
EXTERIOR

CONTENTS

E51AA--

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Items	Specifications
Headlamp washer motor and pump	
Motor type	Direct current ferrite magnet type
Pump type	Centrifugal type
Rated current	A 21 or less
Nozzle injection pressure	kPa (kg/cm ² , psi) 180 (1.8, 25.6) or more
Tank capacity	dm ³ (U.S.qts., Imp.qts.) 3.7 (3.9, 3.3) or more
Check valve	
Valve opening and closing pressure	kPa (kg/cm ² , psi) 50–110 (0.5–1.1, 7.1–15.6)
Headlamp washer relay	
Timer operation time	sec. 0.33

SERVICE SPECIFICATIONS

E51CB--

Items	Specifications
Standard value	
Windshield wiper blade installation position	mm (in.)
Driver's side	25–35 (0.98–1.38)
Passenger's side	35–45 (1.38–1.77)
Rear wiper blade installation position	mm (in.) 65–75 (2.56–2.95)
P.T.O. output shaft axial play	mm (in.) 0–0.2 (0–0.008)
Clearance between snap ring and snap ring groove of drive shaft universal joint	mm(in.) 0–0.06 (0–0.0024)
Limit	
Number of broken strands in main wire rope	11
Outside diameter of wire rope	mm (in.) 7.45 (0.2933)
Thickness of winch brake shoe lining	mm (in.) 4.0–4.5 (0.157–0.177)
Inside diameter of lower roller bushing of winch rope guide	mm (in.) 19.5 (0.768)
Drive shaft runout	mm (in.)
Front shaft assembly	1.0 (0.04)
Rear shaft assembly	0.5 (0.02)

LUBRICANTS

E51CD--

Items	Specified lubricants	Quantity dm ³ (U.S.qts., Imp.qts.)
Winch gear case	Hypoid gear oil API classification GL-4 or higher SAE viscosity No. 75W–90 or 75W–85W	0.75 (0.79, 0.66)
Transfer case (P.T.O. oil)	Hypoid gear oil API classification GL-4 or higher SAE viscosity No. 75W–90 or 75W–85W	2.7 (2.85, 2.38) [including 0.4 (0.42, 0.35) of P.T.O. oil]


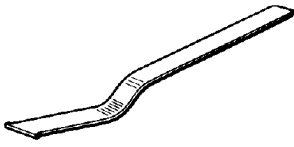
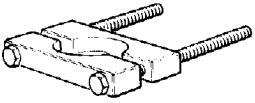


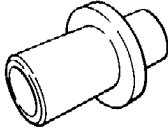
SEALANTS AND ADHESIVES

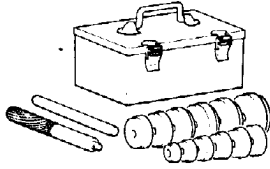

E51CE--

Items	Specified sealant and adhesive	Remarks
Between roof rail and packing	3M ATD Part No. 8513 or equivalent	Non-drying sealant
Between roof rail packing and body Roof spoiler and body mounting section	3M ATD Part No. 8531, 8646 or equivalent	Body sealant
P.T.O. stud bolt Both surfaces of P.T.O. gasket Gear case cover	3M ATD Part No. 8661, 8663 or equivalent	Semi-drying sealant
Winch inner set screw	3M ATD Part No. 8121, 8155 or equivalent	Quick fix adhesive

SPECIAL TOOLS

E51DA--

Tool	Number	Name	Use
	MB990784	Ornament remover	Removal of rear wiper and washer switch, door mirror control mirror switch
	MB990449	Window moulding remover	Removal of roof drip moulding
	MB990560	Rear axle shaft bearing remover	P.T.O. Pressing in and out output shaft front ball bearing Removal of output shaft rear ball bearing Winch Removal of bearing inner race
	MB991152	Dust cover installer	P.T.O. Pressing in output shaft rear ball bearing Pressing in dust seal
	MB990699	Differential oil seal installer	P.T.O. Pressing in oil seal
	MB991007	Bearing installer	Winch Removal of shift lock bracket bushing Pressing in gear case oil seal, bearing inner race

Tool	Number	Name	Use
	<p>MB990925</p>	<p>Bearing and oil seal installer (Refer to GROUP 26–Special Tools.)</p>	<p>Drive shaft Pressing in bearing bracket oil seal MB990938, MB990929</p> <p>Winch Removal of gear case bushing MB990939</p> <p>Pressing in gear case bushing, gear case oil seal, side cover bushing, drum bushing and shift lock bracket bushing MB990938, MB990927</p> <p>Pressing in bearing inner race MB990927</p>
	<p>MB990590</p>	<p>Rear axle shaft oil seal remover</p>	<p>Winch Removal of drum bushing and side cover bushing</p>

SERVICE ADJUSTMENT PROCEDURES

WINCH INSPECTION

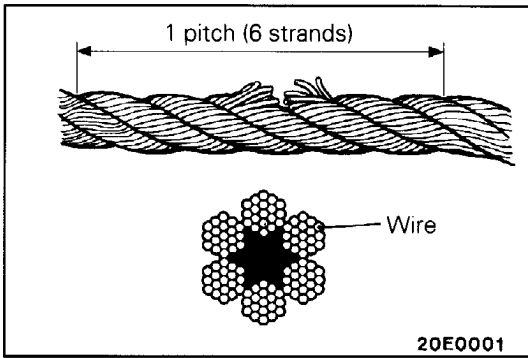
WIRE ROPE AND HOOK INSPECTION

E51FAAB

Inspect the following items, and if an abnormality is found, replace the item concerned.

- (1) In one pitch of the wire rope (6 strands), 10 percent or more of the wires are broken.

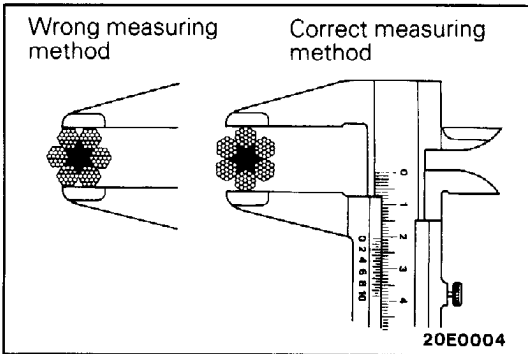
Limit: 11 wires



- (2) Perpendicular decrease in diameter exceeds 7 percent of the rated diameter.

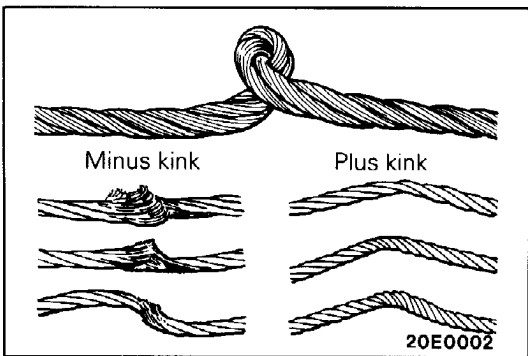
Using the measurement method shown in the illustration, measure the values for three sides and take an average.

Limit: 7.45 mm (0.2933 in.)

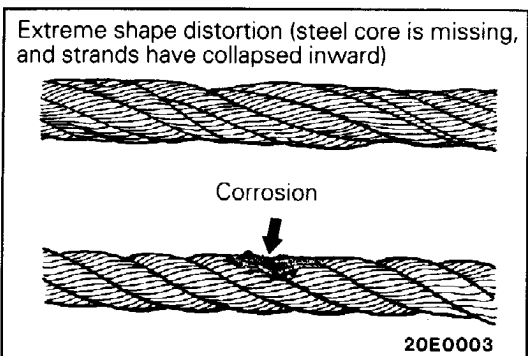


- (3) Rope with kinks.
Rate of decrease in load due to kinks.

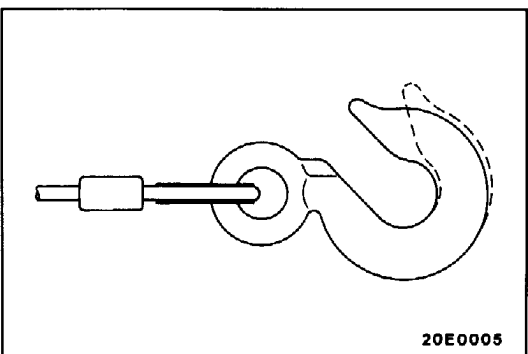
Condition of rope	Rate of decrease %
Rope with no kinks	0
Rope with minus kink (strands unravelling direction)	20-40
Rope with plus kink (strands tightening direction)	50-80

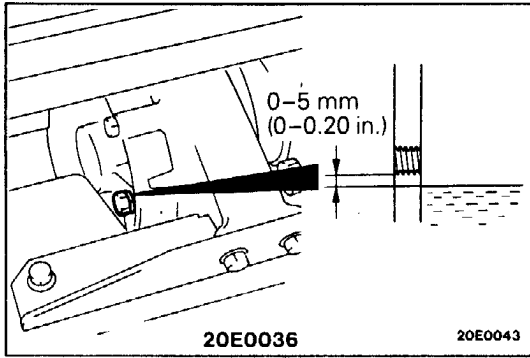


- (4) Extreme shape distortion (dents in strands, steel core protruding, twists tightening), or corrosion.



- (5) Abnormality in caulked section and connection of hook and wire rope.
- (6) Warped (bent hook), cracked or severely eroded item.

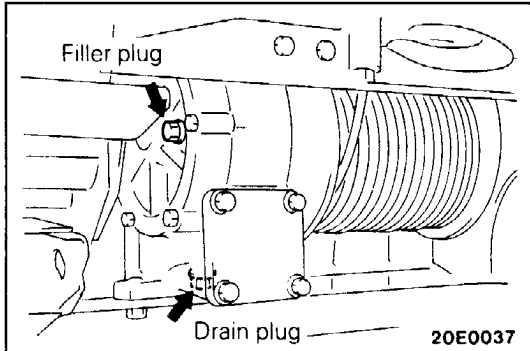




WINCH OIL INSPECTION

E51FEAB

- (1) Remove the filler plug and check that there is oil in the place shown in the illustration.
- (2) Check that the oil is not excessively dirty, and that it has sufficient viscosity.
- (3) Install the filler plug.



WINCH OIL REPLACEMENT

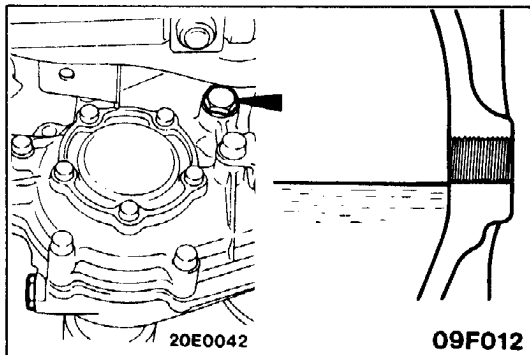
E51FFAA

- (1) Remove the drain plug and filler plug to drain the oil.
- (2) Install the drain plug and pour in the oil.

Specified lubricants: Hypoid gear oil API classification GL-4 or higher SAE viscosity No. 75W-90 or 75W-85W

Quantity: 0.75 dm³ (0.79 U.S. qts., 0.66 Imp. qts.)

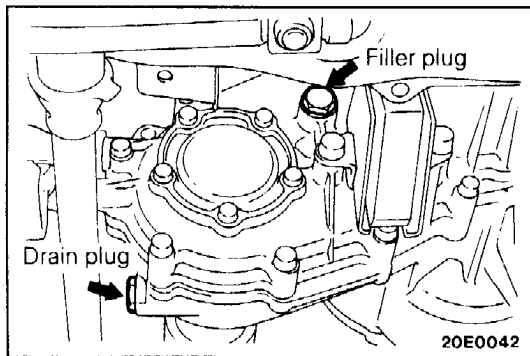
- (3) Install the filler plug.



P.T.O. OIL INSPECTION

E51FBAB

- (1) Remove the transfer filler plug and check that there is oil in the place shown in the illustration.
- (2) Check that the oil is not excessively dirty, and that it has sufficient viscosity.
- (3) Install the filler plug.



P.T.O OIL REPLACEMENT

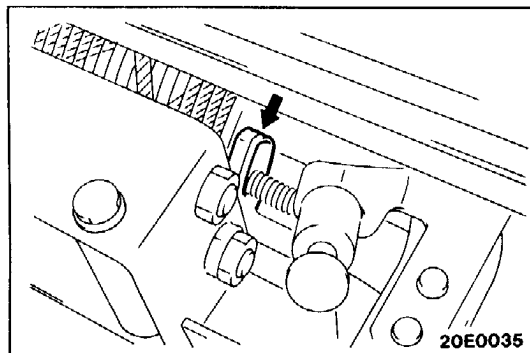
E51FGAA

- (1) Remove the transfer drain plug and filler plug to drain the oil.
- (2) Install the drain plug and pour in the oil.

Specified lubricants: Hypoid gear oil API classification GL-4 or higher SAE viscosity No. 75W-90 or 75W-85W

Quantity: 2.7 dm³ (2.85 U.S. qts., 2.38 Imp. qts.) [including 0.4 dm³ (0.42 U.S. qts., 0.35 Imp. qts.) for P.T.O.]

- (3) Install the filler plug.



WINCH BRAKE SHOE LINING INSPECTION

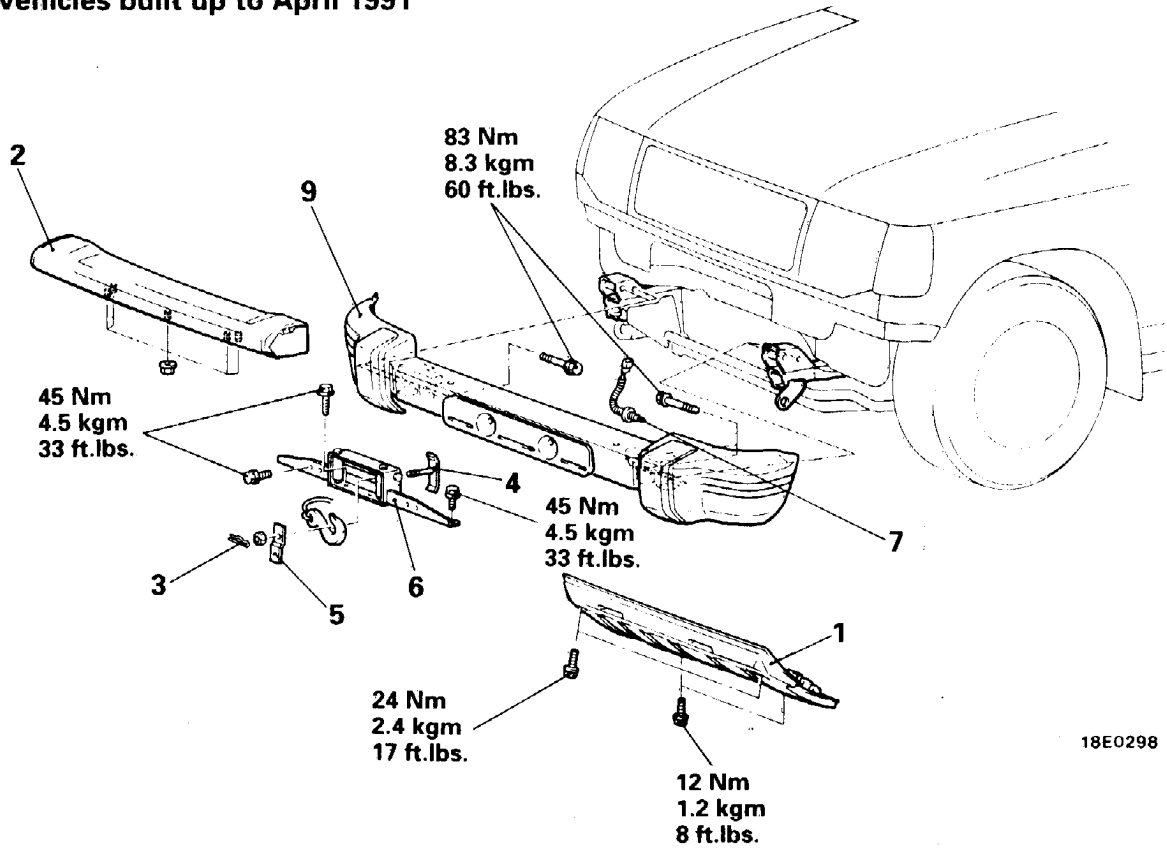
E51FDAB

Remove the brake shoe from the clutch and check that the thickness of the lining is at the limit or higher.

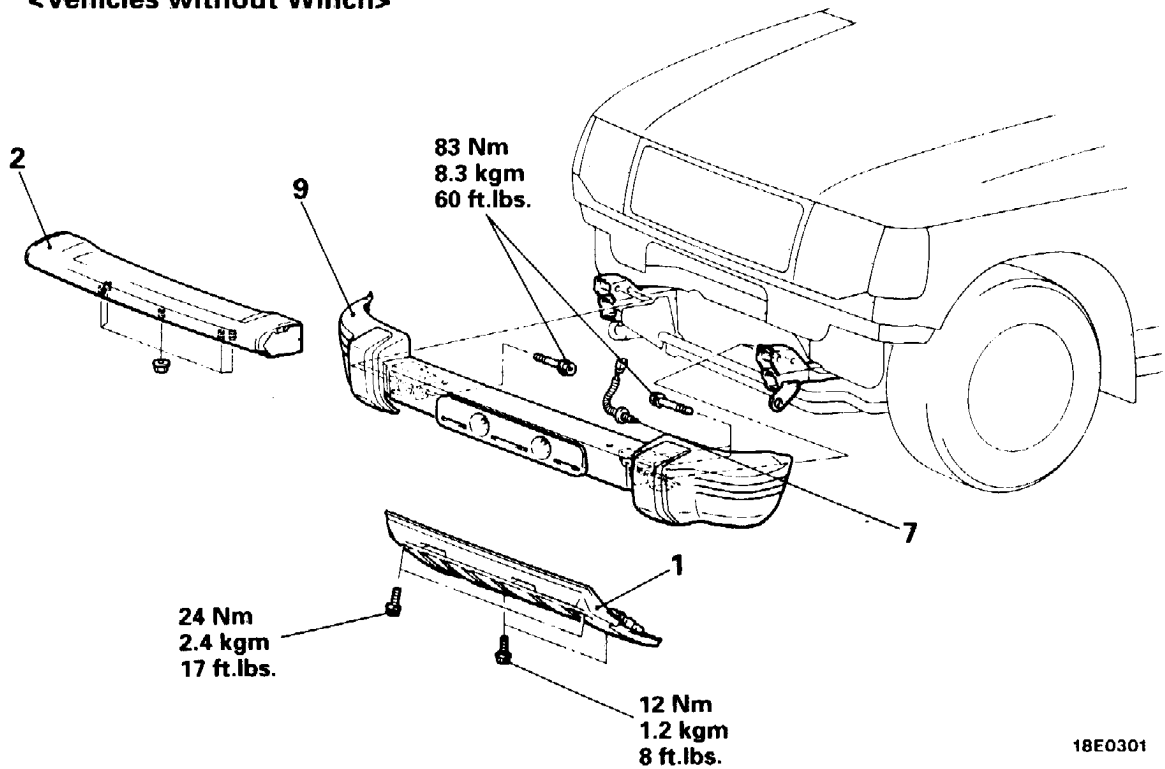
Limit: 4.0-4.5 mm (0.157-0.177 in.)

FRONT BUMPER REMOVAL AND INSTALLATION

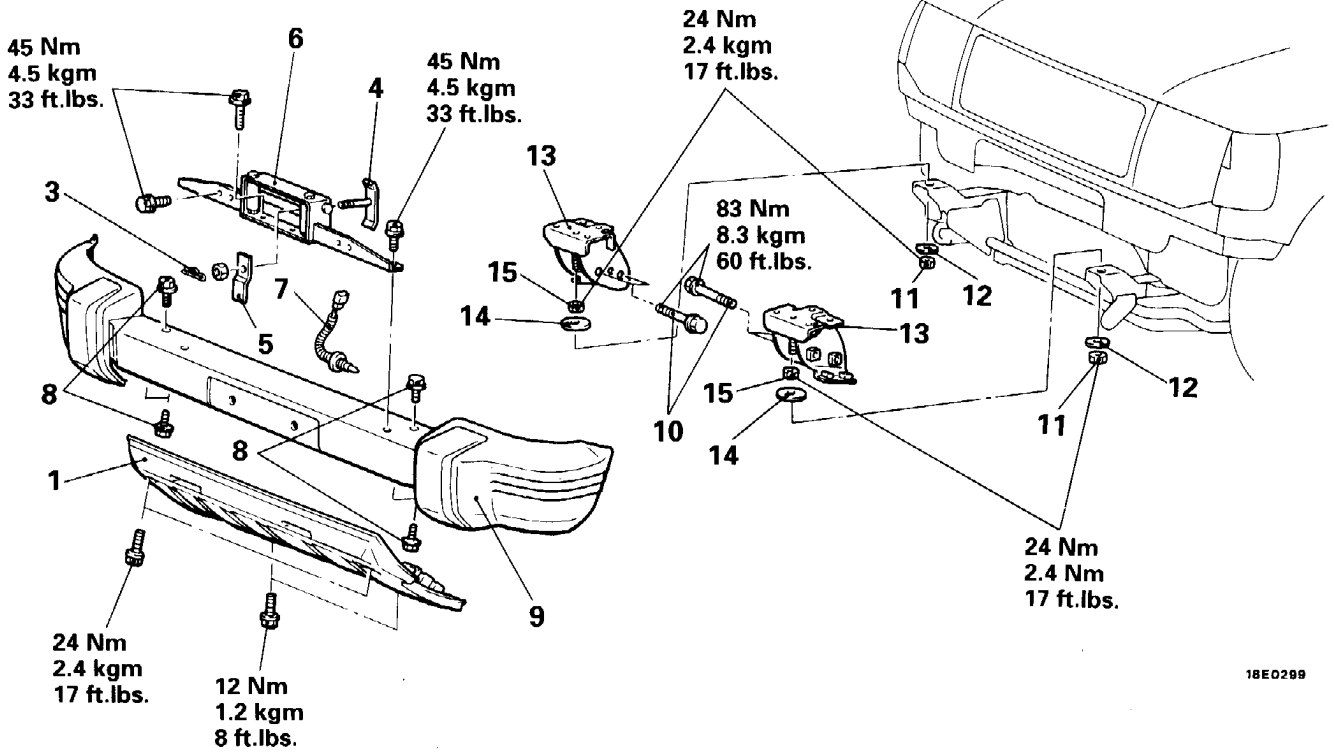
Vehicles built up to April 1991



Vehicles built from May 1991
<Vehicles without Winch>



<Vehicles with Winch>



18E0289

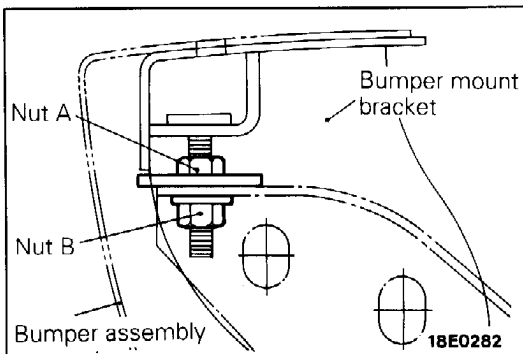
Removal steps

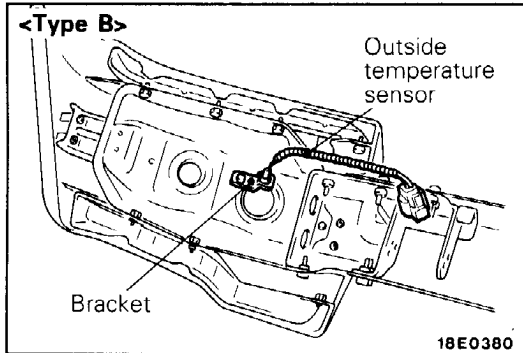
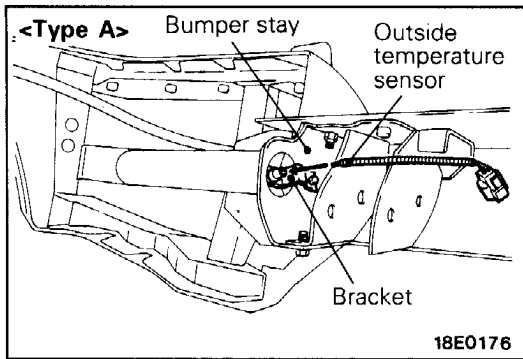
- | | | | |
|--|-----------------------------|--------------------------------|-------------------------|
| 1. Skid plate | | 8. Bolts <Vehicles with Winch> | |
| 2. Bumper garnish <Vehicles without Winch> | | 9. Bumper assembly | |
| 3. Inner pin | | 10. Bumper mount bracket bolts | |
| 4. Guide roller stopper | } <Vehicles with Winch> | ◆◆ 11. Nut B | } <Vehicles with Winch> |
| 5. Rope hook stopper | | ◆◆ 12. Washers | |
| 6. Roller guide assembly | ◆◆ 13. Bumper mount bracket | | |
| ◆◆ 7. Outside temperature sensor <Vehicles with Multi-meter> | ◆◆ 14. Washers | | |
| | ◆◆ 15. Nut A | | |

SERVICE POINTS OF INSTALLATION

15. INSTALLATION OF NUT A/14. WASHERS/13. BUMPER MOUNT BRACKET/12. WASHERS/11. NUT B

Provisionally install the bumper mount bracket, and then adjust the fitting of the bumper assembly and the body with a nut A.

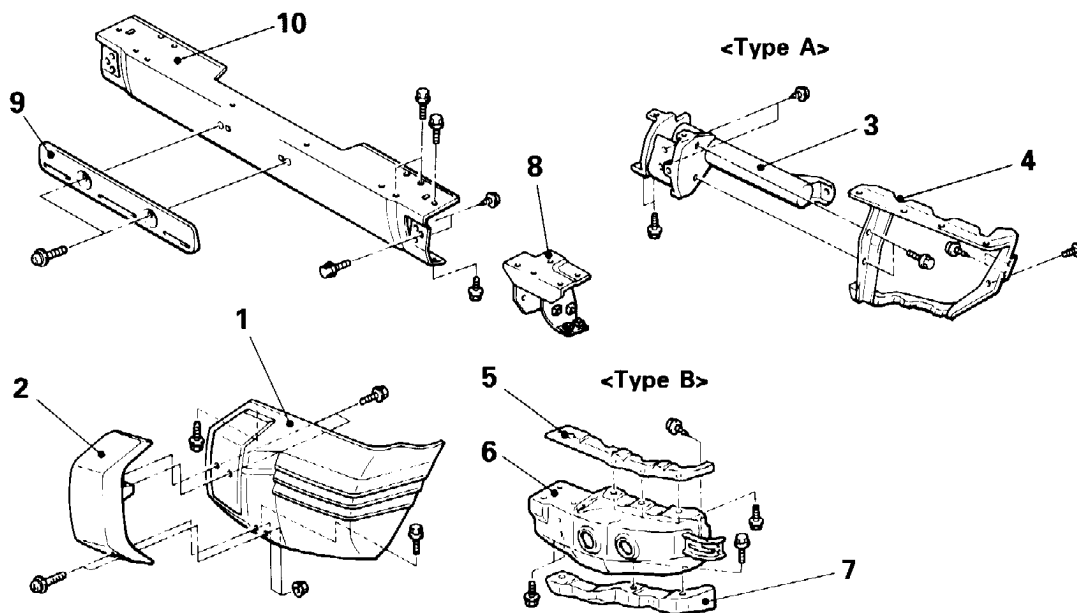




7. INSTALLATION OF OUTSIDE TEMPERATURE SENSOR <Vehicles with Multi-meter>

When installing the bumper assembly, insert the sensor section of the outside temperature sensor into the bracket hole installed.

DISASSEMBLY AND REASSEMBLY



18E0393

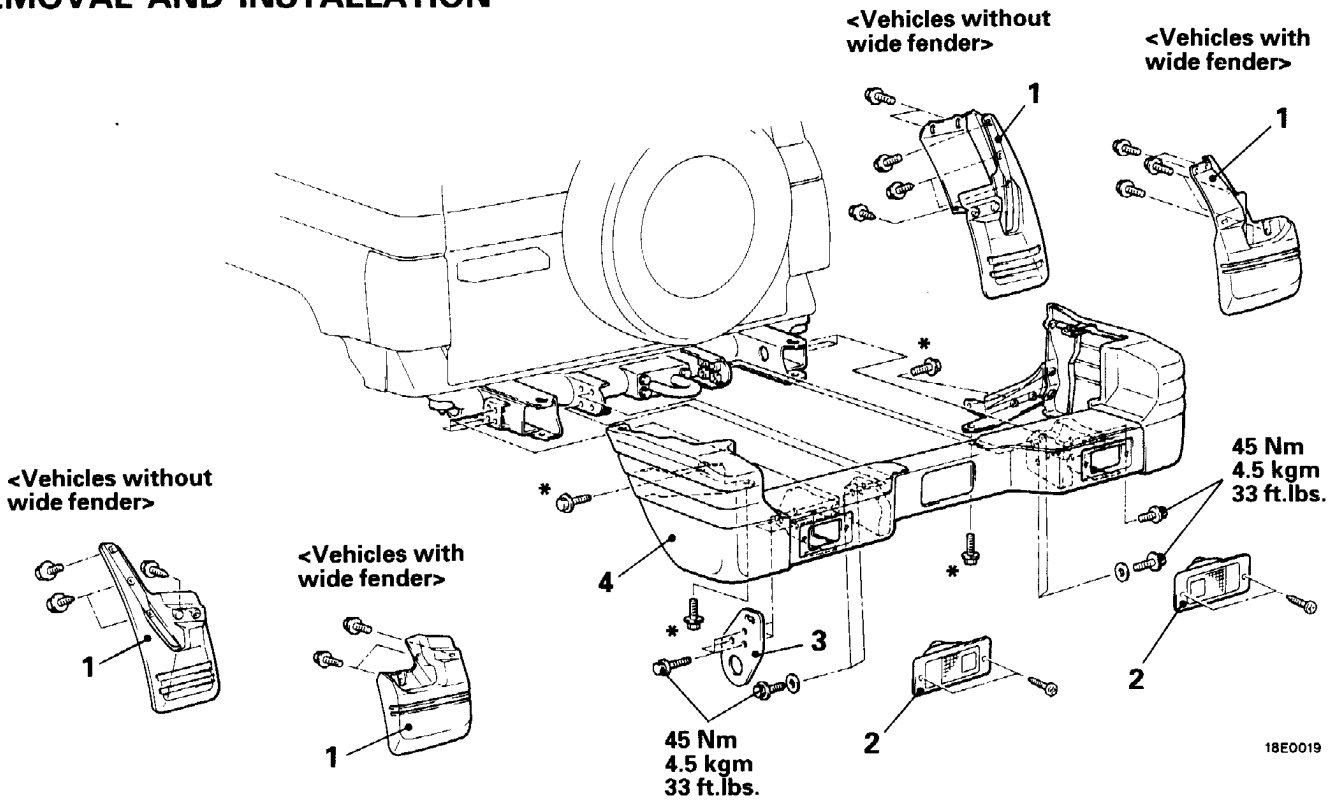
Disassembly steps

1. Bumper side face
2. Bumper guard
3. Bumper stay
4. Bumper side reinforcement
5. Bumper side upper reinforcement
6. Bumper side lower reinforcement
7. Bumper side reinforcement
8. Bumper mount bracket <Vehicles without winch>
9. Licence plate bracket
10. Bumper center face

REAR BUMPER

E51GABJ

REMOVAL AND INSTALLATION



Removal steps

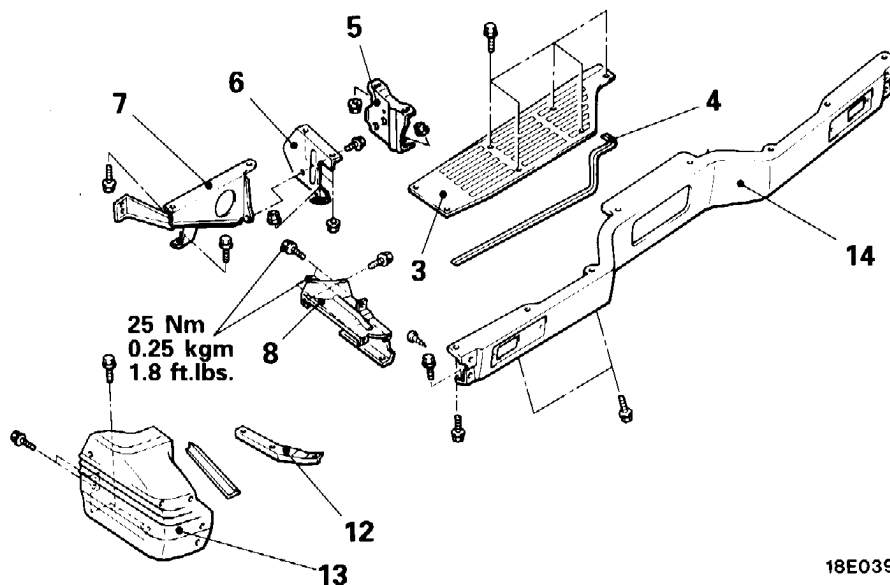
1. Rear mud guard
2. Rear combination lamp
3. Hook bracket
4. Bumper assembly

NOTE

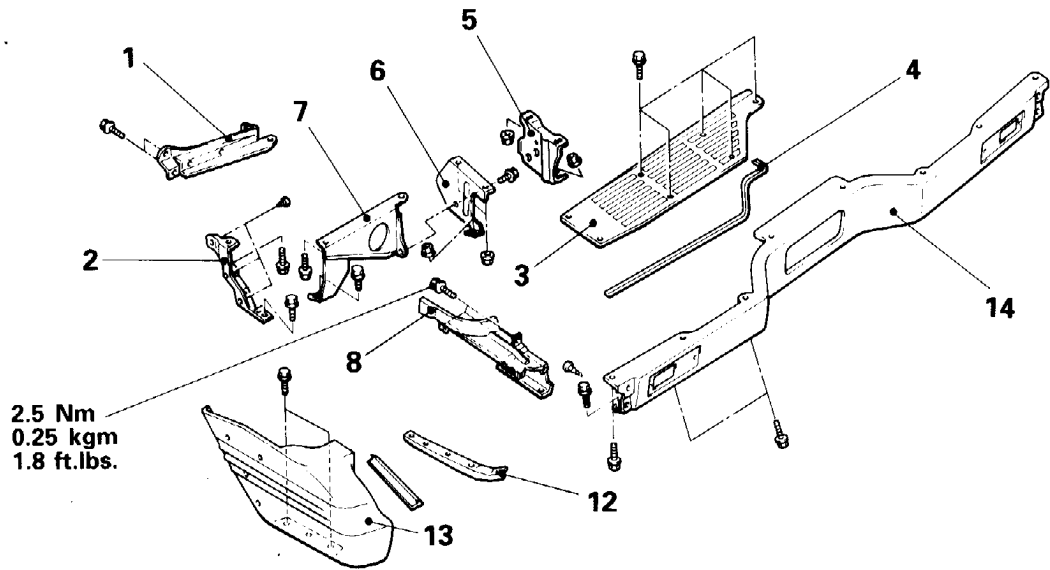
Mounting bolts marked with * are for use on the standard body vehicles only.

DISASSEMBLY AND REASSEMBLY

<Long wheelbase>

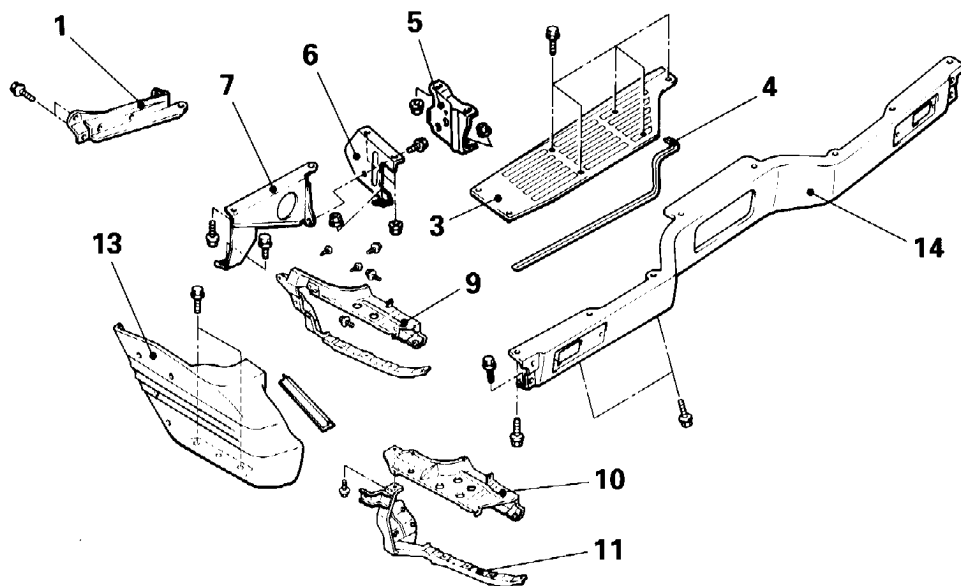


<Standard wheelbase – Type A>



18E0395

<Standard wheelbase – Type B>



18E0396

Removal steps

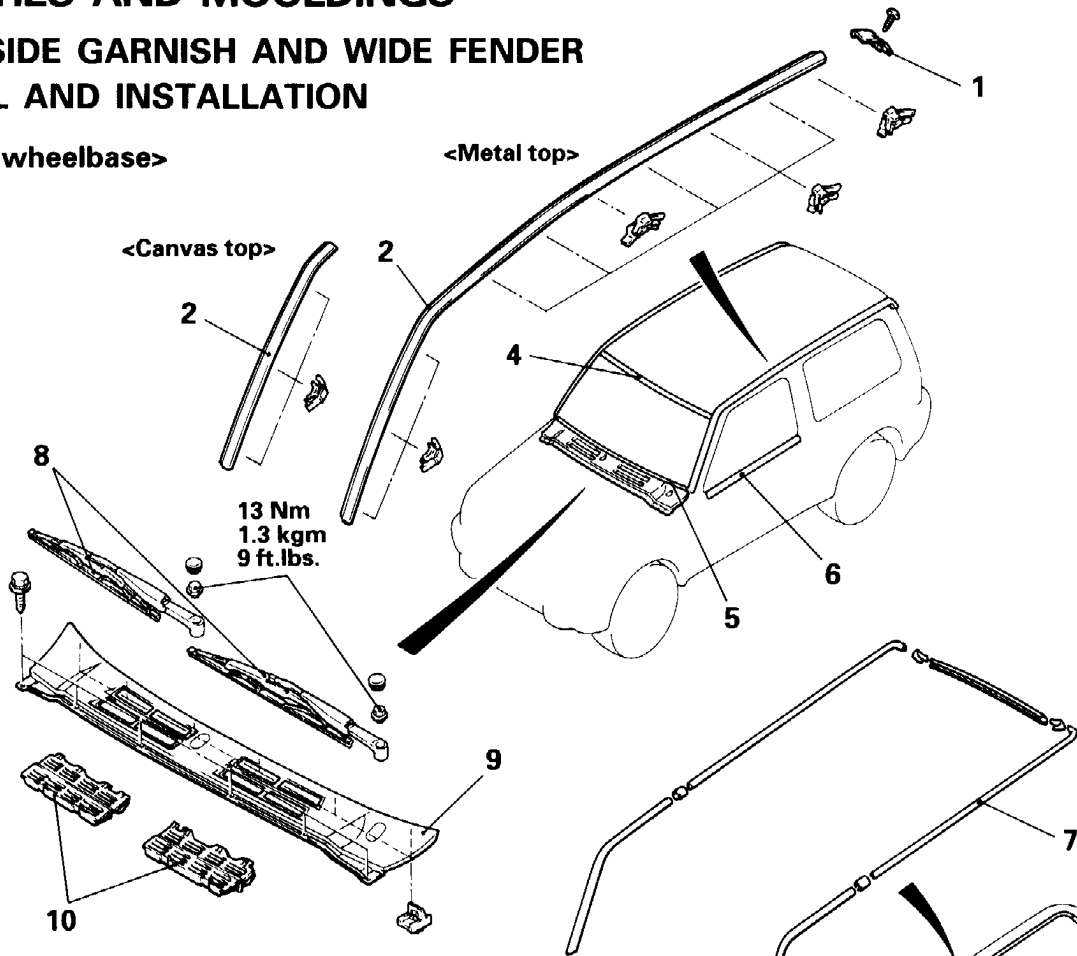
1. Bumper side front stay
2. Bumper side front reinforcement
3. Bumper step plate
4. Weatherstrip
5. Bumper stay A
6. Bumper stay B
7. Bumper reinforcement
8. Bumper side upper reinforcement
9. Bumper side reinforcement
<Vehicles without wide fender>
10. Bumper side upper reinforcement
<Vehicles with wide fender>
11. Bumper side lower reinforcement
<Vehicles with wide fender>
12. Bumper side lower reinforcement
13. Bumper side face
14. Bumper center face

E51ICAN

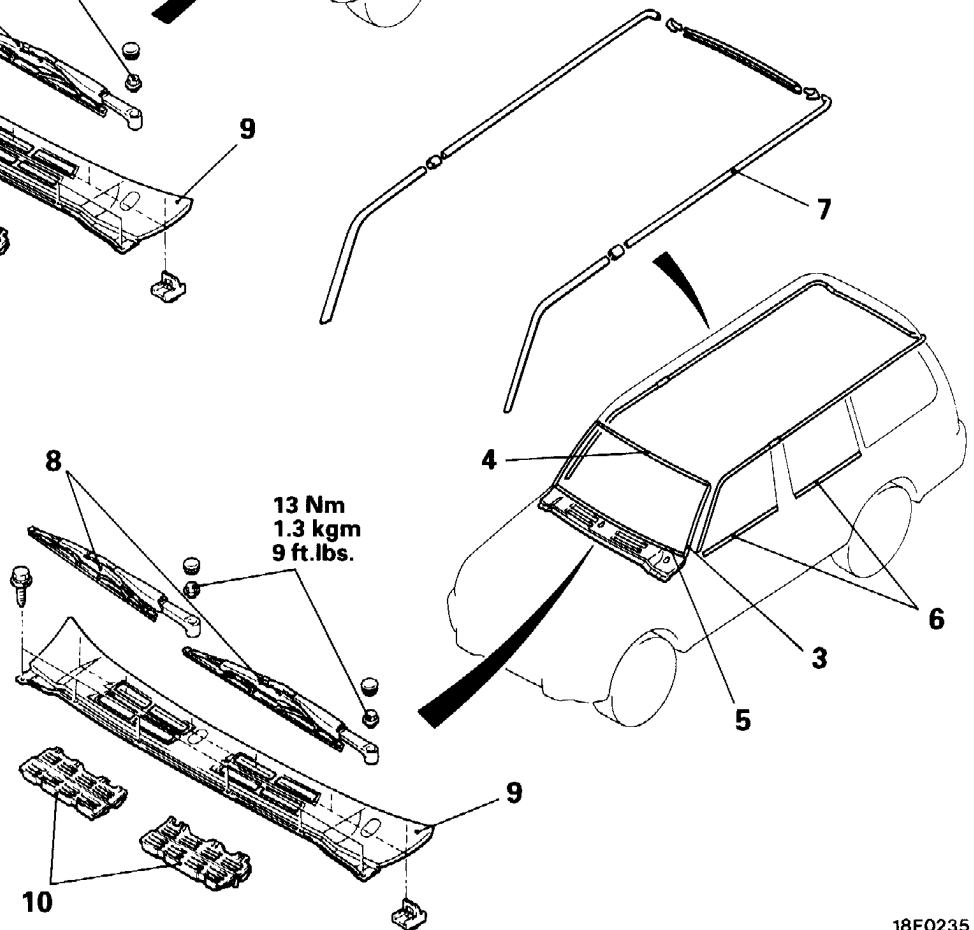
GARNISHES AND MOULDINGS

**EXCEPT SIDE GARNISH AND WIDE FENDER
REMOVAL AND INSTALLATION**

<Standard wheelbase>



<Long wheelbase>

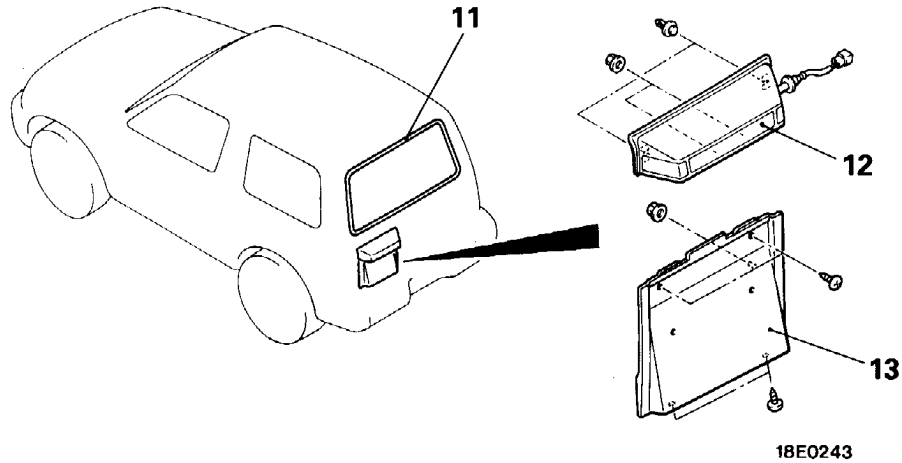


Removal steps of roof drip moulding

1. Roof drip cover
 2. Roof drip moulding
 3. Windshield side moulding
 4. Windshield upper moulding
 5. Windshield lower moulding
 6. Belt line moulding
 7. Drip moulding
- [Refer to GROUP 42–
Windshield Glass.]
- [Refer to GROUP 42–Window Glass
Runchannel and Door Opening Weatherstrip.]

Removal steps of front deck garnish

- Hood [Refer to GROUP 42–Hood.]
- 8. Wiper arm assembly
- 9. Front deck garnish
- 10. Air intake garnish



11. Back door window glass moulding
[Refer to GROUP 42–Back Door Window Glass.]

Removal steps of licence lamp garnish

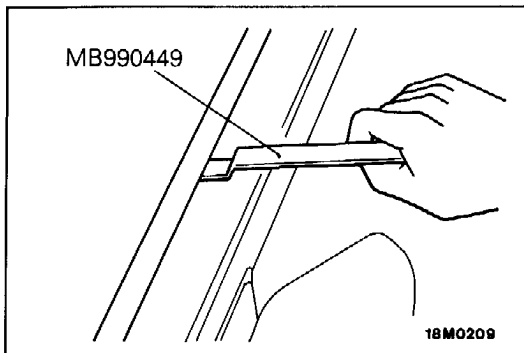
- Back door trim
[Refer to GROUP 42–Back Door Trim and Waterproof Film.]
12. Licence lamp garnish

Removal steps of licence plate garnish

13. Licence plate garnish

NOTE

For roof drip moulding on vehicles with roof rail, refer to P.51–17.



SERVICE POINT OF REMOVAL

2. REMOVAL OF ROOF DRIP MOULDING

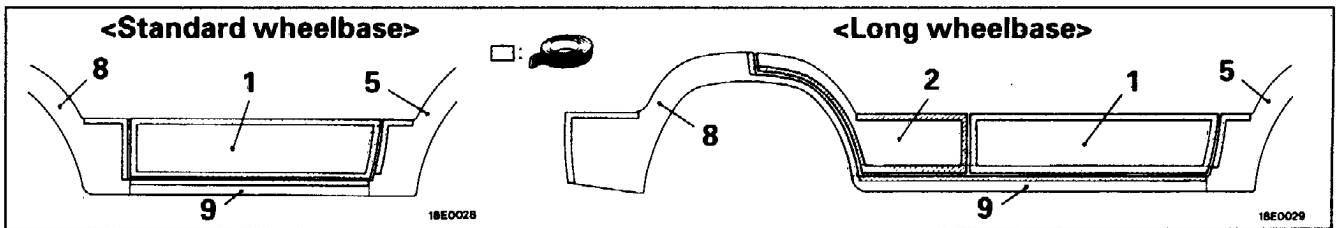
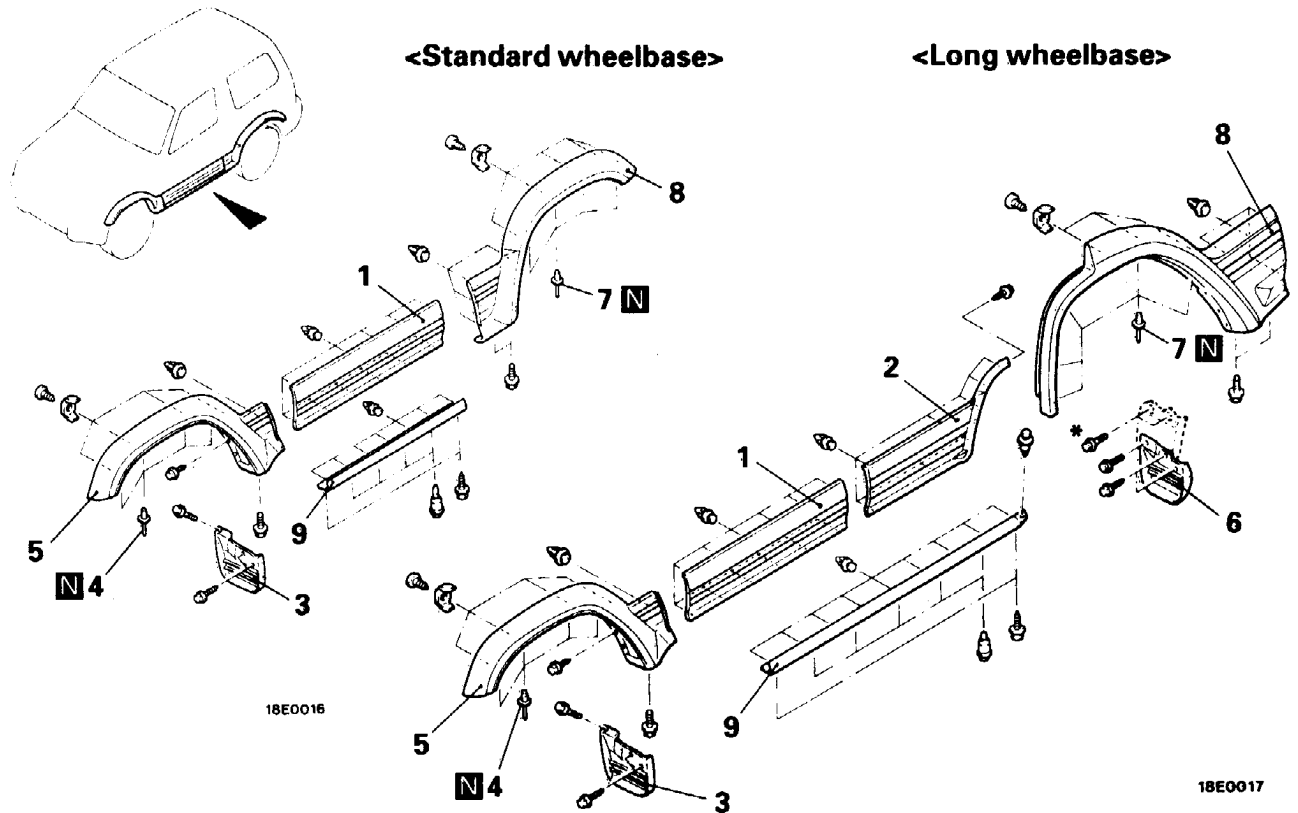
Use the special tool to lever out each moulding.

Caution

Mouldings that become warped should not be re-used.

**SIDE GARNISH AND WIDE FENDER
REMOVAL AND INSTALLATION**

E51CA0



Adhesive tape: Both-side tape 7 mm (0.28 in.) wide and 1.2 mm (0.05 in.) thick

Removal steps of front door side garnish

- ◆◆ ◆◆ 1. Front door side garnish

Removal steps of rear door side garnish

- ◆◆ ◆◆ 2. Rear door side garnish

Removal steps of front flare

- ◆ ◆ Splash shield (Refer to GROUP 42-Fender.)
- ◆◆ ◆◆ 3. Front mud guard
- ◆◆ ◆◆ 4. Blind rivet
- ◆◆ ◆◆ 5. Front flare

Removal steps of rear flare

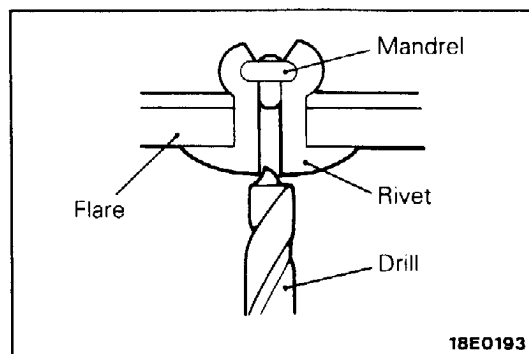
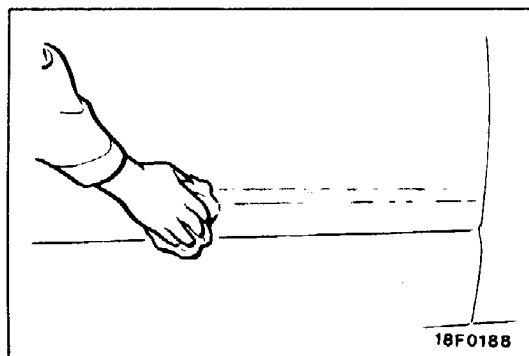
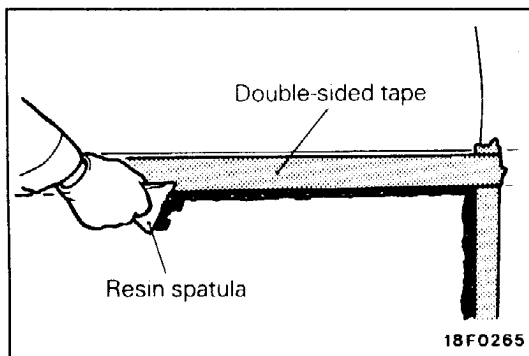
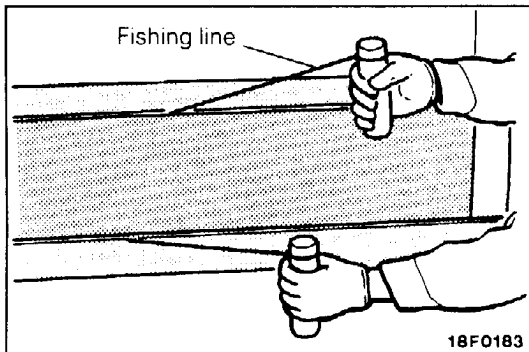
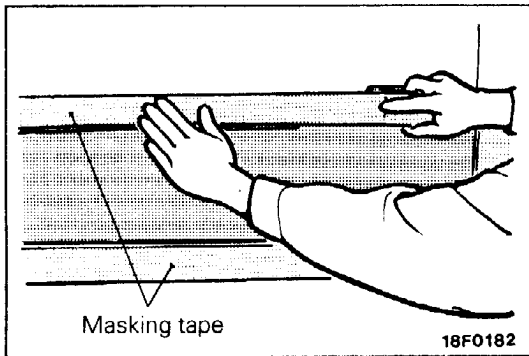
- ◆◆ ◆◆ 6. Rear mud guard <Long wheelbase>
- ◆◆ ◆◆ 7. Blind rivet
- ◆◆ ◆◆ 8. Rear flare

Removal steps of side sill garnish

- ◆◆ ◆◆ 5. Front flare
- ◆◆ ◆◆ 8. Rear flare <Standard wheelbase>
- ◆◆ ◆◆ 9. Side sill garnish

NOTE

Mounting bolts with * marks indicate R.H. side only.



SERVICE POINTS OF REMOVAL

1. REMOVAL OF FRONT DOOR SIDE GARNISH/2. REAR DOOR SIDE GARNISH/5. FRONT FLARE/8. REAR FLARE/9. SIDE SILL GARNISH

(1) Apply masking tape to the outside circumference of each side garnish.

(2) Insert a fishing line [$\phi 0.8$ mm (0.03 in.)] in between the body and the side garnish, and pull both ends alternately to cut the adhesive section and remove the side garnish.

(3) Pull the section of the side garnish with the clips towards you to remove the clips.

Caution

1. When reusing the side garnish, remove by pulling the fishing line along the edge of the body so as not to damage the edge of the side garnish.

2. If the adhesive is difficult to remove, heat it to 40°C (104°F).

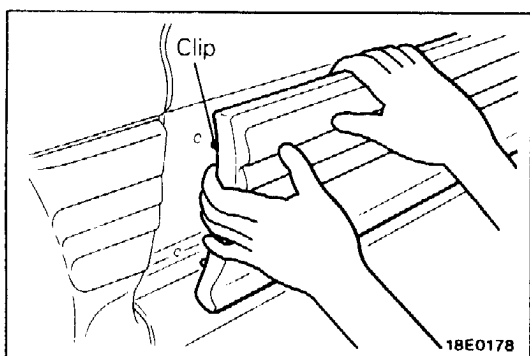
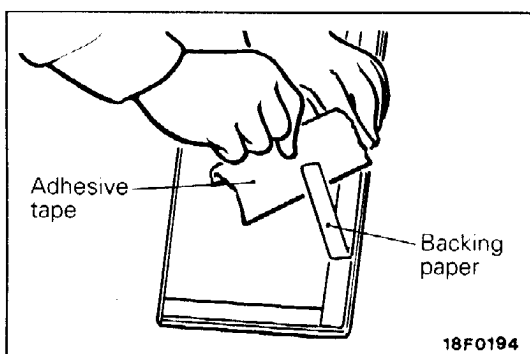
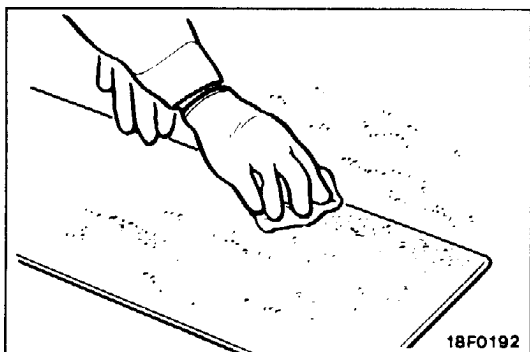
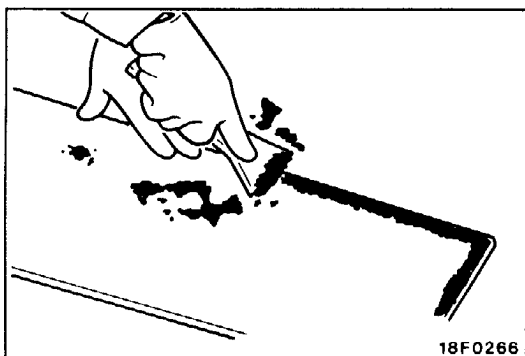
(4) Scrape off the double-sided adhesive tape with a resin spatula.

(5) Tear off the masking tape.

(6) Wipe the body surface clean with a rag moistened with isopropyl alcohol.

4./7. REMOVAL OF BLIND RIVETS

Use a drill [$\phi 4.0$ – 5.5 mm (0.16–0.22 in.)] to break the rivet by drilling a hole, and remove the blind rivet.



SERVICE POINTS OF INSTALLATION

9. INSTALLATION OF SIDE SILL GARNISH/8. REAR FLARE/5. FRONT FLARE/2. REAR DOOR SIDE GARNISH/1. FRONT DOOR SIDE GARNISH

- **Attachment of double-sided tape to each side garnish (when reusing)**

(1) Scrape off the double-sided adhesive tape with a resin spatula or gasket scraper.

(2) Wipe the body surface clean with a rag moistened with isopropyl alcohol.

(3) Heat the adhesive surface of the double-sided tape on the side protector moulding to about 40–60°C (104–140°F).

(4) Attach specified double-sided adhesive tape to each side garnish.

**Adhesive tape: Double-sided tape
7 mm (0.28 in.) wide and
1.2 mm (0.05 in.) thick**

- **Installation of each side garnish**

(1) Tear off the double-sided tape backing paper.

NOTE

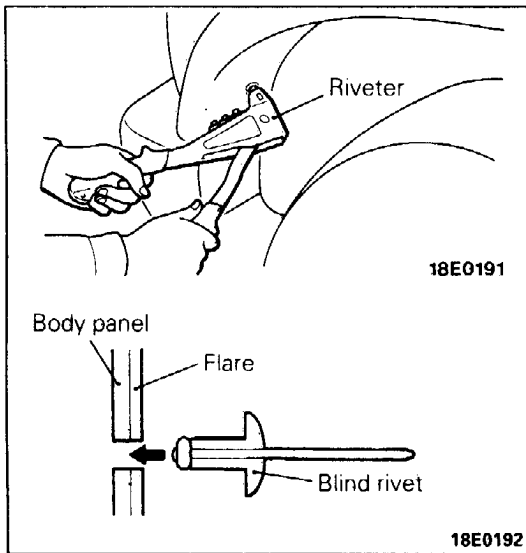
If you attach part of the adhesive tape to the edge of the backing paper, it will be easy to tear off.

(2) Install the side garnish so that the clips match the body holes.

NOTE

If the double-sided adhesive tape is difficult to affix during winter, etc., warm the bonding surfaces of the body and the side garnishes to about 40–60°C (104–140°F) before affixing the tape.

(3) Firmly press in the side garnish.



7./4. INSTALLATION OF BLIND RIVETS

Use a riveter to connect the blind rivet.

EXTERIOR PARTS

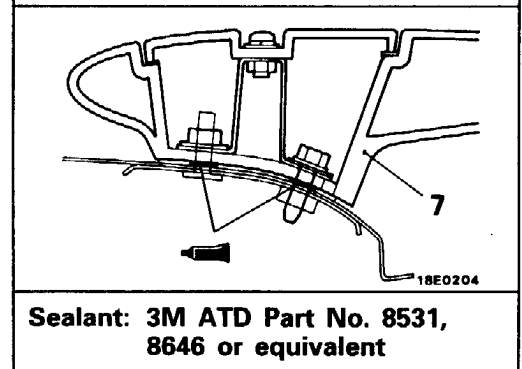
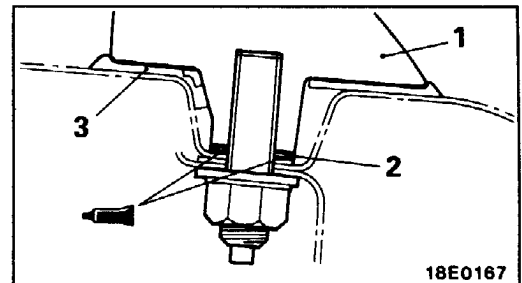
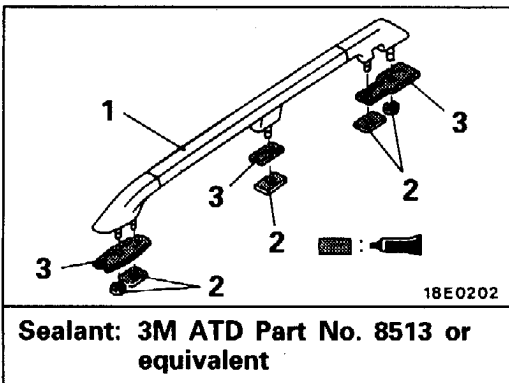
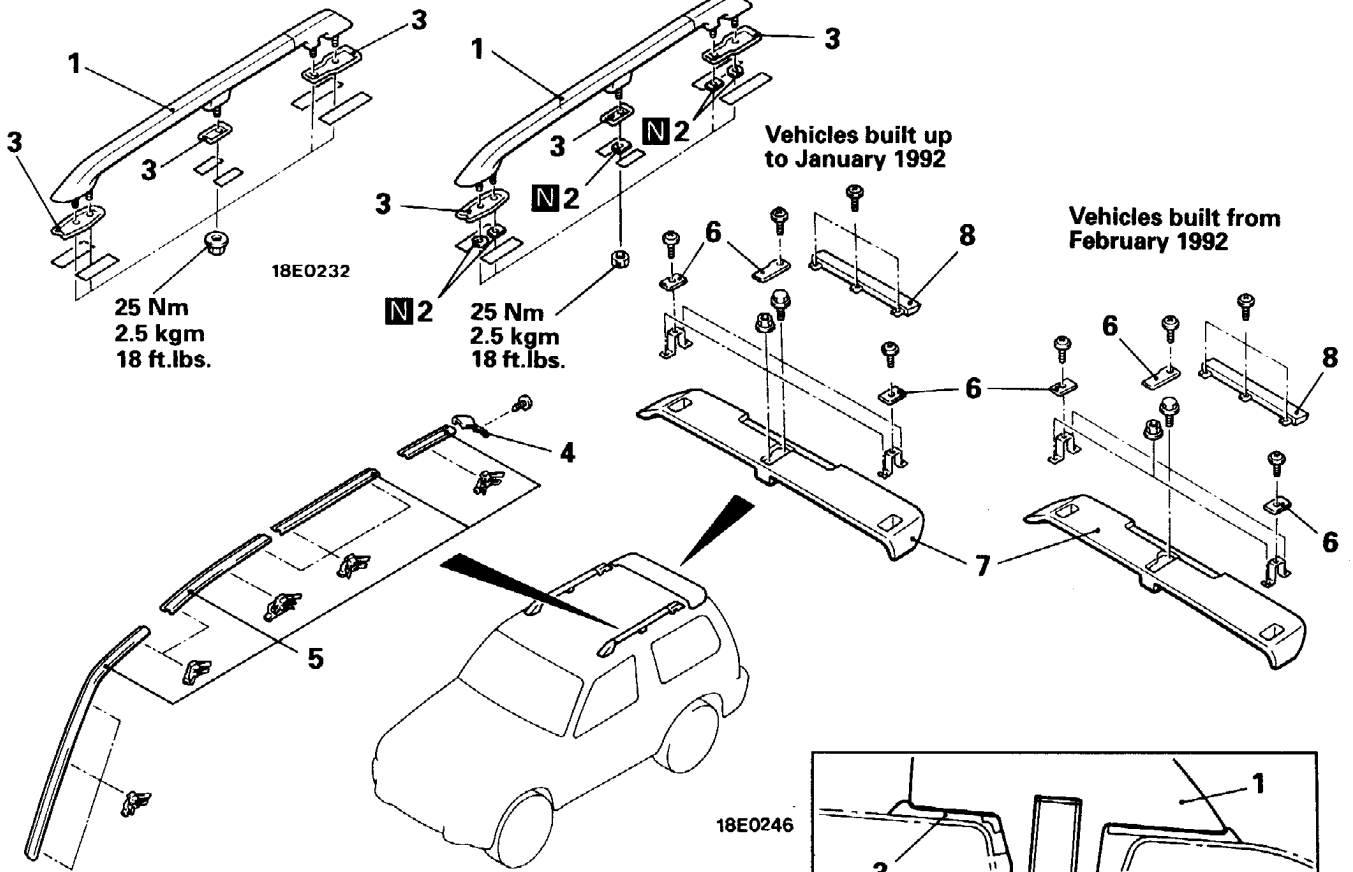
**ROOF RAIL AND ROOF SPOILER
REMOVAL AND INSTALLATION**

Vehicles built from March 1991

Vehicles built up to February 1991

Vehicles built up to January 1992

Vehicles built from February 1992

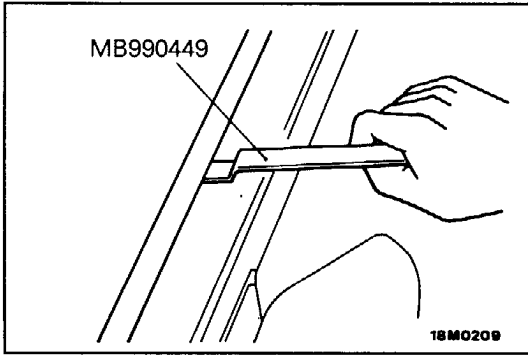


Removal steps of roof rail and roof drip moulding

- Headlining (Refer to GROUP 52-Headlining.)
- 1. Roof rail
- 2. Packing
- 3. Packing
- 4. Roof drip cover
- 5. Roof drip moulding

Removal steps of roof spoiler

- 6. Cap
- 7. Roof spoiler
- 8. Cover



SERVICE POINT OF REMOVAL

5. REMOVAL OF ROOF DRIP MOULDING

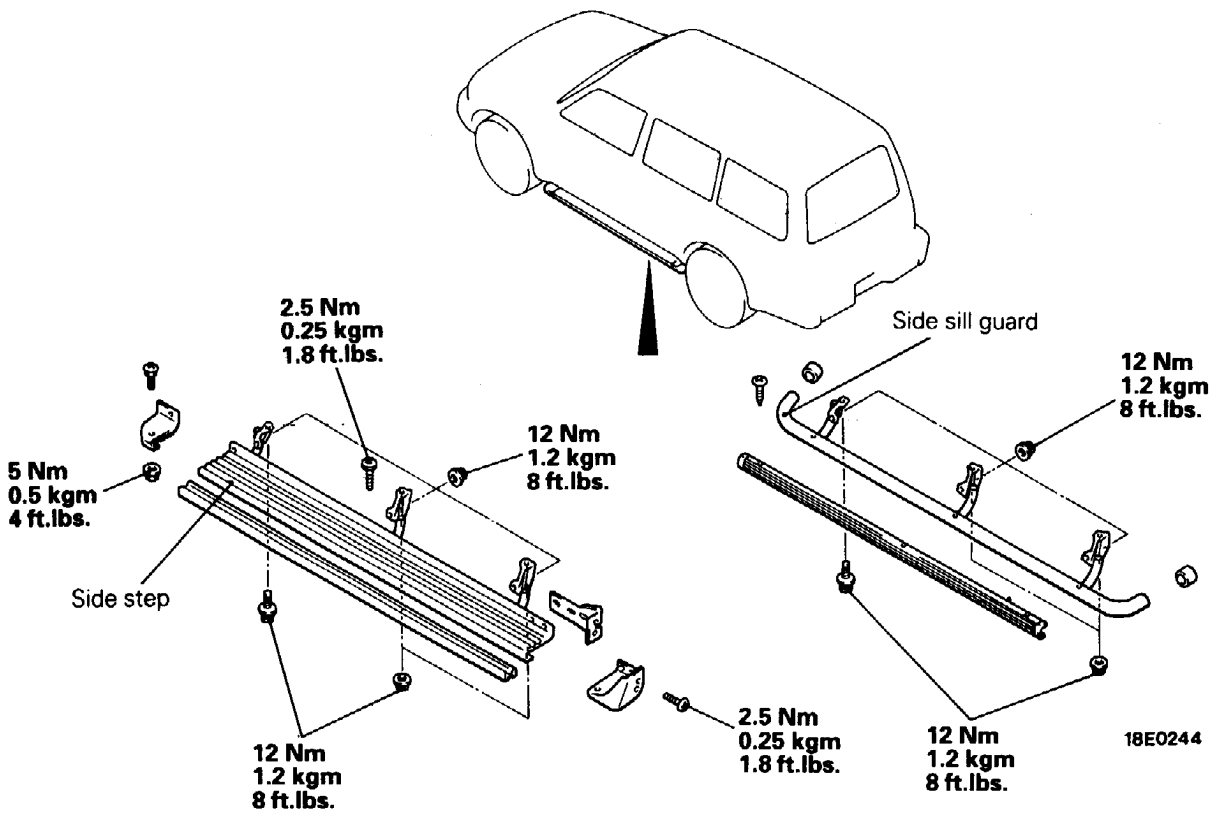
Use the special tool to lever out the moulding.

Caution

If the moulding has become warped, it should not be re-used.

**SIDE STEP AND SIDE SILL GUARD
REMOVAL AND INSTALLATION**

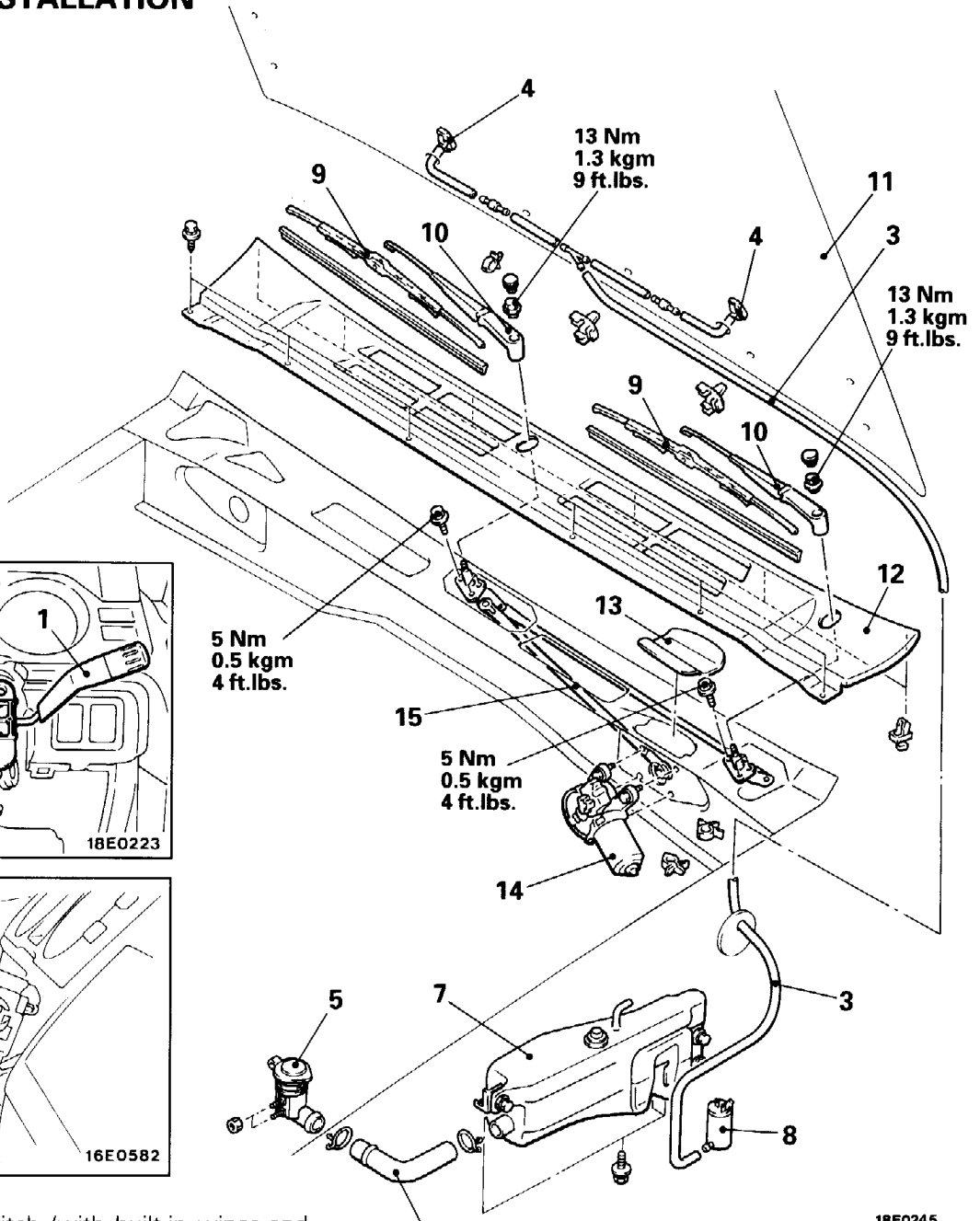
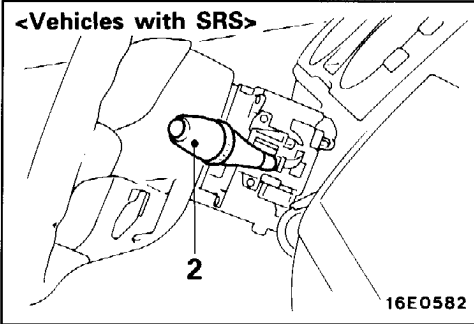
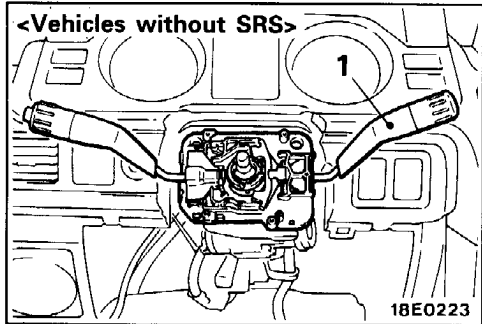
E51TAAB



WINDSHIELD WIPER AND WASHER

E51KCAE

REMOVAL AND INSTALLATION



1. Column switch (with built-in wiper and washer switch, and wiper relay)
[Refer to GROUP 54–Column Switch.]

2. Wiper and washer switch
[Refer to P.51-21]

3. Washer tube

4. Washer nozzle

◆◆ 9. Wiper blade

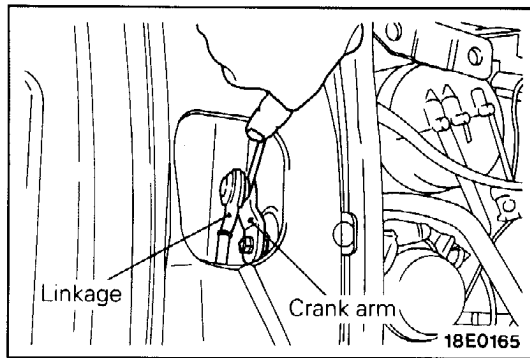
◆◆ 10. Wiper arm
◆◆ 14. Wiper motor

Removal of washer tank

- Splash shield (Refer to GROUP 42–Fender.)
- Draining of washer fluid
- 3. Washer tube
- 5. Cap
- 6. Hose
- 7. Washer tank assembly
- 8. Washer motor

Removal steps of linkage

- ◆◆ 10. Wiper arm
- ◆◆ 11. Hood
- ◆◆ 12. Front deck garnish
- ◆◆ 13. Hole cover
- ◆◆ 14. Wiper motor
- ◆◆ 15. Linkage



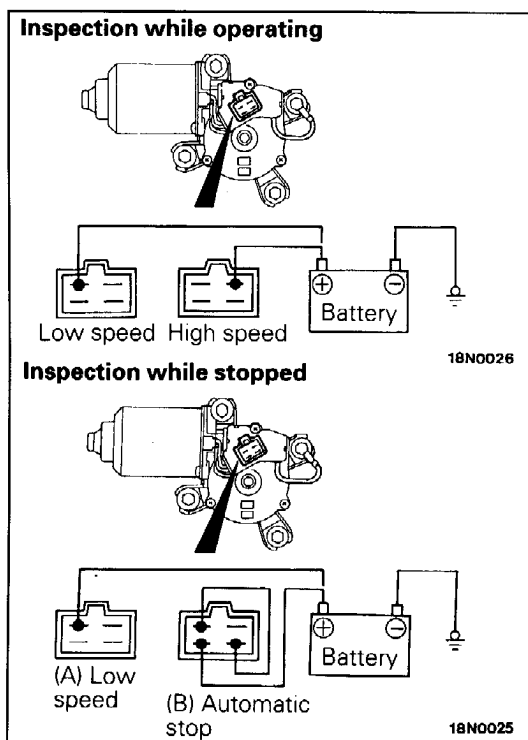
SERVICE POINTS OF REMOVAL

14. REMOVAL OF WIPER MOTOR

Loosen the wiper motor assembly mounting bolts, and then remove the wiper motor assembly. Disconnect the linkage and the motor assembly, and then remove the linkage.

Caution

Because the installation angle of the crank arm and the motor has been set, do not remove them unless it is necessary to do so. If they must be removed, remove them only after marking their mounting positions.



INSPECTION WIPER MOTOR

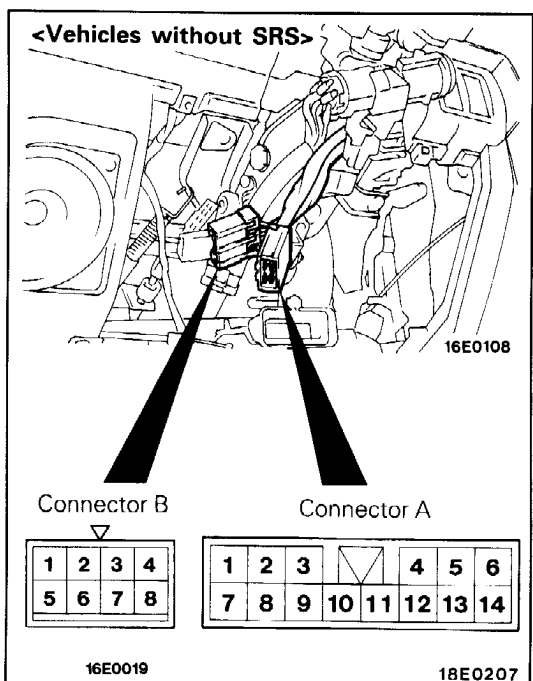
Check the wiper motor after disconnecting the wiring harness connector, and with the wiper motor remaining installed to the body.

Operation of Wiper Motor at Low Speed and High Speed

Connect a battery to the wiper motor as shown in the illustration and inspect motor operation at low speed and high speed.

Operation of Wiper Motor at Stop Position

- (1) Run the wiper motor at low speed, disconnect the battery, and stop the motor.
- (2) Reconnect the battery as shown in the illustration, and confirm that after the motor starts turning at low speed, it stops at the automatic stop position.



COLUMN SWITCH

Wiper and Washer Switch

<Vehicles without SRS>

Disconnect the column switch connector and check the continuity between the terminals for each switch.

		Connector		B			
		A	Terminal	3	4	7	8
Wiper switch	Switch position OFF	5		○	○		
	1 (LO)			○	○		○
	2 (HI)				○		○
Washer switch	ON		○				○

NOTE

○—○ indicates that there is continuity between the terminals.

<Vehicles with SRS>

- (1) Remove the column cover lower.
- (2) Remove the column cover upper.
- (3) Loosen the screws indicated by arrows in the illustration, and then remove the wiper and washer switches.
- (4) Operate the switches to check the continuity between the terminals.

(L.H. drive vehicles)

		Terminal	6	7	8	9	10
		Switch position					
Wiper switch	OFF			○	○		
	1 (LO)				○		○
	2 (HI)					○	○
Washer switch	ON		○				○

(R.H. drive vehicles)

		Terminal	8	9	10	11	12
		Switch position					
Wiper switch	OFF				○	○	
	1 (LO)		○		○		
	2 (HI)		○	○			
Washer switch	ON		○				○

NOTE

○—○ indicates that there is continuity between the terminals.

Intermittent Wiper Relay (Intermittent Operation Inspection)

- (1) Connect the column switch connector.
- (2) Turn the ignition switch to ACC.
- (3) Inspect the intermittent operation time when the wiper switch is turned to INT.

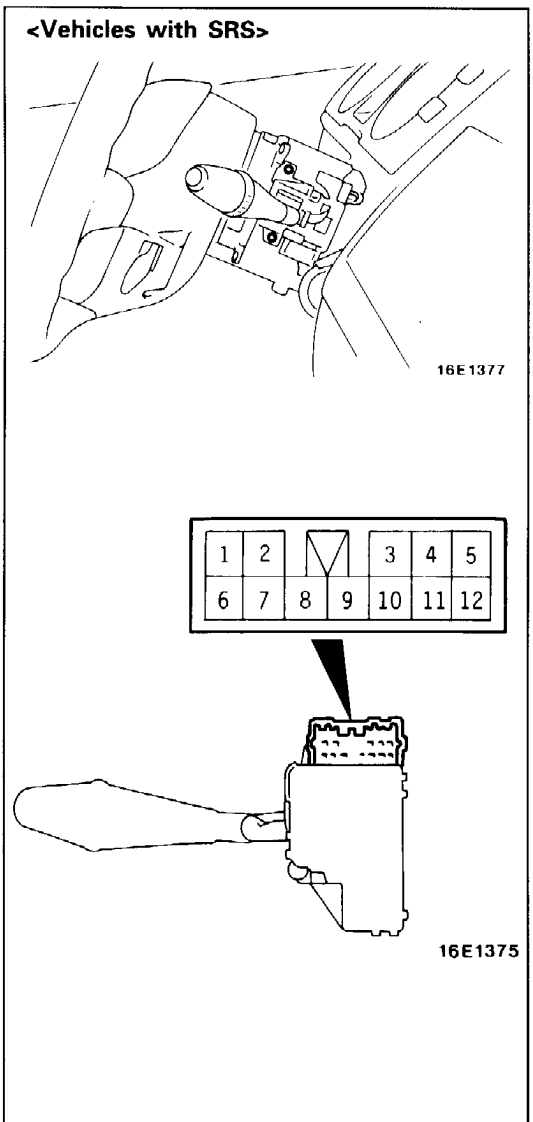
Vehicles without variable intermittent control

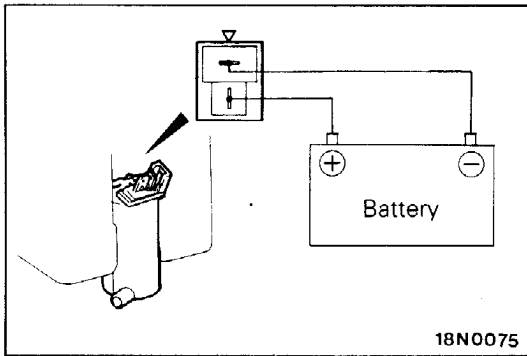
Approx. 3–6 seconds

Vehicles with variable intermittent control

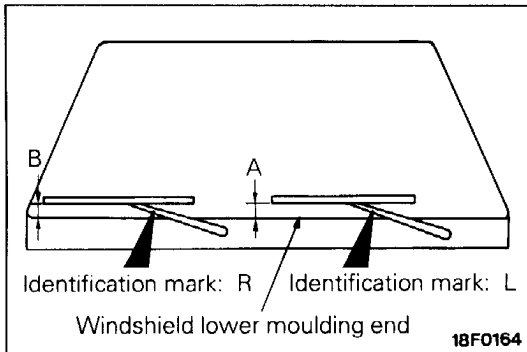
FAST Approx. 3 seconds

SLOW Approx. 12 seconds



**WASHER MOTOR**

- (1) With the washer motor installed to the washer tank, fill the washer tank with water.
- (2) When the battery is connected as shown in the figure, check that the water squirts out strongly.

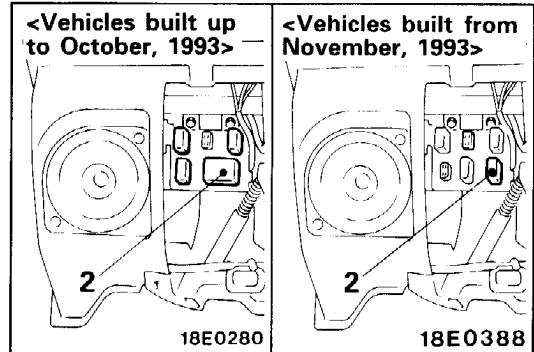
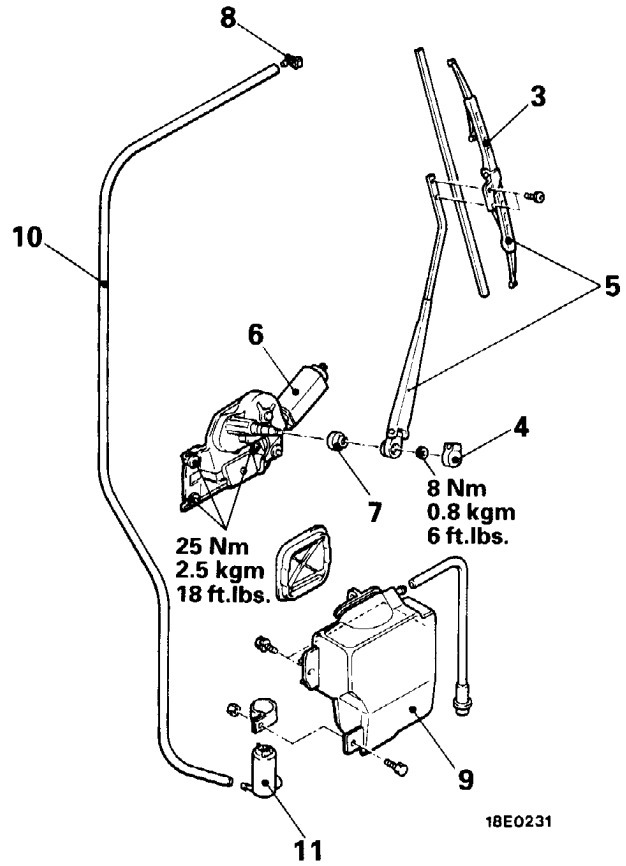
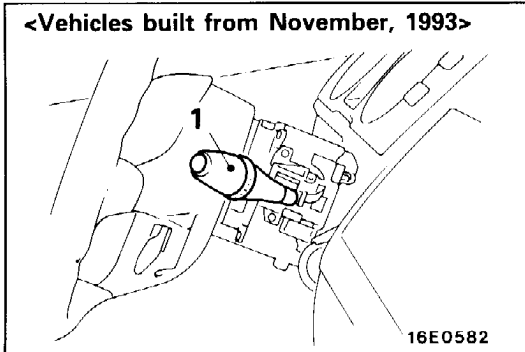
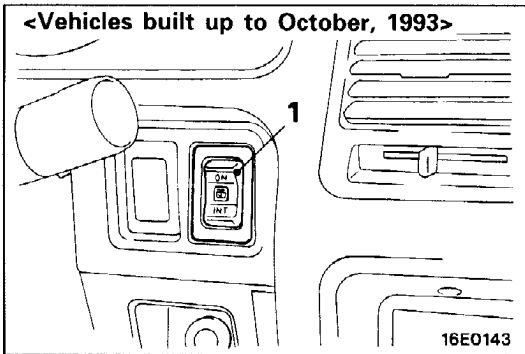
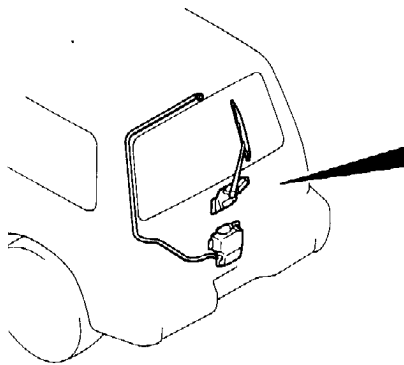
**SERVICE POINTS OF INSTALLATION****10. INSTALLATION OF WIPER ARM/9. WIPER BLADE**

- (1) The movements of the left and right wiper arms are different, so check the identification marks.
- (2) Install the wiper blade in the specified position (standard value) as shown in the illustration.

Standard value (A): 25–35 mm (0.98–1.38 in.)
(B): 35–45 mm (1.38–1.77 in.)

NOTES

**REAR WIPER AND WASHER
REMOVAL AND INSTALLATION**



1. Rear wiper and washer switch
(Refer to GROUP 54 – Column Switch)
<Vehicles built from November, 1993>
3. Wiper blade
8. Washer nozzle

Removal steps of rear intermittent wiper relay

- Instrument under cover
(Refer to GROUP 52–Instrument Panel.)
- 2. Rear intermittent wiper relay

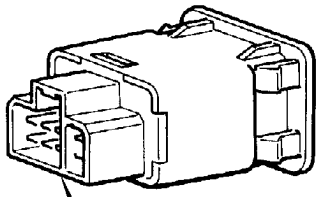
Removal steps of wiper motor

- 4. Cover
- ◆◆ 5. Wiper arm and blade assembly
 - Back door trim (Refer to GROUP 42–Back Door Trim and Waterproof Film.)
- 6. Wiper motor and bracket assembly
- ◆◆ 7. Grommet

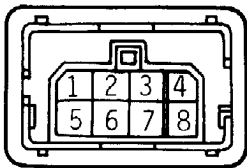
Removal steps of washer tank and motor

- Back door trim (Refer to GROUP 42–Back Door Trim and Waterproof Film.)
- 9. Washer tank assembly
 - Draining of washer fluid
- 10. Washer tube
- 11. Washer motor

<Vehicles built up to October, 1993>



16K2646



16K2536

INSPECTION

REAR WIPER AND WASHER SWITCH

<Vehicles built up to October, 1993>

Operate the switch, and check the continuity between the terminals.

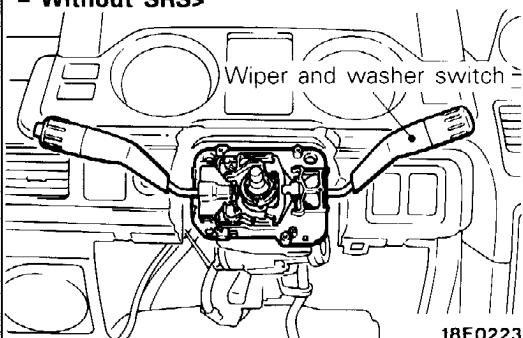
Switch position		Terminal							
		1	2	3	4	5	6	7	8
Wiper switch	ON		○						○
	OFF				○				○
	INT				○				○
Washer switch	ON	○						○	
	OFF		○	○					
Illumination lamp						○		○	○

16A0252

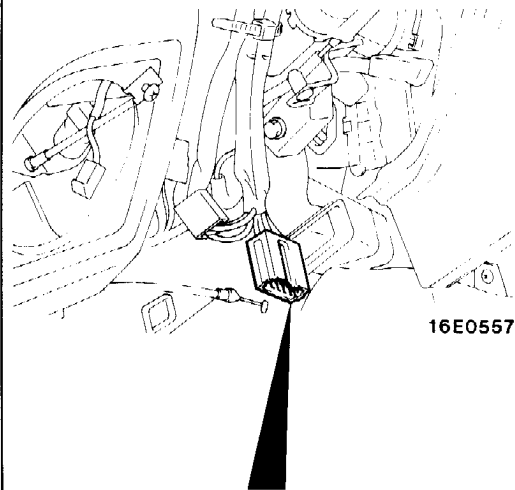
NOTE

○—○ indicates that there is continuity between the terminals.

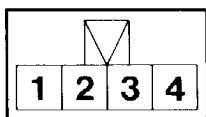
<Vehicles built from November, 1993 - Without SRS>



18E0223



16E0557



16E0555

<Vehicles built from November, 1993 - Without SRS>

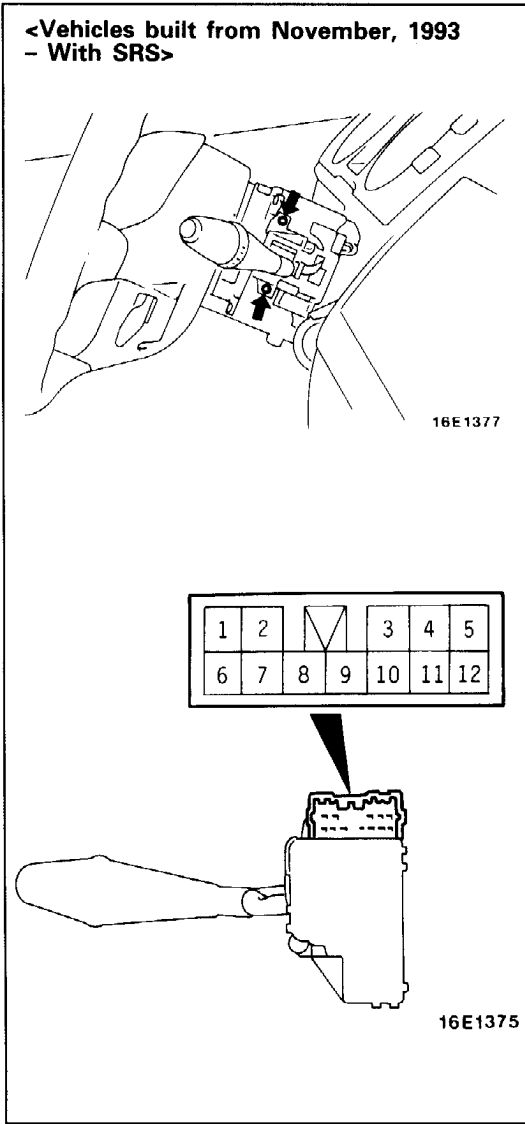
- (1) Remove the instrument under cover.
- (2) Remove the column cover lower.
- (3) Disconnect the wiring connector.

- (4) Operate the switch, and check the continuity between the terminals.

Switch position		Terminal			
		1	2	3	4
Wiper switch	OFF				
	INT	○		○	
	ON	○	○		
Washer switch	ON	○			○

NOTE

○—○ indicates that there is continuity between the terminals.



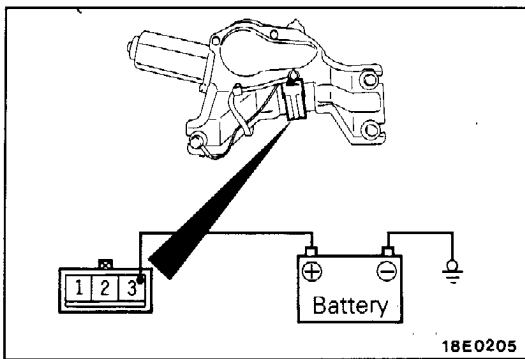
<Vehicles built from November, 1993 – With SRS>

- (1) Remove the column cover lower.
- (2) Remove the column cover upper.
- (3) Loosen the screws indicated by arrows in the illustration, and then remove the rear wiper and washer switches.
- (4) Operate the switch, and check the continuity between the terminals.

Switch position		Terminal			
		2	3	4	10
Wiper switch	OFF				
	INT		○—○		○
	ON			○—○	○
Washer switch	ON	○			○

NOTE

○—○ indicates that there is continuity between the terminals.

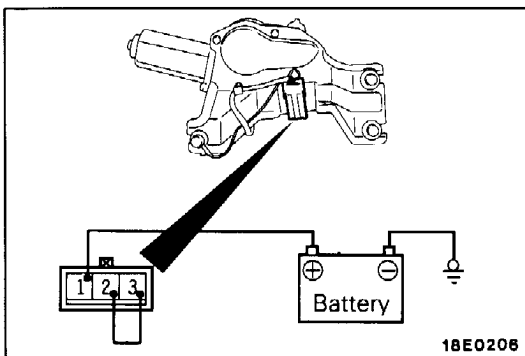


WIPER MOTOR

Check the wiper motor after first disconnecting the wiring harness connector, and with the wiper motor remaining installed to the body.

Operation of Wiper Motor

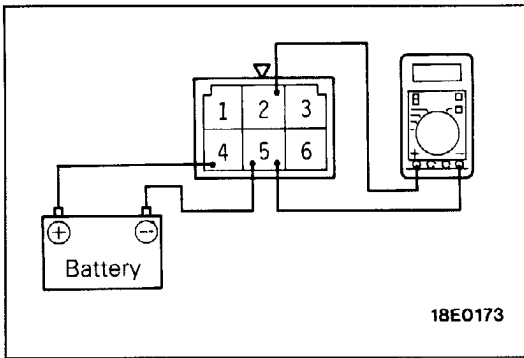
Connect a battery to the wiper motor as shown in the illustration and inspect the motor operation.



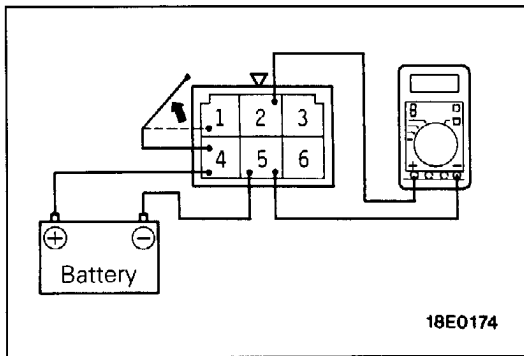
Operation of Wiper Motor at Stop Position

- (1) Run the wiper motor, disconnect the battery, and stop the motor.
- (2) Reconnect the battery as shown in the illustration, and confirm that after the motor starts turning, it stops as the automatic stop position.

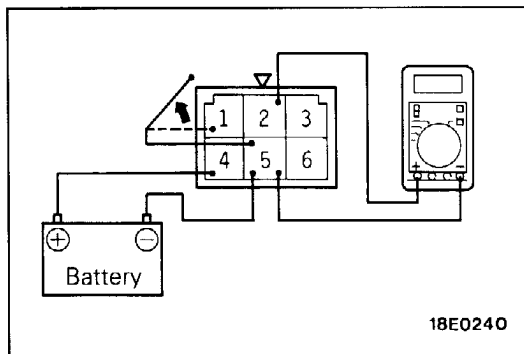
REAR INTERMITTENT WIPER RELAY
<Vehicles built up to October, 1993>



- (1) Connect the ⊕ terminal of the voltmeter to terminal ②, and the ⊖ terminal to terminal ⑤.
- (2) Check that battery voltage shows when the battery ⊕ terminal is connected to terminal ④ and the battery ⊖ terminal is connected to terminal ⑤.



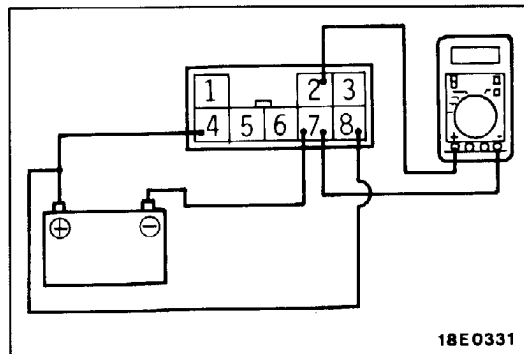
- (3) Under the conditions in (2) above, after shorting terminals ① and ④ for approximately 2 seconds, remove the short connection between these terminals.



- (4) Next, short terminal ① and terminal ⑤. Check that the voltage shown on the voltmeter at this time is 0 V.
- (5) After terminal ① and terminal ⑤ have been shorted for approximately 8 seconds, check if there is battery voltage at terminal ②.

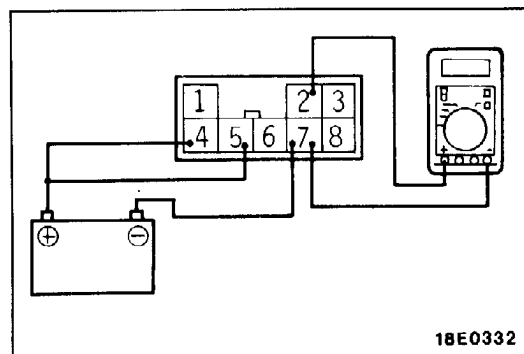
<Vehicles built from November, 1993>

Operation of Rear Wiper Washer

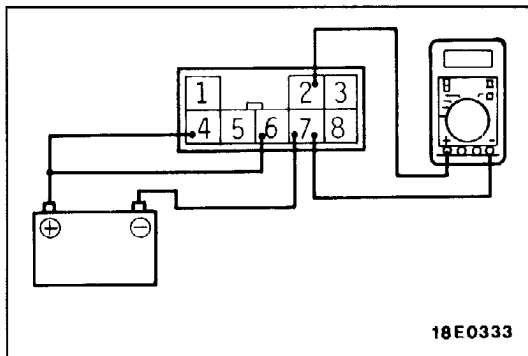


- (1) Connect the ⊕ terminal of the voltmeter to terminal ②, and the ⊖ terminal to terminal ⑦.
- (2) Check that battery voltage appears when the battery ⊕ terminal is connected to terminal ④, ⑧ and the battery ⊖ terminal is connected to terminal ⑦.

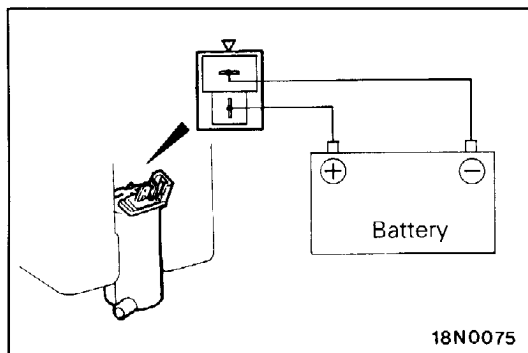
Operation of Rear Intermittent Wiper



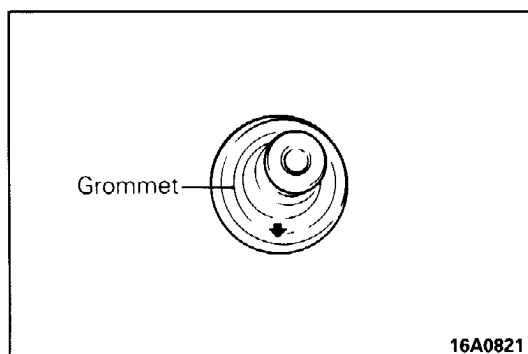
- (1) Connect the ⊕ terminal of the voltmeter to terminal ②, and the ⊖ terminal to terminal ⑦.
- (2) Check that battery voltage shows at intervals of approximately 8 seconds when the battery ⊕ terminal is connected to terminals ④ and ⑤ as well as when the battery ⊖ terminal is connected to terminal ⑦.

**Operation of Rear Wiper at ON Position**

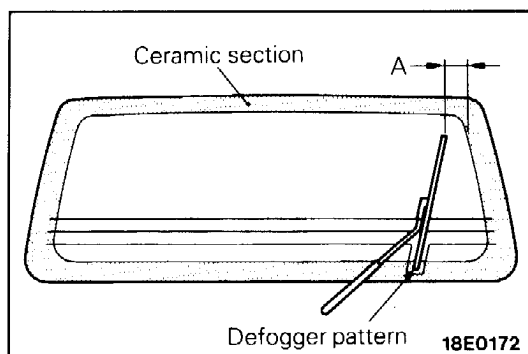
- (1) Connect the \oplus terminal of the voltmeter to terminal ②, and the \ominus terminal to terminal ⑦.
- (2) Check that battery voltage shows when the battery \oplus terminal is connected to terminal ④, ⑥ and the battery \ominus terminal is connected to terminal ⑦.

**WASHER MOTOR**

- (1) With the washer motor installed to the washer tank, fill the washer tank with water.
- (2) When the battery is connected as shown in the figure, check that the water squirts out strongly.

**SERVICE POINT OF INSTALLATION****7. INSTALLATION OF GROMMET**

Install the grommet so that the arrow points downwards.

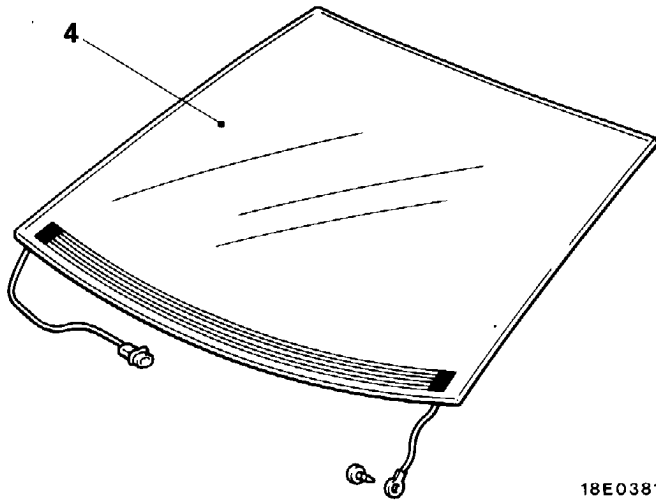
**5. INSTALLATION OF WIPER ARM AND BLADE ASSEMBLY**

Install the wiper blade so that the tip stops at the standard position (standard value), and also so that the lower section of the wiper blade enters the middle of the defogger pattern.

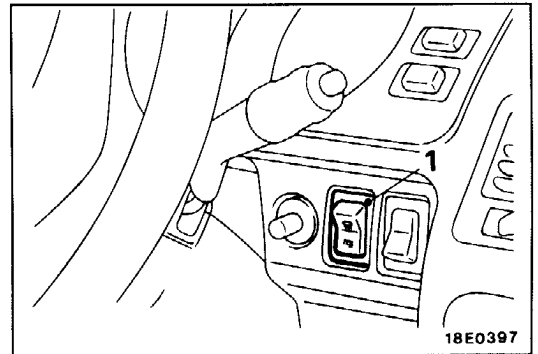
Standard value (A): 65–75 mm (2.56–2.95 in.)

WIPER DEICER

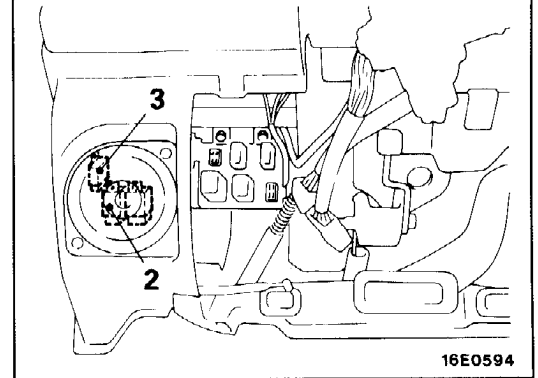
REMOVAL AND INSTALLATION



18E0381



18E0397



16E0594

Wiper deicer removal step

1. Wiper deicer switch

Wiper deicer relay removal step

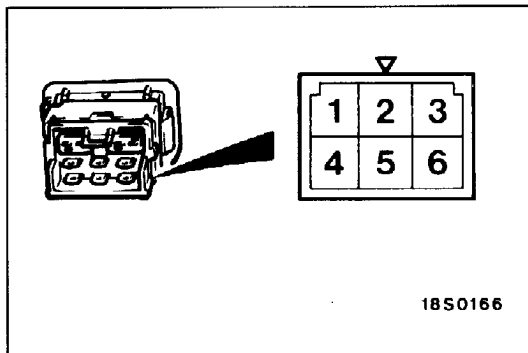
2. Wiper deicer relay

Wiper deicer timer removal step

3. Wiper deicer timer

Removal of Windshield

4. Windshield
(Refer to GROUP 42 – Windshield Glass)



18S0166

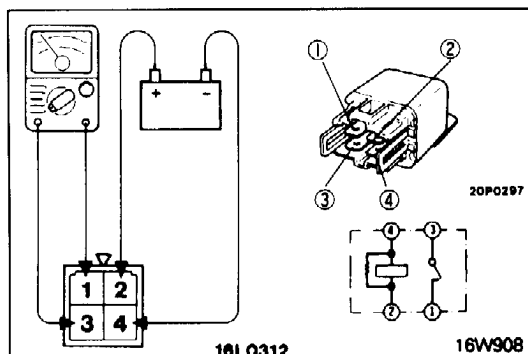
INSPECTION

WIPER DEICER SWITCH CONTINUITY

Terminal	2	5	1	4	3	6
Switch position						
OFF			○—○		○—○	
ON	○—○					
			ILL		IND	

NOTE

○—○ indicates that there is continuity between the terminals.



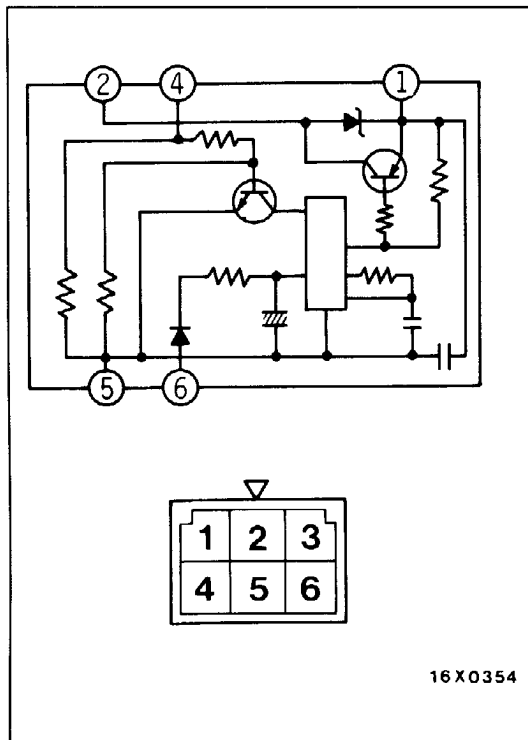
16L0312

16W908

WIPER DEICER RELAY

Apply battery voltage to terminal 2, and check the continuity between the terminals when terminal 4 is earthed.

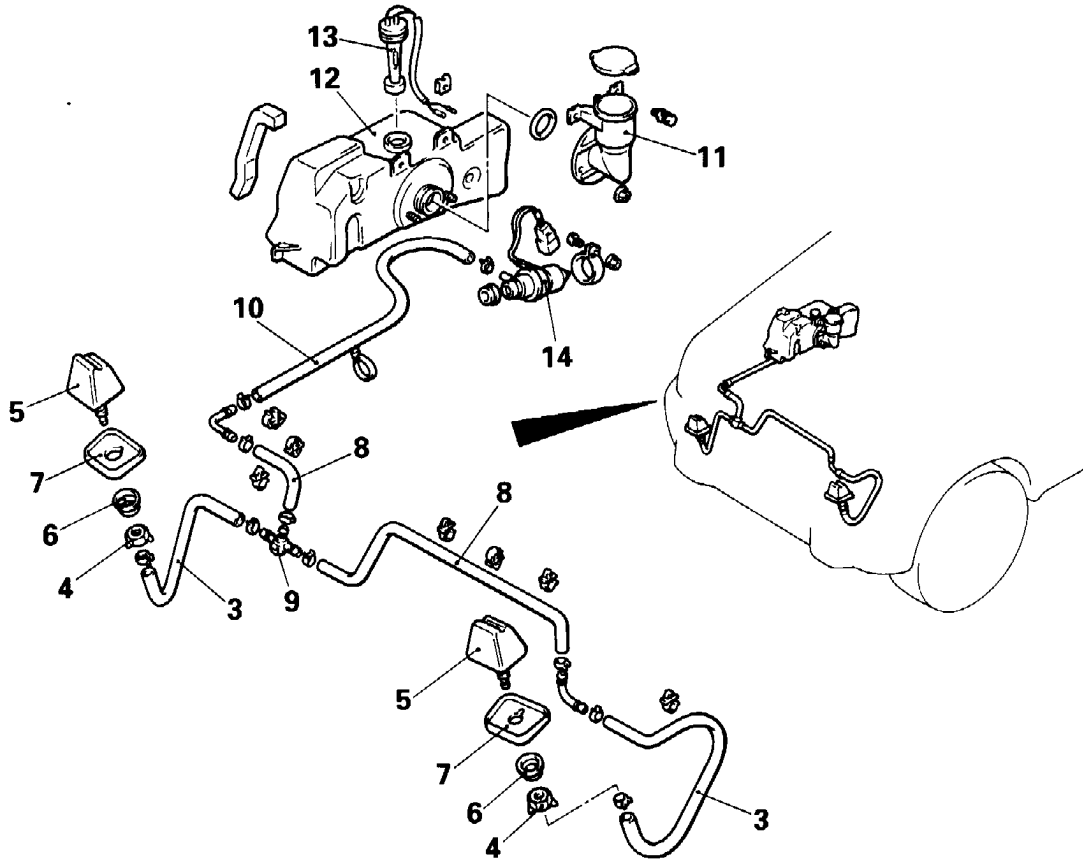
Power is supplied	1-3 terminals	Continuity
Power is not supplied	1-3 terminals	No continuity
	2-4 terminals	Continuity

**WIPER DEICER TIMER**

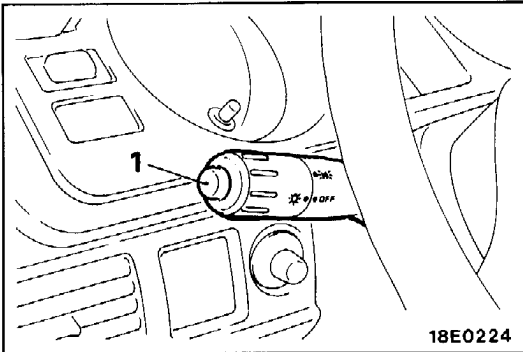
- (1) Connect the battery \oplus terminal to terminals ① and ⑥ as well as the battery \ominus terminal to terminal ⑤.
- (2) Check that battery voltage is output to terminal ② for 18-22 minutes when battery voltage is momentarily applied to terminal ④ and then removed.

HEADLAMP WASHER

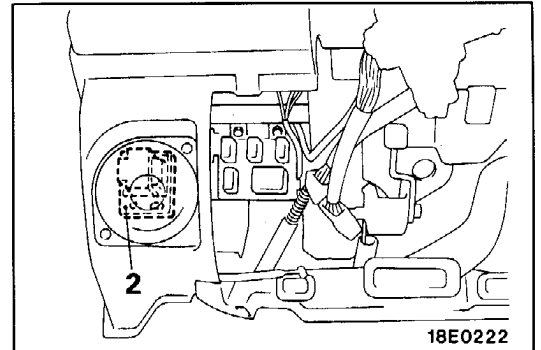
E51MAAM

REMOVAL AND INSTALLATION

18E0229



18E0224



18E0222

Removal steps of headlamp washer switch

1. Headlamp washer switch
(Refer to GROUP 54–Column Switch.)

Removal steps of nozzle and check valve

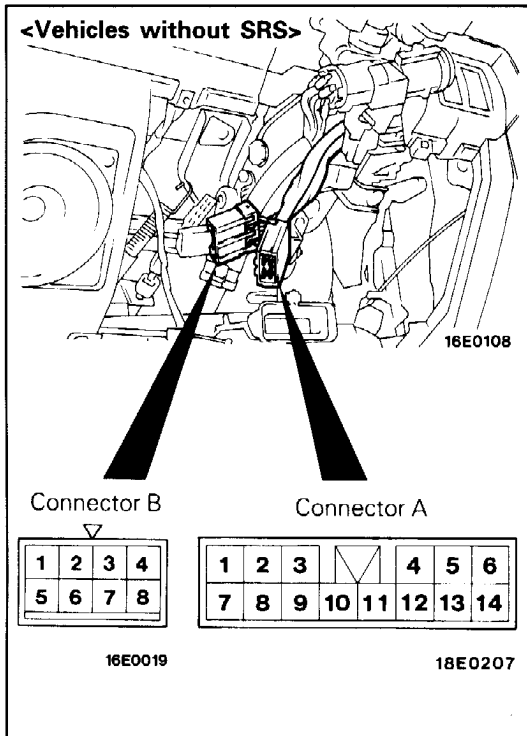
- Front bumper (Refer to P.51–8.)
- Draining of washer fluid
- 3. Washer hose
- 4. Nut
- 5. Nozzle
- 6. Collar
- 7. Nozzle base
[Vehicles without bumper guard]
- 8. Washer hose
- 9. Check valve

Removal steps of headlamp washer relay

- Instrument under cover
(Refer to GROUP 52–Instrument Panel.)
- 2. Headlamp washer relay

Removal steps of washer tank

- Splash shield [RH]
(Refer to GROUP 42–Fender.)
- Front combination lamp
(Refer to GROUP 54–Lighting System.)
- Draining of washer fluid
- 10. Washer hose
- 11. Cap
- 12. Washer tank assembly
- 13. Washer fluid level sensor
- 14. Washer motor



INSPECTION

HEADLAMP WASHER SWITCH

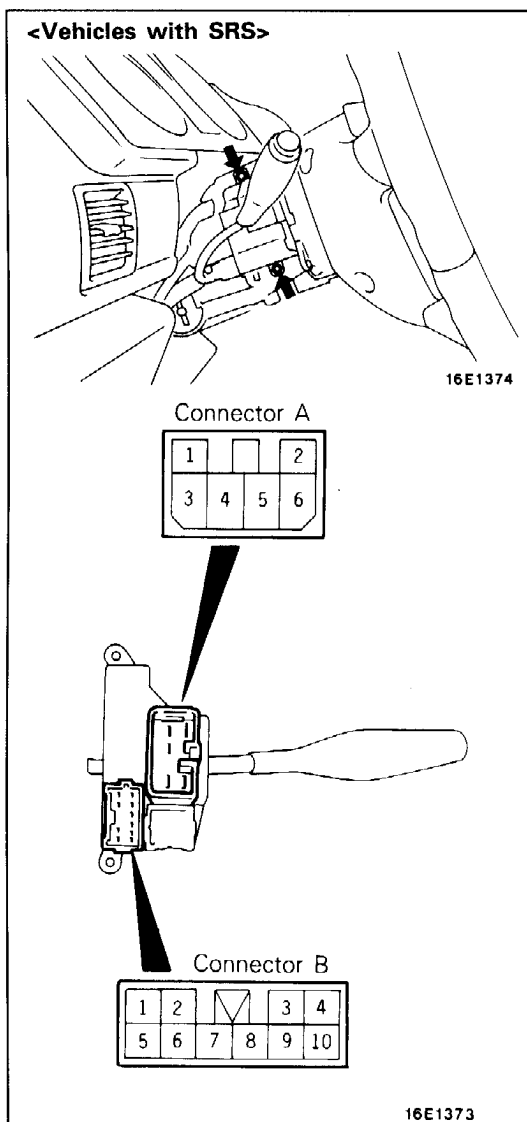
<Vehicles without SRS>

Disconnect the column switch connector and check the continuity between the terminals for each switch.

Switch position	Connector	A	B
	Terminal	4	6
OFF			
ON		○—○	○—○

NOTE

○—○ indicates that there is continuity between the terminals.



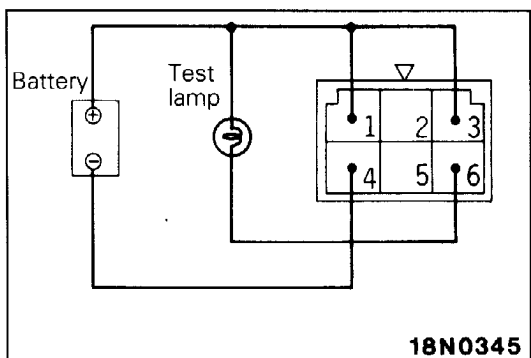
<Vehicles with SRS>

- (1) Remove the column cover lower.
- (2) Remove the column cover upper.
- (3) Loosen the screws indicated by arrows in the illustration, and then remove the head lamp washer switches.
- (4) Disconnect the column switch connector and check the continuity between the terminals for each switch.

Switch position	Connector	A	B
	Terminal	1	2
OFF			
ON		○—○	○—○

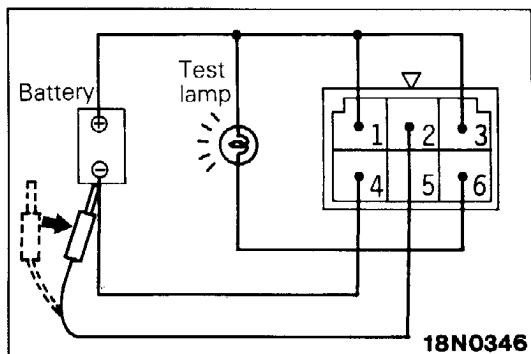
NOTE

○—○ indicates that there is continuity between the terminals.

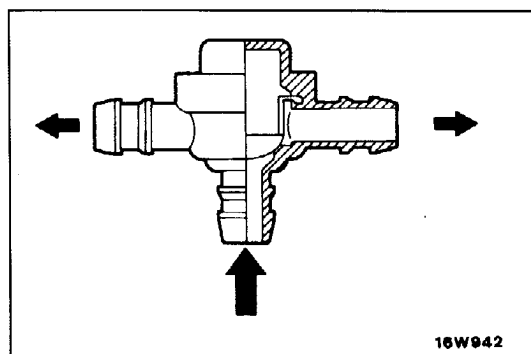


HEADLAMP WASHER RELAY

(1) Connect battery and test lamp to the relay as illustrated.



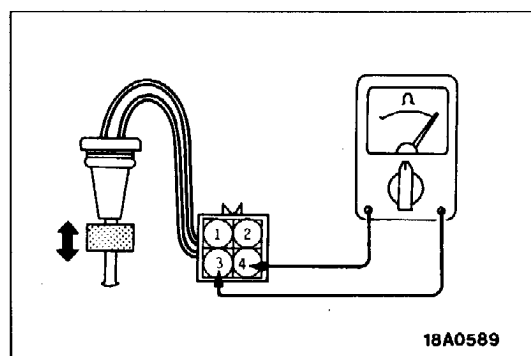
(2) The relay is normal if the lamp lights for approximately 0.3 second upon connection of terminal ② to battery (-).



CHECK VALVE

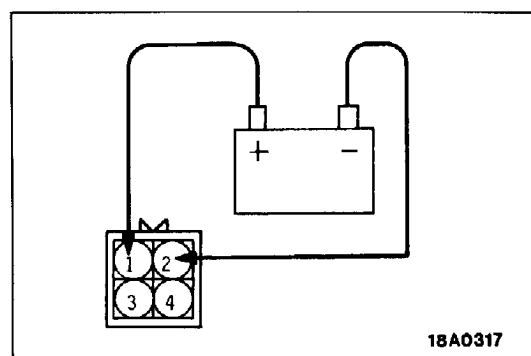
Apply pressure to the inlet of the check valve to check its opening pressure.

**Opening pressure: 50–110 kPa
(0.5–1.1 kg/cm², 7.1–15.6 psi)**



WASHER FLUID LEVEL SENSOR

- (1) Remove the washer fluid level sensor from the washer tank.
- (2) Connect a ohmmeter to the connector of washer fluid level sensor.
- (3) Move the float up and down.
- (4) Make sure that when the float is raised, there is no continuity and when it is lowered, there is continuity.



HEADLAMP WASHER MOTOR

- (1) With the washer motor installed to the washer tank, fill the washer tank with water.
- (2) Connect battery (+) and (-) cables to terminals ② and ① respectively to see that the washer motor runs and water is injected.

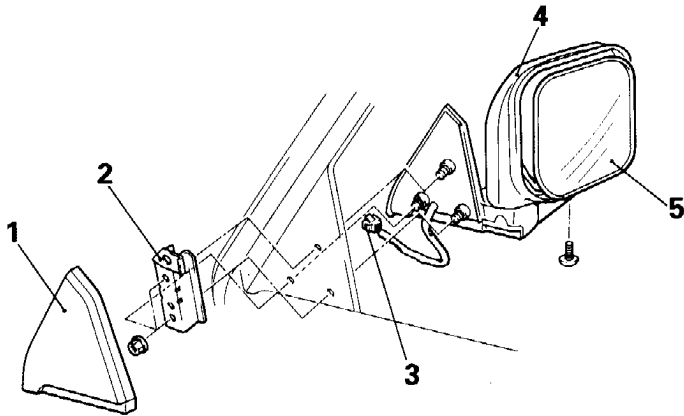
51-26-2

NOTES

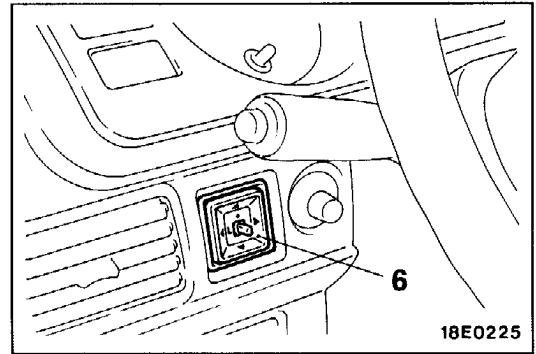
DOOR MIRROR

E51JAAP

REMOVAL AND INSTALLATION



18E0171



18E0225

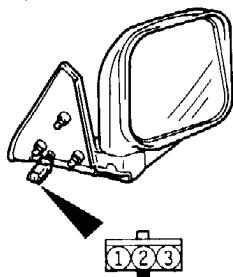
Door mirror removal steps

1. Delta cover inner
2. Inner cover bracket
3. Harness connector
4. Door mirror
5. Mirror

Door mirror control switch removal

6. Door mirror control switch

<Vehicles without heated mirror>



18E0212

INSPECTION

REMOTE CONTROL MIRROR ASSEMBLY

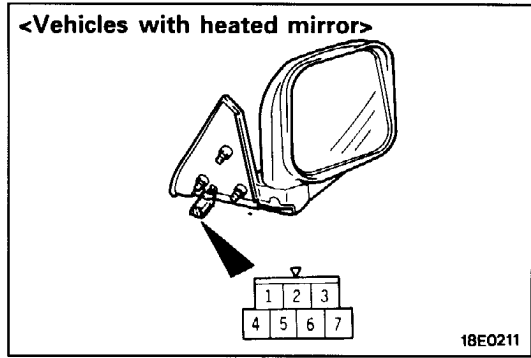
<Vehicles without heated mirror>

Check to be sure that the mirror moves as described in the table when each terminal is connected to the battery.

Direction of operation	Battery		Terminal		
	+	-	1	2	3
Up	○				○
Down		○	○		
Left	○		○		
Right		○		○	

NOTE

○—○ indicates each terminal is connected to the battery.



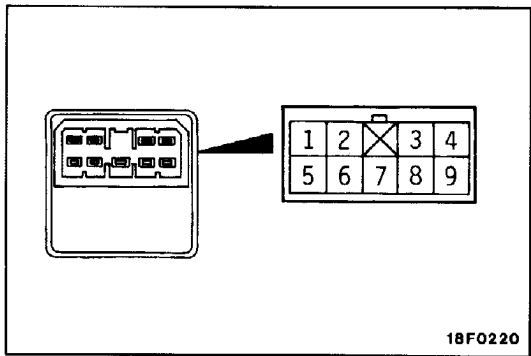
<Vehicles with heated mirror>

1. Check to be sure that the mirror moves as described in the table when each terminal is connected to the battery.
2. Check if there is continuity between terminals ① and ④.

Connection Direction of operation	Battery		Terminal				
	⊕	⊖	5	6	7	1	4
Up	○	○	○		○		
Down	○	○	○		○		
Left	○	○	○	○			
Right	○	○		○			

NOTE

○—○ indicates each terminal is connected to the battery.



DOOR MIRROR CONTROL SWITCH

Operate switch and check for continuity between terminals.

Terminal Direction	Left side					Right side				
	3	4	6	7	8	2	4	6	7	9
UP		○			○	○	○			
DOWN		○	○	○		○	○	○	○	
LEFT		○		○		○	○	○	○	
RIGHT	○	○	○				○	○	○	○

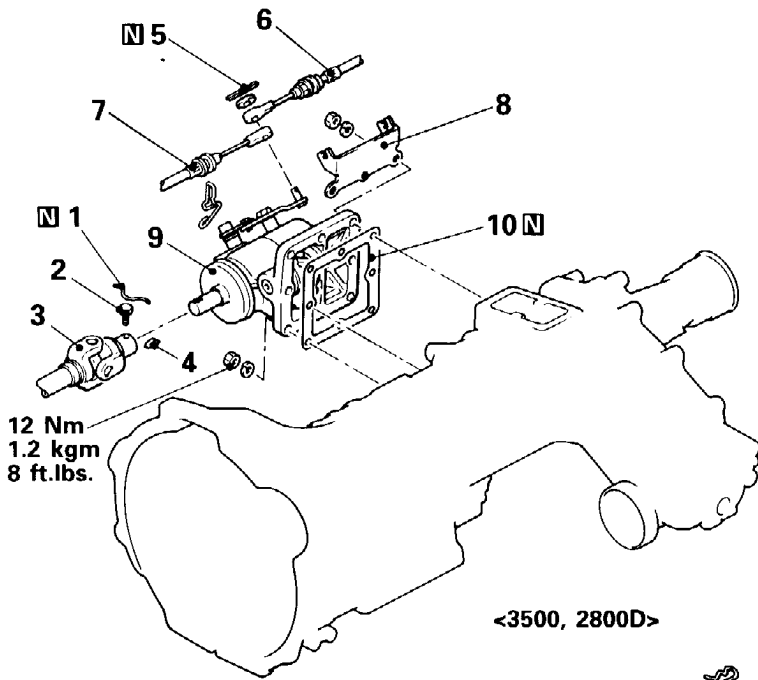
NOTE

○—○ indicates that there is continuity between the terminals.

**P.T.O. (POWER TAKE OFF)
REMOVAL AND INSTALLATION**

E51NBAB

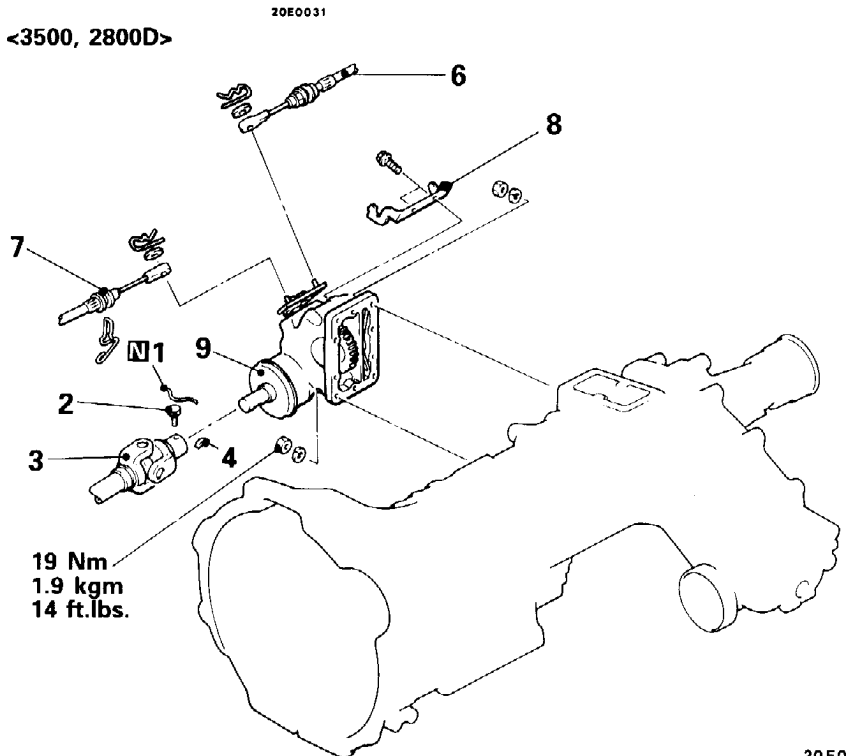
<2400, 3000, 2500D>



Pre-removal and Post-installation Operation

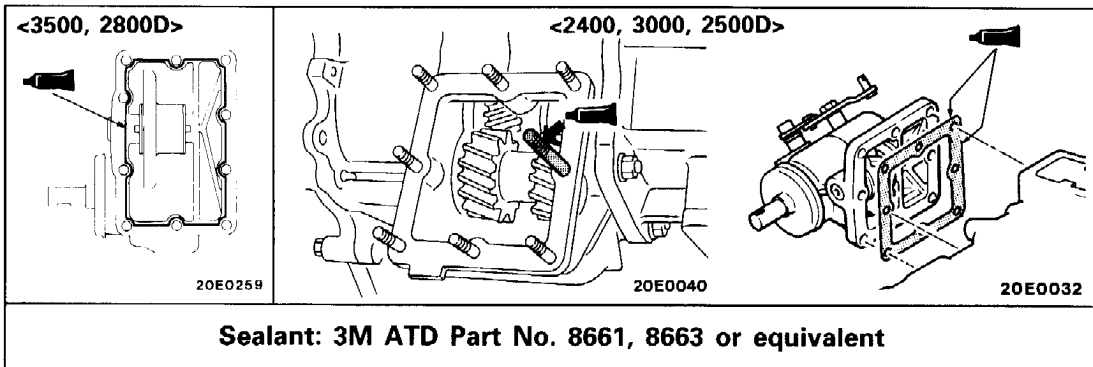
- Draining and Refilling Transfer oil (Refer to P.51-7)
- Removal and Installation of Pre muffler (Refer to GROUP 15 – Exhaust pipe and Muffler <3500, 2800D>)

<3500, 2800D>



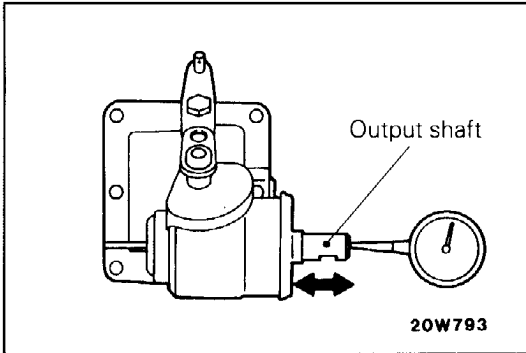
Removal steps

1. Wire
2. Winch bolt
3. Drive shaft
4. Woodruff key
5. Split pin
6. Rear P.T.O. cable
7. Front P.T.O. cable
8. P.T.O. bracket
9. P.T.O. assembly
10. Gasket



Sealant: 3M ATD Part No. 8661, 8663 or equivalent

20E0261



INSPECTION

OUTPUT SHAFT END PLAY

Check the output shaft end play by following the steps below.

- (1) Place a dial gauge as shown in the figure; then move the output shaft in the axial direction and measure the end play.

Standard value: 0–0.2 mm (0–0.008 in.)

- (2) If the end play exceeds the standard value, replace the P.T.O. assembly.

DRIVE SHAFT

E51NDAB

REMOVAL AND INSTALLATION

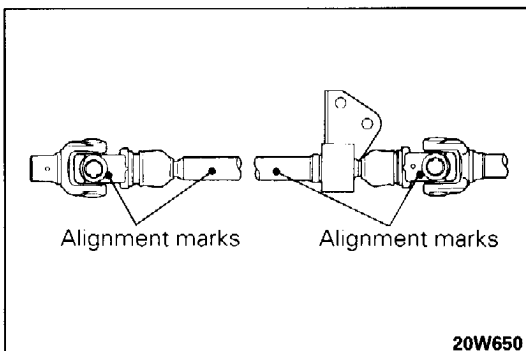
Pre-removal and Post-installation Operation

- Removal and Installation of the Skid Plate
- Removal and Installation of the Under Cover

Removal steps

1. Wire
2. Winch bolt
3. Bolt
4. Rear shaft assembly
5. Front shaft assembly
6. Split pin
7. Shear pin
8. Sleeve yoke assembly
9. Bearing bracket

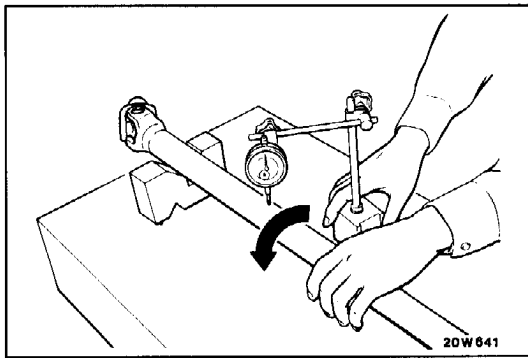
20E0262



SERVICE POINTS OF REMOVAL

3. REMOVAL OF BOLT

Before removing the bearing bracket attaching bolt, make alignment marks on the rear shaft assembly, front shaft assembly and sleeve yoke assembly.

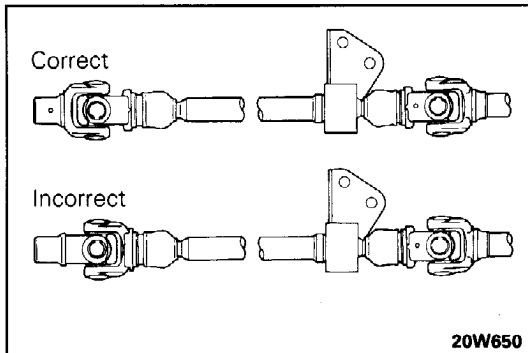


INSPECTION
DRIVE SHAFT RUNOUT

Limit:

Front shaft assembly
Rear shaft assembly

1.0 mm (0.04 in.)
0.5 mm (0.02 in.)



SERVICE POINTS OF INSTALLATION

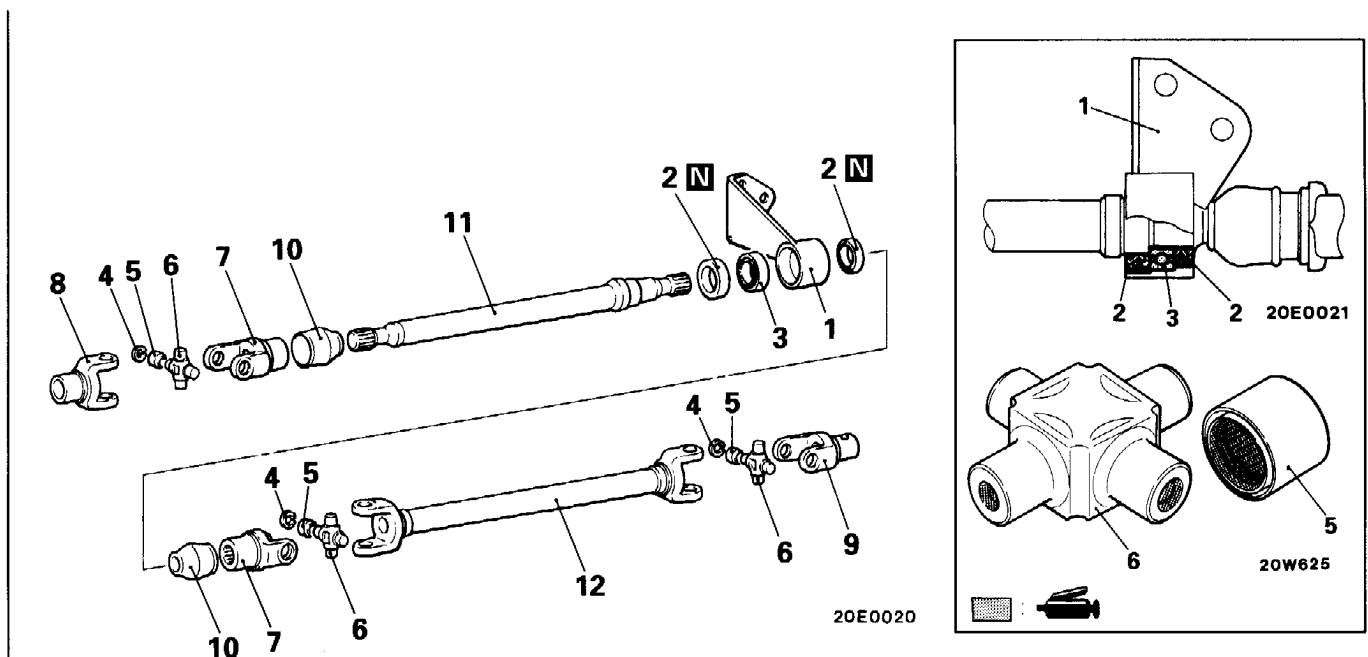
8. INSTALLATION OF FRONT SLEEVE YOKE ASSEMBLY

Install with the sleeve yoke assemblies in the same direction.

NOTE

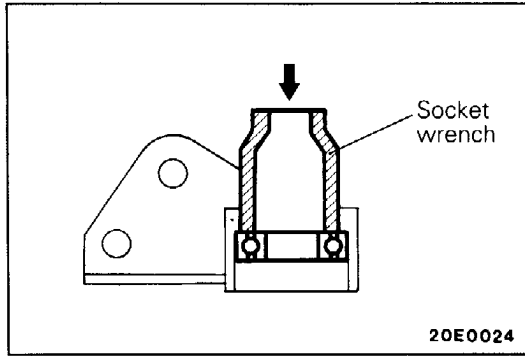
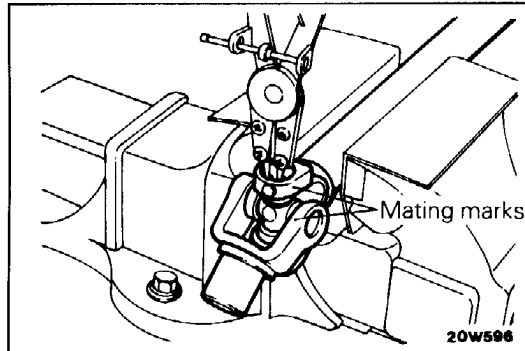
When the rear shaft assembly, front shaft assembly and sleeve yoke assembly are to be reused, align the alignment marks made at removal.

DISASSEMBLY AND REASSEMBLY



Disassembly steps

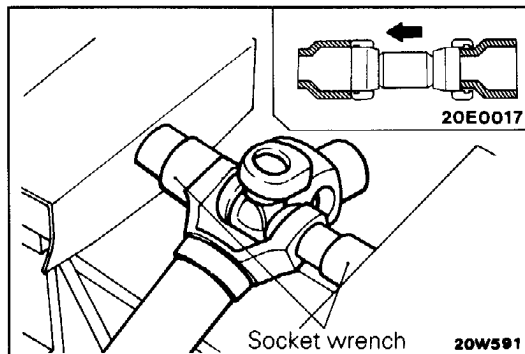
- | | | |
|----|--------------------|-------------------------|
| ◆◆ | 1. Bearing bracket | 7. Sleeve yoke assembly |
| ◆◆ | 2. Oil seal | 8. Front yoke |
| ◆◆ | 3. Ball bearing | 9. Rear yoke |
| ◆◆ | 4. Snap ring | 10. Boot |
| ◆◆ | 5. Needle bearing | 11. Front shaft |
| ◆◆ | 6. Spider | 12. Rear shaft |

**SERVICE POINTS OF DISASSEMBLY****3. REMOVAL OF BALL BEARING****4. REMOVAL OF SNAP RING**

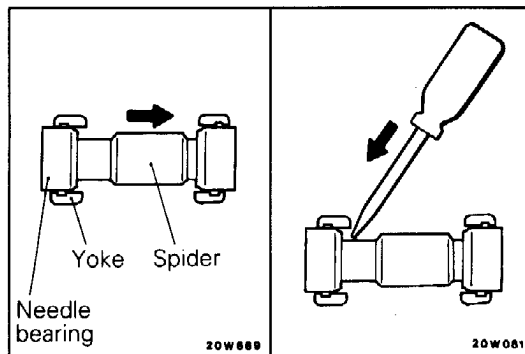
Make mating marks on the yokes of the universal joint that is to be disassembled.

NOTE

To replace the spider and needle bearing, use a universal joint kit.

**5. REMOVAL OF NEEDLE BEARING**

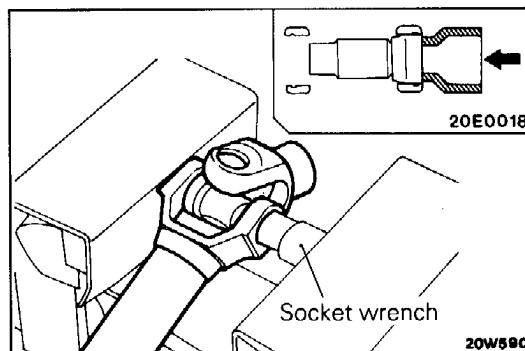
(1) Use a socket wrench to push out the needle bearing.



(2) If the needle bearing cannot be removed, push the spider back to the opposite side, and insert a thin screwdriver block in the clearance between the spider and yoke to remove the needle bearing.

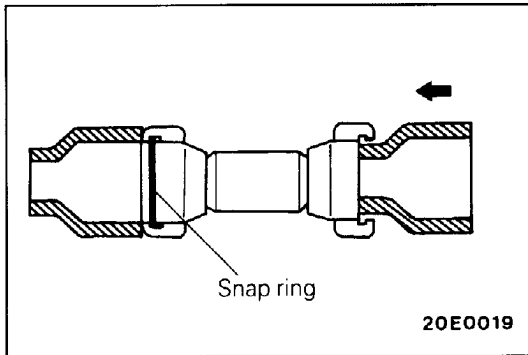
Caution

Use care to prevent damaging the needle bearing press-fitting portion of yoke.

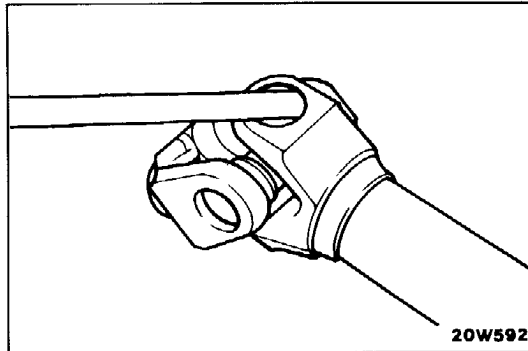
**SERVICE POINTS OF REASSEMBLY****5. INSTALLATION OF NEEDLE BEARING/4. SNAP RING**

(1) Use a socket wrench to press-fit one needle bearing.

(2) Attach the snap ring to the side of the needle bearing that has been press-fitted.



- (3) Use the socket wrench to press-fit the opposite needle bearing.
- (4) Attach a snap ring that is of the same thickness as the snap ring attached previously.

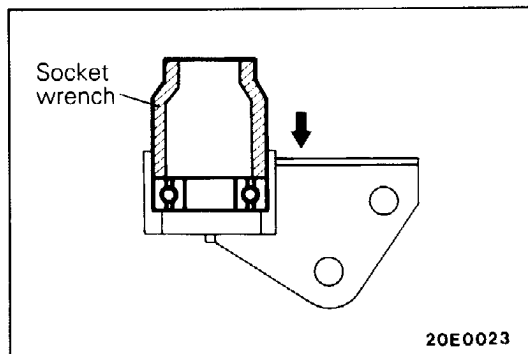


- (5) Using a thickness gauge, check to ensure that the clearance between the snap ring groove and snap ring is within the specified value.

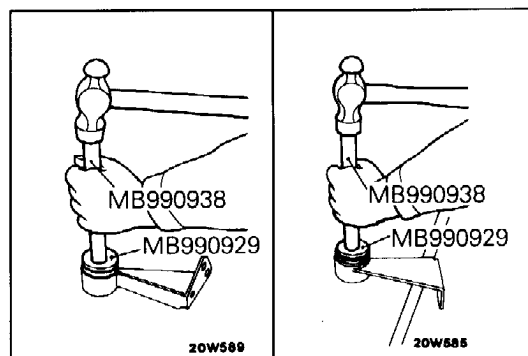
Standard value: 0—0.06 mm (0—0.0024 in.)

NOTE

If the clearance is out of specification, select snap rings of identical thickness for both sides to adjust the clearance to specification, and replace the existing snap rings with the selected ones.



3. PRESSING-IN OF BALL BEARING



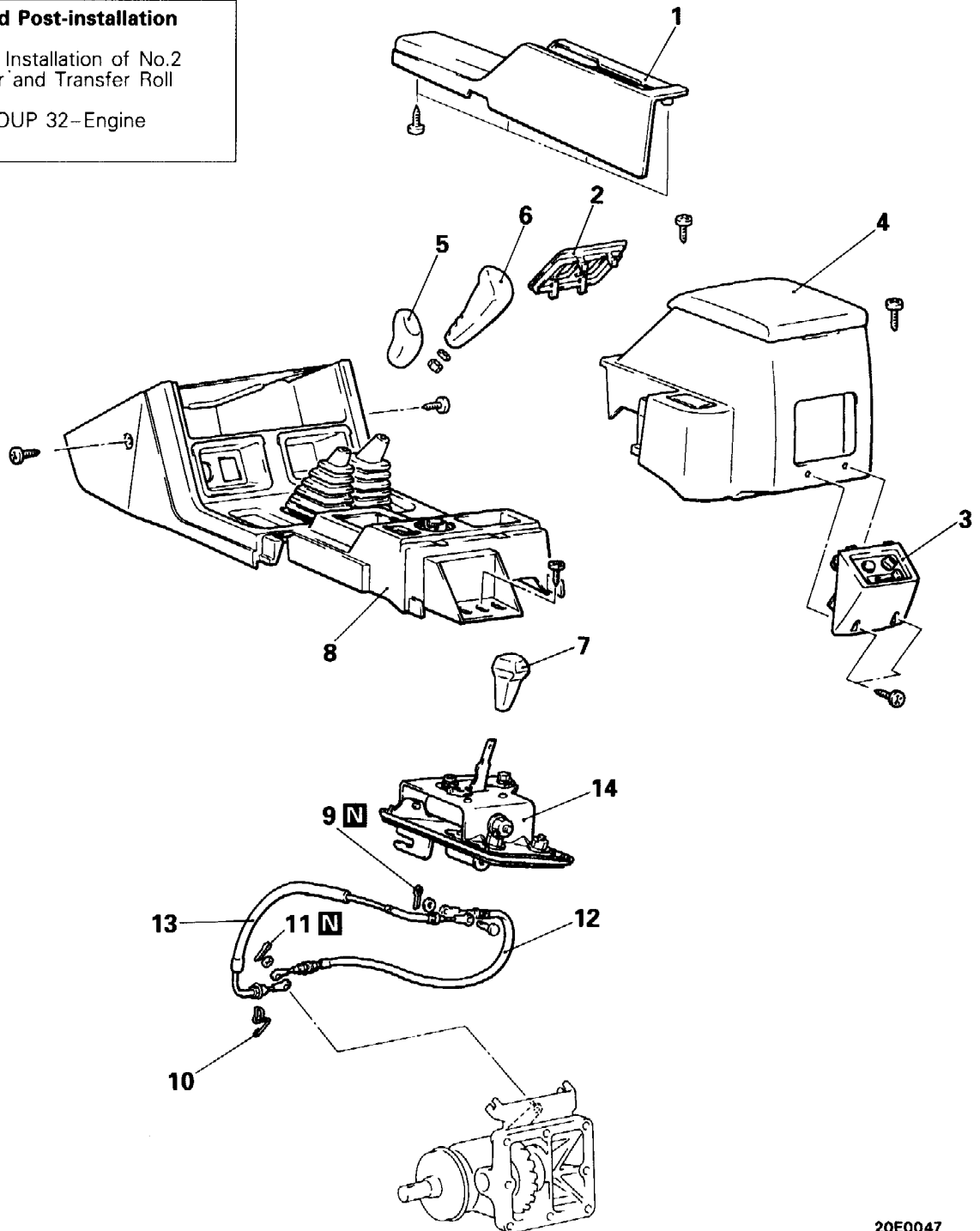
2. PRESSING-IN OF OIL SEAL

P.T.O. CONTROL

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Removal and Installation of No.2 Crossmember and Transfer Roll Stopper
(Refer to GROUP 32-Engine Mounting.)

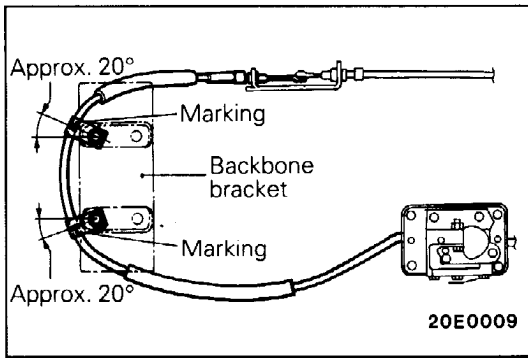


20E0047

Removal steps

1. Side panel
2. Switch panel
3. Rear control assembly
4. Rear floor console
5. T/M shift knob
6. T/F shift knob
7. P.T.O. control knob
8. Front floor console

- ◆◆ ● Adjustment of P.T.O. control cable
- 9. Split pin
- 10. Cable pin
- 11. Split pin
- ◆◆ 12. P.T.O. rear cable
- ◆◆ 13. P.T.O. front cable
- ◆◆ 14. P.T.O. control lever assembly

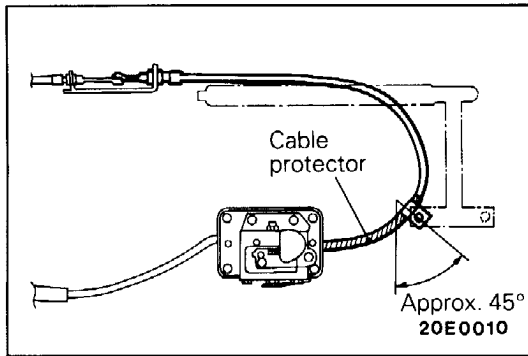


SERVICE POINTS OF INSTALLATION

12. ADJUSTMENT OF P.T.O. FRONT CABLE MOUNTING POSITION

<R.H. Drive Vehicles>

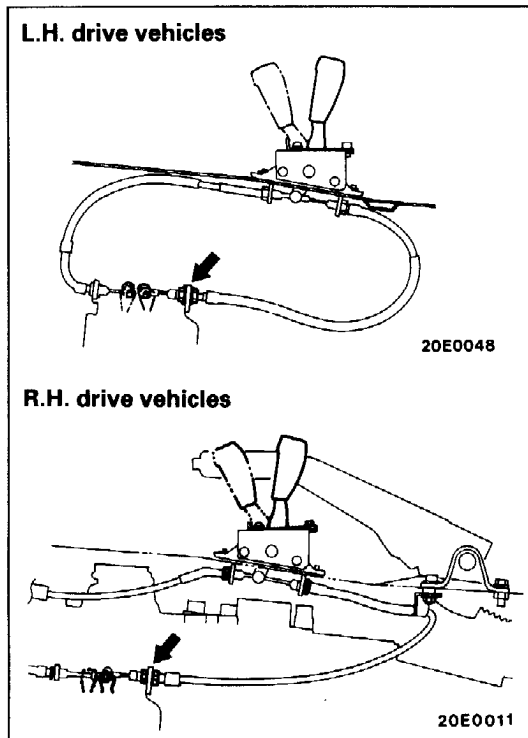
Install the clips to match the positions of the cable markings so that the clips conceal the markings.



13. ADJUSTMENT OF P.T.O. REAR CABLE MOUNTING POSITION

<R.H. Drive Vehicles>

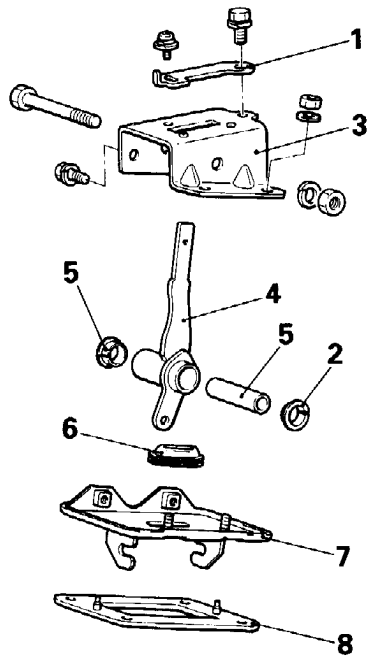
Install the clips onto the cable protector as shown in the illustration.



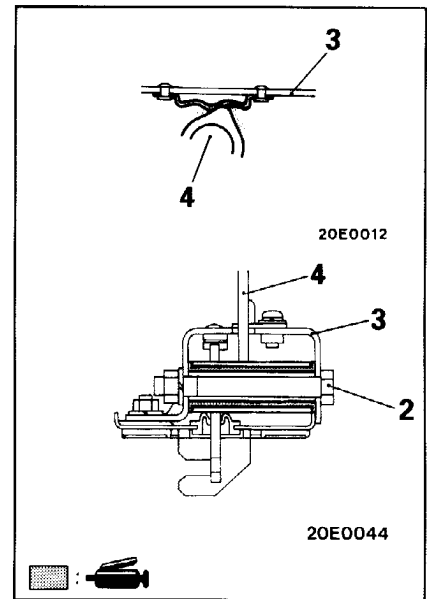
P.T.O. CONTROL CABLE ADJUSTMENT

Adjust with the jam nut so that ON-OFF selection is possible within the movement range of the P.T.O. lever.

DISASSEMBLY AND REASSEMBLY (P.T.O. CONTROL LEVER ASSEMBLY)



20E0046

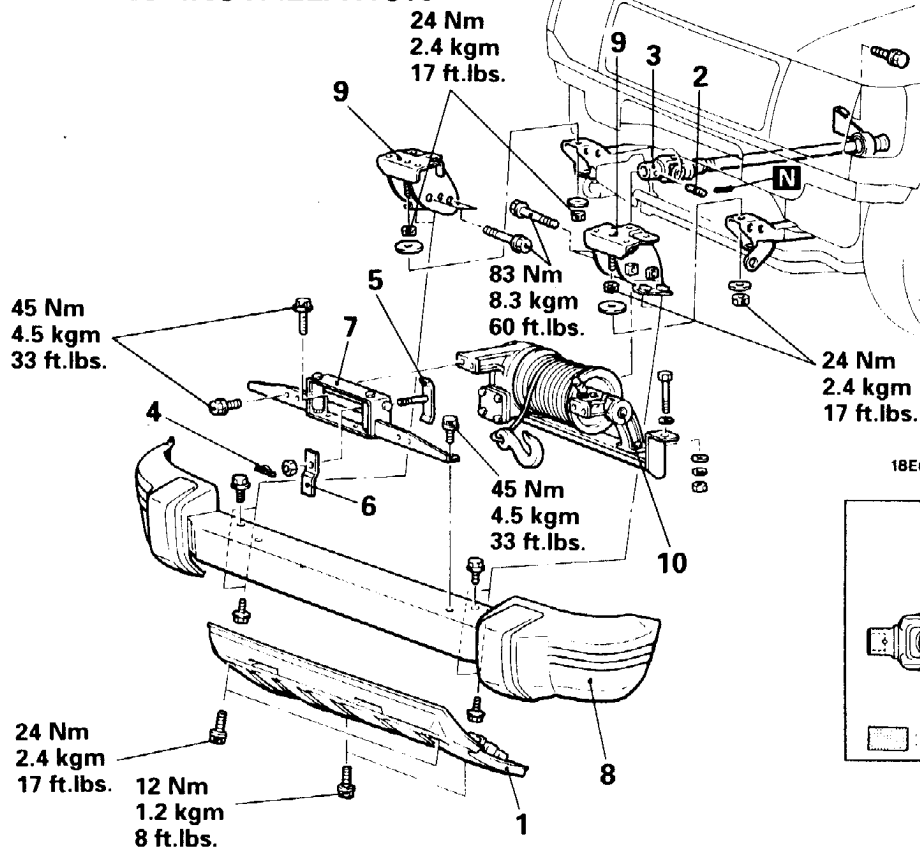
**Disassembly steps**

1. Stopper
2. Bolt
3. Bracket
4. Lever

5. Bushing
6. Grommet
7. Plate
8. Packing

**WINCH
REMOVAL AND INSTALLATION**

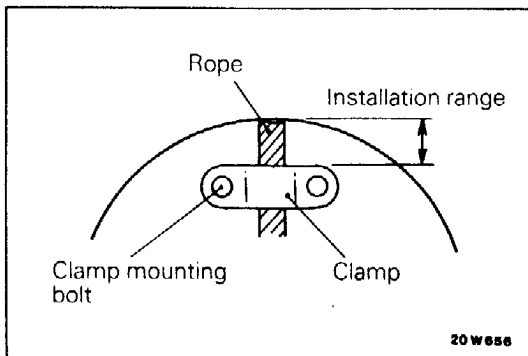
E51NAAC



Removal steps

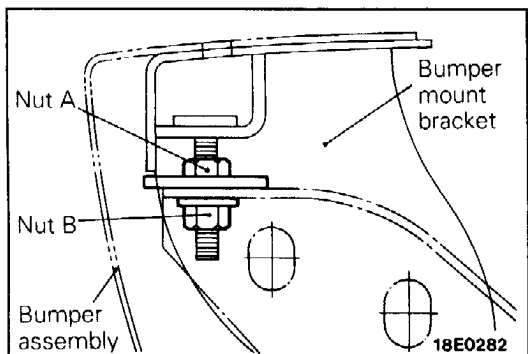
1. Skid plate
2. Shear pin
3. Front shaft assembly
4. Inner pin
5. Guide roller stopper

6. Rope hook stopper
7. Roller guide assembly
8. Front bumper
9. Bumper mount bracket
10. Winch assembly



REPLACEMENT OF WIRE ROPE

1. After pulling out all of the rope, remove the crank mounting bolt, and remove the wire rope.
2. Set the wire rope so that the end is within the range from the drum as shown in the illustration, and secure it with the clamp.

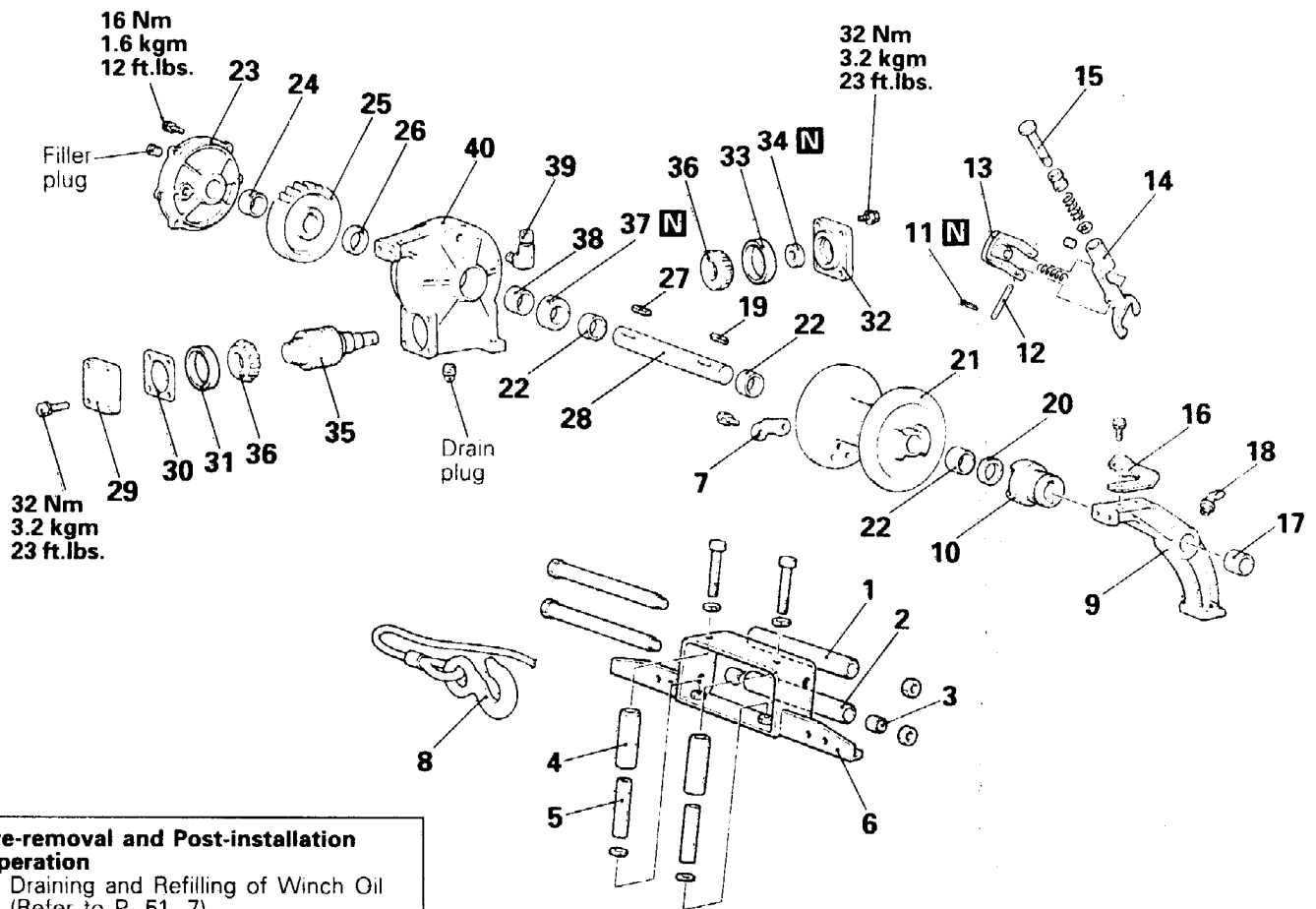


SERVICE POINT OF INSTALLATION

9. INSTALLATION OF BUMPER MOUNT BRACKET

Provisionally install the bumper mount bracket, and then adjust the fitting of the bumper assembly and the body with nut A.

DISASSEMBLY AND REASSEMBLY


Pre-removal and Post-installation Operation

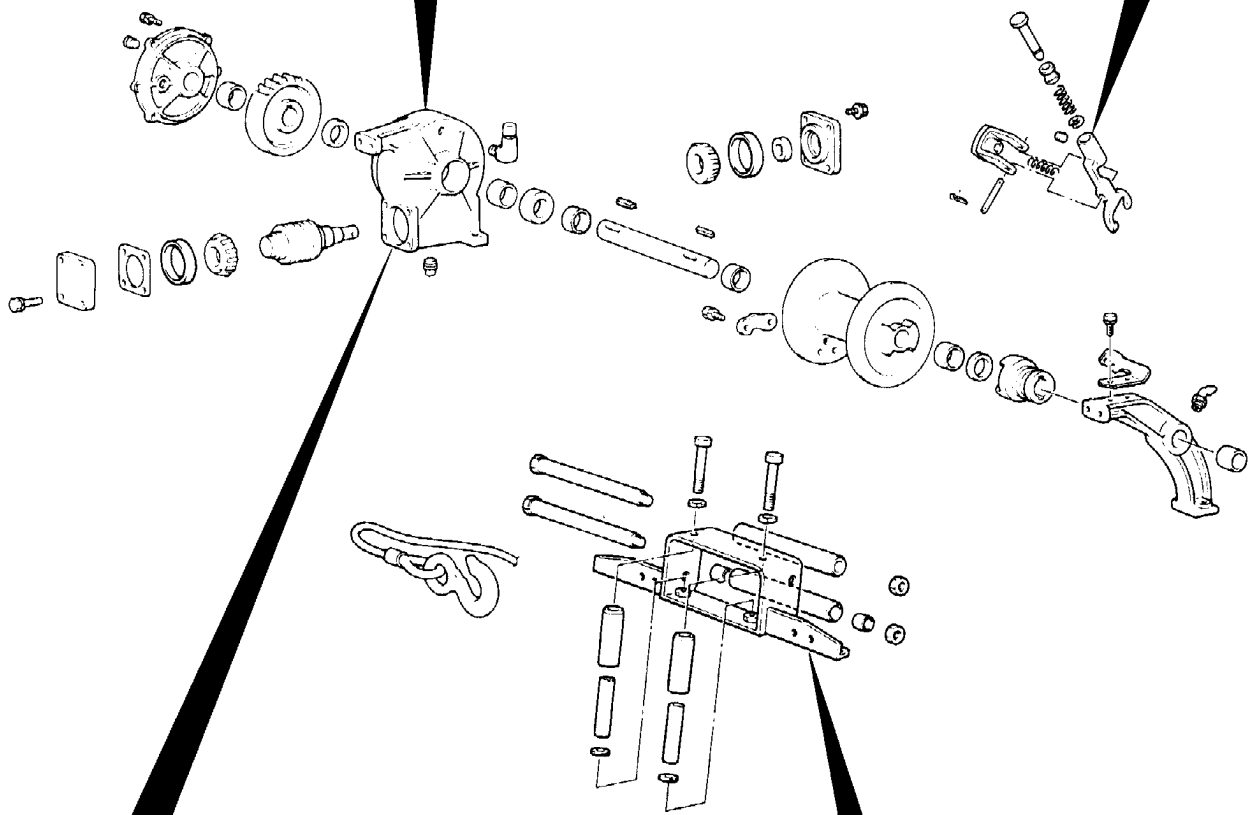
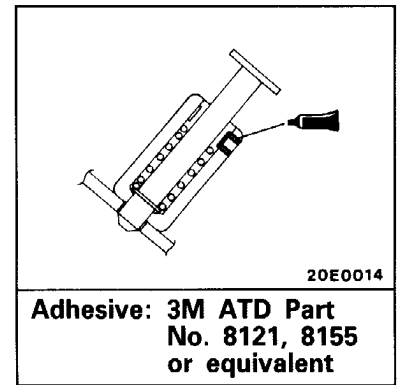
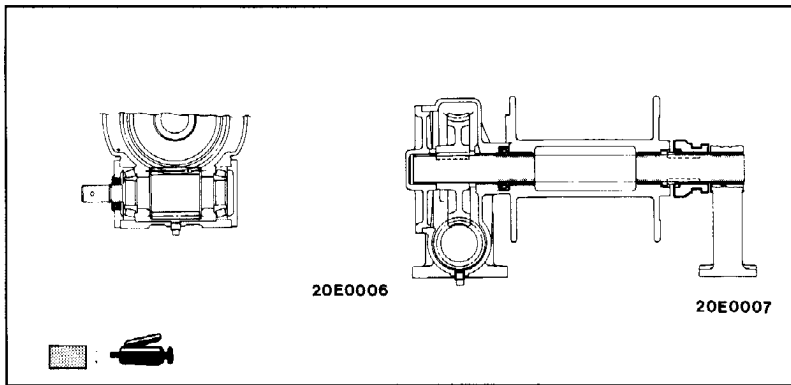
- Draining and Refilling of Winch Oil (Refer to P. 51-7)

20E0028

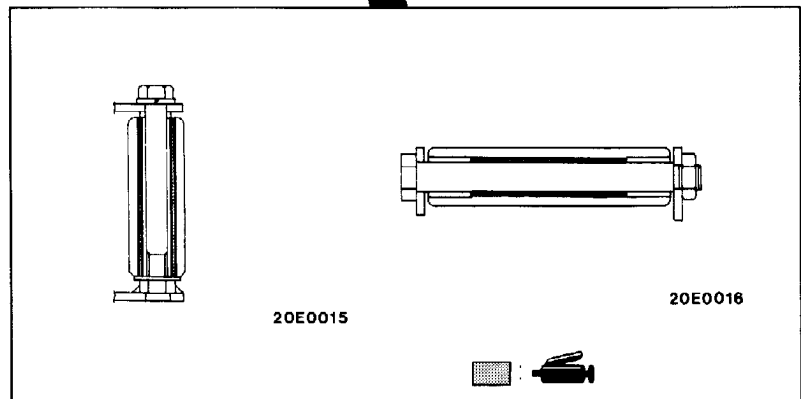
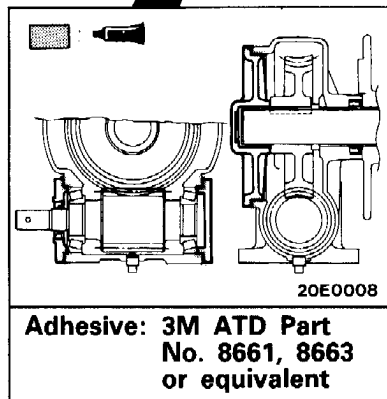
Disassembly steps

- | | | | |
|-------|------------------------------------|-------|------------------------|
| ◆◆ | 1. Rope guide upper roller | ◆◆ | 21. Drum |
| ◆◆ | 2. Rope guide lower roller | ◆◆ ◆◆ | 22. Drum bushing |
| | 3. Rope guide lower roller bushing | ◆◆ | 23. Side cover |
| | 4. Rope guide side roller | ◆◆ ◆◆ | 24. Side cover bushing |
| | 5. Inner spacer | ◆◆ ◆◆ | 25. Worm wheel |
| | 6. Guide roller bracket | | 26. Inner washer |
| | 7. Clamp | | 27. Drum shaft key |
| | 8. Rope hook | ◆◆ | 28. Drum shaft |
| | 9. Drum bracket | ◆◆ | 29. Front cover |
| | 10. Brake shoe clutch | | 30. Adjustment shim |
| | 11. Split pin | | 31. Bearing outer race |
| | 12. Brake shoe shaft | | 32. Rear cover |
| | 13. Brake shoe | | 33. Bearing outer race |
| | 14. Shift lever | ◆◆ | 34. Gear case oil seal |
| | 15. Shift lever stopper | | 35. Worm gear |
| | 16. Shift lock bracket | ◆◆ ◆◆ | 36. Bearing inner race |
| ◆◆ ◆◆ | 17. Shift lock bracket bushing | ◆◆ ◆◆ | 37. Gear case oil seal |
| ◆◆ | 18. Inner nipple | ◆◆ ◆◆ | 38. Gear case bushing |
| ◆◆ | 19. Drum shaft key | | 39. Gear case breather |
| | 20. Gear case washer | | 40. Gear case |

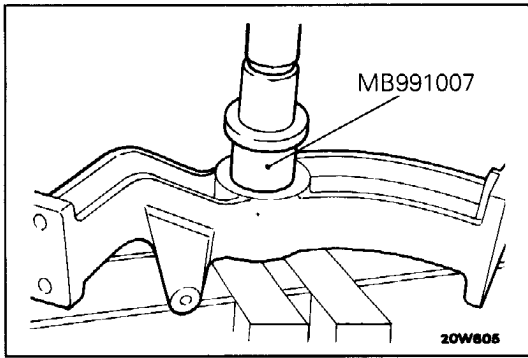
LUBRICATION, ADHESION AND SEALING POINTS



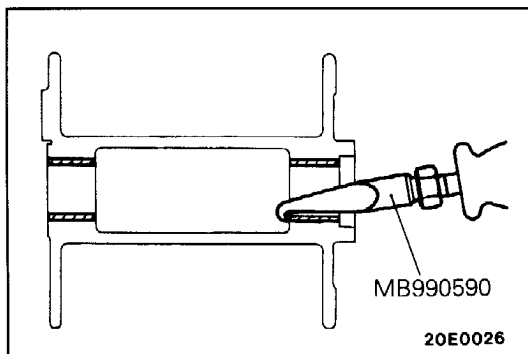
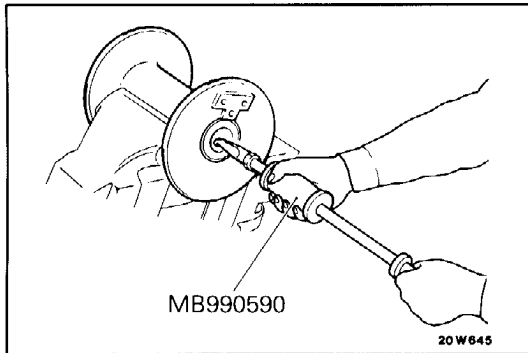
20E0028



SERVICE POINTS OF DISASSEMBLY
17. REMOVAL OF SHIFT LOCK BRACKET BUSHING

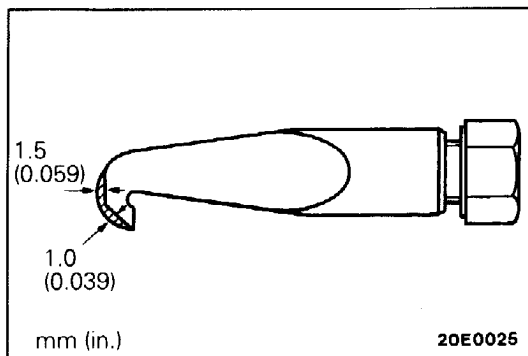


22. REMOVAL OF DRUM BUSHING

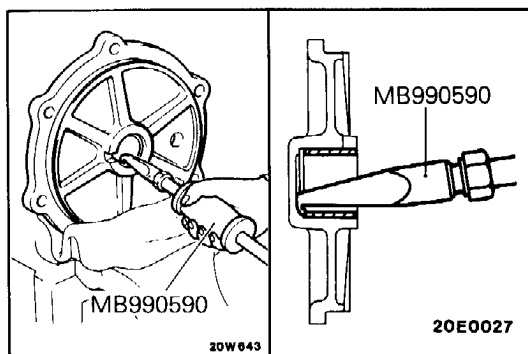


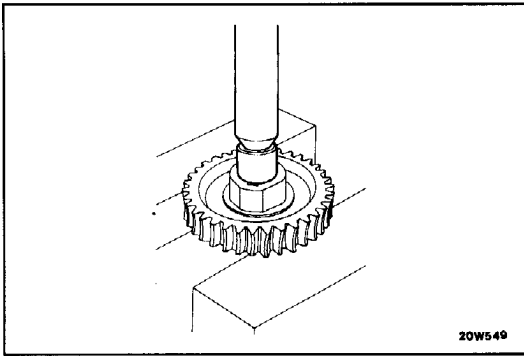
24. REMOVAL OF SIDE COVER BUSHING

- (1) Sharpen the adaptor tab of the special tool as shown in the illustration.



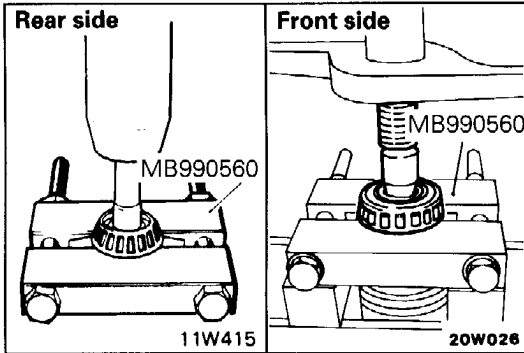
- (2) Use the processed special tool to pull out the bushing from the side cover.



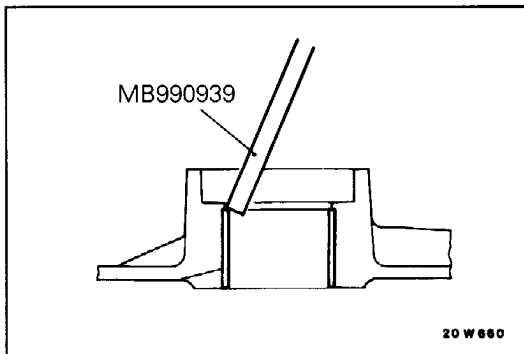


28. REMOVAL OF DRUM SHAFT

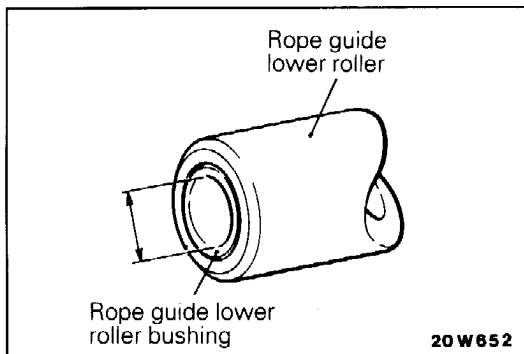
Remove the drum shaft from the worm wheel with a press.



36. REMOVAL OF BEARING INNER RACE



38. REMOVAL OF GEAR CASE BUSHING

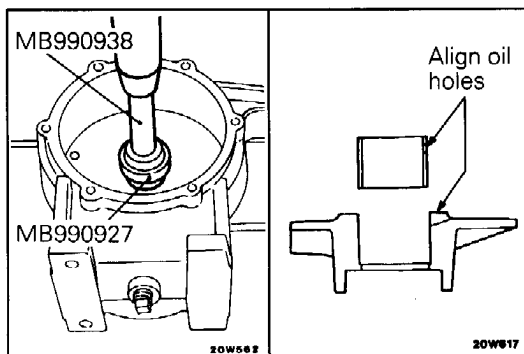


INSPECTION

MEASUREMENT OF INSIDE DIAMETER OF ROPE GUIDE LOWER ROLLER BUSHING

Measure the inside diameter of the bushing in two places or more, and check that the largest value is within the limit value.

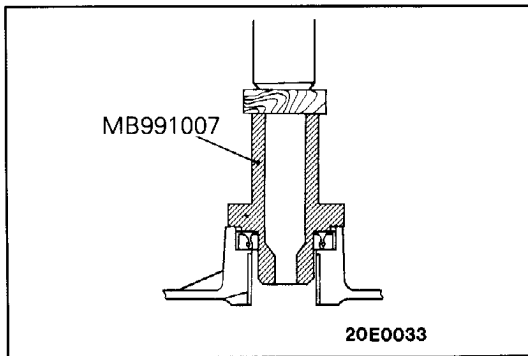
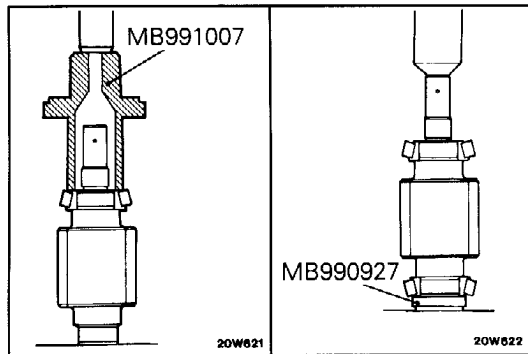
Limit value: 19.5 mm (0.768 in.)



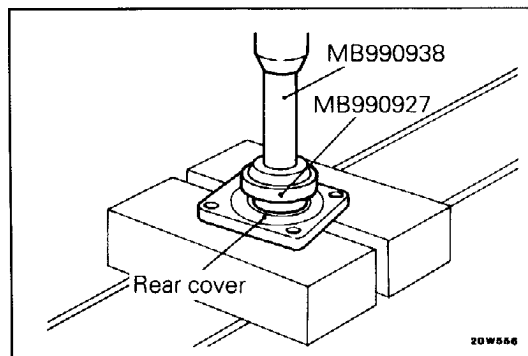
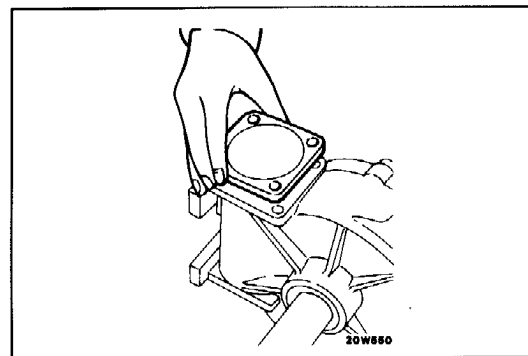
SERVICE POINTS OF REASSEMBLY

38. INSTALLATION OF GEAR CASE BUSHING

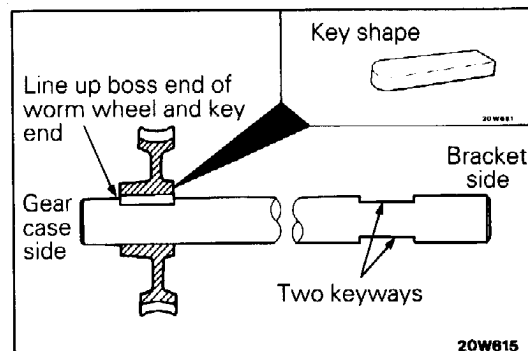
Using the special tools, install the bushing in the gear case, while making sure that the oil holes are in alignment.

**37. PRESSING-IN OF GEAR CASE OIL SEAL****36. PRESSING-IN OF BEARING INNER RACE****Caution**

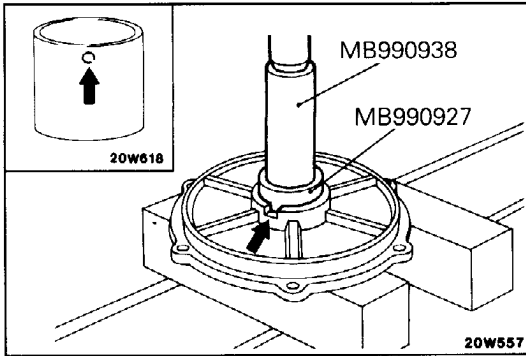
When the worm gear is replaced, the worm wheel should also be replaced.

**34. PRESSING-IN OF GEAR CASE OIL SEAL****29. INSTALLATION OF FRONT COVER**

- (1) Install the front cover and check that the worm gear turns smoothly and that there is no backlash in the shaft direction.
- (2) If the worm gear does not turn smoothly, or if there is backlash, adjust with the shim.

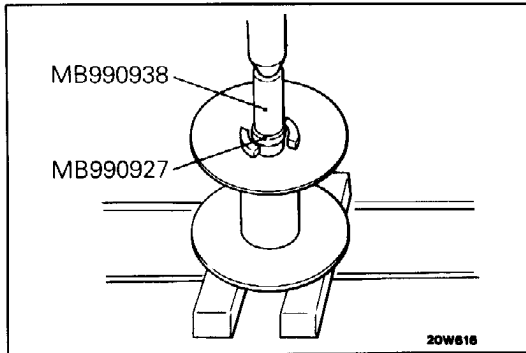
**25. INSTALLATION OF WORM WHEEL**

- (1) Attach the key to the drumshaft side with one keyway, and press-fit the drum shaft to the worm wheel.
- (2) Attach so that the round end of the key and the long end of the worm wheel boss are facing towards the gear end.

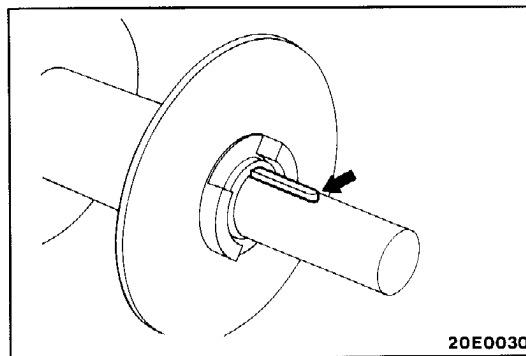


24. PRESSING-IN OF SIDE COVER BUSHING

Using the special tools, press-fit the bushing into the side cover, while making sure that the oil holes are in alignment.

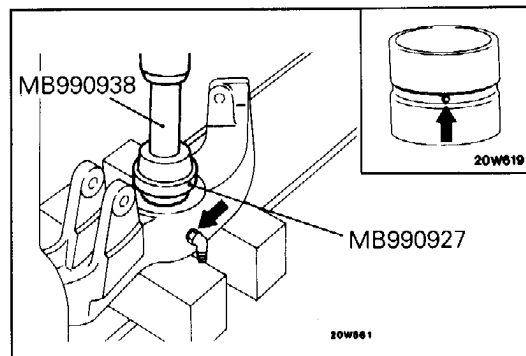


22. PRESSING-IN OF DRUM BUSHING



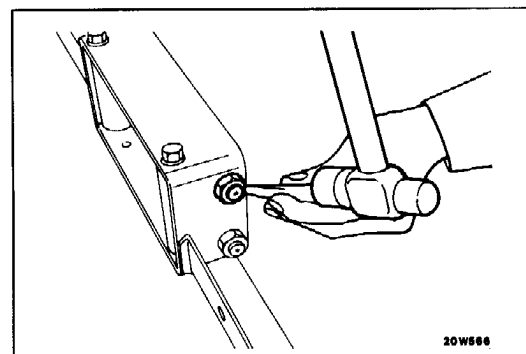
19. INSTALLATION OF DRUM SHAFT KEY

Install the key to the drum shaft channel so that the round end of the key is facing outside.



17. PRESSING-IN OF SHIFT LOCK BRACKET BUSHING

Using the special tools, press-fit the bushing into the drum bracket, while making sure that the grease holes are in alignment.



2. INSTALLATION OF ROPE GUIDE LOWER ROLLER/1. ROPE GUIDE UPPER ROLLER

Caulk the mounting nut of the rope guide upper and lower rollers with a punch.