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# INSTRUCTION MANUAL

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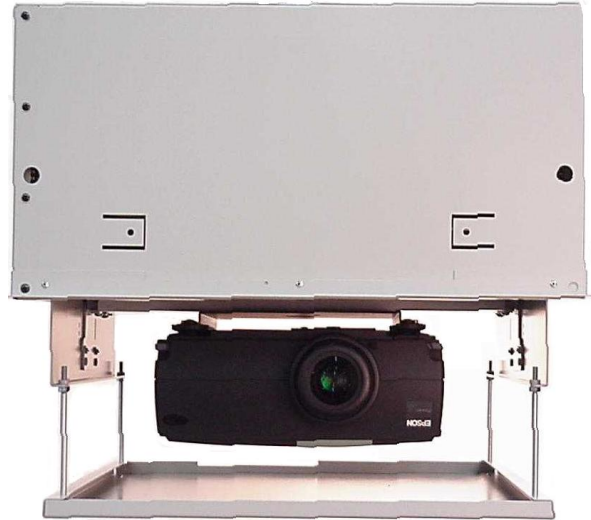
## SMART-LIFT™ Electric Ceiling Lifts

The Model SL-100 and SL-150 SMART-LIFT Electric Ceiling Lifts are reliable, heavy-duty, affordably priced video lift mechanisms for LCD/DLP projectors. They are designed for home-theater, conference room, or school applications.

The ceiling lift provides an attractive solution to recess a projector in the ceiling. Or, they can be flush-mounted to a finished ceiling to protect and secure the projector, as in a classroom situation.

Your projector can be securely mounted in an inverted position (shown) or be set in the tray.

Plenum Rating requires use of Class II control wiring, electrically hard wiring the unit, and all open holes in the housing (except joist tabs) must be sealed using foil tape



### BEFORE YOU BEGIN .....

- **CAUTION: To prevent damage to the ceiling lift, which could affect or void the factory warranty, thoroughly study all instructions and illustrations before you begin to install or operate the lift. Pay particular attention to the “Important Precautions” on Page 1.**
- Because of the size and weight of the lift, Chief Manufacturing recommends that at least two people be available when installing the lift.
- If the lift is to be installed in a plenum rated ceiling, it must be hard wired through the strain relief, control wiring must be Class II, and all open holes in the housing (except joist tabs) must be sealed using foil tape.
- If the lift is to be suspended from the ceiling using a 1-1/2-in. pipe, it must be ordered with a CMA-150 mount bracket that includes a pipe coupler.
- If it is to be installed in a non inverted position (raising up), it must be ordered with an SLB mounting bracket that is custom-designed for the specific projector model referenced on your order.
- If it is to be installed in a suspended ceiling, it must be ordered with a CMA-240 Suspended Ceiling Installation Kit.
- The lift is supplied with a separate controller that can be attached to the frame of the lift, mounted nearby, or placed in a remote location.
- The Model RC-10 Radio Frequency Remote Control or the Model IR-10 Infrared Remote Control is available as an accessory from Chief Manufacturing. The controller is also compatible with many 24V controls from other manufacturers.
- If you have any questions about this installation, contact Chief Manufacturing at 1-800-582-6480.



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## IMPORTANT WARNINGS and CAUTIONS!

**WARNING:** A **WARNING** alerts you to the possibility of serious injury or death if you do not follow the instructions.

**CAUTION:** A **CAUTION** alerts you to the possibility of damage or destruction of equipment if you do not follow the corresponding instructions.

- **WARNING:** Improper installation can result in serious personal injury! Make sure that the ceiling structural members can support a redundant weight factor *five times* the total weight of the equipment. If the ceiling can not support this weight, reinforce the ceiling before installing the lift.
- **WARNING:** Be aware during the installation that this is a motorized device, and there are pinch points for people and for electrical wiring.
- **WARNING:** Be aware of the potential for personal injury or damage to the lift if it is not adequately mounted. The lift (without a projector) weighs about 65 lbs (30 kg).
- **WARNING:** Plenum rating requires the unit to be hard wired through the provided strain relief, use of Class II control wiring, and all open holes in housing (except joist tabs) must be sealed using foil tape.
- **WARNING:** Be sure the lift is installed square and parallel in all dimensions to avoid personal injury or damage to the lift. Avoid stressing the lift at any time during installation.
- **WARNING:** Electrical outlets must be installed by a qualified electrician. Follow all electrical codes.
- **CAUTION:** Test the lift for shipping damage. See “Pretest the lift Before Installing,” on page 3.
- **CAUTION:** Never close lift while projector is running or while projector is in “cool down” operation.

## TOOLS REQUIRED FOR INSTALLATION

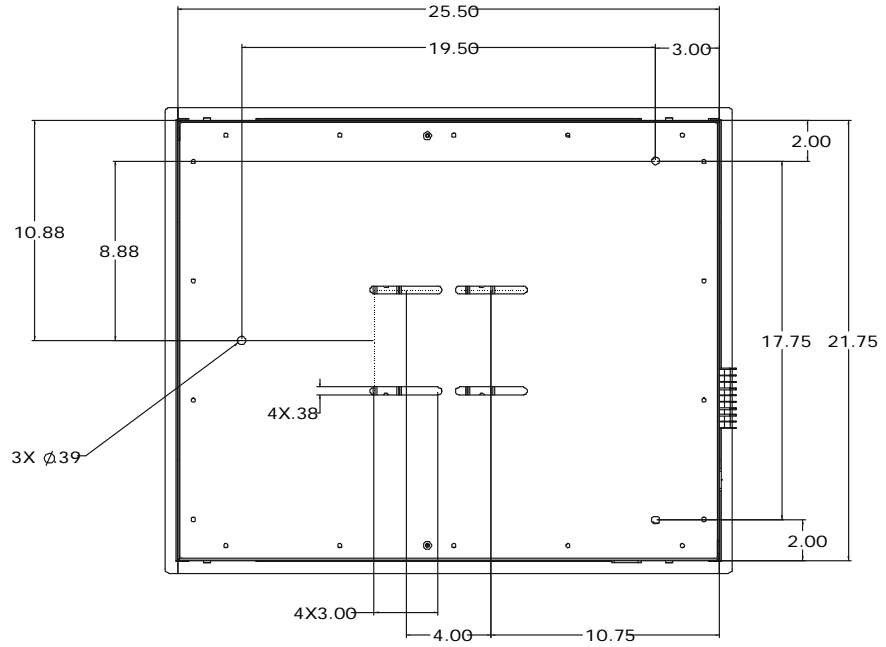
- Phillips screwdrivers, No. 1 and No. 2
- Electric drill and bit set
- Pliers (heavy-duty)
- Electrical wire cutter/stripper
- If suspended from threaded rods: Socket set with extension

**NOTE:** Other tools may be required depending on the method of installing the lift in the ceiling.

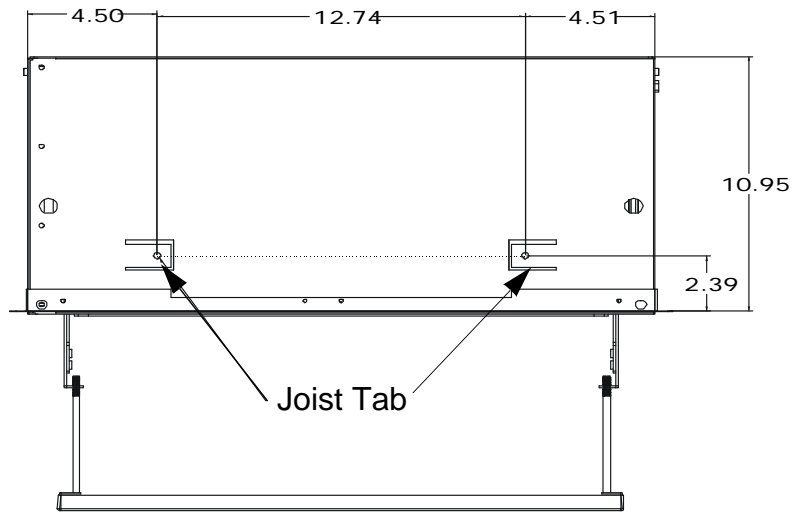
## CONTENTS

DIMENSIONAL DRAWING .....	2
INSTALLATION .....	3
Pretest the Lift Before Installing.....	3
Prepare the Ceiling Opening and Install the Lift...	4
Install the Projector on the Lift .....	9
Adjustments .....	10
Install the Controller.....	11
Connect the Control Wiring .....	11
Connect the Lift to the Power Supply .....	12
Installing Wiring Cover (Optional).....	13
OUTSIDE TERMINAL WIRING EXAMPLES .....	14
INSIDE TERMINAL WIRING EXAMPLES .....	20
TROUBLESHOOTING .....	26

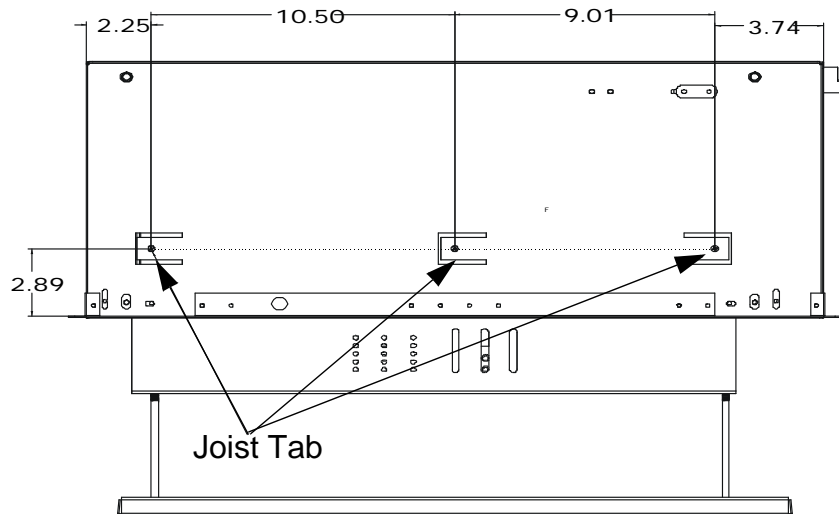
TOP



FRONT



SIDE



## PRETEST THE LIFT BEFORE INSTALLING

**IMPORTANT:** Before mounting the lift in the ceiling, make the following tests to be sure that it operates properly and has not been damaged in shipping.

1. Carefully inspect the lift for shipping damage. If any damage is apparent, call your carrier claims agent and do not continue with the installation until the carrier has reviewed the damage.
2. Set the lift upside down on a clean, level surface.

**NOTE:** The lift is supplied with a momentary push button on the end of a cable to help you pretest the operation.

3. Connect the momentary push button cable's leads to terminals #6 and #1 and add a jumper wire (electrical wire about 4 in. long with 1/4 in. stripped at each end) between terminals #2 and #5 on the same terminal block (see Fig. 1, Item P).
4. Plug the lift's power cord into a 110V 60 Hz or 220V 50 Hz (as appropriate) 15-amp outlet.

**NOTE:** The lift draws approximately 1.5 amps.

5. Operate the lift much like a garage-door opener: press the button when the lift is at its "top" position and it will move "down"; press again when it is at its "bottom" position and it will move "up"; press while moving and it will stop.

Use the push button to check that the lift runs to the top and bottom of its travel without any interference that might indicate damage during shipment.

6. Unplug the lift's power cord.

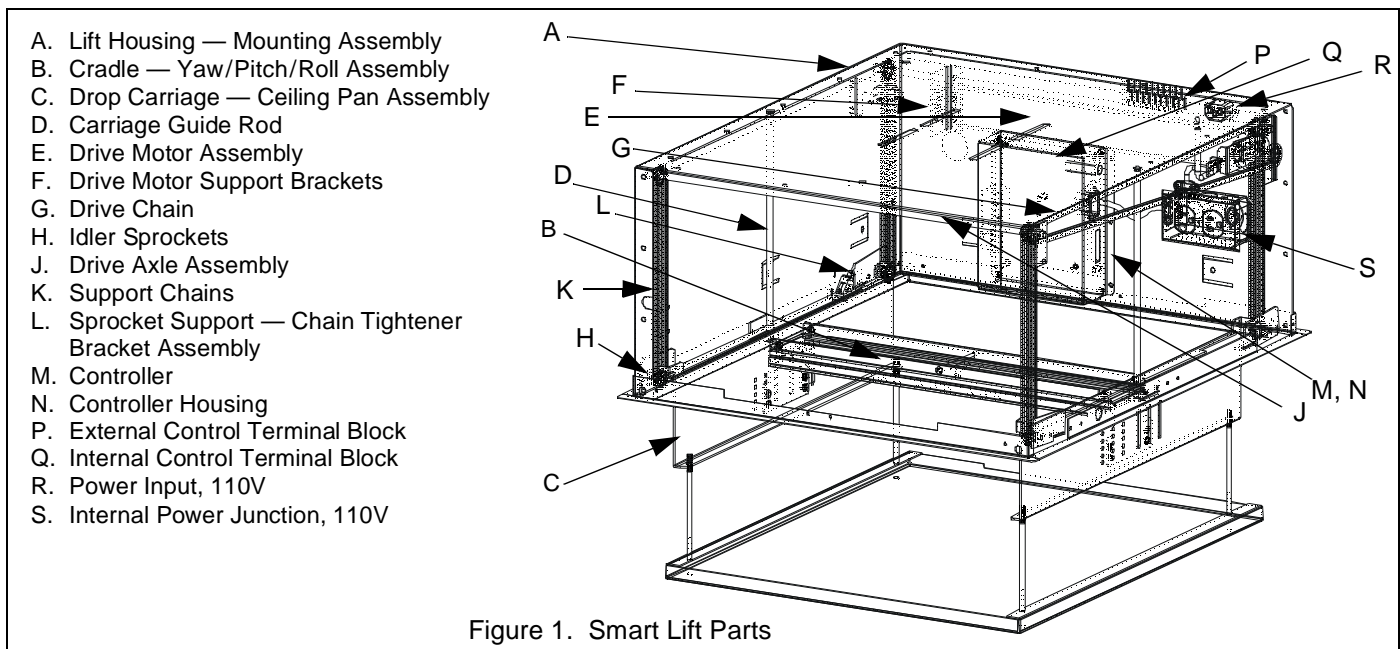


Figure 1. Smart Lift Parts

## PREPARE THE CEILING OPENING AND INSTALL THE LIFT

**NOTE:** If the lift is to be installed in a non inverted position (raising up from a surface instead of suspended from the ceiling), refer to the instructions supplied with the custom-designed SLB Bracket that is shipped with the lift.

Because of the wide variety of possible mounting situations, Chief Manufacturing can only provide general guidelines for preparing the location where the Smart-Lift will be installed. Study the following information carefully, and adapt it as necessary to fit your specific installation.

- **WARNING: Be especially aware of the weight of the lift, and the potential for personal injury or of damage to the lift if it is not adequately mounted. The lift (without a projector) weighs about 65 lbs (30 kg).**

The “General Guidelines” below, and the information on the following pages, covers the most common mounting situations:

- Suspended from a pipe that is secured to a structural cross brace in the ceiling
- Suspended from threaded rods that are secured to the structural cross brace
- Side-mounted to the ceiling joists, or secured to a wood framework that is mounted to the joists.

If the lift is to be installed in a suspended ceiling, a CMA-240 Suspended Ceiling Installation Kit is available as an accessory to fill gap(s) in the ceiling.

### General Guidelines

- Carefully determine the position of the ceiling opening, and its distance from and orientation toward the screen.
- Prepare a plenum (above the ceiling) that is sufficiently larger than the lift. Be sure to provide adequate space for access to the lift on all sides for installation and for any future maintenance or repair.

**WARNING: Improper installation can result in serious personal injury! To avoid such injury, make sure that the ceiling structural members can support a redundant weight factor *five times* the total weight of the equipment you intend to support overhead. If they cannot, the ceiling must be reinforced before you install the lift.**

**WARNING: Improper installation can result in serious injury! Plenum rated installations require electrically hard wiring the unit through the provided strain relief, the use of Class 2 control wiring, and all open holes in the housing (except joist tabs) must be sealed using foil tape. You must adhere to all local codes.**

**WARNING: Have the outlets installed by a qualified electrician. Follow all electrical codes.**

- Bring in electrical power for the lift **before** beginning the installation. Provide a 15-amp service (115V 60 Hz or 230V 50 Hz, as appropriate) above the ceiling. The lift has an 8-ft. power cord with a standard 3-prong receptacle for testing, this cord cannot be used for plenum rated applications. Include an additional outlet if the controller will be mounted inside the ceiling plenum.

**NOTE:** Additional electrical outlets for portable lighting and electrical tools may be helpful during installation, maintenance, or repair.

- Preplan where the controller will be installed, and how the control wiring will be routed to the controller.

### Installation in a Suspended Ceiling (using threaded rods)

**WARNING:** Plenum rating requires hardwiring through the provided strain relief, use of Class II control wiring, and all open holes in housing (except joist tabs) must be sealed using foil tape. See wiring instructions in this manual and follow all local building and electrical codes.

The lift housing can be suspended from three 3/8-in.-dia. threaded rods (not supplied by Chief Manufacturing) that are secured to a structural cross brace in the ceiling. Insert the rods through the three holes on the top side of the lift housing, and secure them to the housing with two jam nuts (one inside, one outside). See Fig. 2 and Fig. 3.

**CAUTION:** For smooth and reliable operation, the lift must be installed square and parallel in all dimensions. Avoid stressing the lift at any time during installation.

**NOTE:** Installing turnbuckles on the threaded rod will make it easier to level the unit.

After installing the lift, use the test push button to carefully operate the lift all the way up and down to be sure the clearances are adequate.

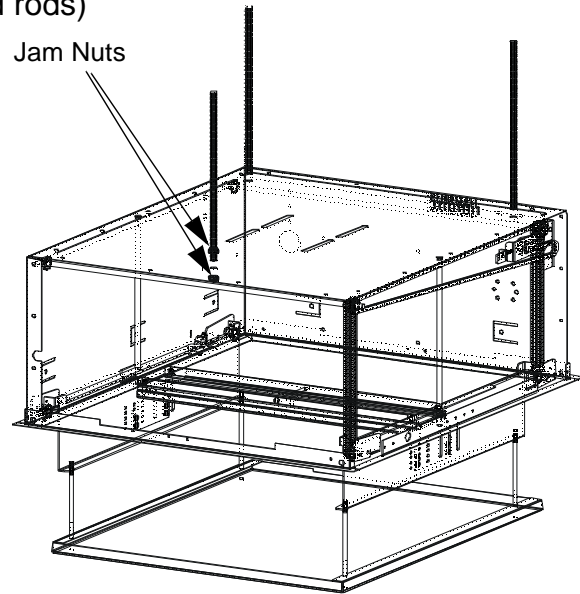


Figure 2. Threaded Rod Installation

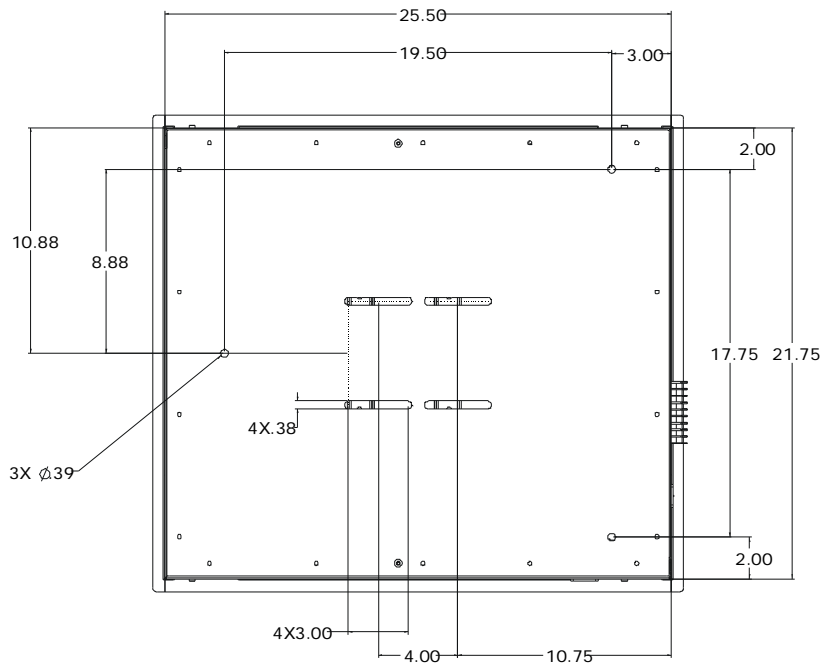


Figure 3. Top View Dimensions

## Installation in a Suspended Ceiling (using pipe coupler)

An optional pipe coupler (Model CMA-150) is available for suspending the lift housing from a 1-1/2 NPT pipe (Fig. 4).

**WARNING:** Plenum rating requires hardwiring through the provided strain relief, use of Class II control wiring, and all open holes in housing (except joist tabs) must be sealed using foil tape. See wiring instructions in this manual and follow all local building and electrical codes.

**CAUTION:** For smooth and reliable operation, the lift must be installed square and parallel in all dimensions. Avoid stressing the lift at any time during installation.

After installing the lift, use the test push button to carefully operate the lift all the way up and down to be sure the clearances are adequate.

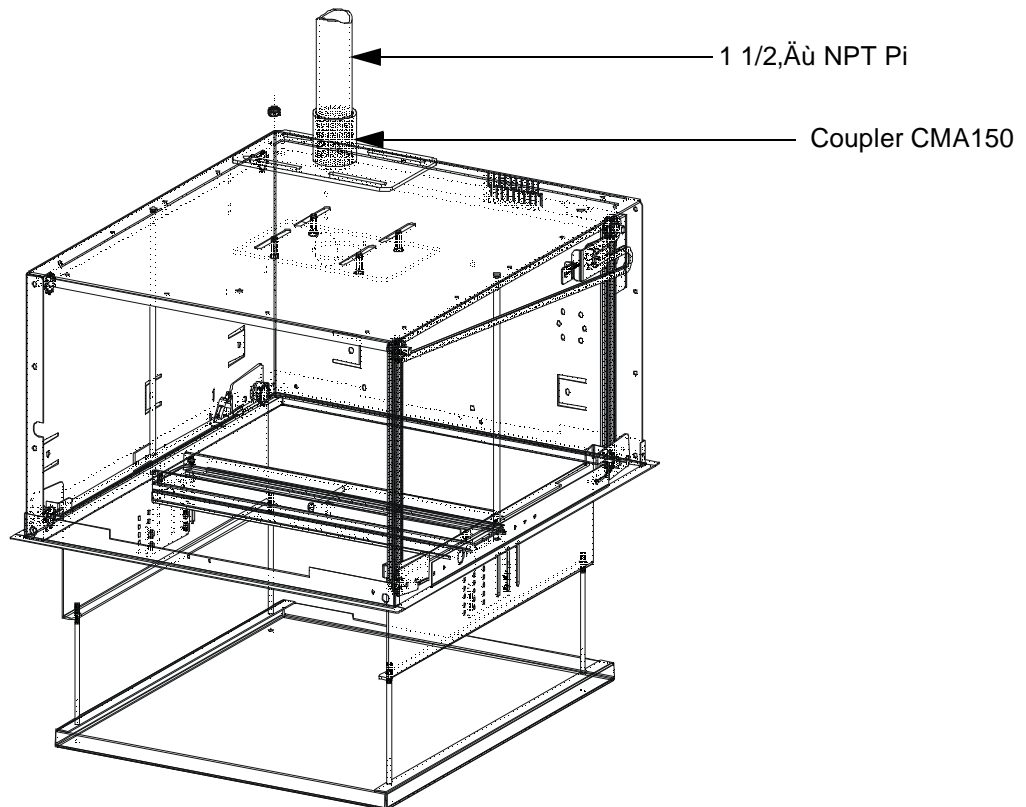


Figure 4. Pipe Coupler Installation

## Installation in a Wood Framework (or Side-Mounted to Joists)

The lift housing has joist tabs to assist in side-mounting the lift to the ceiling joists or otherwise securing it to a wood framework.

For this method, you should first construct any framework and secure it to the joists, then install the lift as outlined below:

- Using the same jumper wire and push button used for pretesting (page 2), cycle the lift to its “open” position. This allows access to the inside of the housing and exposes the mounting tabs.

**WARNING: Plenum rating requires hardwiring through the provided strain relief, use of Class II control wiring, and all open holes in housing (except joist tabs) must be sealed using foil tape. See wiring instructions in this manual and follow all local building and electrical codes.**

- If you need more space for access to the mounting tab remove the ceiling pan:
  - Remove the four plugs, one at each corner of the pan. (See Fig. 5), to reveal four small screws.
  - Using a #1 Phillips screwdriver, remove the four screws and remove the ceiling pan.

**NOTE:** The ceiling-pan screws are primarily used only for removing the pan if there is an electrical problem at the lift can't be cycled open.

- Secure the lift to the joists or wood framework. At least six 1/4 x1-1/4-in. lag screws must be driven through the mounting tabs around the inside of the lift housing. There are 10 tab locations, three in each side and two in each end. Refer to Fig. 5 and Fig. 6. The lift only requires support on two opposing sides.
- Install the ceiling pan and secure the ceiling pan using four screws.

**CAUTION:** For smooth and reliable operation, the lift *must* be installed square and parallel in all dimensions. Avoid stressing the lift at any time during installation.

After installing the lift, use the test push button to carefully operate the lift all the way up and down to be sure the clearances are adequate.

See Fig. 7 for finishing to match the drywall ceiling,

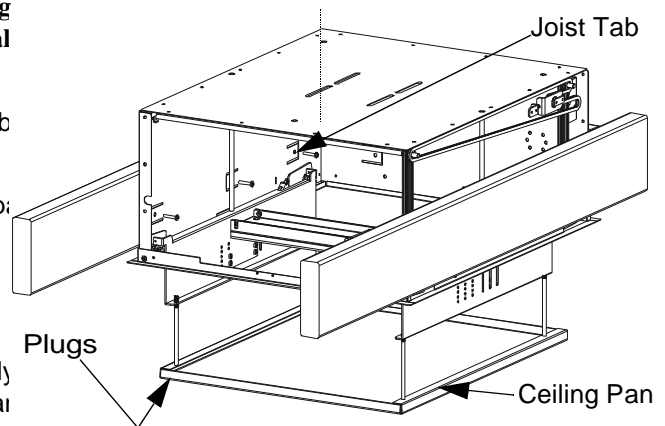


Figure 5. Joist Mounted Installation



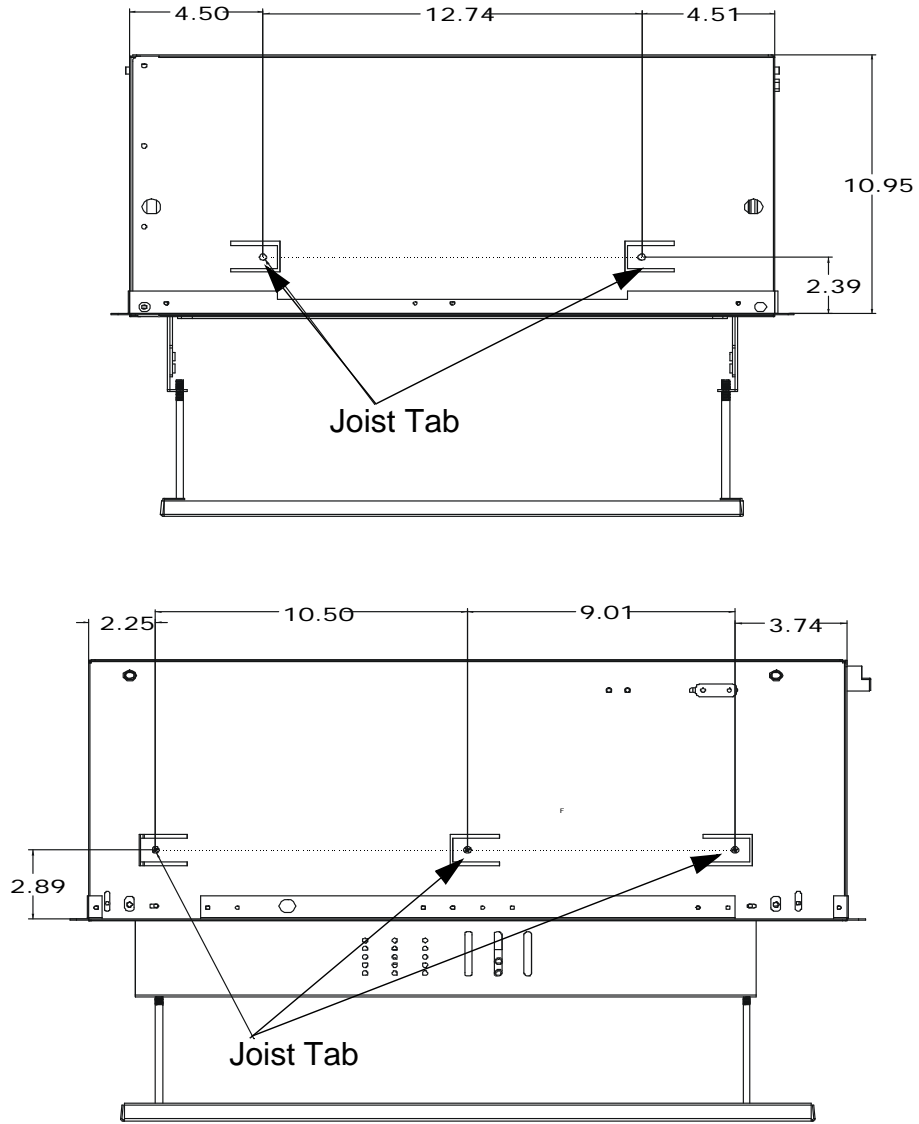
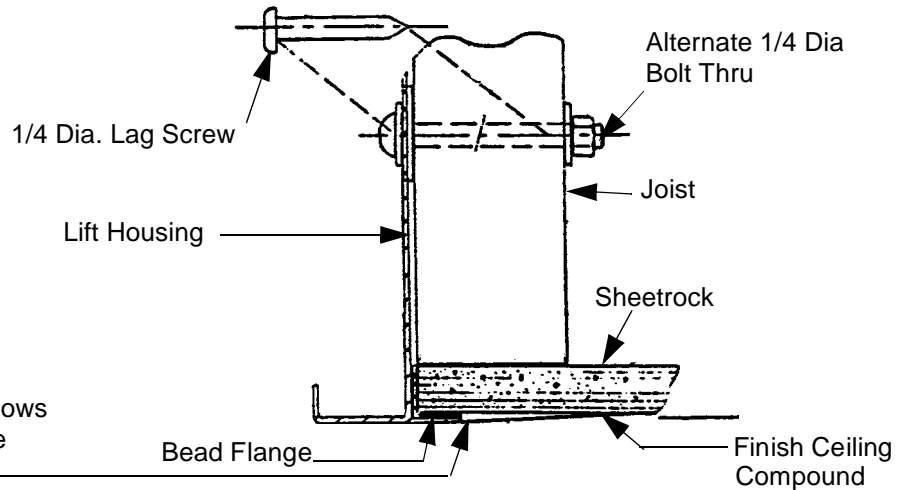


Figure 6. Joist Mounting Dimensions



NOTE: Bead flange setback allows finish compound to hide lift housing seam.

Figure 7. Drywall Finishing

## INSTALL THE PROJECTOR ON THE LIFT

**NOTE:** If desired, the projector can also set directly on the bottom plate of the lift and not be secured by the bracket. Maximum projector weight for this application is 35 pounds.

1. If the lift is installed in an inverted position (suspended from the ceiling), attach the SLB adapter bracket (see Fig. 8) to the projector by aligning the threaded holes on the projector with the slots on the bracket and secure it using the screws provided (refer your individual bracket instructions).
2. If you need more space for access to the mounting tabs, remove the ceiling pan as follows:
  - a. Remove the four plugs (one at each corner of the pan), to reveal four small screws.
  - b. With a #1 Phillips screwdriver, remove the four screws. The ceiling pan will release.
3. Using the six 10-24 x 1/2-in. studs on the top side of the SLB adapter bracket, align the studs with the holes on the underside of the lift cradle.
4. While holding the projector in place, secure the projector using six nuts.

**CAUTION:** If cradles adjusted, cradle must be level (matching set of holes must be used on the right and left side of the cradle).

5. Select the appropriate mounting holes for the cradle within the housing:
  - On the sides of the lift housing, there are five 3/16-in.-dia. holes in a vertical line that allow for alternate vertical positions of the cradle within the housing.
  - There are also three sets of holes 1-3/4 in. apart on each side to accommodate three positions forward-and-back.
6. If necessary, change the position of the cradle.

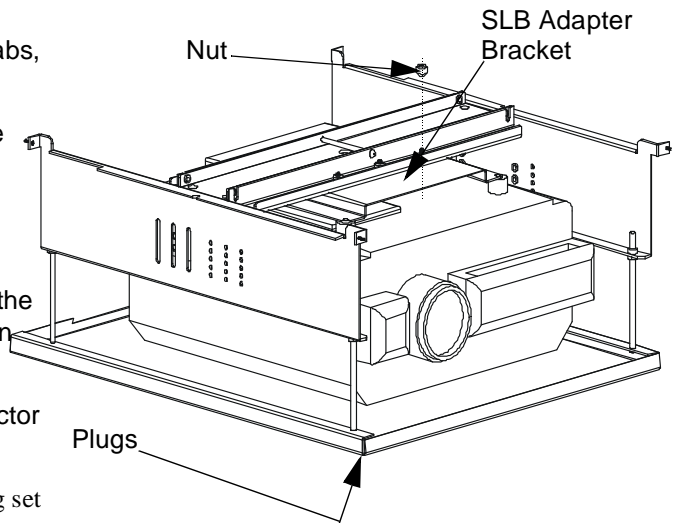


Figure 8. Projector Installation

## ADJUSTMENTS

### To Adjust the Aim of the Projector

The aim of the projector can be adjusted in all directions, as shown:

1. **Yaw.** See Fig. 9. Move the lift to its “down” position. There are four 10-32 x 1/2-in. pan-head screws (two on each side) inside the bottom of the cradle, that secure the left and right horizontal positions. Loosen these screws **slightly**, move the cradle to the desired position, and retighten the screws.

**CAUTION:** The pan-head screws **MUST** be relocated in the matching holes on both sides if you shift positions.

2. **Pitch.** See Fig. 10. There are four 10-32 x 1/2-in. pan-head screws (two on each side) on the outside of the carriage. Loosen these screws **slightly**, tip the carriage in the slotted holes to the desired angle, and retighten the screws.
3. **Roll.** See Fig. 11. There are four 10-32 x 1/2-in. pan-head screws in U-slots at the upper outside corners of the cradle assembly. Slightly loosen these screws, gently rock the cradle to the desired position, and retighten the screws.
5. Plug the projector’s power cord into the outlet into one of the two outlets inside the lift. One outlet is switched and the other is continuously live.

Adjust the position of the projector for optimum projected image alignment.

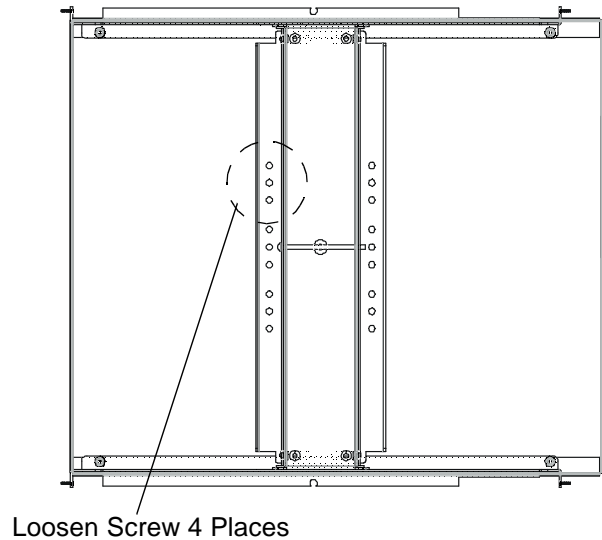


Figure 9. Yaw Adjustment

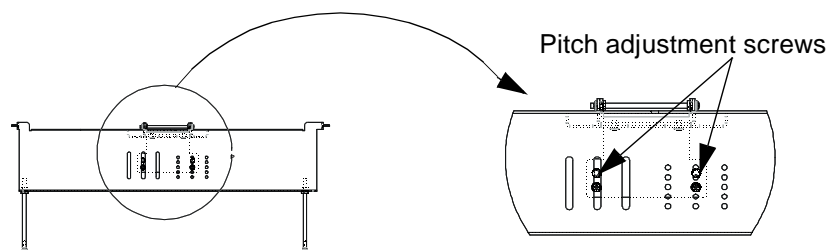


Figure 10. Pitch Adjustment

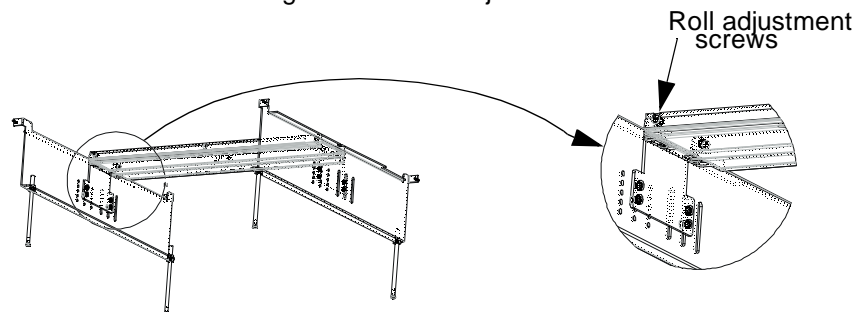


Figure 11. Roll Adjustment

## INSTALL THE CONTROLLER

**WARNING: Plenum rating requires hardwiring through the provided strain relief, use of Class II control wiring, and all open holes in housing (except joist tabs) must be sealed using foil tape. See wiring instructions in this manual and follow all local building and electrical codes.**

Select the desired location for mounting the controller:

- Attached to the top of the lift,
- Mounted inside the plenum in the ceiling, or
- Remote-mounted.

Refer to the instructions supplied with the controller.

## CONNECT THE CONTROL WIRING

Unplug the lift's power cord. Remove the jumper and push button from the external terminal block that you installed when pretesting the lift (page 2).

**WARNING: Plenum rating requires hardwiring through the provided strain relief, use of Class II control wiring, and all open holes in housing (except joist tabs) must be sealed using foil tape. See wiring instructions in this manual and follow all local building and electrical codes.**

Connect the control wiring according to the instructions supplied with the controller. Refer also to the wiring examples and terminal function tables on the following pages.

Feed the video and/or communication cable through the 1-3/8-in. dia. hole on the rear of the lift housing, and connect it to the projector. **Leave enough slack** in the cabling to allow for up and down travel.

If necessary, install a manual push button to control the opening and closing of the lift.

Refer to the controller instructions for connection options. You can use either the internal or external terminal block to control the SMART-LIFT.

**NOTE:** On the Model 100, both plugs of the internal receptacle are on continuously. On the Model 150, one plug turns on or off per position and one plug stays on continuously.

## CONNECT THE LIFT TO THE POWER SUPPLY

**WARNING:** Plenum rating requires hardwiring through the provided strain relief, use of Class II control wiring, and all open holes in housing (except joist tabs) must be sealed using foil tape. See wiring instructions in this manual and follow all local building and electrical codes.

**NOTE:** If the lift is cycled up and down repeatedly, the thermal overload on the motor will stop operation. Operation will resume when the thermal overload resets (3 to 5 minutes).

### Non Plenum Rated Installation

1. Plug the lift's power cord (supplied) into the electrical outlet in the ceiling plenum.

### Plenum Rated Installation



**WARNING:** A licensed electrician should disconnect and terminate the leads to the power cord receptacle and, using the access holes provided for a strain relief, hard wire the unit to a power source.

**WARNING:** Failure to disconnect and terminate power leads properly may result in equipment damage or personal injury.

1. Disconnect and terminate the electrical leads from the power cord receptacle at the interior junction box (see Figure 45).
2. Remove the electrical knockout and install the strain relief (provided).
2. Hardwire the unit to a 110V 60 Hz or 230V 50 Hz (as appropriate) 15-amp power source.

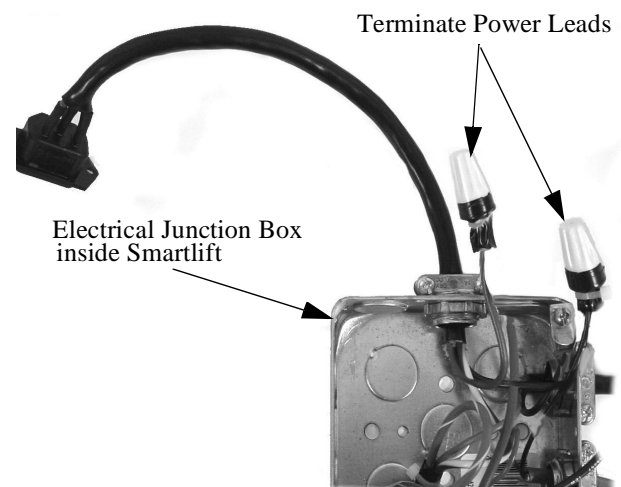


Figure 12. Disconnect and Terminate Power Cord Leads

## (Optional) Installing Wiring Cover

An optional wiring cover may be installed to further protect wiring from mechanical damage.

**WARNING:** Make sure that power to SL-150 is OFF before proceeding!

1. Remove the control harness, and place cover (included in kit) over hole. (See Figure 13)
2. Make control connections directly to the control box. (See Inside Terminal Wiring Examples section)
3. Install the right back wiring cover against the control box.
4. Fit left back wiring cover against right back cover and place against control box. Install self-drilling screws. (See Figure 13)
5. Install small wiring cover to the right of the right back wiring cover and fasten with self-drilling screws. (See Figure 13)
6. Fit the triple switch cover over the left back wiring cover. Be sure that triple switch cover does not interfere with operation of switches.

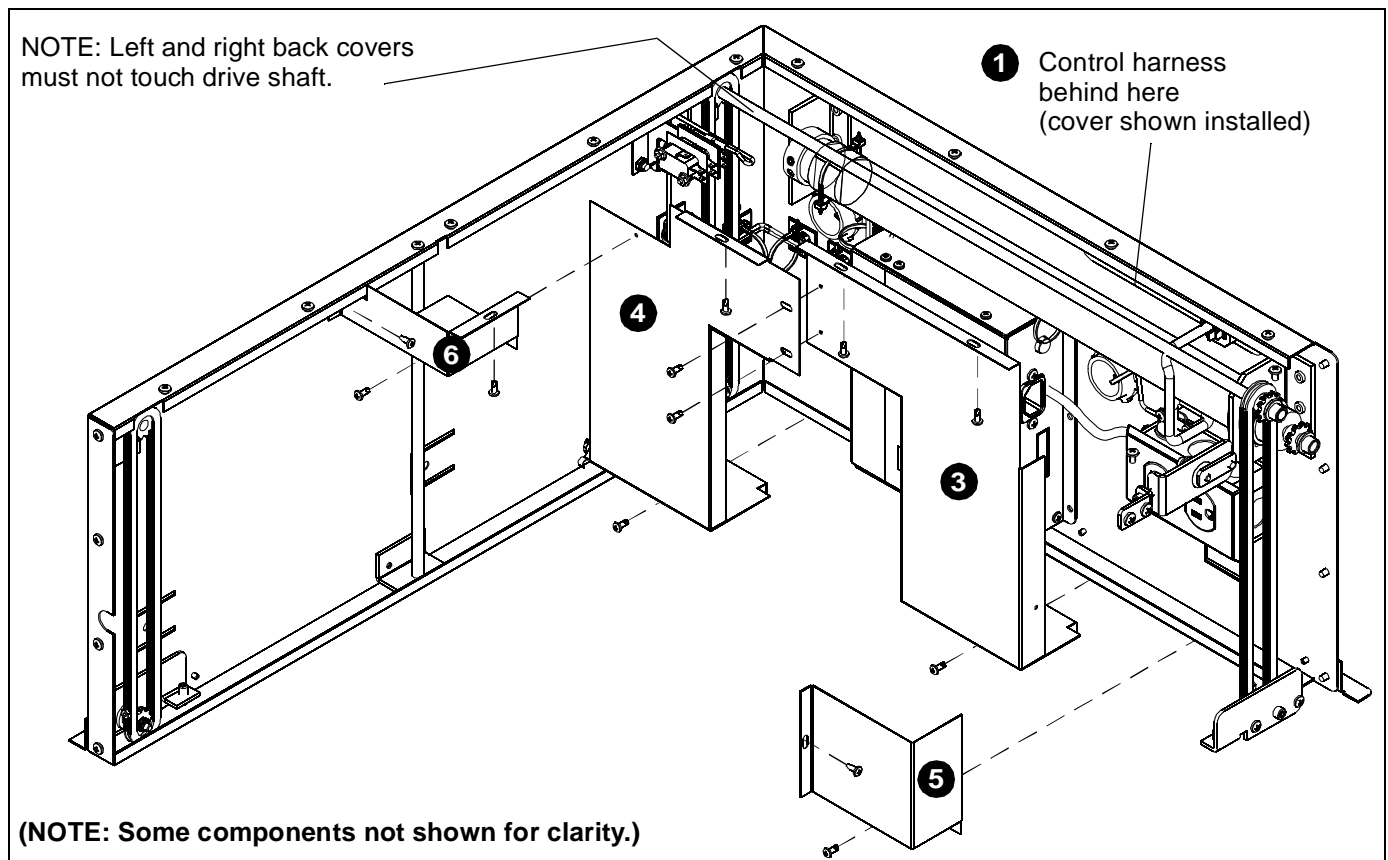


Figure 13. Install Optional Wiring Cover

## OUTSIDE TERMINAL WIRING EXAMPLES

The information on the following pages cover the most common wiring options:

- Pushbutton
- Extend/Retract for momentary or latching contacts
- Remote (RC-10)
- 12 Volt out supply
- 24 Volt out supply
- Two dry contact closures

**CAUTION:** Closing the unit while the projector is running or in the cooling mode will cause premature bulb failure and may damage electrical components.

### Pushbutton

Wire for pushbutton operation (Figure 14) as follows:

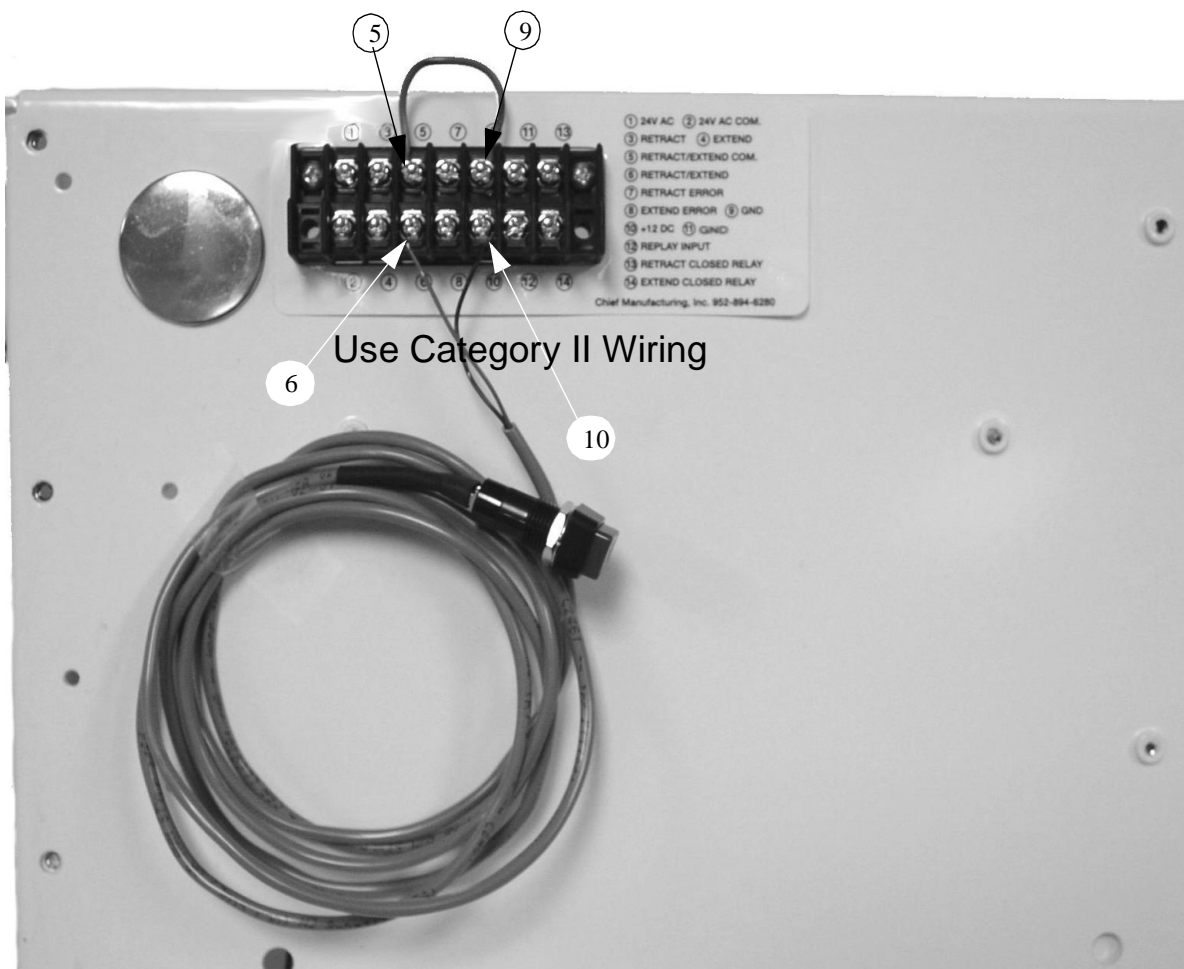


Figure 14. Pushbutton Wiring

1. Install a wire between terminal 5 (extend/retract common) and the ground/common of a power source (5-30 volts). See Figure 15.

Example: Use 12 volt internal power supply terminal #9 as shown in Figure 16.

2. Connect wires from pushbutton to power supply source (5-30 volts) and terminal #6 (extend/retract). See Figure 17.
3. Connect power source.
4. Push the button once and the unit should extend. Push the button during travel and the unit will stop at that location. Push the button after the unit is extended or stopped in mid-travel and the unit will retract.

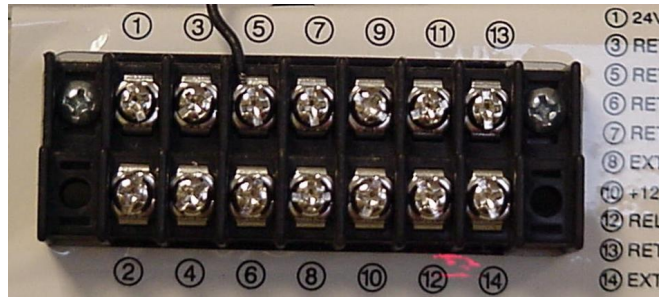


Figure 15. Extend/Retract Common

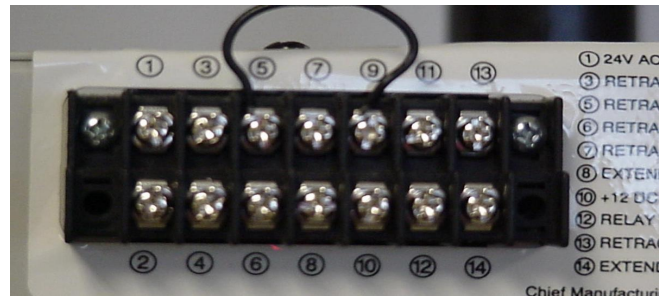


Figure 16. 12 Volt Internal Supply Jumper

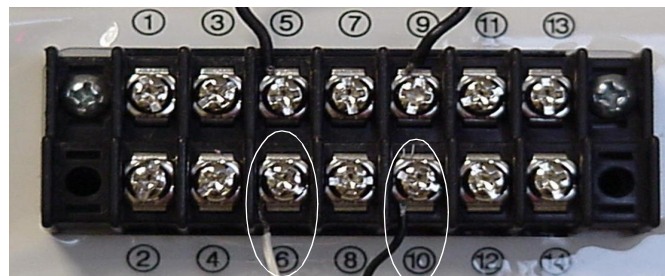


Figure 17. Pushbutton Connection



## Extend/Retract for Momentary or Latching Contacts

These terminals can be used with any latching contacts, momentary contacts, or a wall switch

NOTE: The connection between the ground (#9) and any other terminal connection must be broken (open) before completing the next circuit.

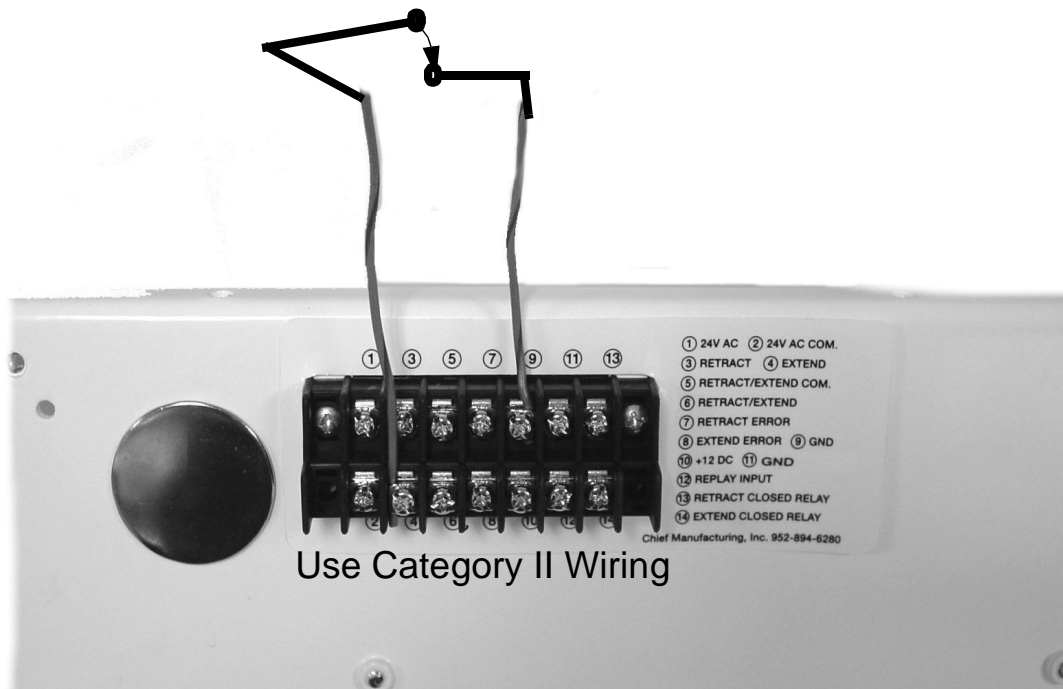


Figure 18. Contacts Wiring

Wire for contact operation (Figure 18) as follows:

1. Install a wire between terminal #9 (shown) and contacts or switch (see Figure 19).
2. Connect power source
3. For extend, complete the circuit to terminal #4 (see Figure 20).
4. Make sure circuit to terminal #4 is open and, for service extend, complete the circuit to terminal #11.
5. Make sure circuit to terminal #11 is open and, for retract, complete the circuit to terminal #3.

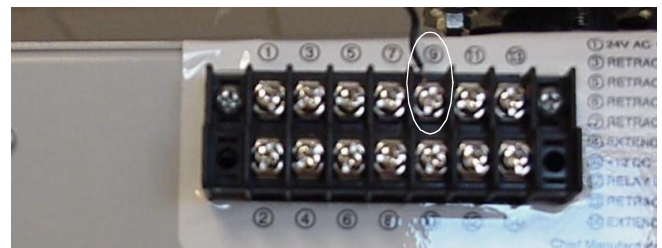


Figure 19. Contacts Connection

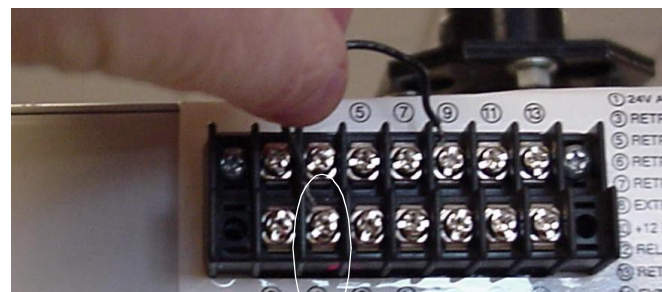


Figure 20. Contacts Connection

## Remote (RC-10)

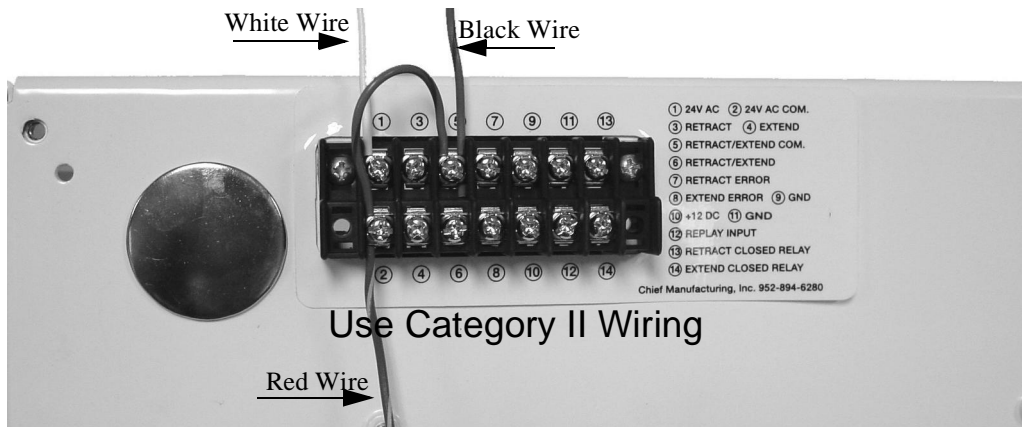


Figure 21. Remote Wiring Connections

Wire for remote (RC-10) (Figure 21) operation as follows:

1. Install a jumper wire between terminals #2 and terminal #5 (see Figure 22).
2. Connect the white wire of the RC-10 controller unit to terminal #1 (see Figure 23).
3. Connect the red wire of the RC-10 controller unit to terminal #2.
4. Connect the black wire of the RC-10 controller unit to terminal #5.
5. Connect the power source to the lift.



Figure 22. Jumper Connection

NOTE: If the unit does not activate, check to make sure the 9 volt battery is working and make sure the dip switches in the sending unit match the dip switch settings in the controller unit (see Figure 24).

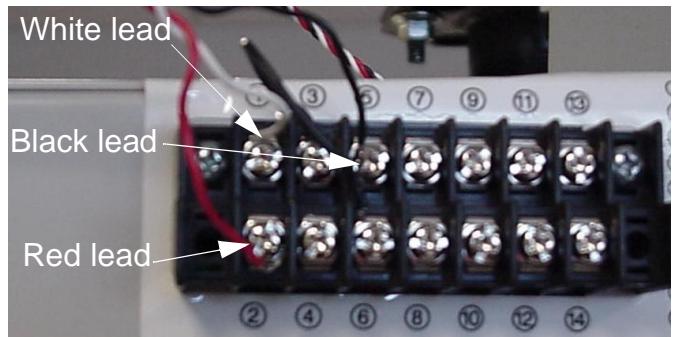


Figure 23. Contacts Connection

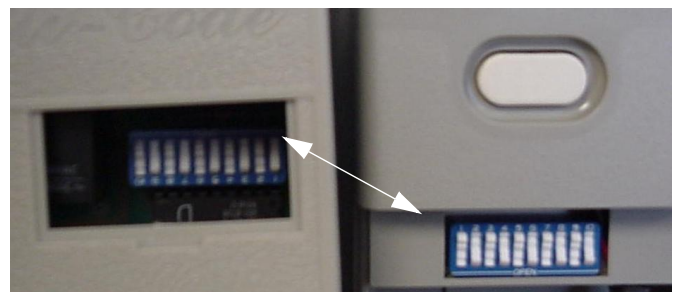


Figure 24. Dip Switches

### 12 Volt Out Supply

This internal power supply can be used to power external devices &/or to initiate specific functions (see Pushbutton operation and Figure 25).

1. Connect one lead to 12 VOLT GROUND (terminal #9).
2. Connect one lead to 12 VOLTS OUT (terminal #10).

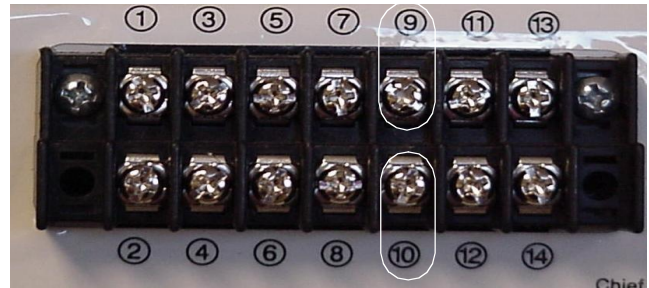


Figure 25. 12 Volts

### 24 Volt Out Supply

This internal power supply can be used to power external devices & remote controllers (see Figure 26).

1. Connect one lead to 24 VOLT COMMON (terminal #2).
2. Connect one lead to 24 VOLTS OUT (terminal #1).



Figure 26. 24 Volts

### Two Dry Contact Closures

NOTE: Dry contacts are rated for 1 Amp @ 24 volts.

These contacts can be used to complete circuits to external devices (see Figure 27).

1. Connect one lead to terminal #12 (common).
2. Connect one lead to terminal #14 (closes when unit reaches full extension).
3. Connect one lead to terminal #13 (closes when unit is fully retracted).

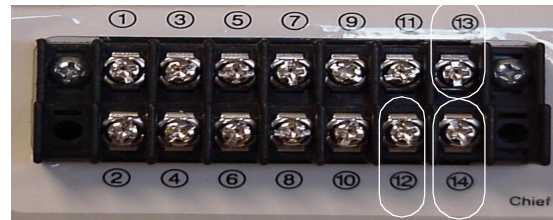


Figure 27. Dry Contacts

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## INSIDE TERMINAL WIRING EXAMPLES

The information on the following pages cover the most common wiring options:

- Pushbutton
- Extend and Retract for Switch or Contacts
- Remote (RC-10)
- 12 Volt out supply
- 24 Volt out supply
- Two dry contact closures
- Voltage Sensing

**CAUTION:** Closing the unit while the projector is running or in the cooling mode will cause premature bulb failure and may damage electrical components.

### Pushbutton

Wire for pushbutton operation as follows:

1. Install a wire between terminal 5 (extend/retract common) and ground terminal 3 (see Figure 28).
2. Connect one wire from pushbutton to terminal #4 (12 VDC power supply) and the other wire from the pushbutton to terminal #6 (extend/retract) (see Figure 29).

With the unit plugged in, push the button once and the unit should extend. Push the button during travel and the unit will stop at that location. Push the button after the unit is extended or stopped in mid-travel and the unit will retract.

### Extend and Retract Terminals to be Triggered By Separate Dry Contacts

These terminals can be used with a wall switch or a separate set of dry contacts for dedicated extend and dedicated retract. Momentary contacts are preferable.

**NOTE:** The connection between the ground (#13) and any other terminal connection must be broken (open) before completing the next circuit.

1. Connect the common to terminal #13 (see Figure 30).
2. Connect the extend to terminal #11 (see Figure 31).
3. Connect the retract to terminal #12 (see Figure 32).

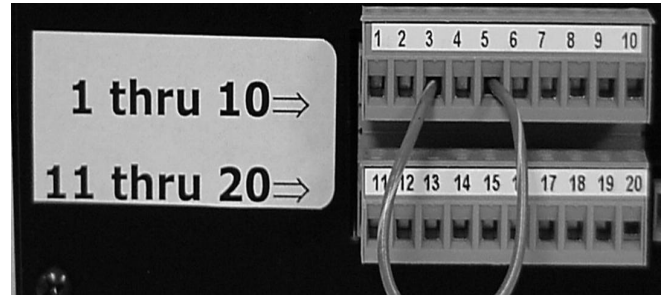


Figure 28. 12 Volt Supply Jumper

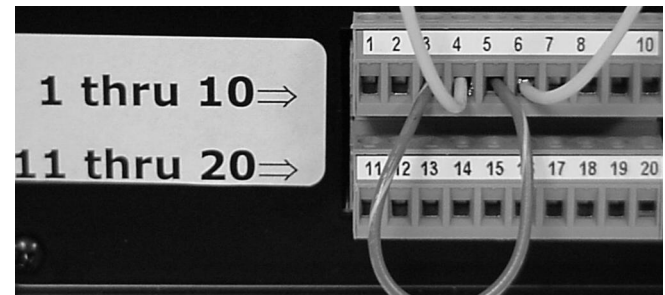


Figure 29. Pushbutton Wires

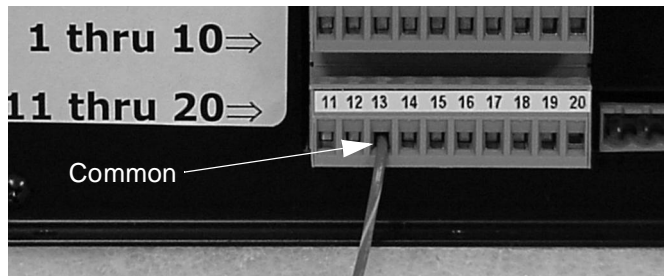


Figure 30. Common for Extend and Retract Contacts

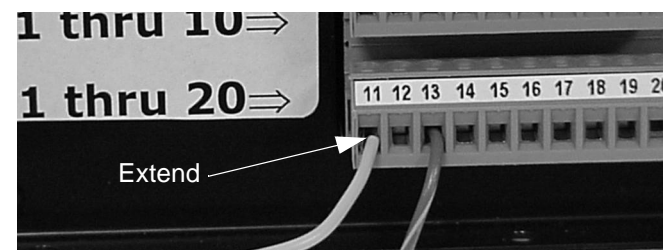


Figure 31. Extend Contact Wiring

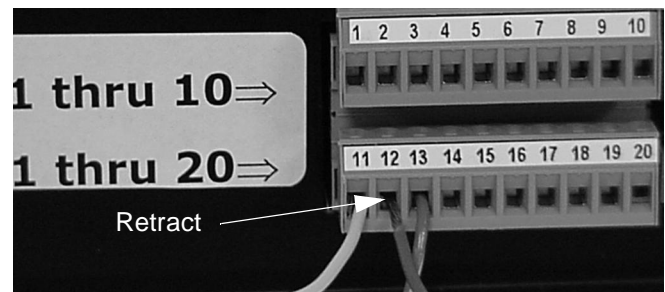


Figure 32. Retract Contact Wiring

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## Remote (RC-10)

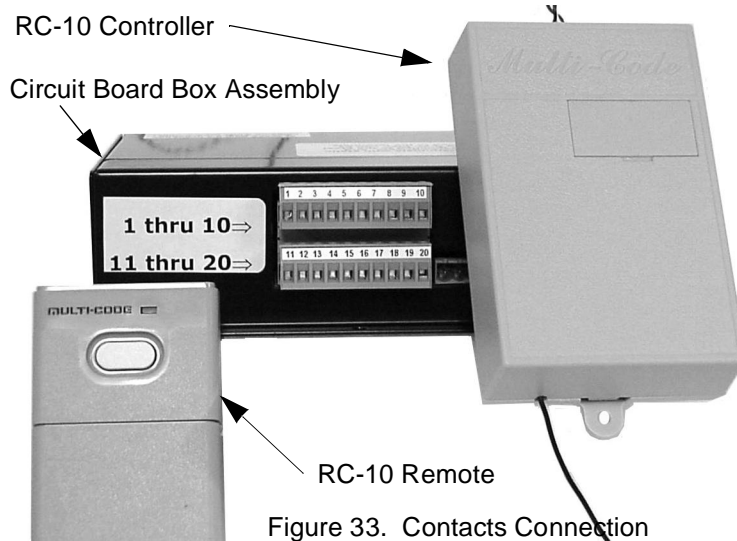


Figure 33. Contacts Connection

Wire for remote (RC-10) operation as follows (see Figure 33):

1. Install a jumper wire between terminals #6 and terminal #2 (see Figure 34).
2. Connect the white wire of the RC-10 controller unit to terminal #1 (see Figure 35).
3. Connect the red wire of the RC-10 controller unit to terminal #2.
4. Connect the black wire of the RC-10 controller unit to terminal #5.
5. Connect the power source to the lift.

NOTE: If the unit does not activate, check to make sure the 9 volt battery is working and make sure the dip switches in the sending unit match the dip switch settings in the controller unit (see Figure 36).

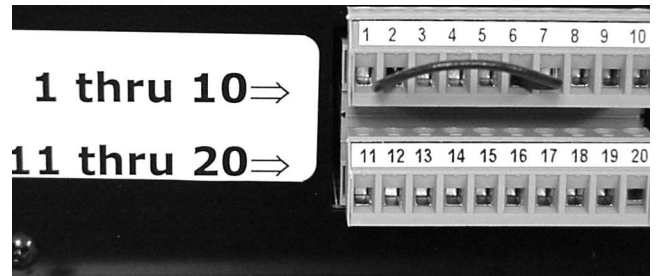


Figure 34. Contacts Connection

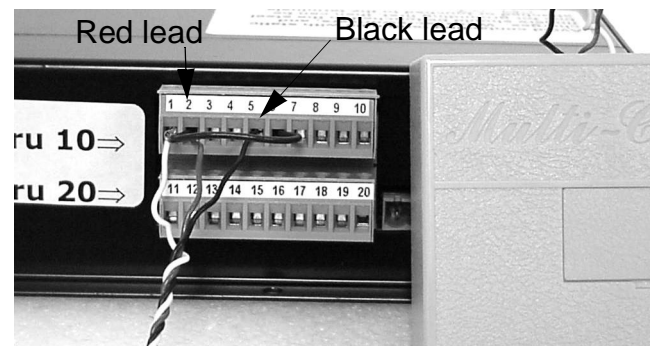


Figure 35. Contacts Connection

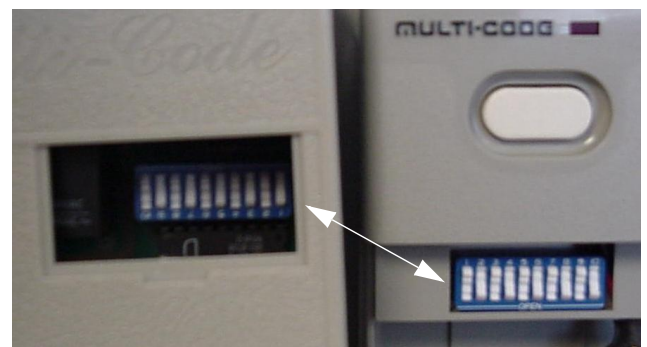


Figure 36. Dip Switches

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## 12 Volt Out Supply

This internal power supply can be used to power external devices &/or to initiate specific functions (see Pushbutton operation and Figure 37).

1. Connect one lead to 12 VOLT GROUND (terminal #3).
2. Connect one lead to 12 VOLTS OUT (terminal #4).

## 24 Volt Out Supply

This internal power supply can be used to power external devices & remote controllers (see Figure 38).

1. Connect one lead to 24 VOLT COMMON (terminal #2).
2. Connect one lead to 24 VOLTS OUT (terminal #1).

## Two Dry Contact Closures

NOTE: Dry contacts are rated for 1 Amp @ 24 volts.

These contacts can be used to complete circuits to external devices (see Figure 39 and Figure 40).

1. Connect one lead to terminal #17 (extend limit common).
2. Connect one lead to terminal #16 (closes when unit reaches full extension).
3. Connect one lead to terminal #19 (retract limit common).
4. Connect one lead to terminal #18 (closes when unit is fully retracted).

## Low Voltage Sensing

1. Connect positive lead (5 - 30 volts AC/DC) to terminal #7 and ground of switching device to terminal #8 (see Figure 41). Unit extends when voltage is sensed, retracts when voltage ceases.

Example using internal 12 volt DC supply (Figure 42):

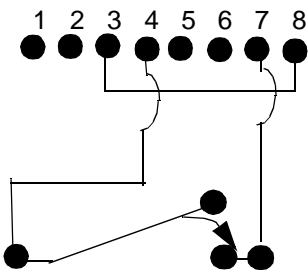


Figure 42. 12 Volt DC Supply

## Service Extend

NOTE: If using latching switch, switch must be disengaged before initiating any other function.

1. Connect momentary or latching contacts to ground terminal (terminal #3, #10, #13 or #20) and terminal #9 (see Figure 43)

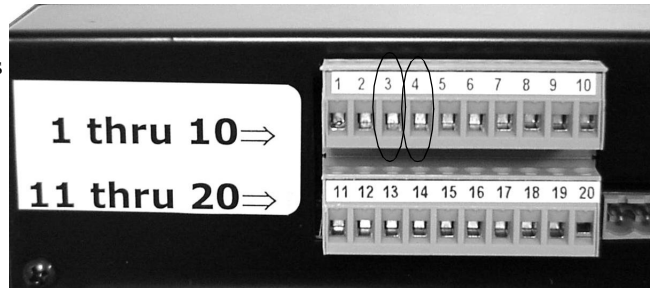


Figure 37. 12 Volts

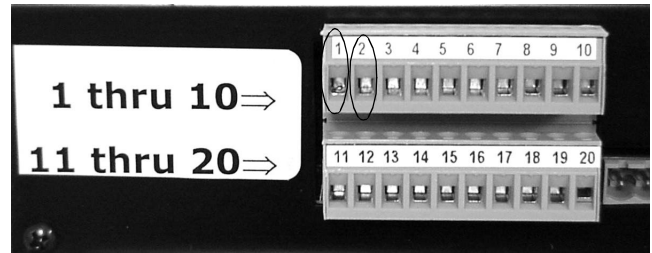


Figure 38. 24 Volts

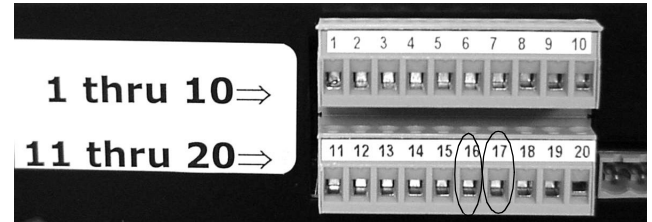


Figure 39. Extend Dry Contacts

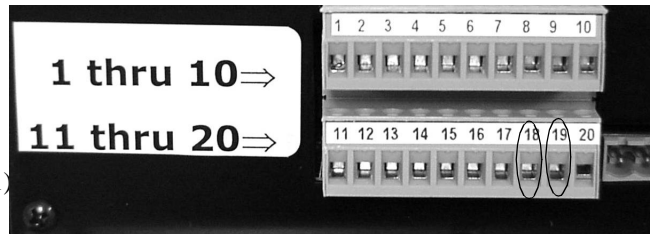


Figure 40. Retract Dry Contacts

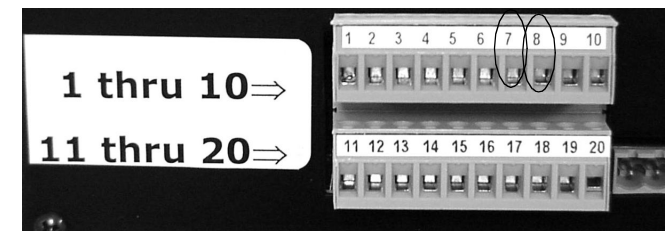


Figure 41. Low Voltage Sensing

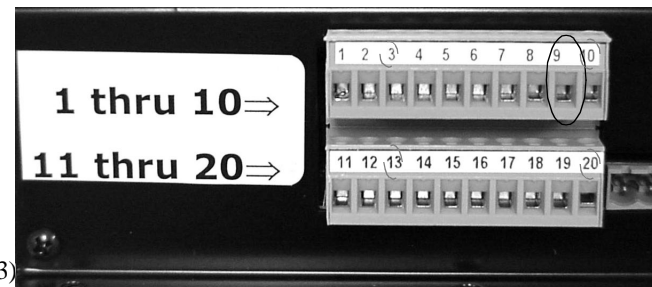


Figure 43. Service Extend

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SMART LIFT INTERIOR BOARD BOX TERMINAL FUNCTION DEFINITIONS				
TERMINAL NUMBER	FUNCTION	DESCRIPTION	WIRING OPTIONS	NOTES
1	24 VOLT AC	24 volt AC output		This is an internal power supply for powering external devices & Remote Controllers.
2	24 VOLT AC COMMON	24 volt AC common		Chief Mfg. offers the RC-10 Radio Frequency Remote Controller which runs off of this power supply.
3	GROUND	Ground		This is an internal power supply for powering external devices &/or used for initiating specific functions (Extend/Retract 5 or Voltage Sensor 7).
4	12 VOLT DC	12 volt DC		
5	EXTEND/RETRACT	Initiates movement if lift is static, or stops movement if lift is in motion. Direction of travel will be opposite of last direction of travel.	<u>To Operate using Internal Power Source</u> Connect terminals 3 & 6 with Jumper Wire. Connect Momentary Switch to terminal 4. Connect other line of Momentary Switch to terminal 5.	Function operates on momentary switch only.  Operating range is 5 – 30 Volts AC or DC
6	EXTEND/RETRACT COMMON	Used in conjunction with Extend/Retract when using an external power source to initiate movement.	<u>To Operate using External Power Source</u> Connect External Power Supply's Common to terminal 6. Connect initiating signal to terminal 5.	NOT TO BE USED AS GROUND FOR FUNCTION OTHER THAN EXTEND/RETRACT TERMINAL 5.
7	VOLTAGE SENSOR	When terminal senses voltage, unit will extend.  When terminal senses cessation of voltage, unit will retract.	<u>Voltage Sensing</u> Connect positive lead to terminal 7. Connect Ground of switching device to terminal 8.  <u>Single-Pull/Throw Latching Switch</u>	Operating range is 5 – 30 Volts AC or DC
8	VOLTAGE SENSOR COMMON	Used in conjunction with Voltage Sensor when using an external power source to initiate movement.	Connect terminals 3 & 8 with Jumper Wire. Connect first Switch Terminal to terminal 4. Connect other Switch Terminal to terminal 7.	NOT TO BE USED AS GROUND FOR FUNCTION OTHER THAN VOLTAGE SENSOR TERMINAL 7.
9	SERVICE EXTEND	Extends unit to maximum limit, bypassing normal-use travel setting.  Often used for servicing projectors in ceiling lifts.	Momentary or Latching contact to Ground terminals 3, 10, 13, or 20.	Feature not available on all models.  If using Latching Switch, be sure to disengage Switch prior to initiating any other function.
10	GROUND	Ground		

11	EXTEND	Extends unit to preset travel limit.	Momentary or Latching contact to Ground terminals 3, 10, 13, or 20.	If using Latching Switch, be sure to disengage Switch prior to initiating any other function.
12	RETRACT	Retracts unit to preset travel limit.		If using Latching Switch, be sure to disengage Switch prior to initiating any other function.
13	GROUND	Ground		
14	EXTEND ERROR	Immediately reverses direction of travel when triggered while unit is extending.	Momentary contact to Ground terminals 3, 10, 13, or 20.	Chief Mfg. offers the SS-10 Pressure Sensitive Safety Strip to provide this function. Please specify how many inches required spanning entire pinch zone. The SS-10 must be ordered with the ST-1: Terminals.
15	RETRACT ERROR	Immediately reverses direction of travel when triggered while unit is retracting.		
16	EXTEND LIMIT RELAY	Closes set of internal dry contacts when unit reaches full extension.		RATED FOR 1 AMP @ 24 VOLTS
17	EXTEND LIMIT RELAY COMMON			
18	RETRACT LIMIT RELAY	Closes set of internal dry contacts when unit reaches full retraction.		RATED FOR 1 AMP @ 24 VOLTS
19	RETRACT LIMIT RELAY COMMON			
20	GROUND	Ground		

**WIRING THE RC-10**

Connect white lead to terminal 1, red lead to terminal 2, and black lead to terminal 5. Place jumper wire from terminal 2 to terminal 6

**WIRING A MOMENTARY PUSH BUTTON**

Connect terminals 3 & 6 with Jumper Wire. Connect Momentary Switch to terminal 4. Connect other line of Momentary Switch to terminal 5.

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<b>SMART LIFT EXTERIOR 14 PIN</b>				
<b>TERMINAL FUNCTION DEFINITION</b>				
<b>TERMINAL NUMBER</b>	<b>FUNCTION</b>	<b>DESCRIPTION</b>	<b>WIRING OPTIONS</b>	<b>NOTES</b>
1	24 VOLT AC	24 volt AC output		This is an internal power supply for powering external devices & Remote Controllers.  Chief Mfg. offers the RC-10 Radio Frequency Remote Controller which runs off of this power supply.
2	24 VOLT AC COMMON	24 volt AC common		
3	RETRACT	Retracts unit to preset travel limit.	Momentary or Latching contact to Ground terminals 9, or 11.	If using Latching Switch, be sure to disengage Switch prior to initiating any other function.
4	EXTEND	Extends unit to preset travel limit.		If using Latching Switch, be sure to disengage Switch prior to initiating any other function.
5	EXTEND/RETRACT COMMON	Used in conjunction with Extend/Retract when using an external power source to initiate movement.	<u>To Operate using Internal Power Source</u> Connect terminals 9 & 5 with Jumper Wire. Connect Momentary Switch to terminal 10. Connect other line of Momentary Switch to terminal 6.	NOT TO BE USED AS GROUND FOR FUNCTION OTHER THAN EXTEND/RETRACT TERMINAL 5.
6	EXTEND/RETRACT	Initiates movement if lift is static, or stops movement if lift is in motion. Direction of travel will be opposite of last direction of travel.	<u>To Operate using External Power Source</u> Connect External Power Supply's Common to terminal 5. Connect initiating signal to terminal 6.	Function operates on momentary switch only.  Operating range is 5 – 30 Volts AC or DC
7	RETRACT ERROR	Immediately reverses direction of travel when triggered while unit is retracting.	Momentary contact to Ground terminals 9, or 11.	Chief Mfg. offers the SS-10 Pressure Sensitive Safety Strip to provide this function. Please specify how many inches required to span entire pinch zone. The SS-10 must be ordered with the ST-1! Terminals.
8	EXTEND ERROR	Immediately reverses direction of travel when triggered while unit is extending.		
9	GROUND	Ground		This is an internal power supply for powering external devices &/or used for initiating specific functions (Extend/Retract 6).
10	12 VOLT DC	12 volt DC		
11	GROUND	Ground		

12	LIMIT RELAY COMMON			RATED FOR 1 AMP @ 24 VOLTS
13	RETRACT LIMIT RELAY	Closes set of internal dry contacts when unit reaches full retraction.		
14	EXTEND LIMIT RELAY	Closes set of internal dry contacts when unit reaches full extension.		

**WIRING THE RC-10**

Connect white lead to terminal 1, red lead to terminal 2, and black lead to terminal 6.  
Place jumper wire from terminal 2 to terminal 5

**WIRING A MOMENTARY PUSH BUTTON**

Connect terminals 9 & 5 with Jumper Wire. Connect Momentary Switch to terminal 10. Connect other line of Momentary Switch to terminal 6.

## TROUBLESHOOTING

If the lift is installed according to these instructions, it should operate trouble-free indefinitely. If you do encounter a problem, and it isn't covered by the troubleshooting suggestions below, call the Technical Services Department at Chief Manufacturing:

1-800-582-6480

952-894-6280

<b>Symptom(s)</b>	<b>Possible Causes</b>	<b>Suggested Action</b>
No Movement and No Sound	No Power	1. Check power to unit (supply, cord, activation control, and connections). No power: Provide power, repair cord, tighten connections or repair activation control. Power: Check fuse on circuit board. If fuse is OK, proceed to next step.
	Faulty Circuit Board	2. Check circuit board as follows: Make three jumper wires with ends stripped. Install one jumper wire on terminal 11. Install one jumper wire on terminal 12. Install one jumper wire on terminal 13. Momentarily touch jumper wire from terminal 11 to terminal 13. Unit should extend. Momentarily touch jumper wire from terminal 12 to terminal 13. Unit should retract.  Activates In both Directions: Circuit board OK, faulty activation interface. Check remote switch, circuit, or batteries in remote control.  Unit Fails Both/Either Direction: Call Chief Manufacturing.
Unit Operates Noisily (Squeeling or grinding)	Track Misalignment	1. Check for noise and/or metal shavings in track Noise or Shavings: Check and adjust track and/or shelf as necessary.  No Track Noise: Possible brake problem, call Chief Manufacturing