GROUP 37A

POWER STEERING

CONTENTS

GENERAL DESCRIPTION	37A-2	STEERING WHEEL AND SHAFT ASSEMBLY*	27A 20
POWER STEERING DIAGNOSIS	37A-2	REMOVAL AND INSTALLATION	
INTRODUCTION TO POWER STEERING		DISASSEMBLY AND ASSEMBLY	37A-20 37A-22
DIAGNOSIS	37A-2		0171 22
POWER STEERING DIAGNOSIS TROUBLESHOOTING STRATEGY	37A-2	POWER STEERING GEAR BOX AND	
SYMPTOM CHART		LINKAGE*	37A-24
SYMPTOM PROCEDURES		REMOVAL AND INSTALLATION	37A-24
		INSPECTION	37A-25
SPECIAL TOOLS	37A-11	DISASSEMBLY AND ASSEMBLY	37A-26
ON-VEHICLE SERVICE	37A-13	TIE ROD END BALL JOINT DUST COVER REPLACEMENT	37A-37
STEERING WHEEL FREE PLAY CHECK .	37A-13	POWER STEERING OIL PUMP	
STEERING ANGLE CHECK	37A-14	ASSEMBLY	37∆-38
TIE ROD END BALL JOINT BREAKAWAY	0	REMOVAL AND INSTALLATION	37A-38
TORQUE CHECK	37A-14	INSPECTION	37A-36
STATIONARY STEERING EFFORT CHECK	37A-15	DISASSEMBLY AND ASSEMBLY	37A-39
STEERING WHEEL RETURN TO CENTER		INSPECTION	
CHECK	37A-16		
DRIVE BELT TENSION CHECK	37A-16	POWER STEERING HOSES*	37A-41
FLUID LEVEL CHECK	37A-16	REMOVAL AND INSTALLATION	37A-41
FLUID REPLACEMENT	37A-16	CDECIFICATIONS	274 42
POWER STEERING SYSTEM AIR	37A-17	SPECIFICATIONS	3/A-43
BLEEDING	37A-17 37A-18	FASTENER TIGHTENING SPECIFICATIONS	37A-43
POWER STEERING PRESSURE SWITCH	31A-10	GENERAL SPECIFICATIONS	37A-43
CHECK	37A-19	SERVICE SPECIFICATIONS	37A-44
BALL JOINT DUST COVER CHECK		LUBRICANTS	-
		SEALANTS	

WARNINGS REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLES

⚠ WARNING

- Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver and passenger (from rendering the SRS inoperative).

 Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISH dealer.
- MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B Supplemental Restraint System (SRS) before beginning any service or maintenance of any component of the SRS or any SRSrelated component.

The SRS includes the following components: SRS air bag control unit, SRS warning light, front impact sensors, air bag module, clock spring, and interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (*).

GENERAL DESCRIPTION

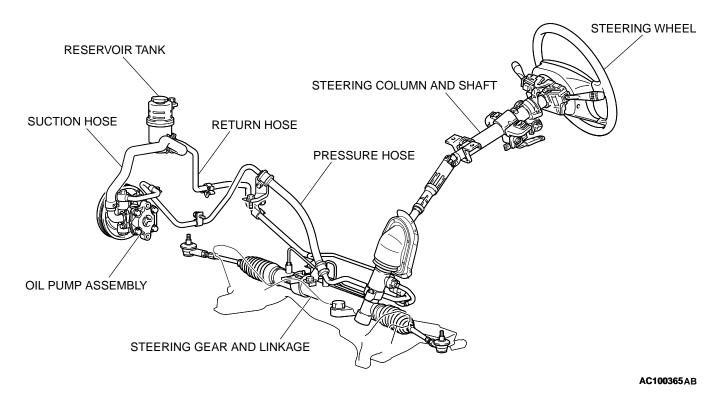
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The steering wheel has four spokes. All vehicles are equipped with SRS (Supplemental Restraint System).

The steering column has a shock absorber mechanism and a tilt steering mechanism.

The power steering is an integral rack and pinion type that combines the steering gear and linkage into one light-weight and compact assembly.

The steering system uses a vane oil pump with a fluid flow control system, so that steering effort varies with engine speed.



POWER STEERING DIAGNOSIS

INTRODUCTION TO POWER STEERING DIAGNOSIS

M1372008500072

Hydraulic power steering is used for all vehicles. Faults in the power steering can include excessive play of the steering wheel, difficult steering wheel operation, noise, vibration, and oil leaks, etc. Possible causes of these faults can include defects in the gear box, oil pump or steering linkage.

POWER STEERING DIAGNOSIS TROUBLESHOOTING STRATEGY

M1372007300075

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find a power steering fault.

- 1. Gather information from the customer.
- 2. Verify that the condition described by the customer exists.
- 3. Find the malfunction by following the Symptom Chart.
- 4. Verify malfunction is eliminated.

TSB Revision

SYMPTOM CHART

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SYMPTOMS	INSPECTION PROCEDURE	REFERENCE PAGE
Excessive play of steering wheel	1	P.37A-3
Difficult steering wheel operation (insufficient power assist)	2	P.37A-4
Rattling noise	3	P.37A-6
Shrill noise	4	P.37A-6
Squealing noise	5	P.37A-7
Hissing noise	6	P.37A-7
Droning noise	7	P.37A-7
Squeaking noise	8	P.37A-8
Vibration	9	P.37A-9
Oil leakage from hose connection	10	P.37A-9
Oil leakage from hose assembly	11	P.37A-9
Oil leakage from oil reservoir	12	P.37A-10
Oil leakage from oil pump	13	P.37A-10
Oil leakage from gear box	14	P.37A-10

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Excessive Play of Steering Wheel

DIAGNOSIS

STEP 1. Check for looseness at the steering shaft coupling section and at the steering wheel linkage.

Q: Is there any looseness?

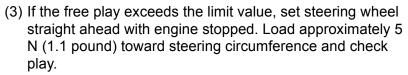
YES: Repair or replace the part. Then go to Step 3.

NO: Go to Step 2.



- (1) With engine running (hydraulic operation), set front wheels straight ahead.
- (2) Measure the play on steering wheel circumference before wheels start to move when slightly moving the steering wheel in both directions.

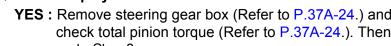
Limit: 30 mm (1.2 inch)



Standard value (steering wheel play with engine stopped): 10 mm (0.4 inch) or less

Q: Does the play exceed the standard value?

YES: Remove steering gear box (Refer to P.37A-24.) and check total pinion torque (Refer to P.37A-24.). Then go to Step 3.



NO: Go to Step 3.

STEP 3. Check steering wheel play.

Verify that the steering wheel play is not excessive.

Q: Is the steering wheel play excessive?

YES: Repeat to Step 1.

NO: The procedure is complete.

INSPECTION PROCEDURE 2: Difficult Steering Wheel Operation (Insufficient Power Assist)

DIAGNOSIS

STEP 1. Check the power steering belt tension.

Refer to GROUP 00, Maintenance Service – Drive Belts P.00-

Q: Is the power steering belt tension within the standard value?

YES: Go to Step 2.

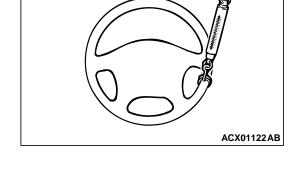
NO: Adjust the tension. (Refer to GROUP 00, Maintenance Service – Drive Belts P.00-37.) Then go to Step 10.

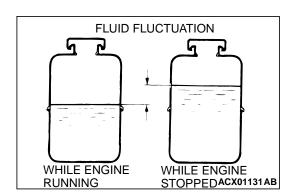
STEP 2. Check the belt for damage.

Q: Is the belt damaged?

YES: Replace the belt. Then go to Step 10.

NO: Go to Step 3.





STEP 3. Check the fluid level.

- (1) Park the vehicle on a flat, level surface, start the engine, and then turn the steering wheel several times to raise the temperature of the fluid to approximately 50 60°C (122 140°F).
- (2) With the engine running, turn the wheel all the way to the left and right several times.
- (3) Check the fluid in the oil reservoir for foaming or milkiness. Check the difference of the fluid level when the engine is stopped, and while it is running. If the change of the fluid level is 5 mm (0.2 inch) or more, bleed air from the system. (Refer to P.37A-17.)

Q: Is fluid foamy?

YES: Go to Step 4.
NO: Go to Step 10.

STEP 4. Check for entry of air.

Q: Has air entered?

YES: Bleed the air (Refer to P.37A-17.). Then go to Step

10.

NO: Go to Step 5.

STEP 5. Check each hose for crushing or twisting.

Q: Is any hose crushed or twisted?

YES: Repair or replace the hose. Then go to Step 10.

NO: Go to Step 6.

STEP 6. Check for oil leaks.

Q: Are there oil leaks?

YES: Repair it. Then go to Step 10.

NO: Go to Step 7.

STEP 7. Check the wheel alignment (camber and caster).

Refer to GROUP 33A, On-vehicle Service – Front Wheel Alignment Check and Adjustment P.33A-6.

Q: Is the alignment incorrect?

YES: Repair it. Then go to Step 10.

NO: Go to Step 8.

STEP 8. Check the gear box rack piston seal for damage.

Q: Is there damage?

YES: Replace it. Then go to Step 10.

NO: Go to Step 9.

STEP 9. Check for excessive tie rod end ball joint breakaway torque.

Refer to P.37A-14.

Q: Is there fault?

YES: Replace the part. Then go to Step 10.

NO: Go to Step 10.

STEP 10. Check steering wheel operation.

Verify that steering wheel operation is not difficult.

Q: Is the steering wheel operation difficult?

YES: Repeat from Step 1.

NO: The procedure is complete.

INSPECTION PROCEDURE 3: Rattling Noise

DIAGNOSIS

STEP 1. Check for proper oil pump and gear box installation.

Q: Is the oil pump and gear box installation correct?

YES: Go to Step 2.

NO: Repair it. Then go to Step 4.

STEP 2. Check for interference of other parts with the steering column and power steering hoses.

Q: Is there interference?

YES: Correct the interference. Then go to Step 4.

NO: Go to Step 3.

STEP 3. Check for noise from inside the oil pump or gear box.

Q: Is there noise?

YES: Replace the part. Then go to Step 4.

NO: Go to Step 4.

STEP 4. Check for rattling noise.

Confirm that no noise is generated.

Q: Is there noise?

YES: Repeat from Step 1.

NO: The procedure is complete.

INSPECTION PROCEDURE 4: Shrill Noise

DIAGNOSIS

STEP 1. Check for entry of air.

Q: Is the power steering fluid foamy?

YES: Bleed the air. (Refer to P.37A-17.) Then go

to Step 3.

NO: Go to Step 2.

STEP 2. Check for seizure in the oil pump.

Q: Is there seizure?

YES: Replace the part. Then go to Step 3.

NO: Go to Step 3.

STEP 3. Retest the system.

Confirm that no noise is generated.

Q: Is there noise?

YES: Repeat from Step 1.

INSPECTION PROCEDURE 5: Squealing Noise

DIAGNOSIS

STEP 1. Check the belt tension.

Refer to GROUP 00, Maintenance Service – Drive Belts P.00-37.

Q: Is the belt tension incorrect?

YES: Adjust the belt tension. (Refer to GROUP 00, Maintenance Service – Drive Belts P.00-37.) Then go to Step 3.

NO: Go to Step 2.

STEP 2. Check for seizure in the oil pump.

Q: Is there seizure?

YES: Replace the part. Then go to Step 3.

NO: Go to Step 3.

STEP 3. Retest the system.

Confirm that no noise is generated.

Q: Is there noise?

YES: Repeat from Step 1.

NO: The procedure is complete.

INSPECTION PROCEDURE 6: Hissing Noise

DIAGNOSIS

STEP 1. Check for entry of air.

Q: Is the power steering fluid foamy?

YES: Bleed the air. (Refer to P.37A-17.) Then go

to Step 4. **NO**: Go to Step 2.

STEP 2. Check each hose for crushing or twisting.

Q: Is any hose crushed or twisted?

YES: Repair or replace the hose. Then go to Step

4

NO: Go to Step 3.

STEP 3. Check the steering gear box for damage.

Q: Is there damage?

YES: Repair or replace the part. Then go to Step

4.

NO: Go to Step 4.

STEP 4. Retest the system.

Confirm that no noise is generated.

Q: Is there noise?

YES: Repeat from Step 1.

NO: The procedure is complete.

INSPECTION PROCEDURE 7: Droning Noise

DIAGNOSIS

STEP 1. Check the oil pump or oil pump bracket installation.

Q: Is the oil pump or oil pump bracket installation correct?

YES: Go to Step 2.

NO: Repair it. Then go to Step 3.

STEP 2. Check the oil pump for damage.

NOTE: If a slight "beat noise" is produced by the oil pump when the steering wheel is turned fully and held in that position, this is not a malfunction.

Q: Is there damage?

YES: Replace the oil pump. Then go to Step 3.

NO: Go to Step 3.

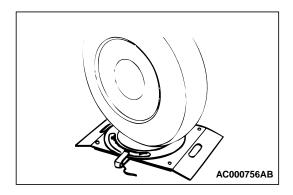
STEP 3. Retest the system.

Confirm that no noise is generated.

Q: Is there noise?

YES: Repeat from Step 1.

INSPECTION PROCEDURE 8: Squeaking Noise



DIAGNOSIS

STEP 1. Check for interference of the wheel and vehicle body.

If interfering, adjust the steering angle.

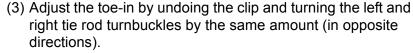
(1) Place the front wheel on a turning radius gauge and measure the steering angle.

Standard value:

ITEM		SPECIFICATI ON
Inside wheel	Vehicle with 14 inch tire	40°40' ± 1°30'
	Vehicle with 15 inch tire	39°30' ± 1°30'
Outside wheel	Vehicle with 14 inch tire	33°20'
(reference)	Vehicle with 15 inch tire	32°30'

(2) If the steering angle is not within the standard value, adjust the toe-in.

Standard value: 1 ± 2 mm (0.04 \pm 0.09 inch)

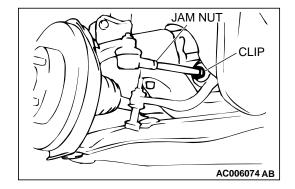


NOTE: The toe will move out as the left turnbuckle is turned toward the front of the vehicle and the right turnbuckle is turned toward the rear of the vehicle.

Q: Is the steering angle normal?

YES: Go to Step 2.

NO: Adjust the steering angle. Then go to Step 3.



STEP 2. Check the steering gear box for damage.

Q: Is there damage?

YES: Repair or replace the part. Then go to Step 3.

NO: Go to Step 3.

STEP 3. Retest the system.

Confirm that no noise is generated.

Q: Is there noise?

YES: Repeat from Step 1.

INSPECTION PROCEDURE 9: Vibration

NOTE: A slight vibration may be felt when the stationary steering effort is made due to the condition of the road surface. To check whether the vibration actually exists or not, test-drive the vehicle on a dry concrete or asphalt surface. A very slight amount of vibration is not a malfunction.

DIAGNOSIS

STEP 1. Check for entry of air.

Q: Is the power steering fluid foamy?

YES: Bleed the air. (Refer to P.37A-17.) Then go

to Step 3.

NO: Go to Step 2.

STEP 2. Check the steering gear box for damage.

Q: Is there damage?

YES: Repair or replace the part. Then go to Step

3.

NO: Go to Step 3.

STEP 3. Retest the system.

Confirm that no vibration is generated.

Q: Is there vibration?

YES: Repeat from Step 1.

NO: The procedure is complete.

INSPECTION PROCEDURE 10: Oil Leakage from Hose Connection

DIAGNOSIS

STEP 1. Check for loosening of the flare nut.

Q: Is the flare nut loose?

YES: Tighten it to 15 ± 3 N·m (11 ± 2 ft-lb). Then

go to Step 3.

NO: Go to Step 2.

STEP 2. Check the hose connection and the clamp installation.

Q: Are they correct?

YES: Go to Step 3.

NO: Repair or replace the part. Then go to Step

3.

STEP 3. Retest the system.

Check that no oil is leaking.

Q: Is there oil leakage?

YES: Repeat from Step 1.

NO: The procedure is complete.

INSPECTION PROCEDURE 11: Oil Leakage from Hose Assembly

DIAGNOSIS

STEP 1. Check the hose for damage or clogging.

Q: Is the hose damaged or clogged?

YES: Repair or replace it. Then go to Step 2.

NO: Go to Step 2.

STEP 2. Retest the system.

Check that no oil is leaking.

Q: Is there oil leakage?

YES: Repeat from Step 1.

INSPECTION PROCEDURE 12: Oil Leakage from Oil Reservoir

DIAGNOSIS

STEP 1. Check the oil reservoir for damage.

Q: Is there damage?

YES: Repair or replace it. Then go to Step 3.

NO: Go to Step 2.

STEP 2. Check for overflowing.

Q: Is there oil overflowing from the reservoir?

YES: Adjust fluid level. Then go to Step 3.

NO: Go to Step 3.

STEP 3. Retest the system.

Q: Is there oil leakage?

YES: Repeat from to Step 1.
NO: The procedure is complete.

INSPECTION PROCEDURE 13: Oil Leakage from Oil Pump

DIAGNOSIS

STEP 1. Check the oil pump body for damage.

Q: Is there damage?

YES: Replace the part. Then go to Step 3.

NO: Go to Step 2.

STEP 2. Check the O-ring or oil seal for damage.

Q: Is there damage?

YES: Replace the part. Then go to Step 3.

NO: Go to Step 3.

STEP 3. Retest the system.

Check that no oil is leaking.

Q: Is there oil leakage?

YES: Repeat from Step 1.

NO: The procedure is complete.

INSPECTION PROCEDURE 14: Oil Leakage from Gear Box

DIAGNOSIS

STEP 1. Check the gear box housing for damage.

Q: Is there damage?

YES: Replace the part. Then go to Step 3.

NO: Go to Step 2.

STEP 2. Check the oil-ring or oil seal for damage.

Q: Is there damage?

YES: Replace the part. Then go to Step 3.

NO: Go to Step 3.

STEP 3. Retest the system.

Check that no oil is leaking.

Q: Is there oil leakage?

YES: Repeat from Step 1.

SPECIAL TOOLS

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TOOL	TOOL NUMBER	SUPERSESSION	APPLICATION
TOOL	AND NAME	SOFERSESSION	AFFLICATION
	MB991897	MB991113-01,	Tie rod end disconnection
AC106827	Ball joint remover	MB990635-01 or general service tool	NOTE: Steering linkage puller (MB990635 or MB991113) is also used to disconnect knuckle and tie rod end ball joint.
Молоотом	MB990748 Ornament remover	General service tool	Cover removal
MB990784			
MB991006	MB990228 or MB991006 Preload socket	MB990228-01	Gear box total pinion torque check
	MB990326	General service	Tie rod end ball joint breakaway
MB990326	Preload socket	tool	torque check
MB991548	MB991548 Power steering oil pressure gauge adapter (Pump side)	MB991548-01	Oil pump pressure test
	MB991549	MB991549-01	-
MB991549	Power steering oil pressure gauge adapter (Hose side)	1949-U I	
MB990662	MB990662 Oil pressure gauge assembly	MB990662-01	
МВ990662			

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
MB991204	MB991204 Torque wrench socket	General service tool	 Rack support adjustment Rack support cover removal
MB990925	MB990925 Bearing and oil seal installer set	MB990925-01 or general service tool	 Oil seal and bearing installation MB990926, MB990927, MB990938, MB990939 (For details, refer to GROUP 26, Special Tools P.26-4.)
MB991120	MB991120 Needle bearing puller	Tool not available	Needle roller bearing removal
MB991202	MB991202 Oil seal and bearing installer	General service tool	 Oil seal installation Rack housing bearing installation
MB991197	MB991197 Bar (long type)	General service tool	
MB991212	MB991212 Rack installer	_	Rack installation
MB991203	MB991203 Oil seal and bearing installer	Tool not available	Oil seal and bearing installation
MB991317	MB991317 Seal ring installer	Tool not available	Seal ring installation

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
MB990941	MB990941 Torque tube bearing installer	MB990941-01 or general service tool	Valve housing oil seal installation
MB991561	MB991561 Boot band crimping tool	MB991561	Bellows band installation
MB990776	MB990776 Front axle base	MB990776-01	Dust cover installation

ON-VEHICLE SERVICE

STEERING WHEEL FREE PLAY CHECK

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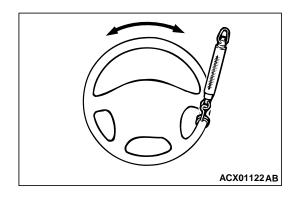
- 1. With the engine running (hydraulic operation), set the front wheels straight ahead.
- 2. Measure the play on the steering wheel circumference before the wheels start to move when slightly moving the steering wheel in both directions.

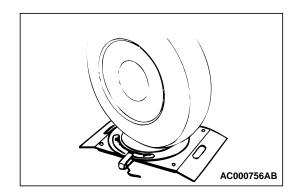
Limit: 30 mm (1.2 inch)

- 3. When the play exceeds the limit, check for the play on the steering shaft and steering linkage connection. Correct or replace.
- 4. If the free play still exceeds the limit value, set the steering wheel straight ahead with the engine stopped. Load 5 N (1.1 pound) towards the steering wheel circumference and check the play.

Standard value (steering wheel play with the engine stopped): 10 mm (0.4 inch) or less

5. If the play exceeds the standard value, remove the steering gear box (Refer to P.37A-24.) and check total pinion torque (Refer to P.37A-24.).





STEERING ANGLE CHECK

M1372001100244

1. Place the front wheel on a turning radius gauge and measure the steering angle.

Standard value:

ITEM		SPECIFICATI ON
Inside wheel	Vehicle with 14 inch tire	40°40' ± 1°30'
	Vehicle with 15 inch tire	39°30' ± 1°30'
Outside wheel	Vehicle with 14 inch tire	33°20'
(reference)	Vehicle with 15 inch tire	32°30'

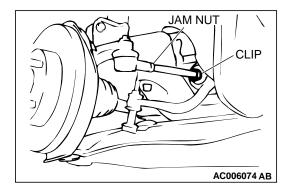
2. If the steering angle is not within the standard value, adjust the toe-in.

Standard value: 1 ± 2 mm (0.04 \pm 0.09 inch)

- 3. Loosen the jam nut, and unclip the bellows.
- 4. Adjust the toe-in by turning the left and right tie rod turnbuckles by the same amount (in opposite directions).

 NOTE: The toe will move out as the left turnbuckle is turned toward the front of the vehicle and the right turnbuckle is turned toward the rear of the vehicle.
- 5. Tighten the jam nut to the specified torque, and tighten the bellows by the clip.

Standard torque: $40 \pm 5 \text{ N} \cdot \text{m}$ (29 $\pm 4 \text{ ft-lb}$)



TIE ROD END BALL JOINT BREAKAWAY TORQUE CHECK

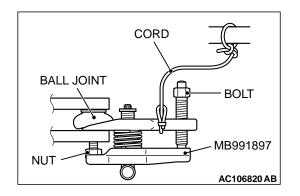
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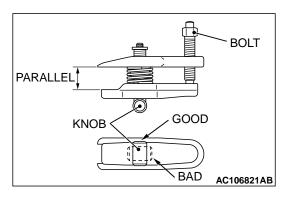
Required Special Tools:

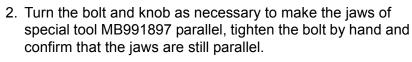
- MB990326: Preload Socket
- MB991897: Ball Joint Remover

⚠ CAUTION

- Do not remove the nut from the ball joint. Loosen it and use special tool MB991897 to avoid possible damage to the ball joint threads.
- Hang special tool MB991897 with rope or wire to prevent them from falling.
- 1. Install the special tool MB991897 as shown in the figure.

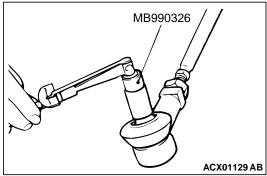






NOTE: When adjusting the jaws in parallel, make sure the knob is in the position shown in the figure.

3. Tighten the bolt with a wrench to disconnect the tie rod end.



 Move the ball joint stud several times and install the nut on the stud. Measure the ball joint breakaway torque with special tool MB990326.

Standard value: 0.5 – 2.5 N⋅m (4.4 – 22.1 in-lb)

- 5. If the breakaway torque exceeds the standard value, replace the tie rod end.
- 6. If the breakaway torque is under the standard value, check the ball joint for end play or ratcheting. If no end play or ratcheting, the ball joint can be re-used.



Always use a new ball joint nut as it is a self-locking nut.

7. Tighten the nut to the specified torque.

Tightening torque: $25 \pm 5 \text{ N} \cdot \text{m}$ (19 \pm 3 ft-lb)

STATIONARY STEERING EFFORT CHECK

M1372001700213

- 1. With the vehicle stopped on a flat and paved surface, turn the steering wheel to the straight ahead position.
- 2. Start the engine and set the engine idle speed.

Standard value: 700 \pm 50 r/min

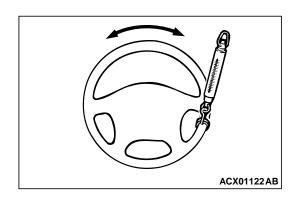
3. Attach a spring scale to the outer circumference of the steering wheel and measure the steering force required to turn the steering wheel from the straight ahead position to the left and right (within a range of 1.5 turns). Also check to be sure that there is no significant change in the required steering effort.

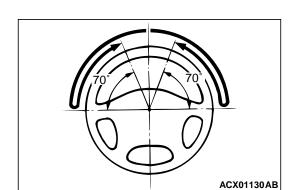
Standard value:

Steering effort: 29 N (6.5 lb) or less

Fluctuation allowance: 5.9 N (1.33 lb) or less

 If the measured value exceeds the standard value, refer to Inspection Procedure 2 "Difficult Steering Wheel Operation (Insufficient Power Assist) P.37A-4.





STEERING WHEEL RETURN TO CENTER CHECK

M1372001800210

Conduct a road test:

- 1. Make both gradual and sudden turns and check the steering wheel return.
- At a vehicle speed of approximately 35 km/h (22 mph), turn the steering wheel 90 degrees, hold a few seconds, then release. If the steering wheel then returns 70 degrees or more, the return can be judged satisfactory.

NOTE: There will be a momentary feeling or "heaviness" when the wheel is turned quickly, but this is not abnormal. (Oil pump discharge amount is especially apt to be insufficient during idling.)

DRIVE BELT TENSION CHECK

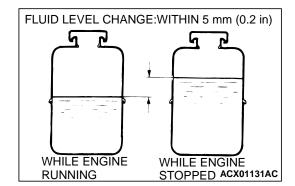
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Refer to GROUP 00, Maintenance Service – Drive Belts P.00-37.

FLUID LEVEL CHECK

M1372002000217

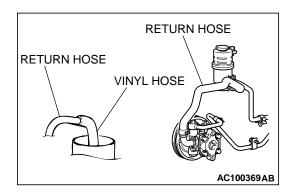
- Park the vehicle on a flat, level surface, start the engine, and then turn the steering wheel several times to raise the temperature of the fluid to approximately 50 – 60°C (122 – 140°F).
- 2. With the engine running, turn the wheel all the way to the left and right several times.
- Check the fluid in the oil reservoir for foaming or milkiness. Check the difference of the fluid level when the engine is stopped, and while it is running. If the change of the fluid level is 5 mm (0.2 inch) or more, air bleeding should be done.



FLUID REPLACEMENT

M1372002100225

1. Raise and support the front wheels.



- 2. Disconnect the return hose connection.
- 3. Connect a vinyl hose to the return hose, and drain the fluid into a container.

↑ CAUTION

Be careful not to position the high-tension cable near the fuel rail.

- 4. Disconnect the high-tension cable.
- 5. While operating the starter motor intermittently, turn the steering wheel all the way to the left and right several times to drain all of the fluid.
- 6. Connect the return hose securely, and then secure with the clip.
- 7. Fill the oil reservoir with GENUINE MITSUBISHI POWER STEERING FLUID up to the lower position of the filler, and then bleed the air.

POWER STEERING SYSTEM AIR BLEEDING

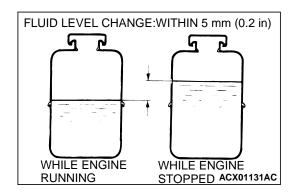
M1372002200233

Perform air bleeding procedure as necessary after replacing the steering gear box or the steering fluid lines.

- 1. Raise and support the front wheels.
- 2. Disconnect the high-tension cable. Turn the steering wheel all the way to the left and right five or six times while using the starter motor to crank the engine intermittently several times (for 15 to 20 seconds).

⚠ CAUTION

- Be careful not to place the high-tension cable near the fuel rail.
- Perform air bleeding only while cranking the engine. If air bleeding is performed while the engine is running, air could enter the fluid. During air bleeding, refill the steering fluid supply so that the level never falls below the lower mark on the dipstick.
- 3. Connect the high-tension cable. Start the engine (idling).
- 4. Turn the steering wheel to the left and right until there are no air bubbles in the oil reservoir.
- 5. Confirm that the fluid is not milky, and that the level is between the high and low dipstick marks.
- 6. Confirm that there is very little change in the fluid level when the steering wheel is turned left and right.
- 7. Confirm that the change in the fluid level is no more than 5 mm (0.2 inch) when the engine is stopped and when it is running.



PRESSURE SHUT-OFF VALVE (FULLY CLOSED) RESERVOIR ADAPTER (MB991548) ADAPTER (MB991549) ACX01133 AB

⚠ CAUTION

If the fluid level rises suddenly after the engine is stopped, the air has not been completely bled. If air bleeding is not complete, there will be abnormal noises from the pump and the flow-control valve, and this condition could cause reduce the life of the power steering components.

8. If the change of the fluid level is 5 mm (0.2 inch) or more, the air has not been completely bled from the system. The air bleeding procedure must be repeated.

OIL PUMP PRESSURE TEST

M1372002300229

Required Special Tools:

- MB990662: Pressure Gauge
- MB991548: Power Steering Oil Pressure Gauge Adapter (Pump Side)
- MB991549: Power Steering Oil Pressure Gauge Adapter (Hose Side)
- Disconnect the pressure hose from the oil pump, and then connect special tools MB991548, MB990662 and MB991549.
- 2. Bleed air, then turn the steering wheel several times while the vehicle is not moving so that the temperature of the fluid rises to approximately $50 60^{\circ}\text{C}$ ($122 140^{\circ}\text{F}$).
- 3. Start the engine and idle it at 700 \pm 50 r/min.

⚠ CAUTION

The pressure gauge shut-off valve must not remain closed for more than 10 seconds.

4. Fully close the shut-off valve of the pressure gauge and measure the oil pump relief pressure to confirm that it is within the standard value range. Open it again immediately after checking the pressure.

Standard value: 8.8 – 9.5 MPa (1,276 – 1,378 psi)

- 5. If it is not within the standard value, replace the oil pump.
- 6. Check whether or not the hydraulic pressure is the standard value when no-load conditions are created by fully opening the shut-off valve of the pressure gauge.

Standard value: 0.8 – 1.0 MPa (116 – 145 psi)

- 7. If it is not within the standard value, the probable cause is a malfunction of the oil line or steering gear box, so check these parts and repair as necessary.
- 8. Turn the steering wheel all the way to the left or right; then check whether or not the retention hydraulic pressure is the standard value.

Standard value: 8.8 - 9.5 MPa (1,276 - 1,378 psi)

- 9. If not the standard value, overhaul the steering gear box. Remeasure fluid pressure.
- Remove special tools MB991548, MB990662 and MB991549, and then tighten the pressure hose to the specified torque.

Tightening torque: 57 \pm 7 N·m (42 \pm 5 ft-lb)

11. Bleed the system. (Refer to P.37A-17.)

POWER STEERING PRESSURE SWITCH CHECK

M13720072002

Required Special Tools:

- MB990662: Pressure Gauge
- MB991548: Power Steering Oil Pressure Gauge Adapter (Pump Side)
- MB991549: Power Steering Oil Pressure Gauge Adapter (Hose Side)
- Disconnect the pressure hose from the oil pump, and then connect special tools MB991548, MB990662 and MB991549.
- 2. Bleed air, and then turn the steering wheel several times while the vehicle is not moving so that the temperature of the fluid rises to approximately 50 60°C (122 140°F).
- 3. The engine should be idling.
- 4. Disconnect the connector for the oil pressure switch, and place an ohmmeter at the switch.
- 5. Gradually close the shut-off valve of the pressure gauge and increase the hydraulic pressure, then check whether or not the hydraulic pressure that activates the switch is the standard value.

Standard value: 1.5 - 2.0 MPa (217 - 290 psi)

6. Gradually open the shut-off valve and reduce the hydraulic pressure; then check whether or not the hydraulic pressure that deactivates the switch is the standard value.

Standard value: 0.7 – 2.0 MPa (102 – 290 psi)

7. Remove special tools MB991548, MB990662 and MB991549, and then tighten the pressure hose to the specified torque.

Tightening torque: $57 \pm 7 \text{ N} \cdot \text{m} (42 \pm 5 \text{ ft-lb})$

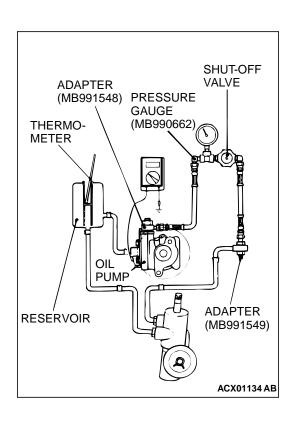
8. Bleed the system. (Refer to P.37A-17.)

BALL JOINT DUST COVER CHECK

M1372008600080

- 1. Press the dust cover with your finger to check whether the dust cover is cracked or damaged.
- 2. If the dust cover is cracked or damaged, replace the tie rod end.

NOTE: If the dust cover is cracked or damaged, the ball joint could be damaged.



STEERING WHEEL AND SHAFT ASSEMBLY

REMOVAL AND INSTALLATION

M1372002600208

MARNING

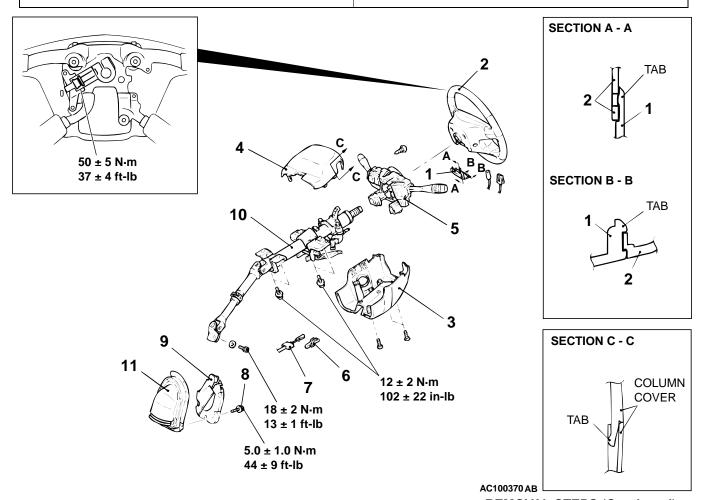
- Before removing the air bag module, refer to GROUP 52B, Service Precautions and Air Bag Module and Clock Spring P.52Ba-16.
- When removing and installing the steering wheel, do not let it bump against the air bag module.

Post-removal Operation

• Instrument Under Cover Removal (Refer to GROUP 52A, Instrument Panel P.52A-2.)

Post-installation Operation

- Instrument Under Cover Removal (Refer to GROUP 52A, Instrument Panel P.52A-2.)
- Checking Steering Wheel Position with Wheels Straight Ahead



REMOVAL STEPS

<<A>>> <>>

- 1. COVER
- 2. STEERING WHEEL AND AIR BAG MODULE ASSEMBLY
- 3. LOWER COLUMN COVER
- 4. UPPER COLUMN COVER
- CLOCK SPRING AND COLUMN SWITCH ASSEMBLY (REFER TO GROUP 52B, AIR BAG MODULE AND CLOCK SPRING P.52Ba-27.)
- 6. COVER <A/T>
- 7. KEY INTERLOCK CABLE <A/T>

REMOVAL STEPS (Continued)

>>**A**<< 8. Bolt

- 9. SHAFT COVER
- STEERING COLUMN SHAFT ASSEMBLY
- 11. COVER ASSEMBLY

Required Special Tool:

• MB990784: Ornament remover

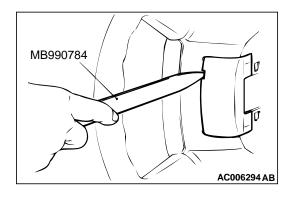
TSB Revision





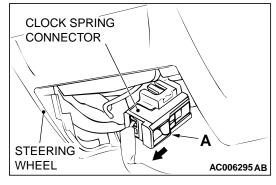
Insert the special tool MB990784 at the indicated position to remove the cover.

NOTE: The special tool MB990784 can be inserted through the notch behind the area shown.



<> STEERING WHEEL AND AIRBAG MODULE ASSEMBLY REMOVAL

 By sliding section A of the clock spring connector shown in the illustration in the arrow direction, disconnect the connector.



2. Loosen the bolt completely. Then, remove the steering wheel and airbag module assembly.

NOTE: Use a hexagonal bit socket or a hexagonal wrench having an effective length of 75 mm (3.0 inches) or more in the hexagonal section and the diameter of 8 mm (0.31 inches) or more.

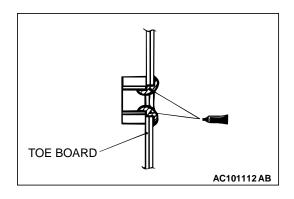


INSTALLATION SERVICE POINT

>>A<< BOLT

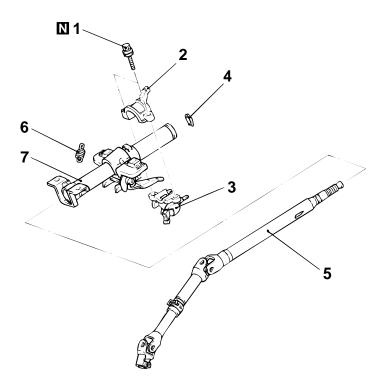
Before installing the bolt, coat the mounting hole on the toe board with the specified sealant.

Specified Sealant: 3M™ AAD Part No. 8633 Windo-weld Resealant or equivalent



DISASSEMBLY AND ASSEMBLY

M1372002800194



AC100394 AB

DISASSEMBLY STEPS

<<A>> >>A<< 1. SPECIAL BOLT

>>A<< 2. STEERING LOCK BRACKET

>>A<< 3. STEERING LOCK CYLINDER

ASSEMBLY

4. SNAP RING

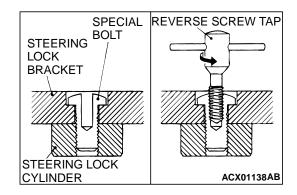
DISASSEMBLY STEPS (Continued)

- 5. STEERING SHAFT ASSEMBLY
- 6. TILT SPRING
- 7. STEERING COLUMN ASSEMBLY

DISASSEMBLY SERVICE POINT

<<A>> SPECIAL BOLT REMOVAL

- 1. Drill in the special bolt a hole deep enough for the tap to stand.
- 2. Remove the special bolt with a left-hand tap.



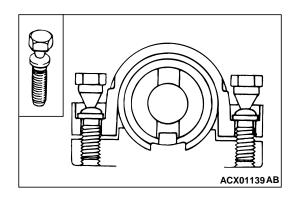
ASSEMBLY SERVICE POINT

>>A<< STEERING LOCK CYLINDER ASSEMBLY/STEER-ING LOCK BRACKET/SPECIAL BOLT INSTALLATION

⚠ CAUTION

The steering lock bracket and bolts must be replaced with new ones when the steering lock is installed.

- 1. When installing the steering lock cylinder and steering lock bracket to the column tube, temporarily install the steering lock in alignment with the column boss.
- 2. After checking that the lock works properly, tighten the special bolts until the head twists off.



POWER STEERING GEAR BOX AND LINKAGE

REMOVAL AND INSTALLATION

M1372010900099

MARNING

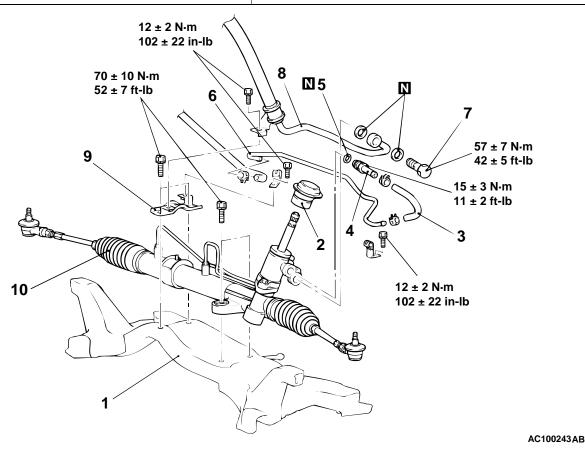
Before removing the steering gear box, refer to GROUP 52B. Center the front wheels and remove the ignition key. Failure to do so may damage the SRS clock spring and render the SRS system inoperative, risking serious injury.

Pre-removal Operation

• Power Steering Fluid Draining (Refer to P.37A-16.)

Post-installation Operation

- Check the Dust Cover for Cracks or Damage by Pushing it with Your Finger.
- Power Steering Fluid Supplying (Refer to P.37A-16.)
- Power Steering Fluid Line Bleeding (Refer to P.37A-17.)
- Checking Steering Wheel Position with Wheels Straight Ahead.
- Front Wheel Alignment Adjustment (Refer to GROUP 33A, On-vehicle Service – Front Wheel Alignment Check and Adjustment P.33A-6.)



REMOVAL STEPS

- CROSSMEMBER (REFER TO GROUP 32, CROSSMEMBER P.32-8.)
- REAR ROLL STOPPER (REFER TO GROUP 32, ENGINE ROLL STOPPER AND CROSSMEMBER P.32-6)
- 2. JOINT COVER GROMMET

REMOVAL STEPS (Continued)

- 3. RETURN HOSE
- 4. RETURN TUBE
- 5. O-RING
- 6. RETURN TUBE
- 7. EYE BOLT
- 8. PRESSURE HOSE ASSEMBLY
- 9. CLAMP
- 10. STEERING GEAR AND LINKAGE

INSPECTION

M1372011000118

GEAR BOX TOTAL PINION TORQUE CHECK

⚠ CAUTION

When holding the steering gear box assembly in a vice, secure its mounting positions. If it is secured in any other place, the gear housing may become deformed or damaged.

Using special tool MB991006, rotate the pinion gear at the rate of one rotation in approximately 4 to 6 seconds to check the total pinion torque.

Standard value: $0.6 - 1.9 \text{ N} \cdot \text{m} (5.3 - 14.2 \text{ in-lb})$ [Change in torque: $0.4 \text{ N} \cdot \text{m} (3.5 \text{ in-lb})$ or less]

NOTE: When measuring, remove the bellows from the rack housing. Measure the pinion torque through the whole stroke of the rack

If the measured value is not within the standard range, first adjust the rack support cover, and then check the total pinion torque again.

If the total pinion torque cannot be adjusted to within the standard range by adjusting the rack support cover, check the rack support cover, rack support spring, rack support and replace any parts if necessary.



- 1. Give 10 hard swings to the tie rod.
- 2. Measure the tie rod swing resistance with a spring scale.

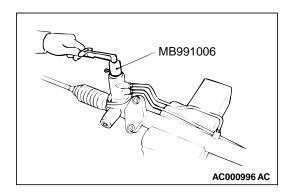
Standard value: $6 - 19 \text{ N} (26.7 - 84.5 \text{ lb}) [1.5 - 4.9 \text{ N} \cdot \text{m} (13.2 - 43.4 \text{ in-lb})]$

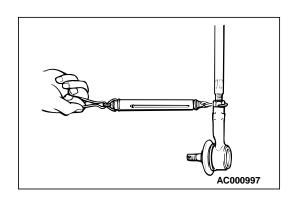
- 3. If the measured value exceeds the standard value, replace tie rod.
- 4. If the measured value is below the standard value, the tie rod can be re-used if it swings smoothly without excessive play.

TIE ROD END BALL JOINT DUST COVER CHECK

- 1. Check the dust cover for cracks or damage by pushing it with your finger.
- 2. If the dust cover is cracked or damaged, replace the tie rod end. (Refer to P.37A-26.)

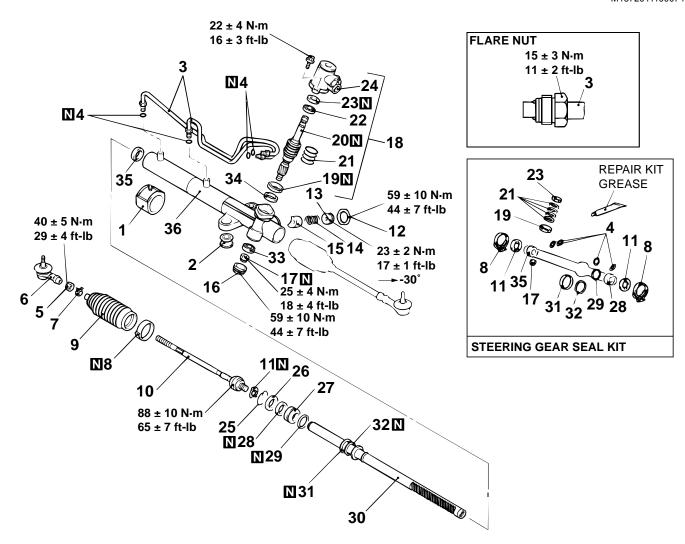
NOTE: Cracks or damage of the dust cover may damage the ball joint. If it is damaged during service work, replace the dust cover. (Refer to P.37A-37.)





DISASSEMBLY AND ASSEMBLY

M1372011100074



AC100244 AB

	>>M<< >>L<<	2. 3. 4. 5. 6. 7. 8. 9. 10.	DISASSEMBLY STEPS GEAR MOUNTING RUBBER CUSHION GEAR HOUSING MOUNTING BUSHING FEED PIPE O-RING LOCK NUT TIE ROD END CLIP BAND BELLOWS TIE ROD TAB WASHER TOTAL PINION TORQUE	< > <c>> <c>> <d>> <<d>> <<e>> <<f>> </f>> </f>> </f>> <</f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></f></e></d></d></c></c>	>>G<< >>F<< >>F<< >>E<< >>D<< >>D<<	20. 21. 22. 23. 24. 25. 26. 27. 28. 29.	DISASSEMBLY STEPS (Continued) JAM NUT VALVE HOUSING ASSEMBLY LOWER OIL SEAL PINION AND VALVE ASSEMBLY SEAL RING UPPER BEARING UPPER OIL SEAL VALVE HOUSING CIRCLIP RACK STOPPER RACK BUSHING OIL SEAL O-RING RACK ASSEMBLY
	>>K<<	•	TOTAL PINION TORQUE ADJUSTMENT	-	>>C<<		
<< A>>	>>J<< >>J<<	13. 14.	JAM NUT RACK SUPPORT COVER SUPPORT SPRING RACK SUPPORT END PLUG	< <h>>></h>	>>B<<	33. 34.	LOWER BEARING NEEDLE BEARING OIL SEAL GEAR HOUSING

TSB Revision

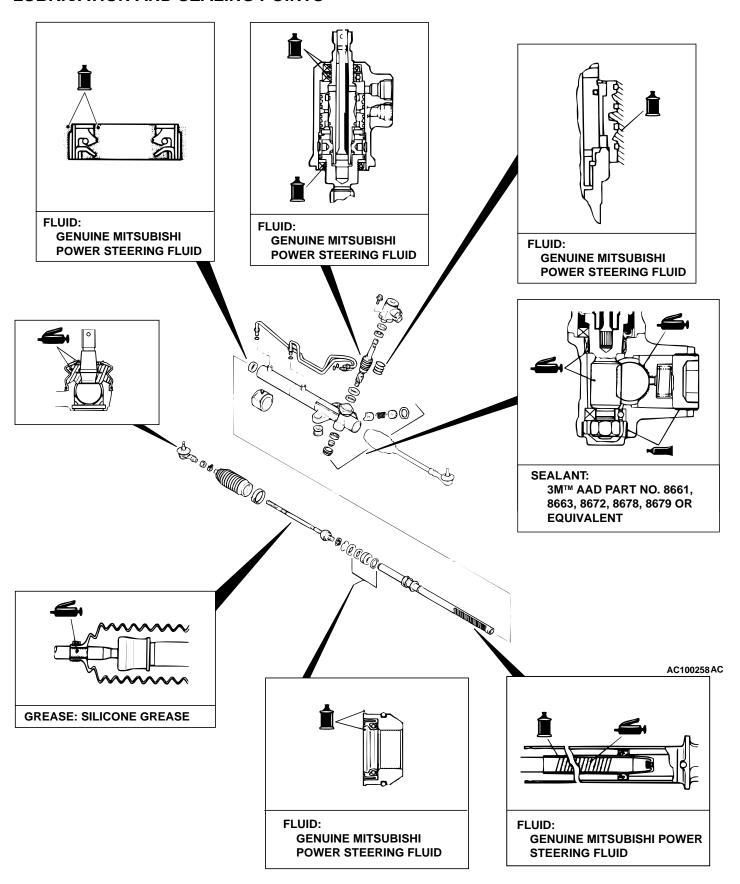
POWER STEERING POWER STEERING GEAR BOX AND LINKAGE

Required Special Tools:

- MB990776: Front Axle Base
- MB990927: Installer Adapter
- MB990938: Bar (Snap-in type)
- MB990939: Brass Bar
- MB990941: Torque Tube Bearing Installer
- MB991006: Preload Socket
- MB991120: Needle Bearing Puller

- MB991152: Dust Cover Installer
- MB991197: Bar (Long type)
- MB991202: Oil Seal and Bearing Installer
- MB991203: Oil Seal and Bearing Installer
- MB991204: Torque Wrench Socket
- MB991212: Rack Installer
- MB991317: Seal Ring Installer
- MB991561: Boot Band Crimping Tool

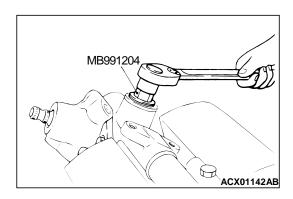
LUBRICATION AND SEALING POINTS



DISASSEMBLY SERVICE POINTS

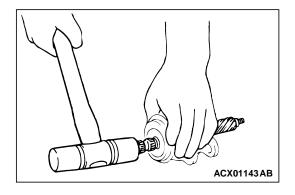


Using special tool MB991204, remove the rack support cover from the gear box.



<> LOWER OIL SEAL/PINION AND VALVE ASSEMBLY REMOVAL

Using a plastic hammer, gently tap the pinion to remove it.

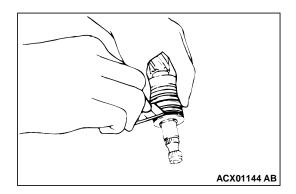


<<C>> SEAL RING REMOVAL

⚠ CAUTION

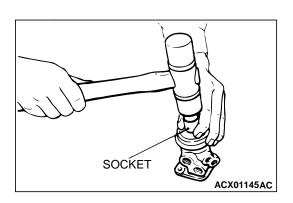
When cutting the seal ring, be careful not to damage the pinion and valve assembly or the rack.

Cut the seal ring and remove it from the pinion and valve assembly and the rack.



<<D>> UPPER BEARING/UPPER OIL SEAL REMOVAL

Using a socket, remove the oil seal and the ball bearing from the valve housing simultaneously.

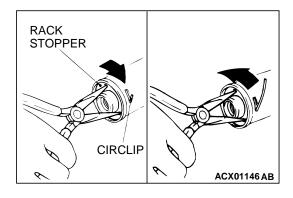




⚠ CAUTION

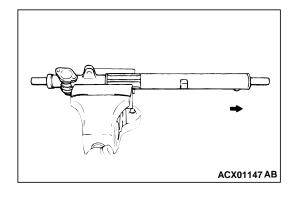
If the rack stopper is first turned counterclockwise, the circlip will get caught in the slot in the housing and the rack stopper will not turn.

- 1. Turn the rack stopper clockwise until the end of the circlip comes out of the slot in the rack housing.
- 2. Turn the rack stopper counterclockwise to remove the circlip.



<<F>> RACK STOPPER/RACK BUSHING/OIL SEAL/O-RING/RACK ASSEMBLY REMOVAL

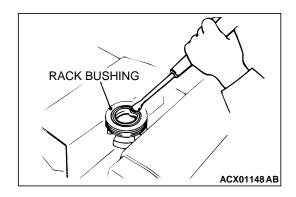
1. Pull out the rack slowly. Take out the rack stopper and the rack bushing at the same time.

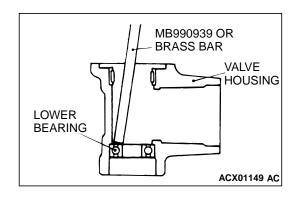


⚠ CAUTION

Do not damage the oil seal press fitting surface.

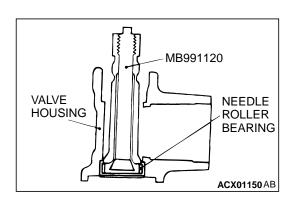
2. Partially bend the oil seal and remove it from the rack bushing.





<<G>> LOWER BEARING REMOVAL

Use a brass bar or special tool MB990939 to remove the ball bearing from the gear housing.



<<H>> NEEDLE BEARING REMOVAL

⚠ CAUTION

Do not open special tool MB991120 excessively to prevent damaging housing interior.

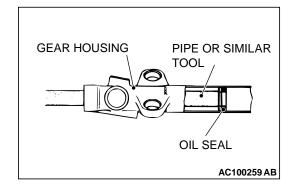
Use special tool MB991120 to remove the needle roller bearing from the rack housing.



⚠ CAUTION

Be careful not to damage the inner surface of the rack cylinder of the gear housing.

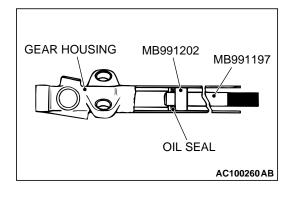
Use a piece of pipe or similar tool to remove the oil seal from the gear housing.



ASSEMBLY SERVICE POINTS

>>A<< OIL SEAL INSTALLATION

- 1. Apply a coating of GENUINE MITSUBISHI POWER STEERING FLUID to the both sides of the oil seal.
- 2. Using special tools MB991202 and MB991197, press the oil seal into the rack housing.



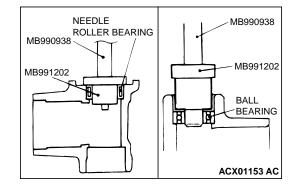
>>B<< NEEDLE BEARING/LOWER BEARING INSTALLATION

1. Apply GENUINE MITSUBISHI POWER STEERING FLUID to housing, bearing and oil seal press fitting surface.

⚠ CAUTION

Press-fit straight. The valve housing is aluminum, and may become deformed if press-fit on an angle.

2. Press fit needle roller bearing with special tools MB990938 and MB991202.

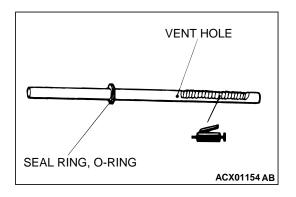


>>C<< RACK ASSEMBLY INSTALLATION

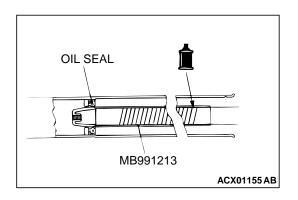
⚠ CAUTION

Do not close the vent hole in the rack with grease.

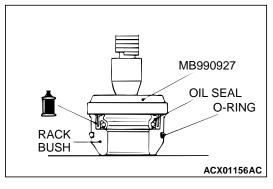
1. Apply a coating of multipurpose grease to the rack teeth face.



POWER STEERING POWER STEERING GEAR BOX AND LINKAGE

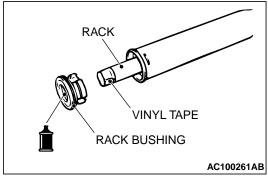


- 2. Cover rack serrations with special tool MB991213.
- 3. Apply GENUINE MITSUBISHI POWER STEERING FLUID to special tool MB991213.
- 4. Align the center of the oil seal with the rack to prevent the retainer spring from slipping. Slowly insert the rack from power cylinder side.



>>D<< OIL SEAL/RACK BUSHING INSTALLATION

1. Apply GENUINE MITSUBISHI POWER STEERING FLUID to the outer surface of the oil seal. Using the special tool, press in the oil seal until it is flush with the bushing end face.



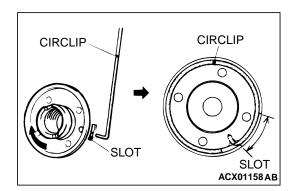
- 2. Apply GENUINE MITSUBISHI POWER STEERING FLUID to the oil seal inner surface and the O-ring.
- 3. Wrap the rack end with plastic tape, and push the rack bushing onto the rack.

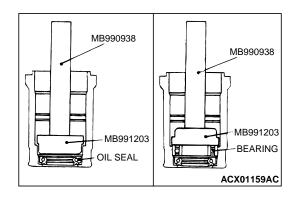


⚠ CAUTION

Insert the circlip to the rack stopper hole while turning the rack stopper clockwise.

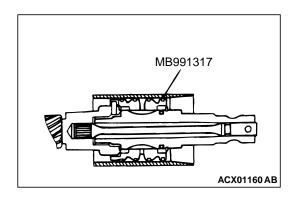
Insert the circlip to the rack stopper hole through cylinder hole. Turn the rack stopper clockwise and insert the circlip firmly.





>>F<< UPPER OIL SEAL/UPPER BEARING INSTALLATION

Apply a coating of GENUINE MITSUBISHI POWER STEER-ING FLUID to the outside of the upper oil seal/upper bearing. Using special tools MB990938 and MB991203, press the upper oil seal/upper bearing into the valve housing.



>>G<< SEAL RING INSTALLATION

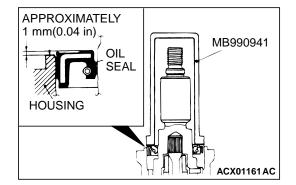
Because the seal rings expand after installation, tighten after installing by using special tool MB991317 to compress the rings, or press down by hand.

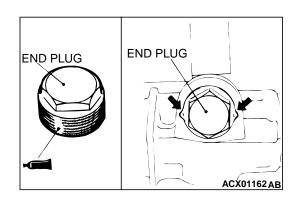
>>H<< OIL SEAL INSTALLATION

⚠ CAUTION

To eliminate a seal malfunction at the valve housing alignment surface, the upper surface of the oil seal should project outward approximately 1 mm (0.04 inch) from the housing edge surface.

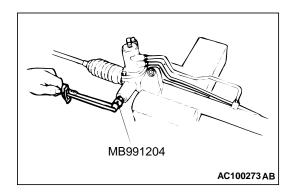
Using special tool MB990941, press the oil seal into the valve housing.





>>I<< END PLUG INSTALLATION

- 1. Apply 3M[™] AAD Part number 8661, 8663, 8672, 8678, 8679 or equivalent to the threaded part of the end plug.
- 2. Secure the threaded portion of the end plug at two places by using a punch.



>>J<< RACK SUPPORT COVER/JAM NUT INSTALLATION

- Position the rack at its center.
- 2. Apply 3M[™] AAD Part number 8661, 8663, 8672, 8678, 8679 or equivalent to the threaded part of the rack support cover.
- 3. Use special tool MB991204 to tighten the rack support cover to 23 \pm 2 N·m (17 \pm 1 ft-lb).
- 4. Turn the rack support cover 30 degree angle counterclockwise.
- 5. Use special tool MB991204 to hold the rack support cover, and then tighten the jam nut to $59 \pm 10 \text{ N} \cdot \text{m}$ (44 $\pm 7 \text{ ft-lb}$).

>>K<< TOTAL PINION TORQUE ADJUSTMENT

⚠ CAUTION

- Be sure there is no ratcheting or catching when operating the rack towards the shaft.
- Measure the total pinion torque through the whole stroke of the rack.
- 1. Using special tool MB991006, rotate the pinion shaft at the rate of one rotation in four to six seconds to check the total pinion torque and the change in torque.

Standard value:

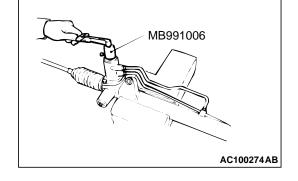
Total pinion torque: $0.6 - 1.6 \text{ N} \cdot \text{m} (5.3 - 14.2 \text{ in-lb})$ [Change in torque: $0.4 \text{ N} \cdot \text{m} (3.5 \text{ in-lb})$ or less]

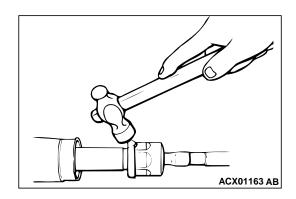


When adjusting, set at the highest value of the standard value range.

 If the total pinion torque or the change in torque is outside the standard value, move the rack support cover 0 – 30 degree angle, and adjust the pinion torque again.
 NOTE: If the total pinion toque cannot be adjusted to the

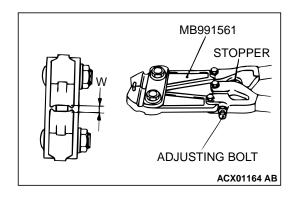
NOTE: If the total pinion toque cannot be adjusted to the standard value within the specified return angle, check the rack support cover components and replace any parts if necessary.





>>L<< TAB WASHER/TIE ROD INSTALLATION

After installing the tie rod to the rack, fold tab washer end (two locations) to tie rod notch.



>>M<< BELLOWS BAND INSTALLATION

1. Turn the adjusting bolt of special tool MB991561 to adjust the opening dimension (W) to the standard value.

NOTE: The dimension (W) is adjusted by approximately 0.7 mm (0.03 inch) per one turn.

NOTE: Do not turn the adjusting bolt more than one turn.

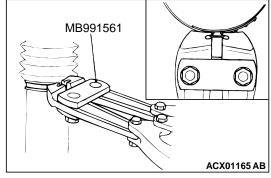
Standard value (W): 2.9 mm (0.11 inch)

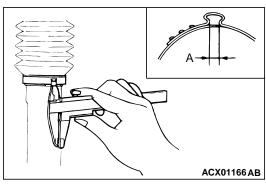
<When more than 2.9 mm (0.11 inch)>: Screw in the adjusting bolt.

<When less than 2.9 mm (0.11 inch)>: Loosen the adjusting bolt.

⚠ CAUTION

- Hold the rack housing, and use special tool MB991561 to crimp the bellows band securely.
- Crimp the bellows band until special tool MB991561 touches the stopper.
- 2. Use special tool MB991561 to crimp the bellows band.





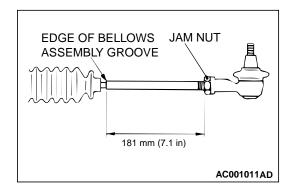
3. Check that crimped width (A) is within the standard value.

Standard value (A): 2.4 – 2.8 mm (0.09 – 0.11 inch) <When more than 2.8 mm (0.11 inch)>: Readjust the dimension (W) of step (1) to the value calculated by the following equation, and repeat step (2).

W = 5.5 mm (0.22 inch) – A [Example: if (A) is 2.9 mm

W = 5.5 mm (0.22 inch) - A [Example: if (A) is 2.9 mm (0.11 inch), (W) is 2.6 mm (0.10 inch).]

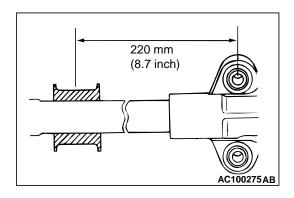
When less than 2.4 mm (0.09 inch)>: Remove the bellows band, readjust the dimension (W) of step (1) to the value calculated by the following equation, and use a new bellows band to repeat steps (2) to (3).
W = 5.5 mm (0.22 inch) – A [Example: if (A) is 2.3 mm (0.09 inch), (W) is 3.2 mm (0.13 inch).]



>>N<< TIE ROD END/TIE ROD END JAM NUT INSTALLATION

Screw in the tie rod end to achieve the right and left length as illustrated. Lock with the jam nut.

NOTE: The locking nut must be tightened securely only after the power steering gear box and linkage are installed to the vehicle and toe-in is adjusted.



>>O<< GEAR MOUNTING RUBBER INSTALLATION

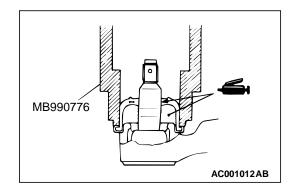
Install the gear mounting rubber to the rack housing so that the distance is as shown in the illustration.



M1372008200101

If the dust cover is damaged accidentally during service work, replace the dust cover as follows:

- 1. Apply grease to the lip and inside of the dust cover.
- 2. Drive in the dust cover with special tool MB990776 until it is fully seated.
- 3. Check the dust cover for cracks or damage by pushing it with your finger.



POWER STEERING OIL PUMP ASSEMBLY

REMOVAL AND INSTALLATION

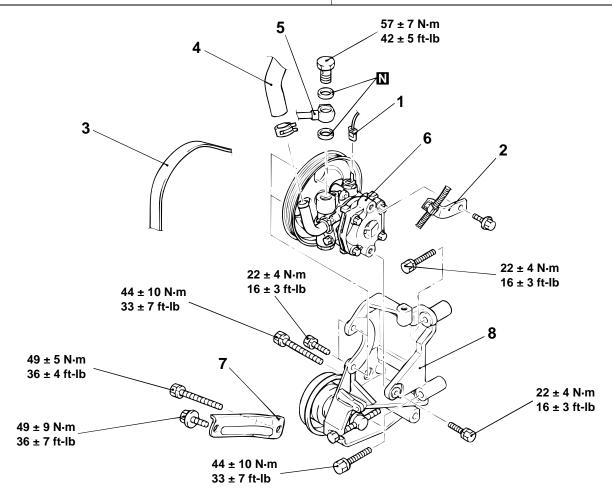
M1372005200210

Pre-removal Operation

• Power Steering Fluid Draining (Refer to P.37A-16.)

Post-installation Operation

- Power Steering Fluid Supplying and Bleeding (Refer to P.37A-17.)
- Drive Belt Tension Adjusting (Refer to GROUP 00, Maintenance Service Drive Belts P.00-37.)



AC100395 AB

REMOVAL STEPS

- 1. PRESSURE SWITCH CONNECTOR <<A>>>
- 2. A/C COMPRESSOR HARNESS CONNECTOR BRACKET
- DRIVE BELT
- 4. SUCTION HOSE CONNECTION
- 5. PRESSURE HOSE CONNECTION

REMOVAL STEPS (Continued)

- 6. OIL PUMP ASSEMBLY
- 7. POWER STEERING PUMP BRACKET STAY
- 8. POWER STEERING PUMP BRACKET

REMOVAL SERVICE POINTS

<<A>> OIL PUMP ASSEMBLY REMOVAL

With the engine lifted by the jack, remove the oil pump assembly mounting bolt (lower side) at the pulley side.

TSB Revision

INSPECTION

M1372005300079

Check the drive belt for cracks.

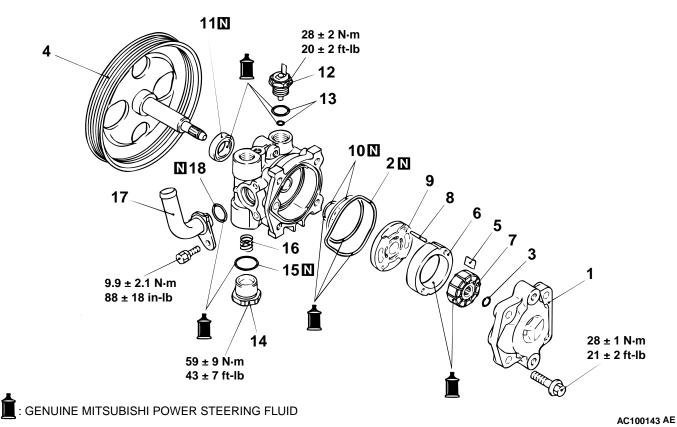
Check the driveshaft assembly for uneven rotation.

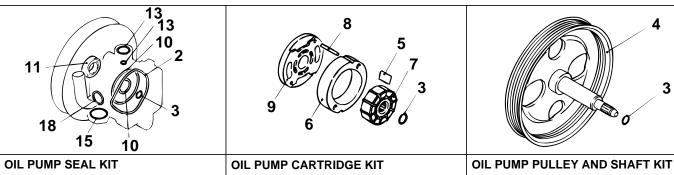
DISASSEMBLY AND ASSEMBLY

M1372005400225

⚠ CAUTION

Never disassemble the terminal assembly. It cannot be reassembled.





DISASSEMBLY STEPS

- 1. PUMP COVER
- 2. O-RING
- 3. SNAP RING
- 4. PULLEY AND SHAFT
- 5. VANES
- >>C<< 6. CAM RING
 - 7. ROTOR
 - 8. PIN
 - 9. SIDE PLATE

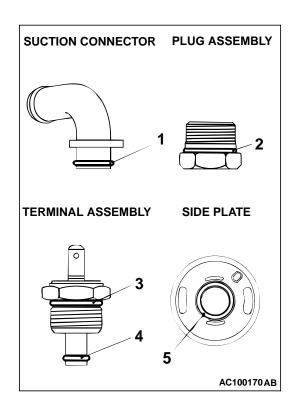
DISASSEMBLY STEPS (Continued)

- >>**A**<< 10. O-RING
- >>B<< 11. OIL SEAL
 - 12. TERMINAL ASSEMBLY
- >>**A**<< 13. O-RING
 - 14. PLUG ASSEMBLY
- >>**A**<< 15. O-RING
 - 16. FLOW CONTROL SPRING
 - 17. SUCTION CONNECTOR
- >>**A**<< 18. O-RING

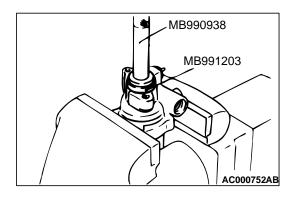
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ASSEMBLY SERVICE POINTS

>>A<< O-RING INSTALLATION



NO.	ID × WIDTH mm (in)
1	15.8 × 2.4 (0.62 × 0.09)
2	21.0 × 1.9 (0.83 × 0.07)
3	14.8 × 2.4 (0.58 × 0.09)
4	$3.8 \times 1.9 \ (0.15 \times 0.07)$
5	14.8 × 1.9 (0.58 × 0.07)



>>B<< OIL SEAL INSTALLATION

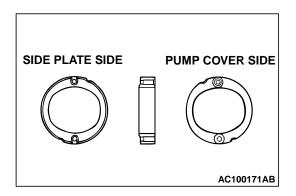
Use special tool MB991203 and MB990938 to install the oil seal.

>>C<< CAM RING INSTALLATION

⚠ CAUTION

Be sure to install the cam ring in the correct direction as shown.

Install the cam ring as shown in the illustration.



INSPECTION

M1372005500084

- · Check the valve subassembly for clogging.
- Check the driveshaft assembly for wear or damage.
- Check the rotor and vane groove for "stepped" wear.
- Check the contact surface of cam ring and vanes for "stepped" wear.
- Check the vanes for damage.

POWER STEERING HOSES

REMOVAL AND INSTALLATION

M1372005700260

MARNING

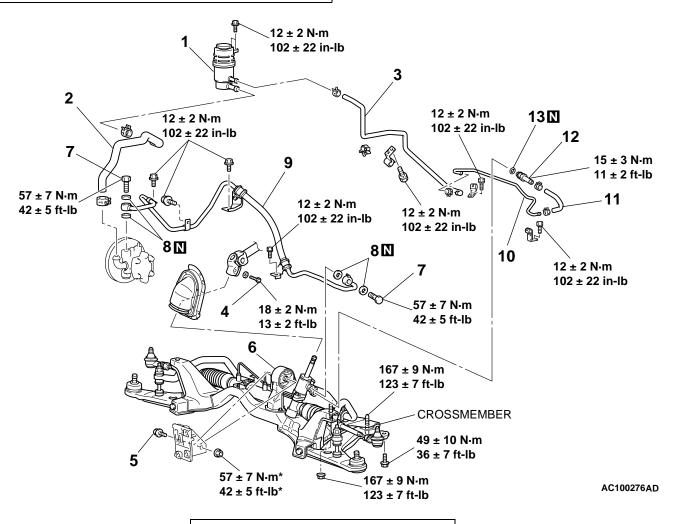
Before removing the steering gear box, refer to GROUP 52B. Center the front wheels and remove the ignition key. Failure to do so may damage the SRS clock spring and render the SRS system inoperative, risking serious injury.

⚠ CAUTION

*: Indicates parts which should be temporarily tightened, and then fully tightened with the vehicle on the ground in an unladen condition.

Pre-removal and Post-installation Operation

 Power Steering Fluid Draining and Refilling (Refer to P.37A-16.)



TSB Revision

<<A>>>

<<A>>

REMOVAL STEPS

- OIL RESERVOIR
- >>C<< 2. SUCTION HOSE
- >>B<< 3. RETURN HOSE
 - CLOCK SPRING (REFER TO GROUP 52B, AIR BAG MODULES AND CLOCK SPRING P.52Ba-27.)
 - CENTER MEMBER (REFER TO GROUP 32, ENGINE ROLL STOPPER AND CENTRE MEMBER REMOVAL AND INSTALLATION P.32-6.)
 - FRONT EXHAUST PIPE (REFER TO GROUP 15, EXHAUST MANIFOLD REMOVAL AND INSTALLATION P.15-9.)
 - 4. STEERING GEAR AND JOINT CONNECTING BOLT

REMOVAL STEPS (Continued)

- 5. REAR ROLL STOPPER CONNECTING BOLT
- 6. REAR ROLL STOPPER (REFER TO GROUP 32, ENGINE ROLL STOPPER AND CENTRE MEMBER REMOVAL AND INSTALLATION P.32-6)
- EYE BOLT
- 8. GASKET
- PRESSURE HOSE ASSEMBLY
- 10. RETURN TUBE
- >>A<< 11. RETURN HOSE
 - 12. RETURN TUBE
 - 13. O-RING

REMOVAL SERVICE POINTS

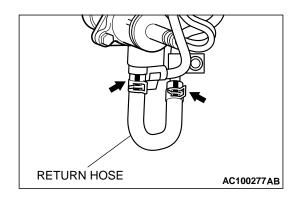
<<A>> EYE BOLT/RETURN TUBE REMOVAL

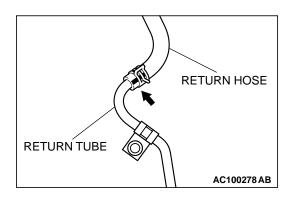
- Loosen the crossmember mounting bolts and nuts, and lower the crossmember to a position so that the eye bolts or return tube at the steering gear side can be removed.
 NOTE: In this case, do not remove the crossmember mounting bolts and nuts.
- 2. Remove the eye bolts or return tube.

INSTALLATION SERVICE POINTS

>>A<< RETURN HOSE INSTALLATION

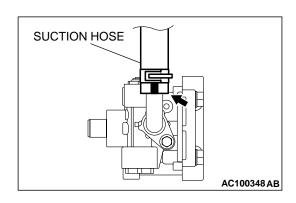
Install the return hose so that the marking is positioned as shown in the illustration.





>>B<< RETURN HOSE INSTALLATION

Install the return hose so that the marking is positioned as shown in the illustration.



>>C<< SUCTION HOSE INSTALLATION

Install the suction hose so that the marking is positioned as shown in the illustration.

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1372008400246

ITEM	SPECIFICATION	
Power steering gear box and linkage		
Cylinder clamp assembly nut, gear box assembly bolt	70 ± 10 N·m (52 ± 7 ft-lb)	
End plug	59 ± 10 N·m (44 ± 7 ft-lb)	
Feed tube flare nut	15 ± 3 N·m (11 ± 2 ft-lb)	
Pinion and valve assembly jam nut	25 ± 4 N·m (18 ± 4 ft-lb)	
Rack support cover	23 ± 2 N·m (17 ± 1 ft-lb)	
Rack support cover jam nut	59 ± 10 N·m (44 ± 7 ft-lb)	
Return hose flare nut, pressure tube flare nut	15 ± 3 N·m (11 ± 2 ft-lb)	
Tie rod	88 ± 10 N·m (65 ± 7 ft-lb)	
Tie rod end nut	40 ± 5 N·m (29 ± 4 ft-lb)	
Valve housing bolt	22 ± 4 N·m (16 ± 3 ft-lb)	
Power steering hose		
Crossmember mounting bolt	49 ± 10 N·m (36 ± 7 ft-lb)	
Crossmember mounting nut	167 ± 9 N⋅m (123 ± 7 ft-lb)	
Crossmember and lower arm connecting bolt	167 ± 9 N⋅m (123 ± 7 ft-lb)	
Oil pump eye bolt	57 ± 7 N·m (42 ± 5 ft-lb)	

TSB Revision

POWER STEERING SPECIFICATIONS

ITEM		SPECIFICATION	
Oil reservoir, pressure hose, pressure tube, return tube, cooler tube bolt		12 ± 2 N·m (102 ± 22 in-lb)	
Pressure tube flare nut		15 ± 3 N·m (11 ± 2 ft-lb)	
Power steering oil pump			
Oil pump bolt		22 ± 4 N·m (16 ± 3 ft-lb)	
Oil pump bracket bolt	M8	22 ± 4 N·m (16 ± 3 ft-lb)	
	M10	44 ± 10 N·m (33 ± 7 ft-lb)	
Plug assembly	•	59 ± 9 N·m (43 ± 7 ft-lb)	
Pressure switch assembly		28 ± 2 N·m (20 ± 2 ft-lb)	
Pump cover bolt		28 ± 1 N·m (21 ± 2 ft-lb)	
Suction pipe bolt		9.9 ± 2.1 N·m (88 ± 18 in-lb)	
Power steering wheel an	d shaft		
Steering shaft and gear box connecting bolt		18 ± 2 N·m (13 ± 1 ft-lb)	
Steering column assembly bolt		12 ± 2 N·m (102 ± 22 in-lb)	
Steering cover assembly bolt		5.0 ± 1.0 N·m (44 ± 9 in-lb)	
Hexagon socket head bolt		50 ± 5 N·m (37 ± 4 ft-lb)	

GENERAL SPECIFICATIONS

M1372000200196

ITEM		SPECIFICATION
Power steering gear box	Туре	Rack and pinion
	Gear ratio	45.74
Oil pump	Туре	Vane type
	Displacement cm ³ /rev (cu in/rev)	7.2 (0.44)
	Relief set pressure MPa (psi)	8.8 (1,276)

SERVICE SPECIFICATIONS

M1372000300267

ITEM			STANDARD VALUE	LIMIT
Steering wheel free play mm (in)	With engine running		_	30 (1.2)
	With engine stopped		10 (0.4) or less	_
Steering angle	Inside wheel	Vehicle with 14 inch tire	40°40' ± 1°30'	_
		Vehicle with 15 inch tire	39°30' ± 1°30'	_
	Outside wheel (reference)	Vehicle with 14 inch tire	33°20'	_
		Vehicle with 15 inch tire	32°30'	_
Toe-in mm (in)			$1 \pm 2 \ (0.04 \pm 0.09)$	_
Tie rod end ball joint breakaway torque N·m (in-lb)			0.5 – 2.5 (4.4 – 22.1)	_
Tie rod swing resistance N (lb) [Tie rod swing torque N⋅m (in-lb)]			6 - 19 (26.7 - 84.5) [1.5 - 4.9 (13.2 - 43.4)]	-
Engine idle speed r/min			700 ± 50	_
Stationary steering effort N (lb) [Fluctuation allowance N (lb)]			29 (6.5) or less [5.9 (1.33) or less]	_

TSB Revision

POWER STEERING SPECIFICATIONS

ITEM			STANDARD VALUE	LIMIT
Oil pump pressure MPa (psi)	Oil pump relief pressure		8.8 – 9.5 (1,276 – 1,378)	_
	Pressure under no-load conditions		0.8 – 1.0 (116 – 145)	_
	Steering gear retention hydraulic pressure		8.8 – 9.5 (1,276 – 1,378)	_
Oil pressure switch operating pressure MPa (psi)		$OFF \to ON$	1.5 – 2.0 (217 – 290)	_
		$ON \to OFF$	0.7 – 2.0 (102 – 290)	_
Gear box total pinion torque N·m (in-lb) [Change in torque N·m (in-lb)]			0.6 - 1.6 (5.3 - 14.2) [0.4 (3.5) or less]	_
Opening dimension of special tool MB991561 mm (in)			2.9 (0.11)	_
Band crimped width mm (in)			2.4 – 2.8 (0.09 – 0.11)	_

LUBRICANTS

M1372000400231

ITEM		SPECIFIED LUBRICANT	QUANTITY dm ³ (qt)	
Gear box	Bearing	GENUINE MITSUBISHI	As required	
	O-ring	POWER STEERING FLUID		
	Oil seal	FLUID		
	Special tool (MB991213)			
	Pinion and valve assembly seal ring part			
	Bellows	Silicon grease	As required	
Oil pump	Power steering fluid	GENUINE MITSUBISHI POWER STEERING FLUID	0.6 (0.57)	
	Friction surface of rotor vane, cam ring and pump cover	GENUINE MITSUBISHI POWER STEERING	As required	
	O-ring	FLUID		

SEALANTS

M1372000500227

ITEM		SPECIFIED SEALANT
Steering shaft cover bolt hole	on the toeboard	3M™ AAD Part No.8663 Windo-weld Resealant or equivalent
Power steering gear box	End plug	3M™ AAD Part No.8661, 8663, 8672,
	Rack support cover	8678, 8679 or equivalent

NOTES