

Installation and Maintenance Manual

Model 9507 Curtain Lift Machine



WARNING

This machine is rated for a maximum load of 1200 pounds at the drum surface. Exceeding this limit will cause permanent damage to the machine and may cause catastrophic failure of some or all of its components.

A 230 volt, 3-phase, 60hz power supply is required to operate this machine.

This machine must be wired in accordance with local and national electrical codes.

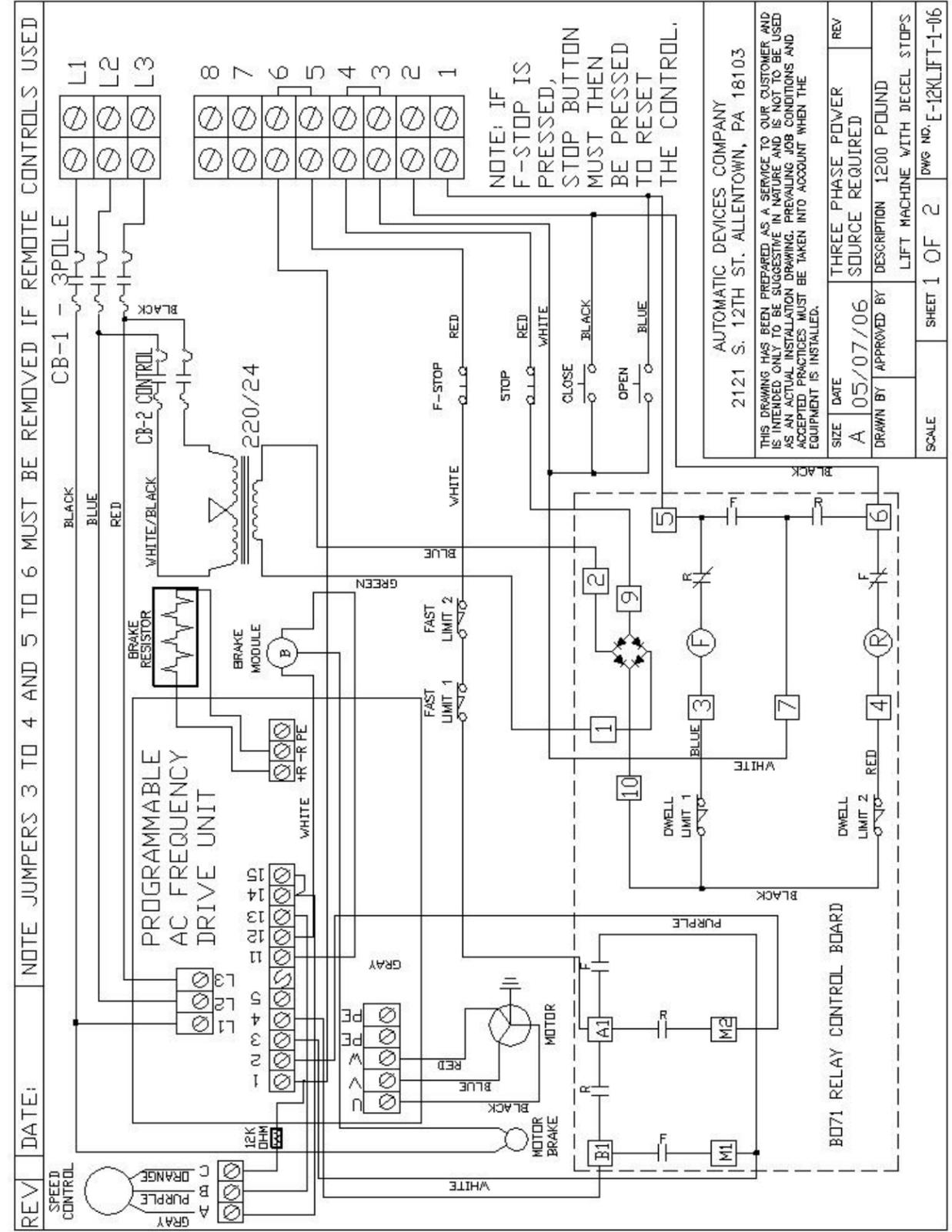


AUTOMATIC DEVICES COMPANY
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Technical Specifications

Input voltage source	230 Volts
Input source phase	3
Input source current	20 amps
Control Voltage	24 VAC
Control breaker rating	2 amps
Control Input Type	N.O. Momentary (except Stop and FStop)
Stop Input Type	N.C. Momentary
FStop Input Type	N.C. Maintained
Motor Rating	5 HP
Drum Size	6"D x 14"L
Cable Speed	0 to 54 fpm
Maximum lift load	1200 pounds (at surface of drum)

MODEL 9507 LIFT MACHINE



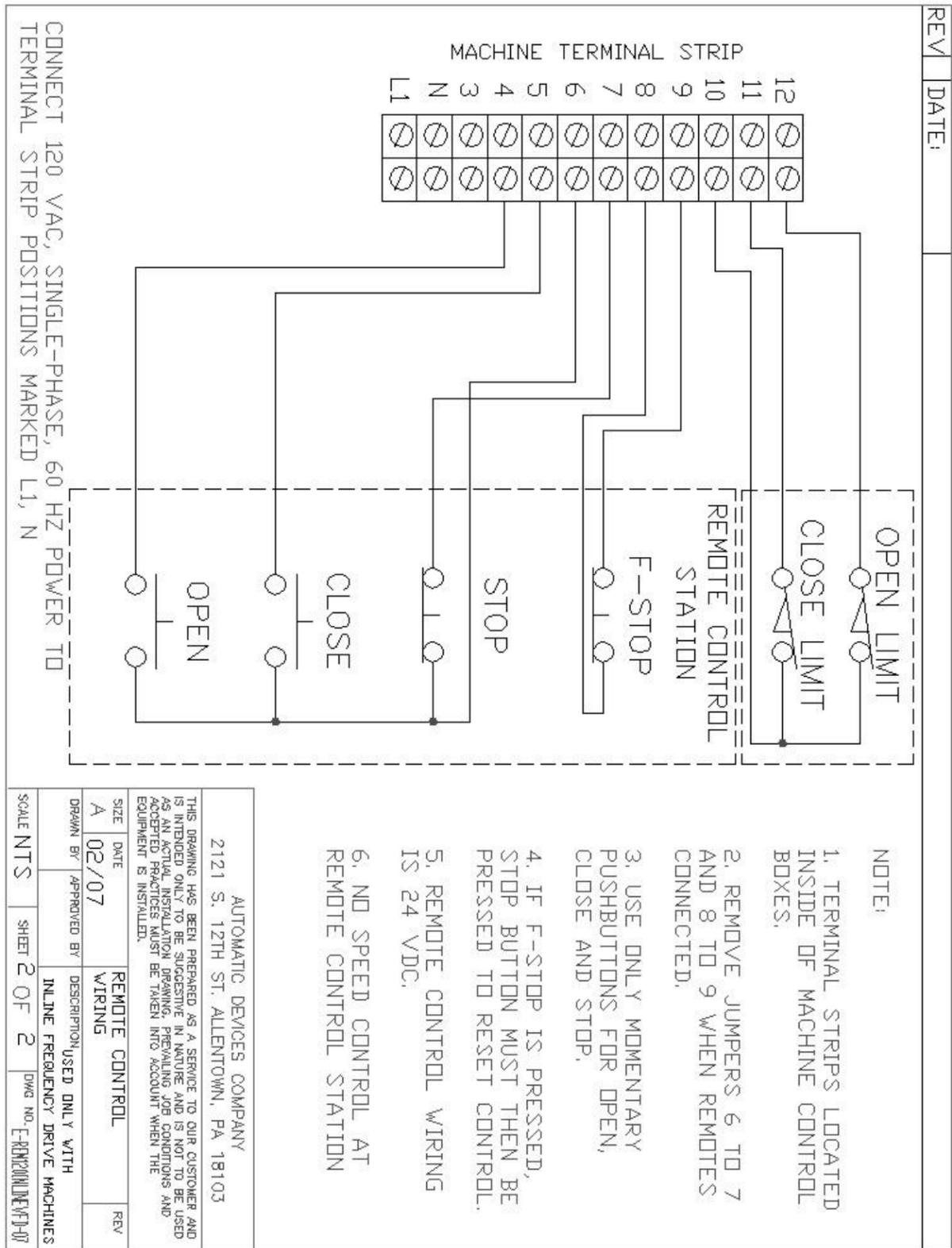


Table Of Contents

General information and Warranty	1
Loss or Damage	2
Machine Description	3
Installation and Start up	4
Setting the Limits	5
Cable Attachment	6
Maintenance	8
Troubleshooting and Repair	9
Notes on Frequency Drive	12
Wiring diagrams	15 & 16

Curtain Machine Instruction Manual ADC 9507TV Lift Machines

1. General Information

1. INTRODUCTION

1A. WARRANTY:

(a) Our equipment is guaranteed against defective material and workmanship for a period of one year from date of shipment, provided however that any claim for defective material or workmanship must be made in writing received by us within the appropriate warranty period, and the material or equipment claimed to be defective returned to us whose liability under this guarantee shall be restricted to the replacement or repair of defective materials and workmanship. In no event will we honor any claim for special or consequential damages, nor will we accept back-charges for work performed on our equipment.

(b) If any modifications or alterations are made to our equipment without our prior approval in writing, our warranty automatically becomes invalid.

(c) Our guarantee against defective material and workmanship applies only to the normal and conventional use and application of our equipment, as operated or capable of operation on our plant testing facilities. The guarantee does not apply to unusual, unique, untested or unconventional use and application.

(d) Commodities not manufactured by us are warranted and guaranteed only to the extent and in the manner warranted and guaranteed to us by the manufacturer, and then only to the extent we are able to enforce such warranty or guarantee.

(e) We will not guarantee the satisfactory operation of our curtain machinery when used with curtain track not of our manufacture.

(f) We will not be held responsible for the failure of our equipment to operate properly at the point of installation unless all information, instructions and drawings requisite to the installation of our equipment and to existing job site conditions are furnished to us in writing prior to our formally acknowledging the order. The above warranty provisions will not apply if it is concluded by us that

TECHNICAL NOTES:

- Model "TV" machines are equipped with inverter duty motors. Do not replace the motor with a standard duty 3-phase motor.
- It is suggested that the machine's frequency be limited to 60 hertz in order to prevent premature wear of the machine and track components.
- If deceleration ramps are used, verify that the machine shuts off prior to the end of the dwell limit cams. If the limit cams release the limit switch during operation the machine will accelerate and continue to run.
- The frequency drive is sized according to the horsepower and voltage of the machine's motor. Do not use a motor of any other horsepower or voltage.
- In most cases the frequency drive's programming section is password protected. A default password is installed at the factory and can be found in the documentation provided with the machine. It is suggested that the password be changed to a user specific password, once the machine installation is complete.
- Not all of the parameters available on the frequency drive can be used with the machine. Verify that the parameter being changed or added, will work with the machine provided.
- The machine provides its own control signal. Do not input any outside control voltage or control signal to the machine.

NOTE: ALL WIRING TO AND FROM THE MACHINE MUST BE DONE IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.

All field wiring is connected to a barrier type terminal strip located inside of the machine's control box. The strip(s) positions are labeled.

All curtain machines must be grounded. A ground terminal is provided in the control box.

Provide a properly sized electrical service for the voltage and current draw of the machine. Though these machines are equipped with 3-phase inverter duty motors, the machine(s) can be fabricated for input voltage sources of; 120 VAC, 220 VAC single phase, 208/220 VAC three phase and 460 VAC three phase. Specifications for the voltage, current, and frequency for the machine can be found on the ADC serial number plate located on the machine's control box cover. A separate branch circuit for each machine is suggested.

In most cases the control circuit is a Class 2 circuit and must be wired accordingly. In most cases the remote control station(s) will operate control relays located in the machine's control box. Depending on the type of relays used, the control circuit could see a maximum inrush load of 100 VA.

If the machine has remotely located speed, fault, indication, etc. controls or indicators please see the manual and schematic provided with the machine for specifications on these circuits.

PROGRAMMING

Model "TV" machines are furnished with a wide variety of control circuits and thus the drives are provided with a wide variety of programs. Each machine is furnished programmed with a basic set of parameters from the factory. These parameters, as well as the rest of the drive parameters, can be reprogrammed in the field to meet the project specifications. To reprogram the drive please see the manual for the frequency drive controller that was furnished with the machine.

Note that depending on the type of drive used, it may be necessary to use a personal computer or user interface module to program the drive.

MACHINES EQUIPPED WITH "FAST STOP" LOOPS

This machine includes a "Fast Stop" loop in addition to the standard stop loop. The machine will need to be electrically reset after the "Fast Stop" circuit has been activated. Simply press the standard Stop pushbutton on the machine or remote control to reset the machine.

our equipment was not properly installed and that without our prior approval alterations and/or modifications were made to approved shop drawings supplied by us and/or to the job site, subsequent to the submissions of the aforementioned information, instructions and drawings.

(g) The giving of or failure to give any advice or recommendations by us shall not constitute any warranty by or impose any liability upon us.

(h) No liability whatsoever shall attach to us until said products have been paid for.

(i) In the interest of improving the operation, appearance and production of our equipment, we reserve the right to make design changes at any time without giving prior notice to the trade.

1B. LOSS OR DAMAGE:

Even though most shipments are delivered in perfect condition, there is always the possibility of loss or damage. In order to eliminate the possibility of inconvenience and possible additional expense, we urge that you carefully follow these suggestions: When a shipment is delivered to the carrier their agent receipts for it in good condition. It is securely packed; otherwise, they would not accept it and according to the terms on the Bill of Lading, a legally binding contract, the carrier agrees to deliver it to you in the same perfect condition. If these goods are damaged, they should not be accepted until the carrier's agent has noted on the Freight Bill which he will give you, the nature and extent of the damage. He is required to do this. In the same manner, if any goods are lost in transit, have shortage noted on the Freight Bill by agent. The agent's opinion that carrier is not responsible does not bar your claim. He is required to refer your claim to his Claim Dept.

Concealed Damage: If there should be damage or loss of such a nature that it could not be detected until the goods were unpacked, have the transportation company's agent call AT ONCE and make inspection. Require him to give you a written "Concealed" Bad Order Report, stating the condition of the goods when examined. It is his duty to do this, and you should insist upon it. If he fails to inspect on request, notify by mail within 15 days of delivery and keep a copy of your letter.

We are always willing to handle claims for loss or damage in shipment if the above instructions are complied with. Notify us immediately supplying us with an inspection report if such an incident occurs.

1C. MACHINE DESCRIPTION:

This curtain machine utilizes a 3-phase inverter duty AC motor, connected to a right angle gear reducer. This model machine is supplied with an 8" (diameter) grooved cable drum, wheel mounted directly to the output shaft of the gear reducer. A gear driven rotary limit switch is also included with this model machine which provides signals for the deceleration ramp for each direction as well as emergency stop limits. The limit assembly is driven by the gear reduction unit via roller chain and sprockets. All electrical components for the machines are located in or on the NEMA 1 control box mounted to the machine. These devices include, but are not limited to: a disconnect switch, overload protective breaker, directional pushbuttons, inverter module, brake relay, control relays and board, and terminal strips. One (1) four-button remote control station is provided for remote operation of the machine, additional stations are available upon request.

TV style machines are equipped with MCS control circuit (described within) provides a low voltage control interface.

The MCD control of TV model machines engages the input of an independent AC frequency drive module which powers the inverter duty three-phase motor directly. The frequency drive board can provide the following options for the machine:

- Variable speed operation
- Maximum obtainable speed
- Minimum obtainable speed
- Deceleration ramp
- Acceleration ramp

TV machines can use only one (1) speed control potentiometer either remotely or locally located. However, any number of RCS-1TV (OPEN, CLOSE, STOP, F-STOP) remote control stations may be used with these machines

Instructions are provided in this manual for the installation, maintenance, troubleshooting and repair of Model 9507TV machines. Standard schematic wiring diagrams are provided and are detailed to show control function, rather than precise electrical connections.

1D. RECEIVING, HANDLING AND STORAGE:

Defective Motor	Check current draw
Dry Motor Bearings	Inspect and lubricate (power removed)
Dry Gear Reducer	Inspect and lubricate if needed
Defective Parts in lift rigging	Replace as Required (power removed)
Incorrectly Assembled	Check track instructions
Lift Rigging	

6I. SYMPTOM: MOTOR STOPS PREMATURELY

POSSIBLE CAUSE

Low Line Voltage	Check with meter
Defective Stop Button	Check with meter (power removed)
Defective Limit Switch	Check with meter (power removed)
Deceleration ramp time too short	Reprogram ramp time (see manual)

**ADDITIONAL NOTES FOR MACHINES EQUIPPED
WITH FREQUENCY DRIVE CONTROLLERS
MODEL NUMBERS ENDING WITH "TV"**

DESCRIPTION:

Model "TV" machines are fabricated with electronic frequency control modules which allow the user to set various operating parameters for the machine in the field. The machines are fabricated in a variety of styles and use a variety of frequency drive types. Each machine is shipped with a programming and operating manual specific to the model controller used.

Various control circuits are provided with these machines. Basic models offer start/stop/reverse pushbutton operation with analog referenced speed signals. This manual provides an overview of basic machine operation and parts. Please see the drive manual and electrical schematic provided with the machine for information on programming or operating the machine.

BASIC INSTALLATION:

See Sections 2 through 5 of this manual.

WIRING:

6E. SYMPTOM: CIRCUIT BREAKER TRIPS

POSSIBLE CAUSE

Wrong Incoming Voltage	Check with meter
Defective Motor	Check current draw
Overloaded or Machine Too Small	Check load
Defective Power Wiring	Check for short circuit (power removed)
Also Check Items Under 6D	Proceeding section

6F. SYMPTOM: FUSE BLOWS

POSSIBLE CAUSE

Faulty Remote Switch Wiring	Check with meter (power removed)
Loose Connection in Control Enclosure	Tighten as required (power removed)
Wrong Fuse	Replace with proper size and type (power removed)
Defective Mechanical Interlock	Replace contactor if jammed (power removed)

6G. SYMPTOM: MACHINE WILL NOT STOP AT LIMIT SETTING

POSSIBLE CAUSE

Faulty Remote Switch Wiring	Permanent Connection Between #1 and #2 correct (power removed)
Open and Close Buttons Activated Simultaneously	Correct (power removed)
Faulty Control Relays, (If Connected to Automated Control)	Check and correct (power removed)
Loose Limit Switch Drive Sprocket	Tighten set screw (power removed)
Broken Limit Switch Chain	Repair or replace (power removed)

6H. SYMPTOM: MOTOR OVERHEATS

POSSIBLE CAUSE

Wrong Incoming Voltage	Check with meter
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Handle and unpack machine carefully. Do not pick up the machine by the control box, limit switch, or by any parts extending from the unit. Use the supporting base and/or the frame for handling the unit.

Immediately upon arrival, check the shipment for concealed damage and make certain that remote switch station, and other items, if ordered, are included. Any damage or missing items should be reported as soon as possible as outlined in 1B.

Equipment which will not be installed immediately should be stored in a clean dry location. Precaution should be taken to prevent moisture, dust and dirt from accumulating in storage and installation areas.

2. MACHINE INSTALLATION AND START-UP

2A. MOUNTING:

This curtain machine is designed to be mounted base down using the mounting holes provided in the base. The machine is normally mounted beneath and in line with the headblock of the lift rigging. The lift machine can be mounted in other locations, such as above the lift rigging, or off to one side but special pulleys are required for other than the normal location described above. Wherever the machine is located, it is important that the operating cables are properly located so that they do not bind, or rub against the sides of the pulleys or against any other objects. The machine must also be located a distance from the last pulley which will keep the fleet angle of the operating cord to less than 2 degrees at any point of its operation.

IMPORTANT: METAL MACHINE GUARD MUST BE INSTALLED IN ORDER FOR MACHINE TO REMAIN IN COMPLIANCE WITH UL STANDARDS.

2B. WIRING:

Provide adequate service for current rating of machine, as indicated on nameplate. A separate branch circuit for each machine is recommended.

Control wiring should be sized according to the type of machine being used. This machine is designed such that the control switches engage electrical relays and thus the maximum in rush control power is limited 100 VA or less for most machines. This machine is equipped with low-voltage control (LVCS) which

lowers the control voltage of the machine to 24 Vac.

Note: Some machines control circuits are Class 2 circuits and must be wired according to NEC standards for Class 2 circuits.

All curtain machines must be grounded. A green ground terminal is provided inside of the control box for this purpose.

Make certain that proper voltage is connected to the unit. DO NOT use an extension cord to provide power to the unit since this will result in a voltage drop to the machine which may cause erratic operation and faults. Check the identification plate of the machine for voltage requirements.

2C. START-UP:

Before applying power, make certain that all parts are free moving and that, if the drum or sprocket rotates, nothing can accidentally engage some nearby object or person.

It is suggested that, if possible, initial start-up be made without cables attached to the drum in order to eliminate mechanical problems which might occur if erratic operation is encountered.

With power applied, and unit either clear of obstructions or connected to cables in a manner which will allow free movement, press either the "OPEN" or "CLOSE" push-button of the machine. The motor should start and the drum of the machine should rotate. Pressing the "STOP" push-button (red) should cause the machine to go into its deceleration ramp and then stop all. Pressing the F-STOP button should cause the machine to come to an immediate stop, by-passing all deceleration ramps and lock-out the machine's operation until a reset command (pressing STOP button) is issued. The machine should operate in the opposite direction of initial movement when remaining push-button is pressed, after machine has stopped. Electrical interlocks prevent reversal while machine it is operating.

2D. SETTING THE LIMIT SWITCHES:

If the machine appears to be operating normally, and complete installation is to be made at this time, remove cover from limit switch, located in small metal enclosure directly above gear reducer. Press either the "OPEN" or "CLOSE" push-button and observe the movement of limit switch cams.

Defective STOP or F-STOP Button section) (power removed)
 Check with meter (power removed)

6B. SYMPTOM: MACHINE RUNS IN ONE DIRECTION ONLY

POSSIBLE CAUSE

Defective Push Button	Check with meter (power removed)
Defective Mechanical Interlock	Replace contactor if jammed (power removed)
Limit Switch Activated	Rotate plastic cam (power removed)
Defective Limit Switch	Check with meter (power removed)
Defective Control Relay	Check relay operation with meter.

6C. SYMPTOM: NOISY MACHINE

POSSIBLE CAUSE

Dry Motor Bearings	Inspect and lubricate if needed (power removed)
Dry Gear Reducer	Inspect and lubricate if needed (power removed)
Loose Parts in Control Box	Tighten as required (power removed)
Loose Machine Mounting Bolts	Tighten as required (power removed)
Machine Mounted on Hollow Object or Wall	Change location or isolate

6D. SYMPTOM: MACHINE STARTS BUT WILL NOT PULL LOAD

POSSIBLE CAUSE

Wrong Incoming Voltage	Check with meter
Extension cord providing power	Replace extension cord with correct permanent wiring
Incorrect wire size used	Replace with correct wire size for machine's amperage
Dry Gear Reducer	Inspect and lubricate as needed (power removed)
Defective Motor	Check and replace (power removed)
Incorrectly Assembled Lift Rigging	Check rigging and pulleys for binding

6. TROUBLESHOOTING AND REPAIR

SEE DRIVE MANUAL FOR INFORMATION ON AC DRIVES

The following information should be of use in checking and servicing the curtain machines described in this manual. It is assumed that the troubleshooting and repair will be performed by individuals with a basic knowledge of electricity, motor controls, with the ability to follow the wiring diagrams enclosed, and who will take the precautions required when working with exposed electrical connections.

In order to perform the procedures listed, basic hand tools plus measuring and indicating equipment are required. A clamp-on type volt-amp-ohmmeter tester with accessories will provide the necessary indication and measurements. Before proceeding with any of the checks listed below, make certain that all connections are tight and any obviously defective or broken parts are replaced. Also make certain that the track system is operating freely and that the cables are in good condition. The reversing contactor can be replaced as a complete assembly or individual parts, as shown on the enclosed manufacturer's literature, can be obtained as needed.

When ordering replacement parts for this curtain machine, please give a description of the part and also provide the model number and serial number of the machine.

6A. SYMPTOM: MACHINE WILL NOT START

POSSIBLE CAUSE

Incoming Power Off	Check with meter, or test light
Disconnect Switch Off	Throw lever
Circuit Breaker Tripped	Reset
Control Fuse Loose or Blown	Tighten cap, or replace
Broken Fuse Holder	Replace
Jumper "X" Removed From #3 & #4 and Remote Stop Button Not Connected	Check and correct if needed
Faulty Remote Switch Wiring	Check with meter, or test light (power removed)
Frequency Drive Fault	Check fault parameters of drive (see drive manual)
Faulty Limit Switch	Check with meter (power removed)
Both Limit Switches Activated	Rotate plastic cams (see limit adjustment)

NOTE: ALL ADJUSTMENTS TO THE LIMIT SWITCHES OR DRIVE BOARD POTENTIOMETERS MUST BE MADE WITH POWER REMOVED FROM THE MACHINE.

- TV machines have two (2) dwell type limit cams in addition to two (2) emergency overtravel limit cams. The cams with the longer dwell are used to assign the starting point of the deceleration ramp. With all power to the machine removed, the dwell cams are rotated using a 1/2 inch open end wrench until they engage their limit switch. At this point the deceleration ramp for this direction will begin. The amount of deceleration is programmed in the frequency drive model. Please see the frequency drive manual provided with the machine for instructions on re-setting the deceleration ramp times.

IMPORTANT: A fraction of a turn of the cam can represent a considerable amount of curtain travel. Adjust carefully! Do not attempt to stop curtain too close to end stops and do not attempt to stack curtain in too small a space. Allow 6 inches to 12 inches at each end of travel.

- The emergency overtravel limits provide the same function as the F-STOP pushbutton. If either limit is activated, the machine will shut off immediately, by-passing all deceleration ramps and remain locked-out until the machine is reset (pressing the STOP button).

Machine should start and continue running until one of the standard cams in the limit switch depresses the arm of one of the micro switches. When the arm of the micro switch is partially depressed, a click will be heard and the curtain machine will begin to decelerate and then eventually stop. Pressing the opposite push-button after the machine has stopped, will start the machine in the opposite direction and the machine will continue to operate until the other cam activates its micro switch. If the unit operates satisfactorily in both directions, it is ready to be connected to cords from track.

3. CABLE ATTACHMENT

3A. GROOVED CABLE DRUM DRIVE:

The drum provided with this machine is designed for attaching a single lift cable to it. The rotation of the drum needed to lift the curtain should be noted before the cable is attached to the drum. Once the rotation needed is known, count 3

grooves from the cable hole of the drum toward the center of the drum (3-dead wraps are required for all lift applications) and wrap the cable on the 3 grooved and through the cable hole in the drum and secure it with the cable clamps provided with the machine. Note that at this time you should have 3 wraps on the drum and the cable should be extending upward to the lifted load or cable clew.

The machine can be jogged in the up direction by pressing the OPEN/UP pushbutton and then pressing the STOP pushbutton. Continue jogging the machine in the up direction until the desired location is reached, bearing in mind the deceleration ramp time of the machine must be satisfied before the machine will shut off. NOTE: if the machine does reach its run speed before the STOP button is pressed, the machine will decelerate quicker than it will when it obtains its run speed during normal operation. The dwell limit should be adjusted as the machine is jogged until the desired position is achieved. Repeat this process for the CLOSE/DOWN direction.

IMPORTANT NOTE: All wire-centered cable stretches during its first few weeks of use. Therefore, it is imperative that excess slack be taken up at the drum. If this is not done, it is entirely possible for the cable to slip off the drum and wrap around the shaft thus causing serious operational difficulties. It is strongly recommended that during the first three weeks of operation, periodic checks be made to assure that excess slack in the cord is eliminated.

DO NOT ATTEMPT TO USE LARGER CABLE THAN SPECIFIED.

Run machine several times to make certain that the equipment is operating properly.

5. MAINTENANCE

5A. LUBRICATION:

Lubricate motor as per instructions on motor nameplate. Most motors do not require or allow lubrication.

Gear reducer is factory filled with 600W super cylinder oil. During average service, the reducer can be considered to be permanently lubricated. If, for some reason, additional lubricant is required, it can be added through an opening at the top of the reducer. The entire limit switch mechanism must be removed in order to add lubricant. Also be sure to remove power prior to performing maintenance on the machine.

Roller chain drives, such as used on the limit switch and on sprocket drive should occasionally be lightly oiled. Remove power from machine prior to oiling.

5B. ADJUSTMENTS:

As explained previously, all wire-centered cable stretches and this slack must be removed in order to prevent possible damage to the machine or rigging.

To adjust limit switch roller chain drive, remove and lockout the machine's power source. Remove the chain guard covering the gear and limit switch sprockets. If the chain is slack, loosen (slightly) the two cap screws holding the limit switch bracket to the gear housing. Tap the bracket upward lightly until the chain appears normal. Tighten cap screws and replace chain guard.

5C. CLEANING:

With power off, remove debris and foreign objects from vicinity of curtain machine, from between motor and base, motor and frame, and from vicinity of drum. Low-pressure air or a vacuum cleaner can be used for this purpose.

With power off, remove cover from control enclosure. Remove dust and dirt with low- pressure air or vacuum cleaner, being careful not to damage any internal parts. Check and tighten all connections and mounting screws. Replace cover. Repeat procedure for limit switch.