MFG: WISDOM COMPANY
NAME: ASTROLINER
TYPE: NON-KIDDIE

OPERATION OF THE ASTRO-LINER

The Astro-Liner has been designed for portability, customer attractiveness and ease of operation. We have attempted to design a piece of equipment that can be operated with a Carnival in an Amusement Park, or by itself in a still location. One major asset of this is it's distinctive shape. It seems that people are attracted to anything that has to do with Space.

To set up the Astro-Liner all that is required is to crank down the four (4) corner jacks, put out the steps, set up the fence, disconnect the two (2) turnbuckles attached to the lift cradle, and the strap holding the umbilical. In adjusting the four (4) corner jacks, crank them down just enough to remove some of the weight from the tires and axles but not enough to raise the wheels off the ground unless it is required for leveling of the ride. The Astro-Liner does not have to be perfectly level to operate.

If the Astro-Liner is set up on irregular ground, occasionally the up stop needs to be adjusted out. This is done on the off side of the Astro-Liner at the very back of the lift cradle. By adjusting out the bolt with the washer welded to the head of it, the Astro-Liner can be made to not raise quite as high, thus preventing hitting the ground behind with the tail section or also of hitting an overhead object if inside a building or under trees or power lines.

We feel that the Astro-Liner is one of the safest pieces of equipment on the Midway, but still as with any ride, there are a few things that must be watched over by the operator to prevent any accidents.

WARNINGS

1. Each time the doors are closed by the operator, he should look out to make sure that no one is standing beneath the door. The door does come down fairly quickly and can cause some injury to someone standing underneath.

2. The steps should be adjusted so that each flat is fairly level and that there are no wires running at the base that someone can trip over when they are entering or leaving the Astro-Liner.

3. During the operation of the Astro-Liner the operator is responsible to keep everyone seated while the Astro-Liner is lifting or rotating. If someone stands up he should immediately stop the ride until that person has been reseated.

4. The fence should be set up around the Astro-Liner so that no one can get in near the lift portion of the Astro-Liner. Since the operator cannot see outside, it would be difficult to know whether someone was underneath the ride while it is being lowered.

5. No Smoking should be allowed inside the Astro-Liner. The carpet and fiberglas on the forward sections of the Astro-Liner are flame retardent and a fire extinguisher is furnished with all new Astro-Liners, still the possibility of fire does exist, plus it may be uncomfortable for other passengers to have people smoking in such closed areas.

The Astro-Liner has been designed for safety of its customers. Installed in each Astro-Liner is a 12 volt battery and system which operates the front door, the lift, lowering, and the emergency lights. Also with the step which is attached to the front door this allows the front door to be opened no matter what position the Astro-Liner is in. The Astro-Liner, using the 12 volt system, can be lowered, the front door opened because of the air storage tanks to open it even should there be a power failure, and the emergency lights for lighting while they are waiting for the Astro-Liner to lower. The front door can be opened in the full up position, if for some reason the ride will not lower. The ride can be lowered manually from the outside by using an Alan wrench.

Highway dimensions

LENGTH	39' 8"	From ball to tail
WIDTH	8'	
HEIGHT	12' 2"	Depending on the height of the pickup hitch.
WEIGHT	12,000 lbs.	

Operating dimensions

LENGTH	43' 50'	From needle to tail With suggested fence Set-up.
WIDTH	13' 25'	With steps See sketches
HEIGHT	12' 6" 30'	At rest At maximum lift

Hydraulic specifications

OIL CAPACITY	30 gallons (Mobil DTE 24 Summer grade hydraulic oil)
ACCUMULATOR CHARGE PRESSURE	200 PSI Rotation 300 PSI Lift
OPERATING PRESSURE	1600 PSI max. Lifting 1100 PSI max. Turning

Electrical specifications

ELECTRICAL POWER	8 KW Three-phase
MOTOR SIZE	7½ HP
AIR PRESSURE	80 - 110 PSI

Greasing

WEEKLY	Thrust rollers Rotation pulleys Lift hoist Roller chain (Silicon Spray)
MONTHLY	Pivot bearings (one shot of grease)

System hydraulics

CHANGE OIL FILTER	After first full week of operation In high humidity climate, change oil and filter yearly In low or medium humidity climates, change oil every 2 to 3 years, and change filter every year

Air compressor

CLEAN air compressor intake filters YEARLY, or more often as needed

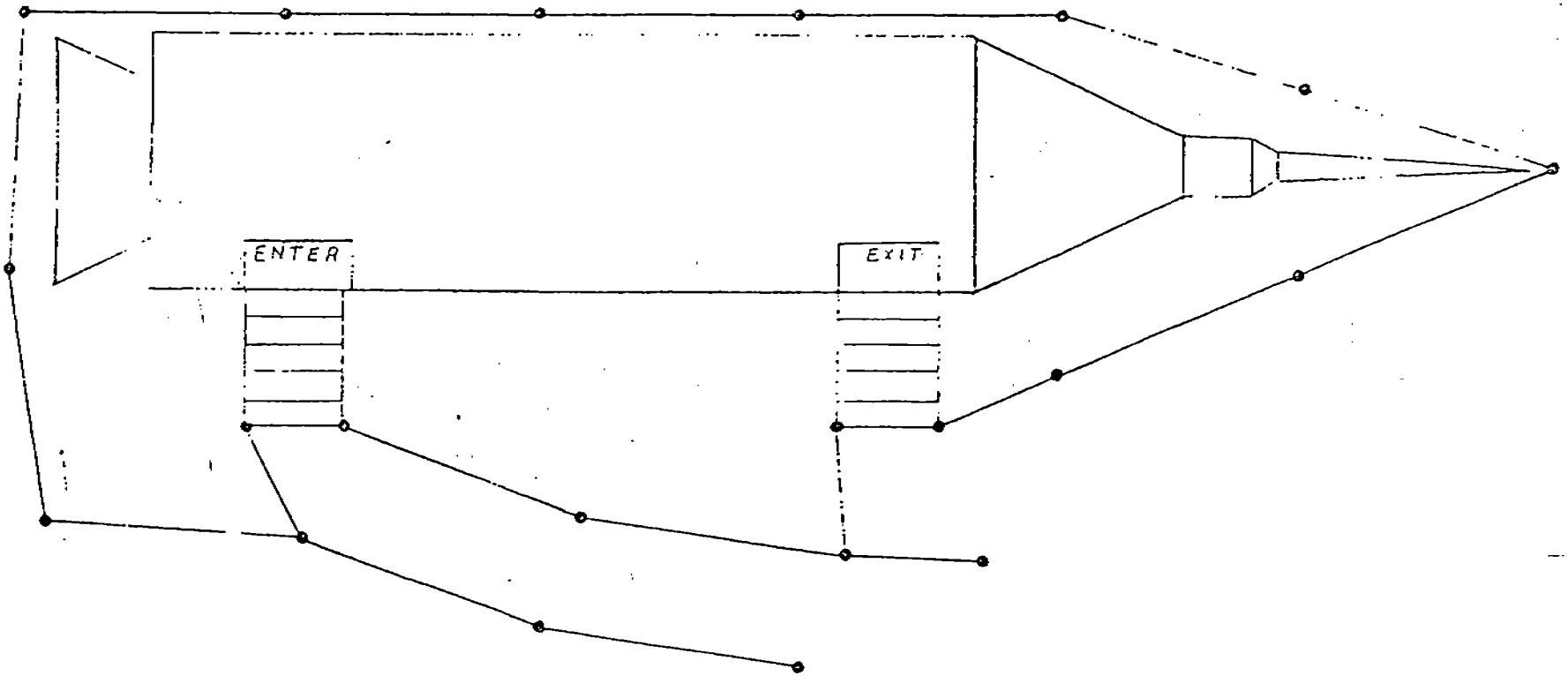
DRAIN condensed water from both air storage tanks DAILY

Projector

Technicolor model 1100 Super 8mm, with optical sound for U.S. projectors and magnetic sound for foreign projectors.
U.S. voltage 110 volts 60 Hz.
Foreign voltage 220-240 volts 50 Hz.

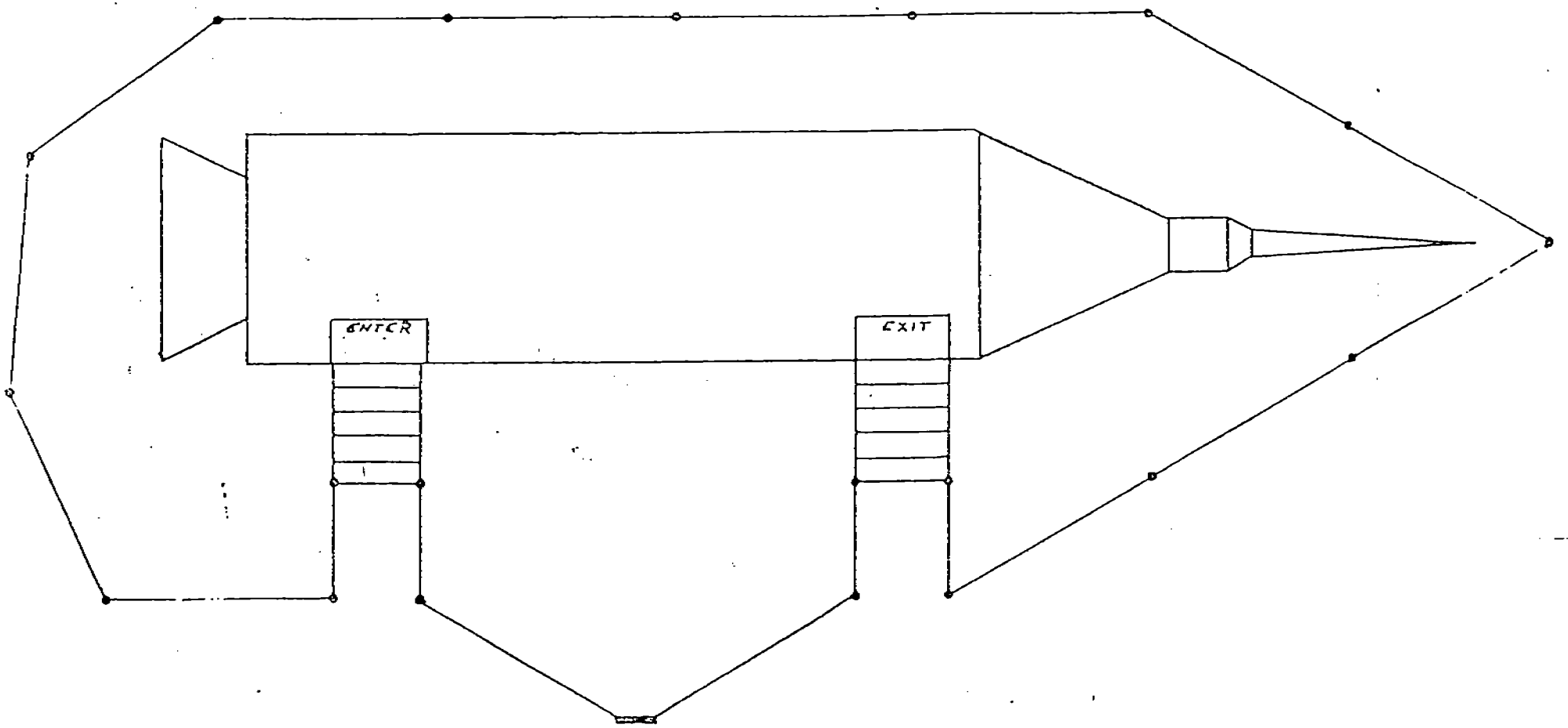
Projector lamp number (U.S. & Foreign) Sylvania EKE or EJV

Sound exciter bulb number (U.S. only) Sylvania BSS - BSB



FENCE LAYOUT

LENGTH 46' WIDTH 20'



FENCE LAYOUT
LENGTH 50' WIDTH 25'

OPERATING AMUSEMENT DEVICES - OPERATOR INSTRUCTIONS

The following are the correct loading (balance) procedures for amusement devices:

1. Every amusement ride must always be operated with a balanced load of passengers at all times.

2. The balancing rule is to ensure an even load on the ride's structure and mechanical drive, which in turn will cause less wear and tear and ensure a safer, longer life of the structure with less down time for adjustments and repairs.

3. In practical terms, consider the difference in driving a motor vehicle with balanced wheels as against unbalanced wheels, which causes vibrations and eventually wear and tear. The majority of operators have experienced driving a car with unbalanced wheels and the consequent results. Amusement devices are mostly large wheels and react the same as an automotive wheel when out of balance.

4. Although the out of balance load on some devices cannot be felt by the passengers or operator, it is still essential for the ride to be balanced.

5. On an extremely fast moving ride, it is essential that the ride be accurately balanced at all times.

6. Although it may not be strictly essential to balance slower revolving rides, it is still most desirable to achieve a balanced load, in the interests of the passengers and the owner of the ride, for increased safety and less "wear and tear".

SAFETY REQUIREMENTS

The key to safety is well trained and supervised employees. Make certain that all employees know how the ride operates. The employees should have a good attitude towards safety and common sense.

REMEMBER, SAFETY MUST ALWAYS COME BEFORE REVENUE.

Do not neglect the employees' safety. Before starting the ride, be certain there are no personnel inside the fences or on the ride structure. Be certain all electricity is turned off whenever an employee might come into contact with electrical connections or components. Safety helmets should be worn by all personnel when erecting or disassembling a ride.

GENERAL SAFETY GUIDELINES

The following is a list of a few general 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.

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 each day of operation to determine that no portion of the ride is damaged, omitted, or worn in such a manner that it is unsafe, or that unsafe conditions may develope.

3. Perform manufacturer's recommended maintenance procedures at intervals and in the manner specified by the Operation and Maintenance Manual, in the following general areas:

   a) Lubrication
   b) Air, Hydraulic, and Electical systems
   c) Torquing of bolts
   d) Wear of bolted or pinned joints
   e) Adjustment and care of mechanical components such as; brakes, clutches, and air compressors
   f) Passenger securing devices
   g) All parts are present and installed
   h) Operating and emergency controls
   i) Factory installed safety devices

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.

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

7. Wear close fitting comfortable clothing when working on or close to mechanical apparatus or live electrical circuits. Avoid finger rings, jewelery, or other articles which may 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 hard hats at all times. When working in elevated areas, use a safety belt.

10. Where work is to be performed is hazardous, such as live electrical circuits, at least two men should work together.

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

12. Clean up each job and dispose of surplus materials.

13. Keep a record of parts replaced and 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 the manufacturer's Service and Safety Bulletins.

OPERATOR RESPONSIBILITIES

1. HANDICAPPED PERSONS - Persons who are physically handicapped must not be allowed to ride violent or fast moving rides. If the management of the amusement area allow handicapped to ride certain slow rides, the operator must ensure that the handicapped person is under the full control of an adult person who will ride with them and provide supervision during the ride.

2. PROHIBITED PASSENGERS - Operators should not allow a passenger on the ride who cannot be properly secured due to his size or if there is a malfunction to the securing device. Similarly, they must refuse service to a pregnant woman, or a passenger who is visibly ill, or under the influence of alcohol or drugs.

3. CLEARANCE PRECAUTION - Before operating the ride, it is important to ensure that there are no personnel around the ride structure or any exposed electrical components or other areas where there could be a risk of injury.

4. ON-DUTY ATTENTION - Insist that each operator remain in full control of the operating controls during operation of the ride with complete attention to the ride and passengers. Under no circumstances should the operator leave his or her position while the ride is in operation.

   If it does become necessary for the operator to leave his post at the controls, he must turn the ride off completely to ensure it does not accidentally start and injure passengers or staff.

5. INSPECTION/CHECK LIST - Operators must inspect the ride and complete a General Check List before each day's operation.

6. DAILY WARM-UP - The operator must always run the ride through several cycles before the first passengers are loaded. This warm-up without passengers is necessary to make sure the ride is safe and there are no problems mechanically not detected previously,

7. PRECAUTIONS BEFORE AND DURING THE RIDE - Never start the ride unless the operator or assistant is facing the ride and is in a position to observe the whole area because:
   - Patrons have been known to jump fences.
   - Patrons have been known to try to change positions while the ride is running.
   - Patrons have been known to "skylark" causing their own

safety and that of others to be put in jeopardy.
- The operator's assistant may wish to make a last minute adjustment and be put in a dangerous position when the operator puts the ride in motion.

8. SMOKING - Smoking is not allowed in the Gravitron. This includes the operator as well as the passengers.

9. LOOSE ITEMS - The area inside the Gravitron must be clear of any items that can fly out to the edge of the ride when it gets up to speed.

10. FOOD AND DRINK - It is recommended that no food or drink be allowed onto the ride.

OPERATOR SELECTION AND INSTRUCTION

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

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 Manual for the ride he supervises.

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

   a) Determine that no portion of the ride is damaged, omitted or worn in such a manner that it is unsafe or that it may develope into an unsafe condition.
   b) Report any irregularities to the superintendent or owner.
   c) Do not operate the ride if any irregularities are found until such condition has been corrected.

4. Instruct the operator to allow no passengers to ride who are visibly ill, or under the influence of drugs or alcohol.

5. Instruct operators and attendants on the proper methods of securing passengers in the ride. Do not allow a passenger to board a ride if he cannot be properly secured because of his size or because there is a malfunction of the securing device.

   STOP the ride immediately if any passenger is observed moving from their seat, turning upside down, or behaving dangerously, such as standing up.

6. Advise the operator 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 each operator remain in full control of the operating controls during operation of the ride, and gives his full attention to the ride and its passengers.

8. Instruct the operator to let no other person, other than another trained operator, operate the controls of the ride, except those portions of the ride that are specifically designed to be controlled by the passenger.

9. Advise the operator that factory-installed safety devices are not to be tampered with or removed.

10. Advise the operator of owner/supervisor procedures for assisting ill or injured passengers.

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

TURN OF THE NUT METHOD

This method applies only to bolts with UNC threads. If the bolt is shorther than eight times its diameter, tighten the nut until the pieces being joined are snugged up. Put a reference mark on the nut or socket wrench being used and tighten the nut, while preventing the bolt from turning, until the nut has been turned an additional 1/2 of a turn. If the bolt is longer than eight times its diameter, proceed as above but tighten the nut 3/4 of a turn. This will apply a preload to the bolt that will be very close to the same value that would be achieved if a torque wrench had been used.

PNUEMATIC TIRES ON AMUSEMENT DEVICES AND SUPPORT VEHICLES

* It is strongly recommended to carry a quality spare tire and wheel for every type you have in operation, and inflated to pressure.

* Check pressures regularly on all tires in operation and maintain to manufacturer's recommendations.

* Unless unavoidable, it is strongly recommended that repairs or the fitting of new tires to rims be carried out by experts at recognized tire dealers using correct equipment.

***CAUTION

Respect the potential power and explosive force of air under pressure. Serious accidents have resulted from lack of awareness of the explosive potential of compressed air. Respect it as you would DYNAMITE.

The following pages of guidelines, safety precautions and procedures of tire changing are included to make all operators aware of the dangers that can be encountered by neglecting care and safety in handling tires and compressed air.

TIRE SAFETY - MOUNTING/DEMOUNTING

The following guidelines and safety procedures are intended to be used for reference only. Procedures will vary for different tire mounting equipment and different types of rims. If at any time an uncertainty exists about the method of assembly or component parts or use of equipment, consult specific equipment manuals.

The following precautions apply generally for all types of tires. In addition, each section emphasises specific precautions for each particular type of tire.

WARNING

FAILURE TO OBSERVE THE PRECAUTIONS OUTLINED IN THIS SECTION MAY RESULT IN FAULTY POSITIONING OF THE TIRE AND/OR RIM PARTS, CAUSING THE ASSEMBLY TO BURST WITH EXPLOSIVE FORCE SUFFICIENT TO CAUSE SERIOUS PHYSICAL INJURY OR DEATH.

CORRECT PROCEDURES- Do it this way.

1. Make sure that all Rims are in good condition for use - not damaged, dented, or deformed.

2. Remove valve core and exhaust all air from the tire (or tires in the case of a dual assembly) before demounting. Probe the valve stem with a wire as a final check to make sure the valve is not plugged. Do not stand in front of a valve opening as dirt particles may be blown into your eyes.

3. Block vehicle in a positive manner so it cannot roll forward or backward after it is jacked up.

4. Place large hardwood blocks under the jack, regardless of how hard or firm the ground appears.

5. Place safety jacks, or crib up with blocks at an appropriate place under the vehicle, in case the jack slips.

6. Check rim diameter to be sure it exactly matches the rim diameter moulded on the tire. If rim is multiple piece, check component parts to see if they are made by the same manufacturer.

7. Clean and inspect used rim parts thoroughly.

8. Use new tubes and new flaps in new tires.

9. Inspect inside of tire for loose cords, cuts, penetrating objects, or other carcass damage. Scrap tires that are beyond simple repair. Remove dirt, debris, and liquids from the inside of tire before tube is installed.

10. Lubricate with approved rubber lubricant, such as thin vegetable oil soap solution.

11. Use a clip on chuck and extension hose with remote control valve and pressure guage, long enough to allow you to stand to one side, not in front of the assembly, during inflation.

12. Center tire properly on rim before inflating.

13. Secure lock wheel down, or place assembly in safety cage or portable safety device before attempting to inflate tire to seat beads.

14. Check for proper flange and lock ring seating.

15. Adjust air pressure to manufacturer's recommended cold operating pressure, after beads have been seated.

16. Inspect valve cores or proper air retention. Replace damaged or leaky cores.

FAULTY PROCEDURES - Do not do it this way

1. Don't work on tire and rim assemblies until you have reviewed safety practices and procedures.

2. Don't loosen lug nuts on duals until all air is exhausted from both tires. A broken or cracked rim part under pressure could blow apart and seriously injure or kill if lugs are removed before air is exhausted.

3. Don't ever apply heat or do repair work on an inflated tire, rim, and wheel assembly. Heat can increase air pressure to a level sufficient to burst the tire or rim.

4. Don't reinflate a tire that has been run flat or seriously under-inflated without demounting the tire and checking the tire and tube for damage.

5. Don't mix rim parts of different manufacturers unless such use is approved by those manufacturers.

6. Don't attempt, under any circumstances, to rework, weld, heat, or braze rim parts. Replace damaged parts with the same size, type, and make.

Electric motor will not start.

The main areas to check when experiencing electric motor starting problems are:

1. Loss of 220 Volt three phase power,
2. Magnetic switch problems,
3. Bad coupling or frozen pump, or
4. Broken or shorting wiring.

The most frequent cause of a motor not starting is the loss of three-phase power. The basic testing technique for 220 Volt three-phase power is outlined on page 5 in the ELECTRICAL section. The test for loss of a power line should follow this sequence:

1. Test at top and bottom of fuses in the main fuse box. If a line is missing, replace the bad fuse or get 220 Volt power to the ride.
2. After pushing the motor start switch, check the output of the magnetic switch. Once it is determined that the problem is in the magnetic switch, all that is usually needed is cleaning the contacts and replacing them if necessary.
3. Check at the box mounted on the motor. If power is present and the pump is not frozen, then the motor is bad and must be replaced.

Two hints that will make trouble-shooting easier are:

1. When the motor hums and the pump is not frozen, this indicates one line is missing.
2. If there is no clicking sound when the magnetic switch is engaged, and if all three legs are present at the input of the magnetic switch, then the start-stop switch or the coil in the magnetic switch is faulty.

Electric motor runs, then stops.

When an electric motor shuts off after ten or fifteen minutes of operation, but CAN be started a few minutes later, the problem is that the overload protectors are kicking the magnetic switch off. If this happens when

the ride is delivered, the problem is that the overload protectors are too small.

It is possible that too light of overload protectors were installed; therefore, they kick out too easily, and should be replaced with the proper size. Another indication of undersized overload protectors is if the ride stops several times (when first started in the morning) and later runs fine. This indicates one of two possible problems.

1. Either the overload protectors are too small, and as the hydraulic oil warms up it requires less power to run the pump; or,
2. That hydraulic oil is too heavy for the climate where the ride is being operated.

NOTE: Whether to install larger overload protectors should be carefully decided. Operating a motor with oversized protectors can eventually cause the motor to burn up if the problem was that the hydraulic oil was too heavy for the climate.

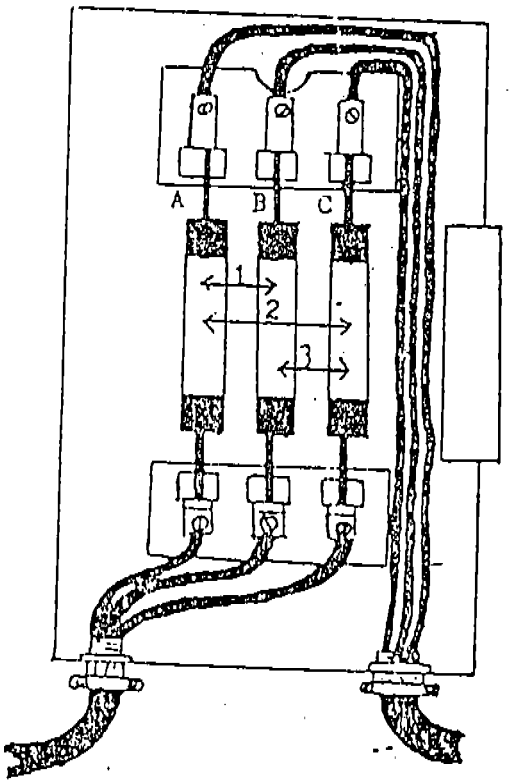
Procedure for 220 Volt three phase power check.

1. Check for 220 Volts between lines A-B.
2. Repeat Step One for lines A-C.
3. Repeat Step One for lines B-C.

A reading of 110 Volts indicates that one of the two lines being measured is missing. To determine which line is missing by completing all three steps of the power check. The common line between the two 110 Volt readings is the missing line.

For example:

A-B	220 V.	A-B	110 V.
A-C	110 V.	A-C	220 V.
B-C	110 V.	B-C	110 V.
Line "C" is missing.		Line "B" is missing.	



12 Volt System

Emergency lights are dim.

The 12 volt battery that is installed in the Astro-Liner is a five year no maintance battery. It is located on the off side of the trailer.

The emergency lights, the raising and lowering, and the front door are all controlled by the 12 volt system. If any or all of these fail, the first thing to check is that the battery charger, mounted next to the battery, is operating. The gauge will indicate whether the charger is operating. Check the battery connections for corrosion and good connections.

Ride will not raise or lower

If after a few hours of operation, or upon start-up, the ride will not raise, check that the 12 volt system is turned on at the operators panel. If the 12 volt system is on, the problem generally is that the 12 volt system has failed. The majority of the problems arise when the battery charger has become disconnected or shut off causing the battery to run down. Voltage to operate the solenoid valve that raises the ride is operated on the 12 volt system. The same situation will exist if the ride will raise, but not lower. The battery has been run down but has enough voltage to operate the valve once and raise but not enough voltage to lower the ride. Generally, the remedy is to lock the battery box so that no one can get in to unplug, turn off the battery charger, or borrow the charger.

Failure of the sound system.

There are three main components in the Astro-Liner that can cause total failure of the sound system:

1. The projector,
2. The wiring from the projector to the amplifier,
3. The amplifier itself.

The first item to check is that the amplifier is turned on, or has power. A red indicator light should glow when it is on and has power. If the projector is not producing a picture on the screen, stop the projector and remove the film cartridge. Examine the exposed film for a burned spot. If one exists, insert another film and return the damaged film for repairs. Once the amplifier is on and sound is not produced, the next quick check is to unplug the mono-phone plug out of the back of the projector. The sound on the film should come over the speaker that is built into the projector. If no sound is heard, turn up the large volume knob on top of the projector. If still no sound comes out, this indicates that the exciter bulb inside the projector is burned out or damaged.

If sound is heard at the projector once the mono-plug is unplugged, this indicates that either the amplifier or the wiring from the projector to the amplifier is defective. A quick visual check of the ends will generally show a broken wire or a short which is quickly fixed with a soldering gun. If the phone jack connections look tight, the only way to check for a break or short in the wiring is by using an ohmmeter. This requires unplugging both ends of the cable and using a long wire and the

ohmeter to test each side of the phone plug. If a cut is found in the speaker wire, it can be reconnected and the cut wires soldered together. Twisting the wires together is not a satisfactory method for repairing the cut because of the static that will be generated by the surrounding power wires and operating equipment. If the wiring is OK the amplifier must be replaced or repaired.

Distortion and static from the sound system.

Several problems may be the cause of distortion in this sound system:

1. Reverse polarity,
2. A loose speaker wire,
3. A loose exciter bulb or dirty exciter lens inside the projector,
4. A lack of lubrication on the film cartridge.

To correct the reverse polarity problem, reverse the two wires in the plugs in to correct this problem. This should improve the sound dramatically.

The next thing to check is that the volume on the projector (the large knob) is turned all the way down and then just barely cracked open again. With the amplifier turned on and the volume turned up, the person adjusting the sound on the projector should be able to hear when the sound quality and volume is improved and to adjust accordingly.

After approximately two to three months of operation, the film cartridge is usually in need of lubrication and rewaxing. When the projector is in need of lubrication,

it will usually put out a high-pitched squeal when it is running. The film may be sent to the shop to be rewaxed or lubricated for a nominal fee, as well as checked for any tears or distortion on the film. There are many Technicolor cartridge centers across the U.S. A list is in the back of this manual.

Lint on the film.

In the process of moving the ride, quite a bit of dust and lint may be picked up on the mirrors and lens of the projector. To clean this, a brush is furnished with each projector, and the instructions for cleaning the projector are included in APPENDIX THREE in the back of this manual.

Cleaning the screen.

The plastic used in this screen is "Lexan," which is unbreakable, but easily scratched. When the screen needs to be cleaned, a damp chamois or very soft cloth should be used. In the reference section of this manual is included some material from 3M Corporation on how to keep your screen static-free and reduce the amount of lint the screen attracts. Having the screen cleaned will enhance the picture and make the film more enjoyable.

Projector will not start.

With the Model 1100 Technicolor projector, using the remote start option, all three wires must be shorted together at the same time for this projector to start. If, for some reason, one of the wires comes loose from the remote start button (located on the operator panel), the projector will not start. Pull out the operator panel and check the wires connected to the projector start button for tight connections; then use the start-stop button mounted on the projector. If the projector will start, the problem is either located in the end of the wire plugged into the side of the projector, or in the remote start button. The two methods of checking are:

1. To make sure the plug in the side of the projector is pushed all the way in, and
2. To make sure all connections to this plug and to the remote start button are sound.

To check the remote start button, first of all, just short all three wires together. If this starts the projector, then the problem lies in the remote start button which would then need to be replaced.

If, when pushing the start-stop button on top of the projector the projector will not start, first remove the tape cartridge and see if it will start. If it still does not, then consult the owner's manual located in APPENDIX TWO of this manual. The owner's manual will indicate all Technicolor Dealers, Distributors, and a Toll Free telephone number to dial for service.

If the projector WILL start once the film is removed, then inspect the film for a small burned spot on one of the frames. This indicates the film has jammed in some manner; pulling the film through the cartridge will usually correct the problem. The best alternative, however, is to use a replacement film while the defective cartridge is being reconditioned and lubricated.

Projector starts, then stops.

Generally, when the projector starts then stops, this indicates the film cartridge has jammed or is not picking up the film as it should. Remove the film cartridge; then pull the film through for an inch or so. This should help the projector start. If this happens when first starting up on a cool morning, the problem may be that the film is cold and too stiff to pull through. After several minutes of operation, the film should become warmer and more flexible, and should pick up much easier.

If, after several months of operation the projector frequently fails to pick up the film, the film is in need

of lubrication and rewaxing. This can be done at our factory for a nominal fee or at one of the cartridge centers listed in the back of this manual.

Another possible problem is that the sound exciter bulb is burned out or loose in the camera. Replace as necessary.

Projector will not stop.

To be able to stop the Model 1100 Technicolor projector, all three wires on the remote start button MUST be isolated from each other. If one wire happens to break loose and touch another wire while the projector is running, the projector cannot stop. Remove the operator panel and check the wire connections. If all connections are good, make certain the phone-plug (located on the side of the projector) is pushed completely in.

Occasionally a film is sent out with out stops. All this entails is covering 2 sproket holes with tape at the end of each film segment.

Ride does not lift or Lower.

The lift for the Astro-Liner is controlled by a 12 volt solenoid valve. The 12 volt system is turned on and off by the main switch mounted on the circuit-braker switch next to the operator. If the ride fails to lift, the first item to check is this switch. Next, make sure the 12 volt trickle charger is on and charging. When the 12 volt battery runs down, the lift will be affected. To check the solenoid valve, turn off the hydraulic pump and have someone move the control handle back and forth. A dull clicking sound should be heard each time a valve is energized. If not, check for power to the solenoid valve when the control handal is moved. If power is not found, check for a faulty turn control switch, or bad wiring. Once power is getting to the solenoids, and the solenoids still do not work, one or both of the solenoid valve actuators are burned out and need to be replaced. Remember that the solenoid valve is 12 volt and NOT 110 volt.

When the pump is on, and no pressure is being developed, first check rotation of the pump. Then measure the oil level in the tank, which should be three to five inches below the top of the tank. The last thing to check, if no pressure is being developed and it has been determined that the pump is rotating in the proper direction, is whether the 12 volt solenoid valve is stuck in the lower position. This would dump all pressure and oil immediatly back into the tank and give no indication on the gauge that the pump is working. To check for a sticking valve, move the control handle inside the Astro-Liner. The pins sticking out of the 12 volt valve should move in approximately one half inch each time the valve is actuated. This should happen on both ends of the valve for each direction. If it does not, the valve is sticking because of a piece of dirt in the valve; this requires disassembling and cleaning the spool and valve block.

Pump makes a high-pitched squeal when running.

Two things can cause the squeal: air being drawn into the system, or a restriction after the pump. When air is being drawn into the system, it is usually caused by a low oil level in the tank. Measure the oil level. If foam is found in the oil, this would indicate that the level is too low, or that the suction line is loose and requires tightening.

Fittings leak.

When the ride is first delivered, all fittings should be tightened up. Do NOT tighten the swivel fittings excessively. One quarter of a turn after it is snug is sufficient. After the first 300 miles of moving, or the first week of regular operation, all fittings should be checked again.

Hoses are wearing.

Wrap all worn spots with a piece of innertube and clamp with a hose clamp.

Adjustment of pressure relief valve.

Loosen the locking nut. Turn the knob IN to increase the pressure, and OUT to reduce the pressure. Tighten the locknut again.

Ride is rough and turns violently.

When the Astro-Liner seems to stop suddenly each time you stop rotation and doesn't seem to have the cushioning effect it did when delivered, the problem could be related to the accumulaters. The accumulaters, which are mounted on the lift frame near the rotation cylinder, are charged with nitrogen to about 200 PSI. The accumulators act as shock absorbers in the rotation system. A picture is furnished to show the make-up of the accumulator. Inside is a bladder, which is filled with the nitrogen to a specified

amount of pressure. When pressure is applied to rotate the ride, the oil pushes in and compresses this bag. This causes the pressure, some of which goes into the accumulator, some which goes into the rotation system, causes the ride to slowly turn until the bag is filled. It then goes up to full rotational velocity. When the ride stops, some of this fluid from the accumulator is pushed out by the bladder, and causes the ride to turn a slight amount more after the valve is closes. This gives a cushion, or a balloon effect at the end of each rotation. This smooths out the ride and keeps the system from being torn up by the sudden and jerky motion.

CAUTION: DO NOT FILL THE ACCUMULATOR WITH ANY GAS, OTHER THAN NITROGEN, DUE TO THE CHANCE OF EXPLOSION.

THE RIDE CAN BE OPERATED WITHOUT THE ACCUMULATORS BEING CHARGED, BUT THIS WILL GIVE A ROUGH RIDE AND CAUSE EXTRA WEAR ON ALL PARTS OF THE ASTRO-LINER.

WHEN WORKING ON THE ASTRO-LINER MAKE SURE ALL PRESSURE IS RELIEVED IN THE ROTATION SYSTEM BEFORE CRACKING ANY HYDRAULIC LINES. APPROXIMATELY 200-300 PSI WILL BE STORED EACH TIME THE RIDE IS STOPPED.

(See diagram on page 15.)

Lift is jerky.

An accumulator is also used in the lift to smooth out the starting and stopping. It works the same as the accumulators on the rotation. Recharge the accumulator to 300 PSI with Nitrogen, if the ride becomes jerky.

Greer Bladder Accumulators Offer You

Operational Efficiency

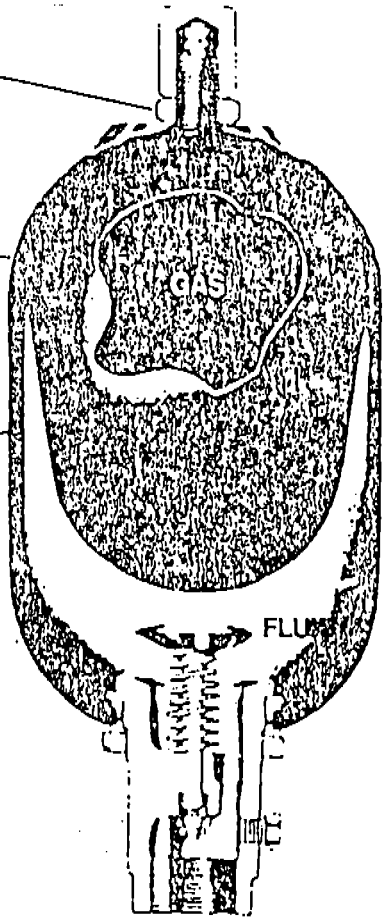
- Instantaneous response to system pressure variations (in milliseconds)
- High volumetric efficiency
- No loss of precharge when on standby for prolonged periods
- No permanent setting of seals
- Operational if stored for long periods

Reliability, Long Service Life

- Low cost convenient maintainability -- no costly machining to refurbish
- Seamless, homogeneous chrome moly steel shell
- No mechanical moving parts to wear out
- High tolerance to contamination

Safety

- Cannot be disassembled when pressurized
- Integral pressure relief feature
- Safety factor of 4:1
- ASME coded and stamped
- Complies with all applicable regulations pressure vessels: Coast Guard, Department of Transportation, insurance underwriters, and other federal, state and municipal agencies

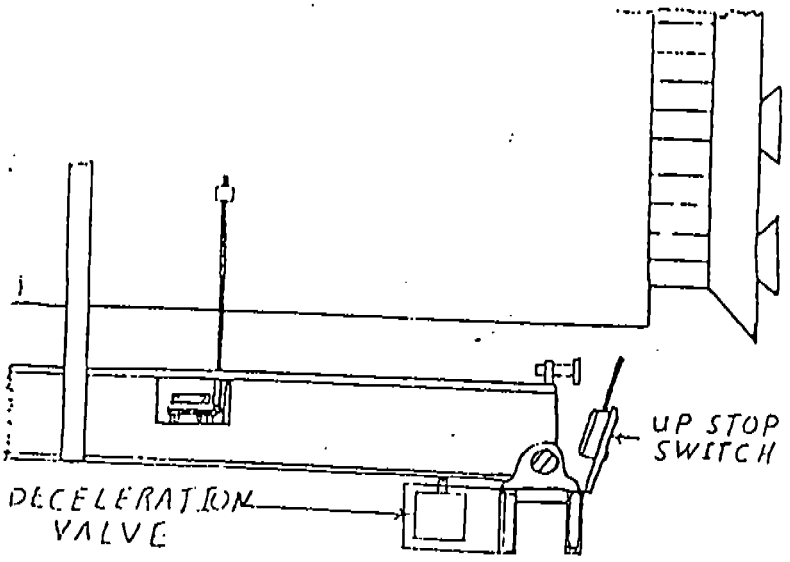


The gauge on the oil filter goes into the red zone.

When the gauge on the oil filter goes into the red zone, this indicates that the oil filter must be changed. The recommended changing periods are: 1) Change the filter after one week of regular operation, and 2) Change once per season thereafter. The oil filter is a spin-on cartridge as is on most automobiles. Only tighten it hand-tight, to prevent stretching or dulling of the threads on the filter and possibly causing leaks.

Ride hits hard when lowered.

When the Astro-Liner hits hard when it is lowered, the deceleration valve needs to be adjusted up. The valve is located underneath the lift hoist on the back side of the ride, near the pivot. To adjust the valve, loosen the four (4) mounting bolts and slide the valve up until the ride hits softly. (Caution): If the valve is tightened in a bind the spool can stick down and not allow the ride to lower.



OPERATING STRUCTIONS & PARTS LIST

OIL-LESS RECIPROCATING AIR COMPRESSORS

MODELS 2Z869 & 2Z870

DAYTON ELECTRIC MANUFACTURING CO. CHICAGO 60648

0575

Description

Your Speedaire Oil-Less Air Compressor is specifically designed to give long life under demanding conditions. Specially suited for providing compressed air for aeration, dental, food processing, pneumatic controls, computer electronics, OEM equipment — any field that needs clean oil-free air under continuous duty.

Specifications

Model	HP	Volts@ 60 Hz.	Max Press	Displ. CFM	Dimensions W	H	L	Wt.
2Z869	1/2	115/230	100 psi	3.5	11½	9	13½	38
2Z870	3/4	115/230	100 psi	4.7	11½	9	14	47

Approval: This unit is Underwriter's Laboratory listed. Guide is MEGR, file MP 1448 Power Operated Pumps.

Performance

	Model 2Z869						Model 2Z870					
Pressure PSI	20	40	50	70	90	100	20	40	50	70	90	100
Free Air CFM	3.00	2.55	2.35	2.06	1.80	1.70	4.10	3.60	3.40	3.00	2.60	2.50

Safety

Caution: Never lubricate this dry oil-less piston pump. The Teflon filled rings are self-lubricating and require no oil. The motor bearings are grease packed for the life of the bearing.

DANGER: To avoid explosive hazard, do not pump combustible liquids or vapors with these units.

Unit comes with pre-set safety valve. Do Not make any adjustments to this valve. If valve malfunctions, replace it. All electric wiring to this unit should be done in accordance with local and state codes. Unit should be electrically grounded for safety.

Installation

Electrical: Wiring instructions are located on plate covering electrical terminals. When wiring is completed, secure plate to original position. Do not discard this plate.

Use only discharge pipe or tubing ID equal to or greater than pump discharge port. Select a cool clean area for location of your compressor.

Operation

Do Not exceed maximum pressure on compressor.

When operating compressor under start-stop conditions, use properly rated pressure switch.

Maintenance

Cleaning: This unit requires NO flushing. Dust off filter felt as it becomes dirty. To replace felt, remove the plastic jar. The felt is held in place by an end cap, and a rivet stud which can readily be pulled out.

Inspection: Regular inspection may prevent expensive repairs. If pump or motor shows evidence of overheating or excessive noise, stop immediately for repairs.

Disassembly: It is not necessary to remove the filter from the cylinder head as metal chips could be dislodged and enter the unit. Remove the shroud, cylinder head, and valve components. Do not re-arrange the valve components. Remove the cylinder and rings. Make sure all parts are clean before re-assembling. DO NOT use any chlorinated solvents to clean valves, or any liquids to flush units. THE STAINLESS STEEL VALVES MAY BE CLEANED WITH WATER. All parts, except the valves, can be cleaned with any industrial, non flammable, non toxic, cleaning solvent.

Assembly: Install piston seals, piston rings, and the ri... ring on the piston. Locate ring joints approximately op... site each other. Attach cylinder to bracket with the cylinder screws and lock washers. Tighten screws finger tight. Move piston to top dead center position. Adjust the cylinder flush with the top of the piston and torque cylinder screws to 150 lb. in. Re-torque a second time. Stack the valve components in order as shown in the detail. The valve leaf is pre-bent and should not be adjusted in any way. Install the cylinder head, lock washers, and head screws. The exhaust ports in the cylinder head have been marked by omitting the ends of two of the fins. Torque the head screws to 95-105 lb. in. and re-torque a second time.

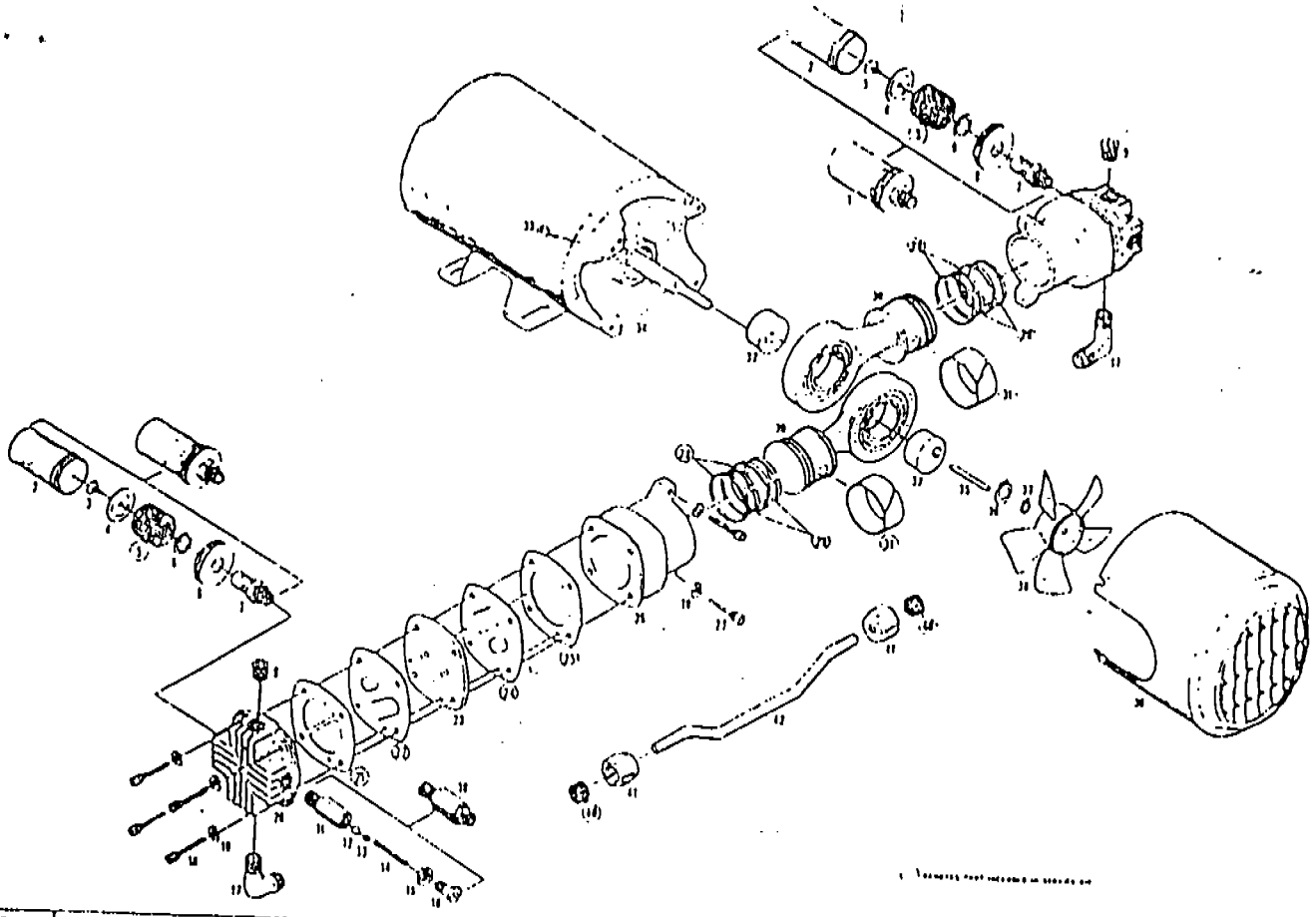
LIMITED WARRANTY

Speedaire Air Compressors are warranted against defects in workmanship or materials under normal use (rental service excluded) for one year from date of purchase to the original owner. Liability in all events is limited to the purchase price paid and liability under the aforesaid warranty is limited to replacing or repairing any part or parts which are defective in materials or workmanship and returned to our factory or Authorized Service Station, shipping costs prepaid.

DISCLAIMER. No warranty of merchantability or fitness for a particular purpose or other warranty, expressed or implied, other than the aforesaid is made or authorized by Dayton Electric Mfg. Co.

PROMPT DISPOSITION. Dayton will make a good faith effort for prompt disposition regarding any item which proves to be defective within warranty. Before returning any merchandise write or call Dayton Electric Mfg. Co. or dealer from whom product was purchased, giving date and number of origi... invoice and describing nature of defect. If merchandise ... damaged in transit to you, file claim with carrier.

DAYTON ELECTRIC MFG. CO., 5959 W. HOWARD STREET, CHICAGO, ILLINOIS 60648



Ref. No.	Description	Part No.	Qty. Req'd. For 2Z869	Qty. Req'd. For 2Z840	Ref. No.	Description	Part No.	Qty. Req'd. For 2Z869	Qty. Req'd. For 2Z840
1	Inlet Filter	B300A	2	2	23	Valve Plate	AF543	2	2
2	Jar	B306	2	2	24*	Valve, Inlet	AF544	2	2
3	Rivet Stud	B378	2	2	25*	Cylinder Gasket	AF521	2	2
4	End Cap	AA730	2	2	26	Cylinder	AF509	2	2
5*	Felt	B344A	2	2	27	Cylinder Screw	BB619	4	4
6	Retaining Ring	B307	2	2	28*	Piston Ring	AF541	4	4
7	Body	B303	2	2	29*	Piston Seal	AF540	4	4
8	Cap	B305	2	2	30	Piston Rod Assembly	AF561	2	2
9	Pipe Plug	BA503	2	2	31*	Rider Ring	AF595	2	2
10	Safety Valve	AF570S	1	1	32	Eccentric	AF515C	2	—
11	Body	AF608	1	1	32	Eccentric	AF515D	—	2
12	Ball	ST14A	1	1	33	Screw	BB411	4	4
13	Spring Button	AF579	1	1	34	Bracket	AF500C	1	—
14	Spring	AF609	1	1	34	Bracket	AF500D	—	1
15	Lock Nut	AA96A	1	1	35	Square Key	AB136D	1	1
16	Adjustment Screw	AA314	1	1	37	Retaining Ring	AC446	1	1
17	Manifold Elbow	AF637A	2	2	38	Fan	AF547	1	1
18	Hex Head Screw	BB619	8	8	39	Shroud	AF549	1	1
19*	Lockwasher	BC115	12	12	40*	Manifold Sleeve	AF567A	2	2
20	Cylinder Head	AF507	2	2	41	Manifold Nut	AF568	2	2
21*	Head Gasket	AF520	2	2	42	Manifold	AF550B	—	1
22*	Valve, Outlet	AF545	2	2	42	Manifold	AF550C	1	—

(*) Included in Service Kit #K263

How To Order Replacement Parts	Please provide following information: • Model Number • Serial Number (if any) • Part Description and Number as shown in Parts List.	Address order to: Dayton Electric Mfg. Co. CUSTOMER SERVICE DEPT. 5959 W. Howard St. Chicago, Illinois 60648

DAYTON 1-YEAR LIMITED WARRANTY

Speedaire Air Compressors are warranted by Dayton Electric Mfg. Co. (Dayton) to the original user against defects in workmanship or materials under normal use (rental use excluded), for one year after date of purchase.

Any part which is determined to be defective in material or workmanship and returned to an authorized service location, as Dayton designates, shipping costs prepaid, will be repaired or replaced at Dayton's option. For warranty claim procedures, see "Prompt Disposition" below. This warranty gives purchasers specific legal rights, and purchasers may also have other rights which vary from state to state.

WARRANTY DISCLAIMER. Dayton has made a diligent effort to illustrate and describe the products in this literature accurately; however, such illustrations and descriptions are for the sole purpose of identification, and do not express or imply a warranty that the products are merchantable, or fit for a particular purpose, or that the products will necessarily conform to the illustrations or descriptions.

Except as provided below, no warranty or affirmation of fact, express or implied, other than as stated in "LIMITED WARRANTY" above is made or authorized by Dayton, and Dayton's liability in all events is limited to the purchase price paid.

Certain aspects of disclaimers are not applicable to consumer products; e.g., (a) some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you; (b) also, some states do not allow limitations on how long an implied warranty lasts, consequently the above, limitation may not apply to you; and (c) by law, during the period of this Limited Warranty, any implied warranties of merchantability or fitness for a particular purpose applicable to consumer products purchased by consumers, may not be excluded or otherwise disclaimed.

PROMPT DISPOSITION. Dayton will make a good faith effort for prompt correction or other adjustment with respect to any product which proves to be defective within warranty. For any product believed to be defective within warranty, first write or call dealer from whom product was purchased. Dealer will give additional directions. If unable to resolve satisfactorily, write to Dayton at address below, giving dealer's name, address, date and number of dealer's invoice, and describing the nature of the defect. If product was damaged in transit to you, file claim with carrier.

DAYTON ELECTRIC MFG. CO., 5959 W. HOWARD ST., CHICAGO, ILLINOIS 60648

JANUARY 1, 1977

Model 1100

Features:

Easy Film Loading: The film is contained in a sealed cartridge to eliminate film threading, rewinding and take-up reels. Just snap in the cartridge and press the ON button, or remote control switch.

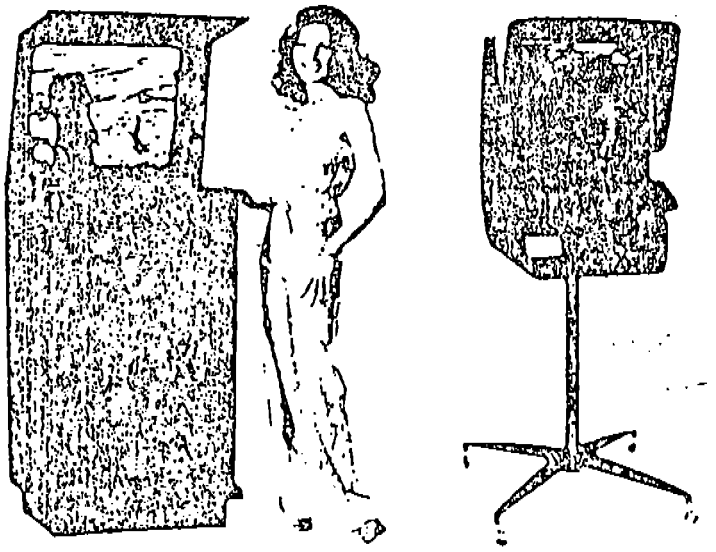
Long Life Lamp: The Model 1100 is equipped with a lamp-saver switch to extend the projection lamp life. The standard EKE lamp with a rated life of 200 hours will give 800 hours service in the lamp-saver position. This greatly reduces the need for spare lamps and eliminates frequent lamp changes. For the brightest picture, use the EJV lamp with a rated life of 100 hours and 400 hours in the lamp-saver position. There is also a spare lamp holder to keep an extra projection lamp handy.

Warranty: Your Technicolor dealer can give you the details for the Technicolor warranty of up to a full year.

Instant Service Insurance: An exclusive optional service program, Instant Service Insurance is available. If your projector malfunctions simply call the toll-free "Hot-Line" phone number. The problem can be solved via phone in over 40% of the cases. If a replacement is needed you'll have one within 72 hours...probably sooner.

Magnetic Sound or Optical Sound: You have the choice of optical or magnetic sound for economical film prints in large or small quantities.

Adapts to Mini Theaters: The Model 1100 is the heart of the Mini Theater line forming an attractive and complete projection system. When combined with either the Mini Theater 3000 or 7000 the Model 1100 is ideal for point-of-purchase, displays, training and entertainment.



Largest Cartridge Capacity: For longer presentations, the large Technicolor sound cartridge holds up to 31 minutes of optical sound film or 28½ minutes of magnetic sound film. However, the small, convenient, and economical Technicolor sound cartridge will suit most sales demonstrations with up to 12 minutes of optical sound film or 10½ minutes of magnetic sound film.

Exclusive and Reliable: Mechanical complexities of conventional motion picture projection equipment are eliminated in the rugged and dependable 1100 – the only cartridge loaded, front throw projector in the industry.

Specifications:

Size:	11"W x 8½"H x 14½"D 28cmW x 22cmH x 36cmD
Weight:	21 lbs. 9.5 kg
Projection Speed	24 frames per second
Lamp Type:	EKE – 21 volt, 150 watt tungsten halogen, average rated life 200 hours (800 hours in lamp saver mode) EJV – 21 volt 150 watt tungsten halogen, average rated life 100 hours (400 hours in lamp saver mode)
Power Source:	Domestic Models 60 Hz, 120 VAC, 300 Watts International Models 50Hz, 220 240 VAC, 300 Watts (with special international connector)
Sound System:	Solid state amplifier 7 watts output: 5 inch eight ohm speaker. Built in outlet for external speaker or headphones.
Synchronization:	Sound precedes picture in accordance with ANSI standards. Optical – 22 frames advance Magnetic -18 frames advance
Controls:	ON, OFF, and REMOTE ON, FOCUS FRAME VOLUME, LAMP-SAVER switch (all models) VOLTAGE SELECTOR switch (international models).
Projection Lens:	Technor 20mm f/1.1
Accessories:	Model 1100 Carrying Case - This extra strong carrying case gives your projector complete portability and protection. It has storage compartments for cartridge and spare lamp. Adapter Lens - For special picture size and projection distance applications Technor adapter lenses provide almost unlimited flexibility for your audio-visual needs.

Technicolor.
Audio-Visual Systems

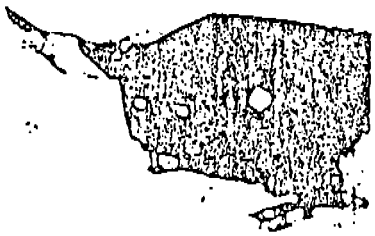
2949 Kelvin Drive Costa Mesa, CA 92626

OPERATION

Your new Model 1100 projector is easy to operate. For trouble free and reliable performance, take a few minutes to familiarize yourself with its features.

INTERNATIONAL MODELS: The power cord plugs into a socket at the rear of the projector. Select the proper voltage (220 or 240) on the voltage selector switch located behind the relamp panel. Remove the relamp panel located beneath the cartridge slot, by pulling outward on top of the panel. The switch is located at the far left behind the small pulleys, replace the relamp panel.

CONNECT POWER CORD: The power cord is connected at the rear of the projector. Plug it into an electrical outlet with a voltage rating the same as noted on the label on the bottom of the projector. For storage the cord may be wrapped conveniently around the three legs on the bottom of the projector.

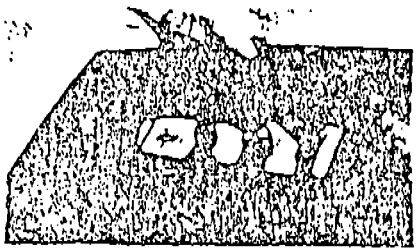


INSERT FILM CARTRIDGE: The cartridge is designed to fit into the slot only one way (square end first). The top side of the cartridge has a label area. Arrows indicate the direction of insertion.

Slowly insert the cartridge into the slot until it firmly engages with a distinct "click."

NOTE: FOR PROPER REPRODUCTION OF SOUND BE SURE THAT ONLY FILMS WITH A MAGNETIC SOUND TRACK ARE USED IN MAGNETIC SOUND PROJECTORS AND FILMS WITH AN OPTICAL SOUND TRACK ARE USED IN OPTICAL SOUND PROJECTORS.

TURN PROJECTOR ON: Push the ON button to start the projector. If it fails to start, check that the cartridge is completely inserted and the power cord is properly connected.



Adjust the VOLUME control as desired. The ELEVATION control is at the rear of the projector. Focus the image with the FOCUS control. If two partial images are projected on the screen, adjust the FRAME control until one complete image is on the screen.

CAUTION: DO NOT REMOVE THE FILM CARTRIDGE WHILE THE PROJECTOR IS OPERATING. THIS MAY DAMAGE THE FILM OR THE PROJECTOR.

The projector will normally stop at the end of the film. To stop the projector manually, press downward on the OFF button.

REMOTE START: The remote start cord supplied with the Model 1100 projector can be used to start the projector when the projector is inconveniently located. Plug the cord into the jack on the cartridge side of the projector and press the button to start the projector. To stop the projector press the OFF button located on the projector or make sure your film is programmed with a stop tape to automatically stop the projector at the end of the film.

LAMP-SAVER SWITCH: Your Model 1100 projector uses an EKE long-life lamp as its standard lamp. An optional, brighter short-life lamp an EJV can also be used.

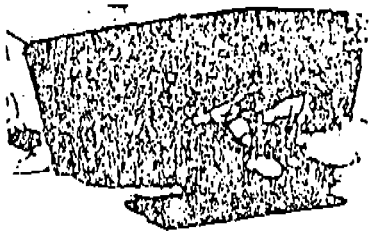
The lamp saver switch may be used to extend the rated life of both lamps with a minimum loss of brightness. The switch is at the rear of the projector.

The rated lamp life for the lamps is as follows.

	Switch Position	
LAMP TYPE	SUPERBRIGHT	LAMP SAVER
EKE	200 hours	800 hours
EJV	100 hours	400 hours

EXTERNAL SPEAKER: An external speaker jack is at the rear of projector. The internal speaker is automatically bypassed when remote speaker or headphone set with a standard ¼" plug is connected. Use headphones of 400-2000 ohms impedance. Eight ohm headphones or speakers can be used, but always turn volume down before inserting plug into jack.

MAINTENANCE



CHANGING THE PROJECTION LAMP: If the projection screen is not illuminated, the projection lamp has probably burned out. But first check that the lamp saver switch at the rear of the projector is not in the middle position. Disconnect the power cord. Remove the film cartridge. Remove the relamp panel, located beneath the cartridge slot, by pulling outward on top of the panel.

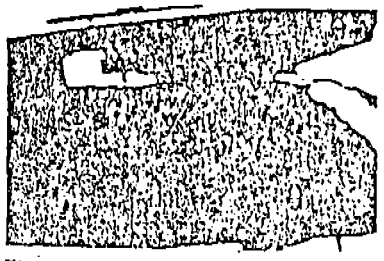
CAUTION: DO NOT HANDLE THE PROJECTION LAMP UNTIL IT IS COOL.

Grasp the handle at the base of the lamp and slowly pull down and out. Replace the lamp and re-insert the lamp holder and panel.

A spring and clip to hold a spare projection lamp (and exciter lamp on optical sound models) are attached to the relamp panel. To avoid disappointing your audience, always keep spare lamps with your projector. Replacement lamps may be purchased from your local Technicolor audio-visual dealer.

CHANGING THE EXCITER LAMP: If there is no sound, check to see that the volume is turned up and the correct film type is being used (optical sound films must be used in optical sound projectors and magnetic sound films must be used in magnetic sound projectors). If there is still no sound and you have an optical sound projector, the exciter lamp may be burned out. To replace the exciter lamp remove the knobs from the control panel, lift the panel out and follow the instructions on the underside of the panel. *There is no exciter lamp for magnetic sound models.*

GENERAL CLEANING: Periodically clean the exterior of the projector with a soft sponge dampened in a mild detergent. Dry with a lint-free cloth.



If the picture becomes fuzzy or uneven around the edges, use the supplied brush to clean the aperture opening. This opening is at the back of the cartridge slot, directly behind the reflector. To expose the aperture opening, move the reflector out of the way by pushing upward on the wire link. (Be sure *not* to smudge the *mirror*.)

The same brush may also be used to dust the projector optics located inside the projector and accessible through the front porthole.

Debris cleaned from the film by the electrostatic cleaner should be brushed from the machine periodically. Remove the volume and focus control knobs and lift out the control panel. Near the front of the uncovered area is a capstan shaft. Debris around the base may be removed with a brush. The brush may also be inserted to the capstan's base via the cartridge slot.

After the projector's warranty period has expired and periodically thereafter, return your projector to your Technicolor dealer for a thorough cleaning and lubrication.

Supplemental Warranty Service Center List

The following centers have been recently added to the regular list

California

General Production Service Inc
883 So East Street
Anaheim California 92805
(714) 535 - 2271

Educational Service and Supplies
4994 E University
Fresno California 93727
(209) 255 - 3038

H - T A V Service
928 North Fresno Street
Fresno California 93701
(209) 485 - 5033

KMR Electronics
2413 South Broadway
Santa Ana California 92707
(714) 979 - 0490

Zonar Corporation
406 So Bon View
Ontario California 91762
(714) 988 - 6406

Canada

Sharp s Theatre Supplies Ltd
104 4th Street South West
Calgary Alberta T2P 1R8
Canada
(403) 262 - 7454

Lambert Lepage Labbe, Inc
3275 Rue Prieur
Montreal Quebec H1H 2K4
Canada
(514) 322 - 0630

Canadian Super 8 Centre
205 Richmond Street W
Toronto Ontario M5V 1V5
Canada
(416) 363 - 2075

Florida

Southern Photo and News Inc
515 Marion Street
Tampa Florida 33602
(813) 228 - 0594

Georgia

Audio Visual Services Inc
223 East Broad Ave
Albany Georgia 31705
(912) 883 - 2110

Illinois

Visualcraft Inc
4820 W. 128th Place
Alsip, Illinois 60658
(312) 385 - 1919

Maryland

Milner - Fenwick, Inc
3800 Liberty Heights Avenue
Baltimore, Maryland 21215
(301) 664 - 2600

Massachusetts

New England Audio Visual Co
34 Cambridge Street
Burlington, Massachusetts 01803
(617) 273 - 1680

Michigan

Newman Visual Education, Inc
134 Manchester Avenue
Highland Park, Michigan 48203
(313) 868 - 4120

Superior Audio Visual Co
329 E Ayer Street
Ironwood, Michigan 49938
(906) 932 - 4411

Missouri

Communication Centers of America
9600 Manchester Road
St. Louis, Missouri 63119
(314) 968 - 5264

Montana

Northern School Supply, Co.
422 Second Street, S.
Great Falls, Montana 59401
(406) 453 - 4374

New Jersey

New Jersey Audio Video
516 Main Street
Boonton, New Jersey 07005
(201) 335 - 2342

New Mexico

Allied School & Office Products
Archie Westfall Corp
4900 Menaul N E
Albuquerque, New Mexico 87110
(505) 243 - 1776

New York

Audio Visual Sales & Service
1664 - 1666 Western Ave
Albany New York 12203
(518) 456 - 5060

Langie Audio Visual Co Inc
410 West Commercial Street
East Rochester New York 14445
(716) 385 - 4880

J - A Audio Visual Inc
346 W Fairfield
Westfield New York
(516) 987 - 0622

Ohio

Twyman Inc
329 Salem Ave
Dayton, Ohio 45401
(513) 223 - 4344

Pennsylvania

William C Johnston Co
5158 Peach Street
Kearsarge Plaza
Erie Pennsylvania 16509
(814) 864 - 0649

State College TV Supply
232 South Allen Street
State College Pennsylvania 16801
(814) 238 - 6021

Rhode Island

Lima Media Repair Service
4 Jackson Street
No Providence Rhode Island 02904
(401) 353 - 2578

Tennessee

MPL Laboratories
781 South Main Street
Memphis Tennessee 38107
(901) 774 - 4944

Texas

Kimball Moore Audio Visual
11078 Morrison Lane
Dallas, Texas 75229
(214) 241 - 0017

Audio Visual Educational Systems
Division of Jayark Corp
6116 Skyline Drive
Houston Texas 77057
(713) 783 - 6440

Travel Camera Service
1504 Fredericksburg Road
San Antonio Texas 78201
(512) 735 - 7411

Technicolor
Audio Visual Systems

Supplemental Warranty Service Center List

Utah

Inkley's AV Service Center
2363 Washington Blvd
Ogden Utah 84401
(801) 399 - 5504

Inkley's AV Service Center
1984 South State Street
Salt Lake City Utah 84115
(801) 486 - 3921

Virginia

Hoppmann Corporation
5410 Port Royal Rd
Springfield Virginia 22151
(703) 321 - 8800

The following are no longer Technicolor Warranty Service Centers.

California

Audio Visual Center

Connecticut

Unicorn

Iowa

Mar - Corn

Illinois

Visualcraft, Inc

Kentucky

Central School Supply

Louisiana

Interstate School Supply - Baton Rouge

Interstate School Supply - New Orleans

Massachusetts

Eastern Visual Enterprises

Unicorn

Michigan

Newman Visual Education, Inc. - Ferndale

Warranty Service Centers

The Technicolor Warranty Service Centers are conveniently located throughout the United States to provide you with rapid service in reparing your Technicolor projector whether it is in or out of warranty. Your product will be serviced at no charge for parts and/or labor while the warranty is in effect.

ALABAMA

Audio Visual Film Service, Inc.
2114 8th Avenue North
Birmingham, Alabama 35203
(205) 252-1949

ALASKA

Pictures, Inc.
811 8th Avenue
Anchorage, Alaska 99501
(907) 279-1515

ARIZONA

Zonar Corporation
2922 W. Weldon
Phoenix, Arizona 85017
(602) 264-2100

Zonar Corporation
1105 East Broadway
Tucson, Arizona 85719
(602) 624-3821

ARKANSAS

Allied Sound Visual Education
3520 West 65th Street, Suite 306
Little Rock, Arkansas 72209
(501) 568-2294

Arkansas School Service, Inc.
1911 Thayer Street
P O Box 2601
Little Rock, Arkansas 72203
501) 376-2417

CALIFORNIA

Buena Audio Visual Service
8206 Commonwealth Avenue
Buena Park, California 90621
(714) 523-4132

Audio Graphic Films
6509 De Longpre Avenue
Hollywood, California 90028
(213) 467-1234

Tapedeck
6611 Sunset Blvd
Hollywood, California 90028
(213) 464-4401

Graf's Camera Repair, Inc.
4129 Beverly Blvd.
Los Angeles, California 90004
(213) 665-5254

United Sound & TV Co
5036 Venice Blvd.
Los Angeles, California 90019
(213) 933-8141

Audio Visual Center
2655 El Camino Real
Palo Alto, California 94304
(415) 328-3440

United Sound & TV Co.
2300 E. Colorado Blvd
Pasadena, California 91107
(213) 793-8141

Universal Cinema Systems
610 Main Street
Pleasanton, California 94566
(415) 846-6934

Audio Graphic Supply, Inc.
810 North Waterman Avenue
P.O. Box 986
San Bernardino, California 92402
(714) 884-3175

Fremlian A.V. Sales & Service
883 Sneath Lane Suite 118
San Bruno, California 94066
(415) 871-9701

McCurry Companies
13th & Kay Street
Sacramento, California 95814
(916) 444-6080

Kurt's Camera Repair
7805 Mission Gorge Road
Time Square Center
San Diego, California 92120
(714) 286-1810

COLORADO

Colburn School Supply Co
1400 W. 3rd. Avenue
Denver, Colorado 80223
(303) 893-9931

Colorado Visual Aids Supply Co
1205 West 7th Avenue
Denver, Colorado 80204
(303) 573-8888

CONNECTICUT

Unicom, Division of United Camera, Inc
365 East Main Street
Branford, Connecticut 06405
(203) 481-2328

H.B. Educational Systems, Inc
21 Audio Lane
New Haven Connecticut 06519
(203) 777-5301

DISTRICT OF COLUMBIA

Ritz Camera Centers
607 14th Street N.W.
Washington, D.C. 20005
(202) 638-1707

Strauss Photo Technical Service, Inc.
1240 Mt. Olivet Road, N E
Washington, D C. 20002
(202) 529-3200

FLORIDA

Cook Consultants, Inc.
2510 S.W. 3rd Avenue
P.O. Box 22857
Ft. Lauderdale, Florida 33315
(305) 525-3355

Brandons, Inc
1027 Mary Street
Jacksonville, Florida 32207
(904) 398-1591

Spire Audio Visual Co., Inc
24 N W. 36th Street
Miami, Florida 33127
(305) 576-0844

Southern Photo Technical Service
1201 North Mills Avenue
Orlando, Florida 32802
(305) 896-0322

Southern Photo Technical Service
1750 Ninth Avenue North
St. Petersburg, Florida 33713
(813) 896-6141

Barber's Electronic Service
3811 Apalachee Parkway
Tallahassee Florida 32301
(904) 488-1234

Randall Educational Productions
707 Nicolet Avenue
Winter Park, Florida 32789
(305) 647-3186

GEORGIA

Calhoun Company Inc
6000 Peachtree Road N E
Atlanta, Georgia 30341
(404) 455-7610

Spire Audio Visual Co
2060 Peachtree Industrial Court
Chamblee, Georgia 30341
(404) 458-7626

Audio Visual Service Co
2642 Batavia Street
East Point, Georgia 30344
(404) 766-1101

HAWAII

El-Tech, Inc.
120 Mokauea Street
Honolulu, Hawaii 96819
(808) 847-2087

Film Service of Hawaii
Division of Servco Pacific, Inc
716 Cooke Street
Honolulu, Hawaii 96813
(808) 538-1978

IDAHO

Moore's Audio Visual Center Inc
2819 Camas Street
Boise Idaho 83705
(208) 336-0482

ILLINOIS

Visualcraft Inc
12842 S Western Avenue
Blue Island, Illinois 60406
(312) 385-1919

Midwest Visual Equipment Co., Inc
6500 North Hamlin Avenue
Chicago, Illinois 60645
(312) 478-1750

Technicolor
AUDIO-VISUAL SYSTEMS

Fox Photo
1351 E. Eldorado Street
Decatur, Illinois 62525
(217) 429-2473

REBCO Audio-Visual, Inc.
675 W. Imboden
Decatur, Illinois 62521
(217) 423-6968

Visualcraft, Inc.
Woodfield Grove Business Center, Suite #158
890 E. Higgins Road
Schaumburg, Illinois 60172
(312) 884-0131

Visualcraft Inc.
Capitol City Shopping Plaza
3107 Dirksen Parkway
Springfield, Illinois 62703
217 529-3646

INDIANA

Schmitt Photo Service Inc.
516 West Franklin Street
Evansville, Indiana 47730
812 424-8203

Shoemaker Motion Picture Company-
343 N. Capitol Avenue
Indianapolis, Indiana 46204
317 637-4808

Burke's Audio-Visual Center, Inc.
2201 South Michigan Street
P.O. Box 2799
South Bend, Indiana 46613
219 232-6958

IOWA

Pratt Educational Media, Inc.
200 3rd Avenue S.W.,
Cedar Rapids, Iowa 52404
(319) 363-8144

Mar-Com, Inc.
2745 Douglas Ave.
Des Moines, Iowa 50310
(515) 277-7137

KANSAS

Hoover Brothers, Inc.
400 Kansas Ave., Suite #203
Topeka, Kansas 66603
(913) 357-5294

Steve Smith Cameras, Inc.
623 Kansas Avenue
Topeka, Kansas 66603
(913) 235-3481

Hoover Brothers, Inc.
239 Pattie, Suite #1
Wichita, Kansas 67211
(316) 265-6272

KENTUCKY

Central School Supply Co.
Audio Visual & Electronic Division, Inc.
4100 Eastmoor Road
Louisville Kentucky 40218
(502) 459-6645

LOUISIANA

Interstate School Supply Co., Inc.
1838 River Road North
Baton Rouge, Louisiana 70821
(504) 387-5131

Interstate School Supply Co., Inc.
1622 Clio Street
New Orleans, Louisiana 70130
(504) 522-2663

Jasper Ewing and Sons Inc.
1904 Poydras Street
New Orleans, Louisiana 70112
(504) 525-5257

MARYLAND

Kunz, Inc.
207 E. Patapsco Avenue
Baltimore, Maryland 21225
(301) 355-7220

Ritz Camera Centers
112 W. Lexington Street
Baltimore, Maryland 21201
(301) 539-6827

Ritz Camera Centers
11710 Baltimore Avenue
Route #1,
Beltsville, Maryland 20705
(301) 782-4700
(301) 953-9600

Ritz Camera Centers
740 Dulaney Valley Road
Towson, Maryland 21204
(301) 825-9334

MASSACHUSETTS

Eastern Visual Enterprises, Inc.
11 Clarks Road
Amesbury, Massachusetts 01913
(617) 388-2900

Cinema, Inc.
234 Clarendon Street
Boston, Massachusetts 02116
(617) 267-0200

Harrison Harries, Inc.
20 1st Avenue
Chicopee Falls, Massachusetts 01020
(413) 592-6758

Unicom, Division of United Camera, Inc.
27 Pacella Park Drive
Randolph, Massachusetts 02368
(617) 698-0545

MICHIGAN

Rence Camera Service & General Repair
11425 Whittier Avenue
Detroit, Michigan 48224
(313) 839-7777

Newman Visual Education, Inc.
730 West 8 Mile Road
Ferndale, Michigan 48220
(313) 398-1140

Newman Visual Education, Inc.
400 32nd Street S.E.
Grand Rapids, Michigan 49508
(616) 243-3300

Newman Visual Education, Inc.
2518 S. Cedar Street
Lansing, Michigan 48910
(517) 485-1746

MINNESOTA

Blumberg Photo Sound Company
525 North Washington Avenue
Minneapolis, Minnesota 55401
(612) 335-1271

Century Communications Corporation
119 N. 9th Street
Minneapolis, Minnesota 55403
(612) 340-5620

MISSISSIPPI

Jasper Ewing and Sons, Inc.
610 North State Street
Jackson, Mississippi 39201
(601) 354-7844

MISSOURI

Maritz Laboratory, Inc.
1385 N. Highway Drive
Fenton, Missouri 63026
(314) 225-4300

Calvin Cinequip, Inc.
215 West Pershing Road
Kansas City, Missouri 64108
(816) 471-7800

Hoover Brothers, Inc.
1515 Baltimore Avenue
P.O. Box 1009
Kansas City, Missouri 64108
(816) 221-7663

Fox Photo
2838 Market Street
St. Louis, Missouri 63103
(314) 652-1300

Hoover Brothers, Inc.
1423 South Big Bend Blvd.
St. Louis, Missouri 63117
(314) 781-2284

Selco Audio Visual, Inc.
4400 St. Vincent Avenue
St. Louis, Missouri 63119
(314) 644-5155

Fox Photo
9120 Lackland Road
Overland, Missouri 63114
(314) 427-9120

MONTANA

Colborn School Supply Co.
2702 Montana Avenue
Billings, Montana 59101
(406) 245-3158

NEBRASKA

Stephenson School Supply Company
935 "O" Street
Lincoln, Nebraska 68501
(402) 432-7663

Fox Photo
7204 Jones Street
Omaha, Nebraska 68114
(402) 397-7210

REPLACEMENT OF BOLTS

During normal maintenance practices, it is necessary to replace some bolts. they work loose because they have not been checked periodically, or they become lost when they are removed to repair some component. The points we wish to stress are the following:

Bolts are identified by markings on the bolt head. Bolts without markings are generally grade 2 or 3 (common hardware store variety) and are not strong enough to be used on amusement rides in high stress areas.

When replacing any bolt, always use an equivalent or stronger bolt. Higher numbers mean stronger bolts.

NOTE: There are some bolts available above grade 8; however, these bolts are not to be used for general purposes. They are extremely brittle and are designed for special applications.

If trouble is encountered with bolts working loose, check the tightness according to the torque chart.

If certain bolts continue to work loose, remove the bolts and inspect the threaded holes. If threads are in good condition, clean the hole out with a non-oil base solvent and blow dry and apply "loctite" to the threads. After doing this, install new washer and bolt and torque as per the chart.

BOLT TENSIONING TORQUE

1. All tensioning pressures are for grade 5 bolts which have a tensile strength of 50 tons per square inch.

2. Bolts that are used continuously for portable ride erection should not be tensioned to maximum torque unless instructed to do so or they are in a high stress area.

3. Bolts tensioned to maximum torque should not be continuously reused and should be replaced with new bolts of equivalent strength.

4. Caution should be exercised in applying torque because in some cases, it may not be possible to utilize all the torque a bolt will stand because of distorting surrounding parts.

5. Lubricate bolts when using with SAE 30 oil or an approved anti-sieze compound.

CAUTION; Torque values are given for steel bolts and steel nuts screwed into threaded holes in steel. Be certain threaded parts are not aluminium, brass, or other soft alloys.

BOLT TORQUE CHART

Bolt Size Grade 5	Max Torque	Recommended Torque Reusable Bolt	Recommended Torque Permanent Bolt
U.N.C.	ft.lbs.	ft.lbs.	ft.lbs
3/8	27	24	26-28
1/2	66	55	60-66
5/8	130	95	125-130
3/4	230	180	220-230
7/8	370	290	360-370
1	560	480	540-560

Maximum torque listed is 65% proof load of bolt

NOTE: It is important to note the necessity of lightly oiling bolt before use as outlined above.

TORQUE METHODS- No torque wrench

Leverage Method:

The average 200-225 lb. mechanic, while standing on his feet, can apply a steady pull with his good arm (right arm if right handed, etc.) of between 100 and 110 lbs. This pull is obtained without bracing his feet or free hand against any solid object such as a work bench or the machinery being worked on.

If a torque of any given value is desired, it becomes a simple matter of leverage. If the mechanic in question is tightening a 7/8" UNC thread bolt wich recommends 520 ft lbs of torque, this value can be reached by using a heavy duty socket wrench and slipping a 5 ft. length of pipe over the handle of the wrench.

Thus, if the mechanic can exert a 100 lb pull, 5 feet times 100 lbs. would equal 500 ft lbs. Any other torque desired can be reached by simply dividing the desired torque value by approximately 110 to determine the length of the pipe or "cheater" bar that is needed.