

# SERVICE BRAKES

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E35AA--

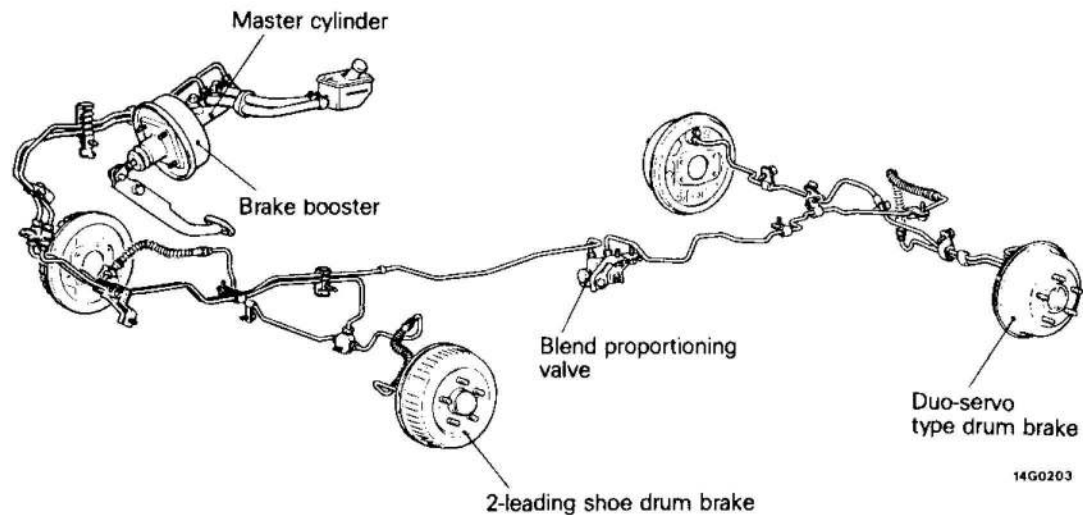
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## GENERAL INFORMATION

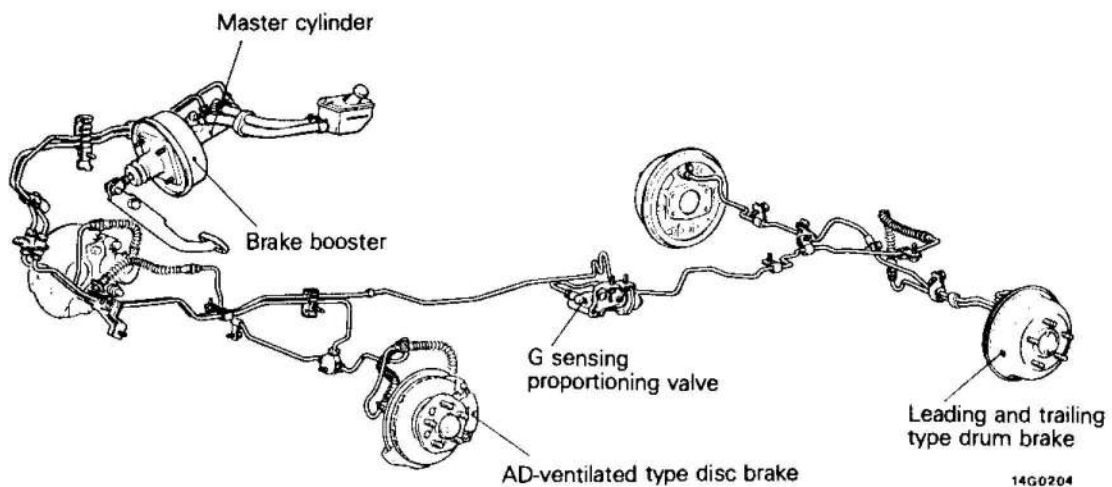
For high reliability and stopping force, the brake system comprises ventilated disc brakes or 2-leading drum brakes for the front wheels and leading-trailing drum brakes or duo-servo drum brakes with automatic adjuster for the rear wheels. A brake booster is also added to reduce the force required for braking. Some models are quipped with a tandem brake booster.

Either a blend proportioning valve, G sensing proportioning valve, or load sensing proportioning valve is provided on all models to stabilize brake efficiency.

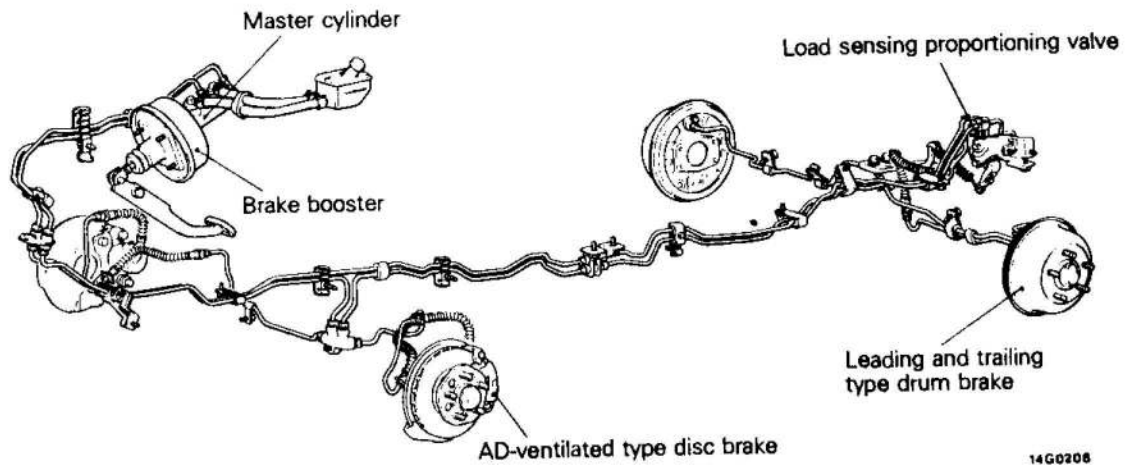
### 2WD (with blend proportioning valve)



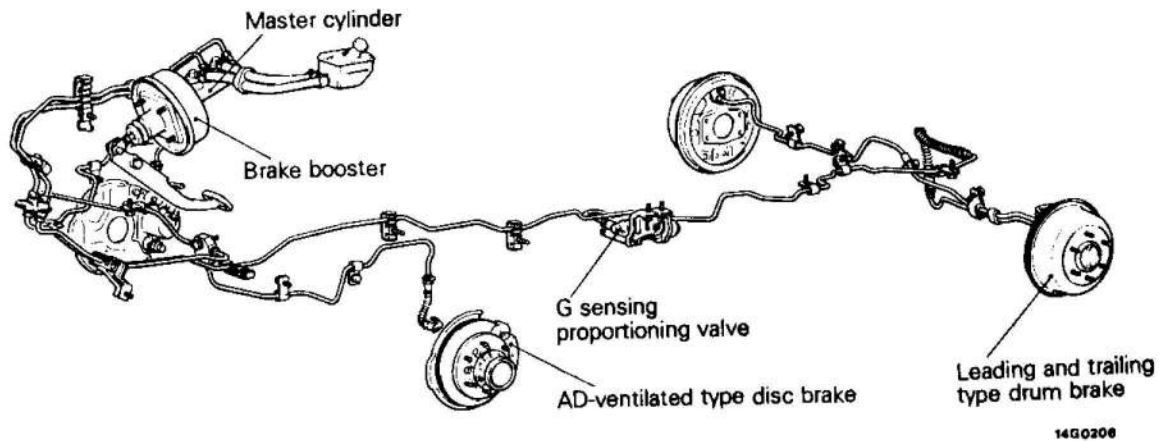
### 2WD (with G sensing proportioning valve)



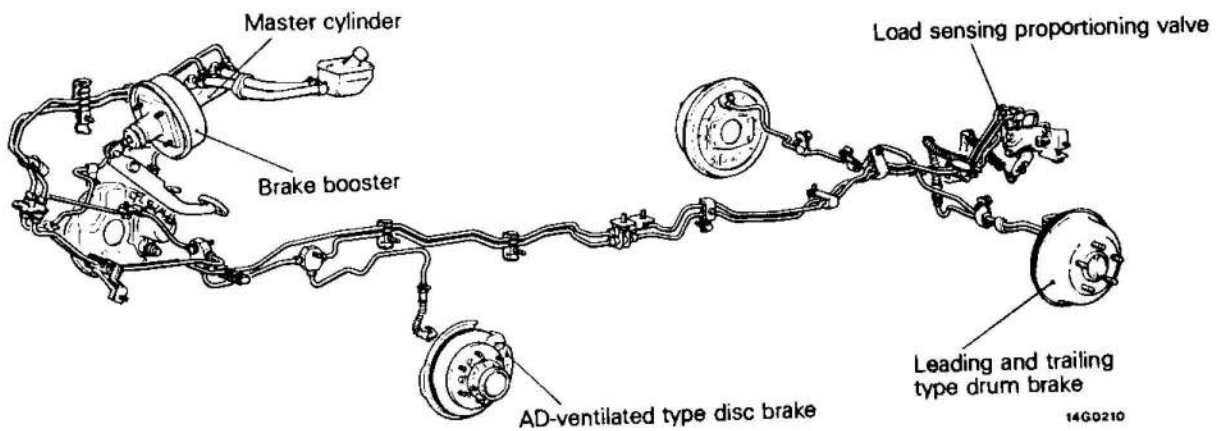
**2WD  
(with load sensing proportioning valve)**



**4WD  
(with G sensing proportioning valve)**



**4WD  
(with load sensing proportioning valve)**



## SPECIFICATIONS

## GENERAL SPECIFICATIONS

Vehicles for Europe

[Applicable through November production, 1987]

Items	P02V, P03V P03W, P04W	P12V, P13V	P23V, P24V P23W, P24W	P05V, P15V P05W
Master cylinder Type I.D. mm (in.)	Tandem type 22.22 (7/8)	Tandem type 23.81 (15/16)	Tandem type 23.81 (15/16)	Tandem type 23.81 (15/16)
Brake booster Type Effective dia. of power cylinder mm (in.) Boosting ratio	Vacuum type, single 230 (9.0) 4.0	Vacuum type, tandem 201+205 (8.0) 5.0	Vacuum type, tandem 201+205 (8.0) 5.0	Vacuum type, single 230 (9.0) 5.0
Pressure control valve Type	Load sensing pro- portioning valve	Load sensing pro- portioning valve	Load sensing pro- portioning valve	Load sensing pro- portioning valve
Front brakes Type Disc O.D. mm (in.) Pad thickness mm (in.) Cylinder I.D. mm (in.) Clearance adjustment	AD-type disc 258 (10.2) 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc 258 (10.2) 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc 277 (10.9) 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc 258 (10.2) 10.5 (0.41) 57.15 (2.25) Automatic
Rear brakes Type Drum I.D. mm (in.) Lining thickness mm (in.) Cylinder I.D. mm (in.) Clearance adjustment	Leading and trail- ing shoe type drum 254 (10.0) 4.6(0.18) 20.64 (13/16) Automatic	Leading and trail- ing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic	Leading and trail- ing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic	Leading and trail- ing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic



[Applicable from December production, 1987]

VAN

Items	P02V, P03V	P05V, P15V	P12V, P13V	P23V, P24V	P25V	P45V*2
Master cylinder Type	Tandem type		Tandem type			
I.D. mm (in.)	22.22 (7/8)		23.81 (15/16)			
Brake booster Type	Vacuum type, single	Vacuum type, single	Vacuum type, tandem		Vacuum type, single	Vacuum type, tandem
Effective dia. of power cylinder mm (in.)	230 (9.0)	230 (9.0)	203 + 230 (8.0 + 9.0)		230 (9.0)	178 + 203 (7.0 + 8.0)
Boosting ratio	4.0	5.0	5.5		5.0	5.5
Pressure control valve Type	Load sensing proportioning valve					
Front brakes Type	AD-type disc			AD-type disc		
Disc O.D. mm (in.)	258 (10.2)			277 (10.9)		
Pad thickness mm (in.)	10.5 (0.41)			10.5 (0.41)		
Cylinder I.D. mm (in.)	57.15 (2 1/4)			57.15 (2 1/4)		
Clearance adjustment	Automatic			Automatic		
Rear brakes Type	Leading and trailing shoe type drum					
Drum I.D. mm (in.)	254 (10.0)					
Lining thickness mm (in.)	4.6 (0.18)					
Cylinder I.D. mm (in.)	20.64 (13/16), 22.22 (7/8)*1					
Clearance adjustment	Automatic					

NOTE

- (1) \*1 indicates vehicles for Sweden.
- (2) \*2 indicates vehicles built from November 1991.

## MINI-BUS

Items	P03W	P05W	P23W, P24W	P25W
Master cylinder Type I.D. mm (in.)	Tandem type 22.22 (7/8)		Tandem type 23.81 (15/16)	
Brake booster Type Effective dia. of power cylinder mm (in.) Boosting ratio	Vacuum type, single 230 (9.0) 4.0	Vacuum type, single 230 (9.0) 5.0	Vacuum type, tandem 203+230 (8.0+9.0) 5.5	Vacuum type, single,* <sup>1</sup> tandem* <sup>2</sup> 230 (9.0)* <sup>1</sup> 178+203 (7.0+8.0)* <sup>2</sup> 5.0* <sup>1</sup> , 5.5* <sup>2</sup>
Pressure control valve Type	Load sensing proportioning valve			
Front brakes Type Disc O.D. mm (in.) Pad thickness mm (in.) Cylinder I.D. mm (in.) Clearance adjustment	AD-type disc 258 (10.2) 10.5 (0.41) 57.15 (2 1/4) Automatic		AD-type disc 277 (10.9) 10.5 (0.41) 57.15 (2 1/4) Automatic	
Rear brakes Type Drum I.D. mm (in.) Lining thickness mm (in.) Cylinder I.D. mm (in.) Clearance adjustment	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic			

## NOTE

\*<sup>1</sup> indicates vehicles built up to November 1988.\*<sup>2</sup> indicates vehicles built from December 1988.

**Vehicles for General Export**  
**[Applicable through June production, 1987]**

Items	P01V P01W	P02V, P02W P03W, P12W	P12V	P23W	P05V, P15V P15W
Master cylinder Type I.D. mm (in.)	Tandem type 23.81 (15/16)	Tandem type 22.22 (7/8)	Tandem type 23.81 (15/16)	Tandem type 22.22 (7/8)	Tandem type 23.81 (15/16)
Brake booster Type Effective dia. of power cylinder mm (in.)  Boosting ratio	Vacuum type, single 180 (7.0)	Vacuum type, single 230 (9.0)	Vacuum type, tandem 201+205 (8.0) [applicable through February production, 1987] 205 (8.0)+230 (9.0) [applicable from March production, 1987] 5.0 [applicable through February production, 1987] 5.5 [applicable from March production, 1987]	Vacuum type, single 230 (9.0)	Vacuum type, single 230 (9.0)
Pressure control valve Type	Blend propor- tioning valve	G sensing proportioning valve	G sensing propor- tioning valve	G sensing proportioning valve	G sensing proportioning valve
Front brakes Type Drum I.D. mm (in.) Disc O.D. mm (in.) Lining thickness mm (in.) Pad thickness mm (in.) Cylinder I.D. mm (in.) Clearance adjustment	2-leading type drum 230 (9.0) – 5.5 (0.22) – 28.57 (1.12) Manual	AD-type disc drum – 258 (10.2) – 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc – 258 (10.2) – 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc – 277 (10.9) – 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc – 258 (10.2) – 10.5 (0.41) 57.15 (2.25) Automatic
Rear brakes Type Drum I.D. mm (in.) Lining thickness mm (in.) Cylinder I.D. mm (in.) Clearance adjustment	Duo-servo type drum 220 (8.7) 4.7 (0.19) 17.46 (11/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6(0.18) 20.64 (13/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic

**Vehicles for General Export**  
**[Applicable through June production, 1987]**

Items	P01V P01W	P02V, P02W P03W, P12W	P12V	P23W	P05V, P15V P15W
Master cylinder Type I.D. mm (in.)	Tandem type 23.81 (15/16)	Tandem type 22.22 (7/8)	Tandem type 23.81 (15/16)	Tandem type 22.22 (7/8)	Tandem type 23.81 (15/16)
Brake booster Type Effective dia. of power cylinder mm (in.)  Boosting ratio	Vacuum type, single 180 (7.0)	Vacuum type, single 230 (9.0)	Vacuum type, tandem 201+205 (8.0) [applicable through February production, 1987] 205 (8.0)+230 (9.0) [applicable from March production, 1987] 5.0 [applicable through February production, 1987] 5.5 [applicable from March production, 1987]	Vacuum type, single 230 (9.0)	Vacuum type, single 230 (9.0)
Pressure control valve Type	Blend propor- tioning valve	G sensing proportioning valve	G sensing propor- tioning valve	G sensing proportioning valve	G sensing proportioning valve
Front brakes Type Drum I.D. mm (in.) Disc O.D. mm (in.) Lining thickness mm (in.) Pad thickness mm (in.) Cylinder I.D. mm (in.) Clearance adjustment	2-leading type drum 230 (9.0) — 5.5 (0.22) — 28.57 (1.12) Manual	AD-type disc — 258 (10.2) — 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc — 258 (10.2) — 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc — 277 (10.9) — 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc — 258 (10.2) — 10.5 (0.41) 57.15 (2.25) Automatic
Rear brakes Type Drum I.D. mm (in.) Lining thickness mm (in.) Cylinder I.D. mm (in.) Clearance adjustment	Duo-servo type drum 220 (8.7) 4.7 (0.19) 17.46 (11/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6(0.18) 20.64 (13/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic

[Applicable from July production, 1987]

Items	P01V P01W	P02V, P03V P06V, P02W P03W	P12V, P16V P13V, P13W	P12W	P23W	P05V, P15V P15W
Master cylinder Type I.D. mm (in.)	Tandem type 23.81 (15/16)	Tandem type 22.22 (7/8)	Tandem type 23.81 (15/16)	Tandem type 22.22 (7/8)	Tandem type 22.22 (7/8)	Tandem type 23.81 (15/16)
Brake booster Type Effective dia. of power cylinder mm (in.) Boosting ratio	Vacuum type, single 180 (7.0) 2.7	Vacuum type, single 230 (9.0) 4.0	Vacuum type, tandem 205 (8.0)+ 230 (9.0) 5.5	Vacuum type, tandem 205 (8.0)+ 230 (9.0) 5.5	Vacuum type, tandem 205 (8.0)+ 230 (9.0) 5.5	Vacuum type, single 230 (9.0) 5.0
Pressure control valve Type	Blend propor- tioning valve	G sensing proportioning valve	G sensing proportioning valve	G sensing proportioning valve	G sensing proportioning valve	G sensing proportioning valve
Front brakes Type Drum I.D. mm (in.) Disc O.D. mm (in.) Lining thickness mm (in.) Pad thickness mm (in.) Cylinder I.D. mm (in.) Clearance adjustment	2-leading type drum 230 (9.0) — 5.5 (0.22) — 28.57 (1.12) Manual	AD-type disc — 258 (10.2) — 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc — 258 (10.2) — 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc — 258 (10.2) — 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc — 277 (10.9) — 10.5 (0.41) 57.15 (2.25) Automatic	AD-type disc — 258 (10.2) — 10.5 (0.41) 57.15 (2.25) Automatic
Rear brakes Type Drum I.D. mm (in.) Lining thickness mm (in.) Cylinder I.D. mm (in.) Clearance adjustment	Duo-servo type drum 220 (8.7) 4.7 (0.19) 17.46 (11/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic

Vehicles for Australia

Items	P03V, P03W	P05V, P15V	P13V, P14V, P04W	P24V, P24W
Master cylinder Type I.D. mm (in.)	Tandem type 22.22 (7/8)	Tandem type 23.81 (15/16)		
Brake booster Type Effective dia. of power cylinder mm (in.) Boosting ratio	Vacuum type, single 230 (9.0) 4.0	Vacuum type, single 230 (9.0) 5.0	Vacuum type, tandem 201+205 (7.0+9.0)* <sup>1</sup> 203+230 (8.0+9.0)* <sup>2</sup> 5.0* <sup>1</sup> , 5.5* <sup>2</sup>	
Pressure control valve Type	Load sensing proportioning valve			
Front brakes Type Disc O.D. mm (in.) Pad thickness mm (in.) Cylinder I.D. mm (in.) Clearance adjustment	AD-type disc 258 (10.2) 10.5 (0.41) 57.15 (2 1/4) Automatic		AD-type disc 277 (10.9) 10.5 (0.41) 57.15 (2 1/4) Automatic	
Rear brakes Type Drum I.D. mm (in.) Lining thickness mm (in.) Cylinder I.D. mm (in.) Clearance adjustment	Leading and trailing shoe type drum 254 (10.0) 4.6 (0.18) 20.64 (13/16) Automatic			

NOTE

- \*1 indicates vehicles built up to October 1987.
- \*2 indicates vehicles built from November 1987.

## SERVICE SPECIFICATIONS

Item	Specifications
Standard value	
Brake pedal height	mm (in.) 196–201 (7.72–7.91)
Brake pedal free play	mm (in.)
Vehicles with front drum brake	10–15 (0.39–0.59)
Vehicles with front disc brake	3–8 (0.12–0.31)
Brake pedal to toeboard clearance	mm (in.) 90 (3.54) or more
Brake booster operating test	
Air-tightness test with no load	kPa (kg/cm <sup>2</sup> , mmHg) 3.3 (0.03, 25) or less
Air-tightness test under load	kPa (kg/cm <sup>2</sup> , mmHg) 3.3 (0.03, 25) or less
Boosting function test	MPa (kg/cm <sup>2</sup> , psi)
At 100 N (10 kg, 22 lbs.) foot force	
7 inch brake booster	1.0–2.5 (10–25, 142–356)
7+8 inch tandem brake booster	2.5–4.0 (25–40, 356–569)
8 inch tandem brake booster	2.0–3.5 (20–35, 284–498)
9 inch brake booster	2.0–3.5 (20–35, 284–498)
8+9 inch tandem brake booster	2.5–4.0 (25–40, 356–569)
At 300 N (30 kg, 66 lbs.) foot force	
7 inch brake booster	5.0–6.5 (50–65, 711–924)
7+8 inch tandem brake booster	8.0–10.0 (80–100, 1,138–1,422)
8 inch tandem brake booster	9.0–11.0 (90–100, 1,280–1,564)
9 inch brake booster	
7/8 inch master cylinder	7.5–9.5 (75–95, 1,067–1,351)
15/16 inch master cylinder	6.5–8.5 (65–85, 924–1,209)
8+9 inch tandem brake booster	10.0–12.5 (100–125, 1422–1,778)
Non-boosting function test	MPa (kg/cm <sup>2</sup> , psi)
At 100 N (10 kg, 22 lbs.) foot force	0.20 (2, 28.4)
At 300 N (30 kg, 66 lbs.) foot force	1.7 (17, 242)
Load sensing spring length	mm (in.)
Standard body	176–179 (6.93–7.05)
Long body <2WD>	176.5–179.5 (6.95–7.07)
Long body <4WD>	176–179 (6.93–7.05)
Load sensing proportioning valve function test	MPa (kg/cm <sup>2</sup> , psi)
No load	
At 6.0 MPa (60 kg/cm <sup>2</sup> , 853 psi) input pressure	
Identifying colour–Orange	1.45–2.05 (14.5–20.5, 206.2–291.6)
Identifying colour–Purple	1.75–2.35 (17.5–23.5, 248.9–334.2)
Identifying colour–Light blue	2.22–2.82 (22.2–28.2, 315.8–401.1)
Identifying colour–Yellow	1.47–2.07 (14.7–20.7, 209.1–294.4)
Identifying colour–Green	0.95–1.55 (9.5–15.5, 135.1–220.5)
Identifying colour–Black	1.28–1.88 (12.8–18.8, 182.1–267.4)
Identifying colour–Blue	0.50–1.10 (5.0–11.0, 71.1–156.5)
At 14.0 MPa (140 kg/cm <sup>2</sup> , 1,991 psi) input pressure	
Identifying colour–Orange	2.35–3.55 (23.5–35.5, 334.2–504.9)
Identifying colour–Purple	2.65–3.85 (26.5–38.5, 376.9–547.6)
Identifying colour–Light blue	3.12–4.32 (31.2–43.2, 443.8–614.4)
Identifying colour–Yellow	1.57–2.77 (15.7–27.7, 223.3–394.4)
Identifying colour–Green	1.05–2.25 (10.5–22.5, 149.3–320.0)



Item	Specifications
Identifying colour-Black	1.38-2.58 (13.8-25.8, 196.3-367.0)
Identifying colour-Blue	0.60-1.80 (6.0-18.0, 85.3-256.0)
Under load [At 14.0 MPa (140 kg/cm <sup>2</sup> , 1,991 psi) input pressure]	
Identifying colour-Orange	4.52-6.52 (45.2-65.2, 642.9-927.4)
Identifying colour-Purple	4.46-6.46 (44.6-64.6, 634.4-918.8)
Identifying colour-Light blue	7.22-9.22 (72.2-92.2, 1,026.9-1,311.4)
Identifying colour-Yellow	5.40-7.40 (54.0-74.0, 768.1-1,052.5)
Identifying colour-Green	2.98-4.98 (29.8-49.8, 423.9-708.3)
Identifying colour-Black	4.02-6.02 (40.2-60.2, 571.8-856.2)
Identifying colour-Blue	4.75-6.75 (47.5-67.5, 675.6-960.1)
Blend proportioning valve function test MPa (kg/cm <sup>2</sup> , psi)	
At 2.5 MPa (25 kg/cm <sup>2</sup> , 356 psi) input pressure	1.8-2.2 (18.0-22.0, 256-313)
At 4.0 MPa (40 kg/cm <sup>2</sup> , 569 psi) input pressure	2.69-3.29 (26.9-32.9, 383-468)
G sensing proportioning valve function test MPa (kg/cm <sup>2</sup> , psi)	
When equivalent with no load	
At 4.0 MPa (40 kg/cm <sup>2</sup> , 569 psi) input pressure	1.45-2.05 (14.5-20.5, 206-292)
When equivalent with no load	
At 9.0 MPa (90 kg/cm <sup>2</sup> , 1280 psi) input pressure	3.42-5.02 (34.2-50.2, 486-714)
Booster push rod to master cylinder piston clearance mm (in.)	
Vehicles with front drum brake	0.4-0.8 (0.016-0.031)
Vehicles with front disc brake	1.5-1.9 (0.059-0.075)
Brake dragging force N (kg, lbs.)	57 (5.7, 13.1) or less
[Brake dragging torque Nm (kgm, ft.lbs.)]	[4 (0.4, 3) or less]
Limit	
Pad thickness mm (in.)	2.0 (0.079)
Disc thickness mm (in.)	20.4 (0.803)
Brake disc runout mm (in.)	0.10 (0.0039)
Lining thickness mm (in.)	1.0 (0.039)
Front Drum I.D. mm (in.)	232.0 (9.134)
Rear Drum I.D. mm (in.)	256.0 (10.079)

TORQUE SPECIFICATIONS

E35CC-

Items	Nm	kgm	ft.lbs.
Clutch shaft	19-28	1.9-2.8	14-21
Bolt	19-28	1.9-2.8	14-21
Assist spring rod nut	9-14	0.9-1.4	7-10
Pipe assembly	9-14	0.9-1.4	7-10
Brake line flare nut	13-17	1.3-1.7	9-12
Stopper bolt	6-9	0.6-0.9	4.4-6.6
Steering column assembly	14-20	1.4-2.0	10-15
Steering column assembly (Vehicles for Europe)	9-14	0.9-1.4	7-10
Pedal assembly	14-20	1.4-2.0	10-15
Fitting	15-18	1.5-1.8	11-13

Items	Nm	kgm	ft.lbs.
Brake booster mounting nut	11–17	1.1–1.7	8–12
Vacuum switch	20–25	2.0–2.5	14–18
Wheel cylinder to backing plate (front)	14–18	1.4–1.8	10–13
Bleeder screw	7–9	0.7–0.9	5.2–6.6
Stooper to shoe adjusting screw	1.4–1.9	0.14–0.19	1.0–1.4
Front brake assembly installation bolt	80–100	8.0–10.0	59–74
Front brake assembly installation screw	3–5	0.3–0.5	2.2–3.7
Lock pin bolt	32–42	3.2–4.2	24–31
Guide pin bolt	40–50	4.0–5.0	30–37
Wheel cylinder to backing plate (rear, duo-servo type drum brake)	8–12	0.8–1.2	6–9
Wheel cylinder to backing plate (rear, leading and trailing shoe type drum brake)	18–21	1.8–2.1	13–15

## LUBRICANTS

E35CD--

Items	Specified lubricant	Quantity
Brake fluid	DOT3 or DOT4	As required
Brake pedal bushing, brake pedal, clutch pedal and pipe assembly	Chassis grease SAE J310, NLGI No. 0	Small quantity
Clevis pin and washer	Wheel bearing grease SAE J310, NLGI No. 2	Small quantity
Brake booster inner parts Push rod seal lip, push rod perimeter, push rod body perimeter, reaction disc, bearing and valve body seal lip, diaphragm, plate and valve body, diaphragm to shell, push rod poppet primer contact surface	Silicon grease	Small quantity
Guide pin sleeve, guide pin boot, lock pin sleeve, lock pin boot, piston seal, piston, piston boot	Repair kit grease (orange)	As required
Brake piston and wheel cylinder	Repair kit grease (orange)	As required
Contacting surfaces at the shoe assemblies and backing plate	Brake grease SAE J310, NLGI No. 1	Small quantity
Rotating portion of the shoe adjuster assembly	Brake grease SAE J310, NLGI No. 1	Small quantity
Wheel cylinder boot	Repair kit grease (orange)	Small quantity
Anchor plates and piston ends	Brake grease SAE J310, NLGI No. 1	Small quantity
Strut and adjusting lever contact sur- face	Brake grease SAE J310, NLGI No. 1	Small quantity
Strut and rear brake shoe contact surface	Brake grease SAE J310, NLGI No. 1	Small quantity
Cable guide and adjusting wire contact surface	Brake grease SAE J310, NLGI No. 1	Small quantity

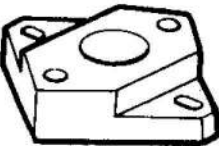
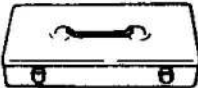
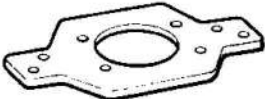


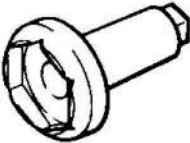


## SEALANTS AND ADHESIVES

E35CE--

Items	Specified sealants and adhesives	Remarks
Thread part of fitting	3M ATD Part No. 8663, 8661 or equiv- alent	Semi-drying sealant
Thread part of vacuum switch	3M ATD Part No. 8659, 8082 or equiva- lent	Non-drying sealant
Shoe hold-down pin Wheel cylinder	3M ATD Part No. 8513 or equivalent	Drying sealant

SPECIAL TOOLS

E360A--

Tool (Number and name)	Use	Tool (Number and name)	Use
<p>MB990750 Brake booster holder</p> 	<p>Disassembly and reassembly of the brake booster</p>	<p>MB990964 Brake tool set</p>  <p>MB990965 Brake tool box</p>	
<p>MB990749 Lever attachment</p> 	<p>Disassembly and reassembly of the brake booster</p>	<p>MB990520 (CT1092) Piston expander</p>  <p>MB990806 Brake spring remover and installer</p> 	<p>Pushing-in of the front disc brake piston</p>
<p>MB991224 Socket</p> 	<p>Disassembly and reassembly of the 8 inch tandem brake booster</p>	 <p>MB990619-(A) MB990620-(B) MB990621-(C) MB990623-(D) MB990773-(E) MB991008-(F) MB991178-(G) Piston cup installer</p>	<p>Installation of drum brake wheel cylinder piston cup</p>
<p>MB991247 Wrench</p> 	<p>Disassembly and reassembly of the 8+9 inch tandem brake booster</p>		

## TROUBLESHOOTING

Symptom	Probable cause	Remedy	Reference page
Vehicle pulls to one side when brakes are applied	Grease or oil on pad or lining surface	Replace	35-21, 62, 67, 72, 76, 79
	Inadequate contact of pad or lining	Correct	35-21, 62, 67, 72, 76, 79
	Auto adjuster malfunction	Adjust	-
	Drum eccentricity or uneven wear	Repair or replace as necessary	35-62, 72, 76, 79
Insufficient braking power	Low or deteriorated brake fluid	Replenish or change	-
	Air in brake system	Bleed air	35-20
	Overheated brake rotor due to dragging of pad or lining	Correct	-
	Grease or oil on pad surface	Replace	35-21, 62, 67, 72, 76, 79
	Inadequate contact of pad or lining	Correct	35-21, 62, 67, 72, 76, 79
	Brake booster malfunction	Correct	35-35, 37
	Auto adjuster malfunction	Adjust	-
	Clogged brake line	Correct	-
Increased pedal stroke (Reduced pedal to floorboard clearance)	Proportioning valve malfunction	Replace	35-56, 57, 58, 59, 60
	Air in brake system	Bleed air	35-20
	Worn lining or pad	Replace	35-21, 62, 67, 72, 76, 79
	Broken vacuum hose	Replace	35-36, 38
	Brake fluid leaks	Correct	35-56, 57, 58, 59, 60
	Auto adjuster malfunction	Adjust	-
	Excessive push rod to master cylinder clearance	Adjust	35-32
	Faulty master cylinder	Replace	35-33
Brake drag	Incomplete release of parking brake	Correct	-
	Incorrect parking brake adjustment	Adjust	-
	Worn brake pedal return spring	Replace	35-23, 25, 27, 29
	Broken drum brake shoe return spring	Replace	35-62, 72, 76, 79
	Lack of lubrication in sliding parts	Lubricate	35-63, 71, 74, 77, 81
	Insufficient push rod to master cylinder clearance	Adjust	35-32
	Defective master cylinder piston return spring	Replace	35-33
	Clogged master cylinder return port	Correct	35-33
Insufficient parking brake function	Worn brake lining	Replace	35-68
	Excessive parking brake lever stroke	Adjust the parking brake lever stroke or check the parking brake cable routing	-
	Grease or oil on lining surface	Replace	35-62, 72, 76, 79
	Auto adjuster malfunction	Adjust	35-78, 81
	Parking brake cable sticking	Replace	-

Symptom	Probable cause	Remedy	Reference page
Insufficient parking brake function	Sticked wheel cylinder or caliper piston	Replace	35-64, 82
Scraping or grinding noise when brakes are applied	Worn brake linings	Replace	35-62, 72, 76, 79
	Caliper to wheel interference	Correct or replace	35-62, 72, 76, 79
	Dust cover to drum interference	Correct or replace	35-62, 72, 76, 79
	Bent brake backing plate	Correct or replace	35-62, 72, 76, 79
	Cracked drums or brake disc	Correct or replace	35-62, 67, 72, 76, 79
Squealing, groaning or chattering noise when brakes are applied	Disc brakes-missing or damaged brake pad anti-squeak shim	Replace	35-67
	Brake drums and lining, discs and pads worn or scored	Correct or replace	35-62, 67, 72, 76, 79
	Improper lining parts	Correct or replace	35-62, 72, 76, 79
	Disc brakes-burred or rusted calipers	Clean or deburr	35-67
	Dirty, greased, contaminated or glazed linings	Clean or replace	35-62, 72, 76, 79
	Drum brakes-weak damaged or incorrect shoe hold-down springs, loose or damaged shoe hold-down pins and springs	Correct or replace	35-62, 72, 76, 79
	Maladjustment of brake pedal or booster push rod	Adjust	35-23, 25, 27, 29, 32
Squealing noise when brakes are not applied	Bent or warped backing plate causing interference with drum	Replace	-
	Improper machining of drum causing interference with backing plate or shoe	Replace drum	35-62, 72, 76, 79
	Disc brakes-rusted, stuck	Lubricate or replace	35-67
	Worn, damaged or insufficiently lubricated wheel bearings Drum brakes-weak, damaged or incorrect shoe-to-shoe spring	Lubricate or replace	-
	Loose or extra parts in brakes	Retighten	-
	Improper positioning of pads in caliper	Correct	35-67
	Improper installation of support mounting to caliper body	Correct	35-67
	Poor return of brake booster or master cylinder or wheel cylinder	Replace	35-31, 36, 38
	Maladjustment of brake pedal or booster push rod	Adjust	35-23, 25, 27, 29, 32
Groaning, clicking or ratting noise when brakes are not applied	Stones of foreign material trapped inside wheel covers	Remove stones, etc.	-
	Loose wheel nuts	Retighten	-
	Disc brake-failure of shim	Replace	35-68
	Disc brakes-loose installation bolt	Retighten	35-67
	Worn, damaged or dry wheel bearings	Lubricate or replace	-
	Maladjustment of brake pedal or booster push rod	Adjust	35-23, 25, 27, 29, 32

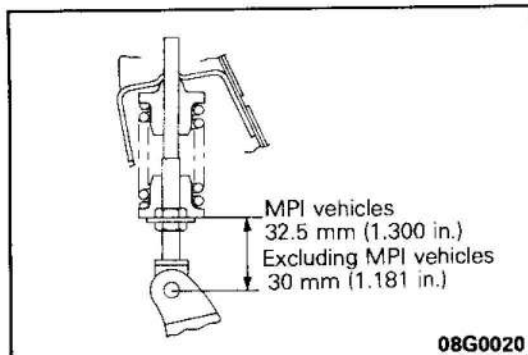
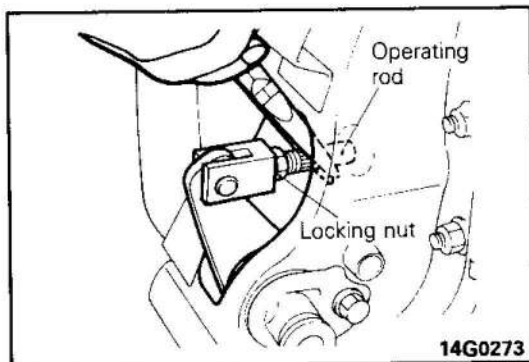
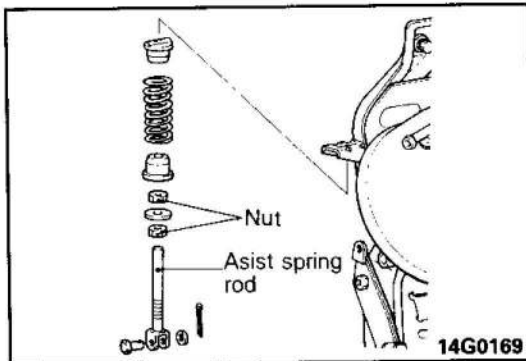
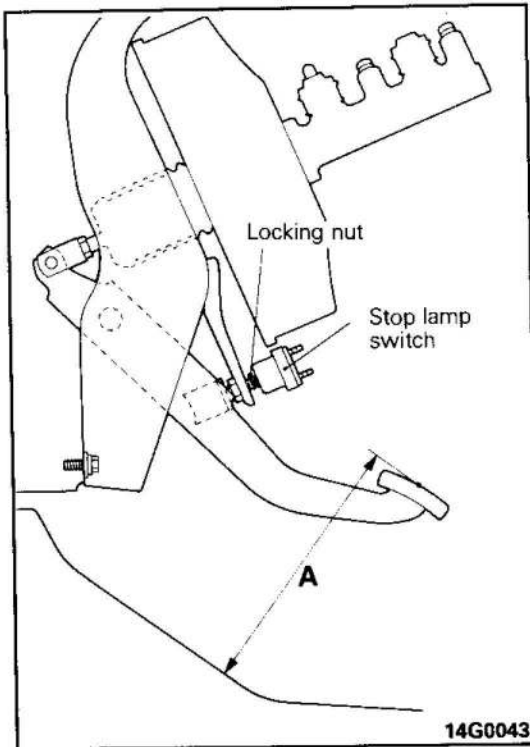
## SERVICE ADJUSTMENT PROCEDURES

### BRAKE PEDAL INSPECTION AND ADJUSTMENT <sup>E35FAAB</sup>

1. Measure the brake pedal height as illustrated. If the brake pedal height is not within the standard value, adjust as follows.

**Standard value (A): 196 – 202 mm (7.72 – 7.95 in.)**

- (1) Disconnect the stop lamp switch connector, and then loosen the locking nut.  
Move the stop lamp switch to a position where it does not contact the brake pedal arm.

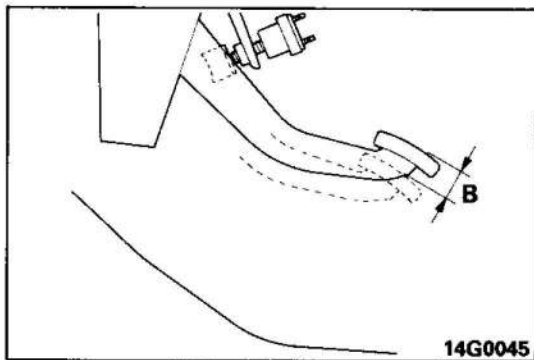
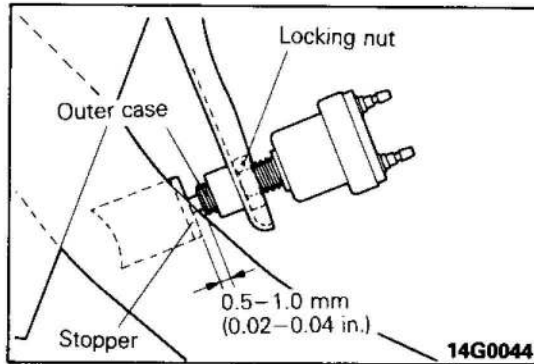


- (2) For models equipped with hydraulic clutch, loosen assist spring rod nut to detach from clutch pedal.

- (3) Loosen operating rod lock nut. Turn serrated part of operating rod with long nosed pliers to adjust brake pedal height to standard value.
- (4) Tighten operating rod lock nut.

- (5) For models equipped with hydraulic clutch, connect assist spring rod to clutch pedal. Adjust spring length with nut as shown in the figure, with clutch pedal touching stopper.





- (6) After screwing in the stop lamp switch until it contacts the brake pedal stopper (just before the brake pedal is caused to move), return the stop lamp switch 1/2 to 1 turn and secure by tightening the lock nut.
- (7) Connect the connector of the stop lamp switch.
- (8) Check to be sure that the stop lamp is not illuminated with the brake pedal undepressed.

2. While the engine is stopped, depress the brake pedal two or three times. After thus eliminating the vacuum in the brake booster, press the pedal down by hand, and confirm that the amount of movement before resistance is met (the free play) is within the standard value range.

**Standard value (B):**

**Vehicles with front drum brake**

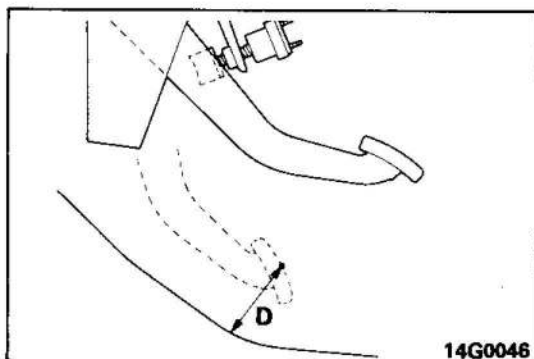
10-15 mm (0.39-0.59 in.)

**Vehicles with front disc brake**

3-8 mm (0.12-0.31 in.)

If the free play is less than the standard value, confirm that the clearance between the outer case of the stop lamp switch and brake pedal is within the standard value.

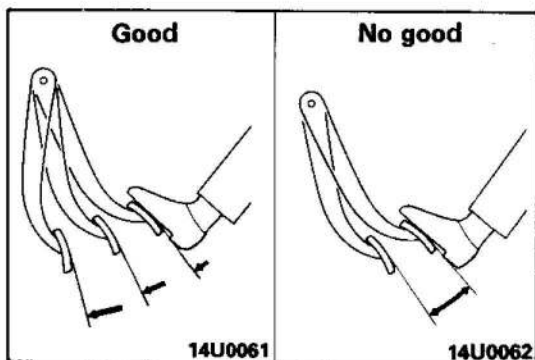
If the free play exceeds the standard value, the clearance between the clevis pin and the brake pedal arm might be excessive. Check and replace the defective parts if necessary.



3. Start the engine, depress the brake pedal with approximately 500 N (50 kg, 110 lbs.) of force, and measure the clearance between the brake pedal and the floorboard.

**Standard value (D): 90 mm (3.54 in.) or more**

If the clearance is less than the standard value, check for air in the brake line or brake fluid leakage, and check the brakes themselves (for excessive shoe clearance caused by a malfunction of the automatic adjuster mechanism), and repair where necessary.



**BRAKE BOOSTER OPERATING TEST**

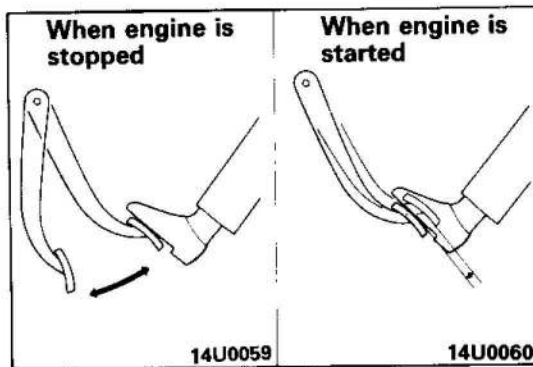
E35FCAC

**TEST WITHOUT A TESTER**

For simple checking of the brake booster operation, carry out the following test:

1. Run the engine for one or two minutes, and then stop it. Step on the brake pedal several times with normal pressure. If the pedal depress fully the first time but gradually becomes higher when depressed succeeding times, the booster is operating properly. If the pedal height remains unchanged, the booster is defective.





- With the engine stopped, step on the brake pedal several times with the same foot pressure to make sure that the pedal height will not change. Then step on the brake pedal and start the engine. If the pedal moves downward slightly, the booster is in good condition. If there is no change, the booster is defective.

- With the engine running, step on the brake pedal and then stop the engine. Hold the pedal depressed for 30 seconds. If the pedal height does not change, the booster is in good condition, if the pedal rises, the booster is defective. If the above three tests are okay, the booster performance can be determined as good. If one of the above three test is not okay at last, the check valve, vacuum hose, or booster will be defective.

### TEST WITH A SIMPLE TESTER

Remove the check valve from the brake booster and insert a nipple without valve function into the check valve installation hole. Install a separate check valve (e.g., MB238892) at the position shown in the figure. Connect the vacuum gauge, pressure gauges and foot pressure gauge as shown. After bleeding the pressure gauges of air, test operate the brake booster according to the following procedures.

#### Test 1—Air-tightness Test with No Load

- Start the engine.
- Stop the engine when the vacuum gauge reaches approximately 68 kPa (0.68 kg/cm<sup>2</sup>, 500 mmHg). After stopping the engine, wait approximately 15 seconds, and then measure the decrease in vacuum.

**Standard value: 3.3 kPa (0.03 kg/cm<sup>2</sup>, 25 mmHg) or less**

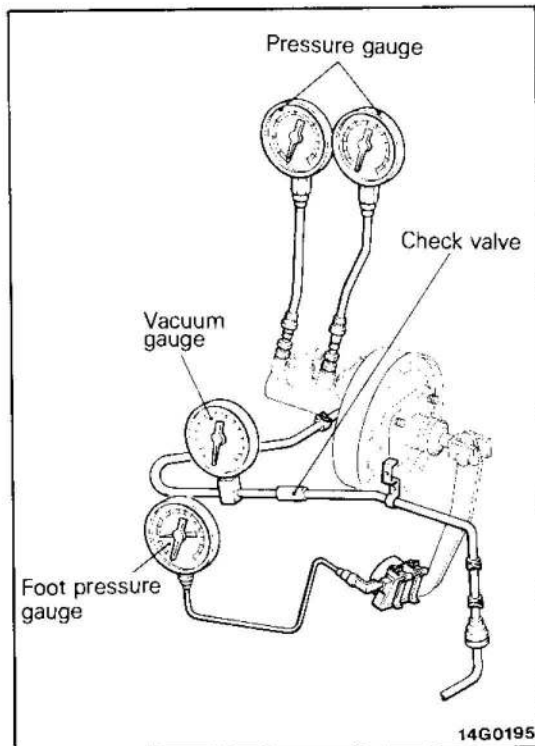
- If the vacuum decrease exceeds the standard value, check the vacuum hoses, and the brake booster, and make any necessary corrections.

#### Test 2—Air-tightness Test Under Load

- Start the engine.
- Depress the brake pedal at a force of approximately 200 N (20 kg, 44 lbs.). Stop the engine when the vacuum gauge reaches approximately 68 kPa (0.68 kg/cm<sup>2</sup>, 500 mmHg).
- After stopping the engine, wait approximately 15 seconds, and then measure the decrease in vacuum.

**Standard value: 3.3 kPa (0.03 kg/cm<sup>2</sup>, 25 mmHg) or less**

- If the vacuum decrease exceeds the standard value, check the check valve, the vacuum hoses and the brake booster, and make any necessary corrections.



**Test 3—Boosting Function Test**

- (1) Start the engine.
- (2) Depress the brake pedal when the vacuum gauge reaches approximately 68 kPa (0.68 kg/cm<sup>2</sup>, 500 mmHg).
- (3) Check to be sure that the brake fluid pressure is the standard value when the brake pedal is depressed at a foot force of 100 N (10 kg, 22 lbs.) and 300 N (30 kg, 66 lbs.).

**Standard value:****At 100 N (10 kg, 22 lbs.) foot force****Vehicles with 7 inch brake booster**

1.0–2.5 MPa

(10–25 kg/cm<sup>2</sup>, 142–356 psi)**Vehicles with 8 inch tandem brake booster**

2.0–3.5 MPa

(20–35 kg/cm<sup>2</sup>, 284–498 psi)**Vehicles with 9 inch brake booster**

2.0–3.5 MPa

(20–35 kg/cm<sup>2</sup>, 284–498 psi)**Vehicles with 8+9 inch tandem brake booster**

2.5–4.0 MPa

(25–40 kg/cm<sup>2</sup>, 356–569 psi)**At 300N (30 kg, 66 lbs.) foot force****Vehicles with 7 inch brake booster**

5.0–6.5 MPa

(50–65 kg/cm<sup>2</sup>, 711–924 psi)**Vehicles with 8 inch tandem brake booster**

9.0–11 MPa

(90–110 kg/cm<sup>2</sup>, 1,280–1,564 psi)**Vehicles with 9 inch brake booster****If equipped with 7/8 inch master cylinder**

7.5–9.5 MPa

(75–95 kg/cm<sup>2</sup>, 1,067–1,351 psi)**If equipped with 15/16 inch master cylinder**

6.5–8.5 MPa

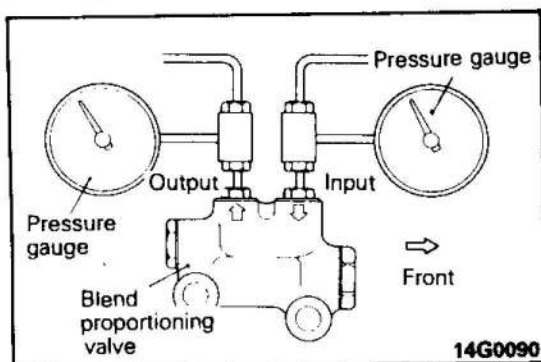
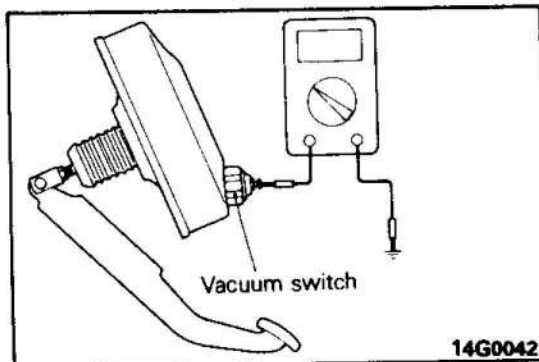
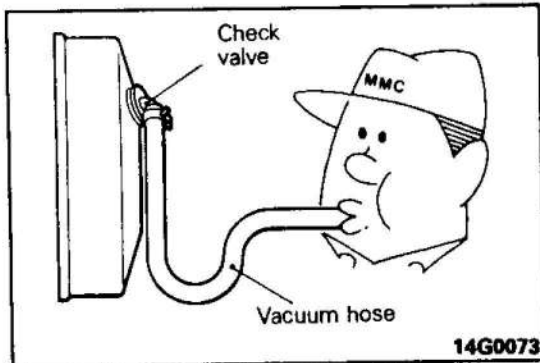
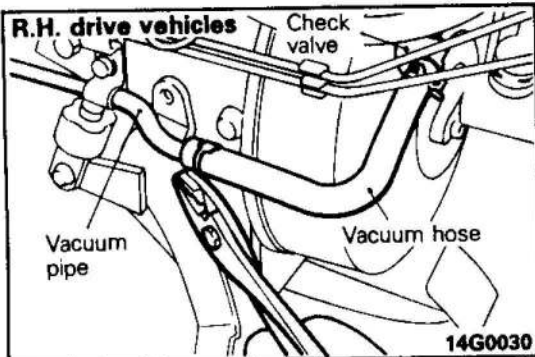
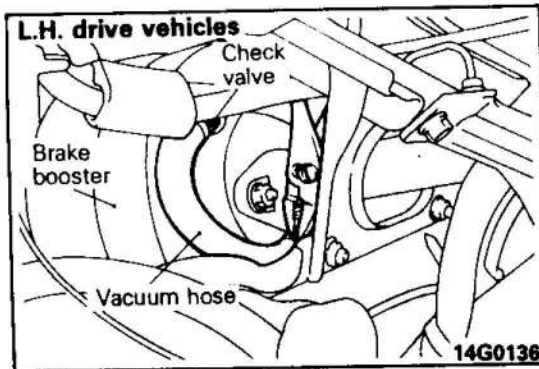
(65–85 kg/cm<sup>2</sup>, 924–1,209 psi)**Vehicles with 8+9 inch tandem brake booster**

10.0–12.5 MPa

(100–125 kg/cm<sup>2</sup>, 1,422–1,778 psi)**Test 4—Non-boosting Function Test**

- (1) Stop the engine.
- (2) Confirm that the vacuum gauge indicates 0 kPa (0 kg/cm<sup>2</sup>, 0 mmHg).
- (3) Check to be sure that the brake fluid pressure is the standard value when the brake pedal is depressed at a foot force of 100 N (10 kg, 22 lbs.) and 300 N (30 kg, 66 lbs.).

**Standard value:****At 100 N (10 kg, 22 lbs.) foot force**0.20 MPa (2 kg/cm<sup>2</sup>, 28.4 psi)**At 300 N (30 kg, 66 lbs.) foot force**1.7 MPa (17 kg/cm<sup>2</sup>, 242 psi)



## CHECK VALVE OPERATION CHECK

1. Start engine.
2. Stop engine.
3. Immediately after stopping engine, remove vacuum hose from vacuum pipe.

4. Place vacuum hose in your mouth.
5. Condition good if there is no aeration when blowing and aeration when depressing brake pedal whilst sucking.

## CHECKING OF THE BRAKE BOOSTER VACUUM SWITCH (Diesel-powered vehicles)

E35FDAB

1. Disconnect vacuum switch. Connect circuit tester to vacuum switch.
2. Start engine. Vacuum switch is in good condition if no circuit continuity when sufficient load is generated, and circuit continuity when brake pedal is pumped several times after stopping engine.

## BLEND PROPORTIONING VALVE FUNCTION TEST

E35FKBB

1. Connect two pressure gauges, one each, to the input side and output side of blend proportioning valve. Bleed the system.
2. Gradually depress the brake pedal and check to be sure that the fluid pressure at the output side is the standard value when the fluid pressure at the input side is 2.45 MPa (25 kg/cm<sup>2</sup>, 355 psi) and 3.92 MPa (40 kg/cm<sup>2</sup>, 569 psi).

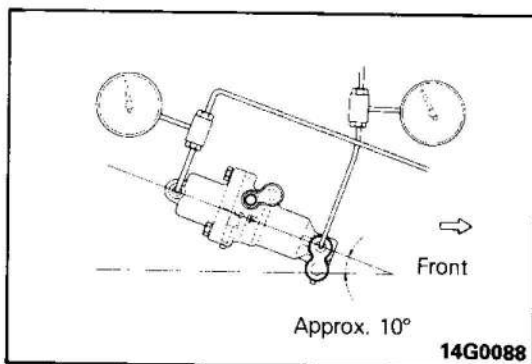
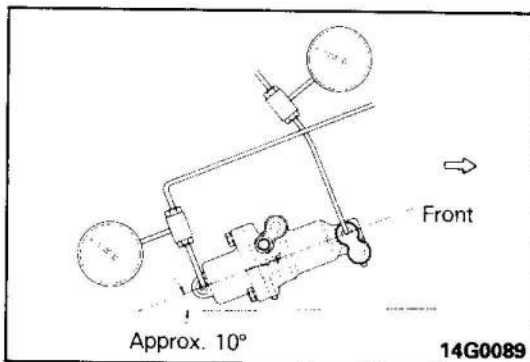
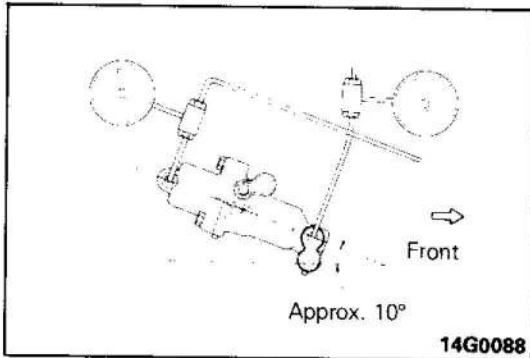
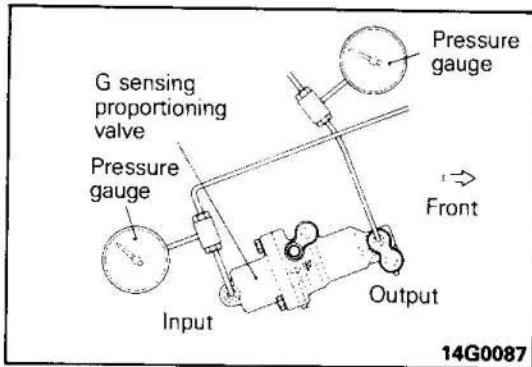
### Standard value:

At 2.5 MPa (25 kg/cm<sup>2</sup>, 355 psi)

1.8–2.2 MPa (18–22 kg/cm<sup>2</sup>, 256–313 psi)

At 4.0 MPa (40 kg/cm<sup>2</sup>, 569 psi)

2.69–3.29 MPa (26.9–32.9 kg/cm<sup>2</sup>, 383–468 psi)



## G SENSING PROPORTIONING VALVE FUNCTION TEST

E35FKEA

1. Remove G sensing proportioning valve from bracket. Connect pressure gauges to input and output sides of G sensing proportioning valve.
2. Bleed air from brake line and pressure gauge.

### 3. No Load Test (equivalent to unloaded vehicle)

- (1) Incline G sensing proportioning valve about 10° forward and downward as illustrated, to firmly contact G sensing ball to cut valve seal.
- (2) Depress brake pedal gradually to assure output hydraulic pressure is within the standard value when input hydraulic pressure at 4.0 MPa (40 kg/cm<sup>2</sup>, 569 psi)

**Standard value:**

**1.45–2.05 MPa (14.5–20.5 kg/cm<sup>2</sup>, 206–292 psi)**

### 4. Load Test (equivalent with load)

- (1) Incline G sensing proportioning valve about 10° forward and upward as illustrated. Maintain G sensing ball so that it does not touch cut valve seal. Increase input hydraulic pressure to 3.23 MPa (32.3 kg/cm<sup>2</sup>, 459 psi) and retain.

- (2) Incline G sensing proportioning valve about 10° forward/downward to contact G sensing ball to cut valve seal. Increase input hydraulic pressure to 9.0 MPa (90 kg/cm<sup>2</sup>, 1280 psi) to assure the output hydraulic pressure is within standard value.

**Standard value:**

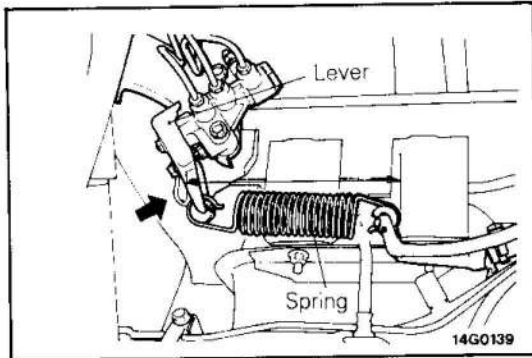
**3.42–5.02 MPa (34.2–50.2 kg/cm<sup>2</sup>, 486–714 psi)**

### CHECKING AND ADJUSTMENT OF THE LOAD SENSING PROPORTIONING VALVE SPRING LENGTH

E35FHAF

1. Set vehicle with no load. Park on flat surface.

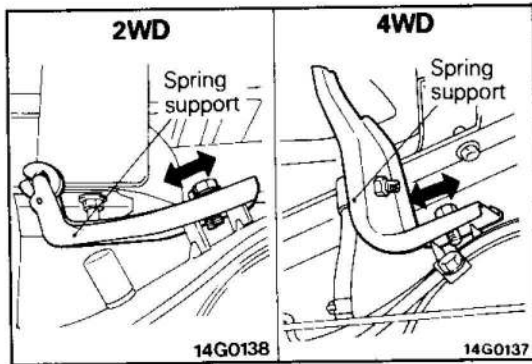
**Caution**  
Do not jack up.



2. Press load sensing proportioning valve lever and measure distance between spring ends.

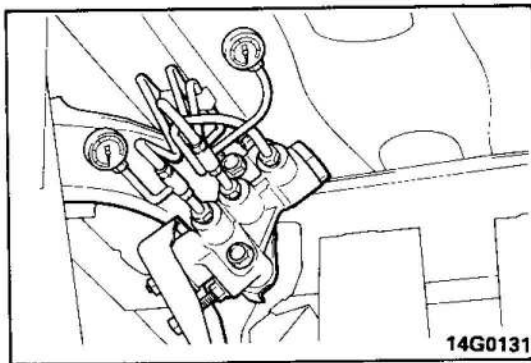
**Standard value:**  
**Standard body**  
 176–179 mm (6.93 in.–7.05 in.)  
**Long body <2WD>**  
 176.5–179.5 mm (6.95 in.–7.07 in.)  
**Long body <4WD>**  
 176–179 mm (6.93 in.–7.05 in.)

3. Adjust with spring support when it is not within the standard value.



### LOAD SENSING PROPORTIONING VALVE FUNCTION TEST

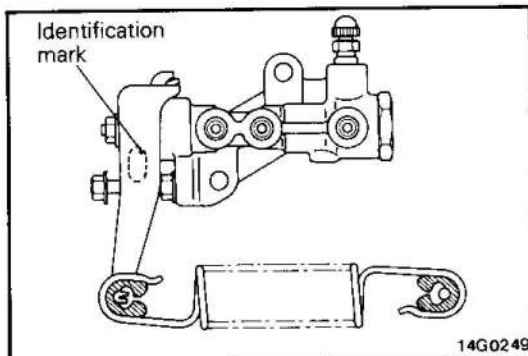
E35FKAG



1. Check to be sure that the length of the load sensing spring is the standard value.
2. Connect pressure gauges to the input and output ports of the load sensing proportioning valve. Bleed the system.
3. Remove the load sensing spring.
4. Gradually depress the brake pedal and check to be sure that the fluid pressure at the output side is the standard value when the fluid pressure at the input side is 6.0 MPa (60 kg/cm<sup>2</sup>, 853 psi) and when it is 14.0 MPa (140 kg/cm<sup>2</sup>, 1,991 psi)

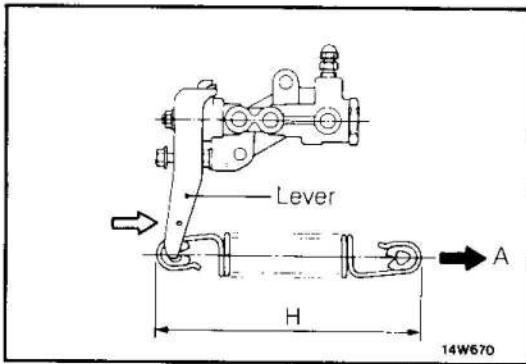
**Standard value**

Input pressure	Identifying colour	MPa	kg/cm <sup>2</sup>	psi
6.0 MPa (60 kg/cm <sup>2</sup> , 853 psi)	Orange	1.45–2.05	14.5–20.5	206.2–291.6
	Purple	1.75–2.35	17.5–23.5	248.9–334.2
	Light blue	2.22–2.82	22.2–28.2	315.8–401.1
	Yellow	1.47–2.07	14.7–20.7	209.1–294.4
	Green	0.95–1.55	9.5–15.5	135.1–220.5
	Black	1.28–1.88	12.8–18.8	182.1–267.4
	Blue	0.50–1.10	5.0–11.0	71.1–156.5





Input pressure	Identifying colour	MPa	kg/cm <sup>2</sup>	psi
14.0 MPa (140 kg/cm <sup>2</sup> , 1,991 psi)	Orange	2.35–3.55	23.5–35.5	334.2–504.9
	Purple	2.65–3.85	26.5–38.5	376.9–547.6
	Light blue	3.12–4.32	31.2–43.2	443.8–614.4
	Yellow	1.57–2.77	15.7–27.7	223.3–394.0
	Green	1.05–2.25	10.5–22.5	149.3–320.0
	Black	1.38–2.58	13.8–25.8	196.3–367.0
	Blue	0.60–1.80	6.0–18.0	85.3–256.0



- Place the spring so that it is in parallel with the load-sensing proportioning valve, and then pull in the direction indicated by arrow A so that its length H shown in the figure (the length between its ends) is as noted below.

**NOTE**

At this time the lever is pressed all the way to the load-sensing proportioning valve side.

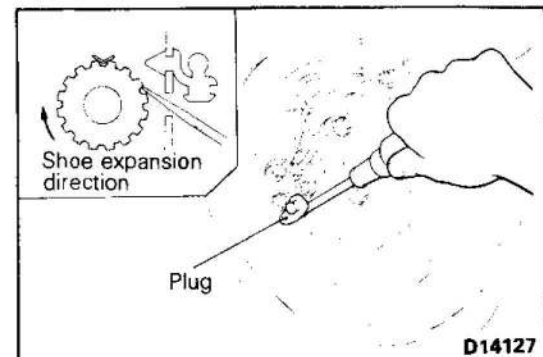
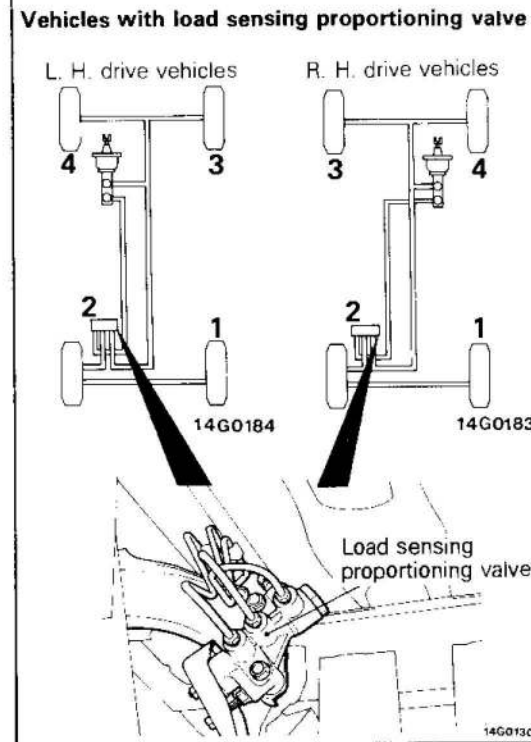
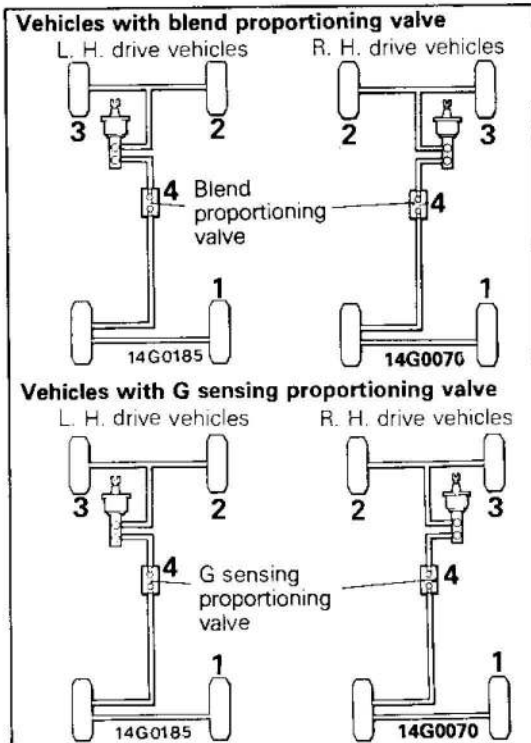
Identifying colour	Spring length H
Orange	203.9 mm (8.03 in.)
Purple	200.1 mm (7.88 in.)
Light Blue or Yellow	200.9 mm (7.91 in.)
Green	198.6 mm (7.82 in.)
Black	205.5 mm (8.09 in.)
Blue	194.7 mm (7.67 in.)

- Gradually depress the brake pedal and check to be sure that the fluid pressure at the output side is the standard value when the fluid pressure at the input side is 14.0 MPa (140 kg/cm<sup>2</sup>, 1,991 psi).

**Standard value**

Input pressure	Identifying colour	MPa	kg/cm <sup>2</sup>	psi
14.0 MPa (140 kg/cm <sup>2</sup> , 1,991 psi)	Orange	4.52–6.52	45.2–65.2	642.9–927.4
	Purple	4.46–6.46	44.6–64.6	634.4–918.8
	Light blue	7.22–9.22	72.2–92.2	1,026.9–1,311.4
	Yellow	5.40–7.40	54.0–74.0	768.1–1,052.5
	Green	2.98–4.98	29.8–49.8	423.9–708.3
	Black	4.02–6.02	40.2–60.2	571.8–856.2
	Blue	4.75–6.75	47.5–67.5	675.6–960.1

- After checking, adjust the length of the load sensing spring.



**BLEEDING**

The brake hydraulic system should be bled whenever the brake tube, brake hose, master cylinder or wheel cylinder has been removed or whenever the brake pedal feels spongy when depressed.

Start the engine, and perform the air bleeder in accordance with the procedure illustrated.

**Specified brake fluid: DOT3 or DOT4**

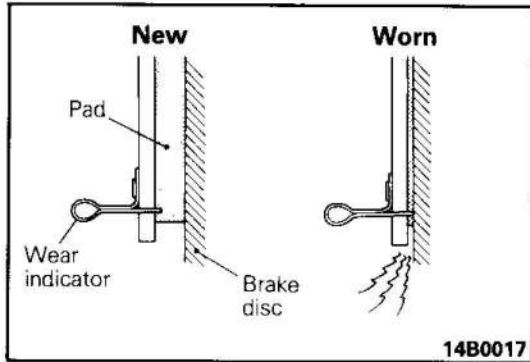
**Caution**

1. Use the specified brake fluid. Avoid using a mixture of the specified brake fluid and other fluid.
2. If brake fluid is exposed to the air, it will be absorb moisture; as water is absorbed from the atmosphere, the boiling point of the brake fluid will decrease and the braking performance will be seriously impaired. For this reason, use a hermetiacly sealed 1 lit. (1.06 U. S. qt., 0.88 Imp. qt.) or 0.5 lit. (0.52 U. S. qt., 0.44 Imp. qt.) brake fluid container.
3. Firmly close the cap of the brake fluid container after use.

**FRONT DRUM BRAKE SHOE CLEARANCE ADJUSTMENT**

1. Pump brake pedal several times.
2. Pull plug knob at the rear of front backing plate assembly to open adjustment hole.
3. With (–) screwdriver, turn adjuster in direction of the arrow (shoe expansion direction) to slightly apply brake.
4. Return adjuster 5 notches in the opposite direction of the arrow.



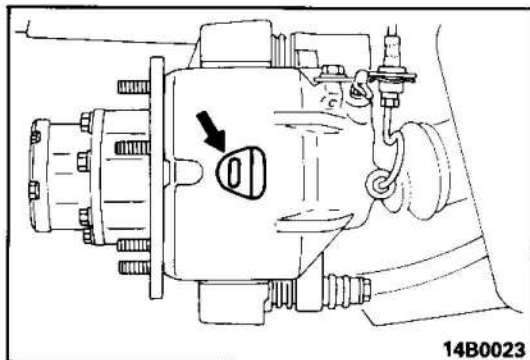


## FRONT DISC BRAKE PAD CHECK AND REPLACEMENT

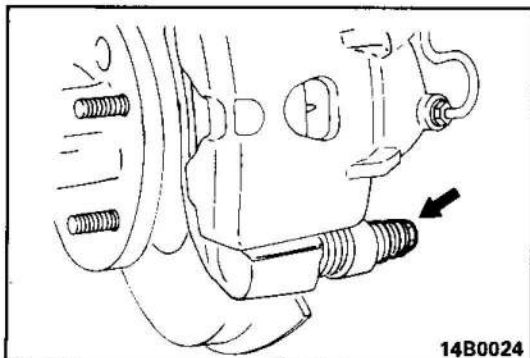
E35FZAC

### NOTE

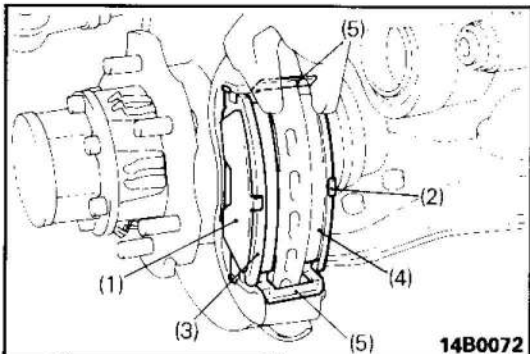
The brake pads have been equipped with wear indicators, so that when the brake pad thickness reaches 2.0 mm (0.079 in.), the wear indicator touches the brake discs and produces a warning squeaking sound.



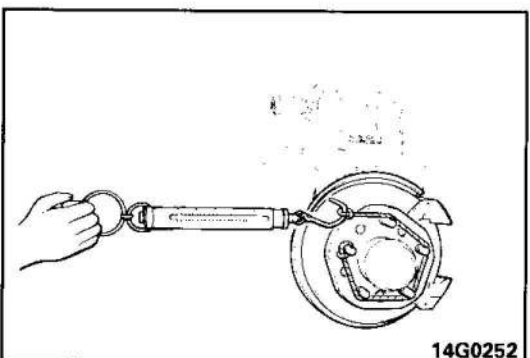
1. Check brake pad thickness through caliper body check port.  
**Limit: 2.0 mm (0.079 in.)**  
Replace brake pads on both sides when wear exceeds limit value. Replace one side at a time.



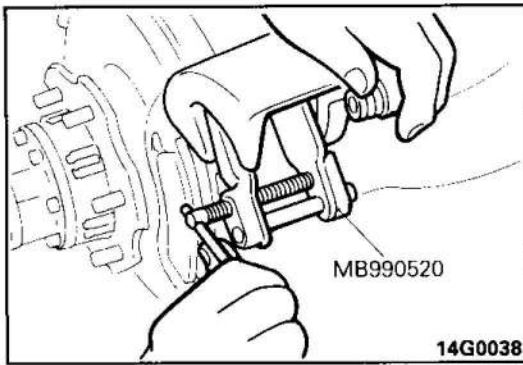
2. Remove lock pin. Lift caliper assembly and retain with wires.  
**Caution**  
**Do not smear special grease on lock pin or make it dirty.**



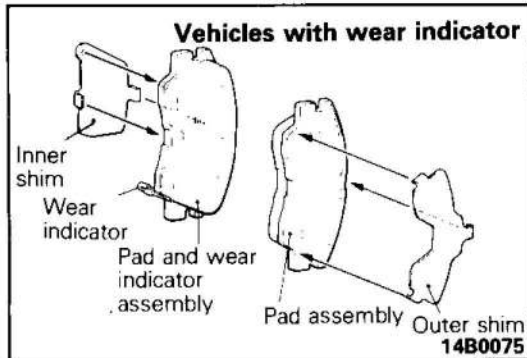
3. Remove the following parts from caliper support.
  - (1) Outer shim
  - (2) Inner shim
  - (3) Pad assembly
  - (4) Pad and wear indicator assembly (for vehicles with wear indicator)  
Pad assembly (for vehicles without wear indicator)
  - (5) Pad clip



4. To measure the disc brake drag torque after the pads are installed, use a spring balance to measure the rotation resistance of the hub in the forward direction with the pads removed.



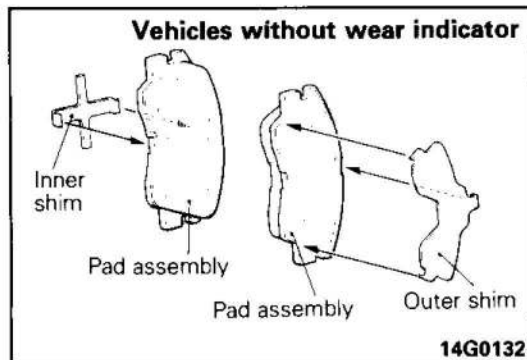
5. With brake fluid reservoir filled to MAX. level, remove small amount of brake fluid.
6. Clean piston and insert into cylinder with special tool.
7. Assemble pad clip to caliper support.



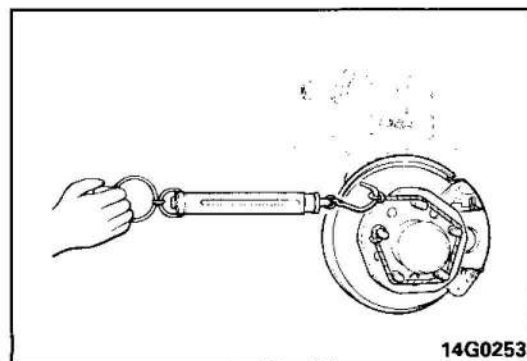
8. For vehicles with wear indicator, assemble pad and shim as follows.
  - (1) Install inner shim on pad and wear indicator assembly. Install outer shim on pad assembly.
  - (2) Assemble pad assembly outside, pad and wear indicator assembly inside (piston side) and wear indicator downside on caliper support.

**Caution**

**Do not deposit grease or other dirt on pad or brake disc friction surfaces.**



9. Assemble inner and outer shims on pad assemblies for vehicles without wear indicator. Install pad assembly with inner shim inside (piston side) and pad assembly without outer shim outside.



10. Without piston boots locked in, lower caliper assembly and install lock pin.
11. Start the engine, and after depressing the brake pedal hard two or three times, stop the engine.
12. Turn the brake disc ten times in the forward direction.
13. Use a spring balance to measure the rotation resistance of the hub in the forward direction.
14. Calculate the drag torque to the disc brake (difference between measured values in 16 and 7).

**Standard value: 57 N (5.7 kg, 131 lbs.) or less  
[4 Nm (0.4 kgm, 3 ft.lbs.)] or less**

15. If the difference in the brake drag torque exceeds the standard value, check the piston seal for deterioration.

**FRONT DISC BRAKE ROTOR INSPECTION**

E35FTAF

**CAUTION**

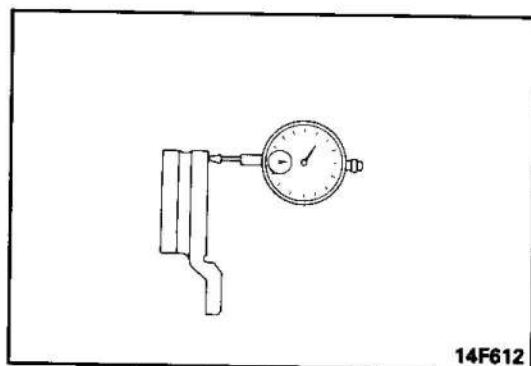
The brake disc must be serviced with the greatest possible care to keep it within the limit value for the maintenance of normal brake operation.

Before refinishing or reworking the brake disc surface, check it for the following conditions.

Check Item	Remarks
Scratch, rust, grease or brake fluid soaked lining and grooves.	<ul style="list-style-type: none"> <li>• If the vehicle operation is suspended for a certain period of time, rust is formed on the portions of the disc which are not in contact with the lining (pad), causing noise or a shudder.</li> <li>• If excessive wear or scratch is not removed from the disc before installation of new pad assembly, the disc makes improper contact with the lining (pad) temporarily.</li> </ul>
Run-out or wobble	Excessive disc run-out or wobble causes piston to be pressed back, resulting in increased pedal travel.
Change in thickness of disc (parallelism)	If the disc thickness becomes uneven due to change in thickness of the disc, pedal pulsation, brake shudder and surge are caused by change in brake fluid pressure.
Dent or deformation (flatness)	Dent or deformation is caused to the disc when it is overheated in operation or handled improperly during maintenance.

**RUN-OUT CHECK**

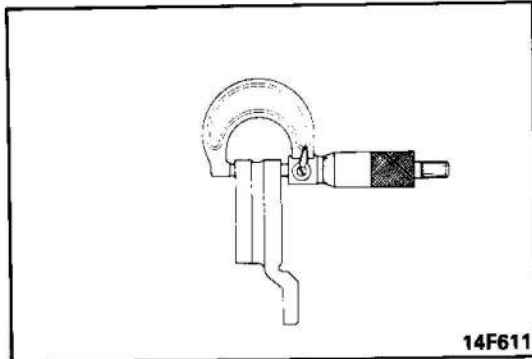
1. Remove the caliper support; then raise the caliper assembly upward and secure by using wire.
2. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.



3. Measure brake disk deflection on the outer circumference.  
**Limit: 0.10 mm (0.0039 in.)**

**RUN-OUT CORRECTION**

1. If the run-out of the brake disc is equivalent to or exceeds the limit specification, change the phase of the disc and hub, and then measure the run-out again. (Refer to P.35-22-1)
2. If the run-out cannot be corrected by changing the phase of the brake disc, replace the disc or turn rotor with on the car type brake lathe ("MAD, DL-8700PF" or equivalent).

**THICKNESS CHECK**

1. Using a micrometer, measure disc thickness at eight positions, approximately 45° apart and 10mm (0.39 in.) in from the outer edge of the disc.

**Brake Disc Thickness**

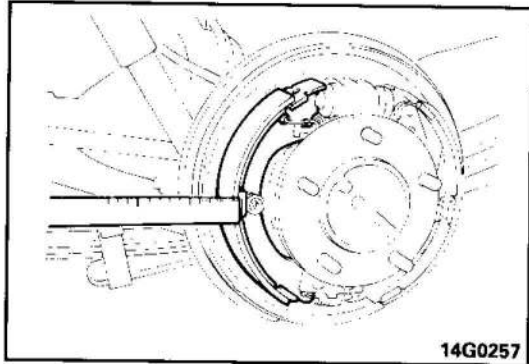
**Standard value:** 22.0 mm (0.866 in.)

**Limit:** 20.4 mm (0.803 in.)

**Thickness Variation (At least 8 position)**

**The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in.).**

2. If the disc is beyond the limits for thickness, remove it and install a new one.  
If thickness variation exceeds the specification, replace the disc or turn rotor with on the car type brake lathe ("MAD, DL-8700PF" or equivalent).



**BRAKE LINING THICKNESS CHECK**

E35FFAA

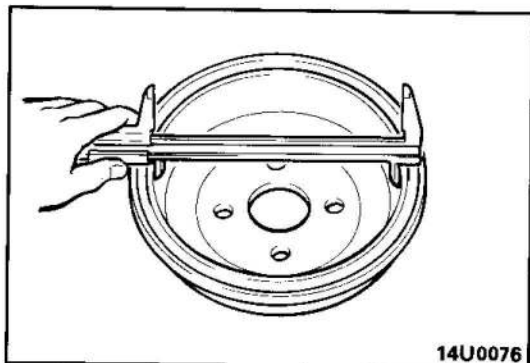
1. Remove the brake drum.
2. Measure the wear of the brake lining at the place worn the most.

**Limit: 1.0 mm (0.04 in.)**

Replace the shoe and lining assembly if brake lining thickness is less than the limit if it is not worn evenly. For information concerning the procedures for installation of the shoe and lining assembly, refer to P.35-62, 72, 76, 79.

**Caution**

1. **Whenever the shoe and lining assembly is replaced, replace both RH and LH assemblies as a set to prevent car from pulling to one side when braking.**
2. **If there is a significant difference in the thicknesses of the shoe and lining assemblies on the left and right sides, check the sliding condition of the piston.**



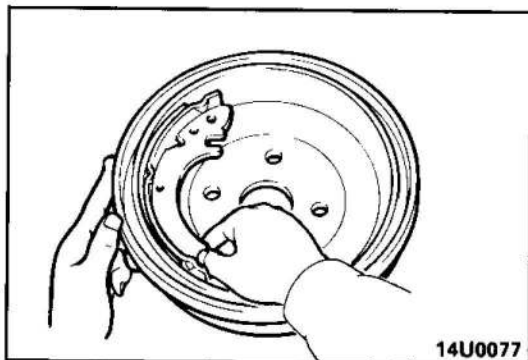
**BRAKE DRUM INSIDE DIAMETER CHECK**

E35FGAA

1. Remove the brake drum.
2. Measure the inside diameter of the hub and drum at two or more locations.

<b>Limit: Front</b>	<b>232.0 mm (9.134 in.)</b>
<b>Rear</b>	
<b>Duo-servo</b>	<b>222.0 mm (8.74 in.)</b>
<b>Leading and trailing</b>	<b>256 mm (10.08 in.)</b>

3. Replace brake drums and shoe and lining assembly when wear exceeds the limit value or is badly imbalanced.



**BRAKE LINING AND BRAKE DRUM CONNECTION CHECK**

E35FIAA

1. Remove the brake drum.
2. Remove the shoe and lining assembly (Refer to P.35-62, 72, 76, 79).
3. Chalk inner surface of brake drum and rub with shoe and lining assembly.
4. Replace shoe and lining assembly or brake drums if very irregular contact area.

For information concerning the procedures for installation of the shoe and lining assembly, refer to P.35-62, 72, 76, 79.

**NOTE**

Clean off chalk after check.

35-22-4

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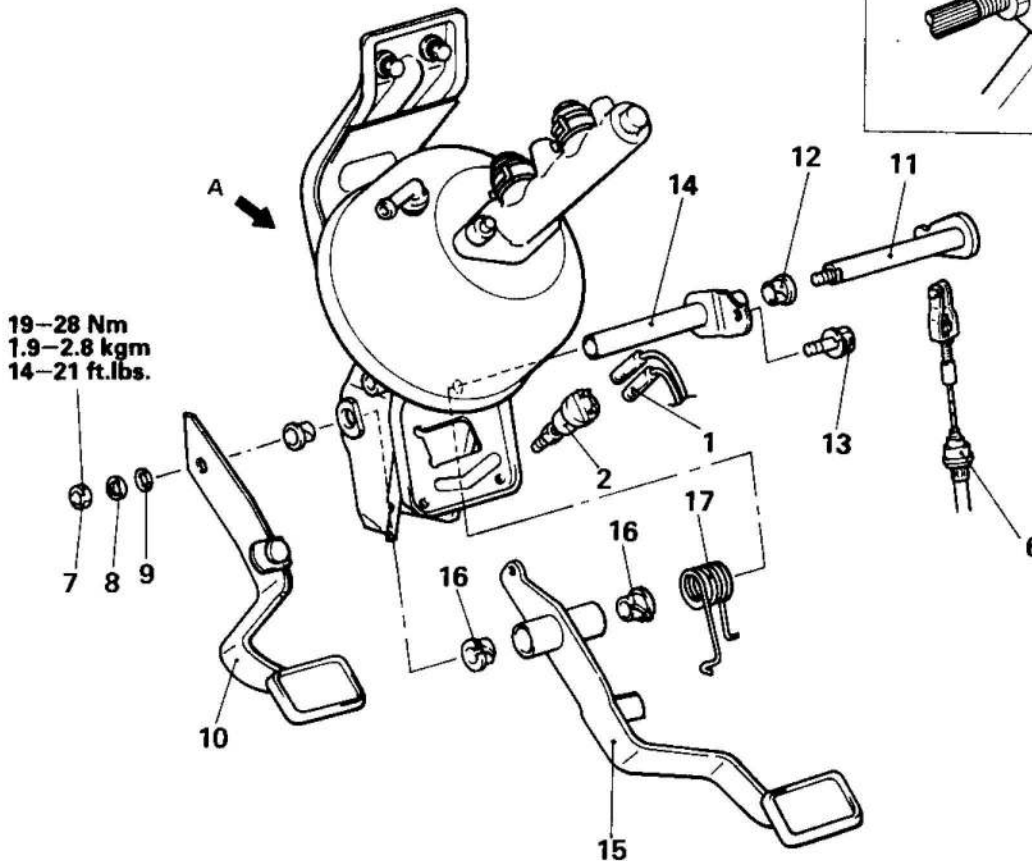
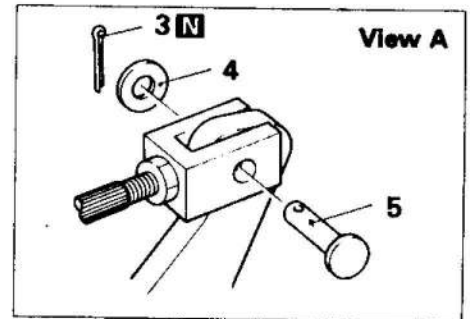
NOTES

**BRAKE PEDAL (VEHICLES WITH CABLE TYPE CLUTCH)**

E36GA--

**REMOVAL AND INSTALLATION**

L.H. drive vehicles



14G0172

**Post-installation Operation**

- Brake pedal adjustment (Refer to P. 35-12.)
- Clutch pedal adjustment (Refer to GROUP 21 CLUTCH-Service Adjustment Procedures)

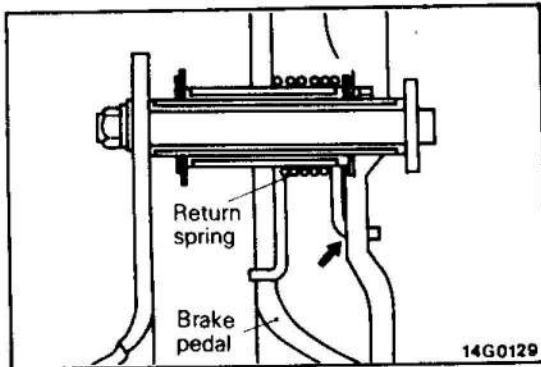
**Removal steps**

- |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>1. Stop lamp switch connector connection</li> <li>2. Stop lamp switch</li> <li>3. Split pin</li> <li>◆◆ 4. Washer</li> <li>◆◆ 5. Clevis pin</li> <li>6. Clutch cable connection</li> <li>7. Nut</li> <li>8. Spring washer</li> <li>9. Washer</li> <li>10. Clutch pedal</li> <li>11. Clutch shaft</li> </ul> | <ul style="list-style-type: none"> <li>◆◆ 12. Pedal bushing</li> <li>13. Bolt</li> <li>14. Pipe assembly</li> <li>◆◆ 15. Brake pedal</li> <li>◆◆ 16. Pedal bushing</li> <li>17. Return spring</li> </ul> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**NOTE**

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆ : Refer to "Service Points of Installation".
- (4) **N** : Non-reusable parts



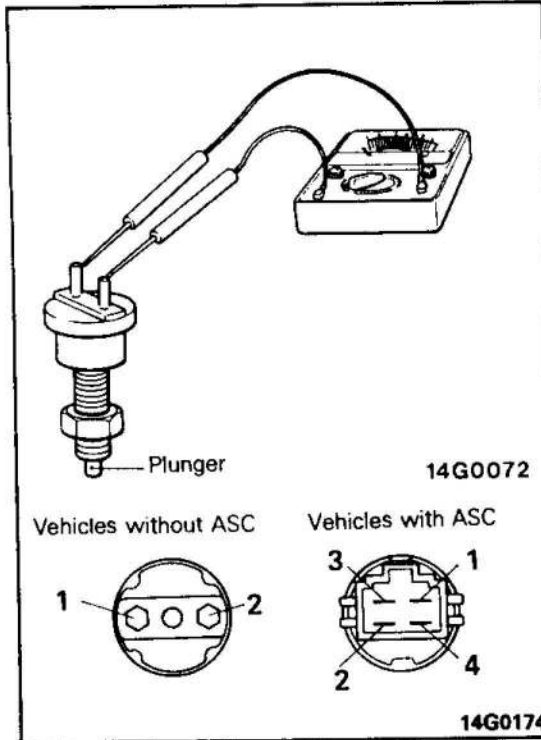


**SERVICE POINTS OF REMOVAL**

E35GBAC

**15. REMOVAL OF BRAKE PEDAL**

Insert (–) screwdriver between return spring and pedal support member. Press with screwdriver to remove return spring end from pedal support member. Pull brake pedal downward.



**INSPECTION**

E5GCAA

- Check pedal bushing for wear
- Check brake pedal for distortion
- Check return spring for wear or damage

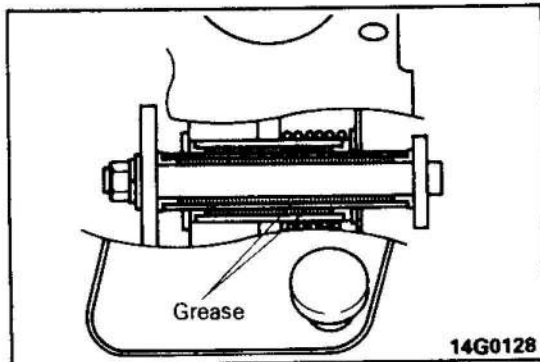
**INSPECTION OF STOP LAMP SWITCH**

Connect an ohmmeter to the connector of the stop lamp switch, and then check for continuity when the plunger of the stop lamp switch is pressed in and when it is released outward.

	Terminal No.	1	2	3	4
Plunger Position					
Pressed in				○—○	
Disconnected		○—○			

**NOTE**

- (1) ○—○ indicates circuit continuity between terminals.
- (2) Terminals 3 and 4 are for automatic speed control power circuit.



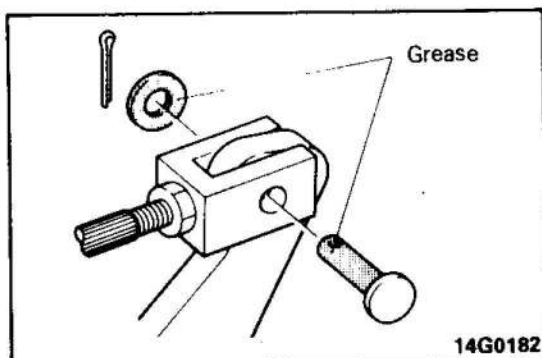
**SERVICE POINTS OF INSTALLATION**

E35GDAD

**16. APPLICATION OF GREASE TO PEDAL BUSHING/12. PEDAL BUSHING**

Apply specified grease to inner pedal bushing, brake pedal, clutch pedal and pipe assembly area.

**Specified grease: Chassis grease SAE J310, NLGI No. 0**



**5. APPLICATION OF GREASE TO CLEVIS PIN/4. WASHER**

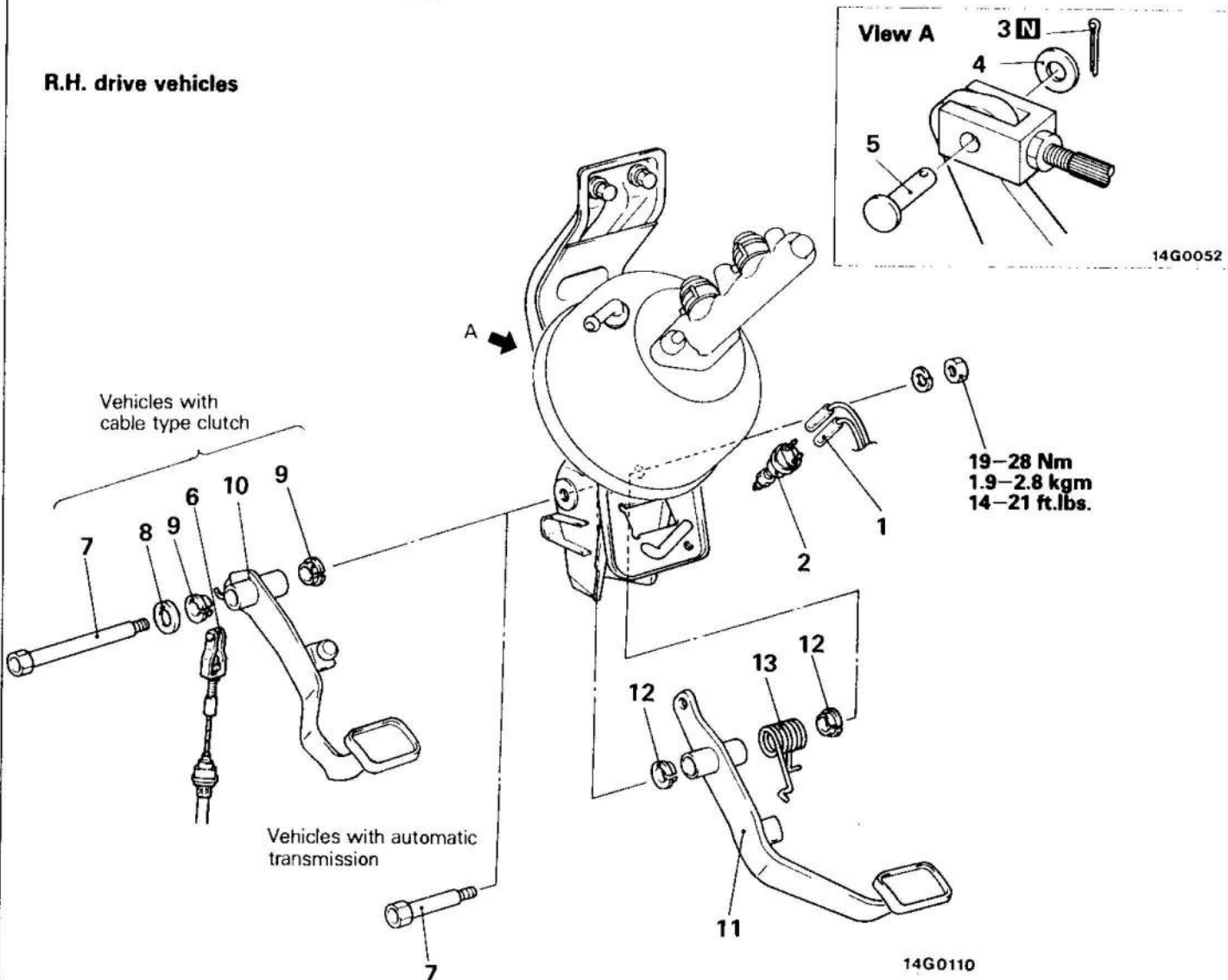
Apply specified grease to clevis pin and washer.

**Specified grease: Wheel bearing grease SAE J310, NLGI No. 2**

REMOVAL AND INSTALLATION

E35GA—

R.H. drive vehicles



**Post-installation Operation**

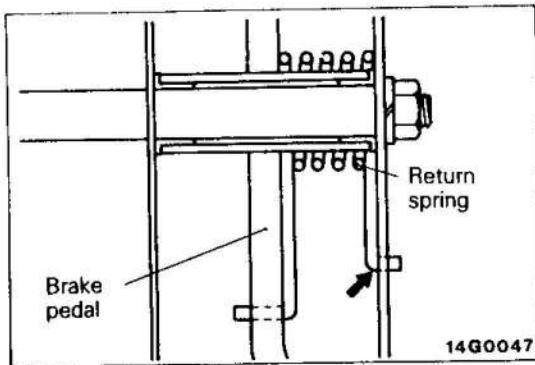
- Brake pedal adjustment (Refer to P. 35-12)
- Clutch pedal adjustment (excluding vehicles with an automatic transmission) (Refer to GROUP 21-Service Adjustment Procedures)

**Removal steps**

1. Stop lamp switch connector connection
2. Stop lamp switch
3. Split pin
- ◆◆ 4. Washer
- ◆◆ 5. Clevis pin
6. Clutch cable
7. Bolt
8. Plain washer
- ◆◆ 9. Pedal bushing
10. Clutch pedal
- ◆◆ 11. Brake pedal
- ◆◆ 12. Pedal bushing
13. Return spring

**NOTE**

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆ : Refer to "Service Points of Installation".
- (4) [N] : Non-reusable parts

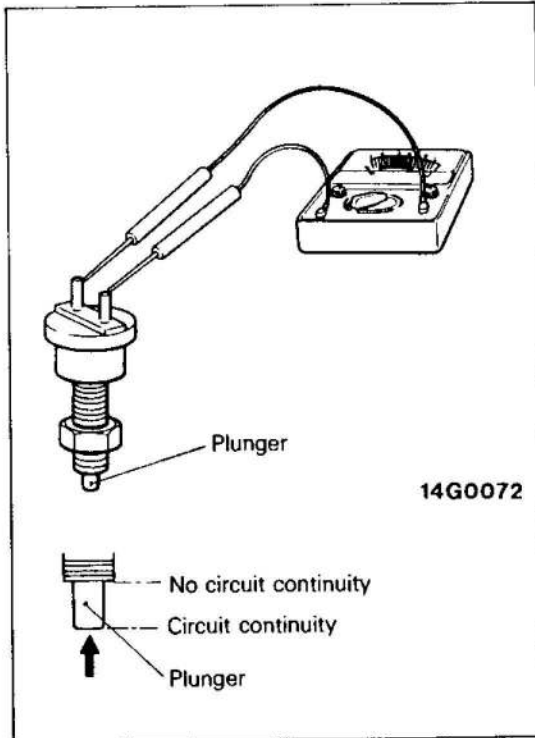


## SERVICE POINTS OF REMOVAL

E35GBAC

## 11. REMOVAL OF BRAKE PEDAL

Insert (–) screwdriver between return spring and pedal support member. Press with screwdriver to remove return spring end from pedal support member. Pull brake pedal downward.



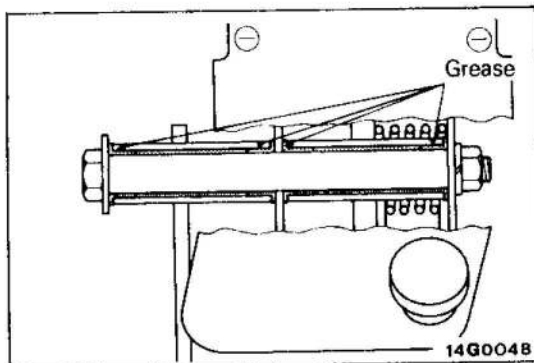
## INSPECTION

E35GCAA

- Check pedal bushing for wear
- Check brake pedal for distortion
- Check return spring for wear or damage

## INSPECTION OF STOP LAMP SWITCH

Connect ohmmeter to stop lamp switch. Confirm circuit continuity by pressing in and releasing stop lamp switch plunger. The switch is in good condition if there is circuit continuity with plunger pressed in and no circuit continuity when released.



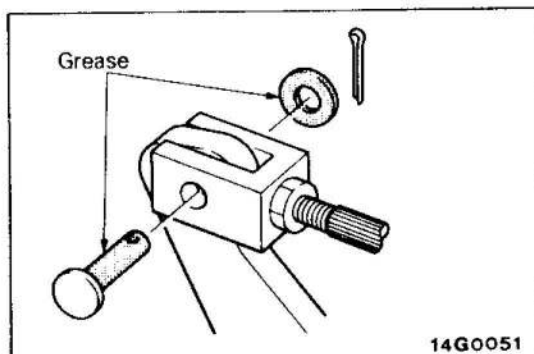
## SERVICE POINTS OF INSTALLATION

E35GCAA

## 12. APPLICATION OF GREASE TO PEDAL BUSHING/9. PEDAL BUSHING

Apply specified grease to inner pedal bushing, brake pedal, clutch pedal and bolt area.

**Specified grease: Chassis grease SAE J310, NLGI No. 0**



## 5. APPLICATION OF GREASE TO CLEVIS PIN/4. WASHER

Apply specified grease to clevis pin and washer.

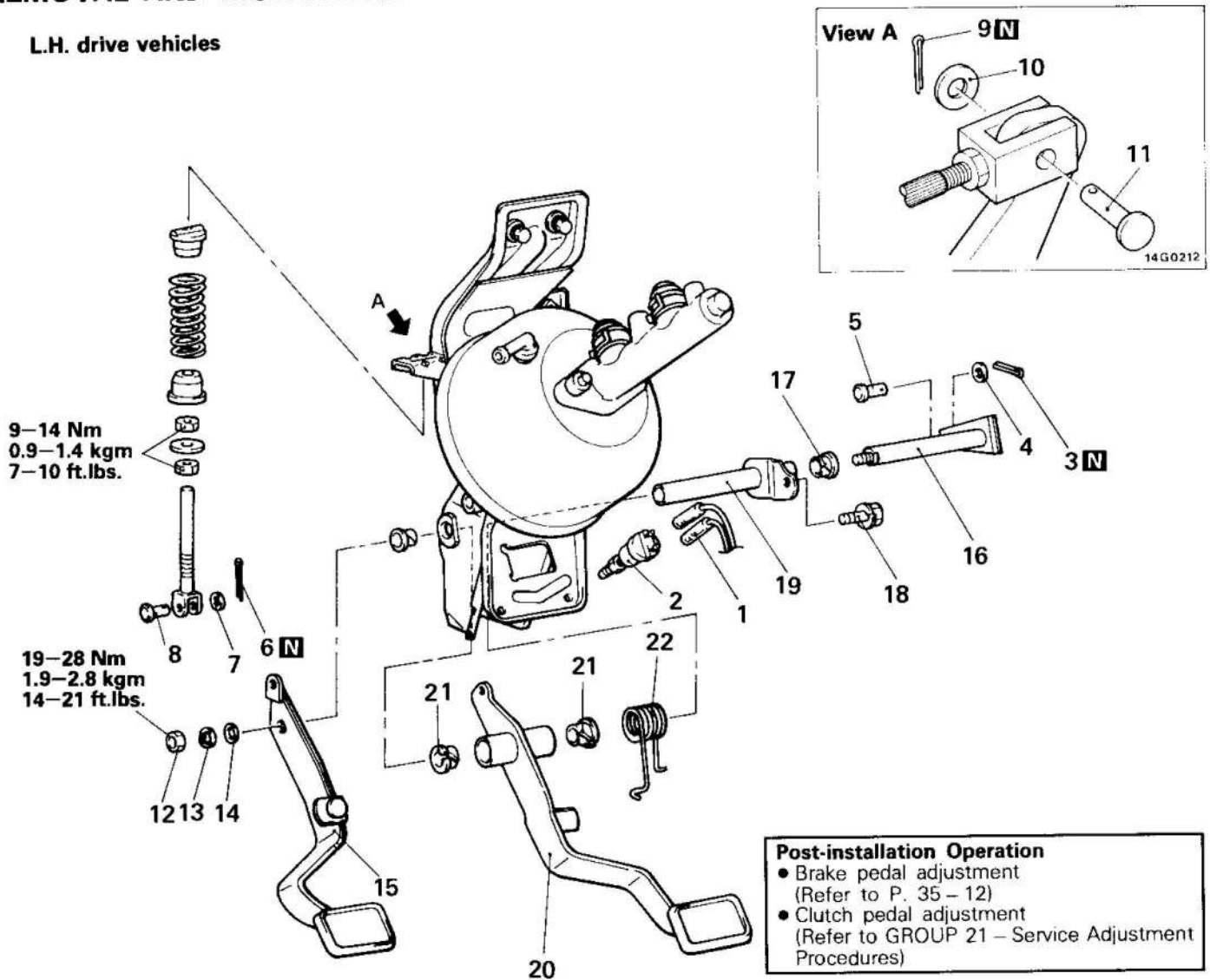
**Specified grease: Wheel bearing grease SAE J310, NLGI No. 2**

# BRAKE PEDAL (VEHICLES WITH HYDRAULIC CLUTCH)

## REMOVAL AND INSTALLATION

E35GA - A

L.H. drive vehicles



**Post-installation Operation**

- Brake pedal adjustment (Refer to P. 35 - 12)
- Clutch pedal adjustment (Refer to GROUP 21 - Service Adjustment Procedures)

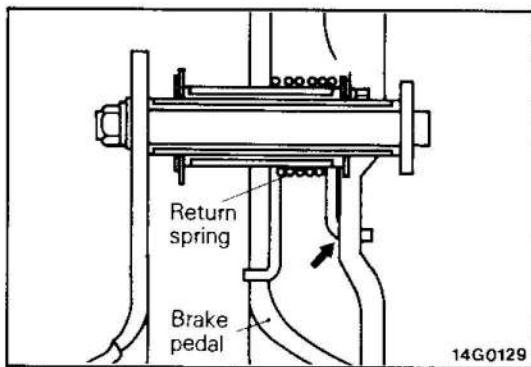
14G0171

**Removal steps**

1. Stop lamp switch connector connection
2. Stop lamp switch
3. Split pin
4. Washer
5. Clevis pin
6. Split pin
7. Washer
8. Clevis pin
9. Split pin
- ◆◆ 10. Washer
- ◆◆ 11. Clevis pin
12. Nut
13. Spring washer
14. Washer
15. Clutch pedal
16. Clutch shaft
- ◆◆ 17. Pedal bushing
18. Bolt
- ◆◆ 19. Pipe assembly
- ◆◆ 20. Brake pedal
- ◆◆ 21. Pedal bushing
22. Return spring

**NOTE**

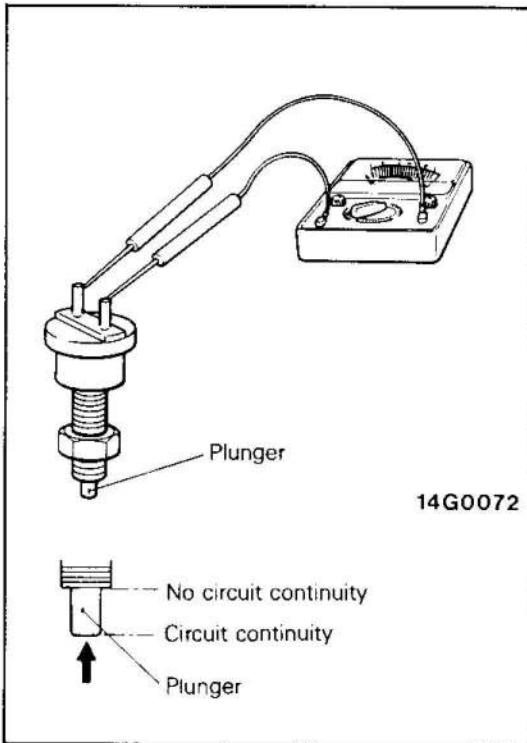
- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆ : Refer to "Service Points of Installation".
- (4) **N** : Non-reusable parts

**SERVICE POINTS OF REMOVAL**

E35GBAC

**20. REMOVAL OF BRAKE PEDAL**

Insert (–) screwdriver between return spring and pedal support member. Press with screwdriver to remove return spring end from pedal support member. Pull brake pedal downward.

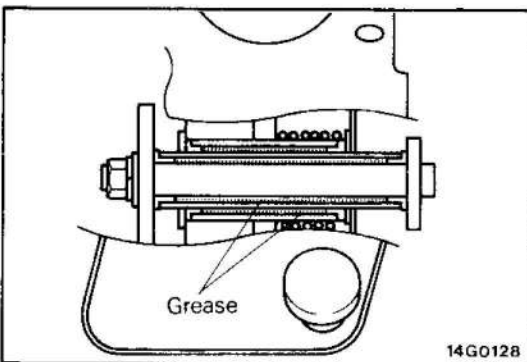
**INSPECTION**

E35GCAA

- Check pedal bushing for wear
- Check brake pedal for distortion
- Check return spring for wear or damage

**INSPECTION OF STOP LAMP SWITCH**

Connect ohmmeter to stop lamp switch. Confirm circuit continuity by pressing in and releasing stop lamp switch plunger. The switch is in good condition if there is circuit continuity with plunger pressed in and no circuit continuity when released.

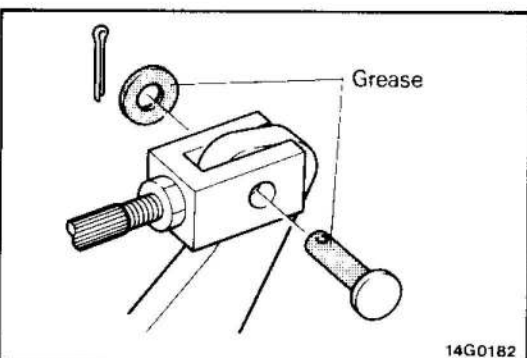
**SERVICE POINTS OF INSTALLATION**

E35GDAD

**21. APPLICATION OF GREASE TO PEDAL BUSHING/17. PEDAL BUSHING**

Apply specified grease to inner pedal bushing, brake pedal, clutch pedal and pipe assembly area.

**Specified grease: Chassis grease SAE J310, NLGI No. 0**

**11. APPLICATION OF GREASE TO CLEVIS PIN/10. WASHER**

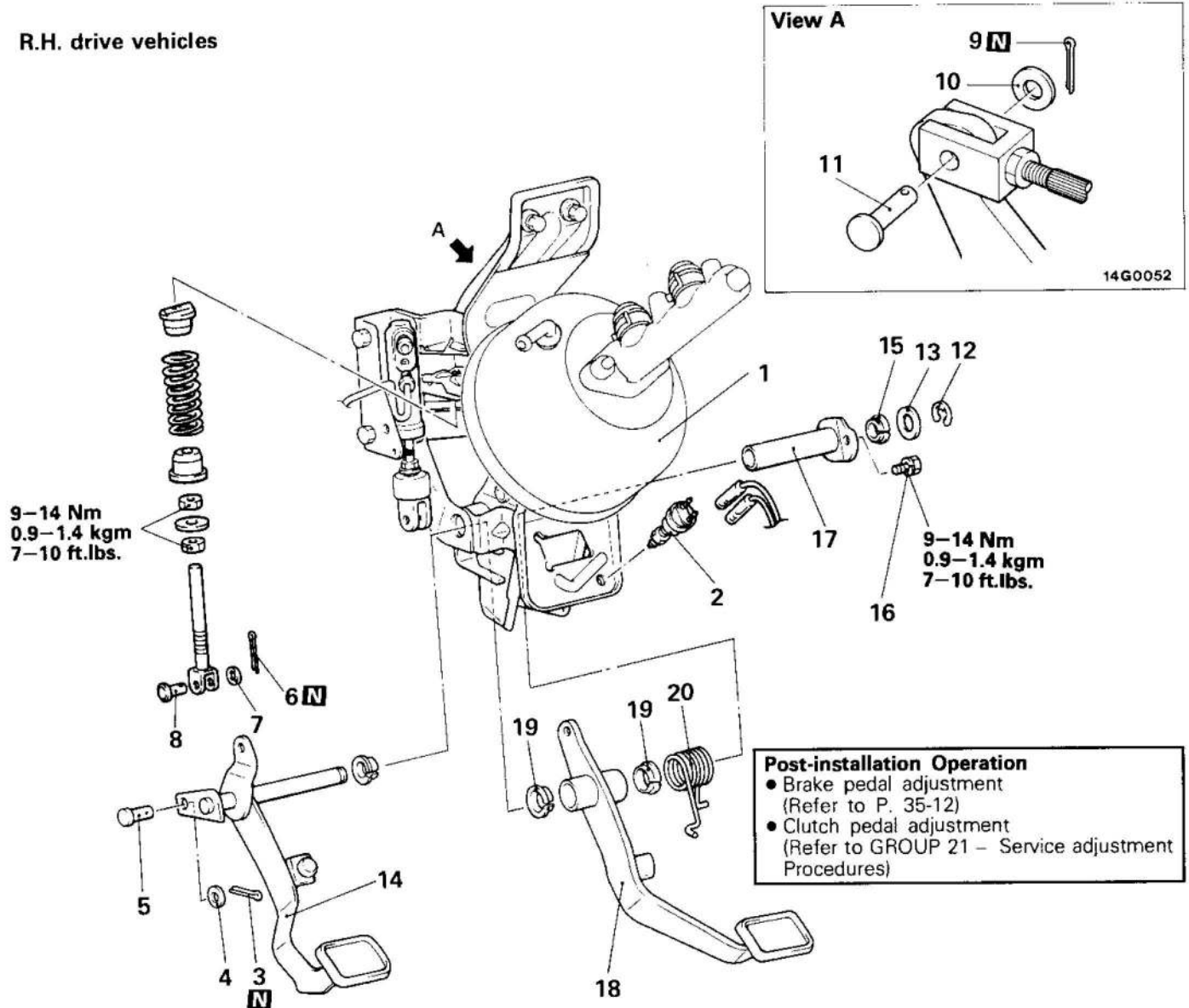
Apply specified grease to clevis pin and washer.

**Specified grease: Wheel bearing grease SAE J310, NLGI No. 2**

REMOVAL AND INSTALLATION

E35GA - B

R.H. drive vehicles



**Post-installation Operation**

- Brake pedal adjustment (Refer to P. 35-12)
- Clutch pedal adjustment (Refer to GROUP 21 – Service adjustment Procedures)

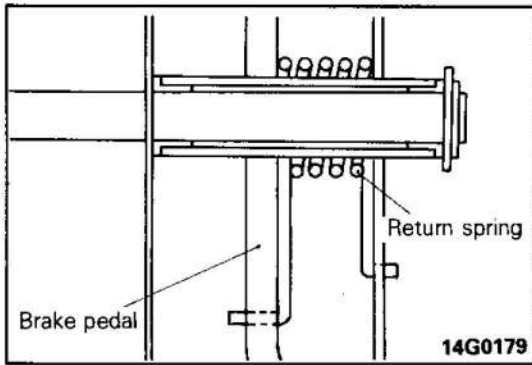
**Removal steps**

- ◆◆ 1. Booster and pedal support member
- ◆◆ 2. Stop lamp switch
- 3. Split pin
- 4. Washer
- ◆◆ 5. Clevis pin
- ◆◆ 6. Split pin
- 7. Washer
- ◆◆ 8. Clevis pin
- ◆◆ 9. Split pin
- ◆◆ 10. Washer
- ◆◆ 11. Clevis pin
- ◆◆ 12. Snap ring
- ◆◆ 13. Washer
- ◆◆ 14. Clutch pedal
- ◆◆ 15. Pedal bushing
- ◆◆ 16. Bolt
- ◆◆ 17. Pipe assembly
- ◆◆ 18. Brake pedal
- ◆◆ 19. Pedal bushing
- ◆◆ 20. Return spring

**NOTE**

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆ : Refer to "Service Points of Installation".
- (4) N : Non-reusable parts



**SERVICE POINTS OF REMOVAL**

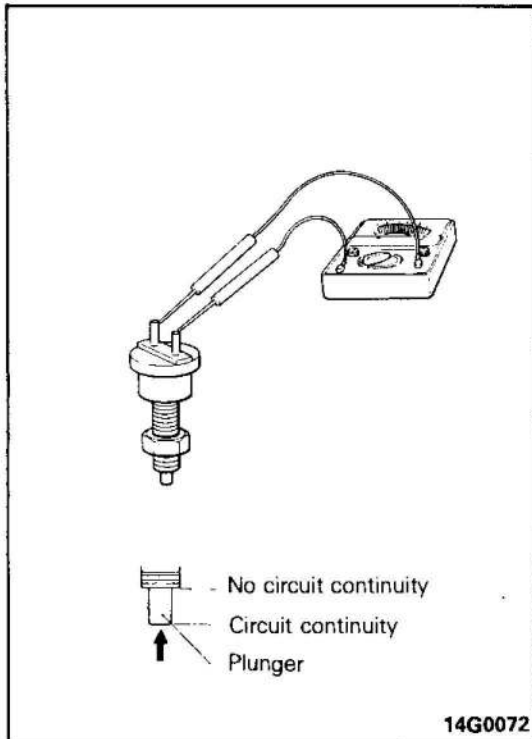
E35GBAD

**1. REMOVAL OF BOOSTER AND PEDAL SUPPORT MEMBER**

Refer to P. 35–36.

**18. REMOVAL OF BRAKE PEDAL**

Insert (-) screwdriver between return spring and pedal support member. Press with screwdriver to remove return spring end from pedal support member. Pull brake pedal downward.

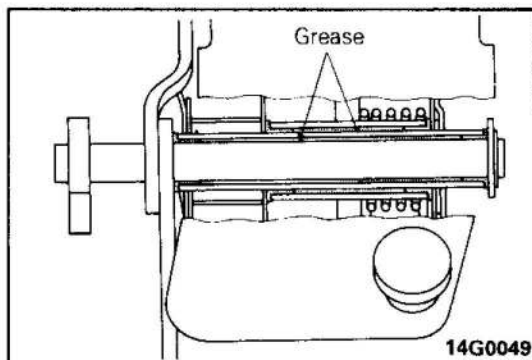
**INSPECTION**

E35GCAA

- Check pedal bushing for wear
- Check brake pedal for distortion
- Check return spring for wear or damage

**INSPECTION OF STOP LAMP SWITCH**

Connect ohmmeter to stop lamp switch. Confirm circuit continuity by pressing in and releasing stop lamp switch plunger. The switch is in good condition if there is circuit continuity with plunger presses in and no circuit continuity when released.

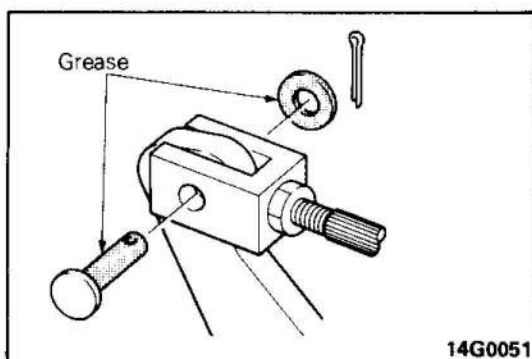
**SERVICE POINTS OF INSTALLATION**

E35GDAD

**19. APPLICATION OF GREASE TO PEDAL BUSHING/15. PEDAL BUSHING**

Apply specified grease to inner pedal bushing, brake pedal, clutch pedal and pipe assembly area.

**Specified grease: Chassis grease SAE J310, NLGI No. 0**

**11. APPLICATION OF GREASE TO CLEVIS PIN/10. WASHER**

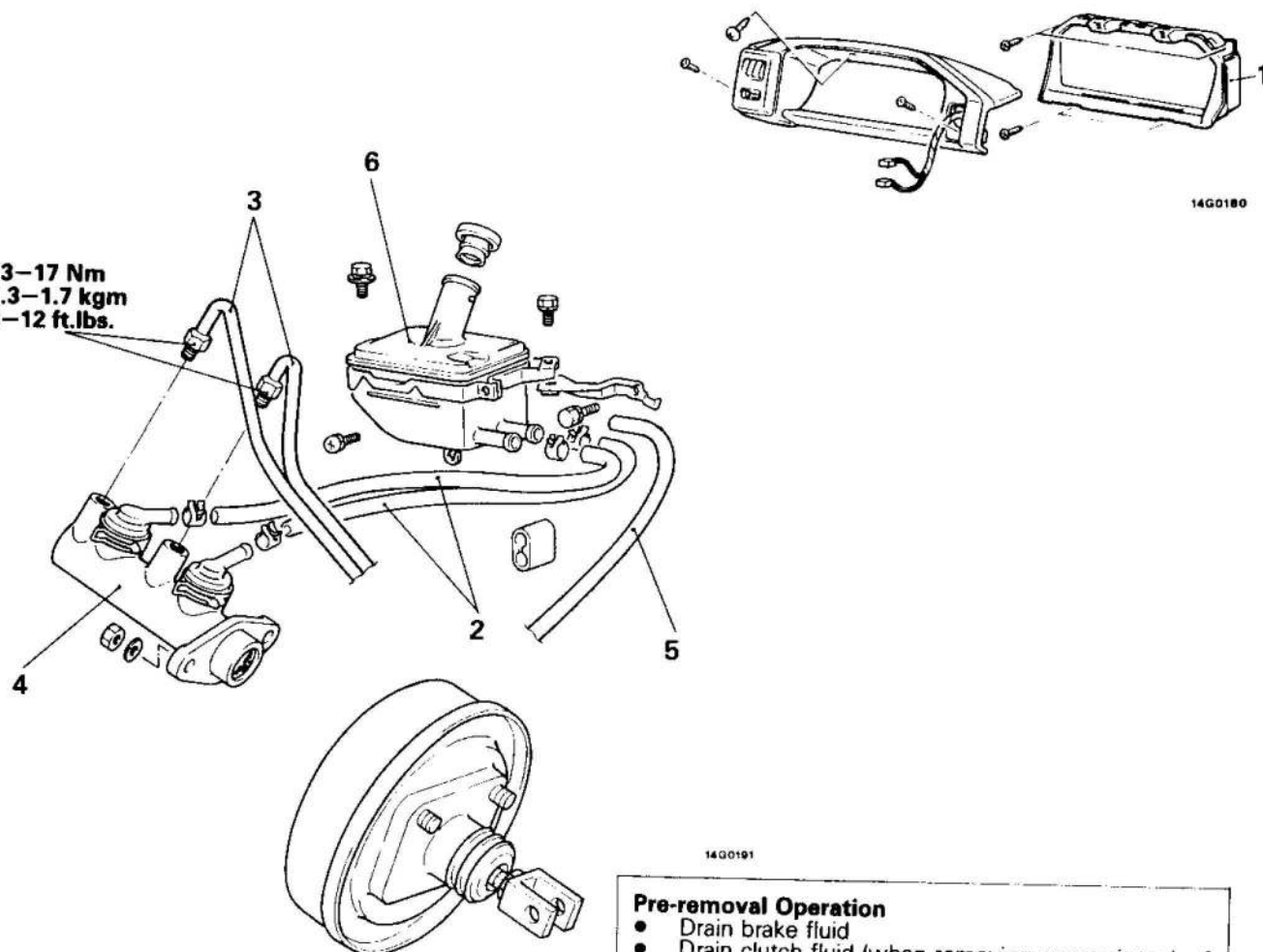
Apply specified grease to clevis pin and washer.

**Specified grease: Wheel bearing grease SAE J310, NLGI No. 2**



# MASTER CYLINDER REMOVAL AND INSTALLATION

13–17 Nm  
1.3–1.7 kgm  
9–12 ft.lbs.



### Removal steps

- ◄◄ 1. Combination meter
- ◄◄ 2. Reservoir hose connection part
- 3. Brake tube connection part
- 4. Master cylinder
- ◄◄ 5. Adjustment of gap between master cylinder and push rod
- 5. Reservoir hose (vehicles with hydraulic clutch)
- ◄◄ 6. Reservoir tank

### Pre-removal Operation

- Drain brake fluid
- Drain clutch fluid (when removing reservoir tank of vehicles with hydraulic clutch)

### Post-installation Operation

- Filling of brake fluid and bleeding system (Refer to P. 35–20)
- Filling of clutch fluid and bleeding system (Refer to GROUP 21 CLUTCH—Service Adjustment Procedures)

### NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◄◄ : Refer to "Service Points of Removal".
- (3) ◄◄ : Refer to "Service Points of Installation".

## SERVICE POINTS OF REMOVAL

### 1. REMOVAL OF COMBINATION METER

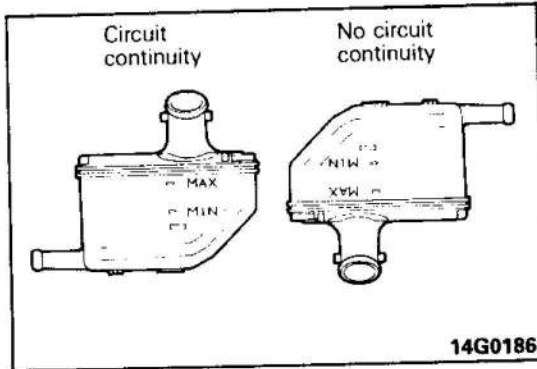
Refer GROUP 54 CHASSIS ELECTRICAL—Meter.

### 2. DISCONNECTION OF RESERVOIR HOSE

Plug reservoir hose after disconnecting to prevent brake fluid dripping into instrument panel.

### 6. REMOVAL OF RESERVOIR TANK

Pull reservoir tank downward. Disconnect brake fluid level sensor (vehicles with level sensor). Remove reservoir tank.

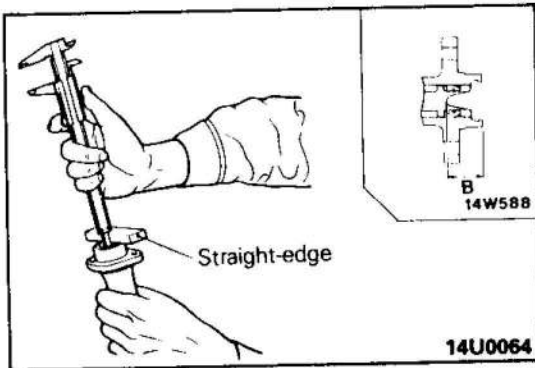
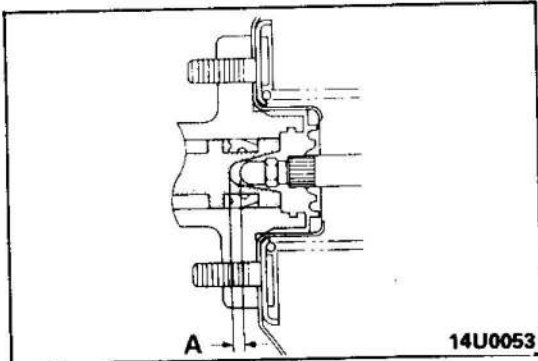
**INSPECTION****BRAKE FLUID LEVEL SENSOR CHECK (VEHICLES WITH LEVEL SENSOR)**

- (1) Connect circuit tester to brake fluid level sensor.
- (2) Sensor is in good condition if there is no circuit continuity when turning reservoir over and circuit continuity when returned to original position.

**SERVICE POINTS OF INSTALLATION**

- **GAP ADJUSTMENT BETWEEN MASTER CYLINDER PRIMARY PISTON AND BRAKE BOOSTER PUSH ROD**

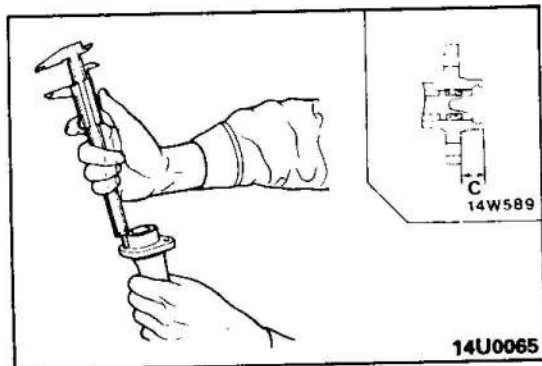
Measure gap (A) as follows.



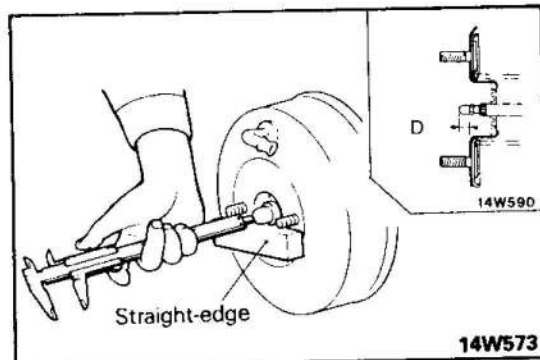
- (1) Measure the distance (B) between master cylinder edge and the back of primary piston.

**NOTE**

Calculate (B) attaching a straight-edge to master cylinder edge and deduct straight-edge thickness.



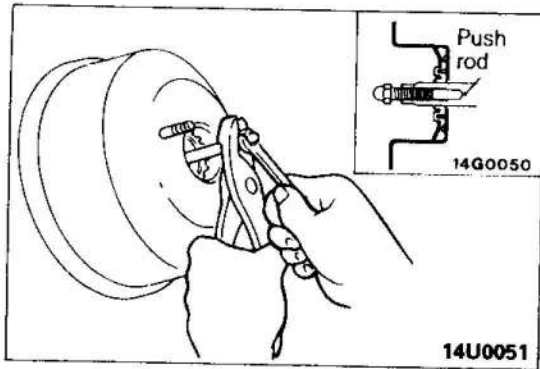
- (2) Measure (C) between master cylinder edge and installing surface.



- (3) Measure (D) between push rod edge and master cylinder installing surface.

**NOTE**

Attach straight-edge on master cylinder installing surface of brake booster, calculate (D) by deducting straight-edge thickness.



- (4) Calculate space (A=B-C-D) with the measurements in (1), (2) and (3).

**Standard value:**

- Vehicles with front drum brake  
0.4–0.8 mm (0.016–0.031 in.)
- Vehicles with front disc brake  
1.5–1.9 mm (0.059–0.075 in.)

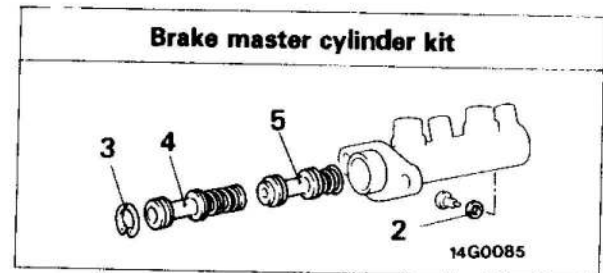
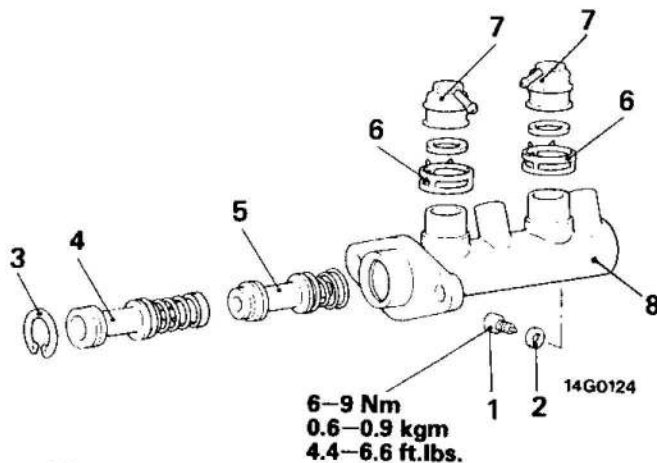
- (5) Adjust push rod length turning push rod edge when the space is not within the standard value.

**Caution**

A gap smaller than the standard value causes brake drag.

**DISASSEMBLY AND REASSEMBLY**

E35E--

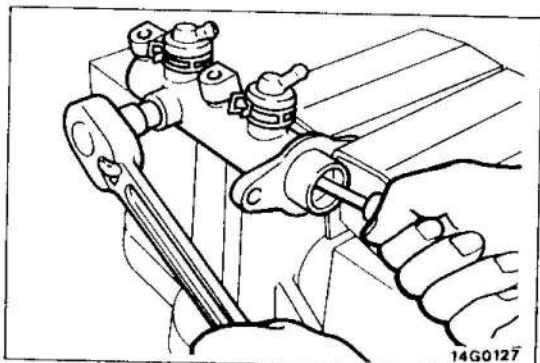


**Disassembly steps**

- ◆◆ 1. Stopper bolt
- ◆◆ 2. Stopper bolt gasket
- ◆◆ 3. Snap ring
- ◆◆◆◆ 4. Primary piston assembly
- ◆◆◆ 5. Secondary piston assembly
- ◆◆ 6. Union band
- ◆◆ 7. Union collar
- ◆◆ 8. Master cylinder body

**NOTE**

- (1) Reverse the disassembly procedures to reassemble.
- (2) ◆◆ : Refer to "Service Points of Disassembly".
- (3) ◆◆◆ : Refer to "Service Points of Reassembly".

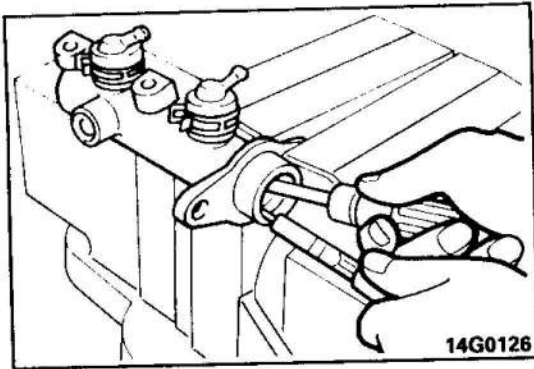


**SERVICE POINTS OF DISASSEMBLY**

E35FAC

**1. REMOVAL OF STOPPER BOLT**

Press in primary piston and remove stopper bolt.

**3. REMOVAL OF SNAP RING**

Press in primary piston and remove snap ring.

**4. CAUTION FOR PRIMARY PISTON ASSEMBLY/5. SECONDARY PISTON ASSEMBLY****Caution**

**Do not disassemble primary or secondary piston assemblies.**

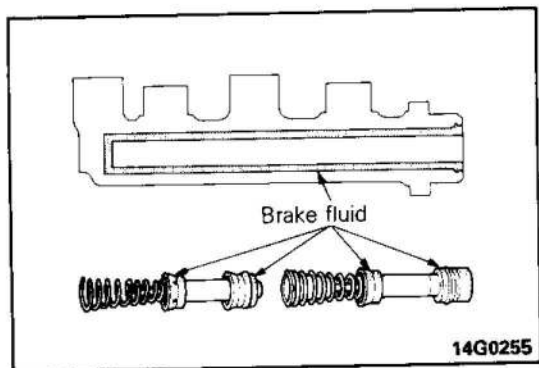
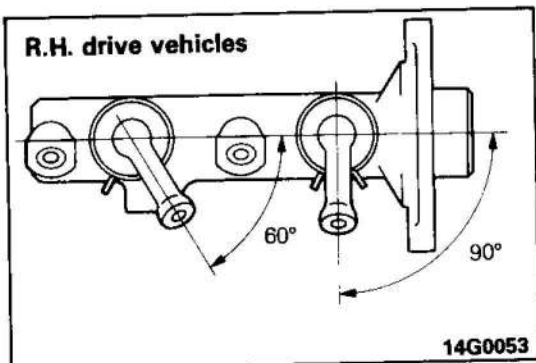
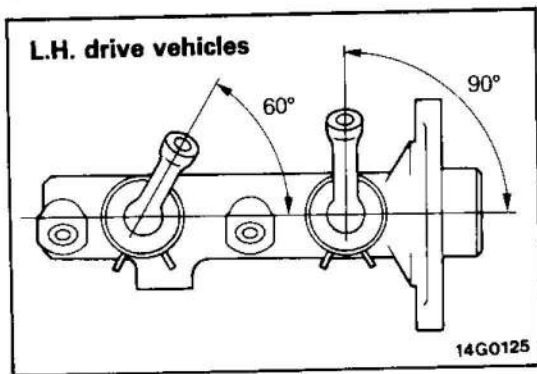
**NOTE**

When secondary piston assembly cannot be removed from master cylinder, direct compressed air through secondary side output port of master cylinder to remove.

**INSPECTION**

E35IGACa

- Check inner master cylinder for rust or damage
- Check primary and secondary piston for rust, damage or wear
- Check primary and secondary piston cups for damage



**SERVICE POINTS OF REASSEMBLY**

**7. INSTALLATION OF UNION COLLAR**

Install as illustrated.

**5. INSTALLATION OF SECONDARY PISTON ASSEMBLY/4. PRIMARY PISTON ASSEMBLY**

Apply specified brake fluid to master cylinder inner body and secondary and primary piston cups.

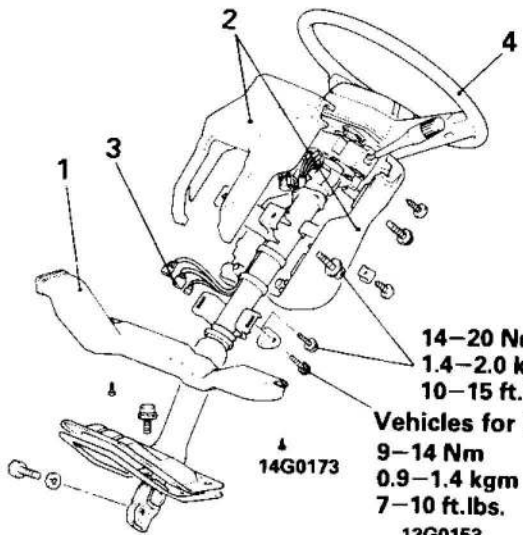
**Specified brake fluid: DOT3 or DOT4**

**BRAKE BOOSTER**

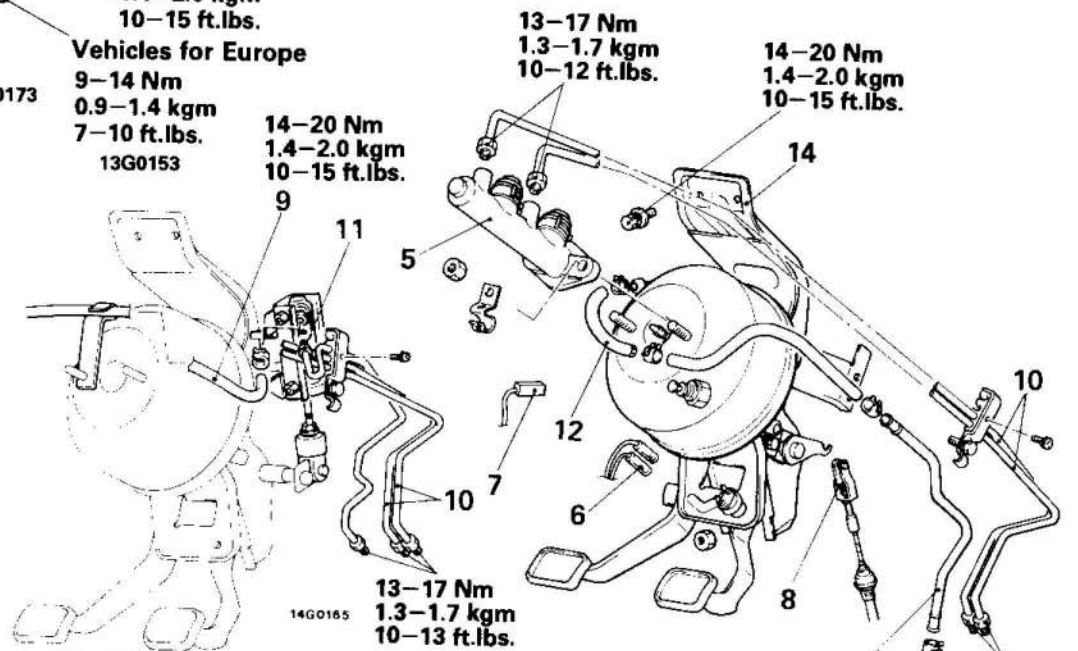
**REMOVAL AND INSTALLATION**

E35JA--

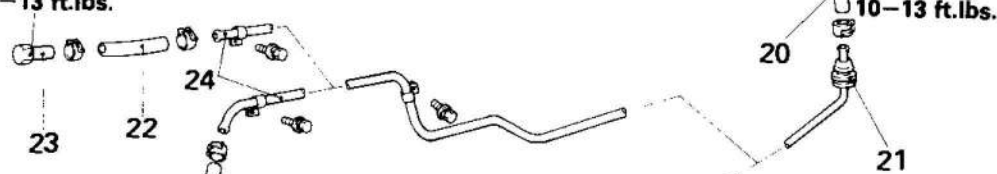
L.H. drive vehicles



Vehicles with hydraulic clutch



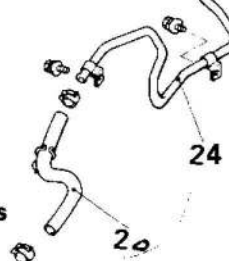
Petrol-powered vehicles (MPI)



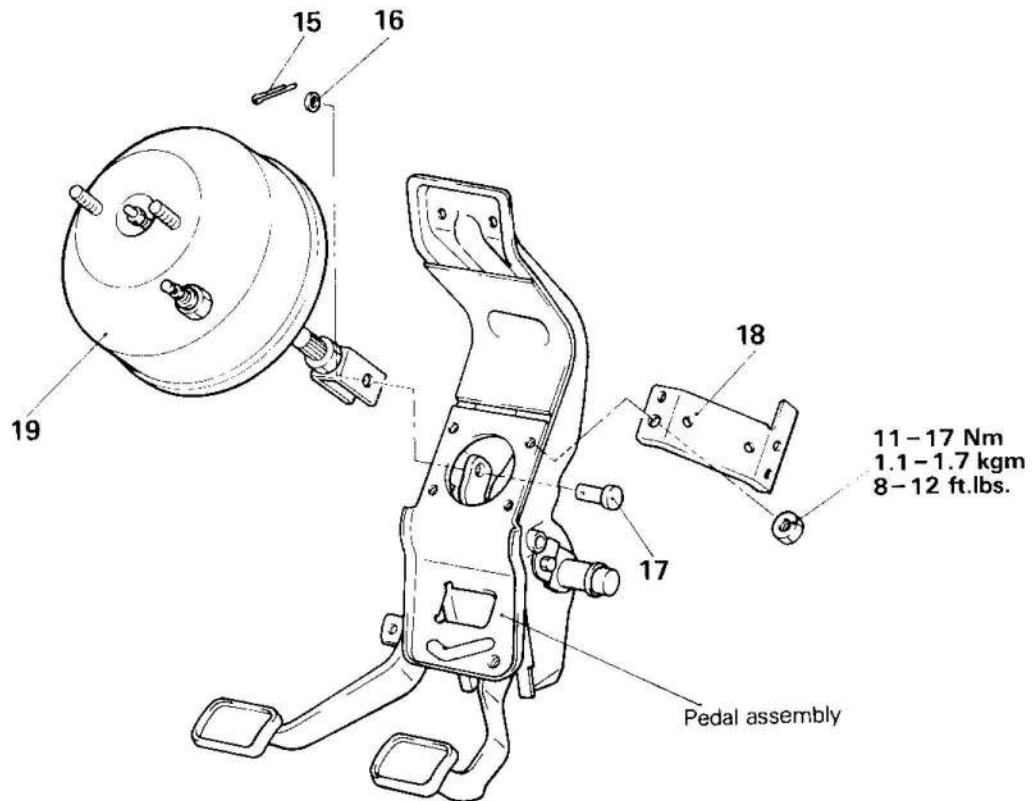
Petrol-powered vehicles (excluding MPI)



Diesel-powered vehicles



14G0164



14G0167

**Pre-removal Operation**

- Drain brake fluid
- Drain clutch fluid (vehicles with hydraulic clutch)

**Removal steps**

1. Lap heater duct (vehicles with lap heater duct)
2. Steering column cover
3. Column switch connector
4. Steering column assembly
5. Master cylinder
6. Stop lamp switch connector
7. Vacuum switch connector (for diesel-powered vehicles)
8. Clutch cable connection (for vehicles with cable type clutch)
9. Hydraulic clutch reservoir hose (vehicles with hydraulic clutch)
10. Brake tube
11. Clutch tube (vehicles with hydraulic clutch)
12. Vacuum hose
13. Vacuum pipe
14. Pedal assembly (with brake booster)
15. Split pin
16. Washer
17. Clevis pin

**Post-installation Operation**

- Brake fluid filling and bleeding (Refer to P. 35-20.)
- Clutch fluid filling and bleeding (Refer to GROUP 21 CLUTCH-Service Adjustment Procedures)
- Brake pedal adjustment (Refer to P. 35-12.)
- Clutch pedal adjustment (Refer to GROUP 21 CLUTCH-Service Adjustment Procedures)

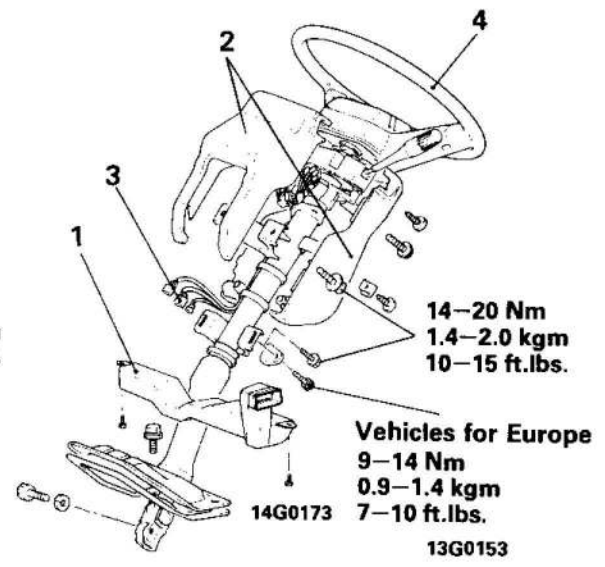
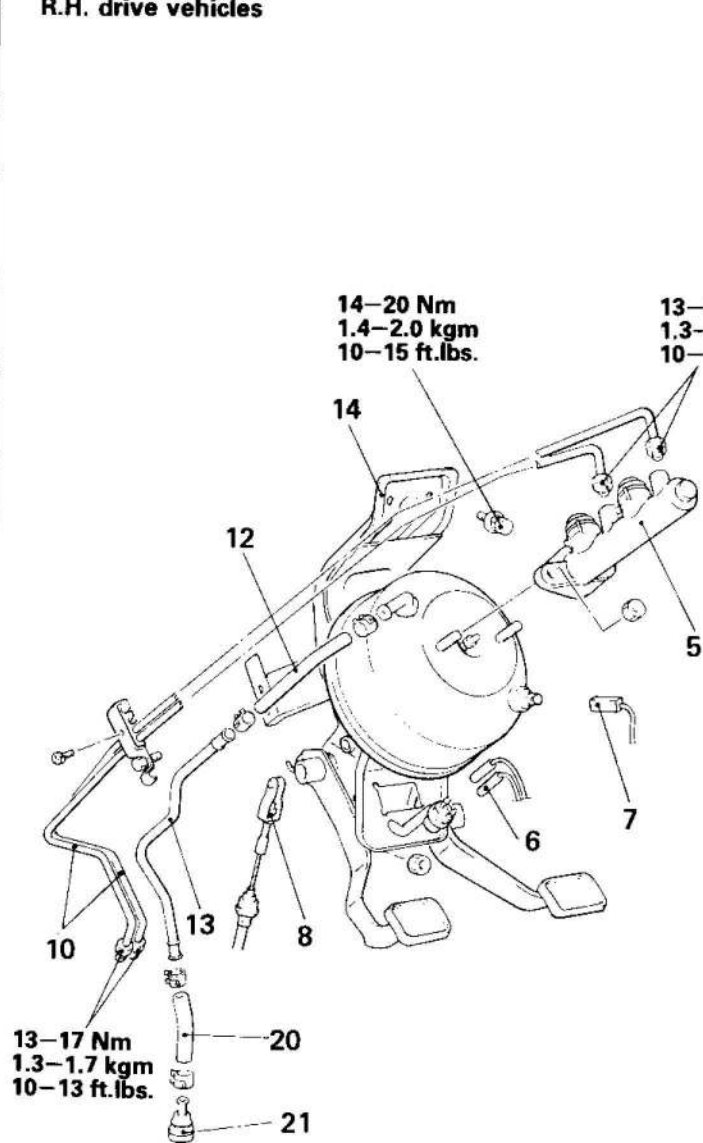
18. Stay
19. Brake booster
20. Vacuum hose
21. Grommet
22. Vacuum hose
23. Fitting (petrol-powered vehicles)
24. Vacuum pipe

**NOTE**

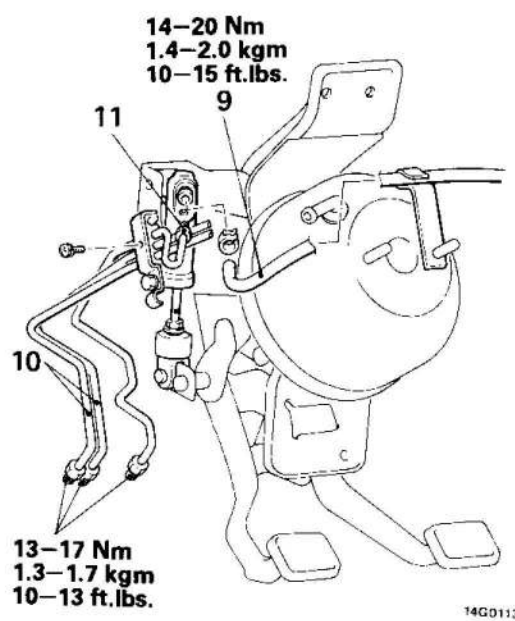
- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆◆ : Refer to "Service Points of Installation".
- (4) **N** : Non-reusable parts



R.H. drive vehicles

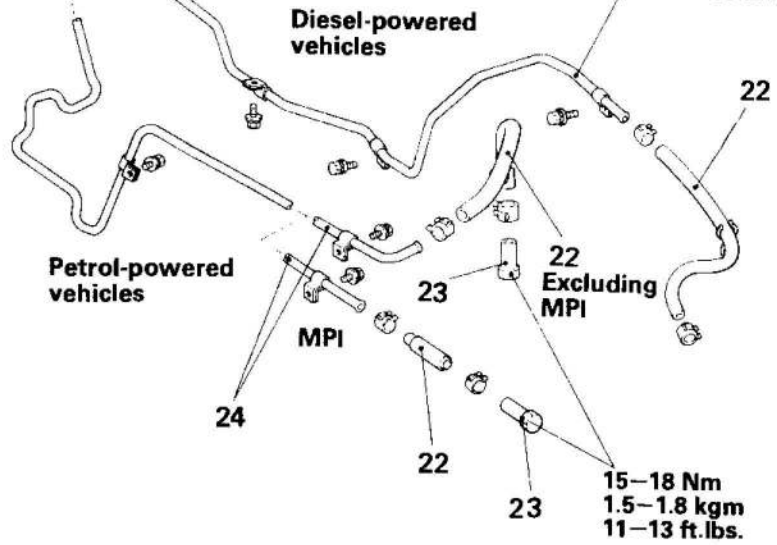


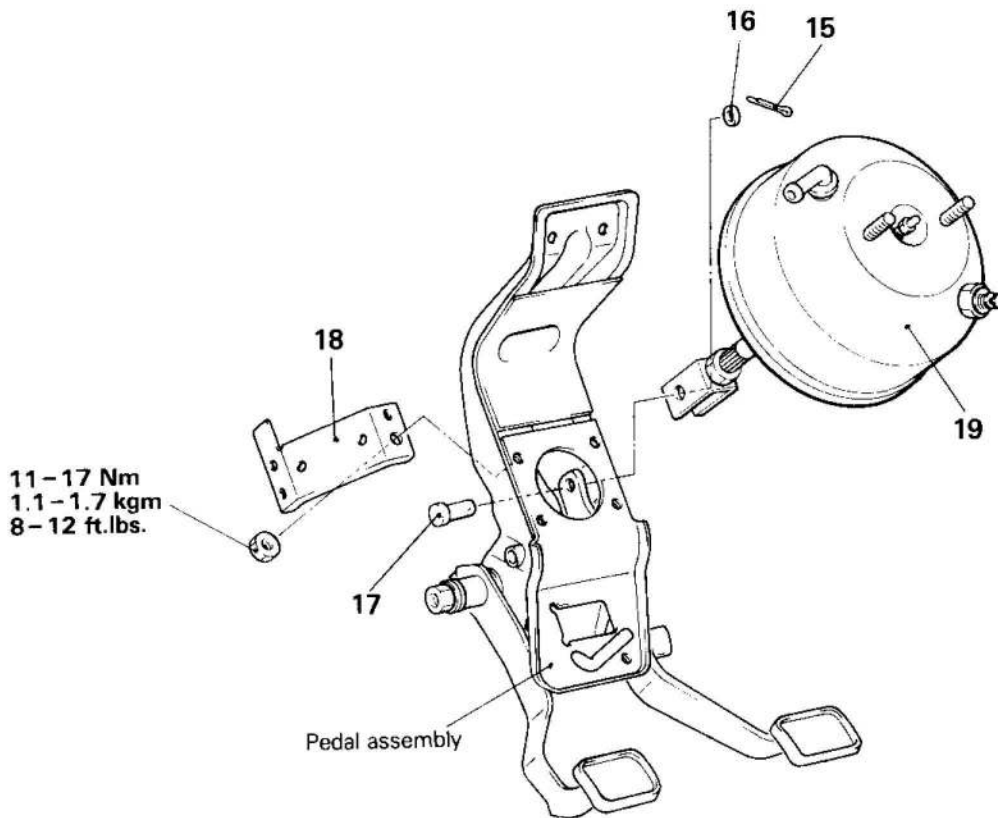
Vehicles with hydraulic clutch



Diesel-powered vehicles

Petrol-powered vehicles





14G0166

**Pre-removal Operation**

- Drain brake fluid
- Drain clutch fluid (vehicles with hydraulic clutch)

**Removal steps**

1. Lap heater duct (vehicles with lap heater duct)
2. Steering column cover
3. Column switch connector
- ◆◆ 4. Steering column assembly
- ◆◆ 5. Master cylinder
6. Stop lamp switch connector
7. Vacuum switch connector (for diesel-powered vehicles)
- B. Clutch cable connection (for vehicles with cable type)
9. Hydraulic clutch reservoir hose (vehicles with hydraulic clutch)
10. Brake tube
11. Clutch tube (vehicles with hydraulic clutch)
12. Vacuum hose
13. Vacuum pipe
- ◆◆ 14. Pedal assembly (with brake booster)
15. Split pin
- ◆◆ 16. Washer

**Post-installation Operation**

- Brake fluid filling and bleeding (Refer to P. 35-20.)
- Clutch fluid filling and bleeding (Refer to GROUP 21 CLUTCH—Service Adjustment Procedures.)
- Brake pedal adjustment (Refer to P. 35-12.)
- Clutch pedal adjustment (Refer to GROUP 21 CLUTCH—Service Adjustment Procedures.)

- ◆◆ 17. Clevis pin
- 18. Stay
- 19. Brake booster
- 20. Vacuum hose
- 21. Grommet
- 22. Vacuum hose
- ◆◆ 23. Fitting (petrol-powered vehicles)
- 24. Vacuum pipe

**NOTE**

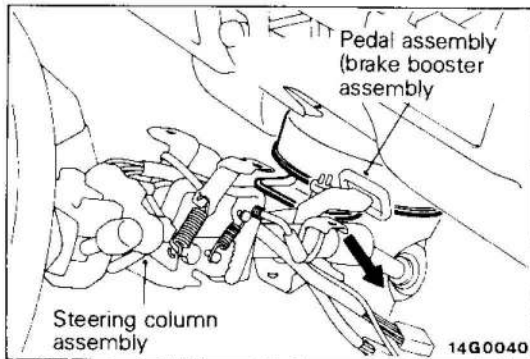
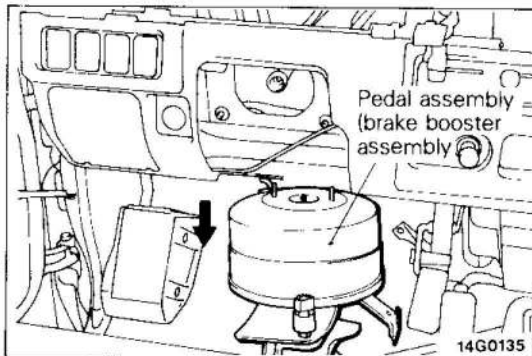
- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆ : Refer to "Service Points of Installation".
- (4) **N** : Non-reusable parts

**SERVICE POINTS OF REMOVAL**

E35JBAG

**4. REMOVAL OF STEERING COLUMN ASSEMBLY**

- (1) For floor shift vehicles (excluding L.H. drive vehicles) remove 4 steering column bolts and lay back on front seat to avoid exerting force to lower steering column.
- (2) For column shift vehicles and L.H. drive vehicles, remove steering column assembly (column shift). (Refer to GROUP 37 STEERING—Wheel and Shaft)

**5. REMOVAL OF MASTER CYLINDER**

Refer to P35-31 for removal procedures.

**14. REMOVAL OF PEDAL ASSEMBLY (WITH BRAKE BOOSTER)**

L.H. drive vehicles

Remove brake booster downward to ensure not damaging other parts in instrument panel.

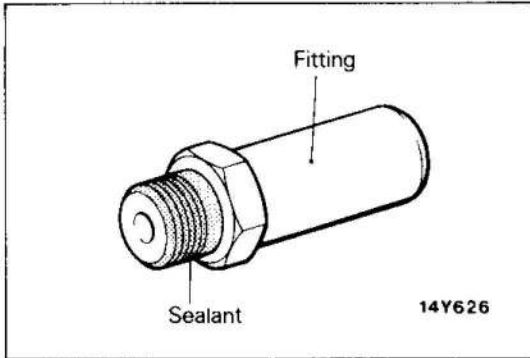
R.H. drive vehicles

Remove brake booster to the right to ensure not damaging other instrument panel components.

**INSPECTION**

E35JCAC

- Check external brake booster for damage.
- Check vacuum hose for crack or wear
- Check operation of check valve (Refer to P. 35-16 for check procedures.)

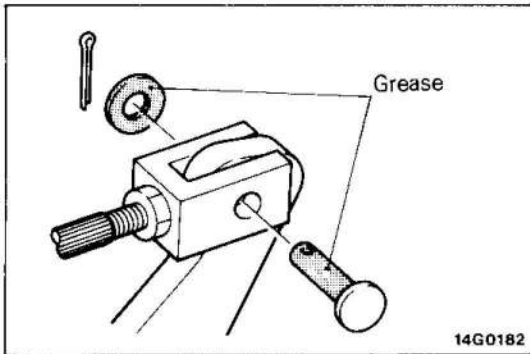
**SERVICE POINTS OF INSTALLATION**

E35JDAG

**23. INSTALLATION OF FITTING**

When installing the fitting, apply the specified sealant to its threaded portion.

**Specified sealant: 3M ATD Part No. 8663, 8661  
or equivalent**

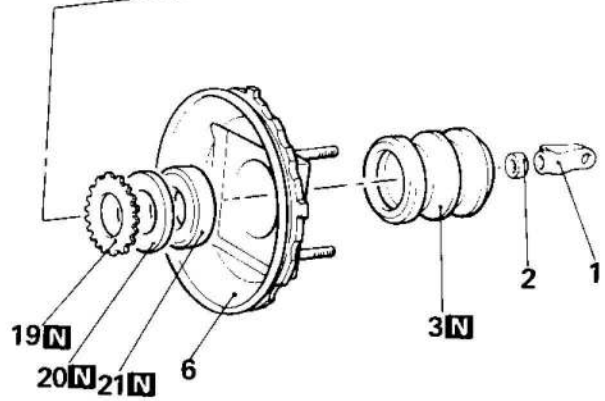
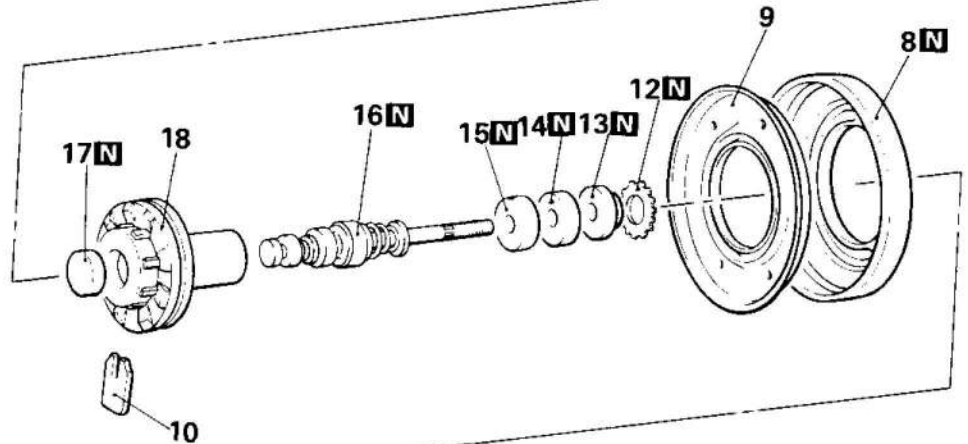
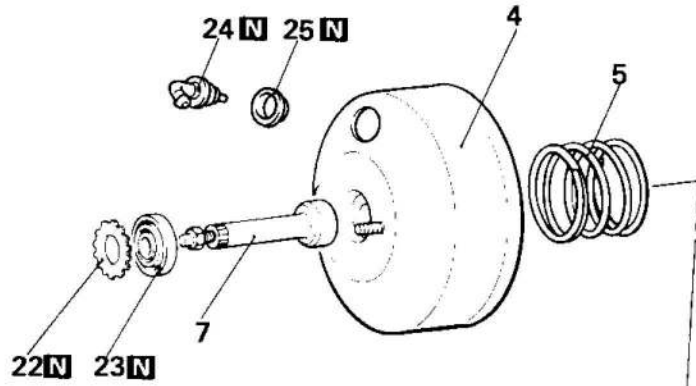
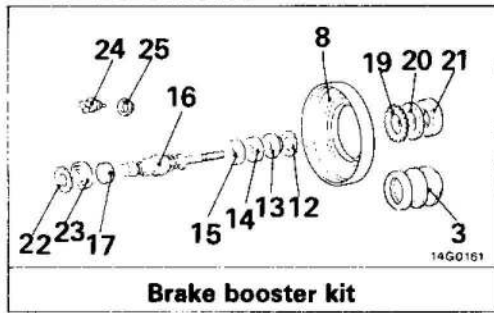
**17. INSTALLATION OF CLEVIS PIN/16. WASHER**

After applying the specified grease to the clevis pin and washer, insert a clevis pin and bend the split pin tightly.

**Specified grease: Wheel bearing grease SAE J310,  
NLGI No. 2**

DISASSEMBLY AND REASSEMBLY (SINGLE TYPE)

7 inch brake booster



14G0158

Disassembly steps

- 1. Operating rod yoke
- 2. Locking nut
- 3. Boot
- ◆◆ 4. Front shell
- ◆◆ 5. Spring
- ◆◆ 6. Rear shell
- ◆◆ ◆◆ 8. Diaphragm
- ◆◆ ◆◆ 9. Diaphragm plate
- ◆◆ ◆◆ 10. Valve plunger stop key
- ◆◆ ◆◆ 12. Retainer
- ◆◆ 13. Filter
- ◆◆ 14. Silencer
- ◆◆ 15. Filter

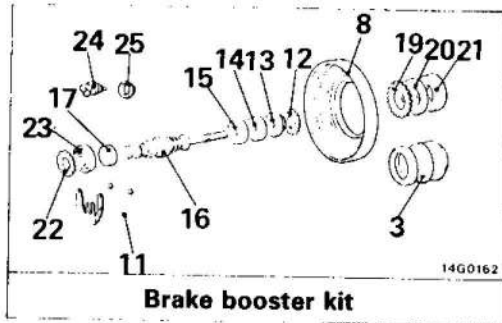
- ◆◆ 16. Valve rod and plunger
- ◆◆ 17. Reaction disc
- ◆◆ 18. Valve body assembly (with diaphragm plate assembly)
- ◆◆ ◆◆ 19. Retainer
- ◆◆ ◆◆ 20. Bearing
- ◆◆ ◆◆ 21. Valve body seal
- ◆◆ ◆◆ 22. Retainer
- ◆◆ ◆◆ 23. Push rod seal and plate assembly
- ◆◆ 24. Check valve
- ◆◆ 25. Grommet
- ◆◆ Grease points

NOTE

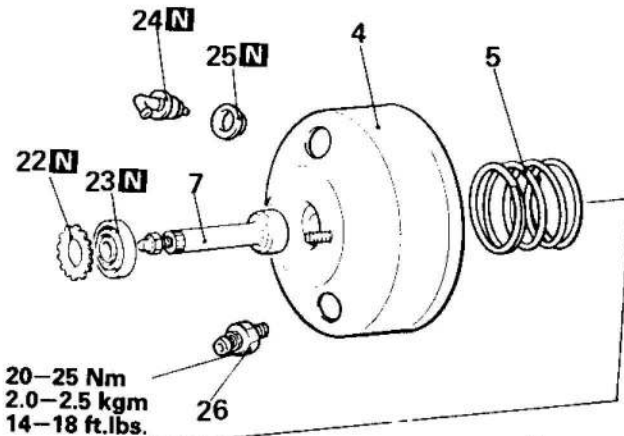
- (1) Reverse the disassembly procedures to reassemble.
- (2) ◆◆ : Refer to "Service Points of Disassembly".
- (3) ◆◆ : Refer to "Service Points of Reassembly".
- (4) N : Non-reusable parts

E35JE--

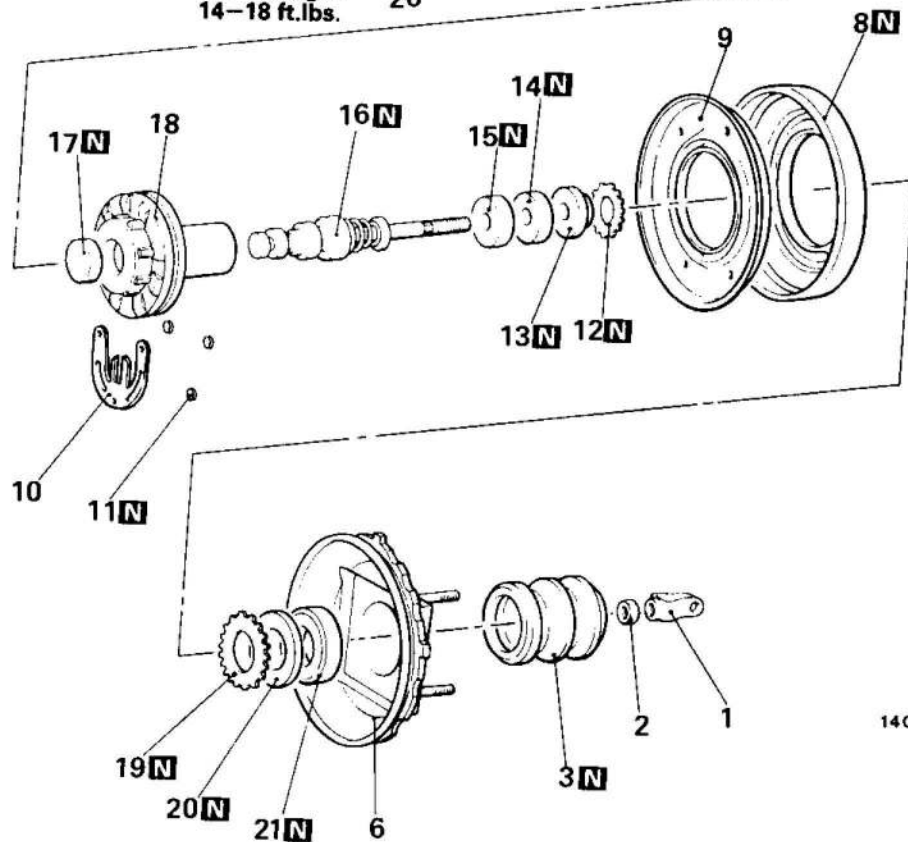
9 inch brake booster



Brake booster kit



20-25 Nm  
2.0-2.5 kgm  
14-18 ft.lbs.



14G0159

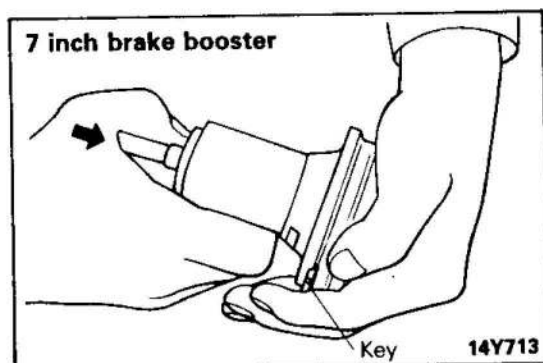
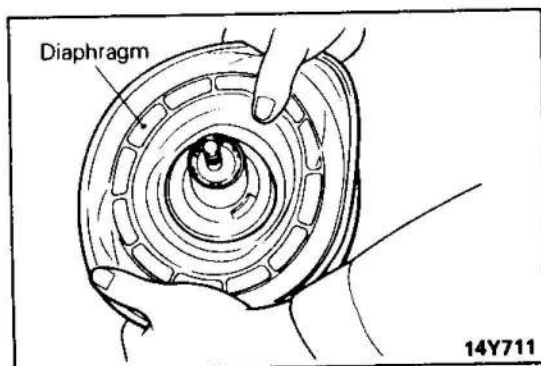
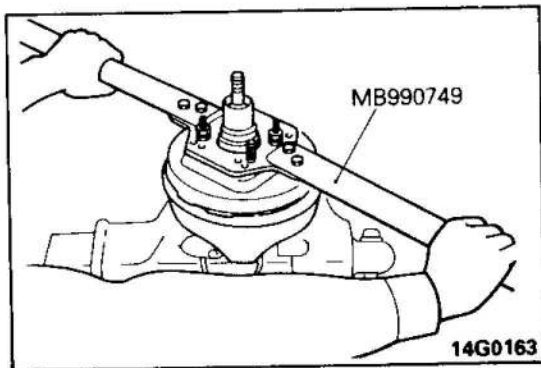
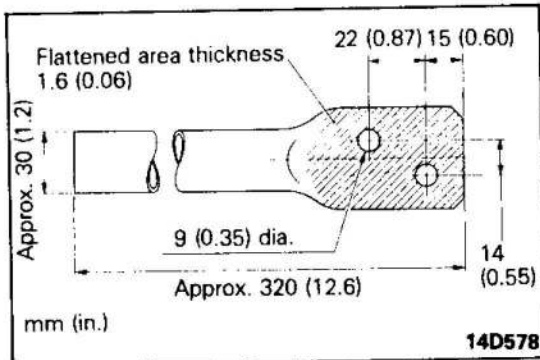
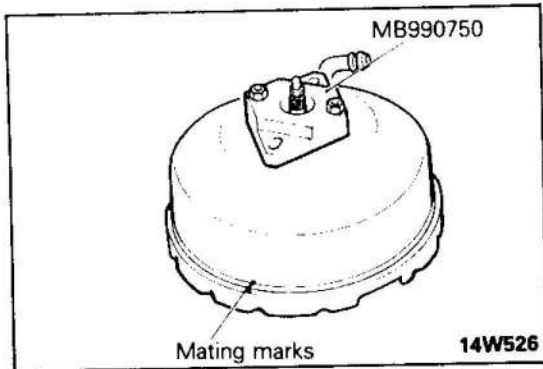
Disassembly steps

- |                       |                            |                                                            |                                                |
|-----------------------|----------------------------|------------------------------------------------------------|------------------------------------------------|
| 1. Operating rod yoke | ◆◆                         | 16. Valve rod and plunger                                  |                                                |
| 2. Locking nut        |                            | 17. Reaction disc                                          |                                                |
| 3. Boot               | ◆◆                         | 18. Valve body assembly<br>(with diaphragm plate assembly) |                                                |
| ◆◆                    | 4. Front shell             | ◆◆◆◆                                                       | 19. Retainer                                   |
| 5. Spring             |                            | ◆◆                                                         | 20. Bearing                                    |
| 6. Rear shell         |                            | ◆◆◆◆                                                       | 21. Valve body seal                            |
| 7. Push rod           | ◆◆◆◆                       | ◆◆◆◆                                                       | 22. Retainer                                   |
| 8. Diaphragm          |                            | ◆◆                                                         | 23. Push rod seal and plate assembly           |
| ◆◆                    | 9. Diaphragm plate         | ◆◆                                                         | 24. Check valve                                |
| ◆◆                    | 10. Valve plunger stop key | ◆◆                                                         | 25. Grommet                                    |
| 11. Stopper           |                            | ◆◆                                                         | 26. Vacuum switch<br>(diesel-powered vehicles) |
| ◆◆◆◆                  | 12. Retainer               | ◆◆                                                         | Grease points                                  |
| 13. Filter            |                            |                                                            |                                                |
| 14. Silencer          |                            |                                                            |                                                |
| 15. Filter            |                            |                                                            |                                                |

NOTE

- (1) Reverse the disassembly procedure to reassemble.
- (2) ◆◆: Refer to "Service Points of Disassembly".
- (3) ◆◆◆: Refer to "Service Points of Reassembly".
- (4) N: Non-reusable parts





## SERVICE POINTS OF DISASSEMBLY

### 4. REMOVAL OF FRONT SHELL

- (1) Clean the booster body before starting disassembly.

#### Caution

During disassembly, do not allow dust, dirt, water or other impurities into the brake booster.

- (2) Set the special tool to the front shell and hold it in a vice.
- (3) Make the mating marks on the front and rear shells.

- (4) Make two arms of steel pipe as shown in the illustration, and attach the arms to the special tool with suitable bolts.

- (5) Set the special tool to the rear shell. Rotate the special tool counterclockwise to remove the rear shell.

### 8. REMOVAL OF DIAPHRAGM

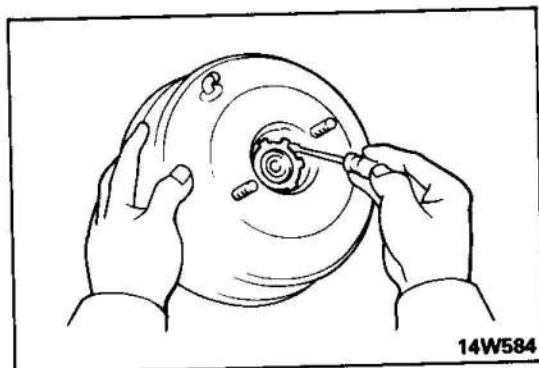
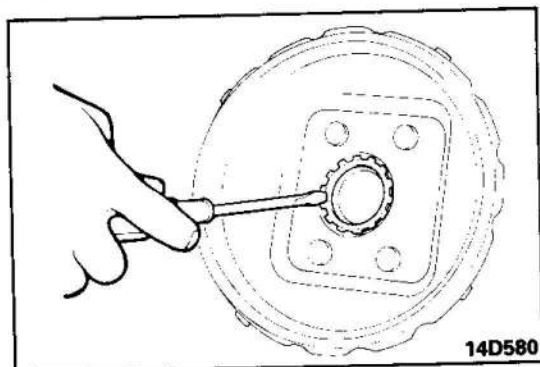
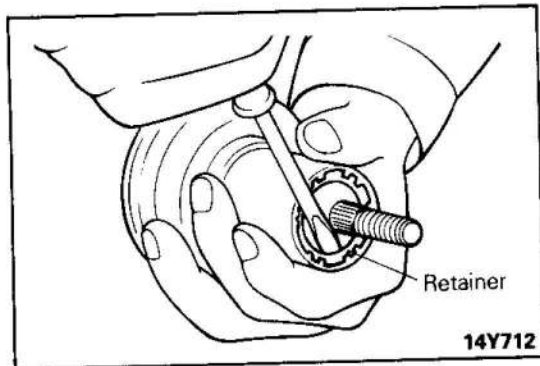
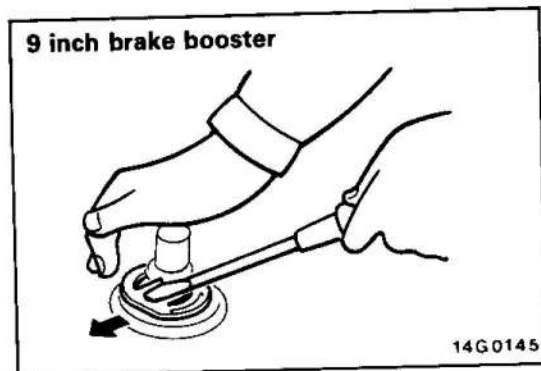
Pull off the diaphragm from the diaphragm plate.

#### Caution

The valve body, being made of plastic, should be carefully handled. Do not drop it or subject it to impact.

### 10. REMOVAL OF VALVE PLUNGER STOP KEY

Remove the valve plunger stop key while pushing the valve rod and plunger assembly.



**12. REMOVAL OF RETAINER**

Using a screwdriver, remove the retainer from the valve body.

**16. REMOVAL OF VALVE ROD AND PLUNGER**

Slowly pull out the valve rod and plunger with the filter and silencer from the valve body.

**19. REMOVAL OF RETAINER**

Using a screwdriver, remove the retainer from the rear shell.

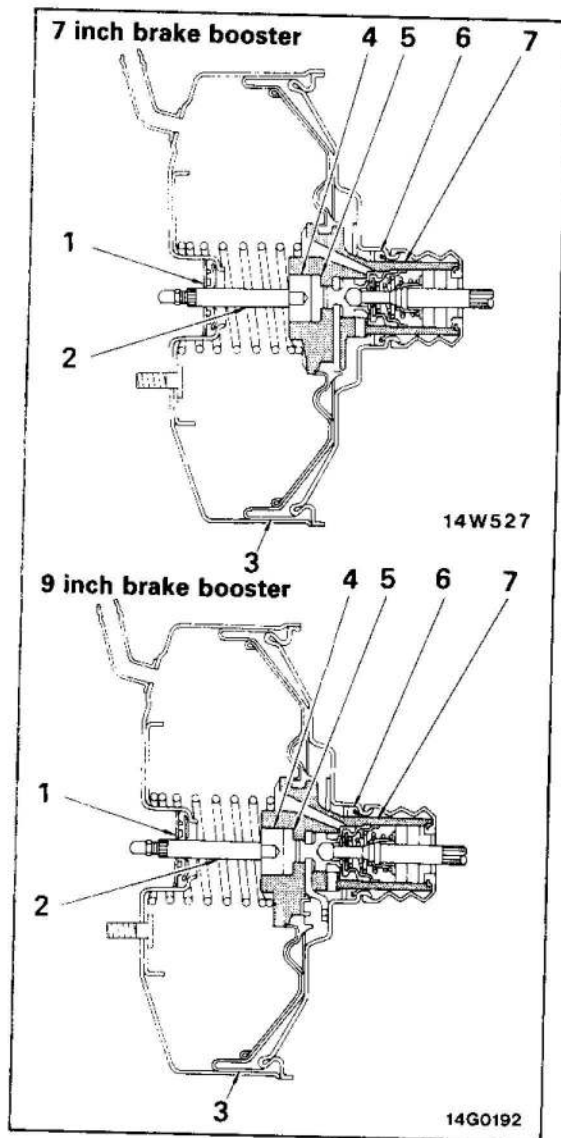
**22. REMOVAL OF RETAINER**

Using a screwdriver, remove the retainer from the front shell.

**INSPECTION**

E35JGAA

- Check the plate and seal assembly for wear.
- Check the push rod for bend or damage.
- Check the front shell and rear shell for deformation, cracks and damage.
- Check the spring for deterioration.
- Check the valve body for damage and cracks.
- Check the diaphragm for damage.
- Check the bearing and valve body seal for wear.
- Check the valve rod and plunger for wear, bend and damage.
- Check the air silencer filter and silencer for clogging.
- Check the boot for cracks and damage.



## SERVICE POINTS OF REASSEMBLY

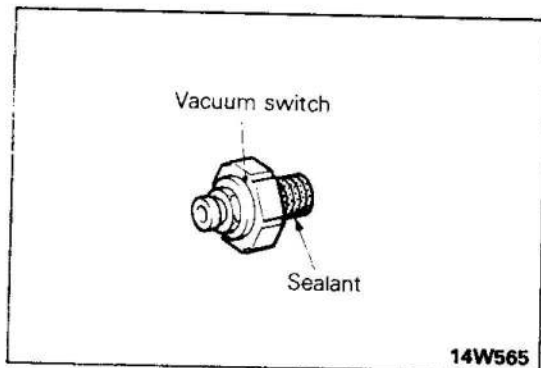
### • GREASE POINTS

Coat the following points with the silicone grease.

- (1) Push rod seal lip
- (2) Push rod perimeter
- (3) Diaphragm to shell contact surfaces
- (4) Push rod body perimeter
- (5) Reaction disc (all surfaces)
- (6) Bearing and valve body seal lip
- (7) Valve body (inside and outside)

### NOTE

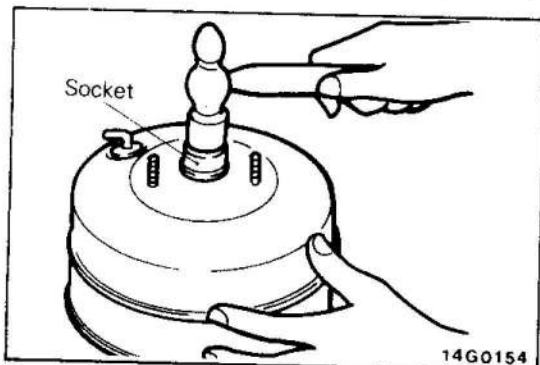
Do not stain the diaphragm with grease.



### 26. APPLICATION OF SEALANT TO VACUUM SWITCH (diesel-powered vehicles)

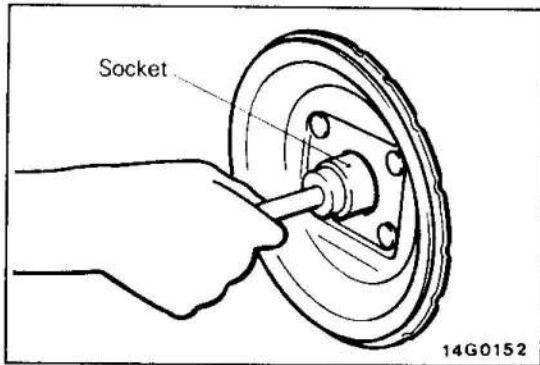
Install the vacuum switch, after applying the specified sealant to its threaded portion.

**Specified sealant: 3M ATD Part No. 8659, 8082 or equivalent**

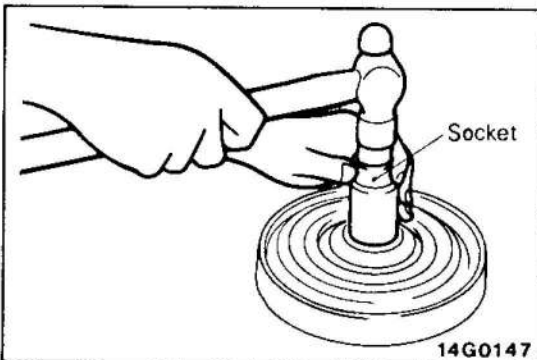


### 23. INSTALLATION OF PUSH ROD SEAL AND PLATE ASSEMBLY/22. RETAINER

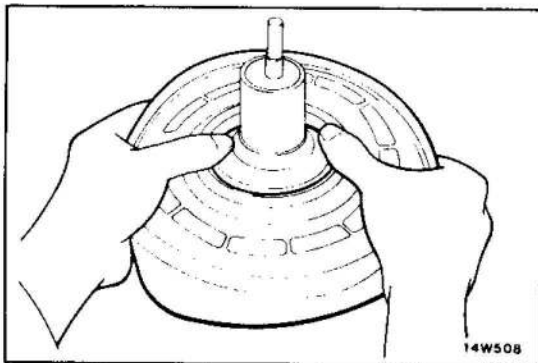
Use 27 mm (1 1/16 in.) socket and install push rod seal, plate assembly and retainer to front shell.

**21. INSTALLATION OF VALVE BODY SEAL/20. BEARING/19. RETAINER**

Use 32 mm (1 1/4 in.) socket and install retainer seal, bearing and retainer to rear shell.

**12. INSTALLATION OF RETAINER**

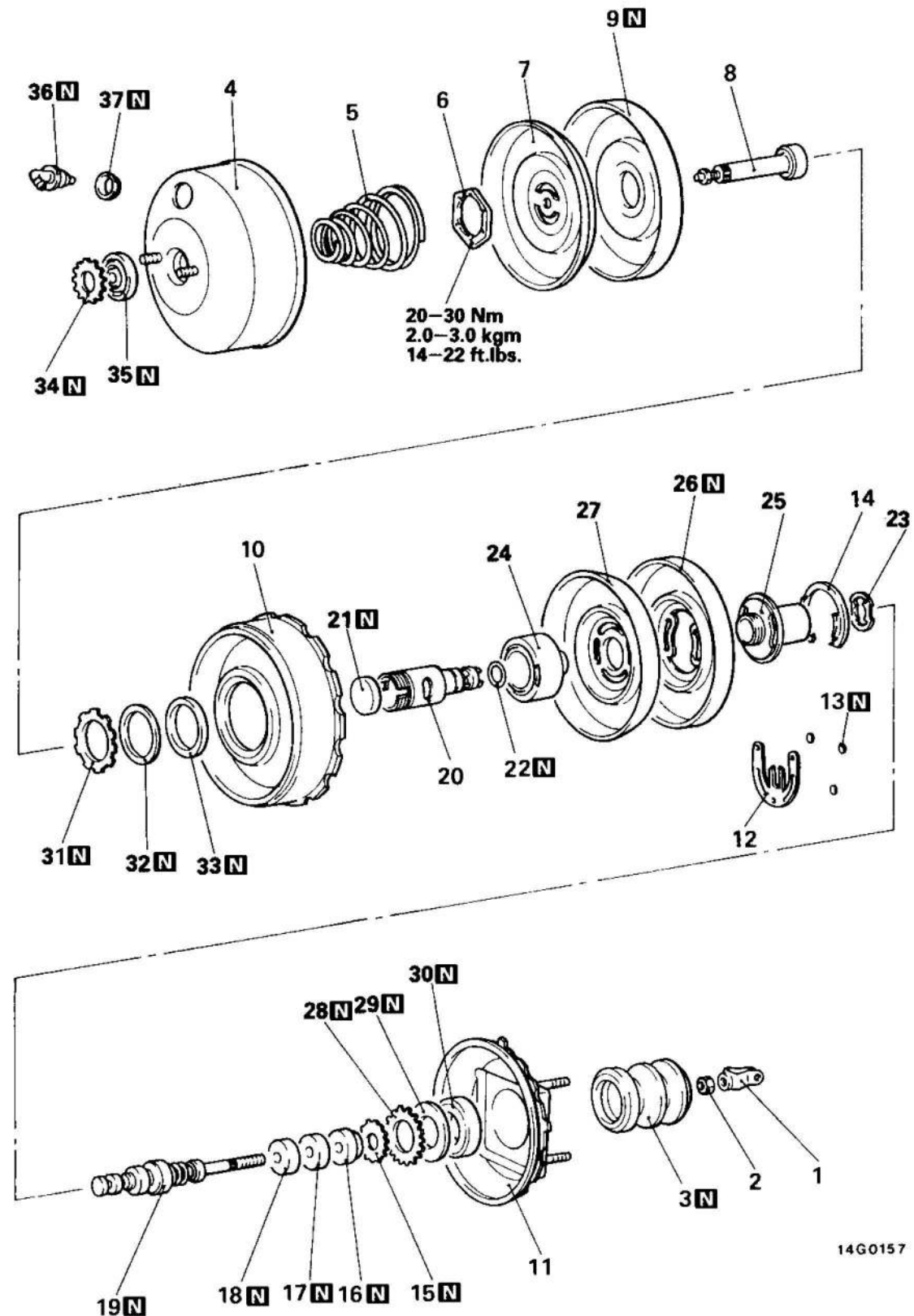
Use 22 mm (7/8 in.) socket and install retainer to valve body.

**8. INSTALLATION OF DIAPHRAGM**

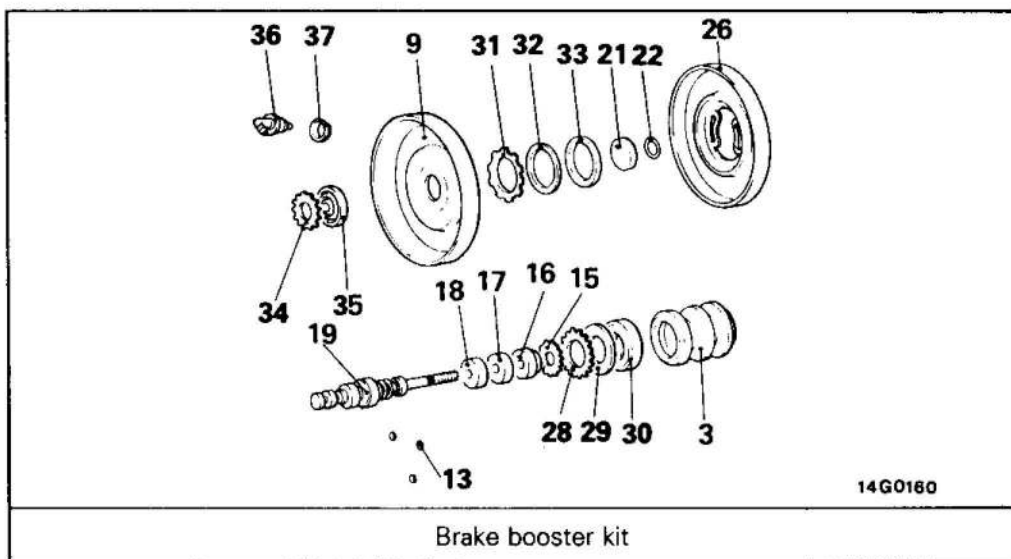
- (1) Mount the diaphragm plate to the valve body, and then push the diaphragm securely into the groove in the valve body.
- (2) Confirm that the valve body, the diaphragm plate, and the diaphragm are securely assembled.

DISASSEMBLY AND REASSEMBLY (TANDEM TYPE)

8 inch tandem brake booster



14G0157



Brake booster kit

**Disassembly steps**

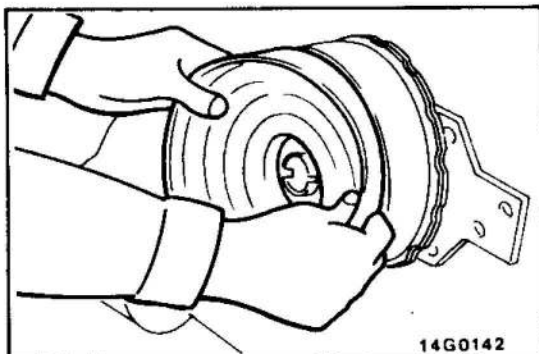
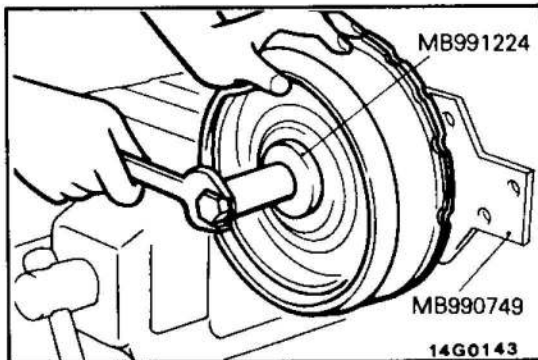
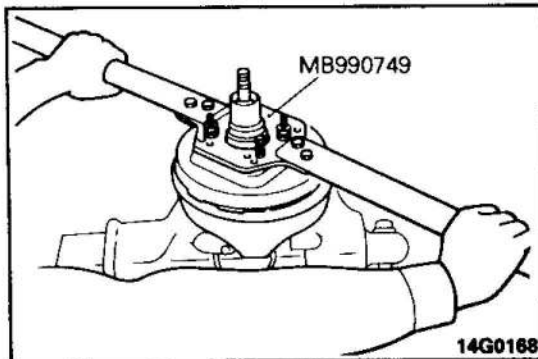
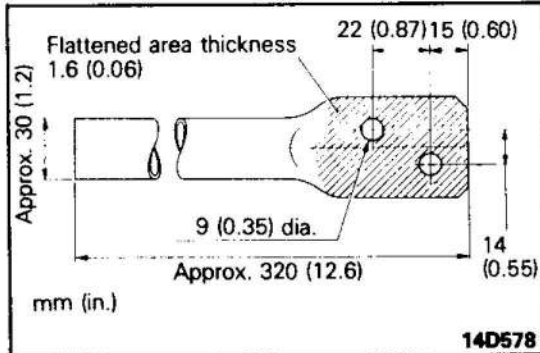
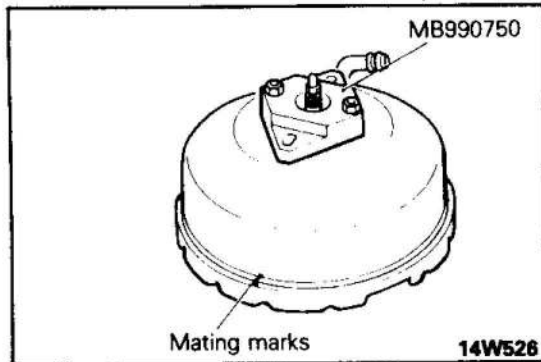
- 1. Operating rod yoke
- 2. Locking nut
- 3. Boot
- ◆◆ 4. Front shell
- ◆◆◆◆ 5. Spring
- ◆◆◆◆◆ 6. Nut
- ◆◆◆◆◆ 7. Diaphragm plate
- ◆◆◆◆◆ 8. Push rod
- ◆◆◆◆◆ 9. Diaphragm
- ◆◆◆◆◆ 10. Center plate
- ◆◆ 11. Rear shell
- ◆◆ 12. Valve plunger stop key
- 13. Stopper
- 14. Retainer
- ◆◆◆◆◆ 15. Retainer
- ◆◆◆◆◆ 16. Filter
- ◆◆◆◆◆ 17. Silencer
- ◆◆◆◆◆ 18. Filter
- ◆◆ 19. Valve rod and plunger
- ◆◆◆◆◆ 20. Reaction disc hub

- 21. Reaction disc
- 22. O-ring
- ◆◆◆◆◆ 23. Retainer
- ◆◆◆◆◆ 24. Center body
- ◆◆◆◆◆ 25. Valve body
- ◆◆◆◆◆ 26. Diaphragm
- ◆◆◆◆◆ 27. Diaphragm plate
- ◆◆◆◆◆ 28. Retainer
- ◆◆◆◆◆ 29. Bearing
- ◆◆◆◆◆ 30. Retainer seal
- ◆◆◆◆◆ 31. Retainer
- ◆◆◆◆◆ 32. Bearing
- ◆◆◆◆◆ 33. Center plate seal
- ◆◆◆◆◆ 34. Retainer
- ◆◆◆◆◆ 35. Push rod seal and plate assembly
- ◆◆◆◆◆ 36. Check valve
- ◆◆◆◆◆ 37. Grommet
- ◆◆◆◆◆ Grease points

**NOTE**

- (1) Reverse the disassembly procedures to reassemble.
- (2) ◆◆◆◆◆ : Refer to "Service Points of Disassembly".
- (3) ◆◆◆◆◆ : Refer to "Service Points of Reassembly".
- (4) **N** : Non-reusable parts





## SERVICE POINTS OF DISASSEMBLY

### 4. REMOVAL OF FRONT SHELL

- (1) Clean the booster body before starting disassembly.

#### Caution

During disassembly, do not allow dust, dirt, water or other impurities into the brake booster.

- (2) Set the special tool to the front shell and hold it in a vice.
- (3) Make the mating marks on the front and rear shells.

- (4) Make two arms of steel pipe as shown in the illustration, and attach the arms to the special tool with suitable bolts.

- (5) Set the special tool to the rear shell. Rotate the special tool counterclockwise to remove the rear shell.

### 6. REMOVAL OF NUT

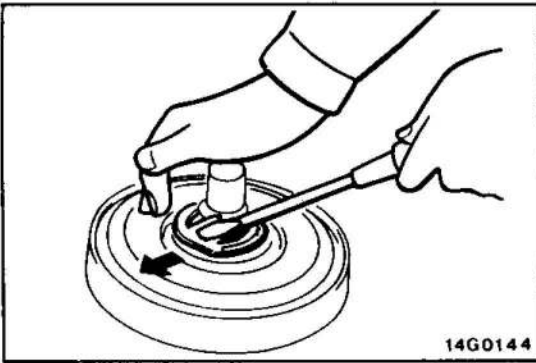
- (1) Lock brake booster with special tool in vice.
- (2) Hold diaphragm and remove nut with special tool.

#### Caution

The valve body, being made of plastic, should be carefully handled. Do not drop it or subject it to impact.

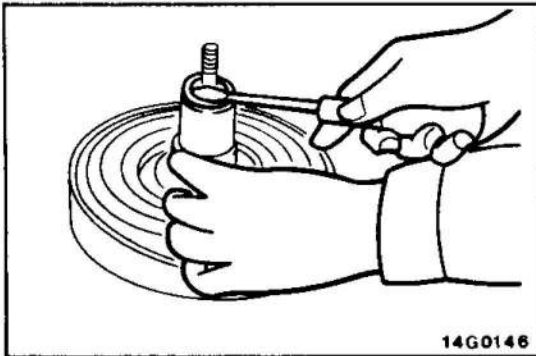
### 9. REMOVAL OF DIAPHRAGM

Pull off the diaphragm from the diaphragm plate.



**12. REMOVAL VALVE PLUNGER STOP KEY**

Remove the valve plunger stop key while pushing the valve rod and plunger assembly.

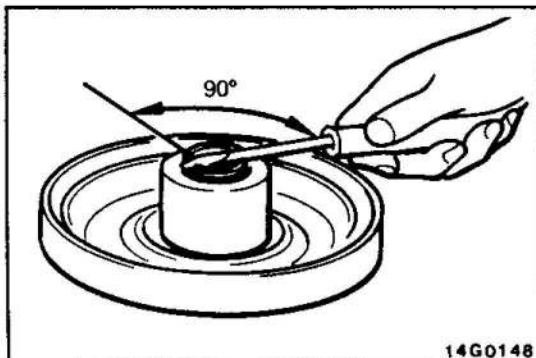


**15. REMOVAL OF RETAINER**

Using a screwdriver, remove the retainer from the valve body.

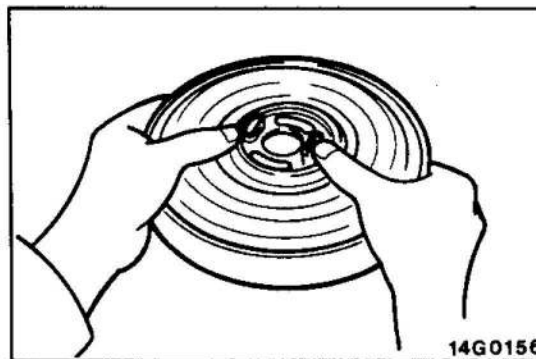
**19. REMOVAL OF VALVE ROD AND PLUNGER**

Slowly pull out the valve rod and plunger with the filter and silencer from the valve body.



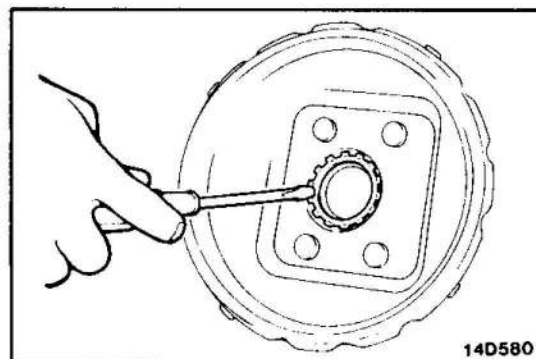
**20. REMOVAL OF REACTION DISC HUB**

Turn reaction disc hub 90° and remove from valve body.



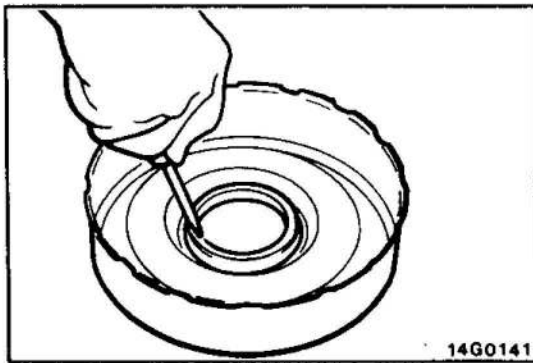
**26. REMOVAL OF DIAPHRAGM**

Pull off the diaphragm from the diaphragm plate.

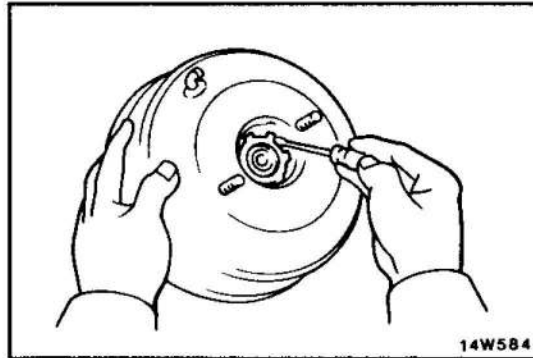


**28. REMOVAL OF RETAINER**

Using a screwdriver, remove the retainer from the rear shell.



14G0141



14W584

**31. REMOVAL OF RETAINER**

Using a screwdriver, remove the retainer from the center plate.

**34. REMOVAL OF RETAINER**

Using a screwdriver, remove the retainer from the front shell.

**INSPECTION**

E35JGAA

- Check the plate and seal assembly for wear.
- Check the push rod for bend or damage.
- Check the front shell and rear shell for deformation, cracks and damage.
- Check the spring for deterioration.
- Check the center body and valve body for damage and cracks.
- Check the diaphragm for damage.
- Check the bearing and valve body seal for wear.
- Check the valve rod and plunger for wear, bend and damage.
- Check the air silencer filter and silencer for clogging.
- Check the boot for cracks and damage.
- Check the reaction disc hub for damage and cracks.
- Check the nut for damage.

**SERVICE POINTS OF REASSEMBLY**

E35JHAD

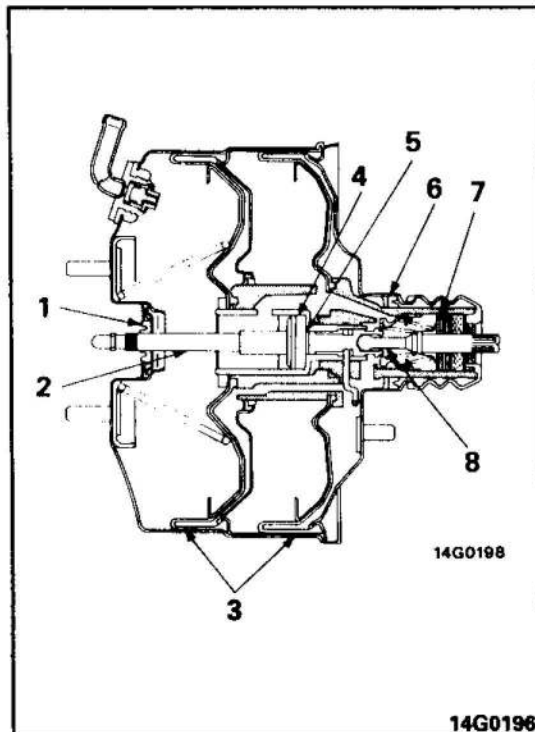
- **GREASE POINTS**

Coat the following points with the silicone grease.

- (1) Push rod seal lip
- (2) Push rod perimeter
- (3) Diaphragm to shell contact surfaces
- (4) Push rod body perimeter
- (5) Reaction disc (all surfaces)
- (6) Bearing and valve body seal lip
- (7) Valve body (inside and outside)
- (8) Push rod poppet perimeter

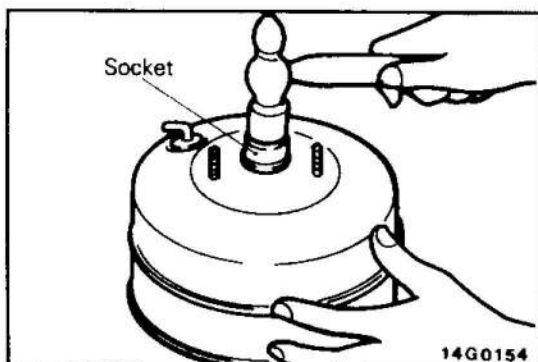
**NOTE**

Do not stain the diaphragm with grease.



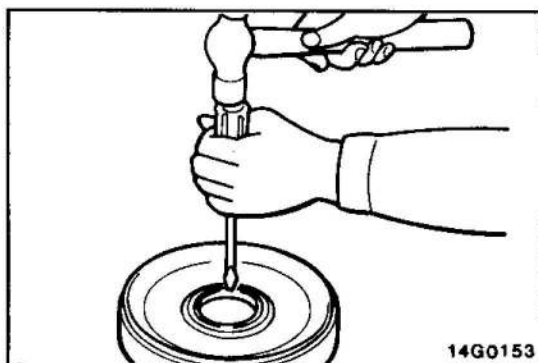
14G0198

14G0196



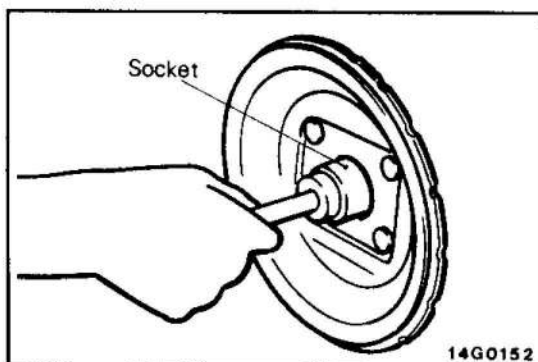
**35. INSTALLATION OF PUSH ROD SEAL AND PLATE ASSEMBLY/34. RETAINER**

Use 27 mm (1 1/16 in.) socket and install push rod seal, plate assembly and retainer to front shell.



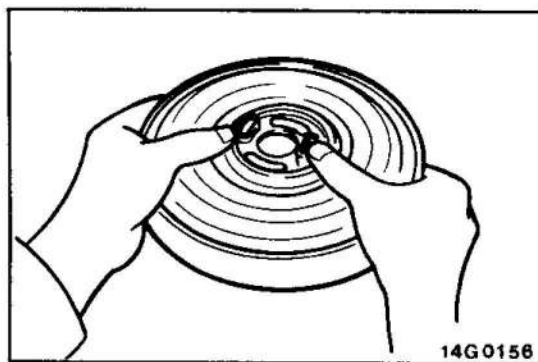
**33. INSTALLATION OF CENTER PLATE SEAL/32. BEARING /31. RETAINER**

Use screwdriver and install bearing, center plate seal and retainer to center plate.



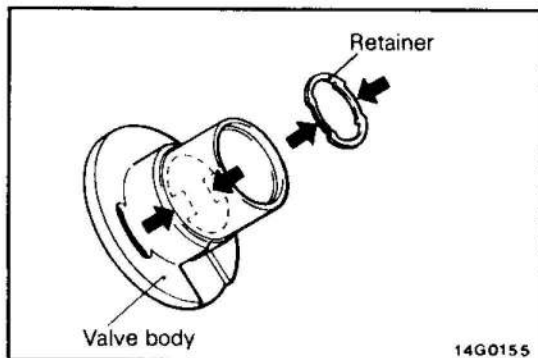
**30. INSTALLATION OF RETAINER SEAL/29. BEARING/28. RETAINER**

Use 32 mm (1 1/4 in.) socket and install retainer seal, bearing and retainer to rear shell.



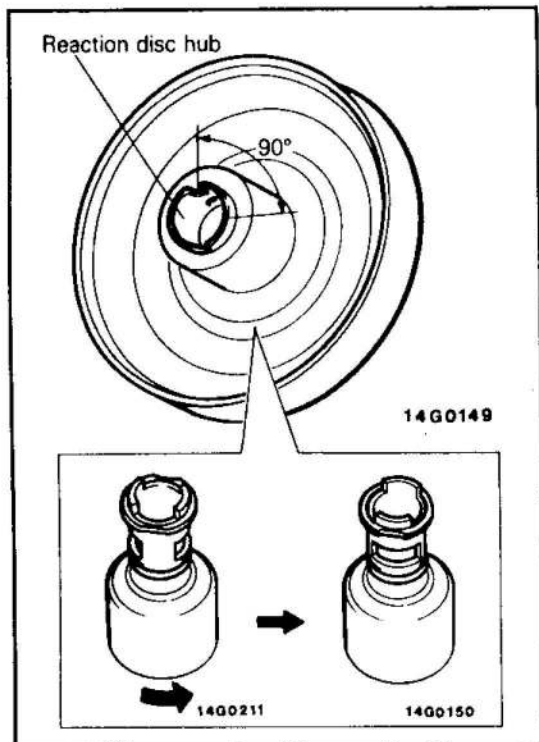
**26. INSTALLATION OF DIAPHRAGM**

Match with diaphragm plate projection and install diaphragm.

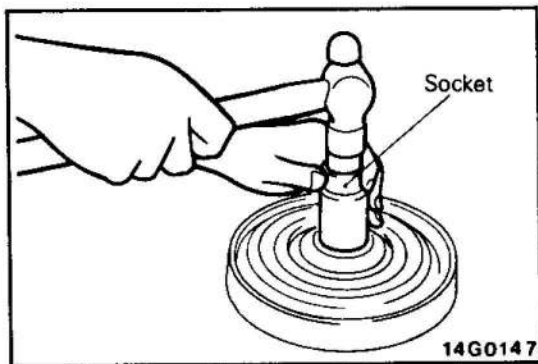


**23. INSTALLATION OF RETAINER**

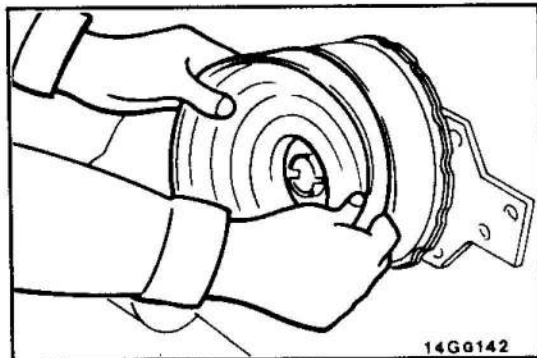
Match the notch and install retainer to valve body.

**20. INSTALLATION OF REACTION DISC HUB**

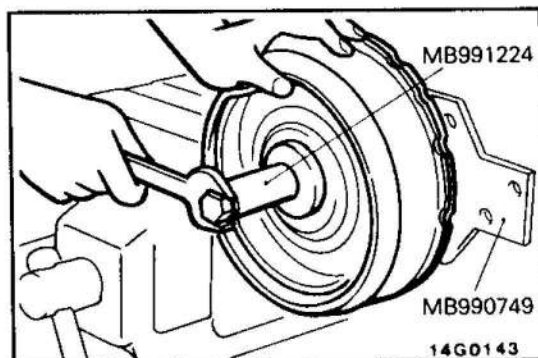
Install reaction disc hub to center body and turn 90° to lock onto retainer.

**15. INSTALLATION OF RETAINER**

Use 22 mm (7/8 in.) socket and install retainer to valve body.

**9. INSTALLATION OF DIAPHRAGM**

Install diaphragm to diaphragm plate.

**6. INSTALLATION OF NUT**

- (1) Lock brake booster with special tool in vice.
- (2) Hold diaphragm and tighten nut with special tool.

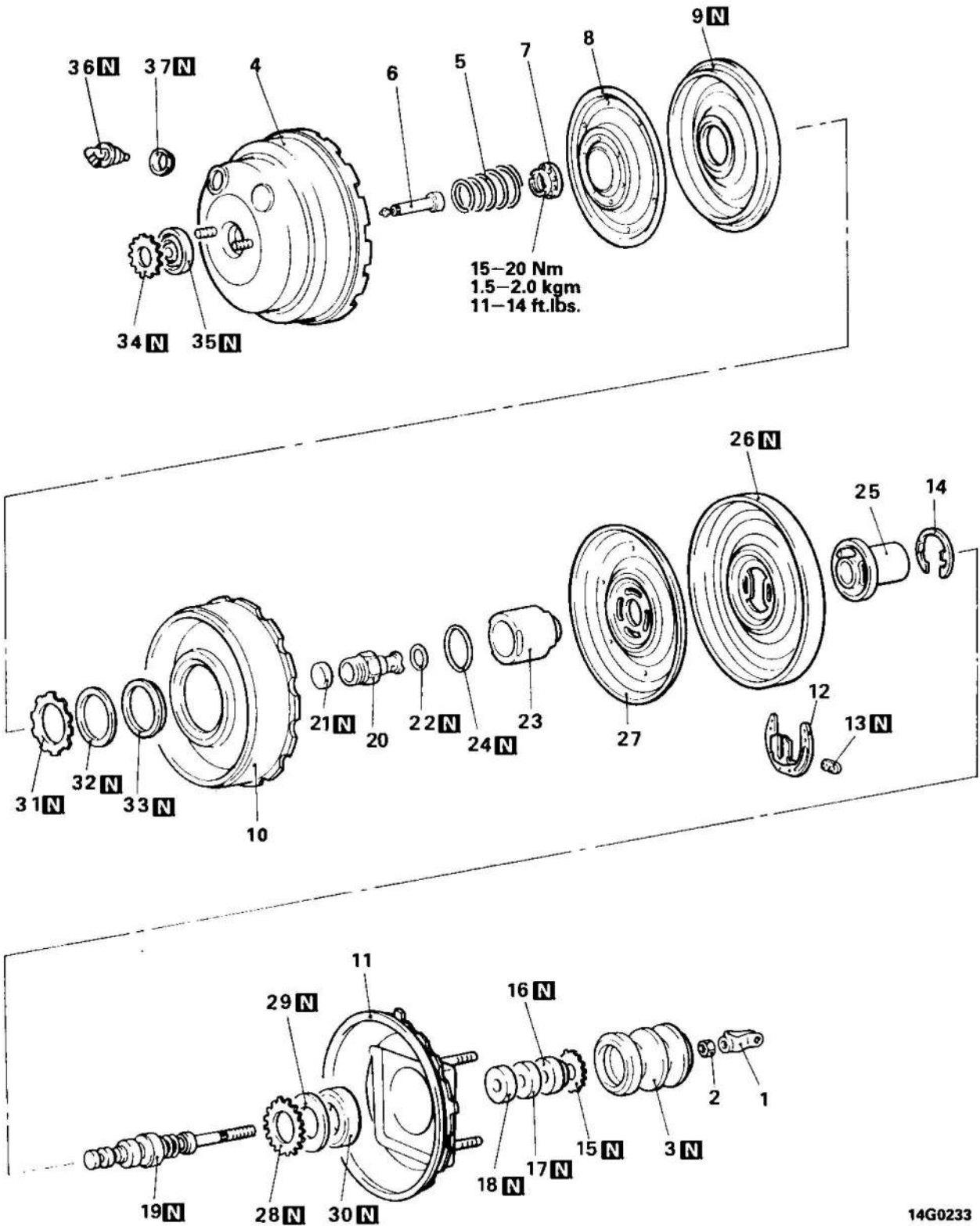
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NOTES

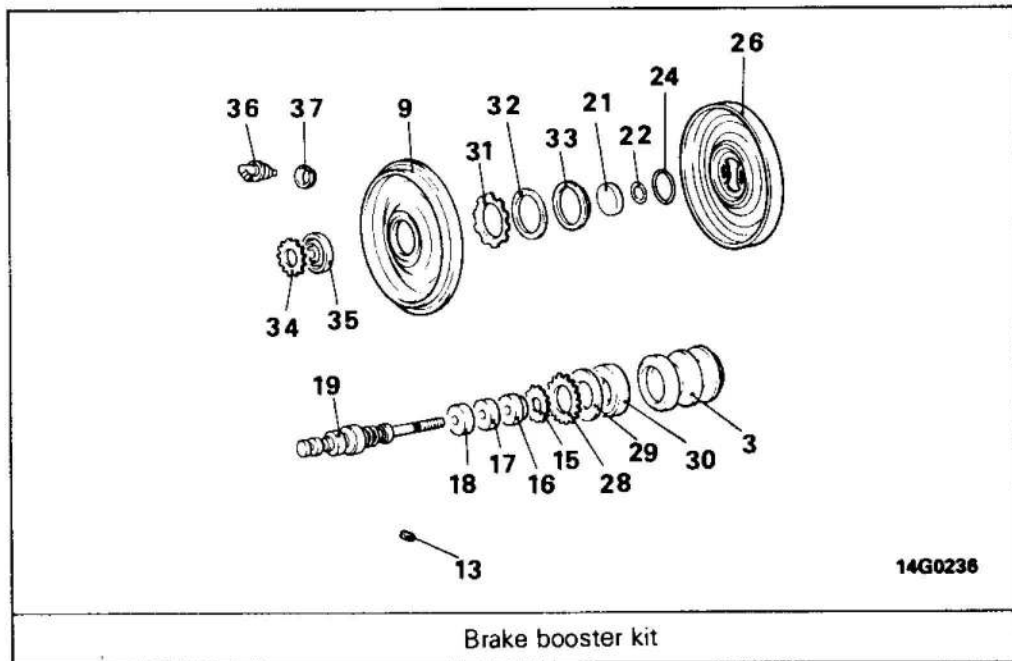


DISASSEMBLY AND REASSEMBLY (TANDEM TYPE)

7+8 inch tandem brake booster  
 8+9 inch tandem brake booster



14G0233

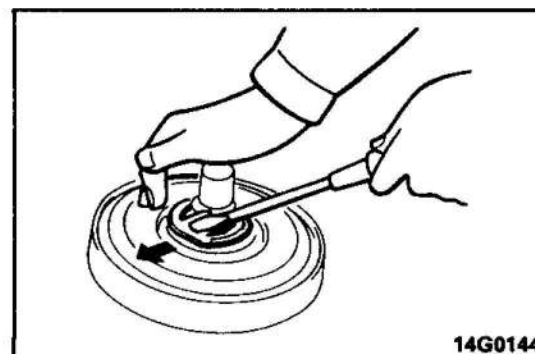
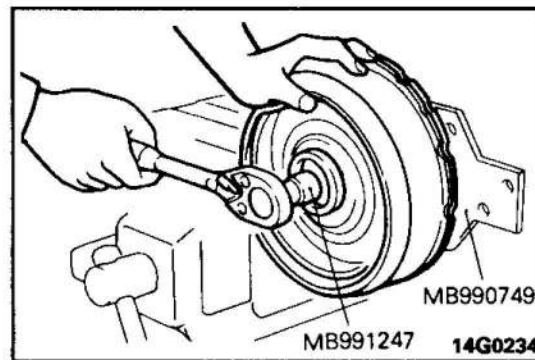
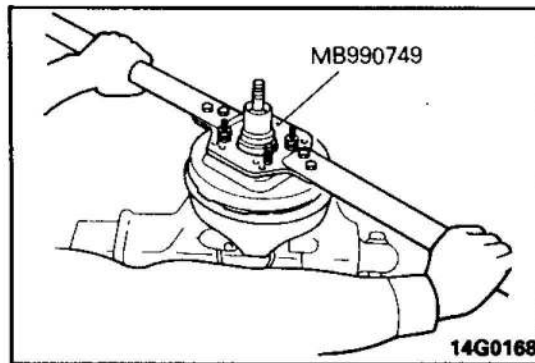
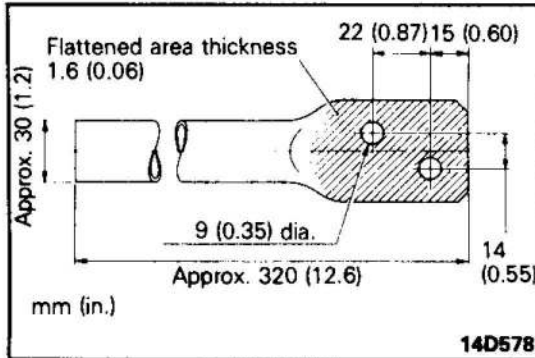
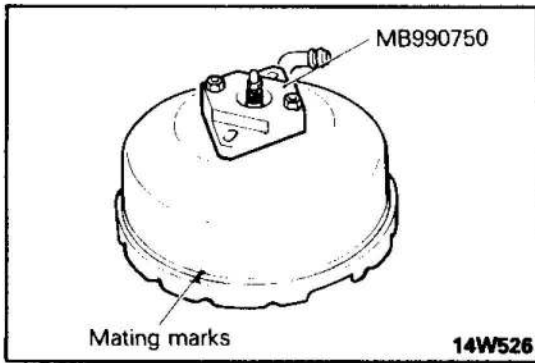


**Disassembly steps**

- |       |                            |                                         |
|-------|----------------------------|-----------------------------------------|
|       | 1. Operating rod yoke      | 21. Reaction disc                       |
|       | 2. Locking nut             | 22. O-ring                              |
|       | 3. Boot                    | 23. Center body                         |
| ◄◄    | 4. Front shell             | 24. O-ring                              |
|       | 5. Spring                  | 25. Valve body                          |
| ◄◄ ◄◄ | 6. Push rod                | 26. Diaphragm                           |
|       | 7. Nut                     | 27. Diaphragm plate                     |
| ◄◄ ◄◄ | 8. Diaphragm plate         | ◄◄ ◄◄ 28. Retainer                      |
|       | 9. Diaphragm               | ◄◄ 29. Bearing                          |
|       | 10. Center plate           | ◄◄ 30. Retainer seal                    |
|       | 11. Rear shell             | ◄◄ ◄◄ 31. Retainer                      |
| ◄◄    | 12. Valve plunger stop key | ◄◄ 32. Bearing                          |
|       | 13. Stopper                | ◄◄ 33. Center plate seal                |
|       | 14. Retainer               | ◄◄ ◄◄ 34. Retainer                      |
| ◄◄ ◄◄ | 15. Retainer               | ◄◄ 35. Push rod seal and plate assembly |
|       | 16. Filter                 | ◄◄ 36. Check valve                      |
|       | 17. Silencer               | ◄◄ 37. Grommet                          |
|       | 18. Filter                 | ◄◄ Grease points                        |
| ◄◄    | 19. Valve rod and plunger  |                                         |
| ◄◄ ◄◄ | 20. Reaction disc hub      |                                         |

**NOTE**

- (1) Reverse the disassembly procedures to reassemble.
- (2) ◄◄ : Refer to "Service Points of Disassembly".
- (3) ◄◄ ◄◄ : Refer to "Service Points of Reassembly".
- (4) **N** : Non-reusable parts



## SERVICE POINTS OF DISASSEMBLY

### 4. REMOVAL OF FRONT SHELL

- (1) Clean the booster body before starting disassembly.

#### Caution

**During disassembly, do not allow dust, dirt, water or other impurities into the brake booster.**

- (2) Set the special tool to the front shell and hold it in a vice.
- (3) Make the mating marks on the front and rear shells.

- (4) Make two arms of steel pipe as shown in the illustration, and attach the arms to the special tool with suitable bolts.

- (5) Set the special tool to the rear shell. Rotate the special tool counterclockwise to remove the rear shell.

### 7. REMOVAL OF NUT

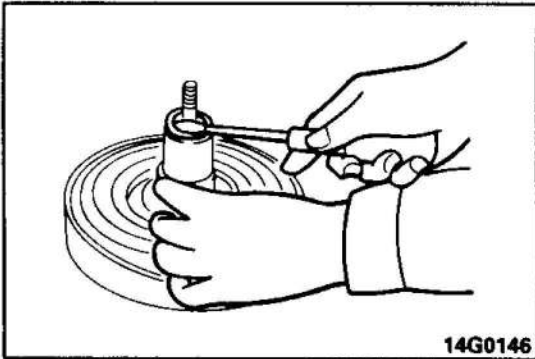
- (1) Lock brake booster with special tool in vice.
- (2) Hold diaphragm and remove nut with special tool.

#### Caution

**The valve body, being made of plastic, should be carefully handled. Do not drop it or subject it to impact.**

### 12. REMOVAL VALVE PLUNGER STOP KEY

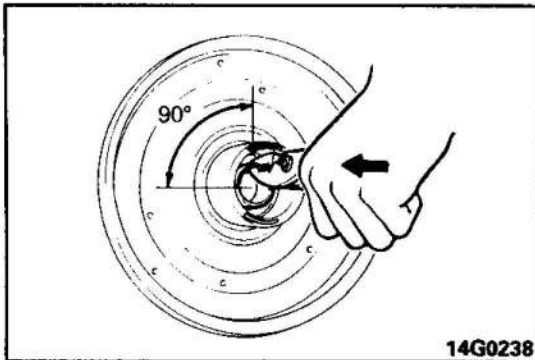
Remove the valve plunger stop key while pushing the valve rod and plunger assembly.

**15. REMOVAL OF RETAINER**

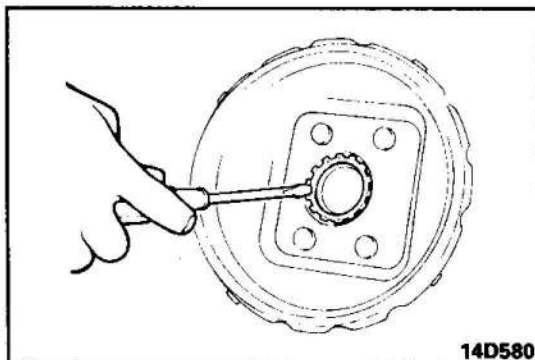
Using a screwdriver, remove the retainer from the valve body.

**19. REMOVAL OF VALVE ROD AND PLUNGER**

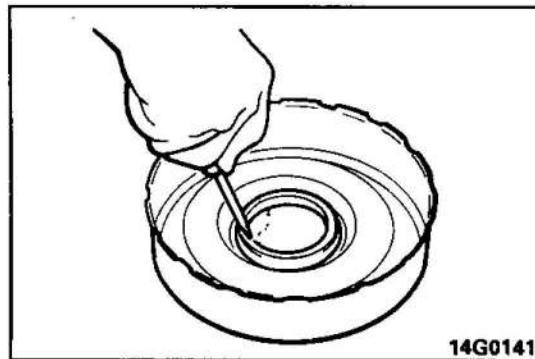
Slowly pull out the valve rod and plunger with the filter and silencer from the valve body.

**20. REMOVAL OF REACTION DISC HUB**

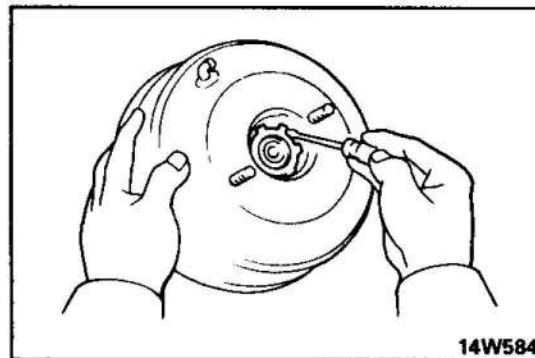
With a pair of pliers inserted into the reaction disc hub, turn it 90° and pull it out.

**28. REMOVAL OF RETAINER**

Using a screwdriver, remove the retainer from the rear shell.

**31. REMOVAL OF RETAINER**

Using a screwdriver, remove the retainer from the center plate.

**34. REMOVAL OF RETAINER**

Using a screwdriver, remove the retainer from the front shell.

**INSPECTION**

- Check the plate and seal assembly for wear.
- Check the push rod for bend or damage.
- Check the front shell and rear shell for deformation, cracks and damage.
- Check the spring for deterioration.
- Check the center body and valve body for damage and cracks.
- Check the diaphragm for damage.
- Check the bearing and valve body seal for wear.
- Check the valve rod and plunger for wear, bend and damage.
- Check the air silencer filter and silencer for clogging.
- Check the boot for cracks and damage.
- Check the reaction disc hub for damage and cracks.
- Check the nut for damage.

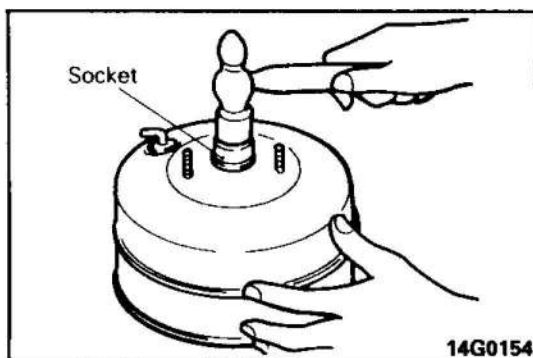
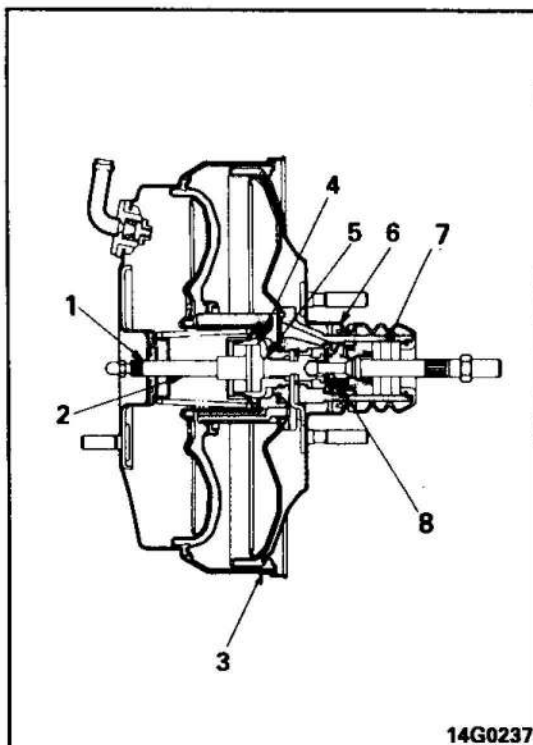
**SERVICE POINTS OF REASSEMBLY**● **GREASE POINTS**

Coat the following points with the silicone grease.

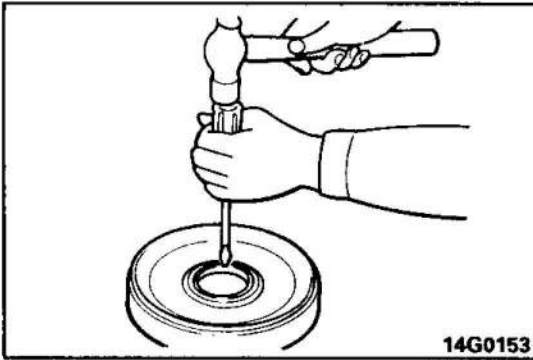
- (1) Push rod seal lip
- (2) Push rod perimeter
- (3) Diaphragm to shell contact surfaces
- (4) Push rod body perimeter
- (5) Reaction disc (all surfaces)
- (6) Bearing and valve body seal lip
- (7) Valve body (inside and outside)
- (8) Push rod poppet perimeter

**NOTE**

Do not stain the diaphragm with grease.

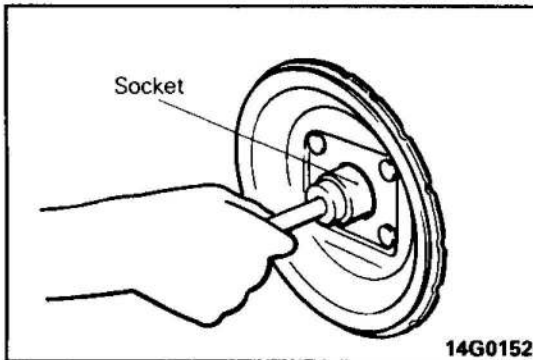
**35. INSTALLATION OF PUSH ROD SEAL AND PLATE ASSEMBLY/34. RETAINER**

Use socket and install push rod seal, plate assembly and retainer to front shell.



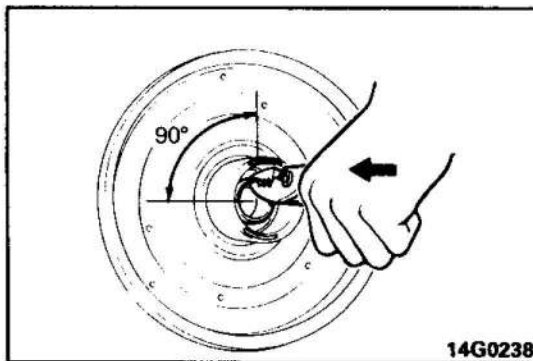
**33. INSTALLATION OF CENTER PLATE SEAL/32. BEARING /31. RETAINER**

Use screwdriver and install bearing, center plate seal and retainer to center plate.



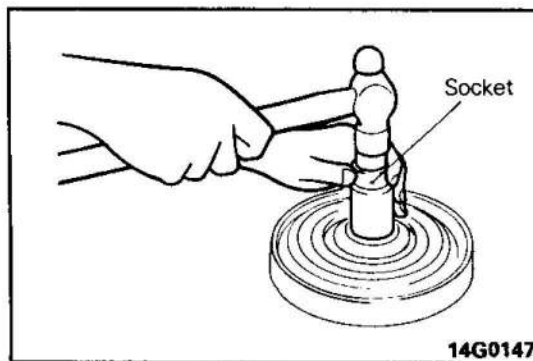
**30. INSTALLATION OF RETAINER SEAL/29. BEARING/28. RETAINER**

Use socket and install retainer seal, bearing and retainer to rear shell.



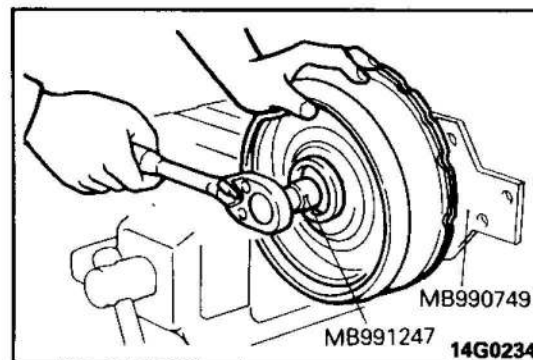
**20. INSTALLATION OF REACTION DISC HUB**

With a pair of pliers inserted into the reaction disc hub, turn it 90° and push it in.



**15. INSTALLATION OF RETAINER**

Use socket and install retainer to valve body.



**7. INSTALLATION OF NUT**

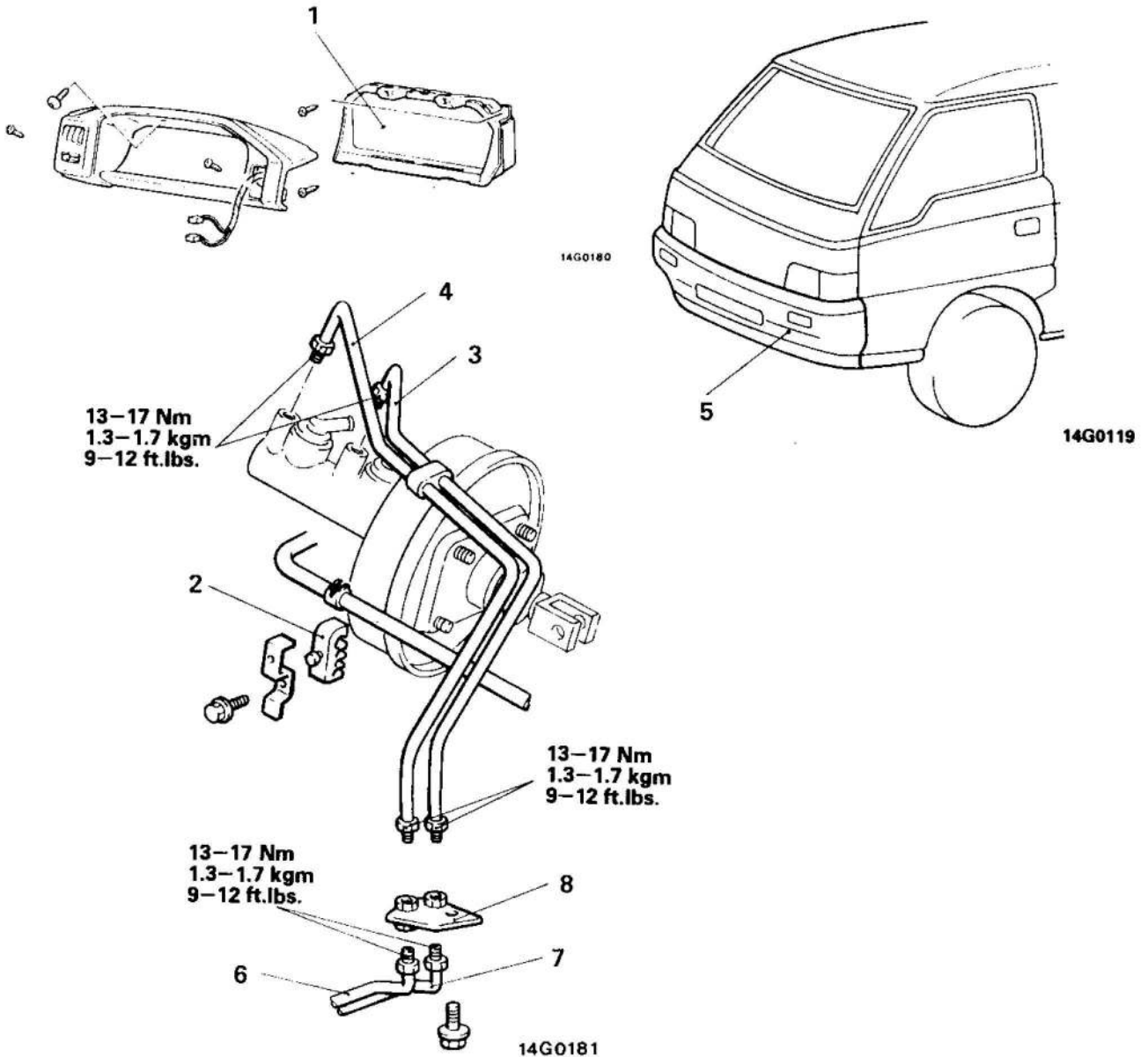
- (1) Lock brake booster with special tool in vice.
- (2) Hold diaphragm and tighten nut with special tool.

35-54-8



**BRAKE LINE (INTERNAL)  
REMOVAL AND INSTALLATION**

E3SKA--



**Removal steps**

1. Combination meter
2. Clip
3. Brake tube (A)
4. Brake tube (B)
5. Front bumper
6. Brake tube (main)
7. Brake tube (C)
8. Connector

**Pre-removal Operation**

- Drain brake fluid

**Post-installation Operation**

- Brake fluid filling and bleeding  
(Refer to P. 35-20)

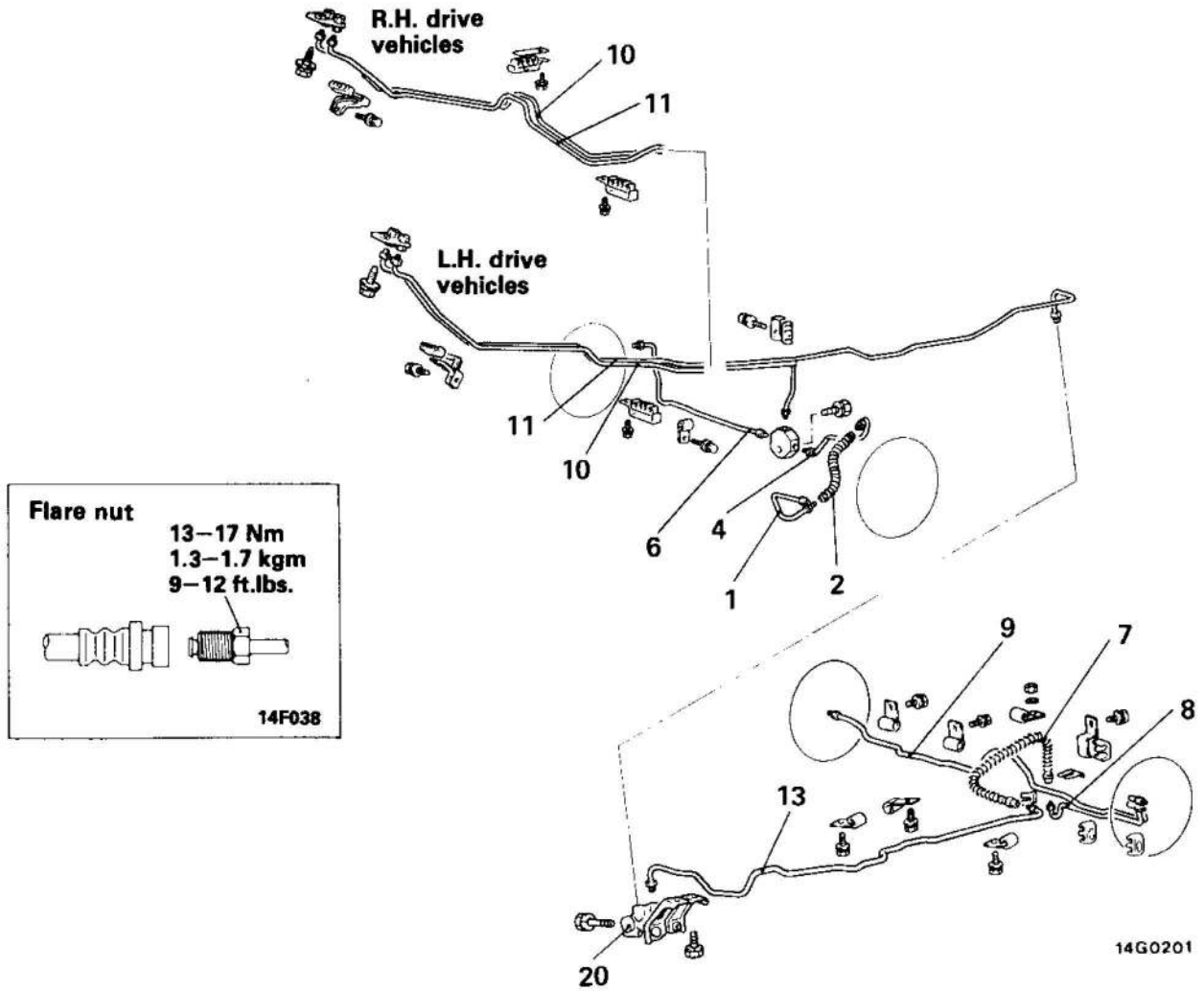
**NOTE**

Reverse the removal procedures to reinstall.

# BRAKE LINE (UNDERNEATH FLOOR)

## REMOVAL AND INSTALLATION

2WD (with blend proportioning valve)



**Flare nut**  
 13-17 Nm  
 1.3-1.7 kgm  
 9-12 ft.lbs.

14F038

- ◆◆◆◆ 1. Brake tube (L.H.)
- ◆◆◆◆ 2. Brake hose
- ◆◆◆◆ 4. Brake tube (front L.H.)
- ◆◆◆◆ 6. Brake tube (front R.H.)
- ◆◆◆◆ 7. Brake hose
- ◆◆◆◆ 8. Brake tube (rear L.H.)
- ◆◆◆◆ 9. Brake tube (rear R.H.)
- ◆◆◆◆ 10. Brake tube (C)
- ◆◆◆◆ 11. Brake tube (main)
- ◆◆◆◆ 13. Brake tube (main, body)
- ◆◆◆◆ 16. 3 way connector
- ◆◆◆◆ 20. Blend proportioning valve

**Pre-removal Operation**

- Drain brake fluid

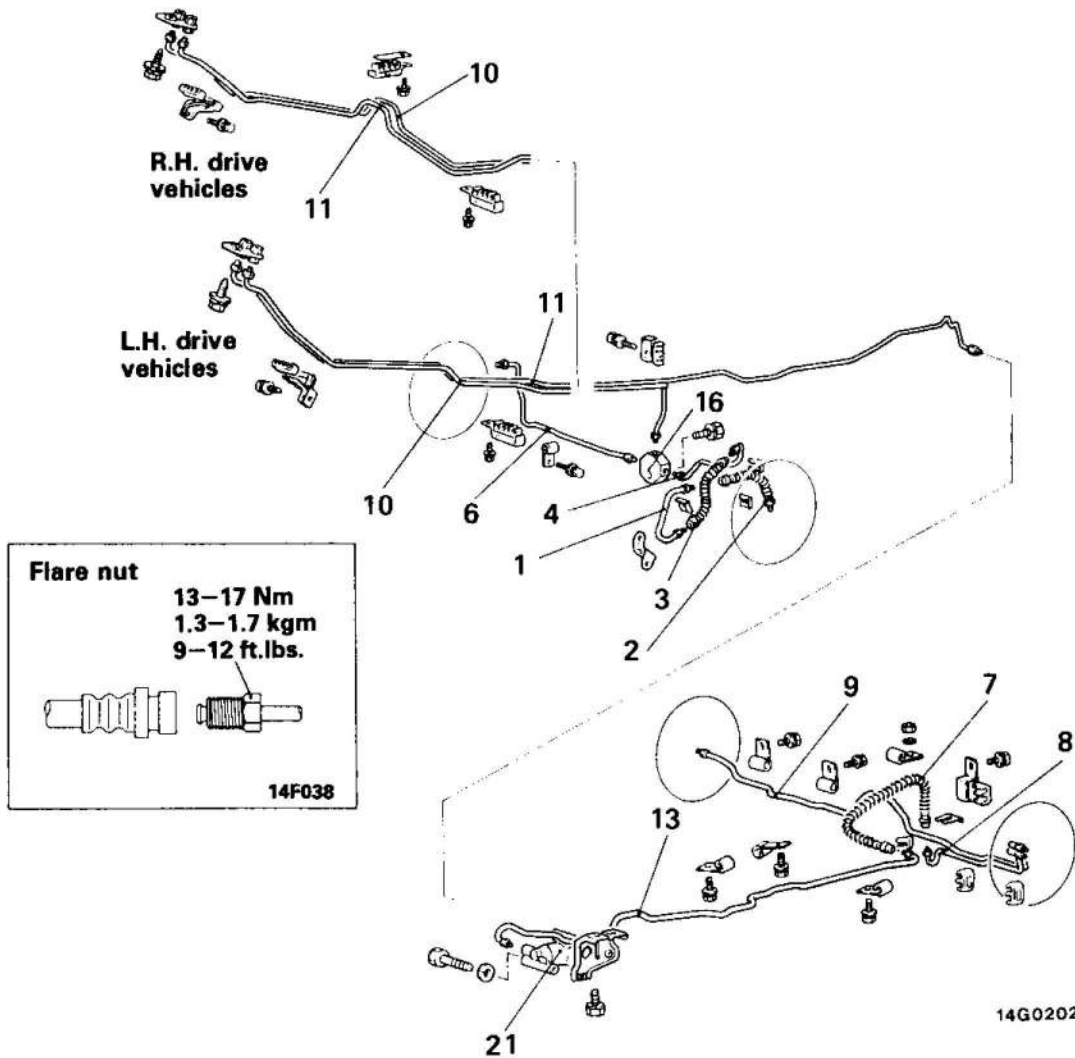
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**Post-installation Operation**

- Brake fluid filling and bleeding (Refer to P. 35-20)

NOTE  
 (1) ◆◆ : Refer to "Service Points of Removal".  
 (2) ◆◆◆ : Refer to "Service Points of Installation".

2WD (with G sensing proportioning valve)



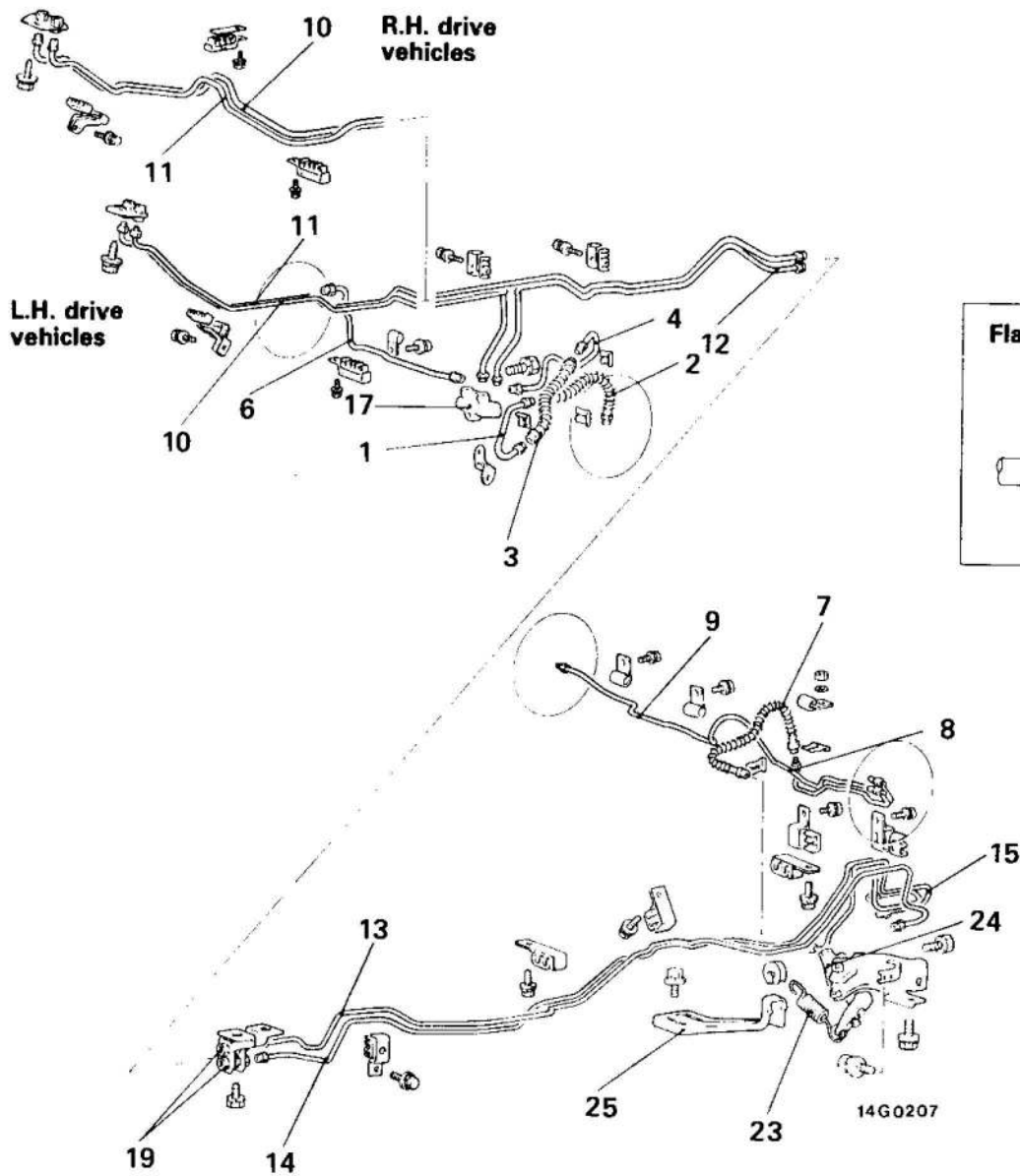
- ◆◆◆◆ 1. Brake tube (L.H.)
- ◆◆◆◆ 2. Brake hose
- ◆◆◆◆ 3. Brake hose
- ◆◆◆◆ 4. Brake tube (front L.H.)
- ◆◆◆◆ 6. Brake tube (front R.H.)
- ◆◆◆◆ 7. Brake hose
- ◆◆◆◆ 8. Brake tube (rear L.H.)
- ◆◆◆◆ 9. Brake tube (rear R.H.)
- ◆◆◆◆ 10. Brake tube (C)
- ◆◆◆◆ 11. Brake tube (main)
- ◆◆◆◆ 13. Brake tube (main, body)
- ◆◆◆◆ 16. 3 way connector
- ◆◆ 21. G sensing proportioning valve

**Pre-removal Operation**  
 ● Drain brake fluid

**Post-installation Operation**  
 ● Brake fluid filling and bleeding  
 (Refer to P. 35-20)

NOTE  
 (1) ◆◆◆◆ : Refer to "Service Points of Removal".  
 (2) ◆◆◆◆ : Refer to "Service Points of Installation".

2WD (with load sensing proportioning valve)



- ◆◆◆◆ 1. Brake tube (L.H.)
- ◆◆◆◆ 2. Brake hose
- ◆◆◆◆ 3. Brake hose
- ◆◆◆◆ 4. Brake tube (front L.H.)
- ◆◆◆◆ 6. Brake tube (front R.H.)
- ◆◆◆◆ 7. Brake hose
- ◆◆◆◆ 8. Brake tube (rear L.H.)
- ◆◆◆◆ 9. Brake tube (rear R.H.)
- ◆◆◆◆ 10. Brake tube (C)
- ◆◆◆◆ 11. Brake tube (main)
- ◆◆◆◆ 12. Brake tube (main)
- ◆◆◆◆ 13. Brake tube (main, body)
- ◆◆◆◆ 14. Brake tube (main, body)
- ◆◆◆◆ 15. Brake tube (rear, main)
- ◆◆◆◆ 17. 4 way connector
- ◆◆◆◆ 19. 2 way connector
- ◆◆◆◆ 23. Load sensing spring
- ◆◆◆◆ 24. Load sensing proportioning valve
- ◆◆◆◆ 25. Spring support

**Pre-removal Operation**

- Drain brake fluid

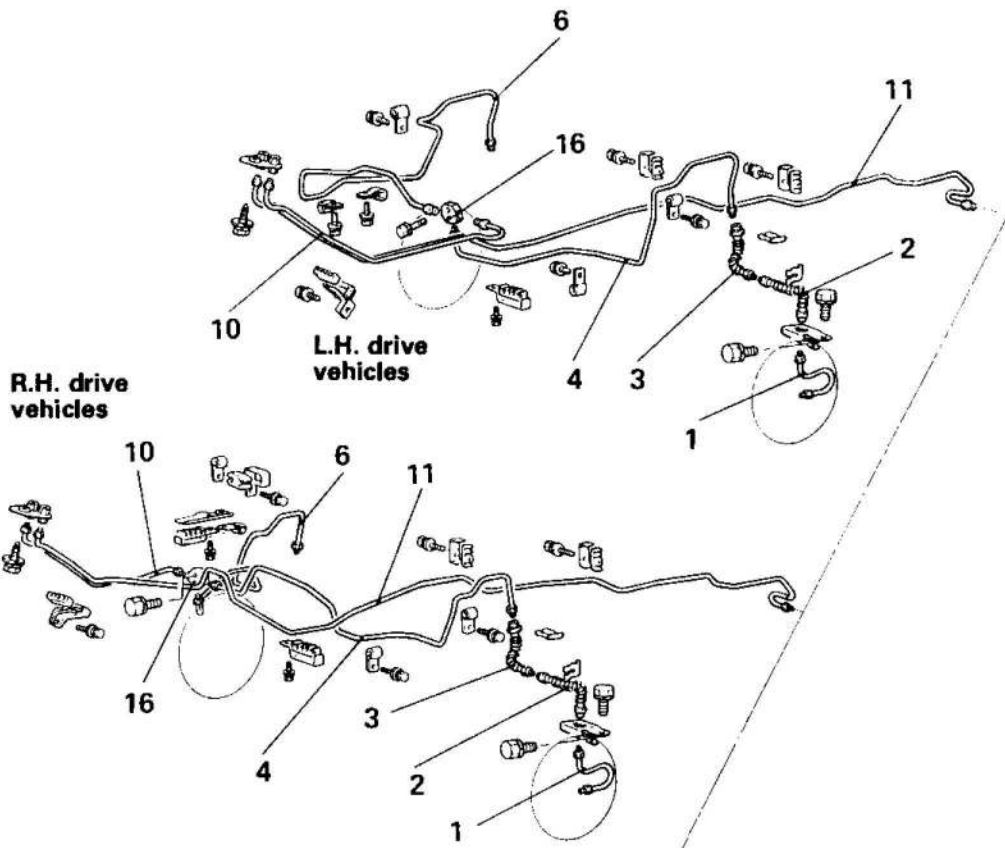
**Post-installation Operation**

- Brake fluid filling and bleeding (Refer to P. 35-20)

**NOTE**

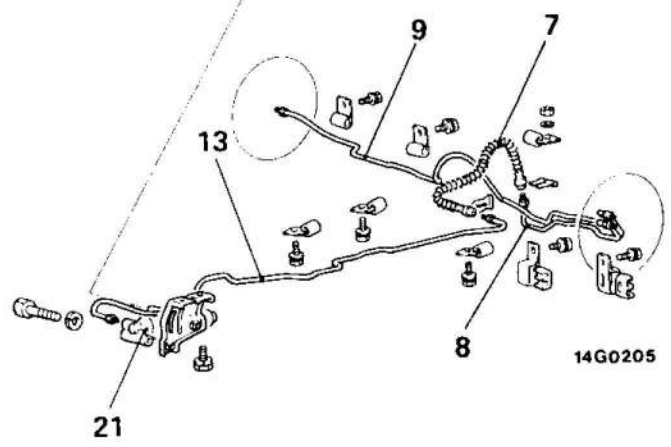
- (1) ◆◆ : Refer to "Service Points of Removal".
- (2) ◆◆◆ : Refer to "Service Points of Installation".

4WD  
(with G sensing  
proportioning valve)



**Flare nut**  
 13-17 Nm  
 1.3-1.7 kgm  
 9-12 ft.lbs.

14F038



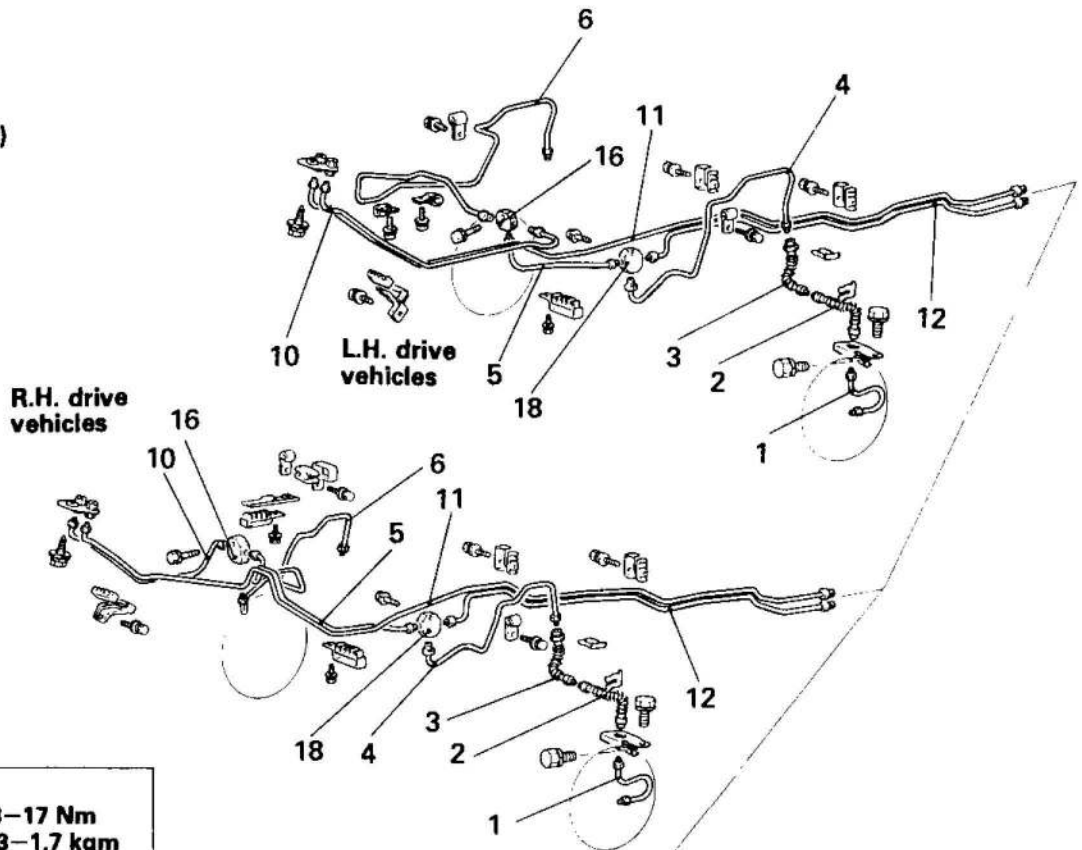
- 1. Brake tube (L.H.)
- ◆◆◆◆ 2. Brake hose
- ◆◆◆◆ 3. Brake hose
- ◆◆◆◆ 4. Brake tube (front L.H.)
- ◆◆◆◆ 6. Brake tube (front R.H.)
- ◆◆◆◆ 7. Brake hose
- ◆◆◆◆ 8. Brake tube (rear L.H.)
- ◆◆◆◆ 9. Brake tube (rear R.H.)
- ◆◆◆◆ 10. Brake tube (C)
- ◆◆◆◆ 11. Brake tube (main)
- ◆◆◆◆ 13. Brake tube (main, body)
- ◆◆◆◆ 16. 3 way connector
- ◆◆ 21. G sensing proportioning valve

**Pre-removal Operation**  
 • Drain brake fluid

**Post-installation Operation**  
 • Brake fluid filling and bleeding  
 (Refer to P. 35-20)

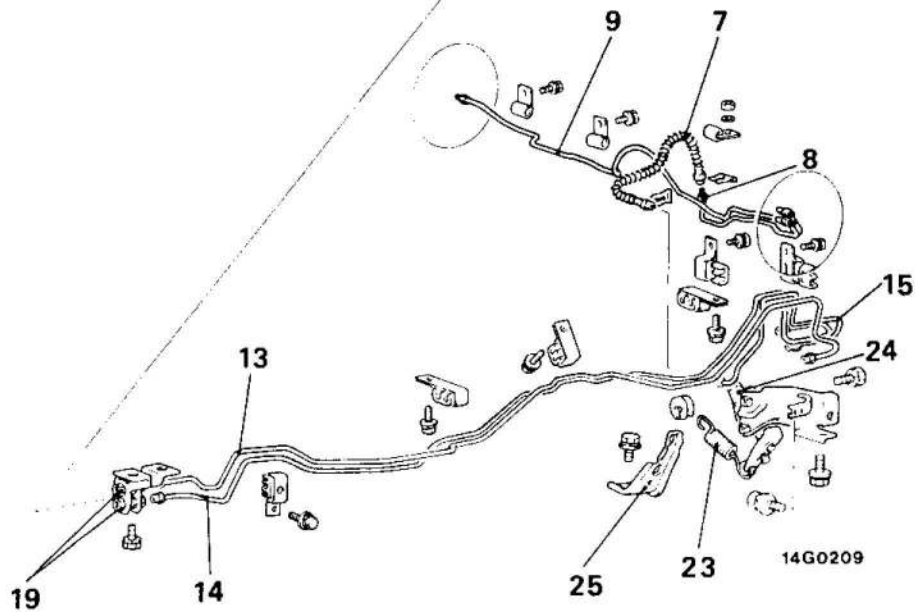
**NOTE**  
 (1) ◆◆ : Refer to "Service Points of Removal".  
 (2) ◆◆ : Refer to "Service Points of Installation".

4WD  
(with load sensing  
proportioning valve)



**Flare nut**  
13-17 Nm  
1.3-1.7 kgm  
9-12 ft.lbs.

14F038



- 1. Brake tube (L.H.)
- ◀▶▶▶▶ 2. Brake hose
- ◀▶▶▶▶ 3. Brake hose
- 4. Brake tube (front L.H.)
- 5. Brake tube (front)
- 6. Brake tube (front R.H.)
- ◀▶▶▶▶ 7. Brake hose
- 8. Brake tube (rear L.H.)
- 9. Brake tube (rear R.H.)
- 10. Brake tube (C)
- 11. Brake tube (main)
- 12. Brake tube (main)
- 13. Brake tube (main, body)
- 14. Brake tube (main, body)
- 15. Brake tube (rear, main)
- 16. 3 way connector
- 18. 3 way connector
- 19. 2 way connector
- 23. Load sensing spring
- ◀▶▶▶▶ 24. Load sensing proportioning valve
- 25. Spring support

**Pre-removal Operation**

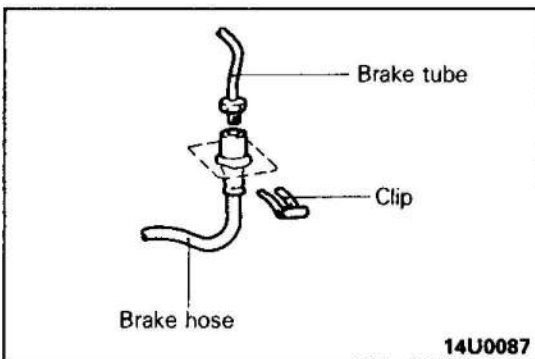
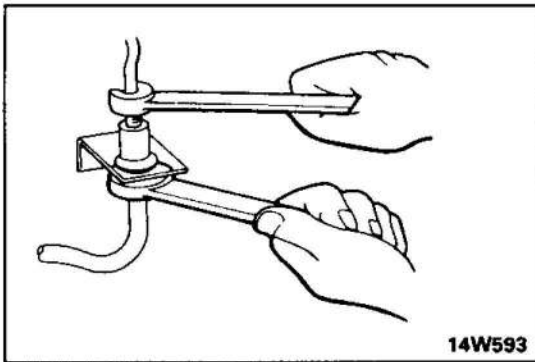
- Drain brake fluid

**Post-installation Operation**

- Brake fluid filling and bleeding (Refer to P. 35-20)

**NOTE**

- (1) ◀▶ : Refer to "Service Points of Removal".
- (2) ▶▶ : Refer to "Service Points of Installation".

**SERVICE POINTS OF REMOVAL**

E35KBAF

**2. REMOVAL OF BRAKE HOSE/3. BRAKE HOSE/7. BRAKE HOSE**

The brake tube and brake hose should be separated as described below.

- (1) Bleed the brake fluid from the bleeder of each brake's wheel cylinder.
- (2) Holding the nut at the brake hose side, loosen the flare nut of the brake tube.

- (3) Pull off the brake hose clip and remove the brake hose from the bracket.

**20. REMOVAL OF BLEND PROPORTIONING VALVE**

Do not disassemble the blend proportioning valve because its performance depends on the set load of the spring.

**21. REMOVAL OF G SENSING PROPORTIONING VALVE**

Do not disassemble the G sensing proportioning valve because its performance depends on the set load of the spring.

**24. REMOVAL OF LOAD SENSING PROPORTIONING VALVE**

Do not disassemble the load sensing proportioning valve because its performance depends on the set load of the spring.

**INSPECTION**

E35KCAA

- Check the brake tubes for cracks, crimps and corrosion.
- Check the brake hoses for cracks, damage and leakage.
- Check the brake tube flare nuts for damage and leakage.

**SERVICE POINTS OF INSTALLATION**

E35KDAE

**7. INSTALLATION OF BRAKE HOSE/3. BRAKE HOSE/2. BRAKE HOSE**

Install the brake hoses without twisting them.

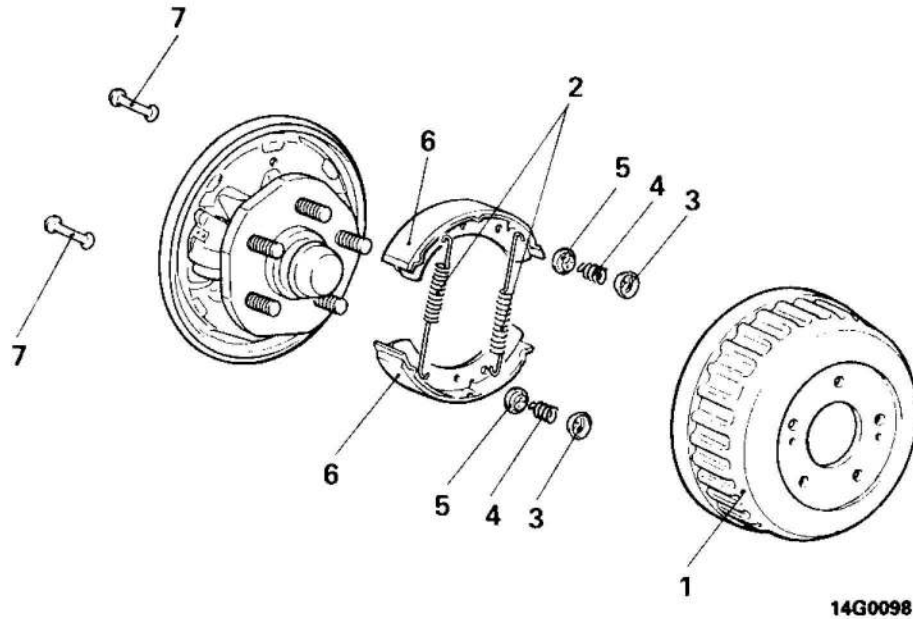
**NOTE**

When installing, check to be sure the brake hose has no contact edges, weld beads or moving parts.



## FRONT DRUM BRAKE SHOE

## REMOVAL AND INSTALLATION



## Removal steps

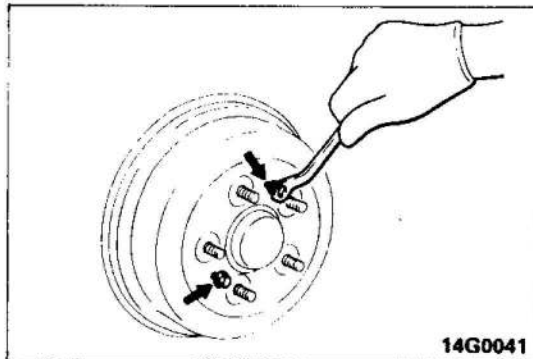
- ◆◆ 1. Brake drum
- ◆◆ 2. Shoe to shoe spring
- ◆◆ 3. Shoe hold down cup
- ◆◆ 4. Shoe hold down spring
- ◆◆ 5. Shoe hold down cup
- ◆◆ 6. Shoe and lining assembly
- ◆◆ 7. Shoe hold down pin

## Post-installation Operation

- Adjust clearance between drum and lining (Refer to P. 35-20)

## NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆ : Refer to "Service Points of Installation".

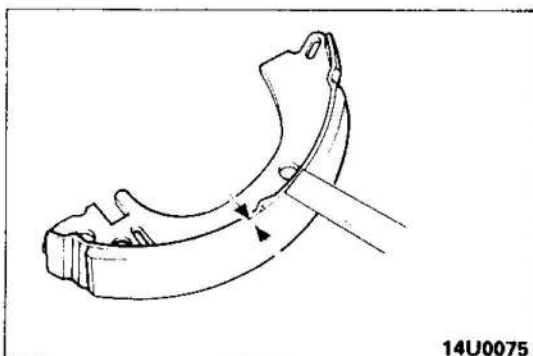


## SERVICE POINTS OF REMOVAL

E35PBAA

## 1. REMOVAL OF BRAKE DRUM

If the brake drum is difficult to remove, insert bolt (M8 × 1.25) into drum flange hole to remove.



## INSPECTION

E35PCAA

## LINING WEAR CHECK

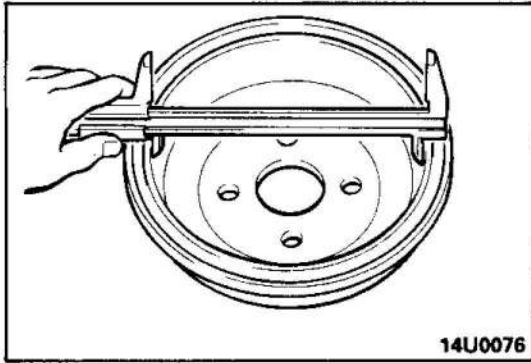
Measure the lining at its most worn area.

**Limit: 1.0 mm (0.04 in.)**

Replace shoe and lining assembly when wear exceeds the limit value or is badly imbalanced.

## NOTE

Replace both right and left shoe and lining assemblies.

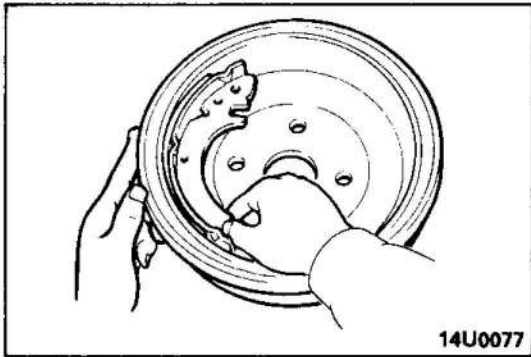


**BRAKE DRUM BORE CHECK**

Measure brake drum bore at more than 2 locations.

**Limit: 232.0 mm (9.134 in.)**

Replace brake drum when wear exceeds the limit value or is badly imbalanced.



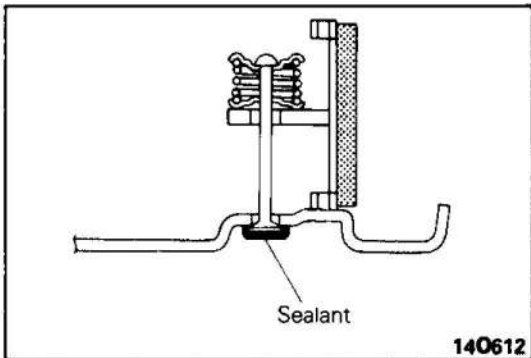
**LINING AND BRAKE DRUM CONTACT CHECK**

Chalk the inner face of the brake drum. Rub with shoe and lining assembly.

Replace shoe and lining assembly or brake drum when highly irregular contacted.

NOTE

Wipe off chalk after check.



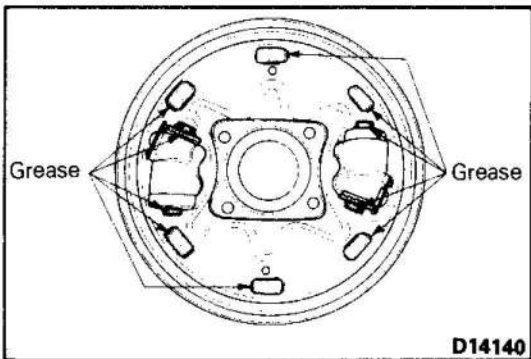
**SERVICE POINTS OF INSTALLATION**

E35PDAA

**7. APPLICATION OF SEALANT TO SHOE HOLD DOWN PIN**

Apply specified sealant on shoe hold down pin where front backing plate assembly is installed.

**Specified sealant: 3M ATD Part No. 8513 or equivalent**

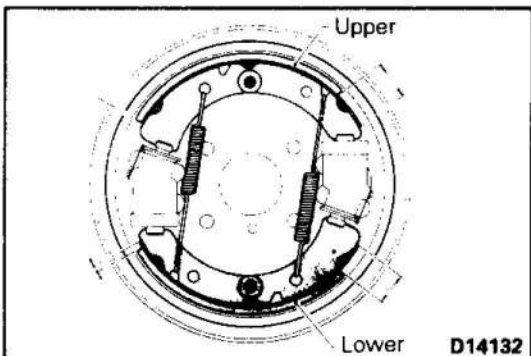


**6. INSTALLATION OF SHOE AND LINING ASSEMBLY**

(1) Apply specified grease to the following parts.

- ① Shoe and lining assembly and front backing plate assembly contact area.
- ② Adjuster, piston and shoe and lining assembly contact area.

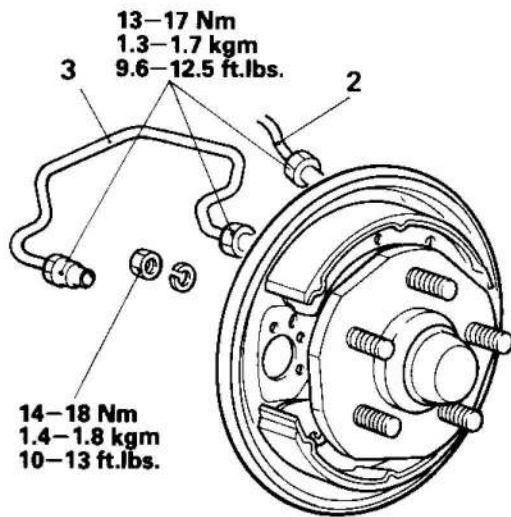
**Specified grease: Brake grease SAE J310, NLGI No. 1**



(2) Ensure correct shoe and lining assembly installation as the upper and lower parts are different.

## FRONT DRUM BRAKE WHEEL CYLINDER

## REMOVAL AND INSTALLATION

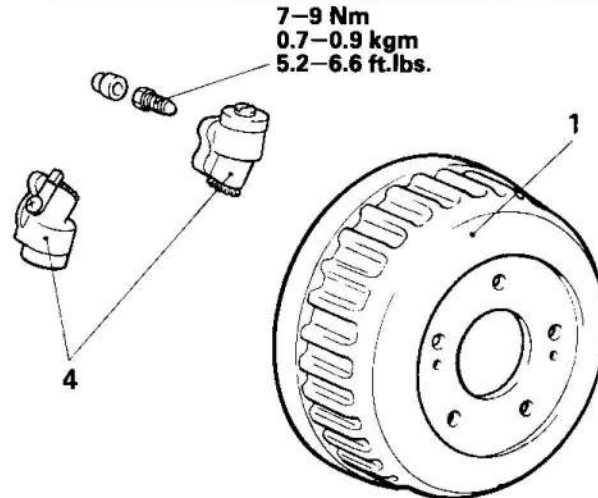


## Pre-removal Operation

- Drain brake fluid

## Post-installation Operation

- Brake fluid filling and bleeding (Refer to P. 35-20)
- Adjust clearance between drum and lining (Refer to P. 35-20)



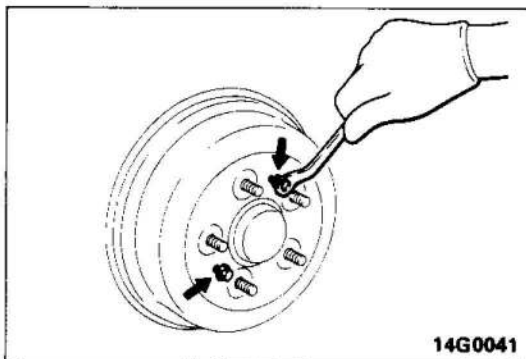
14G0101

## Removal steps

1. Brake drum
2. Brake tube connection part
3. Brake tube
4. Wheel cylinder

## NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◀▶ : Refer to "Service Points of Removal".
- (3) ▶▶ : Refer to "Service Points of Installation".



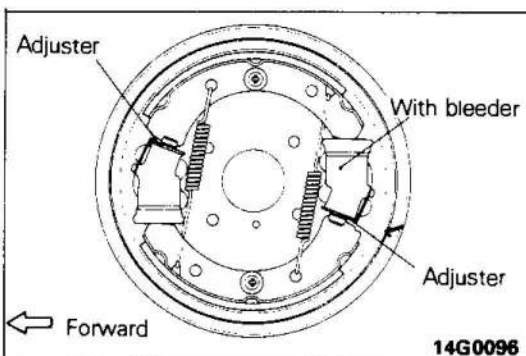
14G0041

## SERVICE POINTS OF REMOVAL

E35QBAA

## 1. REMOVAL OF BRAKE DRUM

If the brake drum is difficult to remove, insert bolt (M8 × 1.25) into drum flange hole to remove.



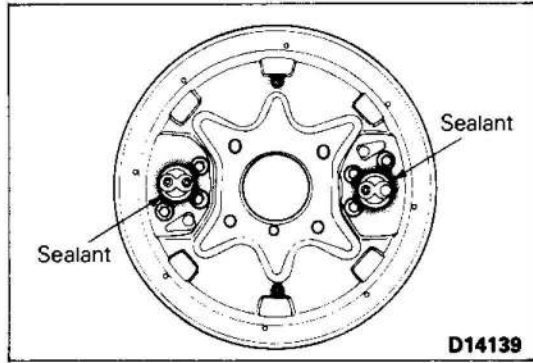
14G0096

## SERVICE POINTS OF INSTALLATION

E35QGAA

## 4. INSTALLATION OF WHEEL CYLINDER

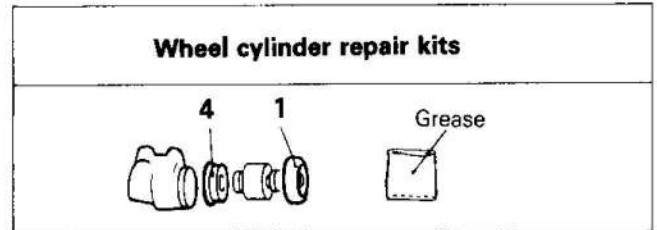
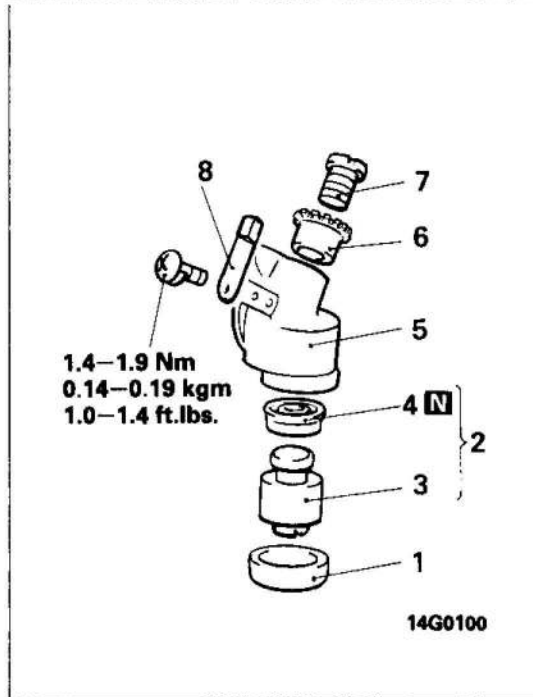
- (1) Install wheel cylinder as illustrated.



(2) Apply specified sealant on wheel cylinder where installed into backing plate assembly.

**Specified sealant: 3M Sealant Part No. 8634 or equivalent**

**DISASSEMBLY AND REASSEMBLY**

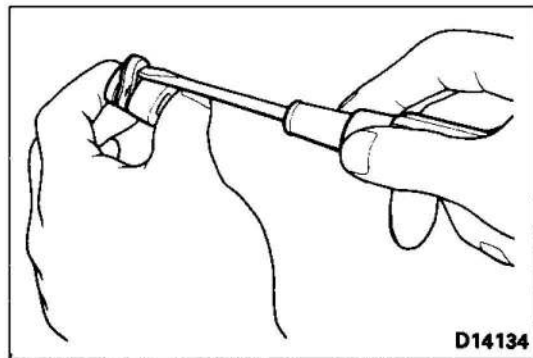


**Disassembly steps**

- 1. Boots
- ◆◆ 2. Piston assembly
- 3. Piston
- ◆◆◆◆ 4. Piston cup
- ◆◆ 5. Shoe adjusting screw
- ◆◆ 6. Adjuster nut
- 7. Wheel cylinder body
- 8. Stopper

**NOTE**

- (1) Reverse the disassembly procedures to reassembly.
- (2) ◆◆ : Refer to "Service Points of Disassembly".
- (3) ◆◆◆ : Refer to "Service Points of Reassembly".
- (4) **N** : Non-reusable parts



**SERVICE POINTS OF DISASSEMBLY**

E35QDAA

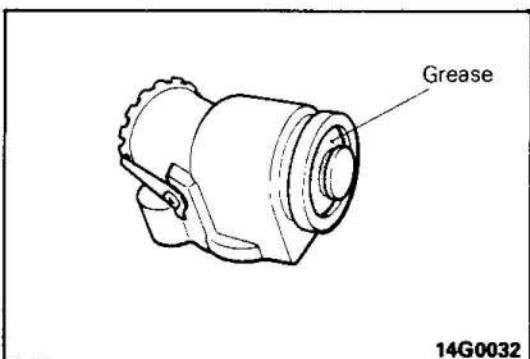
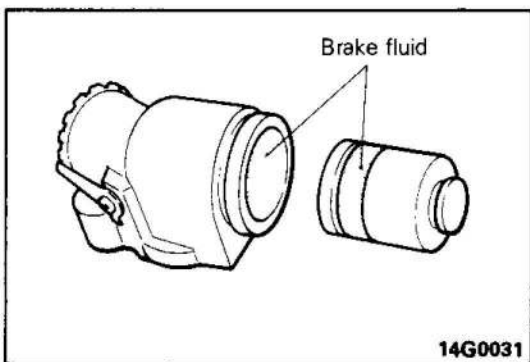
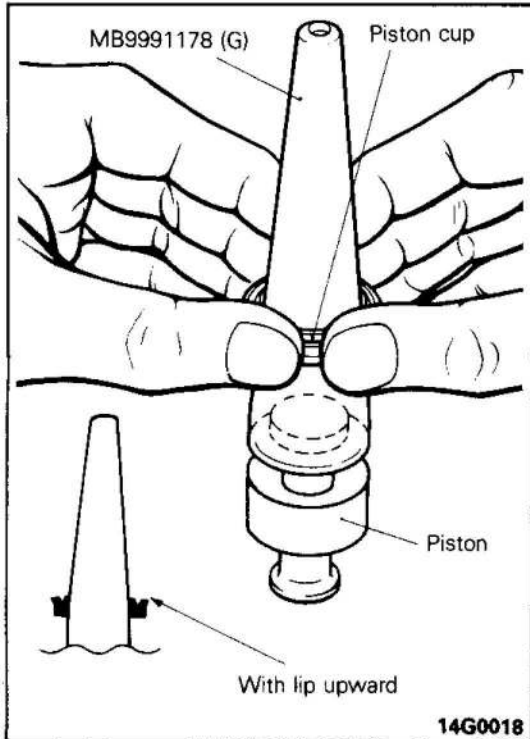
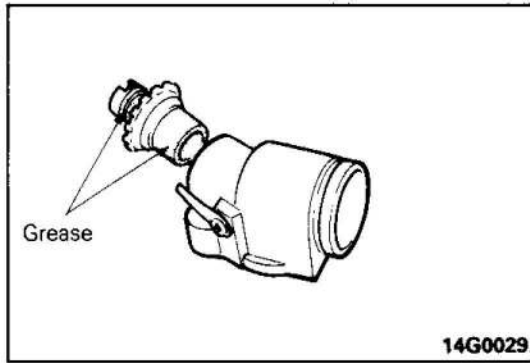
**4. REMOVAL OF PISTON CUP**

Remove piston cup carefully without damaging piston.

**INSPECTION**

E35QEAAa

- Check piston or inner wheel cylinder for rust or damage.



## SERVICE POINTS OF REASSEMBLY

E35QFAA

### 6. APPLICATION OF GREASE TO ADJUSTER NUT/5. SHOE ADJUSTING SCREW

Apply specified grease to adjuster nut, shoe adjusting screw and cylinder body contact area.

**Specified grease: Repair kit grease (orange)**

### 4. INSTALLATION OF PISTON CUP

(1) Clean piston with trichloroethylene, alcohol or specified brake fluid.

**Specified brake fluid: DOT3 or DOT4**

(2) Apply specified brake fluid on piston cup and outer side of special tool.

(3) Set special tool on piston.

Insert piston cup with its lip upward into special tool.

(4) Slowly press piston cup into piston groove.

### 2. INSTALLATION OF PISTON ASSEMBLY

(1) Clean inside of wheel cylinder with specified brake fluid.

**Specified brake fluid: DOT3 or DOT4**

(2) Apply specified brake fluid to wheel cylinder inner and outer piston cup.

Install piston assembly.

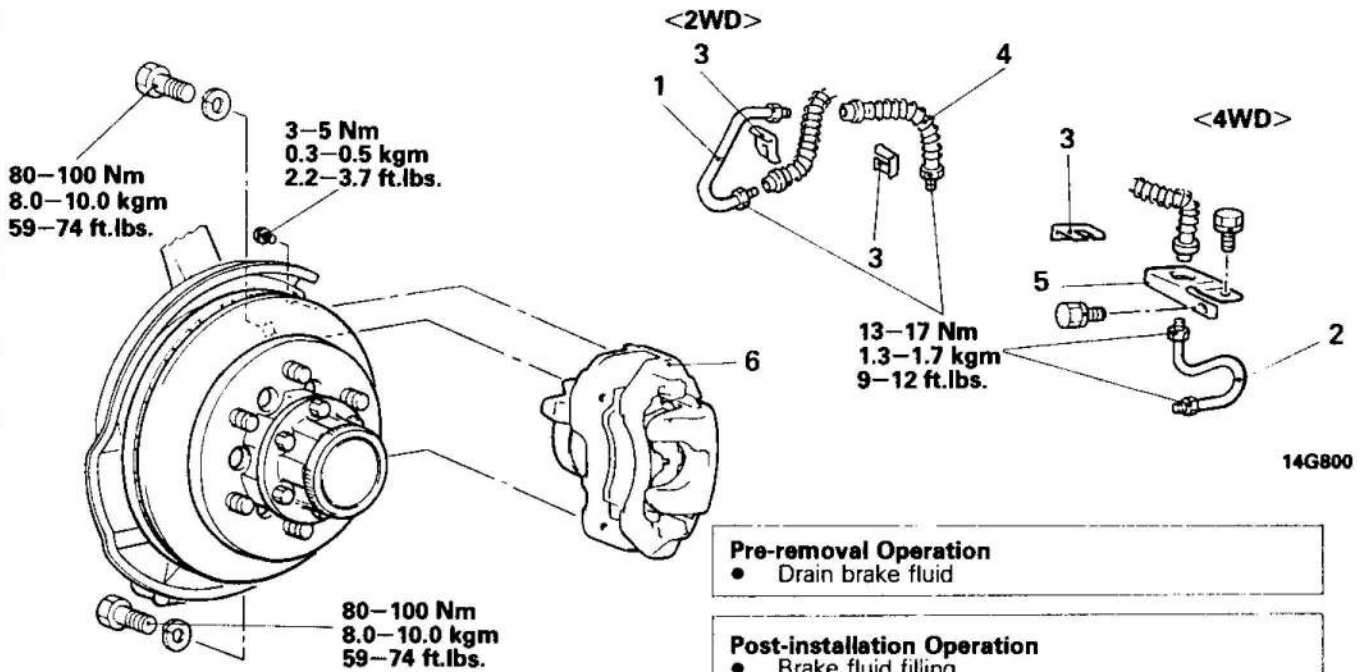
(3) Fill piston edge with specified grease.

**Specified grease: Repair kit grease (orange)**

**FRONT DISC BRAKE**

E35LA--

**REMOVAL AND INSTALLATION**



**Pre-removal Operation**

- Drain brake fluid

**Post-installation Operation**

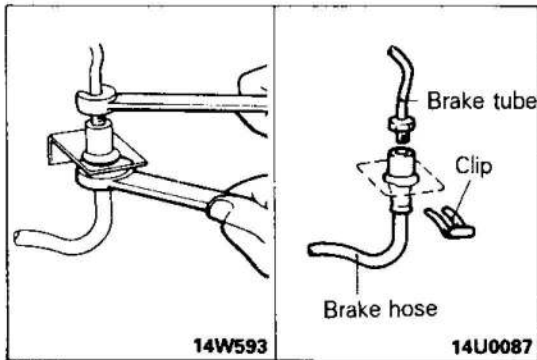
- Brake fluid filling
- Brake line bleeding
- (Refer to P. 35-20.)

**Removal steps**

- ◆◆ 1. Brake tube (2WD)
- ◆◆ 2. Brake tube (4WD)
- ◆ 3. Clip
- ◆◆ 4. Brake hose
- ◆ 5. Bracket
- ◆◆ 6. Front disc brake assembly

**NOTE**

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆ : Refer to "Service Points of Installation".
- (4) Refer to GROUP 26 FRONT AXLE—Knuckle for brake disc and dust cover removal and installation.



**SERVICE POINTS OF REMOVAL**

E35LBAB

**1. 1/2. DISCONNECTION OF BRAKE TUBE**

- (1) Lock nut on brake hose side. Loosen flared brake line nut.
- (2) Remove brake hose clip. Remove brake hose from bracket.

**SERVICE POINTS OF INSTALLATION**

E35LDAB

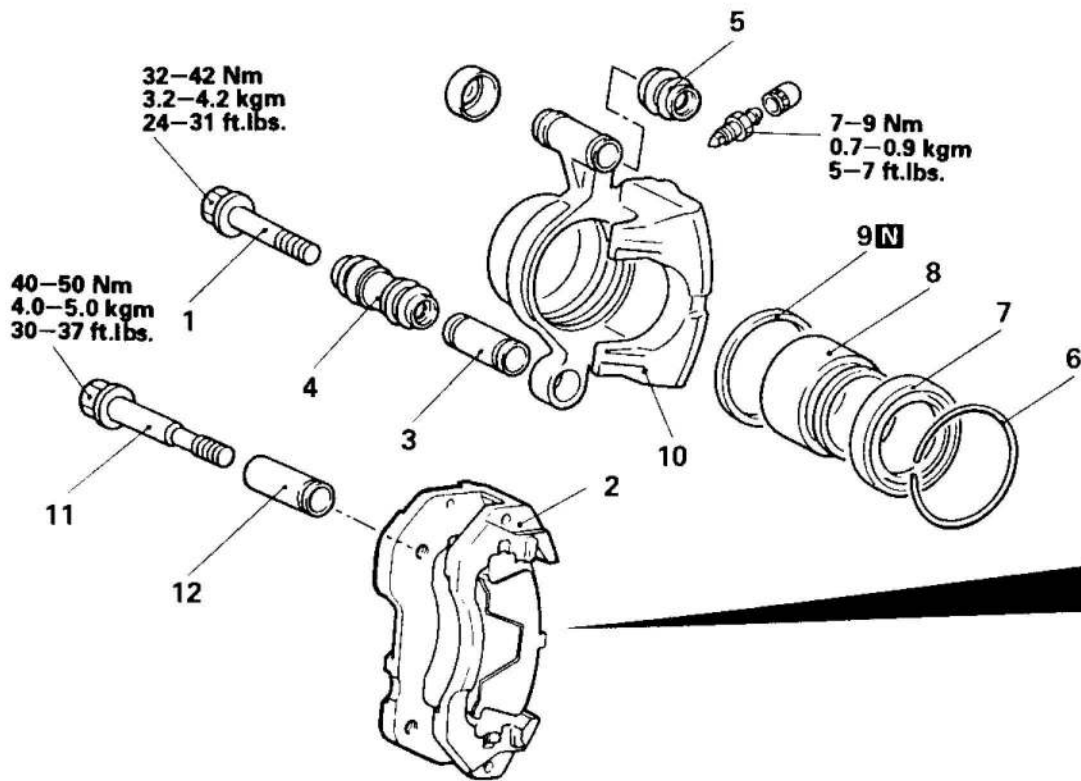
**6. INSTALLATION OF FRONT DISC BRAKE ASSEMBLY**

Press out pad. Install front disc brake assembly onto knuckle.

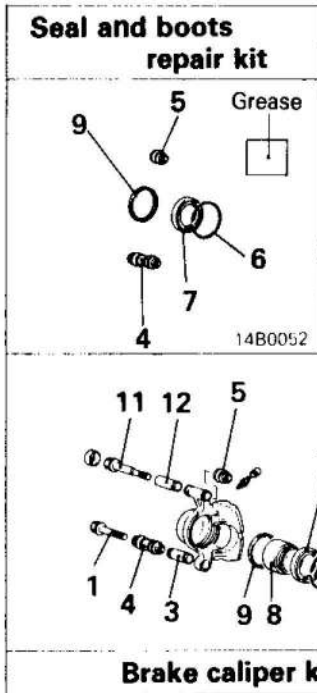
**4. INSTALLATION OF BRAKE HOSE**

Install brake hose without twisting or kinking.

DISASSEMBLY AND REASSEMBLY



14G0082

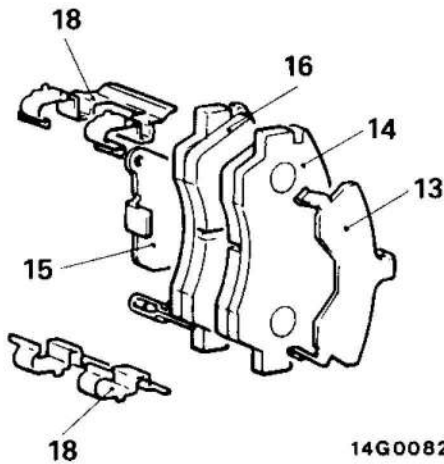


**Caliper disassembly steps**

1. Lock pin
- ↔ 2. Caliper support (pad, clip, shim)
3. Lock pin sleeve
- ↔↔ 4. Lock pin boot
- ↔↔ 5. Guide pin boot
- ↔↔ 6. Boot ring
- ↔↔ 7. Piston boot
- ↔↔↔ 8. Piston
- ↔↔↔ 9. Piston seal
- ↔↔↔ 10. Caliper body
- ↔ 11. Guide pin
- ↔ 12. Guide pin sleeve

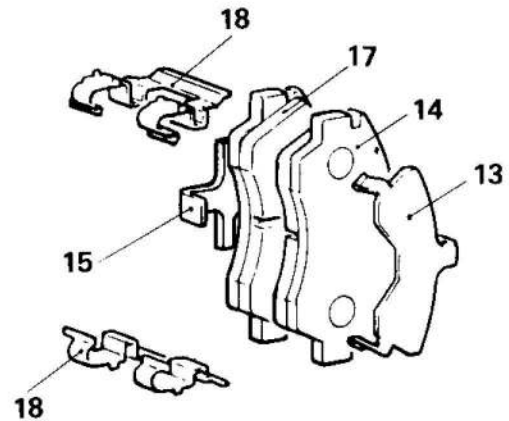


Vehicles with wear indicator



14G0082

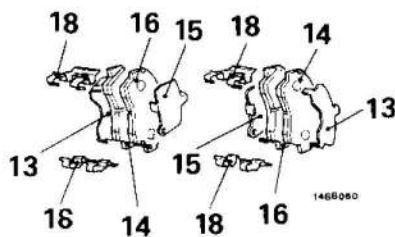
Vehicles without wear indicator



14G0133

Pad repair kit

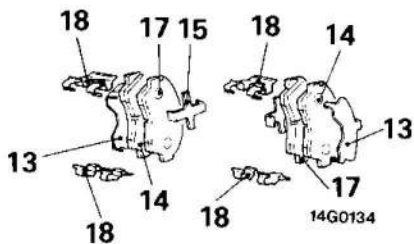
Vehicles with wear indicator



14G0082

Pad repair kit

Vehicles without wear indicator



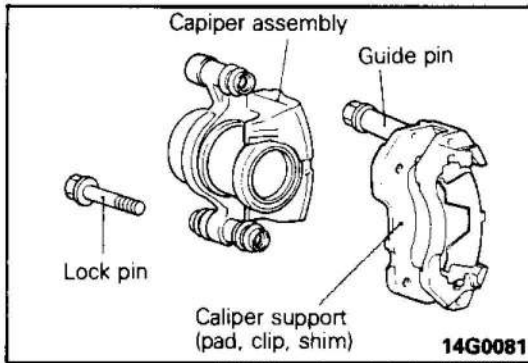
14G0133

Pad assembly disassembly steps

1. Lock pin
2. Caliper support (pad, clip, shim)
3. Outer shim
4. Pad assembly
5. Inner shim
6. Pad and wear indicator assembly
7. Pad assembly
8. Pad clip

NOTE

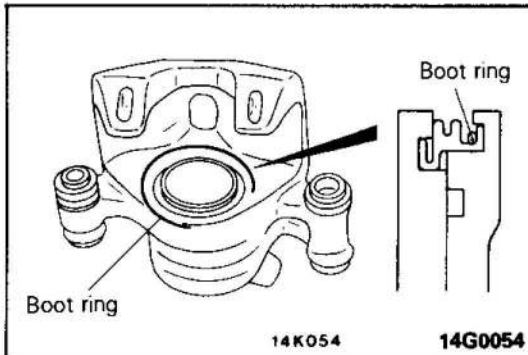
- (1) Reverse the disassembly procedures to reassemble.
- (2) ◆◆ : Refer to "Service Points of Disassembly".
- (3) ◆◆ : Refer to "Service Points of Reassembly".
- (4) [N] : Non-reusable parts

**SERVICE POINTS OF DISASSEMBLY**

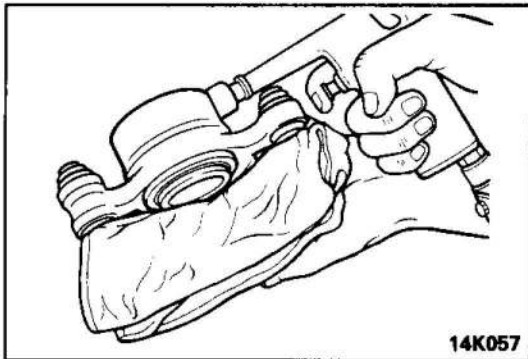
E35LGAB

**2. REMOVAL OF CALIPER SUPPORT (PAD, CLIP, SHIM)**

Remove caliper support from caliper body.

**6. REMOVAL OF BOOT RING**

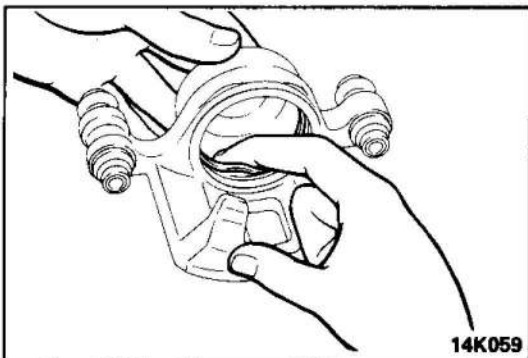
Remove boot ring with (-) screwdriver.

**7. REMOVAL OF PISTON BOOT/8. PISTON**

Protect caliper body with cloth. Blow compressed air through brake hose to remove piston boot and piston.

**Caution**

**Blow compressed air gently.**

**9. REMOVAL OF PISTON SEAL**

(1) Remove piston seal with finger tip.

**Caution**

**Do not use (-) screwdriver or other tool to prevent damage to inner cylinder.**

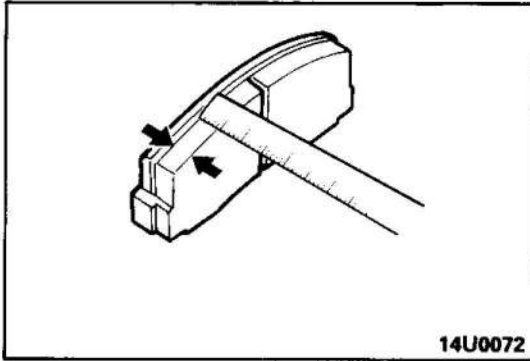
(2) Clean piston surface and inner cylinder with trichloroethylene, alcohol or specified brake fluid.

**Specified brake fluid: DOT3 or DOT4**

**INSPECTION**

E35LHAB

- Check cylinder for wear, damage or rust.
- Check piston surface for wear, damage or rust.
- Check caliper body or sleeve for wear.
- Check pad for damage or adhesion of grease, check backing metal for damage.
- Check wear indicator for damage.

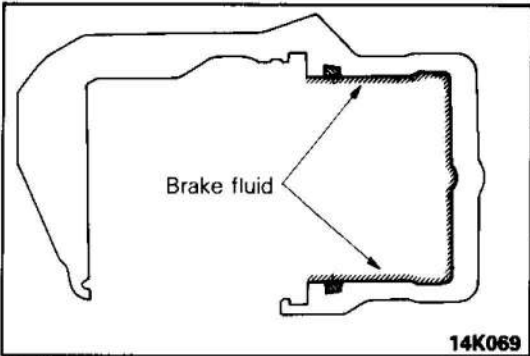


14U0072

**PAD WEAR CHECK**

Measure thickness at the thinnest and worn area of the pad. Replace pad assembly when pad thickness is less than the limit value.

**Limit value: 2.0 mm (0.079 in.)**



14K069

**SERVICE POINTS OF REASSEMBLY**

E35LIAB

**10. APPLICATION BRAKE FLUID TO CALIPER BODY**

Apply specified brake fluid to inner cylinder.

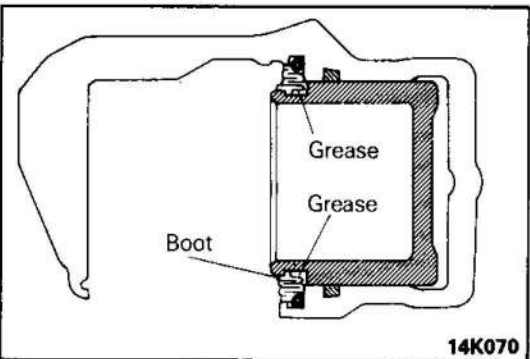
**Specified brake fluid: DOT3 or DOT4**

**9. INSTALLATION OF PISTON SEAL**

Install piston seal in cylinder groove.

**Caution**

**Do not wipe special grease on piston seal.**



14K070

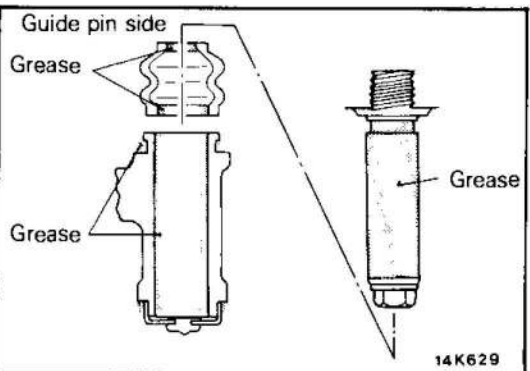
**8. INSTALLATION OF PISTON**

(1) Apply specified brake fluid to piston. Insert into cylinder without twisting.

**Specified brake fluid: DOT3 or DOT4**

(2) Fill piston edge with specified grease. Install piston boots.

**Specified grease: Repair kit grease (orange)**

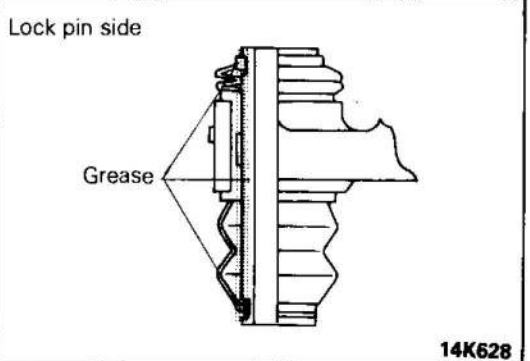


14K629

**5. APPLICATION OF GREASE TO GUIDE PIN BOOT/4. LOCK PIN BOOT**

Grease parts as illustrated with specified grease.

**Specified grease: Repair kit grease (orange)**



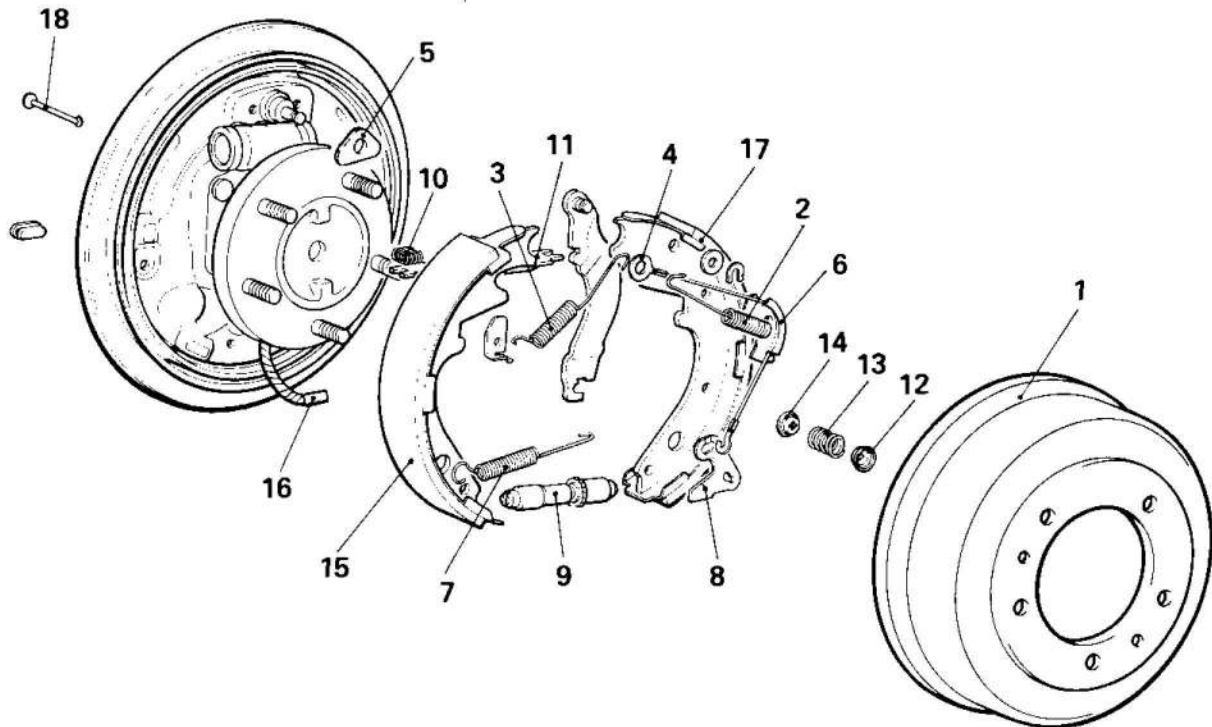
14K628

# REAR DRUM BRAKE SHOE (DUO-SERVO)

## REMOVAL AND INSTALLATION

### Post-installation Operation

- Parking brake lever adjustment  
(Refer to GROUP 36 PARKING BRAKE—  
Service Adjustment Procedures.)



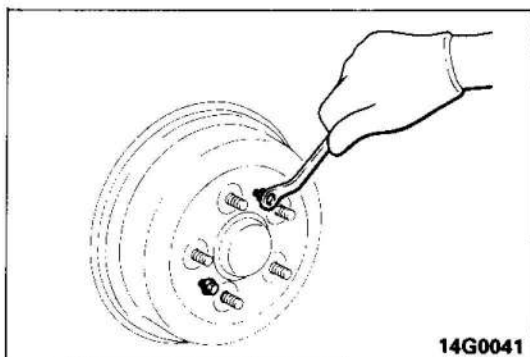
14G0102

### Removal steps

- |      |                                   |                                        |
|------|-----------------------------------|----------------------------------------|
| ◆◆   | 1. Brake drum                     | 13. Shoe hold down spring              |
| ◆◆◆  | Adjustment of shoe outer diameter | 14. Shoe hold down cup                 |
| ◆◆◆  | Adjuster assembly operation check | 15. Primary shoe and lining assembly   |
| ◆◆◆◆ | 2. Return spring (secondary)      | 16. Parking brake cable                |
| ◆◆◆◆ | 3. Return spring (primary)        | 17. Secondary shoe and lining assembly |
| ◆◆◆◆ | 4. Adjusting wire                 | ◆◆◆◆ 18. Shoe hold down pin            |
| ◆◆◆  | 5. Plate                          |                                        |
| ◆◆◆  | 6. Cable guide                    |                                        |
| ◆◆◆  | 7. Return spring                  |                                        |
| ◆◆◆  | 8. Automatic adjuster lever       |                                        |
| ◆◆◆  | 9. Adjuster assembly              |                                        |
| ◆◆◆  | 10. Anti-rattle spring            |                                        |
| ◆◆◆  | 11. Parking brake strut           |                                        |
| ◆◆◆  | 12. Shoe hold down cup            |                                        |

### NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆◆: Refer to "Service Points of Removal".
- (3) ◆◆◆◆: Refer to "Service Points of Installation".
- (4) Refer to GROUP 27 REAR AXLE—Axle Shaft for removal and installation of backing plate.



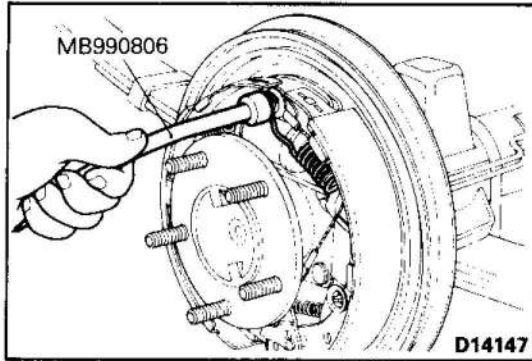
14G0041

## SERVICE POINTS OF REMOVAL

E35UDDA

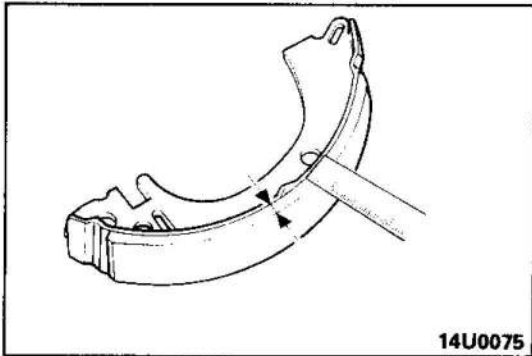
### 1. REMOVAL OF BRAKE DRUM

If the brake drum is difficult to remove, insert bolt (M8 × 1.25) into hole on brake drum flange and remove.



**2. REMOVAL OF RETURN SPRING (SECONDARY)/3. RETURN SPRING (PRIMARY)**

Remove return spring (secondary) and return spring (primary) from anchor pin with special tool.



**INSPECTION**

E35UCAB

**LINING WEAR CHECK**

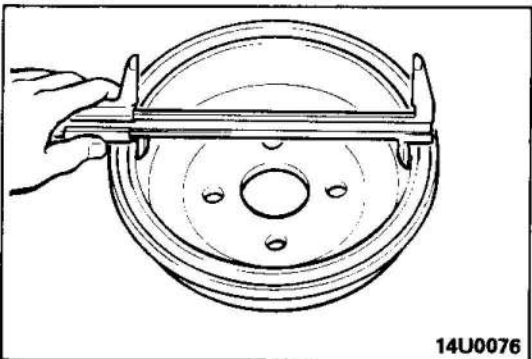
Measure thickness at the thinnest area of the lining.

**Limit: 1.0 mm (0.039 in.)**

Replace shoe and lining assembly when wear exceeds the limit value or is badly imbalanced.

**NOTE**

Replace shoe and lining assemblies on both sides.

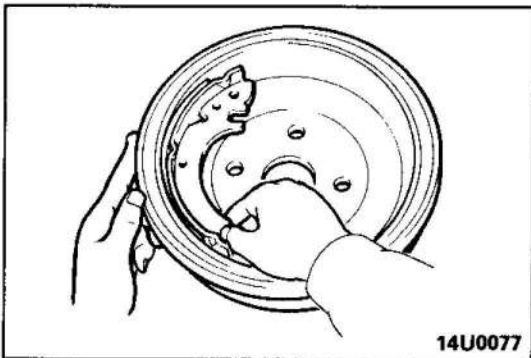


**BRAKE DRUM BORE CHECK**

Measure brake drum bore at more than 2 locations.

**Limit: 222.0 mm (8.74 in.)**

Replace brake drum when wear exceeds the limit value or is badly imbalanced.

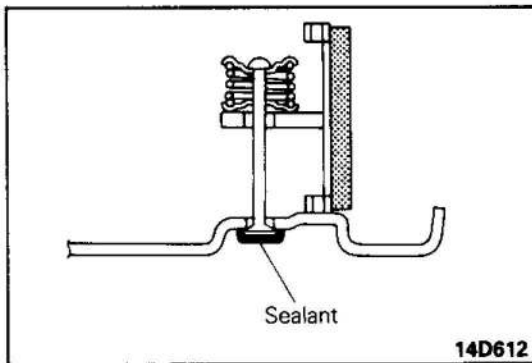


**LINING AND BRAKE DRUM CONTACT CHECK**

Chalk inner surface of brake drum and rub with shoe and lining assembly. Replace shoe and lining assembly or brake drum when contact area badly irregular.

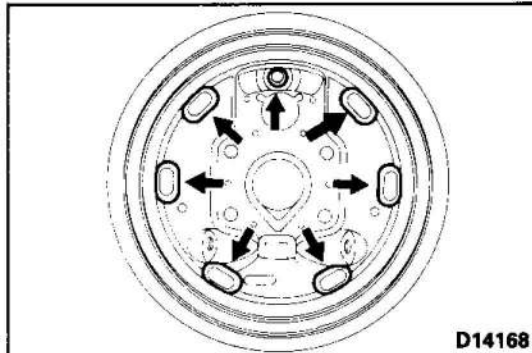
**NOTE**

Clean chalk off after check.

**SERVICE POINTS OF INSTALLATION****18. INSTALLATION OF SHOE HOLD DOWN PIN**

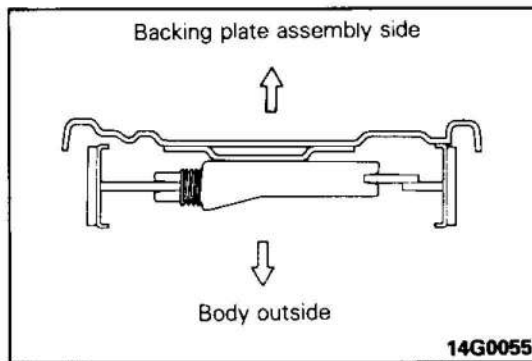
- (1) Apply specified sealant on shoe hold down pin and backing plate assembly install surface.

**Specified sealant: 3M ATD Part No. 8513  
or equivalent**

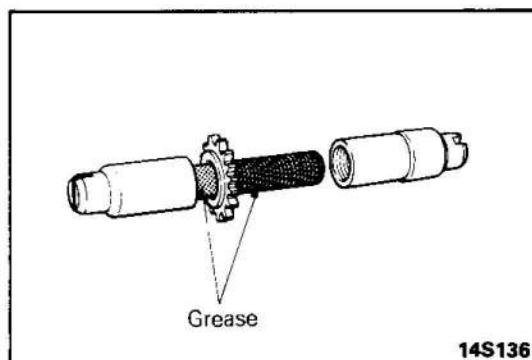


- (2) Apply specified grease on backing plate as illustrated.
- 1 Anchor pin and shoe web contact surface
  - 2 Shoe and lining assembly and backing plate contact surface

**Specified grease: Brake grease SAE J310,  
NLGI No. 1**

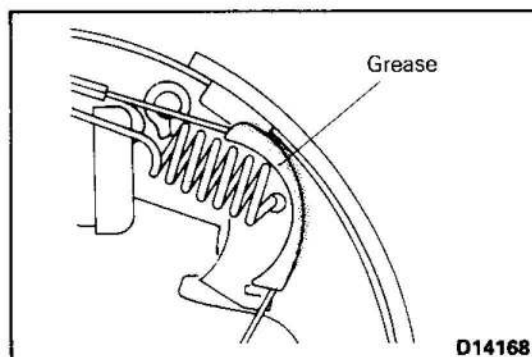
**11. INSTALLATION OF PARKING BRAKE STRUT/10. ANTI-RATTLE SPRING**

Install parking brake strut and anti-rattle spring as illustrated.

**9. INSTALLATION OF ADJUSTER ASSEMBLY**

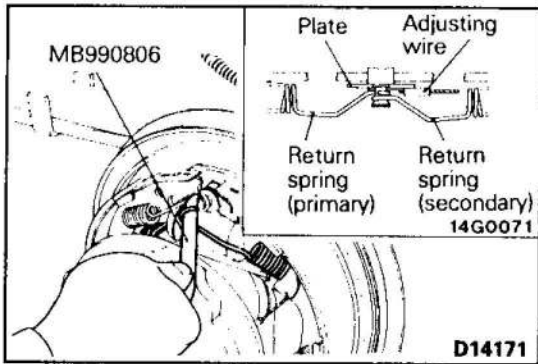
Apply specified grease to adjuster assembly screw area. Install as illustrated.

**Specified grease: Brake grease SAE J310,  
NLGI No. 1**

**6. APPLICATION OF GREASE TO CABLE GUIDE**

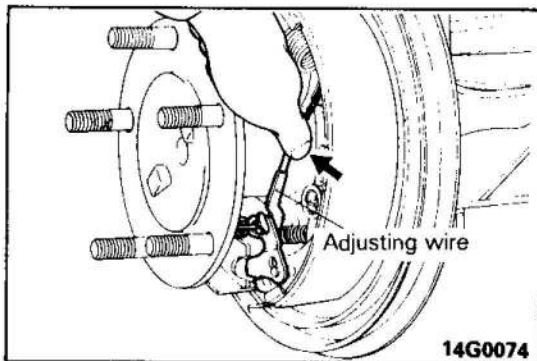
Apply specified grease to cable guide at adjusting wire contact area.

**Specified grease: Brake grease SAE J310,  
NLGI No. 1**



**3. INSTALLATION OF RETURN SPRING (PRIMARY)/  
2. RETURN SPRING (SECONDARY)**

With special tool, install return spring (primary), return spring (secondary) on anchor pin in this order.

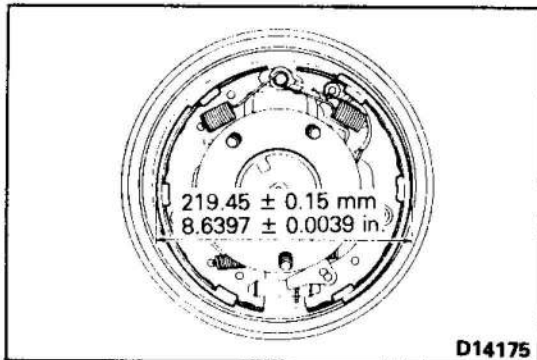


• **ADJUSTER ASSEMBLY OPERATION CHECK**

Condition good if one tooth sent when adjusting wire is drawn, and returns when wire released.

Check following if malfunction.

- (1) Adjusting wire and cable guide installation
- (2) Adjusting lever and return spring installation
- (3) Adjuster assembly operation



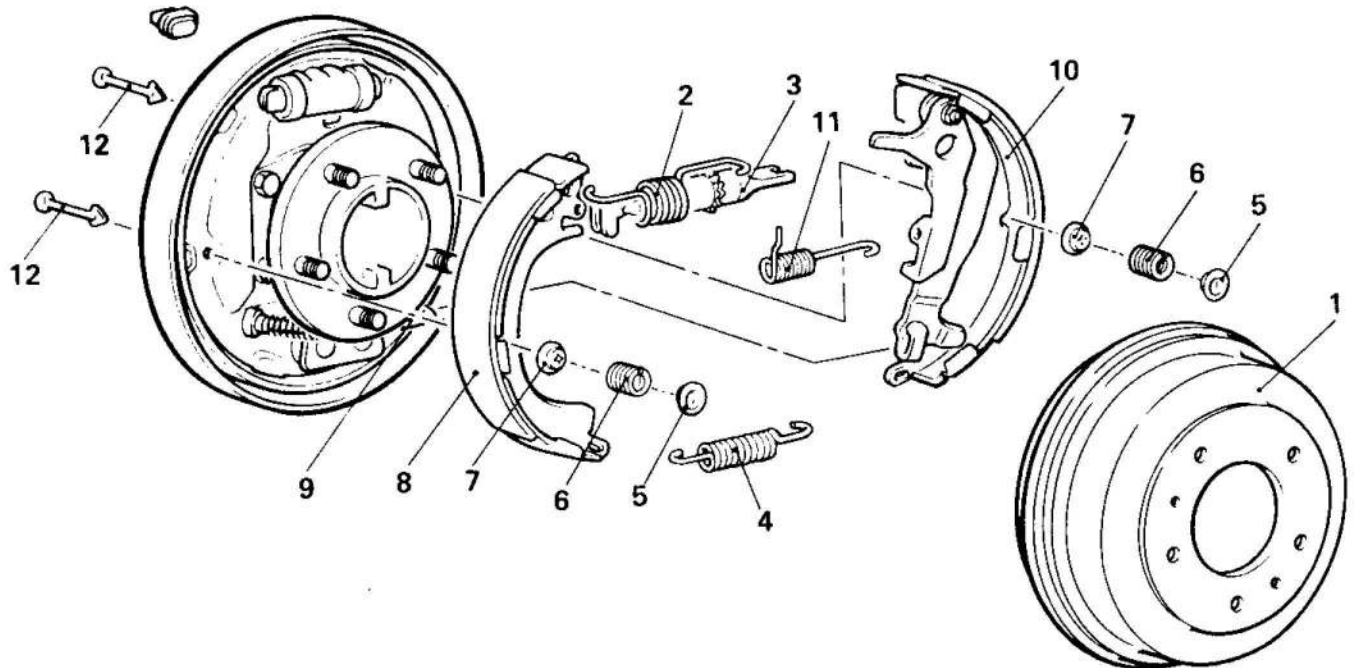
• **ADJUSTMENT OF SHOE OUTER DIAMETER**

Turn adjuster assembly and adjust outer diameter as illustrated.



## REAR DRUM BRAKE SHOE (LEADING AND TRAILING 2WD)

## REMOVAL AND INSTALLATION



14G0097

## Removal steps

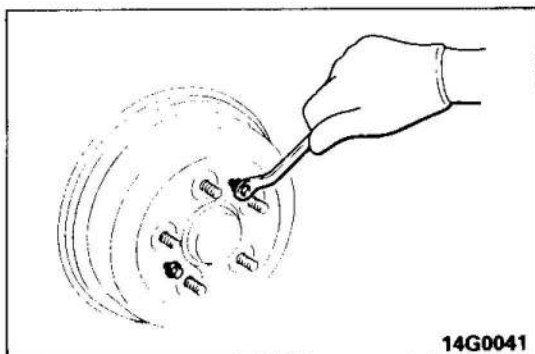
- ◆◆ 1. Brake drum
- ◆◆◆ Adjustment of shoe outer diameter
- ◆◆◆ 2. Shoe return spring
- ◆◆◆ 3. Adjusting screw assembly
- ◆◆ 4. Shoe retainer spring
- ◆◆ 5. Shoe hold down cup
- ◆◆ 6. Shoe hold down spring
- ◆◆ 7. Shoe hold down cup
- ◆◆ 8. Shoe and lining assembly
- ◆◆ 9. Parking brake cable connection
- ◆◆ 10. Shoe and lever assembly
- ◆◆ 11. Adjusting spring
- ◆◆◆ 12. Shoe hold down pin

## Post-installation Operation

- Parking brake lever adjustment (Refer to GROUP 36 PARKING BRAKE—Service Adjustment Procedures)

## NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆◆ : Refer to "Service Points of Installation".
- (4) Refer to GROUP 27 REAR AXLE—Axle shaft for removal and installation of backing plate.



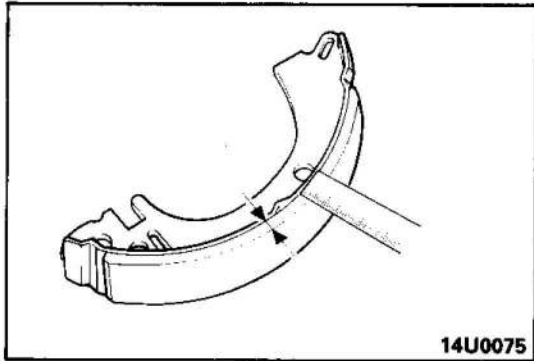
14G0041

## SERVICE POINTS OF REMOVAL

E35UBAB

## 1. REMOVAL OF BRAKE DRUM

If the brake drum is difficult to remove, insert bolt (M8 × 1.25) into hole on brake drum flange and remove.



14U0075

**INSPECTION**

E35UCAB

**LINING WEAR CHECK**

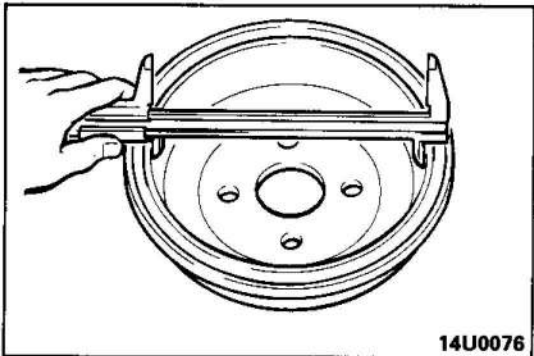
Measure lining thickness at the most worn part.

**Limit: 1.0 mm (0.039 in.)**

Replace shoe and lining assembly when wear exceeds the limit value or is badly imbalanced.

**NOTE**

Replace both right and left shoe and lining assemblies.



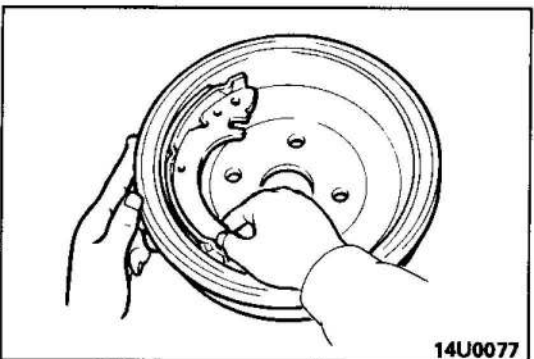
14U0076

**BRAKE DRUM BORE CHECK**

Measure brake drum bore at more than 2 locations.

**Limit: 256.0 mm (10.08 in.)**

Replace brake drum when wear exceeds the limit value or is badly imbalanced.



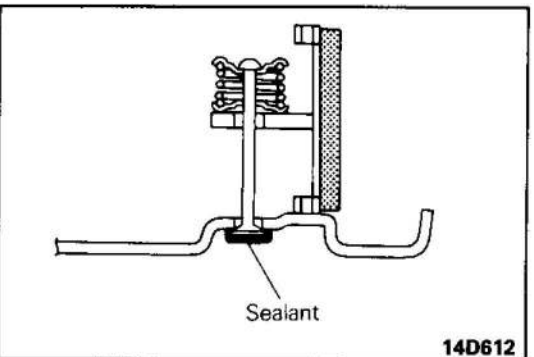
14U0077

**LINING AND BRAKE DRUM CONTACT CHECK**

- (1) Chalk inner surface of brake drum and rub with shoe and lining assembly.
- (2) Replace shoe and lining assembly or brake drum if very irregular contact area.

**NOTE**

Clean off chalk after check.



14D612

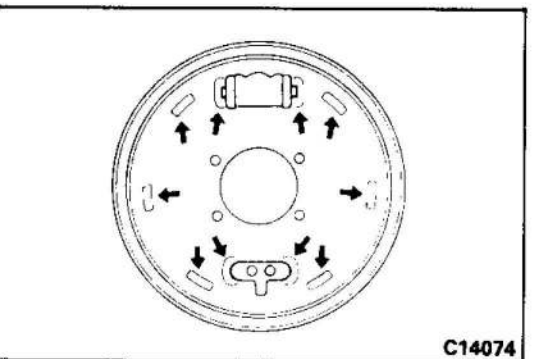
**SERVICE POINTS OF INSTALLATION**

E35UDAB

**12. INSTALLATION OF SHOE HOLD DOWN PIN**

- (1) Apply specified sealant on shoe hold down pin at backing plate assembly install surface.

**Specified sealant: 3M ATD Part No. 8513 or equivalent**

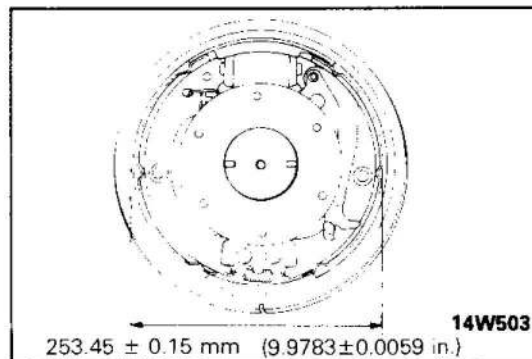
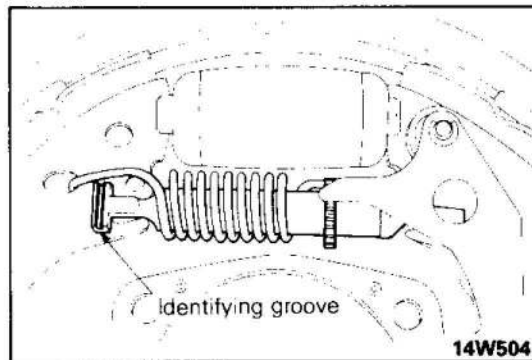
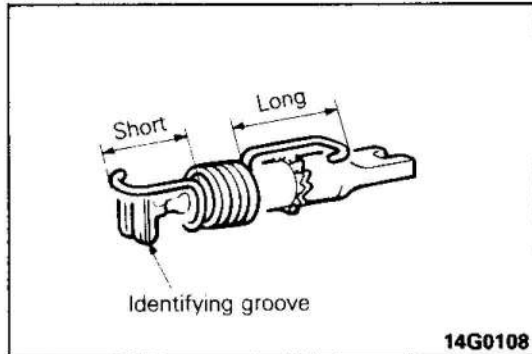
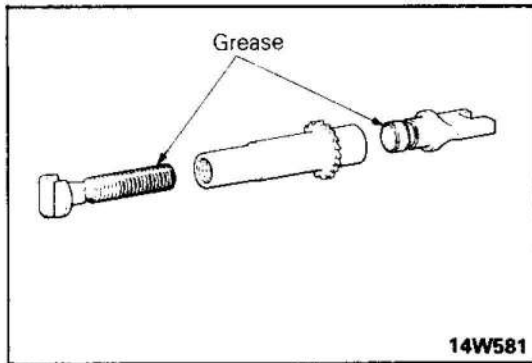


C14074

- (2) Apply specified grease to backing plate as illustrated.

- ① Shoe and lever, and shoe and lining assembly and backing plate contact parts.
- ② Anchor plate and wheel cylinder piston edges

**Specified grease: Brake grease SAE J310, NLGI No. 1**



### 3. INSTALLATION OF ADJUSTING SCREW ASSEMBLY/ 2. SHOE RETURN SPRING

- (1) Apply specified grease to adjusting screw assembly as illustrated.

**Specified grease: Brake grease SAE J310,  
NLGI No. 1**

- (2) Install shoe return spring on adjuster screw assembly as illustrated.

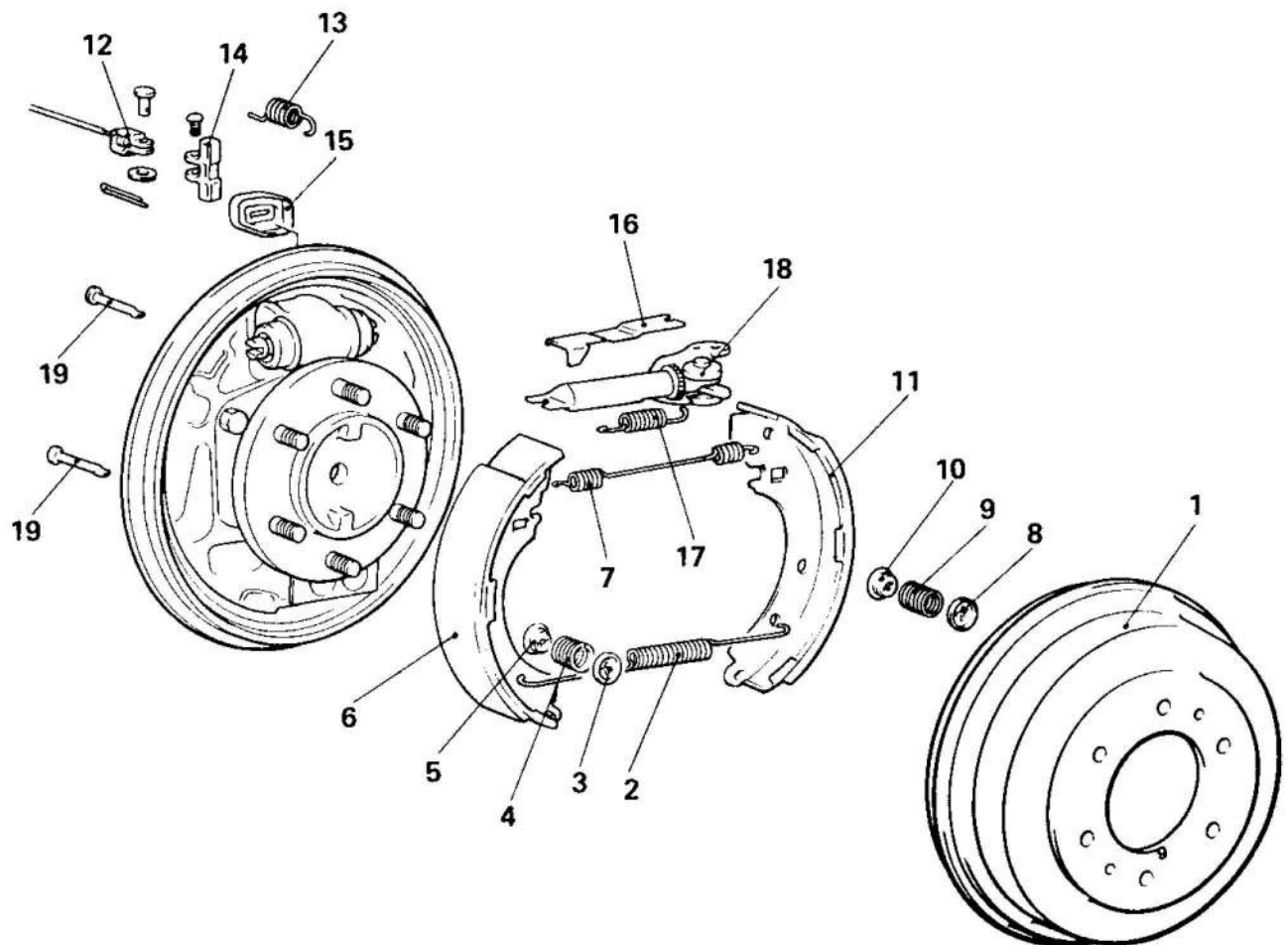
- (3) Install so that adjusting screw identifying groove faces to shoe and lining assembly and outside.

#### • ADJUSTMENT OF SHOE OUTER DIAMETER

Turn adjusting screw to adjust show outer diameter as illustrated.

# REAR DRUM BRAKE SHOE (LEADING AND TRAILING 4WD)

## REMOVAL AND INSTALLATION



14G0193

### Removal steps

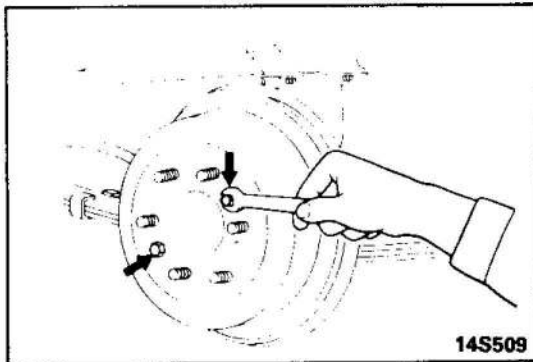
- ◆◆ 1. Brake drum
- ◆◆ ◆◆ Adjustment of shoe outer diameter
- ◆◆ 2. Lower shoe return spring
- ◆◆ 3. Shoe hold down cup
- ◆◆ 4. Shoe hold down spring
- ◆◆ 5. Shoe hold down cup
- ◆◆ 6. Shoe and lining assembly
- ◆◆ 7. Upper shoe return spring
- ◆◆ 8. Shoe hold down cup
- ◆◆ 9. Shoe hold down spring
- ◆◆ 10. Shoe hold down cup
- ◆◆ 11. Shoe and lining assembly
- ◆◆ 12. Parking brake cable connection
- ◆◆ 13. Lever return spring
- ◆◆ 14. Parking lever stopper
- ◆◆ 15. Lever boots
- ◆◆ ◆◆ 16. Lever return spring bracket
- ◆◆ ◆◆ 17. Spring
- ◆◆ ◆◆ 18. Adjuster lever assembly
- ◆◆ ◆◆ 19. Shoe hold down pin

### Post-installation Operation

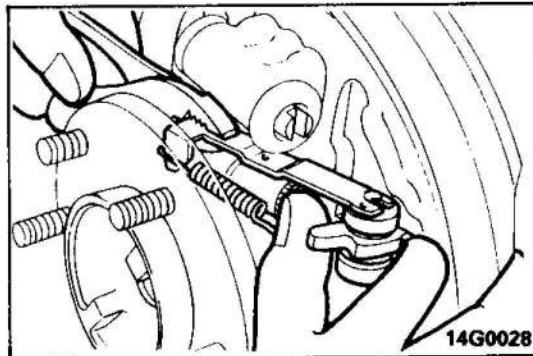
- ◆ Parking brake lever adjustment (Refer to GROUP 36 PARKING BRAKE – Service Adjustment Procedures.)

### NOTE

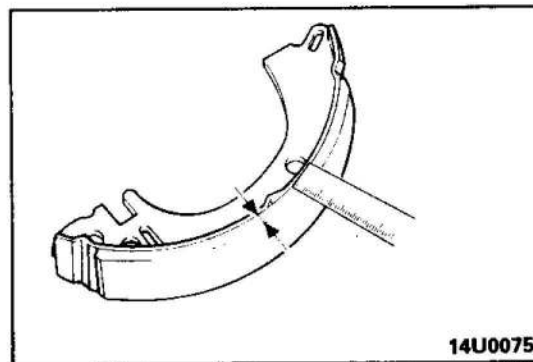
- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆◆ : Refer to "Service Points of Installation".
- (4) Refer to GROUP 27 REAR AXLE – Axle shaft for removal and installation of backing plate.



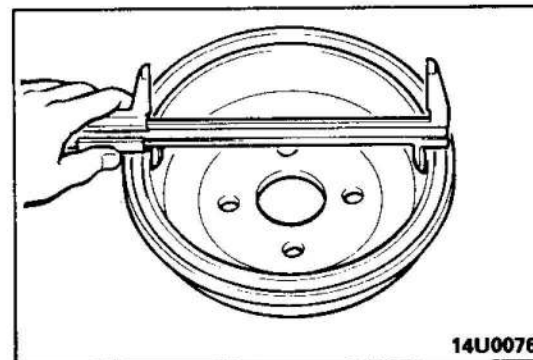
14S509



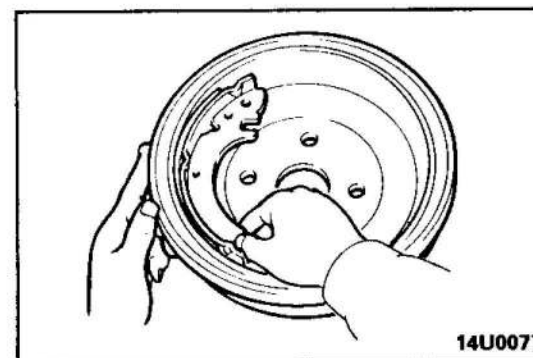
14G0028



14U0075



14U0076



14U0077

## SERVICE POINTS OF REMOVAL

E35UBAC

### 1. REMOVAL OF BRAKE DRUM

If brake drum is difficult to remove, insert bolt (M8 × 1.25) into brake drum flange hole to remove.

### 16. REMOVAL OF LEVER RETURN SPRING BRACKET/17. SPRING

Pull the lever return spring bracket with pliers and remove it and spring.

## INSPECTION

E35UCAB

### LINING WEAR CHECK

Measure lining thickness at the most worn area.

**Limit: 1.0 mm (0.039 in.)**

Replace shoe and lining assembly when wear exceeds the limit value or is badly imbalanced.

#### NOTE

Replace shoe and lining assemblies on both sides.

### BRAKE DRUM BORE CHECK

Measure brake drum bore at more than 2 locations.

**Limit: 256.0 mm (10.08 in.)**

Replace brake drum when wear exceeds the limit value or is badly imbalanced.

### LINING AND BRAKE DRUM CONTACT CHECK

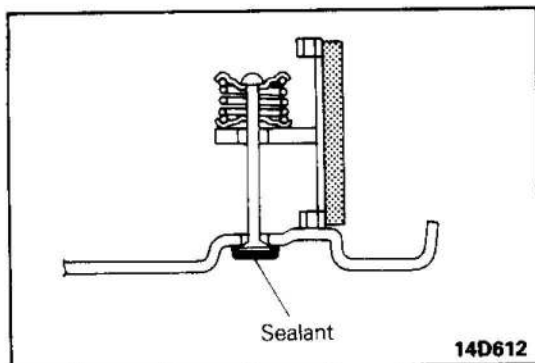
Chalk the inner surface of brake drum and rub with shoe and lining assembly.

Replace shoe and lining assembly or brake drum if very irregular contact area.

#### NOTE

Clean off chalk after check.

E35UDAC

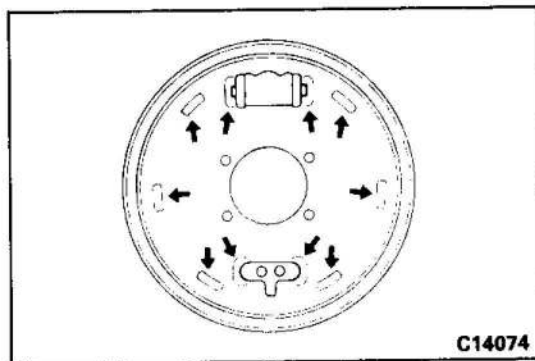


**SERVICE POINTS OF INSTALLATION**

**19. INSTALLATION OF SHOE HOLD DOWN PIN**

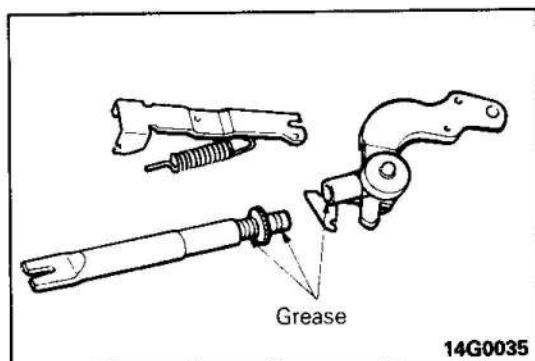
- (1) Apply specified sealant on shoe hold down pin and backing plate assembly install surface.

**Specified sealant: 3M ATD Part No. 8513 or equivalent**



- (2) Apply specified grease on backing plate as illustrated.
  - ① Shoe and lever, and shoe and lining assembly and backing plate contact parts.
  - ② Anchor plate and wheel cylinder piston edges

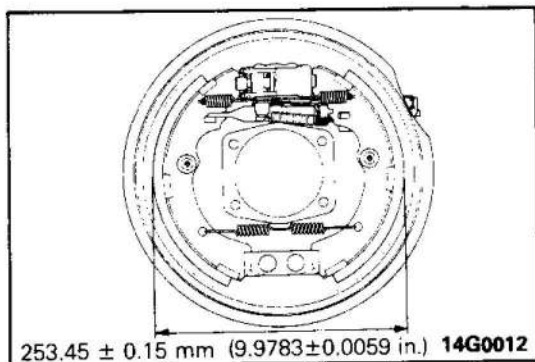
**Specified grease: Brake grease SAE J310, NLGI No.1**



**18. APPLICATION OF GREASE TO ADJUSTER LEVER ASSEMBLY**

Apply specified grease to adjuster lever assembly as illustrated.

**Specified grease: Brake grease SAE J310, NLGI No. 1**



• **ADJUSTMENT OF SHOE OUTER DIAMETER**

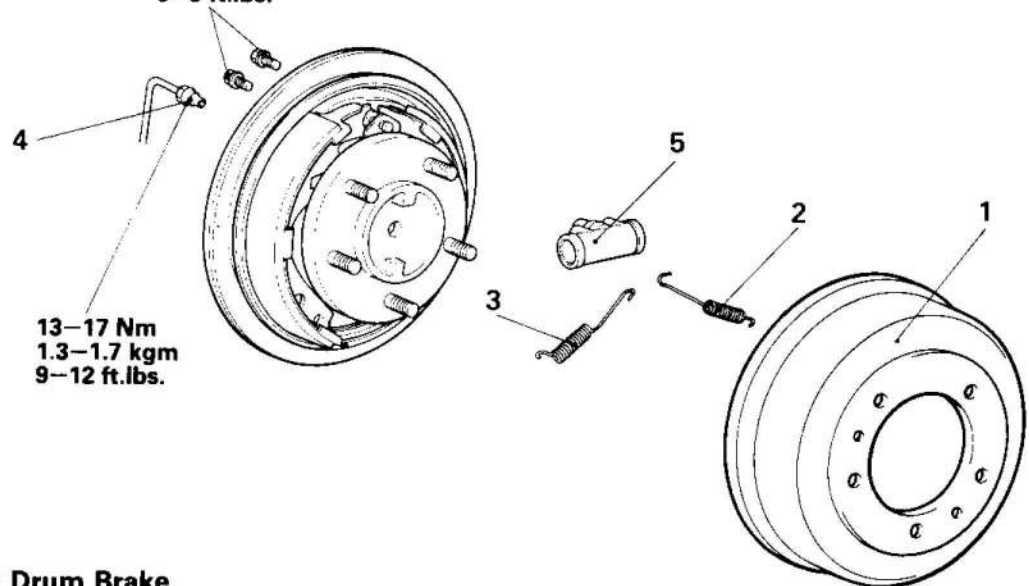
Turn the adjuster wheel and adjust shoe outer diameter as illustrated.



# REAR DRUM BRAKE WHEEL CYLINDER

## REMOVAL AND INSTALLATION

**Duo Servo Drum Brake**  
 8–12 Nm  
 0.8–1.2 kgm  
 6–9 ft.lbs.

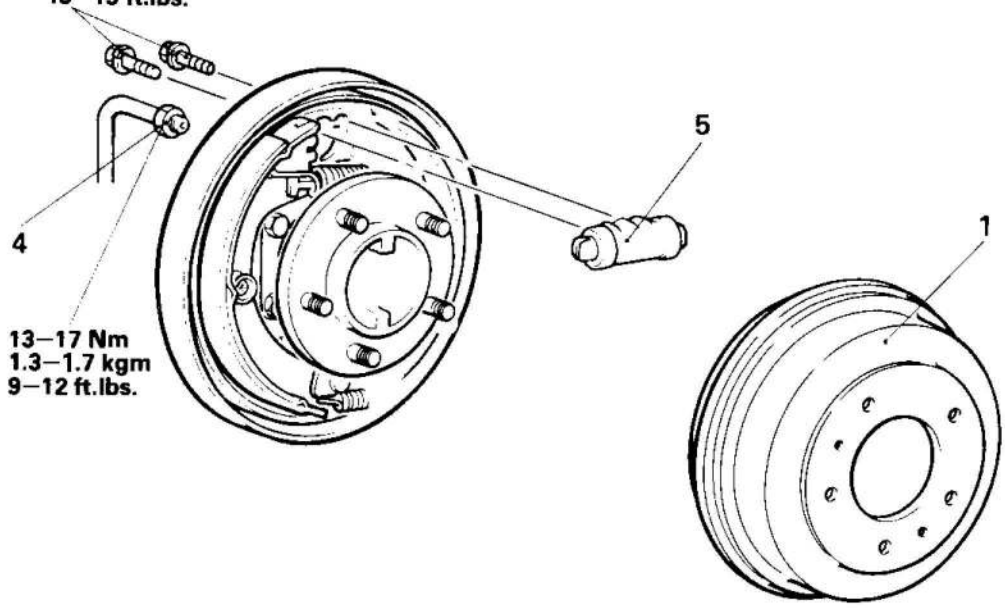


13–17 Nm  
 1.3–1.7 kgm  
 9–12 ft.lbs.

14G0103

### Leading-trailing Drum Brake

18–21 Nm  
 1.8–2.1 kgm  
 13–15 ft.lbs.



13–17 Nm  
 1.3–1.7 kgm  
 9–12 ft.lbs.

14G0098

### Removal steps

- ◆◆ 1. Brake drum
- ◆◆◆◆ 2. Return spring (secondary)
- ◆◆◆◆ 3. Return spring (primary)
- ◆◆◆◆ 4. Brake tube connection
- ◆◆ 5. Wheel cylinder

### NOTE

- (1) Reverse the removal procedures to reinstall.
- (2) ◆◆ : Refer to "Service Points of Removal".
- (3) ◆◆◆ : Refer to "Service Points of Installation".

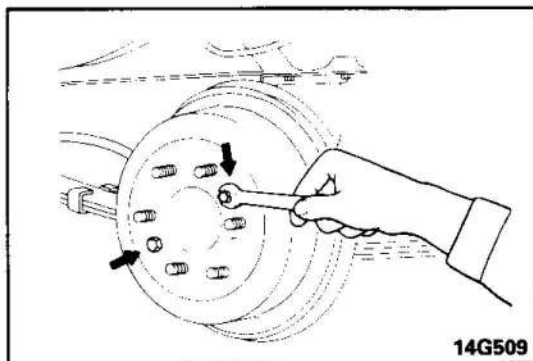
### Pre-removal Operation

- Drain brake fluid

### Post-installation Operation

- Brake fluid filling
- Brake line bleeding  
 (Refer to P. 35–20.)



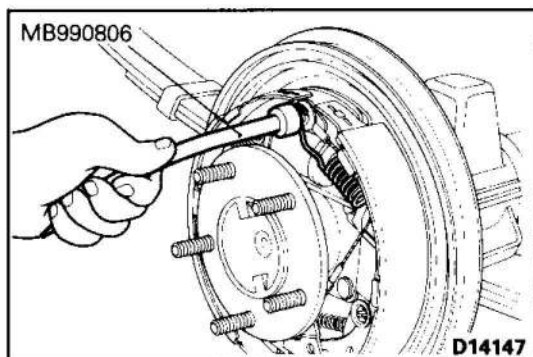


**SERVICE POINTS OF REMOVAL**

E35VBAC

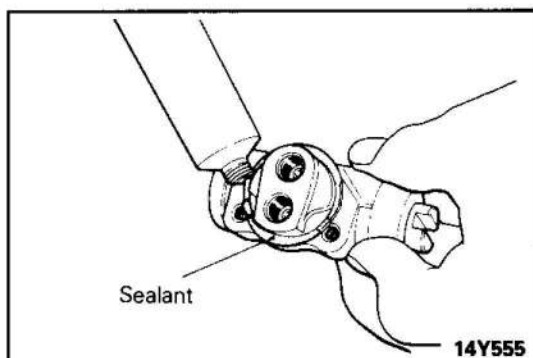
**1. REMOVAL OF BRAKE DRUM**

If brake drum is difficult to remove, insert bolt (M8 × 1.25) into brake drum flange hole and remove.



**2. REMOVAL OF RETURN SPRING (SECONDARY)/  
3. RETURN SPRING (PRIMARY)**

Use special tool and remove return spring (secondary) and return spring (primary) from anchor pin.



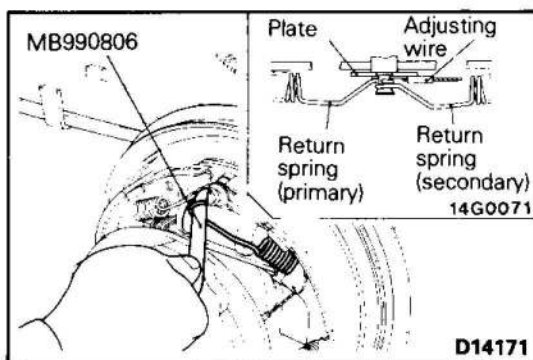
**SERVICE POINTS OF INSTALLATION**

E35VDAB

**5. APPLICATION OF SEALANT TO WHEEL CYLINDER**

Apply specified sealant on wheel cylinder and backing plate contact surface.

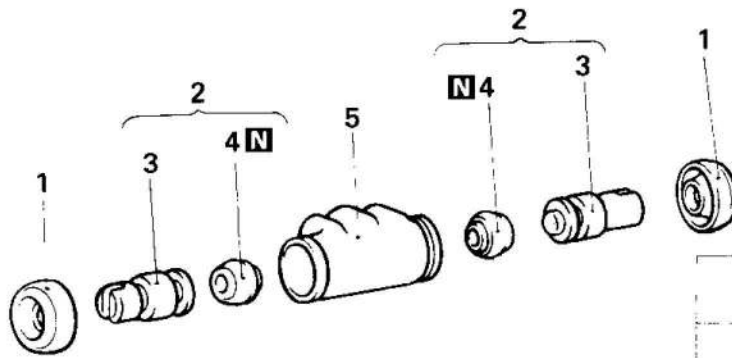
**Specified sealant: 3M ATD Part No. 8513  
or equivalent**



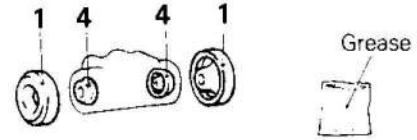
**3. INSTALLATION OF RETURN SPRING (PRIMARY)/  
2. RETURN SPRING (SECONDARY)**

Use special tool and install return spring (primary) and return spring (secondary) on anchor pin in this order.

## DISASSEMBLY AND REASSEMBLY



## Wheel cylinder repair kit

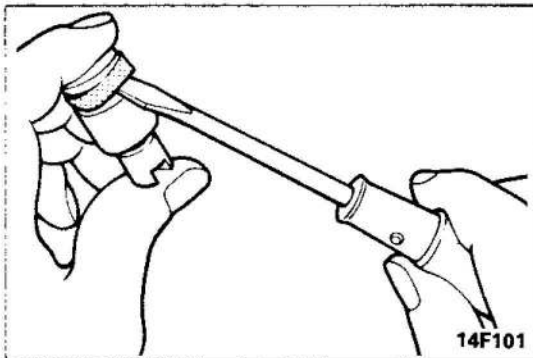


## Disassembly steps

1. Boots
- ◆◆ 2. Piston assembly
- ◆◆ 3. Piston
- ◆◆◆◆ 4. Piston cup
5. Wheel cylinder body

## NOTE

- (1) Reverse the disassembly procedures to reassemble.
- (2) ◆◆ : Refer to "Service Points of Disassembly".
- (3) ◆◆◆ : Refer to "Service Points of Reassembly".
- (4) **N** : Non-reusable parts



## SERVICE POINTS OF DISASSEMBLY

E35VFAB

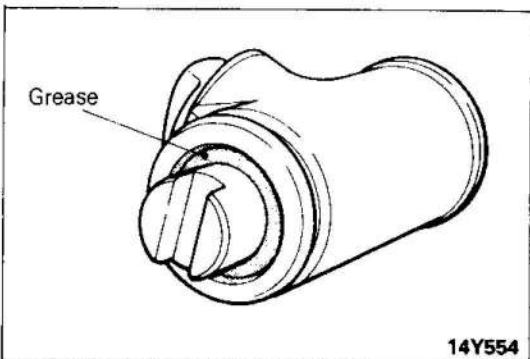
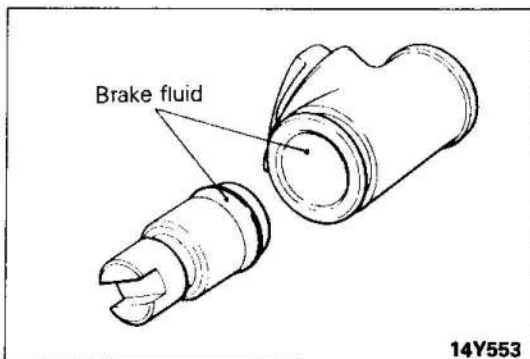
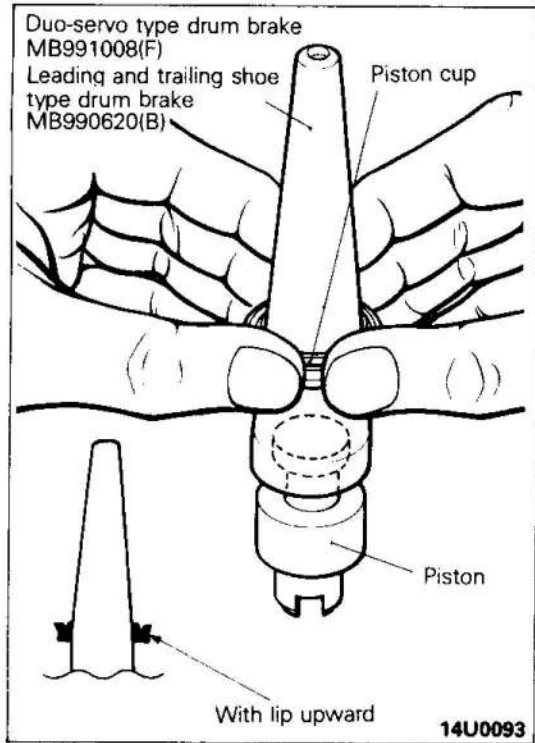
## 4. REMOVAL OF PISTON CUP

Remove piston cup without damaging piston.

## INSPECTION

E35VCAA

- Check the piston and wheel cylinder walls for rust or damage.



## SERVICE POINTS OF REASSEMBLY

E35VHAB

### 4. INSTALLATION OF PISTON CUP/3. PISTON

- (1) Clean piston with trichlorethylene, alcohol or specified brake fluid.

**Specified brake fluid: DOT3 or DOT4**

- (2) Apply specified brake fluid on piston cup and outer surface of special tool.
- (3) Set special tool on piston. Insert piston cup with lip upward in special tool.
- (4) Gently ease piston cup into piston groove.

### 2. INSTALLATION OF PISTON ASSEMBLY

- (1) Clean inner wheel cylinder body with specified brake fluid.

**Specified brake fluid: DOT3 or DOT4**

- (2) Apply specified brake fluid on inner wheel cylinder body and exterior piston cup. Install piston assembly.

- (3) Fill piston edge with specified grease.

**Specified grease: Repair kit grease (orange)**

35-86

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NOTE