Impreza 1993-1996

SUBARU

Exit

1994 SERVICE MANUAL

SUPPLEMENT

SUBARU®
IMPREZA

- **General Information Section**
- **Repair Section**
- **Diagnostics Section**
- **Wiring Diagram Section**

RHD MODEL

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1. 4-door Sedan

1. DIMENSIONS

Model			1600		1800		2000
			FWD	AWD	FWD	AWD	
Overall length		mm (in)	4,350 (171.3), 4,375 (172.2)*1				4,340 (170.9)
Overall width		mm (in)	1,690 (66.5)				
Overall height (at CW)		mm (in)	1,400 (55.1)*2, 1,405 (55.3) 1,415 (55.7)*3	1,415 (55.7)	1,405 (55.3) 1,415 (55.7)*3	1,415 (55.7)	1,400 (55.1)
Compartment	Length	mm (in)	1,820 (71.7)				
	Width	mm (in)	1,385 (54.5)				
	Height	mm (in)	1,170 (46.1)				
Wheelbase		mm (in)	2,520 (99.2)				
Tread	Front	mm (in)	1,475 (58.1)*2 1,465 (57.7) 1,460 (57.5)*3	1,460 (57.5)	1,460 (57.5)	1,460 (57.5)	1,465 (57.7)
	Rear	mm (in)	1,465 (57.7)*2 1,455 (57.3) 1,450 (57.1)*3	1,455 (57.3)	1,455 (57.3) 1,450 (57.1)*3	1,455 (57.3)	1,455 (57.3)
Minimum road clearance		mm (in)	150 (5.9)	160 (6.3)	150 (5.9)	160 (6.3)	150 (5.9)

*1 : G.C.C. Countries
*2 : with 13 inch wheel
*3 : Australian model

2. ENGINE

Model		1600	1800	2000
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)	87.9 x 75 (3.461 x 2.95)	92 x 75 (3.62 x 2.95)
Displacement	cm^3 (cu in)	1,597 (97.45)	1,820 (111.06)	1,994 (121.67)
Compression ratio		9.4	9.5	8.0
Firing order		1 — 3 — 2 — 4		
Idle speed at Park/Neutral position	rpm	700		900
Maximum output	kW (PS)/rpm	66 (90)/5,600	76 (103)/5,600	155 (210)/6,000
Maximum torque	N.m (kg-m, ft-lb)/rpm	128 (13.0, 94)/4,000	147 (15.0, 108)/4,400	270 (27.6, 200)/4,800

3. ELECTRICAL

Model				1600	1800	2000
Ignition timing at idling speed			BTDC/rpm	15°/700		18°/900
Spark plug	Type and manufacturer			NGK: BKR6E (without catalyst) NGK: BKR6E-11 (with catalyst) CHAMPION: RC8YC4 (with catalyst)		NGK: PFR6G
Generator				12V — 75A		
Battery	Type and capacity (5HR)	For Europe		5MT: 12V — 48AH 4AT: 12V — 52AH		5MT: 12V — 48AH
		Others		5MT: 12V — 27AH 4AT: 12V — 36AH		5MT: 12V — 27AH or 12V — 48AH

4. TRANSMISSION

Model			1600		1800	
			FWD			
Transmission type			5MT*1	4AT*1	5MT*1	4AT*1
Clutch type			DSPD	TCC	DSPD	TCC
Gear ratio		1st	3.636	2.785	3.636	2.785
		2nd	2.105	1.545	2.105	1.545
		3rd	1.428	1.000	1.428	1.000
		4th	1.093	0.694	1.093	0.694
		5th	0.825	—	0.825	—
		Reverse	3.583	2.272	3.583	2.272
Auxiliary transmission gear ratio		High	—	—	—	—
		Low	—	—	—	—
Reduction gear (Front drive)	1st reduction	Type of gear	—	Helical	—	Helical
		Gear ratio	—	1.000	—	1.000
	Final reduction	Type of gear	Hypoid	Hypoid	Hypoid	Hypoid
		Gear ratio	3.900	4.444	3.900	4.111
Reduction gear (Rear drive)	Transfer reduction	Type of gear	—	—	—	—
		Gear ratio	—	—	—	—
	Final reduction	Type of gear	—	—	—	—
		Gear ratio	—	—	—	—

Model			1600	1800		2000
			AWD			
Transmission type			5MT*2	5MT*2	4AT*2	5MT*2
Clutch type			DSPD	DSPD	TCC	DSPD
Gear ratio		1st	3.545	3.545	2.785	3.454
		2nd	2.111	2.111	1.545	1.947
		3rd	1.448	1.448	1.000	1.366
		4th	1.088	1.088	0.694	0.972
		5th	0.825	0.825	—	0.738
		Reverse	3.416	3.416	2.272	3.416
Auxiliary transmission gear ratio		High	—	—	—	—
		Low	—	—	—	—
Reduction gear (Front drive)	1st reduction	Type of gear	—	—	Helical	—
		Gear ratio	—	—	1.000	—
	Final reduction	Type of gear	Hypoid	Hypoid	Hypoid	Hypoid
		Gear ratio	3.900	3.900	4.111	3.900
Reduction gear (Rear drive)	Transfer reduction	Type of gear	Helical	Helical	—	Helical
		Gear ratio	1.000	1.000	—	1.000
	Final reduction	Type of gear	Hypoid	Hypoid	Hypoid	Hypoid
		Gear ratio	3.900	3.900	4.111	3.545

5MT*1: 5-forward speeds with synchromesh and 1-reverse
4AT*1: Electronically controlled fully-automatic, 4-forward speeds and 1-reverse
5MT*2: 5-forward speeds with synchromesh and 1-reverse – with center differential and viscous coupling
4AT*2: Electronically controlled fully-automatic, 4-forward speeds and 1-reverse – with hydraulically controlled transfer clutch
DSPD: Dry Single Plate Diaphragm
TCC: Torque Converter Clutch

5. STEERING

Model		Non TURBO	TURBO	
			RHD	LHD
Type		Rack and Pinion		
Turns, lock to lock		3.2	2.8	3.0
Minimum turning circle	m (ft)	Curb to curb: 10.2 (33.5)	Curb to curb: 10.4 (34.1)	Curb to curb: 10.8 (35.4)

6. SUSPENSION

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

7. BRAKE

Model	without ABS	with ABS	TURBO
Service brake system	Dual circuit hydraulic with vacuum suspended power unit		
Front	Ventilated disc brake		
Rear	Drum brake	Disc brake	
Parking brake	Mechanical on rear brakes		

8. TIRE

Model	Non TURBO		TURBO
Rim size	13 x 5.00B	14 x 5-1/2JJ	15 x 6JJ
Tire size	165R13	175/70R14	205/55R15
Type	Steel belted radial, Tubeless		

9. CAPACITY

Model			Non TURBO				TURBO
			FWD		AWD		
			5MT	4AT	5MT	4AT	5MT
Fuel tank		ℓ (US gal, Imp gal)	50 (13.2, 11.0)				60 (15.9, 13.2)
Engine oil	Upper level	ℓ (US qt, Imp qt)	4.0 (4.2, 3.5)				4.5 (4.8, 4.0)
	Lower level	ℓ (US qt, Imp qt)	3.0 (3.2, 2.6)				3.5 (3.7, 3.1)
Transmission gear oil		ℓ (US qt, Imp qt)	2.6 (2.7, 2.3)	—	4.0 (4.2, 3.5)	—	4.0 (4.2, 3.5)
Automatic transmission fluid		ℓ (US qt, Imp qt)	—	7.9 (8.4, 7.0)	—	7.9 (8.4, 7.0)	—
AT differential gear oil		ℓ (US qt, Imp qt)	—	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)		
Power steering fluid		ℓ (US qt, Imp qt)	0.7 (0.7, 0.6)				
Engine coolant		ℓ (US qt, Imp qt)	1600: 6.4 (6.8, 5.6), 1800: 6.2 (6.6, 5.5)				2000: 7.2 (7.6, 6.3)

10. WEIGHT

Model — Europe, General —			1600					
			FWD					
			DL		LX		GL	
			5MT	4AT	5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front	kg (lb)	605 (1,335)	650 (1,435)	615 (1,355)	660 (1,455)	625 (1,380)	670 (1,475)
	Rear	kg (lb)	400 (880)	410 (905)	410 (905)	415 (915)	425 (935)	430 (950)
	Total	kg (lb)	1,005 (2,215)	1,060 (2,335)	1,025 (2,260)	1,075 (2,370)	1,050 (2,315)	1,100 (2,425)
Maximum permissible axle weight (M.P.A.W.)	Front	kg (lb)	790 (1,750)	830 (1,830)	790 (1,750)	830 (1,830)	810 (1,785)	850 (1,875)
	Rear	kg (lb)	760 (1,675)	790 (1,740)	760 (1,675)	790 (1,740)	770 (1,700)	800 (1,765)
Maximum permissible weight (M.P.W.)	Total	kg (lb)	1,520 (3,350)	1,590 (3,505)	1,520 (3,350)	1,590 (3,505)	1,580 (3,485)	1,640 (3,615)

Model — Europe, General —			1600		1800				2000
			AWD		FWD		AWD		
			LX	GL	GL		GL		TURBO
			5MT	5MT	5MT	4AT	5MT	4AT	5MT
Curb weight (C.W.)	Front	kg (lb)	645 (1,420)	650 (1,435)	630 (1,390)	675 (1,490)	655 (1,445)	685 (1,510)	725 (1,600)
	Rear	kg (lb)	470 (1,035)	475 (1,045)	425 (935)	430 (950)	475 (1,045)	480 (1,060)	510 (1,125)
	Total	kg (lb)	1,115 (2,460)	1,125 (2,480)	1,055 (2,325)	1,105 (2,435)	1,130 (2,490)	1,165 (2,570)	1,235 (2,725)
Maximum permissible axle weight (M.P.A.W.)	Front	kg (lb)	810 (1,785)	830 (1,830)	810 (1,785)	850 (1,875)	840 (1,850)	860 (1,895)	900 (1,985)
	Rear	kg (lb)	830 (1,830)	840 (1,850)	770 (1,700)	800 (1,760)	840 (1,850)	840 (1,850)	850 (1,875)
Maximum permissible weight (M.P.W.)	Total	kg (lb)	1,620 (3,570)	1,640 (3,615)	1,580 (3,485)	1,640 (1,615)	1,680 (3,705)	1,680 (3,705)	1,750 (3,860)

Model — G.C.C. Countries —			1600		
			FWD		
			LX	GL	
			5MT	5MT	4AT
Curb weight (C.W.)	Front	kg (lb)	645 (1,420)	650 (1,435)	695 (1,530)
	Rear	kg (lb)	410 (905)	425 (935)	435 (960)
	Total	kg (lb)	1,055 (2,325)	1,075 (2,370)	1,130 (2,490)
Gross vehicle weight (G.V.M.)	Front	kg (lb)	810 (1,785)	810 (1,785)	840 (1,850)
	Rear	kg (lb)	770 (1,700)	770 (1,700)	800 (1,765)
	Total	kg (lb)	1,580 (3,485)	1,580 (3,485)	1,640 (3,615)

Model — Australia —			1600		1800				2000
			FWD		FWD		AWD		
			LX		GX		GX		WRX
			5MT	4AT	5MT	4AT	5MT	4AT	5MT
Unladen mass (U.M.)	Front	kg (lb)	610 (1,345)	650 (1,435)	620 (1,365).	660 (1,455)	635 (1,400)	665 (1,465)	730 (1,610)
	Rear	kg (lb)	420 (925)	425 (935)	435 (960)	440 (970)	485 (1,070)	490 (1,080)	515 (1,135)
	Total	kg (lb)	1,030 (2,270)	1,075 (2,370)	1,055 (2,325)	1,100 (2,425)	1,120 (2,470)	1,155 (2,545)	1,245 (2,745)
Gross vehicle mass (G.V.M.)	Front	kg (lb)	830 (1,830)		830 (1,830)		830 (1,830)		900 (1,985)
	Rear	kg (lb)	750 (1,655)		780 (1,720)		830 (1,830)		850 (1,875)
	Total	kg (lb)	1,580 (3,485)		1,610 (3,550)		1,660 (3,660)		1,750 (3,860)

NOTE:
When any of the following optional parts are installed, add the weight to the curb weight or unladen mass.
If power steering is not equipped, subtract the weight from the curb weight.

Weight of optional parts	Power window	Power door lock	A.B.S.	Air conditioning	Sun roof	Power steering	SRS Airbag (Driver)	SRS Air bag (Driver & Passenger)
Front kg (lb)	1 (2)	0 (0)	11 (24) [18 (40)]	19 (42)	5 (11)	8 (18)	5 (11)	8 (18)
Rear kg (lb)	2 (4)	1 (2)	8 (18) [13 (29)]	–2 (–4)	8 (18)	–1 (–2)	1 (2)	0 (0)
Total kg (lb)	3 (7)	1 (2)	19 (42) [31 (68)]	17 (37)	13 (29)	7 (15)	6 (12)	8 (18)

[ ] : In case that the ABS is installed on 13 in.-wheel equipped vehicles, the wheels must be exchanged for 14 in. ones. To obtain the curb weight of the vehicle, therefore, the values shown in [ ] must be added.

2. 5-door

1. DIMENSIONS

Model			1600		1800		2000
			FWD	AWD	FWD	AWD	
Overall length		mm (in)	4,350 (171.3), 4,375 (172.2)*1				4,340 (170.9)
Overall width		mm (in)	1,690 (66.5)				
Overall height (at CW)		mm (in)	1,405 (55.3)*2, 1,410 (55.5)	1,420 (55.9)	1,410 (55.5) 1,415 (55.8)*3	1,420 (55.9)	1,400 (55.1) 1,435 (56.5)*4
Compartment	Length	mm (in)	1,790 (70.5)				
	Width	mm (in)	1,385 (54.5)				
	Height	mm (in)	1,170 (46.1)				
Wheelbase		mm (in)	2,520 (99.2)				
Tread	Front	mm (in)	1,475 (58.1)*2 1,465 (57.7)	1,460 (57.5)	1,465 (57.7) 1,460 (57.5)*3	1,460 (57.5)	1,465 (57.7)
	Rear	mm (in)	1,460 (57.5)*2 1,450 (57.1)	1,450 (57.1)	1,450 (57.1)	1,450 (57.1)	1,450 (57.1)
Minimum road clearance		mm (in)	150 (5.9)	160 (6.3)	150 (5.9)	160 (6.3)	150 (5.9)

*1 : G.C.C. Countries
*2 : with 13 inch wheel
*3 : Australian model
*4 : with roof rail

2. ENGINE

Model		1600	1800	2000
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)	87.9 x 75 (3.461 x 2.95)	92 x 75 (3.62 x 2.95)
Displacement	cm^3 (cu in)	1,597 (97.45)	1,820 (111.06)	1,994 (121.67)
Compression ratio		9.4	9.5	8.0
Firing order		1 — 3 — 2 — 4		
Idling speed at Park/Neutral position	rpm	700		900
Maximum output	kW (PS)/rpm	66 (90)/5,600	76 (103)/5,600	155 (210)/6,000
Maximum torque	N.m (kg-m, ft-lb)/rpm	128 (13.0, 94)/4,000	147 (15.0, 108)/4,400	270 (27.6, 200)/4,800

3. ELECTRICAL

Model			1600	1800	2000
Ignition timing at idling speed		BTDC/rpm	15°/700		18°/900
Spark plug	Type and manufacturer		NGK: BKR6E (without catalyst), NGK: BKR6E-11 (with catalyst) CHAMPION: RC8YC4 (with catalyst)		NGK: PFR6G
Generator			12V — 75A		
Battery	Type and capacity (5HR)	For Europe	5MT: 12V — 48AH 4AT: 12V — 52AH		5MT: 12V — 48AH
		Others	5MT: 12V — 27AH 4AT: 12V — 36AH		5MT: 12V — 27AH or 12V — 48AH

4. TRANSMISSION

Model			1600		1800	
			FWD			
Transmission type			5MT*1	4AT*1	5MT*1	4AT*1
Clutch type			DSPD	TCC	DSPD	TCC
Gear ratio		1st	3.636	2.785	3.636	2.785
		2nd	2.105	1.545	2.105	1.545
		3rd	1.428	1.000	1.428	1.000
		4th	1.093	0.694	1.093	0.694
		5th	0.825	—	0.825	—
		Reverse	3.583	2.272	3.583	2.272
Auxiliary transmission gear ratio		High	—	—	—	—
		Low	—	—	—	—
Reduction gear (Front drive)	1st reduction	Type of gear	—	Helical	—	Helical
		Gear ratio	—	1.000	—	1.000
	Final reduction	Type of gear	Hypoid	Hypoid	Hypoid	Hypoid
		Gear ratio	3.900	4.444	3.900	4.111
Reduction gear (Rear drive)	Transfer reduction	Type of gear	—	—	—	—
		Gear ratio	—	—	—	—
	Final reduction	Type of gear	—	—	—	—
		Gear ratio	—	—	—	—

Model			1600	1800			2000
			AWD				
Transmission type			5MT*3	5MT*3	4AT*2	5MT*2	5MT*2
Clutch type			DSPD	DSPD	TCC	DSPD	DSPD
Gear ratio		1st	3.545	3.545	2.785	3.545	3.545
		2nd	2.111	2.111	1.545	2.111	1.947
		3rd	1.448	1.448	1.000	1.448	1.366
		4th	1.088	1.088	0.694	1.088	0.972
		5th	0.825	0.825	—	0.825	0.738
		Reverse	3.416	3.416	2.272	3.416	3.416
Auxiliary transmission gear ratio		High	1.000	1.000	—	—	—
		Low	1.592	1.592	—	—	—
Reduction gear (Front drive)	1st reduction	Type of gear	—	—	Helical	—	—
		Gear ratio	—	—	1.000	—	—
	Final reduction	Type of gear	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid
		Gear ratio	3.900	3.900	4.111	3.900	3.900
Reduction gear (Rear drive)	Transfer reduction	Type of gear	Helical	Helical	—	Helical	Helical
		Gear ratio	1.000	1.000	—	1.000	1.100
	Final reduction	Type of gear	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid
		Gear ratio	3.900	3.900	4.111	3.900	3.545

5MT*1: 5-forward speeds with synchromesh and 1-reverse
4AT*1: Electronically controlled fully-automatic, 4-forward speeds and 1-reverse
5MT*2: 5-forward speeds with synchromesh and 1-reverse — with center differential and viscous coupling
4AT*2: Electronically controlled fully-automatic, 4-forward speeds and 1-reverse — with hydraulically controlled transfer clutch
5MT*3: 5 × 2 forward speeds with synchromesh and 1-reverse — with center differential and viscous coupling
DSPD: Dry Single Plate Diaphragm
TCC: Torque Converter Clutch

5. STEERING

Model	Non TURBO	TURBO	
		RHD	LHD
Type	Rack and Pinion		
Turns, lock to lock	3.2	2.8	3.0
Minimum turning circle m (ft)	Curb to curb: 10.2 (33.5)	Curb to curb: 10.4 (34.1)	Curb to curb: 10.8 (35.4)

6. SUSPENSION

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

7. BRAKE

Model	without ABS	with ABS	TURBO
Service brake system	Dual circuit hydraulic with vacuum suspended power unit		
Front	Ventilated disc brake		
Rear	Drum brake	Disc brake	
Parking brake	Mechanical on rear brakes		

8. TIRE

Model	Non TURBO		TURBO
Rim size	13 x 5.00B	14 x 5-1/2JJ	15 x 6JJ
Tire size	165R13	175/70R14	205/55R15
Type	Steel belted radial, Tubeless		

9. CAPACITY

Model			Non TURBO				TURBO
			FWD		AWD		
			5MT	4AT	5MT	4AT	5MT
Fuel tank		ℓ (US gal, Imp gal)	50 (13.2, 11.0)				60 (15.9, 13.2)
Engine oil	Upper level	ℓ (US qt, Imp qt)	4.0 (4.2, 3.5)				4.5 (4.8, 4.0)
	Lower level	ℓ (US qt, Imp qt)	3.0 (3.2, 2.6)				3.5 (3.7, 3.1)
Transmission gear oil		ℓ (US qt, Imp qt)	2.6 (2.7, 2.3)	—	4.0 (4.2, 3.5)	—	4.0 (4.2, 3.5)
Automatic transmission fluid		ℓ (US qt, Imp qt)	—	7.9 (8.4, 7.0)	—	7.9 (8.4, 7.0)	—
AT differential gear oil		ℓ (US qt, Imp qt)	—	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)		
Power steering fluid		ℓ (US qt, Imp qt)	0.7 (0.7, 0.6)				
Engine coolant		ℓ (US qt, Imp qt)	1600: 6.4 (6.8, 5.6), 1800: 6.2 (6.6, 5.5)				2000: 7.2 (7.6, 6.3)

10. WEIGHT

Model — Europe, General —			1600					
			FWD				AWD	
			LX		GL		LX	GL
			5MT	4AT	5MT	4AT	5MT	5MT
Curb weight (C.W.)	Front	kg (lb)	610 (1,345)	655 (1,445)	620 (1,365)	665 (1,465)	645 (1,420)	650 (1,435)
	Rear	kg (lb)	450 (990)	460 (1,015)	460 (1,015)	465 (1,025)	510 (1,125)	510 (1,125)
	Total	kg (lb)	1,060 (2,335)	1,115 (2,460)	1,080 (2,380)	1,130 (2,490)	1,155 (2,545)	1,160 (2,560)
Maximum permissible axle weight (M.P.A.W.)	Front	kg (lb)	810 (1,785)	830 (1,830)	800 (1,765)	840 (1,850)	810 (1,785)	820 (1,810)
	Rear	kg (lb)	800 (1,765)	810 (1,785)	830 (1,830)	840 (1,850)	870 (1,920)	870 (1,920)
Maximum permissible weight (M.P.W.)	Total	kg (lb)	1,590 (3,505)	1,640 (3,615)	1,630 (3,595)	1,680 (3,705)	1,670 (3,680)	1,690 (3,725)

Model — Europe, General —			1800				2000
			FWD		AWD		
			GL		GL		TURBO
			5MT	4AT	5MT	4AT	5MT
Curb weight (C.W.)	Front	kg (lb)	625 (1,880)	670 (1,475)	655 (1,445)	680 (1,500)	725 (1,600)
	Rear	kg (lb)	455 (1,005)	465 (1,025)	510 (1,125)	515 (1,135)	545 (1,200)
	Total	kg (lb)	1,080 (2,380)	1,135 (2,500)	1,165 (2,570)	1,195 (2,635)	1,270 (2,800)
Maximum permissible axle weight (M.P.A.W.)	Front	kg (lb)	800 (1,765)	840 (1,850)	850 (1,875)	850 (1,875)	900 (1,985)
	Rear	kg (lb)	830 (1,830)	840 (1,850)	870 (1,920)	870 (1,920)	900 (1,985)
Maximum permissible weight (M.P.W.)	Total	kg (lb)	1,630 (3,595)	1,680 (3,705)	1,720 (3,795)	1,720 (3,795)	1,800 (3,970)

Model — G.C.C. Countries —			1600		1800
			FWD		AWD
			GL		GL
			5MT	4AT	5MT
Curb weight (C.W.)	Front	kg (lb)	640 (1,410)	690 (1,520)	665 (1,465)
	Rear	kg (lb)	465 (1,025)	470 (1,035)	515 (1,135)
	Total	kg (lb)	1,105 (2,435)	1,160 (2,560)	1,180 (2,600)
Gross vehicle weight (G.V.M.)	Front	kg (lb)	800 (1,765)	830 (1,830)	850 (1,875)
	Rear	kg (lb)	830 (1,830)	860 (1,895)	870 (1,920)
	Total	kg (lb)	1,630 (3,595)	1,690 (3,725)	1,720 (3,795)

Model — Australia —			1800				2000
			FWD		AWD		
			GX		GX		WRX
			5MT	4AT	5MT	4AT	5MT
Unladen mass (U.M.)	Front	kg (lb)	610 (1,345)	650 (1,435)	635 (1,400)	670 (1,475)	725 (1,600)
	Rear	kg (lb)	470 (1,035)	475 (1,045)	520 (1,145)	525 (1,160)	555 (1,225)
	Total	kg (lb)	1,080 (2,380)	1,125 (2,480)	1,155 (2,545)	1,195 (2,635)	1,280 (2,820)
Gross vehicle mass (G.V.M.)	Front	kg (lb)	870 (1,920)		870 (1,920)		900 (1,985)
	Rear	kg (lb)	820 (1,810)		870 (1,920)		900 (1,985)
	Total	kg (lb)	1,690 (3,725)		1,740 (3,835)		1,800 (3,970)

NOTE:
When any of the following optional parts are installed, add the weight to the curb weight or unladen mass.
If power steering is not equipped, subtract the weight from the curb weight.

Weight of optional parts	Power window	Power door lock	A.B.S.	Air conditioning	Sun roof	Power steering	SRS Airbag (Driver)	SRS Air bag (Driver & Passenger)
Front kg (lb)	1 (2)	0 (0)	11 (24) [18 (40)]	19 (42)	5 (11)	8 (18)	5 (11)	8 (18)
Rear kg (lb)	2 (4)	1 (2)	8 (18) [13 (29)]	–2 (–4)	8 (18)	–1 (–2)	1 (2)	0 (0)
Total kg (lb)	3 (7)	1 (2)	19 (42) [31 (68)]	17 (37)	13 (29)	7 (15)	6 (12)	8 (18)

[ ] : In case that the ABS is installed on 13 in.-wheel equipped vehicles, the wheels must be exchanged for 14 in. ones. To obtain the curb weight of the vehicle, therefore, the values shown in [ ] must be added.

GENERAL INFORMATION 1-3

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1. General Precautions
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4. Identification Number and Label Locations 6
5. Recommended Fuel, Lubricants, Sealants and Adhesives 8
6. Tightening Torque of Standard Bolts and Nuts
7. Lifting, Towing and Tie-down Points 11

3. Vehicle Identification Numbers (V.I.N)

A. APPLICABLE V.I.N. IN THIS MANUAL

1. LEFT-HAND DRIVE VEHICLE

4-Door Sedan	1600 cc engine	DL	5MT	J	F	1	G	C	3	B	L	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	C	3	B	L	0	E	K	0	0	2	0	0	1	and after
		LX	5MT	J	F	1	G	C	3	B	L	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	C	3	B	L	0	E	K	0	0	2	0	0	1	and after
		GL	5MT	J	F	1	G	C	3	B	L	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	C	3	B	L	0	E	K	0	0	2	0	0	1	and after
		AWD LX	5MT	J	F	1	G	C	4	B	L	0	E	G	0	0	2	0	0	1	and after
		AWD GL	5MT	J	F	1	G	C	4	B	L	0	E	G	0	0	2	0	0	1	and after
	1800 cc engine	GL	5MT	J	F	1	G	C	5	B	L	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	C	5	B	L	0	E	K	0	0	2	0	0	1	and after
		AWD GL	5MT	J	F	1	G	C	6	B	L	0	E	G	0	0	2	0	0	1	and after
			4AT	J	F	1	G	C	6	B	L	0	E	H	0	0	2	0	0	1	and after
	2000 cc DOHC engine	AWD TURBO	5MT	J	F	1	G	C	8	B	L	0	B	G	0	0	2	0	0	1	and after
5-Door	1600 cc engine	LX	5MT	J	F	1	G	F	3	B	L	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	F	3	B	L	0	E	K	0	0	2	0	0	1	and after
		GL	5MT	J	F	1	G	F	3	B	L	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	F	3	B	L	0	E	K	0	0	2	0	0	1	and after
		AWD LX	5MT DR	J	F	1	G	F	4	B	L	0	E	J	0	0	2	0	0	1	and after
		AWD GL	5MT DR	J	F	1	G	F	4	B	L	0	E	J	0	0	2	0	0	1	and after
	1800 cc engine	GL	5MT	J	F	1	G	F	5	B	L	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	F	5	B	L	0	E	K	0	0	2	0	0	1	and after
		AWD GL	5MT DR	J	F	1	G	F	6	B	L	0	E	J	0	0	2	0	0	1	and after
			4AT	J	F	1	G	F	6	B	L	0	E	H	0	0	2	0	0	1	and after
	2000 cc DOHC engine	AWD TURBO	5MT	J	F	1	G	F	8	B	L	0	B	G	0	0	2	0	0	1	and after

DR: Dual-range

2. RIGHT-HAND DRIVE VEHICLE

4-Door Sedan	1600 cc engine	LX	5MT	J	F	1	G	C	3	B	R	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	C	3	B	R	0	E	K	0	0	2	0	0	1	and after
		GL	5MT	J	F	1	G	C	3	B	R	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	C	3	B	R	0	E	K	0	0	2	0	0	1	and after
		AWD LX	5MT	J	F	1	G	C	4	B	R	0	E	G	0	0	2	0	0	1	and after
		AWD GL	5MT	J	F	1	G	C	4	B	R	0	E	G	0	0	2	0	0	1	and after
	1800 cc engine	AWD GL	5MT	J	F	1	G	C	6	B	R	0	E	G	0	0	2	0	0	1	and after
			4AT	J	F	1	G	C	6	B	R	0	E	H	0	0	2	0	0	1	and after
	2000 cc DOHC engine	AWD TURBO	5MT	J	F	1	G	C	8	B	R	0	B	G	0	0	2	0	0	1	and after

5-Door	1600 cc engine	LX	5MT	J	F	1	G	F	3	B	R	0	E	B	0	0	2	0	0	1	and after
		GL	5MT	J	F	1	G	F	3	B	R	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	F	3	B	R	0	E	K	0	0	2	0	0	1	and after
		AWD LX	5MT DR	J	F	1	G	F	4	B	R	0	E	J	0	0	2	0	0	1	and after
		AWD GL	5MT DR	J	F	1	G	F	4	B	R	0	E	J	0	0	2	0	0	1	and after
	1800 cc engine	AWD GL	5MT DR	J	F	1	G	F	6	B	R	0	E	J	0	0	2	0	0	1	and after
			4AT	J	F	1	G	F	6	B	R	0	E	H	0	0	2	0	0	1	and after
	2000 cc DOHC engine	AWD TURBO	5MT	J	F	1	G	F	8	B	R	0	B	G	0	0	2	0	0	1	and after

DR: Dual-range

3. AUSTRALIA

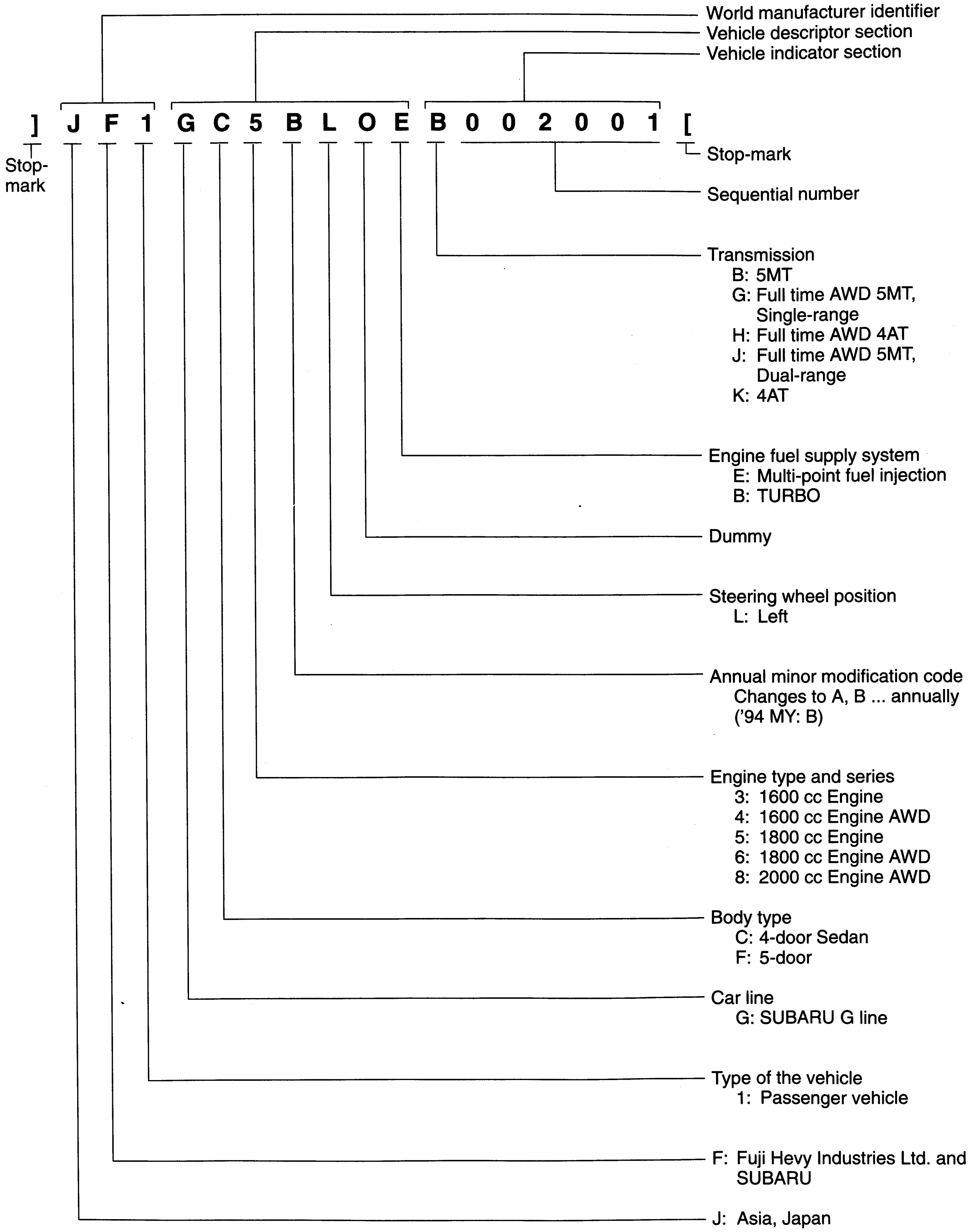
4-Door Sedan	1600 cc engine	LX	5MT	J	F	1	G	C	3	B	R	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	C	3	B	R	0	E	K	0	0	2	0	0	1	and after
	1800 cc engine	GX	5MT	J	F	1	G	C	5	B	R	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	C	5	B	R	0	E	K	0	0	2	0	0	1	and after
		AWD GX	5MT	J	F	2	G	C	6	B	R	0	E	G	0	0	2	0	0	1	and after
			4AT	J	F	2	G	C	6	B	R	0	E	H	0	0	2	0	0	1	and after
	2000 cc DOHC engine	AWD WRX	5MT	J	F	2	G	C	8	B	R	0	B	G	0	0	2	0	0	1	and after
5-Door	1800 cc engine	GX	5MT	J	F	1	G	F	5	B	R	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	F	5	B	R	0	E	K	0	0	2	0	0	1	and after
		AWD GX	5MT	J	F	2	G	F	6	B	R	0	E	G	0	0	2	0	0	1	and after
			4AT	J	F	2	G	F	6	B	R	0	E	H	0	0	2	0	0	1	and after
	2000 cc DOHC engine	AWD WRX	5MT	J	F	2	G	F	8	B	R	0	B	G	0	0	2	0	0	1	and after

4. G.C.C. COUNTRIES

4-Door Sedan	1600 cc engine	LX	5MT	J	F	1	G	C	3	B	L	0	E	B	0	0	2	0	0	1	and after
		GL	5MT	J	F	1	G	C	3	B	L	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	C	3	B	L	0	E	K	0	0	2	0	0	1	and after
5-Door	1600 cc engine	GL	5MT	J	F	1	G	F	3	B	L	0	E	B	0	0	2	0	0	1	and after
			4AT	J	F	1	G	F	3	B	L	0	E	K	0	0	2	0	0	1	and after
	1800 cc engine	AWD GL	5MT	J	F	1	G	F	6	B	L	0	E	G	0	0	2	0	0	1	and after

B. THE MEANING OF V.I.N.

1. LEFT-HAND DRIVE VEHICLE



2. RIGHT-HAND DRIVE VEHICLE

JF1 — World manufacturer identifier
GC5BROE — Vehicle descriptor section
B002001 — Vehicle indicator section

] J F 1 G C 5 B R O E B 0 0 2 0 0 1 [

Stop-mark

Stop-mark

Sequential number

Transmission
- B: 5MT
- G: Full time AWD 5MT, Single-range
- H: Fulltime AWD 4AT
- J: Full time AWD 5MT, Dual-range
- K: 4AT

Engine fuel supply system
- E: Multi-point fuel injection
- B: TURBO

Dummy

Steering wheel position
- R: Right

Annual minor modification code
- Changes to A, B ... annually
- ('94 MY: B)

Engine type and series
- 3: 1600 cc Engine
- 4: 1600 cc Engine AWD
- 5: 1800 cc Engine
- 6: 1800 cc Engine AWD
- 8: 2000 cc Engine AWD

Body type
- C: 4-door Sedan
- F: 5-door

Car line
- G: SUBARU G line

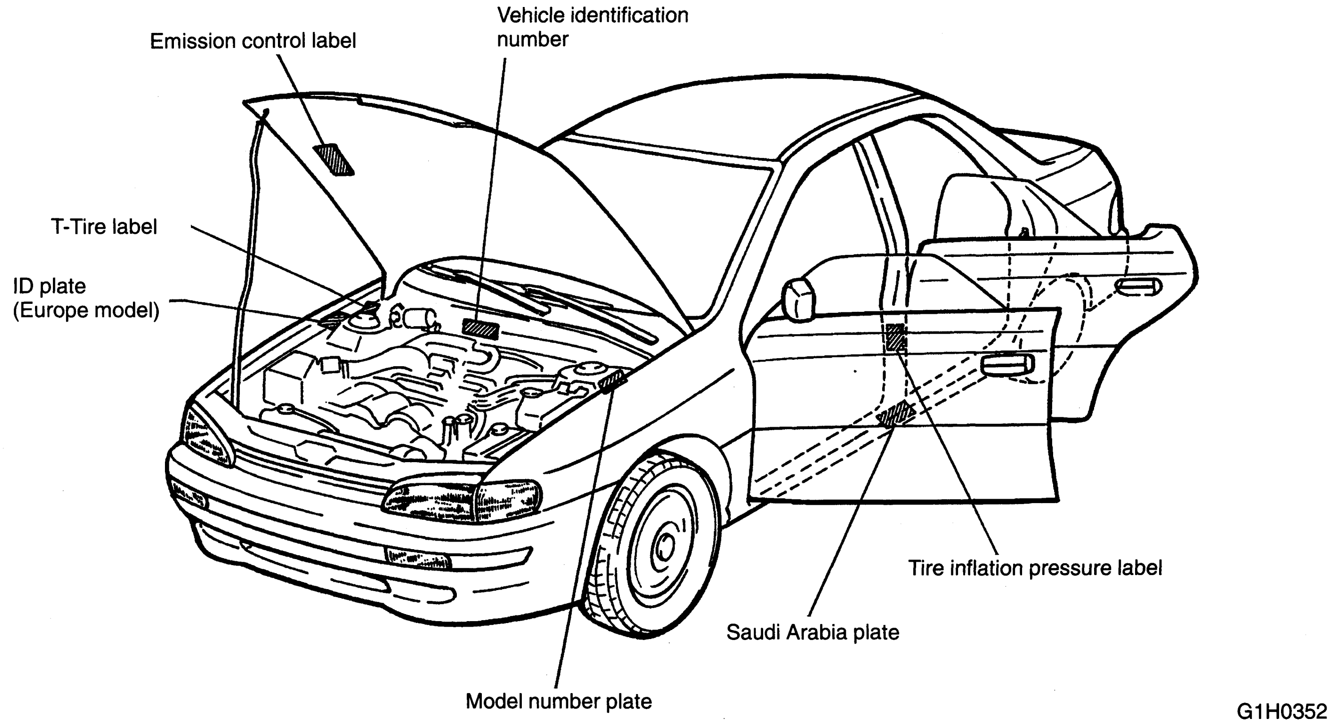
Type of the vehicle
- Except Australia
  - 1: Passenger vehicle
- Australia
  - 1: Passenger vehicle (FWD)
  - 2: Passenger vehicle (AWD)

F: Fuji Hevy Industries Ltd. and SUBARU

J: Asia, Japan

4.Identification Number and Label Locations

Engine, transmission and vehicle identification numbers are used for factory communications such as Technical Information, Service Bulletins and other information.



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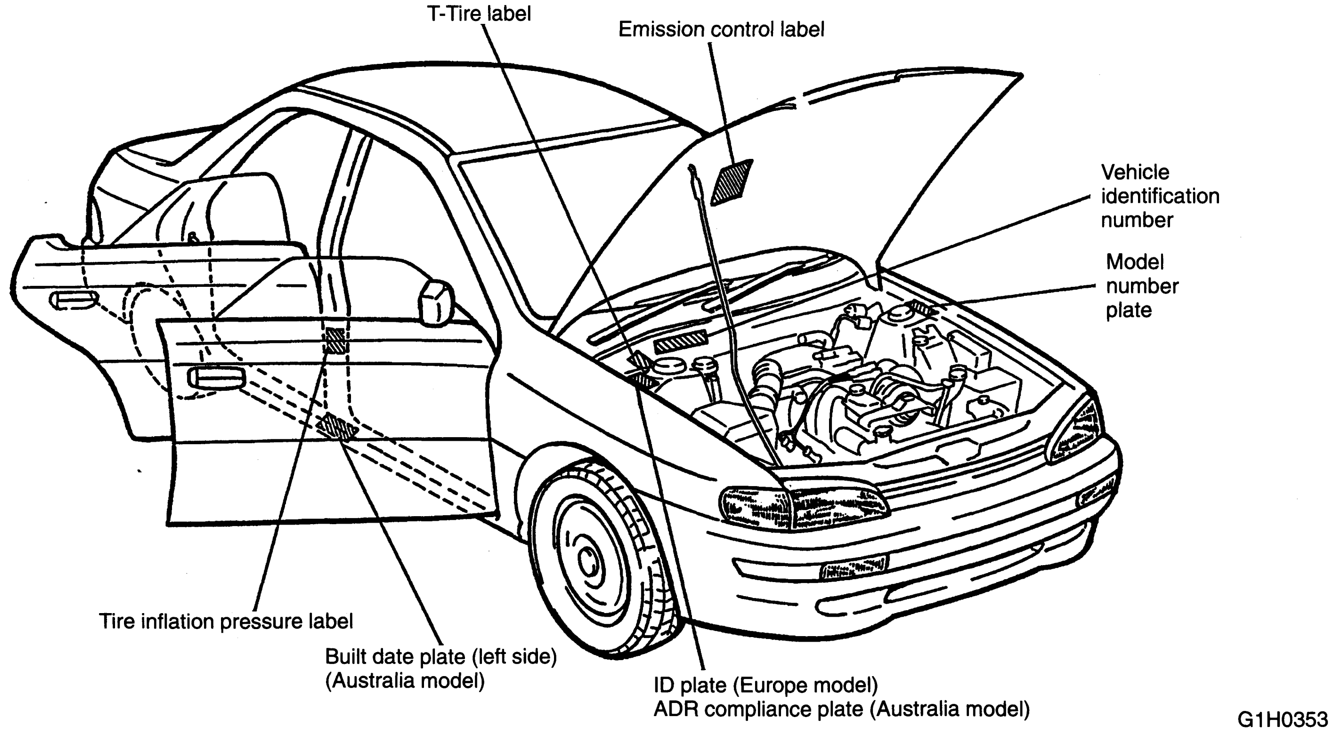

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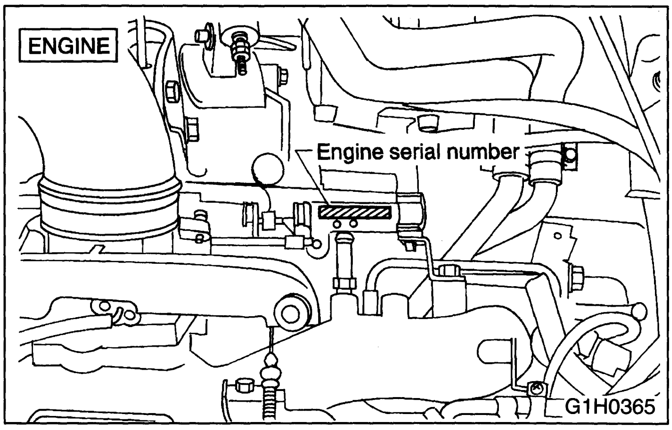
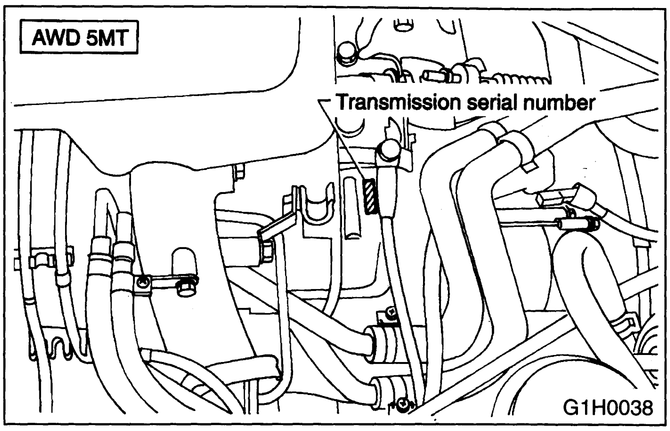
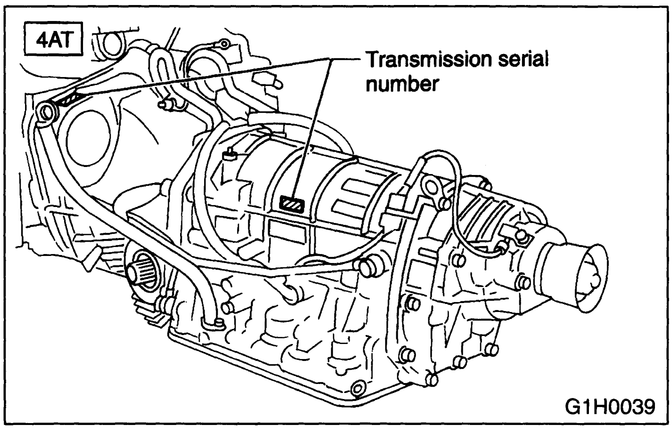
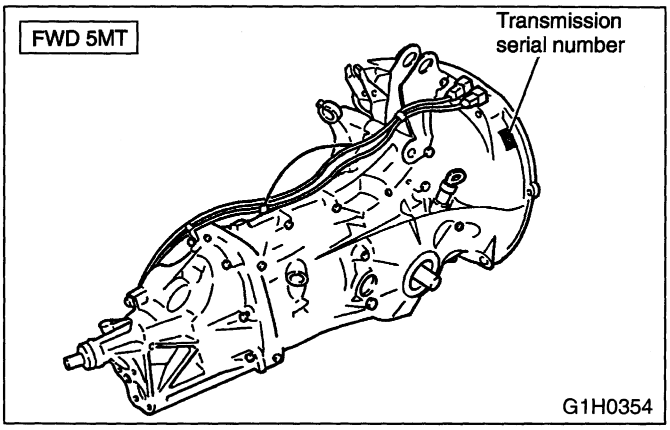
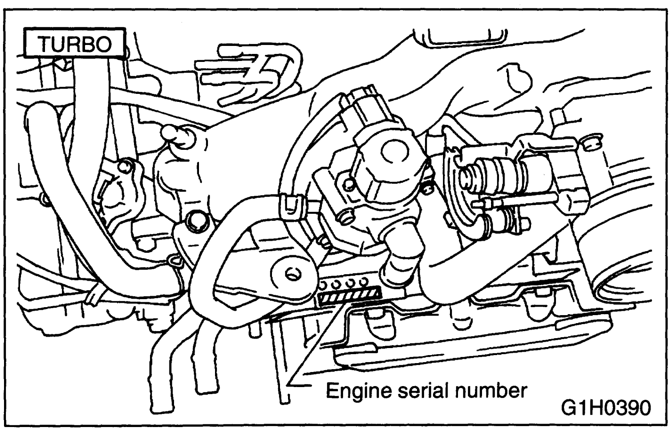

ENGINE
Engine serial number
G1H0365


AWD 5MT
Transmission serial number
G1H0038


4AT
Transmission serial number
G1H0039


FWD 5MT
Transmission serial number
G1H0354


TURBO
Engine serial number
G1H0390

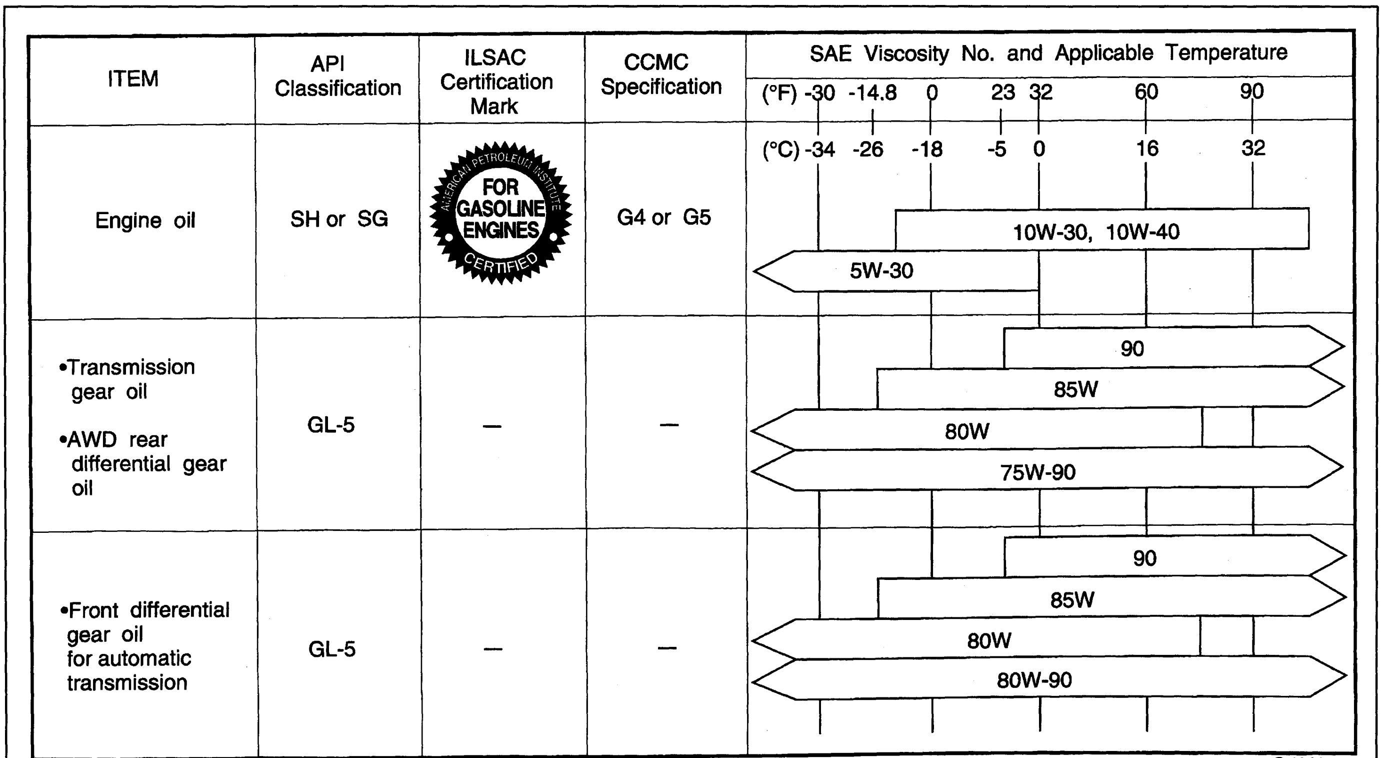
5. Recommended Fuel, Lubricants, Sealants and Adhesives

1. FUEL

1) With catalytic convertor
   - Non-turbo model
   The engine is designed to provide satisfactory performance while producing low exhaust emissions by using **unleaded** gasoline with an octane rating 90 or above (the octane rating selected by the Research Methos).
   - Turbo model
   The engine is designed to provide satisfactory performance while producing low exhaust emissions by using **unleaded** gasoline with an octane rating 95 or above (the octane rating selected by the Research Methos).
2) Without catalytic convertor
   The engine is designed to provide satisfactory performance while producing low exhaust emissions by using gasoline with an octane rating 90 or above (the octane rating selected by the Research Methos).

Lubricants	Specifications	Remarks
• Engine oil	• API Classification: SH or SG or • ILSAC Certified or • CCMC Specification: G4 or G5	• For SAE viscosity number, refer to the following table. • If it is impossible to get SH or SG grade, you may use SF grade.
• Transmission and differential gear oil • AWD rear differential gear oil	• API Classification: GL-5	• For SAE viscosity number, refer to the following table.
• Automatic transmission fluid	• "DEXRON II" type auotmatic transmission fluid	—
• Power steering fluid	• "DEXRON II" or "DEXRON IIE" type automatic transmission fluid	—
• Coolant	• Genuine SUBARU Coolant (Part No. 000016218) (Anti-freeze, anti-corrosive ethylene glycol base)	• For further coolant specifications, refer to the following table.
• Brake fluid	• DOT3 or DOT4	• FMVSS NO. 116 • Avoid mixing brake fluid of different brands to prevent the fluid performance from degrading. • When brake fluid is added, be careful not to allow any dust into the reservoir.
• Clutch fluid	• DOT3 or DOT4	• FMVSS NO. 116 • Avoid mixing clutch fluid of different brands to prevent the fluid performance from degrading. • When clutch fluid is added, be careful not to allow any dust into the reservoir.

Lubricants	Recommended	Application	Equivalent
• Spray lubricants	SUBARU CRC (P/N 004301003)	O_2 sensor	
• Grease	SUNLIGHT 2 (P/N 003602010)	Steering shaft bearing, bushing for manual transmission gear shift system	—
	Valiant grease M-2 (P/N 003608001)	Steering gearbox	—
	Niglube RX-2 (P/N 003606000 or 725191040)	Piston boot of disc brake and sliding pin	—
	Molykote No. 7439 (P/N 725191460)	Contacting surfaces of drum brake shoes and shoe clearance adjuster	—
	Molylex No.2 (P/N 723223010)	BJ and DOJ (for except front axle of AT vehicle) joints of axle shafts	—
	VU-3A702 (P/N 23223GA050)	DOJ (for front axle of AT vehicle) joints of axle shafts	—
	NTG2218 (P/N 28093AA020)	UFJ joints of axle shafts	—
	FX clutch grease (P/N 000040901)	Splines of transmission main shaft	—
	Slicolube G-30M (P/N 004404002)	Control cables and carburetor linkages subject to cold weather, water-pump impeller, door latch, striker, battery terminals, etc.	—



G1H0394

CAUTION:
• Each oil manufacturer has its base oil and additives. Thus, do not mix two or more brands (Except engine oil).
• When replenishing oil, it does not matter if the oil to be added is a different brand from that in the engine; however, use oil having the API classification and SAE viscosity No. designated by SUBARU.
• SAE 5W-30 is not recommended for sustained high speed driving.

NOTE:
If vehicle is used in desert areas with very high temperatures or for other heavy duty applications, the following viscosity oils may be used:
30, 40, 10W-50, 20W-40, 20W-50

Coolant Specifications							
Lowest anticipated atmospheric temperature	SUBARU coolant-to-*water ratio (Volume) %	Specification gravity					Freezing point
		at 10°C (50°F)	at 20°C (68°F)	at 30°C (86°F)	at 40°C (104°F)	at 50°C (122°F)	
Above –30°C (–22°F)	50 — 50	1.084	1.080	1.074	1.068	1.062	–34°C (–35°F)
Above –15°C (5°F)	30 — 70	1.050	1.047	1.042	1.037	1.032	–14.5°C (3.6°F)

* It is recommended that distilled water be used.

CAUTION:
• Avoid using any coolant or only water other than this designated type to prevent corrosion.
• SUBARU's engine is aluminum alloy, and so special care is necessary.

2. SEALANTS

	Recommended	Application	Equivalent
Sealant	Three Bond 1105 (P/N 004403010)	Rear differential oil drain plug, bearing cap (#5), etc.	Dow Corning's No. 7038
	Three Bond 1215 (P/N 004403007)	Matching surface of oil pump, transmission case, etc. Flywheel and drive plate tightening bolts, etc.	Dow Corning's No. 7038
	Starcalking B-33A (P/N 000018901)	Sealing against water and dust entry through weatherstrips, grommets, etc.	Butyl Rubber Sealant
	Three Bond 1207C (P/N 004403012)	Matching surface of oil pan, oil pressure switch	—
	Three Bond 1102 (P/N 004403006)	Steering gear box adjust screw	—

3. ADHESIVES

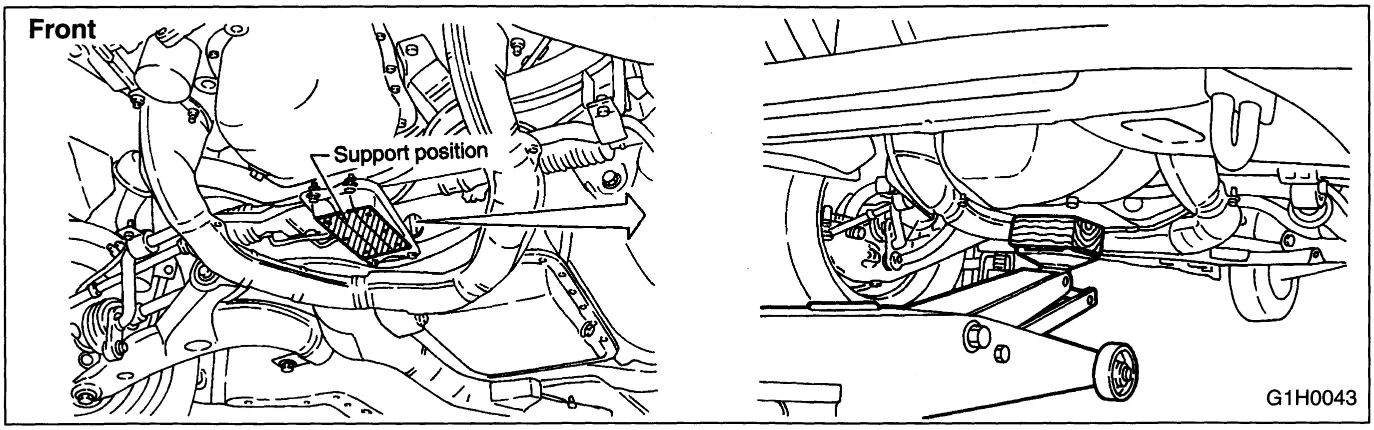
Adhesive	Cemedine 5430L	Weatherstrips and other rubber parts, plastics and textiles except soft vinyl parts.	3M's EC-1770 EC-1368
	Cemedine 540	Soft vinyl parts, and other parts subject to gasoline, grease or oil, e.g. trim leather, gear shift boot, door inner remote cover, etc.	3M's EC-776 EC-847 EC-1022 (Spray Type)
	Cemedine 3000	Bonding metals, glass, plastic and rubber parts. Repairing slightly torn weatherstrips, etc.	Armstrong's Eastman 910
	Essex Chemical Crop's Urethane E	Windshield to body panel.	Sunstar 580

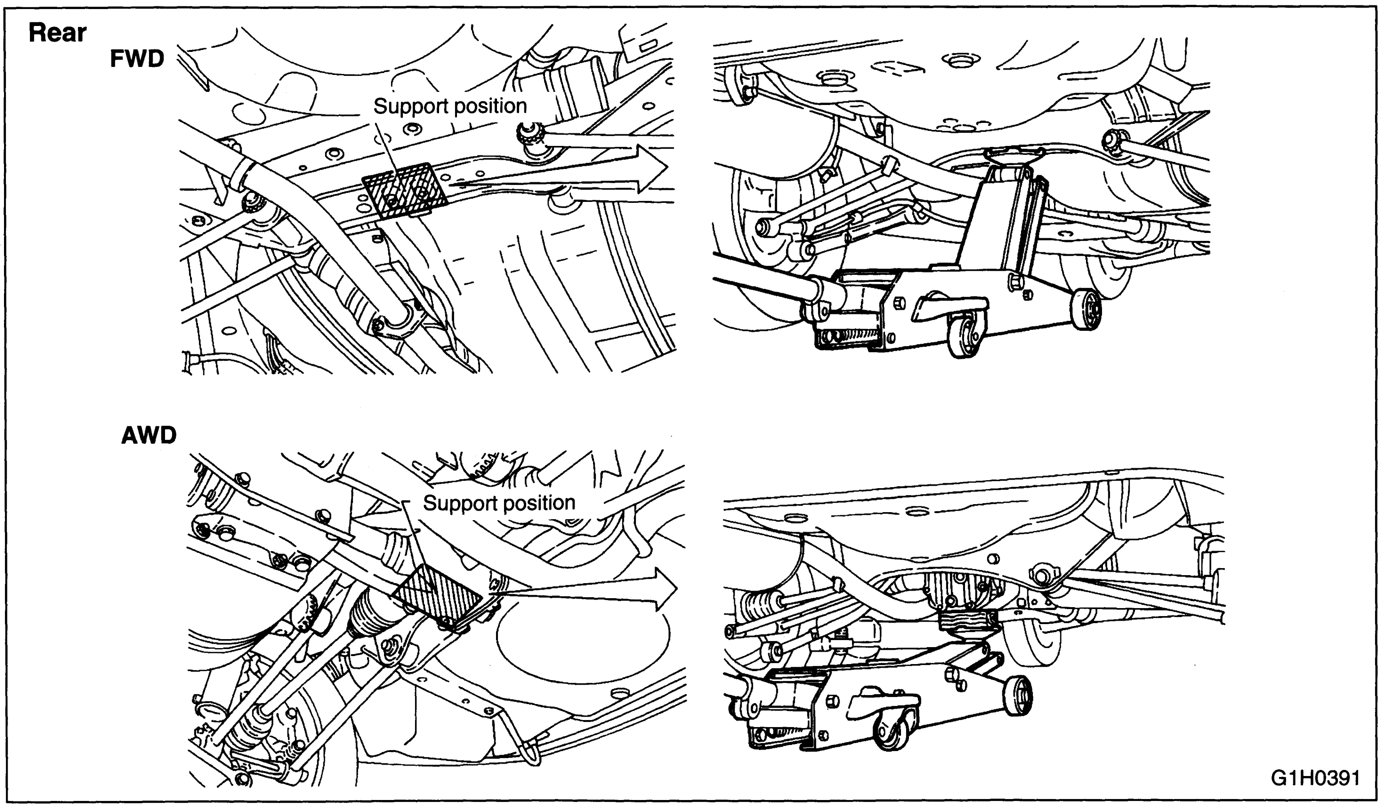
7. Lifting, Towing and Tie-down Points

WARNING:
- **Never get under the vehicle while it is supported by a jack.**
- **When jacking up the vehicle, place chocks to hold wheels.**
- **After jacking up the vehicle with garage jack, be sure to support the vehicle with stands for safety.**
- **Be sure to lift vehicle at the same four positions as those for pantograph jack.**

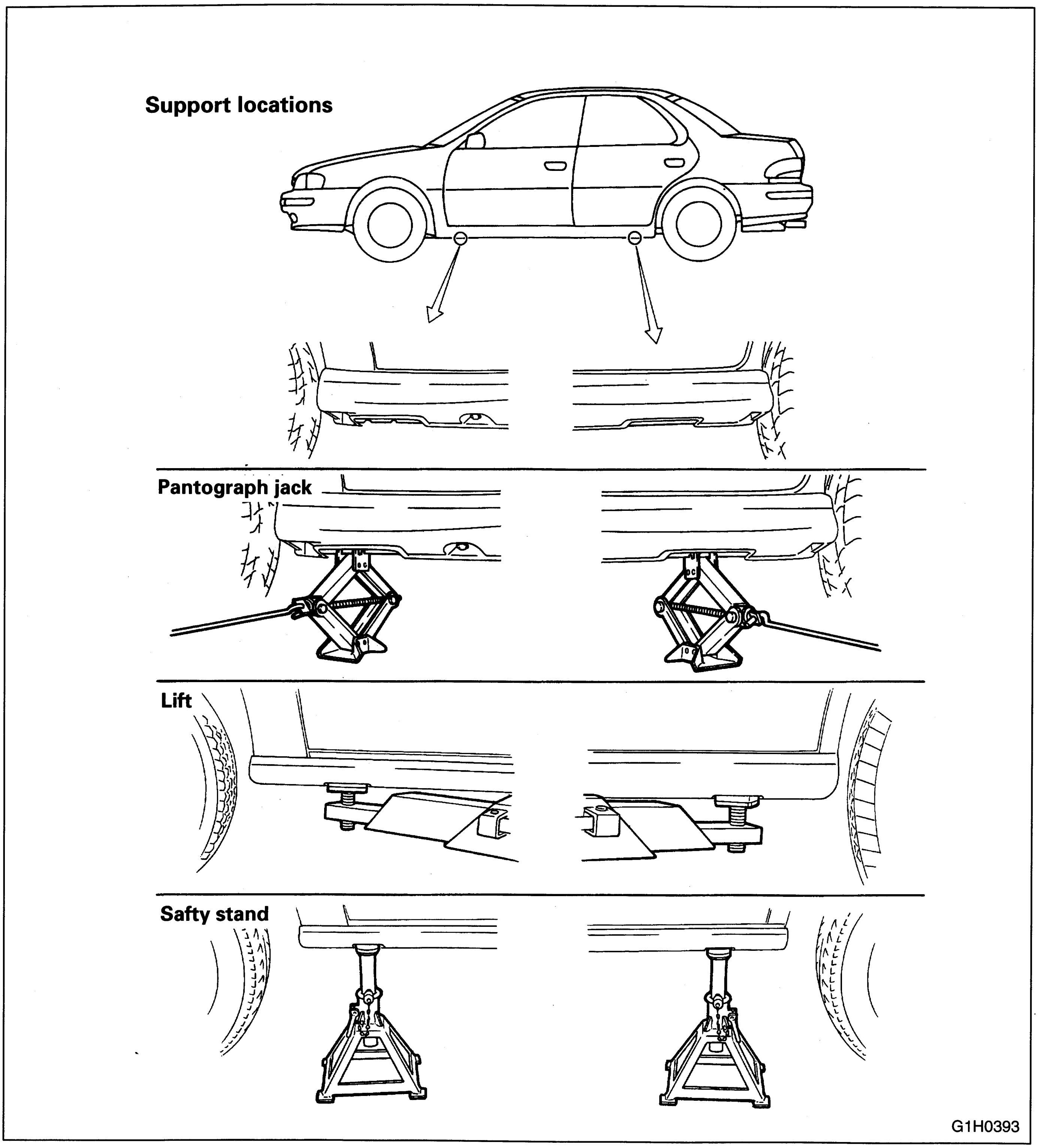
CAUTION:
Be sure to lift, tow and tie-down the vehicle at the designated positions.

1. GARAGE JACK





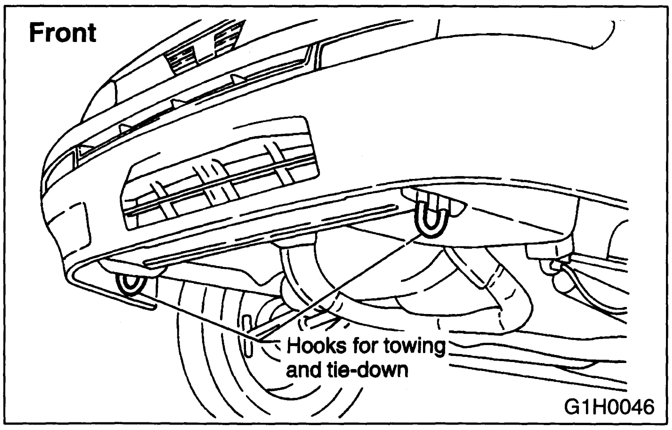
2. PANTOGRAPH JACK, SAFETY STAND AND LIFT



WARNING:
- **Never get under the vehicle while it is supported only by the jack. Always use safety stands to support body when you have to get under the car.**
- **Block the wheels diagonally by wheel chocks.**

CAUTION:
- **Make sure the jack is set at the correct position on the flange of side sill.**
- **Be careful not to set the jack at the air flap portion.**

3. TOWING AND TIE-DOWN HOOKS



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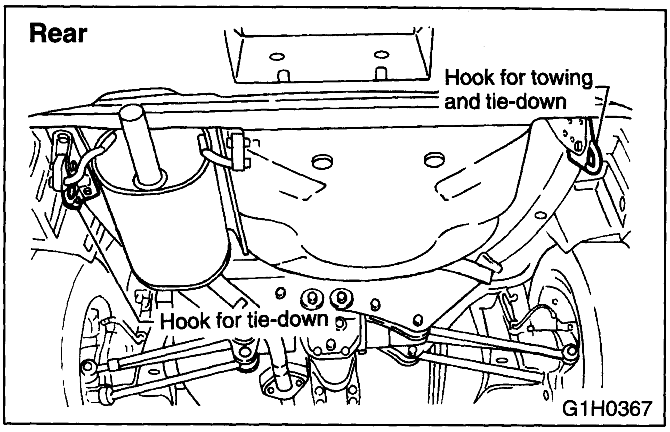

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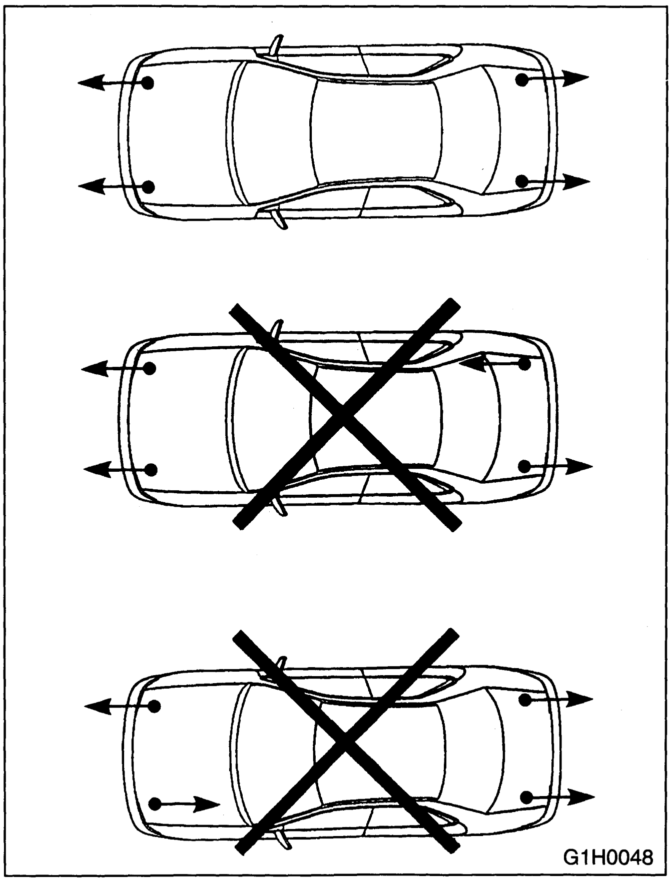
G1H0048

CAUTION:
- **Avoid towing another car with front towing hooks.**
- **Do not tow a vehicle which is heavier than towing vehicle.**
- **Do not apply excessive lateral load to towing hook.**
- **Wrap the towing rope with cloth to prevent damaging bumper, etc.**
- **Keep the vehicle level during towing.**
- **Tie the front and rear tie-down hooks in the same direction.**

PRE-DELIVERY INSPECTION 1-4

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1. List of Pre-delivery Inspection

INSPECTION ITEM		CHECK POINTS
2. Pre-road Test Inspection		
A	HOOD OPERATION	1. Operation of hood release and lock 2. Condition of lock 3. Fitting of hood
B	DOOR OPERATION, DOOR LOCK AND REGULATOR	1. Door “Open-close” operation 2. Operation of door release and lock 3. Loose or damaged parts 4. Regulator handle operation 5. Position of door window glass 6. Operation of power window switches 7. Power door locking operation
C	TRUNK LID, REAR GATE AND FUEL LID OPERATION	1. Trunk lid, rear gate and fuel lid “open-close” operation 2. Operation of trunk lid and rear gate (release and lock) 3. Fitting of trunk lid, rear gate and fuel lid 4. Operation of trunk lid, rear gate and fuel lid opener cancel lever
D	BRAKE FLUID LEVEL AND BRAKE PIPING INSTALLATION	1. Brake fluid level in reserve tank 2. Wiring of fluid leveller and its operation 3. Brake booster, master cylinder and pressure control valve for proper installation; brake pipe, brake hose and connectors for proper fitting 4. Leakage in any of the above
E	BATTERY FLUID LEVEL AND BATTERY INSTALLATION	1. External parts 2. Electrolyte level 3. Specific gravity
F	COOLANT LEVEL AND COOLING FAN INSTALLATION	1. Coolant level 2. Cooling fan motor and wiring 3. Water leakage and hose damage
G	ENGINE OIL LEVEL	1. Engine oil level 2. Engine oil leakage or contamination
H	TRANSMISSION AND DIFFERENTIAL GEAR OIL LEVEL	1. Level of transmission gear oil for manual transmission 2. Level of rear differential gear oil for AWD model 3. Level of differential gear oil for automatic transmission
I	DRIVE BELT TENSION	1. Belt tension 2. Damage to belt
J	AIR CLEANER	1. Contamination of air cleaner element 2. Related parts
K	JACK INSTALLATION	1. Installed condition of jack
L	WASHER AND WIPERS	1. Installation of washer tank 2. Checking of fluid level 3. Direction and quantity of washer fluid sprayed 4. Operation of wiper and washer
M	WHEEL NUTS FOR LOOSENESS AND TIRE INFLATION PRESSURE	1. Wheel nut tightening torque 2. Tire inflation pressure and tire specification 3. Damage to tire and rim
N	SEAT ADJUSTER AND SEAT BELTS	1. Front and rear seats, and their facing materials 2. Front seat operation 3. Rear seat folding operation 4. Seat belts and their fit
O	FUSES	1. Fuse installation 2. Spare fuse

INSPECTION ITEM		CHECK POINTS
P	LIGHTS AND SWITCHES	1. Visual inspection of lights (installation, damage, dirty lenses, water inside, etc.) 2. Operation of all lights and switches 3. Horn operation 4. Operation of head light washer and switch
Q	PREPARATION FOR UNDERSIDE INSPECTION	1. Jacking up and lifting point ... Refer to 1-3
R	READ MEMORY AND TEST MODE CONNECTORS	1. Check engine light flashing 2. Read memory and test mode connectors disconnection
S	INSTALLATION OF STEERING COMPONENTS	1. Installation of universal joints 2. Steering gear box for looseness, play, or backlash, and boots for damage 3. Tie-rod and tie-rod end for proper installation, or damage
T	EXHAUST PIPE AND MUFFLER	1. Installation of exhaust system 2. Exhaust gas leakage from parts or joints
U	FUEL SYSTEM FOR LEAKAGE	1. Installation of fuel hose and pipe. And condition of clamps 2. Fuel system for leakage
V	PROTECTOR	1. Protector removal
W	CLUTCH FLUID LEVEL (TURBO MODEL)	1. Clutch fluid level
3. Road Test Inspection		
A	OPERATION OF INDICATOR LIGHTS AND GAUGES	1. Operation of indicator lights 2. Operation of gauges
B	TACHOMETER, RADIO, ETC.	1. Operation of tachometer, radio, cigarette lighter, etc.
C	STARTING CONDITION OF ENGINE	1. Starting condition of engine
D	DRIVING TEST	1. Operation of foot brake and parking brake 2. Inspect the clutch free play 3. Operation of speedometer (Turbo model for Europe and Australia) 4. Operation of clutch and gear shift 5. Operation of selector lever (Automatic transmission) 6. Operation of steering and position of steering wheel 7. Operation of turn signal cancel cam 8. Operation of ventilation system and heater 9. Abnormal noises or vibration 10. Operation of drive select lever (AWD model only) 11. Operation of air conditioning 12. Operation of cruise control
4. Post-road Test Inspection		
A	AUTOMATIC TRANSMISSION FLUID LEVEL	1. Level of automatic transmission fluid
B	POWER STEERING FLUID LEVEL	1. Level of power steering fluid
C	WHEEL ALIGNMENT	1. Toe of front and rear wheels 2. Camber of front wheels
D	UNDERSIDE	1. Leakage of engine oil, transmission gear oil, differential gear oil, etc. 2. Leakage of coolant 3. Leakage of brake fluid 4. Loose suspension mountings or steering mounting
E	WATER LEAKAGE	1. Water leakage by pouring water
F	EXTERNAL APPEARANCE AND EQUIPMENT	1. Paint 2. Scratches and damage to glass 3. Rust formation 4. Contamination of interior parts 5. Installation of equipment

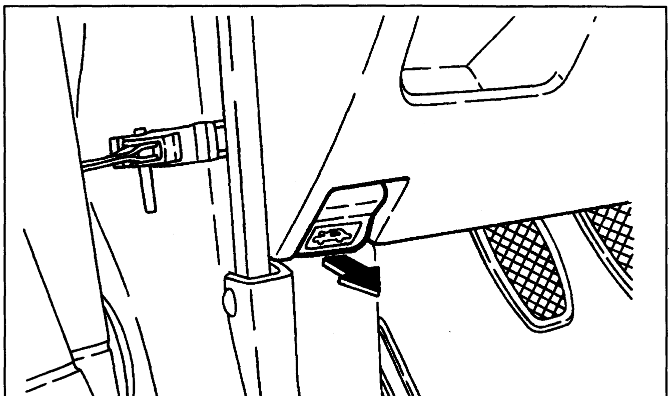
2. Pre-road Test Inspection

A: HOOD OPERATION

CHECK POINTS
1. Operation of hood release and lock **2. Condition of lock** **3. Fitting of hood**

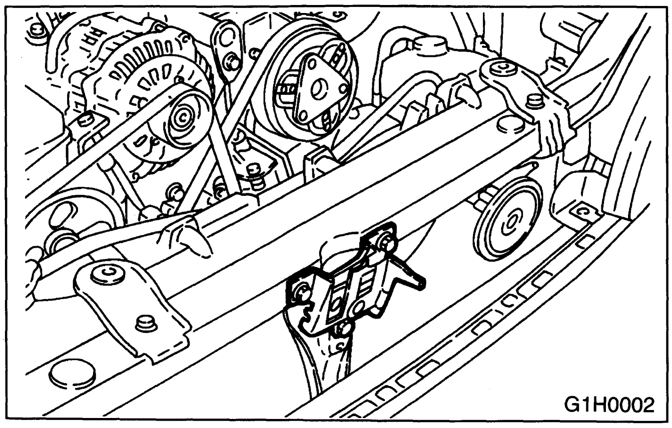
• **Check the opening, closing and locking of hood.**

1) Pull the hood lock release knob in the passenger compartment. (The hood will lift a step.) Check if the cable moves easily and lightly without dragging.



G1H0001

2) Release the lock by pushing the lock lever while pushing the hood down with slight pressure.
Hold the hood open with the stay.
Check the way the safety lock mechanism is released and that the hood opens and closes without any abnormal noise and does not contact the body.



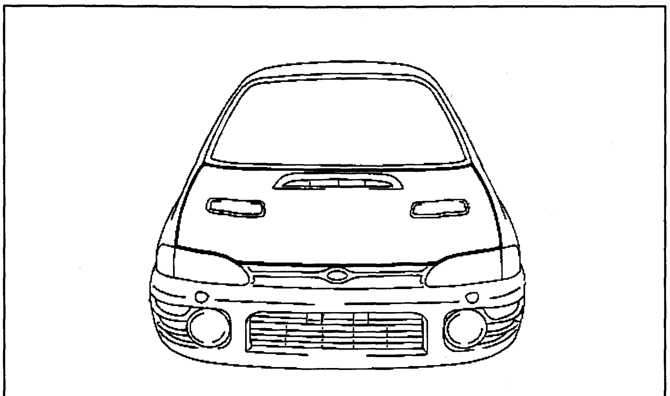
G1H0002

3) Remove the stay and lower the hood until it approaches about 10 cm (3.9 in.) from the closed position and let it drop. After closing the hood, be sure the hood is securely locked.
4) Confirm by repeating the steps 1) to 3) above two or three times.

• **Check the installation of hood.**

After having closed the hood, ensure the hood fits properly.

NOTE:
• The clearance between the hood and front fender is uniform.
• The hood's front end is parallel with the front fender.
• The slope of hood is the same as the parts of body surrounding it.
• The hood and weatherstrip stick fast to each other.

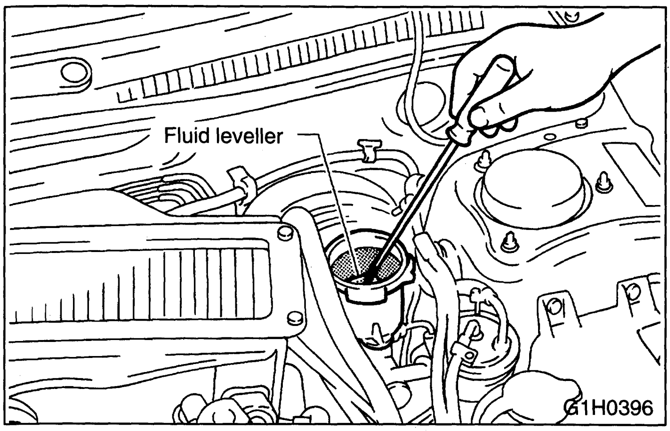


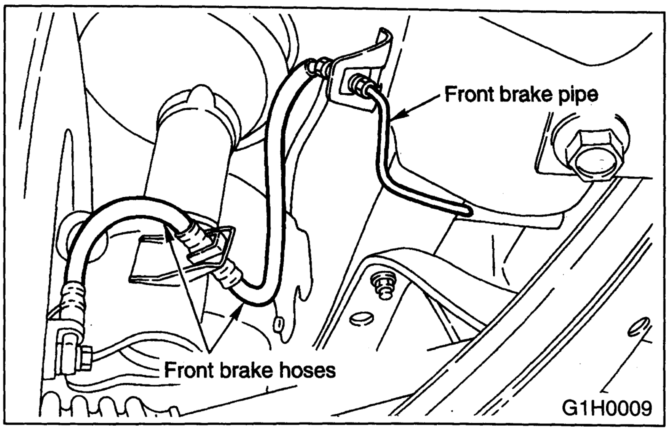
G1H0395

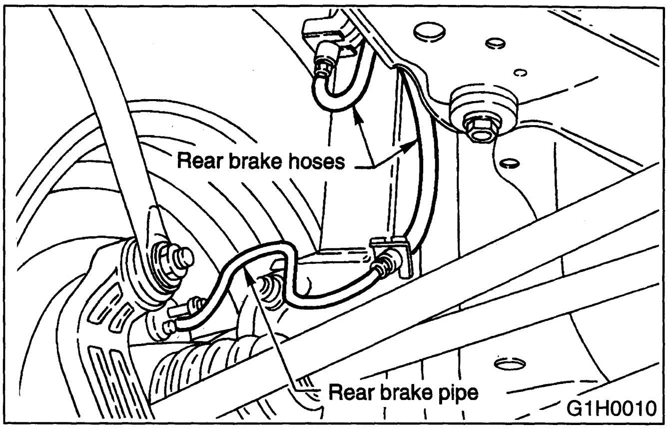
D: BRAKE FLUID LEVEL AND BRAKE PIPING INSTALLATION

CHECK POINTS
1. Fluid level in brake reserve tank **2. Wiring of fluid leveller and its operation** **3. Brake booster, master cylinder and pressure control valve for proper installation; brake pipe, brake hose and connectors for proper fitting** **4. Leakage in any of the above**

• **Check fluid leveller operation while pushing it down with a screwdriver.**







Recommended brake fluid
FMVSS No. 116, fresh DOT3 or DOT4 brake fluid

CAUTION:
- **The fluid level must be kept at "MAX" level.**
- **Do not mix different brands of brake fluid.**
- **When adding brake fluid, be careful not to allow any dirt, water, or oil around the fluid tank to enter it.**
- **Use special care not to spill any brake fluid on the vehicle's painted surfaces, because it will quickly erode them. In case of an accident, wipe it off as quickly and as cleanly as possible.**

NOTE:
- Never use engine oil, gear oil, or any mineral oil.
- Use extreme care not to allow any water to get into the fluid; water in the brake fluid will lower the fluid's boiling point and cause vapor-lock.
- If too much brake fluid is missing, check the brake line for possible leakage.
- After adding brake fluid, any excess must be stored in a tightly sealed container.
- When checking the operation of leveller, use clean screwdriver or the like and be careful not to allow dirt or dust to get into the tank.

1) Check that the brake pipes, hoses and connectors are in good condition.
(1) Brake fluid is not oozing or leaking from the brake fluid lines.
(2) The connectors and clamps are not loose.
(3) There is no possibility of the pipes and hoses contacting the body or other mechanical parts due to vibration during running.

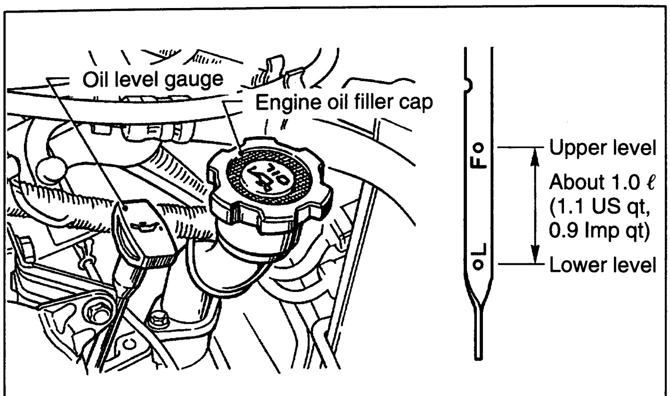
G: ENGINE OIL LEVEL

CHECK POINTS
1. Engine oil level
2. Engine oil leakage or contamination

1. Check the engine oil level

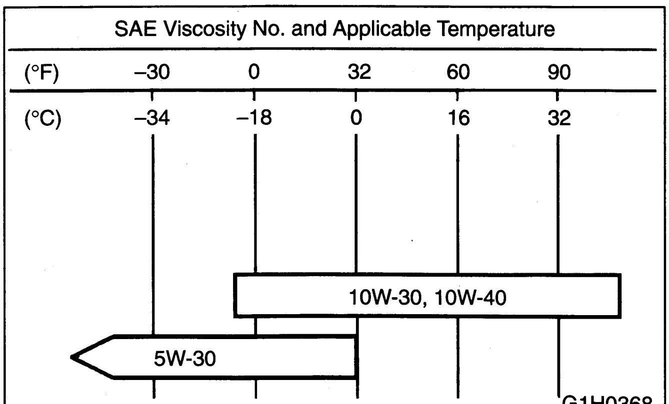
The level should be within the specified range marked on the gauge.

NOTE:
- Check engine oil level before starting the engine, when engine oil is cold, to obtain correct level reading. After stopping a hot engine, wait about 5 minutes until oil returns to oil pan before checking oil level. Oil level reading will be slightly higher than when engine is cold due to oil expansion. It is advisable to check oil level each time oil is replenished.
- Insert the oil level gauge into guide hole.



G1H0397

Recommended oil
API classification: SH or SG,
CCMC specification G4 or G5,
or ILSAC certification mark is displayed on the container
(If it is impossible to get SH or SG grade, you may use SF grade.)



G1H0368

OM-H1027

CAUTION:
- **When replenishing oil, it does not matter if the oil to be added is a different brand from that in the engine; however, use oil having the API classification and SAE viscosity No. designated by SUBARU.**
- **SAE 5W-30 is not recommended for sustained high speed driving.**

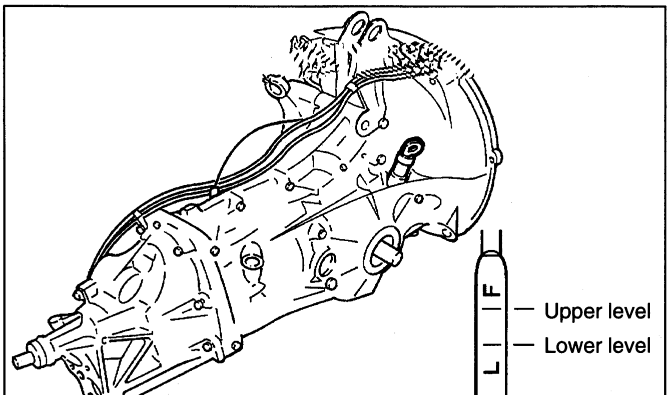
H: TRANSMISSION AND DIFFERENTIAL GEAR OIL LEVEL

CHECK POINTS

1. **Level of transmission gear oil for manual transmission**
2. **Level of rear differential gear oil for AWD model**
3. **Level of differential gear oil for automatic transmission**

1. Check the level of transmission gear oil for manual transmission

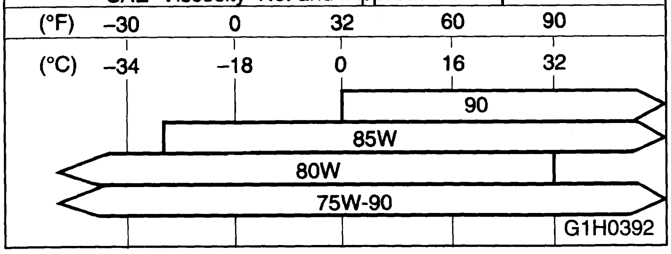
NOTE:
The level should be within the specified range marked on the gauge.



G1H0398

• **Recommended oil**

ITEM
Transmission gear oil
API Classification
GL-5
SAE Viscosity No. and Applicable Temperature

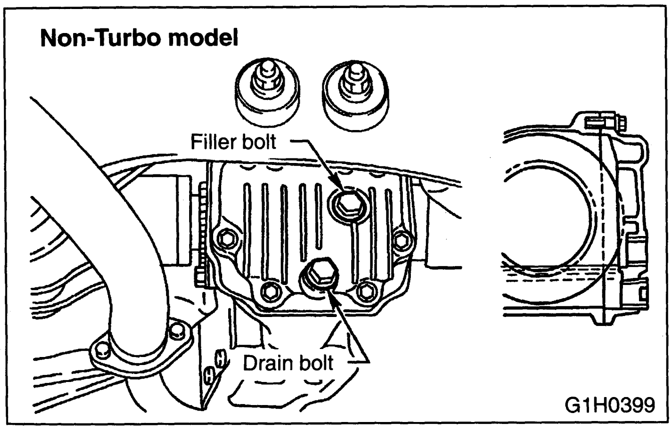


G1H0392

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.

2. Check the level of rear differential gear oil for AWD model

The oil level must be kept above the bottom of the filler bolt or plug. If below that level, add oil up to the bottom line.



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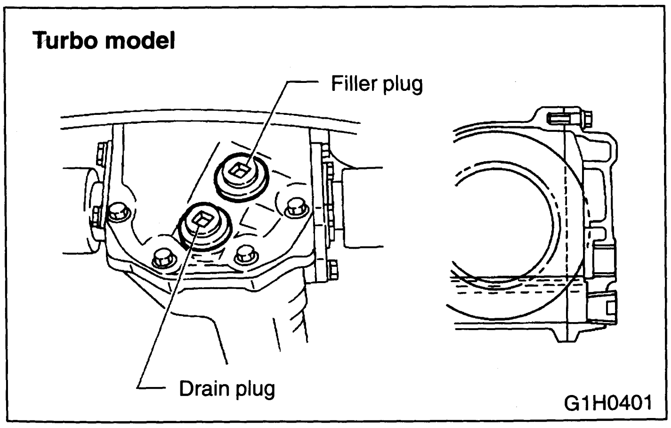
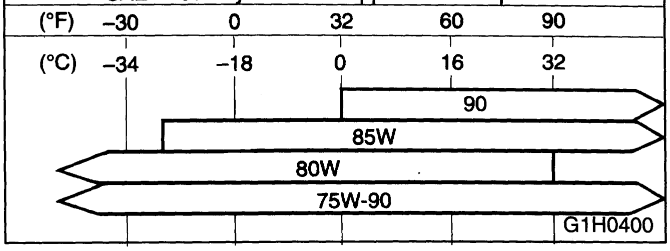


G1H0401

• **Recommended oil**

ITEM
• Rear differential gear oil
API Classification
GL-5
SAE Viscosity No. and Applicable Temperature

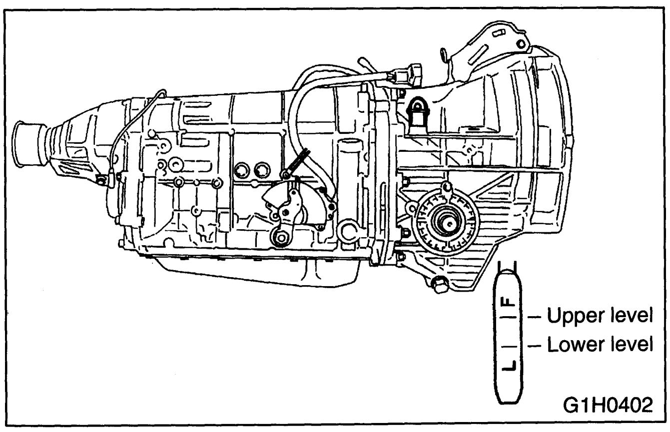


G1H0400

CAUTION:
Each manufacturer uses different base oils and additives. Thus, do not mix brands.

3. Check the level of front differential gear oil for automatic transmission

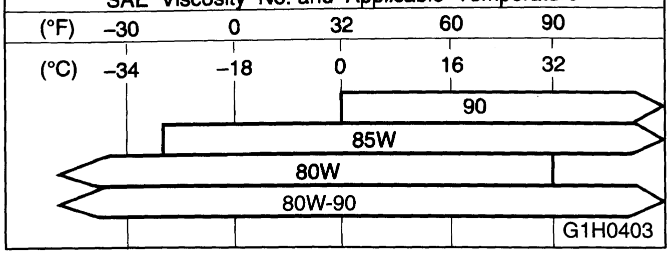
NOTE:
The level should be within the specified range marked on the gauge.



G1H0402

• **Recommended oil**

ITEM
• Front differential gear oil
API Classification
GL-5
SAE Viscosity No. and Applicable Temperature



G1H0403

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

M: WHEEL NUTS FOR LOOSENESS AND TIRE INFLATION PRESSURE

CHECK POINTS

1. **Wheel nut tightening torque**
2. **Tire inflation pressure and tire specification**
3. **Damage to tire and rim**

Tightening torque:
88 ± 10 N.m
(9 ± 1 kg-m, 65 ± 7 ft-lb)

NOTE:
- When checking the wheel nuts, be sure to use a torque wrench, and tighten the nuts to the specified torque.
- After inspecting and adjusting the tire pressure, be sure to put the valve cap back.

CAUTION:
Check that all tires are adjusted to the specified tire inflation pressure.

Tire size	Tire inflation pressure kPa (kg/cm^2, psi)	
	Front	Rear
P165/80R13 83H	220 (2.2, 31)	200 (2.0, 29)
P175/70R14 84H	220 (2.2, 31)	200 (2.0, 29)
P205/55R15 87V	226 (2.3, 33)	220 (2.2, 31)
T type tire	410 (4.2, 58)	

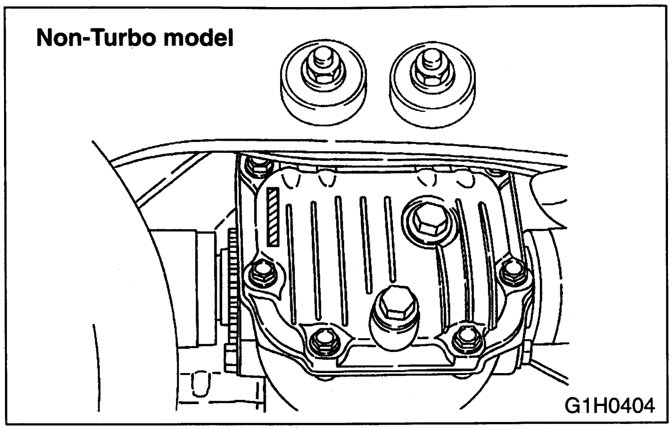
V: PROTECTOR

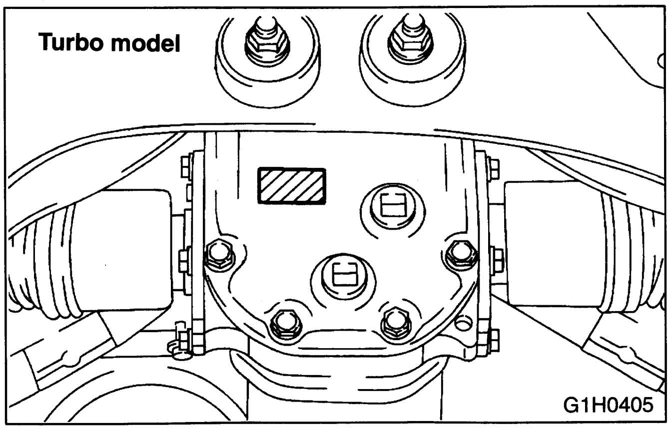
CHECK POINTS

1. **Protector removal**

The following parts are covered to prevent splashing of wax. Remove protector.

NOTE:
Label of rear differential is covered by tape. Remove it.

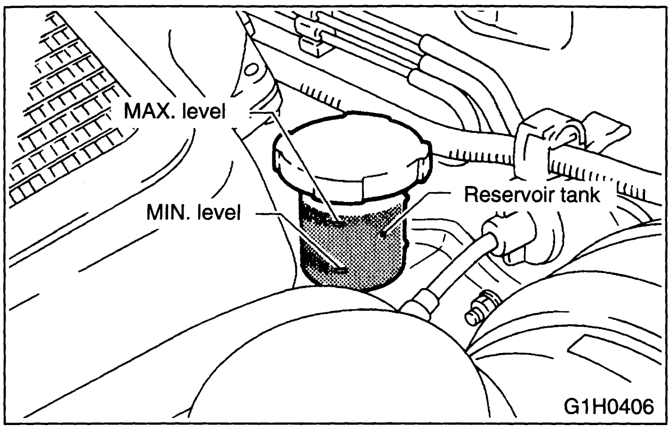




W:CLUTCH FLUID LEVEL (TURBO MODEL)

CHECK POINTS
1. Clutch fluid level

Check the fluid level using the scale on the outside of the clutch master cylinder tank. If the level is below "MIN", add clutch fluid to bring it up to "MAX".



Recommended cluth fluid:
FMVSS No. 116, fresh DOT 3 or DOT 4 brake fluid

CAUTION:
• Avoid mixing different brands of brake fluid to prevent degradation of the fluid.
• Be careful not to allow dirt or dust to get into the reservoir tank.
• Use fresh DOT 3 or DOT 4 brake fluid when refilling fluid.

3. Road Test Inspection

D: DRIVING TEST

CHECK POINTS
1. Operation of foot brake and parking brake
2. Inspect the clutch pedal free play
3. Operation of speedometer (Turbo model for Europe and Australia)
4. Operation of clutch and gear shift
5. Operation of select lever (Automatic transmission)
6. Operation of steering and position of steering wheel
7. Operation of turn signal cancel cam
8. Operation of ventilation system and heater
9. Abnormal noises or vibration
10. Operation of drive select lever (AWD model only)
11. Operation of air conditioner
12. Operation of cruise control

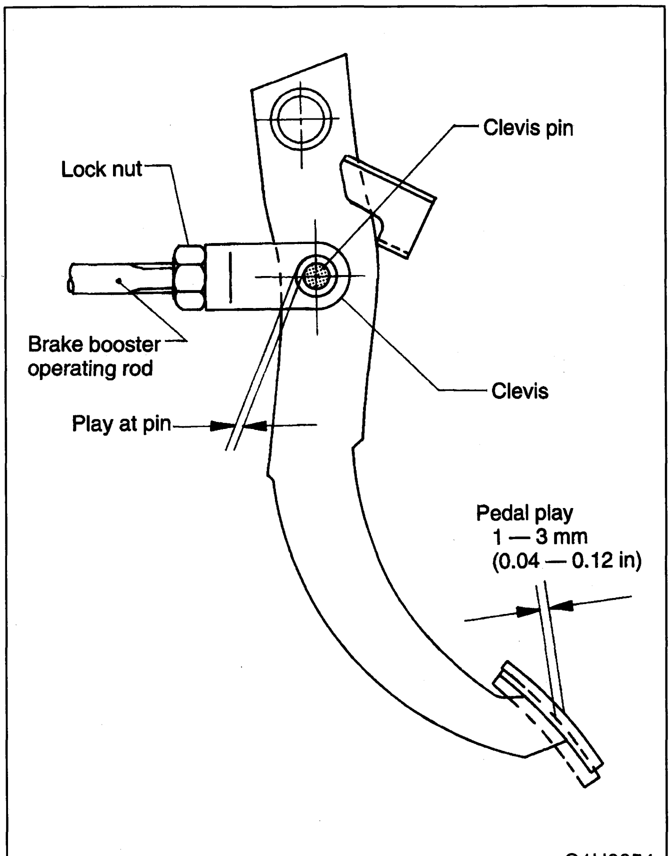
1. Check the foot and parking brakes' operation

1) Drive on a dry, level, paved road, and apply normal braking. Look for uneven or improper operation, or pulling to one side.

CAUTION:
Be sure to perform this test in a safe area.

2) Press the brake pedal in two or three times, and keep it fully depressed. Make sure that the brake can be kept that way for at least five seconds. Also check for air in the brake system, or brake fluid leakage.
3) Perform the adjustment of operating rod assembly as follows:

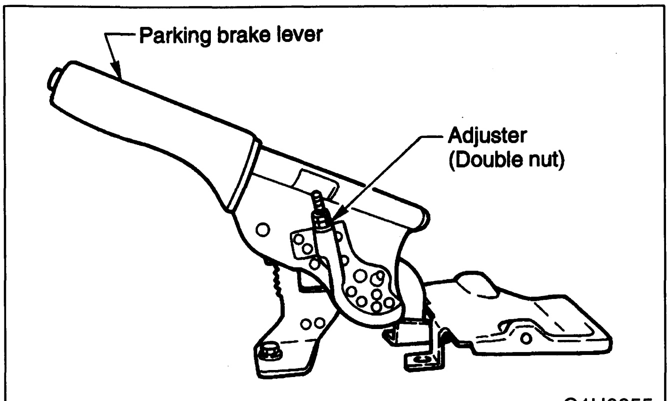
(1) Be sure engine is off. (No vacuum is applied to brake booster).
(2) There should be play between brake booster clevis and pin at brake pedal installing portion.
[Depress brake pedal pad with a force of less than 10 N (1 kg, 2 lb) to a stroke of 1 to 3 mm (0.04 to 0.12 in).]



G1H0054

(3) Depress the surface of brake pad by hand.
(4) If there is no free play between clevis pin and clevis, loosen lock nut for operating rod and adjust operating rod by turning in the direction that it is shortened.
(5) After adjustment, make sure there is no brake dragging.

4) Pull the parking brake lever completely out, and check its operation. Also check the ratchet for normal functioning.
Check the parking brake lever stroke. If it is out of specification, adjust it by turning adjusting nut at parking brake lever.

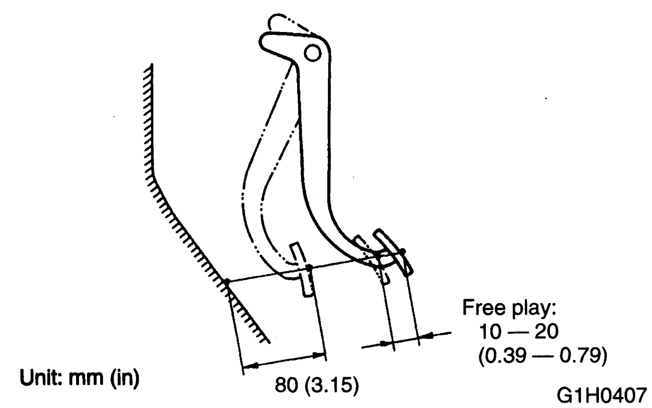


G1H0055

Parking brake lever stroke:
Standard:
7 — 8 notches/196 N (20 kg, 44 lb)

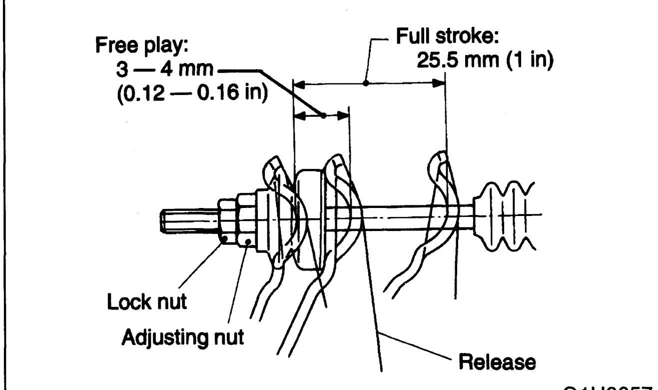
2. Inspect the clutch pedal free play

1) Mechanical application type
(1) Lightly press the clutch pedal down with a finger to check the free play.



G1H0407

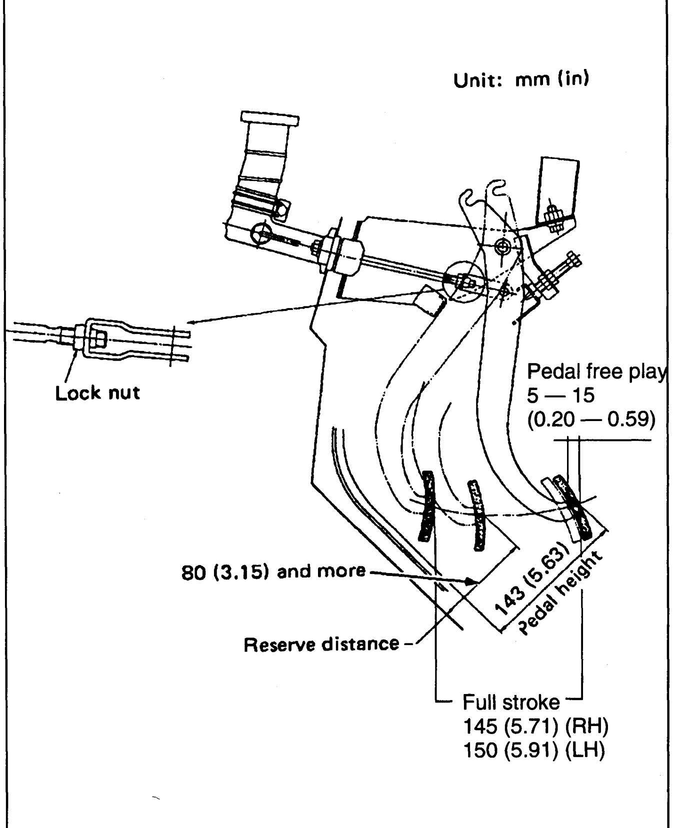
(2) If it is out of specification, adjust it by turning adjusting nut on engine side end of clutch cable at release fork.



G1H0057

Tightening torque:
4.5 — 7.5 N.m
(0.45 — 0.75 kg-m, 3.5 — 5.5 ft-lb)

2) Hydraulic application type
(1) Lightly press the clutch pedal down with a finger to check the free play.
(2) If it is out of specification, loosen lock nut for push rod and adjust push rod by turning in the direction that shortens or lengthens it.



G1H0432

Standard free play:
5 — 15 mm (0.20 — 0.59 in.)
Tightening torque (Adjusting lock nut):
9 — 11 N.m
(0.9 — 1.1 kg-m, 6.5 — 8.0 ft-lb)

3. Operation of speedometer (Turbo model for Europe and Australia)

1) Drive the car at various speeds, and make sure that the pointer of speedometer indicates the position of each speed correctly.

4. Check the operation of clutch and gear shifting

1) With the engine idling and the shift lever in neutral, gradually depress the clutch pedal, to see if it generates any abnormal noise.

NOTE:
Carefully compare a normal clutch's operating sounds to the clutch being tested.

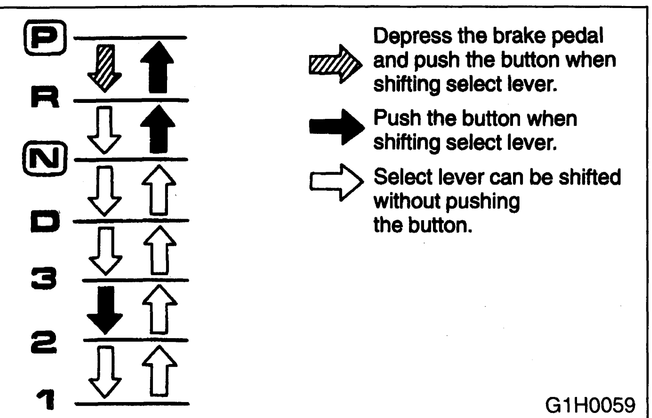
2) Pull the parking brake lever completely out, and place wheel chocks under the tires. Then depress the clutch pedal completely, and place the shift lever in 5th speed.
Raise engine rpm a little, gradually engage the clutch, and see if the engine stalls.
If the engine stalls, it means that the clutch is not slipping.

CAUTION:
- **Be sure to perform this test in a safe area.**
- **Do not repeat this test.**

3) Remove the wheel chocks, and return the shift lever to neutral, then check the gear shifting mechanism for excessive play.
4) Drive the car at various speeds. While depressing the clutch pedal completely, move the gear shift lever into each position, and check for any unusual play or unusual resistance.

5. Operation of selector lever (Automatic transmission models)

1) Place the selector lever in each position, and make sure that the pointer indicates the position of each range correctly.

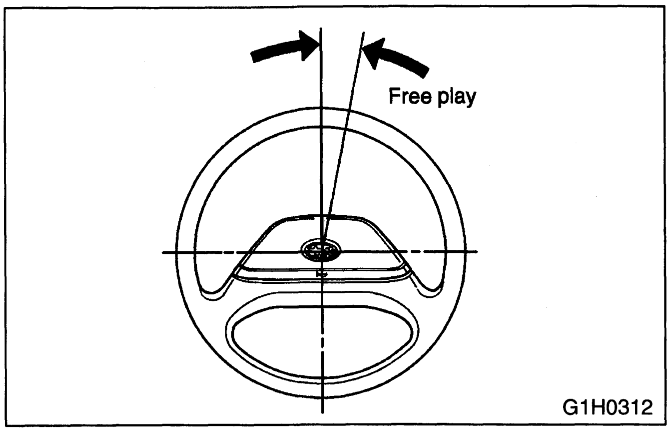


G1H0059

6. Operation of steering and position of steering wheel

1) Check the steering wheel for free play.

Steering wheel free play:
0 — 17 mm (0 — 0.67 in)



G1H0312

2) With the car moving straight ahead, check for hard steering, shimmy, or other abnormalities.
3) Make a turn, and check for hard or heavy steering wheel operation, or poor stability.

7. Operation of turn signal cancel cam

Make a right or left turn with the turn signal on, and make sure that the turn signal switch returns automatically to the OFF position when the steering wheel is returned to the straight ahead position.

8. Operation of ventilation system and heater

1) While driving, move the control lever and dial into each position, and check the ventilation system's operation. Also check for unusual vibration or noises.
2) Move the temperature control lever and fan switch, and make sure that warm air is discharged into the compartment.

9. Abnormal noises or vibration

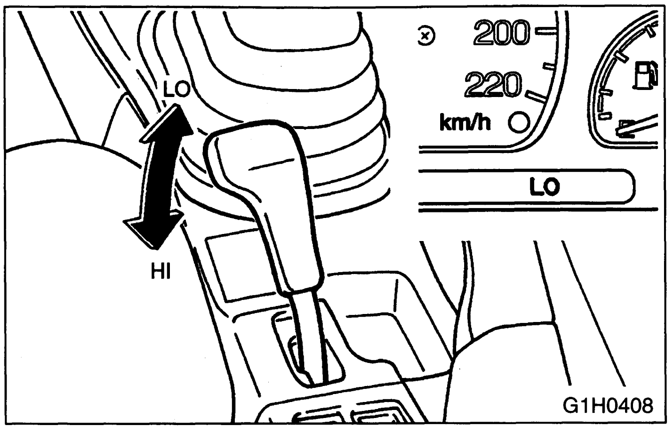
1) When starting the engine, and while driving the vehicle, check the engine, transmission, body, suspension, and steering system for any unusual noises or vibration.
Do this when idling the engine, accelerating, decelerating, and running at low, middle and high speeds.
2) Depress the accelerator pedal, and make sure that the engine rpm increase smoothly and that the vehicle accelerates smoothly.
3) While driving, turn the steering wheel right and left to test the vehicle's stability and response.

CAUTION:
Be sure to perform this test in a safe area.

10. Operation of AWD drive selector lever (AWD dual-range models)

While driving, check the operation of the AWD drive select. Also check that indicator light on instrument panel comes on.

CAUTION:
Never shift the drive select while the wheels are spinning or slipping.



G1H0408

11. Operation of air conditioning

Turn the air conditioning switch "ON", and make sure that cool air is discharged into the compartment.

12. Operation of cruise control

Check the operation of the cruise control according to "Owner's manual".

CAUTION:
Be sure to conduct driving tests using a chassis dynamometer with front wheels set in operation, or tests on an authorized race course or similar place.

4. Post-road Test Inspection

B: POWER STEERING FLUID LEVEL

CHECK POINTS
1. Level of power steering fluid

The power steering fluid shoud be maintained at a proper level.
Check level as follows:
1) Drive the car several miles or kilometers to bring power steering system up to the normal operating temperature of about 60°C (140°F).
2) Park the car on a level surface and stop the engine.
3) Remove the level gauge and wipe it clean.
4) Reinstall the level gauge firmly.
5) Remove it again and read the level on the "HOT" side.
If the fluid level is at the lower level or below it, add recommended power steering fluid up to the high level. When the fluid level is to be checked without warming up the power steering system [at approximately 21°C (70°F)], read the fluid level at the "COLD" position of the level gauge.

CAUTION:
The available power steering fluid is ATF DEXRON II or II E.
Be sure to use the recommended fluid.
When power steering fluid is added, be careful not to allow any dust into the tank.

PERIODIC MAINTENANCE SERVICES 1-5

Page

SCHEDULE OF INSPECTION AND MAINTENANCE SERVICES 2

1. Drive Belt(s) [Except Camshaft] (Inspect drive belt tension)
2. Camshaft Drive Belt (Timing Belt) 4
3. Engine Oil 6
4. Engine Oil Filter
5. Replace Engine Coolant and Inspect Cooling System, Hoses and Connections 9
6. Replace Fuel Filter and Inspect Fuel System, Lines and Connections
7. Air Cleaner Element
8. Spark Plugs 13
9. Idle Mixture [Except for Catalyst Model]
10. Transmission/Differential (Front and rear) Lubricants (Gear oil) 15
11. Automatic Transmission Fluid
12. Brake Fluid
13. Disc Brake Pads and Discs/Front and Rear Axle Boots and Axle Shaft Joint Portions 18
14. Brake Linings and Drums
15. Inspect Brake Lines and Check Operation of Parking and Service Brake System
16. Clutch Operation System 19
17. Steering and Suspension System 21
18. Front and Rear Wheel Bearing Lubricant

SCHEDULE OF INSPECTION AND MAINTENANCE SERVICES

Continue periodic maintenance beyond 100,000 km (60,000 miles) or 48 months by returning to the first column of the maintenance schedule and adding 100,000 km (60,000 miles) or 48 months to the column headings.

Symbols used:
R: Replace
I: Inspect, and then adjust, correct or replace if necessary.
P: Perform
(I): Recommended service for safe vehicle operation

	MAINTENANCE ITEM		MAINTENANCE INTERVAL (Number of months or km (miles), whichever occurs first)					REMARKS
		Months		12	24	36	48	
		x 1,000 km	1.6	25	50	75	100	
		x 1,000 miles	1	15	30	45	60	
1	Drive belt(s) (Except camshaft)			I	I	I	I	
2	Camshaft drive belt (Timing belt)						R	
3	Engine oil		Change every 12,500 km (7,500 miles) or 6 months whichever occurs first.					See NOTE 1)
4	Engine oil filter		Change every 12,500 km (7,500 miles) or 6 months whichever occurs first.					See NOTE 1)
5	Replace engine coolant and inspect cooling system, hoses and connections				P		P	
6	Replace fuel filter and inspect fuel system, line and connections				P		P	See NOTE 3)
7	Air cleaner element			I	R	I	R	See NOTE 2)
8	Spark plugs	Except Sweden		R	R	R	R	
		For Sweden	Change every 30,000 km (18,500 miles).					
		For Turbo					R	
9	Idle mixture [Except for catalyst model]		I	I	I	I	I	
10	Transmission/differential (Front & rear) lubricants (Gear oil)				R		R	See NOTE 4)
11	Automatic transmission fluid				R		R	See NOTE 4)
12	Brake fluid				R		R	See NOTE 5)
13	Disc brake pads and discs/Front and rear axle boots and axle shaft joint portions			I	I	I	I	See NOTE 3)
14	Brake linings and drums (Parking brake)				I		I	See NOTE 3)
15	Inspect brake lines and check operation of parking and service brake system			P	P	P	P	See NOTE 3)
16	Clutch operation system			I	I	I	I	Adjust pedal free play at 1,600 km (1,000 miles)
17	Steering and suspension system			I	I	I	I	See NOTE 3)
18	Front and rear wheel bearing lubricant						(I)	

NOTES:

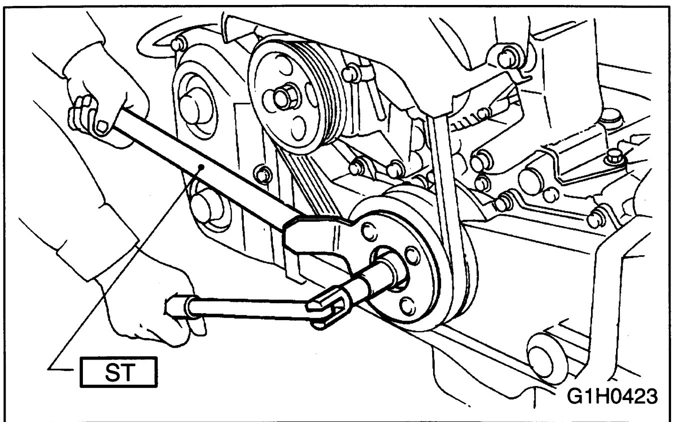
1) **When the vehicle is used under severe driving conditions mentioned below*, the engine oil and oil filter should be changed more frequently.**
2) **When the vehicle is used under severe driving conditions mentioned below*, the air cleaner element should be replaced more frequently.**
3) **When the vehicle is used under severe driving conditions mentioned below*, inspection should be performed at every 12,500 km (7,500 miles) or 6 months whichever occurs first.**
4) **When the automatic transmission vehicle is frequently operated under severe conditions, such as pulling trailer or driving on sand, replacement of automatic transmission fluid and front differential gear oil should be performed more frequently.**
5) **When the vehicle is used under following areas, change fluid every 25,000 km (15,000 miles) or 12 months whichever occurs first.**
   (1) High humidity areas
   (2) Mountainous areas

* Severe driving conditions:

(1) Operating in extremely cold weather (Items 3, 4 and 17 only)
(2) Pulling trailer (Items 3, 4, 13 and 14 only)
(3) Repeated short trips (Items 3, 4, 13 and 14 only)
(4) Driving in dusty roads (Items 7, 13, 14 and 17 only)
(5) Driving in rough and/or muddy roads (Items 13, 14 and 17 only)
(6) Driving in areas using road salt or other corrosive materials (Items 6, 13, 14, 15 and 17 only)
(7) Living in coastal areas (Items 6, 13, 14, 15 and 17 only)

2. Camshaft Drive Belt (Timing Belt)

MAINTENANCE INTERVAL [Number of months of km (miles) whichever occurs first]					
Months		12	24	36	48
x1,000 km	1.6	25	50	75	100
x1,000 miles	1	15	30	45	60
					R



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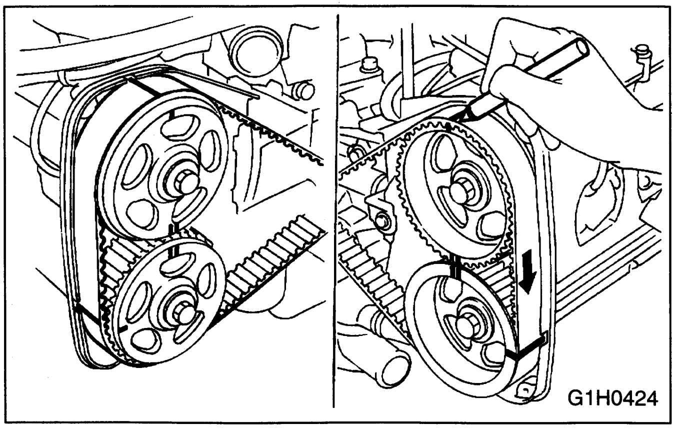
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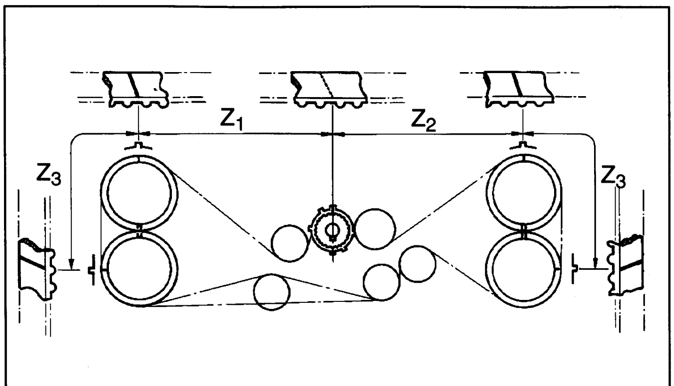


G1H0425

A: REPLACEMENT

2. DOHC MODEL

1) Refer to 1) to 7) of camshaft drive belt. <Ref. to 1-5 [02A0]>
2) Remove pulley bolt. To lock crankshaft use ST.

ST 499977000
CRANKSHAFT PULLEY WRENCH

3) Remove crankshaft pulley.
4) Remove left side belt cover.
5) Remove right side belt cover.
6) Remove front belt cover.
7) If alignment mark and/or arrow mark (which indicates rotation direction) on timing belt fade away, put new marks before removing timing belt as follows:
   (1) Turn crankshaft and align alignment marks on crankshaft, and left and right camshaft sprockets with notches of belt cover and cylinder block.

   ST 499987500 CRANKSHAFT SOCKET

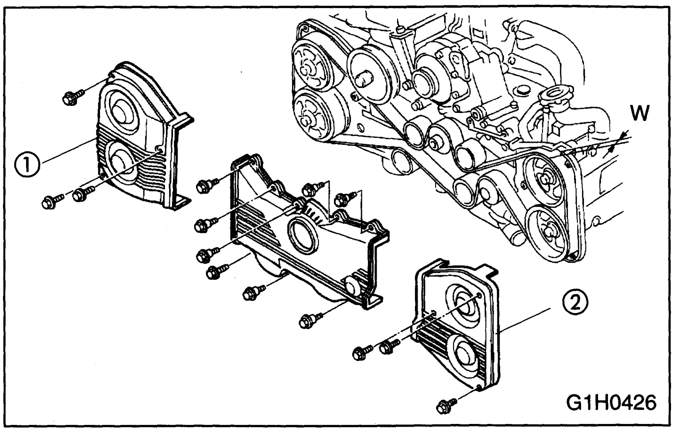
   (2) Using white paint, put alignment and/or arrow marks on timing belts in relation to the sprockets.
8) Loosen tensioner adjuster mounting bolts.
9) Remove belt idler.
10) Remove belt idler No.2.
11) Remove timing belt.

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

B: INSTALLATION

2. DOHC MODEL

To install, reverse order of removal procedures. For installation of tensioner adjuster and camshaft drive belt, refer to “2-3b ENGINE” [W2C0].



G1H0426

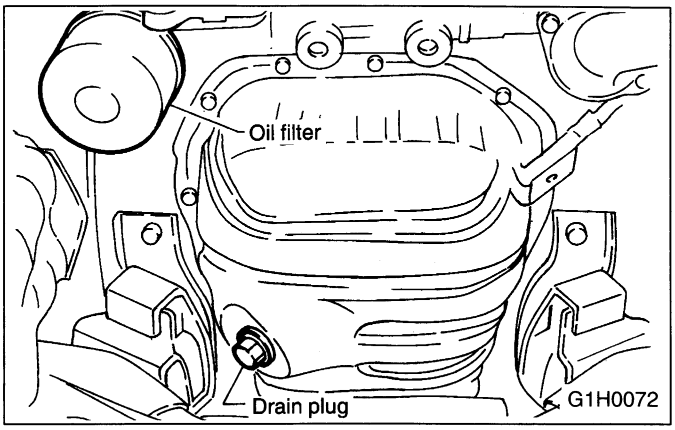
C: INSPECTION

2. DOHC MODEL

1) Remove left and right timing belt covers ① and ②.
2) While cranking engine at least four rotations, check timing belt back surface for cracks or damage. Replace faulty timing belt as needed.
3) Measure timing belt width W. If it is less than 30 mm (1.18 in), check idlers, tensioner, water pump pulley and cam sprocket to determine idler alignment (squareness). Replace worn timing belt.
4) Install left and right timing belt covers ① and ②.

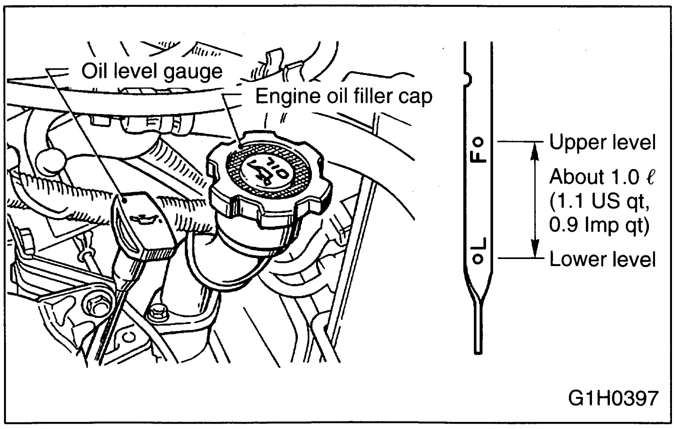
3. Engine Oil

MAINTENANCE INTERVAL [Number of months of km (miles) whichever occurs first]					
Months		12	24	36	48
x1,000 km	1.6	25	50	75	100
x1,000 miles	1	15	30	45	60
	Change every 12,500 km (7,500 miles) or 6 months. Whichever occurs first				

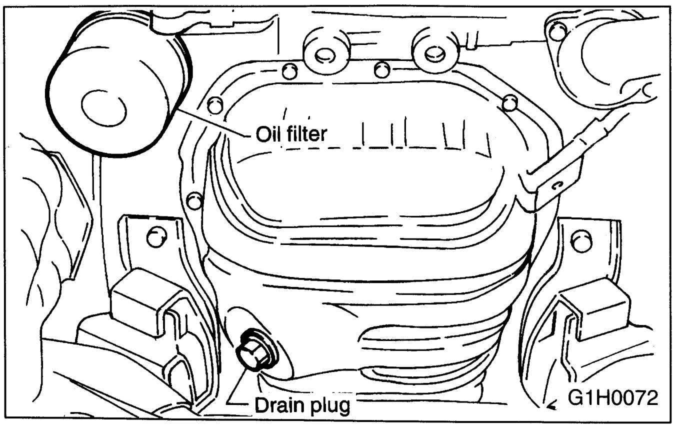


A: REPLACEMENT

1) Drain engine oil by loosening engine oil drain plug.

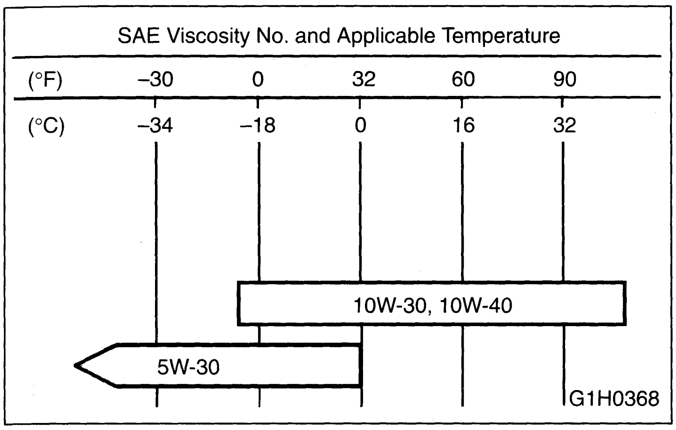


2) Open engine oil filler cap for quick draining of the engine oil.
Replace drain plug gasket.



3) Tighten engine oil drain plug after draining engine oil.

Tightening torque:
44 N.m (4.5 kg-m, 33 ft-lb)



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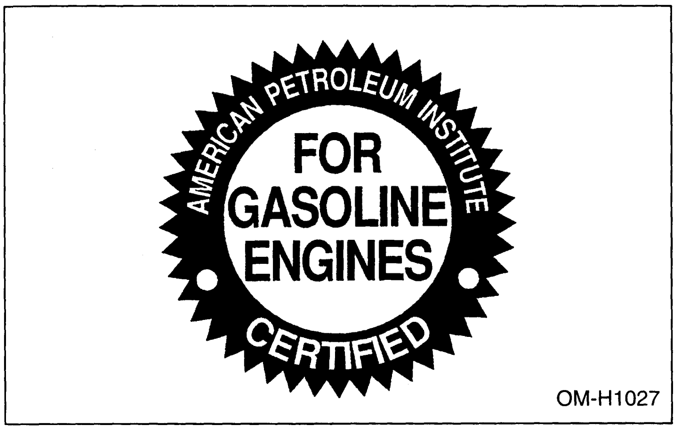

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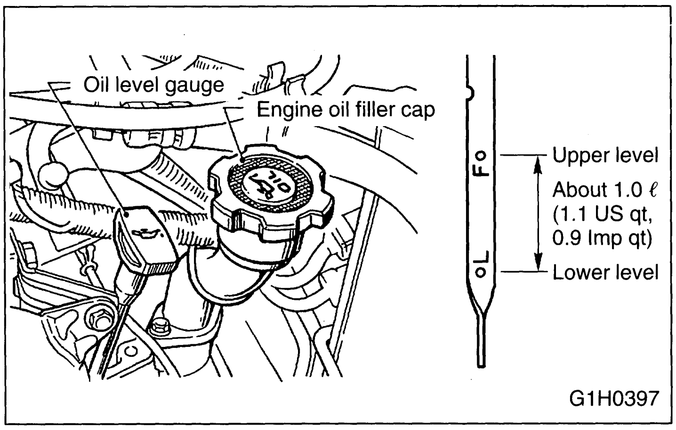


G1H0397

4) Fill engine oil through filler pipe up to upper point on level gauge. Make sure that vehicle is placed level when checking oil level. Use engine oil of proper quality and viscosity, selected in accordance with the table in figure.

Recommended oil

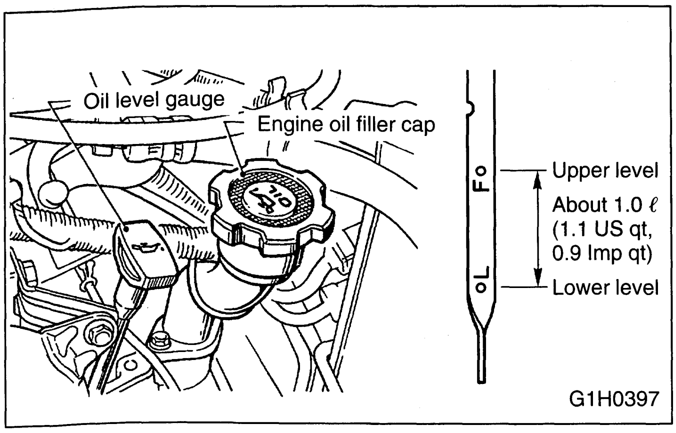
API classification: SH or SG,
CCMC specifiction G4 or G5,
or ILSAC certification mark is displayed on the container
(If it is impossible to get SH or SG grade, you may use SF grade.)

The proper viscosity helps car get good cold and hot starting by reducing viscous friction and thus increasing cranking speed.

CAUTION:

- **When replenishing oil, it does not matter if the oil to be added is a different brand from that in the engine; however, use oil having the API classification and SAE viscosity No. designated by SUBARU.**
- **SAE 5W-30 is not recommended for sustained high speed driving.**

5) Close engine oil filler cap.
6) Start engine and warm it up for a time.
7) After engine stops, recheck the oil level. If necessary, add engine oil up to upper level on level gauge.



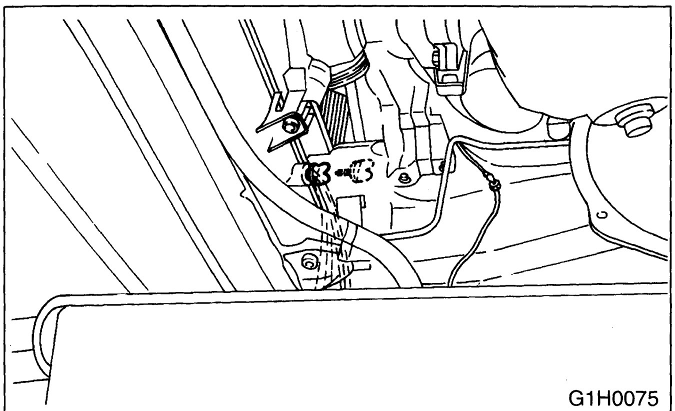
B: INSPECTION

1) Park vehicle on a level surface.
2) Remove oil level gauge and wipe it clean.
3) Reinsert the level gauge all the way. Be sure that the level gauge is correctly inserted and in the proper orientation.
4) Remove it again and note the reading. If the engine oil level is below the "L" line, add oil to bring the level up to the "F" line.
5) After turning off the engine, wait a few minutes for the oil to drain back into the oil pan before checking the level.
6) Just after driving or while the engine is warm, engine oil level may show in the range between the "F" line and the notch mark. This is caused by thermal expansion of the engine oil.
7) To prevent overfilling the engine oil, do not add oil above the "F" line when the engine is cold.

Engine oil capacity (Non-Turbo model):
Upper level
4.0 ℓ (4.2 US qt, 3.5 Imp qt)
Lower level
3.0 ℓ (3.2 US qt, 2.6 Imp qt)
Engine oil capacity (Turbo model):
Upper level
4.5 ℓ (4.8 US qt, 4.0 Imp qt)
Lower level
3.5 ℓ (3.7 US qt, 3.1 Imp qt)

5. Replace Engine Coolant and Inspect Cooling System, Hoses and Connections

MAINTENANCE INTERVAL [Number of months of km (miles) whichever occurs first]					
Months		12	24	36	48
x1,000 km	1.6	25	50	75	100
x1,000 miles	1	15	30	45	60
			P		P


G1H0075

A: REPLACEMENT

1. REPLACEMENT OF COOLANT (NON-TURBO MODEL)

WARNING:
The radiator is of the pressurized type. Do not attempt to open the radiator cap immediately after the engine has been stopped.

1) Place a container under drain tube, and loosen drain plug.
2) Loosen radiator cap to drain coolant.

CAUTION:
Be careful not to spill coolant on the floor.

3) Drain coolant from reserve tank.
4) Tighten radiator drain plug securely after draining coolant. (Drain tube may face downward.)
5) Install reserve tank to original position.
6) Slowly pour prepared coolant from radiator filler port to neck of filler, then pour into reserve tank up to "FULL" level.

Coolant capacity (fill up to "FULL" level)
MT:
Approx. 6.3 ℓ (6.7 US qt, 5.5 Imp qt)
AT:
Approx. 6.2 ℓ (6.6 US qt, 5.5 Imp qt)

CAUTION:
The SUBARU Genuine Coolant containing anti-freeze and anti-rust agents is especially made for SUBARU engine, which has an aluminum crankcase. Always use SUBARU Genuine Coolant, since other coolant may cause corrosion.

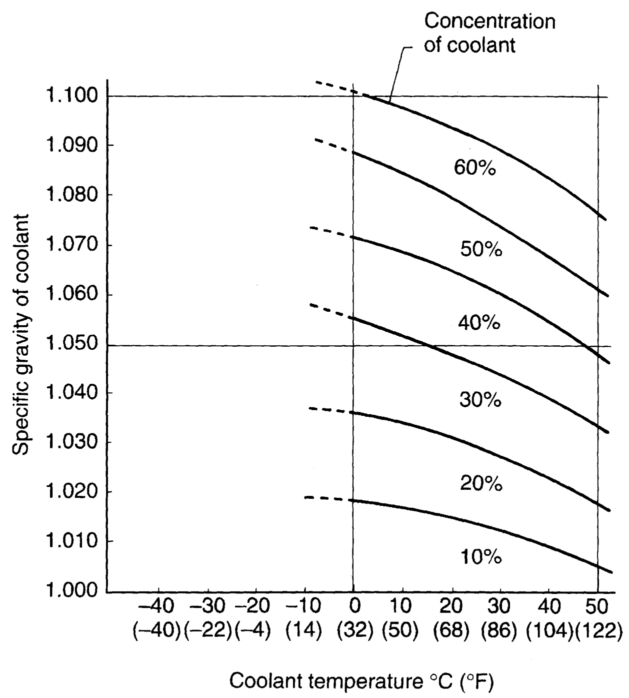
7) Securely install radiator cap.
8) Run engine for more than five minutes at 2,000 to 3,000 rpm. (Run engine until radiator becomes hot in order to purge air trapped in cooling system.)
9) Stop engine and wait until coolant temperature lowers. Then open radiator cap to check coolant level and add coolant up to radiator filler neck. Next, add coolant into reserve tank up to "FULL" level.
10) After adding coolant, securely install radiator and reserve tank caps.

2. REPLACEMENT OF COOLANT (TURBO MODEL)

1) Loosen radiator drain plug after following the same procedures 1) as described for the Non-TURBO model.
2) Loosen coolant flow tank cap to drain coolant.
3) Tighten radiator drain plug securely.
4) Slowly pour prepared coolant from coolant flow tank filler port up to the brim of port, and install cap, then pour coolant into reserve tank up to "FULL" level.
5) Run engine for about 15 minutes, not exceeding 2,000 rpm. (Run engine until radiator becomes hot in order to purge air trapped in cooling system.)
6) Stop engine and wait until coolant temperature lowers. [below 50°C (122°F) or 60°C (140°F)] Open coolant flow tank cap and add coolant up to the brim of the port.
7) Wait until coolant temperature lowers further [below 30°C (86°F)], then pour into reserve tank up to the "FULL" level.
8) Run the vehicle until the coolant temperature rises to 80°C (176°F) and check the level in the coolant flow tank, add coolant up to the "FULL" level.

Coolant capacity (fill up to "FULL" level):
Approx. 7.2 ℓ (7.6 US qt, 6.3 Imp qt)

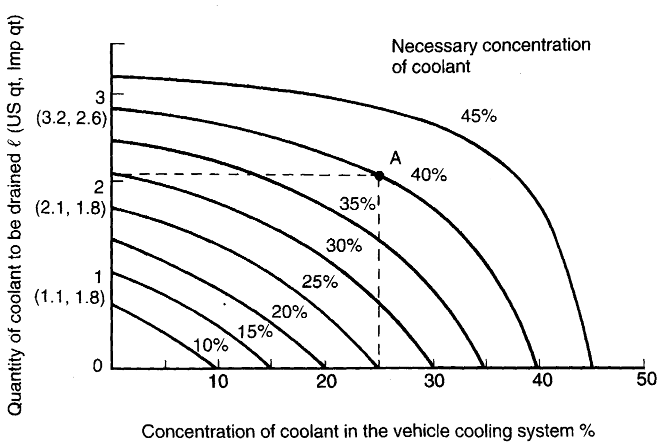
CAUTION:
The SUBARU Genuine Coolant containing anti-freeze and anti-rust agents is especially made for SUBARU engine, which has an aluminum crankcase. Always use SUBARU Genuine Coolant, since other coolant may cause corrosion.



M1H0064

3. RELATIONSHIP OF SUBARU COOLANT CONCENTRATION AND FREEZING TEMPERATURE

The concentration and safe operating temperature of the SUBARU coolant is shown in the diagram. Measuring the temperature and specific gravity of the coolant will provide this information.



Concentration of coolant in vehicle and quantity to be drained

M1H0065

4. PROCEDURE TO ADJUST THE CONCENTRATION OF THE COOLANT

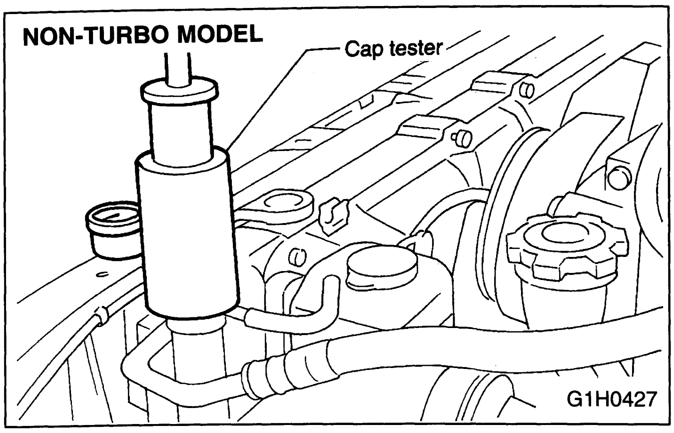
To adjust the concentration of the coolant according to temperature, find the proper fluid concentration in the above diagram and replace the necessary amount of coolant with an undiluted solution of SUBARU genuine coolant (concentration 50).

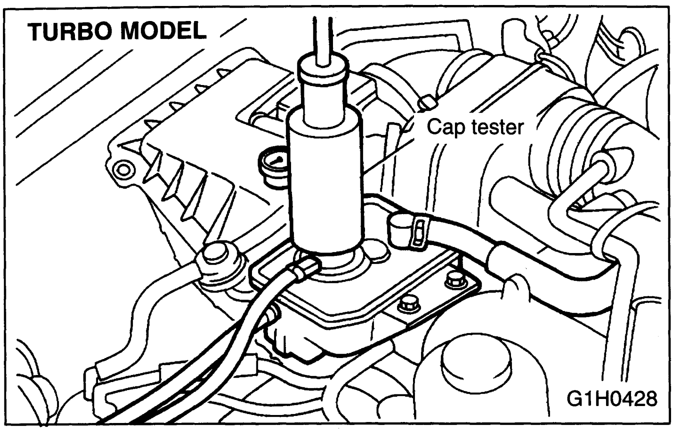
The amount of coolant that should be replaced can be determined using the diagram.

[Example]

Assume that the coolant concentration must be increased from 25% to 40%. Find point A, where the 25% line of coolant concentration intersects with the 40% curve of the necessary coolant concentration, and read the scale on the vertical axis of the graph at height A. The quantity of coolant to be drained is 2.1 liters (2.2 US qt, 1.8 Imp qt). Drain 2.1 liters (2.2 US qt, 1.8 Imp qt) of coolant from the cooling system and add 2.1 liters (2.2 US qt, 1.8 Imp qt) of the undiluted solution of SUBARU coolant.

If a coolant concentration of 50% is needed, drain all the coolant and refill with the undiluted solution only.





B: INSPECTION

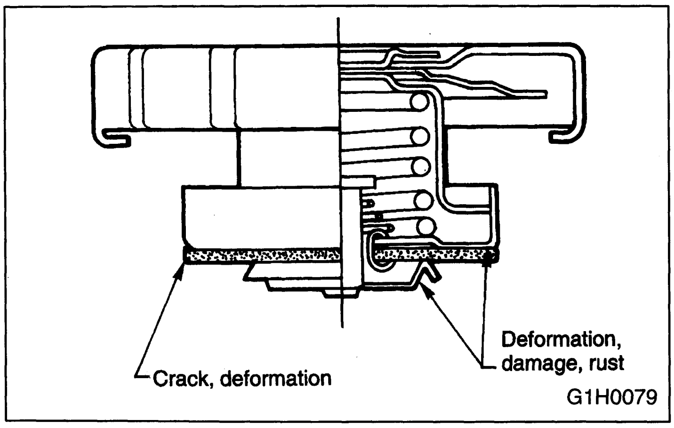
1) Check radiator for leakage, filling it with coolant and attach radiator cap tester to the filler neck. Then apply a pressure of 157 kPa (1.6 kg/cm^2, 23 psi) and check the following points:

- Each portion of radiator for leakage
- Hose joints and other connections for leakage

CAUTION:
When attaching or detaching tester and when operating tester, use special care not to deform radiator filler neck.

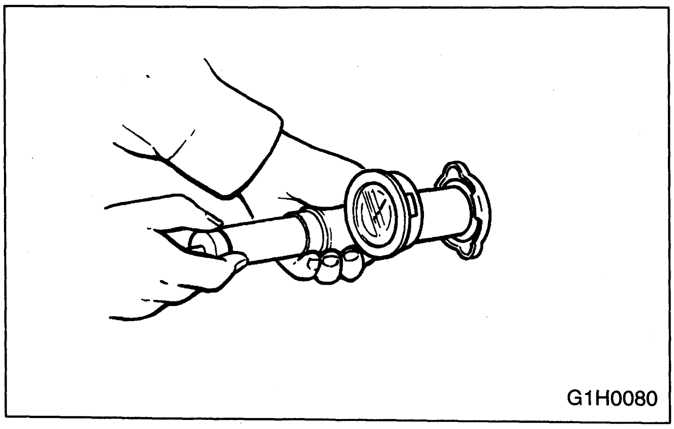
NOTE:

- When performing this check, be sure to keep the engine stationary and fill radiator with coolant.
- Wipe off check points before applying pressure.
- Use care not to spill coolant when detaching tester from radiator.



2) Check the radiator cap valve open pressure using radiator cap tester.
Raise the pressure until the needle of gauge stops and see if the pressure can be retained for five to six seconds. The radiator cap is normal if a pressure above the service limit value has been maintained for this period.

Radiator cap valve open pressure
Standard value:
78 — 98 kPa
(0.8 — 1.0 kg/cm^2, 11 — 14 psi)
Service limit: 69 kPa (0.7 kg/cm^2, 10 psi)

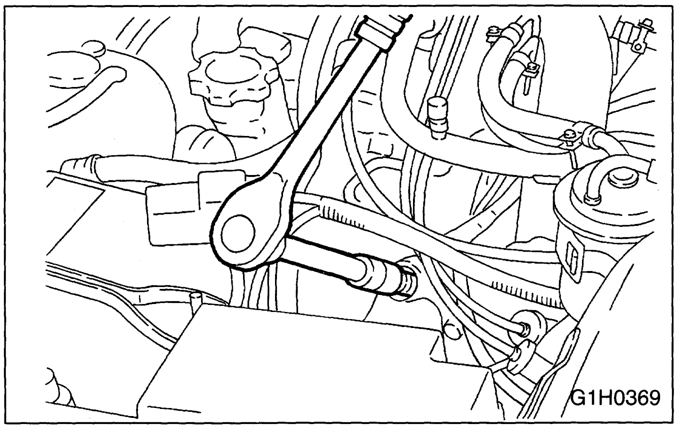


CAUTION:
Rust or dirt on cap may prevent valve from functioning normally: be sure to clean cap before testing.

3) If the coolant temperature exceeds 76.0 to 80.0°C (169 to 176°F) while radiator is not so hot, check thermostat. If thermostat does not open at 76.0 to 80.0°C (169 to 176°F), replace it with a new one.
4) If electric fan does not operate when coolant temperature exceeds 90 to 94°C (194 to 201°F), check thermoswitch or fan motor.

8. Spark Plugs

MAINTENANCE INTERVAL [Number of months of km (miles) whichever occurs first]					
Months		12	24	36	48
x1,000 km	1.6	25	50	75	100
x1,000 miles	1	15	30	45	60
Except Sweden		R	R	R	R
For Sweden	Change every 30,000 km (18,500 miles)				
For Turbo					R



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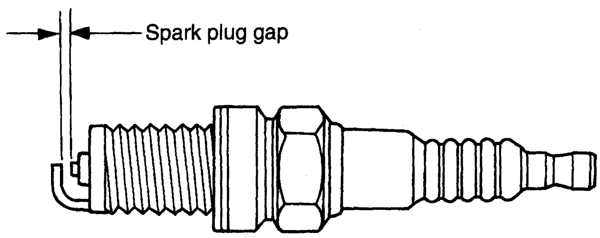


G1H0084

A: REPLACEMENT

1. REPLACEMENT OF SPARK PLUGS (NON-TURBO MODEL)

1) Disconnect spak plug cord.
2) Remove spark plug with a plug-wrench.
3) Set new spark plug.
4) Tighten spark plug lightly with hand, and then secure with a plug-wrench to the specified torque.

Tightening torque:
18—24 N.m (1.8—2.4 kg-m, 13—17 ft-lb)

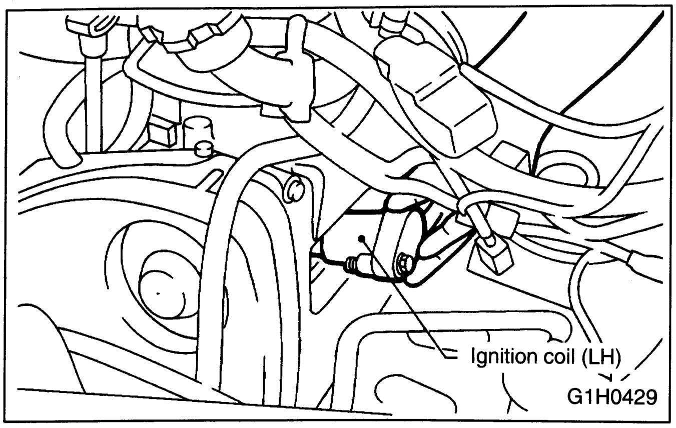
CAUTION:
Be sure to place the gasket between the cylinder head and spark plug.

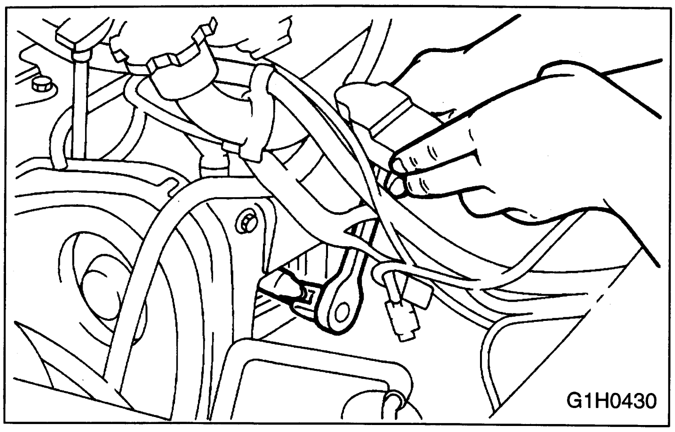
NOTE:
If torque wrench is not available, tighten spark plug until gasket contacts cylinder head; then tighten further 1/4 to 1/2 turns.

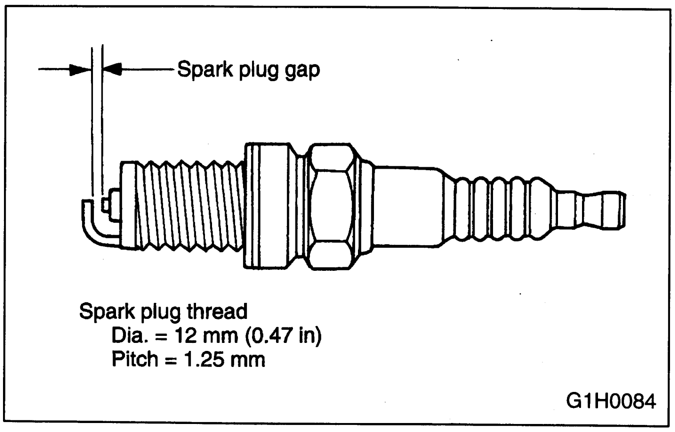
1800 cc
Recommended spark plug:
NGK BKR6E-11
CHAMPION RC8YC4
Spark plug gap
1.0 — 1.1 mm (0.039 — 0.043 in)

1600 cc
Recommended spark plug:
NGK BKR6E
CHAMPION RC8YC4
Spark plug gap
0.8 mm (0.031 in)

NOTE:
<Ref. to 6-1 [W3A0]>







2. REPLACEMENT OF SPARK PLUGS (TURBO MODEL)

1) Removal of ignition coil (RH).
   (1) Dismount accelerator cable from clamps.
   (2) Remove air intake boot and air cleaner case.
   (3) Disconnect ignition coil harness connector.
   (4) Remove ignition coil.
2) Removal of ignition coil (LH).
   (1) Remove battery and window washer tank.
   (2) Disconnect ignition coil harness connector.
   (3) Remove ignition coil.
3) Remove spark plug with a plug-wrench.
4) Set new spark plug.
5) Tighten spark plug lightly with hand, and then secure with a plug-wrench to the specified torque.

Tighteningtorque:
18—24 N.m (1.8—2.4 kg-m, 13—17 ft-lb)

CAUTION:
Be sure to place the gasket between the cylinder head and spark plug.

NOTE:
If torque wrench is not available, tighten spark plug until gasket contacts cylinder head; then tighten further 1/4 to 1/2 turns.

Recommended spark plug:
NGK PFR6G
Spark plug gap:
0.7 — 0.8 mm (0.028 — 0.031 in)

10. Transmission/Differential (Front and rear) Lubricants (Gear oil)

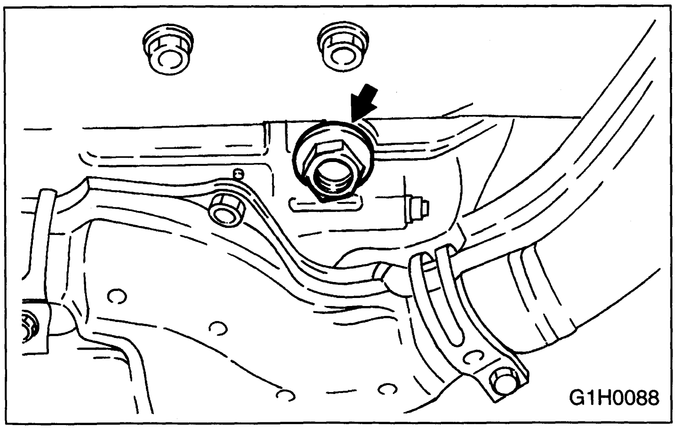
MAINTENANCE INTERVAL [Number of months of km (miles) whichever occurs first]					
Months		12	24	36	48
x1,000 km	1.6	25	50	75	100
x1,000 miles	1	15	30	45	60
			R		R

A: REPLACEMENT

1. MANUAL TRANSMISSION

1) Drain gear oil by removing drain plug after allowing the engine to cool for 3 to 4 hours.

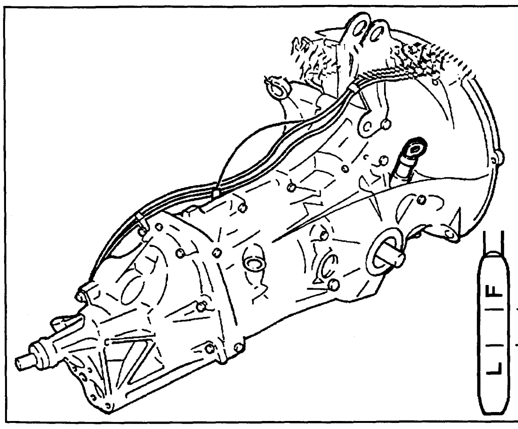
CAUTION:
Before starting work, cool off the engine well.


G1H0088

2) Reinstall drain plug after draining gear oil and tighten it to the specified torque.

Tighteningtorque:
41 — 47 N.m (4.2 — 4.8 kg-m, 30 — 35 ft-lb)

CAUTION:
- **Be sure to place a gasket between the transmission case and drain plug.**
- **Replace the gasket with a new one.**

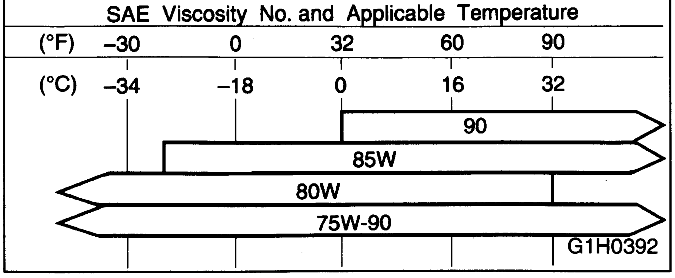


G1H0398

NOTE:
Inspect the transmission gear oil level. If the oil level is at the lower point or below, add some oil through the oil level gauge hole up to the upper point of gauge.

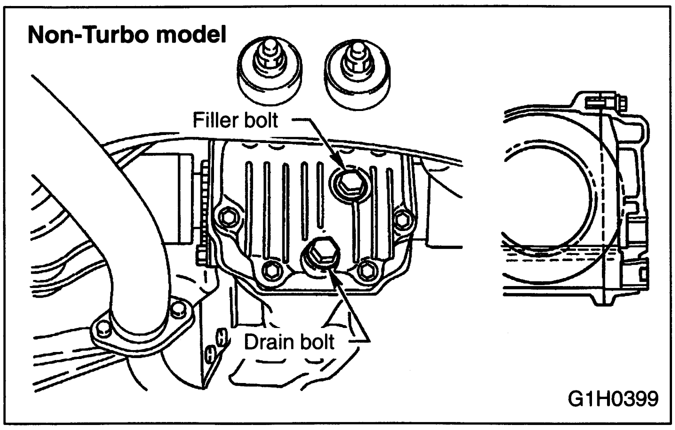
Gear oil capacity:
FWD model: 2.6 ℓ (2.7 US qt, 2.3 Imp qt)
AWD model: 4.0 ℓ (4.2 US qt, 3.5 Imp qt)

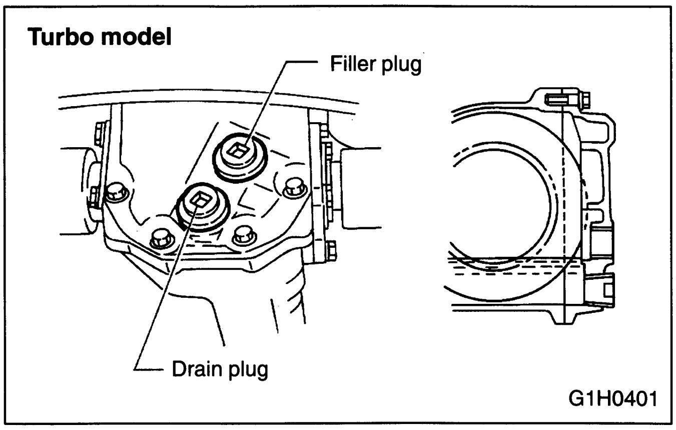
ITEM
Transmission gear oil
API Classification
GL-5
SAE Viscosity No. and Applicable Temperature



Recommended oil

CAUTION:
Each oil manufacturer has its base oil and additives. Thus, do not mix two or more brands.





3. REAR DIFFERENTIAL (AWD MODEL)

1) Drain oil by removing drain bolt or plug.
2) Remove filler bolt or plug for quick draining oil.
3) Tighten drain bolt or plug after draining oil.

CAUTION:
• Non-Turbo model
Always use a new aluminum gasket.

Tightening torque:
34 ± 4 N.m (3.5 ± 0.4 kg-m, 25.3 ± 2.9 ft-lb)

• Turbo model
Apply fluid packing to drain plug threads before installation.

Fluid packing:
Three Bond 1205 or equivalent
Tightening torque:
49 ± 9.8 N.m (5 ± 1 kg-m, 36 ± 7.2 ft-lb)

4) After installing drain bolt or plug onto rear differential gear case firmly, fill oil up fully to the mouth of filler bolt or plug.

Oil capacity:
0.8 ℓ (0.8 US qt, 0.7 Imp qt)

5) Install filler bolt or plug onto rear differential gear case firmly.

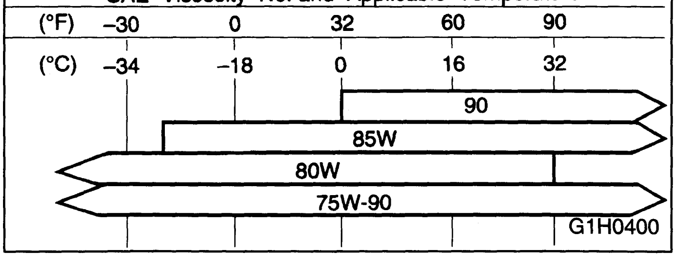
CAUTION:
• Non-Turbo model
Always use a new aluminum gasket.

Tightening torque:
34 ± 4 N.m (3.5 ± 0.4 kg-m, 25.3 ± 2.9 ft-lb)

• Turbo model
Apply fluid packing to filler plug threads before installation.

Fluid packing:
Three Bond 1205 or equivalent
Tightening torque:
49 ± 9.8 N.m (5 ± 1 kg-m, 36 ± 7.2 ft-lb)

ITEM
• Rear differential gear oil
API Classification
GL-5
SAE Viscosity No. and Applicable Temperature

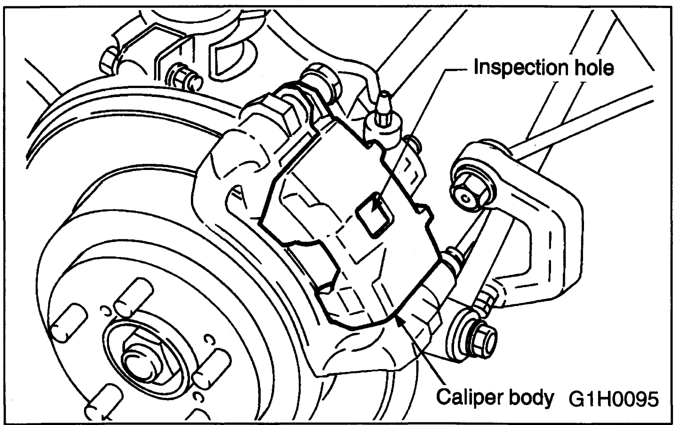


Recommended oil

CAUTION:
Each oil manufacturer has its base oil and additives. Thus, do not mix two or more brands.

13. Disc Brake Pads and Discs/Front and Rear Axle Boots and Axle Shaft Joint Portions

MAINTENANCE INTERVAL [Number of months of km (miles) whichever occurs first]					
Months		12	24	36	48
x1,000 km	1.6	25	50	75	100
x1,000 miles	1	15	30	45	60
		I	I	I	I



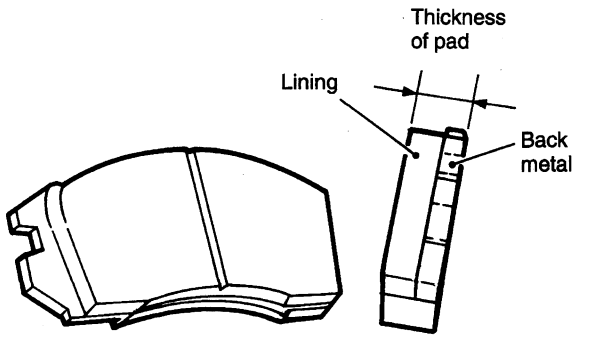
G1H0095

A: INSPECTION

1. DISC BRAKE PAD AND DISC

1) Jack up vehicle and support with rigid racks. Then remove wheels.
2) Visually check pad thickness through inspection hole of disc brake assembly. Replace pad if necessary.

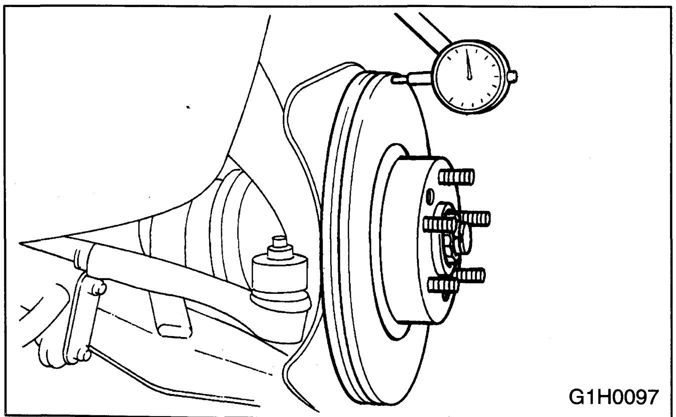
Pad thickness including back metal mm (in)		
	Front	Rear
Standard	17 (0.67)	15 (0.59)
Service limit	7.5 (0.295)	6.5 (0.256)
Service limit (exclude back metal)	1.5 (0.059)	1.5 (0.059)



G1H0096

3) Check the disc rotor, and correct or replace if it is damaged or worn.

Brake disc thickness mm (in)			
	Front		Rear
	15" & 14"	13"	
Standard	24 (0.94)	18 (0.71)	10 (0.39)
Wear limit	22 (0.87)	16 (0.63)	8.5 (0.335)


G1H0097

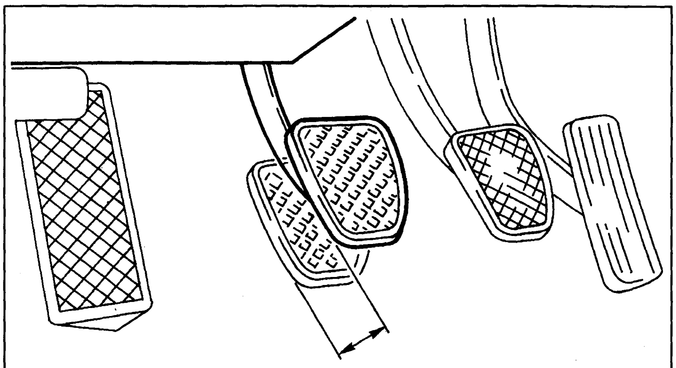
Measure the disc rotor runout at a point less than 5 mm (0.20 in) from the outer periphery of the rotor.

Disc rotor runout limit:
Front: 0.075 mm (0.00295 in)
Rear: 0.100 mm (0.00394 in)

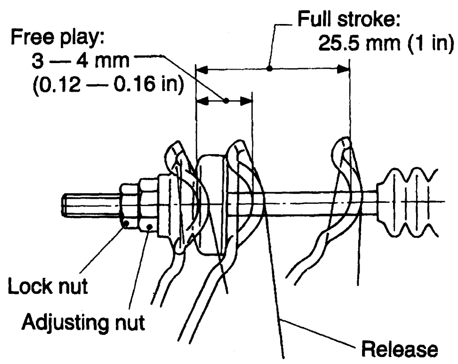
CAUTION:
When replacing a pad, always replace the pads for both the left and right wheels at the same time. Also replace pad clips if they are twisted or worn.

16. Clutch Operation System

MAINTENANCE INTERVAL [Number of months of km (miles) whichever occurs first]					
Months		12	24	36	48
x1,000 km	1.6	25	50	75	100
x1,000 miles	1	15	30	45	60
		I	I	I	I



G1H0107



G1H0057

A: INSPECTION AND ADJUSTMENT

1. MECHANICAL APPLICATION TYPE

1) Inspect free play of clutch pedal by operating pedal by hand.
If it is out of the specified value, adjust it by turning wing nut on engine side of clutch cable at release fork.

Tightening torque
(Adjusting nut on release fork):
6 ± 1.5 N.m
(0.61 ± 0.15 kg-m, 4.4 ± 1.1 ft-lb)

Standard free play:
At clutch pedal
10 — 20 mm (0.39 — 0.79 in)

Fork lever free play allowance:
3 — 4 mm (0.12 — 0.16 in)

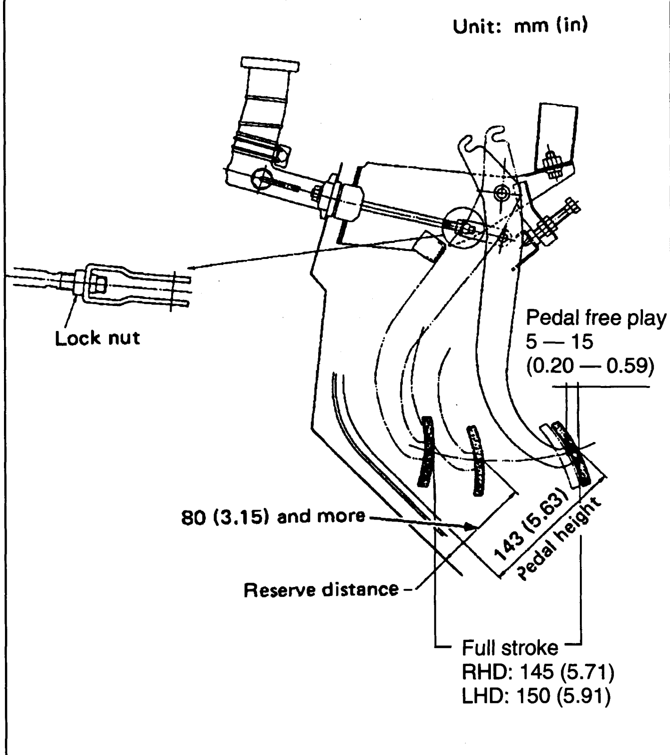
NOTE:
When replacing clutch cable with new one and/or marking free play adjustment of clutch pedal, make adjustment of hill-holder system without fail as follows.
After replacing clutch cable [and/or pressure hold valve (PHV) cable] with a new one, depress clutch pedal about thirty (30) times as a running-in operation prior to this adjustment.

2) Pedal-to-floor plate gap in disengaged position
(1) With the engine idling, pull parking brake lever completely.
(2) Slowly depress clutch pedal while moving shift lever into reverse.
(3) Stop depressing clutch pedal when gearshifting is complete. With clutch pedal in this position, measure the distance between the upper side of pedal pad and the

lower end of front panel (intersection of front panel with floor). Check that the measured value is within the specified standard.

Standard:
80 mm (3.15 in) or more

3) Pedal height
Check that the clutch pedal pad surface is level with or higher than brake pedal pad surface.

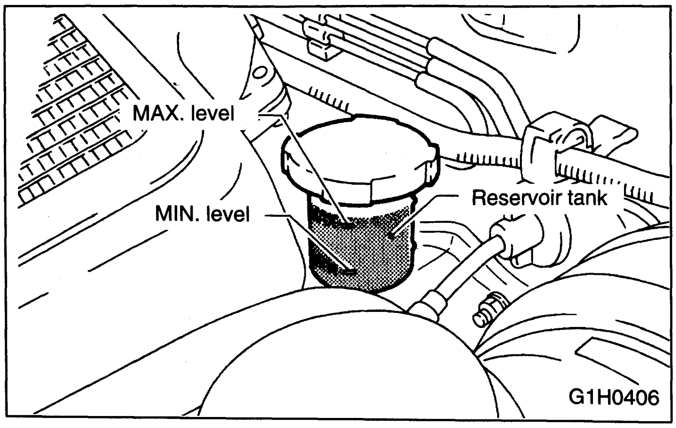


G1H0432

3. HYDRAULIC APPLICATION TYPE

1) Inspect free play of clutch pedal by operating pedal by hand.
If it is out of the specified value, loosen lock nut for push rod and adjust push rod by turning in the direction that shortens or lengthens it.

Standard free play:
5 — 15 mm (0.2 — 0.59 in)
Tightening torque (Adjusting lock nut):
10 ± 1 N-m
(1.0 ± 0.1 kg-m, 7.25 ± 0.75 ft-lb)



G1H0406

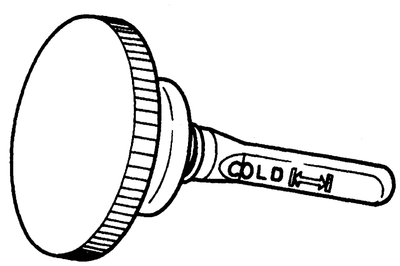
2) Check the fluid level using the scale on the outside of the clutch master cylinder tank. If the level is below "MIN", add clutch fluid to bring it up to "MAX".

Recommended clutch fluid:
FMVSS No. 116, fresh DOT3 or DOT4 brake fluid

CAUTION
- **Avoid mixing different brakes of brake fluid to prevent degradation of the fluid.**
- **Be careful not to allow dirt or dust to get into the reservoir tank.**
- **Use fresh DOT3 or DOT4 brake fluid when refilling fluid.**

17. Steering and Suspension System

MAINTENANCE INTERVAL [Number of months of km (miles) whichever occurs first]					
Months		12	24	36	48
x1,000 km	1.6	25	50	75	100
x1,000 miles	1	15	30	45	60
		I	I	I	I

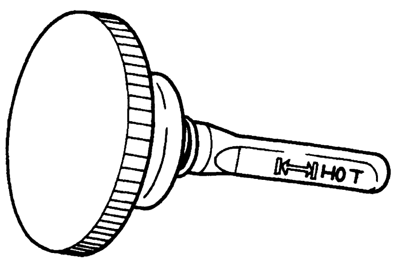


G1H0112

A: INSPECTION

5. POWER STEERING FLUID LEVEL

1) Place vehicle with engine "off" on the flat and level surface.
2) Check the fluid level by removing filler cap of oil pump.
(1) Check at temperature 21°C (70°F) of fluid temperature.



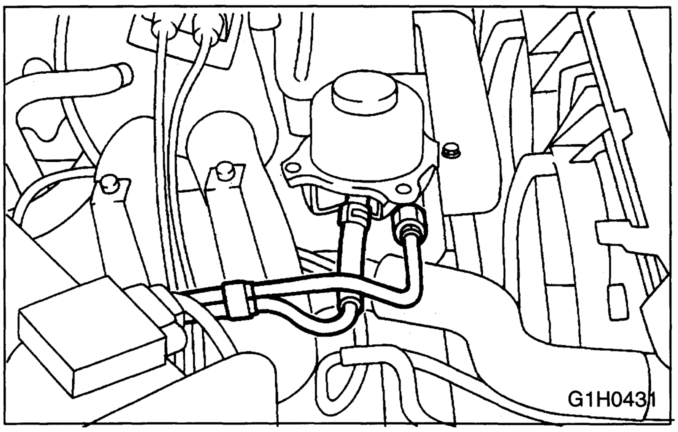
G1H0113

(2) Check at temperature 60°C (140°F) of fluid temperature.

3) Fluid level should be maintained in the each specified range on the indicator of filler cap.
If fluid level is at lower point or below, add fluid to keep the level in the specified range of indicator.
If fluid level is at upper point or above, drain fluid to keep the level in the specified range of indicator by using a syringe or the like.

Recommended fluid	Manufacturer
	B.P.
	CALTEX
"Dexron II or IIE" type automatic transmission fluid	CASTROL
	MOBIL
	SHELL
	TEXACO

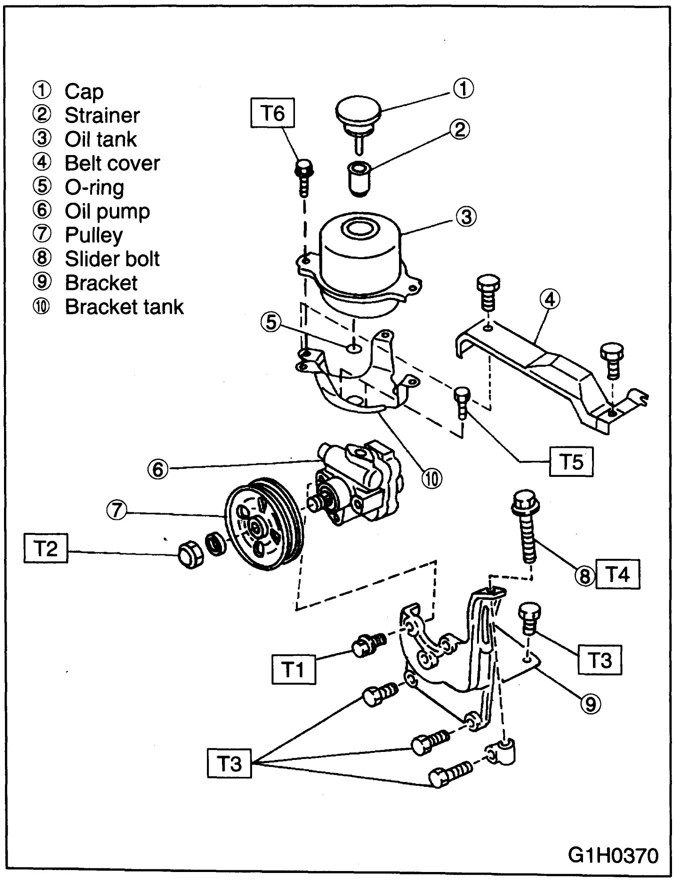
Fluid capacity:
0.7 ℓ (0.7 US qt, 0.6 Imp qt)



7. HOSES OF OIL PUMP FOR DAMAGES

Check pressure hose and return hose of oil pump for crack, swell or damage. Replace hose with new one if necessary.

NOTE:
Prevent hoses from revolving and/or turning when installing hoses.



10. FITTING BOLTS AND NUTS

Inspect fitting bolts and nuts of oil pump and bracket for looseness, and retighten them if necessary.
Inspect and/or retighten them when engine is cold.

Tightening torque:

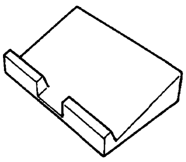
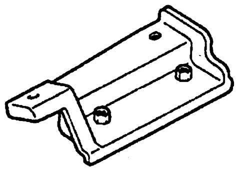
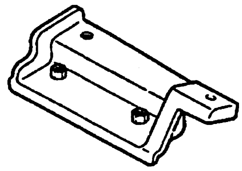
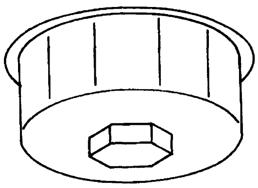
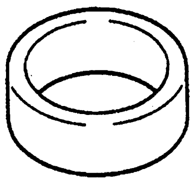
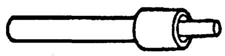
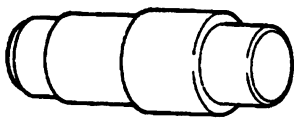
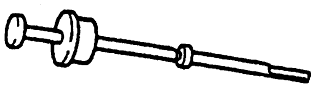
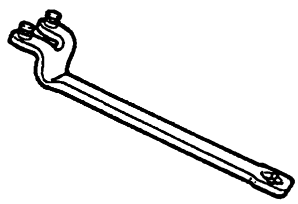
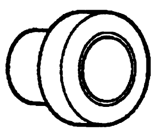
T1: ***20.5 ± 2.5 N.m***
(2.05 ± 0.25 kg-m, 15 ± 2 ft-lb)
T2: ***52 ± 10 N.m***
(5.3 ± 1.0 kg-m, 38.5 ± 7.5 ft-lb)
T3: ***22 ± 2 N.m***
(2.2 ± 0.2 kg-m, 15.5 ± 1.5 ft-lb)
T4: ***8 ± 2 N.m***
(0.8 ± 0.2 kg-m, 5.5 ± 1.5 ft-lb)
T5: 18^{+5}_{0} ***N.m***
($1.8^{+0.5}_{0}$ ***kg-m,*** $13.0^{+3.6}_{0}$ ***ft-lb)***
T6: ***7.4 ± 2.0 N.m***
(0.75 ± 0.20 kg-m, 5.4 ± 1.4 ft-lb)

SPECIAL TOOLS 1-6

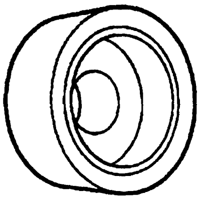
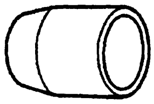
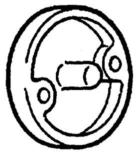
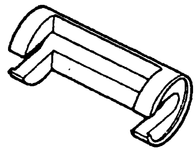
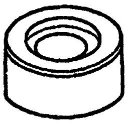
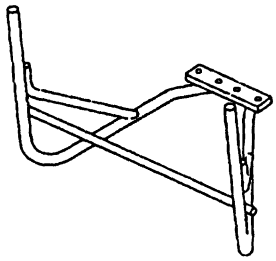
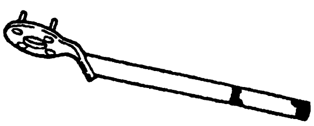
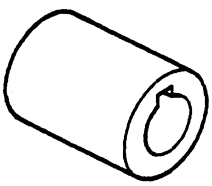
Page

1. Engine Tools 2
2. Manual Transmission and Differential Tools
3. Automatic Transmission and Differential Tools
4. Rear Differential Tools (AWD Models) 4
5. Suspension Tools
6. Wheels and Axles Tools 8
7. Steering System Tools
8. Brake Tools
9. Body Tools
10. Supplemental Restraint System Tools 10
11. Select Monitor and Cartridge 11

1. Engine Tools

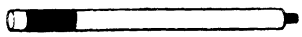
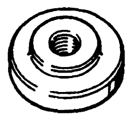
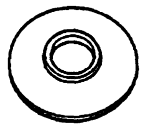
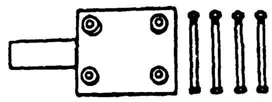
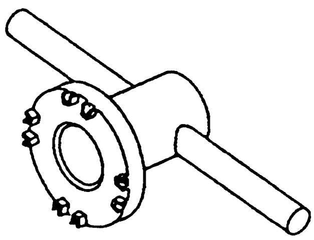
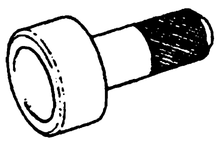
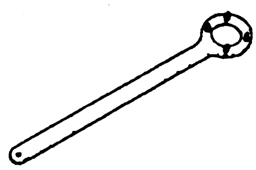
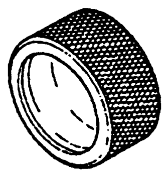
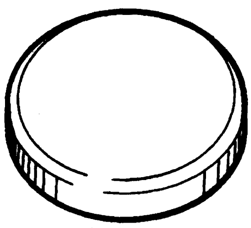
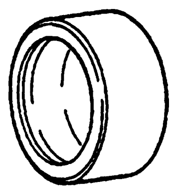
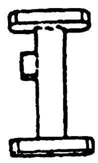
498267600 *	498457000	498457100	498497100
CYLINDER HEAD TABLE	ENGINE STAND ADAPTER RH	ENGINE STAND ADAPTER LH	CRANKSHAFT STOPPER
• For replacing valve guides. Used to remove and install valve springs. • For DOHC engine.	Used with ENGINE STAND (499817000).	Used with ENGINE STAND (499817000).	Used to stop rotation of flywheel when loosening and tightening crankshaft pulley bolt, etc.
 G1H0371	 G1H0128	 G1H0129	 G1H0130
498547000	398744300	498857100	499017100
OIL FILTER WRENCH	PISTON GUIDE	VALVE OIL SEAL GUIDE	PISTON PIN GUIDE
Used to remove and install oil filter.	• Used to install piston in cylinder. • For DOHC engine.	For press-fitting of intake and exhaust valve guide oil seals.	Used to install piston pin, piston and connecting rod.
 G1H0131	 G1H0132	 G1H0133	 G1H0134
499037100	499097500	499207100	499587100
CONNECTING ROD BUSHING REMOVER & INSTALLER	PISTON PIN REMOVER ASSY	CAMSHAFT SPROCKET WRENCH CP	CAMSHAFT OIL SEAL INSTALLER
Used to remove and install connecting rod bushing.	Used to remove piston pin.	Used to remove and install camshaft sprocket.	• Used to install crankshaft oil seal. • Used with CAMSHAFT OIL SEAL GUIDE (499597000).
 G1H0135	 G1H0136	 G1H0137	 G1H0138

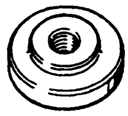
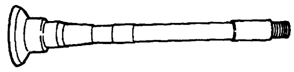
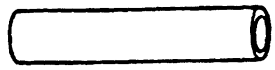
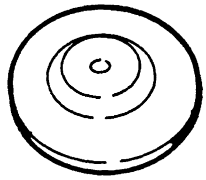
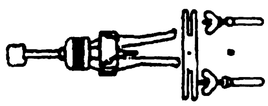
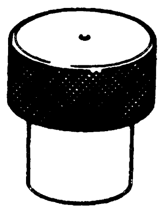
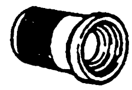
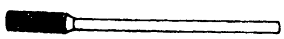
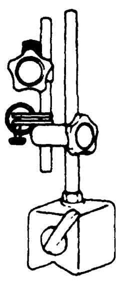
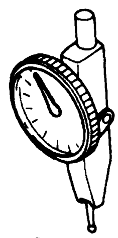
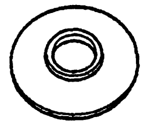
*Newly adopted tool

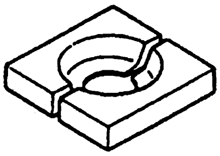
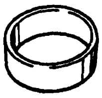
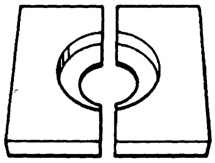
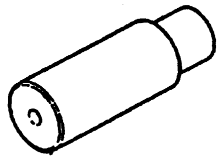
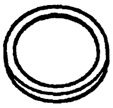
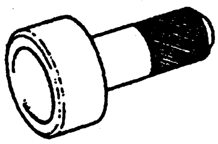
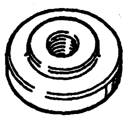
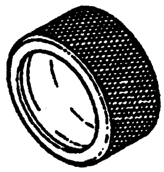
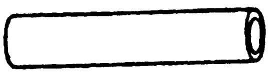
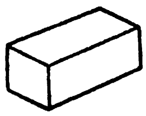
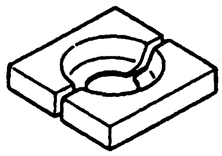
499587200	499597000	499597100	499718000
CRANKSHAFT OIL SEAL INSTALLER	CAMSHAFT OIL SEAL GUIDE	CRANKSHAFT OIL SEAL GUIDE	VALVE SPRING REMOVER
• Used to install crankshaft oil seal. • Used with CRANKSHAFT OIL SEAL GUIDE (499597100).	• Used to install camshaft oil seal. • Used with CAMSHAFT OIL SEAL INSTALLER (499587100).	• Used to install crankshaft oil seal. • Used with CRANKSHAFT OIL SEAL INSTALLER (499587200).	Used to remove and install valve spring.
 G1H0139	 G1H0140	 G1H0141	 G1H0142
498267700 *	499767200	499767400	499817000
VALVE GUIDE ADJUSTER	VALVE GUIDE REMOVER	VALVE GUIDE REAMER	ENGINE STAND
• Used to install intake and exhaust valve guides. • For DOHC engine.	For removing valve guides.	For reaming valve guides.	• Stand used for engine disassembly and ASSY. • Used with ENGINE STAND ADAPTER RH (498457000) & LH (498457100).
 G1H0143	 G1H0144	 G1H0145	 G1H0146
499977000	499987500		
CRANK PULLEY WRENCH CP	CRANKSHAFT SOCKET		
Used to stop rotation of crankshaft pulley when loosening and tightening crankshaft pulley bolts.	Used to rotate crankshaft.		
 G1H0147	 G1H0148		

*Newly adopted tool

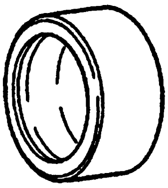
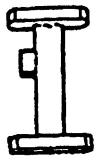
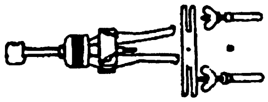
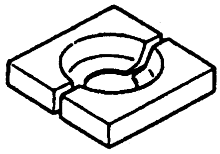
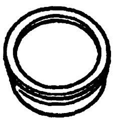
4. Rear Differential Tools (AWD Models)

398477701	398477702	498175500	398217700
HANDLE	DRIFT	INSTALLER	ATTACHMENT SET
Front and rear bearing race.	Rear bearing race.	Rear bearing cone.	Differential ASSY.
 G1H0215	 G1H0227	 G1H0217	 G1H0218
399780111	498447120	498427200	498447100
WRENCH ASSY	DRIFT	FLANGE WRENCH	DRIFT
Used to remove and install side oil seal holder.	Oil seal.	Companion flange.	Oil seal.
 G1H0169	 G1H0221	 G1H0222	 G1H0200
399520105	398467700	498485400	498505501
SEAT	DRIFT	DRIFT	GAUGE
Side bearing cone.	Drive pinion, Pilot bearing, Front bearing cone.	Side bearing cone.	Pinion height adjustment.
 G1H0305	 G1H0224	 G1H0225	 G1H0226

498447110	498447140	32285AA000	499705404
BEARING OUTER RACE DRIFT	DUMMY SHAFT	DUMMY COLLAR	SEAT
For press-fitting the bearing race (front) of differential carrier.	Pinion height and Preload adjustment.	Pinion height and Preload adjustment.	Side bearing cup.
 G1H0227	 G1H0228	 G1H0229	 G1H0304
499705401	399780104	899580100	899874100
PULLEY ASSY	WEIGHT	INSTALLER	INSTALLER
Oil seal, Side bearing cup.	Front bearing cone, Pilot bearing, Companion flange.	Front bearing cone, Pilot bearing.	Companion flange.
 G1H0232	 G1H0234	 G1H0235	 G1H0236
899904100	498247001	498247100	398177700
STRAIGHT PIN REMOVER	MAGNET BASE	DIAL GAUGE	INSTALLER
Differential pinion shaft lock pin.	• Used to measure backlash between side gear and pinion, and hypoid gear. • Used with DIAL GAUGE (498247100).	• Used to measure backlash between side gear and pinion, and hypoid gear. • Used with MAGNET BASE (498247001).	Rear bearing cone.
 G1H0237	 G1H0159	 G1H0160	 G1H0355

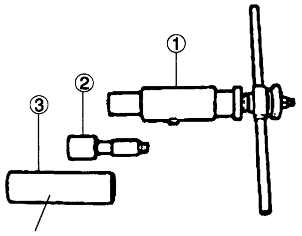
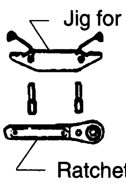
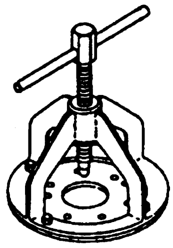
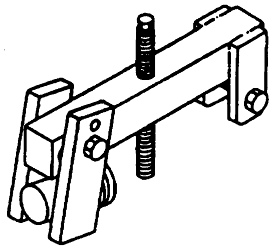
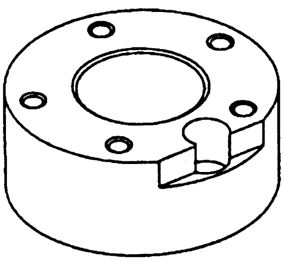
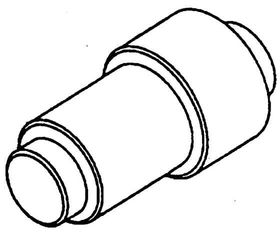
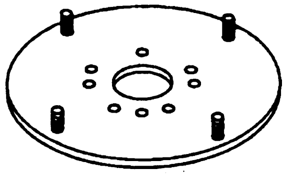
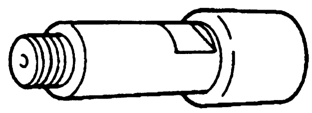
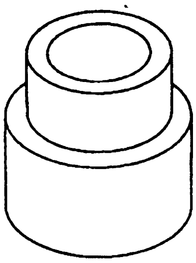
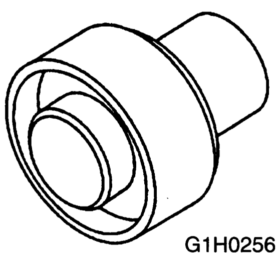
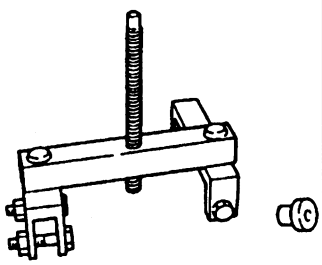
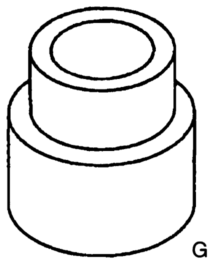
498517210*	498485400	498515500	398457700
REPLACER	SIDE BEARING DRIFT	DRIVE PINION BEARING REPLACER	ATTACHMENT
Side bearing cone.	For press-fitting the side bearing cone of differential.	For removing the drive pinion bearing cone (front).	• Side bearing retainer. • For TURBO model
 G1H0379	 G1H0357	 G1H0358	 G1H0386
398237700	398417700	398427703	398437700
GAUGE	DRIFT	DRIFT 2	DRIFT
• Side bearing. • For TURBO model	• Oil seal. • For TURBO model	• For press-fitting the bearing race (front) of differential carrier. • For TURBO model	• Oil seal. • For TURBO model
 G1H0372	 G1H0373	 G1H0356	 G1H0375
398507702	398507703	398507704	398517700
DUMMY SHAFT	DUMMY COLLAR	BLOCK	REPLACER
• Pinion height and Preload adjustment. • For TURBO model	• Pinion height and Preload adjustment. • For TURBO model	• Pinion height and Preload adjustment. • For TURBO model	• Rear bearing cone. • For TURBO model
 G1H0376	 G1H0377	 G1H0378	 G1H0379

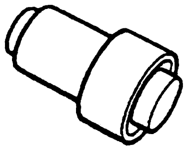
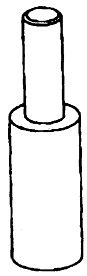
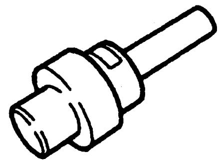
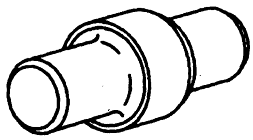
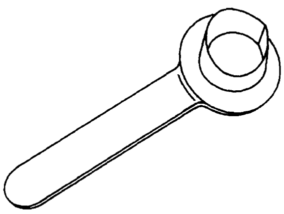
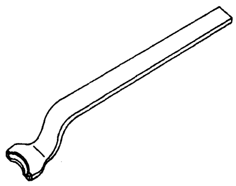
*Newly adopted tool

398487700	398507701	398527700	498517200 *
DRIFT	GAUGE	PULLEY ASSY	REPLACER
• Side bearing cone. • For TURBO model	• Pinion height adjustment. • For TURBO model	• Oil seal, Side bearing cup. • For TURBO model	• Side bearing cone. • For TURBO model
 G1H0380	 G1H0381	 G1H0382	 G1H0379
398227700			
WEIGHT			
• Side bearing. • For TURBO model			
 G1H0385			

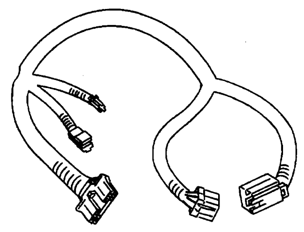
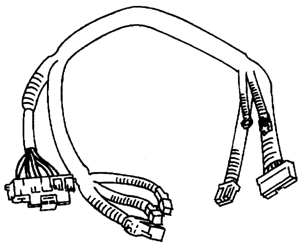
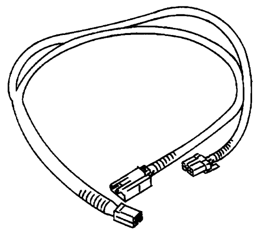
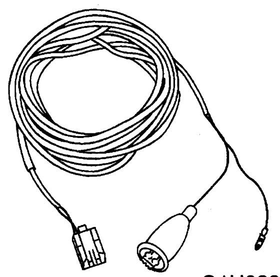
*Newly adopted tool

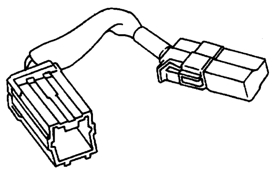
6. Wheels and Axles Tools

922431000	925091000	926470000	927060000
AXLE SHAFT INSTALLER	BAND TIGHTENING TOOL	AXLE SHAFT PULLER	HUB REMOVER
• Used to install axle shaft into housing • Used with ADAPTER (927390000).	For tightening boot band.	Used to remove front axle shaft.	Used to remove front hub.
 G1H0247	 G1H0248	 G1H0249	 G1H0250
927080000	927100000	927140000	927390000
HUB STAND	BEARING PULLER	AXLE SHAFT PULLER PLATE	ADAPTER
Used to disassemble and assemble hub bolt in rear hub CP. FWD	• Used to disassemble and assemble front housing bearing. • Used with HOUSING STAND (927400000).	Same as plate 2 included in AXLE SHAFT PULLER (927070000).	Used as an adapter for AXLE SHAFT INSTALLER (922431000).
 G1H0251	 G1H0252	 G1H0253	 G1H0254
927400000	927410000	927420000	927430000
HOUSING STAND	OIL SEAL INSTALLER	HUB REMOVER	HOUSING STAND
• Used to disassemble and assemble front housing bearing. • Used with BEARING PULLER (927100000).	Used to install oil seal into front housing.	Used to remove rear hub CP.	• Used to disassemble and assemble rear housing bearing. • Used with BEARING PULLER (927440000).
 G1H0255	 G1H0256	 G1H0257	 G1H0255

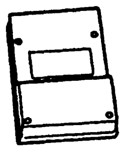
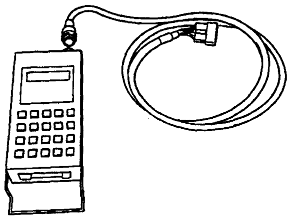
927440000	927120000	927450000	927460000
BEARING REMOVER	HUB INSTALLER	HUB INSTALLER	OIL SEAL INSTALLER
• Used to disassemble and assemble rear housing bearing. • Used with HOUSING STAND (927430000).	Used to install hub.	• Used to press rear hub CP into housing ASSY. • Used with HOUSING STAND (927430000).	• Used to install outer bearing and sub bearing into housing. • Used with HOUSING STAND (927430000).
 G1H0258	 G1H0301	 G1H0259	 G1H0260
28099PA090	28099PA100		
OIL SEAL PROTECTOR	DRIVE SHAFT REMOVER		
• Used to install rear drive shaft into rear differential. • For protecting oil seal.	• Used to remove rear drive shaft from rear differential.		
 G1H0303	 G1H0388		

10. Supplemental Restraint System Tools

98299PA000	98299PA011	98299PA020	98299PA030
HARNESS A	HARNESS B2	HARNESS C	DEPLOYMENT TOOL
Used to check the supplemental restraint system.	Used to check the supplemental restraint system.	Used to check the supplemental restraint system.	Used to operate the supplemental restraint system when scraping the vehicle.
 G1H0284	 G1H0285	 G1H0286	 G1H0287

98299PA040
AIR BAG RESISTOR
Used to check the steering column harness.
 G1H0389

11. Select Monitor and Cartridge

498349900 *	498307500
CARTRIDGE	SELECT MONITOR KIT
Troubleshooting for electrical systems.	Troubleshooting for electrical systems.
 G1H0288	 G1H0127

*Newly adopted tool

ON-CAR SERVICES 2-2

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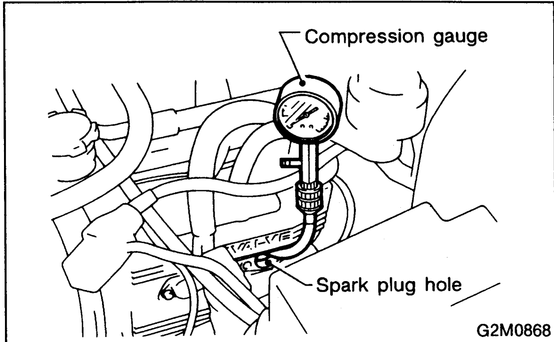
1. Foreword
2. Ignition Timing
3. Engine Idle Speed
4. Engine Compression 2
5. Intake Manifold Vacuum 3
6. Engine Oil Pressure

- The descriptions in this section apply to the turbo model.

4. Engine Compression

A: MEASUREMENT

1) After warming-up the engine, turn ignition switch to OFF.
2) Make sure that the battery is fully charged.
3) Remove all the spark plugs.
4) Disconnect connectors from fuel injectors.
5) Fully open throttle valve.
6) Check the starter motor for satisfactory performance and operation.



G2M0868

7) Hold the compression gauge tight against the spark plug hole.
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 (200 — 300 rpm and fully open throttle):

Standard

981 — 1,177 kPa
(10.0 — 12.0 kg/cm^2, 142 — 171 psi)

Limit

834 kPa (8.5 kg/cm^2, 121 psi)

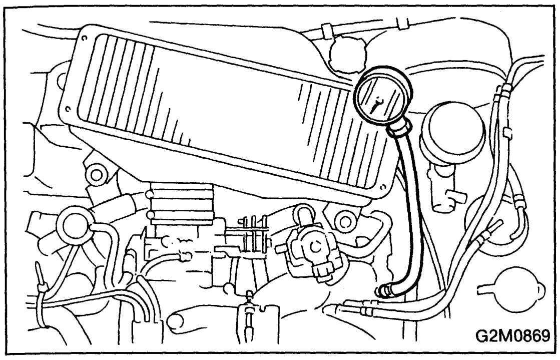
Difference between cylinders

196 kPa (2.0 kg/cm^2, 28 psi)

5. Intake Manifold Vacuum

A: MEASUREMENT

1) Warm-up the engine.
2) Disconnect the vacuum hose and install the vacuum gauge to the hose fitting on the manifold.


G2M0869

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"):
More than –60.0 kPa
(–450 mmHg, –17.72 inHg)

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 throttle chamber gasket.
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 muffler 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.

ENGINE (DOHC) 2-3b

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1. Engine

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	6° BTDC
		Closing	56° ABDC
	Exhaust valve timing	Opening	55° BBDC
		Closing	11° ATDC
	Idling speed [At neutral or position]	rpm	900 ± 100 (No load)
	Firing order		1 → 3 → 2 → 4
	Ignition timing	BTDC/rpm	18° ± 10°/900

B: SERVICE DATA

Belt tension adjuster	Protrusion of adjuster rod			15.4 — 16.4 mm	(0.606 — 0.646 in)
Belt tensioner	Spacer O.D.			16 mm	(0.63 in)
	Tensioner bush I.D.			16.16 mm	(0.6362 in)
	Clearance between spacer and bush		STD	0.117 — 0.180 mm	(0.0046 — 0.0071 in)
			Limit	0.230 mm	(0.0091 in)
	Side clearance of spacer		STD	0.37 — 0.54 mm	(0.0146 — 0.0213 in)
			Limit	0.8 mm	(0.031 in)
Camshaft	Bend limit			0.20 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	41.78 — 41.88 mm	(1.6449 — 1.6488 in)
			Limit	41.62 mm	(1.6386 in)
		Exhaust	STD	41.78 — 41.88 mm	(1.6449 — 1.6488 in)
			Limit	41.62 mm	(1.6386 in)
	Journal O.D.	STD	Front	31.946 — 31.963 mm	(1.2577 — 1.2584 in)
			Center rear	27.946 — 27.963 mm	(1.1002 — 1.1009 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			0.3 mm	(0.012 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 — 6.015 mm	(0.2362 — 0.2368 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	5.950 — 5.965 mm	(0.2343 — 0.2348 in)
			Exhaust	5.950 — 5.965 mm	(0.2343 — 0.2348 in)
	Stem oil clearance	STD	Intake	0.035 — 0.062 mm	(0.0014 — 0.0024 in)
			Exhaust	0.040 — 0.067 mm	(0.0016 — 0.0026 in)
		Limit		0.15 mm	(0.0059 in)
	Overall length		Intake	93.3 mm	(3.673 in)
			Exhaust	93.6 mm	(3.685 in)

STD: Standard I.D.: Inner diameter O.D.: Outer diameter

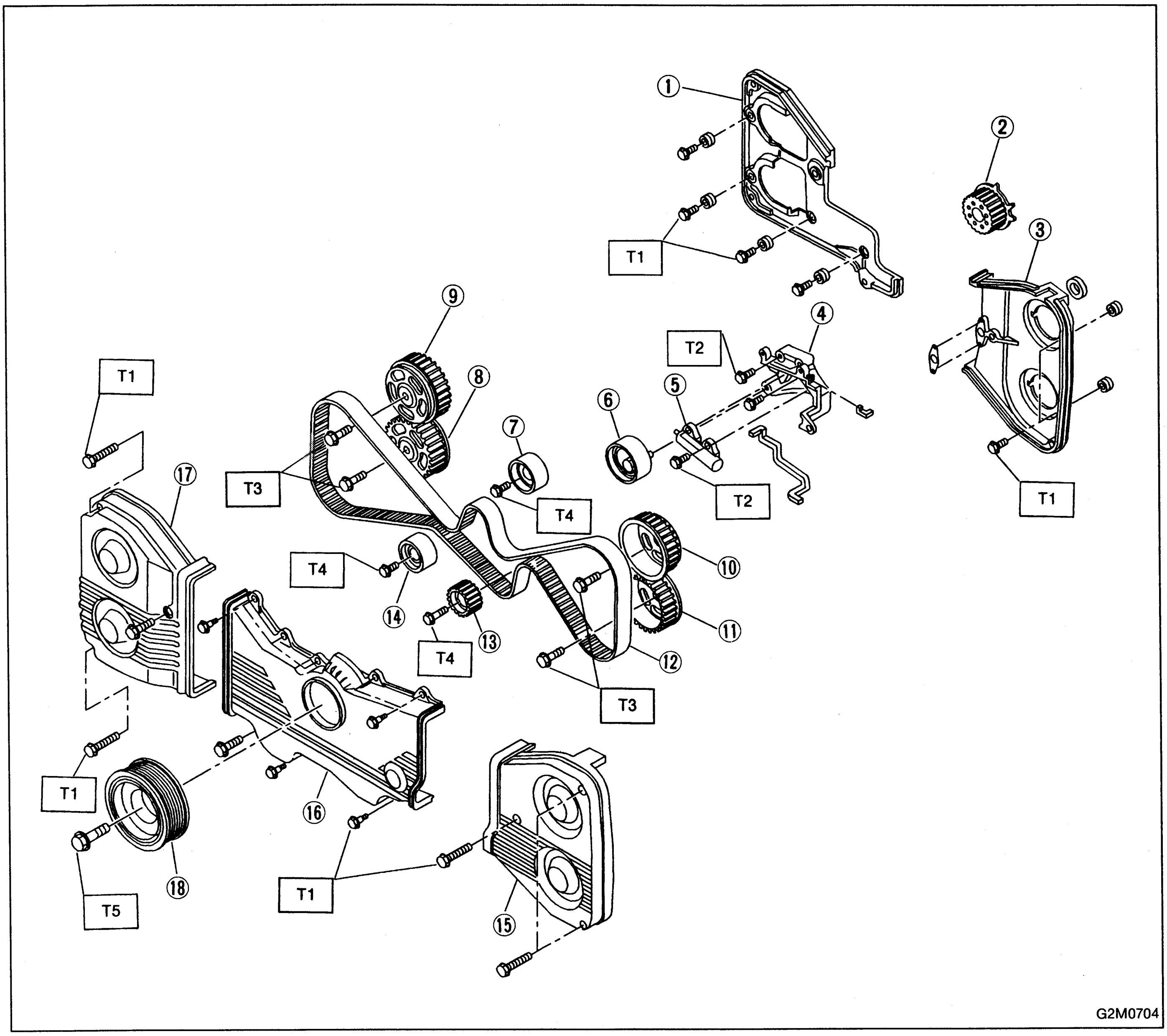
Valve spring	Free length			39.8 mm	(1.567 in)
	Squareness			2.5°, 1.7 mm	(0.067 in)
	Tension/spring height		Set	228.5 — 261.8 N (23.3 — 26.7 kg, 51.4 — 58.9 lb)/31 mm (1.22 in)	
			Lift	462.9 — 531.5 N (47.2 — 54.2 kg, 104.1 — 119.5 lb)/ 23.2 mm (0.913 in)	
Cylinder block	Surface warpage limit (mating with cylinder head)			0.05 mm	(0.0020 in)
	Surface grinding limit			0.1 mm	(0.004 in)
	Cylinder bore		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	0.060 mm	(0.0024 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)
	Standard inner diameter of piston pin hole			23.000 — 23.006 mm	(0.9055 — 0.9057 in)
Piston pin	Outer diameter			22.994 — 23.000 mm	(0.9053 — 0.9055 in)
	Standard clearance between piston pin and hole in piston			0.001 — 0.013 mm	(0.00004 — 0.00051 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 — 0.26 mm	(0.0079 — 0.0102 in)
			Limit	0.5 mm	(0.020 in)
		Second ring	STD	0.37 — 0.52 mm	(0.0146 — 0.0205 in)
			Limit	1.0 mm	(0.039 in)
		Oil ring	STD	0.20 — 0.70 mm	(0.0079 — 0.0276 in)
			Limit	1.5 mm	(0.059 in)
	Clearance between piston ring and piston ring groove	Top ring	STD	0.040 — 0.080mm	(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)

STD: Standard OS: Oversize

Connecting rod bearing	Oil clearance		STD	0.025 — 0.055 mm	(0.0010 — 0.0022 in)
			Limit	0.06 mm	(0.0024 in)
	Thickness at center portion	STD		1.487 — 1.496 mm	(0.0585 — 0.0589 in)
		0.03 mm (0.0012 in) US		1.505 — 1.508 mm	(0.0593 — 0.0594 in)
		0.05 mm (0.0020 in) US		1.515 — 1.518 mm	(0.0596 — 0.0598 in)
		0.25 mm (0.0098 in) US		1.615 — 1.618 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)
	Crankpin and crank journal	Out-of roundness		0.030 mm (0.0012 in) or less	
		Grinding limit		0.250 mm	(0.0098 in)
	Crankpin 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	STD		59.984 — 60.000 mm	(2.3616 — 2.3622 in)
		0.03 mm (0.0012 in) US		59.954 — 59.970 mm	(2.3604 — 2.3610 in)
		0.05 mm (0.0020 in) US		59.934 — 59.950 mm	(2.3596 — 2.3602 in)
		0.25 mm (0.0098 in) US		59.734 — 59.750 mm	(2.3517 — 2.3524 in)
	Thrust clearance	STD		0.030 — 0.115 mm	(0.0012 — 0.0045 in)
		Limit		0.25 mm	(0.0098 in)
	Oil clearance	#1, #5	STD	0.010 — 0.030 mm	(0.0004 — 0.0012 in)
			Limit	0.040 mm	(0.0016 in)
		#2, #3, #4	STD	0.010 — 0.030 mm	(0.0004 — 0.0012 in)
			Limit	0.035 mm	(0.0014 in)
Crankshaft bearing	Crankshaft bearing thickness	#1, #5	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, #3, #4	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)

STD: Standard US: Under size

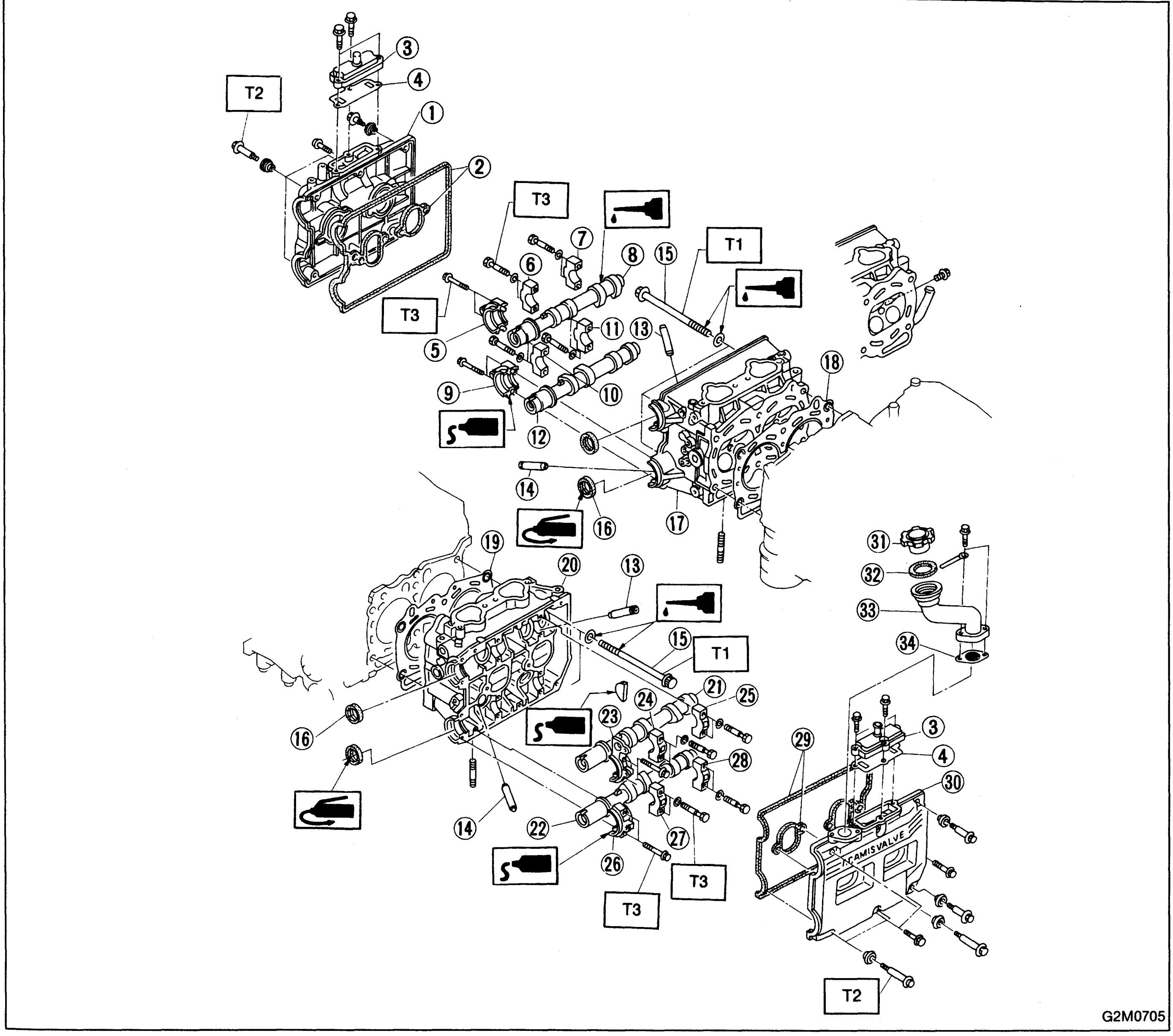
1. Timing Belt



1. Right-hand belt cover No. 2
2. Crankshaft sprocket
3. Left-hand belt cover No. 2
4. Tensioner bracket
5. Tensioner adjuster
6. Belt tensioner
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 (kg-m, ft-lb)
T1: 4.9±0.5 (0.5±0.05, 3.6±0.4)
T2: 25±2 (2.5±0.2, 18.1±1.4)
T3: 39±4 (4.0±0.4, 28.9±2.9)
T4: 78±5 (8.0±0.5, 57.9±3.6)
T5: 98±5 (10.0±0.5, 72.3±3.6)

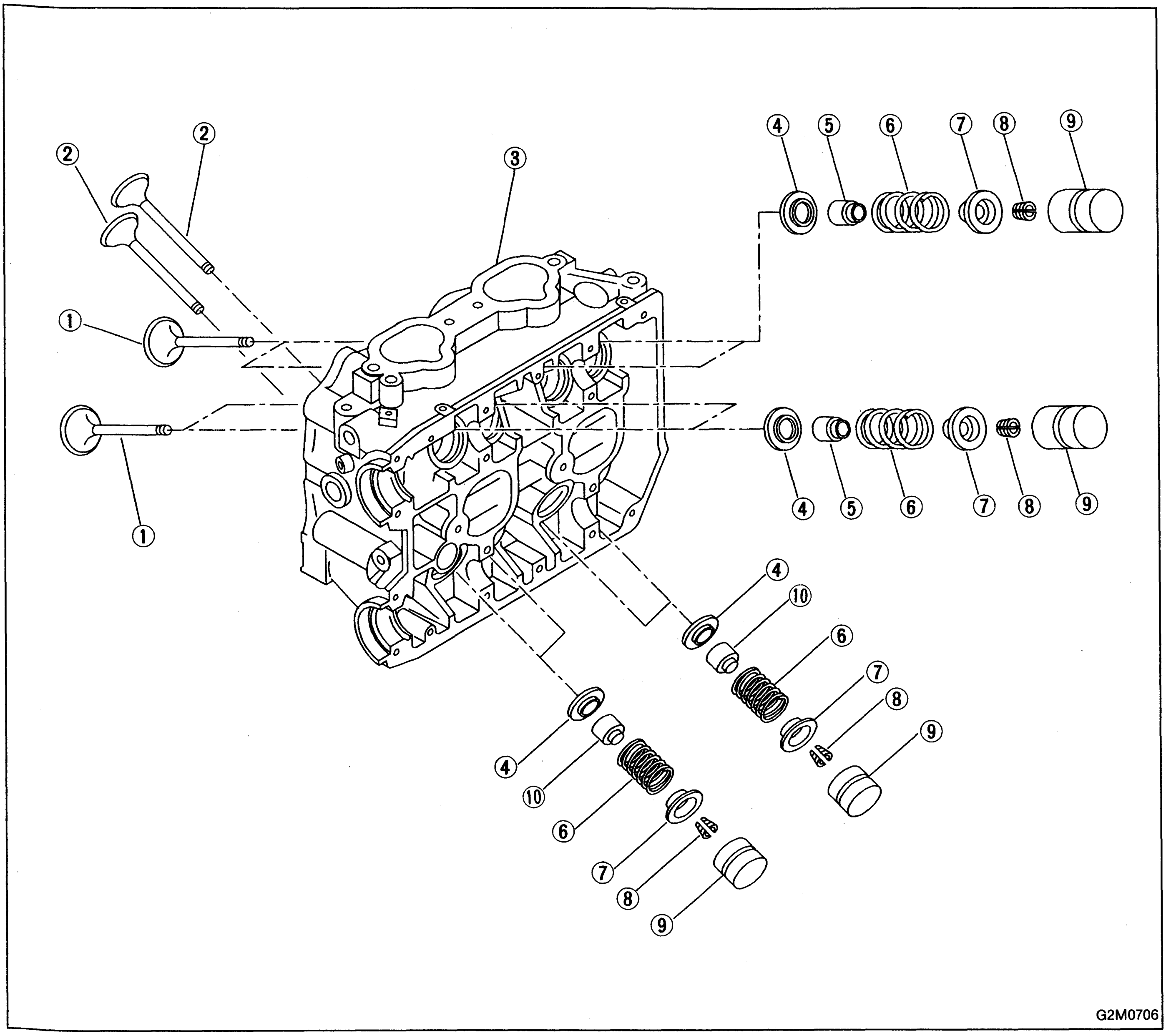
2. Cylinder Head and Camshaft



① Rocker cover (RH)
② Rocker cover gasket (RH)
③ Oil separator cover
④ Gasket
⑤ Intake camshaft cap (Front RH)
⑥ Intake camshaft cap (Center RH)
⑦ Intake camshaft cap (Rear RH)
⑧ Intake camshaft (RH)
⑨ Exhaust camshaft cap (Front RH)
⑩ Exhaust camshaft cap (Center RH)
⑪ Exhaust camshaft cap (Rear RH)
⑫ Exhaust camshaft (RH)
⑬ Intake valve guide
⑭ Exhaust valve guide
⑮ Cylinder head bolt
⑯ Oil seal
⑰ Cylinder head (RH)
⑱ Cylinder head gasket (RH)
⑲ Cylinder head gasket (LH)
⑳ Cylinder head (LH)
㉑ Intake camshaft (LH)
㉒ Exhaust camshaft (LH)
㉓ Intake camshaft cap (Front LH)
㉔ Intake camshaft cap (Center LH)
㉕ Intake camshaft cap (Rear LH)
㉖ Exhaust camshaft (Front LH)
㉗ Exhaust camshaft cap (Center LH)
㉘ Exhaust camshaft cap (Rear LH)
㉙ Rocker cover gasket (LH)
㉚ Rocker cover (LH)
㉛ Oil filler cap
㉜ Gasket
㉝ Oil filler duct
㉞ Gasket

Tightening torque: N·m (kg-m, ft-lb)
T1: Refer to [W5E1].
T2: 5 (0.5, 3.6)
T3: 10 (1.0, 7)

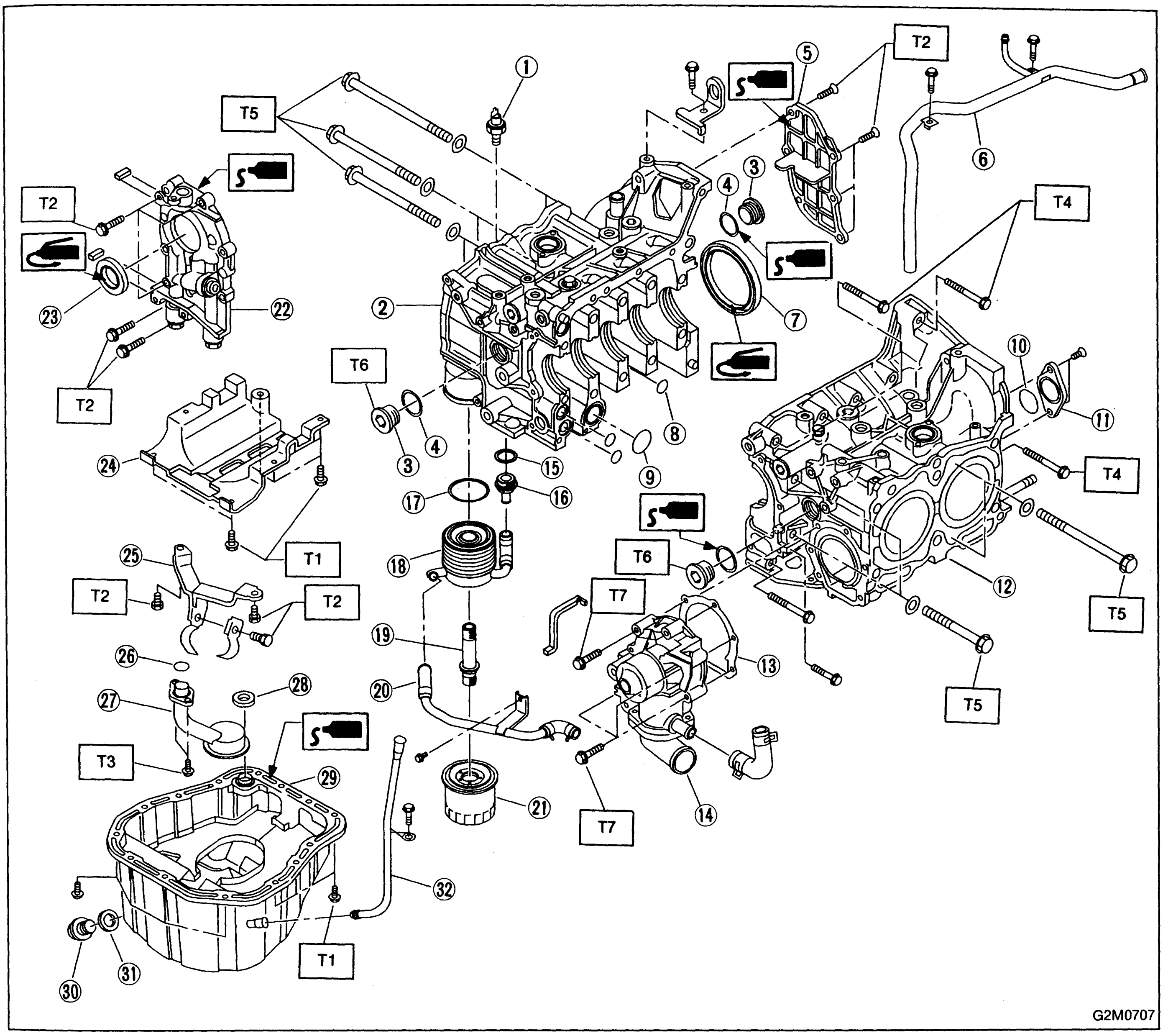
3. Cylinder Head and Valve Assembly



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. Hydraulic lash adjuster
10. Exhaust valve oil seal

Tightening torque: N·m (kg-m, ft-lb)
T1: 5 (0.5, 3.6)
T2: 12 (1.2, 9)

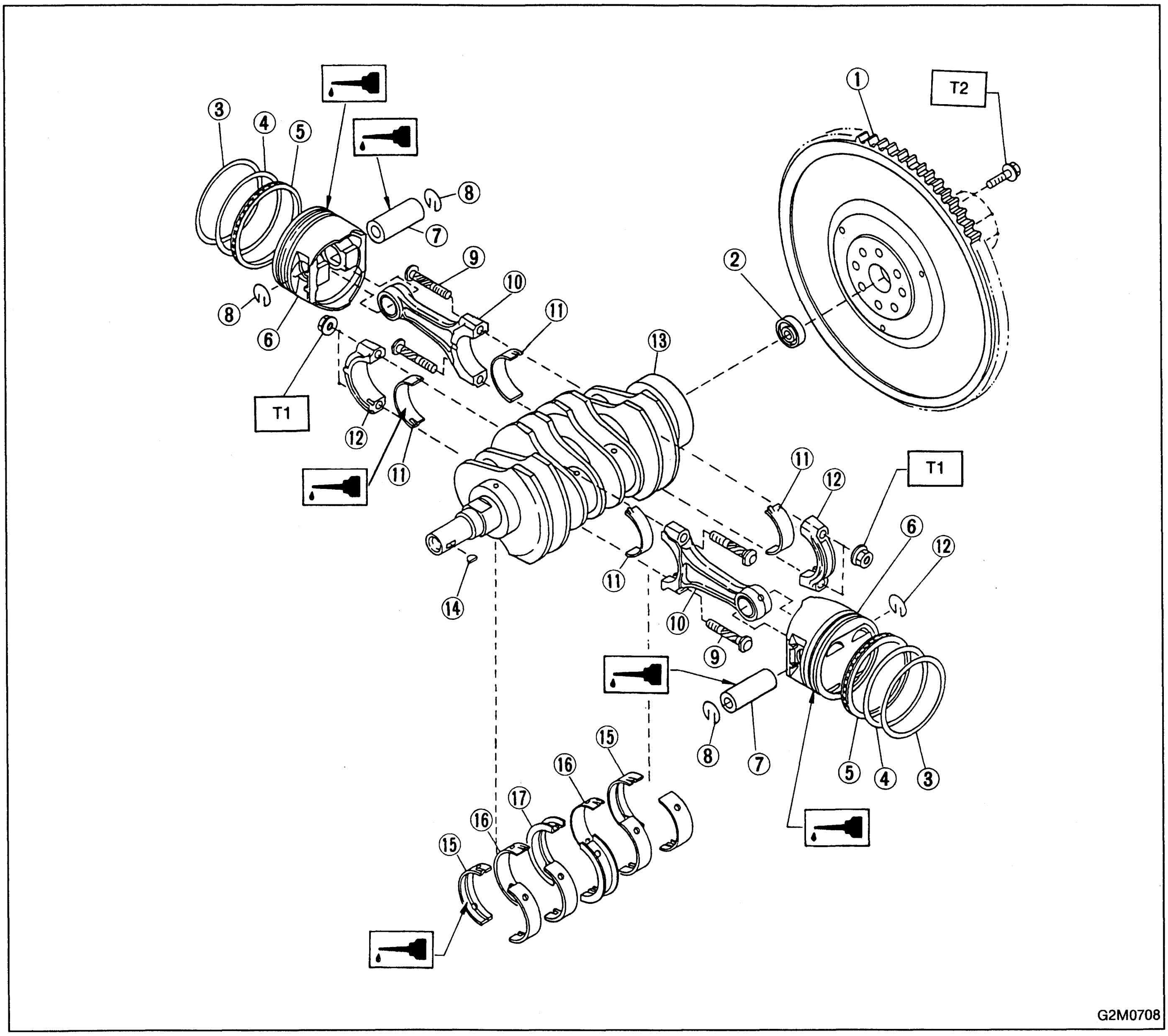
4. Cylinder Block



① Oil pressure switch
② Right-hand cylinder block
③ Service hole plug
④ Metal gasket
⑤ Oil separator cover
⑥ Engine coolant pipe A
⑦ Rear oil seal
⑧ O-ring
⑨ O-ring
⑩ O-ring
⑪ Service hole cover
⑫ Left-hand cylinder block
⑬ Gasket
⑭ Engine coolant pump
⑮ Metal gasket
⑯ Joint plug
⑰ O-ring
⑱ Oil cooler
⑲ Connector
⑳ Engine coolant pipe B
㉑ Oil cleaner
㉒ Oil pump
㉓ Front oil seal
㉔ Baffle plate
㉕ Oil strainer stay
㉖ O-ring
㉗ Oil strainer
㉘ Gasket
㉙ Oil pan
㉚ Oil drain plug
㉛ Metal gasket
㉜ Oil level gauge guide

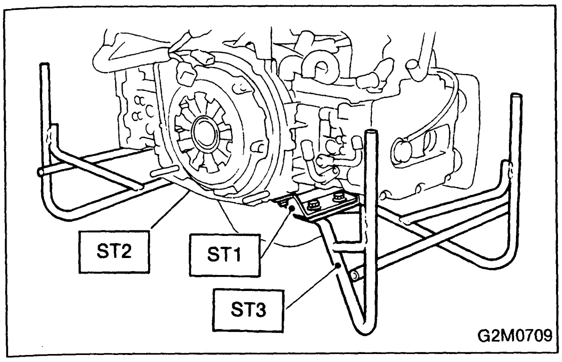
Tightening torque: N·m (kg-m, ft-lb)
- ***T1: 5 (0.5, 3.6)***
- ***T2: 6.4 (0.65, 4.7)***
- ***T3: 10 (1.0, 7)***
- ***T4: 25±2 (2.5±0.2, 18.1±1.4)***
- ***T5: 47±3 (4.8±0.3, 34.7±2.2)***
- ***T6: 69±7 (7.0±0.7, 50.6±5.1)***
- ***T7: First***
  - ***12±2 (1.2±0.2, 8.7±1.4)***
  - ***Second***
  - ***12±2 (1.2±0.2, 8.7±1.4)***

5. Crankshaft and Piston



① Flywheel
② Bell 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, #5
⑯ Crankshaft bearing #2, #4
⑰ Crankshaft bearing #3

Tightening torque: N·m (kg-m, ft-lb)
T1: 43 — 46 (4.4 — 4.7, 32 — 34)
T2: 69 — 75 (7.0 — 7.6, 51 — 55)



1. General Precautions

1) Before disassembling engine, place it on ST3.

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

On turbocharged engine, remove exhaust manifolds, turbo joint pipe and turbocharger before placing it on ST3.

2) All parts should be thoroughly cleaned, paying special attention to the engine oil passages, pistons and bearings.

3) Rotating parts and sliding parts such as piston, bearing and gear should be coated with oil prior to assembly.

4) Be careful not to let oil, grease or coolant contact the timing belt, clutch disc and flywheel.

5) All removed parts, if to be reused, should be reinstalled in the original positions and directions.

6) Gaskets and lock washers must be replaced with new ones. Liquid gasket should be used where specified to prevent leakage.

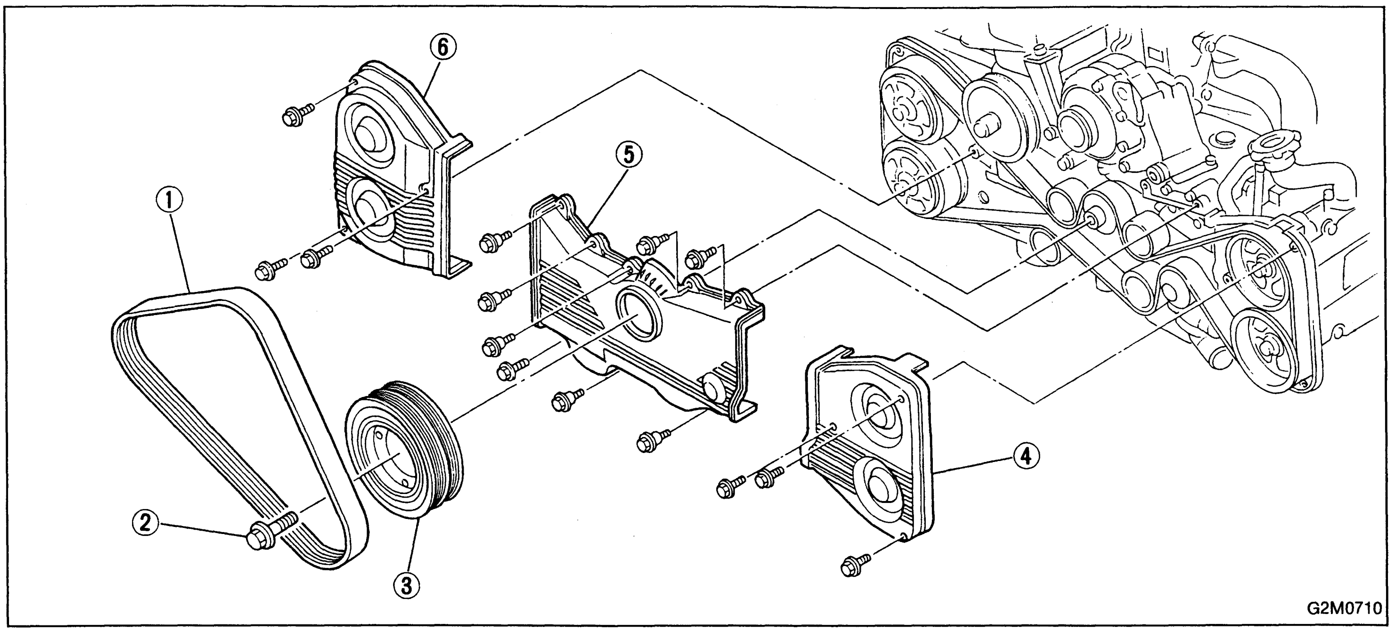
7) Bolts, nuts and washers should be replaced with new ones as required.

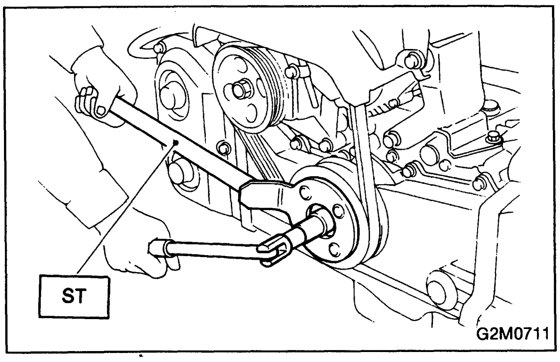
8) Even if necessary inspections have been made in advance, proceed with assembly work while making rechecks.

2. Timing Belt

A: REMOVAL

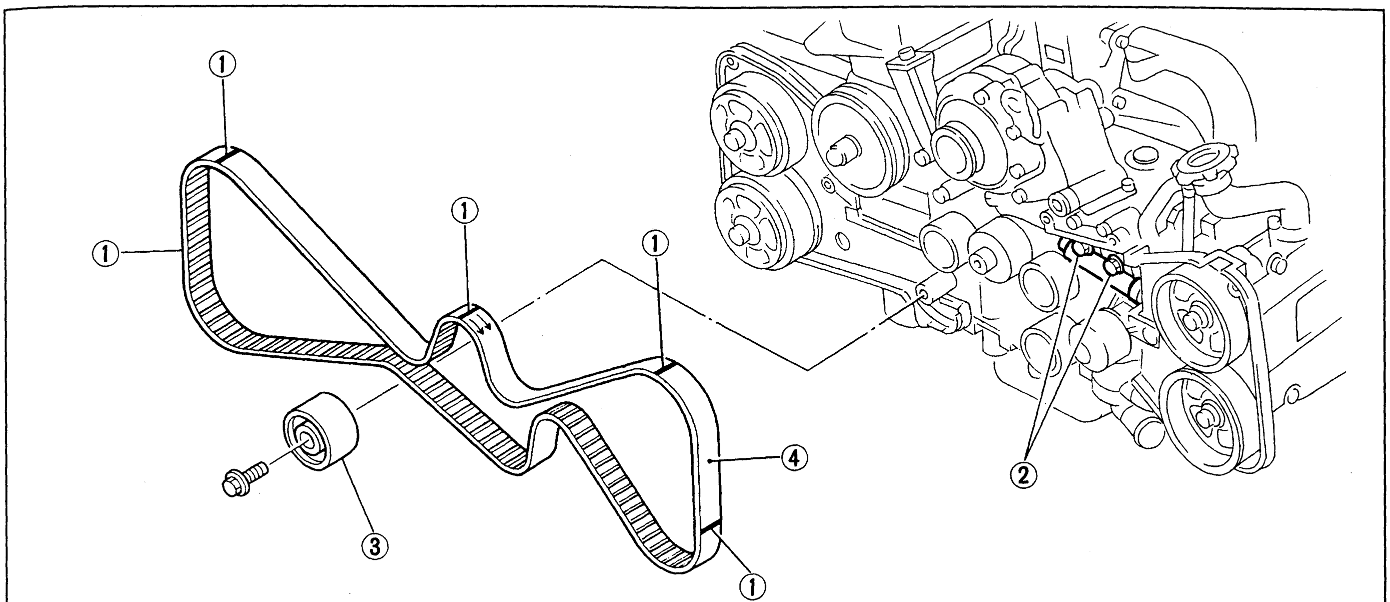
1. CRANKSHAFT PULLEY AND BELT COVER





1) Remove V-belt.
2) Remove pulley bolt. To lock crankshaft, use ST.
ST 499977000 CRANKSHAFT PULLEY WRENCH
3) Remove crankshaft pulley.
4) Remove left-hand belt cover.
5) Remove right-hand belt cover.
6) Remove front belt cover.

2. TIMING BELT



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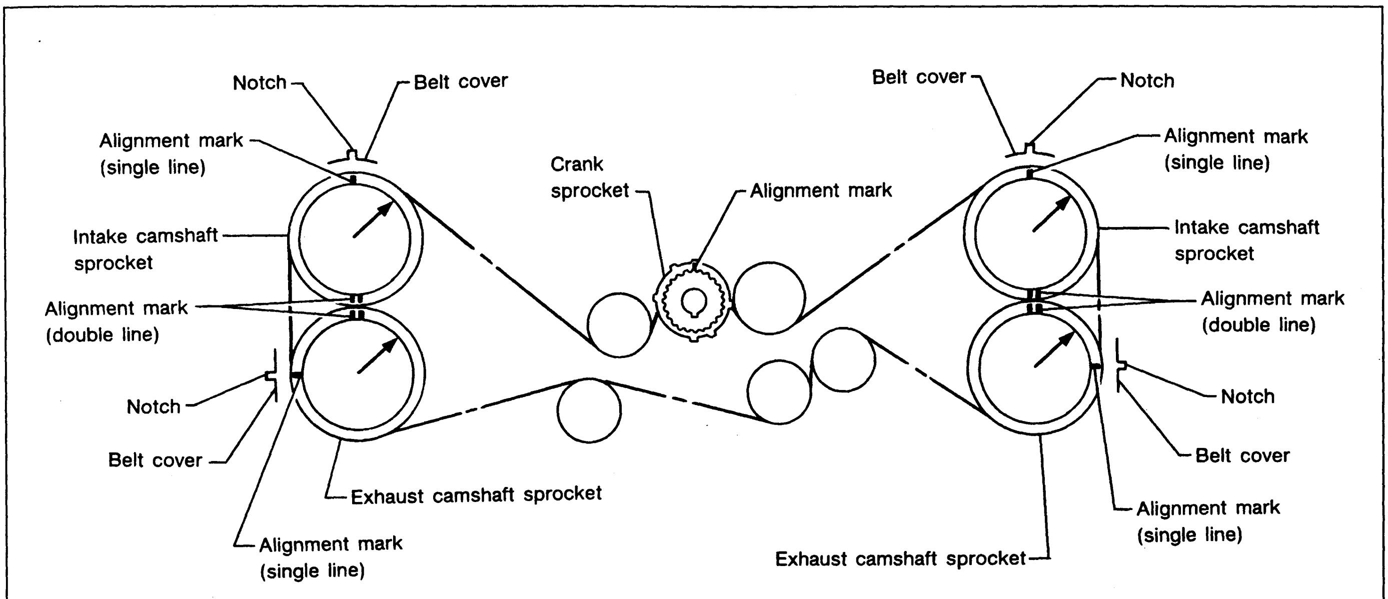

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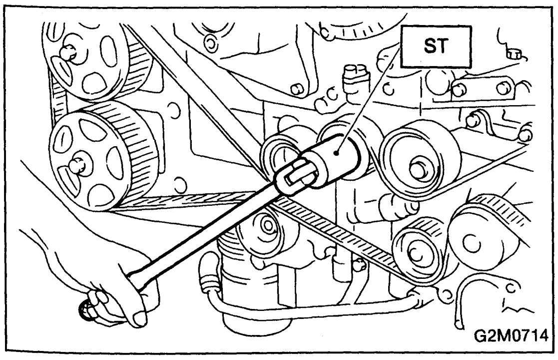
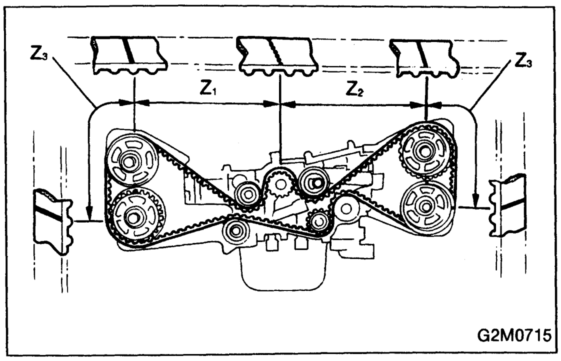


G2M0714

1) If alignment mark and/or arrow mark (which indicates rotation direction) on timing belt fade away, put new marks before removing timing belt as follows:

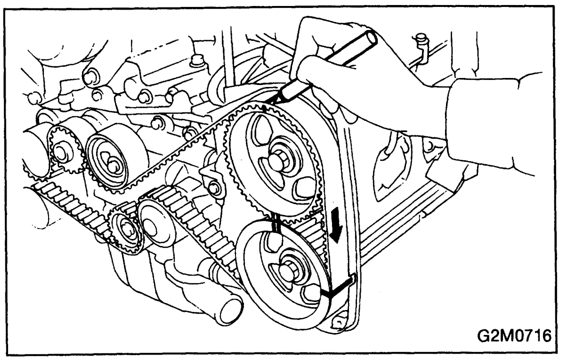
(1) Turn crankshaft using ST, and align alignment marks on crankshaft sprocket, left-hand intake camshaft sprocket, left-hand exhaust camshaft sprocket, right-hand intake camshaft sprocket and right hand exhaust camshaft sprocket with notches of belt cover and cylinder block.

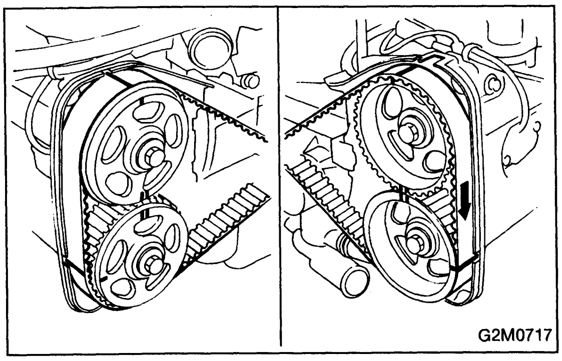
ST 499987500 CRANKSHAFT SOCKET

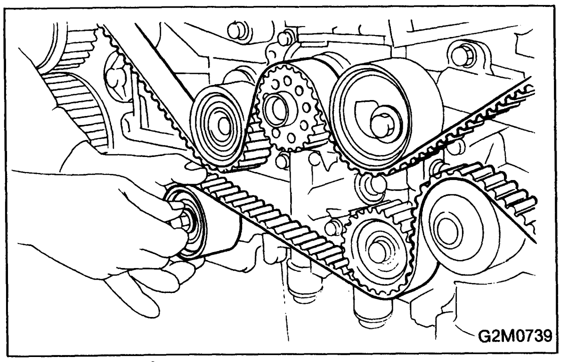


(2) Using white paint, put alignment and/or arrow marks on timing belts in relation to the sprockets.

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



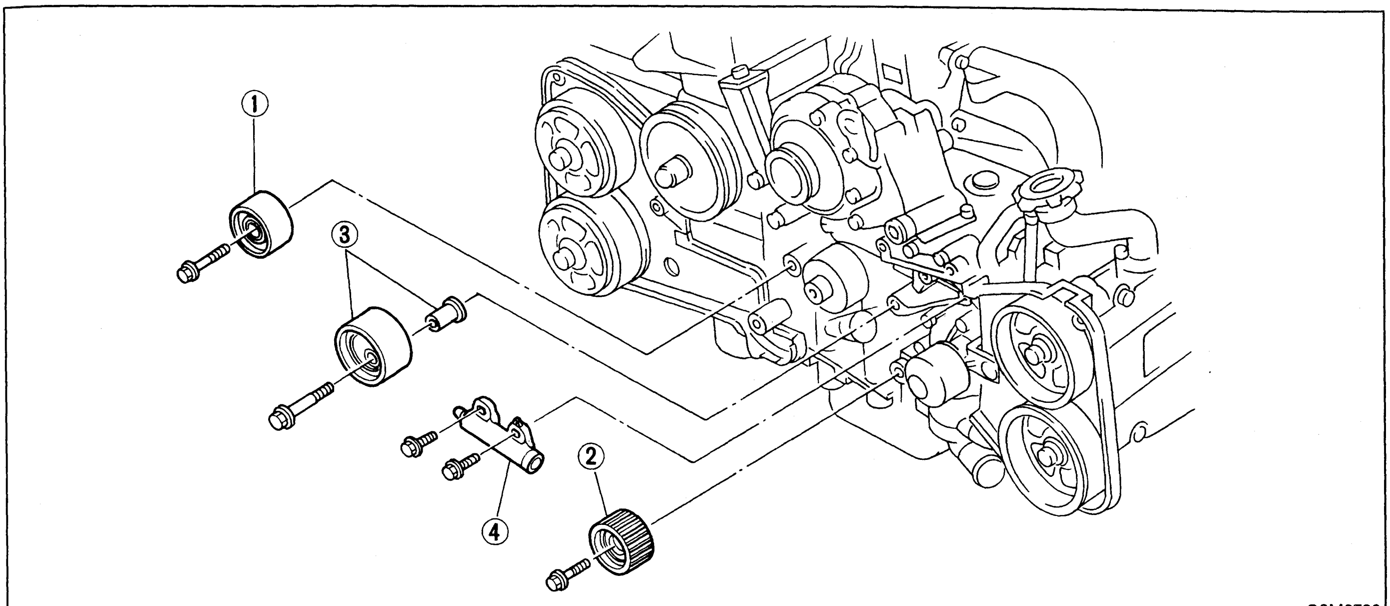




2) Loosen tensioner adjuster mounting bolts.
3) Remove belt idler.

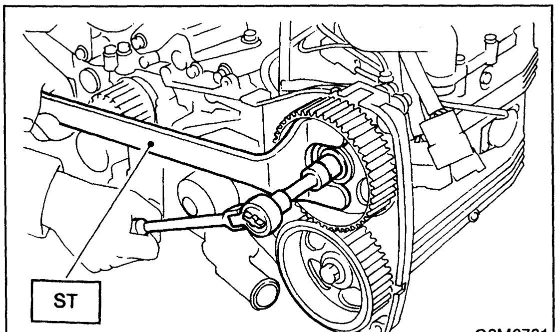
4) Remove timing belt.

3. BELT TENSIONER AND IDLER



G2M0720

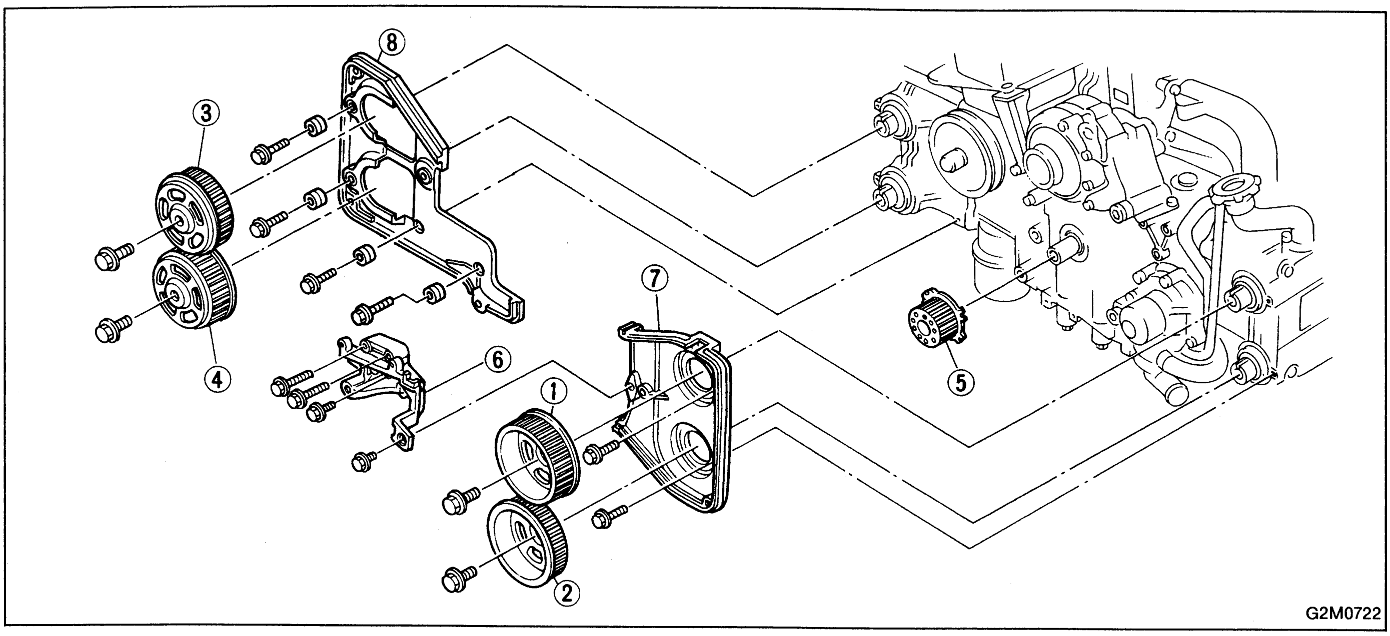
1) Remove belt idler.
2) Remove belt idler No. 2.
3) Remove belt tensioner and spacer.
4) Remove belt tension adjuster.

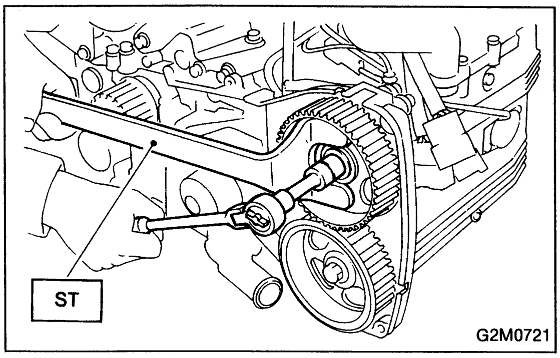


G2M0721

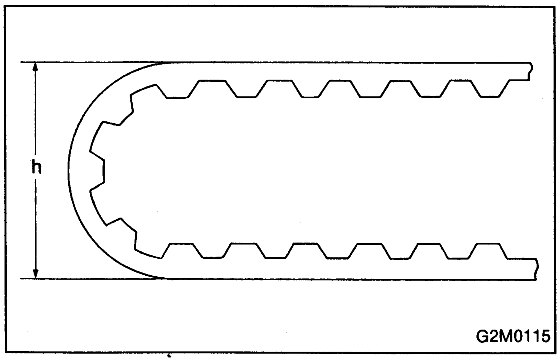
CAUTION:
After timing belt has been removed, never rotate intake and exhaust, camshaft sprocket.
If camshaft sprocket is rotated, the intake and exhaust valve heads strike together and valve stems are bent. For this reason, when removing camshaft sprocket, lock the camshaft sprocket using ST so as to avoid turning camshaft.
ST 499207100 CAMSHAFT SPROCKET WRENCH

4. SPROCKET





1) Remove left-hand intake camshaft sprocket.
2) Remove left-hand exhaust camshaft sprocket.
3) Remove right-hand intake camshaft sprocket.
4) Remove right-hand exhaust camshaft sprocket.
ST 499207100 CAMSHAFT SPROCKET WRENCH
5) Remove crankshaft sprocket.
6) Remove tensioner bracket.
7) Remove left-hand belt cover No. 2.
8) Remove right-hand belt cover No. 2.



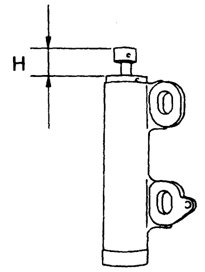
B: INSPECTION

1. TIMING BELT

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



G2M0116

2. BELT TENSION ADJUSTER

1) Visually check oil seals for leaks, and rod ends for abnormal wear or scratches. If necessary, replace faulty parts.

CAUTION:

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

2) While holding tensioner with both hands, push the rod section against floor or wall with a force of 147 to 490 N (15 to 50 kg, 33 to 110 lb) to ensure that the rod section does not move. If it moves, replace tension adjuster with a new one.

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

Rod extension: H
15.4 — 16.4 mm (0.606 — 0.646 in)

3. BELT TENSIONER

1) Check mating surfaces of timing belt and contact point of tension adjuster rod for abnormal wear or scratches. Replace belt tensioner if faulty.

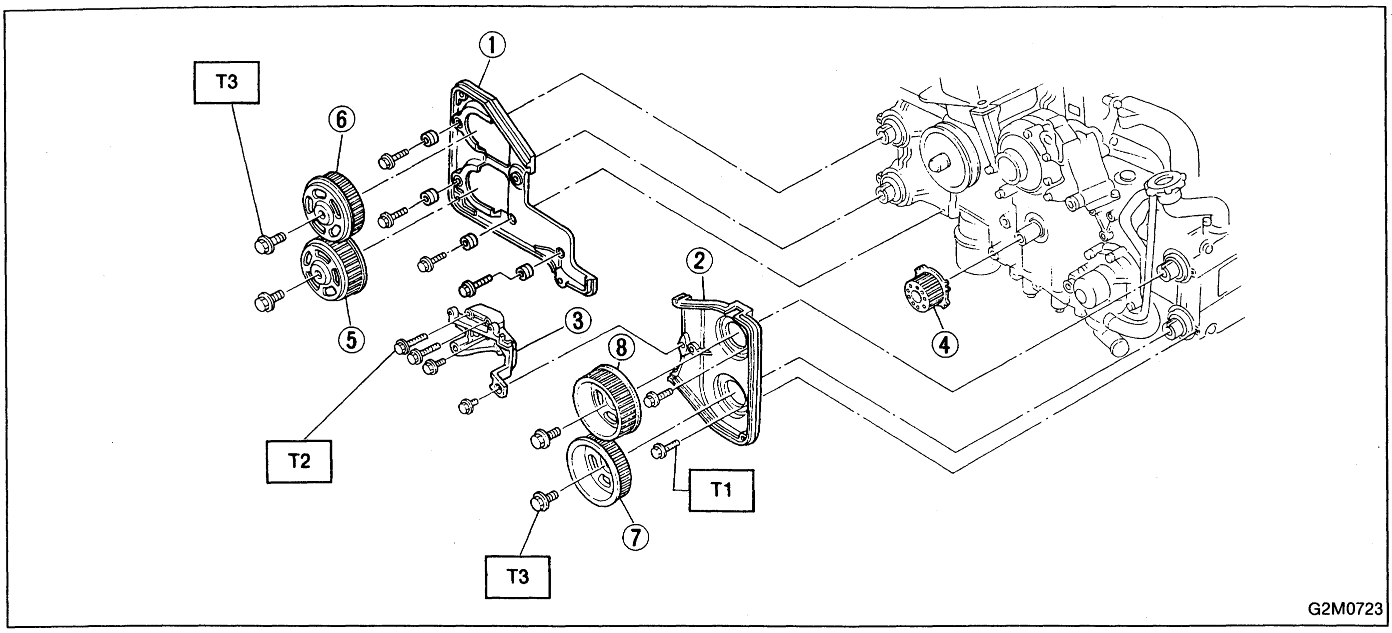
2) Check spacer and tensioner bushing for wear.

4. BELT IDLER

Check idler for smooth rotation. Replace if noise or excessive play is noted.

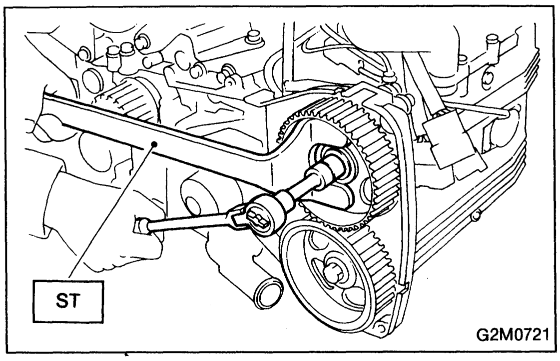
C: INSTALLATION

1. SPROCKET



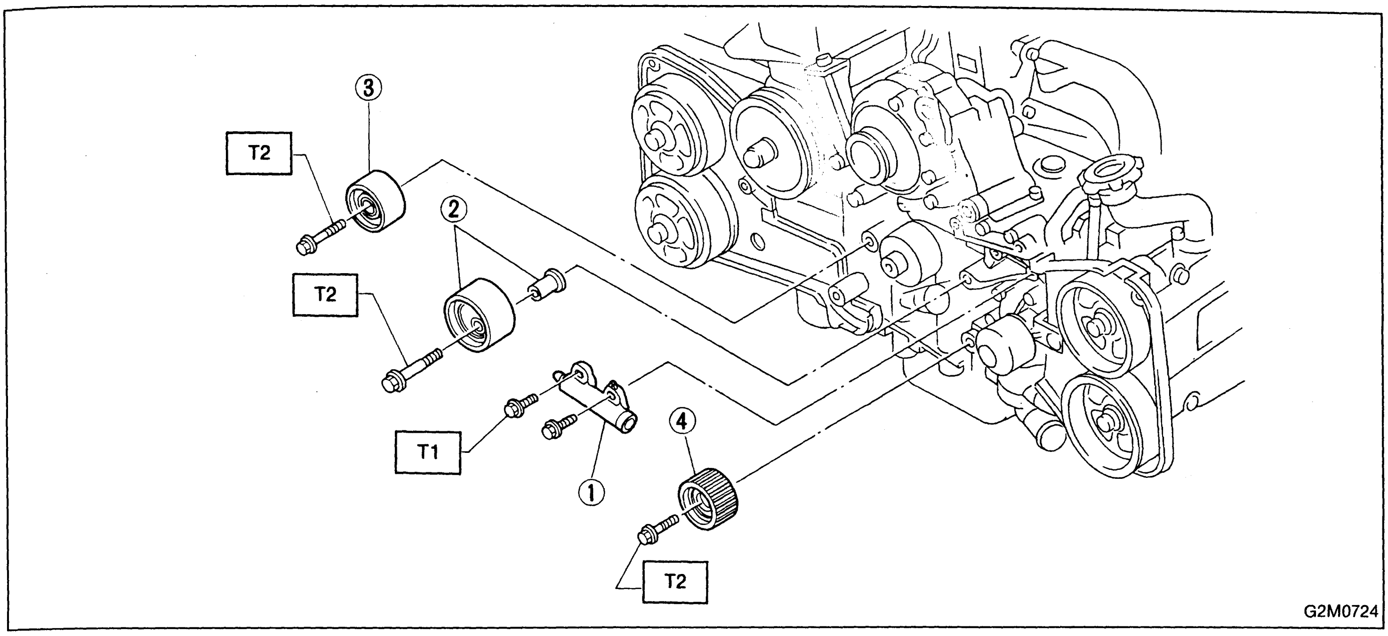
Tightening torque: N·m (kg-m, ft-lb)
T1: 4.9±0.5 (0.5±0.05, 3.6±0.4)
T2: 25±2 (2.5±0.2, 18±1.4)
T3: 78±5 (8.0±0.5, 58±3.6)

1) Install right-hand belt cover No. 2.
2) Install left-hand belt cover No. 2.
3) Install tensioner bracket.
4) Install crankshaft sprocket.

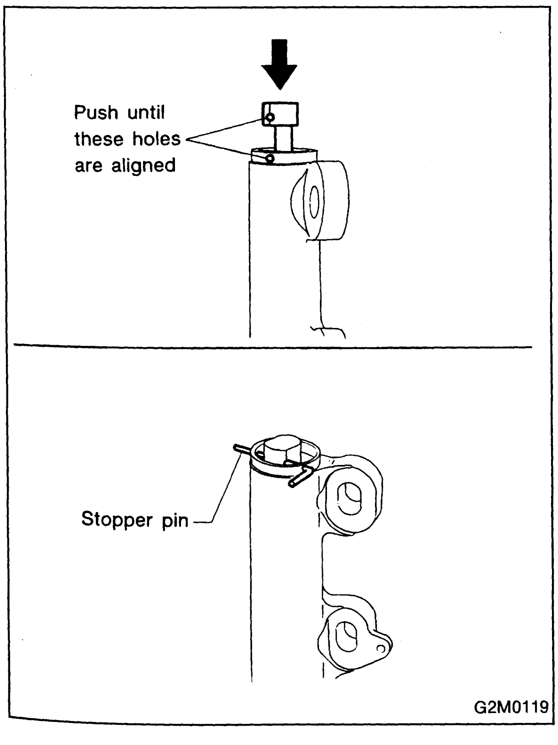


5) Install right-hand exhaust camshaft sprocket. To lock camshaft, use ST.
6) Install right-hand intake camshaft sprocket using ST.
7) Install left-hand exhaust camshaft sprocket using ST.
8) Install left-hand intake camshaft sprocket using ST.
ST 499207100 CAMSHAFT SPROCKET WRENCH

2. BELT TENSIONER AND IDLER

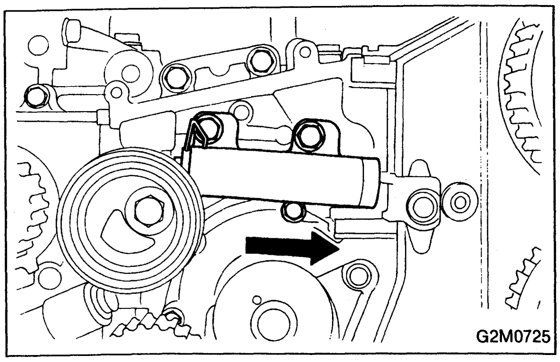


Tightening torque: N·m (kg-m, ft-lb)
T1: 25 ± 2 (2.5 ± 0.2, 18 ± 1.4)
T2: 39 ± 4 (4.0 ± 0.4, 29 ± 2.9)

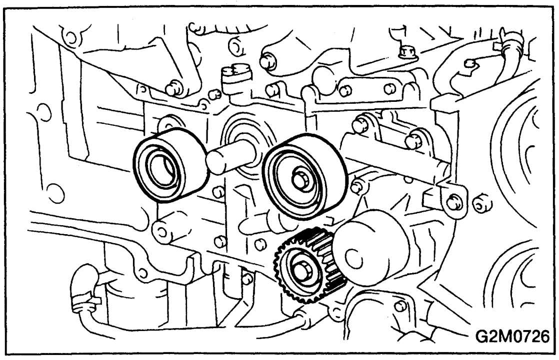


1) Installation of belt tensioner adjuster
   (1) Insert stopper pin 1.5 mm (0.059 in) dia. into place while pushing tension adjuster rod into body using a press.

CAUTION:
- **Do not allow press pressure to exceed 9,807 N (1,000 kg, 2,205 lb).**
- **Do not release press pressure until stopper pin is completely inserted.**
- **Push tension adjuster rod vertically.**

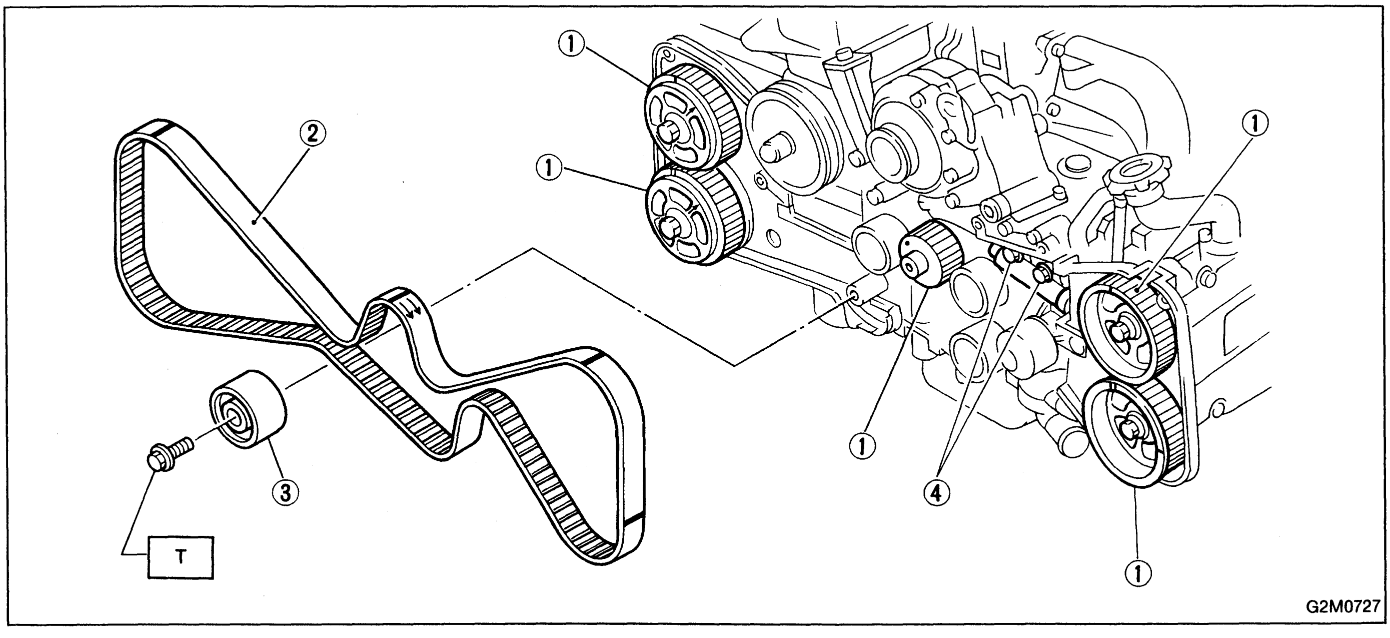

G2M0725

(2) Temporarily tighten bolts while tension adjuster is pushed all the way to the right.


G2M0726

2) Install belt tensioner.
3) Install belt idler.
4) Install belt idler No. 2.

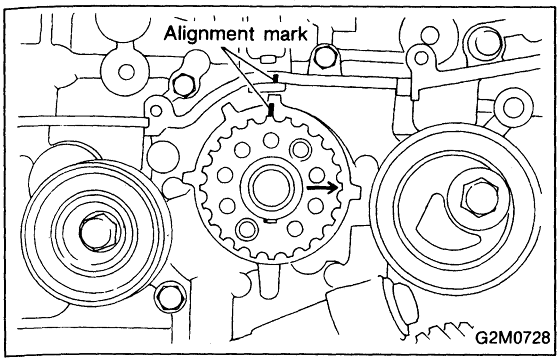
3. TIMING BELT



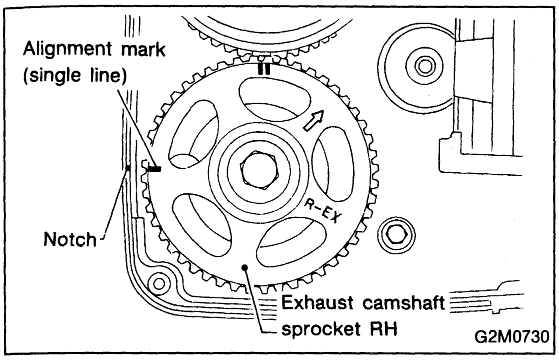
G2M0727

Tightening torque: N·m (kg-m, ft-lb)
T: 39±4 (4.0±0.4, 29±2.9)

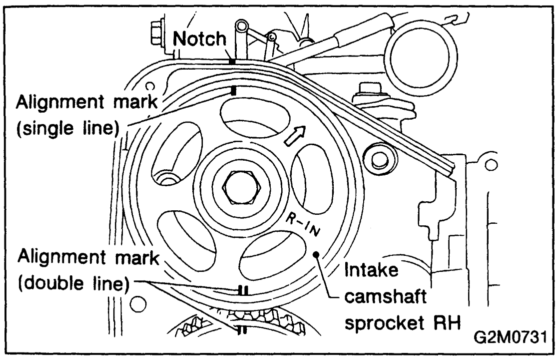
1) Crankshaft and camshaft sprocket alignment
(1) Align mark on crankshaft sprocket with mark on the oil pump cover at cylinder block.



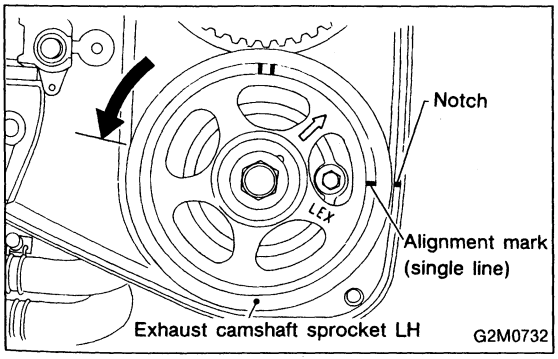
(2) Align single line mark on right-hand exhaust camshaft sprocket with notch on belt cover.



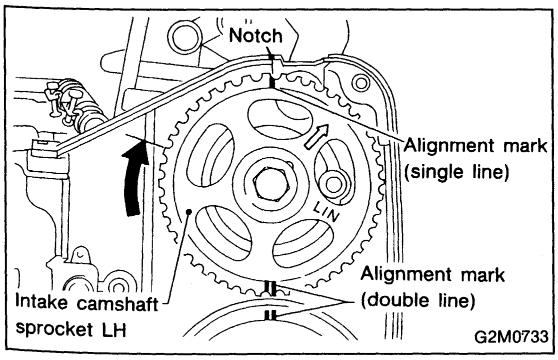
(3) Align single line mark on right-hand exhaust camshaft sprocket with notch on belt cover.
(Make sure double lines on intake camshaft and exhaust camshaft sprockets are aligned.)



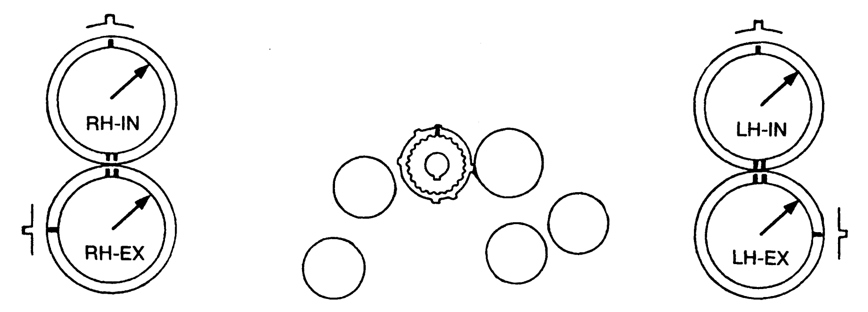
(4) Align single line mark on left-hand exhaust camshaft sprocket with notch on belt cover by turning sprocket counter-clockwise (as viewed from front of engine).



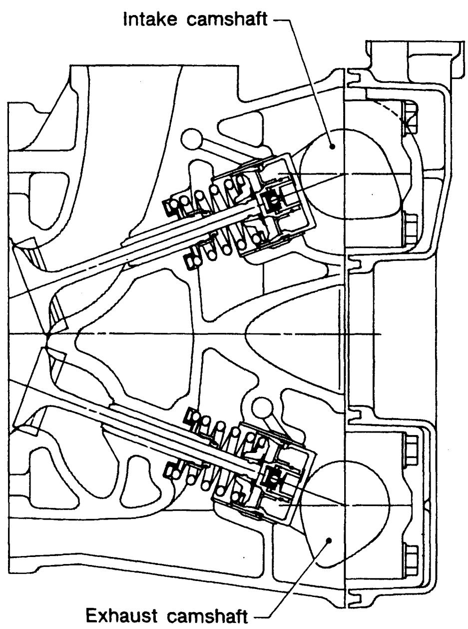
(5) Align single line mark on left-hand intake camshaft sprocket with notch on belt cover by turning sprocket clockwise (as viewed from front of engine).
Ensure double lines on intake and exhaust camshaft sprockets are aligned.



(6) Ensure camshaft and crankshaft sprockets are positioned as shown.



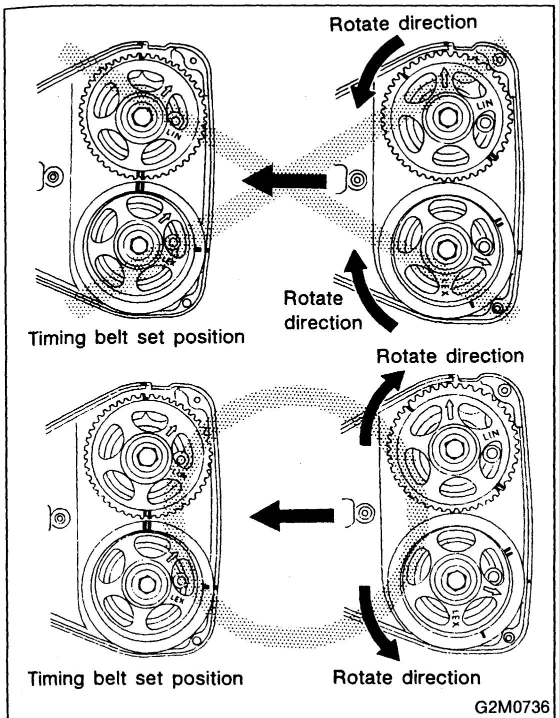
G2M0734



G2M0735

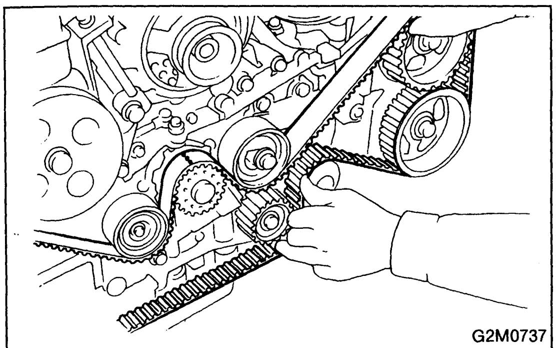
CAUTION:

- **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.**

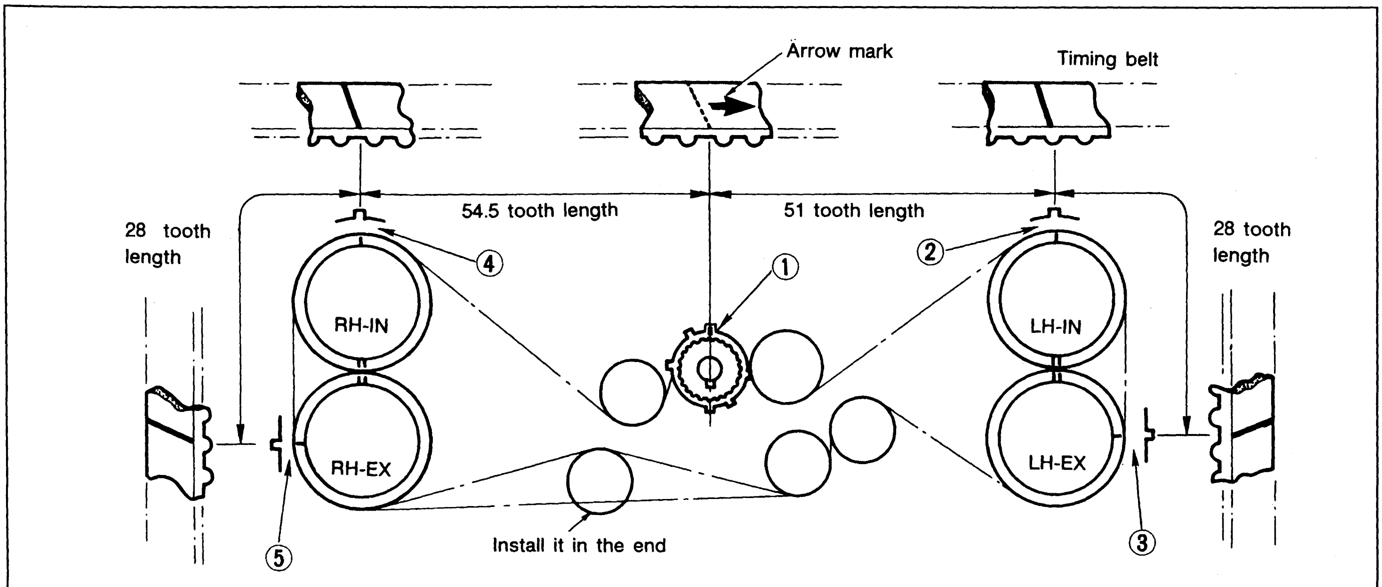


G2M0736

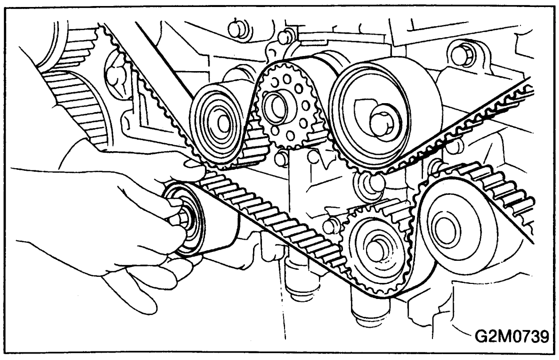
- **When timing belts are not installed, four camshafts are held at the "zero-lift" position, where all cams on camshafts do not push intake and exhaust valves down. (Under this condition, all valves remain unlifted.)**
- **When camshafts are rotated to install timing belts, #2 intake and #4 exhaust 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 camshafts to rotate in the direction shown in the upper of figure as this causes both intake and exhaust valves to lift simultaneously, resulting in interference with their heads.**


G2M0737

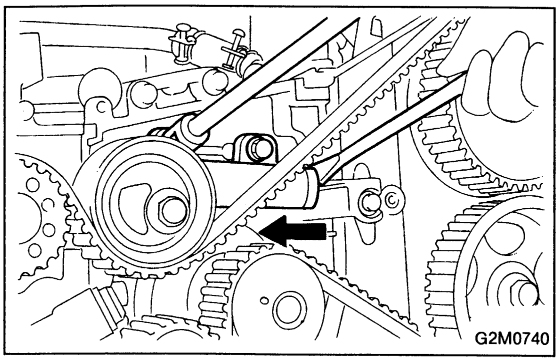
2) Installation of timing belt
Align alignment mark on timing belt with marks on sprockets in the numerical order shown in figure. While aligning marks, position timing belt properly.
CAUTION:
Ensure belt's rotating direction is correct.



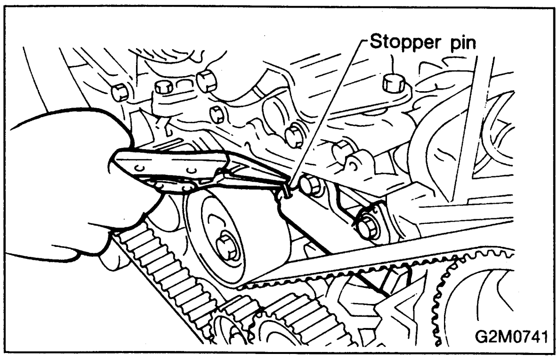
G2M0738



3) Install belt idler.
CAUTION:
Make sure that the marks on timing belt and sprockets are aligned.

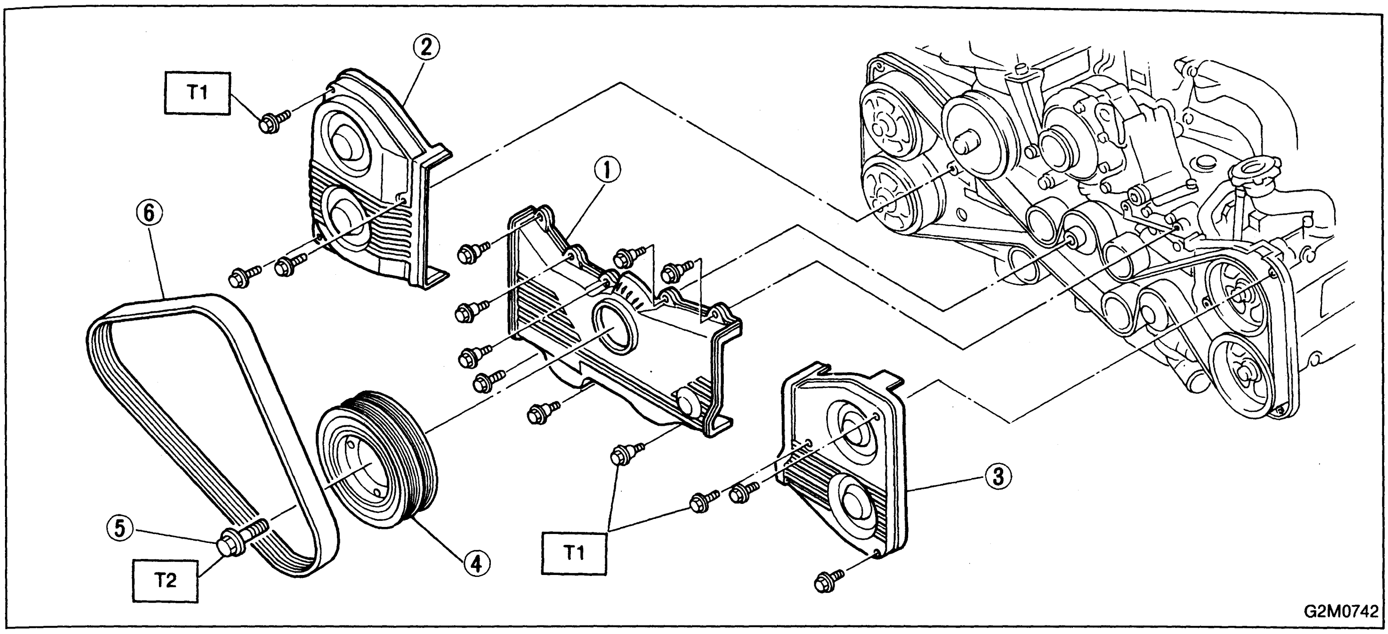


4) Loosen tension adjuster attaching bolts and move adjuster all the way to the left. Tighten the bolts.



5) After ensuring that the marks on timing belt and sprockets are aligned, remove stopper pin from tension adjuster.

4. CRANKSHAFT PULLEY AND BELT COVER



Tightening torque: N·m (kg-m, ft-lb)
T1: 5 ± 0.5 (0.5 ± 0.05, 3.6 ± 0.4)
T2: 110.3 ± 7.4 (11.25 ± 0.75, 81.4 ± 5.4)

1) Install front belt cover.
2) Install right-hand belt cover.
3) Install left-hand belt cover.
4) Install crankshaft pulley.
5) Install pulley bolt by using ST.
ST 499977000 CRANKSHAFT PULLEY WRENCH
6) Install V-belt.

CAUTION:
After installing V-belt, check and adjust V-belt tension.

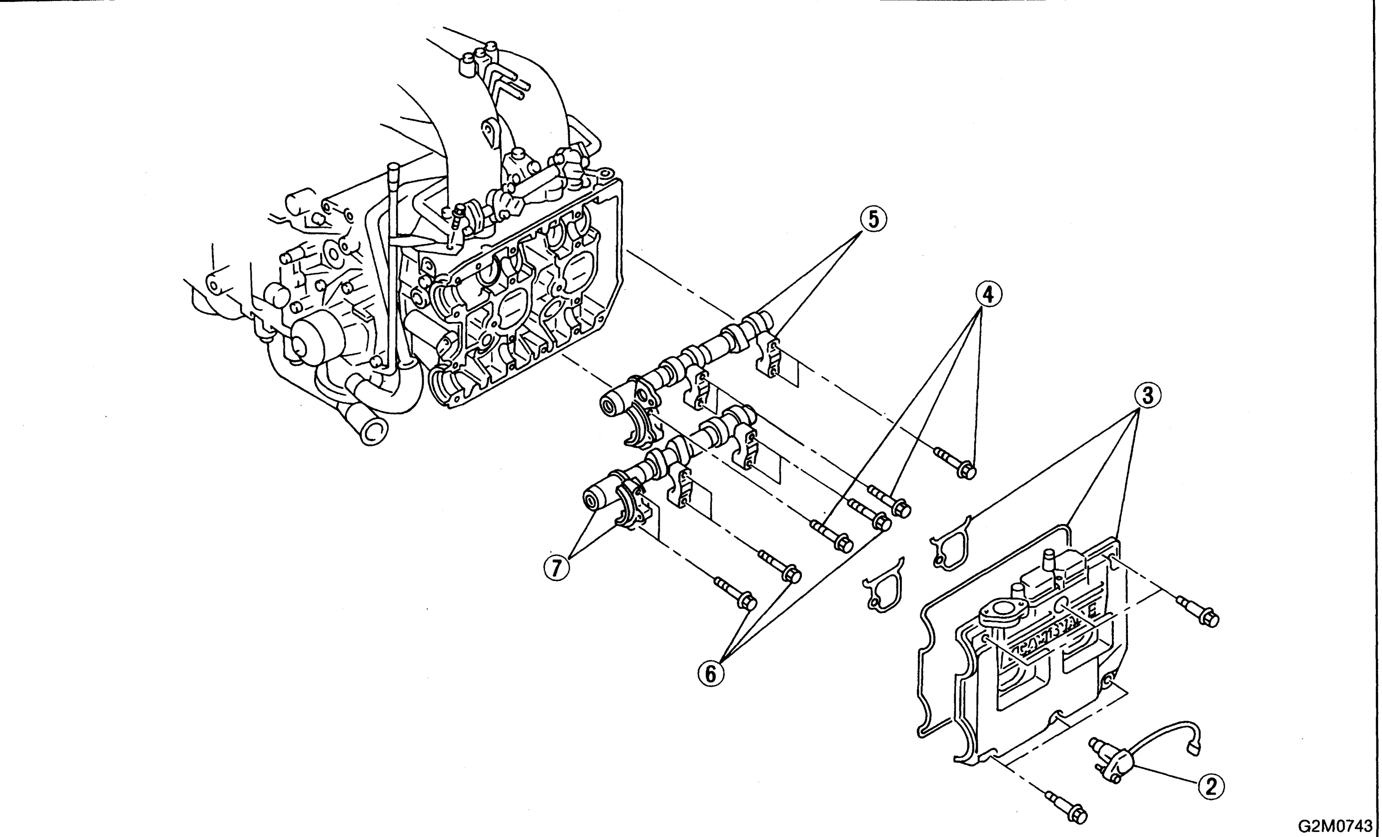
3. Camshaft

A: REMOVAL

1. RELATED PARTS

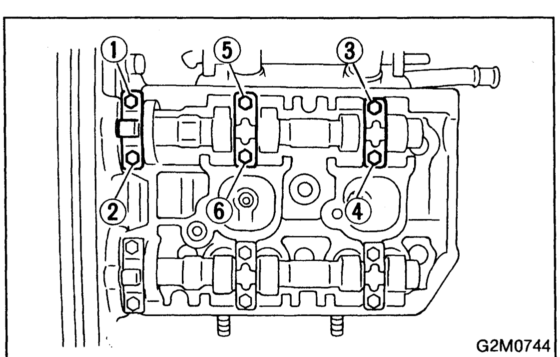
Remove timing belt, camshaft sprockets and related parts. <Ref. to 2-3b [W2A0].>

2. CAMSHAFT LH



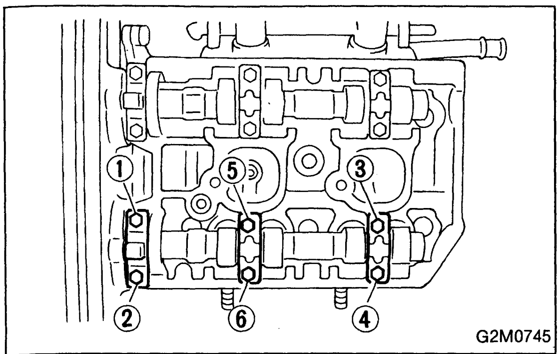
G2M0743

1) Remove camshaft position sensor.
2) Remove ignition coils.
3) Remove cylinder head cover and gasket.



G2M0744

4) Loosen intake camshaft cap bolts equally, a little at a time in the numerical sequence shown in figure.
5) Remove camshaft caps and intake camshaft.



G2M0745

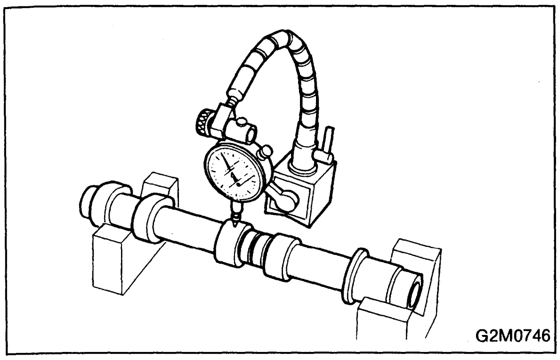
6) Loosen exhaust camshaft cap bolts equally, a little at a time in the numerical sequence shown in figure.
7) Remove camshaft caps and exhaust camshaft.

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

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

B: INSPECTION

1. CAMSHAFT

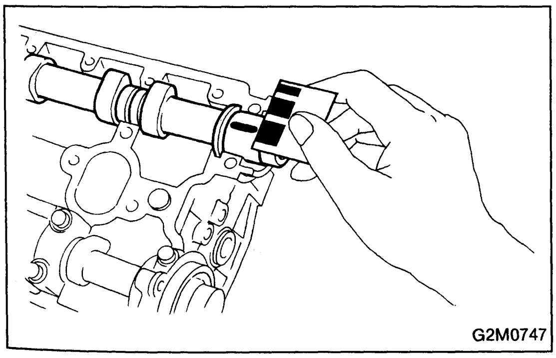

G2M0746

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

Limit:
0.020 mm (0.0008 in)

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

	Camshaft journal	
	Front	Center, rear
Standard	31.946 — 31.963 mm (1.2577 — 1.2584 in)	27.946 — 27.963 mm (1.1002 — 1.1009 in)


G2M0747

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 plastigauge across each of the camshaft journals.
(4) Install the bearing caps.
<Ref. to 2-3b [W3C1].>

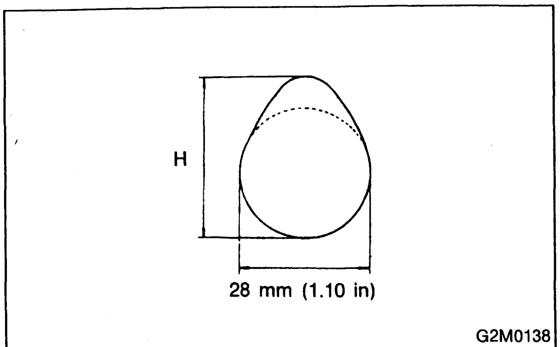
CAUTION:
Do not turn the camshaft.

(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 oil clearance:
0.037 — 0.072 mm (0.0015 — 0.0028 in)

Limit:
0.10 mm (0.0039 in)

(7) Completely remove the plastigauge.



G2M0138

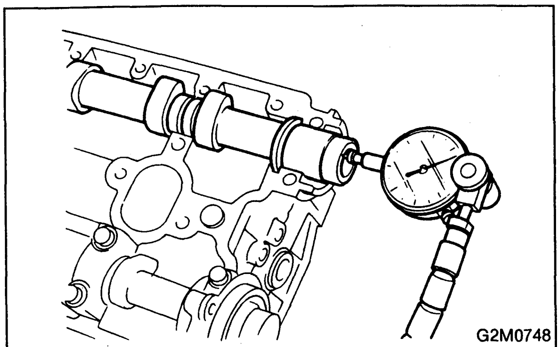
5) Check cam face condition; remove minor faults by grinding with oil stone. Measure the cam height H; replace if the limit has been exceeded.

Standard:

41.78 — 41.88 mm (1.6449 — 1.6488 in)

Limit:

41.62 mm (1.6386 in)


G2M0748

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 camshaft.

Standard:

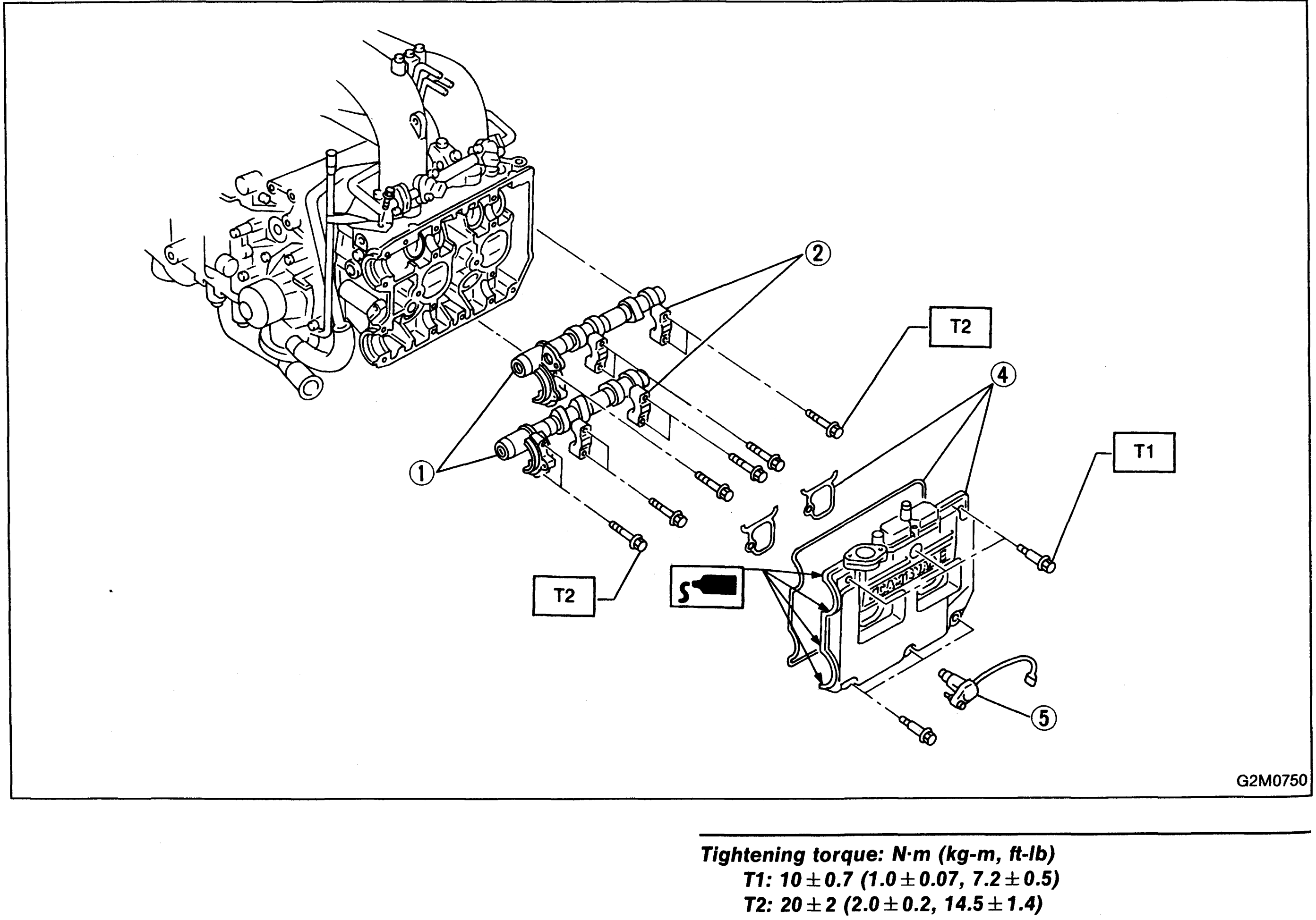
0.015 — 0.070 mm (0.0006 — 0.0028 in)

Limit:

0.1 mm (0.004 in)

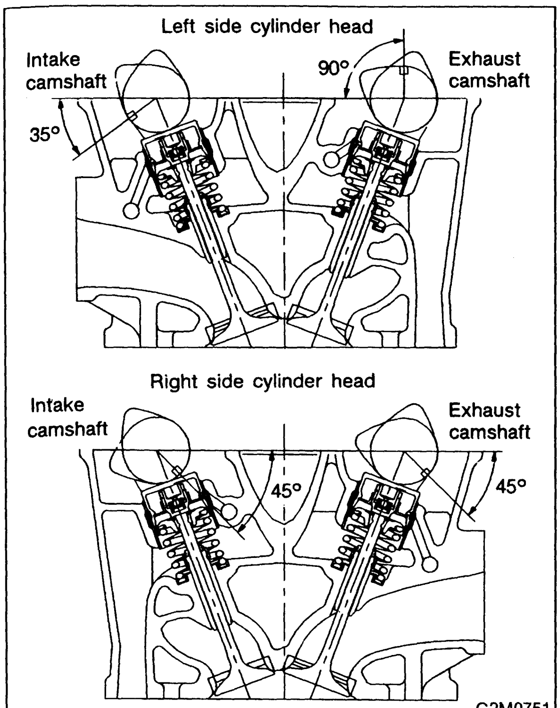
C: INSTALLATION

1. CAMSHAFT



G2M0750

Tightening torque: N·m (kg-m, ft-lb)
T1: 10 ± 0.7 (1.0 ± 0.07, 7.2 ± 0.5)
T2: 20 ± 2 (2.0 ± 0.2, 14.5 ± 1.4)



G2M0751

1) Camshaft installation
Apply engine oil to cylinder head at camshaft bearing location before installing camshaft. Install camshaft so that rocker arm is close to or in contact with "base circle" of cam lobe.

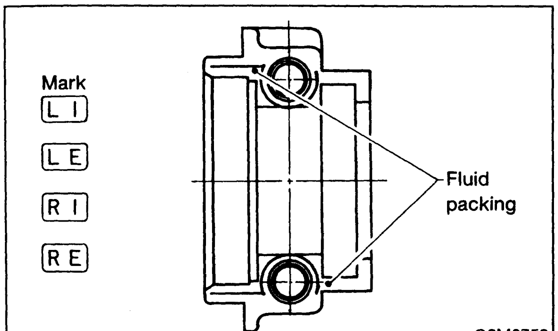
CAUTION:

• When camshafts are positioned as shown in figure, camshafts need to be rotated at a minimum to align with timing belt during installation.

• Right-hand camshaft need not be rotated when set at position shown in figure.

Left-hand intake camshaft: Rotate 80° clockwise.

Left-hand exhaust camshaft: Rotate 45° counter-clockwise.



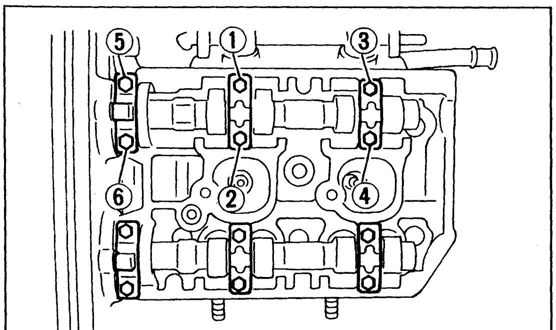
G2M0752

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

CAUTION:

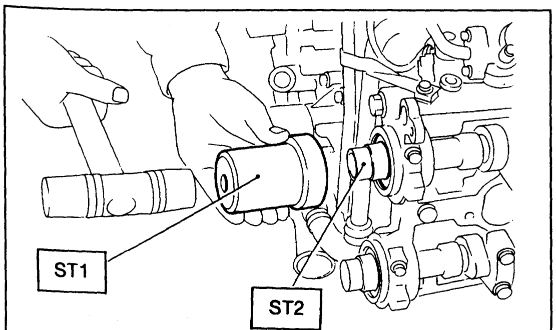
Do not apply fluid packing excessively. Failure to do so may cause excess packing to come out and flow toward oil seal, resulting in oil leaks.

Fluid packing:
THREE BOND 1215 or equivalent



G2M0753

(2) Apply engine oil to cap bearing surface and install cap on camshaft as shown by identification mark.
(3) Gradually tighten cap in at least two stages in the numerical order shown in figure, and then tighten to specified torque.
(4) Similarly, tighten cap on exhaust side.
After tightening cap, ensure camshaft rotates only slightly while holding it at "base" circle.



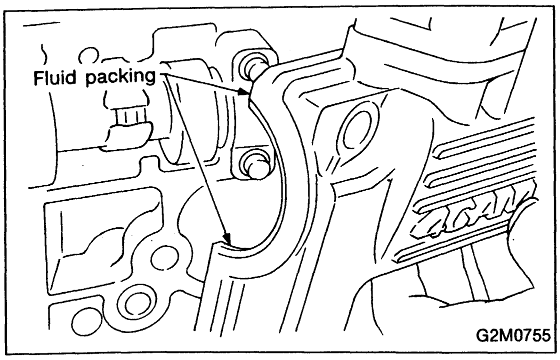
G2M0754

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

CAUTION:

Use a new oil seal.

ST1 499587100 OIL SEAL INSTALLER
ST2 499597000 OIL SEAL GUIDE



4) Rocker cover installation
   (1) Install gasket on rocker cover.
   Install 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 rocker cover on cylinder head. Ensure gasket is properly positioned during installation.

5) Install ignition coil.
6) Install cam angle sensor.
7) Similarly, install parts on right-hand side.

2. RELATED PARTS

Install timing belt, camshaft sprockets and related parts.
<Ref. to 2-3b [W2C0].>

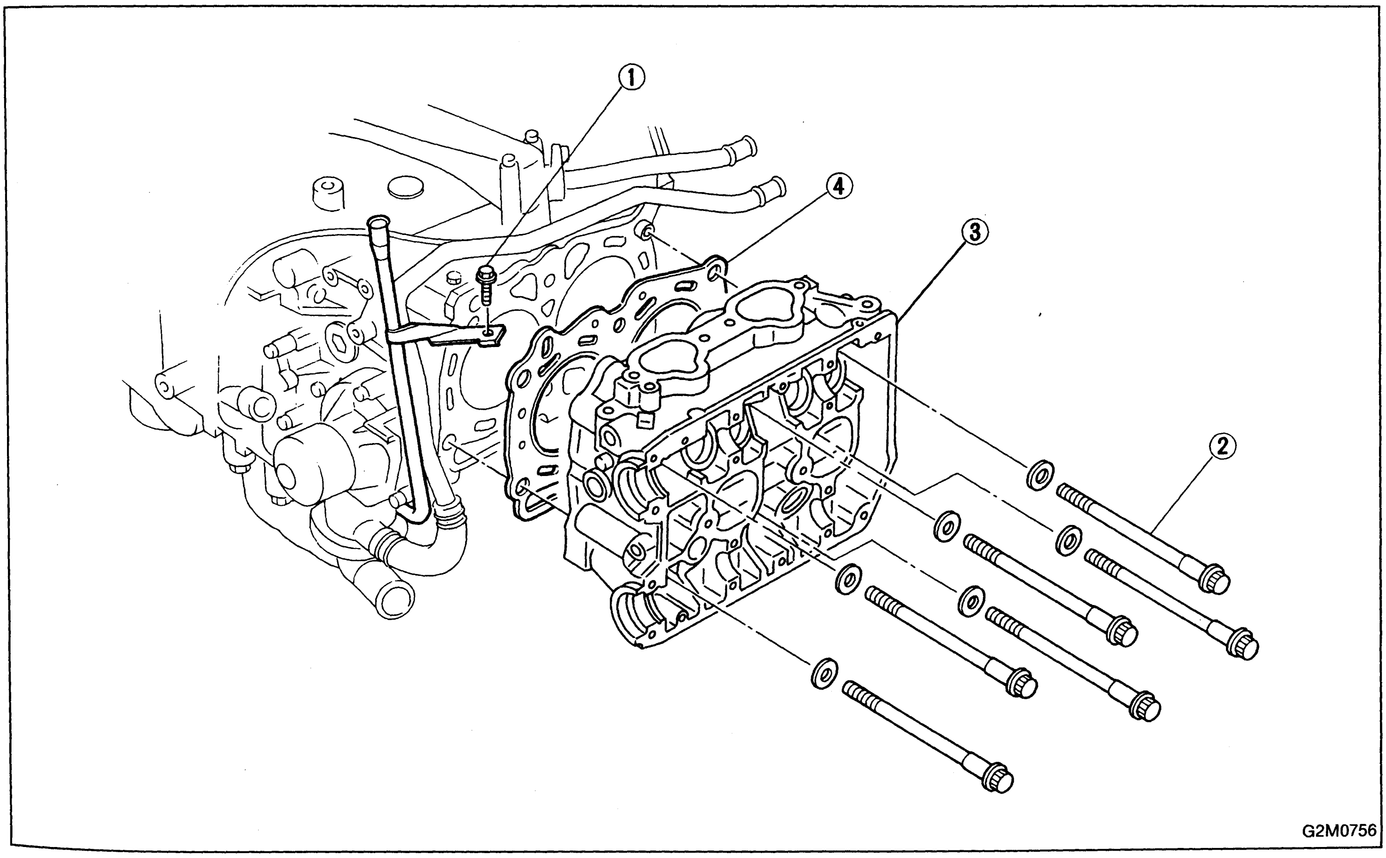
4. Cylinder Head

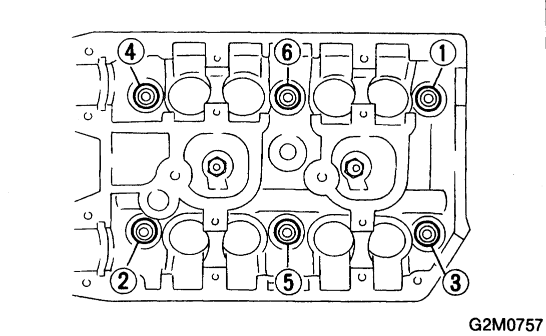
A: REMOVAL

1. INTAKE MANIFOLD

1) Remove V-belt.
2) Remove alternator, air conditioner compressor and brackets.
3) Remove hoses and tubes from cylinder block.
4) Disconnect each connector and/or remove connector bracket.
5) Remove coolant filler tank.
6) Remove intake manifold assembly and gasket.
7) Remove water pipe.
8) Remove crank angle sensor, cam angle sensor and knock sensor.
9) Remove timing belt, camshaft sprockets and related parts.
<Ref. to 2-3b [W2A0].>
10) Remove rocker cover, camshafts and related parts.
<Ref. to 2-3b [W3A0].>

2. CYLINDER HEAD





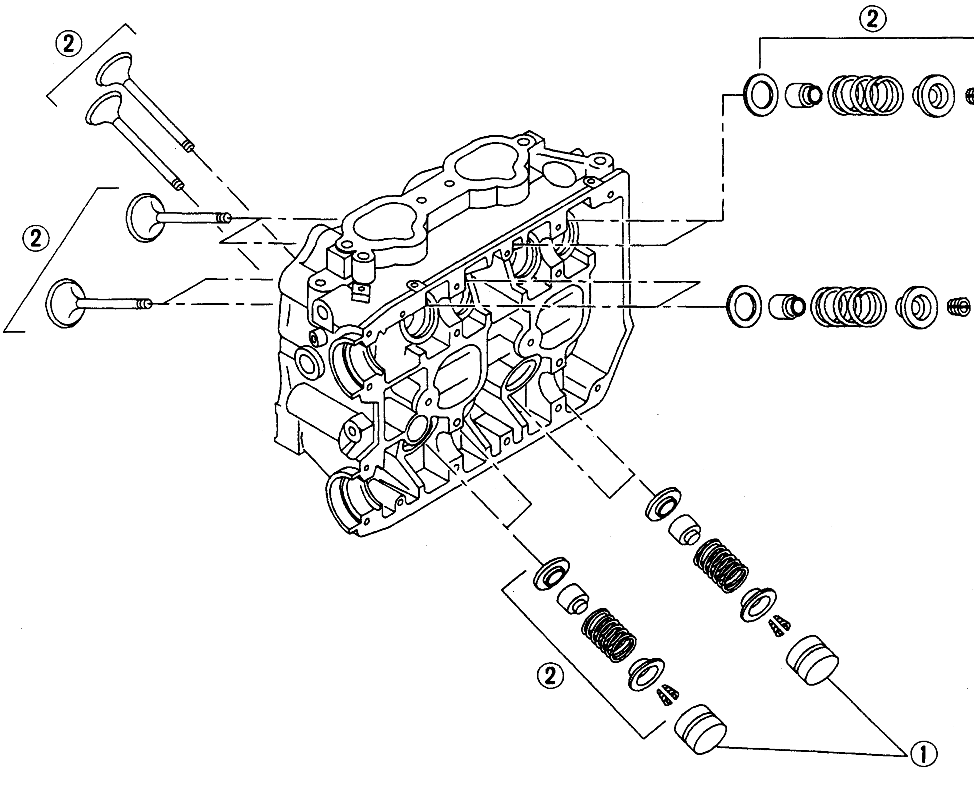
G2M0757

1) Remove oil level gauge guide attaching bolt (left-hand only).
2) Remove cylinder head bolts in numerical sequence shown in figure.

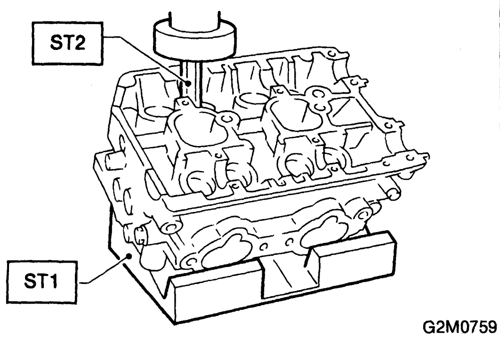
CAUTION:
Leave bolts ① and ④ engaged by three or four threads to prevent cylinder head from falling.

3) While tapping cylinder head with a plastic hammer, separate it from cylinder block.
Remove bolts ① and ④ to remove cylinder head.
4) Remove cylinder head gasket.
5) Similarly, remove right-hand cylinder head.

B: DISASSEMBLY

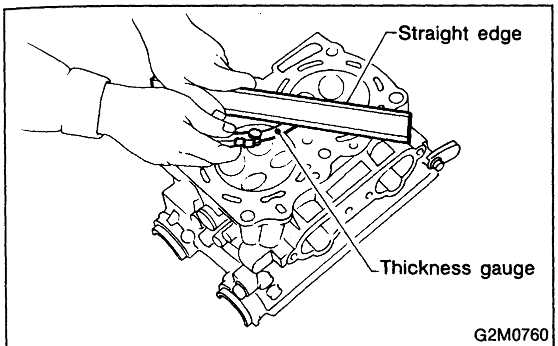


G2M0758



G2M0759

1) Remove hydraulic lash adjusters.
2) Compress the valve spring and remove the valve spring retainer key. Remove each valve and valve spring.
ST1 498267600 CYLINDER HEAD TABLE
ST2 499718000 VALVE SPRING REMOVER
CAUTION:
- **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.**



G2M0760

C: INSPECTION

1. CYLINDER HEAD

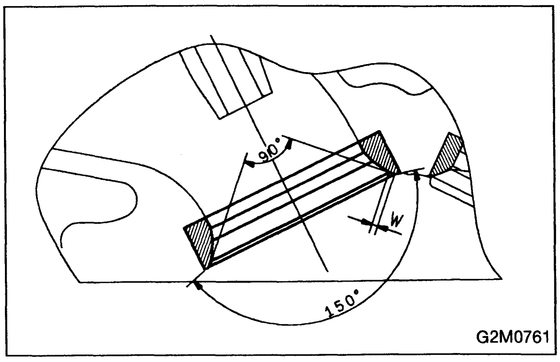
1) Make sure that no crack or other damage exists. In addition to visual inspection, inspect important areas by means of red check.
2) Measure the warping of the cylinder head surface that mates with crankcase by using a straight edge and thickness gauge.
If the warping exceeds 0.05 mm (0.0020 in), regrind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

Warping limit:
0.05 mm (0.0020 in)

Grinding limit:
0.3 mm (0.012 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

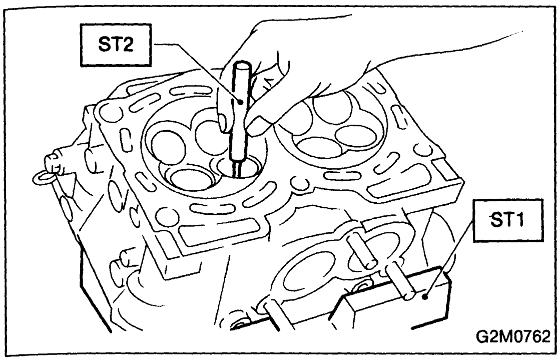
Inspect intake and exhaust valve seats, and correct the contact surfaces with valve seat cutter if they are defective or when valve guides are replaced.

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***
    - ***0.035 — 0.062 mm (0.0014 — 0.0024 in)***
  - ***Exhaust***
    - ***0.040 — 0.067 mm (0.0016 — 0.0026 in)***
- ***Limit***
  - ***0.15 mm (0.0059 in)***
- ***Valve guide inner diameter:***
  - ***6.000 — 6.015 mm (0.2362 — 0.2368 in)***
- ***Valve stem outer diameter:***
  - ***Intake***
    - ***5.950 — 5.965 mm (0.2343 — 0.2348 in)***
  - ***Exhaust***
    - ***5.950 — 5.965 mm (0.2343 — 0.2348 in)***



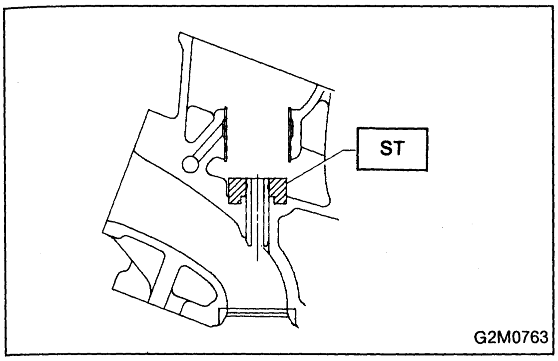
G2M0762

2) If the clearance between valve guide and stem exceeds the specification, replace guide as follows:

(1) Place cylinder head on ST1 with the combustion chamber upward so that valve guides enter the holes in ST1.

(2) Insert ST2 into valve guide and press it down to remove valve guide.

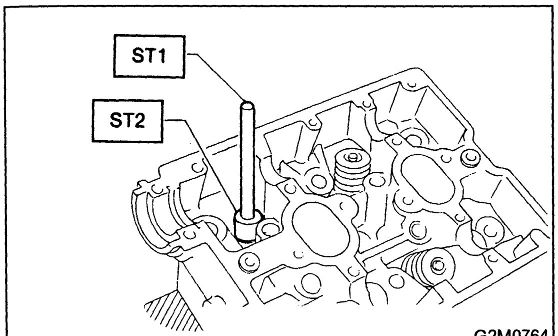
ST1 498267300 CYLINDER HEAD TABLE
ST2 499767300 VALVE GUIDE REMOVER



G2M0763

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

ST 499767100 VALVE GUIDE ADJUSTER



G2M0764

(4) Before installing 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 valve guide. Press in until the valve guide upper end is flush with the upper surface of ST2.

ST1 499767200 VALVE GUIDE REMOVER
ST2 499767000 VALVE GUIDE ADJUSTER

(6) Check the valve guide protrusion.

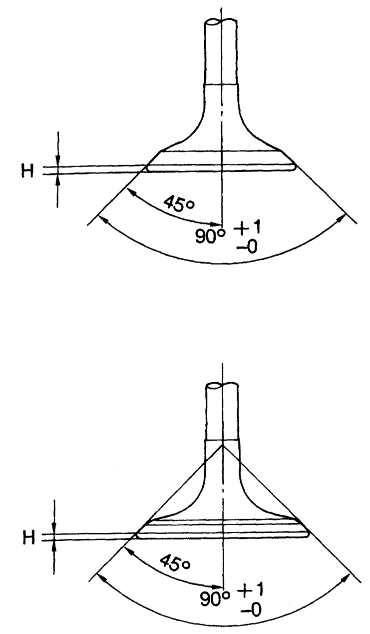
Valve guide protrusion: L
13.3 — 13.7 mm (0.524 — 0.539 in)

(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 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 valve guide.



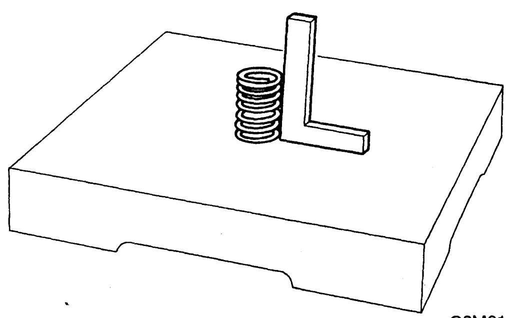
G2M0153

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 93.3 mm (3.673 in)***
  - ***Exhaust 93.6 mm (3.685 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.

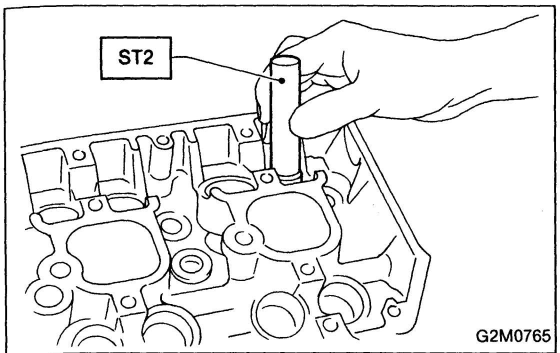


G2M0154

5. VALVE SPRINGS

1) Check valve springs for damage, free length, and tension. Replace valve spring if it is not to the specifications presented below.
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	39.8 mm (1.567 in)
Tension/spring height	228.5 — 261.8 N (23.3 — 26.7 kg, 51.4 — 58.9 lb)/31.0 mm (1.220 in)
	462.9 — 531.5 N (47.2 — 54.2 kg, 104.1 — 119.5 lb)/23.2 mm (0.913 in)
Squareness	2.5°, 1.7 mm (0.067 in)



G2M0765

6. INTAKE AND EXHAUST VALVE OIL SEAL

Replace 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 cylinder head on ST1.
2) Press in oil seal to the specified dimension indicated in the figure by using ST2.

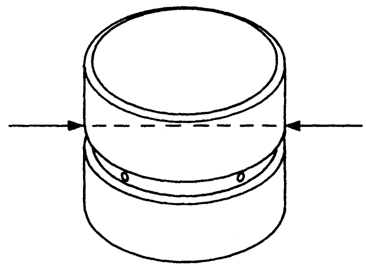
ST1 498267200 CYLINDER HEAD TABLE
ST2 498857100 VALVE OIL SEAL GUIDE

CAUTION:

- **Apply engine oil to 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]

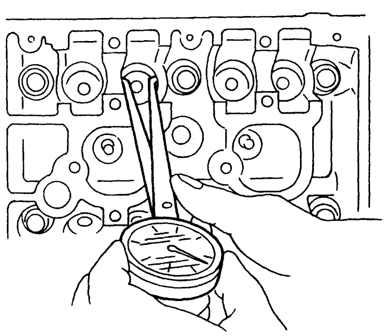
Color of spring part:
Intake [Black]
Exhaust [Black]


G2M0766

7. VALVE LASH ADJUSTER

1) Check valve lash adjuster visually.
2) Measure outer diameter of valve lash adjuster.

Outer diameter:
29.959 — 29.975 mm (1.1795 — 1.1801 in)


G2M0767

3) Measure inner diameter of bush on cylinder head.

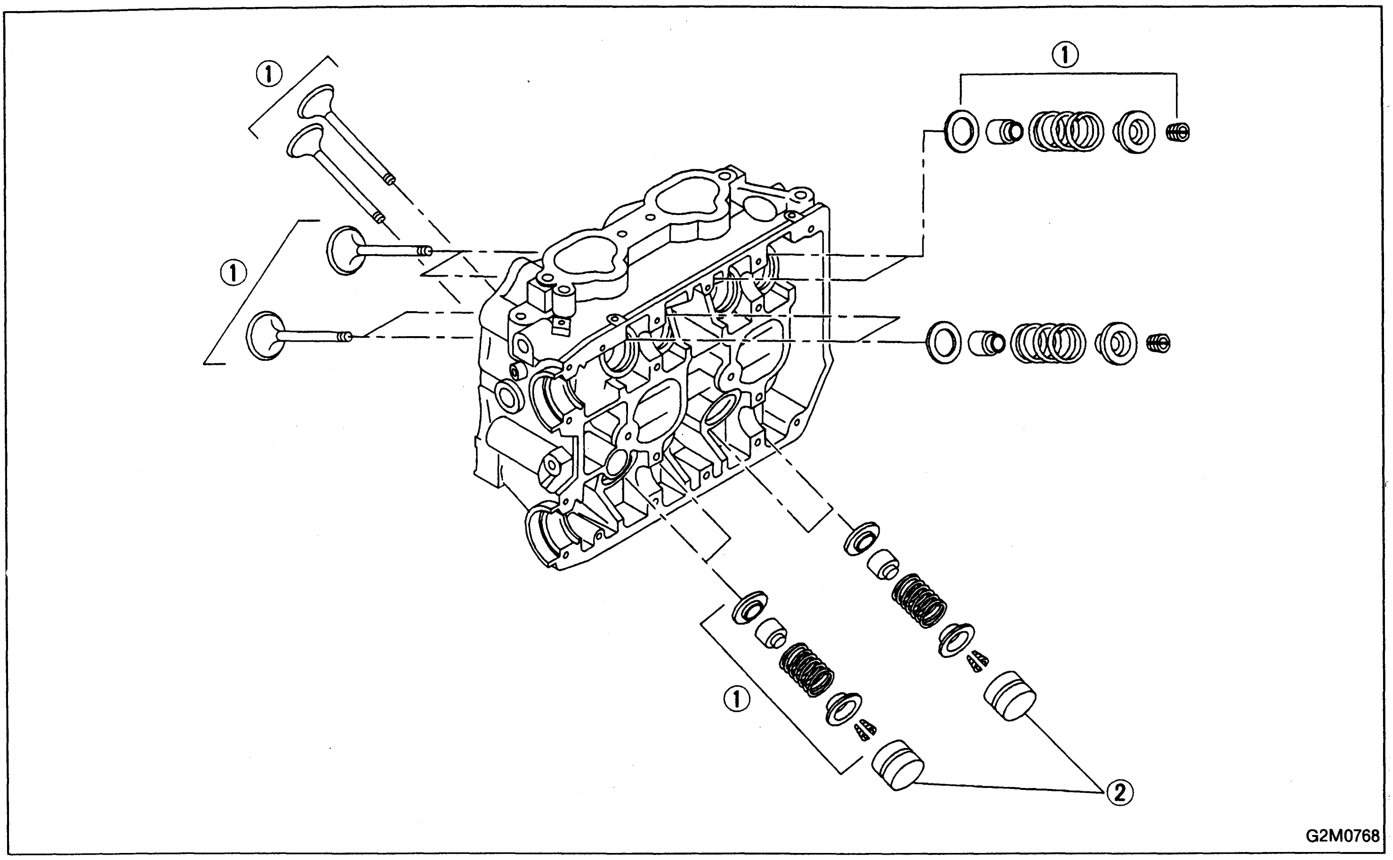
Inner diameter:
29.994 — 30.016 mm (1.1809 — 1.1817 in)

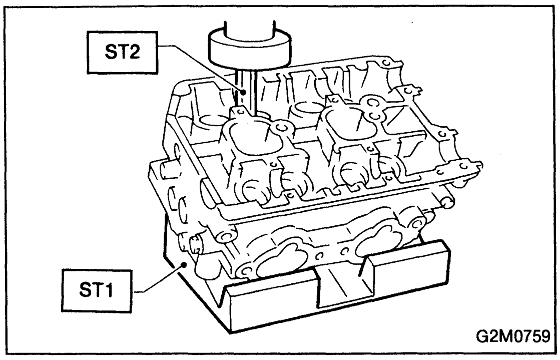
CAUTION:
If difference between outer diameter of valve lash adjuster and inner diameter of bush is over the limit, replace cylinder head.

Standard:
0.019 — 0.057 mm (0.0007 — 0.0022 in)

Limit:
0.100 mm (0.0039 in)

D: ASSEMBLY





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

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

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

ST1 498267600 CYLINDER HEAD TABLE
ST2 499718000 VALVE SPRING REMOVER

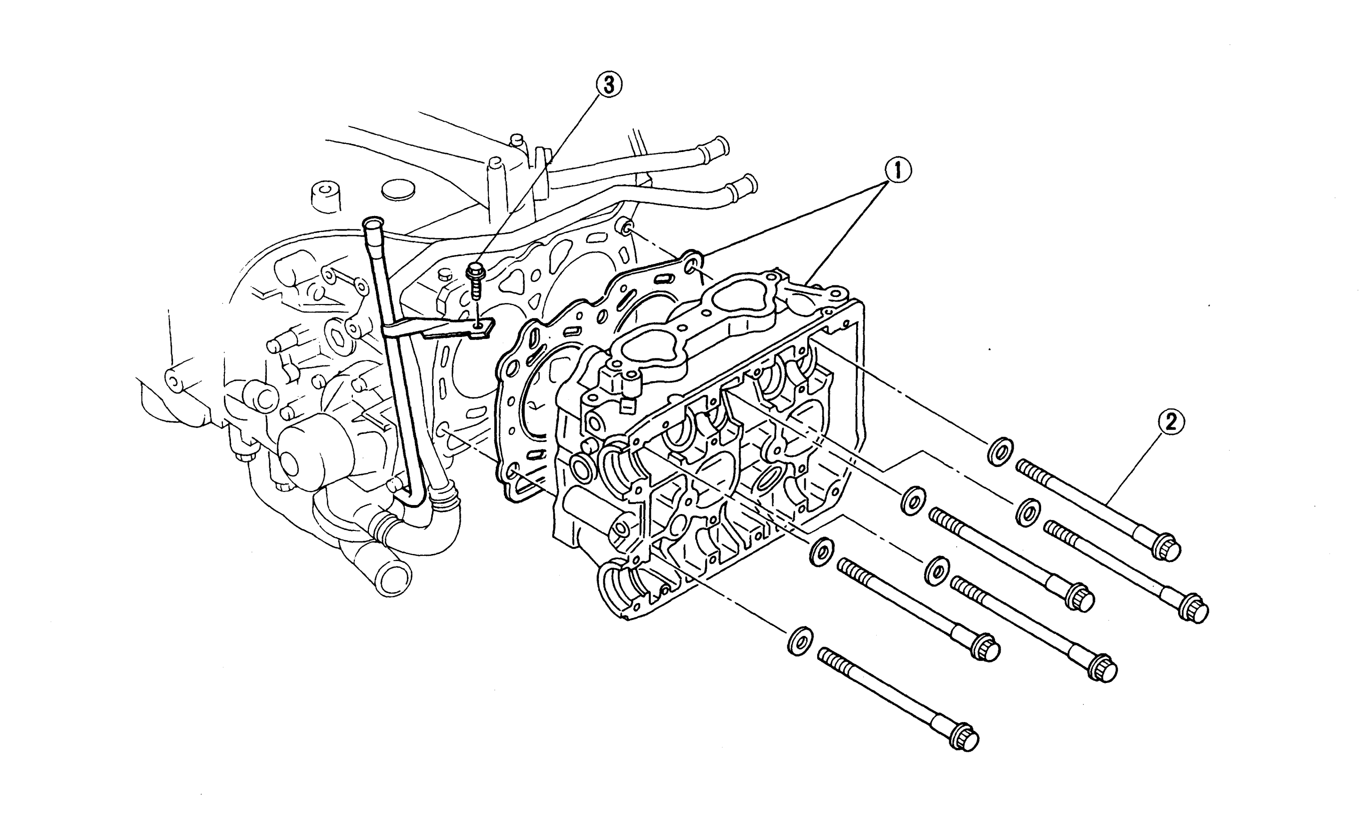
CAUTION:
Be sure to install the valve springs with their close-coiled end facing the seat on the cylinder head.

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

2) Install hydraulic lash adjuster.

E: INSTALLATION

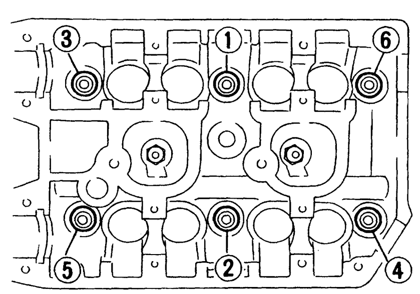
1. CYLINDER HEAD



G2M0770

1) Install cylinder head and gaskets on cylinder block.

CAUTION:
Use new cylinder head gaskets.



G2M0771

2) Tighten cylinder head bolts.
   (1) Apply a coat of engine oil to washers and bolt threads.
   (2) First tighten all bolts to 29 N·m (3.0 kg-m, 22 ft-lb) in the order shown in the figure. After this, tighten them further to 69 N·m (7.0 kg-m, 51 ft-lb) in the same order.
   (3) Back off all bolts by 180°. After this, back them off another 180°.
   (4) Tighten all bolts to 29 N·m (3.0 kg-m, 22 ft-lb) in the order shown in the figure.
   (5) Tighten all bolts by 80° to 90° in numerical sequence.

CAUTION:
Do not tighten bolts more than 90°.

   (6) Further tighten all bolts by 40° to 45° in numerical sequence.
   (7) Further tighten bolts ① and ② by 40° to 45°.

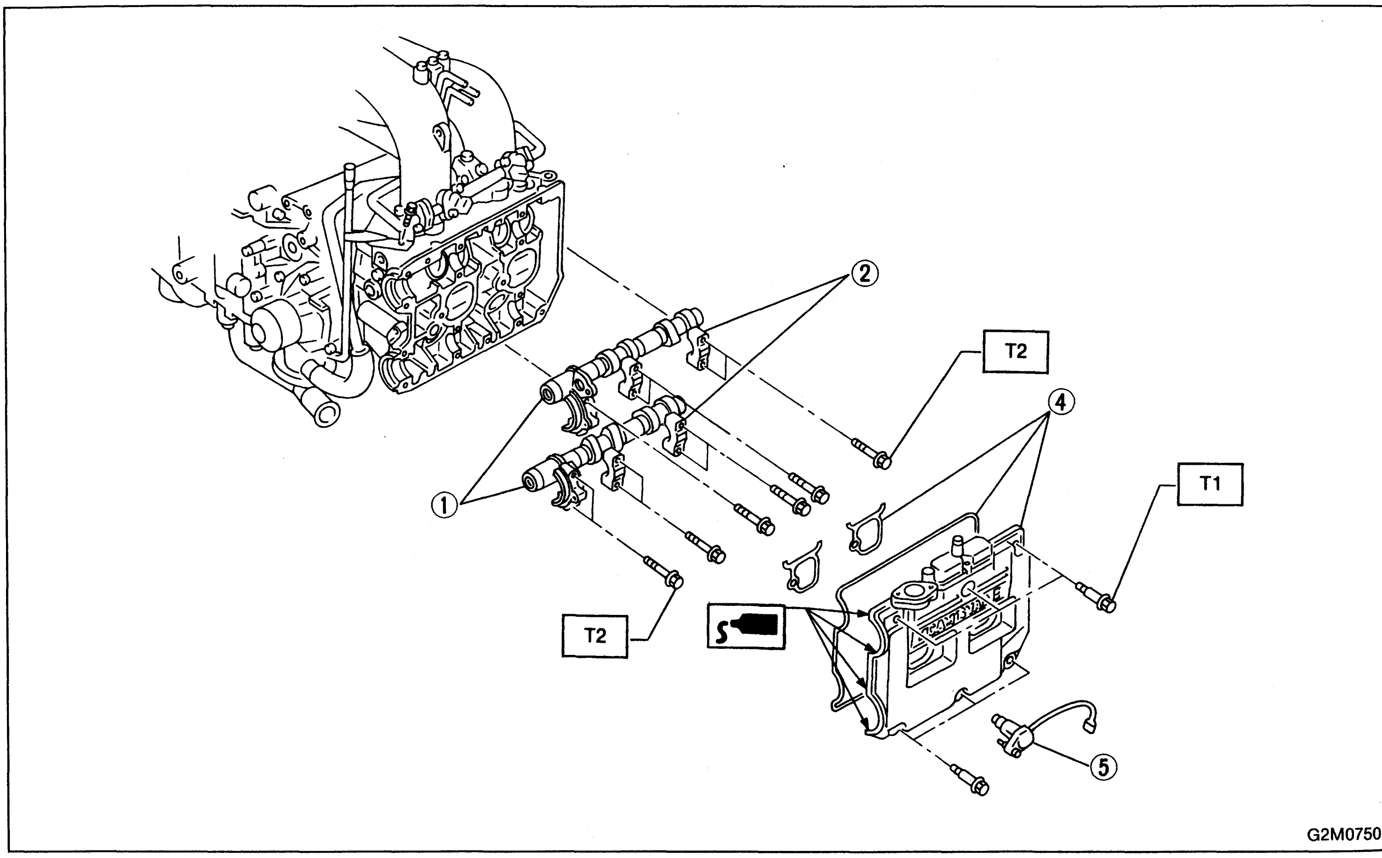
CAUTION:
- **Ensure that "tightening angle" [steps (6) and (7)] do not exceed 45°.**

- **Ensure that the total "re-tightening angle" [steps (6) and (7)] do not exceed 90°.**

3) Install oil level gauge guide attaching bolt (left-hand only).

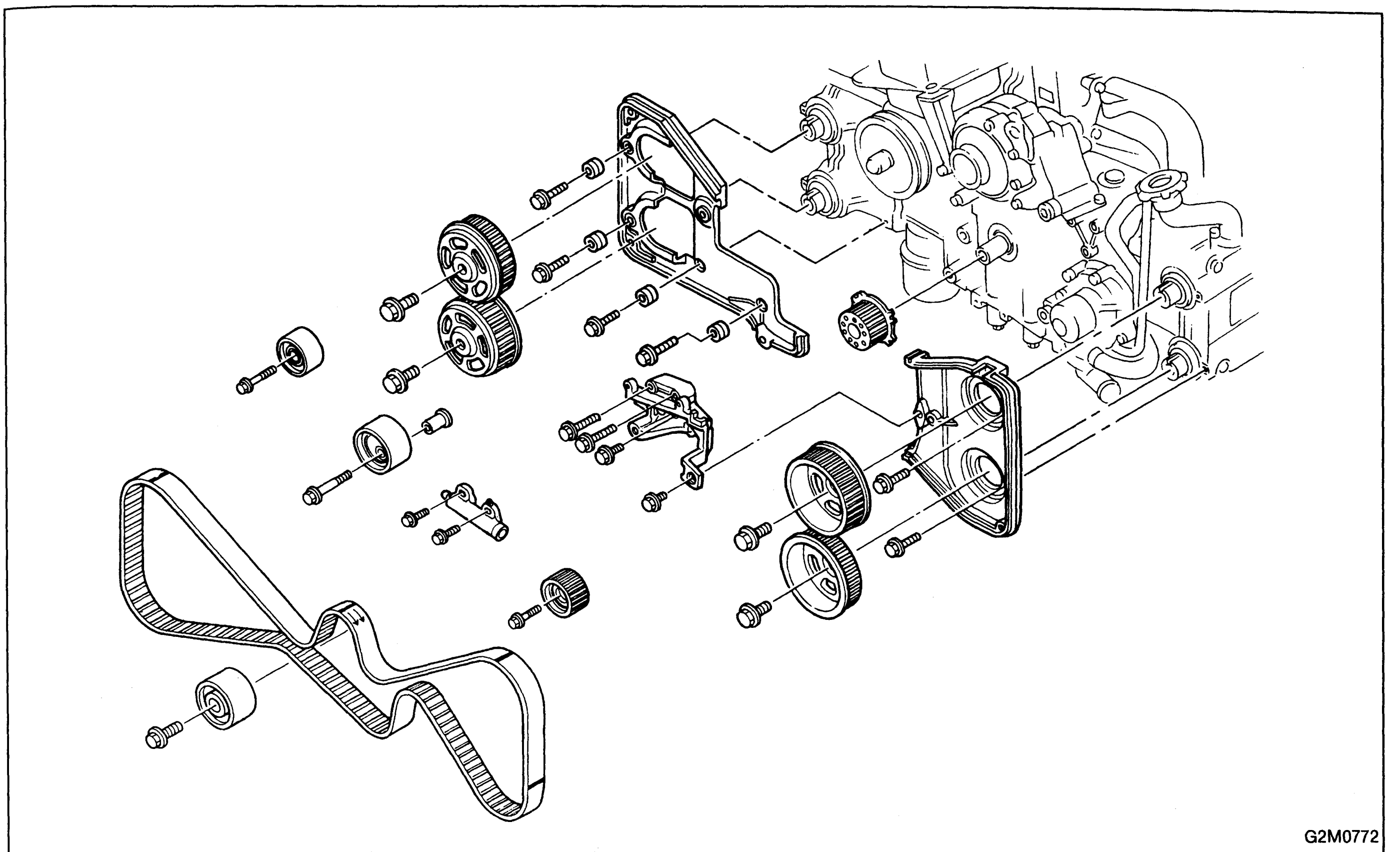
2. INTAKE MANIFOLD

1) Install camshafts, cylinder head cover and related parts.
<Ref. to 2-3b [W3C0].>

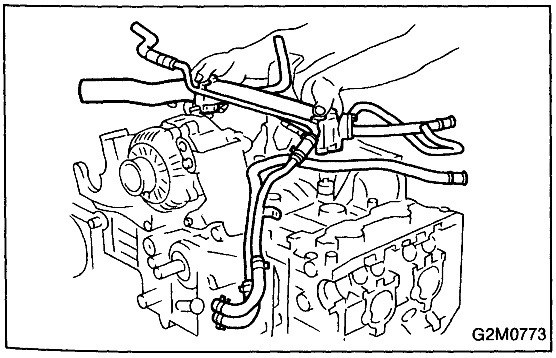


Tightening torque: N·m (kg-m, ft-lb)
T1: 10 ± 0.7 (1.0 ± 0.07, 7.2 ± 0.5)
T2: 20 ± 2 (2.0 ± 0.2, 14.5 ± 1.4)

2) Install camshaft sprockets, timing belt and related parts.
<Ref. to 2-3b [W2C0].>

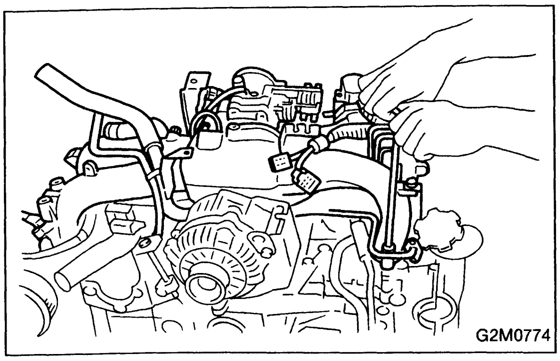


G2M0772



G2M0773

3) Install water pipe.
CAUTION:
Use new gaskets.


G2M0774

4) Install intake manifold.

CAUTION:

Use new gaskets.

5) Install coolant filler tank.

6) Install crankshaft position sensor, camshaft position sensor and knock sensor. Use dry compressed air to remove foreign particles before installing sensors.

7) Connect each connector and/or install connector bracket.

8) Connect hoses and tubes to cylinder block.

9) Install brackets, alternator and air conditioner compressor.

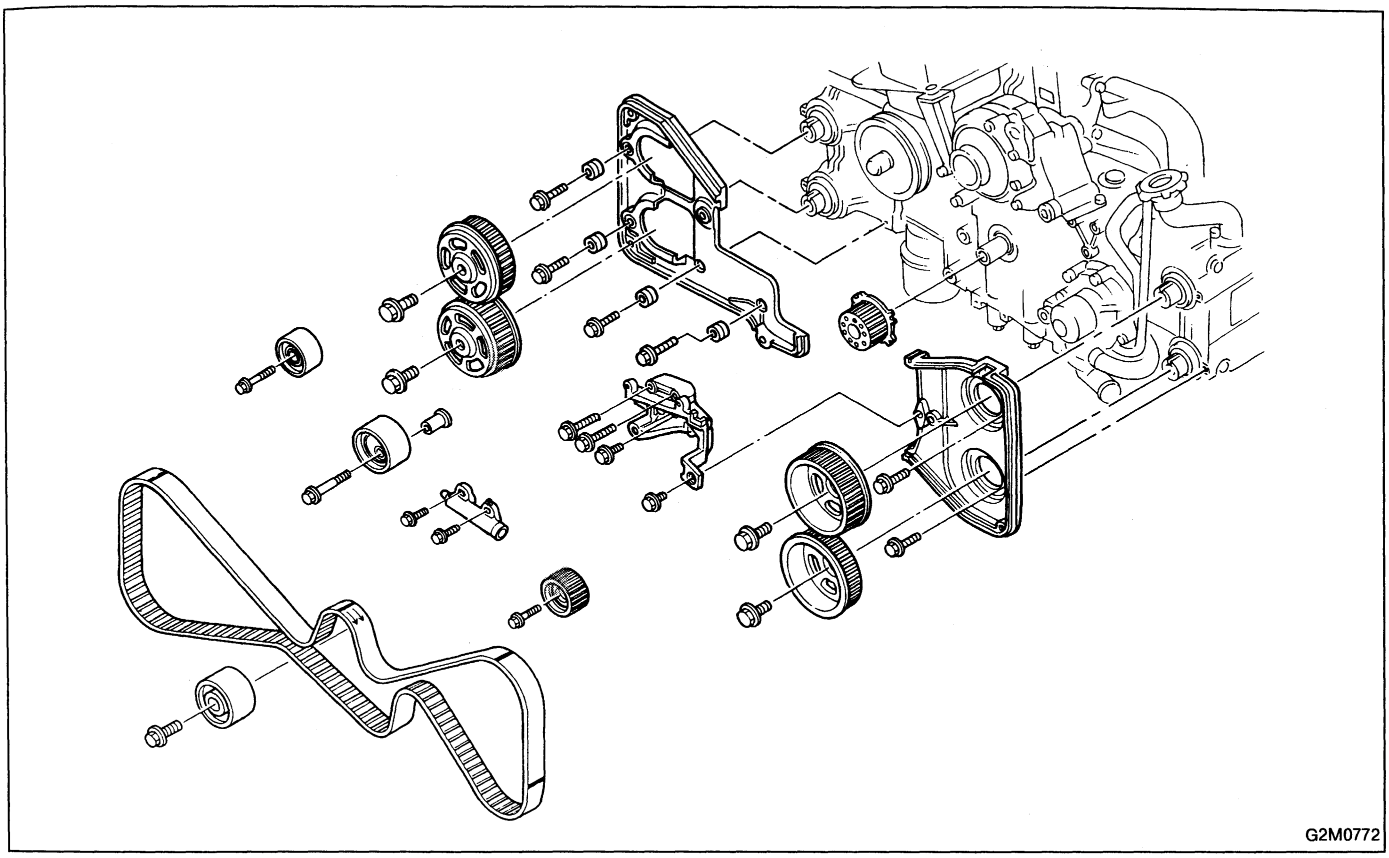
10) Install V-belt.

5. Cylinder Block

A: REMOVAL

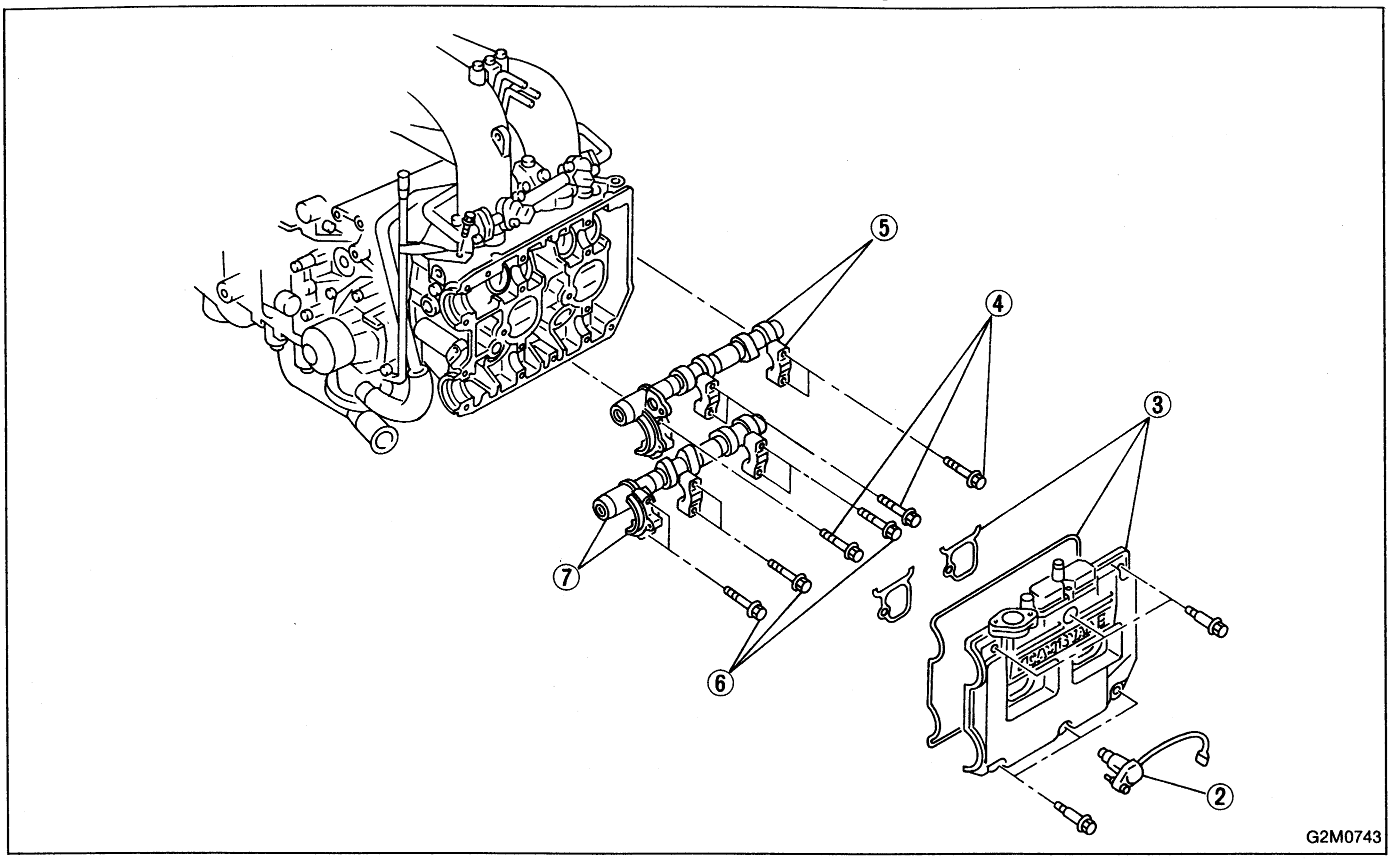
1. RELATED PARTS

1) Remove timing belt, camshaft sprockets and related parts.
<Ref. to 2-3b [W2A0].>

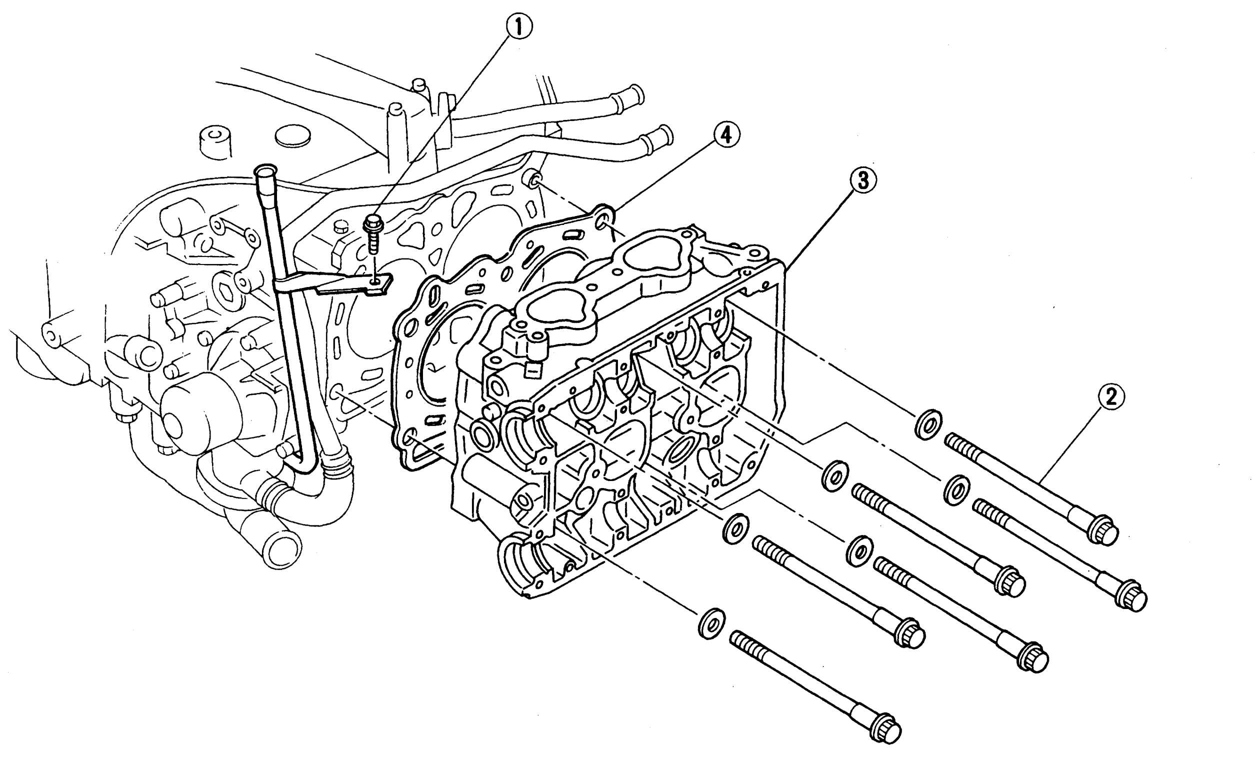


G2M0772

2) Remove cylinder head covers, camshafts and related parts.
<Ref. to 2-3b [W3A0].>

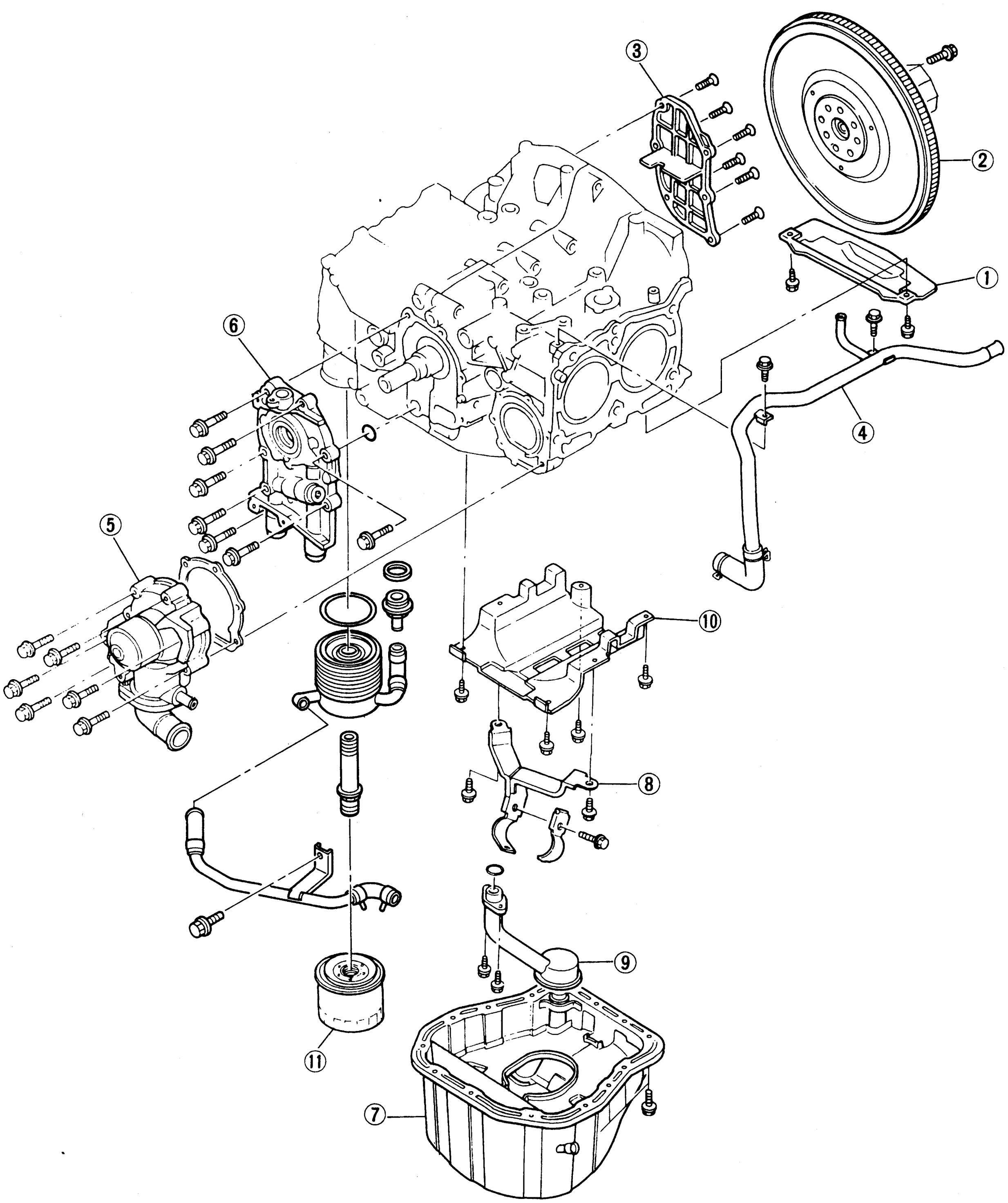


3) Remove cylinder heads.
<Ref. to 2-3b [W4A0].>

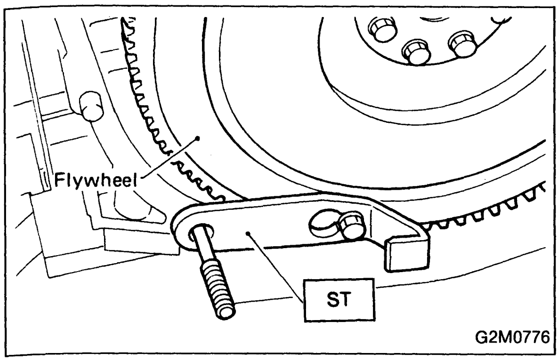


G2M0756

2. OIL PUMP AND ENGINE COOLANT PUMP

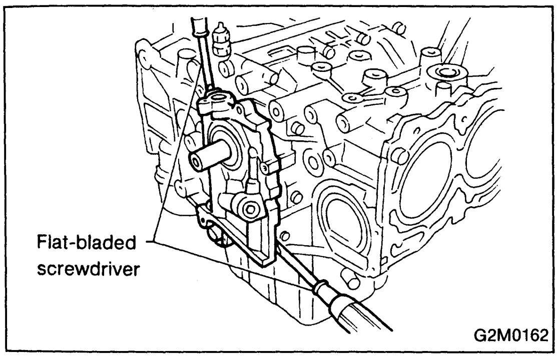


G2M0775



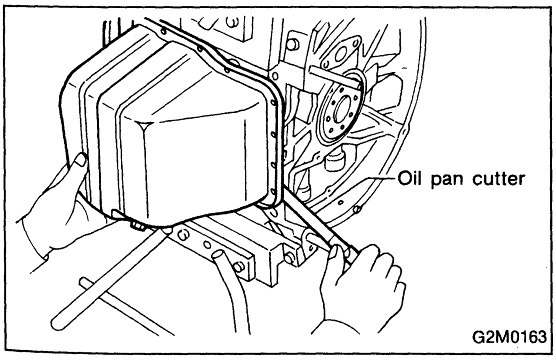
1) Remove housing cover.
2) Remove flywheel.
Using ST, lock crankshaft.
ST 498497100 CRANKSHAFT STOPPER

3) Remove oil separator cover.
4) Remove engine coolant pipe.
5) Remove engine coolant pump.



6) Remove oil pump from cylinder block.
Use a flat-bladed screwdriver as shown in figure when removing oil pump.

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



7) Removal of oil pan
   (1) Turn cylinder block with #2 and #4 piston sides facing upward.
   (2) Remove bolts which secure oil pan to cylinder block.
   (3) Insert a oil pan cutter blade between cylinder block-to-oil pan clearance and remove oil pan.

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

8) Remove oil strainer stay.
9) Remove oil strainer.

10) Remove baffle plate.

11) Remove oil filter.

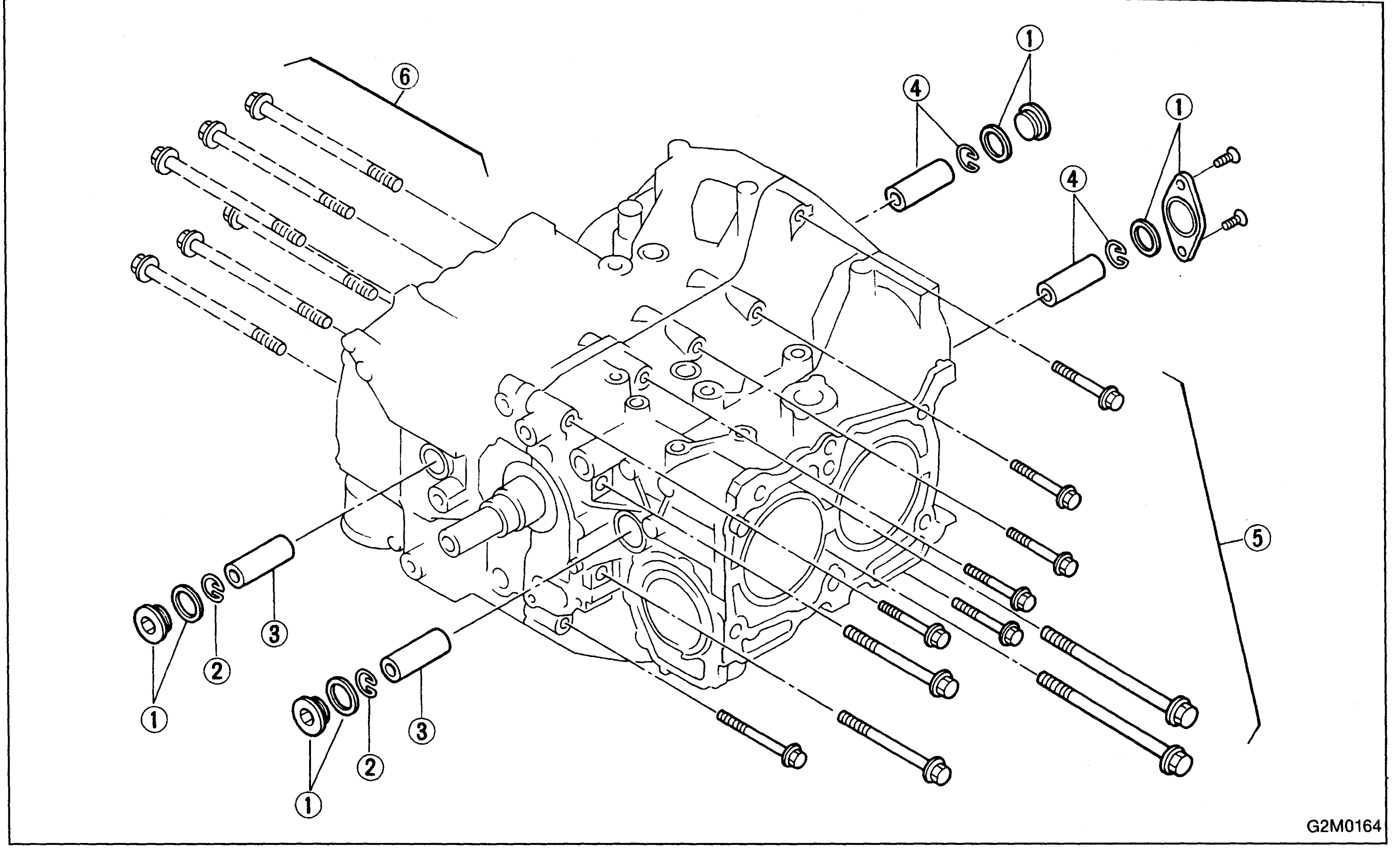
12) Disconnect U-shaped hose from cylinder block.
13) Remove bolt which secure engine coolant pipe to cylinder block.

14) Remove connector pipe.

15) Remove oil cooler.
16) Remove engine coolant pipe from oil cooler.

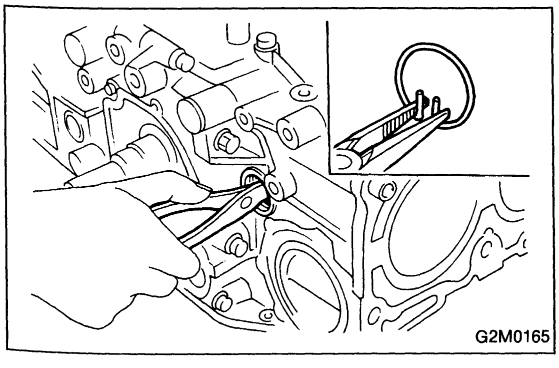
B: DISASSEMBLY

1. PISTON PIN AND CYLINDER BLOCK CONNECTING BOLT

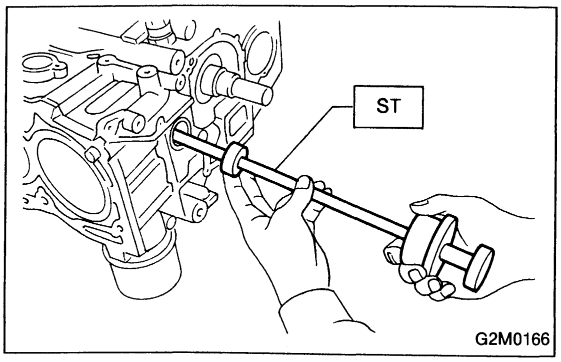


G2M0164

1) Remove service hole cover and service hole plugs using hexagon wrench (14 mm).


G2M0165

2) Rotate crankshaft to bring #1 and #2 pistons to BDC position, then remove piston circlip through service hole of #1 and #2 cylinders.

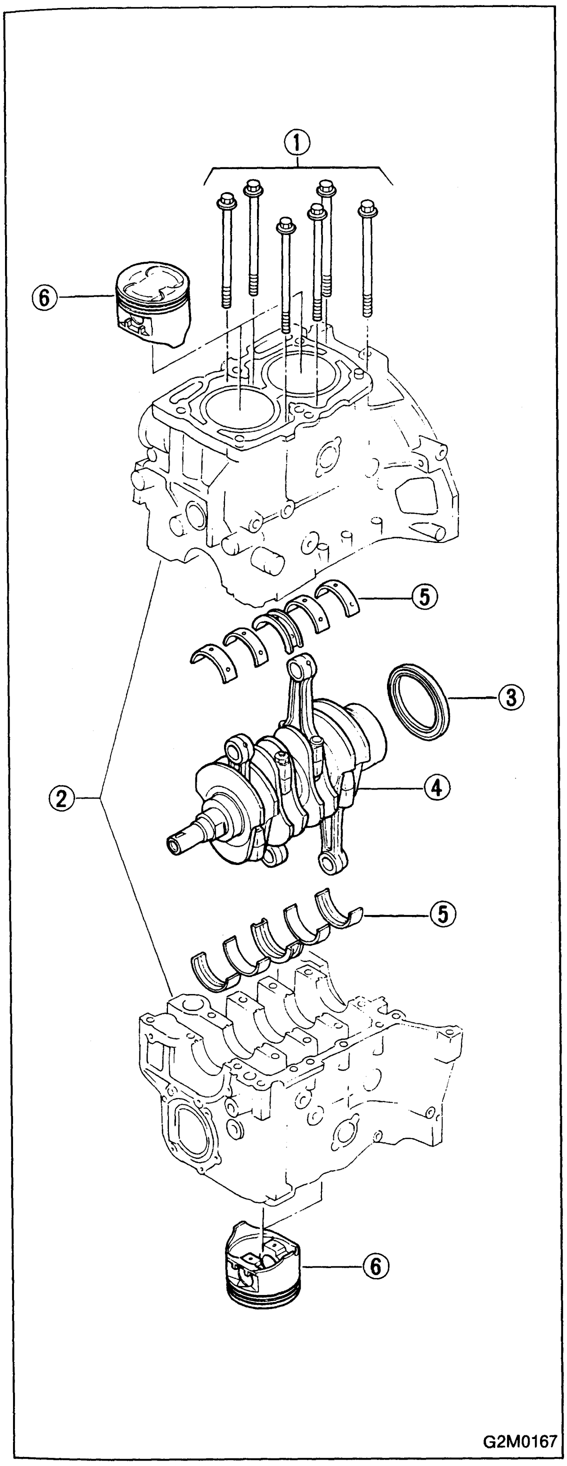


3) Draw out piston pin from #1 and #2 pistons by using ST.
ST 499097500 PISTON PIN REMOVER

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

4) Similarly remove piston pins from #3 and #4 pistons by using ST.

5) Remove bolts which connect cylinder block on the side of #2 and #4 cylinders.
6) Back off bolts which connect cylinder block on the side of #1 and #3 cylinders two or three turns.



2. CYLINDER BLOCK

1) Set up cylinder block so that #1 and #3 cylinders are on the upper side, then remove cylinder block connecting bolts.
2) Separate left-hand and right-hand cylinder blocks.

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

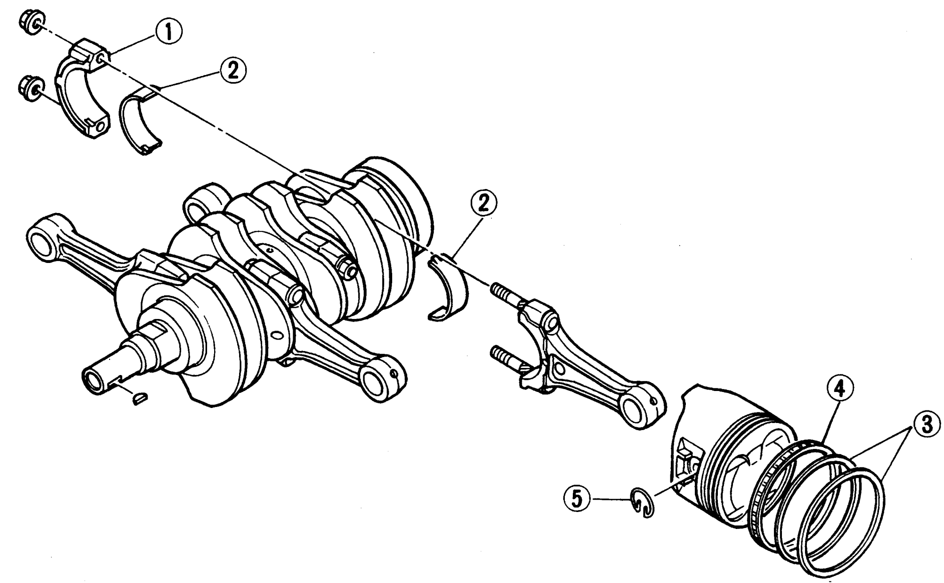
3) Remove rear oil seal.
4) Remove crankshaft together with connecting rod.
5) Remove crankshaft bearings from cylinder block using hammer handle.

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

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

CAUTION:
Do not confuse combination of piston and cylinder.

3. CRANKSHAFT AND PISTON



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

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

3) Remove 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 circlip.

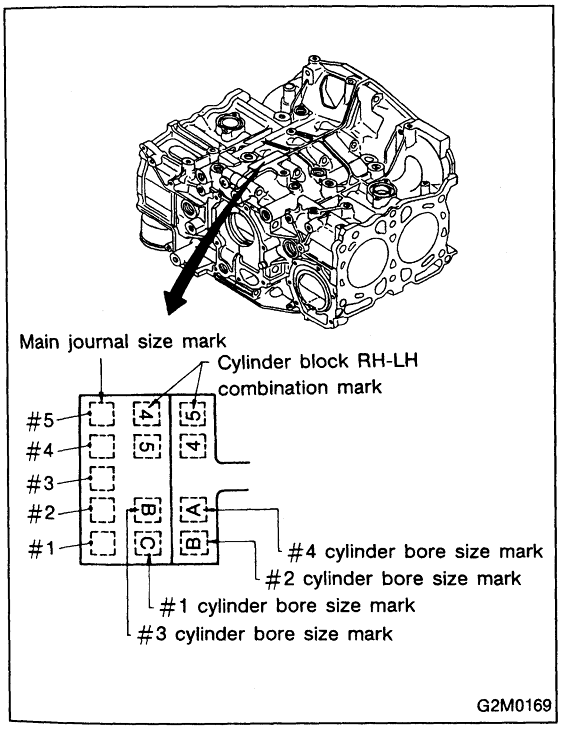
C: INSPECTION

1. CYLINDER BLOCK

1) Check for cracks and damage visually. Especially, inspect important parts by means of red 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)

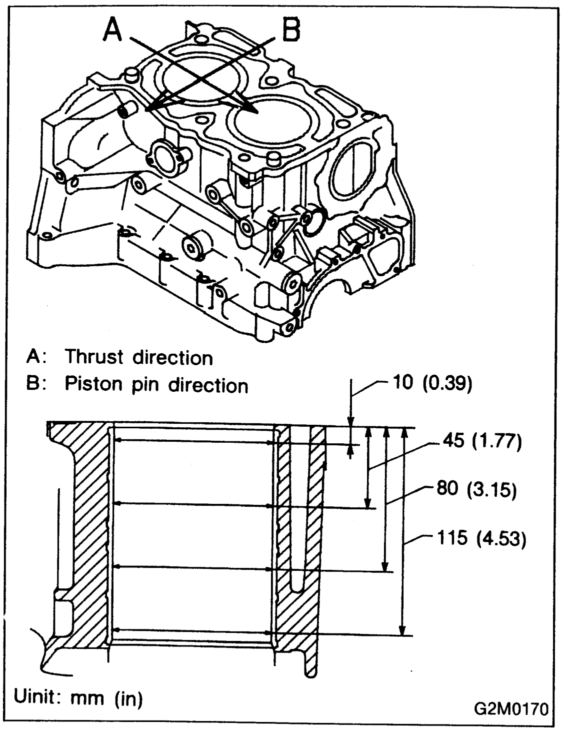
Grinding limit:
0.1 mm (0.004 in)



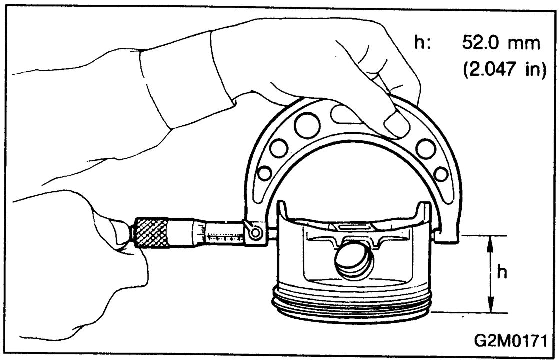
2. CYLINDER AND PISTON

1) The cylinder bore size is stamped on the cylinder block's front upper surface.
NOTE:
Standard sized pistons are classified into three 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)



G2M0170



G2M0171

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 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)

3) When 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 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) How to measure 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

0.060 mm (0.0024 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 pistons and piston pins for damage, cracks, and wear and the piston ring grooves for wear and damage. Replace if defective.

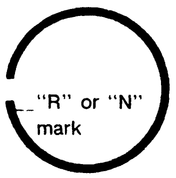
2) Measure the piston-to-cylinder clearance at each cylinder as instructed in 2. CYLINDER AND PISTON [W5C2]. If any of the clearances is not to specification, replace the piston or bore the cylinder to use an oversize piston.

3) Make sure that 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:
0.001 — 0.013 mm (0.00004 — 0.00051 in)

Standard clearance between piston pin and hole in connecting rod:
0 — 0.022 mm (0 — 0.0009 in)

4. PISTON RING

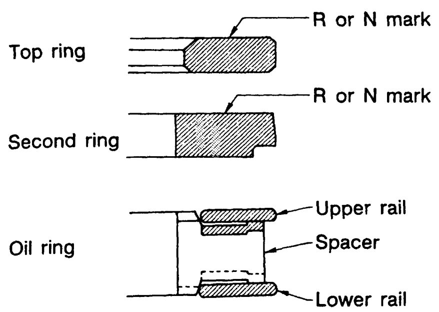


G2M0172

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

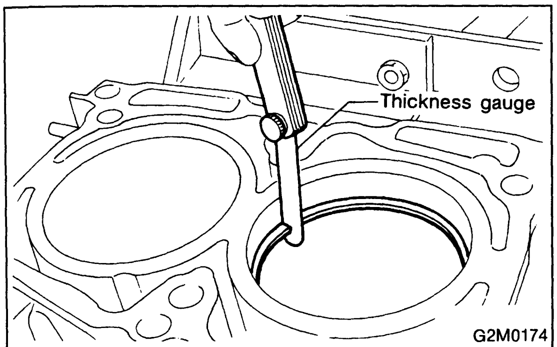
CAUTION:

- **"R" or "N" is marked on the end of the top and second rings. When installing the rings to the piston, face this mark upward.**



G2M0173

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

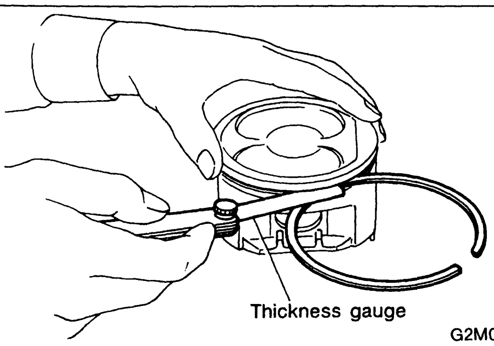


G2M0174

2) Squarely place 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 — 0.26 (0.0079 — 0.0102)	0.5 (0.020)
	Second ring	0.37 — 0.52 (0.0146 — 0.0205)	1.0 (0.039)
	Oil ring rail	0.20 — 0.70 (0.0079 — 0.0276)	1.5 (0.059)



G2M0175

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

CAUTION:

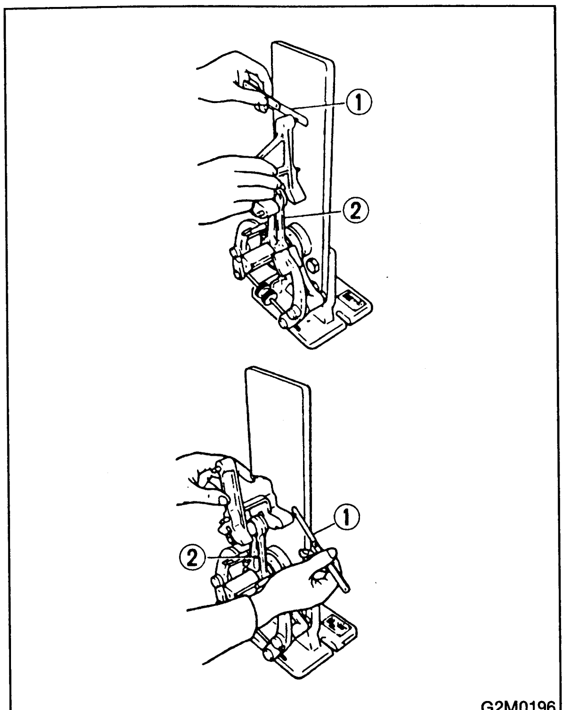
Before measuring the clearance, clean the piston ring groove and piston ring.

Unit: mm (in)

		Standard	Limit
Clearance between piston ring and piston ring groove	Top ring	0.04 — 0.08 (0.0016 — 0.0031)	0.15 (0.0059)
	Second ring	0.03 — 0.07 (0.0012 — 0.0028)	0.15 (0.0059)

5. CONNECTING ROD

1) Replace connecting rod, if the large or small end thrust surface is damaged.

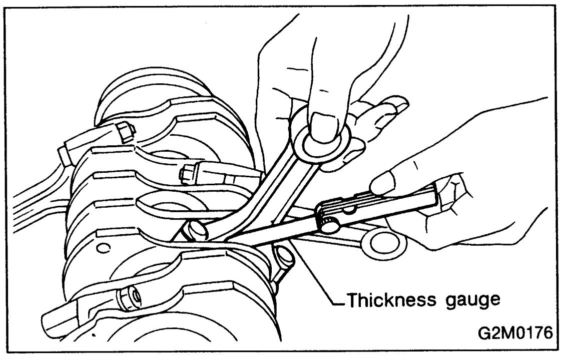


G2M0196

2) Check for bend or twist using a connecting rod aligner. Replace 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)

① Thickness gauge
② Connecting rod



G2M0176

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

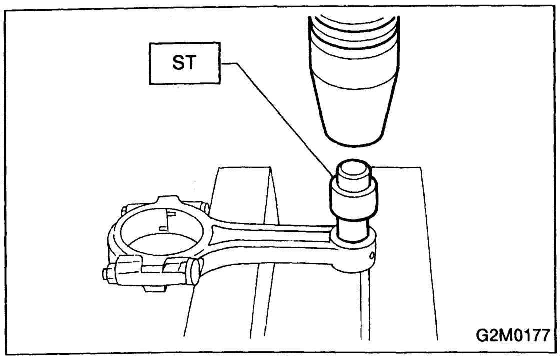
Connecting rod oil clearance:
Standard
0.0158 — 0.0438 mm (0.0006 — 0.0017 in)
Limit
0.05 mm (0.0020 in)

Unit: mm (in)

Bearing	Bearing size (Thickness at center)	Outer diameter of crank pin
Standard	1.492 — 1.501 (0.0587 — 0.0591)	51.984 — 52.000 (2.0466 — 2.0472)
0.03 (0.0012) undersize	1.510 — 1.513 (0.0594 — 0.0596)	51.954 — 51.970 (2.0454 — 2.0461)
0.05 (0.0020) undersize	1.520 — 1.523 (0.0598 — 0.0600)	51.934 — 51.950 (2.0446 — 2.0453)
0.25 (0.0098) undersize	1.620 — 1.623 (0.0638 — 0.0639)	51.734 — 51.750 (2.0368 — 2.0374)

6) Inspect 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)

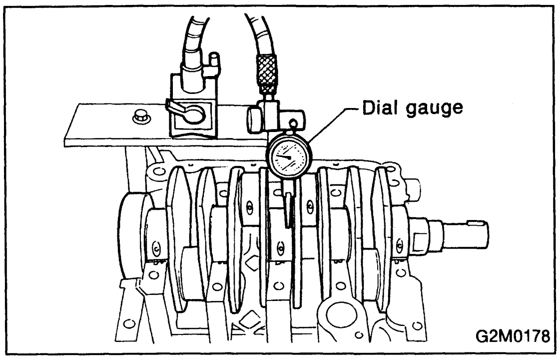


G2M0177

7) Replacement procedure is as follows:
(1) Remove bushing from connecting rod with ST and press.
(2) Press bushing with ST after applying oil on the periphery of bushing.
ST 499037100 CONNECTING ROD BUSHING REMOVER AND INSTALLER
(3) Make two 3 mm (0.12 in) holes in bushing. Ream the inside of bushing.
(4) After completion of reaming, clean bushing to remove chips.

6. CRANKSHAFT AND CRANKSHAFT BEARING

1) Clean crankshaft completely and check for cracks by means of red check etc., and replace if defective.

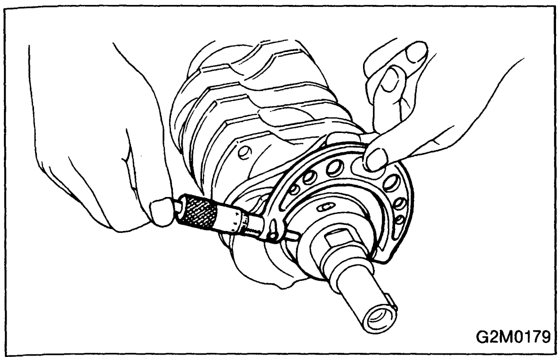


G2M0178

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 cylinder block, position crankshaft on these bearings and measure crankshaft bend using a dial gauge.

Crankshaft bend limit:
0.035 mm (0.0014 in)


G2M0179

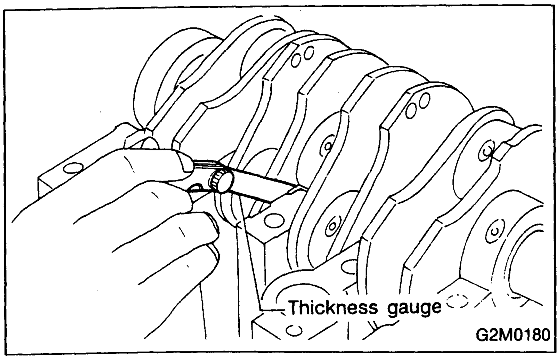
3) Inspect the crank journal and crank pin for wear. If not to specifications, replace bearing with an undersize one, and replace or recondition crankshaft as necessary. When grinding crank journal or crank pin, finish them to the specified dimensions according to the undersize bearing to be used.

Crank pin and crank journal:
Out-of-roundness
0.03 mm (0.0012 in) or less
Taper limit
0.07 mm (0.0028 in)
Grinding limit
0.25 mm (0.0098 in)

Unit: mm (in)

		Crank journal			Crank pin O.D.
		#1, #5	#2, #4	#3	
Standard	Journal O.D.	59.984 — 60.000 (2.3616 — 2.3622)	59.984 — 60.000 (2.3616 — 2.3622)	59.984 — 60.000 (2.3616 — 2.3622)	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)	2.000 — 2.013 (0.0787 — 0.0793)	1.492 — 1.510 (0.0587 — 0.0594)
0.03 (0.0012) undersize	Journal O.D.	59.954 — 59.970 (2.3604 — 2.3610)	←	←	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)	2.019 — 2.022 (0.0795 — 0.0796)	1.510 — 1.513 (0.0594 — 0.0596)
0.05 (0.0020) undersize	Journal O.D.	59.934 — 59.950 (2.3596 — 2.3602)	←	←	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)	2.029 — 2.032 (0.0799 — 0.0800)	1.520 — 1.523 (0.0598 — 0.0600)
0.25 (0.0098) undersize	Journal O.D.	59.734 — 59.750 (2.3517 — 2.3524)	←	←	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)	2.129 — 2.132 (0.0838 — 0.0839)	1.620 — 1.623 (0.0638 — 0.0639)

O.D. ... Outer diameter



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

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

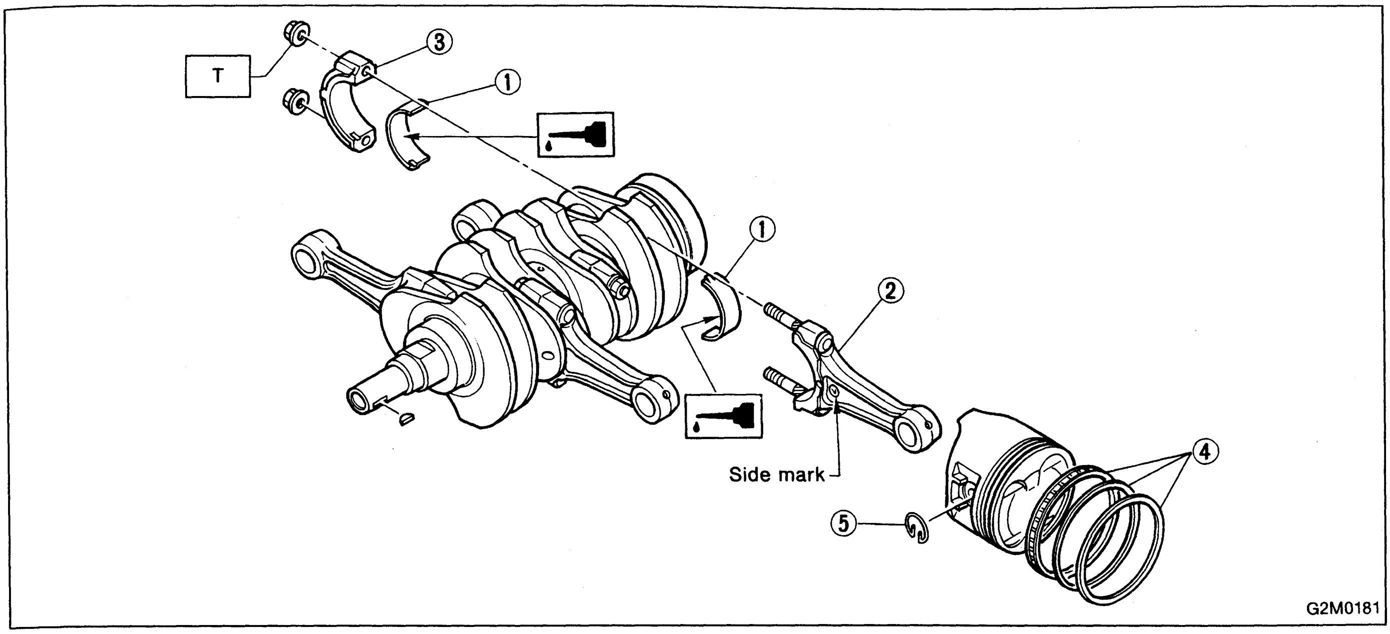
5) Inspect individual crankshaft bearings for signs of flaking, seizure, melting, and wear.
6) Measure the oil clearance on each crankshaft bearing by means of plastigauge. If the measurement is not within the specification, replace defective bearing with an undersize one, and replace or recondition crankshaft as necessary.

Unit: mm (in)

Crankshaft oil clearance		
Standard	#1, #5	0.010 — 0.030 (0.0004 — 0.0012)
	#2, #3, #4	0.010 —'0.030 (0.0004 — 0.0012)
Limit	#1, #5	0.040 (0.0016)
	#2, #3, #4	0.035 (0.0014)

D: ASSEMBLY

1. CRANKSHAFT AND PISTON



Tightening torque: N·m (kg-m, ft-lb)
T: 44.6±1.5 (4.55±0.15, 32.9±1.1)

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

CAUTION:

Apply oil to the surfaces of the connecting rod bearings.

2) Install connecting rod on crankshaft.

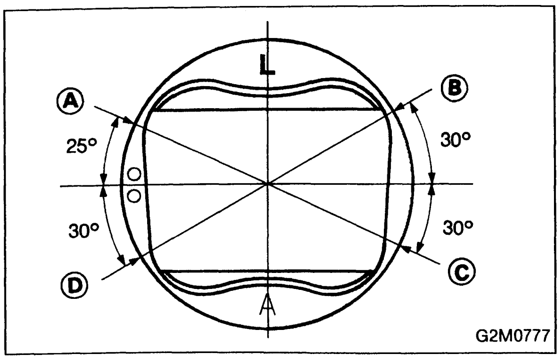
CAUTION:

Position each connecting rod with the side marked facing forward.

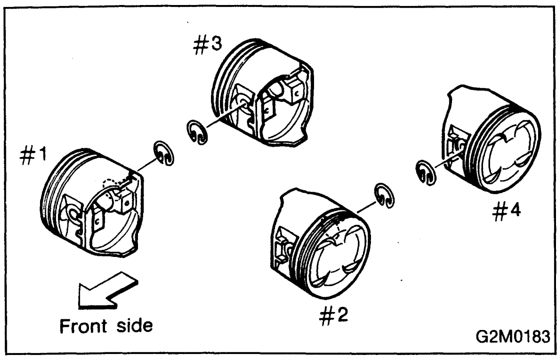
3) Install connecting rod cap with connecting rod nut.
Ensure the arrow on connecting rod cap faces the front during installation.

CAUTION:

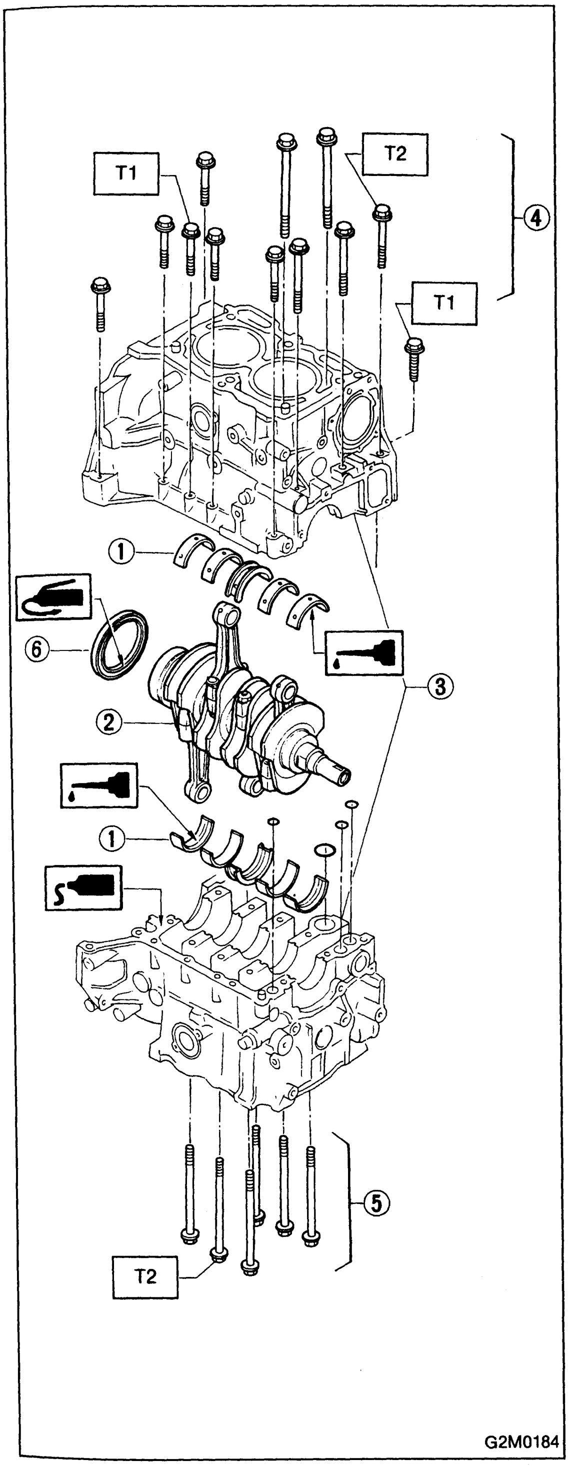
- **Each connecting rod has its own mating cap. Make sure that they are assembled correctly by checking their matching number.**
- **When tightening the connecting rod nuts, apply oil on the threads.**



4) Installation of piston rings and oil ring
(1) Install oil ring spacer, upper rail and lower rail in this order by hand. Then install second ring and top ring with a piston ring expander.
(2) Position the gaps of the piston rings and oil ring as shown in the figure.
Ⓐ : Oil ring lower rail
Ⓑ : Oil ring upper rail
Ⓒ : Top ring
Ⓓ : Second ring



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



2. CYLINDER BLOCK

1) Install ST to cylinder block, then install crankshaft bearings.

ST 499817000 ENGINE STAND

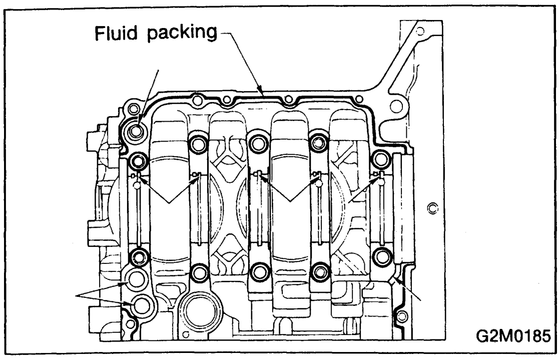
CAUTION:

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

2) Position crankshaft on the #2 and #4 cylinder block.

Tightening torque:

T1: 25±5 N·m (2.5±0.5 kg-m, 18.1±3.6 ft-lb)
T2: 47±3 N·m (4.8±0.3 kg-m, 34.7±2.2 ft-lb)

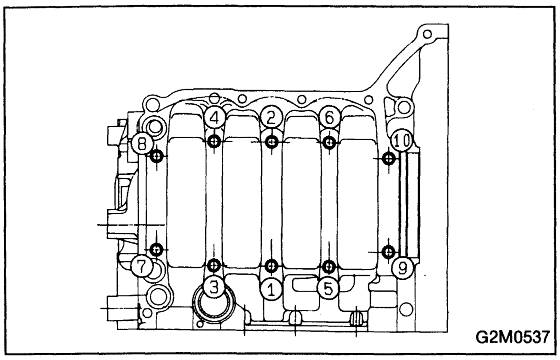


G2M0185

3) 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.

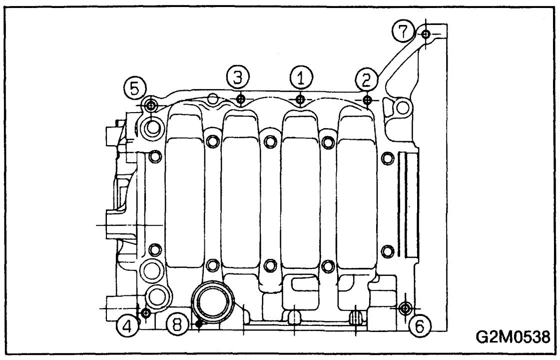


G2M0537

4) Temporarily tighten 10 mm cylinder block connecting bolts in numerical order shown in figure.

5) Tighten 10 mm cylinder block connecting bolts in numerical order.

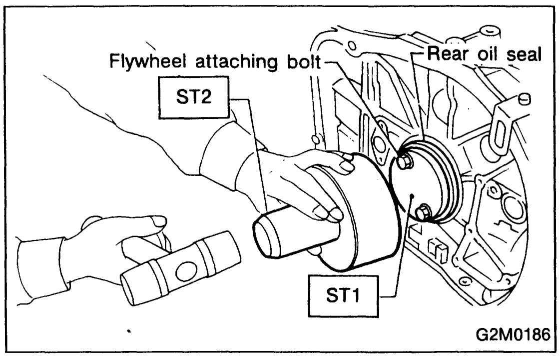
Tightening torque:
47±3 N·m (4.8±0.3 kg-m, 34.7±2.2 ft-lb)



G2M0538

6) Tighten 8 mm and 6 mm cylinder block connecting bolts in numerical order shown in figure.

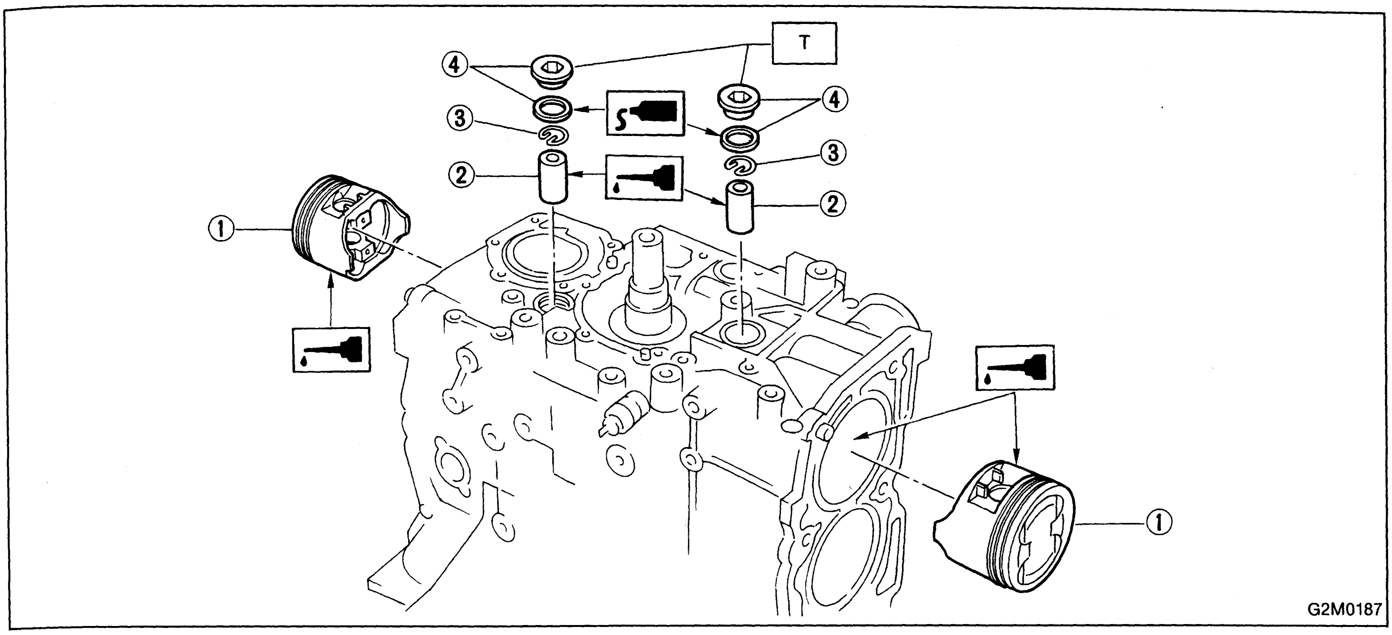
Tightening torque:
① — ⑦: 25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)
⑧: 6.4 N·m (0.65 kg-m, 4.7 ft-lb)



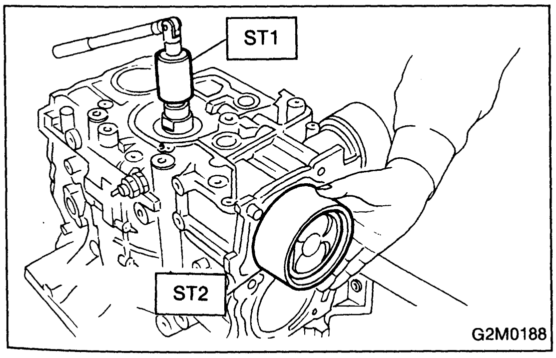
G2M0186

7) Install rear oil seal by using ST1 and ST2.
ST1 499597100 OIL SEAL GUIDE
ST2 499587200 OIL SEAL INSTALLER

3. PISTON AND PISTON PIN (#1 AND #2)



Tightening torque: N·m (kg-m, ft-lb)
T: 69±7 (7.0±0.7, 50.6±5.1)



1) Installing piston

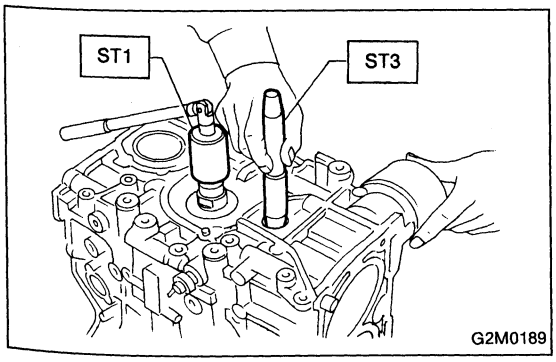
(1) Turn cylinder block so that #1 and #2 cylinders face upward.

(2) Using ST1, turn 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 pistons and cylinders and insert pistons in their cylinders by using ST2.

ST2 498747300 PISTON GUIDE



2) Installing piston pin

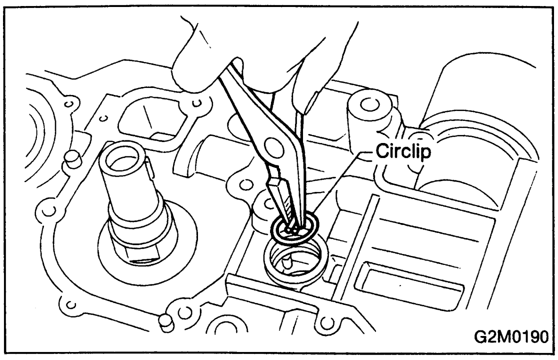
(1) Insert ST3 into service hole to align piston pin hole with connecting rod small end.

CAUTION:

Apply a coat of engine oil to ST3 before insertion.

ST3 499017100 PISTON PIN GUIDE

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



3) Install circlip.

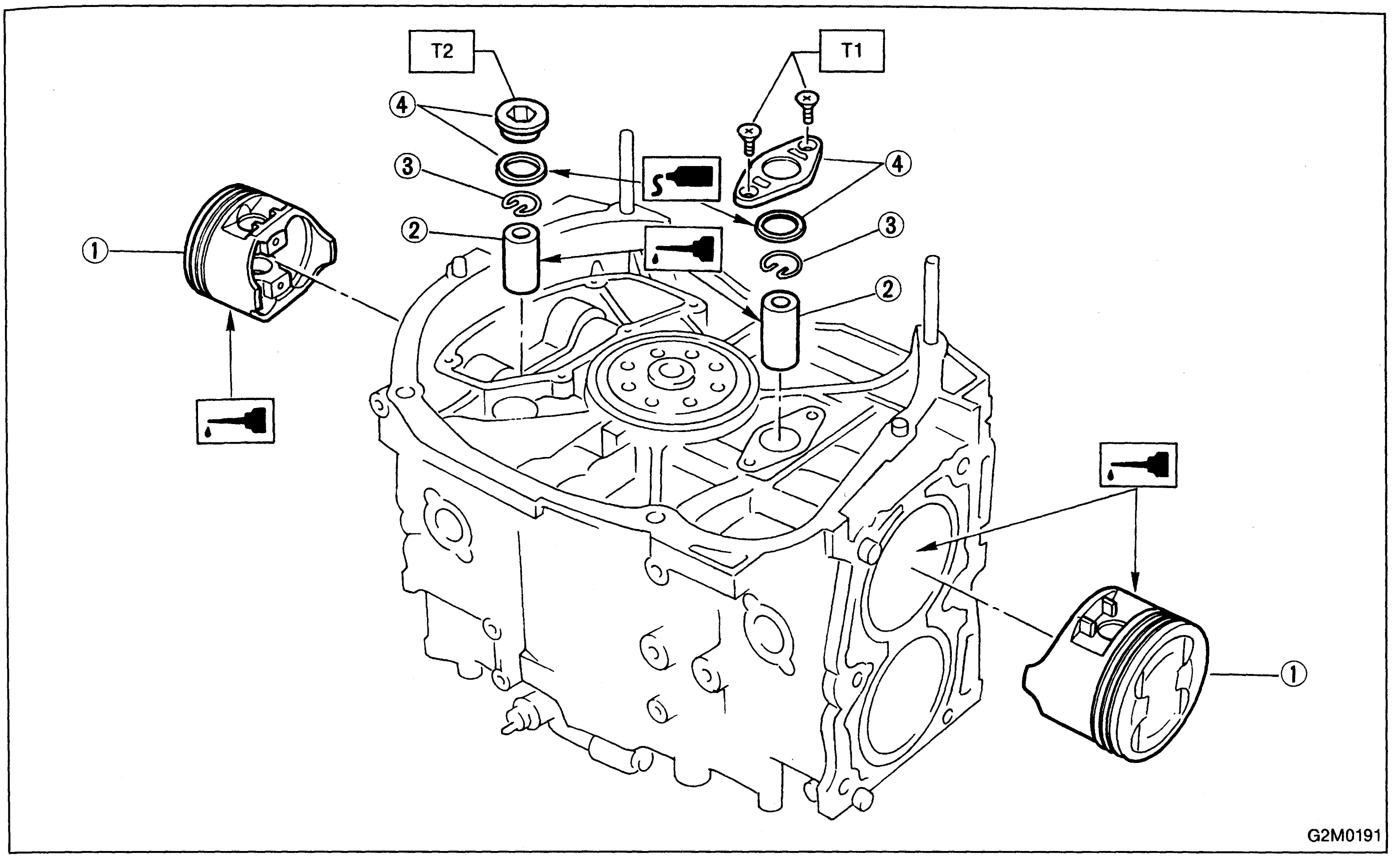
CAUTION:
Use a new circlip.

4) Install service hole plug and gasket.

CAUTION:
Use a new gasket and apply a coat of fluid packing to it before installation.

Fluid packing:
THREE BOND 1215

4. PISTON AND PISTON PIN (#3 AND #4)

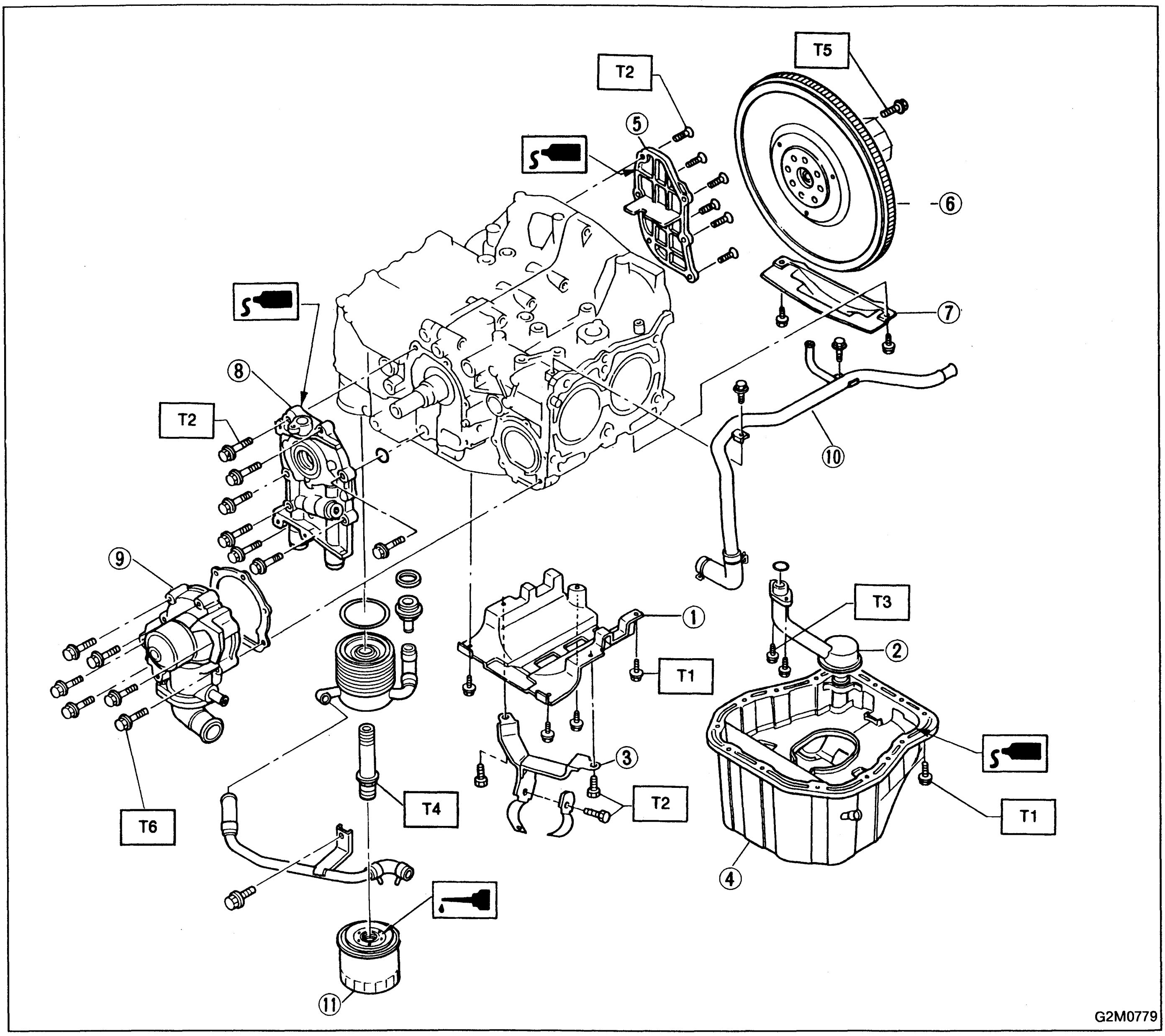


Tightening torque: N·m (kg-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 69 ± 7 (7.0 ± 0.7, 50.6 ± 5.1)

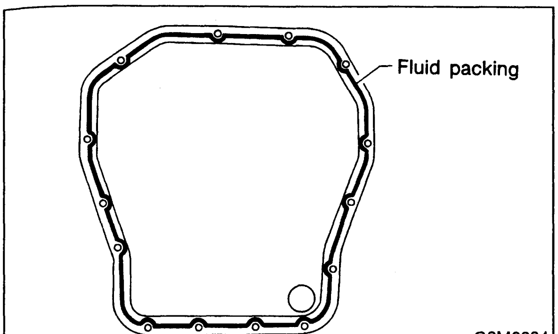
Turn cylinder block so that #3 and #4 cylinders face upward. Using the same procedures as used for #1 and #2 cylinders, install pistons and piston pins.

E: INSTALLATION

1. OIL PUMP AND ENGINE COOLANT PUMP



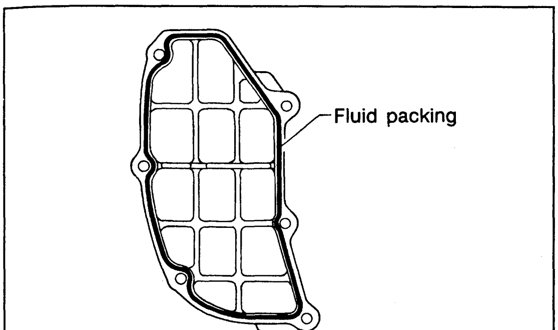
Tightening torque: N·m (kg-m, ft-lb)
- *T1: 5 (0.5, 3.6)*
- *T2: 6.4 (0.65, 4.7)*
- *T3: 10 (1.0, 7)*
- *T4: 54 ± 5 (5.5 ± 0.5, 39.8 ± 3.6)*
- *T5: 72 ± 3 (7.3 ± 0.3, 52.8 ± 2.2)*
- *T6: First 12 ± 2 (1.2 ± 0.2, 8.7 ± 1.4)*
  Second 12 ± 2 (1.2 ± 0.2, 8.7 ± 1.4)



G2M0084

1) Install baffle plate.
2) Install oil strainer and O-ring
3) Install oil strainer stay.
4) Apply fluid packing to matching surfaces and install oil pan.

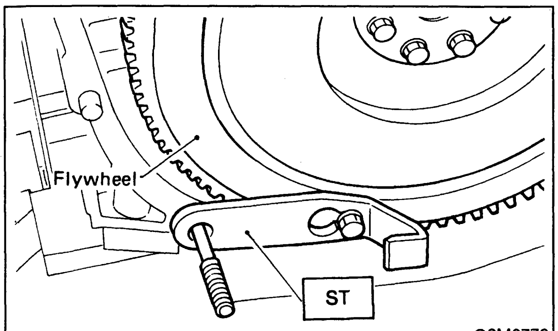
Fluid packing:
THREE BOND 1215 or equivalent



G2M0194

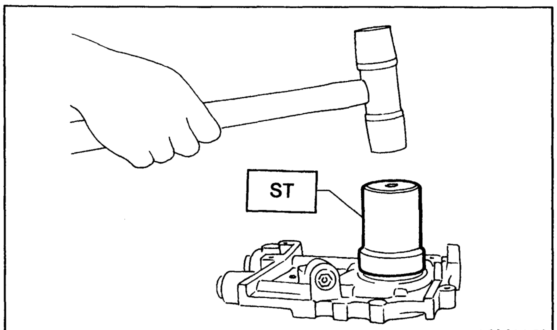
5) Apply fluid packing to matching surfaces and install oil separator cover.

Fluid packing:
THREE BOND 1215 or equivalent



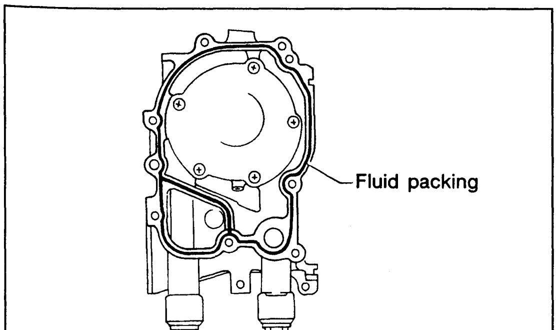
G2M0776

6) Install flywheel. Set ST, and tighten retaining bolts.
ST 498497100 CRANKSHAFT STOPPER
7) Install housing cover.



G2M0076

8) Installation of oil pump
(1) Discard front oil seal after removal. Replace with a new one by using ST.
ST 499587100 OIL SEAL INSTALLER



G2M0078

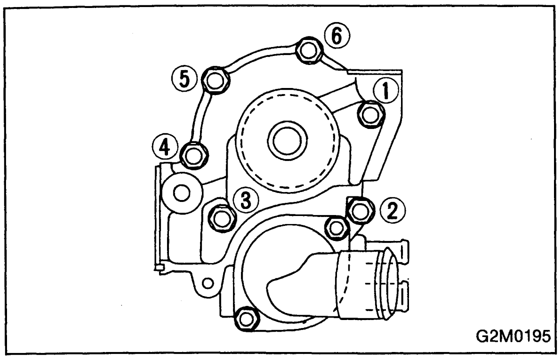
(2) Apply fluid packing to matching surface of oil pump.

Fluid packing:
THREE BOND 1215 or equivalent

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

CAUTION:
- **Do not forget to install O-ring and seal when installing oil pump.**

• Align flat surface of oil pump's inner rotor with crankshaft before installation.



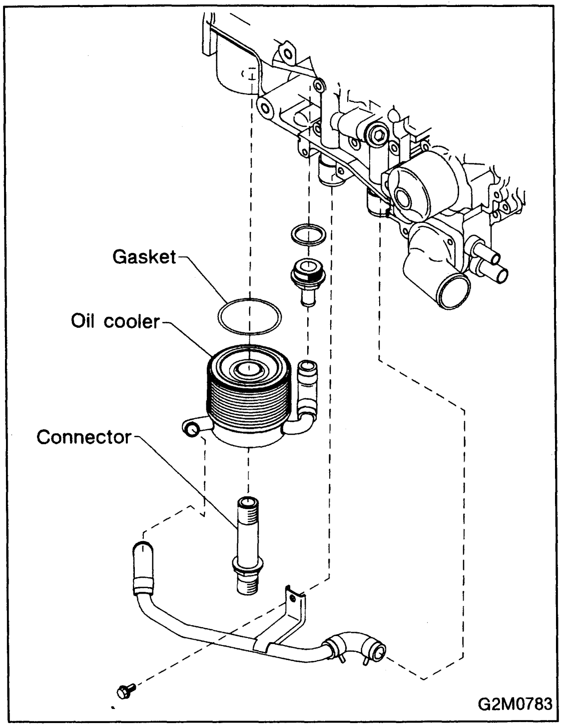
9) Install engine coolant pump and gasket.

CAUTION:

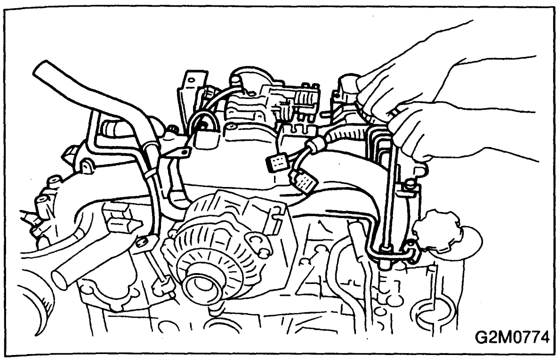
• Be sure to use a new gasket.

• When installing engine coolant pump, tighten bolts in two stages in numerical sequence as shown in figure.

10) Install engine coolant pipes to engine coolant pump.



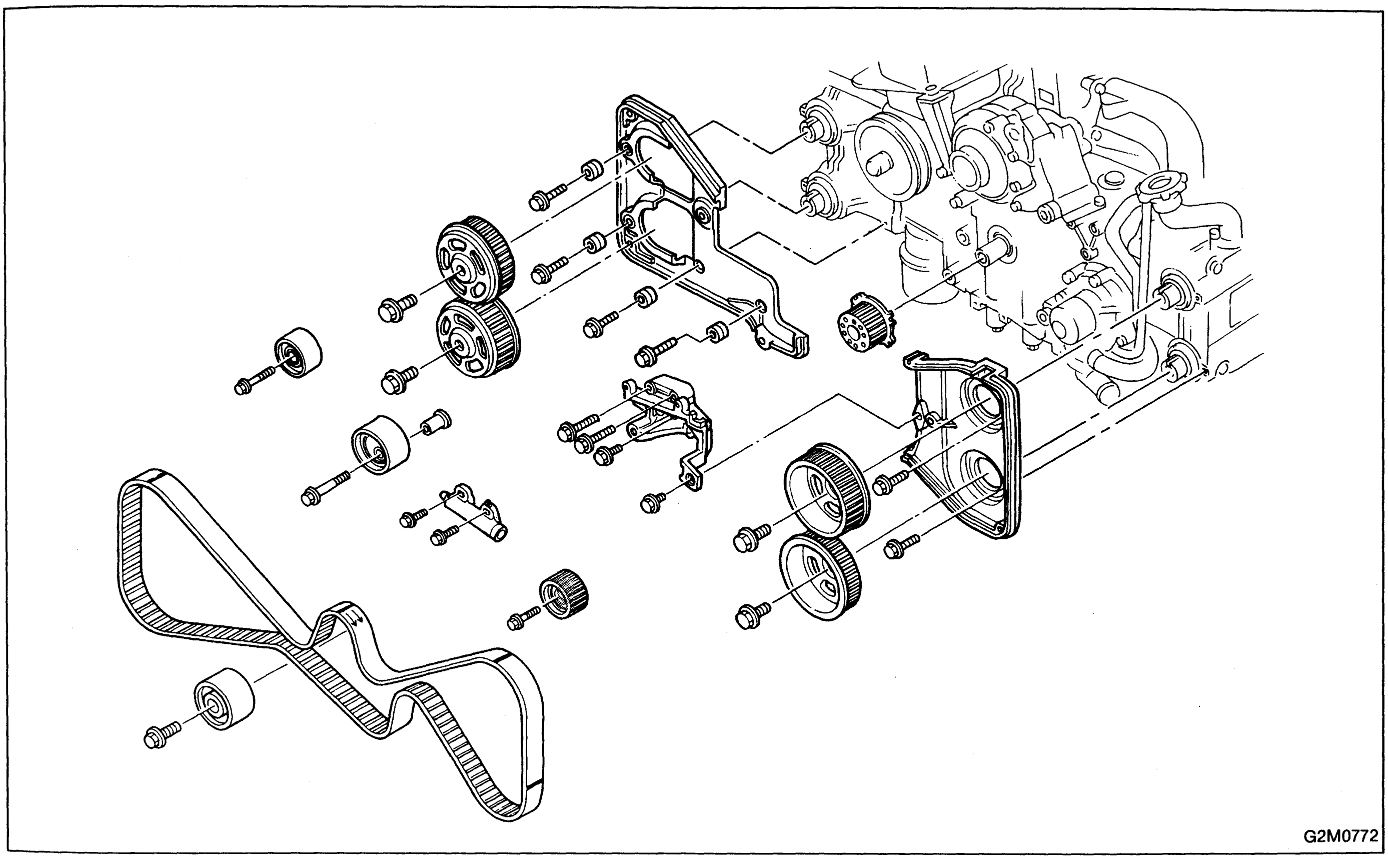
11) Install oil cooler.
12) Install engine coolant pipe to oil cooler.
13) Install oil filter.


G2M0774

2. RELATED PARTS

1) Install cylinder head and intake manifold.
<Ref. to 2-3b [W6E0].>

2) Install timing belt, camshaft sprocket and related parts.
<Ref. to 2-3b [W3C0].>


G2M0772

1. Engine Trouble in General

Numbers shown in the chart refer to the possibility of reason for the trouble in order. ("Very often" to "Rarely")
1 — Very often
2 — Sometimes
3 — Rarely

TROUBLE													
Engine will not start.													
Starter does not turn.	Initial combustion does not occur.	Initial combustion occurs.	Engine stalls after initial combustion.	Rough idle and engine stall.	Low output, hesitation and poor acceleration.	Surging.	Engine does not return to idle.	Dieseling (Run-on).	After burning in exhaust system.	Knocking.	Excessive engine oil consumption.	Excessive fuel consumption.	**POSSIBLE CAUSE**
													STARTER
2													• Defective battery-to-starter harness.
3													• Defective starter switch.
3													• Defective inhibitor switch.
2	3												• Defective starter.
													BATTERY
1													• Poor terminal connection.
1													• Run-down battery.
2													• Defective charging system.
	1	1	1	1	1	1	1	1	1	1		1	MFI SYSTEM <Ref. to 2-7b.>
													IGNITION SYSTEM
	2	2	2	1	1	1	1	1	1	1		1	• Incorrect ignition timing.
	2	1		2	2	2			3			3	• Disconnection of ignition coil.
	2			3	1	2	2		1	2			• Defective ignitor.
	2			3	2	2							• Defective ignition coil.
	2			3	3	3							• Defective cord or wiring.
		2		2	2	2			1				• Defective spark plug.
	2	2	2	1	2	1	3		2	2			• Incorrect cam timing.

TROUBLE													
Engine will not start.													
Starter does not turn.	Initial combustion does not occur.	Initial combustion occurs.	Engine stalls after initial combustion.	Rough idle and engine stall.	Low output, hesitation and poor acceleration.	Surging.	Engine does not return to idle.	Dieseling (Run-on).	After burning in exhaust system.	Knocking.	Excessive engine oil consumption.	Excessive fuel consumption.	
													INTAKE SYSTEM
		2	2	1	2	2	1	2	2			1	• Improper idle adjustment.
			2	1	1	1			3	1			• Loosened or cracked intake duct.
			3	1	1	1			3	1	1		• Loosened or cracked blow-by hose.
			3	1	2	1	1		2	1			• Loosened or cracked vacuum hose.
			3	2	2	2				1			• Defective air cleaner gasket.
		2	2	2	2	2				1			• Defective intake manifold gasket.
		2	2	2	2	2				1			• Defective throttle body gasket.
				3	2	2			2	2	2		• Defective PCV valve.
				2	2	2			3	2	3		• Loosened oil filler cap.
			3	3	1	2				2		1	• Dirty air cleaner element.
													FUEL LINE
	1	3		3	2	2							• Defective fuel pump.
		3	3	3	2	2							• Clogged fuel line.
	2	2	2	2	3	3							• Lack of or insufficient fuel.
													BELT
	2	2	2										• Defective.
	2	2	2	3	2	2			2	2		2	• Defective timing.
													FRICTION
3													• Seizure of crankshaft and connecting rod bearing.
3													• Seized camshaft.
3													• Seized or stuck piston and cylinder.
													COMPRESSION
	3	3	3	2	2	2			2	3		2	• Defective hydraulic lash adjuster.
	3	3	3	2	2	3			3			3	• Loosened spark plugs or defective gasket.
	3	3	3	2	2	3			3			3	• Loosened cylinder head nuts or defective gasket.
	3	3	3	2	2	3			2			2	• Improper valve seating.
	3	3	3	3	3	3			3		1	3	• Defective valve stem.
	2	2	2	2	2	3			3			3	• Worn or broken valve spring.
	3	3	3	2	3	3			3		1	2	• Worn or stuck piston rings, cylinder and piston.
	2	2	2	1	1	1			1	2		2	• Incorrect valve timing.
	2	2	2	2	2	2							• Improper engine oil (low viscosity).

TROUBLE													
Engine will not start.													
Starter does not turn.	Initial combustion does not occur.	Initial combustion occurs.	Engine stalls after initial combustion.	Rough idle and engine stall.	Low output, hesitation and poor acceleration.	Surging.	Engine does not return to idle.	Dieseling (Run-on).	After burning in exhaust system.	Knocking.	Excessive engine oil consumption.	Excessive fuel consumption.	
													LUBRICATION SYSTEM
				2	2				3			3	• Incorrect oil pressure.
											2		• Loosened oil pump attaching bolts and defective gasket.
											2		• Defective oil filter seal.
											2		• Defective crankshaft oil seal.
				3							2		• Defective rocker cover gasket.
											2		• Loosened oil drain plug or defective gasket.
											2		• Loosened oil pan fitting bolts or defective oil pan.
													COOLING SYSTEM
				3	3	2		2		1			• Overheating.
					3				3			3	• Over cooling.
													OTHERS
				1	1	3			3				• Malfunction of Evaporative Emission Control System.
				2			1						• Stuck or damaged throttle valve.
				3			2	2				2	• Accelerator cable out of adjustment.

2. Engine Noise

Hydraulic valve lash adjusters may make clicking noise once engine starts. It is normal if clicking noise ceases after a few minutes.

If clicking noise continues after a few minutes, check engine oil level and add oil if necessary. Warm-up engine for five minutes, then operate it at approximately 3,000 rpm for twenty minutes. If noise still exists, conduct diagnostics procedures in accordance with the following table.

CAUTION:

Do not disconnect ignition coil from spark plug while engine is running.

Type of sound	Condition	Possible cause
Regular clicking sound.	Sound increases as engine speed increases.	Valve mechanism is defective ● Broken lash adjuster. ● Worn valve rocker. ● Worn camshaft. ● Broken valve spring. ● Worn valve lifter hole.
Heavy and dull metallic knock.	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 metallic knock. (Engine knocking)	Sound is noticeable when accelerating with an overload.	● Ignition timing advanced. ● Accumulation of carbon inside combustion chamber. ● Wrong spark plug. ● Improper gasoline.
Metallic knock when engine speed is medium (1,000 to 2,000 rpm).	Sound is reduced when fuel injector connector of noisy cylinder is disconnected.	● 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.	● 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.	● Unusually worn valve lifter. ● Worn cam sprocket gear. ● Worn camshaft journal bore in crankcase.
Squeaky sound.	—	● Insufficient alternator lubrication.
Rubbing sound.	—	● Defective alternator 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 timing belt. ● Defective engine coolant 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.

ENGINE LUBRICATION SYSTEM 2-4

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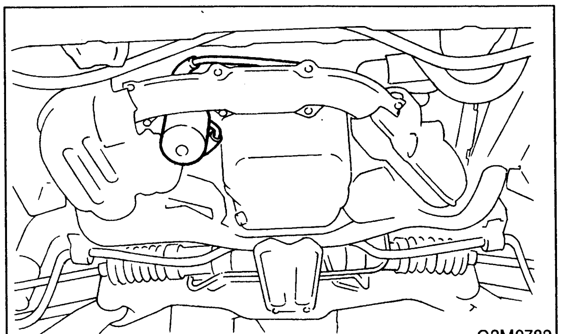
S SPECIFICATIONS AND SERVICE DATA
1. Specifications
C COMPONENT PARTS
1. Lubrication System
W SERVICE PROCEDURE 2
1. Oil Pump
2. Oil Pan and Oil Strainer
3. Oil Pressure Switch
4. Oil Cooler (Turbo model) 2
T DIAGNOSTICS
1. Engine Lubrication System

- The descriptions in this section apply to the turbo model.

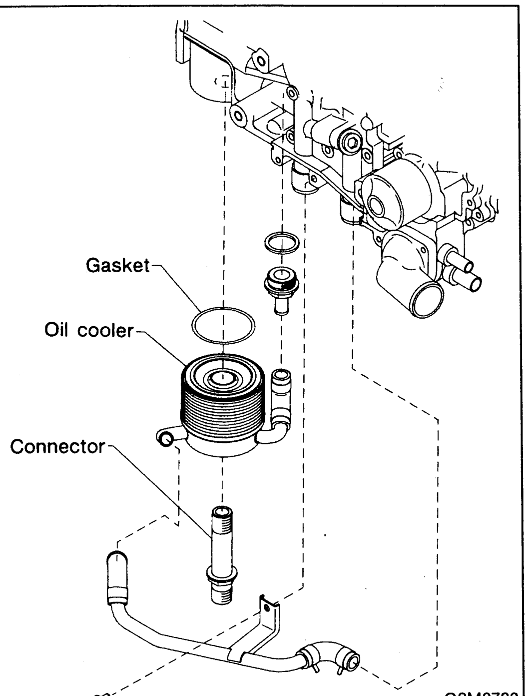


G2M0782

4. Oil Cooler (Turbo model)

A: REMOVAL

1) Remove water pipe.
2) Remove oil filter.

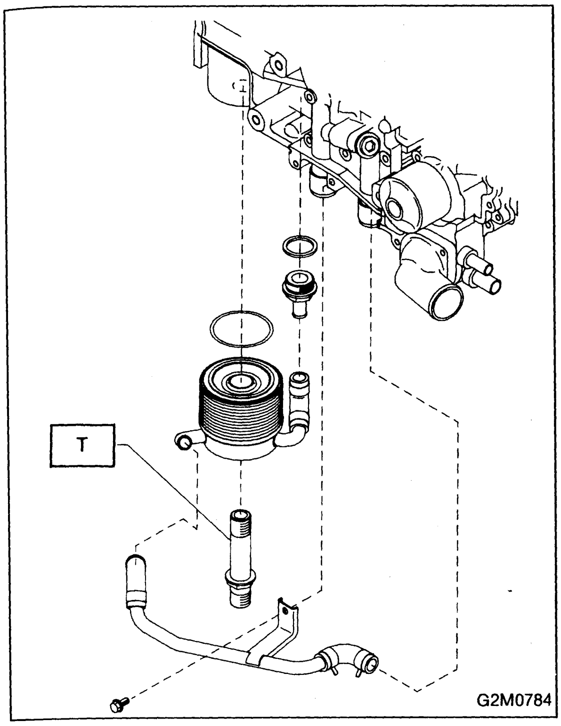


G2M0783

3) Remove connector and remove oil cooler.

B: INSPECTION

1) Check that coolant passages are not clogged using air blow method.
2) Check mating surfaces of cylinder block, O-ring groove and oil filter for damage.



C: INSTALLATION

1) Install oil cooler on cylinder block with connector pipe.
2) Install oil filter.

Tightening torque:

T: 49 — 59 N·m (5.0 — 6.0 kg-m, 36 — 43 ft-lb)

CAUTION:

Always use a new O-ring.

FUEL INJECTION SYSTEM [MFI-TURBO] 2-7b

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2. Air Intake System 3
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S SERVICE PROCEDURE 6
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7. Crankshaft Position Sensor 16
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12. Idle Air Control Solenoid Valve 20
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14. Turbocharger Unit 21
15. Fuel Injector 24
16. Engine Control Module 25
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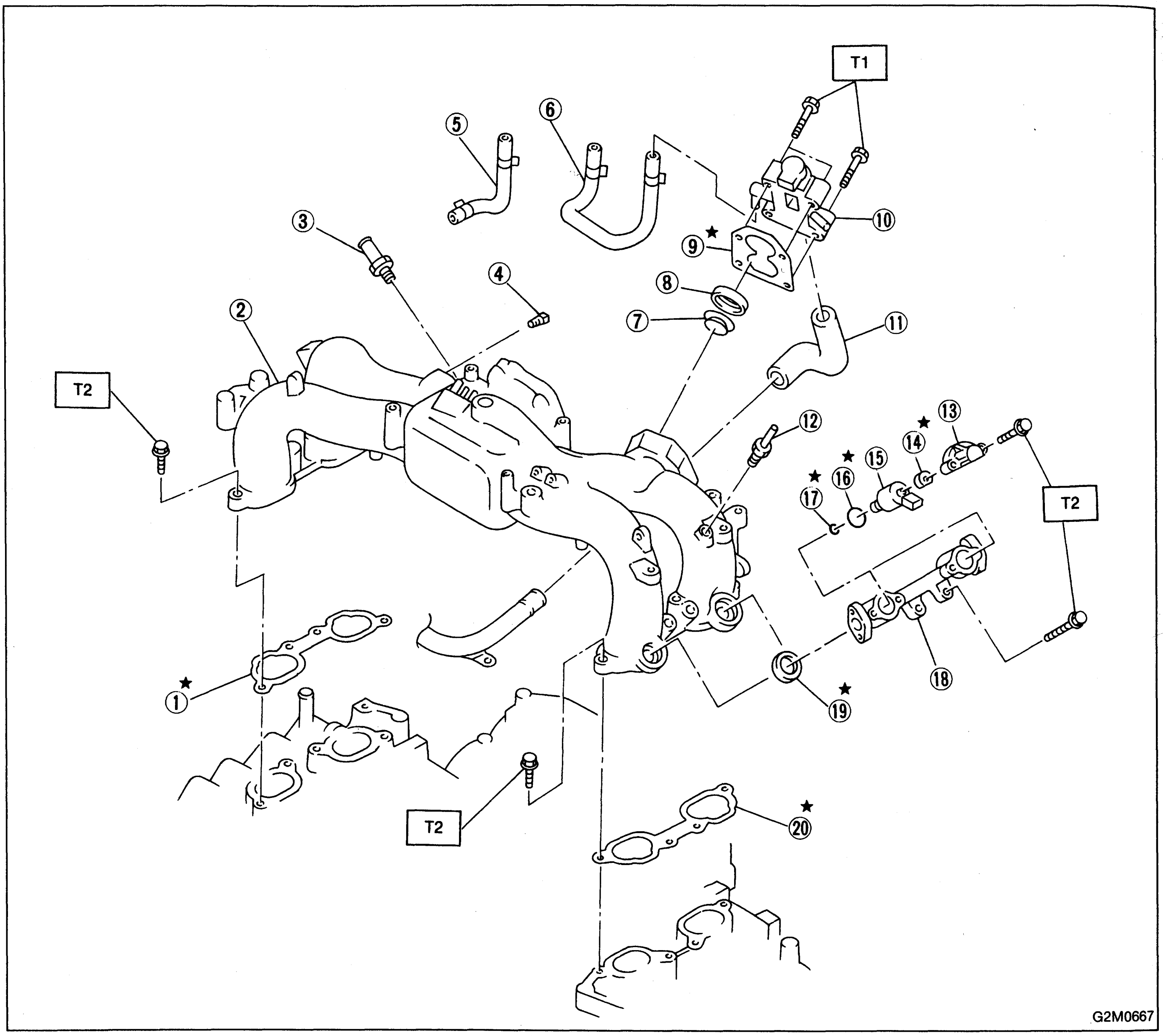
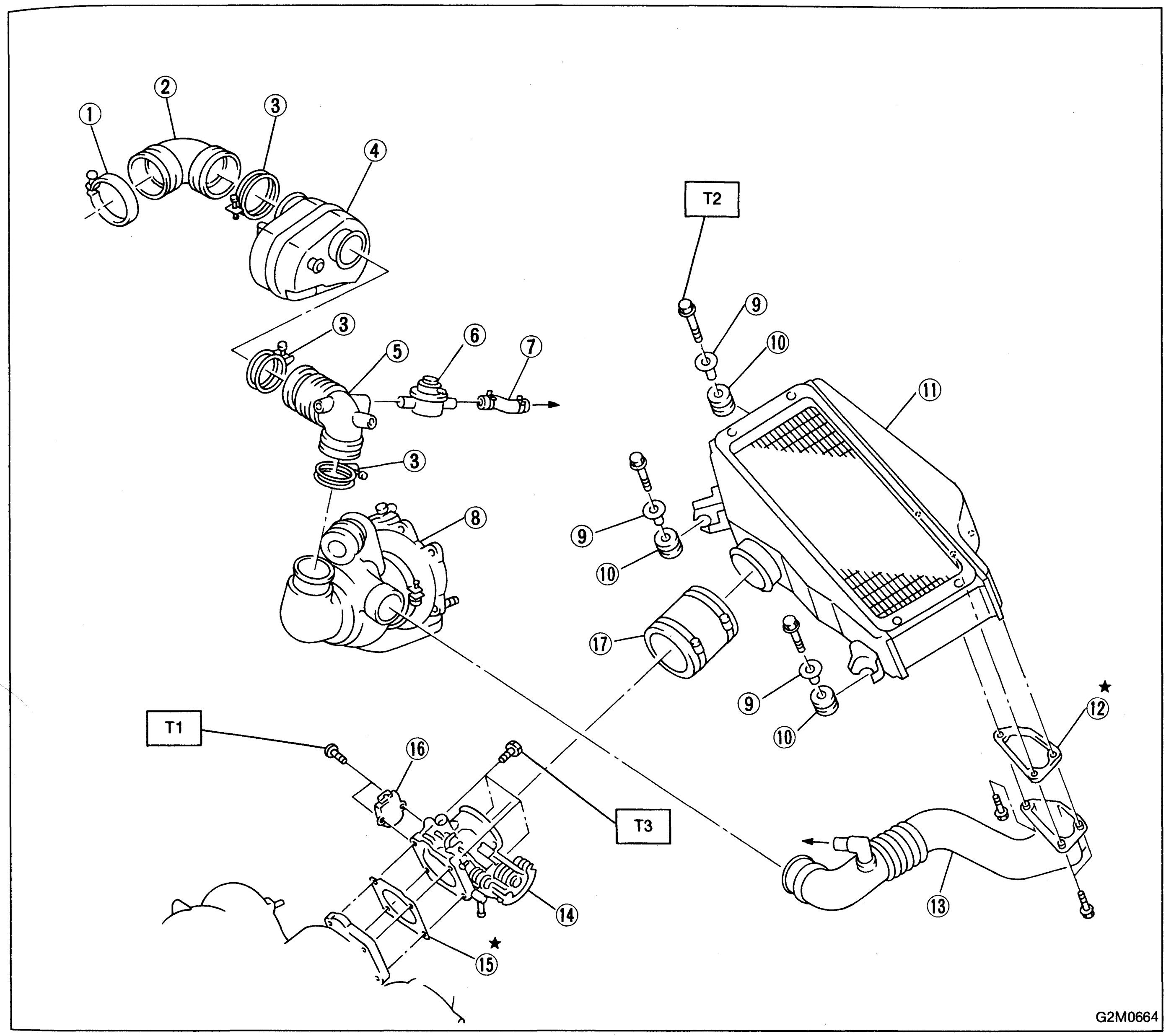
1. Collector Chamber and Intake Manifold



① Intake manifold gasket LH
② Intake manifold
③ PCV valve
④ Plug
⑤ Engine coolant hose A
⑥ Engine coolant hose B
⑦ Air control valve 2
⑧ Air control valve spring
⑨ Gasket
⑩ Idle air control solenoid valve
⑪ Engine coolant hose C
⑫ Nipple
⑬ Fuel injector cap
⑭ Insulator
⑮ Fuel injector
⑯ O-ring A
⑰ O-ring B
⑱ Fuel injector pipe
⑲ Washer
⑳ Intake manifold gasket LH

Tightening torque: N·m (kg-m, ft-lb)
T1: 6 — 7 (0.6 — 0.7, 4.3 — 5.1)
T2: 19 — 23 (1.9 — 2.3, 14 — 17)

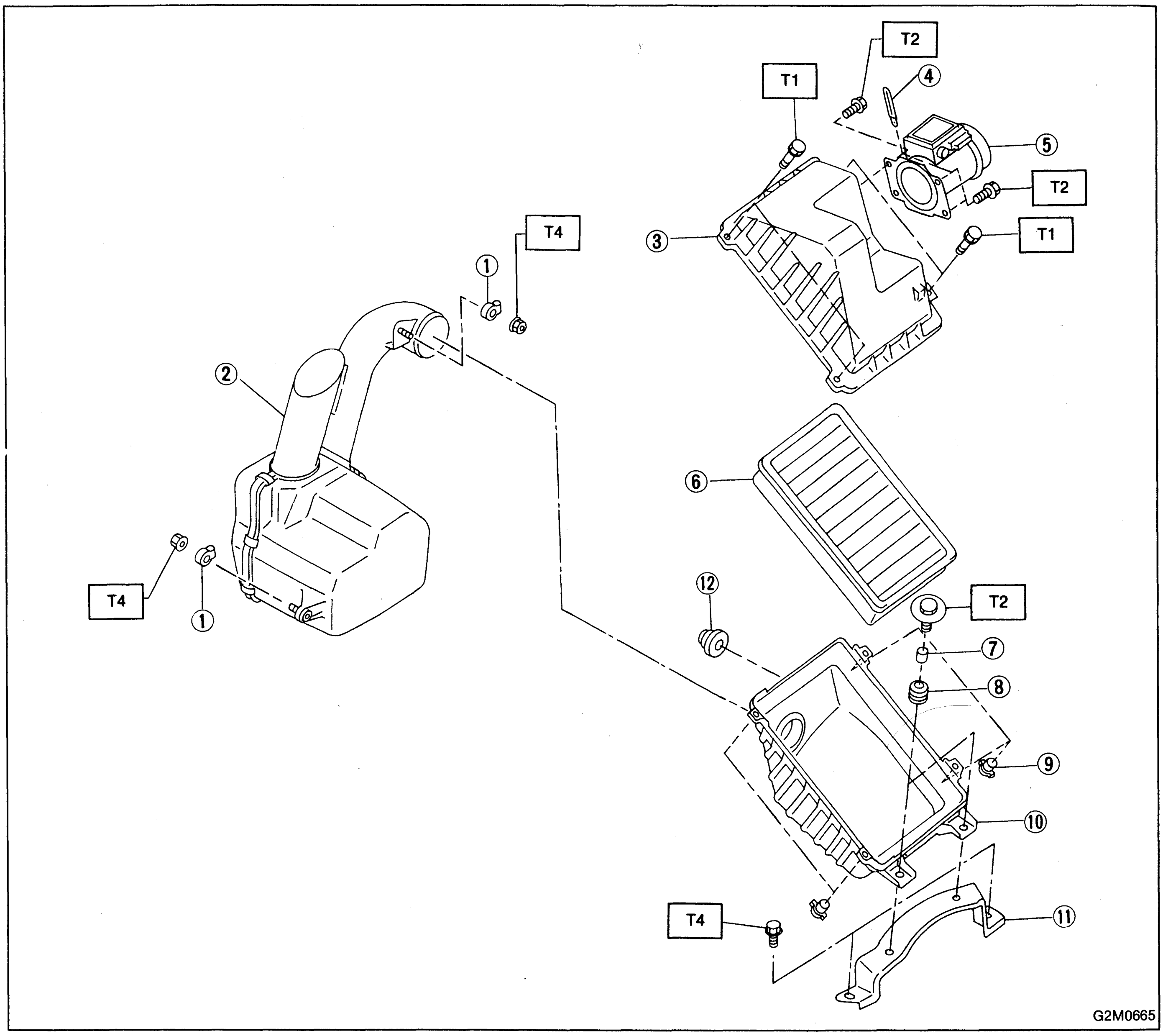
2. Air Intake System



① Clip
② Air intake boot
③ Clip
④ Resonator chamber
⑤ Air intake duct A
⑥ Air by-pass valve
⑦ Air by-pass hose
⑧ Turbocharger unit
⑨ Spacer
⑩ Cushion
⑪ Intercooler
⑫ Gasket
⑬ Air intake duct B
⑭ Throttle body
⑮ Gasket
⑯ Throttle position sensor
⑰ Connection rubber

Tightening torque: N·m (kg-m, ft-lb)
T1: 2.0 — 2.4 (0.20 — 0.24, 1.4 — 1.7)
T2: 16 — 20 (1.6 — 2.0, 12 — 14)
T3: 23 — 26 (2.3 — 2.7, 17 — 20)

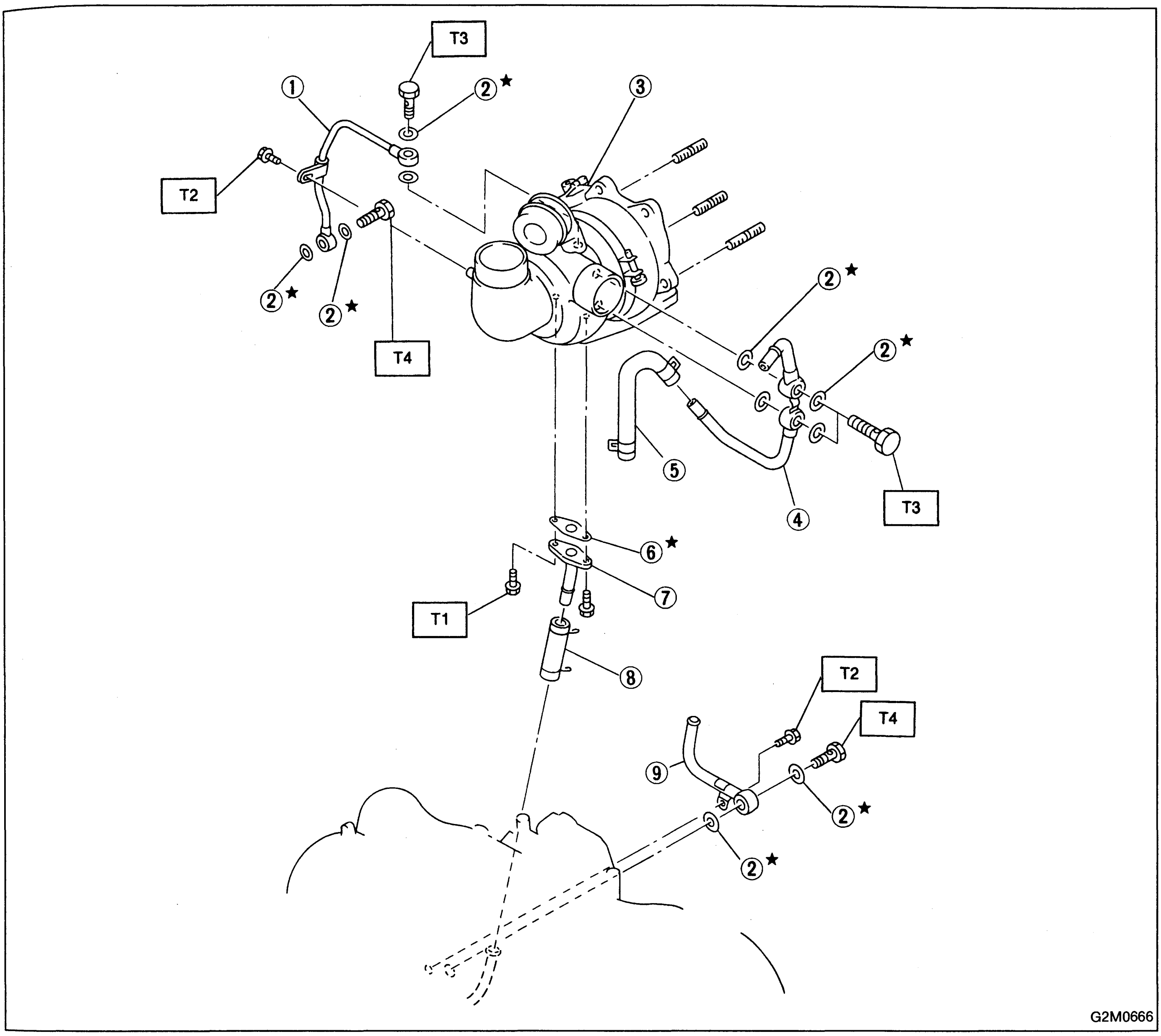
3. Air Cleaner



1. Spring cushion
2. Resonator ASSY
3. Air cleaner upper cover
4. Clip
5. Mass air flow sensor
6. Air cleaner element
7. Spacer
8. Bush
9. Spacer
10. Air cleaner lower cover
11. Air cleaner bracket
12. Cushion rubber

Tightening torque: N·m (kg-m, ft-lb)
T1: 2.5 — 4.4 (0.25 — 0.45, 1.8 — 3.3)
T2: 4.4 — 7.4 (0.45 — 0.75, 3.3 — 5.4)
T3: 6.4 — 8.3 (0.65 — 0.85, 4.7 — 6.1)
T4: 27 — 37 (2.8 — 3.8, 20 — 27)

4. Turbocharger Unit

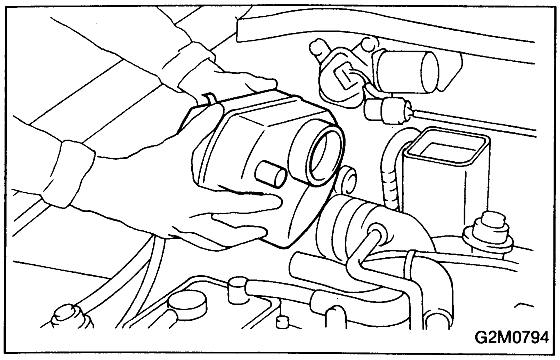


① Oil inlet pipe
② Metal gasket
③ Turbocharger
④ Engine coolant pipe A
⑤ Engine coolant hose
⑥ Gasket
⑦ Oil outlet pipe
⑧ Oil outlet hose
⑨ Engine coolant pipe B

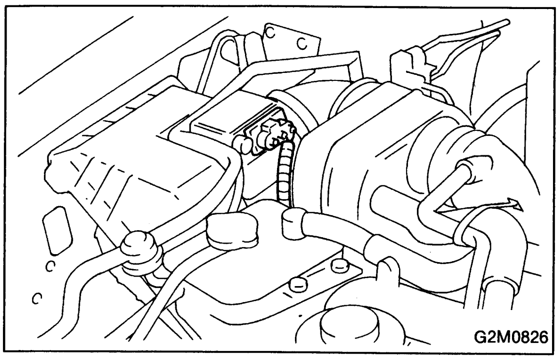
*Tightening torque: **N·m (kg-m, ft-lb)***
***T1:** 2.5 — 4.4 (0.25 — 0.45, 1.8 — 3.3)*
***T2:** 4.4 — 5.4 (0.45 — 0.55, 3.3 — 4.0)*
***T3:** 15 — 18 (1.5 — 1.8, 11 — 13)*
***T4:** 22 — 25 (2.2 — 2.5, 16 — 18)*

1. Air Cleaner and Air Intake Duct

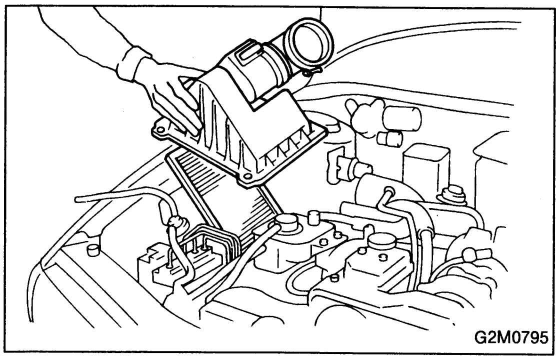
A: REMOVAL AND INSTALLATION



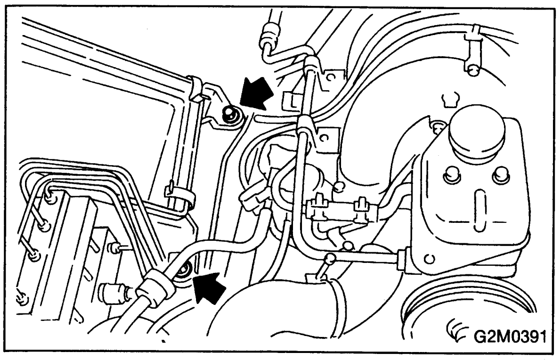
1) Remove resonator chamber.



2) Disconnect connector from mass air flow sensor.

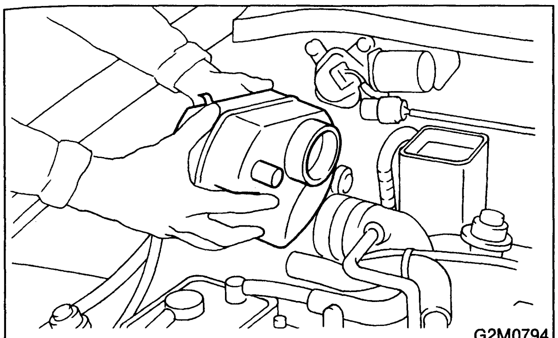


3) Remove clip of air cleaner upper cover.
4) Remove air cleaner element.



5) Remove air cleaner lower case.

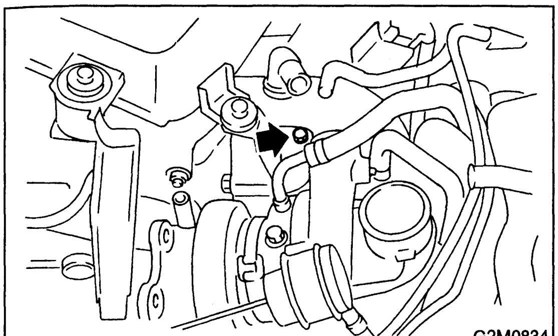
6) Installation is in the reverse order of removal.


G2M0794

2. Intercooler

A: REMOVAL AND INSTALLATION

1) Remove resonator chamber and air intake duct.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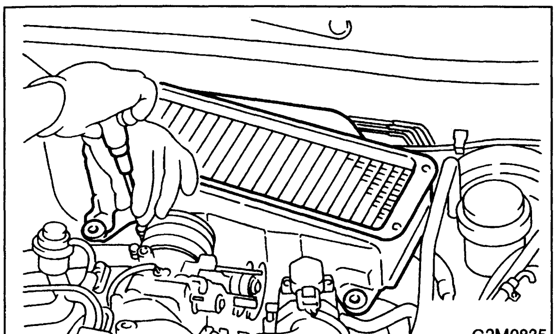
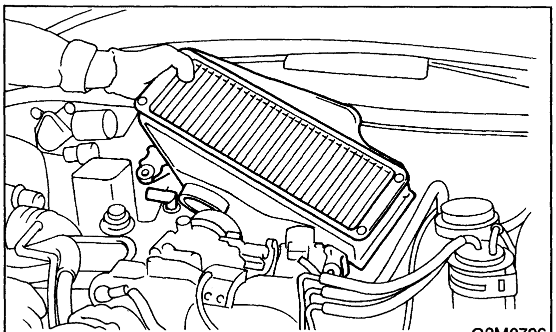
2) Separate intercooler air duct from turbocharger.


G2M0835

3) Remove bolts which install intercooler to bracket.
4) Separate intercooler from throttle body, and remove it.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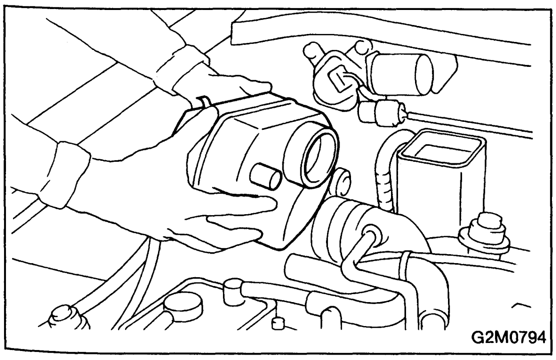
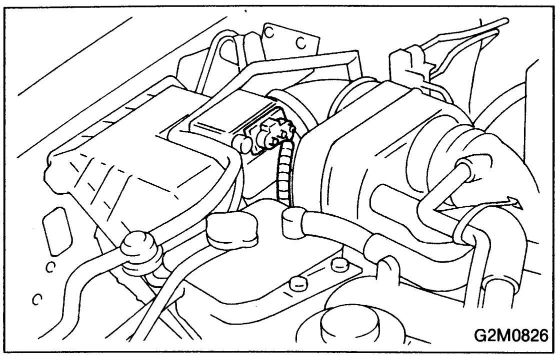
5) Installation is in the reverse order of removal procedure.


G2M0794

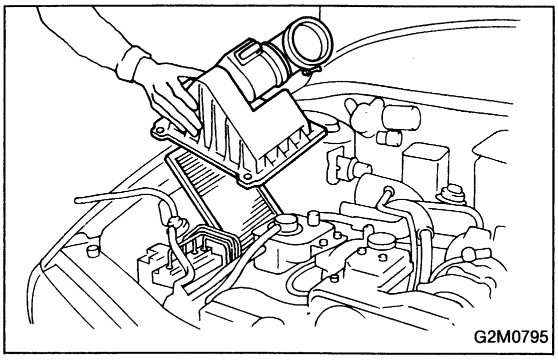
3. Mass Air Flow Sensor

A: REMOVAL AND INSTALLATION

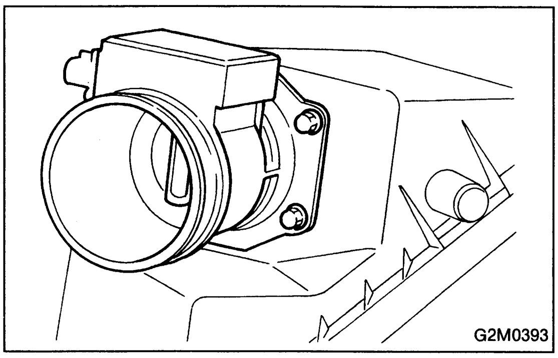
1) Remove resonator chamber.



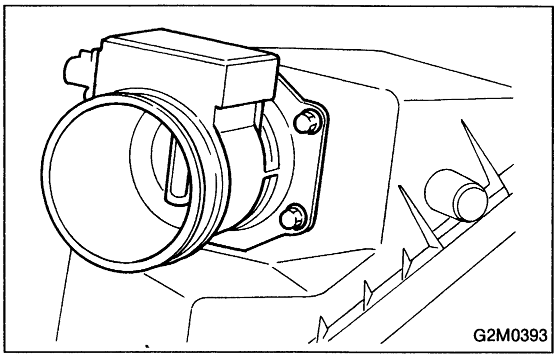
2) Disconnect connector from mass air flow sensor.



3) Remove air cleaner upper cover.

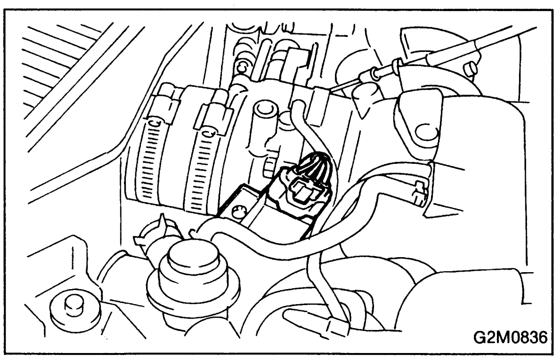


4) Remove mass air flow sensor from air cleaner upper cover.



5) Installation is in the reverse order of removal.

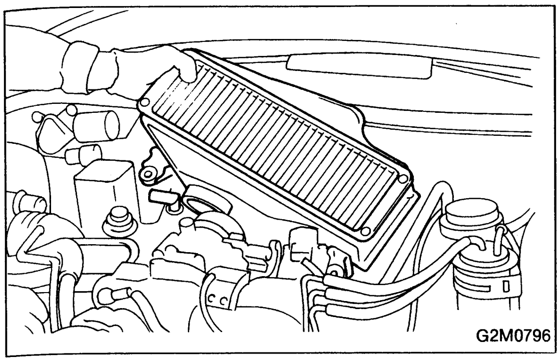
Tightening torque:
4.4 — 7.4 N·m (0.45 — 0.75 kg-m, 3.3 — 5.4 ft-lb)



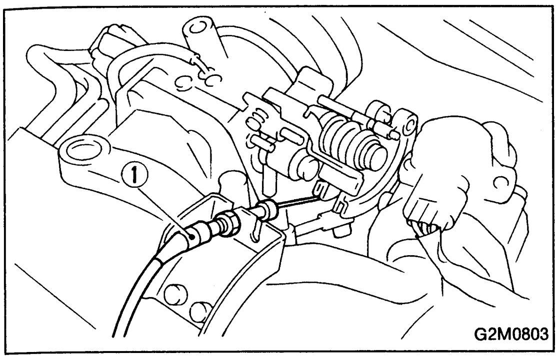
4. Throttle Body

A: REMOVAL AND INSTALLATION

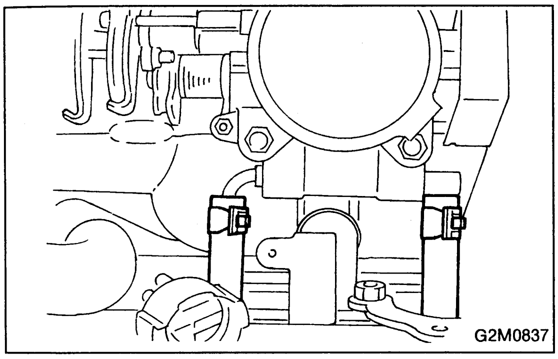
1) Disconnect connector from throttle position sensor.



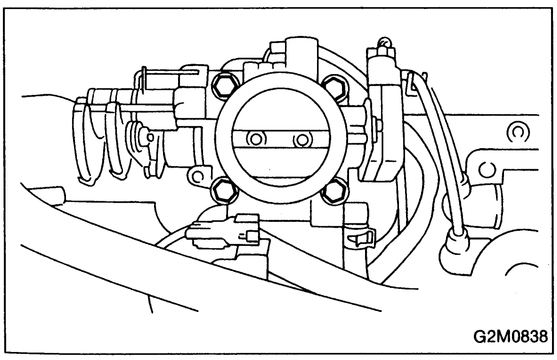
2) Remove intercooler.



3) Disconnect accelerator cable ①.



4) Disconnect engine coolant hose from throttle body.

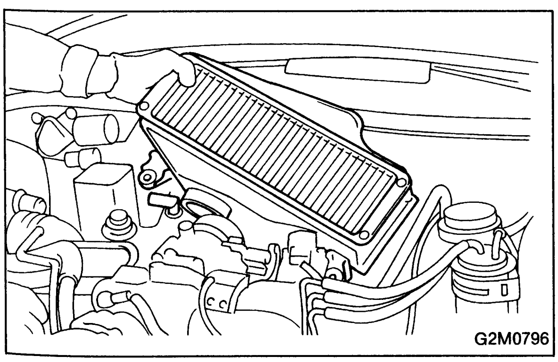


5) Remove bolts which install throttle body to collector chamber.
6) Installation is in the reverse order of removal procedure.

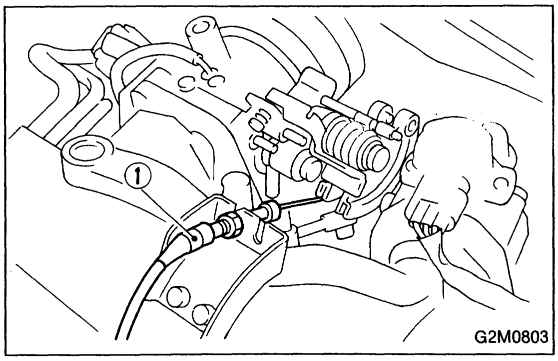
Tightening torque:
28 — 34 N·m (2.9 — 3.5 kg-m, 21 — 25 ft-lb)

5. Collector Chamber and Intake Manifold

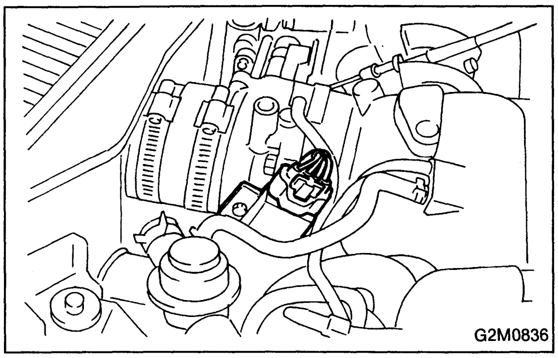
A: REMOVAL



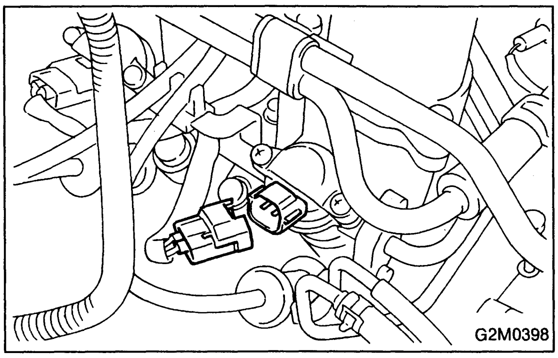
1) Release fuel pressure. <Ref. to 2-8 [W1A0].>
2) Remove intercooler.



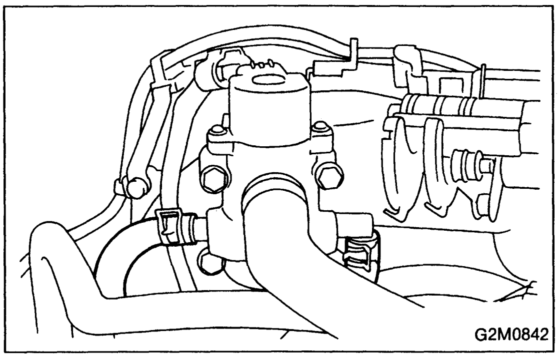
3) Disconnect accelerator cable ①.



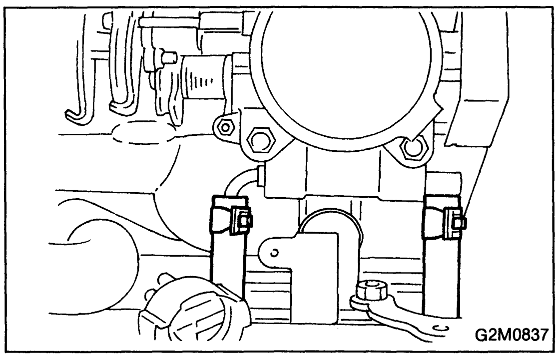
4) Disconnect connector from throttle position sensor.



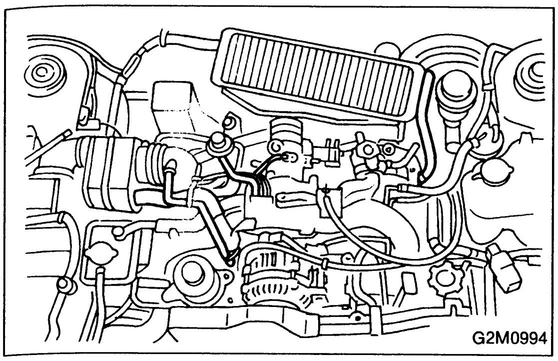
5) Disconnect connectors from fuel injectors.



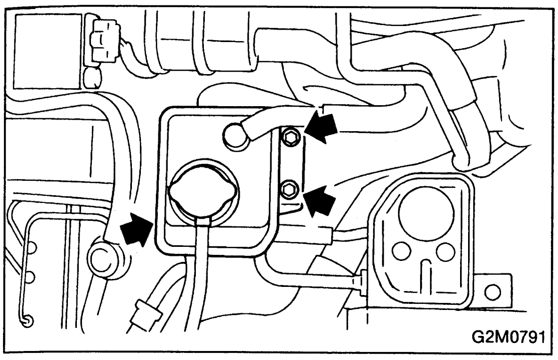
6) Disconnect engine coolant hose from idle air control solenoid valve.
7) Disconnect air inlet hose.



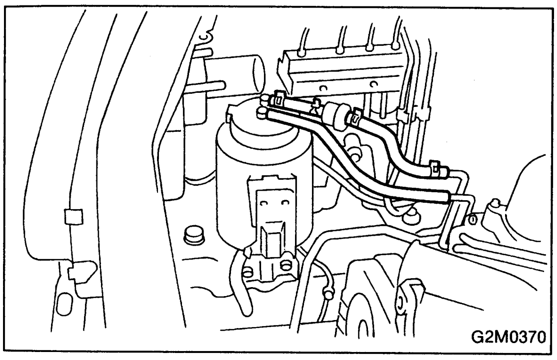
8) Disconnect engine coolant hoses from throttle body.



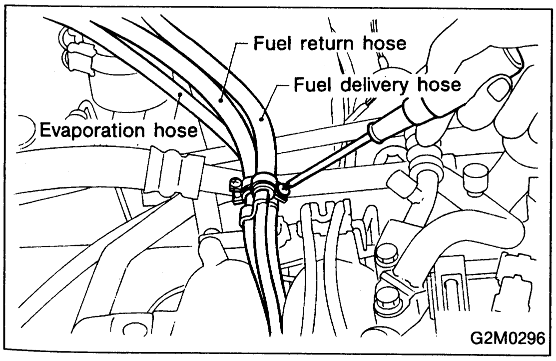
9) Disconnect brake booster hose.
10) Disconnect air by-pass hoses from intake manifold.
11) Disconnect emission hoses from intake manifold.



12) Remove coolant filler tank.

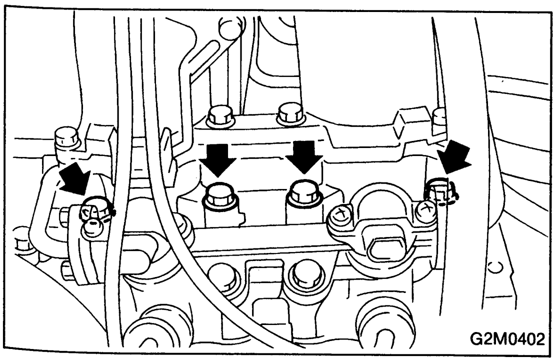


13) Disconnect canister hose from pipe.



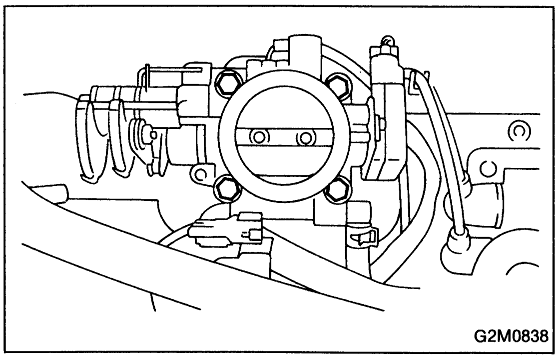
14) Disconnect fuel hoses from pipes.

WARNING:
Catch fuel from hoses in a container.



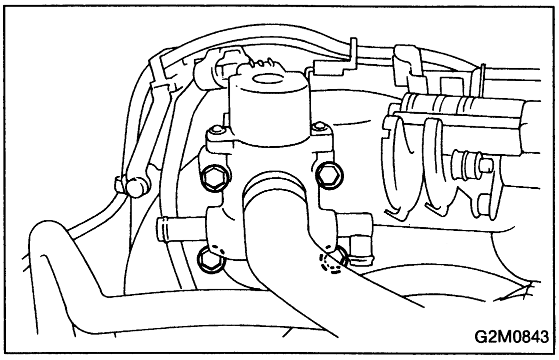
15) Remove bolts which hold power steering pipe bracket onto intake manifold.
16) Remove bolts which hold intake manifold onto cylinder heads.

17) Disconnect connector from purge control solenoid valve on inner side of collector chamber.
18) Remove collector chamber and intake manifold.

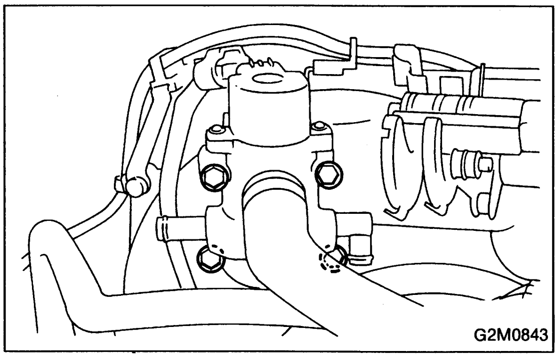


B: DISASSEMBLY

1) Remove throttle body.



2) Remove idle air control solenoid valve.

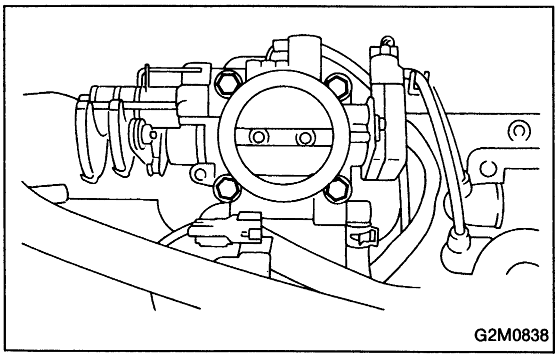


C: ASSEMBLY

1) Assemble idle air control solenoid valve.

CAUTION:
Replace gaskets with new ones.

Tightening torque:
6 — 7 N·m (0.6 — 0.7 kg-m, 4.3 — 5.1 ft-lb)



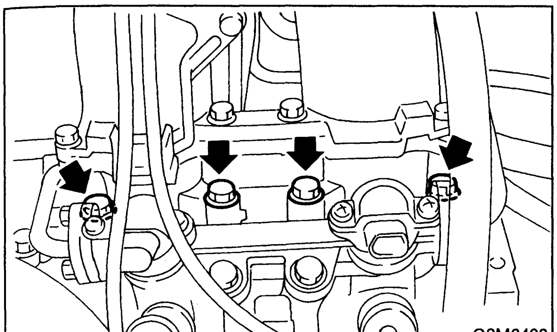
2) Assemble throttle body.

CAUTION:
Replace gasket with a new one.

Tightening torque:
14 — 24 N·m (1.4 — 2.4 kg-m, 10 — 17 ft-lb)

D: INSTALLATION

1) Connect connector to purge control solenoid valve on inner side of collector chamber.

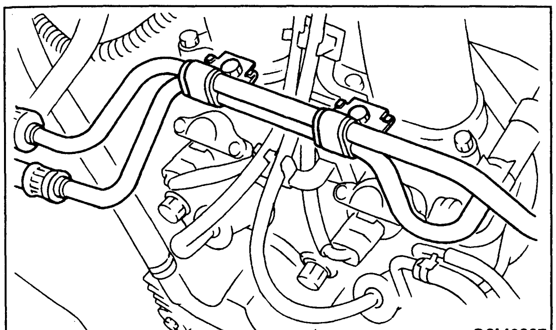


G2M0402

2) Install intake manifold and collector chamber onto cylinder heads.

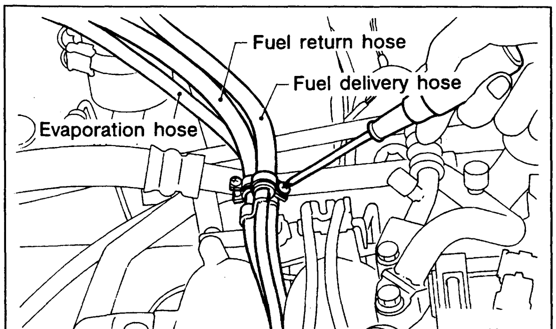
CAUTION:
Always use new gaskets.

Tightening torque:
20 — 34 N·m (2.0 — 3.5 kg-m, 14 — 25 ft-lb)



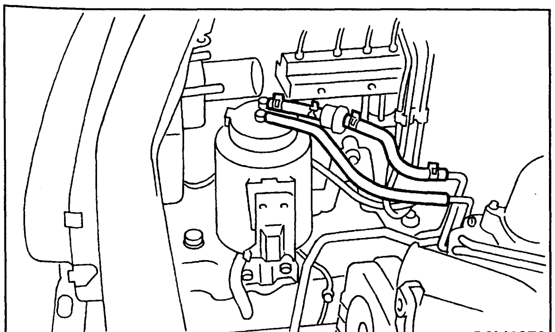
G2M0287

3) Install power steering pipe bracket onto intake manifold.



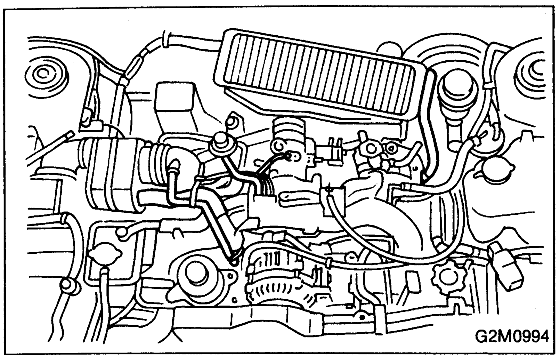
G2M0296

4) Connect fuel hoses.

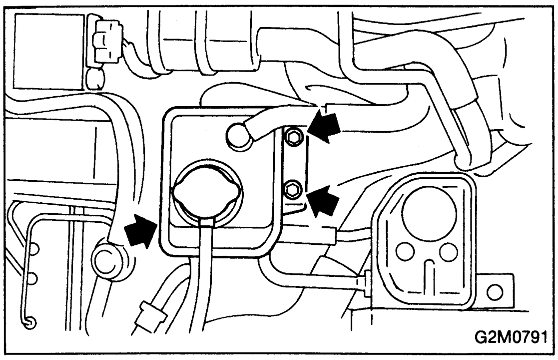


G2M0370

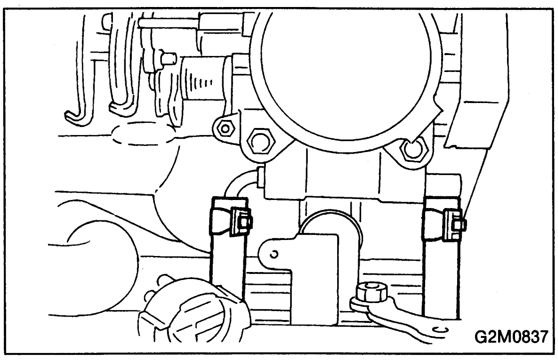
5) Connect canister hoses.



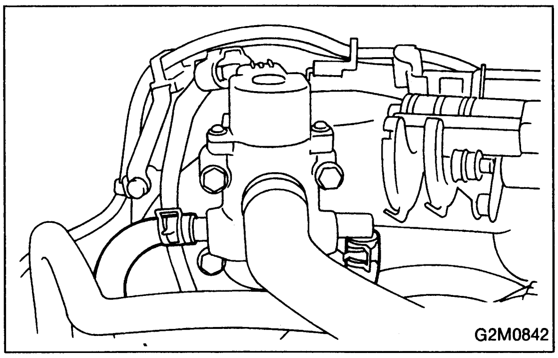
6) Connect brake booster vacuum hose.
7) Connect air by-pass hoses.
8) Connect emission hoses.



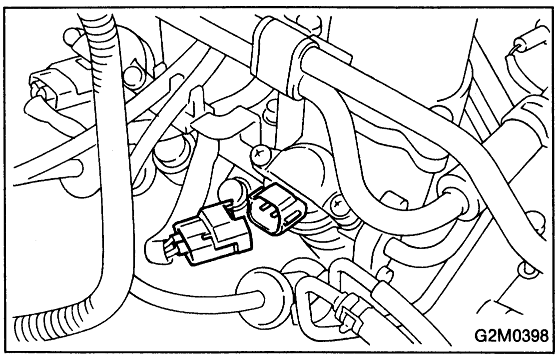
9) Install engine coolant filler tank.



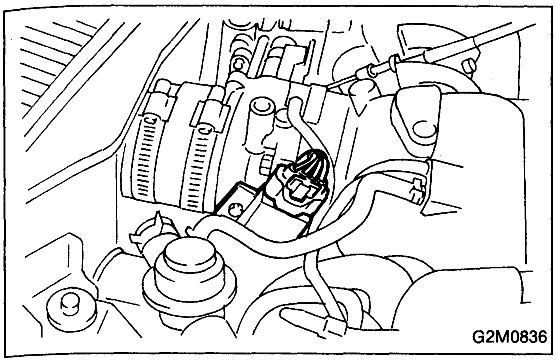
10) Connect engine coolant hoses to throttle body.



11) Connect engine coolant hose to idle air control solenoid valve.
12) Connect air inlet hose.

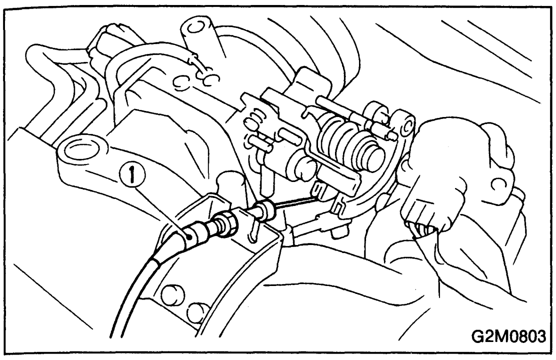


13) Connect connectors to fuel injectors.



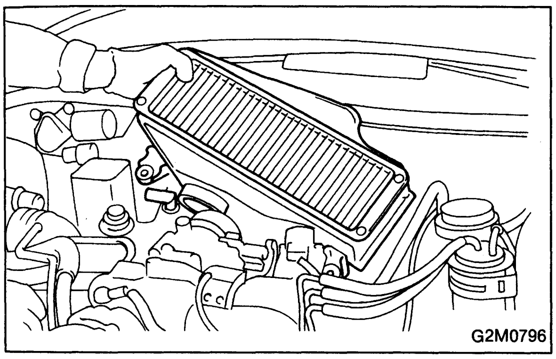
G2M0836

14) Connect connector to throttle position sensor.



G2M0803

15) Connect accelerator cable ①.

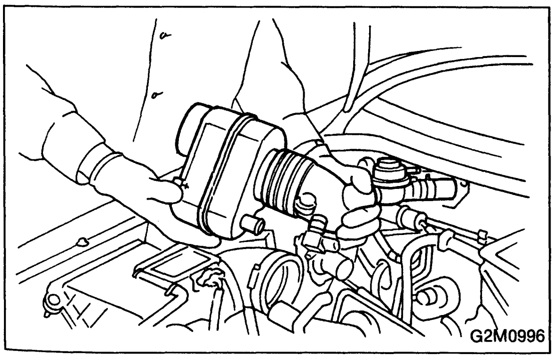


G2M0796

16) Install intercooler.

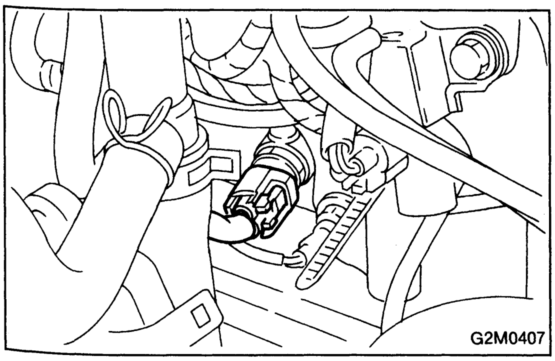
6. Engine Coolant Temperature Sensor

A: REMOVAL AND INSTALLATION



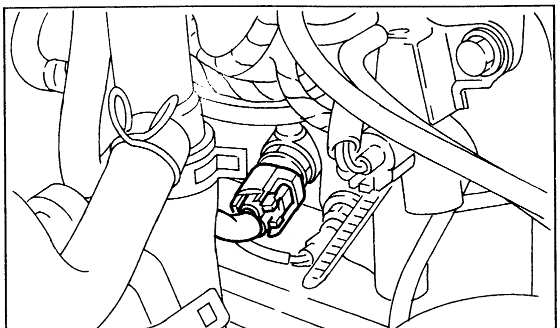
G2M0996

1) Remove resonator chamber and air inlet duct A.



G2M0407

2) Disconnect connector from engine coolant temperature sensor.
3) Remove engine coolant temperature sensor.



G2M0407

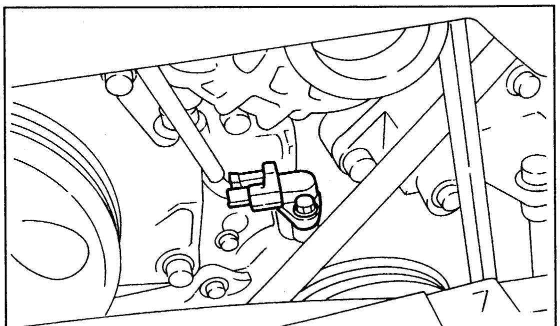
4) Installation is in the reverse order of removal.

Tightening torque:

22 — 27 N·m (2.2 — 2.8 kg-m, 16 — 20 ft-lb)

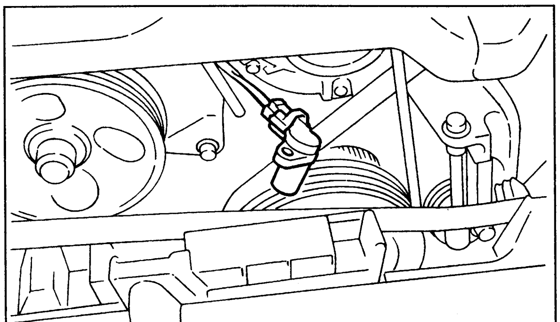
7. Crankshaft Position Sensor

A: REMOVAL AND INSTALLATION



G2M0408

1) Remove bolt which install crankshaft position sensor to cylinder block.

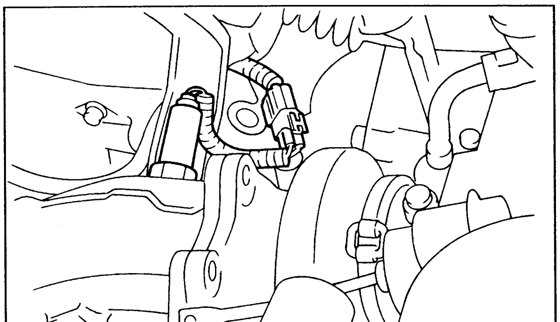


G2M0409

2) Remove crankshaft position sensor, and disconnect connector from it.

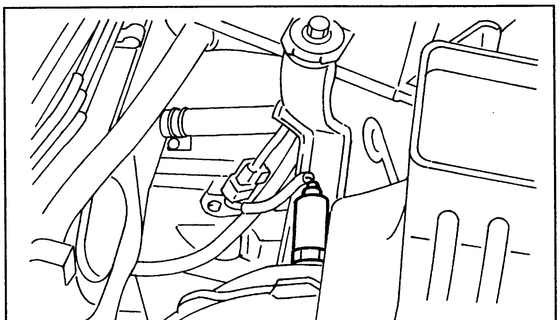
8. Oxygen Sensor

A: REMOVAL



G2M0812

1) Disconnect connector from oxygen sensor.



G2M0839

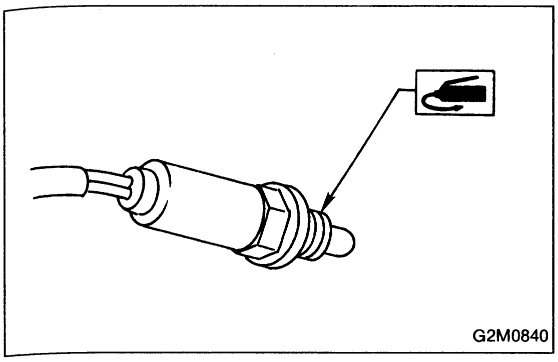
2) Apply SUBARU CRC or its equivalent to threaded portion of oxygen sensor, and leave it for one minute or more.

SUBARU CRC (Part No. 004301003)

3) Remove oxygen sensor.

CAUTION:

When removing oxygen sensor, do not force oxygen sensor free, especially when exhaust pipe is cold. Otherwise, it will damage exhaust pipe.

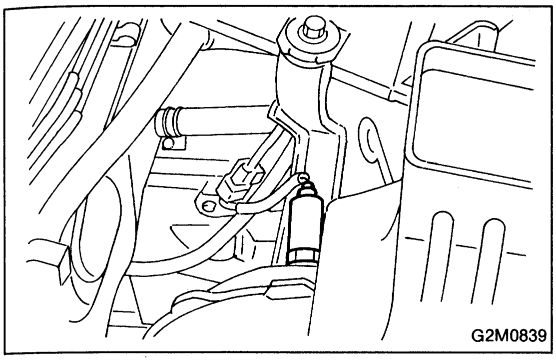

G2M0840

B: INSTALLATION

1) Before installing oxygen sensor, apply anti-seize compound only to threaded portion of oxygen sensor to make the next removal easier.

Anti-seize compound:
SS-30 by JET LUBE

CAUTION:
Never apply anti-seize compound to protector of oxygen sensor.


G2M0839

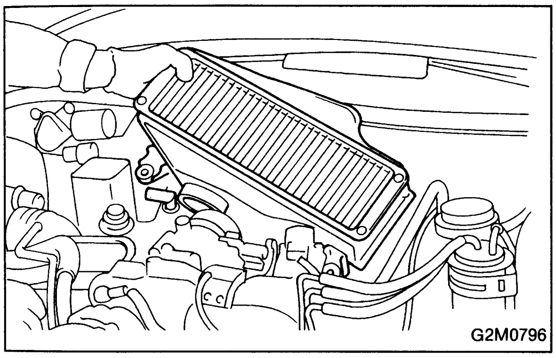
2) Install oxygen sensor.

Tightening torque:
41 — 47 N·m (4.2 — 4.8 kg-m, 30 — 35 ft-lb)

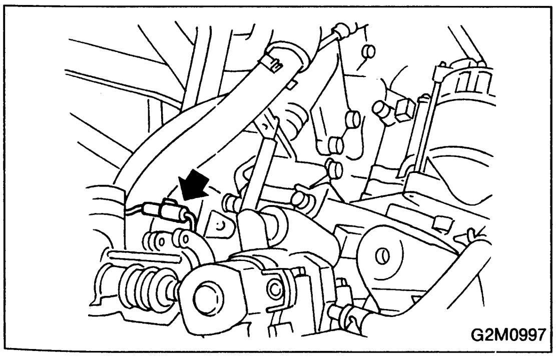
3) Connect connector of oxygen sensor.

9. Knock Sensor

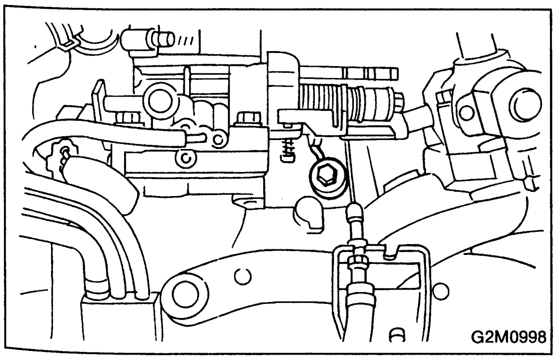
A: REMOVAL AND INSTALLATION


G2M0796

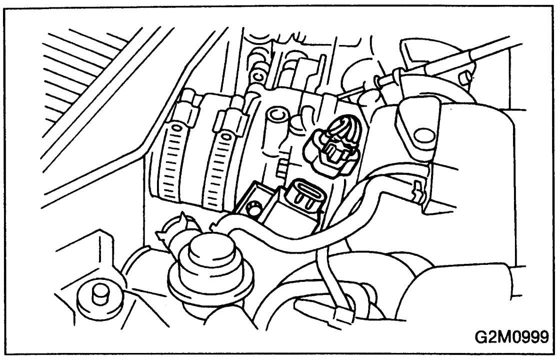
1) Remove intercooler.


G2M0997

2) Disconnect connector from knock sensor.


G2M0998

3) Remove knock sensor on cylinder block.
4) Installation is in the reverse order of removal.



10. Throttle Position Sensor

A: REMOVAL AND INSTALLATION

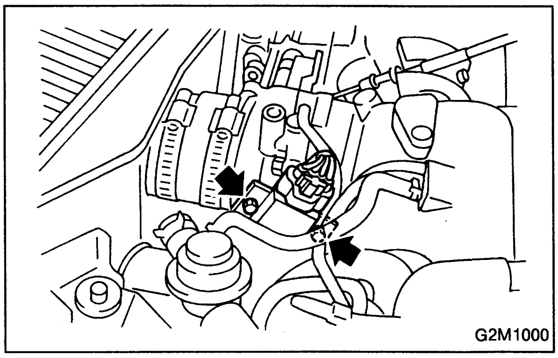
1) Disconnect connector from throttle position sensor.
2) Remove throttle position sensor holding screws, and remove it.
3) Installation is in the reverse order of removal.

Tightening torque:

2.0 — 2.4 N·m (0.20 — 0.24 kg-m, 1.4 — 1.7 ft-lb)

CAUTION:

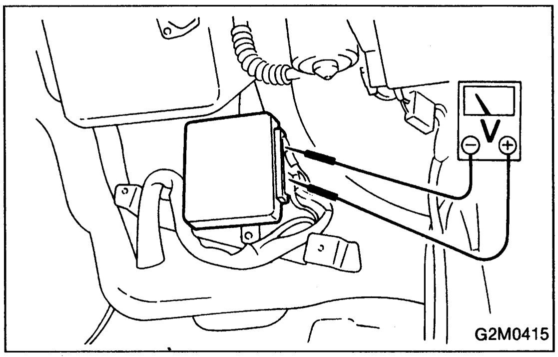
When installing throttle position sensor, adjust to the specified data.



B: ADJUSTMENT

1. THROTTLE POSITION SENSOR

1) Turn ignition switch to OFF.
2) Loosen throttle position sensor holding screws.

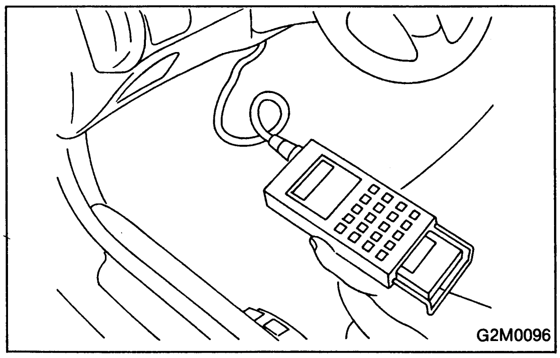


3) When using voltage meter;
   (1) Take out ECM.
   (2) Turn ignition switch to ON.
   (3) Adjust throttle position sensor to specified voltage between ECM connector terminal.

Connector & Terminal / Specified voltage

LHD (B108) No. 2 — (B108) No. 1 / 4.5 — 5.5 V
RHD (B95) No. 2 — (B95) No. 1 / 4.5 — 5.5 V
[Fully closed.]

   (4) Tighten throttle position sensor holding screws.

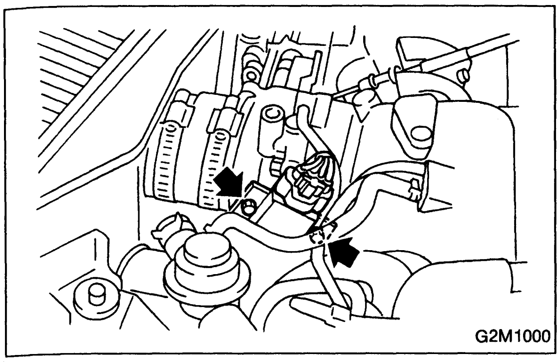


4) When using the Select Monitor;
   (1) Attach Select Monitor.
   (2) Turn ignition switch to ON.
   (3) Select mode "F10".
   (4) Adjust throttle position sensor to specified data.

Condition / Specified data.

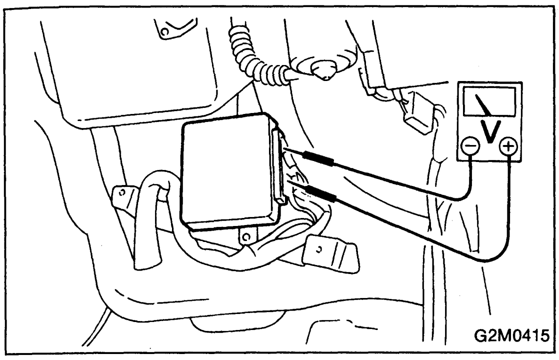
Throttle fully closed. / 4.7 V

   (5) Tighten throttle position sensor holding screws.



2. IDLE SWITCH

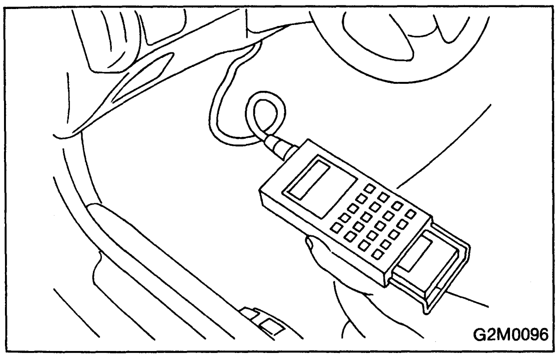
1) Turn ignition switch to OFF.
2) Loosen throttle position sensor holding screws.



3) When using voltage meter;
   (1) Take out ECM.
   (2) Turn ignition switch to ON.
   (3) Adjust throttle position sensor to specified voltage between ECM connector terminal.

Connector & Terminal / Specified voltage
LHD (B109) No. 6 — Body / 0 V
RHD (B96) No. 6 — Body / 0 V
[Fully closed.]

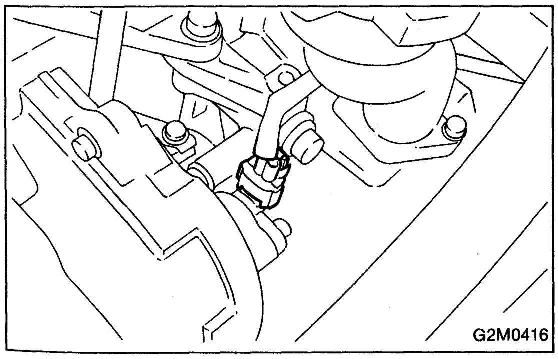
   (4) Tighten throttle position sensor holding screws.



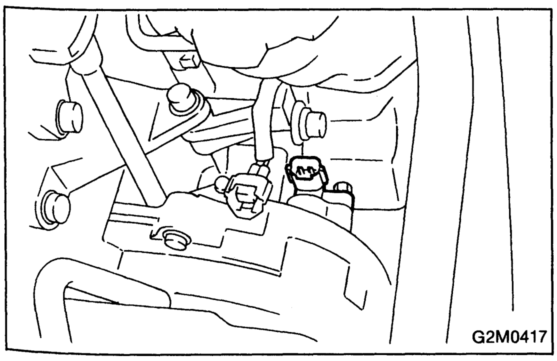
4) When using the Select Monitor;
   (1) Attach Select Monitor.
   (2) Turn ignition switch to ON.
   (3) Select mode "FA1".
   (4) Make sure that No. 1 LED is turned ON when throttle valve is fully closed.
   (5) Tighten throttle position sensor holding screws.

11. Camshaft Position Sensor

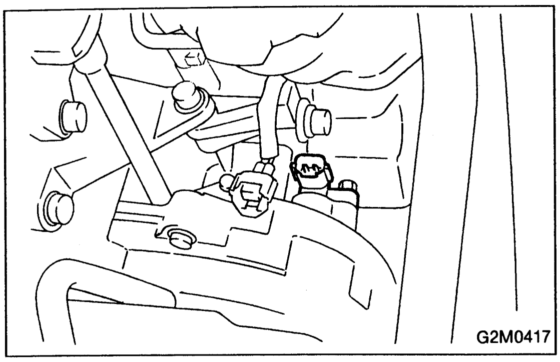
A: REMOVAL AND INSTALLATION



1) Disconnect connector from camshaft position sensor.



2) Remove camshaft position sensor from camshaft support LH.

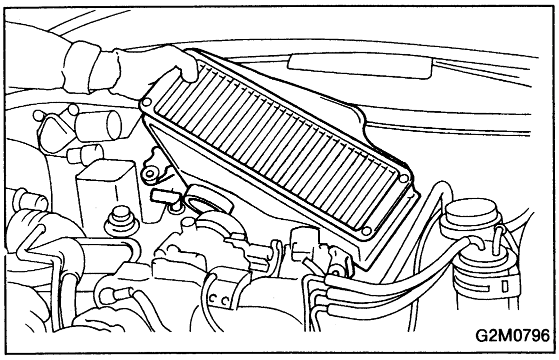

G2M0417

3) Installation is in the reverse order of removal.

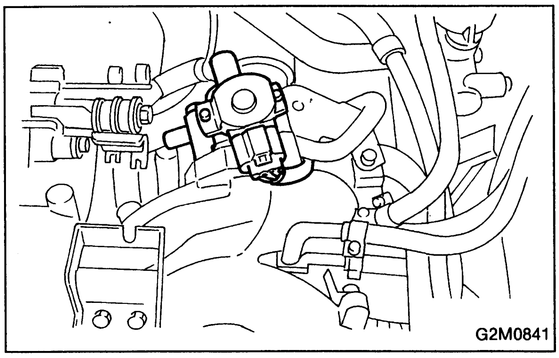
Tightening torque:
49 N·m (5.0 kg-m, 36 ft-lb)

12. Idle Air Control Solenoid Valve

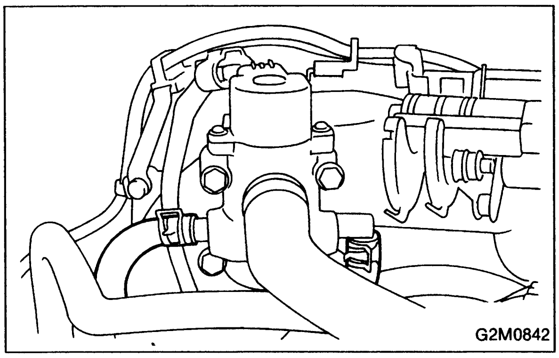
A: REMOVAL AND INSTALLATION


G2M0796

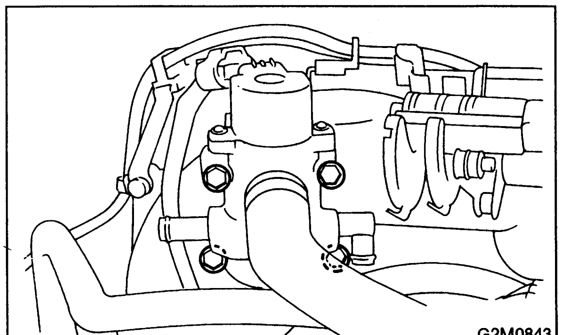
1) Remove intercooler.


G2M0841

2) Disconnect connector from idle air control solenoid valve.


G2M0842

3) Disconnect engine coolant hose from idle air control solenoid valve.
4) Disconnect air inlet hose.


G2M0843

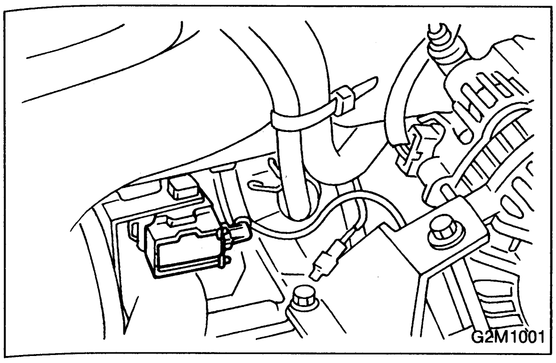
5) Remove bolts which install idle air control solenoid valve to collector chamber.
6) Installation is in the reverse order of removal procedure.

CAUTION:
Replace gasket with a new one.

Tightening torque:
6 — 7 N·m (0.6 — 0.7 kg-m, 4.3 — 5.1 ft-lb)

13. Purge Control Solenoid Valve

A: REMOVAL AND INSTALLATION



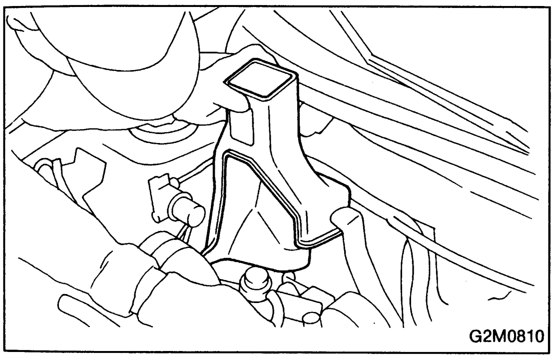
G2M1001

1) Remove bolt which installs bracket of purge control solenoid valve onto collector chamber.

2) Take out purge control solenoid valve with bracket through the bottom of the collector chamber.
3) Disconnect connector and hoses from purge control solenoid valve.
4) Installation is in the reverse order of removal.

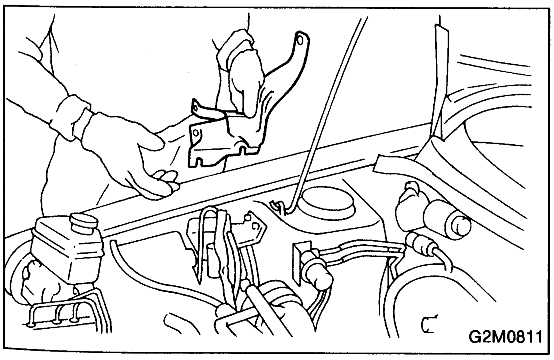
14. Turbocharger Unit

A: REMOVAL



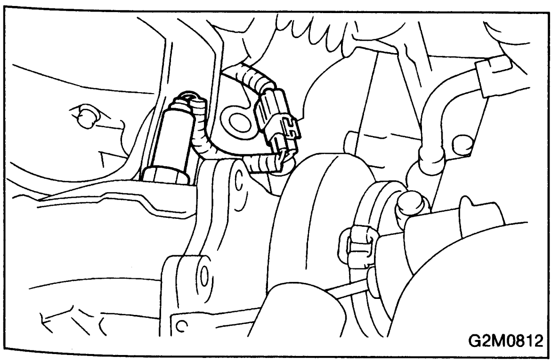
G2M0810

1) Remove intercooler.
2) Remove turbocharger cooling duct.



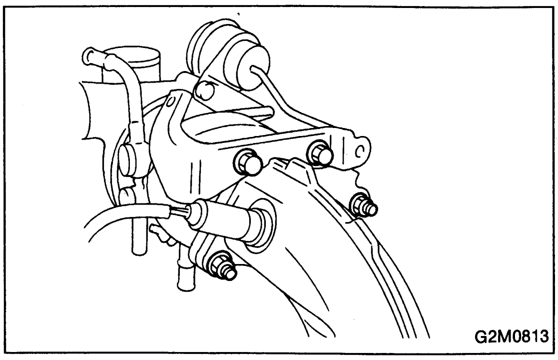
G2M0811

3) Remove turbocharger lower cover.

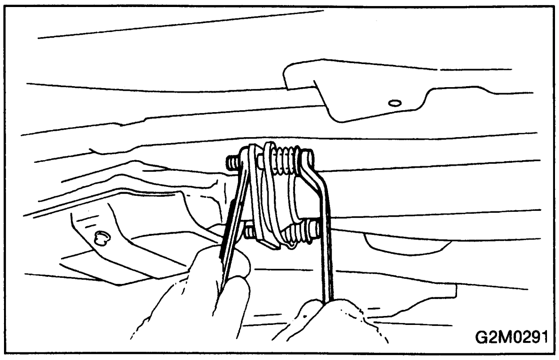


G2M0812

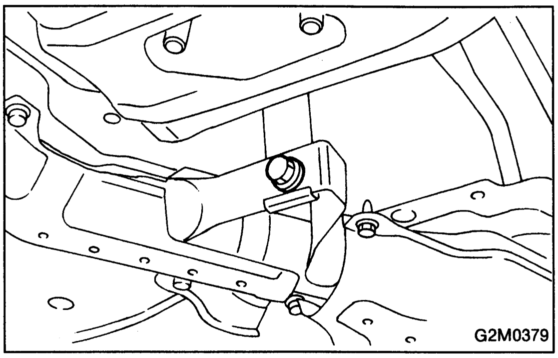
4) Disconnect connector from oxygen sensor.



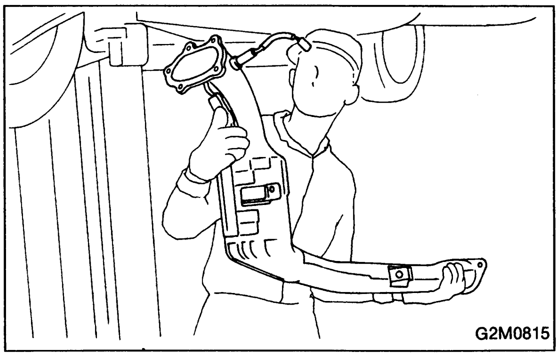
5) Remove nuts and bolts which install center exhaust pipe to turbocharger.



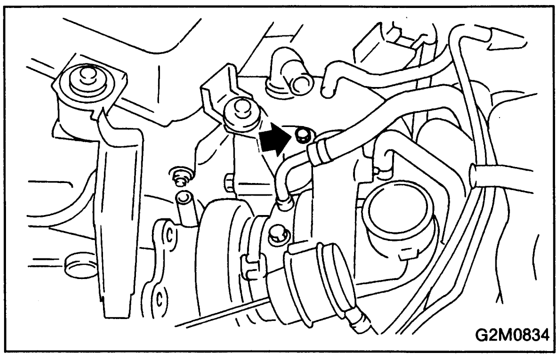
6) Lift-up the vehicle.
7) Separate center exhaust pipe from rear exhaust pipe.



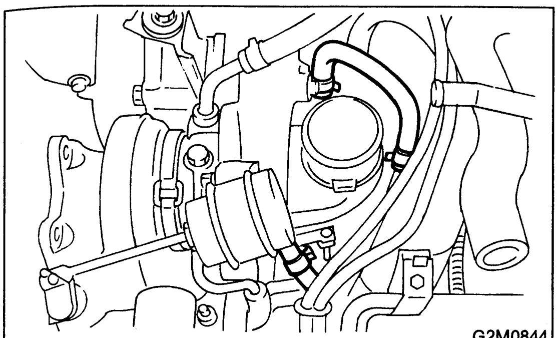
8) Remove bolt which installs center exhaust pipe to bracket.



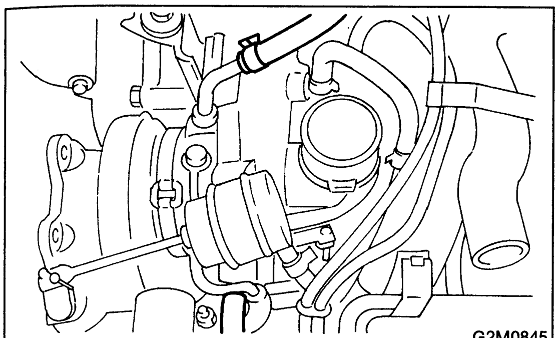
9) Remove center exhaust pipe.



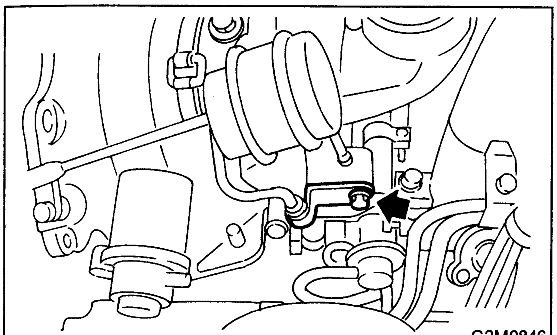
10) Lower the vehicle.
11) Separate intercooler air duct from turbocharger.


G2M0844

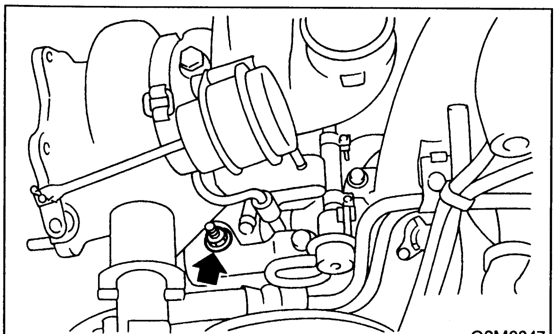
12) Disconnect hoses of pressure control line from turbocharger unit.


G2M0845

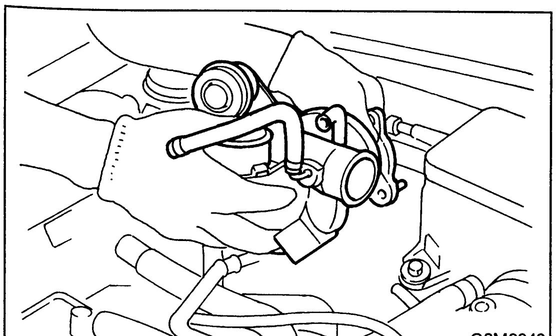
13) Disconnect engine coolant hose and engine oil hose.


G2M0846

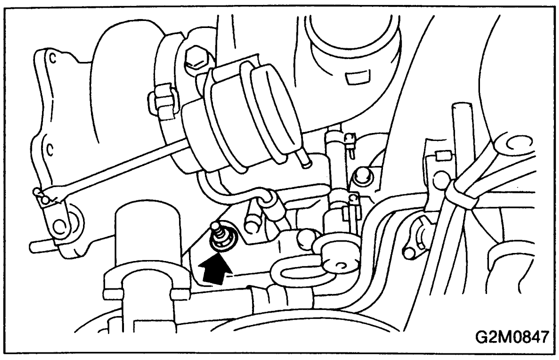
14) Remove bolt which installs oil pipe bracket onto turbocharger unit.


G2M0847

15) Remove nuts which install turbocharger unit on turbo joint pipe.


G2M0848

16) Remove turbocharger unit.


G2M0847

17) Installation is in the reverse order of removal procedure.

CAUTION:

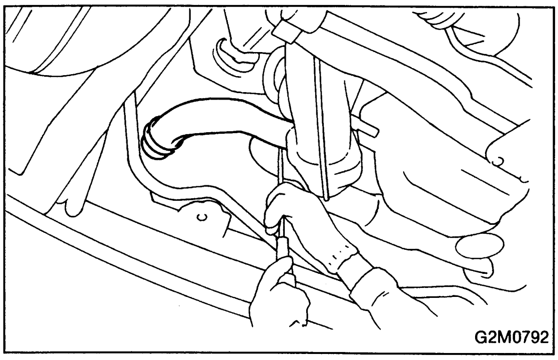
- **When installing turbocharger unit, connect engine coolant outlet hose to turbocharger unit.**
- **Replace gasket with a new one.**

Tightening torque:

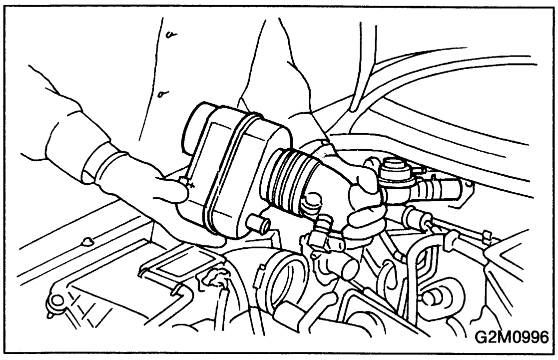
29±3 N·m (3.0±0.3 kg-m, 22±2.2 ft-lb)

15. Fuel Injector

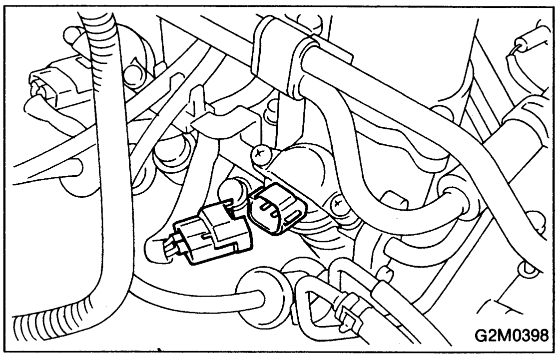
A: REMOVAL AND INSTALLATION


G2M0792

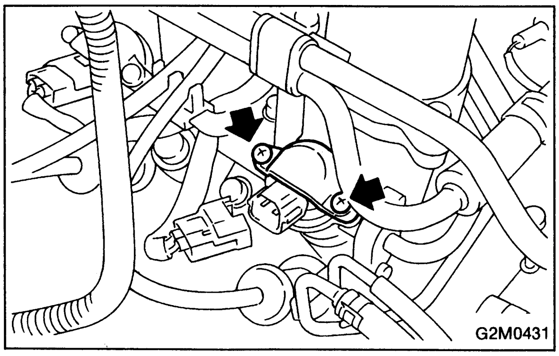
1) When removing the #1 fuel injector, remove coolant filler tank.


G2M0996

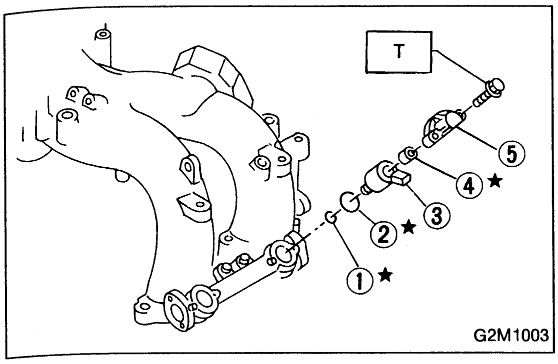
2) When removing the #3 fuel injector, remove resonator chamber and air inlet duct A.


G2M0398

3) Release fuel pressure.
4) Disconnect connector from fuel injector.


G2M0431

5) Remove fuel injector from fuel pipe assembly.



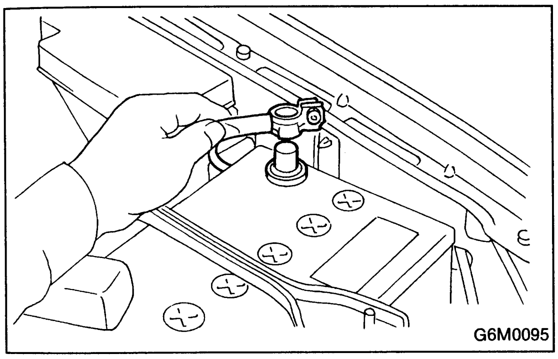
G2M1003

6) Installation is in the reverse order of removal.

CAUTION:
Replace O-rings and insulator.

Tightening torque:
T: 2.1 — 2.9 N·m (0.21 — 0.30 kg-m, 1.5 — 2.2 ft-lb)

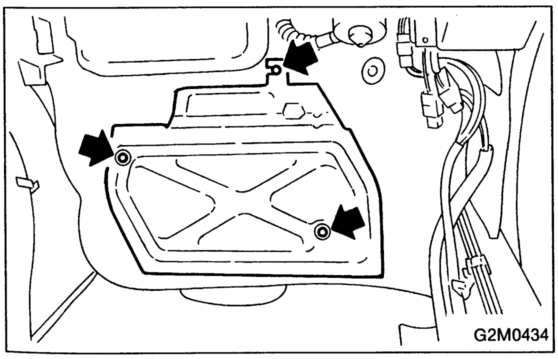
① O-ring B
② O-ring A
③ Fuel injector
④ Insulator
⑤ Fuel injector cup


G6M0095

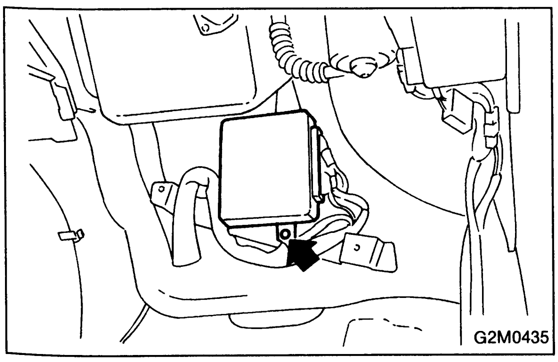
16. Engine Control Module

A: REMOVAL AND INSTALLATION

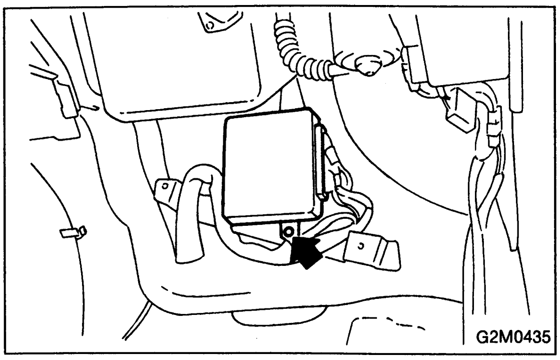
1) Disconnect battery ground cable.


G2M0434

2) Detach floor mat of front passenger seat.
3) Remove protect cover.


G2M0435

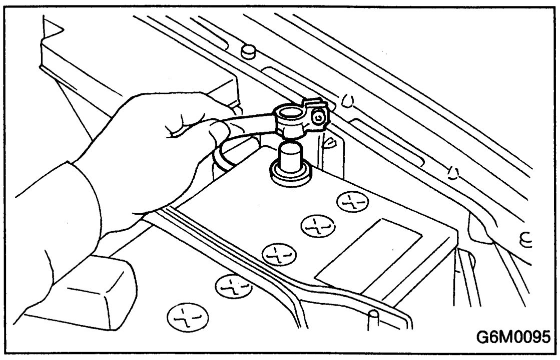
4) Remove nuts which install ECM onto body.
5) Take out ECM and disconnect connector from it.



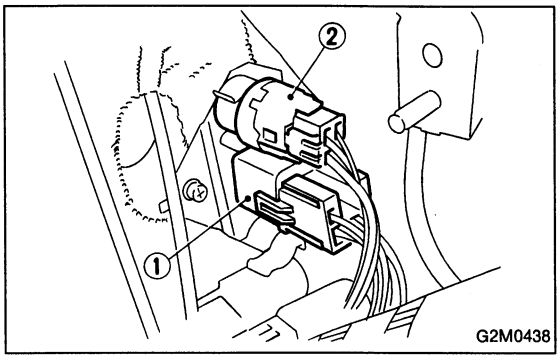
6) Installation is in the reverse order of removal.

17. Main Relay and Fuel Pump Relay

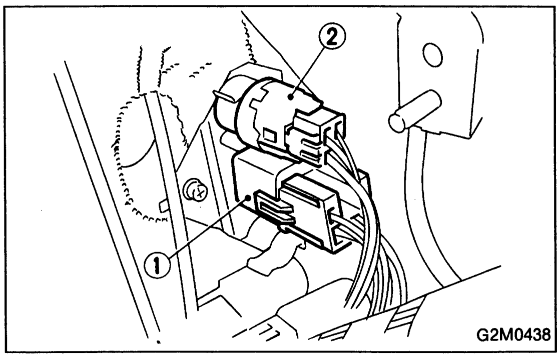
A: REMOVAL AND INSTALLATION



1) Disconnect battery ground cable.



2) Remove screw which installs bracket of main relay ① and fuel pump relay ②.
3) Disconnect connectors from main relay and fuel pump relay.



4) Installation is in the reverse order of removal.
① Main relay
② Fuel pump relay

FUEL SYSTEM 2-8

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2. On-Car Services
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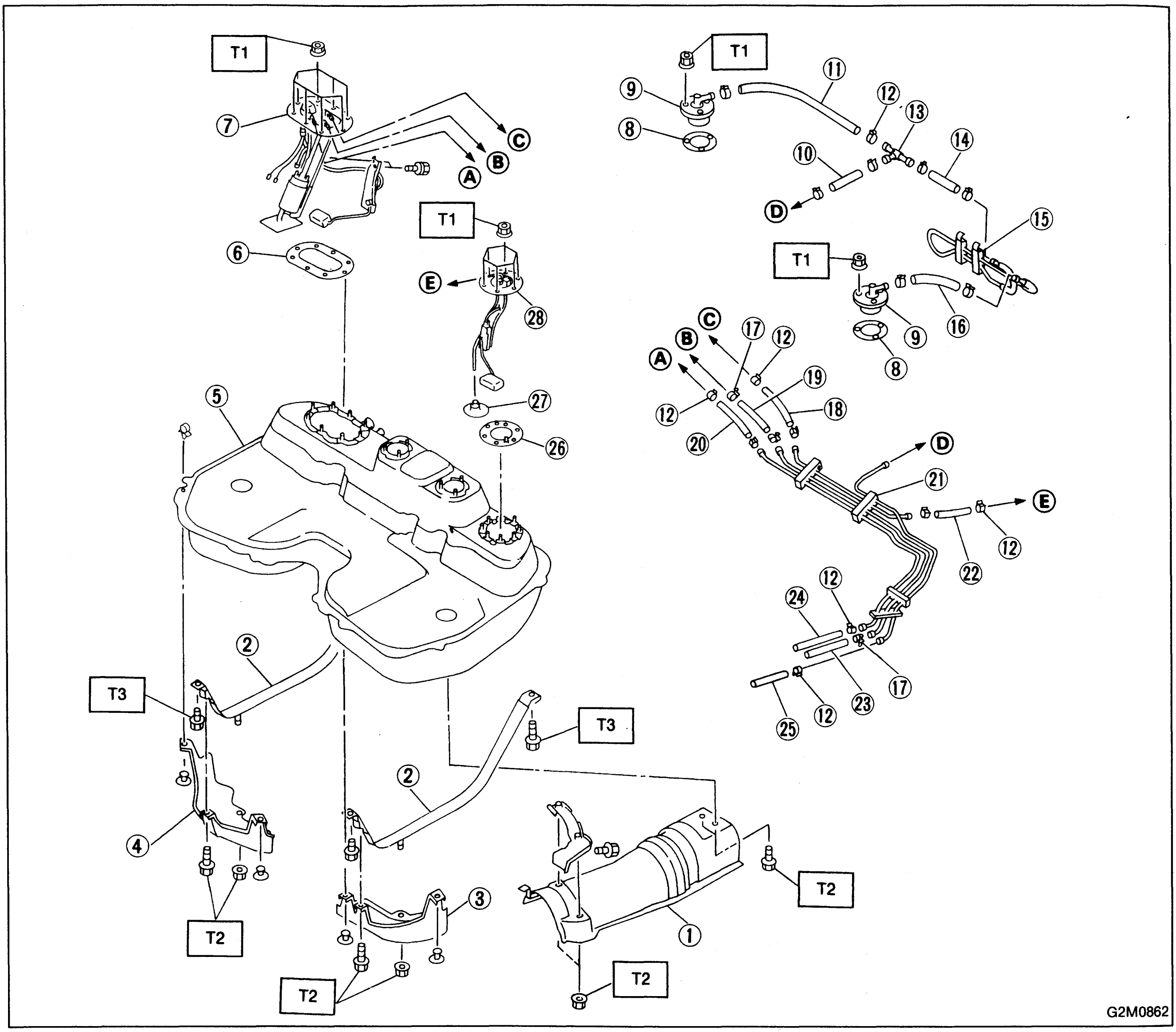
5. Fuel Filter
6. Fuel Pump
7. Fuel Meter Unit
8. Fuel Delivery, Return and Evaporation Lines
9. Canister
10. Fuel Sub Meter Unit (Turbo model only) 3
11. Fuel Cut Valve (AWD model only) 4
T DIAGNOSTICS
1. Fuel System

1. Fuel Tank

3. TURBO MODEL

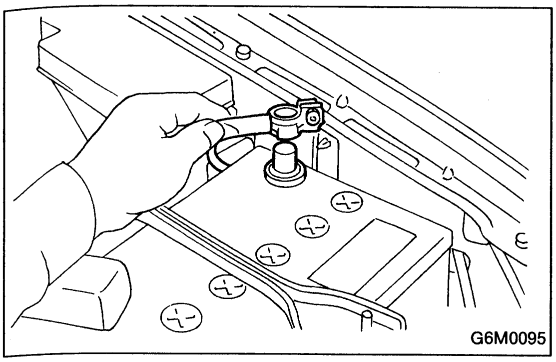


① Heat sealed cover
② Fuel tank band
③ Protector LH
④ Protector RH
⑤ Fuel tank
⑥ Fuel pump gasket
⑦ Fuel pump ASSY
⑧ Fuel cut valve gasket
⑨ Fuel cut valve
⑩ Evaporation hose C
⑪ Evaporation hose A
⑫ Clip
⑬ Joint pipe
⑭ Evaporation hose B
⑮ Evaporation pipe ASSY
⑯ Evaporation hose D
⑰ Clamp
⑱ Jet pump hose A
⑲ Fuel delivery hose A
⑳ Fuel return hose A
㉑ Fuel pipe ASSY
㉒ Jet pump hose B
㉓ Fuel delivery hose B
㉔ Fuel return hose B
㉕ Evaporation hose E
㉖ Fuel sub meter gasket
㉗ Jet pump filter
㉘ Fuel sub meter unit

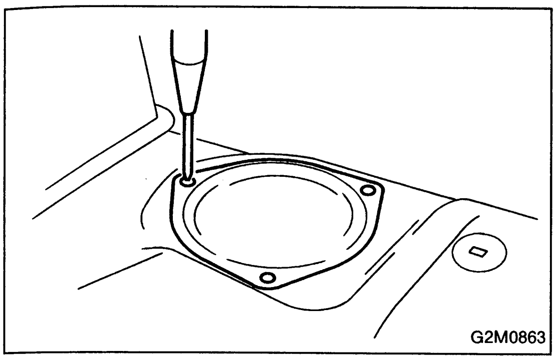
Tightening torque: N·m (kg-m, ft-lb)
T1: 3 — 6 (0.3 — 0.6, 2.2 — 4.3)
T2: 5.5 — 9.5
(0.56 — 0.97, 4.1 — 7.0)
T3: 23 — 43 (2.3 — 4.4, 17 — 32)

10. Fuel Sub Meter Unit (Turbo model only)

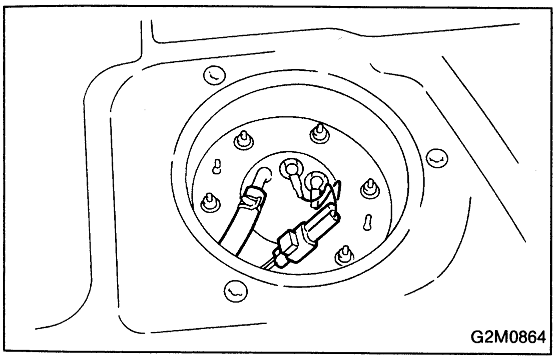
A: REMOVAL AND INSTALLATION



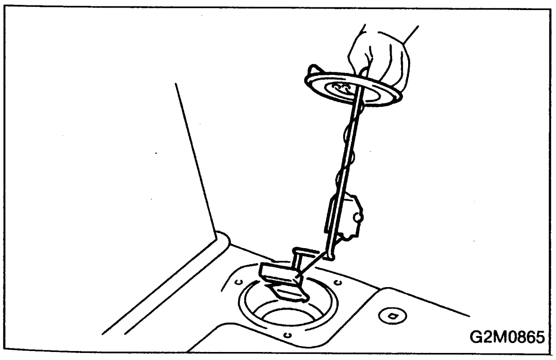
1) Disconnect battery ground cable.



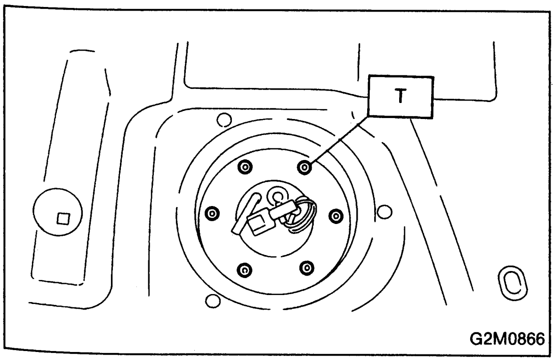
2) Remove rear seat.
3) Remove service hole cover.



4) Disconnect connector from fuel sub meter.
5) Disconnect fuel jet pump hose.



6) Remove fuel sub meter unit.

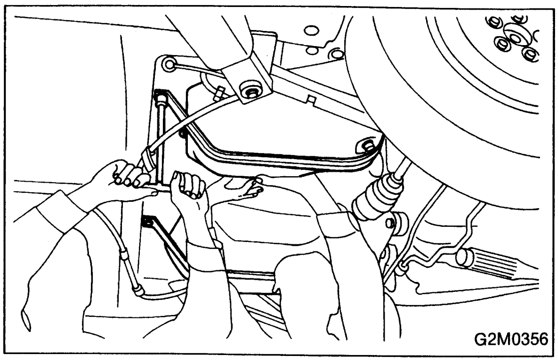


7) Installation is in the reverse order of removal procedure.

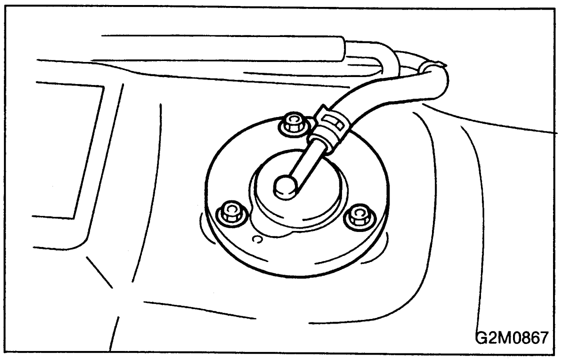
Tightening torque:
T: 3 — 6 N·m (0.3 — 0.6 kg-m, 2.2 — 4.3 ft-lb)

11. Fuel Cut Valve (AWD model only)

A: REMOVAL AND INSTALLATION


G2M0356

1) Remove fuel tank.


G2M0867

2) Disconnect evaporation hose from fuel cut valve.
3) Remove fuel cut valve.
4) Installation is in the reverse order of removal procedure.

Tightening torque:
3 — 6 N·m (0.3 — 0.6 kg-m, 2.2 — 4.3 ft-lb)

EXHAUST SYSTEM 2-9

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C COMPONENT PARTS 2

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2. Exhaust System (Turbo model) 2

W SERVICE PROCEDURE 4

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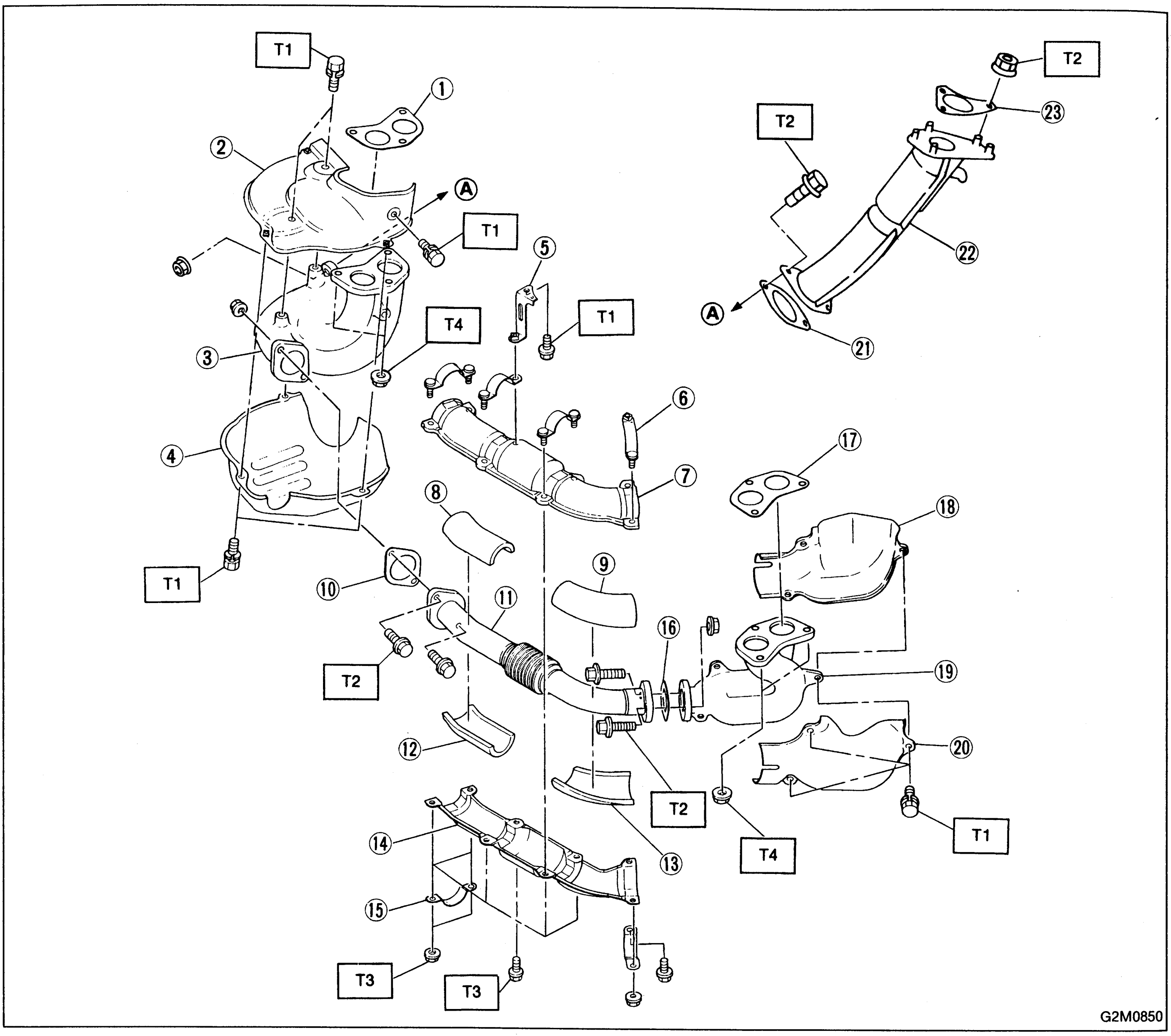
2. Rear Exhaust Pipe
3. Muffler
4. Front Exhaust Pipe (Turbo model) 4
5. Center Exhaust Pipe (Turbo model) 6

- The descriptions in this section apply to the turbo model.

2. Exhaust System (Turbo model)

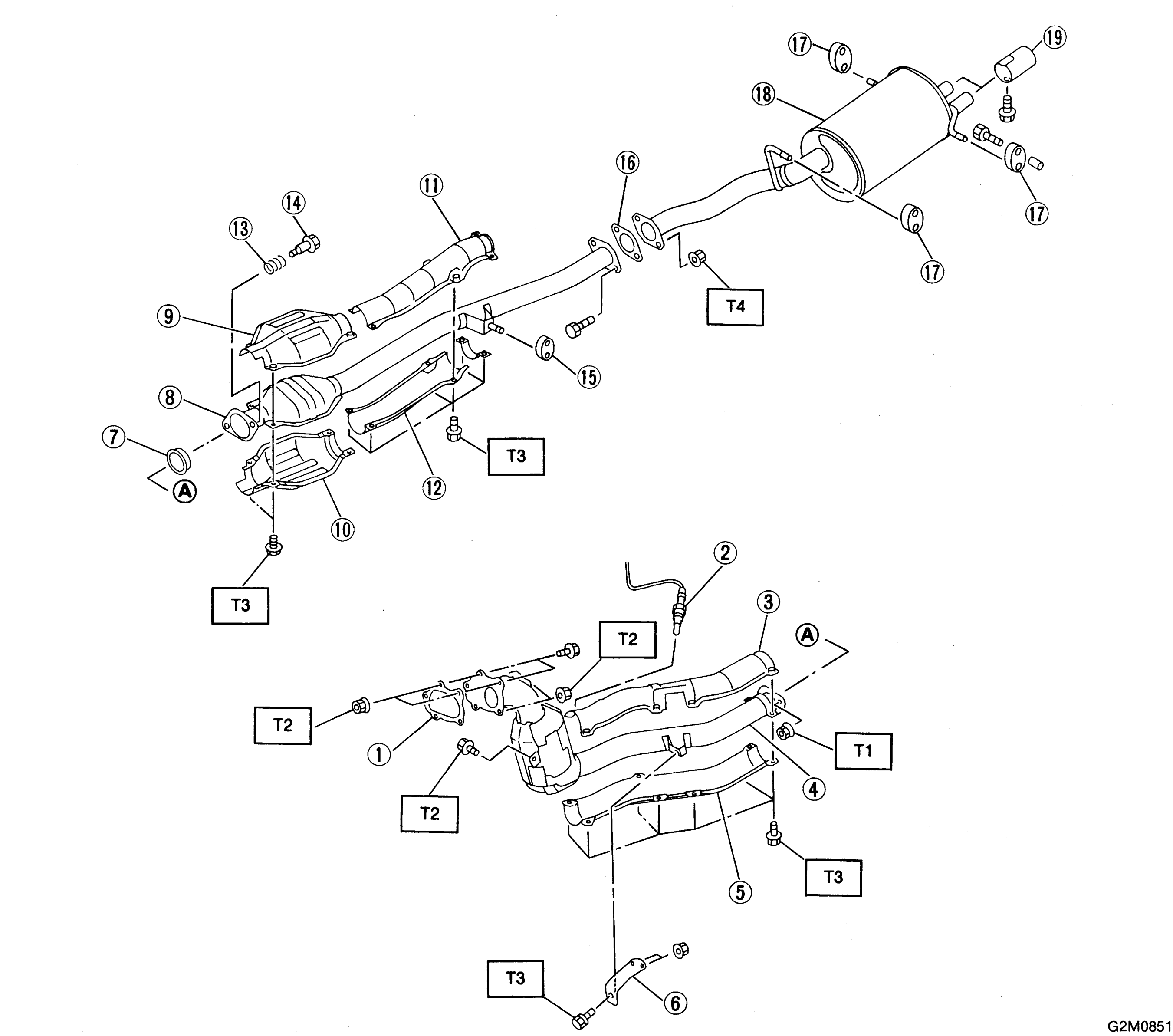
1. FRONT EXHAUST PIPE



1. Gasket
2. Upper exhaust manifold cover (RH)
3. Exhaust manifold (RH)
4. Lower exhaust manifold cover (RH)
5. Bracket
6. Upper clamp B
7. Upper cover C
8. Upper insulator B
9. Upper insulator A
10. Gasket
11. Front joint pipe
12. Lower insulator B
13. Lower insulator A
14. Lower cover C
15. Lower clamp B
16. Gasket
17. Gasket
18. Upper exhaust manifold cover (LH)
19. Exhaust manifold (LH)
20. Lower exhaust manifold cover (LH)
21. Gasket
22. Turbocharger joint pipe
23. Gasket

Tightening torque: N·m (kg-m, ft-lb)
T1: 17 — 20 (1.7 — 2.0, 12 — 14)
T2: 25 — 35 (2.6 — 3.6, 19 — 26)
T3: 30 — 40 (3.1 — 4.1, 22 — 30)
T4: 34 — 44 (3.5 — 4.5, 25 — 33)

2. CENTER AND REAR EXHAUST PIPE, AND MUFFLER

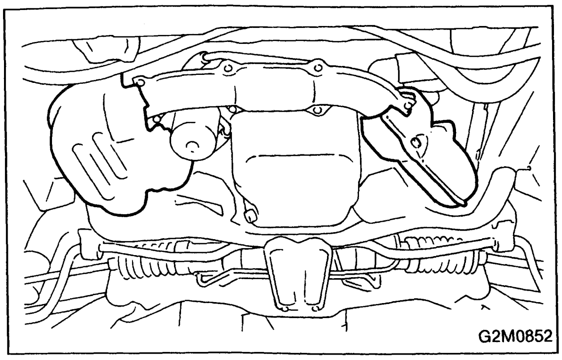


1. Gasket
2. Oxygen sensor
3. Upper center pipe cover
4. Center exhaust pipe
5. Lower center pipe cover
6. Bracket (MT)
7. Gasket
8. Rear exhaust pipe
9. Upper cover
10. Lower cover
11. Upper cover A
12. Lower cover A
13. Spring
14. Bolt
15. Cushion
16. Gasket
17. Cushion
18. Muffler
19. Muffler cutter

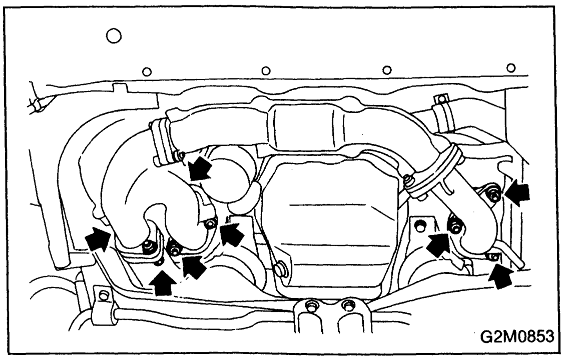
Tightening torque: N·m (kg-m, ft-lb)
T1: 13 — 23 (1.3 — 2.3, 9 — 17)
T2: 25 — 35 (2.6 — 3.6, 19 — 26)
T3: 30 — 40 (3.1 — 4.1, 22 — 30)
T4: 43 — 53 (4.4 — 5.4, 32 — 39)

4. Front Exhaust Pipe (Turbo model)

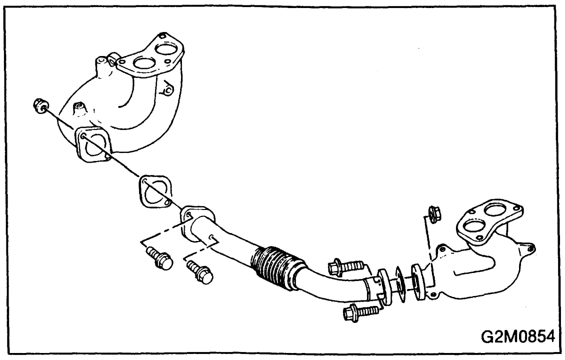
A: REMOVAL


G2M0852

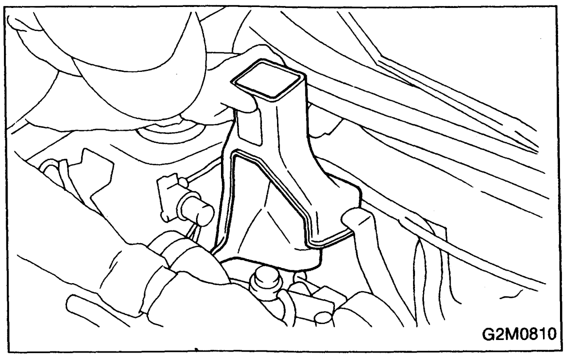
1) Remove lower exhaust manifold cover (RH).
2) Remove lower and upper exhaust manifold covers (LH).


G2M0853

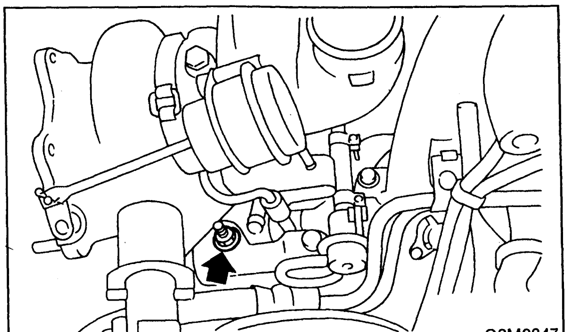
3) Remove bolts and nuts which hold front exhaust pipe assembly to turbocharger joint pipe.
4) While holding front exhaust pipe assembly with one hand, remove nuts which hold front exhaust pipe assembly to cylinder head exhaust port.
5) Remove front exhaust pipe assembly.


G2M0854

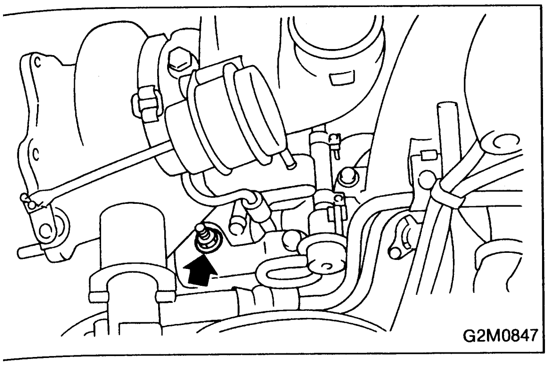
6) Remove covers from exhaust manifold and front exhaust pipe.
7) Separate front exhaust pipe from exhaust manifolds.


G2M0810

8) Remove turbocharger cooling duct.


G2M0847

9) Remove turbocharger joint pipe.



B: INSTALLATION

CAUTION:

Replace gaskets with new ones.

1) Install turbocharger joint pipe.

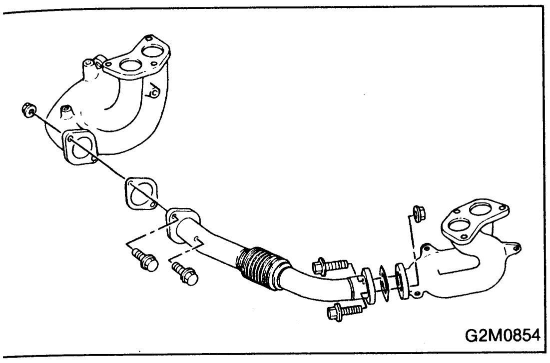
Tightening torque:

25 — 35 N·m (2.6 — 3.6 kg-m, 19 — 26 ft-lb)

2) Install turbocharger cooling duct.

Tightening torque:

5.4 — 9.3 N·m (0.55 — 0.95 kg-m, 4.0 — 6.9 ft-lb)



3) Assemble front exhaust pipe and exhaust manifolds.

Tightening torque:

25 — 35 N·m (2.6 — 3.6 kg-m, 19 — 26 ft-lb)

4) Install front exhaust pipe covers.

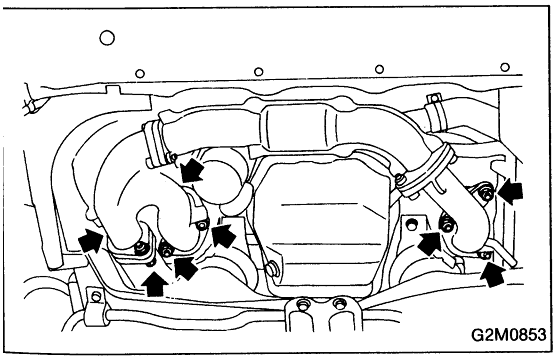
Tightening torque:

30 — 40 N·m (3.1 — 4.1 kg-m, 22 — 30 ft-lb)

5) Install upper exhaust manifold cover (RH).

Tightening torque:

17 — 20 N·m (1.7 — 2.0 kg-m, 12 — 14 ft-lb)



6) Install front exhaust pipe assembly.

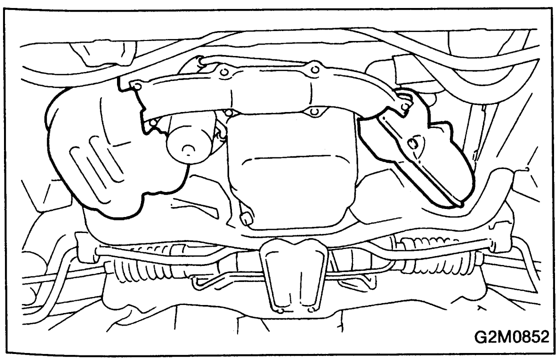
Tightening torque:

34 — 44 N·m (3.5 — 4.5 kg-m, 25 — 33 ft-lb)

7) Connect exhaust manifold (RH) to turbocharger joint pipe.

Tightening torque:

25 — 35 N·m (2.6 — 3.6 kg-m, 19 — 26 ft-lb)



8) Install upper and lower exhaust manifold covers (LH).

Tightening torque:

17 — 20 N·m (1.7 — 2.0 kg-m, 12 — 14 ft-lb)

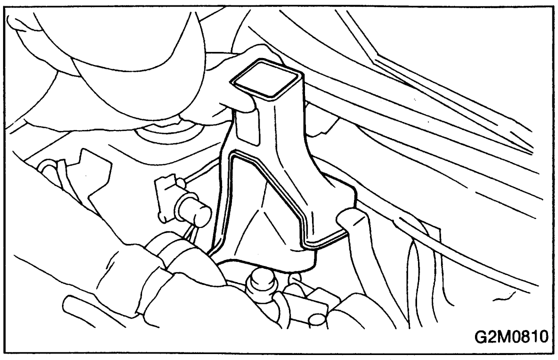
9) Install lower exhaust manifold cover (RH).

Tightening torque:

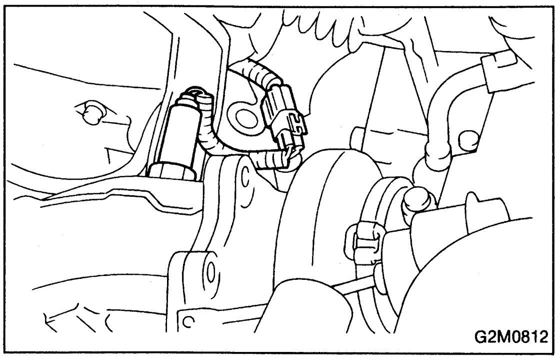
17 — 20 N·m (1.7 — 2.0 kg-m, 12 — 14 ft-lb)

5. Center Exhaust Pipe (Turbo model)

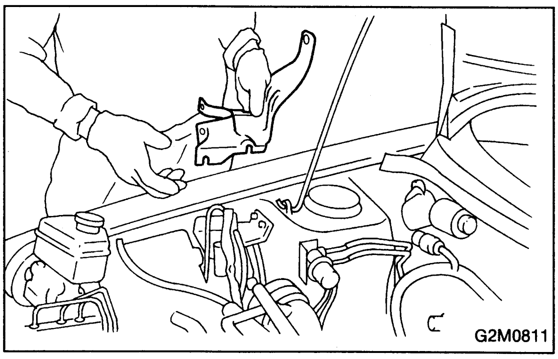
A: REMOVAL


G2M0810

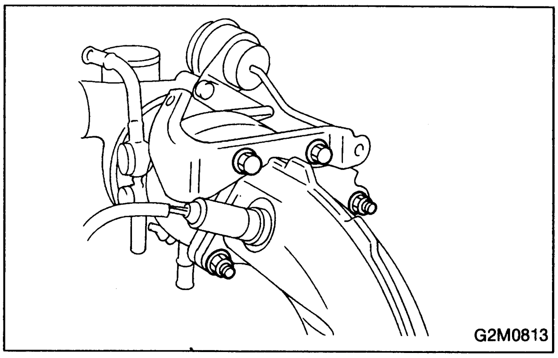
1) Remove turbocharger cooling duct.


G2M0812

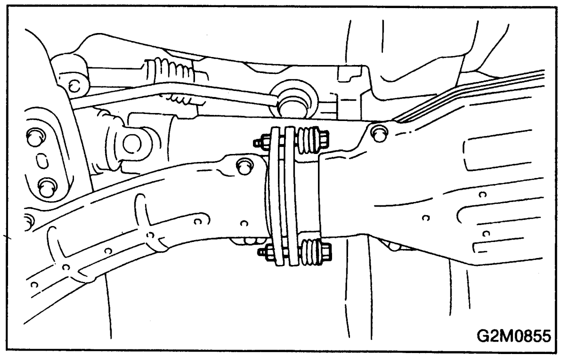
2) Disconnect connector from oxygen sensor.


G2M0811

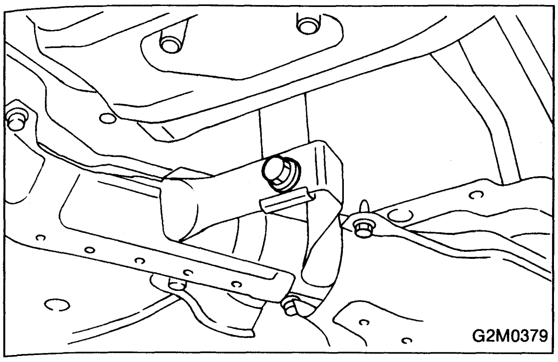
3) Remove turbocharger lower cover.


G2M0813

4) Separate center exhaust pipe from turbocharger.

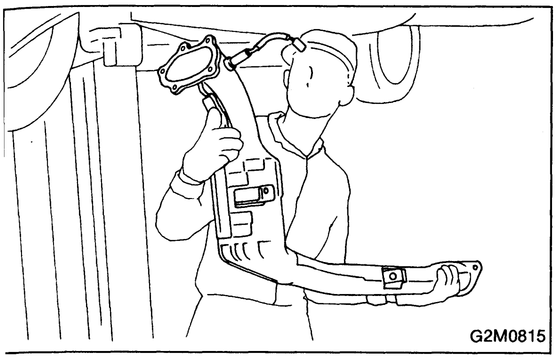

G2M0855

5) Separate center exhaust pipe from rear exhaust pipe.



6) Remove intercooler bracket.
7) Remove bolt which holds center exhaust pipe to hanger bracket.

CAUTION:
Be careful not to pull down center exhaust pipe.

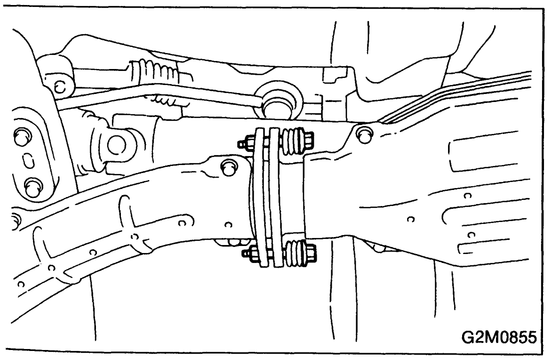


8) Remove center exhaust pipe.

B: INSTALLATION

CAUTION:
Replace gaskets with new ones.

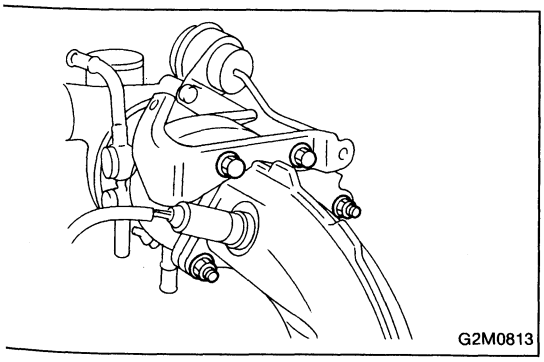
1) Install center exhaust pipe and temporarily tighten bolt which holds center exhaust pipe to hanger bracket.



2) Install center exhaust pipe to rear exhaust pipe.

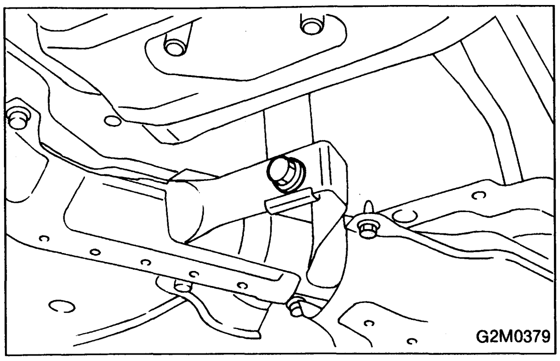
Tighteningtorque:
13 — 23 N·m (1.3 — 2.3 kg-m, 9 — 17 ft-lb)

3) Install intercooler bracket and loosely tighten bolts.



4) Connect center exhaust pipe to turbocharger.

Tightening torque:
25 — 35 N·m (2.6 — 3.6 kg-m, 19 — 26 ft-lb)

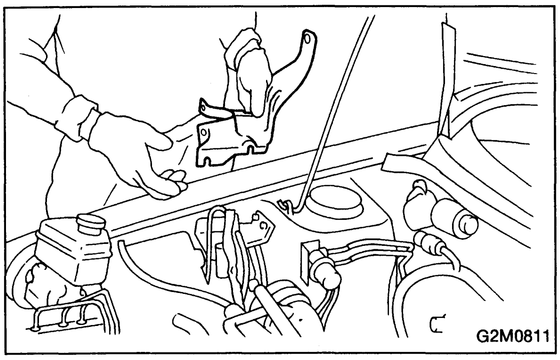


5) Tighten bolt which holds center exhaust pipe to hanger bracket.

Tightening torque:
30 — 40 N·m (3.1 — 4.1 kg-m, 22 — 30 ft-lb)

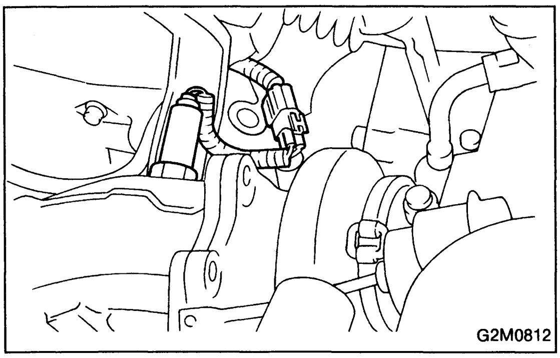
6) Tighten bolts which hold intercooler bracket.

Tightening torque:
30 — 40 N·m (3.1 — 4.1 kg-m, 22 — 30 ft-lb)

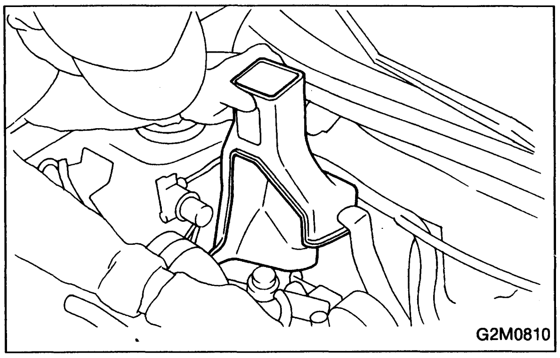


7) Install turbocharger lower cover.

Tightening torque:
5.4 — 9.3 N·m (0.55 — 0.95 kg-m, 4.0 — 6.9 ft-lb)



8) Connect connector to oxygen sensor.



9) Install turbocharger cooling duct.

Tightening torque:
5.4 — 9.3 N·m (0.55 — 0.95 kg-m, 4.0 — 6.9 ft-lb)

CLUTCH 2-10

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T DIAGNOSTICS
1. Clutch System

1. Clutch System

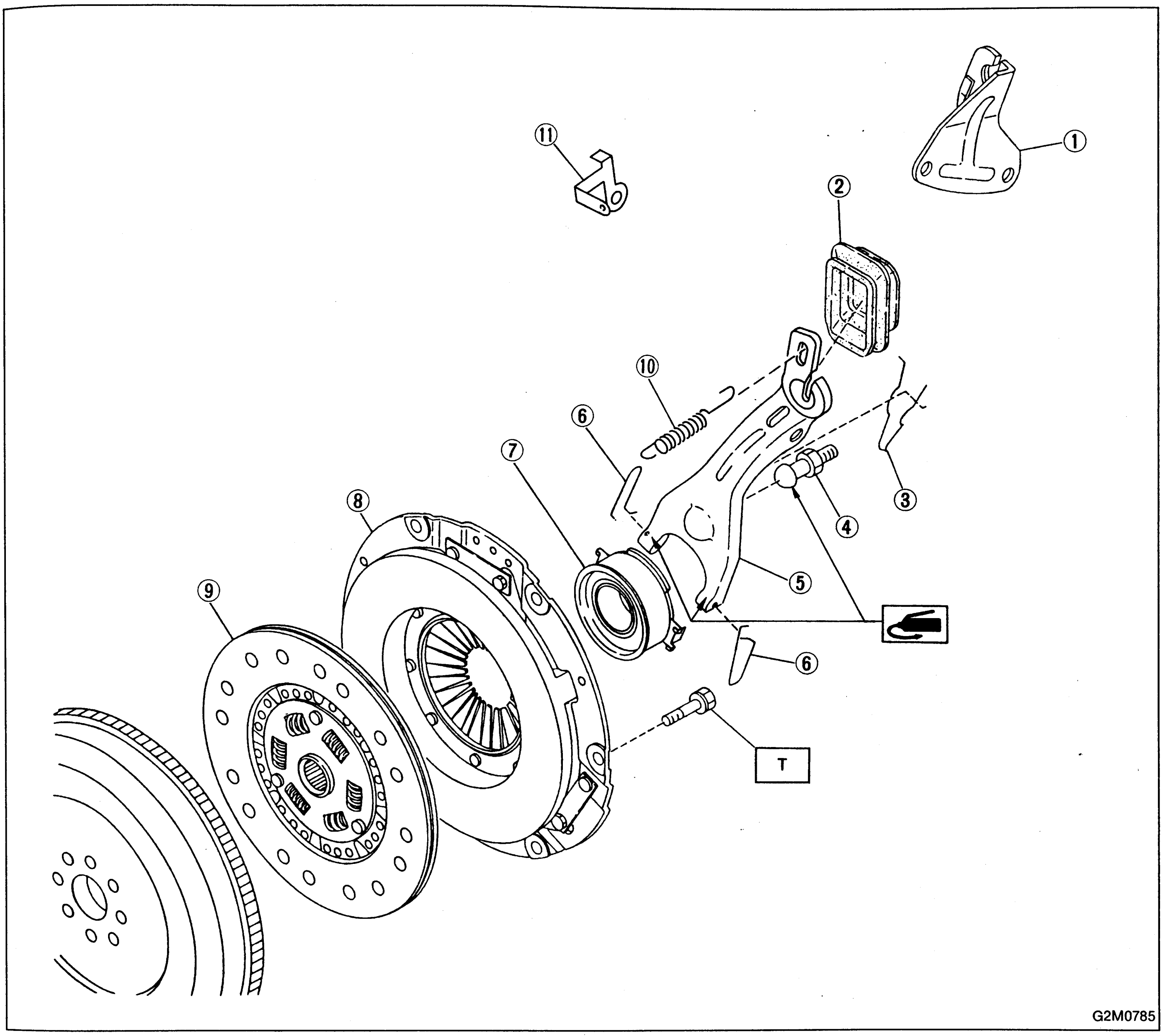
A: SPECIFICATIONS

		FWD		AWD		
		1600 cc	1800 cc	1600 cc	1800 cc	2000 cc TURBO
Clutch cover	Type	Push type				Pull type
	Diaphragm set load kg (lb)	400 (882)		440 (970)	450 (992)	700 (1,544)
Clutch disc	Facing material	Woven (Non asbestos)				
	O.D. x I.D. x thickness mm (in)	190 x 132 x 3.5 (7.48 x 5.20 x 0.138)	200 x 130 x 3.5 (7.87 x 5.12 x 0.138)	215 x 150 x 3.5 (8.46 x 5.91 x 0.138)	225 x 150 x 3.5 (8.86 x 5.91 x 0.138)	
	Spline O.D. mm (in)	22.2 (0.874), (No. of teeth: 21)		25.2 (0.992), (No. of teeth: 24)		
Clutch release lever ratio		3.0				1.7
Release bearing		Grease-packed self-aligning				

B: SERVICE DATA

			FWD		AWD		
			1600 cc	1800 cc	1600 cc	1800 cc	2000 cc TURBO
Clutch pedal	Full stroke mm (in)		140 — 150 (5.51 — 5.91)				145 — 150 (5.71 — 5.91)
Release lever	Stroke mm (in)		24 — 26 (0.94 — 1.02)				13.3 — 14.7 (0.524 — 0.579)
	Play at release lever center mm (in)		3 — 4 (0.12 — 0.16)				
Clutch disc	Depth of rivet head mm (in)	Standard	1.3 — 1.9 (0.051 — 0.075)	1.4 (0.055)	1.3 — 1.9 (0.051 — 0.075)		
		Limit of sinking	0.3 (0.012)				
	Limit for deflection mm (in)		1.0 (0.039) at R = 90 (3.54)	1.0 (0.039) at R = 95 (3.74)	1.0 (0.039) at R = 102 (4.02)	1.0 (0.039) at R = 107 (4.21)	

1. Clutch System

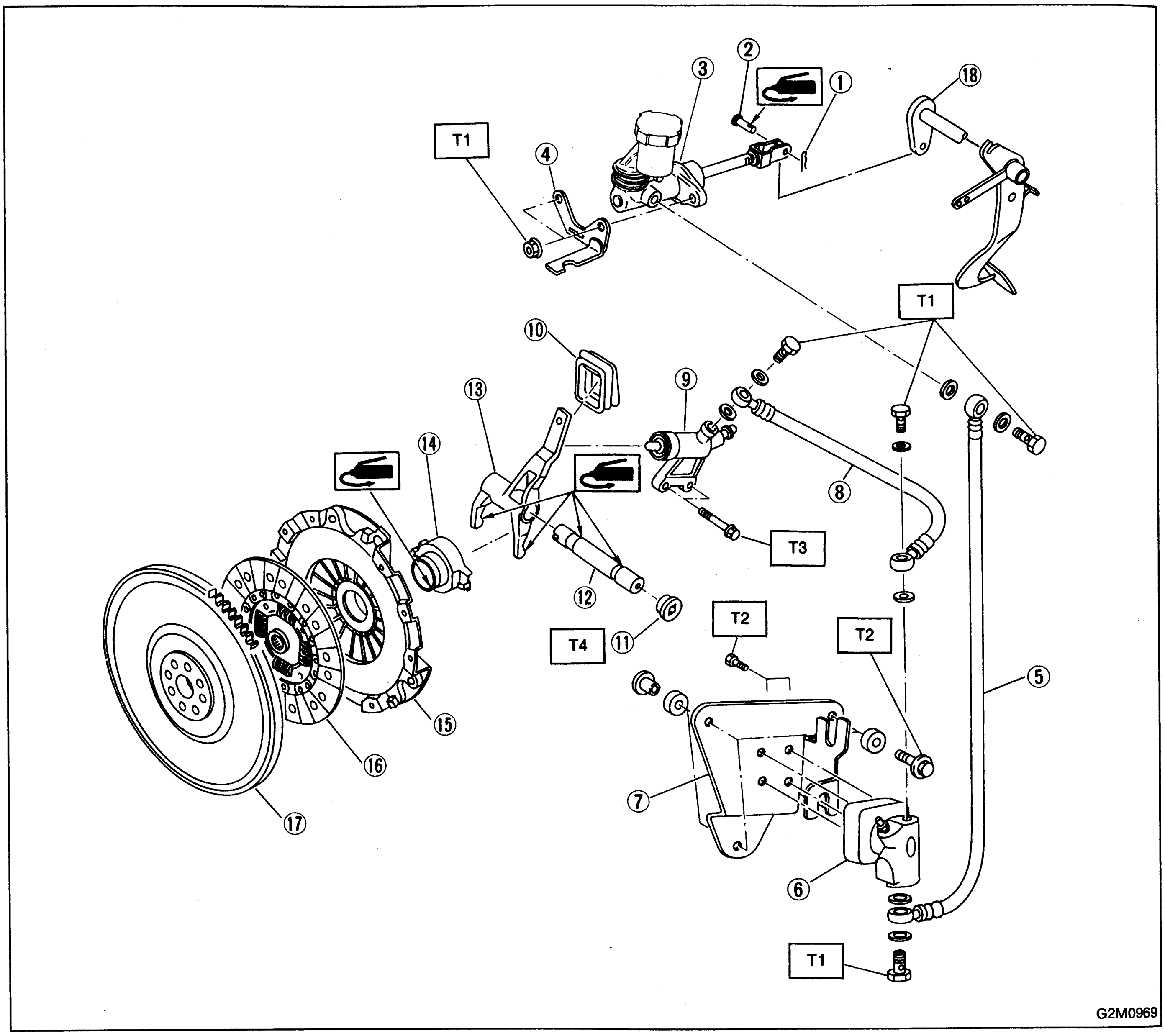


① Clutch cable bracket
② Clutch release lever sealing
③ Retainer spring
④ Pivot
⑤ Clutch release lever
⑥ Clip
⑦ Clutch release bearing
⑧ Clutch cover
⑨ Clutch disc
⑩ Return spring
⑪ Clutch return spring bracket

Tightening torque: N·m (kg-m, ft-lb)
T: 15.7±1.5 (1.6±0.15, 11.6±1.1)

2. Clutch System (Hydraulic application type)

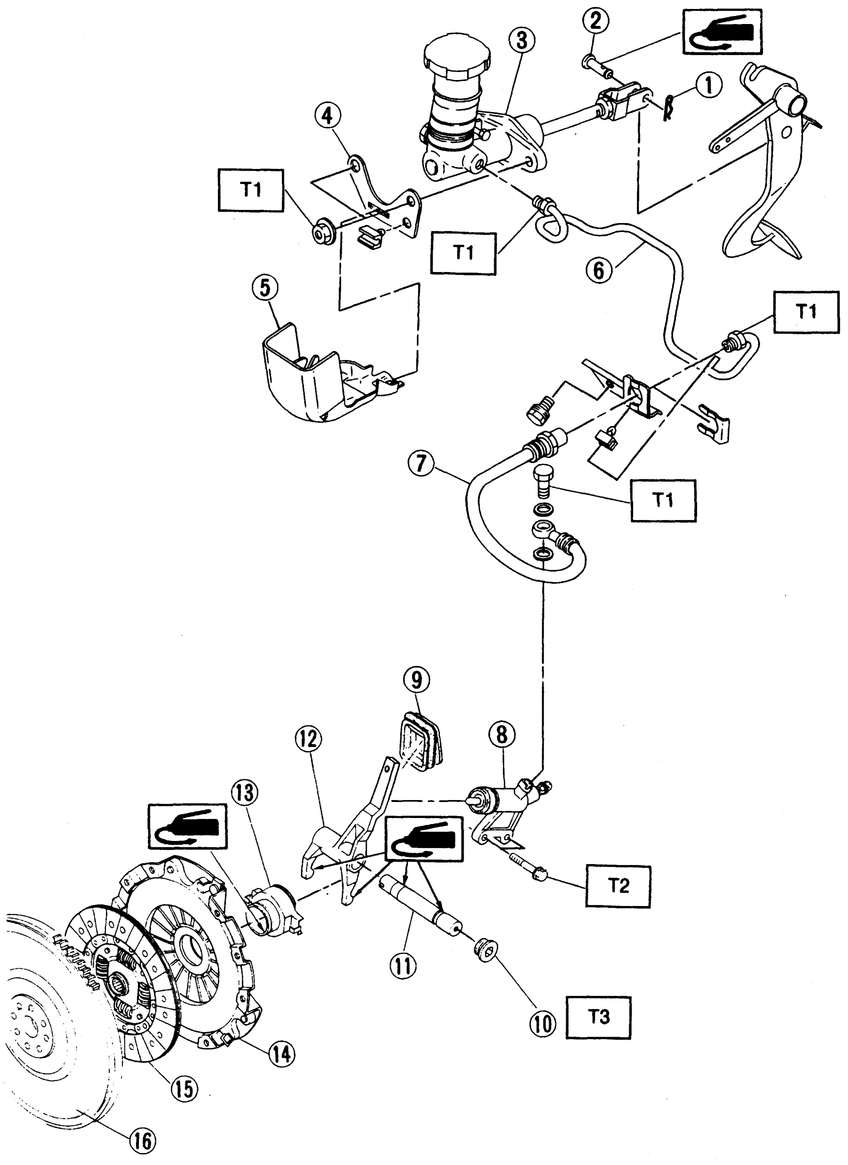
1. LHD MODEL



① Snap pin
② Clevis pin
③ Master cylinder ASSY
④ Bracket
⑤ Clutch hose
⑥ Clutch damper
⑦ Damper bracket
⑧ Clutch hose
⑨ Operating cylinder
⑩ Release lever dust cover
⑪ Plug
⑫ Release lever shaft
⑬ Release lever
⑭ Release bearing
⑮ Clutch cover
⑯ Clutch disc
⑰ Flywheel
⑱ Spacer

Tightening torque: N·m (kg-m, ft-lb)
T1: 18 ± 3 (1.8 ± 0.3, 13.0 ± 2.2)
T2: 25 ± 7 (2.5 ± 0.7, 18.1 ± 5.1)
T3: 37 ± 3 (3.8 ± 0.3, 27.5 ± 2.2)
T4: 44 ± 3 (4.5 ± 0.3, 32.5 ± 2.2)

2. RHD MODEL

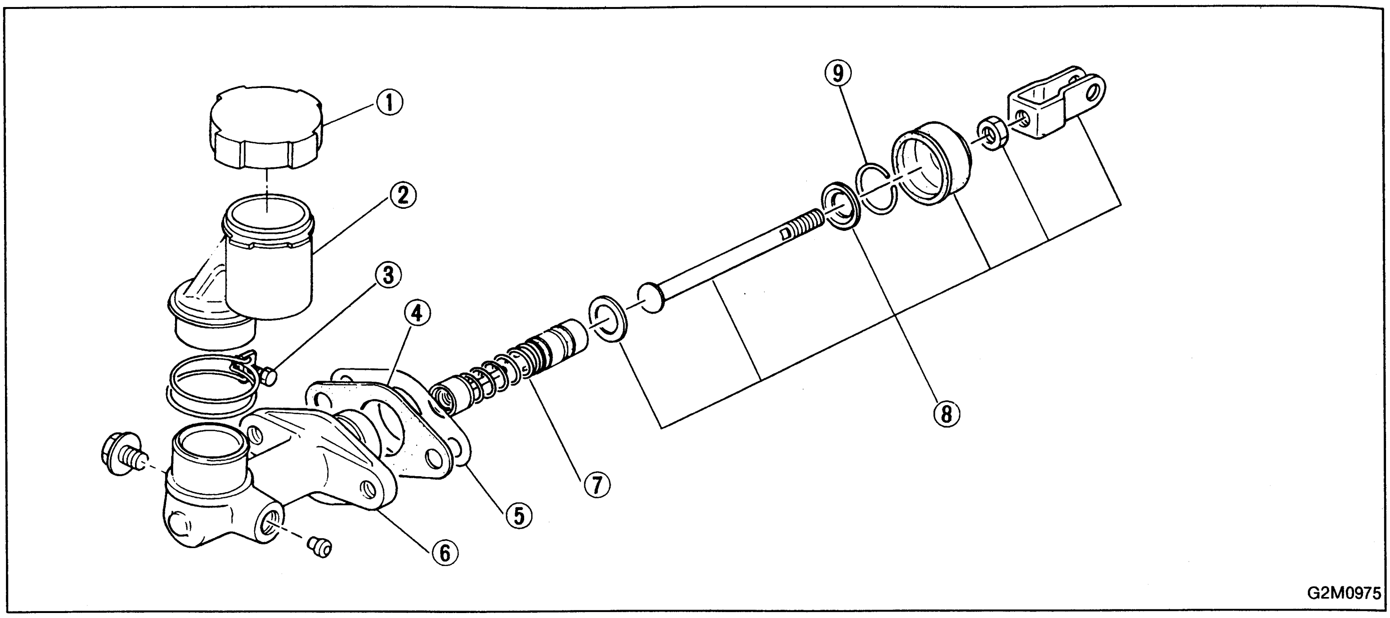


① Snap pin
② Clevis pin
③ Master cylinder ASSY
④ Bracket
⑤ Sealed cover
⑥ Clutch pipe
⑦ Clutch hose
⑧ Operating cylinder
⑨ Release lever dust cover
⑩ Plug
⑪ Release lever shaft
⑫ Release lever
⑬ Release bearing
⑭ Clutch cover
⑮ Clutch disc
⑯ Flywheel

Tightening torque: N·m (kg-m, ft-lb)
T1: 18±3 (1.8±0.3, 13.0±2.2)
T2: 37±3 (3.8±0.3, 27.5±2.2)
T3: 44±3 (4.5±0.3, 32.5±2.2)

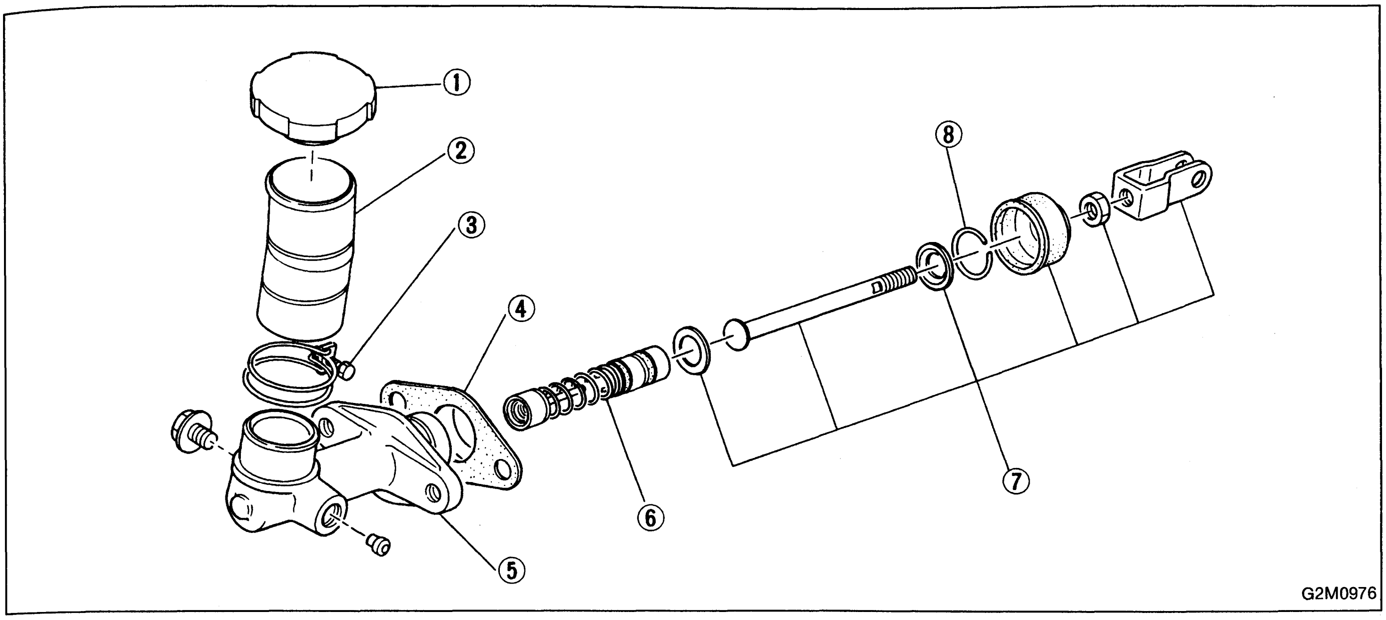
3. Master Cylinder and Reservoir Tank

1. LHD MODEL



① Reservoir cap
② Reservoir tank
③ Reservoir band
④ Seat
⑤ Gasket
⑥ Master cylinder
⑦ Piston
⑧ Push rod
⑨ Piston stop ring

2. RHD MODEL

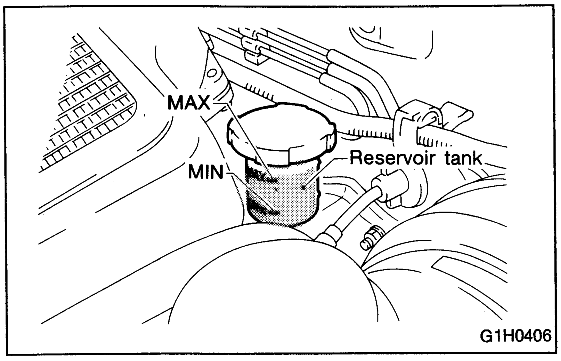


① Reservoir cap
② Reservoir tank
③ Reservoir band
④ Seat
⑤ Master cylinder
⑥ Piston
⑦ Push rod
⑧ Piston stop ring

1. General

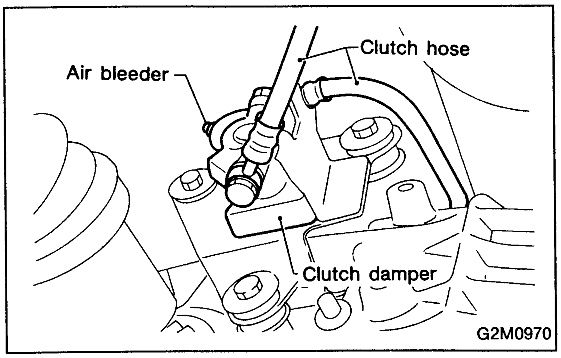
A: PRECAUTION

When servicing clutch system, pay attention to the following items.



2. HYDRAULIC APPLICATION TYPE

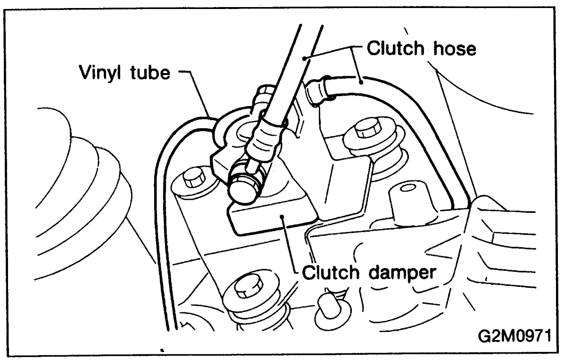
1) Check fluid level using scale on outside of reservoir tank.
2) Make sure that clutch fluid does not leak from master cylinder, operating cylinder and piping.
3) Apply grease sufficiently to the release lever pinion.



2. On-Car Service

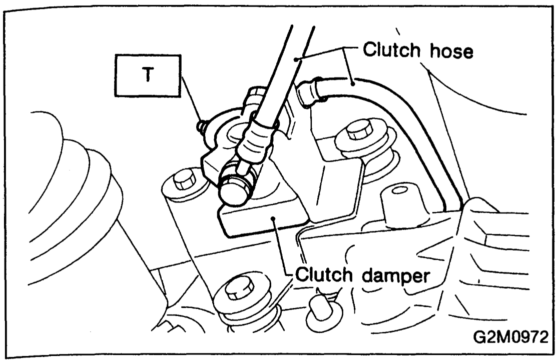
2. HYDRAULIC APPLICATION TYPE

Bleed air from oil line with the help of a co-worker.
1) Fit one end of a vinyl tube into the air bleeder of clutch damper and put the other end into a clutch fluid container.



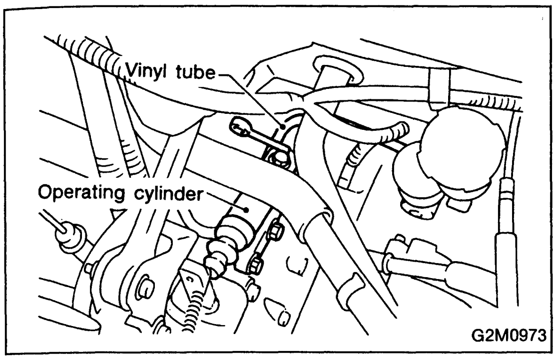
2) Slowly depress the clutch pedal and keep it depressed. Then open the air bleeder to discharge air together with the fluid.
Release the air bleeder for 1 or 2 seconds. Next, with the bleeder closed, slowly release the clutch pedal.

3) Repeat these steps until there are no more air bubbles in the vinyl tube.
CAUTION:
Cover bleeder with waste cloth when loosening it, to prevent clutch fluid from being splashed over surrounding parts.

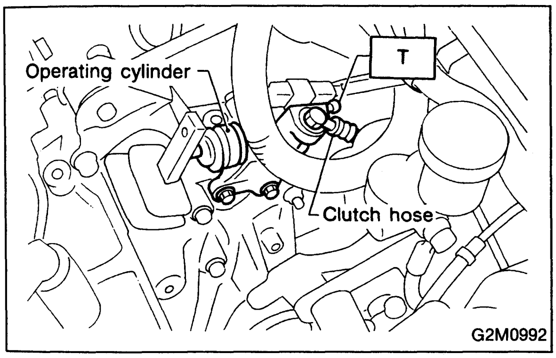


4) Tighten air bleeder.

Tightening torque:
T: 18±3 N·m (1.8±0.3 kg-m, 13.0±2.2 ft-lb)



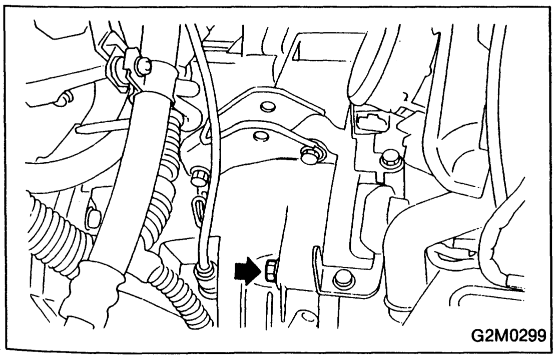
5) Repeat steps 1) through 3) using air bleeder on operating cylinder.



6) Tighten air bleeder.

Tightening torque:
T: 18±3 N·m (1.8±0.3 kg-m, 13.0±2.2 ft-lb)

7) After depressing the clutch pedal, make sure that there are no leaks evident in the entire system.
8) For RHD models, repeat steps 5) through 7) of LHD models.

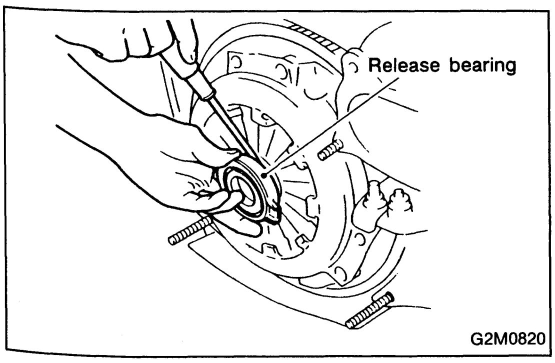


3. Release Bearing and Lever

A: REMOVAL

2. HYDRAULIC APPLICATION TYPE

Remove release bearing and lever after separating engine and transmission. <Ref. to 2-11.>

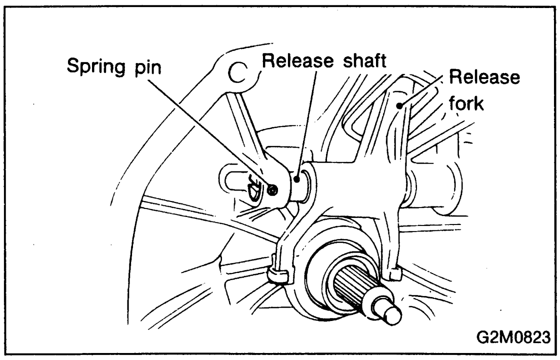


1) Remove release lever from transmission.
2) Put release bearing in engine side.
3) Remove release bearing from clutch cover using flat-type screwdriver.

C: INSTALLATION

Before or during assembling, lubricate the following points with a light coat of grease.

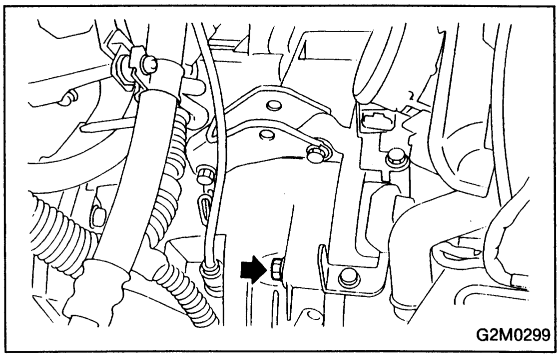
- Inner groove of release bearing
- Contact surface of lever and pivot
- Contact surface of lever and bearing
- Transmission main shaft spline (Use grease containing molybdenum disulphide.)



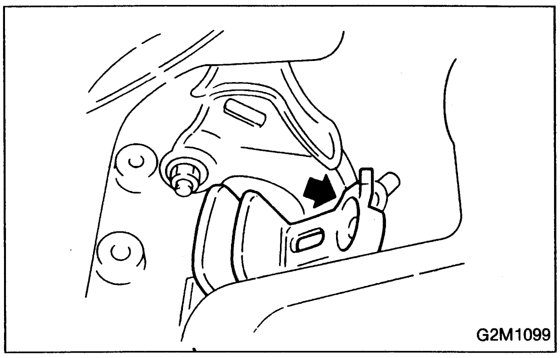
2. HYDRAULIC APPLICATION TYPE

1) Position both release lever and bearing on transmission.
2) Install release lever shaft.

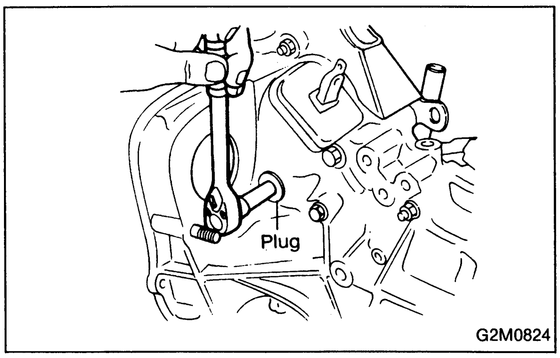
CAUTION:
Be sure to fit groove on release lever shaft into pin located at through-hole.



3) With release lever held in that position, connect engine and transmission.

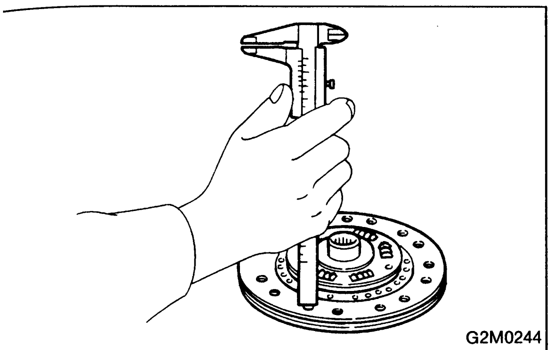


4) Push release lever to fit bearing into clutch cover.



5) Install plug.

Tightening torque:
44±3 N·m (4.5±0.3 kg-m, 32.5±2.2 ft-lb)


G2M0244

4. Clutch Disc and Cover

B: INSPECTION

1. CLUTCH DISC

1) Facing wear

Measure the depth of rivet head from the surface of facing. Replace if facings are worn locally or worn down to less than the specified value.

Depth of rivet head:

Standard value

1800 cc FWD model: 1.4 mm (0.055 in)

1600 cc FWD model: 1.3 — 1.9 mm (0.051 — 0.075 in)

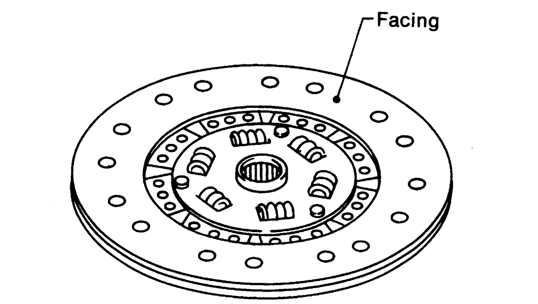
AWD model: 1.3 — 1.9 mm (0.051 — 0.075 in)

Limit of sinking

0.3 mm (0.012 in)

CAUTION:

Do not wash clutch disc with any cleaning fluid.



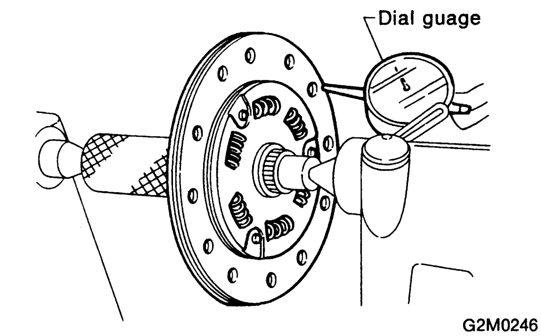
G2M0245

2) Hardened facing

Correct by using emery paper or replace.

3) Oil soakage on facing

Replace clutch disc and inspect transmission front oil seal, transmission case mating surface, engine rear oil seal and other points for oil leakage.



G2M0246

4) Deflection on facing

If deflection exceeds the specified value at the outer circumference of facing, repair or replace.

Limit for deflection:

1800 cc FWD model:

1.0 mm (0.039 in) at R = 95 mm (3.74 in)

1600 cc FWD model:

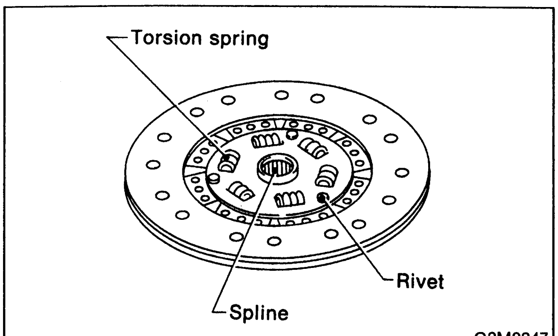
1.0 mm (0.039 in) at R = 90 mm (3.54 in)

1600 cc AWD model:

1.0 mm (0.039 in) at R = 102 mm (4.02 in)

1800 cc AWD and 2000 cc TURBO model:

1.0 mm (0.039 in) at R = 107 mm (4.21 in)

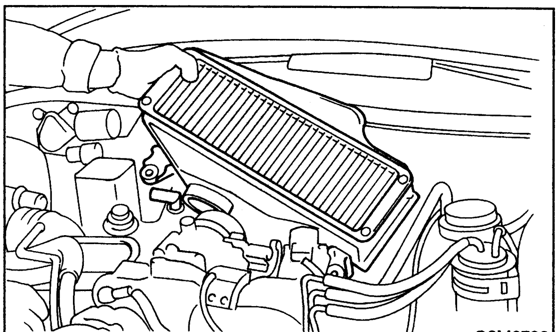


G2M0247

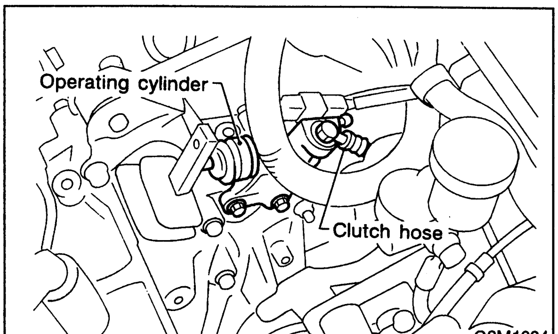
5) Worn spline, loose rivets and torsion spring failure
Replace defective parts.

5. Operating Cylinder

A: REMOVAL AND INSTALLATION


G2M0796

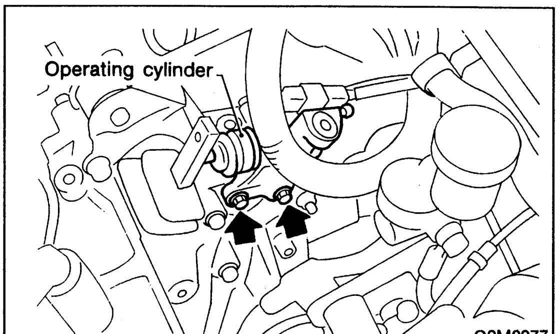
1) Remove intercooler.



G2M1004

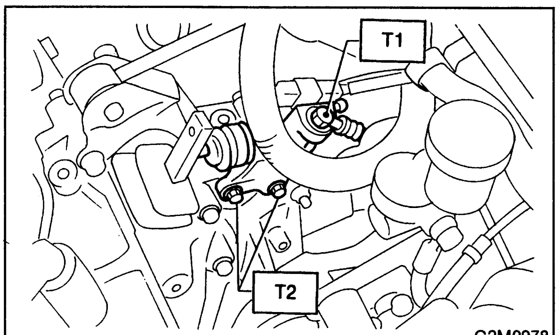
2) Remove clutch hose from operating cylinder.

CAUTION:
Cover hose joint to prevent clutch fluid from flowing out.



G2M0977

3) Remove operating cylinder from transmission.

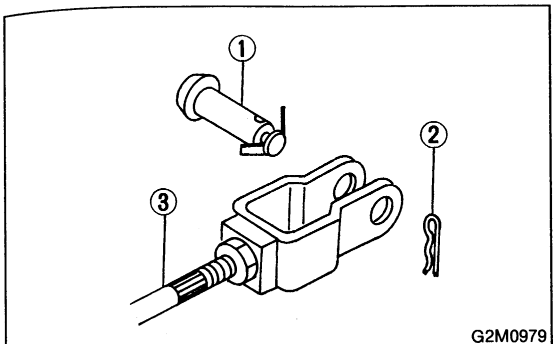


G2M0978

4) Installation is in the reverse order of removal.

Tightening torque:

T1: 18±3 N·m (1.8±0.3 kg-m, 13.0±2.2 ft-lb)
T2: 37±3 N·m (3.8±0.3 kg-m, 27.5±2.2 ft-lb)

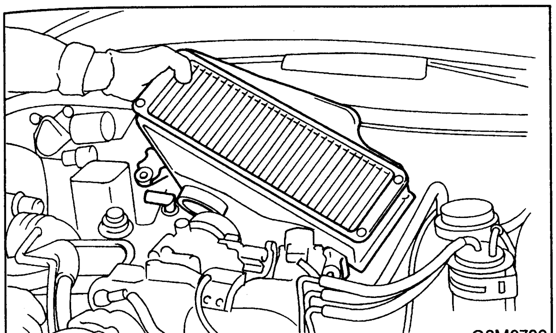


G2M0979

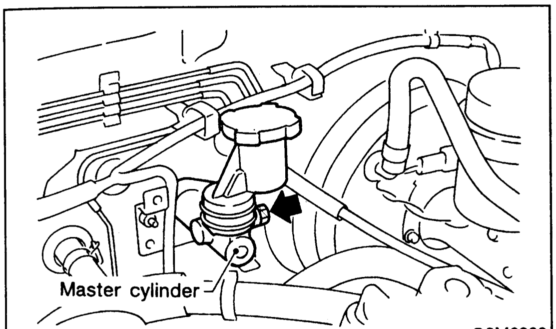
6. Master Cylinder and Reservoir Tank (LHD Model)

A: REMOVAL

1) Remove snap pin ②, clevis pin ① and separate push rod ③ of master cylinder from clutch pedal.


G2M0796

2) Remove intercooler. <Ref. to 2-7b [W2A0].>

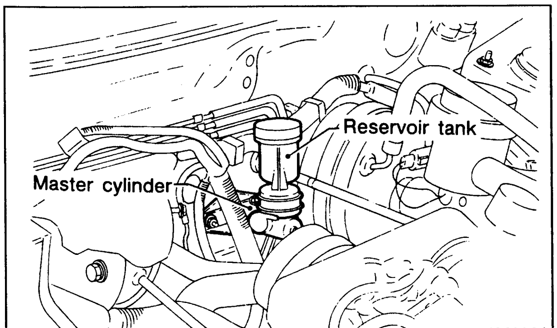


G2M0980

3) Remove clutch hose from master cylinder.

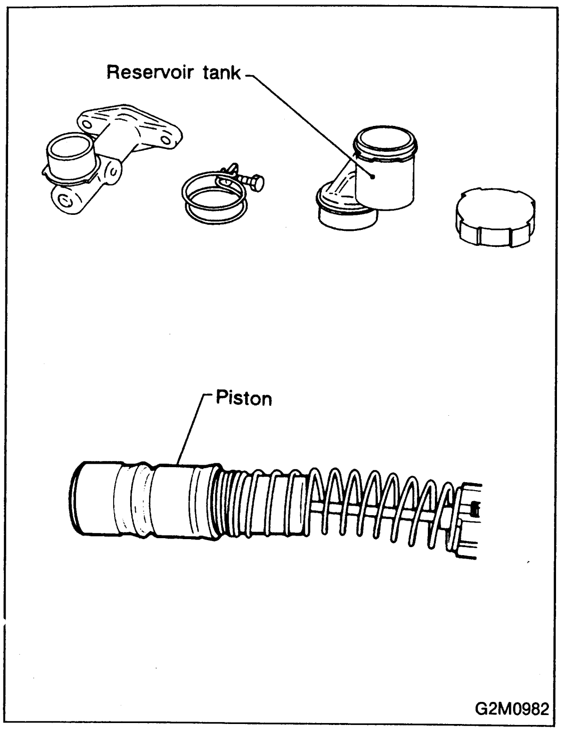
CAUTION:

Plug up hose connection to prevent clutch fluid from spilling out.



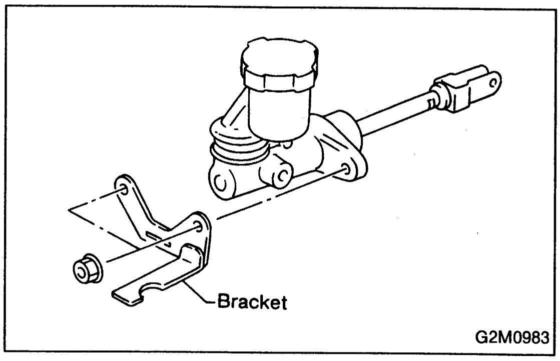
G2M0981

4) Remove master cylinder with reservoir tank.



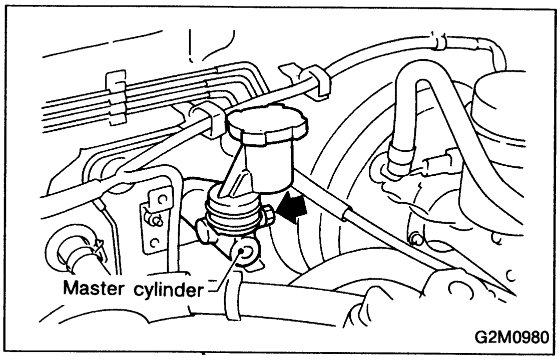
B: INSPECTION

If any damage, deformation, wear, swelling, rust or other faults are found on the cylinder, piston, push rod, fluid reservoir, seat and gasket, replace the faulty part.

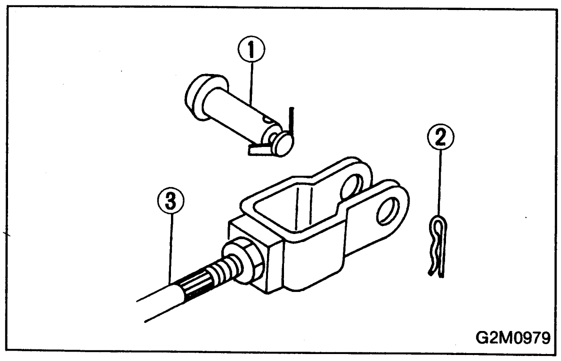


C: INSTALLATION

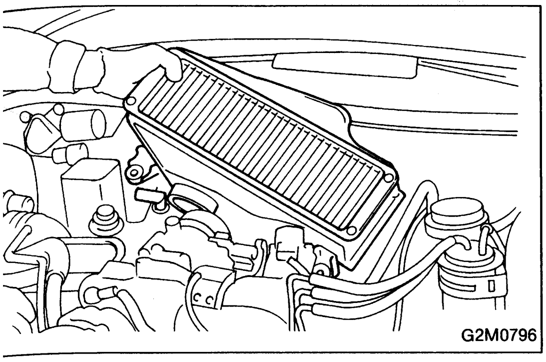
1) Install master cylinder to body.
CAUTION:
Always use a new gasket.
Tightening torque:
18±3 N·m (1.8±0.3 kg-m, 13.0±2.2 ft-lb)



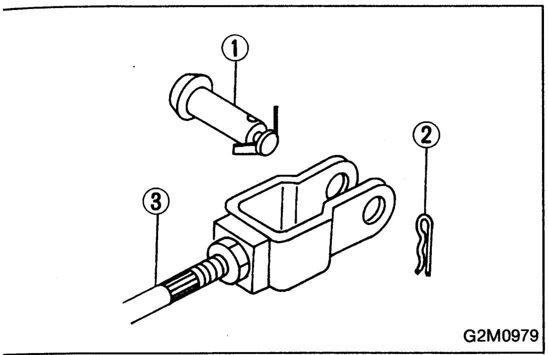
2) Install clutch hose to master cylinder.
CAUTION:
Check that hose is routed properly.
Tightening torque:
18±3 N·m (1.8±0.3 kg-m, 13.0±2.2 ft-lb)



3) Connect push rod ③ of master cylinder to clutch pedal, and install clevis pin ② and snap pin ①.



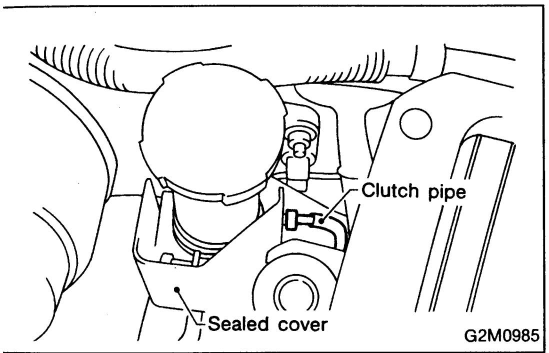
4) Install intercooler. <Ref. to 2-7b [W2A0].>



7. Master Cylinder and Reservoir Tank (RHD Model)

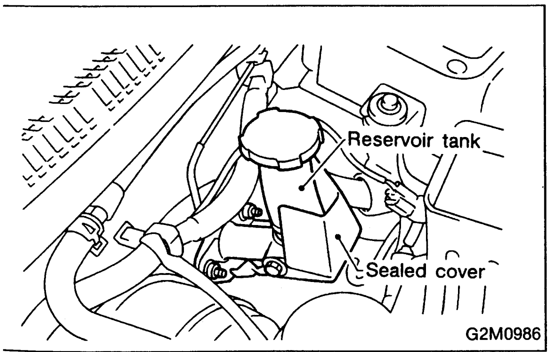
A: REMOVAL

1) Remove snap pin ②, clevis pin ① and separate push rod ③ of master cylinder from clutch pedal.

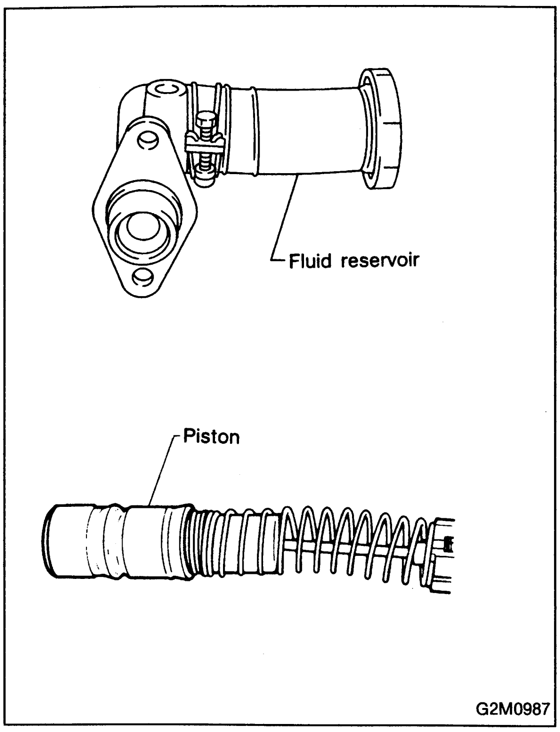


2) Remove clutch pipe from master cylinder.

CAUTION:
Plug up hose connection to prevent clutch fluid from spilling out.

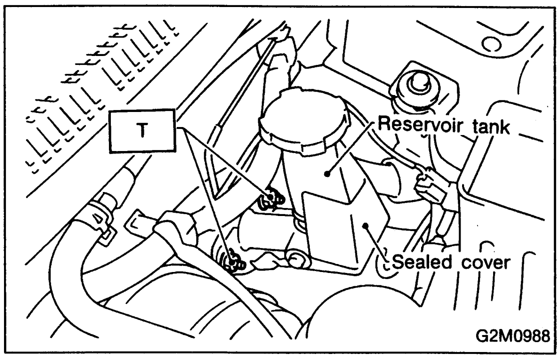


3) Remove master cylinder with reservoir tank.



B: INSPECTION

If any damage, deformation, wear, swelling, rust or other faults are found on the cylinder, piston, push rod, fluid reservoir, seat and gasket, replace the faulty part.

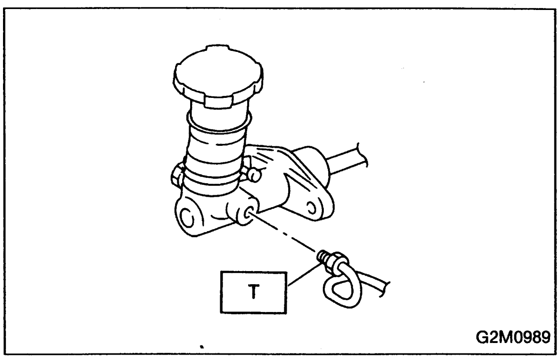


C: INSTALLATION

1) Install master cylinder to body.

CAUTION:
Always use a new gasket.

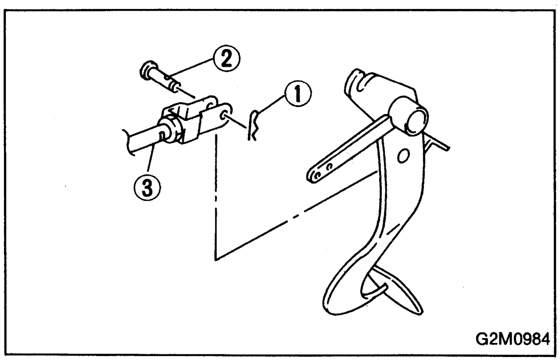
Tightening torque:
T: 18±3 N·m (1.8±0.3 kg-m, 13.0±2.2 ft-lb)



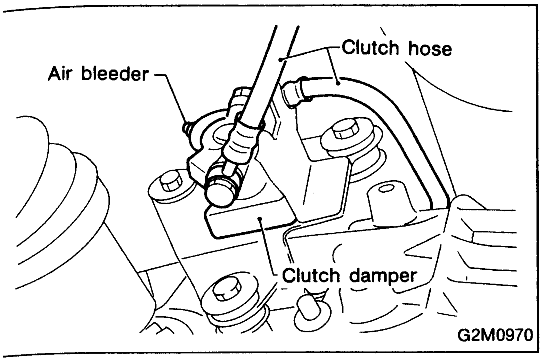
2) Install clutch hose to master cylinder.

CAUTION:
Check that hose is routed properly.

Tightening torque:
T: 18±3 N·m (1.8±0.3 kg-m, 13.0±2.2 ft-lb)



3) Connect push rod ③ of master cylinder to clutch pedal, and install clevis pin ② and snap pin ①.



8. Clutch Damper (LHD Model)

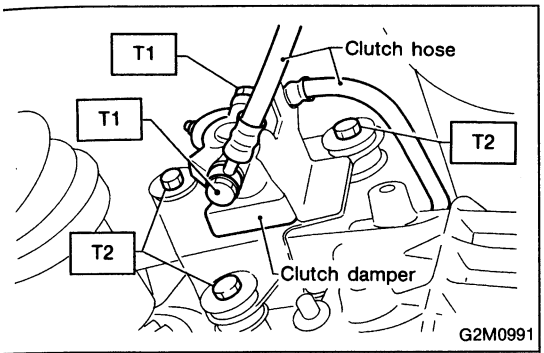
A: REMOVAL AND INSTALLATION

1) Remove clutch hoses from clutch damper.

CAUTION:

Cover hose joint to prevent clutch fluid from flowing out.

2) Remove clutch damper with bracket.



3) Installation is in the reverse order of removal.

Tightening torque:

T1: 18 ± 3 N·m (1.8 ± 0.3 kg-m, 13.0 ± 2.2 ft-lb)
T2: 37 ± 3 N·m (3.8 ± 0.3 kg-m, 27.5 ± 2.2 ft-lb)

ENGINE AND TRANSMISSION MOUNTING SYSTEM 2-11

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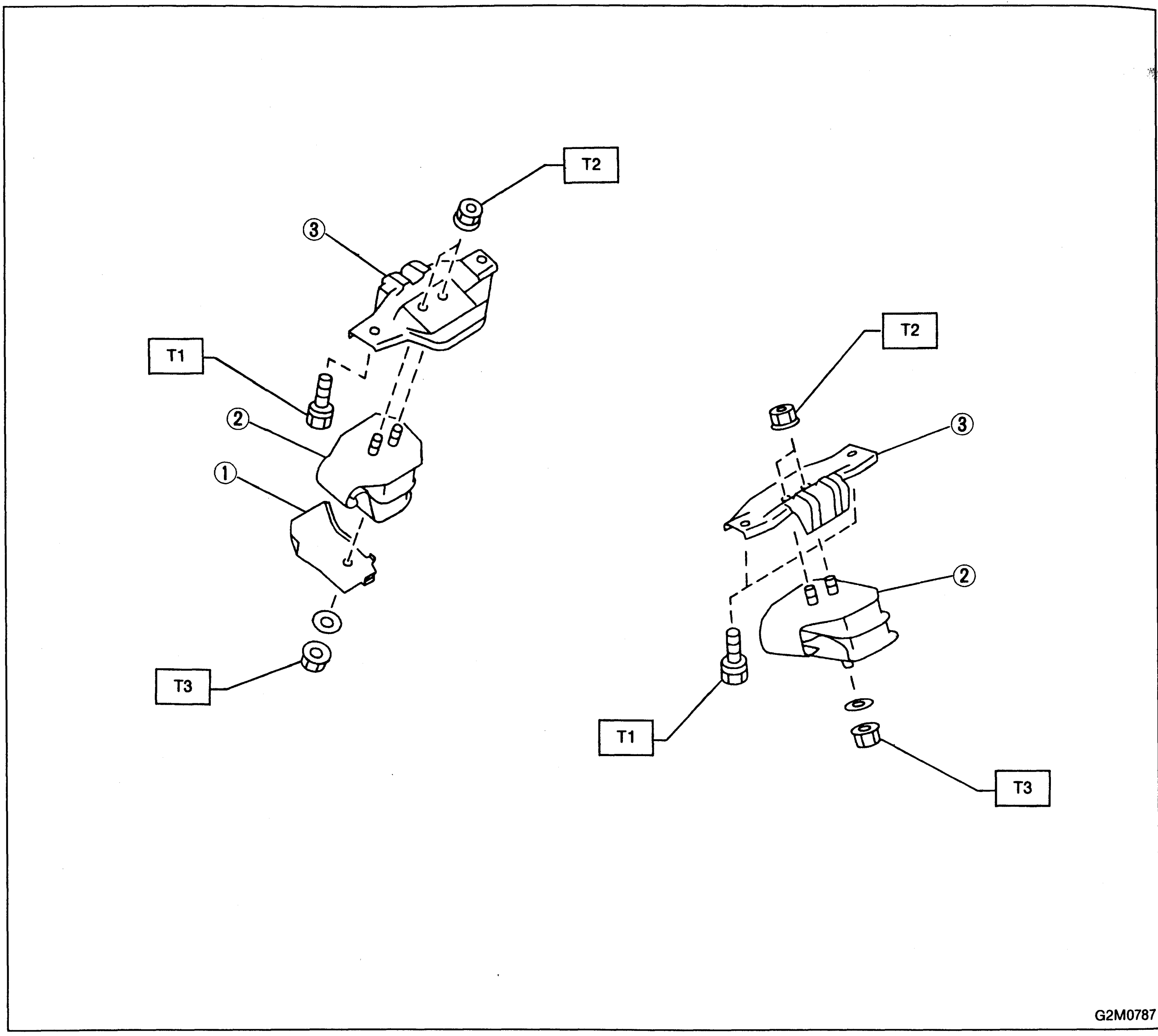
1. Engine Mounting 2
2. Transmission Mounting 3
W SERVICE PROCEDURE 4
1. General Precaution 4
2. Engine 5
3. Transmission 29

- The descriptions in this section apply to the turbo model.

1. Engine Mounting

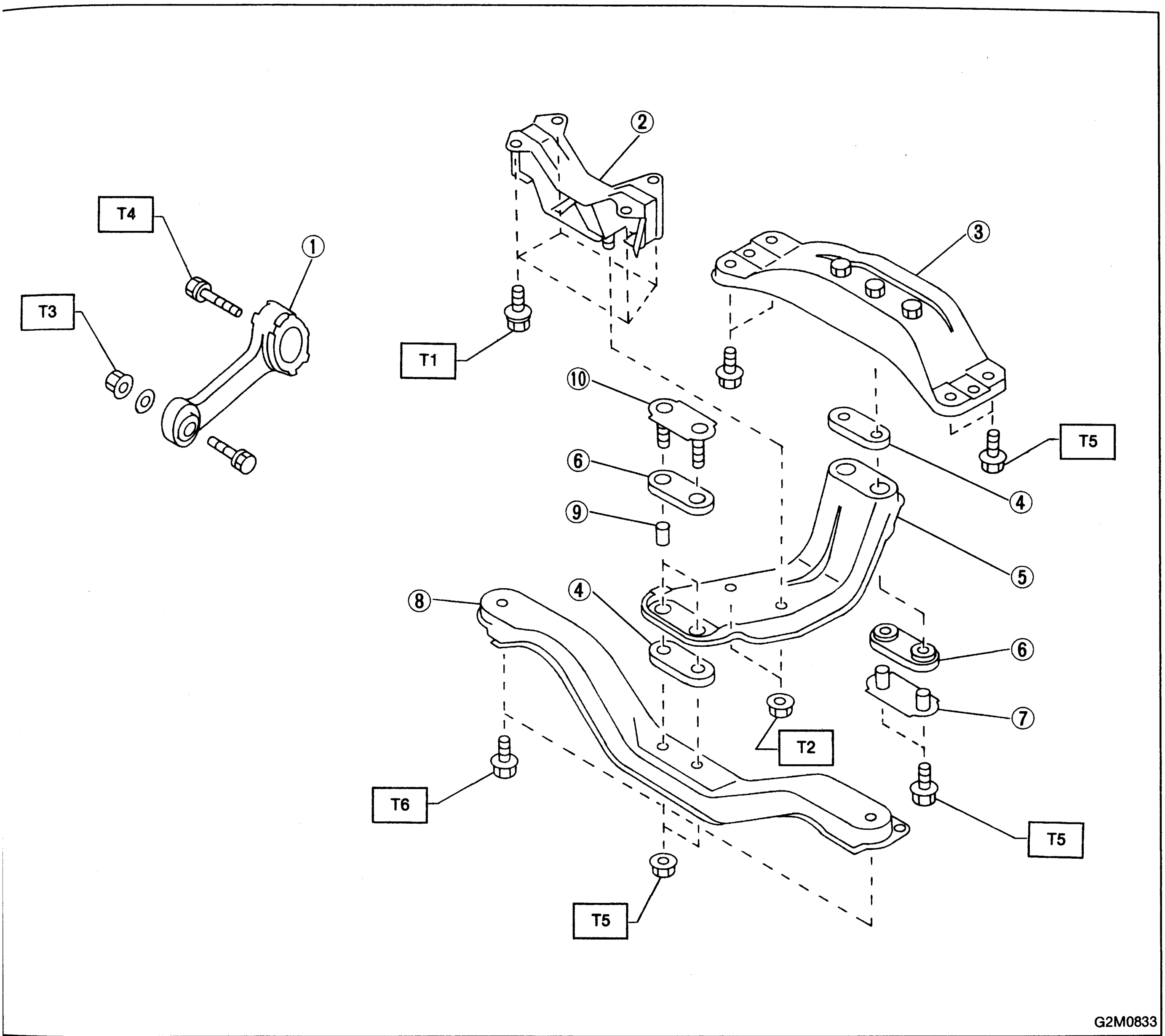


① Heat shield cover
② Front cushion rubber
③ Front engine mounting bracket

Tightening torque: N·m (kg-m, ft-lb)
T1: 20 — 33 (2.0 — 3.4, 14 — 25)
T2: 31 — 51 (3.2 — 5.2, 23 — 38)
T3: 54 — 83 (5.5 — 8.5, 40 — 61)

2. Transmission Mounting

3. TURBO MODEL



① Pitching stopper
② Rear cushion rubber (AWD)
③ Rear crossmember
④ Cushion D
⑤ Center crossmember
⑥ Cushion C
⑦ Rear plate
⑧ Front crossmember
⑨ Spacer
⑩ Front plate

Tightening torque: N·m (kg-m, ft-lb)
T1: 28 — 38 (2.9 — 3.9, 21 — 28)
T2: 27 — 47 (2.8 — 4.8, 20 — 35)
T3: 44 — 54 (4.5 — 5.5, 33 — 40)
T4: 47 — 67 (4.8 — 6.8, 35 — 49)
T5: 54 — 83 (5.5 — 8.5, 40 — 61)
T6: 118 — 157 (12 — 16, 87 — 116)

1. General Precaution

1) Remove or install engine and transmission in an area where chain hoists, lifting devices, etc. are available for ready use.
2) 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.
3) Prior to starting work, prepare the following:
Service tools, clean cloth, containers to catch coolant and oil, wire ropes, chain hoist, transmission jacks, etc.
4) Lift up or lower the vehicle when necessary. Make sure to support the correct positions. (Refer to Chapter 1-3 "General Information".)

2. Engine

A: REMOVAL

1. Set the vehicle on lift arms.
2. Open front hood and support with a stay.

↓

3. Release fuel pressure.
4. Remove battery from vehicle.
5. Remove window washer tank.
6. Drain coolant.

↓

7. Remove cooling system.

↓

With A/C

8. Collect refrigerant, and remove pressure hose.

↓

9. Remove air intake system.

↓

10. Remove canister and bracket.

↓

11. Disconnect connectors, cables and hoses.

↓

12. Remove starter.

↓

13. Remove power steering pump from bracket.

↓

14. Remove center exhaust pipe.

↓

15. Remove nuts which hold lower side of transmission to engine.
16. Remove nuts which install front cushion rubber onto front crossmember.

↓

17. Separate clutch release fork from release bearing.

↓

18. Remove pitching stopper.

↓

19. Disconnect fuel delivery hose, return hose and evaporation hose.
20. Remove fuel filter and bracket.

↓

21. Support engine with a lifting device and wire ropes.
22. Support transmission with a garage jack.

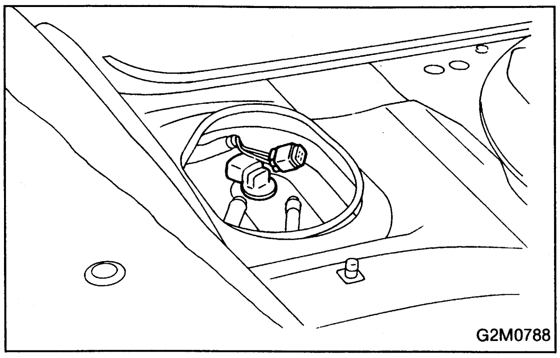
↓

23. Remove bolts which hold upper side of transmission to engine.

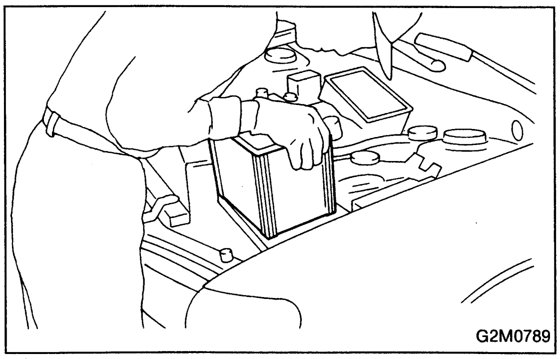
↓

24. Remove engine from vehicle.

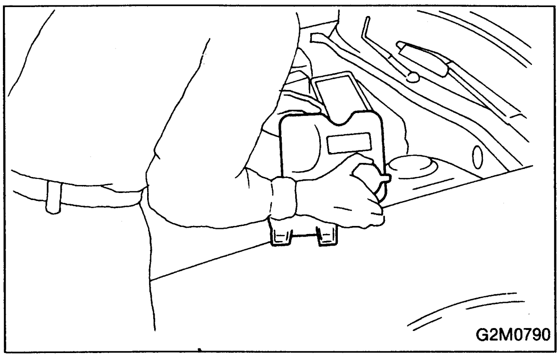
1) Set the vehicle on lift arms.
2) Open front hood fully and support with stay.


G2M0788

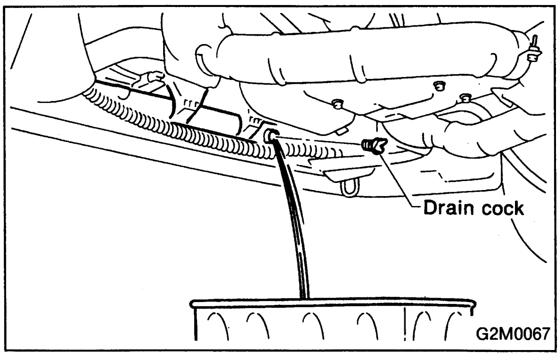
3) Release fuel pressure.
(1) Disconnect connector from fuel pump.
(2) Start the engine, and run until it stalls.
(3) After the engine stalls, crank it for five seconds more.
(4) Turn ignition switch to "OFF".
<Ref. to 2-8 [W101].>


G2M0789

4) Remove battery from vehicle.


G2M0790

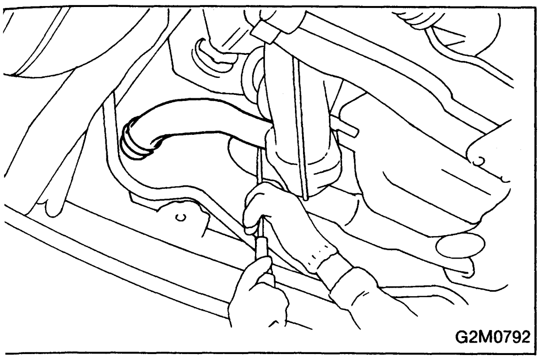
5) Remove window washer tank.



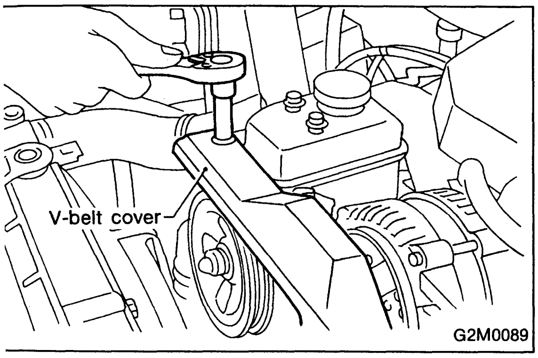
G2M0067

6) Drain coolant.
Set container under the vehicle, and remove drain cock from radiator.

7) Remove cooling system.

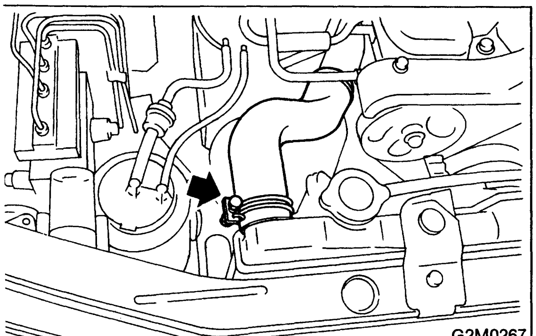

G2M0792

(1) Disconnect radiator fan motor connector.
(2) Disconnect radiator outlet hose from thermostat cover.

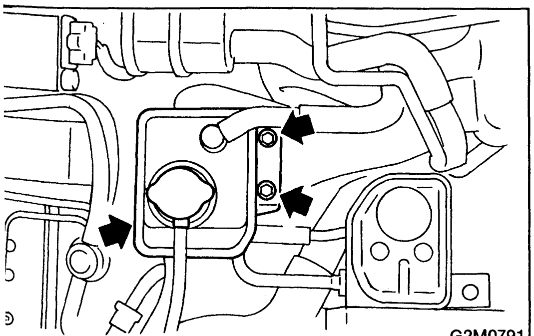


G2M0089

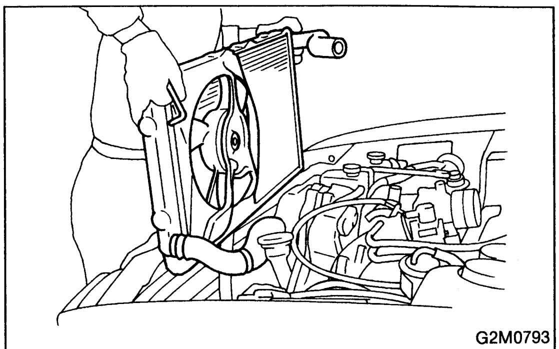
(3) Remove V-belt cover.


G2M0267

(4) Disconnect radiator inlet hose from radiator.


G2M0791

(5) Remove coolant filler tank.



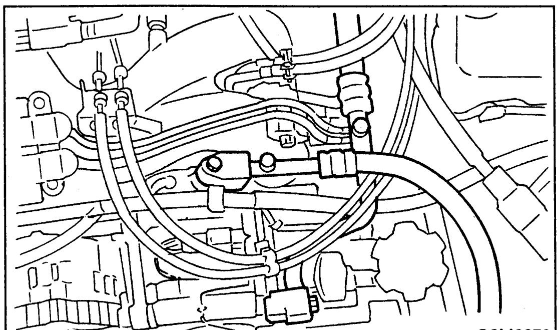
G2M0793

(6) Remove radiator upper bracket, and remove radiator assembly from vehicle.

8) Collect refrigerant, and remove pressure hoses. (With A/C)

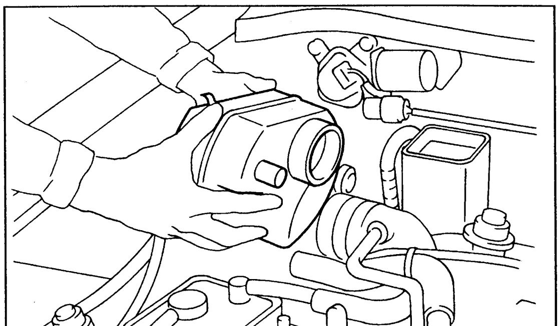
(1) Place and connect the attachment hose to the refrigerant recycle system.

(2) Collect refrigerant from A/C system.



G2M0270

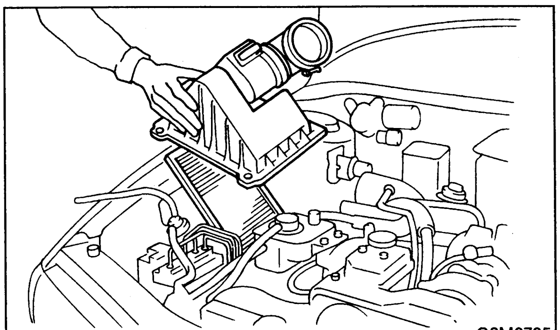
(3) Disconnect A/C pressure hoses from A/C compressor.



G2M0794

9) Remove air intake system.

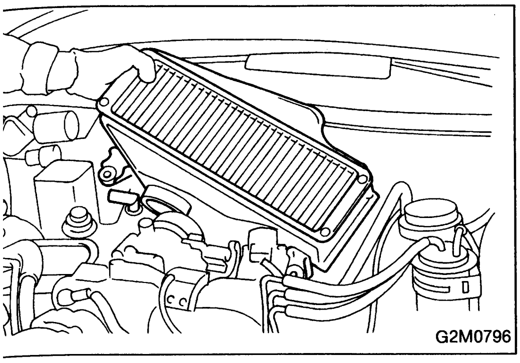
(1) Remove resonator chamber.



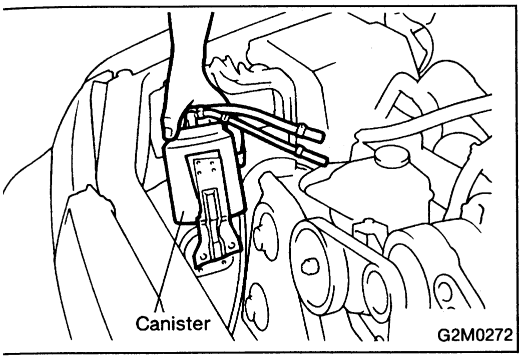
G2M0795

(2) Disconnect connector from mass air flow sensor.

(3) Remove air cleaner upper cover and air cleaner element.

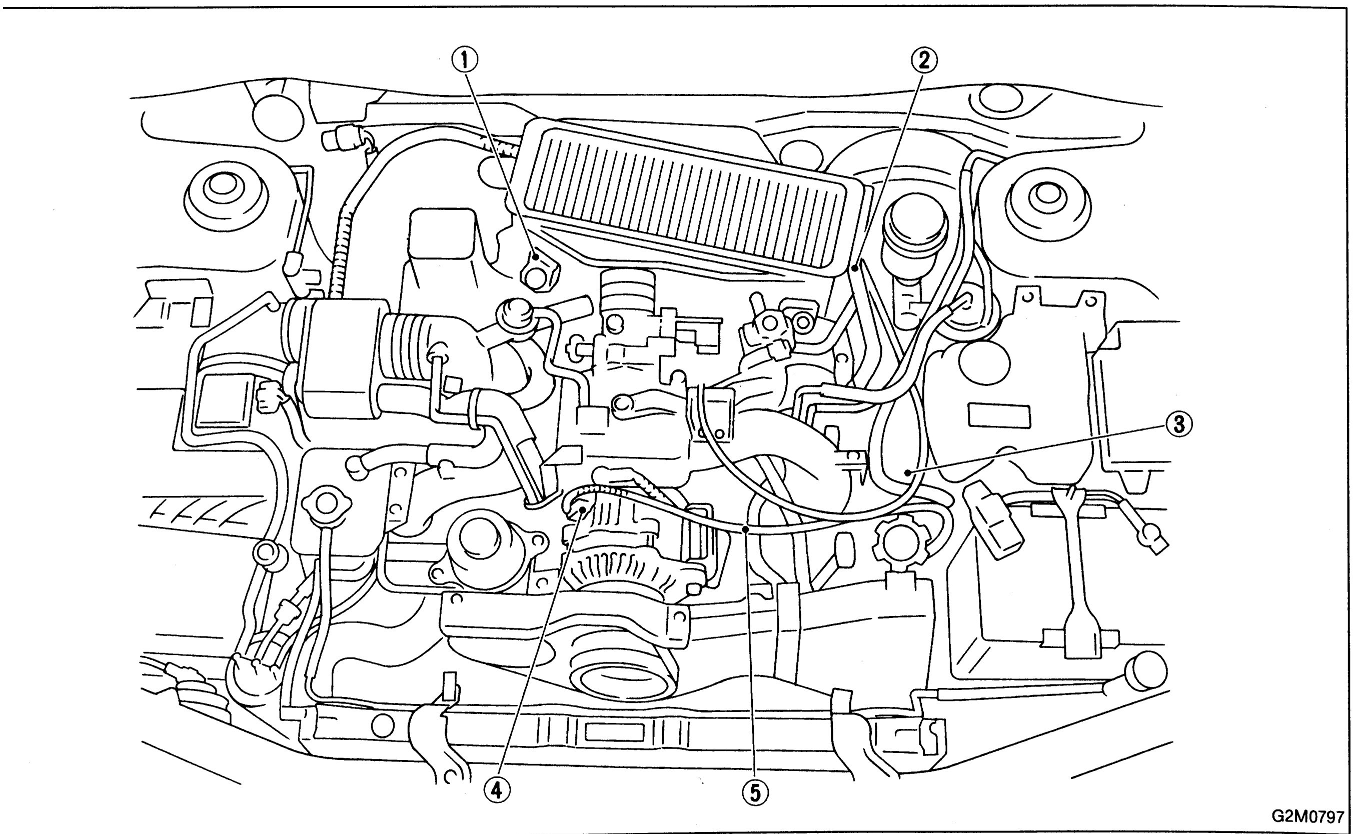


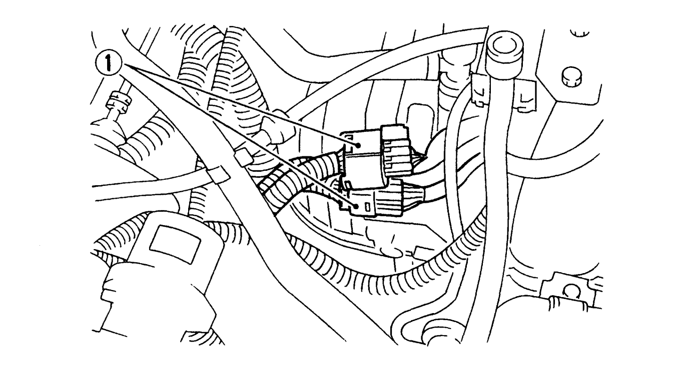
(4) Remove intercooler.



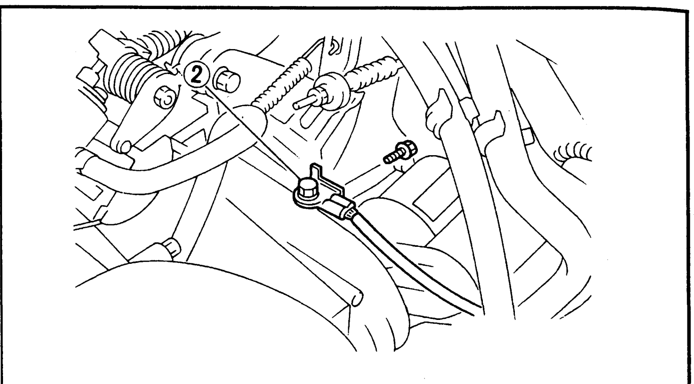
10) Remove canister and bracket.

11) Disconnect connectors, cables and hoses.
(1) Disconnect the following connectors.
① Engine harness connectors
② Engine ground terminal
③ Battery ground harness
④ Alternator connector and terminal
⑤ A/C compressor connectors (With A/C)

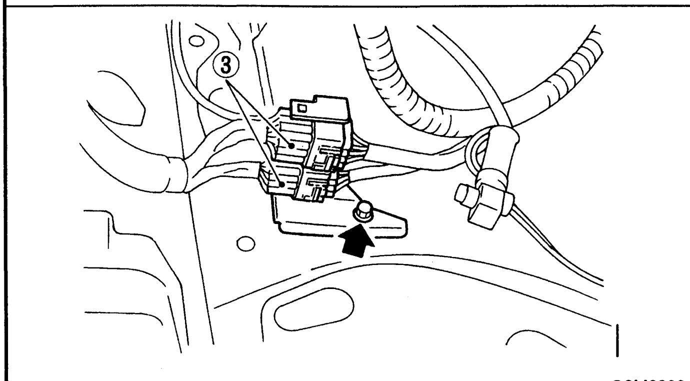




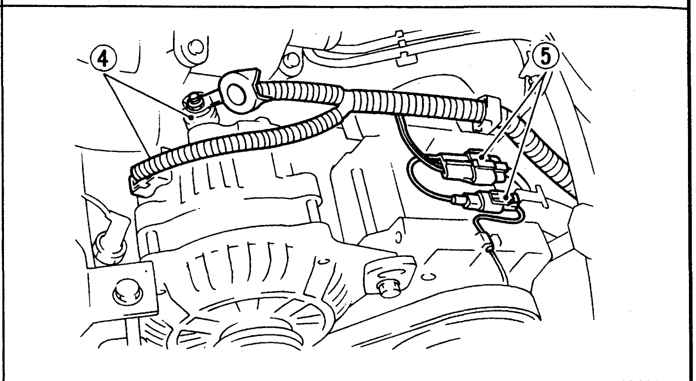
G2M0798



G2M0799



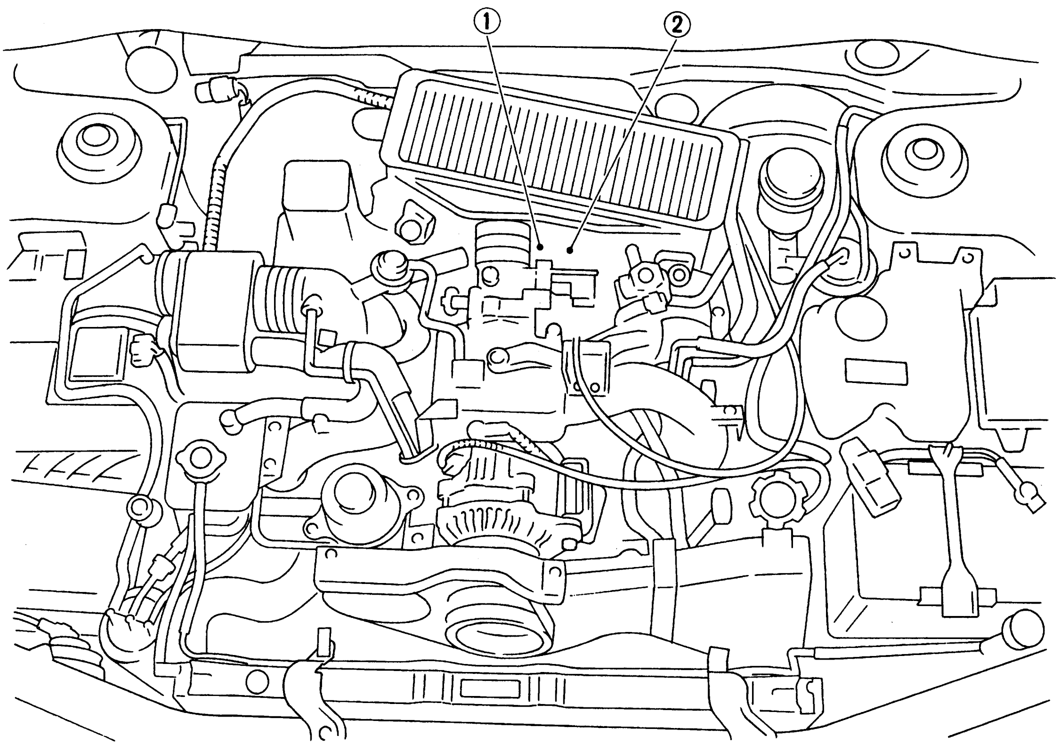
G2M0800



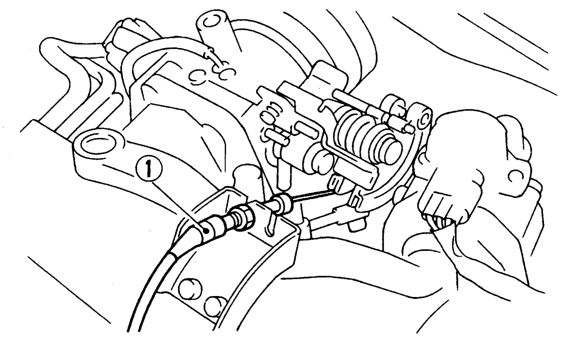
G2M0801

CAUTION:
When disconnecting battery ground harness ③, remove bracket.

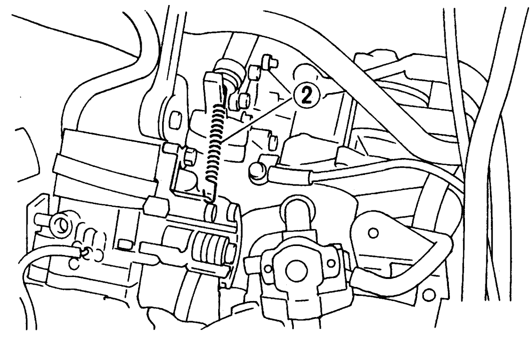
(2) Disconnect the following cables.
① Accelerator cable
② Clutch release spring



G2M0802

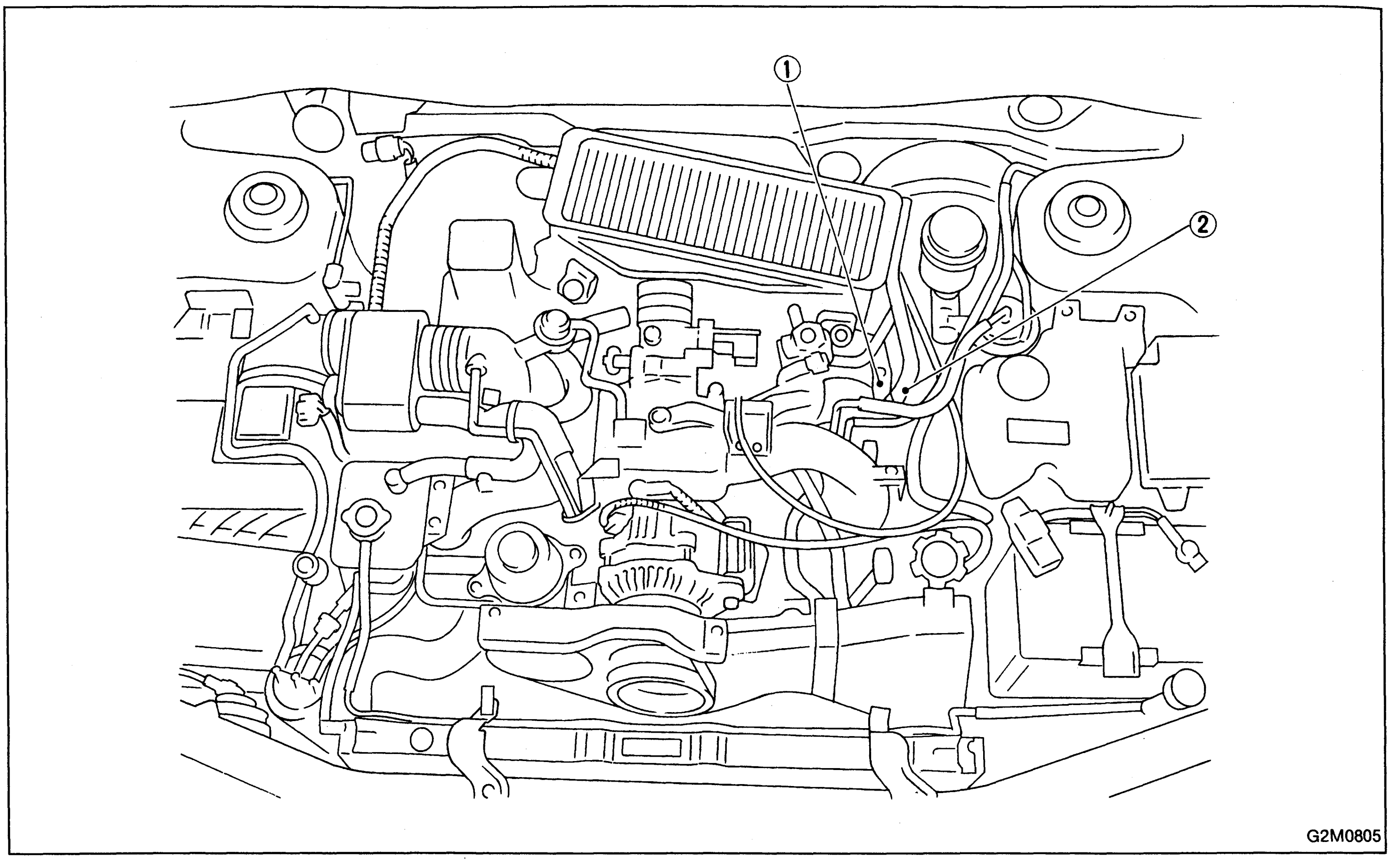


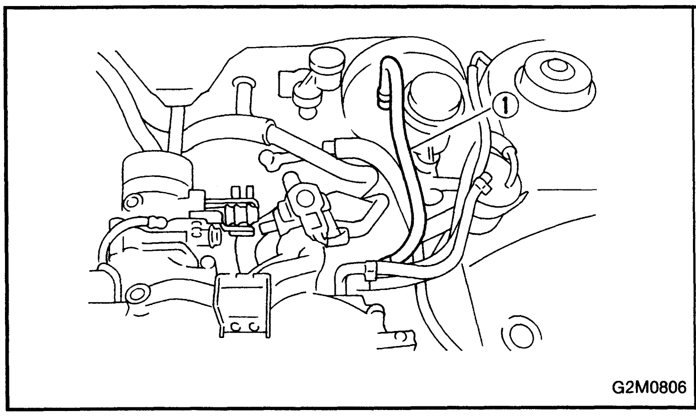
G2M0803

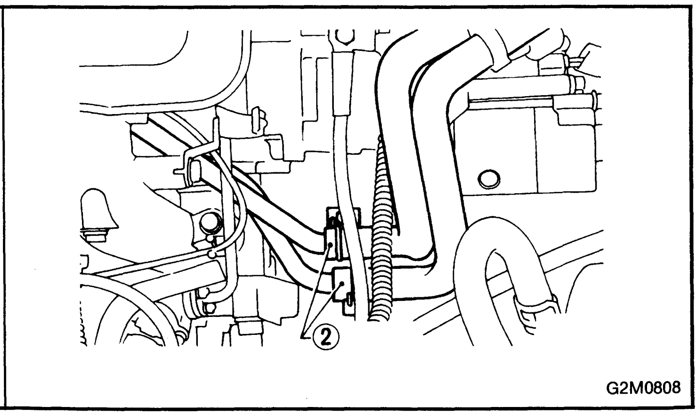


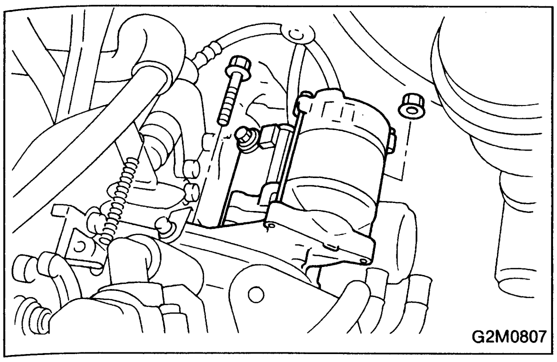
G2M0804

(3) Disconnect the following hoses.
① Brake booster vacuum hose
② Heater inlet and outlet hoses

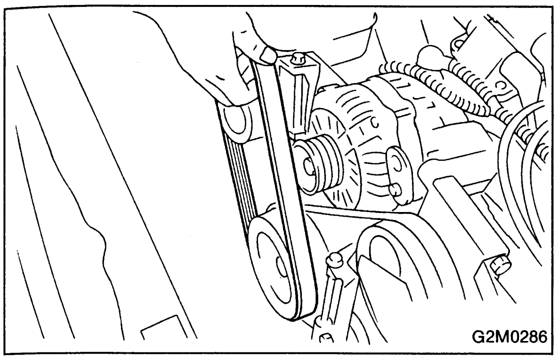






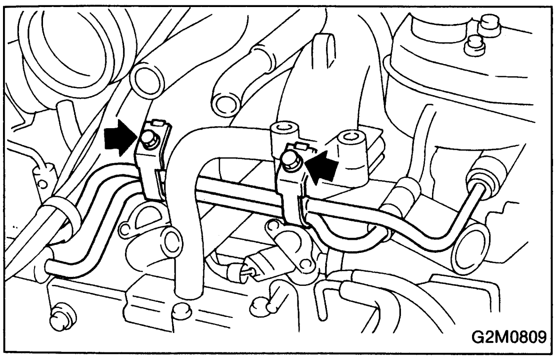


12) Remove starter.

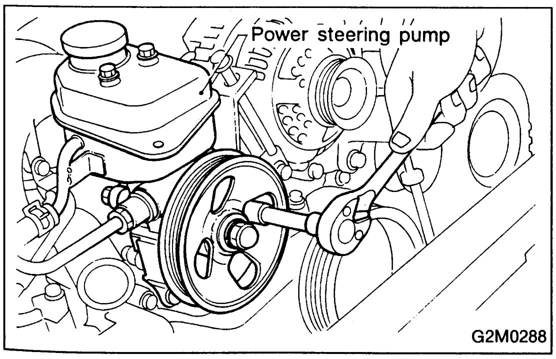


13) Remove power steering pump from bracket.

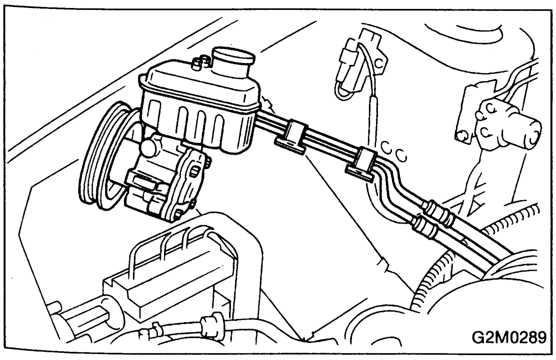
(1) Loosen lock bolt and slider bolt, and remove front side V-belt.



(2) Remove pipe with bracket from intake manifold.



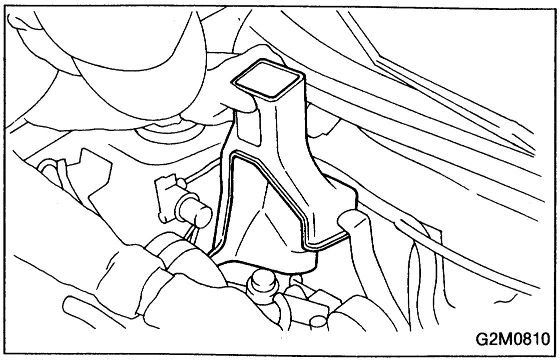
(3) Remove bolts which install power steering pump from bracket.



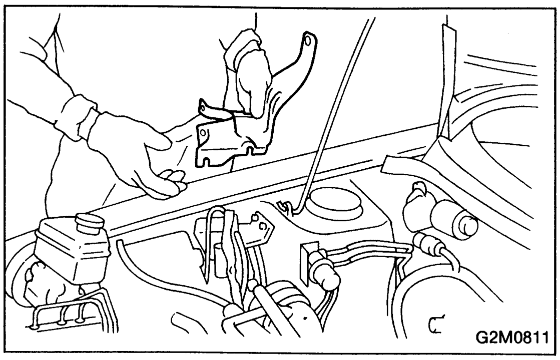
(4) Place power steering pump on the right side wheel apron.

14) Remove center exhaust pipe.

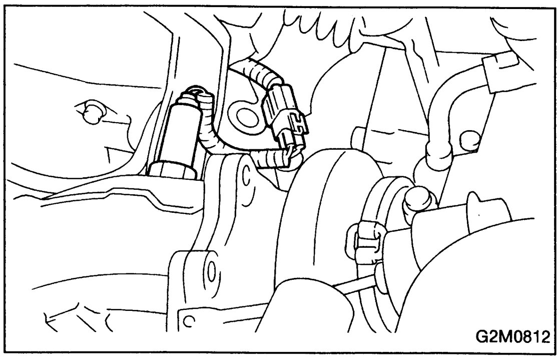
(1) Remove turbocharger cooling duct.


G2M0810

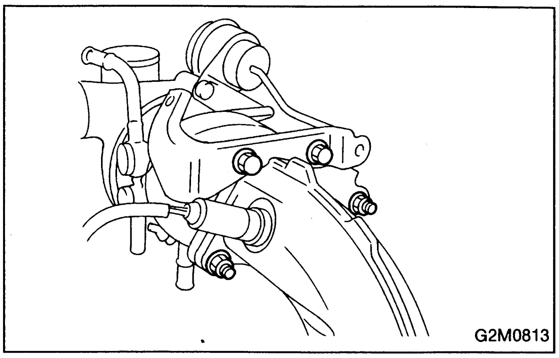
(2) Remove turbocharger lower cover.


G2M0811

(3) Disconnect connector from oxygen sensor.

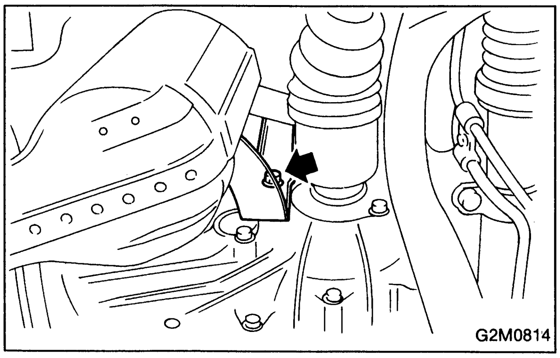

G2M0812

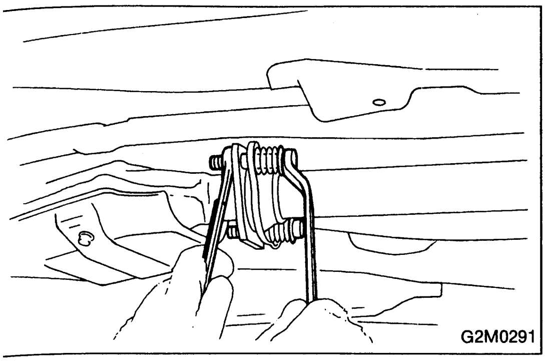
(4) Remove nuts and bolts which install center exhaust pipe to turbocharger.


G2M0813

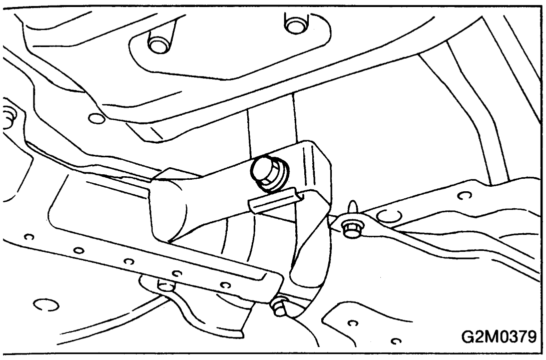
(5) Lift up the vehicle.

(6) Remove intercooler bracket.


G2M0814

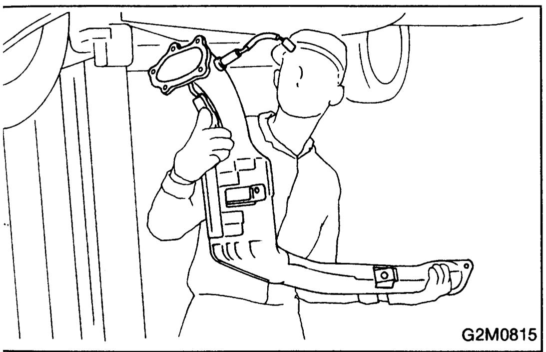

G2M0291

(7) Separate center exhaust pipe from rear exhaust pipe.

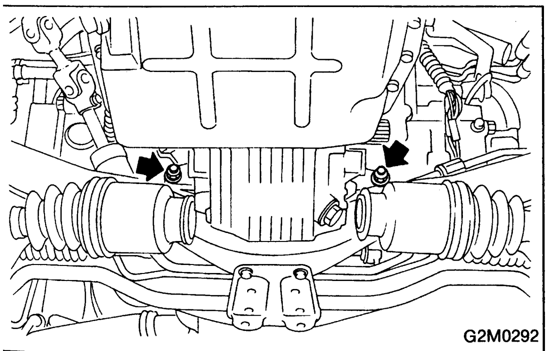

G2M0379

(8) Remove bolt which installs center exhaust pipe on hunger bracket.

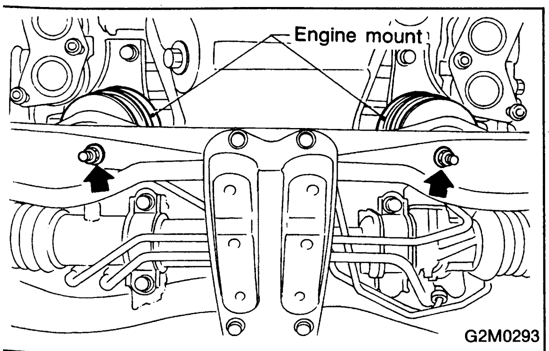
CAUTION:
Exhaust pipe will drop when all bolts are removed. So, hold it when removing the last bolt.


G2M0815

(9) Remove center exhaust pipe.

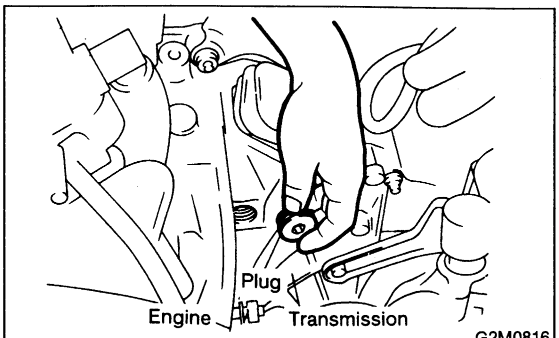

G2M0292

15) Remove nuts which hold lower side of transmission to engine.



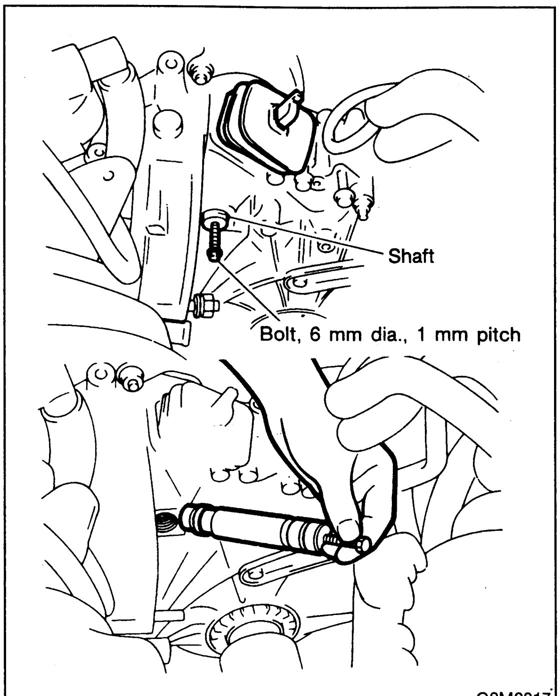
G2M0293

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



G2M0816

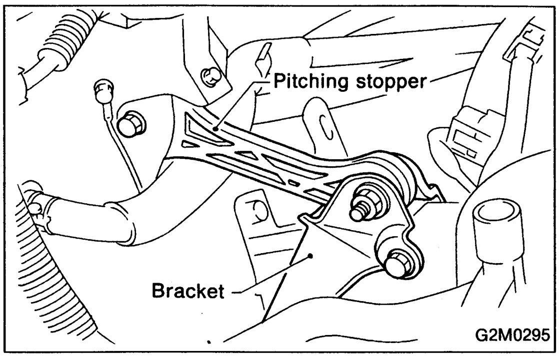
17) Separate clutch release fork from release bearing.
(1) Remove clutch operating cylinder from transmission.
(2) Remove plug using 10 mm hexagon wrench.



G2M0817

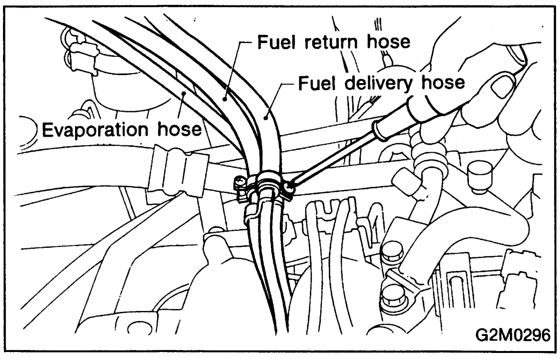
(3) Screw 6 mm dia. bolt into release fork shaft, and remove it.
(4) Raise release fork and unfasten release bearing tabs to free release fork.

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



G2M0295

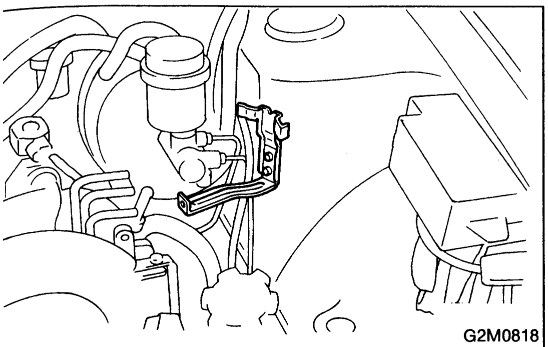
18) Remove pitching stopper.



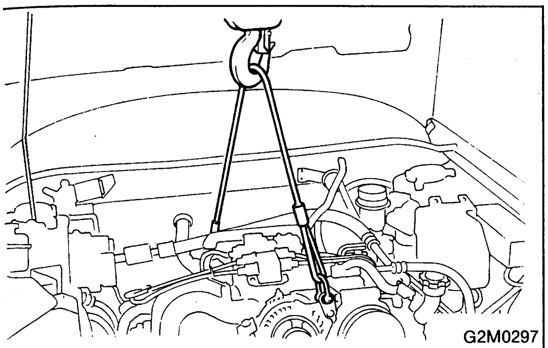
G2M0296

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

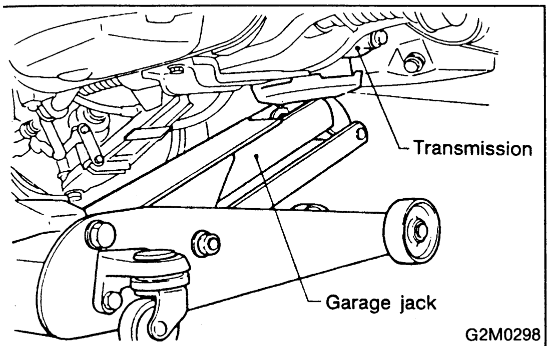
CAUTION:
Catch fuel from hose into container.


G2M0818

20) Remove fuel filter and bracket.


G2M0297

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

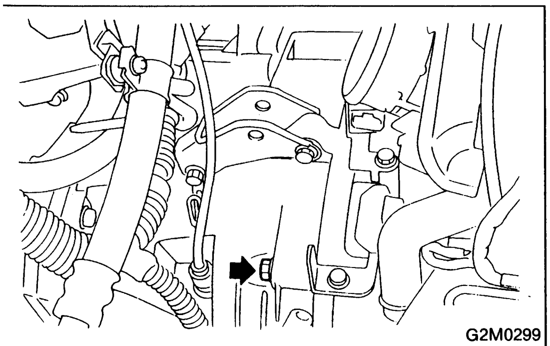


G2M0298

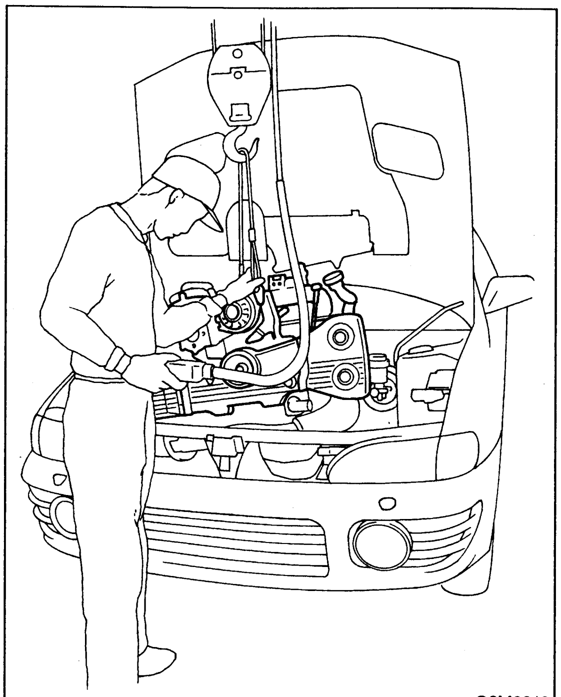
22) Support transmission with a garage jack.

CAUTION:

Before moving 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.


G2M0299

23) Remove bolt which holds right upper side of transmission to engine.


G2M0819

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

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

B: INSTALLATION

1. Install clutch release fork and bearing onto transmission.

↓

2. Install engine to transmission.

↓

3. Tighten bolts which hold upper side of transmission to engine.

↓

4. Remove lifting device and wire rope.
5. Remove garage jack.

↓

6. Install pitching stopper.

↓

7. Install starter.

↓

8. Install fuel filter and bracket.

↓

9. Install canister and bracket.
0. Install power steering pump on bracket.

↓

1. Tighten nuts which hold lower side of transmission to engine.
2. Tighten nuts which install front cushion rubber onto crossmember.

↓

3. Install center exhaust pipe.

↓

4. Connect hoses, connectors and cables.

↓

5. Install air intake system.

↓

ith A/C

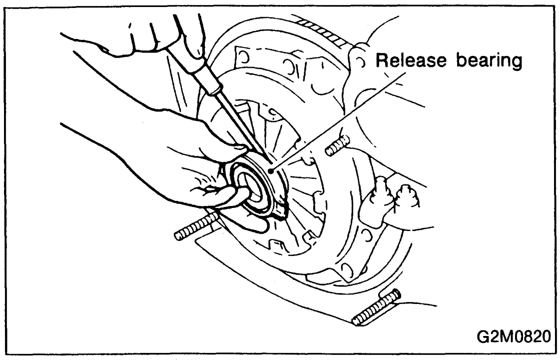
6. Install A/C pressure hoses.

↓

7. Install cooling system.

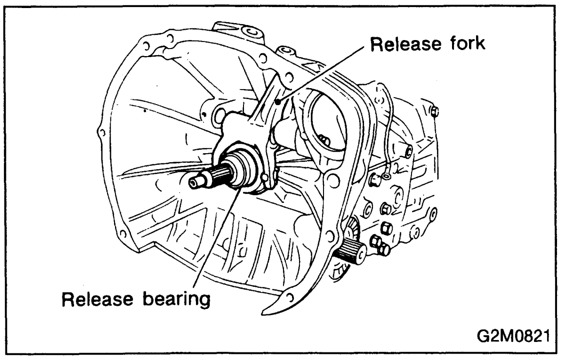
↓

8. Install window washer tank.
9. Install battery onto the vehicle, and connect cables.
0. Fill coolant.
1. Charge A/C system with refrigerant.
2. Remove front hood stay, and close front hood.
3. Remove the vehicle from lift arms.



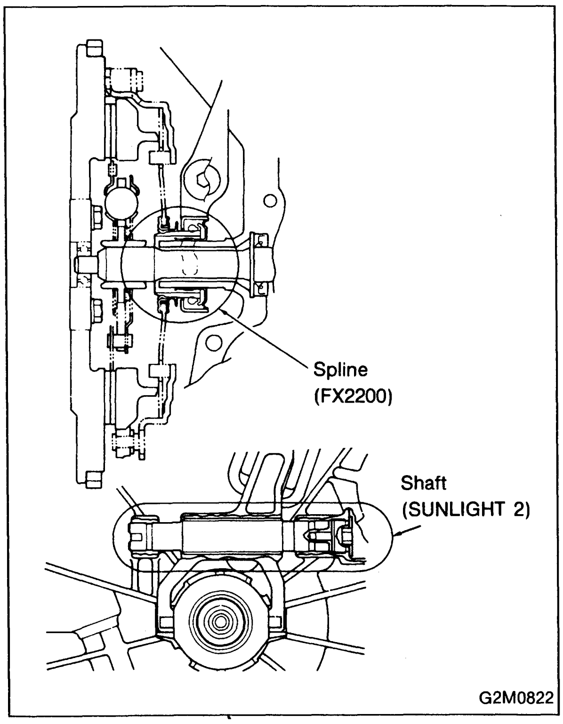
1) Install clutch release fork and bearing onto transmission.

(1) Remove release bearing from clutch cover with flat type screw driver.



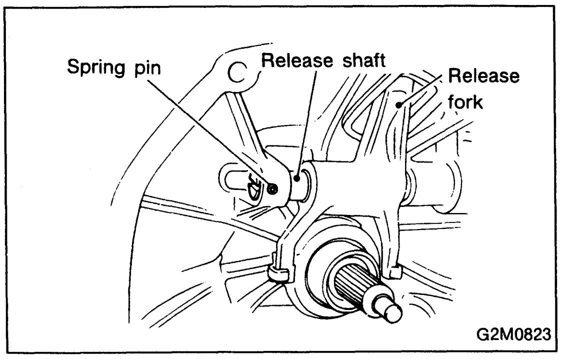
(2) Install release bearing on transmission.

(3) Insert release fork into release bearing tab.



(4) Apply grease to specified points:

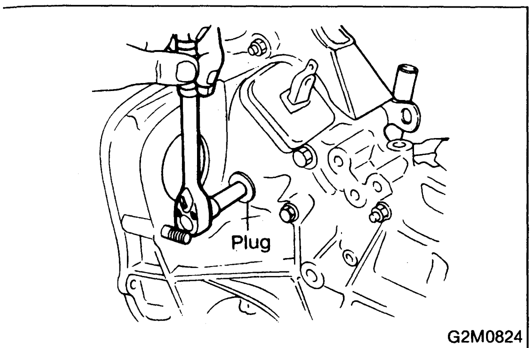
- Spline FX2200
- Shaft SUNLIGHT 2



(5) Insert release fork shaft into release fork.

CAUTION:

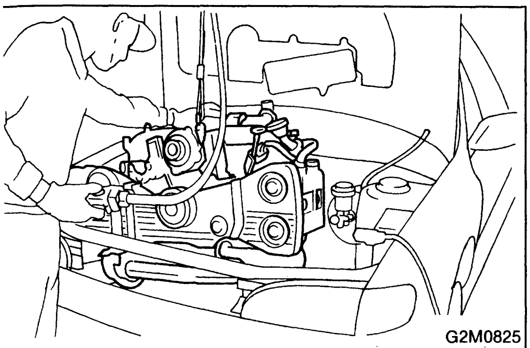
Make sure the cutout portion of release fork shaft contacts spring pin.



G2M0824

(6) Tighten plug.

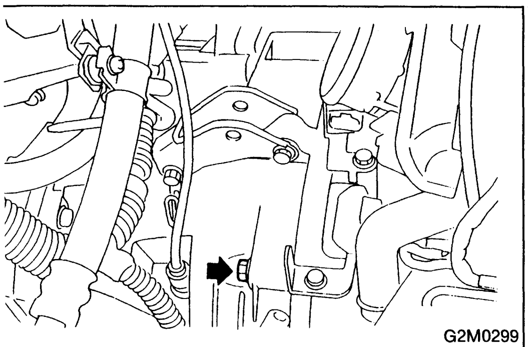
Tightening torque:
39 — 49 N·m (4.0 — 5.0 kg-m, 29 — 36 ft-lb)


G2M0825

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

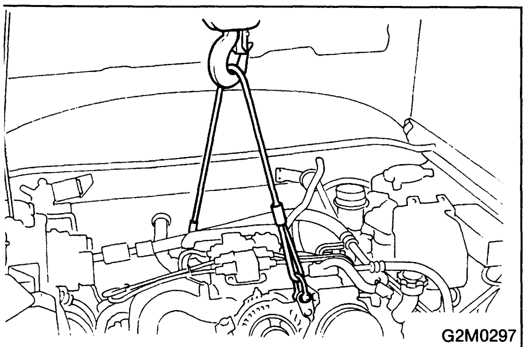
CAUTION:
Be careful not to damage adjacent parts or body panels with crank pulley, oil pressure gauge, etc.

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

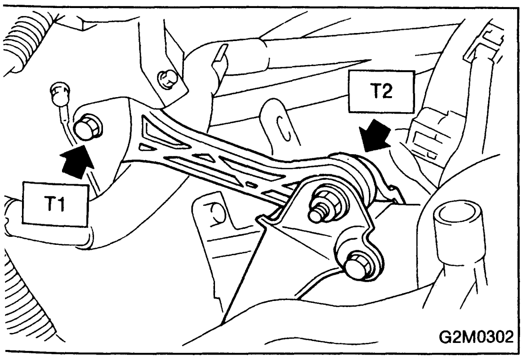

G2M0299

3) Tighten bolt which hold right upper side of transmission to engine.

Tightening torque:
46 — 54 N·m (4.7 — 5.5 kg-m, 34 — 40 ft-lb)


G2M0297

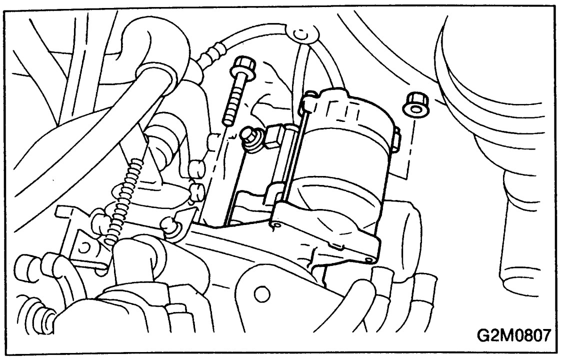
4) Remove lifting device and wire ropes.
5) Remove garage jack.



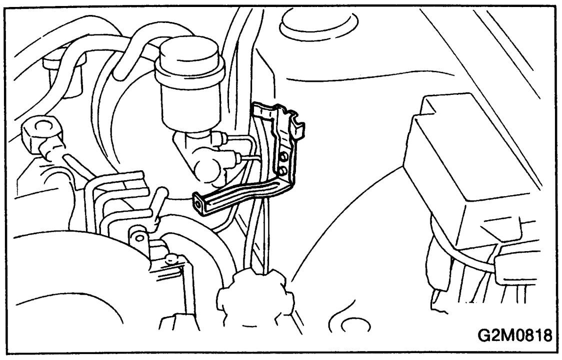
G2M0302

6) Install pitching stopper.

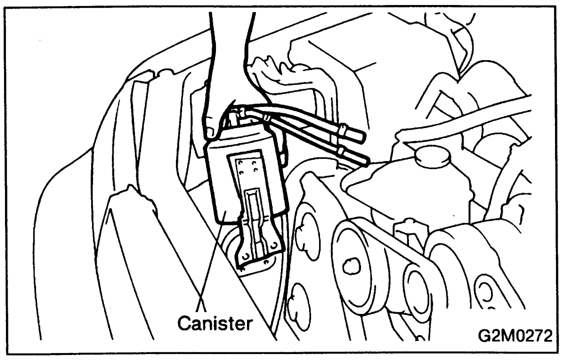
Tightening torque:
T1: 44 — 54 N·m (4.5 — 5.5 kg-m, 33 — 40 ft-lb)
T2: 47 — 67 N·m (4.8 — 6.8 kg-m, 35 — 49 ft-lb)


G2M0807

7) Install starter.


G2M0818

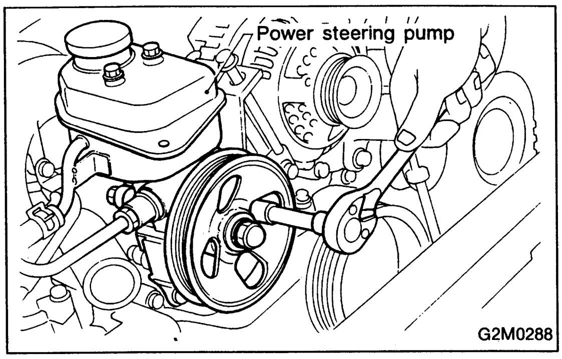
8) Install fuel filter and bracket.



G2M0272

9) Install canister and bracket.

CAUTION:
Insert air vent hose of canister into the hole on body.

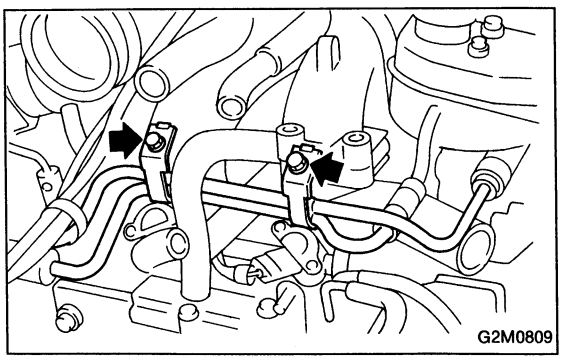


G2M0288

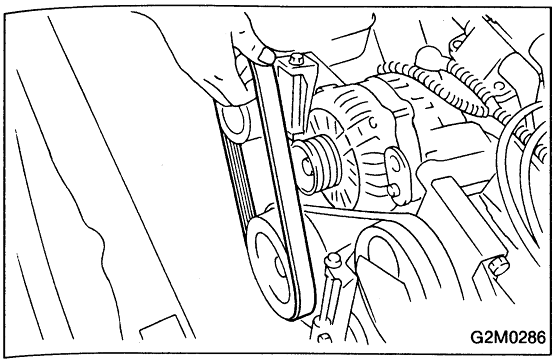
10) Install power steering pump on bracket.

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

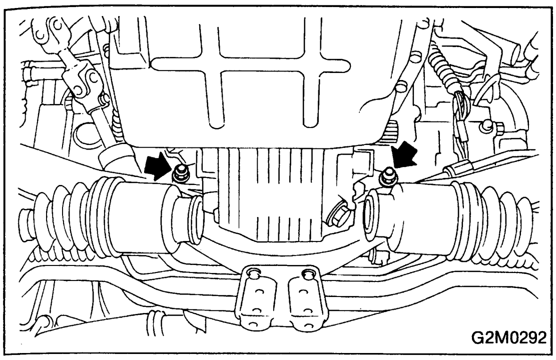
Tightening torque:
29 — 49 N·m (3 — 5 kg-m, 22 — 36 ft-lb)


G2M0809

(2) Install power steering pipe bracket on right side intake manifold, and install spark plug codes.

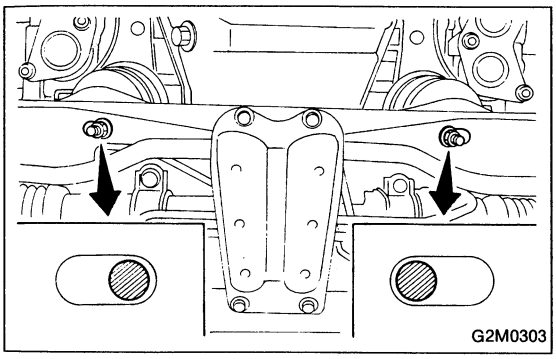


(3) Install front side V-belt, and adjust it.
<Ref. to 1-5 [W1A0].>



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

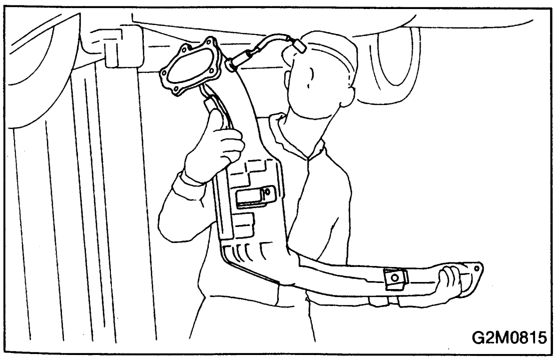
Tightening torque:
46 — 54 N·m (4.7 — 5.5 kg-m, 34 — 40 ft-lb)



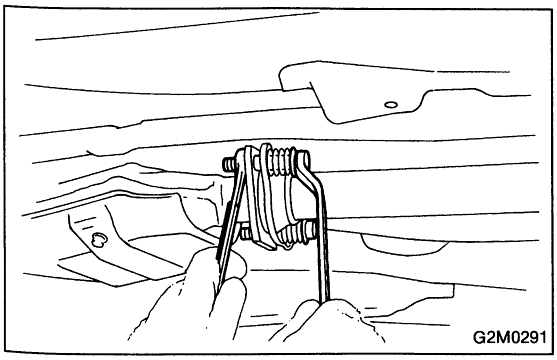
12) Tighten nuts which install front cushion rubber onto crossmember.

Tightening torque:
54 — 83 N·m (5.5 — 8.5 kg-m, 40 — 61 ft-lb)

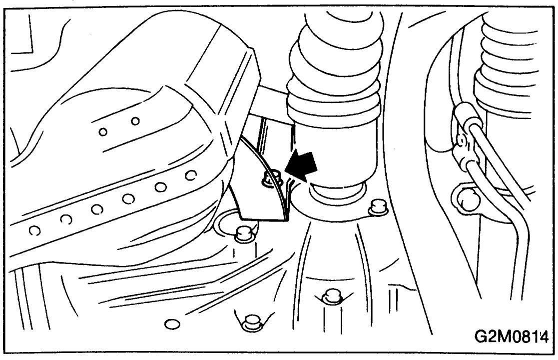
CAUTION:
Be sure to tighten front cushion rubber mounting bolts in the innermost elliptical hole in the front crossmember.



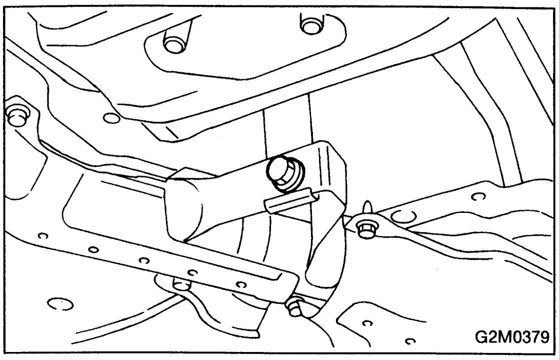
13) Install center exhaust pipe.
(1) Place center exhaust pipe on vehicle.



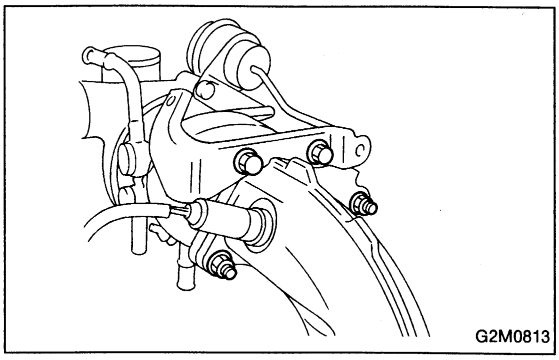
(2) Install center exhaust pipe to rear exhaust pipe.



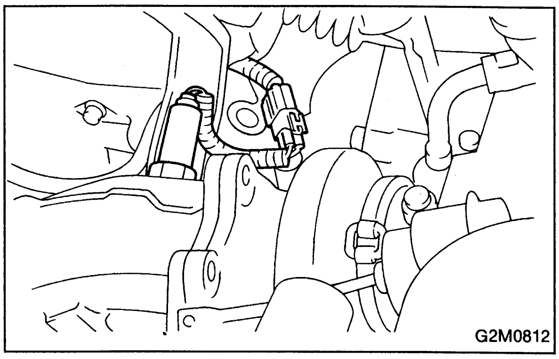
(3) Install intercooler bracket.



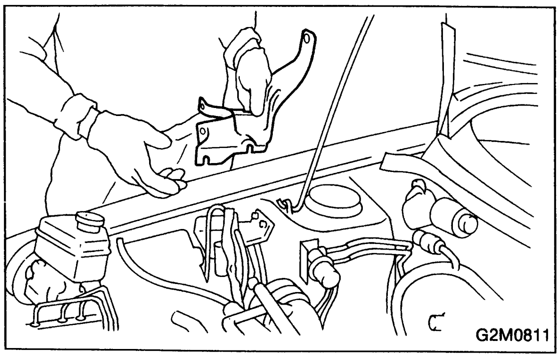
(4) Install bolt which installs center exhaust pipe to hanger bracket.



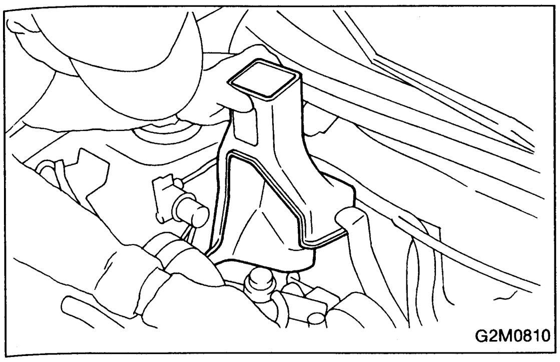
(5) Lower the vehicle.
(6) Install nuts and bolts which install center exhaust pipe to turbocharger.



(7) Attach connector to oxygen sensor.



(8) Install turbocharger lower cover.


G2M0810

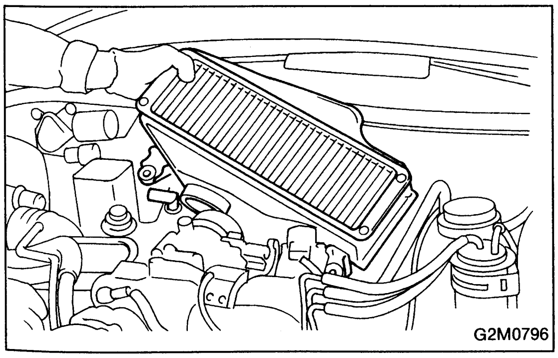
(9) Install turbocharger cooling duct.

14) Connect hoses, connectors and cables.
(1) Connect the following hoses.
- Fuel delivery hose, return hose and evaporation hose
- Heater inlet and outlet hoses
- Brake booster vacuum hose

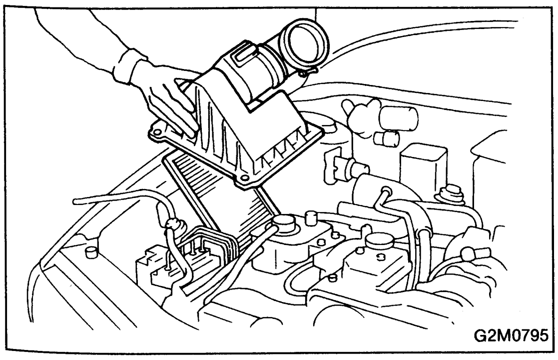
(2) Connect the following connectors and terminals.
- Engine ground terminal
- Engine harness connectors
- Alternator connector and terminal
- A/C compressor connectors (With A/C)

(3) Connect the following cables.
- Accelerator cable
- Clutch release spring

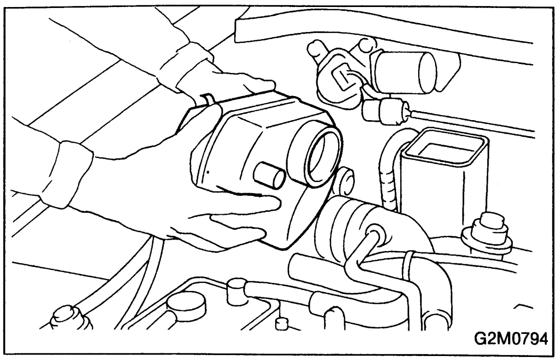
CAUTION:
After connecting each cable, adjust them.


G2M0796

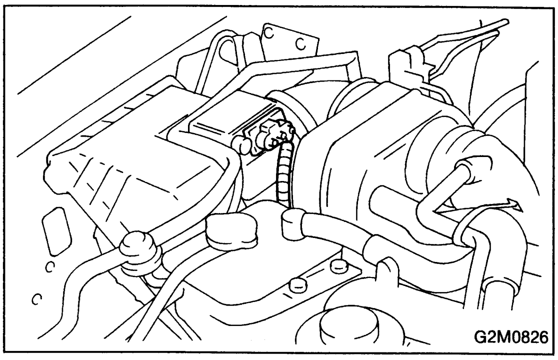
15) Install air intake system.
(1) Install intercooler.


G2M0795

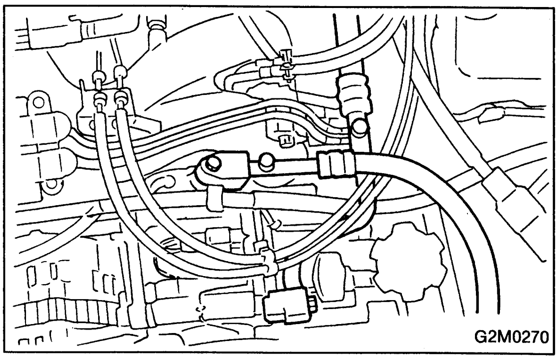
(2) Install air cleaner element and air cleaner upper cover.


G2M0794

(3) Install resonator chamber.


G2M0826

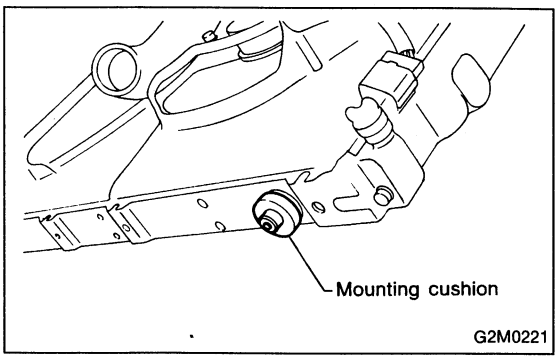
(4) Connect connector to mass air flow sensor.


G2M0270

16) Install A/C pressure hoses. (With A/C)

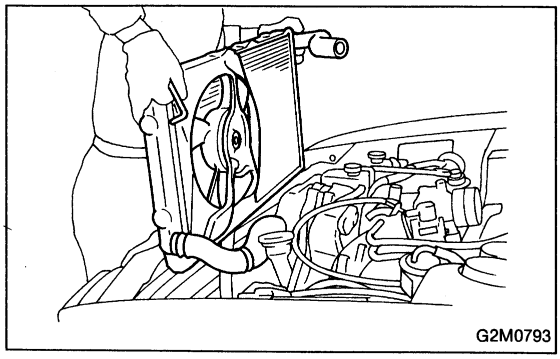
CAUTION:
Use new O-rings.

Tightening torque:
18 — 31 N·m (1.8 — 3.2 kg-m, 13 — 23 ft-lb)

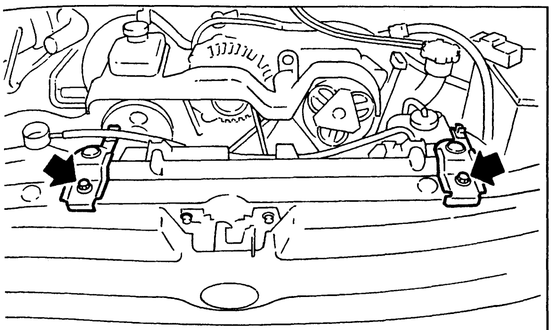


G2M0221

17) Install cooling system.
(1) Attach radiator mounting cushions to pins on lower side of radiator.


G2M0793

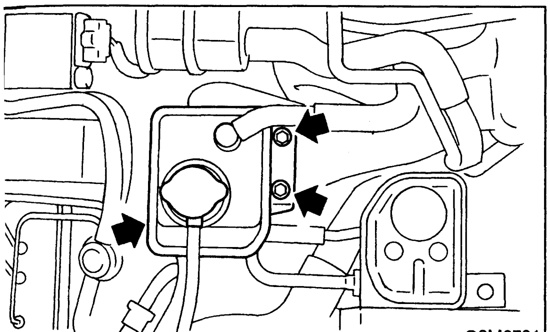
(2) Fit cushions on lower side of radiator, into holes on body side and install radiator.



G2M0218

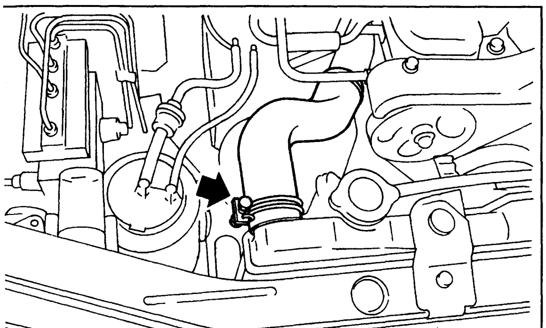
(3) Install radiator brackets and tighten bolts.

Tightening torque:
12.3 — 15.2 N·m
(1.25 — 1.55 kg-m, 9.0 — 11.2 ft-lb)



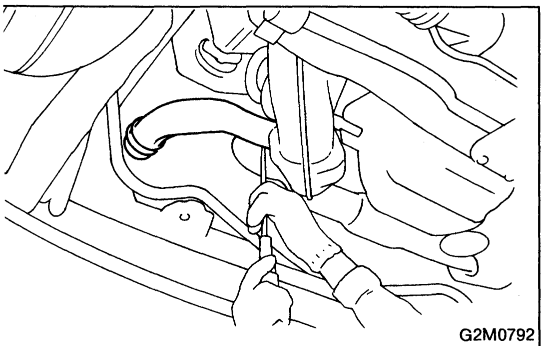
G2M0791

(4) Install coolant filler tank.



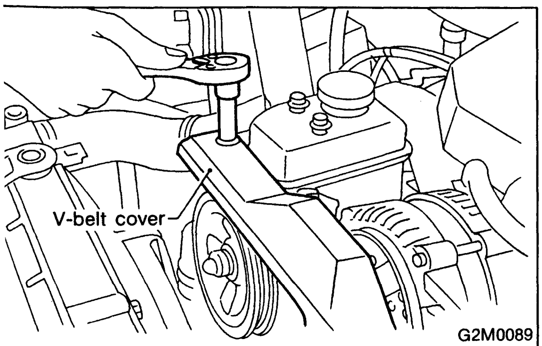
G2M0267

(5) Connect radiator inlet hose.



G2M0792

(6) Connect radiator outlet hose.
(7) Connect radiator fan motor connector.



G2M0089

(8) Install V-belt cover.

18) Install window washer tank.
19) Install battery in the vehicle, and connect cables.
20) Fill coolant.
21) Charge A/C system with refrigerant.
<Ref. to 4-7 [W700].>
22) Remove front hood stay, and close front hood.
23) Remove the vehicle from lift arms.

3. Transmission

A: REMOVAL

1. Open front hood fully, and support it with stay.
2. Disconnect battery ground terminal.

↓

3. Remove air intake system.

↓

4. Disconnect connectors and cables.

↓

5. Remove starter.

↓

6. Remove operating cylinder.
7. Remove clutch damper.

↓

8. Remove pitching stopper.

↓

9. Remove transmission connector bracket.

↓

10. Remove exhaust system.

↓

11. Remove propeller shaft.

↓

12. Remove gear shift rod and stay from transmission.

↓

13. Set special tools.

↓

14. Remove bolt which holds right upper side of transmission to engine.

↓

15. Remove bolts which install stabilizer clamp onto crossmember.

↓

16. Remove front drive shaft from transmission.

↓

17. Remove nuts which hold lower side of transmission to engine.

↓

18. Place transmission jack under transmission.

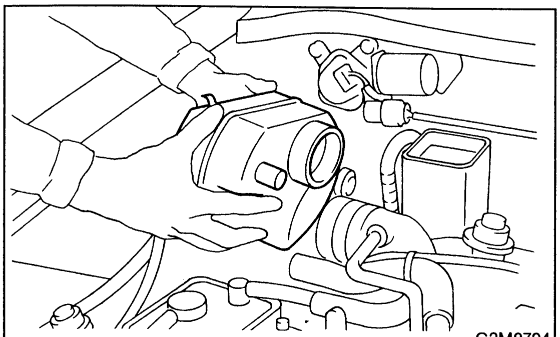
↓

19. Remove transmission rear crossmember.

↓

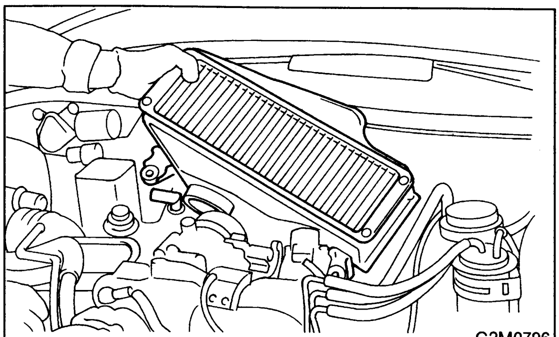
20. Remove transmission.

1) Open front hood fully, and support with stay.
2) Disconnect battery ground terminal.



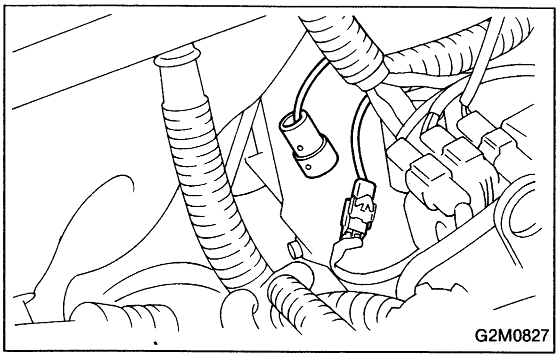
G2M0794

3) Remove air intake system.
   (1) Remove resonator chamber.



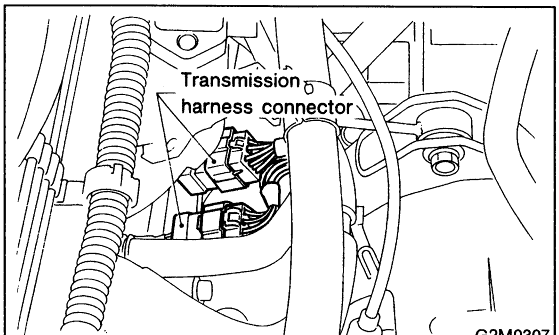
G2M0796

   (2) Remove intercooler.



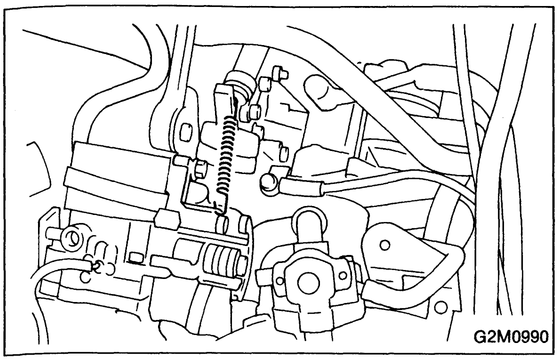
G2M0827

4) Disconnect connectors and cables.
   (1) Disconnect the following connectors.
   - Vehicle speed sensor 2

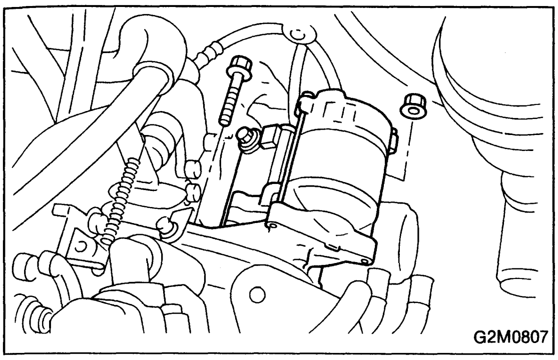


G2M0307

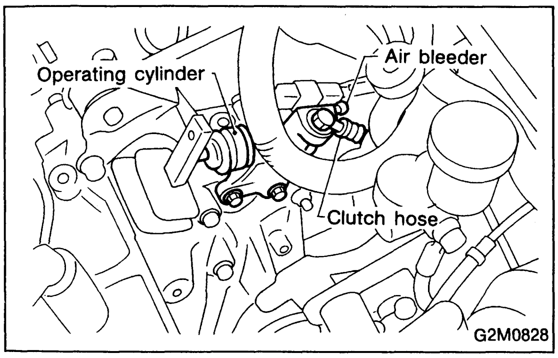
   - Transmission harness connector
   - Transmission ground terminal



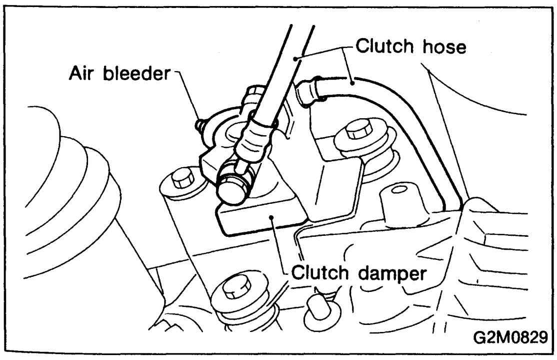
(2) Disconnect the following cable.
- Clutch release spring



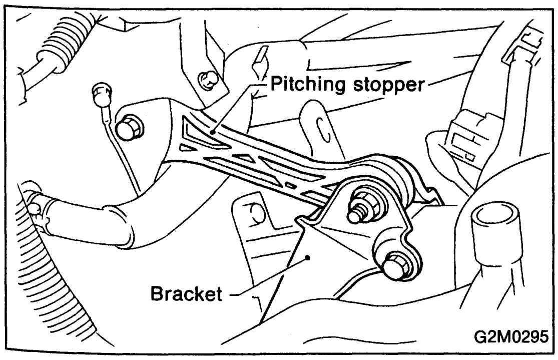
5) Remove starter.
(1) Disconnect connectors and terminal from starter.
(2) Remove bolt which installs upper side of starter.
(3) Remove nut which installs lower side of starter, and remove starter from transmission.



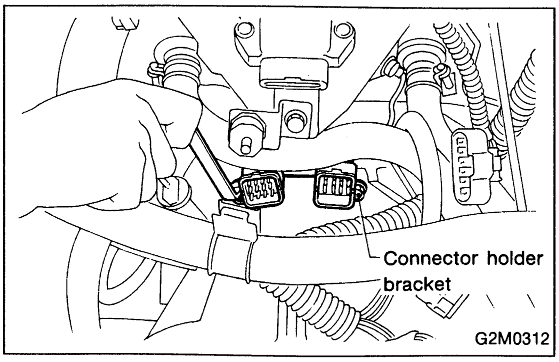
6) Remove operating cylinder.



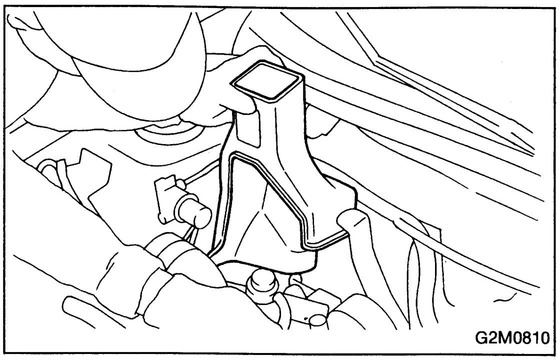
7) Remove clutch damper.



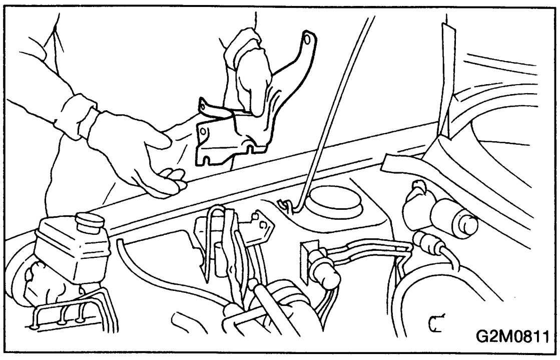
8) Remove pitching stopper.



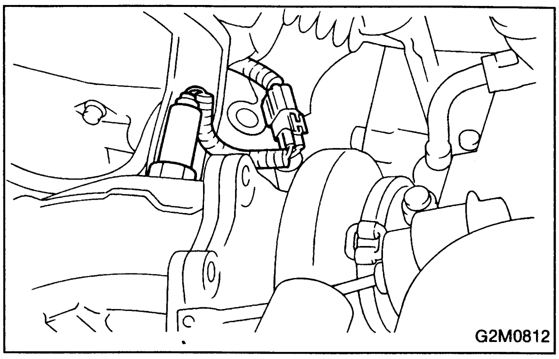
9) Remove transmission connector holder bracket.



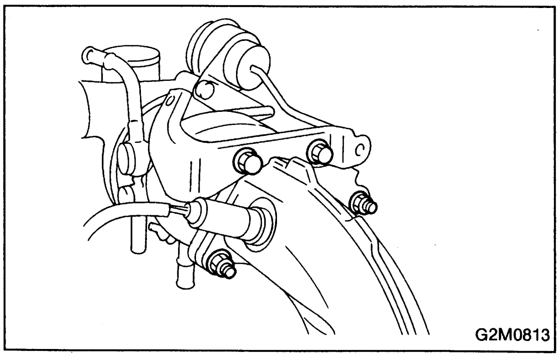
10) Remove exhaust system.
   (1) Remove turbocharger cooling duct.



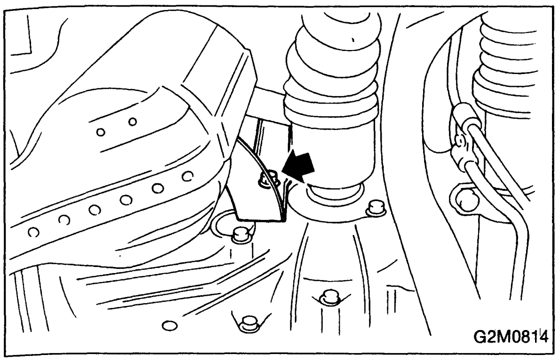
   (2) Remove turbocharger lower cover.



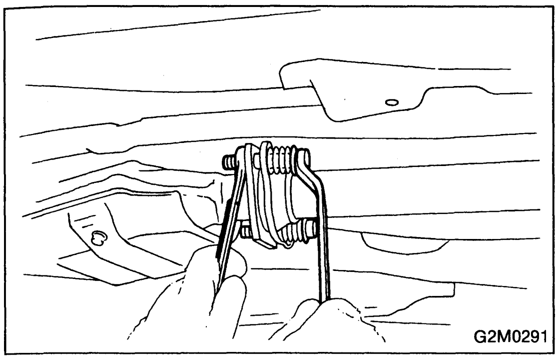
   (3) Disconnect connector from oxygen sensor.



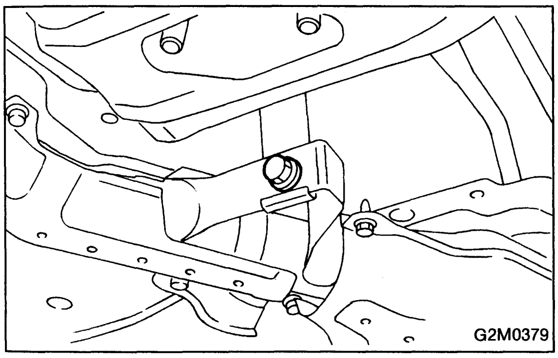
   (4) Remove nuts and bolts which install center exhaust pipe to turbocharger.



(5) Lift up the vehicle.
(6) Remove intercooler bracket.

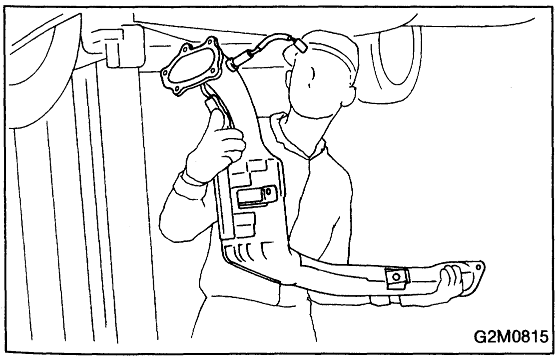


(7) Separate center exhaust pipe from rear exhaust pipe.

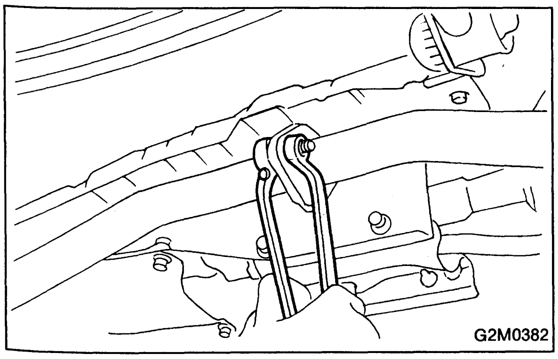


(8) Remove bolt which installs center exhaust pipe on hunger bracket.

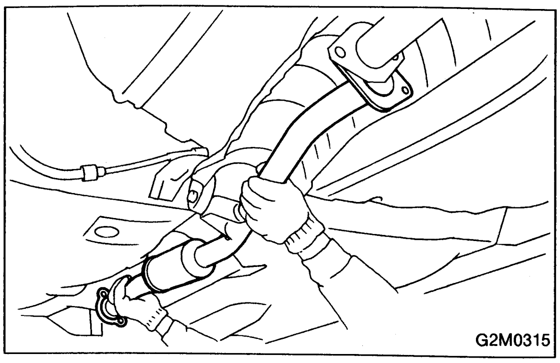
CAUTION:
Exhaust pipe will drop when all bolts are removed. So, hold it when removing the last bolt.



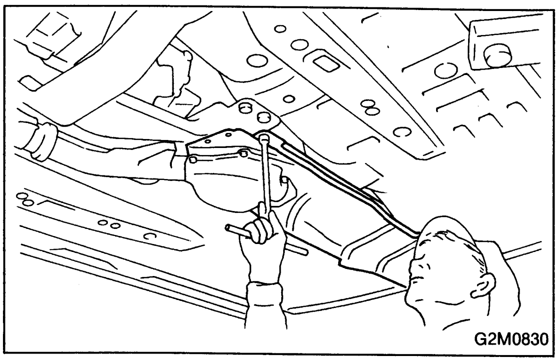
(9) Remove center exhaust pipe.



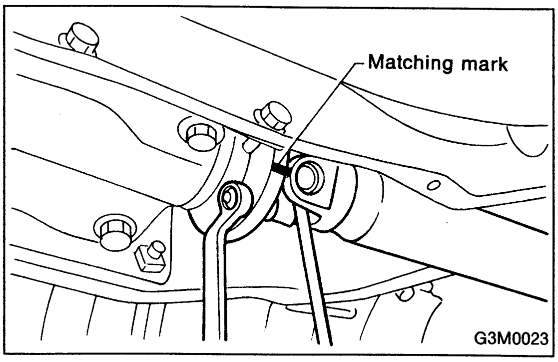
(10) Separate rear exhaust pipe from muffler.



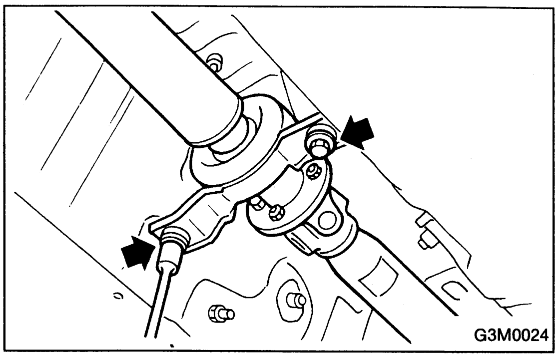
(11) Remove rear exhaust pipe.



11) Remove propeller shaft.
(1) Remove heat shield cover.



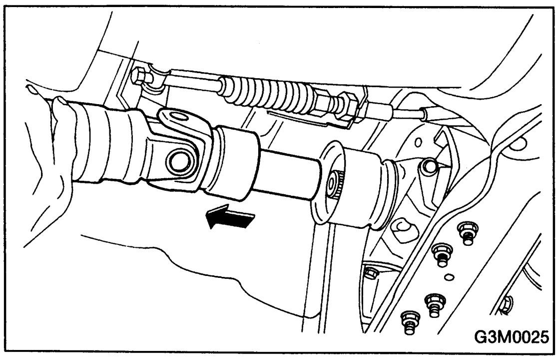
(2) Remove front cover of rear differential mount.
(3) Separate propeller shaft from rear differential.



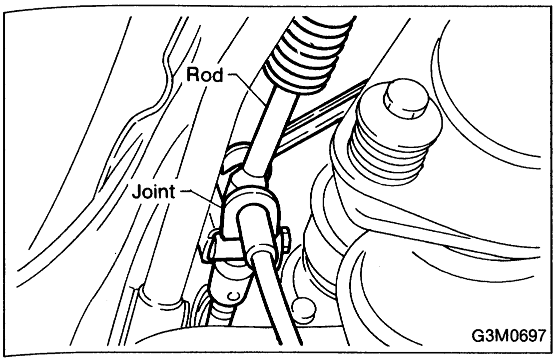
(4) Remove bolts which hold center bearing onto body.

CAUTION:
Be careful not to drop propeller shaft.

(5) Remove propeller shaft from transmission.

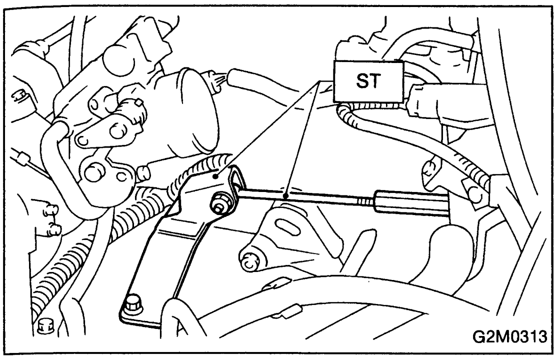


CAUTION:
- **Be sure to use an empty container to catch oil flowing out when removing propeller shaft.**
- **Be sure not to damage oil seals and the frictional surface of sleeve yoke.**
- **Be sure to plug the opening in transmission after removal of propeller shaft.**



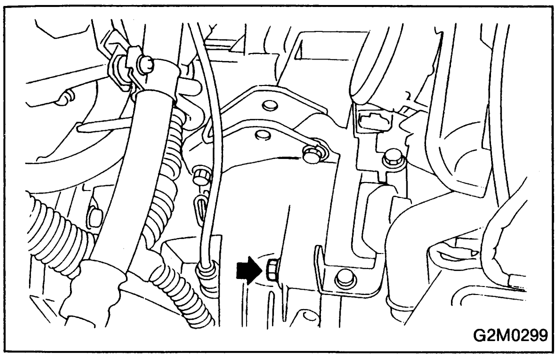
G3M0697

12) Remove gear shift rod and stay from transmission.
(1) Remove spring.
(2) Disconnect stay from transmission.
(3) Disconnect rod from transmission.

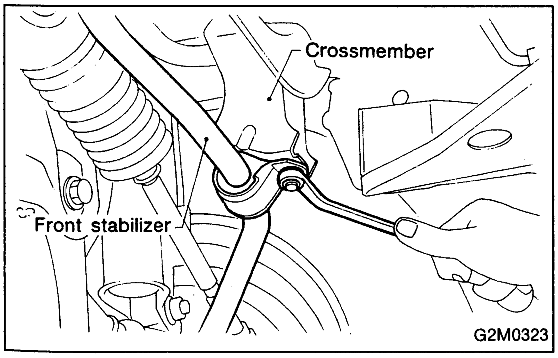


G2M0313

13) Lower the vehicle, and set special tool.
ST 41099AA000 ENGINE SUPPORT
NOTE:
Also is available Part No. 927670000.

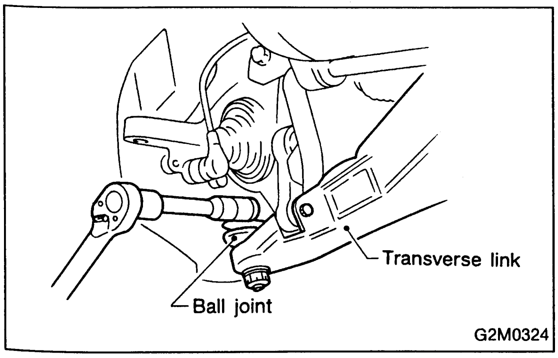

G2M0299

14) Remove bolt which holds right upper side of transmission to engine.



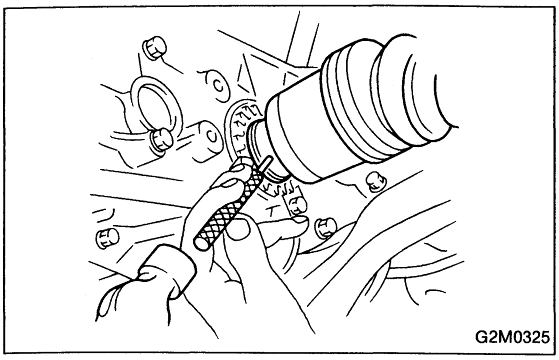
G2M0323

15) Remove bolts which install stabilizer clamp onto crossmember.



G2M0324

16) Remove front drive shaft from transmission.
(1) Remove transverse link from housing.
(2) Lower transverse link.

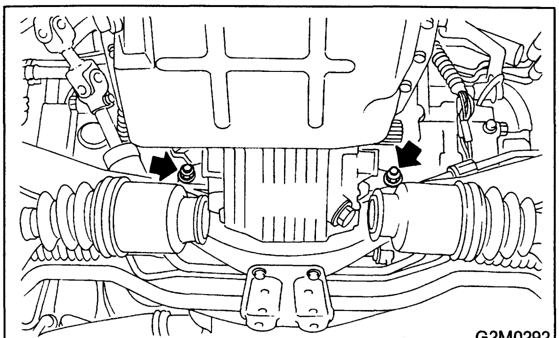


G2M0325

(3) Remove spring pin and separate front drive shaft from each side of the transmission.

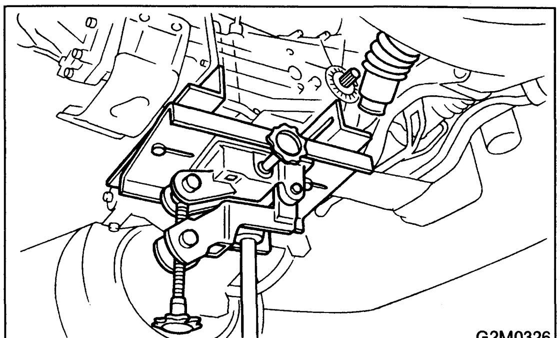
CAUTION:

Discard removing spring pin. Replace with a new one.



G2M0292

17) Remove nuts which hold lower side of transmission to engine.

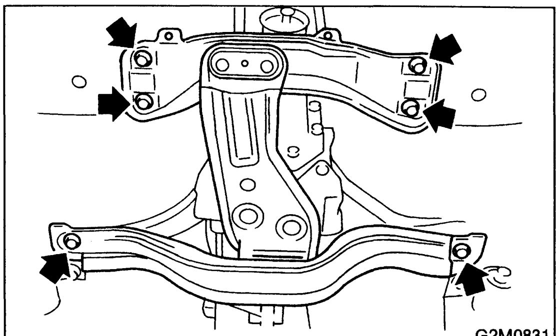


G2M0326

18) Place transmission jack under transmission.

CAUTION:

Always support transmission case with a transmission jack.



G2M0831

19) Remove transmission rear crossmember.

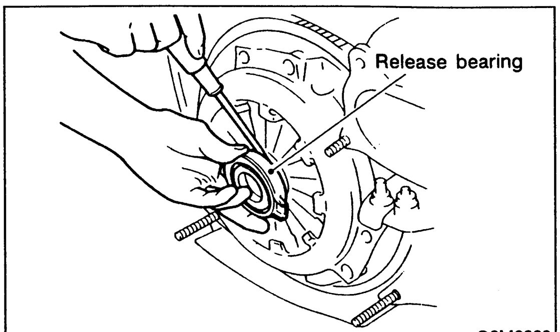
20) Remove transmission.

CAUTION:

Move transmission jack toward rear until mainshaft is withdrawn from clutch cover.

B: INSTALLATION

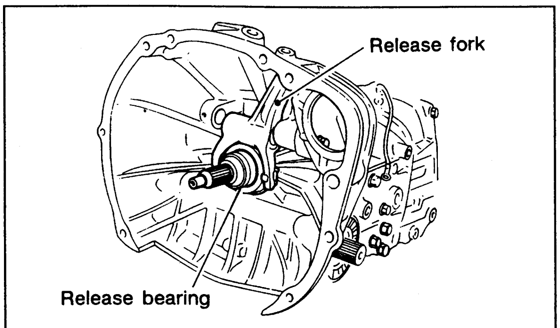
1. Install clutch release fork and bearing onto transmission.
↓
2. Install transmission to engine.
↓
3. Install transmission rear crossmember.
↓
4. Take off transmission jack.
↓
5. Tighten nuts which hold lower side of transmission to engine.
↓
6. Tighten bolt which holds right upper side of transmission to engine.
↓
7. Remove special tools.
8. Install pitching stopper and bracket.
↓
9. Install front drive shaft into transmission.
↓
10. Install stabilizer clamp onto front crossmember.
↓
11. Install gear shift rod and stay.
↓
12. Install propeller shaft.
↓
13. Install exhaust system.
↓
14. Install clutch damper.
15. Install operating cylinder.
↓
16. Install transmission connector holder bracket.
↓
17. Connect connectors and cables.
↓
18. Install starter.
↓
19. Install air intake system.
↓
20. Connect battery ground cable.
21. Take off the vehicle from lift arm.



G2M0820

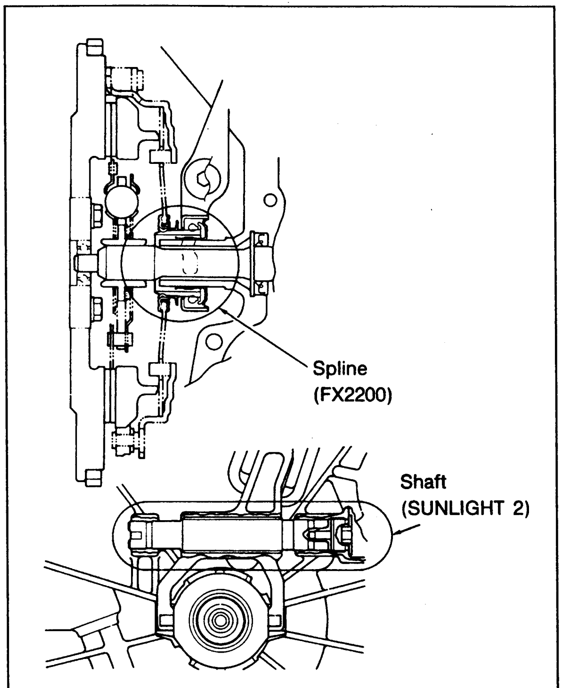
1) Install clutch release fork and bearing onto transmission.

(1) Remove release bearing from clutch cover with flat type screwdriver.



G2M0821

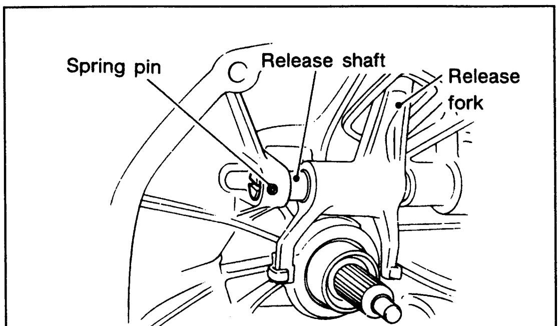
(2) Install release bearing onto transmission.
(3) Insert release fork into release bearing tab.



G2M0822

(4) Apply grease to specified points:

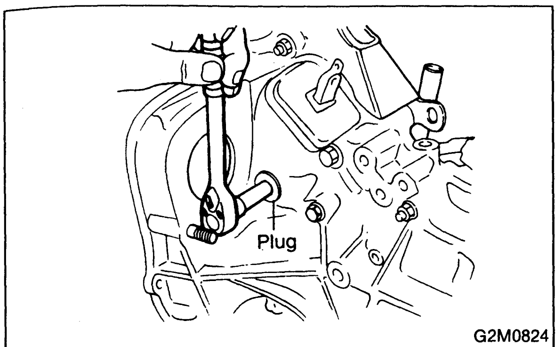
● Spline	FX2200
● Shaft	SUNLIGHT 2



G2M0823

(5) Insert release fork shaft into release fork.

CAUTION:
Make sure the cutout portion of release fork shaft contacts spring pin.



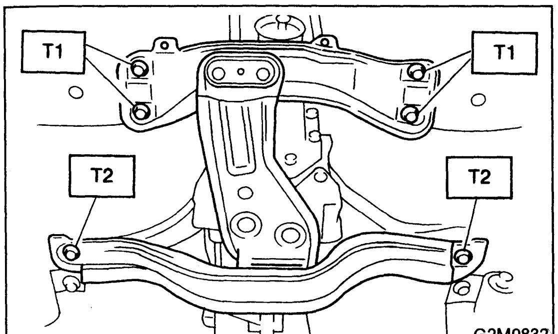
G2M0824

(6) Install plug.

Tightening torque:
41 — 47 N·m (4.2 — 4.8 kg-m, 30 — 35 ft-lb)

2) Install transmission onto engine.
(1) Gradually raise transmission with transmission jack.
(2) Engage them at splines.

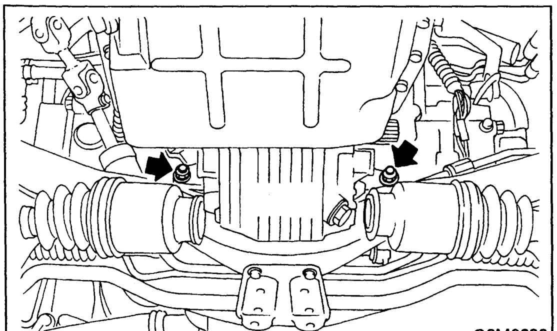
CAUTION:
Be careful not to strike mainshaft against clutch cover.



G2M0832

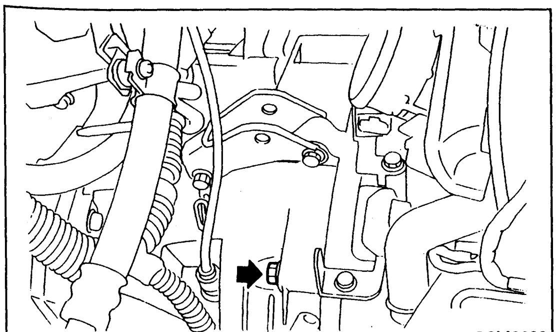
3) Install transmission rear crossmember.

Tightening torque:
T1: 54 — 83 N·m (5.5 — 8.5 kg-m, 40 — 61 ft-lb)
T2: 118 — 157 N·m (12 — 16 kg-m, 87 — 116 ft-lb)


G2M0292

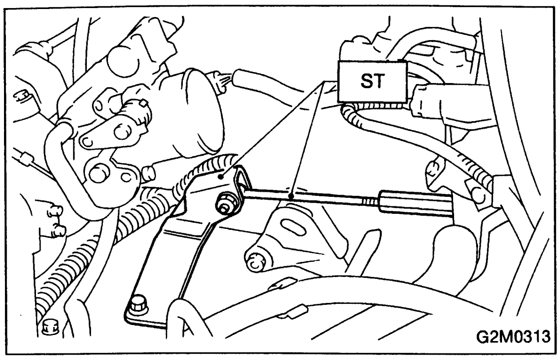
4) Take off transmission jack.
5) Tighten nuts which hold lower side of transmission to engine.

Tightening torque:
46 — 54 N·m (4.7 — 5.5 kg-m, 34 — 40 ft-lb)

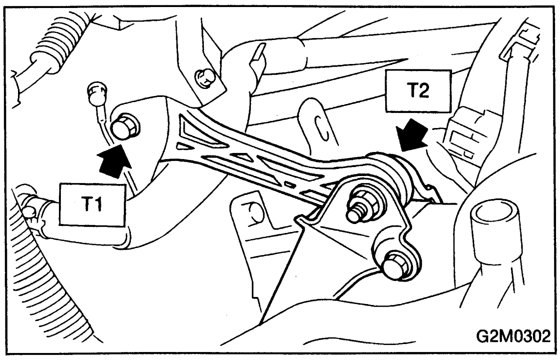

G2M0299

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

Tightening torque:
46 — 54 N·m (4.7 — 5.5 kg-m, 34 — 40 ft-lb)

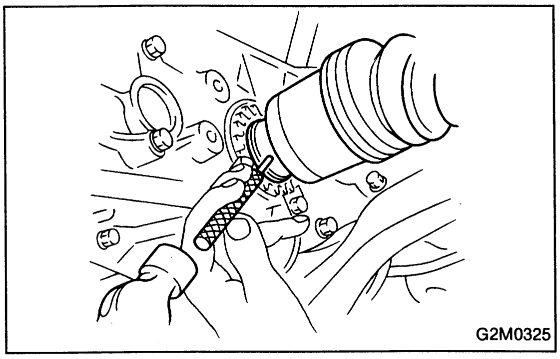


7) Remove special tool.



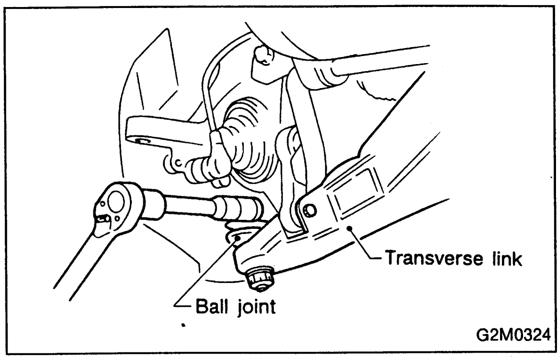
8) Install pitching stopper.

Tightening torque:
T1: 44 — 54 N·m (4.5 — 5.5 kg-m, 33 — 40 ft-lb)
T2: 47 — 67 N·m (4.8 — 6.8 kg-m, 35 — 49 ft-lb)



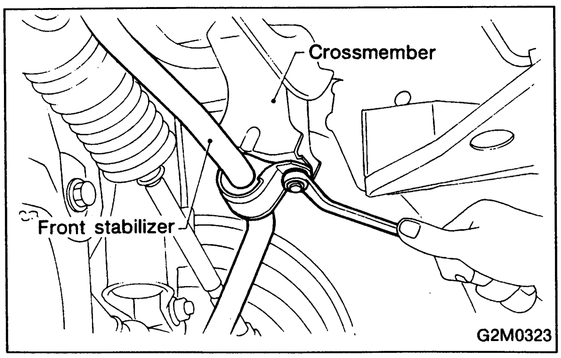
9) Install front drive shaft into transmission.
   (1) Lift up the vehicle.
   (2) Install front drive shaft into transmission.
   (3) Drive spring pin into chamfered hole of drive shaft.

CAUTION:
Always use a new spring pin.



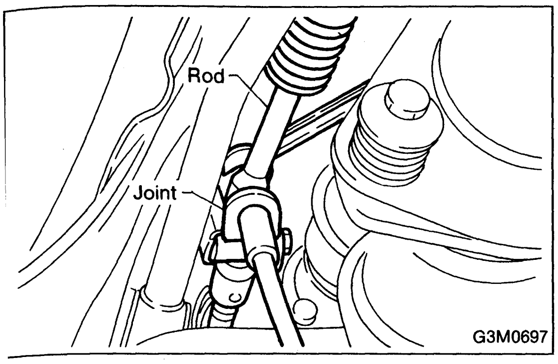
(4) Install ball joint of lower arm into knuckle arm of housing, and tighten installing bolt.

Tightening torque:
25 — 29 N·m (2.5 — 3.0 kg-m, 18 — 22 ft-lb)

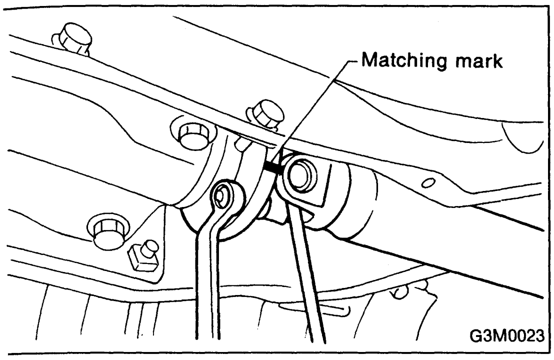


10) Install stabilizer clamp onto front crossmember.

Tightening torque:
21 — 28 N·m (2.1 — 2.9 kg-m, 15 — 21 ft-lb)

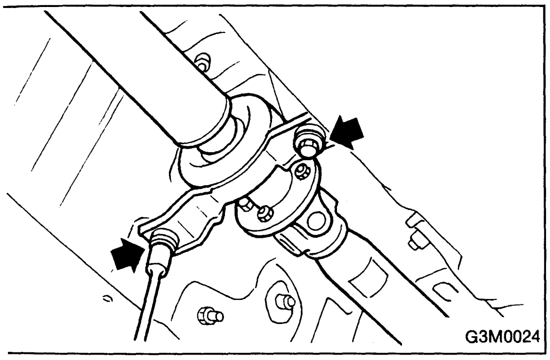


11) Install gear shift rod and stay.
(1) Install gear shift rod onto transmission.
(2) Install stay onto transmission.
(3) Install spring.



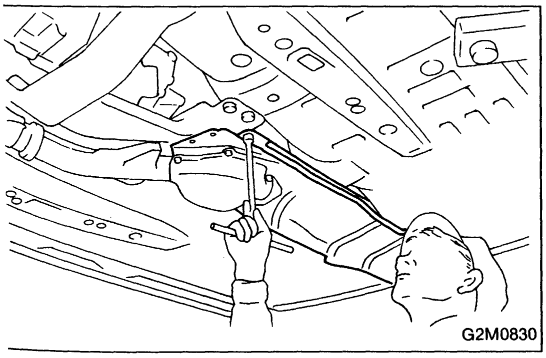
12) Install propeller shaft.
(1) Install propeller shaft into transmission.
(2) Tighten bolts which install propeller shaft onto companion flange of rear differential.

Tightening torque:
24 — 39 N·m (2.4 — 4.0 kg-m, 17 — 29 ft-lb)

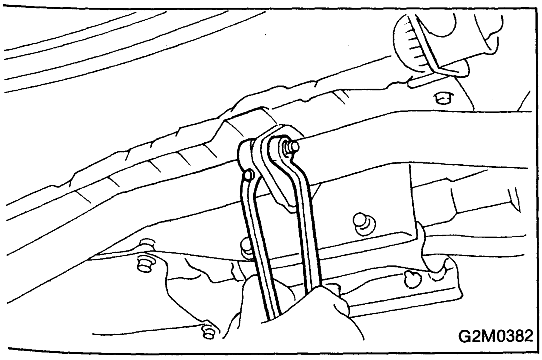


(3) Install center bearing bracket on body.

Tightening torque:
47 — 57 N·m (4.8 — 5.8 kg-m, 35 — 42 ft-lb)

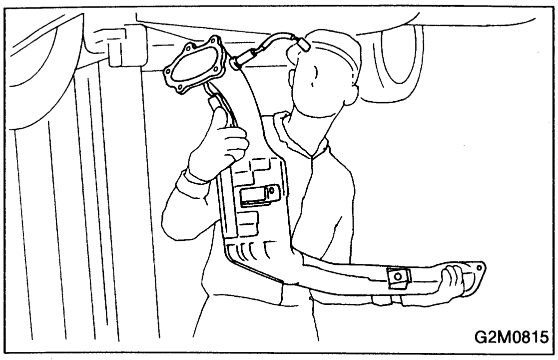


(4) Install heat shield cover.



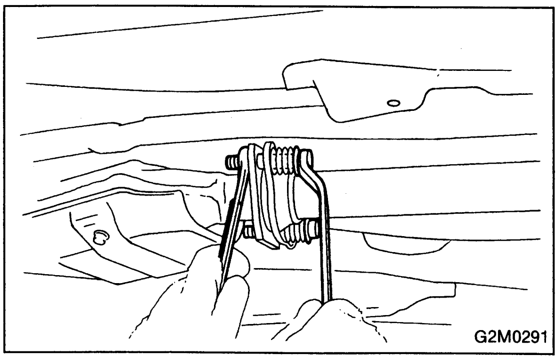
13) Install exhaust system.
(1) Install rear exhaust pipe to muffler.

Tightening torque:
43 — 53 N·m (4.4 — 5.4 kg-m, 32 — 39 ft-lb)



G2M0815

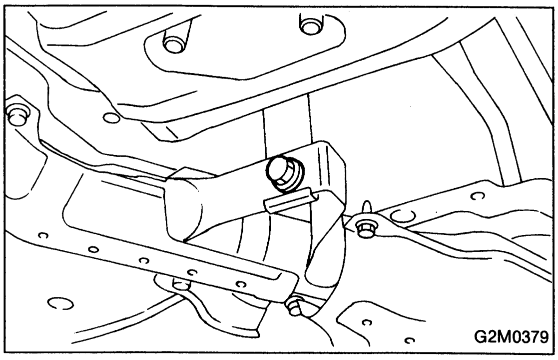
(2) Place center exhaust pipe on vehicle.



G2M0291

(3) Install center exhaust pipe to rear exhaust pipe.

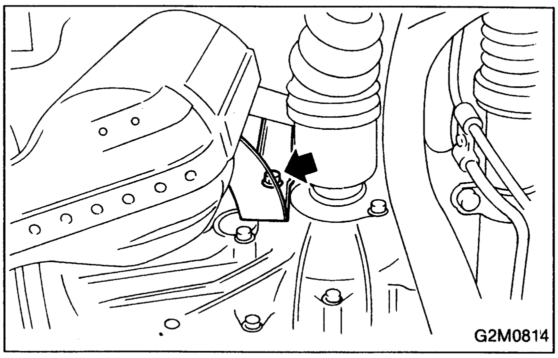
Tightening torque:
13 — 23 N·m (1.3 — 2.3 kg-m, 9 — 17 ft-lb)



G2M0379

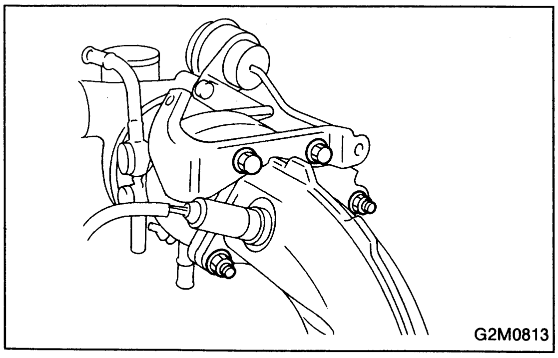
(4) Tighten bolt which installs center exhaust pipe to hunger bracket.

Tightening torque:
25 — 35 N·m (2.5 — 3.6 kg-m, 18 — 26 ft-lb)



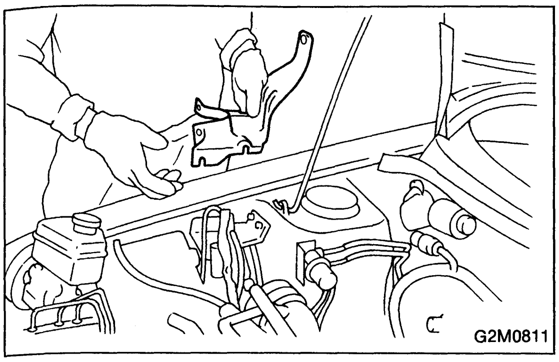
G2M0814

(5) Install intercooler bracket.

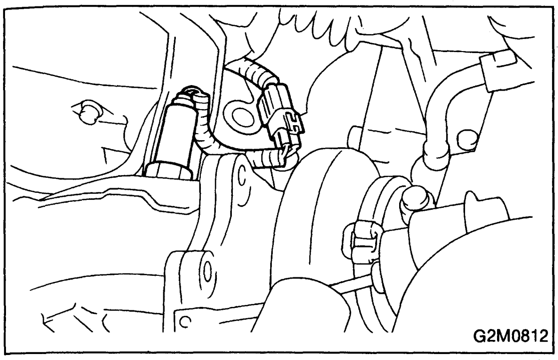


G2M0813

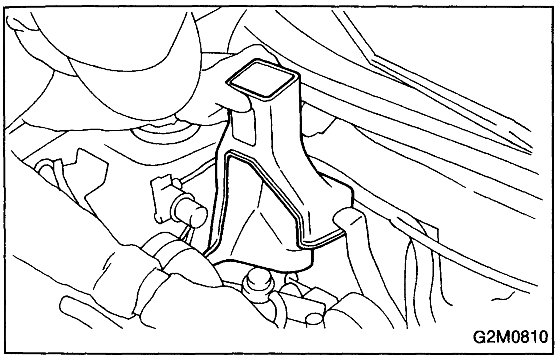
(6) Lower the vehicle.
(7) Install nuts and bolts which install center exhaust pipe to turbocharger.



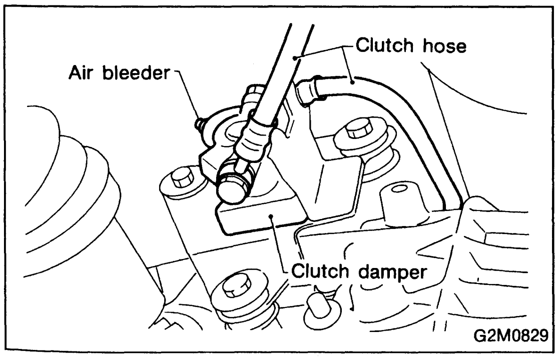
(8) Install turbocharger lower cover.



(9) Attach connector to oxygen sensor.

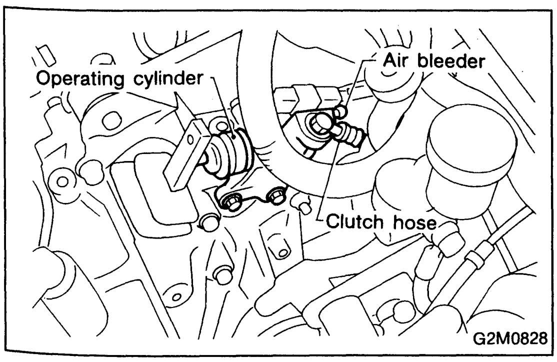


(10) Install turbocharger cooling duct.



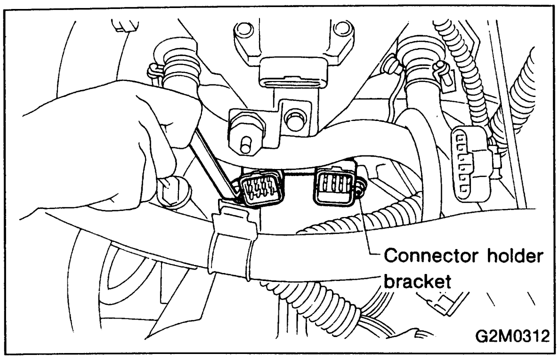
14) Install clutch damper. (LHD model)

Tightening torque:
18 — 31 N·m (1.8 — 3.2 kg-m, 13 — 23 ft-lb)



15) Install operating cylinder.

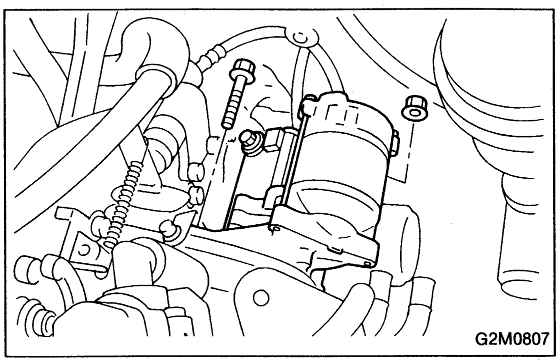
Tightening torque:
34 — 40 N·m (3.5 — 4.1 kg-m, 25 — 30 ft-lb)



16) Install transmission connector holder bracket.

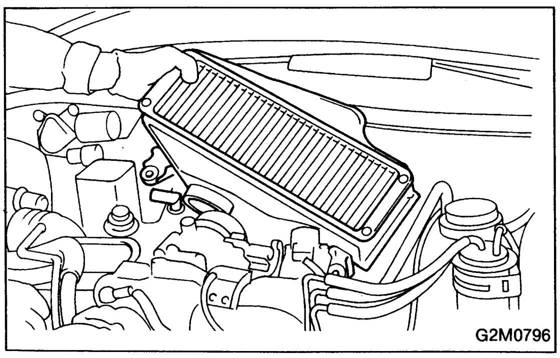
17) Connect connectors and cables.
(1) Connect the following connectors.
- Transmission harness connectors
- Transmission ground terminal
- Vehicle speed sensor 2

(2) Connect the following cable.
- Clutch release spring

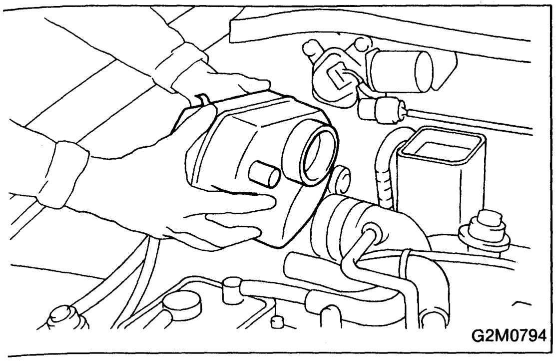


18) Install starter.
(1) Install starter onto transmission case, and connect connectors and terminals.
(2) Tighten bolt and nut which install starter onto transmission.

Tightening torque:
46 — 54 N·m (4.7 — 5.5 kg-m, 34 — 40 ft-lb)



19) Install air intake system.
(1) Install intercooler.


G2M0794

(2) Install resonator chamber.

20) Connect battery ground cable.
21) Take off vehicle from lift arms.

MANUAL TRANSMISSION AND DIFFERENTIAL 3-1

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T DIAGNOSTICS
1. Manual Transmission and Differential

- The descriptions in this section apply to the turbo model.

1. Manual Transmission and Differential

A: SPECIFICATIONS

Item			Model				
			FWD		AWD		
			1600 cc	1800 cc	1600 cc	1800 cc	2000 cc Turbo
Type			5-forward speeds with synchromesh and 1-reverse *1 (5 x 2-forward speeds with synchromesh and 1-reverse)				
Transmission gear ratio		1st	3.636		3.545		3.454
		2nd	2.105		2.111		1.947
		3rd	1.428		1.448		1.366
		4th	1.093		1.088		0.972
		5th	0.825		0.825		0.738
		Reverse	3.583		3.416		3.416
*1 Auxiliary transmission gear ratio		High	—		1.000		—
		Low			1.592		
Front reduction gear	Final	Type of gear	Hypoid				
		Gear ratio	3.900		3.900		
Rear reduction gear	Transfer	Type of gear	—		Helical		
		Gear ratio	—		1.000		1.100
	Final	Type of gear	—		Hypoid		
		Gear ratio	—		3.900		3.545
Front differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)				
*2 Center differential	Type and number of gear		—		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2 and viscous coupling)		
Rear differential	Type and number of gear		—		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)		
Transmission gear oil			GL-5				
Transmission gear oil capacity			2.6 ℓ (2.7 US qt, 2.3 Imp qt)		*2 4.0 ℓ (4.2 US qt, 3.5 Imp qt)		
Rear differential gear oil capacity			—		0.8 ℓ (0.8 US qt, 0.7 Imp qt)		

*1: Dual-range model only
*2: Full-time AWD only

B: SERVICE DATA

10. DRIVE PINION ASSEMBLY (Full-time 4WD)

Preload adjustment of thrust bearing:
Starting torque
0.3 — 0.8 N·m (3 — 8 kg-cm, 2.6 — 6.9 in-lb)

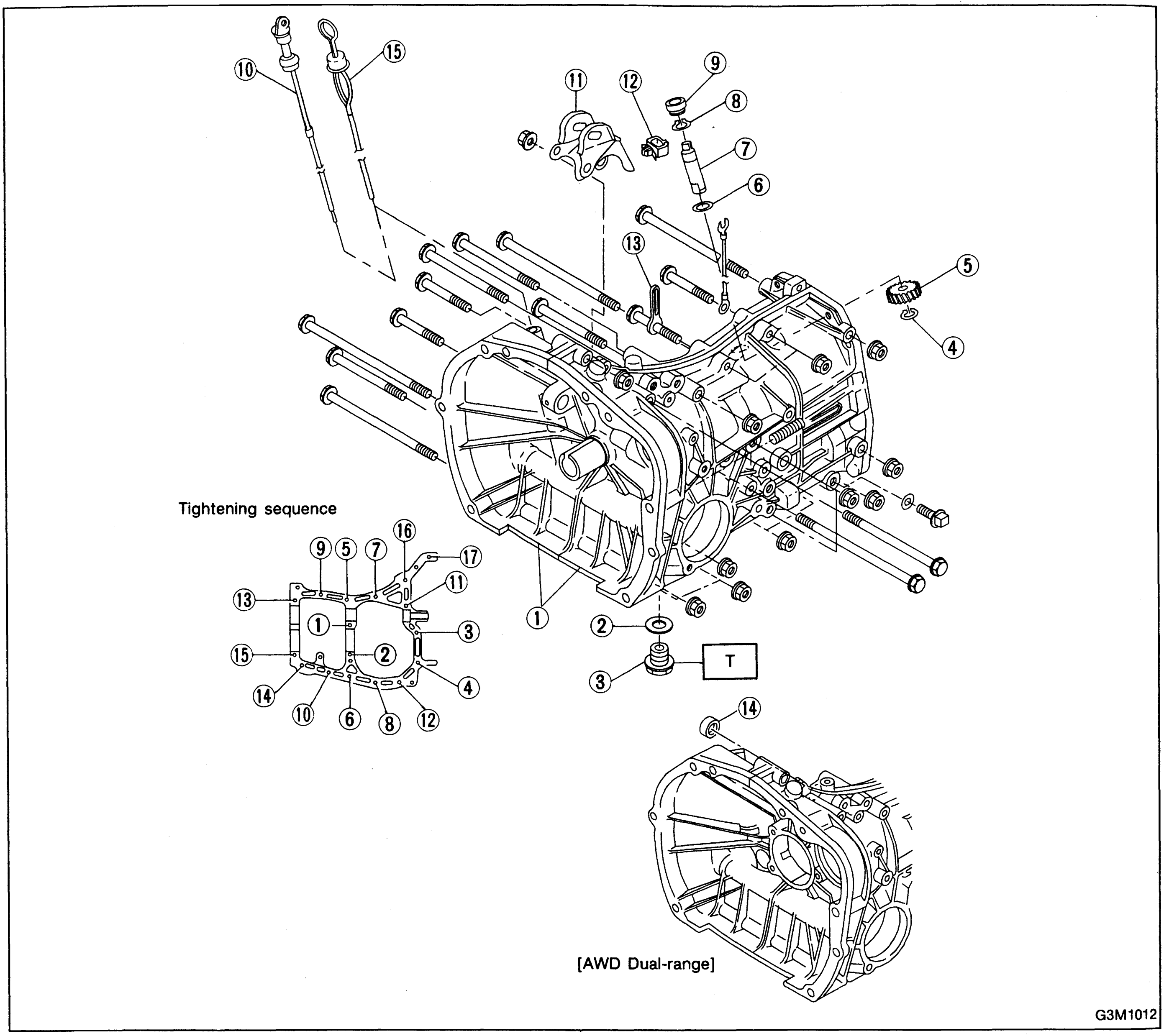
Adjusting washer No. 1	
Part No.	Thickness mm (in)
803025051	3.925 (0.1545)
803025052	3.950 (0.1555)
803025053	3.975 (0.1565)
803025054	4.000 (0.1575)
803025055	4.025 (0.1585)
803025056	4.050 (0.1594)
803025057	4.075 (0.1604)

Adjusting washer No. 2	
Part No.	Thickness mm (in)
803025059	3.850 (0.1516)
803025054	4.000 (0.1575)
803025058	4.150 (0.1634)

Assemble a driven shaft and 1st driven gear that are selected for the proper radial clearance adjustment.

Driven shaft		1st driven gear	
Part No.	Diameter A mm (in)	Part No.	Spec.
32229AA130	49.959 — 49.966 (1.9669 — 1.9672)	32231AA270	Non-turbo
		32231AA600	Turbo
32229AA120	49.967 — 49.975 (1.9672 — 1.9675)	32231AA260	Non-turbo
		32231AA590	Turbo

3. Transmission Case



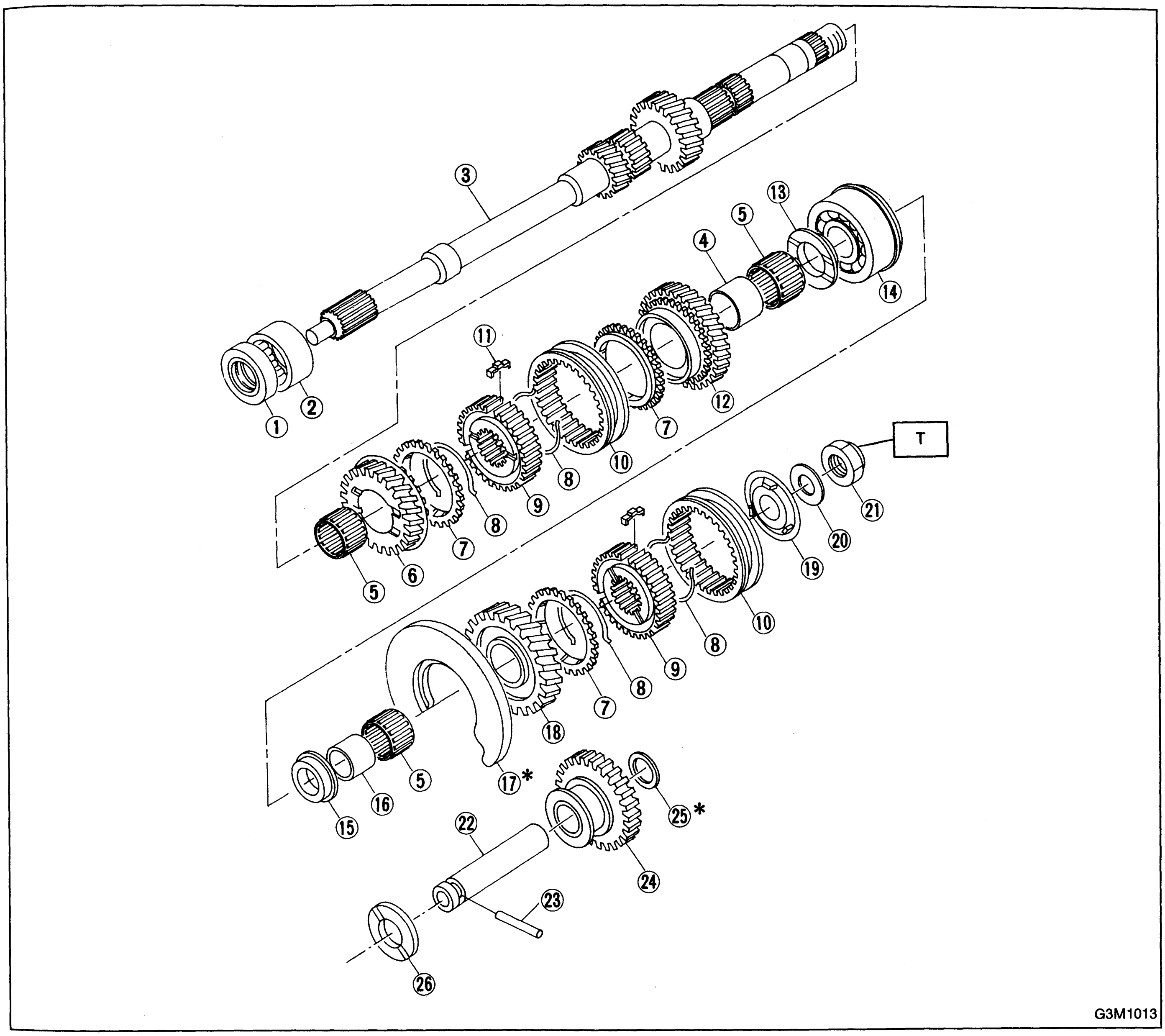
① Transmission case ASSY
② Gasket
③ Drain plug
④ Snap ring (Outer)
⑤ Speedometer driven gear
⑥ Washer
⑦ Speedometer shaft
⑧ Snap ring (Outer)
⑨ Oil seal
⑩ Oil level gauge
⑪ Pitching stopper bracket
⑫ Clamp
⑬ Clip
⑭ Oil seal (AWD Dual-range)
⑮ Oil level gauge (Turbo model)

Tightening torque: N·m (kg-m, ft-lb)
T: 44 ± 3 (4.5 ± 0.3, 32.5 ± 2.2)

Size	All models	Torque
8 mm bolt	⑤ — ⑮	25 ± 2 N·m (2.5 ± 0.2 kg-m, 18.1 ± 1.4 ft-lb)
10 mm bolt	① — ④ ⑯ — ⑰	39 ± 2 N·m (4 ± 0.2 kg-m, 28.9 ± 1.4 ft-lb)

6. Main Shaft Assembly

1. AWD SINGLE-RANGE MODEL



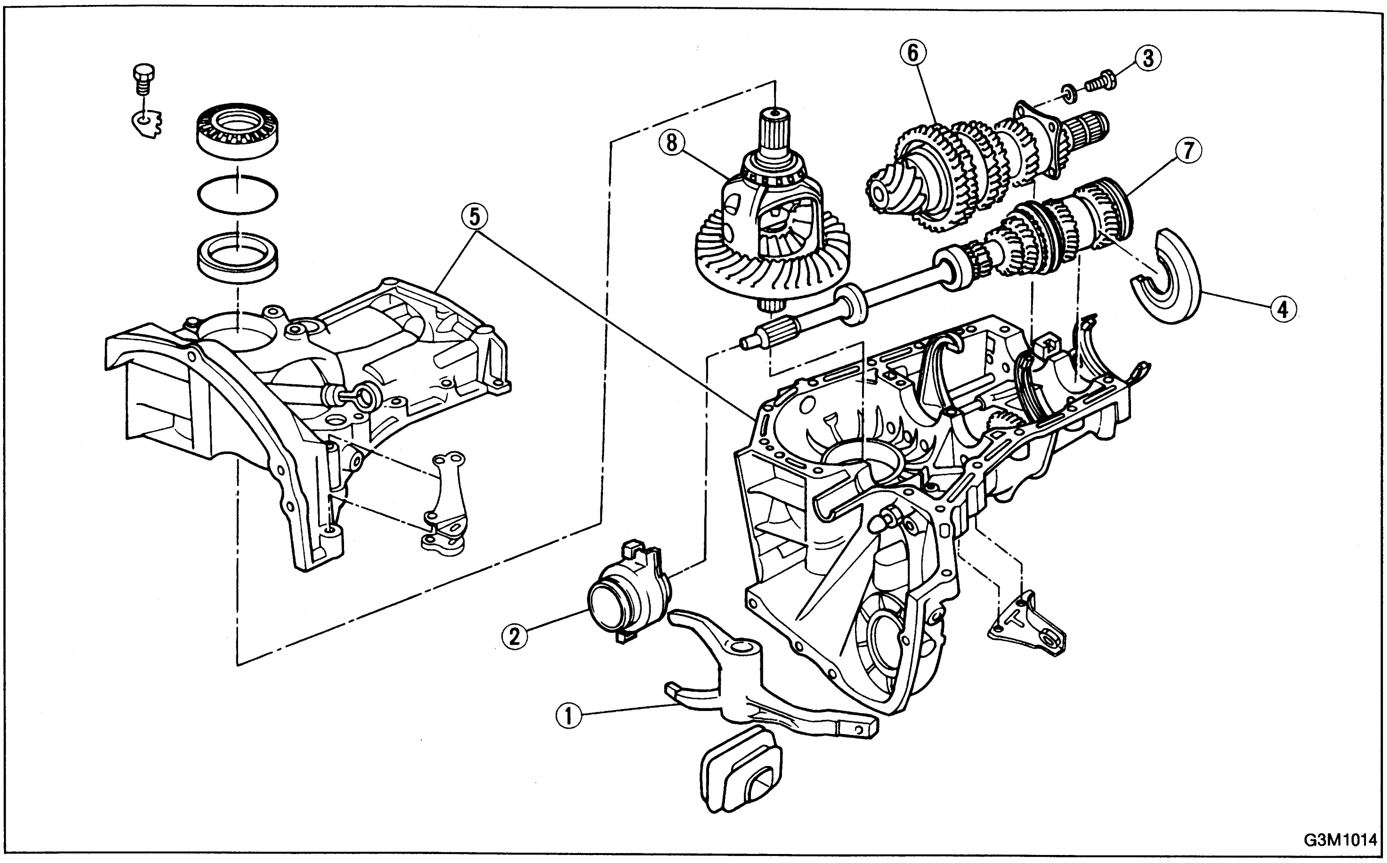
① Oil seal
② Needle bearing
③ Transmission main shaft
④ 4th needle bearing race
⑤ Needle bearing
⑥ 3rd drive gear
⑦ Baulk ring
⑧ Synchronizer spring
⑨ Synchronizer hub
⑩ Coupling sleeve
⑪ Shifting insert
⑫ 4th drive gear
⑬ 4th gear thrust washer
⑭ Ball bearing
⑮ 5th gear thrust washer
⑯ 5th needle bearing race
⑰ Main shaft rear plate
⑱ 5th drive gear
⑲ Insert stopper plate
⑳ Lock washer
㉑ Lock nut
㉒ Reverse idler gear shaft
㉓ Straight pin
㉔ Reverse idler gear
㉕ Washer
㉖ Washer (Turbo model)

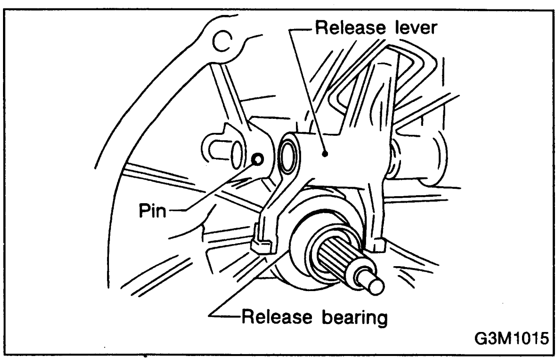
Tightening torque: N·m (kg-m, ft-lb)
T: 118±6 (12.0±0.6, 86.8±4.3)

4. Transmission Case (AWD Single-range Model)

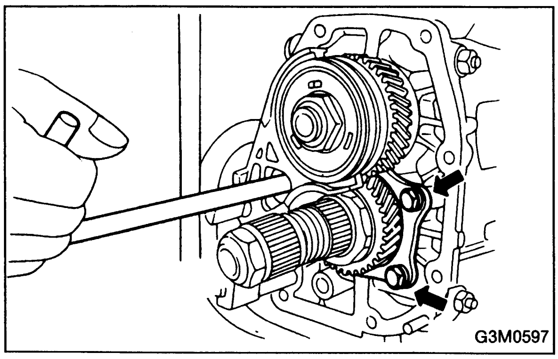
A: DISASSEMBLY

3. SEPARATION OF TRANSMISSION CASE (TURBO MODEL)

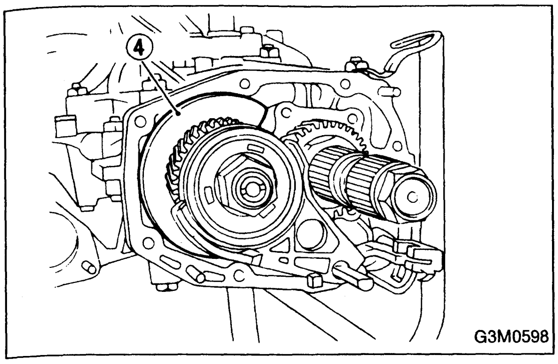




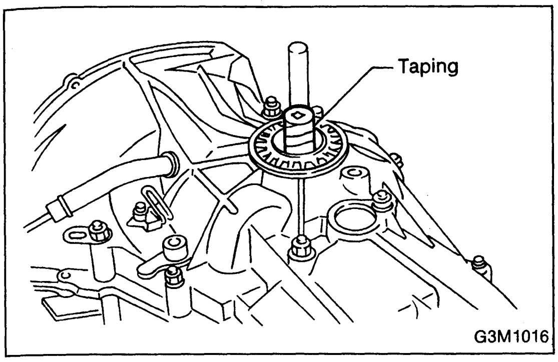
1) Remove clutch release lever ① and bearing ②. (Refer to 2-10 clutch.)



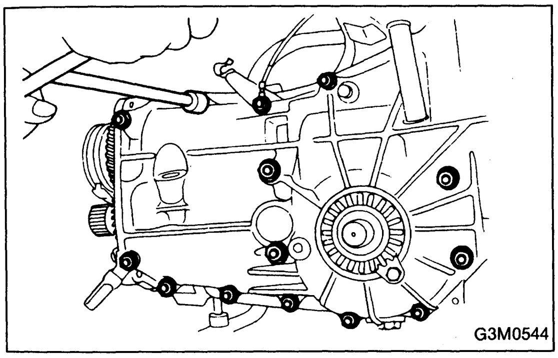
2) Remove bearing mounting bolts.



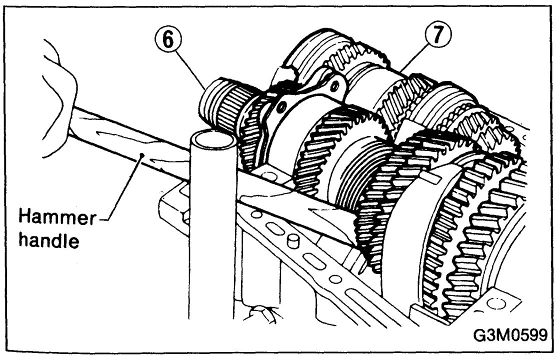
3) Remove main shaft rear plate ④.



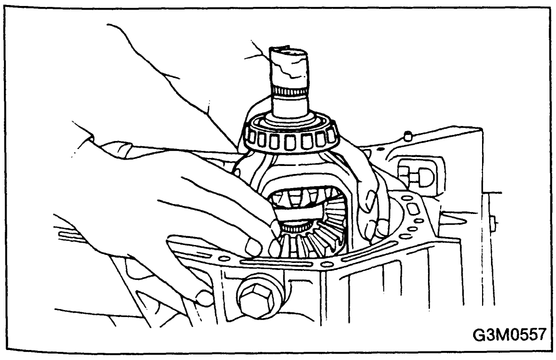
4) Separating transmission case
(1) Put vinyl tape around splines of right and left axle drive shafts to prevent damage to oil seals.



(2) Separate transmission case into right and left cases by loosening seventeen coupling bolts and nuts.



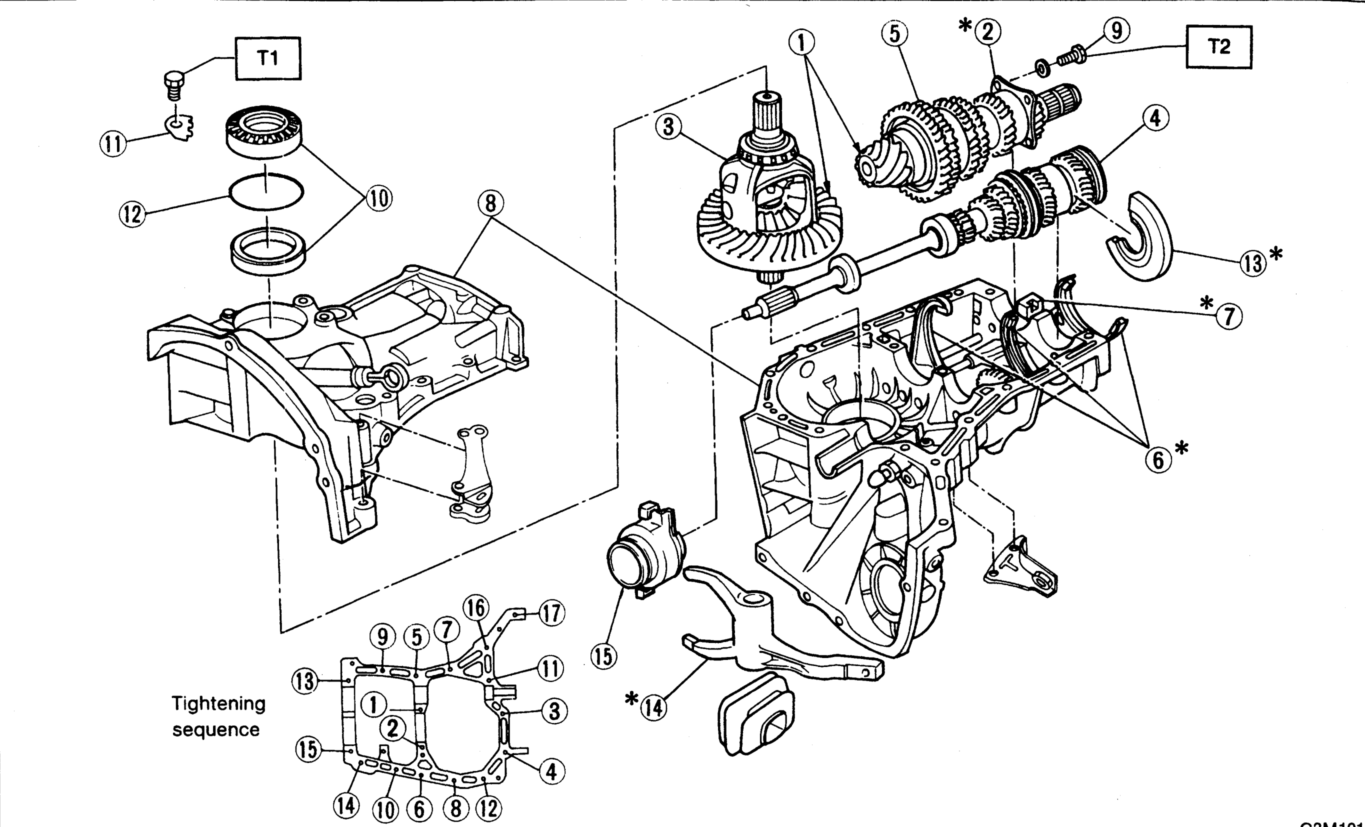
5) Remove drive pinion shaft assembly ⑥ from left side transmission case.
NOTE:
Use a hammer handle, etc. to remove if too tight.
6) Remove main shaft assembly ⑦.



7) Remove differential assembly ⑧.
CAUTION:
- **Be careful not to confuse right and left roller bearing outer races.**
- **Be careful not to damage retainer oil seal.**

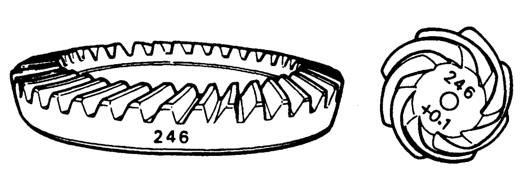
B: ASSEMBLY

3. COMBINATION OF TRANSMISSION CASE (TURBO MODEL)



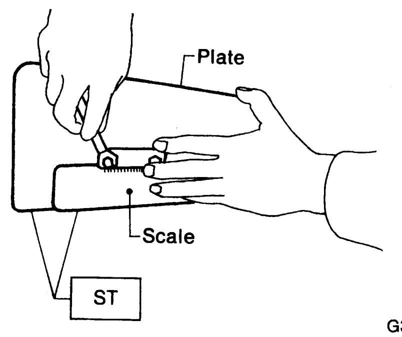
G3M1017

Tightening torque: N·m (kg-m, ft-lb)
T1: 25 (2.5, 18)
T2: 29±3 (3.0±0.3, 21.7±2.2)



G3M0554

1) Alignment marks/figures on hypoid gear set ①
The upper figure on driven pinion is the match number for combining it with hypoid driven gear. The lower figure is for shim adjustment. If no lower figure is shown, the value is zero. The figure on hypoid driven gear indicates a number for combination with drive pinion.



G3M0555

2) Adjustment of drive pinion shim ②

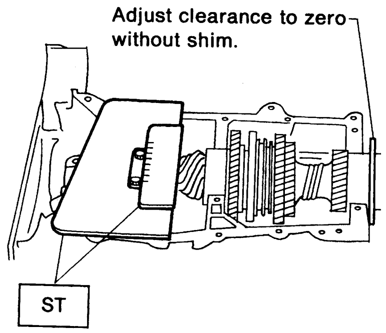
(1) Place drive pinion shaft assembly on right hand transmission main case without shim and tighten bearing mounting bolts.

(2) Inspection and adjustment of ST

NOTE:

- Loosen the two bolts and adjust so that the scale indicates 0.5 correctly when the plate end and the scale end are on the same level.
- Tighten the two bolts.

ST 499917500 DRIVE PINION GAUGE ASSY



G3M0556

(3) Position the ST by inserting the knock pin of ST into the knock hole in the transmission case.

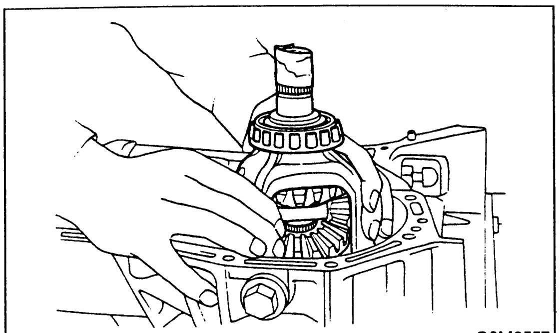
(4) Slide the drive pinion gauge scale with finger tip and read the value at the point where it matches with the end face of drive pinion.

(5) The thickness of shim shall be determined by adding the value indicated on drive pinion to the value indicated on the ST. (Add if the figure on drive pinion is prefixed by + and subtract if the figure is prefixed by –.)

ST 499917500 DRIVE PINION GAUGE ASSY

Select one to three shims from the next table for the value determined as described above and take a shim thickness which is closest to the said value.

Drive pinion shim	
Part No.	Thickness mm (in)
32295AA031	0.150 (0.0059)
32295AA041	0.175 (0.0069)
32295AA051	0.200 (0.0079)
32295AA061	0.225 (0.0089)
32295AA071	0.250 (0.0098)
32295AA081	0.275 (0.0108)
32295AA091	0.300 (0.0118)
32295AA101	0.500 (0.0197)


G3M0557

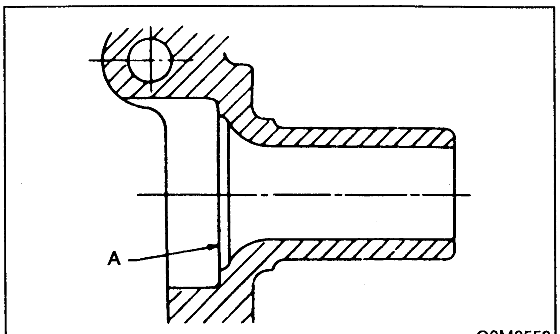
3) Install differential assembly ⑧ on left hand transmission case.

CAUTION:

Be careful not to fold the sealing lip of oil seal.

NOTE:

Wrap the left and right splined sections of axle shaft with vinyl tape to prevent scratches.



G3M0558

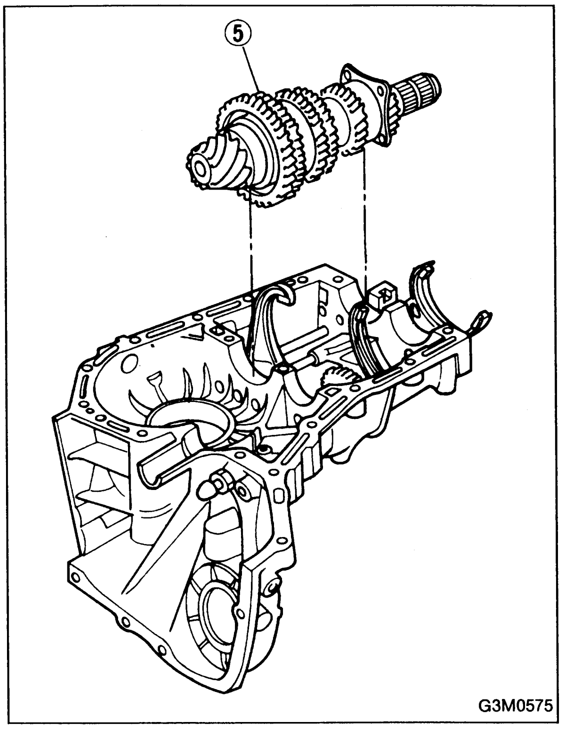
4) Install needle bearing and oil seal onto the front of transmission main shaft assembly ④, and position in left side transmission case.

CAUTION:

- **Wrap clutch splined section with vinyl tape to prevent damage to oil seal.**
- **Apply grease (Unilube #2 or equivalent) to the sealing lip of oil seal.**

NOTE:

- Align the end face of seal with surface A of left side transmission main case when installing oil seal.
- Be careful not to drop oil seal when installing right side transmission main case.
- Make sure straight pin is positioned in hole in needle bearing's outer race.

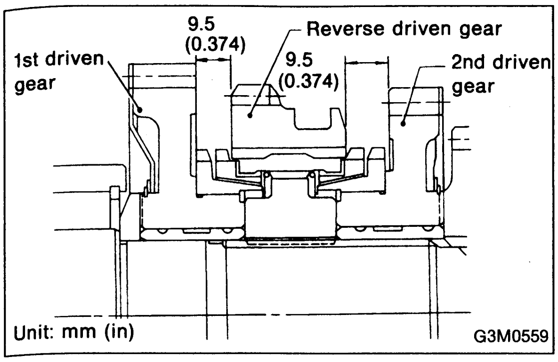


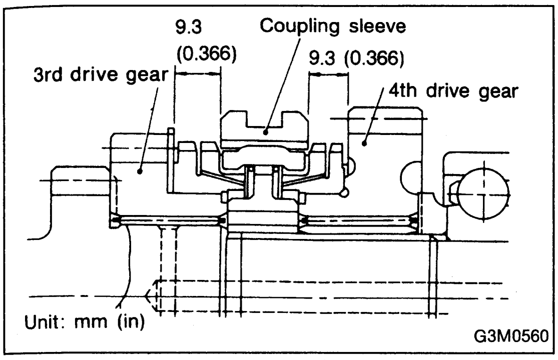
G3M0575

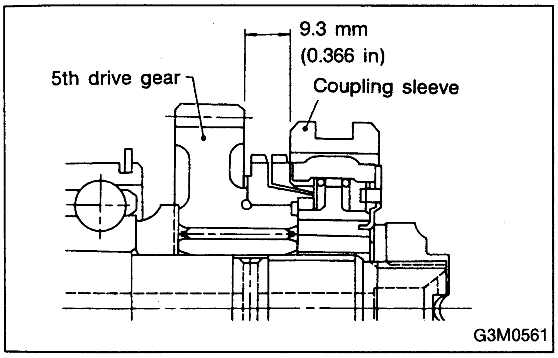
5) Install drive pinion shaft assembly ⑤ with shims selected before into transmission case.

NOTE:

Ensure that the knock pin of the case is fitted into the hole in the bearing outer race.

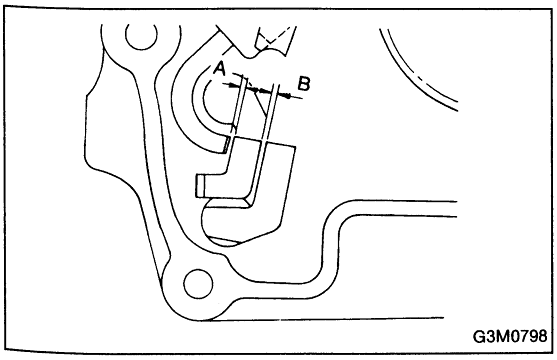






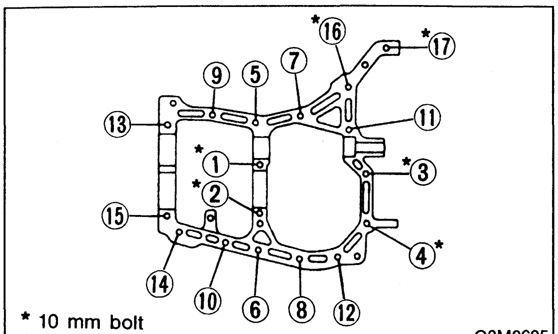
6) Selection of suitable 1st-2nd, 3rd-4th and 5th shifter fork
Set transmission main shaft assembly and drive pinion shaft assembly in position (so there is no clearance between the two when moved all the way to the front). Select suitable 1st-2nd, 3rd-4th and 5th shifter fork so that coupling sleeve and reverse driven gear are positioned in the center of their synchronizing mechanisms.

1st-2nd shifter fork		
Part No.	No.	Remarks
32804AA060	1	Approach to 1st gear by 0.2 mm (0.008 in)
32804AA070	No mark	Standard
32804AA080	3	Approach to 2nd gear by 0.2 mm (0.008 in)
3rd-4th shifter fork		
Part No.	No.	Remarks
32810AA060	1	Approach to 4th gear by 0.2 mm (0.008 in)
32810AA070	No mark	Standard
32810AA100	3	Approach to 3rd gear by 0.2 mm (0.008 in)
5th shifter fork		
Part No.	No.	Remarks
32812AA060	1	Approach to 5th gear by 0.2 mm (0.008 in)
32812AA070	No mark	Standard
32812AA100	3	Become distant from 5th gear by 0.2 mm (0.008 in)



7) Inspection of rod end clearance
Measure rod end clearances A and B. If any clearance is not within specifications, replace rod or fork as required.

A: 1st-2nd to 3rd-4th	0.5 — 1.5 mm (0.020 — 0.059 in)
B: 3rd-4th to 5th	0.6 — 1.4 mm (0.024 — 0.055 in)



G3M0605

8) Combination of transmission case

(1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline, and apply liquid gasket, and then put case right side and left side together.

Liquid gasket:

THREE BOND 1215 or equivalent

(2) Tighten 17 bolts with bracket, clip, etc. as shown in the figure.

Tightening torque:

8 mm bolt

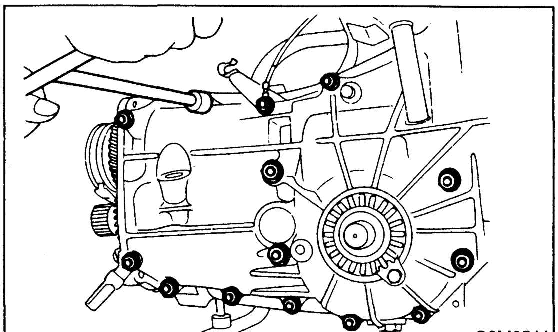
25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)

10 mm bolt

39±3 N·m (4.0±0.3 kg-m, 28.9±2.2 ft-lb)

NOTE:

- Insert bolts from the bottom and tighten nuts at the top.
- Put cases together so that drive pinion shim and input shaft holder shim are not caught up in between.
- Confirm that counter gear and speedometer gear are meshed.

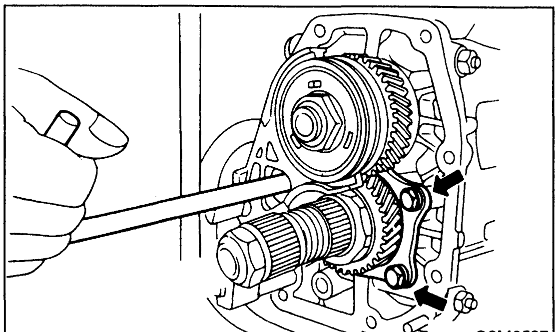


G3M0544

9) Tighten ball bearing attachment bolts.

Tightening torque:

29±3 N·m (3.0±0.3 kg-m, 21.7±2.2 ft-lb)



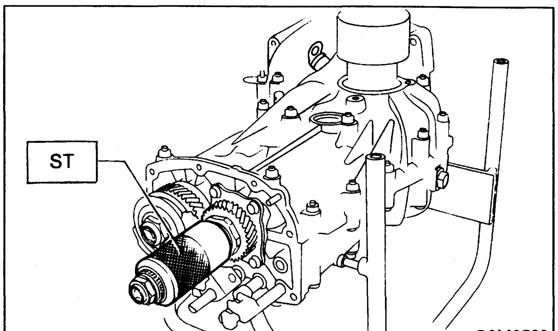
G3M0597

10) Backlash adjustment of hypoid gear and preload adjustment of roller bearing

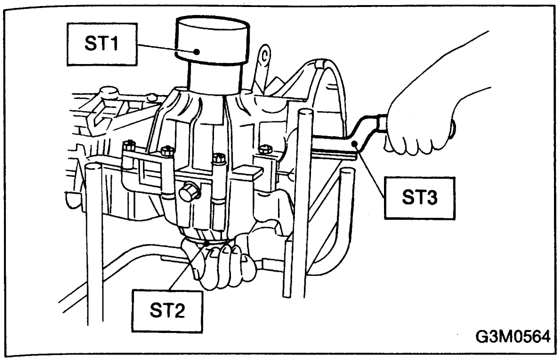
NOTE:

Support drive pinion assembly with ST.

ST 498427100 STOPPER



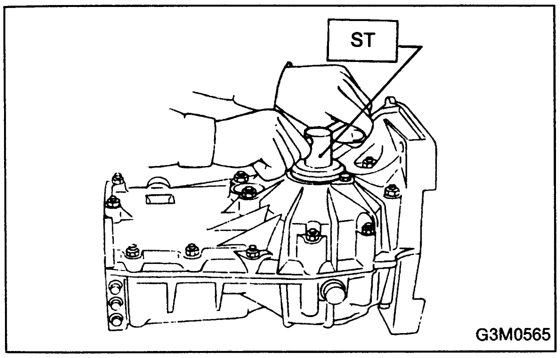
G3M0563



G3M0564

(1) Place the transmission with case left side facing downward and put ST1 on bearing cup.
(2) Screw retainer assembly into left case from the bottom with ST2. Fit ST3 on the transmission main shaft. Shift gear into 4th or 5th and turn the shaft several times. Screw in the retainer while turning ST3 until a slight resistance is felt on ST2.
This is the contact point of hypoid gear and drive pinion shaft. Repeat the above sequence several times to ensure the contact point.

ST1 399780104 WEIGHT
ST2 499787000 WRENCH ASSY
ST3 499927100 HANDLE

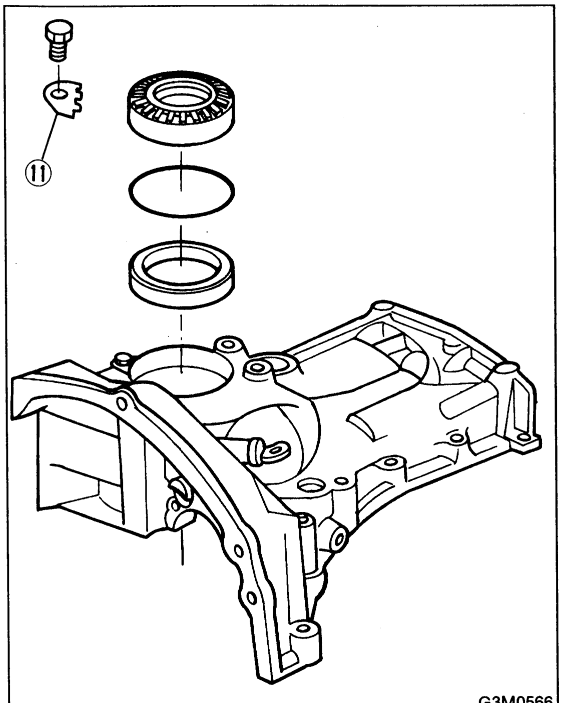


G3M0565

(3) Remove weight and screw in retainer without O-ring on the upper side and stop at the point where slight resistance is felt.

NOTE:
At this point, the backlash between the hypoid gear and drive pinion shaft is zero.

ST 499787000 WRENCH ASSY

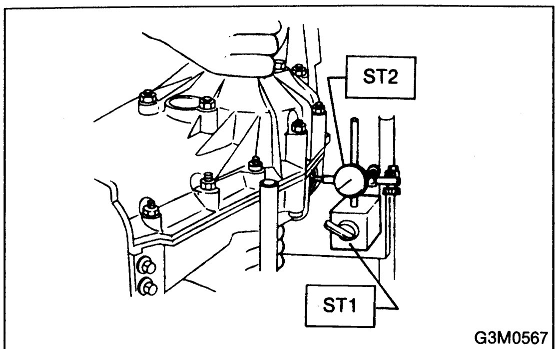


G3M0566

(4) Fit lock plate ⑪. Loosen the retainer on the lower side by 1-1/2 notches of lock plate and turn in the retainer on the upper side by the same amount in order to obtain the backlash.

NOTE:
The notch on the lock plate moves by 1/2 notch if the plate is turned upside down.

(5) Turn in the retainer on the upper side additionally by 1 notch in order to apply preload on taper roller bearing.
(6) Tighten temporarily both the upper and lower lock plates and mark both holder and lock plate for later readjustment.
(7) Turn transmission main shaft several times while tapping around retainer lightly with plastic hammer.
(8) Set ST1 and ST2. Insert the needle through transmission oil drain plug hole so that the needle comes in contact with the tooth surface at a right angle and check the backlash.



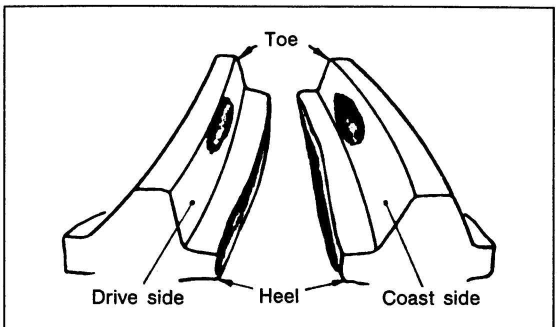
G3M0567

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

Backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

NOTE:
- If backlash is outside specified range, adjust it by turning holder in right side case.
- Turning holder pawl 1/2 rotation changes backlash by approximately 0.04 mm (0.0016 in).

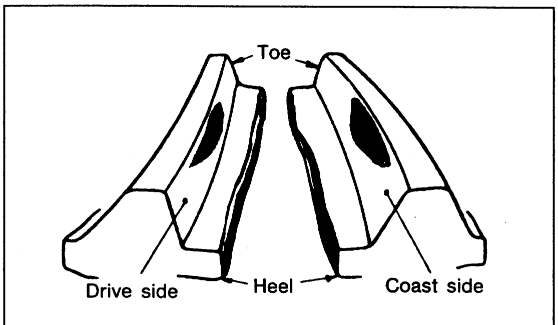


G3M0568

(9) Check tooth contact of hypoid gear as follows: Apply a uniform thin coat of red lead on both tooth surfaces of 3 or 4 teeth of the hypoid gear. Move the hypoid gear back and forth by turning the transmission main shaft until a definite contact pattern is developed on hypoid gear, and judge whether face contact is correct.

- Tooth contact is correct.

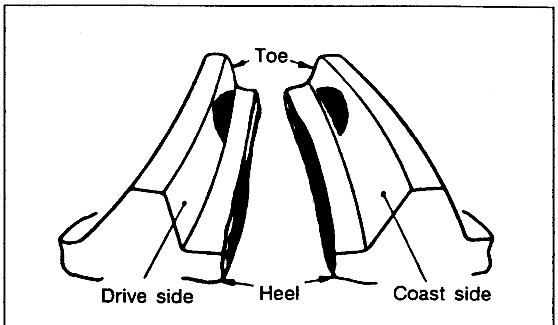
NOTE:
If it is incorrect, make the following correction.



G3M0569

- Backlash is excessive.

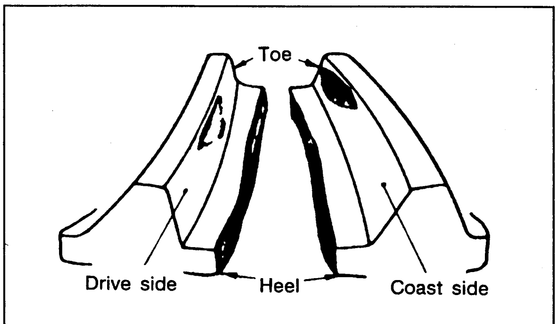
To reduce backlash, loosen holder on the upper side (case right side) and turn in the holder on the lower side (case left side) by the same amount.



G3M0570

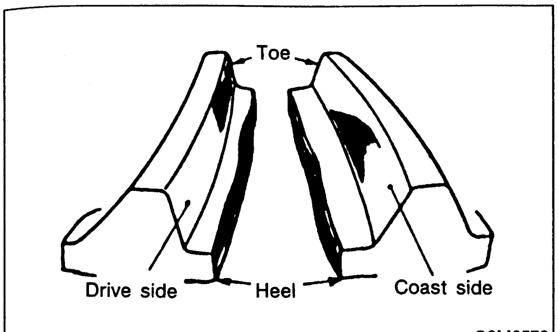
- Backlash is insufficient.

To increase backlash, loosen holder on the lower side (case left side) and turn in the holder on the upper side (case right side) by the same amount.



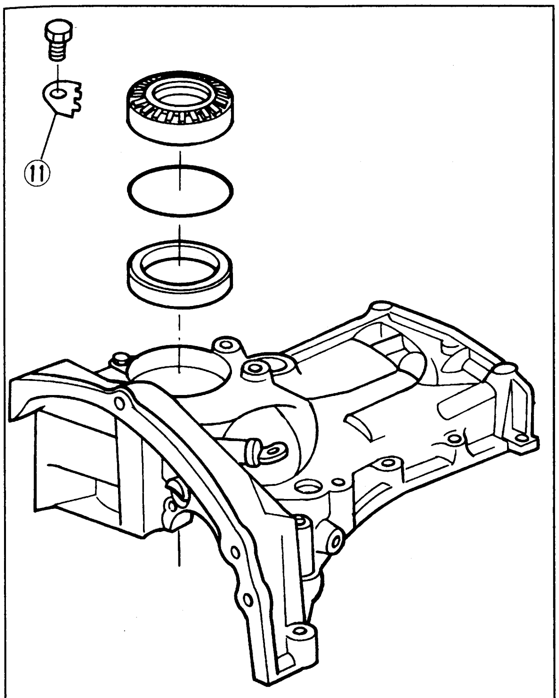
G3M0571

- The drive pinion shim selected before is too thick. Reduce its thickness.



G3M0572

• The drive pinion shim selected before is too thin. Increase its thickness.

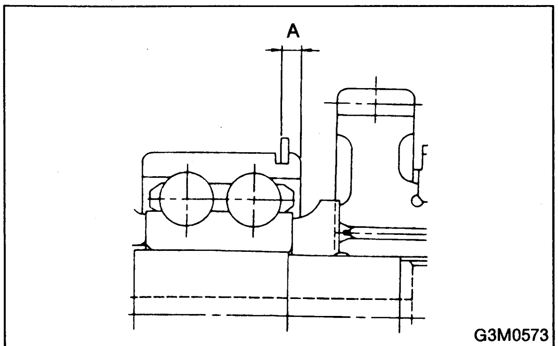


G3M0566

11) After checking the tooth contact of hypoid gears, remove the lock plate ⑪. Then loosen retainer until the O-ring groove appears. Fit O-ring into the groove and tighten retainer into the position where retainer has been tightened in.
Tighten lock plate ⑪.

Tightening torque:
25 ± 3 N·m (2.5 ± 0.3 kg-m, 18.1 ± 2.2 ft-lb)

NOTE:
Carry out this job on both upper and lower retainers.

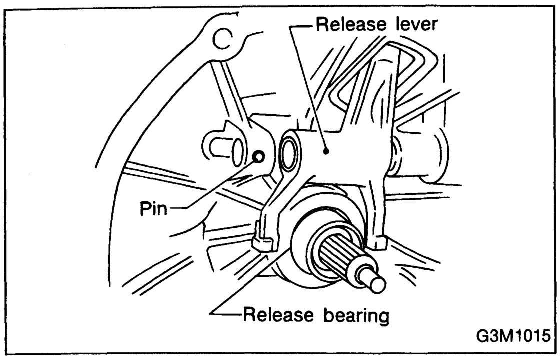


G3M0573

12) Selecting of main shaft rear plate
Using ST, measure the amount A of ball bearing protrusion from transmission main case surface and select the proper plate in the following table:
ST 498147000 DEPTH GAUGE

Dimension "A" mm (in)	Part No.	Mark
4.00 — 4.13 (0.1575 — 0.1626)	32294AA040	1
3.87 — 3.99 (0.1524 — 0.1571)	32294AA050	2

NOTE:
Before measuring, tap the end of main shaft with a plastic hammer lightly in order to make the clearance zero between the main case surface and the moving flange of bearing.

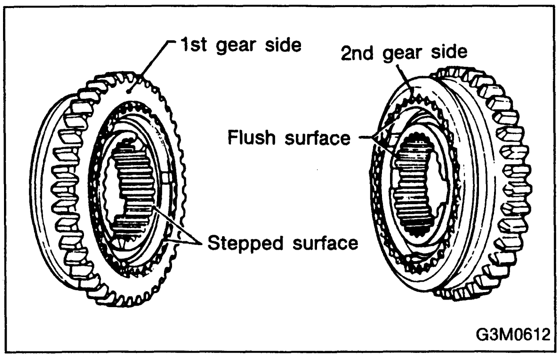


13) Install clutch release lever and bearing .

7. Drive Pinion Assembly (AWD Model)

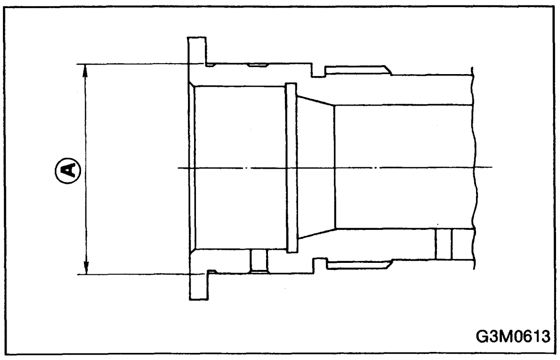
B: ASSEMBLY

1. GEAR AND HUB ASSEMBLY



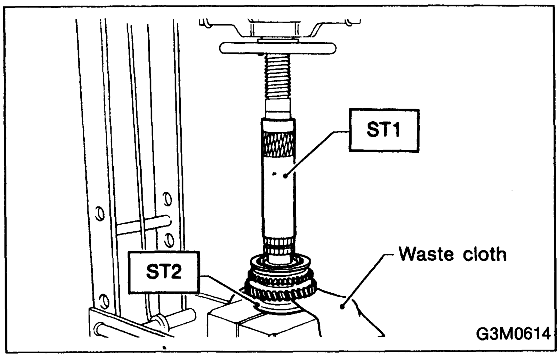
NOTE:
Position open ends of springs 120° apart.

2. DRIVEN GEAR ASSEMBLY



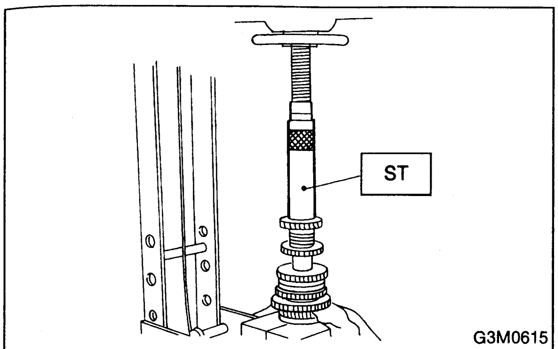
Assemble a driven shaft and 1st driven gear that select for adjustment the proper radial clearance.

Driven shaft		1st driven gear	
Part No.	Diameter A mm (in)	Part No.	Spec.
32229AA130	49.959 — 49.966 (1.9669 — 1.9672)	32231AA270	Non-turbo
		32231AA600	Turbo
32229AA120	49.967 — 49.975 (1.9672 — 1.9675)	32231AA260	Non-turbo
		32231AA590	Turbo



1) Install 1st driven gear, 1st-2nd baulk ring and gear and hub assembly onto driven shaft.
NOTE:
Take care to install gear hub in proper direction.
2) Install 2nd driven gear bushing onto driven shaft using ST1, ST2 and press.
ST1 499277200 INSTALLER
ST2 499587000 INSTALLER

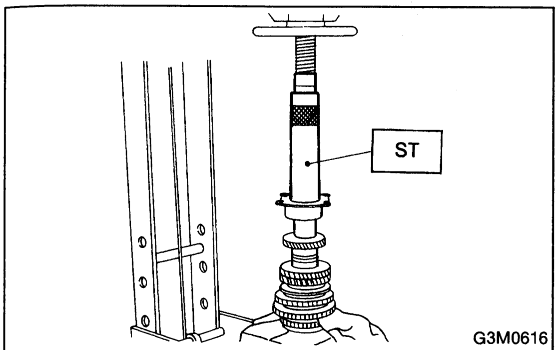
CAUTION:
Attach a cloth to the end of driven shaft to prevent damage.



G3M0615

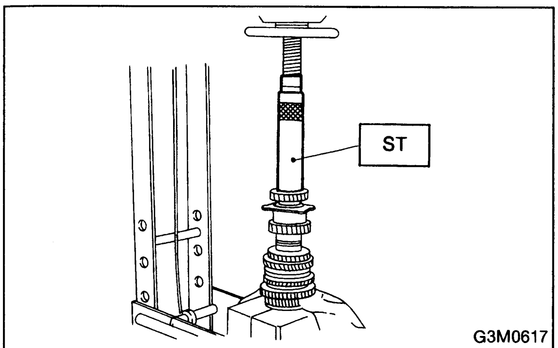
3) Install 2nd driven gear, 1st-2nd baulk ring and insert onto driven shaft. After installing key on driven shaft, install 3rd-4th driven gear using ST and press.
ST 499277200 INSTALLER

CAUTION:
Align groove in baulk ring with insert.



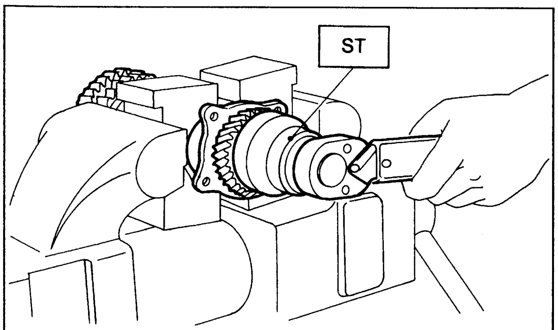
G3M0616

4) Install a set of roller bearings (42 x 74 x 40) onto the driven shaft using ST and press.
ST 499277200 INSTALLER



G3M0617

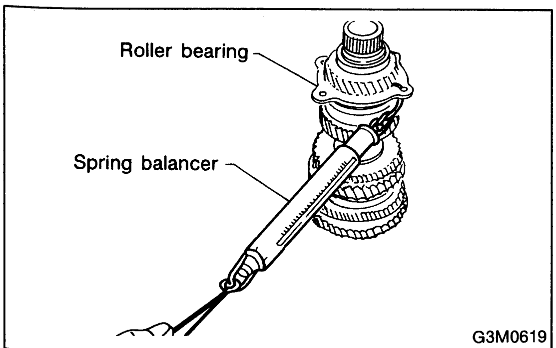
5) Position woodruff key in groove on the rear of driven shaft. Install 5th driven gear onto drive shaft using ST and press.
ST 499277200 INSTALLER



G3M0618

6) Install lock washer (42 x 53 x 2). Install lock nut (42 x 13) and tighten to the specified torque using ST.
ST 499987300 SOCKET WRENCH (50)

Tightening torque:
245±10 N·m (25±1 kg-m, 181±7 ft-lb)



G3M0619

NOTE:
- Stake lock nut at two points.
- Check that starting torque of roller bearing is 0.1 to 1.5 N·m (1 to 15 kg-cm, 0.9 to 13.0 in-lb).

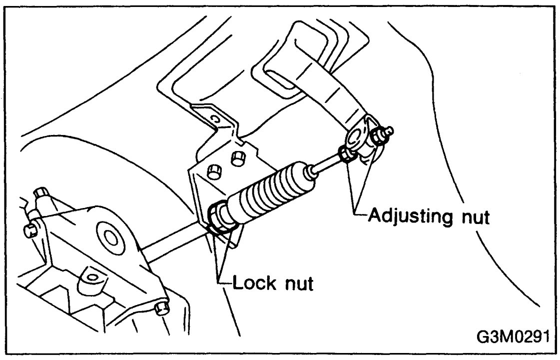
AUTOMATIC TRANSMISSION AND DIFFERENTIAL 3-2

Page

S SPECIFICATIONS AND SERVICE DATA
1. Automatic Transmission and Differential

C COMPONENT PARTS
1. Torque Converter Clutch and Case
2. Differential Case
3. Oil Pump
4. Control Valve and Harness Routing
5. Transmission Case, Transmission Cover and Control Device
6. Reverse Clutch and Band Brake
7. High Clutch and Planetary Gear
8. Forward Clutch and Low & Reverse Brake
9. Reduction Gear
10. Transfer and Extension

W SERVICE PROCEDURE 2
1. Precaution
2. On-Car Service 2
3. Performance Test
4. Overall Transmission
5. Reduction Drive Gear Assembly
6. Control Valve Body
7. Oil Pump Assembly
8. Drive Pinion Shaft
9. Reverse Clutch
10. High Clutch
11. Forward Clutch Drum
12. One-way Clutch Outer Race
13. Servo Piston
14. Differential Case Assembly
15. Transfer Clutch
16. Transfer Valve Body



2. On-Car Service

B: ADJUSTMENT

2. INHIBITOR SWITCH

The inhibitor switch allows the back-up lights to turn on when the select lever is in the R range and the starter motor to start when the lever is in the N or P range. It also monitors the input signal electronically controlled for each range and turns on the corresponding range light on the instrument panel.

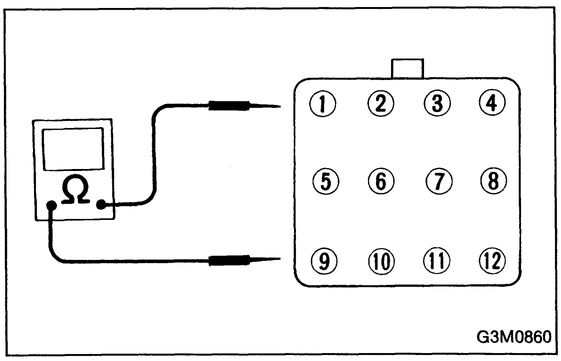
When light operation, driving condition or starter motor operation is erroneous, first check the shift linkage for improper operation. If the shift linkage is functioning properly, check the inhibitor switch.

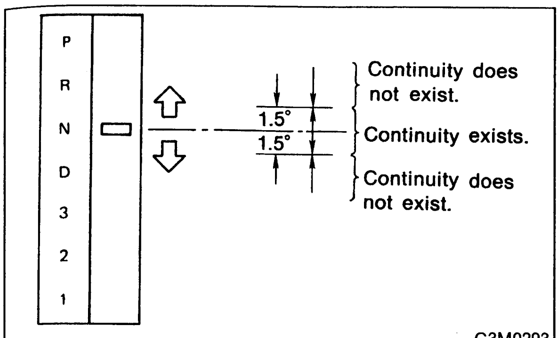
<Inspection>

(1) Disconnect cable end from select lever.
(2) Disconnect inhibitor switch connector.
(3) Check continuity in inhibitor switch circuits with select lever moved to each position.

CAUTION:
Also check that continuity in ignition circuit does not exist when selector lever is in R, D, 3, 2 and 1 ranges.

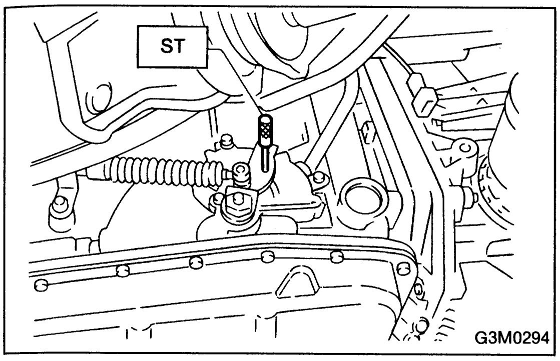
Pin No.	4	3	2	1	8	7	6	5	12	11	10	9
Lead color / Position	B	Y	Br	YG	W	BY	R	GW	BY	BW	BW	RW
P	○	○							○	○		
R	○	—	○								○	○
N	○	—	—	○					○	○		
D	○	—	—	—	○							
3	○	—	—	—	—	○						
2	○	—	—	—	—	—	○					
1	○	—	—	—	—	—	—	○				
	Signal sent to AT control unit								Ignition circuit		Back-up light circuit	





G3M0293

(4) Check if there is continuity at equal points when the select lever is turned 1.5° in both directions from the N range.
If there is continuity in one direction and the continuity in the other or if there is continuity at unequal points, adjust the inhibitor switch.



G3M0294

<Adjustment>

(1) Loosen the three inhibitor switch securing bolts.
(2) Shift the select lever to the N range.
(3) Insert ST as vertical as possible into the holes in the inhibitor switch lever and switch body.

ST 499267300 STOPPER PIN

(4) Tighten the three inhibitor switch bolts.

Tightening torque:
3.4±0.5 N·m (0.35±0.05 kg-m, 2.5±0.4 ft-lb)

(5) Repeat the above checks. If the inhibitor switch is determined to be "faulty", replace it.

AWD SYSTEM 3-4

Page

S SPECIFICATIONS AND SERVICE DATA 2
1. AWD System 2

C COMPONENT PARTS 4
1. Rear Differential Mounting System 4
2. Propeller Shaft 5
3. Rear Differential Assembly 6

W SERVICE PROCEDURE 7
1. Propeller Shaft
2. Rear Differential 7
3. Rear Differential Front Member

T DIAGNOSTICS
1. Rear Differential
2. Propeller Shaft

1. AWD System

A: SPECIFICATIONS

1. REAR FINAL REDUCTION GEAR RATIO

Type of gear	Hypoid		
	MT	AT	TURBO*
Gear ratio (Number of gear teeth)	3.900 (39/10)	4.111 (37/9)	3.545 (39/11)
Oil capacity	0.8 ℓ (0.8 US qt, 0.7 Imp qt)		
Rear differential gear oil	GL-5		

*: With VC type LSD

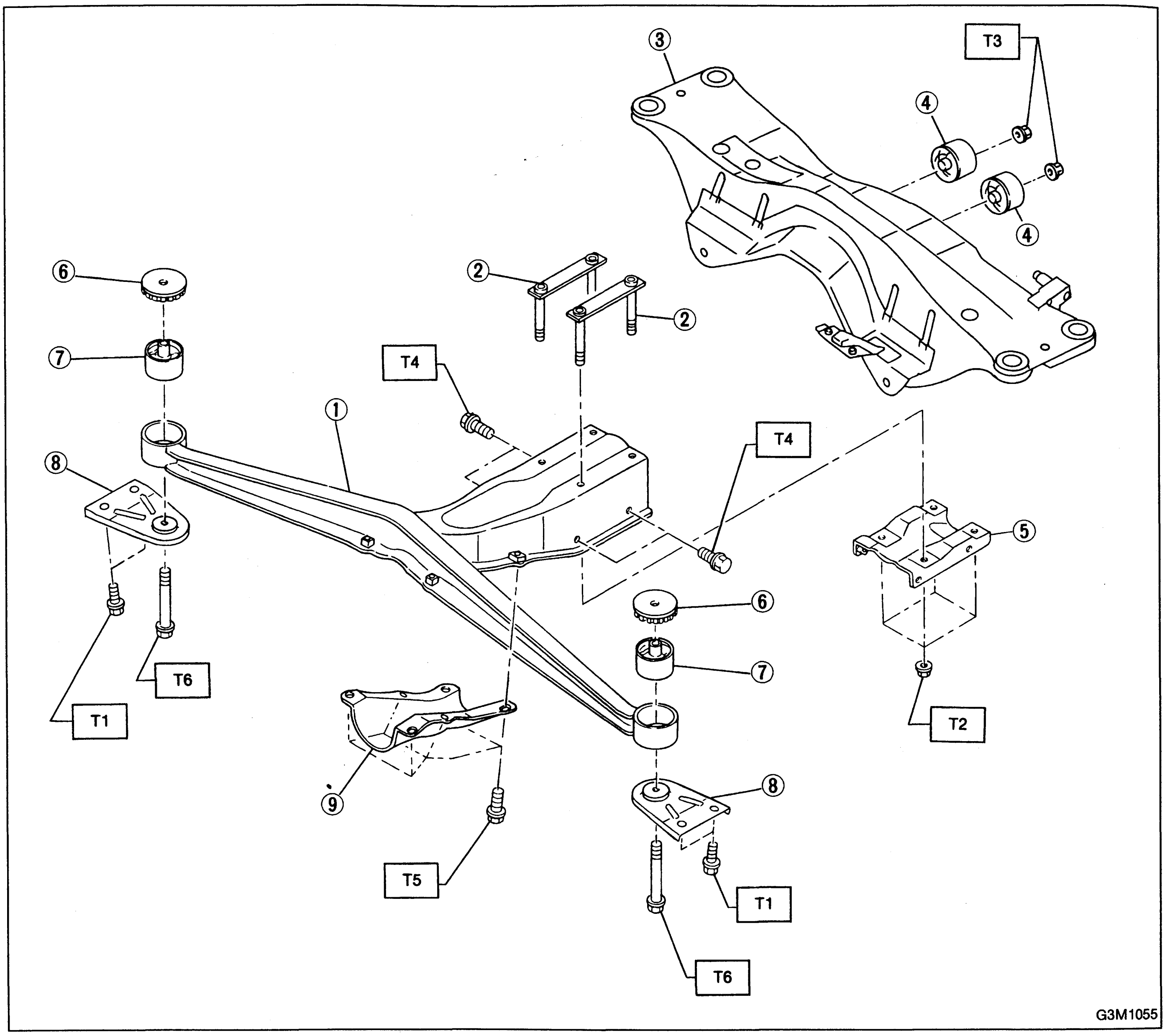
B: SERVICE DATA

2. REAR DIFFERENTIAL (TURBO MODEL)

Front and rear bearing preload at companion flange bolt hole	New bearing	19.6 — 28.4 N (2.0 — 2.9 kg, 4.4 —6.4 lb)
	Used bearing	8.34 — 16.67 N (0.85 — 1.7 kg, 1.87 — 3.75 lb)
Preload adjusting washer length	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)
Preload adjusting spacer length	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)

Pinion height adjusting shim thickness	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 bearing standard width	—	20.00 mm (0.7874 in)
Side bearing retainer shim thickness	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		0.10 — 0.20 mm (0.0039 — 0.0079 in)
Crown gear runout on its back surface	Limit	0.05 mm (0.0020 in)
Oil capacity		0.8 ℓ (0.8 US qt, 0.7 Imp qt)

1. Rear Differential Mounting System

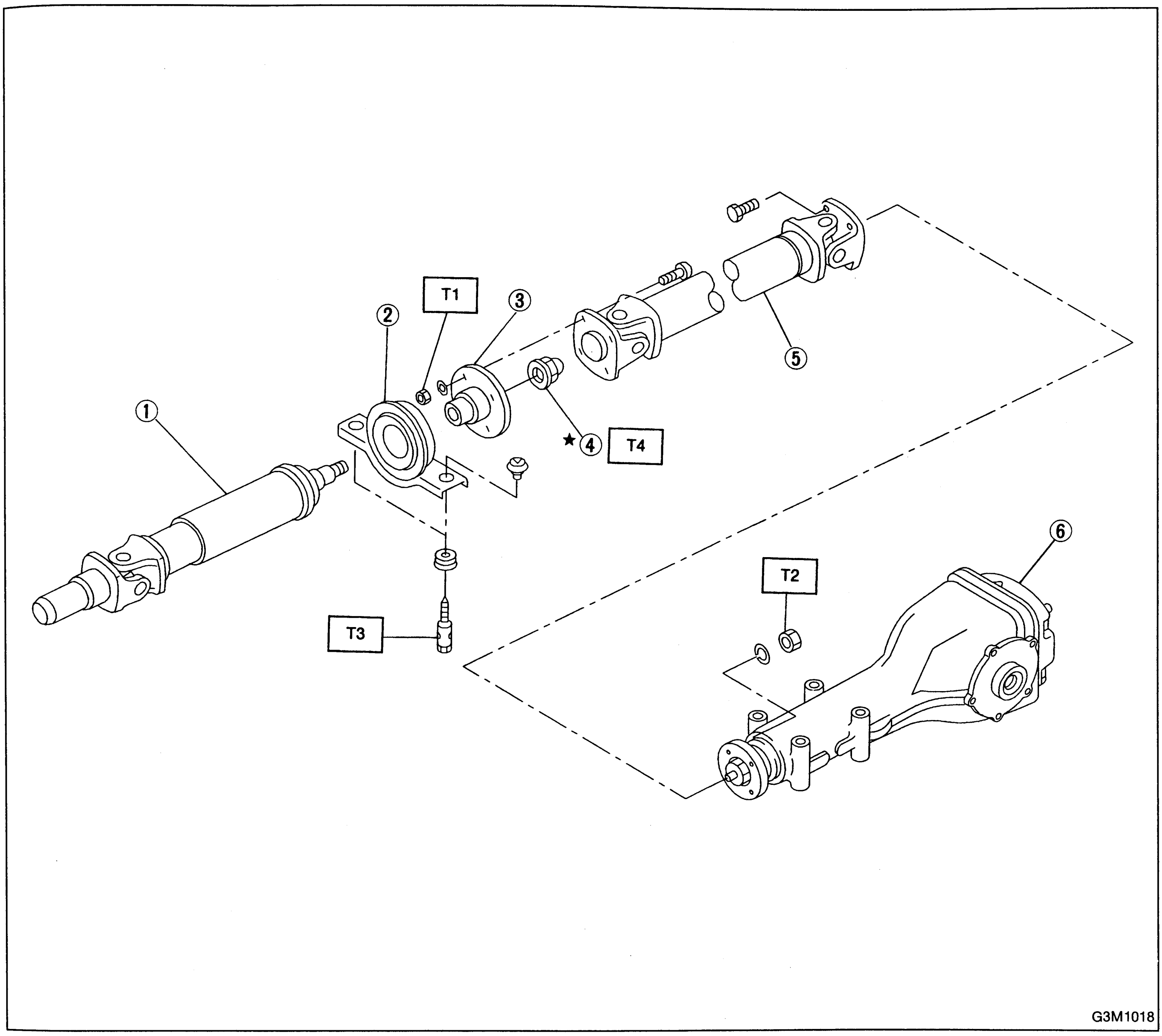


① Differential front member
② Plate
③ Crossmember
④ Rear bushing
⑤ Differential mount lower bracket
⑥ Stopper
⑦ Front bushing
⑧ Differential mount bracket
⑨ Differential mount front cover

Tightening torque: N·m (kg-m, ft-lb)
T1: 32±8 (3.3±0.8, 23.9±5.8)
T2: 64±8 (6.5±0.8, 47.0±5.8)
T3: 69±8 (7.0±0.8, 50.6±5.8)
T4: 69±10 (7.0±1.0, 51.0±7.2)
T5: 88±10 (9.0±1.0, 65.0±7.2)
T6: 98±10 (10.0±1.0, 72.0±7.2)

2. Propeller Shaft

2. TURBO MODEL

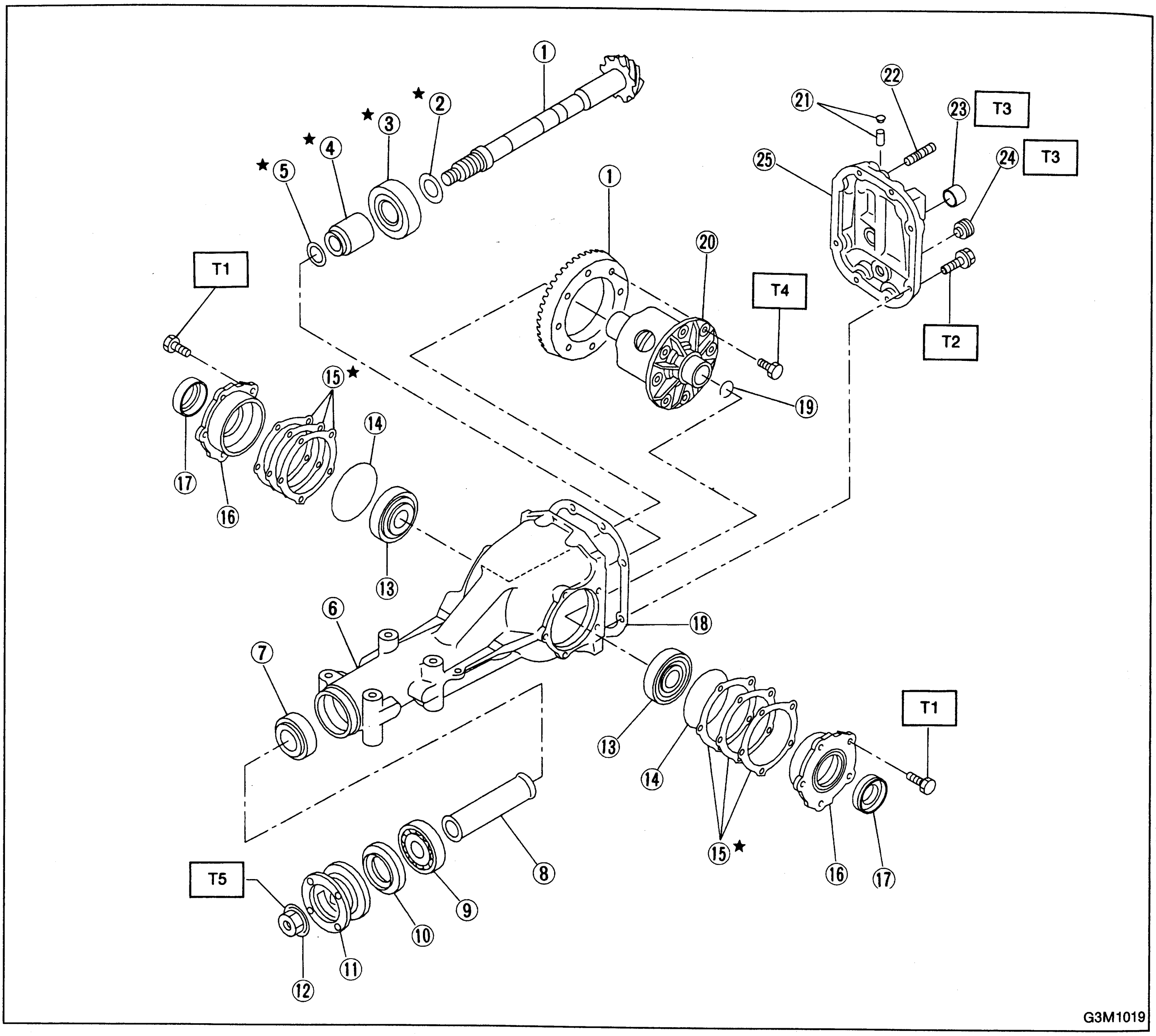


① Front propeller shaft
② Center bearing
③ Companion flange
④ Stake nut
⑤ Rear propeller shaft
⑥ Rear differential (LSD)

Tightening torque: N·m (kg-m, ft-lb)
- ***T1: 27.9±4.4 (2.85±0.45, 20.6±3.3)***
- ***T2: 31±8 (3.2±0.8, 23.1±5.8)***
- ***T3: 52±5 (5.3±0.5, 38.3±3.6)***
- ***T4: 270±25 (27.5±2.5, 199±18)***

3. Rear Differential Assembly

2. TURBO MODEL



1. Pinion crown gear set
2. Pinion height adjusting shim
3. Rear bearing
4. Bearing preload adjusting spacer
5. Bearing preload adjusting washer
6. Differential carrier
7. Front bearing
8. Collar
9. Pilot bearing
10. Front oil seal
11. Companion flange
12. Self-locking nut
13. Side bearing
14. O-ring
15. Side bearing retainer shim
16. Side bearing retainer
17. Side oil seal
18. Gasket
19. Circlip
20. Differential case
21. Air breather cap
22. Stud bolt
23. Oil filler plug
24. Oil drain plug
25. Rear cover

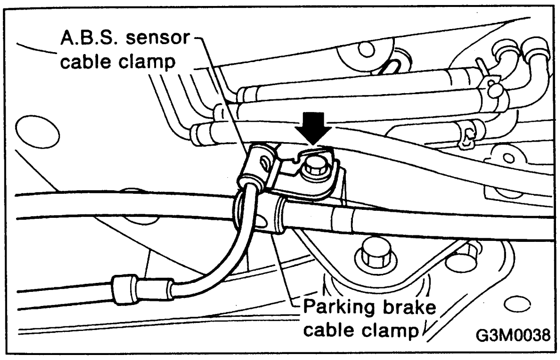
Tightening torque: N·m (kg-m, ft-lb)
T1: 10.3±1.5 (1.05±0.15, 7.6±1.1)
T2: 29.4±4.9 (3.00±0.50, 21.7±3.6)
T3: 49.0±9.8 (5.00±1.00, 36.2±7.23)
T4: 103.0±9.8 (10.50±1.00, 75.9±7.23)
T5: 181.4±14.7 (18.50±1.50, 133.8±10.8)

2. Rear Differential

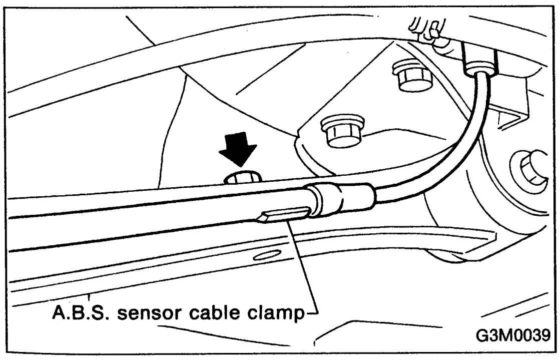
A: ON-CAR SERVICE

3. SIDE OIL SEAL (TURBO MODEL)

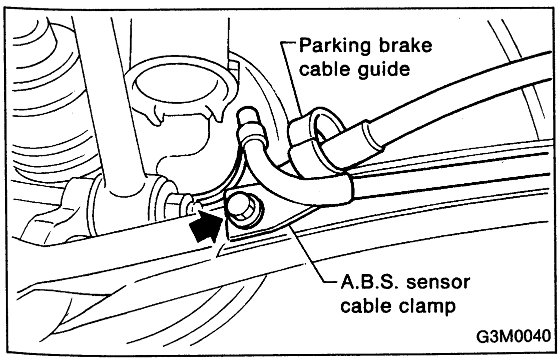
1) Disconnect ground cable from battery.
2) Move selector lever or gear shift lever to "N".
3) Release the parking brake.
4) Loosen both wheel nuts.
5) Jack-up the vehicle and support it with rigid racks.
6) Remove wheels.
7) Remove rear exhaust pipe and muffler.
<Ref. to G170GE2, 2-9 [W2A0, W3A0].>



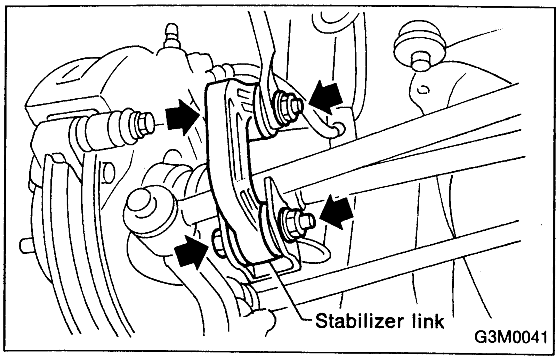
8) Remove the DOJ of rear drive shaft from rear differential.
(1) Remove the A.B.S. sensor cable clamp and parking brake cable clamp from bracket.



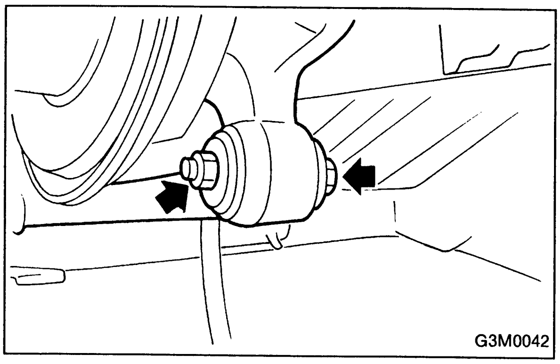
(2) Remove the A.B.S. sensor cable clamp from the trailing link.



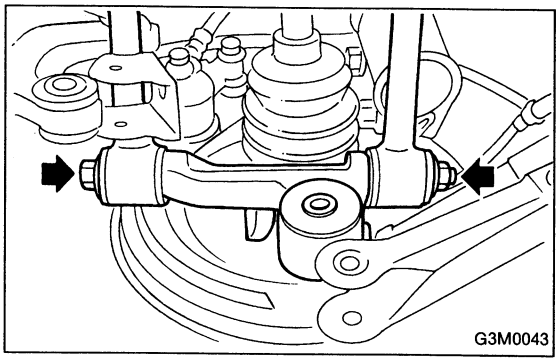
(3) Remove the A.B.S. sensor cable clamp and parking brake cable guide from the trailing link.



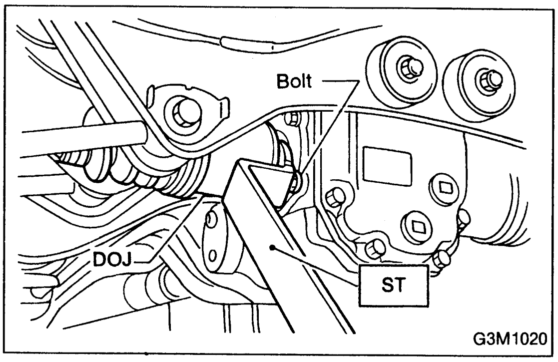
(4) Remove the rear stabilizer link.



(5) Remove the bolts which secure the trailing link to the rear housing.

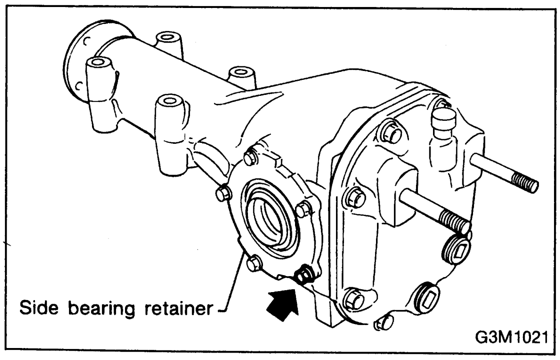


(6) Remove the bolts which secure the front and rear lateral link to the rear housing.

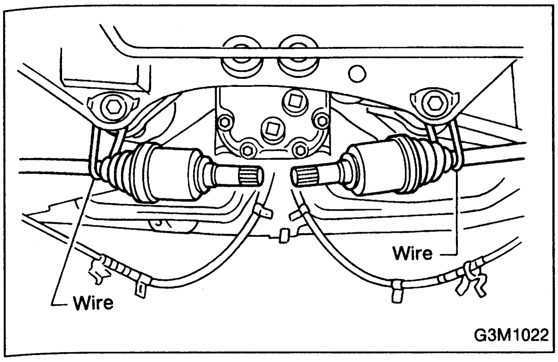


(7) Remove the DOJ from the rear differential by using ST.

ST 208099PA100 DRIVE SHAFT REMOVER

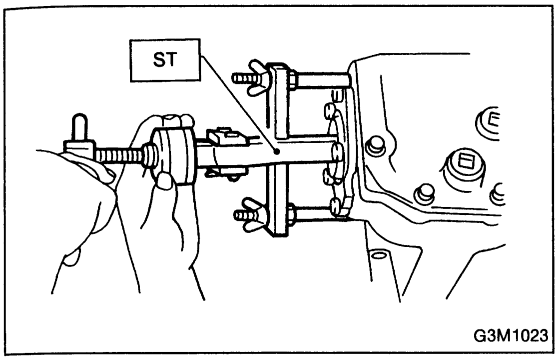


CAUTION:
When removing the DOJ from the rear differential, fit tire lever to the bolt as shown in figure so as not to damage the side bearing retainer.



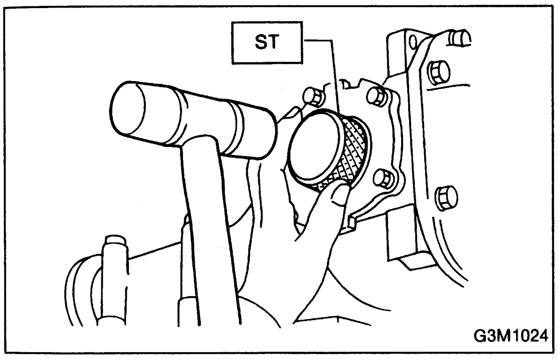
G3M1022

9) Secure rear drive shaft to rear crossmember using wire.



G3M1023

10) Remove side oil seal with ST.
ST 398527700 PULLER ASSY



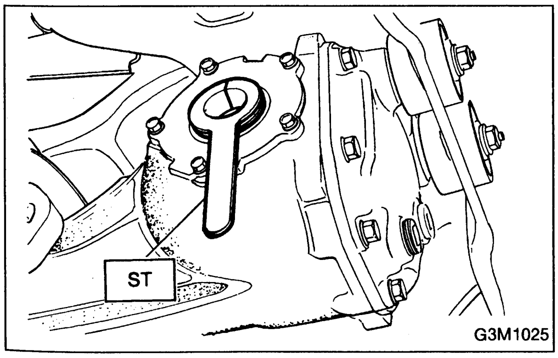
G3M1024

11) Drive in a new side oil seal with ST.

CAUTION:

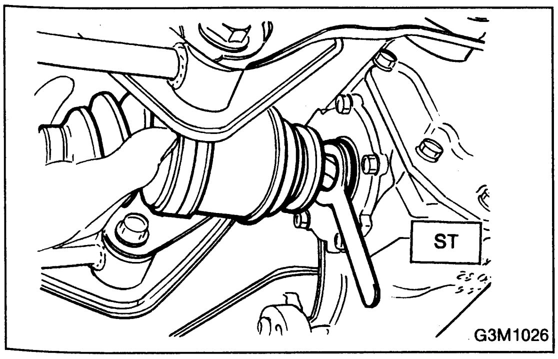
Apply chassis grease between the oil seal lips.

ST 398437700 DRIFT



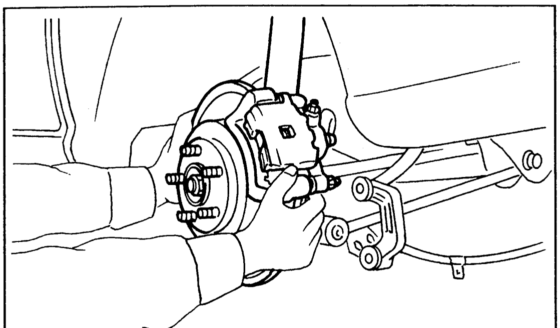
G3M1025

12) Insert the DOJ into rear differential.
(1) Install ST to rear differential.
ST 28099PA090 SIDE OIL SEAL PROTECTOR



G3M1026

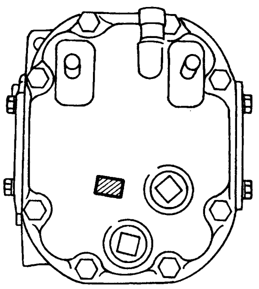
(2) Insert the spline shaft until the spline portion is inside the side oil seal.
(3) Remove ST.
ST 28099PA090 SIDE OIL SEAL PROTECTOR


G3M0050

(4) Completely insert DOJ into rear differential by pressing rear housing.

NOTE:
Make sure that oil seal lip is not folded over inward.

13) Hereafter, re-assemble in reverse order of disassembly.


G3M1049

B: IDENTIFICATION

2. TURBO MODEL

When replacing a rear differential assembly, select the correct one according to the following table.

CAUTION:
Using the different rear differential assembly causes the drive line and tires to "drag" or emit abnormal noise when AWD is selected.

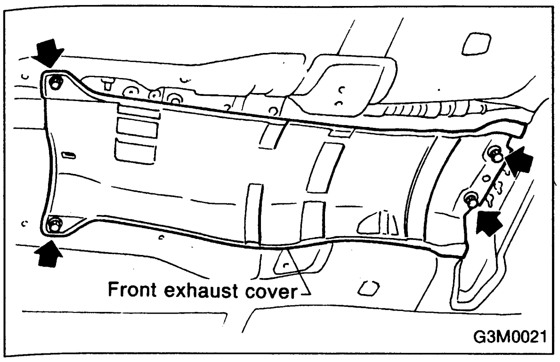
Gear ratio	Part number	Label stuck on rear differential
3.545	27011AA400	W T

G3M1027

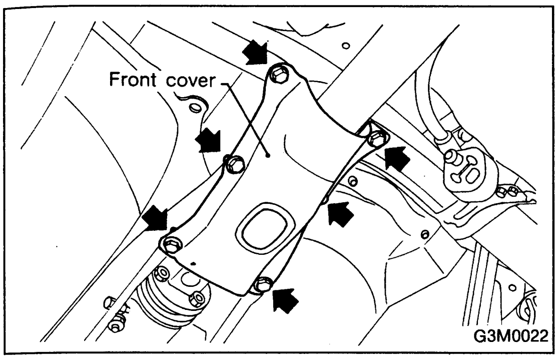
C: REMOVAL

2. TURBO MODEL

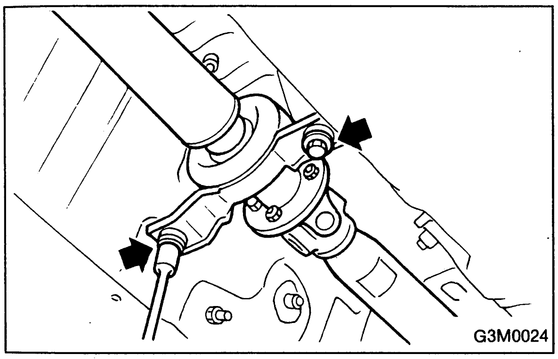
1) Disconnect ground cable from battery.
2) Move selector lever or gear shift lever to "N".
3) Release the parking brake.
4) Loosen wheel nuts.
5) Jack-up vehicle and support it with sturdy racks.
6) Remove wheels.
7) Remove rear exhaust pipe and muffler.
<Ref. to G170GE2, 2-9 [W2A0, W3A0].>



8) Remove front exhaust cover.



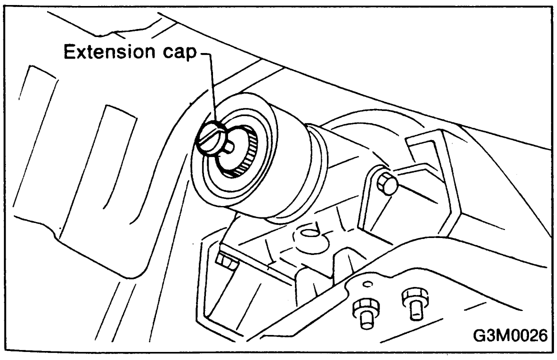
9) Remove front cover of rear differential mount.



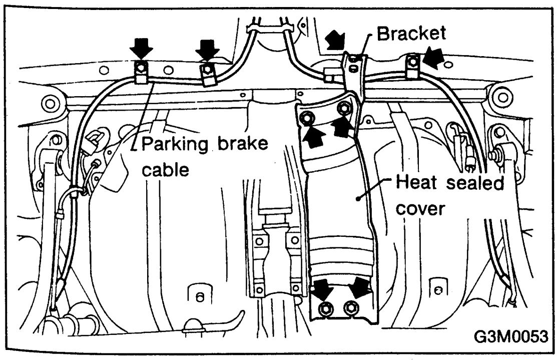
10) Remove propeller shaft.

CAUTION:
When removing propeller shaft, pay attention not to damage the sliding surfaces of rear drive shaft (extension) spline, oil seal and sleeve yoke.

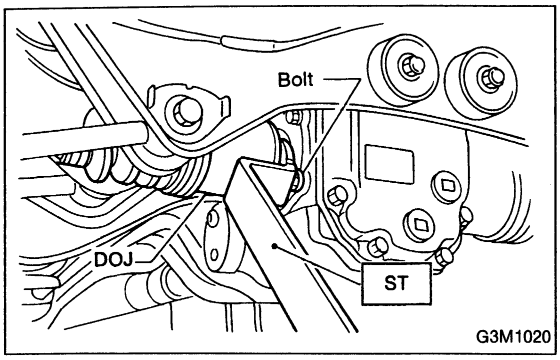
NOTE:
Prepare an oil can and cap since the transmission oil flows out from the extension at removing propeller shaft.



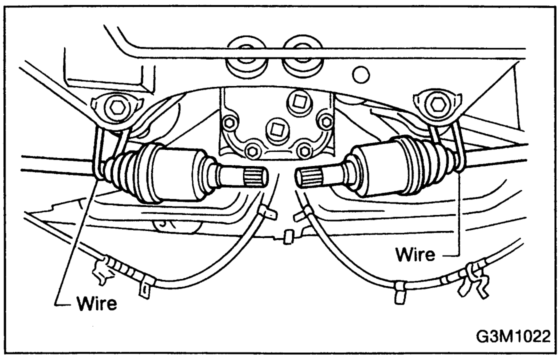
NOTE:
Insert the cap into the extension to prevent transmission oil from flowing out immediately after removing the propeller shaft.



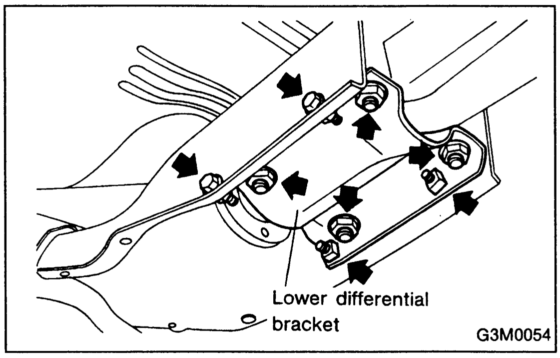
11) Remove heat sealed cover.
12) Remove clamps and bracket of parking brake cable.



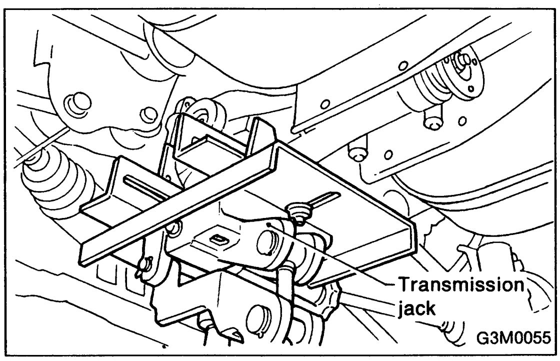
13) Remove DOJ of rear drive shaft from rear differential using ST. <Ref. to G173GE2, 3-4 [W2A3].>
ST 28099PA100 DRIVE SHAFT REMOVER



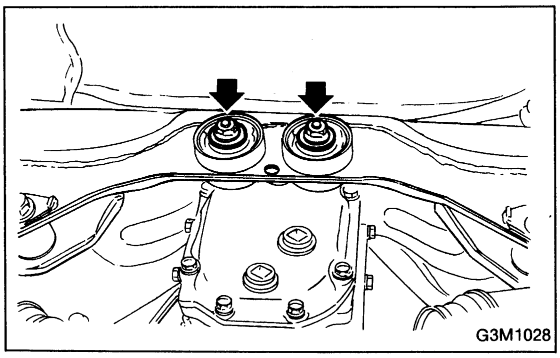
14) Secure rear drive shaft to rear crossmember using wire.



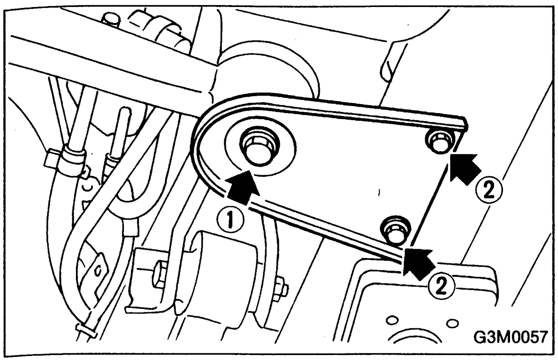
15) Remove lower differential bracket.



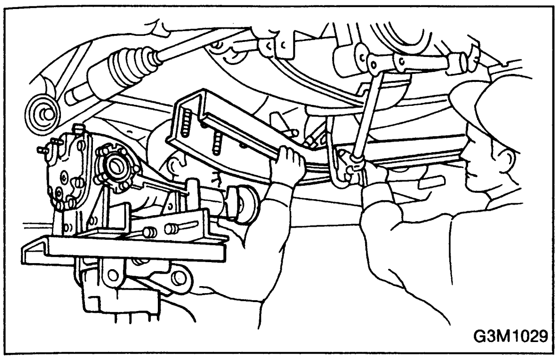
16) Support rear differential with transmission jack.



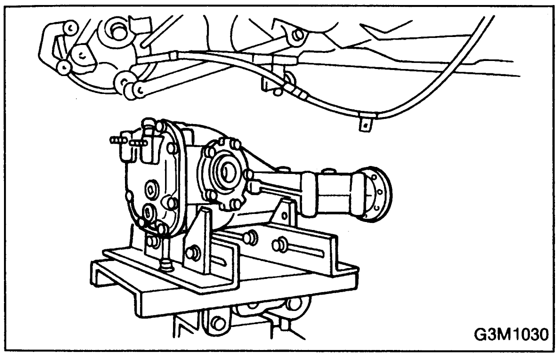
17) Remove self-locking nuts connecting rear differential to rear crossmember.



18) Remove bolts which secure rear differential front member to body.
Loosen bolt ① first, then remove bolts ②.
NOTE:
Support front member with the use of a helper to prevent it from dropping.



19) While slowly lowering transmission jack, move rear differential forward and remove bolts from rear crossmember.
20) Remove front member from body.

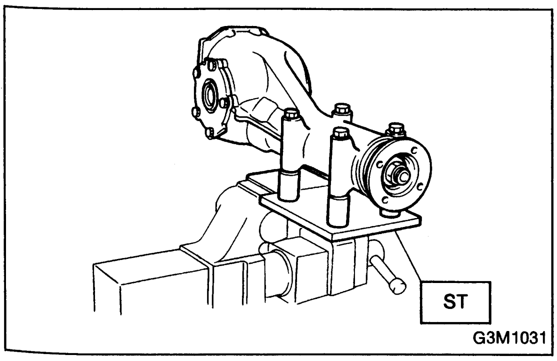


21) Remove rear differential from body.

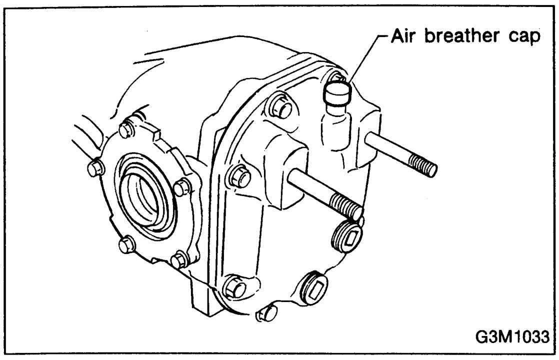
D: DISASSEMBLY

2. TURBO MODEL

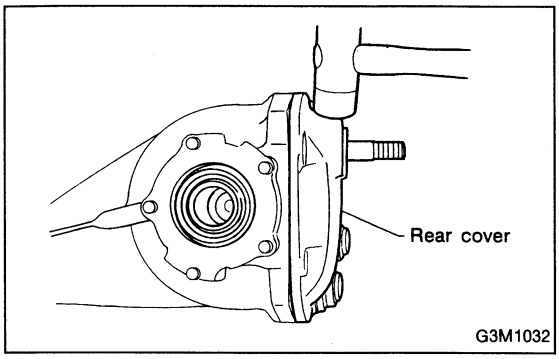
To detect real cause of trouble, inspect the following items before disassembling. <Ref. to G173GE2, 3-4 [W2F2].>
- Tooth contact of crown gear and pinion, and backlash
- Runout of crown gear at its back surface
- Turning resistance of drive pinion



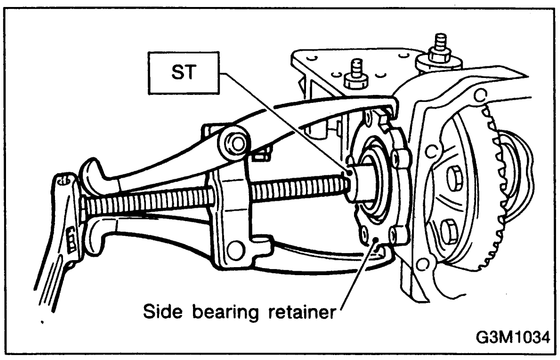
1) Set ST on vise and install the differential assembly to ST.
ST 398217700 ATTACHMENT
2) Drain gear oil by removing plug.



3) Remove the air breather cap.
NOTE:
Do not attempt to replace the air breather cap unless necessary.

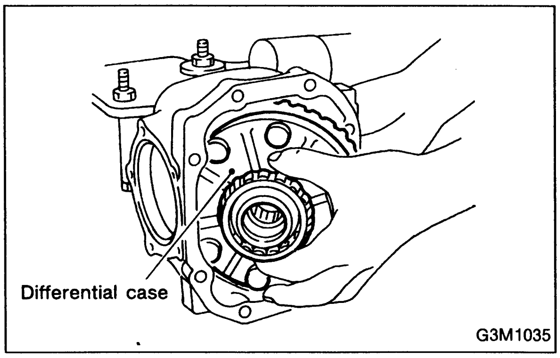


4) Remove rear cover by loosening retaining bolts.



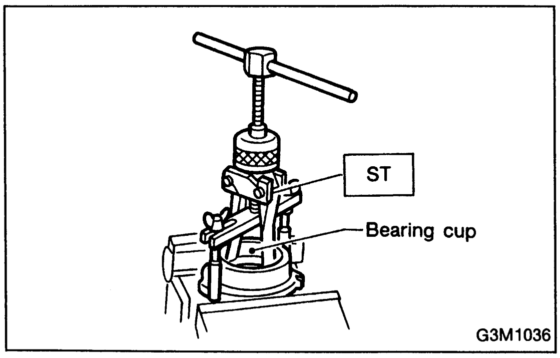
5) Make right and left side bearing retainers in order to identify them at reassembly. Remove side bearing retainer attaching bolts, set ST to differential case, and extract right and left side bearing retainers with a puller.
ST 398457700 ATTACHMENT

CAUTION:
Each shim, which is installed to adjust the side bearing preload, should be kept together with its mating retainer.

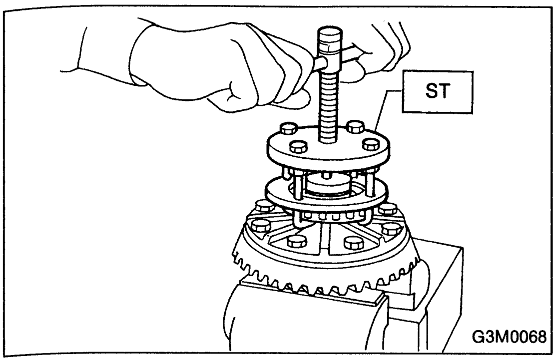


6) Pull out differential assembly from differential carrier.

CAUTION:
Be careful not to hit the teeth against the case.



7) When replacing side bearing, pull bearing cup from side bearing retainer using ST.
ST 398527700 PULLER ASSY



8) Extract bearing cone with ST.

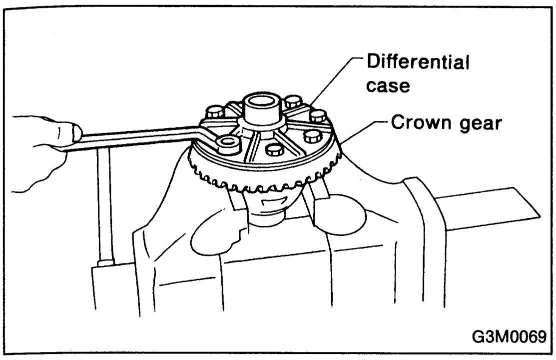
CAUTION:

Do not attempt to disassemble the parts unless necessary.

NOTE:

- Set puller so that its claws catch the edge of the bearing cone.
- Never mix up the right and left hand bearing cups and cones.

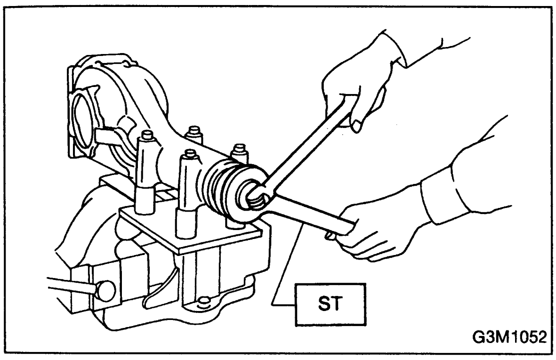
ST 399527700 PULLER SET



9) Remove crown gear by loosening crown gear bolts.

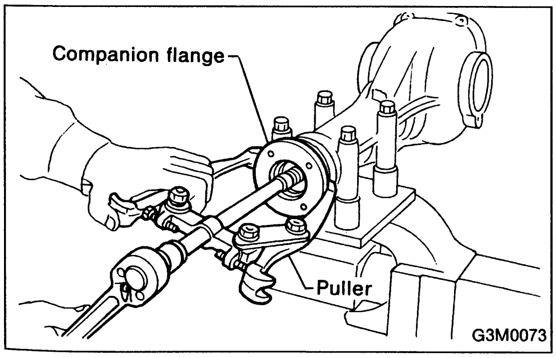
CAUTION:

Further disassembling is not allowed.

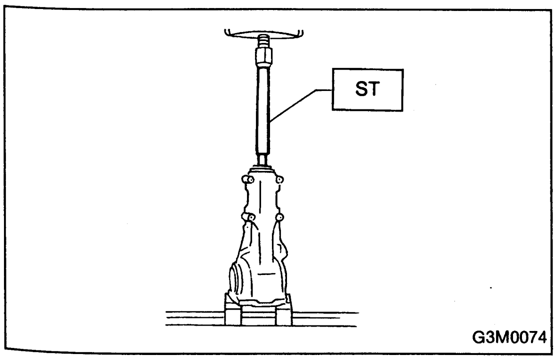


10) Hold companion flange with ST and remove drive pinion nut.

ST 498427200 FLANGE WRENCH



11) Extract the companion flange with a puller.

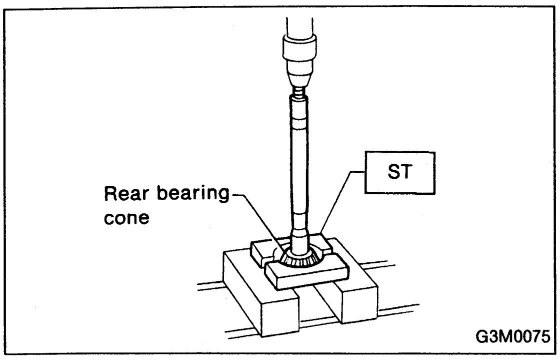


12) Press the end of drive pinion shaft and extract it together with rear bearing cone, preload adjusting spacer and washer.

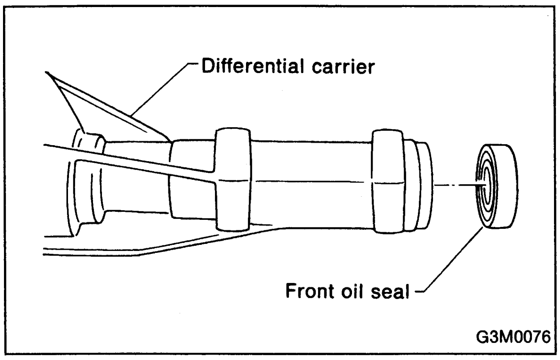
NOTE:

Hold the drive pinion so as not to drop it.

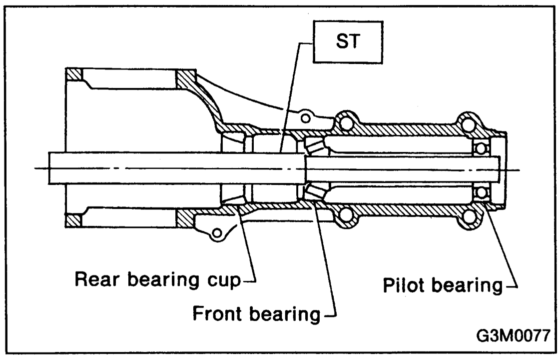
ST 398467700 DRIFT



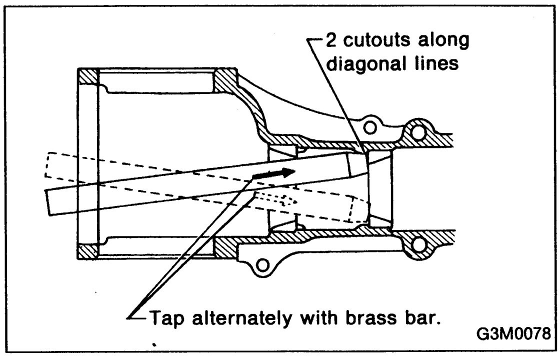
13) Remove rear bearing cone from drive pinion by supporting cone with ST.
NOTE:
Place the replacer so that its center-recessed side faces the pinion gear.
ST 398517700 REPLACER



14) Remove front oil seal from differential carrier using ST.
ST 398527700 PULLER ASSY



15) Remove pilot bearing together with front bearing cone using ST.
ST 398467700 DRIFT



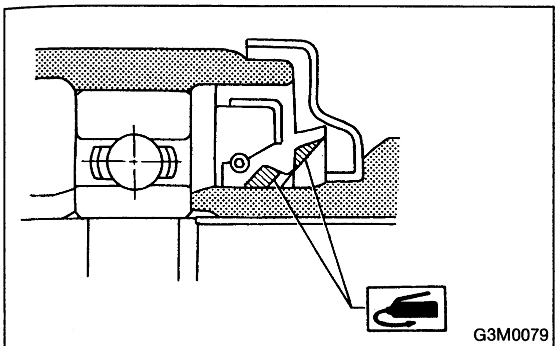
16) When replacing bearings, tap front bearing cup and rear bearing cup in this order out of case by using a brass bar.

F: ASSEMBLY

2. TURBO MODEL

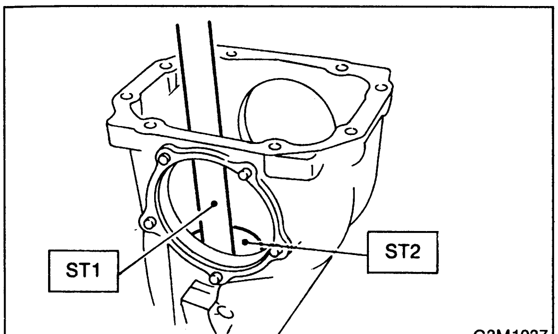
1) Precautions for assembling
   (1) Assemble in the reverse order of disassembling.
   (2) Check and adjust each part during assembly.
   (3) Keep the shims and washers in order, so that they are not misinstalled.
   (4) Thoroughly clean the surfaces on which the shims, washers and bearings are to be installed.

(5) Apply gear oil when installing the bearings and thrust washers.
(6) Be careful not to mix up the right and left hand cups of the bearings.



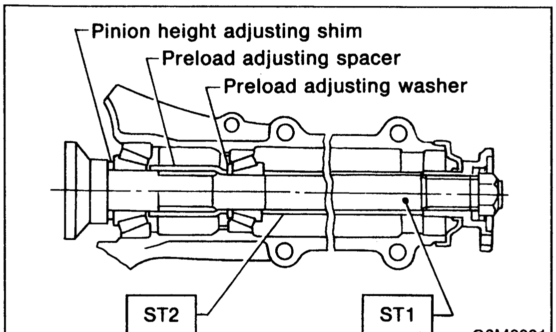
G3M0079

(7) Replace the oil seal with new one at every disassembly. Apply chassis grease between the lips when installing the oil seal.



G3M1037

2) Adjusting preload for front and rear bearings
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.
(1) Press rear bearing race into differential carrier with ST1 and ST2.
ST1 398477701 HANDLE
ST2 398427703 DRIFT 2

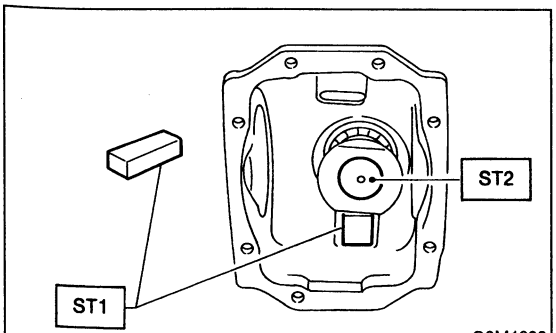


G3M0081

(2) Insert ST1 into case with pinion height adjusting washer and rear bearing cone fitted onto it.

CAUTION:
- **Re-use the used washer if not deformed.**
- **Use a new rear bearing cone.**

(3) Then install preload adjusting spacer and washer, front bearing cone, ST2, companion flange, and washer and drive pinion nut.
ST1 398507702 DUMMY SHAFT
ST2 398507703 DUMMY COLLAR

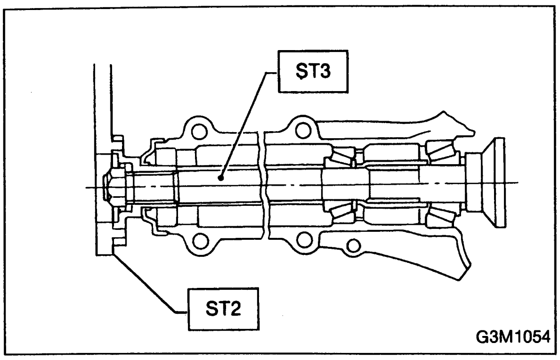


G3M1038

(4) Turn ST1 with hand to make it seated, and tighten drive pinion nut while measuring the preload with spring balance. Select preload adjusting washer and spacer so that the specified preload is obtained when nut is tightened to the specified torque with ST2.

CAUTION:
Use a new lock nut.

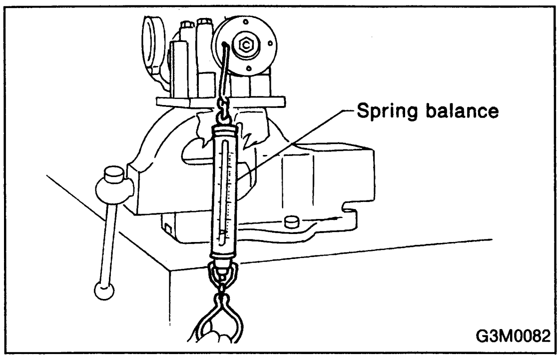
NOTE:
- Be careful not to give excessive preload.



- When tightening the drive pinion nut, lock ST1 with ST2 as shown in the figure.

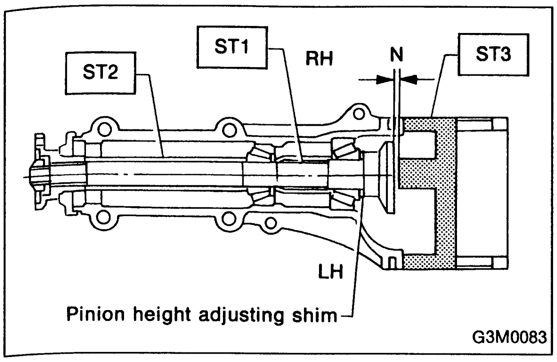
ST1 398507704 BLOCK
ST2 398507702 DUMMY SHAFT
ST3 498427200 FLANGE WRENCH

Tightening Torque:
181±15 N·m (18.5±1.5 kg-m, 134±11 ft-lb)

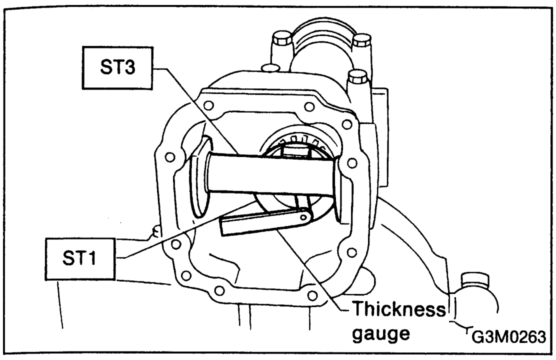


Front and rear bearing preload
For new bearing: 19.6 — 28.4 N (2.0 — 2.9 kg, 4.4 — 6.4 lb) at companion flange bolt hole

	Part No.	Length mm (in)
• Preload adjusting washer length	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)
• Preload adjusting spacer length	383695201	56.2 (2.213)
	383695202	56.4 (2.220)
	383695203	56.6 (2.228)
	383695204	56.8 (2.236)
	383695205	57.0 (2.244)
	383695206	57.2 (2.252)



3) Adjusting drive pinion height
Adjust drive pinion height with shim installed between rear bearing cone and the back of pinion gear.
(1) Install ST1, ST2 and ST3, as shown in the figure, and apply the specified preload on the bearings. <Ref. to 2).> "Adjusting preload for front and rear bearings"
NOTE:
At this time, install a pinion height adjusting shim which is temporarily selected or the same as that used before.

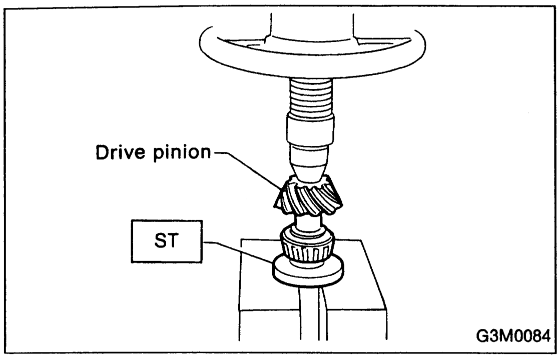


(2) Measure the clearance N between the end of ST3 and the end surface of ST1 by using a thickness gauge.
NOTE:
Make sure there is no clearance between the case and ST3.

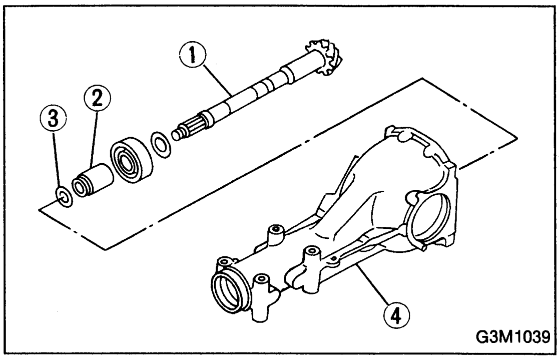
ST1 398507702 DUMMY SHAFT
ST2 398507703 DUMMY COLLAR
ST3 398507701 DIFFERENTIAL CARRIER GAUGE

(3) Obtain the thickness of pinion height adjusting shim to be inserted from the following formula, and replace the temporarily installed shim with this one.
T = To + N – (H x 0.01) – 0.20 (mm)
Where:
T = Thickness of pinion height adjusting shim (mm)
To = Thickness of shim temporarily inserted (mm)
N = Reading of thickness gauge (mm)
H = Figure marked on drive pinion head
(Example of calculation)
To = 2.20 + 1.20 = 3.40 mm
N = 0.23 mm H = + 1,
T = 3.40 + 0.23 – 0.01 – 0.20 = 3.42
Result: Thickness = 3.42 mm
Therefore use the shim 383605200.

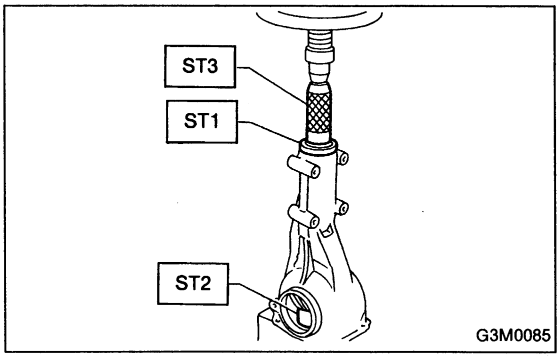
	Part No.	Thickness mm (in)
• Pinion height adjusting shim thickness	383495200	3.09 (0.1217)
	383505200	3.12 (0.1228)
	383515200	3.15 (0.1240)
	383525200	3.18 (0.1252)
	383535200	3.21 (0.1264)
	383545200	3.24 (0.1276)
	383555200	3.27 (0.1287)
	383565200	3.30 (0.1299)
	383575200	3.33 (0.1311)
	383585200	3.36 (0.1323)
	383595200	3.39 (0.1335)
	383605200	3.42 (0.1346)
	383615200	3.45 (0.1358)
	383625200	3.48 (0.1370)
	383635200	3.51 (0.1382)
	383645200	3.54 (0.1394)
	383655200	3.57 (0.1406)
	383665200	3.60 (0.1417)
	383675200	3.63 (0.1429)
	383685200	3.66 (0.1441)



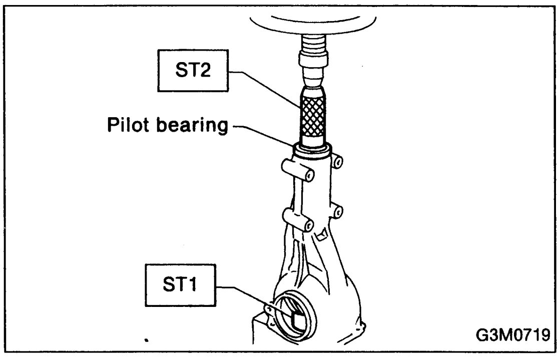
4) Install the selected pinion height adjusting shim on drive pinion, and press the rear bearing cone into position with ST.
ST 398177700 INSTALLER



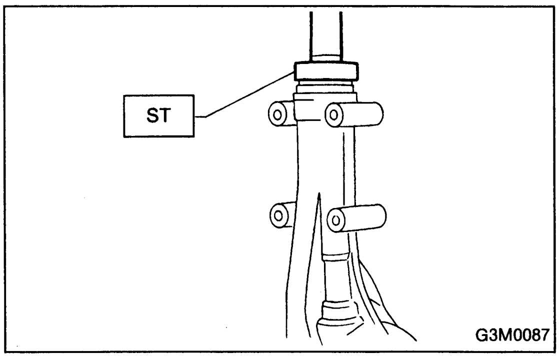
5) Insert drive pinion ① into differential carrier ④, install the previously selected bearing preload adjusting spacer ② and washer ③.



6) Press-fit front bearing cone into case with ST1, ST2 and ST3.
ST1 398507703 DUMMY COLLAR
ST2 399780104 WEIGHT
ST3 899580100 INSTALLER

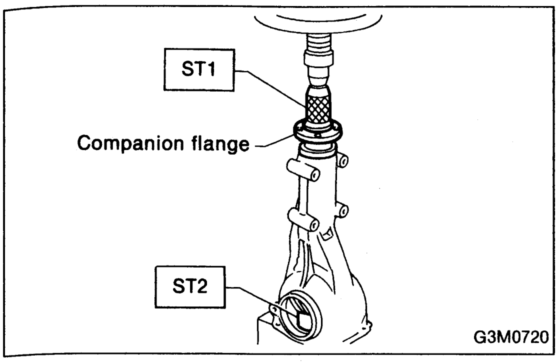


7) Insert spacer, then press-fit pilot bearing with ST1 and ST2.
ST1 399780104 WEIGHT
ST2 899580100 INSTALLER



8) Fit a new oil seal with ST.
NOTE:
- Press-fit until end of oil seal is 1 mm (0.04 in) inward from end of carrier.
- Apply grease between the oil seal lips. <Ref. to 1).> "Precautions for assembling"

ST 498447120 OIL SEAL INSTALLER



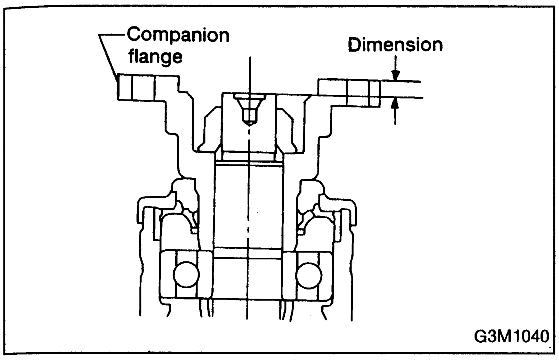
G3M0720

9) Press-fit companion flange with ST1 and ST2 until flange protrudes 0 to 5 mm (0 to 0.20 in) beyond shaft.

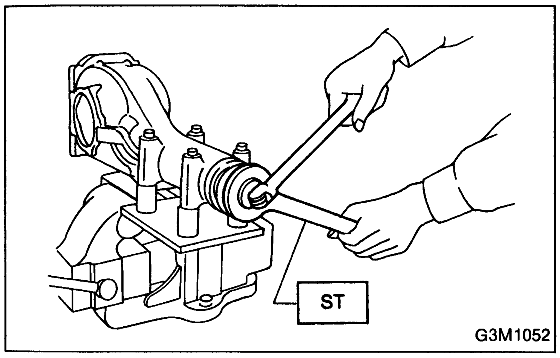
CAUTION:

Be careful not to damage bearing.

ST1 899874100 INSTALLER
ST2 399780104 WEIGHT



G3M1040

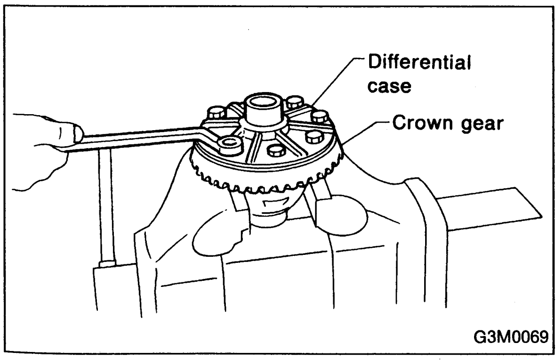


G3M1052

10) Install self-locking nut. Then tighten it with ST.

ST 498427200 FLANGE WRENCH

Tightening torque:
181±15 N·m (18.5±1.5 kg-m, 134±11 ft-lb)

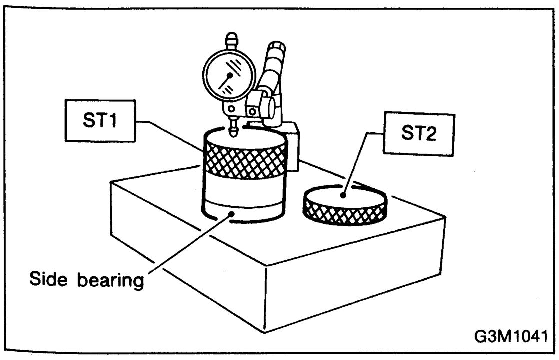


G3M0069

11) Install crown gear on differential case.

Tightening Torque:
103±10 N·m (10.5±1.0 kg-m, 76±7 ft-lb)

NOTE:
Tighten diagonally while tapping the bolt heads.



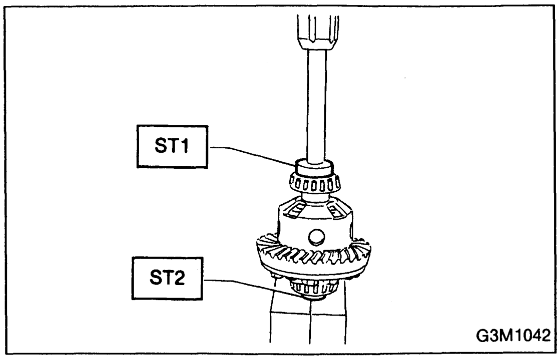
G3M1041

12) Before installing side bearing, measure the bearing width by using a dial gauge, ST1 and ST2.

Standard bearing width:
20.00 mm (0.7874 in)

NOTE:
Set the dial gauge needle to zero, using a standard bearing or block of specified height in advance.

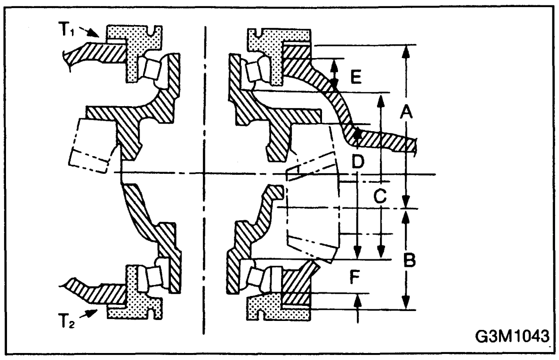
ST1 398227700 WEIGHT
ST2 398237700 GAUGE



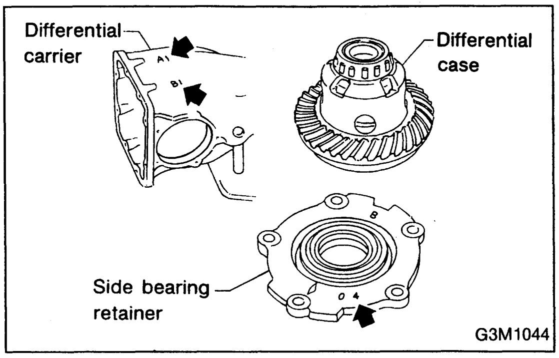
G3M1042

13) Press side bearing cone onto differential case with ST1 and ST2 included in ST3.

ST1 398487700 DRIFT
ST2 398497701 ADAPTER
ST3 399527700 PULLER SET



G3M1043



G3M1044

14) Adjusting side bearing retainer shims

(1) The drive gear backlash and side bearing preload can be determined by the side bearing retainer shim thickness.

(2) When replacing differential case, differential carrier, side bearing and side bearing retainer, obtain the right and left retainer shim thickness from the following formulas.

T_1 (Left) = $(A + C + G_1 - D) \times 0.01 + 0.76 - E$ (mm)

T_2 (Right) = $(B + D + G_2) \times 0.01 + 0.76 - F$ (mm)

T_1 & T_2 : Thickness of left and right side bearing retainer shim (mm)

A & B : Number marked on differential carrier

C & D : Number marked on differential case

E & F : Difference of width of left and right side bearing from standard width 20.0 mm, expressed in a unit of 0.01 mm. For example, if the bearing measured width is 19.89 mm, value of E or F is as follows. $20.00 - 19.89 = 0.11$ (E or F)

G_1 & G_2 : Number marked on side bearing retainer

If a number is not marked, regard it as zero.

NOTE:
Use several shims to obtain the calculated thickness.

	Part No.	Thickness mm (in)
• Side bearing retainer shim thickness	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)

Example of calculation

Ex. 1

$A = 5, B = 5, C = 3, D = 3, G_1 = 4, G_2 = 1,$
$E = 0.10$ mm, $F = 0.15$ mm

Left side

$T_1 = (A + C + G_1 - D) \times 0.01 + 0.76 - E$
$= (5 + 3 + 4 - 3) \times 0.01 + 0.76 - 0.10$
$= 0.09 + 0.76 - 0.10 = 0.75$ mm

The correct shims are as follows:

Thickness		Q'ty	
0.25	x	1	= 0.25
0.50	x	1	= 0.50
Total shim thickness			= 0.75 mm

Right side

$T_2 = (B + D + G_2) \times 0.01 + 0.76 - F$
$= (5 + 3 + 1) \times 0.01 + 0.76 - 0.15$
$= 0.09 + 0.76 - 0.15$
$= 0.70$ mm

The correct shims are as follows:

Thickness		Q'ty	
0.20	x	1	= 0.20
0.50	x	1	= 0.50
Total shim thickness			= 0.70 mm

Ex. 2

$A = 2, B = 3, C = 0, D = 3, G_1 = 2, G_2 = 3,$
$E = 0.22$ mm, $F = 0.10$ mm

Left side

$T_1 = (A + C + G_1 - D) \times 0.01 + 0.76 - E$
$= (2 + 0 + 2 - 3) \times 0.01 + 0.76 - 0.22$
$= 0.01 + 0.76 - 0.22$
$= 0.55$ mm

The correct shims are as follows:

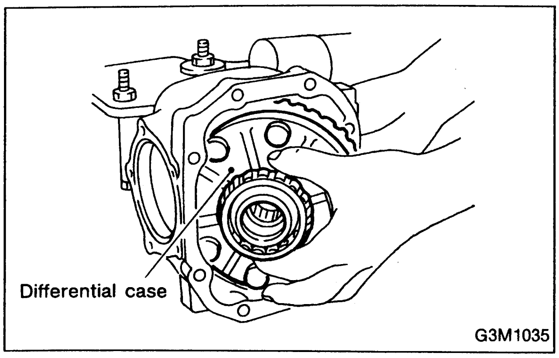
Thickness		Q'ty	
0.25	x	1	= 0.25
0.30	x	1	= 0.30
Total shim thickness			= 0.55 mm

Right side

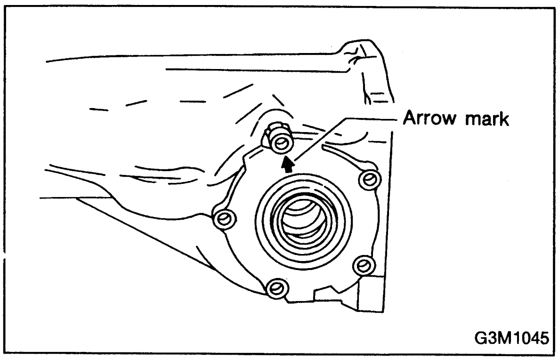
$T_2 = (B + D + G_2) \times 0.01 + 0.76 - F$
$= (3 + 3 + 3) \times 0.01 + 0.76 - 0.10$
$= 0.09 + 0.76 - 0.10$
$= 0.75$ mm

The correct shims are as follows:

Thickness		Q'ty	
0.25	x	1	= 0.25
0.50	x	1	= 0.50
Total shim thickness			= 0.75 mm

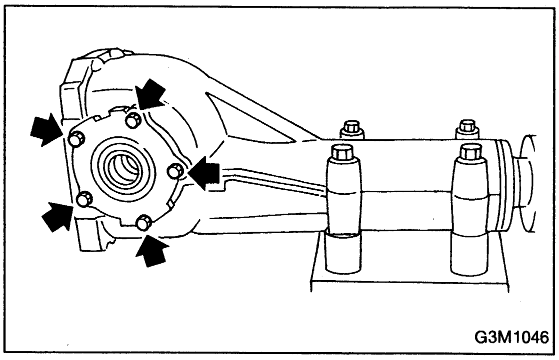


(3) Install the differential case assembly into differential carrier in the reverse order of disassembly.



(4) Fit the selected shims and O-ring on side bearing retainer and install them on differential carrier with the arrow mark on the retainer directed as shown in figure.

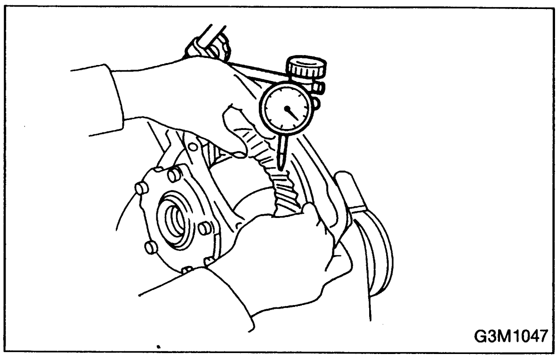
CAUTION:
Be careful that side bearing cup is not damaged by bearing roller.



(5) Tighten side bearing retainer bolts.

Tightening Torque:
10.3 ± 1.5 N·m (1.05 ± 0.15 kg-m, 7.6 ± 1.1 ft-lb)

NOTE:
On vehicles with LSD, apply a coat of THREE BOND 1215 (Part No. 004403007) to threads.



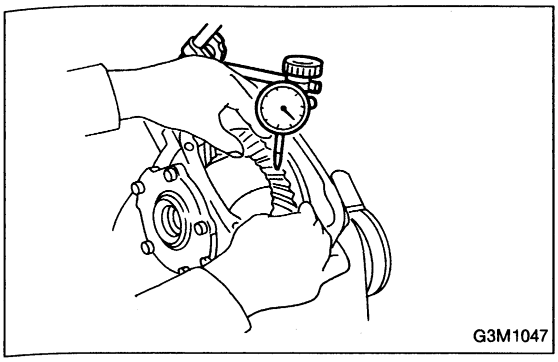
(6) Measure the crown gear-to-drive pinion backlash. Set magnet base on differential carrier. Align contact point of dial gauge with tooth face of crown gear, and move crown gear while holding drive pinion still. Read value indicated on dial gauge.

Backlash:
0.10 — 0.20 mm (0.0039 — 0.0079 in)

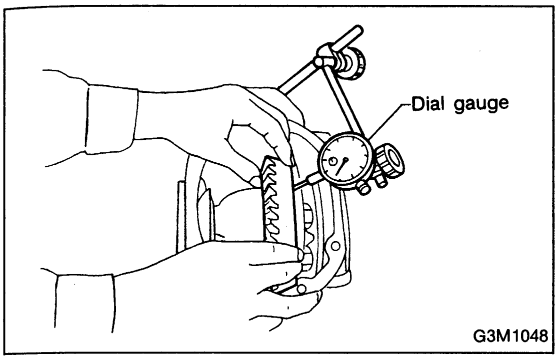
(7) At the same time, measure the turning resistance of drive pinion. Compared with the resistance when differential case is not installed, if the increase of the resistance is not within the specified range, readjust side bearing retainer shims.

Turning resistance increase:
0.1 — 0.6 N·m (1 — 6 kg-cm, 0.9 — 5.2 in-lb)

NOTE:
If measured backlash is not within specified range, repeat steps (1) thru (7).



15) Re-check crown gear-to-pinion backlash.
Backlash:
0.10 — 0.20 mm (0.0039 — 0.0079 in)



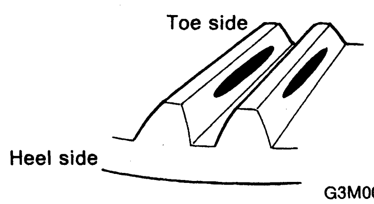
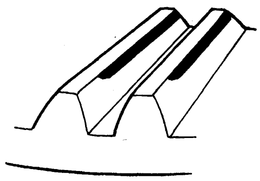
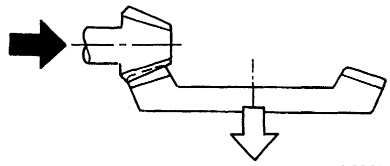
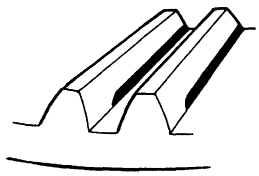
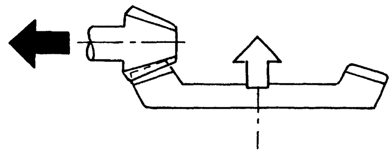
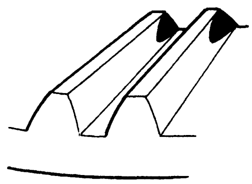
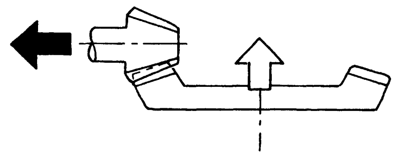
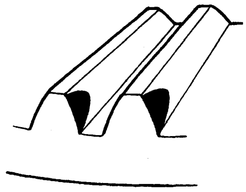
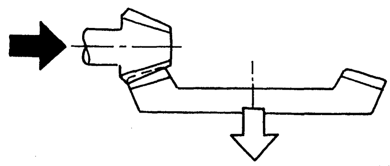
16) Check the crown gear runout on its back surface, and make sure pinion and crown gear rotate smoothly.
Limit of runout:
0.05 mm (0.0020 in)

17) 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 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".

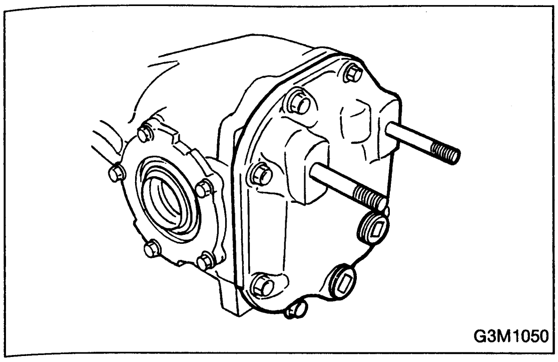
NOTE:
Be sure to wipe off red lead completely after adjustment is completed.

18) If proper tooth contact is not obtained, once again adjust the drive pinion height and the differential side bearing preload (mentioned above) and the hypoid gear backlash.

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


G3M1050

19) Install rear cover and tighten bolts to specified torque.

Tightening torque:

29±5 N·m (3.0±0.5 kg-m, 21.7±3.6 ft-lb)

G: INSTALLATION

2. TURBO MODEL

To install, reverse the removal sequence.

1) Install the air breather cap tapping with a plastic hammer.

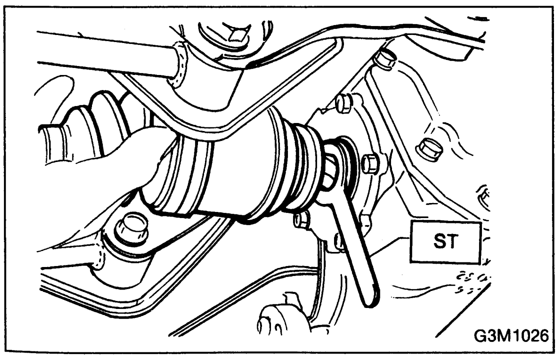
CAUTION:

Be sure to install new air breather cap.

2) Position front member on body by passing it under parking brake cable and securing to rear differential.

NOTE:

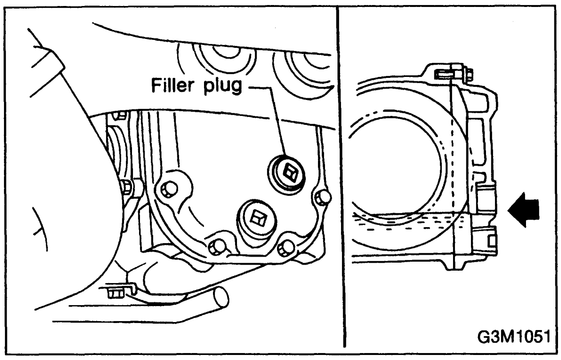
When installing rear differential front member, do not confuse the installation sequence of the upper and lower stoppers.



G3M1026

3) Install DOJ of rear drive shaft into rear differential. <Ref. to 3-4 [W2A3].>

ST 28099PA090 SIDE OIL SEAL PROTECTOR



G3M1051

4) Installing procedure hereafter is in the reverse order of removal.
5) After installation, fill differential carrier with gear oil to the upper plug level.

CAUTION:
Apply fluid packing to plug.

Fluid packing:
THREE BOND 1205 or equivalent

Oil capacity:
0.8 ℓ (0.8 US qt, 0.7 Imp qt)

Tightening torque:
44±4 N·m (4.5±0.4 kg-m, 32.5±2.9 ft-lb)

SUSPENSION 4-1

Page

S SPECIFICATIONS AND SERVICE DATA 2
1. Suspension 2
C COMPONENT PARTS
1. Suspension
W SERVICE PROCEDURE
1. On-car Services
2. Front Transverse Link
3. Front Ball Joint
4. Front Strut
5. Front Stabilizer
6. Front Crossmember
7. Rear Trailing Link
8. Lateral Link
9. Rear Strut
10. Rear Crossmember (FWD Model)
11. Rear Crossmember (AWD Model)
T DIAGNOSTICS
1. Suspension

1. Suspension

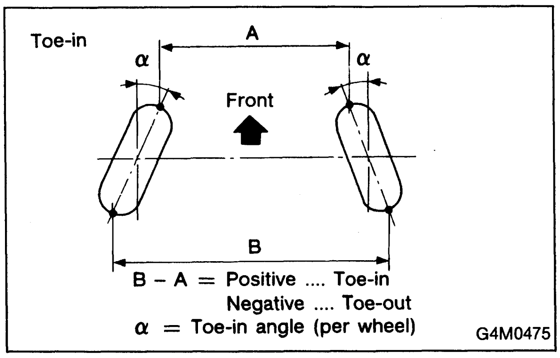
A: SPECIFICATIONS

1. STABILIZER

	Bar dia. mm (in)	
	Front	Rear
4 door Sedan	19 (0.75)	—
	19 (0.75)	13 (0.51)
4 door Sedan TURBO	19 (0.75)	17 (0.67)
5 door	19 (0.75)	—
5 door TURBO	19 (0.75)	17 (0.67)

B: WHEEL ALIGNMENT

		4 door Sedan			5 door		
		FWD	AWD	TURBO	FWD	AWD	TURBO
Front	Camber (tolerance: ±0°30′)	–0°15′	0°	–0°25′	–0°15′	0°	–0°25′
	Caster (common difference: ±1°)	3°05′	3°	3°05′	2°50′	2°45′	3°05′
	Toe-in mm (in)	0±3 (0±0.12) Toe-in angle: –0°09′ [when toe-in is –3 (–0.12)] Toe-out angle: 0°09′ [when toe-out is 3 (0.12)]					
	Kingpin angle	14°20′	14°05′	14°40′	14°20′	14°05′	14°40′
	Wheel arch height [tolerance: $^{+12}_{-24}$ mm ($^{+0.47}_{-0.94}$ in)] mm (in)	381 (15.00)	391 (15.39)	371 (14.61)	381 (15.00)	391 (15.39)	371 (14.61)
Rear	Camber (tolerance: ±0°45′)	–1°	–0°55′	–1°10′	–0°50′	–0°50′	–1°10′
	Toe-in mm (in)	0±3 (0±0.12) Toe-in angle: –0°09′ [when toe-in is –3 (–0.12)] Toe-out angle: 0°09′ [when toe-out is 3 (0.12)]					
	Wheel arch height [tolerance: $^{+12}_{-24}$ mm ($^{+0.47}_{-0.94}$ in)] mm (in)	368 (14.49)	379 (14.92)	363 (14.29)	378 (14.88)	387 (15.24)	363 (14.29)



NOTE:

- Front and rear toe-ins and front camber can be adjusted. If toe-in or camber tolerance exceeds specifications, adjust toe-in and camber to the middle value of specifications.
- The other items indicated in the specification table cannot be adjusted. If the other items exceeds specifications, check suspension parts and connections for deformities; replace with new ones as required.

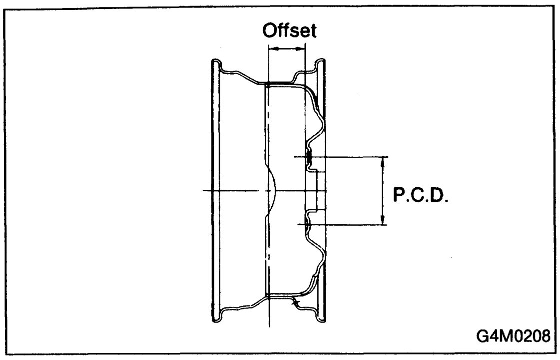
WHEELS AND AXLES 4-2

Page

S SPECIFICATIONS AND SERVICE DATA 2
1. Wheels and Axles 2

C COMPONENT PARTS
1. Front Axle
2. Rear Axle

W SERVICE PROCEDURE
1. Front Axle
2. Rear Axle (AWD Model)
3. Rear Axle (FWD Model)
4. Front and Rear Drive Shafts 6
5. Full Wheel Cap
6. Steel Wheel and Tire
7. Wheel Balancing
8. Installation of Wheel Assembly to Vehicle
9. Tire Rotation
10. "T-type" Tire



1. Wheels and Axles

A: SPECIFICATIONS

1. TIRE AND WHEEL SIZE

	Tire size	Rim size	Rim offset mm (in)	P.C.D. mm (in)
Front and Rear	165/80R13 82S 165R13 82T	13 x 5.00B	50 (1.97)	100 (3.94) dia.
	175/70R14 84T, 84H	14 x 5 1/2JJ	55 (2.17)	
	205/55R15 87V	15 x 6JJ	55 (2.17)	
T-type tire	T125/70D15	15 x 4T	53 (2.09)	
	T125/70D16	16 x 4T	50 (1.97)	
	T135/70D16	16 x 4T	50 (1.97)	

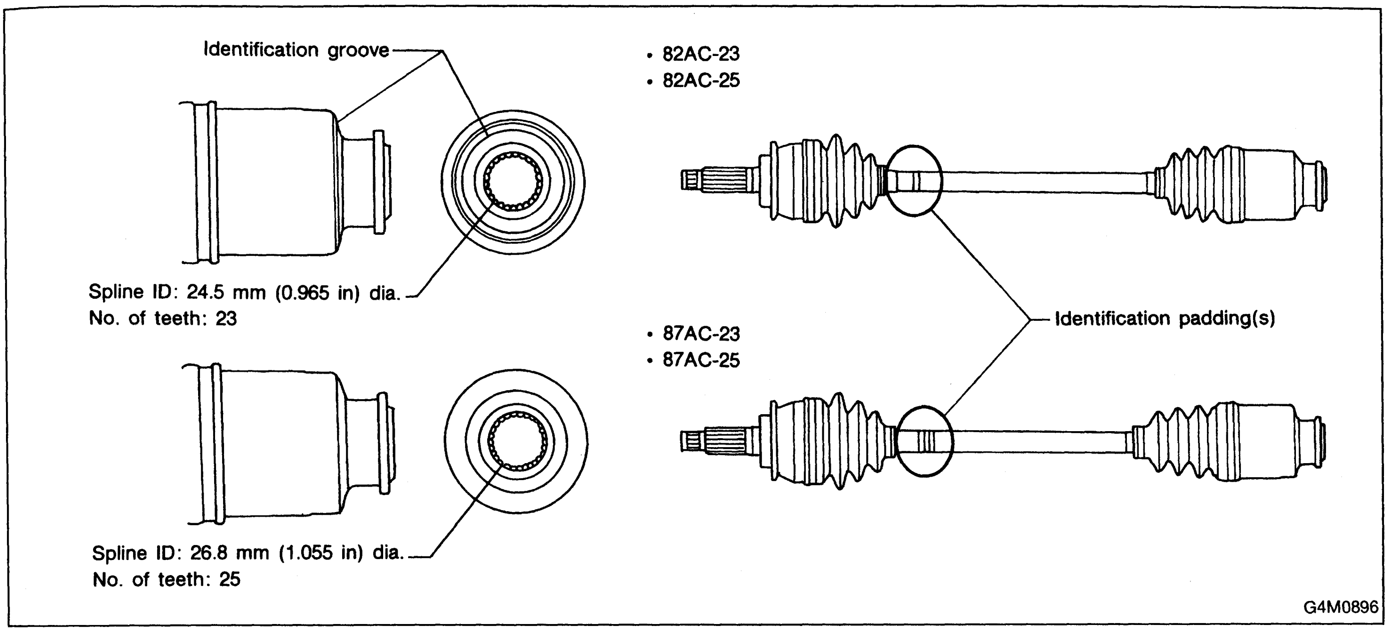
NOTE: "T-type" tire for temporary use is supplied as a spare tire.

2. TIRE INFLATION PRESSURE

	Tire size	Tire inflation pressure kPa (kg/cm^2, psi)	
		Light load	Full load
4 door Sedan 5 door	165/80R13 82S 165R13 82T 175/70R14 84T, 84H	Ft: 220 (2.2, 32) Rr: 200 (2.0, 29)	
4 door Sedan Turbo 5 door Turbo	205/55R15 87V	Ft: 230 (2.3, 33) Rr: 220 (2.2, 32)	
T-type tire	T125/70D15 T125/70D16 T135/70D16	420 (4.2, 60)	

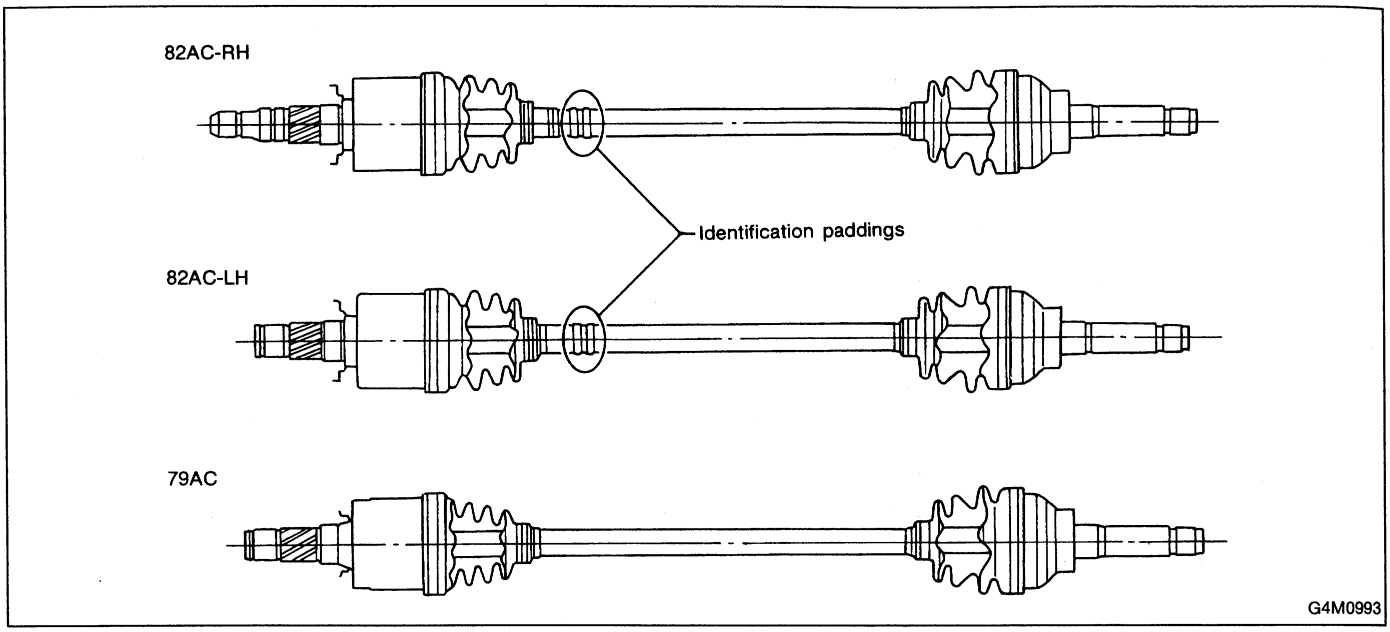
3. FRONT DRIVE SHAFT ASSEMBLY

Type of axle shaft assembly	SHAFT	DOJ
	No. of identification paddings on shaft	No. of spline teeth
82AC-23	1 (One)	23
82AC-25	1 (One)	25
87AC-23	2 (Two)	23
87AC-25	2 (Two)	25



4. REAR DRIVE SHAFT ASSEMBLY (AWD MODEL)

Type of axle shaft assembly	SHAFT
	No. of identification paddings on shaft
79AC	None
82AC-RH, 82AC-LH	2 (Two)



5. APPLICATION TABLE

Model	Power unit	Front drive shaft		Rear drive shaft
		5MT	4AT	
FWD	1600 cc	82AC-23	82AC-25	—
FWD	1800 cc	87AC-23	87AC-25	—
AWD	1600·1800 cc	82AC-25	82AC-25	79AC
AWD	2000 cc Turbo	87AC-25	—	82AC-RH, 82AC-LH

B: SERVICE DATA

Wheel balancing	Standard	Service limit
Dynamic unbalance	Less than 5 g (0.18 oz)	

1. STEEL WHEEL

Balance weight part number (For steel wheel)	Weight g (oz)
28101AA001	5 (0.18)
28101AA011	10 (0.35)
28101AA021	15 (0.53)
28101AA031	20 (0.71)
28101AA041	25 (0.88)
28101AA051	30 (1.06)
28101AA061	35 (1.23)
28101AA071	40 (1.41)
28101AA081	45 (1.59)
28101AA091	50 (1.76)
28101AA101	55 (1.94)
28101AA111	60 (2.12)

2. ALUMINUM WHEEL

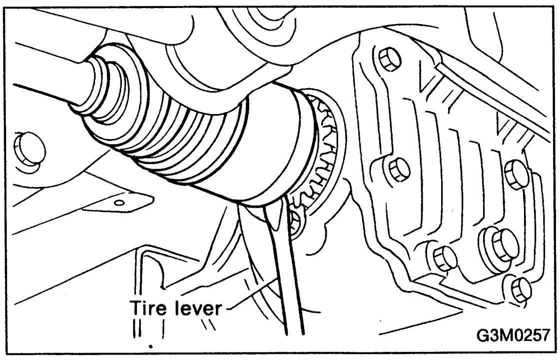
Balance weight part number (For aluminum wheel)	Weight g (oz)
23141GA462	5 (0.18)
23141GA472	10 (0.35)
23141GA482	15 (0.53)
23141GA491	20 (0.71)
23141GA501	25 (0.88)
23141GA511	30 (1.06)
23141GA521	35 (1.23)
23141GA531	40 (1.41)
23141GA541	45 (1.59)
23141GA551	50 (1.76)
—	55 (1.94)
23141GA571	60 (2.12)

4. Front and Rear Drive Shafts

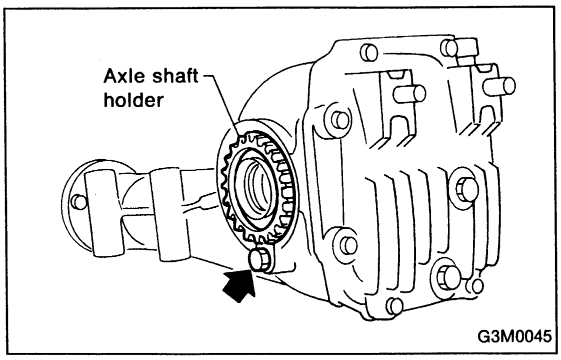
A: REMOVAL

2. REAR DRIVE SHAFT

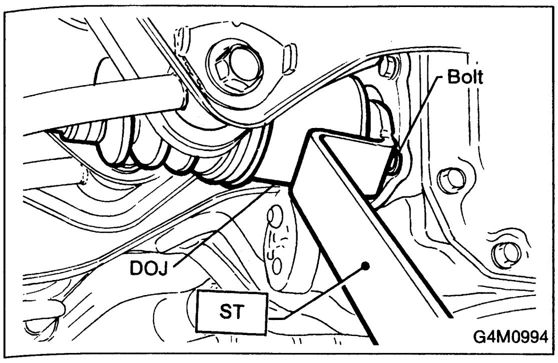
1) Disconnect ground cable from battery.
2) Lift-up vehicle, and remove rear wheel cap and wheels.
CAUTION:
Be sure to loosen and retighten axle nut after removing wheel from vehicle. Failure to follow this rule may damage wheel bearings.
3) Unlock axle nut.
4) Loosen axle nut using a socket wrench.
CAUTION:
Do not remove axle nut.
5) Remove A.B.S. sensor clamps and parking brake cable bracket.
6) Remove bolts which secure lateral link assembly to rear housing.
CAUTION:
Discard old self-locking nut. Replace with a new one.
7) Remove bolts which secure trailing link assembly to rear housing.
CAUTION:
Discard old self-locking nut. Replace with a new one.



Non TURBO model: Perform step 8).
8) Remove DOJ from rear differential using tire lever.
NOTE:
The side spline shaft circlip comes out together with the shaft.



CAUTION:
When removing the DOJ from the rear differential, fit tire lever to the bolt as shown in figure so as not to damage the axle shaft holder.



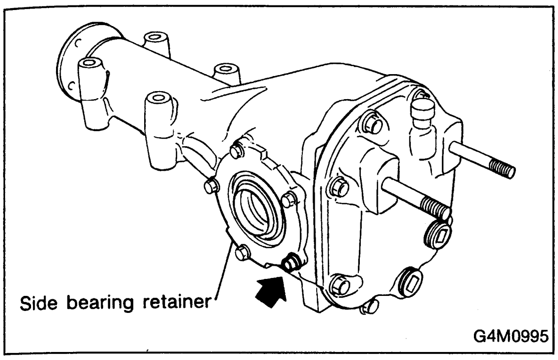
TURBO model: Perform step 9).

9) Remove DOJ from rear differential using ST.

ST 28099PA100 DRIVE SHAFT REMOVER

NOTE:

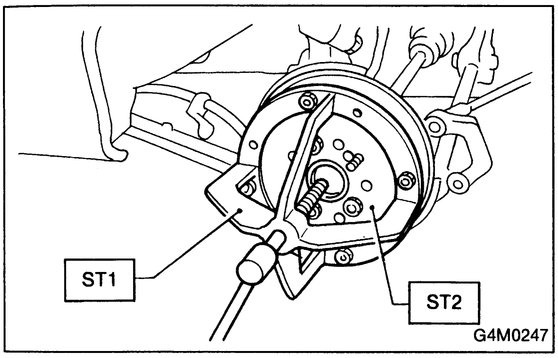
Left spline end of DOJ is removed together with circlip. Do not remove right circlip attached to inside of differential.



CAUTION:

Be careful not to damage side bearing retainer. Always use bolt as supporting point for ST during removal.

ST 28099PA100 DRIVE SHAFT REMOVER



10) Remove axle nut and drive shaft. If it is hard to remove, use ST1 and ST2.

ST1 926470000 AXLE SHAFT PULLER

ST2 927140000 PLATE

CAUTION:

- **Be careful not to damage oil seal lip when removing rear drive shaft.**
- **When rear drive shaft is to be replaced, also replace inner oil seal with a new one.**

STEERING SYSTEM 4-3

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1. Power Steering

PRECAUTION FOR SUPPLEMENTAL RESTRAINT SYSTEM "AIRBAG"

The Supplemental Restraint System "Airbag" helps to reduce the risk or severity of injury to the driver in a frontal collision.

The Supplemental Restraint System consists of an airbag module (located in the center of the steering wheel), sensors, a control module, warning light, wiring harness and roll connector.

Information necessary to service the safety is included in the "5-5. SUPPLEMENTAL RESTRAINT SYSTEM" of this Service Manual.

WARNING:

- **To avoid rendering the Airbag system inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized SUBARU dealer.**
- **Improper maintenance, including incorrect removal and installation of the Airbag system, can lead to personal injury caused by unintentional activation of the Airbag system.**
- **All Airbag system electrical wiring harnesses and connectors are covered with yellow outer insulation. Do not use electrical test equipment on any circuit related to the Supplemental Restraint System "Airbag".**

1. Steering System

A: SPECIFICATIONS

Model			Non TURBO	TURBO	
				LHD	RHD
Whole system	Minimum turning radius	m (ft)	5.1 (16.7)	5.4 (17.7)	5.2 (17.1)
	Steering angle (Inside-Outside)		37.5° — 32.6°	34.3° — 30.1°	36.5° — 31.8°
	Steering wheel diameter	mm (in)	With AIRBAG 385 (15.16) Without AIRBAG 375 (14.76)	370 (14.57)	
	Overall gear ratio (Turns, lock to lock)		16.5 (3.2)	16.7 (3.0)	15 (2.8)
Gearbox	Type		Rack and pinion, Integral		
	Backlash		0 (Automatically adjustable)		
	Valve (Power steering system)		Rotary valve		
Pump (Power steering system)	Type		Vane pump		
	Oil tank		Installed on pump		
	Output	cm^3 (cu in)/rev.	7.2 (0.439)		
	Relief pressure	kPa (kg/cm^2, psi)	6,375 (65, 924)	7,355 (75, 1,067)	7,846 (80, 1,138)
	Hydraulic fluid control		Dropping in response to increased engine revolutions		Constant flow type
	Hydraulic fluid	ℓ (US qt, Imp qt)	1,000 rpm: 7 (7.4, 6.2) 3,000 rpm: 5 (5.3, 4.4)		7 (7.4, 6.2)
	Range of revolution	rpm	500 — 7,500		
	Revolving direction		Clockwise		
Working fluid (Power steering system)	Name		ATF DEXRON II or IIE		
	Capacity	Oil tank Total ℓ (US qt, Imp qt)	0.3 (0.3, 0.3) 0.7 (0.7, 0.6)		

B: SERVICE DATA

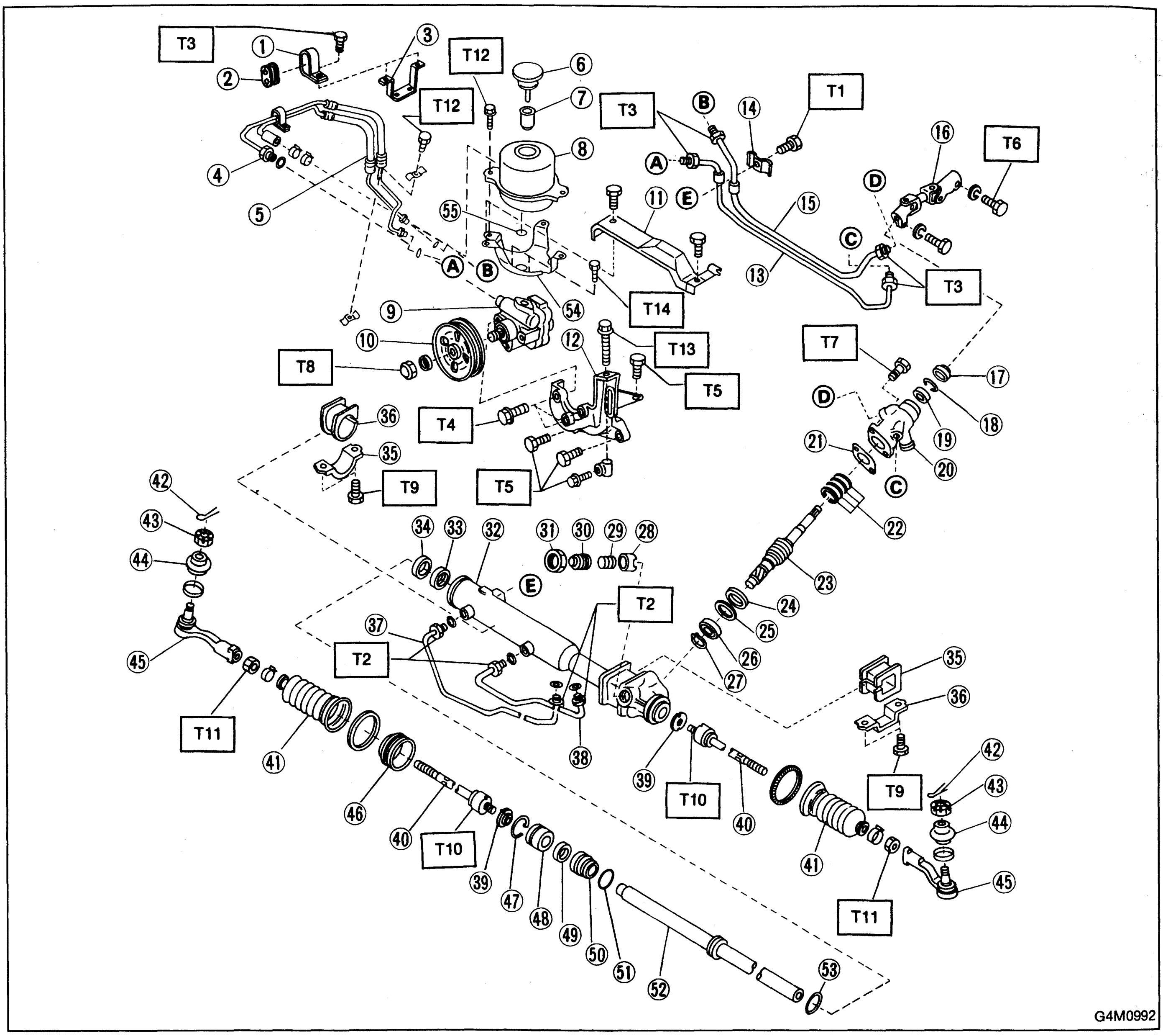
Model			Non TURBO LHD	Non TURBO RHD	TURBO LHD	TURBO RHD
Steering wheel	Free play mm (in)		17 (0.67)			
Turning angle	Inner tire & wheel		37.5°		34.3°	36.5°
	Outer tire & wheel		32.6°		30.1°	31.8°
Steering shaft	Clearance between steering wheel and column cover mm (in)		3.0 (0.118)			
Steering gearbox (Power steering system)	Sliding resistance N (kg, lb)		240.3 (24.5, 54.0) or less			314 (32, 71) or less
	Rack shaft play in radial direction mm (in)	Right-turn steering	0.19 (0.0075) or less	0.45 (0.0177) or less	0.19 (0.0075) or less	0.45 (0.0177) or less
		Left-turn steering	0.45 (0.0177) or less	0.19 (0.0075) or less	0.45 (0.0177) or less	0.19 (0.0075) or less
	Input shaft play mm (in) In radial direction In axial direction		0.18 (0.0071) or less 0.1 (0.004) or less			
	Turning resistance N (kg, lb)		Within 30 mm (1.18 in) from rack center in straight ahead position: Less than 11.18 (1.14, 2.51) Maximum allowable value: 12.7 (1.3, 2.9)			
Oil pump (Power steering system)	Pulley shaft mm (in) Radial play Axial play		0.4 (0.016) or less 0.9 (0.035) or less			
	Pulley Ditch deflection mm (in) Resistance to rotation N (kg, lb)		1.0 (0.039) or less 9.22 (0.94, 2.07) or less			
	Regular pressure kPa (kg/cm^2, psi)		981 (10, 142) or less			
	Relief pressure kPa (kg/cm^2, psi)		6,375 (65, 924)		7,355 (75, 1,067)	7,846 (80, 1,138)
Steering wheel effort (Power steering system)	At standstill with engine idling on a concrete road N (kg, lb)		31.4 (3.2, 7.1) or less			
	At standstill with engine stalled on a concrete road N (kg, lb)		147 (15, 33) or less			

C: RECOMMENDED POWER STEERING FLUID

Recommended power steering fluid	Manufacturer
ATF DEXRON II or ATF DEXRON IIE	B.P.
	CALTEX
	CASTROL
	MOBIL
	SHELL
	TEXACO

2. Power Steering System

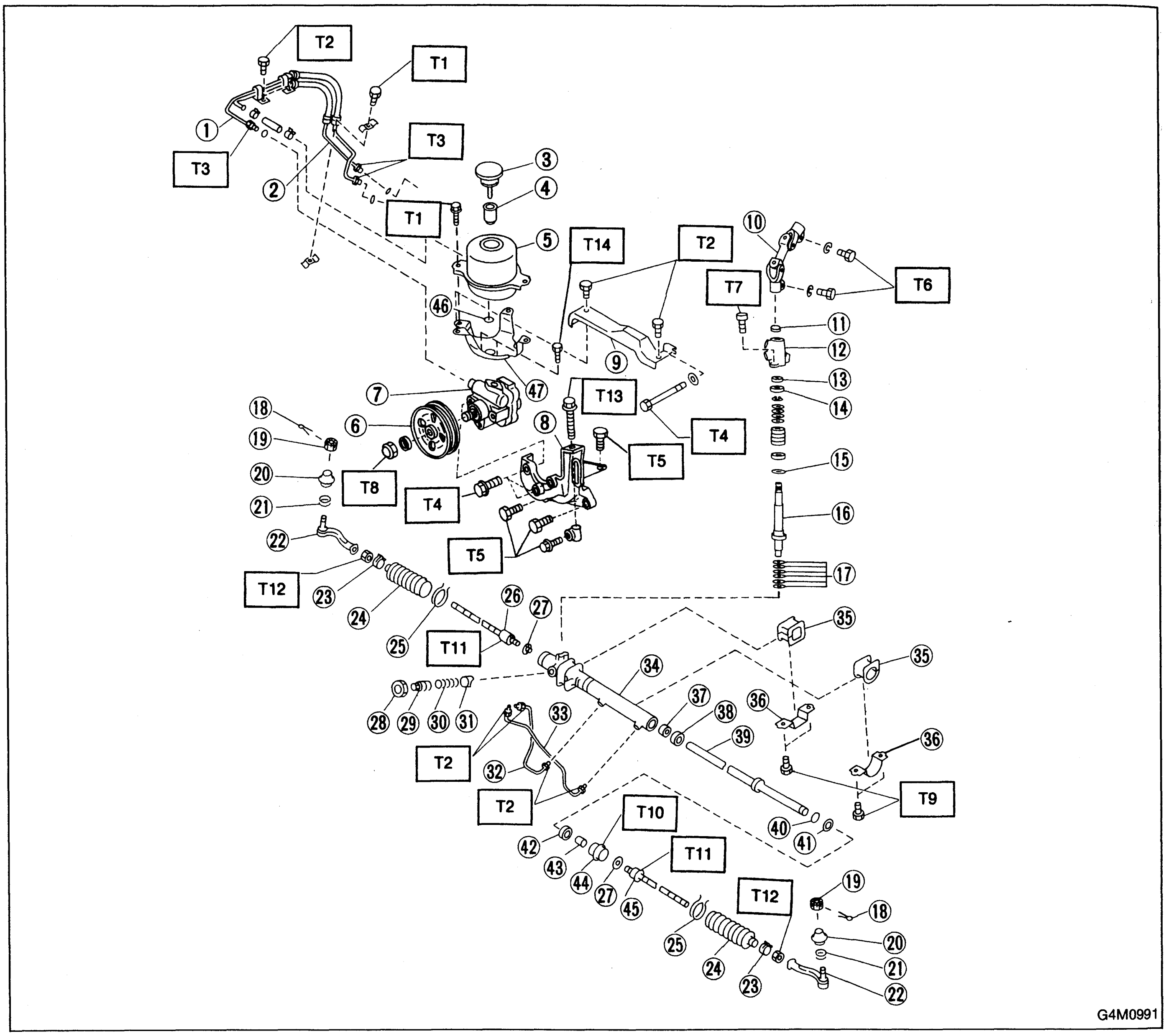
1. LHD MODEL



Tightening torque: N·m (kg-m, ft-lb)
- *T1: 5.4 ± 1.5 (0.55 ± 0.15, 4.0 ± 1.1)*
- *T2: 13 ± 3 (1.3 ± 0.3, 9.4 ± 2.2)*
- *T3: 15 ± 5 (1.5 ± 0.5, 10.8 ± 3.6)*
- *T4: 20.1 ± 2.5 (2.05 ± 0.25, 14.8 ± 1.8)*
- *T5: 22 ± 2 (2.2 ± 0.2, 15.9 ± 1.4)*
- *T6: 24 ± 3 (2.4 ± 0.3, 17.4 ± 2.2)*
- *T7: 25 ± 5 (2.5 ± 0.5, 18.1 ± 3.6)*
- *T8: 52 ± 10 (5.3 ± 1.0, 38 ± 7)*
- *T9: 59 ± 12 (6.0 ± 1.2, 43 ± 9)*
- *T10: 78 ± 10 (8.0 ± 1.0, 58 ± 7)*
- *T11: 83 ± 5 (8.5 ± 0.5, 61.5 ± 3.6)*
- *T12: 7.4 ± 2.0 (0.75 ± 0.20, 5.4 ± 1.4)*
- *T13: 8 ± 2 (0.8 ± 0.2, 5.8 ± 1.4)*
- *T14: 18^{+5}_{0} ($1.8^{+0.5}_{0}$, $13.0^{+3.6}_{0}$)*

1. Clamp
2. Adapter
3. Hose bracket
4. Pipe C
5. Pipe D
6. Cap
7. Strainer
8. Tank
9. Oil pump
10. Pulley
11. Belt cover
12. Bracket
13. Pipe E
14. Clamp plate
15. Pipe F
16. Universal joint
17. Dust seal
18. C-ring
19. Oil seal
20. Valve housing
21. Packing
22. Seal ring
23. Pinion and valve ASSY
24. Oil seal
25. Back-up washer
26. Ball bearing
27. Snap ring
28. Sleeve
29. Spring
30. Adjusting screw
31. Lock nut
32. Housing ASSY
33. Back-up washer
34. Oil seal
35. Adapter
36. Clamp
37. Pipe A
38. Pipe B
39. Lock washer
40. Tie-rod
41. Boot
42. Cotter pin
43. Castle nut
44. Dust seal
45. Tie-rod end
46. Spacer
47. Circlip
48. Rack stopper
49. Oil seal
50. Rack bushing
51. O-ring
52. Rack
53. Piston ring
54. Tank bracket
55. O-ring

2. RHD MODEL



Tightening torque: N·m (kg-m, ft-lb)

T1: 7.4±2.0 (0.75±0.2, 5.4±1.4)
T2: 13±3 (1.3±0.3, 9.4±2.2)
T3: 15±5 (1.5±0.5, 10.8±3.6)
T4: 20.1±2.5 (2.05±0.25, 14.8±1.8)
T5: 22±2 (2.2±0.2, 15.9±1.4)
T6: 24±3 (2.4±0.3, 17.4±2.2)
T7: 25±5 (2.5±0.5, 18.1±3.6)
T8: 52±10 (5.3±1.0, 38±7)
T9: 59±12 (6.0±1.2, 43±9)
T10: 64±10 (6.5±1.0, 47±7)
T11: 78±10 (8.0±1.0, 58±7)
T12: 83±5 (8.5±0.5, 61.5±3.6)
T13: 8±2 (0.8±0.2, 5.8±1.4)
T14: 18^{+5}_{0} ($1.8^{+.5}_{0}$, $13.0^{+3.6}_{0}$)

① Pipe C
② Pipe D
③ Cap
④ Strainer
⑤ Tank
⑥ Pulley
⑦ Oil pump
⑧ Bracket
⑨ Belt cover
⑩ Universal joint
⑪ Dust cover
⑫ Valve housing
⑬ Y-packing
⑭ Ball bearing
⑮ Spacer
⑯ Pinion
⑰ Shim
⑱ Cotter pin
⑲ Castle nut
⑳ Dust seal
㉑ Clip
㉒ Tie-rod end
㉓ Clip
㉔ Boot
㉕ Wire
㉖ Tie-rod RH
㉗ Lock washer
㉘ Lock nut
㉙ Adjusting screw
㉚ Spring
㉛ Sleeve
㉜ Pipe B
㉝ Pipe A
㉞ Housing ASSY
㉟ Adapter
㊱ Clamp
㊲ Back-up washer
㊳ Oil seal
㊴ Rack
㊵ O-ring
㊶ Oil seal
㊷ Y-packing
㊸ Bush
㊹ Holder
㊺ Tie-rod LH
㊻ O-ring
㊼ Tank bracket

BRAKES 4-4

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3. Rear Drum Brake
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6. A.B.S. System
7. Hill Holder
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3. Rear Drum Brake
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8. Hill Holder
9. Parking Brake Lever
10. Parking Brake Cable
11. Air Bleeding
12. Brake Fluid Replacement
13. Proportioning Valve
14. A.B.S. Sensor
15. Hydraulic Unit for A.B.S. System
16. A.B.S. Control Module
17. G Sensor for A.B.S. System
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PRECAUTION FOR SUPPLEMENTAL RESTRAINT SYSTEM "AIRBAG"

The Supplemental Restraint System "Airbag" helps to reduce the risk or severity of injury to the driver in a frontal collision.

The Supplemental Restraint System consists of an airbag module (located in the center of the steering wheel), sensors, a control module, warning light, wiring harness and roll connector.

Information necessary to service the safety is included in the "5-5. SUPPLEMENTAL RESTRAINT SYSTEM" of this Service Manual.

WARNING:

- **To avoid rendering the Airbag system inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized SUBARU dealer.**
- **Improper maintenance, including incorrect removal and installation of the Airbag system, can lead to personal injury caused by unintentional activation of the Airbag system.**
- **All Airbag system electrical wiring harnesses and connectors are covered with yellow outer insulation. Do not use electrical test equipment on any circuit related to the Supplemental Restraint System "Airbag".**

1. Brakes

A: SPECIFICATIONS

1. MODELS WITH A.B.S.

	Model	4 Door Sedan					5 Door			
	Engine (cc)	1600		1600		1800	1600	1600		1800
	Driving system	FWD		AWD			FWD	AWD		
		LX	GL	LX	GL	GL	GL	LX	GL	GL
Front brake	Type	Disc (Floating type, ventilated)								
	Effective disc diameter mm (in)	210 (8.27)								
	Disc thickness x Outer diameter mm (in)	24 x 260 (0.94 x 10.24)								
	Effective cylinder diameter mm (in)	53.97 (2.125)								
	Pad dimensions (length x width x thickness) mm (in)	112.4 x 44.3 x 11.0 (4.43 x 1.744 x 0.433)								
	Clearance adjustment	Automatic adjustment								
Rear brake	Type	Disc (Floating type)								
	Effective disc diameter mm (in)	230 (9.06)								
	Disc thickness x Outer diameter mm (in)	10 x 266 (0.39 x 10.47)								
	Effective cylinder diameter mm (in)	34.93 (1.375)						38.10 (1.5000)		
	Pad dimensions (length x width x thickness) mm (in)	92.4 x 33.7 x 10.0 (3.638 x 1.327 x 0.394)								
	Clearance adjustment	Automatic adjustment								

	Model	4 Door Sedan					5 Door			
	Engine (cc)	1600		1600		1800	1600	1600		1800
	Driving system	FWD		AWD			FWD	AWD		
		LX	GL	LX	GL	GL	GL	LX	GL	GL
Parking brake	Type	Mechanical on rear brakes, drum in disc								
	Effective drum diameter mm (in)	170 (6.69)								
	Lining dimensions (length x width x thickness) mm (in)	162.6 x 30.0 x 3.2 (6.40 x 1.181 x 0.126)								
	Clearance adjustment	Manual adjustment								
Master cylinder	Type	Tandem								
	Effective diameter mm (in)	25.40 (1)								
	Reservoir type	Sealed type								
	Brake fluid reservoir capacity cm^3 (cu in)	190 (11.59)								
Brake booster	Type	Vacuum suspended								
	Effective diameter mm (in)	180 + 205 (7.09 + 8.07)								
Propor-tioning valve	Split point kPa (kg/cm^2, psi)	1,961 (20, 284)								
	Reducing ratio	0.4								
Brake line		Dual circuit system								
A.B.S.		OP								

2. MODELS WITHOUT A.B.S.

	Model	4 Door Sedan							5 Door					
	Engine (cc)	1600			1800	1600		1800	1600		1800	1600		1800
	Driving system	FWD				AWD			FWD			AWD		
		DL	LX	GL	GL	LX	GL	GL	LX	GL	GL	LX	GL	GL
Front brake	Type	Disc (Floating type, ventilated)												
	Effective disc diameter mm (in)	194 (7.64)		210 (8.27)					194 (7.64)	210 (8.27)				
	Disc thickness x Outer diameter mm (in)	18 x 242 (0.71 x 9.53)		24 x 260 (0.94 x 10.24)					18 x 242 (0.71 x 9.53)	24 x 260 (0.94 x 10.24)				
	Effective cylinder diameter mm (in)	53.97 (2.125)												
	Pad dimensions (length x width x thickness) mm (in)	112.4 x 44.3 x 11.0 (4.43 x 1.744 x 0.433)												
	Clearance adjustment	Automatic adjustment												
Rear brake	Type	Drum (Leading-Trailing type)												
	Effective drum diameter mm (in)	228.6 (9)												
	Effective cylinder diameter mm (in)	17.45 (0.6870)				19.05 (0.7500)			17.45 (0.6870)	19.05 (0.7500)				
	Lining dimensions (length x width x thickness) mm (in)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)												
	Clearance adjustment	Automatic adjustment												

<table>
<tr><td rowspan="4"></td><td>Model</td><td colspan="7">4 Door Sedan</td><td colspan="6">5 Door</td></tr>
<tr><td>Engine (cc)</td><td colspan="3">1600</td><td>1800</td><td colspan="2">1600</td><td>1800</td><td colspan="2">1600</td><td>1800</td><td colspan="2">1600</td><td>1800</td></tr>
<tr><td>Driving system</td><td colspan="4">FWD</td><td colspan="3">AWD</td><td colspan="3">FWD</td><td colspan="3">AWD</td></tr>
<tr><td></td><td>DL</td><td>LX</td><td>GL</td><td>GL</td><td>LX</td><td>GL</td><td>GL</td><td>LX</td><td>GL</td><td>GL</td><td>LX</td><td>GL</td><td>GL</td></tr>
<tr><td rowspan="4">Parking brake</td><td>Type</td><td colspan="13">Mechanical on rear brakes, drum in disc</td></tr>
<tr><td>Effective drum diameter mm (in)</td><td colspan="13">228.6 (9)</td></tr>
<tr><td>Lining dimensions (length x width x thickness mm (in)</td><td colspan="13">218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)</td></tr>
<tr><td>Clearance adjustment</td><td colspan="13">Automatic adjustment</td></tr>
<tr><td rowspan="4">Master cylinder</td><td>Type</td><td colspan="13">Tandem</td></tr>
<tr><td>Effective diameter mm (in)</td><td colspan="13">23.81 (0.9374)</td></tr>
<tr><td>Reservoir type</td><td colspan="13">Sealed type</td></tr>
<tr><td>Brake fluid reservoir capacity cm^3 (cu in)</td><td colspan="13">190 (11.59)</td></tr>
<tr><td rowspan="2">Brake booster</td><td>Type</td><td colspan="13">Vacuum suspended</td></tr>
<tr><td>Effective diameter mm (in)</td><td colspan="13">230 (9.06)</td></tr>
<tr><td rowspan="2">Propor-tioning valve</td><td>Split point kPa (kg/cm^2, psi)</td><td colspan="13">2,942 (30.0, 427)</td></tr>
<tr><td>Reducing ratio</td><td colspan="13">0.4</td></tr>
<tr><td colspan="2">Brake line</td><td colspan="13">Dual circuit system</td></tr>
</table>

3. TURBO MODEL

	Model	4 Door Sedan	5 Door
	Engine (cc)	2000	
	Driving system	AWD	
		TURBO	
Front brake	Type	Disc (Floating type, ventilated)	
	Effective disc diameter mm (in)	228 (8.98)	
	Disc thickness x Outer diameter mm (in)	24 x 277 (0.94 x 10.91)	
	Effective cylinder diameter mm (in)	42.86 (1.6874)	
	Pad dimensions (length x width x thickness) mm (in)	112.3 x 50.0 x 11.0 (4.42 x 1.969 x 0.433)	
	Clearance adjustment	Automatic adjustment	
Rear brake	Type	Disc (Floating type)	
	Effective disc diameter mm (in)	230 (9.06)	
	Disc thickness x Outer diameter mm (in)	10 x 266 (0.39 x 10.47)	
	Effective cylinder diameter mm (in)	38.10 (1.5000)	
	Pad dimensions (length x width x thickness) mm (in)	92.4 x 33.7 x 10.0 (3.638 x 1.327 x 0.394)	
	Clearance adjustment	Automatic adjustment	

	Model	4 Door Sedan	5 Door
	Engine (cc)	2000	
	Driving system	AWD	
		TURBO	
Parking brake	Type	Mechanical on rear brakes, drum in disc	
Parking brake	Effective drum diameter mm (in)	170 (6.69)	
Parking brake	Lining dimensions (length x width x thickness) mm (in)	162.6 x 30.0 x 3.2 (6.40 x 1.181 x 0.126)	
Parking brake	Clearance adjustment	Manual adjustment	
Master cylinder	Type	Tandem	
Master cylinder	Effective diameter mm (in)	25.40 (1)	
Master cylinder	Reservoir type	Sealed type	
Master cylinder	Brake fluid reservoir capacity cm^3 (cu in)	190 (11.59)	
Brake booster	Type	Vacuum suspended	
Brake booster	Effective diameter mm (in)	180 + 205 (7.09 + 8.07)	
Proportioning valve	Split point kPa (kg/cm^2, psi)	1,961 (20, 284)	
Proportioning valve	Reducing ratio	0.4	
Brake line		Dual circuit system	
A.B.S.		OP	

B: SERVICE DATA

ITEM		STANDARD	SERVICE LIMIT
Front brake	Pad thickness (including back metal)	17 mm (0.67 in)	7.5 mm (0.295 in)
	Disc thickness	13-inch type: 18 mm (0.71 in) 15·14-inch type: 24 mm (0.94 in)	13-inch type: 16 mm (0.63 in) 15·14-inch type: 22 mm (0.87 in)
	Disc runout	—	0.075 mm (0.0030 in)
Rear brake (Disc type)	Pad thickness (including back metal)	15 mm (0.59 in)	6.5 mm (0.256 in)
	Disc thickness	10 mm (0.39 in)	8.5 mm (0.335 in)
	Disc runout	—	0.10 mm (0.0039 in)
Rear brake (Drum type)	Inside diameter	228.6 mm (9 in)	230.6 mm (9.079 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/196N (20 kg,44 lb)	

			Non TURBO model		TURBO model	
			Without A.B.S.	With A.B.S.	Without A.B.S.	With A.B.S.
Brake booster		Brake pedal force	Fluid pressure			
	Brake fluid pressure without engine running	147N (15 kg, 33 lb)	874.8 kPa (8.92 kg/cm^2, 126.8 psi)	770.8 kPa (7.86 kg/cm^2, 111.8 psi)	770.8 kPa (7.86 kg/cm^2, 111.8 psi)	770.8 kPa (7.86 kg/cm^2, 111.8 psi)
		294N (30kg, 66 lb)	2,267.4 kPa (23.12 kg/cm^2, 328.8 psi)	1,993.8 kPa (20.33 kg/cm^2, 289.1 psi)	1,993.8 kPa (20.33 kg/cm^2, 289.1 psi)	1,993.8 kPa (20.33 kg/cm^2, 289.1 psi)
	Brake fluid pressure with engine running and vacuum at 66.7 kPa (500 mmHg, 19.69 inHg)	147N (15 kg, 33 lb)	5,546.8 kPa (55.54 kg/cm^2, 789.8 psi)	5,483.1 kPa (55.91 kg/cm^2, 795.0 psi)	3,999.3 kPa (40.78 kg/cm^2, 579.9 psi)	4,787.8 kPa (48.82 kg/cm^2, 694.2 psi)
		294N (30kg, 66 lb)	8,361.4 kPa (85.26 kg/cm^2, 1,212.4 psi)	9,114.6 kPa (92.94 kg/cm^2, 1,321.6 psi)	8,892.0 kPa (90.67 kg/cm^2, 1,289.3 psi)	9,114.6 kPa (92.94 kg/cm^2, 1,321.6 psi)

C: RECOMMENDED BRAKE FLUID

FMVSS No. 116, fresh DOT3 or 4 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.**

D: BRAKE FLUID LEVEL INDICATOR

Reserve tank with level indicator:

Residual fluid quantity at light ON

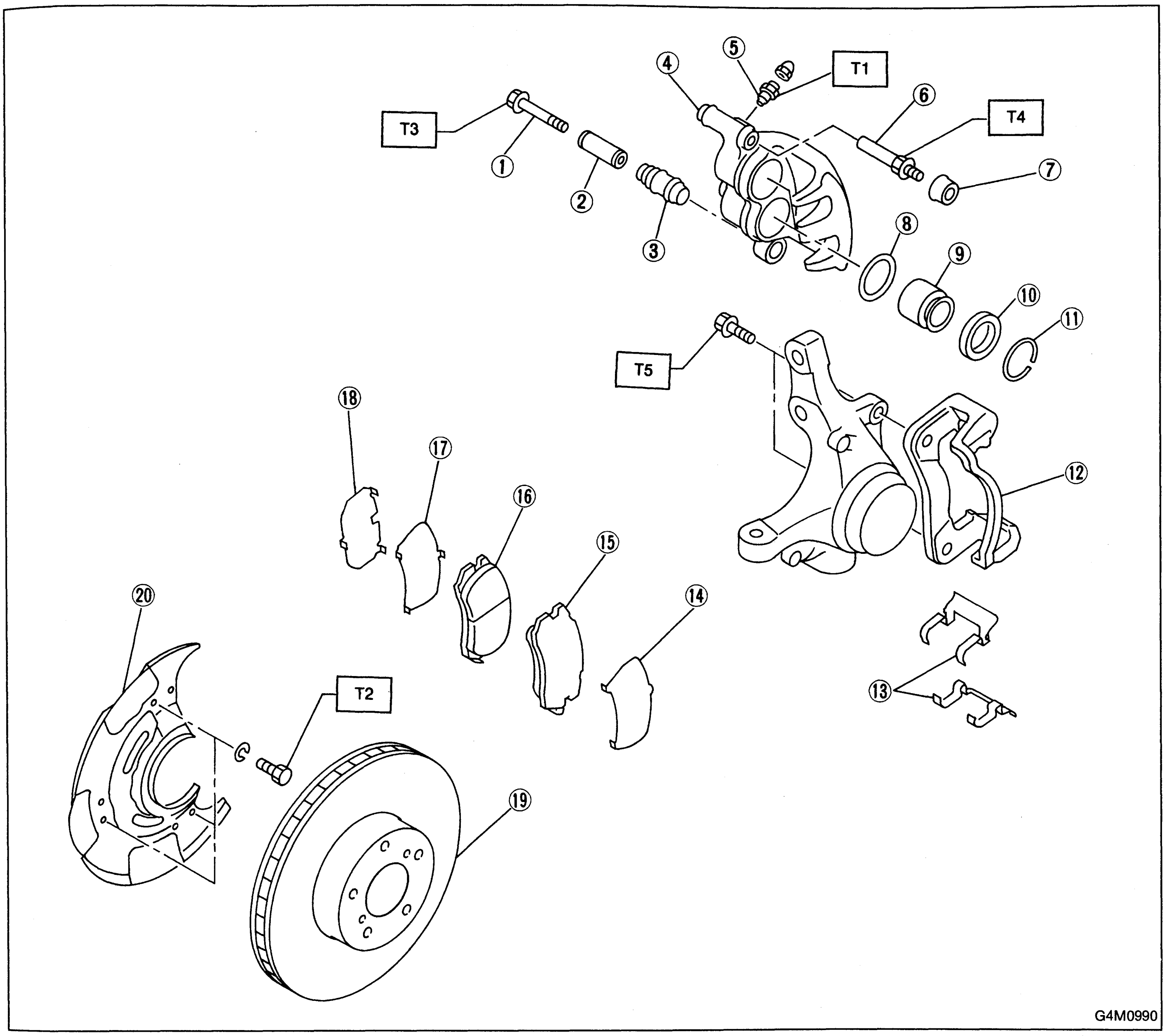
Approx. 80 cm^3 (80 cc, 4.88 cu in)

Tank capacity

190 cm^3 (190 cc, 11.59 cu in)

1. Front Disc Brake

2. TURBO MODEL



① Lock pin
② Lock pin sleeve
③ Lock pin boot
④ Caliper body
⑤ Air bleeder screw
⑥ Guide pin
⑦ Guide pin boot
⑧ Piston seal
⑨ Piston
⑩ Piston boot
⑪ Boot ring
⑫ Support
⑬ Pad clip
⑭ Outer shim
⑮ Pad (Outside)
⑯ Pad (Inside)
⑰ Inner shim
⑱ Shim
⑲ Disc rotor
⑳ Disc cover

Tightening torque: N·m (kg-m, ft-lb)
T1: 8±1 (0.8±0.1, 5.8±0.7)
T2: 14±4 (1.4±0.4, 10.1±2.9)
T3: 36±5 (3.7±0.5, 26.8±3.6)
T4: 49±5 (5.0±0.5, 36.2±3.6)
T5: 78±10 (8.0±1.0, 58±7)

PEDAL SYSTEM AND CONTROL CABLES 4-5

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2. Clutch Cable
3. Accelerator Cable
4. Speedometer Cable

T DIAGNOSTICS

1. Pedal System and Control Cables

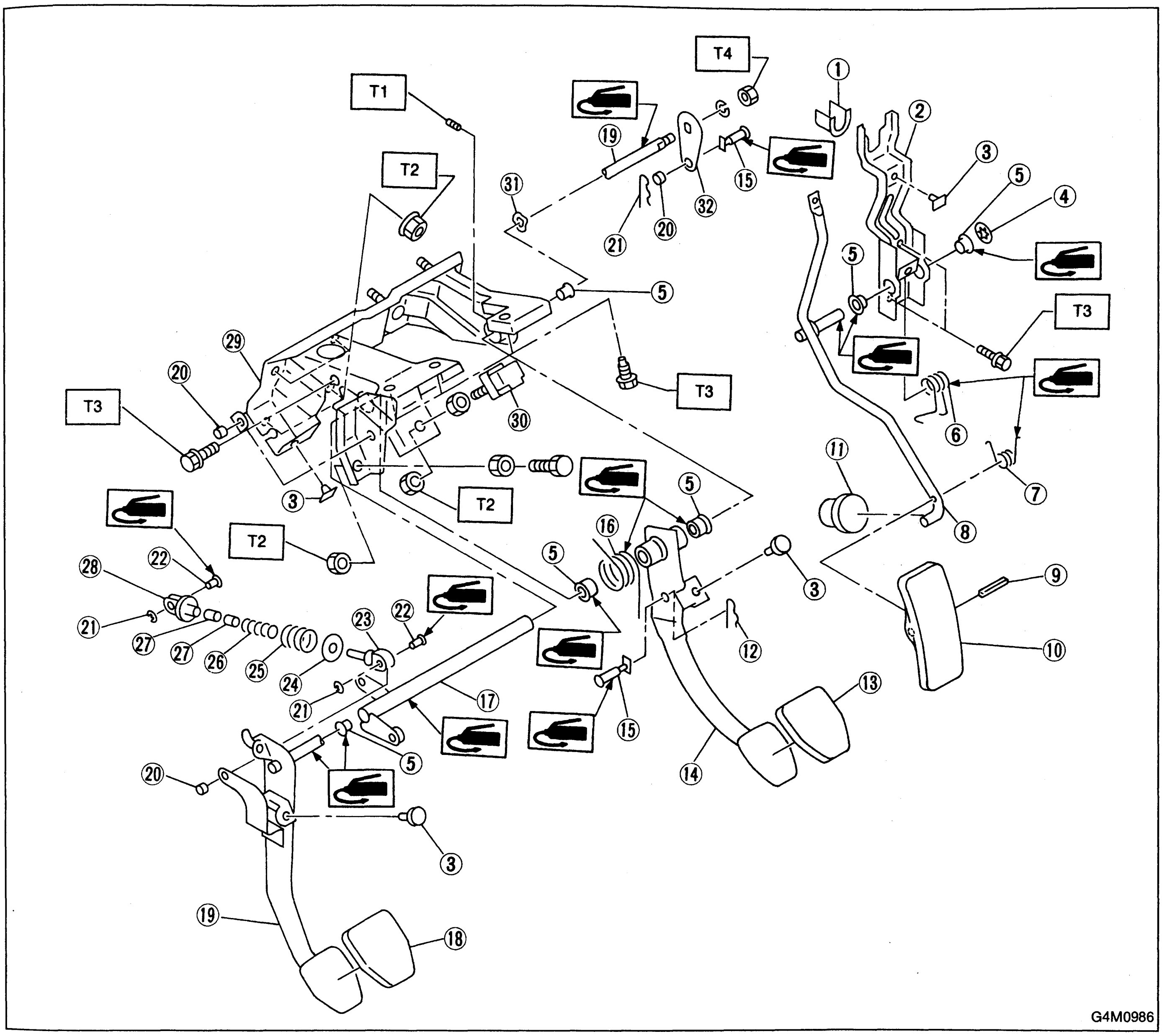
1. Pedal System

A: SERVICE DATA

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 kg, 2 lb).]
Clutch pedal	Free play	At clutch pedal pad	5 — 15 mm (0.20 — 0.59 in)
	Full stroke	At clutch pedal pad	LHD: 145 — 150 mm (5.71 — 5.91 in) RHD: 140 — 145 mm (5.51 — 5.71 in)
Accelerator pedal	Free play	At pedal pad	1 — 4 mm (0.04 — 0.16 in)
	Stroke	At pedal pad	46 — 50 mm (1.81 — 1.97 in)

1. Pedal (MT model)

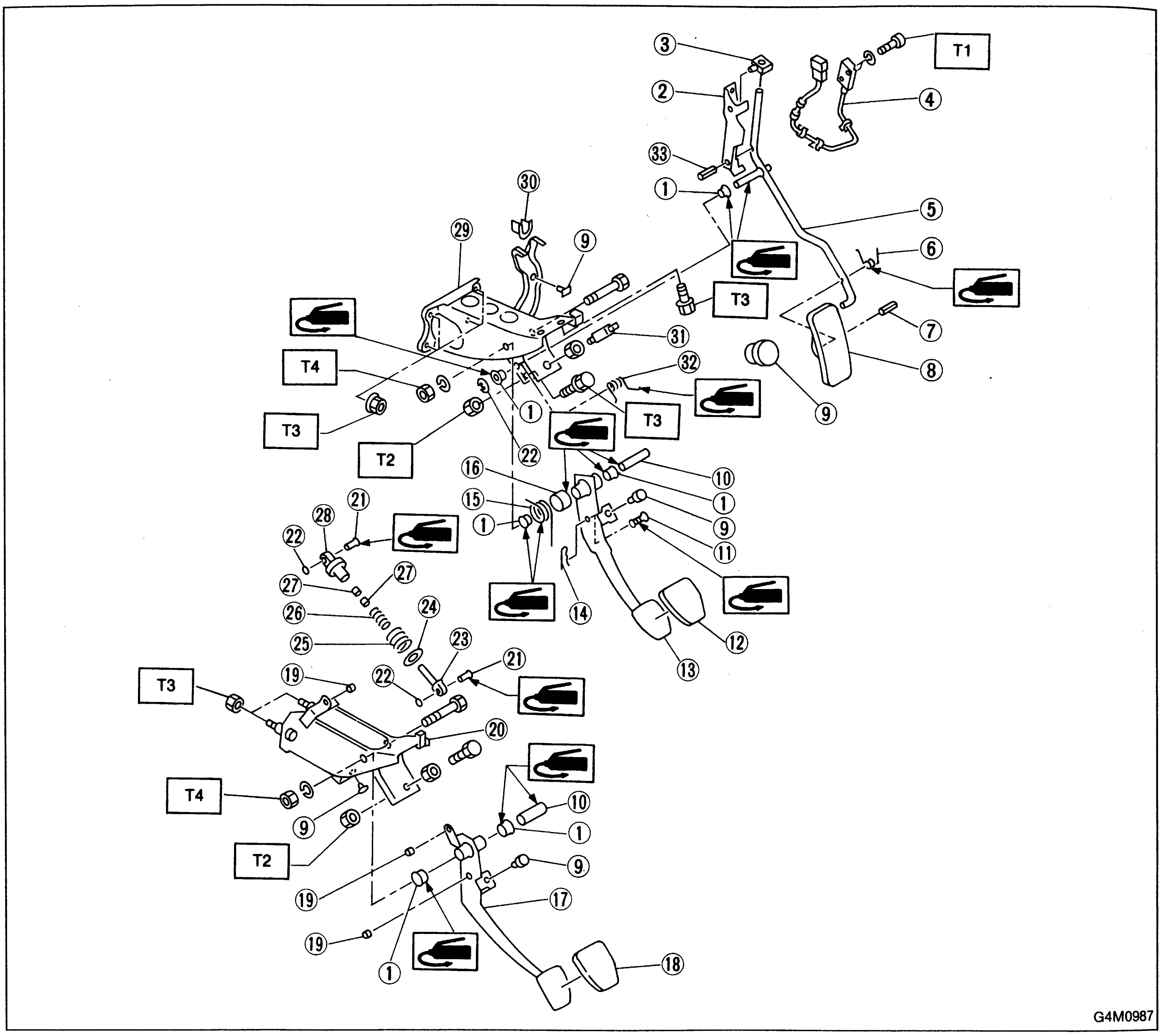
3. LHD TURBO MODEL



① Holder
② Accelerator bracket
③ Stopper
④ Clip
⑤ Bushing
⑥ Accelerator spring
⑦ Accelerator pedal spring
⑧ Accelerator pedal
⑨ Spring pin
⑩ Accelerator pedal pad
⑪ Accelerator stopper
⑫ Snap pin
⑬ Brake pedal pad
⑭ Brake pedal
⑮ Clevis pin
⑯ Brake pedal spring
⑰ Bracket shaft
⑱ Clutch pedal pad
⑲ Clutch pedal
⑳ Bushing C
㉑ Clip
㉒ Clutch clevis pin
㉓ Assist rod
㉔ Assist plate A
㉕ Assist spring A
㉖ Assist spring B
㉗ Assist bushing
㉘ Assist plate ASSY
㉙ Pedal bracket
㉚ Stop light switch
㉛ Wave washer
㉜ Lever

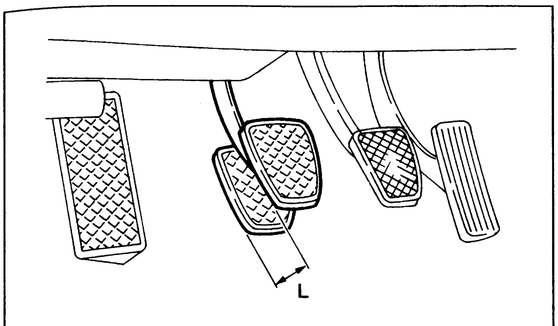
Tightening torque: N·m (kg-m, ft-lb)
T1: 2.2±0.5 (0.22±0.05, 1.6±0.4)
T2: 8±2 (0.8±0.2, 5.8±1.4)
T3: 18±5 (1.8±0.5, 13.0±3.6)
T4: 29±7 (3.0±0.7, 21.7±5.1)

4. RHD TURBO MODEL



① Bushing
② Accelerator lever
③ Clip
④ Accelerator switch
⑤ Accelerator pedal
⑥ Accelerator pedal spring
⑦ Spring pin
⑧ Accelerator pedal pad
⑨ Stopper
⑩ Spacer
⑪ Clevis pin
⑫ Brake pedal pad
⑬ Brake pedal
⑭ Snap pin
⑮ Brake pedal spring
⑯ Brake spacer
⑰ Clutch pedal
⑱ Clutch pedal pad
⑲ Bushing C
⑳ Clutch pedal bracket
㉑ Clutch clevis pin
㉒ Clip
㉓ Assist rod
㉔ Assist plate A
㉕ Assist spring A
㉖ Assist spring B
㉗ Assist bushing
㉘ Assist plate ASSY
㉙ Pedal bracket
㉚ Holder
㉛ Stop light switch
㉜ Accelerator spring
㉝ Spring pin

Tightening torque: N·m (kg-m, ft-lb)
T1: 0.5–0.6 (0.05–0.06, 0.4–0.4)
T2: 8±2 (0.8±0.2, 5.8±1.4)
T3: 18±5 (1.8±0.5, 13.0±3.6)
T4: 29±7 (3.0±0.7, 21.7±5.1)



G4M0318

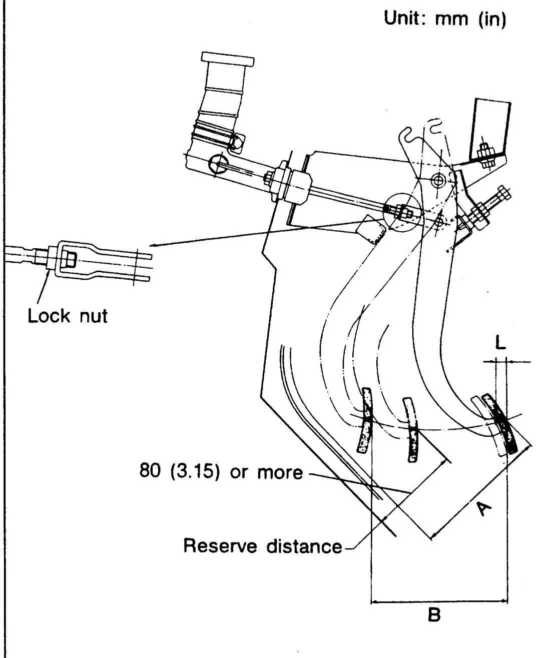
1. Pedal

A: ON-CAR SERVICE

4. CLUTCH PEDAL (Turbo model)

1) Check clutch pedal free play by operating pedal by hand.

Free play: L (At clutch pedal pad)
5 — 10 mm (0.20 — 0.39 in)



G4M0988

2) If it is out of specification, loosen lock nut for push rod and adjust push rod by turning in the direction that shortens or lengthens it.

Tightening torque (Adjusting nut):
10±1 N·m (1.0±0.1 kg-m, 7.2 — 0.7 ft-lb)

3) Check the fluid level on the outside of the clutch master cylinder tank. If the level is below "MIN", add clutch fluid to bring it up to "MAX".

Recommended clutch fluid:
FMVSS No. 116, fresh DOT 3 or DOT 4 brake fluid

Pedal free play: L
5 — 15 mm (0.20 — 0.59 in)
Pedal height: A
143 mm (5.63 in)
Pedal full stroke: B
RHD: 145 mm (5.71 in)
LHD: 150 mm (5.91 in)

B: REMOVAL

4. BRAKE AND CLUTCH PEDAL (LHD turbo model)

1) Remove steering bolts.
2) Raise vehicle on hoist and remove the two bolts which secure steering unit to underside of body.
3) Lower vehicle to floor.
4) Remove instrument panel lower cover from instrument panel.
5) Disconnect the following parts from pedal bracket.
- Operating rod of brake booster
- Electrical connectors (for stop lamp switch, etc.)
6) Remove clevis pin which secures lever to push rod.
7) Remove nut which secures clutch master cylinder.
8) Remove steering assembly.
9) Remove bolts and nuts which secure brake and clutch pedals, and remove pedal assembly.

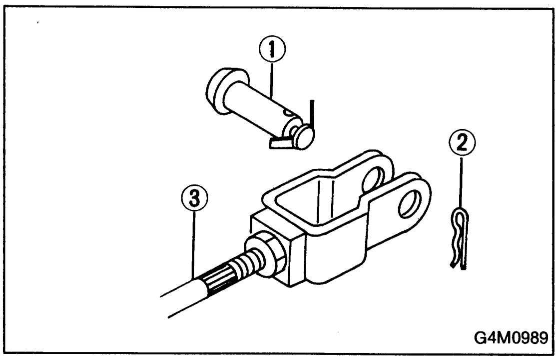
5. CLUTCH PEDAL (RHD turbo model)

1) Remove master cylinder cover.
2) Remove master cylinder mounting nuts.
3) Remove snap pin and clevis pin that join push rod and clutch pedal.
4) Remove clutch pedal and bracket as a unit.

E: INSTALLATION

3. BRAKE AND CLUTCH PEDAL (LHD turbo model)

1) Set pedal bracket above steering column.
2) Insert bolts of brake booster into holes on toe board, support it from engine room, and fit holes of pedal bracket onto the bolts.
At this time, operating rod of brake booster should be engaged with brake pedal.
3) While pushing pedal bracket upward firmly, tighten 4 nuts and 2 bolts at its upper surface.



4) Connect operating rod of brake booster to brake pedal using clevis pin and snap pin.
① Clevis pin
② Snap pin
③ Operating rod
5) Connect electrical connectors for stop light switch, etc.
6) Install steering column or steering assembly as before.
7) Install nut which secures clutch master cylinder.
8) Install clevis pin which secures lever to push rod.
9) Check pedal free play.
<Ref. to 4-5 [W1A1].>

4. CLUTCH PEDAL (RHD turbo model)

1) Clean clutch pedal shaft and bushing, and apply grease.
2) Install push rod and clutch pedal with clevis pin and snap pin.
3) Install master cylinder.
4) Install master cylinder cover.
5) Check clutch pedal free play.
Refer to ON-CAR SERVICE 4-5 [W1A2].

AIR CONDITIONING SYSTEM 4-7

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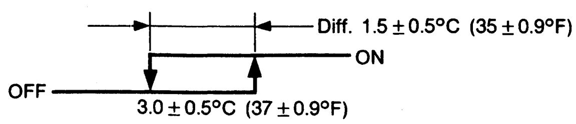
8. Condenser Fan (Sub Fan) Diagnosis (I)
9. Condenser Fan (Sub Fan) Diagnosis (II)

*: HALIDE LEAK DETECTOR ([W804]) has been removed.

**: Sight Glass Inspection ([D201]—[D202]) has been removed.

1. Air Conditioning System

Item			Specifications
Type of air conditioner			Reheat air-mix type
Cooling capacity (IMACA)			5.234 kW (4,500 kcal/h, 17,856 BTU/h)
Refrigerant			HFC-134a (CH_2FCF_3) [0.6 — 0.7 kg (1.3 — 1.5 lb)]
Compressor		Type	5-vane rotary, fix volume (CR-14)
		Discharge	144 cm^3 (8.79 cu in)/rev
		Max. permissible speed	7,000 rpm
Magnet clutch		Type	Dry, single-disc type
		Power consumption	47W
		Type of belt	V-Ribbed 4 PK
		Pulley dia. (effective dia.)	120 mm (4.72 in)
		Pulley ratio	1.8 model: 1.11, 1.6 model: 0.92
Condenser		Type	Corrugated fin (Multi-flow)
		Core face area	0.196 m^2 (2.1 sq ft)
		Core thickness	19 mm (0.75 in)
		Radiation area	4.7 m^2 (51 sq ft)
Receiver drier		Effective inner capacity	250 cm^3 (15.26 cu in)
Expansion valve		Type	External equalizing
Evaporator		Type	Single tank
		Dimensions (W x H x T)	86 x 222 x 235 mm (3.39 x 8.74 x 9.25 in)
Blower fan		Fan type	Sirocco fan
		Outer diameter x width	150 x 75 mm (5.91 x 2.95 in)
		Power consumption	230W at 12V
Condenser fan (Sub fan)		Motor type	Magnet
		Power consumption	120W at 12V
		Fan outer diameter	320 mm (12.60 in)
Radiator fan (Main fan)		Motor type	Magnet
		Power consumption	120W at 12V
		Fan outer diameter	320 mm (12.60 in)
Idling speed with F.I.C.D. in operation		MPFI model	850±50 rpm (700±50 rpm "D" range in AT model)
Dual switch (Pressure switch)	Low-pressure switch operating pressure kPa (kg/cm^2, psi)	ON → OFF	176±20 (1.80±0.20, 25.5±2.9)
		OFF → ON	186±29 (1.90±0.30, 27.0±4.2)
	High-pressure switch operating pressure kPa (kg/cm^2, psi)	ON → OFF	2,648±196 (27±2, 384±28)
		DIFF	588±196 (6±2, 85±28)
Compressor relief valve blow-out pressure kPa (kg/cm^2, psi)			3,727±196 (38±2.0, 540±28)
Thermo control amplifier working temperature (Evaporator outlet air)			
Compressor thermocut temperature			140±5°C (284±9°F) Diff. 15±5°C (59±9°F)

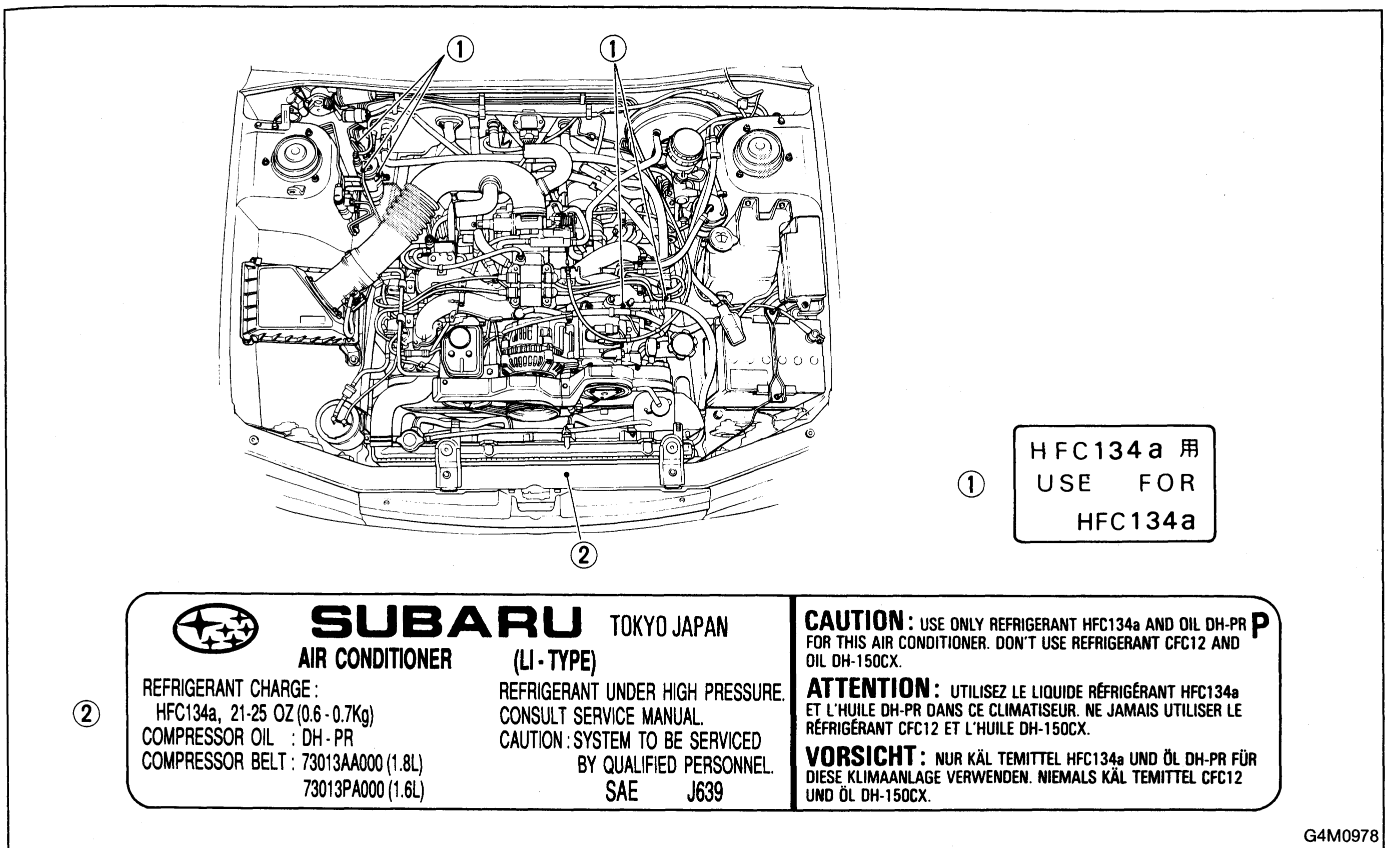
G4M0938

1. Safety Precautions

1. HFC-134a AIR CONDITIONING SYSTEM

Component parts of the cooling system, refrigerant, compressor oil, and other parts are not the same for the HFC-134a system and the older CFC-12 system. Do not interchange parts or liquid.

Vehicles with HFC-134a air conditioning systems, use only HFC-134a parts that are indicated on a label attached to the vehicle. Before performing any maintenance, verify the type of air conditioning system installed in the vehicle.



G4M0978

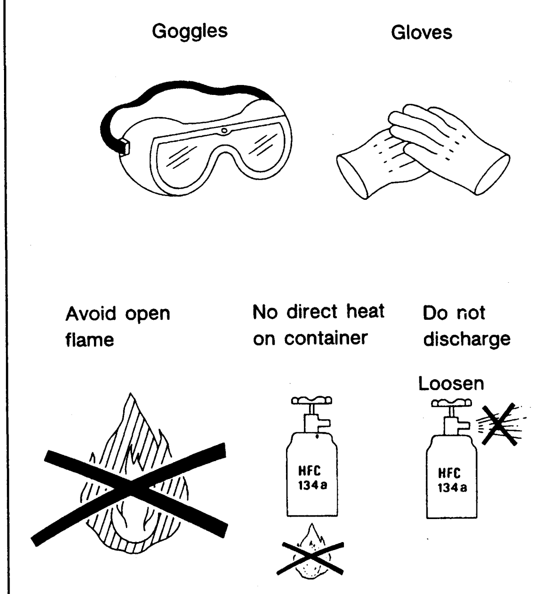
2. COMPRESSOR OIL

Do not use any compressor oil that is not specifically designated for the HFC-134a air conditioning system; only use DH-PR. Also, do not use HFC-134a compressor oil in the CFC-12 air conditioning system. If compression oils are mixed, poor lubrication will result and the compressor itself may be damaged.

Because HFC-134a compressor oil is very hygroscopic (easily absorbs moisture), when parts of the air conditioning system are being removed, quickly install a blind plug to prevent contact with the outside air. Also, always make sure that the service container for compressor oil is tightly closed except when in use. Store compressor oil in a tightly closed steel container.

3. REFRIGERANT

Do not put CFC-12 refrigerant into a HFC-134a air conditioning system. Also, do not put HFC-134a refrigerant into a CFC-12 air conditioning system. If the wrong refrigerant is used, poor lubrication will result and the compressor itself may be destroyed.



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4. HANDLING OF REFRIGERANT

Because refrigerant boils at approx. –30°C (–22°F) at sea level, it is cold enough to give you severe frostbite. Always wear goggles to protect your eyes and gloves to protect your hands. Also, even under the pressures normally found in CFC-12 containers, refrigerant will boil with the addition of heat. This could raise the pressure inside the container to a dangerous level.
Never expose a can of HFC-134a to direct sunlight, or to temperatures over 40°C (104°F). One more thing to remember about HFC-134a is that when it is exposed to an open flame or to hot metal, it forms phosgene, a deadly gas. Do not discharge HFC-134a into the atmosphere on purpose. Always read and follow the precautions on the HFC-134a bottle.

3. Tools and Equipment

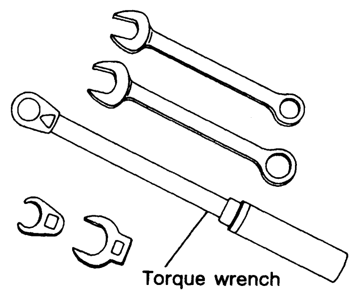
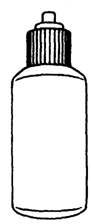
The following section provides information about the tools and equipment that will be necessary to properly service the A/C system.

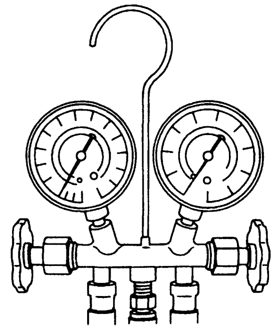
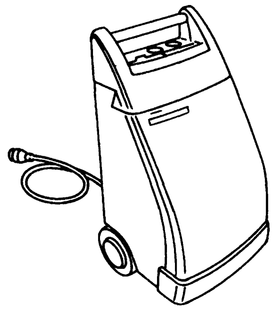
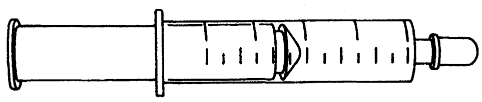
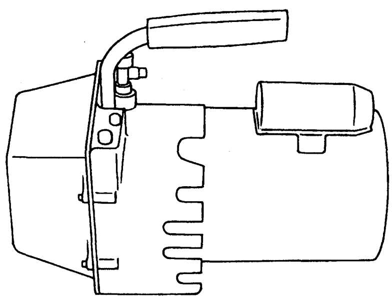
Since equipment may vary slightly depending on the manufacturer, it is important to always read and follow the manufacturer's instructions.

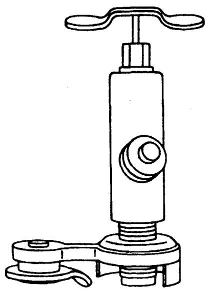
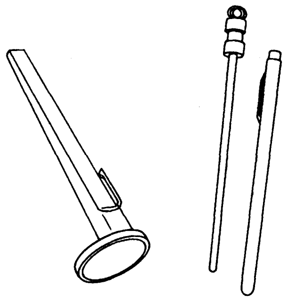
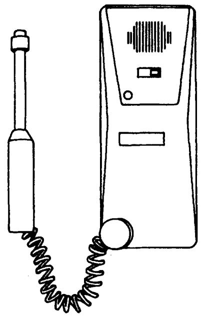
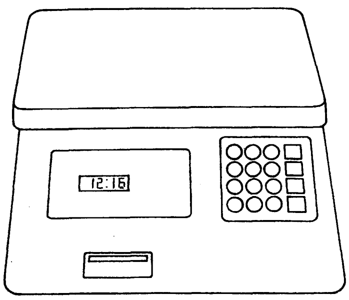
CAUTION:

When working on vehicles with the HFC-134a system, only use HFC-134a specified tools and parts. Do not mix with CFC-12 tools and parts. If HFC-134a and CFC-12 refrigerant or compressor oil is mixed, poor lubrication will result and the compressor itself may be destroyed. In order to help prevent mixing HFC-134a and CFC-12 parts and liquid, the tool and screw type and the type of service valves used are different. The gas leak detectors for the HFC-134a and CFC-12 systems must also not be interchanged.

	HFC-134a	CFC-12
Tool & screw type	Millimeter size	Inch size
Valve type	Quick joint type	Screw-in type

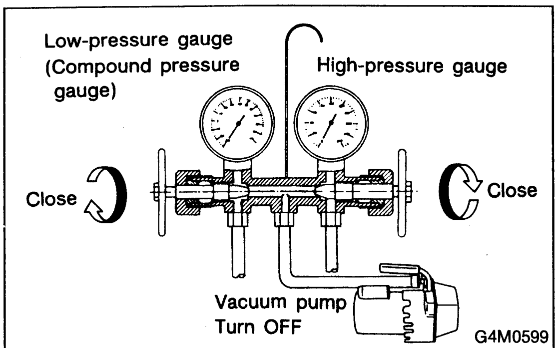
Tools and Equipment	Description
• WRENCH Various **WRENCHES** will be required to service any A/C system. A 7 to 40 N·m (0.7 to 4.1 kg-m, 5 to 30 ft-lb) torque wrench with various crowfoot wrenches will be needed. Open end or flare nut wrenches will be needed for back-up on the tube and hose fittings.	 G4M0571
• APPLICATOR BOTTLE A small **APPLICATOR BOTTLE** is recommended to apply refrigerant oil to the various parts. They can be obtained at a hardware or drug store.	 G4M0572

Tools and Equipment	Description
• MANIFOLD GAUGE SET A **MANIFOLD GAUGE SET** (with hoses) can be obtained from either a commercial refrigeration supply house or from an auto shop equipment supplier.	 G4M0573
• REFRIGERANT RECOVERY SYSTEM A **REFRIGERANT RECOVERY SYSTEM** is used for the recovery and reuse of A/C system refrigerant after contaminants and moisture have been removed from the refrigerant.	 G4M0574
• SYRINGE A graduated plastic **SYRINGE** will be needed to add oil back into the system. The syringe can be found at a pharmacy or drug store.	 G4M0575
• VACUUM PUMP A **VACUUM PUMP** (in good working condition) is necessary, and may be obtained from either a commercial refrigeration supply house or an automotive equipment supplier.	 G4M0576

Tools and Equipment	Description
• CAN TAP A **CAN TAP** for the 397 g (14 oz) can is available from an auto supply store.	 G4M0577
• THERMOMETER Pocket **THERMOMETERS** are available from either industrial hardware store or commercial refrigeration supply houses.	 G4M0578
• ELECTRONIC LEAK DETECTOR An **ELECTRONIC LEAK DETECTOR** can be obtained from either a specialty tool supply or an A/C equipment supplier.	 G4M0579
• WEIGHT SCALE A **WEIGHT SCALE** such as an electronic charging scale or a bathroom scale with digital display will be needed if a 13.6 kg (30 lb) refrigerant container is used.	 G4M0580

7. Evacuating and Charging

2. PERFORM A VACUUM LEAK TEST



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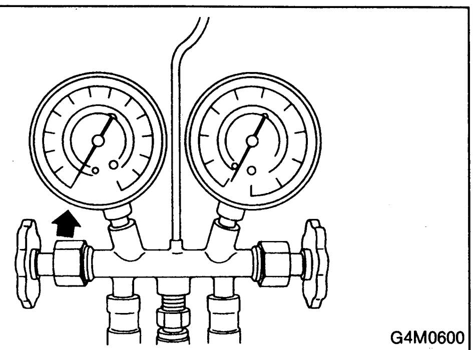
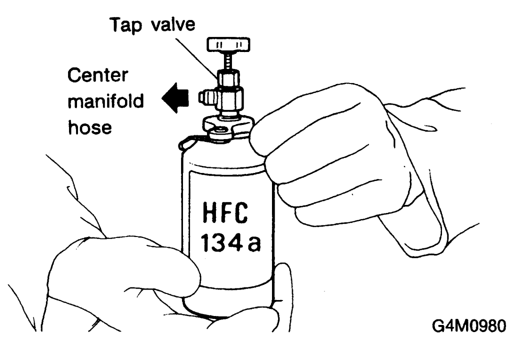
1) After 15 minutes (or more) of evacuation, close the high-pressure manifold valve.
2) Close the low-pressure manifold valve.
3) Turn off the vacuum pump.



G4M0600

4) Note the low side gauge reading.
5) After 5 minutes, re-check the low-pressure gauge reading.
If the vacuum level has changed more than 4 kPa (25 mmHg, 1 inHg), perform an HFC-134a leak test.
If the vacuum reading is about the same as noted in step 2-4), continue on to step 2-6).



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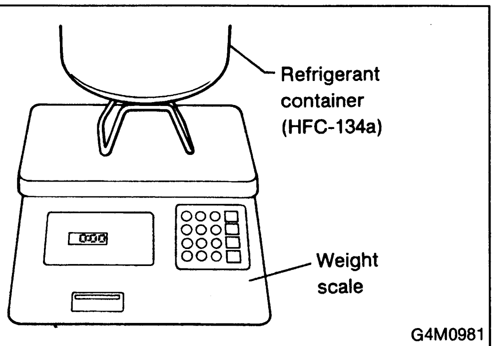
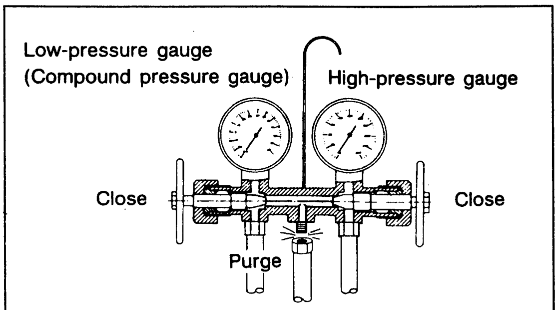
6) Carefully attach the can tap to the refrigerant can by following the can tap manufacturer's instructions.
7) Disconnect the center manifold hose from the vacuum pump and connect the hose to the tap valve.



G4M0981

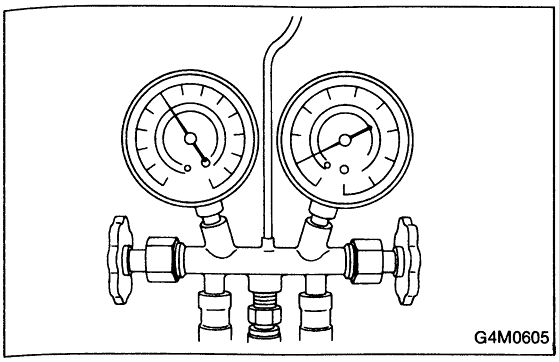
8) If a 13.6 kg (30 lb) container of refrigerant is used a weight scale will be needed. This scale is to determine the amount of refrigerant that is used.
Connect the center hose from the manifold to the valve.
Place the 13.6 kg (30 lb) container on the scale, valve end down.

3. PURGE THE CENTER HOSE



G4M0603

1) Verify that all three hose connections are tight at the manifold gauge set.
2) Open the valve on the HFC-134a source.
3) **With safety equipment in place (goggles and gloves), use extreme caution** and loosen the center hose connection at the manifold and allow the HFC-134a to escape for no more than two or three seconds, then quickly retighten the hose fitting at the manifold.

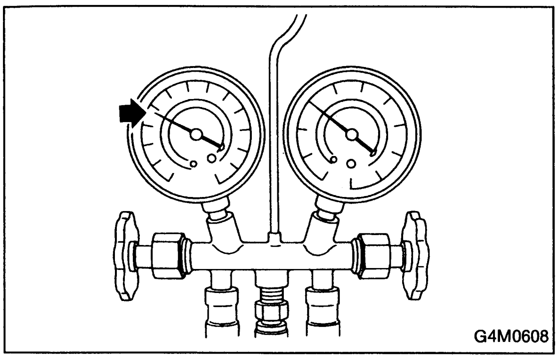

G4M0605

5. CHECK THE GAUGE READINGS

When both the high- and low-pressure gauge readings are about equal, or the HFC-134a source is empty, or the system has been filled to specifications, close the high-pressure manifold valve.

6. ADD ADDITIONAL CANS

If the HFC-134a source is exhausted, first close the high-pressure manifold valve, second, close the can tap valve, then slowly purge the refrigerant from the service hose by loosening the fitting at the can tap. Repeat steps 15 through 19 as necessary.


G4M0608

8. CHARGE THE SYSTEM

1) With the refrigerant source connected and the service hose purged, slowly open the low-pressure manifold valve, while checking the low-pressure gauge reading.

CAUTION:

The refrigerant source must be positioned for vapor (valve up).

2) Keep the low side pressure below 276 kPa (2.81 kg/cm^2, 40 psi) by using the low-pressure manifold valve to regulate the flow of refrigerant into the system.

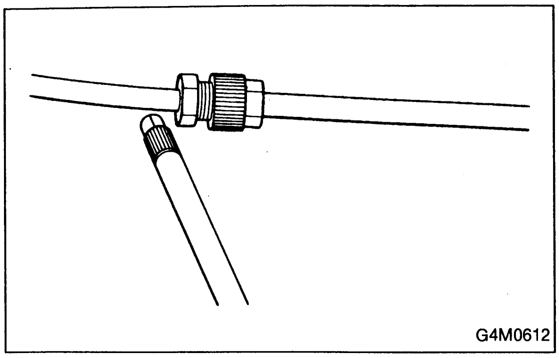
3) When the system is fully charged, close the low- pressure manifold valve.

4) Close the valve at the refrigerant source.

- Refrigerant capacity

Unit: kg (lb)

Refrigerant	Minimum	Maximum
HFC-134a	0.6 (1.3)	0.7 (1.5)


G4M0612

8. Leak Testing

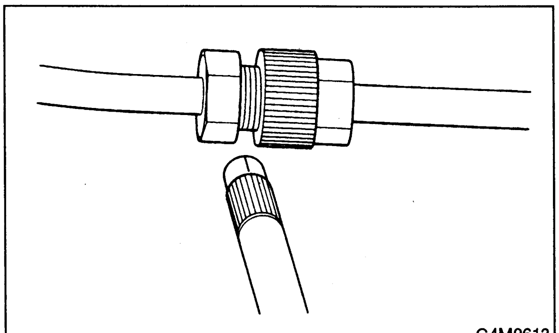
5. LEAK TEST — HIGH-PRESSURE SIDE

Operate the A/C system for approx. 10 minutes, then turn the engine off and begin the leak test.

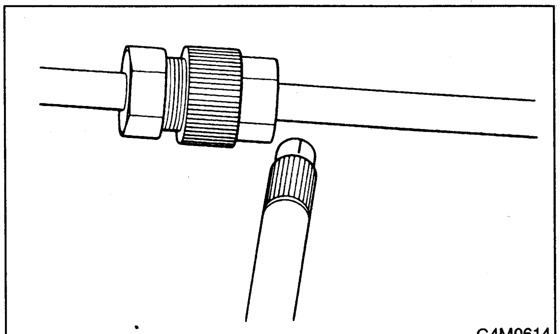
1) Begin at the connection of the high-pressure tube to the evaporator, and work your way along the high- pressure side of the system to the compressor. There are three places to check each tube connection.

2) Check the area.

(1) Check the area where the fitting meets the tube.


G4M0613

(2) Check the area where the two parts of the fitting join each other.


G4M0614

(3) Check the area where the nut meets the tube.

3) Check the area of the pressure switch (dual switch), and also check the seams of the receiver drier.

4) Check the connections of the tubes to the condenser, and also check any welded joints on the condenser.

CAUTION:
An oily area on the fins of the condenser may indicate a leak.

5) Check the area where the hoses attach to the compressor.

6) Check around the machined portions of the compressor (where the compressor sections join each other).
7) If equipped, check the thermal limiter on the compressor housing.
8) Check the compressor shaft seal by probing near the center of the compressor clutch pulley.
NOTE:
Some shaft seals have a very slight amount of normal leakage [approximately 28 g (1.0 oz) per year].

9. Lubrication

3. OIL REPLACEMENT

After stabilization and discharge, replace the component, adding the appropriate amount of oil (DH-PR) to the new component before installation.

Evaporator	114 mℓ (3.9 US fl oz, 4.0 Imp fl oz)
Receiver drier	5 mℓ (0.2 US fl oz, 0.2 Imp fl oz)
Condenser	2 mℓ (0.07 US fl oz, 0.07 Imp fl oz)
Hose	1 mℓ (0.03 US fl oz, 0.04 Imp fl oz)

If the compressor is replaced (after stabilization):
1) Drain and measure the oil from the original compressor.
2) Drain the oil from the replacement compressor and refill with the same amount that was drained from the original [20 mℓ (0.7 US fl oz, 0.7 Imp fl oz) minimum]. Always use DH-PR for the replacement oil.

18. Pressure Switch (Dual Switch)

A: INSPECTION

1) Remove cap from high-pressure line service valve, and connect gauge manifold to service valve.
2) Disconnect pressure switch harness connector, and check pressure switch for proper ON-OFF operation. Use a circuit tester.

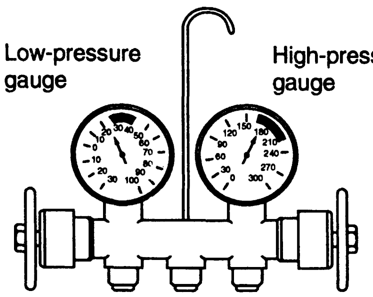
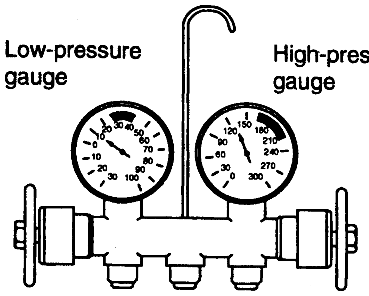
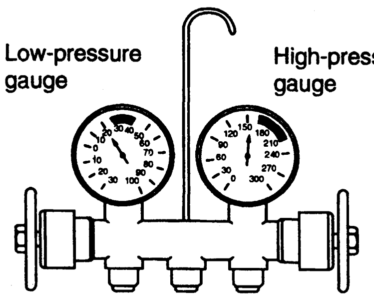
	Terminal	Operation	High-pressure side line pressure kPa (kg/cm^2, psi)
High and low pressure switch	①— ②	Turns OFF.	Increasing to 2,648 ± 196 (27 ± 2, 384 ± 28)
			Decreasing to 177 ± 20 (1.8 ± 0.2, 26 ± 2.8)
		Turns ON.	Increasing to 186 ± 29 (1.9 ± 0.3, 27 ± 4)
			Decreasing to 2,059 ± 196 (21 ± 2, 299 ± 28)

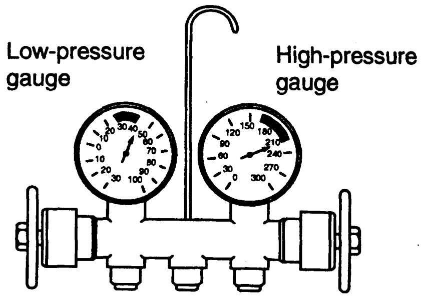
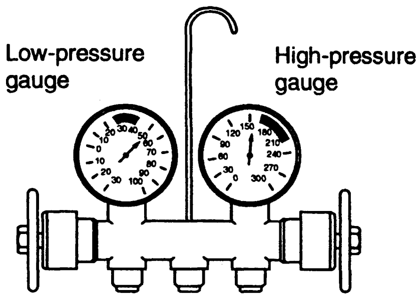
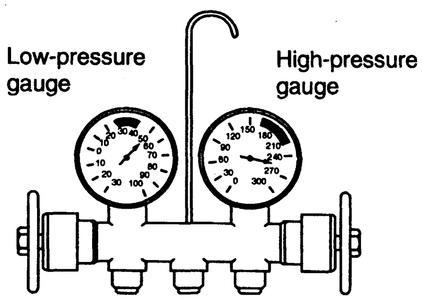
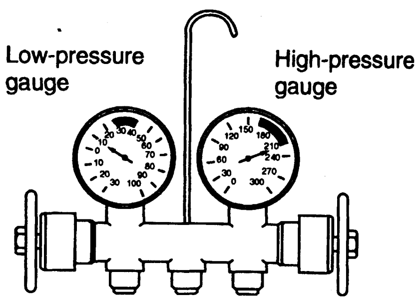
1. Air Conditioning System Diagnosis

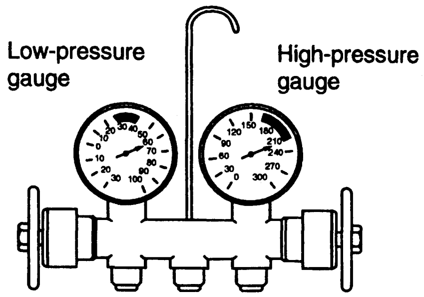
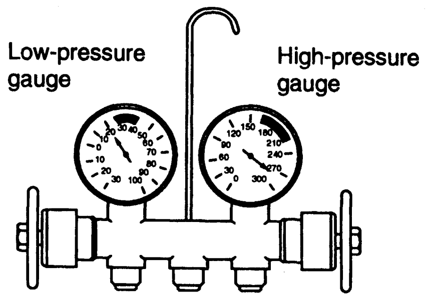
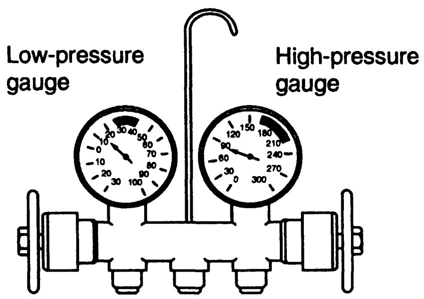
- SUFFICIENT COOLING
  - Check air flow.
    - No or low air flow
      - Check blower motor operation.
        - Abnormal operation or no operating at all.
          - Malfunctioning internal circuit of blower motor.
          - Malfunctioning electrical circuit.
            - Discontinued wiring or component circuits, or poor connection/faulty resistor, amplifier, etc./burned-out fuse or low battery voltage.
          - Malfunctioning blower motor fan.
            - Loosen fan/improper contact of fan and case/deformed fan
        - Normal operation
          - Clogged blower inlet/clogged duct /loose connection duct/air leakage, etc.
    - Normal air flow
      - Check compressor operation.
        - Abnormal operation or not operating at all.
          - Belt slipping.
            - Check compressor belt and belt tension.
          - Magnet clutch slipping.
            - Faulty electrical circuit (poor connection, low battery voltage, etc.)
            - Foreign particles on clutch frictional surface or excessive disc clearance
            - Malfunctioning internal parts of clutch, compressor.
          - Magnet clutch does not engage.
            - Activation of safety/protection devices (such as pressure switch, lock protection circuit, etc.)
            - Check electrical circuit. (wiring, component's circuit)
            - Check magnet clutch. (coil circuit, disc to pulley clearance)
        - Normal operation
          - Check discharge pressure. <Ref. to [T300].>
            - Normal pressure
              - Malfunctioning temperature control operation. (Air mix door position improperly adjusted.)
            - Abnormal pressure
              - Low-pressure side becomes negative.
              - Low-pressure side sometimes becomes negative.
              - Both high and low pressure sides are too low.
              - High-pressure side is too low and low-pressure side is too high.
              - High-pressure side is too high and low-pressure side is too low.
              - Both high and low pressure sides are too high.

3. Performance Test Diagnosis

If various conditions caused to other air conditioning system, the characteristics revealed on manifold gauge reading are shown in the following.
As to the method of a performance test, refer to the item of "Performance Test".
Each shaded area on the following tables indicates a reading of the normal system when the temperature of outside air is 32.5°C (91°F).

Condition		Probable cause	Corrective action
INSUFFICIENT REFRIGERANT CHARGE  G4M0673	Insufficient cooling.	Refrigerant is small, or leaking a little.	1. Leak test. 2. Repair leak. 3. Charge system. **Evacuate, as necessary, and recharge system.**
ALMOST NO REFRIGERANT  G4M0674	No cooling action.	Serious refrigerant leak.	**Stop compressor immediately.** 1. Leak test. 2. Discharge system. 3. Repair leak(s). 4. Replace receiver drier if necessary. 5. Check oil level. 6. Evacuate and recharge system.
FAULTY EXPANSION VALVE  G4M0675	Slight cooling. Sweating or frosted expansion valve inlet.	Expansion valve restricts refrigerant flow. ● Expansion valve is clogged. ● Expansion valve is inoperative. Valve stuck closed. Thermal bulb has lost charge.	If valve inlet reveals sweat or frost: 1. Discharge system. 2. Remove valve and clean it. Replace it if necessary. 3. Evacuate system. 4. Charge system. If valve does not operate: 1. Discharge system. 2. Replace valve. 3. Evacuate and charge system.

Condition		Probable cause	Corrective action
 G4M0676  G4M0677	Insufficient cooling. Sweated suction line. No cooling. Sweating or frosted suction line.	Expansion valve allows too much refrigerant through evaporator. Faulty seal of O-ring in expansion valve.	Check valve for operation. If suction side does not show a pressure decrease, replace valve. 1. Discharge system. 2. Remove expansion valve and replace O-ring. 3. Evacuate and replace system.
AIR IN SYSTEM  G4M0678	Insufficient cooling.	Air mixed with refrigerant in system.	1. Discharge system. 2. Replace receiver drier. 3. Evacuate and charge system.
MOISTURE IN SYSTEM  G4M0679	After operation for a while, pressure on suction side may show vacuum pressure reading. During this condition, discharge air will be warm. As warning of this, reading shows 39 kPa (0.4 kg/cm^2, 6 psi) vibration.	Drier is saturated with moisture. Moisture has frozen at expansion valve. Refrigerant flow is restricted.	1. Discharge system. 2. Replace receiver drier (twice if necessary). 3. Evacuate system completely. (Repeat 30 minute evacuating three times.) 4. Recharge system.

Condition		Probable cause	Corrective action
FAULTY CONDENSER  G4M0680	No cooling action. Engine may overheat. Suction line is very hot.	Condenser is often found not functioning well.	• Check condenser cooling fan. • Check condenser for dirt accumulation. • Check engine cooling system for overheat. • Check for refrigerant overcharge. **If pressure remains high in spite of all above actions taken, remove and inspect the condenser for possible oil clogging.**
HIGH-PRESSURE LINE BLOCKED  G4M0681	Insufficient cooling. Frosted high-pressure liquid line.	Drier clogged, or restriction in high-pressure line.	1. Discharge system. 2. Remove receiver drier or strainer and replace it. 3. Evacuate and charge system.
FAULTY COMPRESSOR  G4M0682	Insufficient cooling.	Internal problem in compressor, or damaged gasket and valve.	1. Discharge system. 2. Remove and check compressor. 3. Repair or replace compressor. 4. Check oil level. 5. Replace receiver drier. 6. Evacuate and charge system.

BODY AND EXTERIOR 5-1

Page

S SERVICE DATA AIRBAG
1. Supplemental Restraint System "Airbag"
2. Body Datum Points
3. Datum Dimensions
4. Datum Points and Dimensions Concerning On-Board Aiming Adjustment (G.C.C. models only)

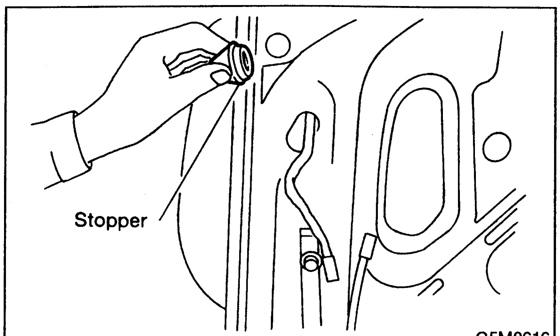
C COMPONENT PARTS
1. Front Hood and Hood Lock
2. Trunk Lid
3. Front Bumper
4. Rear Bumper
5. Sunroof
6. Steering Support Beam

W SERVICE PROCEDURE 2
1. Hood
2. Trunk Lid (including rear gate opener)
3. Fuel Flap
4. Repair Instruction for Fuel Flap
5. Front Bumper AIRBAG
6. Rear Bumper
7. Coating Method for PP Bumper
8. Repair Instructions for Colored PP Bumper
9. Front Fender AIRBAG
10. Mud Guard and Arch Protector AIRBAG
11. Cowl Panel
12. Molding and Retainer
13. Front Grille
14. Sunroof
15. Rear Spoiler (4 door Sedan) 2
16. Rear Spoiler (5 door) 3

T DIAGNOSTICS
1. Sunroof

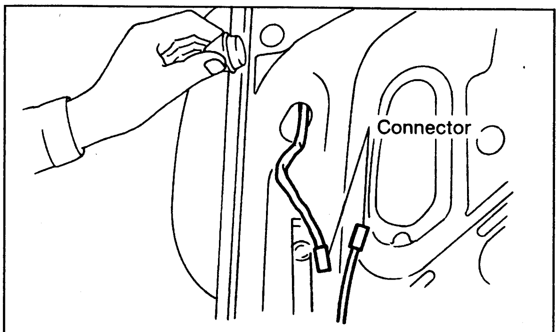
15. Rear Spoiler (4 door Sedan)

A: REMOVAL



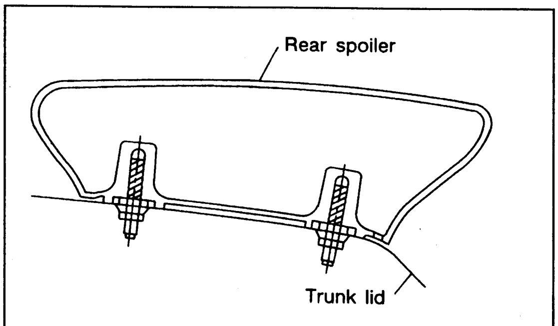
G5M0616

1) Remove stoppers from both sides of trunk lid.



G5M0617

2) Disconnect high-mount stop lamp connector. (Stop lamp equipped vehicle only)



G5M0618

3) Remove nuts from rear spoiler.

CAUTION:

Be careful not to drop nuts into box section of trunk lid.

Tightening torque:

7.4±2.0 N·m (0.75±0.2 kg-m, 5.4±1.4 ft-lb)

4) Lift rear spoiler and unfasten clips.
Remove spoiler from trunk lid.

CAUTION:

Be careful not to damage trunk lid.

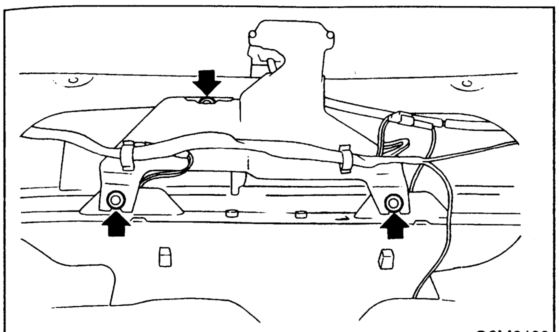
B: INSTALLATION

Installation is in the reverse order of removal.

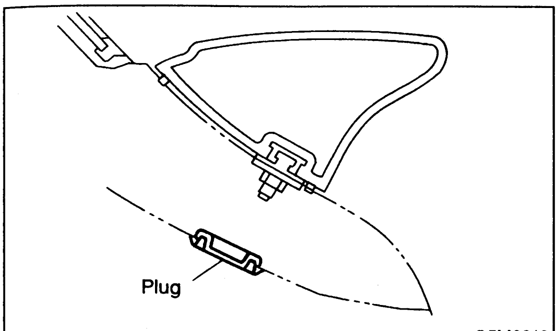
16. Rear Spoiler (5 door)

A: REMOVAL

1. WAIST SPOILER

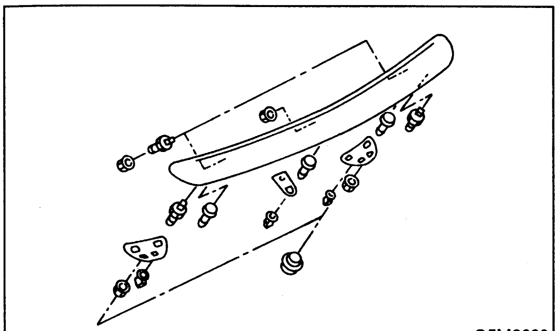

G6M0130

1) Remove rear wiper. <Ref. to 6-2 [W6B3].>



G5M0619

2) Remove plugs from rear gate.


G5M0620

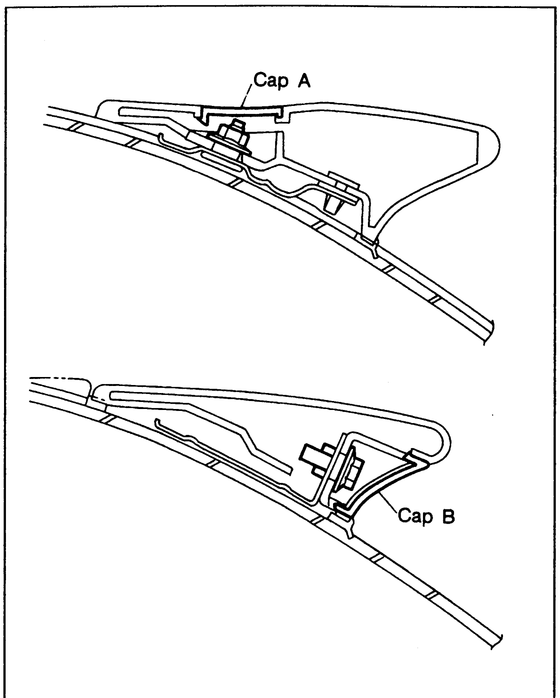
3) Remove nuts from spoiler.

Tightening torque:

7.4±2.0 N·m (0.75±0.2 kg-m, 5.4±1.4 ft-lb)

4) Lift spoiler and unfasten clips.
Remove spoiler from rear gate.

CAUTION:
Be careful not to damage rear gate.



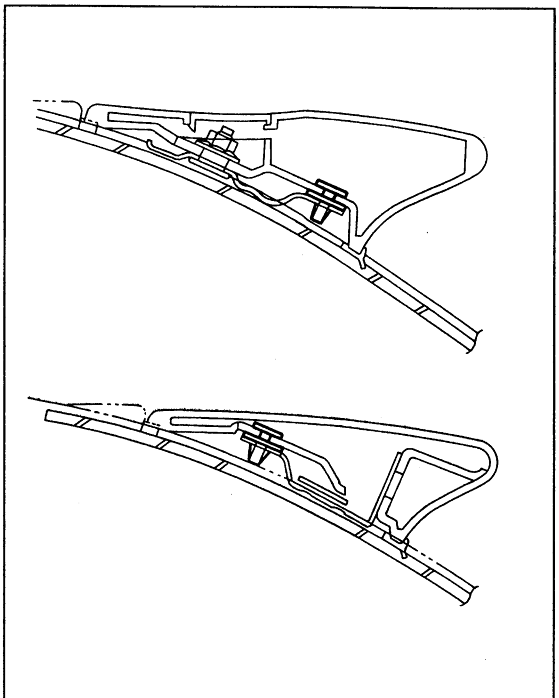
G5M0621

2. ROOF SPOILER

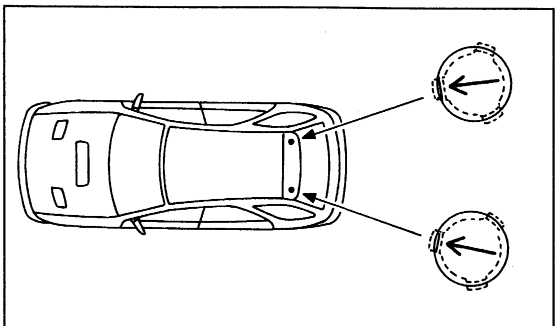
1) Remove caps from both sides of spoiler.
2) Remove nuts and bolts from spoiler.

Tighteningtorque:

7.4±2.0 N·m (0.75±0.2 kg-m, 5.4±1.4 ft-lb)


G5M0622

3) Lift spoiler and unfasten clips.


G5M0623

B: INSTALLATION

Installation is in the reverse order of removal.

NOTE:

Install cap A with the arrow (on the back) facing the center of the vehicle as shown in the figure.

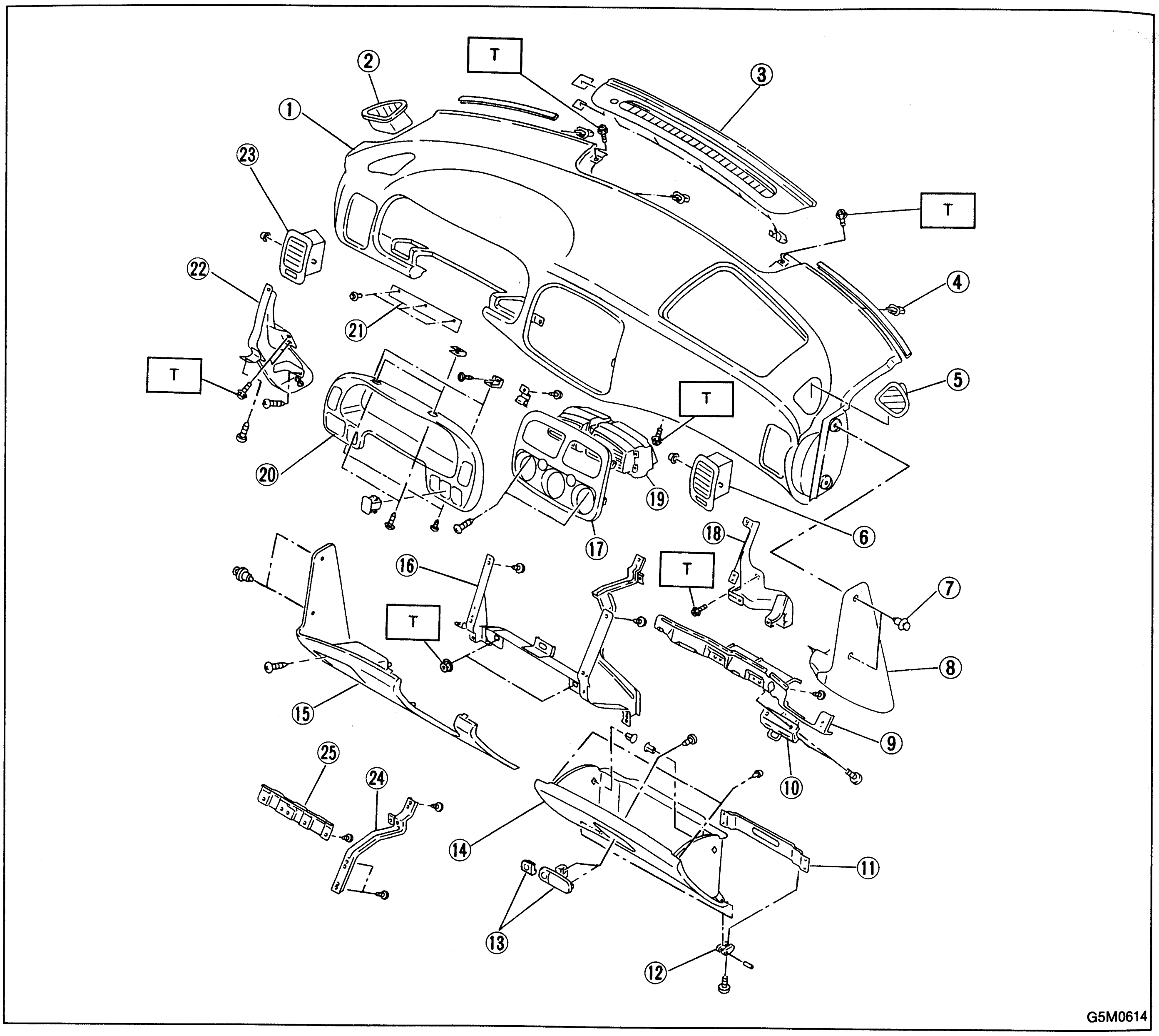
INSTRUMENT PANEL 5-4

Page

C COMPONENT PARTS 2
1. Instrument Panel 2
W SERVICE PROCEDURE 3
1. Instrument Panel AIRBAG 3

1. Instrument Panel

4. WITH PASSENGER AIRBAG MODEL



① Pad & frame	⑪ Frame pocket	㉑ Cover
② Grille SD def. (D)	⑫ Hinge	㉒ Reinf. (D)
③ Front def. grille	⑬ Lock ASSY	㉓ Grille vent (D)
④ Grommet	⑭ Pocket ASSY	㉔ Reinf. airbag B
⑤ Grille SD def. (P)	⑮ Lower cover ASSY	㉕ Reinf. airbag UPPER
⑥ Grille vent (P)	⑯ Reinf. CTR	
⑦ Clip	⑰ Panel CTR (A)	
⑧ SD panel (P)	⑱ Reinf. (P)	
⑨ Reinf. airbag CTR	⑲ Grille CTR def.	
⑩ Striker	⑳ Meter visor	

Tightening torque: N·m (kg-cm, in-lb)
T: 6.9 ± 1.0 (70 ± 10, 60.8 ± 8.7)

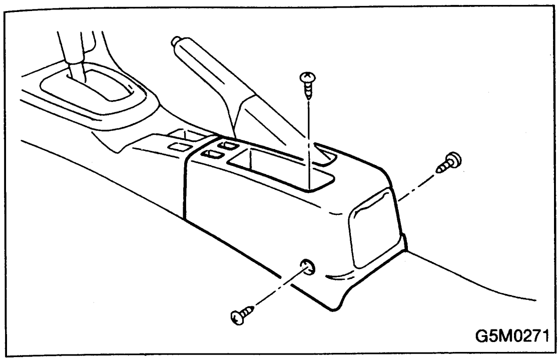
1. Instrument Panel AIRBAG

Airbag system wiring harness is routed near combination meter and audio.

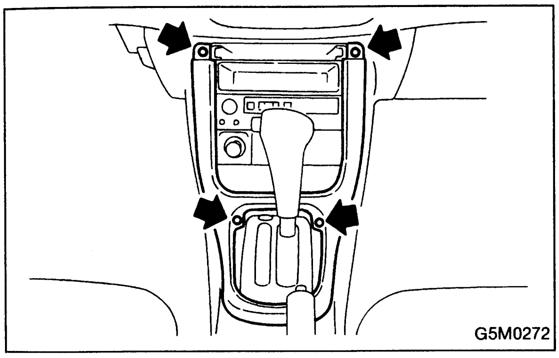
CAUTION:

- **All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuits.**
- **Be careful not to damage Airbag system wiring harness when servicing the combination meter and audio.**

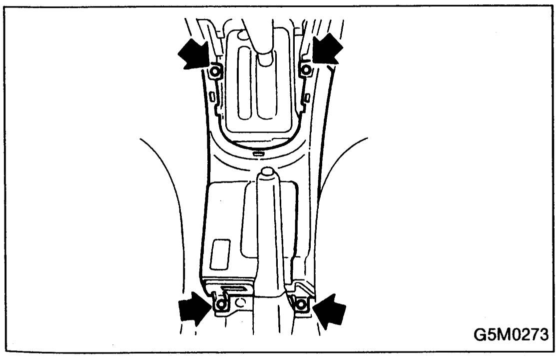
A: REMOVAL


G5M0271

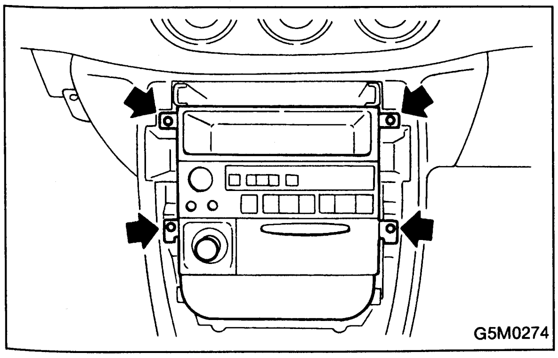
1) Disconnect GND cable from battery.
2) Remove rear console box.


G5M0272

3) Remove the covers on both sides of the clock (Europe model). Pull cup holder.
4) Turn over shift lever boot of front end (MT model). Remove select lever cover (AT model).
5) Remove console cover and disconnect connectors (Europe model).
Remove console cover (except Europe model).


G5M0273

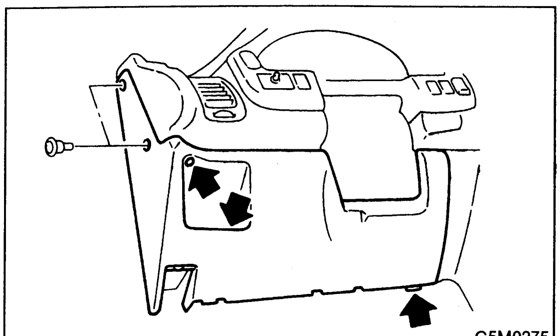
6) Remove center console.


G5M0274

7) Remove audio assembly and then disconnect radio antenna feeder and connectors.

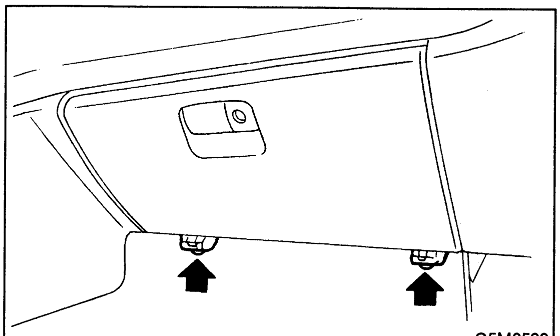
CAUTION:

Be sure to hold socket section and not harness when disconnecting.



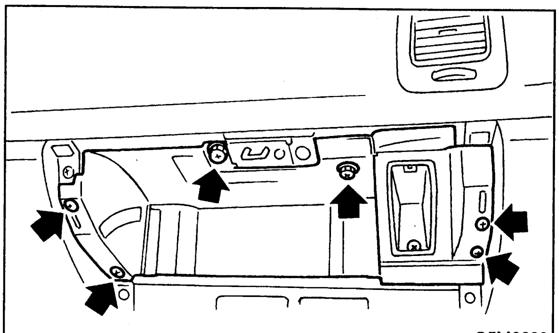
G5M0275

8) Remove lower cover and then disconnect seat belt timer connector.



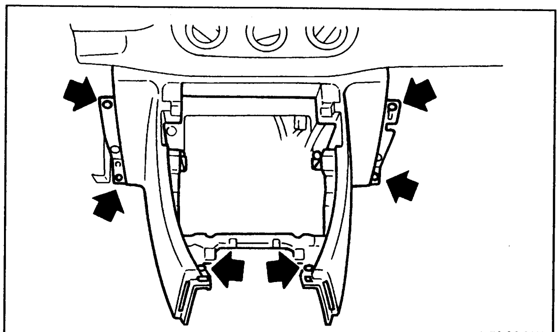
G5M0599

9) Remove glove box.



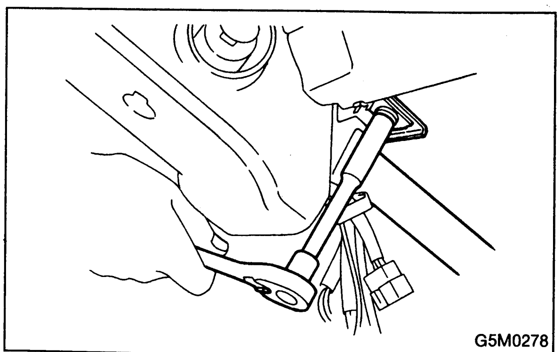
G5M0600

10) Remove pocket back panel (Airbag model).



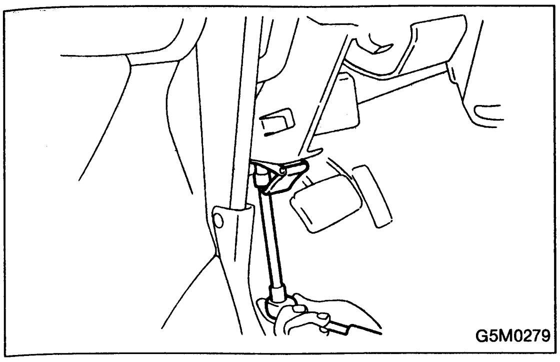
G5M0277

11) Remove instrument panel console.



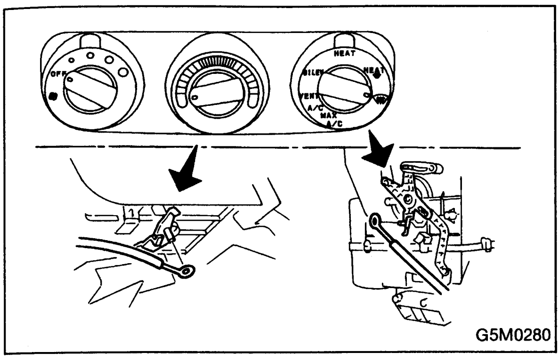
G5M0278

12) Remove two bolts and lower steering column.



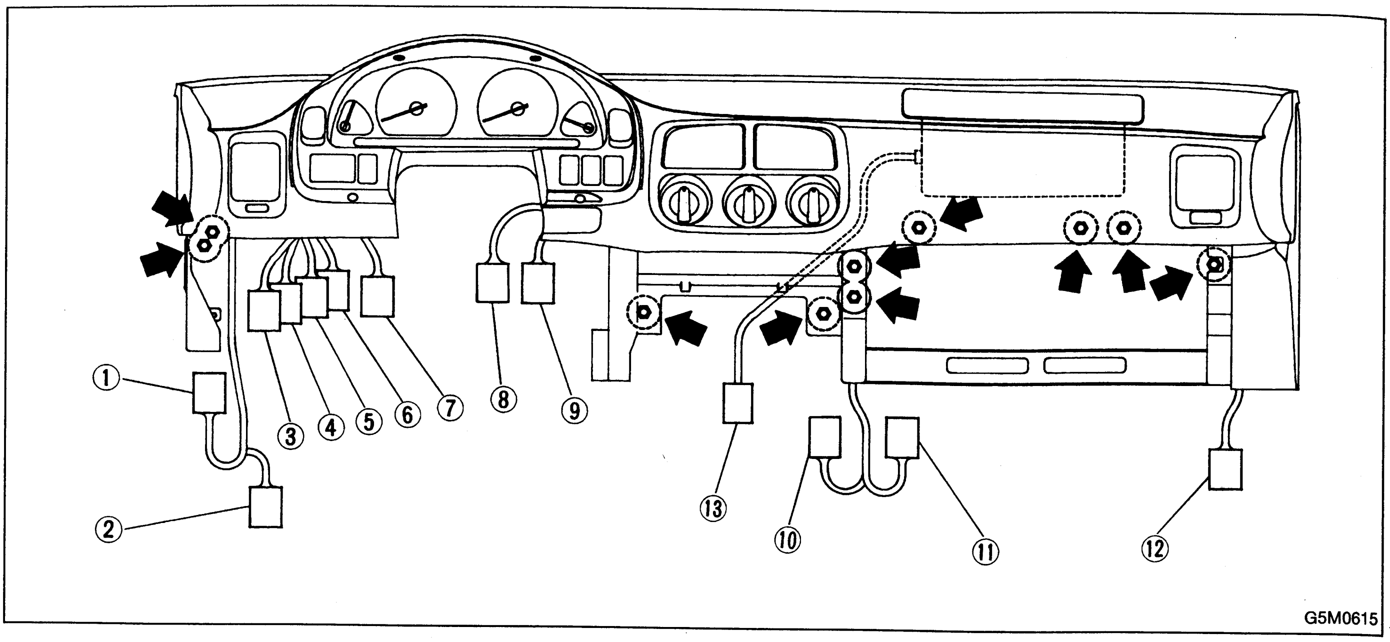
G5M0279

13) Remove hood opener lever.



G5M0280

14) Set temperature control switch to Max. COLD, and mode selector switch to defroster position.
15) Disconnect both temperature control cable and mode selector cable from link.
NOTE:
Do not move switch and link when installing.



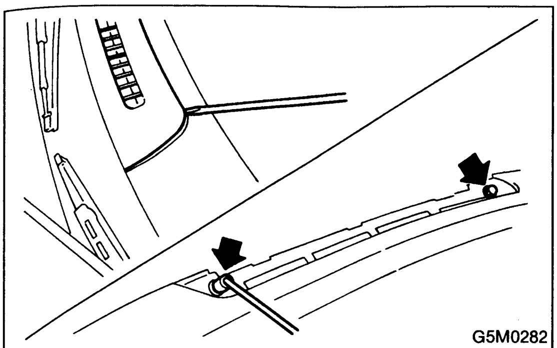
16) Disconnect harness connectors.

	LHD model	RHD model
①	15P/Gray	15P/Gray
②	12P/Black	—
③	20P/White	22P/Black
④	20P/Blue	22P/White
⑤	12P/Black	22P/Blue
⑥	8P/Natural	22P/Brown (AT model)
⑦	—	6P/White
⑧	4P/Blue	—
⑨	4P/Blue	4P/Blue
⑩	6P/Black	6P/Black
⑪	—	4P/Blue
⑫	16P/Natural	—
⑬	Airbag connector (AB10)/Yellow	—

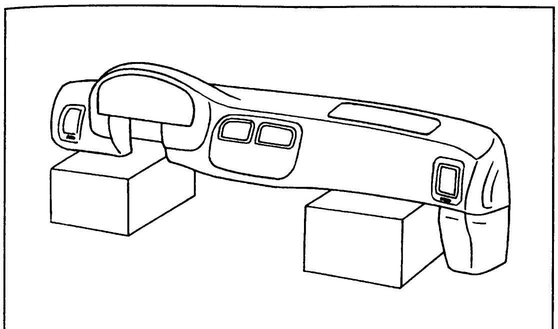
CAUTION:
- **Be sure to hold socket section and not harness when disconnecting.**
- **When disconnecting airbag connector (AB10), refer to 5-5 [M2-6].**

NOTE:
Put matching mark, if necessary, for easy re-assembly.

17) Remove the ten bolts and nuts.


G5M0282

18) Remove front defroster grille and two bolts.
19) Remove instrument panel carefully from the body and then disconnect speedometer cable from back of combination meter.


G5M0602

CAUTION:
When storing removed instrument panel with passenger airbag module, place it standing up on the floor.

SUPPLEMENTAL RESTRAINT SYSTEM 5-5

Page

S SPECIFICATIONS AND SERVICE DATA 2
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C COMPONENT PARTS 3
1. SRS Airbag 3
W SERVICE PROCEDURE 4
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3. Front Sensor
4. Main Harness 7
5. Airbag Control Unit
6. Combination Switch
7. Disposal of Airbag Module 8

1. Inspection and Replacement Standards

2. AIRBAG MODULE (Driver and passenger)

Inspection standard:

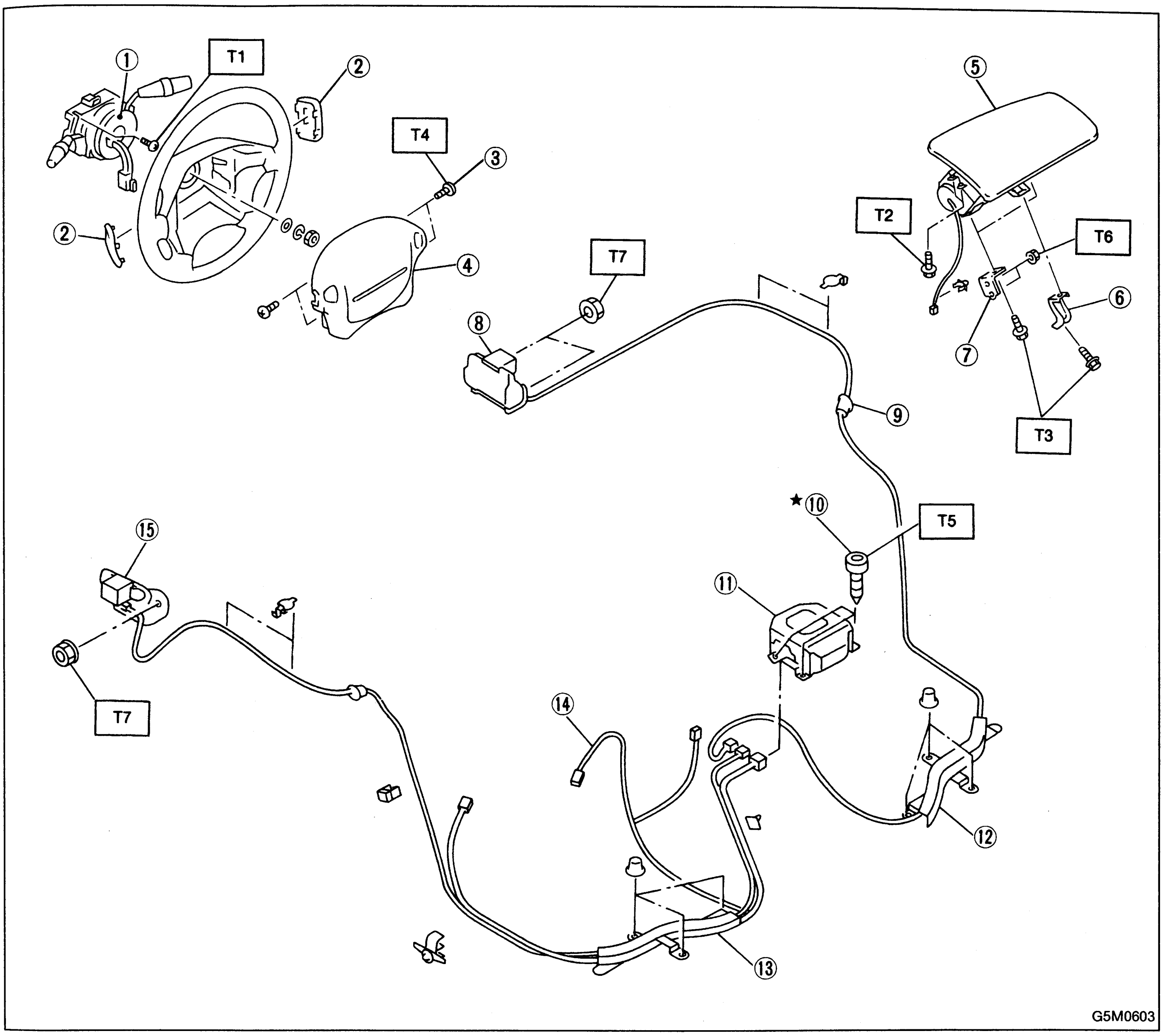
- The vehicle damaged in a collision (regardless of whether or not airbag is deployed.)
- The designated trouble code is output during self-diagnosis. (Refer to "Diagnostics" Section.)

Replacement standard:

- Airbag is deployed.
- The pad surface is scratched or cracked.
- Harness and/or connector is deformed or cracked, their circuits are broken, lead wire is exposed, etc.
- Mounting bracket is cracked or deformed.
- The module surface is fouled with foreign matter. (grease, oil, water, cleaning solvent, etc.)
- Airbag module dropped to the floor/ground.
- Airbag module determined as faulty during self-diagnosis.

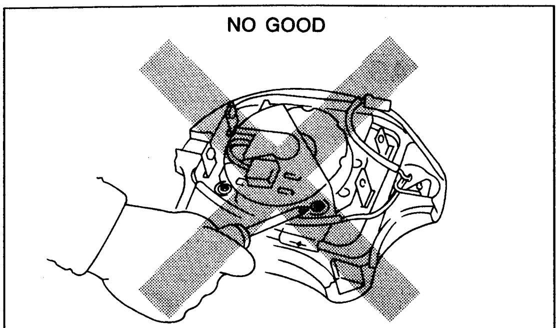
1. SRS Airbag

3. WITH PASSENGER AIRBAG MODEL



① Combination switch ASSY with roll connector
② Cover
③ TORX® bolt
④ Airbag module ASSY (Driver)
⑤ Airbag module ASSY (Passenger)
⑥ BRKT A
⑦ BRKT B
⑧ Front sensor ASSY RH
⑨ Grommet
⑩ TORX® bolt
⑪ Airbag control module
⑫ Protector RH
⑬ Protector LH
⑭ Airbag main harness
⑮ Front sensor ASSY LH

Tightening torque: N·m (kg-cm, in-lb)
T1: 2.5 ± 0.5 (25 ± 5, 21.7 ± 4.3)
T2: 4.4 ± 1.5 (45 ± 15, 39 ± 13)
T3: 7.4 ± 0.2 (75 ± 2, 65.1 ± 1.7)
T4: 9.8 ± 2.0 (100 ± 20, 87 ± 17)
T5: 9.81 ± 2.45 (100.0 ± 25.0, 86.8 ± 21.7)
T6: 17.7 ± 4.9 (180 ± 50, 156 ± 43)
T7: 19.6 ± 3.9 (200 ± 40, 174 ± 35)

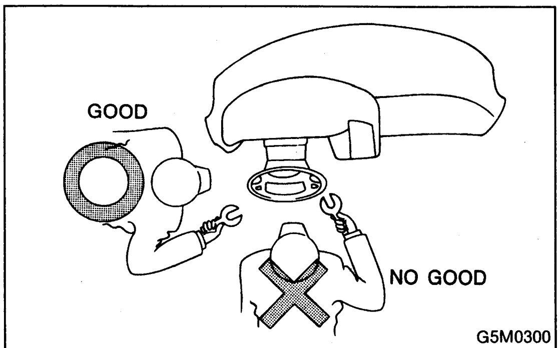


G5M0299

1. Precaution

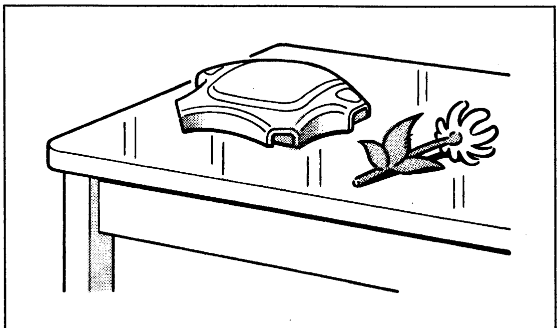
2. AIRBAG MODULE

1) The airbag module (driver side and passenger side) must not be disassembled. The airbag module cannot be used again once inflated.

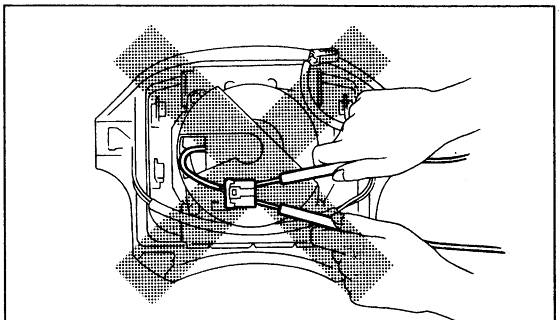


G5M0300

2) When removing and installing the airbag module (driver side and passenger side), the operator should stand, as much as possible, on the side of the airbag module.


G5M0301

3) After removal, the airbag module (driver side and passenger side) should be kept away from heat and light sources, and stored on a clean, flat surface to prevent from any damage to its lower structure.



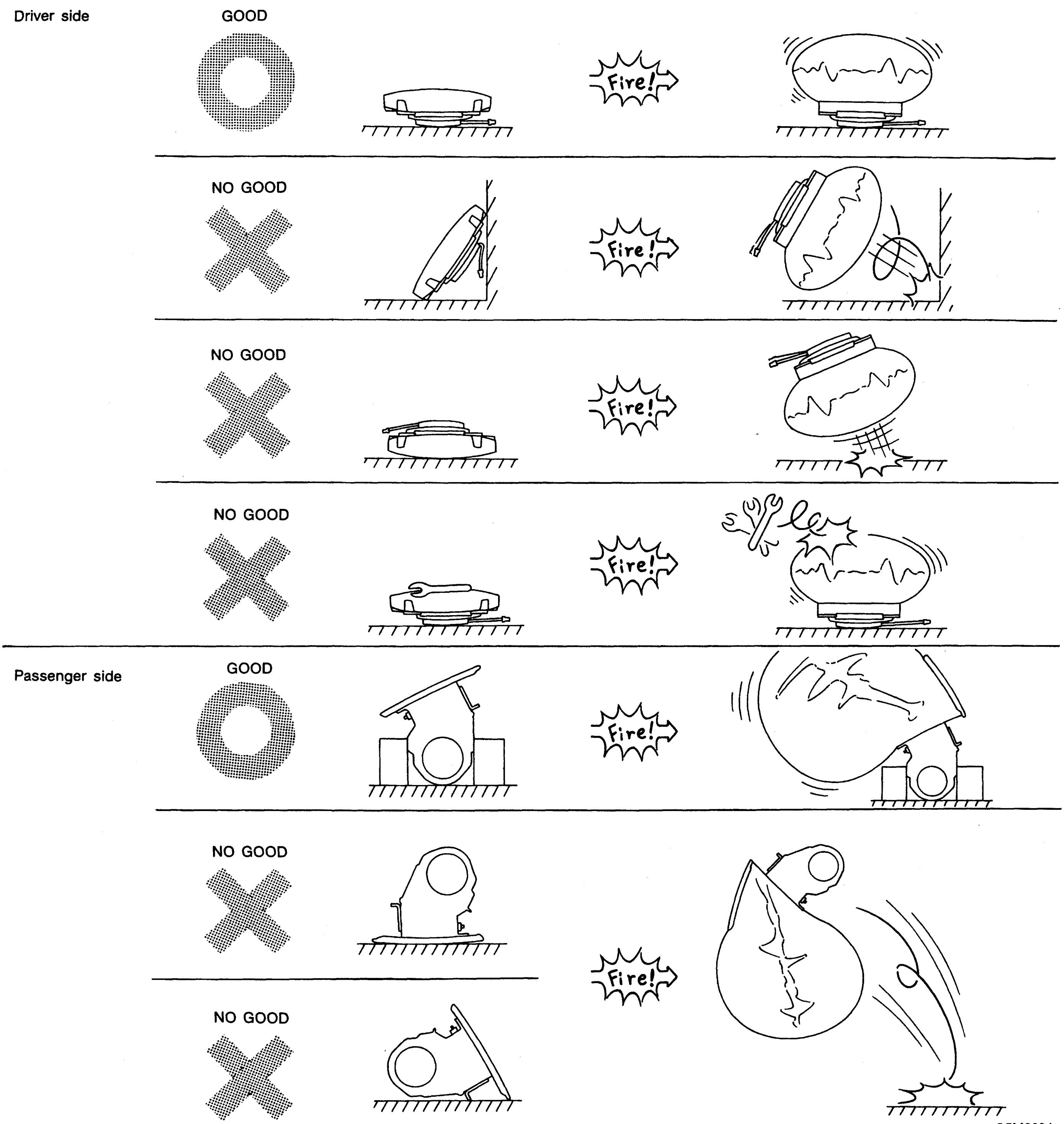
G5M0302

4) Do not check airbag module (driver side and passenger side) continuity with airbag removed from the vehicle body.

5) Replace airbag module (driver side and passenger side) with a new one, when any of the following conditions develop.

- Pad surface is scratched or cracked.
- Connector harness is damaged.
- Inflator side structure of module is cracked or deformed.
- Module is excessively stained with water, oil, etc.
- Module was accidentally dropped.

6) When storing a removed airbag module (driver side and passenger side), be sure to place it in parallel with floor with the pad facing up. Do not place it against a wall, or place anything on the pad; otherwise, a dangerous condition may be created if the module malfunctions.



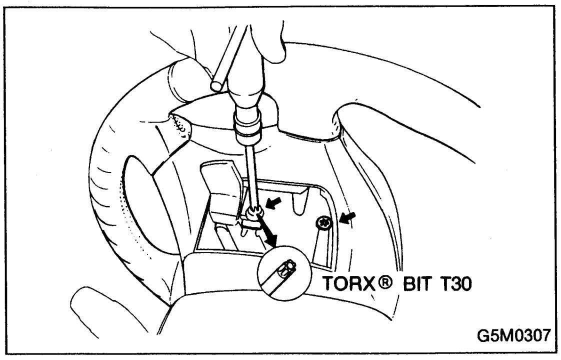
G5M0604

2. Airbag Module

A: REMOVAL

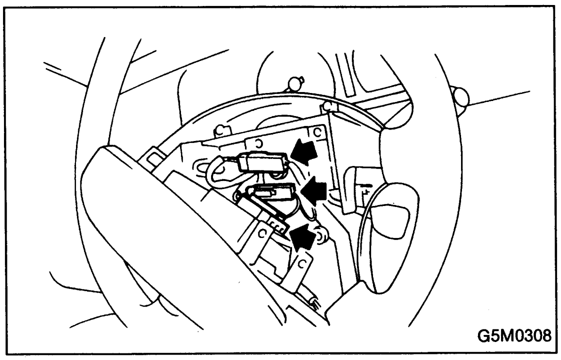
1. DRIVER SIDE

1) Set front wheels in straight ahead position.
2) Turn ignition switch off.
3) Disconnect ground cable from battery and wait for at least 20 seconds before starting work.



G5M0307

4) Remove covers from both sides of steering wheel. Using TORX® BIT T30 (Tamper resistant type), remove four TORX® bolts.

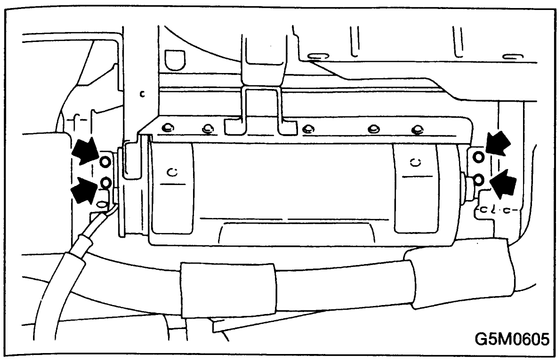

G5M0308

5) Disconnect airbag and horn connectors on back of airbag module. <Ref. to [M206].>

6) Refer to "Precaution" for handling of a removed airbag module.

2. PASSENGER SIDE

1) Remove instrument panel. <Ref. to 5-4 [W1A0].>



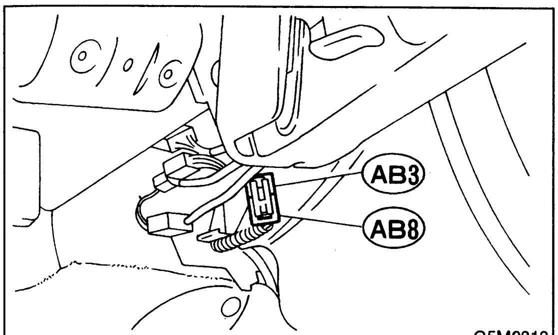
G5M0605

2) Remove four bolts and then carefully remove airbag module.
3) Refer to "Precaution" for handling of a removed airbag module.

4. Main Harness

A: REMOVAL

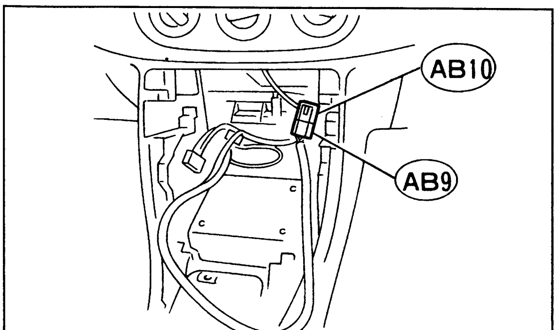
1) Turn ignition switch off.
2) Disconnect ground cable from battery and wait for at least 20 seconds before starting work.



G5M0312

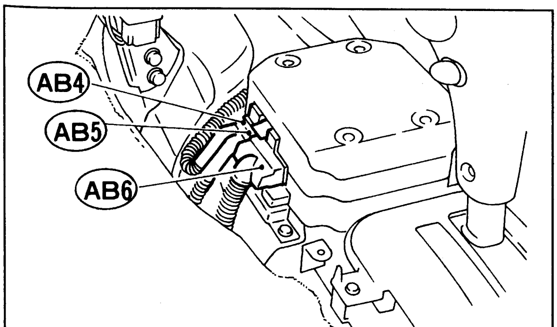
3) Remove lower cover. <Ref. to 5-4 [W1A0].> Disconnect airbag connector (AB3) and (AB8) below steering column.

CAUTION:
Do not reconnect airbag connector at steering column until main harness are securely re-installed.



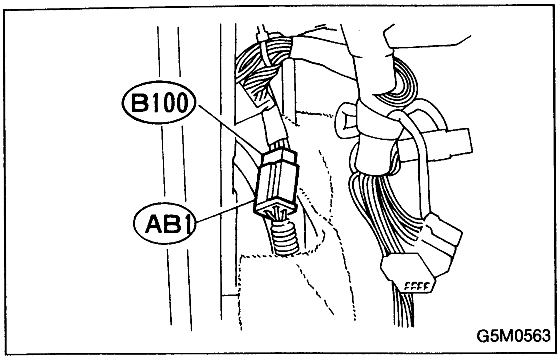
G5M0596

4) Disconnect airbag connector (AB9) and (AB10). <Ref. to 5-5 [T5F1].>

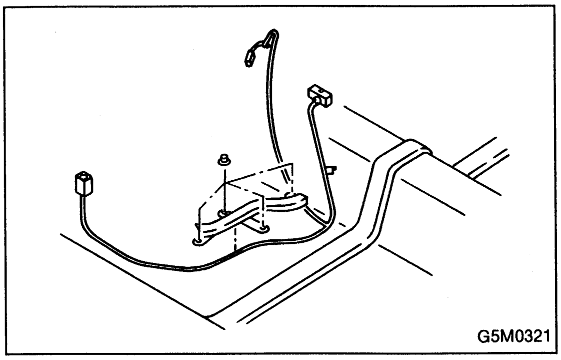


G5M0313

5) Remove instrument panel console. <Ref. to 5-4 [W1A0].> Disconnect 12 pin yellow connector (AB6) from airbag control unit. <Ref. to 5-5 [M206].>



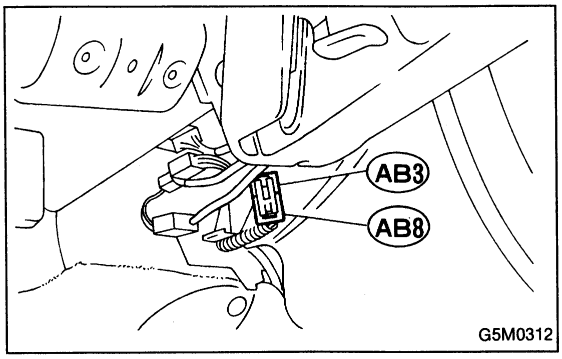
6) Disconnect body harness connector (B100) from connector (AB1).



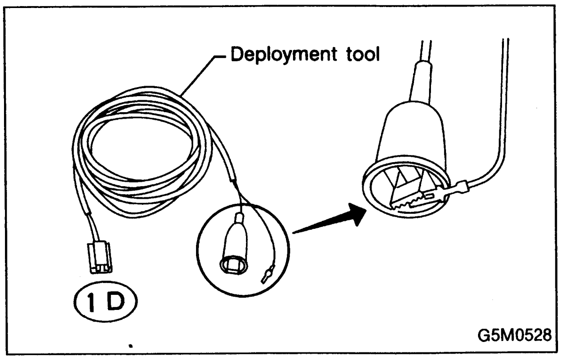
7) Roll up floor mat and side sill cover (LH side). Remove main harness from clip and protector.

7. Disposal of Airbag Module

3. DISPOSAL OF AIRBAG MODULE WHILE STILL INSTALLED (DRIVER SIDE AIRBAG MODULE)

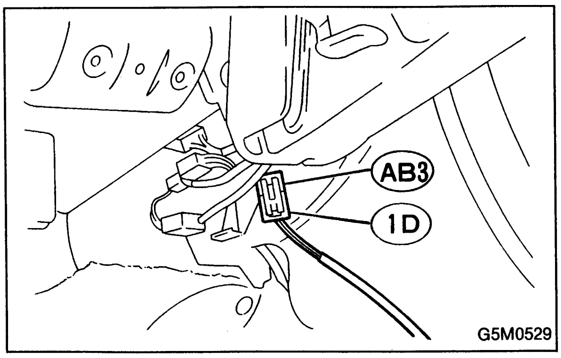


1) Turn ignition switch off.
2) Disconnect ground cable from battery, and wait for at least 20 seconds before starting work.
3) Remove lower cover. <Ref. to 5-4 [W1A0].>
Disconnect airbag connector (AB3) and (AB8) below steering column.

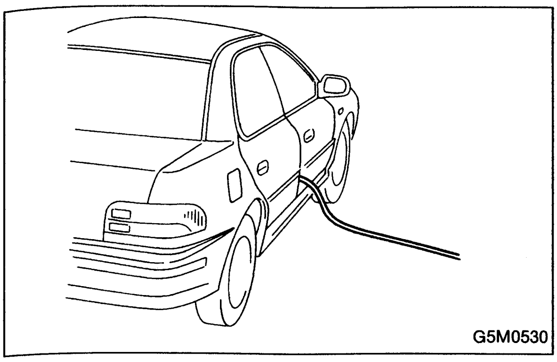


4) Short terminal to alligator clip furnished as deployment tool.

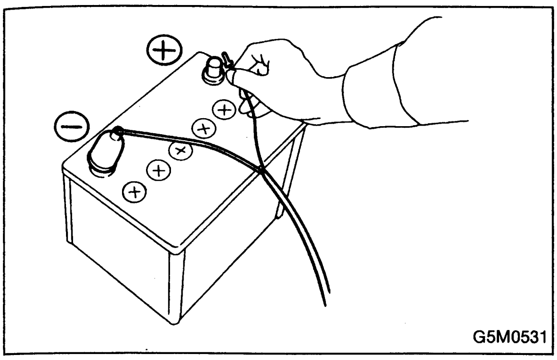
CAUTION:
Deployment tool should be kept shorted until just before deployment of airbag module.



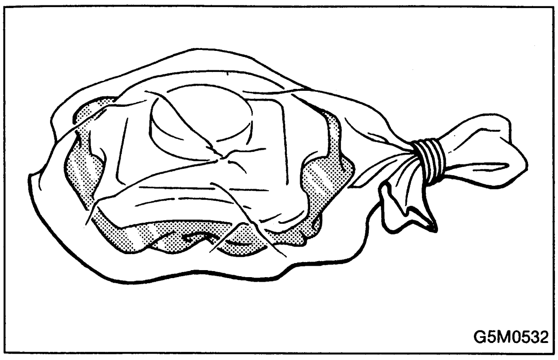
5) Connect deployment tool connector (1D) to airbag connector (AB3).



6) Extend deployment tool to the limit and make sure vehicle is empty. Completely close vehicle all windows, sunroof and trunk lid.



7) Move battery at least 5 meter (16 ft) from vehicle and secure area. Connect deployment tool alligator clip to battery minus terminal. Connect the other terminal of deployment tool to battery plus terminal.

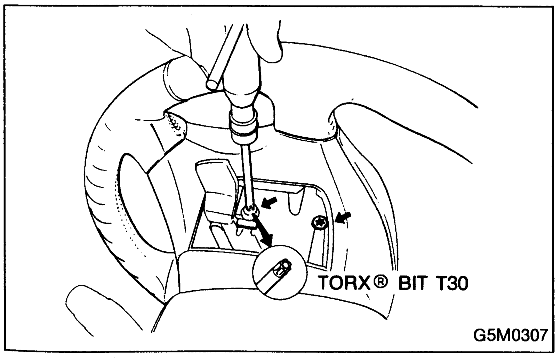


8) After deployment, airbag module is extremely hot. Leave it unattended for 40 minutes.

CAUTION:

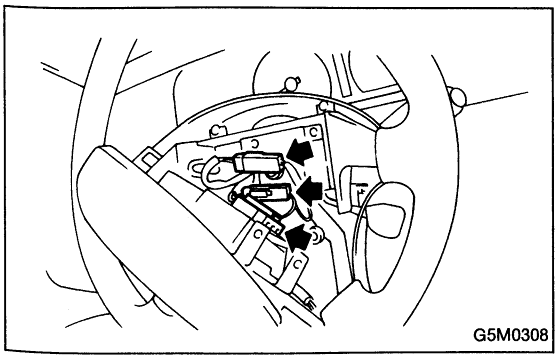
Do not apply water to cool it down.

9) Remove deployed airbag module. Wrap it in an airtight vinyl bag and discard. Do not attempt to disassemble or incinerate airbag module.

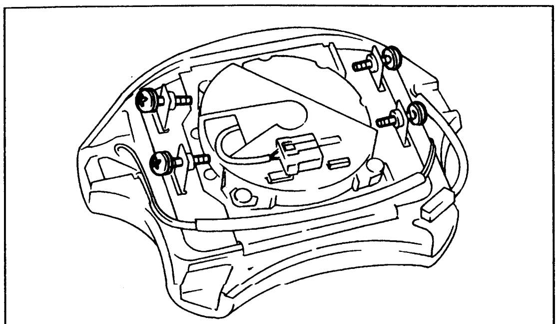


4. DISPOSAL OF AIRBAG MODULE AS A DETACHED UNIT (DRIVER SIDE AIRBAG MODULE)

1) Turn ignition switch off.
2) Disconnect ground cable from battery, and wait for at least 20 seconds before starting work.
3) Remove covers from both sides of steering wheel. Using TORX® BIT T30 (Tamper resistant type), remove four TORX® bolts.

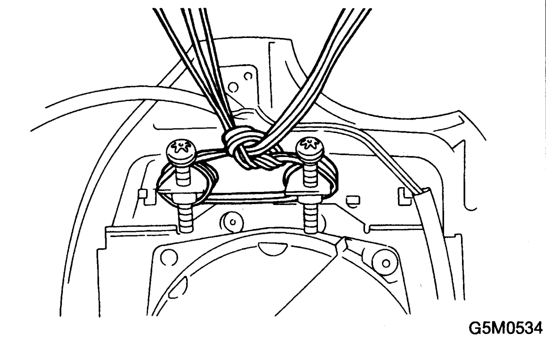


4) Disconnect airbag and horn connectors on back of airbag module. <Ref. to [M2-6].>



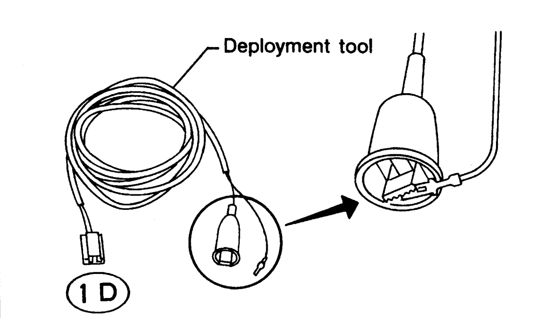
G5M0533

5) Replace four removed TORX® bolts on airbag module.



G5M0534

6) Bundle three wire harnesses for automotive use [each with a sectional area of 1.25 mm^2 (0.00194 sq in) or more] and bind them twofold around airbag module stay.

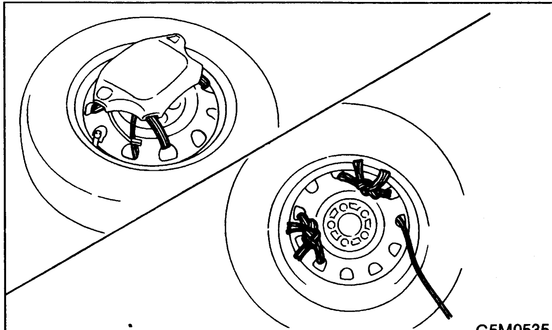


G5M0528

7) Short deployment tool alligator clip to terminal.

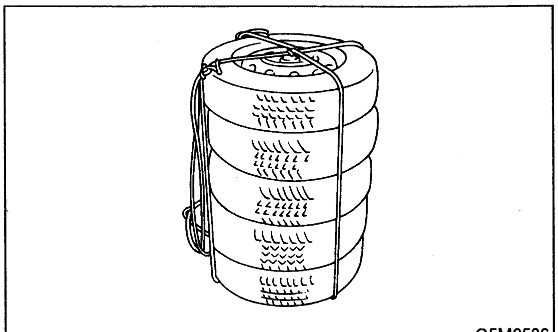
CAUTION:

Keep deployment tool shorted until just before airbag module deployment.



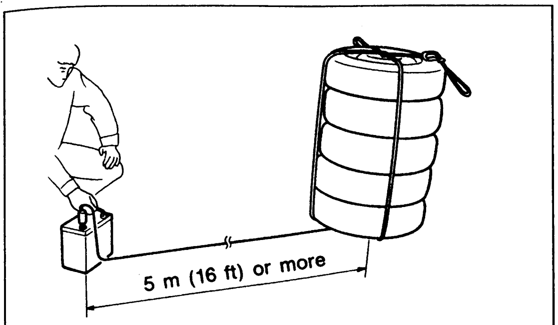
G5M0535

8) Connect connectors of deployment tool (1D) and airbag module.
Install airbag module with pad side facing upward on disk wheel with tire attached.



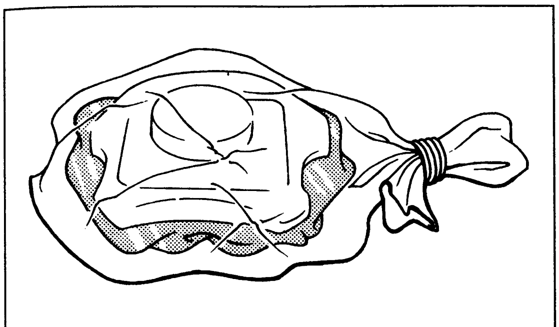
G5M0536

9) Pile three tires without disk wheel upon the tire installed with airbag module. Pile upon this an additional tire with disk wheel. Fasten this pile tight with rope.



G5M0537

10) Extend deployment tool to the limit. Secure area. Then, connect deployment tool alligator clip to battery minus terminal and the other terminal to battery plus terminal.

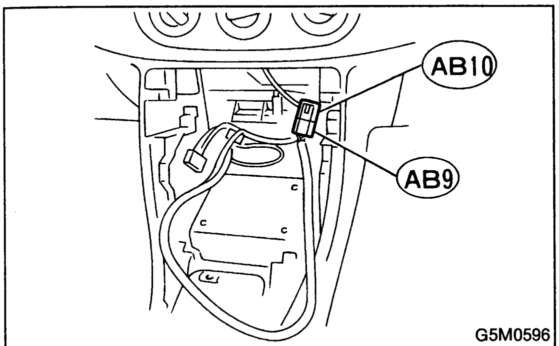

G5M0532

11) After deployment, airbag module is extremely hot. Leave it unattended for 40 minutes.

CAUTION:

Do not apply water to cool it down.

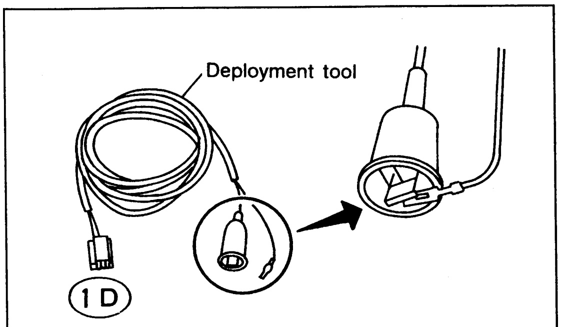
12) Remove deployed airbag module. Wrap it in an air-tight vinyl bag and discard. Do not attempt to disassemble or incinerate airbag module.



G5M0596

5. DISPOSAL OF AIRBAG MODULE WHILE STILL INSTALLED (PASSENGER SIDE AIRBAG MODULE)

1) Turn ignition switch off.
2) Disconnect ground cable from battery, and wait for at least 20 seconds before starting work.
3) Remove console cover and radio. <Ref. to 5-4 [W1A0].>
Disconnect airbag connector (AB9) and (AB10).



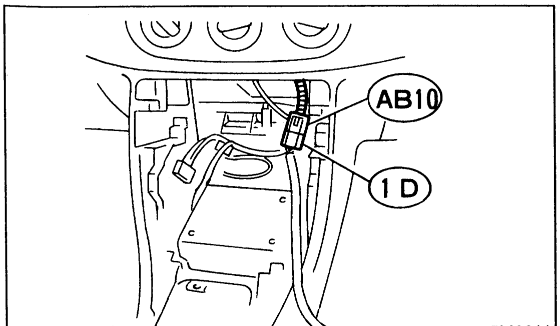
G5M0610

4) Short terminal to alligator clip furnished as deployment tool.

Deployment tool: (Part No. 98299PA030)

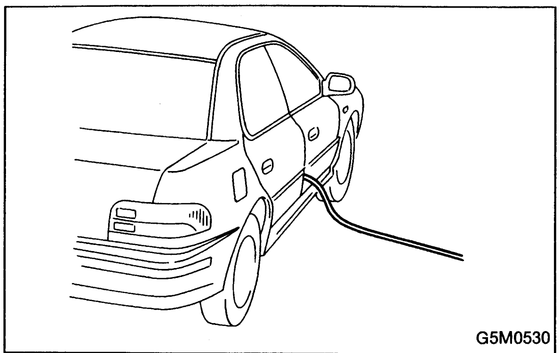
CAUTION:

Deployment tool should be kept shorted until just before deployment of airbag module.



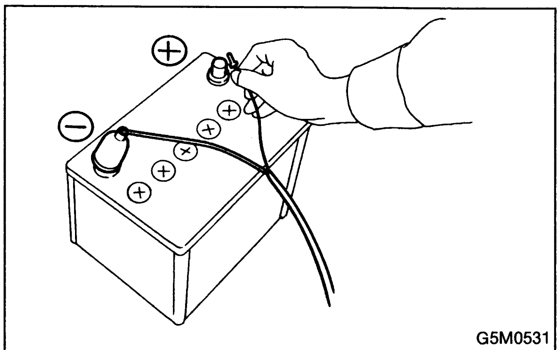
G5M0611

5) Connect deployment tool connector (1D) to airbag connector (AB10).



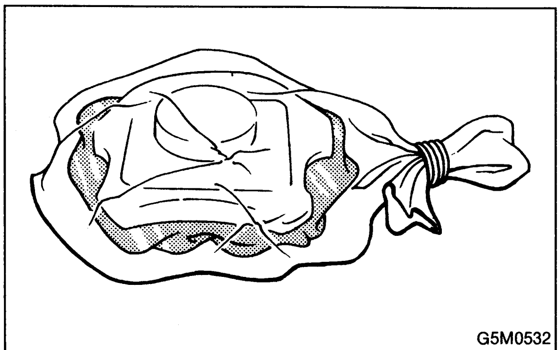
G5M0530

6) Extend deployment tool to the limit and make sure vehicle is empty. Completely close vehicle all windows, sunroof, trunk lid and rear gate.



G5M0531

7) Move battery at least 5 meter (16 ft) from vehicle and secure area. Connect deployment tool alligator clip to battery minus terminal. Connect the other terminal of deployment tool to battery plus terminal.



G5M0532

8) After deployment, airbag module is extremely hot. Leave it unattended for 40 minutes.

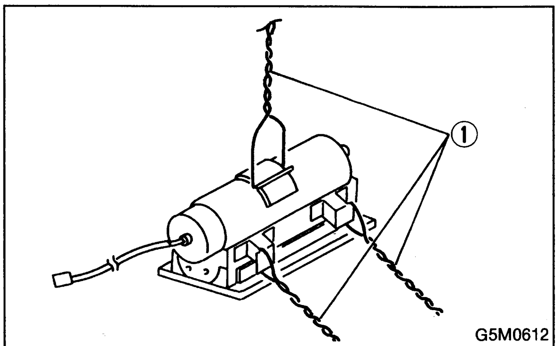
CAUTION:

Do not apply water to cool it down.

9) Remove deployed airbag module. Wrap it in an airtight vinyl bag and discard. Do not attempt to disassemble or incinerate airbag module.

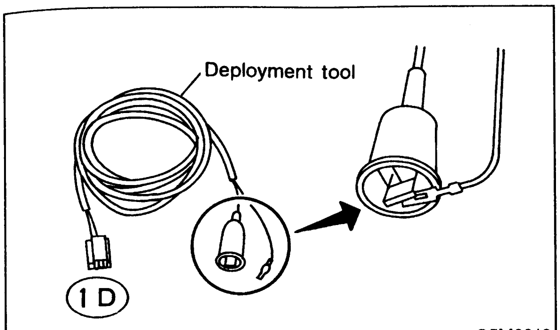
6. DISPOSAL OF AIRBAG MODULE AS A DETACHED UNIT (PASSENGER SIDE AIRBAG MODULE)

1) Turn ignition switch off.
2) Disconnect ground cable from battery, and wait for at least 20 seconds before starting work.
3) Remove passenger side airbag module. <Ref. to 5-5 [W2A2].>



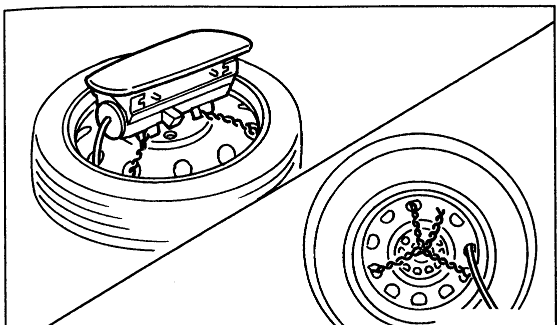
G5M0612

4) Route two strands of a thick cable ① through airbag module bracket and twist it for added strength.

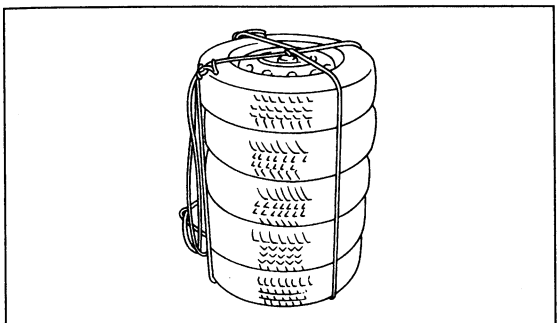


G5M0610

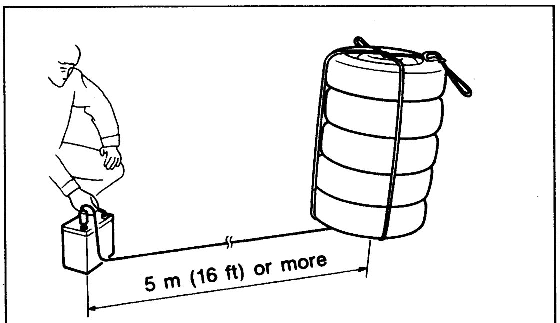
5) Short deployment tool alligator clip to terminal.
Deployment tool: (Part No. 98299PA030)
CAUTION:
Keep deployment tool shorted until just before airbag module deployment.


G5M0613

6) Connect connectors of deployment tool (1D) and airbag module.
Install airbag module with pad side facing upward on disk wheel with tire attached.
NOTE:
Use 14 inch or greater size disk wheel with tire.

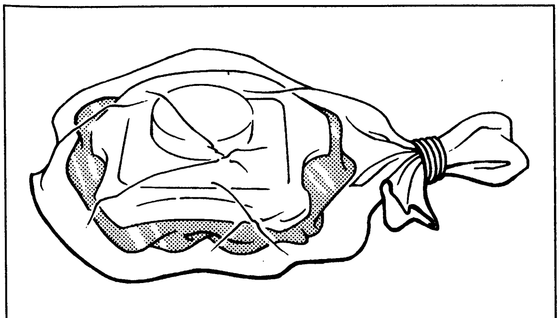

G5M0536

7) Pile three tires without disk wheel upon the tire installed with airbag module. Pile upon this an additional tire with disk wheel. Fasten this pile tight with rope.



G5M0537

8) Extend deployment tool to the limit. Secure area. Then, connect deployment tool alligator clip to battery minus terminal and the other terminal to battery plus terminal.


G5M0532

9) After deployment, airbag module is extremely hot. Leave it unattended for 40 minutes.
CAUTION:
Do not apply water to cool it down.
10) Remove deployed airbag module. Wrap it in an air-tight vinyl bag and discard. Do not attempt to disassemble or incinerate airbag module.

BODY ELECTRICAL SYSTEM 6-2

Page

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4. Lighting
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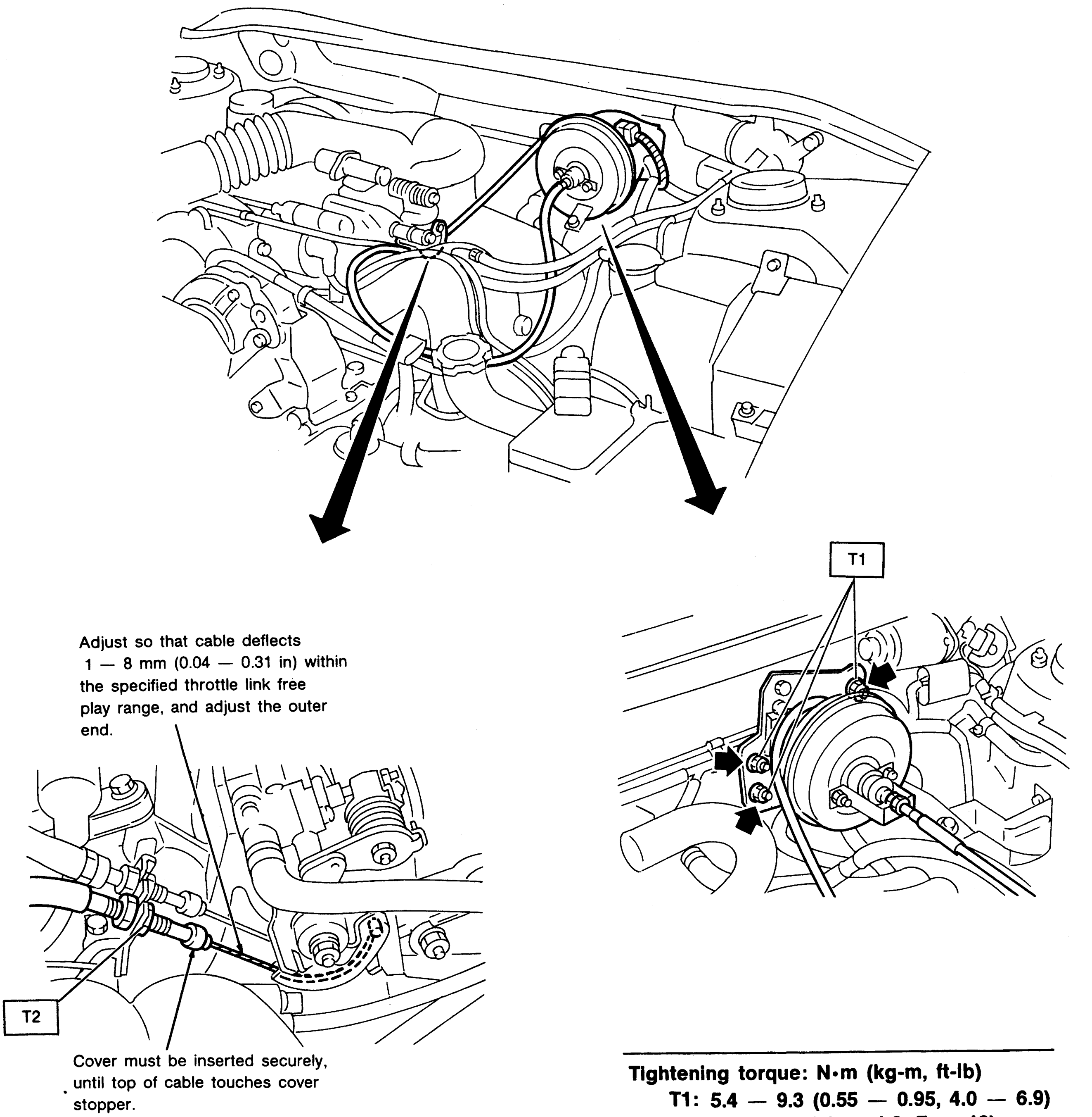
6. Rear Wiper and Washer
7. Rear Window Defogger
8. Combination Meter
9. Radio
10. Towing Power Connector
11. Cruise Control 2
12. Vehicle Speed Sensor 2 (Turbo model) 6

11. Cruise Control

A: ADJUSTMENT



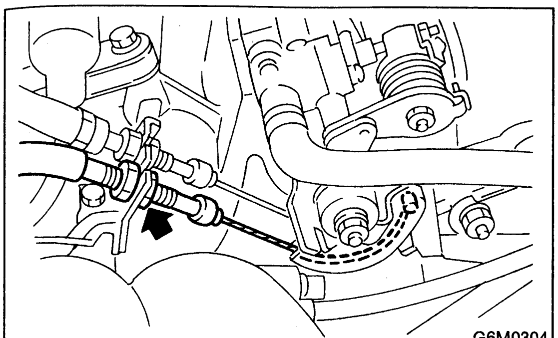
Tightening torque: N·m (kg-m, ft-lb)
T1: 5.4 — 9.3 (0.55 — 0.95, 4.0 — 6.9)
T2: 10 — 18 (1.0 — 1.8, 7 — 13)

G6M0303

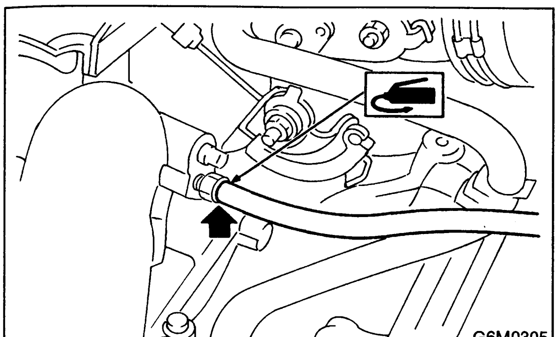
B: REMOVAL AND INSTALLATION

Remove each part as described below.
And, install in the reverse order of removal.

1. ACTUATOR


G6M0304

1) Remove the nut which secures control cable end to throttle cam, and remove control cable end.
2) Remove clip bands from control cable.


G6M0305

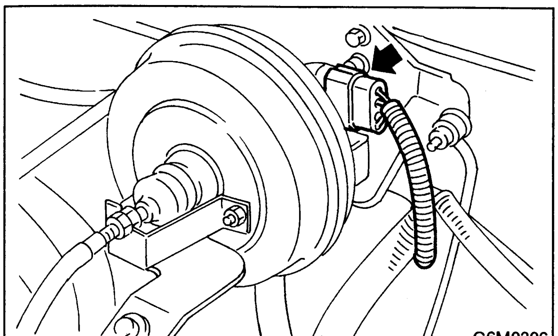
3) Disconnect cruise control hose from intake manifold.

CAUTION:

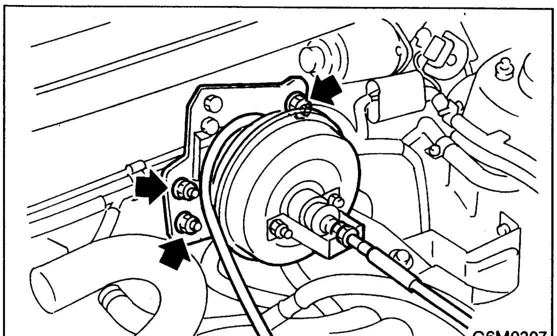
When inserting hose into intake manifold, apply sealant to hose.

Fluid packing:

THREE BOND 1105 or equivalent


G6M0306

4) Disconnect connector from actuator.


G6M0307

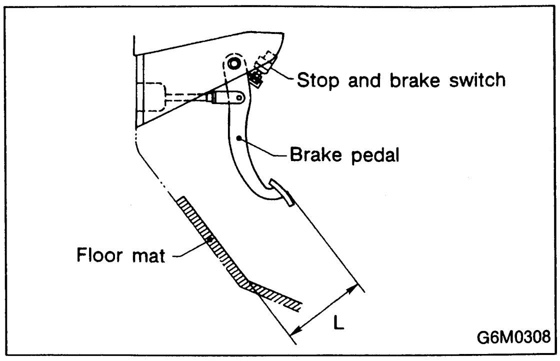
5) Remove actuator.

Tightening torque:

5.4 — 9.3 N·m (0.55 — 0.95 kg-m, 4.0 — 6.9 ft-lb)

CAUTION:

- **Be careful not to apply excessive load to the wire cable when adjusting and/or installing; otherwise, the actuator may be deformed or damaged.**
- **Do not bend cable sharply with a radius less than 100 mm (3.94 in); otherwise, cable may bend permanently, resulting in poor performance.**
- **When installing cable, be careful not to sharply bend or pinch the inner cable; otherwise, the cable may break.**

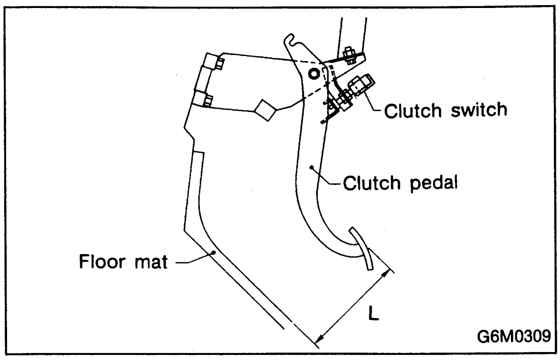


2. STOP AND BRAKE SWITCH

1) Disconnect stop and brake switch connector.
2) Remove stop and brake switch.
NOTE:
During installation, set brake pedal position by adjusting position of stop and brake switch.

Pedal position L:
125.9 mm (4.96 in)

Stop and brake switch tightening torque:
6 — 10 N·m (0.6 — 1.0 kg-m, 4.3 — 7.2 ft-lb)

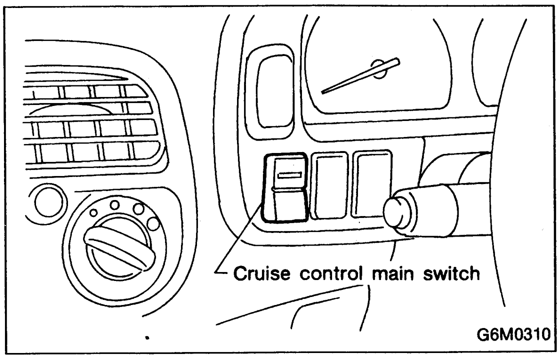


3. CLUTCH SWITCH

1) Disconnect clutch switch connector.
2) Remove clutch switch.
NOTE:
During installation, set clutch pedal position by adjusting position of clutch switch.

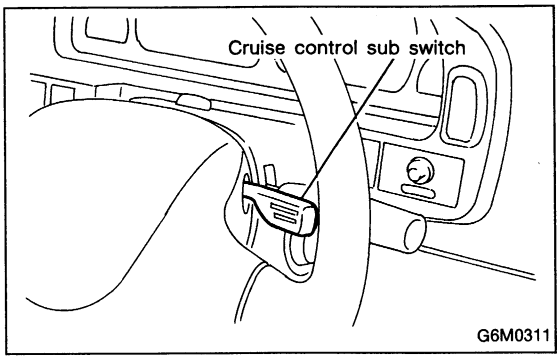
Pedal position L (distance between floor mat and pedal face):
142 — 150 mm (5.59 — 5.91 in)

Clutch switch tightening torque:
6 — 10 N·m (0.6 — 1.0 kg-m, 4.3 — 7.2 ft-lb)



4. CRUISE CONTROL MAIN SWITCH

1) Remove meter visor.
2) Remove cruise control main switch by pushing it outward.

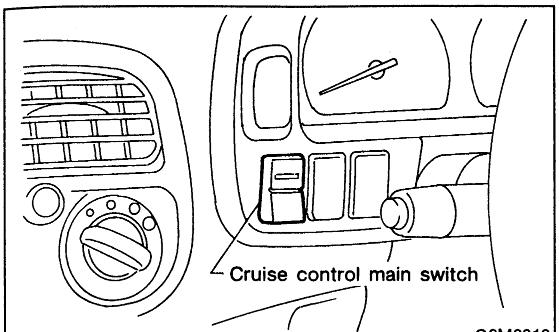


5. CRUISE CONTROL SUB SWITCH

1) Remove horn pad and disconnect horn switch connector.
2) Remove attaching screws and then, remove cruise control sub switch.

C: DRIVING TESTS

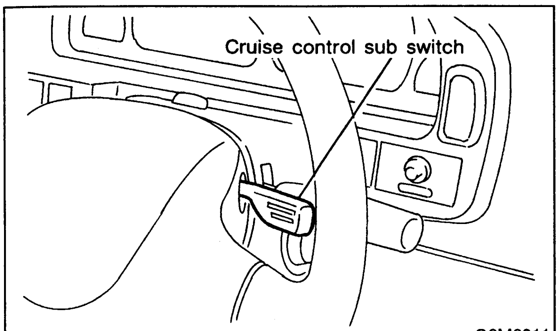
Conduct road tests by selecting a smooth, flat road or use free rollers as road test simulation.



G6M0310

1. CRUISE CONTROL MAIN SWITCH

1) Turn ignition switch to ON.
2) Check that indicator light comes on when main switch is pressed (ON).
3) Check that indicator light goes out when main switch is pressed again (OFF).
4) Turn ignition switch to OFF with main switch ON (which is indicated by illumination). Turn ignition switch to ON again to ensure that indicator light remains OFF.



G6M0311

2. CRUISE CONTROL SUB SWITCH

1) Check that sub switch is properly set in "SET/ COAST" or "RESUME/ACCEL" mode.
2) Also check that sub switch returns to the original position when released.

3. CONSTANT SPEED TEST

1) Turn cruise control main switch to ON.
2) Drive vehicle at speed greater than 40 km/h (25 MPH).
3) Press sub switch to set in "SET/COAST" mode.
4) Ensure that vehicle is maintained at the speed set when sub switch was pressed.

4. ACCELERATION TEST

1) Set vehicle speed at speed greater than 35 km/h (22 MPH).
2) Ensure that vehicle continues to accelerate while holding sub switch in "RESUME/ACCEL" mode, and that vehicle maintains that optional speed when sub switch is released.

5. DECELERATION TEST

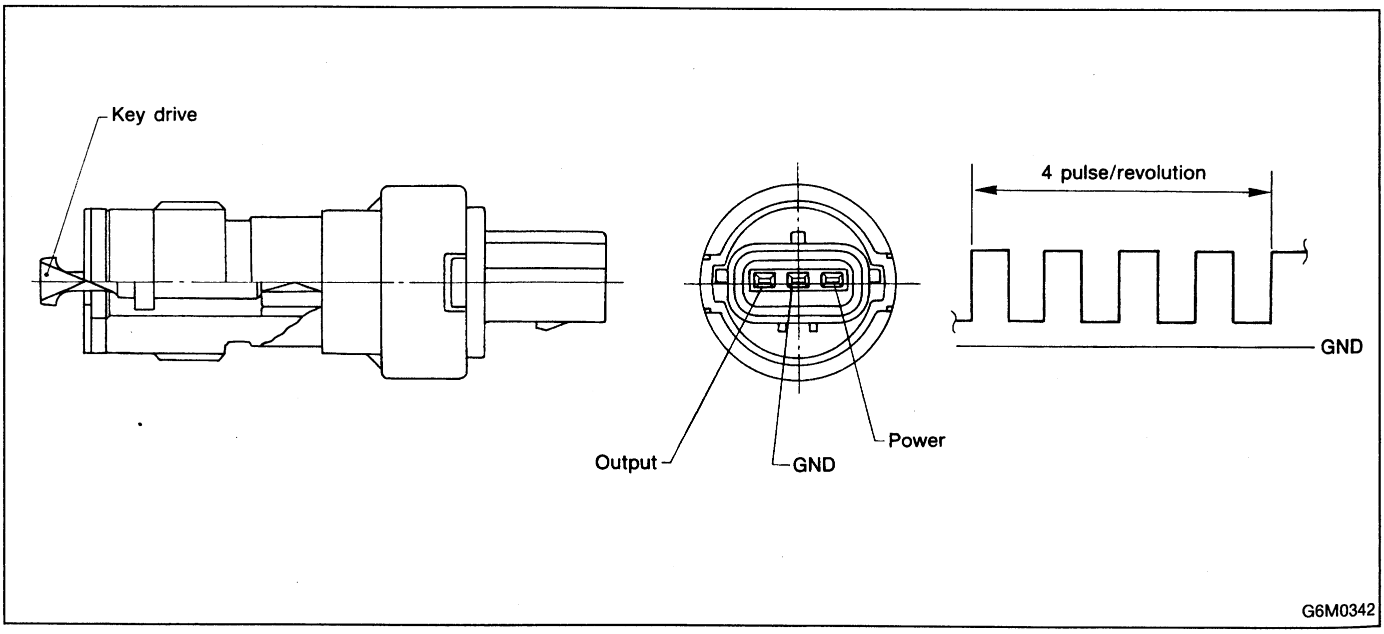
1) Set vehicle speed at optional speed greater than 40 km/h (25 MPH).
2) Ensure that vehicle continues to decelerate while holding sub switch in "SET/COAST" mode, and that it maintains that optional speed when sub switch is released.
NOTE:
When vehicle speed reaches the lower speed limit of 30 km/h (19 MPH) during deceleration, cruise control will be released.

12. Vehicle Speed Sensor 2 (Turbo model)

A: DESCRIPTION

1. MECHANISM

The vehicle speed sensor is a rotating type that utilizes a magnetic resistance element MRE. The MRE is a two-dimensional magnetic sensor whose resistance value varies with changes in the direction of the magnetic field. When the multi-pole ring magnet built into the sensor rotates along with the revolution of the transmission's driven gear, the direction of the magnetic field applied to the MRE cyclically changes by the same number of magnet poles, causing a cyclical change in the resistance value of the MRE. This change in the resistance value is shaped to a rectangular waveform through a built-in IC which produces it as a pulse output.



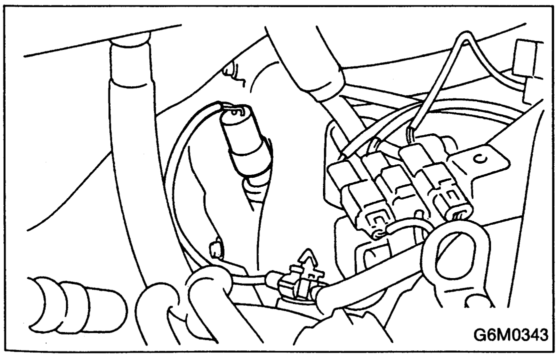
2. GENERAL PRECAUTIONS

1) Be careful not to drop or bump sensor as this may break built-in magnet.
2) Drive key is designed to separate from vehicle speed sensor. Be careful not to lose it or forget to install.
3) Vehicle speed sensor is installed in part (which contains bearings, etc., finished to a high degree of accuracy). Do not allow foreign matter (filings, sand, etc.) to get into it.
4) When checking output of vehicle speed sensor as a single unit, ensure test leads are connected to their correct terminals. Failure to do this may damage internal IC.
5) Discard vehicle speed sensor after removal; replace with new one.

B: REMOVAL

CAUTION:

• Be careful when removing vehicle speed sensor immediately after driving vehicle for a while as temperature around it is high.
• Before removing vehicle speed sensor, clean dirt, etc. from surrounding areas. Take care not to allow foreign matter to get into mounting hole.



1) Remove collector cover.
2) Disconnect vehicle speed sensor connector.
3) Turn and remove vehicle speed sensor.
4) Remove key and packing.

C: INSTALLATION

CAUTION:

- **Ensure sensor mounting hole is clean and free of foreign matter.**
- **Apply grease to tip end of key to prevent key from falling off sensor.**
- **Align tip end of key with key groove on end of speedometer shaft during installation.**

1) Hand tighten vehicle speed sensor 2, then tighten it using suitable tool.
Tightening torque required for sensor to reach bottom of transmission is as follows.

Tightening torque:
0.39 — 0.88 N·m (4.0 — 9.0 kg-cm, 3.5 — 7.8 in-lb)

CAUTION:

- **When torque must be applied that exceeds 0.88 N·m (9.0 kg-cm, 7.8 in-lb), the key and key groove on end of speedometer may not be aligned properly. Remove the key, align it correctly and reassemble.**
- **Sensor threads are secured by Locktite. The reassembly must be completed within 5 minutes before Locktite dries.**

2) Tighten vehicle speed sensor 2 further to specified torque.

Tightening torque:
5.9±1.5 N·m (60±15 kg-cm, 52±13 in-lb)

FUEL INJECTION SYSTEM [MFI-TURBO] 2-7b

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2. Precautions 2
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4. Electrical Unit Location 6
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1. Supplemental Restraint System "Airbag"

Airbag system wiring harness is routed near the engine control module (ECM), main relay and fuel pump relay.

CAUTION:

- **All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.**
- **Be careful not to damage Airbag system wiring harness when servicing the engine control module (ECM), main relay and fuel pump relay.**

2. Precautions

1) Never connect the battery in reverse polarity.
- The ECM will be destroyed instantly.
- The fuel injector and other part will be damaged in just a few minutes more.

2) Do not disconnect the battery terminals while the engine is running.
- A large counter electromotive force will be generated in the alternator, and this voltage may damage electronic parts such as ECM, etc.

3) Before disconnecting the connectors of each sensor and the ECM, be sure to turn OFF the ignition switch.

4) Before removing ECM from the located position, disconnect two cables on battery.
- Otherwise, the ECM may be damaged.

5) The connectors to each sensor in the engine compartment and the harness connectors on the engine side and body side are all designed to be waterproof. However, it is still necessary to take care not to allow water to get into the connectors when washing the vehicle, or when servicing the vehicle on a rainy day.

6) Every MFI-related part is a precision part. Do not drop them.

7) Observe the following cautions when installing a radio in MFI equipped models.

CAUTION:

- **The antenna must be kept as far apart as possible from the control unit.**
- **The antenna feeder must be placed as far apart as possible from the ECM and MFI harness.**
- **Carefully adjust the antenna for correct matching.**
- **When mounting a large power type radio, pay special attention to the three items above mentioned.**
- **Incorrect installation of the radio may affect the operation of the ECM.**

8) Before disconnecting the fuel hose, disconnect the fuel pump connector and crank the engine for more than five seconds to release pressure in the fuel system. If engine starts during this operation, run it until it stops.

3. Pre-inspection

Before performing diagnostics, check the following items which might affect engine problems:

1. POWER SUPPLY

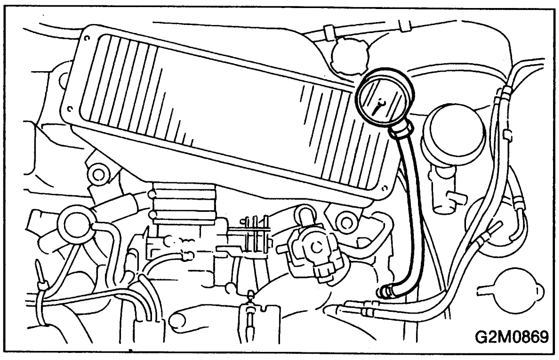
1) Measure battery voltage and specific gravity of electrolyte.

Standard voltage: 12 V
Specific gravity: Above 1.260

2) Check the condition of the main and other fuses, and harnesses and connectors. Also check for proper grounding.

2. CAPS AND PLUGS

1) Check that the fuel cap is properly closed.
2) Check that the oil filler cap is properly closed.
3) Check that the oil level gauge is properly inserted.

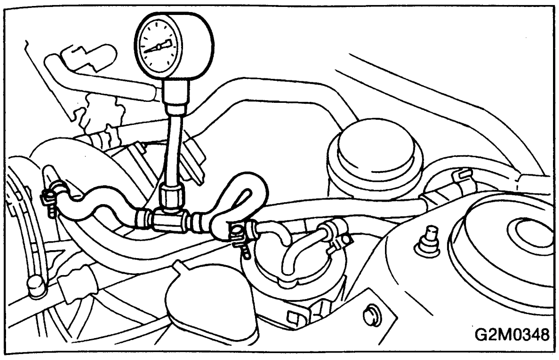


3. INTAKE MANIFOLD VACUUM PRESSURE

1) After warming-up the engine, measure intake manifold vacuum pressure while at idle.

Standard vacuum pressure:
More than –69.3 kPa (–520 mmHg, –20.47 inHg)
<Ref. to 2-2 [W5A0].>

2) Unusual vacuum pressure occurs because of air leaks, fuel or engine problems. In such a case, engine idles roughly.


G2M0348

4. FUEL PRESSURE

1) Release fuel pressure.
<Ref. to 2-8 [W1A0].>
2) Connect fuel pressure gauge between fuel filter and hose, and measure fuel pressure at idling.
<Ref. to 2-8 [W2A0].>

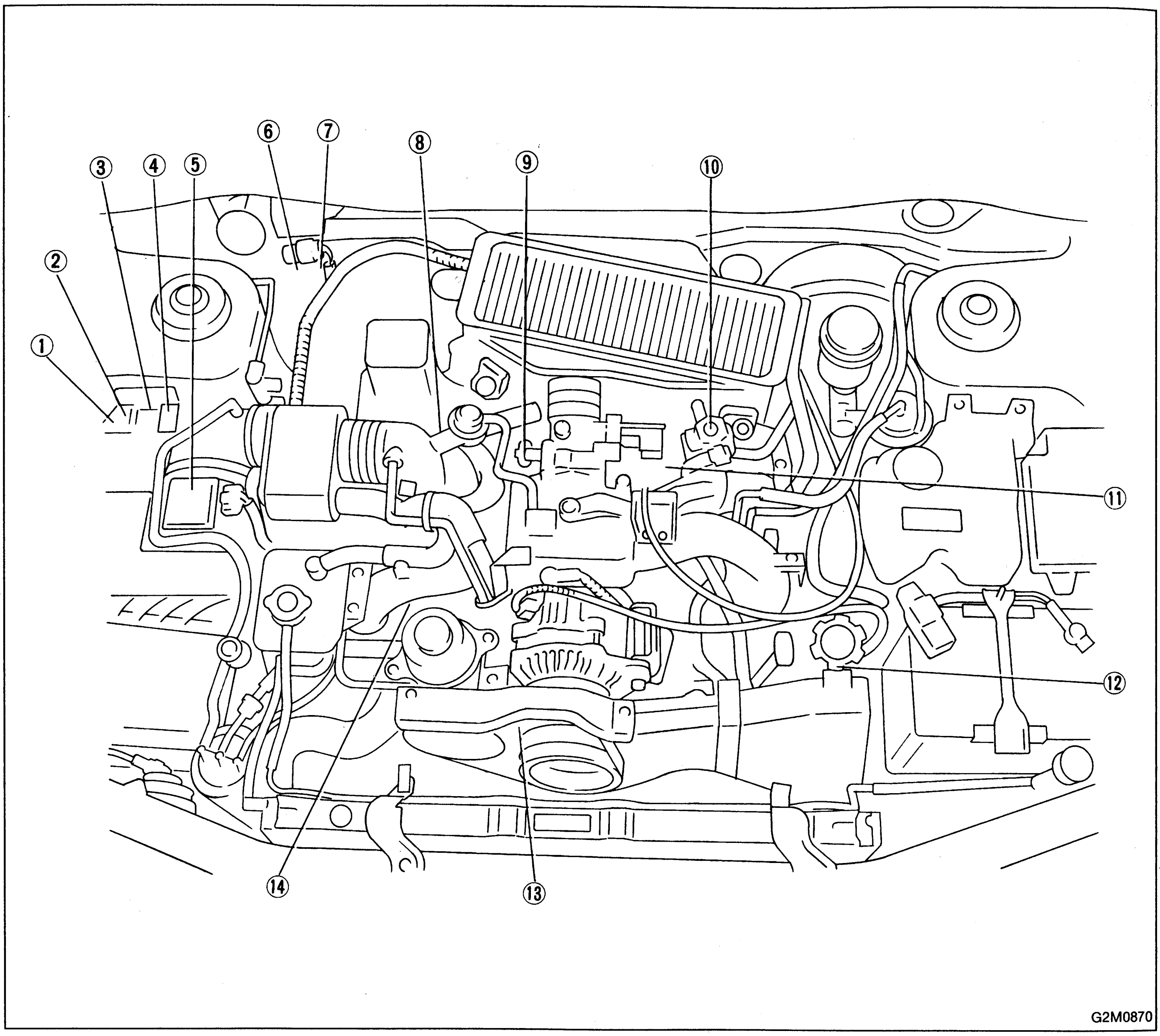
Fuel pressure:
177 — 206 kPa (1.8 — 2.1 kg/cm^2, 26 — 30 psi)

5. ENGINE GROUNDING

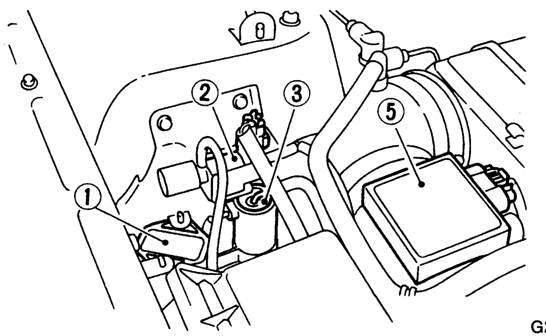
Make sure the engine grounding terminal is properly connected to the engine.

4. Electrical Unit Location

1. SENSOR AND SOLENOID VALVE



① Pressure sensor
② Pressure exchange solenoid valve
③ Wastegate control solenoid valve
④ Ignitor
⑤ Mass air flow sensor
⑥ Oxygen sensor
⑦ Vehicle speed sensor 2
⑧ Engine coolant temperature sensor
⑨ Throttle position sensor (with idle switch)
⑩ Idle air control solenoid valve
⑪ Knock sensor
⑫ Camshaft position sensor
⑬ Crankshaft position sensor
⑭ Purge control solenoid valve



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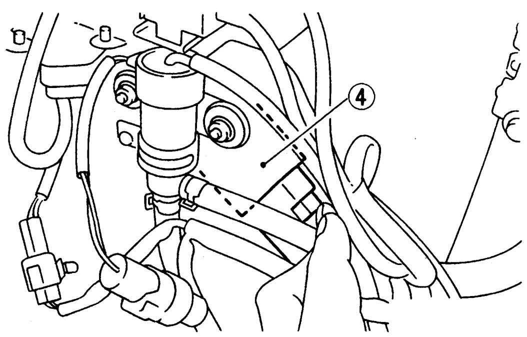
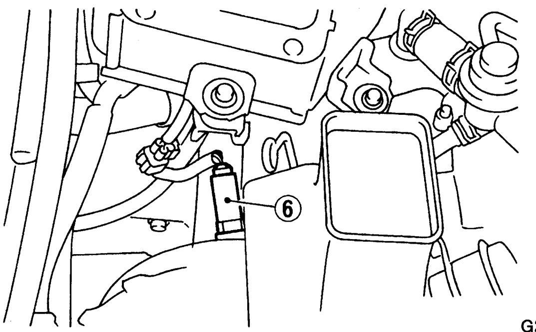
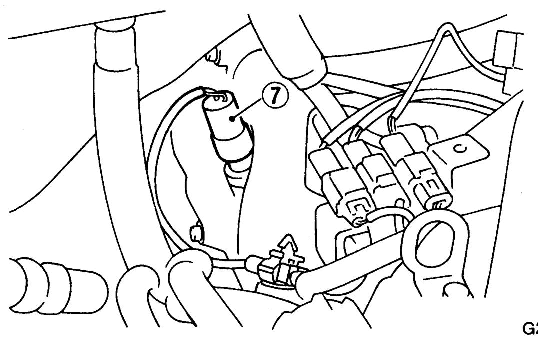


G2M0872



G2M0873



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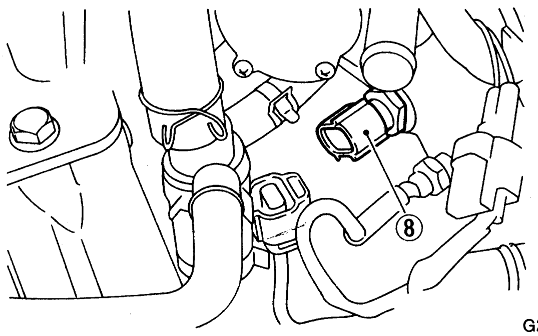

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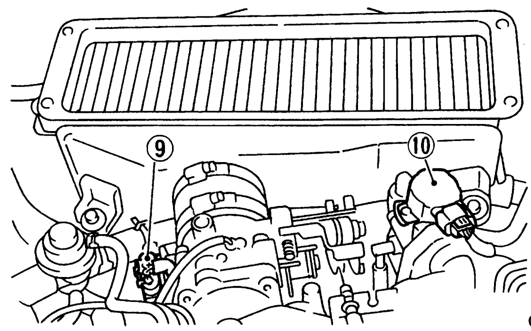
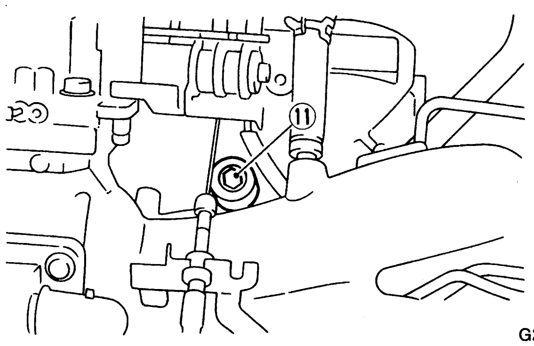
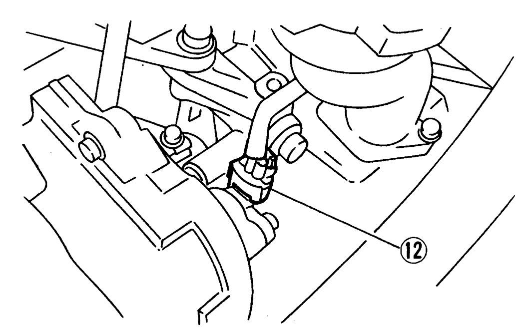


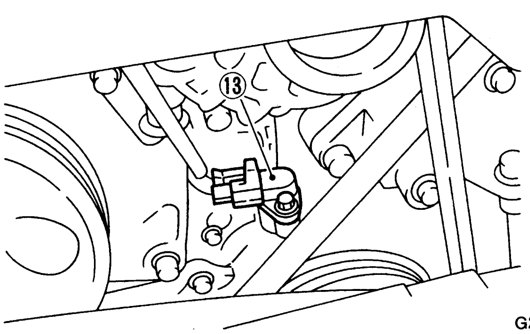
G2M0876



G2M0877



G2M0878



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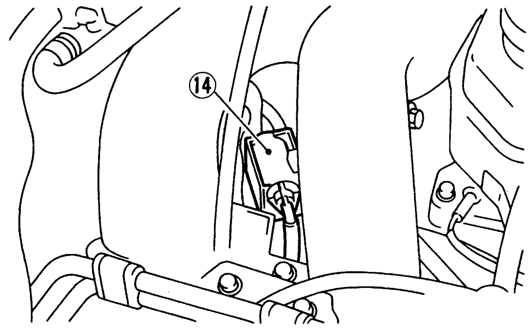

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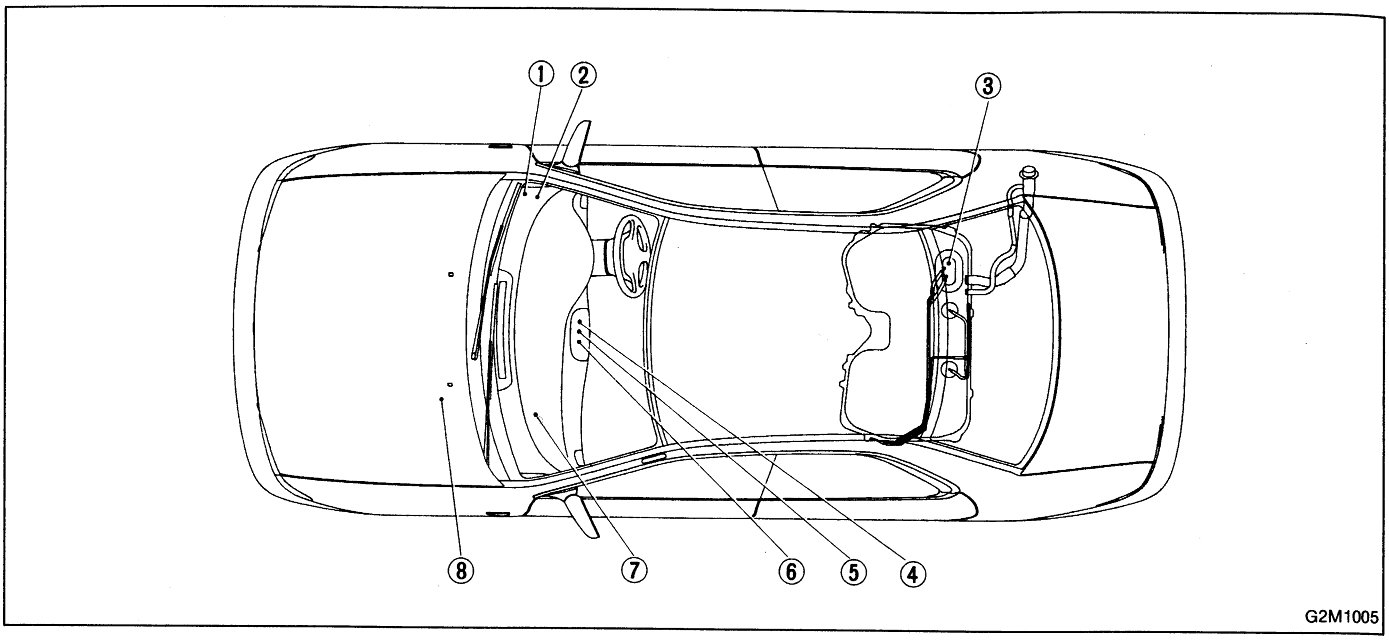
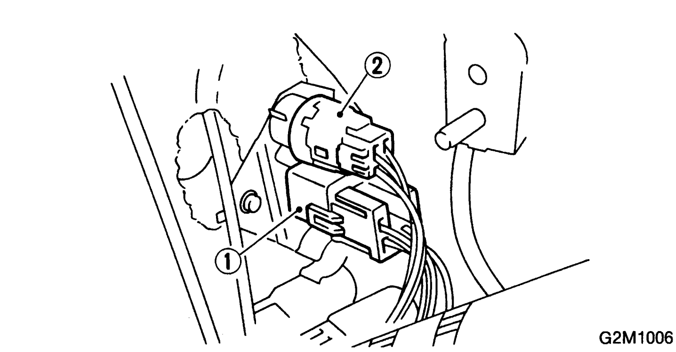
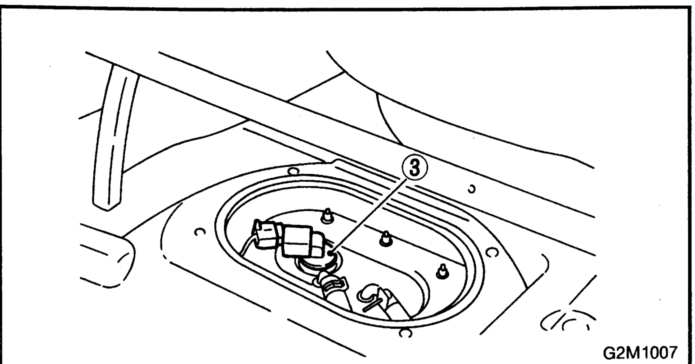
2. MODULE AND RELAY



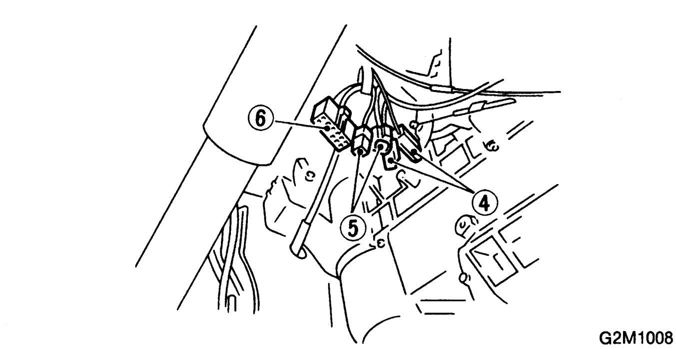
① Main relay
② Fuel pump relay
③ Fuel pump
④ Read memory connector
⑤ Test mode connector
⑥ Data link connector
⑦ ECM
⑧ Starter



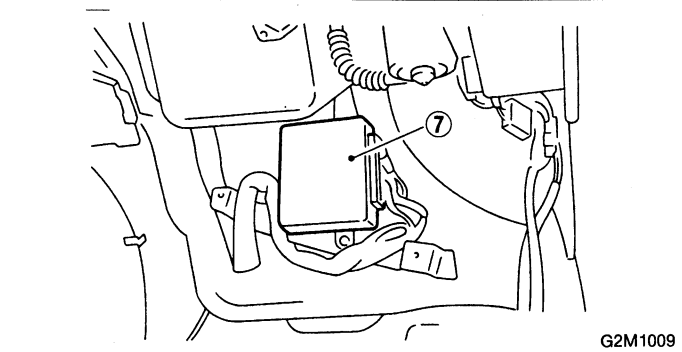
G2M1006



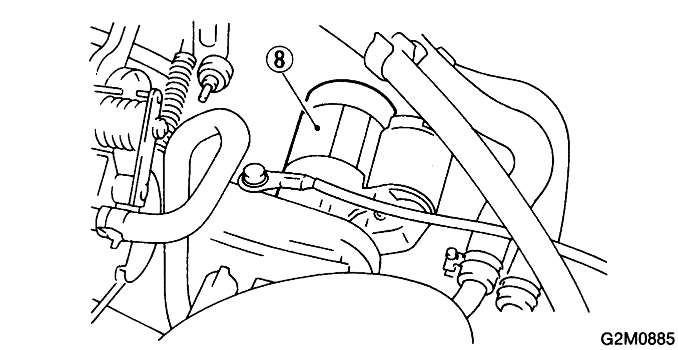
G2M1007



G2M1008

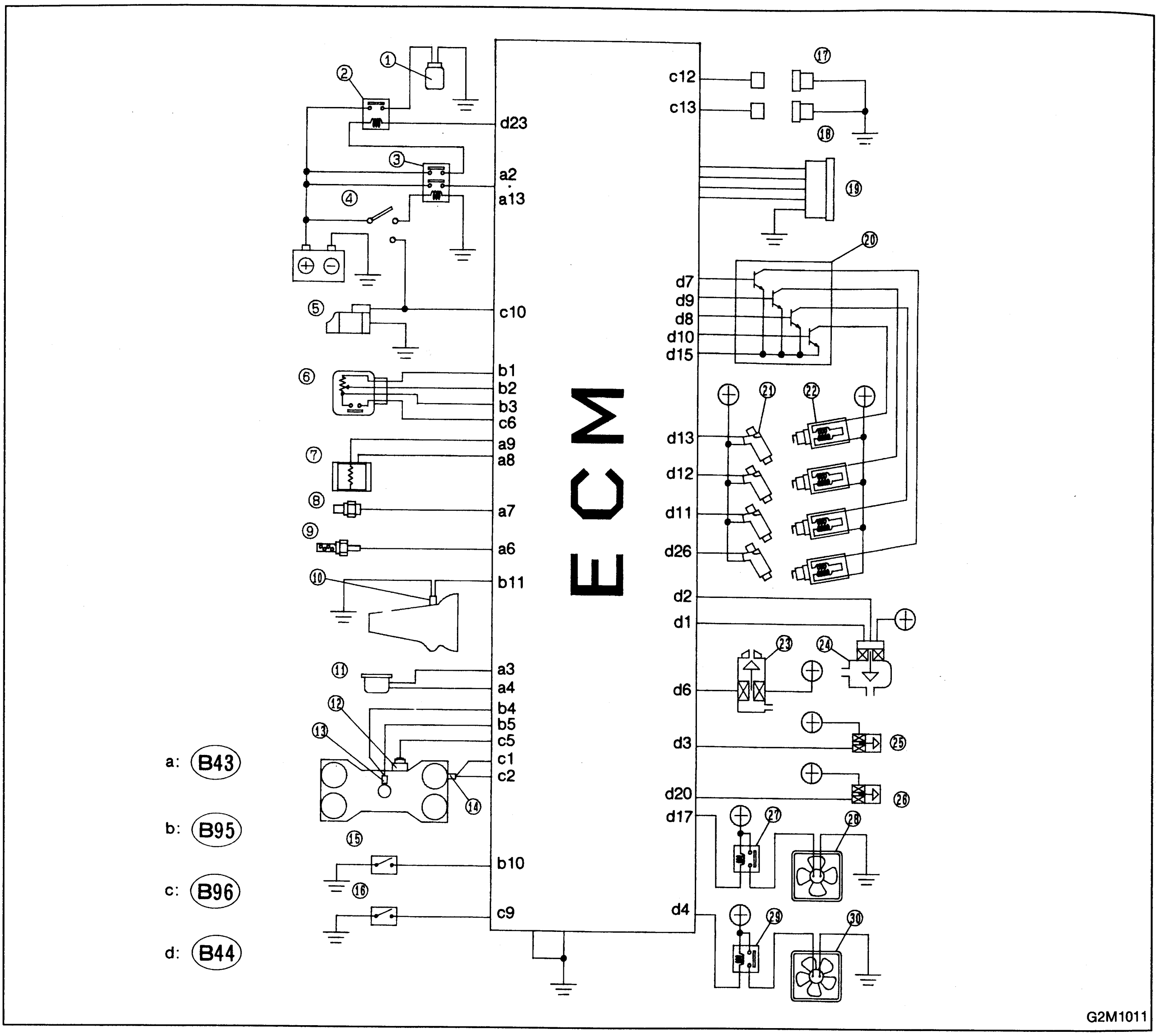


G2M1009



G2M0885

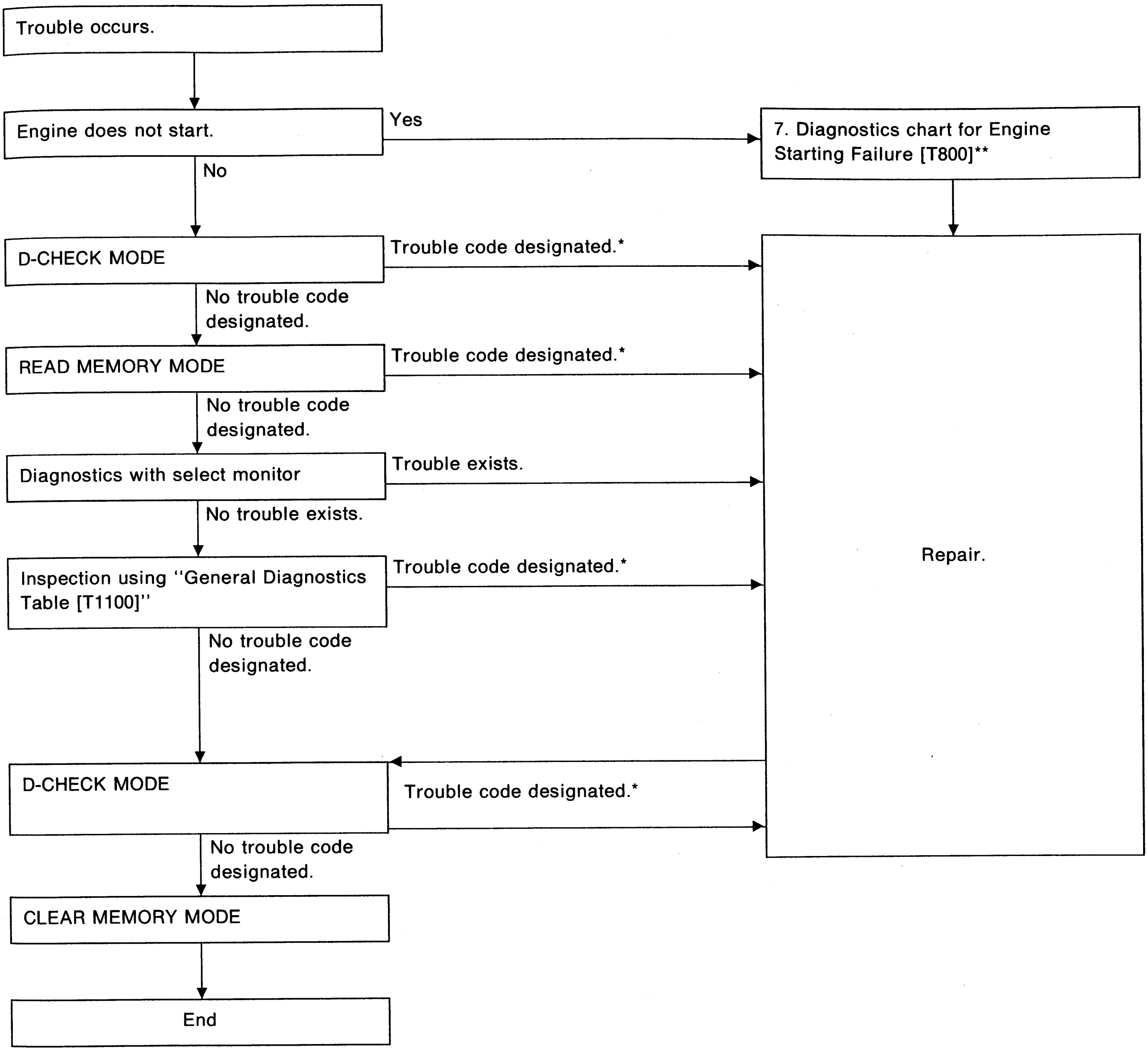
5. Schematic



① Fuel pump
② Fuel pump relay
③ Main relay
④ Ignition switch
⑤ Starter
⑥ Throttle position sensor (with idle switch)
⑦ Mass air flow sensor
⑧ Engine coolant temperature sensor
⑨ Oxygen sensor
⑩ Vehicle speed sensor 2
⑪ Pressure sensor
⑫ Knock sensor
⑬ Crankshaft position sensor
⑭ Camshaft position sensor
⑮ Neutral position switch
⑯ A/C switch
⑰ Read memory connector
⑱ Test mode connector
⑲ Data link connector
⑳ Ignitor
㉑ Fuel injector
㉒ Ignition coil
㉓ Purge control solenoid valve
㉔ Idle air control solenoid valve
㉕ Wastegate control solenoid valve
㉖ Pressure exchange solenoid valve
㉗ Radiator main fan relay
㉘ Radiator main fan
㉙ Radiator sub fan relay
㉚ Radiator sub fan

6. Diagnostics Chart for On-board Diagnosis System

A: BASIC DIAGNOSTICS PROCEDURE



*: When more than one trouble code is out-putted, begin diagnostics with the smallest trouble code number and proceed to the next higher code.
After correcting each problem, conduct the D-CHECK and ensure that the corresponding trouble code no longer appears.

**: When a trouble code is displayed in the READ MEMORY MODE, conduct diagnostics measures which correspond with the code.

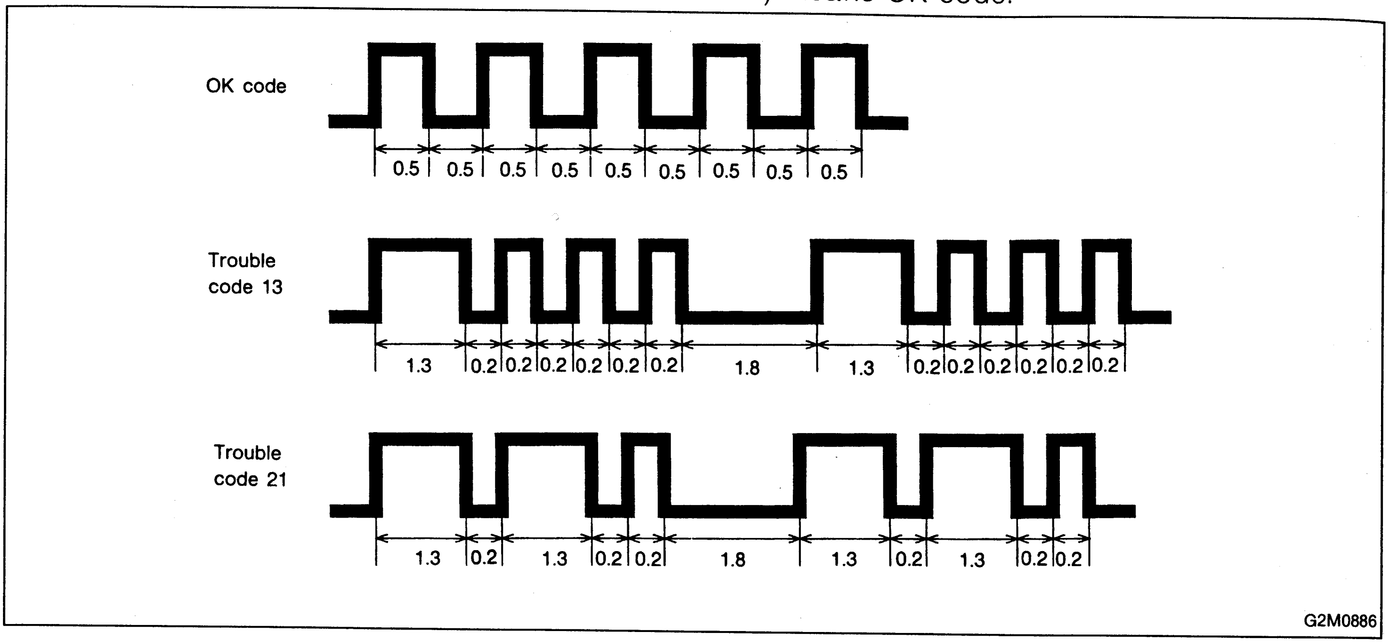
CAUTION:

- **Check the connector while it is connected unless specified otherwise.**
- **Be sure to check again from the beginning in order to prevent secondary trouble caused by repair work.**

B: TROUBLE CODE

1. HOW TO READ TROUBLE CODE

The malfunction indicator lamp flashes the code corresponding to the faulty parts. The long segment (1.3 seconds ON) indicates a "ten", and the short segment (0.2 seconds ON) signifies "one". And middle segment (0.5 seconds ON) means OK code.



2. LIST OF TROUBLE CODE

Trouble code	Item	Contents of diagnosis
11	Crankshaft position sensor	• No signal entered from crankshaft position sensor when starter switch is ON. • The harness connector between ECM and crankshaft position sensor is in short or open.
12	Starter switch	• The starter switch signal is abnormal. • The harness connector between ECM and starter switch is in short or open.
13	Camshaft position sensor	• No signal entered from camshaft position sensor, but signal entered from crankshaft position sensor. • The harness connector between ECM and camshaft position sensor is in short or open.
21	Engine coolant temperature sensor	• The engine coolant temperature sensor signal is abnormal. • The harness connector between ECM and engine coolant temperature sensor is in short or open.
22	Knock sensor	• The knock sensor signal is abnormal. • The harness connector between ECM and knock sensor is in short or open.
23	Mass air flow sensor	• The mass air flow sensor signal is abnormal. • The harness connector between ECM and mass air flow sensor is in short or open.
24	Idle air control solenoid valve	• The idle air control solenoid valve is not in function. • The harness connector between ECM and idle air control solenoid valve is in short or open.
31	Throttle position sensor	• The throttle position sensor signal is abnormal. • The throttle position sensor is installed abnormally. • The harness connector between ECM and throttle position sensor is in short or open.
32	Oxygen sensor	• The oxygen sensor is not in function. • The harness connector between ECM and oxygen sensor is in short or open.
33	Vehicle speed sensor 2	• The vehicle speed sensor 2 is not in function. • The harness connector between ECM and vehicle speed sensor 2 is in short or open.
35	Purge control solenoid valve	• The purge control solenoid valve is not in function. • The harness connector between ECM and purge control solenoid valve is in short or open.
42	Idle switch	• The idle switch signal is abnormal. • The throttle position sensor is installed abnormally. • The harness connector between ECM and idle switch is in short or open.
44	Wastegate control solenoid valve	• The wastegate control solenoid valve is not in function. • The harness connector between ECM and wastegate control solenoid valve is in short or open.
45	• Pressure sensor • Pressure exchange solenoid valve	• The pressure sensor signal is abnormal. • The pressure exchange solenoid valve is not in function. • The intake manifold pressure is not transmitted to pressure sensor. • The harness connector between ECM and pressure sensor, and pressure exchange solenoid valve is in short or open.
51	Neutral position switch	• The neutral position switch signal is abnormal. • The harness connector between ECM and neutral position switch is in short or open.

C: READ MEMORY MODE

Vehicle returned to dealer.

↓

Turn ignition switch to OFF.

↓

Connect read memory connector.

↓

Turn ignition switch to ON (engine OFF).

↓

Malfunction indicator lamp is turned ON.

- NO → Inspect control unit power supply any ground line, and malfunction indicator lamp line.
- YES ↓

Trouble code is indicated on malfunction indicator lamp.

- NO (OK code) → Turn ignition switch to OFF. → Disconnect read memory connector. → On-board diagnosis systems have no trouble. Trouble is in a system other than the on-board diagnosis system.
- YES ↓

Confirm trouble code.

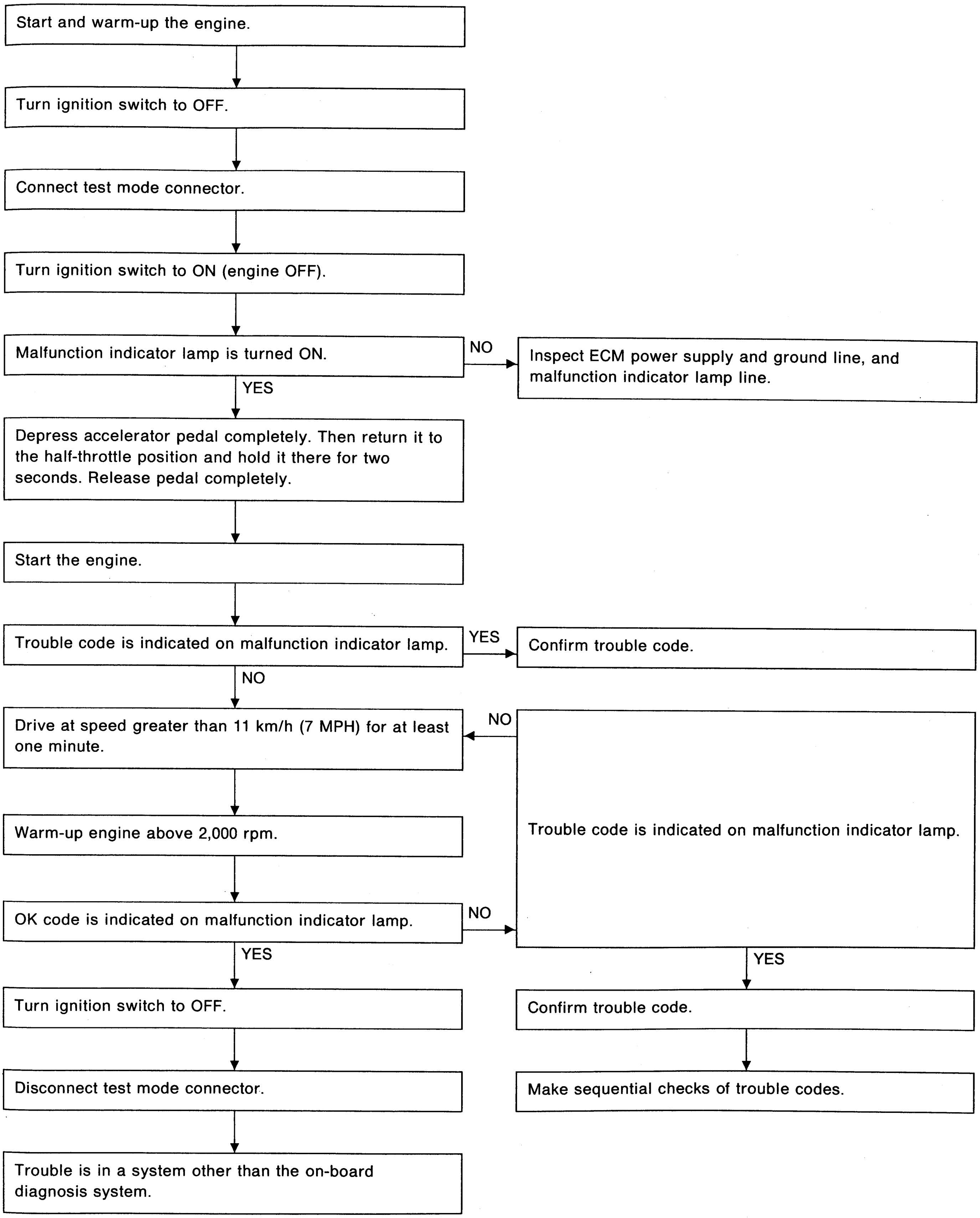
↓

Disconnect read memory connector.

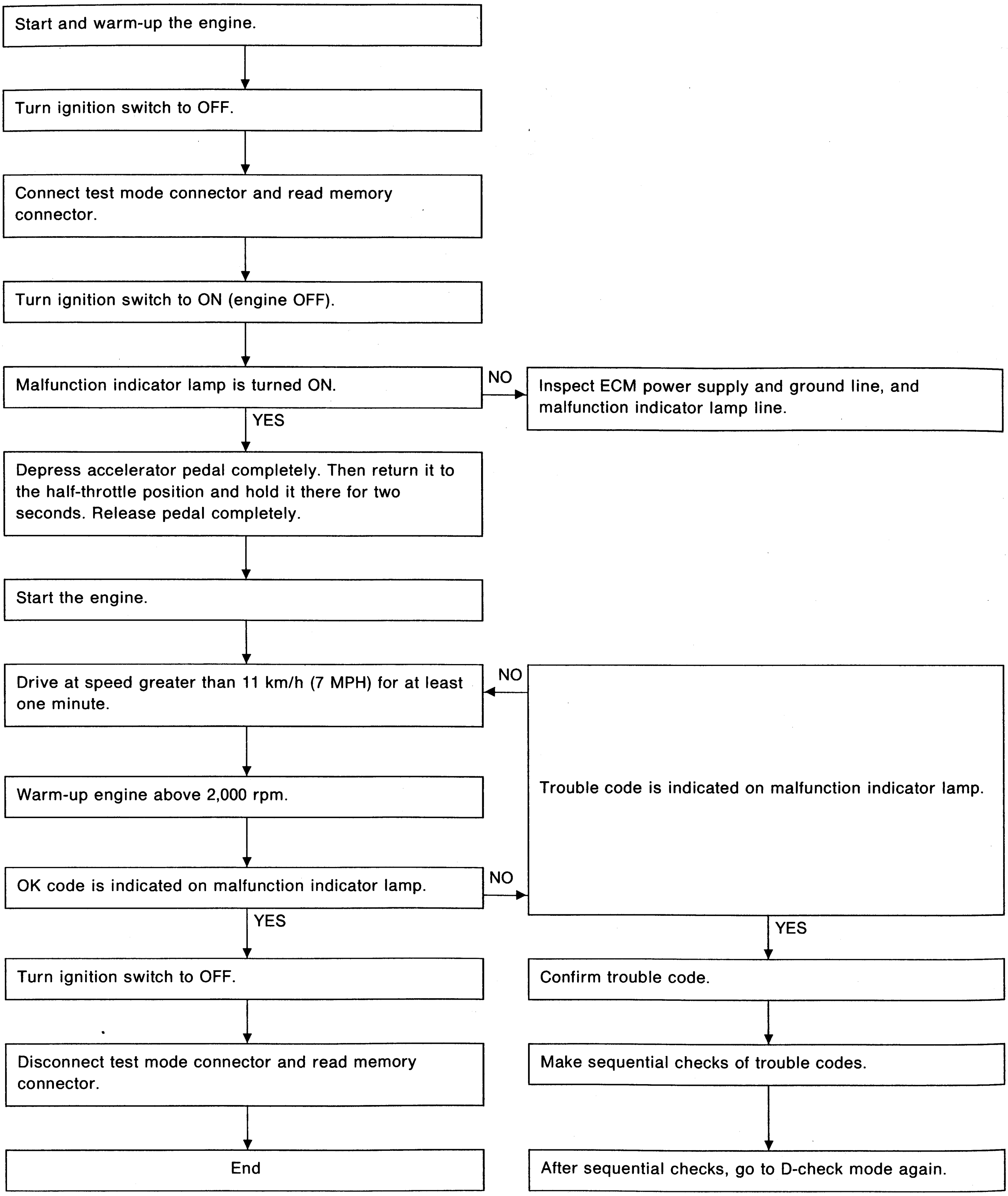
↓

Conduct D-check.

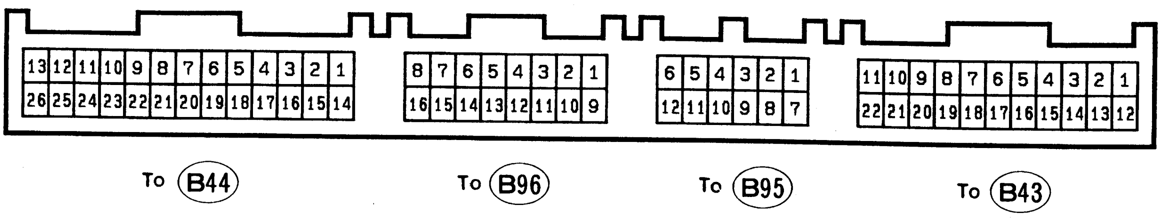
D: D-CHECK MODE



E: CLEAR MEMORY MODE



7. Control Module I/O Signal



G2M1012

Content		Con-nector No.	Ter-minal No.	Signal (V) Ig SW OFF	Signal (V) Ig SW ON (Engine OFF)	Signal (V) Engine ON (Idling)	Note
Crankshaft position sensor	Signal (+)	B95	4	—	0	*	*Sensor output waveform
	Signal (−)	B95	5	—	0	0	—
	Shield	B95	6	—	0	0	—
Camshaft position sensor	Signal (+)	B96	1	—	0	*	*Sensor output waveform
	Signal (−)	B96	2	—	0	0	—
	Shield	B96	3	—	0	0	—
Mass air flow sensor	Power supply	B43	8	—	10 — 13	13 — 14	—
	Signal	B43	9	—	0 — 0.3	0.8 — 1.2	—
	GND	B43	10	—	0	0	—
Throttle position sensor	Signal	B95	2	—	Fully closed: 4.7 Fully opened: 0.9	Fully closed: 4.7 Fully opened: 0.9	—
	Power supply	B95	3	—	5	5	—
	GND	B95	1	—	0	0	—
Oxygen sensor	Signal	B43	6	—	0.6	Rich mixture: 0.7 — 1.0 Lean mixture: 0 — 0.2	
	Shield	B43	17	—	0	0	—
Knock sensor	Signal	B96	5	—	3 — 4	3 — 4	—
	Shield	B96	4	—	0	0	—
Engine coolant temperature sensor		B43	7	0	0.7 — 1.5	0.7 — 1.5	*After warm-up
Vehicle speed sensor 2		B95	11	—	0 or 5	0 or 5	"5" and "0" are repeatedly displayed when vehicle is driven.
Pressure sensor	Signal	B43	4	—	2.4 ↔ 2.7	1.4 — 1.6	—
	Power supply	B43	3	—	5	5	—
	GND	B43	21	—	0	0	—
Idle switch		B96	6	—	ON:0, OFF:5	ON:0, OFF:5	—
Starter switch		B96	10	—	0	0	Cranking: 10 to 14
Air conditioner switch		B96	9	—	ON:10 — 13, OFF:0	ON:13 — 14, OFF:0	—
Ignition switch		B95	12	0	10 — 13	13 — 14	—

Content		Connector No.	Terminal No.	Signal (V) Ig SW OFF	Signal (V) Ig SW ON (Engine OFF)	Signal (V) Engine ON (Idling)	Note
Neutral position switch		B95	10	—	N Position: 7 Other: 0	N Position: 7 Other: 0	—
Test mode connector		B96	13	—	7	7	When connected: 0
Read memory connector		B96	12	—	7	7	When connected: 0
Back-up power supply		B43	15	10 — 13	10 — 13	13 — 14	—
Control module power supply		B43	2	0	10 — 13	13 — 14	
		B43	13	0	10 —13	13 — 14	—
Ignition control	#1	B44	10	—	0	—	—
	#2	B44	9	—	0	—	—
	#3	B44	8	—	0	—	—
	#4	B44	7	—	0	—	—
Fuel injector	#1	B44	13	10 — 13	10 — 13	13 — 14	—
	#2	B44	12	10 — 13	10 — 13	13 — 14	—
	#3	B44	11	10 — 13	10 — 13	13 — 14	—
	#4	B44	26	10 — 13	10 — 13	13 — 14	—
Idle air control solenoid valve	OPEN end	B44	2	—	8 — 9	9 — 10	—
	CLOSE end	B44	1	—	6 — 7	6 — 7	—
Fuel pump relay control		B44	23	—	ON: 0 OFF: 10 — 13	0	—
Air conditioner cut relay control		B44	22	—	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Radiator fan 1 control		B44	17	—	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Radiator fan 2 control		B44	4	—	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Self-shutoff control		B44	5	—	10 — 13	13 — 14	—
Wastegate control		B44	3	—	10 — 13	13 — 14	—
Malfunction indicator lamp		B44	19	—	1, max.	—	Light "ON": 1, max. Light "OFF": 10 — 14
Pressure exchange solenoid valve		B44	20	—	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Engine tachometer output		B96	16	—	—	—	—
Purge control solenoid valve		B44	6	—	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
GND (sensors)		B43	21	—	0	0	—
GND (injectors)		B44	24	—	0	0	—
		B44	25	—	0	0	—
Ignition system		B44	15	—	0	0	—
GND (power supply)		B44	14	—	0	0	—
GND (control systems)		B43	11	—	0	0	—
		B43	22	—	0	0	—
Select Monitor Signal		B96	8	—	—	—	—
		B96	7	—	—	—	—

8. Diagnostics Chart for Engine Starting Failure

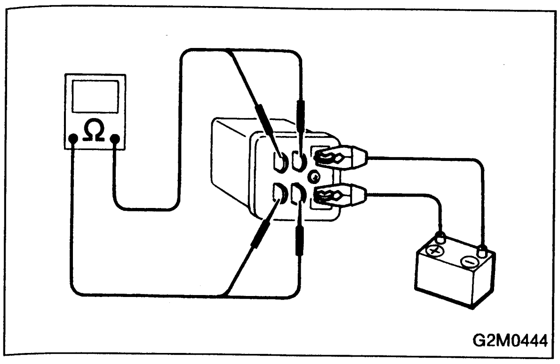
A: BASIC DIAGNOSTICS CHART

When engine cranks but does not start, perform diagnostics in accordance with the following chart.

Inspection		Not O.K. →
Inspection of ECM power supply and ground line	Not O.K. →	Repair power supply or ground line.
↓ O.K.		
Inspection of ignition control system	Not O.K. →	Repair ignition control system.
↓ O.K.		
Inspection of fuel pump circuit	Not O.K. →	Repair fuel pump circuit.
↓ O.K.		
Inspection of fuel injector circuit	Not O.K. →	Repair fuel injector circuit.
↓ O.K.		
Inspection using select monitor or inspection using "General Diagnostics Table [T1100]"		

B: CONTROL UNIT POWER SUPPLY AND GROUND LINE

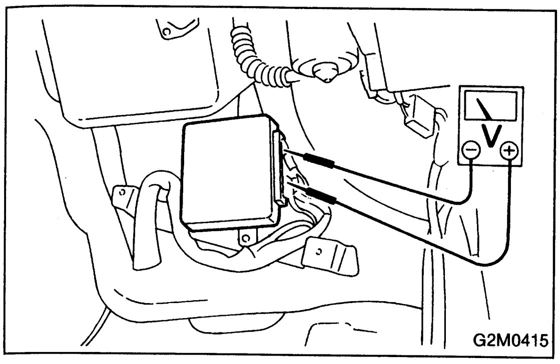
Check	Not O.K.
1. Check main relay.	Replace main relay.
O.K. ↓	
2. Check power supply circuit of ECM.	Repair or replace harness connector of power supply circuit.
O.K. ↓	
3. Check ground circuit of ECM.	Repair or replace harness connector of ground circuit.
O.K. ↓	
Check ignition system.	



1. CHECK MAIN RELAY.

1) Turn the ignition switch to OFF.
2) Remove main relay.
3) Connect battery to main relay terminals No. 1 and No. 2.
4) Measure resistance between main relay terminals.

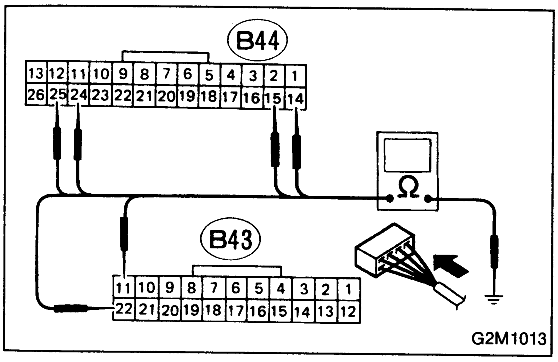
Terminals / Specified resistance:
No. 3 — No. 5 / 10 Ω, max.
No. 4 — No. 6 / 10 Ω, max.



2. CHECK POWER SUPPLY CIRCUIT OF ECM.

1) Install main relay.
2) Turn ignition switch to ON.
3) Measure power supply voltage between ECM connector terminals and body.

Connector & terminal / Specified voltage:
(B43) No. 12 — Body / 10 V, min.
(B43) No. 13 — Body / 10 V, min.
(B43) No. 15 — Body / 10 V, min.
(B95) No. 12 — Body / 10 V, min.



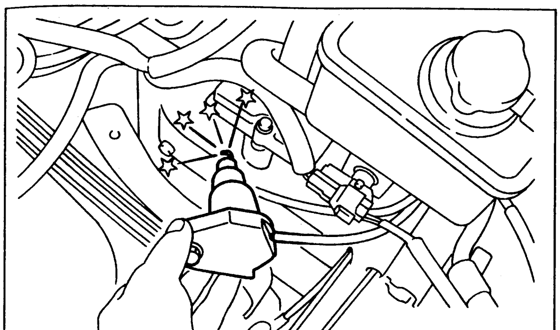
3. CHECK GROUND CIRCUIT OF ECM.

1) Turn ignition switch to OFF.
2) Measure resistance of harness connector between ECM and body.

Connector & terminal / Specified resistance:
(B43) No. 11 — Body / 10 Ω, max.
(B43) No. 22 — Body / 10 Ω, max.
(B44) No. 14 — Body / 10 Ω, max.
(B44) No. 15 — Body / 10 Ω, max.
(B44) No. 24 — Body / 10 Ω, max.
(B44) No. 25 — Body / 10 Ω, max.

C: IGNITION CONTROL SYSTEM

Check	Result	Action
1. Check ignition system for sparks.	O.K.	Check fuel pump system.
	Not O.K.	Go to 2.
2. Check power supply circuit for ignition coil.	Not O.K.	Repair or replace harness connector.
	O.K.	Go to 3.
3. Check ignition coil.	Not O.K.	Replace ignition coil.
	O.K.	Go to 4.
4. Check harness connector between ignitor and each ignition coil.	Not O.K.	Repair or replace harness connector.
	O.K.	Go to 5.
5. Check input signal for ignitor.	Not O.K.	Replace ignitor.
	O.K.	Go to 6.
6. Check harness connector of ignitor ground circuit.	Not O.K.	Repair or replace harness connector.
	O.K.	Go to 7.
7. Check harness connector between ECM and ignitor.	Not O.K.	Repair or replace harness connector.
	O.K.	• Repair ECM connector terminal. • Replace ECM.



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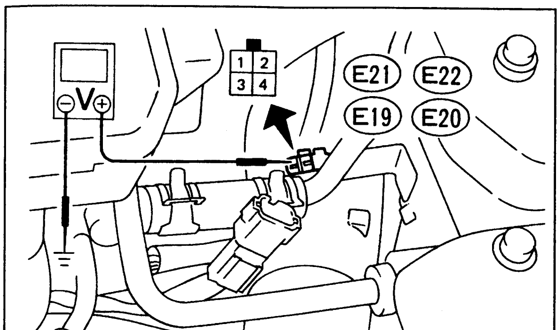
1. CHECK IGNITION SYSTEM FOR SPARKS.

1) Remove ignition coil from each spark plug.
2) Install new spark plug on ignition coil.

CAUTION:

Do not remove spark plug from engine.

3) Contact spark plug's thread portion on engine.
4) While opening throttle valve fully, crank engine to check that spark occurs at each cylinder.

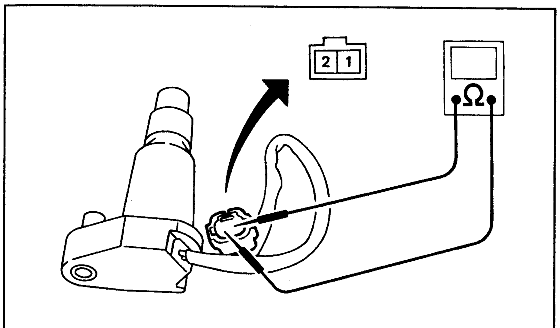


G2M1014

2. CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL.

1) Turn ignition switch to OFF.
2) Disconnect connector from ignition coil.
3) Turn ignition switch to ON.
4) Measure power supply voltage between each ignition coil connector terminal and body.

Connector & terminal / Specified voltage:
(E21), (E19), (E22), (E20)
No. 1 — Body / 10 V, min.



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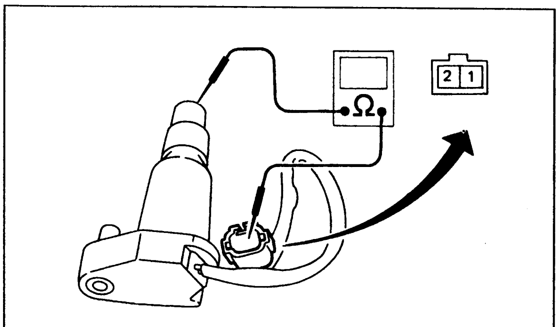
3. CHECK IGNITION COIL.

1) Remove ignition coil.
2) Measure resistance between ignition coil terminals to check primary coil.

Terminals / Specified resistance:
No. 1 — No. 2 / 0.7 Ω



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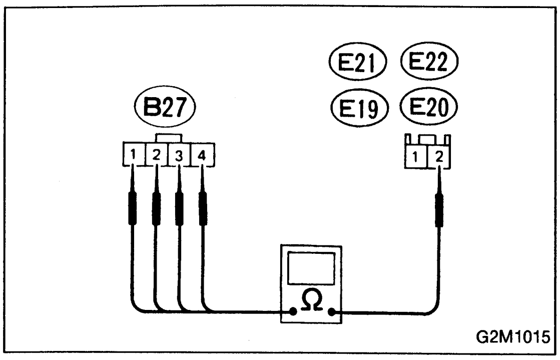
3) Measure resistance between spark plug contact portions to check secondary coil.

Connector & terminal / Specified resistance:
No. 1 — Contact portion / 13.8 kΩ

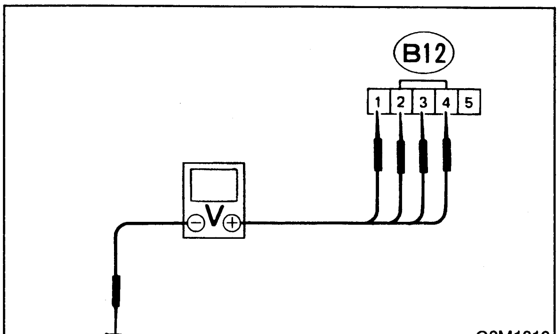


G2M1015

4. CHECK HARNESS CONNECTOR BETWEEN IGNITOR AND EACH IGNITION COIL.

1) Turn ignition switch to OFF.
2) Disconnect connector from ignitor.
3) Measure resistance of harness connector between each ignition coil and ignitor.

Connector & terminal / Specified resistance:
(B27) No. 1 — (E21) No. 2 / 10 Ω, max.
(B27) No. 3 — (E19) No. 2 / 10 Ω, max.
(B27) No. 2 — (E22) No. 2 / 10 Ω, max.
(B27) No. 4 — (E20) No. 2 / 10 Ω, max.



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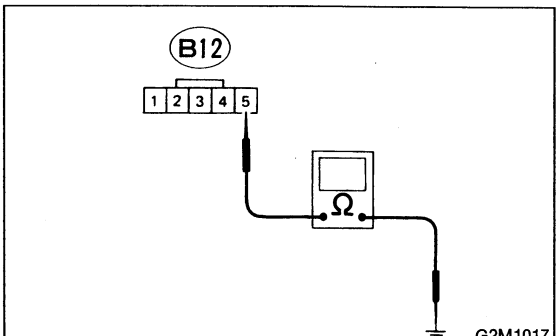
5. CHECK INPUT SIGNAL FOR IGNITOR.

Check if voltage varies synchronously with engine speed when cranking, while monitoring voltage between ignitor connector and body.

Connector & terminal / Specified voltage:
(B12) No. 1 — Body / 0.1 V, min. — 3.4 V, max.
(B12) No. 2 — Body / 0.1 V, min. — 3.4 V, max.
(B12) No. 3 — Body / 0.1 V, min. — 3.4 V, max.
(B12) No. 4 — Body / 0.1 V, min. — 3.4 V, max.

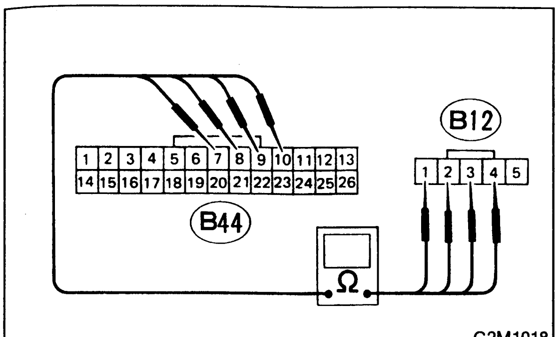


G2M1017

6. CHECK HARNESS CONNECTOR OF IGNITOR GROUND CIRCUIT.

1) Turn ignition switch to OFF.
2) Measure resistance between ignitor and body.

Connector & terminal / Specified resistance:
(B12) No. 5 — Body / 10 Ω, max.



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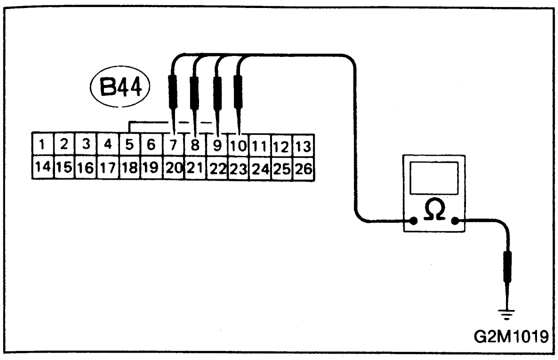

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7. CHECK HARNESS CONNECTOR BETWEEN ECM AND IGNITOR.

1) Disconnect connector from ECM.
2) Measure resistance of harness connector between ECM and ignitor.

Connector & terminal / Specified resistance:
(B44) No. 7 — (B12) No. 1 / 10 Ω, max.
(B44) No. 8 — (B12) No. 2 / 10 Ω, max.
(B44) No. 9 — (B12) No. 3 / 10 Ω, max.
(B44) No. 10 — (B12) No. 4 / 10 Ω, max.

3) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

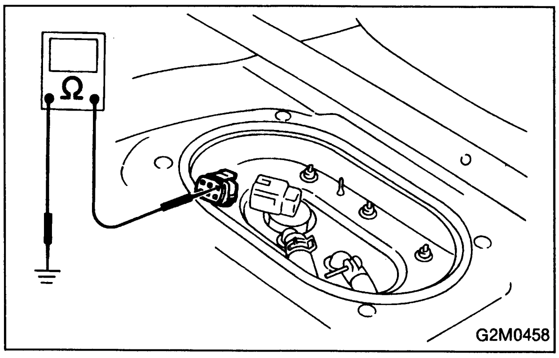
Connector & terminal / Specified resistance:
(B44) No. 7 — Body / 1 MΩ, min.
(B44) No. 8 — Body / 1 MΩ, min.
(B44) No. 9 — Body / 1 MΩ, min.
(B44) No. 10 — Body / 1 MΩ, min.

D: FUEL PUMP CIRCUIT

Step	Result	Action
1. Check operating sound of fuel pump.	O.K.	Fuel injector circuit.
	Not O.K.	Go to step 2.
2. Check ground circuit of fuel pump.	Not O.K.	Repair or replace harness connector.
	O.K.	Go to step 3.
3. Check power supply to fuel pump.	O.K.	Replace fuel pump.
	Not O.K.	Go to step 4.
4. Check harness connector between fuel pump and fuel pump relay.	Not O.K.	Repair or replace harness connector.
	O.K.	Go to step 5.
5. Check fuel pump relay.	Not O.K.	Replace fuel pump relay.
	O.K.	Go to step 6.
6. Check harness connector between ECM and fuel pump relay.	Not O.K.	Repair or replace harness connector.
	O.K.	• Repair ECM connector terminal. • Replace ECM.

1. CHECK OPERATING SOUND OF FUEL PUMP.

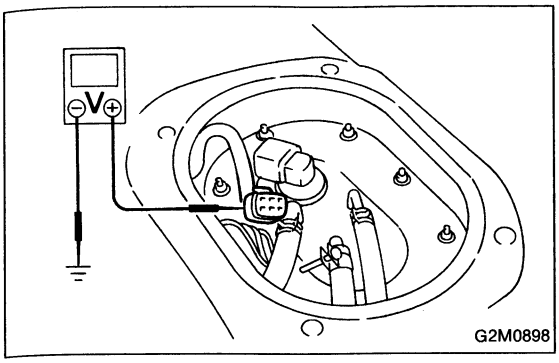
Make sure that fuel pump is in operation for two seconds when turning ignition switch to ON.



2. CHECK GROUND CIRCUIT OF FUEL PUMP.

1) Turn ignition switch to OFF.
2) Disconnect connector from fuel pump.
3) Measure resistance of harness connector between fuel pump and body.

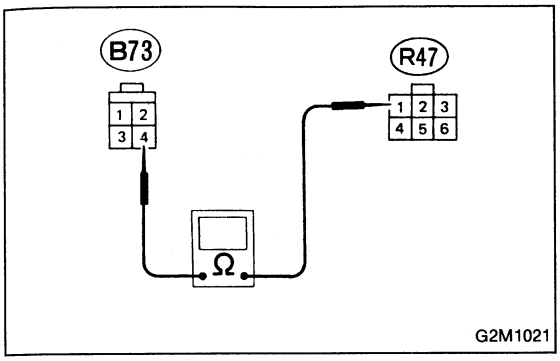
Connector & terminal / Specified resistance:
(R47) No. 4 — Body / 10 Ω, max.



3. CHECK POWER SUPPLY TO FUEL PUMP.

1) Turn ignition switch to ON.
2) Measure voltage of power supply circuit between fuel pump connector and body.

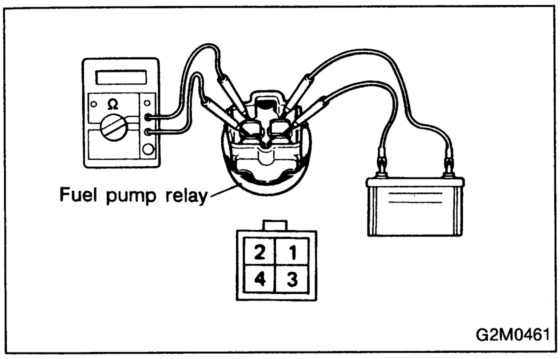
Connector & terminal / Specified voltage:
(R47) No. 1 — Body / 10 V, min.



4. CHECK HARNESS CONNECTOR BETWEEN FUEL PUMP AND FUEL PUMP RELAY.

1) Turn ignition switch to OFF.
2) Measure resistance of harness connector between fuel pump and fuel pump relay.

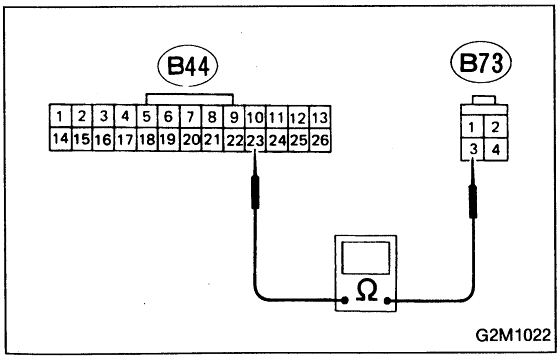
Connector & terminal / Specified resistance:
(R47) No. 1 — (B73) No. 4 / 10 Ω, max.



5. CHECK FUEL PUMP RELAY.

1) Disconnect connectors from fuel pump relay and main relay.
2) Remove fuel pump relay and main relay with bracket.
3) Connect battery to fuel pump relay connector terminals No. 1 and No. 3.
4) Measure resistance between connector terminals of fuel pump relay.

Terminals / Specified resistance:
No. 2 — No. 4 / 10 Ω, max.



6. CHECK HARNESS CONNECTOR BETWEEN ECM AND FUEL PUMP RELAY.

1) Disconnect connectors from ECM.
2) Measure resistance of harness connector between ECM and fuel pump relay.

Connector & terminal / Specified resistance:
(B44) No. 23 — (B73) No. 3 / 10 Ω, max.

E: FUEL INJECTOR CIRCUIT

1. **Check operation of each fuel injector.**
   - O.K. → Check fuel pressure. <Ref. to 2-2 [W4A0].>
   - Not O.K. → 2.

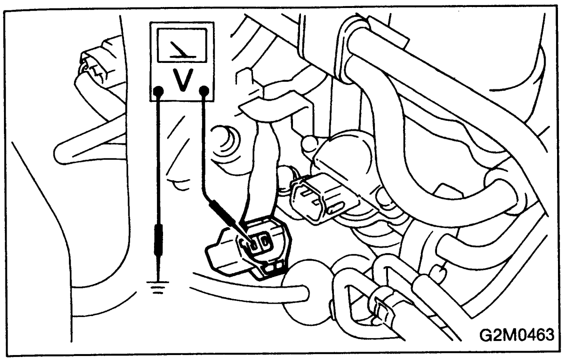
2. **Check power supply to fuel injector.**
   - Not O.K. → Repair or replace harness connector.
   - O.K. → 3.

3. **Check each fuel injector.**
   - Not O.K. → Replace fuel injectors.
   - O.K. → 4.

4. **Check harness connector between ECM and each fuel injector.**
   - Not O.K. → Repair or replace harness connector.
   - O.K. →
     - Repair ECM connector terminal.
     - Replace ECM.

1. CHECK OPERATION OF EACH FUEL INJECTOR.

While cranking the engine, check that each fuel injector emits "operating" sound. Use a sound scope or attach a screwdriver to injector for this check.



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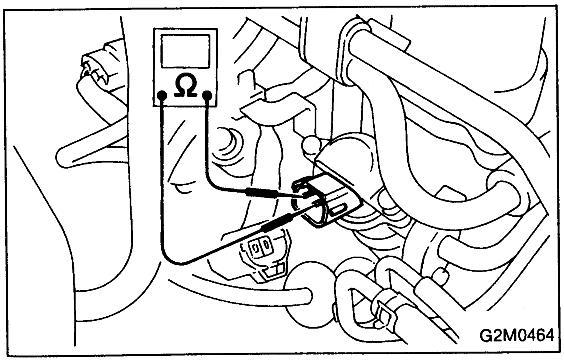
2. CHECK POWER SUPPLY TO FUEL INJECTOR.

1) Turn ignition switch to OFF.
2) Disconnect connector from each injector.
3) Turn ignition switch to ON.
4) Measure voltage between each fuel injector connector terminal and body.

Connector & terminal / Specified voltage:
#1 (E4) No. 2 — Body / 10 V, min.
#2 (E13) No. 2 — Body / 10 V, min.
#3 (E3) No. 2 — Body / 10 V, min.
#4 (E14) No. 2 — Body / 10 V, min.



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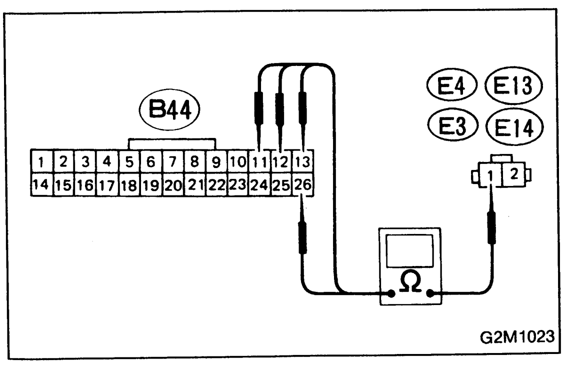
3. CHECK EACH FUEL INJECTOR.

Measure resistance between fuel injector terminals.

Terminals / Specified resistance:
No. 1 — No. 2 / 11 — 12 Ω



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4. CHECK HARNESS CONNECTOR BETWEEN ECM AND EACH FUEL INJECTOR.

1) Disconnect connector from ECM.
2) Measure resistance of harness connector between ECM and each fuel injector.

Connector & terminal / Specified resistance:
(B44) No. 13 — (E4) No. 1 / 10 Ω, max.
(B44) No. 12 — (E13) No. 1 / 10 Ω, max.
(B44) No. 11 — (E3) No. 1 / 10 Ω, max.
(B44) No. 26 — (E14) No. 1 / 10 Ω, max.

9. Diagnostics Chart with Trouble Code

A: TROUBLE CODE

Trouble code	Item	Contents of diagnosis	Page
11	Crankshaft position sensor	• No signal entered from crankshaft position sensor when starter switch is ON. • The harness connector between ECM and crankshaft position sensor is in short or open.	32
12	Starter switch	• The starter switch signal is abnormal. • The harness connector between ECM and starter switch is in short or open.	34
13	Camshaft position sensor	• No signal entered from camshaft position sensor, but signal entered from crankshaft position sensor. • The harness connector between ECM and camshaft position sensor is in short or open.	36
21	Engine coolant temperature sensor	• The engine coolant temperature sensor signal is abnormal. • The harness connector between ECM and engine coolant temperature sensor is in short or open.	38
22	Knock sensor	• The knock sensor signal is abnormal. • The harness connector between ECM and knock sensor is in short or open.	40
23	Mass air flow sensor	• The mass air flow sensor signal is abnormal. • The harness connector between ECM and mass air flow sensor is in short or open.	42
24	Idle air control solenoid valve	• The idle air control solenoid valve is not in function. • The harness connector between ECM and idle air control solenoid valve is in short or open.	44
31	Throttle position sensor	• The throttle position sensor signal is abnormal. • The throttle position sensor is installed abnormally. • The harness connector between ECM and throttle position sensor is in short or open.	46
32	Oxygen sensor	• The oxygen sensor is not in function. • The harness connector between ECM and oxygen sensor is in short or open.	50
33	Vehicle speed sensor 2	• The vehicle speed sensor 2 is not in function. • The harness connector between ECM and vehicle speed sensor 2 is in short or open.	52
35	Purge control solenoid valve	• The purge control solenoid valve is not in function. • The harness connector between ECM and purge control solenoid valve is in short or open.	54
42	Idle switch	• The idle switch signal is abnormal. • The throttle position sensor is installed abnormally. • The harness connector between ECM and idle switch is in short or open.	56
44	Wastegate control solenoid valve	• The wastegate control solenoid valve is not in function. • The harness connector between ECM and wastegate control solenoid valve is in short or open.	58
45	• Pressure sensor • Pressure exchange solenoid valve	• The pressure sensor signal is abnormal. • The pressure exchange solenoid valve is not in function. • The intake manifold pressure is not transmitted to pressure sensor. • The harness connector between ECM and pressure sensor, and pressure exchange solenoid valve is in short or open.	60
51	Neutral position switch	• The neutral position switch signal is abnormal. • The harness connector between ECM and neutral position switch is in short or open.	64

B: TROUBLE CODE (11)

— CRANKSHAFT POSITION SENSOR —

DIAGNOSIS:

- No signal entered from crankshaft position sensor when starter switch is ON.
- The harness connector between ECM and crankshaft position sensor is in short or open.

TROUBLE SYMPTOM:

- Engine stalls.
- Restarting impossible

1. Check input signal for ECM.

O.K. →
- Repair ECM connector terminal.
- Replace ECM.

Not O.K. ↓

2. Check harness connector between ECM and crankshaft position sensor.

Not O.K. → Repair or replace harness connector.

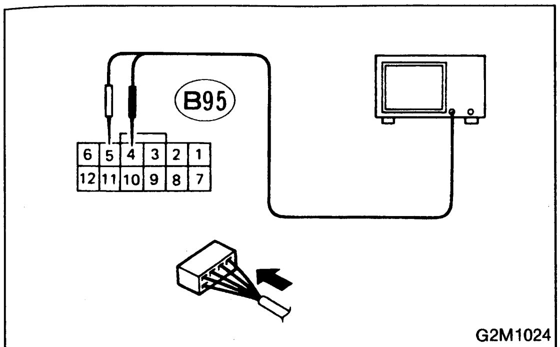
O.K. ↓

3. Check crankshaft position sensor.

Not O.K. → Replace crankshaft position sensor.

O.K. ↓

Mechanical trouble between crankshaft position sensor and crankshaft sprocket.

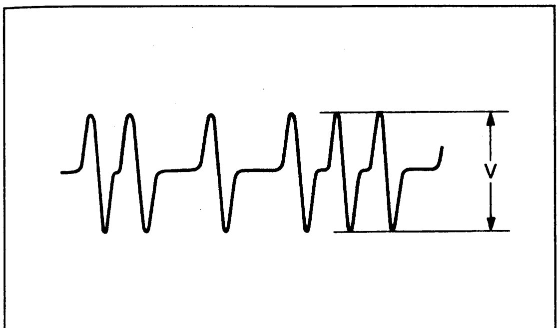


G2M1024

1. CHECK INPUT SIGNAL FOR ECM.

1) Set the positive (+) probe and earth lead of oscilloscope at ECM connector terminals.

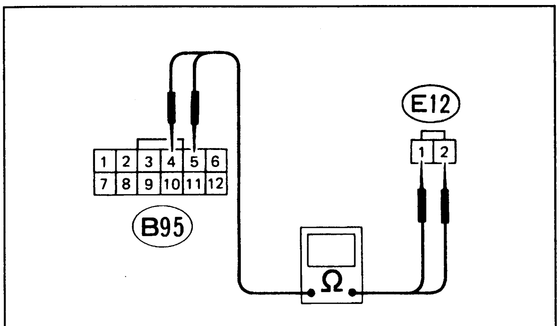
Connector & terminal / (B95) No. 4 — (B108) No. 5



G2M0467

2) Measure signal voltage indicated on oscilloscope while cranking the engine.

Specified voltage / 400 mV, min.

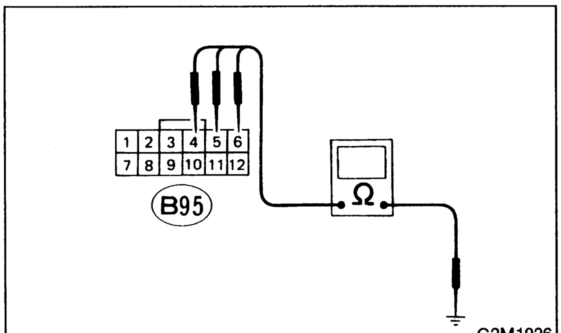


G2M1025

2. CHECK HARNESS CONNECTOR BETWEEN ECM AND CRANKSHAFT POSITION SENSOR.

1) Turn ignition switch to OFF.
2) Disconnect connectors from ECM and crankshaft position sensor.
3) Measure resistance of harness connector between ECM and crankshaft position sensor.

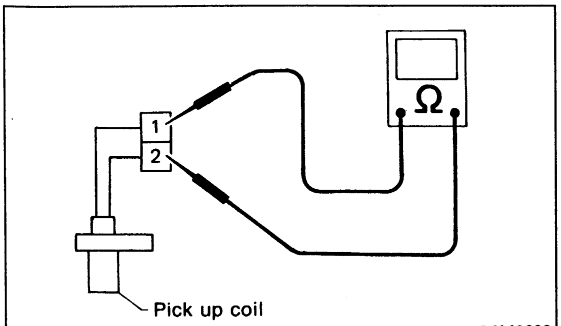
Connector & terminal / Specified resistance:
(B95) No. 4 — (E12) No. 1 / 10 Ω, max.
(B95) No. 5 — (E12) No. 2 / 10 Ω, max.



G2M1026

4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:
(B95) No. 4 — Body / 1 MΩ, min.
(B95) No. 5 — Body / 1 MΩ, min.
(B95) No. 6 — Body / 1 MΩ, min.



G2M0639

3. CHECK CRANKSHAFT POSITION SENSOR.

1) Remove crankshaft position sensor.
2) Measure resistance between connector terminals of crankshaft position sensor.

Terminals / Specified resistance:
No. 1 — No. 2 / 950 — 1,250 Ω

C: TROUBLE CODE (12) — STARTER SWITCH —

DIAGNOSIS:

- The starter switch signal is abnormal.
- The harness connector between ECM and starter switch is in short or open.

TROUBLE SYMPTOM:

- Failure of engine to start.

1. Check operation of starter motor.

Not O.K. → Repair starter motor circuit or replace starter motor.

O.K. ↓

2. Check input signal for ECM.

O.K. →
- Repair ECM connector terminal.
- Replace ECM.

Not O.K. ↓

3. Check harness connector between ECM and starter motor.

Not O.K. → Repair or replace harness connector.

O.K. ↓

Repair or replace harness connector between ECM and ignition switch.

ᴇCK OPERATION OF STARTER MOTOR.

ɪnition switch to "ST" to ensure that starter motor ns.

ᴇCK INPUT SIGNAL FOR ECM.

re voltage between ECM and body while cranking gine.

ctor & terminal / Specified voltage:
6) No. 10 — Body / 9 — 14 V

ᴇCK HARNESS CONNECTOR BETWEEN ECM TARTER MOTOR.

n ignition switch to OFF.
connect connectors from ECM and starter motor.
asure resistance of harness connector between nd starter motor.

ctor & terminal / Specified resistance:
6) No. 10 — (B8) No. 1 / 0 Ω

asure resistance of harness connector between motor and body to make sure that circuit does not

ctor & terminal / Specified resistance:
) No. 1 — Body / 1 MΩ, min.

2. CHECK HARNESS CONNECTOR BETWEEN ECM AND CAMSHAFT POSITION SENSOR.

1) Turn ignition switch to OFF.
2) Disconnect connectors from ECM and camshaft position sensor.
3) Measure resistance of harness connector between ECM and camshaft position sensor.

Connector & terminal / Specified resistance:
(B96) No. 1 — (E17) No. 1 / 10 Ω, max.
(B96) No. 2 — (E17) No. 2 / 10 Ω, max.

G2M1031

4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:
(B96) No. 1 — Body / 1 MΩ, min.
(B96) No. 2 — Body / 1 MΩ, min.
(B96) No. 3 — Body / 1 MΩ, min.

G2M1032

3. CHECK CAMSHAFT POSITION SENSOR.

1) Remove camshaft position sensor.
2) Measure resistance between connector terminals of camshaft position sensor.

Terminals / Specified resistance:
No. 1 — No. 2 / 950 — 1,250 Ω

G2M0639

F: TROUBLE CODE (22) — KNOCK SENSOR —

DIAGNOSIS:

- The knock sensor signal is abnormal.
- The harness connector between ECM and knock sensor is in short or open.

TROUBLE SYMPTOM:

- Poor driving performance
- Engine has the knocking on high engine speed.

O.K. →
- Repair ECM connector terminal.
- Replace ECM.

Not O.K. → Replace knock sensor.

and

Not O.K. → Repair or replace harness connector.

G: TROUBLE CODE (23) — MASS AIR FLOW SENSOR —

DIAGNOSIS:

- The mass air flow sensor signal is abnormal.
- The harness connector between ECM and mass air flow sensor is in short or open.

TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

1. Check input signal for ECM.

O.K. → • Repair ECM connector terminal. • Replace ECM.

Not O.K. ↓

2. Check power supply to mass air flow sensor.

Not O.K. → Repair or replace harness connector.

O.K. ↓

3. Check harness connector between ECM and mass air flow sensor.

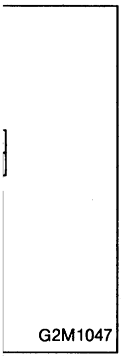
Not O.K. → Repair or replace harness connector.

O.K. ↓

Replace mass air flow sensor.

rmal.
normally.
throttle posi-

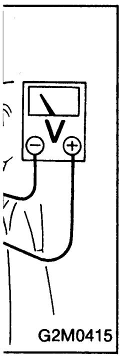
r.



G2M1047

4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:
(B95) No. 1 — Body / 1 MΩ, min.
(B95) No. 2 — Body / 1 MΩ, min.
(B95) No. 3 — Body / 1 MΩ, min.



G2M0415

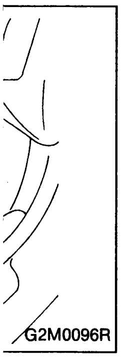
3. CHECK AND ADJUST THROTTLE POSITION SENSOR.

1) Connect all connectors.
2) Loosen throttle position sensor installing screws.
3) Adjust throttle position sensor while throttle valve is fully closed.

- Using voltage meter:
  (1) Turn ignition switch to ON.
  (2) Adjust throttle position sensor to specified voltage between ECM connector terminals.

Connector & terminal / Specified voltage:
(B95) No. 2 — (B95) No. 1 / 4.7 V

(3) Tighten throttle position sensor installing screws.

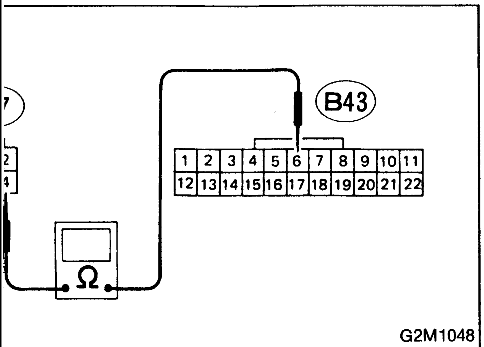


G2M0096R

- Using select monitor:
  (1) Attach select monitor.
  (2) Turn ignition switch to ON.
  (3) Select mode "F10".
  (4) Adjust throttle position sensor to specified data.

Conditions / Specified data:
Throttle valve fully closed / 4.7 V

(5) Tighten throttle position sensor installing screws.

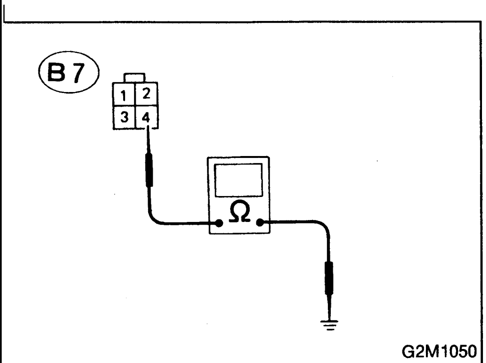


G2M1048

1. CHECK HARNESS CONNECTOR BETWEEN ECM AND OXYGEN SENSOR.

1) Disconnect connectors from ECM and oxygen sensor.
2) Measure resistance of harness connector between ECM and oxygen sensor.

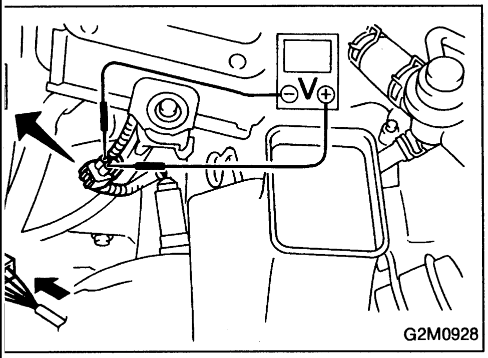
Connector & terminal / Specified resistance:
(B43) No. 6 — (B7) No. 4 / 0 Ω



G2M1050

3) Measure resistance of harness connector between oxygen sensor and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:
(B7) No. 4 — Body / 1 MΩ, min.

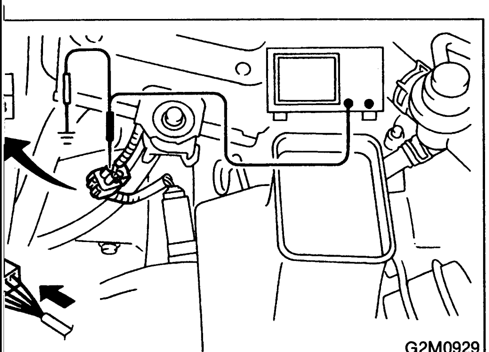


G2M0928

2. CHECK OXYGEN SENSOR HEATER CIRCUIT.

1) Connect connectors of ECM and oxygen sensor.
2) Turn ignition switch to ON.
3) Measure voltage between connector terminals of oxygen sensor.

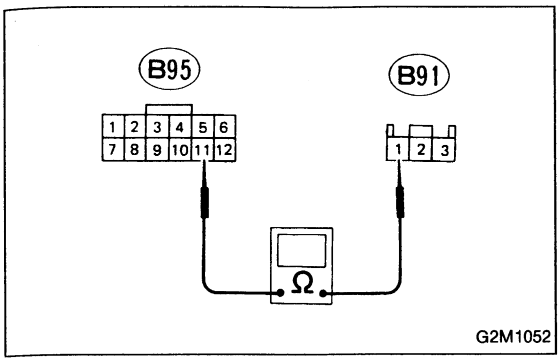
Connector & terminal / Specified voltage:
(B7) No. 1 — (B7) No. 2 / 10 — 14 V


G2M0929

3. CHECK OXYGEN SENSOR.

1) Idle engine.
2) Measure voltage between oxygen sensor terminal and body by using oscilloscope.

Connector & terminal / Specified voltage:
No. 4 — Body / 0.1 — 1.0 V

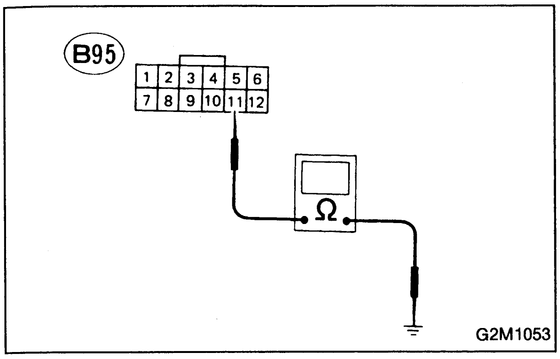


G2M1052

2. CHECK HARNESS CONNECTOR BETWEEN ECM AND VEHICLE SPEED SENSOR 2.

1) Turn ignition switch to OFF.
2) Disconnect connectors from ECM and vehicle speed sensor 2.
3) Measure resistance of harness connector between ECM and vehicle speed sensor 2.

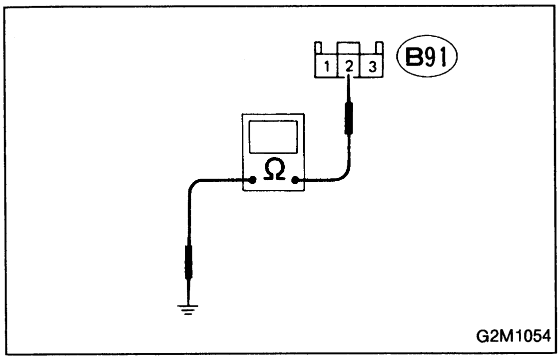
Connector & terminal / Specified resistance:
(B95) No. 11 — (B91) No. 1 / 10 Ω, max.



G2M1053

4) Measure resistance of harness connector between ECM and body to make sure that circuit does not short.

Connector & terminal / Specified resistance:
(B95) No. 11 — Body / 1 MΩ, min.

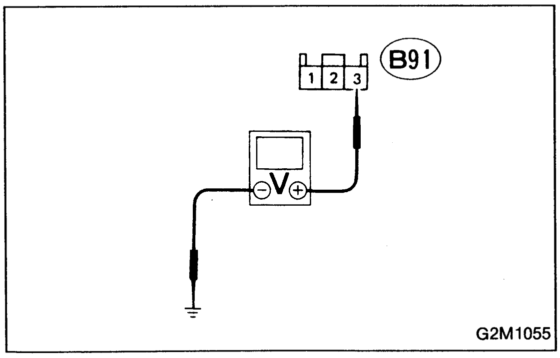


G2M1054

3. CHECK GROUND CIRCUIT OF VEHICLE SPEED SENSOR 2.

Measure resistance of harness connector between vehicle speed sensor 2 and body.

Connector & terminal / Specified resistance:
(B91) No. 2 — Body / 10 Ω, max.



G2M1055

4. CHECK POWER SUPPLY CIRCUIT OF VEHICLE SPEED SENSOR 2.

1) Turn ignition switch to ON.
2) Measure power supply voltage to vehicle speed sensor 2.

Connector & terminal / Specified voltage:
(B91) No. 3 — Body / 10 V, min.

M: TROUBLE CODE (42) — IDLE SWITCH —

DIAGNOSIS:

- The idle switch signal is abnormal.
- The throttle position sensor is installed abnormally.
- The harness connector between ECM and idle switch is in short or open.

TROUBLE SYMPTOM:

- Restarting impossible
- Poor driving performance

Step	Result	Action
1. Check input signal for ECM.	O.K.	• Repair ECM connector terminal. • Replace ECM.
	Not O.K.	↓ (to step 2)
2. Check harness connector between ECM and idle switch.	Not O.K.	Repair or replace harness connector.
	O.K.	↓ (to step 3)
3. Check and adjust idle switch.	Not O.K.	Replace throttle position sensor.
	O.K.	↓ END

END

N: TROUBLE CODE (44) — WASTEGATE CONTROL SOLENOID VALVE —

DIAGNOSIS:

- The wastegate control solenoid valve is not in function.
- The harness connector between ECM and wastegate control solenoid valve is in short or open.

TROUBLE SYMPTOM:

- Poor driving performance

1. Check input signal for ECM.

O.K. → • Repair ECM connector terminal. • Replace ECM.

Not O.K. ↓

2. Check wastegate control solenoid valve.

Not O.K. → Replace wastegate control solenoid valve.

O.K. ↓

3. Check power supply circuit of wastegate control solenoid valve.

Not O.K. → Repair or replace power supply circuit.

O.K. ↓

Repair or replace harness connector between ECM and wastegate control solenoid valve.

SIGNALS ON ECM.

/I connector terminal and

ed voltage:

- 2.7 V

or 10 — 13 V

:ONTACT INTAKE

between pressure sensor
ssure exchange solenoid
veen intake manifold and

s and damage.

l.

ressure sensor.
erminals No. 1 and No. 2,
positive side and terminal

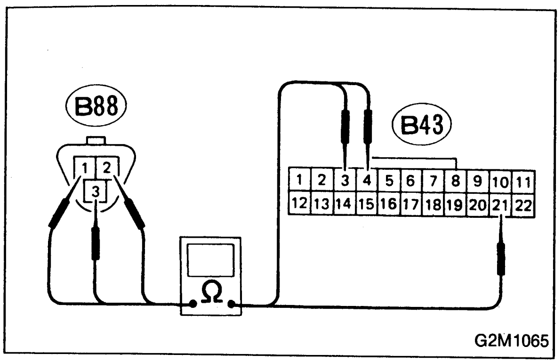
fitting on pressure sensor.
minals when pressure is

.7 kPa
g, 7.87 inHg)
kPa
0 inHg)
6.7 kPa
Hg, –7.87 inHg)

IGE SOLENOID VALVE.
pressure exchange sole-

erminals.

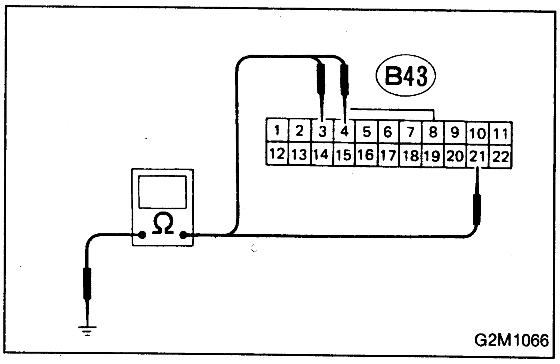
ce:



5. CHECK HARNESS CONNECTOR BETWEEN ECM AND PRESSURE SENSOR.

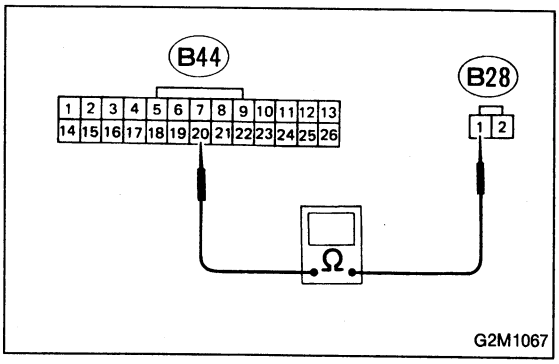
1) Disconnect connectors from ECM.
2) Measure resistance of harness connector between ECM and pressure sensor connector.

Connector & terminal / Specified resistance:
(B43) No. 3 — (B88) No. 1 / 0 Ω
(B43) No. 4 — (B88) No. 3 / 0 Ω
(B43) No. 21 — (B88) No. 2 / 0 Ω



3) Measure resistance between ECM connector terminal and body to make sure that circuit does not short.

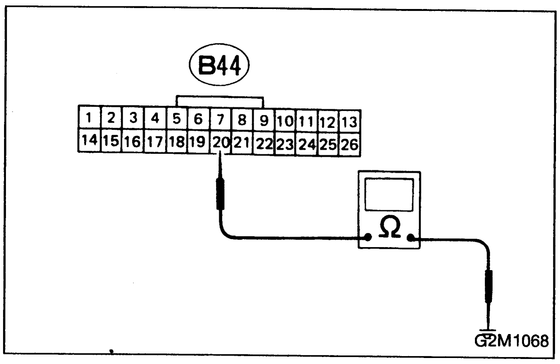
Connector & terminal / Specified resistance:
(B43) No. 3 — Body / 1 MΩ, min.
(B43) No. 4 — Body / 1 MΩ, min.
(B43) No. 21 — Body / 1 MΩ, min.



6. CHECK HARNESS CONNECTOR BETWEEN ECM AND PRESSURE EXCHANGE SOLENOID VALVE.

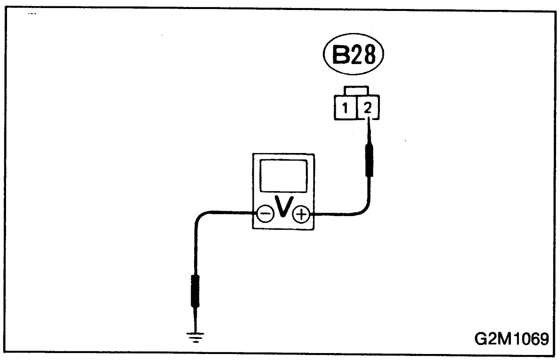
1) Measure resistance of harness connector between ECM and pressure exchange solenoid valve connector.

Connector & terminal / Specified resistance:
(B44) No. 20 — (B28) No. 1 / 0 Ω



2) Measure resistance of harness connector between ECM terminal and body to make sure that circuit does not short.

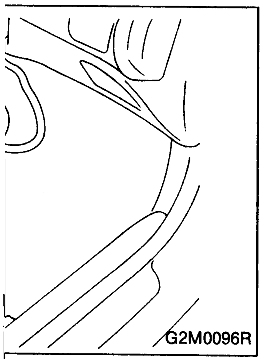
Connector & terminal / Specified resistance:
(B44) No. 20 — Body / 1 MΩ, min.



7. CHECK POWER SUPPLY TO PRESSURE EXCHANGE SOLENOID VALVE.

1) Turn ignition switch to ON.
2) Measure voltage between connector terminal of pressure exchange solenoid valve and body.

Connector & terminal / Specified voltage:
(B28) No. 2 — body / 10 — 14 V



10. Diagnostics Chart with Select Monitor

A: FUNCTION MODE

Applicable cartridge of select monitor: No. 498349900

Contents	Abbreviation	Unit of measure	Page
ID number	YEAR	—	67
ry voltage	VB	V	67
:le speed signal	VSP	MPH	68
:le speed signal	VSP	km/h	68
ıe speed signal	EREV	rpm	68
ıe coolant temperature signal	TW	deg F	69
ıe coolant temperature signal	TW	deg C	69
ɔn signal	ADVS	deg	69
air flow signal	QA	V	70
data	LDATA	—	70
tle position signal	THV	V	71
or pulse width	TIM	mS	72
.ir control signal	ISC	%	73
ən sensor output signal	O_2	V	73
ən sensor MAX. output signal	O_2 MAX.	V	74
ən sensor MIN. output signal	O_2 MIN.	V	74
orrection coefficient	ALPHA	%	75
ɔn timing correction value	RTRD	deg	75
ɜgate control signal	WGC	%	76
spheric pressure	BARO. P	mmHg	76
ɜ manifold pressure	MANI. P	mmHg	77
› OFF signal	—	—	78
› OFF signal	—	—	78
› OFF signal	—	—	79
› OFF signal	—	—	79

LED No.	Signal name	Display
1	Stop light switch	ST
2	Brake switch	BR
3	SET/COAST switch	SE
4	RESUME/ACCEL switch	RE
5	• Clutch switch (MT) • Inhibitor switch (AT)	IH
6	—	—
7	—	—
8	—	—
9	—	—
10	—	—

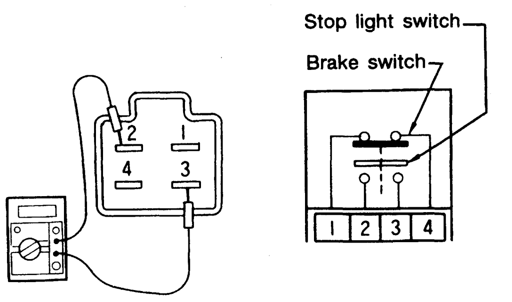
ST	BR	SE	RE	IH
—	—	—	—	—

1	2	3	4	5
6	7	8	9	10

1. CHECK WITH SELECT MONITOR.

1) Turn ignition switch to ON.
2) Turn cruise control main switch to ON.
3) Apply parking brake securely.
4) Set select monitor in "FA0" mode.
5) Release the clutch pedal (MT model) or set selector lever in D position (AT model).
6) Depress the brake pedal and check signals for proper operation.

Stop light switch: LED No. 1 goes out. — lights.
Brake switch : LED No. 2 goes out. — lights.



G6M0183

2. CHECK BRAKE SWITCH AND STOP LIGHT SWITCH.

1) Remove connector of stop and brake switch.
2) Check circuit between each terminal.

Pedal operation	Brake switch between No. 1 — 4	Stop light switch between No. 2 — 3
Depressing the brake pedal.	Circuit failure	Circuit normal
Without depressing the brake pedal.	Circuit normal	Circuit failure

CANCEL	(FB0)
12	CLU or N

G6M0171

C: TROUBLE CODE 12 — CLUTCH SWITCH, N POSITION —

DIAGNOSIS:

- Failure or disconnection of inhibitor switch (AT model)
- Failure or disconnection of clutch switch (MT model)

TROUBLE SYMPTOM:

- Cruise control cannot be set.

1. Check with select monitor.
- OK → Check for proper contact of the harness and connectors.
- Not OK ↓

2. Check clutch switch. (MT model)
- Not OK → Replace switch, repair wiring.
- OK ↓

3. Check inhibitor switch. (AT model)
- Not OK → Replace switch, repair wiring.
- OK ↓

Check for proper contact in connector. If OK, failure is in cruise control module.

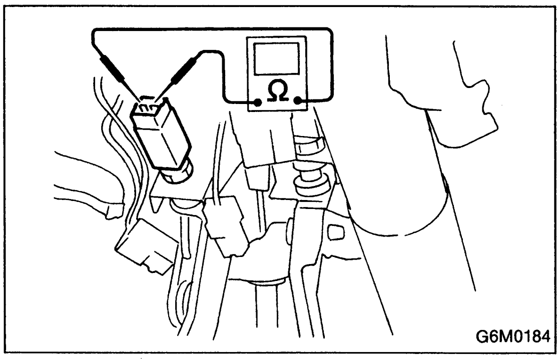
LED No.	Signal name	Display
1	Stop light switch	ST
2	Brake switch	BR
3	SET/COAST switch	SE
4	RESUME/ACCEL switch	RE
5	• Clutch switch (MT) • Inhibitor switch (AT)	IH
6	—	—
7	—	—
8	—	—
9	—	—
10	—	—

ST	BR	SE	RE	IH
—	—	—	—	—

1	2	3	4	5
6	7	8	9	10

1. CHECK WITH SELECT MONITOR.

1) Turn ignition switch to ON.
2) Turn cruise control main switch to ON.
3) Set select monitor in "FA0" mode.
4) Depress the clutch pedal (MT model) or set selector lever in N position (AT model) while checking the signal for proper operation.
LED No. 5 goes out. — lights.



G6M0184

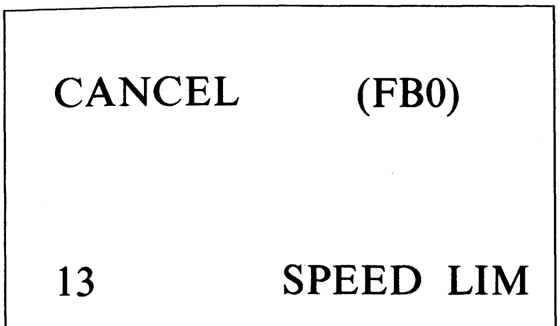
2. CHECK CLUTCH SWITCH. (MT MODEL)

1) Disconnect connector from clutch switch.
2) Check continuity of the clutch switch.

Terminals / Specified resistance:
No. 1 — No. 2 / 10 Ω, max. (Without pedal depressing.)
/ 1 MΩ, min. (Pedal depressing.)

3. CHECK INHIBITOR SWITCH. (AT MODEL)

1) When engine starts in the N position (the starter rotates), N position contact point of the inhibitor switch is normal.
2) Check the wiring harness.



G6M0173

D: TROUBLE CODE 13 AND 24 — SPEED LIMITER, VEHICLE SPEED SENSOR 2 —

DIAGNOSIS:

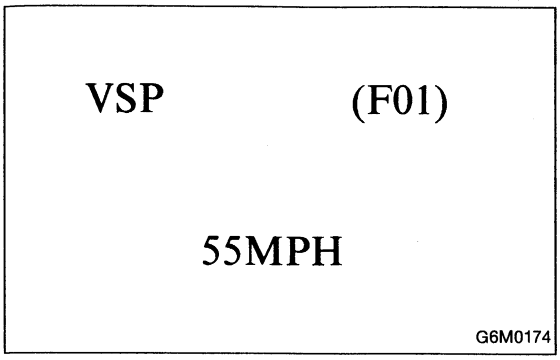
- Disconnection or short circuit of vehicle speed sensor 2.

TROUBLE SYMPTOM:

- Cruise control cannot be set. (Cancelled immediately.)

1. Check speed signal with select monitor.
- OK → Failure in cruise control module
- Not OK → 2.

2. Check circuit between combination meter and cruise control module.
- OK → Failure in vehicle speed sensor 2. → Replace combination meter.
- Not OK → Repair harnesses and connectors.



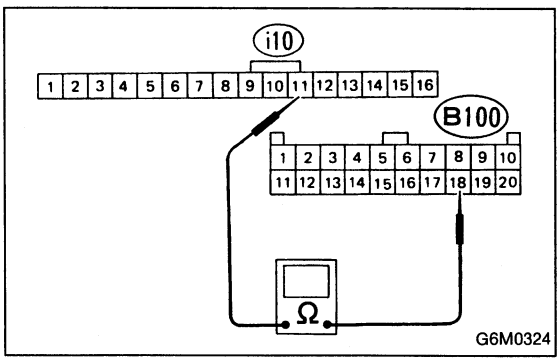
G6M0174

1. CHECK SPEED SIGNAL WITH SELECT MONITOR.

1) Turn ignition switch to ON.
2) Set select monitor in "F02" mode.
3) Drive the vehicle at speed greater than 40 km/h (25 MPH).
4) Check that vehicle speed indicates correctly.

NOTE:

- When there is a failure in the meter cable or the vehicle speed sensor 2, the indicated value of the meter will be incorrect.
- When there is a disconnection or short circuit in the harness between the meter and the cruise control module, the indicated value will be 0 — 1 km/h (0 — 0.6 MPH).

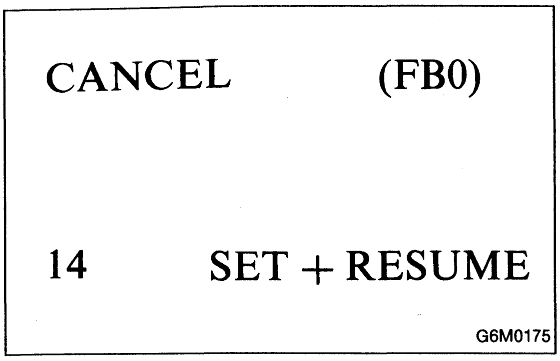


G6M0324

2. CHECK CIRCUIT BETWEEN COMBINATION METER AND CRUISE CONTROL MODULE.

1) Disconnect connectors from combination meter and cruise control module.
2) Measure resistance of harness connector between combination meter and cruise control module.

Connector & terminal / Specified resistance:
(i10) No. 11 — (B100) No. 18 / 10 Ω, max.



G6M0175

E: TROUBLE CODE 14
— SET SWITCH AND RESUME SWITCH —

DIAGNOSIS:

- Short circuit inside the SET switch and RESUME switch.

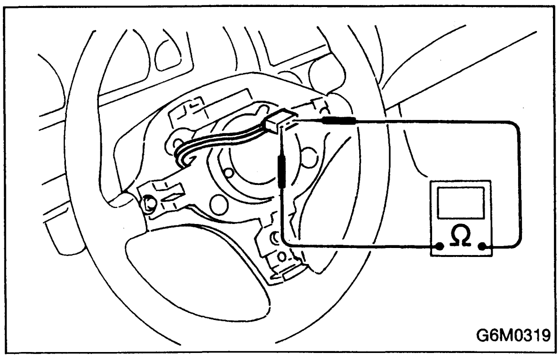
TROUBLE SYMPTOM:

- Cruise control cannot be set. (Cancelled immediately.)

1. Check short circuit of cruise control sub switch. — Not OK → Replace the sub switch.

OK ↓

Check for short circuit in harness between sub switch and cruise control module.

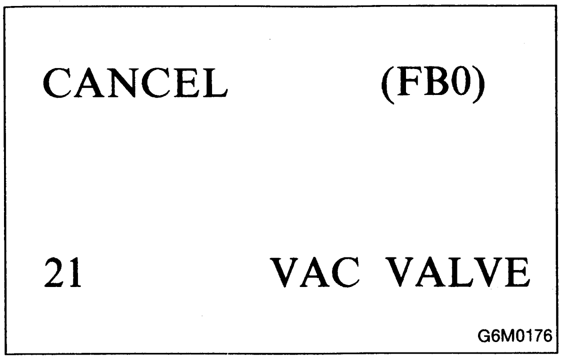


G6M0319

1. CHECK SHORT CIRCUIT OF CRUISE CONTROL SUB SWITCH.

1) Disconnect connector of cruise control sub switch.
2) Measure resistance between each terminal of cruise control sub switch.

Terminals / Specified resistance:
SET switch ON: No. 1 — No. 2 / 10 Ω, max.
RESUME switch ON: No. 1 — No. 3 / 10 Ω, max.



G6M0176

F: TROUBLE CODE 21, 22 AND 23 — VACUUM VALVE, VENT 2 VALVE, VENT 1 VALVE —

DIAGNOSIS:

- Open or poor contact of vacuum valve, vent 1 valve and vent 2 valve.

TROUBLE SYMPTOM:

- Cruise control cannot be set. (Cancelled immediately.)

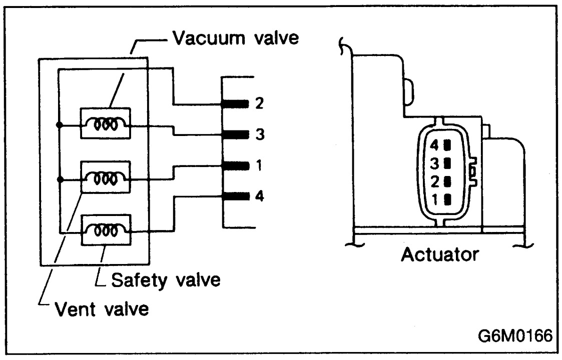
1. Measure resistance of actuator. — Not OK → Malfunction in actuator

↓ OK

2. Check circuit between cruise control module and actuator. — Not OK → Failure in harness

↓ OK

Faulty cruise control module (Check input and output voltage.)



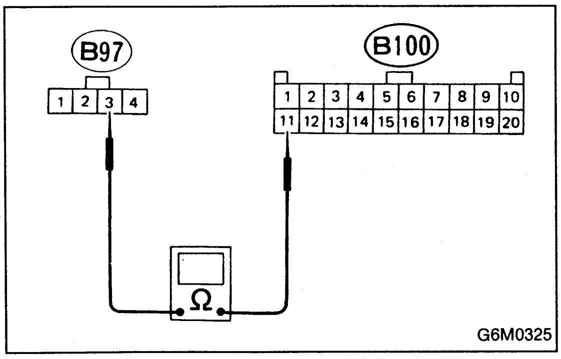
G6M0166

1. MEASURE RESISTANCE OF ACTUATOR.

1) Disconnect connector of actuator.
2) Measure resistance between each terminal of actuator.

Terminals / Specified resistance:

No. 2 — No. 1 / 55 Ω
No. 2 — No. 3 / 22 Ω
No. 2 — No. 4 / 55 Ω



G6M0325

2. CHECK CIRCUIT BETWEEN CRUISE CONTROL MODULE AND ACTUATOR.

1) Disconnect connectors from cruise control module and actuator.
2) Measure resistance of harness connector between cruise control module and actuator.

Connector & terminal / Specified resistance:

(B97) No. 1 — (B100) No. 1 / 10 Ω, max.
(B97) No. 2 — (B100) No. 8 / 10 Ω, max.
(B97) No. 3 — (B100) No. 11 / 10 Ω, max.
(B97) No. 4 — (B100) No. 2 / 10 Ω, max.

CANCEL (FB0)

25 CONTROL UNIT

G6M0190

Replace cruise control module.

G: TROUBLE CODE 25 — CONTROL MODULE —

DIAGNOSIS:

- Faulty cruise control module

TROUBLE SYMPTOM:

- Cruise control cannot be set.

8. Diagnostics Chart for Actuator

Check vehicle speed input signal with select monitor.

↓ (At first, confirm that vehicle speed signal is input normally.)

Check operation of actuator.

↓

Repair.

A: CHECK OPERATION OF ACTUATOR

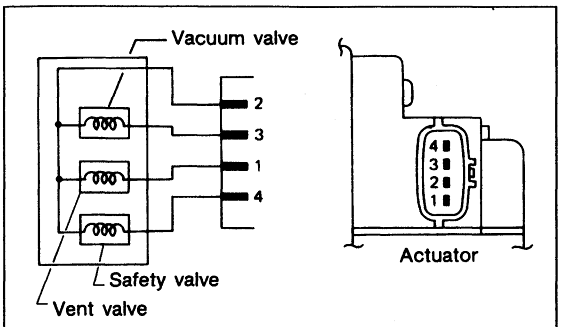
DIAGNOSIS:

- Sticking of air leaves of actuator, or sticking of valve and actuator diaphragm.

TROUBLE SYMPTOM:

- Vehicle cannot run at set speed ±3 km/h (±2 MPH).

Step	Not OK
1. Check each valve of actuator.	Replace the actuator.
OK ↓	
2. Check for leakage and sticking of actuator valve.	Replace the actuator.
OK ↓	
Faulty cruise control module	

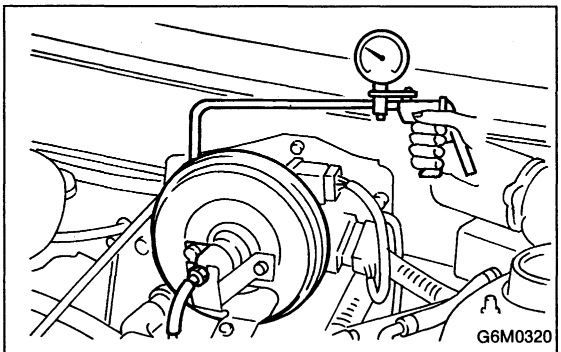


G6M0166

1. CHECK EACH VALVE OF ACTUATOR.

1) Disconnect connector of actuator.
2) Measure resistance between each terminal of actuator.

Terminals / Specified resistance:
No. 2 — No. 1 / 55 Ω (Vent valve)
No. 2 — No. 3 / 22 Ω (Vacuum valve)
No. 2 — No. 4 / 55 Ω (Safety valve)


G6M0320

2. CHECK FOR LEAKAGE AND STICKING OF ACTUATOR VALVE.

1) Connect ⊕ (positive) battery cable to terminal 2 and ⊖ (negative) battery cable to terminals 1, 3 and 4.
2) Make sure cable moves smoothly when a vacuum pressure of 40.0 kPa (300 mmHg, 11.81 inHg) is applied to actuator using vacuum pump.

Stroke: 35 mm (1.38 in)
Movement time: Within 3 seconds

3) When the battery is removed from condition 2) above, make sure the cable returns to its original position smoothly.

Movement time: Within 1.5 seconds

4) Connect battery to each terminal and check cable movement when vacuum pressure is applied by vacuum pump.

Vacuum pressure	Terminal No.				Battery		Operation mode
	1	2	3	4	⊕	⊖	
OFF	—	—	—	—	—	—	—
ON (Vacuum pressure applied.)		○			○		Pull
			○			○	
	○					○	
				○		○	
		○			○		Hold
	○					○	
				○		○	
		○			○		Release
				○		○	

WIRING DIAGRAM 6-3

Page

D WIRING DIAGRAM 2
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2. Basic Diagnostics Procedures
3. Working Precautions
4. How to Use Wiring Diagram
5. How to Use Super Multiple Junction (S.M.J.)
6. Wiring Diagram 2
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   2. GROUND DISTRIBUTION 4
   3. AIR CONDITIONING SYSTEM 8
   4. ANTI-LOCK BRAKE SYSTEM 12
   5. A/T CONTROL SYSTEM
   6. AUDIO & CLOCK SYSTEM
   7. BACK-UP LIGHT SYSTEM 14
   8. CHARGING SYSTEM 15
   9. COMBINATION METER 16
   10. DOOR LOCK SYSTEM
   11. ENGINE ELECTRICAL SYSTEM 18
   12. FRONT WIPER AND WASHER SYSTEM
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   15. HORN AND CIGARETTE LIGHTER SYSTEM
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   34. FRONT FOG LIGHT SYSTEM 36
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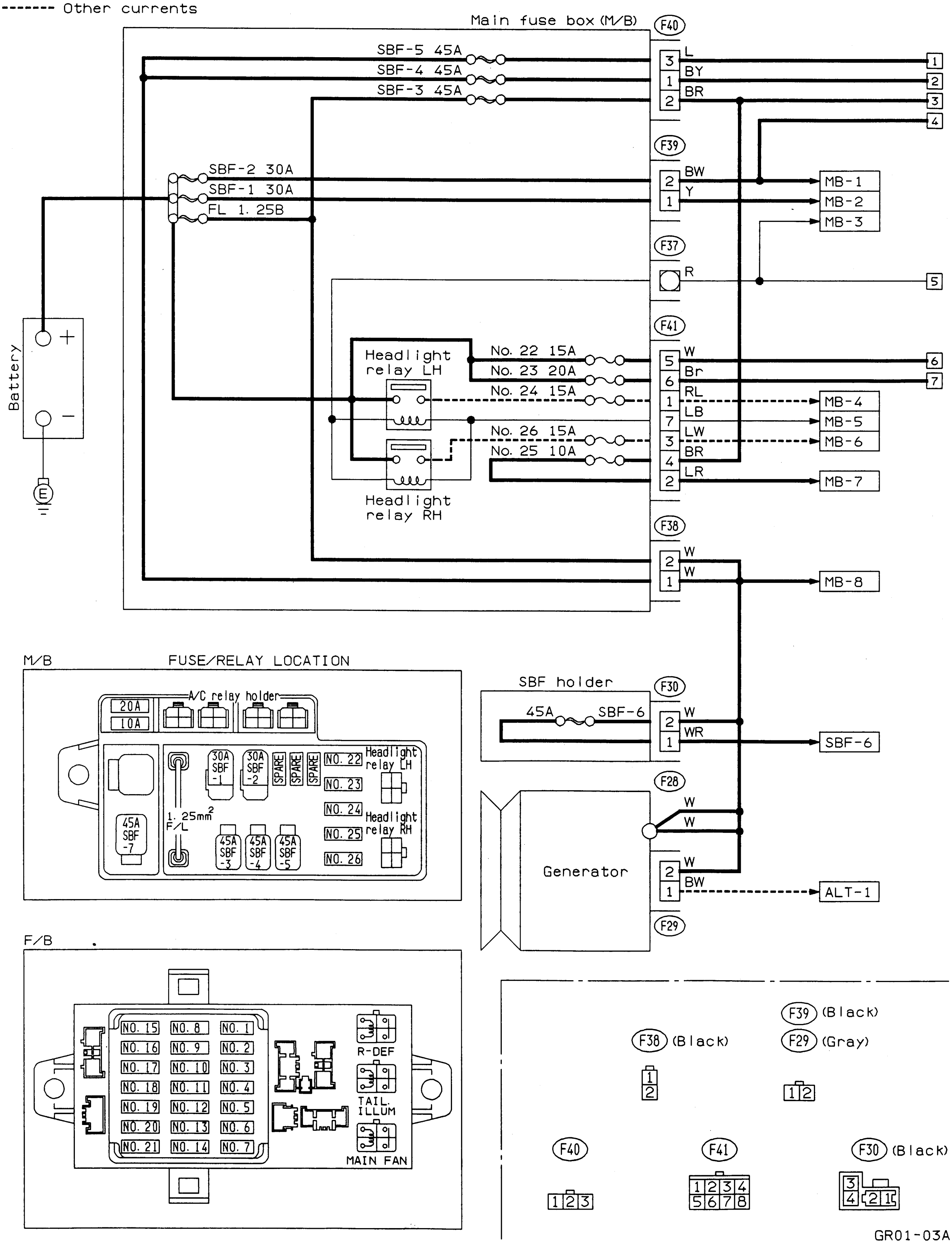
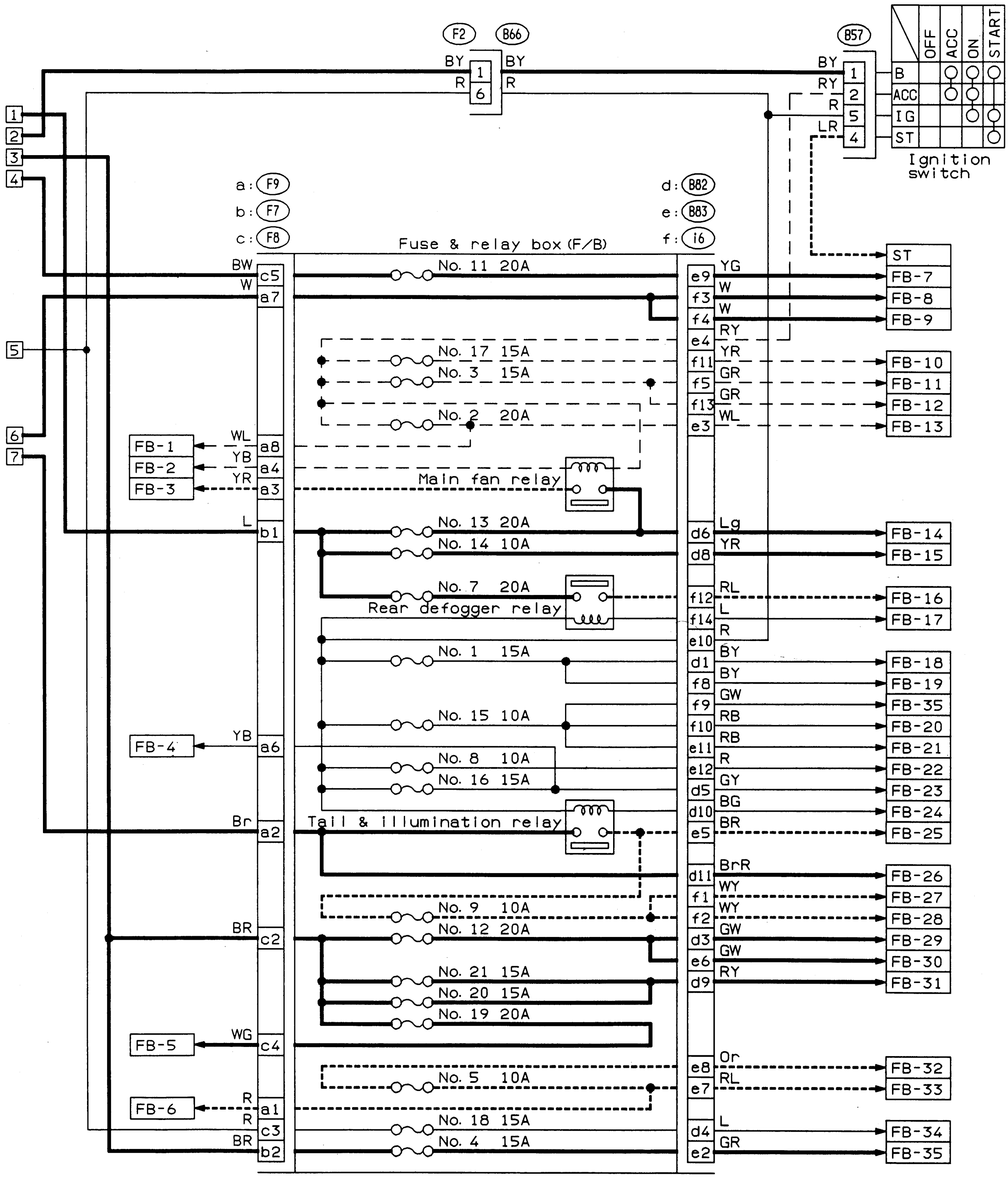
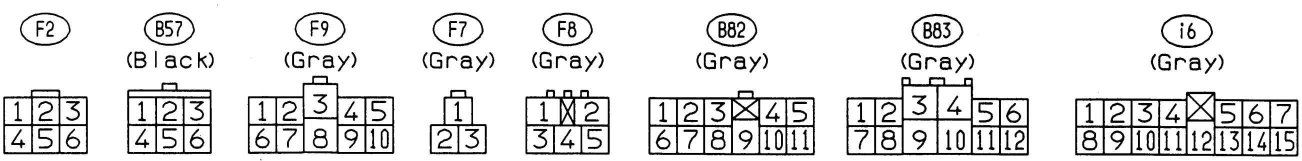
6. Wiring Diagram

1. POWER SUPPLY ROUTING

- ——— Battery current
- ——— Current from ignition switch IG terminal
- – – – Current from ignition switch ACC terminal
- ------- Other currents

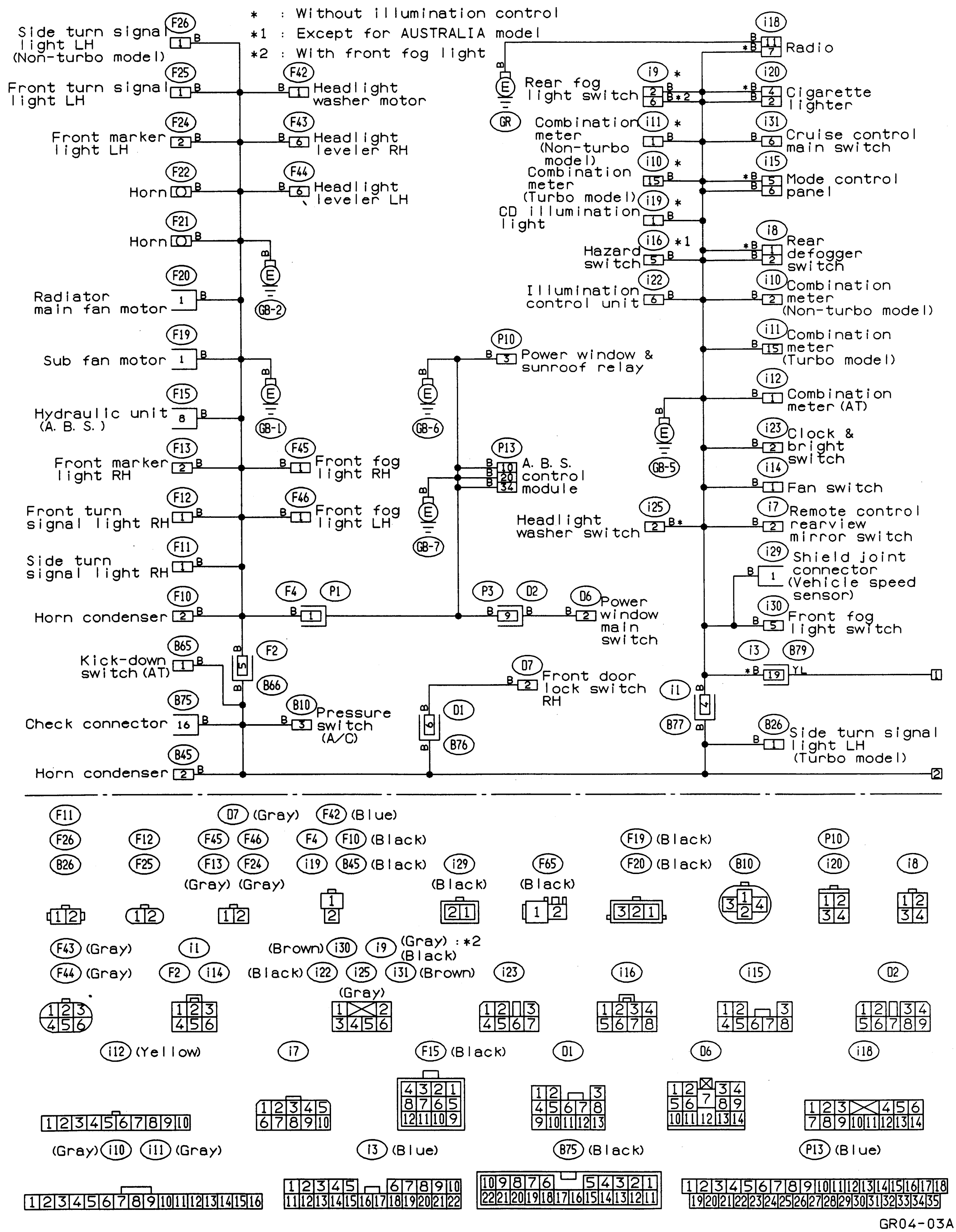


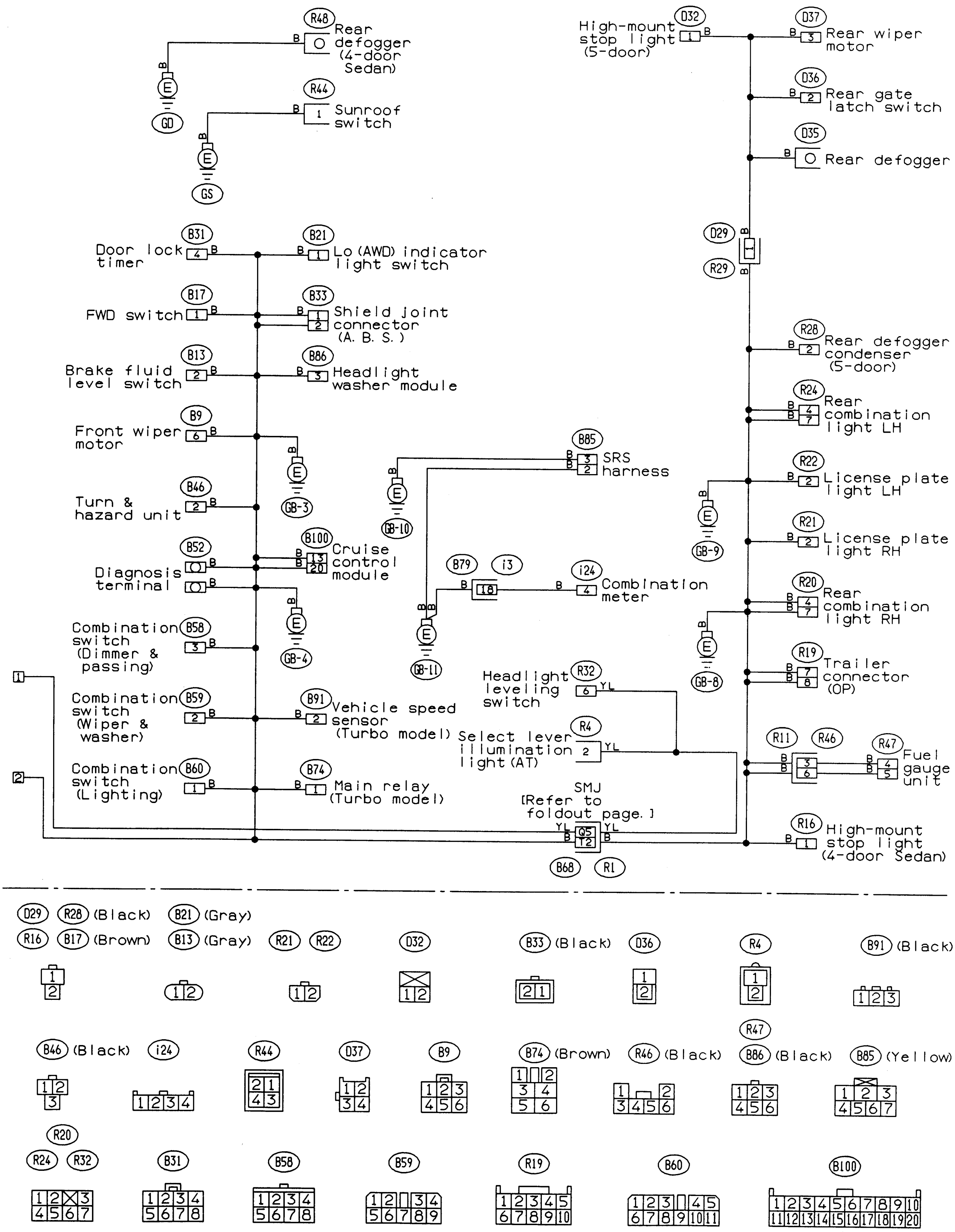

F2
B66
B57
BY
R
1
6
OFF
ACC
ON
START
B
ACC
IG
ST
Ignition switch
a: F9
b: F7
c: F8
d: B82
e: B83
f: i6
Fuse & relay box (F/B)
No. 11 20A
No. 17 15A
No. 3 15A
No. 2 20A
Main fan relay
No. 13 20A
No. 14 10A
No. 7 20A
Rear defogger relay
No. 1 15A
No. 15 10A
No. 8 10A
No. 16 15A
Tail & illumination relay
No. 9 10A
No. 12 20A
No. 21 15A
No. 20 15A
No. 19 20A
No. 5 10A
No. 18 15A
No. 4 15A
FB-1
FB-2
FB-3
FB-4
FB-5
FB-6
ST
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-35
FB-20
FB-21
FB-22
FB-23
FB-24
FB-25
FB-26
FB-27
FB-28
FB-29
FB-30
FB-31
FB-32
FB-33
FB-34
FB-35

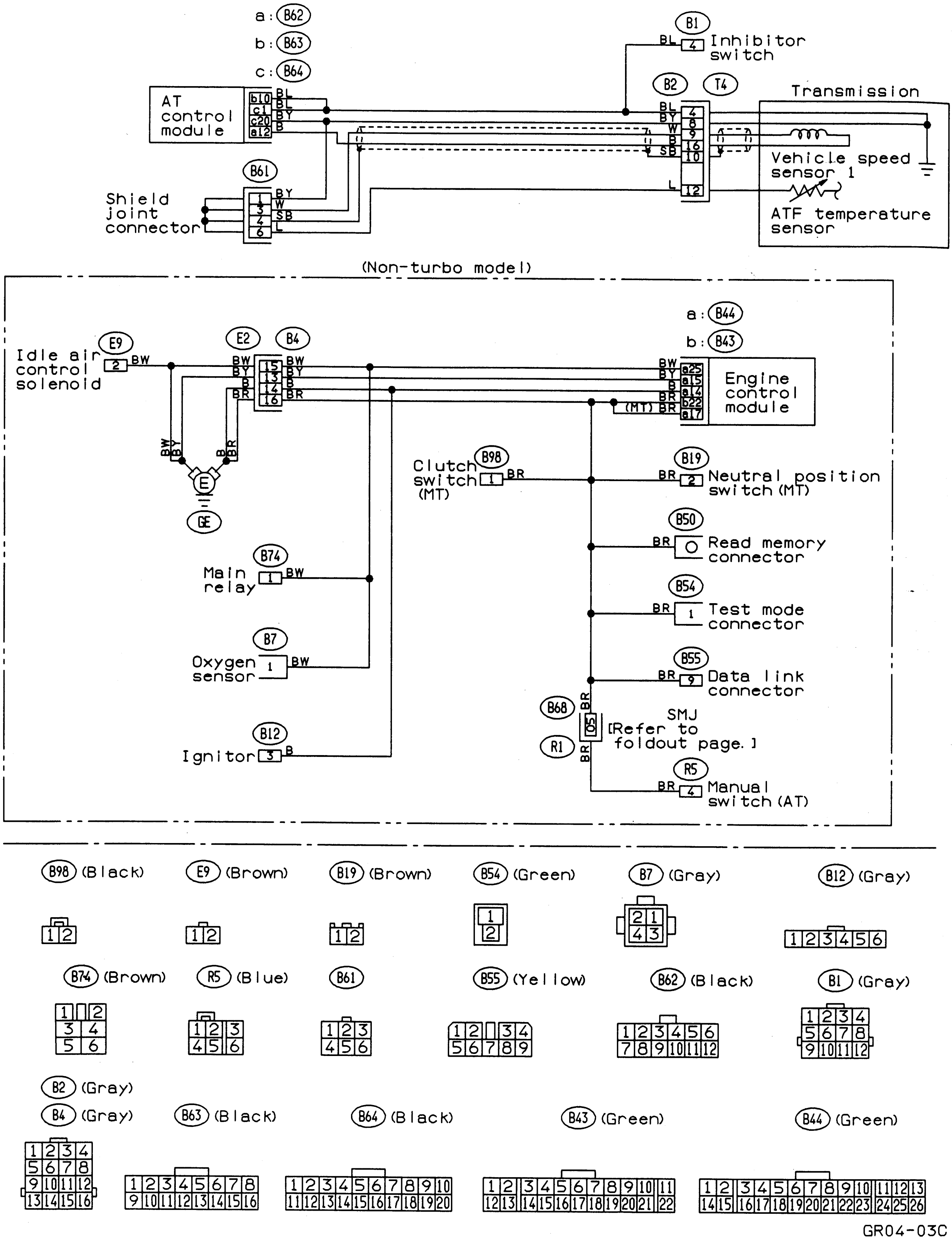

F2
B57 (Black)
F9 (Gray)
F7 (Gray)
F8 (Gray)
B82 (Gray)
B83 (Gray)
i6 (Gray)

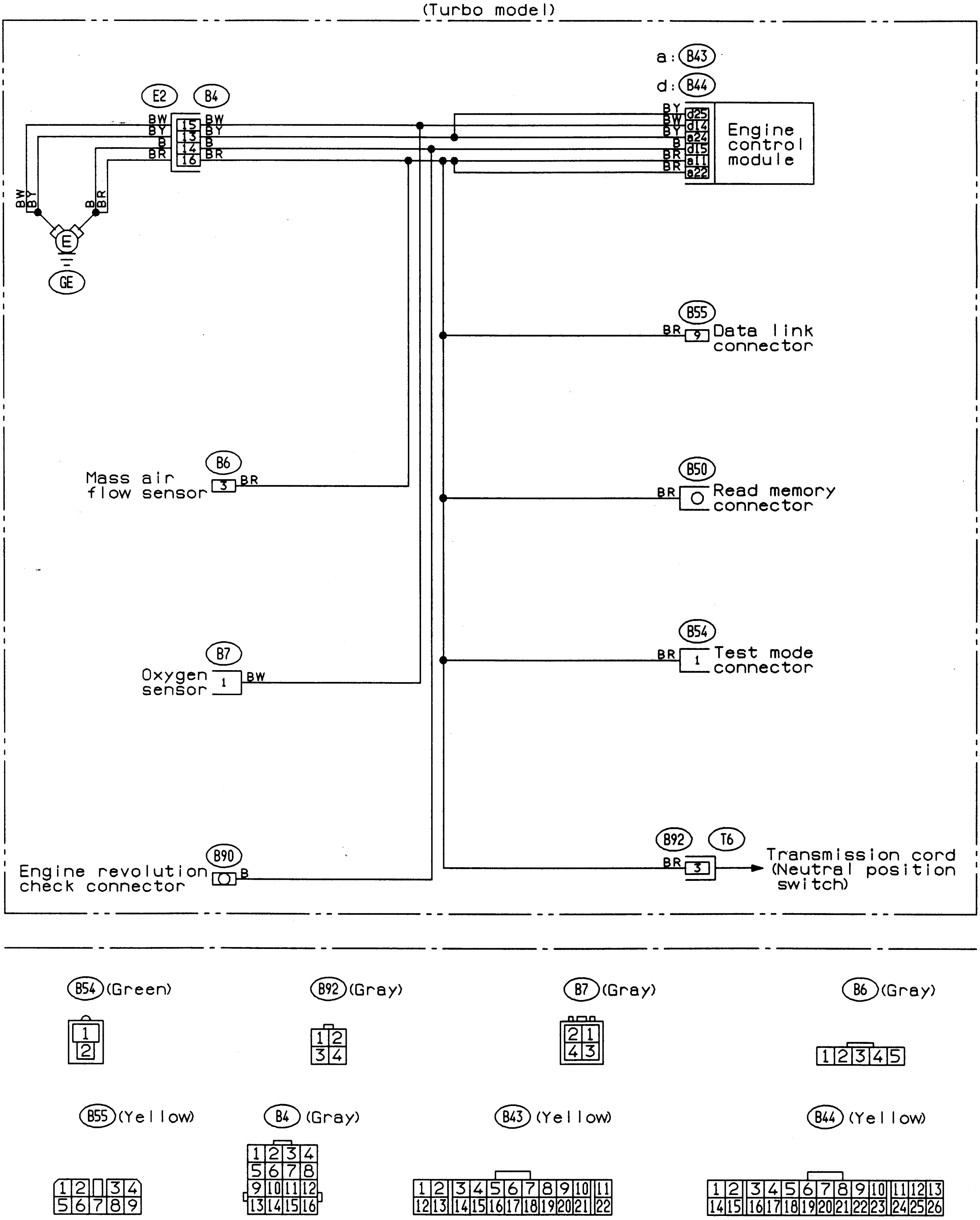
GR01-03B

2. GROUND DISTRIBUTION




Rear defogger (4-door Sedan)
Sunroof switch
High-mount stop light (5-door)
Rear wiper motor
Rear gate latch switch
Rear defogger
Door lock timer
Lo (AWD) indicator light switch
FWD switch
Shield joint connector (A. B. S.)
Brake fluid level switch
Headlight washer module
Front wiper motor
SRS harness
Turn & hazard unit
Cruise control module
Diagnosis terminal
Combination meter
Combination switch (Dimmer & passing)
Combination switch (Wiper & washer)
Vehicle speed sensor (Turbo model)
Combination switch (Lighting)
Main relay (Turbo model)
Headlight leveling switch
Select lever illumination light (AT)
SMJ [Refer to foldout page.]
Rear defogger condenser (5-door)
Rear combination light LH
License plate light LH
License plate light RH
Rear combination light RH
Trailer connector (OP)
Fuel gauge unit
High-mount stop light (4-door Sedan)
GD
GS
GB-3
GB-10
GB-4
GB-11
GB-9
GB-8
(Black)
(Gray)
(Brown)
(Yellow)
GR04-03B


a : B62
b : B63
c : B64
AT control module
b10 c1 c20 a12
BL BL BY B
B61
Shield joint connector
1 3 2 4 6
BY W SB L
B1
BL 4 Inhibitor switch
B2 T4
Transmission
BL BY W B SB L
4 8 9 16 10 12
Vehicle speed sensor 1
ATF temperature sensor
(Non-turbo model)
a : B44
b : B43
Idle air control solenoid
E9
2 BW
E2 B4
BW BY B BR
15 13 14 16
Engine control module
a25 a15 a14 b22 a17
(MT) BR
E
GE
Clutch switch (MT)
B98
1 BR
B19
BR 2 Neutral position switch (MT)
B50
BR Read memory connector
B54
BR 1 Test mode connector
B55
BR 9 Data link connector
B68
R1
05
SMJ [Refer to foldout page.]
R5
BR 4 Manual switch (AT)
Main relay
B74
1 BW
Oxygen sensor
B7
1 BW
Ignitor
B12
3 B
B98 (Black)
E9 (Brown)
B19 (Brown)
B54 (Green)
B7 (Gray)
B12 (Gray)
B74 (Brown)
R5 (Blue)
B61
B55 (Yellow)
B62 (Black)
B1 (Gray)
B2 (Gray)
B4 (Gray)
B63 (Black)
B64 (Black)
B43 (Green)
B44 (Green)
GR04-03C

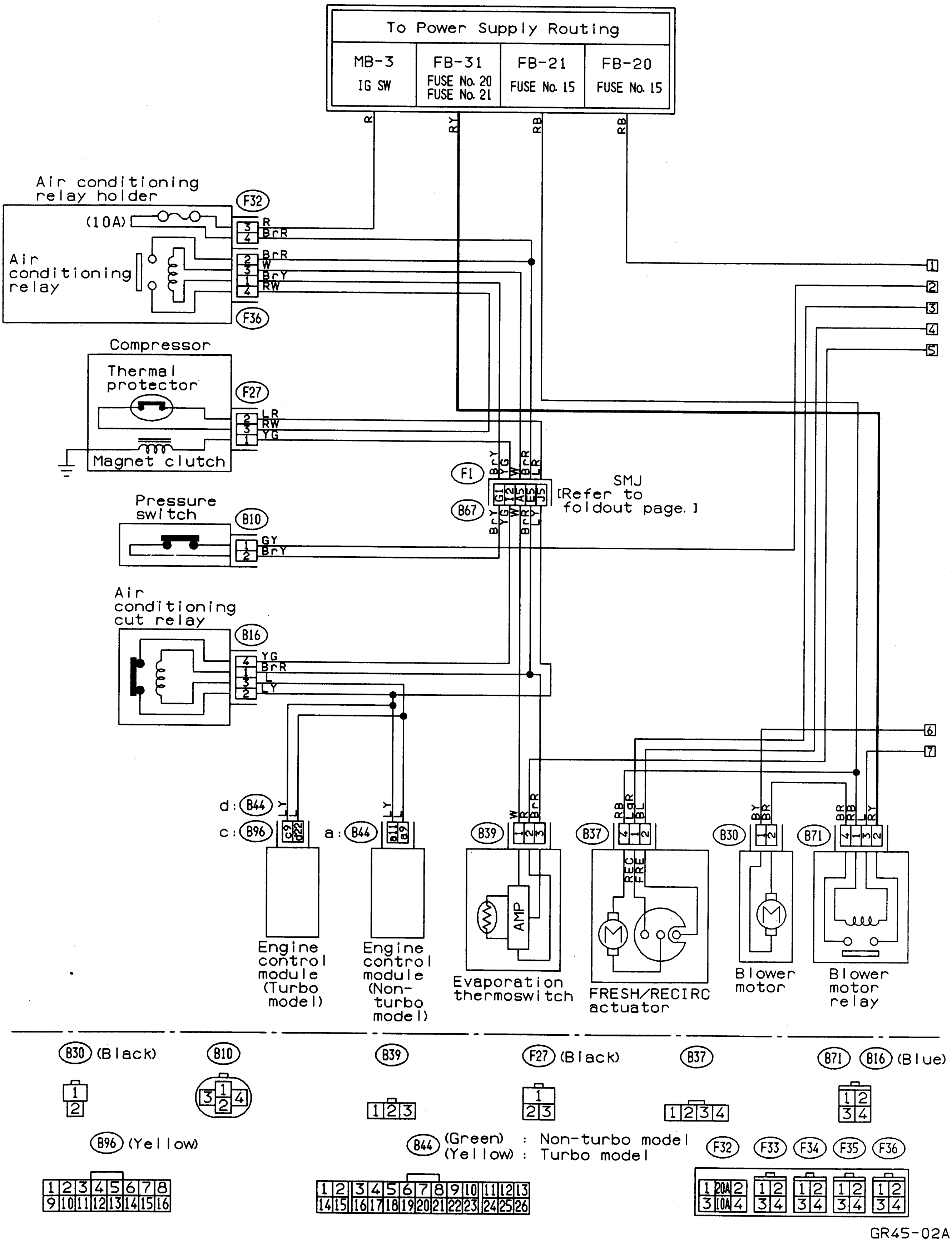

(Turbo model)
a: B43
d: B44
E2
B4
Engine control module
GE
B55
Data link connector
B6
Mass air flow sensor
B50
Read memory connector
B54
Test mode connector
B7
Oxygen sensor
B90
Engine revolution check connector
B92
T6
Transmission cord (Neutral position switch)
B54 (Green)
B92 (Gray)
B7 (Gray)
B6 (Gray)
B55 (Yellow)
B4 (Gray)
B43 (Yellow)
B44 (Yellow)

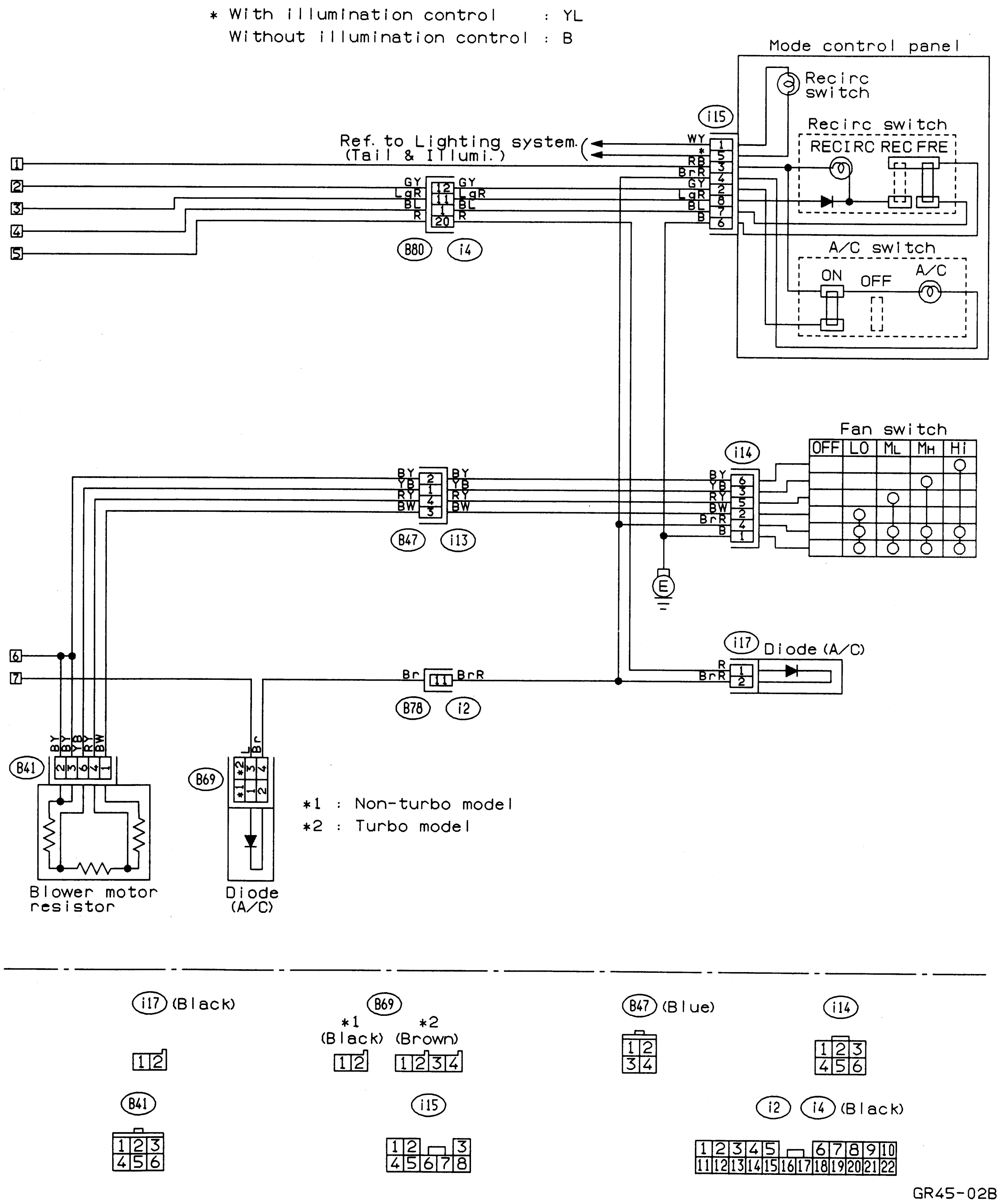
GR04-03D

WIRING DIAGRAM

3. AIR CONDITIONING SYSTEM

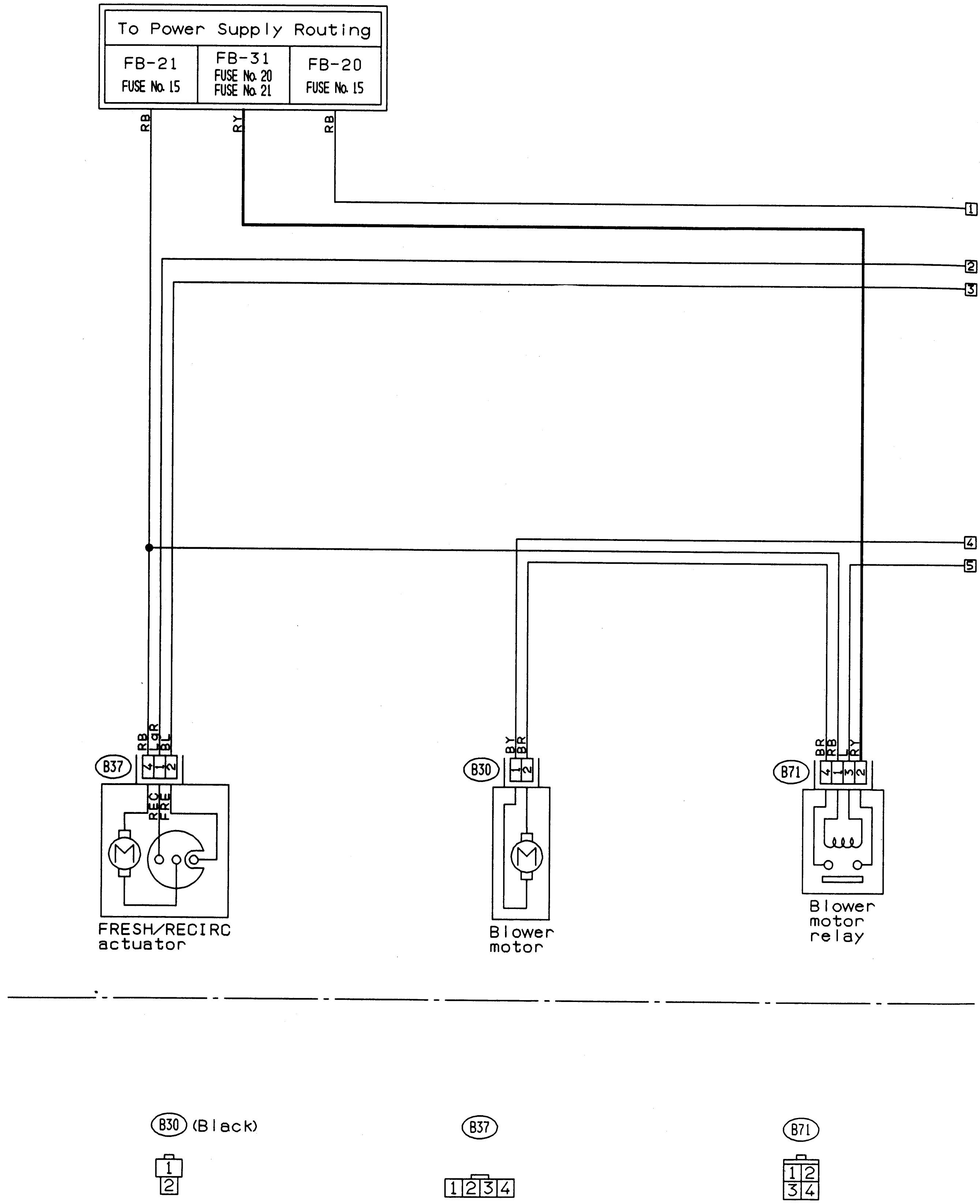
- **With A/C model**




* With illumination control : YL
Without illumination control : B
Mode control panel
Recirc switch
Recirc switch
RECIRC REC FRE
A/C switch
ON OFF A/C
Ref. to Lighting system. (Tail & Illumi.)
Fan switch
OFF LO ML MH Hi
Diode (A/C)
Blower motor resistor
Diode (A/C)
*1 : Non-turbo model
*2 : Turbo model
i17 (Black)
B69 *1 (Black) *2 (Brown)
B47 (Blue)
i14
B41
i15
i2 i4 (Black)
GR45-02B

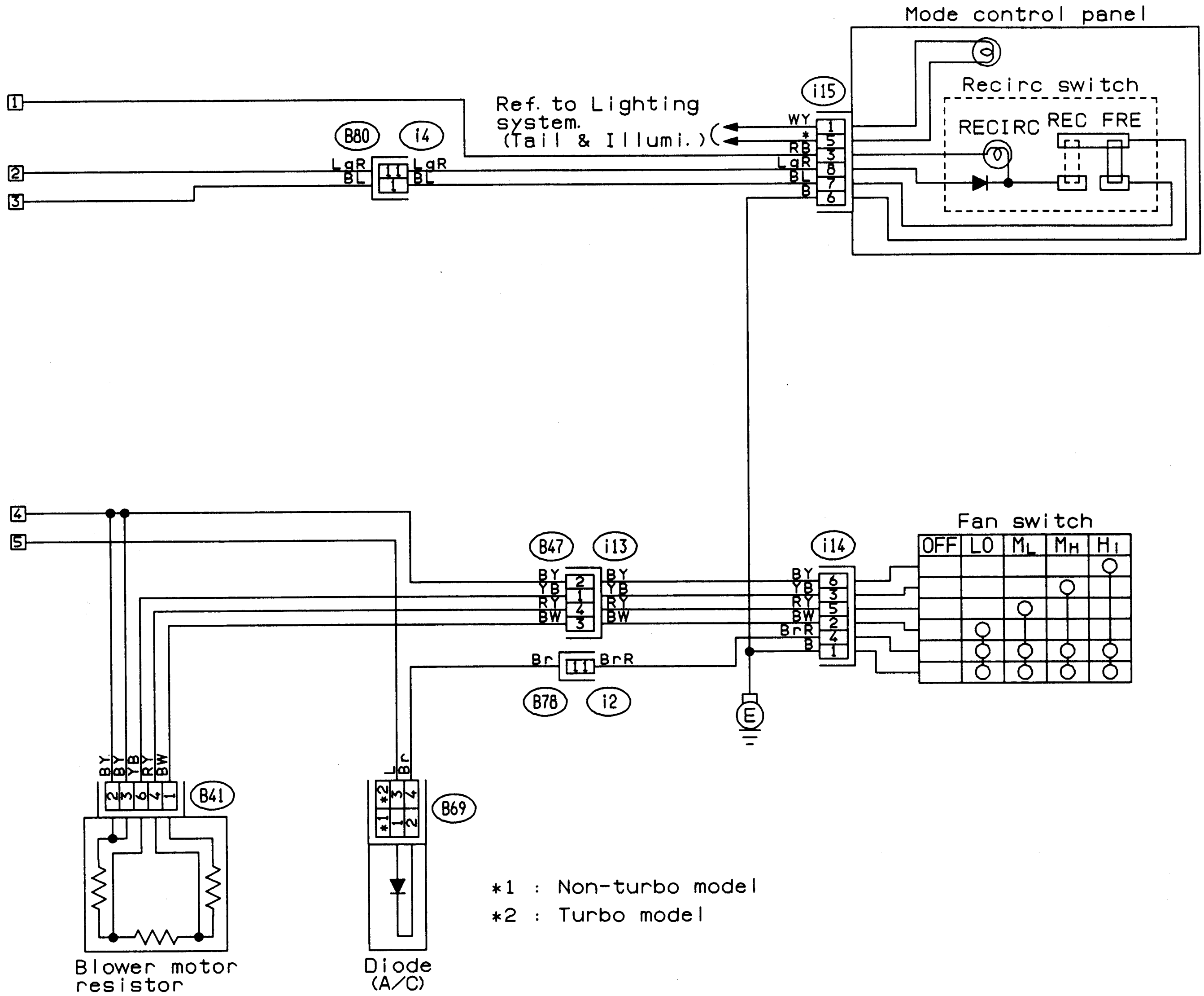
3. AIR CONDITIONING SYSTEM

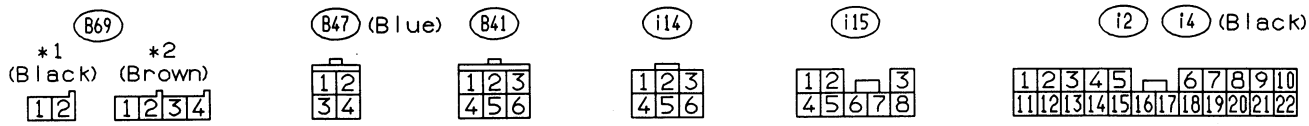
- **Without A/C model**



GR78-02A

* With illumination control : YL
Without illumination control : B

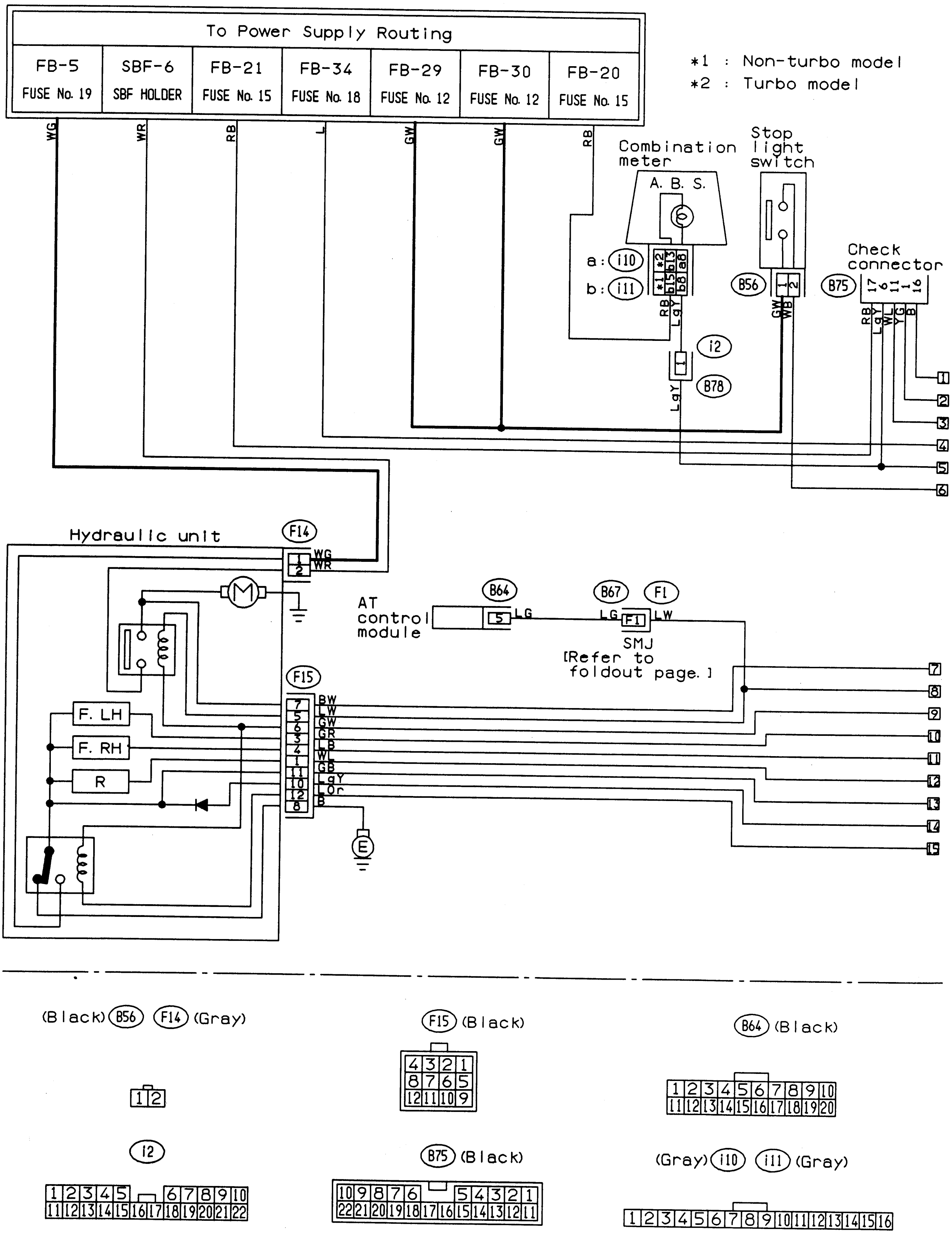




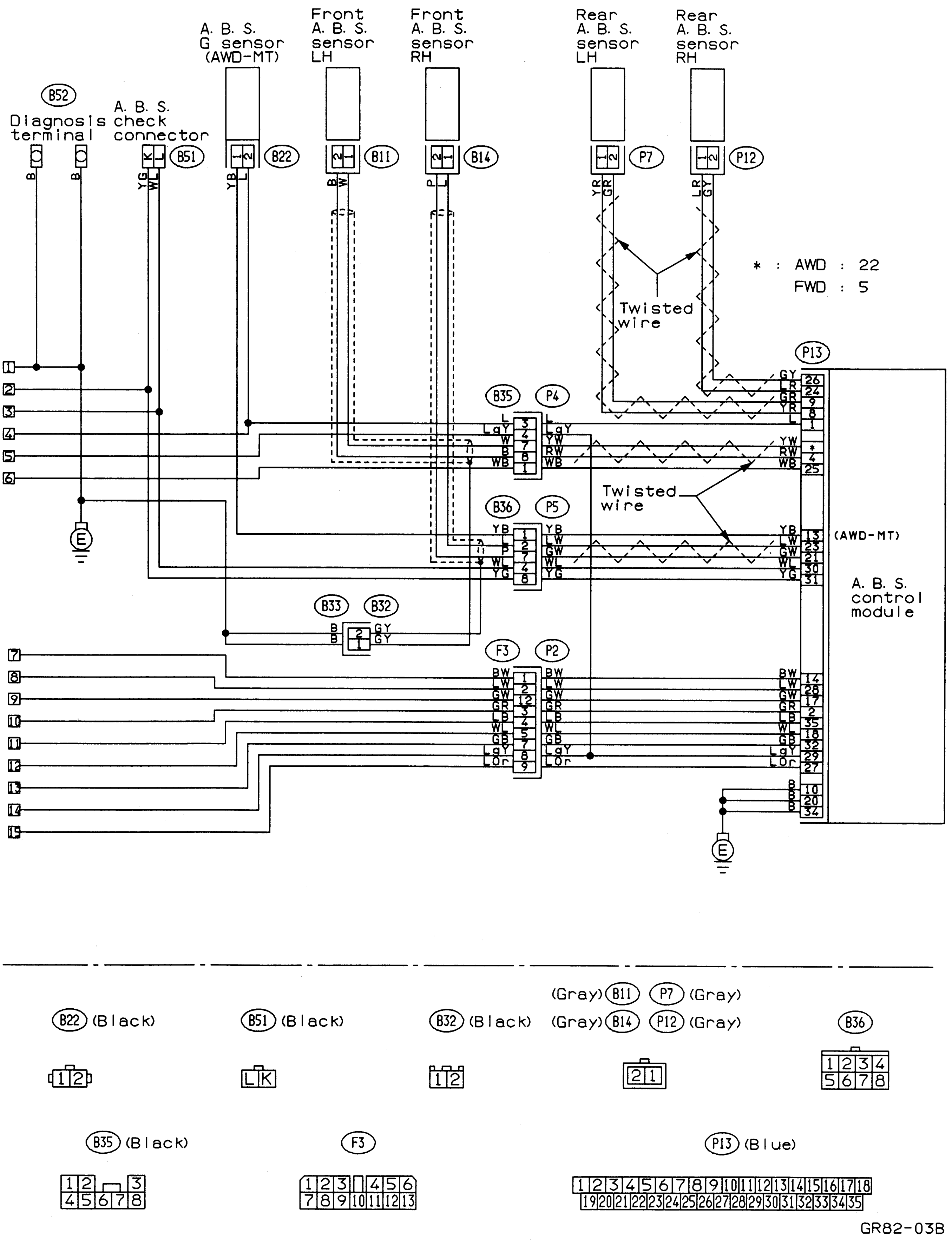
GR78-02B

WIRING DIAGRAM

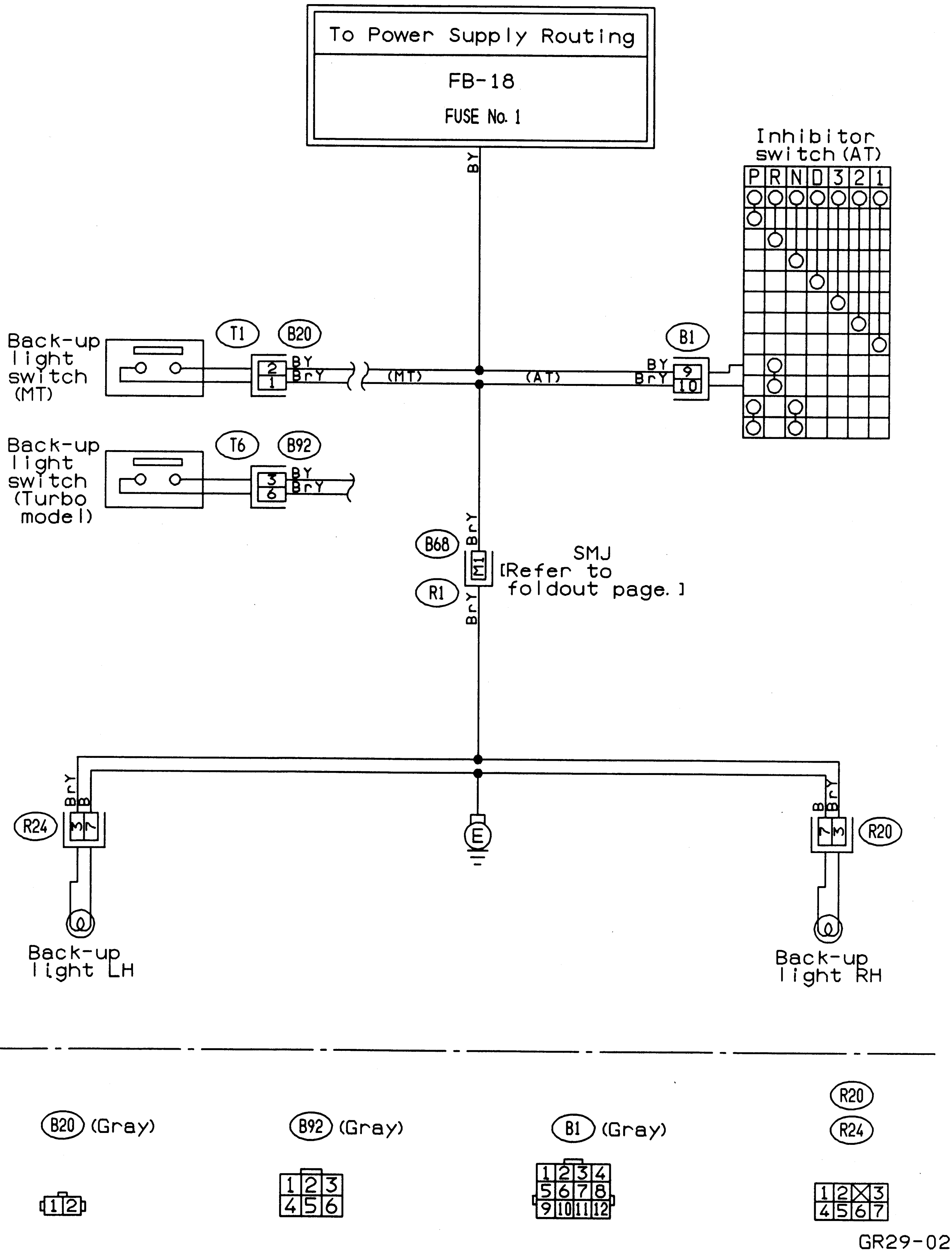
4. ANTI-LOCK BRAKE SYSTEM



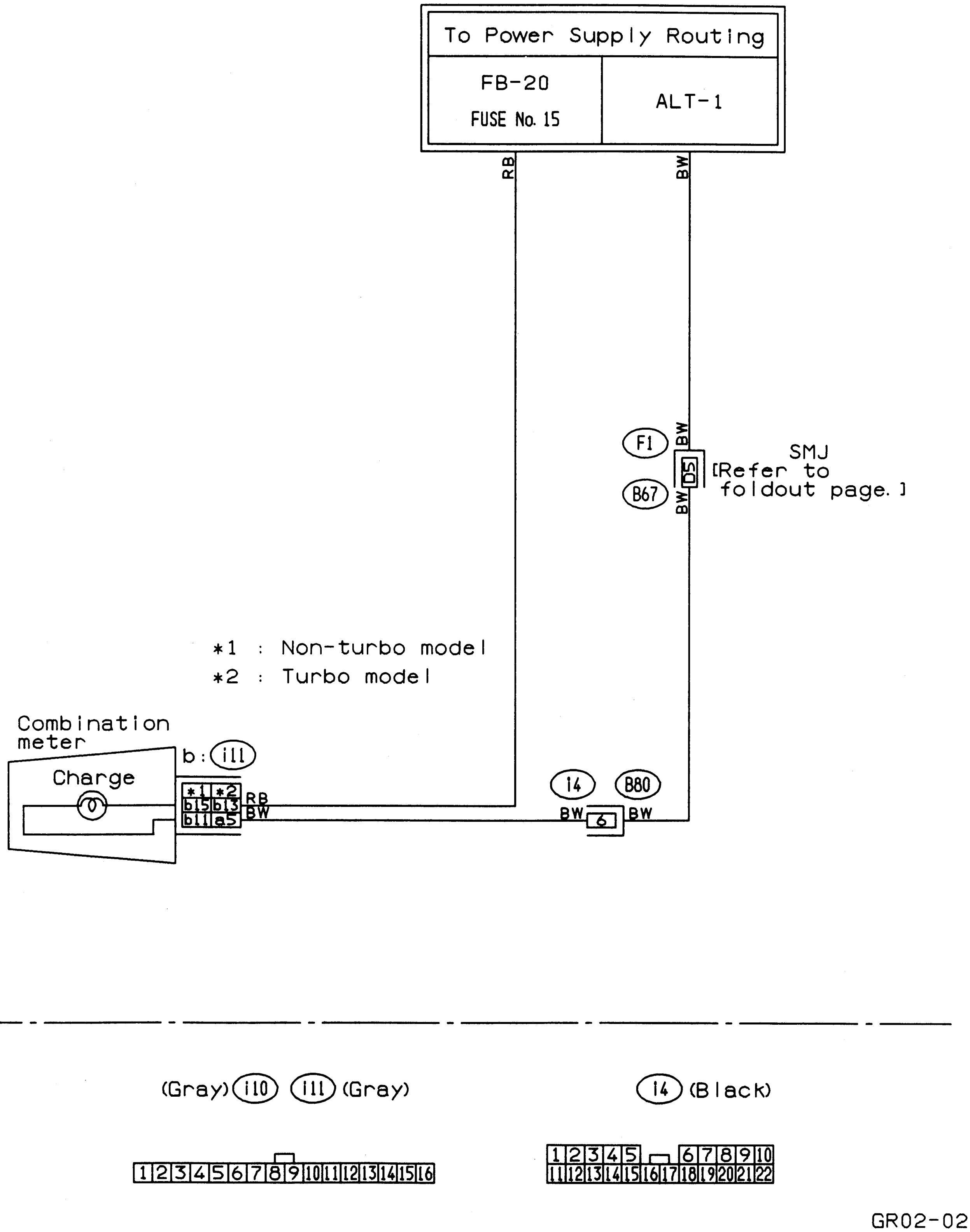
GR82-03A


A. B. S. G sensor (AWD-MT)
Front A. B. S. sensor LH
Front A. B. S. sensor RH
Rear A. B. S. sensor LH
Rear A. B. S. sensor RH
B52
Diagnosis terminal
A. B. S. check connector
B51
B22
B11
B14
P7
P12
* : AWD : 22
FWD : 5
Twisted wire
P13
B35
P4
B36
P5
(AWD-MT)
A. B. S. control module
B33
B32
F3
P2
B22 (Black)
B51 (Black)
B32 (Black)
(Gray) B11
P7 (Gray)
(Gray) B14
P12 (Gray)
B36
B35 (Black)
F3
P13 (Blue)
GR82-03B

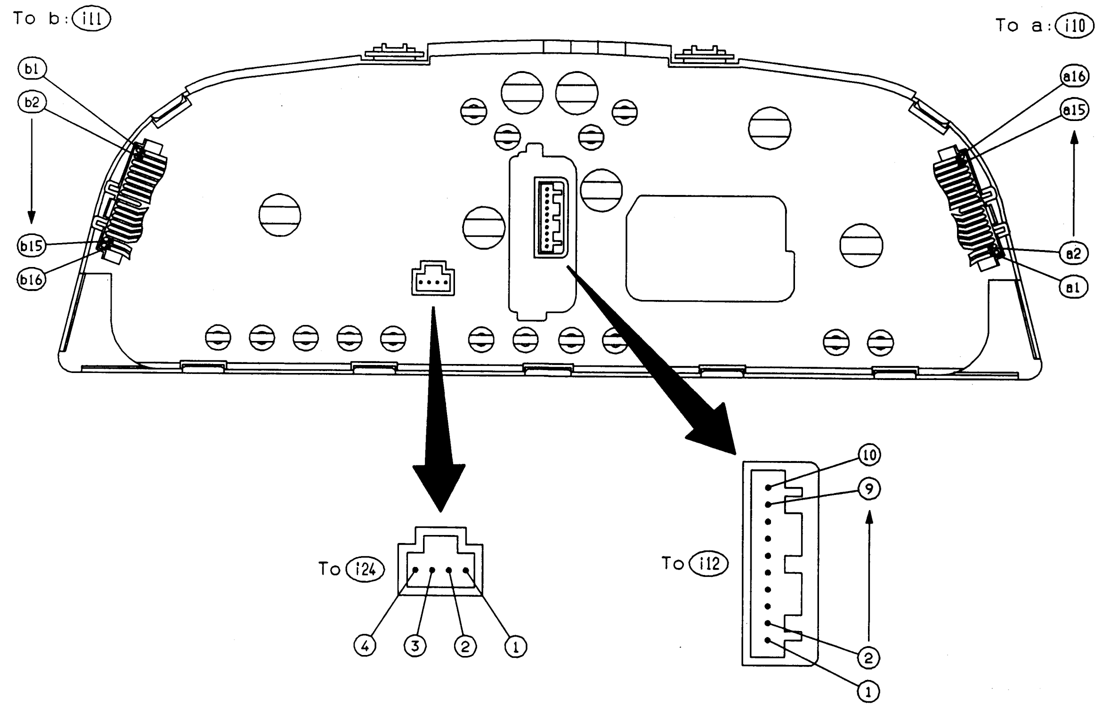
7. BACK-UP LIGHT SYSTEM

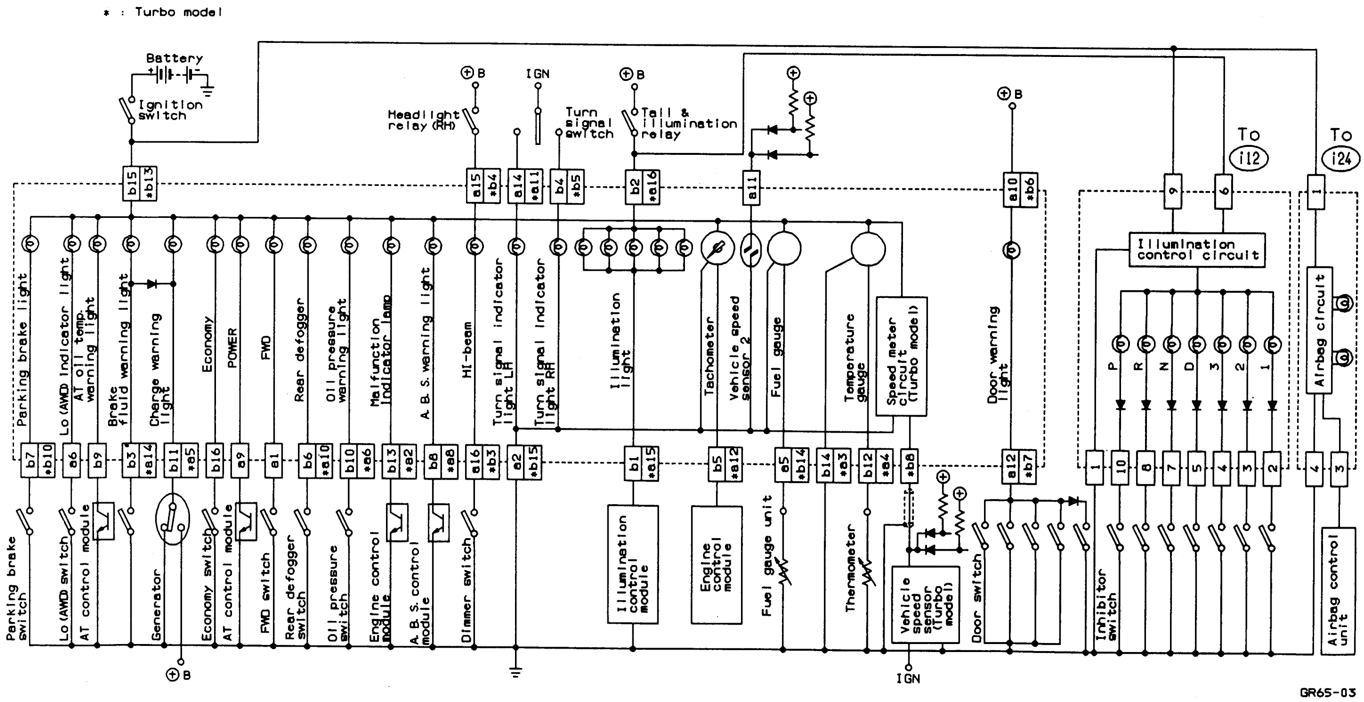


8. CHARGING SYSTEM



9. COMBINATION METER

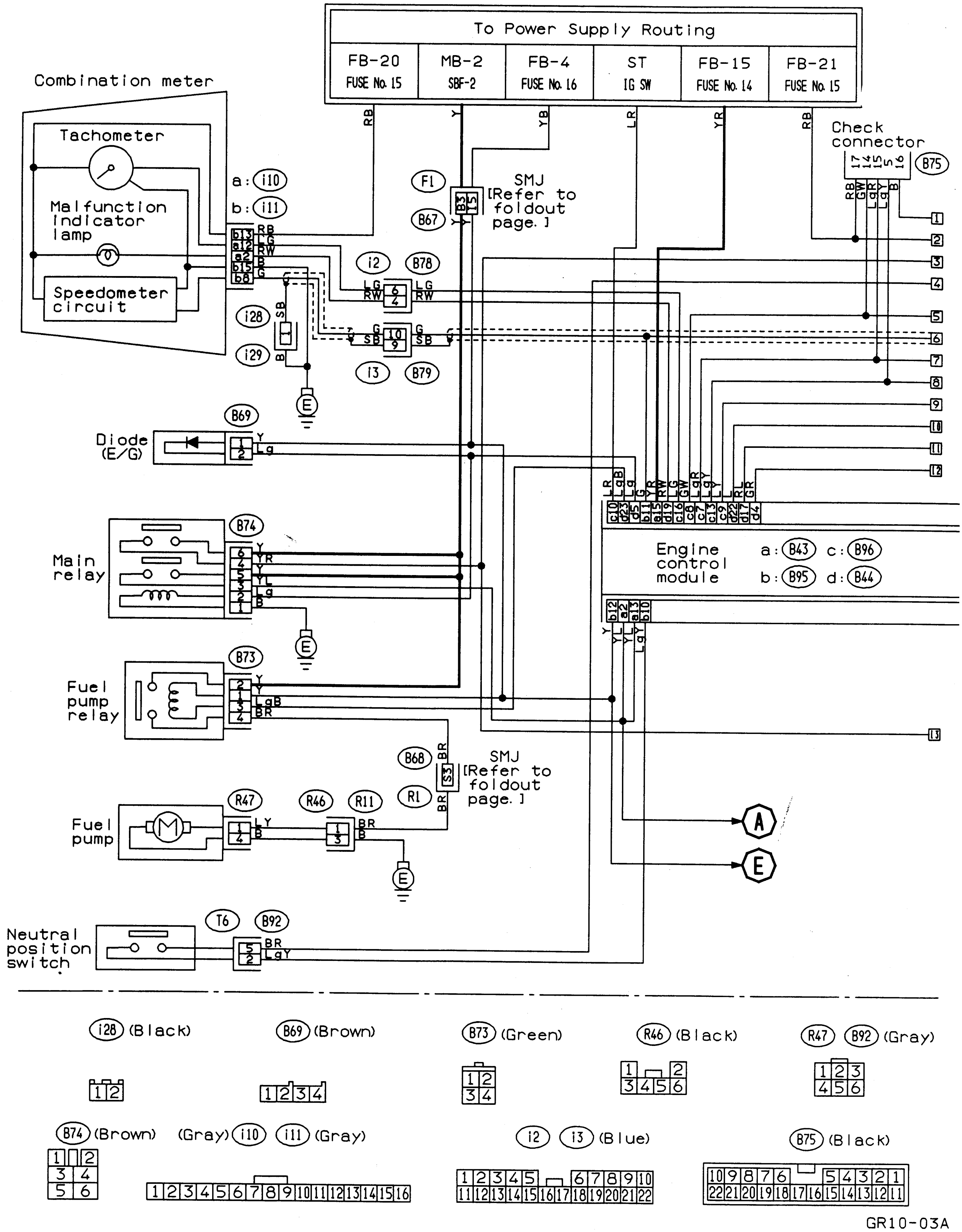




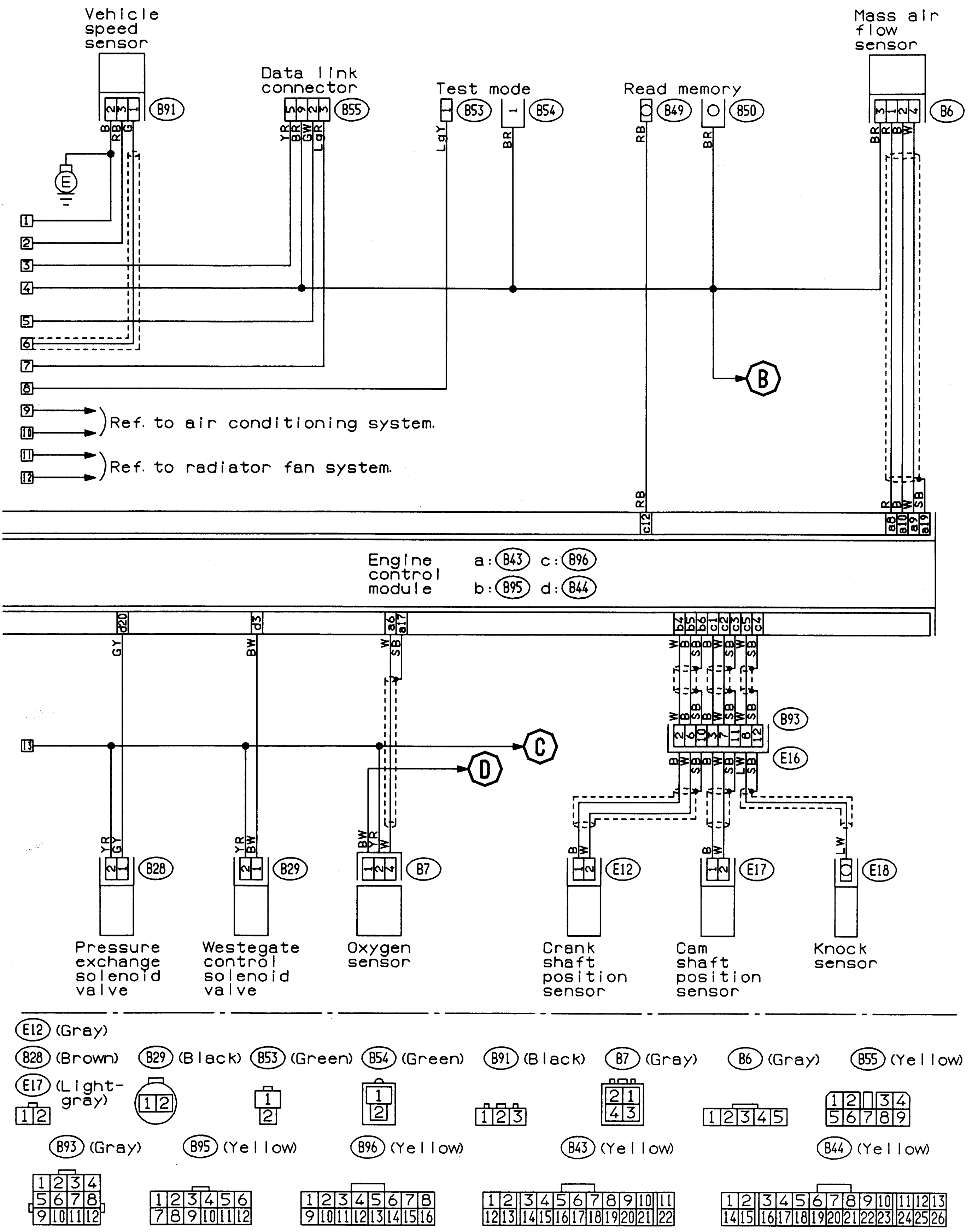
GR65-03

11. ENGINE ELECTRICAL SYSTEM

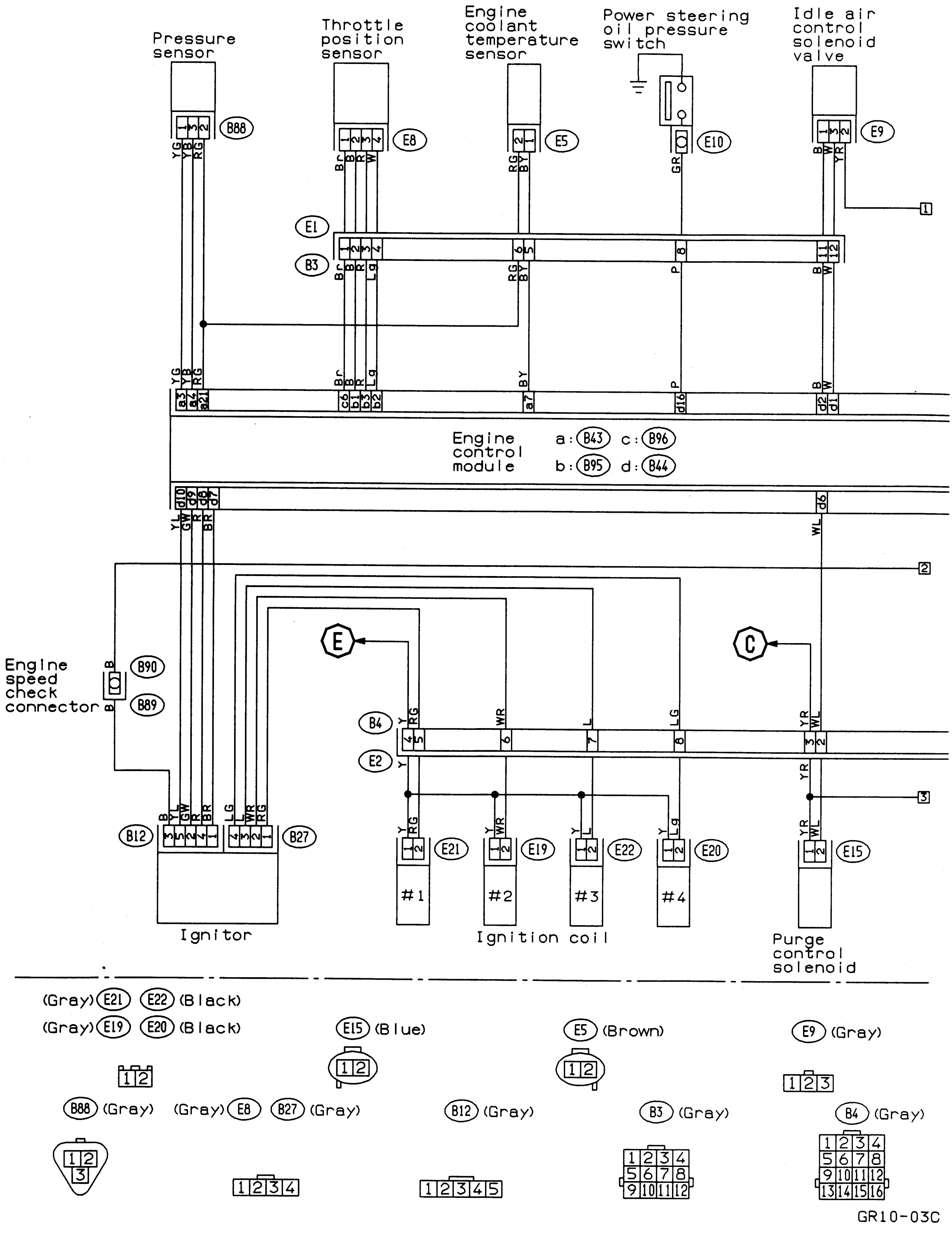
• Turbo model

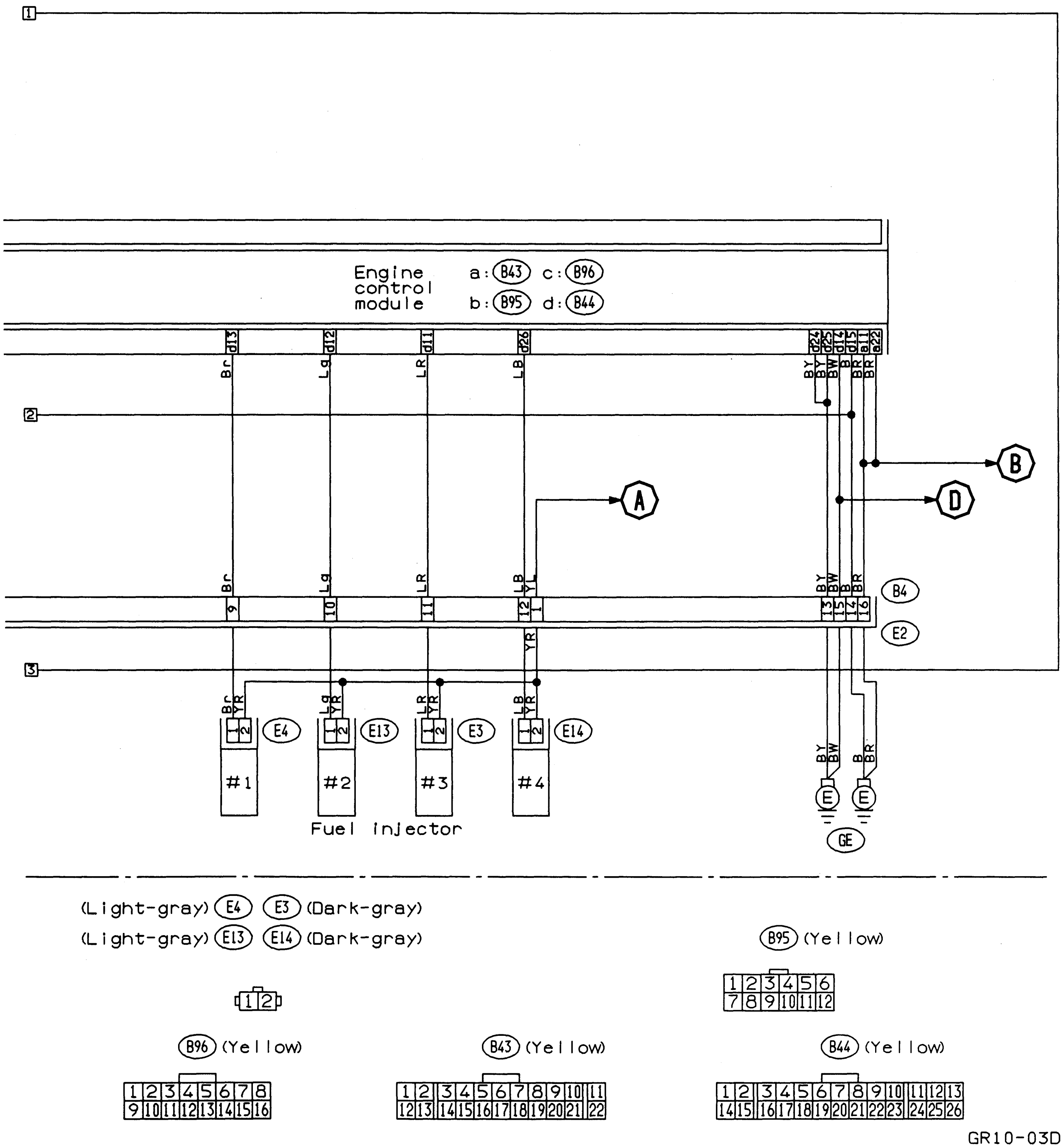


GR10-03A

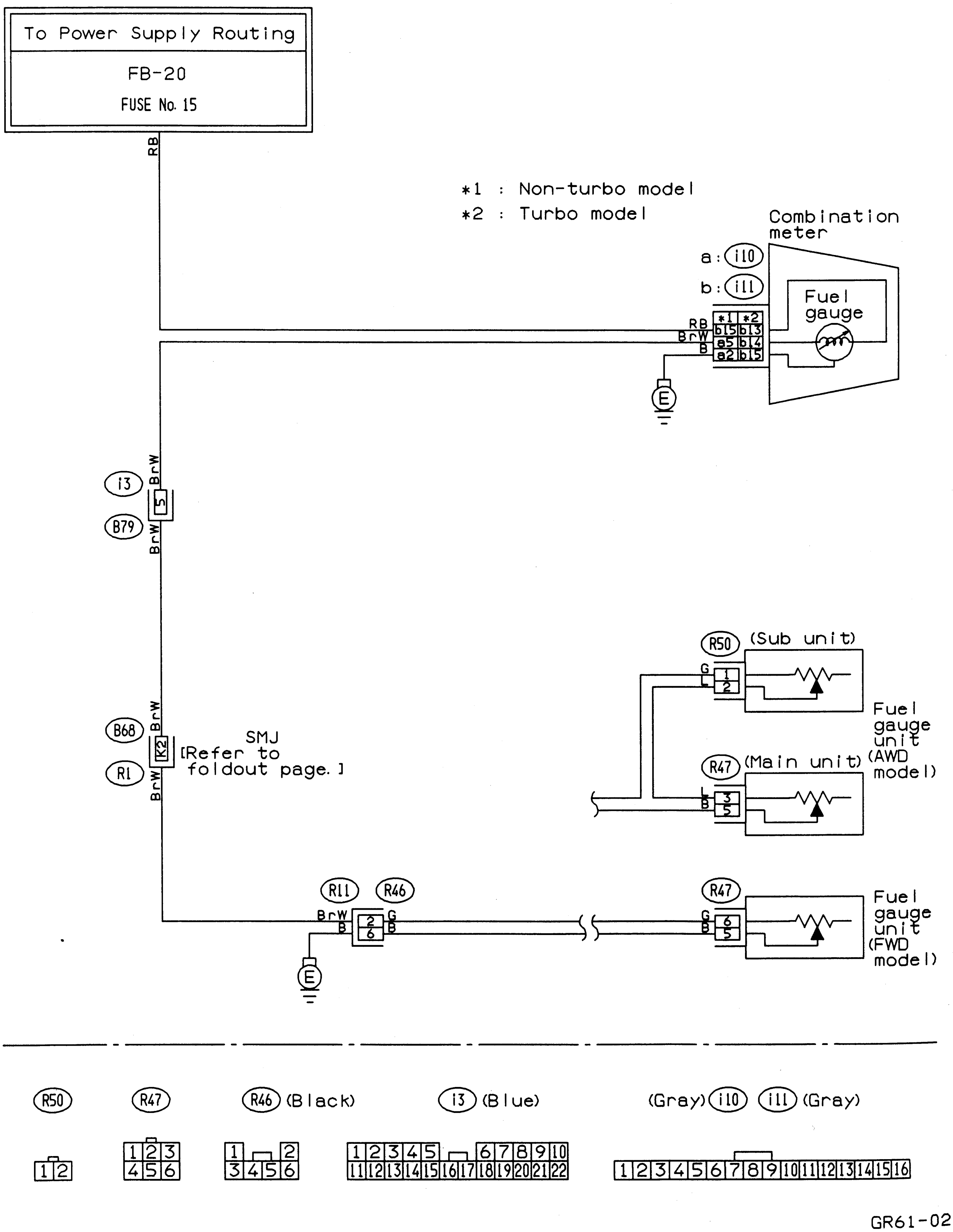

Vehicle speed sensor
B91
Data link connector
B55
Test mode
B53
B54
Read memory
B49
B50
Mass air flow sensor
B6
Ref. to air conditioning system.
Ref. to radiator fan system.
Engine control module
a: B43 c: B96
b: B95 d: B44
B93
E16
B
C
D
B28
B29
B7
E12
E17
E18
Pressure exchange solenoid valve
Westegate control solenoid valve
Oxygen sensor
Crank shaft position sensor
Cam shaft position sensor
Knock sensor
E12 (Gray)
B28 (Brown)
B29 (Black)
B53 (Green)
B54 (Green)
B91 (Black)
B7 (Gray)
B6 (Gray)
B55 (Yellow)
E17 (Light-gray)
B93 (Gray)
B95 (Yellow)
B96 (Yellow)
B43 (Yellow)
B44 (Yellow)

GR10-03B

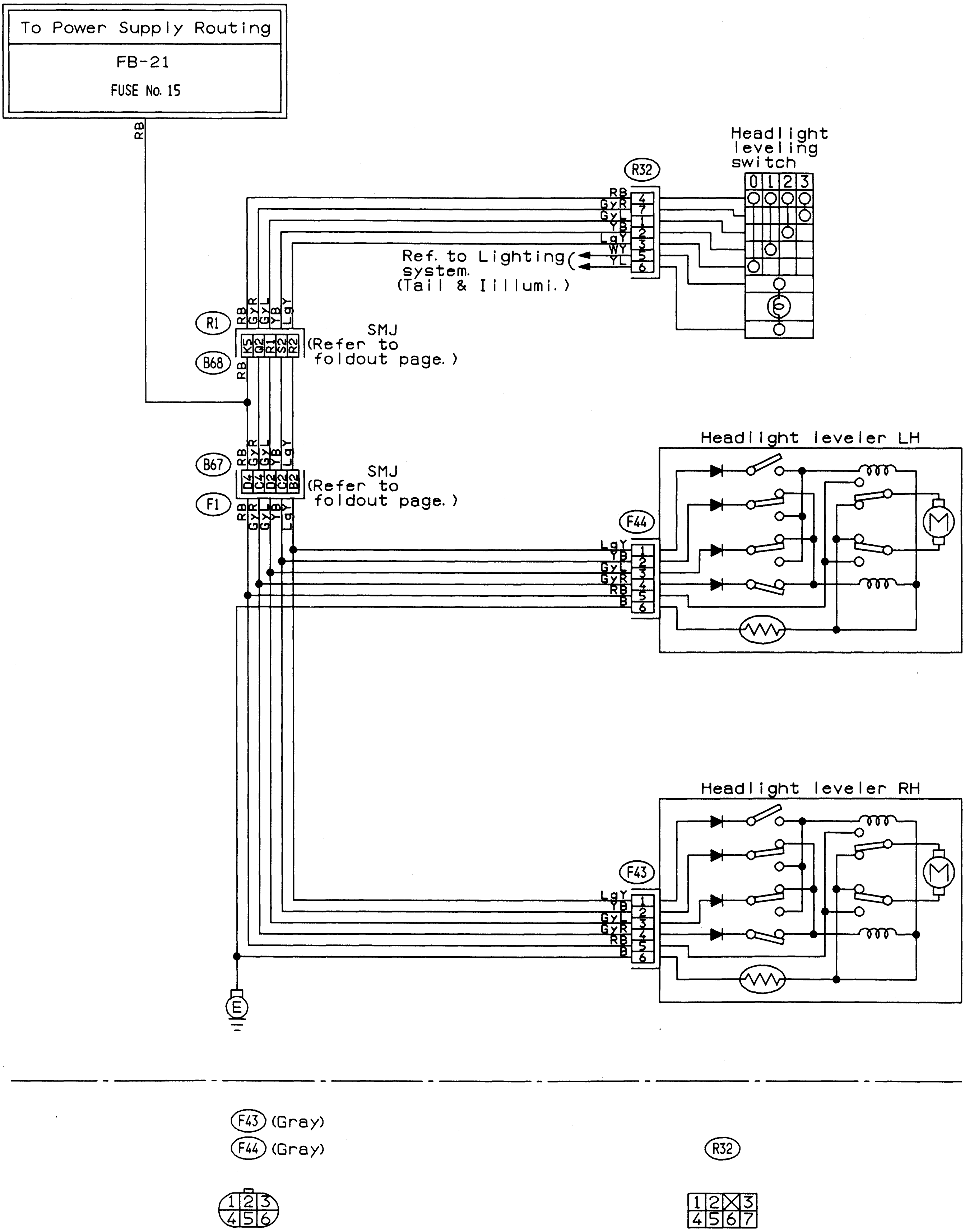

Pressure sensor
Throttle position sensor
Engine coolant temperature sensor
Power steering oil pressure switch
Idle air control solenoid valve
B88
E8
E5
E10
E9
E1
B3
Engine control module
a: B43 c: B96
b: B95 d: B44
Engine speed check connector
B90
B89
B4
E2
B12
B27
E21
E19
E22
E20
E15
#1
#2
#3
#4
Ignitor
Ignition coil
Purge control solenoid
(Gray) E21 E22 (Black)
(Gray) E19 E20 (Black)
E15 (Blue)
E5 (Brown)
E9 (Gray)
B88 (Gray)
(Gray) E8
B27 (Gray)
B12 (Gray)
B3 (Gray)
B4 (Gray)
GR10-03C


Engine control module
a: B43 c: B96
b: B95 d: B44
Fuel injector
#1
#2
#3
#4
E4
E13
E3
E14
B4
E2
GE
A
B
D
(Light-gray) E4 E3 (Dark-gray)
(Light-gray) E13 E14 (Dark-gray)
B95 (Yellow)
B96 (Yellow)
B43 (Yellow)
B44 (Yellow)
GR10-03D

13. FUEL GAUGE SYSTEM

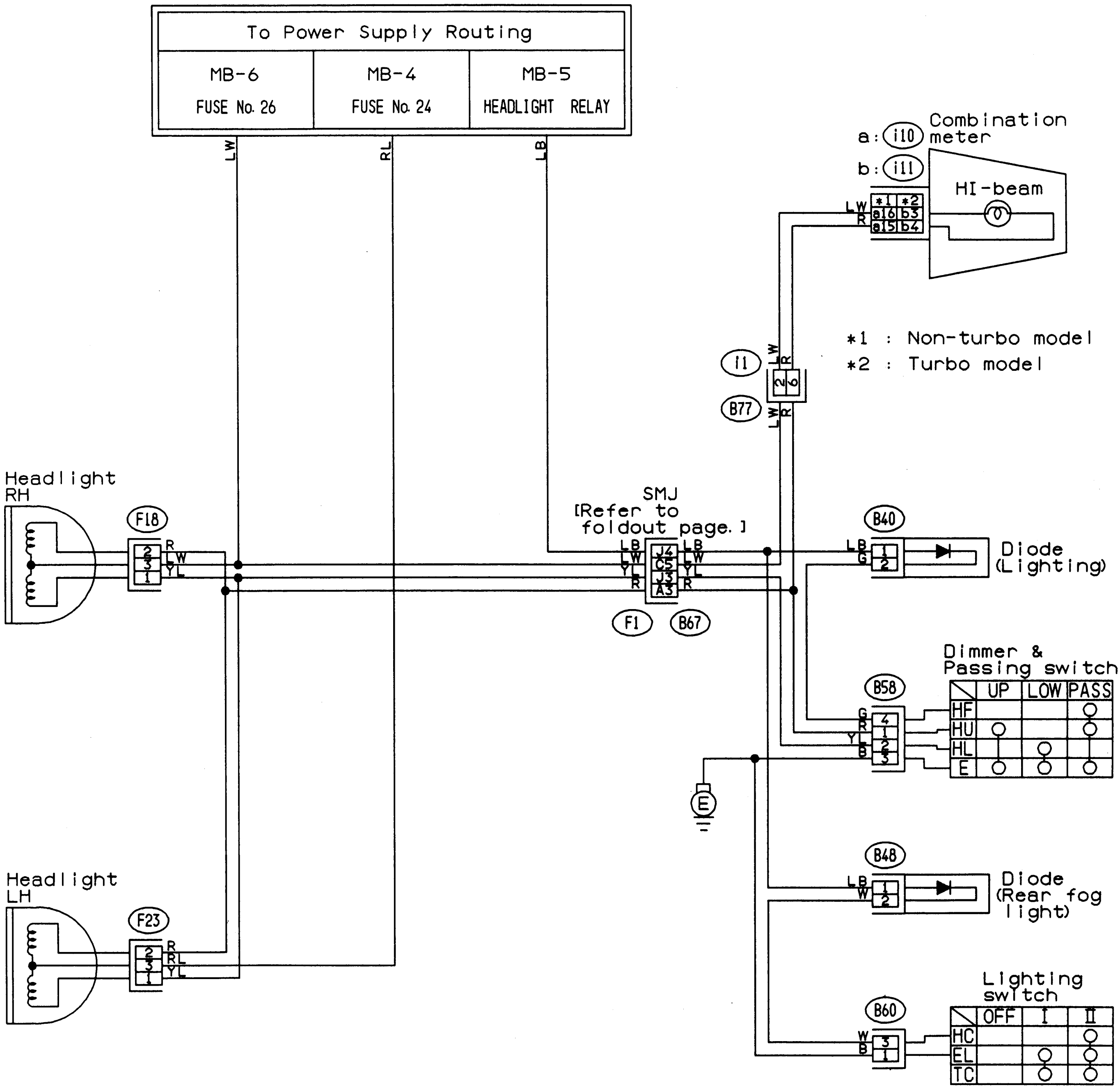


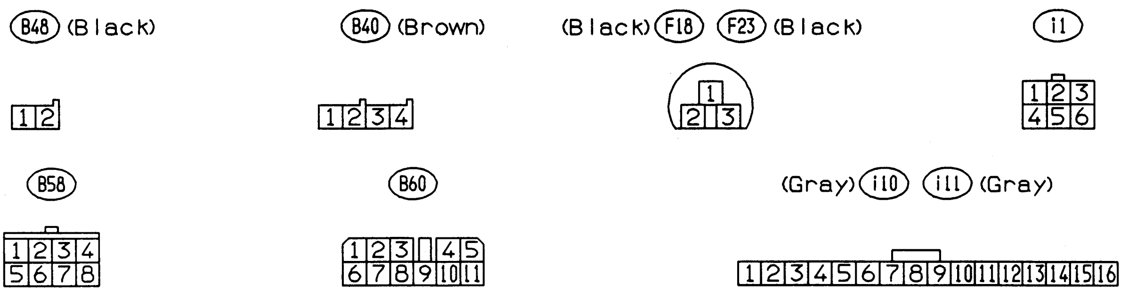
16. HEADLIGHT BEAM LEVELER SYSTEM



GR83-03

18. LIGHTING (HEADLIGHT) SYSTEM

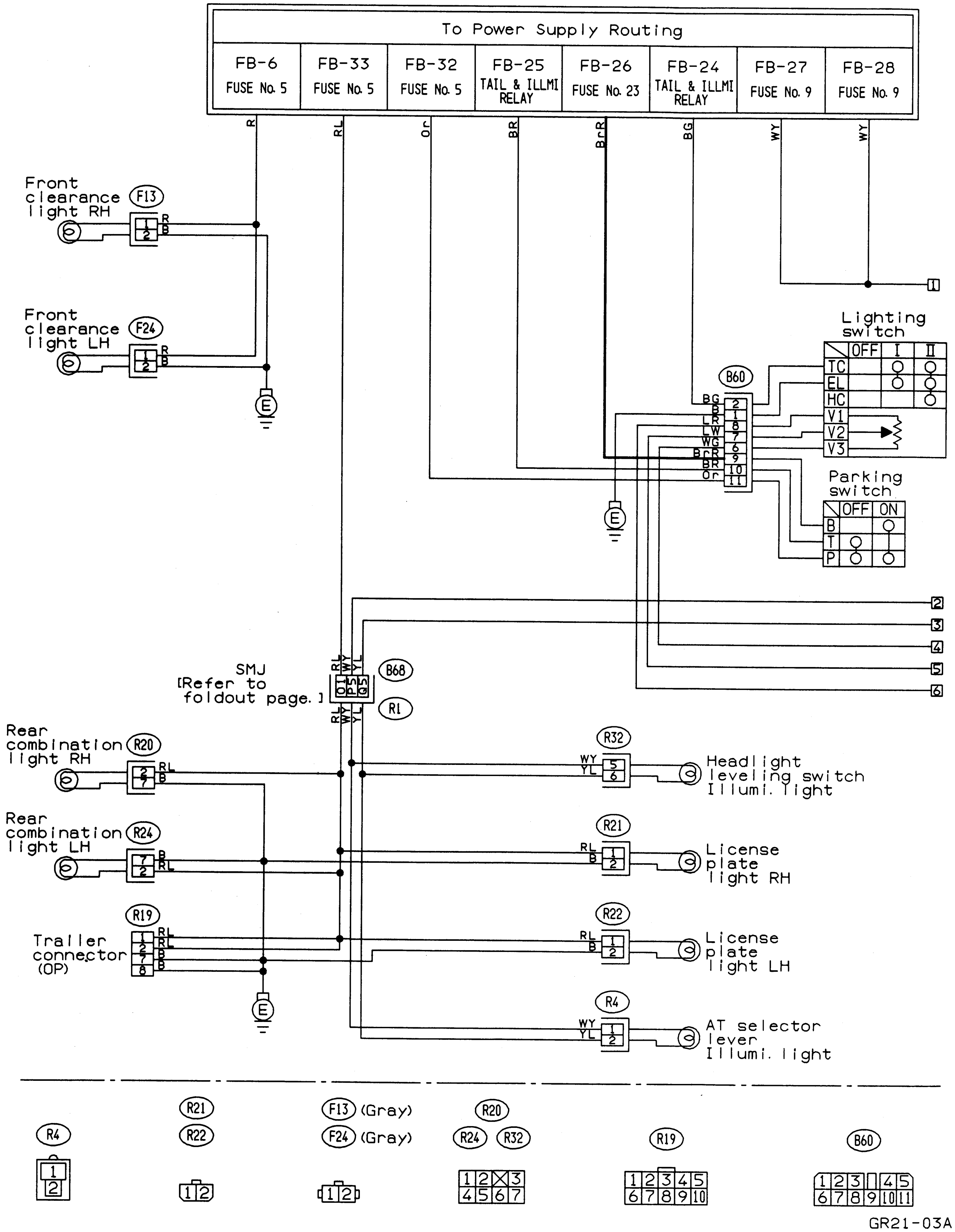


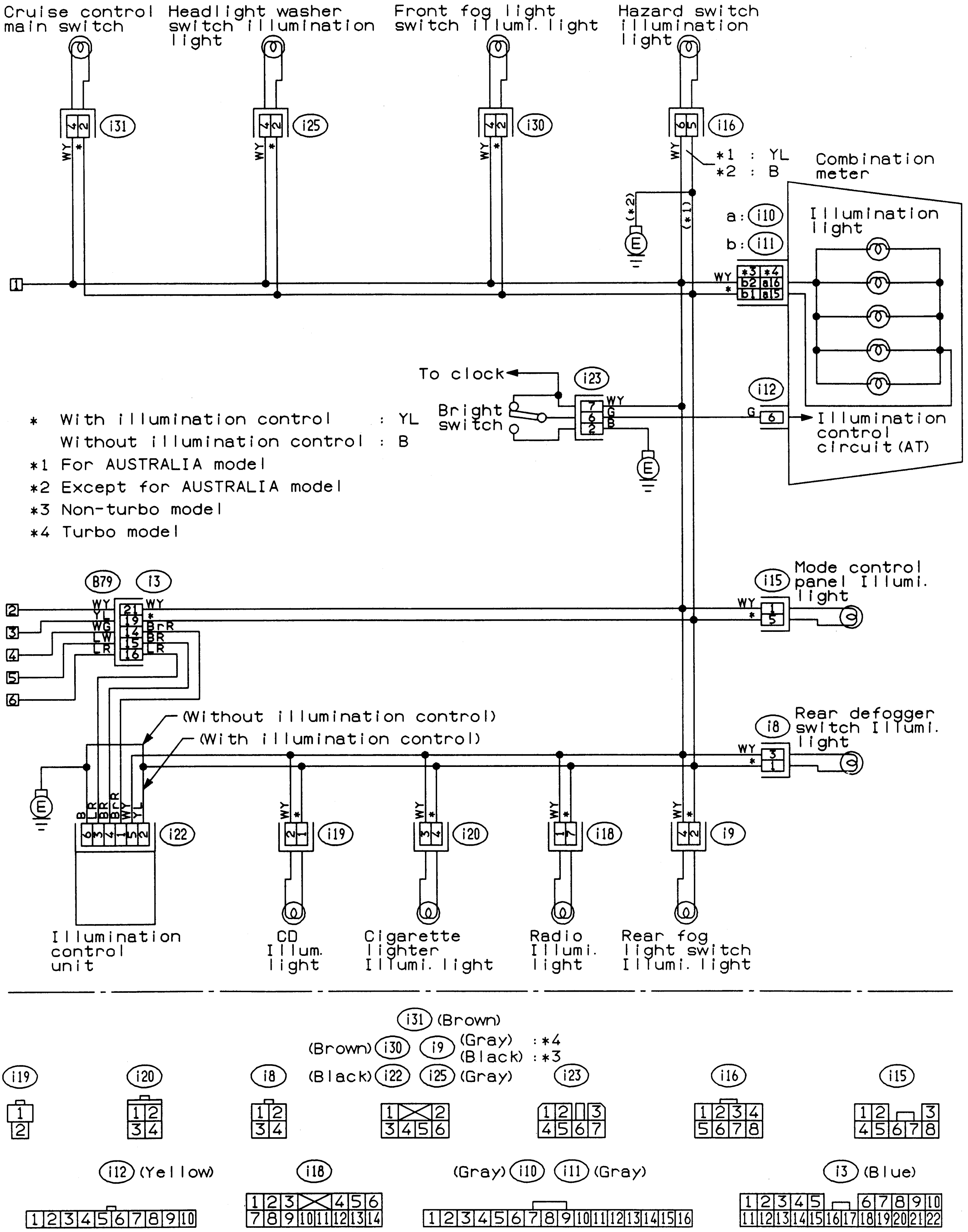


GR20-02

WIRING DIAGRAM

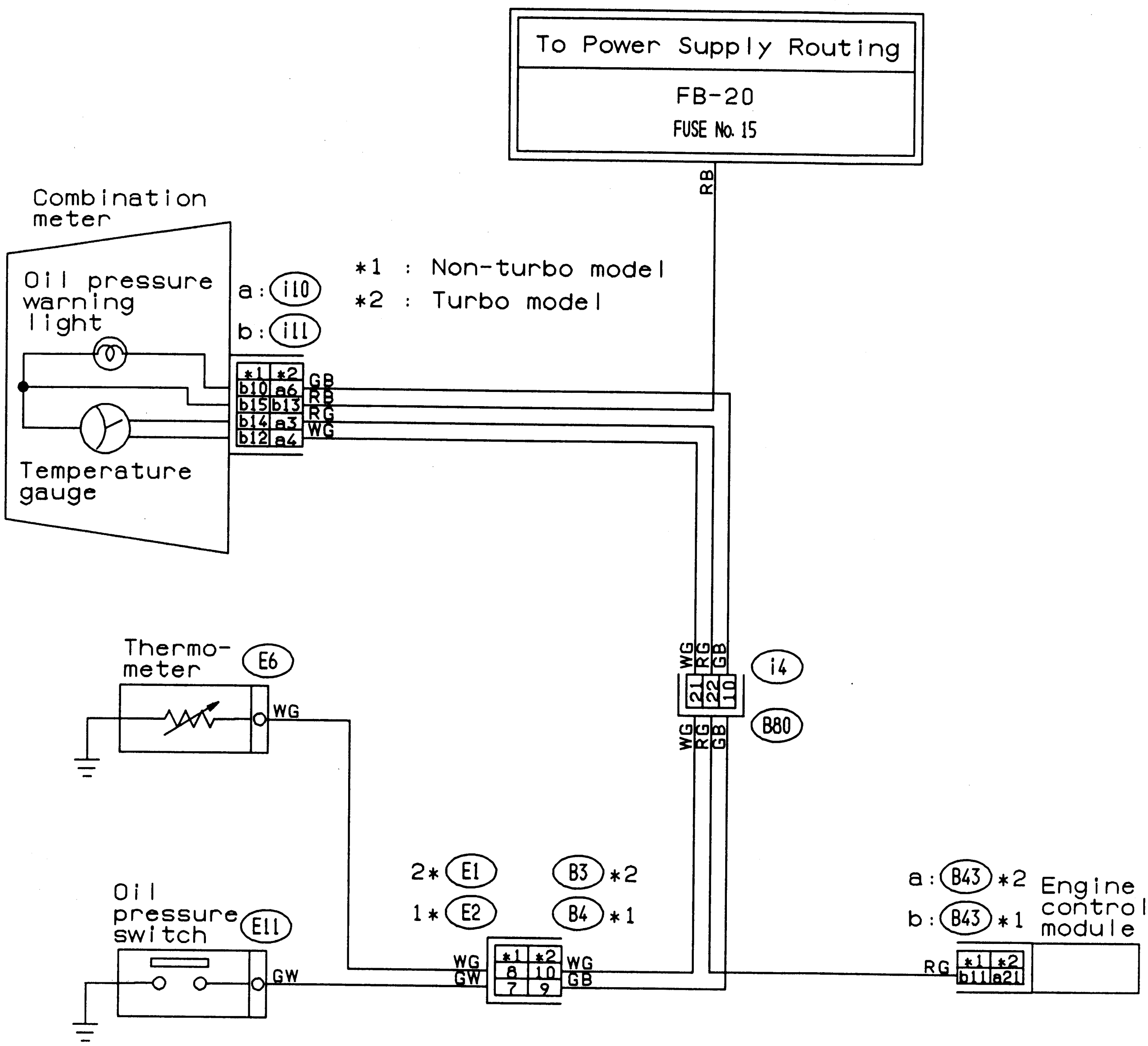
19. LIGHTING (TAIL LIGHT·ILLUMINATION LIGHT·ETC.) SYSTEM

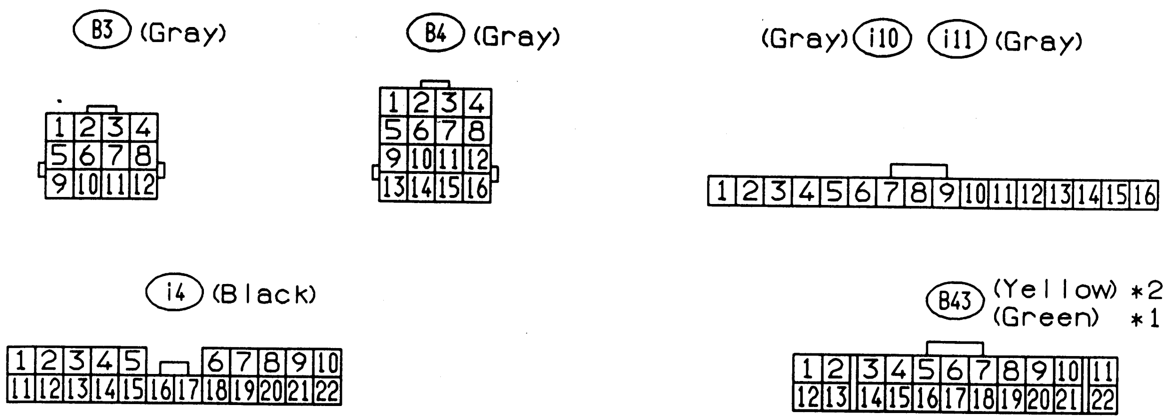



Cruise control main switch
Headlight washer switch illumination light
Front fog light switch illumi. light
Hazard switch illumination light
*1 : YL
*2 : B
Combination meter
Illumination light
a: i10
b: i11
To clock
Bright switch
Illumination control circuit (AT)
* With illumination control : YL
Without illumination control : B
*1 For AUSTRALIA model
*2 Except for AUSTRALIA model
*3 Non-turbo model
*4 Turbo model
Mode control panel Illumi. light
Rear defogger switch Illumi. light
(Without illumination control)
(With illumination control)
Illumination control unit
CD Illum. light
Cigarette lighter Illumi. light
Radio Illumi. light
Rear fog light switch Illumi. light
i31 (Brown)
(Brown) i30
i9 (Gray) : *4
(Black) : *3
(Black) i22
i25 (Gray)
i12 (Yellow)
(Gray) i10
i11 (Gray)
i3 (Blue)

GR21-03B

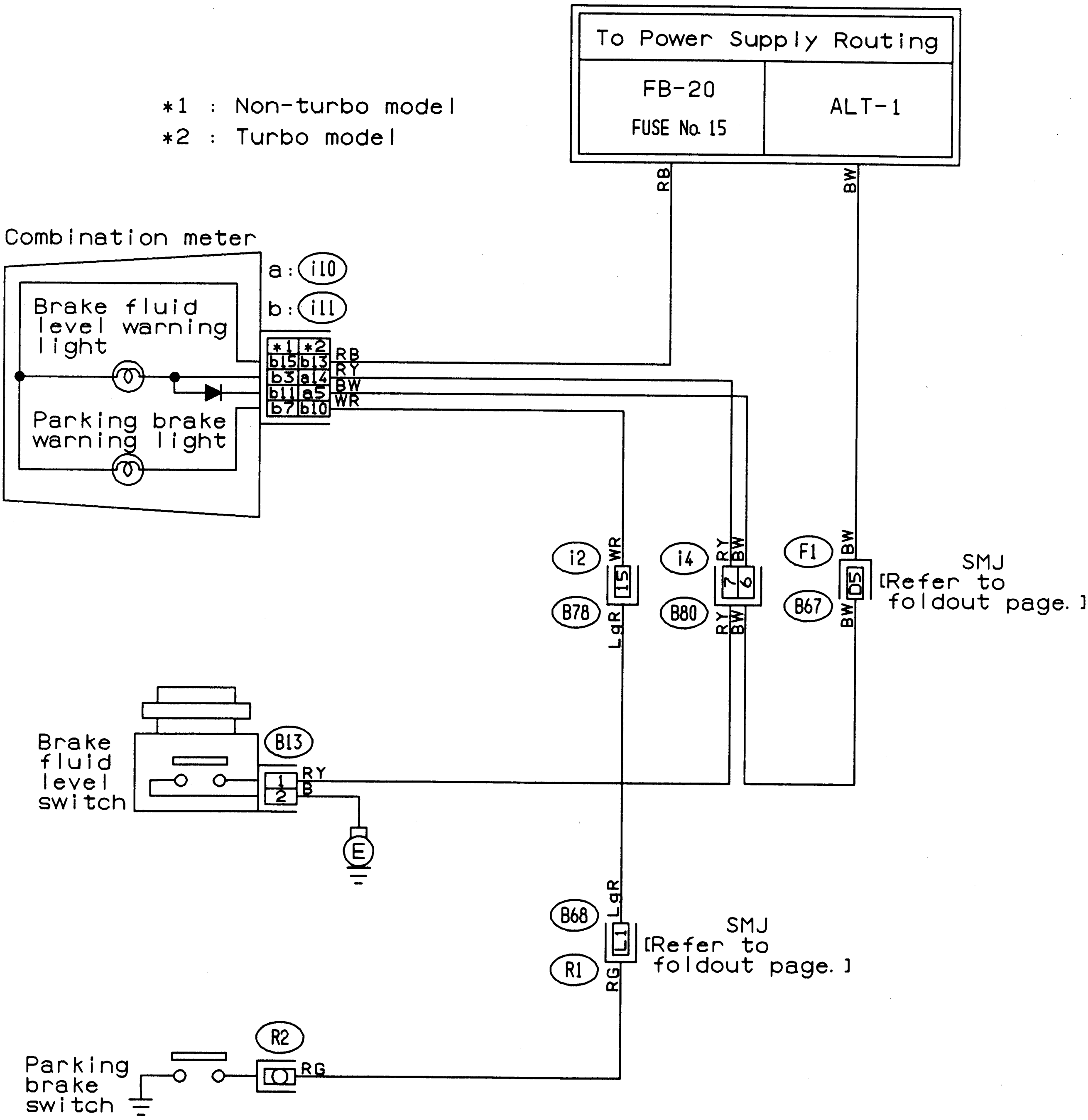
20. OIL PRESSURE AND TEMPERATURE GAUGE SYSTEM

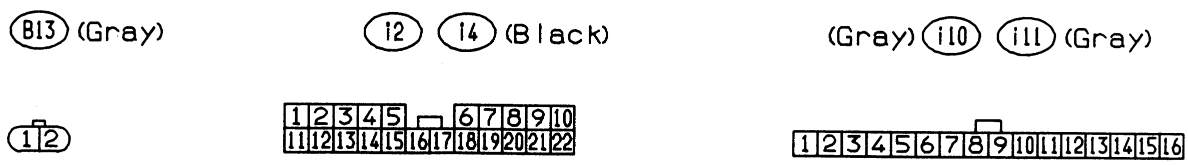




GR66-02

21. PARKING BRAKE AND BRAKE FLUID LEVEL WARNING SYSTEM

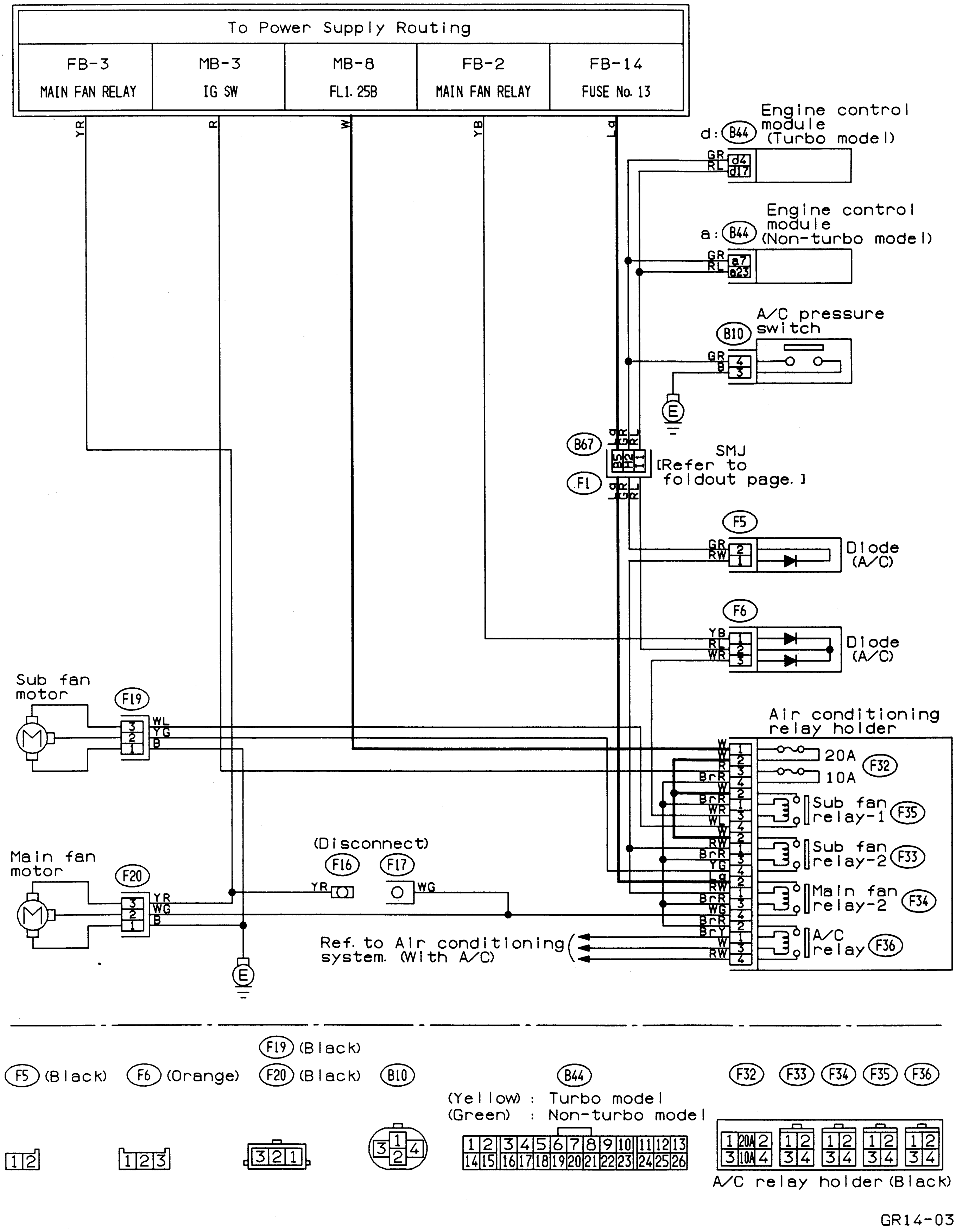




GR60-02

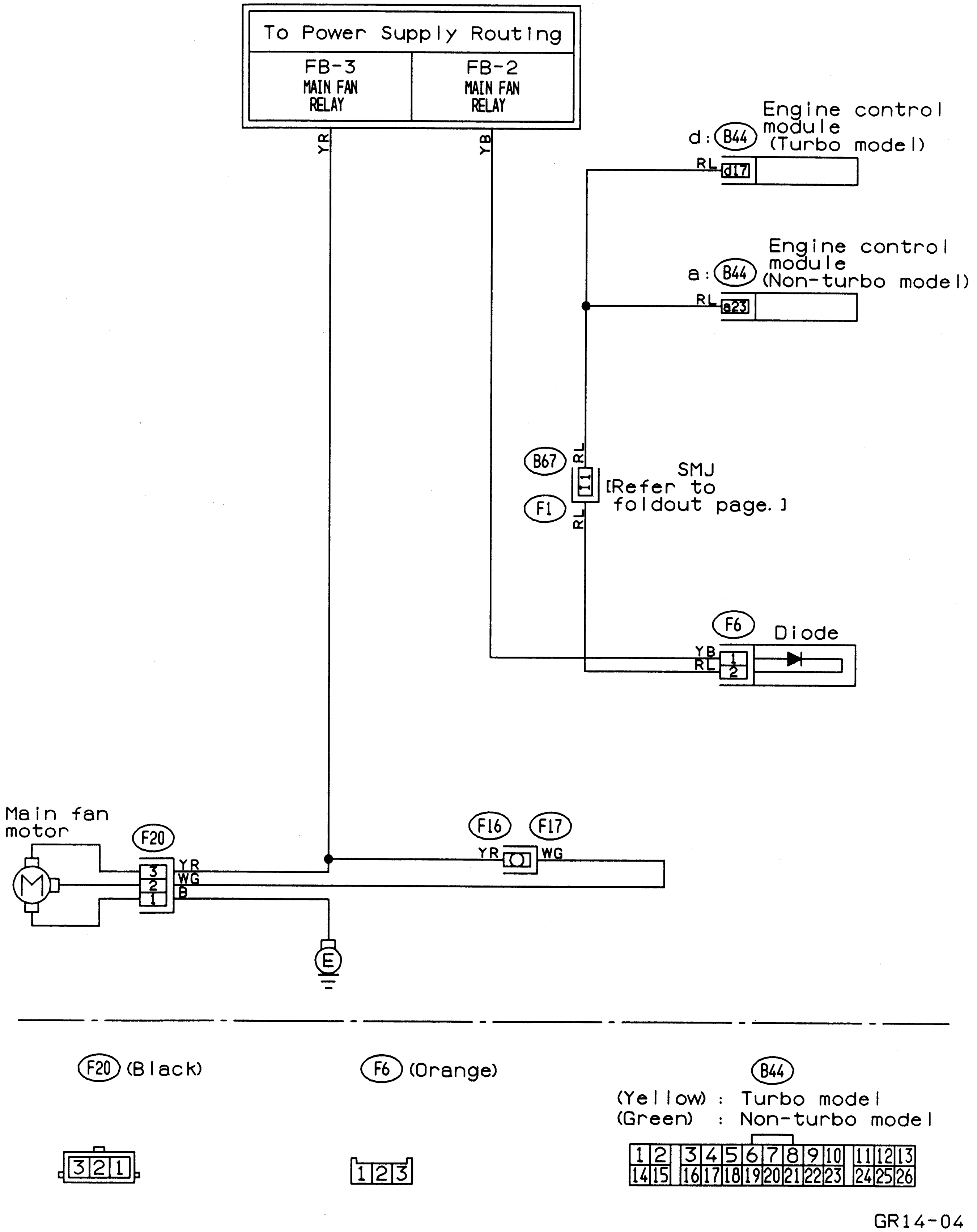
23. RADIATOR FAN SYSTEM

• With A/C model



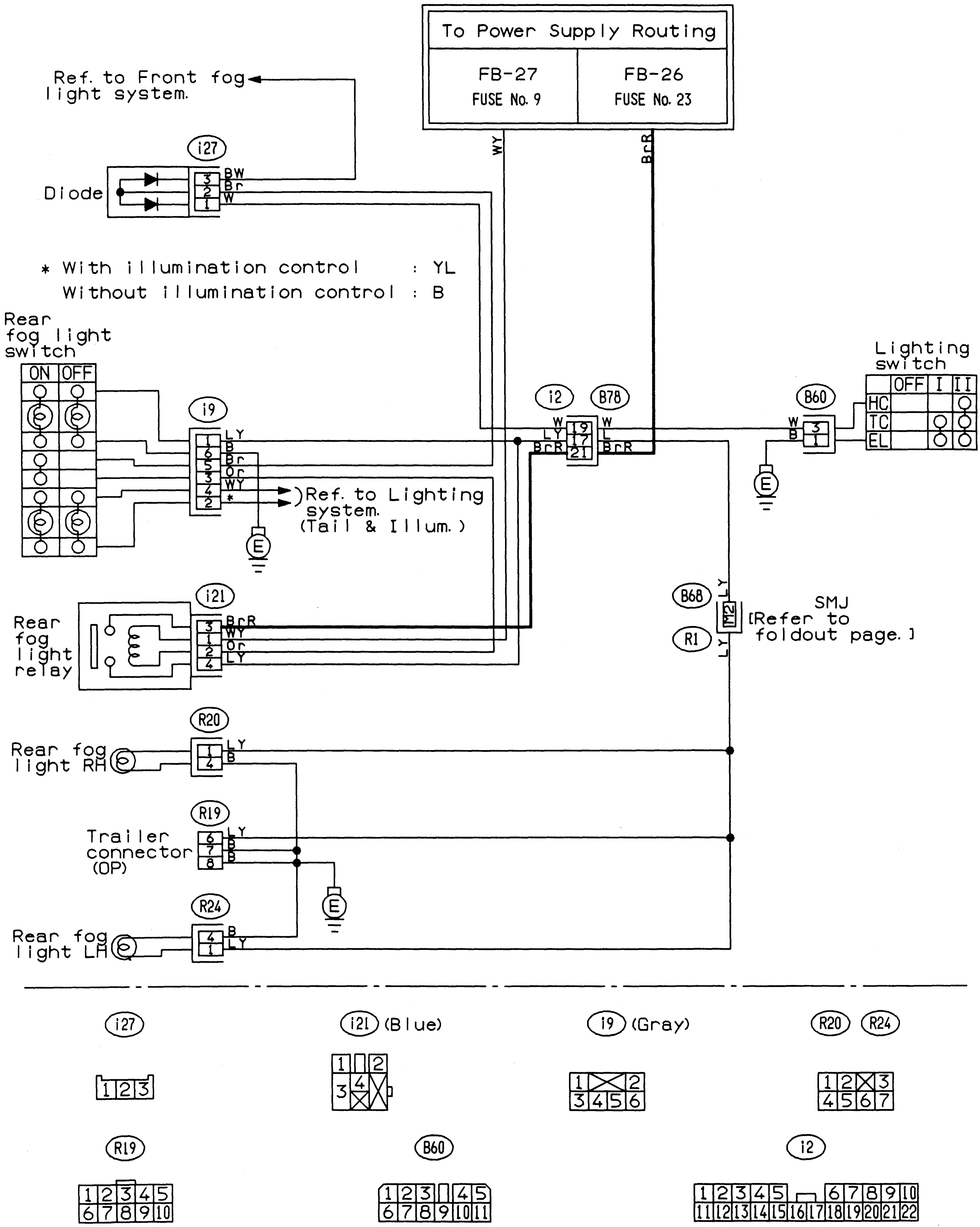
23. RADIATOR FAN SYSTEM

- **Without A/C model**



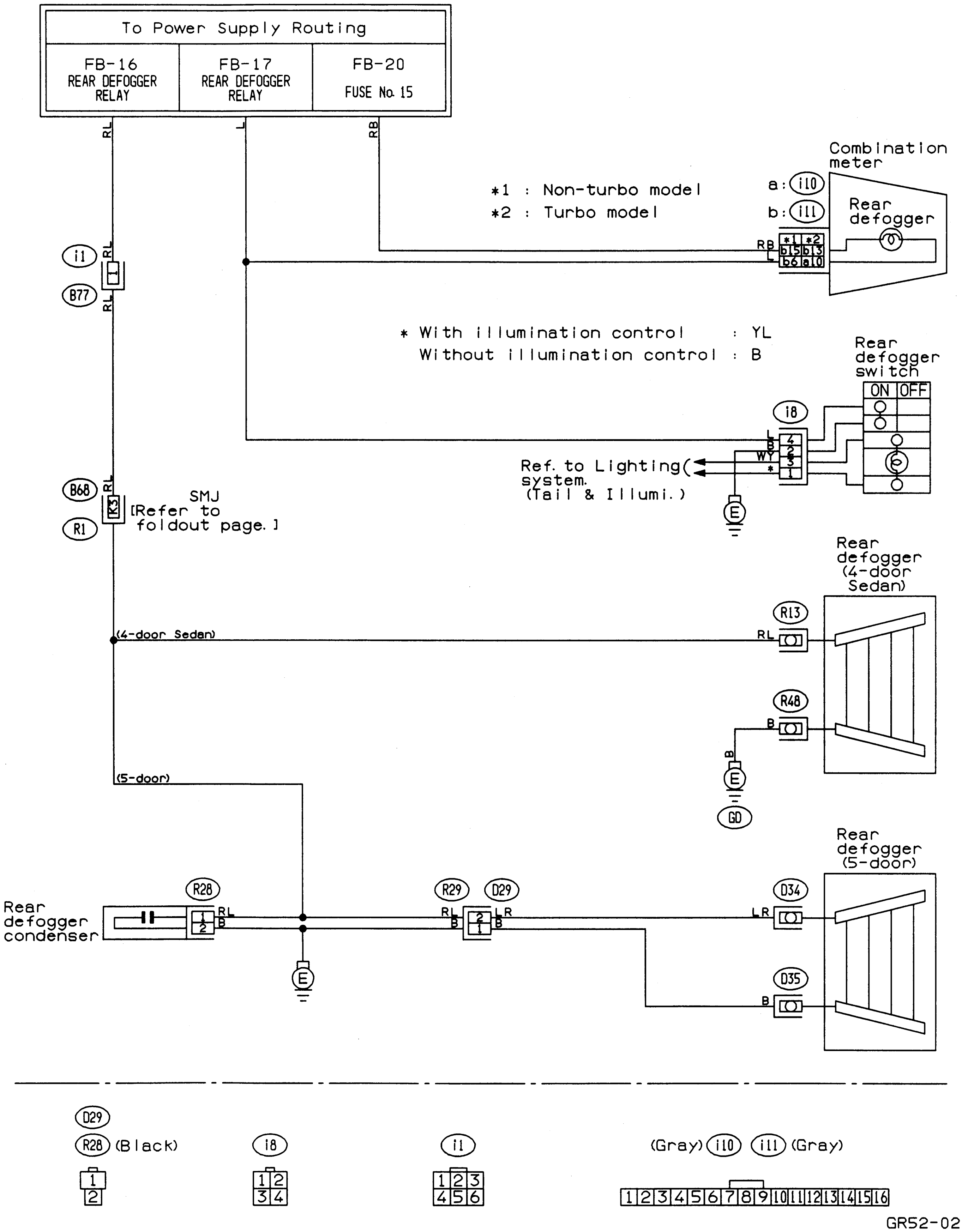
24. REAR FOG LIGHT SYSTEM

- **With front fog light model**

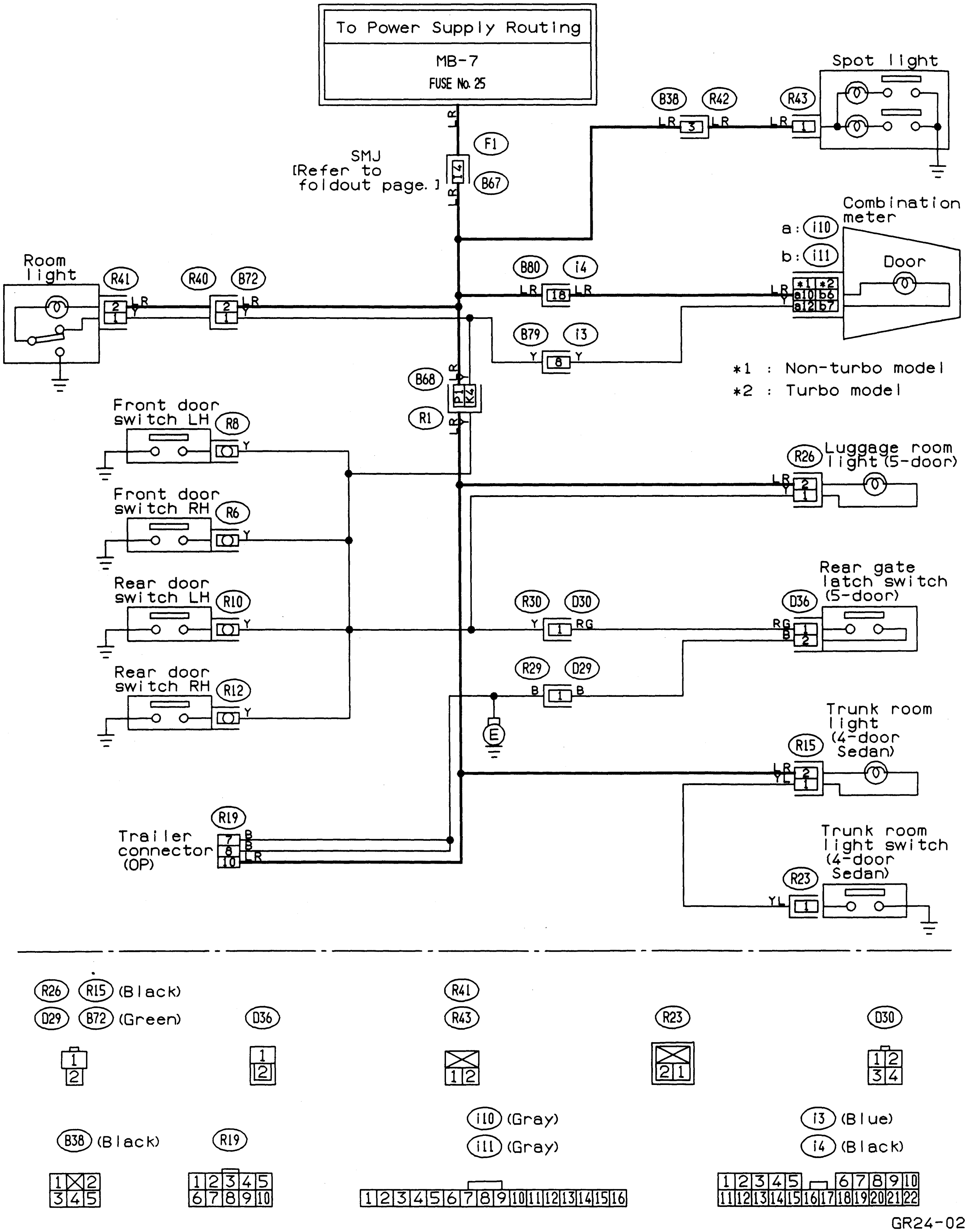


GR30-02

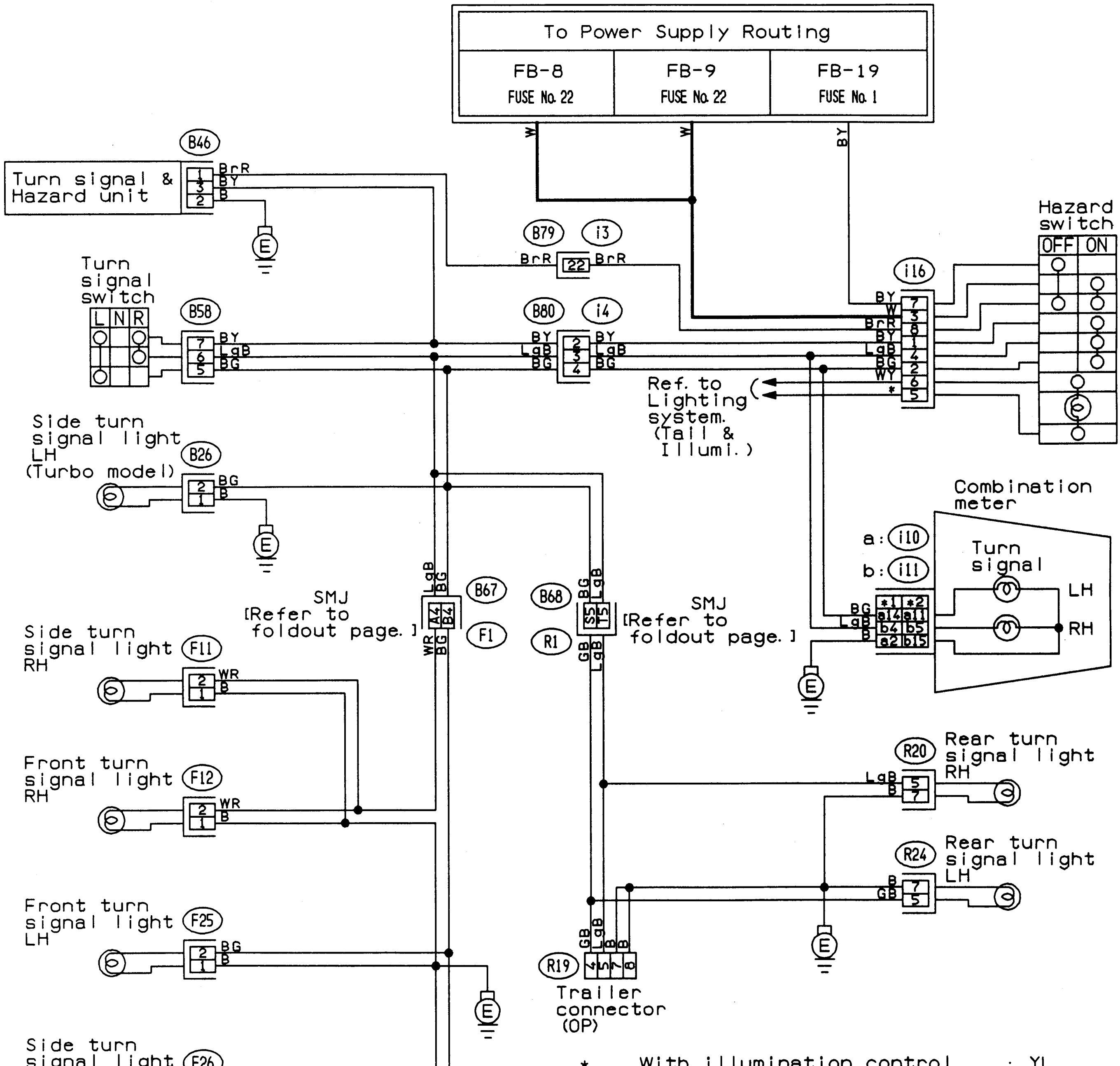
25. REAR WINDOW DEFOGGER SYSTEM



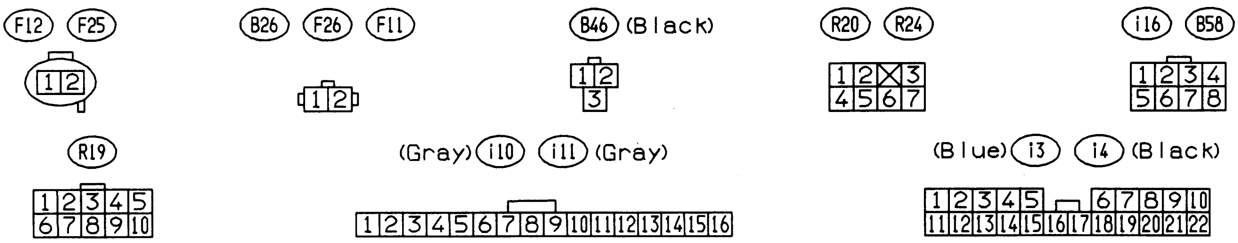
28. SPOT LIGHT, ROOM LIGHT, LUGGAGE AND TRUNK ROOM LIGHT SYSTEM



32. TURN SIGNAL AND HAZARD SYSTEM

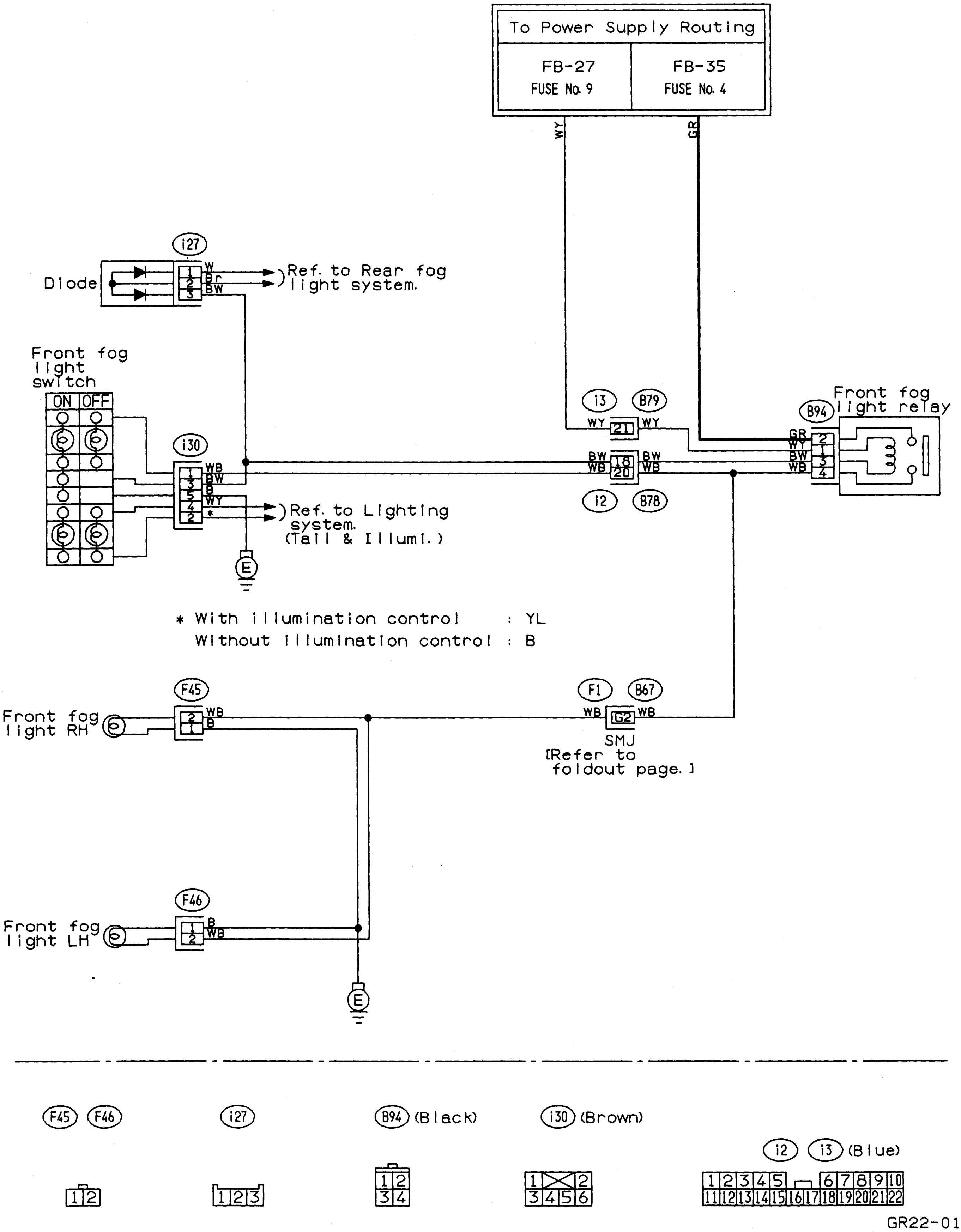


* With illumination control : YL
Without illumination control : B
*1 : Non-turbo model
*2 : Turbo model

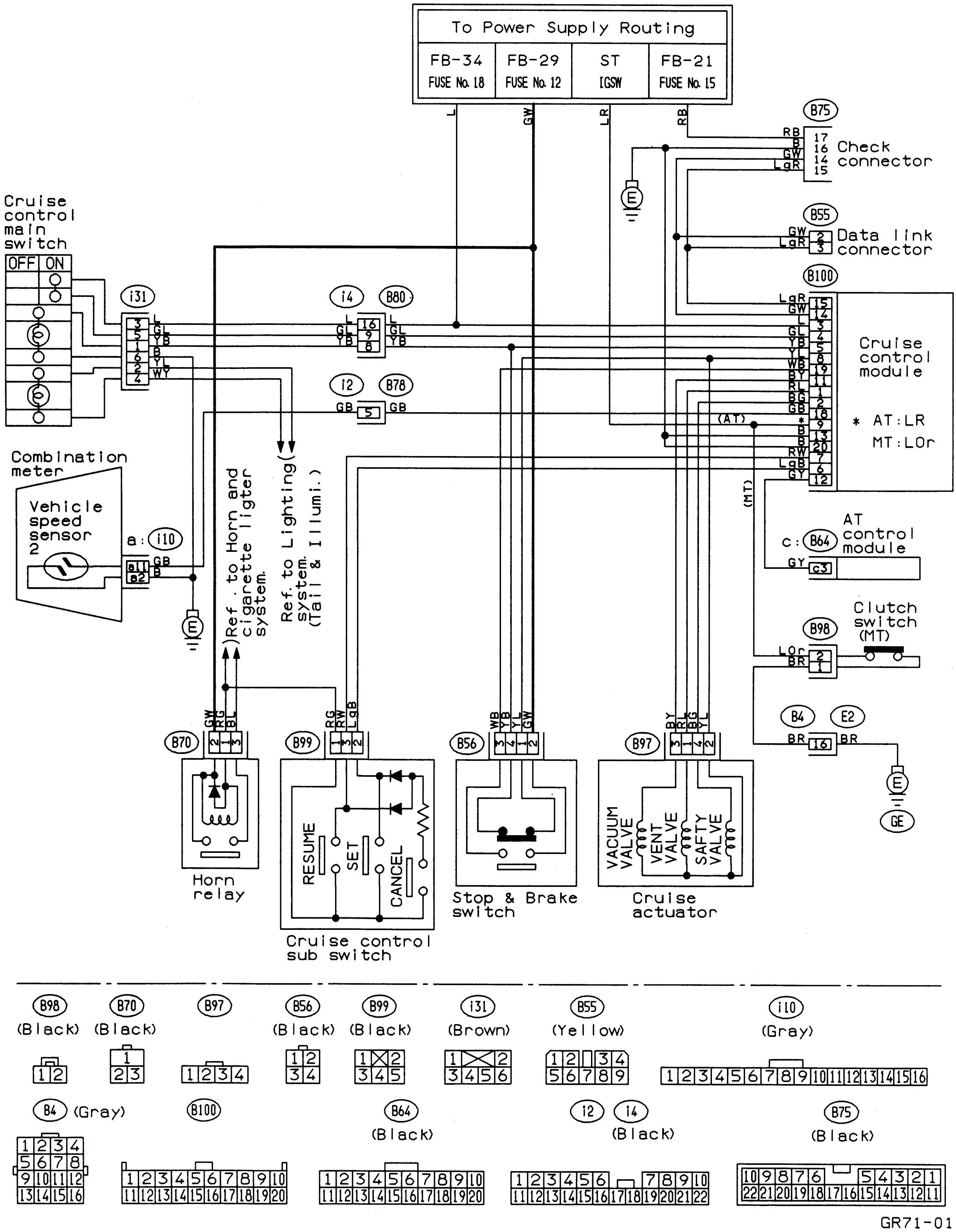


GR26-03

34. FRONT FOG LIGHT SYSTEM



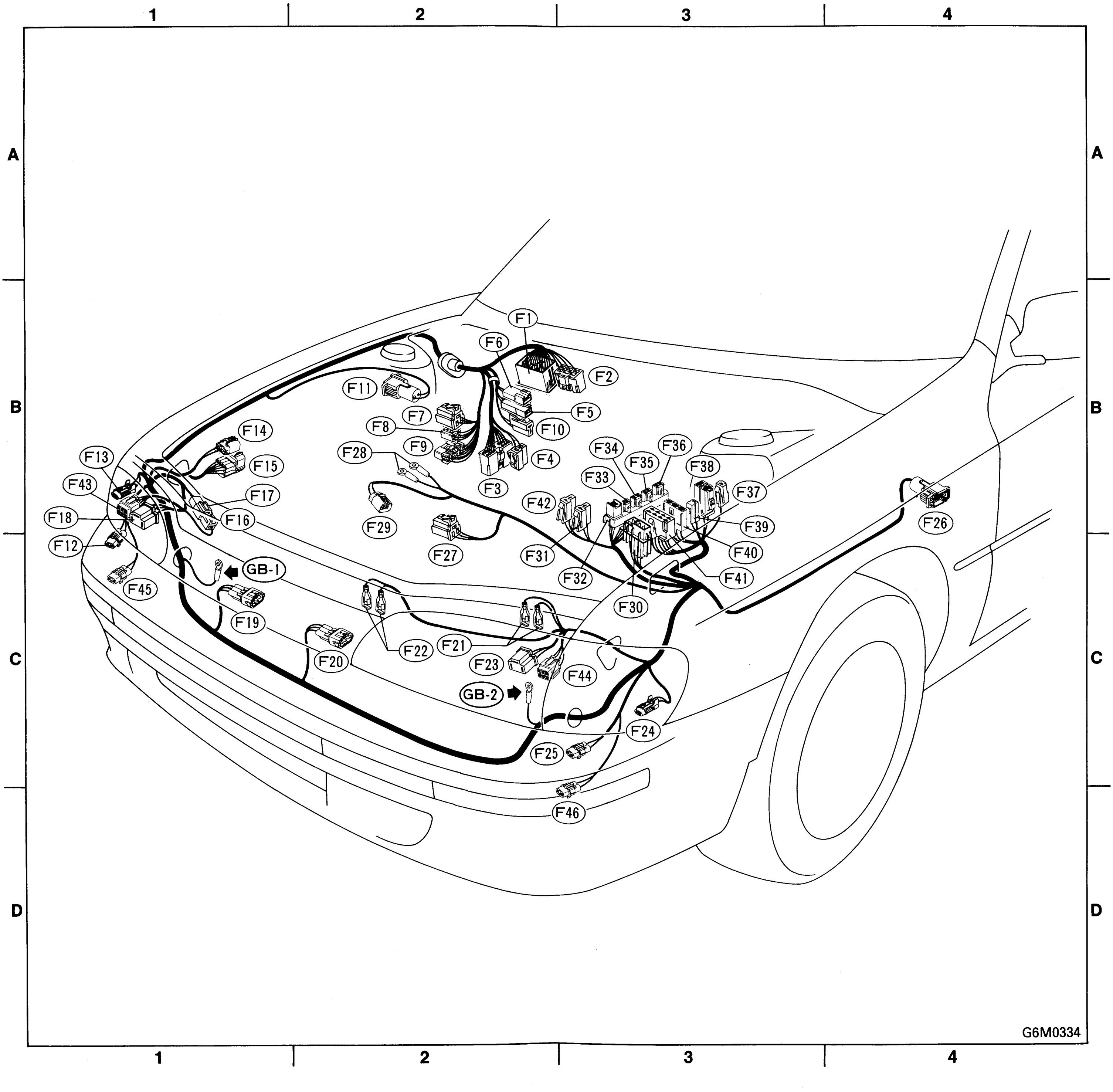
35. CRUISE CONTROL SYSTEM



Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
F1	40		B2	B67	Bulkhead wiring harness (S.M.J.)
F2	6		B2	B66	Bulkhead wiring harness
F3	13		B2	P2	Power window main harness
F4	2		B2	P1	
F5	2	Black	B2		Diode (A/C)
F6	3	Orange	B2		Diode (A/C)
F7	3	Gray	B2		F/B
F8	5	Gray	B2		
F9	10	Gray	B2		
F10	2	Black	B2		Horn condenser
F11	2		B2		Side turn signal light RH
F12	2		B1		Front turn signal light RH
F13	2	Gray	B1		Front marker light RH
F14	2	Gray	B1		Hydraulic unit (A.B.S.)
F15	12	Black	B1		Hydraulic unit (A.B.S.)
F16	1	Black	B1	F17	A/C short connector
F17	1	Black	B1	F16	
F18	3	Black	B1		Headlight RH
F19	3	Black	C1		Sub fan motor
F20	3	Black	C2		Radiator main fan motor
F21	1 x 2		C2		Horn
F22	1 x 2		C2		
F23	3	Black	C2		Headlight LH
F24	2	Gray	C3		Front marker light LH
F25	2		C3		Front turn signal light LH
F26	2		B4		Side turn signal light LH (Non-turbo model)
F27	3	Black	B2		A/C compressor
F28	1 x 2		B2		Generator
F29	2	Gray	B2		
F30	4	Black	B3		SBF holder
F31	2	Green	B3		Front washer motor
F32	4	Black	B3		A/C fuse (Relay holder)
F33	4	Black	B3		A/C sub fan relay-2 (Relay holder)
F34	4	Black	B3		A/C main fan relay-2 (Relay holder)
F35	4	Black	B3		A/C sub fan relay-1 (Relay holder)
F36	4	Black	B3		A/C relay (Relay holder)
F37	1	Brown	B3		M/B
F38	2	Black	B3		
F39	2	Black	B3		
F40	3		B3		
F41	8		B3		
F42	2	Blue	B2		Headlight washer motor
F43	2	Gray	B1		Headlight leveler RH
F44	2	Gray	C2		Headlight leveler LH
F45	2		C1		Front fog light RH
F46	2		C2		Front fog light LH

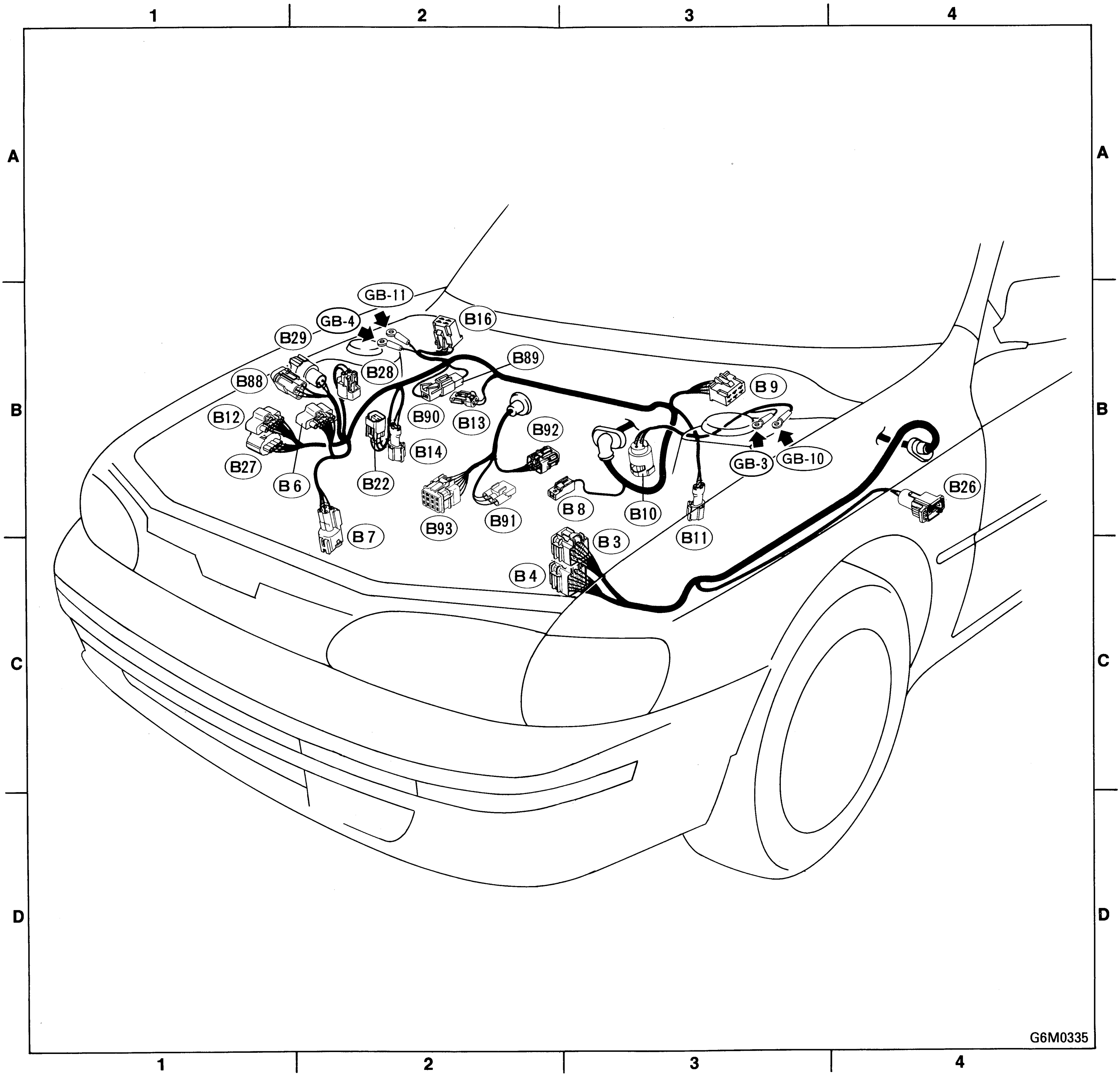
7. Electrical Wiring Harness and Ground Point

1. FRONT WIRING HARNESS AND GROUND POINT



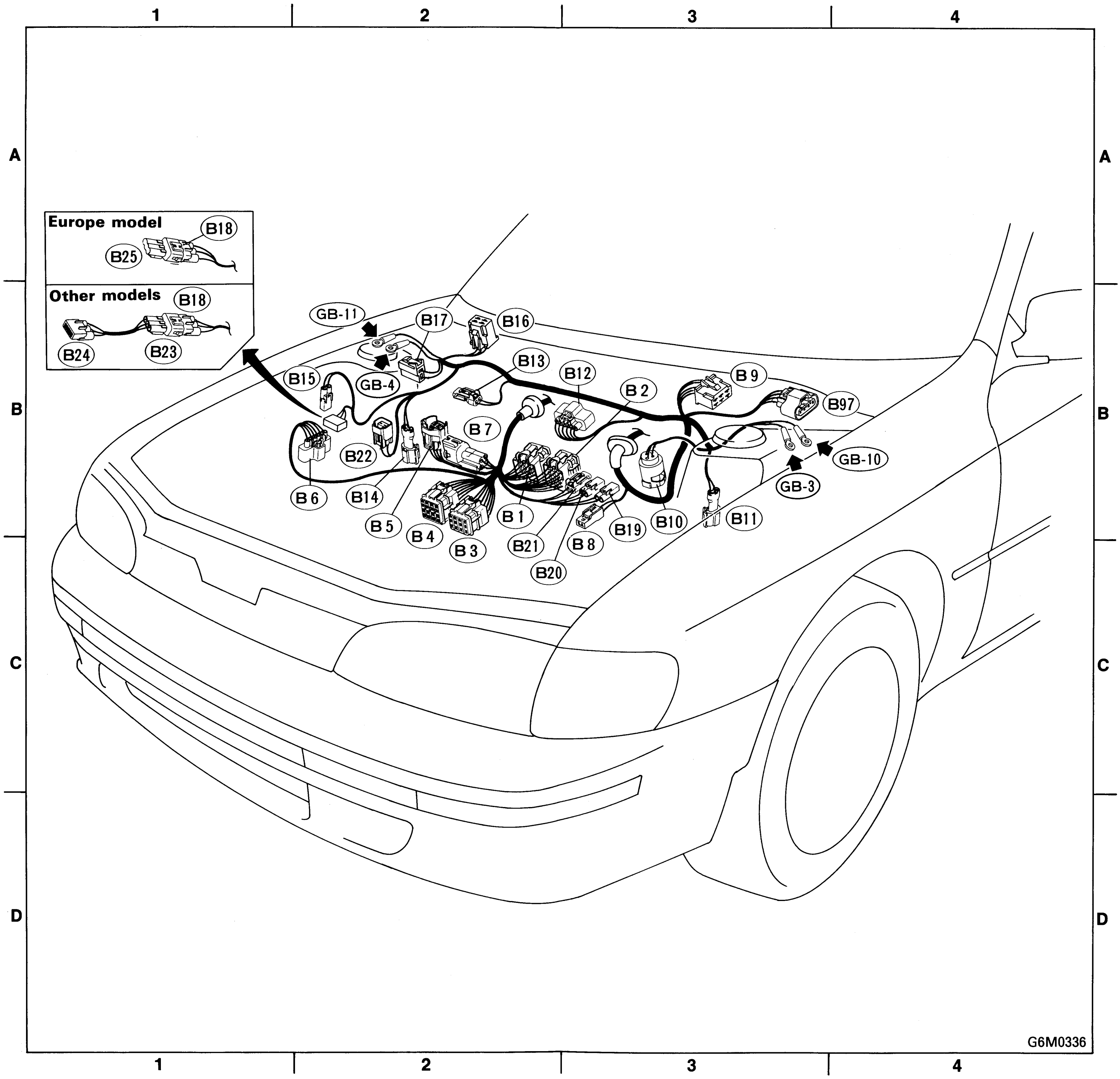
Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B3	12	Gray	B2	E1	Engine wiring harness
B4	16	Gray	B2	E2	
B6	5	Gray	B2		Mass air flow sensor
B7	4	Gray	C2		Oxygen sensor
B8	1	Black	B3		Starter (Magnet)
B9	6		B3		Front wiper motor
B10	4		B3		A/C pressure switch
B11	2	Gray	B3		A.B.S. front sensor LH
B12	5	Gray	B1		Ignitor
B13	2	Gray	B2		Brake fluid level switch
B14	2	Gray	B2		A.B.S. front sensor RH
B16	4	Blue	B2		A/C cut relay
B22	2	Black	B2		A.B.S. G sensor
B26	2		C4		Side turn signal light LH
B27	4	Gray	B1		Ignitor
B28	2	Brown	B2		Pressure exchange solenoid valve
B29	2	Black	B2		Wastegate control solenoid valve
B88	3	Gray	B2		Pressure sensor
B89	1	Black	B2	B90	Engine revolution speed check connector
B90	1	Black	B2	B89	
B91	3	Black	B2		Vehicle speed sensor
B92	6	Gray	B2	T6	Transmission
B93	12	Gray	B2	E16	Engine wiring harness

2. BULKHEAD WIRING HARNESS AND GROUND POINT (IN ENGINE ROOM) (TURBO MODEL)



Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B1	12	Gray	B2	T3	Transmission (AT)
B2	16	Gray	B2	T4	
B3	12	Gray	B2	E1	Engine wiring harness
B4	16	Gray	B2	E2	
B5	2	Gray	B2		FICD solenoid
B6	5	Gray	B2		Mass air flow meter
B7	4	Gray	B2		Oxygen sensor
B8	1	Black	B3		Starter (Magnet)
B9	6		B3		Front wiper motor
B10	4		B3		A/C pressure switch
B11	2	Gray	B3		A.B.S. front sensor LH
B12	6	Gray	B3		Ignitor
B13	2	Gray	B2		Brake fluid level switch
B14	2	Gray	B2		A.B.S. front sensor RH
B15	2	Gray	B2		AT dropping resistor
B16	4	Blue	B2		A/C cut relay
B17	2	Brown	B2		FWD switch (AWD — AT)
B18	3	Gray	A1	B25	Connector lid (Europe model)
			B1	B23	CO resistor adapter cord (Other models)
B19	2	Brown	B3	T2	Neutral position switch (MT)
B20	2	Gray	B3	T1	Back-up light switch (MT)
B21	2	Gray	B3	T5	Lo (AWD) indicator light switch (MT — AWD dual-range)
B22	2	Black	B2		A.B.S. G sensor (AWD — MT)
B23	3	Gray	B1	B18	Bulkhead wiring harness
B24	3	Gray	B1		CO resistor
B25	3	Gray	A1	B18	Bulkhead wiring harness
B97	4		B3		Cruise actuator

2. BULKHEAD WIRING HARNESS AND GROUND POINT (IN ENGINE ROOM) (NON-TURBO MODEL)



(Turbo model)

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
E1	12	Gray	B2	B3	Bulkhead wiring harness
E2	16	Gray	B2	B4	
E3	2	Dark-gray	A1		Injector #3
E4	2	Light-gray	A1		Injector #1
E5	2	Brown	A1		Engine coolant temperature sensor
E6	1		A1		Thermometer
E8	4	Gray	A1		Throttle position sensor
E9	3	Gray	A2		Idle air control solenoid
E10	1	Gray	A1		Power steering oil pressure switch
E11	1		A1		Oil pressure switch
E12	2	Gray	A1		Crankshaft position sensor
E13	2	Light-gray	B2		Injector #2
E14	2	Dark-gray	A2		Injector #4
E15	2	Blue	A1		Purge control solenoid valve
E16	12	Gray	A2	B93	Bulkhead wiring harness
E17	2	Light-gray	B2		Camshaft position sensor
E18	1	Gray	A2		Knock sensor
E19	2	Gray	A2		Ignition coil #2
E20	2	Black	A2		Ignition coil #4
E21	2	Gray	A1		Ignition coil #1
E22	2	Black	A1		Ignition coil #3

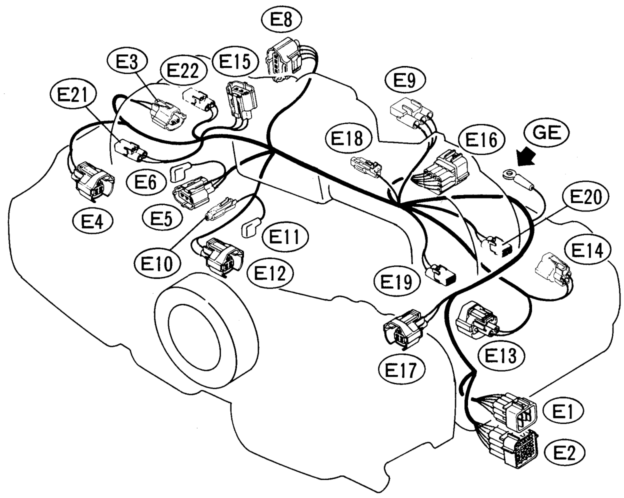
(Non-turbo model)

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
E1	12	Gray	A4	B3	Bulkhead wiring harness
E2	16	Gray	A4	B4	
E3	2	Gray	A3		Injector #3
E4	2	Gray	A3		Injector #1
E5	2	Brown	A3		Engine coolant temperature sensor
E6	1		A3		Thermometer
E7	3	Gray	A3		Ignition coil
E8	3	Brown	A4		Throttle position sensor
E9	2	Brown	A4		Idle air control solenoid
E10	1	Gray	A3		Power steering oil pressure switch
E11	1		B3		Oil pressure switch
E12	2	Gray	B3		Crankshaft position sensor
E13	2	Gray	B4		Injector #2
E14	2	Gray	A4		Injector #4
E15	2	Blue	A3		Purge control solenoid valve

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
T1	2	Gray	D1	B20	Bulkhead wiring harness (MT)
T2	2	Brown	D1	B19	
T3	12	Gray	C3	B1	Bulkhead wiring harness (AT)
T4	16	Gray	D4	B2	
T5	2	Gray	D1	B21	Bulkhead wiring harness (MT — AWD dual-range)
T6	6	Gray	C1	B92	Bulkhead wiring harness

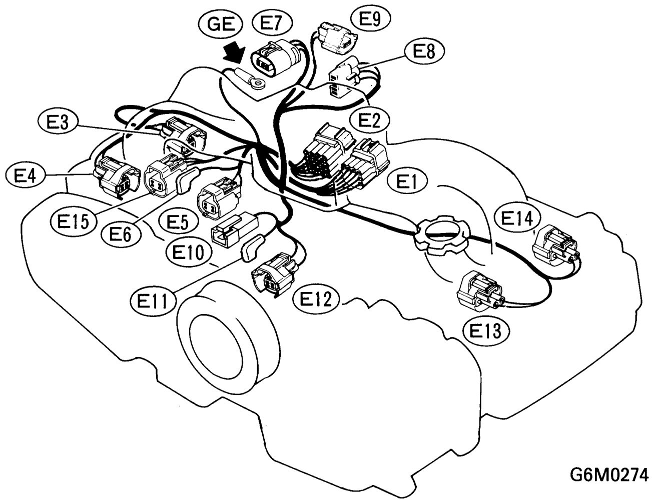
3. ENGINE WIRING HARNESS, TRANSMISSION CORD AND GROUND POINT

(Turbo model)



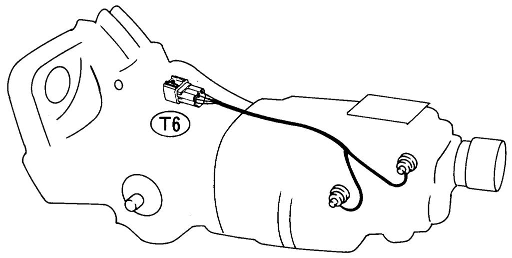
G6M0337

(Non-turbo model)

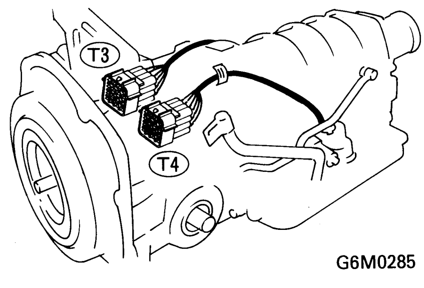


G6M0274

(Turbo model)

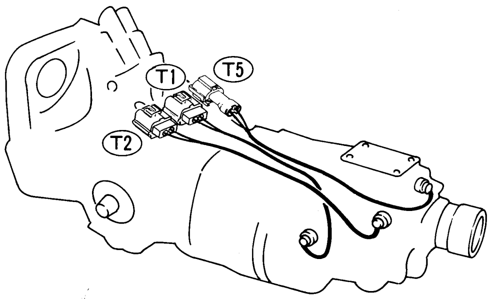


G6M0341



G6M0285

(Non-turbo model)

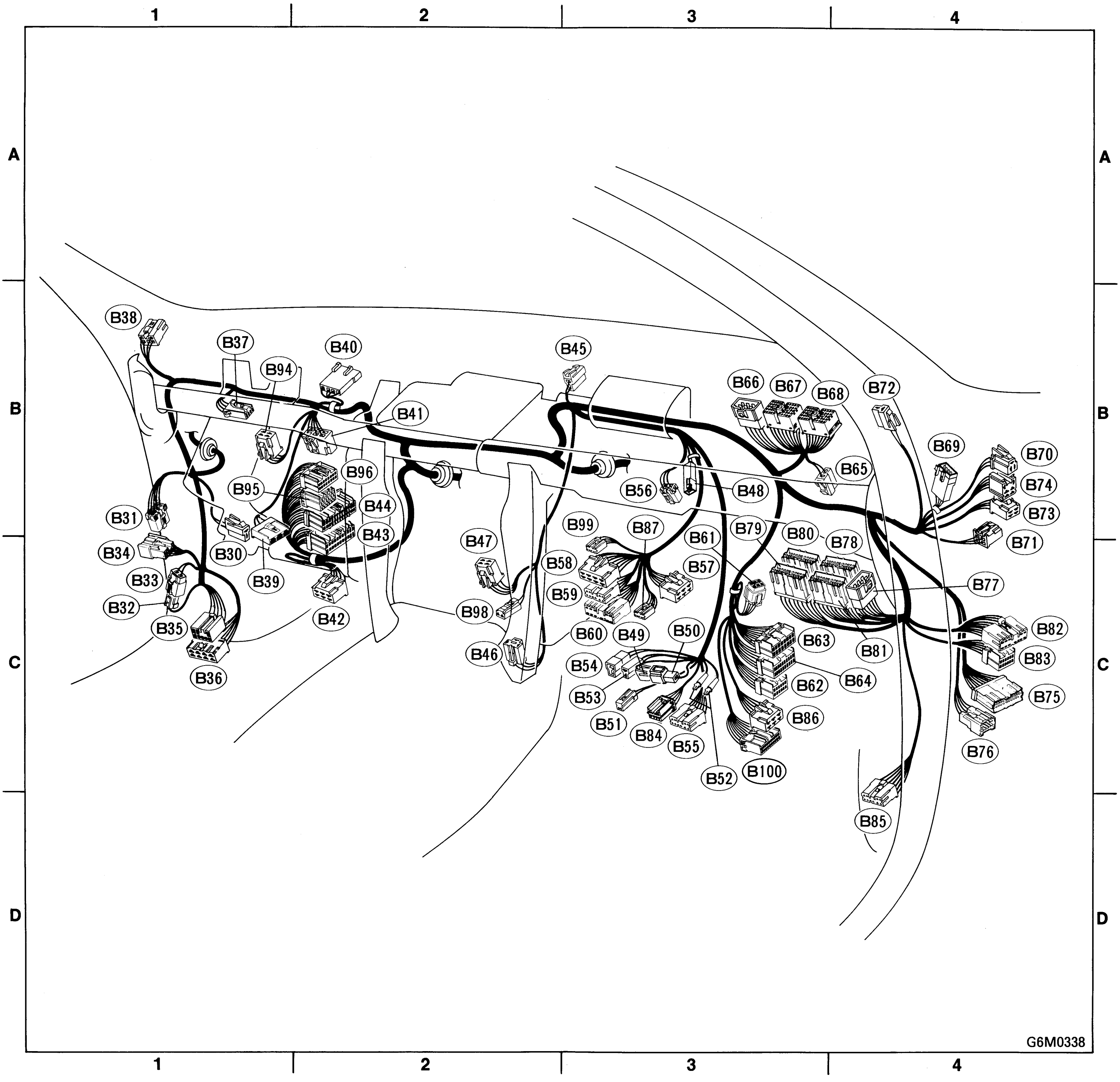


G6M0284

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B30	2	Black	B1		Blower motor
B31	8		B1		Door lock timer
B32	2	Black	C1	B33	Shield joint connector (A.B.S.)
B33	2	Black	C1	B32	
B34	13		C1	D9	Front door cord LH
B35	8	Black	C1	P4	Power window main harness (With A.B.S.)
B36	4		C1	P5	Power window main harness (Without A.B.S.)
	8		C1	P5	Power window main harness (With A.B.S.)
B37	4		B1		FRESH/RECIRC actuator
B38	5	Black	B1	R42	Sunroof cord
B39	3		B1		Evaporator thermoswitch
B40	4	Brown	B2		Diode (Lighting & A/C)
B41	6		B2		Blower motor resistor
B42	6		C2		Shield joint connector (Engine control)
B43	22	Green	B2		Engine control module (Non-turbo model)
		Yellow			Engine control module (Turbo model)
B44	26	Green	B2		Engine control module (Non-turbo model)
		Yellow			Engine control module (Turbo model)
B45	2	Black	B3		Horn condenser
B46	3	Black	C2		Turn & hazard unit
B47	4	Blue	C2	i13	Instrument panel wiring harness
B48	2	Black	B3		Diode (Rear fog light)
B49	1	Black	C3	B50	Read memory connector
B50	1	Black	C3	B49	
B51	2	Black	C3		Diagnosis connector (A.B.S.)
B52	1 x 2		C3		Diagnosis terminal (Ground)
B53	2	Green	C3		Test mode connector
B54	2	Green	C3		
B55	9	Yellow	C3		Data link connector
B56	2	Black	B3		Stop light switch
	4	Black	B3		Stop & brake switch (With cruise control)
B57	6	Black	C3		Ignition switch
B58	8		C3		Combination switch (Dimmer & passing)

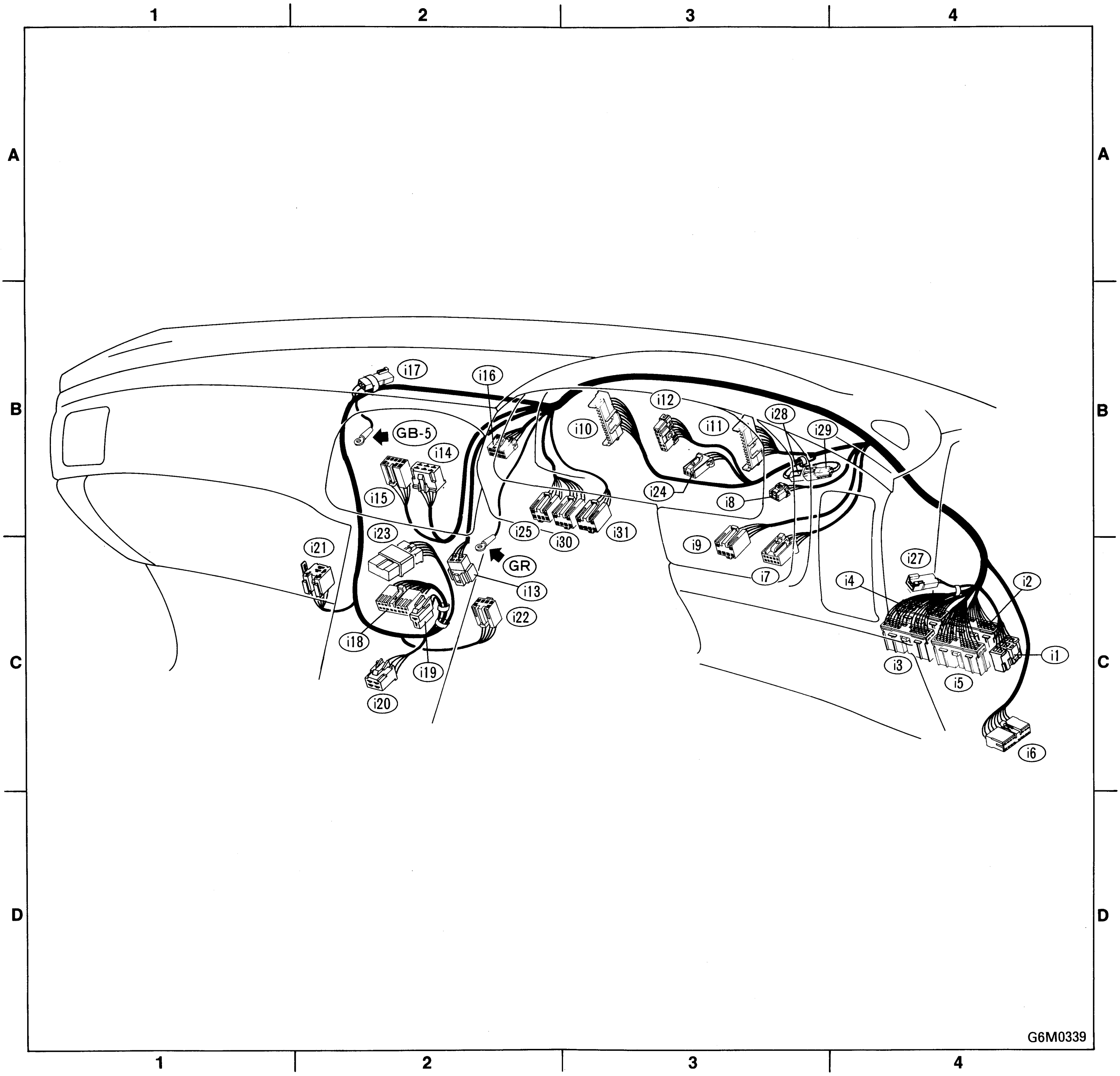
Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B59	9		C3		Combination switch (Wiper & washer)
B60	11		C3		Combination switch (Lighting)
B61	6		C3		Shield joint connector (AT)
B62	12	Black	C3		AT control module
B63	16	Black	C3		
B64	20	Black	C3		AT control module
B65	2	Black	B4		Kick-down switch (AT)
B66	6		B3	F2	Front wiring harness
B67	40		B3	F1	Front wiring harness (S.M.J.)
B68	40	Gray	B3	R1	Rear wiring harness (S.M.J.)
B69	2	Black	B4		Diode (Engine) (Non-turbo model)
	4	Brown			Diode (Engine) (Turbo model)
B70	3	Black	B4		Horn relay
B71	4		B4		Blower relay
B72	2	Green	B4	R40	Room light cord
B73	4	Green	B4		Fuel pump relay
B74	6	Brown	B4		Main relay
B75	22	Black	C4		Check connector
B76	13		C4	D1	Front door cord RH
B77	6		C4	i1	Instrument panel wiring harness
B78	22		C4	i2	
B79	22	Blue	C3	i3	
B80	22	Black	C3	i4	
B81	22	Brown	C4	i5	Instrument panel wiring harness (AT)
B82	11	Gray	C4		F/B
B83	12	Gray	C4		
B84	6	Black	C3		Diagnosis connector (Airbag)
B85	7	Yellow	D4	B1	Airbag harness
B86	6	Black	C3		Headlight washer module
B87	5	Black	C3		Horn switch (Airbag)
B94	4	Black	B2		Front fog light relay
B95	12	Yellow	B2		Engine control module (Turbo model)
B96	16	Yellow	B2		
B98	2	Black	C2		Clutch switch (MT)
B99	5	Black	C3		Cruise control sub switch
B100	20		C3		Cruise control module

4. BULKHEAD WIRING HARNESS (IN COMPARTMENT)



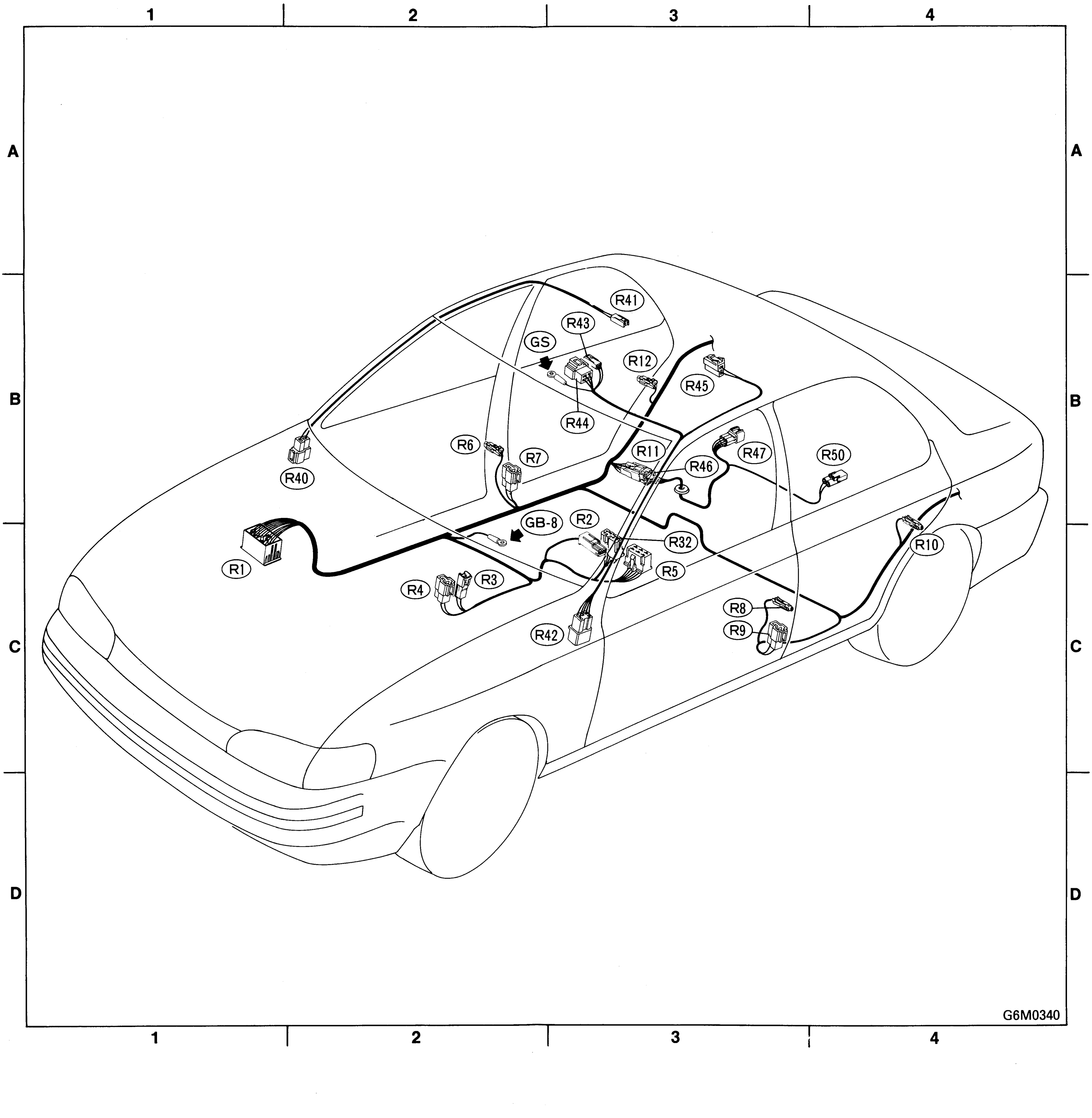
Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
i1	6		C4	B77	Bulkhead wiring harness
i2	22		C4	B78	
i3	22	Blue	C4	B79	
i4	22	Black	C4	B80	
i5	22	Brown	C4	B81	Bulkhead wiring harness (AT)
i6	15	Gray	C4		F/B
i7	10		C3		Remote control rearview mirror switch
i8	4		B3		Rear defogger switch
i9	6	Black	C3		Rear fog light switch
		Gray	C3		Rear fog light switch (Turbo model)
i10	16	Gray	B3		Combination meter
i11	16	Gray	B3		
i12	10	Yellow	B3		Combination meter (AT)
i13	4	Blue	C2	B47	Bulkhead wiring harness
i14	6		B2		Fan switch
i15	8		B2		Mode control panel
i16	8		B2		Hazard switch
i17	2	Black	B2		Diode (A/C)
i18	14		C2		Radio
i19	2		C2		CD illumination light
i20	4		C2		Cigarette lighter
i21	4	Blue	C2		Rear fog light relay
i22	6	Black	C2		Illumination control unit
i23	7		C2		Clock and bright switch
i24	4		B3		Combination meter (Airbag warning)
i25	6	Gray	B3		Headlight washer switch
i27	3		C4		Diode (Fog light) (Turbo model)
i28	2	Black	B3		Shield joint connector (Vehicle speed sensor) (Turbo model)
i29	2	Black	B3		
i30	6	Brown	B3		Front fog light switch
i31	6	Brown	B3		Cruise control main switch

5. INSTRUMENT PANEL WIRING HARNESS AND GROUND POINT



Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
R1	40	Gray	B1	B68	Bulkhead wiring harness (S.M.J.)
R2	1		B3		Parking brake switch
R3	2		C2		Economy switch (AT)
R4	2		C2		Select lever illumination light (AT)
R5	6	Blue	B3		Manual switch (AT)
R6	1	Brown	B2		Front door switch RH
R7	2	Pink	B2	D16	Rear door adapter cord RH
R8	1	Brown	C3		Front door switch LH
R9	2	Pink	C3	D19	Rear door adapter cord LH
R10	1	Brown	B4		Rear door switch LH
R11	6	Black	B3	R46	Fuel tank cord
R12	1	Brown	B3		Rear door switch RH
R32	7		B3		Headlight leveling switch
R40	2	Green	B2	B72	Bulkhead wiring harness
R41	2		B3		Room light
R42	5	Black	C3	B38	Bulkhead wiring harness
R43	2		B3		Spot light
R44	4		B3		Sunroof switch
R45	2		B3		Sunroof motor
R46	6	Black	B3	R11	Rear wiring harness
R47	6		B3		Fuel gauge unit
R50¨	2		B4		Fuel gauge sub unit (Turbo model)

6. REAR WIRING HARNESS AND GROUND POINT



SUBARU

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