

FRONT SUSPENSION

Front Shock Absorber Operation	6- 1
Front Suspension	6- 4
Front Shock Absorber	6- 9
Front Axle Hub	6-18
Front Wheel Alignment	6-19
Front Alignment Repair Procedures	6-22

FRONT SHOCK ABSORBER OPERATION

This shock absorber can be disassembled, but the work must be done in a clean place and using special tools.

The shock absorber damping force is produced by the fluid resistance of Castle Auto Fluid Special contained in the absorber shell flowing through the base valve, non-return valve, and piston valve.

At bound, when the shock absorber piston rod reaches the bottom limit of its stroke, the rod movement is arrested by the front spring bumper on the lower part of coil spring seat. At rebound, when the piston rod reaches the top limit of its stroke, the rebound stopper attached to the piston rod strikes against the rod guide to arrest the motion.

Shock absorber action can be divided into four kinds explained below.

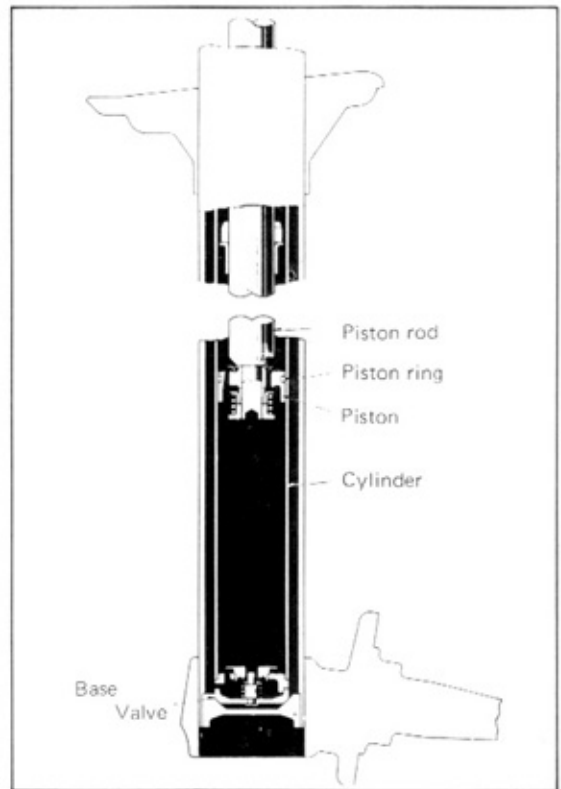


Fig. 6-1 Sectional View of Front Shock Absorber

ACTION WHEN EXTENDING

When shock is light

When the piston rod extends outward, the fluid at the upper side of piston enters in through the cutaway grooves (part A) at piston top part, flows through the grooves at piston outer side (part B), and flows in the cylinder.

The fluid at the under side of the base valve enters in through the slots (C) between the base valve case and body, passes through the leaf valve (part D), and flows into the cylinder.

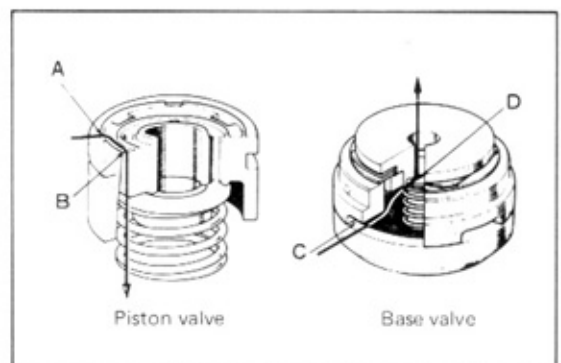


Fig. 6-2 Action When Extending (1)

When shock is heavy

When the piston rod is extended suddenly, the fluid at the upper side of the piston enters in through the piston groove (part E), pushes down the valve (F), and flows into the cylinder. The fluid at the under side of the base valve enters in through the slots (part C) between the base valve case and body, pushes up the non-return valve (G) and flows into the cylinder.

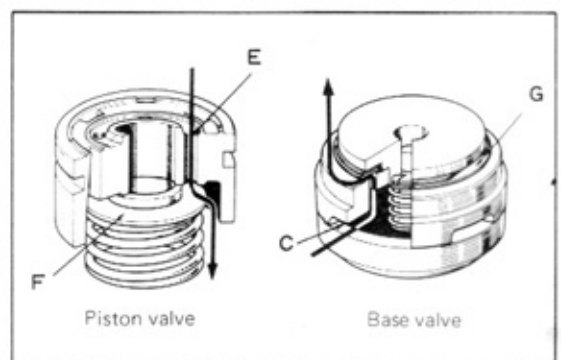


Fig. 6-3 Action When Extending (1)

ACTION WHEN CONTRACTING

When shock is light

When piston rod is contracted, the fluid in the cylinder enters in through the groove at piston lower side, passes through the grooves in the piston outside (part B) and the cutaway grooves at piston top part (part A) and flows into the upper side of piston.

The fluid in the cylinder also passes out through the center of base valve, pushes open the leaf valve (part D) and flows outside through the slots (C) between the case and body.

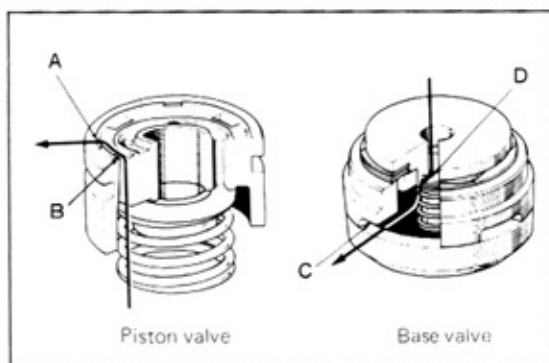


Fig. 6-4 Action When Contracting (1)

When shock is heavy

When the piston rod suddenly moves downward, the fluid in the cylinder passes through the grooves (part B) in piston outside pushes up the non-return valve, and flows into the upper part. The fluid in the cylinder also passes out through the center of base valve, pushes down the leaf valve (part D), and flows outside.

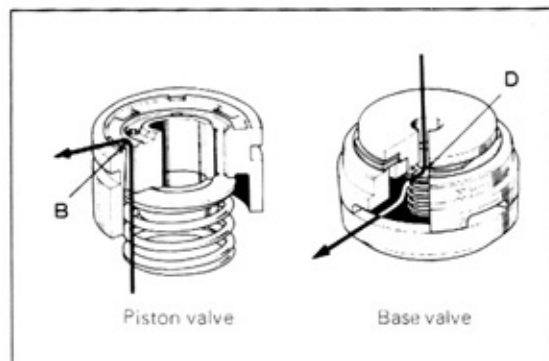


Fig. 6-5 Action When Contracting (2)

SPECIFICATIONS

Table 6-1 Front Suspension Specifications

	Model	TA10, 12 series	TA12-H	TA22-K	TA22-H	RA20L-KA	
	Color	White	Blue	Red	Yellow	White	White
Free length	405 mm (15.9")	413 mm* (16.3")	389 mm (15.3")	397 mm (15.7")	392 mm (15.4")		
Front Coil	No. coils	7.2				7.1	
Coil	Coil diam.	152 mm (5.9")		140 mm (5.5")			
Spring	Wire diam.	12.2 mm (0.490")			12.5" (0.492")		
	Installed load	271 kg (597 lb)	283 kg (624 lb)	270 kg (595 lb)	282 kg (622 lb)	288 kg (635 lb)	
	Spring Constant	1.55				1.70	
Front Shock Absorber	Model	TA10, 12 series			TA22, RA20L series		
	Max. length	631.4 mm (24.86")			616.4 mm (24.27")		
	Min. length	439.4 mm (17.30")			424.4 mm (16.71")		
	Fluid cap.	330 cc (11 fl. oz.)			315 cc (10.5 fl. oz.)		
	Damping	Exp.	90 kg (198 lb)			90 kg (198 lb)	
	Force**	Comp.	30 kg (66 lb)			30 kg (66 lb)	
Stabilizer bar	Diam.	21 mm (13/16")			21 mm (13/16")		
Strut bar	Diam.	16 mm (5/8")			16 mm (5/8")		

Note : * Reference value ** Piston speed 0.6 m/sec (2.0 ft/sec)

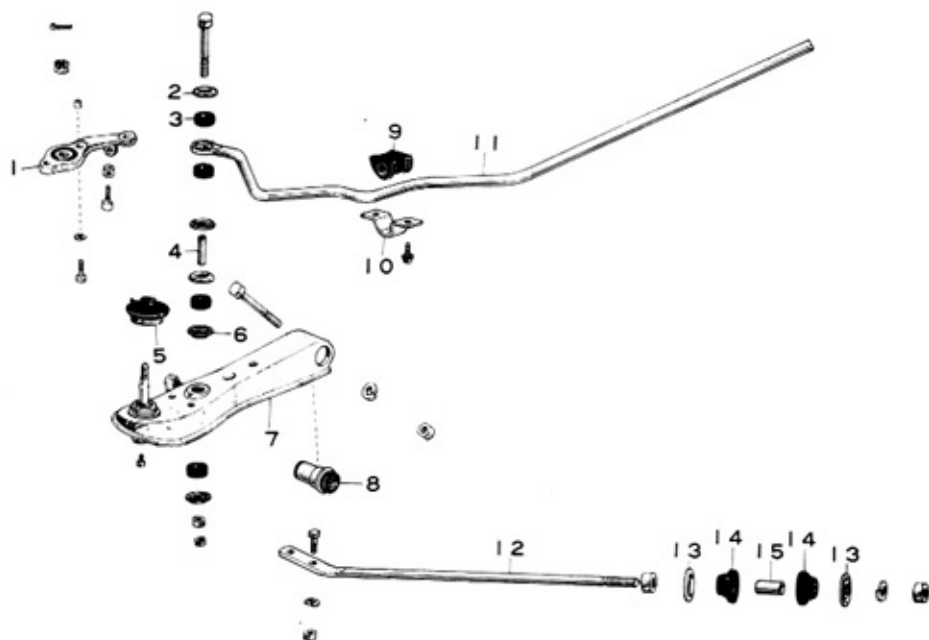
TROUBLE SHOOTING

Symptoms and Probable Causes	Remedies
Heavy steering 1. Tire inflation too low 2. Bearing (suspension support) damaged 3. Lower ball joint sticking or damaged	Adjust Replace Replace ball joint
Steering wheel wanders 1. Wheel and tire unbalanced 2. Side deflection (runout) in wheel and tire. 3. Excessive difference in left and right tire outside diameters. 4. Hub nut loose. 5. Bearing (wheel) damaged, worn, or loose 6. Hub drum unbalanced 7. Lower ball joint damaged, worn, or loose 8. Lower arm shaft bushing worn or bolt loose	Correct balance Repair or replace Adjust inflation or replace tire. Retighten Adjust or replace bearing Replace Replace or retighten Retighten or replace
Shocks felt on steering wheel 1. Tire inflation too high 2. Shock absorber operation defective 3. Wheel and tire unbalanced	Adjust to specified pressure Repair or replace Correct balance or replace
Steering wheel pulls to one side (Steering wheel pulls to one side when driving straight ahead on flat paved road) 1. Tires worn unevenly. 2. Excessive difference in left and right tire outside diameters. 3. Brake dragging on one wheel. 4. Bearing (wheel) damaged or improperly adjusted	Replace tires and check for side slipping Adjust inflation or replace tires Adjust brake Adjust or replace
Excessive wear or one-sided wear in tires 1. Tires improperly inflated 2. Wheel and tire unbalanced 3. Excessive play in bearing (wheel) 4. Side deflection (runout) in wheel and tire. 5. Tires rotated improperly	Adjust Correct or replace Adjust Repair or replace Rotate as specified

Abnormal or excessive noise

1. Loose joints and connections
2. Shock absorber fluid insufficient
3. Shock absorber valve defective
4. Bearing (wheel) damaged or worn
5. Lower arm bushing worn
6. Ball joints and tie rod ends worn or operation defective
7. Bushing worn (column tube upper)

Retighten at specified torque
 Replace seal and add fluid
 Repair
 Replace
 Replace
 Replace
 Replace

FRONT SUSPENSION**COMPONENT PARTS**

- | | |
|-----------------------------------|---------------------------------|
| 1. Arm, steering knuckle | 9. Bushing, stabilizer |
| 2. Retainer, cushion | 10. Bracket, stabilizer |
| 3. Cushion, stabilizer | 11. Bar, stabilizer |
| 4. Collar | 12. Bar, strut |
| 5. Cover, lower ball joint dust | 13. Retainer, strut bar cushion |
| 6. Retainer, cushion | 14. Cushion, strut bar |
| 7. Arm subassy., suspension lower | 15. Collar |
| 8. Bushing, suspension lower arm | |

Fig. 6-6 Front Suspension Component Parts

LOWER SUSPENSION ARM**REMOVAL**

1. Jack up the front end of vehicle and support it on stands.

Caution : Do not support the suspension arm on a stand as the arm will be deformed.

2. Remove the front wheels.
5. Remove the stabilizer bar mounting bolt.
6. Remove the strut bar mounting bolts.
7. Remove the lower arm mounting bolt and take off the lower arm from the suspension member.

8. Using Ball Joint Puller [09628-12020], separate the steering knuckle arm from lower suspension arm.

Note : If the steering knuckle arm only is to be replaced, this can be done by just removing the front shock absorber lower end mounting bolts and disconnecting the tie rod end.

3. Remove the bolts mounting the lower end of front shock absorber, and separate the knuckle arm and suspension arm from the shock absorber.

4. Using Tie Rod End Puller [09611-20013], disconnect the tie rod end from steering knuckle arm. (For removal procedures, refer to P7-13).

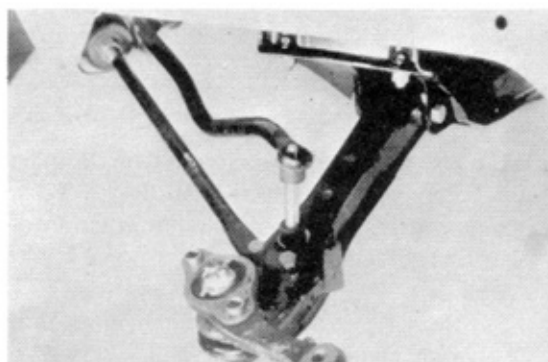


Fig. 6-7 Lower Arm Removal



Fig. 6-8 Removing Knuckle Arm

INSTALLATION

Inspect all removed parts on the following points and repair or replace any found defective.

1. Steering knuckle arm
Knuckle arm for cracks or deformation.
2. Lower suspension arm
 - (1) Lower arm for damage or deformation.
 - (2) Lower arm bushing for deterioration.

- (3) Lower ball joint for proper operation, excessive looseness, or damaged ball stud.

Note : Lower arm and lower ball joint cannot be disassembled from each other. If either should be defective, the lower arm assembly must be replaced.

- (4) Lower ball joint dust cover for damage.

1. Dust Cover Replacement

Note : In case of replacing the dust cover only while on vehicle, refer to the note in 8 above, and perform the work accordingly.

- (1) Remove the dust cover.
- (2) Install the dust cover on the ball joint and secure it with a new wire.

- (3) Remove the plug from ball joint lower side and attach grease fitting.

- (4) Fill the ball joint with specified grease.
Specified grease : Castle Chassis Grease Special

- (5) Remove the grease fitting and replace the plug.

2. Lower Arm Bushing Replacement

- (1) Using Lower Suspension Arm Bushing Remover & Replacer [09726-12021], press out the bushing toward the front, taking care not to deform the lower arm.

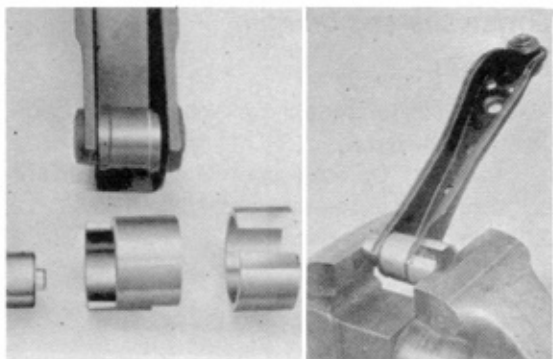


Fig. 6-9 Lower Arm Bushing Removal

- (2) Using Lower Suspension Arm Bushing Remover & Replacer [09726-12021], press in the new bushing from the front side of lower arm.

Notes :

1. Be sure not to mistake the lower arm front and rear sides.
2. Take care not to deform the lower arm or bushing.

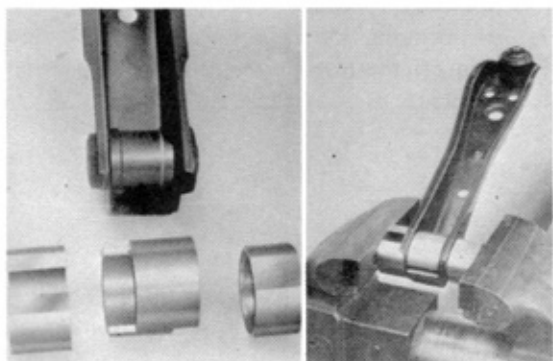


Fig. 6-10 Lower Arm Bushing Installation

INSTALLATION

Install by following the removal procedures in reverse order.

Notes :

1. When installing the lower arm to the cross member tighten the bolts lightly and lower the jack. Shake the vehicle several times to allow the suspension to settle down and then retighten the bolts at specified torque.
Bolt torque : 700-900 kg-cm (51-65 ft lb)
2. Be sure to use the specified bolts to install the lower arm.

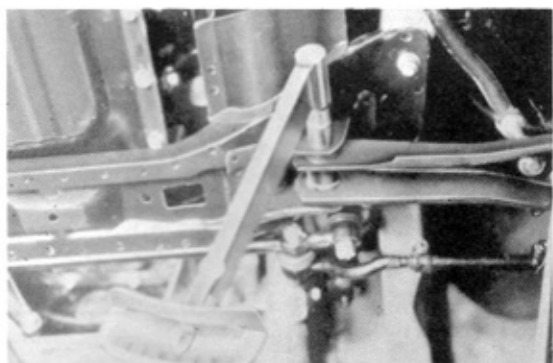


Fig. 6-11 Reassembly of Lower Arm

STABILIZER BAR**REMOVAL**

1. Jack up the front end of vehicle and support it on stands at specified points.
2. Remove the engine under cover.
3. Remove the bolt installing the stabilizer to lower arm (both left and right sides).
4. Remove the stabilizer bracket and bushing (both left and right sides).
5. Remove the stabilizer bar.

INSPECTION

Inspect the stabilizer bars to see if they are deformed and the bushings and cushions to see if deteriorated.

INSTALLATION

Follow the removal procedures in reverse order.

Note: Take care to install the stabilizer cushions and retainers in proper location and direction.

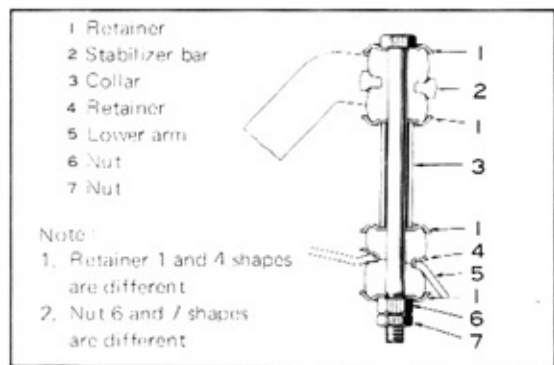


Fig. 6-12 Stabilizer

STRUT BAR**REMOVAL**

1. Jack up the front end of vehicle and support it on stands at specified points.
2. Remove part (1) and take off parts (2), (3), and (4).
3. Remove the lower arm mounting bolts.
4. Remove the strut bar.

Note: The nut at the inner side of strut bar threaded end is a position determining nut and has been peened on. Do not move this nut unless found necessary to do so.

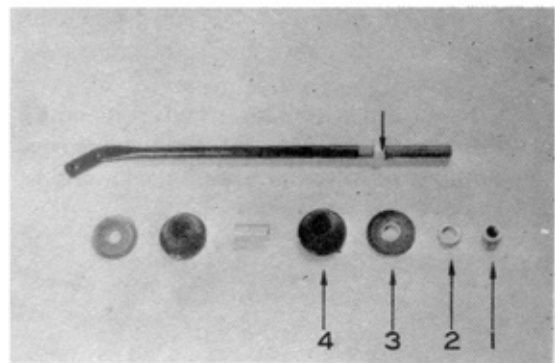


Fig. 6-13 Strut Bar

INSPECTION

Inspect the removed parts on the following points, and repair or replace any part found defective.

1. Strut bar for deformation.
2. Collar for damage or deformation.
3. Bushing for deformation.

Tightening torques

Lower arm x stabilizer

(nut) 140–220 kg-cm (10–16 ft-lb)

(Lock nut) 100–160 kg-cm (7–12 ft-lb)

Strut bar bracket x stabilizer bracket
100–160 kg-cm (7–12 ft-lb)

Lower arm x strut bar 400–550 kg-cm
(29–40 ft-lb)

Strut bar bracket x strut bar 750–1100 kg-cm
(54–80 ft-lb)

INSTALLATION

Install by following the removal procedures in reverse order.

Notes:

1. When replacing the lower arm or strut bar, adjust to standard dimension.
Standard dimension : 82 mm (3.2")
2. Take care to install the cushion rubber and retainers in correct location and direction.

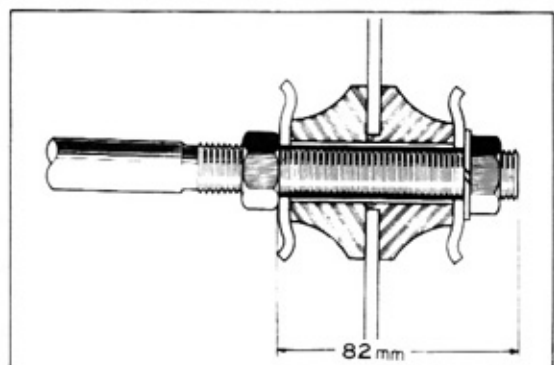


Fig. 6-14 Strut Bar Installation

FRONT SUSPENSION MEMBER

REMOVAL

1. Jack up front end of vehicle and support it on stands at specified points.
2. Remove the wheels.
3. Remove the part (1) and support the engine on jack.
4. Remove the parts (2), (3), and (4) at both sides and push down the suspension lower arm.
5. Remove the suspension member mounting bolts (two at left and right sides) and remove the suspension member toward the lower side.

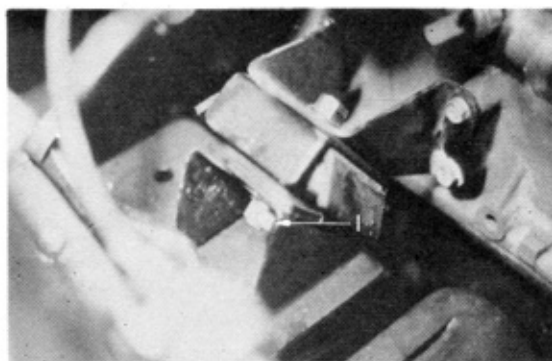


Fig. 6-15 Engine Mounting

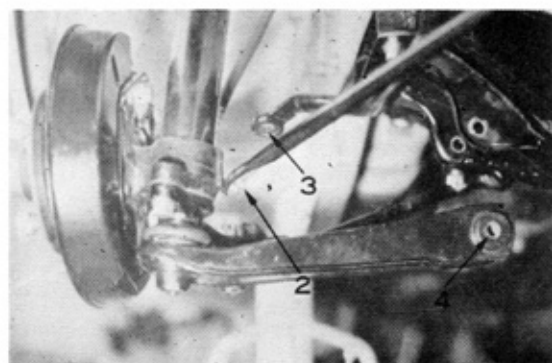


Fig. 6-16 Stabilizer Strut Bar

INSPECTION

If the front suspension member is subjected to a shock (such as in a traffic accident), it may become deformed and make it impossible to attain proper front wheel alignment. In such cases, inspect the front suspension member and replace it if found defective.

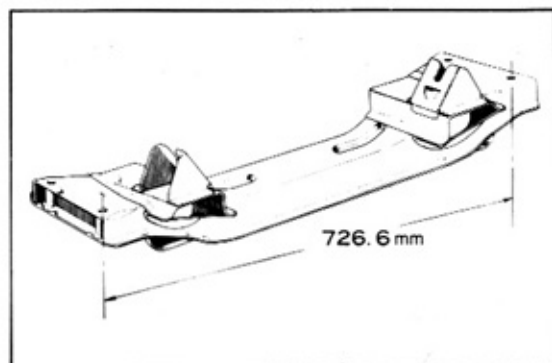


Fig. 6-17 Suspension Member Standard Dimension

INSTALLATION

Install by following the removal procedures in reverse order.

Note: Bolt down the suspension member at the specified torque.

Bolt torque: 400–500 kg-cm (29–33 ft-lb)

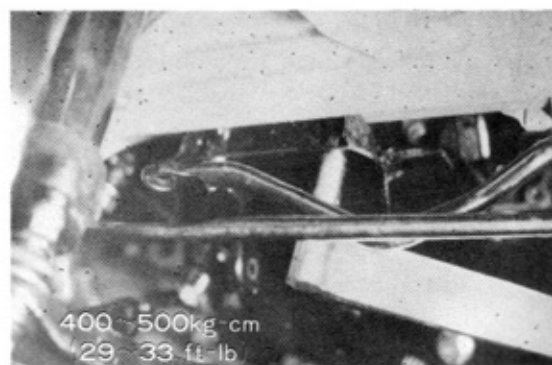


Fig. 6-18 Suspension Member Installation

FRONT SHOCK ABSORBER

COMPONENT PARTS

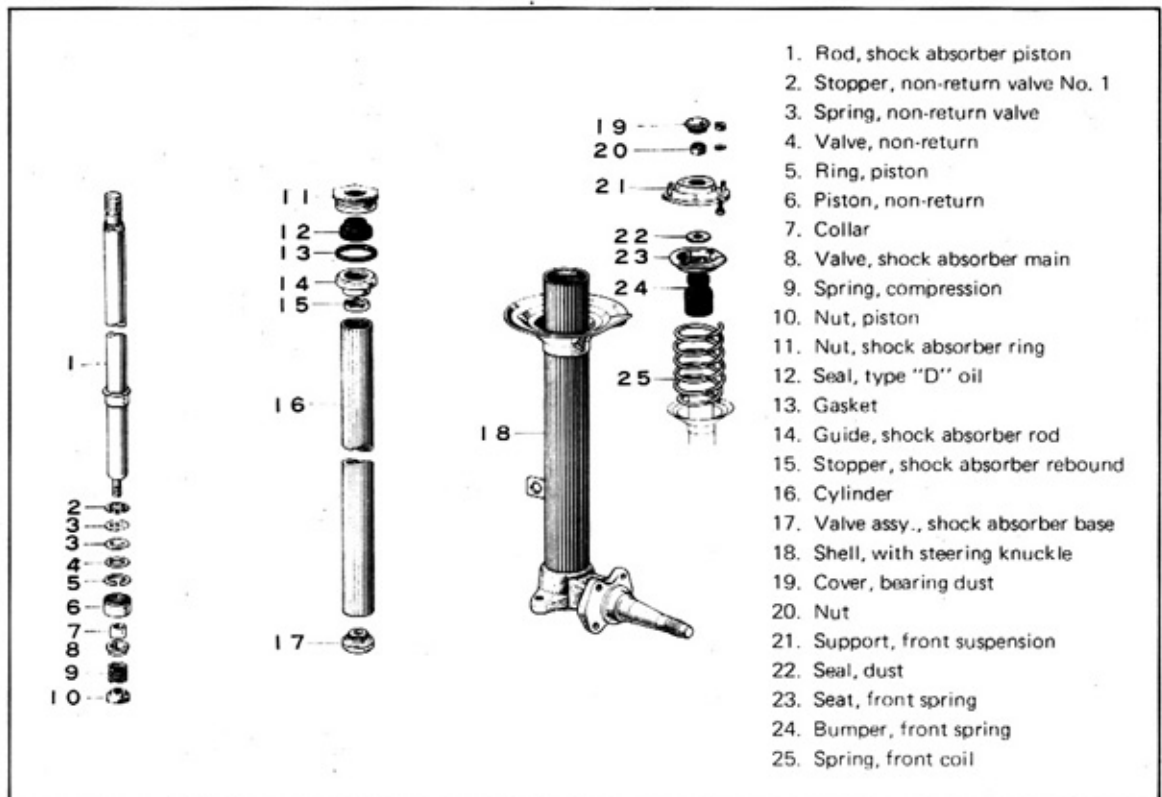


Fig. 6-19 Front Shock Absorber Component Parts

REMOVAL

1. Jack up the front end of vehicle and support it on stands at specified points.
2. Remove the wheel.
3. Disconnect the brake tube and flexible hose from the clamp.

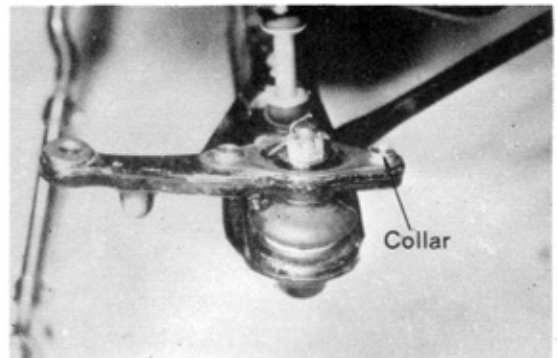


Fig. 6-20 Knuckle Arm Collar

4. Remove the three suspension support nuts at top part of fender apron and separate the shock absorber top end from the body.
5. Remove the two bolts installing the lower end of shock absorber (steering knuckle part) to the steering knuckle arm.

Note : The bolt holes in the steering knuckle arm are provided with positioning collars that extend out about 5 mm (3/16") from the arm surface, and fit into the bolt holes in shock absorber lower end (steering knuckle part). Therefore, the suspension lower arm must be pressed down in order to remove the shock absorber.

6. Bolt the Shock Absorber Stand [09471-14010] to the lower end of shock absorber and clamp the holder in a vise as illustrated.

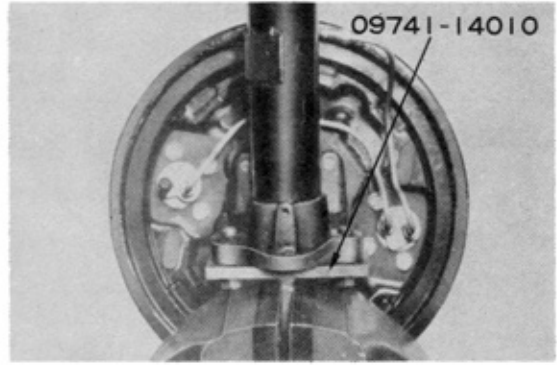


Fig. 6-21 Absorber Clamped in Vise

7. Using Front Coil Spring Compressor [09727-14010], compress the coil spring.
Note : Compress the spring until it can be moved freely.
8. Remove the bearing dust cover.

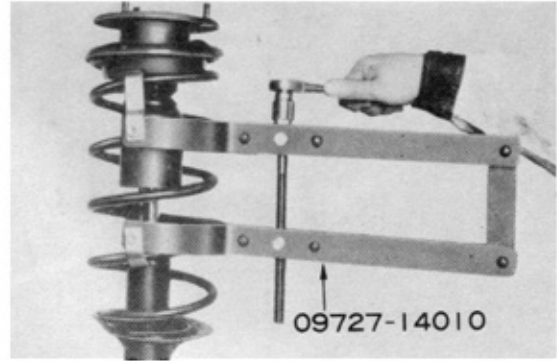


Fig. 6-22 Compressing Coil Spring

9. Holding the upper seat by using Front Spring Upper Seat Holder [09729-14010], loosen and remove the nut at absorber top end with a socket wrench (19 mm).
10. Remove the front suspension support and coil spring from the shock absorber.

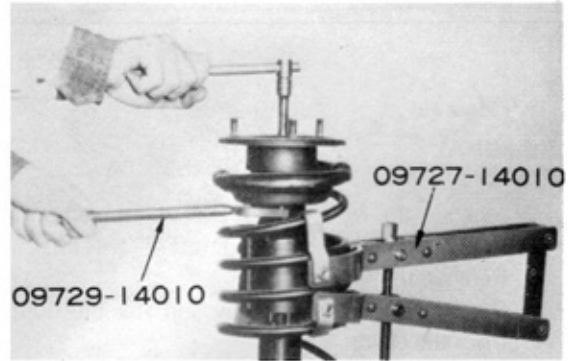


Fig. 6-23 Removing Support Nut

11. Remove the front brake.
 - (1) Remove the hub and brake drum.
 - (2) Remove the parking brake (4 bolts).

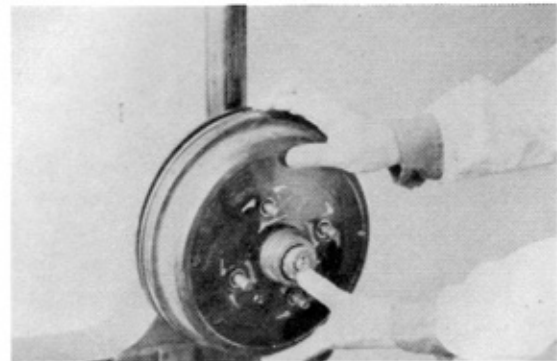


Fig. 6-24 Front Brake Removal

INSPECTION AND REPAIRS

Inspect the disassembled parts on the following points, and repair or replace any part found defective.

1. Shock absorber
 - (1) Leakage or faulty operation
 - (2) Shell for damage or deformation
 - (3) Inspect steering knuckle using flaw detecting agent or flaw detector.
2. Coil spring for weakness.
3. Front spring bumper for weakness.
4. Front spring seat for deformation or cracks.
5. Dust seal for deterioration.
6. Bearing stud cover for damage.

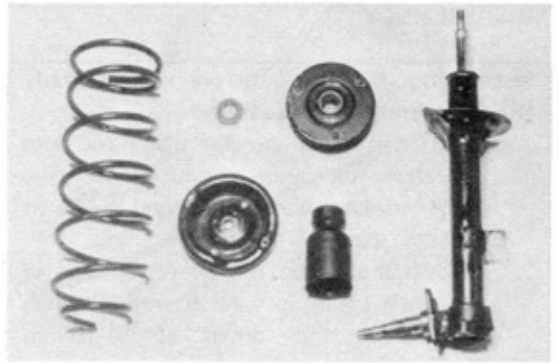


Fig. 6-25 Inspection of Disassembled Parts

7. Front suspension support
 - (1) Bearing for wear.
 - (2) Cushion for deterioration.
 - (3) Serrated bolts for damage.

INSTALLATION

Install by following the removal procedures in reverse order.

Notes :

1. When installing the front suspension support on the shock absorber piston rod after compressing the coil spring with Front Coil Spring Compressor [09727-14010], make sure that the support hole fits properly over the piston rod end.

TIGHTENING TORQUES

Piston rod x suspension support 400-550 kg-cm (29-40 ft-lb)

Suspension support x fender apron 190-310 kg-cm (14-23 ft-lb)

Absorber shell x knuckle arm : 800-1200 kg-cm (58-87 ft-lb)

2. Use a new nut (with nylon ring) when installing the suspension support to the piston rod.
In removing or installing this nut, air impact nut runner utilizing impact must not be used.
3. Coat the suspension support bearing part with MP grease before installing.

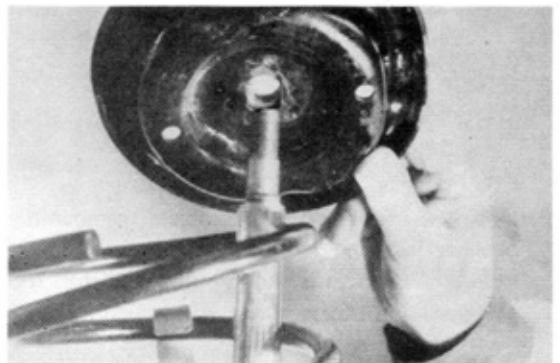


Fig. 6-26 Installing Support

After installing the support to the piston rod, pack the space at top part of support with MP grease.

4. Adjust the front wheel bearing preload to proper value.
(Refer to P6-18 for adjustment procedures).
5. Do not forget to bleed the brake system.
(Refer to P8-11 for brake bleeding procedures).
6. When reconnecting the flexible hose, make sure that it is not twisted.

DISASSEMBLY

Inspection Methods before Disassembly
(Requirements for Disassembly)

1. In case the shock absorber piston rod does not show the same resistance over the entire stroke when pushed and pulled at constant speed.
2. In case the piston rod shows changes in resistance (delay in valve operation) when jerked up and down at 5–10 mm (1/4"–3/8") stroke.
3. In case abnormal resistance or abnormal noise is present in either of the above tests.

Precautions on Shock Absorber Disassembly and Reassembly

1. Shock absorber disassembly and reassembly must be performed in a clean place and care taken to prevent any dirt or foreign matter from getting on the disassembled parts.
2. The shock absorber piston rod surface has been machined to extremely high precision in order to have it contacting perfectly against the type "D" oil seal as the rod moves up and down. Thus, special care must be taken not to mar this surface as any injury, even if slight, may cause the fluid to leak through the oil seal.

1. Bolt the Shock Absorber Stand [09741–14010] to the lower end of shock absorber and clamp the holder in a vise. (See P6-10 for mounting method).
2. Using Ring Nut Wrench [09728–14010], loosen the ring nut, and remove the ring nut from the shell, taking care not to damage the type "D" oil seal.

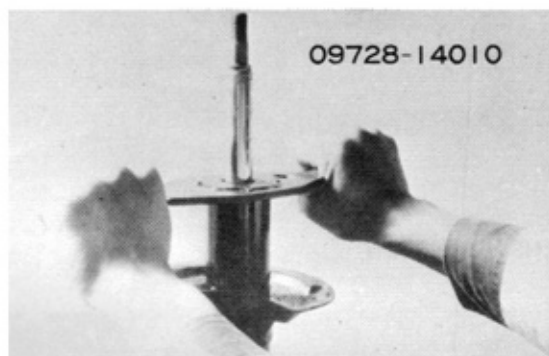


Fig. 6-27 Removing Ring Nut

3. Using a needle or similar object, remove the gasket installed around the rod guide upper circumference. Carefully pull the piston rod upward and remove it from the shell together with the rod guide.

4. Take out the cylinder from inside the shell.
Note : The fluid in the cylinder will leak out so have a pan or other container on hand to catch the fluid.

5. From inside the cylinder, drive out the base valve force-fitted in the cylinder.

- Note :** The driving out can be done easily by using a brass bar (about 450 mm [18"] long).

6. Unclamp the shell from the vise and drain out the fluid.

7. Insert a screwdriver into the slot at center of base valve and pry apart the base valve case and base valve.

8. Remove the piston valve from the piston rod.

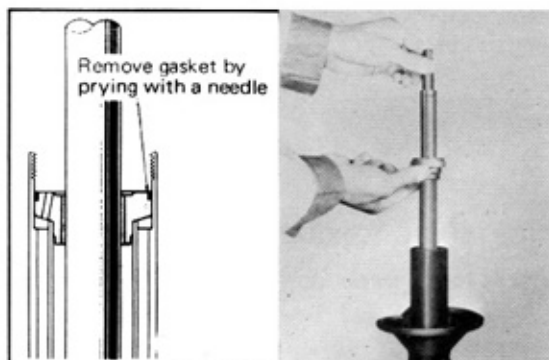


Fig. 6-28 Piston Rod Removal

- (1) Clamp the flat part of rod top end in a vise, using aluminum sheets as liners.

- (2) Remove the piston nut and take out the piston valve, spring, piston, cylinder valve, and other parts.

Note : Piston nut cannot be reused once it is removed.

- (3) Remove the piston ring from the piston.

INSPECTION AND REPAIRS

Inspect the disassembled parts on the following points and repair or replace any part found defective.

1. Piston rod

- (1) Plated part of rod for damage or wear.
Outside diameter wear limit 21.98 mm (0.8653")

Note: Inspect the distance between A and B of piston rod (Fig. 13-29) with extreme care because any injury on this part, even if small, may cause fluid leakage.

- (2) Threaded part (C) for piston nut and piston valve contacting face (D) for damage.
- (3) Rod for bending.

Support the rod on V blocks placed 50 mm (2.0") from the ends and measure the deflection at middle of rod.

Deflection limit 0.3 mm (0.012")

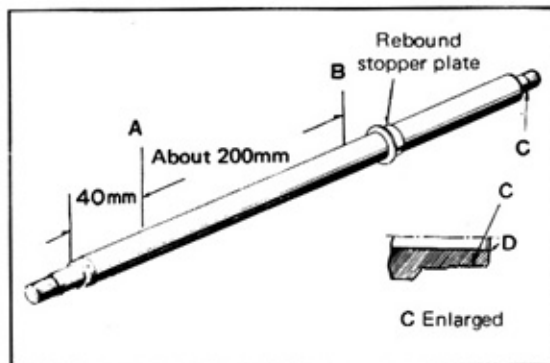


Fig. 6-29 Piston Rod Inspection

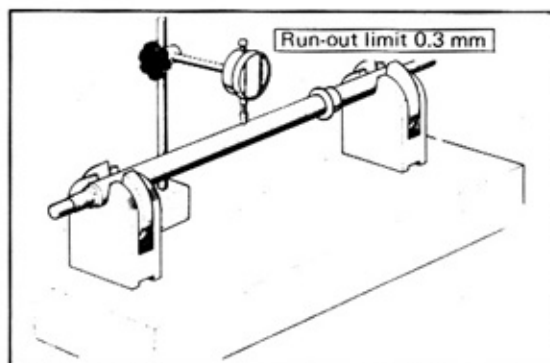


Fig. 6-30 Measuring Piston Rod Deflection

2. Piston

- (1) Piston top side non-return valve contacting surfaces for damage or wear.
- (2) Piston underside piston valve contacting surface for damage or wear.
- (3) Piston outside diameter for wear.
Limit 31.80 mm (1.252")

3. Piston ring

Piston ring for damage or wear.

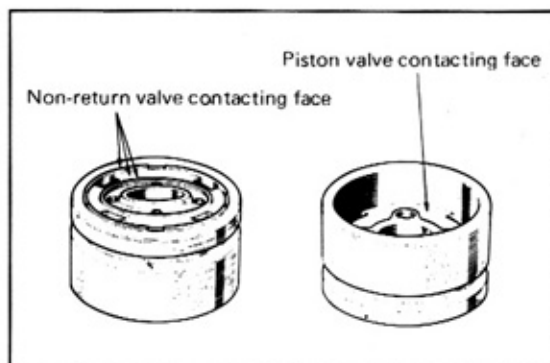


Fig. 6-31 Piston Inspection

4. Base valve

- (1) Base sub-valve (3) and main valve (4) for damage.
- (2) Valve guide case rivet (5) for looseness.
- (3) Sub-valve contacting surface (6) at center of base valve case underside, non-return valve (2), and non-return valve spring (1) for damage.

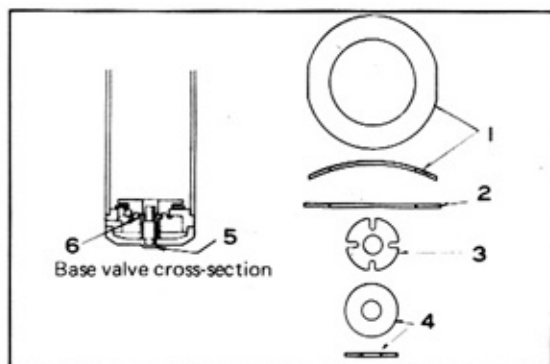


Fig. 6-32 Valve Inspection

5. Cylinder

- (1) Cylinder bore for damage or wear.
Bore wear limit 32.23 mm (1.269")

Note: Measure the cylinder bore at the part where the piston slides.

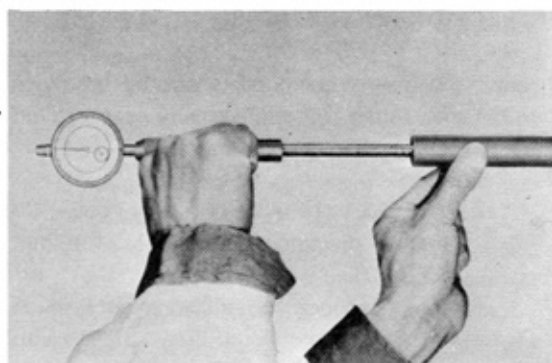


Fig. 6-33 Cylinder Inspection

- (2) Cylinder for bending

Support the cylinder on a V block located 10 mm (1/2") from the ends and measure the deflection.

Deflection limit 0.10 mm (0.004")

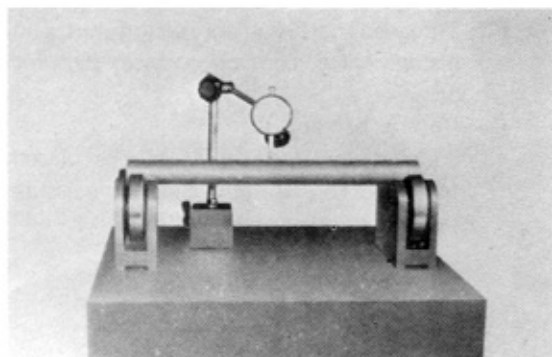


Fig. 6-34 Measuring Cylinder Deflection

6. Rod guide

Bimetal formed bushing inside rod guide for wear or damage.

Bore wear limit 22.35 mm (0.880")

7. Ring nut

- (1) Nut threads for damage.

- (2) Type "D" oil seal lip for damage or wear.

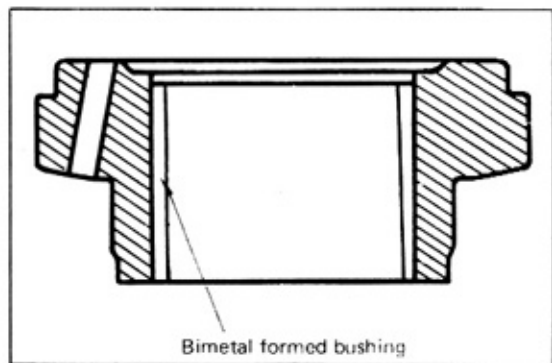


Fig. 6-35 Rod Guide Inspection

TYPE "D" OIL SEAL REPLACEMENT

- Using a screwdriver and vise, remove the oil seal from the ring nut.
- Press in the new oil seal, using Front Shock Absorber Oil Seal Replacer [09742-14010].

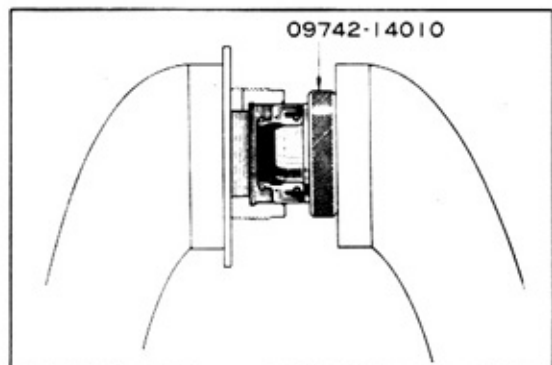


Fig. 6-36 Oil Seal Replacement

REASSEMBLY

Reassemble by following the disassembly procedures in reverse order as a general rule.

1. Install the parts (1)–(8) on the piston rod in the order shown in illustration.

Note : Have the peened part of piston rod corrected before reassembly.

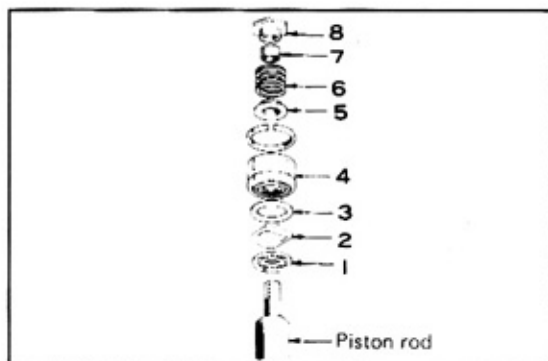


Fig. 6-37 Piston Rod Reassembly

2. Tighten the piston nut.
Tightening torque 190–310 kg-cm
(14–22 ft-lb)

Notes :

1. The non-return valve must be positioned at the center of non-return valve stopper, otherwise the valve will be deformed when tightened.
2. Be sure to tighten the piston nut at the specified torque.
3. The wrench socket should be cleaned before using.

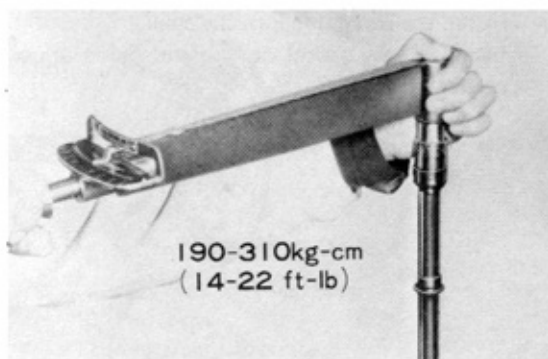


Fig. 6-38 Tightening Piston Nut

3. With a punch, lock the piston nut at four places.
4. Install the piston ring on the piston.

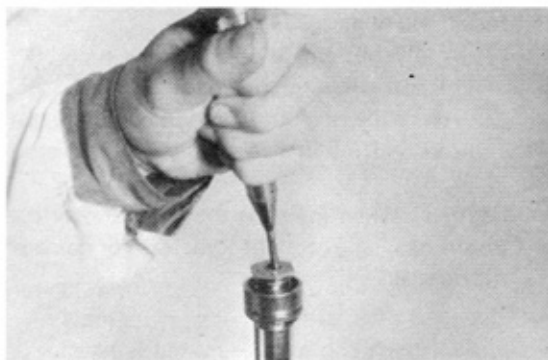


Fig. 6-39 Locking Piston Nut

5. Press the base valve (2) into the base valve case (1) and using a plastic hammer, drive these parts into the cylinder (3).
6. Insert the piston rod into the cylinder.
Caution : Take care not to damage the piston ring.
7. After installing the piston rod into the cylinder, insert the cylinder into the shell.

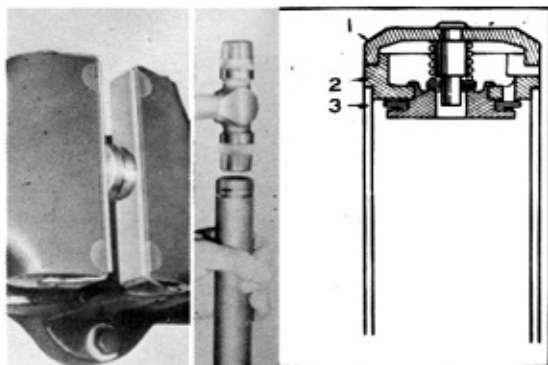


Fig. 6-40 Base Valve Reassembly

8. Fill the shell with new Castle Auto Fluid Special.
 Fluid quantity 330 cc (11 fl. oz.) (TA10, 12 series)
 315 cc (10.5 fl. oz.) (TA22, RA20L series)

Note : Measure accurately the amount of fluid to be filled.

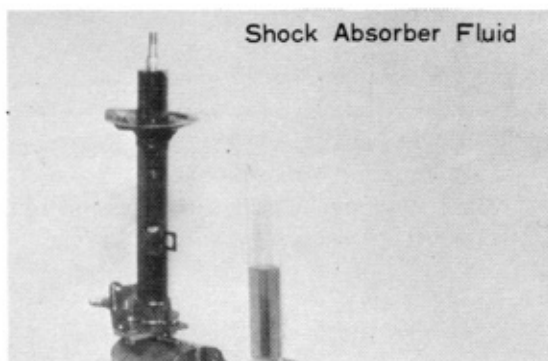


Fig. 6-41 Filling Fluid

9. Install the rod guide into the shell.
 Install a new gasket on the rod guide upper perimeter.

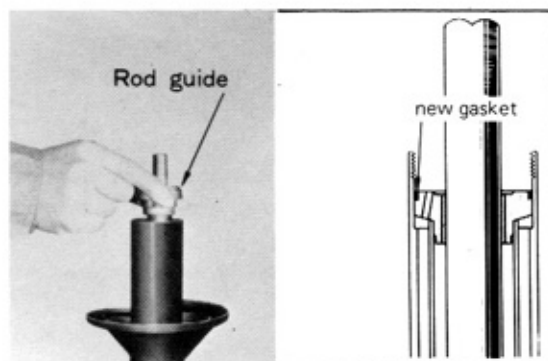


Fig. 6-42 Rod Guide Installation

10. Install the ring nut.
 (1) Apply MP grease on the lip of type "D" oil seal inside the ring nut.
 (2) Insert the ring nut from top end of piston rod and install it carefully on the piston rod.

Caution : When inserting the ring nut over the piston rod, take care not to deform or damage the oil seal.

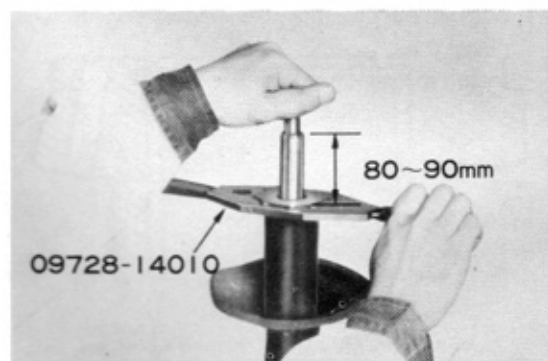


Fig. 6-43 Installing Ring Nut (1)

11. Piston rod position.
 When tightening the ring nut, have the piston rod pulled out about 80-90 mm (3"-3-1/2") from the shell.
 Piston rod raised up 80-90 mm (3"-3-1/2") corresponds to vehicle standard state.
12. Using Ring Nut Wrench [09728-14010], tighten the ring nut to the specified torque.
 Nut torque 1000-1500 kg-cm (72-108 ft-lb)

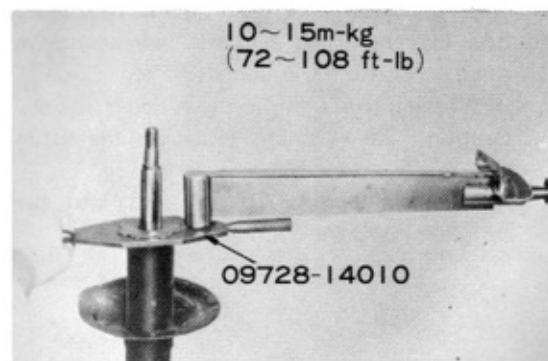


Fig. 6-44 Installing Ring Nut (2)

FRONT AXLE HUB

COMPONENT PARTS

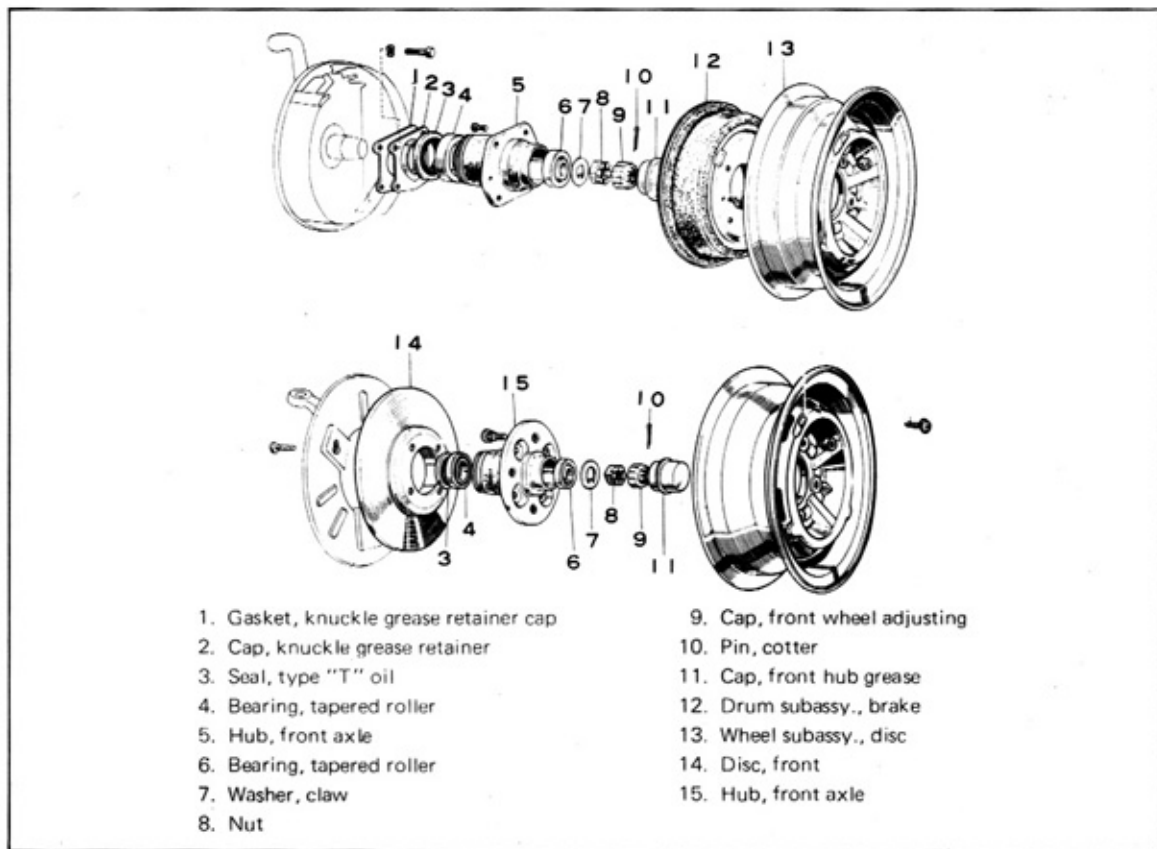


Fig. 6-45 Front Axle Hub Component Parts

REMOVAL

1. Jack up the front end of vehicle and support it on stands at specified points.
2. Remove the hub grease cap, cotter pin, castle nut, and claw washer.
3. Remove the front axle hub together with the

brake drum.

Note: Do not separate the axle hub and brake drum unless found necessary as there is danger of disturbing their center alignments.

INSPECTION

Take out the grease and wash all disassembled parts. Then inspect them on the following points and repair or replace any found defective.

1. Bearings
Inner and outer bearings for wear, damage, and discoloration.
2. Brake drum
(1) Hub bolts for damage.
(2) Drum inside surface for damage or wear.
3. Type "T" oil seal for damage, or deformation, and seal lip for deterioration or wear.
4. Hub grease cap for damage or deformation.

BEARING CUP REPLACEMENT

- Using [No. 2] and [No. 3] of Front Hub & Drive Pinion Bearing Tool Set [09608-20010], remove the inner bearing cup and oil seal.

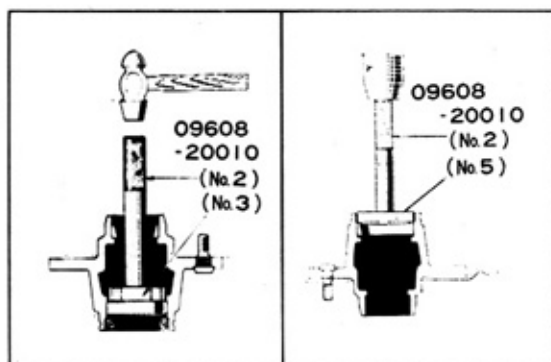


Fig. 6-46 Bearing Replacement

- Using tools [No. 2] and [No. 4] of the same tool set, remove the outer bearing cup.
- Press in the outer and the inner bearing cups by using handle [No. 2] and replacers [No. 6] and [No. 5] respectively.
- Fill the axle hub and bearings with sufficient amount of MP grease.

Install the inner bearing cone on the axle hub, and using the handle [No. 2] and the back side of replacer [No. 5], press in the oil seal.

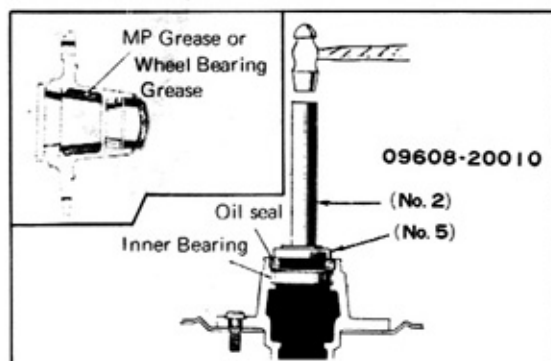


Fig. 6-47 Oil Seal Installation

INSTALLATION

- Install the front hub and brake drum
- Adjust the front wheel bearings.
 - Tighten the castle nut at 260–320 kg-cm (19–24 ft-lb) torque and then turn the drum 2 or 3 times to make certain that the bearings have settled into place.
 - Loosen the nut until it can be turned with fingers. Then retighten the nut finger-tight.
 - Measure the preload by method shown in Fig. 13-48.
Preload 0.3–0.7 kg (9.6–22.5 oz.) (wheel rotating).
- After installing the cotter pin in the adjusting cap, press the grease cap on the axle hub.

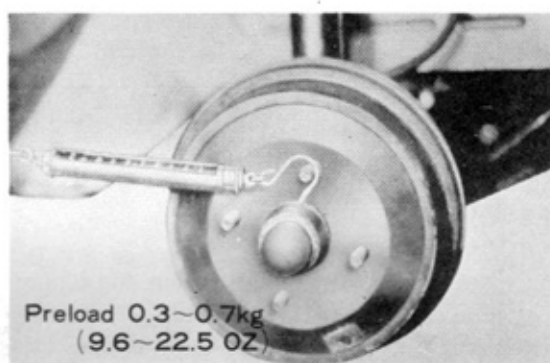


Fig. 6-48 Measuring Front Wheel Bearing Preload

FRONT WHEEL ALIGNMENT

EXPLANATORY NOTES

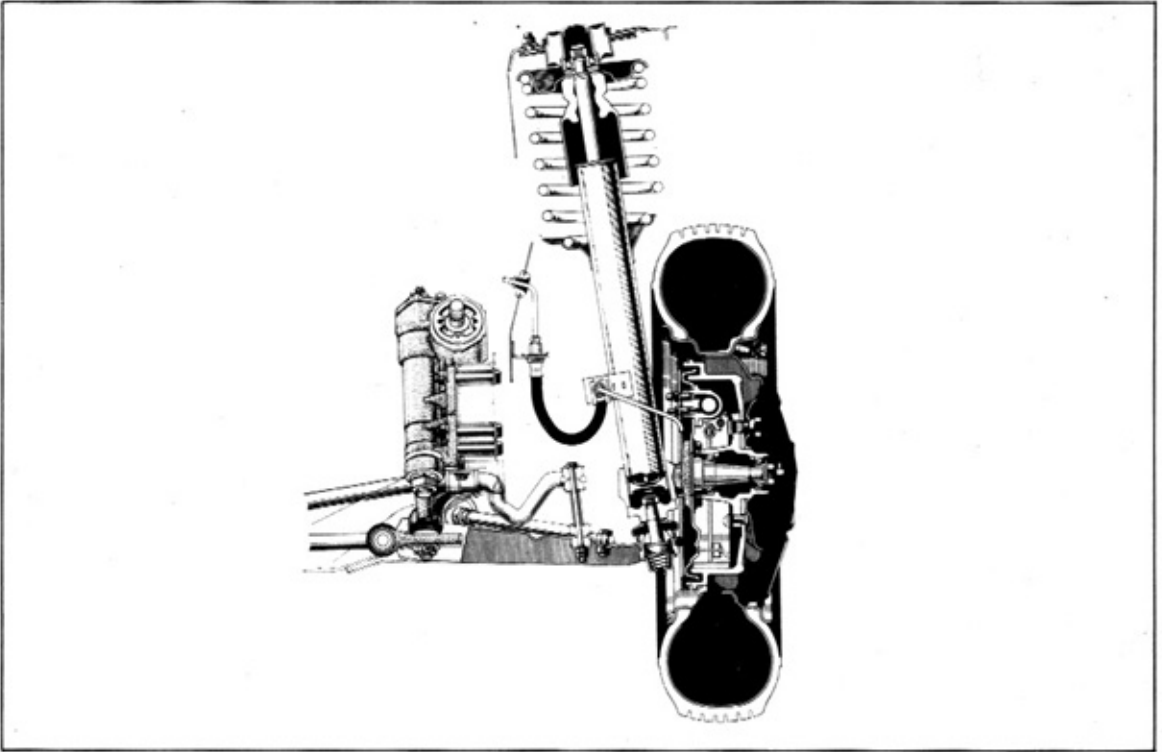


Fig. 6-49 Construction Drawing

In general, the strut type suspension is made up of high-rigidity component parts. Since the distance between the vertical supporting points is long and the body is highly rigid, unless the vehicle gets into a big accident, the front wheel alignment will remain virtually unchanged.

If there is doubt as to whether the front wheel alignment is correct because of symptoms such as abnormal tire wear or steering difficulties, it

should be checked together with wheel balance. Any discrepancy will make necessary the performing of corrections to wheel balance or body alignment. Also inspect the suspension component parts and repair or replace any part found defective.

Use gauges that can be depended on for accuracy, and be sure to have sufficient understanding on the use of the gauges.

Table 6-2 Wheel Alignment

Toe-in	When unladen At rated load	$6 \pm 1 \text{ mm}$ ($0.24'' \pm 0.04''$) 3 mm (0.12'') (Reference value)
Camber	When unladen At rated load	$1^\circ \pm 30'$ 30' (Reference value)
Caster	When unladen At rated load	$1^\circ \pm 30'$ $1^\circ 15'$ (Reference value)
King pin inclination	When unladen At rated load	$7^\circ 30' \pm 30'$ 8° (Reference value)

Notes :

Before starting to inspect the wheel alignment, make sure that the following points have been corrected.

1. Differences in tire inflations and wheel heights.

2. Tire one-sided wear and deflection, and axial play in wheel.
3. Excessive looseness in front suspension and steering linkage.

TOE-IN MEASUREMENT AND ALIGNMENT

1. Advance the vehicle a few meters (yards) and bring the front wheels accurately to straight ahead position.
2. Set the heights of toe-in gauge measuring pointers to the front wheel center heights.
3. Place the gauge at the rear side of front wheels and mark the gauge height at the tread center of each tire. With the toe-in gauge, measure the distance between the left and right tire marks.
4. Advance the vehicle so that the tires will roll 180°.
5. Measure the distance between the marks at front side of tires.

Rear side measured value – front side measure value = toe-in

Toe-in (vehicle unladen) 3 mm (0.12")

If the toe-in is not within the reference value, correct by adjusting the lengths of left and right tie-rods underneath the vehicle.

Notes :

1. Set the left and right tie-rods to the same length.
2. Adjust by turning the adjusting tubes at left and right sides by the same amounts.
3. Take care on the intersecting angle between the No. 1 and No. 2 tie ends.

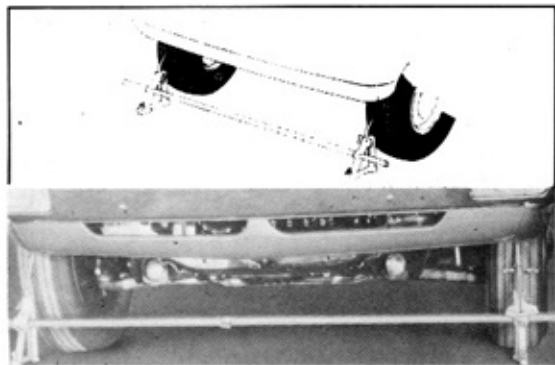


Fig. 6-50 Toe-In Inspection

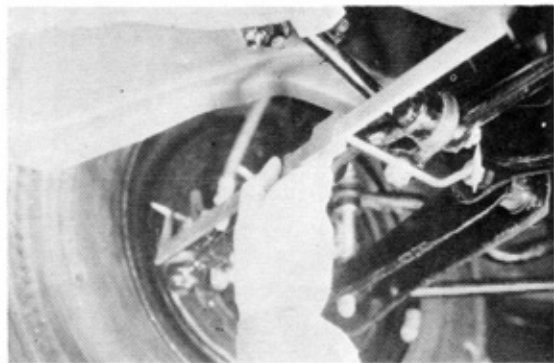


Fig. 6-51 Left and Right Tie Rod Length Measurement

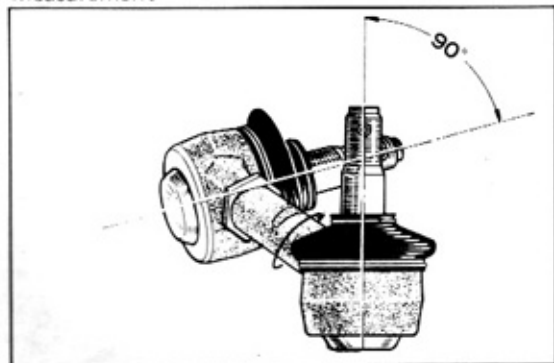


Fig. 6-52 Tie-Rod End No. 1 and No. 2 Intersecting Angle

SIDE SLIP MEASUREMENT

After measuring and adjusting the toe-in, adjust the side slip, using the side slip tester.

Side slip limit 3 mm (0.12")
(per 1 meter [39.37"] at both in and out)

Note : In case the side slip exceeds the limit, the probable cause would be incorrect adjusting of toe-in or faulty front wheel alignment.



Fig. 6-53 Side Slip Measurement

STEERING ANGLE ADJUSTMENT

Measure the tire steered angles after turning the steering wheel fully to both directions.

Reference value Inside 38°30'

Outside 31°

In case the steering angle is not within the reference value, correct by adjusting the knuckle stopper bolt.

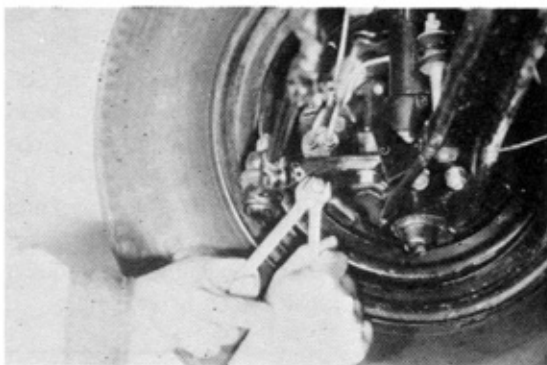


Fig. 6-54 Steering Angle Adjustment

WHEEL DEFLECTION INSPECTION

Jack up the vehicle and check the wheel side deflections.

Tire deflection limit 3 mm (0.12")

Notes :

1. In tire deflection measurement, there must be no excessive bearing looseness.
2. If the vehicle had been parked for long time, warping may remain in tires so that the vehicle should be run before measuring the deflection.

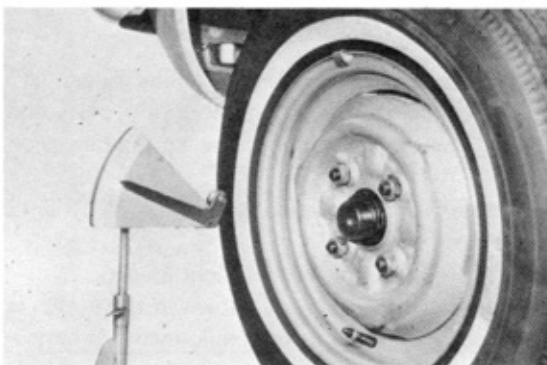


Fig. 6-55 Checking Wheel Deflection

WHEEL BALANCE INSPECTION

The wheel (including disc wheel, tire, and tube) balance may become disturbed by defective wheel alignment, sudden braking, tire eccentric wear due to improper tire inflation, or repairs to tire and tube.

Therefore, when the wheel or tire is replaced or repaired, it is necessary to have the wheel balance checked both statically and dynamically.

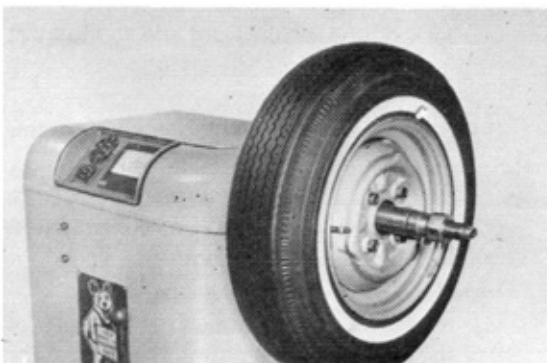


Fig. 6-56 Wheel Balance Inspection

WHEEL BALANCE CORRECTION

There are two methods of correcting the balance, as follows :

1. Correcting after removing wheel from the vehicle.
2. Correcting without removing wheel from the vehicle.

In any of the above methods, wheel balancer suited for the purpose will be required.

Wheel unbalance limit 330 g-cm (0.29 in-lb)
(Equivalent to 20 g (0.64 oz.) balance weight)

Table 6-3 Balance Weight Sizes

Part No.	Weight
90942-03041	10 g (0.32 oz)
90942-03017	20 " (0.64 ")
90942-03020	30 " (0.96 ")
90942-03022	40 " (1.28 ")
90942-03025	50 " (1.60 ")
90942-03027	60 " (1.93 ")
90942-03029	70 " (2.25 ")
90942-03031	80 " (2.57 ")

FRONT BODY ALIGNMENT

After repairing a vehicle body damaged in collision, if the front wheel alignment does not seem to be correct, use the suspension gauge [09722-14010] (for TA10 & 12 series) or [09722-14020] (for TA22 & RA20L series) and check the body alignment.

If the inspection shows misalignment exceeding the allowable limit, repair the body once more.

FRONT BODY ALIGNMENT GAUGE

1. Preparatory work before installing gauge.

- (1) Remove the hood mounting bolts and take off the hood, leaving the hinges on the body.

Note : This operation is only for TA 10 & 12 series.

- (2) Remove the left and right fenders.

Note : If the cutaway shown in the sketch is made, there will be no requirement for removing the fenders. This operation is required only for TA10 & 12 series.

- (3) Remove the air cleaner.
- (4) Jack up the vehicle front end and support it on stands at specified points.
- (5) Remove the wheels.
- (6) Remove the shock absorbers with drums attached.
Refer to P6-9 for removal procedures.
- (7) Remove the suspension member mounting bolts (one only at both rear sides).

2. Install the body alignment gauge.

- (1) Install (1) to the suspension supports at the upper side of fender apron.

Note : Install so that arrow marks are pointing toward inner side of fender apron.

- (2) Assemble (2) (L) to (1), and (3) (R) to (1) over (4).

Note : Use (4) at the fender apron that seems to be correct.

- (3) Assemble (6) to (4).

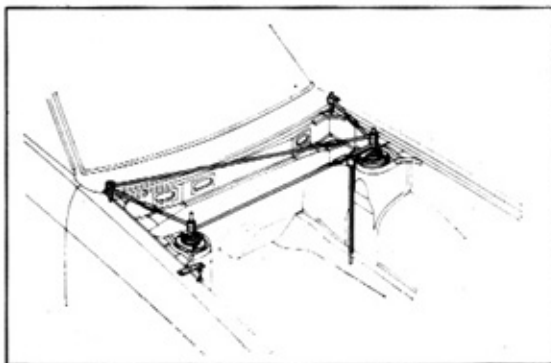


Fig. 6-57 Body Alignment Gauge Installation

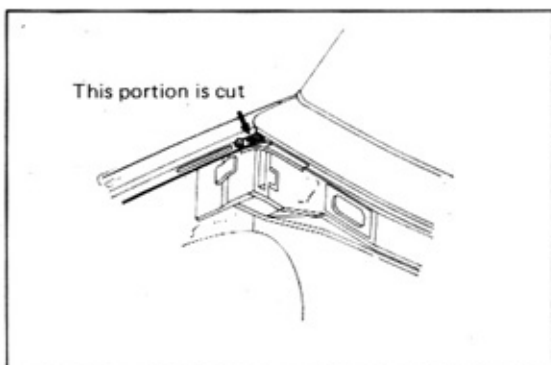


Fig. 6-58 Cutaway for Installation of Rod Pin

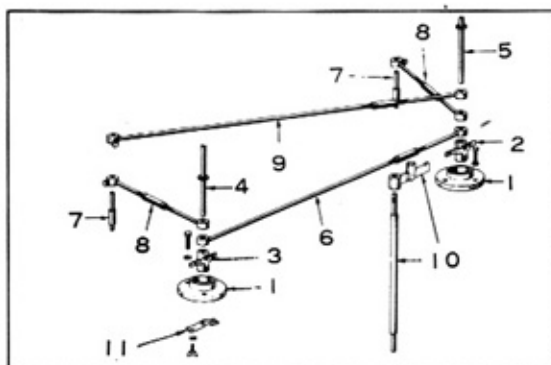


Fig. 6-59 Body Alignment Gauge Components

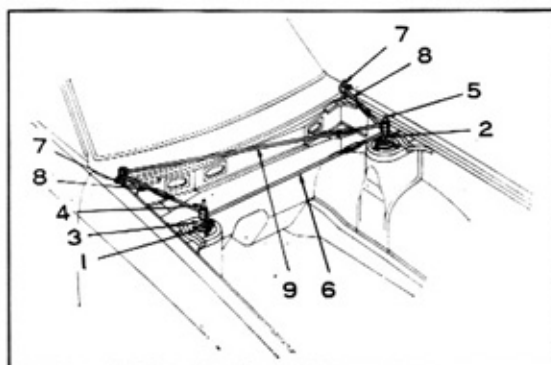


Fig. 6-60 Gauge Mounting Procedure (1)

(4) Insert (7) into counter support holes.

Note : Use hood bumper holes in case of TA20 & 22.

(5) Insert (8) over (4) and (7). Insert the other (8) over (7) only.

Note : Designate (7) as the one with the lock bolt.

(6) Insert (5) into (8), (6), and (2) or (3).

(7) Set the (2) and (3) scales to "A", and lock (7).

(8) Install (9) to (5) and (7).

(9) Insert (10) into front side member mounting hole (rear).

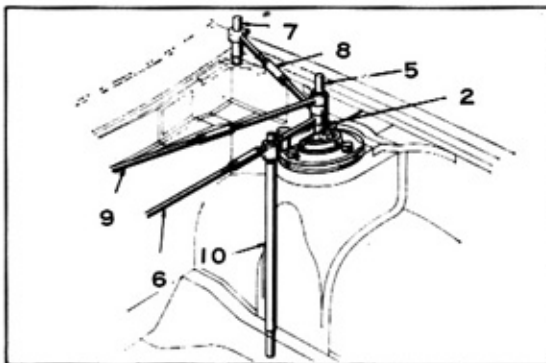


Fig. 6-61 Gauge Mounting Procedure (2)

3. Body alignment measurement

(1) Read the vehicle width between (4) and (5) on the "A" gauge at the center of both (2) and (3).

Notes :

1. Set the (2) or (3) gauge "A", whichever had been inserted over (4), to the position shown in Fig. 13-62.

2. Measurement valve will be that indicated on the gauge "A" which had been inserted over (5).

Allowable range ± 2 mm (0.08")

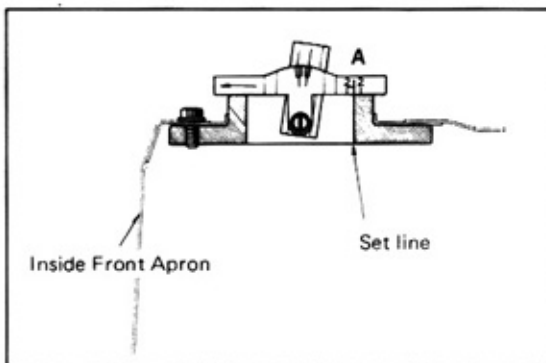


Fig. 6-62 Gauge "A" Measurement

(2) Read the front suspension support surface angles on the center gauges "B" and "C" of (2) and (3).

Notes :

1. Case of gauge "B".
Allowable range ± 2 degrees

2. Case of gauge "C"
Point the gauge arrow mark toward the front.

Allowable range ± 2 degrees

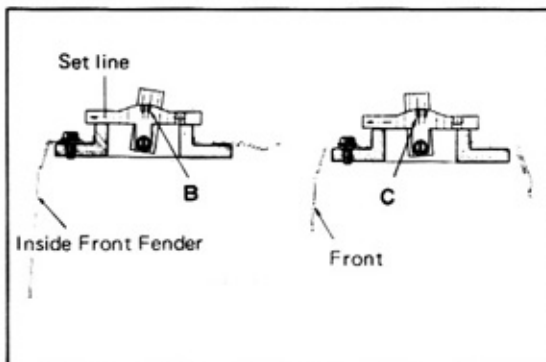


Fig. 6-63 Gauge "B" and "C" Measurements

(3) Read the height from front suspension support surface to the side member on gauge "D" of (10).

Note : Set (10) as shown in Fig. 6-64 and read gauge "D" scale.

Allowable range ± 5 mm (0.20")

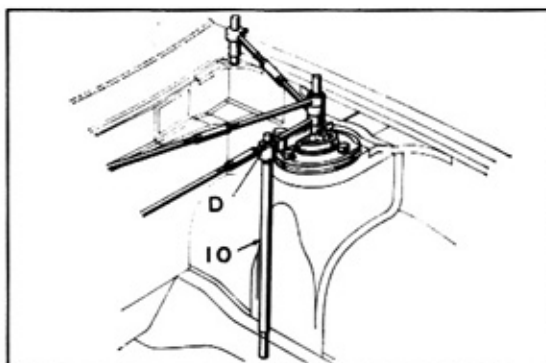


Fig. 6-64 Gauge "D" Measurement

4. In case the front body is partially damaged by an accident, it must be repaired by cutting out the damaged portion and replacing it with a new part or by bumping out and straightening the damaged metal parts. The newly designed front alignment gauge is of the simplified type which can be mounted quickly and depending on how it is used, several kinds of body repairs become possible.

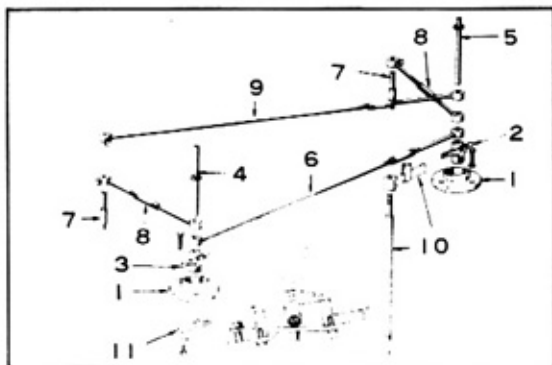


Fig. 6-65 Gauge Components

[In case W or X is damaged]

- Install and lock (6), (8), and (9) to (4).
- Check gauges "B" and "C" on (4) to see if within allowable range.
- Remove (9) and set the center line of gauge "A" scale on (4) to ring inner side.
- Attach (11) to underside of (1) and lock (4).
- Install (7) together with (9) to the damaged part.
- Insert (5) at the intersection point of (6), (8), and (9).
- Position (5) becomes the repair value for damaged part.

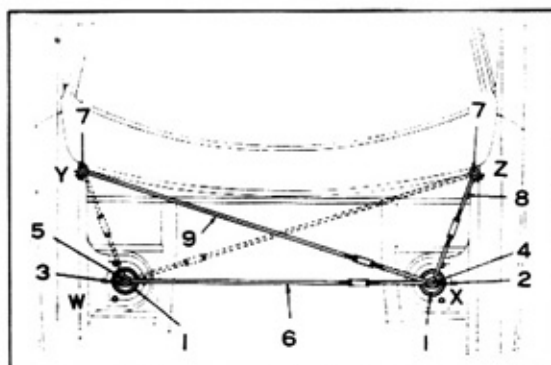


Fig. 6-66 Body Alignment Repair (1)

[In case W-Y or X-Z is damaged]

- Install (8) and (4) on the undamaged side (2) and (7) or (3) and (7), and lock (8).
- Check gauges "B" and "C" on (4) to see if within allowable range.
- Set the gauge on (4) as shown in Fig. 13-62, and lock it by installing (11).
- Install (6) on (4), and (9) on (7).
- Install (5) at the intersection of (6) and (9).
- Position of (5) becomes the repair value.

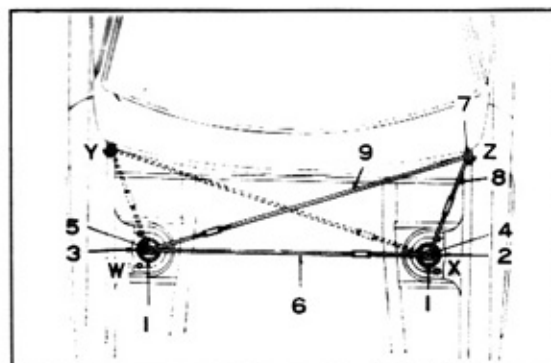


Fig. 6-67 Body Alignment Repair (2)

[In case W and X is damaged]

- Install (8) and (9) and insert (4) into the intersection of (8) and (9), and lock (8).
- Carefully withdraw (9) from (4).
- Install (8) and (9) and insert (4) into the intersection of (8) and (9), and lock (8).
- Install (6) on (4) and (5).
- Positions of (4) and (5) become the repair values.

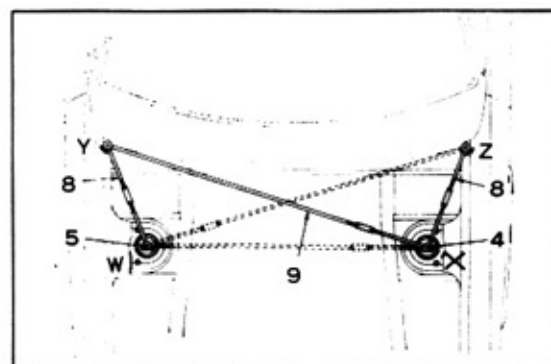


Fig. 6-68 Body Alignment Repair (3)