

MFG: CHANCE RIDES, INC.
NAME: TURBO/RADAR
TYPE: NON-KIDDIE

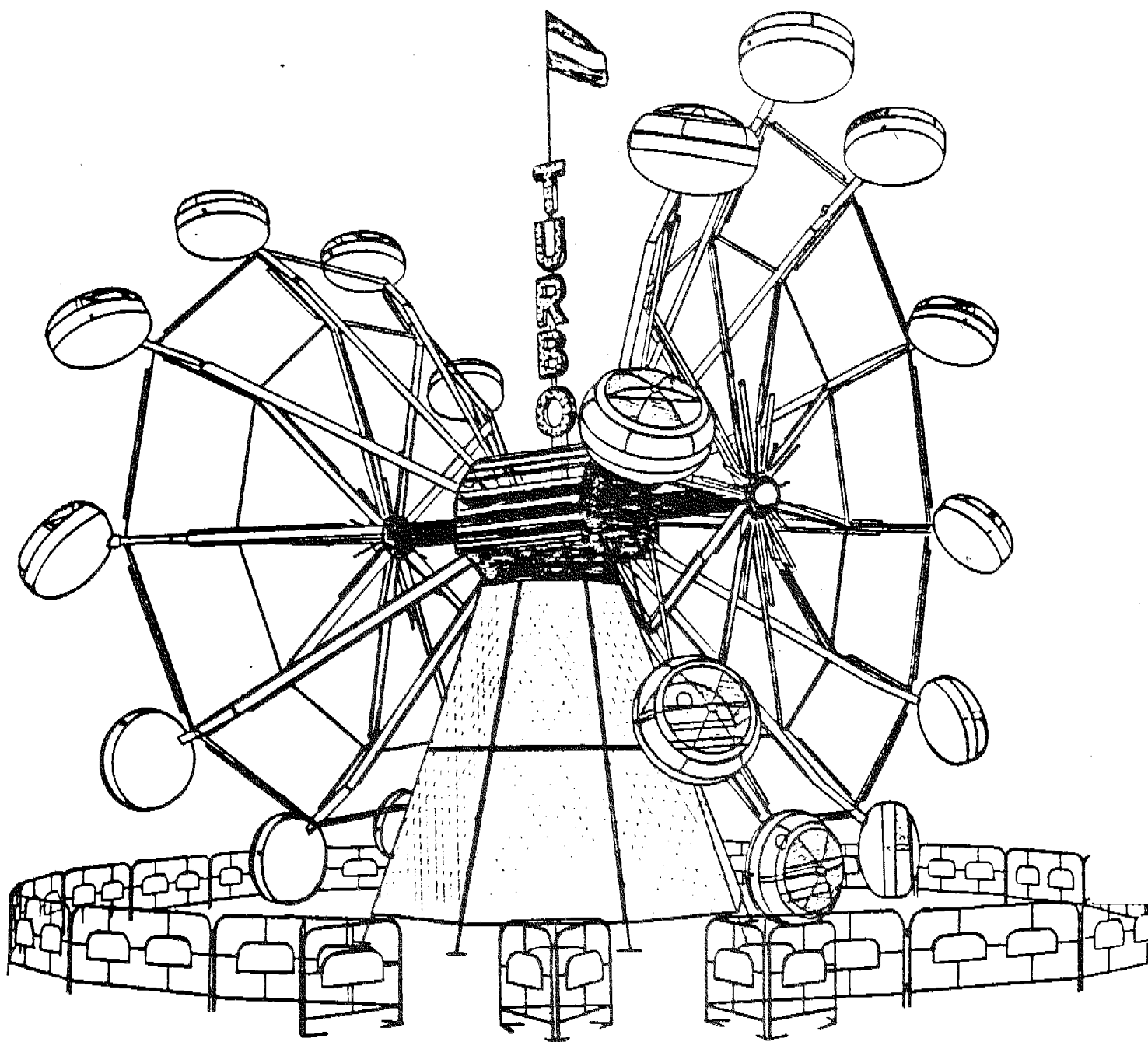
TURBO / RADAR

TURBO / RADAR

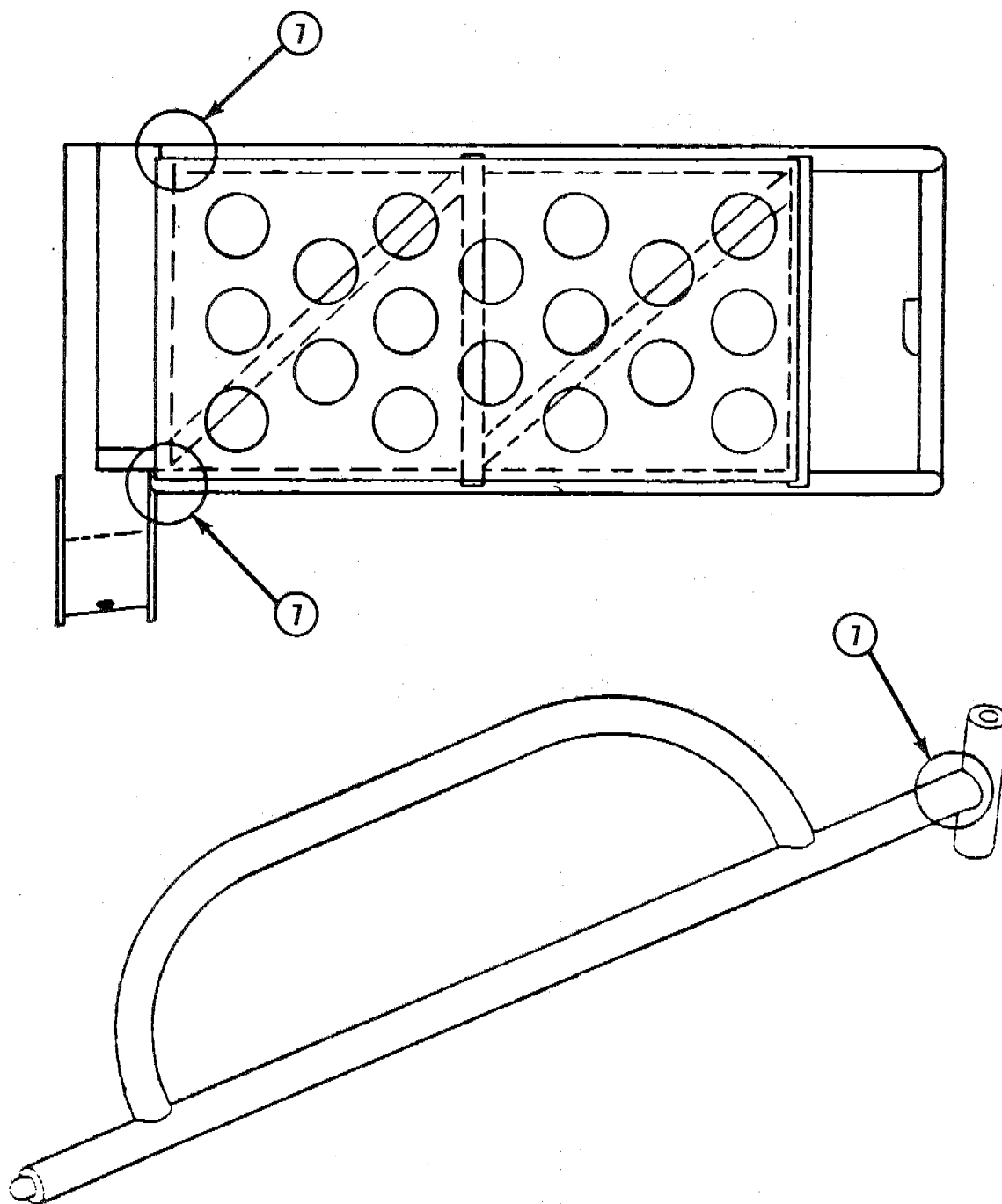
Ride Serial Number _____ Owner _____ Date _____

FIELD INSPECTION POINTS

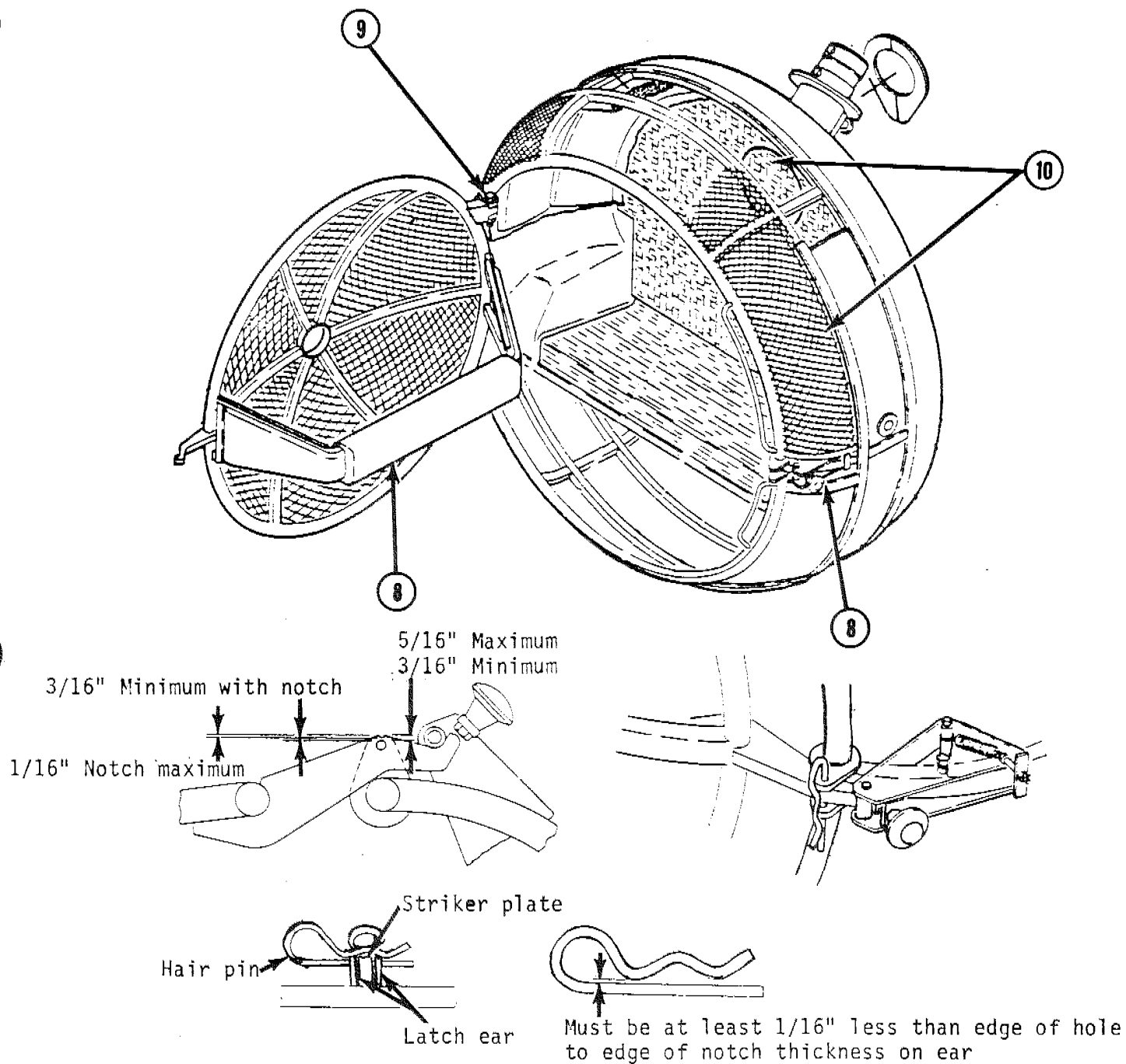
1. () Inspect blocking and leveling.
2. () Inspect lock nuts on leveling jacks.
3. () Inspect hydraulic valves for leveling jacks.
4. () Inspect cable leads, electrical connections and grounding per local code.
5. () Inspect fences.
6. () Inspect seat attach points. Check sweeps and support arms for cracks (Bulletins 51 and 07-166).
7. () Inspect RADAR seats, lap bar locks and safety belts (Bulletin 122).
8. () Inspect TURBO seat locks, seat door locks and lap bars (Bulletins 07-166, B07-0167-00 and B07-0335-00).
9. () Inspect TURBO seat door hinges (Bulletin 07-166).
10. () Inspect TURBO seat padding and screening (Bulletin 07-166).
11. () Inspect sweep hub bolts (Bulletin 07-166).
12. () Inspect spreader hub bolts (Bulletin 07-166).
13. () Inspect drive chain adjustment (Bulletin 07-166).
14. () Inspect outriggers.
15. () Inspect panels.
16. () Inspect trailer tie rod.
17. () Check starting and braking performance of ride. Relief valves must be set at 1200 psi maximum, 800 psi minimum.
18. () Inspect turret bearing bolts.
19. () Inspect drives to make sure they run properly in both directions.
20. () Check speed of turret drive in both directions - 8 rpm maximum (TURBO)
- 5 to 6 rpm (RADAR).
21. () Check speed of wheel drives in both directions - 10 rpm maximum (TURBO)
- 6 to 7 rpm (RADAR).
22. () Check oscillation of seats.
23. () Check ride operation for excessive vibration.
24. () Inspect structure for cracks, bad welds, etc.
25. () Inspect electrical wiring for short circuits, bad wires, etc.
26. () Inspect for hydraulic leaks.
27. () Inspect overall appearance of ride for cleanliness and general overall upkeep.



19. () Inspect drives to make sure they run properly in both directions.
20. () Check speed of turret drive in both directions
 - 8 rpm maximum (TURBO)
 - 5 to 6 rpm (RADAR).
21. () Check speed of wheel drives in both directions
 - 10 rpm maximum (TURBO)
 - 6 to 7 rpm (RADAR).
22. () Check oscillation of seats.



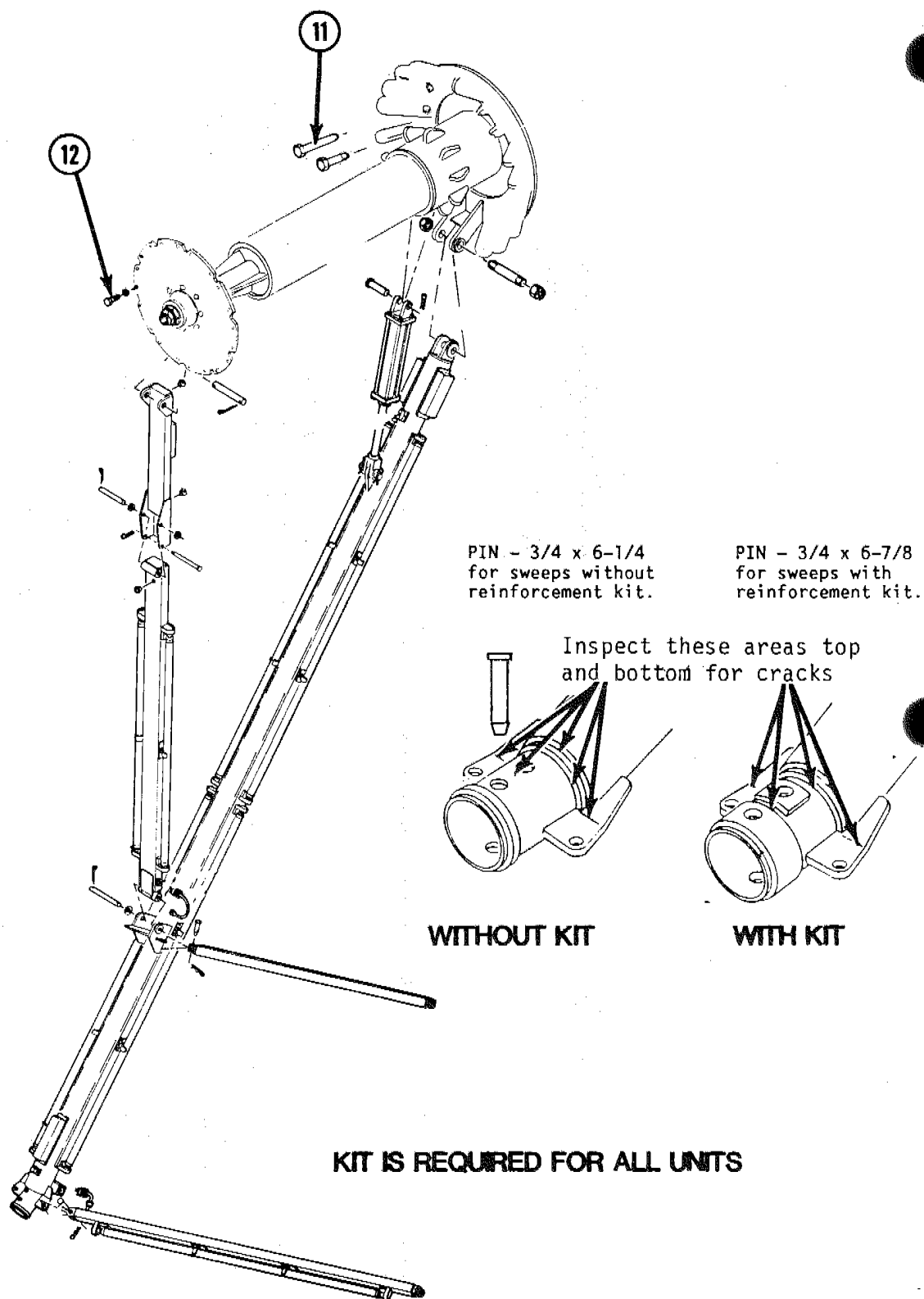
7. () Inspect RADAR seats, lap bar locks and safety belts (Bulletin 122).



8. () Inspect TURBO seat locks, seat door locks and lap bars (Bulletins 07-166, B07-0167-00 and B07-0335-00).

9. () Inspect TURBO seat door hinges (Bulletin 07-166).

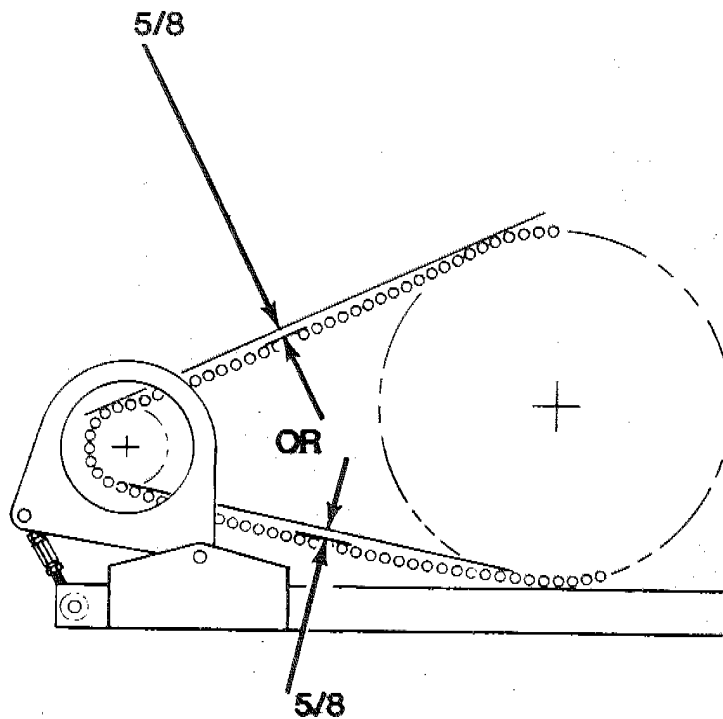
10. () Inspect TURBO seat padding and screening (Bulletin 07-166).



6. () Inspect seat attach points. Check sweeps and support arms for cracks (Bulletins 51 and 07-166).

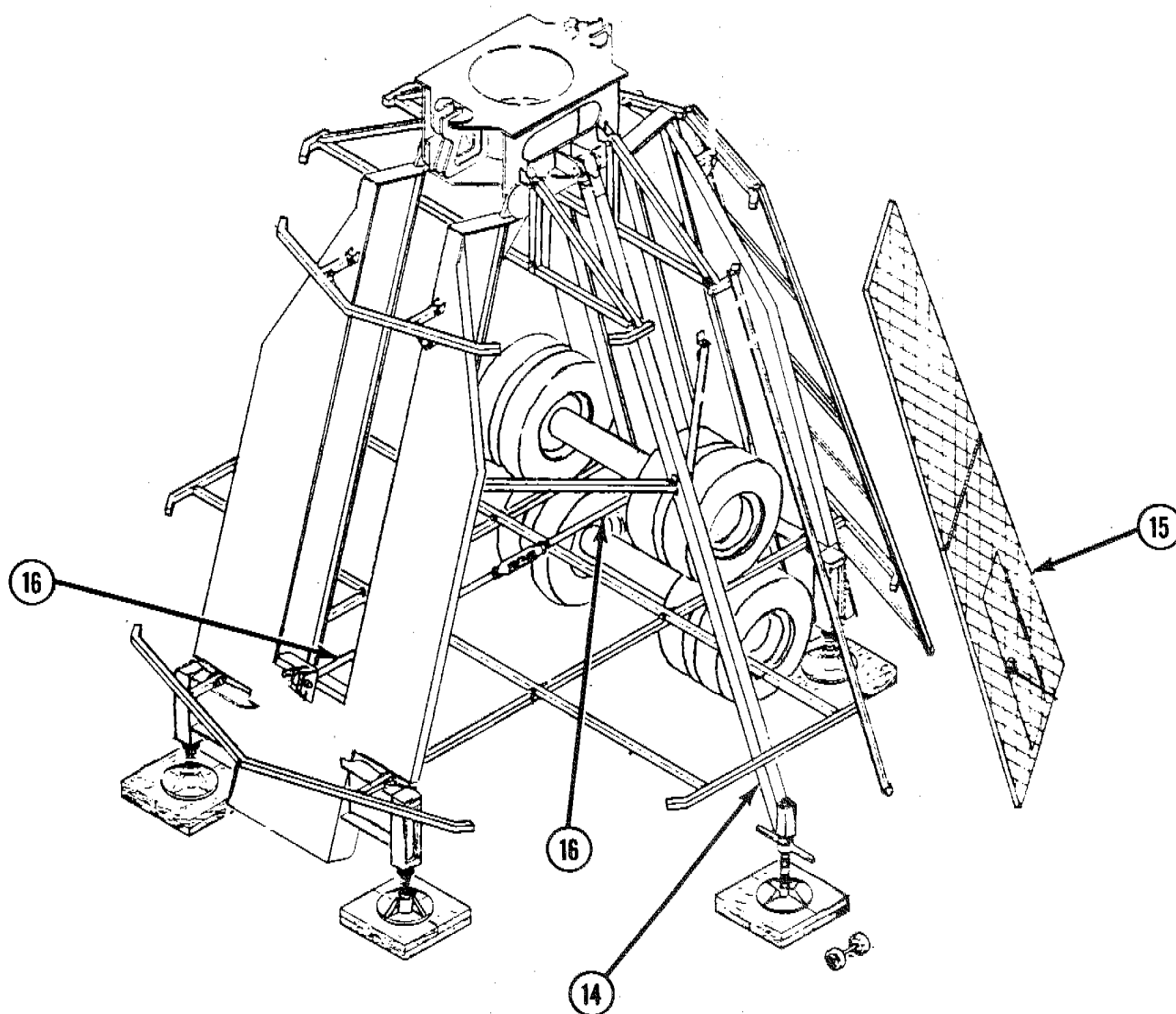
11. () Inspect sweep hub bolts (Bulletin 07-166).

12. () Inspect spreader hub bolts (Bulletin 07-166).



DRIVE CHAIN ADJUSTMENT

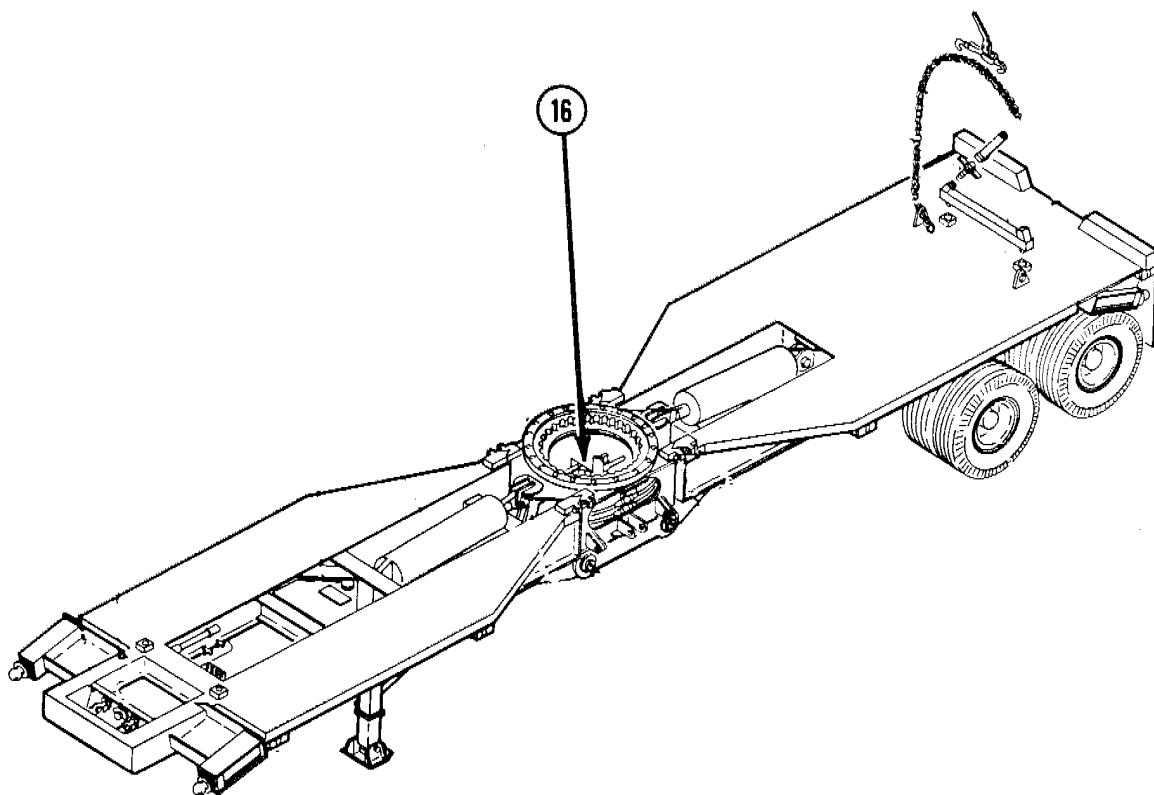
13. () Inspect drive chain adjustment (Bulletin 07-166).



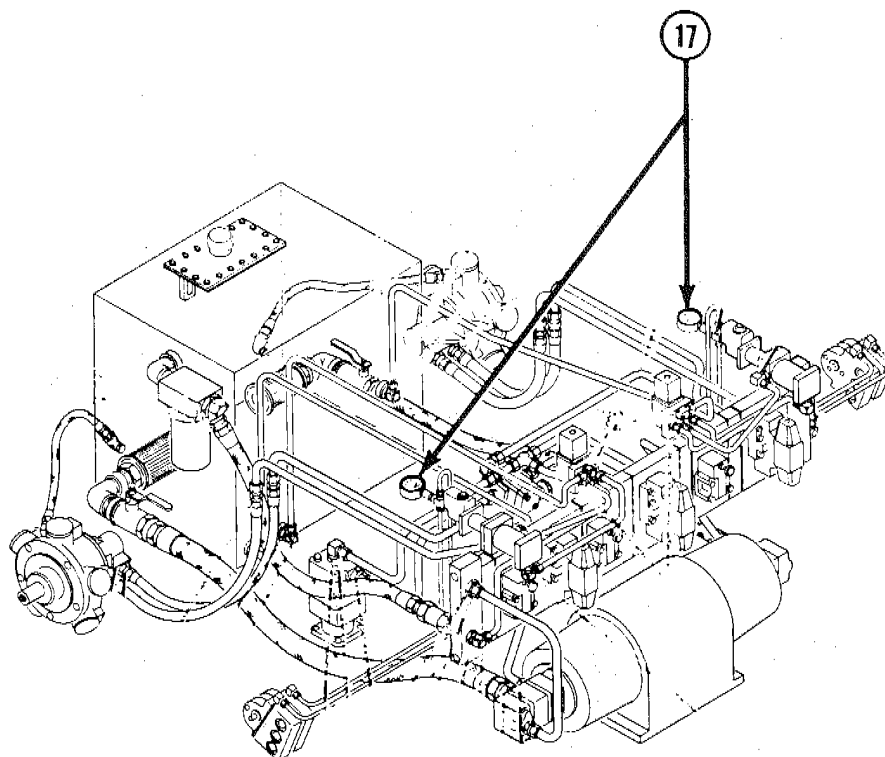
14. () Inspect outriggers.

15. () Inspect panels.

16. () Inspect trailer tie rod.



16. () Inspect trailer tie rod.



17. () Check starting and braking performance of ride. Relief valves must be set at 1200 psi maximum, 800 psi minimum.

RADAR

TROUBLE SHOOTING CHART

TROUBLE	PROBABLE CAUSE	CORRECTION
Complete loss of hydraulic power	Pumps not working Pumps running wrong direction	Check electrical system Change two of the 110 volt lines at electrical source
Trailer fails to form tower	Leaking cylinder Damaged or leaking lines Malfunctioning check valve (on bottom of cylinder) Malfunctioning manual control valve	Install cylinder repair kit (See Parts Catalog) Reseal or replace lines Replace valve Repair or replace valve (See Parts Catalog)
Complete loss of electrical power	Tripped breaker, main	Reset or replace breaker
Isolated loss of electrical power	Tripped circuit breakers	Reset or replace breaker (See Electrical Section)
Turret fails to rotate	Malfunctioning control valve Motor malfunctioning Malfunctioning relief valve	See Hydraulics Section See vendor catalog Repair or replace valve
Sweeps will not extend or retract	Malfunctioning manual control valve Leaking cylinder Leaking or damaged lines Plugged orifice on cylinder	Repair or replace valve (See Parts Catalog) Install seal kit (See Parts Catalog) Reseal or replace lines Remove and clean
Wheel will not rotate	Defective drive motor Leaking or damaged lines going to motor Broken chain Malfunctioning control valve Malfunctioning relief valve	Repair or replace (See vendor catalog) Reseal or replace lines Replace chain See Hydraulics Section See Hydraulics Section
Wheel will not stop	Disc Brake not functioning	See Section on disc brakes
Turret does not stop	Malfunctioning relief valve	Repair or replace valve

7 TROUBLE SHOOTING CHART (Cont)

TROUBLE	PROBABLE CAUSE	CORRECTION
Pump cavitation	Dirty strainers in tank Air leaks between reservoir and pump	Remove and clean strainers Reseal or replace lines
Pumps make excessive noise	Pump cavitation (low on hydraulic fluid)	Replenish fluid (See Lubrication Chart)



Number: B07-0335-00

Date: March 22, 1989

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers:

All Units

Ride:

TURBO

Subject:

Inspection Of Seat Door Latches

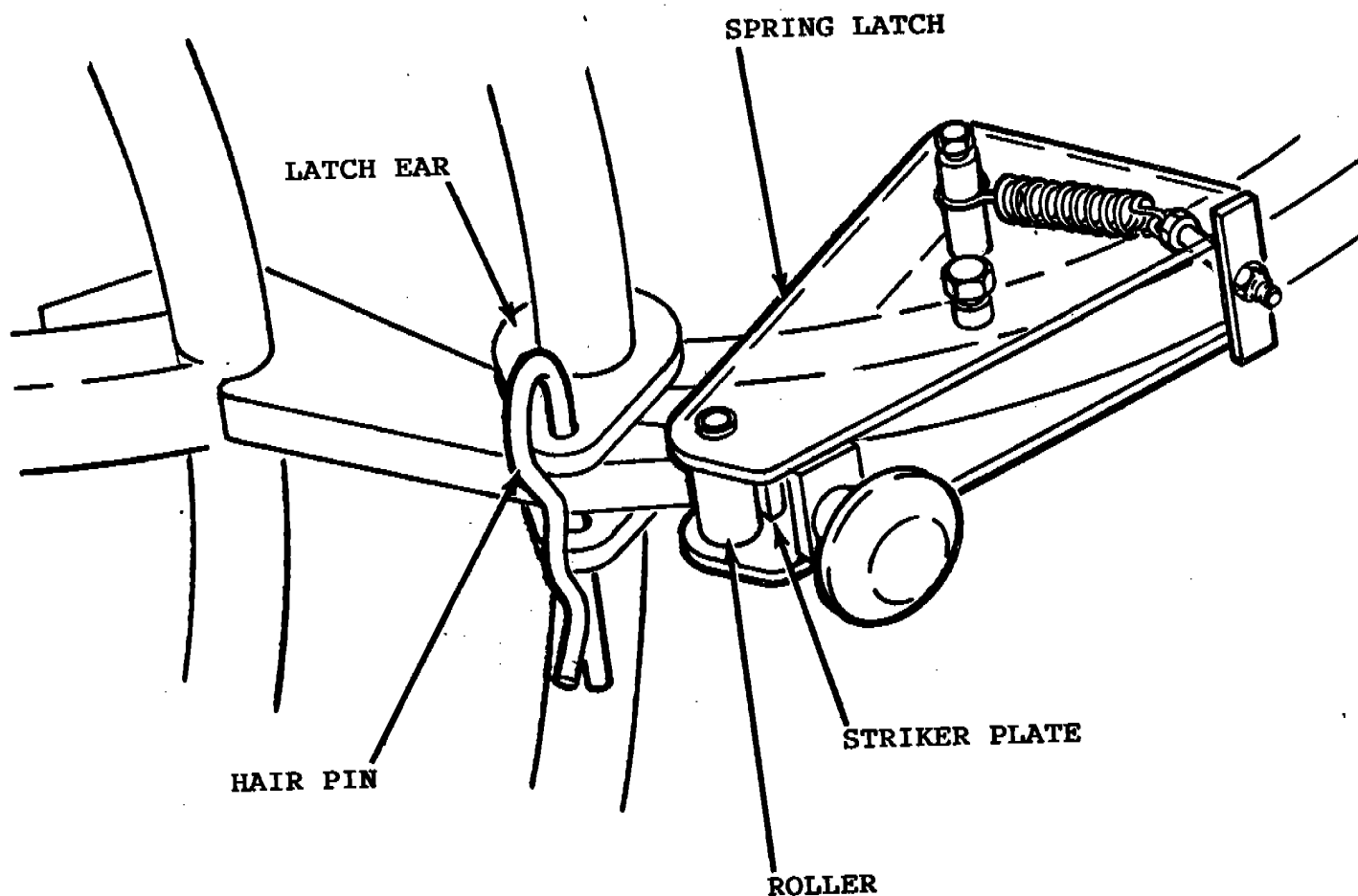
Recent field inspections have found seat door latches on TURBO amusement rides in poor operating condition, because of wear, damage or lack of attention. This device must be kept in proper working condition to maintain the safety of the ride.

CHANCE MANUFACTURING CO., INC. wishes to emphasize the importance of regular inspection of seat door latches, as described in Service Bulletin 07-166 (Nov. 20, 1978). The instructions are repeated on the following pages of this bulletin.

The inspection must be performed by qualified personnel, capable of understanding the function of the parts and their proper installation. If there are any questions regarding the instructions or this inspection, contact the CHANCE CUSTOMER SERVICE DEPARTMENT.

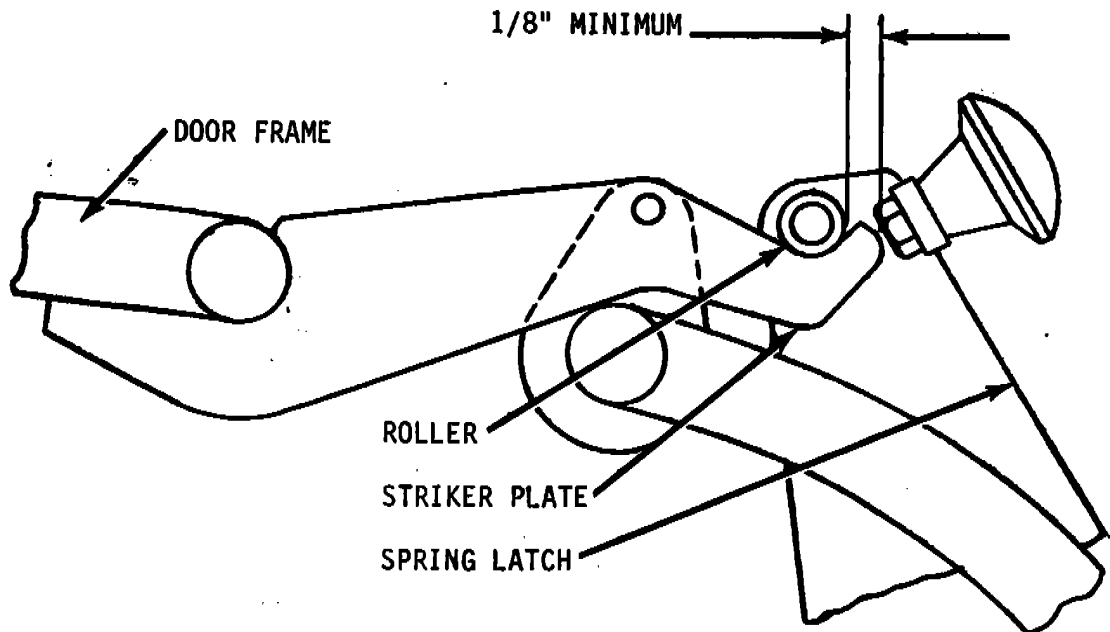
INSPECTION PROCEDURE

Inspect the seat door latches before each day's operation and when ride is set up. The spring latch is used as the primary latch and the hair pin is used as a secondary safety pin on the hatch latching mechanisms. Both the spring latch and hair pin latch must be in good working order before the ride can be operated. In no event should a seat be used if either one of the latches is not in good working order.



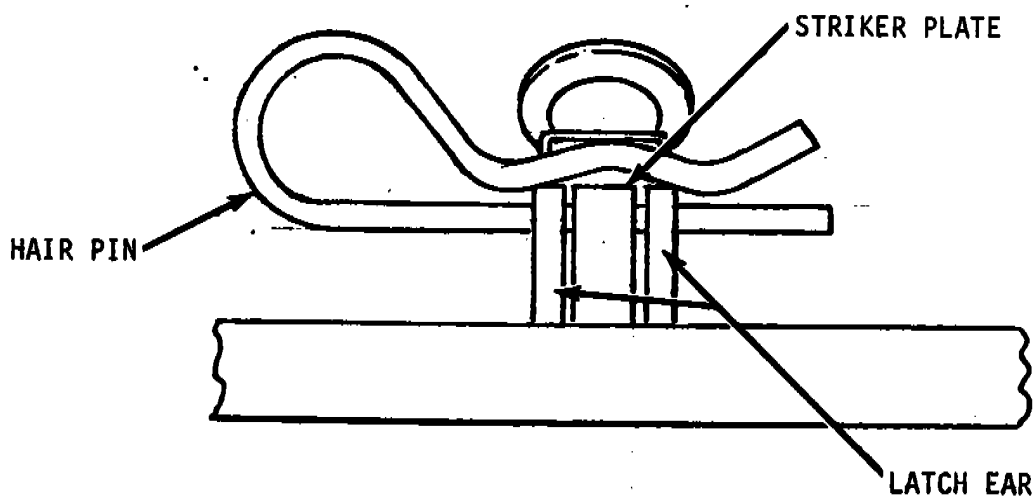
The spring latch pivot bolt must be tight and the spring latch must pivot easily with no binding. The return spring must not be stretched out of shape and must hold spring latch tight against stop when door is open. Striker plate must push spring latch aside with no binding as door is closed. The spring latch knob must be in place and be tight. The roller on the spring latch must turn freely and not be worn through.

When viewed from the front of the seat the striker plate must overlap the roller by at least 1/8" as shown in the following illustration.

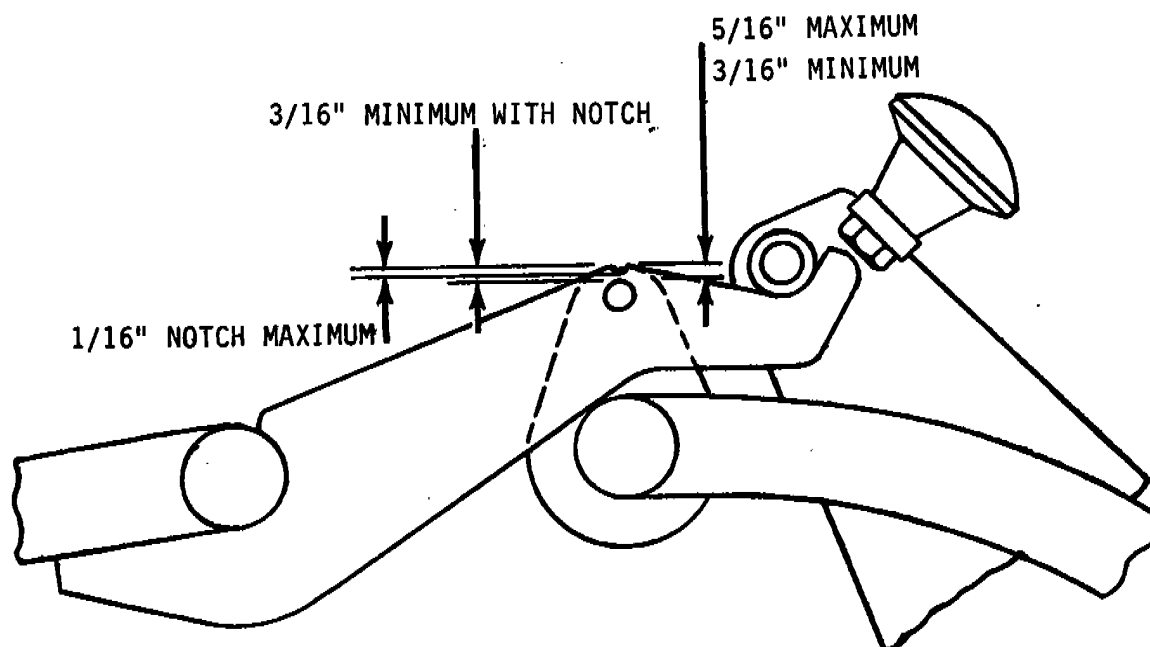


The holes for the hair pin in the latch ears and the striker plate must match so that they are aligned when the hatch is fully closed. If the striker plate has been sprung or the ears forced out of position they should be realigned.

The latch ears and the striker plate must be the same height. Under no circumstances should the latch ears be higher than the striker plate.



The amount of material between the top of the hair pin hole and the edge of the parts on the striker plate and the latch ear must fall within the tolerances given in the next illustration. Replacements should be ordered for latches that cannot be maintained or repaired.

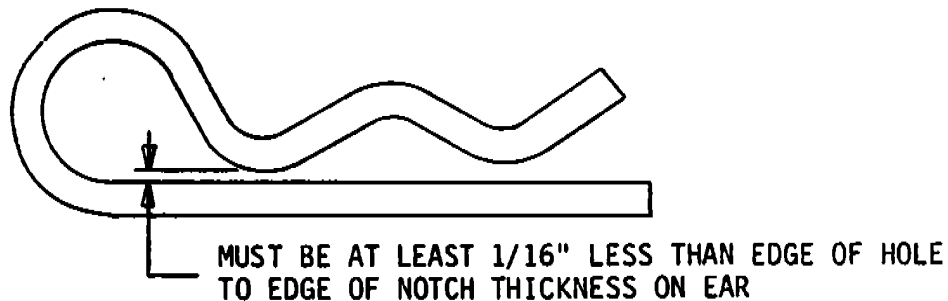


Hairpins must be inserted and removed from the latch by hand only. If hair pin cannot be inserted by hand, correct the misalignment condition.

A new hair pin inserted in a latch having a maximum 5/16" edge of hole to edge of ear thickness will require the maximum force to insert and remove.

A hair pin inserted in a latch having worn or notched condition that reduces the edge of hole to edge of ear thickness to a minimum allowable 3/16", will require less force to insert.

Latch hairpins are expendable items and will become sprung after repeated use. Clearance at the inner lobe of the hairpin, as shown below, must always be at least 1/16" less than the edge of hole to edge of ear thickness, or be replaced. This ensures a reasonable amount of force (approximately 8 pounds or more) will be required to insert or remove the hair pin. A hair pin that is easily inserted or removed must not be used under any condition.



Do not use a hammer to insert or remove the hair pins. Using a hammer may cause the hair pin to turn to one side and be forced over the ear in a position where the material thickness is greater than the hair pin is designed for. This can cause the hair pin to be sprung beyond its usable dimensions. Do not insert hair pin past the second lobe.



Number:

B07-0167-00

Date:

1-22-79

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers: ALL RIDES

Ride: TURBO/RADAR

Subject: SWEEP END REPLACEMENT

If you no longer own this ride please notify Chance Manufacturing Co. of new owners name and address.

Chance Manufacturing Co. is making a sweep end replacement kit available to all Turbo and Radar owners to prevent possible fatigue cracks. This kit is available to all ride owners at our bare manufacturing cost and should be installed on your ride.

Due to the extended service and wear in pin holes and joints there is a possibility that cracks may form laterally across ears to which spreader bars are attached and around the outer edges of the sweep end(s) where they are welded to sweeps. See FIGURE A.

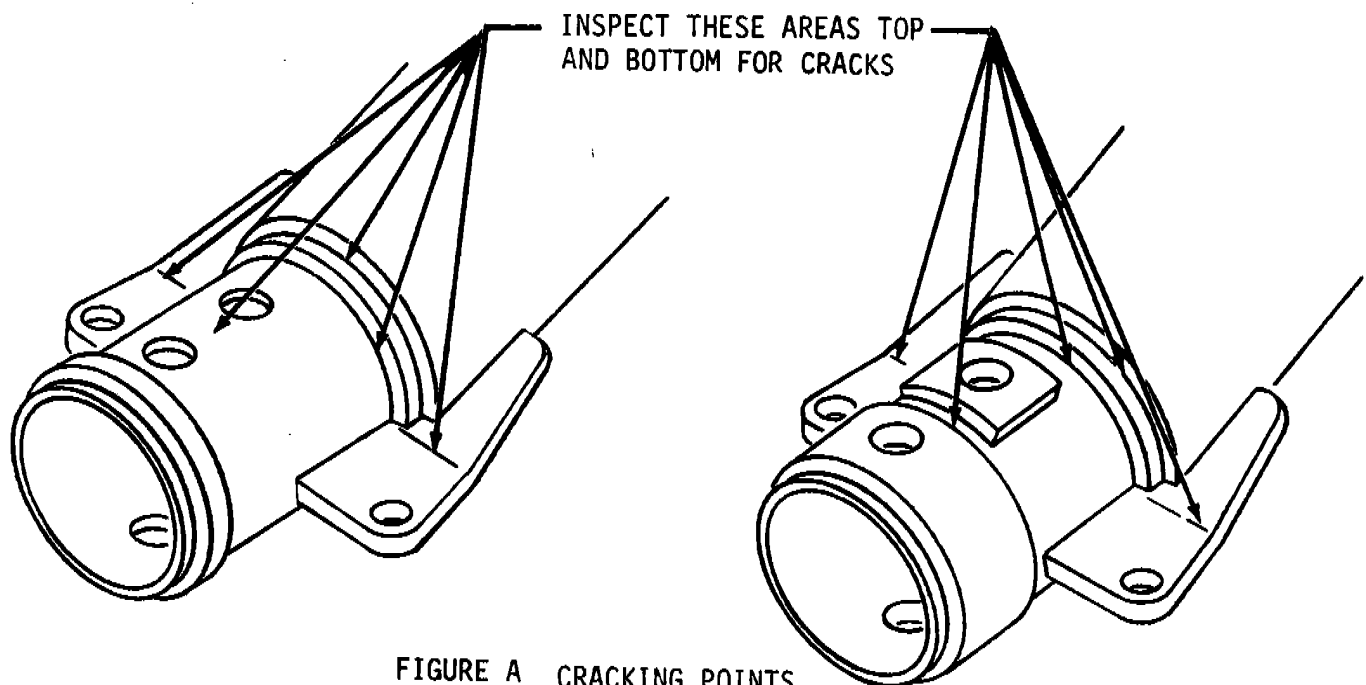


FIGURE A CRACKING POINTS

Factory and Sales Office: 4219 Irving • P.O. Box 12328 • Wichita, Kansas 67277 • (316) 942-7411

To correct this problem, install this kit according to subsequent instructions.

All work must be performed by competent mechanics and welders capable of understanding the function of the parts and their proper installation. All welding must be performed by welders certified under the American Welding Society Structural Welding Code D1.1-75 or equivalent.

Before installing this kit, read the instructions completely and familiarize yourself with the parts listed. Make certain all parts have been received. If any parts are missing, notify Chance Manufacturing Co. immediately. Do not substitute an inferior grade of material or part.

The attached Certification of Compliance must be completed and returned to Chance Manufacturing Co., Inc. within seven (7) days of receipt of this kit.

QTY.	PART DESCRIPTION	PART NO.
-	COMPLETE KIT	K02-0167-00
1	Service Bulletin	B07-0167-00
1 per sweep	Sweep End	1094112-6
2 per sweep	Taper Pin	390-52463
2 per sweep	Hair Pin	694-51904
1	Certification of Compliance	-

The ride must be erected to perform these procedures.

NOTE: Only one sweep end should be replaced at a time. Do not remove spreader bars from more than one sweep at a time.

1. Remove seat assembly from sweep to be repaired by removing cotter pins and clevis pins.
2. Remove spreader bars from sweep end to be replaced.
3. Cut sweep end and ears off of sweep as shown in FIGURE B. Grind surface of reinforcing ring on end of sweep and sides of sweep flat and smooth.

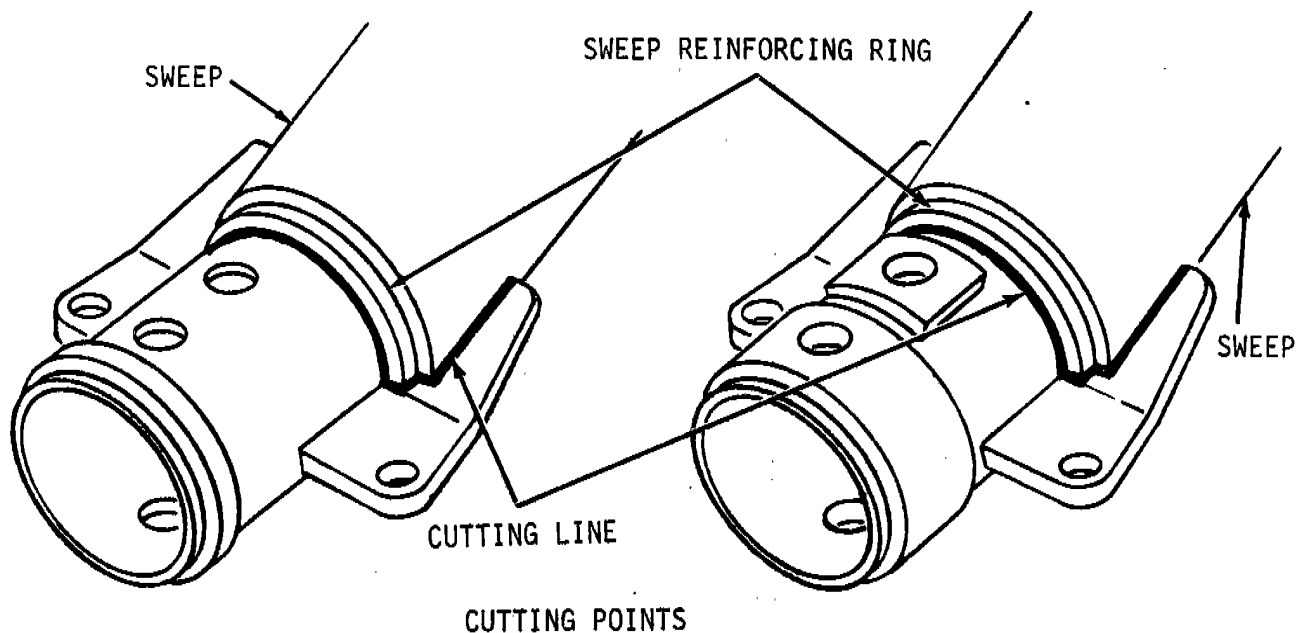


FIGURE B

4. Attach spreader bars to new sweep end. Align holes in reinforcing rings of sweep and new sweep end, FIGURE C, and tack weld in position.

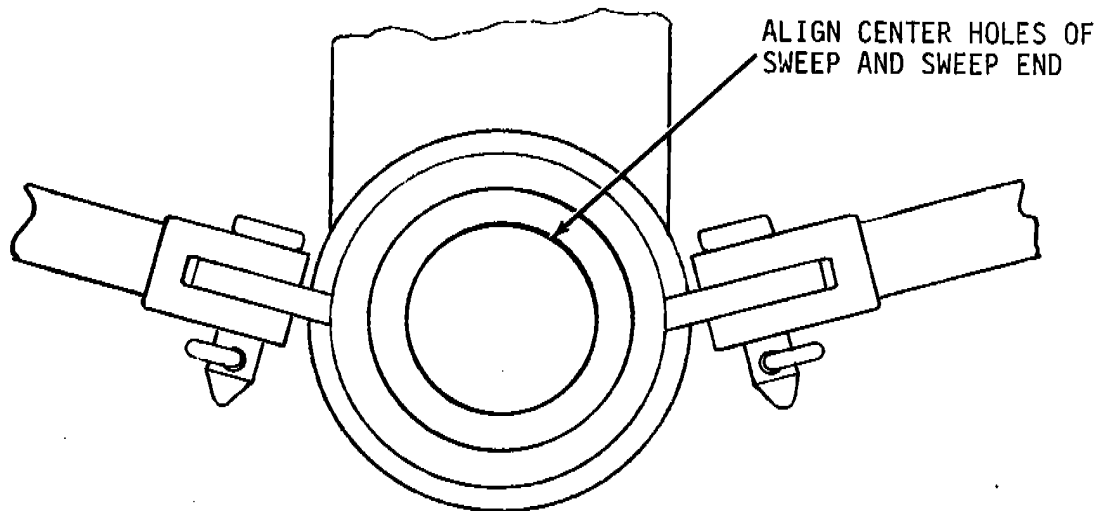


FIGURE C ALIGNMENT OF HOLES

5. Weld sweep end to sweep

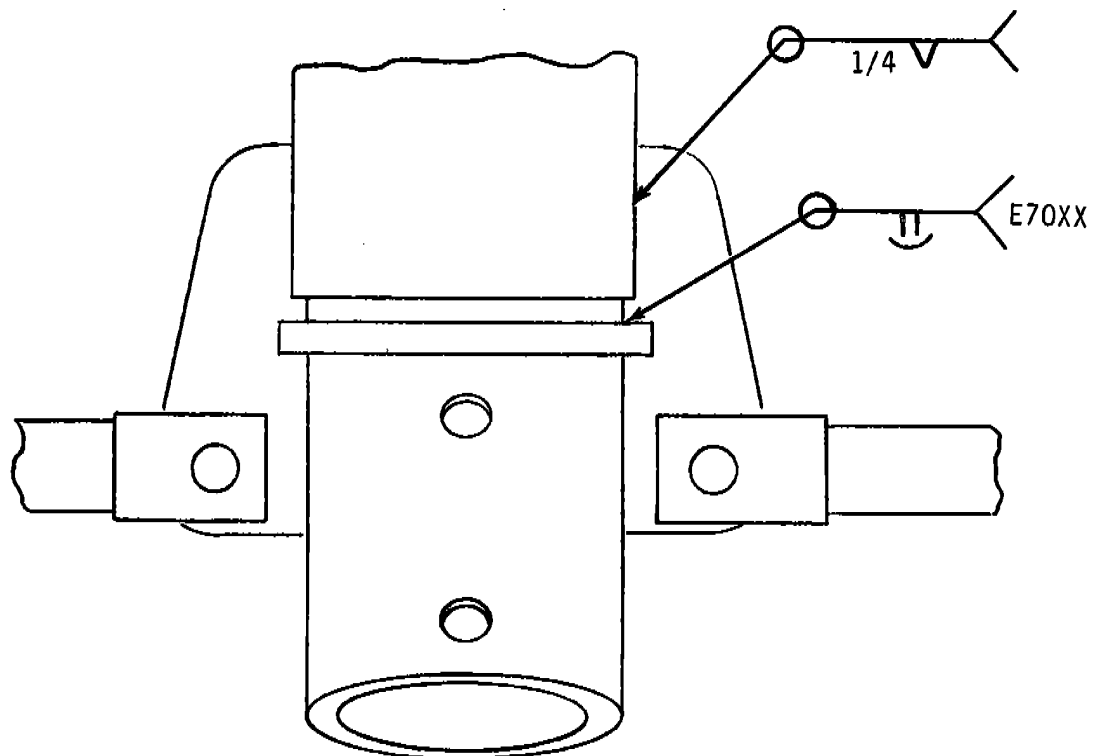


FIGURE D WELD POINTS

6. Reattach seat using new 390-52463 taper pins and 694-51904 hair pins.

7. Repeat procedures for all sweep ends.

If you have any questions concerning the installation of this kit, please contact Chance Manufacturing for assistance.



Number: 07-166

Date: 11-20-78

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers: ALL RIDES

Ride: TURBO & RADAR

Subject: MAINTENANCE INSPECTION

This bulletin is being issued to point out in detail several operating and maintenance practices on the Turbo and Radar that are necessary to maintain the safety of the ride. These items should be checked along with the other inspection points listed at the end of this bulletin.

Inspection of the ride must be performed by competent, qualified mechanics capable of understanding the function of the parts and their proper installation.

All welding must be performed by a welder that is certified under the American Welding Society Structural Welding Code DI. 1-75 or the equivalent.

All references to the Turbo Manual refer exclusively to the Turbo Operations Manual and Parts Catalog dated July 30, 1971 on the front cover. All other manuals have been superceded and are no longer in effect. Copies of the current manual are available from the factory at no charge.

Page numbers are given with each heading and item numbers are given in the text for easy reference to the parts in the Turbo Manual.

SWEEP SOCKET - TURBO AND RADAR (SEE TURBO MANUAL PAGES 54 and 55)

The sockets on the outer end of the sweeps serve as seat sockets on the Turbo and sweep extension sockets on the Radar. Inspect the sockets for cracks between the pin holes and for fatigue cracks adjacent to the welds securing the sockets to the end plugs. (SEE FIGURE A) Check for cracks that may have progressed into the sweep spreader ears.

If any sockets are cracked, do not operate ride until sockets have been repaired. Cracks longer than one inch should not be welded as socket will warp preventing the installation of the Turbo seats or Radar sweep extensions. Chance Mfg. has developed a heavy duty socket which may be ordered to replace damaged sockets. Ask for Turbo-Radar Kit 07-167.

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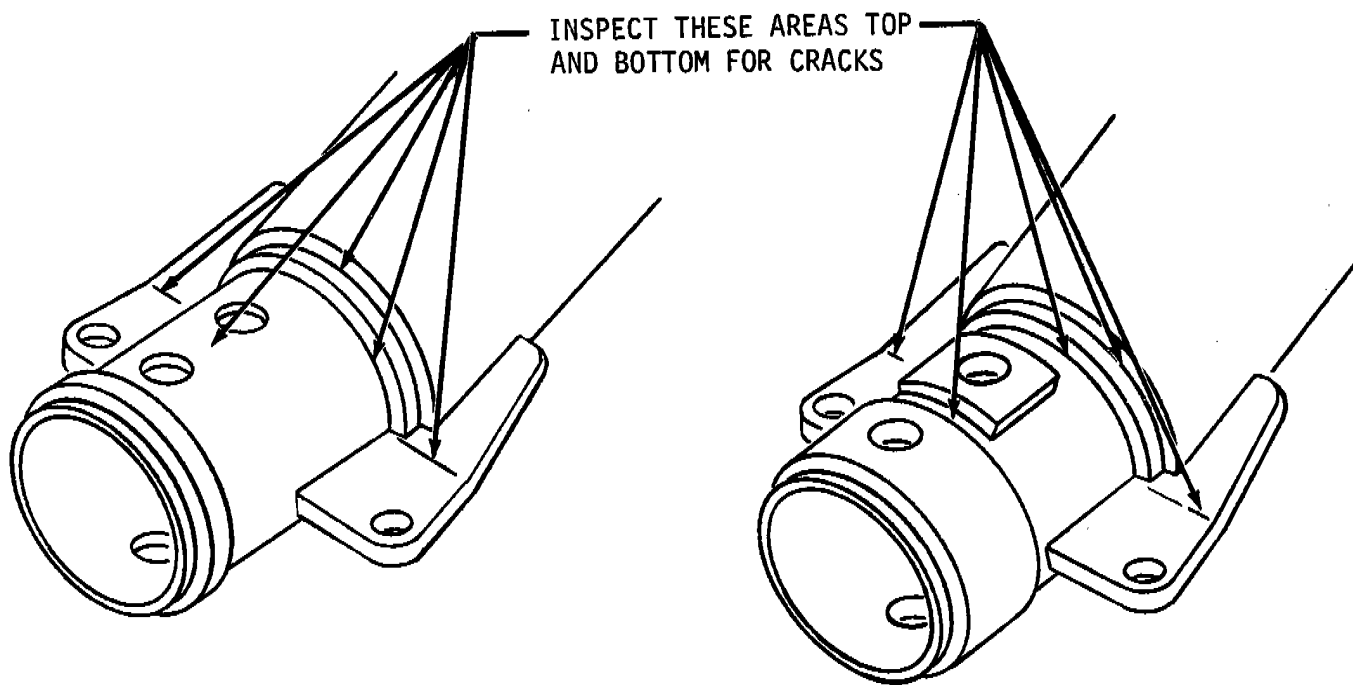


FIGURE A

SEAT ATTACHMENT - TURBO AND RADAR (SEE TURBO MANUAL PAGE 54)

Two taper pins (1) must be used to attach each Turbo seat or Radar seat extension to a sweep. Two taper pins must also be used to attach each Radar seat to a sweep extension. Check taper pins and holes weekly for wear. Replace worn taper pins. If holes are worn, contact Chance Mfg. Co., Inc. for further information.

A hair pin (2) must be used in each taper pin. Seat attachment hair pins must have no more than 1/16" clearance at the outer lobe when they are in the relaxed position.

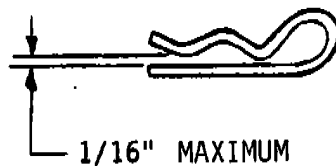


FIGURE B

SEAT ATTACHMENT HAIR PIN

SEAT BEARINGS - TURBO AND RADAR (SEE TURBO MANUAL PAGE 55)

Check condition of seat bearings weekly by rotating seats to see that bearings (25) turn freely with no binding. Also lift seats to check for loose bearings. Bearings should be inspected annually and if grease is dry, caked or contaminated bearings should be repacked. The bearings in the Turbo seats can be reached by removing the cover plate (35) in the center of the seat back. The bearings in the Radar seats can be reached by removing the cover plate on the end of the bearing housing. Extreme care should be taken in replacing lock ring (32) and lock nuts (31, 33).

TURBO SEAT POSITION LOCK (SEE TURBO MANUAL PAGE 55)

A seat position lock (27-30) must be secured to the back of each seat. Plungers (27) must move freely in the locks without binding. Knobs (29) must be tight on studs (28) and studs must be tight in plunger. Check studs and guide slots for wear. Springs (30) must not be distorted or broken.

Check operation of seat position lock daily to see that plungers engage in hole in flanges and will hold the seat in position. Plunger must stay in either the locked or unlocked position until it is forceably moved. Seat should always be free to swivel when the ride is in motion.

TURBO SEAT CONDITION (SEE TURBO MANUAL PAGE 54)

Inspect condition of seats before each day's operation and when ride is set up. Check the general condition of the seat. See that the screening is not torn or loose and that there are no sharp edges. See that the padding in the seat (14) and on the lap bar (20) is fastened securely and is not torn or split.

TURBO SEAT DOOR (SEE TURBO MANUAL PAGE 54)

Inspect seat doors before each day's operation and when ride is set up. Check to see that hinge bolts (18) are tight and in good working order. Door must open and close without binding. Inspect seat and door to see that there are no restrictions that will keep the hatch from closing properly. Do not fasten hair pin to seat or door, chain may fall in opening and restrict hatch from closing properly.

TURBO SEAT DOOR LATCHES - (SEE TURBO MANUAL PAGE 55)

Inspect seat door latches before each day's operation and when ride is set up. The spring latch is used as the primary latch and a hair pin (45) is used as a secondary safety pin on the hatch latching mechanisms. Both the spring latch and hair pin latch must be in good working order before the ride can be operated. In no event should a seat be used if either one of the latches is not in good working order.

The spring latch pivot bolt (38) must be tight and the spring latch must pivot easily with no binding. The return spring (41) must not be stretched out of shape and must hold spring latch tight against stop when door is open. (Items 42 and 93 attach to spring latch stop) Striker plate must push spring latch aside with no binding as door is closed. The spring latch knob must be in place and be tight. The roller on the spring latch must turn freely and not be worn through.

When viewed from the front of the seat the striker plate must overlap the roller by at least 1/8" as shown in FIGURE C.

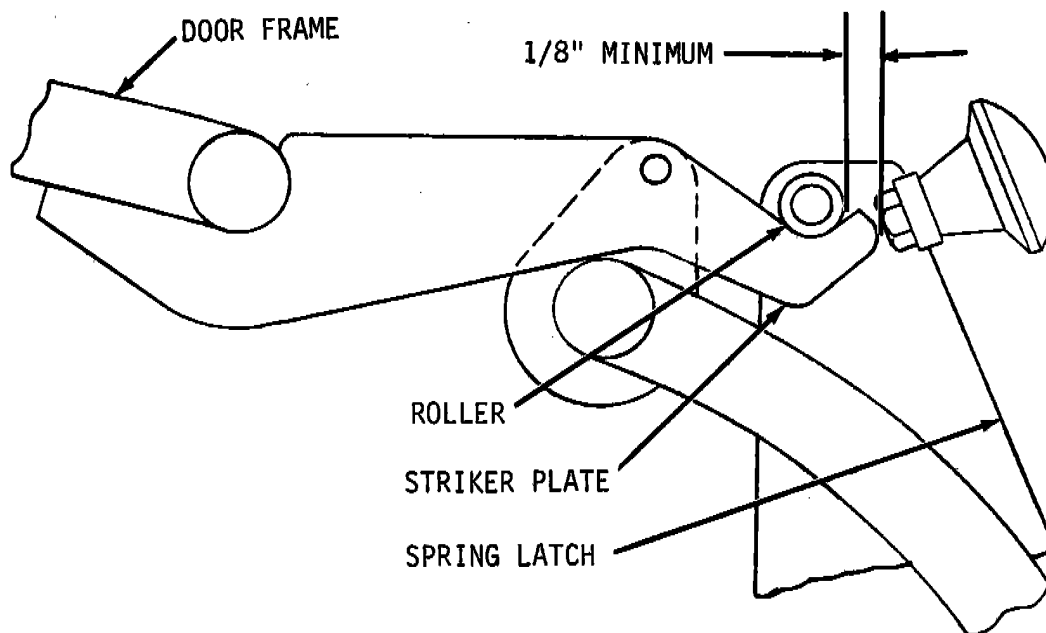


FIGURE C

The holes for the hair pin in the latch ears and the striker plate must match so that they are aligned when the hatch is fully closed. If the striker plate has been sprung or the ears forced out of position they should be realigned.

The latch ears and the striker plate must be the same height. Under no circumstances should the latch ears be higher than the striker plate. See FIGURE D.

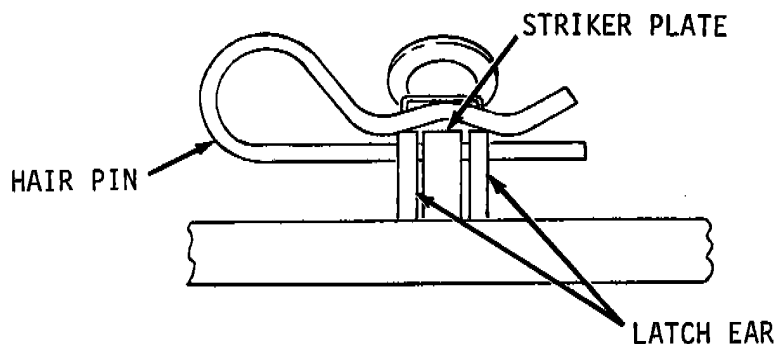


FIGURE D

The amount of material between the top of the hair pin hole and the edge of the parts on the striker plate and the latch ear must fall within the tolerances shown in FIGURE E. Replacements should be ordered for latches that cannot be maintained or repaired.

If the tops of the latch ears or the latch arm become worn beyond the allowable tolerance they may be built up by welding and then ground down to the allowable tolerance.

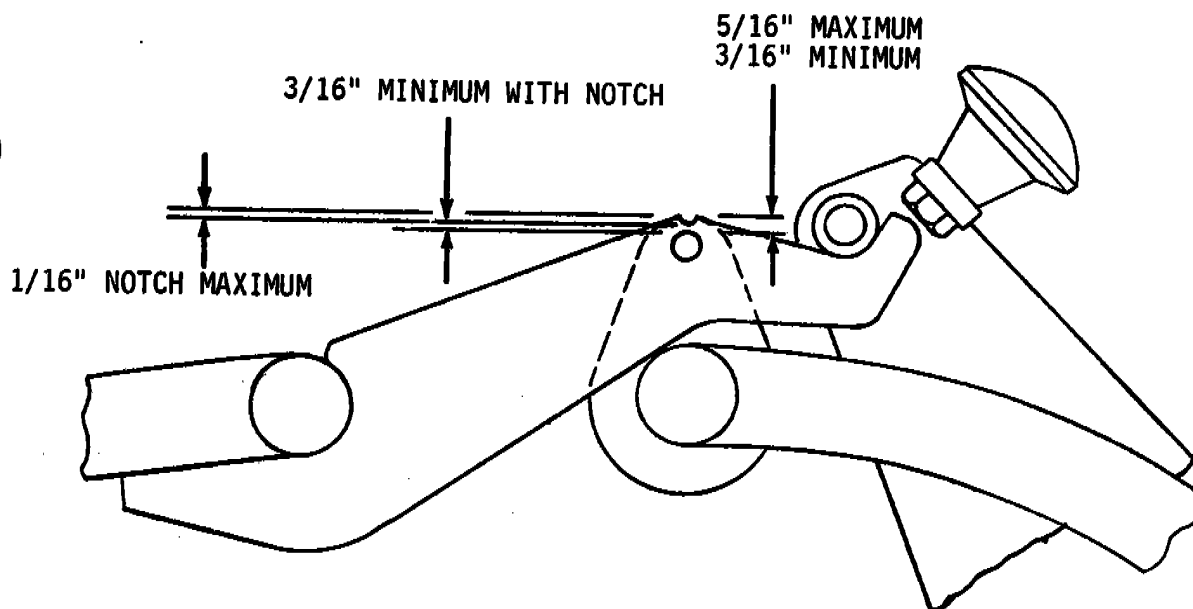


FIGURE E

Hair pins must be inserted and removed from the latch by hand only. If hair pin cannot be inserted by hand correct the misalignment condition.

A new hairpin inserted in a latch having maximum $5/16$ " edge of hole to edge of ear thickness (SEE FIGURE E) will require the maximum force to insert and remove.

A hairpin inserted in a latch having a worn or notched condition that reduces the edge of hole to edge of ear thickness to a minimum allowable of $3/16$ " (SEE FIGURE E), will require less force to insert.

Latch hairpins are expendable items and will become sprung after repeated use. Clearance at the inner lobe of the hairpin, Figure , must always be at least $1/16$ " less than the edge of hole to edge of ear thickness or be replaced. This ensures a reasonable amount of force (approximately 8 pounds or more) will be required to insert or remove the hairpin. A hairpin that is easily inserted and removed must not be used under any condition.

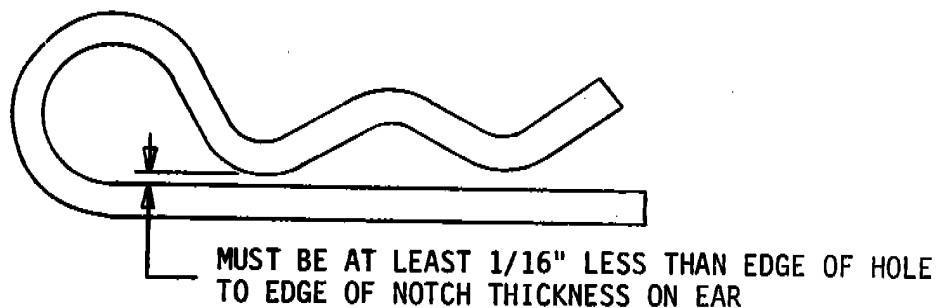


FIGURE F LATCH HAIR PIN

Do not use a hammer to insert or remove the hair pins. Using a hammer may cause the hair pin to turn to one side and be forced over the ear in a position where the material thickness is greater than the hair pin is designed for. This can cause the hair pin to be sprung beyond its usable dimensions. Do not insert hair pin past the second lobe.

RADAR SEAT CONDITION

Check the condition of each seat assembly. See that fiberglass seats are not broken or cracked and have no sharp edges. Pop rivets which hold fiberglass seats to frames must all be in place and tight. Check seat frames for cracks and sharp edges. Report any cracks to Chance Mfg. Co.

RADAR LAP BAR

Lap bar hinge bolts must be tight and lap bars must swing open and closed without binding. Check hinge bolts and lap bars for wear. Inspect lap bars for cracks and replace any that are cracked with new 307-03824 lap bars. Do not attempt to weld lap bars. Plungers must move in lap bar without binding and springs must hold plungers out.

Lap bar latches must be mounted securely to seat frames. Latch knobs must be tight on plungers and plungers must move in latches without binding. At each seat hold latch knob in and close lap bar. When lap bar is closed spring must force lap bar plunger into latch so that latch plunger and knob are pushed out. Lap bar plunger must hold lap bar so that lap bar will not open until latch knob is pushed in to release lap bar plunger.

RADAR LAP BELTS

Inspect lap belts before each day's operation and when ride is set up. In no event should any seat be used that does not have a lap belt which is in good working order. Check the webbing and stitching for cuts and fraying. Check operation of latch to see that it will hold lap belt together until latch is released. Lap belt mounting bolts must be tight.

SWEEP CYLINDER - TURBO AND RADAR (SEE TURBO MANUAL PAGE 52)

Sometimes during set up, the orifice in a sweep cylinder (20) may become clogged and the sweep will not go up or down. The orifice can be cleaned with a small wire or a torch tip cleaner. Roll the hub until the sweep is horizontal so that the sweep will not swing down when the lines are taken loose.

SWEEP DRIVE INSTALLATION - TURBO AND RADAR (SEE TURBO MANUAL PAGE 44)

Perform the following inspection monthly:

Check for cracks where the drive sprockets (36) are welded to the hubs. Inspect the brass bushings (39) on the outer ends of the hubs for wear. It may be necessary to have someone lift the sweeps to move the hub vertically before any cracks or wear can be detected.

NOTE: On earlier rides the brass bushings (39) were in one piece and held in with three screws. They are now available in halves for easier replacement and are held in with 8 bolts. New holes must be drilled and tapped in the hub.

Check the bolts (15) that fasten the chain sprocket to the bearing. If the bolts have become loose several times the holes may have become egg shaped so that bolts cannot be tightened properly. If holes have become egg shaped, drill and ream holes to 3/4". Replace the bolts and nuts with 3/4" aircraft bolts that are the correct grip length (Bolt AN-12-21 and 3/4-16 ESNA LOCK NUTS). Clean bolts, nuts and holes and use green Loc-tite on the bolts and nuts.

WHEEL DRIVE CHAINS - TURBO AND RADAR (SEE TURBO MANUAL PAGE 44)

Wheel drive chains (34) should be maintained per instructions in the Turbo Manual under "Wheel Drive Chains" on page 19. Check adjustment of chains weekly and see that nuts on adjusting links (8) are tight. Also check chain sprockets (30 and 36) for wear. Inspect motor mounts (1) for worn pins, bolts and mounting holes.

AXLE SUPPORT PLATE - TURBO AND RADAR (SEE TURBO MANUAL PAGE 44)

Check the bolts (57) that hold the axle support plate (67) to the hub (58). If bolts continually become loose, weld the axle support plate to the hub using a low hydrogen rod and a DC welding machine.

DRIVE SPEED - TURBO AND RADAR

Check drive speed each time ride is set up. The ride must never be operated faster than the specified maximum speed. The maximum speed for the turret drive in either direction is 8 RPM for the Turbo and 5 RPM for the Radar. The maximum speed for the wheel drive in either direction is 10 RPM for the Turbo and 6 RPM for the Radar. A slight increase in speed greatly increases the centrifugal forces on the ride beyond the safety limits.

BRAKES - DISC - TURBO (SEE TURBO MANUAL PAGES 20, 21 and 74)

NOTE: A kit is available to convert the existing disc braking on each wheel of the Turbo to a new system which uses the hydraulic drive motors to brake the wheels as well as drive them. The new system has proven superior to the disc brake system, particularly for maintenance. For additional information call Chance Mfg. Co. about Turbo kit number 75.

Brake fluid level in master cylinder (No. 9, page 74) should be checked weekly. If fluid level is low find and correct the cause of the loss.

CAUTION: WHEN REPLENISHING FLUID IN MASTER CYLINDER, USE BRAKE FLUID ONLY. DO NOT USE HYDRAULIC OIL.

If brake pressure is below 600 PSI on the gauge (No. 10, page 74) in the master cylinder, the brakes should be bled to remove any air from the system. Air can become trapped in the fluid if the system is opened for repairs or if a leak in the system causes the fluid level to drop below the required level in the master cylinder. Use the following bleeding procedures in place of those on page 21 of the Turbo Operations Manual.

1. Check fluid level in master cylinder and fill as required.

WARNING: DO NOT OPERATE MASTER CYLINDER WITH FILLER CAP REMOVED.

2. With the hydraulic pump running, shift the solenoid valve (No. 11, page 74) to activate the master cylinder five times.

3. Leave the solenoid valve shifted to create pressure in the master cylinder and open the disc brake bleeder screw (Letter H, page 20) nearest the master cylinder 1/4 turn. Tighten the bleeder screw when flow of brake fluid slows due to loss of pressure.

Repeat procedure until escaping brake fluid is free of air bubbles. Continually check fluid level in master cylinder. Do not check fluid level while pressure is being applied to master cylinder.

CAUTION: BLEEDER SCREWS MUST BE TIGHT WHEN PRESSURE IS RELIEVED ON MASTER CYLINDER TO PREVENT AIR FROM BEING DRAWN INTO THE SYSTEM.

Each bleeder screw must be bled separately, starting with the bleeder screw nearest the master cylinder and working toward the one furthest away.

NOTE: A pressure bleeder may be used.

4. Repeat step 2 to set automatic adjustment.

5. Apply pressure, hold for two minutes and inspect for hydraulic leaks and check pressure reading on gauge in master cylinder.

Brake discs (rotors) should be inspected weekly for wear or damage and should also be cleaned if necessary. Brake linings (Letter B, page 20) should be checked weekly for wear. If the linings are allowed to wear beyond the limits as shown in FIGURE G, it will allow the pistons to make contact with the brake discs. If this happens the pistons (Letter C, page 21) must be replaced. There is also the possibility that the pistons will severely damage the brake discs, which means that the ride will have to be returned to the factory for replacement of the brake discs.

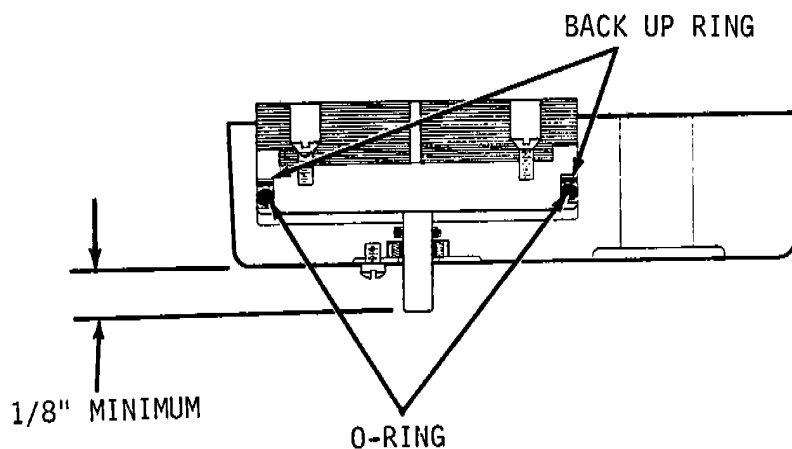


FIGURE G

Detailed information for servicing the brakes can be found on pages 20 and 21 of the Turbo Manual. The following information should be added under the heading "Brake Seal Replacement" on page 21.

Calipers now use a teflon back-up ring (Part No. 207-61241) not shown in the manual. This back-up ring must be positioned on the side of the o-ring (Letter F, page 21) that is toward the lining.

When replacing brake caliper halves special precautions must be taken to keep bolts from loosening or shearing. Clean both caliper mounting surfaces with oil free solvent (mineral spirits, alcohol, or Loc-tite primer). Also, clean bolts and mounting bracket on ride. All mounting surfaces should be absolutely clean. Coat caliper mounting surface, bracket mounting surface, and bolts with green Loc-tite and tighten bolts with torque wrench to 360 ft. lbs. Let ride sit minimum of two hours before operating, or overnight if possible.

BRAKES - HYDRAULIC DRIVE MOTORS - TURBO AND RADAR

Open the valve to the pressure gauge on the relief valve mounted on the front side of the panel block. With all systems turned off the gauge should read zero. Activate the switch controlling the wheel drive and observe the gauge. Gauge should have a maximum reading of 1600 PSI. If not, adjust relief valve according to instructions below.

If wheel does not rotate at all or if directional control valve shifts hard or squeals, the choke block located between valve sections will have to be adjusted (see below).

With the wheel turning, deactivate switch, while observing pressure gauge on relief valve on the new manifold assemblies. The gauge should have a maximum reading of 2000 PSI while the wheel is stopping. Adjust gauge accordingly.

NOTE: In order for manifolds to function for braking, the relief valve on the manifold must be set for a higher setting than the relief valve located on the front side of the panel blocks.

Adjust reliefs and directional control valve for the other wheel in the same manner.

After all adjustments are complete, close all needle valves behind pressure gauges.

If needle valves are not closed, the pressure gauges will be short lived, making future adjustments difficult.

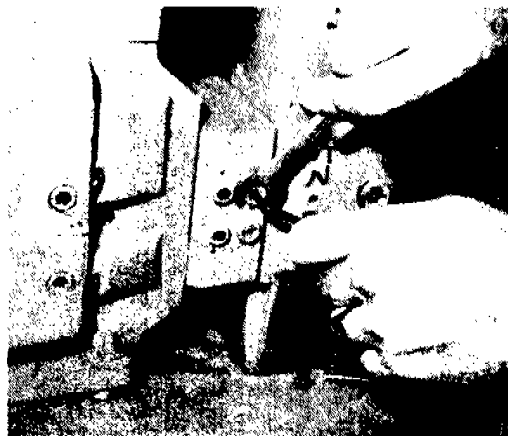
RELIEF VALVE ADJUSTMENT

Loosen the jam nut on the adjustment knob stem and turn knob until desired setting is obtained. Tighten jam nut back down against valve body.

DIRECTIONAL CONTROL VALVE CHOKE ADJUSTMENT

The choke on the directional control valve will have to be adjusted if any of the following symptoms occur:

- A. Failure to Shift
- B. Shifts too Hard (Loud clunking noise)
- C. Shifts too Slow (Vibration plus delay)



There is a separate adjustment for each direction of shifting. Adjust as necessary.

Loosen the lock nut around set screw. Adjusting set screw clockwise will make it shift faster, counterclockwise will slow it down.

HYDRAULIC SYSTEM - TURBO AND RADAR (SEE TURBO MANUAL PAGE 74)

The most important thing with any hydraulic system is to keep it clean. Change filters (21) twice yearly. After any work which opens up the system, such as an oil change or replacing or repairing the control valve, the filter should also be changed. When the oil is changed manually, the strainer (19) inside the tank (15) should be cleaned, also. Remove the strainer from the tank to clean. Clogged strainers will starve the pumps and ruin them beyond repair. Some of the first signs of damaged pumps are excessive pump noise or the ride running slowly, especially when the oil is hot.

It is very important to keep the oil at the proper level in the tank. The ride will operate on much less than a full tank, but the tank level has to be kept in the sight gauge (17), or the hydraulic system can overheat. Overheating can damage almost every component in the system. The recommended operating temperature is 140° to 180°.

Another common hydraulic problem is burned out coils in the solenoid valves (4, 5 and 11). The position of the valves on the Turbo make them leak water into the coils more than most other equipment. A plastic bag slipped over the coil section with a strong rubber band around the bottom of the bag will eliminate most of this problem. Rides in coastal areas especially need this protection.

LEVELING JACKS - TURBO AND RADAR (SEE TURBO MANUAL PAGES 41 and 70)

Leveling jacks (No. 3, page 41) have a stroke of 9" and are hydraulically extended and spring retracted. As the leveling jack reaches the end of its stroke the hand pump (No. 12, page 70) will get harder to operate. The leveling jack should not be extended past this point as damage may result to the piston (No. 10, page 41) and the return spring (No. 14, page 41). To help prevent overstroking place as much blocking as possible under the jack pads before extending the leveling jacks. Inspect leveling jacks for leaks each time the ride is set up or torn down. Leaks are usually the result of damaged seals (Nos. 11 and 12, page 41) or scratched cylinder walls (No. 7, page 41).

Hydraulic pressure can increase due to expansion when leveling jacks are exposed to heat such as direct sun light. The increased pressure can cause the leveling jack to raise the ride off of the locking rings (No. 21, page 41) and make the ride unstable. After ride is leveled and locking rings have been tightened, open needle valves (No. 9, page 76) and hand pump valve (No. 12, page 41) to relieve pressure on the leveling jacks. When racking the ride, close the valves and operate the hand pump and the needle valves to extend each of the leveling jacks so that the weight is lifted off of the locking rings. Locking rings can then be backed off so that leveling jacks can be retracted.

TORQUING OF BOLTS - (SEE SERVICE BULLETIN 90-148B)

All structural bolts must be periodically be checked for tightness. Refer to Service Bulletin 90-148B for proper torque values. Notify Chance Manufacturing Co. of any bolts that are frequently found loose.

LUBRICATION - TURBO AND RADAR (SEE TURBO MANUAL PAGE 17)

Proper lubrication is one of the best forms of preventive maintenance. The following lubrication points should be added to those found on page 17 of the Turbo manual. It is recommended that a record be kept of all lubrication procedures performed on the ride.

ITEM	LUBRICATION	FREQUENCY
MAIN SPOKE HINGE	MULTI-PURPOSE OIL	WEEKLY
STIFF LEG HINGE	MULTI-PURPOSE OIL	WEEKLY
TURRET DRIVE OUTER BUSHING	ZERK GREASE	DAILY
SPINDLE BEARINGS	ZERK GREASE	SEMI-ANNUALLY (HAND PACK)
SEAT DOOR HINGE (TURBO)	MULTI-PURPOSE OIL	WEEKLY
SEAT DOOR LATCH (TURBO)	MULTI-PURPOSE OIL	WEEKLY
SEAT POSITION LOCK (TURBO)	MULTI-PURPOSE OIL	WEEKLY
LAP BAR HINGE (RADAR)	MULTI-PURPOSE OIL	WEEKLY
LAP BAR PLUNGER (RADAR)	MULTI-PURPOSE OIL	WEEKLY
LAP BAR LATCH (RADAR)	MULTI-PURPOSE OIL	WEEKLY

The attached CERTIFICATION OF COMPLIANCE must be completed and returned to Chance Manufacturing Co. within seven (7) days of receipt of kit.

If you have any questions concerning this bulletin, please contact Chance Manufacturing Co. for assistance.

INSPECTION POINTS

SUMMARY OF INSPECTION POINTS COVERED IN DETAIL

1. Check ends of sweeps for cracks and worn taper pin holes.
2. Check Turbo seats to see that they are secured to sweeps with two taper pins and two hair pins each and that hair pins are not sprung.
3. Check Radar sweep extensions to see that they are secured to sweeps with two taper pins and two hair pins each and that hair pins are not sprung.
4. Check Radar seats to see that they are secured to sweep extensions with two taper pins and two hair pins each and that hair pins are not sprung.
5. Check seat bearings for looseness.
6. Check to see that seats rotate freely in bearings.
7. Check Turbo seat position lock to see that it will stay in position.
8. Check Turbo seat position lock to see that it will hold seat.
9. Check Turbo seats for loose screening.
10. Check Turbo seats and lap bars for sharp corners and missing padding.
11. Check Turbo doors for loose hinge bolts and proper door operation.
12. Check Turbo seats for restrictions that would prevent doors from closing properly.

13. Check Turbo seat door latches to see that latches operate properly and that springs are not stretched out of shape.
14. Check Turbo seat door latches to see that rollers turn free and are not worn through.
15. Check Turbo seat door latches for overlap clearance between striker plates and rollers.
16. Check Turbo seat door latches for alignment of holes in latch ears and striker plates.
17. Check Turbo seat door latches to see that latch ears and striker plates are same height.
18. Check Turbo seat door latches for correct material thickness on latch ears and striker plates.
19. Check Turbo seat door latches for sprung hair pins.
20. Check Radar seats for sharp edges and broken or loose fiberglass.
21. Check Radar seat frame for cracks.
22. Check Radar lap bar operation.
23. Check Radar lap bar latch operation.
24. Check Radar lap belt for cuts and fraying.
25. Check Radar lap belt buckle operation.
26. Check for cracks where the drive sprockets are welded to the hubs.
27. Check brass bushings on outer ends of hubs for wear.
28. Check the bolts that attach the chain sprocket to the bearing.
29. Check adjustment of drive chains and tightness of chain adjusting links.
30. Check chain sprockets for wear.
31. Check motor mounts for worn pins, bolts and mounting holes.
32. Check bolts that attach axle support plate to hub.
33. Check drive speed of turret and wheel drives in both directions.
34. Check Turbo disc brake operation.
35. Check brake fluid level.
36. Check brake fluid pressure.
37. Check brake lining and brake disc for wear or damage.
38. Check hydraulic drive motor brakes pressure setting.
39. Check hydraulic oil for contamination and overheating.
40. Check hydraulic oil level.
41. Check leveling jacks for leaks.
42. Check leveling jack lock rings.

43. Check setting of hand pump valve and needle valves.
44. Check blocking under leveling jacks.
45. Check all structural bolts for proper torque.
46. Check ride for proper lubrication.

THE FOLLOWING FIELD INSPECTION POINTS MUST ALSO BE CHECKED DAILY

1. Inspect for proper leveling.
2. Inspect for proper grounding.
3. Inspect fences.
4. Inspect sweep hub bolts.
5. Inspect spreader hub bolts.
6. Inspect outriggers.
7. Inspect panels.
8. Inspect trailer tie rod.
9. Inspect starting and braking performance of ride.
10. Inspect ride for excessive vibration.
11. Inspect structure for cracks, bad welds, etc.
12. Inspect electrical circuit for shorts, bad wires, etc.
13. Inspect for hydraulic leaks.
14. Inspect rides' overall appearance for cleanliness and general external upkeep.



Number: 122

Date: 5-7-76

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers:

Ride: RADAR

Subject: SEAT FRAME REINFORCEMENT

We have been notified that some RADAR seat frames are developing cracks. We are shipping a plate which, when installed properly, will prevent the frames from cracking. If cracks are found, they should be repaired before installing the plate. SEE FIGURE 1.

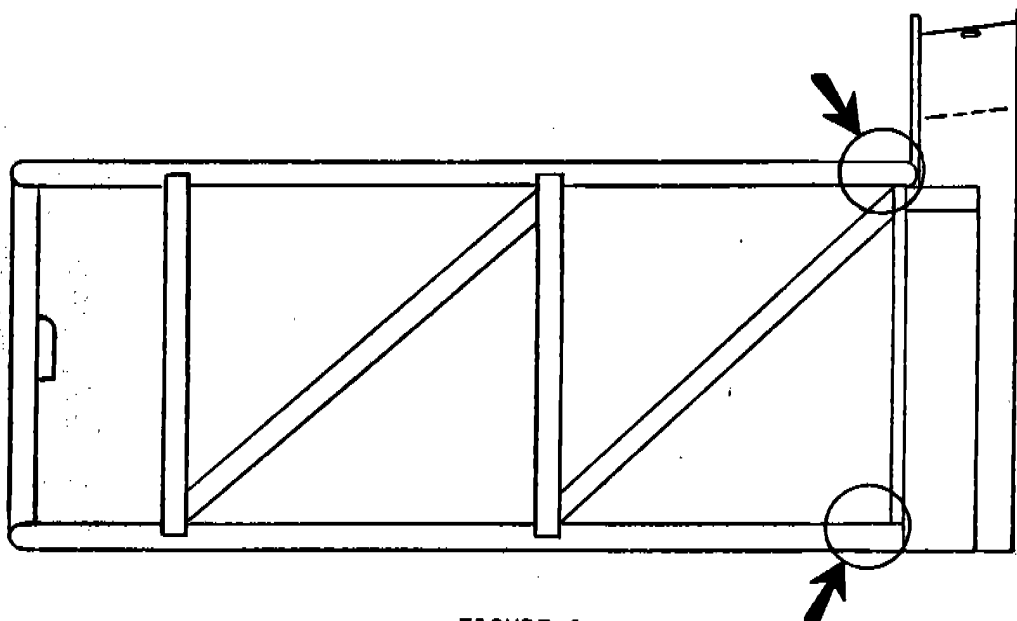


FIGURE 1
Rear View

The plate should be installed as shown in FIGURE 2. The hole pattern is farther from one end of the plate. This end should be placed on the spindle side of the frame. The plate should be centered as shown, with a minimum of 1/4" overlap the entire height of each end brace. Weld outside of plate to seat frame and inside of plate to cross bracing and frame, per weld symbols in FIGURE 2.

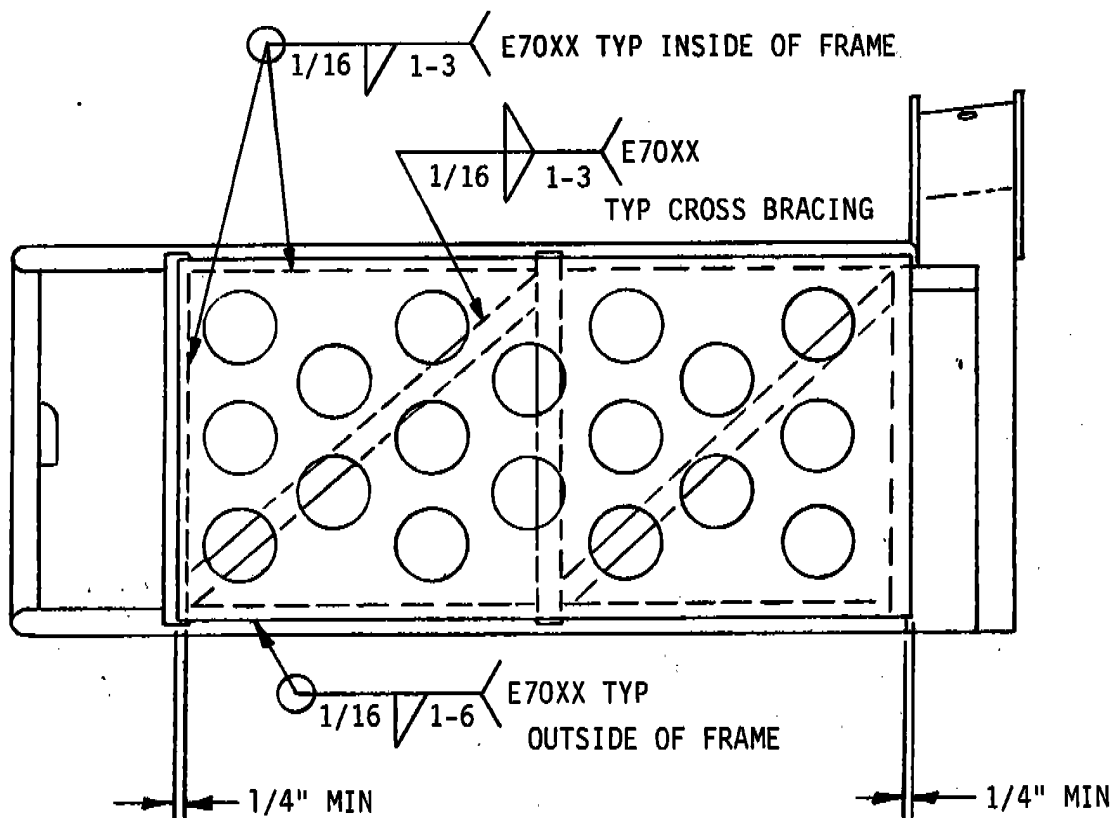


FIGURE 2
Rear View

Fitting plate to frame may entail grinding down or building up of gussets so gussets mate flush with plate (upper gusset shown in FIGURE 3). Plate should then be welded securely to gussets.

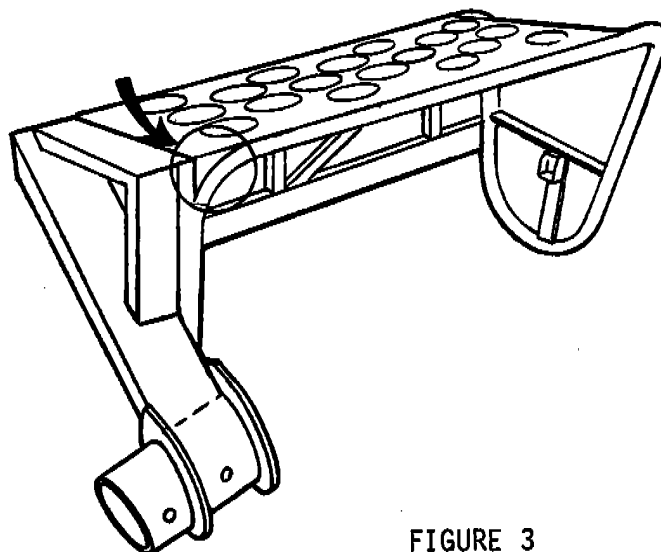


FIGURE 3

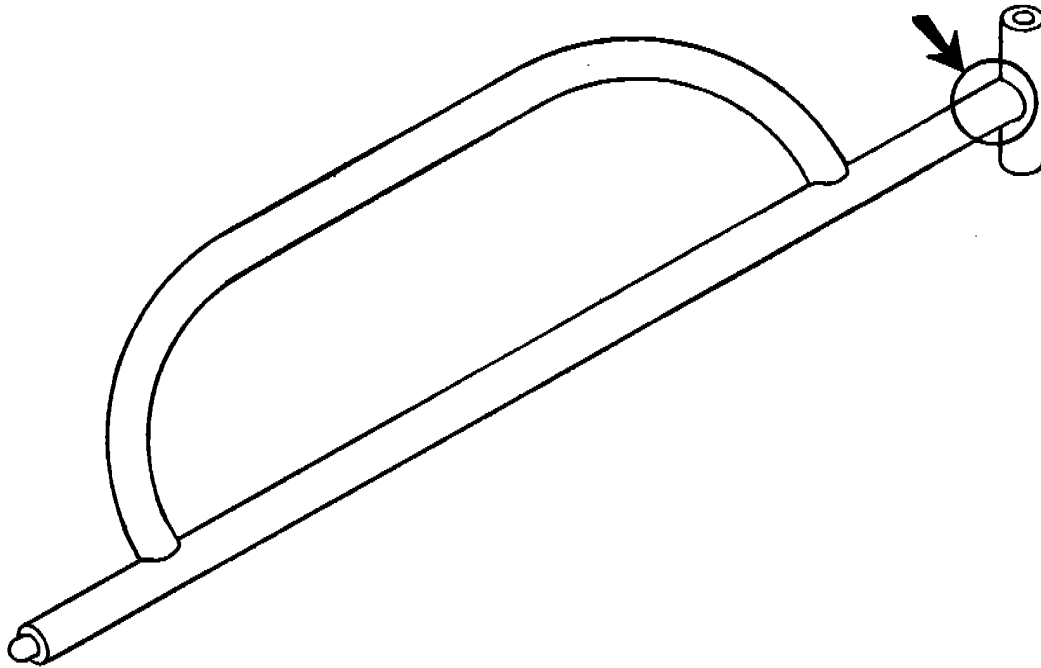


FIGURE 4

We are also asking all RADAR owners to check for cracks on the lap bar in area shown in FIGURE 4. If cracks are found, notify factory immediately.



Number: 75

Date: 9-3-74

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers:

Ride: TURBO

Subject: WHEEL BRAKE CONVERSION

We are now offering a kit to convert the existing disc braking on each wheel of the TURBO to a new system which uses the hydraulic drive motors to brake the wheels as well as drive them.

The new system is operating on several rides and has proven far superior, particularly for maintenance.

The kit is being offered in two versions, one being less costly and easier to install, but having a delivery time of approximately six months from date we receive your order. The other version is slightly harder to install and costs a little more, but is available for normal delivery schedules.

Both versions consist of the same components except for the Directional Control Valves. Version One replaces the base section of valve, which means the wiring going to the solenoids does not have to be disturbed. Version Two replaces the entire valve, necessitating the removal and reinstallation of the wiring for the solenoids.

Kits are priced at \$1,043.21* for Version One and \$1,293.21* for Version Two. Both include all necessary parts for conversion.

*Prices subject to change without notice.

NOTE

The existing disc brakes now on the TURBO can be left intact, and simply disconnected. This will allow them to be rewired** at the factory at a later date so they can be used as parking or holding brakes only.

**Rewiring of existing disc brakes is not included in the kit prices quoted above.

PARTS INCLUDED IN BOTH KITS

QUANTITY	PART DESCRIPTION	PART NUMBER
1	Manifold Assy.	1098611-1
1	Manifold Assy.	1098611-2
4	Hose Assy.	1098611-4
1	Hose Assy.	1098611-5
1	Hose Assy.	1098611-6
1	Close Nipple	1 1/4 NPT - M.P.
1	Tee	1 1/4 NPT - M.P.
1	Bushing	1 1/4 x 3/4 NPT
1	Adapter	290-01319
2	3000# Press Gauge	290-29628
2	Needle Valve	290-84410

PARTS FOR VERSION ONE ONLY

2	Directional Control Valve Base	DG3S4068C
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PARTS FOR VERSION TWO ONLY

2	Directional Control Valve	290-84526
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TOOLS REQUIRED

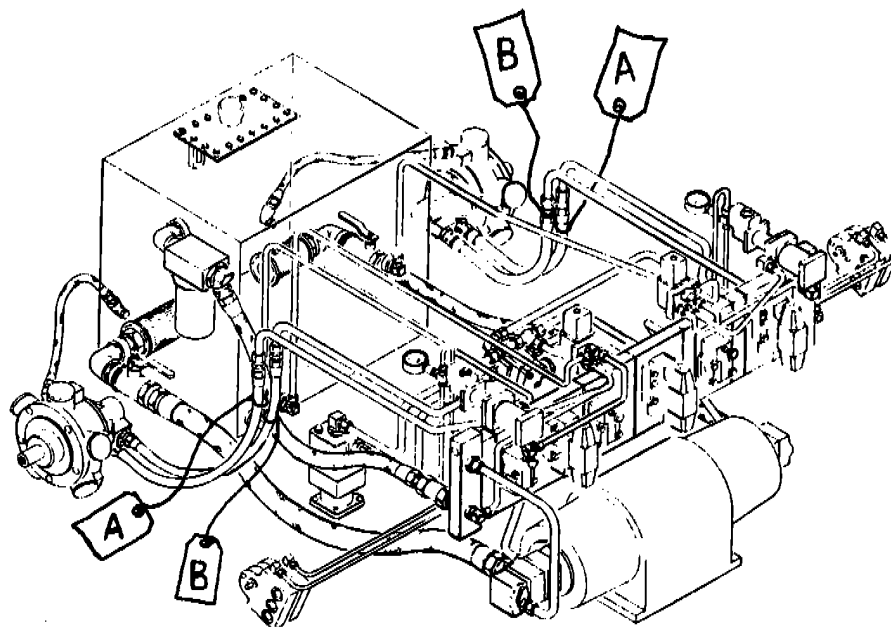
Assortment of Open End Wrenches
Allen Wrench Set
Teflon Tape or Pipe Sealant
Screwdrivers - Slot and Phillips
Wire Cutters
Wire Nuts and Electrical Tape
Rags - Oil Soak - Bucket

Removal of Existing Plumbing

1. Tag hoses going to hydraulic motor as shown in illustration.
Trace lines going to back side of panel blocks and mark ports to match hoses.
2. Disconnect hoses where they join hard tubing and drain fluid into bucket.
3. Disconnect tubing from back of panel blocks and discard tubing.
4. Loosen the return line hose from Check Valve. Unscrew Check Valve and install tee, 1 1/4 to 3/4 bushing and close nipple between panel blocks and Check Valve. Install Check Valve making sure it is installed with arrow pointing towards Hydraulic Filter.

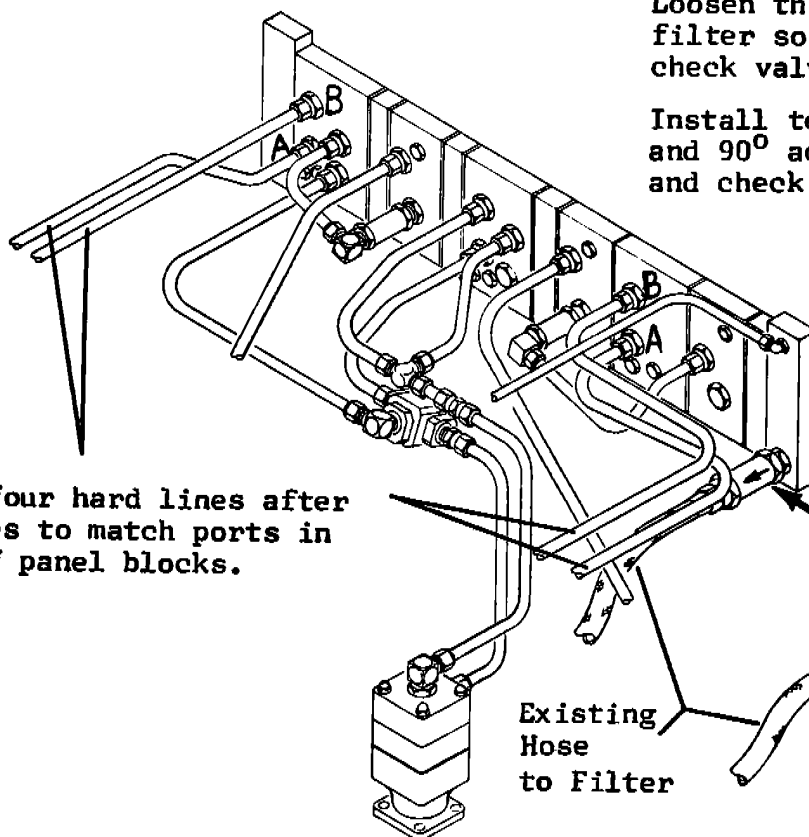
Connect return line to Check Valve.

Screw 3/4-90° adapter in pipe bushing, bottom of tee.



Loosen the return line hose at the filter so the hose and existing check valve can be removed.

Install tee, close nipple, bushing and 90° adapter between panel blocks and check valve.

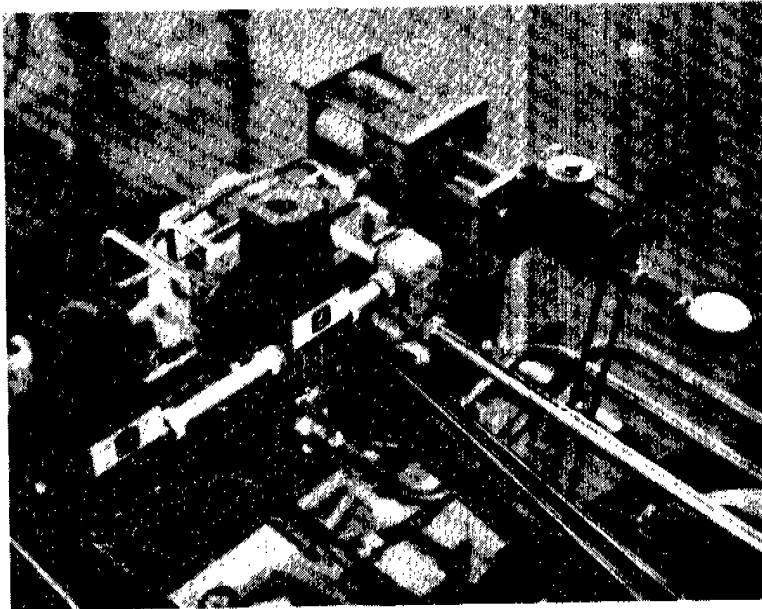


Remove the four hard lines after tagging hoses to match ports in rear side of panel blocks.

Existing
Hose
to Filter

Tee
Close Nipple
Bushing
90° Adapter

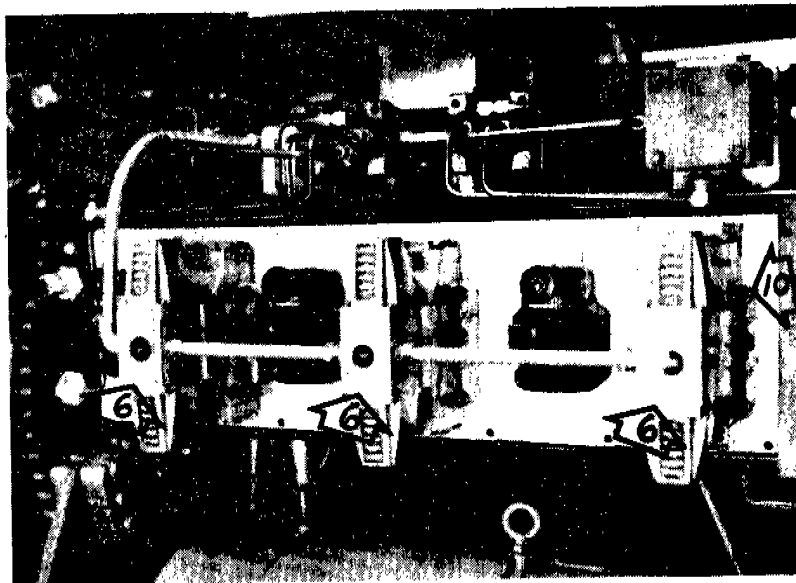
Reinstall check valve and return line hose going to filter.



5. Remove the cover plate from the Hydraulic Brake Valves. Disconnect the wires going to the Valve Solenoid. Screw Wire Nuts or tape leads going to valves and replace valve cover plate.
-

Steps 6 through 15 are for Version Two kit #75, Replacing Entire Directional Control Valve.

6. Remove the cover plates from the three Directional Control Valves on the front side of panel blocks.
7. Identify the leads going into each valve by placing tape on them and marking with letters or numbers. Alternate method is to make a diagram using the wire colors as a code.



8. Starting on the right hand valve, disconnect wiring and pull back through middle valve. Do middle valve in the same manner.
9. On the left hand valve, disconnect the wiring conduit at the elbow going into the valve.
Pull wiring back through valve.
10. Remove the bolts securing valve to panel blocks and remove valve allowing wiring to pull through elbow and out of the valve.
11. Remove right hand valve in like manner.

Do Not Remove Middle Valve

12. Clean surface of panel blocks where valves mount and bolt new right hand valve in position.
New valves are identical, so either one can go on the right side.
13. Remove the conduit elbow from old valve and install in new valve.
14. Thread wiring through elbow and position valve in place, securing with bolts.
15. Route wiring to middle and right hand valves connecting wires to solenoids to match old valves.

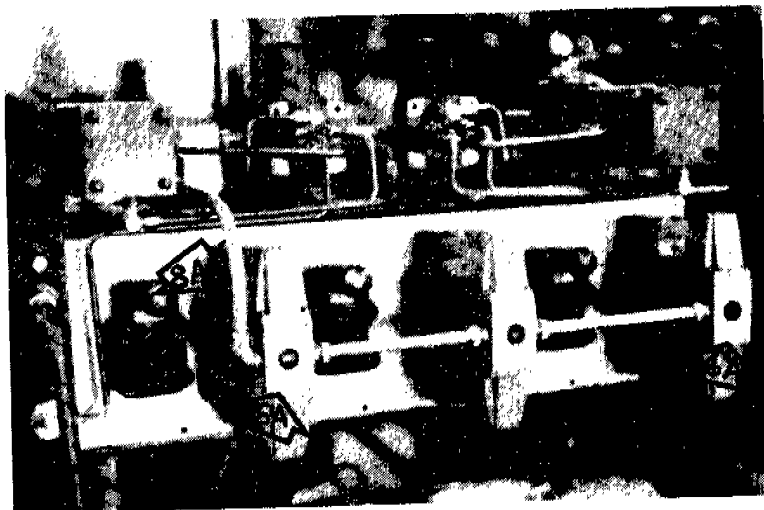


CAUTION

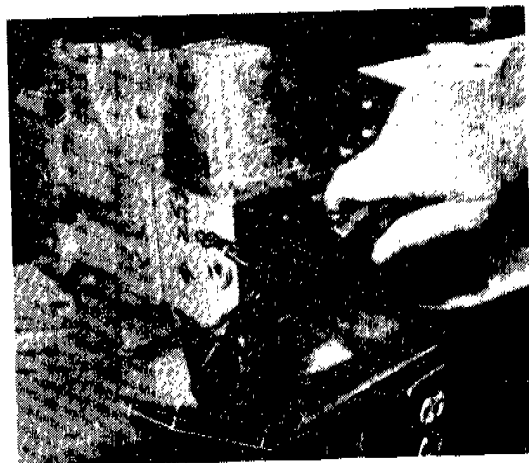
When installing new valves, make sure valve is positioned so the holes in the base of the valves and holes in panel block align.

Also make sure there is an O' ring in the seat around each hole in valve base.

Steps 6A through 12A are for Version One kit #75, Replacing Base Section only of Directional Control Valves.



- 6A. Remove the cover plates from the two outer directional control valves.



- 7A. Remove the four socket head cap screws that bolt the solenoid section of the valve to the base section.

- 8A. Remove bolts securing the base section of valve to the panel blocks.

NOTE

Support the solenoid section of valve while removing base section.

- 9A. Install new base sections, making sure all O' rings are in position between panel blocks and base.

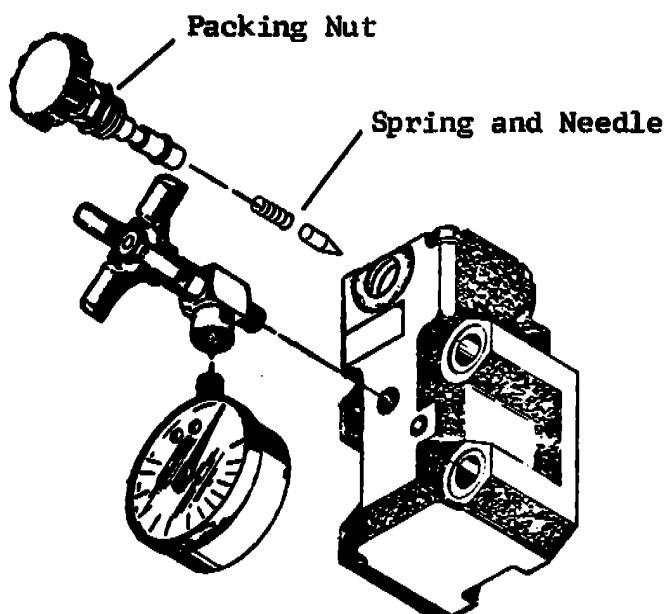
- 10A. Secure solenoid section of valve to base section, again making sure O' rings are in seats.

- 11A. Change the base section for the other solenoid valve in the same manner.

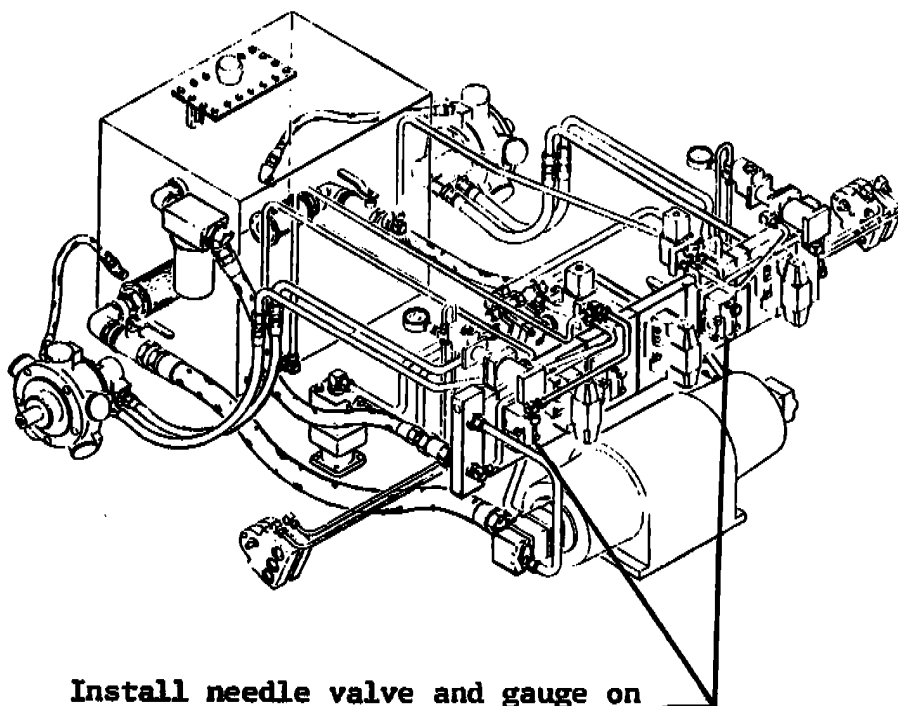
- 12A. Proceed to Step 16.

Steps 16 and 17 are for the left and right hand relief valves.

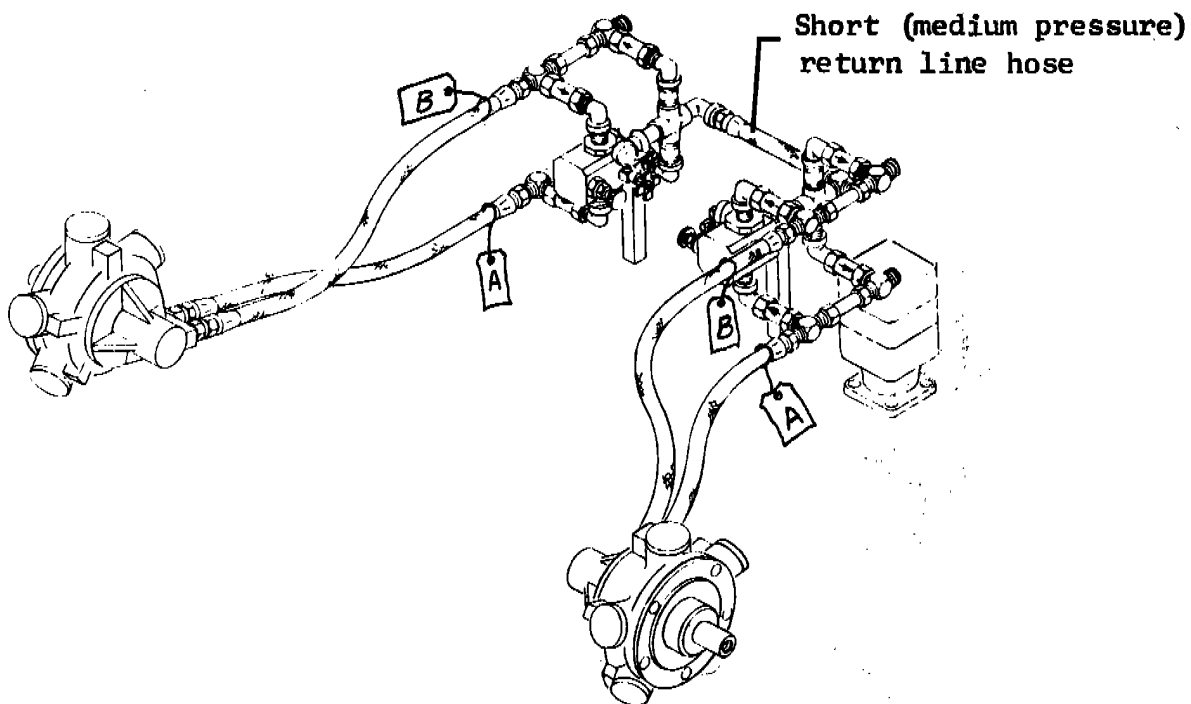
16. Loosen the packing nut on the relief valve adjustment knob and unscrew knob assembly, taking care not to lose the spring under the adjustment stem.



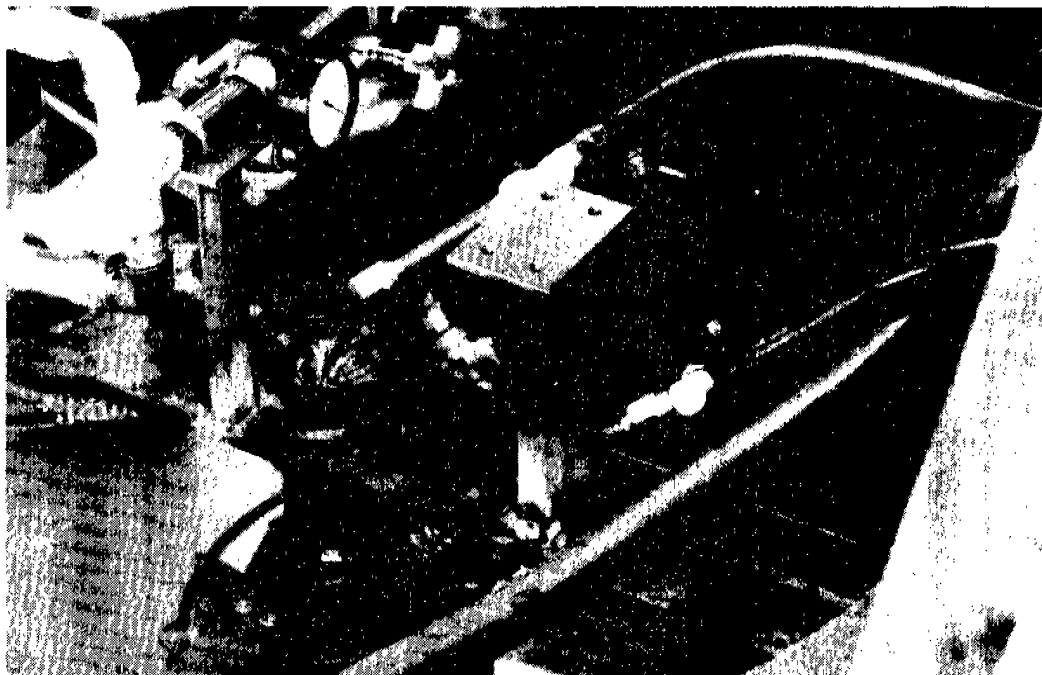
17. Remove the socket head plug and install needle valve and gauge. Reinstall adjustment knob, making sure spring seats against adjustment stem.



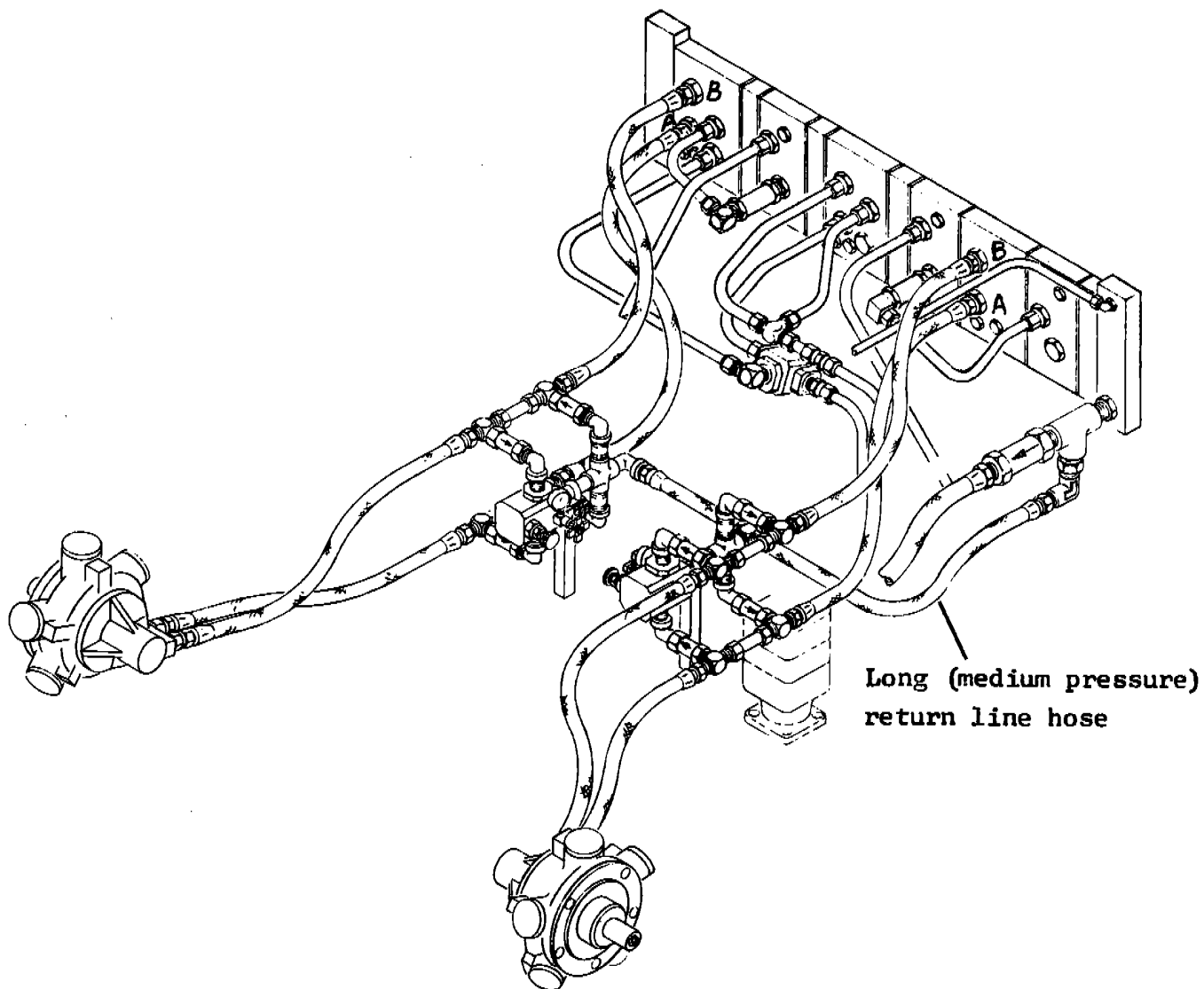
Install needle valve and gauge on the two outer relief valves.



18. Connect the two manifold assemblies together with the short (medium pressure) return line hose (hand tight) as shown. Position manifolds under the turret tube and connect the hoses (hand tight) from the hydraulic motors.



19. Support each manifold so the support tube is resting on the bridge plate of the turret and weld hangers in place.



20. Connect the long (medium pressure) return line hose to the tee next to the panel blocks (Ref. Step 4). Route hose to the tee connecting the two manifold assemblies together.
21. Connect hoses from bottom tees of manifold assemblies to bottom ports in panel block and tighten.
22. Connect hoses from top tees on the manifold assemblies to upper ports in panel blocks.
23. Tighten all connections completed so far.
24. After all connections have been completed, etc., the ride can be erected for operation. However, there will have to be someone on the turret section to perform final adjustments.

25. Activate the switch controlling wheel drive and observe pressure gauge on the relief valve mounted front side of panel blocks. Gauge should have maximum reading of 1600 PSI. If not, adjust relief valve according to instructions below.

If wheel does not rotate at all or if directional control valve shifts hard or squeals, the choke block located between valve sections will have to be adjusted (see below).

26. With the wheel turning, deactivate switch, while observing pressure gauge on relief valve on the new manifold assemblies. The gauge should have a maximum reading of 2000 PSI while the wheel is stopping. Adjust gauge accordingly.

NOTE

In order for manifolds to function for braking, the relief valve on the manifold must be set for a higher setting than the relief valve located on the front side of the panel blocks.

27. Adjust reliefs and directional control valve for the other wheel in the same manner.
28. After all adjustments are complete, close all needle valves behind pressure gauges.

If needle valves are not closed, the pressure gauges will be short lived, making future adjustments difficult.

RELIEF VALVE ADJUSTMENT

Loosen the jam nut on the adjustment knob stem and turn knob until desired setting is obtained. Tighten jam nut back down against valve body.

DIRECTIONAL CONTROL VALVE CHOKE ADJUSTMENT

The choke on the directional control valve will have to be adjusted if any of the following symptoms occur.

- A. Failure to Shift
- B. Shifts too Hard (Loud clunking noise)
- C. Shifts too Slow (Vibration plus delay)

There is a separate adjustment for each direction of shifting. Adjust as necessary.

1. Loosen the lock nut around set screw. Adjust set screw, clockwise will make it shift faster, counterclockwise will slow it down.



Number: 51

Date: 1-31-73

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers:

Ride: TURBO

Subject: SEAT SOCKET REINFORCEMENT

This service kit is a follow up for a letter that was sent to all TURBO owners, letter dated August 31, 1972. In that letter all owners were advised that they should inspect the tub support socket, on the end of each sweep, for possible cracks developing between the two mounting holes. After inspecting the sockets, the owners were requested to report their findings to Wayne Fearey, Engineering Department, Chance Manufacturing Company.

Due to the lack of response to our August 31, 1972 letter, the cracks that were discovered on one ride were considered to be an isolated case, and therefore, no kit was issued for the other rides at that time.

However, recently we have received reports of cracks developing on other rides. The parts provided with this kit will strengthen the tub sockets to eliminate the possibility of any future cracks developing. Install the parts per drawings below. After parts are added to the sockets, it will be necessary to use new pins to secure the tubs. New pins are included in the kit. For replacement pins, order pin #390-52463.

The cost of these parts will be absorbed by Chance Manufacturing Company. However, to insure that these parts are installed, we are charging a nominal fee for the kit. The cost of the kit is \$275.00. After the new parts are installed, ship the old seat pins back to us and you will be issued credit for the original cost of the kit.

NOTE:

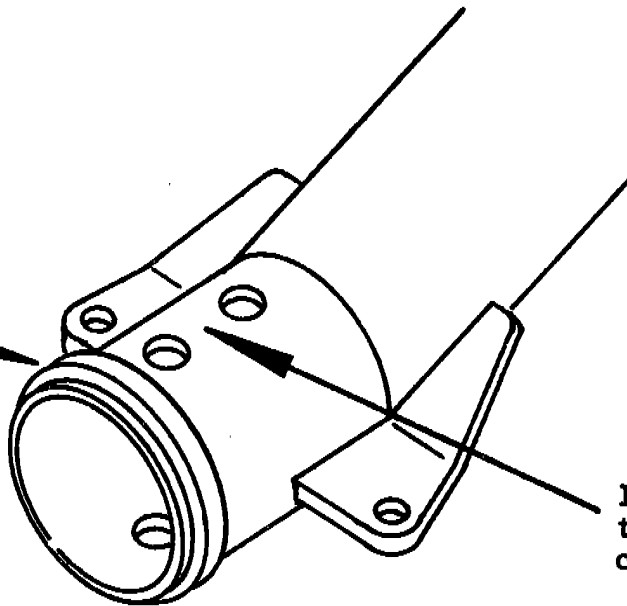
IN the interest of safety, it is imperative that this kit be ordered immediately, and that the parts be installed as soon as possible after receiving them.

PARTS INCLUDED IN KIT

390-52463	Taper Pin	(40)	1099000-2	Band	(20)
290-52387	Hair Pin	(40)	1099000-3	Plate	(40)

Factory and Sales Office: 4219 Irving • P.O. Box 12328 • Wichita, Kansas 67277 • (316) 942-7411

Remove old reinforcing
ring and grind smooth

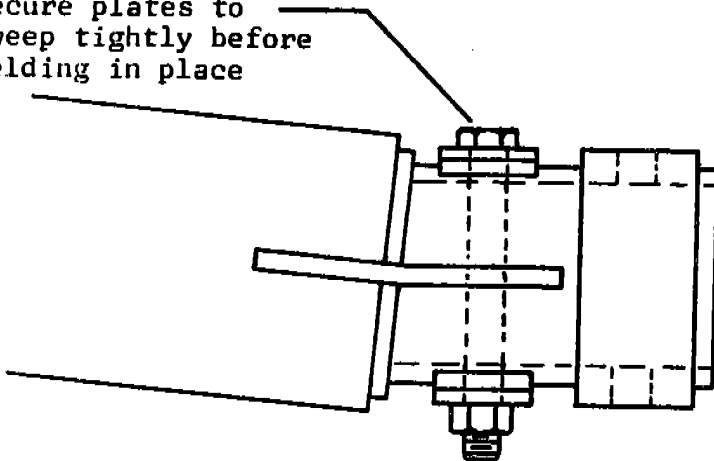


Inspect this area,
top and bottom, for
cracks

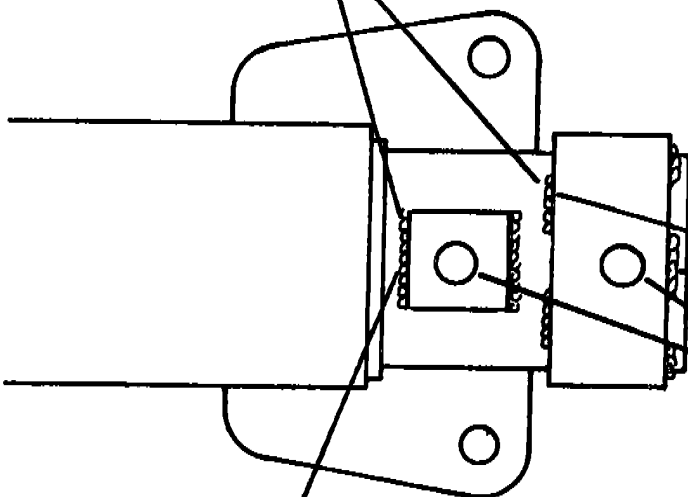
EXISTING SWEEP END

Position new parts and tack weld.

Use a bolt to
secure plates to
sweep tightly before
welding in place

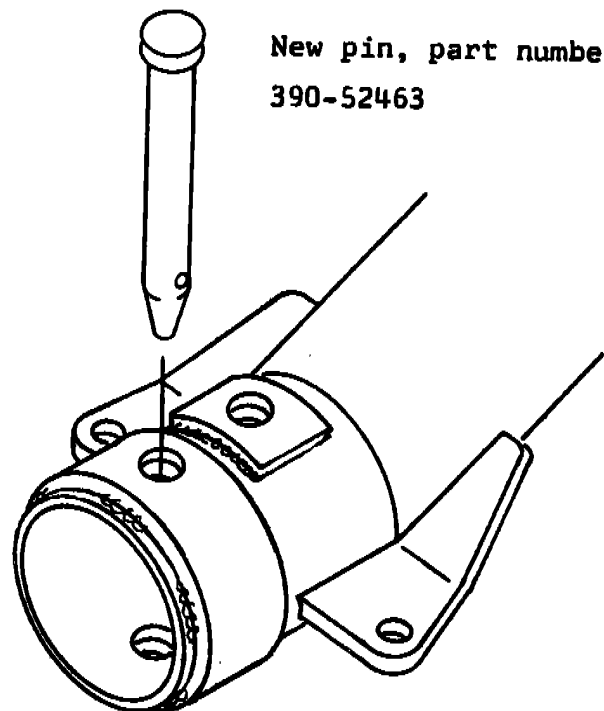


1/4" WELD TYPICAL



Weld plates
Front & Rear

New pin, part number
390-52463



SWEEP END AFTER MODIFICATION

Skip weld around
ring in approximately
4 places each side

Skip welds should be staggered

Align holes to locate parts