 1.000 ★1
	Final reduction	Type of gear	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid
		Gear ratio	4.111	4.444	3.900	4.111	3.545, 4.444★1	4.111	3.700, 4.111★1	4.111	3.545, 3.900 ★1

5MT:5-forward speeds with synchromesh and 1-reverse
4AT:Electronically controlled fully-automatic, 4-forward speeds and 1-reverse
6MT:6-forward speeds with synchromesh and 1-reverse
DSPD:Dry Single Plate Diaphragm
TCC:Torque Converter Clutch
★1:Australia spec vehicle

E: STEERING

Model		Turbo 2.0 L, 2.5 L	OUTBACK	OTHERS	STi
Type		Rack and Pinion			
Turns, lock to lock		RHD: 2.7 LHD: 3.0	3.0	3.2	2.7
Minimum turning circle m (ft)	Curb to curb	11.0 (36.1)	10.8 (35.4)	10.4 (34.1)	11.0
	Wall to wall	12.0 (39.4)	11.6 (38.1)	11.2 (36.7)	12.0

F: SUSPENSION

Front	Macpherson strut type, Independent, Coil spring
Rear	Dual-link type, Independent, Coil spring

G: BRAKE

Model	1.6 L	Non-Turbo 2.0 L, 2.5 L	Turbo 2.0 L, STi
Service brake system	Dual circuit hydraulic with vacuum suspended power unit		
Front	Ventilated disc brake		
Rear	Drum brake	Disc brake	Ventilated disc brake
Parking brake	Mechanical on rear brakes		

H: TIRE

Rim size	14 x 5 1/2 JJ	15 x 6JJ	16 x 6 1/2 JJ	17 x 7JJ	17 x 7 1/2 JJ
Tire size	175/70R14 84T 185/70R14 88H	185/65R15 88H 195/60R15 88H	P205/55R16 89V 205/50R16 87V	215/45R17 87W	225/45R17 90W 215/45R17 87W
Type	Steel belted radial, Tubeless				

I: CAPACITY

Model		1.6 L		Non-Turbo 2.0 L		Turbo 2.0 L		2.5 L		STi
		5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	6MT
Fuel tank	ℓ (US gal, Imp gal)	50 (13.2, 11.0)				60 (15.9, 13.2)				
Engine oil	Total capacity ℓ (US qt, Imp qt)	4.0 (4.2, 3.5)				4.5 (4.8, 4.0)		4.0 (4.2, 3.5)		4.5 (4.8, 4.0)
	Engine oil amount for refill ℓ (US qt, Imp qt)	Approx. 4.0 (4.2, 3.5)				Approx. 4.5 (4.8, 4.0)		Approx. 4.0 (4.2, 3.5)		Approx. 4.5 (4.8, 4.0)
Transmission gear oil	ℓ (US qt, Imp qt)	3.5 (3.7, 3.1), 4.0 (4.2, 3.5)★1	—	3.5 (3.7, 3.1), 4.0 (4.2, 3.5)★1	—	3.5 (3.7, 3.1)	—	3.5 (3.7, 3.1)	—	4.1 (4.3, 3.6)
Automatic transmission fluid	ℓ (US qt, Imp qt)	—	8.4 (8.9, 7.4)	—	8.4 (8.9, 7.4)	—	9.3 (9.8, 8.2)	—	9.3 (9.8, 8.2)	—
AT differential gear oil	ℓ (US qt, Imp qt)	—	1.2 (1.3, 1.1)	—	1.2 (1.3, 1.1)	—	1.2 (1.3, 1.1)	—	1.2 (1.3, 1.1)	—
AWD rear differential gear oil	ℓ (US qt, Imp qt)	0.8 (0.8, 0.6)								1.0 (1.1, 0.9)
Power steering fluid	ℓ (US qt, Imp qt)	0.7 (0.7, 0.6)								
Engine coolant	ℓ (US qt, Imp qt)	7.4 (7.8, 6.5)	7.3 (7.7, 6.4)	7.0 (7.4, 6.2)	6.9 (7.3, 6.1)	7.7 (8.1, 6.8)	7.7 (8.1, 6.8)	7.0 (7.4, 6.2)	6.9 (7.3, 6.1)	7.7 (8.1, 6.8)

★1:Dual range

J: WEIGHT

1. LHD VEHICLE

Sedan

Option code★1			EC		K4		K0		KS	
Model			1.6 L							
			AWD							
			TS							
			5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front	kgf (lb)	730 (1,609)	750 (1,654)	750 (1,654)	770 (1,698)	750 (1,654)	770 (1,698)	740 (1,631)	760 (1,676)
	Rear	kgf (lb)	520 (1,146)	520 (1,146)	520 (1,146)	520 (1,146)	520 (1,146)	520 (1,146)	535 (1,179)	535 (1,179)
	Total	kgf (lb)	1,250 (2,755)	1,270 (2,800)	1,270 (2,800)	1,290 (2,844)	1,270 (2,800)	1,290 (2,844)	1,275 (2,810)	1,295 (2,855)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)
	Rear	kgf (lb)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)
Option	Air conditioner		—	—	○	○	○	○	○	○
	Cruise control		—	—	—	—	—	—	—	—
	ABS		—	—	—	—	—	—	—	—
	Aluminium wheel		—	—	—	—	—	—	—	—
	Rear spoiler		—	—	—	—	—	—	—	—
	Spoiler pac		—	—	—	—	—	—	—	—

★1:For option code, refer to ID section. <Ref. to ID-5, Option code.>

Option code★1			EC		K4		K0		KS	
Model			2.0 L							
			AWD							
			GX							
			5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front	kgf (lb)	745 (1,643)	770 (1,698)	765 (1,687)	790 (1,742)	760 (1,676)	795 (1,753)	750 (1,653)	780 (1,720)
	Rear	kgf (lb)	535 (1,179)	530 (1,168)	530 (1,168)	525 (1,157)	525 (1,157)	530 (1,168)	550 (1,213)	545 (1,202)
	Total	kgf (lb)	1,280 (2,822)	1,300 (2,866)	1,295 (2,855)	1,315 (2,899)	1,285 (2,833)	1,325 (2,921)	1,300 (2,866)	1,325 (2,921)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)
	Rear	kgf (lb)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)
Option	Air conditioner		—	—	○	○	○	○	○	○
	Cruise control		—	—	—	—	—	—	—	—
	ABS		—	—	○	○	○	○	—	○
	Aluminium wheel		—	—	○	○	—	—	○	○
	Rear spoiler		—	—	—	—	—	—	○	○
	Spoiler pac		—	—	—	—	—	—	—	—

Option code★1			EC			
Model			2.5 L		2.0 L Turbo	
			AWD			
			RS		WRX	STi
			5MT	4AT	5MT	6MT
Curb weight (C.W.)	Front	kgf (lb)	760 (1,676)	785 (1,731)	815 (1,797)	875 (1,929)
	Rear	kgf (lb)	535 (1,179)	530 (1,168)	550 (1,213)	575 (1,268)
	Total	kgf (lb)	1,295 (2,855)	1,315 (2,899)	1,365 (3,009)	1,450 (3,197)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	930 (2,050)	930 (2,050)	970 (2,138)	1,030 (2,271)
	Rear	kgf (lb)	910 (2,006)	910 (2,006)	920 (2,028)	920 (2,028)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,780 (3,924)	1,780 (3,924)	1,850 (4,079)	1,880 (4,145)
Option	Air conditioner		—	—	—	—
	Cruise control		—	—	—	—
	ABS		○	○	○	○
	Aluminium wheel		—	—	—	—
	Rear spoiler		—	—	—	—
	Spoiler pac		—	—	—	—

★1:For option code, refer to ID section. <Ref. to ID-5, Option code.>

Wagon

Option code★1			EC		K4		K0		KS	
Model			1.6 L							
			AWD							
			TS							
			D/R	4AT	D/R	4AT	D/R	4AT	D/R	4AT
Curb weight (C.W.)	Front	kgf (lb)	735 (1,620)	750 (1,654)	755 (1,664)	770 (1,698)	755 (1,664)	770 (1,698)	745 (1,642)	760 (1,676)
	Rear	kgf (lb)	545 (1,202)	545 (1,202)	545 (1,202)	545 (1,202)	545 (1,202)	545 (1,202)	560 (1,235)	560 (1,235)
	Total	kgf (lb)	1,280 (2,822)	1,295 (2,855)	1,300 (2,866)	1,315 (2,900)	1,300 (2,866)	1,315 (2,900)	1,305 (2,877)	1,320 (2,911)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	900 (1,984)	900 (1,984)	900 (1,984)	900 (1,984)	900 (1,984)	900 (1,984)	900 (1,984)	900 (1,984)
	Rear	kgf (lb)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)
Option	Air conditioner		—	—	○	○	○	○	○	○
	Cruise control		—	—	—	—	—	—	—	—
	ABS		—	—	—	—	—	—	—	—
	Aluminium wheel		—	—	—	—	—	—	—	—
	Rear spoiler		—	—	—	—	—	—	—	—
	Spoiler pac		—	—	—	—	—	—	—	—

D/R Dual range
★1:For option code, refer to ID section. <Ref. to ID-5, Option code.>

Option code★1		EC		K4		K0		KS	
Model		2.0 L							
		AWD							
		GX							
		D/R	4AT	D/R	4AT	D/R	4AT	D/R	4AT
Curb weight (C.W.)	Front kgf (lb)	755 (1,664)	770 (1,698)	775 (1,709)	790 (1,742)	780 (1,720)	795 (1,753)	760 (1,676)	780 (1,720)
	Rear kgf (lb)	570 (1,257)	565 (1,246)	565 (1,246)	560 (1,235)	570 (1,257)	565 (1,246)	580 (1,279)	575 (1,268)
	Total kgf (lb)	1,325 (2,921)	1,335 (2,944)	1,340 (2,955)	1,350 (2,977)	1,350 (2,977)	1,360 (2,999)	1,340 (2,955)	1,355 (2,988)
Maximum permissible axle weight (M.P.A.W.)	Front kgf (lb)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)
	Rear kgf (lb)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)
Maximum permissible weight (M.P.W.)	Total kgf (lb)	1,800 (3,969)	1,800 (3,969)	1,800 (3,969)	1,800 (3,969)	1,800 (3,969)	1,800 (3,969)	1,800 (3,969)	1,800 (3,969)
Option	Air conditioner	—	—	○	○	○	○	○	○
	Cruise control	—	—	—	—	—	—	—	—
	ABS	—	—	○	○	○	○	—	○
	Aluminium wheel	—	—	○	○	—	—	○	○
	Rear spoiler	—	—	—	—	—	—	—	—
	Spoiler pac	—	—	—	—	—	—	—	—

Option code★1		EC	K4
Model		2.0 L Turbo	
		AWD	
		WRX	
		5MT	
Curb weight (C.W.)	Front kgf (lb)	805 (1,775)	825 (1,819)
	Rear kgf (lb)	585 (1,290)	585 (1,290)
	Total kgf (lb)	1,390 (3,065)	1,410 (3,109)
Maximum permissible axle weight (M.P.A.W.)	Front kgf (lb)	970 (2,138)	970 (2,138)
	Rear kgf (lb)	950 (2,094)	950 (2,094)
Maximum permissible weight (M.P.W.)	Total kgf (lb)	1,860 (4,101)	1,860 (4,101)
Option	Air conditioner	—	○
	Cruise control	—	—
	ABS	○	○
	Aluminium wheel	—	—
	Rear spoiler	—	—
	Spoiler pac	—	—

D/R Dual range
★1:For option code, refer to ID section. <Ref. to ID-5, Option code.>

2. RHD VEHICLE

Sedan

Option code★1			EK		K1	
Model			1.6 L			
			AWD			
			TS			
			5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front	kgf (lb)	735 (1,621)	755 (1,665)	750 (1,654)	770 (1,698)
	Rear	kgf (lb)	520 (1,146)	520 (1,146)	520 (1,146)	520 (1,146)
	Total	kgf (lb)	1,255 (2,767)	1,275 (2,811)	1,270 (2,800)	1,290 (2,844)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)
	Rear	kgf (lb)	890 (1,962)	890 (1,962)	890 (1,962)	890 (1,962)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)	1,700 (3,748)
Option	Air conditioner		—	—	○	○
	Cruise control		—	—	—	—
	ABS		○	○	—	—
	Aluminium wheel		—	—	—	—
	Rear spoiler		—	—	—	—
	Spoiler pac		○	○	—	—

Option code★1			EK		K1	
Model			2.0 L			
			AWD			
			GX			
			5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front	kgf (lb)	765 (1,687)	790 (1,742)	770 (1,698)	795 (1,753)
	Rear	kgf (lb)	535 (1,179)	530 (1,168)	535 (1,179)	530 (1,168)
	Total	kgf (lb)	1,300 (2,866)	1,320 (2,910)	1,305 (2,877)	1,325 (2,921)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)
	Rear	kgf (lb)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)	1,760 (3,880)
Option	Air conditioner		○	○	○	○
	Cruise control		—	—	—	—
	ABS		○	○	○	○
	Aluminium wheel		○	○	—	—
	Rear spoiler		○	○	—	—
	Spoiler pac		○	○	—	—

★1:For option code, refer to ID section. <Ref. to ID-5, Option code.>

Option code★1			KA						
Model			2.0 L		2.0 L Turbo		2.5 L		2.0 L Turbo
			AWD						
			GX		WRX		RS		STi
			5MT	4AT	5MT	4AT	5MT	4AT	6MT
Unladen mass (U. M.)	Front	kgf (lb)	750 (1,654)	775 (1,709)	830 (1,830)	855 (1,885)	780 (1,720)	805 (1,775)	895 (1,973)
	Rear	kgf (lb)	535 (1,179)	530 (1,168)	560 (1,235)	555 (1,224)	540 (1,191)	535 (1,179)	575 (1,268)
	Total	kgf (lb)	1,285 (2,833)	1,305 (2,877)	1,390 (3,065)	1,410 (3,109)	1,320 (2,910)	1,340 (2,954)	1,470 (3,241)
Gross vehicle mass (G. V. M.)	Front	kgf (lb)	920 (2,028)	920 (2,028)	970 (2,138)	970 (2,138)	930 (2,050)	930 (2,050)	1,030 (2,271)
	Rear	kgf (lb)	910 (2,006)	910 (2,006)	920 (2,028)	920 (2,028)	910 (2,006)	910 (2,006)	920 (2,028)
	Total	kgf (lb)	1,760 (3,880)	1,760 (3,880)	1,850 (4,079)	1,850 (4,079)	1,780 (3,924)	1,780 (3,924)	1,880 (4,145)
Option	Air conditioner		—	—	○	○	○	○	○
	Cruise control		○	○	○	○	○	○	○
	ABS		○	○	○	○	○	○	○
	Aluminium wheel		—	—	—	—	—	—	—
	Rear spoiler		—	—	○	○	○	○	—
	Spoiler pac		—	—	—	—	—	—	—

Option code★1			EK	
Model			2.0 L Turbo	
			AWD	
			WRX	STi
			5MT	6MT
Curb weight (C.W.)	Front	kgf (lb)	830 (1,830)	895 (1,973)
	Rear	kgf (lb)	560 (1,235)	575 (1,268)
	Total	kgf (lb)	1,390 (3,065)	1,470 (3,241)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	970 (2,138)	1,030 (2,271)
	Rear	kgf (lb)	920 (2,028)	920 (2,028)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,850 (4,079)	1,880 (4,145)
Option	Air conditioner		○	○
	Cruise control		—	—
	ABS		○	○
	Aluminium wheel		—	—
	Rear spoiler		○	—
	Spoiler pac		—	—

★1:For option code, refer to ID section. <Ref. to ID-5, Option code.>

Wagon

Option code★1			EK		K1	
Model			1.6 L			
			AWD			
			TS			
			D/R	4AT	D/R	4AT
Curb weight (C.W.)	Front	kgf (lb)	740 (1,631)	755 (1,664)	755 (1,664)	770 (1,698)
	Rear	kgf (lb)	545 (1,202)	545 (1,202)	545 (1,202)	545 (1,202)
	Total	kgf (lb)	1,285 (2,833)	1,300 (2,866)	1,300 (2,866)	1,315 (2,900)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	900 (1,984)	900 (1,984)	900 (1,984)	900 (1,984)
	Rear	kgf (lb)	910 (2,006)	910 (2,006)	910 (2,006)	910 (2,006)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)	1,730 (3,814)
Option	Air conditioner		—	—	○	○
	Cruise control		—	—	—	—
	ABS		○	○	—	—
	Aluminium wheel		—	—	—	—
	Rear spoiler		—	—	—	—
	Spoiler pac		—	—	—	—

Option code★1			EK		K1	
Model			2.0 L			
			AWD			
			GX			
			D/R	4AT	D/R	4AT
Curb weight (C.W.)	Front	kgf (lb)	775 (1,709)	790 (1,742)	780 (1,720)	795 (1,753)
	Rear	kgf (lb)	570 (1,257)	565 (1,246)	570 (1,257)	565 (1,246)
	Total	kgf (lb)	1,345 (2,965)	1,355 (2,987)	1,350 (2,977)	1,360 (2,999)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)
	Rear	kgf (lb)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,800 (3,968)	1,800 (3,968)	1,800 (3,968)	1,800 (3,968)
Option	Air conditioner		○	○	○	○
	Cruise control		—	—	—	—
	ABS		○	○	○	○
	Aluminium wheel		○	○	—	—
	Rear spoiler		—	—	—	—
	Spoiler pac		○	○	—	—

D/R Dual range
★1:For option code, refer to ID section. <Ref. to ID-5, Option code.>

Option code★1			KA					
Model			2.0 L				2.0 L Turbo	
			AWD					
			GX		OUTBACK		WRX	
			D/R	4AT	D/R	4AT	5MT	4AT
Unladen mass (U. M.)	Front	kgf (lb)	760 (1,676)	775 (1,709)	750 (1,653)	765 (1,687)	825 (1,819)	850 (1,874)
	Rear	kgf (lb)	570 (1,257)	565 (1,246)	570 (1,257)	570 (1,257)	585 (1,290)	585 (1,290)
	Total	kgf (lb)	1,330 (2,932)	1,340 (2,954)	1,320 (2,910)	1,335 (2,943)	1,410 (3,109)	1,435 (3,164)
Gross vehicle mass (G. V. M.)	Front	kgf (lb)	920 (2,028)	920 (2,028)	920 (2,028)	920 (2,028)	970 (2,138)	970 (2,138)
	Rear	kgf (lb)	960 (2,116)	960 (2,116)	960 (2,116)	960 (2,116)	950 (2,094)	950 (2,094)
	Total	kgf (lb)	1,800 (3,968)	1,800 (3,968)	1,800 (3,968)	1,800 (3,968)	1,860 (4,101)	1,860 (4,101)
Option	Air conditioner		—	—	—	—	○	○
	Cruise control		○	○	○	○	○	○
	ABS		○	○	○	○	○	○
	Aluminium wheel		—	—	—	—	—	—
	Rear spoiler		—	—	—	—	—	—
	Spoiler pac		—	—	—	—	—	—

Option code★1			EK
Model			2.0 L Turbo
			AWD
			WRX
			5MT
Curb weight (C.W.)	Front	kgf (lb)	825 (1,819)
	Rear	kgf (lb)	585 (1,290)
	Total	kgf (lb)	1,410 (3,109)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	970 (2,138)
	Rear	kgf (lb)	950 (2,094)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,860 (4,101)
Option	Air conditioner		○
	Cruise control		—
	ABS		○
	Aluminium wheel		—
	Rear spoiler		—
	Spoiler pac		—

D/R Dual range
★1:For option code, refer to ID section. <Ref. to ID-5, Option code.>

MEMO

FUEL INJECTION (FUEL SYSTEM) FU (TURBO)

2. Air Line

G: TUMBLE GENERATOR VALVES

2. STi MODEL

The STi model's engine is not provided with a tumble generation control function. Although it is fitted with a tumble generator housing, there are no sensor and valve actuator on the housing.

4. Sensors and Switches

D: EXHAUST GAS TEMPERATURE SENSOR

2. STi MODEL

The STi model is not provided with an exhaust gas temperature sensor.

I: VARIABLE VALVE TIMING CAMSHAFT POSITION SENSORS

NOTE:
The variable valve timing camshaft position sensors are installed only on the STi model's engine.

- The variable valve timing camshaft position sensors are installed one each on the rear ends of the right and left bank cylinder heads.

- The sensor detects the amounts of the advance and retard angles of the intake valves caused by the effect of the variable valve timing system using the variation in the air gap between the sensor and a boss provided on the rear end of each intake camshaft. The sensor's internal construction and operation are same as those of the crankshaft position sensor.

5. Control System

B: INPUT AND OUTPUT SIGNALS

Signal	Unit	Function
Input signals	Pressure sensor	Detects the amount of intake air (Measures the absolute pressure).
	Mass air flow and intake air temperature sensor	Detects the temperature and amount of intake air.
	Throttle position sensor	Detects the throttle valve position.
	Front oxygen (A/F) sensor	Detects the density of oxygen in exhaust gases at the upstream of the front catalytic converter.
	Rear oxygen sensor	Detects the density of oxygen in exhaust gases at the downstream of the rear catalytic converter.
	Exhaust gas temperature sensor (Except STi model)	Detects the exhaust gas temperature.
	Tumble generator valve position sensor (Except STi model)	Detects the tumble generator valve position.
	Crankshaft position sensor	Detects the crankshaft angular position.
	Camshaft position sensor	Detects the combustion cylinder.
	Variable valve timing camshaft position sensor (Only STi model)	Detects amounts of advance and retard angles of the intake valves.
	Engine coolant temperature sensor	Detects the engine coolant temperature.
	Knock sensor	Detects engine knocking.
	Vehicle speed sensor	Detects the vehicle speed.
	Ignition switch	Detects operation of the ignition switch.
	Starter switch	Detects the condition of engine cranking.
	Neutral position switch	Detects that the gear is in neutral.
	Heater circuit of front and rear oxygen sensor	Detects the abnormality in heater circuit of front and rear oxygen sensor.
	A/C switch	Detects ON-OFF operation of the A/C switch.
	Fuel level sensor	Detects the level of the fuel in the fuel tank.
	Small light switch	Detects ON-OFF operation of the small light switch.
	Blower fan switch	Detects ON-OFF operation of the blower fan switch.
	Rear defogger switch	Detects ON-OFF operation of the rear defogger switch.
Output signals	Fuel Injector	Activates an injector.
	Ignition signal	Turns the primary ignition current ON or OFF.
	Fuel pump controller	Controls the fuel pump.
	A/C control relay	Turns the A/C control relay ON or OFF.
	Radiator fan control relay	Turns the radiator fan control relay ON or OFF.
	Idle air control solenoid valve	Adjusts the amount of air flowing through the bypass line in the throttle body.
	Tumble generator valve actuator (Except STi model)	Operates the tumble generator valve.
	Wastegate control solenoid valve	Controls supercharging pressure
	Malfunction indicator lamp	Indicates existence of abnormality.
	Purge control solenoid valve	Controls purge of evaporative gas absorbed by the canister.
	Power supply	Controls ON/OFF of the main power supply relay.
	Variable valve timing solenoid valve (Only STi model)	Controls advance and retard angles of the intake valves.

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES) EC (TURBO)

1. System Overview

There are three emission control systems which are as follows:

- Crankcase emission control system
- Exhaust emission control system
  - Three-way catalyst system
  - Air/fuel (A/F) control system
  - Ignition control system
- Evaporative emission control system

NOTE: The STi model is not provided with a precatalytic converter.

Item			Main components	Function
Crankcase emission control system			Positive crankcase ventilation (PCV) valve	Draws blow-by gas into intake manifold from crankcase and burns it together with air-fuel mixture. Amount of blow-by gas to be drawn in is controlled by intake manifold pressure.
Exhaust emission control system	Catalyst system	Pre (Except STi model)	Three-way catalyst	Oxidizes HC and CO contained in exhaust gases as well as reducing NOx.
		Front		
		Rear		
	A/F control system		Engine control module (ECM)	Receives input signals from various sensors, compares signals with stored data, and emits a signal for optimal control of air-fuel mixture ratio.
			Front oxygen (A/F) sensor	Detects quantity of oxygen contained exhaust gases.
			Rear oxygen sensor	Detects density of oxygen contained exhaust gases.
			Throttle position sensor	Detects throttle position.
			Mass air flow sensor and intake air temperature sensor	Detects amount of intake air.
				Detects intake air temperature of air cleaner case.
	Ignition control system		ECM	Receives various signals, compares signals with basic data stored in memory, and emits a signal for optimal control of ignition timing.
			Crankshaft position sensor	Detects engine speed (Revolution).
			Camshaft position sensor	Detects reference signal for combustion cylinder discrimination.
			Engine coolant temperature sensor	Detects coolant temperature.
			Knock sensor	Detects engine knocking.
Evaporative emission control system			Canister	Absorbs evaporative gas which occurs in fuel tank when engine stops, and releases it to combustion chambers for a complete burn when engine is started. This prevents HC from being discharged into atmosphere.
			Purge control solenoid valve	Receives a signal from ECM and controls purge of evaporative gas absorbed by canister.

INTAKE (INDUCTION) IN (TURBO)

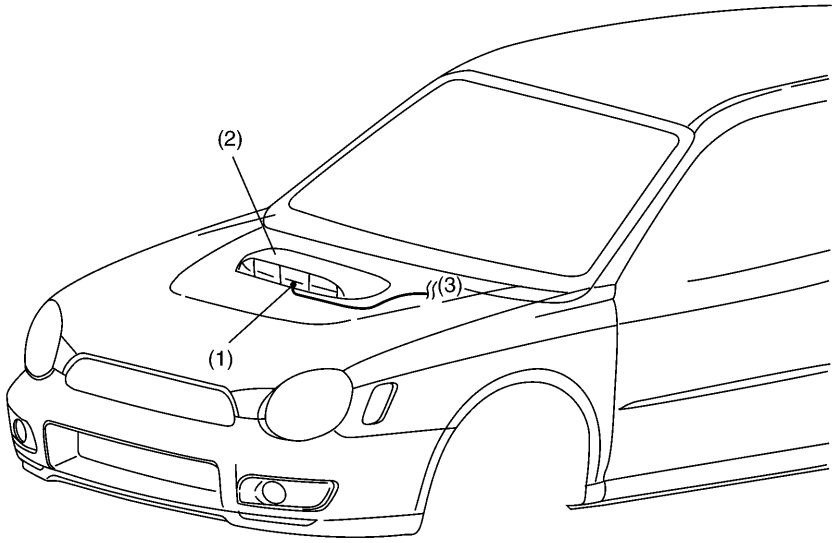
Page

2. Turbocharger System

I: INTERCOOLER WATER SPRAY

● Water is sprayed from the nozzle in the intercooler duct to cool down the intercooler with water spray when the intake air temperature becomes high so that the air temperature is lowered and air intake efficiency is increased.

● The water tank is located in the trunk. The spray nozzle is a diffusion type which ensure a high cooling efficiency.



NF0624

(1) Spray nozzle
(2) Intercooler duct
(3) To water tank

MECHANICAL ME (TURBO)

5. Camshaft

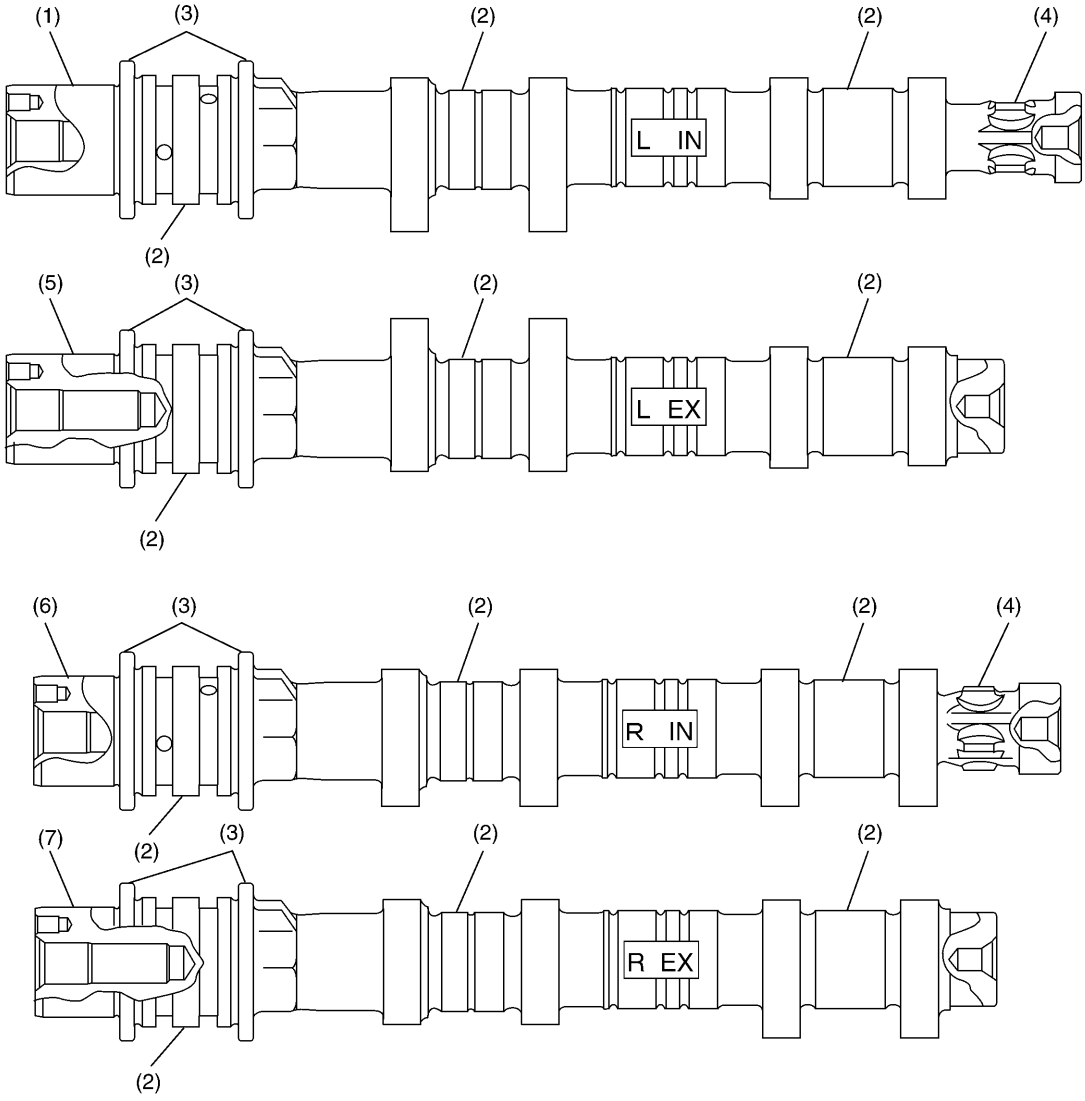
The DOHC engine uses four camshafts in all; intake and exhaust camshafts on each of the right and left banks.

The cam lobe noses are finished by “chill” treatment to increase wear resistance and anti-scuffing properties.

Each camshaft is supported at its three journals and held in position by three camshaft caps. Each camshaft has a flange which fits in the corresponding groove in the cylinder head to receive thrust forces generated in the camshaft.

With the engine for the STi model, each intake camshaft has teeth at the rear end for the variable valve timing position sensor.

B: STi MODEL



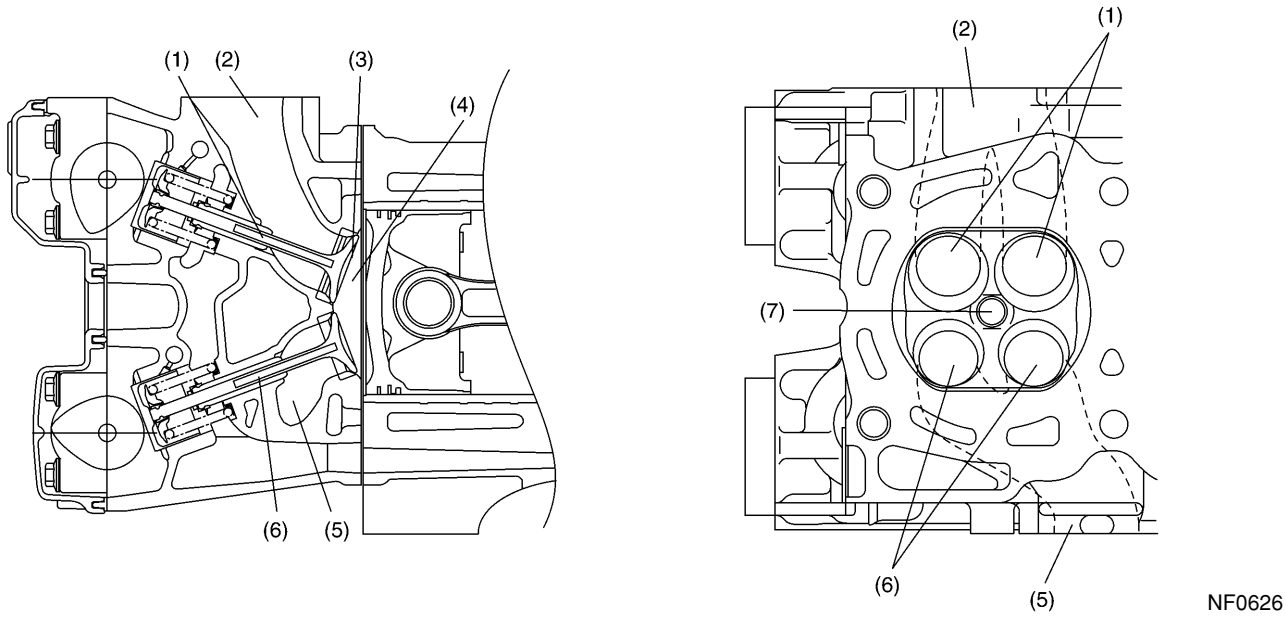
NF0625

(1) Left intake camshaft
(2) Journal
(3) Flange
(4) Teeth for variable timing position sensor
(5) Left exhaust camshaft
(6) Right intake camshaft
(7) Right exhaust camshaft

6. Cylinder Head

- The cylinder head is made of aluminium die casting.
- Each combustion chamber in the cylinder head is a compact, pentroof design. The spark plug is located at the center of the combustion chamber, which contributes to creation of a wide “squish area” for increased combustion efficiency.
- The two intake and two exhaust valves are arranged on opposite sides for a cross-flow feature.
- The cylinder head gasket is a metallic gasket consisting of three layers of the stainless steel sheets. It is highly resistant to heat and maintains high level of sealing performance for a long period.

B: STi MODEL



(1) Intake valve (hollow type)
(2) Intake port
(3) Squish area
(4) Combustion chamber
(5) Exhaust port
(6) Exhaust valve (Sodium-filled)
(7) Spark plug

7. Cylinder Block

● With all the engines except that for the STi model, the cylinder block is made of aluminum die casting. Its open-deck design provides it with such advantageous features as relatively small weight, high rigidity and excellent cooling efficiency.

● With the engine for the STi model that generates increased torque outputs, the cylinder block uses a semi-closed deck design which can hold the cylinder liners with higher rigidity.

● The cylinder liners are made of cast iron. They are dry type which means their outer surfaces are entirely in contact with the cylinder block.

● The cylinder block supports the crankshaft at its five journals. The journal supporting portions are designed such that sufficient stiffness and quiet operation are ensured.

● The oil pump is located in the front center of the cylinder block and the engine coolant pump is located at the front of the left-cylinder bank. At the rear of the right-cylinder bank is an oil separator which removes oil mist contained in blow-by gas.

9. Piston

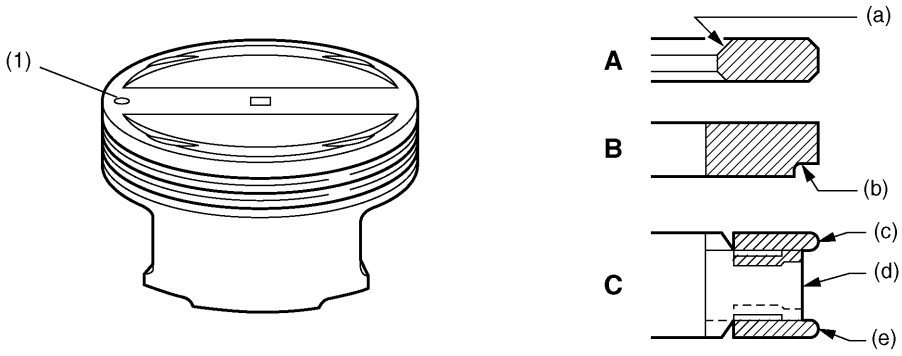
● The pistons are of a slipper skirt design for reduced weight and friction. The oil control ring groove utilizes a thermal design.

● The piston pin is offset either downward (Nos. 1 and 3 pistons) or upward (Nos. 2 and 4 pistons).

● The piston head has recesses to prevent interference with the intake and exhaust valves. It also has engraved marks to identify the piston size and the direction of installation. All the pistons are common in their design.

● Three piston rings are used for each piston – two compression rings and one oil control ring. The top piston ring has inner bevel and the second piston ring has a cut on the bottom outside to reduce oil consumption.

B: STi MODEL



NF0580

(1) Location mark (Engine front side)

A: Top ring
B: Second ring
C: Oil ring

(a) Inner-bevel
(b) Cut
(c) Upper rail
(d) Spacer
(e) Lower rail

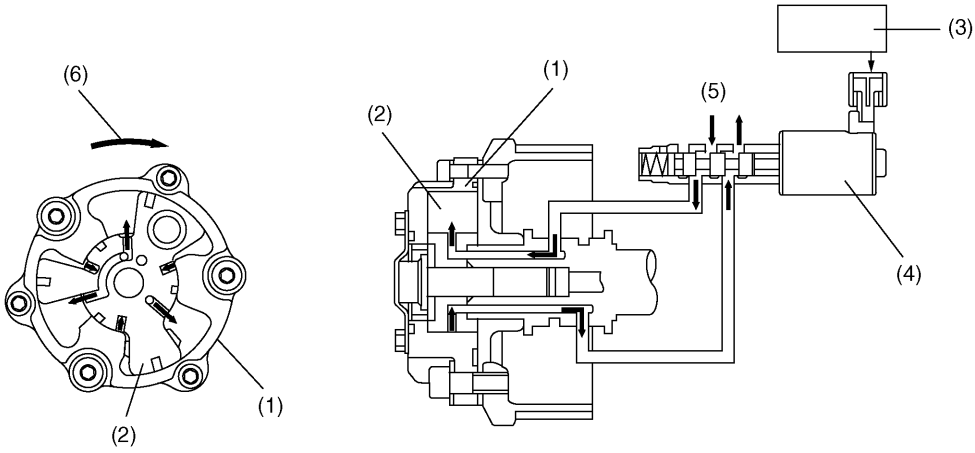
11. Variable Valve Timing System

The STi model's engine has the variable valve timing system, which adjusts the opening and closing timings of the intake valves optimally by continuously changing the phase angle of the camshaft sprocket relative to the camshaft.

- The ECM determines the optimal cam angle relative to the crank angle by making reference to the engine speed, vehicle speed, throttle opening and other relevant parameters.
- Under the control of the ECM, the oil flow control valve moves its spool to switch the hydraulic passage to/from the advance and retard chambers that are formed in the camshaft sprocket to change continuously the phase angle between the camshaft sprocket and camshaft.

A: PHASE ANGLE ADVANCES

In response to an advance signal from the ECM, the oil flow control valve moves its spool such that hydraulic pressure is applied to the advance chamber in the camshaft sprocket. The sprocket is then turned in the direction in which its phase angle advances relative to the camshaft.

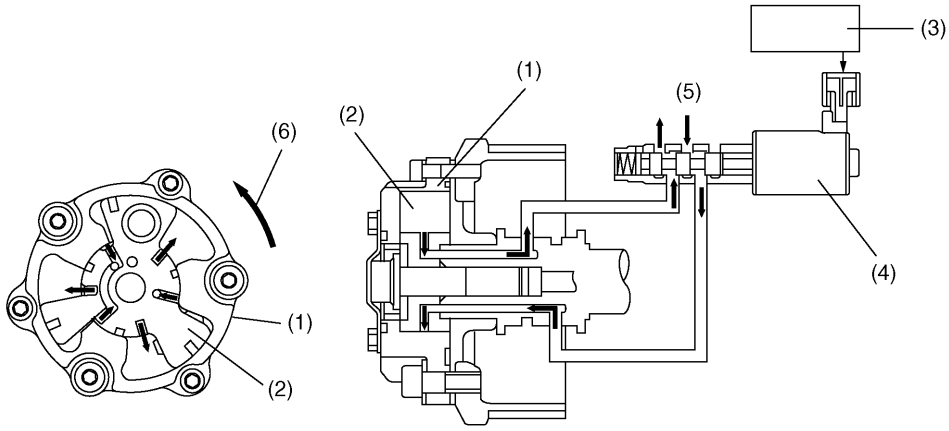


NF0581

(1) Variable valve timing controller (attached to camshaft sprocket)
(2) Vane (attached to intake camshaft)
(3) ECM
(4) Oil flow control valve
(5) Hydraulic pressure
(6) Turns in advance direction

B: PHASE ANGLE RETARDS

In response to a retard signal from the ECM, the oil flow control valve moves its spool such that hydraulic pressure is applied to the retard chamber in the camshaft sprocket. The sprocket is then turned in the direction in which its phase angle retards relative to the camshaft.

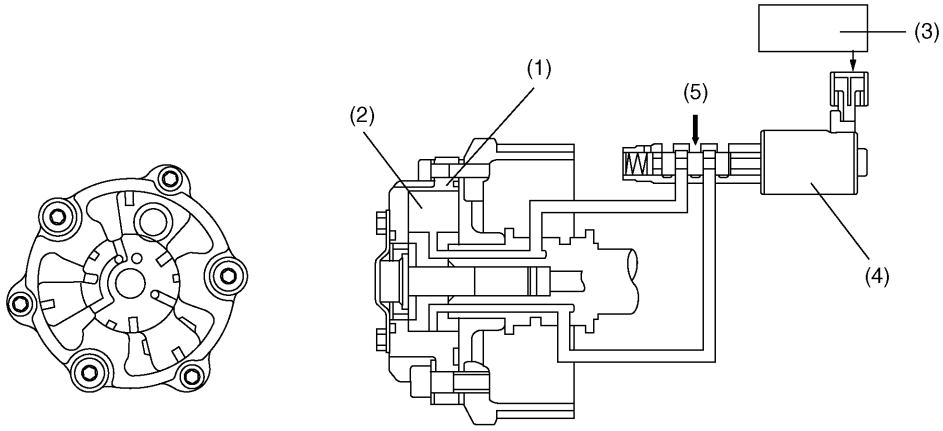


NF0582

(1) Variable valve timing controller (attached to camshaft sprocket)
(2) Vane (attached to intake camshaft)
(3) ECM
(4) Oil flow control valve
(5) Hydraulic pressure
(6) Turns in retard direction

C: A CERTAIN PHASE ANGLE IS RETAINED

When the ECM issues a signal to keep the phase angle unchanged, the oil flow control valve moves its spool to the position at which the hydraulic pressures to/from both the chambers are blocked. The pressures in the chambers are thus maintained, so the phase angle does not change and the intake valves' opening and closing timings also remain unchanged.

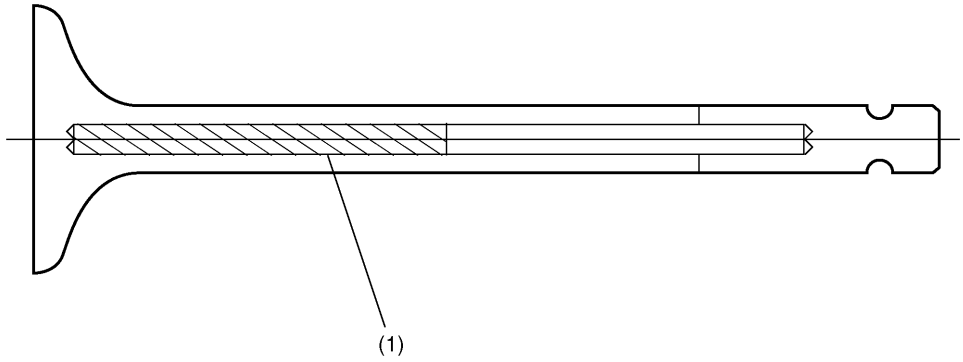


NF0583

(1) Variable valve timing controller (attached to camshaft sprocket)
(2) Vane (attached to intake camshaft)
(3) ECM
(4) Oil flow control valve
(5) Hydraulic pressure

12. Sodium-filled Exhaust Valves

The STi model's engine uses sodium-filled exhaust valves.
Each exhaust valve contains pure sodium in its hollow stem. Sodium has high thermal conductivity. The entrapped sodium will liquefy at high temperatures and move inside the stem as the valve is operated. Thus the sodium will effectively transfer heat from the valve head to the valve stem, contributing to cooling down the valve head faster.



B2H4814A

(1) Pure sodium

MEMO

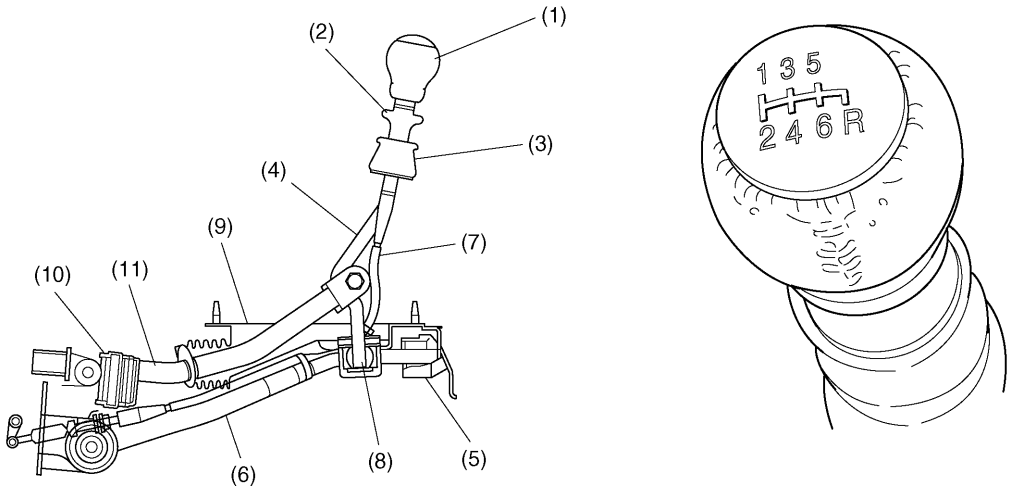
CONTROL SYSTEM CS

Page

4. 6MT Gear Shift Lever

A: GENERAL

The six-speed manual transmission's control system has a gear shift lever specially designed for the use with it. The gearshift lever is complete with a parallel-link gear shift mechanism as is the case with the five-speed transmission's gearshift lever. To prevent accidental engagement of the reverse gear, the lever has an arrangement that allows a shift into reverse only after the slider has been pulled up.

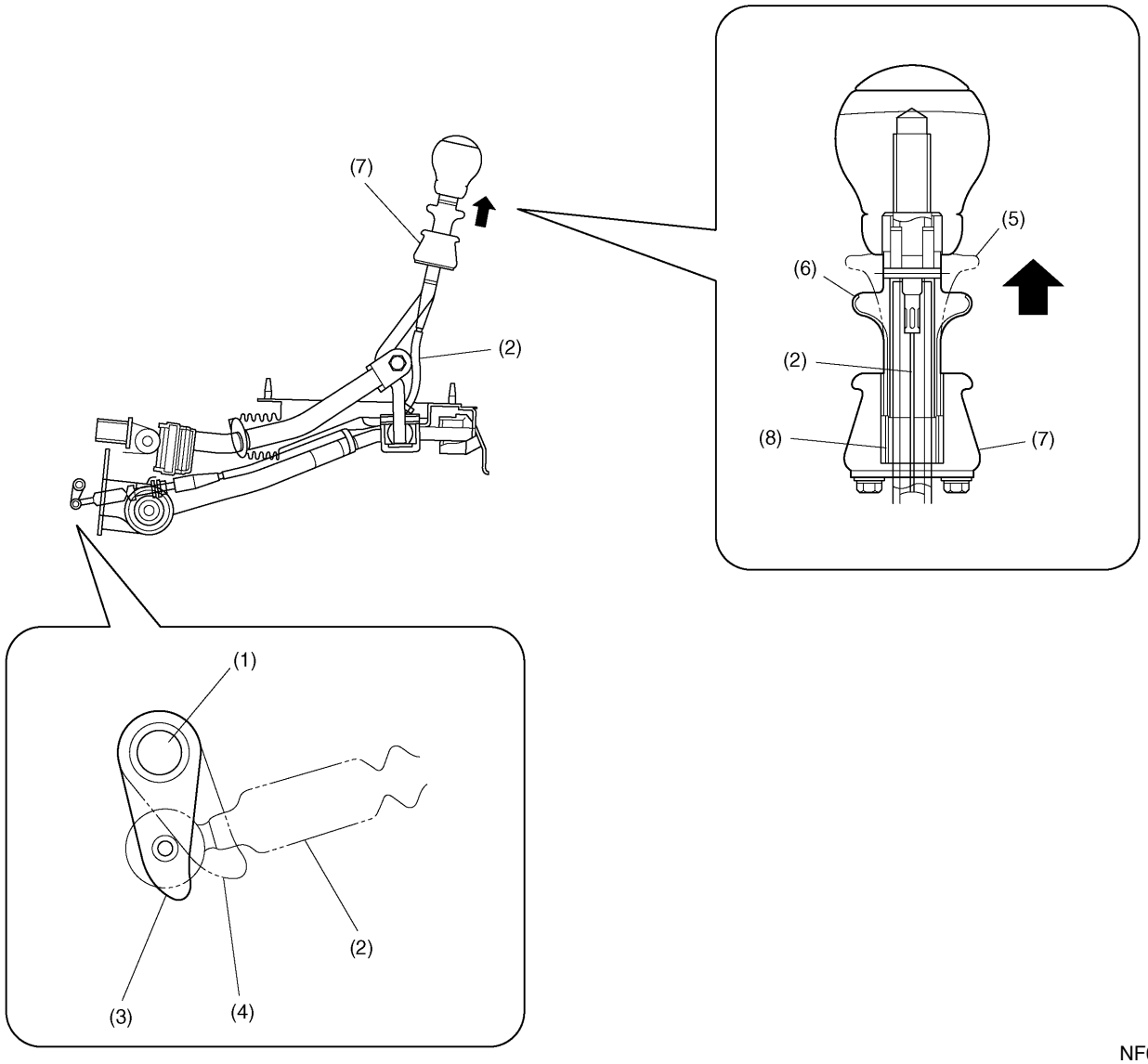


NF0596

(1) Knob
(2) Slider
(3) Holder
(4) Lever
(5) Cushion rubber
(6) Stay
(7) Reverse check cable
(8) Bush
(9) Boot
(10) Joint
(11) Rod

B: OPERATION

When shifting gear into reverse, the driver pulls the slider up (toward the knob). This causes the reverse check cable to move the reverse lever on the six-speed transmission to the lock release position. Since the reverse check system in the transmission then becomes in the state ready for a shift into reverse, the driver can move the gear shift lever to the reverse position.
Should the reverse check cable be severed, the spring in the holder pushes up the slider and keeps it in the raised position, alerting the driver to the abnormality. Since the reverse check system does not function under this condition, a voluntary or involuntary shift can take place without any restriction.



NF0597

(1) Reverse lever
(2) Reverse check cable
(3) Reverse select lock position
(4) Reverse select lock release position
(5) Slider (in reverse select lock release position or when cable is broken)
(6) Slider (in reverse select lock position)
(7) Holder
(8) Spring

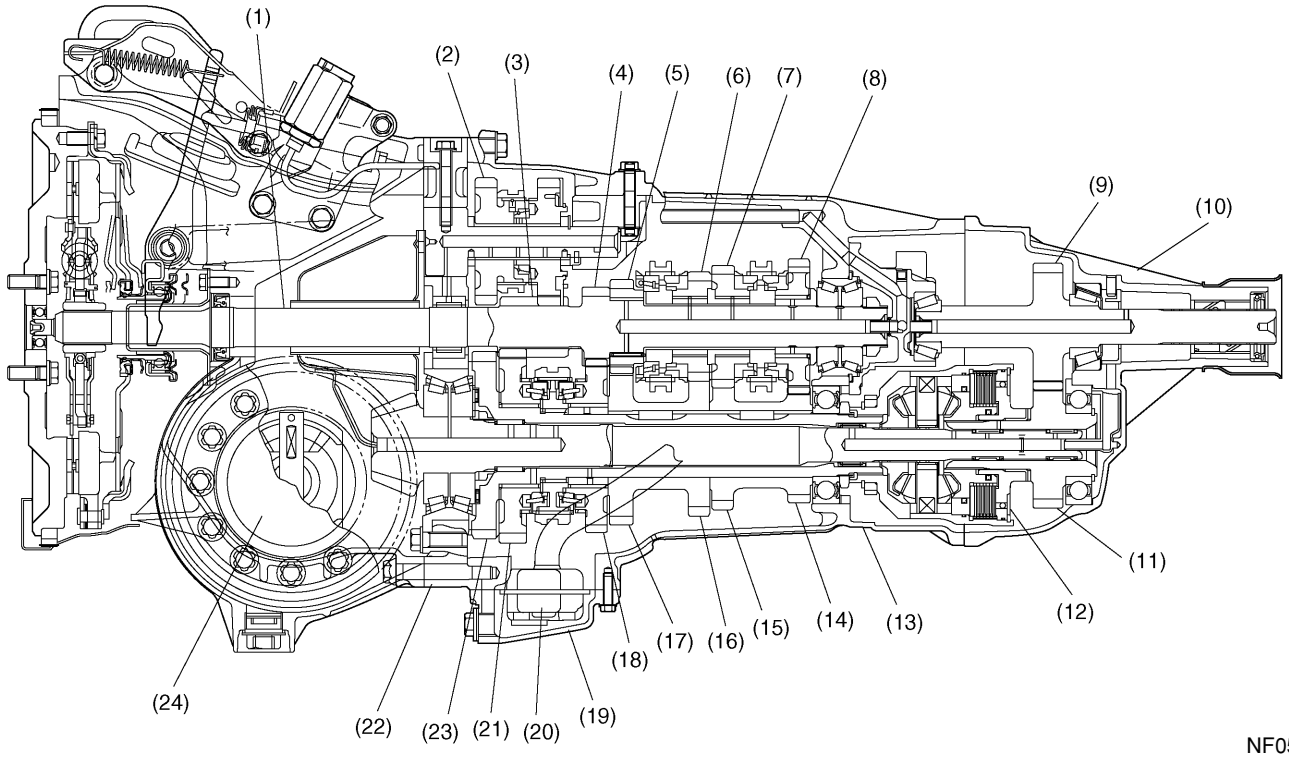
MEMO

MANUAL TRANSMISSION AND DIFFERENTIAL 6MT

1. General

The six-speed manual transmission has been newly developed to exploit the full potential of the STi model's engine and enable the model to have a surpassing driving performance.
The major features of this new transmission are as follows:

- The driver can make a gear shift with a smaller force than with conventional transmissions owing to the double-cone synchronizers employed for the 1st, 3rd and reverse gears and the triple-cone synchronizer employed for the 2nd gear. In addition, the synchronizing elements of the 2nd to 6th gears have splines with asymmetric chamfers in order to prevent generation of undesirable loads that would cause simultaneous engagement of two gears ("double meshing") as well as to ensure improved gear shift feeling.
- The reverse idler gear is a constant-mesh type with a new subgear.
- The shift/select mechanism is of a parallel link design. It has shift rods each supported by a slidable ball bearing and provided with a detent mechanism that uses a plunger with a ball inside.
- The reverse check mechanism prevents unintended engagement of the reverse gear when the driver makes a shift into the 5th or 6th gear.
- The transmission case is split into three pieces lateral direction like that of the automatic transmission used in the standard model. It is highly rigid owing to appropriately arranged ribs.
- The oil pump incorporated in the transmission case ensures improved lubricating and cooling performance.
- An optional SURETRAC type limited slip differential has been introduced for the front differential.
- The center differential uses a viscous coupling of the type whose high performance has already been proven with the preceding SUBARU models.



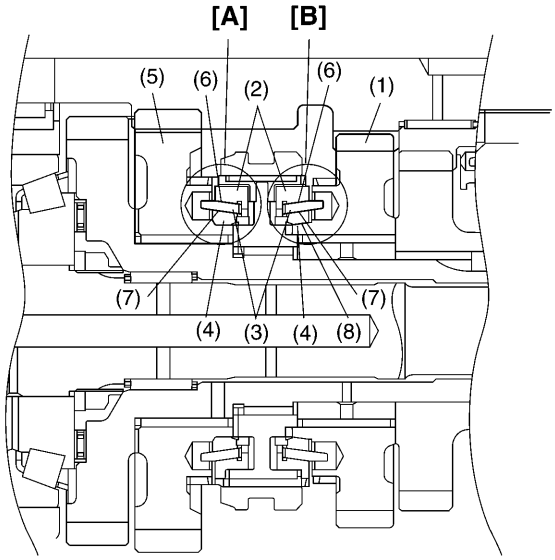
NF0598

(1) Main shaft
(2) Reverse idler gear
(3) 1st drive gear
(4) 2nd drive gear
(5) 3rd drive gear
(6) 4th drive gear
(7) 5th drive gear
(8) 6th drive gear
(9) Transfer driven gear
(10) Extesion case
(11) Transfer drive gear
(12) Center differential assembly
(13) Transmission case
(14) 6th driven gear
(15) 5th driven gear
(16) 4th driven gear
(17) 3rd driven gear
(18) 2nd driven gear
(19) Oil pan
(20) Oil strainer
(21) 1st drive gear
(22) Adapter plate
(23) Reverse driven gear
(24) Front differential assembly

2. Triple-Cone Synchronizer

A: CONSTRUCTION

The triple-cone synchronizer has three frictional interfaces - in addition to the two coaxial interfaces between the synchronizer cone and the inner and outer balk rings (which are same as those with a double-cone synchronizer), it has a third frictional interface between the inner surface of the inner balk ring and the cone on the 2nd driven gear. Thanks to an increased friction force, the triple-cone type produces larger synchronizing power than a double-cone type synchronizer. The main components of the triple-cone synchronizer are the outer balk ring, synchronizer cone, inner balk ring, and 2nd driven gear's cone.



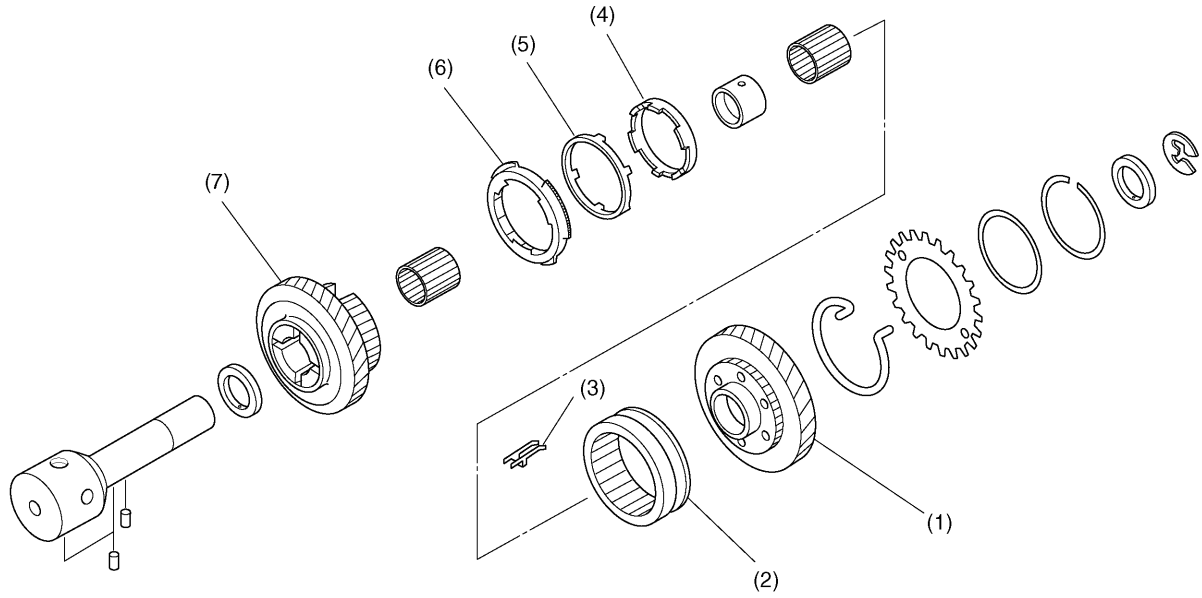
NF0599

[A] Double-cone synchronizer
[B] Triple-cone synchronizer
(1) 2nd driven gear
(2) Outer balk ring
(3) Synchronizer cone
(4) Inner balk ring
(5) 1st driven gear
(6) Cone surface 1
(7) Cone surface 2
(8) Cone surface 3

3. Reverse Idler Gear Assembly (with Synchronizing Mechanism)

- A constant-mesh type reverse gearing is used in the six-speed manual transmission.
- The reverse idler gear assembly is provided with a double-cone synchronizer.

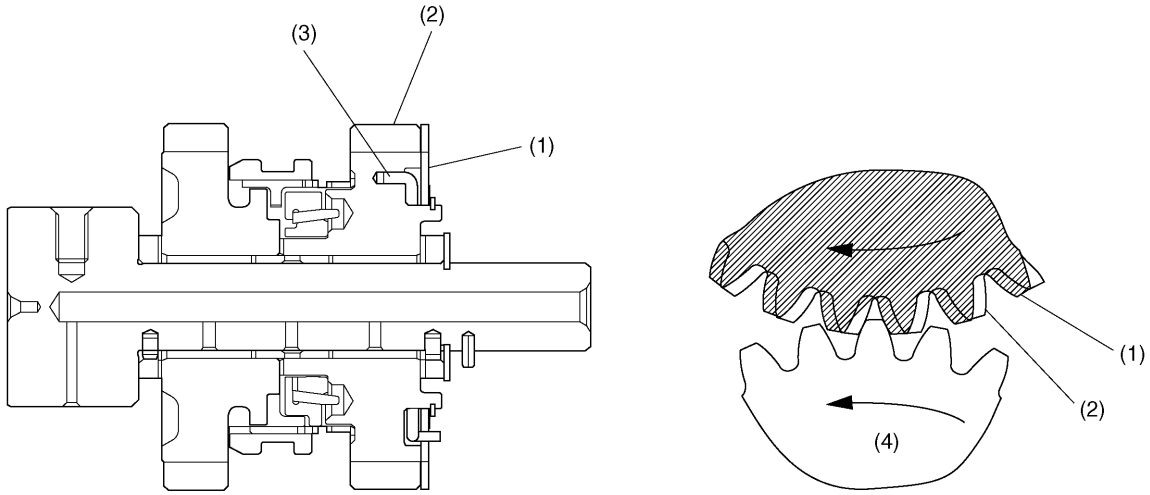
Soon after disengagement of the clutch, the reverse gear remains rotating by an inertial force. If the driver makes a shift while the reverse gear is still rotating, an undesirable “gear clash” would occur. The double-cone synchronizer prevents this by synchronizing the speed of the No. 2 reverse idler gear with that of the reverse sleeve. It also allows the driver to make a smooth shift into the reverse gear.



NF0600

(1) No. 1 reverse idler gear
(2) Reverse sleeve
(3) Insert key
(4) Inner balk ring
(5) Synchronizer cone
(6) Outer balk ring
(7) No. 2 reverse idler gear

● To prevent rattling noise that may occur with the constant-mesh type reverse gearing, No.1 reverse idler gear is fitted with a subgear that has the same number of teeth as the No. 1 reverse idler gear. The subgear is preloaded in the rotating direction by a spring so that it functions to reduce backlash between gear teeth and consequent rattling noise when the No. 1 reverse gear meshes with the reverse drive gear.

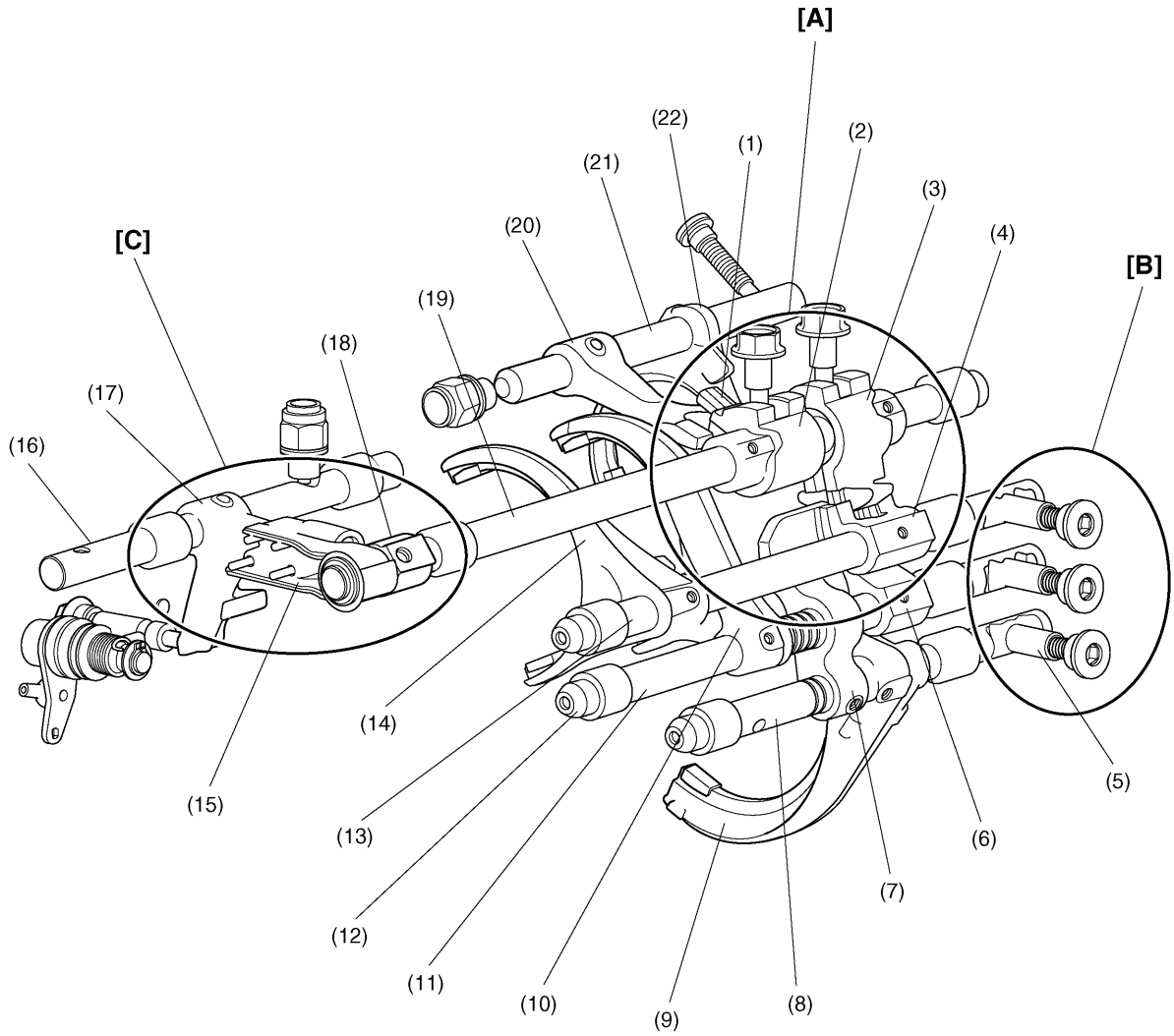


NF0601

(1) Subgear
(2) No. 1 reverse idler gear
(3) Spring
(4) Reverse drive gear

4. Shift and Select Mechanism

- Each of the shifter and fork rods has a detent mechanism using a plunger with a ball in it and is supported with a slidable ball bearing. The detent mechanisms give the driver distinctive detent feeling and the slidable ball bearings help reduce the shift lever operating force.
- Gear double meshing is prevented by a mechanism that uses interlock blocks.
- The select return mechanism (which returns the selector lever to the neutral position) uses a U-shaped leaf spring.



NF0602

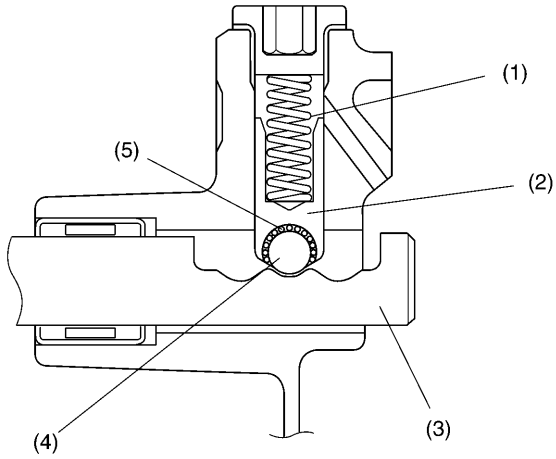
[A] Interlock mechanism
[B] Shift detent mechanism
[C] Select return mechanism

(1) Interlock arm
(2) Reverse interlock block
(3) Interlock block
(4) 5th-6th shifter arm
(5) Shifter plunger
(6) 3rd-4th shifter arm
(7) 1st-2nd shifter arm
(8) 1st-2nd shifter rod
(9) 1st-2nd shift fork
(10) 3rd-4th shift fork
(11) 3rd-4th shifter rod
(12) Slidable bearing
(13) 5th-6th fork rod
(14) 5th-6th shift fork
(15) Neutral set spring
(16) Shifter arm shaft
(17) No. 1 selector arm
(18) No. 2 selector arm
(19) Striking rod
(20) Reverse shifter arm
(21) Reverse fork rod
(22) Reverse shifter fork

A: MECHANISMS

1. SHIFT DETENT MECHANISM

The shift detent mechanism allows the driver to distinctively feel the shift into a gear. The mechanism also prevents the transmission from jumping out of gear.
The shift detent mechanism uses a plunger with a check ball in it. The check ball is held under a small bowl which has the function of reducing friction during a shift and with the detent mechanism on the fork rod, generating a force to retain a gear in the selected position.

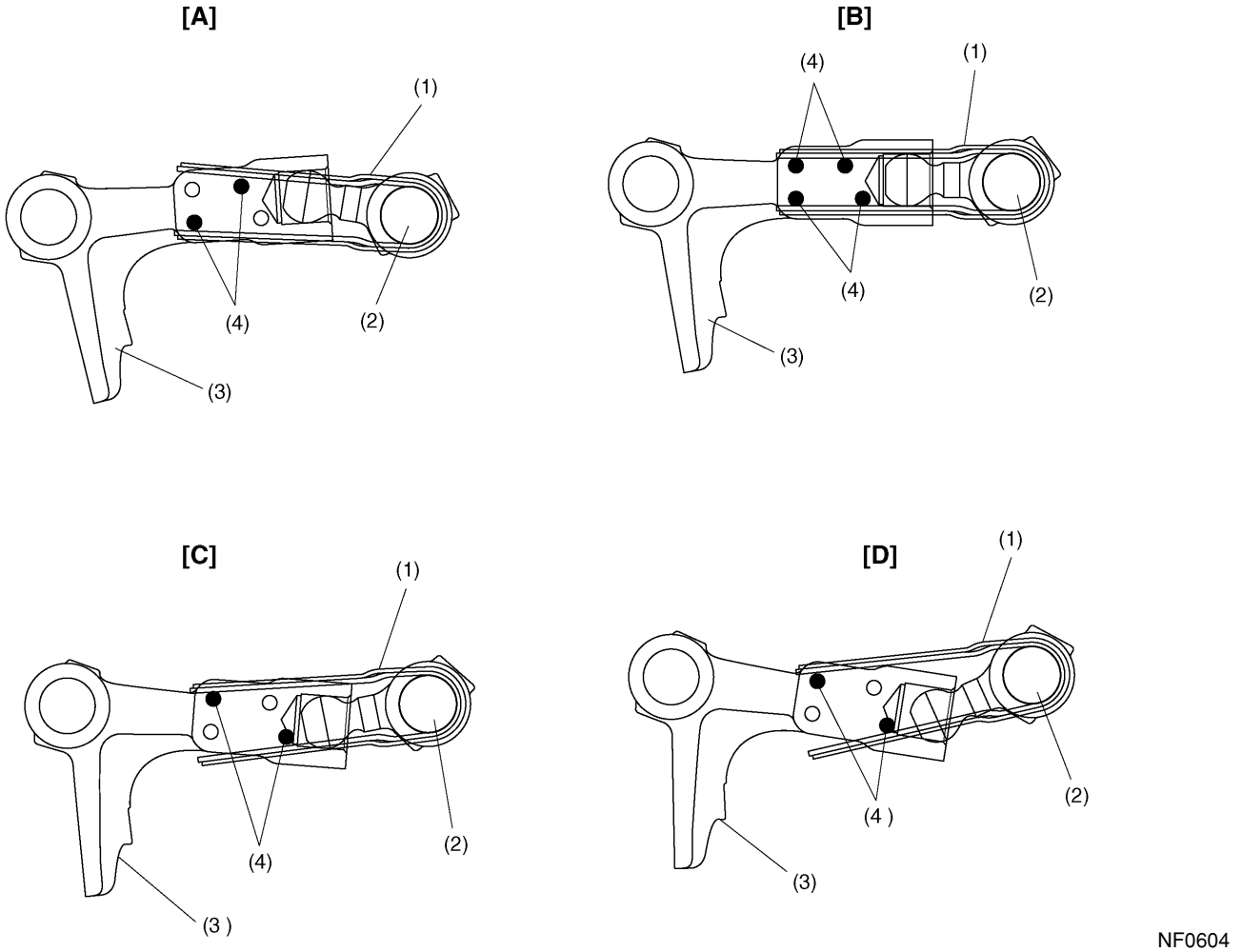


NF0603

(1) Spring
(2) Plunger
(3) Fork rod
(4) Check ball
(5) Bowl

2. SELECT RETURN MECHANISM

The select return mechanism allows the shift lever to return to the neutral position.
The neutral set spring pinches between its two arms the four pins on the No. 1 selector arm to hold the shift lever always in the neutral position. When the driver moves the shift lever in a select direction, the No. 1 and No. 2 selector arms turn about their axes, changing their relative angle.
This causes a pair of diagonally opposing pins on the No. 1 selector arm to open the neutral set spring. When the driver then releases the shift lever, the opened neutral set spring pushes by its returning force the pins to bring the selector arms back to the neutral position.



NF0604

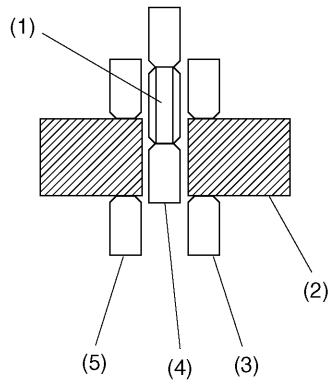
(1) Neutral set spring
(2) No. 2 selector arm
(3) No. 1 selector arm
(4) Pin

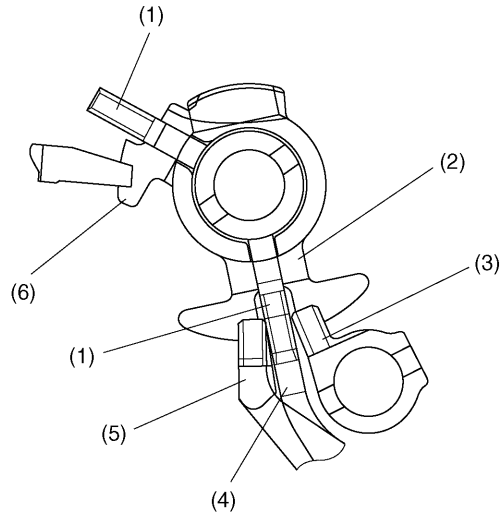
[A] 1st-2nd
[B] Neutral/3rd-4th
[C] 5th-6th
[D] Reverse

3. INTERLOCK MECHANISM (DOUBLE-MESHING PREVENTION MECHANISM)

The interlock mechanism makes it impossible to shift the transmission into two gears at once. When the interlock arm selects the shifter arm corresponding to the gear into which the driver is going to make a shift, the interlock blocks also move in the same select direction, preventing the other shifter arms from being selected.
The gap between the two blocks is adjusted such that only one shifter arm can enter it, so the interlock blocks prevent the other two shifter arms from being selected even if the driver operates the shift lever in a way that otherwise would cause simultaneous engagement of two gears.

- **When shift lever is properly operated**

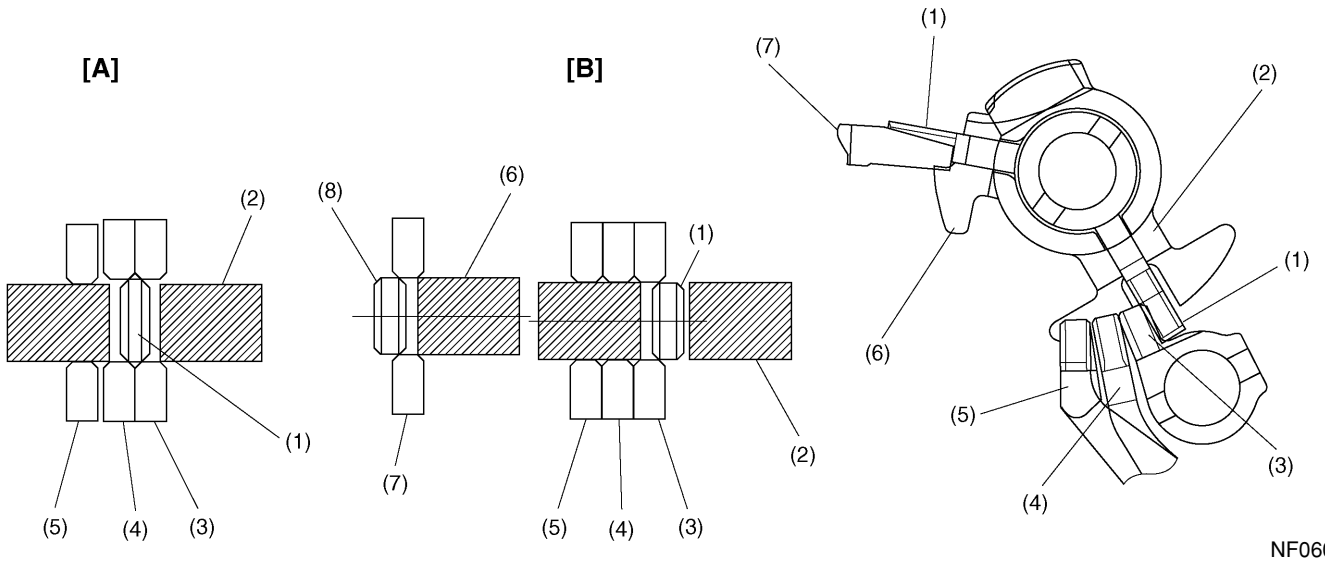




NF0605

(1) Interlock arm
(2) Interlock block
(3) 5th-6th shifter arm
(4) 3rd-4th shifter arm
(5) 1st-2nd shifter arm
(6) Reverse interlock block

- **When “double meshing” is prevented**



[A] Preventing 3rd and 5th double meshing
(1) Interlock arm
(2) Interlock block
(3) 5th-6th shifter arm
(4) 3rd-4th shifter arm

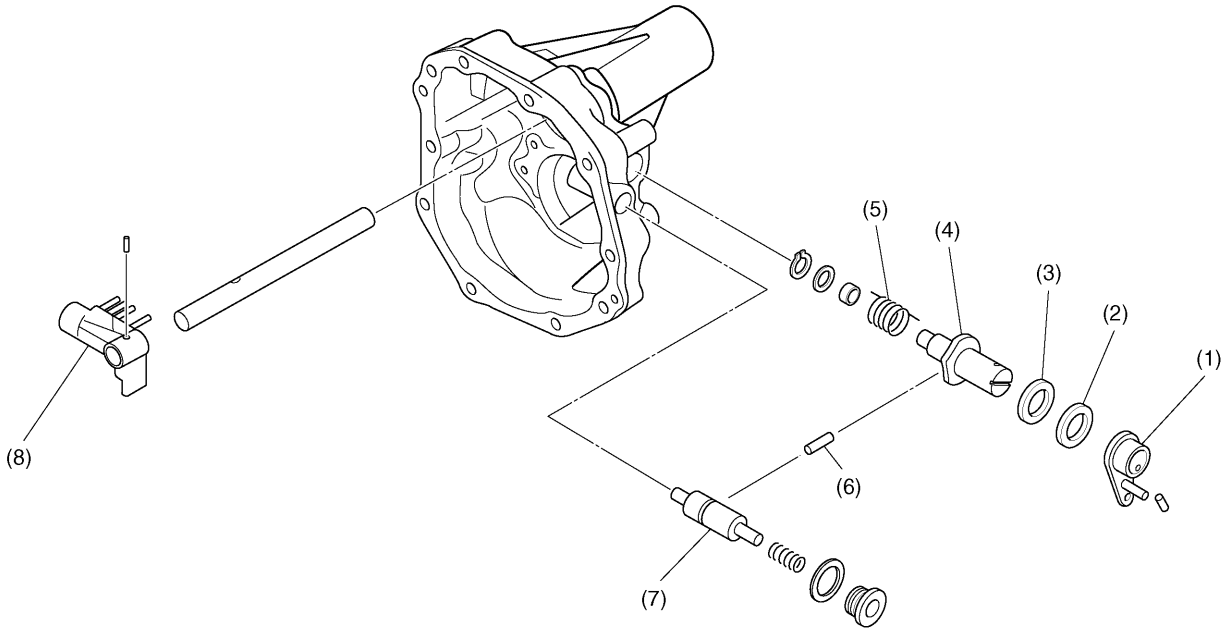
[B] Preventing 6th and reverse double meshing
(5) 1st-2nd shifter arm
(6) Reverse interlock block
(7) Reverse shifter arm
(8) Reverse interlock block

5. Reverse Check Mechanism

The reverse check mechanism prevent the reverse gear from being accidentally engaged when the driver makes a shift into the 5th or 6th gear. This mechanism is provided with a fail-safe function which enable shifting into reverse if the reverse check cable should be broken.

A: CONSTRUCTION

The reverse check mechanism is located inside the extension case.
It consists of a reverse check lever, oil seal, bearing, reverse check shaft, spring, plug and reverse check plug.



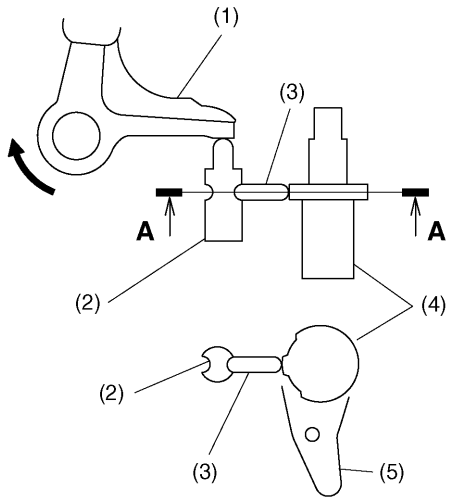
NF0607

(1) Reverse check lever
(2) Oil seal
(3) Bearing
(4) Reverse check shaft
(5) Spring
(6) Plug
(7) Reverse check plug
(8) No. 1 selector arm

B: OPERATION

1. MAKING SHIFT INTO 5TH/6TH

When the shift lever is moved into the 5th or 6th position, the No. 1 selector arm comes into contact with the reverse check plunger, trying to move the reverse check plug.
However, one end of the plunger is in contact with the cam lobe on the reverse check shaft and the other end is held in the groove in the reverse check plug, so the selector arm cannot move in the reverse gear selecting direction.

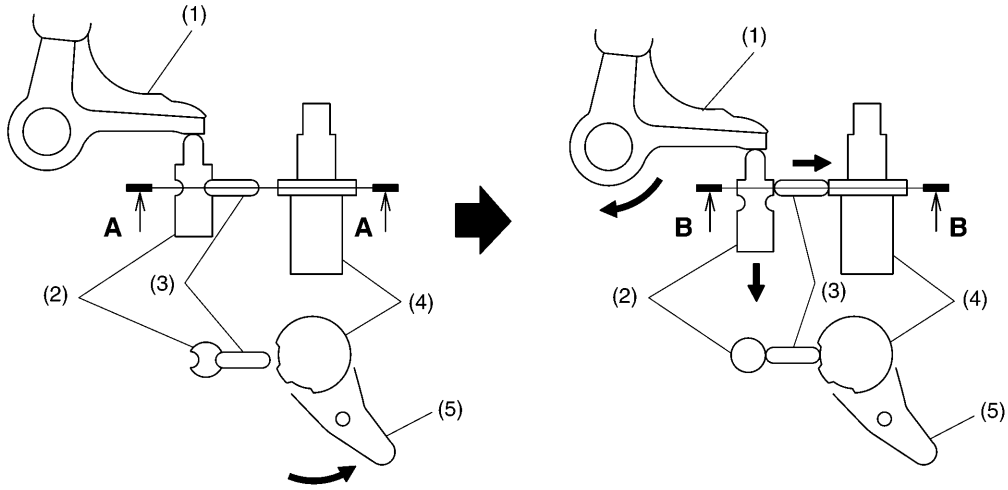


NF0608

(1) No. 1 selector arm
(2) Reverse check plug
(3) Plunger
(4) Reverse check shaft
(5) Reverse check lever

2. MAKING SHIFT INTO REVERSE

When making a shift into reverse, the driver lifts the slider on the shift lever. The upward movement of the slider causes, via the reverse check cable, the reverse check shaft to turn such that the cam lobe on the reverse check shaft becomes clear of the plunger.
The plunger can now move toward the reverse check shaft, allowing the selector arm to turn in the reverse gear selecting direction.

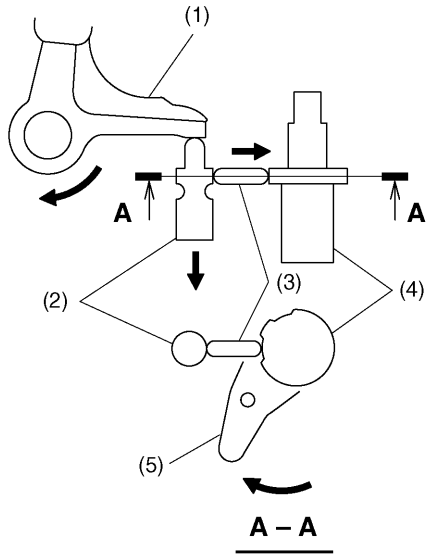


NF0609

(1) Selector arm
(2) Reverse check plug
(3) Plunger
(4) Reverse check shaft
(5) Reverse check lever

3. FAIL-SAFE OPERATION

Should the reverse check cable be broken, the reverse check shaft turns counterclockwise by a spring force, making the plunger get clear of the cam lobe of the reverse check shaft.
The plunger can now move toward the reverse check shaft, allowing the selector arm to turn in the reverse selecting direction.



NF0610

(1) Selector arm
(2) Reverse check plug
(3) Plunger
(4) Reverse check shaft
(5) Reverse check lever

6. Center Differential

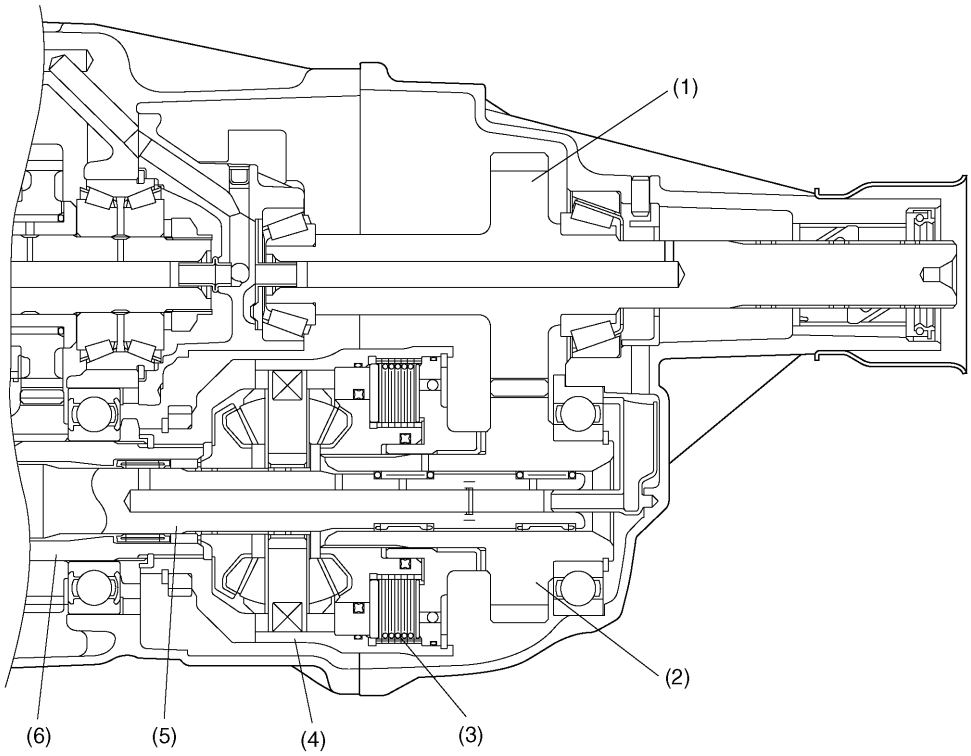
A: CONSTRUCTION

The center differential consists of a set of bevel gears and a viscous coupling.

The center differential has the following two functions: distributing the engine torque to the front and rear wheel drive shafts and absorbing the difference in rotating speed between the front and rear wheels.

The engine torque enters the center differential case from the transmission's driven shaft. The torque is then distributed through the bevel gear set directly to the drive pinion shaft and via the transfer drive and driven gears to the rear drive shaft.

The viscous coupling limits the bevel gear set's differential action when either front or rear wheels spin so that adequate torques are transmitted to the front and rear wheels and proper traction is obtained.

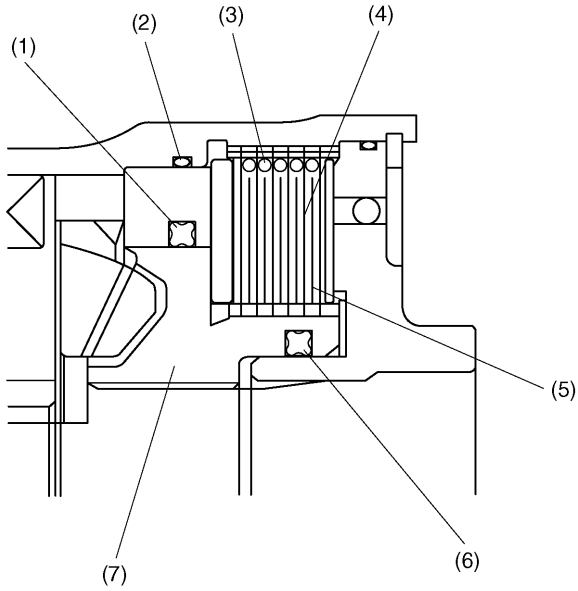


NF0611

(1) Transfer driven gear
(2) Transfer drive gear
(3) Viscous coupling
(4) Center differential assembly (with viscous coupling)
(5) Drive pinion shaft
(6) Driven shaft

B: MECHANISM OF VISCOUS COUPLING

The viscous coupling consists of a number of alternately arranged inner and outer plates and air-and-silicone oil mixture filled into a sealed space that is formed by the center differential case and the rear side gear of the differential gear set. The inner plates have their inner perimeters splined to the side gear and the outer plates have their outer perimeters splined to the center differential case. The outer plates are held apart by spacer rings. There are no spacer rings between the inner rings, so the inner rings are movable slightly in axial directions. X-section rings are used to prevent leakage of silicone oil which would otherwise occur if the oil is pressurized due to large difference in front and rear axle speeds.



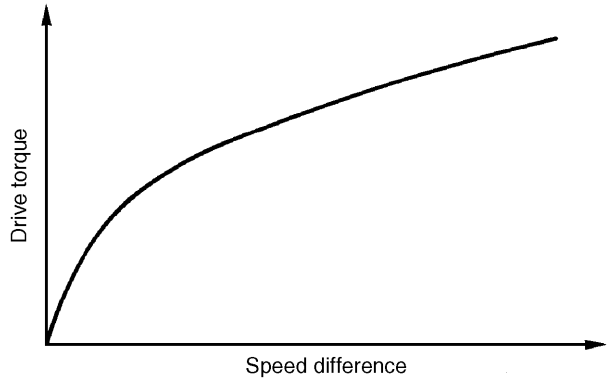
NF0612

(1) X-section ring
(2) O-ring
(3) Spacer ring
(4) Outer plate
(5) Inner plate
(6) X-section ring
(7) Side gear (rear)

1. TORQUE CHARACTERISTICS

When a speed difference occurs between the center differential case and the rear side gear, a shear force is generated in the silicone oil placed between the outer and inner plates. The torque is then transmitted by the silicone oil between the center differential case and the rear side gear.

The greater the speed difference, the greater the shear force generated in the silicone oil. The relationship between the torque transmission and the speed difference is shown in the figure below. As can be seen from the figure, the smaller the speed difference, the smaller the torque transmission and the differential action.



NF0122

2. HUMP PHENOMENON

Silicone oil is heated and expanded as differential action continues. This causes the pressure of air inside the viscous coupling to increase and the pressure of oil between plates to decrease. As a result, the inner and outer plates are pushed together. This direct plate-to-plate contact causes a non-viscous operation to occur, and this phenomenon is called “hump”.

The hump eliminates the rotating speed difference between the center differential case and the rear side gear (or locks the differential), so soon after it has occurred, the internal pressure and temperature drop. The viscous coupling then returns to the normal shear torque transmitting operation. (The hump phenomenon does not occur under normal operating conditions.)

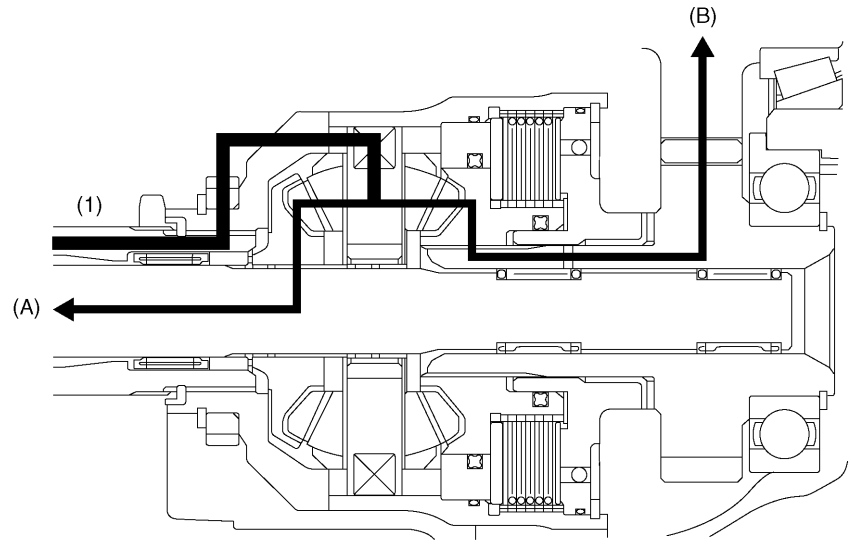
C: FUNCTION

When there is no speed difference between the front and rear wheels, the center differential delivers the engine torque to the front and rear wheels at a ratio of 50:50.

When a rotating speed difference occurs between the front and rear wheels, the center differential operates to absorb it in a controlled way by the function of the viscous coupling.

1. DURING NORMAL DRIVING

During straight-line driving on a flat road at a constant speed, all the four wheels rotate at the same speed. The center differential delivers engine torque evenly to the front and rear drive axles. The viscous coupling does not generate shear torque because there is no relative movements between the inner and outer plates.



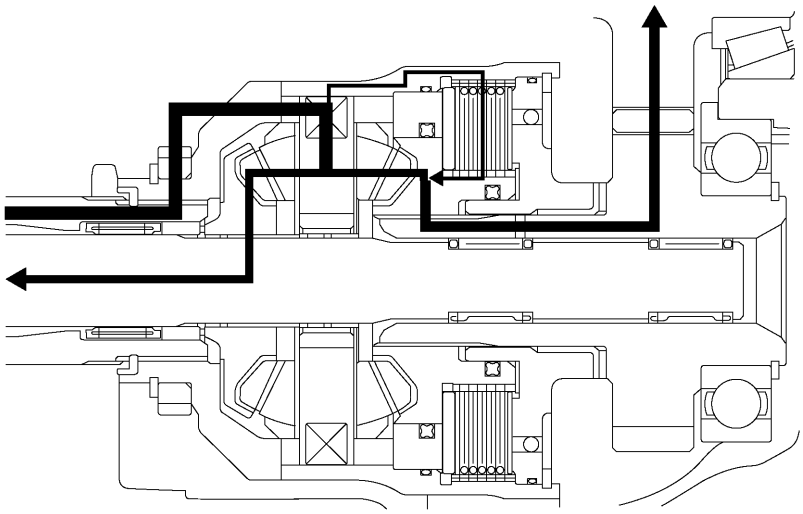
NF0613

(1) Engine torque (A) To front differential (B) To rear differential

2. DURING TURNS AT LOW SPEEDS

During turns at low speeds, rotating speed difference occurs between the front and rear wheels, as well as between the left and right wheels. More particularly, the front wheels rotate faster than the rear wheels. The center differential then acts to absorb the speed difference to enable smooth driving.

Although the speed difference is small under this condition, operation of the viscous coupling causes more torque to be transmitted to the rear than to the front.

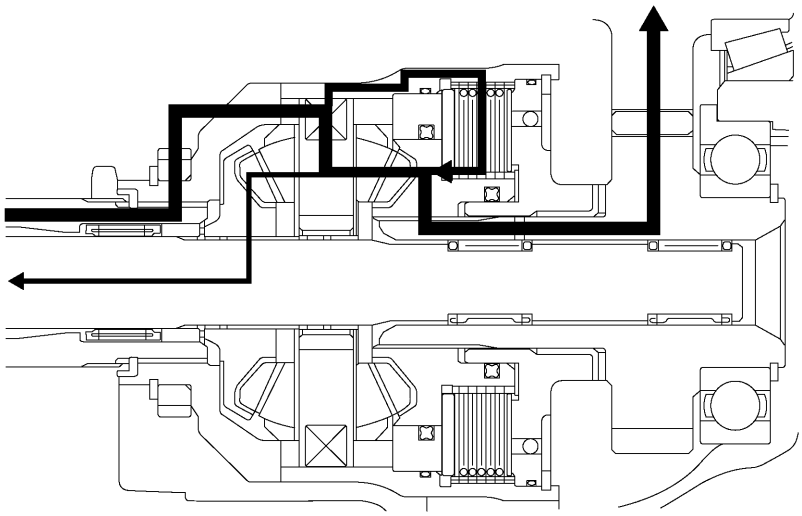


NF0614

3. DRIVING ON ROUGH OR SLIPPERY ROADS

● When front wheels are on a slippery surface

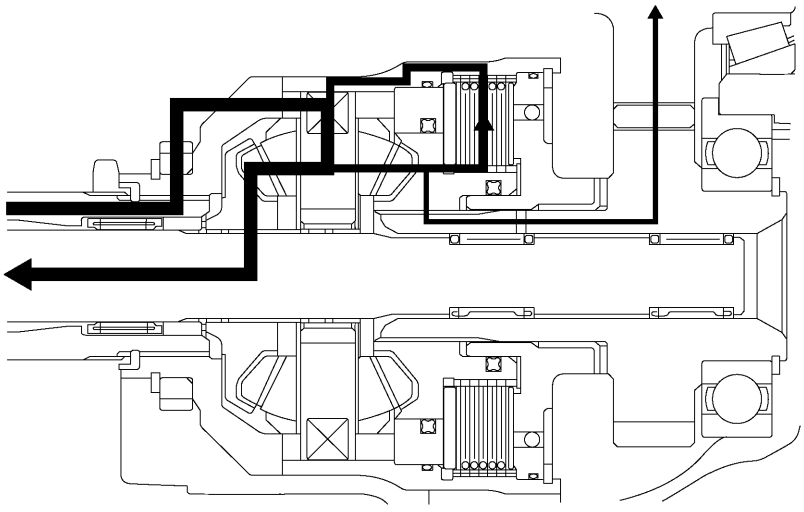
When the front wheels begin to spin, the resulting speed difference between the front and rear drive shafts causes the viscous coupling to generate significant amount of shear torque. As a result, the torque distributed to the rear wheels becomes much larger than that distributed to the spinning front wheels. The traction and driving stability are thus ensured on a rough or slippery road.



NF0615

● When rear wheels are on a slippery surface

When the vehicle is accelerated quickly from a standing start with the rear wheels on a slippery surface, the distribution of the vehicle weight on the front and rear wheels changes and the rear wheels start spinning. Due to the resulting speed difference between the front and rear drive shafts, the viscous coupling generates a significant amount of shear torque, now in the direction opposite to that generated when the front wheels are on a slippery surface. As a result, the torque distributed to the front wheels becomes much larger than that distributed to the rear wheels.

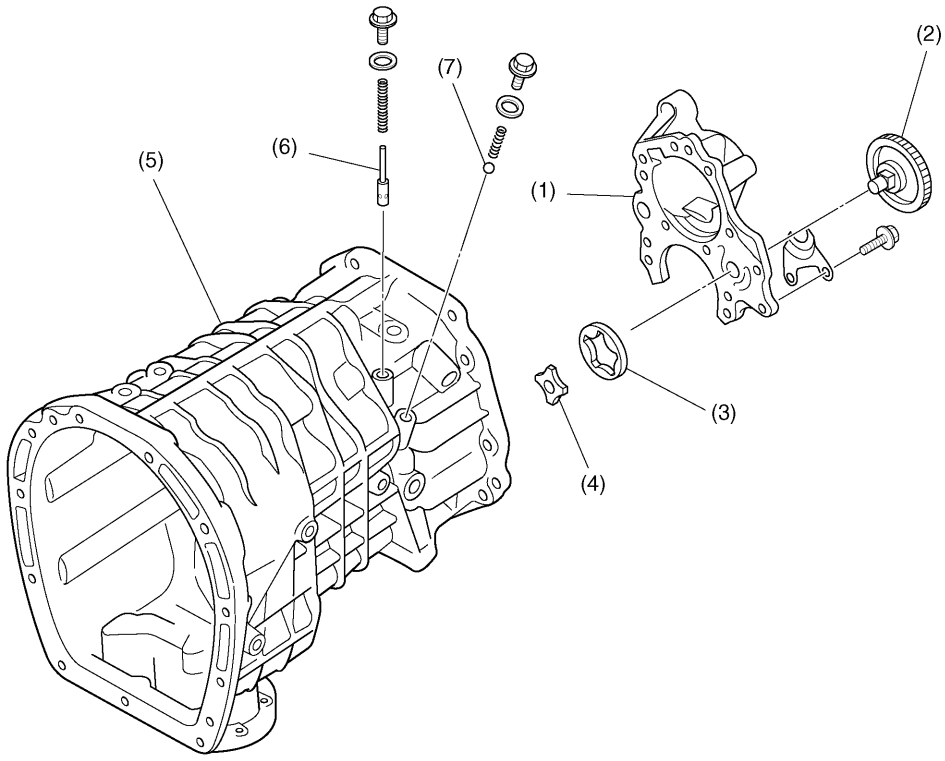


NF0616

7. Oil Pump

A: CONSTRUCTION

The lubricating oil pump incorporated in the transmission case is of a trochoid type.
The pump consists of an inner rotor having four teeth, outer rotor having five teeth, oil pump cover and oil pump driven gear, which are all located at the rear of the transmission case.
The pump is driven by the drive gear located on the center differential, so the delivery rate varies with the speed of the center differential.
There are a pressure regulator valve and pressure relief valve on the delivery side of the pump.

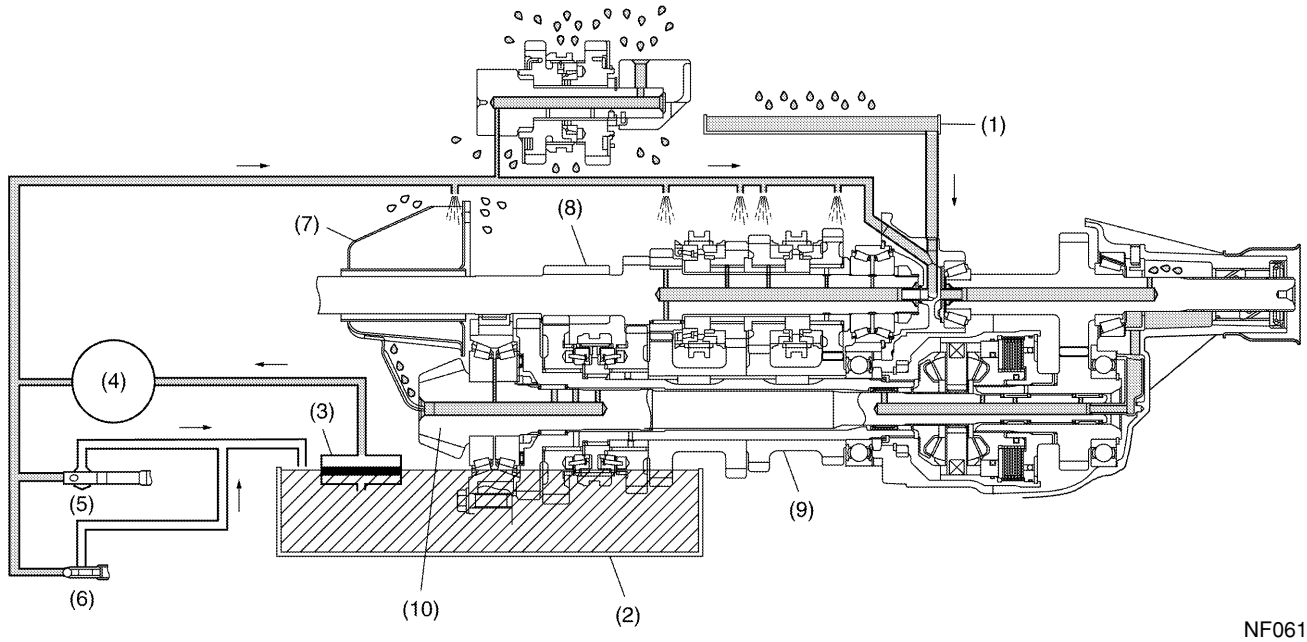


NF0617

(1) Oil pump cover
(2) Oil pump driven gear
(3) Outer rotor
(4) Inner rotor
(5) Transmission case
(6) Pressure regulator valve
(7) Pressure relief valve

8. Lubrication System

A forced lubrication system using an oil pump has been employed to ensure adequate supply of oil to the components of the six-speed transmission.
The oil (gear oil) from the oil pump is distributed to the oil chamber, main shaft, drive pinion shaft, transfer gears, and other components.
The oil chamber has functions of accumulating oil and supplying with oil the central oil passage in the drive pinion shaft uninterruptedly.
In a conventional transmission without an oil chamber, the oil level is typically maintained at a height corresponding to the midpoint of the driven gear assembly. Such a large amount of gear oil (which has a relatively high viscosity) inflicts considerable frictional resistance on the gears when the transmission is operating. The use of the oil chamber can lower the oil level and thus reduce the friction between gears and oil by temporarily storing oil and supplying gears with it in an adequate amount.



NF0618

(1) Oil guide
(2) Oil pan
(3) Oil strainer
(4) Oil pump
(5) Pressure regulator valve
(6) Pressure relief valve
(7) Oil chamber
(8) Main shaft
(9) Driven gear assembly
(10) Drive pinion shaft

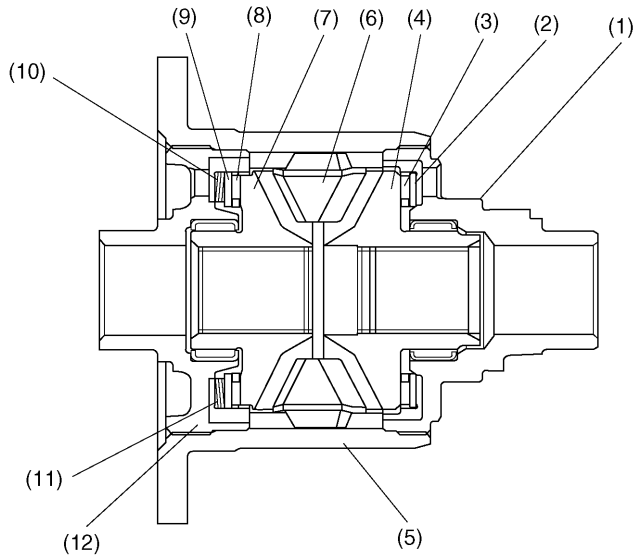
9. Front Differential (SURETRAC Type Limited Slip Differential)

A: OUTLINE

The limited slip differential (LSD) automatically limits the differential action and distributes torque to the left and right wheels adequately to enhance driving stability when the left and right wheels are rotating at speeds different from each other during driving on a slippery road (muddy, snow-covered or slushy road) or cornering.

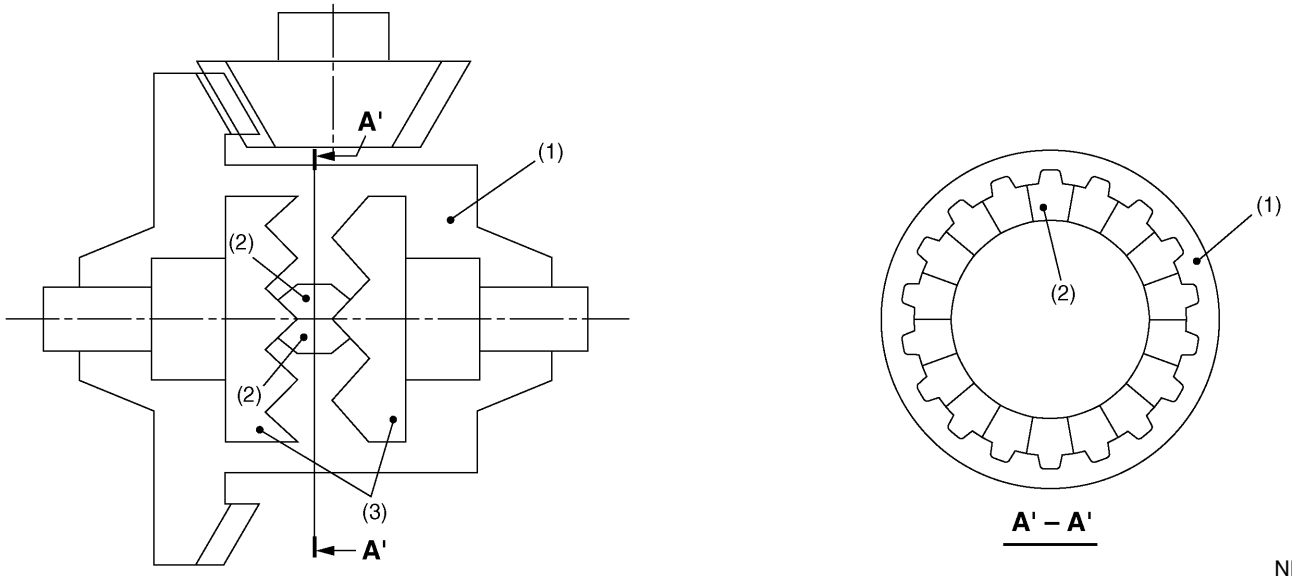
B: STRUCTURE

In the SURETRAC differential, there is a set of hexagonally-shaped cam followers placed between and kept in contact with the left and right face cams (which correspond to the side gears in a conventional differential).
The cam followers engage at their outer ends with the slots that are cut on the inner surface of the cage in the axial direction, so they can slide laterally in the slots but must rotate together with the cage. Since the cam followers push the face cams as the cage rotates, the input torque to the cage is transmitted to the axle shafts.
There are a needle bearing and thrust washer pair between the face cam on each side and cage. Moreover, there is a Belleville spring between one of the needle bearing and thrust washer pairs to give preloading, thus ensuring proper initial friction between the cam followers and face cams.



NF0619

(1) Hub
(2) Thrust washer
(3) Thrust bearing
(4) Face cam
(5) Cage
(6) Cam follower
(7) Face cam
(8) Thrust bearing
(9) Thrust washer
(10) Belleville spring
(11) Shim
(12) Hub

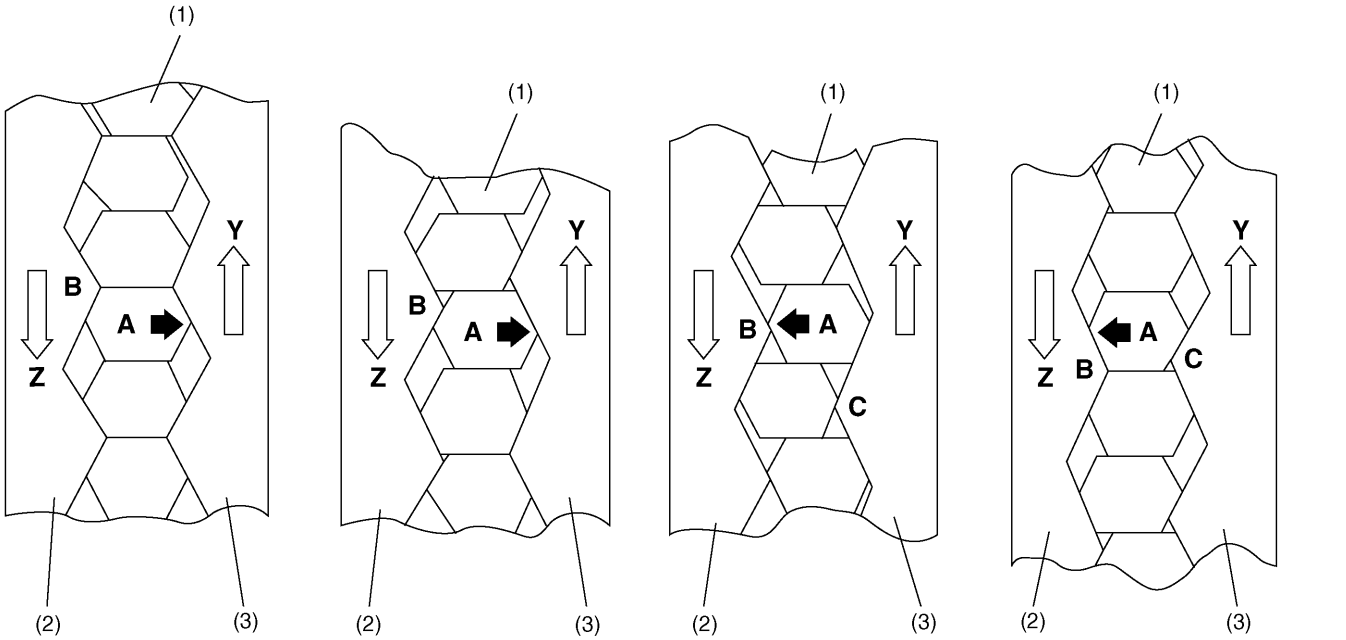


(1) Cage
(2) Cam follower
(3) Face cam

C: OPERATION

1. WHEN RIGHT AND LEFT WHEELS ROTATE AT DIFFERENT SPEEDS

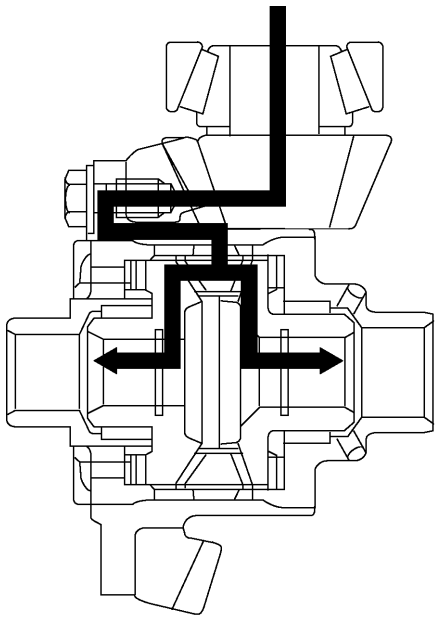
If the left and right wheels move relative to each other in the direction of arrow Z and in the direction of arrow Y, respectively, the cam follower A is pushed by the slope B of the left face cam, moving to the right. Then the cam follower A is pushed by the slope C of the right face cam, now moving to the left.
Likewise, all the other cam followers also repeat rightward and leftward movements as long as the right and left wheels continue rotating at different speeds, so the vehicle can turn a corner smoothly.



(1) Cam follower
(2) Left face cam
(3) Right face cam

2. WHEN RIGHT AND LEFT WHEELS ROTATE AT THE SAME SPEED

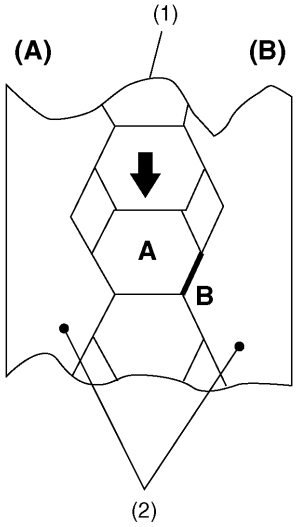
During normal straight-ahead driving where the right and left wheels rotate at the same speed, the cage and cam followers rotate together, just as in conventional differentials. As a result, driving torque is distributed equally to the right and left side gears.



NF0620

3. WHEN TRACTION IS DIFFERENT BETWEEN RIGHT AND LEFT WHEELS

For example, if the left wheel spins on a slippery surface and loses traction, the left face cam starts rotating at a speed faster than the right wheel.
Like when the right and left wheels rotate at different speeds mentioned earlier, the cam follower A starts moving to the left.
This time, however, as the right wheel has traction, the drive torque pushes the cam follower A strongly against the right face cam when it makes the cam follower get over the slope B of the face cam, generating a large friction force between the contacting surfaces (shown by a thick line in the drawing).
This large friction force allows the drive torque to be transmitted to the right wheel.
In this way, the SURETRAC differential can keep the drive torque distributed to a wheel with traction even when the other wheel spins and loses traction.



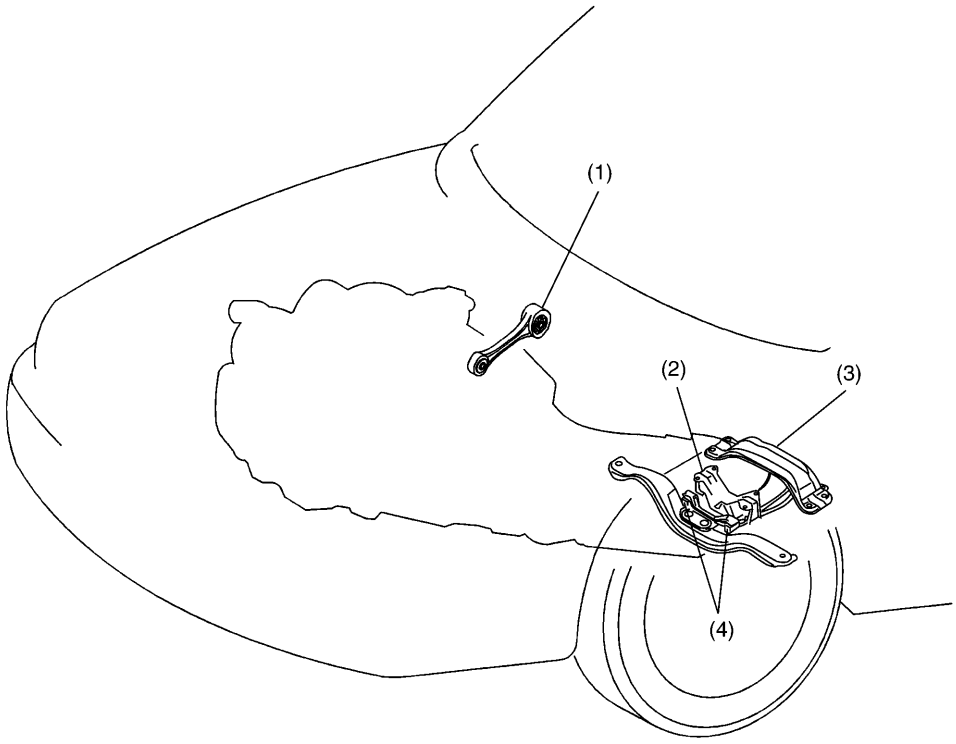
NF0565

(1) Cam follower
(2) Face cam
(A) High speed rotation
(B) Low speed rotation

D: SERVICE PROCEDURES FOR LSD

It is not recommended to disassemble this LSD assembly as components of this LSD assembly are not available individually.

10. Transmission Mounting



NF0628

(1) Pitching stopper
(2) Cushion rubber
(3) Cross member
(4) Dynamic damper (Europe model)

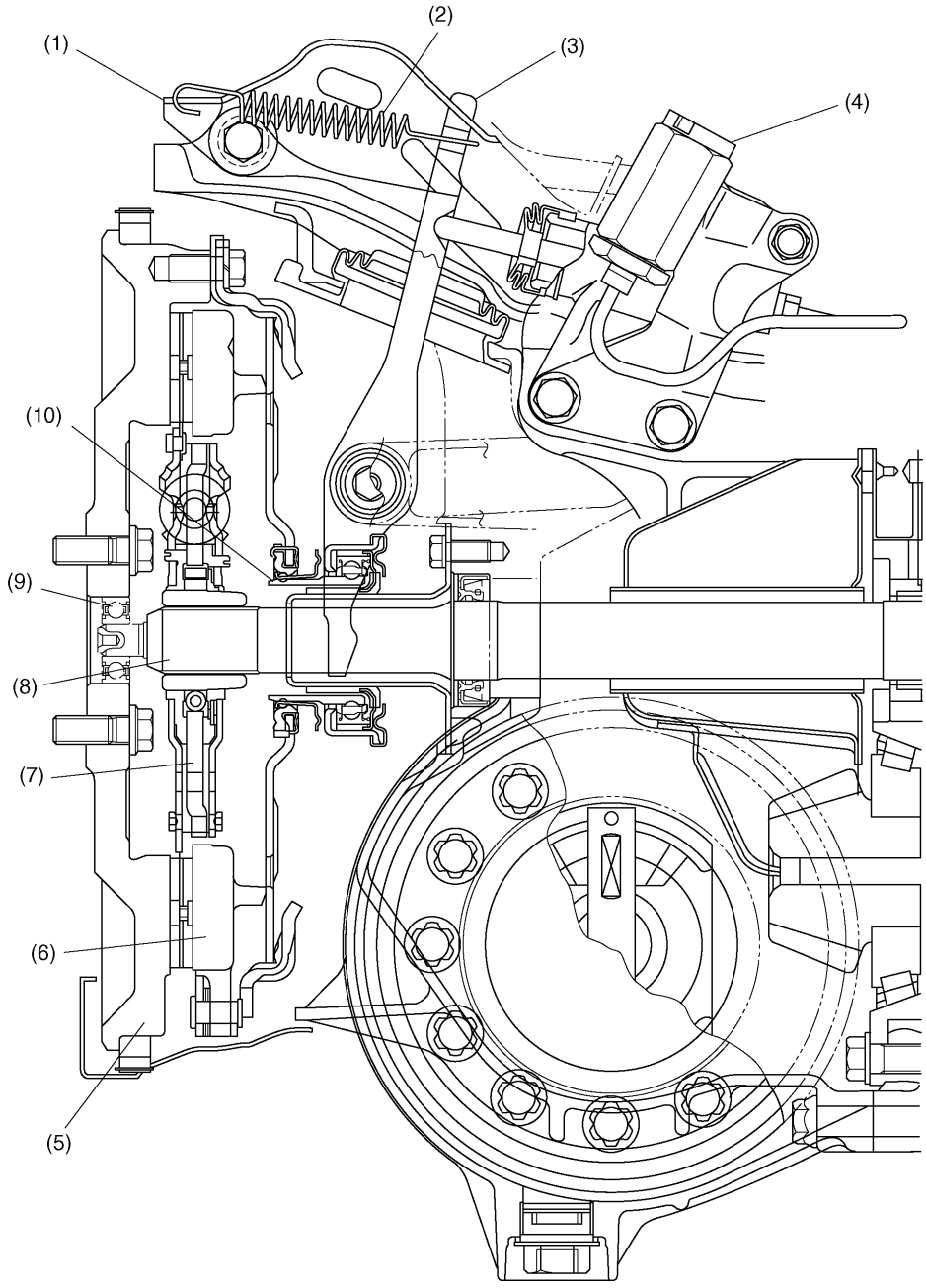
MEMO

CLUTCH CL

Page

3. Cross Sectional View

E: STi MODEL



NF0621

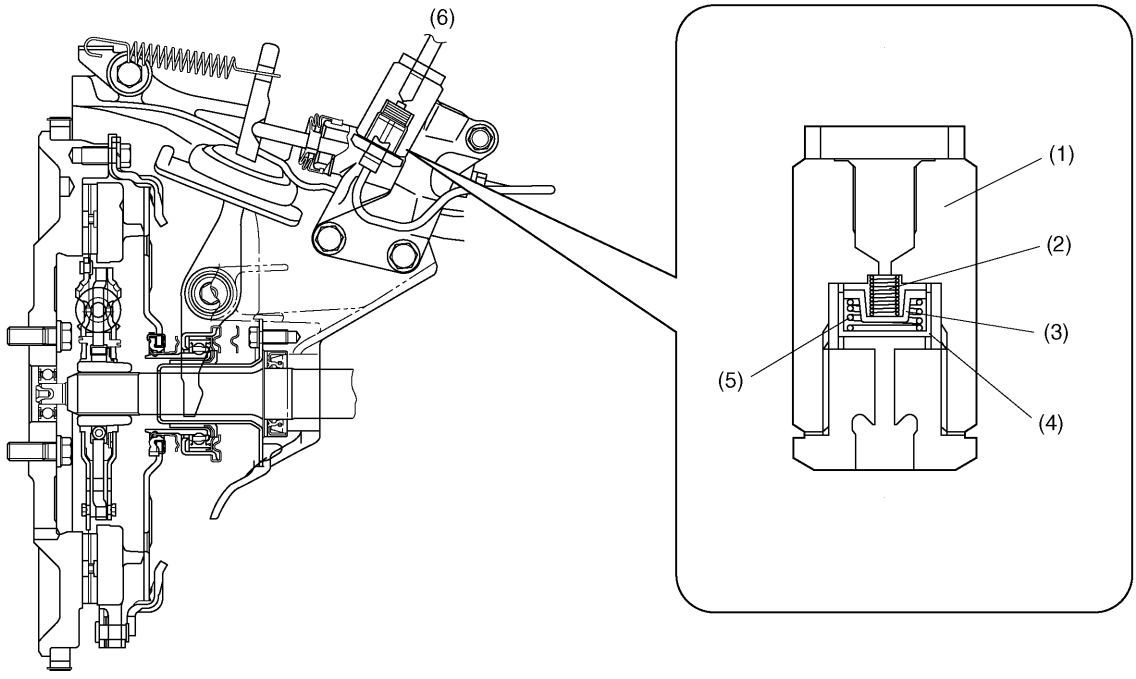
(1) Spring bracket
(2) Spring
(3) Release lever
(4) Operating cylinder
(5) Flywheel
(6) Clutch cover
(7) Clutch disc
(8) Transmission main shaft
(9) Ball bearing
(10) Release bearing

7. Fluid Control System (STi Model)

The clutch operating cylinder incorporates a temperature sensitive orifice unit which controls the clutch engaging speed depending on the fluid temperature to ensure smooth standing starts irrespective of atmospheric temperatures.

A: CONSTRUCTION

The orifice unit consists of an orifice retainer, an orifice valve, and two springs that support the orifice valve.
One of the springs is made of the shape memory alloy that prevents a delay in clutch response when the weather is cold and the oil viscosity is high.

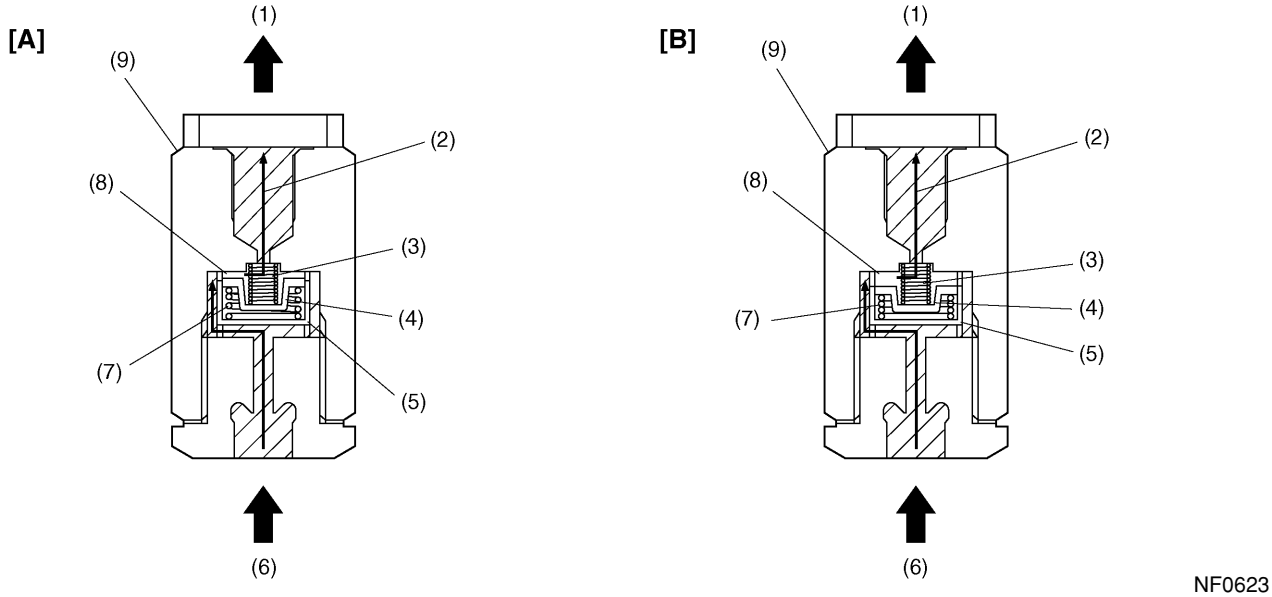


NF0622

(1) Body
(2) No. 2 spring
(3) Orifice valve
(4) Orifice retainer
(5) No. 1 spring
(6) To master cylinder

B: OPERATION

The No. 1 spring is made of a shape memory alloy that contracts and loses the tension when the temperature is low.
When the temperature is high, the orifice valve is kept in a raised position by the No. 1 spring, so the fluid passage is narrow. When the temperature drops, the No. 1 spring contracts, allowing the orifice valve to be pushed down by the No. 2 spring. Now, the fluid passage in the orifice unit opens wide.



[A] In high temperatures
[B] In low temperatures

(1) To master cylinder
(2) Flow of fluid with clutch pedal released
(3) No. 2 spring
(4) Orifice valve
(5) Orifice retainer
(6) From operating cylinder
(7) No. 1 spring
(8) Orifice gap
(9) Body

FRONT SUSPENSION FS

1. Front Suspension

A: OUTLINE

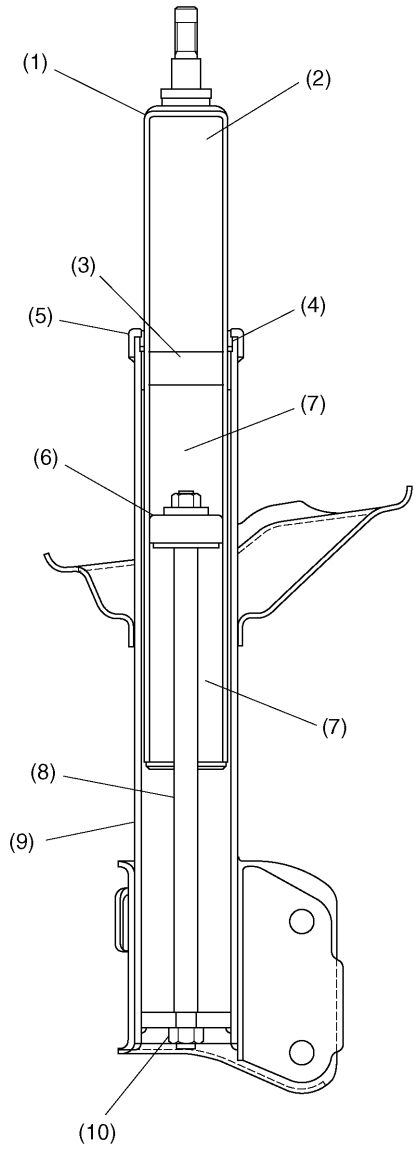
1. STi MODEL

The struts are of an upside-down type, which can provide increased rigidity. They also improve the steering stability.

B: CONSTRUCTION

3. UPSIDE-DOWN-TYPE STRUTS (STi MODEL)

Compared with a conventional suspension strut, the upside-down-type strut has a shock absorber with its top and bottom reversed. This arrangement is advantageous in increasing rigidity as it allows the diameter of the damping tube (which corresponds to the piston rod in the conventional arrangement) to be increased to an almost same diameter as the strut's outer tube diameter.



NF0584

(1) Damping tube
(2) Gas
(3) Free piston
(4) Oil seal
(5) Cap
(6) Piston
(7) Oil
(8) Piston rod
(9) Outer tube
(10) Nut

MEMO

REAR SUSPENSION RS

1. Rear Suspension

A: OUTLINE

1. STi MODEL

As is the case with the front suspension, the rear suspension uses upside-down struts.

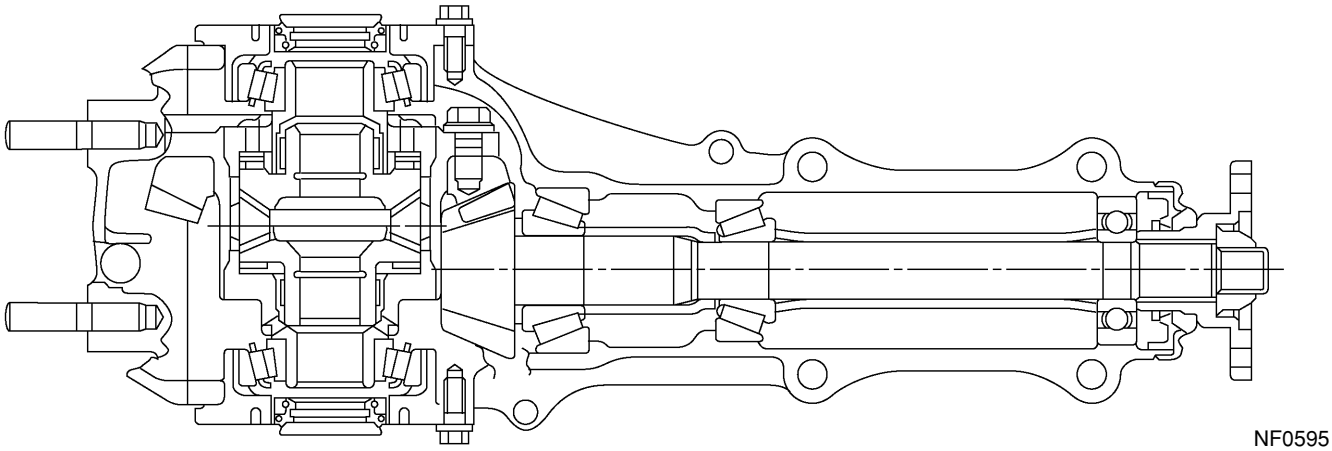
DIFFERENTIALS DI

1. Rear Differential

B: T-TYPE

2. STi MODEL

The drive gear is a hypoid gear with a nominal diameter of 180 mm (7.09 in). The drive pinion shaft is supported by three bearings. The bearing preload is adjusted by selecting a spacer and washer combination of a proper thickness. The drive pinion height is adjusted by properly selecting the thickness of the washers located at the drive pinion neck using Dummy Shaft and Gauge.



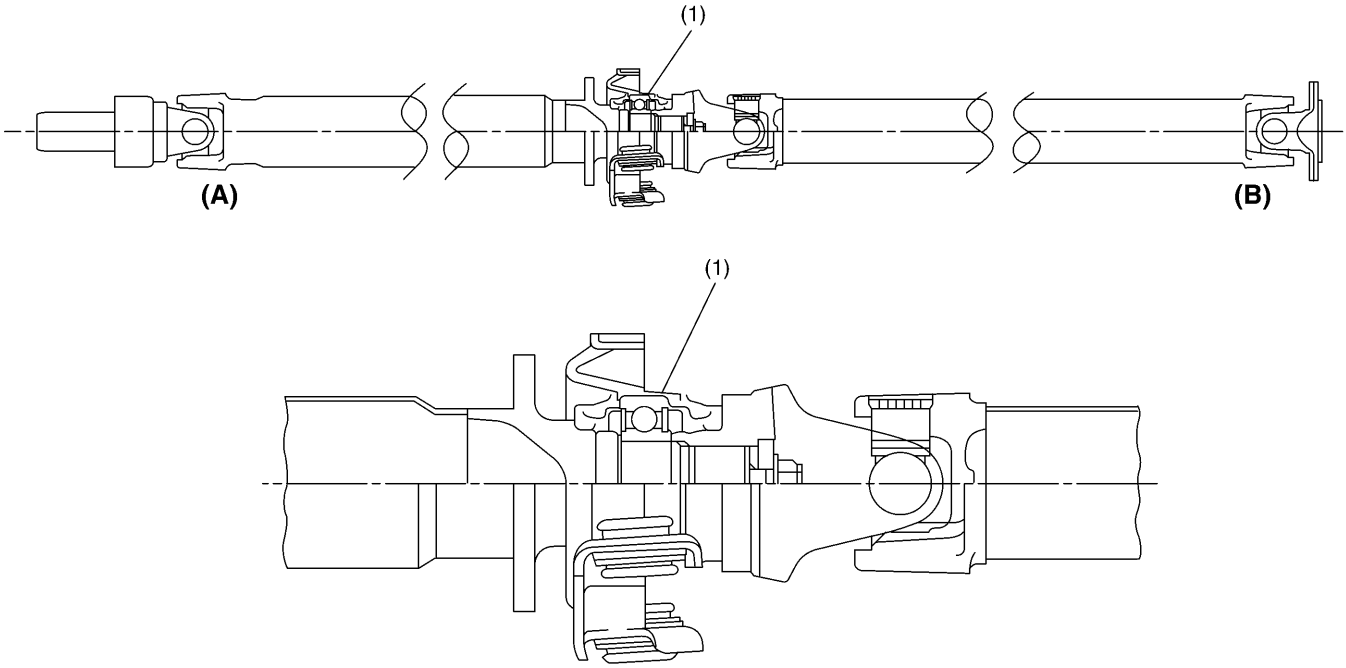
NF0595

DRIVE SHAFT SYSTEM DS

1. Propeller Shaft

C: STi MODEL

The propeller shaft is of a two-piece design that uses three joints.



NF0558

(1) Center bearing

(A) Transmission side

(B) Rear differential side

2. Front Axle

A: GENERAL

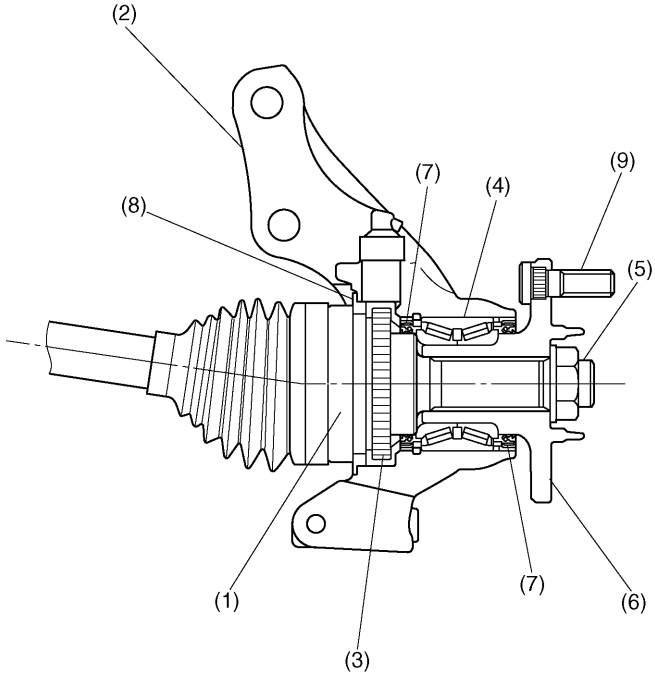
2. STi MODEL

● The inboard end of the axle shaft is connected to the transmission via a constant velocity joint (double offset joint: DOJ) which is flexible in the axial directions, while the outboard end is connected via a bell joint (BJ) to the wheel hub which is supported by a taper roller bearing located inside the axle housing. The BJ features a large operating angle.
Both the constant velocity joints (DOJ and BJ) ensure smooth, regular rotation of the drive wheels with minimum vibration.

● The bearing is a preloaded, non-adjustable tapered roller unit bearing.
Each hub is fitted in the axle housing via the tapered roller bearing.

● The BJ's spindle is splined to the hub and is secured with an axle nut clinched to it.

● The disc rotor is an external mounting type. It is secured to the disc wheel using hub bolts to facilitate maintenance of the disc rotor.



NF0151

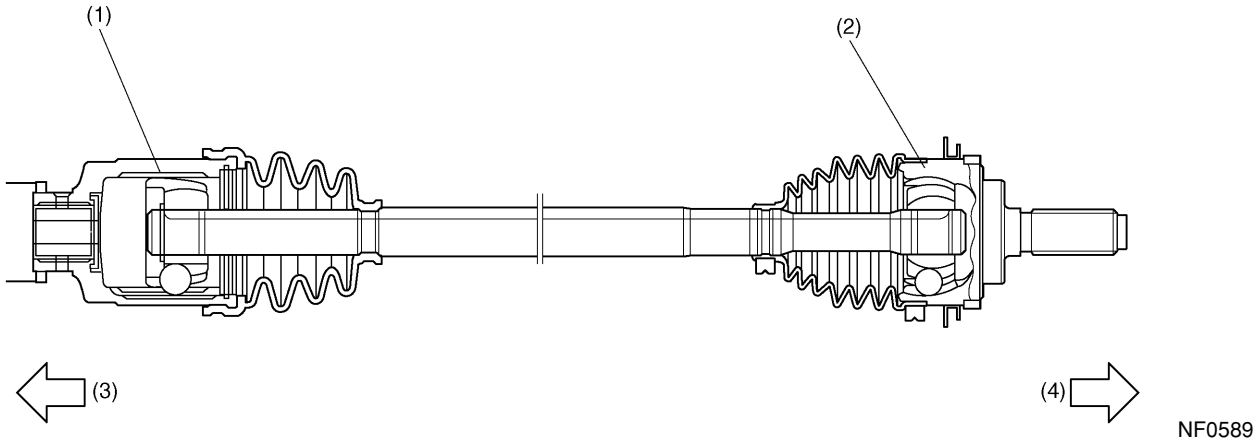
(1) BJ
(2) Axle housing
(3) Tone wheel
(4) Bearing
(5) Axle nut
(6) Hub
(7) Oil seal
(8) Baffle plate
(9) Hub bolt

B: FRONT DRIVE SHAFT

2. STi MODEL

● A double offset joint (DOJ) is used on the differential side of each front drive shaft. The DOJ can be disassembled for maintenance. It provides a maximum operating angle of 25° and can be moved in the axial directions.

● A bell joint (BJ) is used on the wheel side of each front drive shaft.
The BJ's maximum operating angle is 47.1°.



(1) DOJ
(2) BJ
(3) Transmission side
(4) Wheel side

3. Rear Axle

C: AWD TURBO MODELS

2. STi MODEL

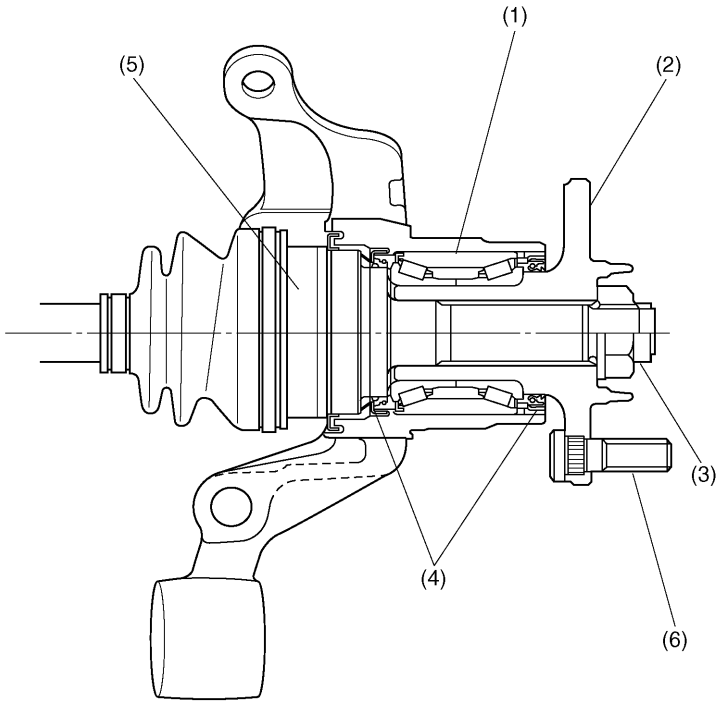
● The inboard end of each axle shaft is connected to the transmission via a double offset joint (DOJ) which can extend and retract in the axial directions.

● The outboard end is supported by taper roller bearings located inside the axle housing via a bell joint (BJ) which features a large operating angle. Both the constant velocity joint (DOJ and BJ) ensure smooth, regular rotation of the drive wheels with minimum vibration.

● The bearing is a preloaded, non-adjustable taper roller unit type.
Each hub is fitted in the axle housing via the taper roller bearing.

● The BJ's spindle is splined to the hub and secured with an axle nut clinched to it.

● The disc rotor is held in position by the hub bolts and wheel nuts together with the wheel. This facilitates removal and installation of the disc rotor and thus improves serviceability.



NF0590

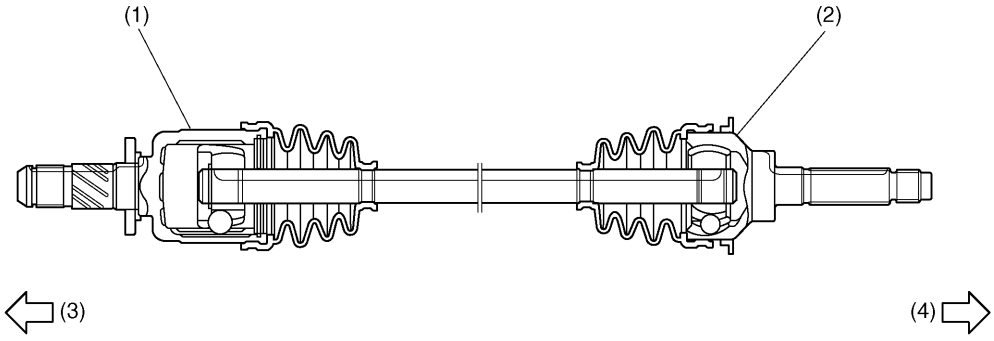
(1) Tapered roller bearing
(2) Hub
(3) Axle nut
(4) Oil seal
(5) BJ
(6) Hub bolt

D: REAR DRIVE SHAFT

3. TURBO MODELS (STi MODEL)

● A double offset joint (DOJ) is used on the differential side of each rear drive shaft. The DOJ can be disassembled for maintenance. It provides a maximum operating angle of 23° and can be moved in the axial directions.

● A bell joint (BJ) is used on the wheel side of each rear drive shaft. Its maximum operating angle is 43.4°.



NF0591

(1) DOJ
(2) BJ
(3) Differential side
(4) Wheel side

ABS ABS

1. Anti-lock Brake System (ABS)

A: FEATURE

● The 5.3i type ABS used in the Impreza has a hydraulic control unit, an ABS control module, a valve relay and a motor relay integrated into a single unit (called “ABSCM & H/U”) for circuit simplicity and reduced weight.

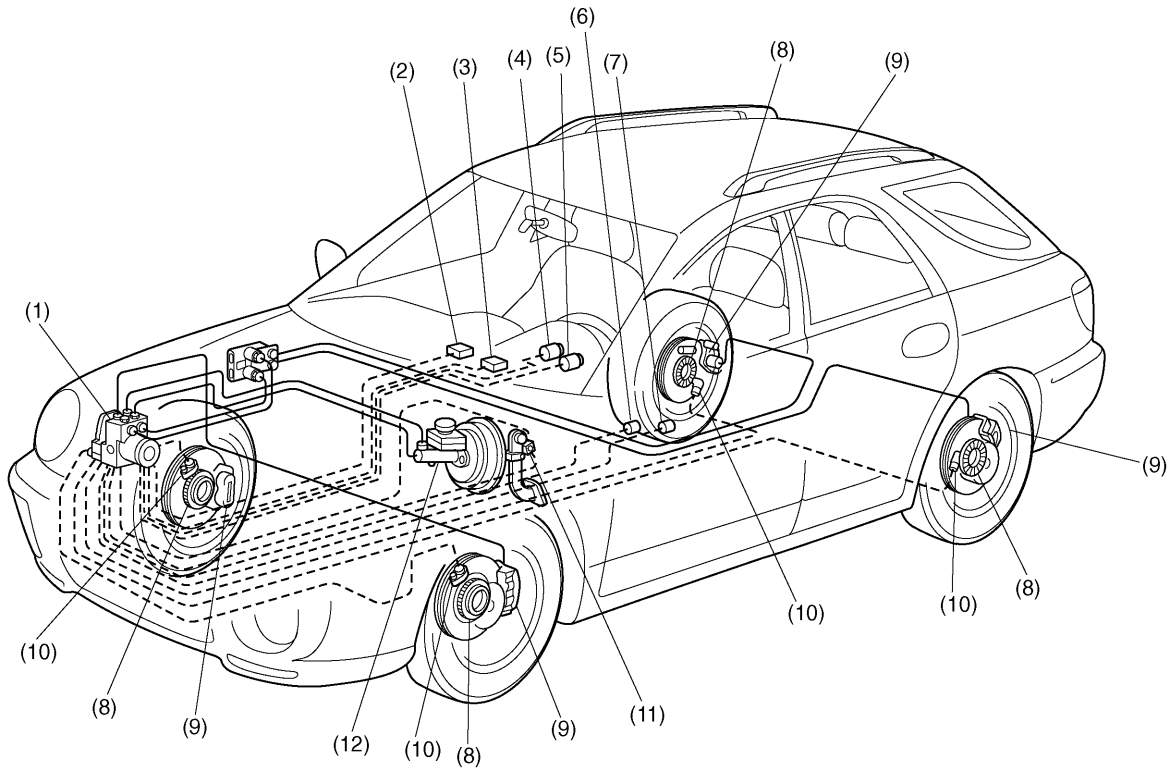
● The ABS electrically controls the brake fluid pressure to each wheel to prevent the wheel from locking during braking on slippery road surfaces, thereby enabling the driver to maintain the directional control.

● If the ABS becomes inoperative, a fail-safe system is activated to ensure same level of braking performance as with a conventional brake system. In that case, the warning light comes on to indicate that the ABS is malfunctioning.

● The ABS is a 4-sensor, 4-channel system; the front wheel system is an independent control design*1, while the rear wheel system is a select-low control design*2.

*1: A system which controls the front wheel brakes individually.
*2: A system which applies the same fluid pressure to both the rear wheels if either wheel starts to lock. The pressure is determined based on the lower of the frictional coefficients of both wheels.

● The STi model is equipped with a Sports ABS. The Sports ABS is different from the standard ABS with an electronic brake force distribution (EBD) function in that it has an additional lateral G sensor. When the G sensor senses large lateral acceleration exceeding the predetermined level during a turn, the ABS switches the rear braking control mode from the select-low control to the independent control in order to improve the braking performance during cornering.

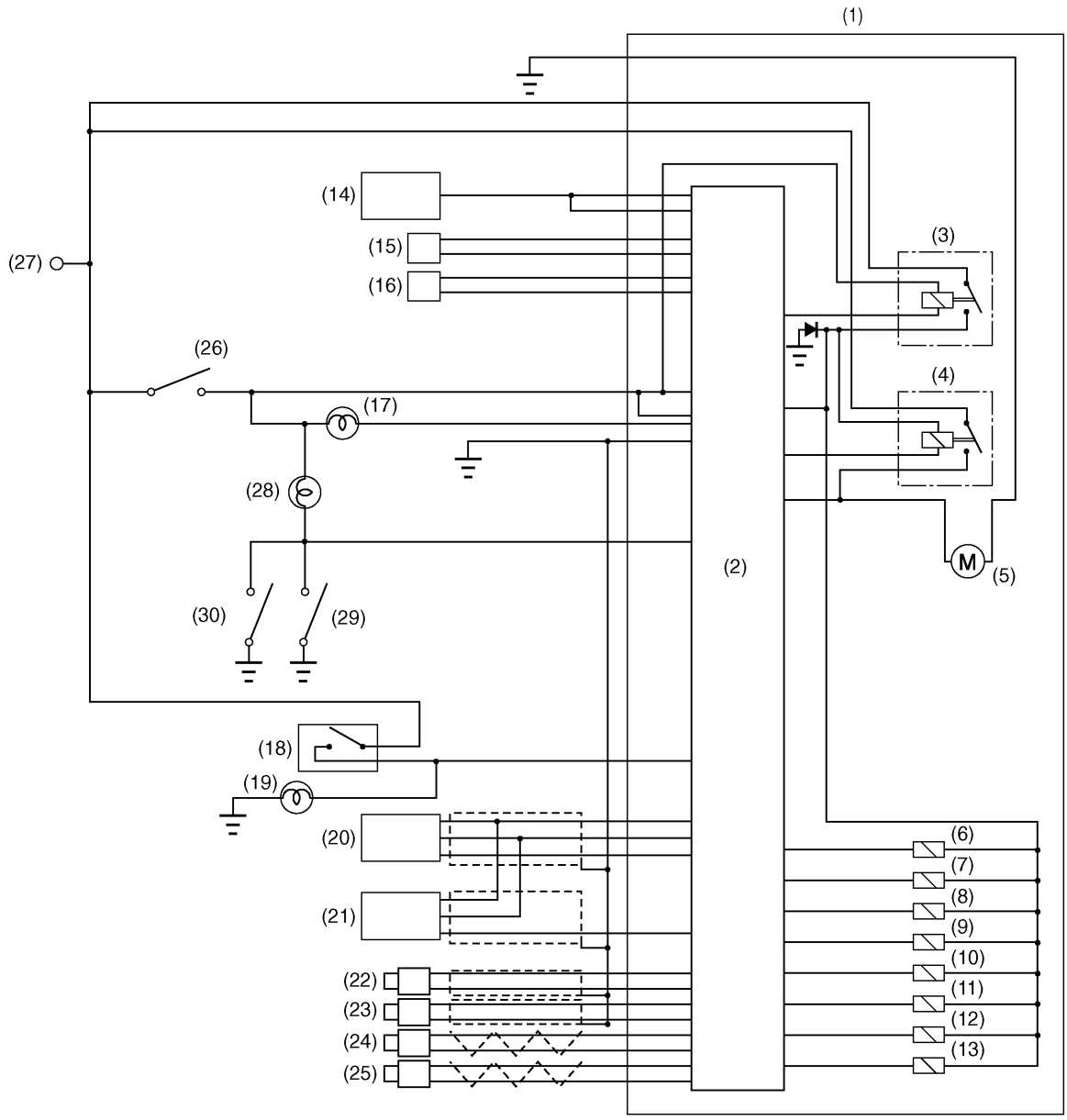


NF0586

(1)	ABS control module and hydraulic control unit (ABSCM & H/U)	(5)	Brake warning light	(9)	Wheel cylinder
(2)	Diagnosis connector	(6)	G sensor	(10)	ABS sensor
(3)	Data link connector (for SUBARU select monitor)	(7)	Lateral G sensor (Only STi model)	(11)	Brake switch
(4)	ABS warning light	(8)	Tone wheel	(12)	Master cylinder

B: FUNCTIONS OF SENSORS AND ACTUATORS

Name		Function
ABS control module and hydraulic control unit (ABSCM & H/U)	ABSCM section	• It determines the conditions of the wheels and the vehicle body from the wheel speed data and controls the hydraulic unit depending on the result. • When the ABS is active, the ABSCM provides the automatic transmission control module with control signals which are used by the module for cooperative control of the vehicle with the ABSCM. • Whenever the ignition switch is placed at ON, the module performs a self diagnosis sequence. If anything wrong is detected, the module cuts off the system. • It communicates with the SUBARU select monitor.
	H/U section	• When the ABS is active, the H/U changes fluid passages to the wheel cylinders in response to commands from the ABSCM. • It constitutes the brake fluid passage from the master cylinder to the wheel cylinders together with the piping.
	Valve relay section	It serves as a power switch for the solenoid valves and motor relay coil. It operates in response to a command from the ABSCM.
	Motor relay section	It serves as a power switch for the pump motor. It operates in response to a command from the ABSCM.
ABS sensors (wheel speed sensors)		They detect the wheel speed in terms of a change in the density of the magnetic flux passing through them and convert it into an electrical signal. The electrical signal is sent to the ABSCM.
Tone wheels		They give a change in the magnetic flux density by the teeth around themselves to let the ABS sensors generate electrical signals.
G sensor		It detects a change in acceleration in the longitudinal direction of the vehicle and outputs it to the ABSCM as a voltage signal.
Lateral G sensor (STi model)		It detects lateral acceleration (G) during a turn and sends a voltage signal proportional to the G value to the ABSCM.
Stop light switch		It provides information on whether the brake pedal is depressed or not to the ABSCM. The ABSCM uses it to determine ABS operation.
ABS warning light		It alerts the driver to an ABS fault. When the diagnosis connector and diagnosis terminal are connected, the light flashes to indicate a trouble code stored in the ABSCM.
Automatic transmission control module		It provides gear controls (fixing the speed at 3rd or changing power transmission to front and rear wheels) in response to control signals from the ABSCM.
Brake warning light		It alerts the driver to an EBD fault. This warning light is also used for parking brake warning and brake fluid level warning.



NF0587

(1) ABS control module and hydraulic control unit
(2) ABS control module section
(3) Valve relay
(4) Motor relay
(5) Motor
(6) Front left inlet solenoid valve
(7) Front left outlet solenoid valve
(8) Front right inlet solenoid valve
(9) Front right outlet solenoid valve
(10) Rear left inlet solenoid valve
(11) Rear left outlet solenoid valve
(12) Rear right inlet solenoid valve
(13) Rear right outlet solenoid valve
(14) Automatic transmission control module
(15) Diagnosis connector
(16) Data link connector
(17) ABS warning light
(18) Stop light switch
(19) Stop light
(20) G sensor
(21) Lateral G sensor (Only STi model)
(22) Front left ABS sensor
(23) Front right ABS sensor
(24) Rear left ABS sensor
(25) Rear right ABS sensor
(26) IGN
(27) BATTERY
(28) Brake warning light
(29) Parking brake switch
(30) Brake fluid level switch

J: LATERAL G SENSOR (STi MODEL)

The lateral G sensor senses variation in the lateral acceleration while the vehicle is making a turn. Its construction and operation are the same as those of the conventional G sensor, which converts changes in the piezoresistivity into changes in the output voltage to the ABSCM.

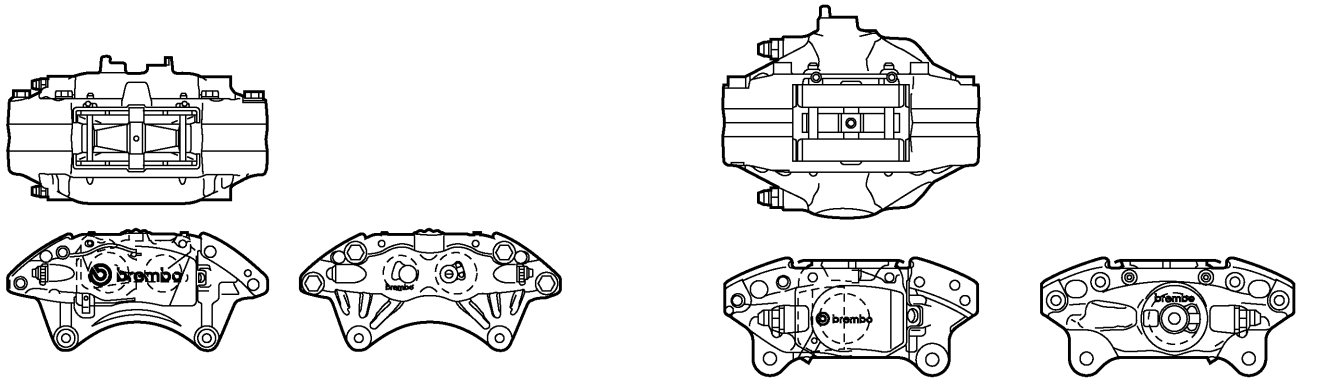
BRAKES BR

1. Front and Rear Disc Brakes

C: STi MODEL

● The brakes of the STi model use Brembo's 17-inch calipers and ventilated disc rotors that provide improved braking performance.

● The brake calipers for the front brakes are of a four-pod-piston type, while those for the rear brakes are of a two-pod-piston type.



(1) (2)

NF0588

(1) Front

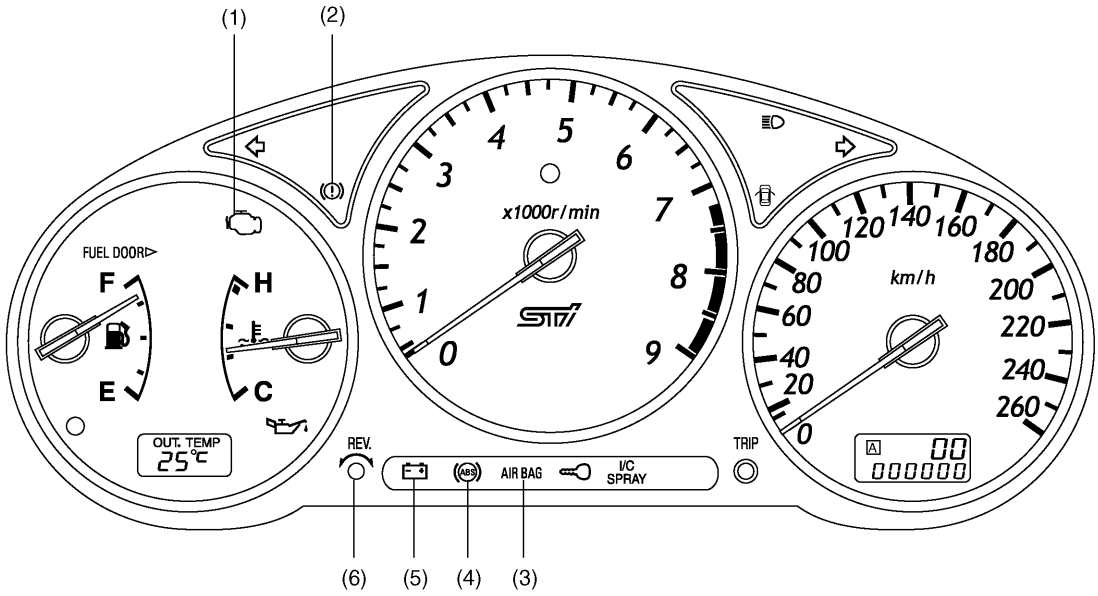
(2) Rear

INSTRUMENTATION/DRIVER INFO IDI

1. Combination Meter

A: WARNING AND INDICATOR LIGHTS

2. STi MODEL



NF0592

(1) CHECK ENGINE warning light
This light illuminates when a fault occurs in the MFI (Multiple point Fuel Injection) system.

(2) Brake fluid level warning / parking brake indicator light
This light illuminates when the fluid level in the brake reservoir tank lowers below the specified level and/or when the parking brake is applied.

(3) AIRBAG system warning light
This light illuminates when a fault occurs in the airbag system.

(4) ABS warning light
This light illuminates when a fault occurs in any electrical component of the ABS (Anti-lock Brake System).

(5) Charge indicator light
This light illuminates when a fault occurs in the charging system while the engine is running.

(6) Oil pressure warning light
This light illuminates when the engine oil pressure decreases below 14.7 kPa (0.15 kgf/cm^2, 2.1 psi).

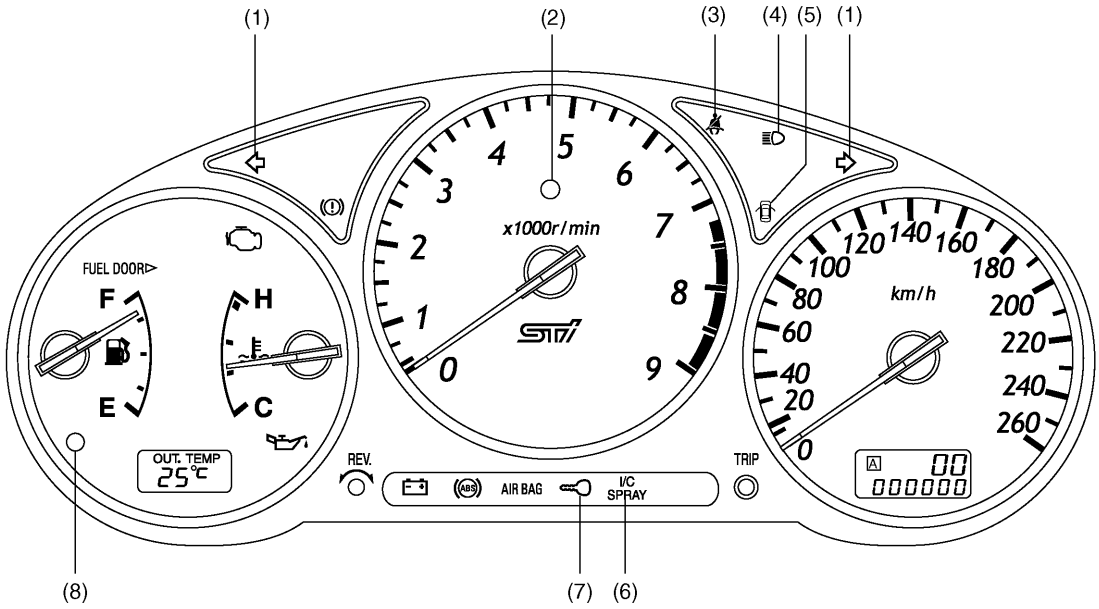
If everything is normal, the warning and indicator lights should be ON or OFF as shown below according to ignition switch positions.

Warning/Indicator light	Ignition switch position			
	LOCK/ACC	ON	ST	While engine is running
(1) CHECK ENGINE	OFF	*1	ON	OFF
(2) Brake fluid level / parking brake	OFF	ON	ON	*4
(3) AIRBAG	OFF	*2	ON	*2
(4) ABS	OFF	*3	ON	OFF
(5) Charge	OFF	ON	ON	OFF
(6) Oil pressure	OFF	ON	ON	OFF

*1:This light comes ON before engine starts, and stays OFF after engine has started.
*2:This light comes ON for about 7 seconds, and then goes out.
*3:This light comes ON for about 2 seconds, and then goes out.
*4:This light comes ON when the parking brake is applied.

B: TELLTALE (GRAPHIC MONITOR)

2. STi MODEL



NF0593

(1) Turn signal indicator light
This light blinks in unison with the corresponding turn signal lights when the turn signal switch is operated.

(2) REV indicator light
This light illuminates when a preset engine speed is exceeded.

(3) Seat belt warning light
This light stays illuminated for about 6 seconds after the ignition switch has been turned ON if the driver's seat belt is not fastened.

(4) Headlight beam indicator light
This light illuminates when the headlights are in the high-beam position.

(5) Door open warning light
This light illuminates when one or more doors and/or rear gate are not completely closed.

(6) Intercooler water spray warning light
This light illuminates when the water level in the water tank lowers.

(7) Immobiliser indicator light
This light illuminates when the immobiliser system is armed.

(8) Low fuel warning light
This light illuminates when the quantity of the fuel remaining in the tank has decreased to 10 liters (2.6 US gal, 2.2 lmp gal) or smaller.

If everything is normal, the telltales should be ON, OFF or in other states as shown below according to ignition switch positions.

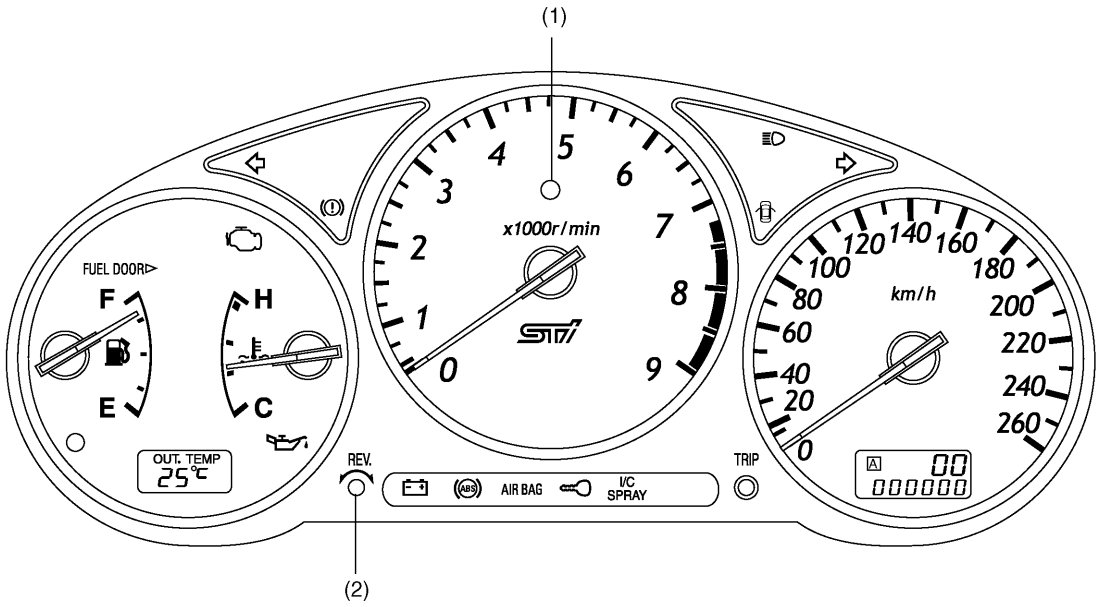
Telltale light		Ignition switch position			
		LOCK/ACC	ON	ST	While engine is running
(1) Turn signal		OFF	Blink	Blink	Blink
(2) REV		OFF	*4	*4	*4
(3) Seat belt		OFF	*2	*2	*2
(4) Headlight beam	• High beam	OFF	ON	ON	ON
	• Low beam	OFF	OFF	OFF	OFF
(5) Door or rear gate open	• Open	ON	ON	ON	ON
	• Shut	OFF	OFF	OFF	OFF
(6) Intercooler water spray		OFF	*5	*5	*5
(7) Immobiliser		*3	OFF	OFF	OFF
(8) Low fuel		OFF	*1	*1	*1

*1:This light illuminates when quantity of the fuel remaining in the tank has decreased to 10 liters (2.6 US gal, 2.2 Imp gal) or smaller.
*2:This light stays illuminated for about 6 seconds after the ignition switch has been turned ON if the driver's seat belt is NOT fastened.
*3:This light blinks when the ignition key has been removed from the ignition switch, or when 60 seconds or more time has passed after the ignition key was inserted in the ignition switch and was turned to the LOCK or ACC position.
*4:This light stays illuminated as long as the engine speed is above the driver's setting.
*5:This warning light illuminates when the water in the intercooler water spray tank decreases to approximately 0.4 liters.

E: TACHOMETER

2. REV INDICATOR LIGHT

The REV indicator light operates together with a buzzer when the engine starts operating at a speed exceeding the speed the driver has set as desired, giving him or her a warning. The light remains illuminated as long as the engine speed is above the set speed. The buzzer sounds intermittently for a short time when the engine speed exceeds the setting. Setting is possible at any speed within the range between 2000 and 7500 rpm.



(1) REV indicator light

(2) REV indicator setting knob