

PREFACE

This manual has been prepared to provide our customers with the necessary information for the care, maintenance and safe operation of the Ridewell Model RAS-227 and RAD-227 Series air ride suspensions.

The Ridewell Air Ride Suspension is designed and engineered to provide continuous trouble-free operation. Properly maintained, it will provide many miles of trouble free service. In the event of a major breakdown, system safeguards are engineered into the suspension that will allow the vehicle to be driven carefully to the nearest place of service.

Major features of the Ridewell Model RAS-227 and RAD-227 Series are:

1. The entire load of vehicle is carried 100% on air springs. This provides the vehicle with exceptional ride due to road shocks being dampened to their maximum.
2. Parallelogram type torque arms mounted in rubber bushings. This gives the vehicle a unique road stability and allows the axles to articulate with no change in steering or drive line angle.
3. Many of the component parts are interchangeable between steering and drive suspensions. This allows for fewer parts to be stocked in your parts room.

OPERATING INSTRUCTIONS

The vehicle's air pressure must be built up and maintained in excess of 65 psi prior to operation. The reason, a minimum of 65 psi is required, is because an air brake protection valve has been installed in the service line leading to the suspension and must be opened preventing damage to air springs. This valve will automatically maintain safe air brake pressure should a loss of air due to a failure in the suspension system occur.

Ride height of vehicle is automatically maintained by the use of Height Control Valves. These valves will increase or decrease the air pressure in air springs as load is applied or removed from vehicle.

In the event an air spring failure should occur on one side, it is recommended the air springs on the opposite side be completely deflated. This should only be done if vehicle becomes difficult to operate. The vehicle will then ride on the internal rubber bumpers of the air spring and can carefully be temporarily operated at a reduced speed.

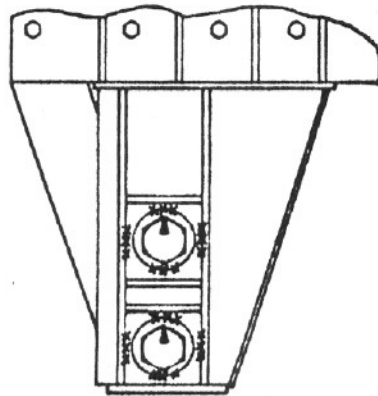
To deflate and cut off air pressure to damaged air spring, disconnect the height control valve and rotate actuating lever arm to a vertical down position.

It should be noted that on the steering axle suspension there is only one (1) height control valve, and on the driving axle suspension there are two (2) height control valves, a left and right hand.

PRE-OPERATIONAL CHECK LIST

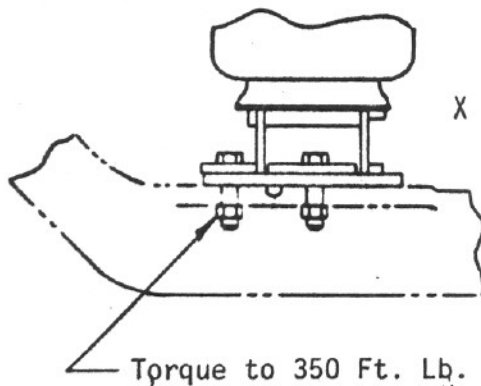
Before vehicle is placed into service, the following steps should be taken.

1. Check all fasteners at frame attachment.
2. Check axle alignment - if alignment is out, see service procedure Page 6.
3. Check welds on clamping blocks in hanger, inside and out. Also, see that anti-turn washers are installed over head of alignment bolts and nuts.

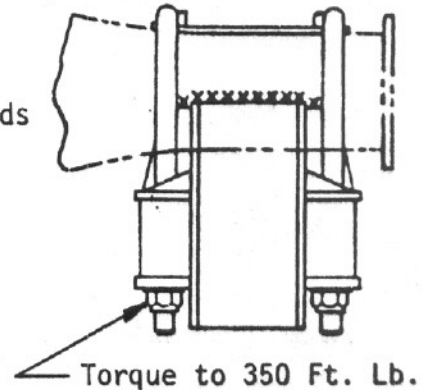


X indicates welds

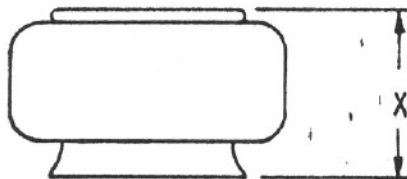
4. Check torque of fasteners and weld of suspension to Drive Axle.



X indicates welds



5. With vehicle on level ground and air pressure built up in excess of 65 psi, all air springs should be of equal firmness. If not, see Page 8 and 9.
6. Check for proper ride height. If incorrect, see service procedure Page 8 and 9.



Steer Axle	X = 6.75 inches
Drive Axle	X = 8.06 inches

7. Check for clearance around air spring.
8. Check for leaks and loose fittings on air lines.
9. Check shock absorbers for any sign of leaking.

PERIODIC OPERATION INSPECTION CHECK LIST

After vehicle has been in operation for approximately 1,000 miles, all fasteners must be checked for proper torque. Refer to torque chart.

Check for leaks and loose fittings on air lines.

Check for equal firmness of air springs with vehicle on level ground and air pressure in excess of 65 psi. If not, see Page 8 and 9.

Check air springs for any sign of wear marks.

Check for proper ride height.

Check welds at axle connection for any cracks.

Check shock absorbers for any sign of leaking.

25,000 Mile Requirements

Repeat all steps as 1,000 mile requirements.

50,000 Mile Requirements

Repeat all steps as 1,000 mile requirements.

Block frame of vehicle and allow axles to hang and check air springs for signs of chaffing or wear.

If tires are showing signs of uneven wear, alignment should be checked. This should be performed as soon as wear signs become visible.

Remove one shock absorber and push in and out; if there is little resistance, they should be replaced at this time. Note: Your vehicle may be equipped with adjustable shock absorbers in which case do not dispose of them, see Page 10.

TROUBLE SHOOTING

<u>Possible Cause</u>	<u>Remedy</u>
<u>All Air Spring Flat or Slow to Fill</u>	
Inadequate air pressure to suspension.	Build air pressure in excess of 65 psi. Check all air connections.
Air filter may be clogged	Repair or replace
Defective Air Brake Protection Valve.	Replace
Height Control Valve inlet clogged or not functioning.	Repair or replace

Air Spring Flat on One Side of Suspension

Damaged air spring.	Replace
Height Control Valve inlet clogged or not functioning	Repair or replace
Improperly adjusted Height Control Valve	See Page 8 and 9 for adjustment procedure.

When Vehicle is Parked Suspension Deflates Rapidly

Leak in air line	Locate and repair
Damaged air spring	Replace

Vehicle Pulls to Left or Right

Tire pressure	Inflate to specifications.
Axle out of alignment	See alignment procedure Page 6
Bushings in torque arm worn	See Service Instructions Page 7

Vehicle has Excessive Sway

Air springs may be softer on one side	Adjust Height Control Valve. See Page 8 and 9
Height Control Valve inlet may be clogged	Repair or replace
Bushings in adjustable sway bar	Remove and replace
Bushings in torque arm worn	See Service Instructions Page 7

SERVICE INSTRUCTIONS

Replace an Air Spring

1. Block frame of vehicle with proper jacks or stands.
2. Exhaust air from the suspension system.
3. Disconnect air supply line and remove upper and lower mounting bolts on air spring.
4. Remove and replace air spring.
5. Reconnect upper and lower mounting bolts and air supply line.
6. Torque all connections to specified torque.
7. Remove stands from frame and build air pressure in excess of 65 psi.
8. Check for air line leaks.

Replace a Shock Absorber

1. Remove tires from axle if necessary.
2. Remove upper and lower mounting nuts.
3. Remove and replace shock absorber.
4. Torque nuts to proper specifications.
5. Reinstall tire and torque wheel nuts to proper specifications.

Note: If your vehicle is equipped with adjustable shocks, see Page 10.

Realignment of Axle

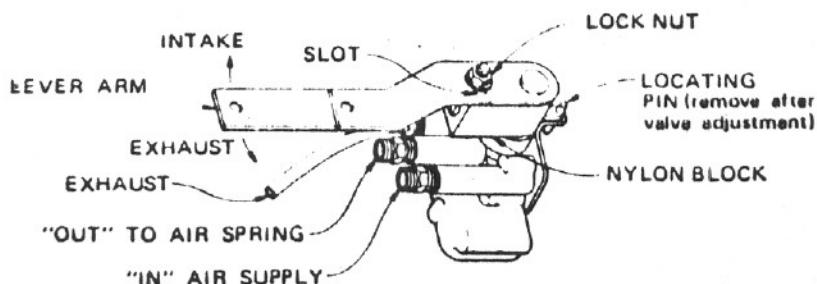
1. Remove anti-turn washers from head of bolt and nut of eccentric bolts in hanger.
2. Remove $1\frac{1}{4}$ " nut on eccentric bolts.
3. To align axle, turn arrow marked on bolt head in direction you want axle to move. Note upper and lower arrows should point in same direction.
4. When axle is aligned, install new $1\frac{1}{4}$ " lock nut and torque to 750 ft. lb. lubricated threads.
5. Reinstall anti-turn washers over head of bolts and nuts and tack weld in two (2) places.

Note: If unit has been in service for more than 150,000 miles, it is recommended that at least one eccentric bolt be removed and visually inspected. Look for signs of wear on bolt and bushing sleeve. To remove eccentric bolt, turn arrow on bolt head to 12 o'clock position and tap out with hammer.

Replace Bushings in Torque Arms

1. Block frame of vehicle with proper jacks or stands and exhaust air from suspension system.
2. Remove tires from axle.
3. Support axle and remove shock absorber if required.
4. Remove anti-turn washers from head of bolt and nut of eccentric bolts.
5. Remove $1\frac{1}{4}$ " nut on eccentric bolt and turn arrow on bolt head to 12 o'clock position and tap out.
6. Remove $1\frac{1}{2}$ " Cap Screw from other end of torque arm in axle seat.
7. Remove Torque Arms from suspension and press bushings out in hydraulic press.
8. Reinstall new bushing in hydraulic press and be sure to use a rubber lubricant.
Note: Bushing should be centered in Torque Beam Eye.
9. New fasteners should be used at this time. Be sure to lubricate all fasteners with some type of rust preventative grease.
10. Reinstall Torque Arms in suspension axle seat first and then to hanger.
11. With Axle at proper ride height, torque $1\frac{1}{2}$ " Cap Screw in axle seat to 1,100 ft. lbs.
12. Install new eccentric bolts in hanger with arrow at 12 o'clock position and only snug the nut down.
13. Reinstall shock absorber and tires.
14. Follow procedure for Realignment of Axle for balance of work to be performed, Page 6.

HEIGHT CONTROL VALVE



Having a clear understanding of how this valve functions, and what importance is placed on it will aid you in the successful operation of your vehicle.

The Height Control Valve is the heart of the air control system. It is also the key valve in the operation of the suspension system, so a great deal is required of it. In simple terms, this valve meters the air pressure automatically to and from air springs controlling the relative position (mounting height) between vehicle frame and axle.

How it Works

As load is applied, the actuating lever arm moves from its neutral position to the Up (intake) position. This opens the valve and air is allowed to pass into air springs, bringing the actuating lever arm back to a neutral position.

As load is removed, the actuating lever arm moves from its neutral position to the Down (exhaust) position. This opens another part of valve and air is allowed to exhaust from air springs, bringing the actuating lever arm back to a neutral position.

It should be noted the valve has a 2 - 6 second time delay and a 3/8" dead zone. This prevents unnecessary intake and exhausting of air springs as vehicle encounters uneven terrain at operating speed.

How to Adjust Valve

1. With vehicle on level ground, build and maintain air pressure in excess of 65 psi.
2. Disconnect links from valves and rotate actuating lever arms down, exhausting all air from air springs.
3. On one valve rotate arm up, this will allow air into air springs. Bring arm of valve to neutral position when proper ride height is reached. See Note No. 6 of pre-operational check list, Page 3.
4. When proper ride height is reached, place locating pin in valve and loosen lock nut on lever arm. Connect link and tighten lock nut to 5 ft. pounds.

5. Disconnect link and remove locating pin. Rotate arm down to exhaust air springs about halfway. Then reconnect link and air springs should reinflate to proper dimension.
6. Disconnect link from properly set valve and rotate lever arm down exhausting all air. You are now ready to adjust other valve following steps 3, 4 and 5.
7. Important -- Connect links to both valves simultaneously, all air springs should inflate to proper ride height. At this time check to see that air springs are of equal firmness.

Care and Maintenance

Normal air brake system maintenance should be practiced.

A protective screen has been installed on the air supply part of valve. This is to prevent dirt or foreign particles from entering valve and causing a malfunction. This screen can be taken off and cleaned.

Visually inspect the valve for proper clearance around or damage to actuating lever.

Never grease this valve.

Valve Replacement

The following steps should be performed before valve is replaced.

1. Build and maintain air pressure in excess of 65 psi.
2. Disconnect the link.
3. Move actuating lever arm up - hold for at least ten (10) seconds - air should flow into related air springs.
4. Move actuating lever arm to neutral position - air flow should stop.
5. Move actuating lever arm down to exhaust air - NOTE: Delay time should be same as intake.
6. Move actuating lever arm to neutral position - air flow should stop.
7. Valve is functional if performance is as noted.

SHOCK ABSORBER ADJUSTMENT PROCEDURE

ADJUSTMENT

If - after many thousands of miles of use - the damping effect of the shock absorbers requires adjustment, this can be done as follows:

Fig. 1

Remove the shock absorber from the vehicle and hold it vertically with the lower eye or pin attachment in a vice. Use clamp plates to prevent damage.

ATTENTION If there is an indentation B in the dust cap C and the cover shows 2 holes A, the shock absorber is fitted with a bump rubber D. If so, fully extend the shock absorber and insert a round bar or screw driver through the holes. Push the bump rubber down and remove it.

Fig. 2

Fully close the shock absorber at the same time turning the dust cap or piston rod slowly **TO THE LEFT** (anti-clockwise, see fig. 2 and 2 A) until it is felt that the cams of the adjusting nut engage in the recesses of the foot valve assembly (fig. 2 B).

The damper may have already been adjusted.

Therefore check whether the shock absorber is in the unadjusted position or not by keeping it closed and gently turning further **TO THE LEFT** counting at the same time the half turns until a stop is felt. Stop turning then and **DO NOT USE FORCE**.

Fig. 3

Keeping the shock absorber closed (fig. 3 and 3A) make 2 half turns (360°) **TO THE RIGHT** (clockwise). In case of prior adjustment add the number of half turns previously found. The total range is about 5 half turns.

Pull the shock absorber out vertically **WITHOUT TURNING** for at least 1 cm to disengage the adjusting mechanism. The dust cap or piston rod may now be turned freely (fig. 3B).

ATTENTION Where a bump rubber was installed, refit same inside the dust cap and by fully closing the shock absorber, the rubber will seat again at top of the dust cap.

The shock absorber will perform as new again and can now be refitted.

N.B. Adjustment must always be carried out in pairs - thus 2 front and/or 2 rear dampers - and for the same amount.

