

SUSPENSION - FRONT (4WD)

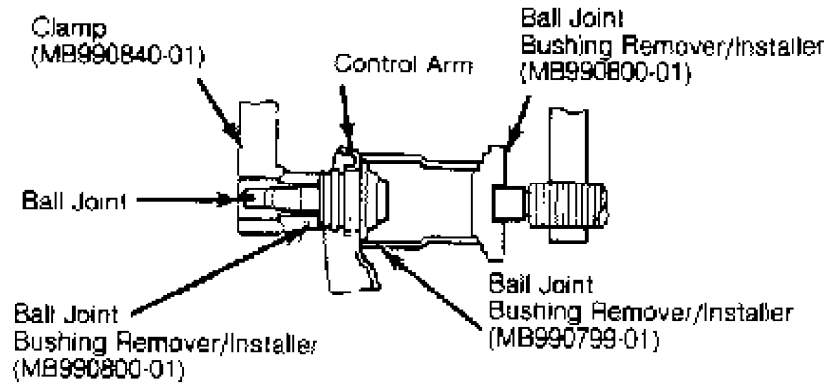
1991 Mitsubishi Montero

1990-92 SUSPENSION
Front - 4WD Trucks

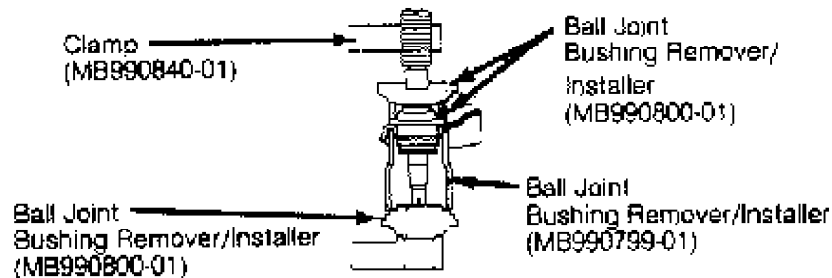
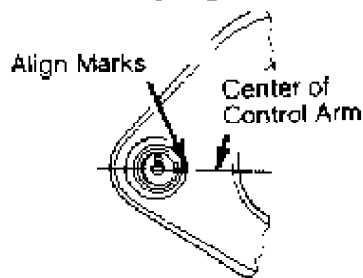
Chrysler Motors; Ram-50
Mitsubishi; Montero, Pickup

DESCRIPTION

The independent front suspension uses upper and lower control arm and torsion bar construction. The components used with this system are upper control arm, lower control arm, torsion bar, shock absorber, stabilizer bar, steering knuckle, drive shaft and front differential. See Fig. 1.



REMOVAL



INSTALLATION

Fig. 1: Replacing Upper Ball Joint (Montero)
Courtesy of Mitsubishi Motor Sales of America.

BALL JOINT CHECKING

LOWER BALL JOINT

Place ball joint in soft-jawed vise. Install dial indicator, with stem resting on end of ball joint stud. Measure ball joint stud end play. Replace ball joint if end play exceeds .02" (.5 mm).

UPPER BALL JOINT

1) With ball joint disconnected from steering knuckle, place nut on ball joint stud. Using INCH lb. torque wrench, measure starting torque required to rotate ball joint stud.

2) Starting torque must be 7-30 INCH lbs. (.8-3.4 N.m). If starting torque is not within specification, replace ball joint (Montero) or upper arm (Ram-50 and Pickup). For ball joint replacement on Montero, see UPPER BALL JOINT under REMOVAL & INSTALLATION.

WHEEL BEARINGS ADJUST

PRELOAD

1) Remove locking hub assembly. See LOCKING HUB under REMOVAL & INSTALLATION. Remove lock washer-to-lock nut bolts and lock washer. Remove brake caliper to ensure brake pads are not contacting rotor.

2) Using Socket (MB990954-01) and torque wrench, rotate front hub and tighten lock nut to 95-145 ft. lbs. (129-197 N.m) to seat bearings. Loosen nut.

3) Retighten nut to 18 ft. lbs. (24 N.m) and loosen 30-40 degrees. After setting preload, check hub turning resistance and axial play.

HUB TURNING RESISTANCE & AXIAL PLAY

1) Using INCH lb. torque wrench or spring scale attached to wheel stud, measure hub turning resistance. Turning resistance should be 1-4 lbs. (.45-1.8 kg) if measured with spring scale or 2.6-11.3 INCH lbs. (.3-1.3 N.m) if measured with torque wrench.

2) Using dial indicator, check front hub axial play. Axial play should be .002" (.05 mm) or less. Adjust wheel bearing so turning resistance and axial play are within specification. If turning resistance and axial play cannot be adjusted to specifications, check wheel bearing condition and installation. Install lock washer.

3) If lock washer and lock nut holes are not aligned, align holes by loosening lock nut a maximum of 40 degrees. Install lock washer bolts to lock nut. Tighten lock washer bolts. Install locking hub.

LOWER BALL JOINT R & I

REMOVAL

1) Raise and support vehicle. Remove wheel assembly. Support lower control arm enough to release torsion bar tension. Loosen but DO NOT remove lower ball joint-to-steering knuckle nut.

2) Using ball joint separator, separate ball joint from steering knuckle. Remove ball joint nut from steering knuckle. Remove ball joint-to-lower control arm bolts. Remove ball joint.

INSTALLATION

Lubricate ball joint with SAE J310 NLGI No. 2 grease. Apply semi-drying sealant to ball joint grooves. Reverse removal procedure to complete installation. Tighten bolts to specification. See TORQUE SPECIFICATIONS table at end of article.

NOTE: On Ram-50 and Pickup, replace upper control arm if ball joint is defective.

UPPER BALL JOINT R & I (MONTERO)

REMOVAL

Remove snap ring and dust cover together from ball joint. See Fig. 1. Use Ball Joint Remover/Installer (MB990799-01 and MB990800-01) and Clamp (MB990840-01) to press ball joint from control arm. Tighten clamp to remove ball joint.

INSTALLATION

1) Before installing, align reference mark on ball joint with center of control arm. Using bushing remover/installers, install ball joint in control arm. See Fig. 1.

2) Install snap ring on ball joint. Lubricate ball joint with SAE J310 NLGI No. 2 grease. Apply semi-drying sealant to ball joint grooves. Install new dust cover and ring.

AUTOMATIC TYPE LOCKING HUB R & I

REMOVAL

1) Place hub must in the FREE position by placing transfer case lever in 2H position and moving vehicle in Reverse approximately 4-6 feet.

2) Remove cover from locking hub. If necessary, wrap shop towel around cover and use an oil filter wrench to loosen cover. Raise and support vehicle. Remove wheel assembly.

3) Using snap ring pliers, remove snap ring and shim from end of drive axle. See Fig. 2. Using hexagonal wrench, remove locking hub retaining bolts. Remove locking hub assembly.

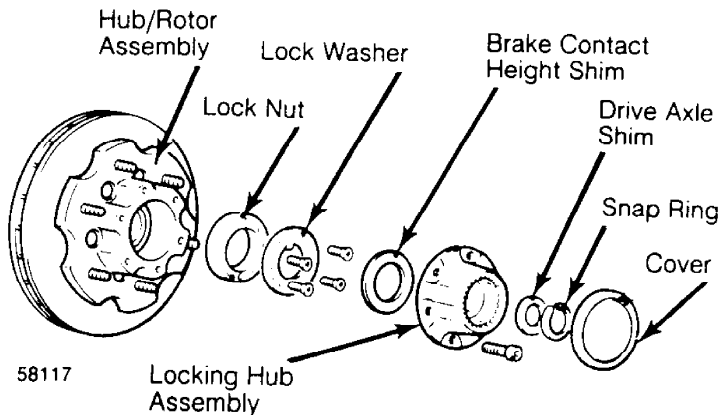


Fig. 2: Exploded View of Automatic Locking Hub
Courtesy of Chrysler Motors.

INSTALLATION

1) Using Socket (MB990954) and torque wrench, rotate front hub and tighten lock nut to 95-145 ft. lbs. (129-197 N.m) to seat bearings. Loosen nut. Retighten nut to 18 ft. lbs. (24 N.m) and loosen 30-40 degrees.

2) Using spring scale attached to wheel stud, measure and record turning resistance required to rotate hub/rotor assembly before installing locking hub.

3) Apply semi-drying sealant on locking hub assembly-to-hub/rotor contact areas. DO NOT apply sealant on outer areas of hub/rotor assembly, toward brake contact areas.

4) Align locking hub assembly key area with steering knuckle keyway area. Loosely install locking hub assembly on hub/rotor assembly. Ensure locking hub assembly fully contacts hub/rotor assembly.

5) Install locking hub retaining bolts. Tighten to specification. See TORQUE SPECIFICATIONS table at end of article. Using spring scale attached to wheel stud, measure turning resistance required to rotate hub/rotor assembly.

6) Subtract turning resistance measured in step 2) (before installing locking hub) from turning resistance measured in step 5) (after installing locking hub). If difference exceeds 3.1 lbs. (14 N), check for incorrect installation of locking hub assembly or components.

7) Install shim and snap ring on drive axle. Rotate drive axle until maximum end play is obtained. Using dial indicator, check drive axle end play.

8) Drive axle end play should be .008-.020" (.20-.51 mm). If end play is not within specification, adjust drive axle end play by changing axle shaft shim. Install new "O" ring and cover. Tighten cover to specification. See TORQUE SPECIFICATIONS table at end of article.

LOWER CONTROL ARM R & I

REMOVAL

1) Raise and support vehicle. Remove wheel assembly. Remove front skid plate and undercover (if equipped). Remove torsion bar. See TORSION BAR under REMOVAL & INSTALLATION. Remove stabilizer bar bolt from control arm.

2) Remove shock absorber-to-control arm bolts. Loosen but DO NOT remove lower ball joint-to-steering knuckle nut. Using ball joint fork, separate lower ball joint from steering knuckle.

3) Remove ball joint stud nut from steering knuckle. Remove control arm shaft. See Fig. 1. Remove torque arm. Remove lower control arm pivot bolt. Remove lower control arm.

INSPECTION

1) Inspect control arm for cracks or deformation. Check ball joints. See BALL JOINT CHECKING under ADJUSTMENTS & INSPECTION.

2) Inspect ball joint dust covers for damage. Replace dust covers if damaged. Inspect control arm bushing and frame bracket bushing for damage. Replace if necessary.

3) If frame bracket bushing needs replacing, install Bushing Remover/Installer (MB990958-01) in bushing. See Fig. 3. Tighten bushing remover/installer bolt until bushing is removed. Reverse bushing remover/installer to install bushing.

NOTE: Differential carrier may require relocation to replace left bracket bushing.

4) If control arm bushing needs replacing, use press and Bushing Remover/Installer (MB990883-01). Press bushing from control arm. See Fig. 4.

5) Coat bushing and control arm with soapy solution. Using press and bushing remover/installer, press bushing into control arm. Position bushing so there is equal distance from bushing-to-control arm at both ends.

6) Reverse bushing remover/installer to install bushing. Position bushing so there is equal distance from bushing-to-control arm at both ends.

CAUTION: Tighten lower control arm shaft and pivot bolt to specification with vehicle at normal operating height.

INSTALLATION

1) To install, reverse removal procedure. Ensure White mark, located on lower mounting end of shock absorber, faces toward outside of vehicle. Tighten lower control arm shaft and pivot bolt to specification with vehicle at normal operating height.

2) Tighten bolts to specification. See TORQUE SPECIFICATIONS table at end of article. Install new nut on stabilizer bar-to-control arm bolt. Tighten stabilizer bar-to-control arm bolt until distance from threaded end of bolt to nut is .24-.31" (6.0-7.8 mm).

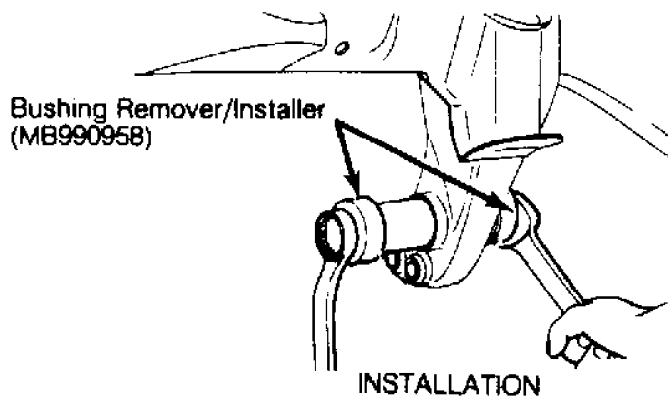
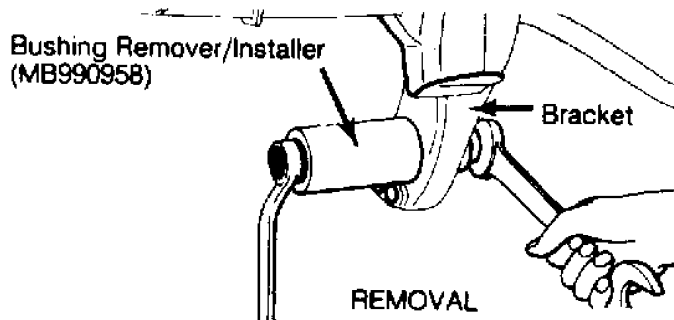


Fig. 3: Replacing Bracket Bushing
Courtesy of Mitsubishi Motor Sales of America.

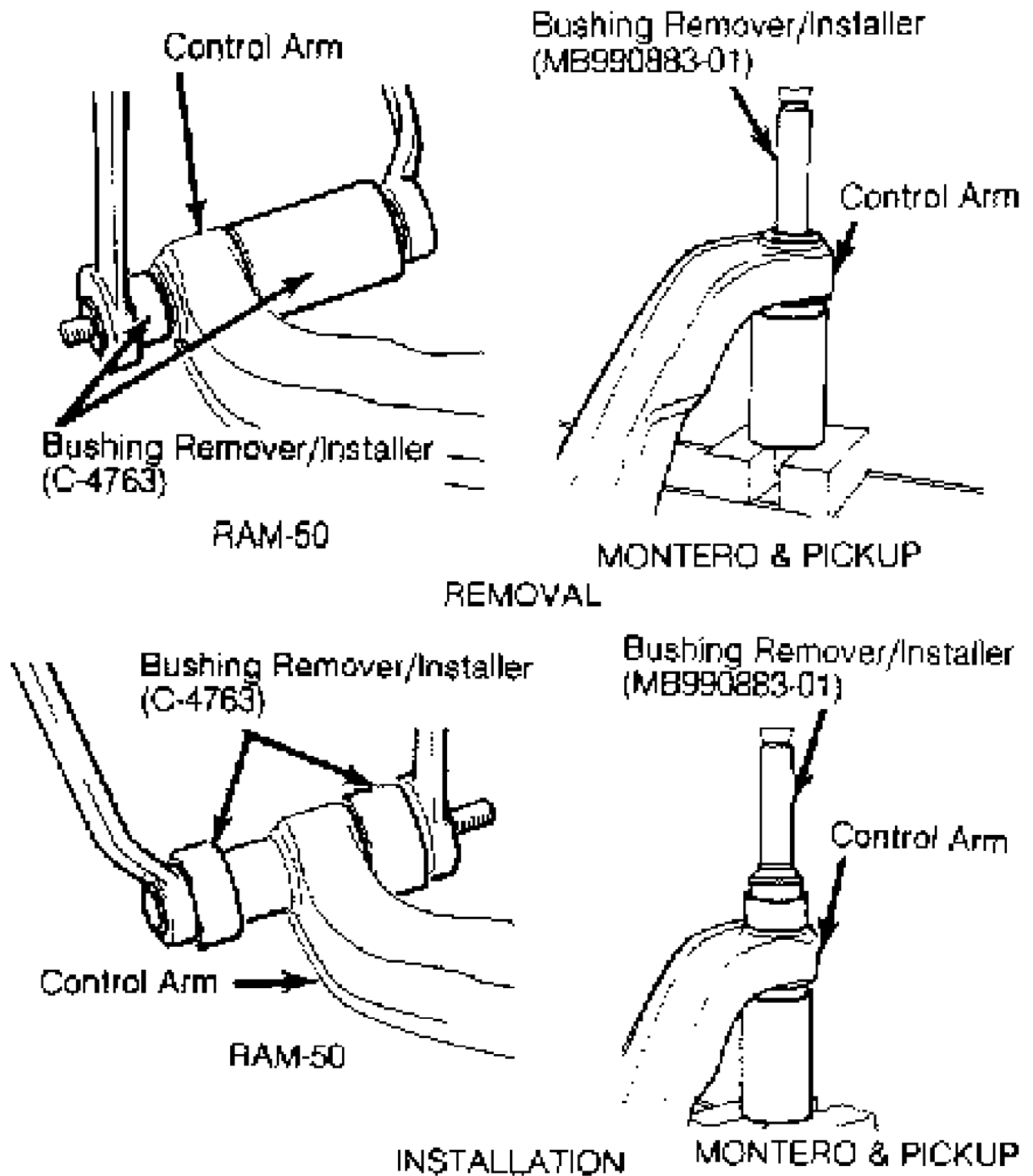


Fig. 4: Replacing Lower Control Arm Bushing
 Courtesy of Mitsubishi Motor Sales of America.

REMOVAL

Remove skid plate (if equipped). Remove stabilizer bar bolt from lower control arm. Remove stabilizer bar clamp-to-hanger bolts. Remove stabilizer bar and bushings. Remove stabilizer bar-to-frame hangers (if necessary).

INSTALLATION

Inspect bushings for wear. Check stabilizer bar for deformation. To install, reverse removal procedure. Install stabilizer bar-to-frame hangers and stabilizer bar-to-control arm bolt using new nuts. Tighten hanger-to-frame nut and stabilizer bar-to-control arm nut until distance from threaded end of bolt to nut is .24-.32" (6.1-8.1 mm).

STEERING KNUCKLE R & I

REMOVAL

1) Raise and support vehicle. Remove wheel assembly. Remove brake caliper. Remove hub/rotor assembly. See WHEEL BEARINGS under REMOVAL & INSTALLATION. Remove dust cover from steering knuckle.

2) Disconnect tie rod end from steering knuckle. Loosen torsion bar anchor arm assembly adjusting nut. Loosen ball joint-to-steering knuckle nuts. Using ball joint separator, separate ball joints from steering knuckle.

3) Detach upper and lower ball joints from steering knuckle. Remove steering knuckle from drive axle. Remove oil seal and spacer from steering knuckle.

INSPECTION

Inspect steering knuckle for cracks. Inspect spindle and steering knuckle needle bearing for wear or damage.

INSTALLATION

1) If needle bearing requires replacement, drive bearing from steering knuckle. Use Bearing Driver (MB990956-01) and Handle (MB9909938-01) to install needle bearing.

NOTE: DO NOT reuse steering knuckle bearing if removed.

2) Using bearing installer and handle, install new needle bearing until bearing is even with steering knuckle end face. Apply SAE J310 NLGI No. 2 grease to bearing roller surface and spacer-to-steering knuckle contact areas. Install spacer with chamfered side toward inside of vehicle.

3) Using Seal Installer (MB990985-01) and Handle (MB990938-01), install seal in steering knuckle until seal is even with steering knuckle end face. Apply grease to seal lip area and inside of seal. To complete installation, reverse removal procedure. Tighten bolts to specification. See TORQUE SPECIFICATIONS table at end of article.

TORSION BAR R & I

CAUTION: Mark torsion bar and anchor arm location for reassembly reference before removing.

REMOVAL

1) Raise and support vehicle. Support lower control arm with jack stand. Loosen anchor arm adjusting bolt lock nut. On Montero, remove heat protector from frame (right side only). Loosen anchor bolt to release torsion bar tension.

2) Place reference marks on front of torsion bar, torque arm and torsion bar-to-torque arm for reassembly reference. Remove anchor arm. See Fig. 1.

3) Remove dust cover from end of torsion bar. On Montero, remove heat cover (left side only) located between dust cover and torsion bar. On all models, remove torsion bar.

INSPECTION

Inspect all splined areas for damage. Inspect dust covers for cracks or damage. Check for bent anchor bolts. Replace components as necessary.

INSTALLATION

1) Apply grease to splined areas of torsion bar, anchor arm, torque arm splines, anchor bolt threads and inside of dust cover. Check for left and right identification marks on torsion bars' ends. Ensure torsion bars are installed in correct location.

2) Install torsion bar in torque arm, with identification mark toward front of vehicle. Align mark on torque arm with mating mark on torsion bar. When installing a new torsion bar, align the White paint spline with index mark on front torque arm.

3) Install anchor arm on torsion bar so initial length of adjusting bolt from flat surface of upper and lower half moon washers is within specification. See Fig. 5.

4) See ANCHOR BOLT INITIAL SPECIFICATIONS table. Ensure upper control arm rebound stopper is contacting crossmember before adjusting initial setting.

NOTE: Ensure upper control arm rebound stopper is contacting crossmember when adjusting initial settings.

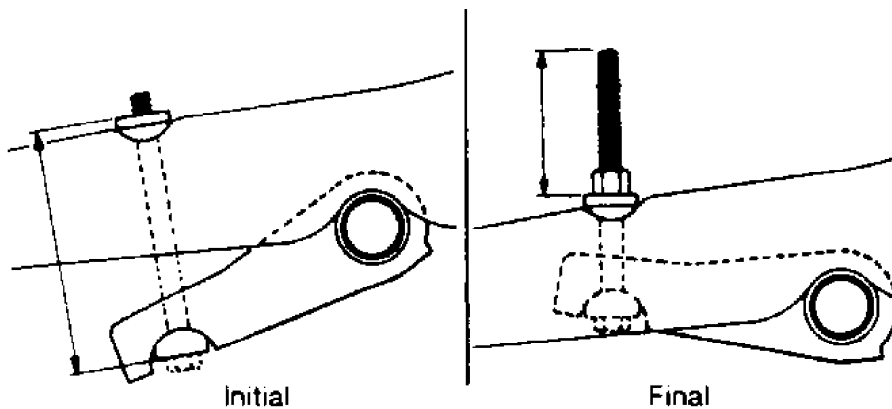


Fig. 5: Adjusting Anchor Arm Bolt
Courtesy of Mitsubishi Motor Sales of America.

ANCHOR BOLT INITIAL SPECIFICATIONS TABLE

Application	In. (mm)
Montero	
Left Side	5.3-5.6 (135-142)
Right Side	4.9-5.2 (124-132)
Ram-50 & Pickup	
Left Side	5.5-5.8 (140-147)
Right Side	5.3-5.6 (135-142)

5) After initial torsion bar setting, tighten anchor bolt adjusting nut to obtain correct final bolt protrusion.

6) On Montero, final bolt protrusion depends upon curb weight of vehicle. Adjust anchor bolt adjusting nut to obtain final anchor bolt protrusion. See appropriate FINAL ANCHOR BOLT PROTRUSION table.

FINAL ANCHOR BOLT PROTRUSION TABLE (MONTERO)

Curb Weight Lbs. (kg)	Right Bolt In. (mm)	Left Bolt In. (mm)
2910 (1320)	2.6 (65)	2.2 (55)
3000 (1360)	2.7 (68)	2.2 (55)
3080 (1400)	2.8 (71)	2.3 (57)
3170 (1440)	2.8 (71)	2.4 (59)
3260 (1480)	2.9 (72)	2.5 (62)
3350 (1520)	3.0 (76)	2.5 (62)
3440 (1560)	3.0 (76)	2.6 (65)
3530 (1600)	3.1 (78)	2.6 (65)
3620 (1640)	3.2 (80)	2.7 (68)
3700 (1680)	3.2 (80)	2.8 (71)
3790 (1720)	3.3 (84)	2.9 (72)
3880 (1760)	3.4 (86)	2.9 (72)
3970 (1800)	3.4 (86)	3.0 (76)
4060 (1840)	3.5 (88)	3.1 (78)

FINAL ANCHOR BOLT PROTRUSION (RAM-50 & PICKUP)

Application	Right Bolt In. (mm)	Left Bolt In. (mm)
Ram-50 & Pickup	3.39 (86.1)	3.94 (100.1)

FINAL ANCHOR BOLT PROTRUSION (1992 MONTERO)

Application	Right Bolt In. (mm)	Left Bolt In. (mm)
Montero	3.15 (80.0)	3.15 (80.0)

7) To complete installation, reverse removal procedure. Tighten bolts to specification. See TORQUE SPECIFICATIONS table at end of article. Place unladed vehicle in normal operating height. Measure clearance between lower control arm bump stop and bump stop bracket on frame.

8) On Montero, clearance should be 2.8" (71 mm). On Pickup, clearance should be 3.1" (78 mm). If clearance measurements are NOT as specified, adjust anchor bolt adjusting nut to obtain correct clearance.

UPPER CONTROL ARM R & I

REMOVAL

1) Remove shock absorber. Support lower control arm with jack stand. Remove wheel assembly. Loosen anchor bolt lock nut. See Fig. 1.

2) Mark anchor bolt for reassembly reference. Loosen anchor bolt to release torsion bar tension. Disconnect and plug brake hose at frame mount bracket. Remove cotter pin from ball joint stud. Loosen but DO NOT remove ball joint stud knuckle nut.

3) Using ball joint fork, loosen ball joint from steering knuckle. Remove ball joint stud nut. Remove rebound stopper and brake hose support from control arm. Remove upper control arm mounting bolts. Note direction of bolt installation and location of camber adjustment shims. Remove control arm.

4) If clearance is inadequate for control arm removal, move control arm toward rear of vehicle and pull out front part of arm. Rotate control arm pivot shaft and remove arm. If arm still cannot be removed, loosen 10 front body mounting nuts. Raise body and remove arm.

NOTE: On Montero, rotating control arm shaft will alter caster setting.

INSPECTION

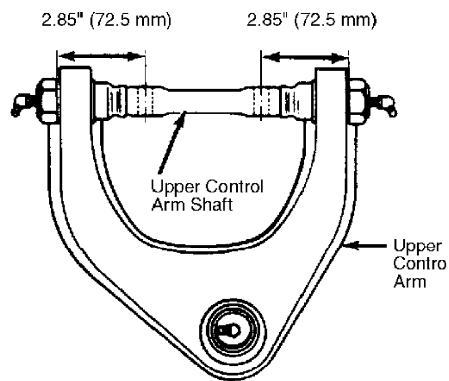
1) Inspect control arm for cracks or deformation. On Montero, mount control arm in soft-jawed vise using control arm shaft. Attach spring scale to upper end of control arm, near ball joint.

2) Using spring scale, measure starting torque required to rotate control arm on the shaft. Replace control arm if starting torque exceeds 1.4 lbs. (6.5 N).

3) On all models, check ball joints. See BALL JOINT CHECKING under ADJUSTMENTS & INSPECTION. Inspect ball joint dust cover for damage and replace as necessary.

INSTALLATION

1) To install, reverse removal procedure. On Montero, ensure control arm shaft is correctly positioned before installing. Rotate control arm shaft to obtain correct measurement. See Fig. 6.



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Fig. 6: Positioning Upper Control Arm Shaft (Montero)
Courtesy of Mitsubishi Motor Sales of America.

2) On Ram-50 & Pickup, install control arm-to-crossmember bolts from the inside of crossmember, with nuts against control arm

shaft.

3) On Montero, install control arm-to-crossmember bolts from the outside of control arm, with nuts against crossmember.

4) Ensure alignment shims are placed in original location. When installing shock absorber, ensure White paint mark on lower end of shock faces toward the outside of vehicle. Tighten shock absorber upper nut until distance from end of threads to nut is .27-.31" (7-8 mm). Install shock lock nut.

5) Tighten bolts to specification. See TORQUE SPECIFICATIONS table at end of article. Bleed brakes. Adjust anchor bolt to proper torsion bar setting. See TORSION BAR under REMOVAL & INSTALLATION. Check wheel alignment and adjust if necessary.

WHEEL BEARINGS R & I

REMOVAL

1) Raise and support vehicle. Remove wheel assembly. Remove caliper assembly. Remove locking hub. See LOCKING HUB under REMOVAL & INSTALLATION.

2) Remove lock washer. Using Socket (MB990954), remove lock nut. Remove front hub assembly from steering knuckle.

3) Remove oil seal and bearings from hub. If bearing races need to be replaced, drive bearing races from hub using brass drift and hammer.

INSTALLATION

1) Before installing, lubricate outside surfaces of bearing outer races with grease. Install bearing outer races in hub. Ensure bearing races are fully seated.

2) Pack bearings with grease. Install inner bearing in hub. On Montero, install seal in hub using Seal Installer (MB990955). On Pickup, use Seal Installer (MB990985).

3) Install seal until seal is even with hub surface. To complete installation, reverse removal procedure. Adjust wheel bearings. See WHEEL BEARINGS under ADJUSTMENTS & INSPECTION. Tighten bolts to specification. See TORQUE SPECIFICATIONS table.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Anchor Bolt Lock Nut	29-36 (39-49)
Automatic Hub Cover	13-25 (18-34)
Ball Joint Nut	
Lower	87-130 (118-176)
Upper	43-65 (58-88)
Ball Joint-to-Lower	
Control Arm Bolt	39-54 (53-73)
Caliper Bolt	58-72 (79-98)
Control Arm-to-Frame Bolt	
Lower	(1) 101-116 (137-157)
Upper	72-87 (98-118)
Locking Hub-to-Hub/Rotor Bolt	36-43 (49-58)
Manual Hub Cover Bolt	10 (14)
Shock Absorber Lower Mount Bolt	
Montero	11-16 (15-22)
Ram-50 & Pickup	10 (14)

Shock Absorber Shaft Nut 10-13 (14-18)
Tie Rod Nut 33 (45)
Torque Arm Bolt 69-87 (94-118)

INCH Lbs. (N.m)

Stabilizer Bar Clamp Bolt 84-108 (8-12)

(1) - Tighten with vehicle at normal operating
height.
