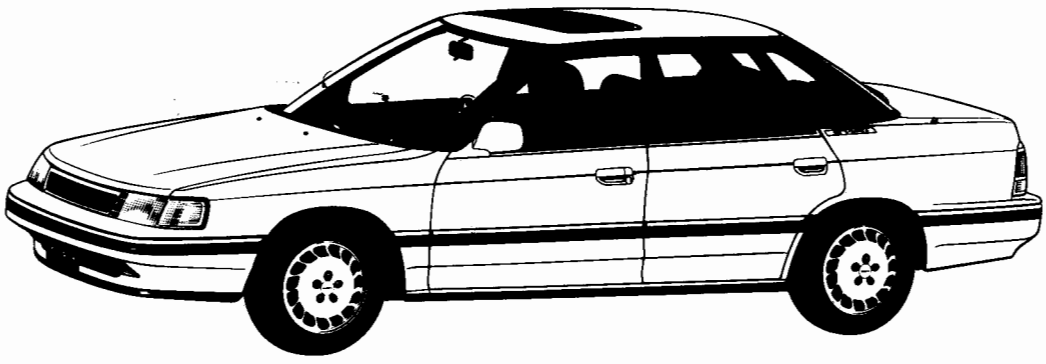
SUBARU®

LEGACY

1990 SERVICE MANUAL

SUPPLEMENT



FUJI HEAVY INDUSTRIES LTD.

SUBARU®
LEGACY
SERVICE MANUAL

FOREWORD

This service manual supplement has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU LEGACY.
Please study and then utilize this supplement together with 1990 SERVICE MANUAL (Pub. No. G201BE) Section 1 to 6 published already.

When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.
All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD.

IMPORTANT SAFETY NOTICE

Providing appropriate service and repair is a matter of great importance in the serviceman's safety maintenance and safe operation, function and performance which the SUBARU vehicle possesses.

In case the replacement of parts or replenishment of consumables is required, genuine SUBARU parts whose parts numbers are designated or their equivalents must be utilized.

It must be made well known that the safety of the serviceman and the safe operation of the vehicle would be jeopardized if he used any service parts, consumables, special tools and work procedure manuals which are not approved or designated by SUBARU.

How to use this manual

- **Service Manual is divided into six volumes by section. Refer to the Table of Contents, select and use the necessary section.**

This supplement includes corrective and/or additional information in relation to the above six service manual volumes. Please place it in a handy place for ready reference.
For information not covered in this supplement, refer to 1990 SERVICE MANUAL (Pub. No. G201BE) SECTION 1 to 6.

- Each chapter in the manual is basically made of the following five types of areas.

  M : Mechanism and function
  C : Component parts
  W : Service procedure
  (X : Service procedure)
  (Y : Service procedure)
  T : Troubleshooting

- The description of each area is provided with four types of titles different in size as shown below. The Title No. or Symbol prefixes each title in order that the construction of the article and the flow of explanation can be easily understood.

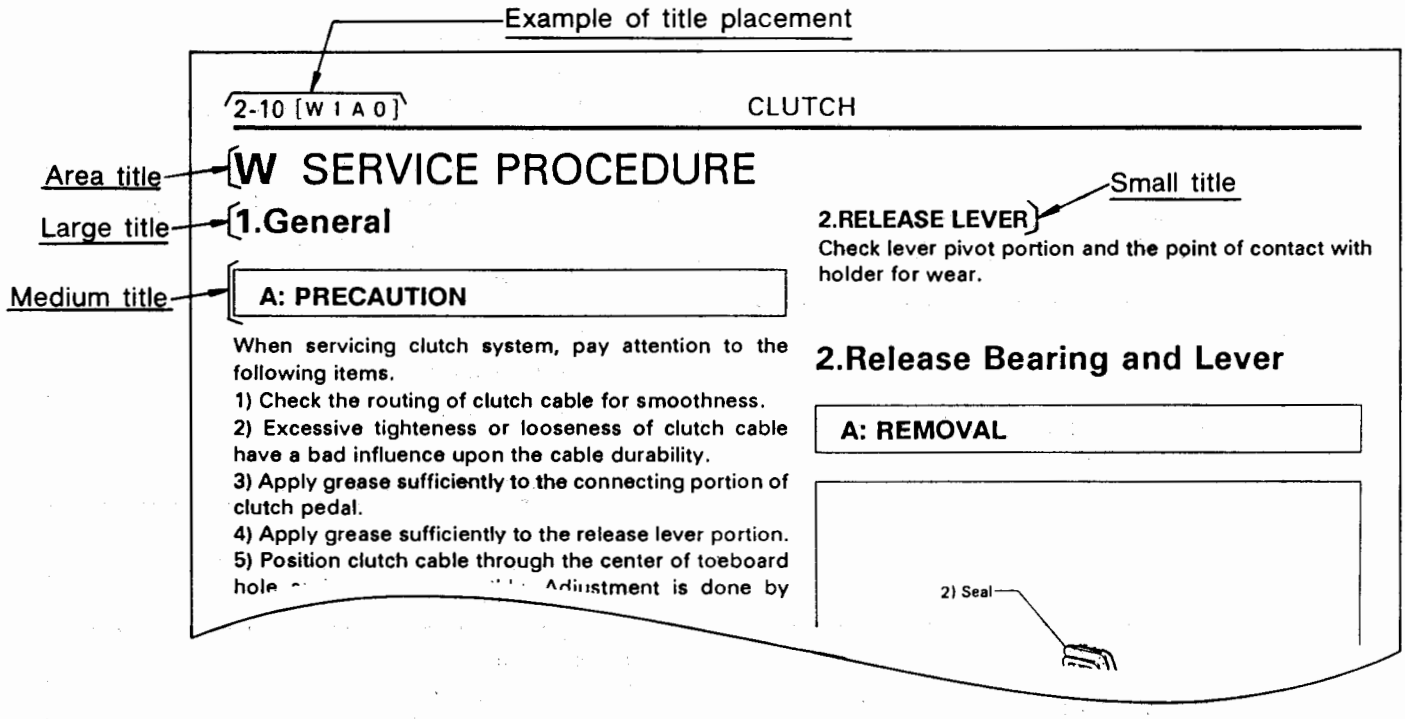
  [Example of each title]
  - Area title: W. Service procedure (one of the five types of areas)
  - Large title (Heading): 1. Oil Pump (to denote the main item of explanation)
  - Medium title (Section): A. REMOVAL (to denote the type of work in principle)
  - Small title (Sub-section): 1. INNER ROTATOR (to denote a derivative item of explanation)

- The Title Index No. is indicated on the top left (or right) side of the page as the book is opened. This is useful for retrieving the necessary portion.

(Example of usage)

Refer to 2 - 4 [W 1 B 1]

- Small title (Sub-section)
- Medium title (Section)
- Large title (Heading)
- Area title
- Chapter No.



- In this manual, the following symbols are used.

: Should be lubricated with oil.

: Should be lubricated with grease.

: Sealing point

T : Tightening torque

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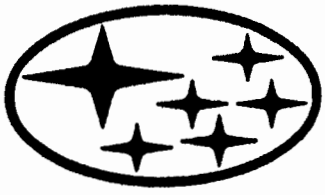
1990

SERVICE MANUAL



S SPECIFICATIONS

A:4-DOOR SEDAN

MODEL	FWD								4WD					
	—		L		LS*1		LS-D*2		L		LS*1		LS-D*2	
ITEM	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT

1. DIMENSIONS

Overall length			mm (in)	4,510 (177.6)	
Overall width			mm (in)	1,690 (66.5)	
Overall height			mm (in)	1,335 (52.6)	1,360 (53.5)
Compartment	Leg room	Front Max.	mm (in)	1,075 (42.3)	
		Rear Min.	mm (in)	900 (35.4)	
	Head room	Front	mm (in)	965 (38.0)	
		Rear	mm (in)	915 (36.0)	
	Shoulder room	Front	mm (in)	1,375 (54.1)	
		Rear	mm (in)	1,365 (53.7)	
Wheelbase			mm (in)	2,580 (101.6)	
Tread		Front	mm (in)	1,465 (57.7)	1,460 (57.5)
		Rear	mm (in)	1,450 (57.1)	
Minimum road clearance			mm (in)	115 (4.5)	

2. WEIGHT

Curb Weight	Front	kg (lb)	705 (1,550)	740 (1,635)	705 (1,555)	745 (1,640)	730 (1,615)	770 (1,700)	740 (1,625)	775 (1,710)	725 (1,600)	760 (1,670)	755 (1,660)	785 (1,730)	760 (1,670)	790 (1,740)
	Rear	kg (lb)	530 (1,170)	540 (1,185)	535 (1,180)	540 (1,195)	550 (1,210)	555 (1,225)	555 (1,225)	565 (1,240)	600 (1,325)	605 (1,335)	615 (1,335)	620 (1,365)	620 (1,370)	625 (1,380)
	Total	kg (lb)	1,235 (2,720)	1,280 (2,820)	1,240 (2,735)	1,285 (2,835)	1,280 (2,825)	1,325 (2,925)	1,295 (2,850)	1,340 (2,950)	1,325 (2,925)	1,365 (3,005)	1,370 (3,015)	1,405 (3,095)	1,380 (3,040)	1,415 (3,120)
Gross Vehicle Weight	Front	kg (lb)	940 (2,065)								950 (2,095)					
	Rear	kg (lb)	845 (1,865)								915 (2,015)					
	Total	kg (lb)	1,785 (3,930)								1,865 (4,110)					

*1: The weight of the air conditioner is included in the C.W.
*2: The weight of the sunroof and air conditioner is included in the C.W

When optional parts are installed, the weight indicated in the following table is added to curb weight.

	Sunroof	Air conditioner, Cruise control and Cassette player	ABS
Frontkg (lb)	9 (20)	30 (65)	14 (30)
Rear kg (lb)	14 (30)	—2 (—5)	0 (0)
Totalkg (lb)	23 (50)	28 (60)	14 (30)

MODEL	FWD								4WD					
	—		L		LS		LS-D		L		LS		LS-D	
ITEM	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT

3. ENGINE

Engine type		Horizontally opposed, liquid cooled, 4-cylinder, 4- stroke gasoline engine
Valve arrangement		Overhead camshaft type
Bore x Stroke	mm (in)	96.9 x 75 (3.815 x 2.95)
Displacement	cm^3 (cu in)	2,212 (134.98)
Compression ratio		9.5
Firing order		1-3-2-4
Idling speed at N or P position	rpm	700m ± 100 (No load) 850m ± 50 (Air conditioner ON)
Maximum output	HP/rpm	130 at 5,600
Maximum torque	N•m(kg-m, ft-lb) /rpm	186 (19.0, 137) at 2,400

4. ELECTRICAL

Ignition timing at idling speed		BTDC/rpm	20° at 700
Spark plug	Type and manufacturer		NGK: BKR6E-11 NIPPON DENSO: K20PUR-11 CHAMPION: RC9YC-4
Alternator			12 V — 70 A
Battery	Type		5MT: 55D23L-MF/4AT: 75D23L-MF
	Reserve capacity	min.	5MT: 99/4AT: 111
	Cold cranking amperes	amp.	5MT: 356/4AT: 490

5. TRANSMISSION

Clutch type		DSPD	TC	DSPD	TC	DSPD	TC	DSPD	TC	DSPD	TC	DSPD	TC	DSPD	TC
Transmission type		*3	*5	*3	*5	*3	*5	*3	*5	*4	*6	*4	*6	*4	*6
Gear ratio	1st	3.545	2.785	3.545	2.785	3.545	2.785	3.545	2.785	3.545	2.785	3.545	2.785	3.545	2.785
	2nd	1.947	1.545	1.947	1.545	1.947	1.545	1.947	1.545	1.947	1.545	1.947	1.545	1.947	1.545
	3rd	1.366	1.000	1.366	1.000	1.366	1.000	1.366	1.000	1.366	1.000	1.366	1.000	1.366	1.000
	4th	0.972	0.694	0.972	0.694	0.972	0.694	0.972	0.694	0.972	0.694	0.972	0.694	0.972	0.694
	5th	0.738	—	0.738	—	0.738	—	0.738	—	0.738	—	0.738	—	0.738	—
	Reverse	3.416	2.272	3.416	2.272	3.416	2.272	3.416	2.272	3.416	2.272	3.416	2.272	3.416	2.272

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

MODEL			FWD								4WD					
			—		L		LS		LS-D		L		LS		LS-D	
ITEM			5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT
Reduction gear (Front drive)	1st reduction	Type of gear	—	Heli-cal	—	Heli-cal	—	Heli-cal	—	Heli-cal	—	Heli-cal	—	Heli-cal	—	Heli-cal
		Gear ratio	—	1.000	—	1.000	—	1.000	—	1.000	—	1.000	—	1.000	—	1.000
	Final reduction	Type of gear	Hy-poid	Hy-poid	Hy-poid	Hy-poid	Hy-poid	Hy-poid	Hy-poid	Hy-poid	Hy-poid	Hy-poid	Hy-poid	Hy-poid	Hy-poid	Hy-poid
		Gear ratio	3.700	3.700	3.700	3.700	3.700	3.700	3.700	3.700	4.111	4.111	4.111	4.111	4.111	4.111
Reduc-tion gear (Rear drive)	Transfer reduction	Type of gear	—								Heli-cal	—	Heli-cal	—	Heli-cal	—
		Gear ratio	—								1.000	—	1.000	—	1.000	—
	Final reduction	Type of gear	—								Hy-poid	Hy-poid	Hy-poid	Hy-poid	Hy-poid	Hy-poid
		Gear ratio	—								4.111	4.111	4.111	4.111	4.111	4.111

6. STEERING

Type	Rack and Pinion
Turns, lock to lock	3.3
Minimum turning circle m (ft)	Wall to wall ..... 11.0 (36.1) Curb to curb 10.2 (33.5)

7. SUSPENSION

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

8. BRAKE

Service brake system	Dual circuit hydraulic with vacuum suspended power unit
Front	Ventilated disc brake
Rear	Disc brake
Parking brake	Mechanical on rear brakes

9. TIRE

Size	P175/70R14 84H	P185/70R14 87H
Type	Steel belted radial, Tubeless	

MODEL	FWD								4WD					
	—		L		LS		LS-D		L		LS		LS-D	
ITEM	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT

10. CAPACITY

Fuel tank		ℓ (US gal, Imp gal)	60 (15.9, 13.2)												
Engine oil	Upper level	ℓ (US qt, Imp qt)	4.5 (4.8, 4.0)												
	Lower level	ℓ (US qt, Imp qt)	3.5 (3.7, 3.1)												
Transmission gear oil		ℓ (US qt, Imp qt)	3.3 (3.5, 2.9)	—	3.3 (3.5, 2.9)	—	3.3 (3.5, 2.9)	—	3.3 (3.5, 2.9)	—	3.5 (3.7, 3.1)	—	3.5 (3.7, 3.1)	—	3.5 (3.7, 3.1)	—
Automatic transmission fluid		ℓ (US qt, Imp qt)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)
AT differential gear oil		ℓ (US qt, Imp qt)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)
4WD rear differential gear oil		ℓ (US qt, Imp qt)	—								0.8 (0.8, 0.7)					
Power steering fluid		ℓ (US qt, Imp qt)	0.7 (0.7, 0.6)												
Engine coolant		ℓ (US qt, Imp qt)	6.0 (6.3, 5.3)												

B: STATION WAGON

MODEL	FWD								4WD					
	—		L		LS*1		LS-D*2		L		LS*1		LS-D*2	
ITEM	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT

1. DIMENSIONS

Overall length			mm (in)	4,600 (181.1)											
Overall width			mm (in)	1,690 (66.5)											
Overall height			mm (in)	1,365 (53.7)							1,390 (54.7)		1,420 (55.9)	1,390 (54.7)	1,420 (55.9)
Compartment	Leg room	Front Max.	mm (in)	1,075 (42.3)											
		Rear Min.	mm (in)	905 (35.6)											
	Head room	Front	mm (in)	970 (38.2)											
		Rear	mm (in)	960 (37.8)											
	Shoulder room	Front	mm (in)	1,375 (54.1)											
		Rear	mm (in)	1,365 (53.7)											
Cargo space	Length	with 2 seats	mm (in)	1,685 (66.3)											
		with 5 seats	mm (in)	860 (33.9)											
	Width	with 2 seats	mm (in)	1,365 (53.7)											
		with 5 seats	mm (in)	1,365 (53.7)											
	Height		mm (in)	875 (34.4)											
Wheelbase			mm (in)	2,580 (101.6)											
Tread		Front	mm (in)	1,465 (57.7)							1,460 (57.5)				
		Rear	mm (in)	1,450 (57.1)							1,450 (57.1)				
Minimum road clearance			mm (in)	135 (5.3)							155 (6.1)		165 (6.5)	155 (6.1)	165 (6.5)

2. WEIGHT

Curb weight	Front	kg (lb)	690 (1,525)	730 (1,610)	695 (1,535)	735 (1,620)	725 (1,595)	760 (1,680)	730 (1,605)	765 (1,690)	715 (1,580)	750 (1,650)	745 (1,640)	780 (1,725)	750 (1,650)	785 (1,735)
	Rear	kg (lb)	595 (1,310)	600 (1,325)	600 (1,320)	605 (1,335)	600 (1,325)	610 (1,340)	610 (1,345)	620 (1,360)	665 (1,465)	670 (1,475)	665 (1,470)	675 (1,485)	675 (1,490)	685 (1,505)
	Total	kg (lb)	1,285 (2,835)	1,330 (2,935)	1,295 (2,855)	1,340 (2,955)	1,325 (2,920)	1,370 (3,020)	1,340 (2,950)	1,385 (3,050)	1,380 (3,045)	1,420 (3,125)	1,410 (3,110)	1,455 (3,210)	1,425 (3,140)	1,470 (3,240)
Gross vehicle weight	Front	kg (lb)	915 (2,015)								935 (2,065)					
	Rear	kg (lb)	960 (2,115)								990 (2,180)					
	Total	kg (lb)	1,875 (4,130)								1,925 (4,245)					

*1: The weight of the air conditioner is included in the C.W.
*2: The weight of the sunroof and air conditioner is included in the C.W

NOTE: When optional parts are installed, the weight indicated in the following table is added to curb weight.

	Sunroof	Air conditioner, Cruise control and Cassette player	ABS
Frokg (lb)	9 (20)	30 (65)	14 (30)
Reakg (lb)	14 (30)	—2 (—5)	0 (0)
Totakg (lb)	23 (50)	28 (60)	14 (30)

MODEL	FWD								4WD					
	—		L		LS		LS-D		L		LS		LS-D	
ITEM	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT

3. ENGINE

Engine type		Horizontally opposed, liquid cooled, 4-cylinder, 4- stroke gasoline engine
Valve arrangement		Overhead camshaft type
Bore x Stroke	mm (in)	96.9 x 75 (3.815 x 2.95)
Displacement	cm^3 (cu in)	2,212 (135.0)
Compression ratio		9.5
Firing order		1-3-2-4
Idling speed at N or P position	rpm	700m ± 100 (No load) 850m ±50 (Air conditioner ON)
Maximum output	HP/rpm	130 at 5,600
Maximum torque	N•m(kg-m, ft-lb)/rpm	186 (19.0, 137) at 2,400

4. ELECTRICAL

Ignition timing at idling speed	BTDC/rpm	20° at 700
Spark plug	Type and manufacturer	NGK: BKR6E-11 NIPPON DENSO: K20PUR-11 CHAMPION: RC9YC-4
Alternator		12 V - 70 A
Battery	Type	5MT: 55D23L-MF/4AT: 75D23L-MF
	Reserve capacity min.	5MT: 99/4AT: 111
	Cold cranking amperes amp.	5MT: 356/4AT: 490

5. TRANSMISSION

Clutch type		DSPD	TC	DSPD	TC	DSPD	TC	DSPD	TC	DSPD	TC	DSPD	TC	DSPD	TC
Transmission type		*3	*5	*3	*5	*3	*5	*3	*5	*4	*6	*4	*6	*4	*6
Gear ratio	1st	3.545	2.785	3.545	2.785	3.545	2.785	3.545	2.785	3.545	2.785	3.545	2.785	3.545	2.785
	2nd	1.947	1.545	1.947	1.545	1.947	1.545	1.947	1.545	1.947	1.545	1.947	1.545	1.947	1.545
	3rd	1.366	1.000	1.366	1.000	1.366	1.000	1.366	1.000	1.366	1.000	1.366	1.000	1.366	1.000
	4th	0.972	0.694	0.972	0.694	0.972	0.694	0.972	0.694	0.972	0.694	0.972	0.694	0.972	0.694
	5th	0.738	—	0.738	—	0.738	—	0.738	—	0.738	—	0.738	—	0.738	—
	Reverse	3.416	2.272	3.416	2.272	3.416	2.272	3.416	2.272	3.416	2.272	3.416	2.272	3.416	2.272

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

MODEL			FWD								4WD					
			—		L		LS		LS-D		L		LS		LS-D	
ITEM			5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT
Reduction gear (Front drive)	1st reduction	Type of gear	—	Helical	—	Helical	—	Helical	—	Helical	—	Helical	—	Helical	—	Helical
		Gear ratio	—	1.000	—	1.000	—	1.000	—	1.000	—	1.000	—	1.000	—	1.000
	Final reduction	Type of gear	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid
		Gear ratio	3.700	3.700	3.700	3.700	3.700	3.700	3.700	3.700	4.111	4.111	4.111	4.111	4.111	4.111
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	Hypoid	Hypoid
		Gear ratio	—								4.111	4.111	4.111	4.111	4.111	4.111

6. STEERING

Type	Rack and Pinion
Turns, lock to lock	3.3
Minimum turning circle m (ft)	Wall to wall ..... 11.0 (36.1) Curb to curb 10.2 (33.5)

7. SUSPENSION

Front	Macpherson strut type, Independent			
	Coil spring	*7	Coil spring	*7
Rear	Dual link strut type, Independent			
	Coil spring	*7	Coil spring	*7

8. BRAKE

Service brake system	Dual circuit hydraulic with vacuum suspended power unit
Front	Ventilated disc brake
Rear	Disc brake
Parking brake	Mechanical on rear brakes

9. TIRE

Size	P175/70R14 84H	P185/70R14 87H
Type	Steel belted radial, Tubeless	

*7; Pneumatic suspension with height control

MODEL	FWD								4WD					
	—		L		LS		LS-D		L		LS		LS-D	
ITEM	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT

10. CAPACITY

Fuel tank		ℓ (US gal, Imp gal)	60 (15.9, 13.2)												
Engine oil	Upper level	ℓ (US qt, Imp qt)	4.5 (4.8, 4.0)												
	Lower level	ℓ (US qt, Imp qt)	3.5 (3.7, 3.1)												
Transmission gear oil		ℓ (US qt, Imp qt)	3.3 (3.5, 2.9)	—	3.3 (3.5, 2.9)	—	3.3 (3.5, 2.9)	—	3.3 (3.5, 2.9)	—	3.5 (3.7, 3.1)	—	3.5 (3.7, 3.1)	—	3.5 (3.7, 3.1)	—
Automatic transmission fluid		ℓ (US qt, Imp qt)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)
AT differential gear oil		ℓ (US qt, Imp qt)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)
4WD rear differential gear oil		ℓ (US qt, Imp qt)	—								0.8 (0.8, 0.7)					
Power steering fluid		ℓ (US qt, Imp qt)	0.7 (0.7, 0.6)												
Engine coolant		ℓ (US qt, Imp qt)	6.0 (6.3, 5.3)												

C: TOURING WAGON

MODEL	FWD						4WD					
	L		LS*1		LS-D*2		L		LS*1		LS-D*2	
ITEM	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT

1. DIMENSIONS

Overall length			mm (in)	4,600 (181.1)									
Overall width			mm (in)	1,690 (66.5)									
Overall height			mm (in)	1,405 (55.3)				1,430 (56.3)		1,460 (57.5)	1,430 (56.3)	1,460 (57.5)	
Compartment	Leg room	Front Max.	mm (in)	1,075 (42.3)									
		Rear Min.	mm (in)	905 (35.6)									
	Head room	Front	mm (in)	1,010 (39.8)									
		Rear	mm (in)	1,000 (39.4)									
	Shoulder room	Front	mm (in)	1,375 (54.1)									
		Rear	mm (in)	1,365 (53.7)									
Cargo space	Length	with 2 seats	mm (in)	1,685 (66.3)									
		with 5 seats	mm (in)	860 (33.9)									
	Width	with 2 seats	mm (in)	1,365 (53.7)									
		with 5 seats	mm (in)	1,365 (53.7)									
	Height		mm (in)	915 (36.0)									
Wheelbase			mm (in)	2,580 (101.6)									
Tread	Front		mm (in)	1,465 (57.7)				1,460 (57.5)					
	Rear		mm (in)	1,450 (57.1)				1,450 (57.1)					
Minimum road clearance			mm (in)	135 (5.3)				155 (6.1)		165 (6.5)	155 (6.1)	165 (6.5)	

2. WEIGHT

Curb Weight	Front	kg (lb)	695 (1,535)	735 (1,620)	725 (1,595)	760 (1,680)	730 (1,605)	765 (1,690)	715 (1,580)	750 (1,650)	745 (1,640)	780 (1,725)	750 (1,650)	785 (1,735)
	Rear	kg (lb)	600 (1,320)	605 (1,335)	600 (1,325)	610 (1,340)	610 (1,345)	620 (1,360)	665 (1,465)	670 (1,475)	665 (1,470)	675 (1,485)	675 (1,490)	685 (1,505)
	Total	kg (lb)	1,295 (2,855)	1,340 (2,955)	1,325 (2,920)	1,370 (3,020)	1,340 (2,950)	1,385 (3,050)	1,380 (3,045)	1,420 (3,125)	1,410 (3,110)	1,455 (3,210)	1,425 (3,140)	1,470 (3,240)
Gross Vehicle Weight	Front	kg (lb)	915 (2,015)						935 (2,065)					
	Rear	kg (lb)	960 (2,115)						990 (2,180)					
	Total	kg (lb)	1,875 (4,130)						1,925 (4,245)					

*1: The weight of the air conditioner is included in the C.W.
*2: The weight of the sunroof and air conditioner is included in the C.W

NOTE: When optional parts are installed, the weight indicated in the following table is added to curb weight.

	Sunroof	Air conditioner, Cruise control and Cassette player	ABS
Front kg (lb)	9 (20)	30 (65)	14 (30)
Rear kg (lb)	14 (30)	—2 (—5)	0 (0)
Total kg (lb)	23 (50)	28 (60)	14 (30)

MODEL	FWD						4WD					
	L		LS		LS-D		L		LS		LS-D	
ITEM	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT

3. ENGINE

Engine type	Horizontally opposed, liquid cooled, 4-cylinder, 4- stroke gasoline engine
Valve arrangement	Overhead camshaft type
Bore x Stroke mm (in)	96.9 x 75 (3.815 x 2.95)
Displacement cm^3 (cu in)	2,212 (135.0)
Compression ratio	9.5
Firing order	1-3-2-4
Idling speed at N or P position rpm	700 ± 100 (No load) 850m ± 50 (Air conditioner ON)
Maximum output HP/rpm	130 at 5,600
Maximum torque N•m(kg-m, ft-lb)/rpm	186 (19.0, 137) at 2,400

4. ELECTRICAL

Ignition timing at idling speed BTDC/rpm		20° at 700
Spark plug	Type and manufacturer	NGK: BKR6E-11 NIPPON DENSO: K20PUR-11 CHAMPION: RC9YC-4
Alternator		12 V — 70 A
Battery	Type	5MT: 55D23L-MF/4AT: 75D23L-MF
	Reserve capacity min.	5MT: 99/4AT: 111
	Cold cranking amperes amp.	5MT: 356/4AT: 490

5. TRANSMISSION

Clutch type		DSPD	TC	DSPD	TC	DSPD	TC	DSPD	TC	DSPD	TC	DSPD	TC
Transmission type		*3	*5	*3	*5	*3	*5	*4	*6	*4	*6	*4	*6
Gear ratio	1st	3.545	2.785	3.545	2.785	3.545	2.785	3.545	2.785	3.545	2.785	3.545	2.785
	2nd	1.947	1.545	1.947	1.545	1.947	1.545	1.947	1.545	1.947	1.545	1.947	1.545
	3rd	1.366	1.000	1.366	1.000	1.366	1.000	1.366	1.000	1.366	1.000	1.366	1.000
	4th	0.972	0.694	0.972	0.694	0.972	0.694	0.972	0.694	0.972	0.694	0.972	0.694
	5th	0.738	—	0.738	—	0.738	—	0.738	—	0.738	—	0.738	—
	Reverse	3.416	2.272	3.416	2.272	3.416	2.272	3.416	2.272	3.416	2.272	3.416	2.272

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

MODEL			FWD						4WD					
			L		LS		LS-D		L		LS		LS-D	
ITEM			5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT
Reduction gear (Front drive)	1st reduction	Type of gear	—	Helical	—	Helical	—	Helical	—	Helical	—	Helical	—	Helical
		Gear ratio	—	1.000	—	1.000	—	1.000	—	1.000	—	1.000	—	1.000
	Final reduction	Type of gear	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid	Hypoid
		Gear ratio	3.700	3.700	3.700	3.700	3.700	3.700	4.111	4.111	4.111	4.111	4.111	4.111
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	Hypoid	Hypoid
		Gear ratio	—						4.111	4.111	4.111	4.111	4.111	4.111

6. STEERING

Type	Rack and Pinion
Turns, lock to lock	3.3
Minimum turning circle m (ft)	Wall to wall ..... 11.0 (36.1) Curb to curb 10.2 (33.5)

7. SUSPENSION

Front	Macpherson strut type, Independent			
	Coil spring	*7	Coil spring	*7
Rear	Dual link strut type, Independent			
	Coil spring	*7	Coil spring	*7

8. BRAKE

Service brake system	Dual circuit hydraulic with vacuum suspended power unit
Front	Ventilated disc brake
Rear	Disc brake
Parking brake	Mechanical on rear brakes

9. TIRE

Size	P175/70R14 84H	P185/70R14 87H
Type	Steel belted radial, Tubeless	

*7: Pneumatic suspension with height control

MODEL	FWD						4WD					
	L		LS		LS-D		L		LS		LS-D	
ITEM	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT

10. CAPACITY

Fuel tank		ℓ (US gal, Imp gal)	60 (15.9, 13.2)										
Engine oil	Upper level	ℓ (US qt, Imp qt)	4.5 (4.8, 4.0)										
	Lower level	ℓ (US qt, Imp qt)	3.5 (3.7, 3.1)										
Transmission gear oil		ℓ (US qt, Imp qt)	3.3 (3.5, 2.9)	—	3.3 (3.5, 2.9)	—	3.3 (3.5, 2.9)	—	3.3 (3.5, 2.9)	—	3.5 (3.7, 3.1)	—	3.5 (3.7, 3.1)	—
Automatic transmission fluid		ℓ (US qt, Imp qt)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)	—	8.3 (8.8, 7.3)
AT differential gear oil		ℓ (US qt, Imp qt)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)	—	1.4 (1.5, 1.2)
4WD rear differential gear oil		ℓ (US qt, Imp qt)	—						0.8 (0.8, 0.7)					
Power steering fluid		ℓ (US qt, Imp qt)	0.7 (0.7, 0.6)											
Engine coolant		ℓ (US qt, Imp qt)	6.0 (6.3, 5.3)											

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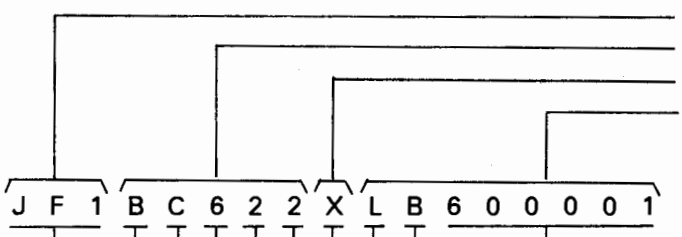
2. THE MEANING OF V.I.N.



- Maker identifier
- Vehicle attributes
- Check digit
- Vehicle identification
- Sequential number
  - 500001 and after: Touring Wagon
  - 600001 and after: 4-Door Sedan
  - 900001 and after: Station Wagon
- Plant of manufacture and transmission type

Plant of manufacture		Transmission type
FHI	SIA	
B	1	FWD 5MT
G	6	Full-time 4WD 5MT
H	7	Full time 4WD 4AT
K	9	FWD 4AT

- Model year
  - L: 1990
- Check digit
  - 0 through 9 and X, varies
- Weight class and restraint type
  - Passenger car
    - 1: Without passive restraint
    - 2: With passive restraint
  - MPV
    - C: 4,001 to 5,001 lb
- Model
  - 2: (base model)
  - 3: L
  - 4: LS
  - 5: LS-D
- Engine type
  - 6: 2.2 liter engine
- Body type
  - C: 4-Door sedan
  - J: Station Wagon
  - F: Touring Wagon
- Line
  - B: SUBARU B line
- Plant of manufacture and type of vehicl0e

Plant of manufacture		Type of vehicle
FHI	SIA	
JF1	4S3	Passenger car
JF2	4S4	MPV

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T TROUBLESHOOTING
2. Engine Noise

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 troubleshooting procedures in accordance with the following table.
For MPFI system engines, do not disconnect spark plug cord 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 gear. ● Worn camshaft journal bore in crankcase.
Squeaky sound.	—	● Insufficient alternator lubrication.
Rubbing sound.	—	● Defective alternator brush and rotor contact.

Type of sound	Condition	Possible cause
Gear scream when starting engine.	—	● Defective ignition starter switch. ● Worn gear and starter pinion.
Sound like polishing glass with a dry cloth.	—	● Loose drive belt. ● Defective water pump shaft.
Hissing sound.	—	● Loss of compression. ● Air leakage in air intake system, hoses, connections or manifolds.
Timing belt noise.	—	● Loose timing belt. ● Belt contacting case/adjacent part.
Distributor gear noise.	—	● Worn gear.

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T TROUBLESHOOTING

7. Troubleshooting Chart with Trouble Code

N: TROUBLE CODE (42) — IDLE SWITCH —

CONTENT OF DIAGNOSIS:
Abnormal voltage input entered from idle switch

TROUBLE SYMPTOM:
- Erroneous idling
- Engine stall
- Poor driving performance

1. Check voltage between ECU and body.
   - OK → Repair ECU terminal poor contact. (Replace ECU.)
   - Not OK ↓
2. Check idle switch.
   - Not OK → Adjust idle switch. (Replace idle switch.)
   - OK ↓
3. Check harness connector between ECU and idle switch.
   - Not OK → Repair harness/connector.
   - OK ↓

Repair ECU terminal poor contact. (Replace ECU.)

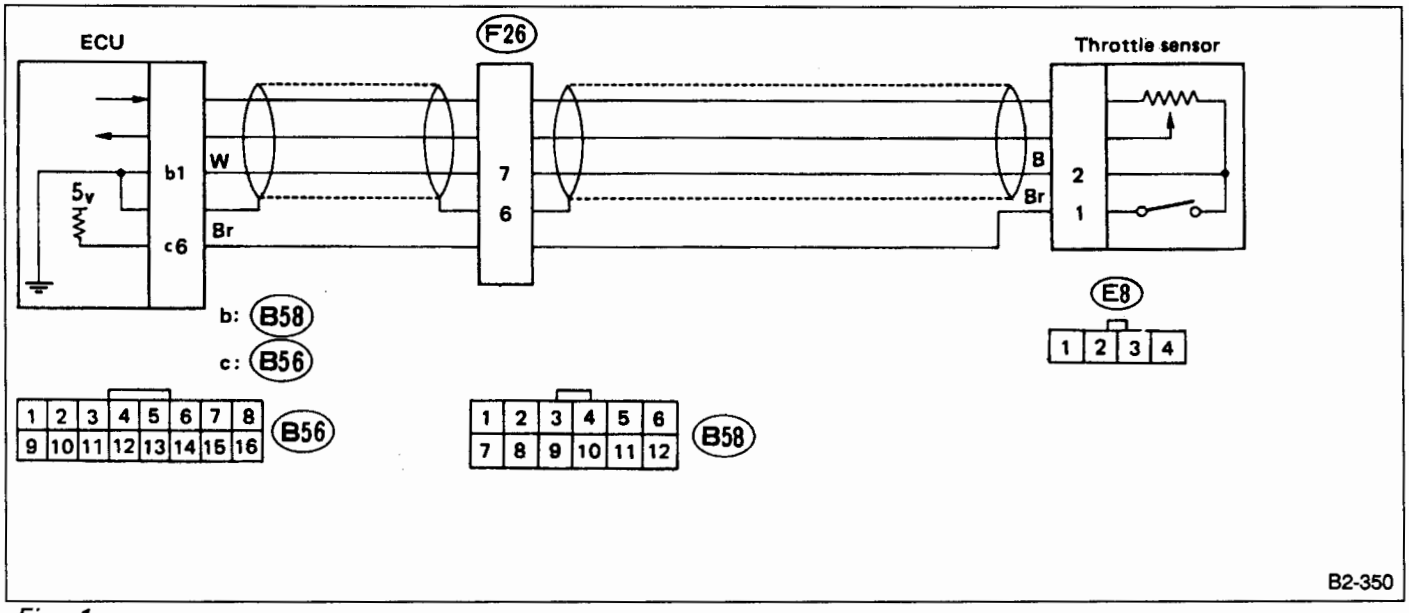

Fig. 1

1. Check voltage between ECU and body.

1) Turn ignition switch to ••ON."
2) Measure voltage between ECU connector terminal and body.

Connector & Terminal/Specified voltage:
(B56) No. 6 — Body/ 0 V (Throttle is fully closed.)
Approx.4.6 V (Throttle is open.)

2. Check idle switch.

1) Disconnect connector from throttle sensor.
2) Check continuity between throttle sensor idle switch terminals.

Terminal/Specified resistance:
No. 1 — No. 2 /0 Ω (Throttle is fully closed.)
1 MΩ, min. (Throttle is fully open.)

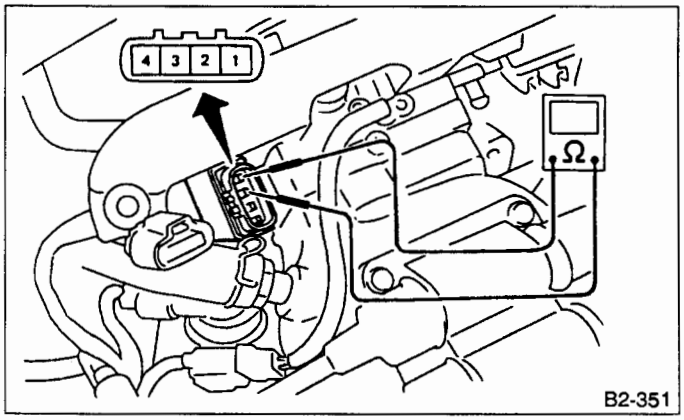

Fig. 2

3). If resistance is outside specifications, adjust idle switch as follows (Before replacement of throttle sensor):
Insert a thickness gauge between the stopper screw of the throttle body and the stopper (Portion G), and check for continuity between terminal No. 1 and No. 2.
(1) Make sure that No.1 and No. 2 are conducting when the throttle is closed fully.
(2) Make sure that No. 1 and No. 2 are conducting when the thickness gauge is 0.7 mm (0.028 in).
(3) Make sure that No. 1 and No. 2 are not conducting when the thickness gauge is 0.9 mm (0.035 in).

(4) If the above standards are not satisfied, loosen the screws (two) securing the throttle sensor to the throttle body, and turn the throttle sensor main body until the correct adjustment is obtained.

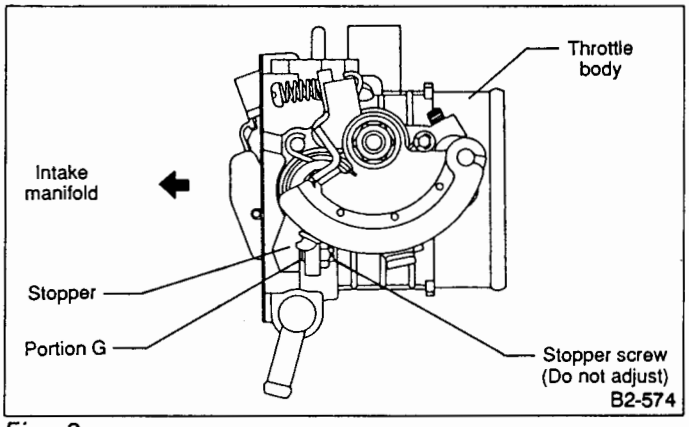

Fig. 3

3. Check harness connector between ECU and idle switch.

1) Disconnect connectors from ECU and throttle sensor.
2) Measure resistance between ECU connector and throttle sensor connector.

Connector & Terminal/Specified resistance:
(B56) No. 6 — (E8) No. 1/0 Ω
(B58) No. 1 — (E8) No. 2/0 Ω

3) Measure resistance between throttle sensor connector and body.

Connector & Terminal/Specified resistance:
(E8) No. 1 — Body/1 MΩ, min.
No. 2 — Body/1 MΩ, min.

• SELECT MONITOR FUNCTION MODE

Mode: A1
LED No.: 1
Condition: Ignition switch ON
ON/OFF Signal: LED OFF (Idle switch OFF)
LED ON (Idle switch ON)

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M MECHANISM AND FUNCTION

1. Outline

The heater control unit is located in the middle portion of the instrument panel.
The heater unit is provided with mode doors and an air mix door. The intake unit is provided with an intake door and blower motor. The heater unit and the intake unit are regulated by their control units.

Fresh outside air is introduced into the compartment through the center and side ventilator grilles when the blower fan is operated.
A high performance heater system is adopted. All models are equipped with the front side window defroster and all models are further equipped with the rear heater duct.

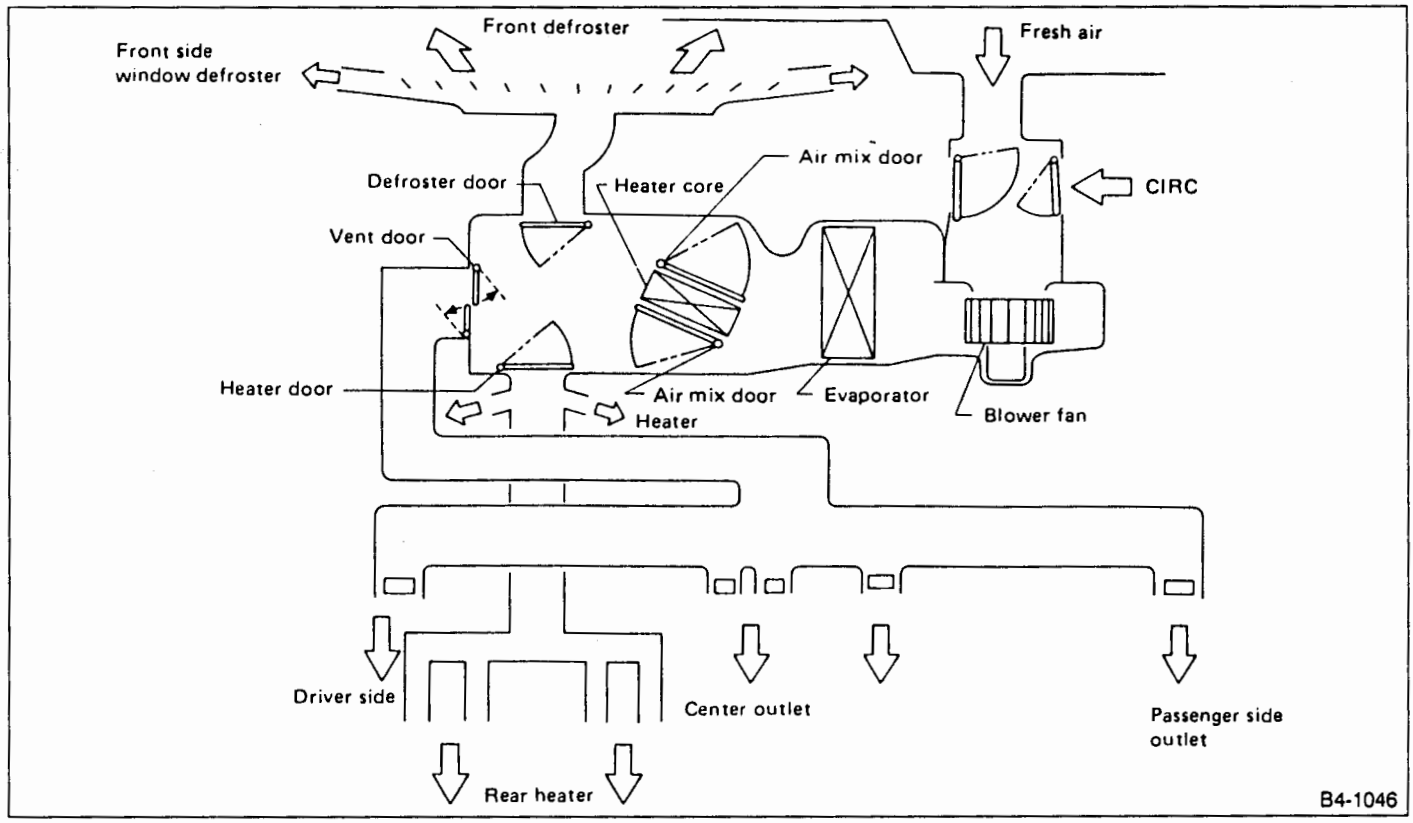


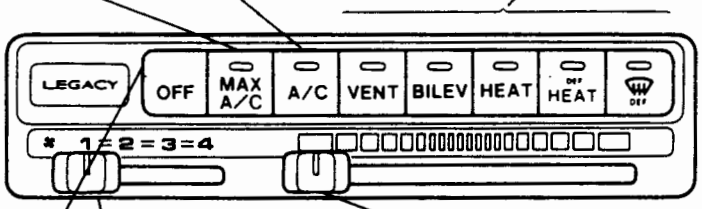
Fig. 1

2. Switch Functions — Manual A/C

A/C SWITCH	
COMPRESSOR	ON
AIR OUTLET	VENT
INTAKE DOOR POSITION	FRESH POSITION
REMARKS	For vehicle without A/C. blind plug is put on A/C SW position

MODE SELECTOR SWITCH					
SWITCH POSITION	VENT	BILEV	HEAT	DEF HEAT	DEF
AIR OUTLET	VENT	VENT HEAT	HEAT	DEF HEAT	DEF
COMPRESSOR	OFF			ON	
INTAKE DOOR POSITION	FRESH POSITION				
FAN SPEED	1st to 4th SPEED				

MAX A/C SWITCH	
COMPRESSOR	ON
AIR OUTLET	VENT
INTAKE DOOR POSITION	CIRC POSITION
REMARKS	
For vehicle without A/C. CIRC SW is put on MAX A/C SW position.	



TEMPERATURE CONTRQL LEVER
Air temperature can be variably controled from COLD to HOT.

OFF SWITCH	
INTAKE DOOR POSITION	FRESH POSITION
AIR OUTLET	HEAT
FAN SPEED	OFF
COMPRESSOR	OFF
REMARKS	
Fresh air comes in by means of Ram pressure.	

FAN SWITCH				
FAN SPEED	1st	2nd	3rd	4th
REMARKS				
OFF switch is operated when Fan switch needs to be OFF.				

* For Automatic Climate Control System equipped model, refer to 4-7 section.

Fig. 2

3. Mode Selector Switch and Air Flow — Manual A/C

A: AIR FLOW

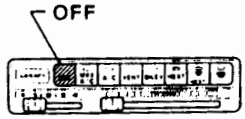
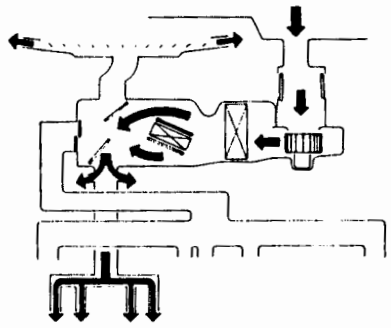
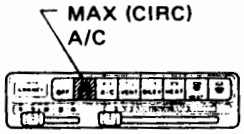
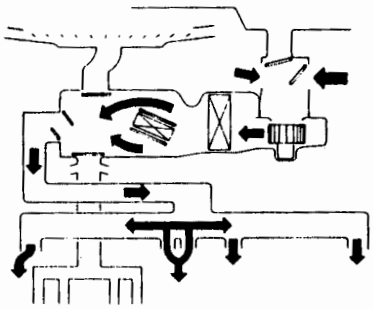
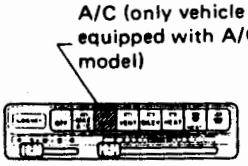
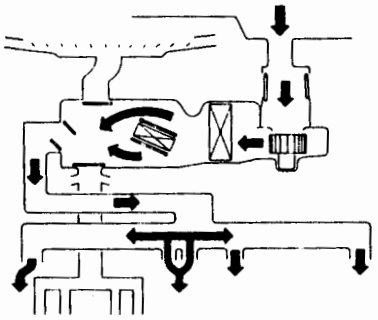
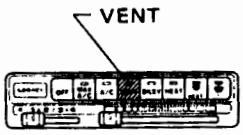
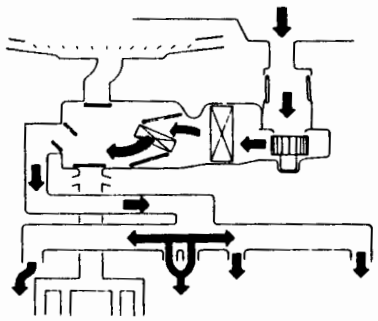
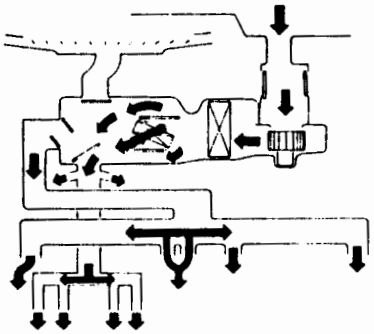
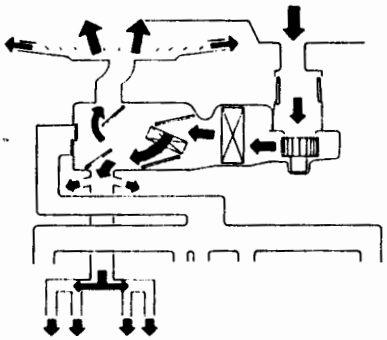
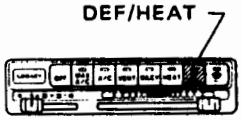
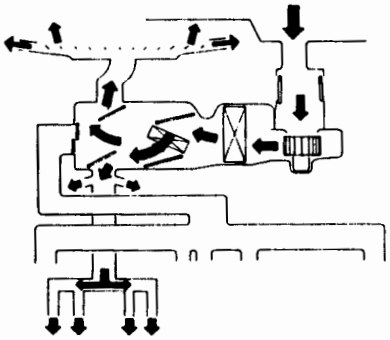
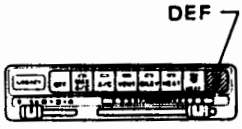
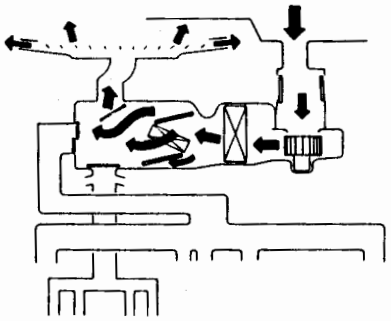
Mode selector switch position	Position of other levers	Air flow
	• Temperature control lever COLD to HOT • Air outlet HEAT	
	• Temperature control lever COLD • Fan switch lever 1st to 4th	
	• Temperature control lever COLD • Fan switch lever 1st to 4th	
	• Temperature control lever COLD to HOT • Fan switch lever 1st to 4th	

Fig. 3

B4-1021

Mode selector switch position	Position of other levers	Air flow
BILEV 	• Temperature control lever COLD to HOT (Middle position) • Fan switch lever 1st to 3rd • Setting temperature control lever to middle position allows heater side to maintain more warmth than ventilation side.	
HEAT 	• Temperature control lever HOT • Fan switch lever 1st to 4th	
DEF/HEAT 	• Temperature control lever HOT • Fan switch lever 1st to 4th	
DEF 	• Temperature control lever HOT • Fan switch lever 1st to 4th	

For Automatic Climate Contorol system,refer to section 4-7.

B4-1022

Fig. 4

B: AIR DISTRIBUTION RATIO

Figure shows air distribution ratios corresponding to mode door position.

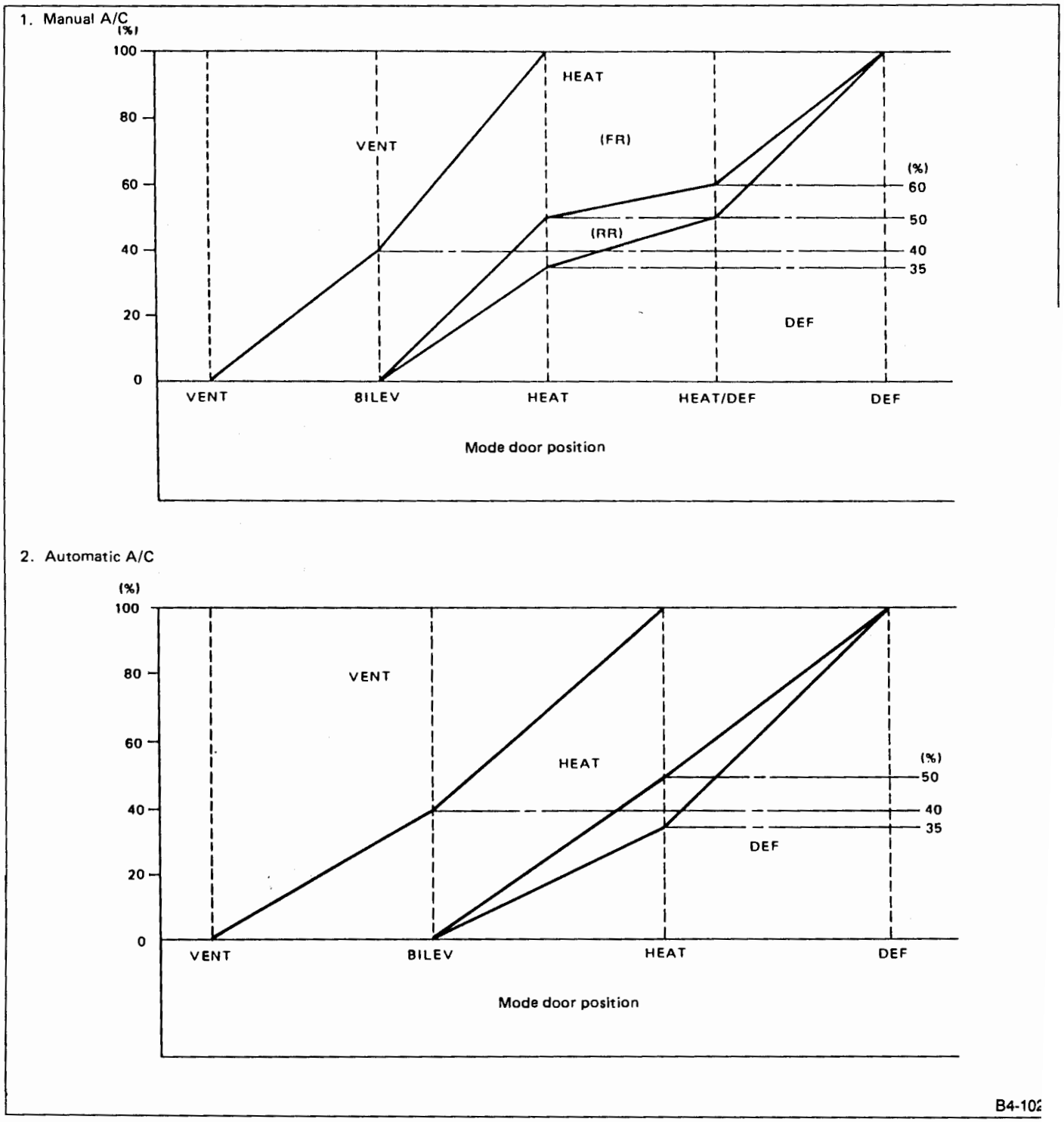


Fig. 5

C: SYSTEM FLOW

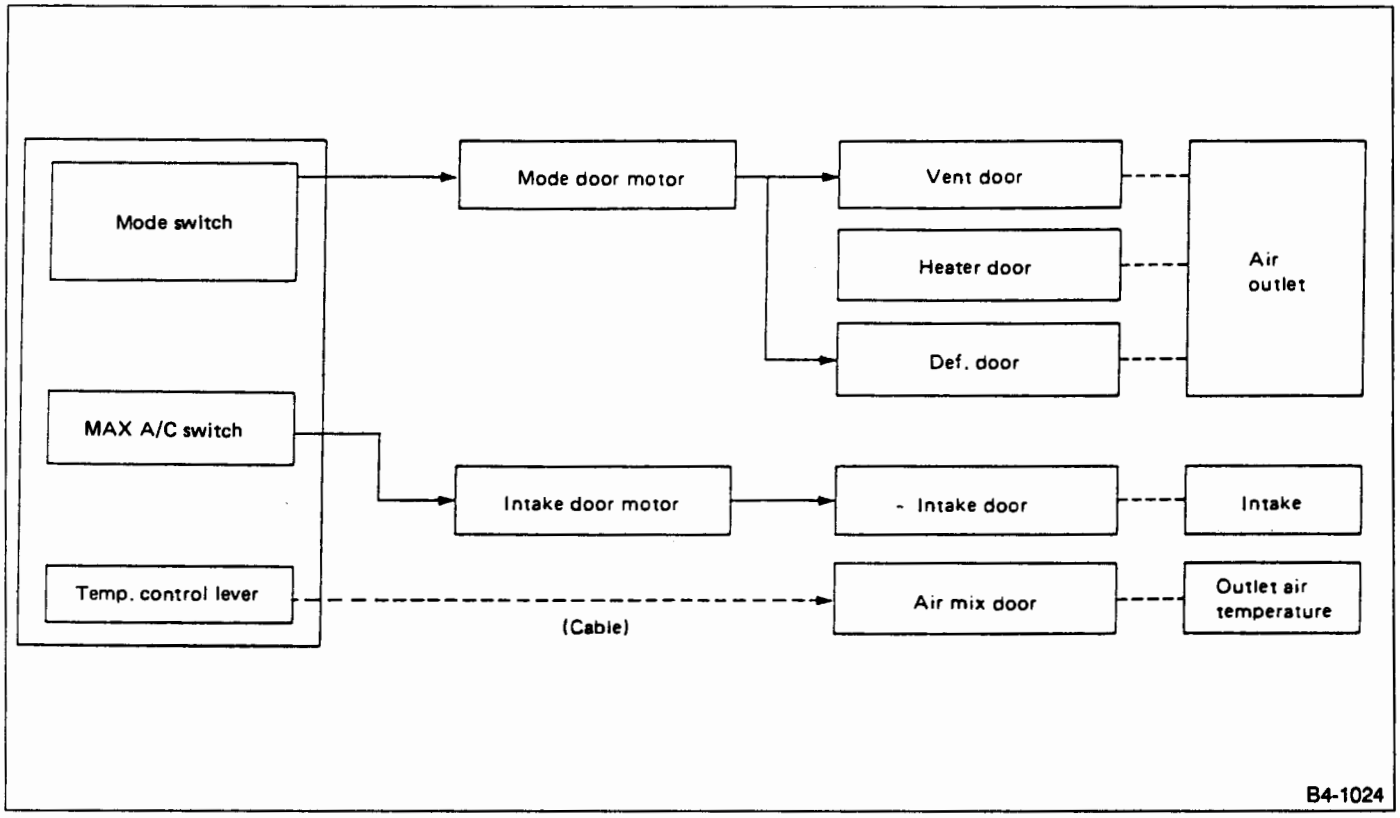
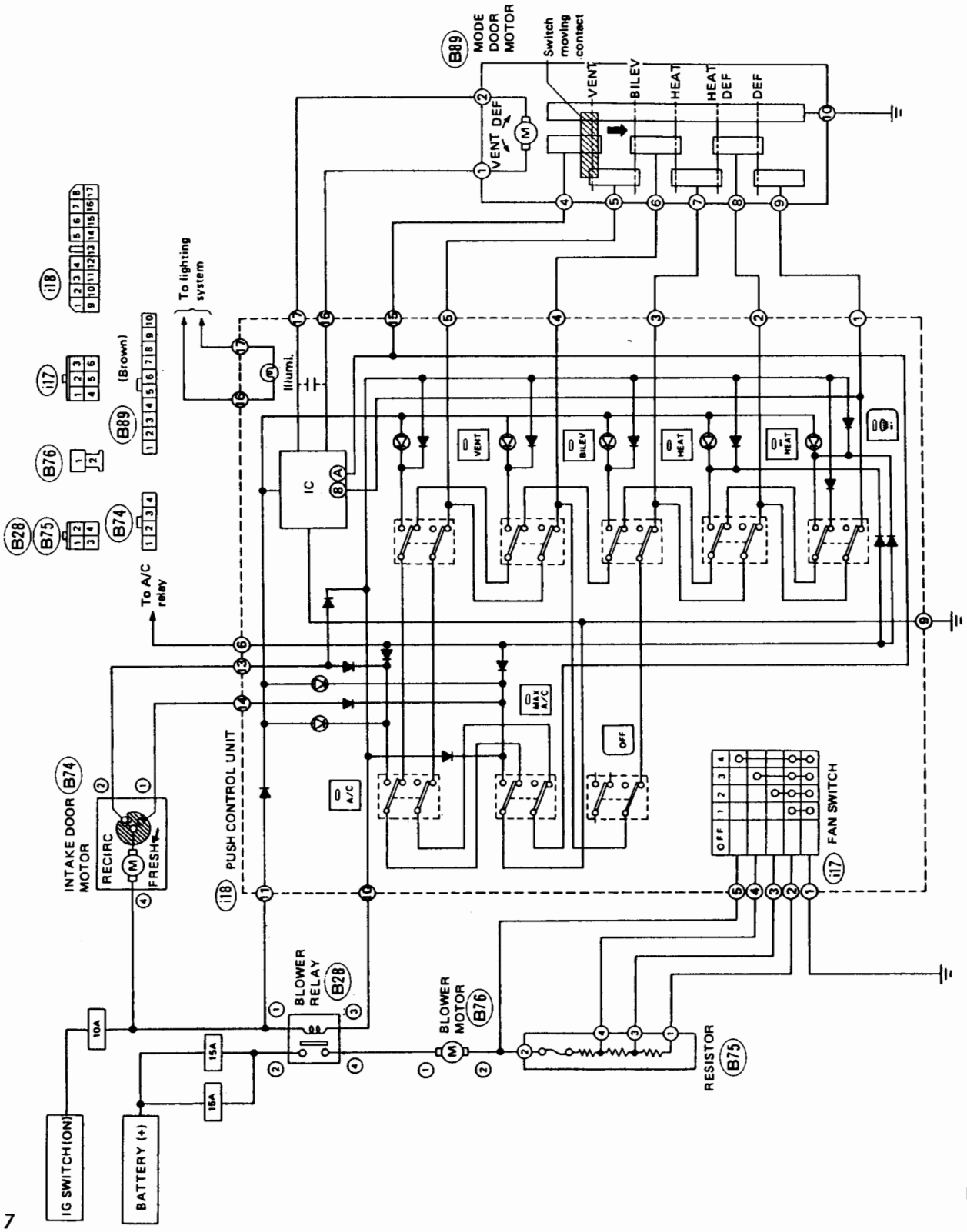


Fig. 6

For Automatic Climate Contorol system,refer to section 4-7.

4. Control Unit

A: SCHEMATIC



B4-1025

Fig. 7

5. Mode Door Control

The mode door motor is located on the left side of the heater unit.

The mode door motor is located on the left side of the heater unit. It opens and closes the vent, heater and defroster doors through side links.

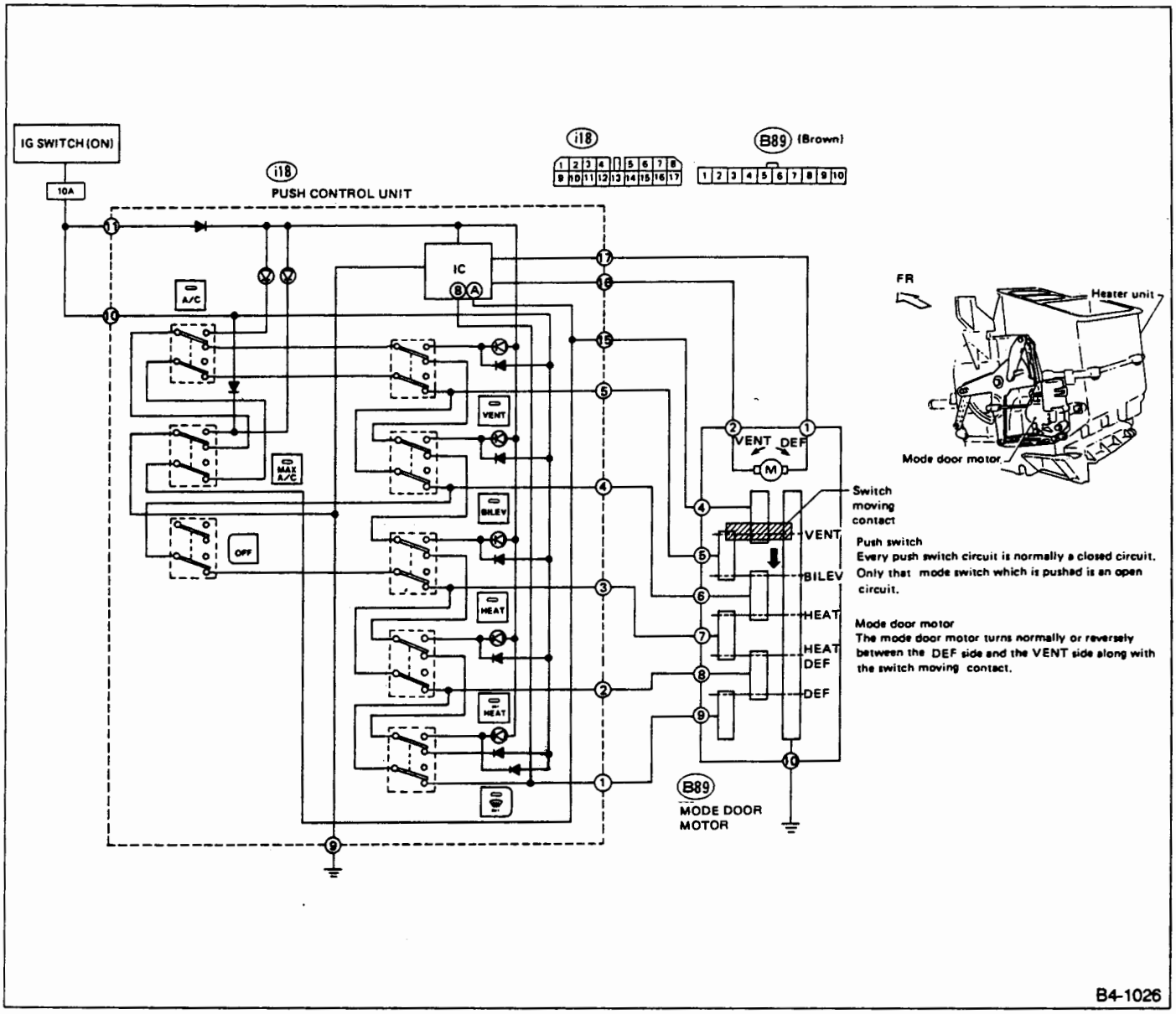


Fig. 8

Operation

1) When motor is stopped:

Both the mode switch and the position switch in mode door motor move together. Current flows from the position switch in the mode door motor to body ground through IC circuits A and B which switch off the mode door motor.

2) When motor is operating:

Current flows to mode door motor from IC circuits A or B whichever corresponds with the pressed mode switch.

While circuit A becomes minus circuit, 12 volts exists at terminal and terminalof mode door motor becomes body ground in circuit B.

As a result, the motor and switch moving contact move together toward DEF position.

While circuit B becomes minus circuit, 12 bolts exists at terminal ② and terminal ① of mode door motor becomes body ground in circuit A.

As a result, the motor and switch moving contact move together toward VENT position.

3) After the switch moving contact teaches DEF or VENT position, a shortcircuit between circuits A and B is completed.

Then the motor operation stops.

6. Intake Door Control

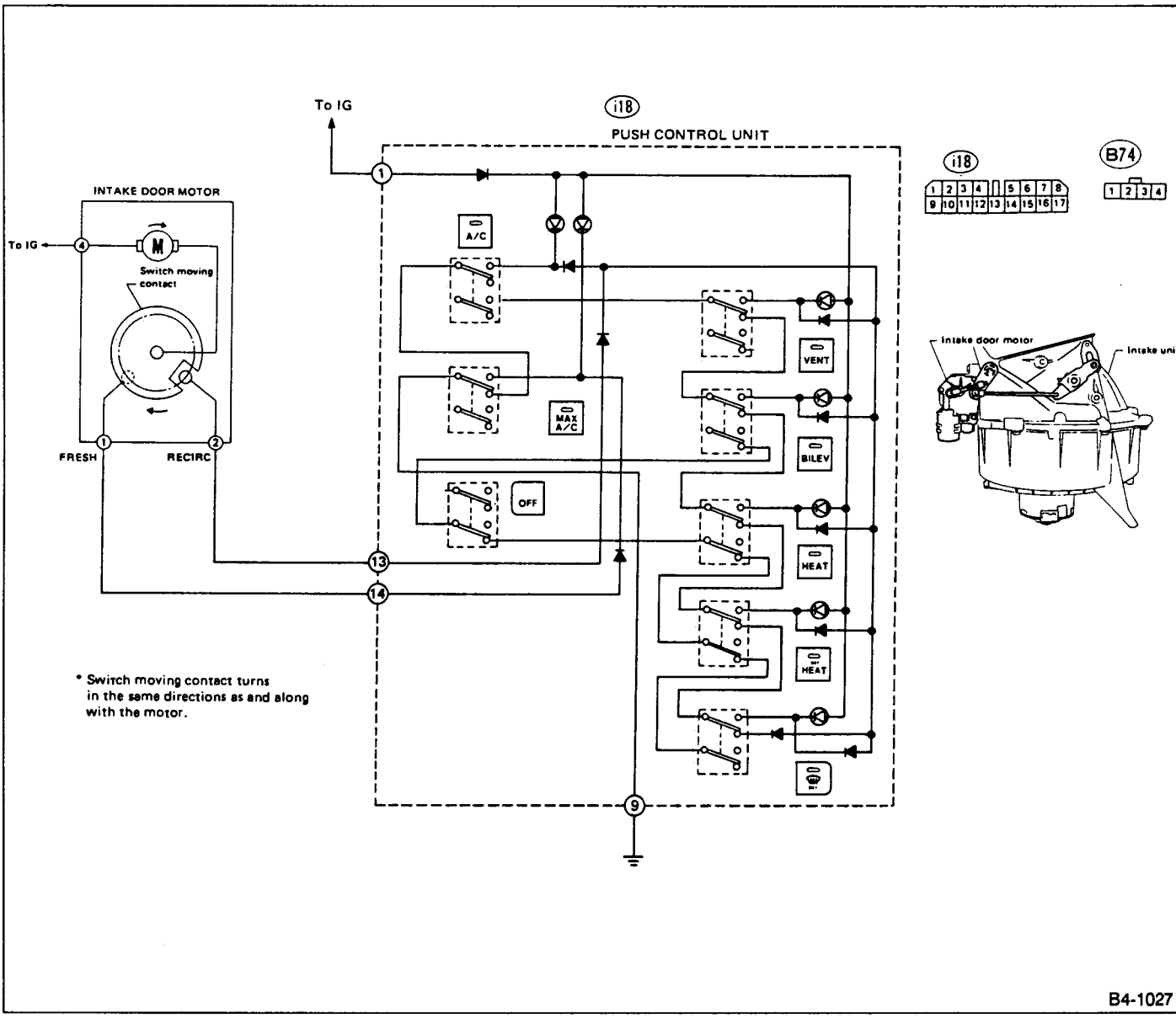


Fig. 9

Intake door motor is located on the upper part of the intake unit. It opens and closes the intake door with a rod and a link. When the MAX A/C switch is set to ON the ground line of the intake door motor is switched to terminal 2 from terminal 1. and the motor starts to rotate because the position switch contacts built into it are set to the current flow position. The contacts turn along with the motor. When they reach the non-contact flow position, the motor will stop. The motor always turns in the same direction. When the MAX A/C switch is set to OFF follow the same operation.

7. Blower System

Operation of the blower relay is controlled by turning ON and OFF the ignition switch. When the ignition switch is ON and the fan switch is operated from 1st to 4th speed, electric current from the battery goes through the blower motor, the resistor, the fan switch and ground. The resistor is switched by the position of the fan switch, and controls the blower motor speed from 1st to 4th.

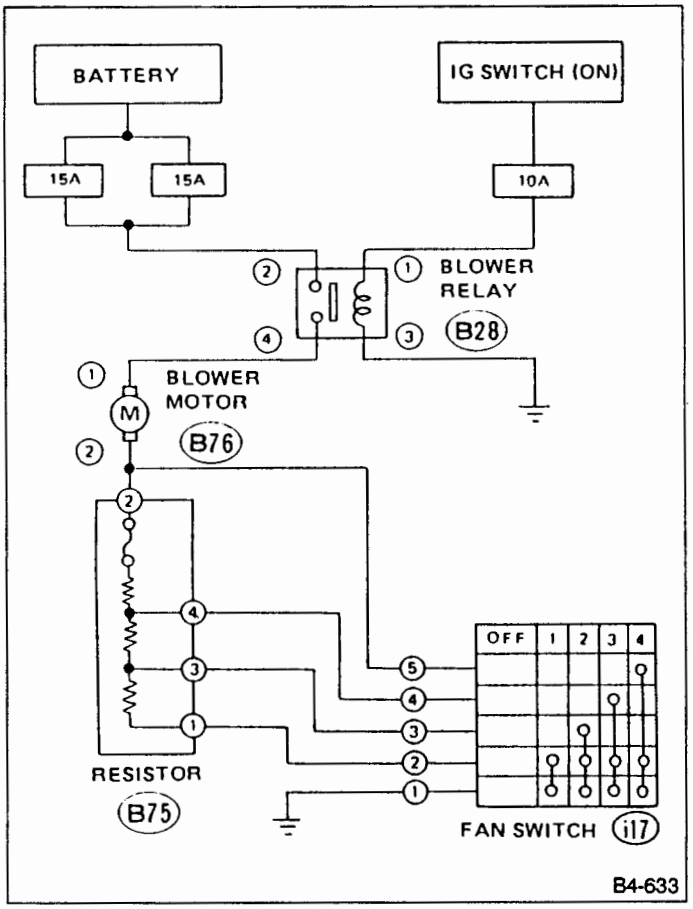


Fig. 10

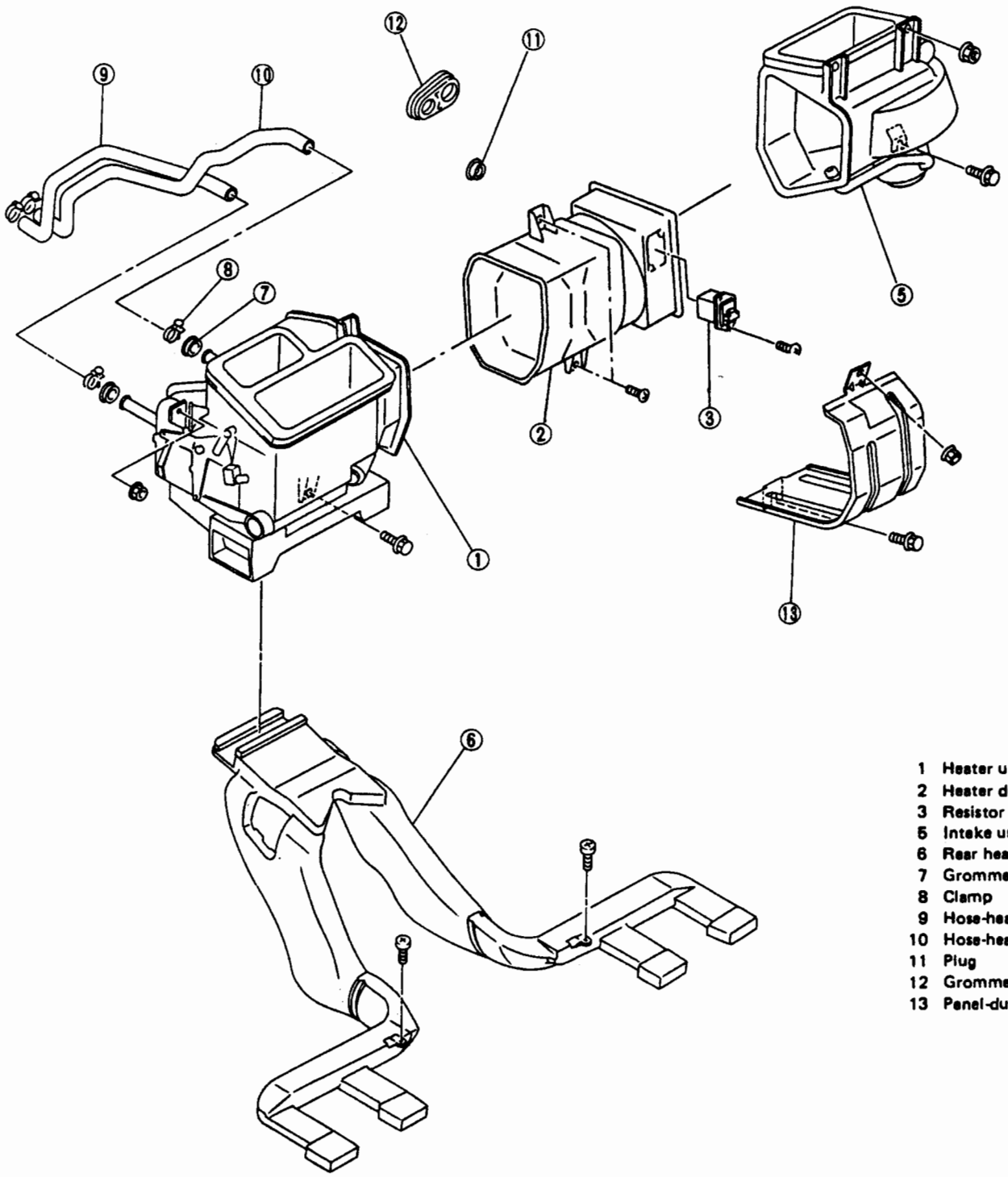
S SPECIFICATIONS AND SERVICE DATA

A: SPECIFICATIONS

Item		Specifications	Condition
Heating capacity		4.768 kW (4,100 kcal/h, 16,269 BTU/h)	• Mode selector switch : HEAT • Temp. control lever : Full hot • Temperature difference between hot water and inlet air : 65°C (149°F) • Hot water flow rate : 360 ℓ/h (95.1 US gal/h, 79.2 Imp gal/h)
Air flow rate		300 m^3/h (10,593 cu ft/h)	—
Max air flow rate		510 m^3/h (18,008 cu ft/h)	• Temperature control lever : Full cold • Blower fan speed : 4th position • Mode switch position : MAX A/C
Heater core size (height x length x width x thickness)		192.4 x 152.0 x 25.0 x 1.8 mm (7.57 x 5.98 x 0.984 x 0.071 in)	—
Blower motor	Type	Magnet motor 250 W or less	at 12,5 V
	Fan type & Size (diameter x width)	Sirocco fan type 150 x 65 mm (5.91 x 2.56 in)	—

C COMPONENT PARTS

1. Heater System

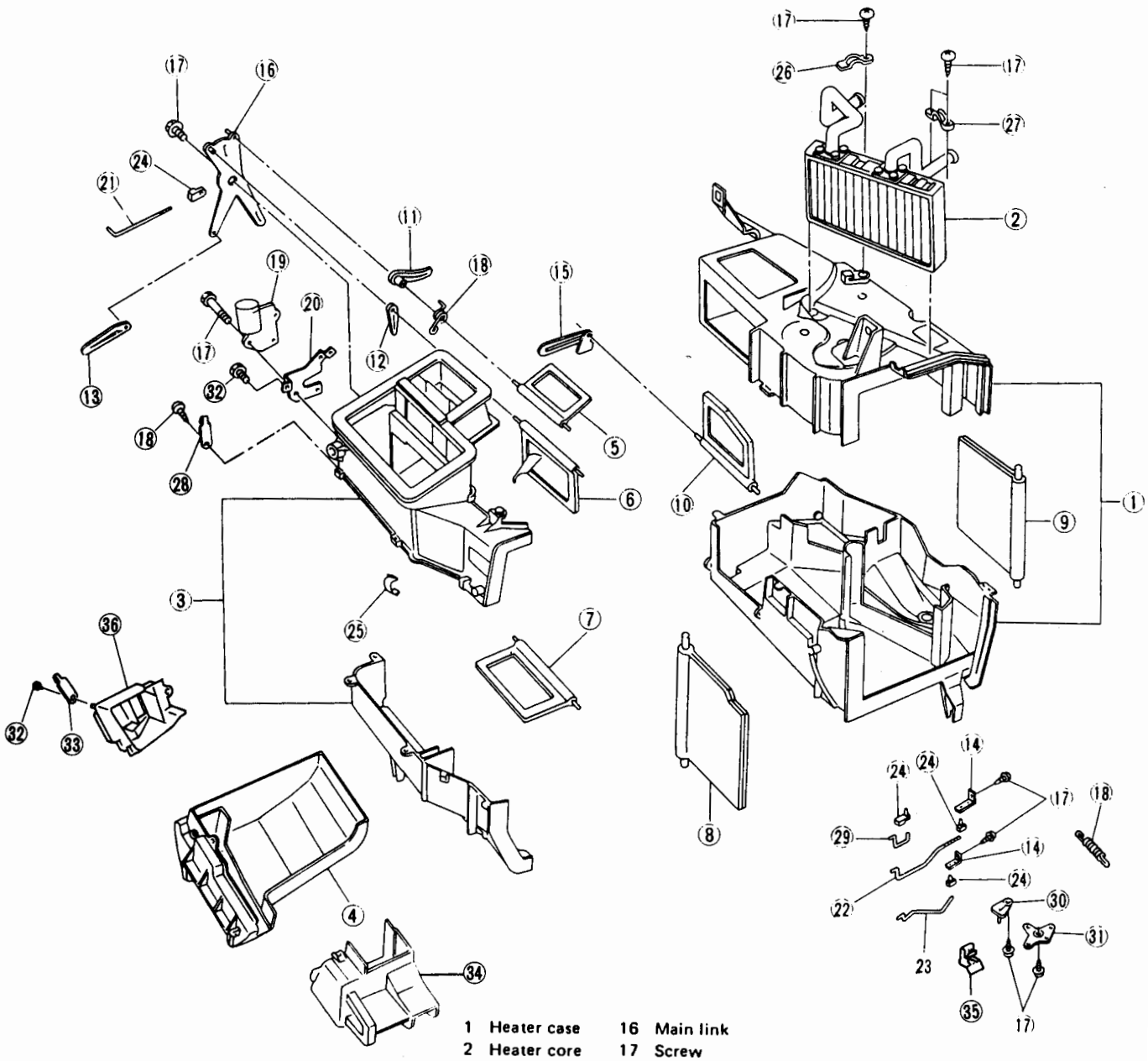


1 Heater unit
2 Heater duct
3 Resistor
5 Inteke unit
6 Rear heater duct
7 Grommet
8 Clamp
9 Hose-heater inlet
10 Hose-heater outlet
11 Plug
12 Grommet
13 Panel-duct

B4-265

Fig. 11

2. Heater Unit — Manual A/C

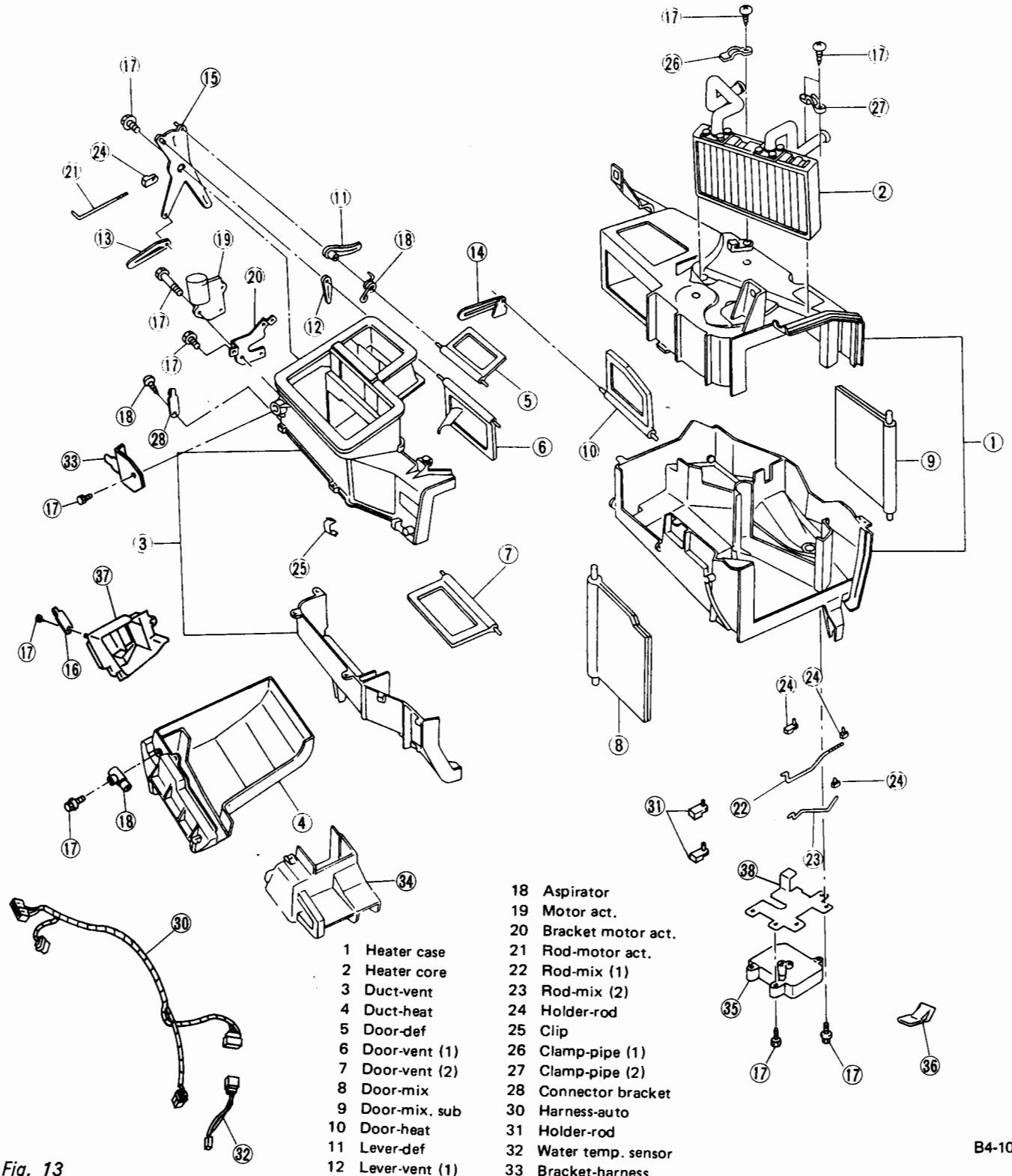


1	Heater case	16	Main link	31	Link-mix (2)
2	Heater core	17	Screw	32	Screw tapping
3	Duct-vent	18	Spring	33	Bracket
4	Duct-heat	19	Motor act.	34	Assist foot duct
5	Door-def	20	Bracket motor act.	35	Clamp cable
6	Door-vent (1)	21	Rod-motor act.	36	Driver foot duct
7	Door-vent (2)	22	Rod-mix (1)		
8	Door-mix	23	Rod-mix (2)		
9	Door-mix, sub	24	Holder-rod		
10	Door-heat	25	Clip		
11	Lever-def	26	Clamp-pipe (1)		
12	Lever-vent (1)	27	Clamp-pipe (2)		
13	Lever-vent (2)	28	Connector bracket		
14	Lever-mix	29	Rod-mix (3)		
15	Lever-heat	30	Link-mix (1)		

B4-10

Fig. 12

– Automatic A/C

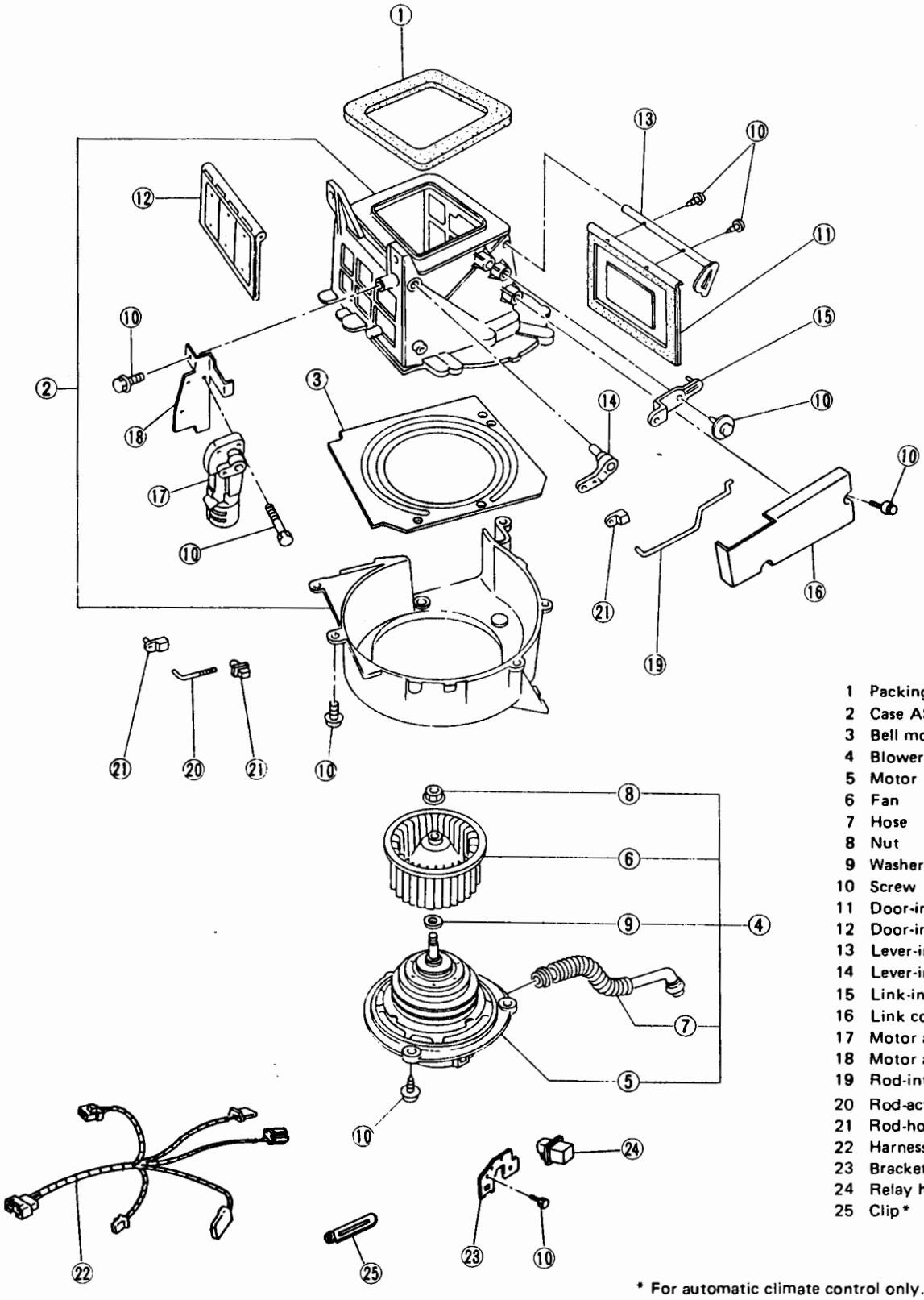


1 Heater case
2 Heater core
3 Duct-vent
4 Duct-heat
5 Door-def
6 Door-vent (1)
7 Door-vent (2)
8 Door-mix
9 Door-mix, sub
10 Door-heat
11 Lever-def
12 Lever-vent (1)
13 Lever-vent (2)
14 Lever-heat
15 Main link
16 Bracket
17 Screw
18 Aspirator
19 Motor act.
20 Bracket motor act.
21 Rod-motor act.
22 Rod-mix (1)
23 Rod-mix (2)
24 Holder-rod
25 Clip
26 Clamp-pipe (1)
27 Clamp-pipe (2)
28 Connector bracket
30 Harness-auto
31 Holder-rod
32 Water temp. sensor
33 Bracket-harness
34 Assist foot duct
35 Air mix door motor
36 Spring-water sensor
37 Driver foot duct
38 Air mix door motor bracket

B4-1029

Fig. 13

3. Intake Unit



1 Packing-Intake
2 Case ASSY-Intake
3 Bell mouth-Intake
4 Blower ASSY
5 Motor
6 Fan
7 Hose
8 Nut
9 Washer
10 Screw
11 Door-intake A
12 Door-intake B
13 Lever-intake A
14 Lever-intake B
15 Link-intake
16 Link cover
17 Motor act-intake
18 Motor act bracket-intake
19 Rod-intake
20 Rod-actuator
21 Rod-holder
22 Harness*
23 Bracket harness*
24 Relay hi *
25 Clip*

* For automatic climate control only.

Fig. 14

B4-1030

W SERVICE PROCEDURE

1. Heater Unit

A: REMOVAL

1) Remove heater hoses (inlet, outlet) in engine compartment.
Drain as much coolant from heater unit as possible, and plug disconnected hose with cloth.
2) Disconnect temperature control cable and door motor joint connectors (mode, intake) from heater unit and intake unit.
3) Remove instrument panel.
〈Refer to 5-4.〉
4) Remove cooling unit ASSY.
〈Refer to 4-7.〉
5) Remove heater unit.

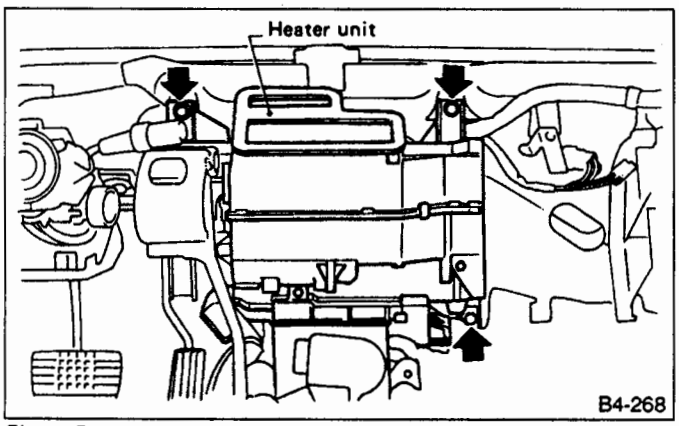


Fig. 15

B: INSTALLATION

Installation is in the reverse order of removal.

Fitted length of heater hose over pipe:
20 — 25 mm (0.79 — 0.98 in)

Heater unit mounting bolt tightening torque:
5.4 — 9.3 N•m (0.55 — 0.95 kg-m, 4.0 — 6.9 ft-lb)

2. Blower Motor Assembly

A: REMOVAL

1) Remove glove box.

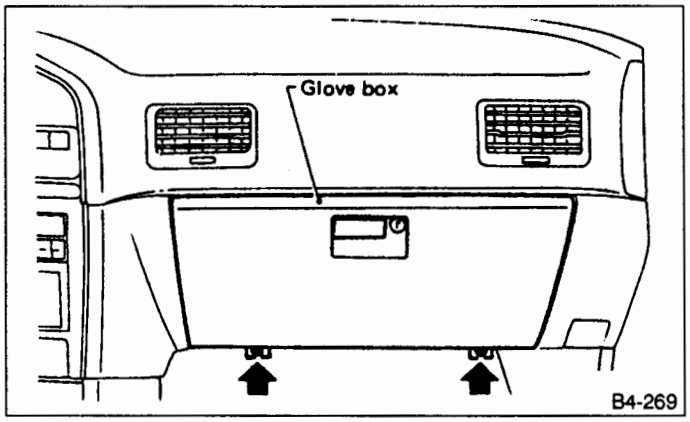


Fig. 16

2) Remove heater duct. (or cooling unit for A/C equipped vehicles.)
3) Disconnect intake door motor harness connector.
4) Disconnect blower motor harness connector.
5) Remove blower motor mounting bolts and nuts.

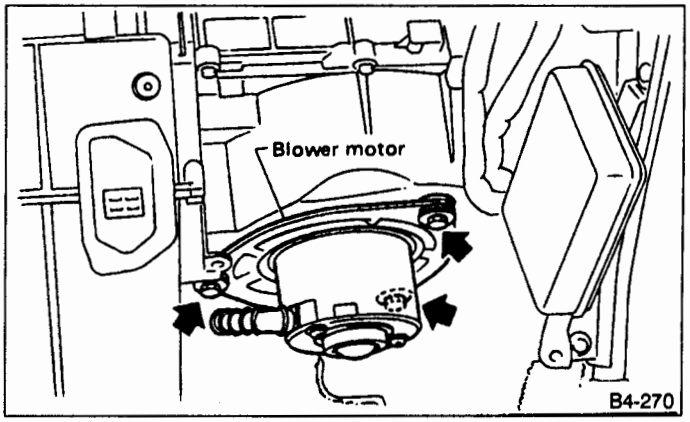


Fig. 17

6) Remove blower motor assembly.

3. Control Unit — Manual A/C

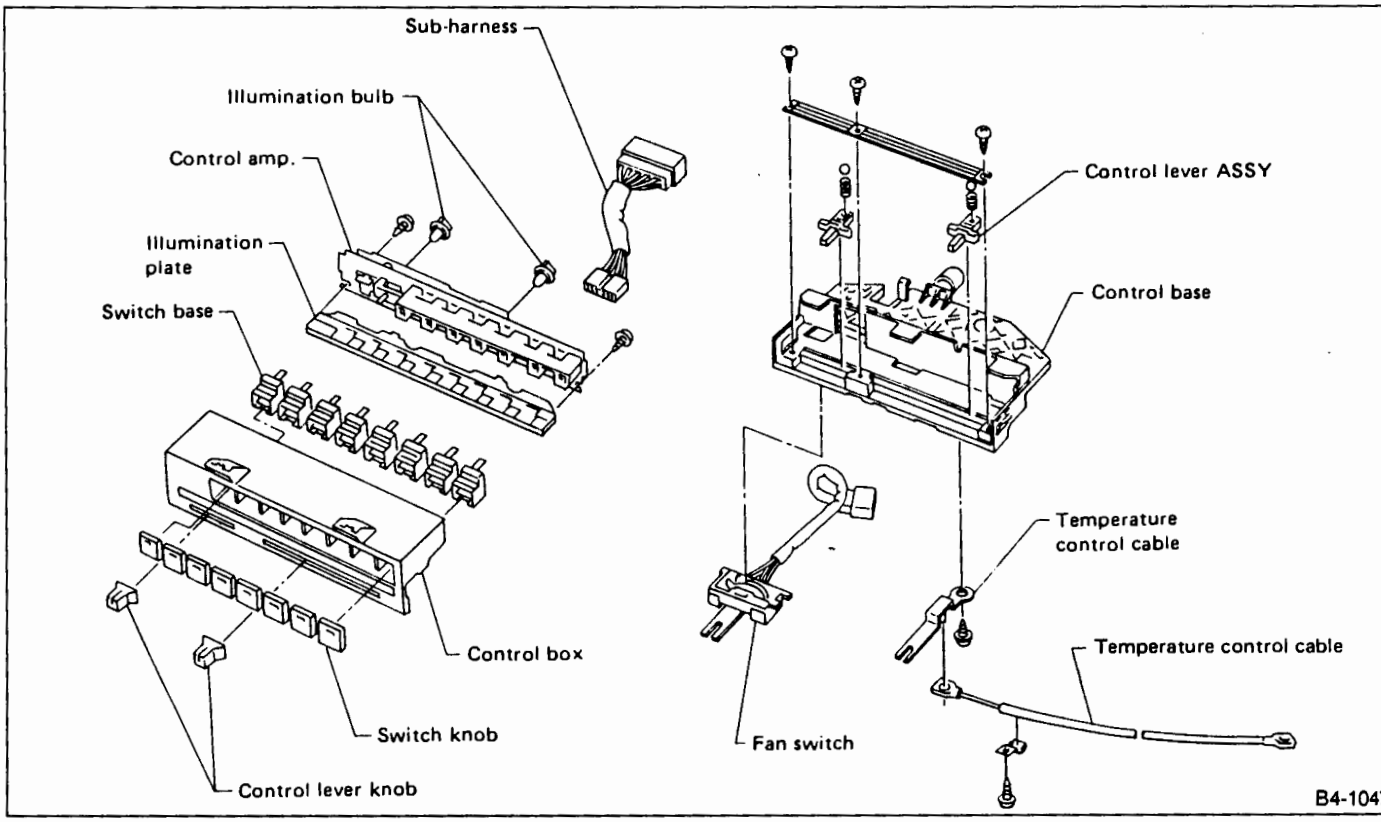


Fig. 18

A: REMOVAL

1) Remove temperature control cable from heater unit.
2) Remove visor A.
(Refer to chapter "INSTRUMENT PANEL".)
3) Disconnect push control unit harness connectors.
4) Remove push control unit assembly.

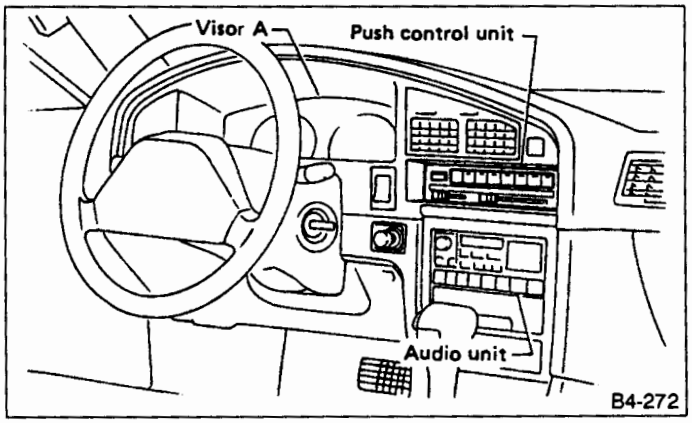


Fig. 19

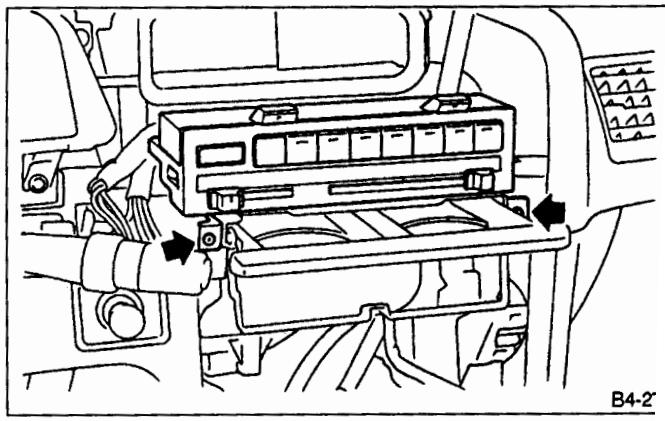


Fig. 20

B: DISASSEMBLY

1) Remove the two control knobs.
2) Remove the switch knobs.

While pushing the switch knob locking retainer with a pointed pin driver, remove switch knob in the direction of the arrow.

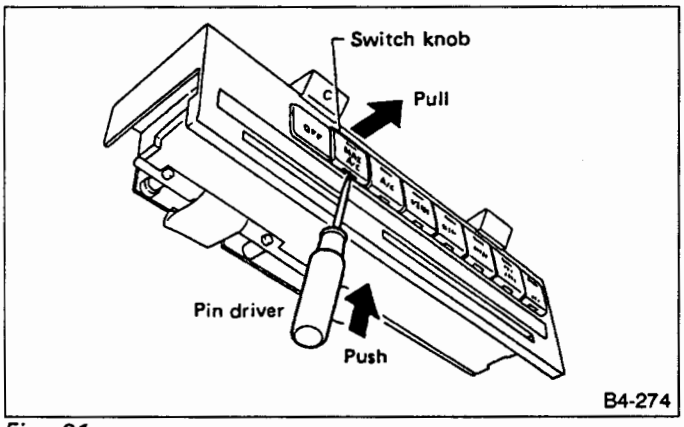


Fig. 21

3) Disconnect push control sub harness connector.
4) Remove control base.

Unfasten locks on each side of control base in the direction of the arrow, and remove control base from control box.

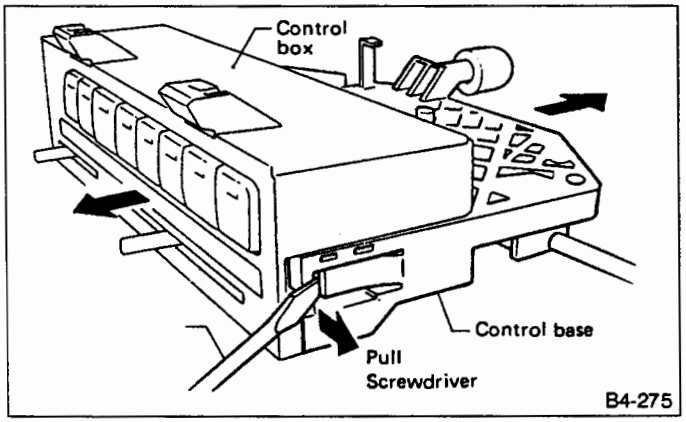


Fig. 22

5) Remove fan switch.

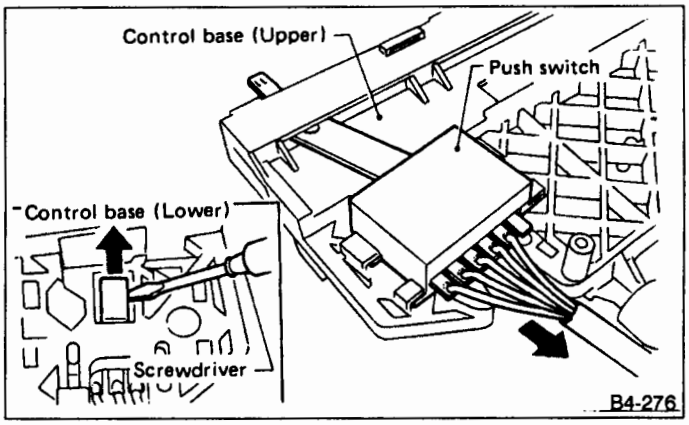


Fig. 23

6) Remove temperature control cable and lever.
7) Remove illumination bulbs.

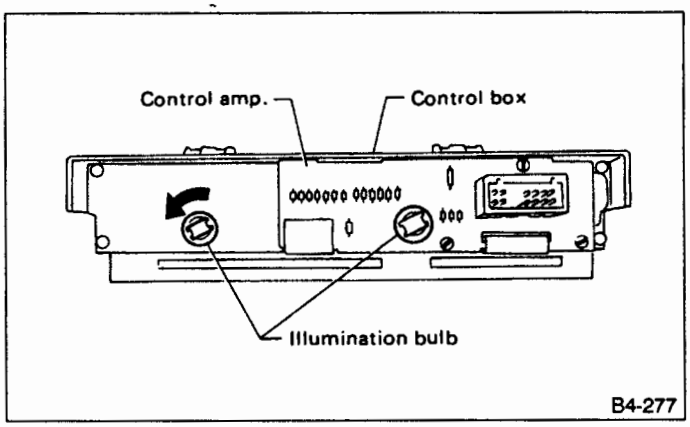


Fig. 24

C: ADJUSTMENT

1) Operate temperature control lever to "FULL COLD."
2) Install control cable to lever. While pulling outer cable, secure control cable with a clamp.

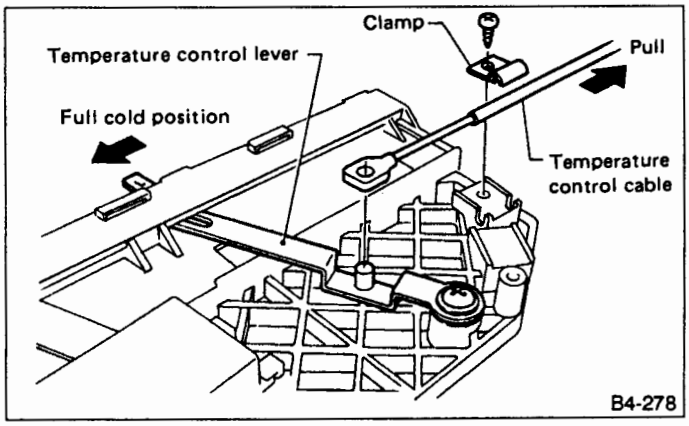


Fig. 25

D: ASSEMBLY

Assembly is in the reverse order of disassembly.

E: INSTALLATION

Installation is in the reverse order of removal.

F: INSPECTION

1. FAN SWITCH

Check continuity between terminals at each switch position.

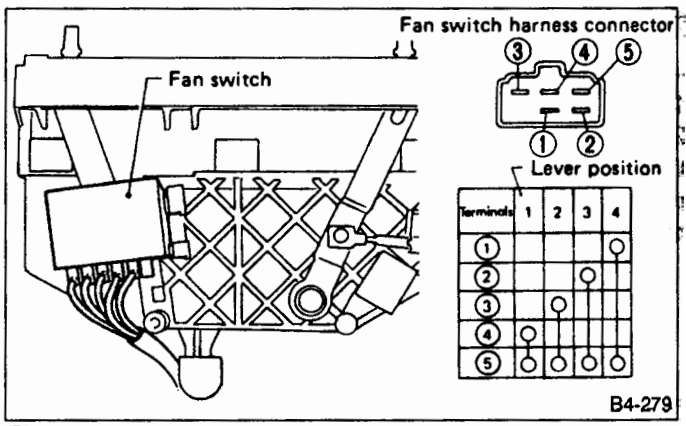


Fig. 26

2. CONTROL UNIT

1) Ignition switch is turned OFF.
2) Disconnect connector from control unit.
3) Check circuit continuity between each terminal, when push control switch is turned ON.

Terminal	Mode selector switch						RECIRC switch (MAX A/C switch)		A/C switch	L.E.D.
	VENT	BILEV	HEAT	HEAT DEF	DEF	OFF (switch canceled)	ON RECIRC	OFF FRESH	ON	Mode selector switch*
①	○	○	○	○		○				
②	○	○	○	○	○	○				
③	○	○	○	○	○	○				
④	○	○	○	○	○	○				
⑤	○	○	○	○	○	○				
⑥				○	○		○		○	
⑦				▼	▼		▼		▼	
⑧										
⑨				○	○		○ ○	○	○	○
⑩										◉
⑪										○
⑫										
⑬							○			
⑭								○		
⑮		○	○	○	○	○				

* Each switch is turned ON.

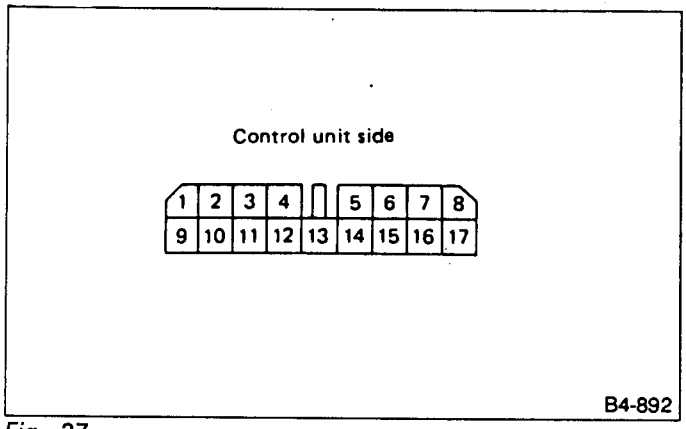


Fig. 27

4. Control Unit — Automatic A/C

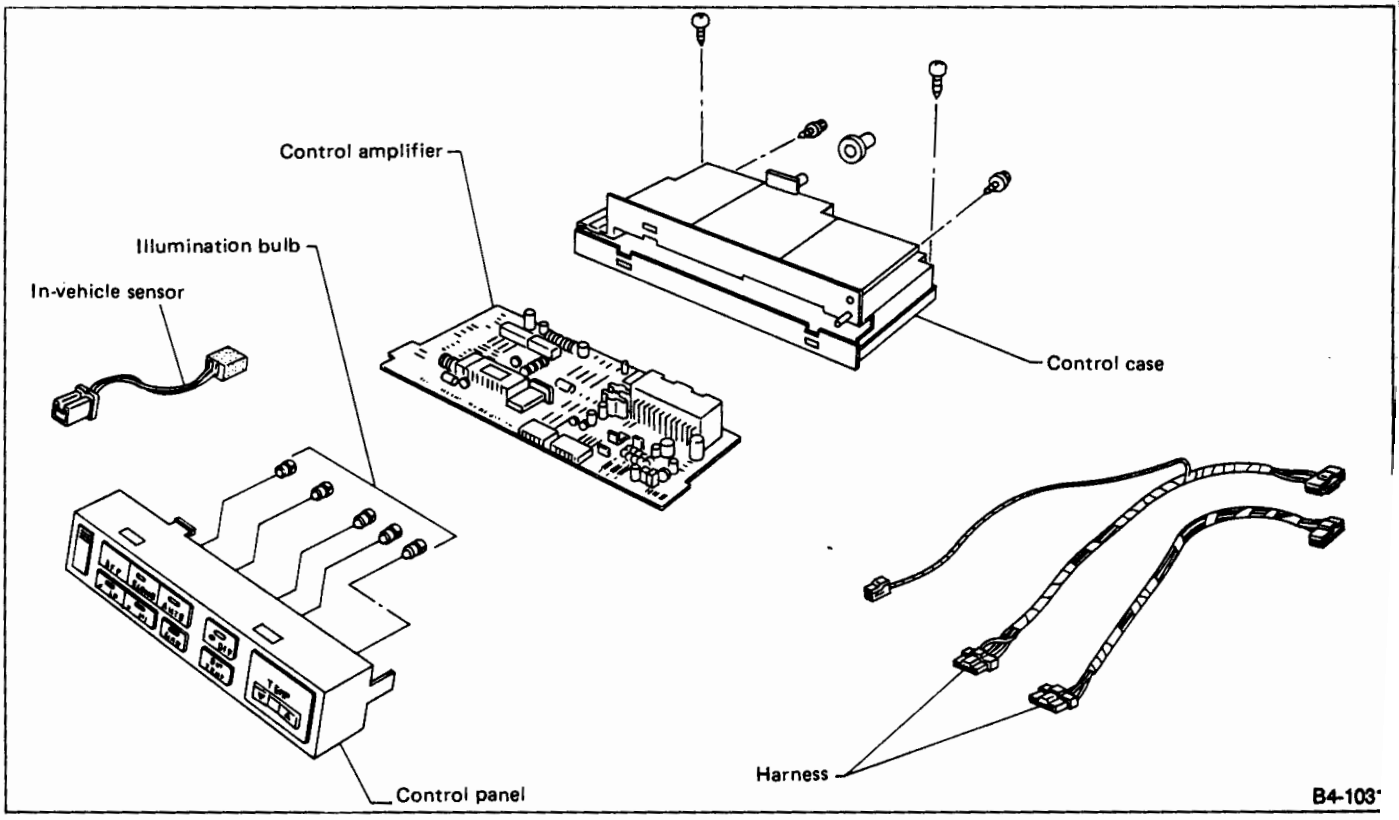


Fig. 28

A: REMOVAL

1) Remove temperature control cable from heater unit.
2) Remove visor A.
(Refer to chapter "INSTRUMENT PANEL".)
3) Disconnect push control unit harness connectors.
4) Remove push control unit assembly.

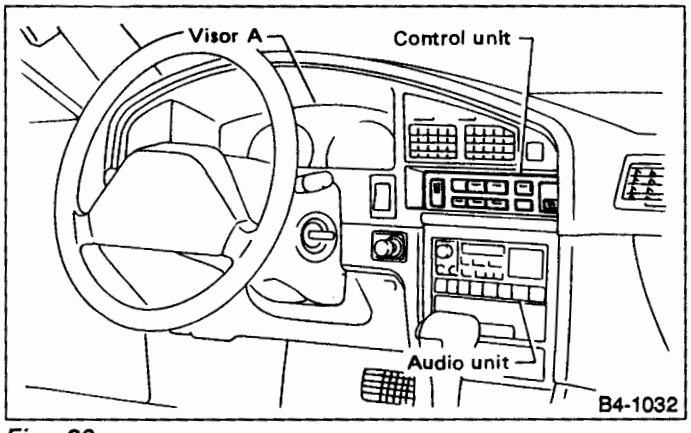


Fig. 29

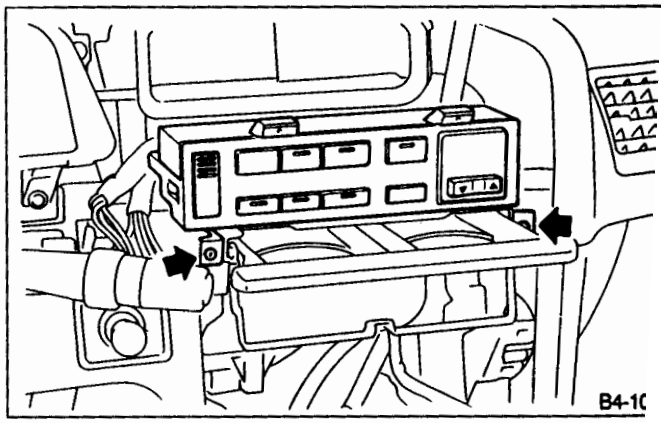


Fig. 30

B: DISASSEMBLY

1) Disconnect in-vehicle sensor connector.
2) Remove aspirator duct from in-vehicle sensor.

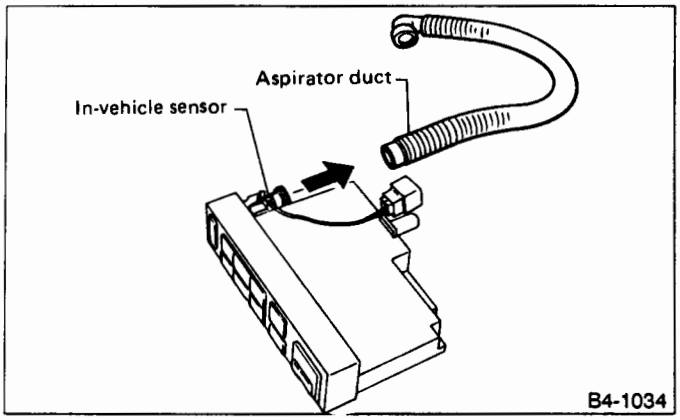


Fig. 31

3) Remove control case from control panel.

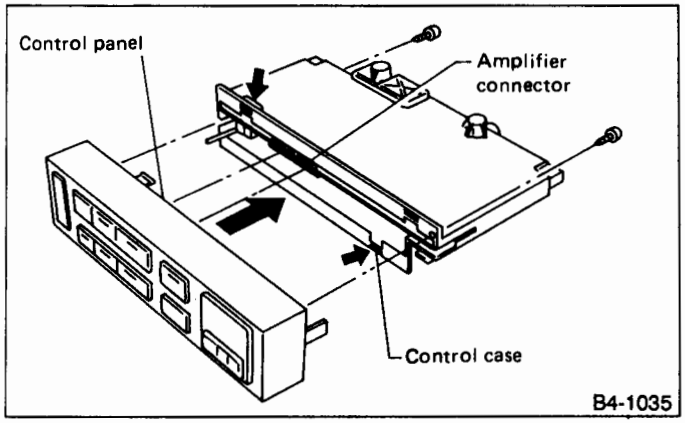


Fig. 32

4) Remove control amplifier from control case.

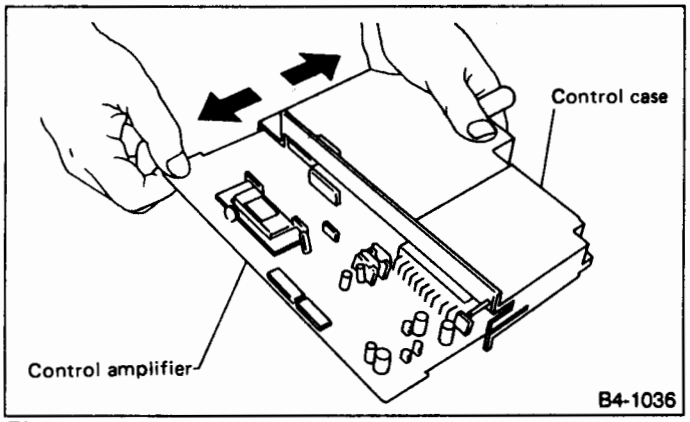


Fig. 33

5) Turn and remove illumination bulb.

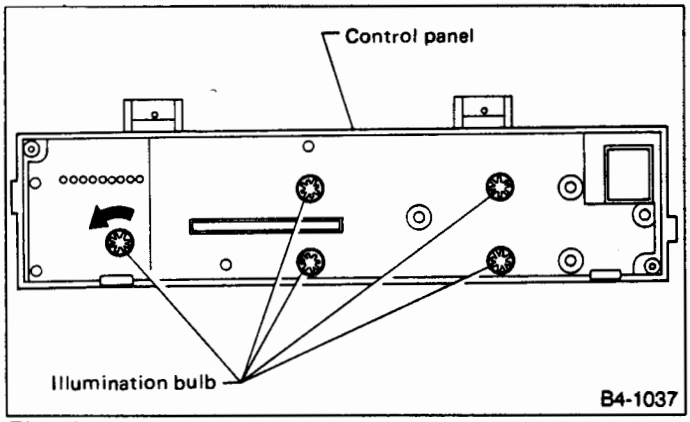


Fig. 34

C: ASSEMBLY

Assembly is in the reverse order of disassembly.

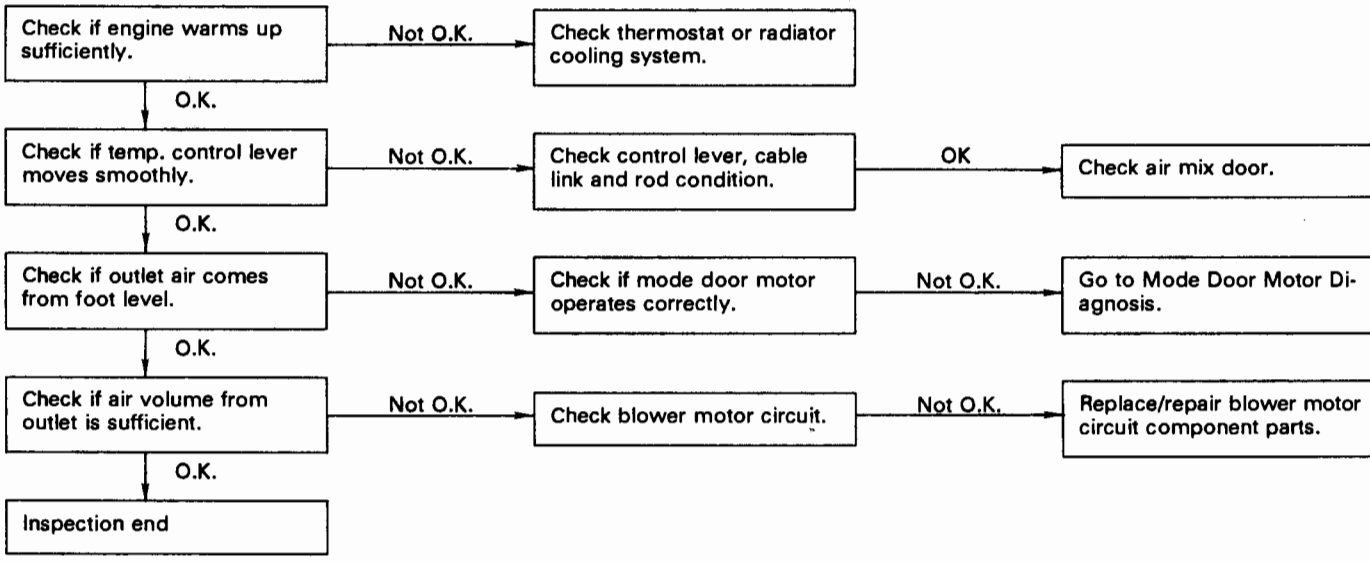
D: INSTALLATION

Installation is in the reverse order of removal.

T TROUBLESHOOTING

1.Heater System Diagnosis

SYMPTOM: Not sufficiently hot



2. Mode Door Motor Diagnosis

SYMPTOM: Air outlet does not change.

1 Check if each air outlet can be selected pushing switches.

↓ Not OK

Check if mode door motor's rod and link are connected correctly. — Not OK → 2 Adjust control rod.

↓ OK

Check if connectors are connected correctly. — Not OK → Connect connectors correctly.

↓ OK

3 Check mode door motor operation. — Not OK → Replace mode door motor.

↓ OK

4 Check if continuity exist in each harness. — Not OK → Repair or connect.

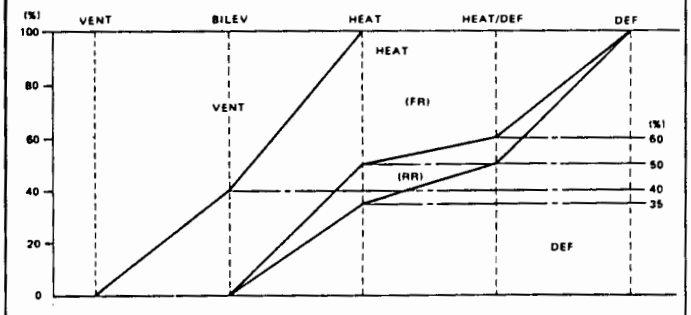
↓ OK

5 Check push control unit. — Not OK → Replace push control unit.

1. CHECK IF EACH AIR OUTLET CAN BE SELECTED BY PUSHING SWITCH.

DOES AIR COME OUT FROM EACH DUCT NORMALLY WHEN EACH MODE SWITCH IS PUSHED WITH IGNITION SWITCH AT IG ON?

Switch	Indicator illuminates					Air outlet
	VENT	BILEV	HEAT	DEF HEAT	DEF	
VENT	○					VENT
BILEV		○				HEAT & VENT
HEAT			○			HEAT
DEF HEAT				○		HEAT & DEF
DEF					○	DEF

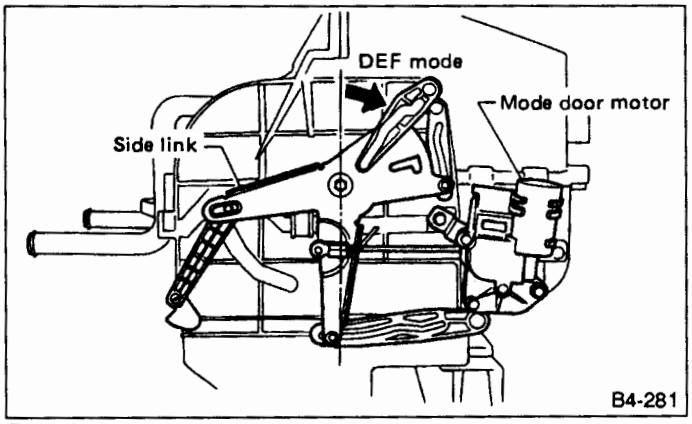


B4-1038

Fig. 35

2. CONTROL ROD ADJUSTMENT

1) Connect mode door motor to harness connector.
2) Turn ignition switch to "ACC" and set mode select or switch to "VENT".
Ensure that mode door motor is set in the vent mode.
3) Install mode door motor on heater unit.
4) Manually operate side link to the vent mode position, and secure rod to rod holder.
5) Set mode selector switch to "DEF", and ensure that side link moves over its full stroke range.



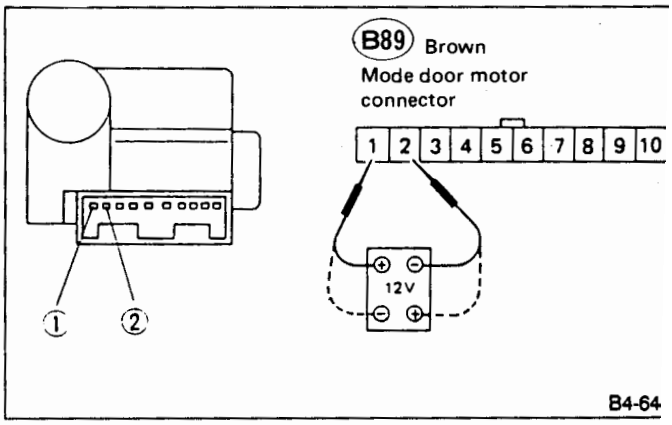
B4-281

Fig. 36

3. CHECK MODE DOOR MOTOR OPERATION.

1) Check the mode door motor operation. When approx. 12V is applied to the mode door motor terminals, mode door motor operates as follows.

Terminal		Mode door motor	
②	①		
Polarity of power supply terminals		Mode door motor operation	Direction of linkage rotation
⊖	⊕	VENT→DEF	Clockwise
⊕	⊖	DEF→VENT	Counterclockwise

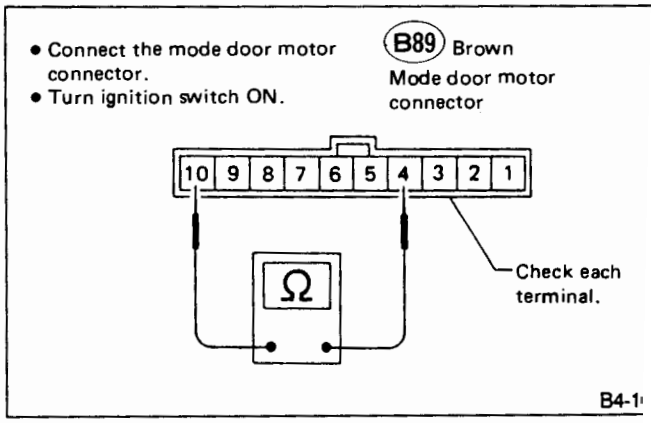


B4-64

Fig. 37

2) Check mode door motor position switch.
When the mode door motor is moved to each mode position by using the mode selector switch, check continuity exists between each terminal as follows.

Mode selector switch positions	Terminals	
VENT	④ or ⑤	⑩
BILEV	⑤ or ⑥	
HEAT	⑥ or ⑦	
DEF/HEAT	⑦ or ⑧	
DEF	⑧ or ⑨	



B4-1

Fig. 38

4.CHECK IF CONTINUITY EXIST IN EACH HARNESS.

1) Check body ground circuit for mode door motor.

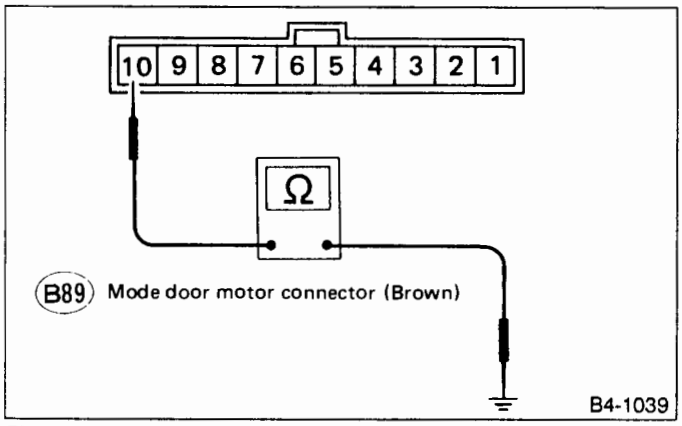


Fig. 39

2) Check circuit continuity between each terminal on push control unit and mode door motor.

Terminal No.		Continuity
(+)	(−)	
Push control unit	Mode door motor	
⑰	①	Yes
⑯	②	
⑮	④	
⑤	⑤	
④	⑥	
③	⑦	
②	⑧	
①	⑨	

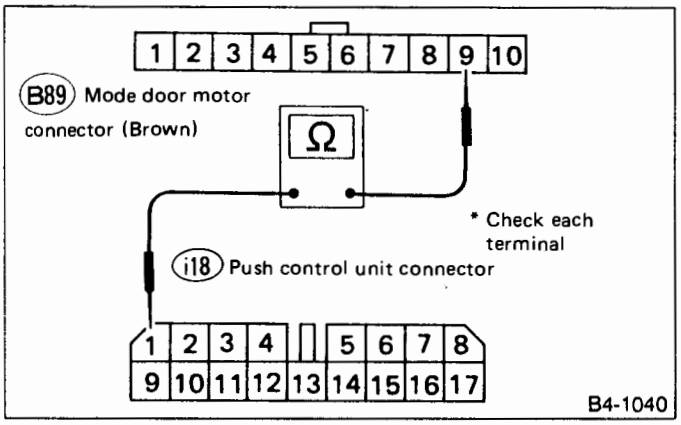


Fig. 40

5. CHECK PUSH CONTROL UNIT.

1) Press VENT switch.

2) Press DEF switch. Motor will start to move mode door from VENT to DEF. At this point, measure voltage across terminal.

3) Press VENT switch. Motor will start to move mode door from DEF to VENT. At this point, measure voltage across.

NOTE: When mode selector switch and mode door motor are set at the same position, voltage across terminals is 0 volts.

Mode selector switch	Mode door motor	Terminal (+)	Terminal (−)	Voltage
VENT ➡ DEF	VENT→DEF	⑰	⑯	12V
DEF ➡ VENT	DEF→VENT	⑯	⑰	12V
Mode door motor stop condition -		⑰	⑯	0V
		⑯	⑰	

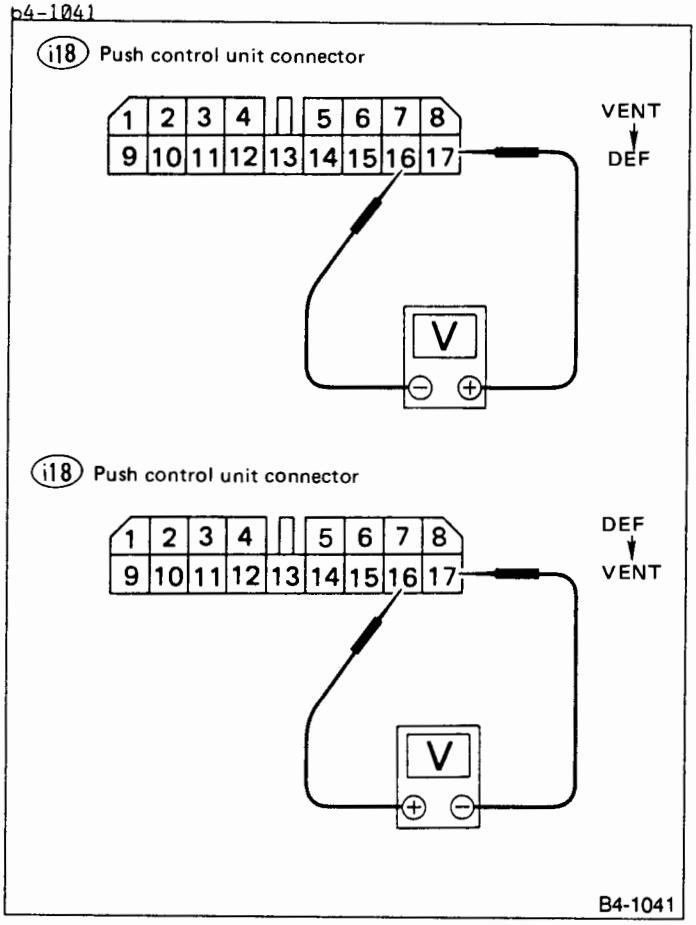


Fig. 41

3. Intake Door Motor Diagnosis

SYMPTOM: Air inlet does not change.

Check if air inlet changes when "CIRC (MAX A/C)" is pushed.

↓ OK

Check if intake door motor rod and link are connected correctly. — Not OK → 1 Adjust Control rod.

↓ OK

Check if connectors are connected correctly. — Not OK → Connect connectors correctly.

↓ OK

2 Check intake door motor operation. — Not OK → Replace intake door motor.

↓ OK

3 Check continuity exists in each harness. — Not OK → Repair or connect harness.

↓ OK

Replace push control unit.

1 CONTROL ROD ADJUSTMENT

1) Remove control rod from intake door motor.
2) Connect harness to intake door motor.
3) Turn ignition switch to "ACC" and set RECIRC switch to "ON" switch to "RECIRC".

Ensure that intake door motor is set in the "RECIRC" mode.

4) Install intake door motor on intake unit.
5) Secure rod holder to link, and install link to intake unit ASSY.
6) Manually set rod in the "RECIRC" mode, and secure to rod holder.
7) Operate mode selector switch to ensure that system changes from intake air to "RECIRC" and from "RECIRC" to intake air in full-stroke range.

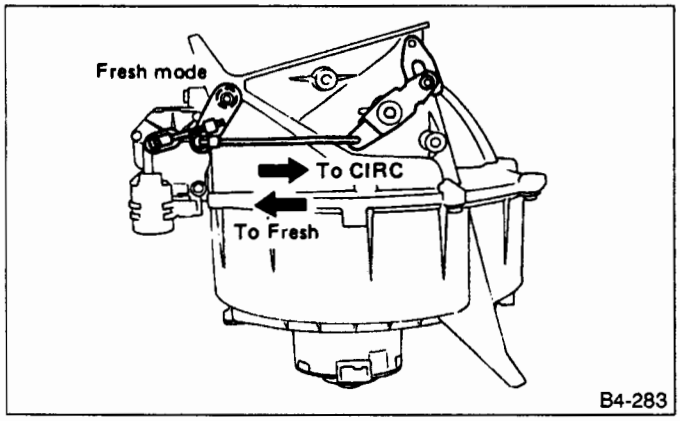


Fig. 42

2. CHECK INTAKE DOOR MOTOR OPERATION.

When approx. 12V is applied to the intake door motor terminals, intake door motor operates as follows.

Intake door motor position	Terminal ⊕	Terminal ⊖	Intake door motor operation
Fresh	④	②	Door motor moved to Recirc position
Recirc		①	Door motor moved to Fresh position

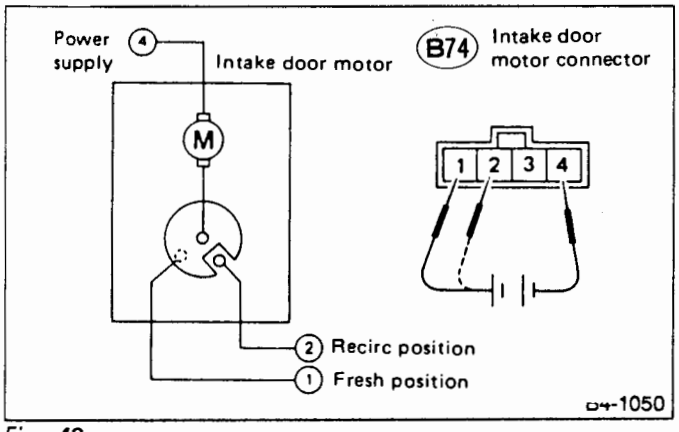


Fig. 43

3. CHECK CONTINUITY EXISTS IN EACH HARNESS.

1) Check body ground circuit for intake door motor.

Terminal No		Continuity
①	Body grouud	Yes

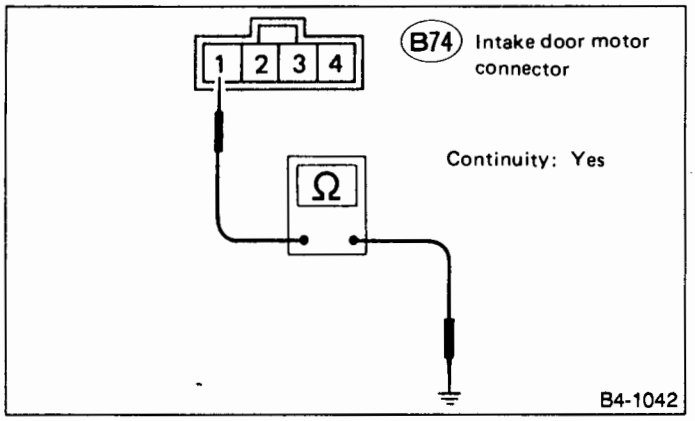


Fig. 44

2) Check circuit continuity between push control unit and intake door motor.

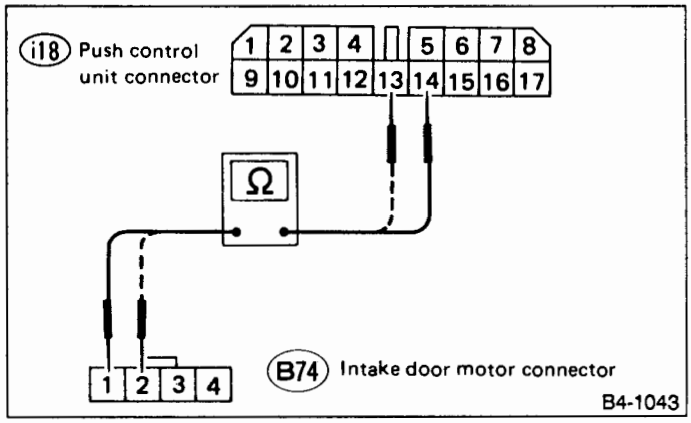


Fig. 45

Terminal No.		Continuity
Intake door motor	Push control unit	
①	⑭	Yes
②	⑬	

SUBARU®

1990

SERVICE MANUAL

M MECHANISM AND FUNCTION

1. Air Conditioning Cycle

The refrigerant flows in the standard pattern, that is, through the compressor, the condenser, the receiver drier, through the evaporator, and back to the compressor.

The refrigerant flow through the evaporator coil is controlled by an externally equalized expansion valve, located inside the evaporator case.

The compressor repeats on and off to maintain the evaporator temperature within a specified range. When the evaporator coil temperature falls below a specified point, the thermo control amplifier interrupts the compressor operation. When the evaporator coil temperature rises above the specification, the thermo control amplifier allows compressor operation.

The refrigerant system is protected against excessively high or low pressures by the trinary switch, located on the receiver drier. If the system pressure rises above, or falls below the specifications, the trinary switch opens to interrupt compressor operation.

The fusible plug opens at temperatures above 105°C (221°F), thereby discharging refrigerant to the atmosphere. If this plug is melted and opened, check the refrigerant line and replace the receiver drier.

The refrigerant system is also protected by a pressure relief valve located at the end of the high pressure flexible hose near the compressor.

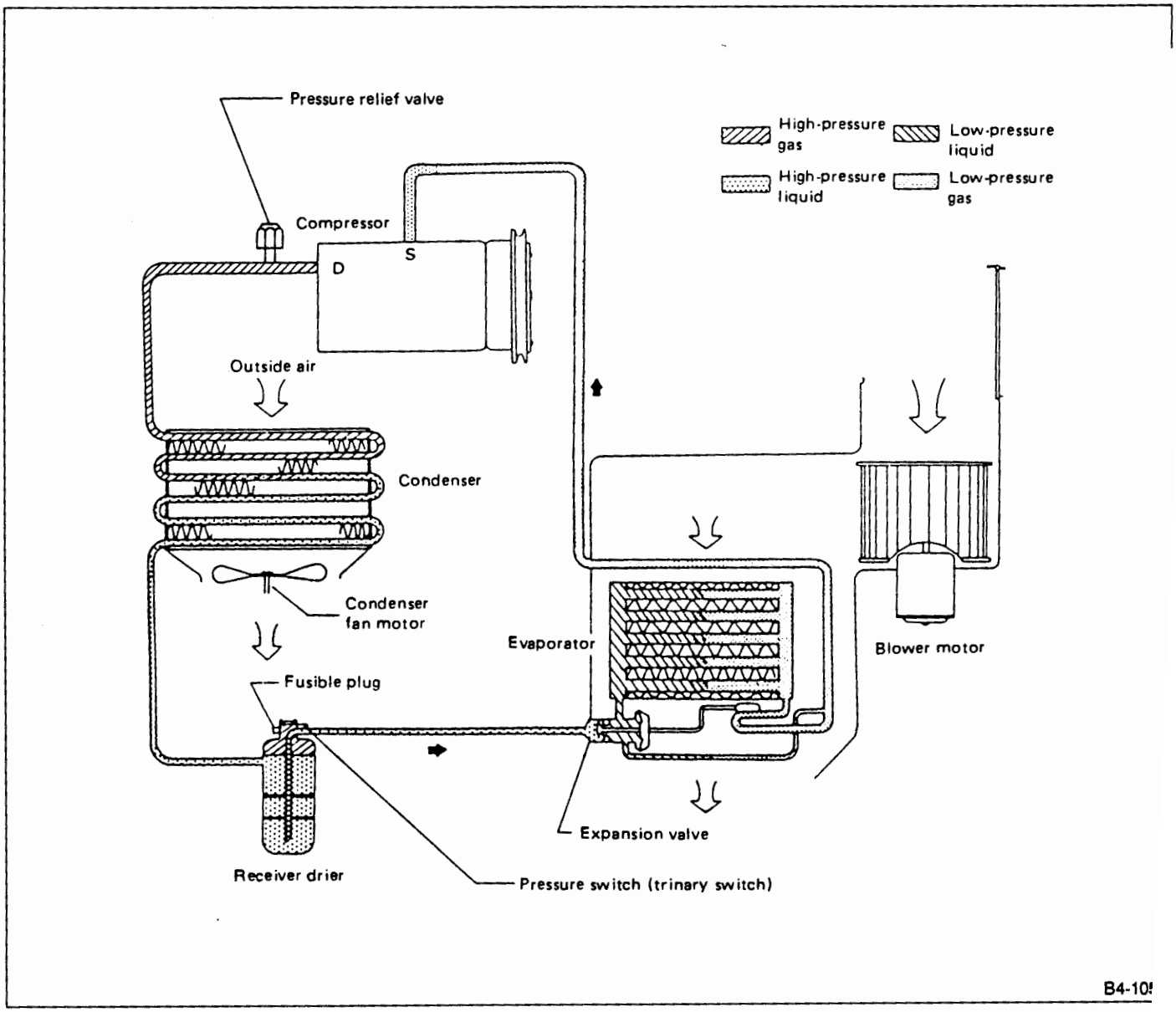


Fig. 1

1. COMPRESSOR

Compressors used in car air conditioners circulate refrigerant a cycle inside a closed system. They suck refrigerant from the outlet of the evaporator and deliver it under high pressure to the condenser.

The relationship between the high and low pressure sides within the system varies depending on the rpms at which the compressor is turning in relation to the vehicle speed, the ambient temperature and the vehicle interior temperature.

When the pressure drops excessively on the low pressure side, the evaporator temperature decreases.

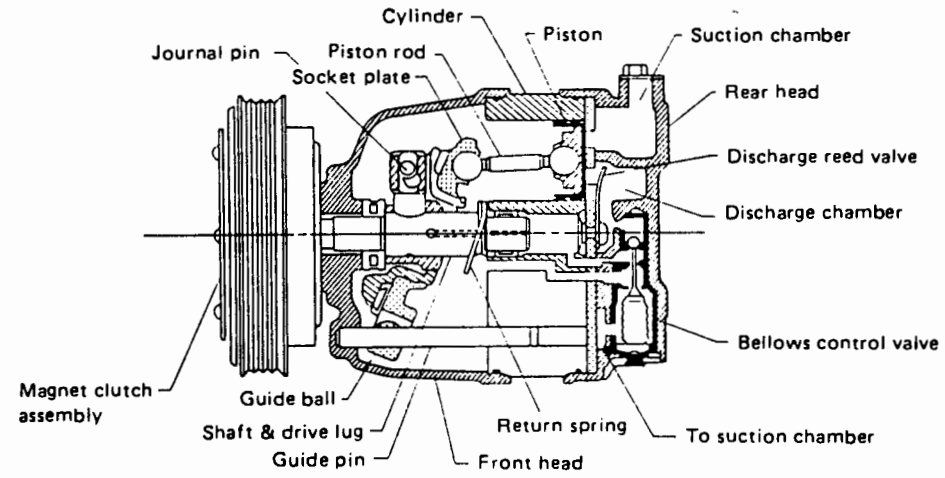
This causes moisture in the air passing through the evaporator to freeze, so that air can no longer flow through the evaporator.

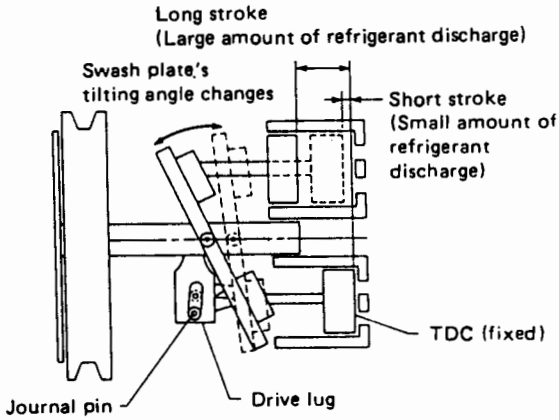
In order to prevent such freezing, conventional compressors utilize a thermo-switch which turns the unit on and off repeatedly.

However, a variable displacement compressor continually senses the pressure on the low pressure side and the amount of refrigerant so as to prevent the pressure from dropping too low.

The variable compressor is basically a swash plate type that changes piston stroke in response to the required cooling capacity.

The tilt of the swash plate allows the piston's stroke to change so that refrigerant discharge can be continuously changed between 3 cm^3 (0.18 cu in) and 146 cm^3 (8.91 cu in).





Discharge control	Discharge capacity cm^3 (cu in)/rev.	Piston stroke length mm (in)
Minimum	3 (0.18)	0.6 (0.024)
Maximum	146 (8.91)	28.6 (1.126)

B4-1052

Fig. 2

1) The operation control valve
The operation control valve is located in the suction port (low-pressure side) and opens or closes in response to changes in refrigerant suction pressure.
Operation of the valve controls the internal pressure of the crankcase. The angle of the swash plate is controlled by the difference between the crankcase's internal pressure and the piston cylinder pressure.
2) Maximum cooling
Refrigerant pressure on the low-pressure side increases with an increase in heat loads.
When this occurs, the control valve's bellow compress to open the low-pressure side valve and close the high-pressure side valve.
This causes the crankcase's internal pressure to equal the pressure on the low-pressure side and the cylinder's internal pressure to be greater than the crankcase's internal pressure.
Under this condition, the swash plate is set to the maximum stroke position.

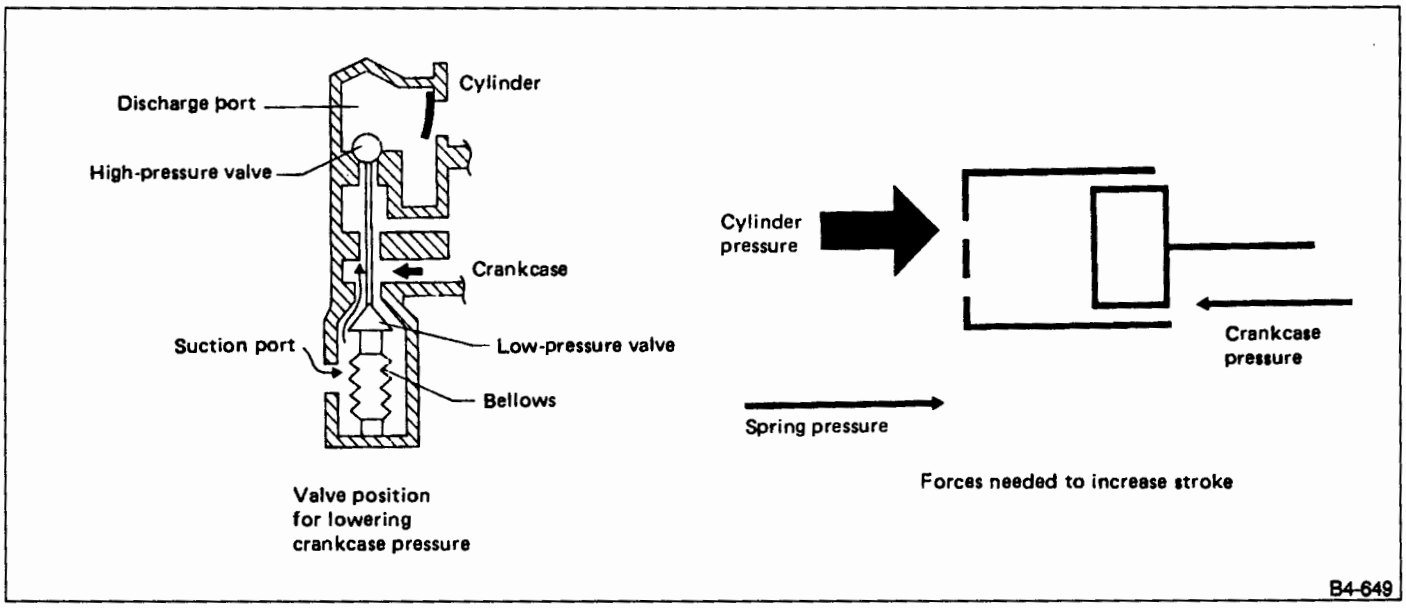


Fig. 3

2. MAGNET CLUTCH

The magnet clutch serve to transmit engine power to the compressor unit. It is built into the compressor shaft. When current flow through the magnet clutch coil, the drive plate is attracted so that the pulley and compressor shaft rotate as a unit. When the compressor is not in use, the pulley alone rotates freely.

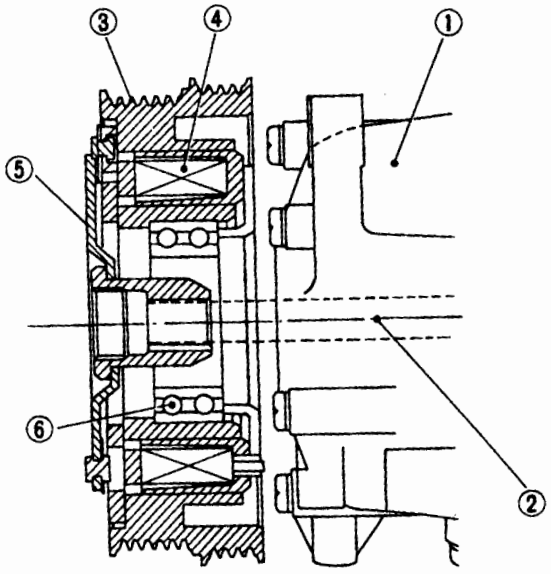


Fig. 5

3. CONDENSER

The condenser cools and liquefies the vaporized refrigerant, which is delivered from the compressor. The condenser consists of corrugated fins and tubes that are made of aluminum. Refrigerant at high temperature goes through the tubes, is cooled by ambient air and liquefies.

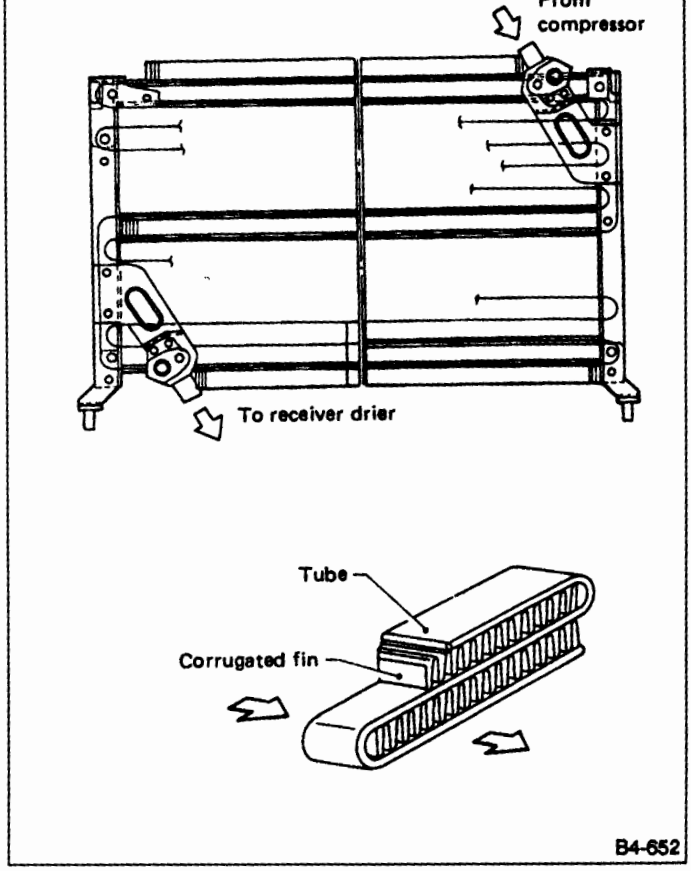


Fig. 6

4. RECEIVER DRIER

The amount of refrigerant circulating varies with the heat load changes. The receiver driver supplies the amount of refrigerant necessary for the cycle according to such changes.

1) It removes bubbles from the condensed refrigerant so that only liquid refrigerant may be delivered to the expansion valve. (If bubbles are present, the refrigerant passing through the expansion valve varies in quantity, temperature, and pressure, resulting in insufficient cooling.)
2) It removes moisture from the refrigerant.
3) It removes foreign substance from the refrigerant.
4) It permits a visual observation of the amount of refrigerant through the sight glass.

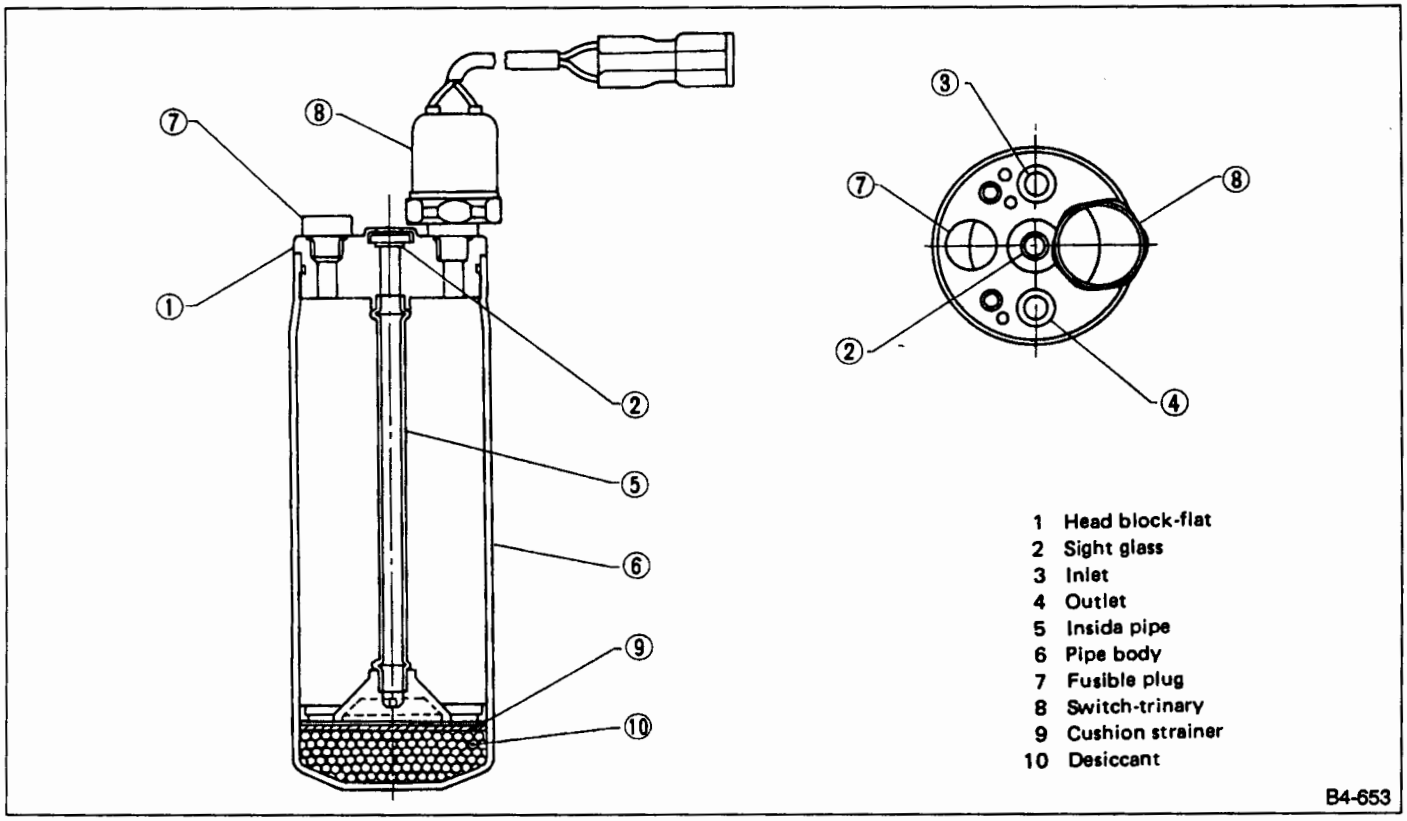


Fig. 7

The receiver-drier consists of a strainer to remove foreign substance, desiccant to absorb moisture from refrigerant, a sight glass to check the amount of refrigerant.

5) Fusible plug

The refrigerant system is protected against excessively high pressure by a fusible plug located on the receiver drier.

This plug opens at temperatures above 105°C (221°F), thereby discharging refrigerant into the atmosphere.

If this plug is melted and opened, check the refrigerant line and the replace receiver drier.

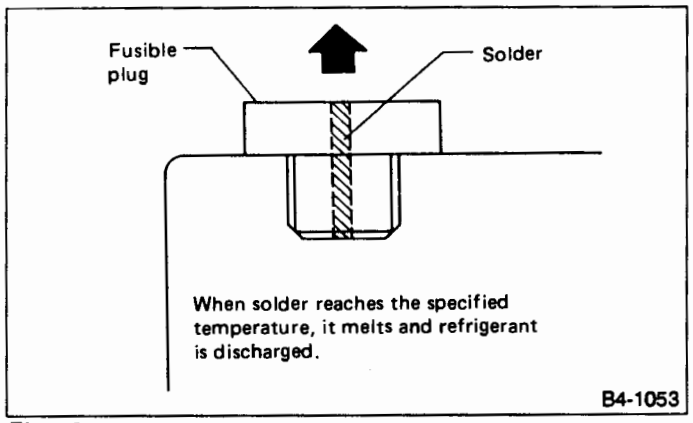


Fig. 8

5. PRESSURE RELIEF VALVE

The refrigerant system is also protected by a pressure relief valve, located on the end of high flexible hose near compressor. When the refrigerant pressure in the system increases to an abnormal level [more than 3,727 kPa (38 kg/cm^2, 540 psi)], the release port on the pressure relief valve automatically opens and releasing the refrigerant into the atmosphere.

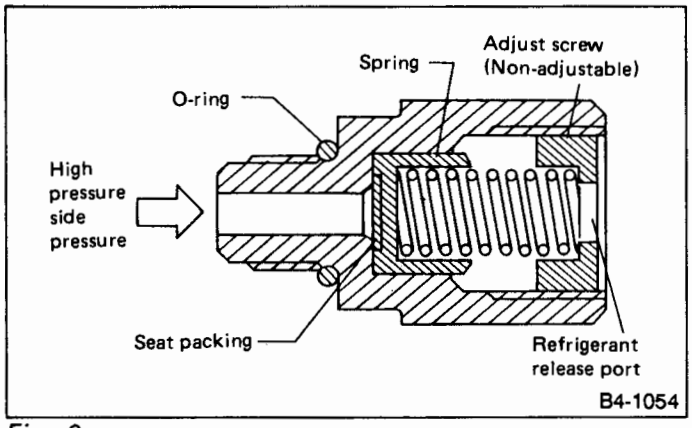


Fig. 9

6. TRINARY SWITCH

The trinary switch is located in the high-pressure line of the refrigeration cycle. It consists of a diaphragm which receives pressure, diaphragm springs, pin and contact points. Two types of contact points are used. One type activates when the internal pressure is low or when it is too high while the other type controls the operation of the condenser fan.

1) Prevention of operation when there is no gases in the line due to absence of refrigerant — (during low-pressure operation)
2) Protection of refrigeration cycle from abnormal refrigerant pressure rise — (during high-pressure operation).
3) 2-speed control to provide a quiet condenser fan operation — (during intermediate-pressure operation).

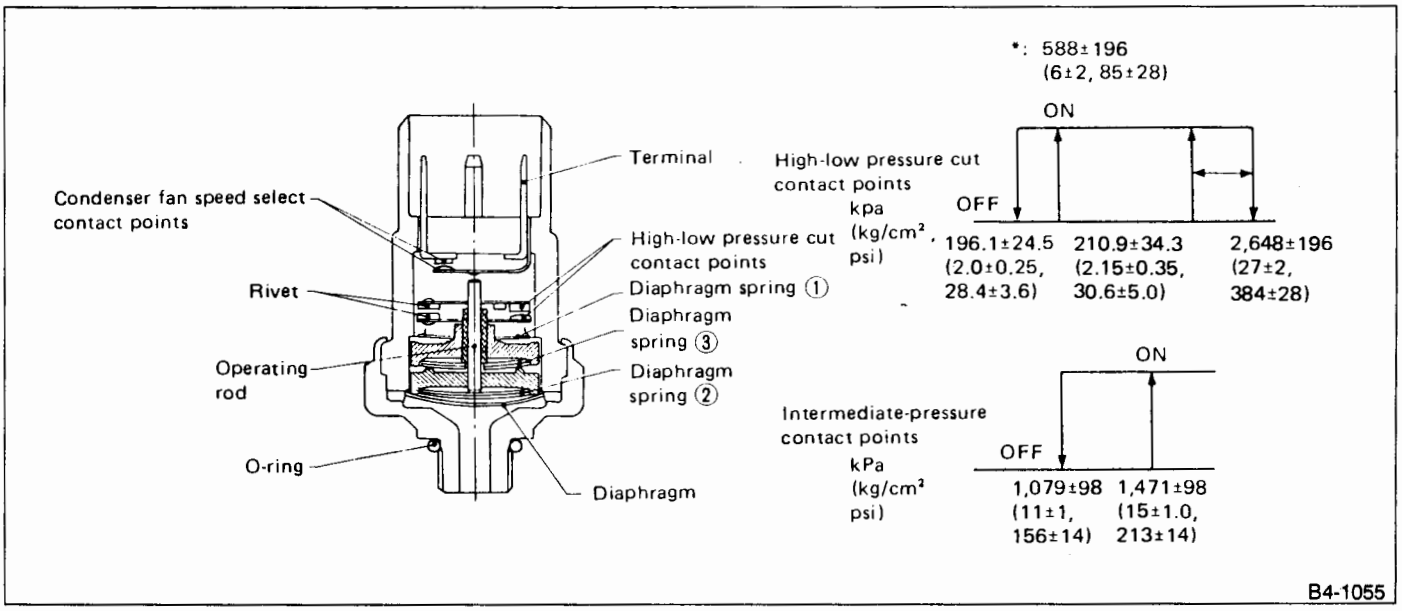


Fig. 10

During abnormal low-pressure operation [P ⟨ approx. 196 kPa (2.0 kg/cm², 28 psi)]

1) All contact points are open (OFF) since the tension of the diaphragm springs is greater than refrigerant pressure.
2) Approx. 196 kPa (2.0 kg/cm², 28 psi) ⟨ P ⟨ approx. 1,471 kPa (15 kg/cm², 213 psi)

When refrigerant pressure is greater than 196 kPa (2.0 kg/cm², 28 psi), diaphragm spring ① is inverted so that high-low pressure cut contact points are closed (ON).

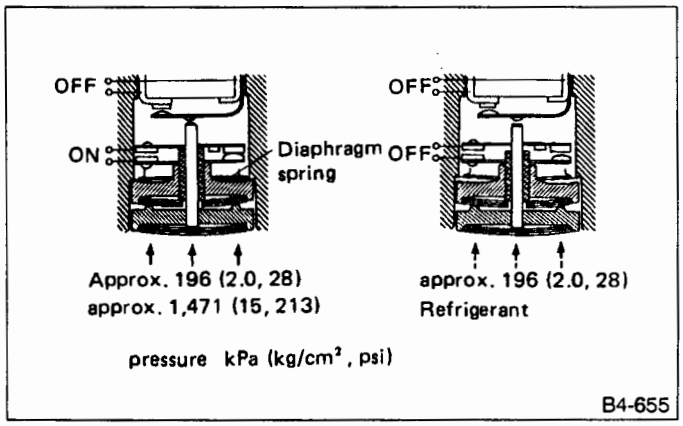


Fig. 11

3) Approx. 1,471 kPa (15 kg/cm², 213 psi) ⟨ P ⟨ approx. 2,648 kPa (27 kg/cm², 384 psi)

When refrigerant pressure is greater than 1,471 kPa (15 kg/cm², 213 psi), diaphragm spring ② is inverted to lift the operating rod. This closes (turns ON) the contact points for the condenser fan.

During abnormal high-pressure operation [P ⟩ approx. 2,648 kPa (27 kg/cm², 384 psi)

When refrigerant pressure is greater than 27 kg/cm², diaphragm spring ③ is inverted so that the high-low pressure cut contact points are opened (OFF).

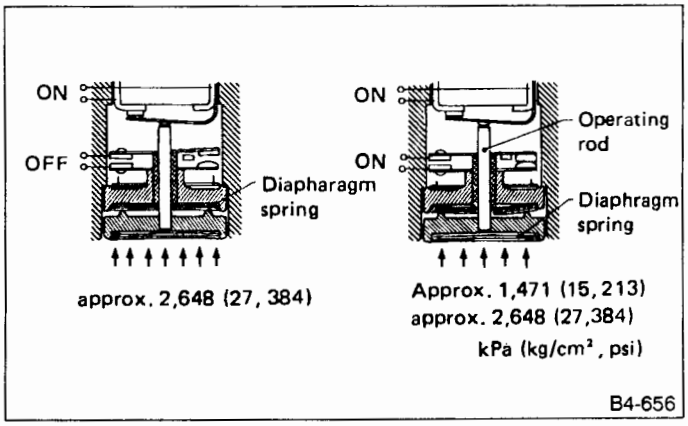


Fig. 12

7. EVAPORATOR

An airstream produced by a blower passes through the cooling fins and tubes. This air is warmer than the refrigerant and gives up its heat to the fins, tubes and then to the refrigerant itself. As the low pressure refrigerant moves through the evaporator, heat given up by the air passing through the evaporator causes the refrigerant to begin to boil. By the time the refrigerant has passed through the evaporator, it becomes a vapor. As the heat is absorbed by the boiling refrigerant, the fins and tubes turn cold and in turn cool the air passing over them. Moisture contained in the air condenses to water drops as it passes around the cooling tubes and fins of the evaporator. Water and dirt are then discharged outside the vehicle through the drain hose.

The evaporator is a laminated type and consists of thin, rectangular aluminum plates arranged in many layers and fins that are attached between them. The operation of the evaporator is as follows:

Misty refrigerant (very close to liquid form) from the expansion valve at a low pressure, enters the lower tube of the evaporator, where it soaks up heat from the compartment. The refrigerant boils and vaporizes quickly due to the rapid heat exchange. Then the refrigerant is pushed upward by the force of the bubble generated during the exchange and passes evaporating into the upper tube. When it reaches to upper tank, the refrigerant is in a thoroughly vaporized form.

The evaporator has a single tank, and its surface has been given a multiple treatment.

1) Rustproof treatment
2) Waterproof treatment
3) Moldproof treatment

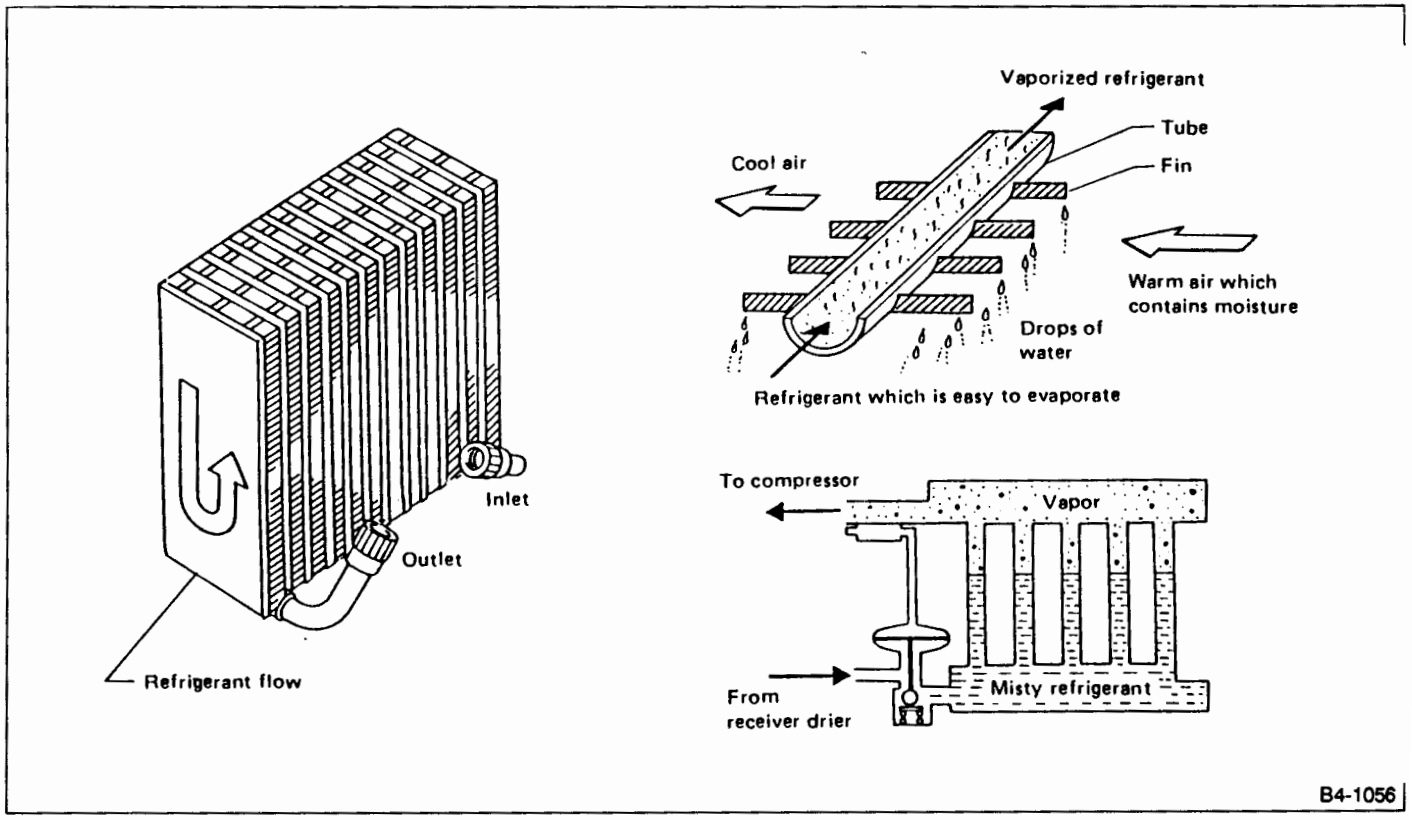


Fig. 13

8. EXPANSION VALVE

The expansion valve is attached to the evaporator inlet. It converts high pressure liquid refrigerant which comes from the liquid tank to misty, low pressure refrigerant, and delivers to the evaporator. Being at low pressure and low temperature, the liquid refrigerant evaporates in the evaporator removing heat from the compartment. It automatically controls the flow rate of refrigerant to obtain the necessary cooling ability required by the fluctuating heat load.

The expansion valve is composed of a sensing bulb with a capillary tube that senses the temperature at the evaporator outlet, an equalizer that transmits the pressure of the refrigerant in the evaporator to the diaphragm and other parts such as the spring, ball and diaphragm.

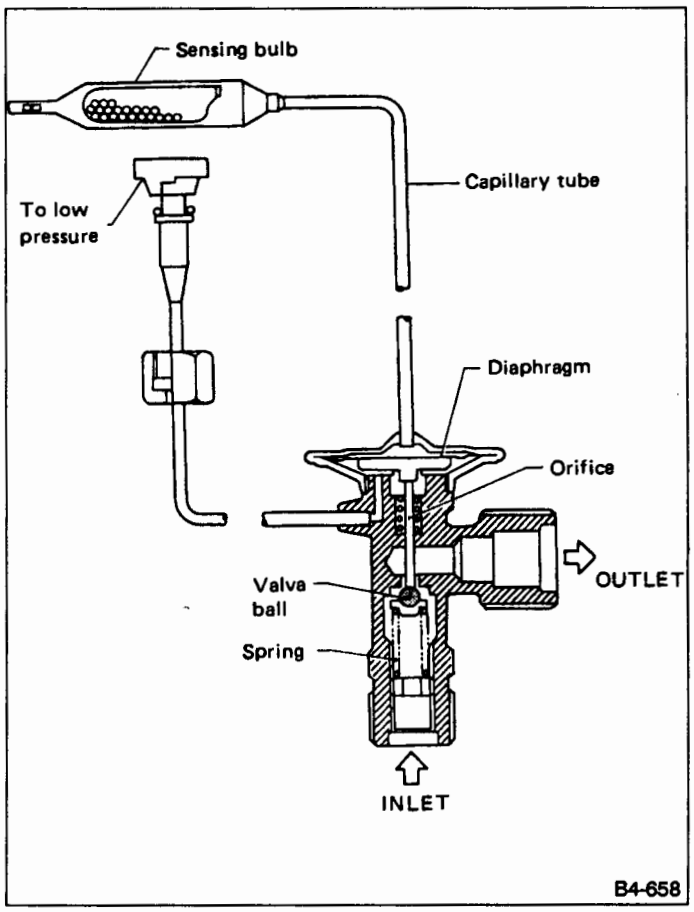


Fig. 14

The operation of the external equalizer type is as follows.

The expansion valve opening is automatically controlled by the functions of three force: the pressure of the temperature-sensing bulb (P_1) containing a liquid or vapor, the pressure at the evaporator outlet (P_2), and the force of the spring (F).

Temperature-sensing bulb pressure (P_1)

..... Forces the diaphragm downward (opens the valve).

Pressure at the evaporator outlet (P_2)

. Forces the diaphragm upward (closes the valve).

Force of the spring (F)

..... Forces the ball upward (closes the valve).

A: Condition of the valve with the compressor in off.

Since the temperature around the evaporator is constant, the pressure in the evaporator is equal to that of the temperature-sensing bulb. Therefore, the force of the spring is greater than these pressures and the pressures are in the following condition:

$P_1 = P_2$

$P_1 < P_2 + F$

That means, the valve is closed with the ball pushed upward.

B: Operation of the valve with the sensing bulb at low temperatures

(When the temperature is low at evaporator outlet)

As the temperature of the compartment decreases, the heat load applied to the evaporator becomes less, and the temperatures at the evaporator outlet, and the sensing bulb drop. Accordingly, the valve tends to close, reducing the amount of refrigerant.

$P_1 < P_2 + F$

The amount of refrigerant is reduced.

C: Operation of valve with the sensing bulb at high temperatures

(When the temperature is high at evaporator outlet)

As the temperature of the compartment rises, the heat load applied to the evaporator becomes greater, and the temperatures at the evaporator outlet, and the sensing bulb increase. Therefore, the valve tends to open, allowing more refrigerant to flow.

$P_1 > P_2 + F$

The amount of refrigerant is increased.

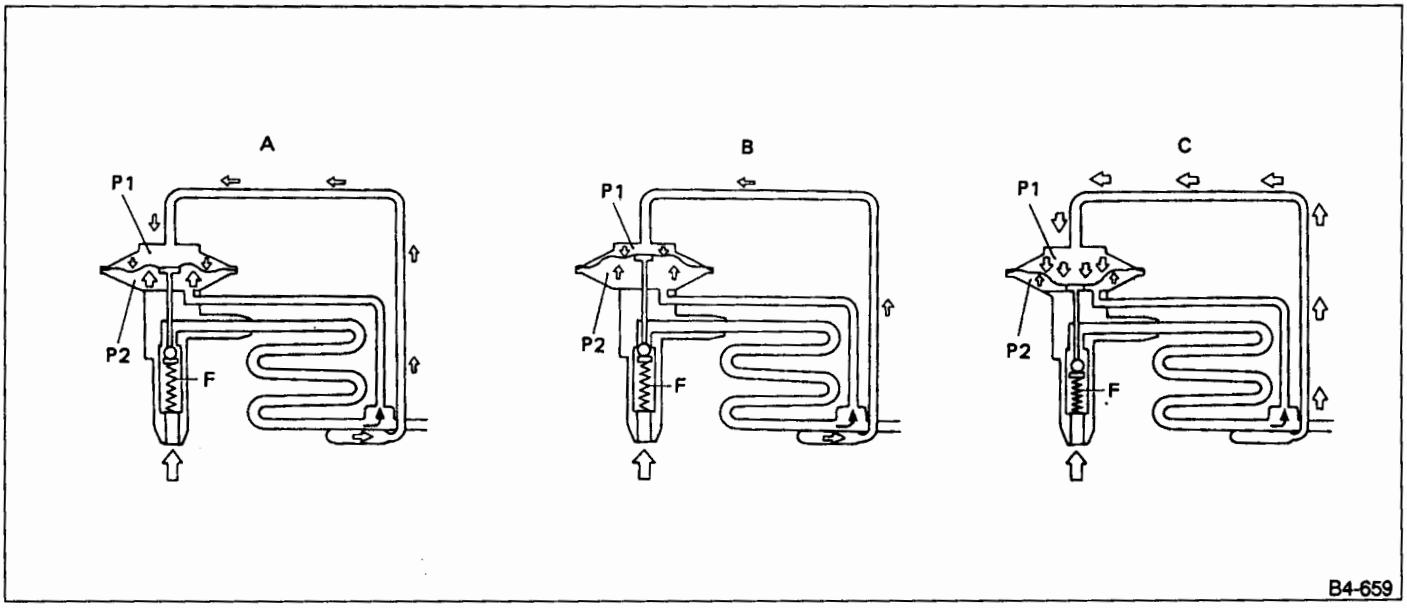


Fig. 15

2. Automatic Climate Control System

A: INTRODUCTION

The Automatic Climate Control system provides automatic regulation of the vehicle interior temperature based on the operator selected "set temperature", regardless of the outside temperature changes. This is done by utilizing a microcomputer, also referred to as the automatic amplifier, which receives input signals from several sensors. The automatic amplifier uses these input signals (including the set temperature) to automatically control the Automatic Climate Control system's outlet air volume, air temperature, and air distribution.

B: FEATURES

1. AIR MIX DOOR CONTROL

The air mix door is automatically controlled so that in-vehicle temperature will reach, and be maintained at the operator selected "set temperature". For a given set temperature, the mix door position will depend on: Ambient temperature, in-vehicle temperature, amount of sunload, and intake air temperature.

2. FAN SPEED CONTROL

The blower speed is automatically controlled, with the actual speed (for a given set temperature) depending on: Ambient temperature, in-vehicle temperature, amount of sunload, intake air temperature, and air mix door position. Additionally, when the system is turned on, the blower will start slowly and then increase speed (over a period of approximately 9 seconds) until the objective speed is reached. When cold starting in cold ambient temperatures, the blower operation will be delayed to prevent blowing cold air on the occupants feet.

3. INTAKE DOOR CONTROL

The intake door position will be determined by: Ambient temperature, in-vehicle temperature, and whether the compressor is on or off.

4. OUTLET DOOR CONTROL

The outlet door position will be determined by: Ambient temperature, in-vehicle temperature, intake air temperature, and amount of sunload.

5. COMPRESSOR CLUTCH CONTROL

The compressor operation (ON-OFF) is automatically controlled by the ambient sensor to prevent compressor damage in very cold ambient temperatures.

6. RECIRCULATION SWITCH

If the operator does not want outside air, the RECIRC switch should be pushed. The passenger compartment air will be recirculated for approx. 10 minutes, then the RECIRC function will be automatically canceled.

7. SELF-DIAGNOSTIC SYSTEM

The self diagnosis system consists of four steps. Each step can be accessed by pushing the switches on the automatic amplifier.
STEP 1: Checks L.E.D.s and segments of the display.
STEP 2: Checks each sensor circuit for open or short circuit
STEP 3: Checks operation of each actuator.
STEP 4: Checks temperature detected by each sensor.

8. MEMORY FUNCTION

When the ignition switch is turned from "ON" to "OFF", the auto amplifier stores the set temperature and the inputs of the various switches in its memory. When the ignition switch is turned from "OFF" to "ON", the system begins operation with the information stored in the memory, then immediately compensates for the actual operating conditions.

C: CONTROL OPERATION

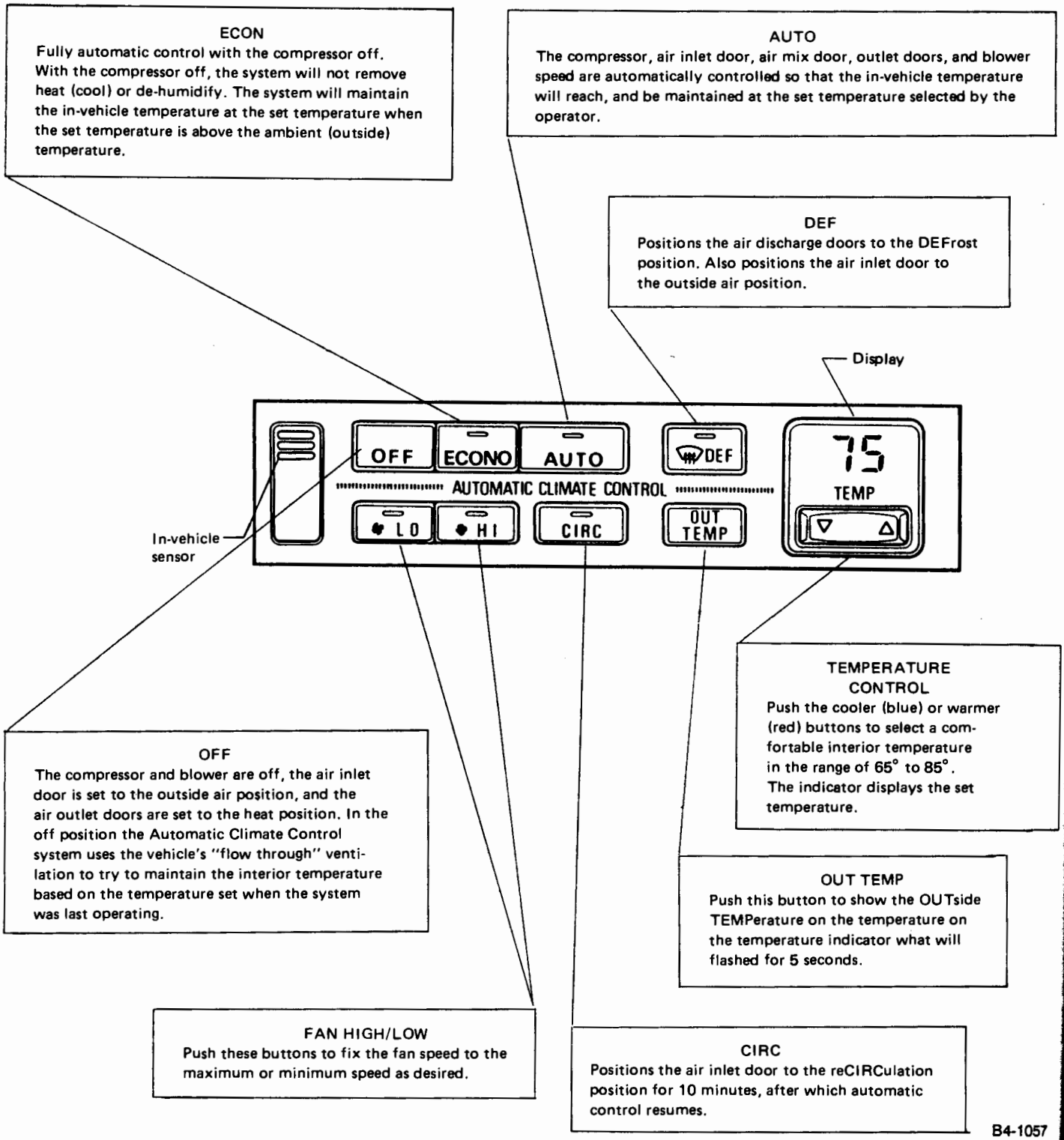


Fig. 16

D: COMPONENT LAYOUT

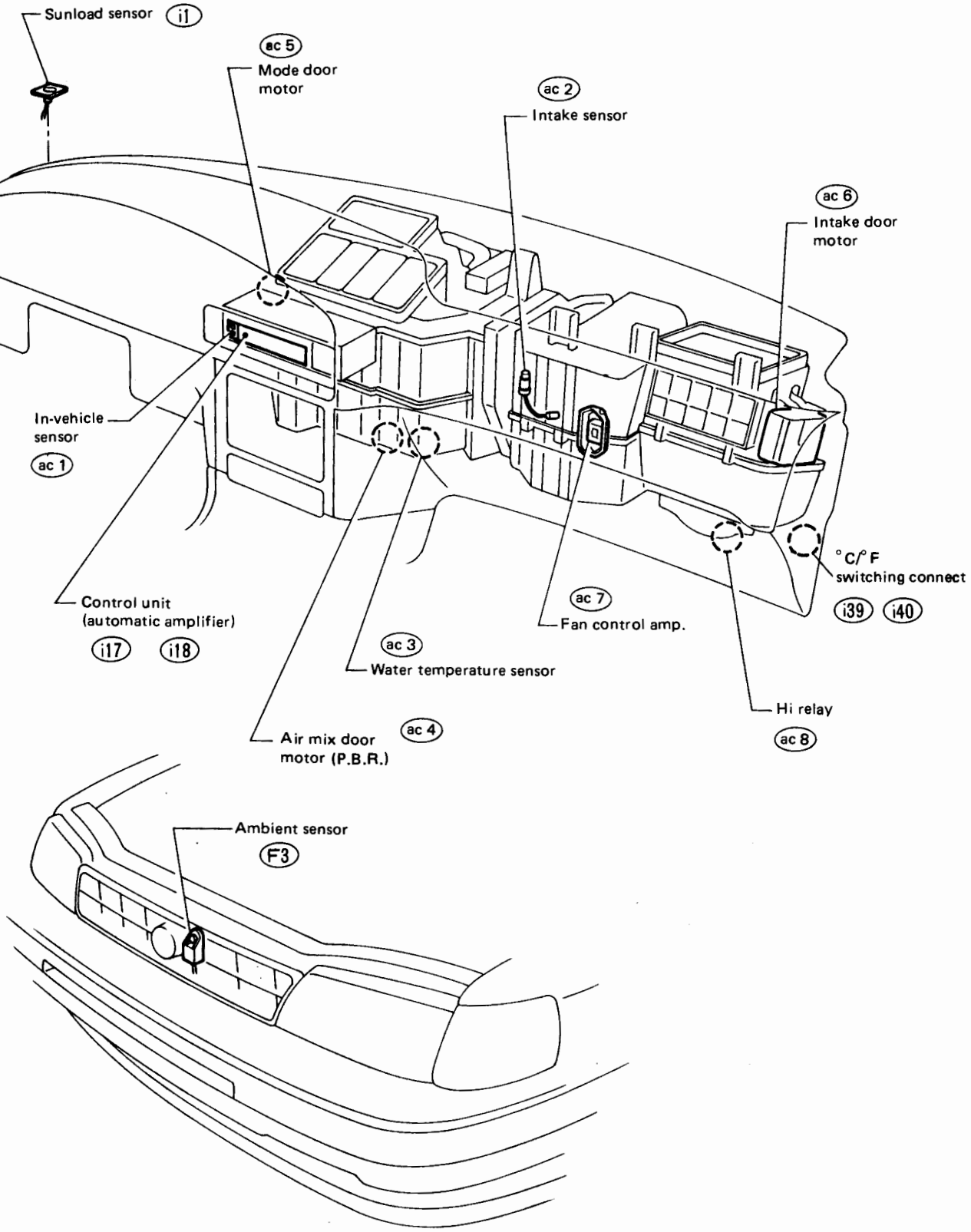


Fig. 17

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E: SYSTEM FLOW

The control system consists of a) input sensors and switches, b) the automatic amplifier (microcomputer), and c) outputs. The relationship of these components is shown in the diagram below:

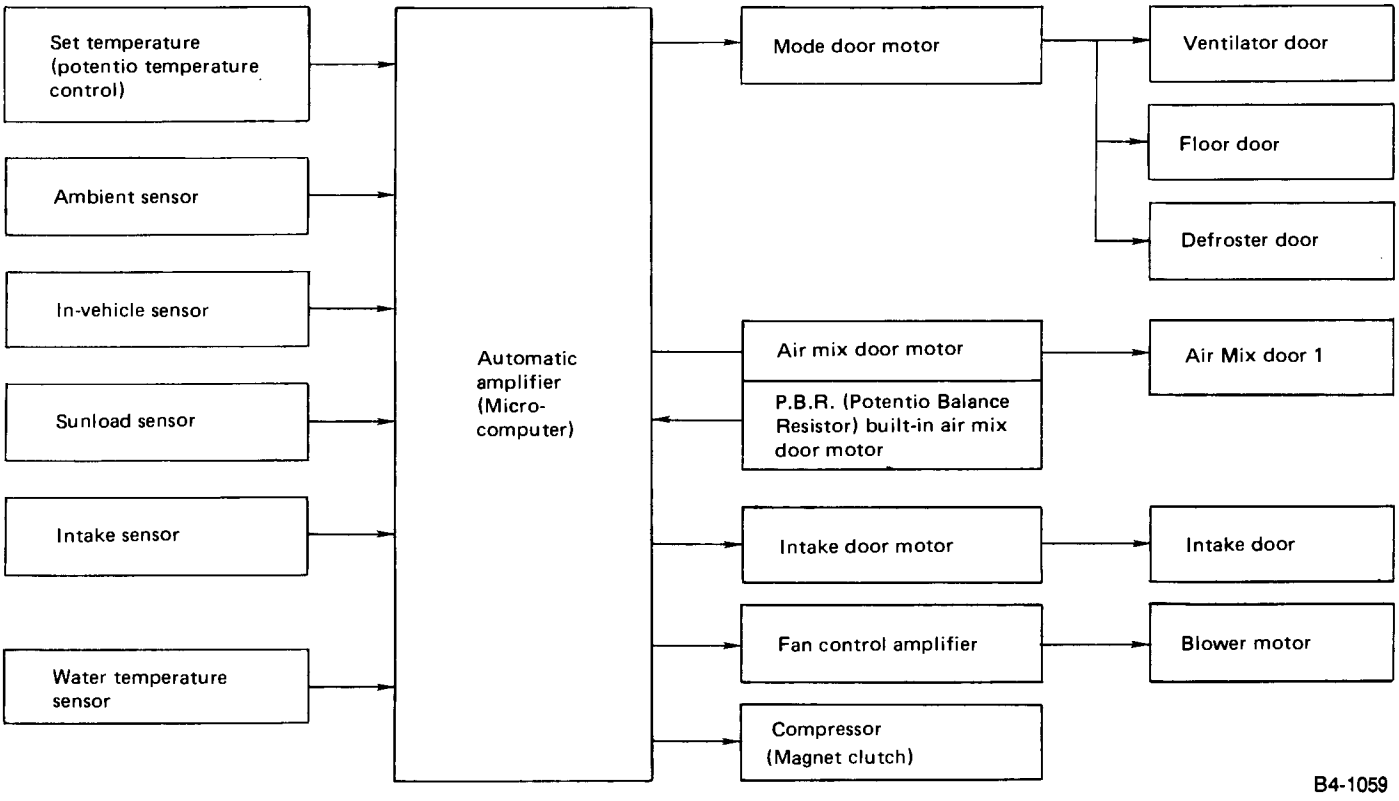


Fig. 18

F: COMPONENT PARTS

1. POTENTIO TEMPERATURE CONTROL (P.T.C.)

The P.T.C. is built into the auto amplifier. It can be set at intervals of 0.5°C (1.0°F) through both P.T.C. switch UP (HOT) and P.T.C. switch DOWN (COLD) control switches. The set temperature is digitally displayed. Press the switches twice to change the setting by 1°C.

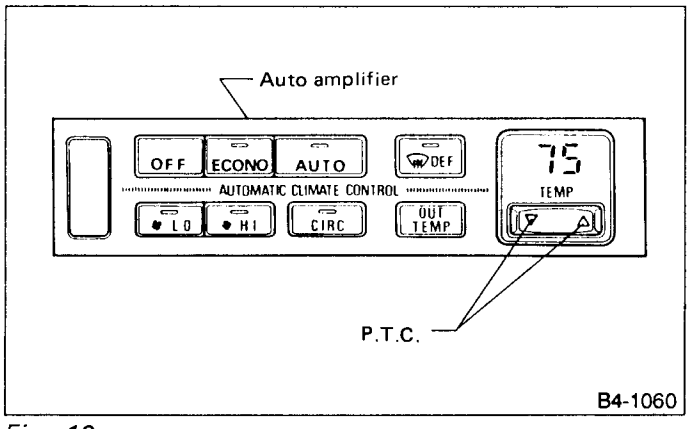


Fig. 19

2. SWITCHING BETWEEN °C AND °F

Switching is made by connecting or disconnecting a connector.
(Under instrument panel RH side:i39, i40)

- connecting — ° F
- disconnecting — ° C

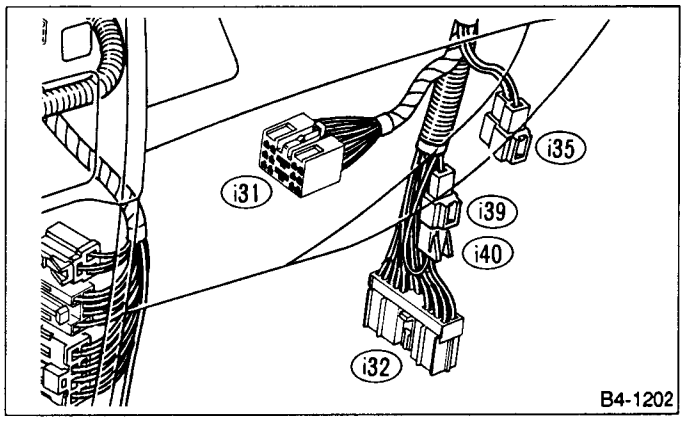


Fig. 20

3. IN-VEHICLE SENSOR

The in-vehicle sensor is attached to cluster lid-C. It converts variations in temperature of compartment air drawn from the aspirator into a resistance value which is then input into the auto amplifier. (a more detailed description of the aspirator is shown on the following page.)

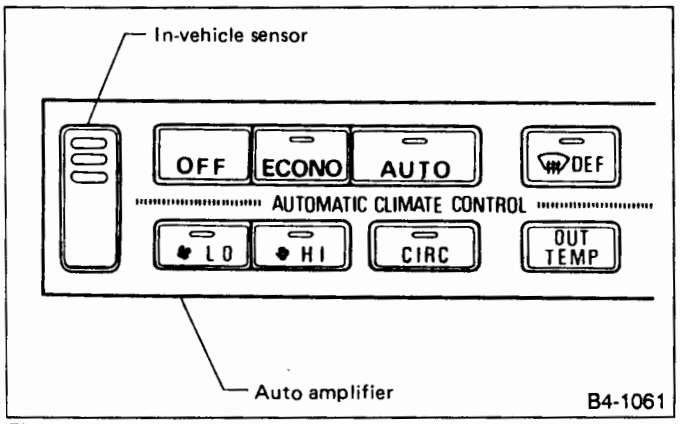


Fig. 21

After disconnecting in-vehicle sensor harness connector (ac1), measure resistance between terminals ① and ② at sensor harness side, using the table below.

Temperature °C (°F)	Resistance kΩ
−35 (−31)	38.35
−30 (−22)	28.62
−25 (−13)	21.61
−20 (−4)	16.50
−15 (5)	12.73
−10 (14)	9.92
−5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07
50 (122)	0.91
55 (131)	0.77
60 (140)	0.66
65 (149)	0.57

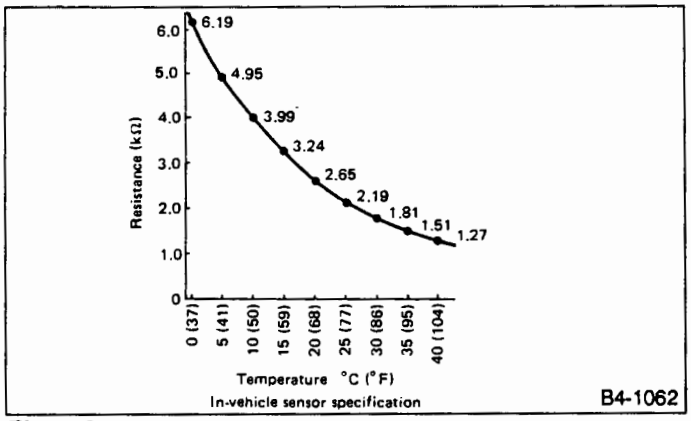


Fig. 22

4. ASPIRATOR

The aspirator is located where the heater unit.
The aspirator motor activates when the ignition switch is "ON".
The aspirator is connected to the in-vehicle sensor via the aspirator duct so that the in-vehicle sensor monitors the compartment temperature. The aspirator continuously draws in a very small amount of compartment air.

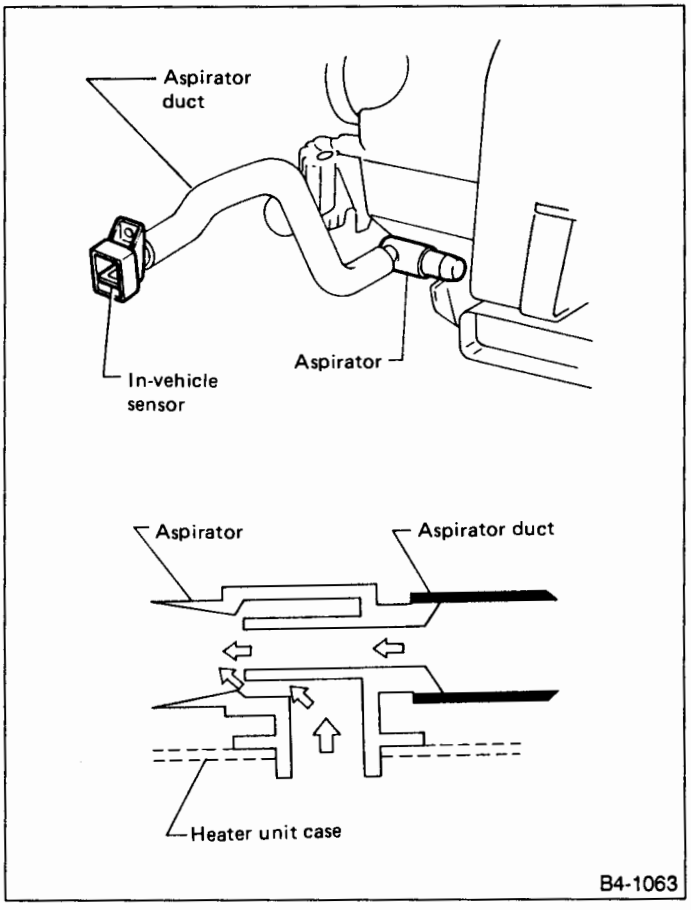


Fig. 23

5. AMBIENT SENSOR

The ambient sensor is attached to hood lock stay. It detects ambient temperature and converts it into a resistance value which is then input to the auto amplifier.

After disconnecting ambient sensor harness connector (F3), measure resistance between terminals ① and ② at sensor harness side, using the table below.

Temperature °C (°F)	Resistance kΩ
−35 (−31)	38.35
−30 (−22)	28.62
−25 (−13)	21.61
−20 (−4)	16.50
−15 (5)	12.73
−10 (14)	9.92
−5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07
50 (122)	0.91
55 (131)	0.77
60 (140)	0.66
65 (149)	0.57

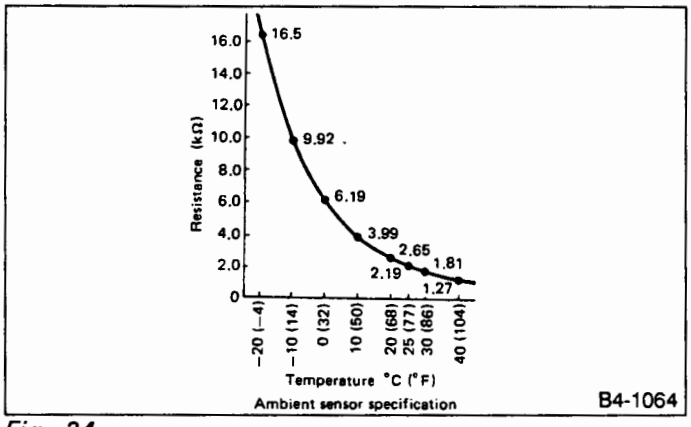


Fig. 24

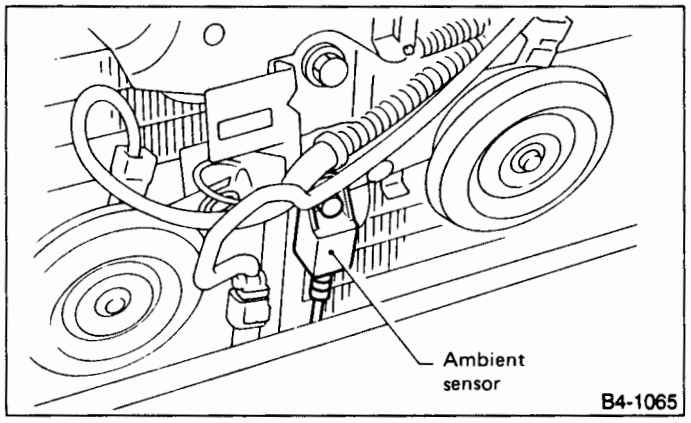


Fig. 25

6. SUNLOAD SENSOR

The sunload sensor is located on the right defroster grille. It detects sunload entering through windshield by means of a photo diode and converts it into a current value which is then input to the auto amplifier.

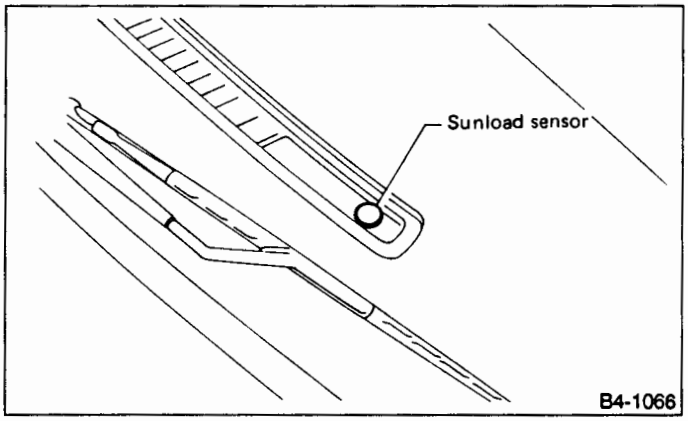


Fig. 26

Measure voltage between terminals ① and ② at vehicle harness side, using the table below.

Input current mA	Output voltage V
0	5.0
0.1	4.1
0.2	3.1
0.3	2.2
0.4	1.3
0.5	0.4

When checking sunload sensor, select a place where sun shines directly on it.

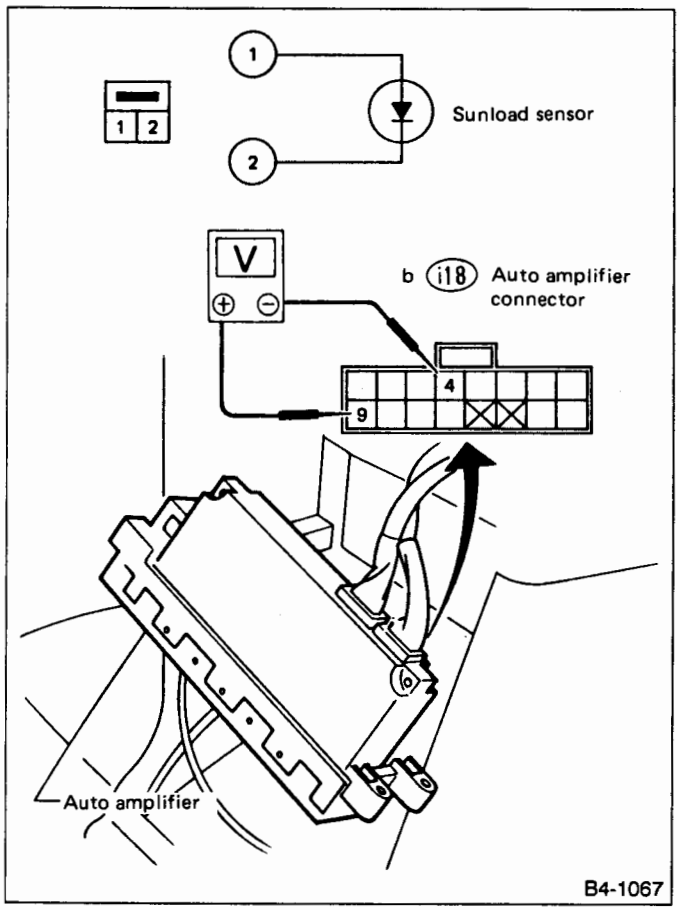


Fig. 27

7. INTAKE SENSOR

The intake sensor is located on the cooling unit. It converts temperature of air after it passes through the evaporator into a resistance value which is then input to the auto amplifier.

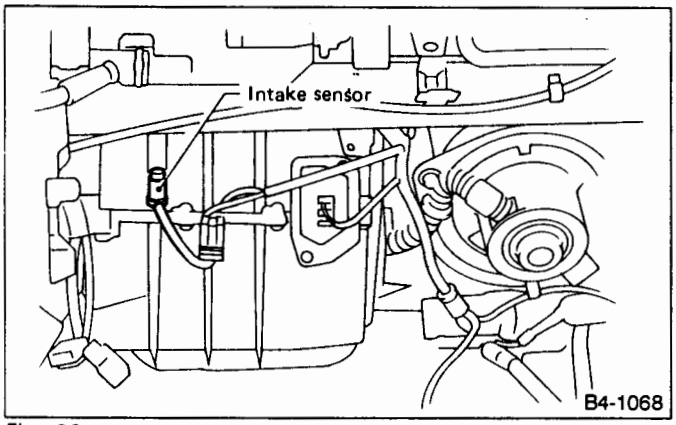


Fig. 28

After disconnecting ambient sensor harness connector (ac2), measure resistance between terminals ① and ② at sensor harness side, using the table below.

Temperature °C (°F)	Resistance kΩ
−35 (−31)	37.18
−30 (−22)	27.74
−25 (−13)	20.95
−20 (−4)	15.99
−15 (5)	12.34
−10 (14)	9.62
−5 (23)	7.56
0 (32)	6
5 (41)	4.8
10 (50)	3.87
15 (59)	3.14
20 (68)	2.57
25 (77)	2.12
30 (86)	1.76
35 (95)	1.47
40 (104)	1.23
45 (113)	1.04
50 (122)	0.88
55 (131)	0.75
60 (140)	0.64
65 (149)	0.55

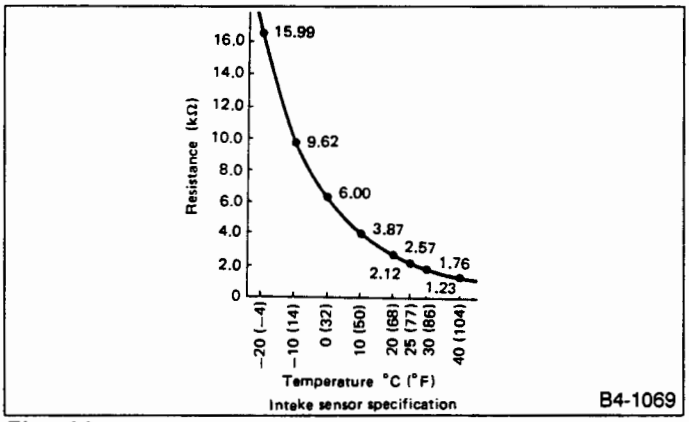


Fig. 29

8. WATER TEMPERATURE SENSOR

The water temperature sensor is attached to the heater unit. If converts the water temperature valve at the heater core entrance into a resistance valve. If inputs the voltage that varies according to change in the resistance valve, into the auto amp.

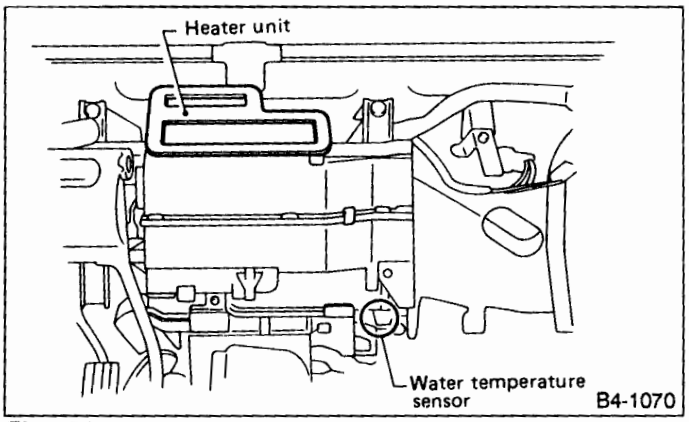


Fig. 30

After disconnecting water temperature sensor harness connector (ac3), measure resistance between terminals ① and ② at sensor harness side, using the table below.

Temperature °C (°F)	Resistance kΩ
0 (32)	3.99
5 (41)	3.17
10 (50)	2.54
15 (59)	2.05
20 (68)	1.67
25 (77)	1.36
30 (86)	1.12
35 (95)	0.93
40 (104)	0.78
45 (113)	0.65
50 (122)	0.55
55 (131)	0.47
60 (140)	0.40
65 (149)	0.34
70 (158)	0.29
75 (167)	0.25
80 (176)	0.22

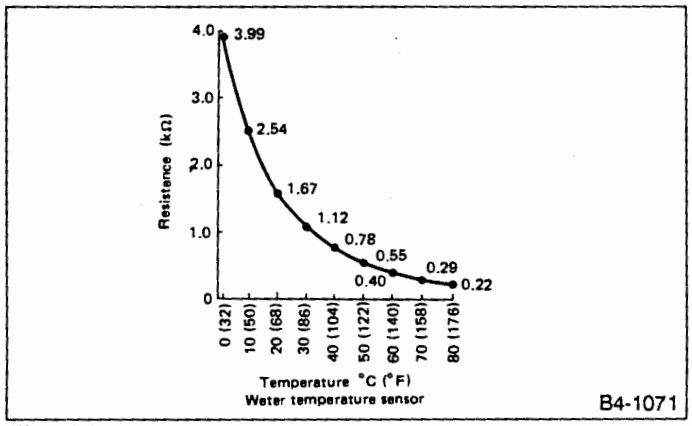


Fig. 31

9. AUTO AMPLIFIER

The auto amplifier has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door, mode door motor, intake door motor, blower motor and compressor are then controlled.

The auto amplifier is unitized with control mechanisms. Signals from various switches and Potentio Temperature Control (P.T.C.) are directly entered into auto amplifier.

Self-diagnostic functions are also built into auto amplifier to provide quick check of malfunctions in the auto air conditioner system.

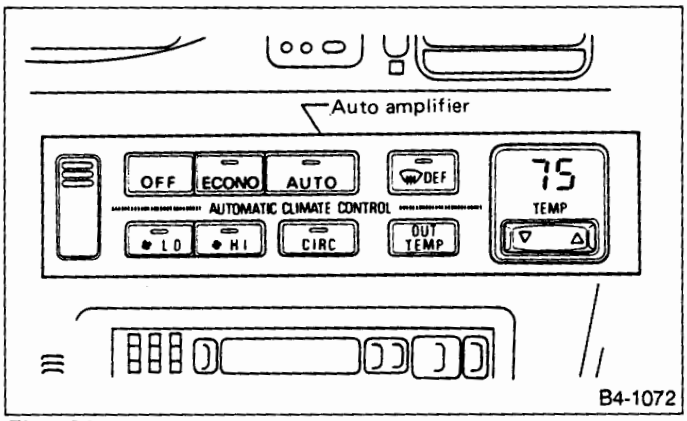


Fig. 32

a. AMBIENT TEMPERATURE INPUT PROCESS

The automatic amplifier includes a "processing circuit" for the ambient sensor input. When the temperature detected by the ambient sensor increases quickly, the processing circuit allows the auto amp. to recognize an ambient temperature increase of only 0.3°C (0.6°F) per 90 seconds.

The ambient temperature input process cancels if the vehicle speed is kept over 30 km/h (19 MPH) and if this condition is continuing over 3 minutes.

As an example, consider stopping for a cup of coffee after high speed driving. Even though the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase because heat radiated from the engine compartment can radiate to the front grille area (where the ambient sensor is located).

b. SUNLOAD INPUT PROCESS

The auto amp. also includes a processing circuit which "average", the variations in detected sunload over a period of time. This prevents drastic swings in the A.T.C. system operation due to small or quick variations in detected sunload.

For example, consider driving along a road bordered by an occasional group of large trees. The sunload detected by the sunload sensor will vary whenever the trees obstruct the sunlight. The processing circuit averages the detected sunload over a period of time, so that the (insignificant) effect of the trees momentarily ob-

structing the sunlight does not cause any change in the A.T.C. system operation. On the other hand, shortly after entering a long tunnel, the system will recognize the change in sunload, and the system will react accordingly.

G: CONTROL SYSTEM

1. INTAKE DOOR CONTROL

1) Components parts

Intake door control system components are:

(1) Auto amplifier
(2) Intake door motor
(3) P.B.R.
(4) In-vehicle sensor
(5) Ambient sensor
(6) Sunload sensor
(7) Intake sensor

2) System operation

The intake door control determines intake door position based on the ambient temperature and the in-vehicle temperature. When the ECON, DEF, or OFF buttons are pushed, the auto amplifier sets the intake door at the "Fresh" position.

If P.T.C. is set at 20°C (68°F), the auto amplifier operates the intake door motor to set at RECIRC. And if P.T.C. is set at 30°C (86°F), the auto amplifier operates the intake door motor to set at FRESH.

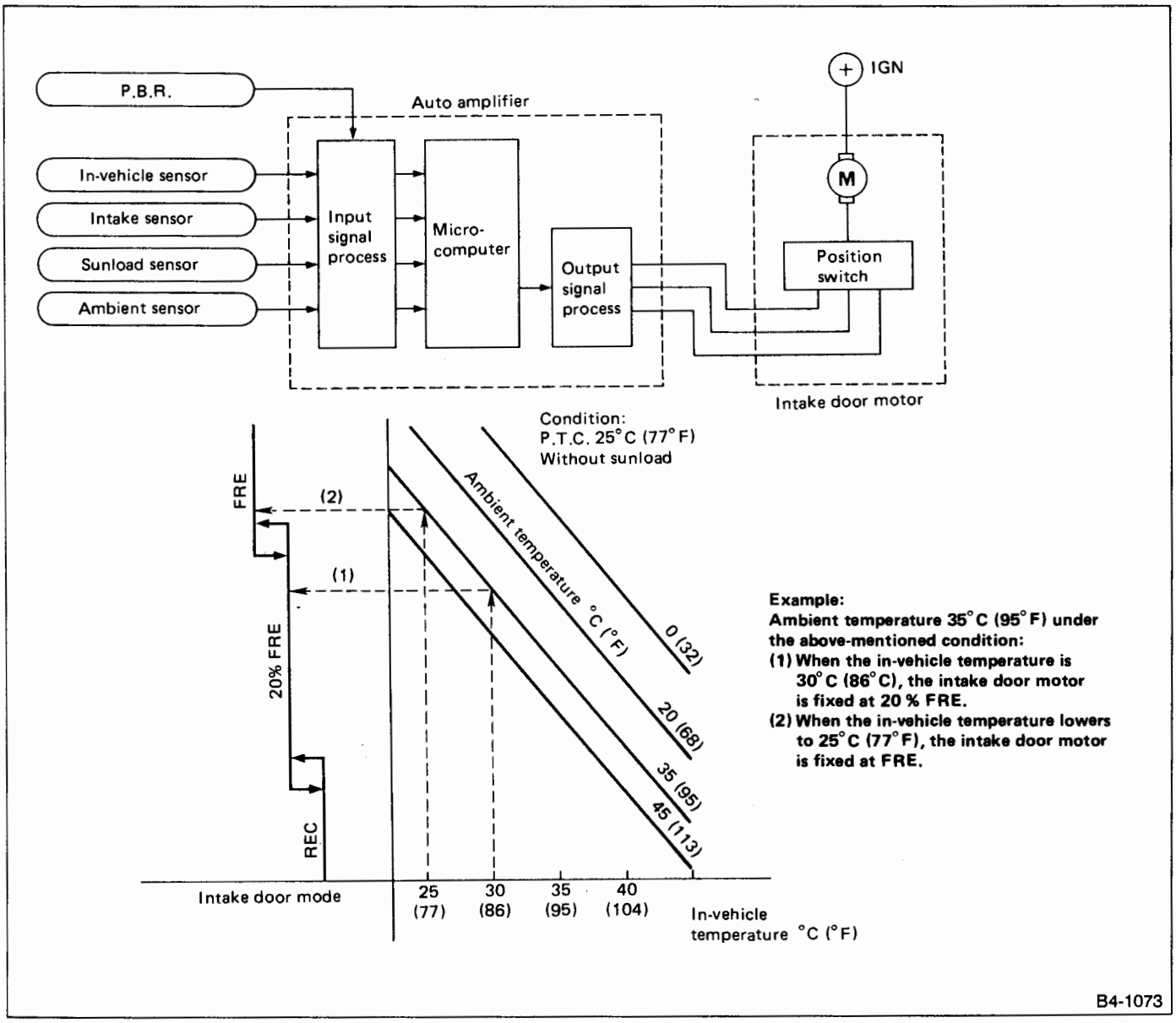


Fig. 33

3) Intake door motor

The intake door motor is attached to the intake unit. It rotates so that air is drawn from inlets set by the auto amplifier. Motor rotation is conveyed to a lever which activates the intake door.

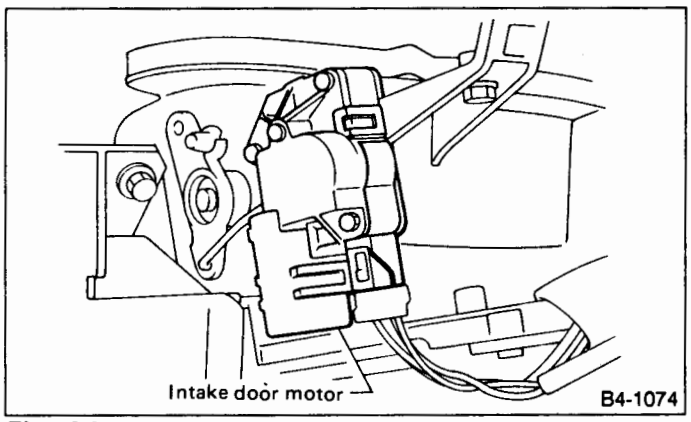
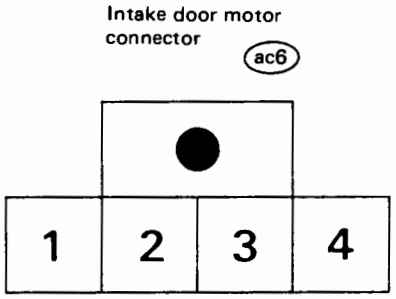


Fig. 34



Intake door motor operation

Terminal 4	Terminal 2	Terminal 3	Intake door operation	Direction of lever rotation
CL	OP	OP	REC	Counterclockwise
OP	CL	OP	20% FRE	
OP	OP	CL	FRE	

OP: Open
CL: Close

B4-1075

Fig 35

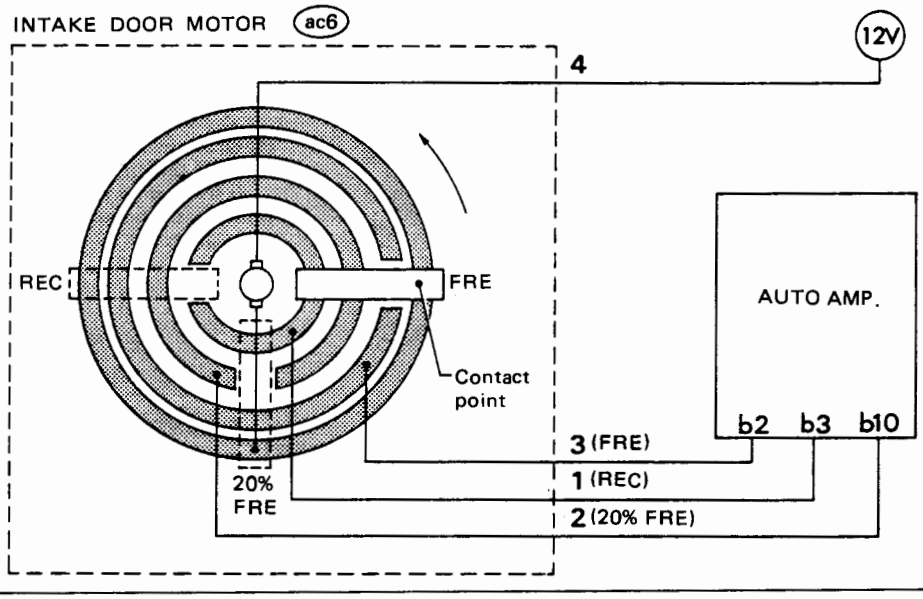


Fig. 36

2. AIR MIX DOOR CONTROL (Automatic temperature control)

1) Component parts
   (1) Auto amplifier
   (2) Air mix door motor (P.B.R.)
   (3) In-vehicle sensor
   (4) Ambient sensor
   (5) Sunload sensor
   (6) Intake sensor

2) System operation

Temperature set by Potentio Temperature Control (P.T.C.) is compensated through setting temperature correction circuit to determine target temperature.

Auto amplifier will operate air mix door motor to set air conditioning system in HOT or COLD position, depending upon relationship between conditions (target temperature, sunload, in-vehicle temperature and ambient temperature) and conditions (air mix door position and intake air temperature).

When P.T.C. is set at 20°C (68°F). The auto amplifier operates are air mix door to set in Full cold. And when P.T.C. is set at 30°C (86°F) set in Full hot.

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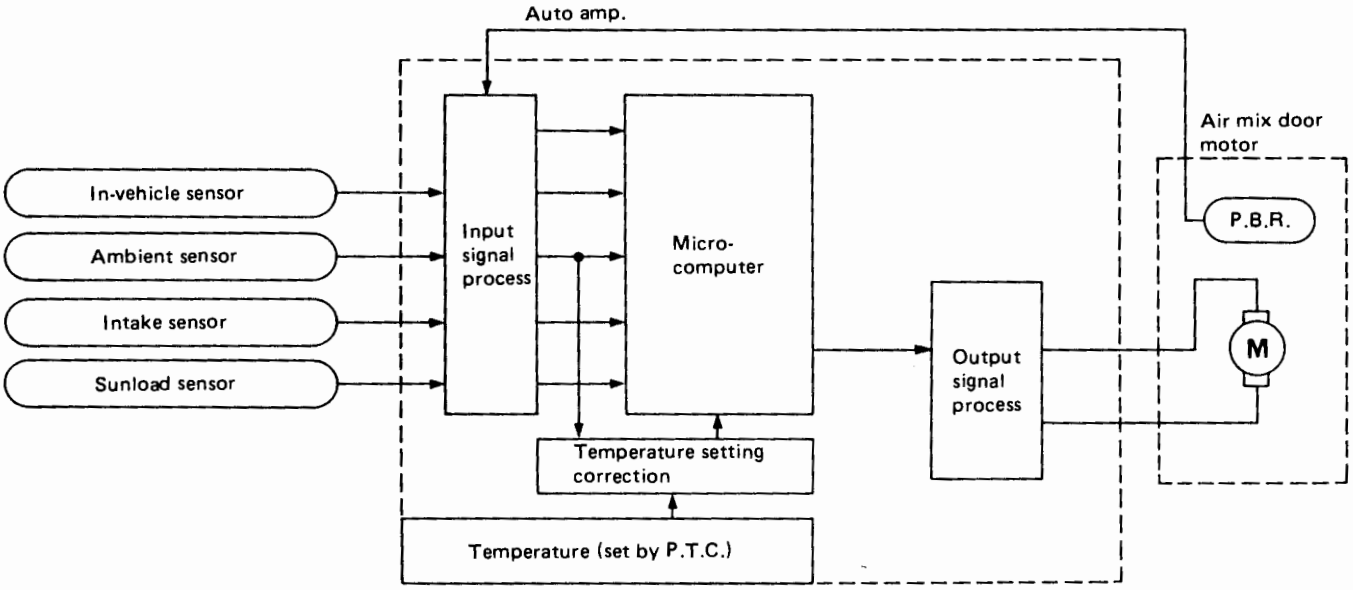
B4-1075

B4-1076



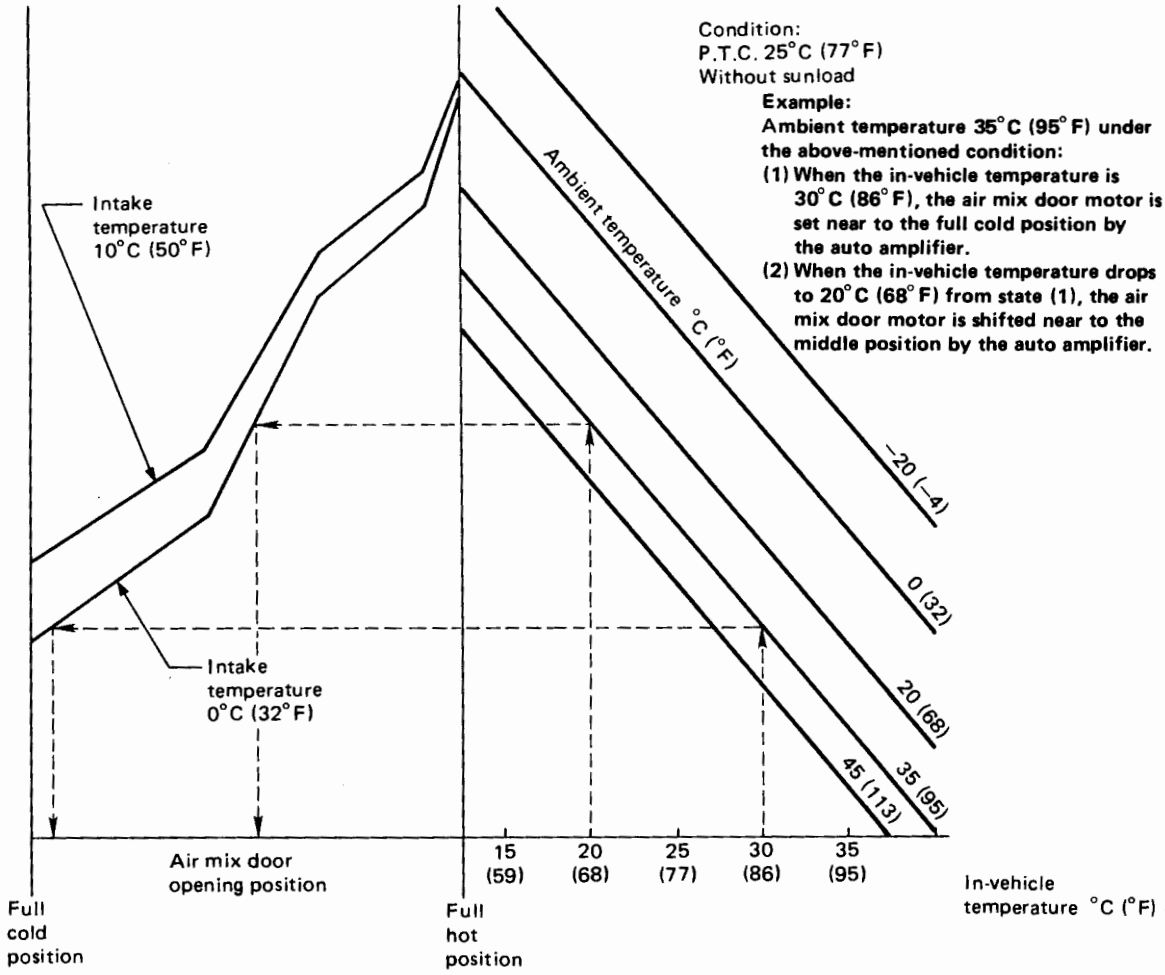


Fig. 37

B4-1077

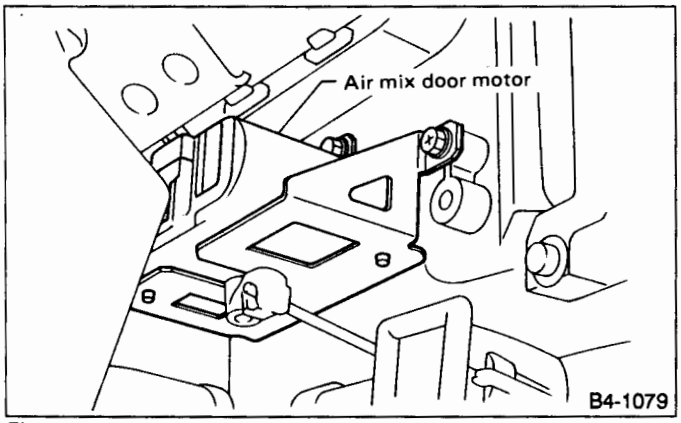
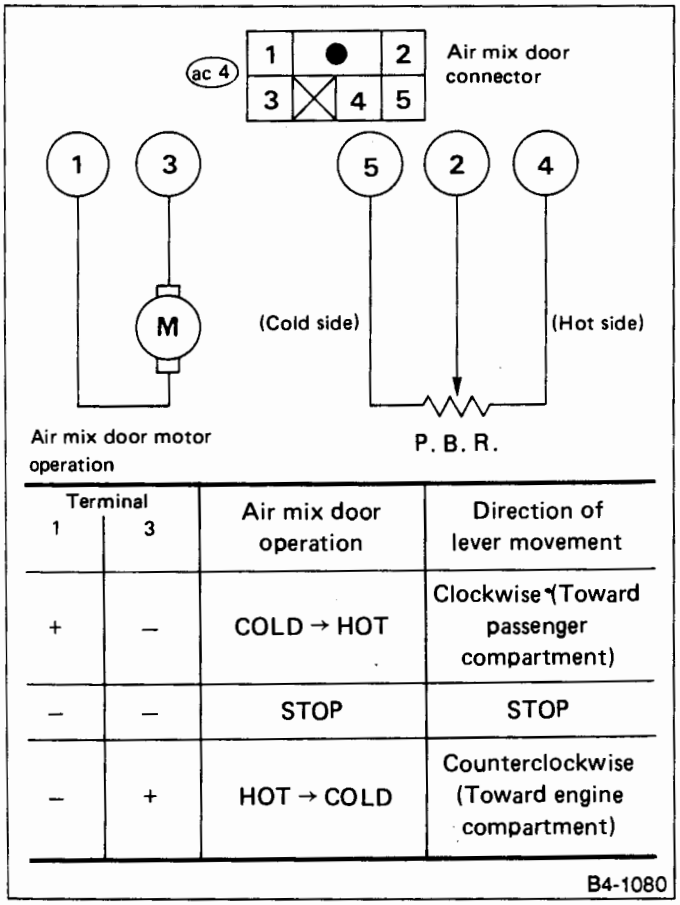


Fig. 38

3) Air mix door motor

The air mix door motor is attached to the heater unit. It rotates so that the air mix door is opened to a position set by the auto amplifier. Motor rotation is then conveyed through a shaft and air mix door position is then fed back to the auto amplifier by P.B.R. built-in air mix door motor.



Terminal 1	Terminal 3	Air mix door operation	Direction of lever movement
+	–	COLD → HOT	Clockwise (Toward passenger compartment)
–	–	STOP	STOP
–	+	HOT → COLD	Counterclockwise (Toward engine compartment)

B4-1080

Fig. 39

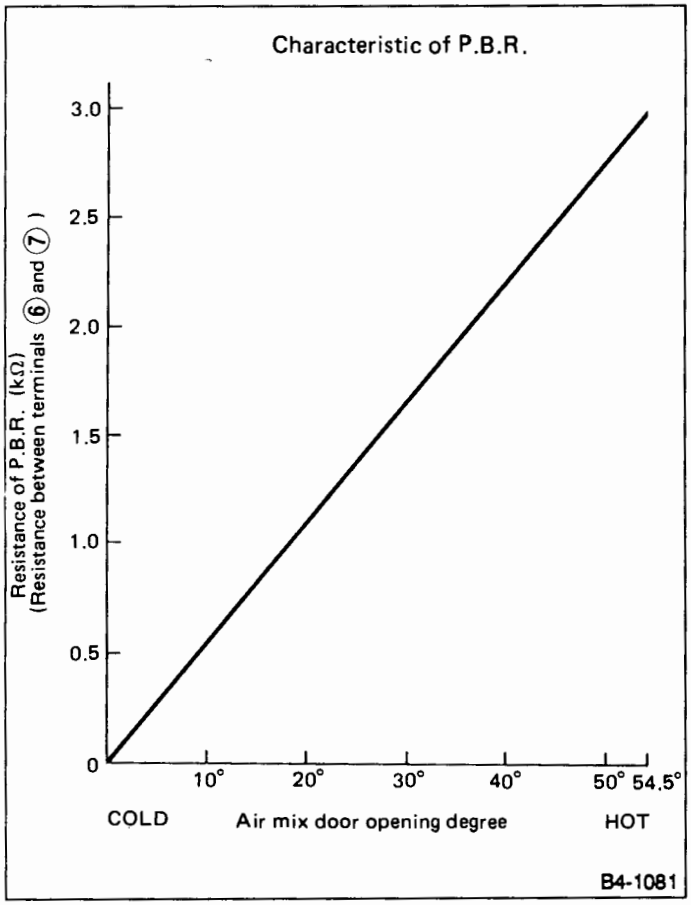


Fig. 40

3. OUTLET DOOR CONTROL

1) Component parts

Outlet door control system components are:

(1) Auto amplifier
(2) Mode door motor
(3) P.B.R.
(4) In-vehicle sensor
(5) Ambient sensor
(6) Sunload sensor
(7) Intake sensor

2) System operation

The auto amplifier computes the air outlet conditions according to the ambient temperature and the in-vehicle temperature. The computed outlet conditions are then corrected for sunload to determine air outlets through which air is discharged into the passenger compartment.

When the air outlets is automatically selected as FOOT/DEF, the actual outlet will be either F/D1 or F/D2 depending on the ambient temperature.

Max cool control

If P.T.C. is set at 20°C (68°F), air outlet is set at VENT.

Max hot control

If P.T.C. is set at 30°C (86°F), air outlet is set at FOOT.

The auto amplifier operates mode door motor to set to DEF if water temperature is below 55°C (131°F) and air outlet is set at FOOT or BILEVEL. If DEF or OFF switch is pushed, mode door motor turns in maximum speed. And if AUTO or ECONO switch is pushed turns slowly.

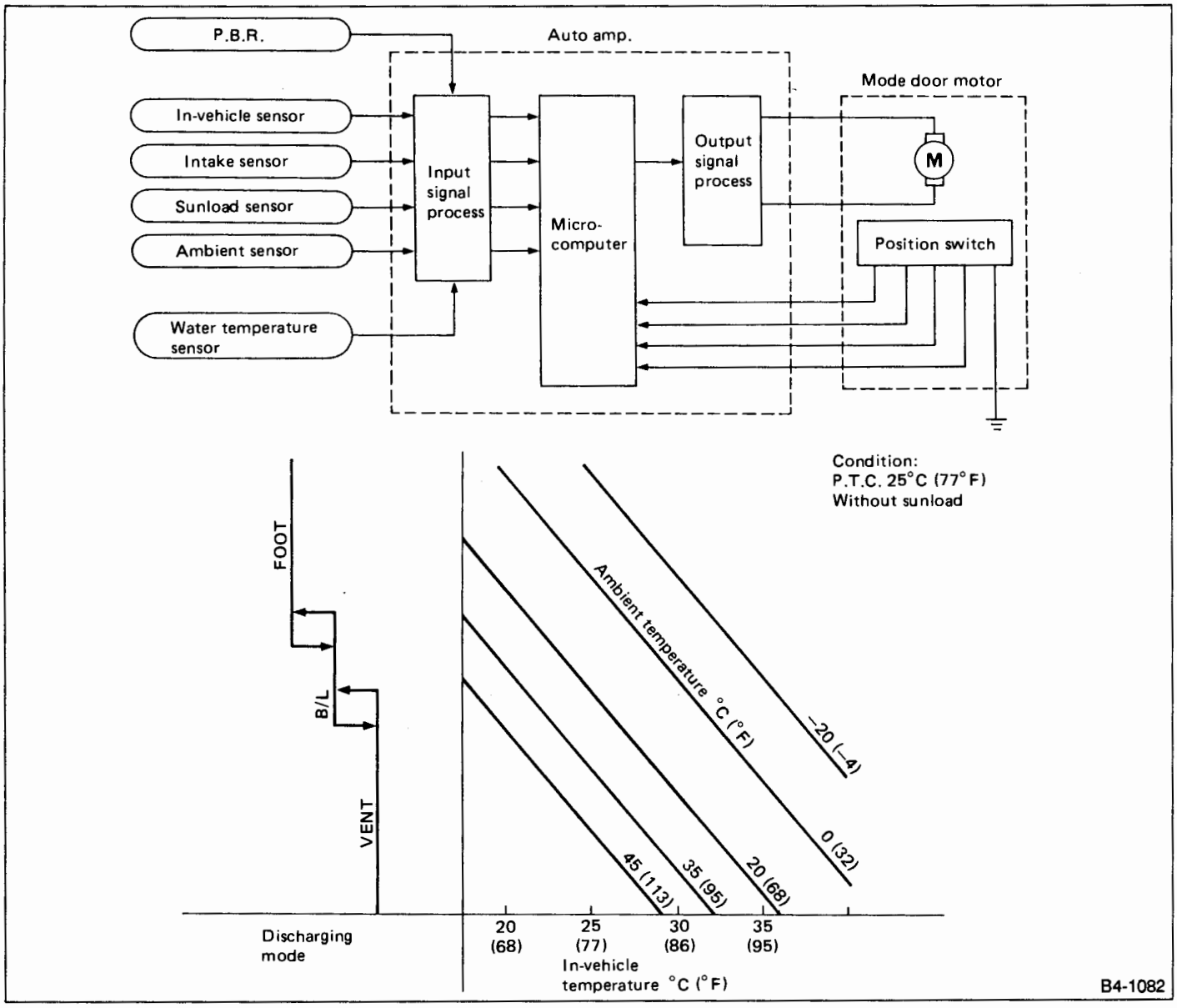


Fig. 41

3) Mode door motor

The mode door motor is attached to the heater unit. It rotates so that air is discharged from outlet set by the auto amplifier. Motor rotation is conveyed to a link which activates the mode door.

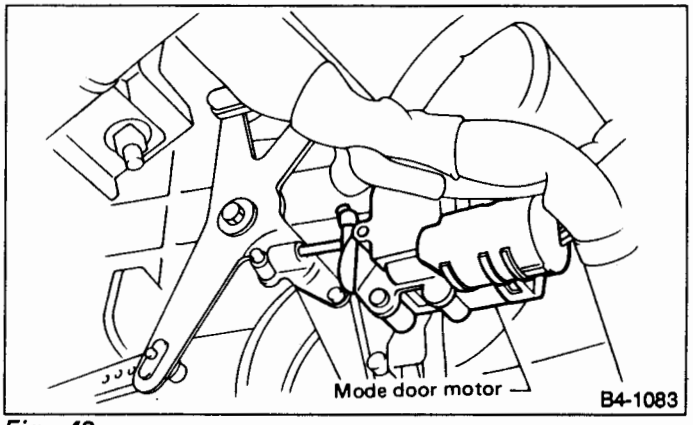


Fig. 42

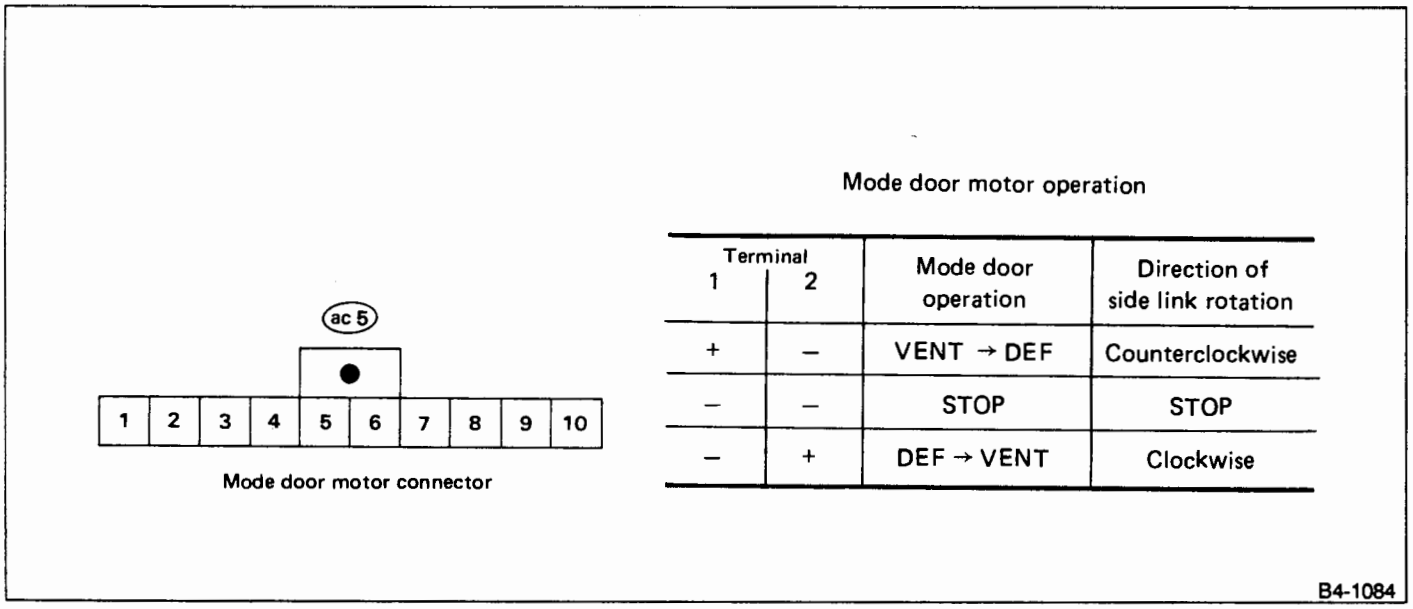


Fig. 43

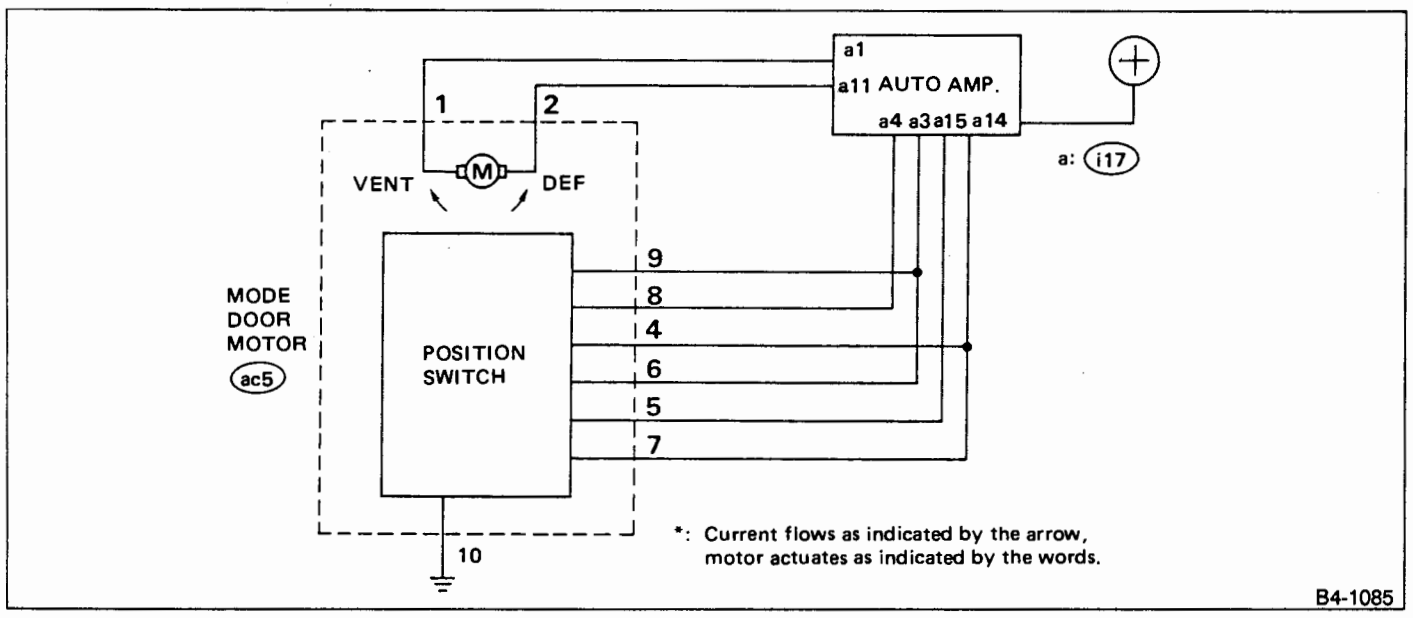


Fig. 44

4. FAN SPEED CONTROL

1) Component parts

Fan speed control system components are:

(1) Auto amplifier
(2) Fan control amplifier
(3) P.B.R.
(4) In-vehicle sensor
(5) Ambient sensor
(6) Sunload sensor
(7) Intake sensor
(8) Hi relay
(9) Water temperature sensor

a. AUTOMATIC MODE

In the automatic mode, the blower motor speed is calculated by the automatic amplifier based on inputs from the P.B.R., in-vehicle sensor, sunload sensor, and ambient sensor. The blower motor applied voltage ranges from approximately 5 volts (lowest speed) to 12 volts (highest speed).

The control blower speed (in the range of 5 to 10.5V), the automatic amplifier supplies a signal to the blower motor amplifier. Based on this signal, the blower amplifier controls the current flow from the blower motor to ground. If the computed blower voltage (from automatic amplifier) is above 10.5 volts, the high blower relay is activated. The high blower relay provides a direct path to ground (bypassing the blower amplifier), and the blower motor operates at high speed.

b. STARTING BLOWER SPEED CONTROL

Start up from "COLD" condition (automatic mode)

In a cold start up condition where the engine temperature is below 32°C (90°F) and the ambient temperature is below 15°C (59°F), the blower will not operate for a short period of time (up to 90 seconds). The exact start delay time varies depending on the ambient and engine temperature.

When the engine temperature is between 32°C (90°F) and 35°C (95°F), and the ambient temperature below 15°C (59°F), the blower speed will gradually rise to the objective speed over a time period of 18 minutes or less (actual time depends on the objective blower speed), the exact start delay time varies depending on the ambient and engine temperature.

In the most extreme case (very low ambient) the blower starting delay will be 90 seconds as described above. After this delay, the blower will operate at low speed until the engine temperature rises above 32°C (90°F), at which time the blower speed will increase to the objective speed.

Start up from normal or "HOT" condition (automatic mode)

The blower will begin operation momentarily after the AUTO button is pushed. The blower speed will gradually rise to the objective speed over a time period of 5 seconds or less (actual time depends on the objective blower speed).

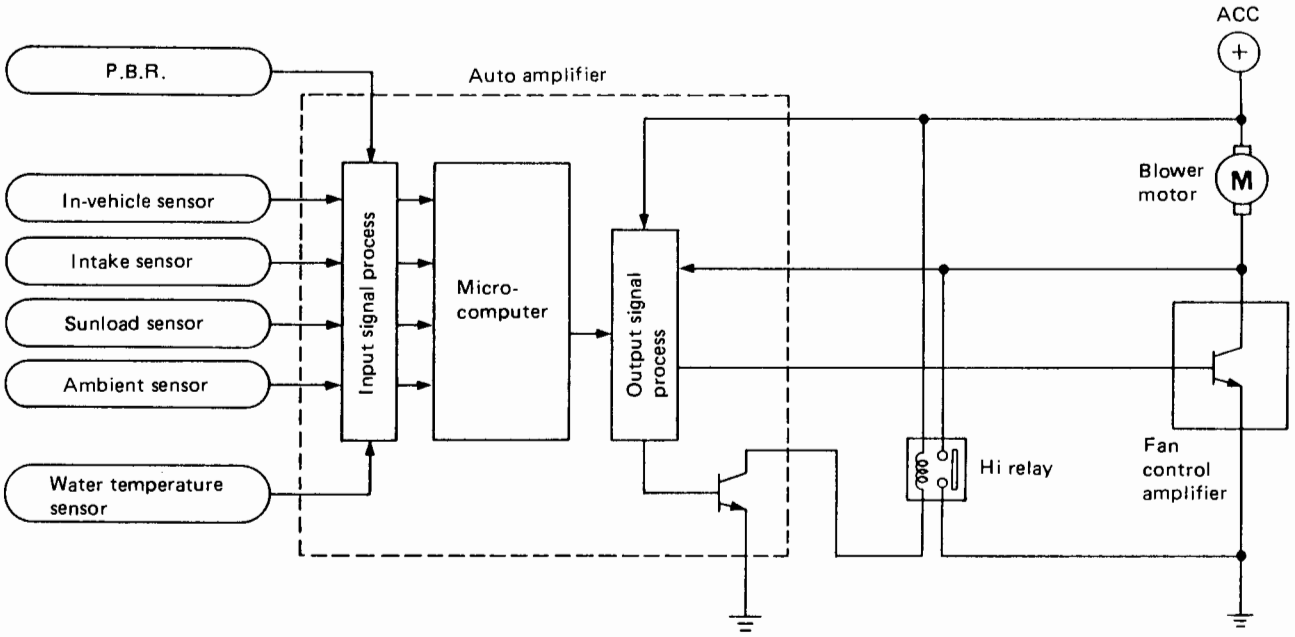
c. BLOWER SPEED COMPENSATION

Sunload

When the in-vehicle temperature and the set temperature are very close, the blower will be operating at low speed. This low speed varies depending on the sunload and mode. In VENT mode during conditions of high sunload, the blower speed is at a middle low speed (approx. 6 volts). In VENT mode during conditions of low or no sunload, the blower speed will drop to the minimum low speed (approx. 5 volts). In all other mode except VENT mode whether under conditions of sunload or not, the blower speed will increase to the normal, maximum low speed (approx. 6.5 volts).

Ambient

When the ambient temperature is in the "moderate" range 10 to 15°C (50 to 59°F), the computed blower voltage will be compensated (reduced) by up to 3.5V (depending on the blower speed). In the "extreme" ambient ranges [below 0°C (32°F) and above 20°C (68°F)] the computed objective blower voltage is not compensated at all. In the ambient temperature ranges between "moderate" and "extreme" [0 to 10°C (32 to 50°F)] and [15 to 20°C (59 to 68°F)], the amount of compensation (for a given blower speed) varies depending on the ambient temperature.



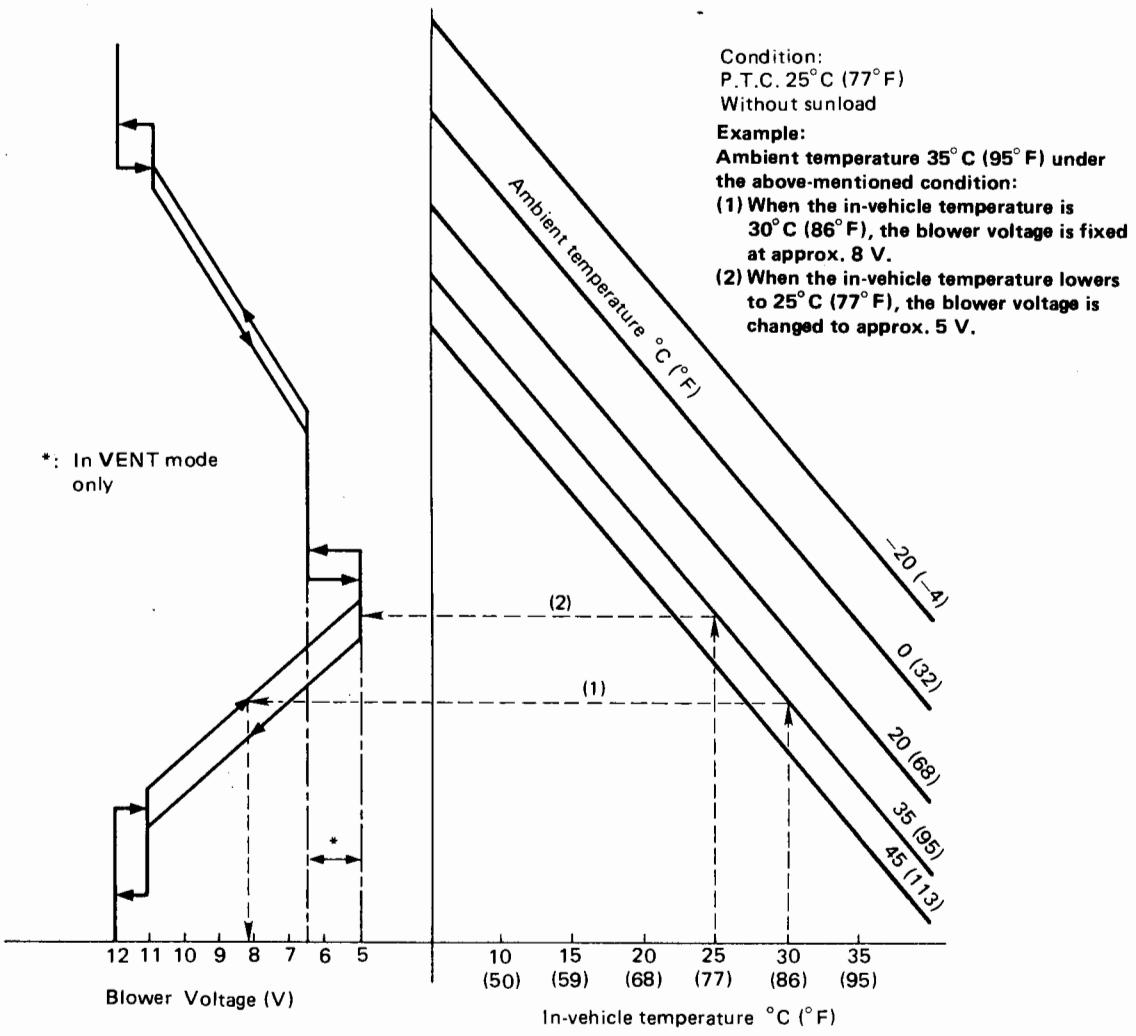


Fig. 45

B4-1086

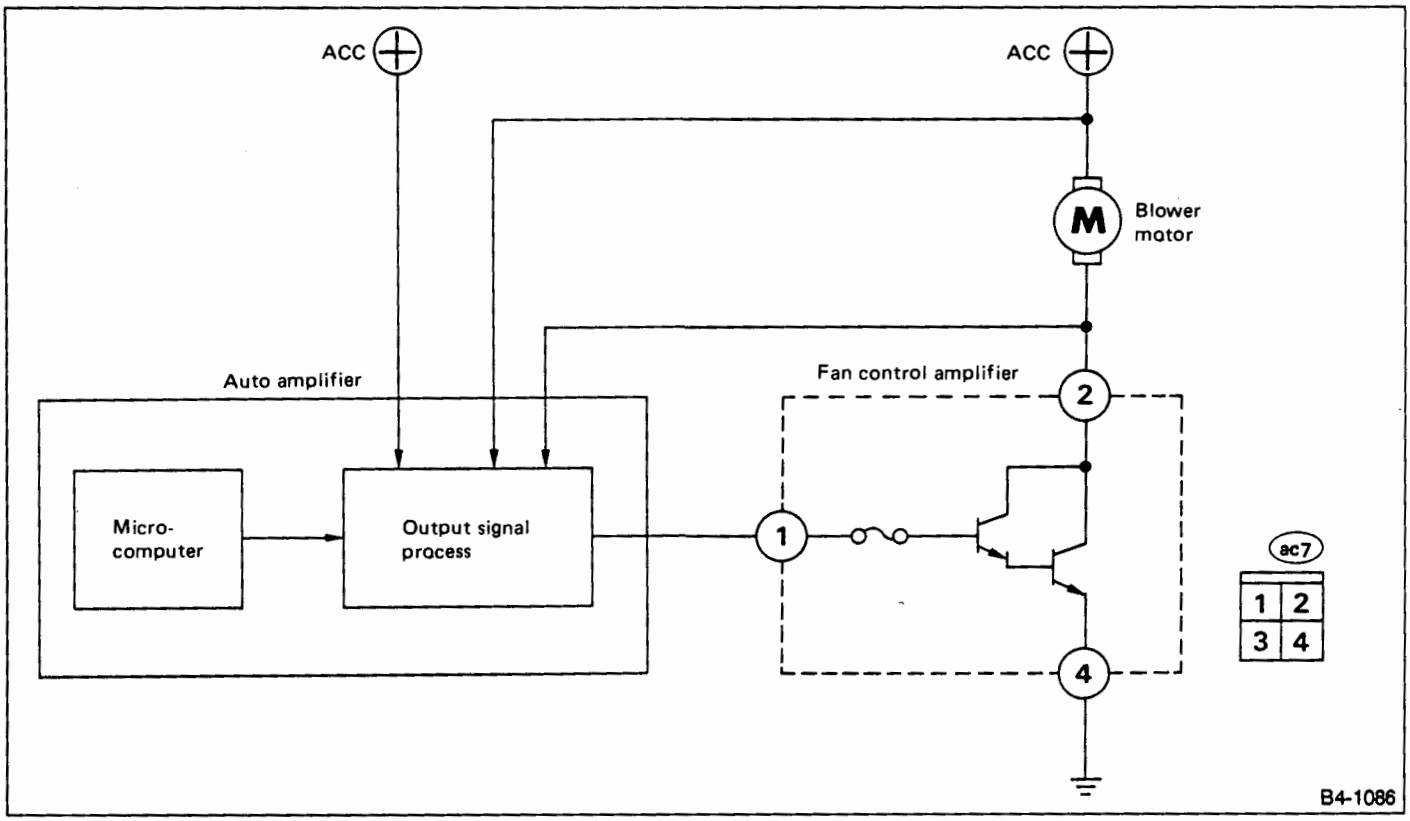


Fig. 46

2) Fan control amplifier

The fan control amplifier is located on the cooling unit. It amplifies a 12-step base current flowing from the auto amplifier to change blower speed.

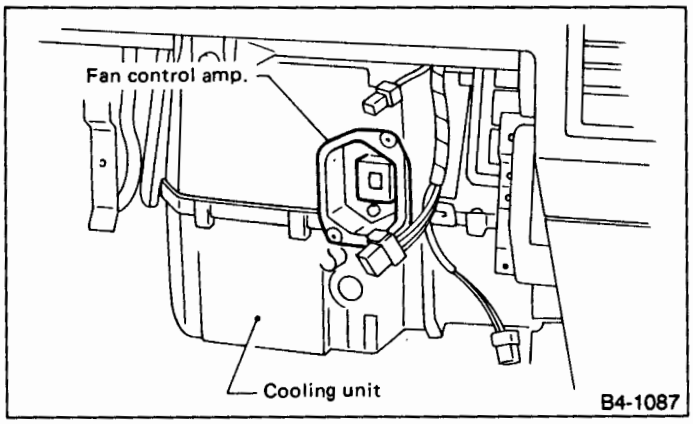


Fig. 47

3) Hi relay

The Hi relay is located on the heater unit. It receives a signal from the auto amplifier to operate the blower motor at high speed.

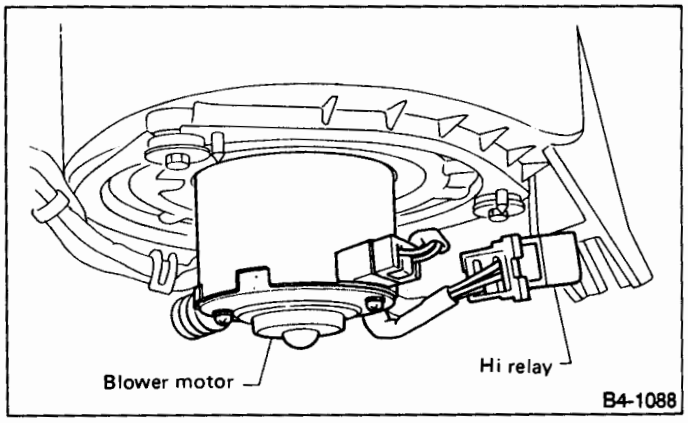


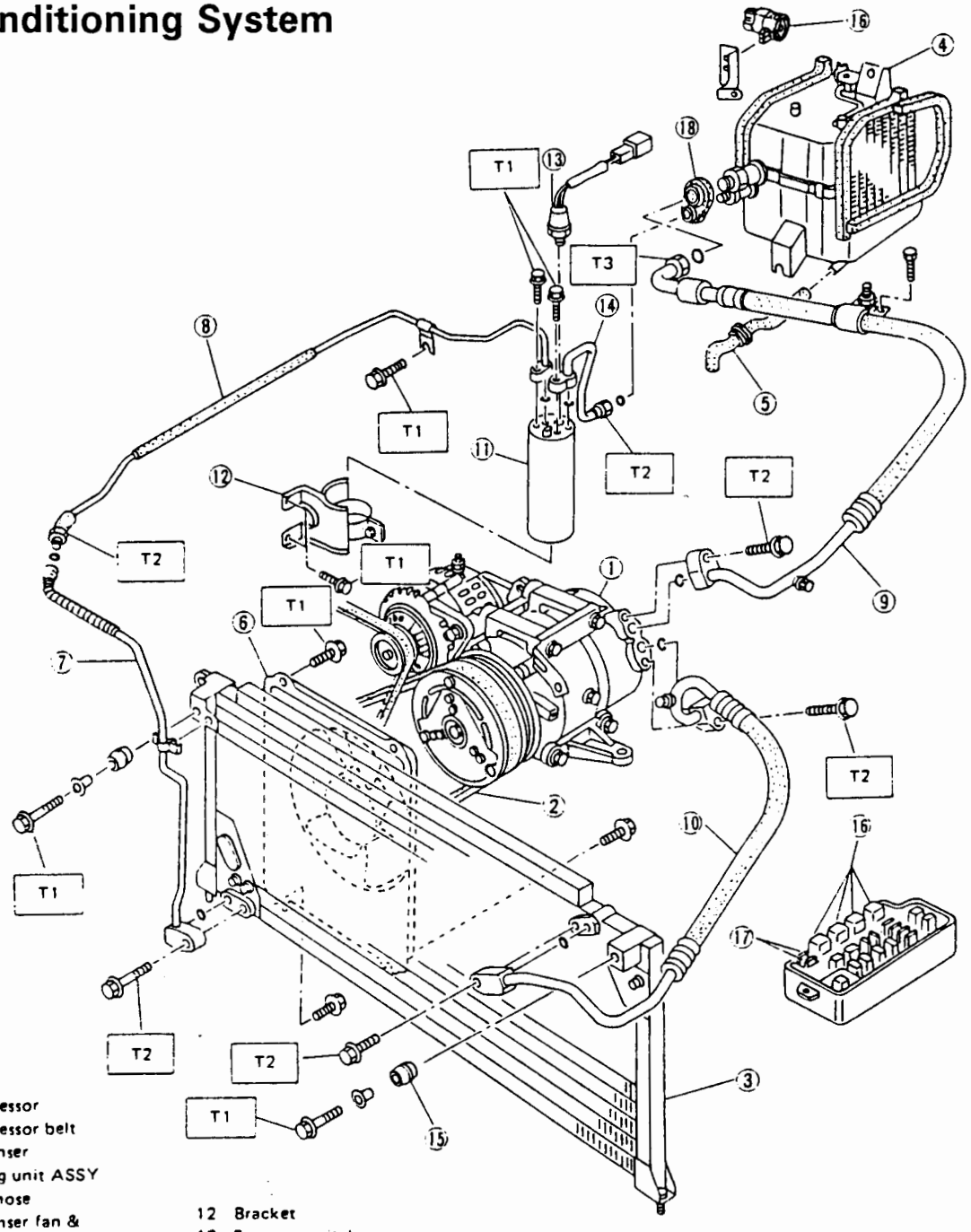
Fig. 48

S SPECIFICATIONS

Item		Specifications	
Type of air conditioner			Reheat air-mix type
Cooling capacity (IMACA)			5.001 kW (4,300 kcal/h, 17,062 BTU/h)
Refrigerant			R-12 (CCL_2F_2) [0.8 — 0.9 kg (1.8 — 2.0 lb)]
Compressor		Type	Variable displacement (V5-15C)
		Discharge	146 cm^3 (8.91 cu in)/rev
		Max. permissible speed	7,000 rpm
Magnet clutch		Type	Dry, single-disc type
		Power consumption	42W
		Type of belt	V-Ribbed 4 PK
		Pulley dia. (effective dia.)	120 mm (4.72 in)
		Pulley ratio	1.11
Condenser		Type	Corrugated fin
		Core face area	0.200 m^2 (2.2 sq ft)
		Core thickness	22 mm (0.87 in)
		Radiation area	4.72 m^2 (50.8 sq ft)
Receiver drier		Effective inner capacity	350 cm^3 (21.36 cu in)
Expansion valve		Type	External equalizing
Evaporator		Type	Laminated
		Dimensions (W x H x T)	214 x 235 x 86 mm (8.43 x 9.25 x 3.39 in)
Blower fan		Fan type	Sirocco fan
		Outer diameter x width	150 x 74.5 mm (5.91 x 2.933 in)
		Power consumption	220W at 12V
Condenser fan (Sub fan)		Motor type	Magnet
		Power consumption	140W at 12V
		Fan outer diameter	280 mm (11.02 in)
Radiator fan (Main fan)		Motor type	Magnet
		Power consumption	120W at 12V
		Fan outer diameter	340 mm (13.39 in)
Trinary switch (Pressure switch)	Low-pressure-switch operating pressure kPa (kg/cm^2, psi)	ON → OFF	196.1 ± 24.5 (2.0 ± 0.25, 28.4 ± 3.6)
		OFF → ON	210.9 ± 34.3 (2.15 ± 0.35, 30.6 ± 5.0)
	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)
	Intermediate-pressure-switch operating pressure (Main fan control) kPa (kg/cm^2, psi)	OFF → ON	1,471 ± 98 (15 ± 1.0, 213 ± 14)
		ON → OFF	1,079 ± 98 (11 ± 1, 156 ± 14)
Compressor relief valve blow-out pressure kPa (kg/cm^2, psi)			3,727 ± 0 (38 ± 0, 540 ± 0)
Fusible plug melting temperature			105 $^{+2}_{-5}$ °C (221 $^{+3.6}_{-9}$ °F)
Thermo control amplifier working temperature (Evaporator outlet air)		ON → OFF	0.1 — 0.9°C (32 — 34°F)
		OFF → ON	2.5 — 3.5°C (37 — 38°F)

C COMPONENT PARTS

1. Air Conditioning System



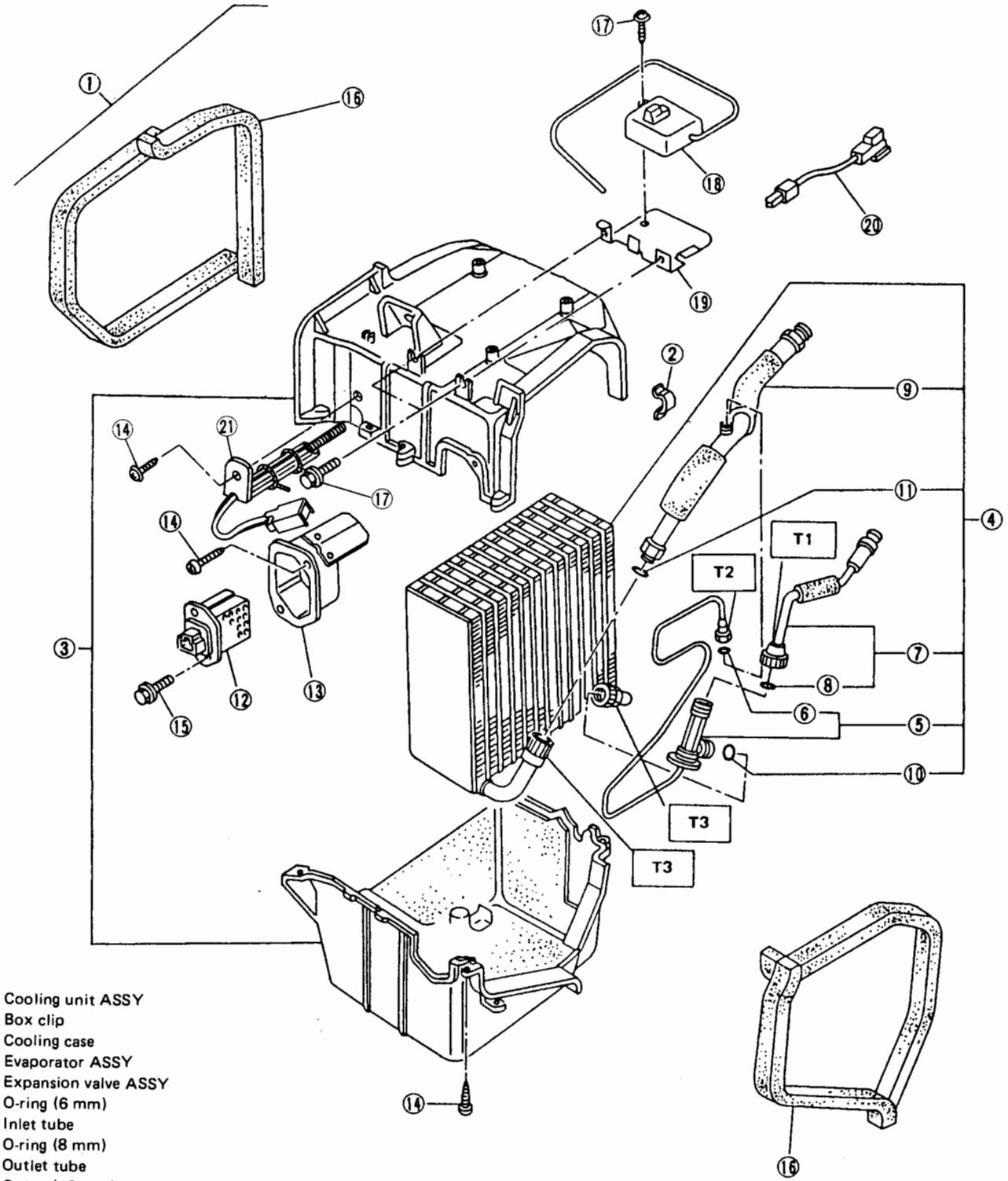
1 Compressor
2 Compressor belt
3 Condenser
4 Cooling unit ASSY
5 Drain hose
6 Condenser fan & Shroud (Sub-fan)
7 Pipe (Condenser-Receiver drier)
8 Pipe (Condenser-Receiver drier)
9 Hose (Ps)
10 Hose (Ps)
11 Receiver drier
12 Bracket
13 Pressure switch
14 Pipe (Receiver drier–C/unit)
15 Grommet
16 A/C relay
17 A/C fuse
18 Grommet

Tightening torque: N·m (kg-m, ft-lb)
T1: 6 – 10 (0.6 – 1.0, 4 – 7)
T2: 10 – 20 (1.0 – 2.0, 7 – 14)
T3: 25 – 34 (2.5 – 3.5, 18 – 25)

B4-1089

Fig. 49

2. Evaporator



1 Cooling unit ASSY
2 Box clip
3 Cooling case
4 Evaporator ASSY
5 Expansion valve ASSY
6 O-ring (6 mm)
7 Inlet tube
8 O-ring (8 mm)
9 Outlet tube
10 O-ring (12 mm)
11 O-ring (16 mm)
12 Resistance (*Fan control amp.)
13 Resistance bracket
14 Screw-tap.
15 Screw-mach.
16 Packing-cooler
17 Screw
18 Thermo control amplifier
19 Thermo control amplifier bracket
20 Sub-harness
21 Intake sensor

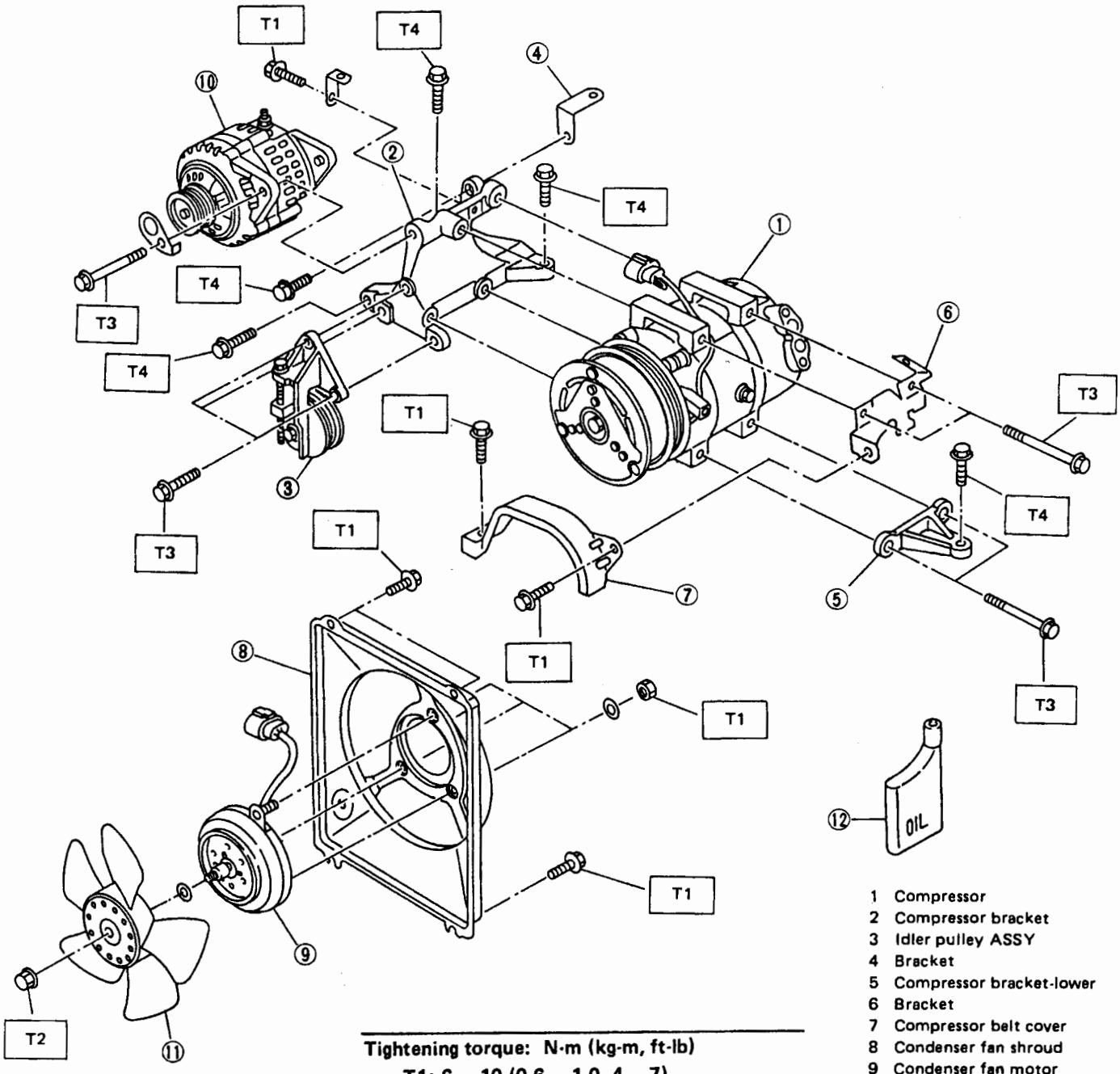
*: For automatic climate control

Tightening torque: N·m (kg-m, ft-lb)
T1: 15 – 25 (1.5 – 2.5, 11 – 18)
T2: 10 – 20 (1.0 – 2.0, 7 – 14)
T3: 20 – 29 (2.0 – 3.0, 14 – 22)

B4-1090

Fig. 50

3. Compressor



Tightening torque: N·m (kg-m, ft-lb)

T1: 6 – 10 (0.6 – 1.0, 4 – 7)
T2: 10 –20 (1.0 – 2.0, 7 – 14)
T3: 25 – 34 (2.5 – 3.5, 18 – 25)
T4: 48 – 58 (4.8 – 5.8, 35 – 43)

1 Compressor
2 Compressor bracket
3 Idler pulley ASSY
4 Bracket
5 Compressor bracket-lower
6 Bracket
7 Compressor belt cover
8 Condenser fan shroud
9 Condenser fan motor
10 Alternator ASSY
11 Condenser fan
12 Compressor oil (Service part oil)

B4-667

Fig. 51

W SERVICE PROCEDURE

1. Safety Precautions

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 R-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 R-12 to direct sunlight, or to temperatures over 40°C (104°F). One more thing to remember about R-12 is that when it is exposed to an open flame or to hot metal, it forms phosgene, a deadly gas. Do not discharge R-12 into the atmosphere on purpose. Always read and follow the precautions on the R-12 bottle.

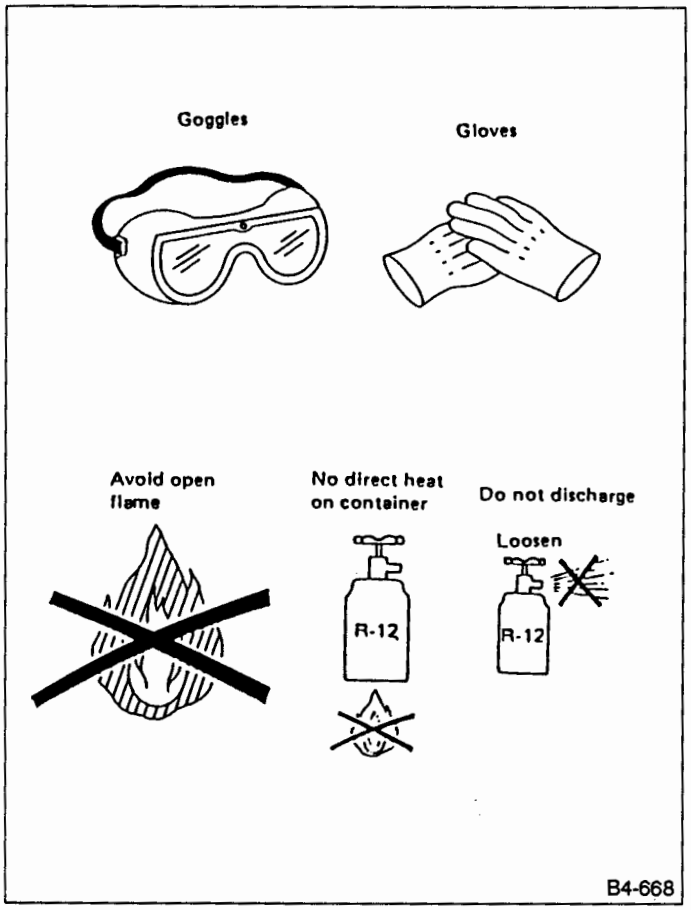


Fig. 52

2. Basic Information

1) The combination of moisture and refrigerant forms acid, therefore, moisture should not be allowed to enter the refrigerant.
2) Refrigerant oil readily absorbs moisture, therefore, keep refrigerant oil containers tightly capped.
3) The process of evacuating the system is performed to remove small amounts of moisture. This is accomplished by lowering the pressure inside the system, which allows the moisture to boil off, in much the same way that a pot of water will boil away to nothing given enough time. The evacuation process does not suck the moisture out of the system.
4) A minimum level of vacuum must be reached to satisfactorily evacuate the system. This minimum level of vacuum depends on the temperature inside the system. The chart below shows the level of vacuum required to boil water at various temperatures.
Additionally, the vacuum level shown on a gauge will read approx. 4 kPa (25 mmHg, 1 inHg) less for each 1000 ft. above sea level, due to the decrease in atmospheric pressure at altitude.

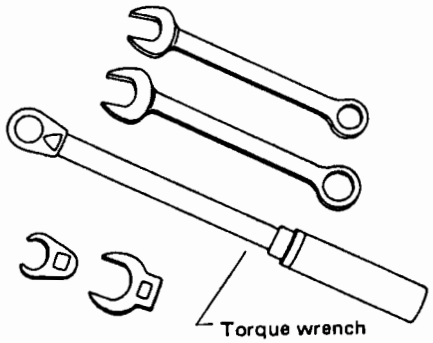
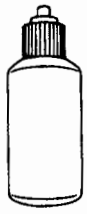
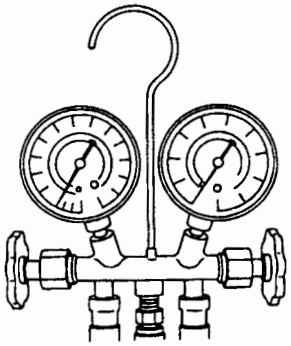
Vacuum level required to boil water (at sea level)

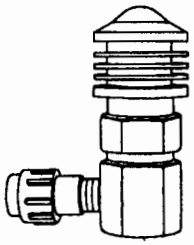
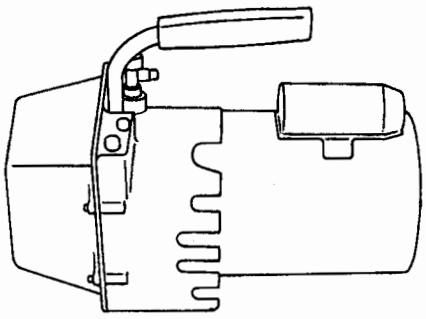
Temperature °C (°F)	Vacuum kPa (mmHg, inHg)
1.7 (35)	100.9 (757, 29.8)
7.2 (45)	100.6 (754, 29.7)
12.8 (55)	99.9 (749, 29.5)
18.3 (65)	99.2 (744, 29.3)
23.9 (75)	98.5 (739, 29.1)
29.4 (85)	97.2 (729, 28.7)
35 (95)	95.8 (719, 28.3)

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.

Tools and Equipment	Description
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.	 B4-669-1
A small **APPLICATOR BOTTLE** is recommended to apply refrigerant oil to the various parts. They can be obtained at a hardware or drug store.	 B4-669-2
A **MANIFOLD GAUGE SET** (with hoses) can be obtained from either a commercial refrigeration supply house or from an auto shop equipment supplier.	 B4-669-3

Tools and Equipment	Description
QUICK DISCONNECT AND ADAPTER FITTINGS are available in several configurations from either a commercial refrigeration supply house or an A/C equipment supplier. Older vehicles use the 6.35 mm (1/4 in) flare size for both the high and low pressure side, while newer vehicles use 6.35 mm (1/4 in) flare on the low pressure side, and 4.76 mm (3/16 in) flare on the high pressure side.	 B4-669-4
A **PURGE CONTAINER** will be needed to collect oil. A clear plastic baby bottle with graduation marks on the side will work.	 B4-669-5
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.	 B4-669-6
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.	 B4-670-1

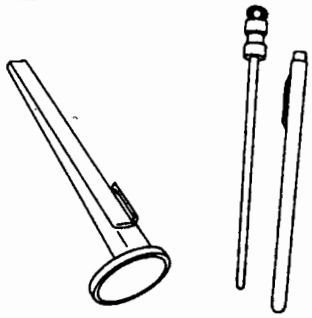
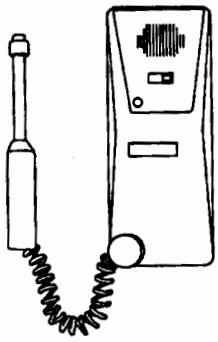
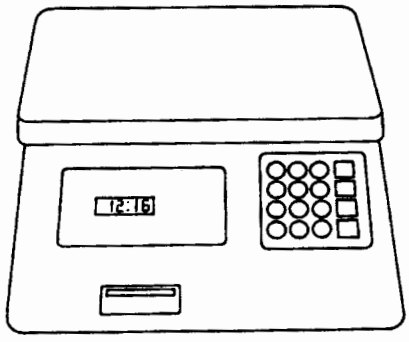
Tools and Equipment	Description
A **CAN TAP** for the 397 g (14 oz) can is available from an auto supply store.	 B4-670-2
Pocket **THERMOMETERS** are available from either industrial hardware store or commercial refrigeration supply houses.	 B4-670-3
An **ELECTRONIC LEAK DETECTOR** can be obtained from either a specialty tool supply or an A/C equipment supplier.	 B4-670-4
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.	 B4-670-5

Fig. 53

4. O-ring Connections

1. GENERAL

The following points should be kept in mind when assembling O-ring connections:

1) Avoid unnecessary handling and contact of O-rings with your hands, since even clean fingers contain body acids, which can contaminate the O-ring surface.

2) Do not handle O-rings with gloves, shop towels, etc., since lint particles may cling to the O-ring, possibly causing a leak upon assembly.

3) Always lubricate O-rings before assembly to allow the O-ring to seat itself properly.

4) Be certain to use torque wrenches when tightening O-ring fittings, because overtightening can not only damage the O-ring, but it can distort the tube end as well.

2. REMOVE PROTECTIVE SEALS

Just prior to making the connection, remove the protective seals.

If for any reason you have to stop before making a connection, recap the tube, component or fitting.

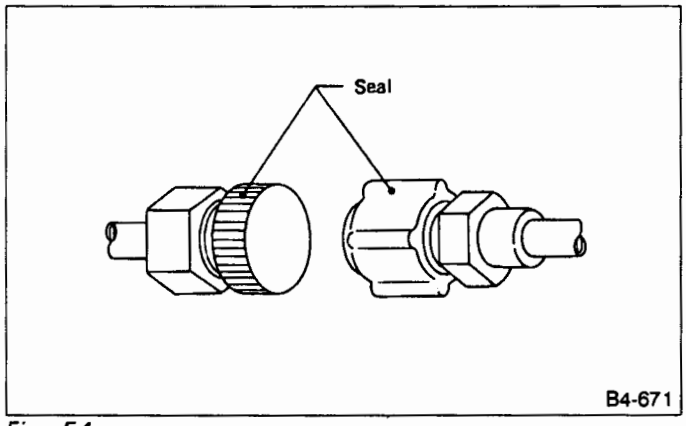


Fig. 54

Visually inspect the O-ring surface, the O-ring mating surface, the threads and the connection points. If a defective part is found, replace it.

The O-ring must sit square against the tube bead. If necessary, slide the O-ring into proper position **with clean hands**.

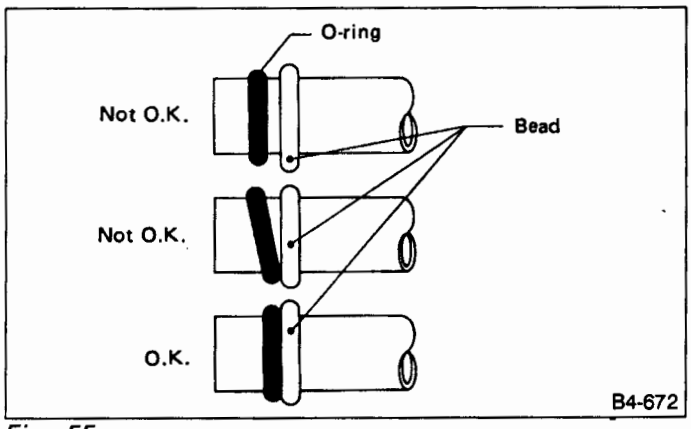


Fig. 55

3. LUBRICATE THE COMPONENTS

For lubrication of the components, use only refrigerant oil as described in the appropriate service manual. Apply oil from an oil squirt gun or other closed container. Do not use your finger to spread the oil over the O-ring.

Apply a small amount of refrigerant oil to the top and sides of the O-ring. The area covered by oil should include the O-ring and the tube bead.

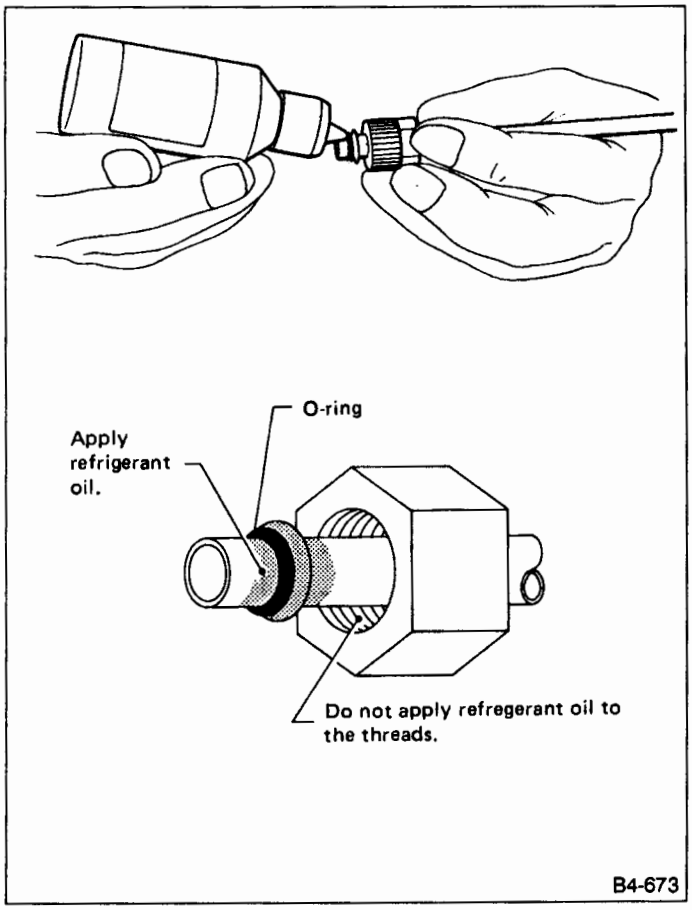


Fig. 56

4. MAKE THE CONNECTION

Carefully align the tube/O-ring assembly with the mating component.

Insert the tube/O-ring into the receiving component until the O-ring is fully seated.

Once the O-ring is fully seated, start the nut **by hand** and tighten **by hand** until snug.

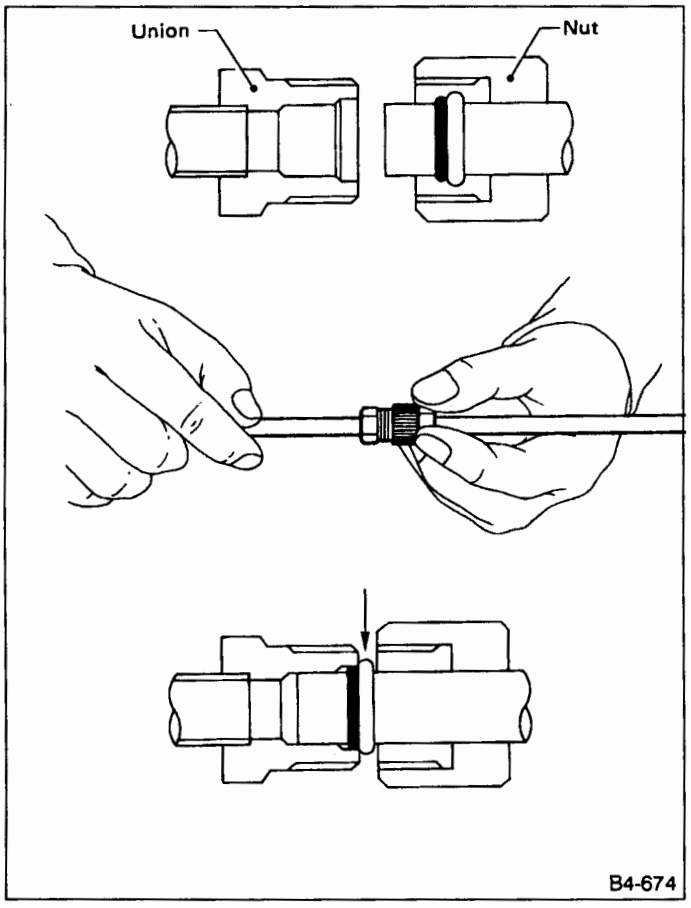


Fig. 57

5. TORQUE THE FITTING

Using a back-up wrench in conjunction with a calibrated torque wrench, torque the connection to the midrange of the specification.

After completion of torquing, use a clean shop towel to remove any excess oil from the connection or any oil that may have dripped on the vehicle body or other parts.

If a leak is suspected after torquing, do not retighten or retorque the connection. Instead, disassemble the connection, remove the O-ring, and inspect the O-ring, threads, joints and seating surfaces.

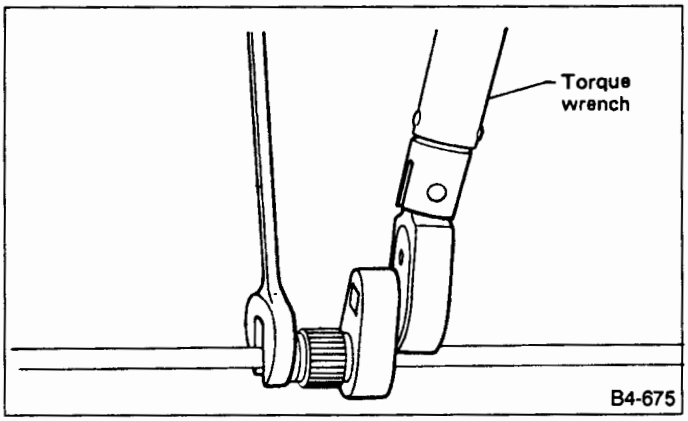
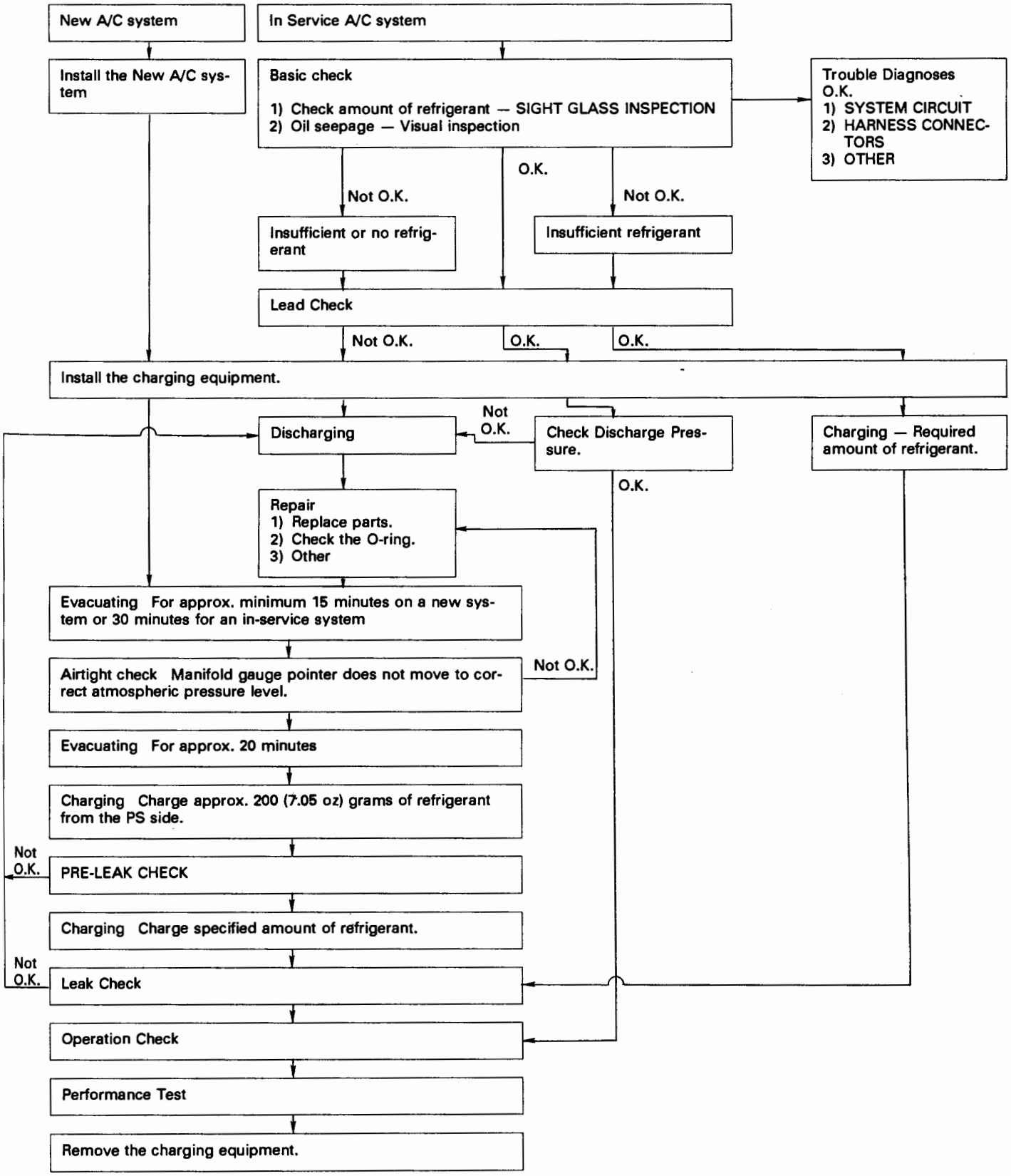


Fig. 58

5. Refrigerant Service Procedure

1. WORK FLOW



6. Discharge the System

The following points should be kept in mind when discharging the system.

1) Be certain that goggles and gloves are worn.
2) Open the manifold valves slowly, and discharge the system slowly to avoid loosing large amounts of oil from the system.
3) Be certain to measure the amount of oil removed during discharge, and add an equal amount of clean oil to the system before recharging.
4) Do not discharge in or near an area that is being used for leak testing.

1. CONNECTING THE MANIFOLD GAUGE SET

1) Close the high and low side manifold valves

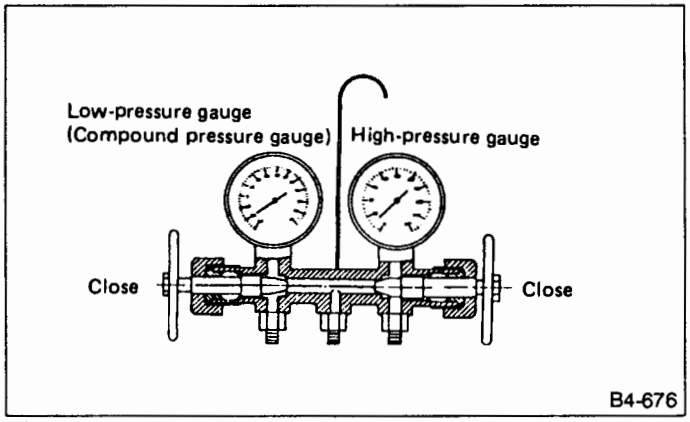


Fig. 59

2) Attach the high- and low-pressure manifolds to the high and low services port on the vehicle.

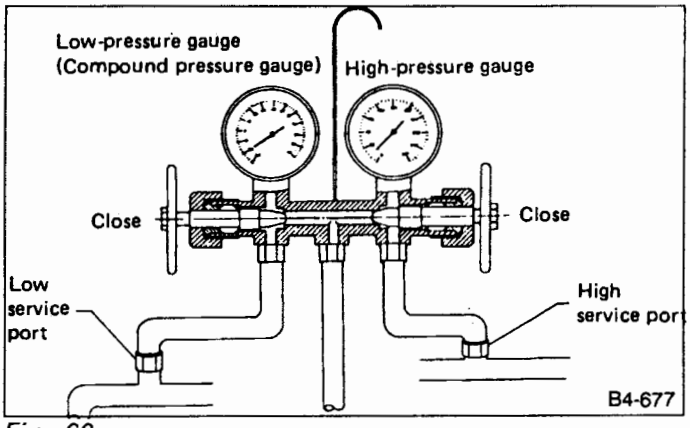


Fig. 60

2. PREPARE FOR DISCHARGING

1) Connect the center manifold hose to the empty purge container

Always use a clean purge container.
Never discharge in an area where leak testing is performed.
Never discharge into a shop towel.

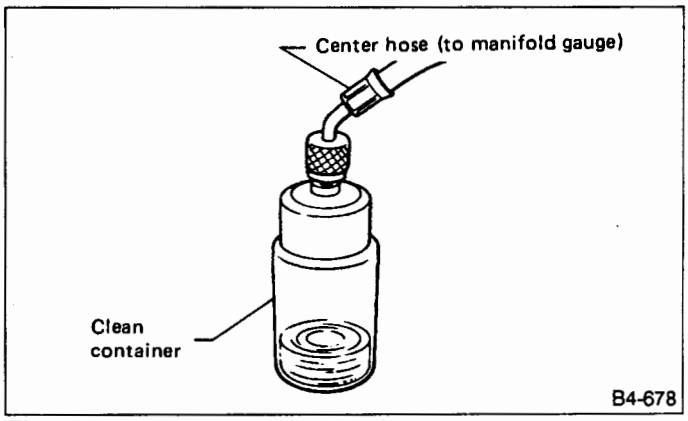


Fig. 61

3. DISCHARGING THE SYSTEM

1) Slowly open the high-pressure manifold valve and adjust the flow rate so that little or no oil is being carried out of the system.

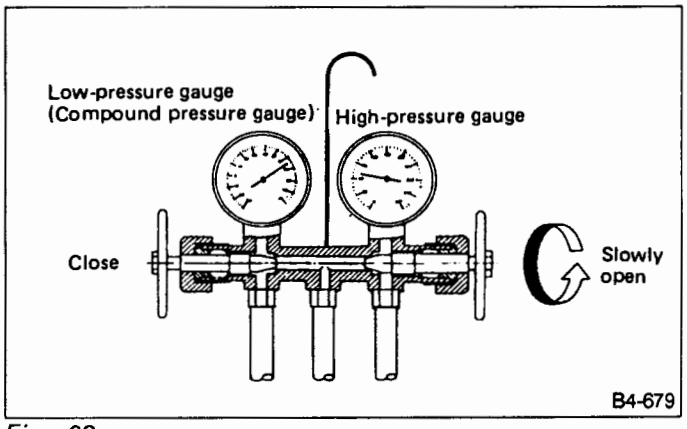


Fig. 62

2) After the high-pressure gauge reading has dropped below 345 kPa (3.52 kg/cm^2, 50 psi) or is equal to the low-pressure gauge reading, perform the next step.

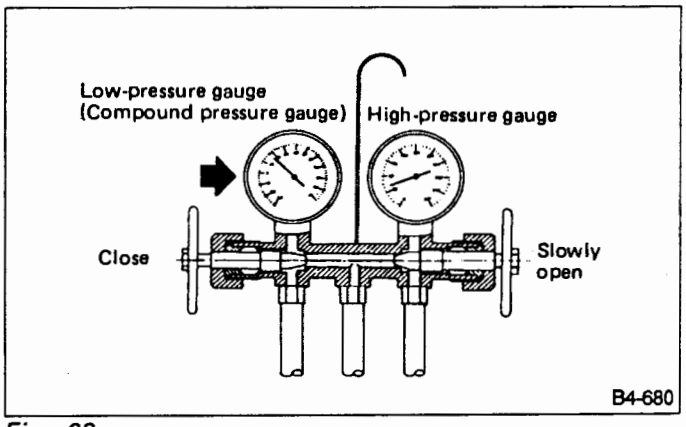


Fig. 63

3) Slowly open the low-pressure manifold valve.

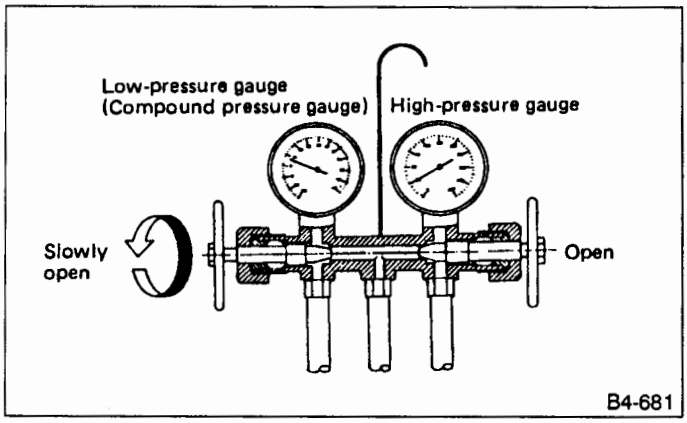


Fig. 64

4) When all system pressure is exhausted, close both the high- and low-pressure manifold valves.

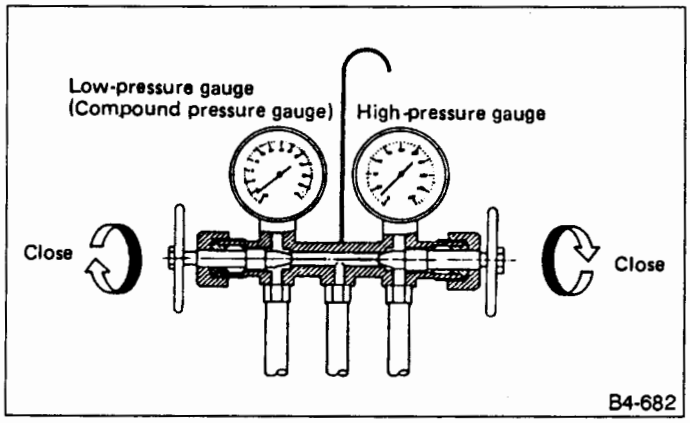


Fig. 65

4. CHECK AMOUNT OF OIL LOSS

1) Using a clean graduated container measure the amount of oil that was discharged from the system. Write down this amount of oil for later reference.

When a system component is replaced, it may be necessary to add an additional amount of oil to the system upon reassembly. Refer to and follow the oil adjustment procedures as outlined.

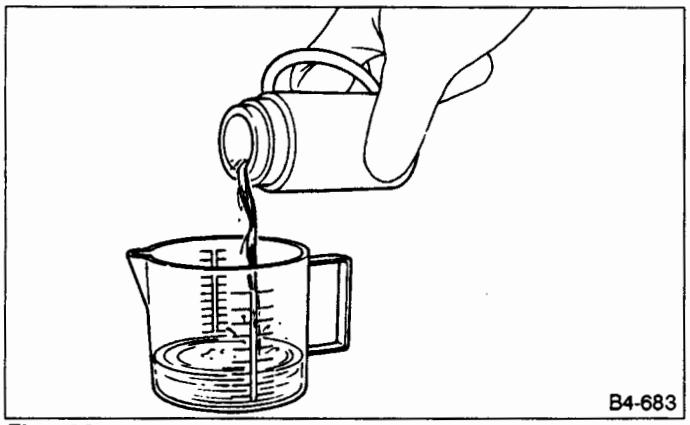


Fig. 66

5. CORRECT FOR OIL LOSS

1) Connect the center manifold hose to the vacuum pump.

2) Fill a graduated syringe with the desired amount of refrigerant oil (from step 4), plus any additional amount required by component replacement as described referring to the compressor oil.

3) Inject the appropriate amount of oil into the low-pressure hose.

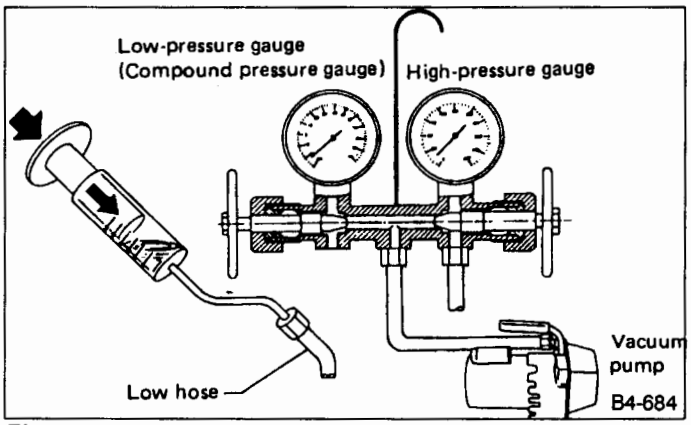


Fig. 67

4) Loosely (just a few threads) reconnect the low-pressure hose to the manifold.

5) Turn on the vacuum pump and slowly open the high-pressure manifold valve.

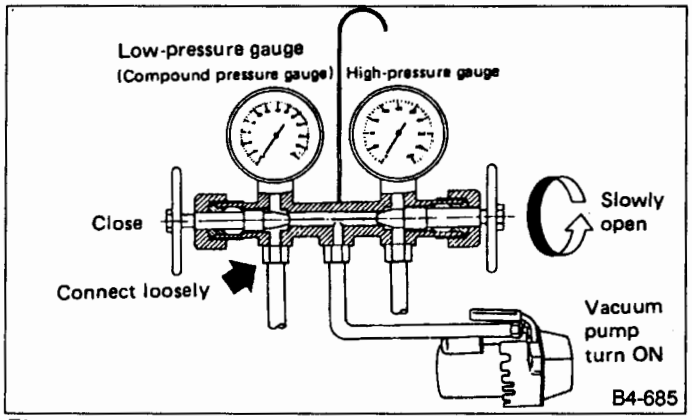


Fig. 68

6) After 2 or 3 minutes, turn off the vacuum pump and tighten the low-pressure hose to manifold hose connection.

If additional oil is to be added to the system (more than the graduated syringe will hold), repeat steps 5-2) through 5-6). At this point the procedure of oil addition is complete. The next step is evacuation and charging.

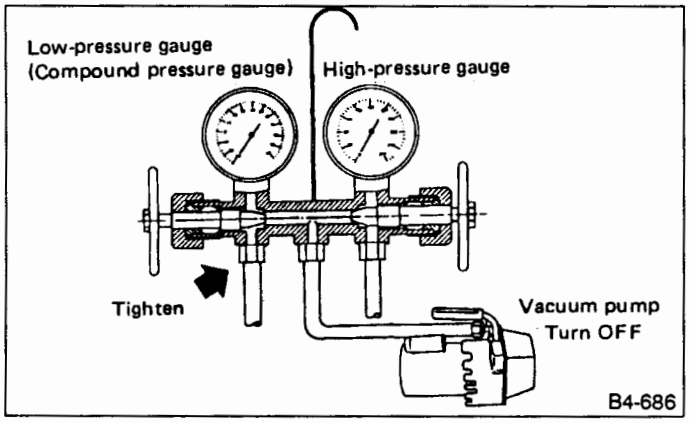


Fig. 69

7. Evacuating and Charging

The following points should be kept in mind when evacuating and charging with a manifold gauge set:

1) Be certain that goggles and gloves are worn.

2) If bulk refrigerant [13.6 kg (30 lb) canister] is used, be certain to weigh the charge amount carefully, using the correct equipment, to avoid overcharging the system.

3) The charging procedure described in this section begins by charging **liquid** refrigerant into the high-pressure side of the system **with the engine off**. The procedure is completed by charging refrigerant **vapor** into the low-pressure side of the system with the engine running.

Never open the high-pressure manifold valve when the engine is running.

1. CONNECT THE GAUGE SET

1) Close the high- and low-pressure manifold valves

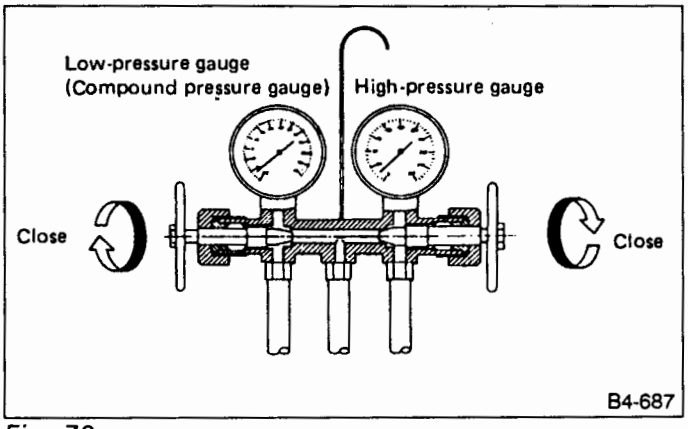


Fig. 70

2) Attach the low-pressure manifold hose to the low-pressure service port on the vehicle. Check the low-pressure gauge. If more than 68.6 kpa (0.70 kg / cm^2, 10.0 psi) is indicated, discharge the system prior to charging.

3) Attach the high-pressure manifold hose to the high-pressure service port on the vehicle.

4) Connect the center hose from the manifold to the vacuum pump.

5) Turn on the vacuum pump.

6) Slowly open the low-pressure manifold valve.

7) When the low-pressure gauge reaches approximately 66.43 kPa (498.3 mmHg, 19.62 inHg), slowly open the high-pressure manifold valve.

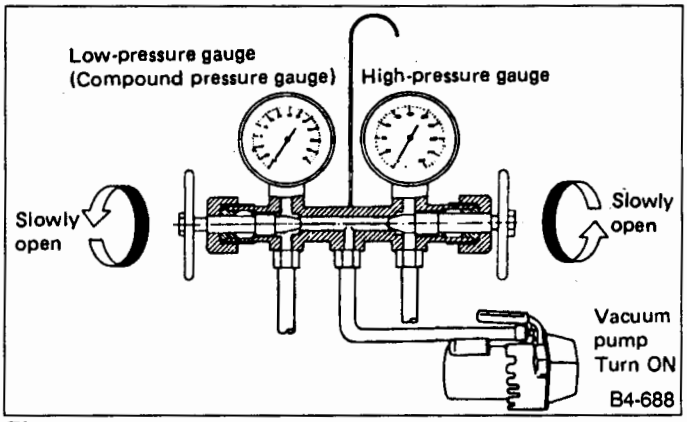


Fig. 71

8) Maintain a minimum vacuum level of 100.56 kPa (754.4 mmHg, 29.70 inHg) for a minimum of 15 minutes on a new system or 30 minutes for an in-service system. **The gauge will read 4 kPa (25 mmHg, 1 inHg) less for every 304.8 m (1,000 ft) above sea level.**

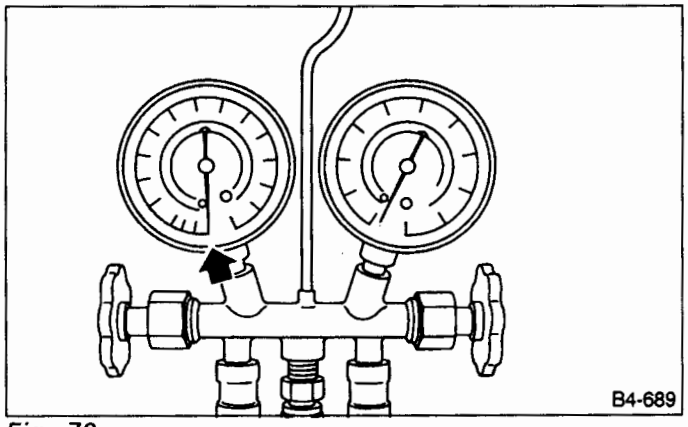


Fig. 72

2. PERFORM A VACUUM LEAK TEST

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.

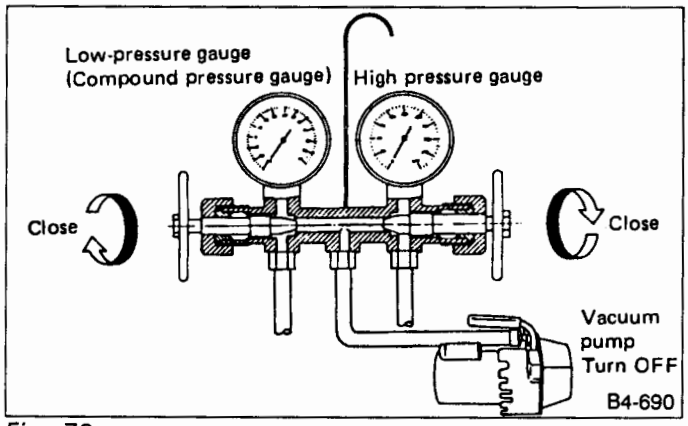


Fig. 73

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 R-12 leak test.

IF the vacuum reading is about the same as noted in step 2-4), continue on to step 2-6).

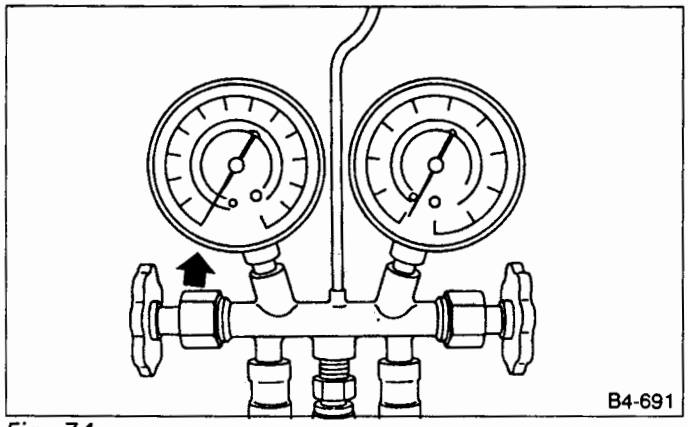


Fig. 74

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.

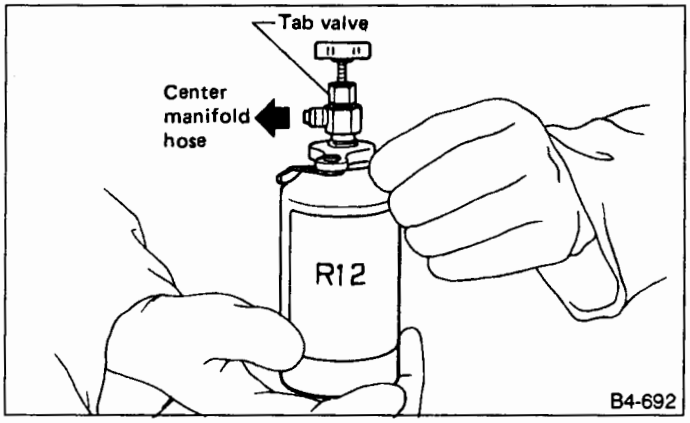


Fig. 75

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.

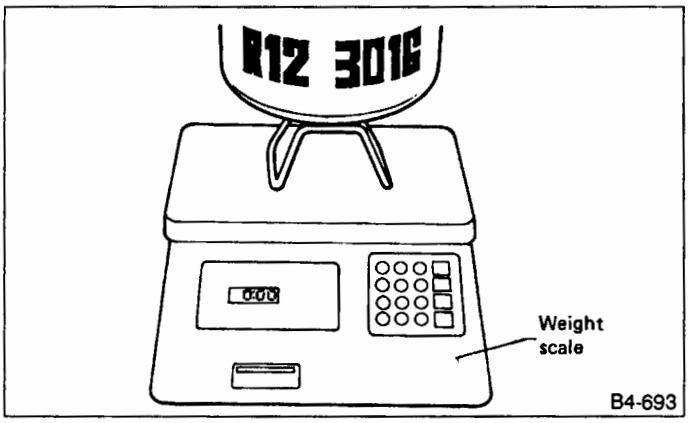


Fig. 76

3. PURGE THE CENTER HOSE

1) Verify that all three hose connections are tight at the manifold gauge set.
2) Open the valve on the R-12 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 R-12 to escape for no more than two or three seconds, then quickly retighten the hose fitting at the manifold.

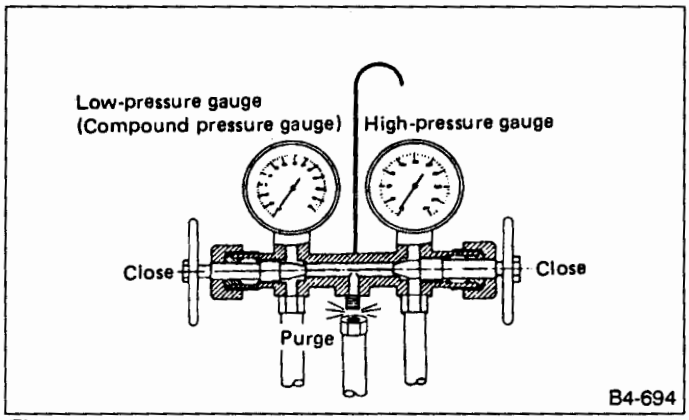


Fig. 77

4. INITIAL CHARGING THROUGH THE HIGH SIDE

1) Connect a tachometer to the engine.
2) **With the engine off**, start charging by slowly opening the high-pressure manifold valve.

The initial charge rate can be increased by immersing the can in lukewarm [below 38°C (100°F)] water for a short time.

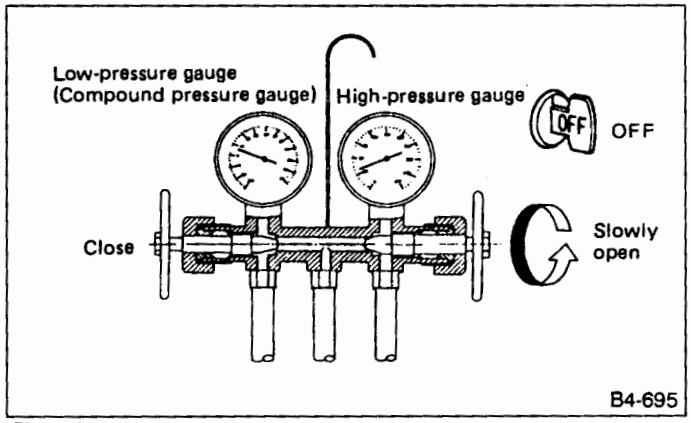


Fig. 78

5. CHECK THE GAUGE READINGS

When both the high- and low-pressure gauge readings are about equal, or the R-12 source is empty, or the system has been filled to specifications, close the high-pressure manifold valve.

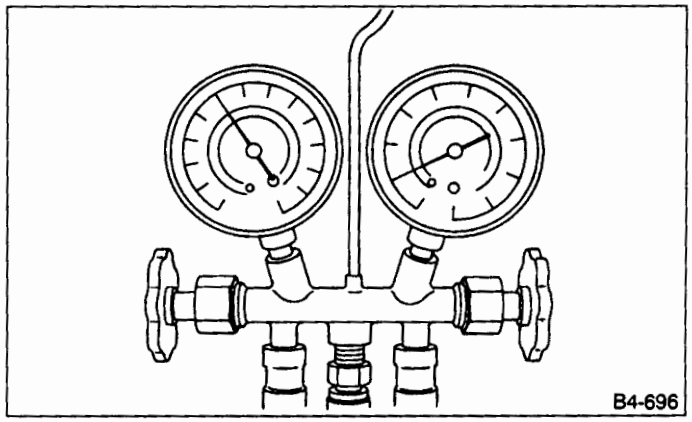


Fig. 79

6. ADD ADDITIONAL CANS

If the R-12 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.

7. COMPLETE CHARGING THROUGH THE LOW SIDE

1) Verify that the high-pressure manifold valve is closed (should have already been closed).
2) Verify that the low-pressure manifold valve is closed (should have already been closed).

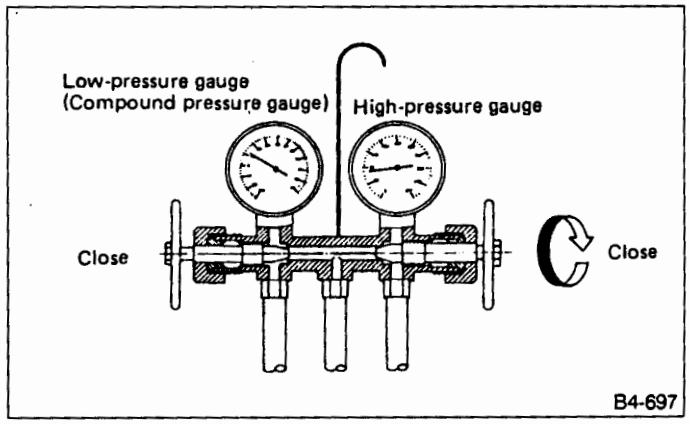


Fig. 80

3) With the A/C switch off and the windows rolled down, start the engine and run at idle rpm.
4) Set the A/C controls on maximum cool and set the blower speed on the highest setting.
5) Quickly turn the A/C switch on-off-on-off a few times to prevent initial compressor damage due to "load shock." Finish this operation with the A/C switch in the ON position.
6) Raise engine rpm to approximately 1,500 rpm.

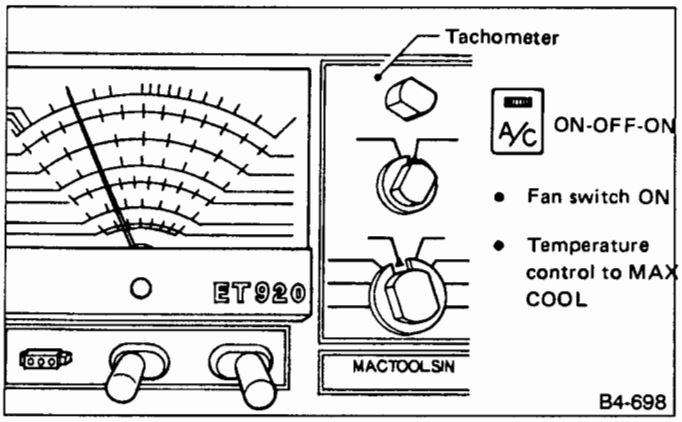


Fig. 81

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.

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.

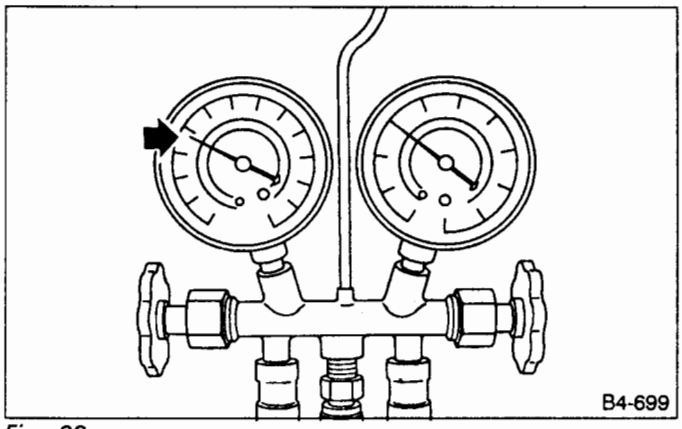


Fig. 82

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
R-12	0.8 (1.8)	0.9 (2.0)

9. COMPLETE ALL SYSTEM CHECKS

1) Evaluate the system performance (refer to performance testing section).

2) Perform leak detection test.

Always perform leak checking in an environment free of refrigerant pollution.

Do not disconnect the high- or low-pressure hoses from the vehicle before leak checking.

10. DISCONNECT THE MANIFOLD GAUGE SET

1) Remove the high- or low-pressure hoses from the service ports and install the service port caps.

8. Leak Testing

The following points should be kept in mind when conducting a refrigerant leak test.

1) The A/C system to be tested must have an adequate refrigerant charge to begin with.

2) The area where the leak test is conducted must be free of wind and drafts, with still air being the ideal condition.

3) The atmosphere where the leak test is conducted must be free of refrigerant contamination.

4) Operate the A/C system for approx. 10 minutes, then turn the engine off an begin the leak test.

5) Refrigerant gas is heavier than air, therefore always hold the probe below the connection being tested.

6) When checking for a leak along a length of hose or tube, the leak detector probe must be moved slowly, approx. 25 mm (1 in) per second making sure probe does not come in contact with the component being tested.

7) When checking for a leak at a certain point, the leak detector probe must be held at that point for at least 5 seconds.

1. CHECK THE SYSTEM PRESSURE

1) With gauges connected to the A/C system, operate the A/C and confirm that the high side pressure is above 690 kPa (7.03 kg/cm^2, 100 psi). If not, evacuate and charge the system before leak checking (refer to evacuation and charging sections).

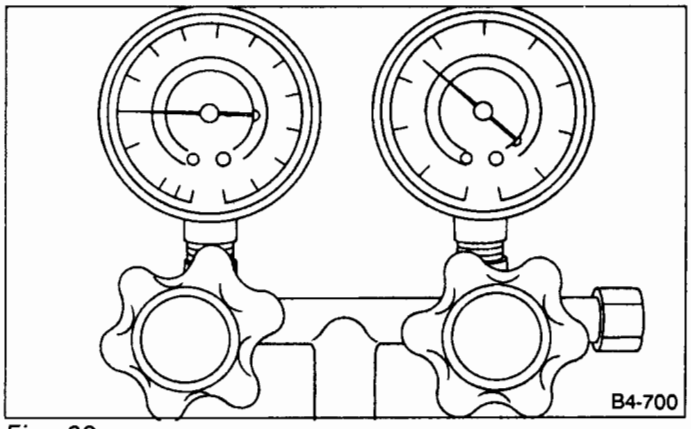


Fig. 83

2. CLEAN CONNECTIONS BEFORE TESTING

Before testing, use a clean shop towel to wipe off refrigerant oil, dirt, or foreign material from all of the connections and components to be tested.

Since refrigerant oil absorbs refrigerant, excess oil on or near a connection may falsely signal a leak.

3. CALIBRATE LEAK DETECTOR

Refer to the manufacturer's instructions for the particular type of detector used and calibrate the instrument. **Always make sure that the probe tip filter is clean and free of contamination.**

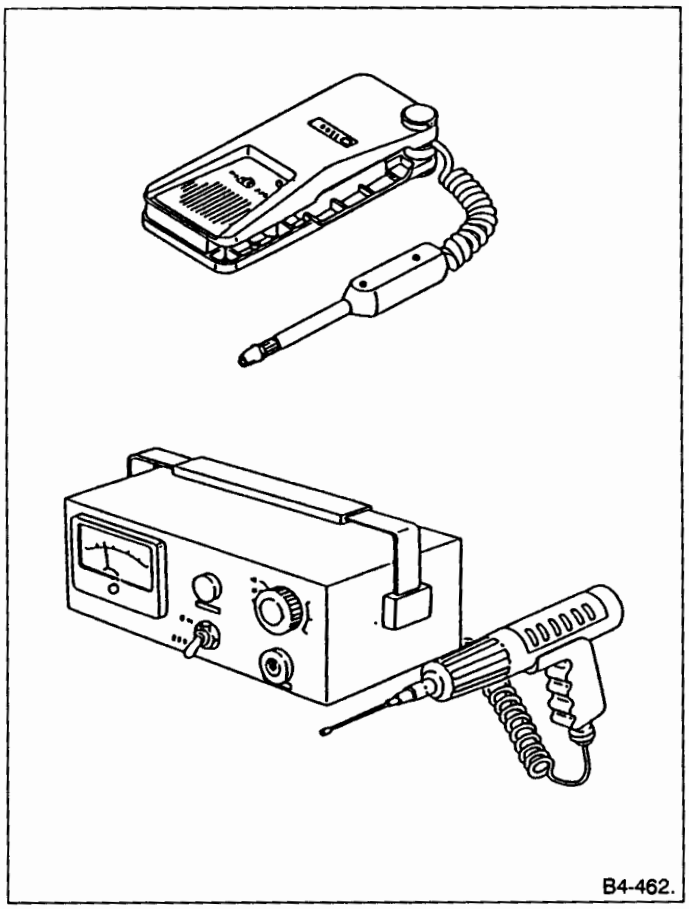


Fig. 84

4. HALIDE LEAK DETECTOR

Since the propane leak detector and butane leak detector are the same in respect to their operation, this section describes the operation of the propane leak detector.

The copper screen is heated by the burning of propane. Refrigerant gas decomposes to color the flame when it contacts the heated screen. The gas to be checked is drawn into the sampling tube and sent out to the burner. A refrigerant leak can clearly be detected by variations in the color of the flame.

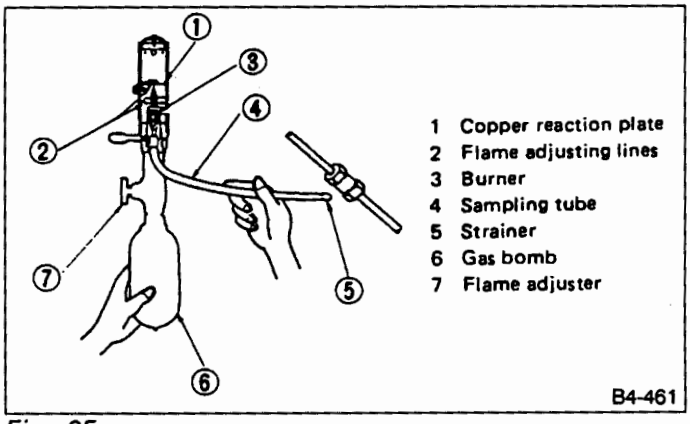


Fig. 85

	Propane type	Butane type
NO LEAK	Greenish blue	Pale blue
SMALL LEAK	Yellow	Bright blue
LARGE LEAK	Purple	Vivid green

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.

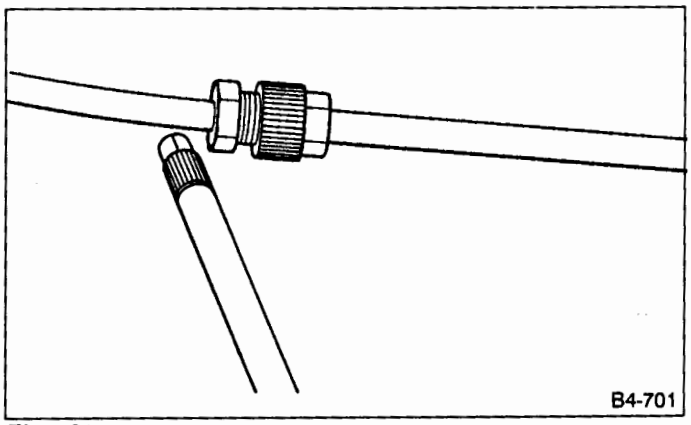


Fig. 86

(2) Check the area where the two parts of the fitting join each other.

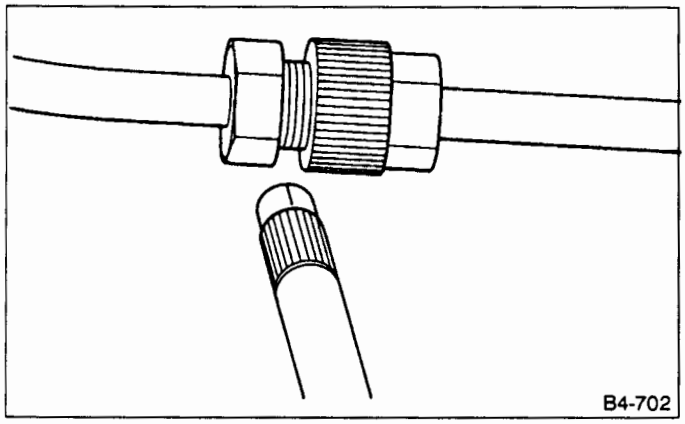


Fig. 87

(3) Check the area where the nut meets the tube.

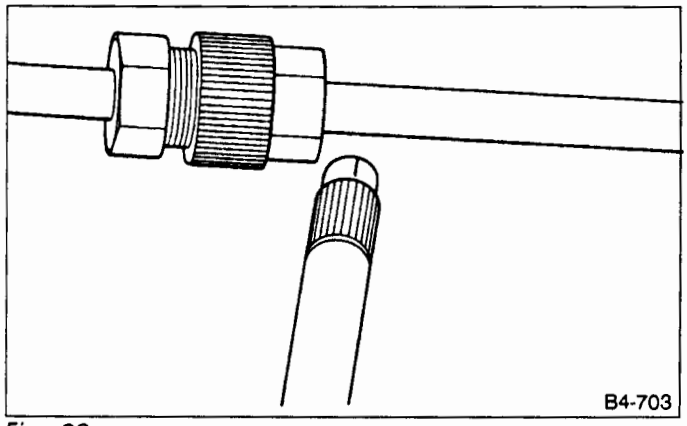


Fig. 88

3) Check the area of the sight glass and pressure switch (trinary 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.
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.
Some shaft seals have a very slight amount of normal leakage [approximately 28g (1.0 oz) per year].

6. LEAK TEST — Low Pressure side

1) Begin at the connection of the low pressure tube to the evaporator, and work your way along the low-pressure of the system to the compressor. There are three places to check on each tube connection.
2) Check the area.
(1) Check the area where the fitting joins the tube.

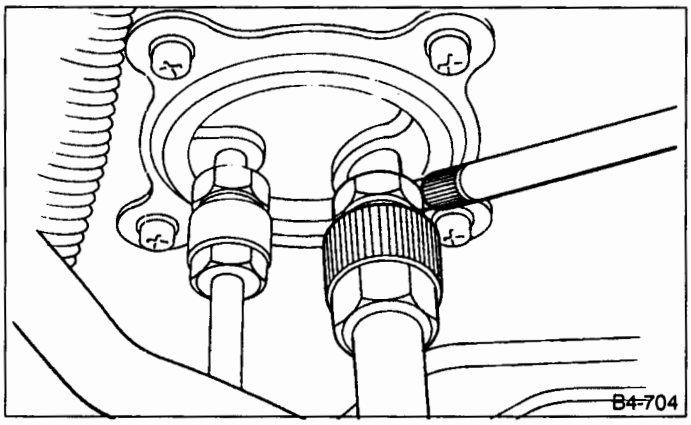


Fig. 89

(2) Check the area where the two parts of the fitting join each other.

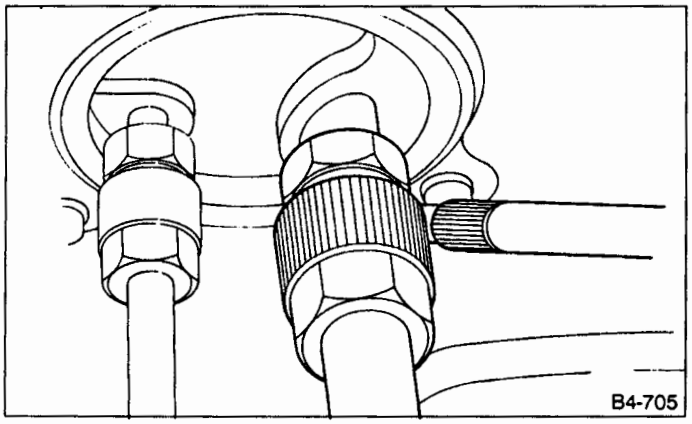


Fig. 90

(3) Check the area where the nut joins the tube.

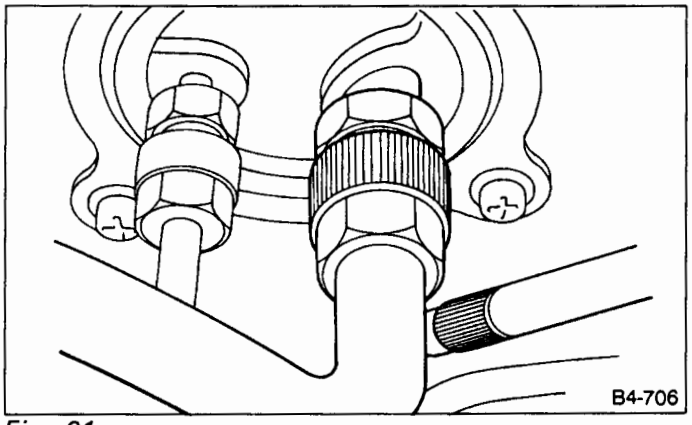


Fig. 91

7. CHECK THE FLEXIBLE HOSES

1) Visually inspect the rubber portions of the flex hoses for cracking. Probe the rubber section, including the ends of any insulators or protectors which may cover

sections of the rubber hose, and near the ends where the rubber meets the metal collar.
Be certain to move the probe slowly [approximately 25mm (1 in) per second] when probing along any length of hose or tube.

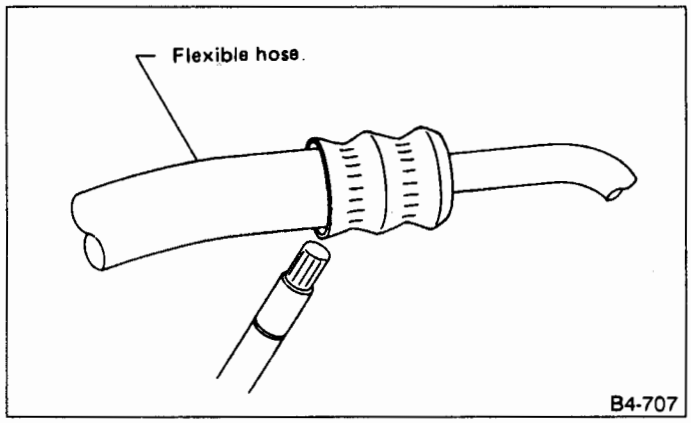


Fig. 92

8. CHECK THE EVAPORATOR ASSEMBLY

1) Use one or both of the following methods to check the evaporator assembly.
2) Remove the drain hose from the case drain nipple. Hold the probe at the end of the case drain nipple for at least 10 seconds. Be certain to reconnect the drain hose when finished.
3) With the ignition key in the "ACC" position, run the blower on high speed for 1 minute, then turn the blower off. Place the probe in the center instrument panel vent, an turn the blower on low speed for 1 to 2 seconds, then turn the blower off. Leave the probe in the vent for at least 10 seconds.

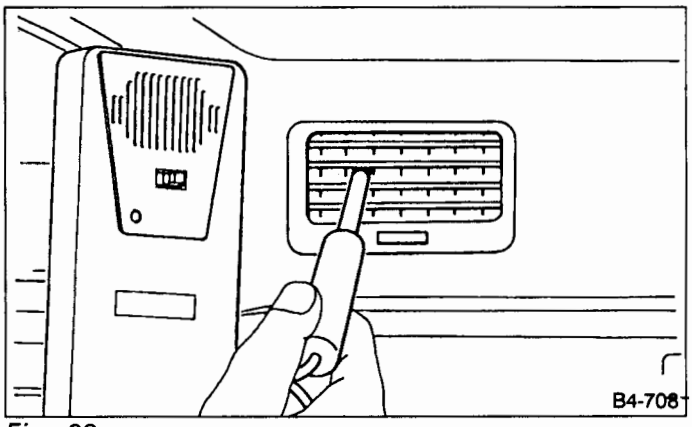


Fig. 93

9. CHECK THE SERVICE PORT CAPS

Visually inspect the inside of the service port caps. Make sure the rubber seal is in place on the inside of the caps. Disconnect the gauges from the vehicle and install the service port caps.

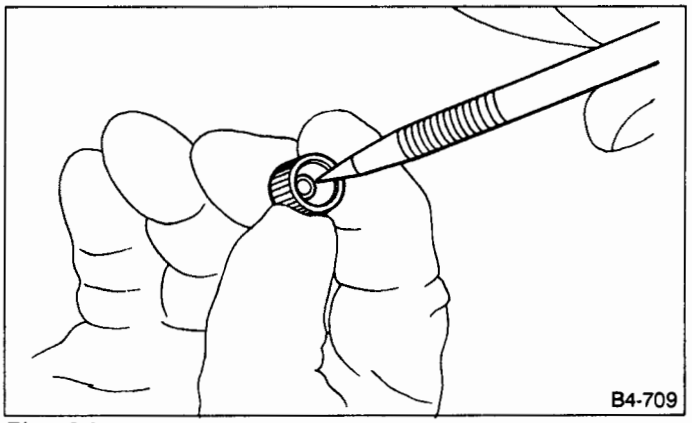


Fig. 94

9. Lubrication

1. SYSTEM OIL STABILIZATION

Prior to opening the refrigerant system for repairs (except compressor seizure) the system must be stabilized for correct oil replenishment.

Follow these procedures:

1) Engine speed set to 1,500 rpm.
2) A/C "ON".
3) Air source to recirculate
4) Blower 4th or high speed position
   A) Make sure the air entering the evaporator is above 26.7°C (80°F).
   B) The discharge (high) side pressure must be above 588 kPa (6 kg/cm^2, 85 psi).
5) Operate the A/C for 10 minutes.

2. SYSTEM DISCHARGE

Slowly, discharge the system starting with the high-pressure side until the pressure drops below 345 kPa (3.52 kg/cm^2, 50 psi), then open the low-pressure side.

3. OIL REPLACEMENT

After stabilization and discharge, replace the component, adding the appropriate amount of oil (90PX) to the new component before installation.

Evaporator	79 g (2.8 oz)
Receiver Drier	57 g (2 oz)
Condenser	43 g (1.5 oz)
Hose	57 g (2 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 [85 g (3 oz) minimum]. Always use 90PX for the replacement oil.

If the compressor was seized:

(1) Clean system.
(2) Replace receiver drier.
(3) Install new compressor with shipping oil charge 235 mℓ (7.9 US fl oz, 8.3 Imp fl oz).

10. Performance Test

1. VEHICLE SET UP

In order to obtain meaningful test results, the vehicle must be set up to meet the following conditions:

1) Vehicle in shade
2) No wind
3) All vehicle doors closed
4) Front windows open
5) Hood open
6) Engine speed set at 1,500 rpm.
7) A/C ON
8) Temperature control lever — Maximum cold
9) Air source — Recirculation
10) Blower speed — 4th position (High)
11) Operate A/C for 10 minutes (Minimum) before taking measurement.

2. MEASUREMENTS

After 10 minutes (Minimum) of A/C operation and using accurate test equipment, take the following measurements (in order):

1) Evaporator intake air temperature at recirculation door.
2) Evaporator discharge air temperature at center grill.
3) Condenser (Ambient) intake air temperature measured 0.9 m (3 ft) in front and in line with the center of the condenser
4) Suction (Low) side pressure
5) Discharge (High) side pressure

If only one thermometer is available; 1) take the ambient measurement first; then 2) the intake air; and 3) discharge air temperature.

3. MEASUREMENT VERSES STANDARDS

Compare temperature and pressure measurements with the established standards shown in the following charts.

PERFORMANCE CHART

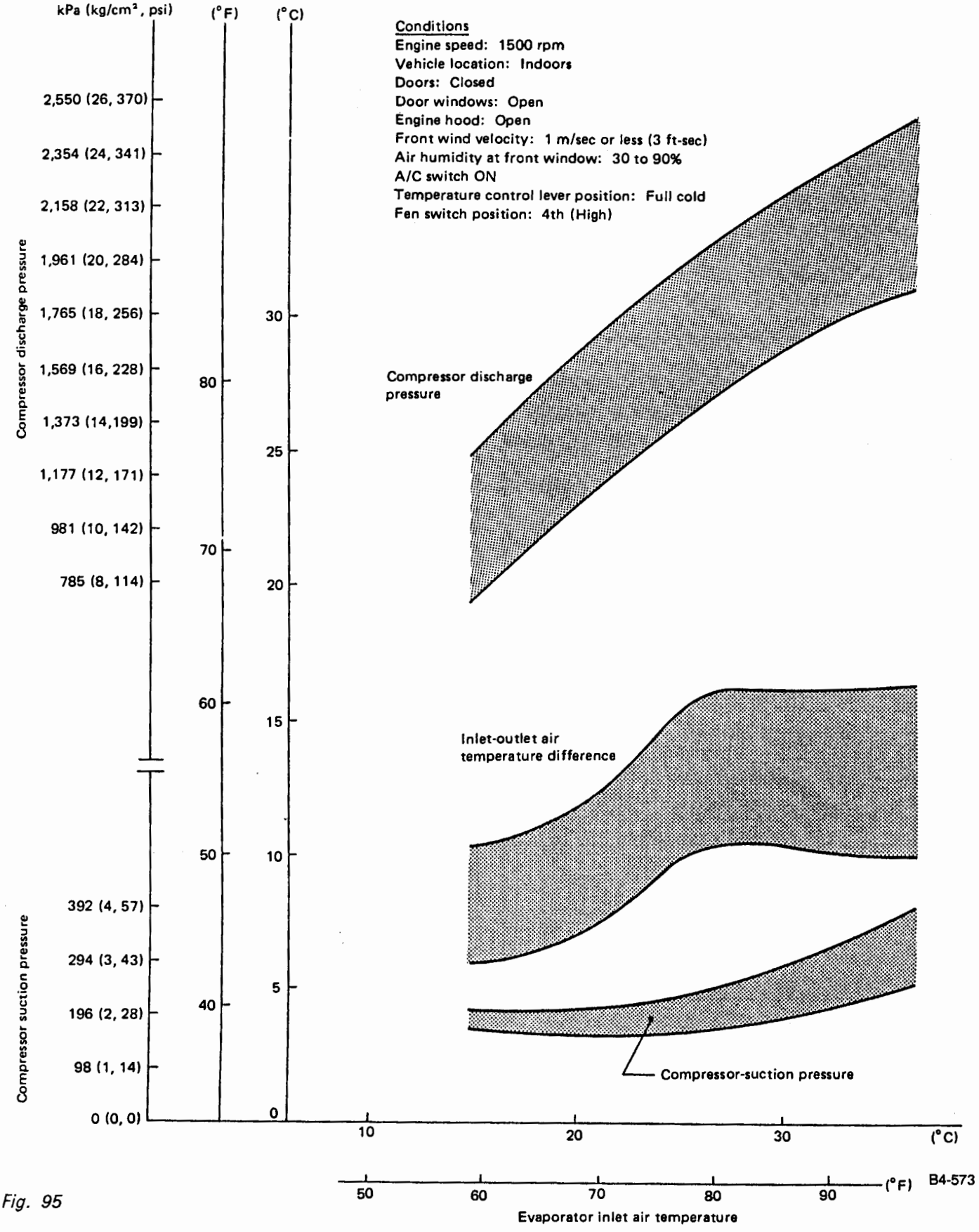


Fig. 95

11. Compressor

1) Compressor is a variable plate type. When trouble occurs, replace compressor as a single unit.

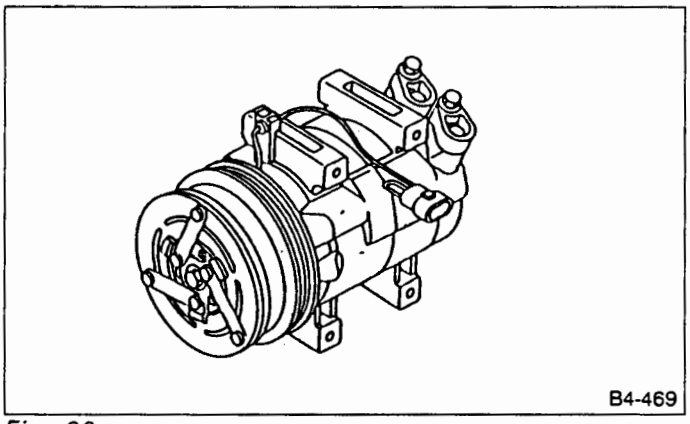


Fig. 96

2) Compressor utilizes a splash lubrication design. A drive hub and thrust flange rotate so that blow-by oil contained in the suction gas and oil contained in the shell, lubricate functional parts.

1. COMPRESSOR CLUTCH

Compressor clutch trouble is often caused by clutch slippage and noise. Check and take corrective measures, as required.

1) Check that clearance between drive plate and pulley over the entire perimeter is within specifications.

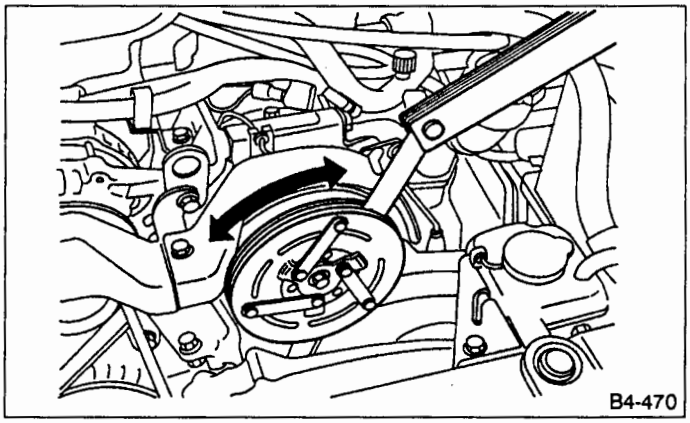


Fig. 97

Clearance: mm (in)
0.3 — 0.6 (0.012 — 0.024)

2) Check that voltage applied to magnetic coil is at least 10.5 volts.

3) When noise is noted, check that it originates in either compressor or pulley bearing.

A: REMOVAL

1) Disconnect ground cable from battery.
2) Discharge refrigerant using manifold gauge.
   (1) Fully close low-pressure valve of manifold gauge.
   (2) Connect low-pressure charging hose of manifold gauge to low-pressure service valve.
   (3) Open low-pressure manifold gauge valve slightly, and slowly discharge refrigerant from system.

Do not allow refrigerant to rush out. Otherwise, compressor oil will be discharged along with refrigerant.

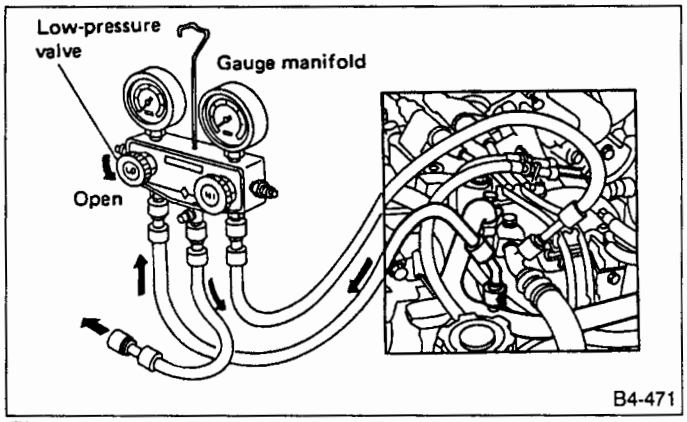


Fig. 98

3) Low-pressure hose (Flexible hose Ps)

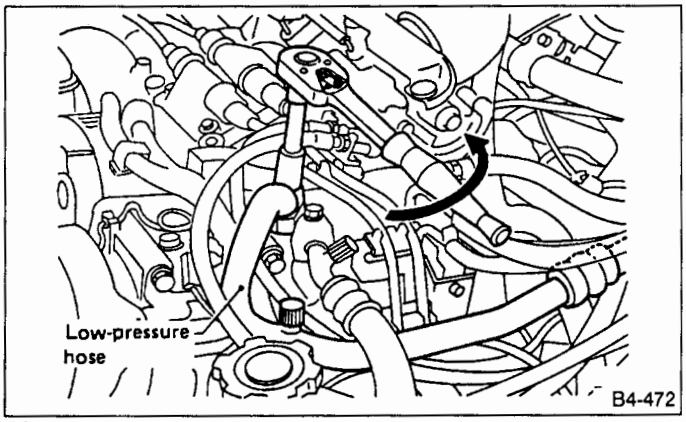


Fig. 99

a. Be careful not to lose O-ring of low-pressure hose.
b. Plug the opening to prevent foreign matter from entering.

4) High-pressure hose (Flexible hose Pd)

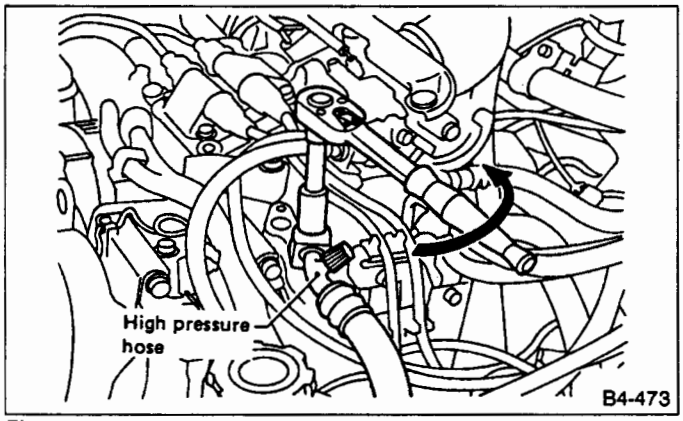


Fig. 100

a. Be careful not to lose O-ring of high-pressure hose.
b. Plug the opening to prevent foreign matter from entering.

5) Compressor belt cover and alternator belt cover
Remove bolts which secure belt covers.

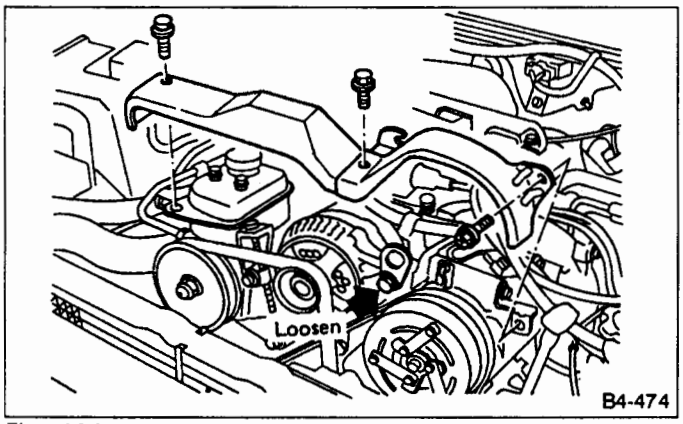


Fig. 101

6) Alternator V-belt
Loosen lock bolt on alternator bracket. Turn adjustment bolt and remove V-belt.

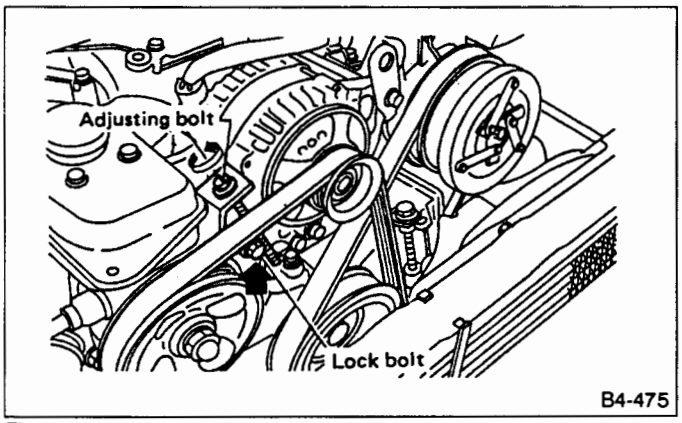


Fig. 102

7) Compressor V-belt
Loosen lock bolt on idler pulley. Turn adjustment bolt and remove V-belt.

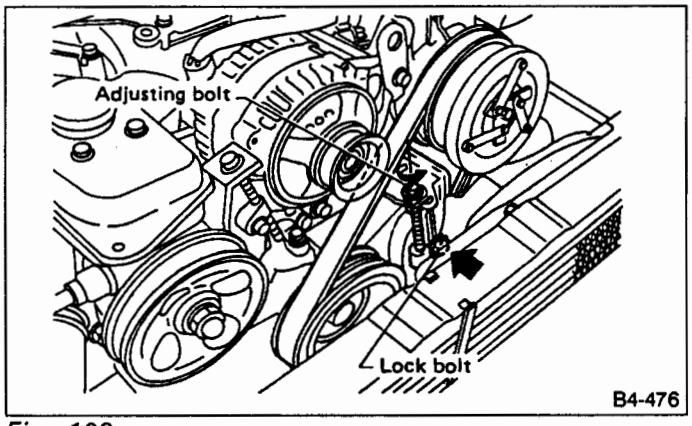


Fig. 103

8) Alternator harness

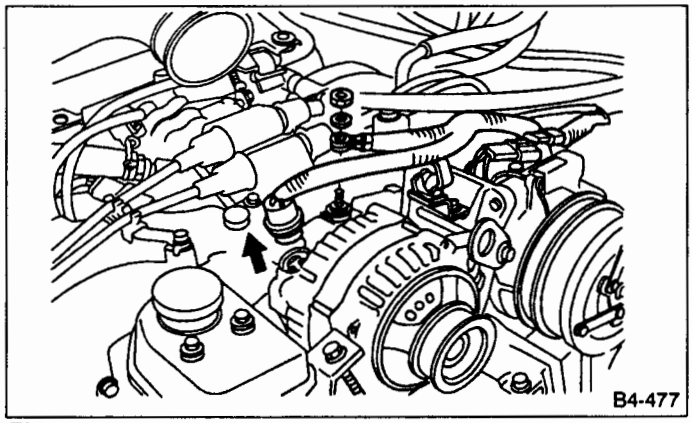


Fig. 104

9) Compressor harness
Disconnect compressor harness from body harness.
10) Lower bracket
Remove bolts which secure lower compressor bracket.

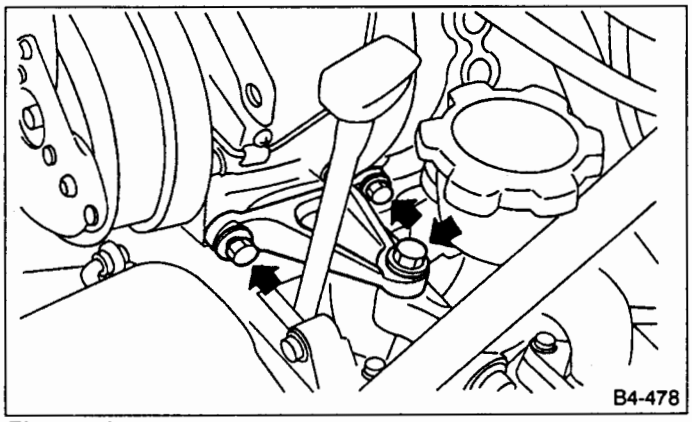


Fig. 105

11) Compressor
Remove bolts which secure compressor. Remove compressor from bracket.

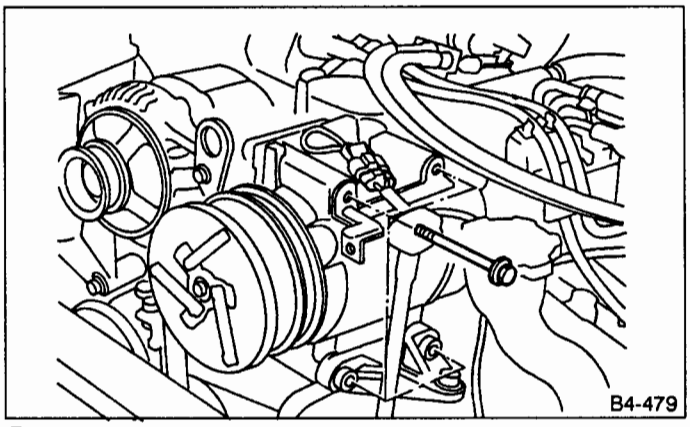


Fig. 106

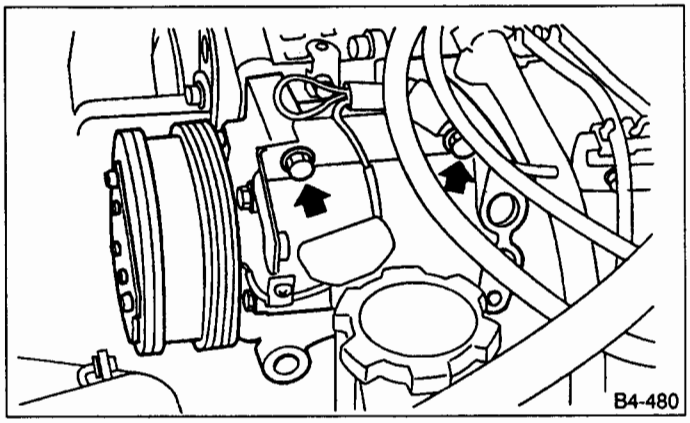


Fig. 107

B: INSTALLATION

1) Compressor
Install compressor on bracket.

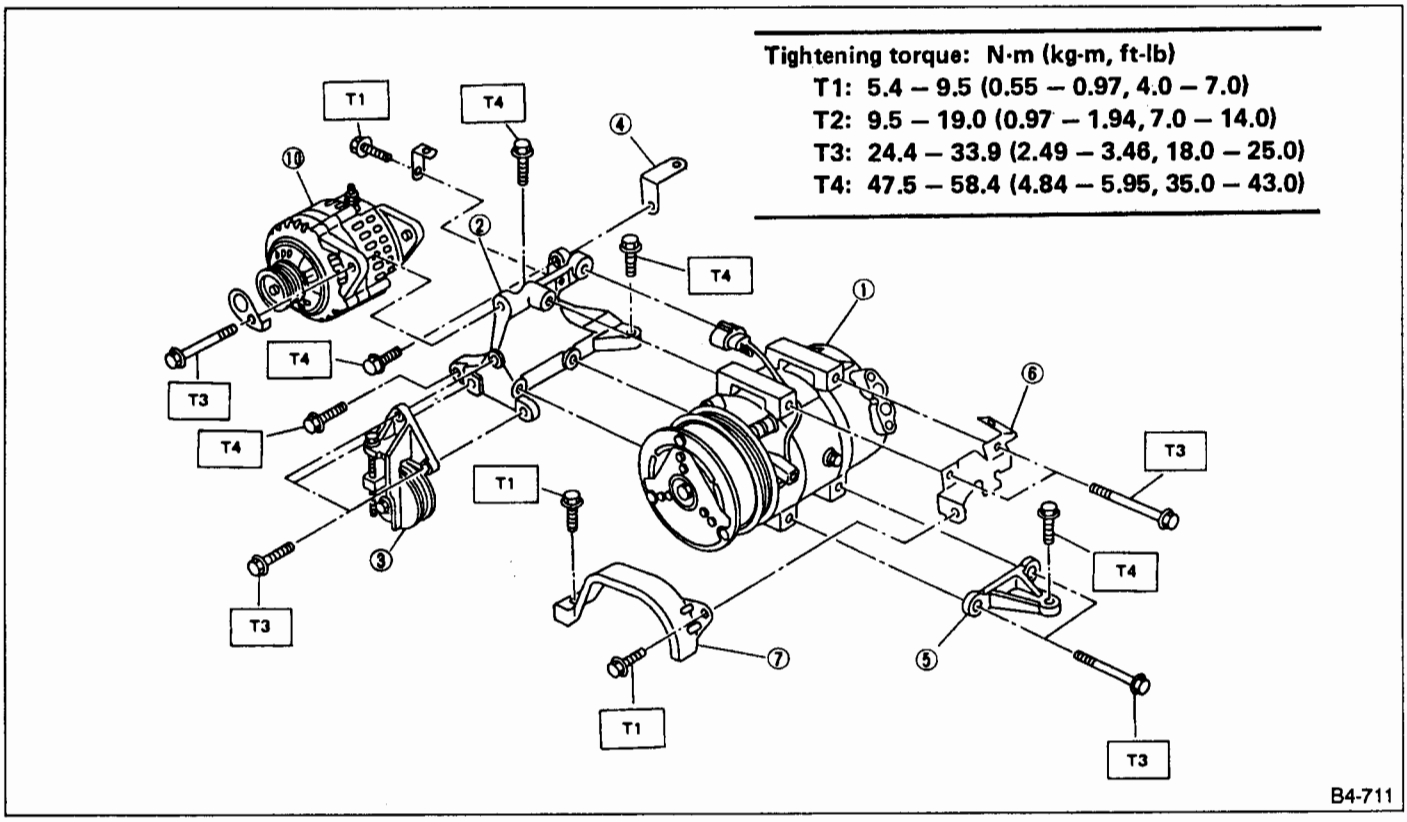


Fig. 108

2) Compressor harness
3) Alternator harness
4) Compressor V-belt (Rear)

After adjusting belt tension, tighten tension pulley lockbolt securely.

5) Alternator V-belt
After adjusting V-belt tension, tighten alternator bracket lock-bolt securely.

Tightening torque: N•m(kg-m, ft-lb)
Lock-bolt: 23 — 42 (2.3 — 4.3,17 — 31)

6) Check drive belt tension and adjust it if necessary by changing alternator position and/or idler pulley position.

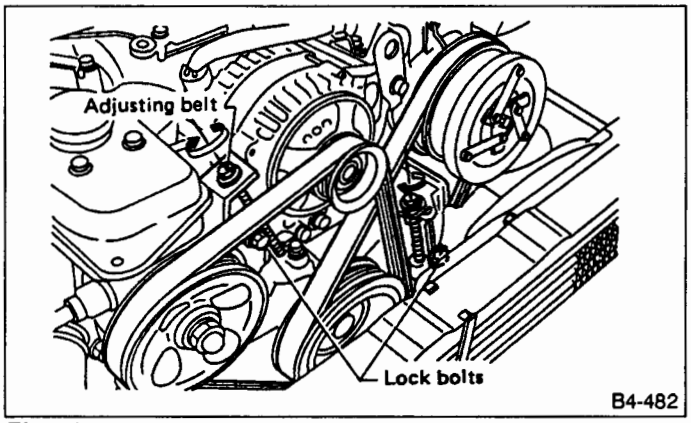


Fig. 109

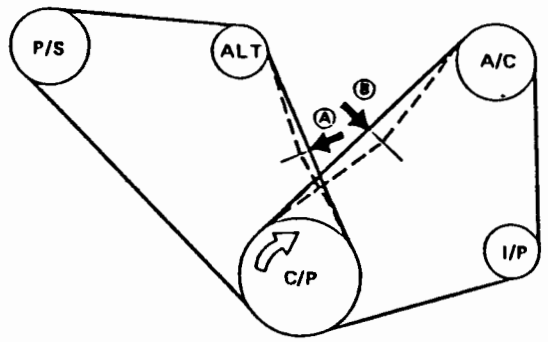
Pulley arrangement	Tension mm (in)/98N (10 kg, 22 lb)	
	A	B
 B1-294	New belt: 7.0 — 9.0 (0.276 — 0.354) Existing belt: 9.0 — 11.0 (0.354 — 0.433)	New belt: 7.0 — 9.0 (0.276 — 0.354) Existing belt: 9.0 — 11.0 (0.354 — 0.433)

Fig. 110

C/P : Crankshaft pulley
ALT : Alternator pulley
P/S : Power steering oil pump pulley
A/C : Air conditioner compressor pulley
I/P : Idler pulley
When replacing belts with new ones, adjust tensions to specification and then readjust to the same specification after running engine for 5 minutes.
a. Ensure that the V-belt is aligned correctly. If it is not, check for loose bolts.
b. The V-belt should not be too tight or too loose. A belt which is too tight may break bearing or cause gas to leak from the shaft seal. A belt which is too loose slips, thereby causing the belt cut.
c. After completing the compressor installation and testing the system operation, check and adjust the tension of both V-belts again.
7) High-pressure hose (Flexible hose Pd)
Connect high-pressure hose with compressor.

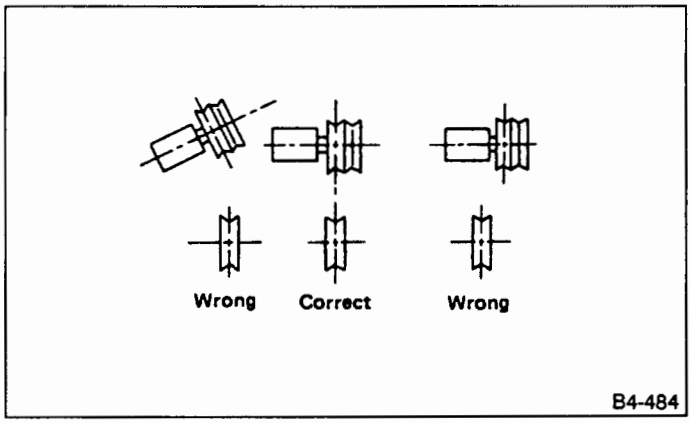


Fig. 111

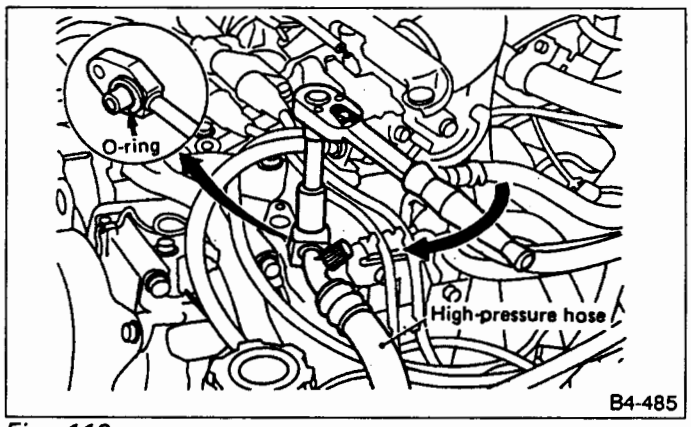


Fig. 112

Tightening torque: N·m (kg-m, ft-lb)
10 — 20 (1.0 — 2.0, 7 — 14)

Be sure to apply compressor oil to the periphery of O-ring.

8) Low-pressure hose (Flexible hose Ps)
Connect low-pressure hose with compressor.

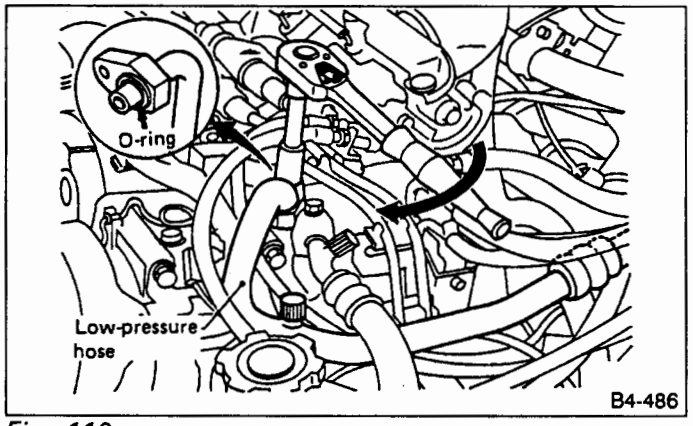


Fig. 113

Tightening torque: N·m (kg-m, ft-lb)
10 — 20 (1.0 — 2.0, 7 — 14)

Be sure to apply compressor oil to the periphery of O-ring.

9) Install belt cover.
10) Connect ground cable to negative terminal of battery.
11) Charging refrigerant. ⟨Ref. to 4-7⟩

12. Condenser

A: REMOVAL AND INSTALLATION

1) Disconnect battery negative terminal.
2) Discharge refrigerant from low pressure side.
3) Remove front grille.

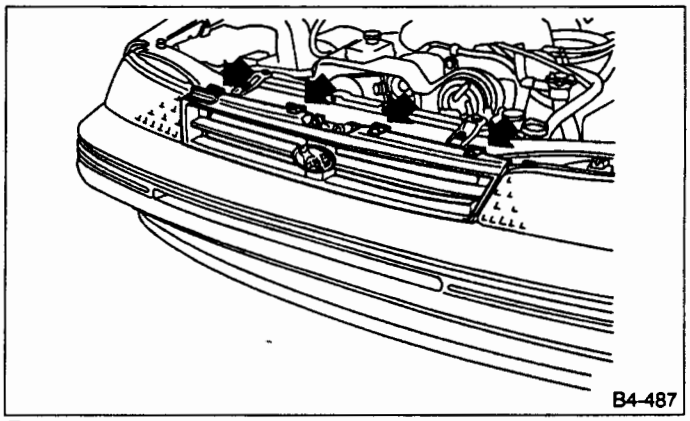


Fig. 114

4) Remove the radiator support bracket.
5) Remove the air guide.

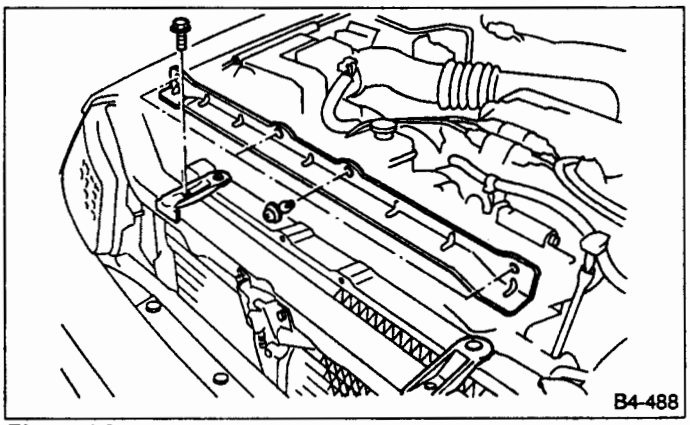


Fig. 115

6) Disconnect pipe connections.
7) Disconnect hose connections.

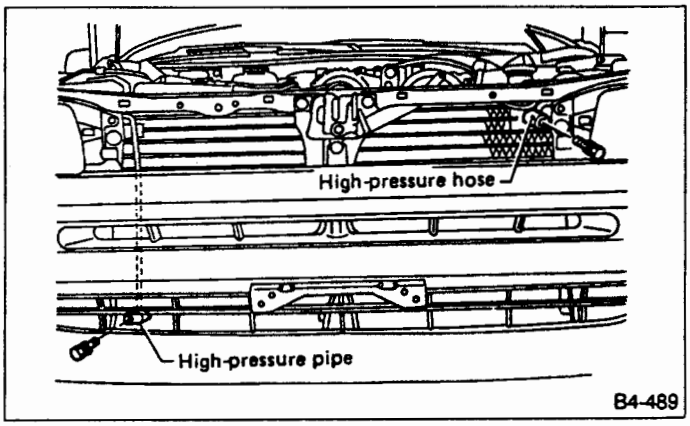


Fig. 116

8) Remove the two bolts which secure condenser. While lifting condenser, remove it through space between radiator and radiator panel.

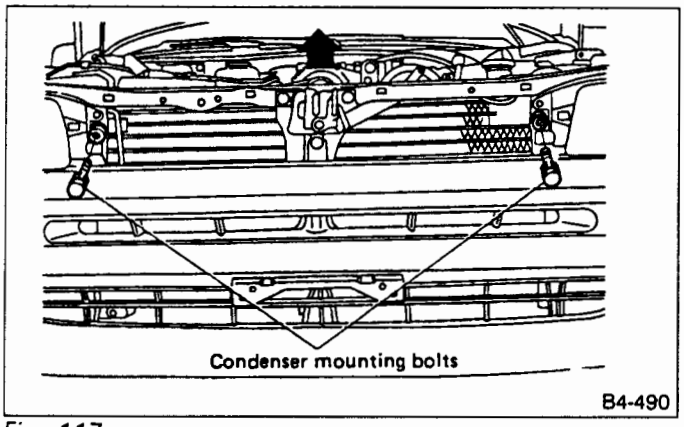


Fig. 117

9) The condenser should be installed in the reverse order in which it was removed.
When installing the condenser, pay attention to the following:

a. After installing condenser, ensure that guide on lower side of condenser is inserted into hole in radiator panel. Tighten attaching bolts.

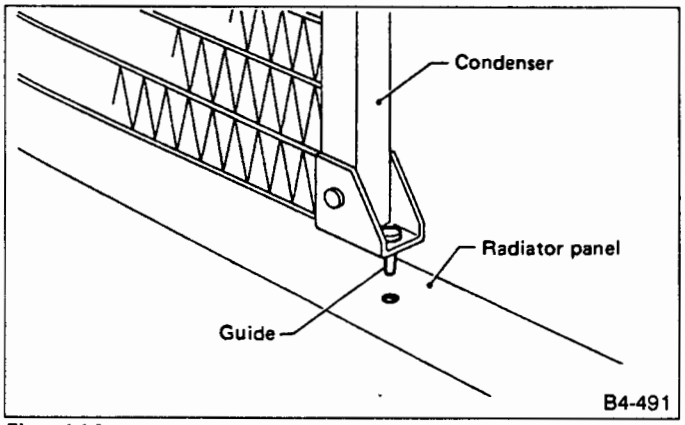


Fig. 118

b. Before connecting the pipe, be sure to apply oil to the periphery of O-ring.

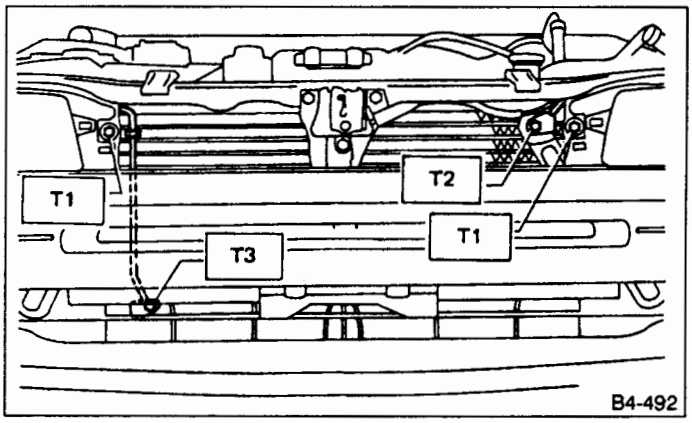


Fig. 119

Tightening torques: N•m (kg-m, ft-lb)
T1,T3 : 6 — 10 (0.6 — 1.0, 4.3 — 7.2)
T2: 10 — 20 (1.0 — 2.0, 7 — 14)

B: INSPECTION

1) Make sure the condenser fins are free from dust and insects. If the fins are clogged, clean by blowing air or water through them.
To prevent dust and water from getting into the condenser, this work must be done when the condenser is installed in an actual vehicle.
2) Check the condenser to see if it shows any sign of oil seepage. Should oil ooze or gas leak from the condenser replace it with a new one.

13. Receiver Drier

A: REMOVAL AND INSTALLATION

1) Disconnect battery negative terminal.
2) Discharge refrigerant.
3) Disconnect pressure switch harness.
4) Disconnect pipes.

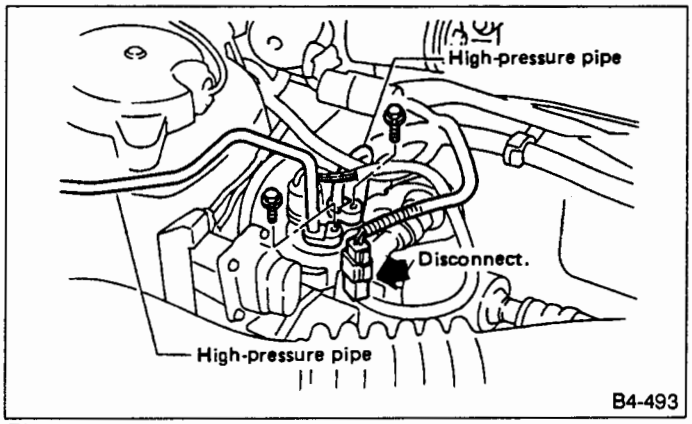


Fig. 120

5) Remove mounting bolt and remove receiver drier.

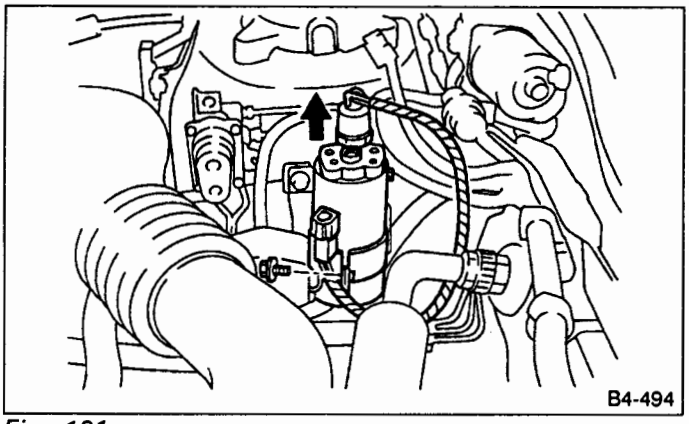


Fig. 121

The receiver drier contains a desiccant. Be sure to put a blind plug in the detached receiver drier to protect it from moisture.

6) Install the receiver drier in the reverse order of removal.

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

14. Evaporator

A: REMOVAL AND INSTALLATION

1) Disconnect battery negative terminal.
2) Discharge refrigerant.
3) Disconnect discharge pipe, suction pipe and grommets.

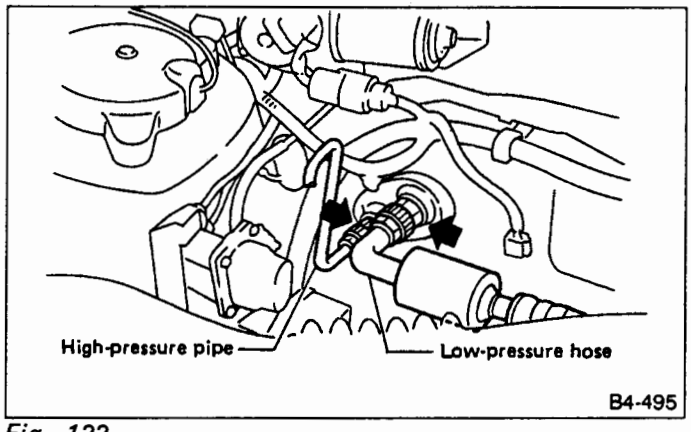


Fig. 122

4) Remove glove box.
5) Remove glove box support bracket.

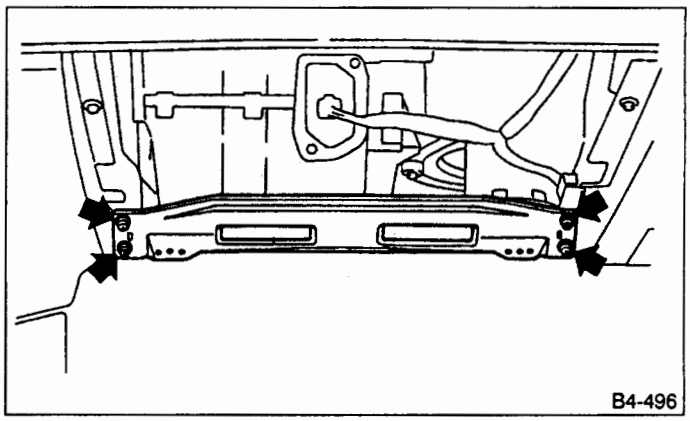


Fig. 123

6) Disconnect the harness connector from evaporator.
7) Disconnect drain hose.
8) Remove evaporator mounting bolt and nut.

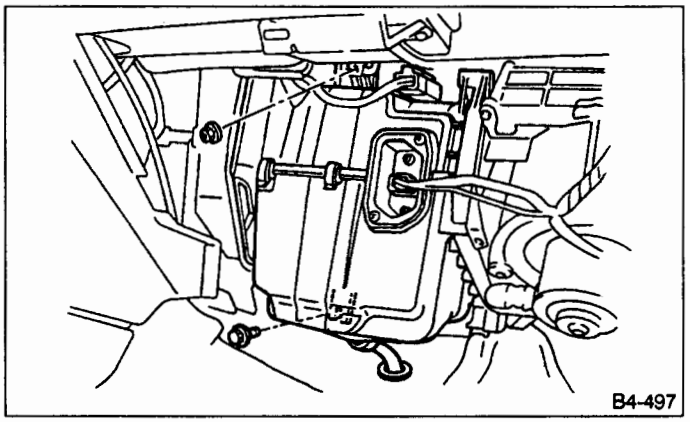


Fig. 124

9) Install the evaporator in the reverse order of removal.

B: DISASSEMBLY & ASSEMBLY

1) Using a flat-bladed screwdriver, remove the clamps and the evaporator upper case.

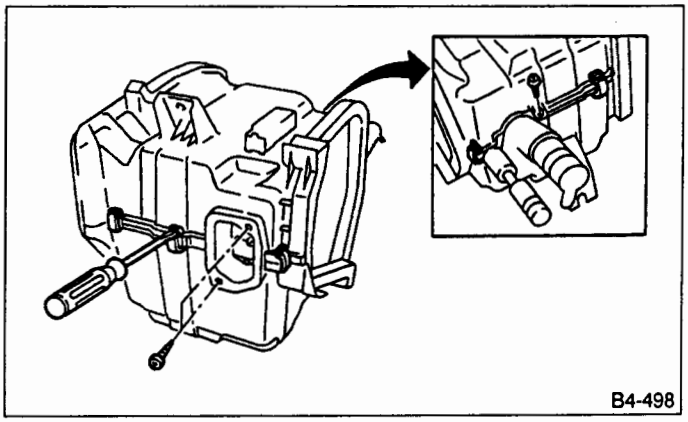


Fig. 125

2) Remove thermostat from upper case. (Thermistor is inserted into specified evaporator fin position.) When installing thermostat, be sure to insert thermistor into specified fin position.

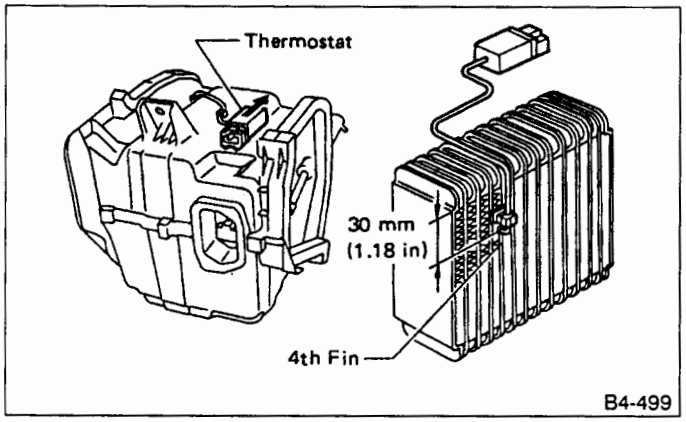


Fig. 126

3) Disconnect the connection between the expansion valve and pipe from receiver drier.
4) Remove the expansion valve from pipes.

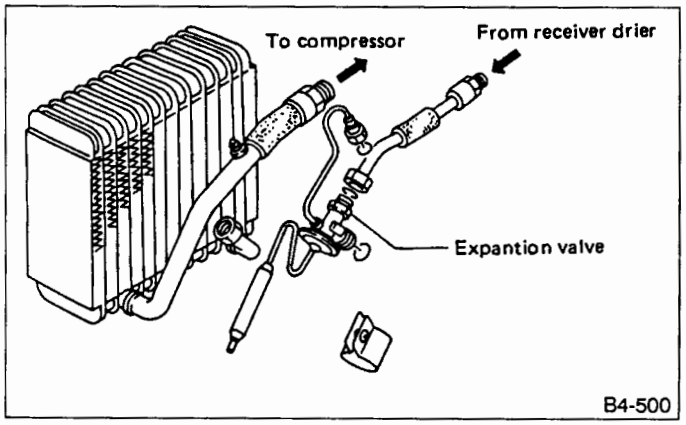


Fig. 127

5) To install expansion valve, reverse removal procedures. Properly wrap capillary tube of expansion valve with seal.

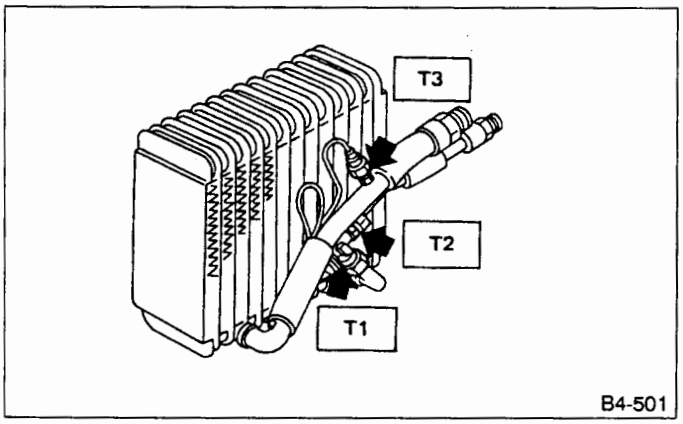


Fig. 128

Tightening torque: N•m (kg-m, ft-lb)
T1: 15 — 25 (1.5 — 2.5 , 11 - 18)
T2: 10 — 20 (1.0 — 2.0, 7 — 14)
T3: 7 — 13 (0.7 — 1.3, 5.1 — 9.4)

6) Check to see if the evaporator fins are clogged. If they are, clean them with compressed air.
Water must never be used to clean the evaporator.
7) Check parts that have been removed for cracks or scratches, and repair or replace them with new ones, if necessary.
8) Reassemble the evaporator in the reverse order of disassembly. Observe the following points during the reassembly process:
(1) Confirm that the O-ring is inserted in the specified position.
(2) Tightening torque

Tightening torque: N•m (kg-m, ft-lb)
Nut on discharge side
15 — 25 (1.5 — 2.5, 11 — 18)
Nut on suction side
10 — 20 (1.0 — 2.0, 7 — 14)

15. Condenser Fan Assembly

A: REMOVAL AND INSTALLATION

1) Disconnect battery negative terminal.
2) Disconnect harness connector from fan motor.
3) Loosen bolts on lower side of condenser fan shroud, and remove bolts from upper side. Remove condenser fan assembly.

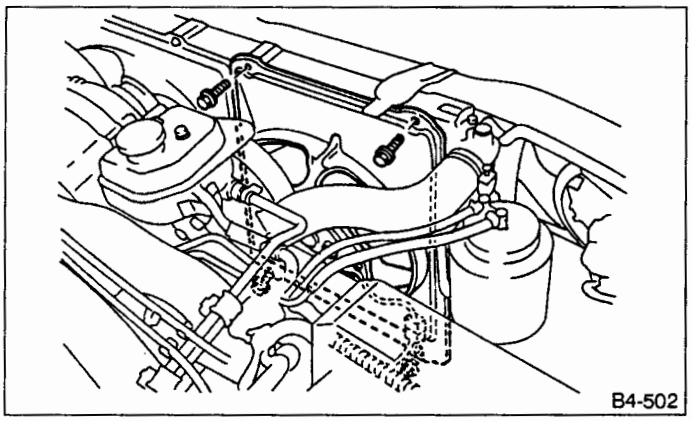


Fig. 129

4) Install the condenser fan assembly in the reverse order of removal.

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

16. Flexible Hose

With the following cautions, replace flexible hoses with new ones if they are damaged or swollen.
(1) The flexible hoses should be free from twists and tension after they have been connected.
(2) The flexible hoses must not be forcibly.

A: REMOVAL

1) Disconnect battery negative terminal.
2) Discharge refrigerant.
3) Remove low pressure hose.
(1) Remove hose attaching bolts.
(2) Remove hose clip.

Plug the opening to prevent foreign matter from getting in.

(3) Disconnect the connector at evaporator unit.

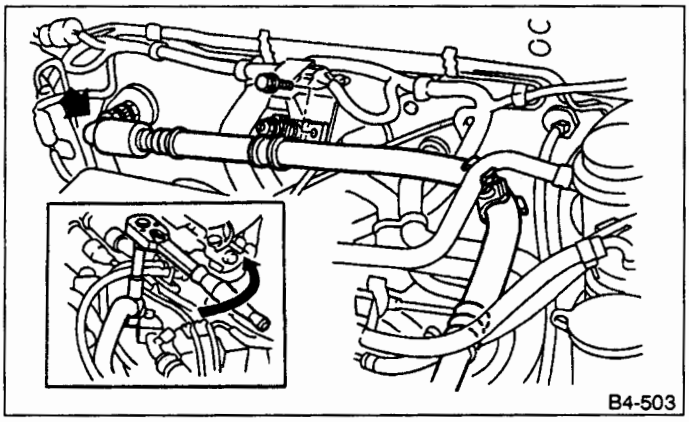


Fig. 130

4) Remove high-pressure hose
(1) Disconnect hose attaching bolt (compressor side)
(2) Remove the front grille
(3) Disconnect hose attaching bolt (condenser side)

Plug the opening to prevent foreign matter from getting in.

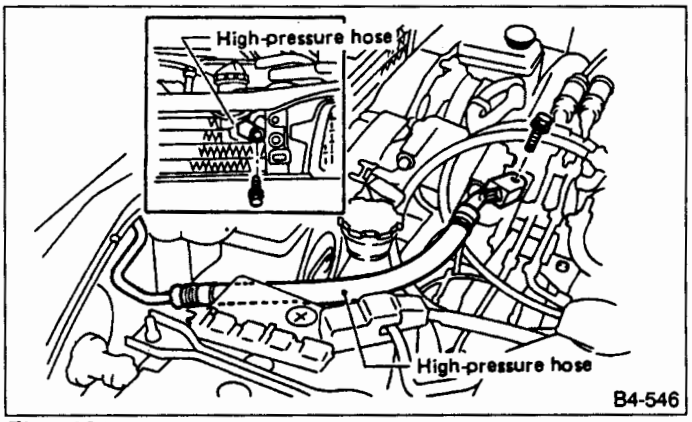


Fig. 131

B: INSTALLATION

Installation is in the reverse order of removal.
Tightening torque for flexible hose connections:

Tightening torque: N•m (kg-m, ft-lb)
Nut
15 — 25 (1.5 — 2.5, 11 — 18)
Mounting bolt
10 — 20 (1.0 — 2.0, 7 — 14)

17. Relay and Fuse

Relays used with A/C system are located as shown in figure below.
1) A/C relay
2) Main fan (radiator fan) relay
3) Sub fan (condenser fan) relay
4) Sub fan (condenser fan) water temperature relay
5) Fuses (10 A and 15 A)

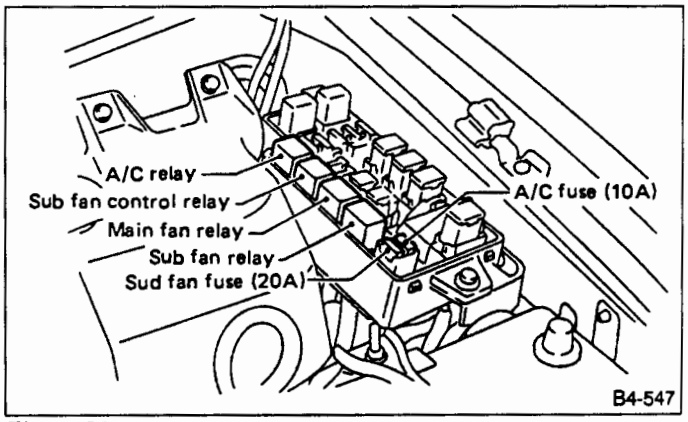


Fig. 132

6) A/C cut relay
A/C cut relay is attached by a bolt to upper side of evaporator in passenger compartment via a bracket.

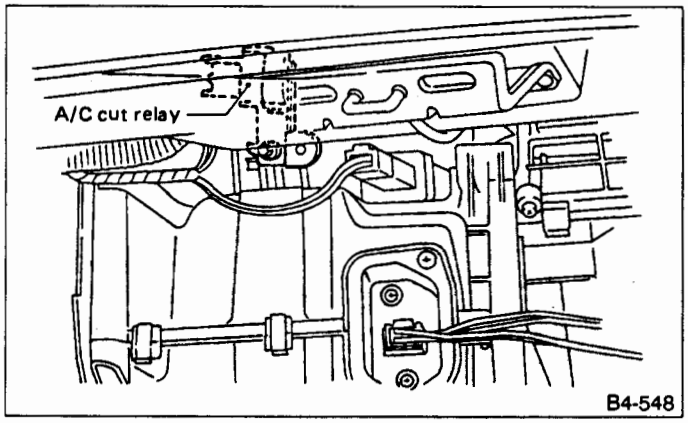


Fig. 133

A: INSPECTION

Check conduction with a circuit tester (ohm range) according to the following table.

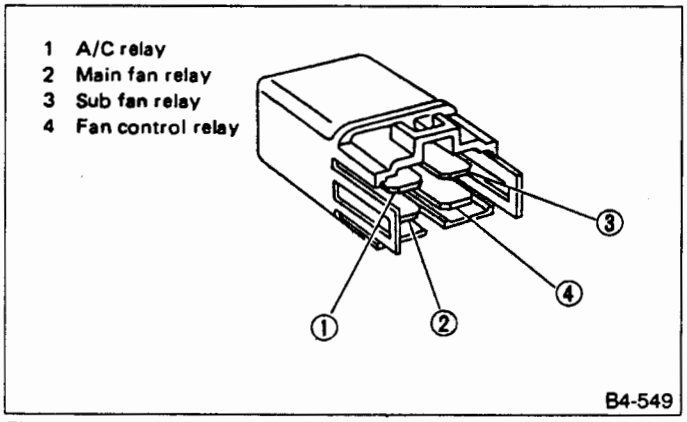


Fig. 134

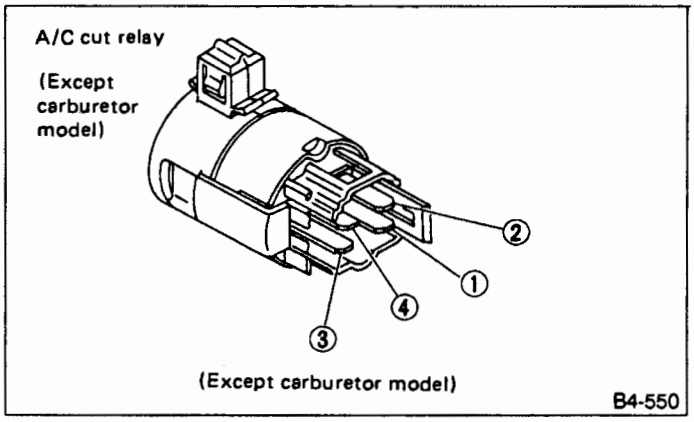
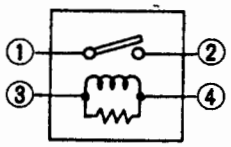
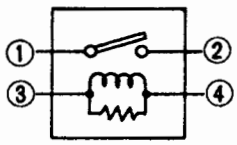


Fig. 135

A/C relay Main fan relay Sub-fan relay Fan control relay	A/C cut relay
	
About 100Ω between ③ and ④	About 120Ω between ③ and ④
∞Ω between ① and ②	∞Ω between ① and ②

B4-551

Fig. 136

Replace relays which do not meet above specifications.

18. Pressure Switch (Trinary Switch)

Pressure switch is attached to receiver-dryer. It has two built-in switches.

- High-low pressure switch
- Fan control switch

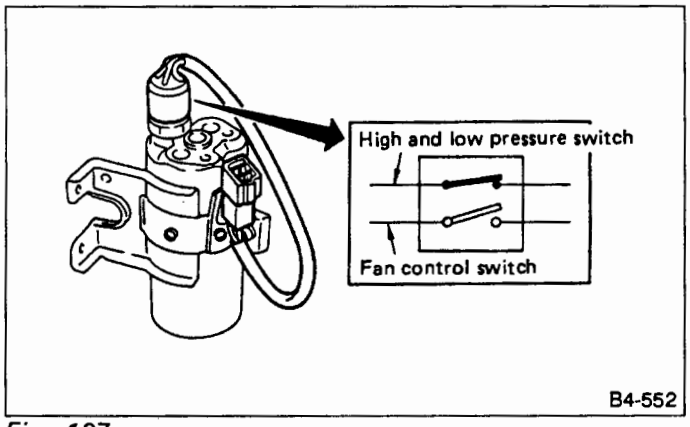


Fig. 137

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.

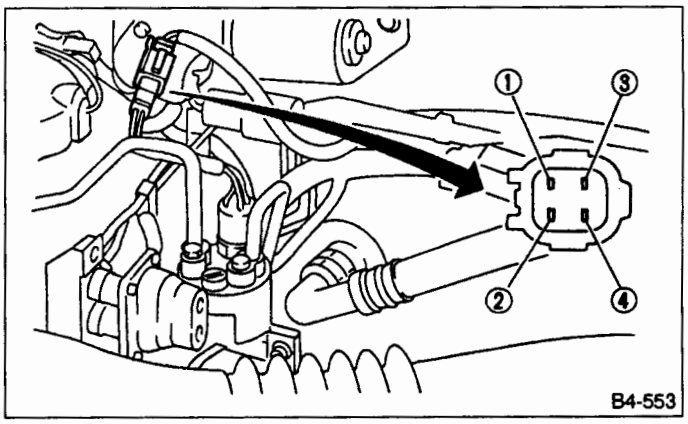


Fig. 138

	Terminal	Operation	High pressure side line-pressure kPa (kg/cm², psi)
High and low pressure switch	③ – ④	Turns OFF	Increasing to 2,648 ± 196 (27 ± 2, 384 ± 28)
			Decreasing to 210.9 ± 34.3 (2.15 ± 0.35, 30.6 ± 5.0)
		Turns ON	Increasing to 210.9 ± 34.3 (2.15 ± 0.35, 30.6 ± 5.0)
			Decreasing to 2,059 ± 196 (21 ± 2, 299 ± 28)
Fan control switch	① – ②	Turns ON	Increasing to 1,471 ± 98 (15 ± 1.0, 213 ± 14)
		Turns OFF	Decreasing to 1,079 ± 98 (11 ± 1, 156 ± 14)

T TROUBLESHOOTING

CONTENTS

1. Pre-inspection

Before troubleshooting check the following items.

1. POWER SUPPLY

1) Measure battery voltage and specific gravity of electrolyte.

Standard voltage: 12V
Specific gravity: Above 1.260

2) Check the condition of the fuses for A/C. heater and other fuses.
3) Check the condition of the harnesses and harness connectors connection.

2. REFRIGERANT LINE

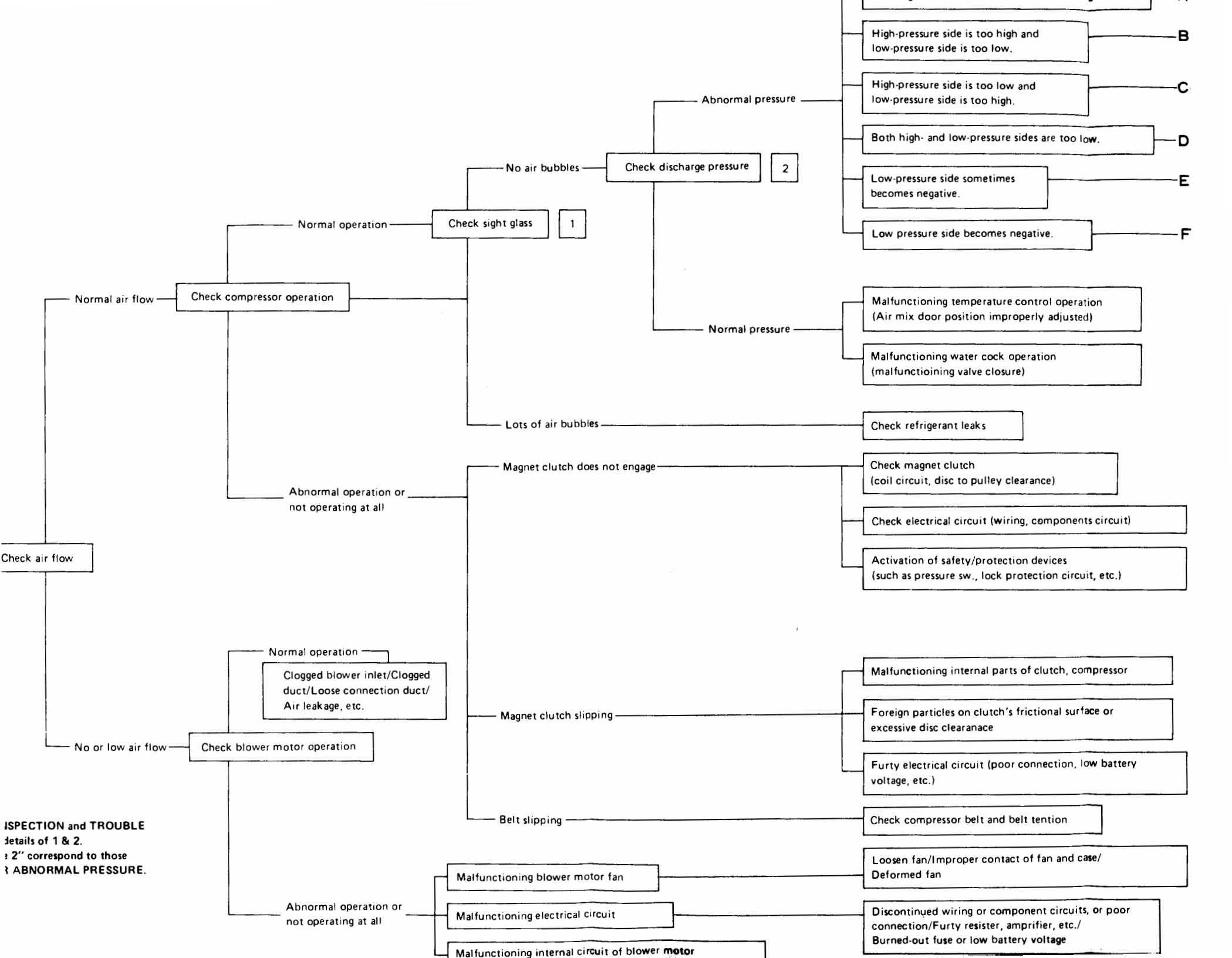
1) Check contact for refrigerant line.
2) Check amount of refrigerant.
Refer to the Sight Glass Inspection.

Refrigerant: R-12
0.8 — 0.9 kg (1.8 — 2.0 lb)

3) Check refrigerant line pressure.
Refer to PERFORMANCE CHART.

3. CONTROL LINKAGE

1) Check state of mode door control rod and linkage.
2) Check state of air mix door control rod and linkage.
3) Check state of intake door control rod and linkage.


Check air flow
Normal air flow
Check compressor operation
Normal operation
Check sight glass
1
No air bubbles
Check discharge pressure
2
Abnormal pressure
High-pressure side is too high and low-pressure side is too low.
B
High-pressure side is too low and low-pressure side is too high.
C
Both high- and low-pressure sides are too low.
D
Low-pressure side sometimes becomes negative.
E
Low pressure side becomes negative.
F
Normal pressure
Malfunctioning temperature control operation (Air mix door position improperly adjusted)
Malfunctioning water cock operation (malfunctioining valve closure)
Lots of air bubbles
Check refrigerant leaks
Abnormal operation or not operating at all
Magnet clutch does not engage
Check magnet clutch (coil circuit, disc to pulley clearance)
Check electrical circuit (wiring, components circuit)
Activation of safety/protection devices (such as pressure sw., lock protection circuit, etc.)
Magnet clutch slipping
Malfunctioning internal parts of clutch, compressor
Foreign particles on clutch's frictional surface or excessive disc clearanace
Furty electrical circuit (poor connection, low battery voltage, etc.)
Belt slipping
Check compressor belt and belt tention
No or low air flow
Check blower motor operation
Normal operation
Clogged blower inlet/Clogged duct/Loose connection duct/ Air leakage, etc.
Abnormal operation or not operating at all
Malfunctioning blower motor fan
Loosen fan/Improper contact of fan and case/ Deformed fan
Malfunctioning electrical circuit
Discontinued wiring or component circuits, or poor connection/Furty resister, amprifier, etc./ Burned-out fuse or low battery voltage
Malfunctioning internal circuit of blower motor
ISPECTION and TROUBLE
details of 1 & 2.
2" correspond to those
ABNORMAL PRESSURE.

3. Sight Glass Inspection

1. INSPECTION CONDITION

1) Operate the engine at approximately 1,500 rpm.
2) Open the door windows.
3) Set the fan switch to the 4th (High) position.
4) Turn the Air Conditioner switch "ON".
5) Ensure that compressor discharge pressure is at least 598 kPa (6 kg/cm^2, 85 psi).

When discharge pressure does not reach 588 kPa (6 kg/cm^2, 85 psi) in areas where outside air temperature is low, proceed as follows.

a. Set the TEMP. LEVER to the Full-hot position.
b. Set the intake lever/switch to the recirculation position.
c. Close the door windows completely.
d. Increase the compartment temperature so that discharge pressure reaches at least 588 kPa (6 kg/cm^2, 85 psi).

2. REFRIGERANT CHARGE AMOUNT CHECKING

Check the refrigerant charge amount using the following table as a guide.

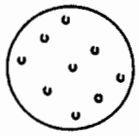
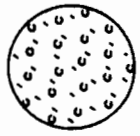
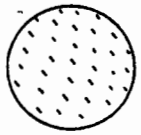
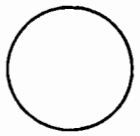
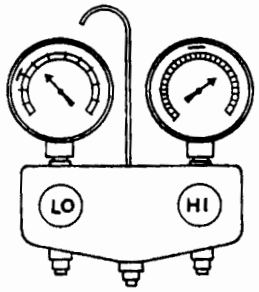
Item to check	Adequate	Insufficient	Almost in refrigerant	Too much refrigerant
State in sight glass	CLEAR Air bubbles sometimes appear when engine speed is increased or decreased 	FOAMY or BUBBLY Air bubbles always appear. 	FROSTY Frost-like appears. 	NO FOAM NO air bubbles appear. 
Temperature of high and low pressure lines	High-pressure side is hot while low-pressure side is cold. (A big temperature difference between high and low-pressure side.)	High-pressure side is warm and low-pressure side is slightly cold. (Not so big temperature difference between high and low-pressure side.)	There is almost no temperature difference between high and low- pressure side.	High-pressure side is hot and low-pressure side is slightly warm. (Slight temperature difference between and low pressure side.)
Pressure of system	Both pressures on high and low-pressure sides are normal.	Both pressures on high and low-pressure sides are slightly low.	High-pressure side is abnormally low.	Both pressures on high and low-pressure sides are abnormally high.

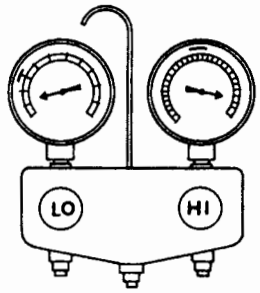
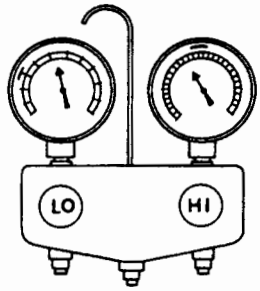
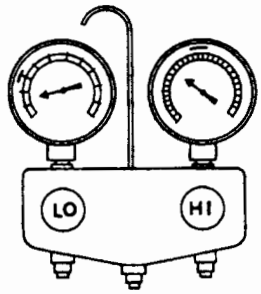
Fig. 139 B4-712

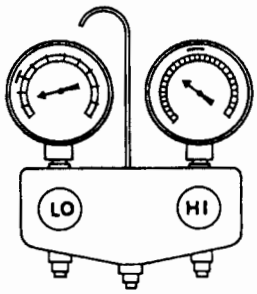
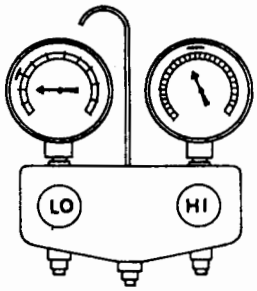
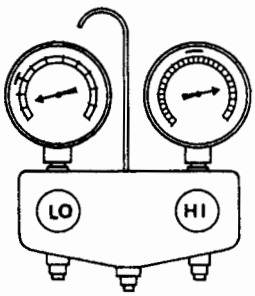
4. Trouble Diagnosis for Abnormal Pressure

Whenever abnormal pressure in the high and/or low sides of the system is noted. Diagnosis must be conducted by using a gauge manifold. The thick-line zone on the gauge scale (see illustrations) shown in the following table refers to the standard (normal) pressure. However, standards differ from vehicle to vehicle, so refer to the "Ambient Temperature-Pressure Characteristics" chart.

Pressure measurements are effective only when ambient temperature is in the range indicated under the heading "PERFORMANCE CHART (2) Measurement of compressor's high- and low-pressure".

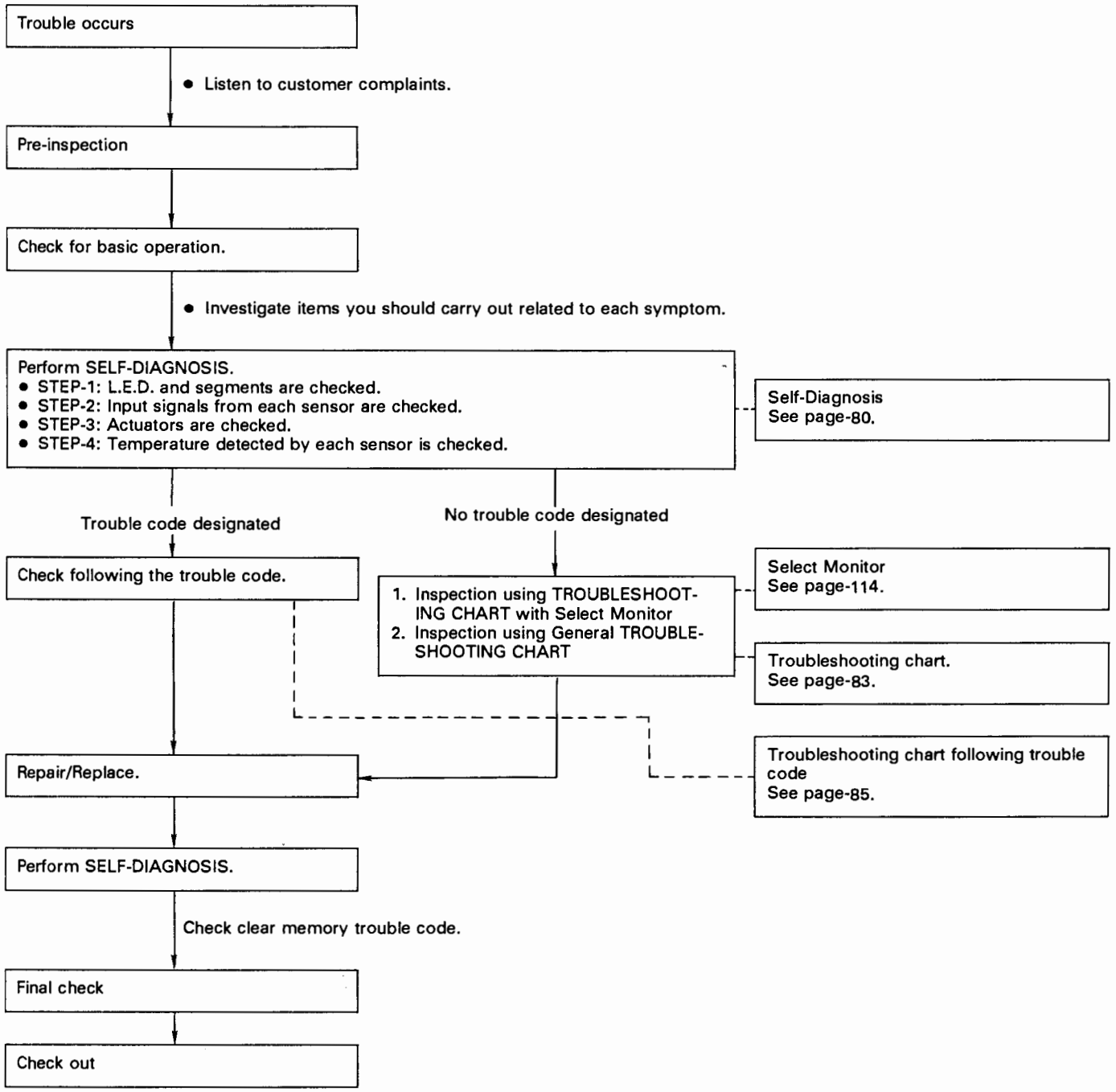
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  B4-713 *Fig. 140*	Pressure is reduced soon after water is splashed on condenser. No air bubbles appear in sight glass when pressure is reduced.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until specified pressure is obtained.
	Air suction by radiator or condenser fan is insufficient.	Insufficient condenser cooling performance ↓ 1)Condenser fin is clogged. 2)Improper rotation of radiator fan or condenser fan	●Clean condenser. ●Check and repair radiator or condenser fan as necessary.
	●Low-pressure pipe is not cold. ●When compressor is stopped, high-pressure value quickly drops by approximately 196 kPa (2 kg/cm^2, 28 psi). It will then decrease gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high pressure decreases too slowly.) ↓ Air in refrigeration cycle	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	●Area near low-pressure pipe connection and service valves are considerably cold as compared with area near expansion valve outlet or evaporator. ●Parts are sometimes covered with frost.	●Excessive liquid refrigerant on low-pressure side ●Excessive refrigerant discharge flow ●Expansion valve is open a little compared with the specification. ↓ 1)Improper thermal valve installation 2)Improper expansion valve adjustment	Replace expansion valve.

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.  B4-714 *Fig. 141*	Upper side of condenser and high-pressure side are hot, however, receiver drier is not so hot.	High-pressure hose or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check compressor oil for contamination.
High-pressure side is too low and low-pressure side is too high.  B4-715 *Fig. 142*	High-and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside packings for compressor	Replace compressor.
	No temperature difference between high and low-pressure sides	Compressor discharge capacity does not change. (Compressor stroke is set at maximum.)	Replace compressor.
Both high-and low-pressure sides are too low.  B4-716 *Fig. 143*	• There is a big temperature difference between receiver drier outlet and inlet. Outlet temperature is extremely low. • Receiver drier inlet and expansion valve are frosted.	Receiver drier inside is clogged a little.	• Replace receiver drier • Check compressor oil for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near receiver drier. • Expansion valve inlet may be frosted. • Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between receiver drier and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check compressor oil for contamination.

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high and low-pressure sides are too low.  B4-716 *Fig. 144*	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve becomes closed a little compared with the specification. ↓ 1) Improper expansion valve adjustment 2) Malfunctioning thermal valve 3) Outlet and inlet may be clogged	• Remove foreign particles by using compressed air. • Check compressor oil for contamination.
	Area near low-pressure pipe connection and service valve are extremely cold as compared with area near expansion valve outlet and evaporator.	Low-pressure hose is clogged or crushed.	• Check and repair malfunctioning parts. • Check compressor oil for contamination.
	Air flow volume is not enough or low.	Evaporator is frozen ↓ Compressor discharge capacity does not change. (Compressor stroke is set at maximum length.)	Replace compressor.
Low-pressure side sometimes becomes negative.  B4-718 *Fig. 145*	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly function for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed in refrigeration cycle.	• Drain water from refrigerant cycle or replace refrigerant. • Replace receiver drier.
Low-pressure side becomes negative.  B4-719 *Fig. 146*	Receiver drier or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or receiver drier is frosted.	After the system is left at rest, start again in order to confirm whether or not problem is caused by water or foreign particles. • If the problem is due to water, drain water from refrigeration cycle or replace refrigerant. • If it is due to foreign particles, remove expansion valve and remove it with dry and compressed air. • If either of the above method cannot correct the problem, replace expansion valve. • Replace receiver drier. • Check compressor oil for contamination.

5. Troubleshooting Chart

A: BASIC TROUBLESHOOTING PROCEDURE



6. Symptom Chart

SYMPTOM / CHECK ITEM				Self-diagnosis System				Check with SELECT MONITOR												
				STEP-1	STEP-2	STEP-3	STEP-4	F03, F04 Target outlet air temp. (°C) (°F)	F05, F06	F07, F08	F09, F10	F11, F12	F13	F14	F15	F16	F17	F18		
Check based on trouble code (STEP-2 mode)	21	In-vehicle sensor circuit is shorted.		○	○		○	○	○											
	−21	In-vehicle sensor circuit is open.		○	○		○	○	○											
	22	Ambient sensor circuit is shorted.		○	○		○	○		○										
	−22	Ambient sensor circuit is open.		○	○		○	○		○										
	23	Intake sensor circuit is shorted.		○	○		○	○			○									
	−23	Intake sensor circuit is open.		○	○		○	○			○									
	24	Water temperature sensor circuit is shorted.		○	○			○				○								
	−24	Water temperature sensor circuit is open.		○	○			○				○								
	−25	Sunload sensor circuit is shorted.		○	○			○					○	○						
	26	P.B.R. circuit is shorted.		○	○			○							○	○				
	−26	P.B.R. circuit is open.		○	○			○							○	○				
Check based on actuator test (STEP-3 mode)	Mode door motor		Mode door is not switched. (STEP-2 mode)	○	○	○	○	○	●	●	●	●	●	●	●	●	○	○		
	Intake door motor		External/internal air is not switched.	○	○	○	○	○	●	●	●		●	●	●	●				
	Air mix door motor		Temperature control is disabled.	○	○	○	○	○	●	●	●		●	●	○	○				
	Blower motor		Blower motor speed does not change.	○	○	○	○	○	●	●	●	●	●	●	●	●				○
	Compressor		Compressor does not turn ON or OFF.	○	○	○	○	○	●	●	●	●								

○ : Important check item ● : Check item for reference

○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	**F03, F04** **Target outlet air temp. (°C) (°F)**	Check with SELECT MONITOR
●	●	●	●	●										○	○	F05, F06	
●	●	●	●	●								○	○			F07, F08	
●	●	●	●	●						○	○					F09, F10	
●	●			●				○	○							F11, F12	
	●	●	●	●			○									F13	
	●	●	●	●			○									F14	
	●	○	●	●	○	○										F15	
	●	○	●	●	○	○										F16	
				○												F17	
				○												F18	
	○															F19	
			○													F20	
○	○	○	○	○								○	○			F21, F22	
○	○	○	○	○								○	○			Ambient sensor	
○	○	○	○	○										○	○	In-vehicle sensor	
○	○	○	○	○						○	○					Intake sensor	
	○	○	○	○			○									Sunload sensor	
○	○			○				○	○							Water temperature sensor	Check component parts
	○			○												Mode door motor	
			○													Intake door motor	
	○	○	○	○	○	○										Air mix door motor	
	○															Blower motor	
	○															Fan control amp.	
	○															Blower hi relay	
○																A/C relay	
○																Trinary switch	
○																Magnet clutch (Compressor)	
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	Auto amplifier	
○																MPFI control unit	
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	Harness or connector	
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	Power supply	

7. Schematic

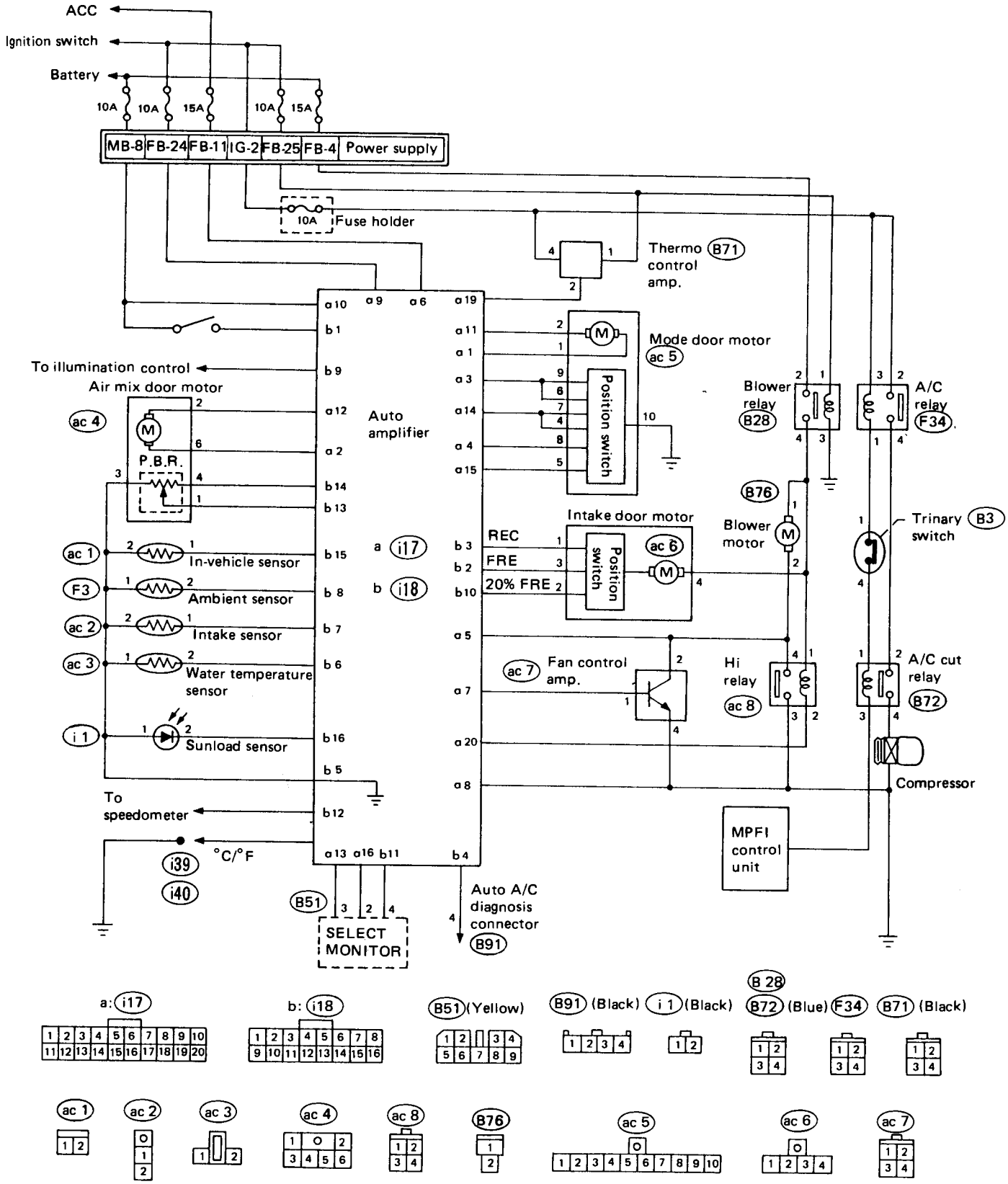


Fig. 147

B4-1091

A: BASIC CHECKS

The basic checks are to confirm that the system operates as it should. The systems which will be checked are the blower, mode (DEFrost), ambient display, intake air, econ, auto, temperature decrease, temperature increase, and memory function.

- Check in the following order.

CONDITIONS: running at normal operating temperature

1. CHECK LOW/HIGH BLOWER FAN.

1) Press LOW switch button one time.
Blower should operate on low speed with light the indicator lamp.
2) Press LOW switch button one more time. LOW switch function canceled with light off the indicator lamp.
3) Press LOW switch button again.
4) Press HIGH switch button one time.
Low switch function canceled and blower should operate one high speed with light the indicator lamp.
5) Press HIGH switch button one more time. HIGH switch function canceled with light off the indicator lamp.

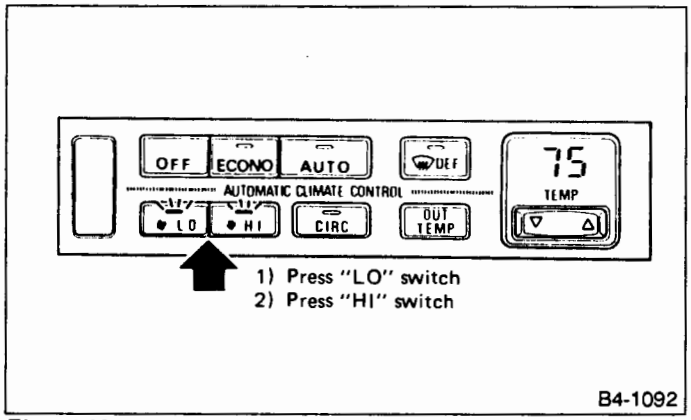


Fig. 148

2. CHECK reCIRCulation.

1) Press reCIRCUlation button one time. CIRC indicator should light.
2) Listen for intake door position change (you should hear blower sound change slightly).
3) Press reCIRCulation button one more time. Confirm that the reCIRC switch function is canceled and indicator is off.
4) Press reCIRCulation switch one more again.

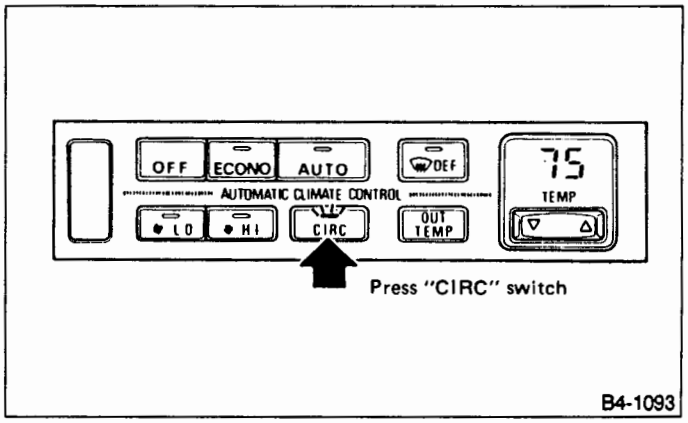


Fig. 149

3. CHECK DEFROSTER.

1) Press DEFroster button one time.
2) Check that RECIRC is canceled.
The discharge air should be coming only from the defrost vents.
3) Confirm that the compressor clutch is engaged.
4) Confirm that the indicator lamp is light.
5) Press DEFroster button one more time. Confirm that defroster keep operating.

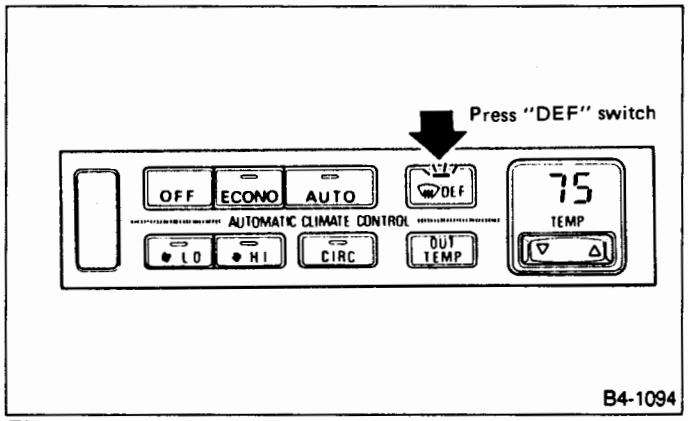


Fig. 150

4. CHECK ECON MODE.

1) Press ECON button.
Defroster should be canceled.
The discharge air outlet will depend on ambient, in-vehicle, and set temperatures.
Indicator should light.
2) Confirm that the compressor clutch not engaged.

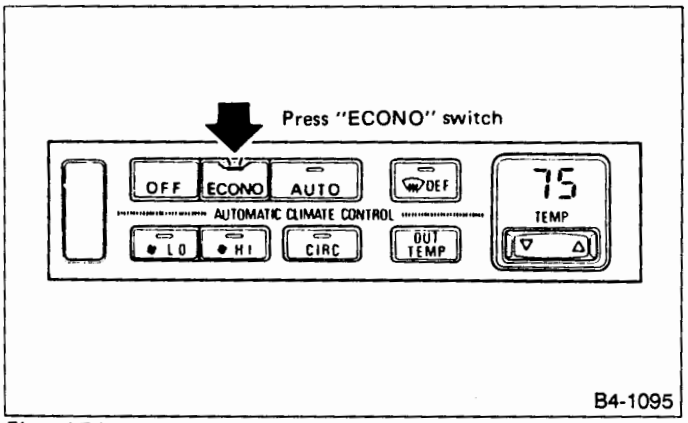


Fig. 151

5. CHECK AUTO MODE.

1) Press AUTO button.
2) Confirm that the compressor clutch engages.
Indicator should light.
(Discharge air will depend on ambient, in-vehicle, and set temperatures).

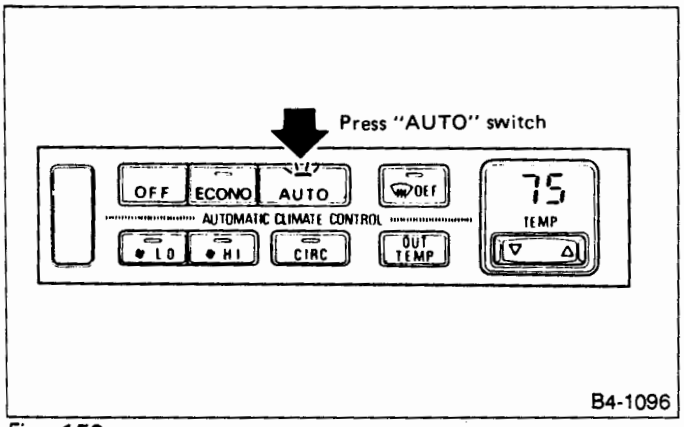


Fig. 152

6. CHECK TEMPERATURE DECREASE.

1) Press the temperature decrease button until 20°C (68°F) is displayed.
2) Check for cold air at discharge air outlets.

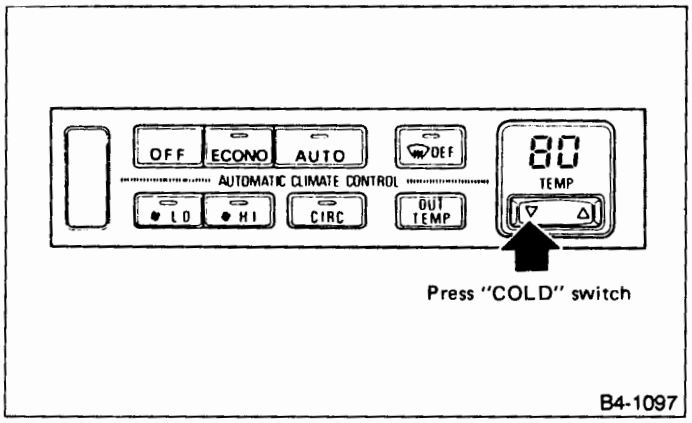


Fig. 153

7. CHECK TEMPERATURE INCREASE.

1) Press the temperature increase button until the 30°C (80°F) is displayed.
2) Listen for changes in blower speed as set temperature changes.
3) Check for hot air at discharge air outlets.

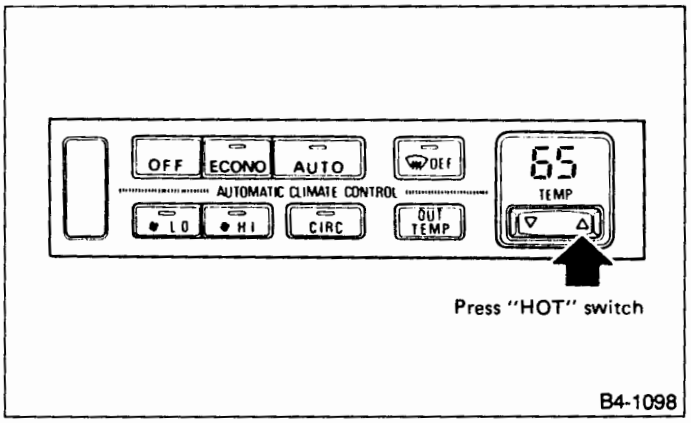


Fig. 154

8. CHECK MEMORY FUNCTION.

1) Press OFF button.
2) Turn the ignition switch off.
3) Wait 15 seconds.
4) Turn the ignition switch on.
5) Press the AUTO button.
6) Confirm that the set temperature remained at 32°C (90°F).

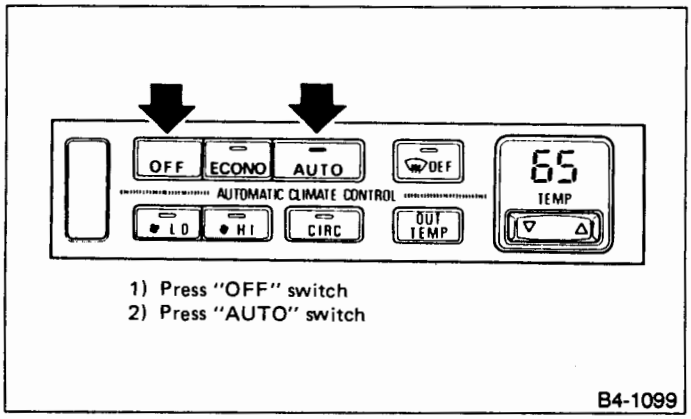


Fig. 155

9. CHECK AMBIENT DISPLAY.

Press the OUTside TEMPerature button.
Display should show the outside temperature for approx. 5 seconds.

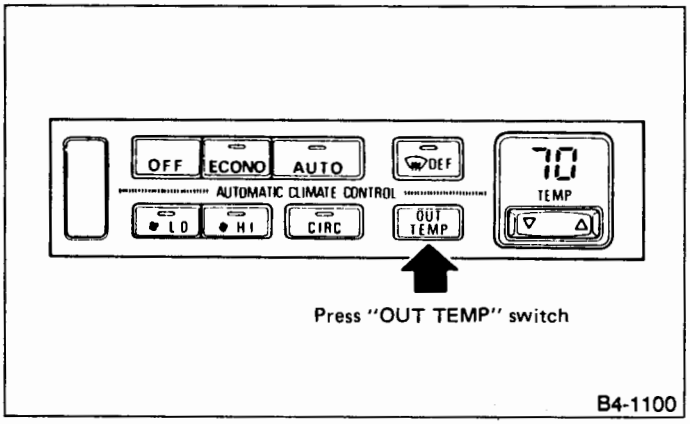


Fig. 156

8. Self-diagnosis System

A: GENERAL

The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (item) for details.
Shifting from normal control to self-diagnostic system is accomplished by starting engine (turning ignition switch from "OFF" to "ON") and connecting diagnosis connector to diagnosis ground connector with the jumping wire harness.
Shifting from one step to another is accomplished by pushing temperature switch (HOT) or temperature switch (COLD), as required.

B: FUNCTION

1. HOW TO START THE SELF-DIAGNOSIS.

Start engine.
(Ignition switch: ON)

↓

Connect the self-diagnosis connector to diagnosis ground connector with jumping wire harness.

↓

Start the self-diagnosis.
(Displayed STEP-1 following)

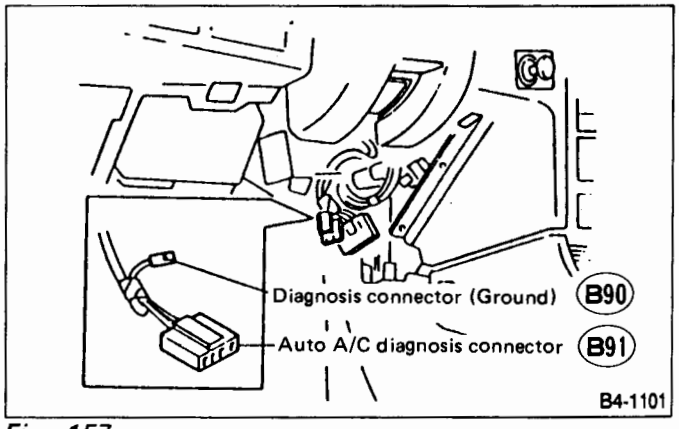


Fig. 157

2. FUNCTION

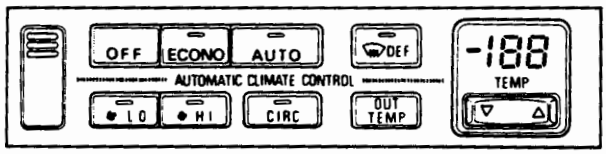
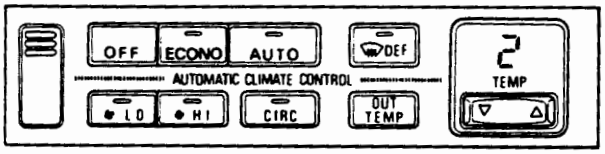
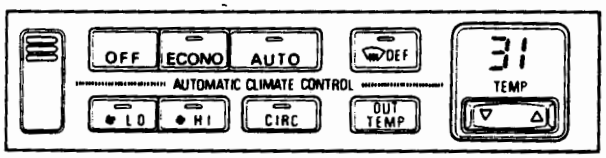
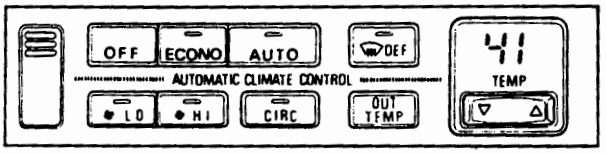
	Functions	Display	
STEP-1	L.E.Ds and segments are checked.		See page 83.
STEP-2	Input signals from each sensor are checked. (open and short circuit) • In-vehicle sensor • Ambient sensor • Intake sensor • Water temperature sensor • P.B.R.		See page 85.
STEP-3	Actuators are checked. • Mode door motor • Intake door motor • Air mix door motor • Blower motor • Compressor		See page 99.
STEP-4	Temperature detected by each sensor is checked. • The temperature near the sensor and the detected value are compared.		See page 111.

Fig. 158

B4-1102

3. SELF-DIAGNOSIS PROCEDURE

Use the HOT and COLD switches on the temperature control button to switch STEP-1 through STEP-4 for self-diagnosis.
Press DEF switch to change test pattern in STEP-3 and STEP-4.

STEP-1: Displays all L.E.D. and segments "– 188".

Not Displayed → Malfunctioning auto amplifier, switch, power supply, or harness.
Go to Trouble Chart for STEP-1.

Press (HOT SWITCH)

Press (COLD SWITCH)

STEP-2: Sensors check (open or short)
Displays trouble code.

21. –21. 22. –22
23. –23. 24. –24
. –25. 26. –26

All sensor good order.

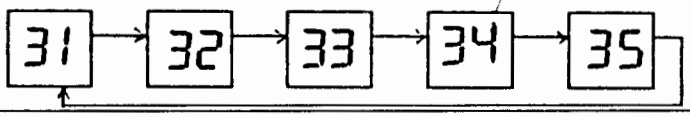
→ Go to Trouble Chart for STEP-2.

→ Go to SELECT MONITOR.

Press (HOT SWITCH)

Press (COLD SWITCH)

STEP-3: Actuators check
Test pattern changes when DEF switch is pressed.

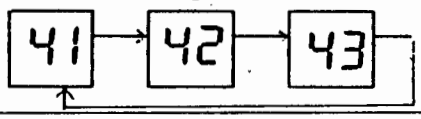


→ Go to Trouble Chart for STEP-3.

Press (HOT SWITCH)

Press (COLD SWITCH)

STEP-4: Temperature detected by each sensor is checked.
Sensor to be checked changes when DEF switch is pressed.



→ Go to Trouble Chart for STEP-4.

Code	Temperature
41	Ambient sensor
42	In-vehicle sensor
43	Intake sensor

Press (HOT SWITCH)

Return to STEP-1.

9. Trouble Chart for STEP-1

CHECK L.E.D.s AND SEGMENTS

Start self-diagnosis STEP-1.

Display shows all L.E.D. and segments are flash below.
- When switches L.E.D. and segments are good order in STEP-1 mode, the corresponding L.E.D. and fluorescent display tube will flash.

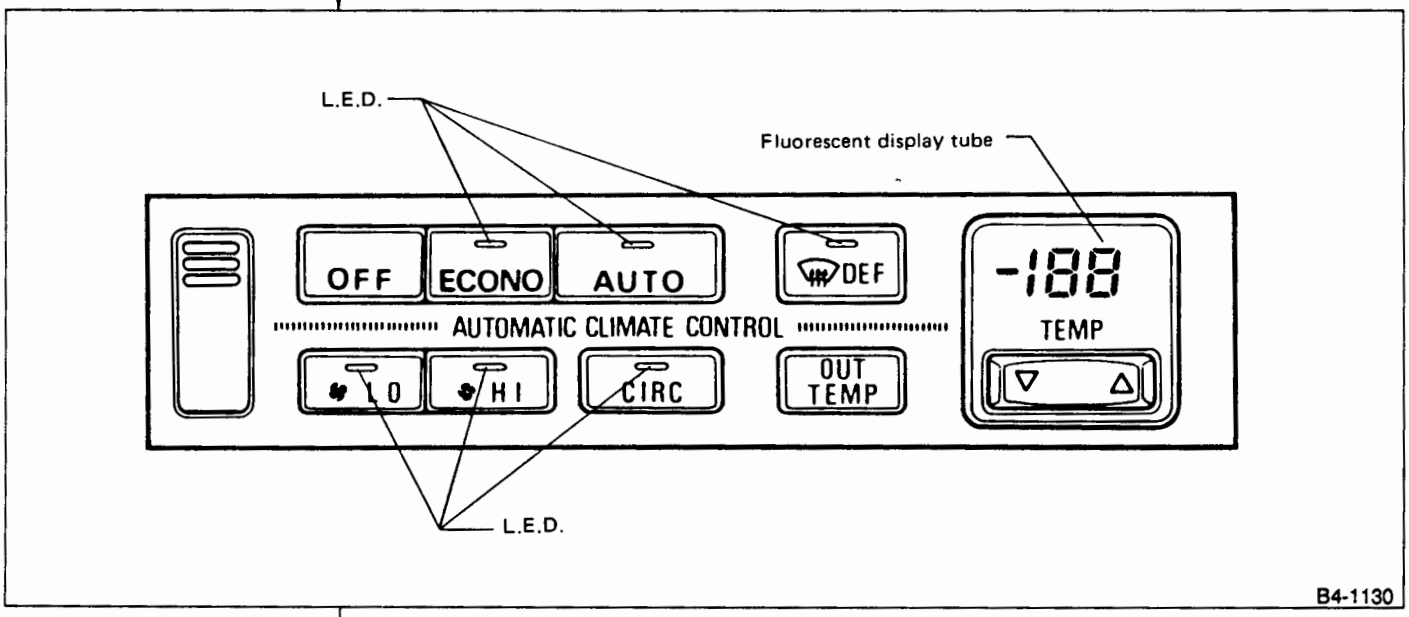


Fig. 159

If L.E.D.s or segments malfunction, L.E.D. does not come on or display shows incomplete segment.

When hot switch is pressed, display change to self-diagnosis STEP-2.

When cold switch is pressed, display change to self-diagnosis STEP-4.

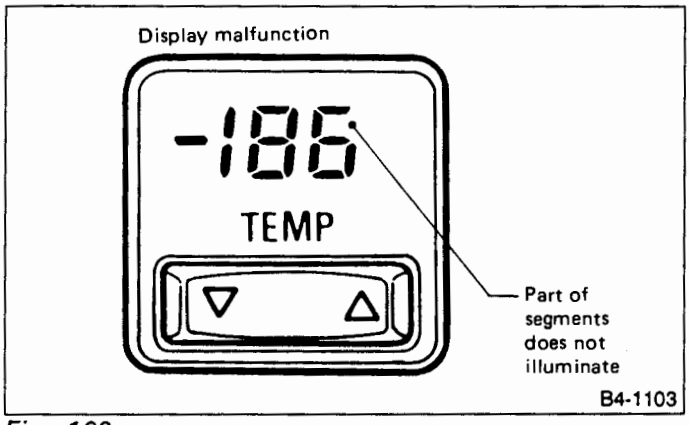


Fig. 160

10. Trouble Chart for STEP-2

CHECKS EACH SENSOR CIRCUIT (For open or short circuit)

Display shows "2" in STEP-2 mode.

It takes approximately 4 seconds to check all sensors.

Trouble code "20"
- All sensors "NORMAL" condition

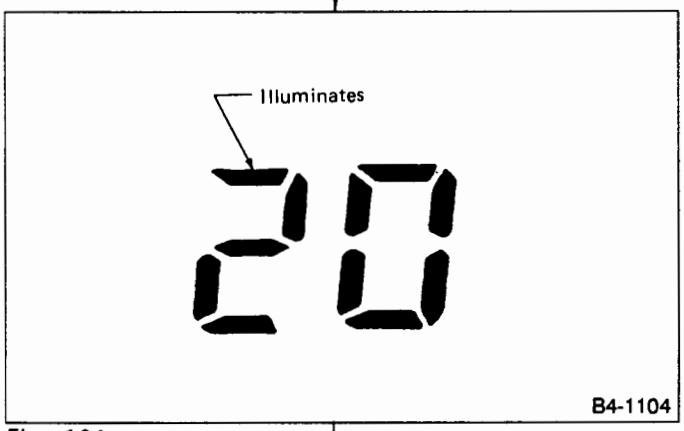


Fig. 161

Trouble code
21, −21, 22, −22, 23, −23, 24, −24, −25, 26, −26.

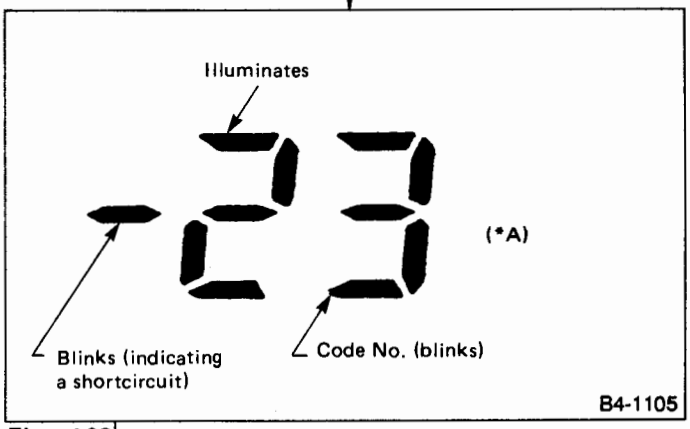


Fig. 162

*A a: **A short circuit is identified by a blinking "−" mark preceding mode number.**
b: **If two or more sensors malfunction.corresponding code No's respectively blink two times.**

Check input signals from each sensors circuit using the select monitor as follows. See page 114.	
Key No.	Function item
F03 (04)	Target outlet air temperature.
F05 (06)	In-vehicle temperature
F07 (08)	Ambient temperature
F09 (10)	Evaporator outlet air temp.
F11 (12)	Cooling water temperature
F13 (14)	Quantity/Average of solar rad.
Others	Refer to other functions as needed.

Check each sensor circuit for following the trouble code.		
Code No.	Condition	Pages
21	In-vehicle sensor circuit is open or short circuit.	86
−21		
22	Ambient sensor circuit is open or short circuit.	88
−22		
23	Intake sensor circuit is open or short circuit.	90
−23		
24	Water temp. sensor circuit is open or short circuit.	92
−24		
−25	Sunload sensor circuit is short circuit. *	94
26	P.B.R. circuit is open or short circuit.	96
−26		

Repair/Replace.

Final check Display shows trouble code "20".

When hot switch is pressed, display change to self-diagnosis STEP-3.
When cold switch is pressed, display return to self-diagnosis STEP-1.

* The sunload sensor has no open-circuit indication.

A: TROUBLE CODE (21/−21) — Check in-vehicle sensor circuit.

21	Open circuit:	Outlet air temperature is high./Target outlet air temperature is high. (Auto amplifier judges that temperature inside vehicle is very low)
−21	Short circuit:	Outlet air temperature is cold./Target outlet air temperature is low. (Auto amplifier judges that temperature inside vehicle is very high)

1 Check circuit continuity for in-vehicle sensor.
- Not OK → Replace in-vehicle sensor.
- OK ↓

2 Check input signals for in-vehicle sensor.
- OK → Repair harness.
- Not OK ↓

3 Check output signals for auto amplifier.
- OK → Repair harness.
- Not OK ↓

Check with SELECT MONITOR (F05/06).
Check with self-diagnosis STEP-4 (No. "42").
- Not OK → Replace auto amplifier.
- OK → Repair harness.

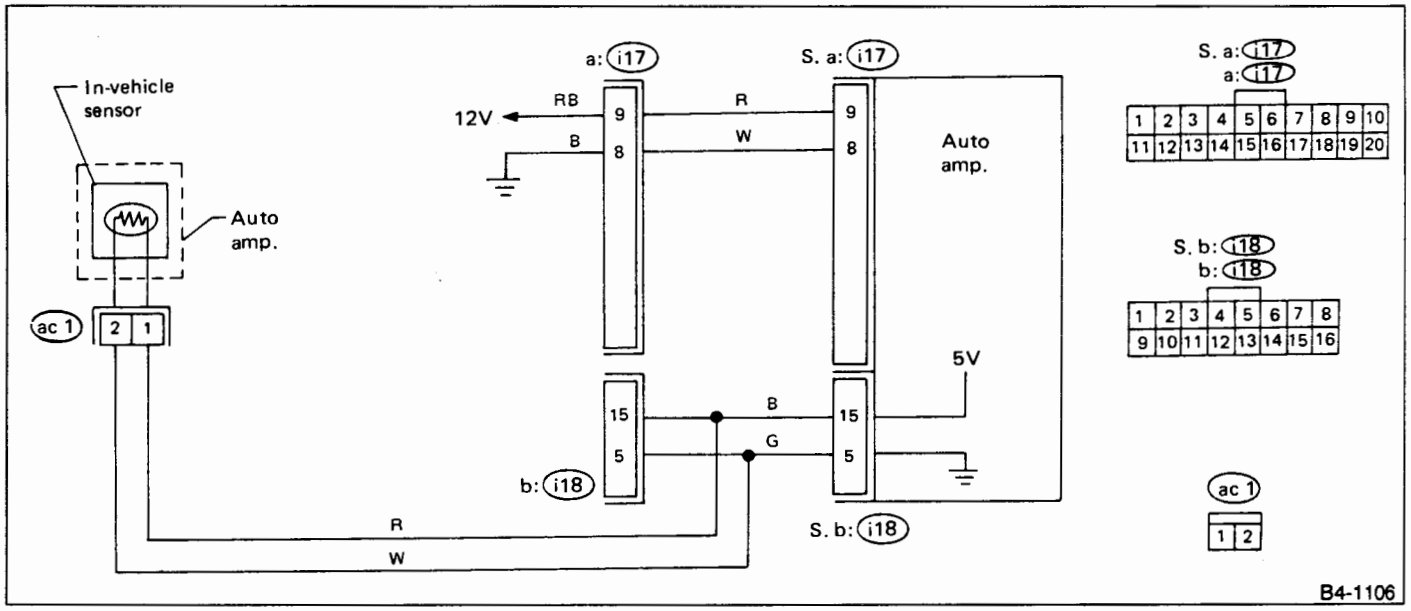


Fig. 163

1. CHECK CIRCUIT CONTINUITY FOR IN-VEHICLE SENSOR

1) Turn ignition switch OFF.
2) Remove auto amplifier.
3) Disconnect in-vehicle sensor harness connector.
4) Check circuit continuity for in-vehicle sensor.
5) Measure resistance using the table below.

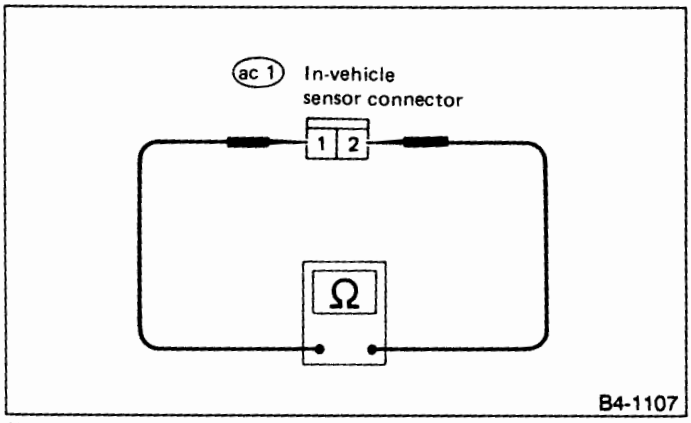


Fig. 164

Temperature °C (°F)	Resistance kΩ
−35 (−31)	38.35
−30 (−22)	28.62
−25 (−13)	21.61
−20 (−4)	16.50
−15 (5)	12.73
−10 (14)	9.92
−5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07
50 (122)	0.91
55 (131)	0.77
60 (140)	0.66
65 (149)	0.57

2. CHECK INPUT SIGNALS FOR IN-VEHICL SENSOR

1) Turn ignition switch ON.
2) Remove auto amplifier.
3) Disconnect in-vehicle sensor harness connector.
4) Measure voltage exist between in-vehicle sensor harness connector and body ground.

Voltage: approx. 5V

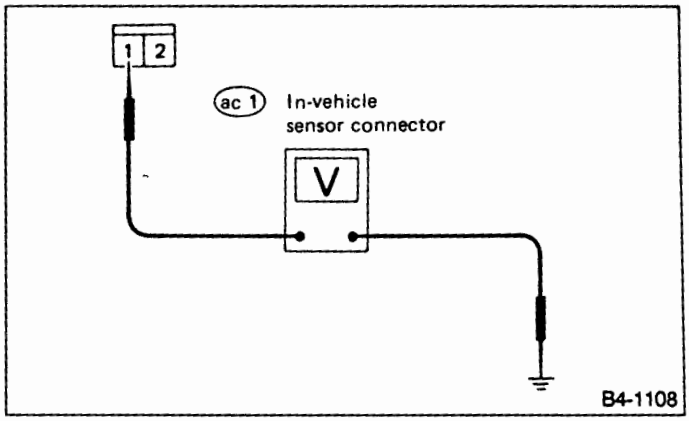


Fig. 165

3. CHECK OUTPUT SIGNALS FOR AUTO AMPLIFIER.

1) Turn ignition switch ON.
2) Remove auto amplifier.
3) Measure voltage for output signals for auto amplifier.

Voltage: approx. 5V

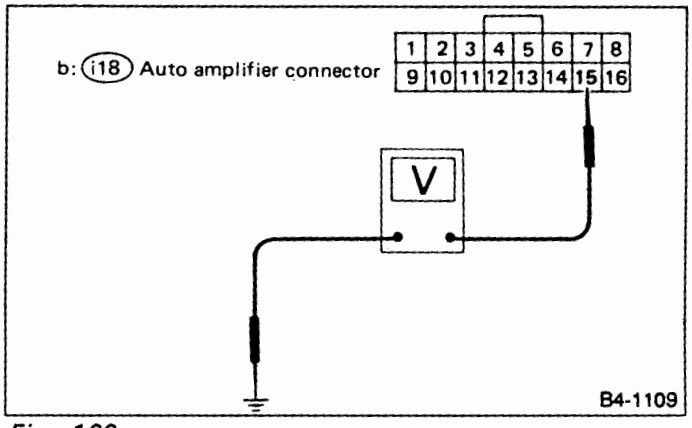


Fig. 166

B: TROUBLE CODE (22/−22) — Check ambient sensor circuit.

22	Open circuit:	Air outlet controlled maximum hot/Air mix door does not move (Fixed high) Blower fan speed controlled maximum high/Blower fan speed does not change. (Auto amplifier judges that temperature outside vehicle is very low.)
−22	Short circuit:	Air outlet controlled maximum cool/Air mix door does not move (Fixed cool) Blower fan speed controlled maximum low/Blower fan speed does not change. (Auto amplifier judges that temperature outside vehicle is very high.)

1 Check circuit continuity for ambient sensor.
- Not OK → Replace ambient sensor.
- OK ↓

2 Check input signals for ambient sensor.
- OK → Repair harness.
- Not OK ↓

3 Check output signals for auto amplifier.
- OK → Repair harness.
- Not OK ↓

Check with SELECT MONITOR (F07/08).
Check with self-diagnosis STEP-4 (No. "41").
- Not OK → Replace auto amplifier.
- OK ↓

Repair harness.

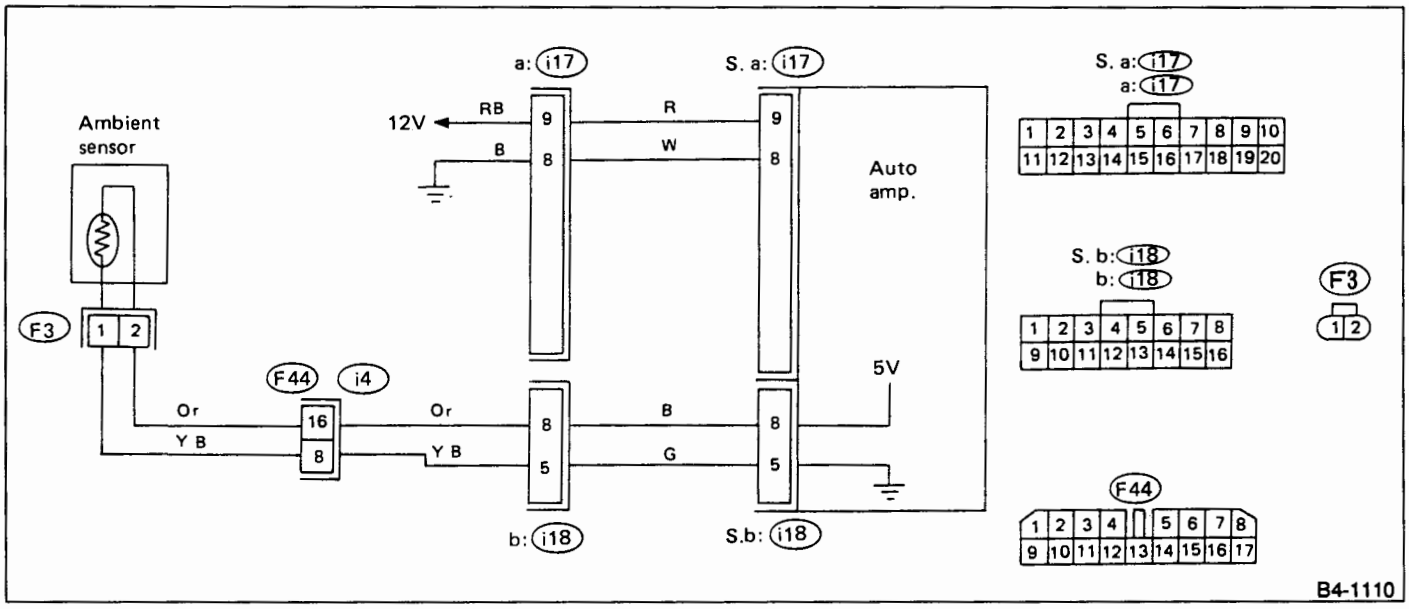


Fig. 167

1. CHECK CIRCUIT CONTINUITY FOR AMBIENT SENSOR.

1) Turn ignition switch OFF.
2) Disconnect ambient sensor harness connector.
3) Measure resistance using the table below.

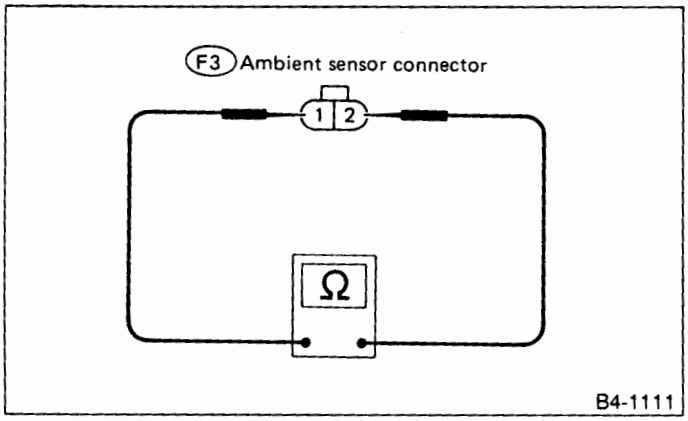


Fig. 168

Temperature °C (°F)	Resistance kΩ
−35 (−31)	38.35
−30 (−22)	28.62
−25 (−13)	21.61
−20 (−4)	16.50
−15 (5)	12.73
−10 (14)	9.92
−5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07
50 (122)	0.91
55 (131)	0.77
60 (140)	0.66
65 (149)	0.57

2. CHECK INPUT SIGNALS FOR AMBIENT SOR.

1) Turn ignition switch ON.
2) Disconnect ambient sensor harness connector
3) Measure voltage exist between ambient senso ness connector and body ground.

Voltage: approx. 5V

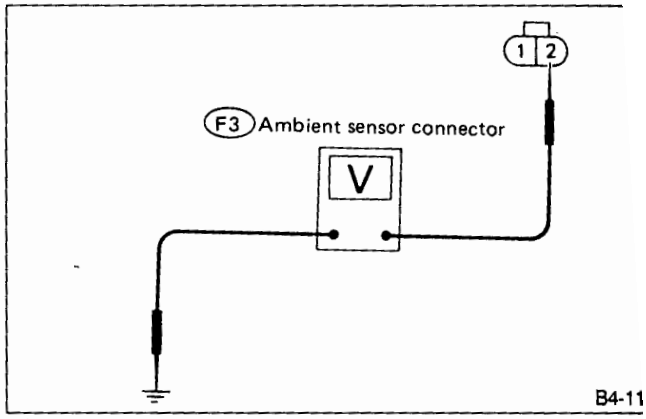


Fig. 169

3. CHECK OUTPUT SIGNALS FOR AUTO AMP FIER.

1) Turn ignition switch ON.
2) Remove auto amplifier.
3) Measure voltage for output signals for auto amp fier.

Voltage: approx. 5V

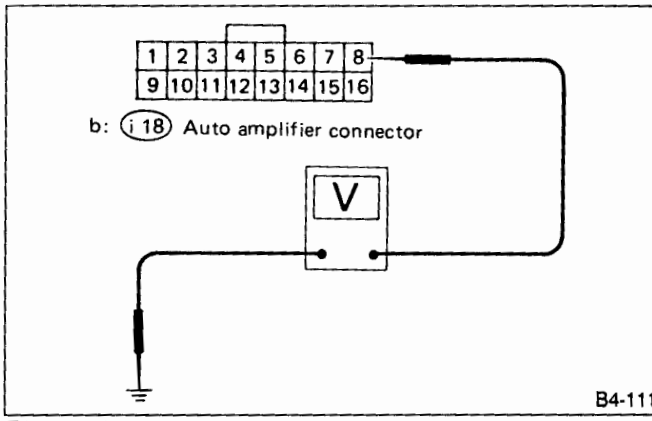


Fig. 170

C: TROUBLE CODE (23/−23) — Check intake sensor circuit.

23 −23	Open circuit: Short circuit:	Compressor ON/OFF operation does not controlled. Outlet temperature control does not controlled/Target air mix door opening ratio is abnormal. (Auto amplifier judges that temperature outside evaporator is very low)

1 Check circuit continuity for intake sensor.
- Not OK → Replace intake sensor.
- OK ↓

2 Check input signals for intake sensor.
- OK → Repair harness.
- Not OK ↓

3 Check output signals for auto amplifier.
- OK → Repair harness.
- Not OK ↓

Check with SELECT MONITOR (F09/10).
Check with self-diagnosis STEP-4 (No. "43").
- Not OK → Replace auto amplifier.
- OK ↓

Repair harness.

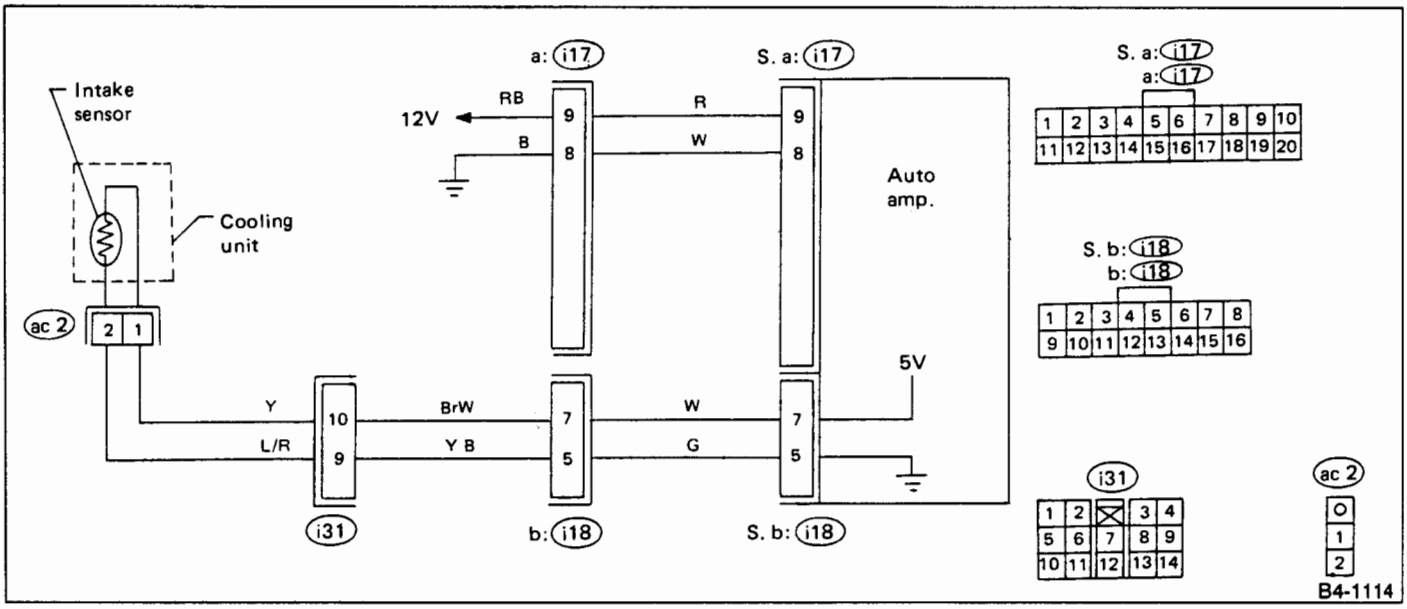


Fig. 171

1. CHECK CIRCUIT CONTINUITY FOR INTAKE SENSOR.

1) Turn ignition switch OFF.
2) Remove glove box.
3) Disconnect intake sensor harness connector.
4) Measure resistance using the table below.

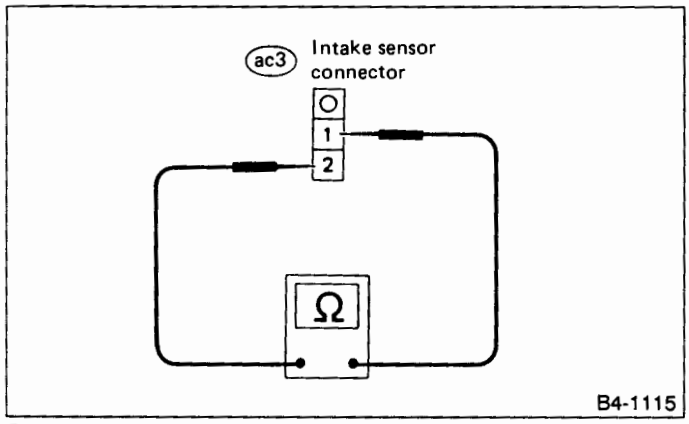


Fig. 172

2. CHECK INPUT SIGNALS FOR INTAKE SENSOR.

1) Turn ignition switch ON.
2) Disconnect intake sensor harness connector.
3) Measure voltage exist between intake sensor harness connector and body ground.

Voltage: approx. 5V

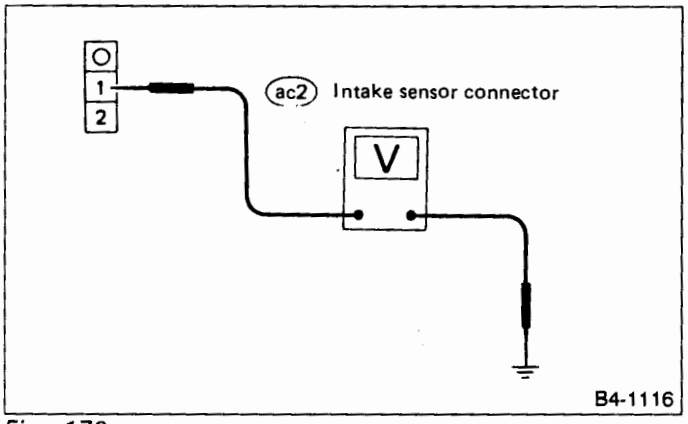


Fig. 173

3. CHECK OUTPUT SIGNALS FOR AUTO AMPLIFIER.

1) Turn ignition switch ON.
2) Remove auto amplifier.
3) Measure voltage for output signals for auto amplifier.

Voltage: approx. 5V

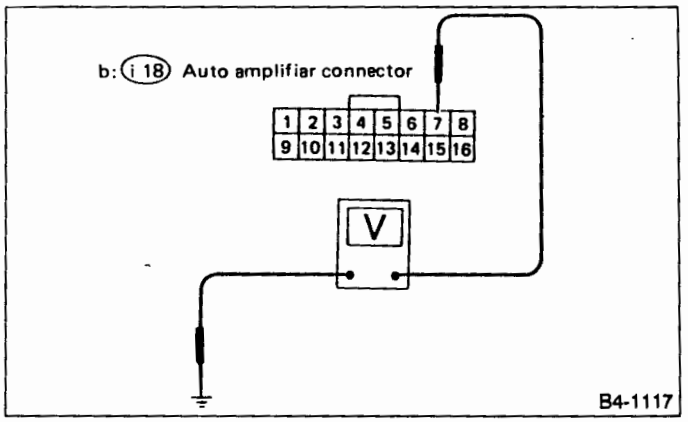


Fig. 174

D: TROUBLE CODE (24/−24) — Check water temperature sensor circuit.

24	Open circuit:	In spite of water temperature being high, air outlet does not change fixed DEF mode position) and blower fan does not operate (or low). (Auto amplifier judges that water temperature is very low.)
−24	Short circuit:	In spite of water temperature being very low, blower fan operate to high speed. (Auto amplifier judges that water temperature is very high.)

1 Check circuit continuity for water temperature sensor.
- Not OK → Replace water temperature sensor.
- OK ↓

2 Check input signals for water temperature sensor.
- OK → Repair harness.
- Not OK ↓

3 Check output signals for auto amplifier.
- OK → Repair harness.
- Not OK ↓

Check with SELECT MONITOR (F11/12).
- Not OK → Replace auto amplifier.
- OK → Repair harness.

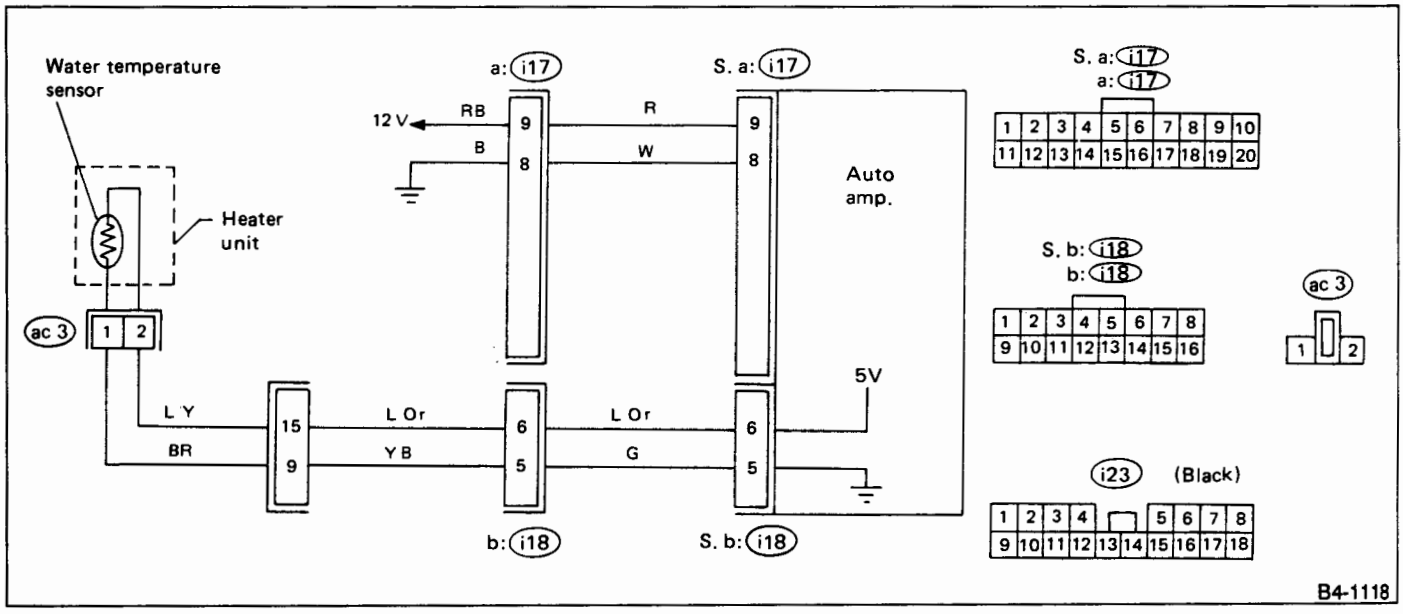


Fig. 175

1. CHECK CIRCUIT CONTINUITY FOR WATER TEMPERATURE SENSOR.

1) Turn ignition switch OFF.
2) Disconnect water temperature sensor harness connector.
3) Measure resistance using the table below.

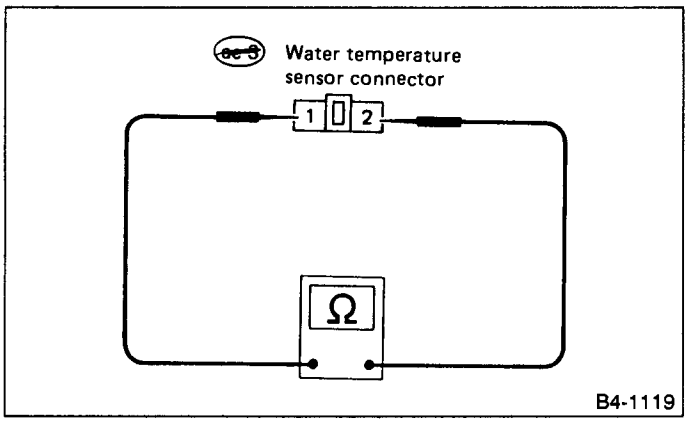


Fig. 176

2. CHECK INPUT SIGNALS FOR WATER TEMPERATURE SENSOR.

1) Turn ignition switch ON.
2) Disconnect water temperature sensor harness connector.
3) Measure voltage exist between water temperature harness connector and body ground.

Voltage: approx. 5V

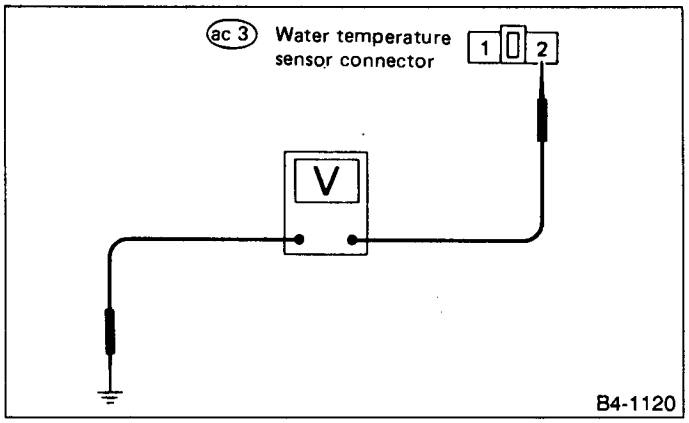


Fig. 177

3. CHECK OUTPUT SIGNALS FOR AUTO AMPLIFIER.

1) Turn ignition switch ON.
2) Remove auto amplifier.
3) Measure voltage for output signals for auto amplifier.

Voltage: approx. 5V

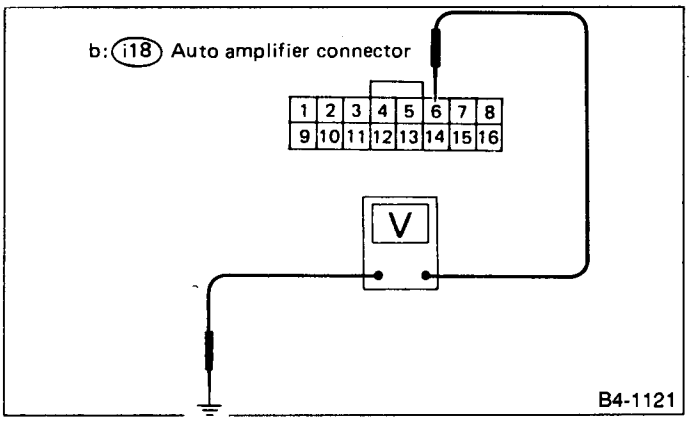


Fig. 178

E: TROUBLE CODE (−25) — Check sunload sensor circuit.

−25	Short circuit:	Auto amplifier judges that solar radiation is maximum point, so it control outlet air temperature to approx. maximum cool.

1 Check input signals for sunload sensor.
- Not OK → 2 Check harness.
- OK → Replace auto amplifier.

3 Check sunload sensor.
- Not OK → Replace sunload sensor.
- OK →

Check with SELECT MONITOR (F13)
- Not OK → Replace auto amplifier.
- OK → Repair harness.

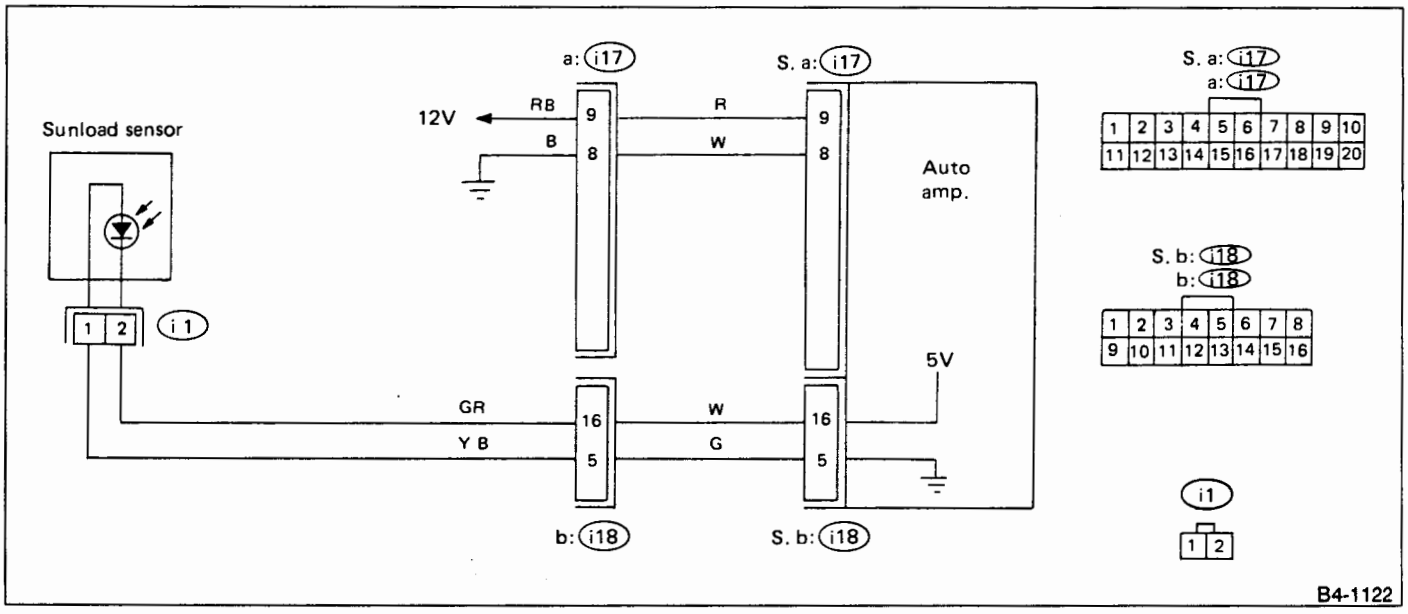


Fig. 179

1. CHECK INPUT SIGNALS FOR SUNLOAD SENSOR.

1) Remove sunload sensor with connect harness on the instrument panel.
2) Disconnect sunload harness connector.
3) Turn ignition switch ON.
4) Measure voltage exist between sunload harness connector and body ground.

Voltage: approx. 5V

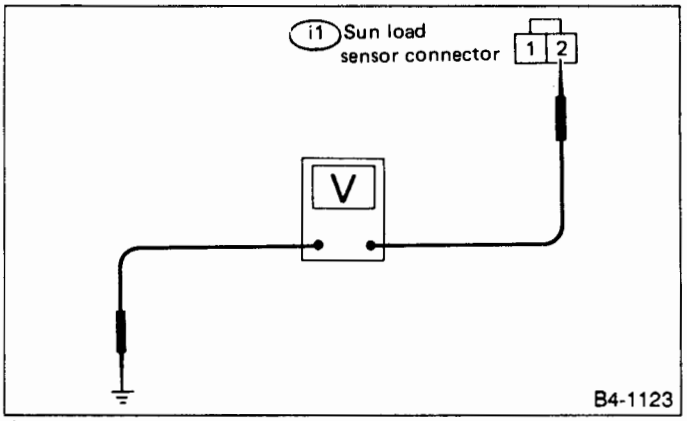


Fig. 180

2. CHECK HARNESS.

1) Turn ignition switch OFF.
2) Disconnect sunload harness connector.
3) Remove auto amplifier.
4) Disconnect auto amplifier harness connector.
5) Check circuit continuity between sunload sensor harness connector and auto amplifier harness connector.

Resistance: approx. 0Ω

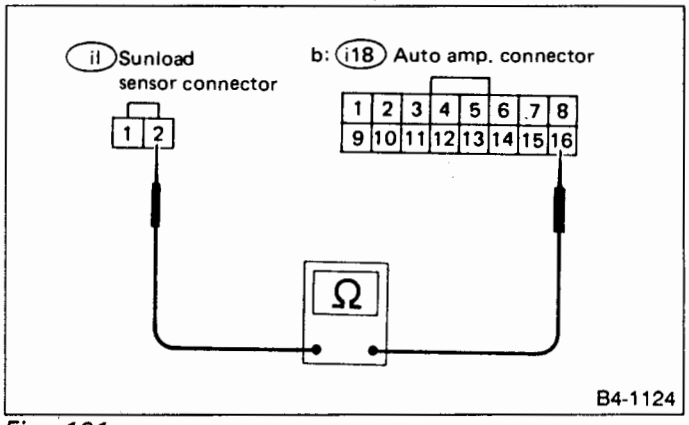


Fig. 181

3. CHECK SUNLOAD SENSOR.

1) Connect sunload sensor harness connector.
2) Connect auto amplifier harness connector.
3) Turn ignition switch ON.
4) Shutting-off the sunlight above the sunload with by hands or something, and measure voltage of circuit.

Voltage: approx. 5V

5) When you stop shutting off the sunlight, confirm that voltage varies as below chart.
NOTE:
Checking for sunload sensor should be done at a place in the sun.

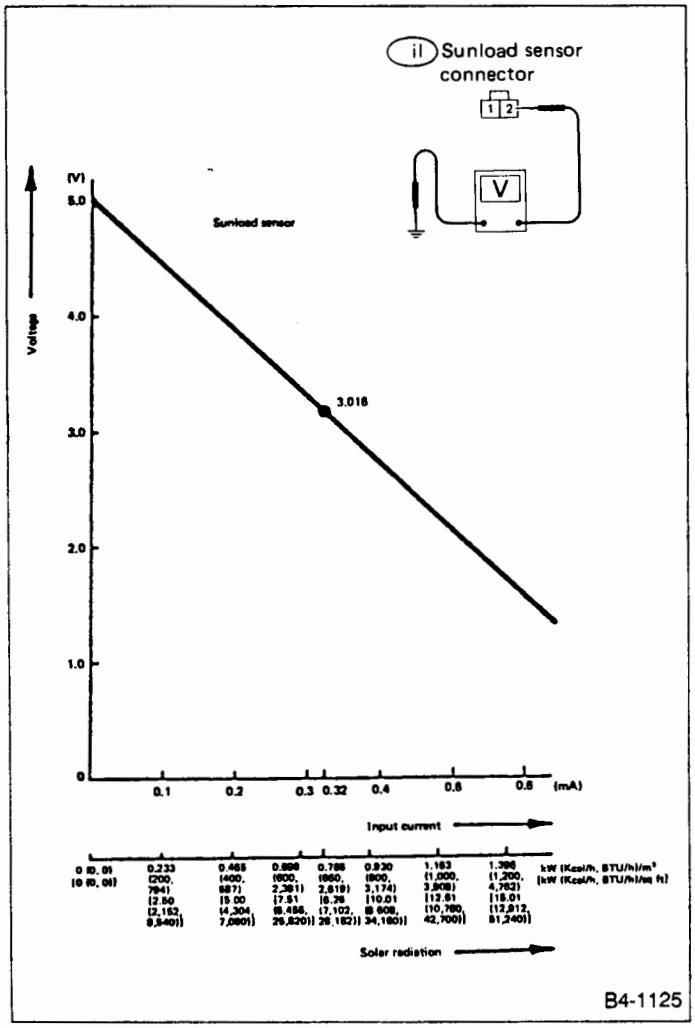


Fig. 182

F: TROUBLE CODE (26/−26) — Check P.B.R. (Potentio Balance Resistor)

26	Open circuit:	Outlet air temperature cannot be controlled.
−26	Short circuit:	Outlet air temperature cannot be controlled.

1 Check P.B.R. → Not OK → Replace air mix door motor.

OK ↓

2 Check P.B.R. circuit. → OK → Repair harness.

Not OK ↓

Check with SELECT MONITOR (F07/08). → Not OK → Replace auto amplifier.

OK ↓

Repair harness or connector.

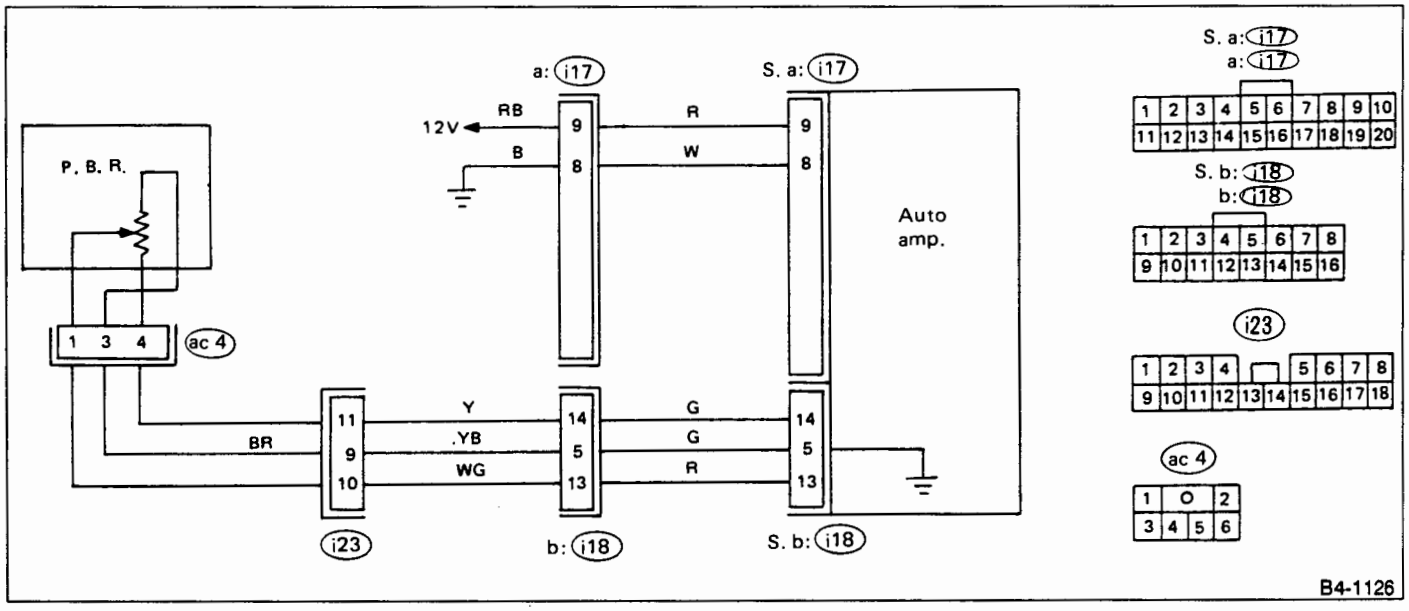


Fig. 183

1. CHECK P.B.R.

1) Turn ignition switch OFF.
2) Disconnect air mix door motor harness connector.
3) Check air mix door motor operation.

- When approx. 12V is applied to the air mix door motor terminals, air mix door motor operates.

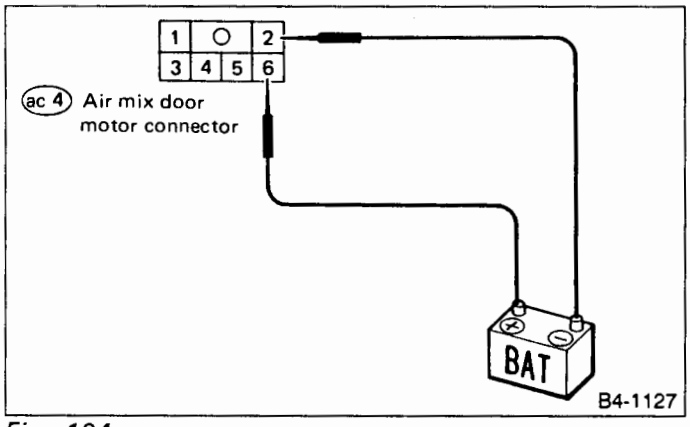


Fig. 184

4) Check resistance for P.B.R.

Air mix door motor is maximum cool position:
Resistance: approx. 0 kΩ
Air mix door motor is maximum hot position:
Resistance: approx. 3 kΩ

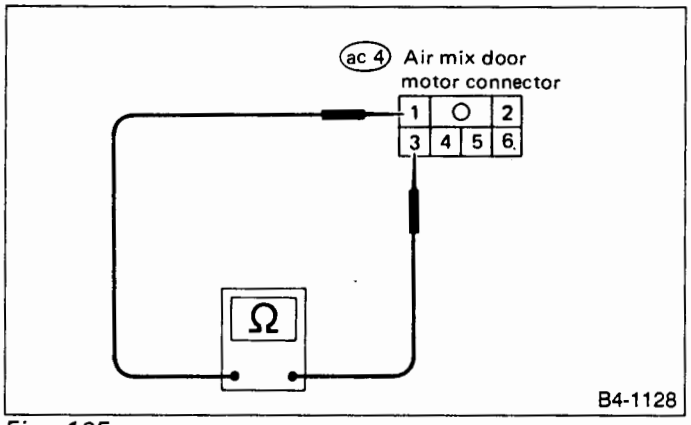


Fig. 185

2. CHECK P.B.R. CIRCUIT.

1) Remove auto amplifier.
2) Connect auto amplifier harness connector.
3) Turn ignition switch ON.
4) Measure voltage exist between auto amplifier harness connector and body ground.

Voltage: approx. 5V

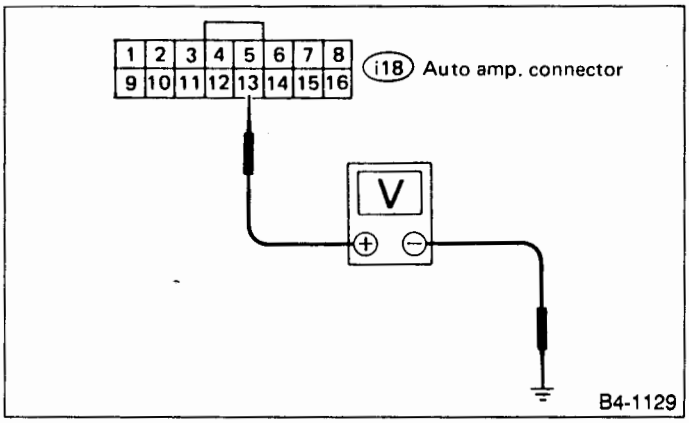


Fig. 186

11. Trouble Chart for STEP-3

CHECKS OPERATION OF EACH ACTUATOR.

In self-diagnosis STEP-3, the specified test signal is transmitted from the auto amplifier to all actuators and the actuator operation state is checked accordingly.

Start self-diagnosis STEP.

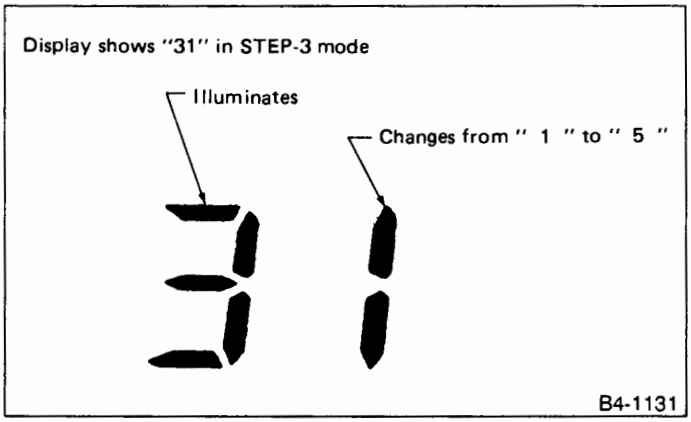


Fig. 187

Code No.	Actuators test pattern				
	Mode door	Intake door	Air mix door	Blower motor	Compressor
31	DEF	20% FRESH	Full Hot	approx. 5V	ON
32	FOOT	FRESH	Full Hot	approx. 7V	ON
33	B/L	FRESH	60% Hot	approx. 11V	OFF
34	VENT	FRESH	Full Hot	FAN HI	OFF
35	VENT	RECIRC	Full Hot	FAN HI	ON

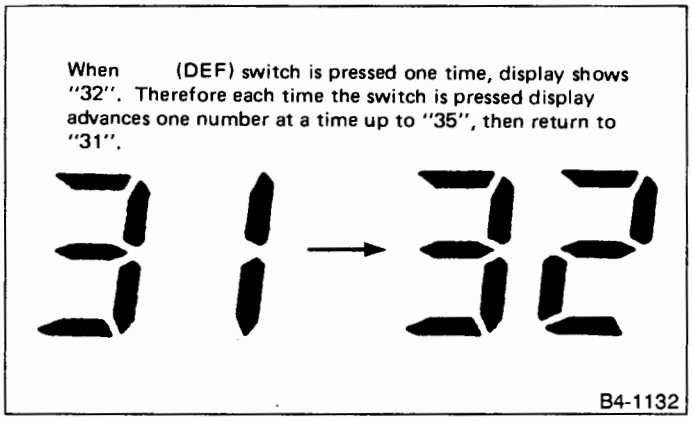


Fig. 188

Check actuators.
Check according to the test patterns. (Check the state of all actuators.)
1) Mode door motor
2) Intake door motor
3) Air mix door motor
4) Blower motor
5) Compressor

When hot switch is pressed, display changes to self-diagnosis STEP-4.
When cold switch is pressed, display returns to self-diagnosis STEP-2.

Proceed to the following flow-chart in case of Not OK		
Flow chart	Symptom	See page
A	Mode door does not change	100
B	Intake door does not change	102
C	Air mix door does not operate	104
D	Blower motor does not rotate	106
E	Compressor does not turn ON/OFF	108

A: CHECK MODE DOOR MOTOR

SYMPTOM: Mode door does not change.

Start self-diagnosis STEP-3.

Check mode door motor position using the air distribution ratio.
- Press DEF switch to change the test pattern.
- Place hand over blow outlet and check the mode door position.

Not OK

Not OK

1 Check control rod. — Not OK → Adjust the control rod.

OK

2 Check mode door motor. — Not OK → Replace mode door motor.

OK

Check with SELECT MONITOR (F17 and F18). — Not OK → Replace auto amplifier.

OK

Repair harness or connector.

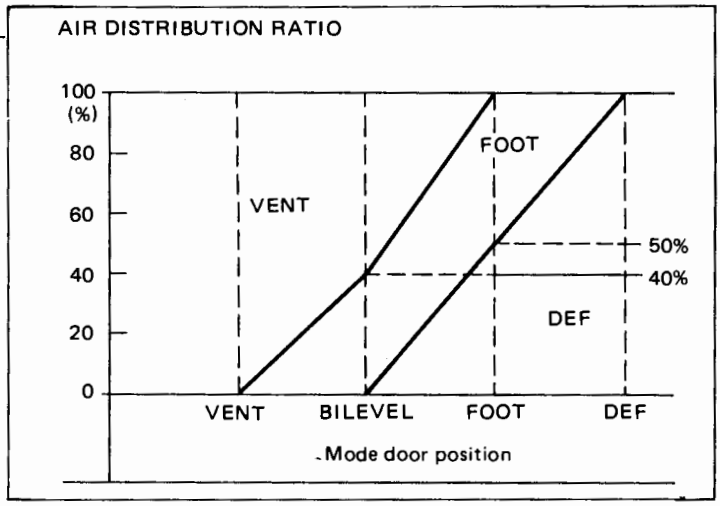


Fig. 189

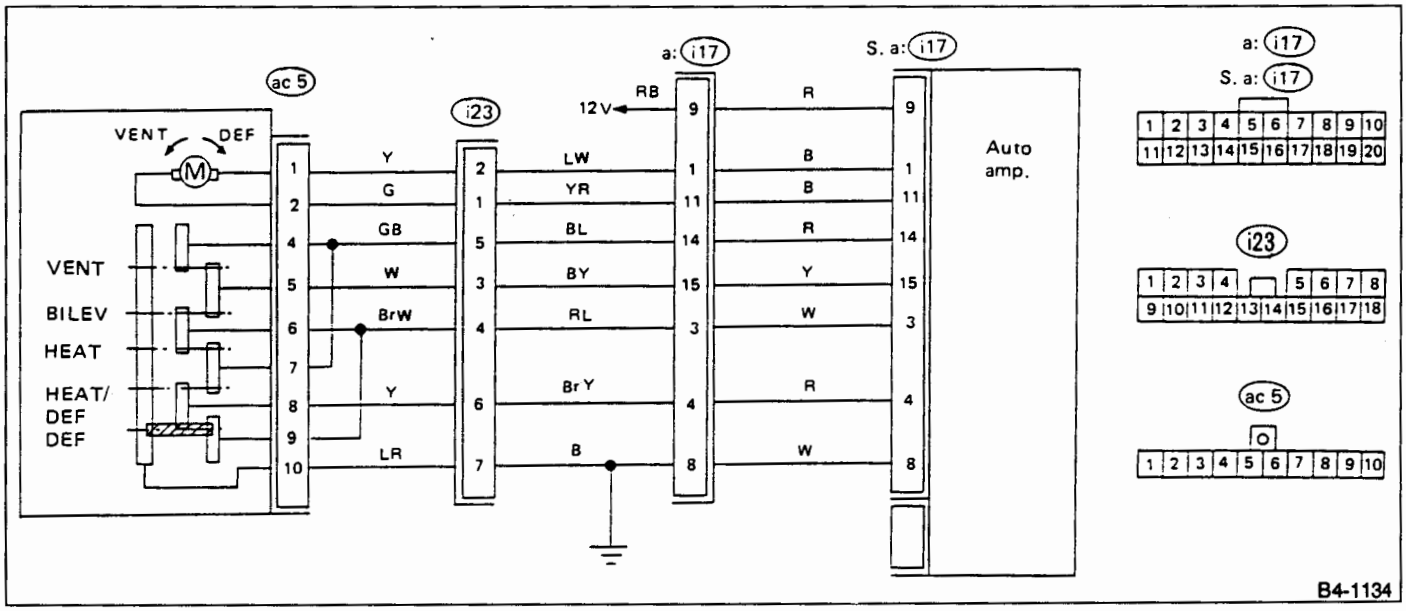


Fig. 190

1. CHECK CONTROL ROD.

1) Mode door motor set to VENT mode using the self-diagnosis STEP-3.
- Remove mode door motor control rod from side rink.

2) Turn the side link in the unlocked state and confirm smooth movement.
3) With self-diagnosis STEP-3, check the mode door motor moves until it reaches the correct position for each mode.
4) With self-diagnosis STEP-3, set mode door motor to VENT mode.
5) With side link at VENT mode, connect mode door motor control rod to side link.
6) With control rod connected to side link, confirm mode door motor turns smoothly.

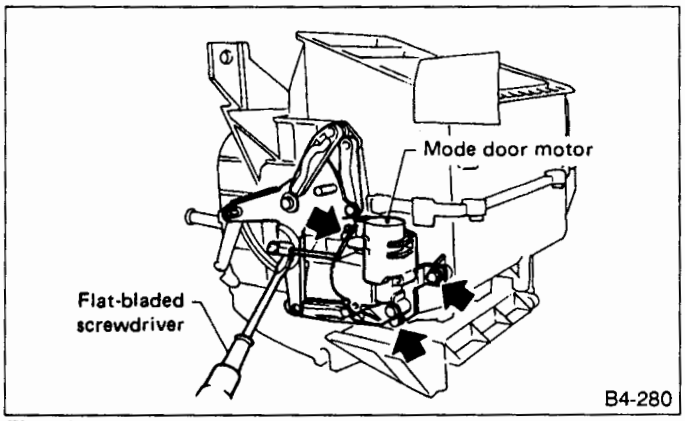


Fig. 191

2. CHECK MODE DOOR MOTOR.

1) With self-diagnosis STEP-3, set to VENT mode.
2) Remove mode door motor from heater unit.
3) Check the mode door motor operation.
- When approx. 12 volts is applied to the mode door motor terminals, mode door motor operates as follows.

Terminal		Mode door motor	
②	①		
Polarity of power supply terminals		Mode door motor operation	Direction of linkage rotation
⊖	⊕	VENT → DEF	Clockwise
⊕	⊖	DEF → VENT	Counterclockwise

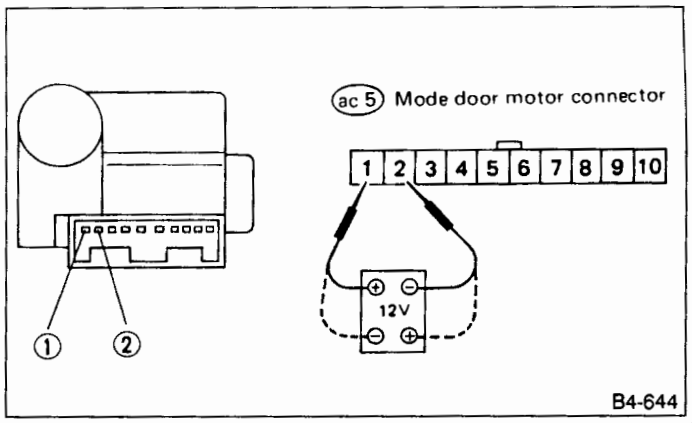


Fig. 192

4) Check mode door position switch.
- When the mode door motor is moved to each mode position by using the self-diagnosis STEP-3, check if continuity between each terminal as follows.

Self-diagnosis STEP-3	Mode door motor position	Terminal	
34 or 35	VENT	④ or ⑤	⑩
33	BILEVEL	⑤ or ⑥	
32	HEAT	⑥ or ⑦	
31	DEF	⑧ or ⑨	

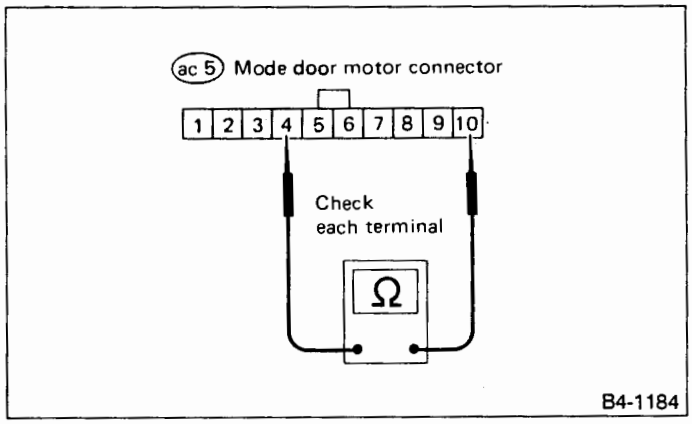


Fig. 193

B: CHECK INTAKE DOOR MOTOR

SYMPTOM: Intake door does not change.

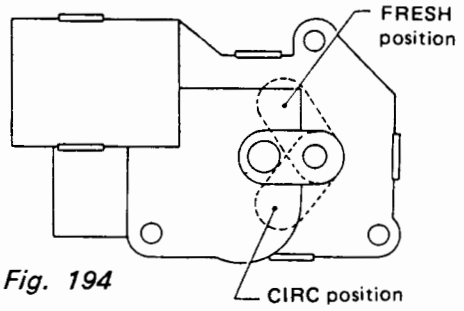


Fig. 194

Start self-diagnosis STEP-3.

↓

Check intake door position using the illustration of intake door motor shaft lever.
- Confirm that the shaft lever is placed at certain position for the proper air intake.

↓ Not OK

1 Check the control rod. → Not OK → Adjust the control rod.

↓ OK

2 Check intake door motor. → Not OK → Replace intake door motor.

↓ OK

Check with SELECT MONITOR. (F20) → Not OK → Replace auto amplifier.

↓ OK

Repair harness or connector.

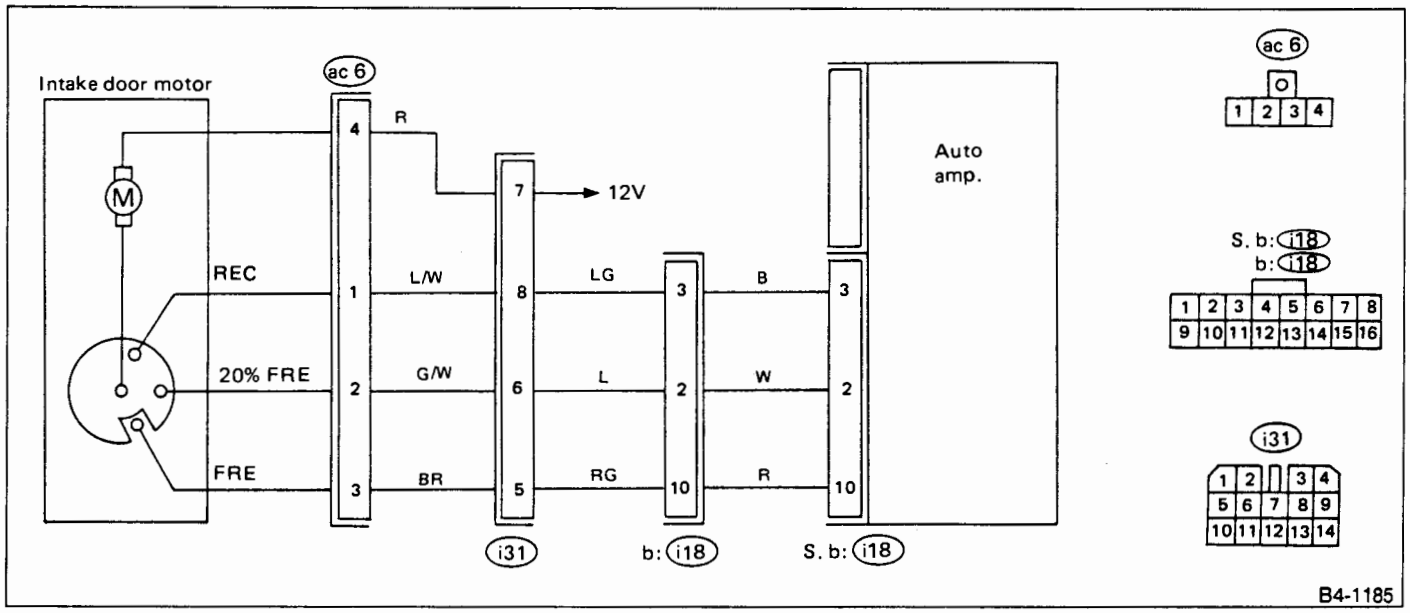


Fig. 195

1. CHECK THE CONTROL ROD.

1) Remove control rod from intake door motor.
2) With intake door unlocked, operate intake door lever manually. Confirm smooth door movement.
3) With self-diagnosis STEP-3, confirm correct intake door operation.
4) With self-diagnosis STEP-3, set mode door motor to RECIRC mode.
5) Set mode door to RECIRC and set control rod to mode door motor.

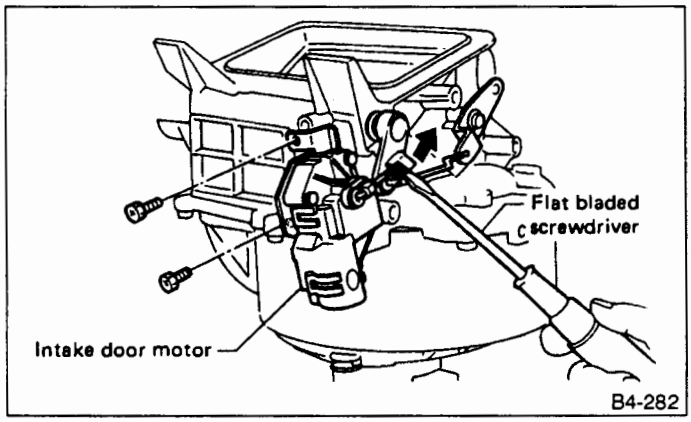


Fig. 196

2. CHECK INTAKE DOOR MOTOR.

1) Check intake door motor operation.
- When approx. 12 volts is applied to the intake door motor terminals, intake door motor operates as follows.

Intake door motor position	Terminal		Intake door motor operation
	⊕	⊖	
Fresh	④	②	Door motor moved to Recirc position
Recirc		①	Door motor moved to Fresh position

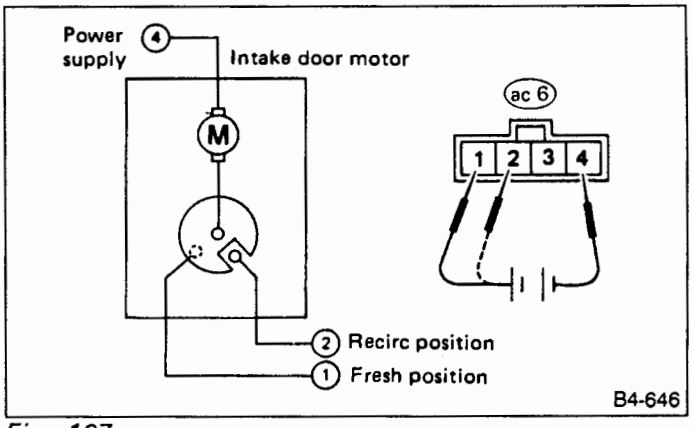


Fig. 197

C: CHECK AIR MIX DOOR MOTOR

SYMPTOM: Air mix door does not change.

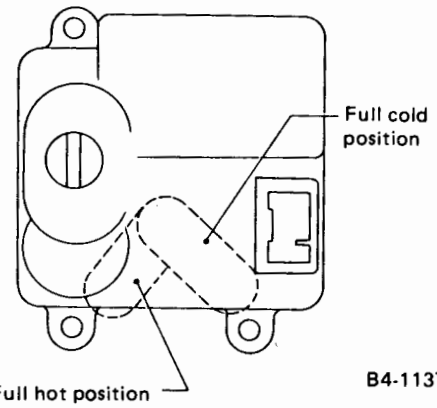


Fig. 198

Start self-diagnosis STEP-3.

↓

Check air mix door position using the illustration of air mix door motor shaft lever.
- Confirm that desired air comes out from air outlets when pressing temperature control.

↓ Not OK

1 Check the control rod. — Not OK → Adjust the control rod.

↓ OK

2 Check air mix door motor. — Not OK → Replace air mix door motor.

↓ Not OK

Check with SELECT MONITOR (F03 and F04). — Not OK → Replace auto amplifier.

↓ OK

Repair harness or connector.

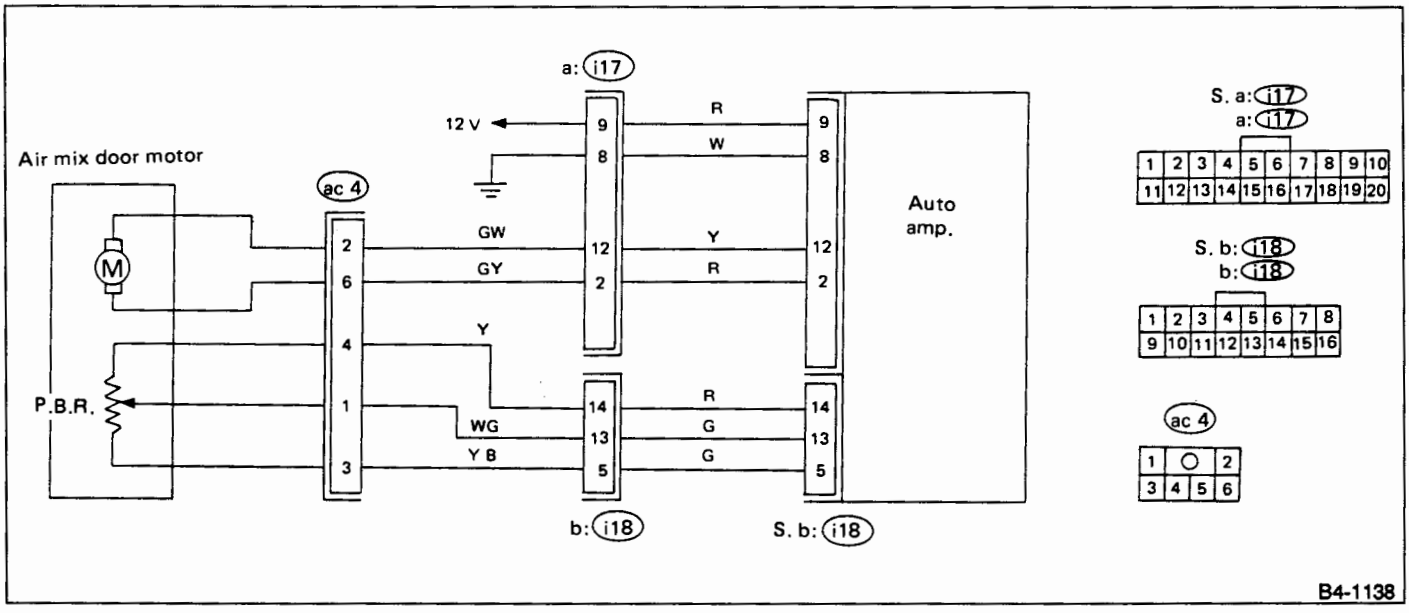


Fig. 199

1. CHECK THE CONTROL ROD

1) Remove control rod from air mix door motor.
2) With air mix door unlocked, operate door manually. Confirm smooth door movement.
3) With self-diagnosis STEP-3, confirm air mix door motor operates at full stroke.
4) With self-diagnosis STEP-3, set air mix door motor to FULL COLD.
5) Set air mix door at FULL COLD and fix control rod to air mix door.

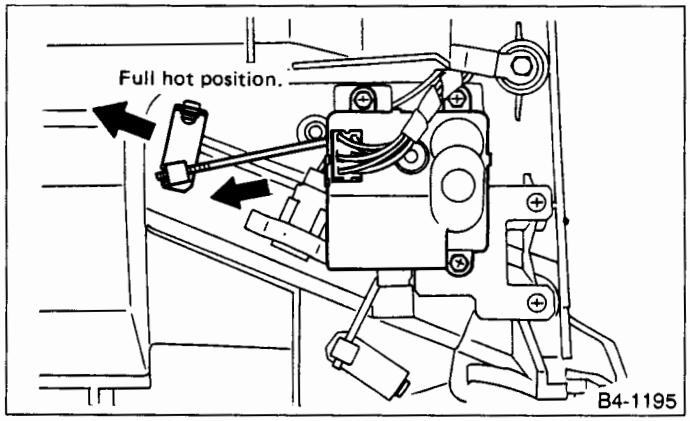


Fig. 200

2. CHECK AIR MIX DOOR MOTOR

1) Check air mix door motor operation.
- When approx. 12 volts is applied to the air mix door motor terminals, air mix door motor operates as follows.

Terminal No.		Air mix door motor operation
②	⑥	
⊕	⊖	Cold → Hot
⊖	⊕	Hot → Cold

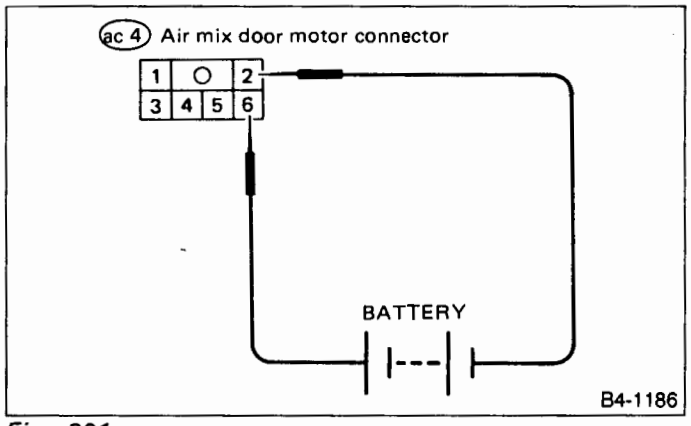
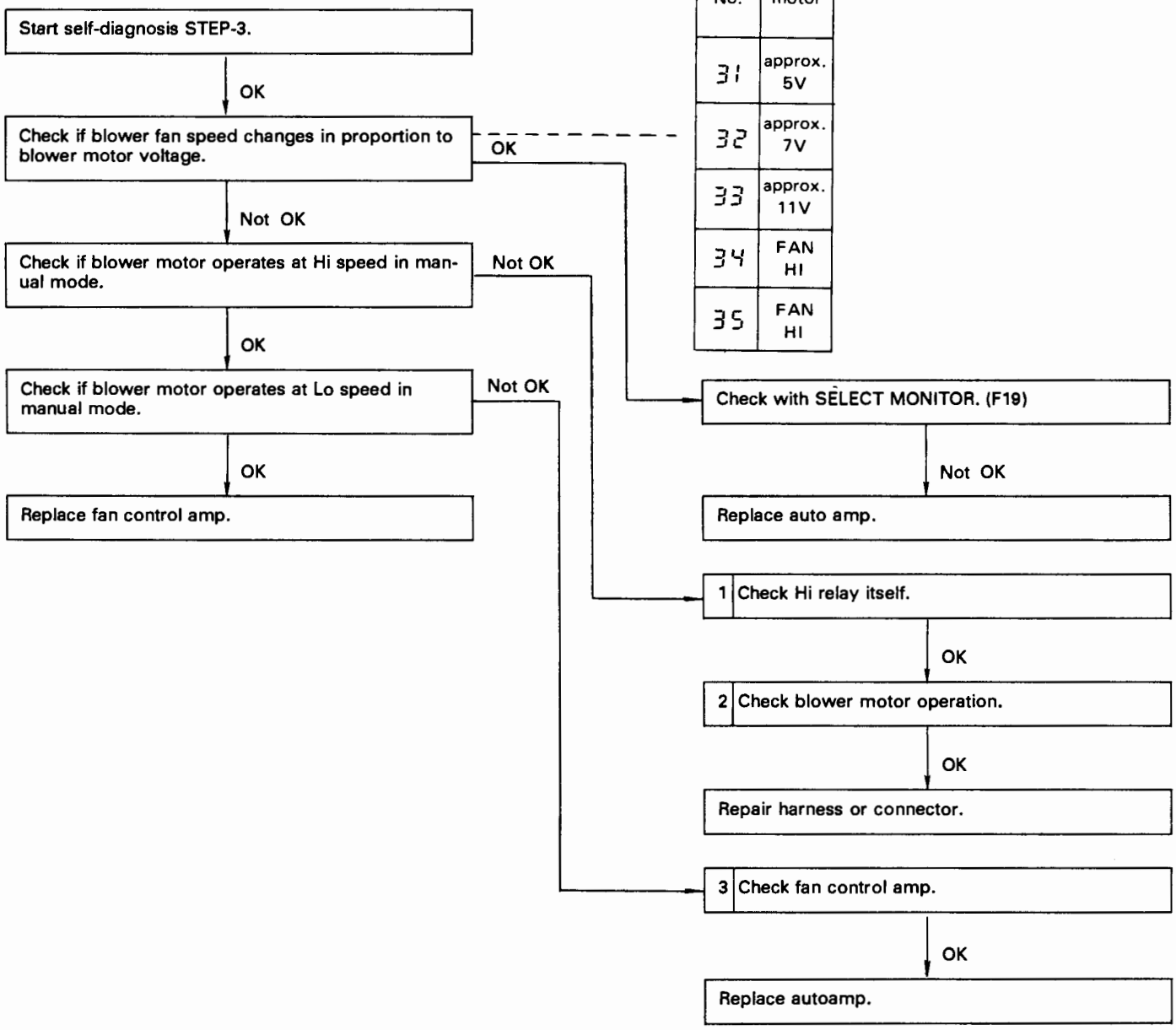


Fig. 201

D: CHECK BLOWER MOTOR

SYMPTOM: Blower fan speed does not change.



1. CHECK HI RELAY

Check circuit continuity between terminals by supplying 12 volts to coil side terminal of Hi relay.

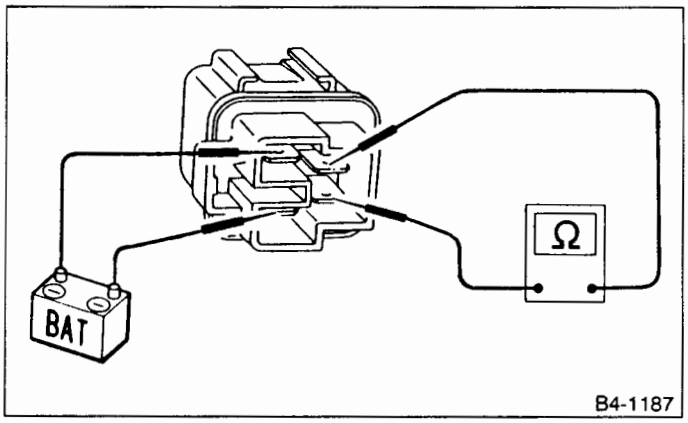


Fig. 202

2. CHECK BLOWER MOTOR OPERATION

1) Disconnect blower motor harness connector.
2) Confirm blower fan turns smoothly when approximately 12 volts are conducted to blower motor terminal.

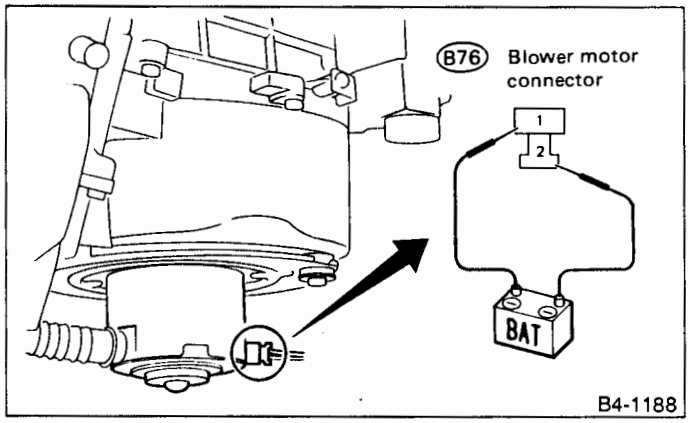


Fig. 203

3. CHECK FAN CONTROL AMP.

1) Connect fan control amp. harness connector.
2) Ignition switch ON. Fan switch OFF.
3) Measure voltage of fan control amp. output signal.

Terminal	Voltage
① — Body ground	0 volts

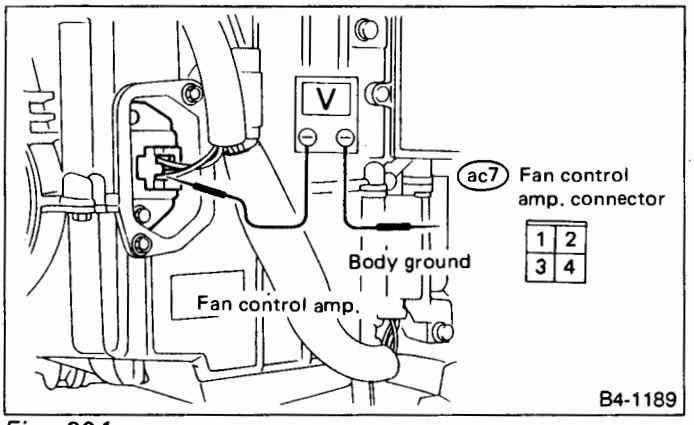


Fig. 204

4) Ignition switch OFF.
5) Disconnect fan control amp. harness connector.
6) Check circuit continuity of fan control amp.

Terminal		Continuity
⊕	⊖	
②	④	∞Ω

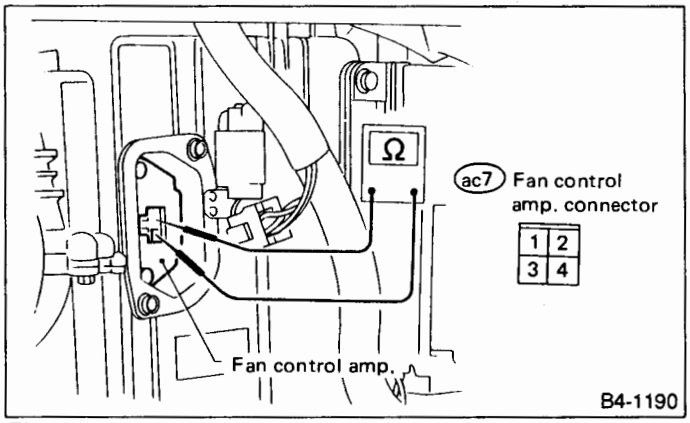
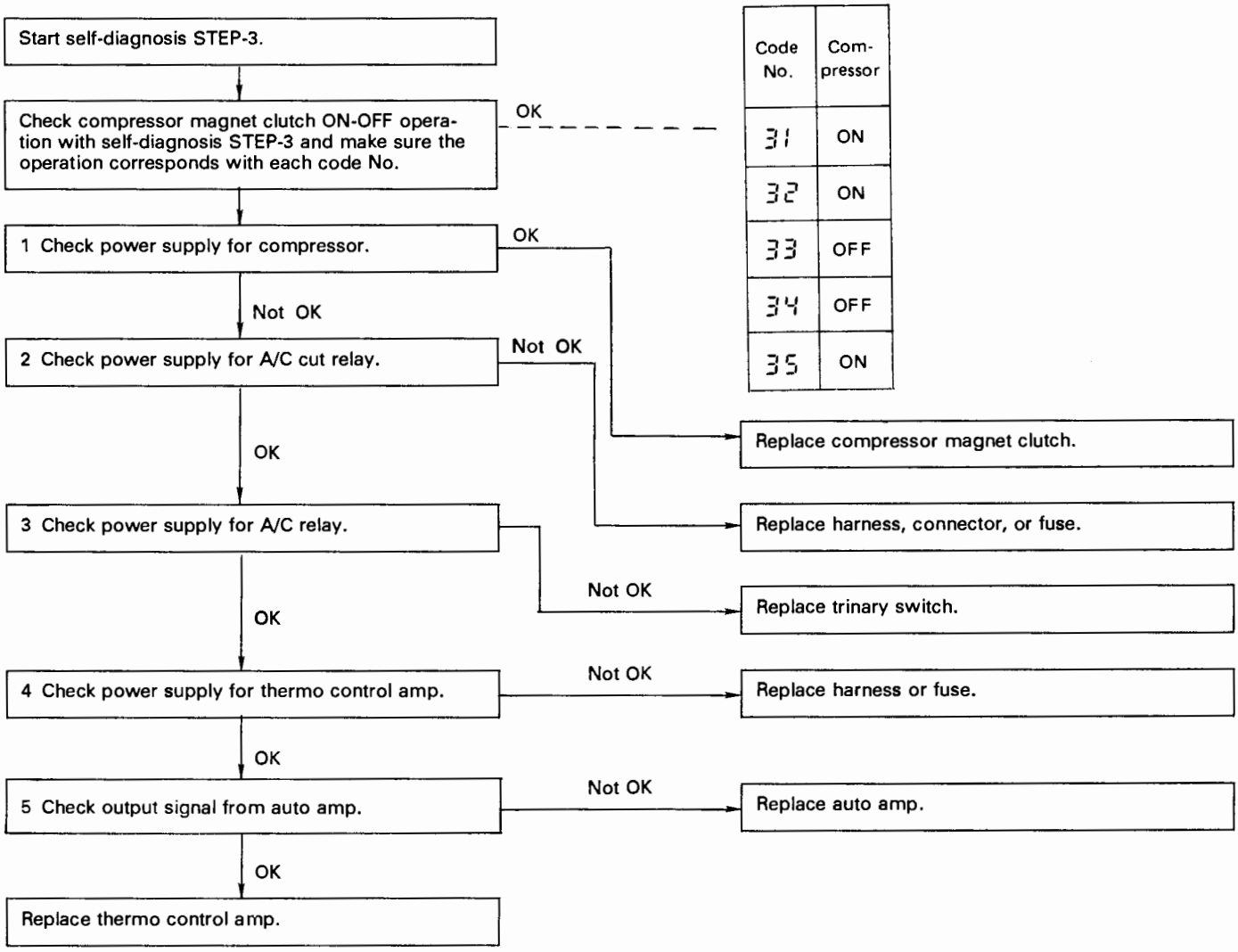


Fig. 205

E: CHECK COMPRESSOR

SYMPTOM: Compressor is not turned ON and OFF.



Code No.	Compressor
31	ON
32	ON
33	OFF
34	OFF
35	ON

1. CHECK POWER SUPPLY FOR COMPRESSOR

1) Set mode to "31", "32", or "35" in self-diagnosis STEP-3.
2) Measure compressor voltage power supply.

Voltage: battery voltage

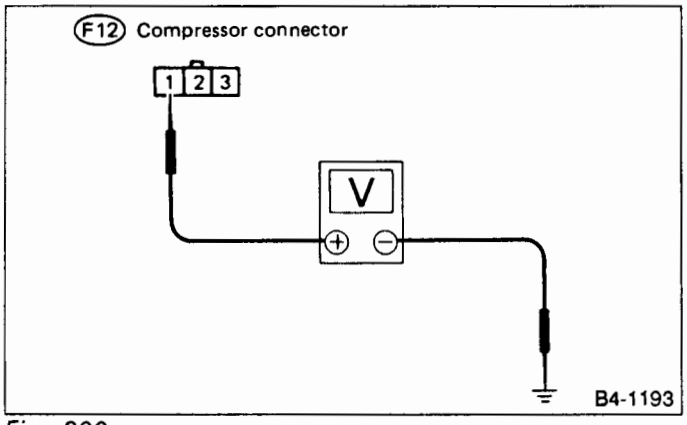


Fig. 206

2. CHECK POWER SUPPLY FOR A/C CUT RELAY

1) Disconnect A/C cut relay harness connector.
2) Measure voltage power supply for A/C cut relay.

Voltage: battery voltage

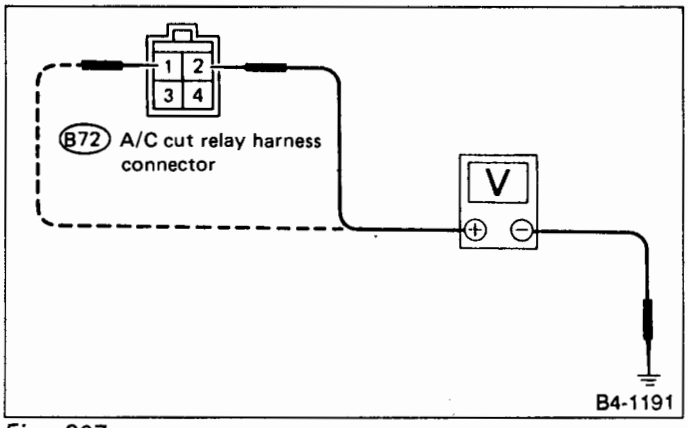


Fig. 207

3. CHECK POWER SUPPLY FOR A/C RELAY

1) Disconnect A/C relay.
2) Measure voltage power supply for A/C relay.

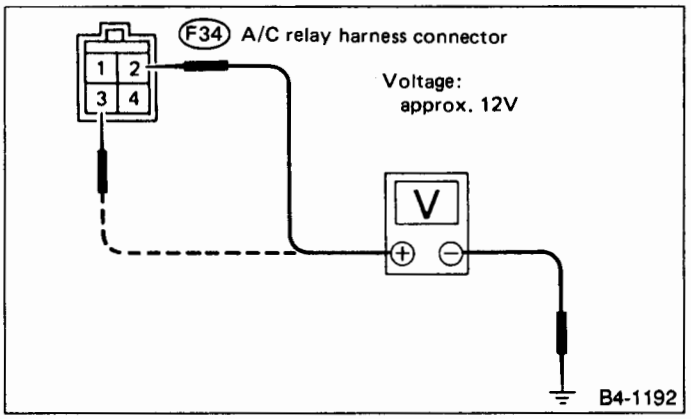


Fig. 208

4. CHECK POWER SUPPLY FOR THERMO CONTROL AMP.

1) Disconnect thermo control amp. harness connector.
2) Measure voltage power supply for thermo control amp.

Voltage: approx. 12 volts

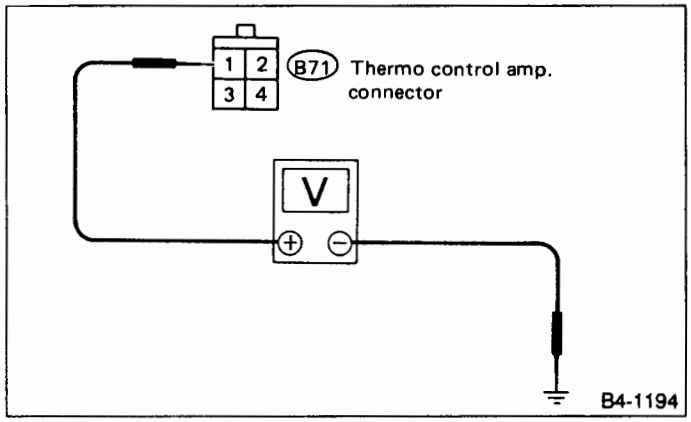


Fig. 209

5. CHECK OUTPUT SIGNAL FROM AUTO AMP.

1) Turn ignition switch ON.
2) Press "DEF" switch.
3) Disconnect auto amplifier connector (a. (i17)).
4) Measure voltage between auto amplifier harness connector and body ground.

Voltage: approx. 12V

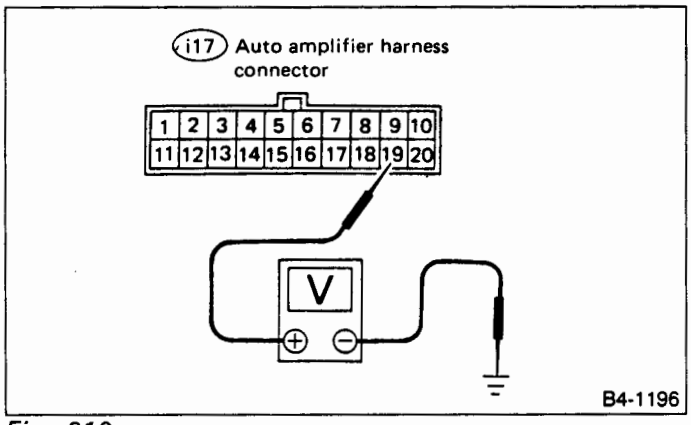


Fig. 210

12.Trouble Chart for STEP-4

CHECKS TEMPERATURE DETECTED BY SENSORS.

The temperatures detected by each sensor are displayed. When the difference between the detected value and actual temperature near the sensor is significant, use the temperature characteristics of each sensor to check single sensor units or the sensor circuit.

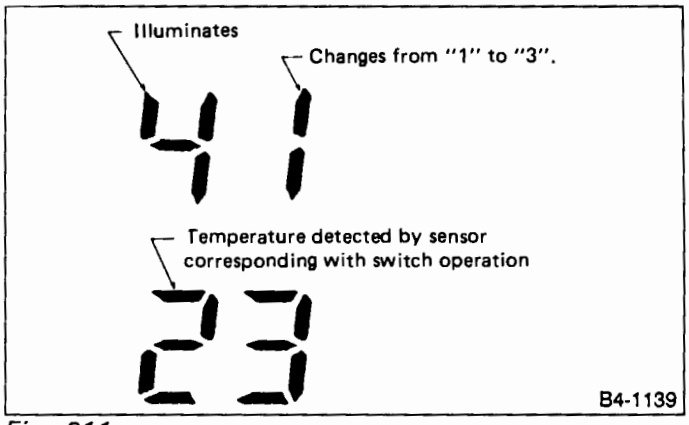
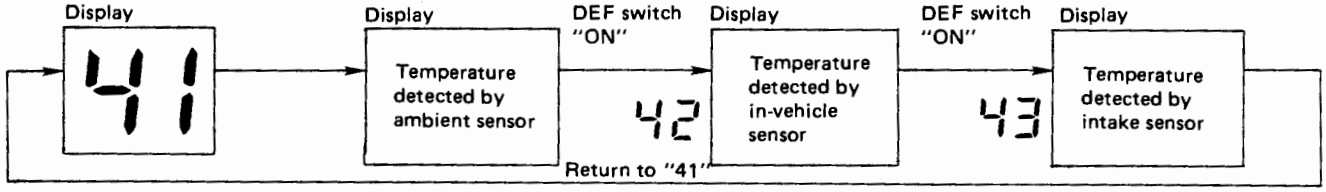


Fig. 211

Start self-diagnosis STEP-4.

1) Display shows "41" in STEP-4 mode. (Temperature shows detected by ambient sensor.)
2) When DEF switch is pressed one time, display shows temperature detected by in-vehicle sensor.
3) When DEF switch is pressed one time, display shows temperature detected by intake sensor.



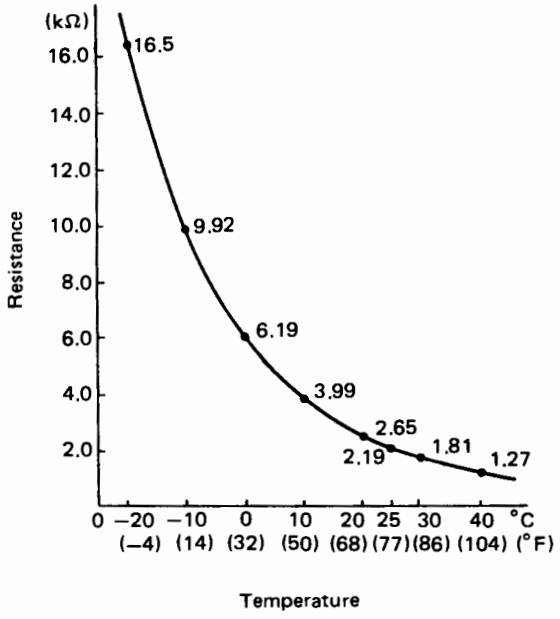
If temperature is showed on display greatly differs from actual temperature, check sensor circuit at first then inspect sensor itself according to the procedures described.

→ Go to specifications for sensor.
Go to SELECT MONITOR.
(F05, F06, F07, F08, F09, F10)

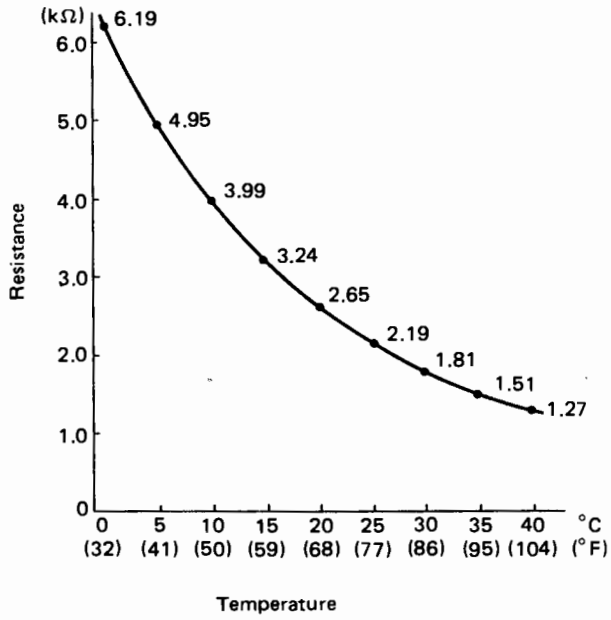
When hot switch is pressed, display returns to self-diagnosis STEP-1.
When cold switch is pressed, display returns to self-diagnosis STEP-3.

13. Specifications for Sensor

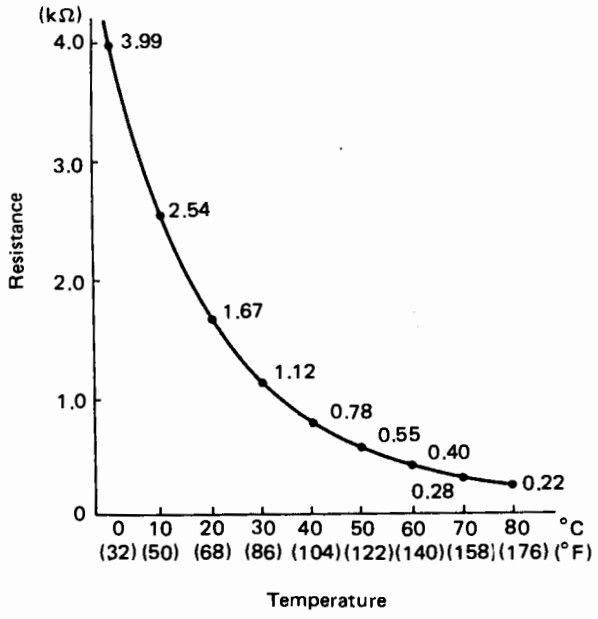
Ambient sensor



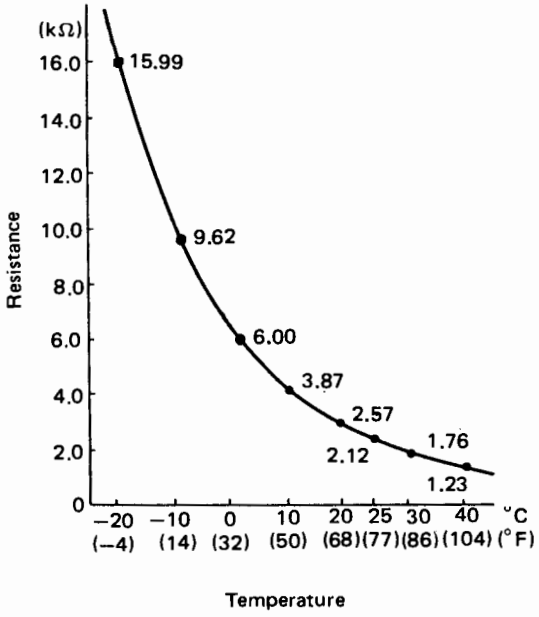
In-vehicle sensor



Water temperature sensor



Intake sensor



B4-1140

Fig. 212

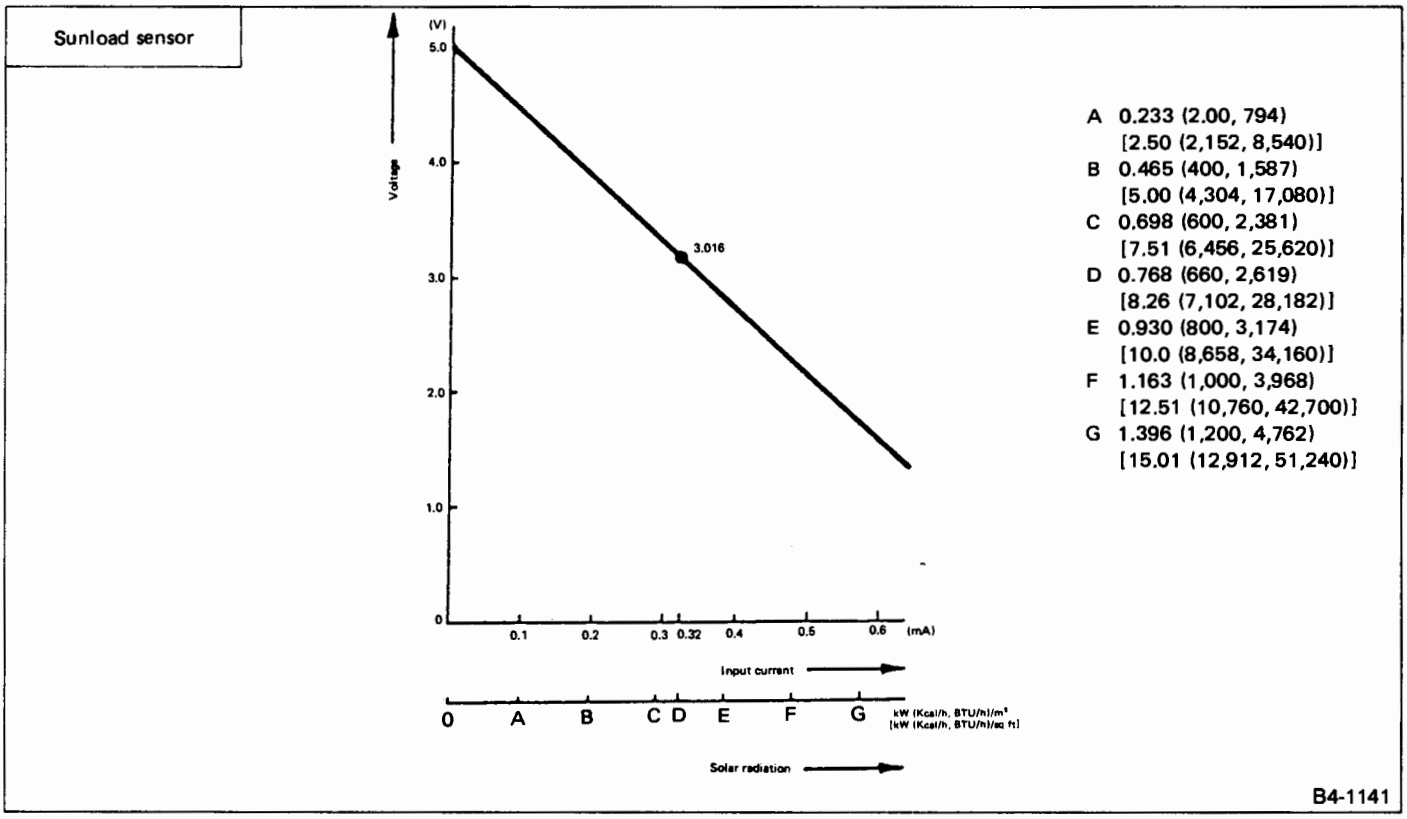


Fig 213

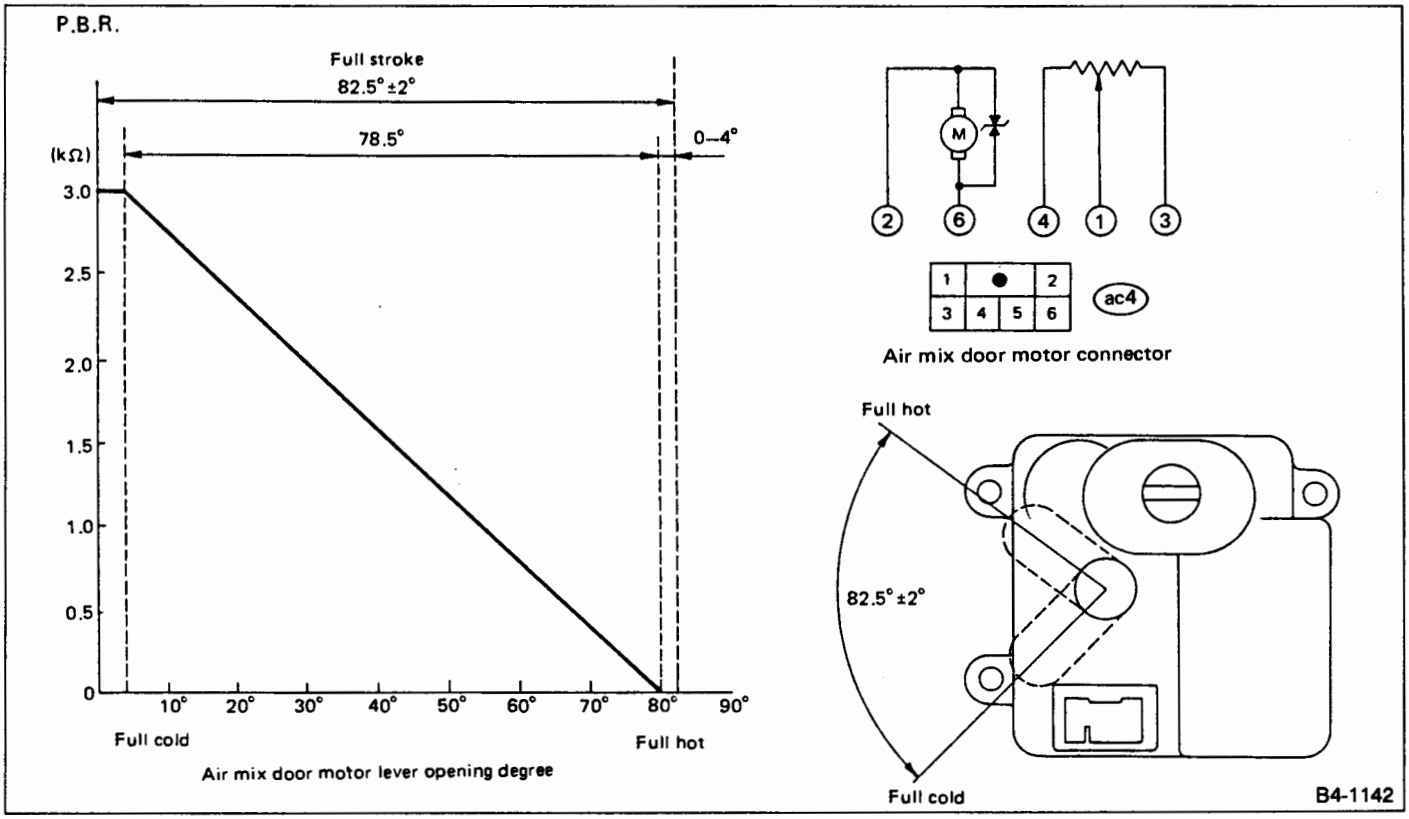


Fig. 214

4-1140

14. Select Monitor

A: SELECT MONITOR FUNCTIONS.

1. FUNCTION MODE

Applicable cartridge No.: 498347601

Functions		Item	Reference Page
Code No.	Code		
F03	To	Target outlet air temperature (°C)	115
F04	To	Target outlet air temperature (°F)	115
F05	Troom	In-vehicle temperature (°C)	117
F06	Troom	In-vehicle temperature (°F)	117
F07	Tamb	Ambient temperature (°C)	117
F08	Tamb	Ambient temperature (°F)	117
F09	Tevp	Evaporator outlet air temperature (°C)	117
F10	Tevp	Evaporator outlet air temperature (°F)	117
F11	TW	Cooling water temperature (°C)	117
F12	TW	Cooling water temperature (°F)	117
F13	Qsun	Quantity of solar radiation (kcal/m^{2}h)	117
F14	Qav	Average quantity of solar radiation (kcal/m^{2}h)	118
F15	AMRs	Target air mix door opening (%)	118
F16	AMRp	Actual air mix door opening (%)	118
F17	MODEs	Target mode door position	118
F18	MODEp	Actual mode door position	118
F19	BLW	Blower motor voltage (V)	119
F20	INTAKE	Intake door position	120
F21	VSP	Vehicle speed (km/h)	120
F22	VSP	Vehicle speed (mile/h)	120
F23	DI	Positioning of pressed switch	120

2. PROCEDURE FOR SELECT MONITOR

1) Connect select monitor to connector (B51) located behind lower instrument cover on driver's side.
2) Turn ignition switch ON.
3) Turn select monitor power ON.

All L.E.D.'s will come on. After several seconds, select monitor display will show as below.

CRUISE (/)
YES: 0, OTHERS: /

Pressing "/" will convert display to read.

AUTO AIR (/)
YES: 0, OTHERS: /

Pressing "0" will convert display to read.

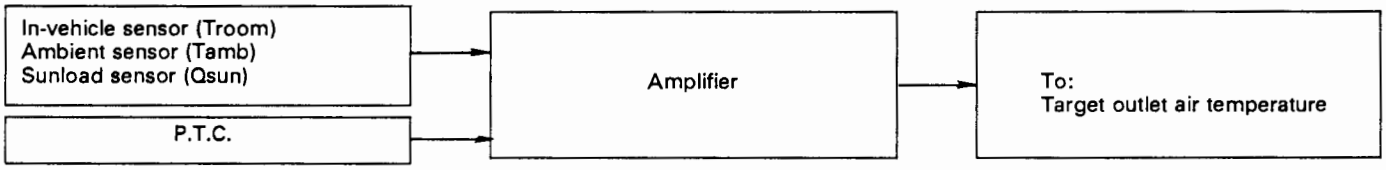
AUTO AIR
RUN

AUTO AIR (F00)
CONDITIONER

Press "F", "0", "3", and "ENT" in that order, and enter the desired designated code ("F03", for example), or press scroll key to select the code.

CODE: F03 (F04) Target outlet temperature To °C (°F)

To: Target outlet temperature
The target temperature at the outlet is specified so the interior temperature reaches the PTC set value. Therefore, the value indicated at the PTC and that indicated at the select monitor are, in principle, different. The target outlet temperature moves toward the set temperature as the interior temperature reaches the set temperature.



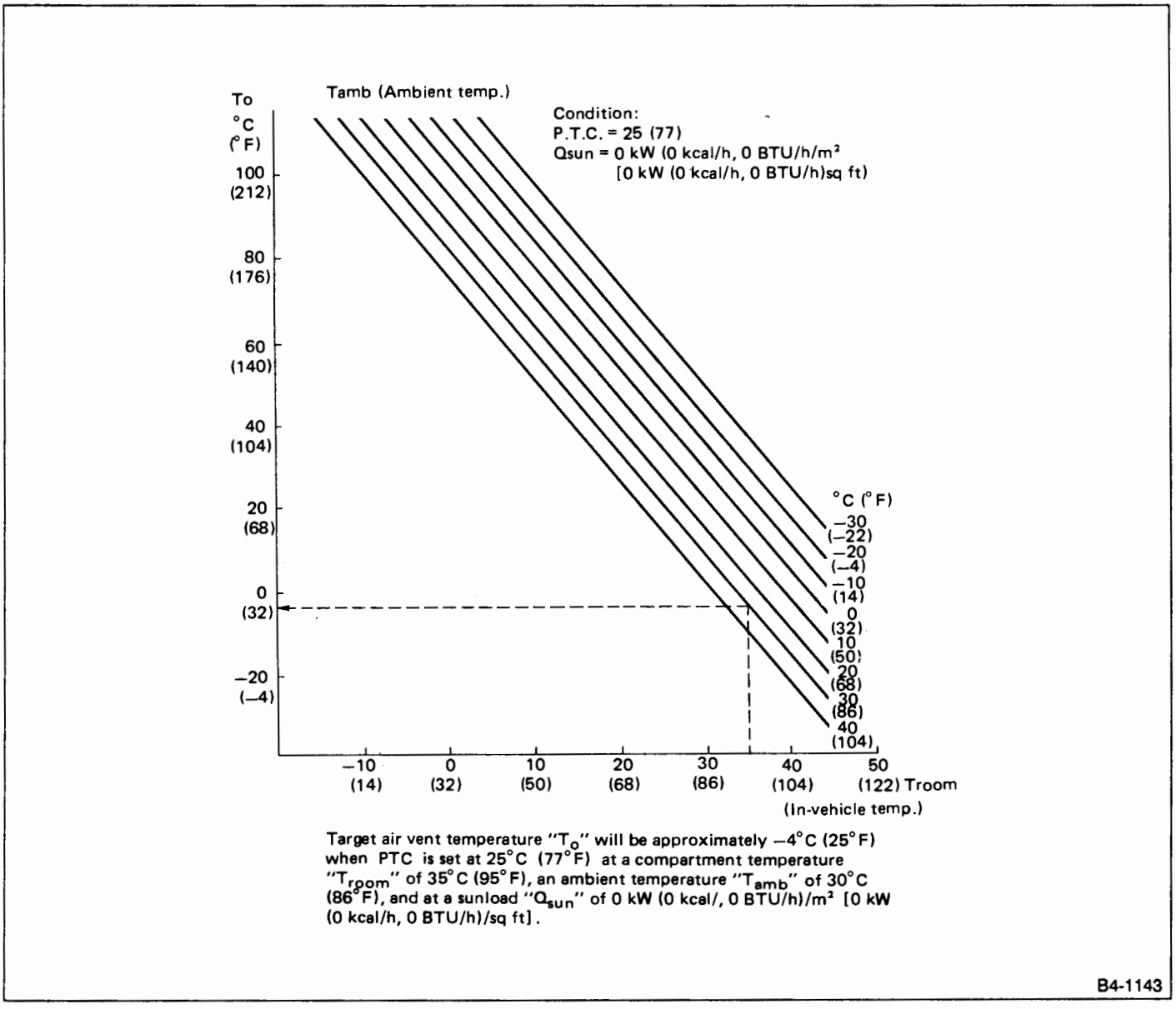
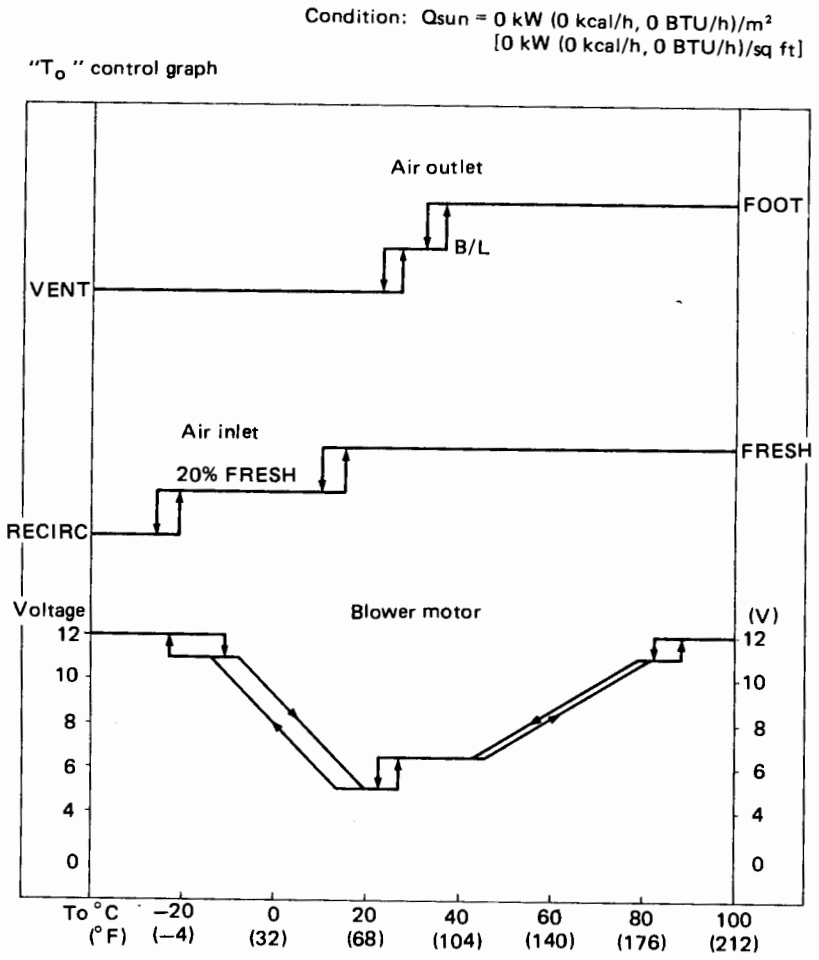


Fig. 215

How to diagnose
Check the following items according to the To Control Graph below.
1) Does the blower voltage change according to the To value?
2) Does the inlet temperature change according to the To value change?
3) Does the outlet temperature change according to the To value change?



B4-1144

Fig. 216

CODE: F05 (F06) In-vehicle sensor Troom

This is the actual atmospheric temperature near the sensor as detected by the in-vehicle sensor.
How to diagnose
1) Measure the temperature near the in-vehicle sensor. Is the value close to the displayed Troom value?
2) Using a tester, measure the resistance and compare with the graph below.

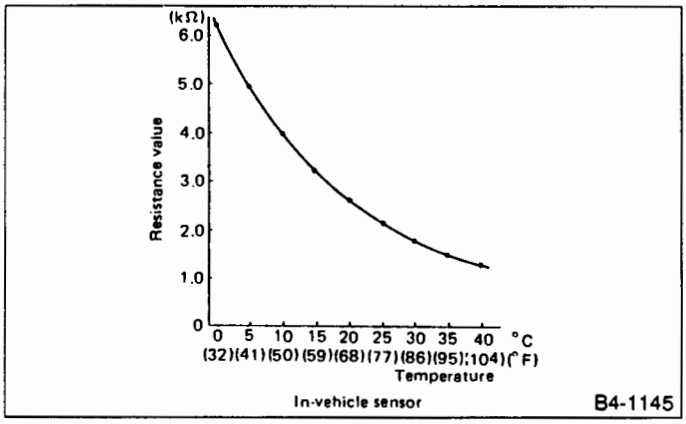


Fig. 217

CODE: F07 (F08) Outside temperature sensor Tamb

This is the atmospheric temperature near the sensor as detected by outside temperature sensor. Actual outside temperature may differ as it takes 90 seconds to increase by 0.3°C (0.6°F) when the engine coolant water temperature exceeds 50°C (122°F). This characteristic is released when a 30 km/h (19MPH) vehicle speed is retained over 3 minutes.
How to diagnose
1) Measure the resistance with a tester and compare with the graph below.

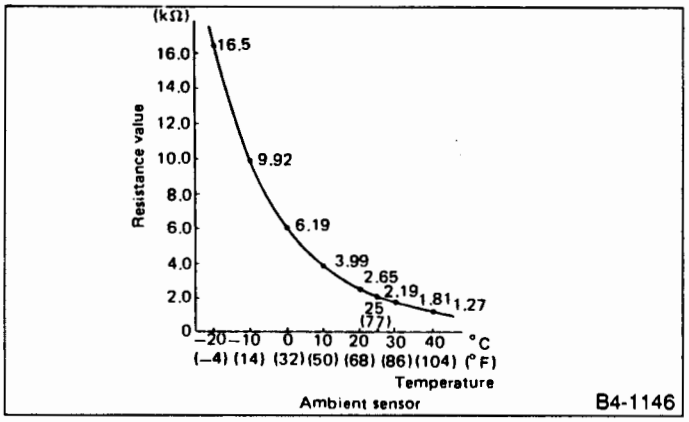


Fig. 218

CODE: F09 (F10) Intake sensor Tevp

This is the air temperature detected by the intake sensor immediately after the air passes through the evaporator.
How to diagnose
1) Measure the resistance with a tester and compare with the graph below.

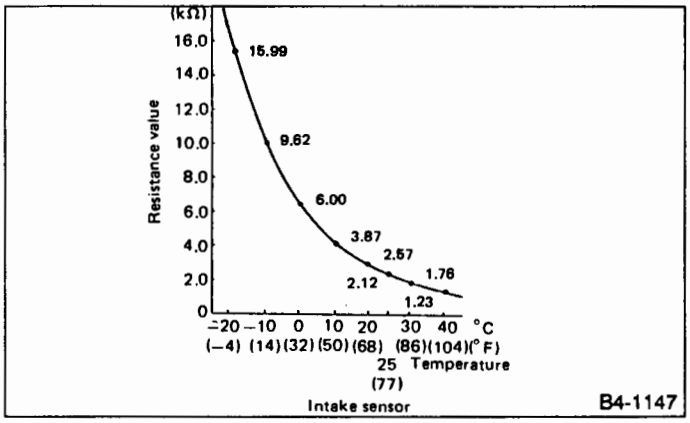


Fig. 219

CODE: F11 (F12) Water temperature sensor TW

This is the temperature of the lower heater core as detected by the water temperature sensor.
1) Measure the resistance with a tester and compare with the graph below.

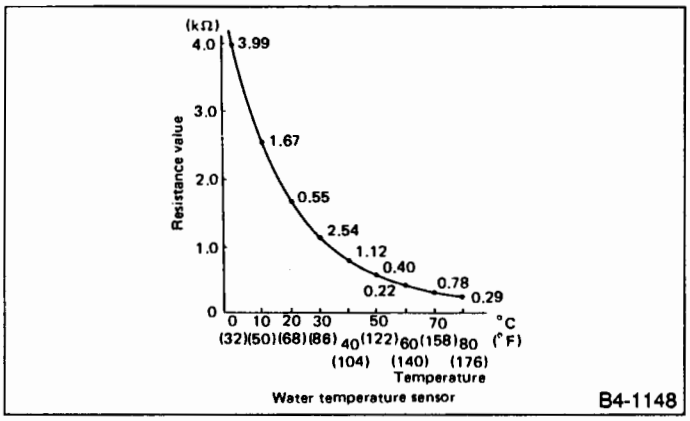


Fig. 220

CODE: F13 Sunlight sensor Q sun Kcal

This is the illuminance near the defroster grill as detected by the sunlight sensor and is displayed directly without being compensated by the auto amplifier.
How to diagnose
1) Is 0 Kcal displayed when the sunlight is cut off?
2) Does the illuminance change immediately when illuminated with a flashlight or other light source?

CODE: F14 Sunlight sensor Qav (Kcal)

This value indicates the illuminance near the defroster grill compensated by the auto amplifier after detection by the sunlight sensor.
How to diagnose
1) Does the amount of solar radiation gradually increase when illuminated with a flashlight after sunlight has been cut off?
2) Does the quantity of solar radiation drop gradually when sunlight is cut-off from the state in 1)?

CODE:F15 Target air mix door opening AMRS.(%)

The target angle of the air mix door opening is determined by the target outlet temperature and intake sensor. It is the signal output from the auto amplifier.
How to diagnose
1) Compare with the actual opening angle of F16 air mix door.
2) Compare the To value and Tevp value according to the graph below.

CODE:F16 Actual air mix door opening AMRp (%)

The actual air mix door opening angle is the actual angle at which door opened according to the target opening angle signal of F15 air mix door.
How to diagnose
1) Compare with the target opening angle of F15 air mix door.
2) Compare To value and Tevp value according to the graph below.

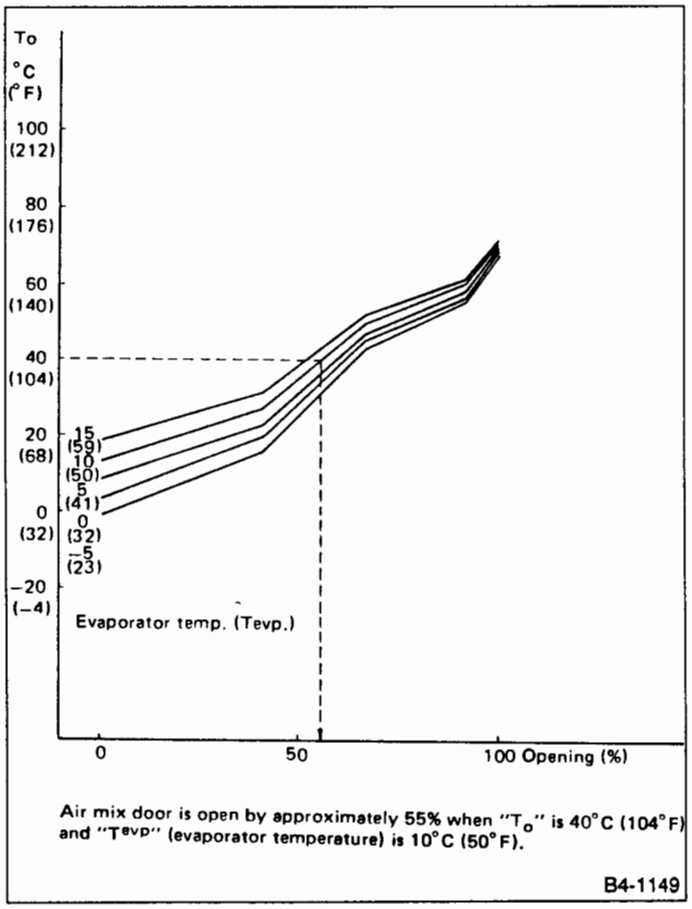


Fig. 221

CODE: F17 Target mode door select position MODEs

This position is determined by the mode door motor in relation to a signal that selects the air vents. The air vents are selected in accordance with target air vent temperatures.
How to diagnose
1) Compare with the actual F18 mode door switching position.
2) Compare with the target outlet temperature according to the graph below.

CODE: F18 Actual mode door position MODEp

This position is actually determined in relation to the signal in code F17 above.
How to diagnose
1) Compare with the target F17 mode door switching position.
2) Compare with the target outlet temperature according to the graph below.

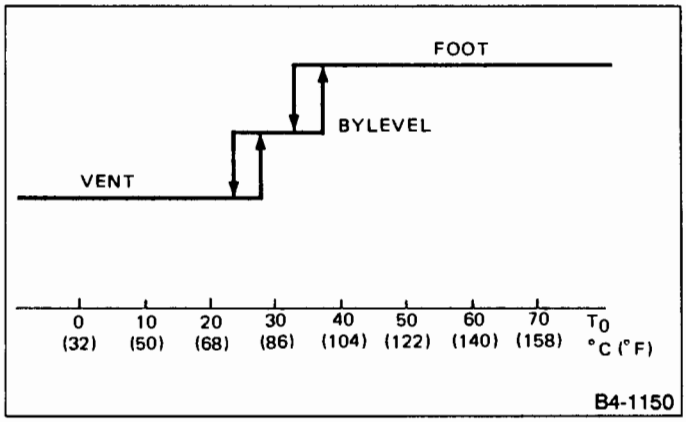


Fig. 222

CODE: F19 blower motor voltage value BLW (V)

The voltage to the blower motor is displayed.
How to diagnose
1) Compare the target outlet temperature and voltage switching point according to the graph below.
2) Measure the voltage with a tester. (Indicated values and measured value may differ slightly.)

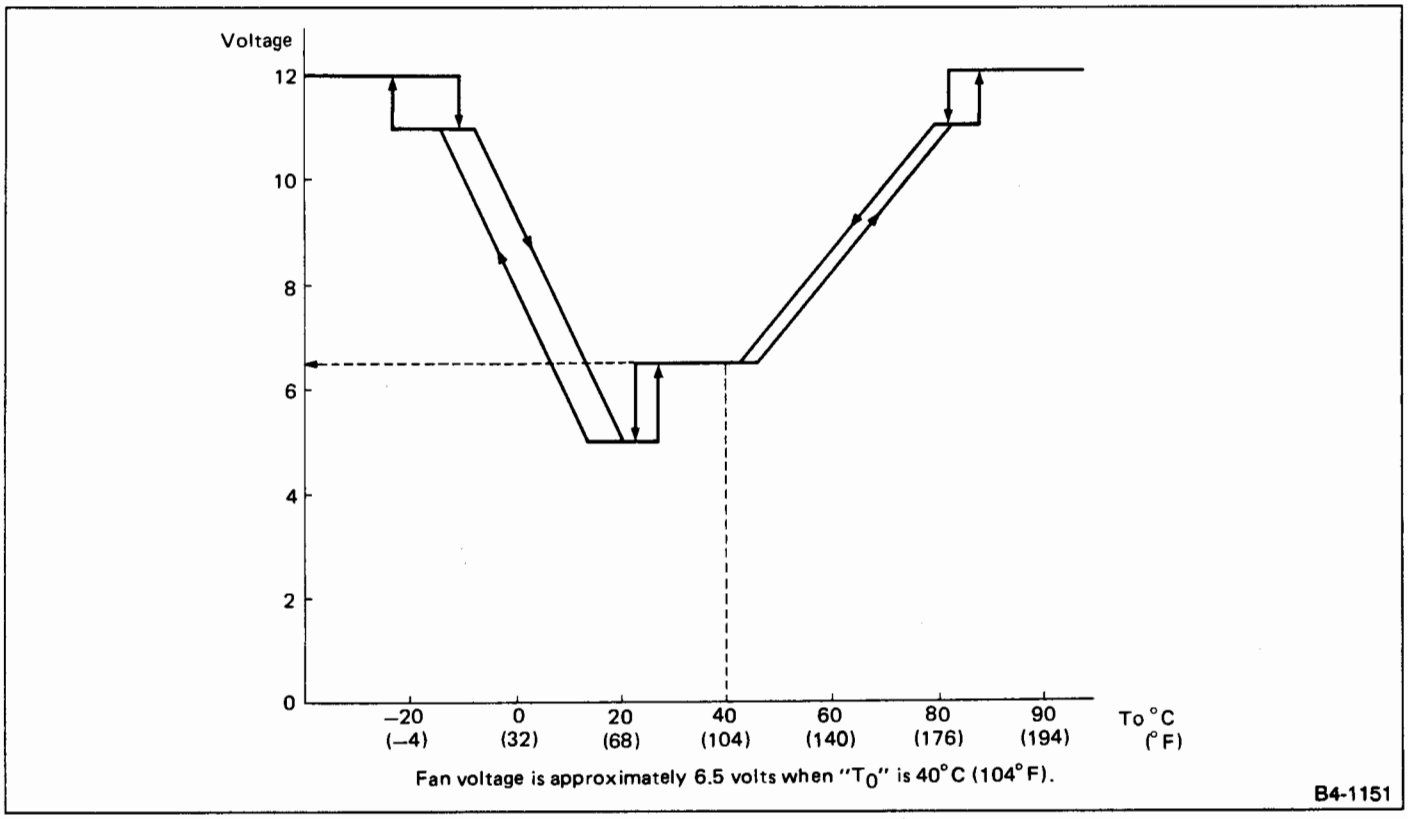


Fig. 223

CODE: F20 intake door position INTAKE (%)

Intake door position is displayed.
How to diagnose
Compare the target outlet temperature and intake door switching point according to the graph below.

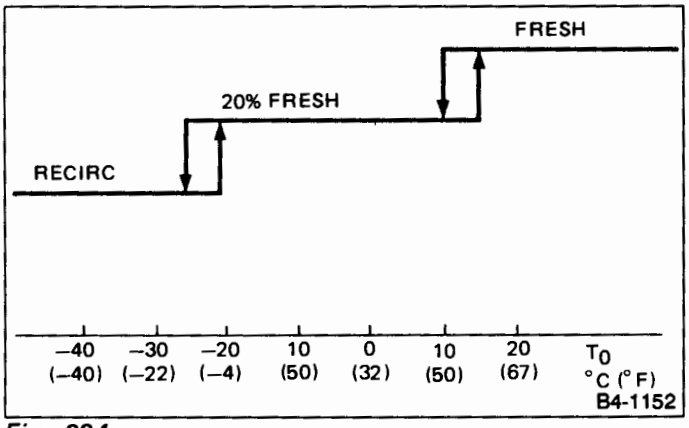


Fig. 224

CODE: F21 (F22) vehicle speed km/h (mile/h)

Vehicle speed displayed.
How to diagnose
Use a speedometer tester and, based upon the corrective characteristics of F07 outside air temperature sensor, retain 30 km/h (19MPH) for 3 minutes. Is the outside air temperature compensation limit released? Remove the coupler from the outside air temperature sensor and keep it disconnected.
Turn IG switch OFF.
Re-connect coupler.
Turn IG switch On.
Is "−30" displayed when "OUT TEMP" on the control panel is pressed? (Check memory functions.)
Use a speedometer tester and retain 30 km/h (19MPH) over 3 minutes.
Press "OUT TEMP" on the control panel.
Is the current outside temperature displayed after the outside temperature corrective characteristic is released?
* See CODE: F07 (F08) outside air temperature sensor for outside air temperature corrective characteristic.

CODE NO.: F23 switch position DI

The switch pressed on the control panel is displayed.
How to diagnose
1) Is the pressed switch indicated correctly?
2) Combine with self-diagnosis STEP-1.

SUBARU®

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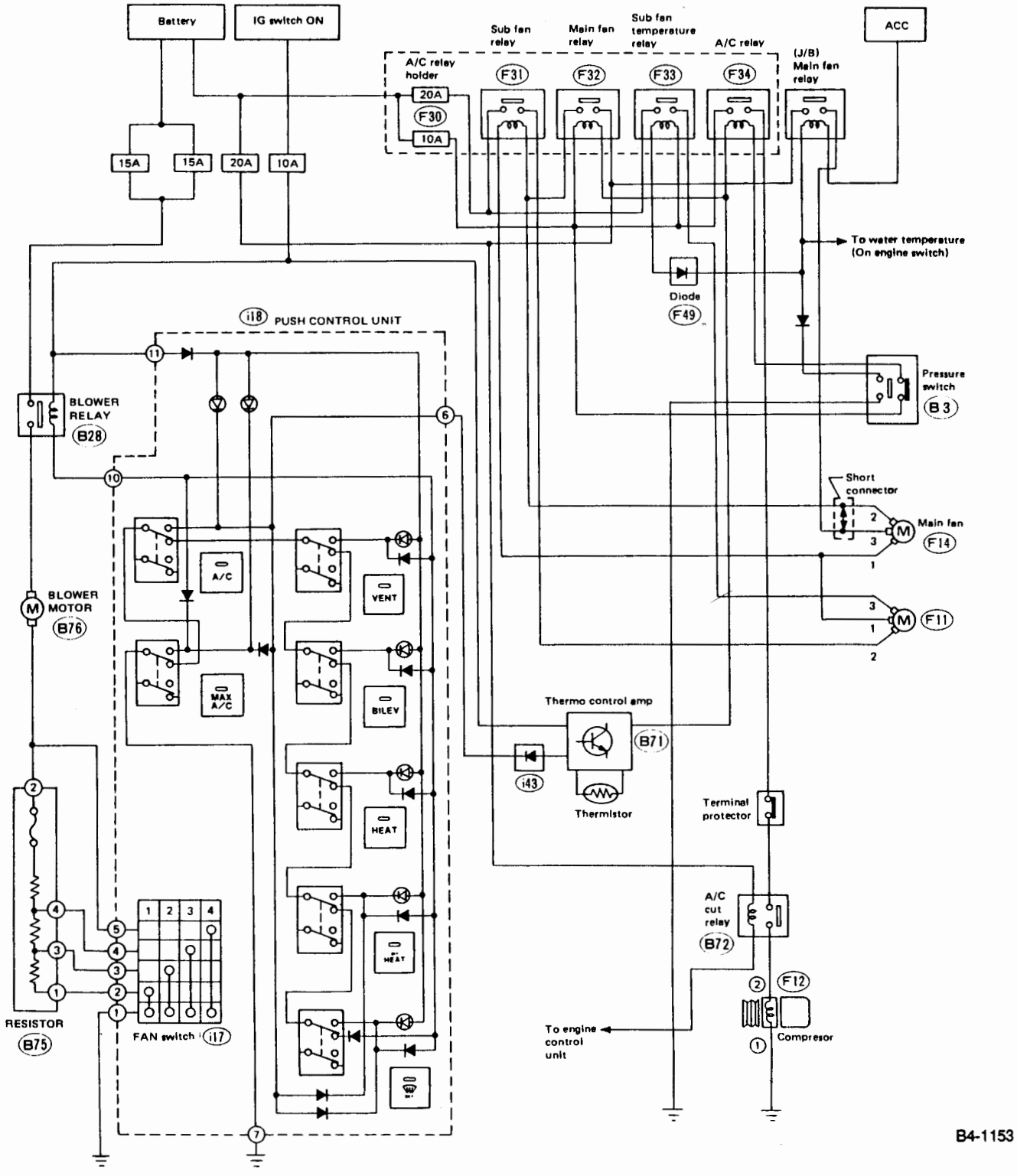
SERVICE MANUAL

M MECHANISM AND FUNCTION

1. Compressor Control System

1. SCHEMATIC



B4-1153

Fig. 1

1) When the A/C switch and fan switch are turned ON, the A/C relay activates. The compressor and F.I.C.D. are turned on, and then the main and sub fans also operate. Blower relay operates to direct the air flowrate determined by FAN switch position.

2) The thermo amplifier activates to stop the compressor clutch, F.I.C.D., and main and sub fans.
3) When the "High-Low" pressure switch operates, the compressor clutch and F.I.C.D. stop but the main and sub fans are operating.
4) When the fan control switch operates, both the main and sub fans operate rapidly.

2. THERMO CONTROL AMPLIFIER

The thermo control amplifier disconnects the magnet clutch circuit to prevent the evaporator from becoming frosted when the temperature of the evaporator fin drops close to "0°C (32°F)". As the evaporator is cooled, the thermistor (located on the evaporator fin) interrupts the "base" current of the amplifier. This in turn deenergizes the A/C relay coil, which in turn disconnects the magnet clutch circuit.

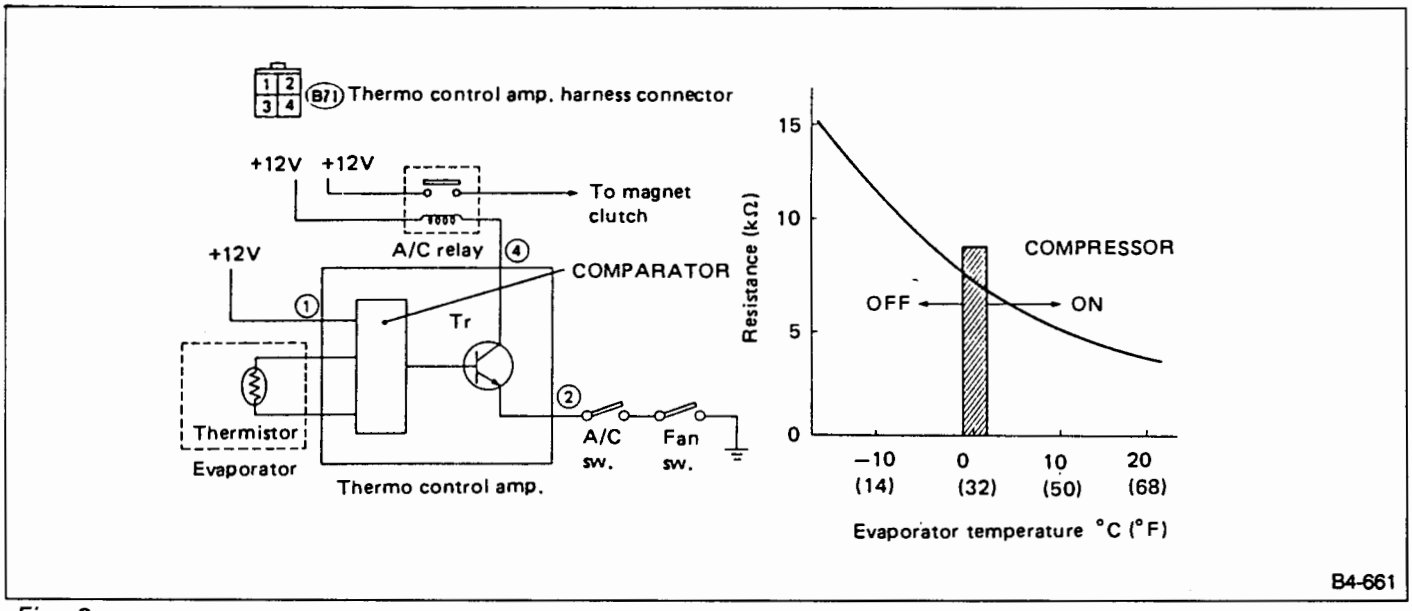


Fig. 2

Evaporator outlet air temperature °C (°F)	Thermo control amp. operation
0.1 — 0.9 (32 — 34)	Turns OFF
2.5 — 3.5 (37 — 38)	Turns ON

3. ACCELERATION CUT SYSTEM

The A/C switch turns the A/C system on or off. The on-off operation of the switch is transmitted to the ECU. The A/C cut relay breaks the current flow to the compressor, through the use of an output signal from the ECU, for a certain period of time when a "full-throttle" signal (emitted from the throttle sensor) enters the ECU while the compressor is operating. This prevents the degradation of acceleration performance and stabilizes the main fuse box located on the left side of the engine compartment.

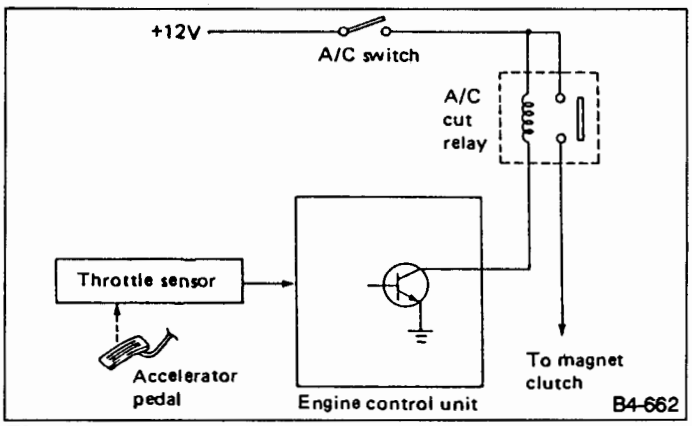


Fig. 3

4-1153

erate.
leter-

4. F.I.C.D.

The F.I.C.D. increases engine idle speed when the compressor is turned ON.

MPFI model

The Engine Control unit activates the by-pass air control valve in advance to control the amount of by-pass air flowing through the throttle valve in relation to the signal emitted from the A/C switch, so that the proper idle speed specified for each engine load is achieved.

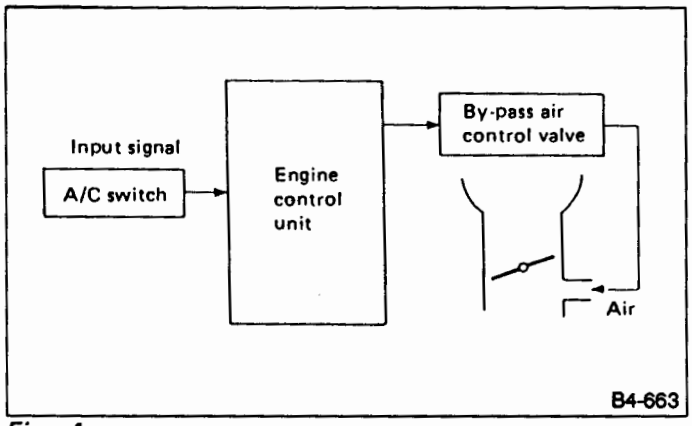


Fig. 4

Idle speed with F.I.C.D. in operation
MPFI model
MT: 850 ± 100 rpm (Neutral range)
AT: 850 ± 100 rpm ("N" range)
700 ± 100 rpm ("D" range)

F.I.C.D. does not need to be adjusted.

5. FAN CONTROL

When the pressure in the high-pressure line is greater than the specified pressure, the fan control switch in the trinary switch turns ON. This increases the main and sub fan speeds. When it is less than the specified pressure, the fan control switch turns OFF. This decreases the main and sub fan speeds.

Refer to TRINARY SWITCH.

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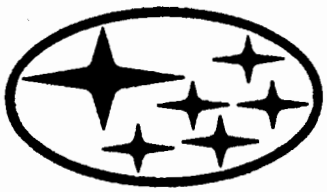

W SERVICE PROCEDURE

19. Fuel Gauge

A: SCHEMATIC

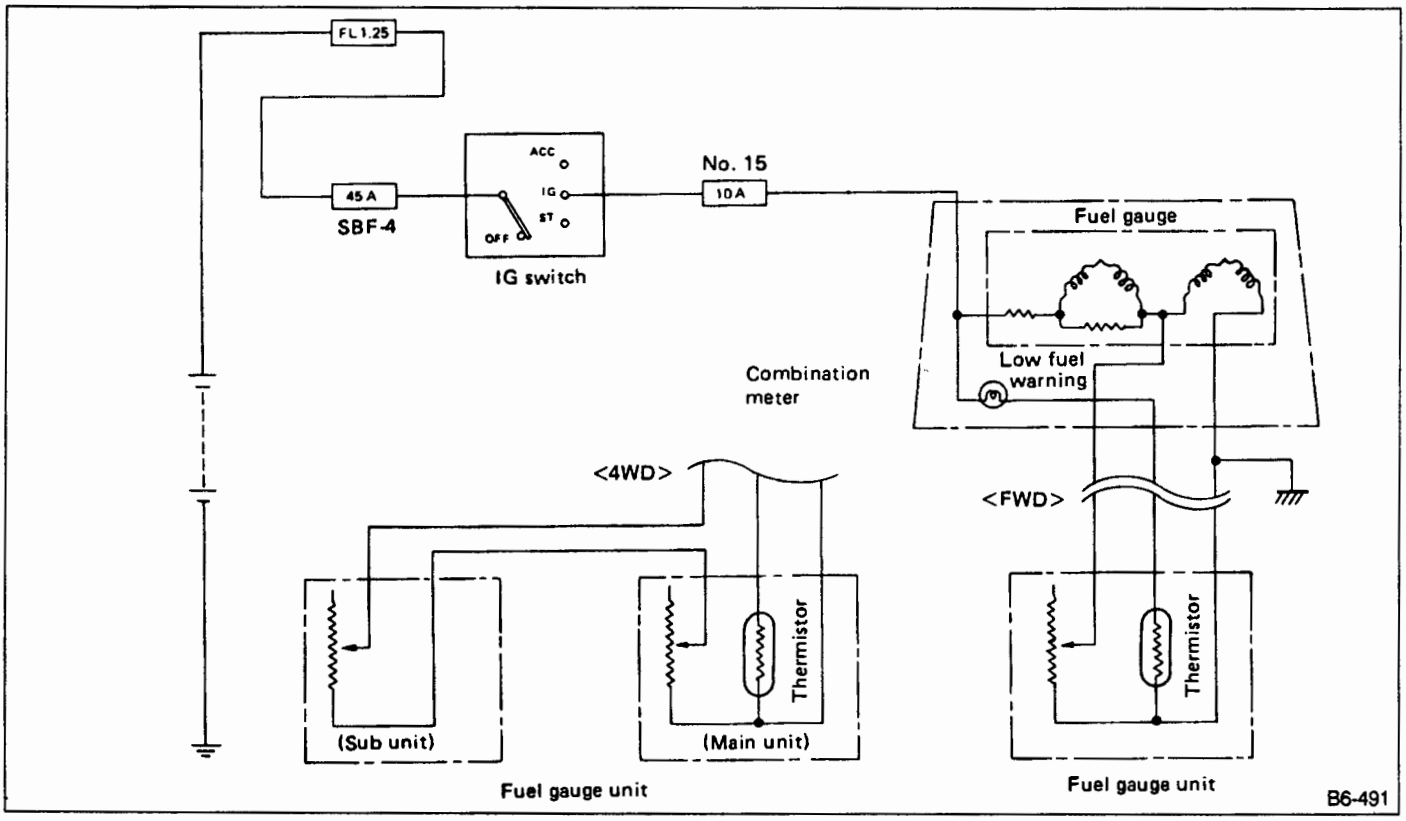

Fig. 93

B: REMOVAL AND INSTALLATION

1. FUEL GAUGE UNIT

〈Ref. to [2-8] No.W6A0 〉

C: INSPECTION

1. FUEL GAUGE UNIT

1) Float position While moving float, determine point F (upper limit position) where float arm contacts stopper and point E (lower limit position).

2) Standard resistance of fuel gauge unit When float is at point F (upper limit position) and point E (lower limit position), measure resistance between terminals (1) and (2) [or between terminals (3) and (2) on 4WD models, and between terminals (3) and (2)], respectively.

Vehicle type / Float position and resistance		FWD	4WD	
			MAIN UNIT	SUB UNIT
Float positionmm (in)	F	101.4 ± 3 (3.99 ± 0.12)	80.9 ± 3 (3.185 ± 0.118)	72.9 ± 3 (2.870 ± 0.118)
	E	230.4 ± 3 (9.07 ± 0.12)	252.0 ± 3 (9.92 ± 0.12)	249.0 ± 3 (9.80 ± 0.12)
Normal resistance(FΩ)	F	2.0 - 5.0	0.5 - 2.5	0.5 - 2.5
	E	92.0 - 95.0	50.0 - 52.0	42.0 - 44.0

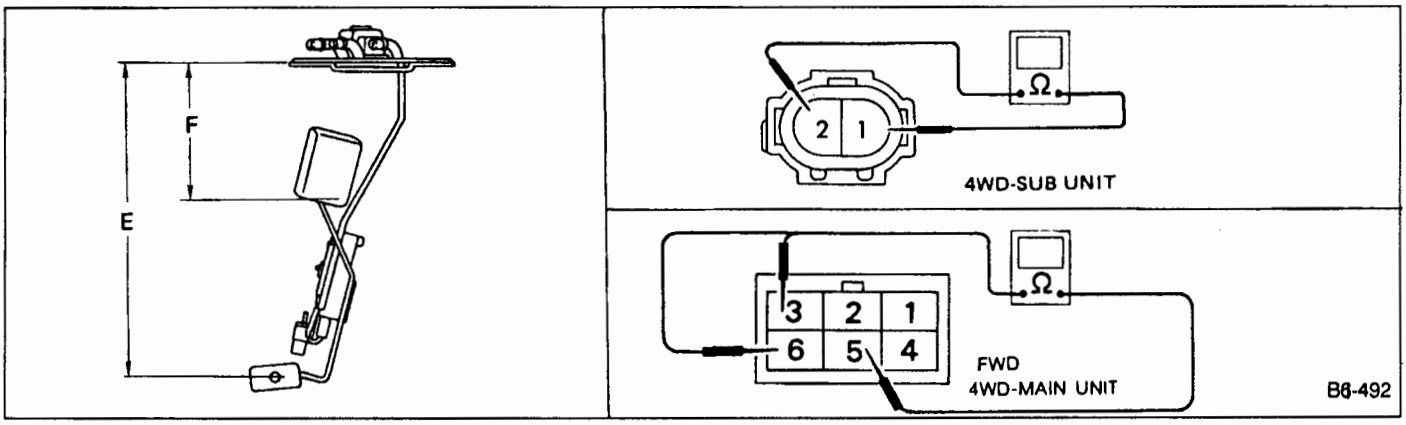

Fig. 94

3) Ensure that resistance gradually changes when float is slowly moved from point F to point E, and vice versa.
4) Low fuel warning sensor (thermistor) Connect fuel gauge unit and test lamp (12V-3.0W) to battery, and connect terminal (2) to fuel gauge unit and terminal (4) to test lamp, respectively.
Ensure that test lamp remains off when fuel gauge unit is dipped in fuel and comes on when removed from fuel.

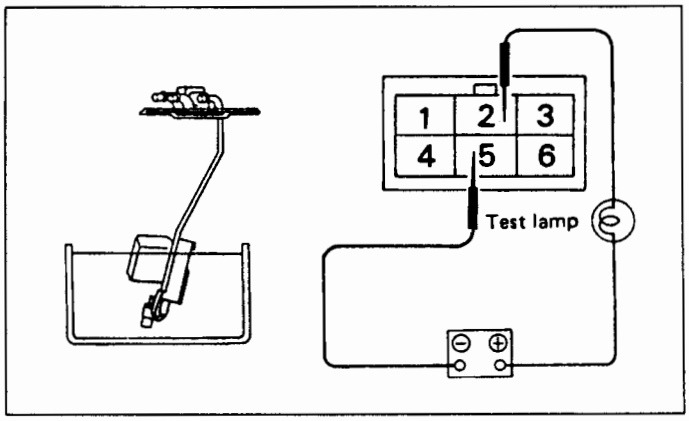

Fig. 95

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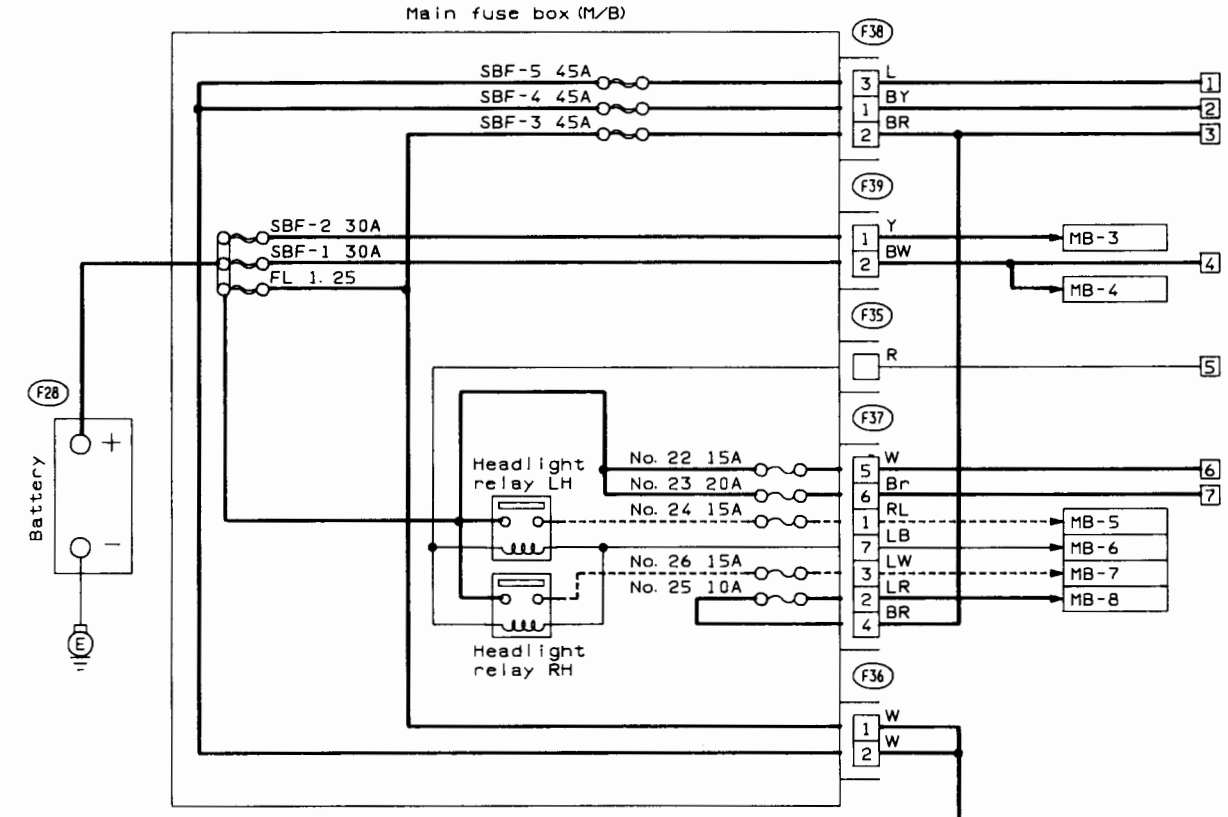
SERVICE MANUAL

( ) : S. I. A Model

5. Wiring Diagram and Troubleshooting

1. POWER SUPPLY ROUTING



FUSE LOCATION

(M/B)

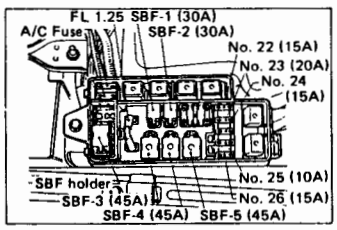


Fig. 25-1 B6-349

(F/B)

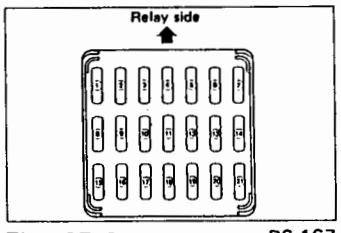


Fig. 25-2 B6-167

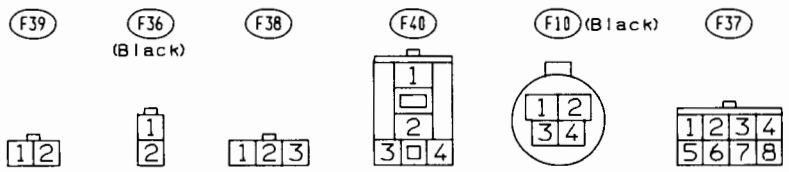
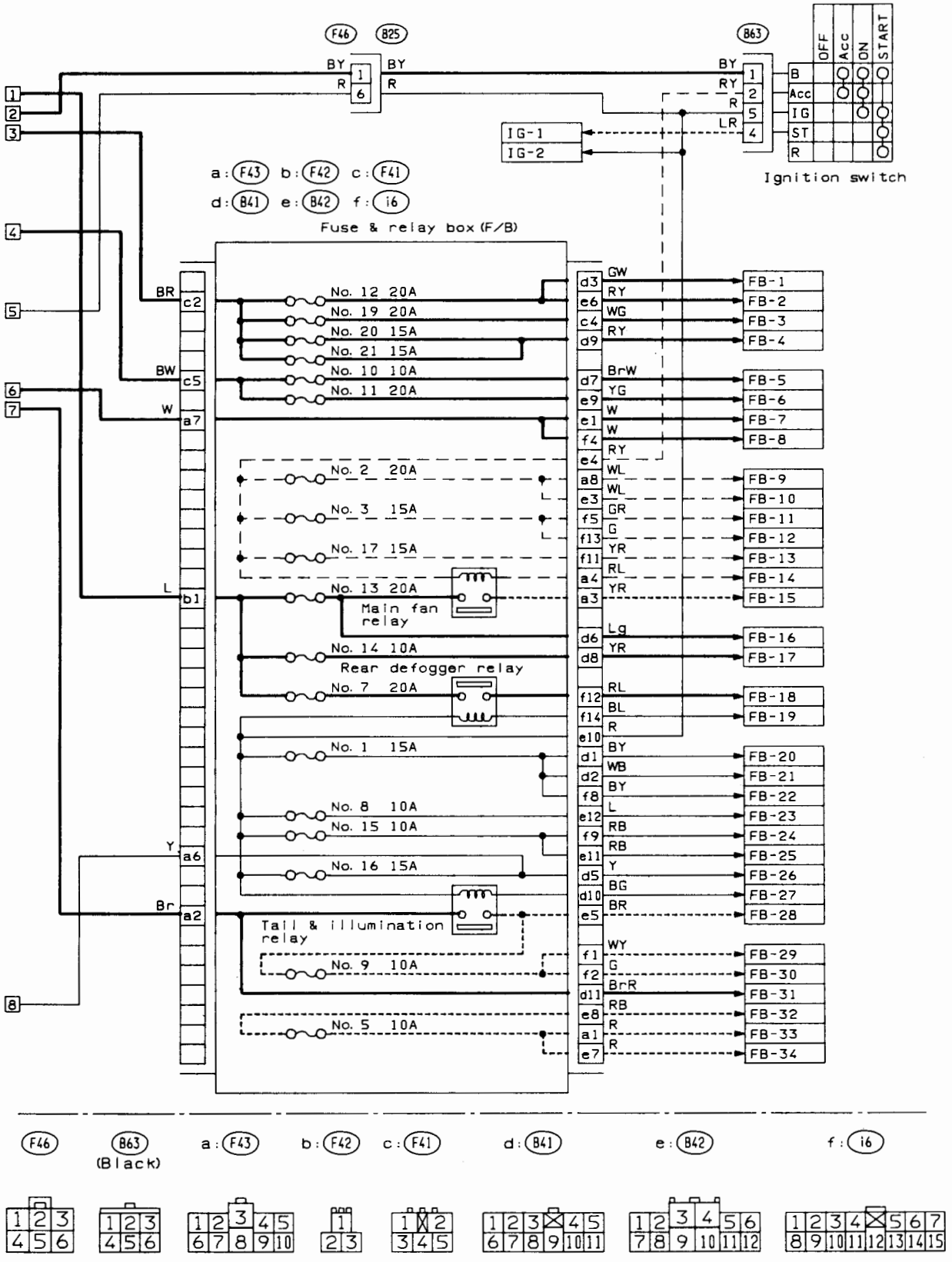


Fig. 6 BU01-01A

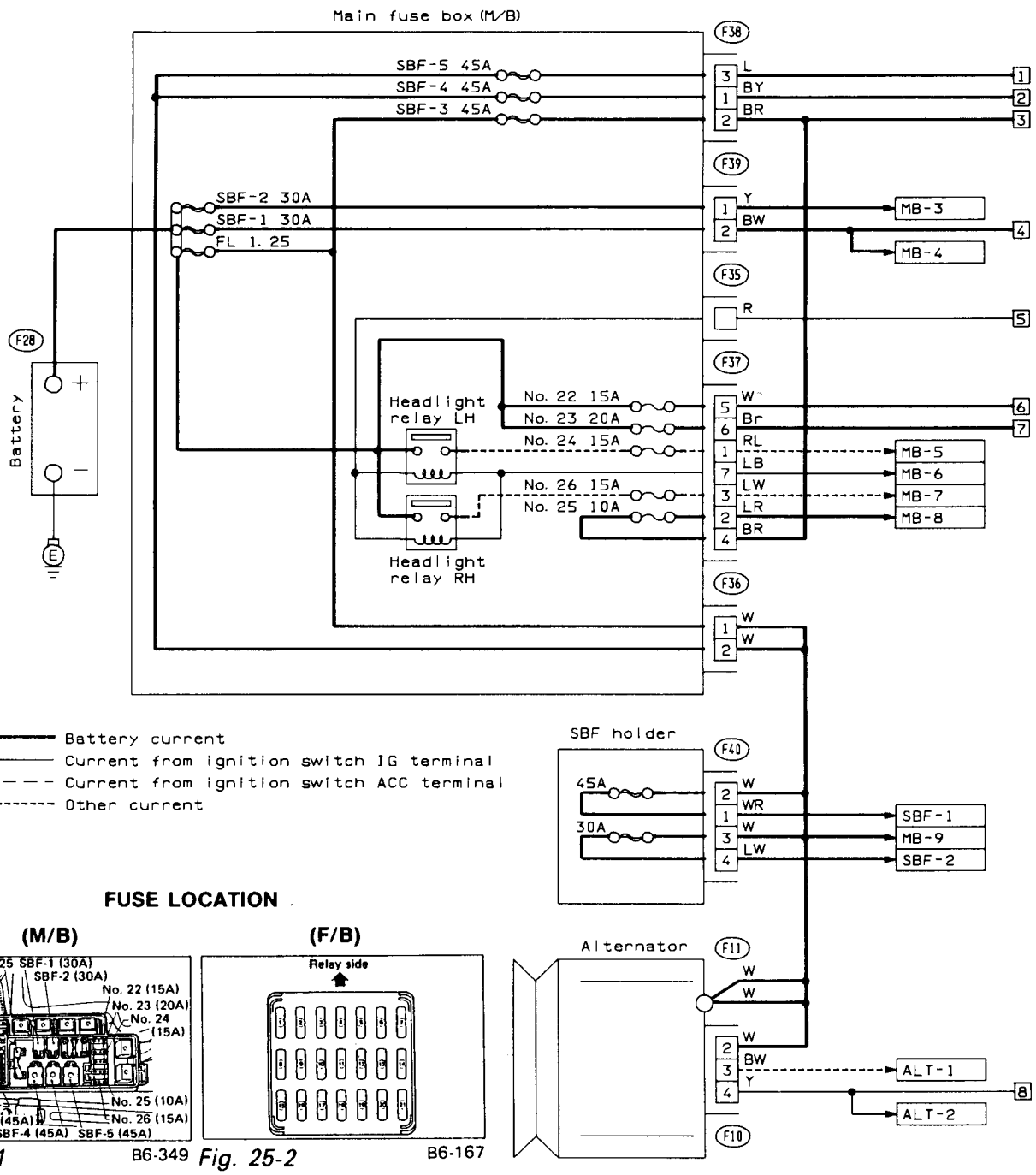

F46
B25
B63
BY
R
RY
LR
OFF
Acc
ON
START
B
Acc
IG
ST
R
IG-1
IG-2
Ignition switch
a: F43 b: F42 c: F41
d: B41 e: B42 f: i6
Fuse & relay box (F/B)
No. 12 20A
No. 19 20A
No. 20 15A
No. 21 15A
No. 10 10A
No. 11 20A
No. 2 20A
No. 3 15A
No. 17 15A
No. 13 20A
Main fan relay
No. 14 10A
Rear defogger relay
No. 7 20A
No. 1 15A
No. 8 10A
No. 15 10A
No. 16 15A
Tail & illumination relay
No. 9 10A
No. 5 10A
BR
BW
W
L
Y
Br
FB-1
FB-2
FB-3
FB-4
FB-5
FB-6
FB-7
FB-8
FB-9
FB-10
FB-11
FB-12
FB-13
FB-14
FB-15
FB-16
FB-17
FB-18
FB-19
FB-20
FB-21
FB-22
FB-23
FB-24
FB-25
FB-26
FB-27
FB-28
FB-29
FB-30
FB-31
FB-32
FB-33
FB-34
F46
B63
(Black)
a: F43
b: F42
c: F41
d: B41
e: B42
f: i6

1A

BU01-01B

5. Wiring Diagram and Troubleshooting

1. POWER SUPPLY ROUTING



FUSE LOCATION

(M/B)

Fig. 25-1 B6-349

(F/B)

Fig. 25-2 B6-167

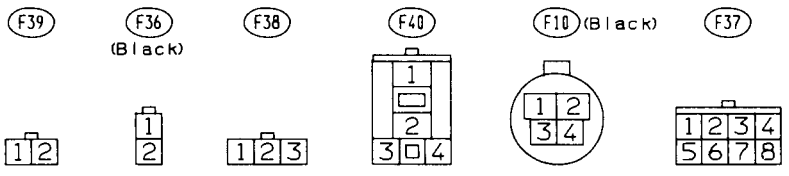
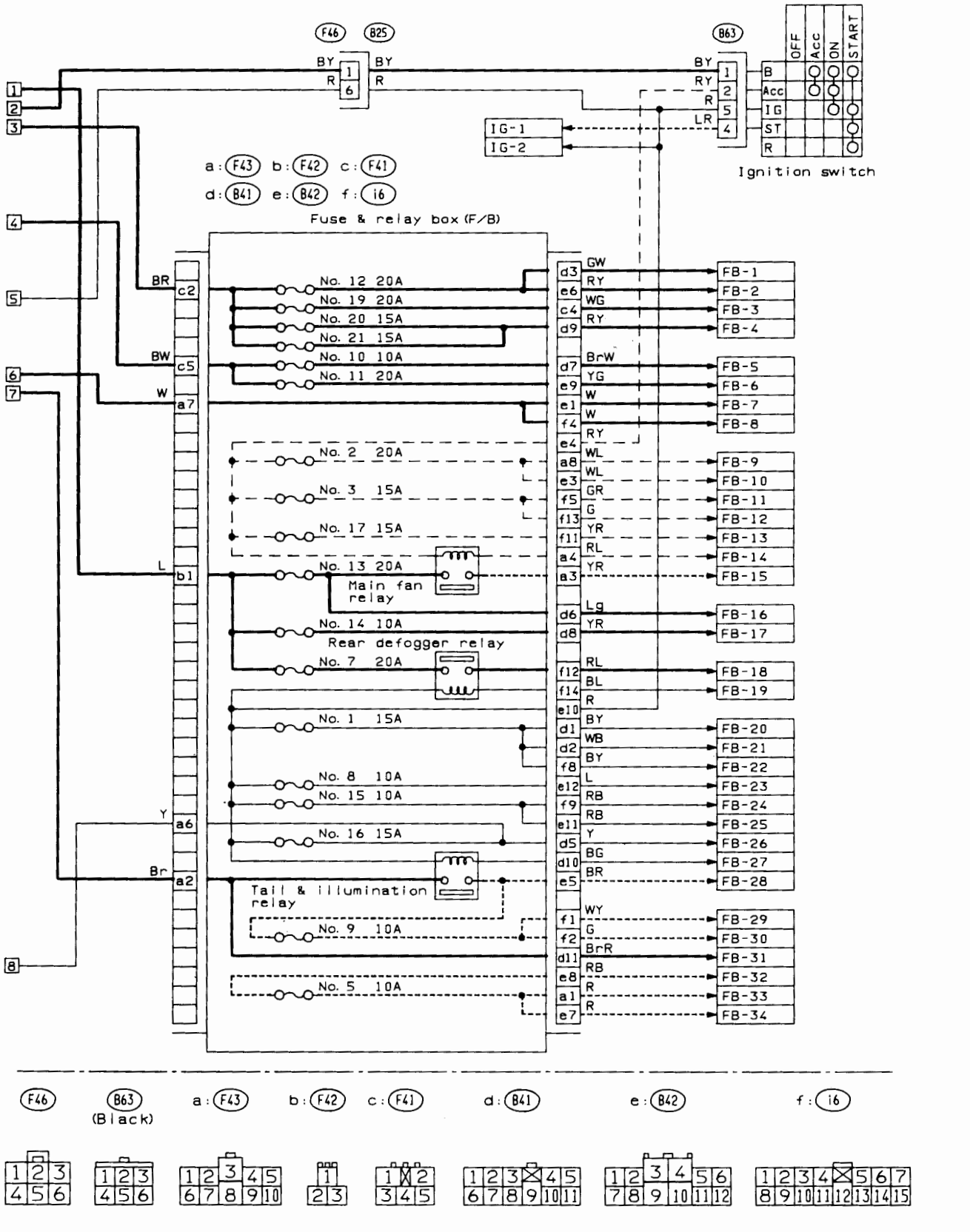


Fig. 6 BU01-01A


F46
B25
B63
OFF
Acc
ON
START
B
Acc
IG
ST
R
Ignition switch
IG-1
IG-2
a: F43 b: F42 c: F41
d: B41 e: B42 f: i6
Fuse & relay box (F/B)
No. 12 20A
No. 19 20A
No. 20 15A
No. 21 15A
No. 10 10A
No. 11 20A
No. 2 20A
No. 3 15A
No. 17 15A
No. 13 20A
Main fan relay
No. 14 10A
Rear defogger relay
No. 7 20A
No. 1 15A
No. 8 10A
No. 15 10A
No. 16 15A
Tail & illumination relay
No. 9 10A
No. 5 10A
FB-1
FB-2
FB-3
FB-4
FB-5
FB-6
FB-7
FB-8
FB-9
FB-10
FB-11
FB-12
FB-13
FB-14
FB-15
FB-16
FB-17
FB-18
FB-19
FB-20
FB-21
FB-22
FB-23
FB-24
FB-25
FB-26
FB-27
FB-28
FB-29
FB-30
FB-31
FB-32
FB-33
FB-34
F46
B63 (Black)
a: F43
b: F42
c: F41
d: B41
e: B42
f: i6

BU01-01B

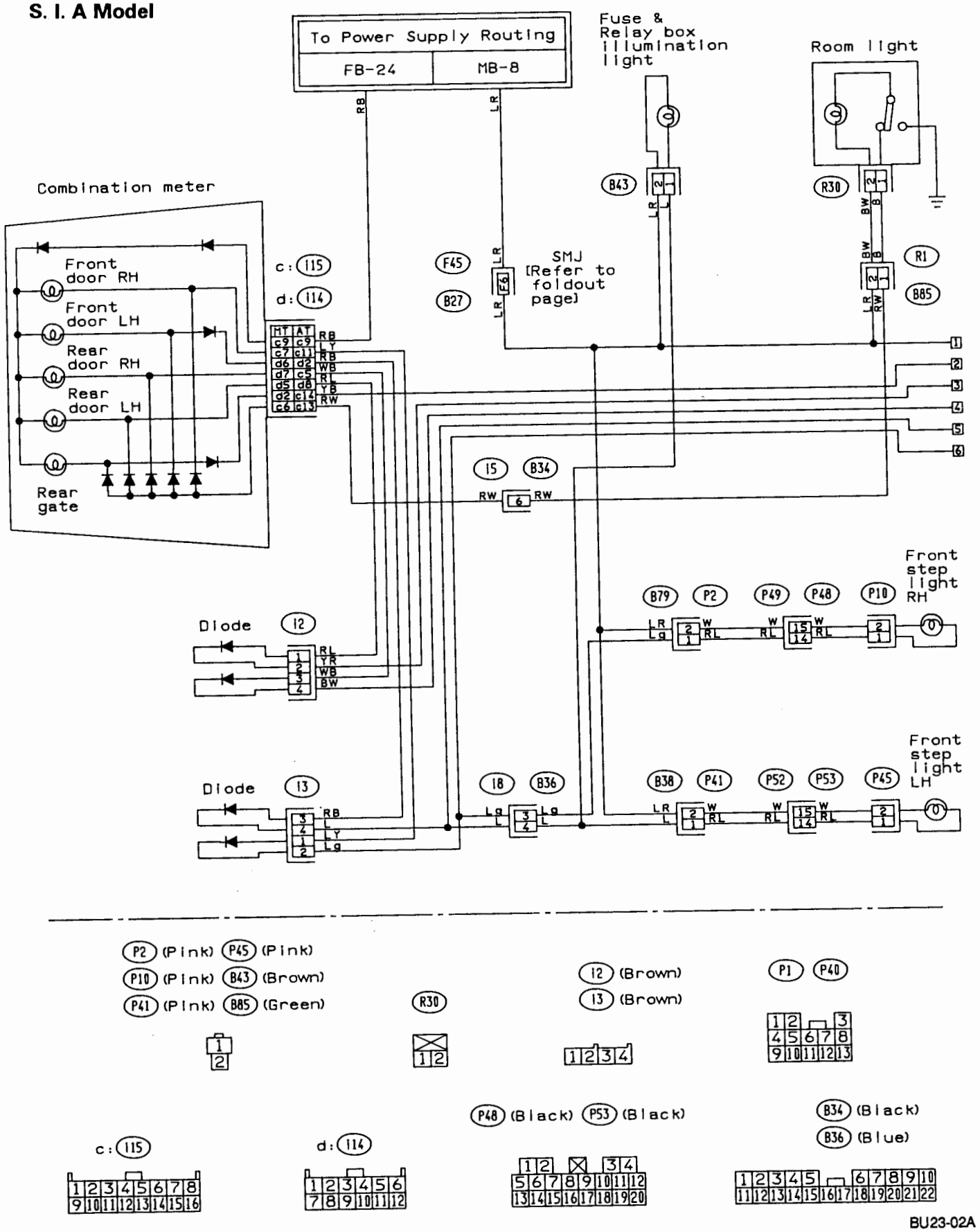
No.	Load
MB-3	Ignition relay: Fig. 27, 28 Fuel pump relay: Fig. 28 Injectors: Fig. 28
MB-4	P/W circuit breaker: Fig. 49 Automatic shoulder belt control unit: Fig. 59 Sunroof relay: Fig. 54
MB-5	Headlight LH: Fig. 30, 31
MB-6	Diode (Lighting): Fig. 30, 31 Lighting switch: Fig. 30 Daytime running light control unit: Fig. 31
MB-7	Head light RH: Fig. 30, 31 Combination meter: Fig. 30, 31
MB-8	Radio: Fig. 55 Height control unit: Fig. 58 Spot light: Fig. 54 F/B light: Fig. 33, 34 Room light (Wagon): Fig. 33, 34 Step lights: Fig. 33 Luggage room light: Fig. 33, 34 Trunk room light: Fig. 37
MB-9	A/C relay holder: Fig. 41
SBF-1	Hydraulic unit: Fig. 61
SBF-2	A/S compressor: Fig. 58
ALT-1	Combination meter: Fig. 26, 35, 45 Daytime running light control unit: Fig. 31
ALT-2	Diode (MPFI): Fig. 28
IG-1	Inhibitor switch: Fig. 27, 28, 31 Starter interlock relay: Fig. 27, 31 MPFI control unit: Fig. 28
IG-2	Daytime running light control unit: Fig. 31 Daytime running light relay: Fig. 31 Daytime running light high-beam relay: Fig. 31
FB-1	Stop and Brake switch: Fig. 35, 39, 40, 50, 61 Stop light switch: Fig. 35, 39, 40, 61
FB-2	Shift lock control unit: Fig. 40 Horn relay: Fig. 53 Condenser (Horn): Fig. 53
FB-3	Hydraulic unit: Fig. 61
FB-4	Blower motor relay: Fig. 41, 56
FB-5	A/S compressor relay: Fig. 58 A/S charge solenoid: Fig. 58 A/S discharge solenoid: Fig. 58 A/S solenoids: Fig. 58

No.	Load
FB-6	Front door lock switch LH: Fig. 51, 52
FB-7	Shift lock control unit: Fig. 40 Key warning switch: Fig. 40, 59, 61 Power antenna: Fig. 55 Automatic shoulder belt control unit: Fig. 59
FB-8	Hazard switch: Fig. 36
FB-9	Front washer motor: Fig. 42
FB-10	Front wiper motor: Fig. 42 Front wiper switch: Fig. 42 Rear washer motor: Fig. 43 Rear wiper relay: Fig. 43 Rear wiper motor: Fig. 43 Shift lock control unit: Fig. 40
FB-11	Cigarette lighter: Fig. 53
FB-12	Remote controlled rearview mirror switch: Fig. 57
FB-13	Radio: Fig. 55
FB-14	Diode (A/C): Fig. 41 A/C pressure switch: Fig. 41 MPFI control unit: Fig. 29
FB-15	A/C short connector: Fig. 29, 41 Main fan motor: Fig. 29, 41
FB-16	A/C Main fan relay: Fig. 41
FB-17	AT control unit: Fig. 39 MPFI control unit: Fig. 28
FB-18	Rear defogger switch: Fig. 44 Condenser (Rear defogger): Fig. 44 Rear defogger (Heat wire): Fig. 44
FB-19	Rear defogger switch: Fig. 44
FB-20	Inhibitor switch: Fig. 38 Back-up light switch: Fig. 38
FB-21	Shift lock control unit: Fig. 40
FB-22	Hazard switch: Fig. 36
FB-23	ABS-G sensor: Fig. 61 ABS control unit: Fig. 61 Main relay: Fig. 53 Cruise control main switch: Fig. 53

No.	Load
FB-24	Combination meter: Fig. 24, 28, 33, 34, 35, 39, 45, 46, 48, 54, 58, 59, 60, 61 Automatic shoulder belt control unit: Fig. 59 Height control switch: Fig. 58 Mode control panel: Fig. 56 Seat belt timer: 60
FB-25	P/W relay: Fig. 49 Check connector: Fig. 39, 58 Evaporation thermo switch: Fig. 41 Blower motor relay: Fig. 41, 56 Height control unit: Fig. 58 Sunroof relay: Fig. 54 Vanity mirror light: Fig. 54 FRESH/RECIRC actuator: Fig. 56
FB-26	AT control unit: Fig. 39 Fuel pump relay: Fig. 28 MPFI control unit: Fig. 28
FB-27	Lighting switch: Fig. 32
FB-28	Parking switch: Fig. 32
FB-29	Illumination lights: Fig. 32 Combination meter: Fig. 32
FB-30	Illumination control unit: Fig. 32 Illumination lights: Fig. 32
FB-31	Parking switch: Fig. 32
FB-32	Parking switch: Fig. 32
FB-33	Side marker lights: Fig. 32
FB-34	Rear combination lights (Tail light): Fig. 32 License plate lights: Fig. 32

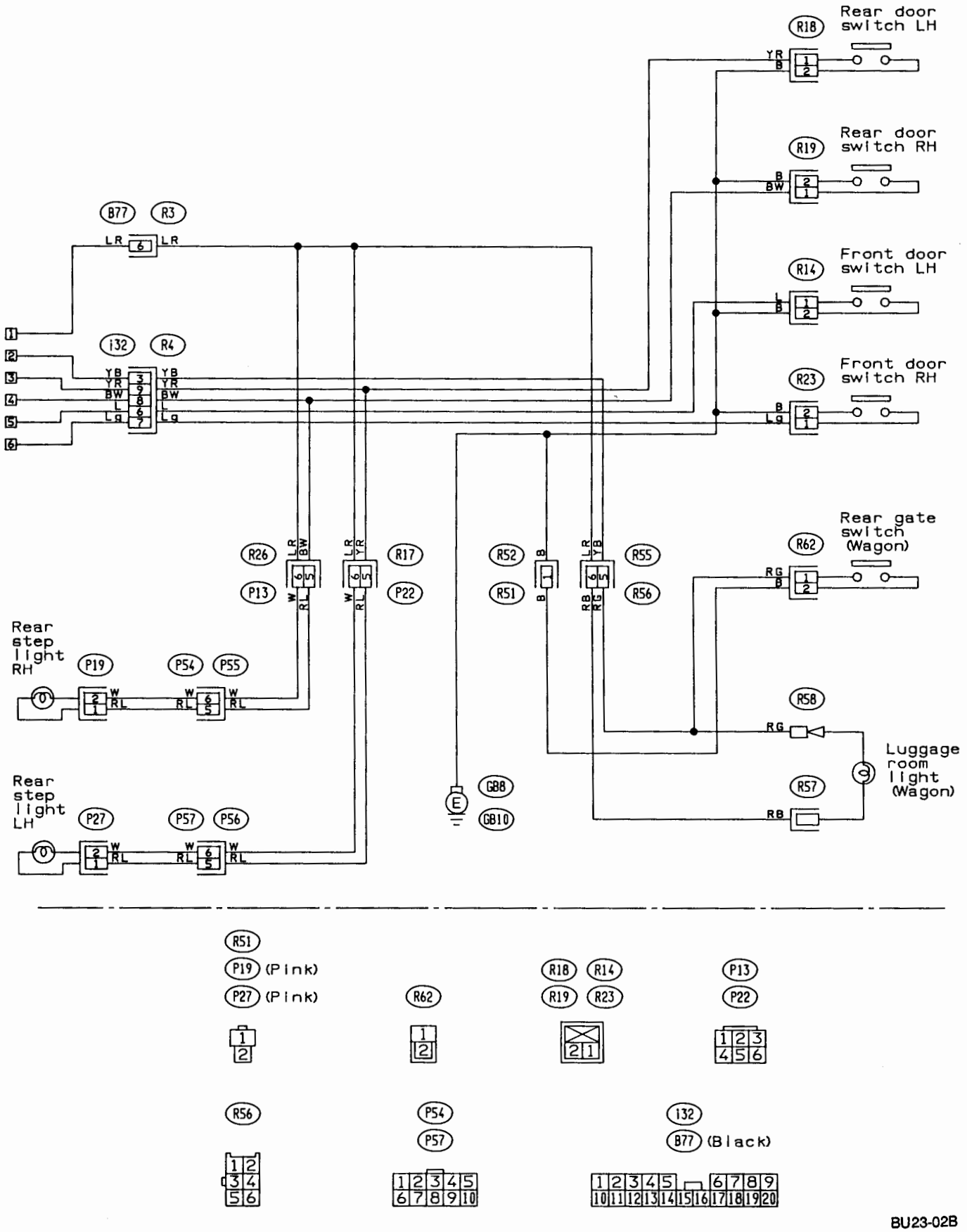
7. ROOM LIGHT AND DOOR SWITCH (WITH STEP LIGHT)

S. I. A Model



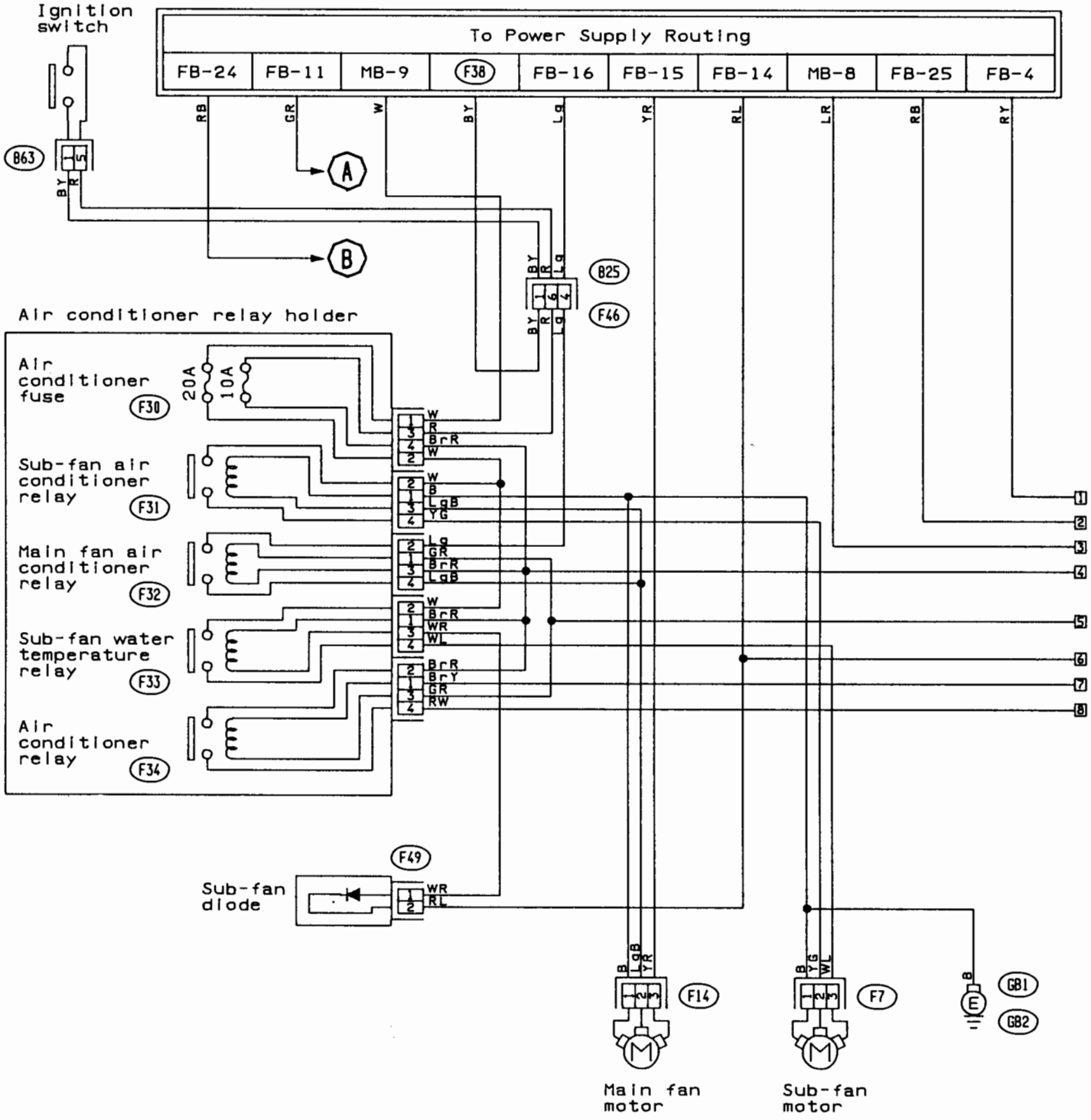
BU23-02A

Fig. 7


Rear door switch LH
R18
Rear door switch RH
R19
Front door switch LH
R14
Front door switch RH
R23
B77
R3
i32
R4
R26
P13
R17
P22
R52
R51
R55
R56
R62
Rear gate switch (Wagon)
Rear step light RH
P19
P54
P55
Rear step light LH
P27
P57
P56
R58
Luggage room light (Wagon)
R57
GB8
GB10
R51
P19 (Pink)
P27 (Pink)
R62
R18
R14
R19
R23
P13
P22
R56
P54
P57
i32
B77 (Black)

BU23-02B

14-2 AUTOMATIC AIR CONDITIONER



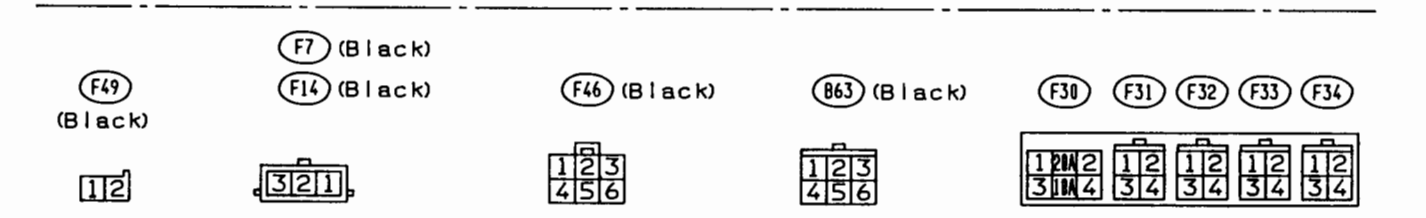
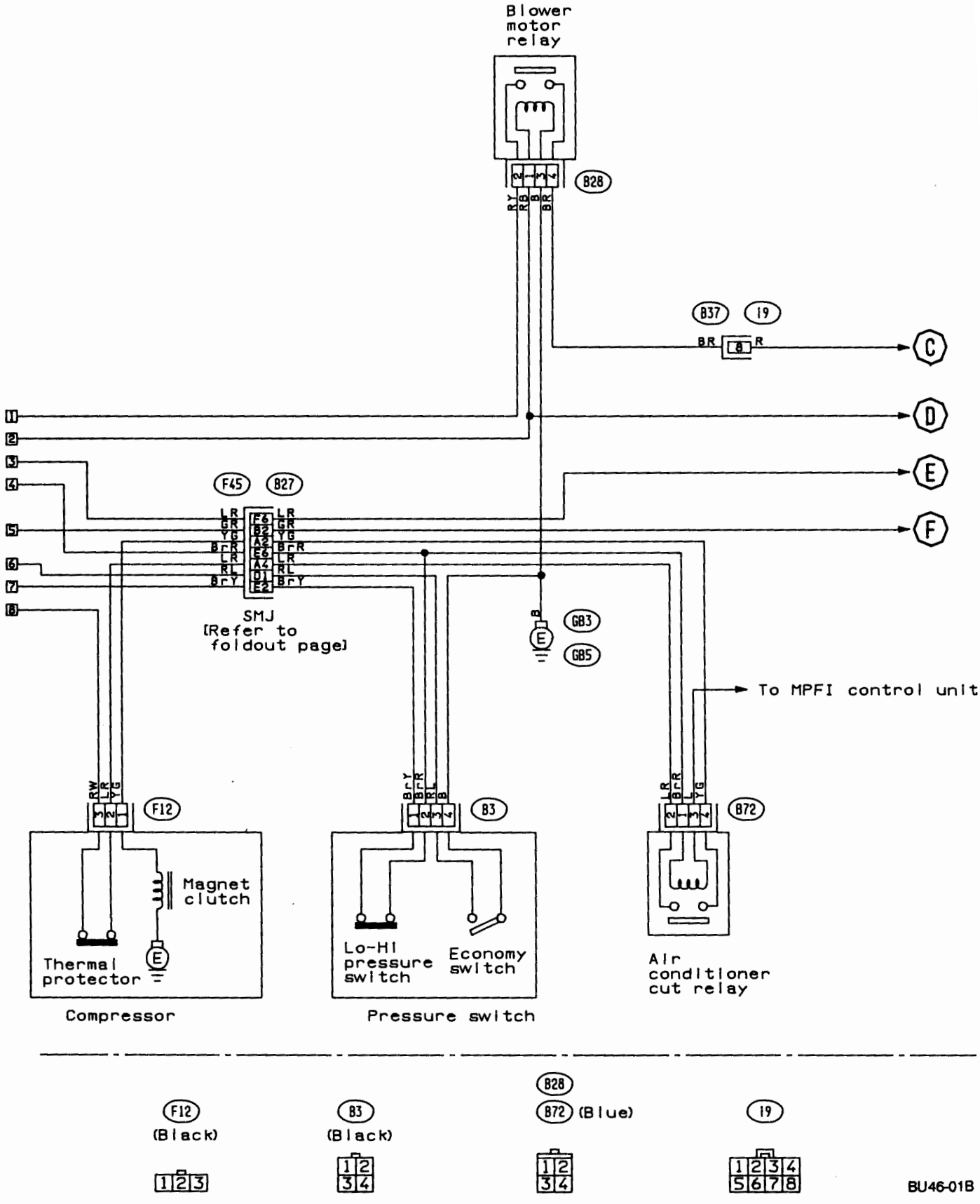
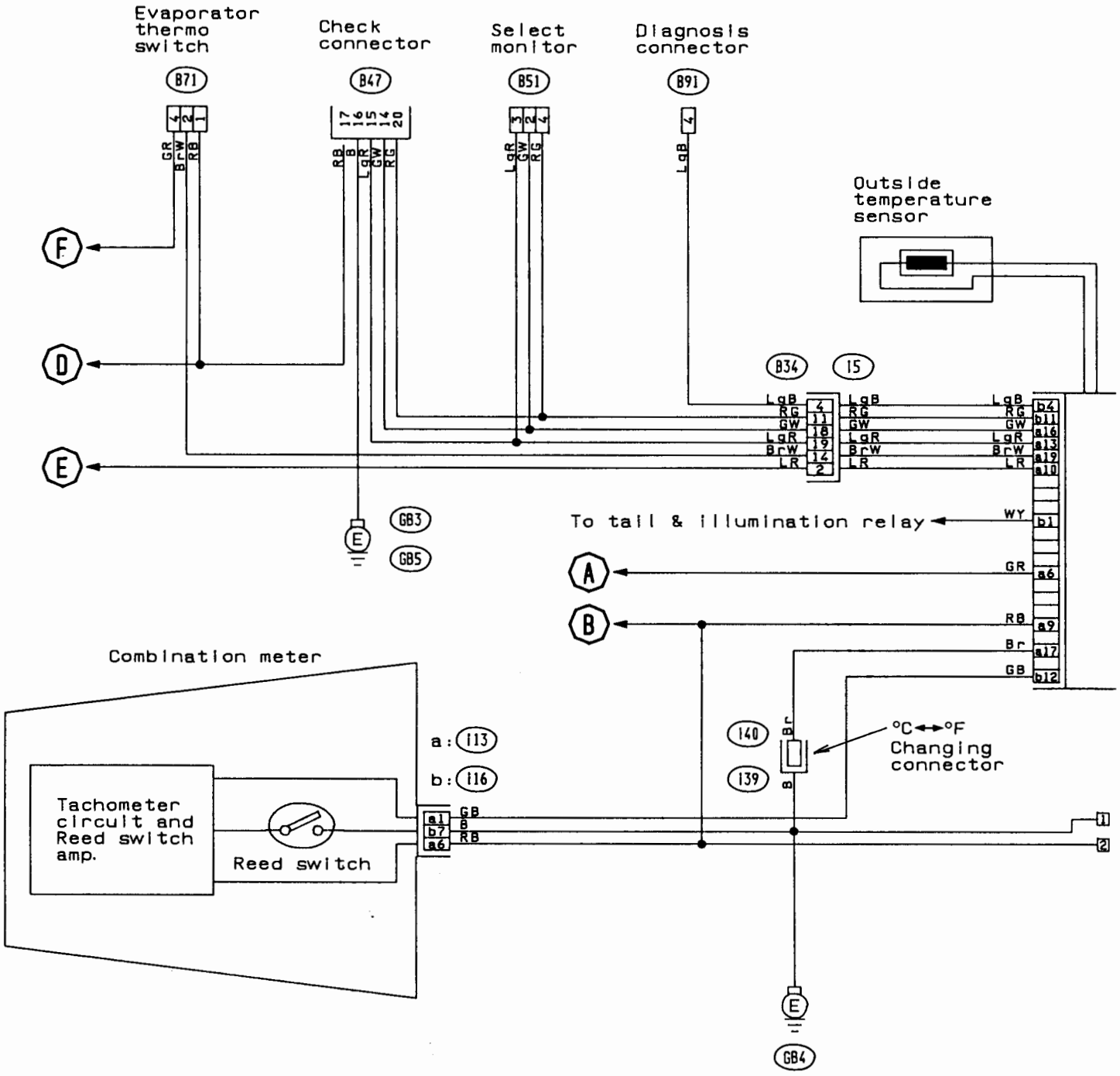


Fig. 8

BU46-01A


Blower motor relay
B28
RY
RB
B
BR
B37
19
BR
R
C
D
E
F
F45
B27
SMJ
(Refer to foldout page)
GB3
GB5
To MPFI control unit
F12
Magnet clutch
Thermal protector
Compressor
B3
Lo-Hi pressure switch
Economy switch
Pressure switch
B72
Air conditioner cut relay
F12
(Black)
B3
(Black)
B28
B72 (Blue)
19
BU46-01B



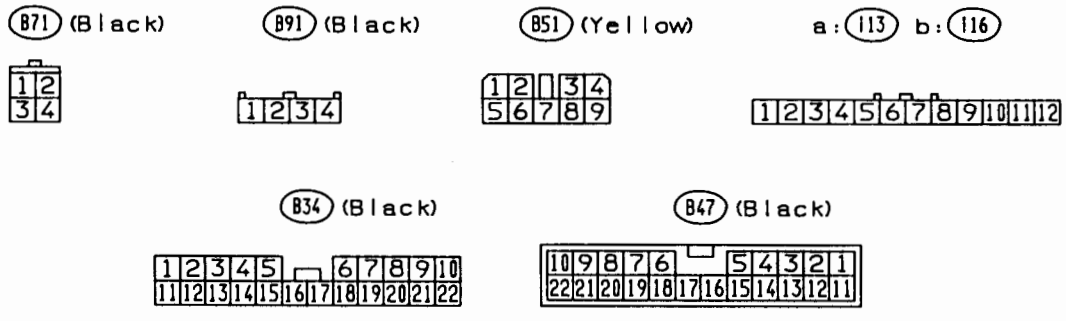
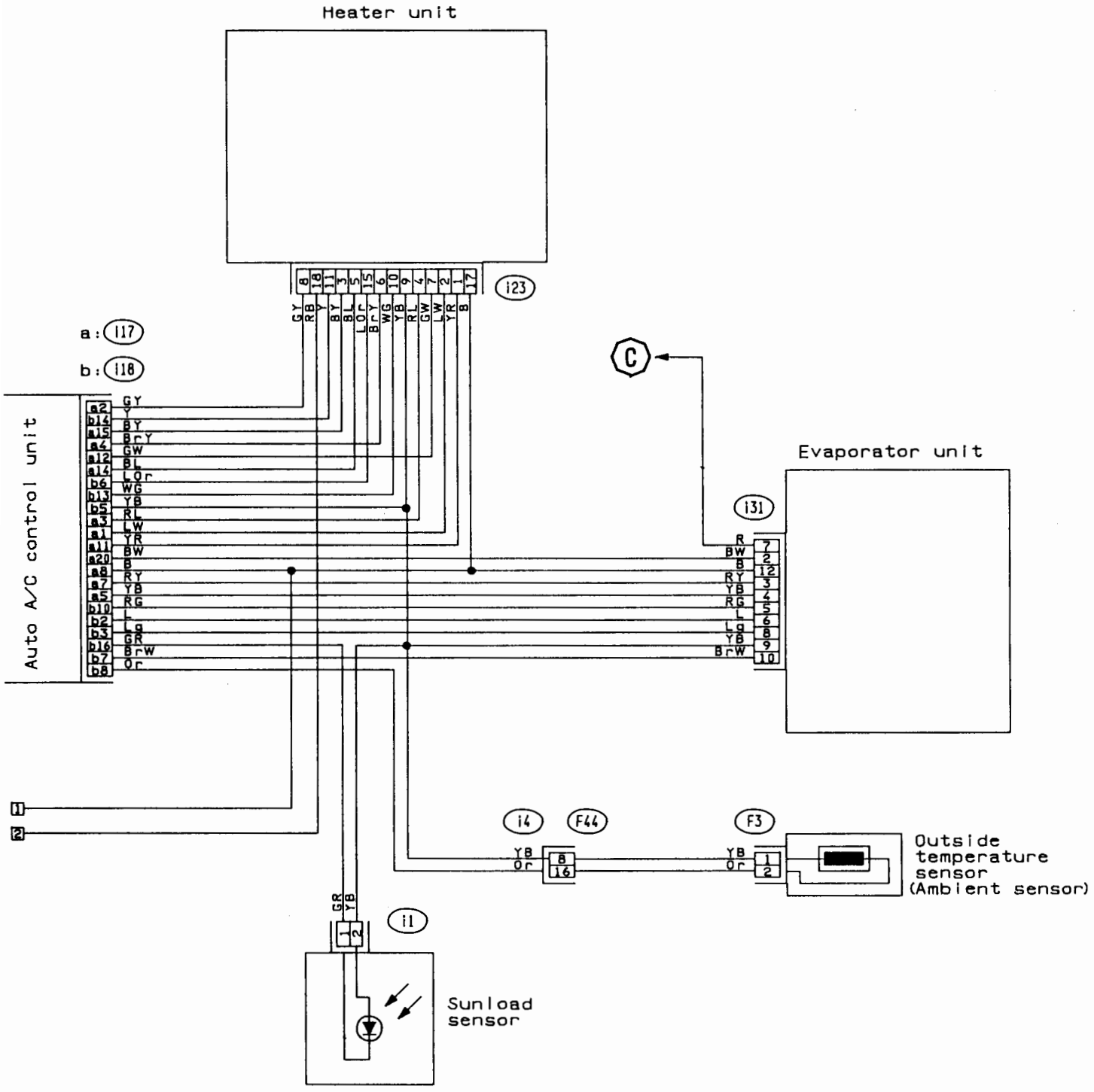
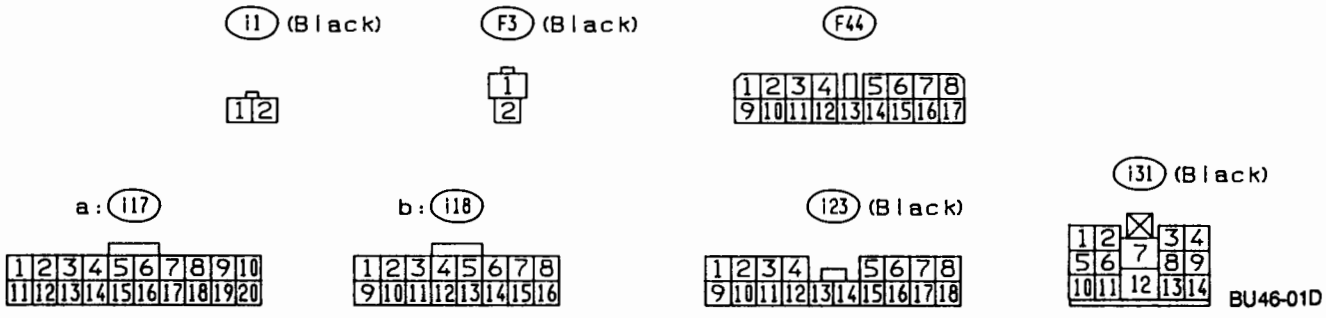


Fig. 9

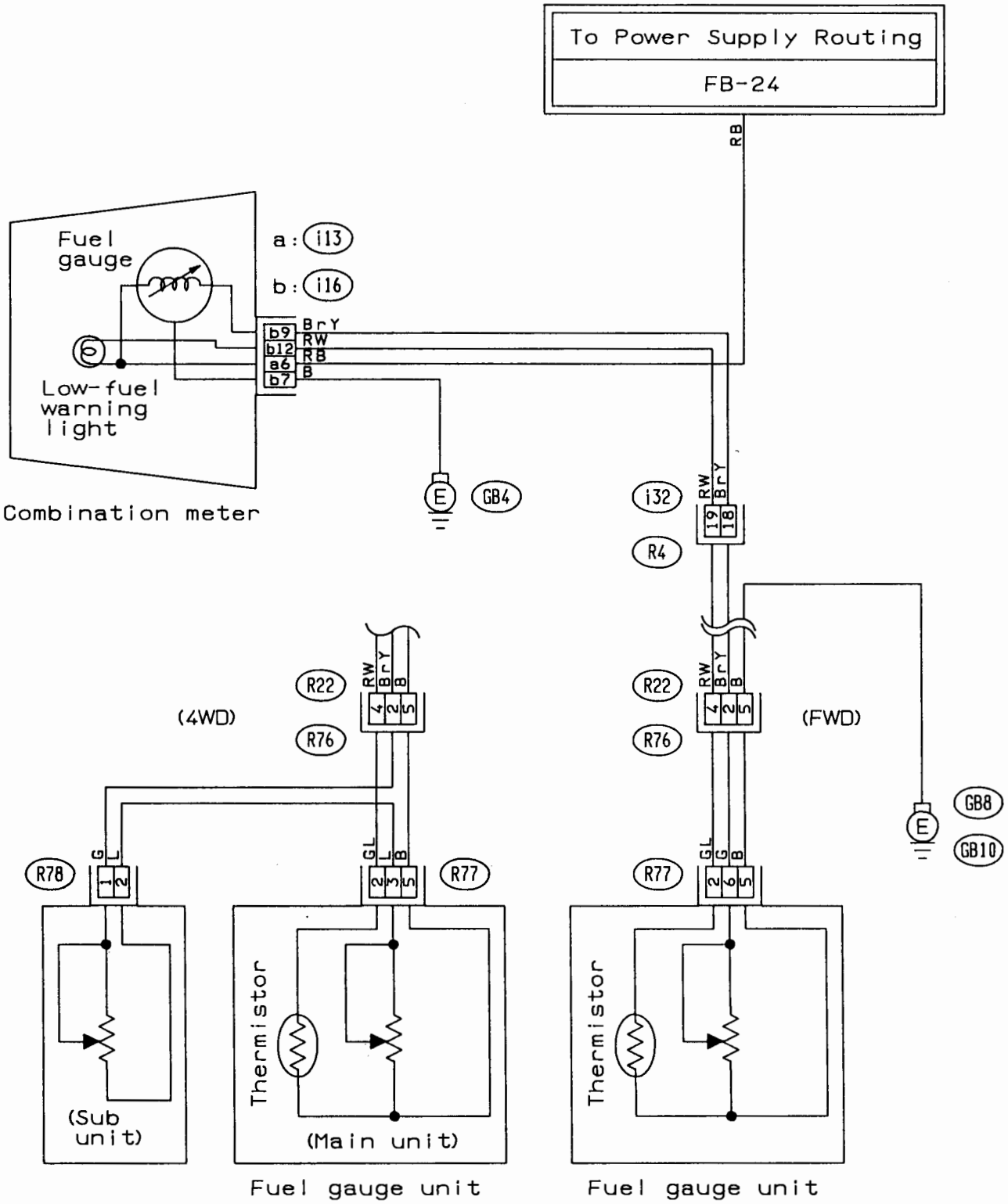
BU46-01C


Heater unit
i23
a: i17
b: i18
Auto A/C control unit
C
Evaporator unit
i31
i4
F44
F3
Outside temperature sensor (Ambient sensor)
i1
Sunload sensor


i1 (Black)
F3 (Black)
F44
a: i17
b: i18
i23 (Black)
i31 (Black)

BU46-01D

19. FUEL GAUGE)



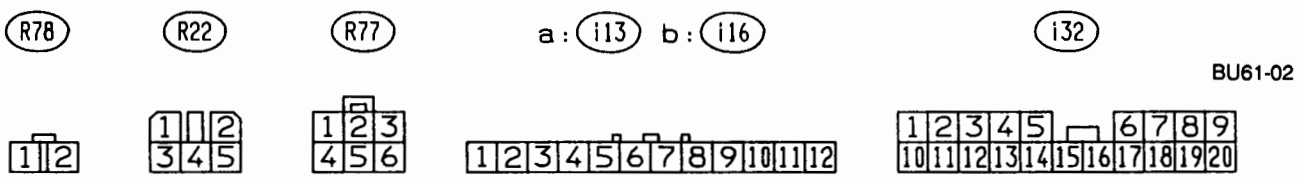
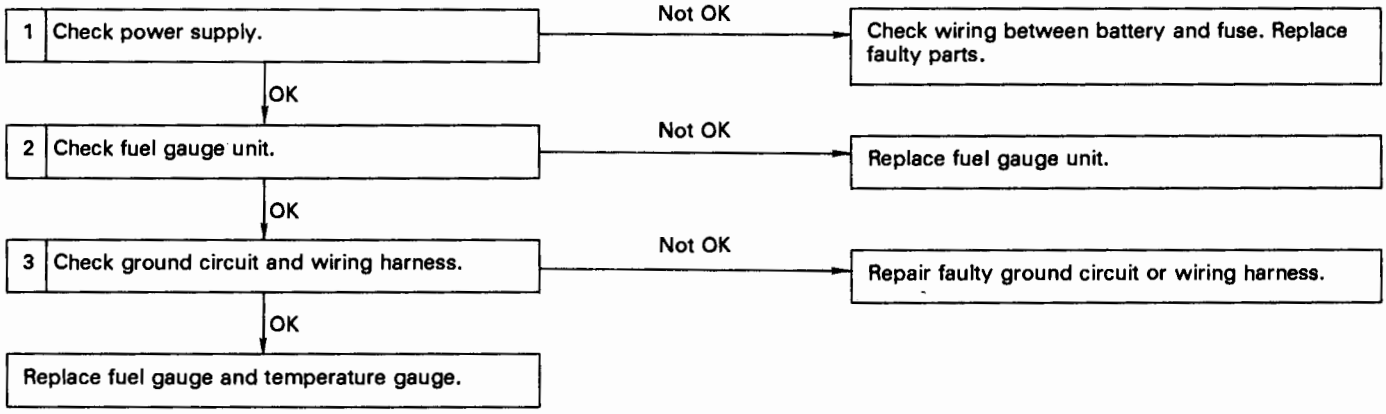


Fig. 10

1. Fuel gauge does not move or does not read correct level.

CONTENTS OF DIAGNOSIS
Power supply, fuel gauge unit, ground and wiring harness

SYMPTOM
- **Fuel gauge does not move.**
- **Fuel gauge does not read correct level.**



1 Check power supply.

Turn ignition switch and measure voltage at No. 15 fuse.

Specification: Battery voltage

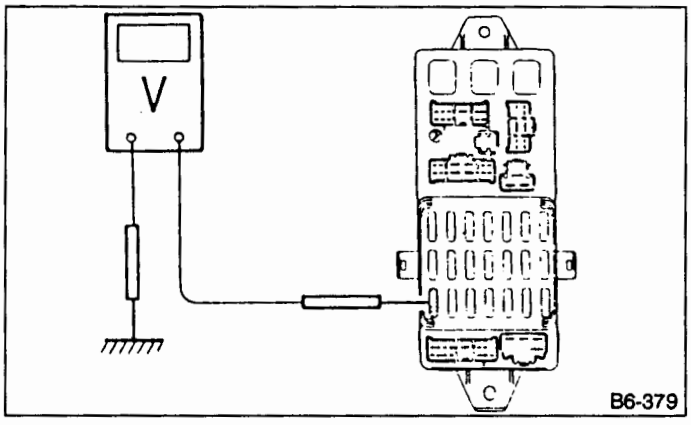


Fig. 11

2 Check fuel gauge unit (FWD model).

Measure resistance between terminals, as shown.

Terminal	Condition	Standard resistance ohms
5 — 6	FULLY	2.0 — 5.0
	EMPTY	92.0 — 95.0

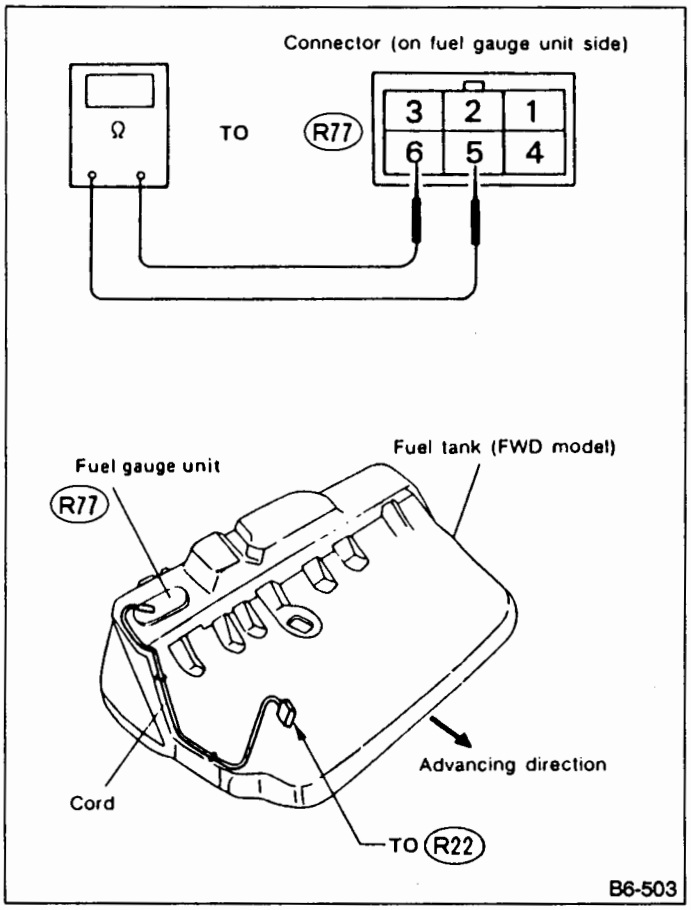


Fig. 12

2 Replace fuel gauge unit (4WD model)].

Measure resistance between terminals, as shown.

Connector location	Terminal	Condition	Standard resistance ohms
Main unit side	3 — 5	FULL	0.5 — 2.5
		EMPTY	50.0 — 52.0
Sub-unit side	1 — 2	FULL	0.5 — 2.5
		EMPTY	42.0 — 44.0

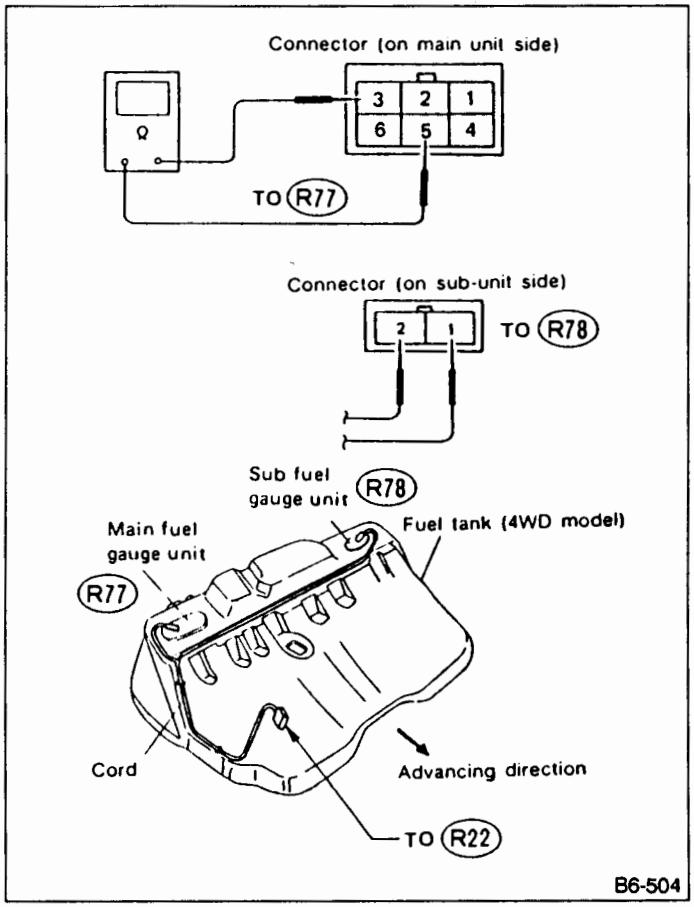


Fig. 13

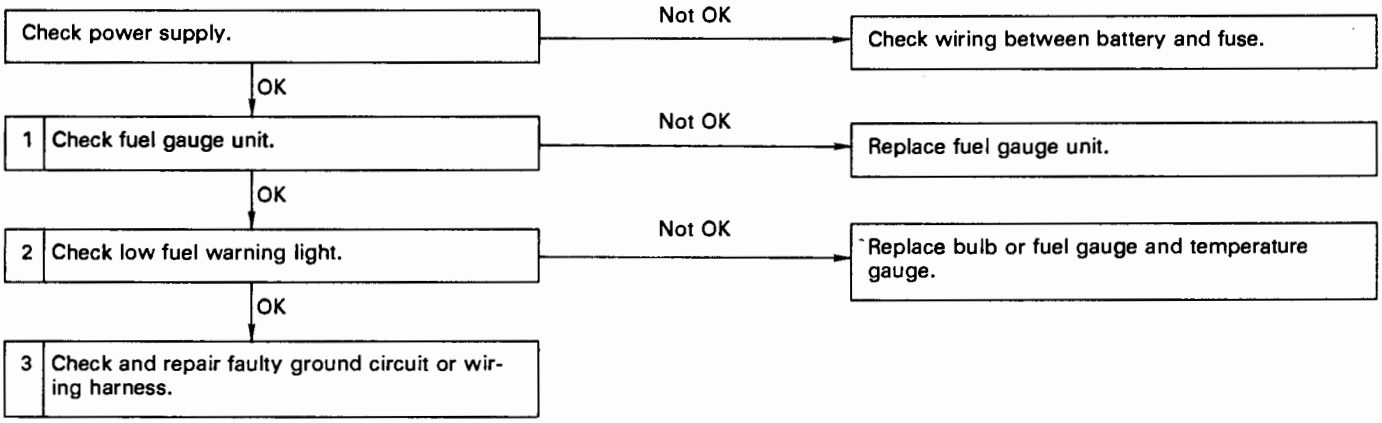
3 Check ground circuit and wiring harness.

Check terminals for discontinuity or shortcircuits.

2. Low fuel warning light does not come on or activates erroneously.

CONTENTS OF DIAGNOSIS
Power supply, fuel gauge unit, low fuel warning light, ground and wiring harness

SYMPTOM
- **Warning light does not come on when fuel drops below specified level.**
- **Warning light comes on when fuel level is above specified level.**



1 Check fuel gauge unit.

Measure current flowing through thermistor when voltage is applied to it.

Specification: 60 mA, min. (FULL)
135 mA, min. (EMPTY)

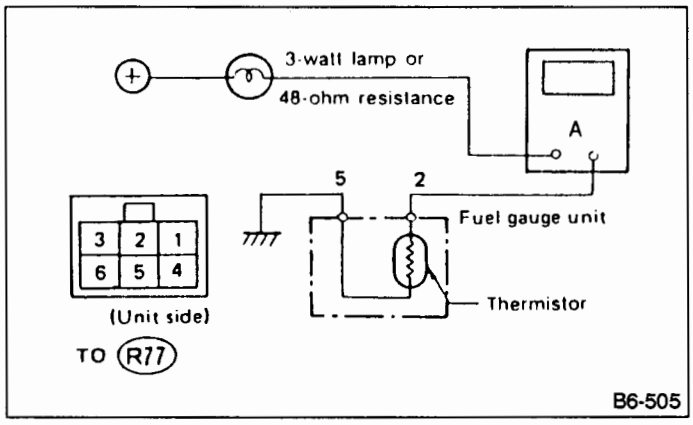


Fig. 14

2 Check low fuel warning light.

Check if low fuel warning light comes on (ignition switch ON) when connector (No. R77) terminal (2) is grounded.

Specification: Warning light comes on.

If test checks out "Not OK," remove combination meter and ensure that continuity between terminal (12) connector (i16) (on meter side) and terminal (2).

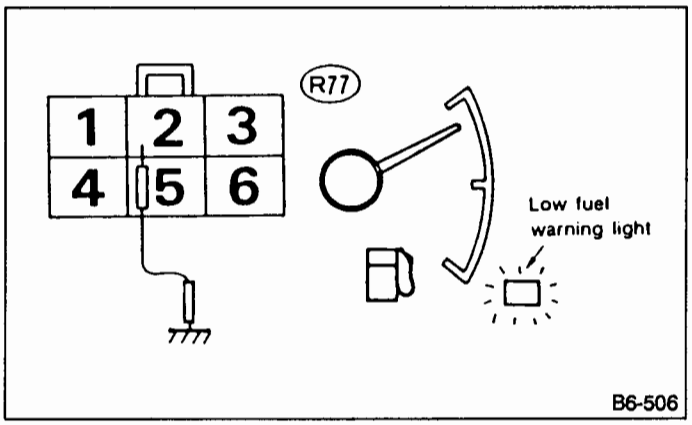
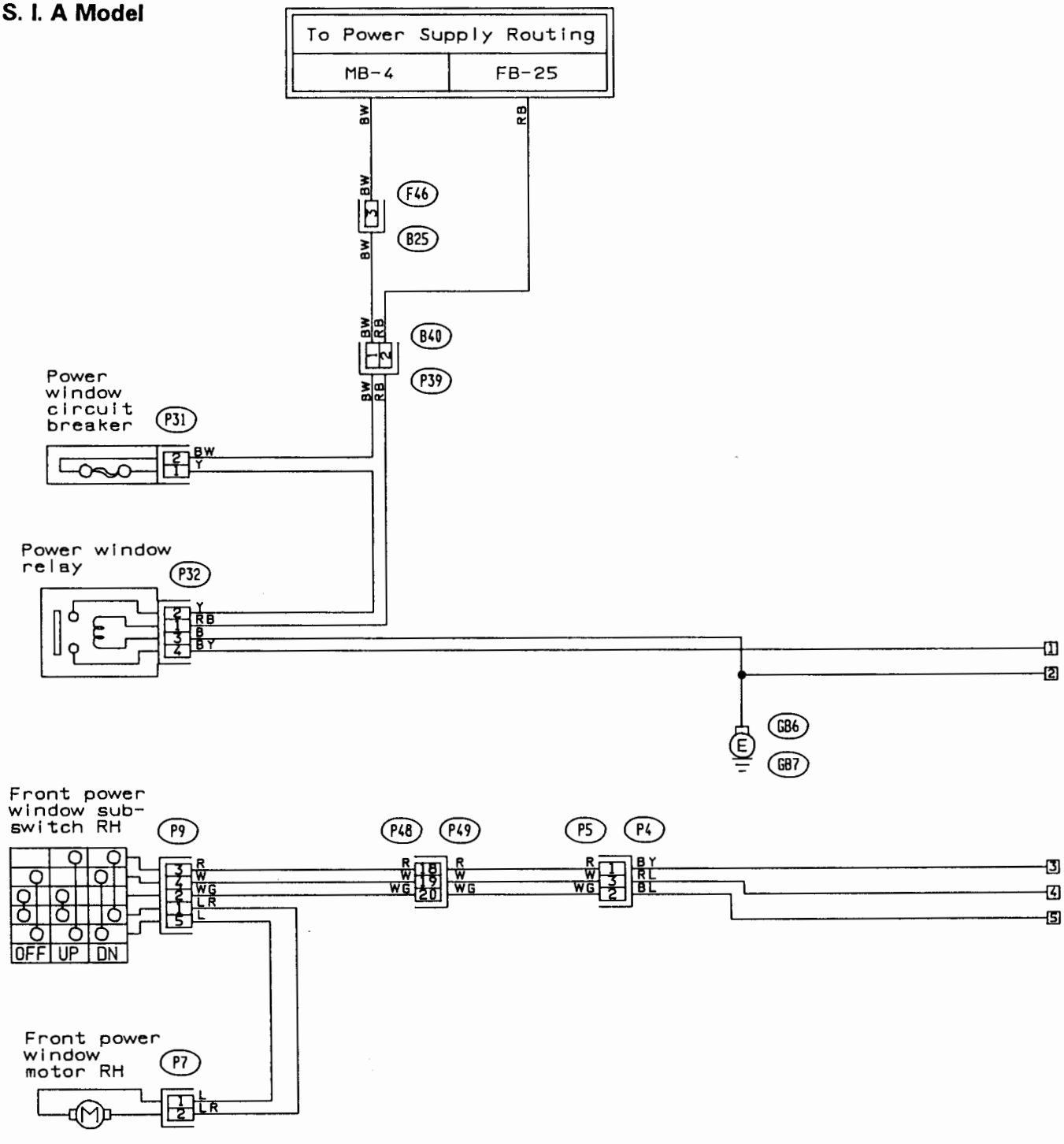


Fig. 15

3 Check and repair faulty ground circuit or wiring harness.

Check for discontinuity or shortcircuits between terminals.

22. POWER WINDOW
S. I. A Model



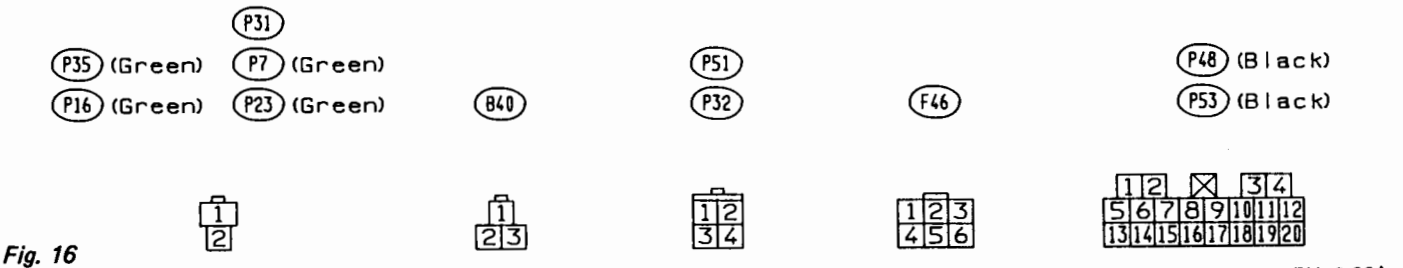
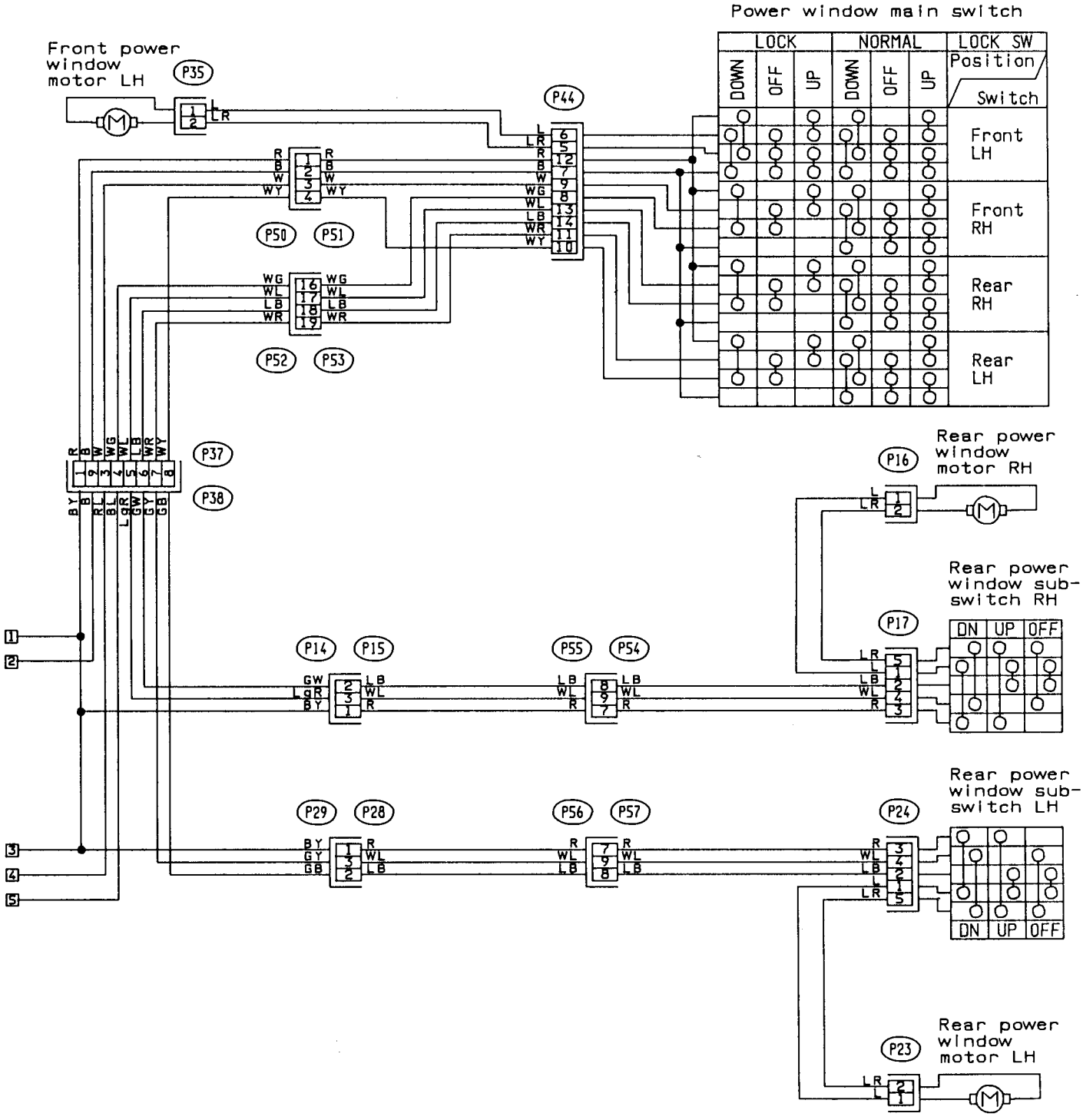
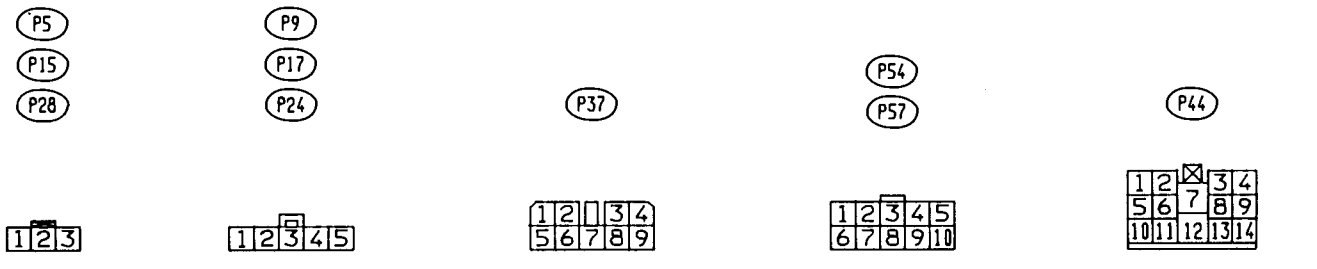


Fig. 16

BU70-02A


Power window main switch
LOCK
NORMAL
LOCK SW
DOWN
OFF
UP
Position
Switch
Front LH
Front RH
Rear RH
Rear LH
Front power window motor LH
Rear power window motor RH
Rear power window sub-switch RH
Rear power window sub-switch LH
Rear power window motor LH
DN
UP
OFF
P35
P44
P50
P51
P52
P53
P37
P38
P16
P17
P14
P15
P55
P54
P29
P28
P56
P57
P24
P23


P5
P15
P28
P9
P17
P24
P37
P54
P57
P44

BU70-02B

24. DOOR LOCK
S. I. A MODEL

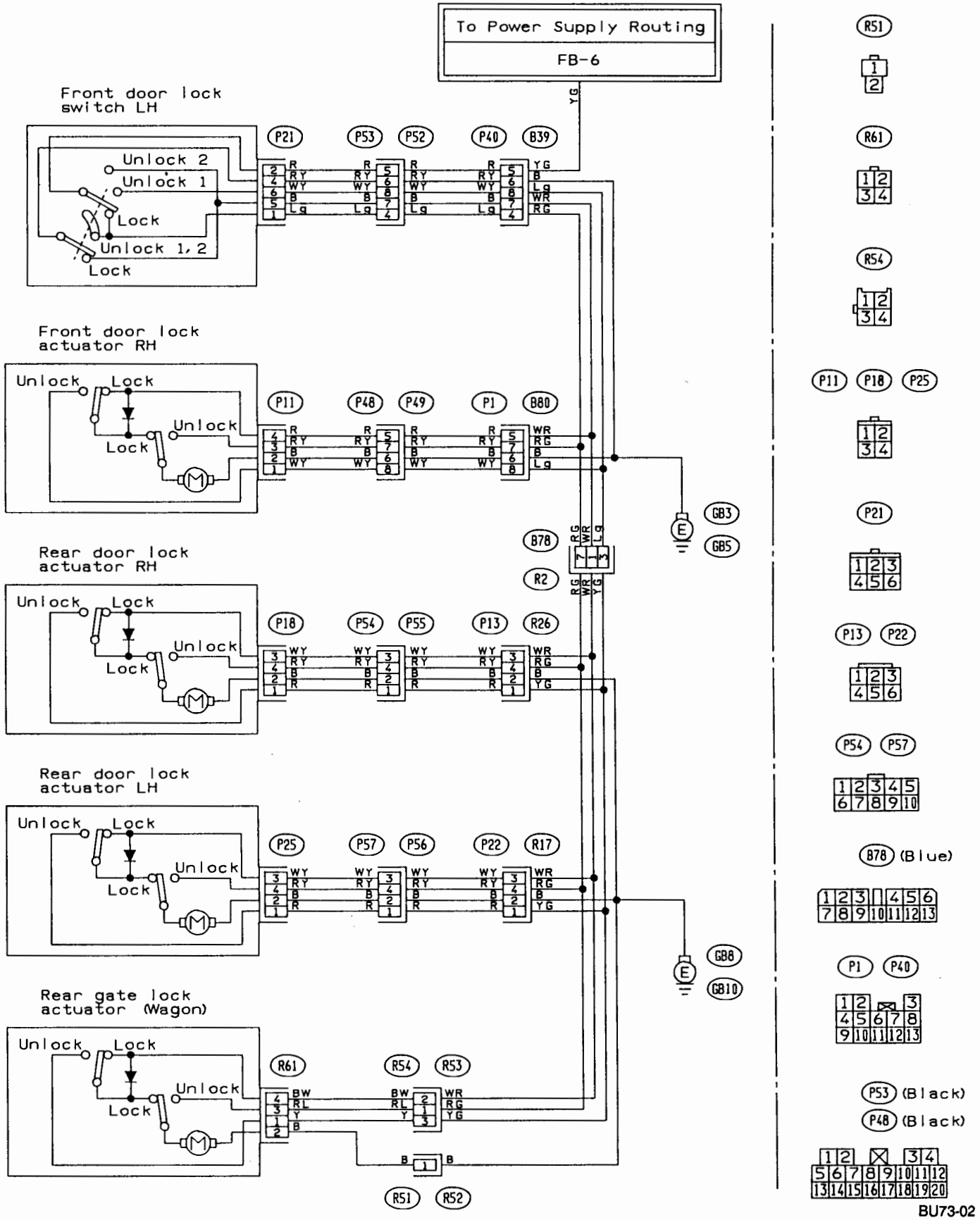
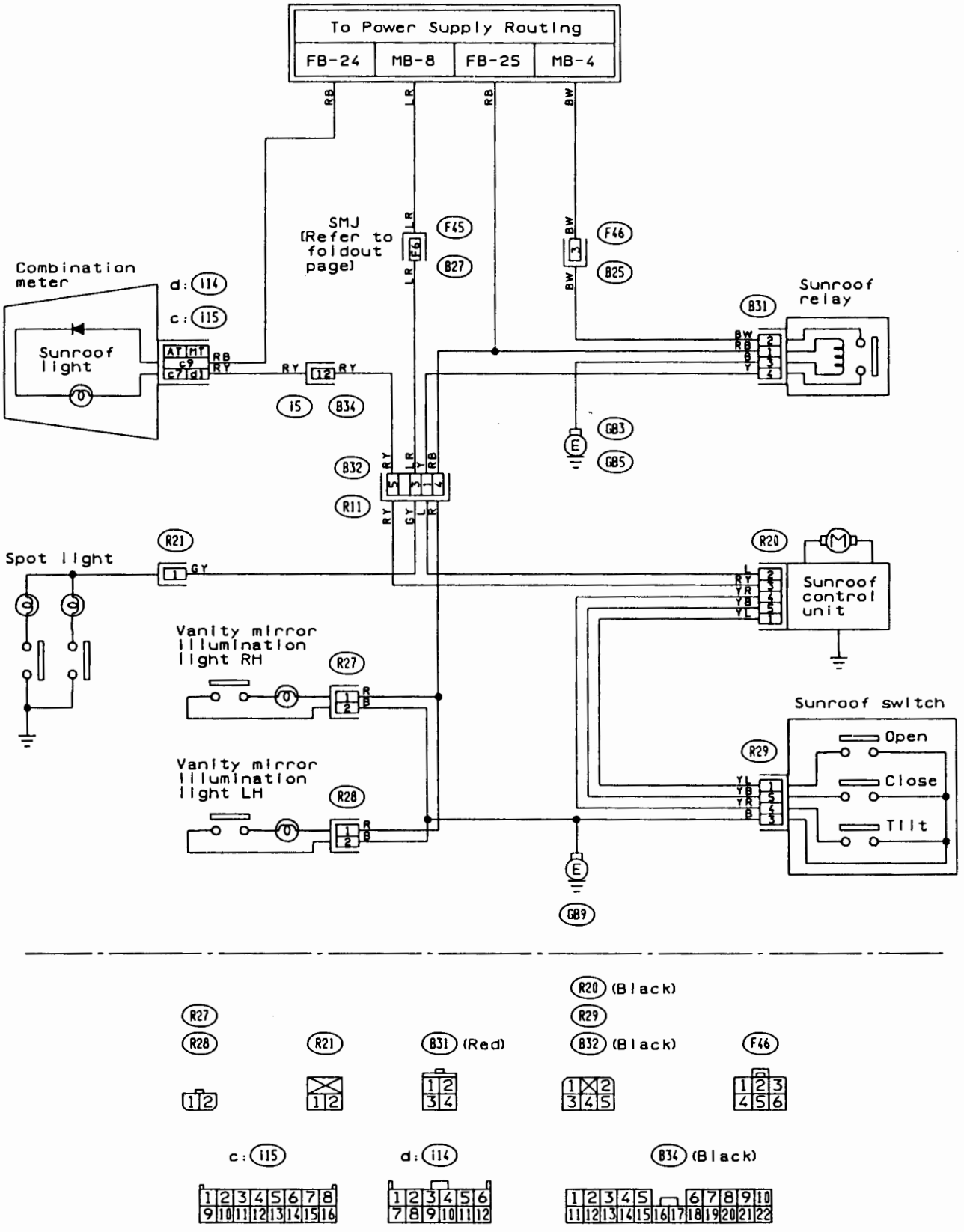


Fig. 17

26. SUNROOF•SPOT LIGHT AND VANITY MIRROR



BU75-02

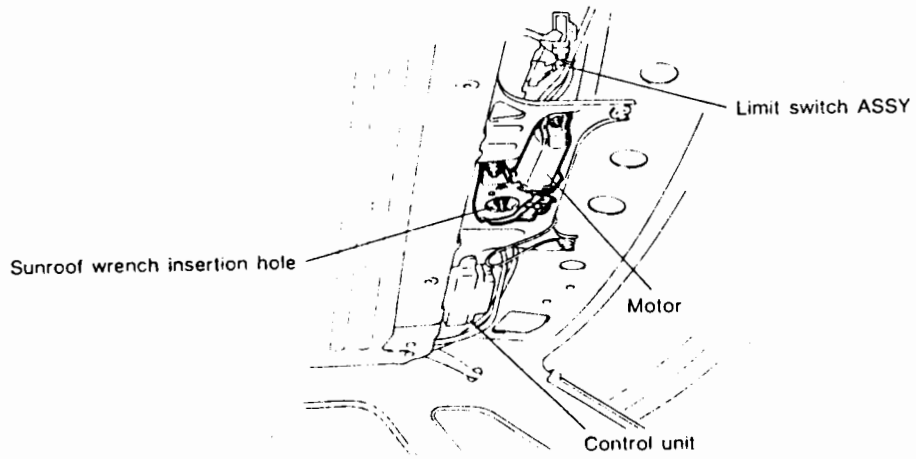
Fig. 18

SPOT LIGHT AND VANITY MIRROR LIGHT

Item to check / Symptom	M/B				Ignition switch	F/B	Spot light switch	Vanity mirror light switch	Bulb	Wiring harness
	Fuse No. 25	SBF-3	FL 1.25	SBF-4		Fuse No. 15				
Spot light does not come on.	○	○	○				○		○	○
Vanity mirror light does not come on.			○	○	○	○		○	○	○

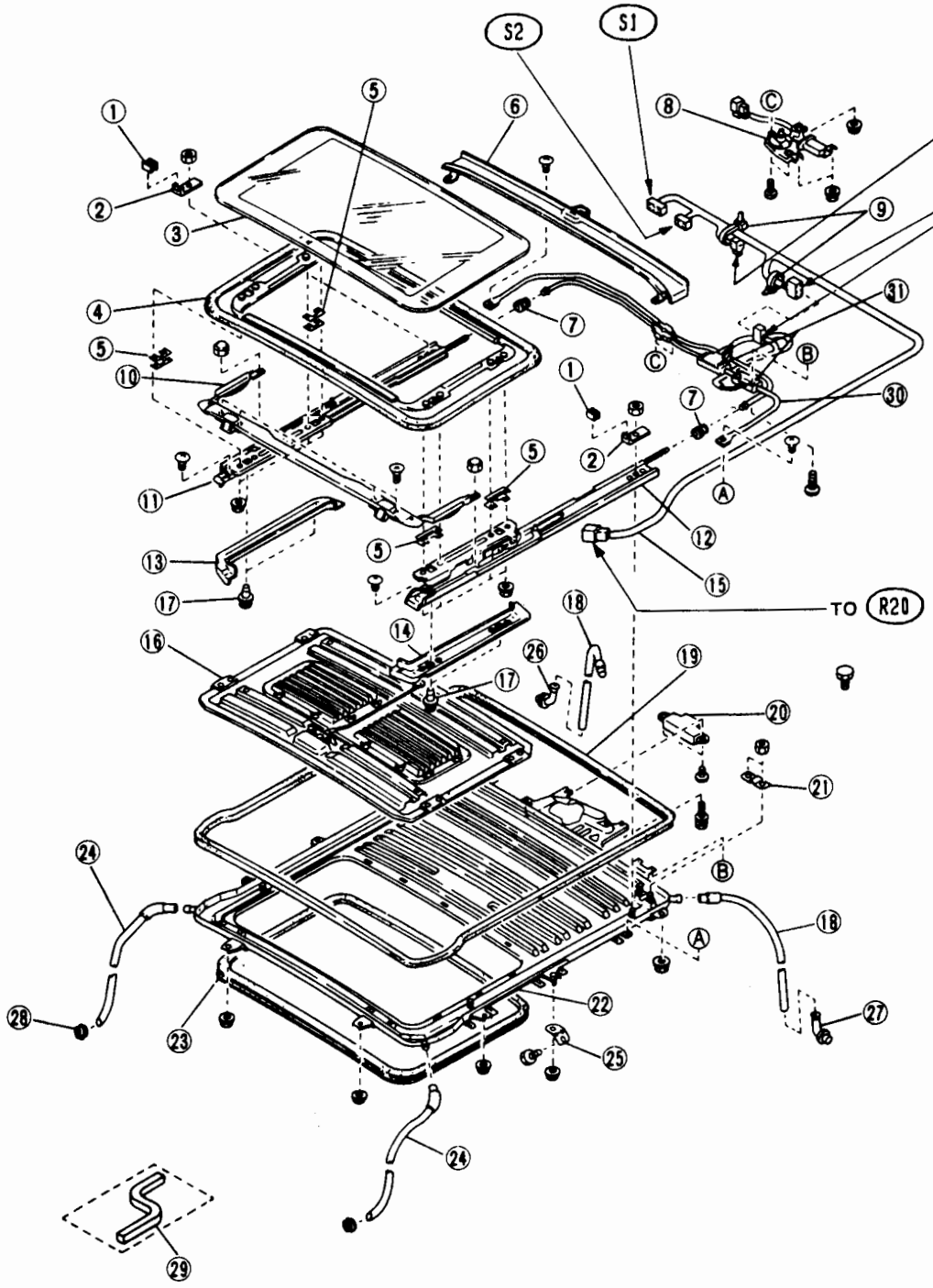
SUNROOF

Symptom	Item to check
Motor emits noise.	(1) Motor for loose installation (2) Gear or bearing for wear (3) Cable for wear (4) Cable pipe for deformities
Motor does not operate or operate abnormally. (Use sunroof wrench to check operation of sunroof.)	(1) Blown fuse (2) Switch for improper function (3) Motor terminal voltage for abnormalities (4) Relay for improper operation (5) Faulty ground (6) Open harness or loose terminal (7) Control unit for improper function (8) Limit switch for improper function



B6-388

Detail of Sunroof Control Unit



1 Spacer
2 Stopper
3 Glass
4 Lid ASSY
5 Shim
6 Drain ASSY
7 Pipe grommet
8 Motor ASSY
9 Band
10 Deflector ASSY
11 Guide rail ASSY (R.H.)
12 Guide rail ASSY (L.H.)
13 Guide rail cover (R.H.)
14 Guide rail cover (L.H.)
15 Harness ASSY
16 Sun shade ASSY
17 Clip
18 Drain tube (rear)
19 Frame weatherstrip
20 Control unit
21 Pipe stopper
22 Frame COMPL.
23 Garnish
24 Drain tube (front)
25 Bracket (A)
26 Rear drain grommet (R.H.)
27 Rear drain grommet (L.H.)
28 Front drain grommet
29 Handle
30 Pipe ASSY
31 Limit switches

B6-512

Fig. 19

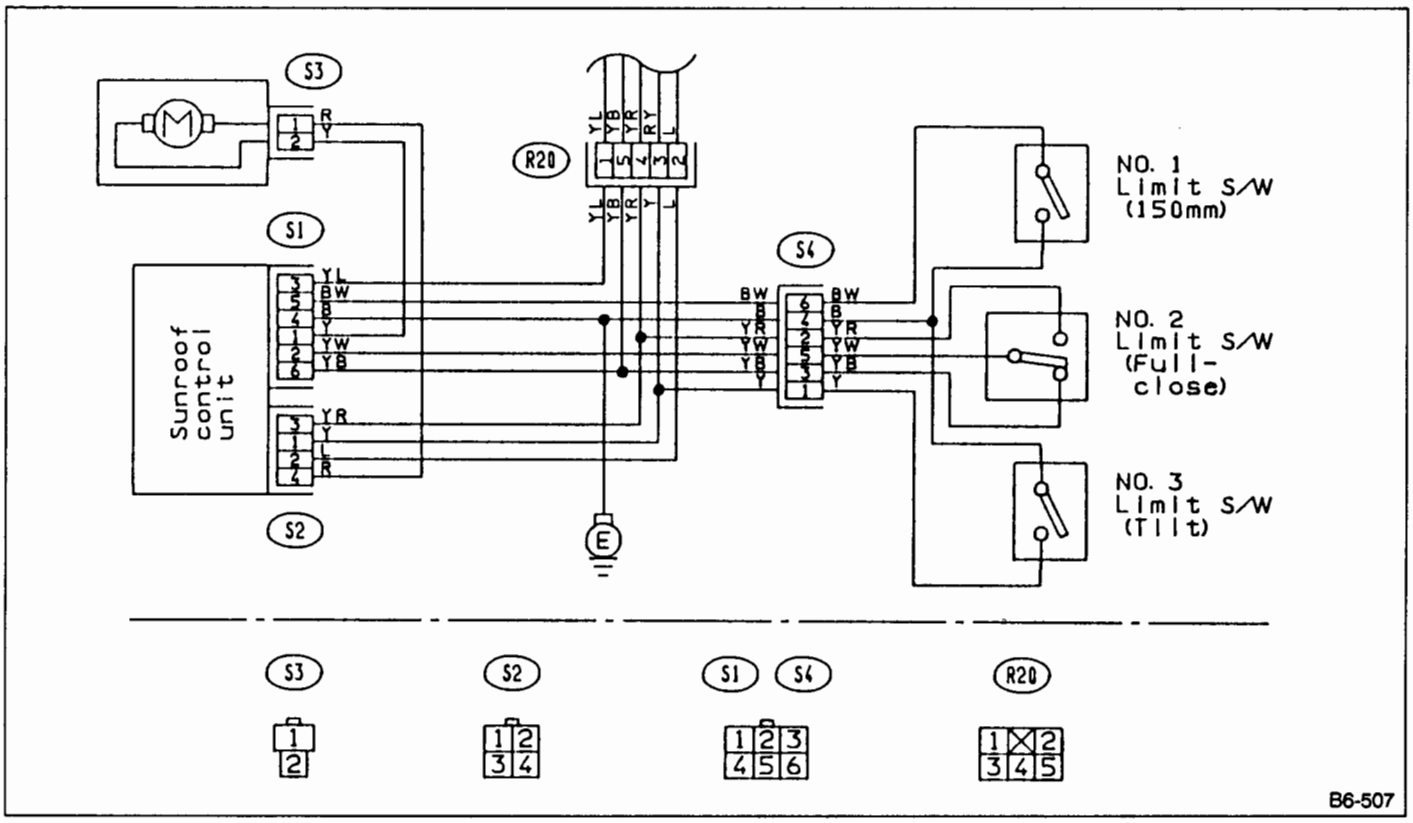
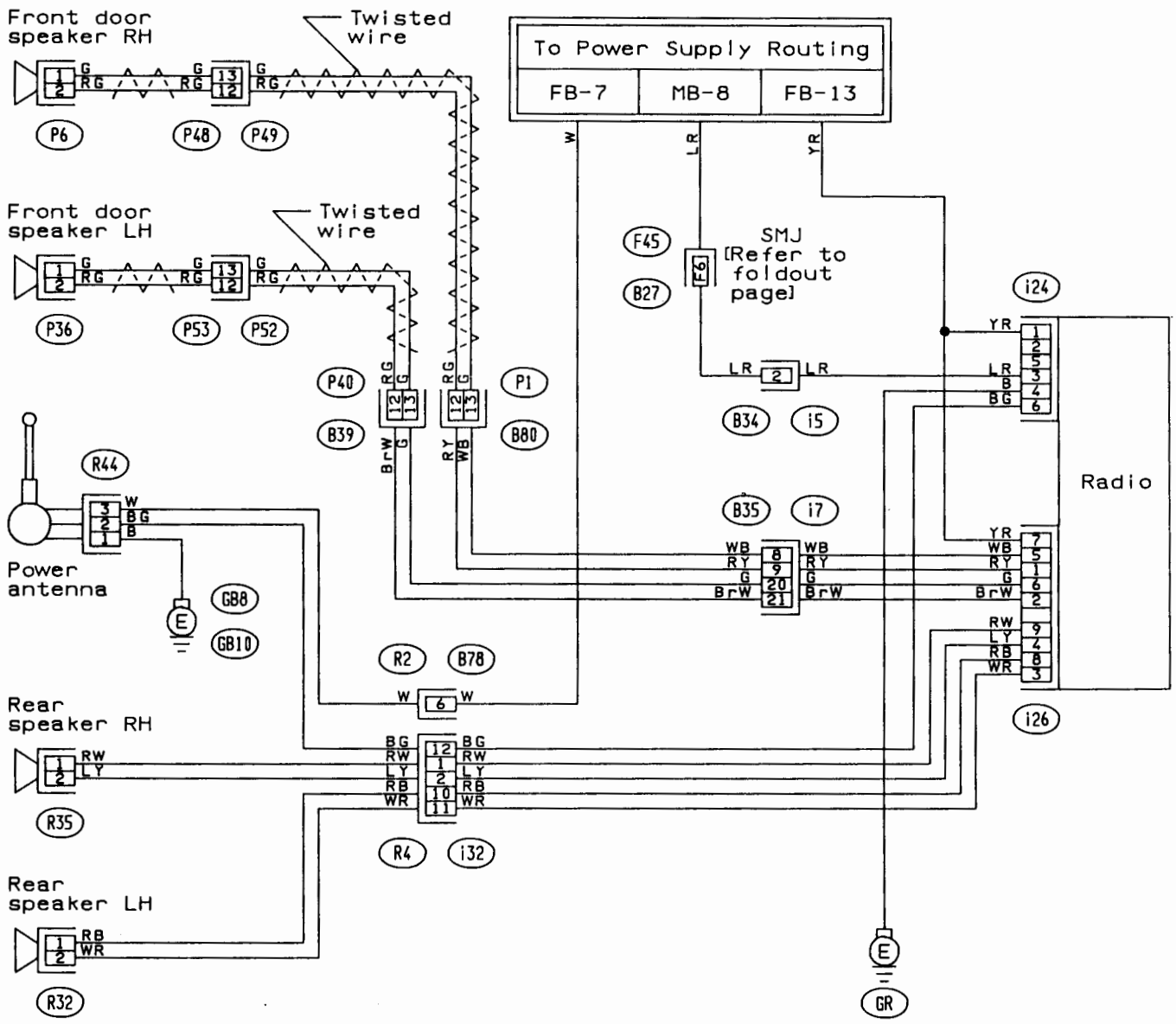


Fig. 20

Limit switch No.	No. 1	No. 2		No. 3
Between terminal of connector (S4) / Sunroof position	6 and 4	2 and 5	3 and 5	1 and 4
FULL CLOSE	○	○	x	x
AUTO STOP before FULL CLOSE	○	x	○	x
TILT UP	○	○	x	○
FULL OPEN	x	x	○	x

○ : Continuity exists
x : Continuity does not exists
Limit switch
No. 1 : 150 mm (5.91 in) limit switch
(AUTO STOP POSITION)
No. 2 : FULL CLOSE limit switch
No. 3 : TILT limit switch

27. RADIO AND POWER ANTENNA S. I. A Model



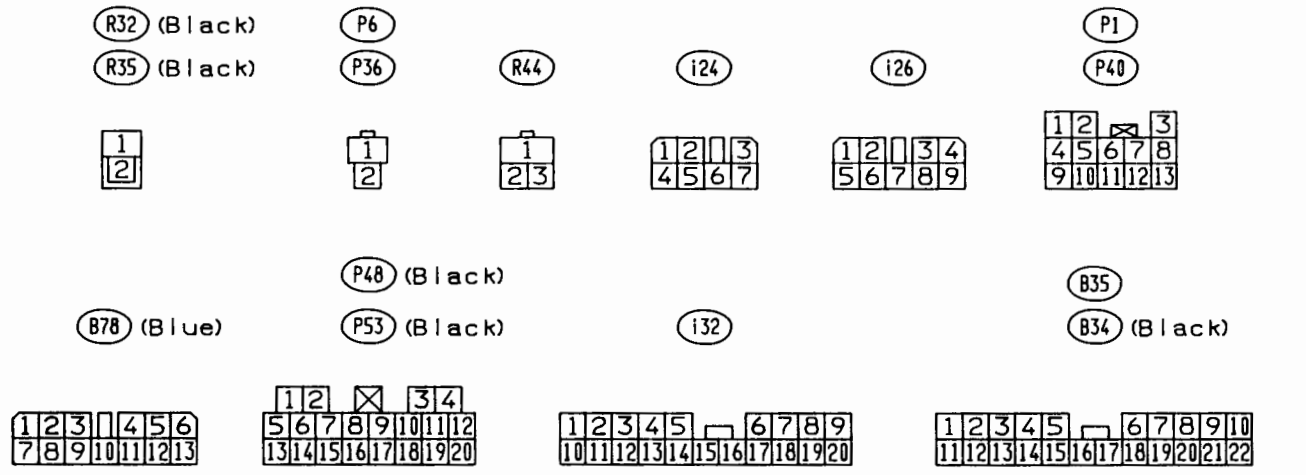
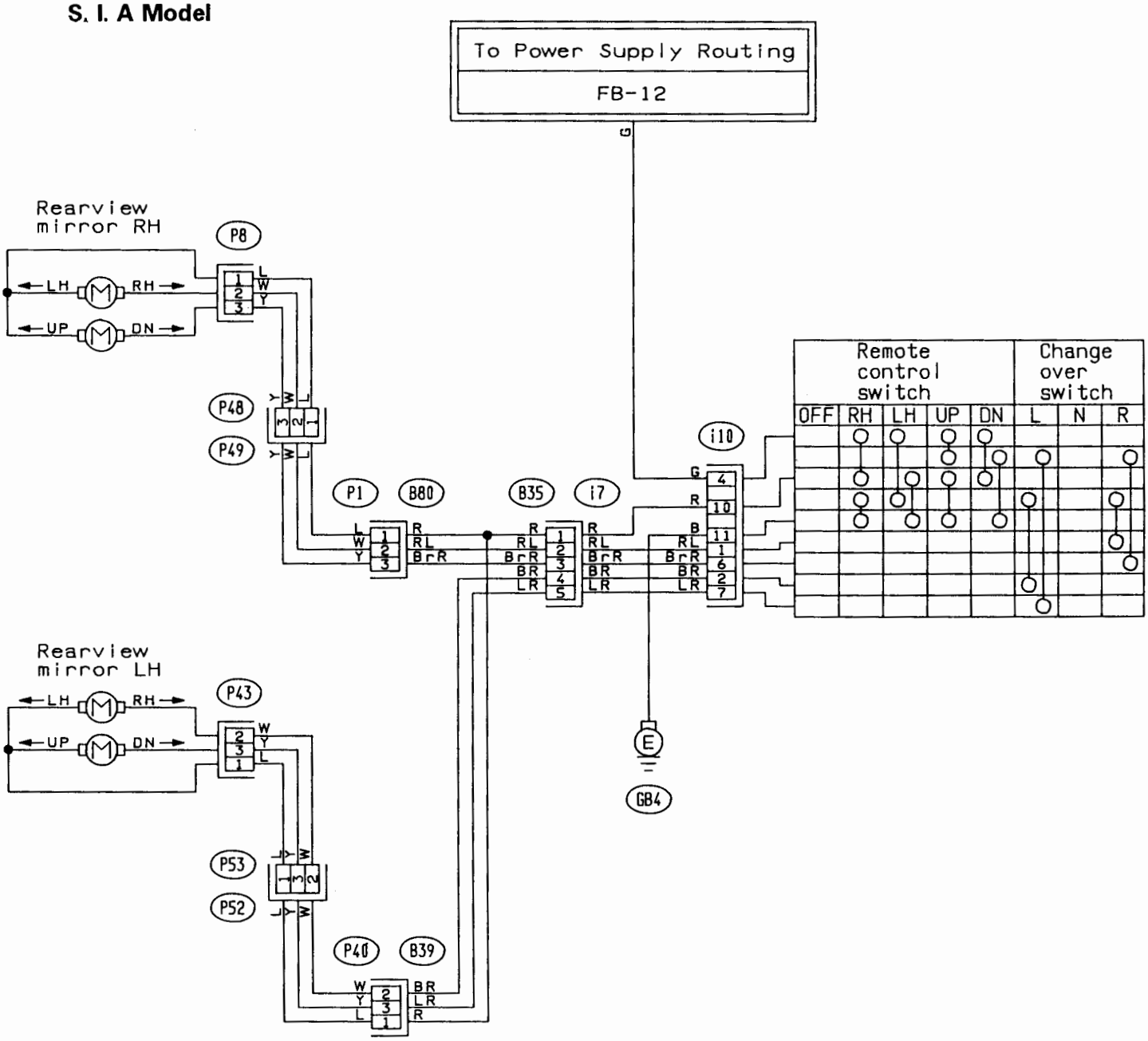


Fig. 21

BU76-02

29. REMOTE CONTROLLED REARVIEW MIRROR
S. I. A Model



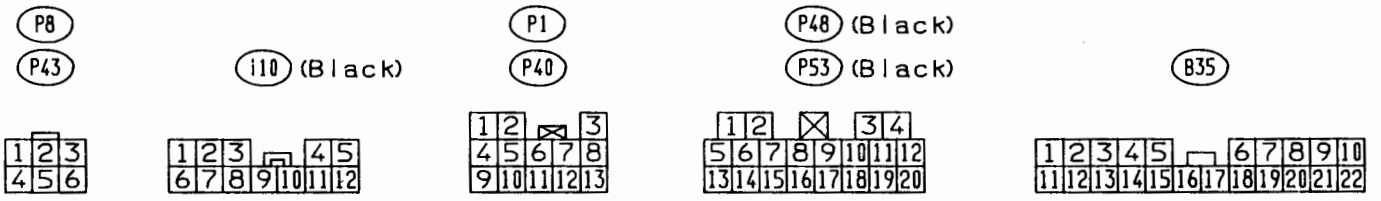
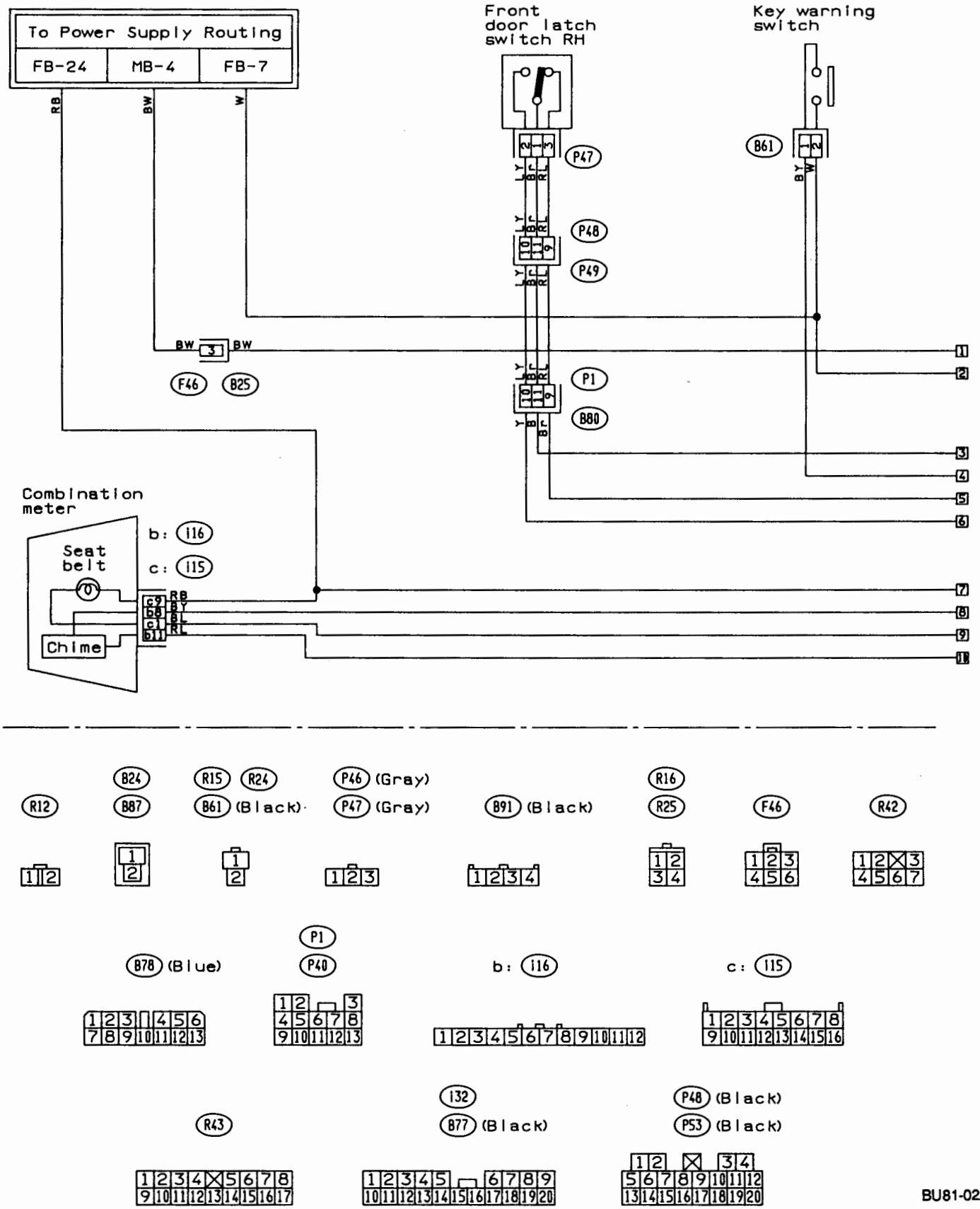


Fig. 22

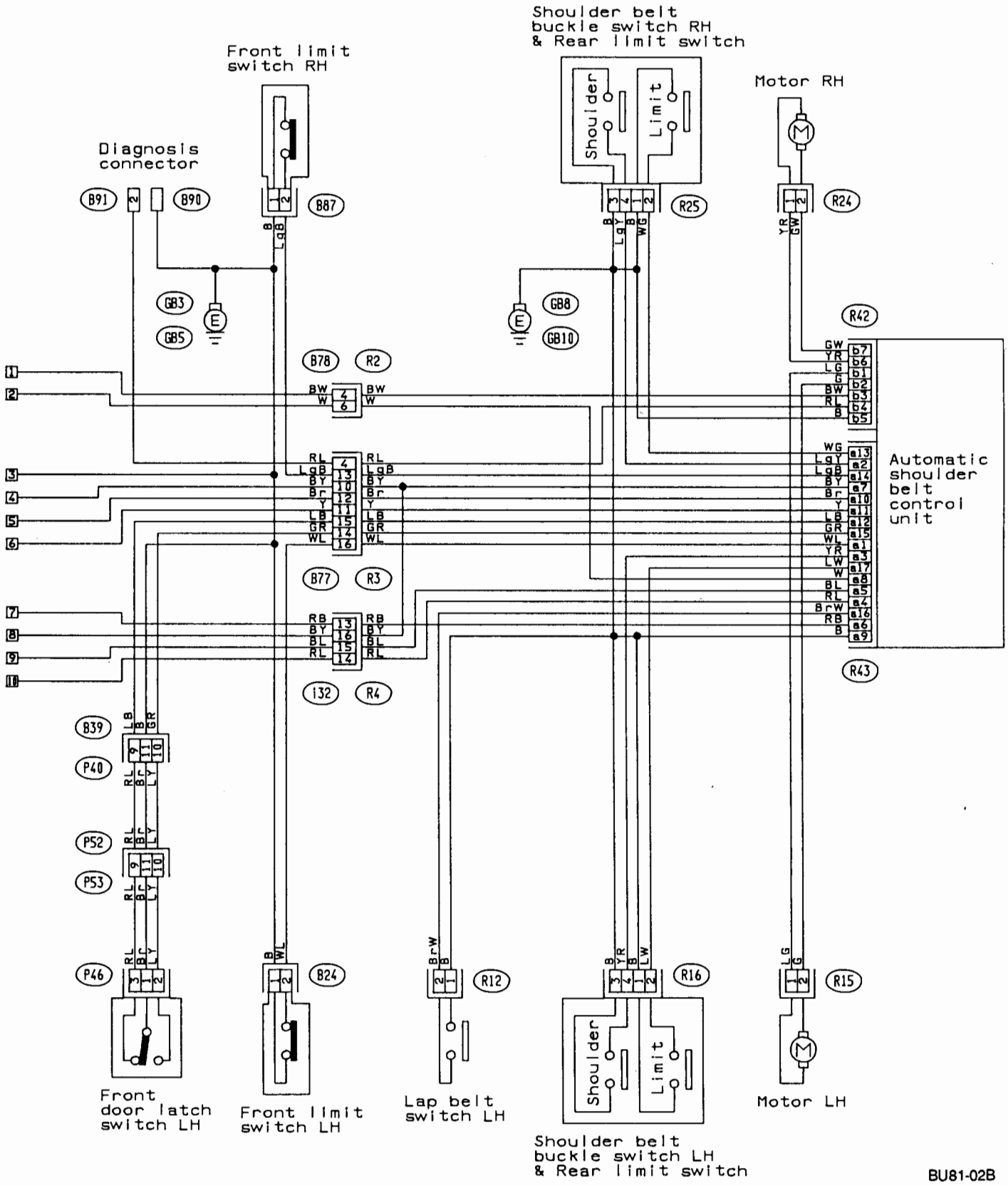
BU79-02

31. AUTOMATIC SHOULDER BELT (SEAT BELT) AND KEY WARNING CHIME
S. I. A MODEL



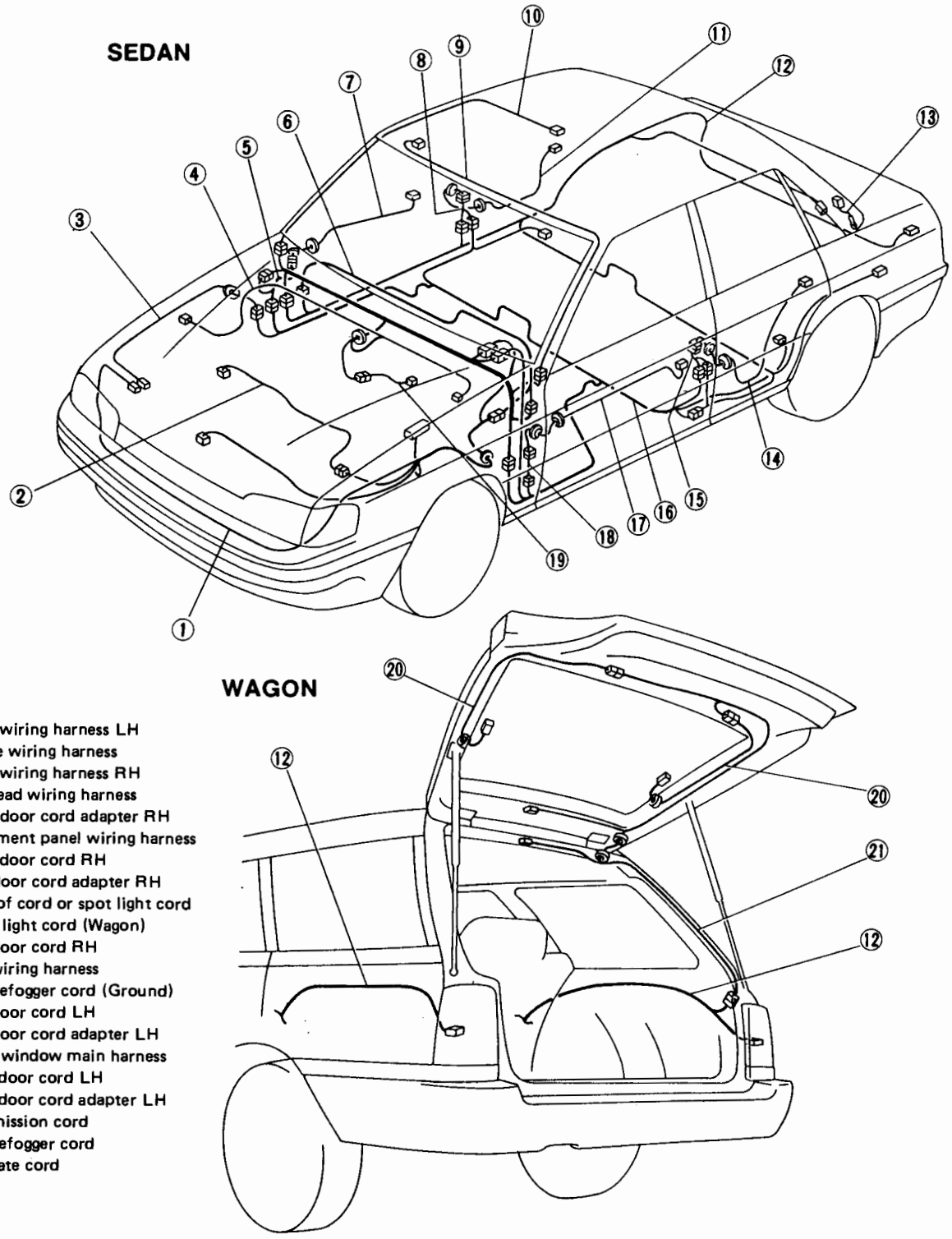
BU81-02A

Fig. 23


Shoulder belt buckle switch RH & Rear limit switch
Front limit switch RH
Motor RH
Diagnosis connector
Automatic shoulder belt control unit
Front door latch switch LH
Front limit switch LH
Lap belt switch LH
Shoulder belt buckle switch LH & Rear limit switch
Motor LH
BU81-02B

7. Electrical Wiring Harness and Ground Point

S.I.A Model



1 Front wiring harness LH
2 Engine wiring harness
3 Front wiring harness RH
4 Bulkhead wiring harness
5 Front door cord adapter RH
6 Instrument panel wiring harness
7 Front door cord RH
8 Rear door cord adapter RH
9 Sunroof cord or spot light cord
10 Room light cord (Wagon)
11 Rear door cord RH
12 Rear wiring harness
13 Rear defogger cord (Ground)
14 Rear door cord LH
15 Rear door cord adapter LH
16 Power window main harness
17 Front door cord LH
18 Front door cord adapter LH
19 Transmission cord
20 Rear defogger cord
21 Rear gate cord

B6-316

Fig. 24

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
P1	13		C-1	B80	Bulkhead wiring harness
P2	2	Pink	C-1	B79	
P3	13		C-1	F1	Front wiring harness LH
P4	3		C-1	P5	Front door cord adapter RH
P5	3		C-1	P4	Power window main harness
P6	2		B-2		Front speaker RH
P7	2	Green	B-2		Front power window motor RH
P8	6		B-2		Remote controlled rear view mirror RH
P9	5		B-2		Front power window sub-switch RH
P10	2	Pink	B-2		Front step light RH
P11	4		B-2		Front door lock actuator
P12	35	Blue	B-2		ABS control unit
P13	6		B-2	R26	Rear wiring harness
P14	3		B-2	P15	Rear door cord RH
P15	3		B-2	P14	Power window main harness
P16	2	Green	B-2		Rear power window motor RH
P17	5		B-2		Rear power window sub-switch RH
P18	4		B-3		Rear door lock actuator RH
P19	2	Pink	B-3		Rear step light RH
P20	2	Gray	B-3		Rear ABS sensor RH
P21	6		C-3		Front door lock switch
P22	6		C-3	R17	Rear wiring harness
P23	2	Green	B-4		Rear power window motor LH
P24	5		B-4		Rear power window sub-switch LH
P25	4		B-4		Rear door lock actuator LH
P26	2	Gray	B-4		Rear ABS sensor LH
P27	2	Pink	C-4		Rear step light LH
P28	3		C-4	P29	Power window main harness
P29	3		C-4	P28	Rear door cord LH
P30	14	Black	C-3	R13	Rear wiring harness
P31	2		C-3		Power window circuit breaker
P32	4		C-3		Power window relay
P33	20		C-3		A/S control unit
P34	16		C-3		
P35	2	Green	C-3		Front power window motor LH
P36	2		C-3		Front speaker LH
P37	9		C-3	P38	Power window main harness
P38	9		C-3	P37	Front door cord adapter LH
P39	3		C-2	B40	Bulkhead wiring harness
P40	13		C-2	B39	
P41	2	Pink	C-2	B38	
P42	40		C-2	B26	Bulkhead wiring harness (SMJ)
P43	16		C-3		Remote controlled rear view mirror LH
P44	14		C-3		Power window main switch
P45	2	Pink	C-3		Front step light LH
P46	3	Gray	C-3		Front door latch switch LH
P47	3	Gray	B-2		Front door latch switch RH
P48	20	Black	B-1	P49	Front door cord adapter RH
P49	20	Black	B-1	P48	Front door cord RH
P50	4		C-2	P51	Front door cord LH
P51	4		C-2	P50	Front door cord adapter LH
P52	20	Black	C-3	P53	Front door cord LH
P53	20	Black	C-3	P52	Front door cord adapter LH
P54	10		B-2	P55	Rear door cord adapter RH
P55	10		B-2	P54	Rear door cord RH
P56	10		B-3	P57	Rear door cord LH
P57	10		B-3	P56	Rear door cord adapter LH

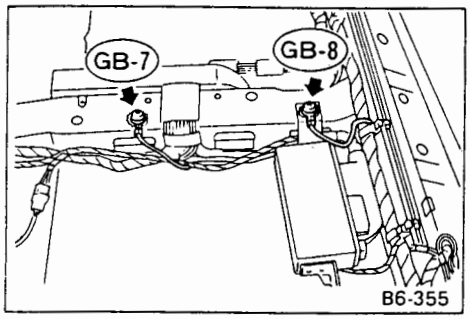
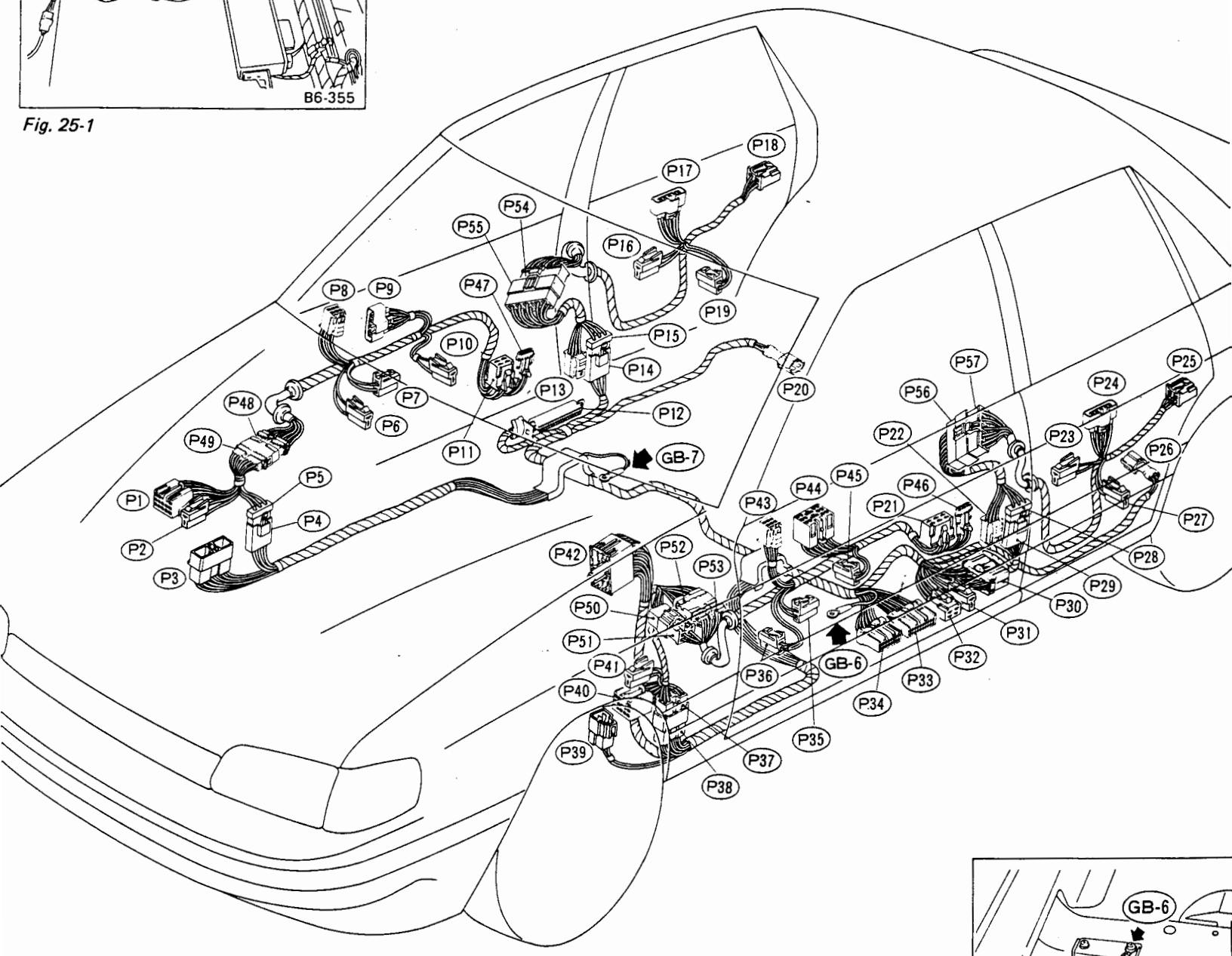


Fig. 25-1



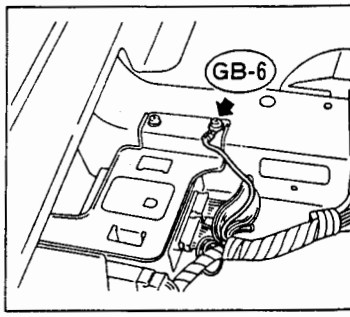


Fig. 25-2