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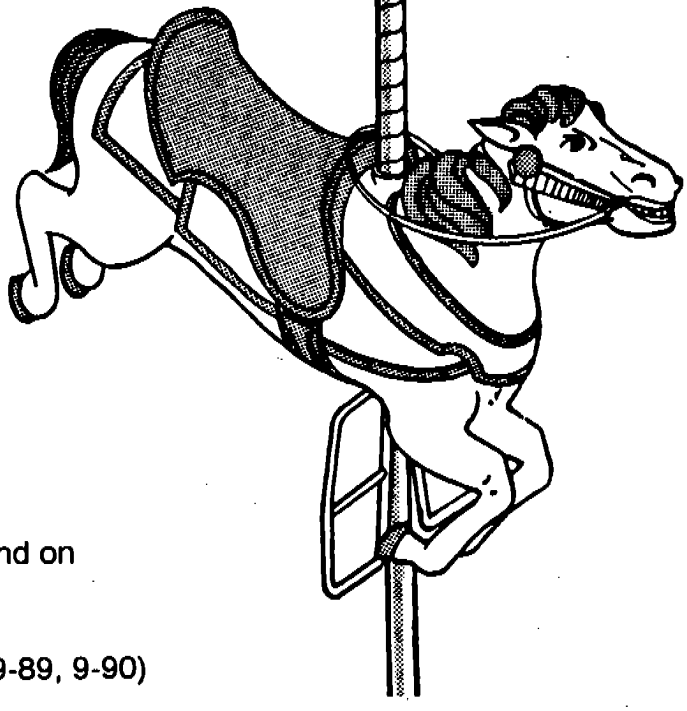
MFG: CHANCE RIDES, INC.
NAME: GRAND CAROUSEL
TYPE: NON-KIDDIE

50-FOOT CARROUSEL

Operation Manual
& Parts Catalog



Serial Number 389-010-86 and on

Manual Number 24327200
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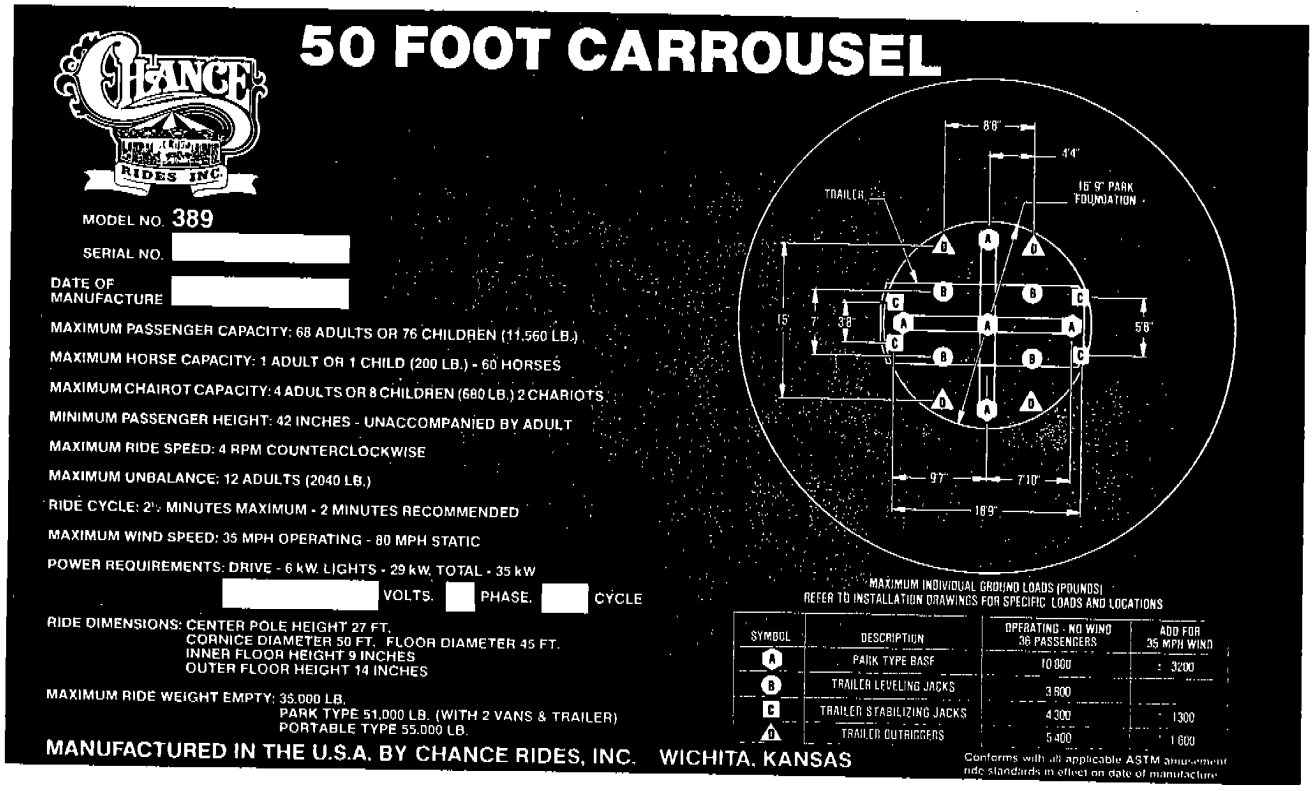
To The Owner

This manual is your guide to safe, productive operation. Read it carefully. It will help reduce trial and error learning and minimize damage and down-time caused by improper operation and maintenance.
For additional information, call the CHANCE CUSTOMER SERVICE DEPARTMENT.

Ride Information Plaque



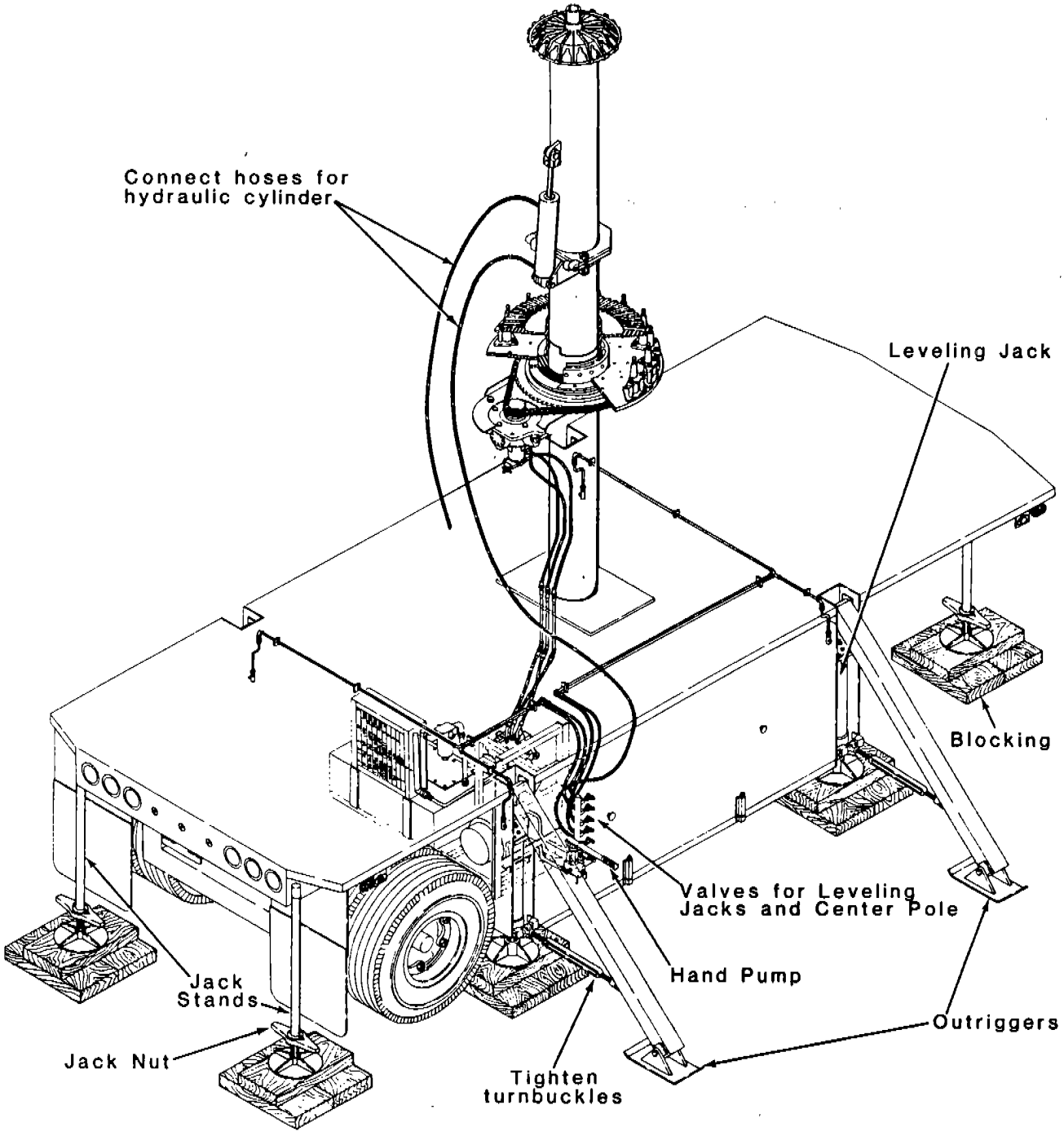
The ride information plaque is mounted to the center pole (portable rides) or a bracket on the mud sill (park model rides).

The plaque lists ride specifications, as well as model and serial number and date of manufacture.

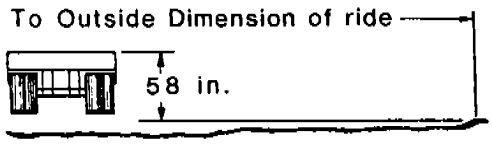
When ordering parts, or requesting information from the CHANCE CUSTOMER SERVICE DEPARTMENT, always specify the model and serial number of your ride. Record this information in the spaces shown above.

SET-UP

Set-Up Procedure - Trailer Mounted Carrousel



1. Refer to operation dimensions on the ride information plaque. Locate the trailer in position.



NOTE: There must be at least 58 inches from the top of the trailer to the highest level of ground as shown. Level the trailer accordingly.

2. Place good solid blocking, preferably wooden 3 x 12's, under each hydraulic leveling jack. Refer to drawing for approximate placement. As blocks are stacked, criss-cross each layer. Position the jack bases on top of the blocking.

3. The hand pump and needle valves are used to control the leveling jacks and the center pole lift cylinder.

4. Open the two valves for the front leveling jacks. The other valves must be closed. Operate the hand pump until the trailer is high enough to remove the tractor. Close the valves for the front jacks.

IMPORTANT: Leveling jacks have a stroke of nine inches. They are hydraulically extended and spring-retracted. As the jack reaches the end of its stroke, the hand pump gets harder to operate. Do not attempt to extend the jack beyond this point. Damage can result to the piston and return spring.

To help prevent overstroking the jack, place as much blocking under the jack as possible before extending the jack.

5. Open both valves for the rear jacks. Raise the trailer high enough to take the weight off the tires and suspension.

6. Level the rear of the trailer from side to side using a bubble level. Screw the lock nuts up tight against the bottom of the jack.

7. Raise the front of the trailer until it is level with the rear and level from side to side.

IMPORTANT: Hydraulic pressure in the jacks can increase due to expansion when jacks are exposed to heat, such as direct sunlight. This increase in pressure can cause the jack to raise off the jack lock nuts, making the ride unstable.

After the ride is leveled and all lock nuts have been tightened, open the needle valves and the hand pump valve to relieve pressure on the hydraulic jacks.

NOTE: During the tear-down procedure, the trailer must be jacked up far enough to take the weight off the locking rings before they can be loosened.

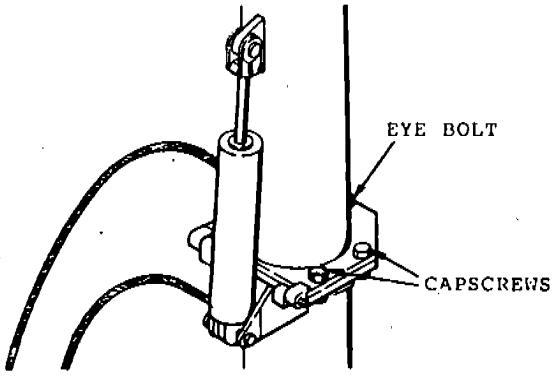
8. Swing the outriggers into position and install the turnbuckles and tighten. Use blocking as required.

9. Install the jack stands and tighten the jack nuts. Use blocking as required.

10. Install the tent pole into the center pole.

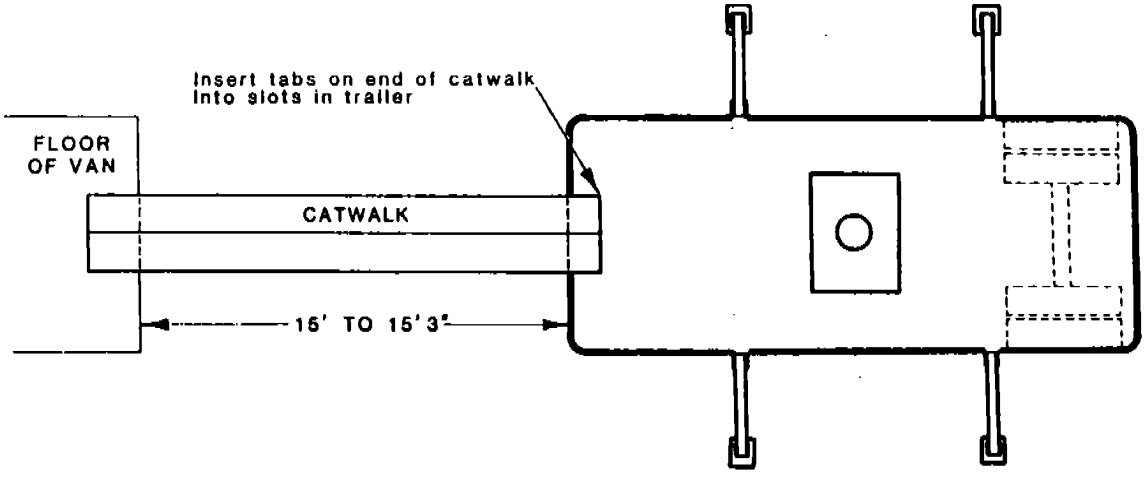
11. Connect the two hoses to the hydraulic cylinder.

NOTE: If leveling jack valves were opened to relieve hydraulic pressure (Step 7), close the valves temporarily to raise the center pole. When the center pole is up and bolted in place, open all the needle valves.

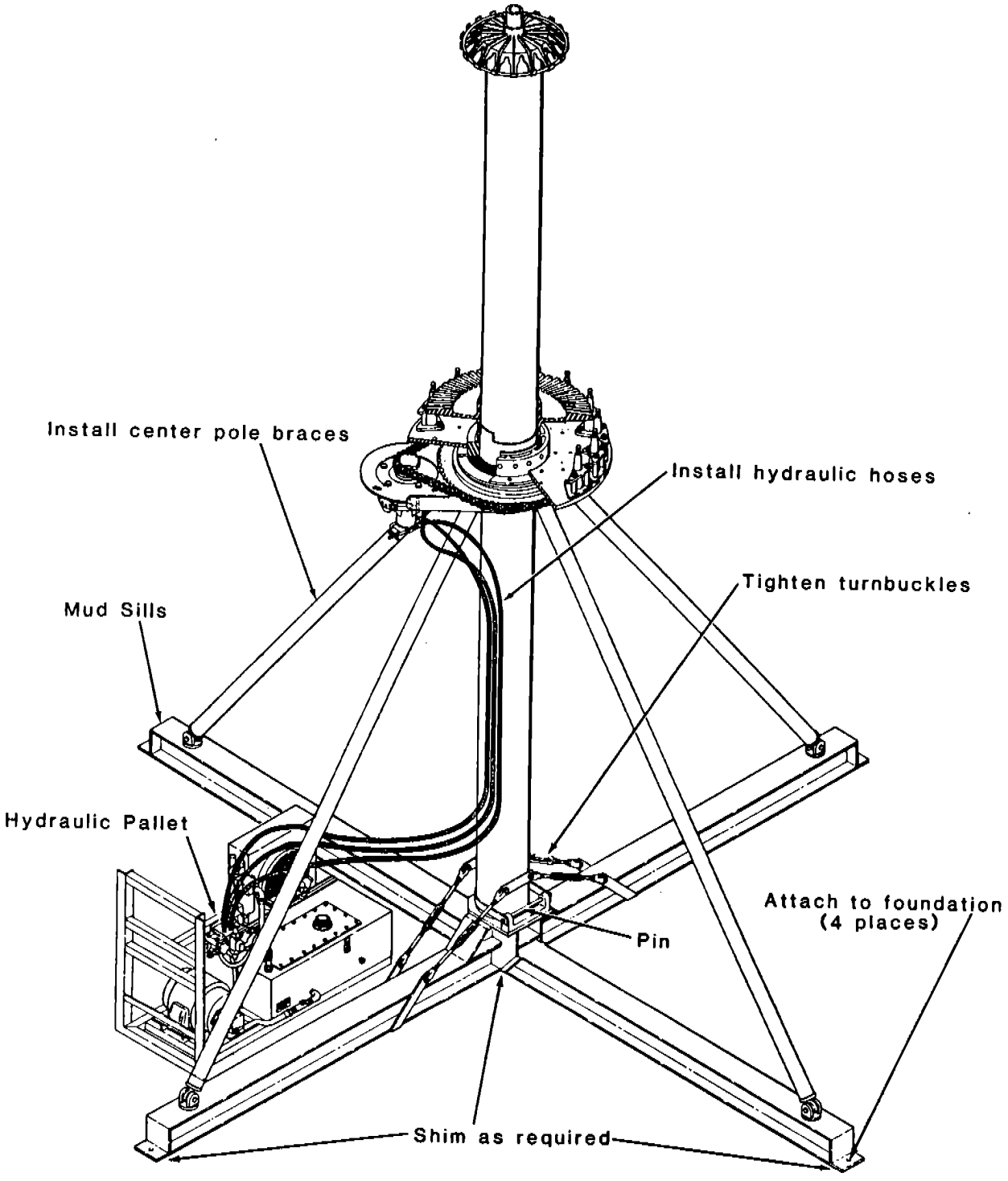


12. Install the four capscrews and swing the eye bolt up into position. Secure the two center pole sections with flat washers and hex nuts.

13. Position the van at the rear of the trailer as shown. Install the catwalk between the ride trailer and the van.



Set-Up Procedure - Park Model Carrousel



1. Refer to the operating dimensions on the ride information plaque. Locate the mud sills in position.

NOTE: It is recommended that the ride be set-up on a concrete foundation and bolted to the foundation. Specifications for the recommended foundation are available from the factory.

2. Pin the bottom of the center pole to the base. Install the tent pole into the center pole.

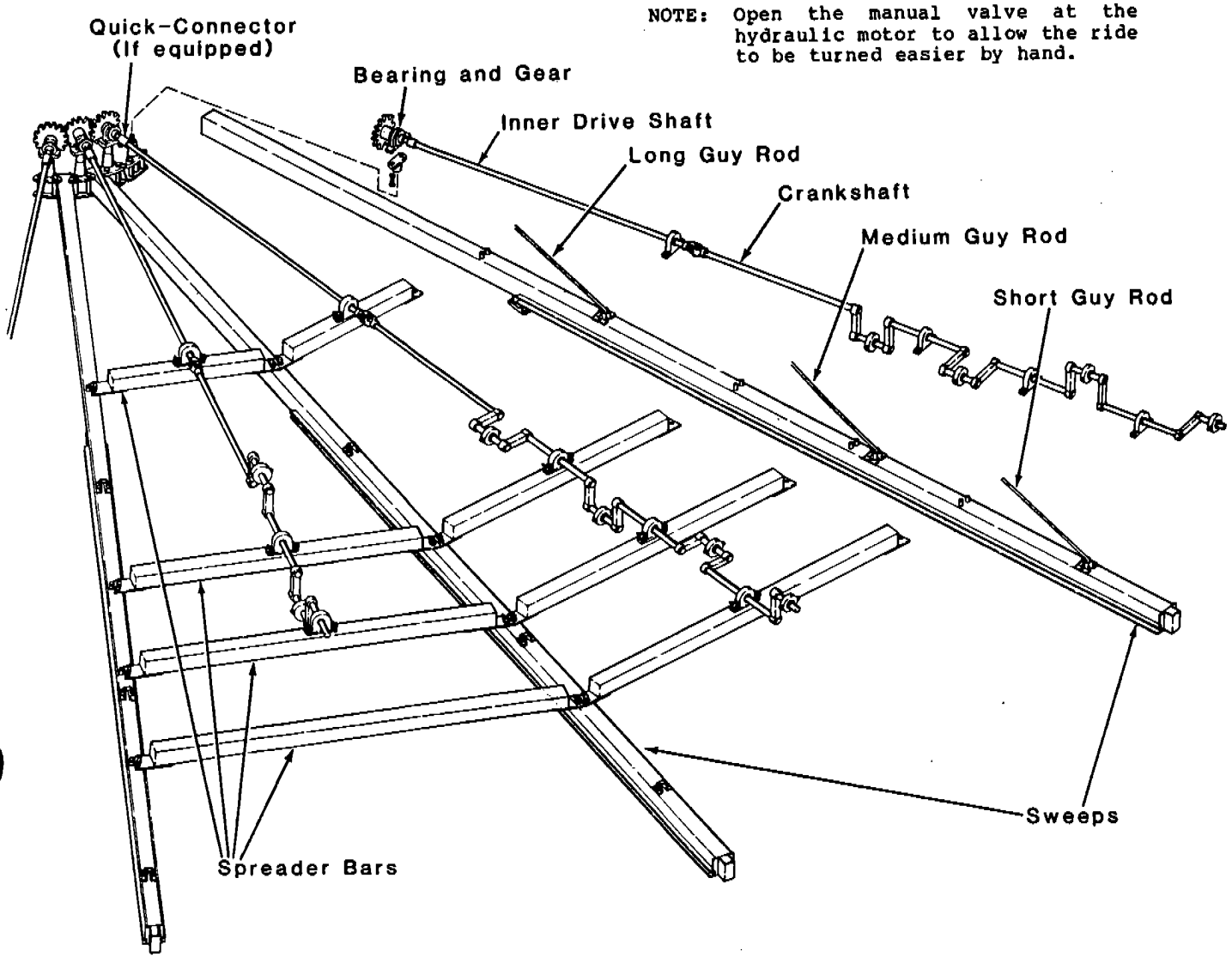
3. Using suitable hoisting equipment, raise the center pole and install the four hub braces.

4. Install thin wood or metal shims under the ends of the mud sills and under the center to level the center pole. Also, install shims under the center pole to assure tight ground contact. Tighten the bolts to the foundation if applicable.

5. Install the hydraulic pallet and plumbing to hydraulic motor.

Set-Up Procedure - Sweeps and Crankshafts

NOTE: Open the manual valve at the hydraulic motor to allow the ride to be turned easier by hand.



1. Install one long, medium and short guy rod on spider ring.

2. Install sweep #1 into hub. With one man on the end of the sweep and a man at each guy rod, lift the sweep slightly and simultaneously install all three guy rods to the sweep.

IMPORTANT: The guy rods must be securely hooked at each end or the sweep can fall.

3. Repeat Steps 1 and 2 to install sweep #2.

4. Install four spreader bars between sweeps #1 and #2.

5. Continue around ride, installing guy rods, sweeps and spreaders.

6. Install the inner drive shafts.

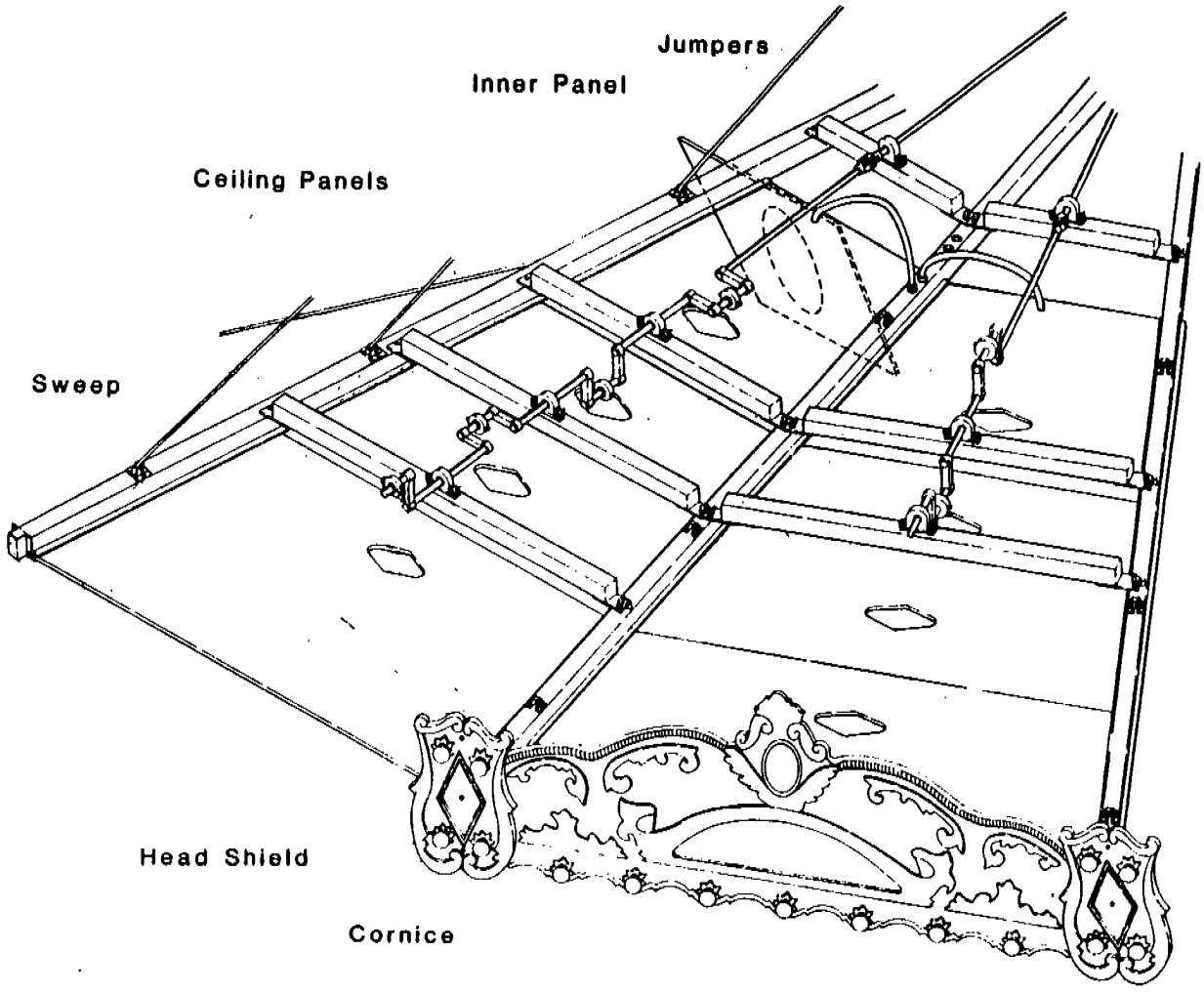
NOTE: If ride has unequal length drive shafts, alternate short and long drive shafts.

Install the bearing and gear, or quick-connector, depending on how ride is equipped.

7. Install the crankshafts. Bring the crankshafts from the van, up between the two outer spreaders.

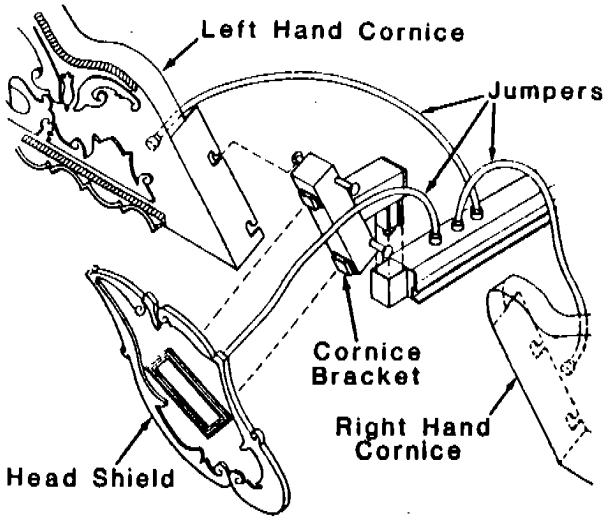
IMPORTANT: To achieve attractive ride operation, the crankshafts must be "timed" correctly. To accomplish this, all crankshafts must be installed so that as the ride rotates past a given point, each crankshaft is in the same position as it passes that point. For example, if the outer crank on one crankshaft is pointed straight up as it passes one corner of the frame, install each remaining crankshaft so that it is similarly positioned when rotated past the same corner.

Set-Up Procedure – Ceilings, Cornices, Head Shields and Inner Panels



1. Slide the ceiling panels into place between sweeps. As each section is completed, install the electrical jumpers as shown, and pin the outer ceiling panel in place.

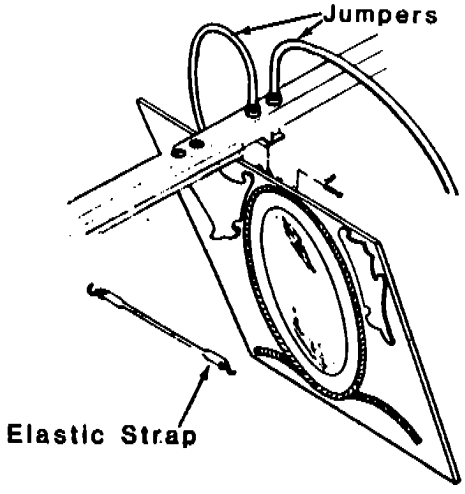
2. Install the cornices and head shields and lock in place as shown.



NOTE: Cornices are made as right hand and left hand units. Alternate right hand and left hand cornices and install electrical jumpers as shown.

3. At this point, the canvas tent top can be installed, if desired. Refer to "Tent Top Installation" at the back of this section.

4. Install the inner panels. Secure with elastic straps as shown.



5. Install electrical jumpers as shown.

6. If tent top was installed in Step 3, all ladders, work platforms, etc. can be moved clear of the ride.

Tent Top Installation

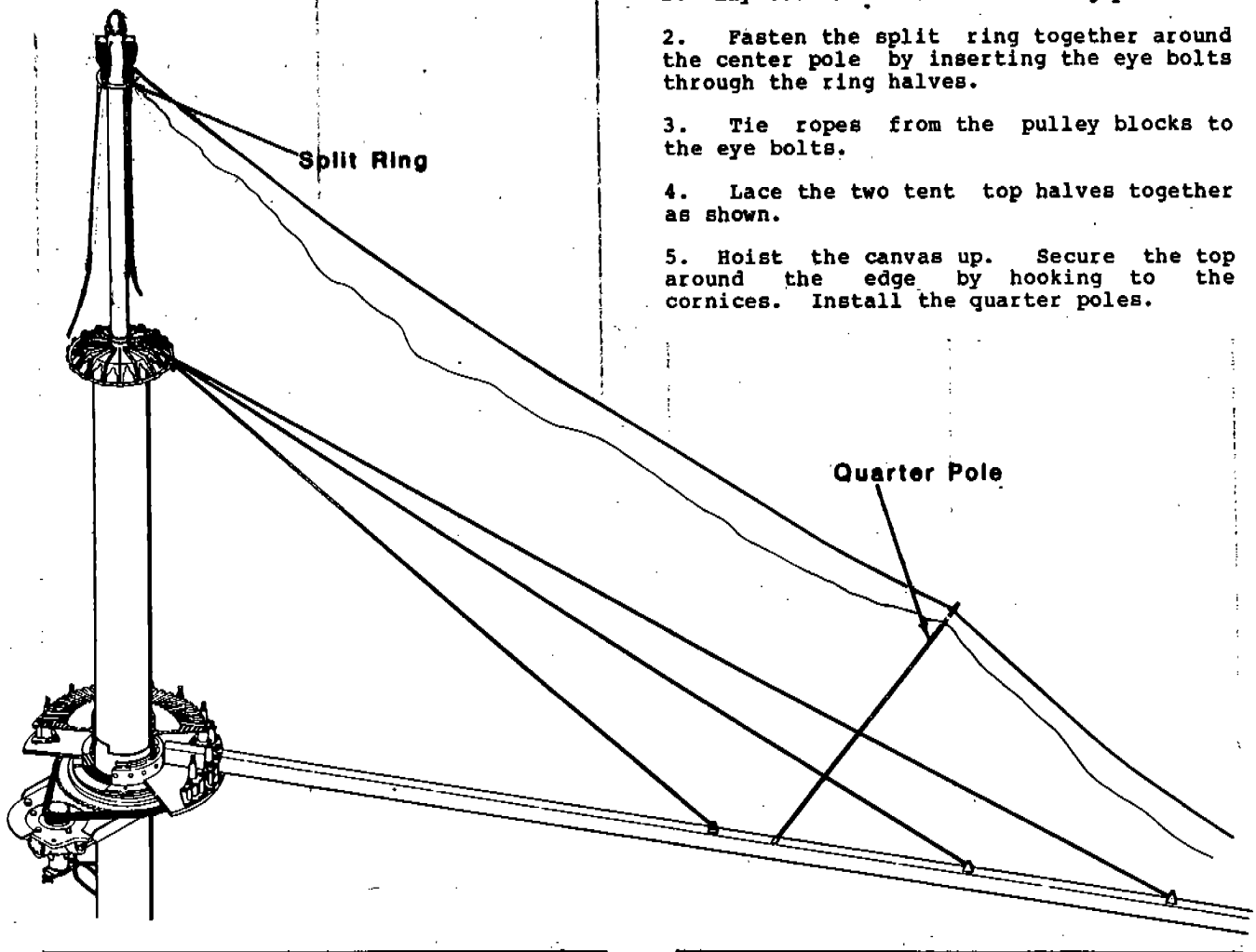
1. Lay out the canvas over the guy rods.

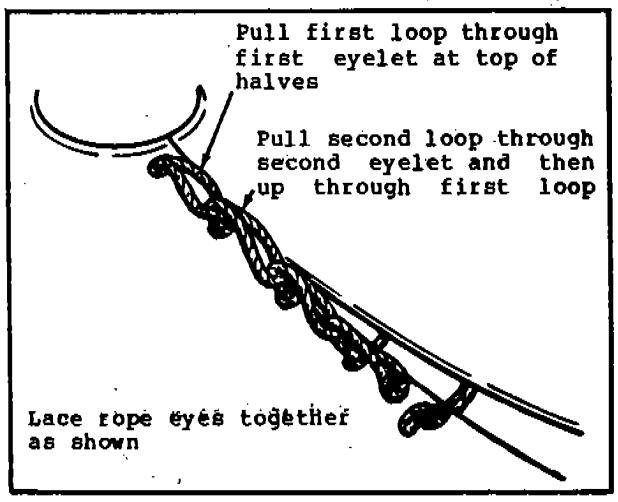
2. Fasten the split ring together around the center pole by inserting the eye bolts through the ring halves.

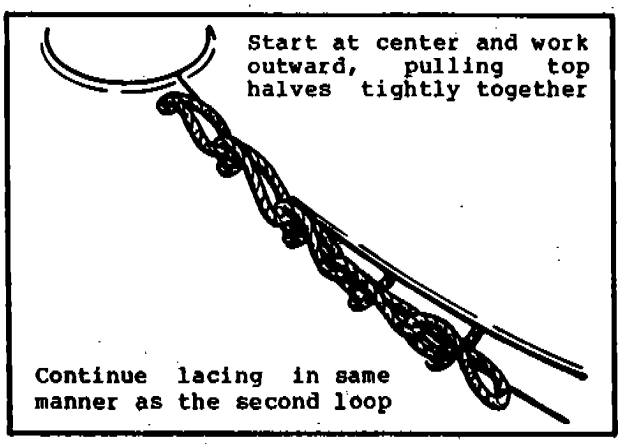
3. Tie ropes from the pulley blocks to the eye bolts.

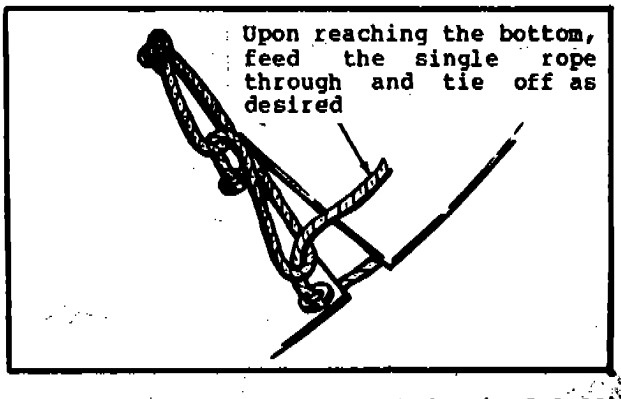
4. Lace the two tent top halves together as shown.

5. Hoist the canvas up. Secure the top around the edge by hooking to the cornices. Install the quarter poles.

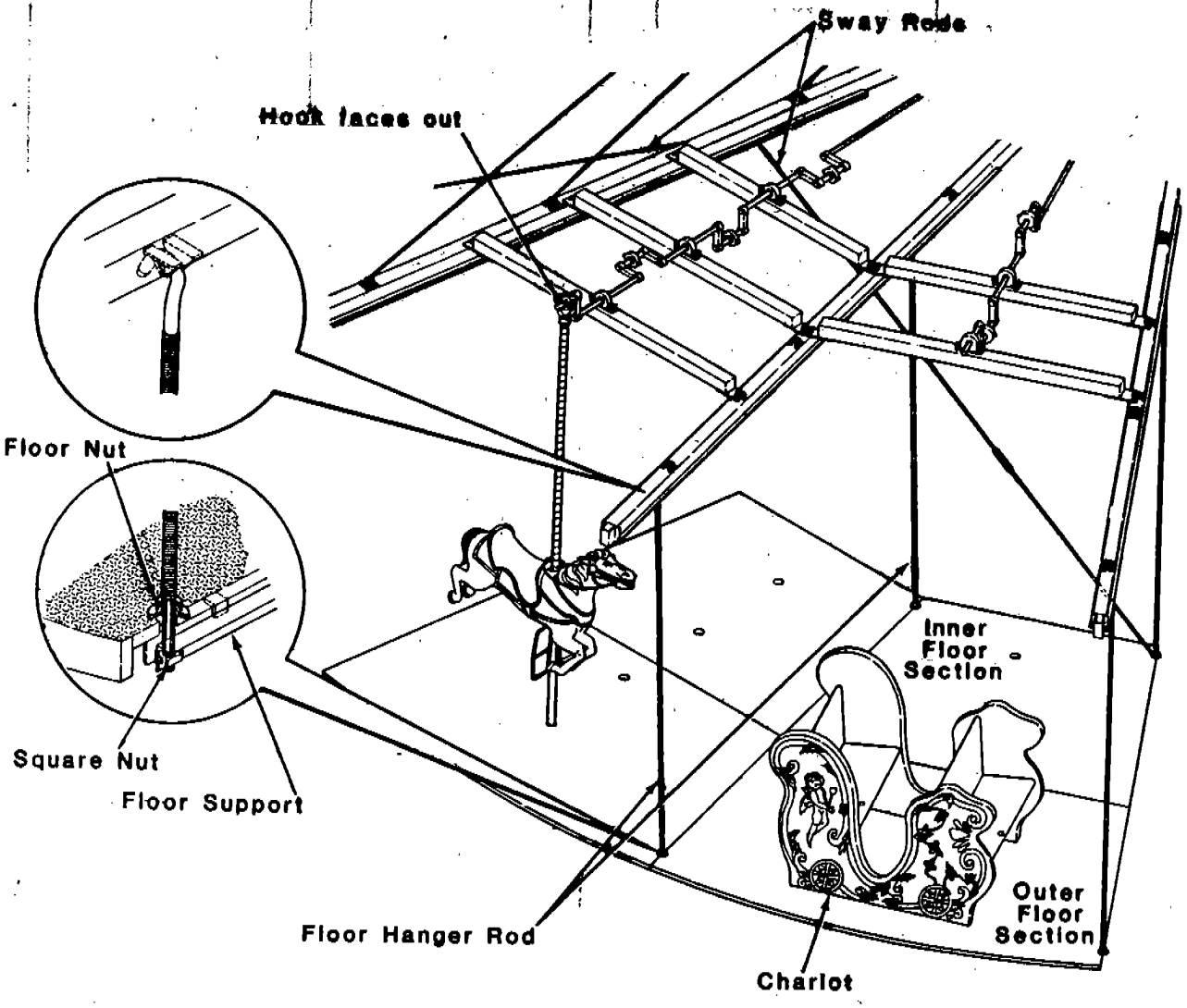








Set-Up Procedure - Floors, Horses and Chariots

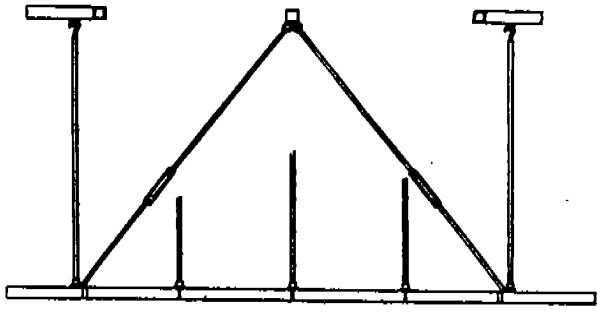


1. Install all floor hanger rods.

2. Install all floor supports.

3. Install each segment of floor sections, starting with the inner section.

4. Install the sway rods as shown and tighten all the floor nuts.



DETAIL OF SWAY ROD INSTALLATION

NOTE: The following steps describe installation of the horses. Start with the inner row (small horses), then the next row (medium horses). As the two outer rows of large horses are installed, distribute the "head-up" and "head-down" horses evenly around the ride.

5. Hook the horse pole over the crankshaft bearing with the hook facing out.

6. Swing the pole out and install the horse and horse step. Pin in place. Slide a telescope pipe onto the bottom of the horse pole.

7. Swing the well-greased horse pole back in and align the telescope with the socket in the floor. Push the telescope pipe down and turn one-quarter turn to lock.

8. Install the chariots on the platform. Insert the chariot base pins in the key hole slots and push into the small end of the slot.

9. Install the canvas sidewalls (if so equipped). The canvas sidewalls are secured to the eyelets on the sweeps, then rolled to the top and secured with the webbing straps provided.

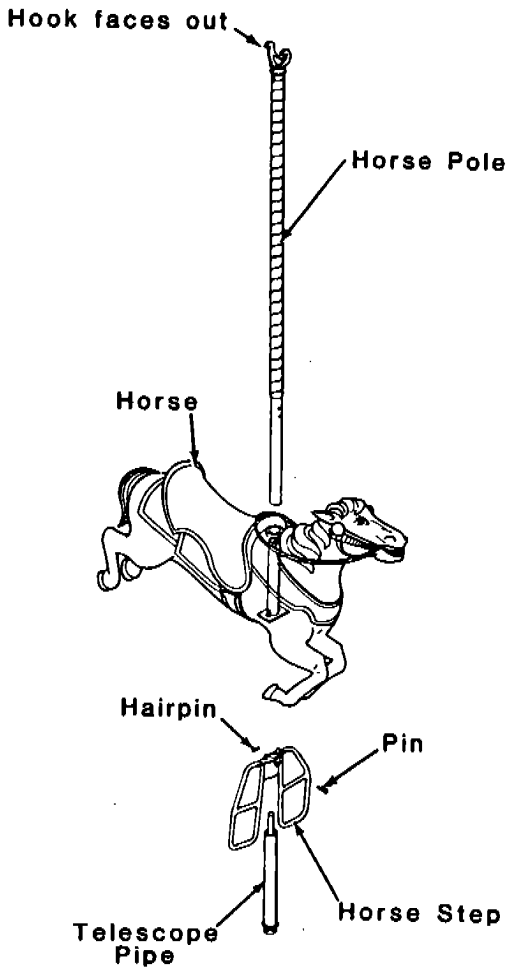
10. Install the canvas skirt (if so equipped).

11. Install the fences.

12. Install the control panel.

NOTE: If the manual valve at the hydraulic motor was opened during set-up, it must be closed before the ride is operated.

13. Install the trailer panels (if so equipped).



OPERATION

Operator Selection and Instruction

1. Select competent mature operators, capable of understanding the function, use and control of amusement rides.

2. Instruct each operator fully in the proper use and function of the ride he is to supervise, including:

   a. Controls and procedures for normal and emergency operation.

   b. Manufacturer's recommended maximum speed and load.

   c. Manufacturer's recommended length of ride time and frequency of repeat rides.

   d. Any foreseeable misuse of the ride as determined by the manufacturer or owner, or by special conditions such as weather, location or crowds.

   e. Each operator must have immediate availability of a manufacturer's operator's manual for the ride he supervises.

3. Require each operator to inspect the ride he supervises before each day of operation.

   a. Determine that no portion of the ride is damaged, missing, or worn in such a manner that it is unsafe or that can develop into an unsafe condition.

   b. Report any irregularities to superintendent or owner.

   c. Do not operate the ride if any irregularities are found until such condition is corrected.

4. Instruct the operators to allow no passenger on ride who is visibly ill, under the influence of drugs or alcohol, or pregnant.

5. Instruct operators and attendants on the proper methods of securing passengers in the ride. Do not allow a passenger in the ride that cannot be properly secured due to passenger size or malfunction of the securing device. Stop the ride immediately if any passenger is observed tampering with any restraining device or behaving dangerously, such as standing up.

6. Advise the operators against starting or operating the ride while any person (passenger, spectator or employee), is in an endangered or unsafe position on the ride or within the ride area.

7. Insist that both operators remain in full control of the operating controls during operation of the ride, and give full attention to the ride and its passengers.

8. Instruct the operators to allow no other person, other than another trained operator, to operate the controls of the ride, excepting portions of the ride that are designed to be controlled by the passenger.

9. Instruct the operators and attendants fully as to the proper method of assembly and disassembly of portable rides and supply adequate personnel and equipment to do it safely.

   Do not allow spectators in the area.

10. Instruct the operators to inspect and either report or correct damaged, lost or worn parts that are unsafe or that can develop into unsafe parts, during assembly or disassembly.

11. Advise the operators that factory-installed safety devices must not be tampered with or removed.

12. Advise the operators of owner/supervisor procedure for assisting ill or injured passengers.

13. Instruct operators and attendants that patrons are required to secure all articles, such as keys, change, eye glasses, etc., which may become loose while riding.

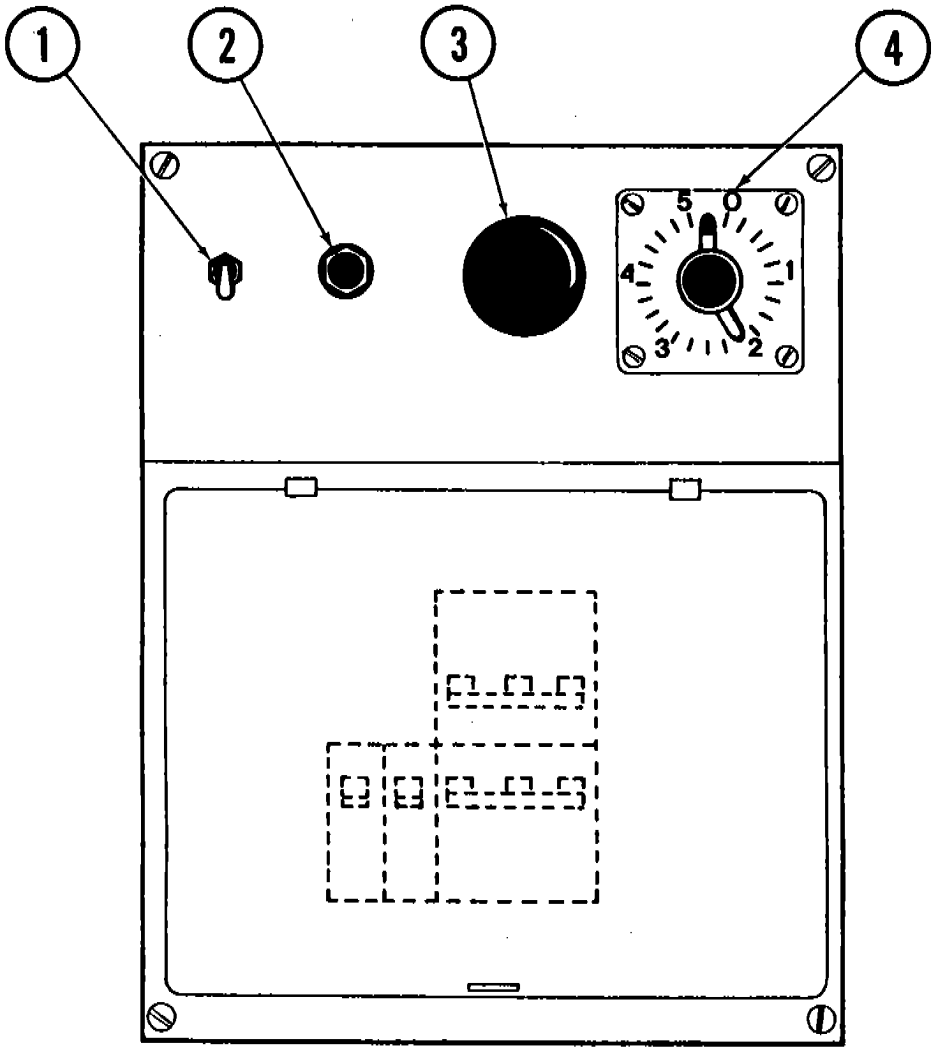
Ride Profile

The Chance 50 foot CARROUSEL rotates counterclockwise, as viewed from the top. The ride accelerates smoothly from a stop to the specified speed in approximately one full revolution, depending upon the number of passengers. Similarly, it brakes smoothly from full speed to a stop in approximately one revolution. Ride duration is controlled by a timer.

The 60 jumping horses are suspended from crankshafts, which are driven as they rotate past a stationary bevel gear.

Operator's Controls

Fixed Control Panel On Hydraulic Pallet



1. PUMP SWITCH - This switch controls the hydraulic pump. The switch must be off whenever the operator leaves the ride.

IMPORTANT: Never stop the ride by shutting off the pump.

NOTE: Shutting off the pump between ride cycles is not recommended.

2. START BUTTON - Push this button to start the ride cycle. Once the button is pushed, the timer automatically controls the length of the ride and braking at the end of the cycle.

When the timer has not been set, the start button can be used to jog the ride to any desired position. Hold the button down to jog the ride; release the button to brake to a stop.

3. STOP BUTTON - This button interrupts the timed ride cycle. The ride will brake to a stop.

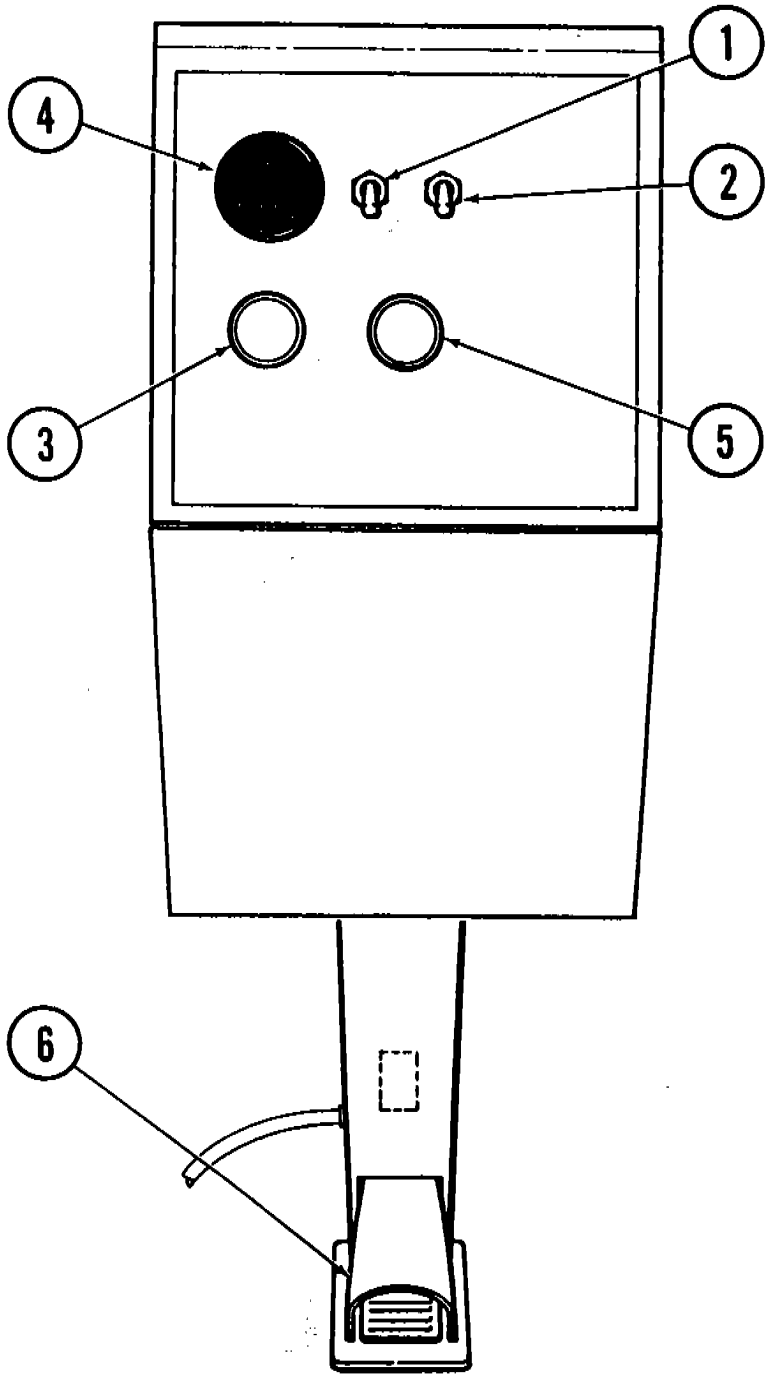
NOTE: The control panel cover will push the stop button to stop the ride if closed.

4. TIMER - Rotate the pointer to the desired length of ride cycle. When the start button is pushed, the timer will control the length of the ride and braking at the end of the cycle. Reset the timer pointer before each ride cycle.

NOTE: The timer has a stop which can be preset at any desired position. The pointer cannot be turned past the stop.

5. LIGHTS SWITCH (NOT SHOWN) - This is a circuit breaker under the hinged cover below the operating controls.

REMOTE OPERATOR'S
CONTROL CONSOLE
(If Equipped)



1. PUMP SWITCH - This switch controls the hydraulic pump. The switch must be off whenever the operator leaves the ride.

IMPORTANT: Never stop the ride by shutting off the pump.

NOTE: Shutting off the pump between ride cycles is not recommended.

2. LIGHT SWITCH - This switch controls all the decorative lighting on the ride.

3. START BUTTON - Push this button to start the ride cycle. Once the button is pushed, the timer automatically controls the length of the ride and braking at the end of the cycle.

NOTE: The timer, located in the main electrical box, automatically resets at the end of the ride cycle. Set the timer stop to the desired length of ride. If the ride is equipped with a foot switch, it must be depressed to operate the start button.

4. STOP BUTTON - This button interrupts the timed ride cycle. The ride will brake to a stop.

5. JOG BUTTON (IF EQUIPPED) - The jog feature allows the operator to rotate the ride to any position. The jog button operates only when the foot switch is depressed.

6. FOOT SWITCH (IF EQUIPPED) - This switch must be depressed to operate the START or JOG buttons. If the foot switch is released, the timed ride cycle is interrupted and the ride will brake to a stop.

Loading

CAUTION: Do not allow any passenger on the ride who cannot be properly secured because of passenger size or condition.

Never allow a pregnant woman or a passenger who is visibly ill or under the influence of drugs or alcohol on the ride.

If the ride is being operated at less than its full passenger capacity, direct the passengers around the ride to balance the load. Never operate the ride with an imbalance of more than eight adults on any one side of the ride.

Operating The Ride

CAUTION: Before starting the ride, make sure there are no people around the ride structure, between the horses, close to any exposed electrical components, or any other area where there is a possibility of personal injury.

CAUTION: The operator must remain in full control of the operating controls at all times during operation of the ride. The ride and its passengers must be given the FULL attention of the operator.

Never leave the operating controls while the ride is in operation.

1. Turn on the main circuit breaker on the power unit.

2. Turn on the pump and lights.

3. Allow the passengers to load. Walk around the ride and make sure all passengers are seated.

4. When all passengers are safely loaded, press the foot switch (if equipped), and the "START" button to start the ride.

5. The ride cycle is timed and will stop automatically when the cycle is completed. Keep your foot on the foot switch (if equipped).

6. When the ride cycle is completed and the ride is stopped, allow the passengers to exit.

PREVENTIVE MAINTENANCE

Preventive Maintenance

Preventive maintenance is the easiest and most economical means of assuring many satisfactory, productive hours of operation. Properly scheduled maintenance is the key to lower operating costs and longer service life for your ride.

Intervals have been established for servicing the ride. These intervals are based on the number of days the ride has run.

The items listed in this section are separated into maximum intervals. These intervals are based on "average" operating conditions. Actual conditions under which your ride is operated are the determining factors when setting up a maintenance schedule. When operating under "severe" conditions, such as excessive heat, cold, dust, mud, water, or salt sea air, more frequent servicing is necessary.

Maintenance - First Week of Operation

The ride has been completely serviced and tested before leaving the factory. However, during the first week of operation and after each set-up, the ride operator must be especially observant and watch for loose bolts, leaks, etc.

In addition, to regular scheduled maintenance, check the following:

1. Check the torque of all functional load carrying capscrews after the first week of operation and after each set-up. This allows for initial seating of components. Check torque at monthly intervals thereafter except where a shorter interval is specified in this manual.

2. Check for leaks in the hydraulic system. During transport, the vibrations can cause leaks at hoses and fittings.

3. Check for lubricant leaks.

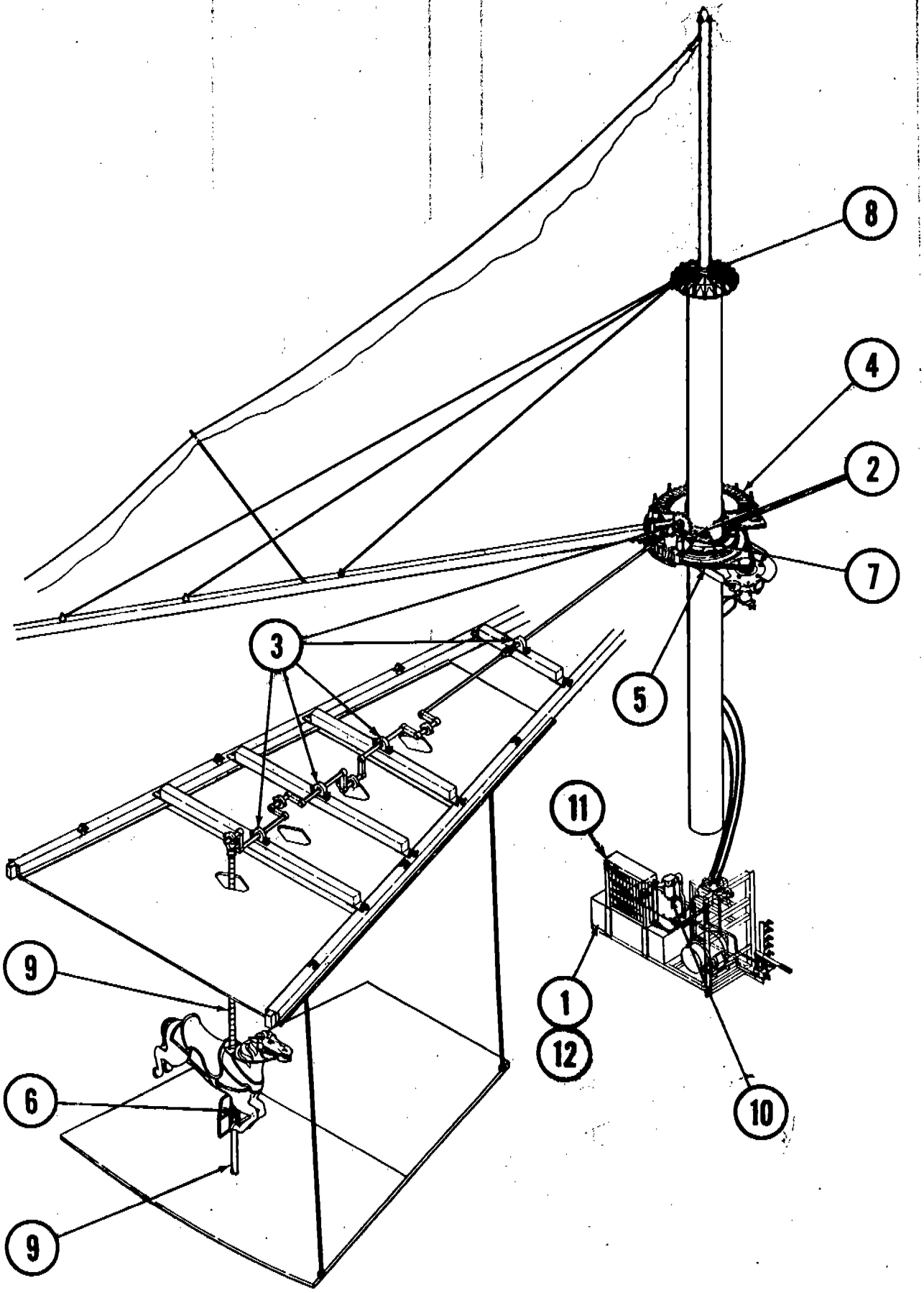
Lubricants Chart

Timely lubrication and the use of high quality oil and grease is necessary to obtain the maximum life of the ride and its components. Use only the oils and grease specified in the following chart.

IMPORTANT: In addition to the following items, certain components require special lubricants. Refer to the "Vendor Literature" section of this manual for lubricant specifications for specific components.

COMPONENT	SPECIFICATION
All Zerk Fittings and Bevel Gear	No. 2 Lithium Base Grease
Hydraulic Fluid	Non-detergent motor oil, API Service Classification MS, SAE 10W Examples: D.T.E. - 24 Mobil 10-10W Universal Hydraulic Fluid
Telescopes	Any high quality, multi-purpose machine oil - SAE 20W or SAE 30W. - or - A 50/50 mixture of SAE 30W machine oil and STP® Oil Treatment, to control excessive dripping of oil.
Drive Chain and Sprockets	Any high quality industrial drive chain lubricant made for extreme-pressure, low speed operation

Maintenance Schedule



Maintenance Schedule

NOTE: Open the manual valve at the hydraulic motor to allow hand rotation of the ride for lubrication.

IMPORTANT: In addition to the following items, certain components require scheduled maintenance. Refer to the "Vendor Literature" section of this manual for maintenance schedules for specific components.

REF. NO.	SERVICE POINT	SERVICE REQUIRED	SEE PAGE	FREQUENCY *
1	Hydraulic Oil Reservoir	Check level at sight glass	5-6	Daily
2	Sweep Hub Bearing Zerks (2 places)	Grease		Weekly or at every set-up, whichever occurs first
3	Crankshaft Bearing Zerks (5 per crankshaft-14 places 4 per crankshaft--2 places)	Grease		
4	Bevel Gear	Grease teeth evenly by hand		
5	Drive Chain	Lubricate & check tightness	4-12	
6	Telescopes (60 places)	Oil		
7	Tee Bearing Set Screws (16 places)	Check tightness		
8	Spider Thrust Bearing Zerk**	Grease		Monthly or at every set-up, whichever occurs first
9	Horse Pipes and Telescopes	Inspect horse hanger hooks and telescope locks	4-11	
10	Hydraulic Oil Filter	Replace with a new filter	5-6	
11	**Hydraulic Oil Cooler**	**Check for accumulation of dirt and debris between cooling fins and fan.**	5-7	
12	Hydraulic Oil Reservoir	Drain the reservoir, clean the strainer and refill with new oil	5-6	Once per season or every 6 months of operation, whichever occurs first

* Service intervals are based on ACTUAL OPERATING TIMES of 40 hours or less per week. A corresponding increase in service frequency is necessary if the ride is operated more than 40 hours per week.

** Lower the canvas and remove the tent pole to obtain access to the spider thrust bearing zerk on early models.

Safety

The following is a list of a few general selected rules which should be adhered to by everyone.

Remember that in the long run the key to a safe and successful operation is to have well-trained and well-supervised employees.

General Safety Guidelines

1. All work must be done by competent, qualified mechanics, capable of understanding the function of the parts and their proper installation.

2. Inspect the ride before each day of operation to determine that no portion of the ride is damaged, missing or worn in such a manner that it is unsafe, or that unsafe conditions can develop.

3. Perform the manufacturer's recommended maintenance procedures at the intervals and in the manner specified in this manual.

4. Study each job carefully to determine all hazards so that necessary safeguards can be taken.

5. Examine safety devices (tools, ladders, etc.) before they are used to make sure they are in good condition. Ladders must be clean and unpainted.

6. Use the proper tool or equipment for each job. Ground all hand electric power tools before use.

7. Wear close-fitting, comfortable clothing when working on or close to moving parts or live electrical circuits. Avoid finger rings, jewelry or other articles which can be caught in moving parts or come in contact with electrical circuits.

8. Protect your eyes by wearing approved safety glasses or goggles.

9. Wear a hard hat at all times. When working in elevated areas, use a safety belt.

10. Where work to be performed is hazardous, at least two men shall work together.

11. If guards must be removed from equipment, make sure they are replaced before leaving the job.

12. Clean up after each job, disposing of surplus materials.

13. Keep a record of parts replaced and the date of replacement. Inform the manufacturer of any replacement requirements that are frequent or cause unsafe conditions.

14. Make modifications and additions as outlined in manufacturer's service and safety bulletins.

Troubleshooting Procedures

Before calling the CHANCE CUSTOMER SERVICE DEPARTMENT for help, be prepared with the following information:

1. Have ride serial number and name available.

2. Have manual ready to use as reference.

3. If ride was formerly owned - by whom? (Chance records will often show changes made to a ride by its previous owner)

4. Have the same person make all calls. Be sure to get the name of the person to whom he is speaking at the factory. All calls should then be made to that person.

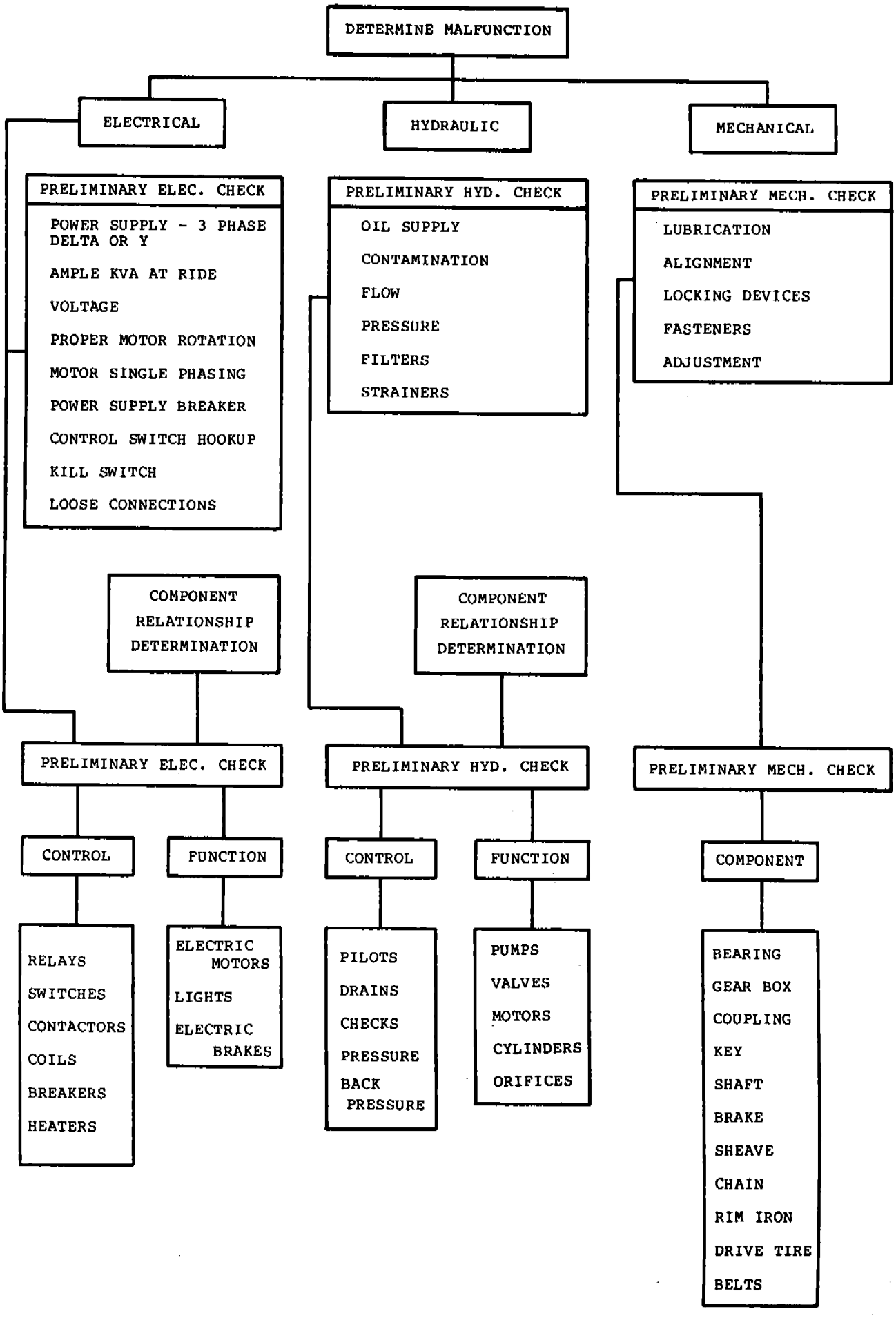
5. Have a telephone number ready at which you can be reached.

6. Have shipping instructions ready (how, when, and where to ship parts).

7. Have list of any alterations, modifications or kits that have been added to the ride.

8. The person calling the factory must be familiar with the problem and able to describe symptoms of the ride problem (such as: was the problem gradual; did it suddenly quit; are any sounds occurring that are not normal; does the problem occur continuously or is it intermittent; does the ride run one direction only; does the ride run but has no braking, etc.)

9. Many times the problem that completely stops a ride from working is one of many simple things that are forgotten or overlooked. Listed on the following chart are many of the items that may cause this, as well as all items that must be checked before any calls are made to the factory. Use this chart to try and determine the cause. It can save several expensive phone calls or a more expensive visit by a factory representative, as well as valuable time.


DETERMINE MALFUNCTION
ELECTRICAL
HYDRAULIC
MECHANICAL
PRELIMINARY ELEC. CHECK
POWER SUPPLY - 3 PHASE DELTA OR Y
AMPLE KVA AT RIDE
VOLTAGE
PROPER MOTOR ROTATION
MOTOR SINGLE PHASING
POWER SUPPLY BREAKER
CONTROL SWITCH HOOKUP
KILL SWITCH
LOOSE CONNECTIONS
PRELIMINARY HYD. CHECK
OIL SUPPLY
CONTAMINATION
FLOW
PRESSURE
FILTERS
STRAINERS
PRELIMINARY MECH. CHECK
LUBRICATION
ALIGNMENT
LOCKING DEVICES
FASTENERS
ADJUSTMENT
COMPONENT RELATIONSHIP DETERMINATION
COMPONENT RELATIONSHIP DETERMINATION
PRELIMINARY ELEC. CHECK
PRELIMINARY HYD. CHECK
PRELIMINARY MECH. CHECK
CONTROL
FUNCTION
CONTROL
FUNCTION
COMPONENT
RELAYS
SWITCHES
CONTACTORS
COILS
BREAKERS
HEATERS
ELECTRIC MOTORS
LIGHTS
ELECTRIC BRAKES
PILOTS
DRAINS
CHECKS
PRESSURE
BACK PRESSURE
PUMPS
VALVES
MOTORS
CYLINDERS
ORIFICES
BEARING
GEAR BOX
COUPLING
KEY
SHAFT
BRAKE
SHEAVE
CHAIN
RIM IRON
DRIVE TIRE
BELTS

Special Torquing Instructions

Capscrews used by CHANCE RIDES, INC. are classified as functional load carrying capscrews if:

-They are used as tension members in the erection or operation of a ride

and/or

-They are required to resist shear through friction-type connections in the erection or operation of a ride

Capscrews are selected with consideration to grade, size and quantity, using joint capacities based on tightness torques of 60% of rated yield and group joint efficiency of 62.5%.

Capscrew Grades

CHANCE RIDES, INC. uses only Grade 5 or better capscrews and Grade 8 locknuts, with A325 hardened washers for functional loads. The Grade Markings Chart shows the capscrew markings to be found on Chance rides. The manufacturers identification symbols must be present on all functional load carrying capscrews.

CHANCE RIDES, INC. recommends the use of cold-formed hex head capscrews with rolled threads. Hex bolts and hot-formed hex head capscrews are not recommended because they may have machined threads, and can have die seams along the shank.

NEVER REPLACE CAPSCREWS OR LOCKNUTS WITH PARTS OF A LESSER GRADE, OR OF DIFFERENT LENGTHS THAN THOSE SHOWN IN THE PARTS CATALOG SECTION OF THIS MANUAL.

Torque Requirements

Unless otherwise specified in this manual, all capscrews must be tightened to the torque values listed in the Torque Chart. These values were selected to produce a tightening torque range of 60% to 70% of proof load, when tightened with a hardened washer under the locknut or capscrew head (whichever is accessible for tightening). When the capscrew is tightened from the head end, apply anti-seize lubricant to the shank of the capscrew. When the threads are lubricated, use 10% less torque to tighten the capscrew.

DO NOT TIGHTEN CAPSCREWS OVER THE RECOMMENDED TORQUE. This can damage the capscrew, due to variances in coefficients of friction and torque wrench accuracy.

Always use a torque wrench. It is impossible to accurately measure the tightness of a capscrew by other methods. Torque wrenches must be checked for accuracy twice each operating season.

Replacement of Capscrews and Locknuts

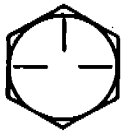
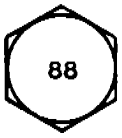
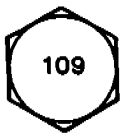
When permanently installed capscrews and locknuts are disassembled for repair or adjustment, they must be replaced if they have been in service over five (5) years. Corrosion or other damage can require over-torquing for removal, and therefore make replacement necessary. If a torque wrench is not used to measure excessive removal torques, the capscrews and locknuts must be replaced.

Capscrews and locknuts which are frequently removed for portability must be replaced each operating season. If the capscrews and locknuts become damaged, corroded or require excessive torque for removal, they must be replaced. If a torque wrench is not used to measure excessive removal torques, the capscrews and locknuts must be replaced.

IMPORTANT: For your convenience, the "Parts Catalog" section of this manual lists torque values for specific capscrews in special care areas, as well as their classification of either permanently installed or frequently removed.

GRADE MARKINGS
For Functional Load Carrying Capscrews

Manufacturer's identification symbols must be present on all capscrews.

CORRECT MARKINGS	UNACCEPTABLE MARKINGS
SAE J429 GRADE 5 MEDIUM CARBON 81,000 YIELD 	 GRADE 5.1 LOW CARBON  GRADE 5.2 LOW CARBON MARTENSITIC
ASTM A325 TYPE 1 MEDIUM CARBON LONGER SHANK & SHORTER THREAD LENGTH THAN GRADE 5 81,000 YIELD  ASTM A 325 TYPE 3 CORROSION RESISTING LONGER SHANK & SHORTER THREAD LENGTH THAN GRADE 5 81,000 YIELD 	 ASTM A325 TYPE 2 LOW CARBON MARTENSITIC
SAE J429 GRADE 8 MEDIUM CARBON 130,000 YIELD 	 ISO R898 CLASS 8.8 MEDIUM CARBON 92,000 YIELD 
ASTM A490 ALLOY STEEL LONGER SHANK & SHORTER THREAD LENGTH THAN GRADE 8 130,000 YIELD 	 ISO R 898 CLASS 10.9 ALLOY STEEL 130,000 YIELD 

Torque Chart

TORQUES FOR FUNCTIONAL LOAD CARRYING COLD FINISHED HEX HEAD CAPSCREWS WITH DRY ROLLED THREADS, USED WITH LOCKNUTS (SEE NOTE 3), AND TIGHTENED WITH AN ASTM A325 HARDENED WASHER UNDER THE CAPSCREW OR LOCKNUT HEAD (WHICHEVER IS ACCESSIBLE FOR TIGHTENING).

THIS TORQUE RANGE WILL DEVELOP 60% TO 70% OF PROOF LOAD.

REFER TO "REPLACEMENT OF CAPSCREWS AND LOCKNUTS" FOR CONDITIONS REQUIRING REPLACEMENT.

SIZE	FOOT POUND TORQUE RANGE (SEE NOTES 1 AND 2) WITH LOCKNUT AND HARDENED WASHER	
DIAMETER - THREADS/ INCH	SAE J429 GRADE 5 ASTM A325	SAE J429 GRADE 5 ASTM A325
1/4 - 20	5-6	7-8
1/4 - 28	6-7	8-10
5/16 - 18	11-13	15-18
5/16 - 24	12-15	17-21
3/8 - 16	19-24	27-33
3/8 - 24	22-27	31-38
7/16 - 14	30-35	45-55
7/16 - 20	35-40	50-60
1/2 - 13	50-60	65-80
1/2 - 20	55-65	75-90
5/8 - 11	95-115	130-160
5/8 - 18	105-130	150-180
3/4 - 10	165-200	235-285
3/4 - 16	185-225	260-320
7/8 - 9	270-325	380-460
7/8 - 14	295-360	415-505
1 - 8	400-490	565-690
1 - 12	440-535	620-755
1-1/8 - 7	495-600	800-975
1-1/8 - 12	555-675	900-1095
1-1/4 - 7	700-850	1135-1380
1-1/4 - 12	775-940	1255-1525
1-1/2 - 6	1215-1480	1975-2395
1-1/2 - 12	1370-1660	2220-2700

NOTES:

1. USE ANTI-SEIZE LUBRICANT ON CAPSCREW SHANK WHEN TIGHTENED FROM HEAD END.
2. USE 10% LESS TORQUE WHEN ANTI-SEIZE OR OTHER LUBRICANT IS USED ON THREADS.
3. USE SAME TORQUE RANGE FOR HOLES TAPPED IN STEEL.

Horse Pipes and Telescopes

All horse pipes have a 1/8-inch x 45 degree chamfer on the bottom as shown. Telescope pipes have a 3/16-inch x 30 degree chamfer on the top as shown.

These chamfers prevent the two pipes from cutting into one another and binding.

Never use replacement pipes which do not have chamfers in both these areas.

The lower casting on the telescope and the upper casting on the floor lock must be inspected once a month or at every set-up, whichever occurs first.

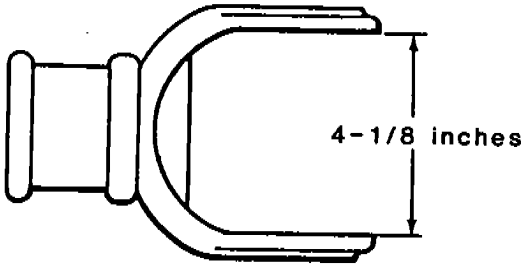
Check the locking tabs on each piece for excessive wear or damage, which can cause the telescope to disengage from the floor lock.

Good parts require some effort to engage or disengage the lock. Parts which allow easy locking or unlocking are worn and must be replaced.

Horse Hanger Hook Inspection

Perform the following inspection on ALL horse hanger hooks and bearings once a month or at each set-up, whichever occurs first.

1. Measure the distance between the hooks as shown below. The dimension must be 4-1/8 inches.



IMPORTANT: DO NOT HEAT THE HORSE HANGER HOOK TO STRAIGHTEN IT. THIS WILL WEAKEN THE CASTING.

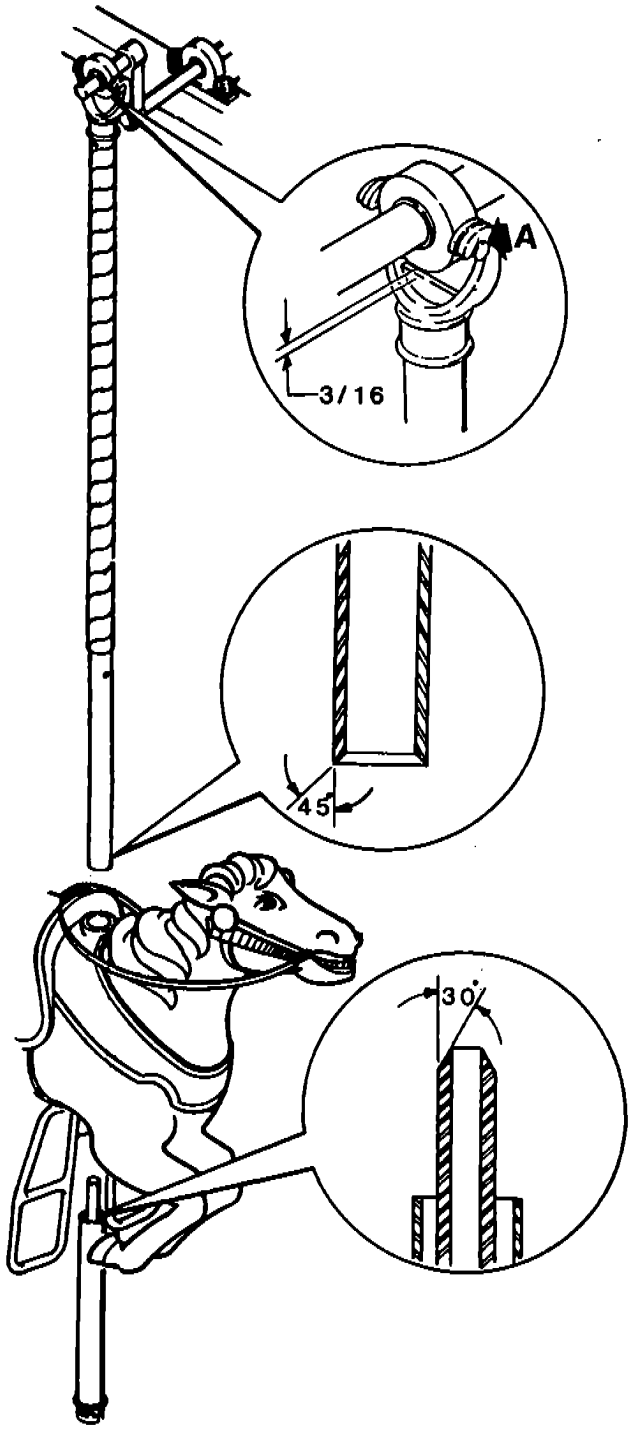
2. Check for wear on top of the horse hanger bearing ears and the underside of the horse hanger hook ("A"). Wear at this point increases the clearance between the safety stops. Clearance must not exceed 3/16".

Use a piece of 3/16 inch bar to check the clearance between the safety stops on every horse pipe.

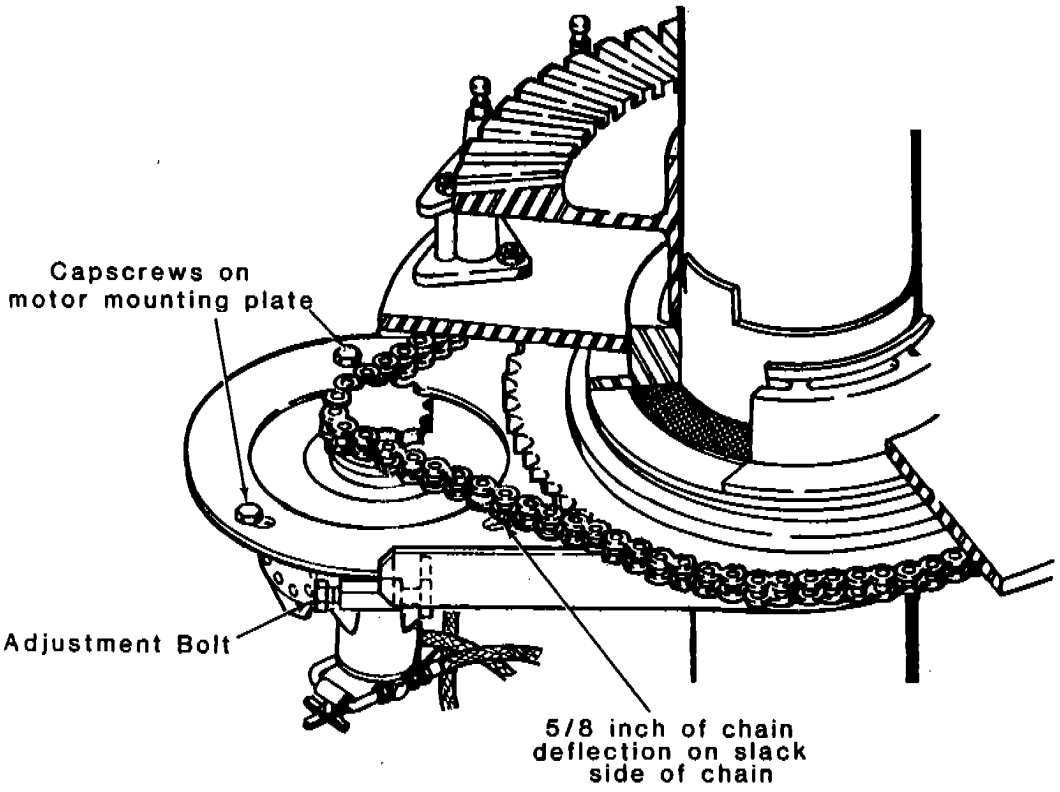
NOTE: The horse pipe must be vertical when measuring clearance.

If the bar passes easily through the gap, the hanger bearings must be replaced. Inspect horse hanger hook and replace it if excessive wear is evident.

3. Check the tightness of the horse hanger hook on the horse pipe. If it is loose it will allow movement which will wear out the rivets attaching it to the hook.



Drive Chain Adjustment



The drive chain must be kept in adjustment to obtain maximum service life.

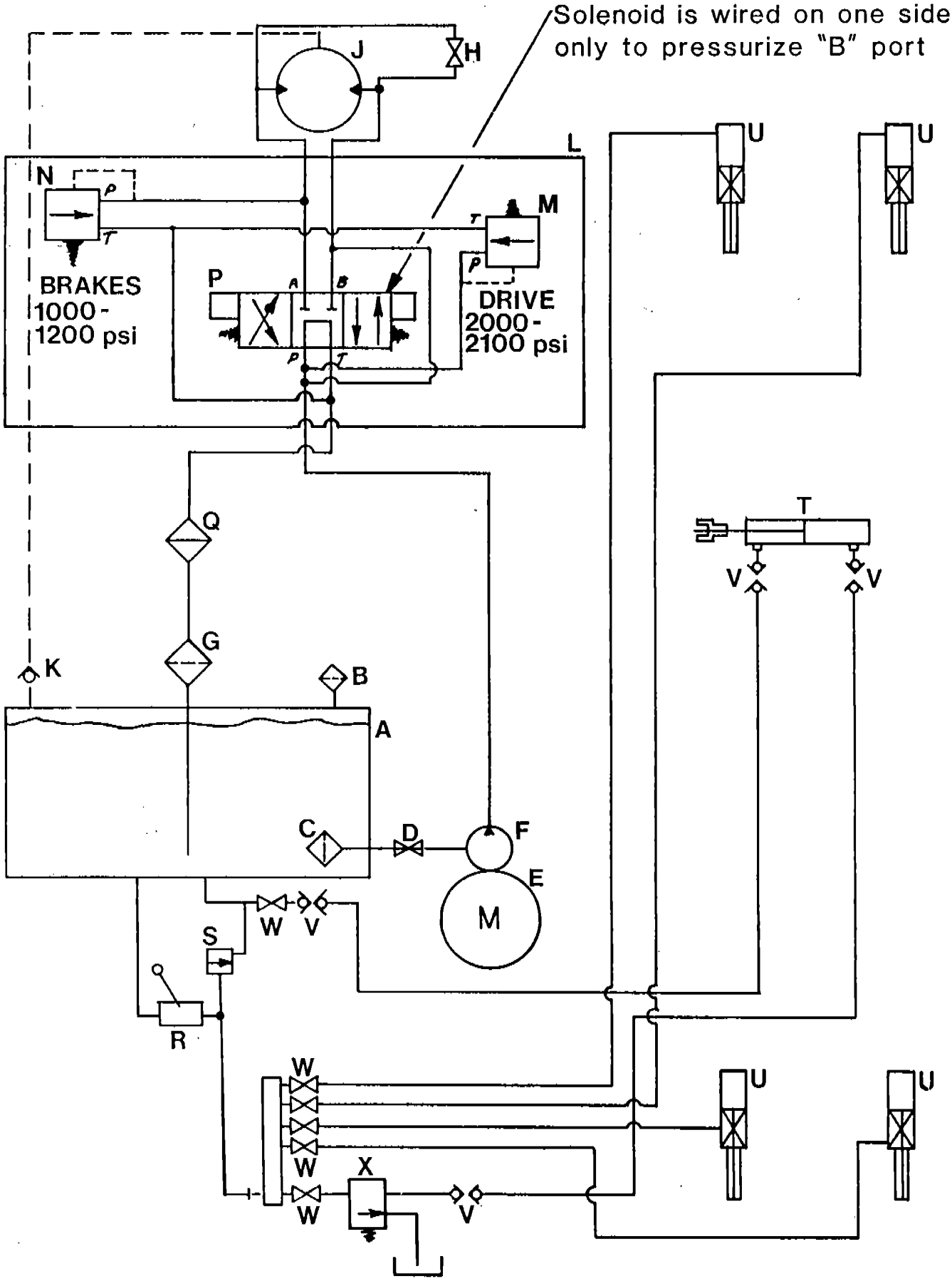
1. Loosen the three capscrews on the motor mounting plate.

2. Tighten the adjustment bolt to obtain 5/8 inch of chain deflection on the slack side of the chain.

3. Check the vertical alignment of the large sprocket and the motor sprocket. Adjust as required.

4. Tighten the mounting capscrews.

HYDRAULIC SYSTEM

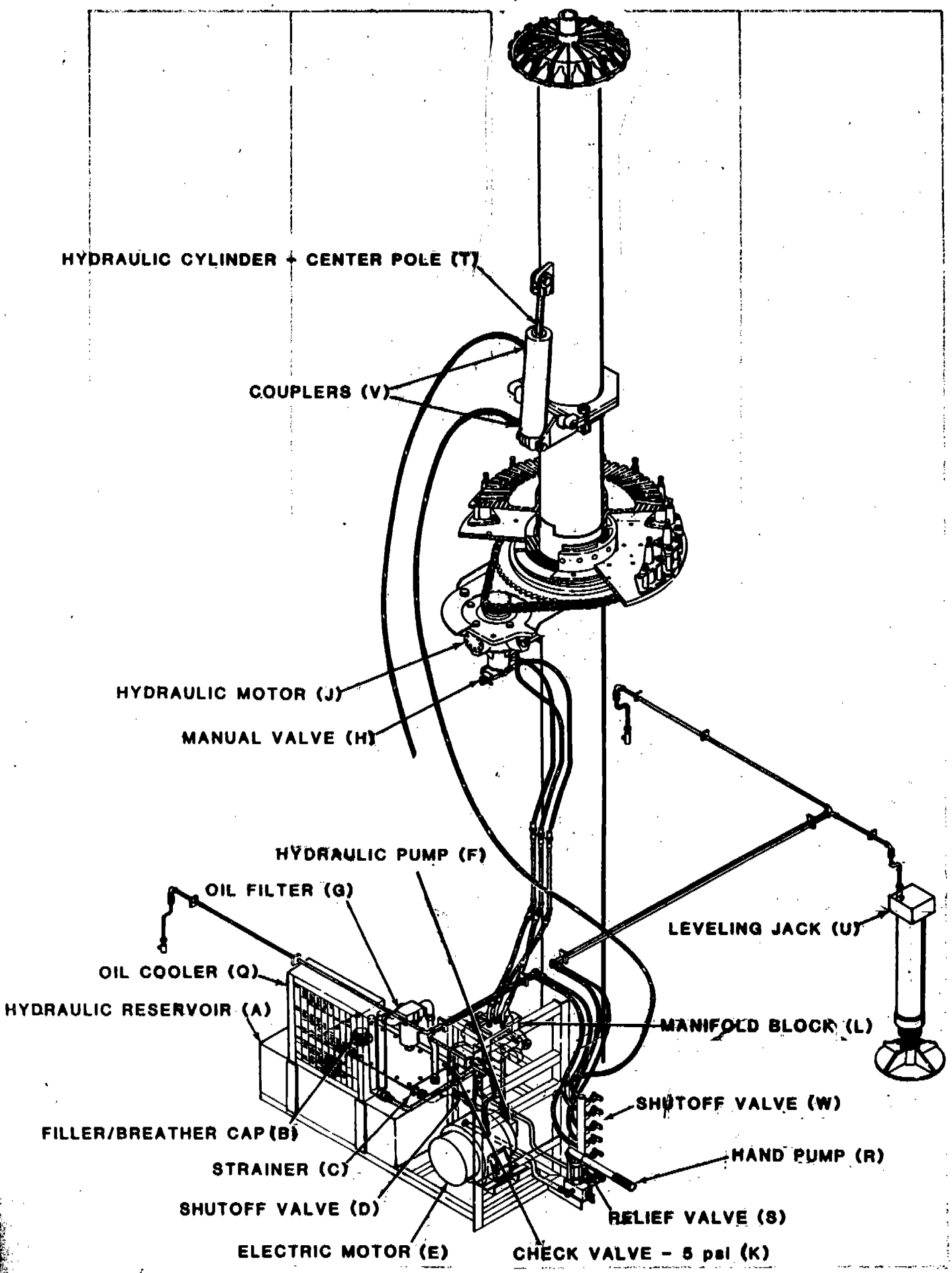

Solenoid is wired on one side only to pressurize "B" port
J
H
L
N
M
BRAKES
1000 -
1200 psi
P
A
B
DRIVE
2000 -
2100 psi
U
U
T
V
V
Q
G
K
B
A
C
D
F
E
M
W
V
S
R
W
W
X
W
V
U
U

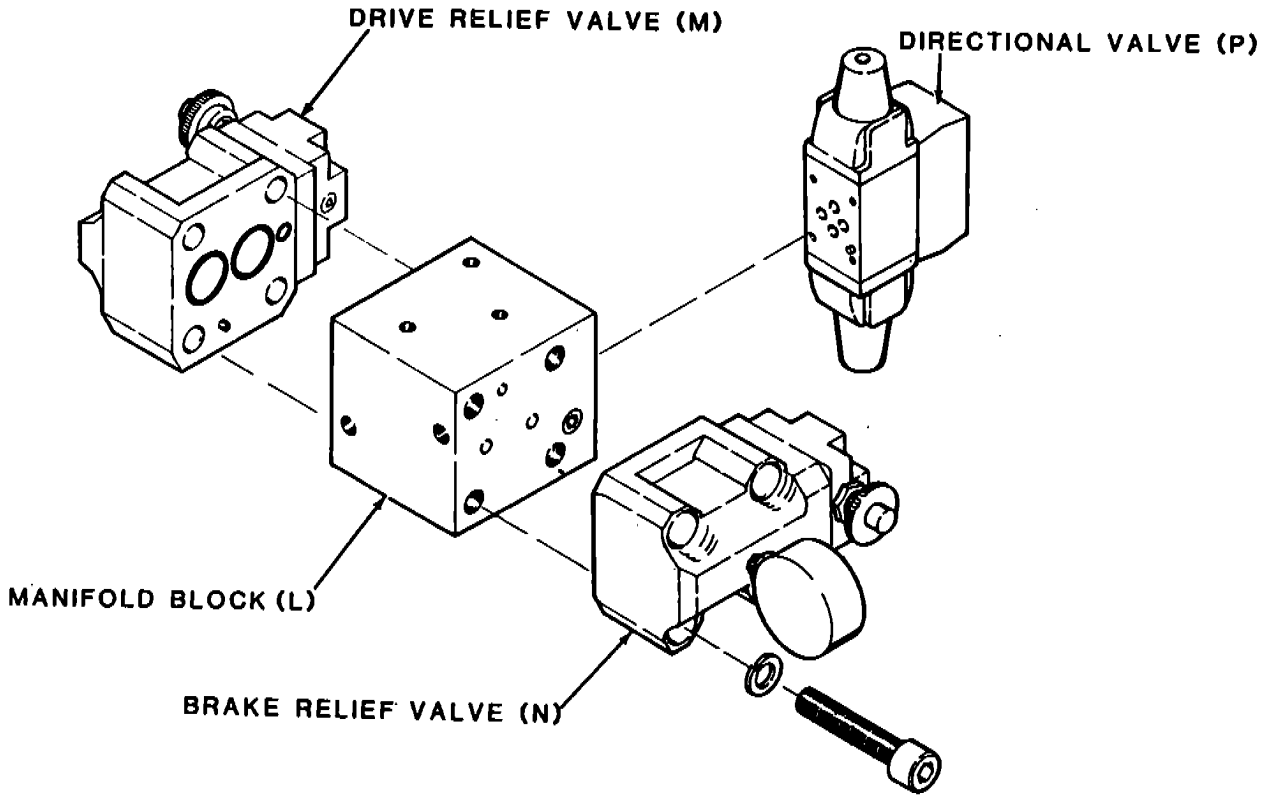
SYMBOL	DESCRIPTION	VENDOR	QTY.	CHANCE PART NO.
A	HYDRAULIC RESERVOIR	CHANCE 389-625-001	1	
B	FILLER BREATHER CAP	VICKERS SP113-C	1	290-26595
C	STRAINER	VICKERS OF3-10-10	1	290-74380
D	SHUTOFF VALVE	MARK 1"	1	290-84631
E	ELECTRIC MOTOR - 7-1/2 HP	REULAND	1	272-44618
F	HYDRAULIC PUMP - 10 GPM	VICKERS V10-1P2P-1C10	1	233-56119
G	OIL FILTER	VICKERS OFRS25P10	1	203-26681
	°°FILTER ELEMENT (Spin-On)	VICKERS	1	290-24660
H	MANUAL VALVE	MANATROL MV400-S	1	290-84411
I	CHECK VALVE	VICKERS #DT8P10665 - 65#	2	290-84403
J	HYDRAULIC MOTOR	STAFFA B-30	1	229-44921
	°°SEAL KIT	STAFFA	1	
	°°SHAFT SEAL ONLY	STAFFA		
K	CHECK VALVE - 5 PSI	BRUNING DC-500	1	237-84480
L	MANIFOLD BLOCK	CHANCE 390-640-002	1	
M	DRIVE RELIEF VALVE	PARKER-HANNIFIN MRFN-16M-OA-HO-9AC	1	290-84432
N	BRAKE RELIEF VALVE	PARKER-HANNIFIN MRFN-16M-OA-HO-9AC		
P	DIRECTIONAL VALVE	VICKERS DG4U-3-8C-W-DN-10	1	290-84688
	°°REPLACEMENT COIL 115V/60 HZ 115V/50 HZ (SPIN-ON RETAINER)*	VICKERS 633741	2	290-17435
Q	OIL COOLER	AMERICAN STANDARD 15L	1	273-17805

THE FOLLOWING ITEMS ARE USED ONLY ON TRAILER MOUNTED (PORTABLE) MODEL CARROUSELS:

R	HAND PUMP	T-K PINE 1000-8	1	290-56073
S	RELIEF VALVE	PARKER-HANNIFIN RCP-400S-1	1	274-84683
T	HYDRAULIC CYLINDER-CENTER POLE	T-J #LSM3	1	217-21583
U	LEVELING JACK	CHANCE CSN-50A-002	4	
V	COUPLER-MALE	PARKER-HANNIFIN H2-63	4	272-46910
V	COUPLER-FEMALE	PARKER-HANNIFIN H2-62	4	272-20198
W	SHUTOFF VALVE	MANATROL MV460-S	6	290-84410
X	RELIEF VALVE	PARKER-HANNEFIN RCP 400S-1	1	274-84683

*FOR BOLT-ON STYLE COIL, ORDER 290-17525


HYDRAULIC CYLINDER + CENTER POLE (T)
COUPLERS (V)
HYDRAULIC MOTOR (J)
MANUAL VALVE (H)
HYDRAULIC PUMP (F)
OIL FILTER (G)
LEVELING JACK (U)
OIL COOLER (Q)
HYDRAULIC RESERVOIR (A)
MANIFOLD BLOCK (L)
SHUTOFF VALVE (W)
FILLER/BREATHER CAP (B)
HAND PUMP (R)
STRAINER (C)
SHUTOFF VALVE (D)
RELIEF VALVE (S)
ELECTRIC MOTOR (E)
CHECK VALVE - 5 psi (K)



Detail of Manifold Block

HYDRAULIC SYSTEM

The hydraulic system is an open-type circuit. The system does not have to be bled, since any air in the system will simply be pumped out. The system requires very little maintenance and is relatively trouble free. All of the plumbing, where possible, is of steel tubing. This eliminates hoses which are potential trouble spots.

The principle components of the system are a reservoir, pump, directional valve, relief valves, and the hydraulic motor. Each of these components is explained in the following paragraphs.

The letter beside each component name corresponds to the letter of that component on the hydraulic schematic.

REPLACEMENT PARTS

For replacement parts, refer to the parts list with each schematic. These parts can be ordered from Chance Manufacturing, or you can usually obtain them through a local representative for the product.

REPAIR OF COMPONENTS - GENERAL

NOTE: Before attempting to remove any component from system for repair, refer to the "Vendor Literature" section of this manual for information pertaining to that particular component.

When removing any component from hydraulic system, plug all ports lines, etc. that are left exposed, so that dirt and contamination cannot enter.

Hydraulic Reservoir (A)

The hydraulic reservoir has a capacity of 26 gallons and working oil capacity of 21 gallons. The fluid level should be maintained at 21 gallons, or 4/5 full. Check the fluid level daily by the sight gauge located on the reservoir. The fluid level must be within the limits of the sight gauge. For frequency of maintenance on reservoir, see the "Maintenance Schedule" in this manual.

Air Breather and Fill Cap (B)

This cap must be kept tight at all times to prevent foreign matter from entering reservoir. Clean the breather at the same time the hydraulic filter is changed.

Hydraulic Oil Strainer (C)

The strainer, located in the bottom of the reservoir, strains the oil going to the hydraulic pump. This strainer must be removed when the hydraulic oil is changed and washed out with solvent. At this time the tank should also be thoroughly flushed if deposits of dirt, etc. are present in the bottom of the tank.

Shutoff Valve (D)

This valve shuts off the oil supply going from the tank. Be sure this valve is open or system will not function and damage to the pump can result.

Hydraulic Pump Motor (E)

Pump motor is a 7-1/2 HP, 3 phase, 1800 RPM electric motor. The motor end shaft couples directly to the hydraulic pump.

Hydraulic Pump (F)

This pump is a rotary vane type. If pump becomes excessively noisy or hot during operation, first check fluid level in reservoir. If fluid level is correct, consult the troubleshooting chart in this section.

Filter (G)

The hydraulic filter is one of the most important components in the system. All of the oil in the system passes through the filter element, and is cleansed of foreign particles. The removal of these particles from the system greatly prolongs the life of the other components in the system. The filter element must be replaced at least semi-annually, or if system becomes contaminated between changes. See "Maintenance Schedule".

Manual Valve (H)

This valve releases pressure in hydraulic motor to enable ride to be rotated by hand.

NOTE: This valve must be closed during normal operation.

Hydraulic Motor (J)

The ride is powered by a five piston Staffa B-30 hydraulic motor.

Check Valve (K)

This five pound check valve is located in the drain line from the hydraulic motor to the reservoir. The valve maintains enough pressure in the motor to assure that the bearings and seals are always supplied with adequate oil.

Manifold Block (L)

This is a machined and ported block which eliminates a major portion of the plumbing normally required for a hydraulic system of this type. Refer to detail of manifold block assembly.

Drive Relief Valve (M)

This relief valve controls ride acceleration by controlling hydraulic oil pressure from the pump to the motor. The relief in the valve is pilot-operated and must be adjusted to 2000 to 2100 psi.

IMPORTANT: Do not adjust relief valve pressure above the specified pressure to increase the speed of the ride. It will not affect the speed of the ride at all, but can cause abrupt ride movement.

Drive Pressure Adjustment

Start the ride while observing the pressure gauge. The maximum gauge reading occurs while the ride is accelerating. If gauge does not register the correct pressure, loosen the jam nut behind the control handle. Turn the handle until the correct pressure is obtained during acceleration. Tighten the jam nut down against valve body.

NOTE: The gauge will register the highest reading when the ride is first started. After the ride has reached operation speed (5 rpm) the gauge pressure will drop.

Brake Relief Valve (N)

This valve controls the braking of the ride. This valve must be properly adjusted to give a fairly quick stop, and must be adjusted to 1000 to 1200 psi. ALWAYS MAINTAIN THIS PRESSURE SETTING.

Brake Pressure Adjustment

To check the braking pressure, run the ride at normal speed, then stop the ride. Observe the pressure gauge when the braking cycle first starts. If the pressure is not correct, loosen jam nut behind the control knob. Adjust the control knob until the correct pressure is obtained and then tighten jam nut down against valve body.

Directional Control Valve (P)

The directional control valve for the drive and brakes is a four-way, spring-centered, solenoid controlled valve. The spools have three positions, the center position being open to ports "P" and "T", and closed to "A" and "B".

NOTE: On this ride, the solenoid is wired on only one side, to pressurize the "B" port. The other solenoid can be used as a spare part, if required.

The directional valve (P) controls the rotation of the ride by shifting the spool, which directs oil to the motor.

A solenoid is used to shift the spool. When the solenoid is energized, the spool shifts, directing oil to the "B" port of the valve. When de-energized the spool shifts back to the center position. The ports are blocked, forcing return oil over the brake relief valve, stopping the ride.

Since the solenoid in the valve controls the action of the valve, check it first if the ride will not run.

Checking Solenoid

If it is suspected that the solenoid is not functioning, there is a simple test to verify the problem. There is a hole in the end of the solenoid cap. Insert the end of a small rod (approximately 1/8") into the hole and shift the spool manually. If the valve shifts, the ride will function normally. In this case, remove the end cap and visually inspect the solenoid. If the spool is free, check the electrical circuit, using a volt meter or test light (230 volts). If the valve will not shift, remove the solenoid and free the spool. If the electrical circuit is bad, consult the "Electrical" section of this manual.

Replacement of Solenoid

Remove the retainer and determine how the solenoid is wired. Remove the solenoid and replace it with a new solenoid. Reassemble in reverse order.

NOTE: The above procedure can be performed without removing the valve from system.

If spool still does not shift, it is probably stuck. Refer to the "Vendor Literature" section of this manual.

Oil Cooler (Q)

Lubricate the electric motor on the oil cooler according to instructions furnished with motor.

Keep the oil cooler clean. Dirt on the cooling fins reduces air flow and cooling efficiency. Dirt on the fan blades reduces air output and can cause imbalance and overload the motor. Dirt on the electric motor reduces motor ventilation and cooling, causing overheating and possible damage to the motor.

At least once each year, remove dust and greasy deposits from the cooling fins, electric motor, fan blades and fan shroud. Use a stiff brush or air nozzle for loose dirt. Use a non-flammable solvent and brush for solid deposits. Do not bend or damage the cooling fins. Be careful not to damage fan blades. An out-of-balance condition can result, causing vibration, damage to motor bearings, and other motor damage.

Internal Cleaning

Once a year, disconnect the plumbing and use a degreasing agent or flushing oil, circulated through the unit to remove sludge from turbulators and internal tube surfaces to return the unit to efficiency.

NOTE: See following pages for trouble-shooting information for this system.

NOTE: The following items are used only on some trailer-mounted (portable) model CARROUSELS.

Hand Pump (R)

Use the handle to tighten the valve (clockwise), then operate the pump to extend the leveling jacks (U) on center pole hydraulic cylinder (T). Refer to "Set-Up Procedure" in this manual for operation of the shutoff valves (W).

Loosen the valve (counterclockwise) gradually to relieve pressure in each jack.

Relief Valve (S)

This relief valve controls the hydraulic pressure from the hand pump to the leveling jacks and the center pole lift cylinder.

If the center pole will not raise using the hand pump, adjust the relief valve as follows:

-Loosen the lock nut under the handle.

-Turn the handle one turn clockwise and try the hand pump again.

-If the cylinder still does not raise the center pole, turn the relief valve handle another turn, and try the hand pump again.

-When the valve is adjusted, tighten the lock nut.

NOTE: If adjustment of the relief valve does not correct the problem, check for worn cylinder seals, or a mechanical problem in the center pole pivot.

Hydraulic System Troubleshooting Chart

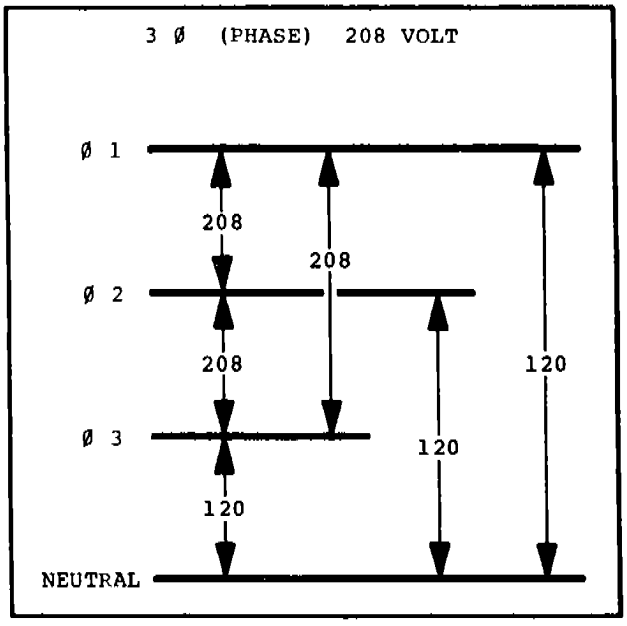
TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
COMPLETE LOSS OF ELECTRICAL POWER	1. TRIPPED MAIN BREAKER 2. POOR CONNECTIONS AT POWER SUPPLY TIE IN	1. RESET OR REPLACE BREAKER 2. CHECK AND TIGHTEN CONNECTION
ISOLATED LOSS OF ELECTRICAL POWER	1. TRIPPED CIRCUIT BREAKERS IN MAIN ELECTRICAL BOX 2. MALFUNCTIONING CONTACTOR	1. RESET OR REPLACE BREAKER 2. REPLACE CONTACT POINTS OR COIL
COMPLETE LOSS OF HYDRAULIC POWER	1. PUMP NOT FUNCTIONING 2. PUMP ROTATING IN WRONG DIRECTION	1. CHECK MOTOR AND PUMP 2. REVERSE TWO OF THE 115 VOLT LINES AT POWER SUPPLY TIE IN
PUMP CAVITATION OR PUMPS EXCESSIVELY NOISY	1. DIRTY STRAINERS IN TANK 2. AIR LEAKS BETWEEN RESERVOIR AND PUMP 3. LOW ON HYDRAULIC FLUID	1. REMOVE AND CLEAN 2. RESEAL OR REPLACE LINES 3. REPLENISH FLUID
RIDE DOES NOT RUN	1. BAD COILS IN DRIVE DIRECTIONAL VALVE 2. STUCK SPOOL IN DRIVE DIRECTIONAL VALVE 3. DEFECTIVE HYDRAULIC MOTOR 4. DAMAGED SPROCKET OR CHAIN FROM LACK OF LUBRICATION 5. MALFUNCTIONING DRIVE RELIEF VALVE 6. MALFUNCTIONING PUMP	1. REPLACE COILS 2. LOOSEN END CAP AND MOVE SPOOL TO DISLODGE 3. SEE STAFFA INFORMATION IN "VENDOR LITERATURE" 4. REPLACE PARTS AND SEE LUBRICATION SPECIFICATIONS 5. CORRECT PRESSURE SETTING OR DISASSEMBLE AND REPAIR AS NECESSARY 6. SEE VICKERS INFORMATION IN "VENDOR LITERATURE"
RIDE DOES NOT STOP FAST ENOUGH	1. WRONG PRESSURE SETTING ON BRAKE RELIEF VALVE 2. MALFUNCTIONING RELIEF VALVE	1. ADJUST PRESSURE SETTING 2. DISASSEMBLE AND REPAIR
RIDE DOES NOT RUN FAST ENOUGH AND RELIEF VALVE PRESSURE IS SET CORRECTLY	1. BLOWN SEALS ON HYDRAULIC MOTOR CAUSED BY CLOGGED RETURN LINE FILTER, BY-PASS NOT OPENING 2. MAIN HUB BEARING BINDING FROM LACK OF LUBRICATION	1. SEE STAFFA INFORMATION IN "VENDOR LITERATURE" 2. LUBRICATE UNTIL BEARING TURNS FREELY
DAMAGED HYDRAULIC MOTOR	1. 5 PSI CHECK VALVE IN MOTOR DRAIN LINE NOT HOLDING OR STUCK OPEN	1. DISASSEMBLE AND CLEAN OR REPLACE

ELECTRICAL

Electrical Troubleshooting

Complete Power Failure

Check the master circuit breaker and reset. If trouble is not there, check the connection at the main power supply. Also, check to see if power is coming to your main power supply tie-in. If there is power at supply source, but not at master breaker, check the power cable.



3-PHASE WYE

Check electrical cable by reading voltage at both ends of the power cable.

IMPORTANT: Avoid the use of excessively long power cables. They will result in low voltage, which causes electrical components to operate improperly.

Electric Motor Failure

Refer to motor manufacturer's troubleshooting and maintenance instructions.

DO NOT ATTEMPT REPAIRS YOU DO NOT UNDERSTAND. CALL THE FACTORY FOR ASSISTANCE.

Lighting Failure

SINGLE BULBS (INCANDESCENT)

Replace burned out bulbs daily. If a new bulb is installed and does not light, remove the bulb and, <u>with power turned off</u>, inspect inside of socket. Sockets can become corroded which causes an incomplete circuit, or the tang in the socket can be bent down so that it does not contact the base of the bulb properly. If either of these conditions exists, correct by scraping clean, or by bending the tang up slightly so it makes good contact with base of bulb. Check the pin socket cap for tightness. Make sure the electrical wires are in the pin contact grooves before tightening. If the new bulb still does not light, it will be necessary to replace the socket.

IMPORTANT: Tripped circuit breakers are usually a result of component failure in the system. Repair immediately before damage results to the wiring.

LOSS OF ALL LIGHTING

The light switch actuates the coils in the contactors, which control all lights. This circuit has a circuit breaker located in the main electrical box.

In the event that all of the lights go out, first check the circuit breakers. Reset if necessary. If the circuit breaker trips when reset, check the switch and wiring for a direct short.

Although it is rare, contactor coils can short out. If the wiring and switches are okay, then check the contactor coils and the wiring going to them.

Refer to the lighting controller manufacturer's troubleshooting and maintenance instructions.

General Maintenance – Motor and Lighting Contactors

The following general maintenance procedures must be followed for proper operation of motor and lighting contactors. For information on specific components, refer to the "Vendor Literature" section of this manual.

1. KEEP CONTROLLERS CLEAN AND DRY

Industrial controllers seldom operate in clean, dry places. Dust, dirt, oil and moisture reduce the insulating distance between otherwise clean and dry surfaces, and cause sluggish mechanical action of electrical controllers.

Accumulation of dust and dirt must be removed regularly, either by vacuum or by blowing with compressed air. Avoid excessive air pressures because sharp, small particles can be driven into some insulating materials. Special attention is required to remove metallic dust with metallic properties, which can collect and adhere to the magnetized parts of the controller. Dirt, oil and moisture are usually removed by wiping the surfaces with cloths and suitable solvents.

Moisture due to condensation can collect within an enclosure. Drainage holes are not normally acceptable to relieve this condition. Heaters are often used to prevent condensation moisture. The heaters are most essential when the controller is idle. When in operation the coils and resistors within the enclosure usually provide enough heat to prevent condensation.

2. REPLACE CONTACTS THAT ARE WORN VERY THIN OR BADLY BURNED AND PITTED.

Replace contacts in pairs. Maintain the correct contact pressures.

When controller contacts open or close, they are subjected to mechanical wear and arcing (electrical burning). The reason for this is that the contacts close with a rolling movement combined with a wiping action. Although this action insures a good contact and confines the arcing to the tips of the contact, both conditions cause wearing of the contacts. Contact parts, therefore, are items that can require considerable maintenance, depending upon the operating conditions. The actual mechanical wear of contacts that operate frequently can be more serious than the electrical burning caused by the arcing.

As contacts wear, the material in them gradually disappears because of both mechanical wear and electrical burning. During the wearing process, the contact pressures decrease. This affects the current-carrying ability of the contacts and eventually can cause overheating of the contacts. A small contact with suitable pressure will carry current with less heating than a large contact with little or no pressure. Reasonable provisions are made for the wearing of the contacts, but replacements will eventually be necessary. Manufacturers furnish information on correct contact pressures for their devices. The contact pressures can be reduced either because of worn contacts or damaged contact springs. If contact springs have been overheated, they may be unable to provide sufficient contact pressure because the material has been weakened by the overheating. Contact pressures should be checked and maintained within the limits specified by the manufacturer.

Always replace both moving and stationary contacts.

Since contacts operate in pairs, replacement must never be made of a single contact so that a new contact will operate with an old contact. The extra time and expense spent in replacing both contacts will repay itself many times over in operating life.

3. KEEP CONTACTS CLEAN.

Do not change contact shape by rough filing or grinding.

Contacts are generally made of copper or silver. Silver contacts are generally used on the small current-carrying contacts of relays, electrical interlocks, push buttons, thermostats, pressure switches and similar devices. The remainder of the contacts are usually made of copper. Contacts must be kept clean. This is especially true of copper contacts because the discoloration that soon appears on clean copper is a poor electrical conductor. It increases the contact resistance and is often the cause of serious heating of contacts. When contacts are replaced, clean the new contact, if it is discolored, and the surface against which it is mounted. The discoloration (copper oxide) increases the resistance of the contact surface. The higher resistance causes more heating and the increased temperature causes more oxidation and higher resistance. The effect is always cumulative and the heating increases until the parts overheat, deteriorate or burn.

The slight rubbing action and burning that occur during normal operation will generally keep the contact surfaces clean enough for good service. Copper contacts which seldom open or close, however, will readily accumulate the thin discolored surface that can cause heating.

This is not true of silver contacts. The discoloration that soon appears on clean silver is a relatively good electrical conductor. It is not necessary to keep silver contacts clean except for appearance sake.

Burned Contacts

When excessive currents are closed or opened, or when contact motion is sluggish, the contact surfaces can be severely burned. If this burning causes deep pits, craters, or a very rough surface, both the stationary and moving contacts must be renewed.

However, it is not desirable to have contact surfaces entirely smooth. Slightly roughened surfaces that appear during normal operation, if clean, provide better contact area than smooth surfaces. Contacts, therefore, with surfaces comparable to very coarse sandpaper may be considered in good condition.

Contacts that are dirty or excessively rough must be cleaned and smoothed with a fine file. Use care to maintain the true surface shape or contour of the original contact. Much time and effort has been spent to determine the best contact shape. Changing the original shape by careless filing will leave high points or edges that can overheat. Do not use emery paper to clean contacts since it is an electrical conductor. Furthermore, some particles can become embedded in the contact surfaces and will cause unnecessary wear.

When a silver contact face has one corner burned, the contact can be used again if ample silver remains to permit carefully removing the burned surface to restore the smooth and true contact shape.

Badly burned and pitted points must be replaced with new parts.

When a contact surface has been worn away unevenly by mechanical wear, replace with a new pair of contacts.

Welding of Contacts

When contacts close, there is usually some "bounce" or rebound. This is due to the reaction of the contact springs as they are compressed to provide the final contact pressure. When the contacts bounce, they separate. At this time the contacts are carrying current and, even though the separation be very small, an arc is created. This arc can cause sharp projections of burned or roughened contact surfaces to overheat, and can weld or "freeze" the contact surfaces together. Under such conditions the contacts will not open correctly. Other causes of contact welding are:

-excessive currents when contacts close or open;

-insufficient contact pressures;

-sluggish operation either when closing or opening;

-momentary closure of contacts without much or any pressure applied.

Well designed contacts, properly installed, reduce this possibility to a minimum.

Check contact pressures on a spring balance by reading the scale when the contacts separate. The pull must be in a direction perpendicular to the contact surface.

4. KEEP CONTACTS AND ALL CONNECTIONS TIGHT.

Any loose electrical connection will eventually cause trouble. An open circuit or a loose connection can cause lost time and production because they are often difficult to find. Also, a loose connection can cause a poor contact of high resistance. Other loose connections cause similar heating and on thermally operated devices, such as a heater of a thermal overload relay, may cause the relay to trip and stop a motor when the motor is not overloaded.

The bolts or fastening devices that hold contacts in place must always be tight. Normal expansion and contraction of metals due to temperature changes or excessive vibration will cause bolts or nuts to become loose. Frequent checking for loose contacts is, therefore, advisable.

5. DO NOT OIL CONTACTOR OR RELAY BEARINGS. KEEP THESE UNITS CLEAN AND WITH NO FRICTION IN THE MOVING PARTS.

Since the correct operation of the contactor depends on the unit being completely clean and free from foreign material, contactor and relay bearings require no lubrication. If lubricated, the accumulation of oil and dirt can cause sluggish mechanical action, causing excessive arcing or welding of the contacts. Except for bearings of master switches, drum controllers and similar units, no lubrication of controller parts is necessary.

6. OPERATE COILS AT RATED VOLTAGE.

Both overvoltage and undervoltage conditions are undesirable.

Coils provide the electro-magnetic pull that opens or closes the contacts of relays and contactors. Series coils generally carry heavy currents and have relatively few turns of rather heavy copper. Shunt coils have many turns of insulated wire. They are generally impregnated in a vacuum or under pressure with insulating compounds, and are covered with insulating tapes or materials. The impregnating compounds produce a firm but resilient binding material that prevents cracks when temperature changes occur. The impregnation process eliminates air pockets within the winding, and it makes the coil a solid mass that is better able to radiate heat and is less subject to mechanical damage.

Operating Voltages

Shunt coils for A-C devices are designed to close them at 85% of the rated voltage. Coils for D-C devices will close them at 80% normal voltage. Any coil is expected to withstand 110% rated voltage without damage.

Open Circuited Coils

A coil with an open circuit will not operate the contactor or relay. Replace a questionable coil immediately with one that is known to be good. The questionable coil can then be checked for open circuits.

Short Circuited Coils

If some turns of a coil become short circuited, the resistance of the coil will be reduced. More current then passes through the coil. The increased current will cause higher coil temperature and can cause coil burnouts.

Overvoltage

Coils must be operated at the rated voltage. Overvoltage on coils causes higher coil temperature that shortens the coil life. Overvoltage also operates the contactor or relay with unnecessary force and causes more mechanical wear and bounce when closing.

Undervoltage

Undervoltage on coils causes contactors and relays to operate sluggishly. The contact tips may touch but the coils may be unable to completely close the contacts against the contact spring pressure. Under these conditions the contact pressure is below normal and the contacts can overheat and weld together.

7. CORRECT CONDITIONS THAT CAUSE EXCESSIVE TEMPERATURES.

Measure the temperature if in doubt about overheating.

Overheated parts always indicate trouble. However, it is often difficult to know when temperatures are excessive.

Resistors are operated safely at 360 degrees Celsius rise above ambient temperature but insulated coils are generally restricted to 85 degrees Celsius above ambient. Solid copper contacts are limited to a rise of 65 degrees Celsius and copper bus work to 50 degrees Celsius rise.

Barring the presence of gases, acids or alkalis, copper parts with much discoloration have been or are too hot. When in doubt, measure temperatures by thermometer or other means. Never rely on the touch of the hand because safe operating temperatures of many electrical parts are unbearable to the hand. It is best to know what the permissible temperatures are and then measure them.

Thermally operated overload relays must be in approximately the same ambient temperature as the motors they protect. If the relay is in a much higher ambient temperature than the motor, it will trip when the motor is not overloaded. If the relay is in the lower ambient temperature, it may not trip in time to protect the motor. If the ambient temperatures must be different, some compensation for the different temperatures can be made by proper selection of the overload relay heaters or by providing a relay that compensates for temperature differences.

Moisture Damage to Electrical Components

If any of the electrical components become water damaged from flooding or by water from any source, remove the components from the ride. The components will have to be thoroughly dried before being put back in service. It is suggested that after removing components from the ride that they be taken to an electrical service shop for proper drying and inspection. This is especially true if components were damaged by flooding, as flood waters are extremely dirty, and all components will have to be thoroughly cleaned. Since it may not be practical to have components serviced immediately, the following instructions contain information for drying components.

Cleaning and Drying

CLEANING

The methods of cleaning electrical insulation include:

-wiping off dirt with a clean, dry cloth;

-blowing out dirt with compressed air;

-drawing off dirt by suction;

-air blasting with ground nut shells or ground corn cobs;

-removing the soil with solvents;

-washing off with water, hot alkali and emulsion cleaners.

The method selected will depend on the type of components, the type of insulation, the type of soil, and other conditions involved.

WIPING CLOTHS - Cleaning with a dry cloth may be satisfactory when the component is small, the surfaces to be cleaned are accessible and only dry dirt is to be removed.

DO NOT USE "WASTE", as lint will adhere to the insulation and increase the collecting of dirt, moisture, and oil. This is particularly objectionable on high-voltage insulation as it tends to cause concentration of corona.

COMPRESSED AIR - Blowing out dirt with a jet of air is usually effective, particularly when the dirt has collected in places which cannot be reached with a cloth. Cleaning can be done more quickly with compressed air than with a cloth, especially on large components.

It should be noted that if blowing with compressed air simply transfers dirt from one place to another in the machine, little or no good has been accomplished.

CAUTION: Wear adequate and approved eye protection such as spectacles with side shields or goggles when blowing out dust or dirt. Approved dust respirators may also be needed for respiratory protection. Do not direct the jet of air towards any person.

The following conditions are emphasized:

1. Do not blow the compressed air against insulation unless the air is dry and does not carry water which may have condensed and accumulated in the air line.

2. Do not use air pressure greater than 30 pounds per square inch.

3. Too high a pressure may damage insulation and blow dirt under loosened tape.

4. Do not direct the stream of compressed air in such a way that the dirt will be blown into some inner recess from which it would be difficult to remove the dirt and where it might close ventilation openings.

BRUSHING AND SUCTION CLEANING - Dry dust and dirt may be removed by brushing with a bristle brush, followed by vacuum suction cleaning. Do not use a wire brush. Vacuum cleaning is an effective and desirable method of removing dry and loose dirt, since it does not scatter the dirt and thereby avoids settling of the dust on other components.

AIR BLASTING - Air blasting with ground nut shells can be satisfactory for removal of hard dirt deposits from insulation. Use mild abrasives such as 12-20 mesh ground walnut shells. If a softer abrasive is required, use ground corn cob.

The cleaning can be done in a cabinet type, air blasting machine or by an operator directing the jet of abrasive, at a small area long enough to remove the dirt without damaging the insulation. Canopies or other shields must be erected to prevent unnecessary contamination of other equipment or areas.

SOLVENTS - If the accumulated soil contains oil or grease, a solvent is usually required to remove it. A rag wet with solvent can be used for wiping. The component can be sprayed with solvent or dipped into the solvent. Vapor degreasers which have come into use within the last few years for cleaning will be discussed in a later section.

Solvents for cleaning are divided into three groups;

-Petroleum distillates;

-Other solvents: including chlorinated solvents, mixtures of chlorinated and petroleum solvents, aromatic or coal tar solvents, alcohols and lacquer thinners;

-Water, hot alkali or emulsion cleaners

Petroleum distillates

It is recommended that only this type of solvent be used where a solvent is required for cleaning electrical components.

Petroleum distillates which are classed as "Safety Type Solvents" and have a flash point above 100 degrees Fahrenheit (37.8 degrees Celsius) are supplied by practically all oil companies under various trade names. Included in this group of solvents are:

-Westinghouse solvents 1609-1 and 1609-2;

-Stoddard solvent (described in the specifications of the U.S. Bureau of Standards, 1940, under the title of "Commercial Standard CS3-40");

-Mineral spirits;

-Cleaner's naphtha;

-Similar products with a flash point above 100 degrees Fahrenheit and a Kauri Butanol number not exceeding 39.

These solvents are all flammable at temperatures above the flash point. Since the flash point of the solvents mentioned above is higher than that of certain other petroleum distillates, such as gasoline, the safety type solvents present a lesser fire hazard. NEVER USE GASOLINE.

WARNING: Petroleum distillates are flammable and form explosive mixtures with air. AMPLE PRECAUTIONS MUST BE TAKEN TO PREVENT FIRES AND EXPLOSIONS.

WARNING: Air containing vapors of these solvents can have toxic effects when inhaled.

Always use with adequate ventilation.

The ventilation in shop areas is usually sufficient to avoid harmful accumulation of petroleum solvent vapor unless it is used as a fine spray, but when solvent is used on warm apparatus or in hot locations, the evaporation rate will be higher and more attention must be paid to providing proper ventilation. In confined spaces, also, the need for ventilation must be considered.

Avoid continuous or repeated contact of these solvents with the skin. Neoprene coated gloves and aprons can be used to provide protection against skin contact.

WARNING: Gasoline, V.M. & P. naphtha and similar grades must not be used for cleaning, because they are more volatile than the recommended grades, and therefore present too great a fire and explosion hazard.

IMPORTANT: Some cleaning fluids marketed under the general name of "Safety Solvents" contain appreciable quantities of chlorinated solvents to reduce their flammability. This type of solvent should not be used generally because of the high toxicity and changing flammable properties.

Other Solvents

CAUTION: Carbon tetrachloride and benzol are highly toxic solvents and should not be used for cleaning purposes. Safe breathing concentrations of these solvents are extremely low. Death may result from breathing high concentrations of these vapors.

When a low-power petroleum solvent does not provide proper cleaning, a stronger solvent can be necessary. Where a special cleaning job of this kind occurs, it must be performed only under expertly controlled conditions for adequate ventilation and personal protection. Among the strong solvents to consider in cases of this kind are:

-Chlorinated solvents, such as Trichloroethylene, perchloroethylene, and Methyl Chloroform;

-Mixtures of chlorinates solvents and petroleum solvents (generally these mixtures should be avoided);

-Coal tar solvents, such as Toluol, Sylol, or products containing these materials;

-Alcohols and lacquer thinners.

WATER, EMULSION AND ALKALI CLEANING - Electrical components which are clogged with mud and other foreign matter by plant operations, dust storms, floods, or other unusual conditions, require thorough washing. This can be done by immersion, hose washing, or pressure spray from a steam generator. Steam from a shop line or a spray of hot water and compressed air can be used. When tar, wax, grease or oil are to be removed from insulation, add a nonconductive detergent to the water. These compounds contain non-ionic emulsifying agents. Some, known as emulsion cleaners, also contain solvents to soften the hard deposits, so that they can be more easily washed off. These compounds are not electrical conductors and are safe on insulation.

In special cases, hot alkaline cleaning solutions can be used, but are not recommended for general use. They remove tar and grease faster than emulsion cleaners, but are electrical conductors and are not safe for cleaning insulation. Care must be taken to remove the conductive film residue from the insulation by thorough washing with clean water. After any cleaning operation where water is used, remove the water as promptly as possible. (See "DRYING").

When deposits of grease, chemicals, or other foreign matter are to be removed from components, the use of a steam spray machine can be helpful. Portable units generate steam electrically and project a pressure spray of hot cleaning solution through a hose and nozzle. Valves are provided to produce steam or a water rinse if desired.

The spray cleaning equipment can be modified to use steam from a shop line, or a spray of hot water and compressed air.

To avoid damage to insulation, the temperature of the water or cleaning solution must not exceed 90 degrees Celsius (194 degrees Fahrenheit) and the pressure at the windings must not exceed 30 pounds per square inch.

After any cleaning operation where water is used, remove the surface moisture with a clean cloth. Dry the insulation promptly to minimize the amount of water which soaks into the insulation.

Drying

DRYING ELECTRICAL INSULATION

Electrical components, after cleaning or storing, must be dried before being placed in operation if tests indicate that the insulation resistance is below a safe minimum value. Moisture can come from:

-Exposure to rain, snow, or fog;

-Exposure to humid atmosphere;

-Cleaning with water or aqueous solutions.

Normally, components can safely be placed in service without special drying, if a careful inspection of the windings discloses no defects, dirt, or visible moisture, and if insulation resistance tests are satisfactory.

Components must be dried if a hot insulation resistance test shows a value below a safe minimum, which is usually accepted to be one megohm for each 1000 volts of operating or rated voltage, and a minimum of one megohm for operating voltages less than 1000 volts.

The method of producing and applying the heat depends on a number of widely varying conditions. Ideal conditions are seldom found and consequently, the drying often requires a great deal of ingenuity and resourcefulness on the part of the operator. Since much damage can be done by improper heating of the windings of electrical components, it is very important that this type of work be done only by competent persons. Consult the manufacturer's nearest sales office for instructions if there is any doubt as to the proper procedure.

When heat is applied to the windings of electrical components, it must be regulated in such a way that the insulation will not be damaged by overheating. Also, the heating rate must not be so rapid that internal vapor pressures will develop and cause the formation of pockets or blisters, which can rupture the insulation.

Adequate provisions must be made for circulating the hot air within the component which is being dried to remove the vapors. If the component is enclosed, openings must be provided for the escape of moisture-laden air and gases.

The temperature of the insulation must not exceed 85 degrees Celsius (185 degrees Fahrenheit) during drying.

METHODS OF DRYING

There are two general methods of drying the insulation of windings:

-External heat;

-Internal heat.

A combination of externally applied heat and internally generated heat may be found to be desirable under certain conditions.

Drying with External Heat

Oven drying is particularly desirable for small transformers, D-C armatures, control apparatus, etc. Ovens have also been used extensively for salvaging components which have been under flood waters.

Ovens must be ventilated to provide circulation of air and to permit removal of moisture.

Electric heaters or steam coils can be placed inside the ovens, or air can be preheated by passing over electric heaters or steam coils before being blown into the oven. Some form of temperature indicating device must be provided to permit proper heat regulation.

Temporary ovens can be constructed of asbestos board, sheet, iron, brick or concrete block, and lined with non-combustible heat insulating material. Various types of heating can be used, but smoke and soot must not be permitted to enter the oven. Proper precautions must be taken to eliminate fire risk. Fire extinguishers such as the dry chemical or carbon dioxide type must always be available.

With Forced Air

Hot air can be forced or blown through electrical apparatus to dry its insulation. Heat the air with steam coils, hot air furnaces, electric heaters or open fires. Although it will remove surface moisture quickly, generally this method is inefficient and costly, unless a blower and air duct have been provided for the permanent installation and there is ample space to locate a heating unit in the duct.

With Electric Heaters

External drying of the insulation of electrical rotating apparatus by electric heaters distributed under the end windings is strongly recommended. Space heaters are most convenient for this purpose. Typical heaters are only 3/16" thick, 1-1/2" wide and from 12" to 43" long, depending upon their capacity. The cost of the heaters is low and their installation will cost very little. These heaters are sturdy and have so many applications that the salvage value is high.

With Infra-red Lamps

Heating by infra-red lamps is desirable in some cases. Use a group of these lamps, depending on the size of the component. Focus the heat from the lamps on the parts to be dried. Be careful not to overheat the insulation.

CERTIFICATE OF COMPLIANCE

FOR

SERVICE BULLETIN

389R1085-0

We hereby certify the procedure outlined in the above-mentioned service bulletin has been performed on the 50' CARROUSEL,

Serial numbers - _____, in accordance with the instructions and specifications supplied by Chance Rides, Inc.

Date Bulletin Received _____

Date Procedure Performed _____

Name and Address of Person Performing Procedure:

_____

_____

Attested:

Owner _____ Maintenance Supervisor _____

Address _____ Address _____

City _____ State _____ City _____ State _____

By _____

Date _____ Date _____

Results _____

_____

_____

This certification must be completed and returned to **CHANCE RIDES, INC., P.O. BOX 12328, WICHITA, KS 67277-2328**, within fifteen (15) days of receipt of the kit.

NUMBER: B389R1117-0

DATE: JAN. 11, 1993

SUPERSEDES:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Number: MGR-07186 through OMG-12092
Chance Rides, Inc.

389-01086 through 389-02992
Chance Rides, Inc.

All units - Chance Manufacturing Co., Inc.

Chance Rides, Inc. SPECIFICALLY DISCLAIMS ANY LIABILITY for losses associated with rides produced by Chance Manufacturing Company, Inc.

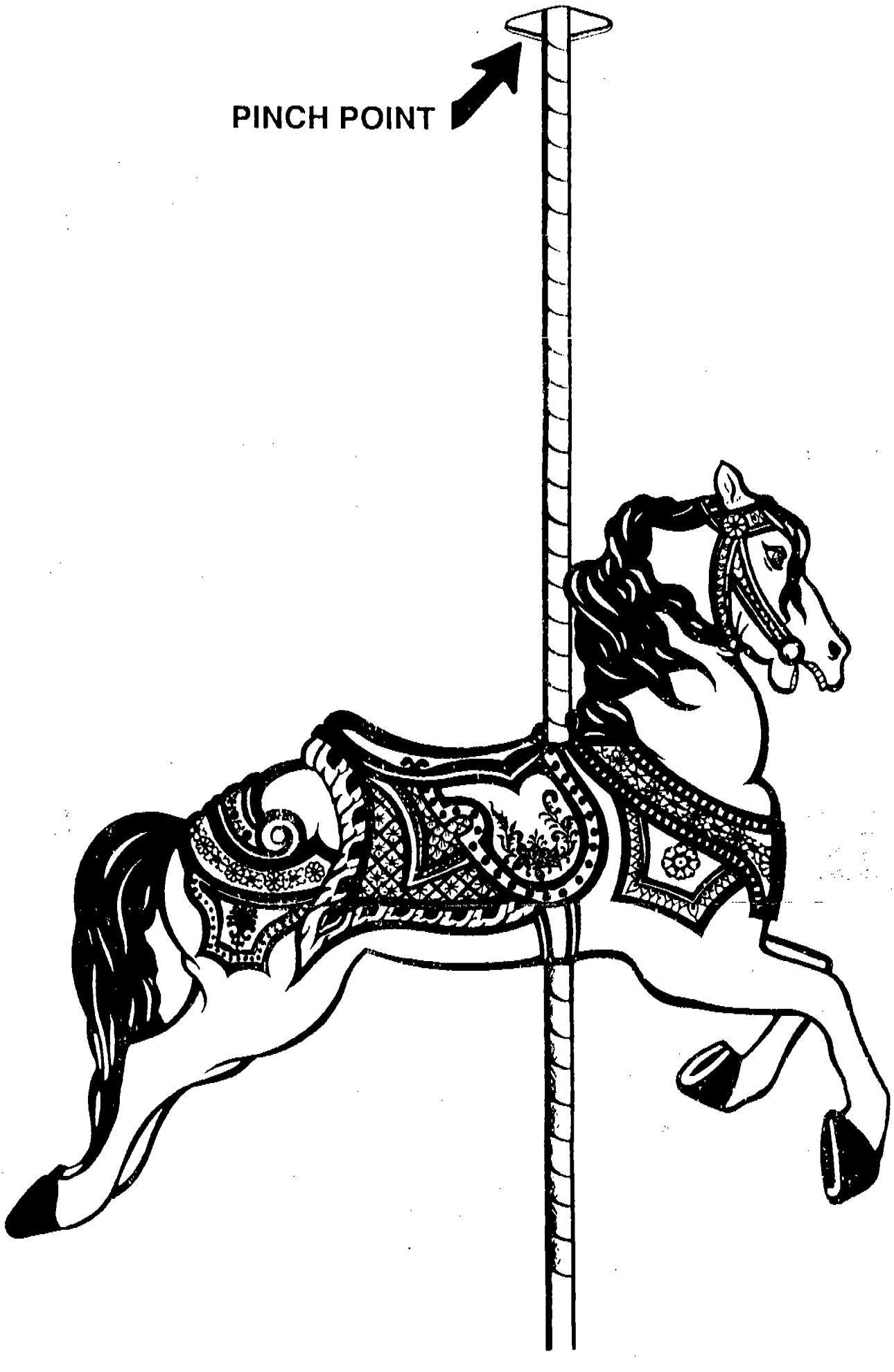
Ride: 36' and 50' CARROUSELS (Equipped with Ceilings) Subject: PINCH POINT

Chance Rides, Inc. has become aware that a possible pinch point exists between the horse pole and the edge of the ceiling panel on the CARROUSEL amusement rides listed above. This may occur if a passenger on a CARROUSEL animal reaches over his or her head and/or stands up in the horse steps while the ride is in motion. When this occurs, it may result in injury to the passenger.

Operators of all rides are required to give safety announcements to all passengers before the start of each ride cycle. Safety announcements given by ride operators of CARROUSELS with ceiling panels must include but not be limited to the following:

1. Once seated, remain seated while the ride is in motion.
2. Hold onto the horse pole.
3. Do not extend hands above your head height on horse pole.

The operator must remain in full control of the operating controls at all times during the operation of the ride. The ride and its passengers must be given the full attention of the operator at all times. The operator must immediately stop the ride if anyone is observed in an unsafe position or doing anything that could lead to an unsafe condition.


PINCH POINT

NUMBER: B389R1085-0

DATE: NOV. 30, 1990

SUPERSEDES:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Number: 38901086 through 38902190 Chance Rides, Inc.

81-4806 through 85-4809
Chance Manufacturing Co., Inc.

Chance Rides, Inc. SPECIFICALLY DISCLAIMS ANY LIABILITY for losses associated with rides produced by Chance Manufacturing Company, Inc.

Ride: 50' CARROUSEL

Subject: Hydraulic Motor Cavitation

Chance Rides, Inc. has become aware of at least one 50' CARROUSEL amusement ride which has experienced cavitation to the hydraulic motor. A rework kit has been developed which when properly installed will help keep the motor supplied with oil. Chance Rides, Inc. requires all owners of the above noted rides to order and install kit number K389R1085-0 which contains all parts necessary to rework one ride.

PARTS LIST

Part Number	Description	Quantity
62743000	3/4" 90° Elbow	1
10000300	Hose	1
62777000	3/4" Close Nipple	2
62701800	3/4 to 1/2 Bushing Reducer	1
60036800	90 Degree Adapter	1
28440300	Check Valve	1
62702800	1" to 3/4" Bushing	1
K389R1085-0	Drawing	

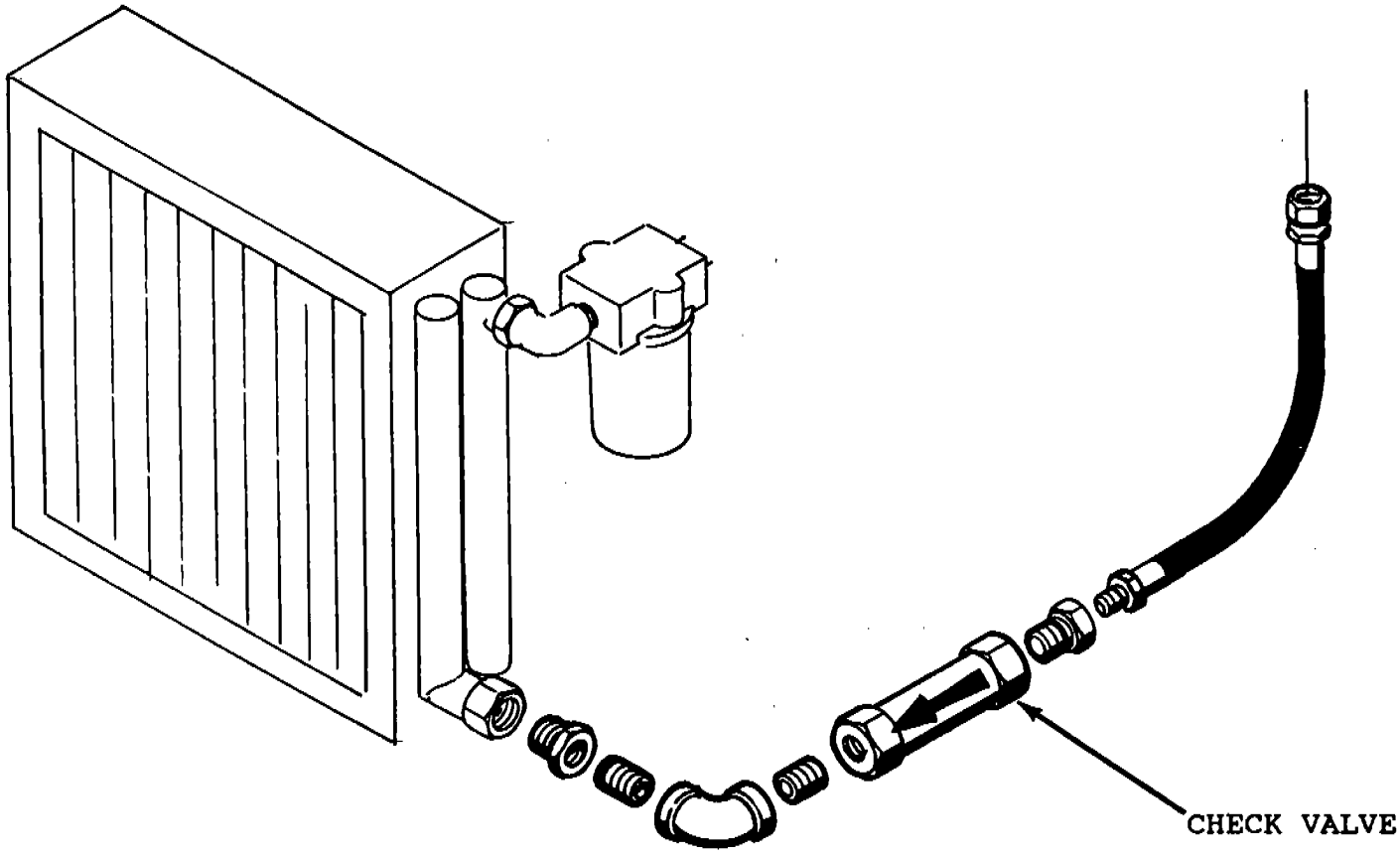
The above noted kit must be installed per the instructions which will accompany the kit and the attached Certification Of Compliance returned within 15 days after receipt of the kit.

All work must be performed by qualified personnel, capable of understanding the function of the parts and their proper installation.

NOTICE

Use only those components authorized, specified or provided by Chance Rides, Inc.

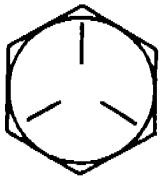
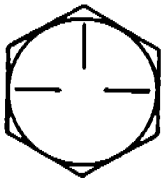
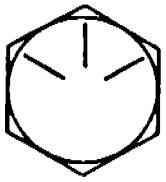
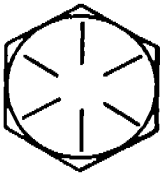
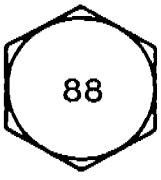
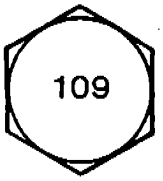
Chance Rides, Inc. **SPECIFICALLY DISCLAIMS ANY LIABILITY** for losses associated with any unauthorized alterations and/or modifications or additions and installations of unauthorized components.



KIT 389R1085-0

GRADE MARKINGS
For Functional Load Carrying Capscrews

Manufacturer's identification symbols must be present on all capscrews.

CORRECT MARKINGS	EXAMPLES OF UNACCEPTABLE MARKINGS
SAE J429 GRADE 5 MEDIUM CARBON 81,000 YIELD 	 GRADE 5.1 LOW CARBON  GRADE 5.2 LOW CARBON MARTENSITIC
ASTM A325 TYPE 1 MEDIUM CARBON LONGER SHANK & SHORTER THREAD LENGTH THAN GRADE 5 81,000 YIELD  ASTM A 325 TYPE 3 CORROSION RESISTING LONGER SHANK & SHORTER THREAD LENGTH THAN GRADE 5 81,000 YIELD 	 ASTM A325 TYPE 2 LOW CARBON MARTENSITIC
SAE J429 GRADE 8 MEDIUM CARBON 130,000 YIELD 	 ISO R898 CLASS 8.8 MEDIUM CARBON 92,000 YIELD 
ASTM A490 ALLOY STEEL LONGER SHANK & SHORTER THREAD LENGTH THAN GRADE 8 130,000 YIELD 	 ISO R 898 CLASS 10.9 ALLOY STEEL 130,000 YIELD 

Torque Chart

TORQUES FOR FUNCTIONAL LOAD CARRYING COLD FINISHED HEX HEAD CAPSCREWS WITH DRY ROLLED THREADS, USED WITH LOCKNUTS (SEE NOTE 3), AND TIGHTENED WITH AN ASTM A325 HARDENED WASHER UNDER THE CAPSCREW OR LOCKNUT HEAD (WHICHEVER IS ACCESSIBLE FOR TIGHTENING).

THIS TORQUE RANGE WILL DEVELOP 60% TO 70% OF PROOF LOAD.

REFER TO "REPLACEMENT OF CAPSCREWS AND LOCKNUTS" FOR CONDITIONS REQUIRING REPLACEMENT.

SIZE DIAMETER - THREADS/ INCH	FOOT POUND TORQUE RANGE (SEE NOTES 1 AND 2) WITH LOCKNUT AND HARDENED WASHER	
	SAE J429 GRADE 5 ASTM A325	SAE J429 GRADE 8 ASTM A490
1/4 - 20	5-6	7-8
1/4 - 28	6-7	8-10
5/16 - 18	11-13	15-18
5/16 - 24	12-15	17-21
3/8 - 16	19-24	27-33
3/8 - 24	22-27	31-38
7/16 - 14	30-35	45-55
7/16 - 20	35-40	50-60
1/2 - 13	50-60	65-80
1/2 - 20	55-65	75-90
5/8 - 11	95-115	130-160
5/8 - 18	105-130	150-180
3/4 - 10	165-200	235-285
3/4 - 16	185-225	260-320
7/8 - 9	270-325	380-460
7/8 - 14	295-360	415-505
1 - 8	400-490	565-690
1 - 12	440-535	620-755
1-1/8 - 7	495-600	800-975
1-1/8 - 12	555-675	900-1095
1-1/4 - 7	700-850	1135-1380
1-1/4 - 12	775-940	1255-1525
1-1/2 - 6	1215-1480	1975-2395
1-1/2 - 12	1370-1660	2220-2700

NOTES:

1. USE ANTI-SEIZE LUBRICANT ON CAPSCREW SHANK WHEN TIGHTENED FROM HEAD END.
2. USE 10% LESS TORQUE WHEN ANTI-SEIZE OR OTHER LUBRICANT IS USED ON THREADS.
3. USE SAME TORQUE RANGE FOR HOLES TAPPED IN STEEL.

NUMBER: B090R1075-0

DATE: MAY 25, 1990

SUPERSEDES: 90-148C-00

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Number: All Units - Chance Rides, Inc.
All Units - Chance Manufacturing Co., Inc.

Chance Rides, Inc. SPECIFICALLY DISCLAIMS ANY LIABILITY for losses associated with rides produced by Chance Manufacturing Company, Inc.

Ride: All Rides

Subject: Replacement and torque requirements for functional load carrying capscrews

Capscrews used by CHANCE RIDES, INC. are classified as functional load carrying capscrews if:

- They are used as tension members in the erection or operation of a ride

  and/or

- They are required to resist shear through friction-type connections in the erection or operation of a ride

Capscrews are selected with consideration to grade, size and quantity, using joint capacities based on tightness torques of 60% of rated yield and group joint efficiency of 62.5%.

TORQUE REQUIREMENTS

Capscrews must be tightened to the torque values listed in the Torque Chart. These values were selected to produce a tightening torque range of 60% to 70% of proof load, when tightened with a hardened washer under the locknut or capscrew head (whichever is accessible for tightening). When the capscrew is tightened from the head end, apply anti-seize lubricant to the shank of the capscrew. When the threads are lubricated, use 10% less torque to tighten the capscrew.

DO NOT TIGHTEN CAPSCREWS OVER THE RECOMMENDED TORQUE. This can damage the capscrew, due to variances in coefficients of friction and torque wrench accuracy.

Always use a torque wrench. It is impossible to accurately measure the tightness of a capscrew by other methods. Torque wrenches must checked for accuracy twice each operating season.

CAPSCREW GRADES

CHANCE RIDES, INC. uses only Grade 5 or better capscrews and Grade 8 locknuts, with A325 hardened washers for functional loads. The Grade Markings Chart shows the capscrew markings to be found on Chance rides. The manufacturers identification symbols must be present on all functional load carrying capscrews.

CHANCE RIDES, INC. requires the use of cold-formed hex head capscrews with rolled threads. Hex bolts and hot-formed hex head capscrews are not recommended because they may machined threads, and can have die seams along the shank.

NEVER REPLACE CAPSCREWS OR LOCKNUTS WITH PARTS OF A LESS GRADE, OR OF DIFFERENT LENGTHS THAN THOSE SHOWN IN THE CHANCE PARTS CATALOG.

REPLACEMENT OF CAPSCREWS AND LOCKNUTS

When permanently installed capscrews and locknuts are disassembled for repair or adjustment, they must be replaced if they have been in service over five (5) years, or corrosion, or other damage requires over-torquing for removal. If a torque wrench is not used to measure excessive removal torques, the capscrews and locknuts must be replaced.

Capscrews and locknuts which are frequently disassembled for portability must be replaced each operating season. If the capscrews and locknuts become damaged, corroded or require excessive torque for removal, they must be replaced. If a torque wrench is not used to measure excessive removal torques, the capscrews and locknuts must be replaced.

NOTE: BOTTOM CASTING EARS AND MATI EARS ON TELESCOPE LOCK SHOULD BE CHECKED FOR EXCESSIVE WEAR WHICH COULD CAUSE THE TELESCOPE TO DISENGAGE FROM THE LOCK.

NOTE: TOP OF TELESCOPE PIPE MUST BE TAPERED AS SHOWN TO PREVENT A SHARP EDGE FROM CUTTING INTO HORSEPIPE RESULTING IN A JAM BETWEEN THE TWO PIPES.

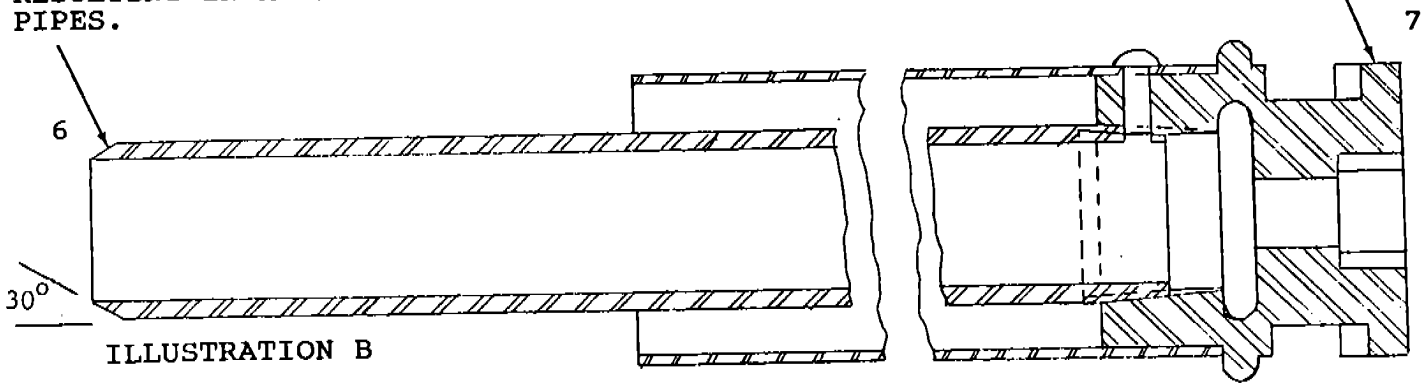


ILLUSTRATION B

NOTE: ALL HORSE HANGER HOOKS AND BEARINGS SHOULD BE INSPECTED FOR EXCESSIVE WEAR AT POINT 1. EXCESSIVE WEAR WILL RESULT IN INCREASED CLEARANCE BETWEEN STOPS 2 AND 3 WHICH SHOULD NOT EXCEED 3/16"

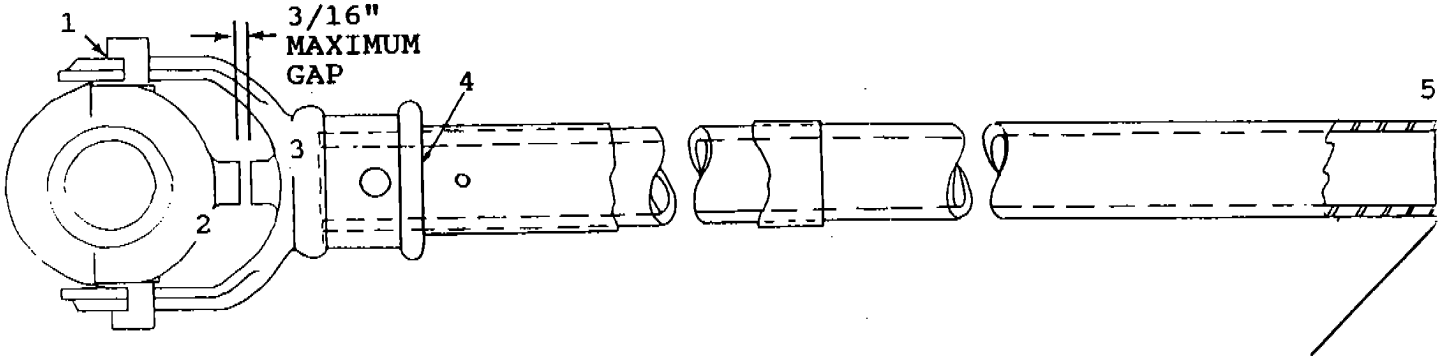


ILLUSTRATION C

1/8" X 45 DEGREES CHAMFER ON BOTTOM OF HORSE PIPE TO PREVENT A SHARP EDGE FROM CUTTING INTO TELESCOPE RESULTING IN A JAM BETWEEN THE TWO PIPES.

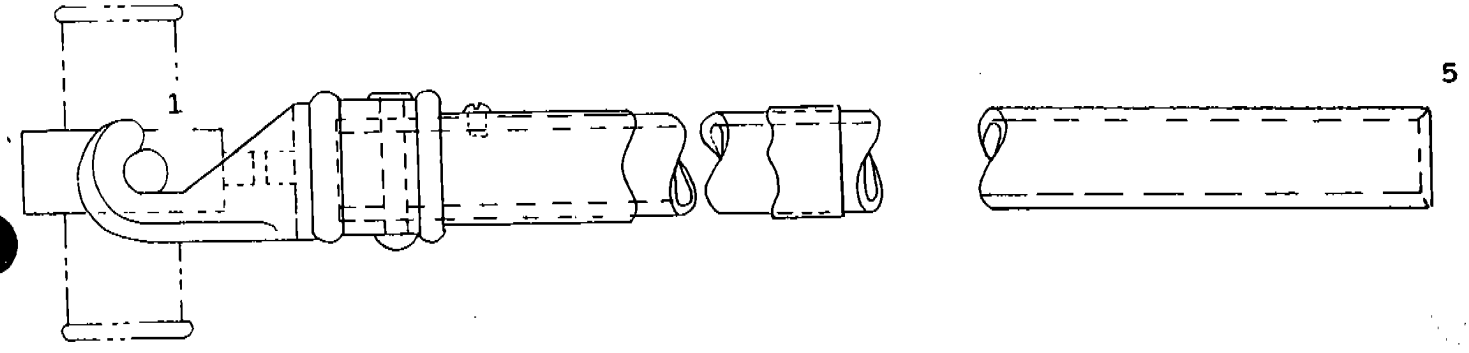


ILLUSTRATION D

NUMBER: B389R1068-0

DATE: May 22, 1990

SUPERSEDES: B30-0259-0A
B-0241-00

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Number: All Units - Chance Rides, Inc.
All Units - Chance Manufacturing Co., Inc.

Chance Rides, Inc. SPECIFICALLY DISCLAIMS ANY LIABILITY for losses associated with rides produced by Chance Manufacturing Company, Inc.

Ride: CARROUSEL

Subject: Inspection of Horse Hanger Hooks, Bearings, Horse Pipe, and Telescope Assemblies

Chance Rides, Inc. requires that all CARROUSEL owners inspect the horse hanger hooks, the horse hanger hook bearing, the horse pole and the telescope assemblies to ensure that all parts fit properly within the wear tolerances for a safe ride.

Perform the following inspection at each set-up, or monthly, whichever occurs first.

MG-70 Horse Hanger Hook,
Part No. 33424000
(36' CARROUSEL)

370-101 Horse Hanger Hook
Part No. 33426300
(50' CARROUSEL)

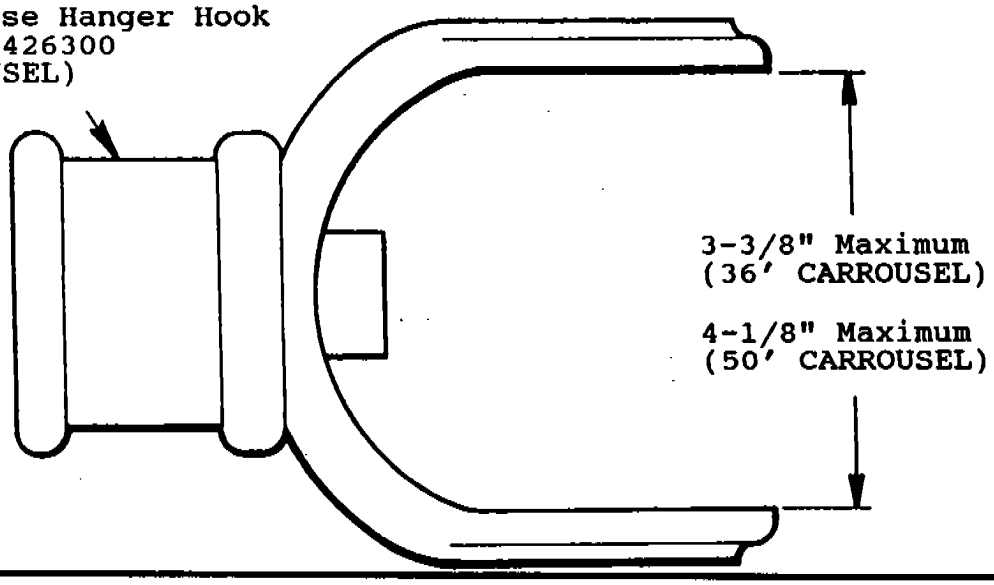


ILLUSTRATION A

Factory and Sales Office: 4219 Irving · P.O. Box 12328 · Wichita, Kansas 67277-2328 · (316) 942-7411 · FAX: (316) 942-7416

1. Measure the distance between the hooks as shown in Illustration A. The dimension must be within the specified limits. Report any variations to the Chance Rides Customer Service Department.

⚠ WARNING: DO NOT HEAT THE HORSE HANGER HOOK TO STRAIGHTEN IT.

2. Inspect for excessive wear on top of the horse hanger bearing ears and the underside of the horse hanger hook Item 1 of Illustration C. Wear at this point increases the gap between safety stops (Item 2 and 3 of Illustration C). This gap should not exceed 3/16". Any gap larger than 3/16" will allow the hook to come off the bearing during operation.

   Using a piece of bar 3/16" thick, check the gap between each of the safety stops, if the bar passes easily through the gap, the hanger bearings should be replaced. Inspect horse hanger hook and replace if excessive wear is evident.

3. The tightness of the horse hanger hook on the horse pipe (Item 4, Illustration C) should also be checked. If this is loose it will allow it to wobble which will ear out the rivets attaching it to the hook.

4. All horse pipes furnished by Chance Rides, Inc. have a 1/8 x 45 degrees chamfer on the bottom (Item 5, Illustration C). The telescope pipes have a 3/16" x 30 degrees chamfer on the top (Item 6, Illustration B). These are to prevent the two pipes cutting into one another and jamming. Any replacement pipes should also be chamfered.

5. The lower casting on the telescope (Item 7, Illustration B) and the upper casting on the floor lock should be inspected for wear or damage. Excessive wear could result in release of the telescope from the floor lock. Parts which allow easy locking or unlocking are worn and should be replaced.

All work must be performed by qualified personnel, capable of understanding the function of the parts and their proper installation.

NOTICE

Use only those components authorized, specified or provided by Chance Rides, Inc.

Chance Rides, Inc. SPECIFICALLY DISCLAIMS ANY LIABILITY for losses associated with any unauthorized alterations and/or modifications or additions and installations of unauthorized components.

Number: B090R1056-0

Date: Feb. 9, 1990

Supersedes:

America's Largest Manufacturer of Amusement Rides

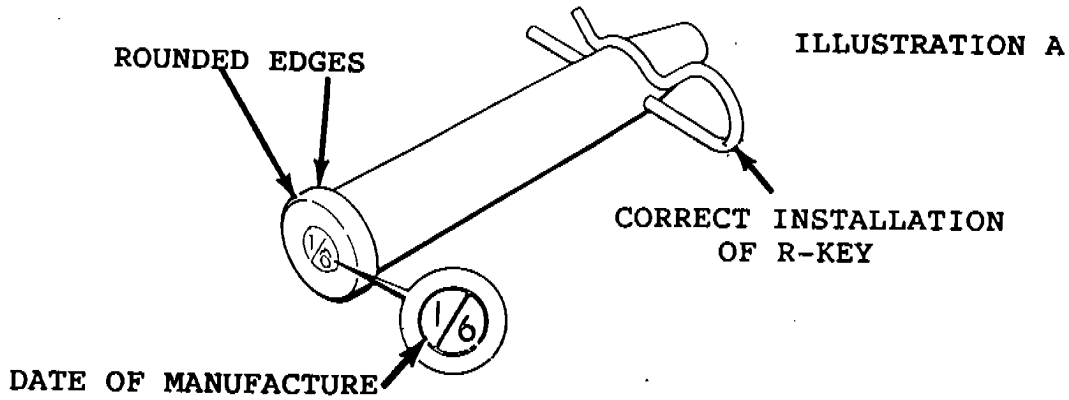
SERVICE BULLETIN

Effective Serial Numbers: All Units

Ride: All Rides

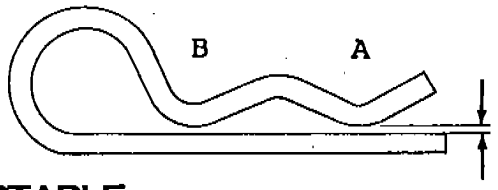
Subject: General Safety - Taper Pins

It has come to the attention of Chance Rides, Inc. that the taper pins being used with amusement rides are subject to deterioration due to improper use and wear. Chance Rides, Inc. specifies certain pins for certain applications on amusement rides. These pins have been developed over a period of years, taking into account size, design, material and hardness characteristics. Only pins specified by Chance Rides, Inc. may be used on rides manufactured by Chance Rides, Inc. These pins are identified as shown in Illustration A.



Care should be taken when installing and removing taper pins. Since these pins are hardened (as are hammers and punches) care must be taken to strike the pin straight on. Striking a pin at an angle could cause the pin to chip resulting in bodily injury. For this reason **APPROVED SAFETY GLASSES OR GOGGLES MUST BE WORN AT ALL TIMES** when taper pins are being installed or removed. Any taper pin which is chipped, bent, or mushroomed on either end must be discarded and replaced with a new pin.

All keepers (R-keys, hair pins, lynch pins, etc.) must be inspected for wear. If any keeper is bent out of shape or sprung, as shown in Illlustration B, it must be replaced.

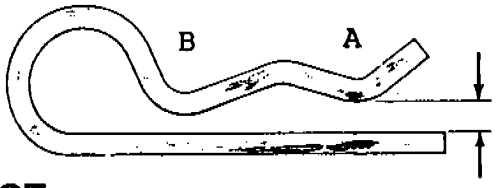


ACCEPTABLE

DIMENSION A

EQUALS DIMENSION

B IN A RELAXED POSITION



REPLACE

DIMENSION A IS

GREATER THAN DIMENSION

B IN A RELAXED POSITION.

NEVER ATTEMPT TO BEND A HAIR PIN BACK INTO SHAPE.
REPLACE IT WITH A NEW PART.

Chance Rides, Inc. recognizes and recommends the safety procedures specified in ASTM Standards F770 Operation Procedures for Amusement Rides and Devices and F853 Maintenance Procedures for Amusement Rides and Devices.

All work must be performed by qualified personnel, capable of understanding the function of the parts and their proper installation.

NOTICE

USE ONLY THOSE COMPONENTS AUTHORIZED, SPECIFIED OR PROVIDED BY THE MANUFACTURER. IF ANY ALTERATIONS AND/OR MODIFICATIONS OR ADDITIONS AND INSTALLATIONS OF UNAUTHORIZED COMPONENTS ARE MADE TO THE ORIGINAL DESIGN WITHOUT THE MANUFACTURER'S EXPLICIT WRITTEN CONSENT OR WITHOUT DIRECT SUPERVISION BY A MANUFACTURER'S REPRESENTATIVE, CHANCE RIDES, INC. MAKES NO CLAIM AS TO THE INTEGRITY OF THE ALTERED OR MODIFIED RIDE.