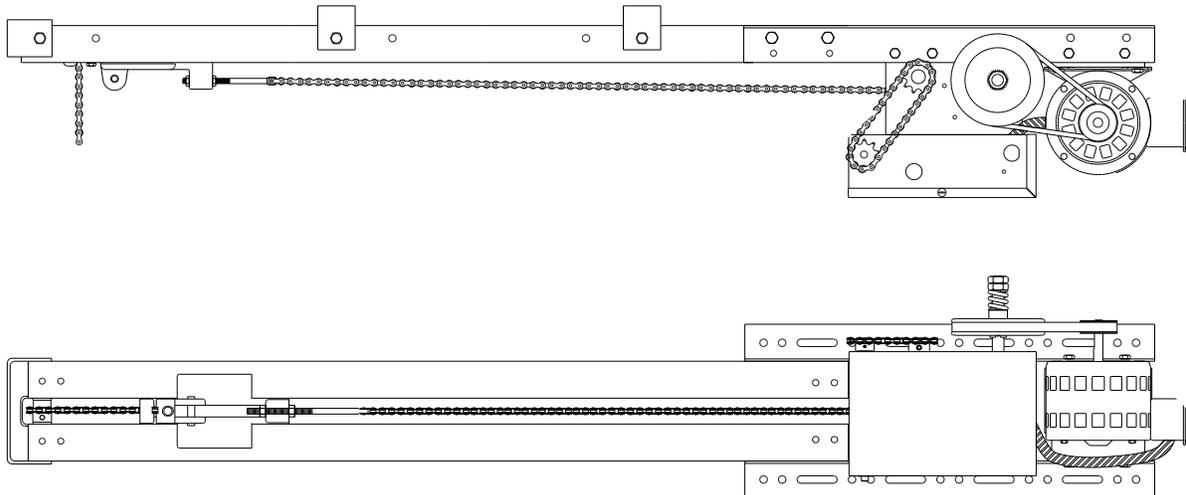




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# INSTALLATION AND OWNER'S MANUAL MD

## M-S SERIES DRAWBAR COMMERCIAL VEHICULAR DOOR OPERATORS with Solid State Controls



100768



As of date of manufacture,  
meets all ANSI/UL 325  
Safety Requirements for  
Vehicular door operators

Serial #:
Date Installed:
Your Dealer:

**READ THIS MANUAL  
CAREFULLY BEFORE  
INSTALLATION OR USE.  
SAVE THIS MANUAL!**

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**READ THESE STATEMENTS CAREFULLY AND FOLLOW THE INSTRUCTIONS CLOSELY.**

The Warning and Caution boxes throughout this manual are there to protect you and your equipment. Pay close attention to these boxes as you follow the manual.


<b>WARNING</b>
Indicates a MECHANICAL hazard of INJURY OR DEATH. Gives instructions to avoid the hazard.


<b>CAUTION</b>
Indicates a MECHANICAL hazard of DAMAGE to your operator or equipment. Gives instructions to avoid the hazard.


<b>WARNING</b>
Indicates an ELECTRICAL hazard of INJURY OR DEATH. Gives instructions to avoid the hazard.


<b>CAUTION</b>
Indicates an ELECTRICAL hazard of DAMAGE to your operator or equipment. Gives instructions to avoid the hazard.

The purpose of this booklet is to provide assembly, installation and operation information concerning the Model MD Commercial Vehicular Garage Door Operators and related Accessory Products.

### NOTICE

**IT IS IMPORTANT THAT THIS INSTRUCTION MANUAL BE READ AND UNDERSTOOD COMPLETELY BEFORE INSTALLATION OR OPERATION IS ATTEMPTED. IT IS INTENDED THAT THE INSTALLATION OF THIS UNIT WILL BE DONE ONLY BY PERSONS TRAINED AND QUALIFIED IN THE INSTALLATION, ADJUSTMENT AND SERVICE OF COMMERCIAL OVERHEAD DOORS AND DOOR OPERATORS AND BY QUALIFIED ELECTRICIANS.**

### NOTICE

**THE IMPORTANT SAFEGUARDS AND INSTRUCTIONS IN THIS MANUAL CANNOT COVER ALL POSSIBLE CONDITIONS AND SITUATIONS WHICH MAY OCCUR DURING ITS USE. IT MUST BE UNDERSTOOD THAT COMMON SENSE AND CAUTION MUST BE EXERCISED BY THE PERSON(S) INSTALLING, MAINTAINING AND OPERATING THE EQUIPMENT DESCRIBED HEREIN. DO NOT USE THIS EQUIPMENT FOR ANY OTHER THAN ITS INTENDED PURPOSE - OPERATING OVERHEAD COMMERCIAL VEHICULAR GARAGE DOORS.**

## STANDARD FEATURES

**Solid State Controls:** The MD operators employ solid state technology with advanced standard features to provide for a complete commercial door operating system.

**Limit Switches:** Driven limit switches, easily adjusted over a wide range. The motor may be removed without affecting the limit switch adjustments

**Manual Release:** Permits manual operation of the door in the event of a power failure.

**Control Circuit:** Connection terminals for a standard three button Open, Close and Stop control station at 5 Volts DC. The motor control board features a built-in 3 button station for test purposes.

### Connections For Auxiliary Entrapment Protection

**Devices:** For the ultimate in protection, terminals are provided to connect a Linear Corp. Photo-Beam System that consists of an emitter, Part No. 217792 and detector, Part No. 217800. This device when connected is a monitored photo-beam system. Additional connection terminals for a Normally Open and Normally Closed reversing devices such as a reversing door edge or a three wire photo-beam are provided.

**Momentary Contact To Close:** Standard operating mode. Requires a photo-beam as described above or one of the Miller Edge family of Door Edge devices as described on this page to be properly installed on the door and connected to the operator. See Page 10 for the entrapment protection installation guide.

## MODEL MD OPERATOR APPLICATIONS:

Drawbar operators are for commercial and industrial use on sectional overhead doors which use horizontal track with normal radius. A draw bar operator is not suitable for doors with high lift exceeding 24 inches or vertical lift doors. The installation requires a minimum clearance of 5 inches above the high arc of the door (the highest point reached by the door at any part of its travel). Add 4 feet, 8 inches to the door height (4 feet, 2 inches for a 10 foot high door) when measuring for the back-room required to install the operator. When properly installed a drawbar operator effectively locks the door in the closed position.

The Model MD (drawbar) operators are used in the following applications:

- Limited Duty Commercial installations only
- Rate of operation shall not exceed 10 cycles of openings and closings per hour, maximum of 75 cycles per day.
- Indoor Use Only
- Up to 14 foot high doors with a maximum area of approximately 196 square feet (will vary depending on door construction, consult factory)
- To operate in Momentary Contact To Close mode and comply with the UL325 Entrapment Protection requirements effective Aug. 29, 2010, the door system must include one of the following (a, b, or c):
  - (a) Linear Corp. Photo-Beam System that consists of an emitter, Part No. 217792 and detector, Part No. 217800 for doors as described above up to 30 FT wide. See Page 10.
  - (b) Any Miller Edge ME, MT/MU, and CPT family of edges, with suffix T2, must be connected to the SM-102 Edge Module, Recognized by UL as per UL325 2010 on 08-29-2010 for door as described above. See Page 10.
  - (c) A Vitector Fraba OSE 2-wire Photosystem as Recognized by UL as per UL325 2010 on 08-29-2010 for door as described above. See Page 10.
- The manufacturer of this operator strongly recommends installation of one of the entrapment protection device above and states that one is REQUIRED where any automatic, remote or manual control is used to activate the door.

## OPTIONAL FEATURES:

**Digital Radio Controls:** Open, Close and Stop operation. Radio units are available to control up to 27 doors from one transmitter.

**Timer to Close Operation:** Two of the programmable operation modes (T & TS), closing delay is adjustable from 5 seconds (factory set at 30 seconds) to 5 minutes in five second intervals.

**Delay on Reverse:** Factory set to 0.6 seconds, adjustable to 2 seconds.

**Keyless Entry System:** Connection terminals provided for hard wired or wireless keyless entry systems.

**Brake:** Specify when ordering.

**WARNING**

**ELECTRIC DOOR OPENERS ARE DESIGNED FOR DOORS IN GOOD WORKING CONDITION, PROPERLY COUNTERBALANCED AND PROPERLY ADJUSTED IN ACCORDANCE WITH THE DOOR MANUFACTURER'S INSTALLATION INSTRUCTIONS.**

The rails and drawbar chain/hardware package are shipped separately from the powerhead.

**Warning:** Rope off the area to keep personnel and vehicles clear of the door and floor space in the vicinity of the operator during the installation.

**WARNING**

**SPRINGS ARE SUBJECT TO VERY HIGH FORCES AT ALL TIMES AND ADJUSTMENTS MUST BE MADE ONLY BY A QUALIFIED PROFESSIONAL DOOR INSTALLER.**

**WARNING**

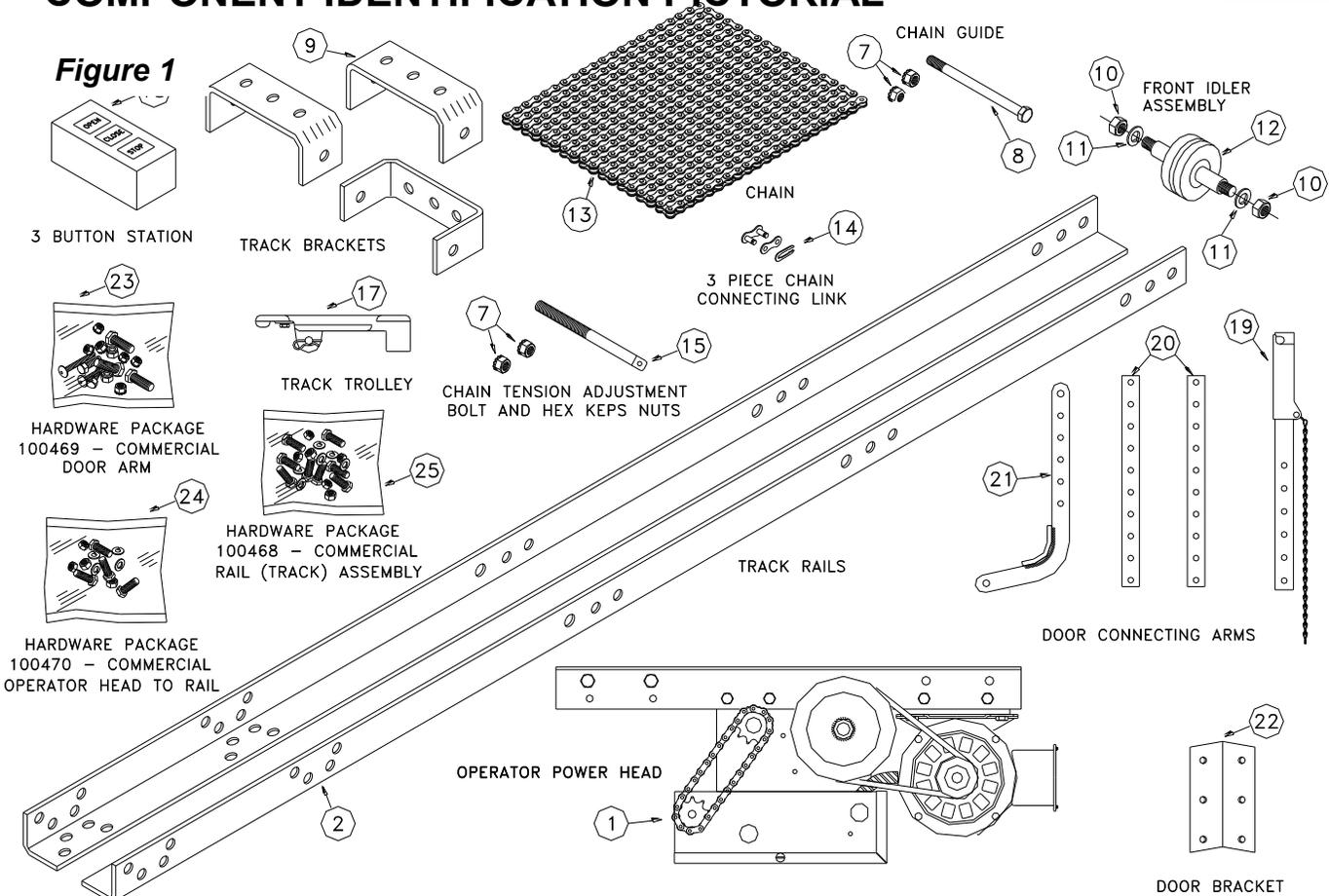
**REMOVE OR DISABLE ANY LOCKING DEVICES FROM DOOR AND REMOVE ALL ROPES**

Before starting the installation of the operator, the door must be in good working condition and properly counterbalanced. Inspect the door and track for loose or missing hardware. Test the door manually for balance and ease of operation. Lubricate door hinges and rollers. If necessary, adjust the springs for proper counterbalance of the door.

Before removing the operator powerhead from the shipping carton, inspect the nameplate on the cover of the operator control box to verify that it is the correct model for the intended application and that the voltage and phase are in accordance with electrical power provided at the job site.

**COMPONENT IDENTIFICATION PICTORIAL**

10710



# IMPORTANT INSTALLATION INSTRUCTIONS! 5



**WARNING**

**TO REDUCE THE RISK OF SEVERE INJURY OR DEATH:**

## READ AND FOLLOW ALL INSTALLATION INSTRUCTIONS!

- Install only on a properly operating and balanced garage door. A door that is operating improperly could cause severe injury. Have qualified service personnel make repairs to cables, spring assemblies and other hardware before installing the opener.
- Remove all pull ropes and remove, or make inoperative, all locks (unless mechanically and/or electrically interlocked to the power unit) that are connected to the garage door before installing the opener.
- Lightweight doors (fiberglass, aluminum etc.) must be reinforced to avoid door damage. Check the door manufacturer's instruction manual for a bracing procedure or the availability or a Reinforcement Kit. See Page 9.
- Model MD is a Commercial Vehicular Door Operator and as such IS NOT recommended for pedestrian traffic. In installations where it is known that pedestrians will be nearby ensure a pedestrian door is available for entrance and exit to the building. In addition YOU MUST install an auxiliary entrapment protection device (reversing door edge or photoelectric beam device).
- Connect an auxiliary entrapment protection device (reversing edge or photoelectric device across the door opening). A device of this type is **STRONGLY ADVISED FOR ALL** commercial operator installations. An auxiliary entrapment protection device is **REQUIRED** when the three button control station is out of sight of the door or any other automatic or manual control is used.
- Install the door operator at least 8 feet or more above the floor if the operator has exposed moving parts.
- Do not connect the opener to the source of power until instructed to do so.
- Locate the control station:
  - a) within sight of the door,
  - b) at a minimum height of five feet above the floor so small children cannot reach it,
  - c) away from all moving parts of the door, and
  - d) far enough away from the door, or positioned such that the user is prevented from coming in contact with the door while operating the controls.
- Do not overtighten the clutch adjustment to compensate for a poorly working door.
- Install the Entrapment Warning Placard next to the control station in a prominent location.
- All warning signs and placards must be installed so they are visible in the area of the door.
- After installing the opener, all safety features must be tested for proper operation (see page 20).
- For products having a manual release, instruct the end user on the operation of the manual release.

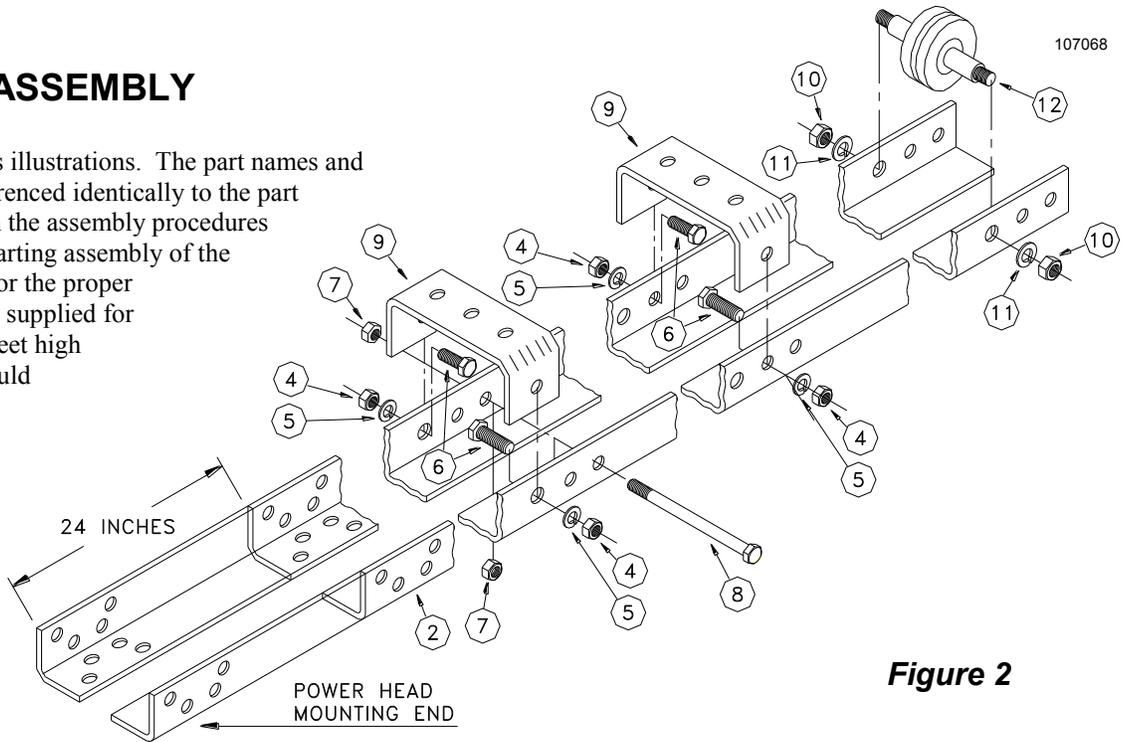
## COMPONENT IDENTIFICATION LISTING

ITEM #	PART#	DESCRIPTION	QUAN	ITEM #	PART#	DESCRIPTION	QUAN
1		Operator Power Head	1	19	100513	Release Door Arm	1
2		Track Rails	2	20	100236	Extension Door Arm	2
7	006031	3/8-16 Keps Hex Nut	6	21	108877	Curved Door Arm	1
8	101315	3/8 - 16 X 6-1/2 Hex Head Bolt	1	22	100108	Door Bracket	1
9	107049	Track Bracket	AR	23	100469	Hardware Pkg Com. Door Arm	1
10	006034	1/2 - 15 Hex Nut	2	26		3/8 - 16 X 2-1/2 Carriage Bolt	2
11	006049	1/2 Split Lockwasher	2	16		3/8 - 16 X 1 Hex Head Bolt	1
12	106265	Front Idler Assembly	1	27		3/8 Nylon Insert Locknut	1
13		Chain For Track Rail	1	28		5/16 - 18 X 1-1/4 Hex Head Bolt	4
14	009224	3 Piece Chain Connecting Link	1	29		5/16 - 18 Keps Hex Nuts	4
15	009084	Chain Tension Adjustment Bolt	1	25	100468	Hardware Pkg Com. Track Assy	1
16	006031	3/8 - 16 Keps Hex Nut	2	4		3/8 - 16 Hex Nut	AR
17	100512	Track Trolley	1	5		3/8 Split Lockwasher	AR
18	005031	3 Button Station	1	6		3/8 - 16 X 1-1/2 Hex Head Bolt	AR

— AR - As Required

## RAIL/CHAIN ASSEMBLY

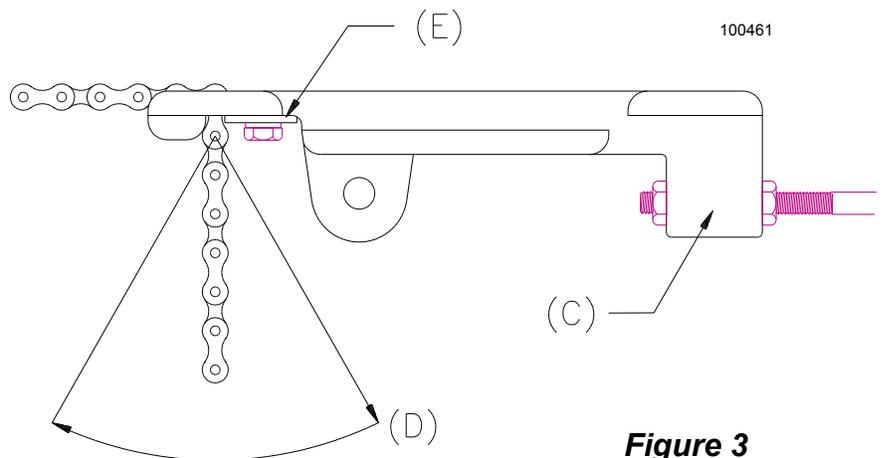
Refer to Figure 1 parts illustrations. The part names and item numbers are referenced identically to the part names and numbers in the assembly procedures that follow. Before starting assembly of the operator track check for the proper length. The tracks are supplied for 8 Feet and 10/12/14 Feet high doors. The tracks should be three (3) feet longer than the door height. If the tracks supplied with the operator are more than three (3) feet longer than the door height it will be necessary to cut off two (2) feet (or 4 feet for 10 FT doors) from the power head mounting end as shown in Figure 2.



**Figure 2**

**CAUTION: WHEN NECESSARY TO CUT THE TRACK ENSURE THE ENDS ARE LINED UP AS IN FIGURE 2.**

- 1) Assemble the operator track by assembling the items as shown in Figure 2.
- 2) After the track is assembled, position track assembly onto the operator power head and attach with four 3/8"-16 x 1" bolts, lock washers and nuts (supplied in a separate hardware package #100470).
- 3) Referring to Figure 1 , 2 and 3 (below) , slide the trolley onto the track with the chain take up bolt lug (C) toward the power head. Thread one 3/8-16 keps nut (attached star washer) onto the Chain take up bolt with the keps part (attached star washer) away from the chain attachment end. Insert the chain take up bolt threaded end through the lug hole on the trolley (C) just far enough to start a second 3/8-16 keps nut. Attach one end of the chain to the opposite end of the threaded stud using a 3-piece chain link (provided). See Figure 3.
- 4) Install chain around drive sprocket at operator head then around idler at front end of rail and thread through opening at front end of carrier. If the rail is equipped with a chain guide-spacer near its center (12 foot rail or longer only) pass the chain over it in one direction and under it in the other direction to separate the two lengths of chain. Apply initial tension by pushing forward on the carrier while pulling chain tight through opening in the carrier in the direction of **D**. When maximum tension has been applied by this means, swing chain forward and insert retaining plate, **E**, in place. Insert 1/4-20 x 5/8 hex head machine screw through retaining plate, **E**, and tighten plate in place. Make final adjustment of chain tension to remove excess sag by adjusting nuts on threaded rod at chain lug, **C**.



**Figure 3**



## CAUTION

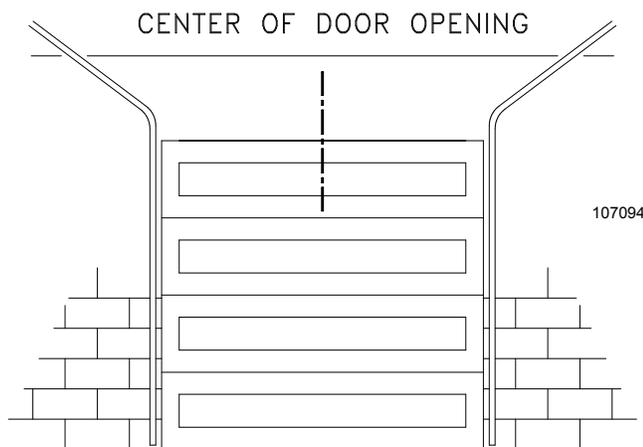
**TO AVOID DAMAGE TO DOOR AND OPERATOR ENSURE ALL DOOR LOCKS ARE DISABLED. USE AN INTERLOCK SWITCH IF A LOCK IS REQUIRED TO RETAIN FUNCTIONALITY.**



## CAUTION

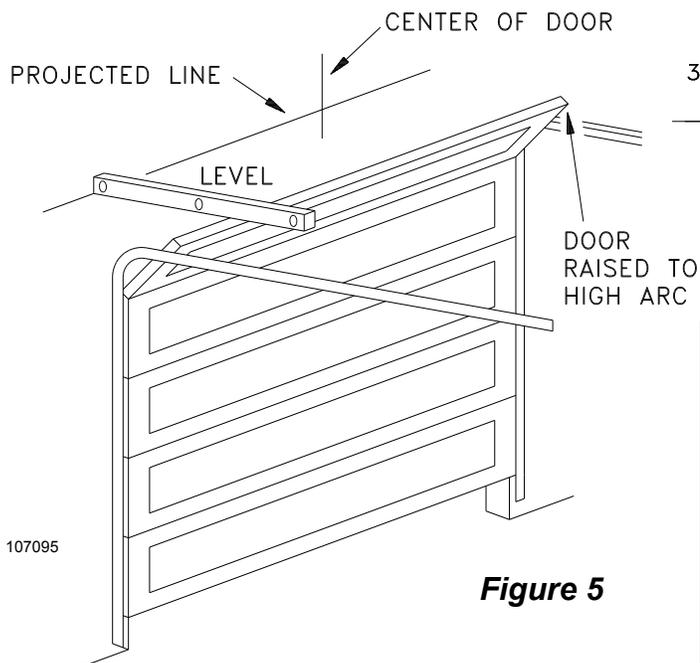
**A MINIMUM OF TWO PERSONS ARE REQUIRED FOR OPERATOR INSTALLATION. ENSURE A SAFE RIGID WORKING PLATFORM IS AVAILABLE.**

- 1) Locate the center of the door and mark a line on the wall directly above the door. Extend this line approximately 20" up the wall. See Figure 4.



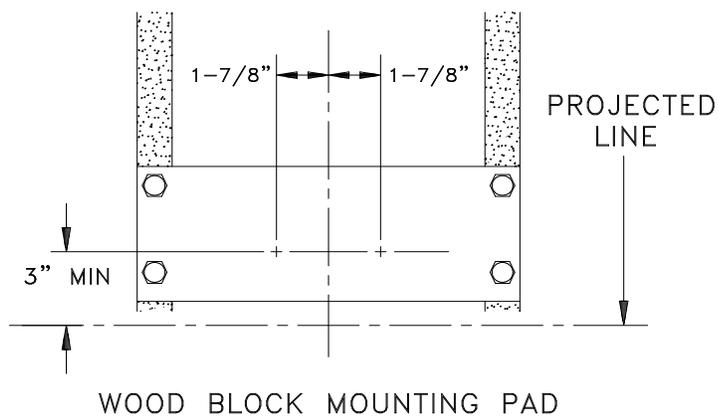
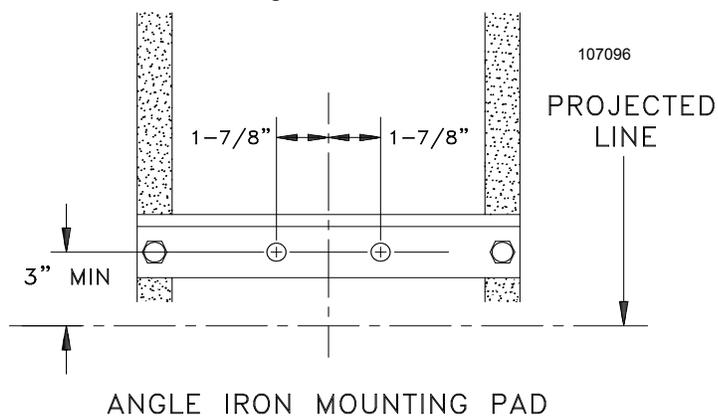
**Figure 4**

- 2) Slowly raise the garage door and observe the action of the top section. When the top section reaches the highest point (high arc), use a level and project a line from this point to the center of the door. See Figure 5.



**Figure 5**

- 3) Using the projected lines for location, mount a suitable wood block or angle iron, depending on the structure of the building, to the wall above the door opening as shown in Figure 6. Ensure the block or angle iron used will provide a sound and secure mounting pad for the operator rail front mounting bracket, see CAUTION warning below.



**Figure 6**

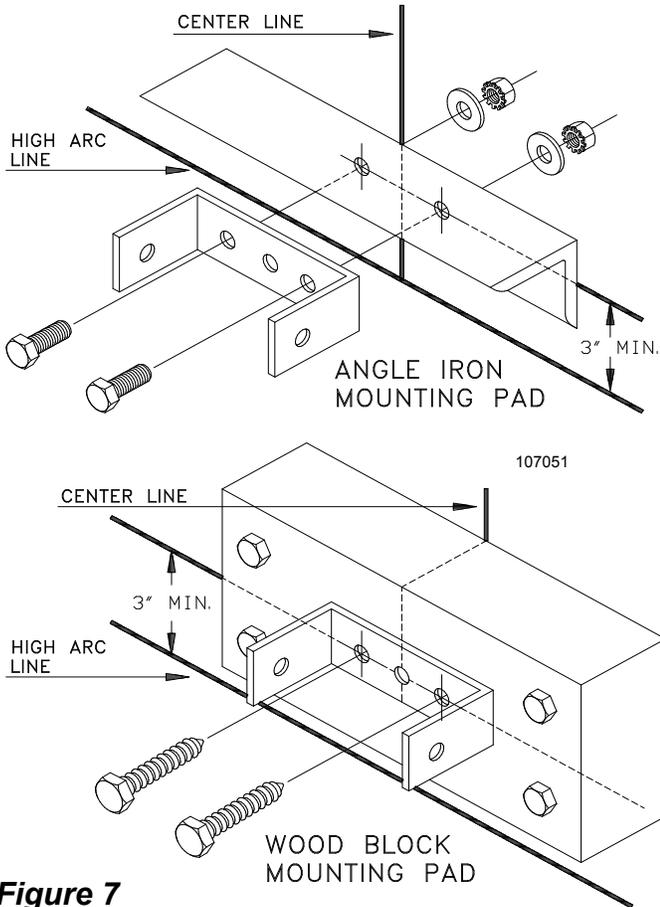


## CAUTION

**THE FRONT MOUNTING SURFACE FOR THE OPERATOR MUST BE SOUND AND SECURE. IF NECESSARY PROVIDE REINFORCEMENT IN THIS AREA BEFORE MOUNTING THE OPERATOR RAIL FRONT MOUNTING BRACKET.**

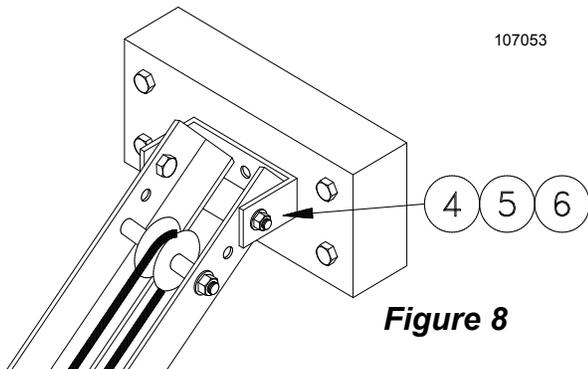
# 8 INSTALLATION INSTRUCTIONS

4) Mount the front mounting bracket (Item 9) to the mounting pad as shown in Figure 7. The location of the door's torsion shaft may prevent you from placing the mounting pad in the location shown. Mount the pad as close as possible to three (3) inches above the door's high arc point.



**Figure 7**

5) With the door in the down position, loosely attach the rail support to the mounting bracket using two (2) bolts, lockwashers and nuts (Items 4, 5, 6). See Figure 8.

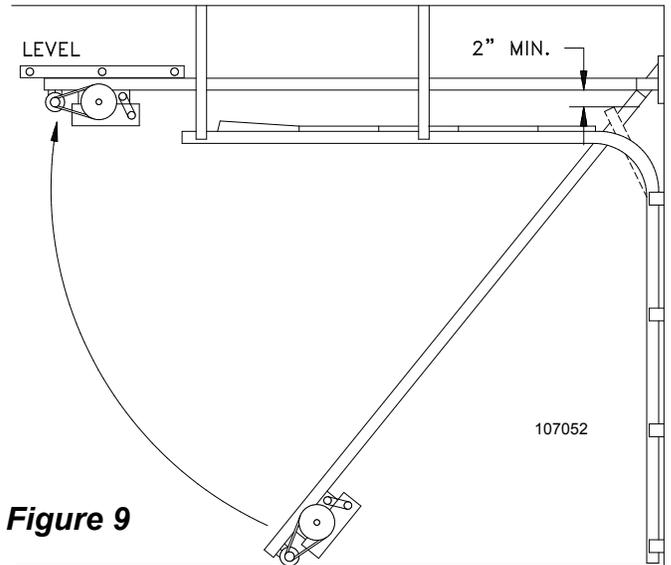


**Figure 8**

6) Swing the operator to a horizontal position above the door guide rails (high enough to raise the door) and temporarily secure by suspending from the ceiling with a suitable rope or chain or support from the floor to the operator. Now open the garage door slowly, being careful not to dislodge the temporary support. Lower the operator until it is level. Make sure the operator is aligned with the center of the door and the bottom of the rail is at least 2" above the high arc of the door. See Figure 9.

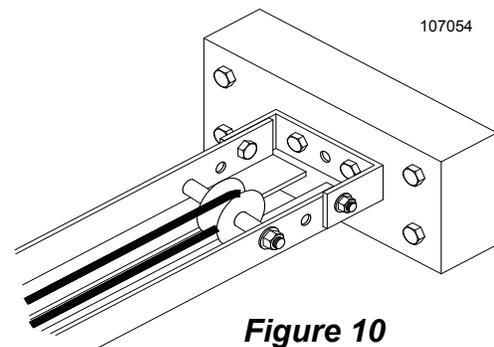
WARNING

**FAILURE TO SUSPEND THE OPERATOR SECURELY MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.**



**Figure 9**

7) Tighten securely the two (2) bolts, nuts and washers that were loosely attached in Step 5. See Figure 10.

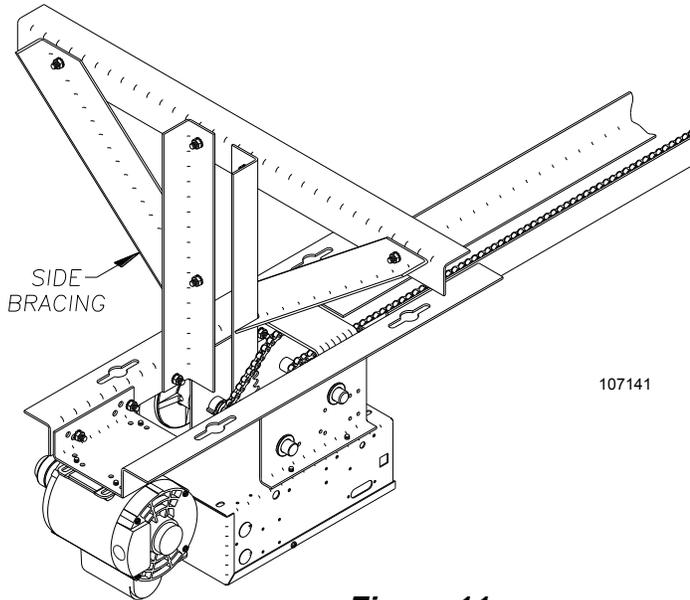


**Figure 10**

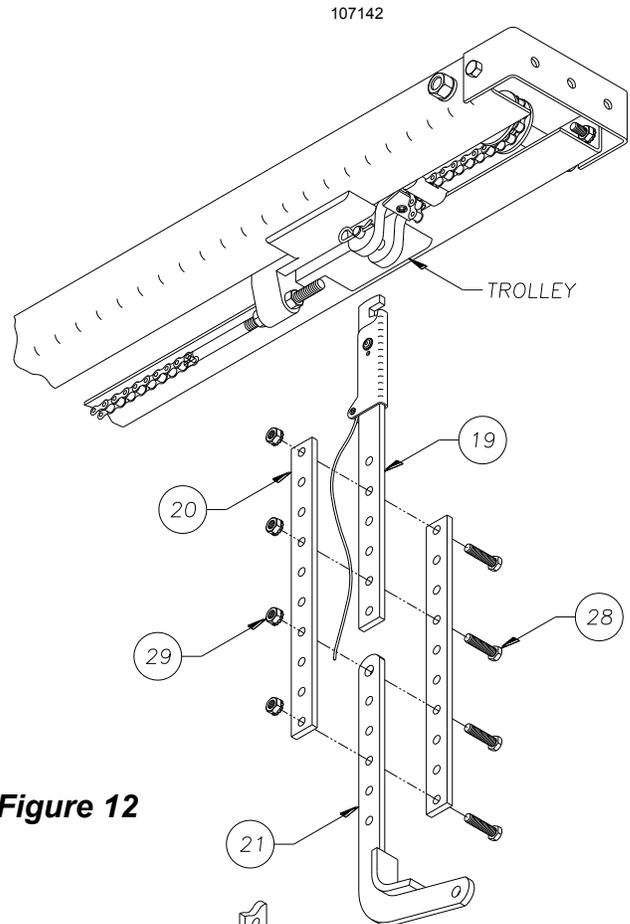
WARNING

**SPRINGS, PULLEYS, CABLES AND MOUNTING HARDWARE USED TO BALANCE YOUR GARAGE DOOR ARE UNDER EXTREME TENSION AT ALL TIMES AND CAN CAUSE SEVERE INJURY OR DEATH IF DISTURBED. DO NOT ATTEMPT ADJUSTMENT.**

8) Figure 11 details a typical method of hanging the operator from the ceiling. Each installation will vary due to the difference in building structures; but in all installations side braces should be used to further strengthen the installation. If the operator track (rail) is longer than 15 feet a mid support is recommended.



**Figure 11**

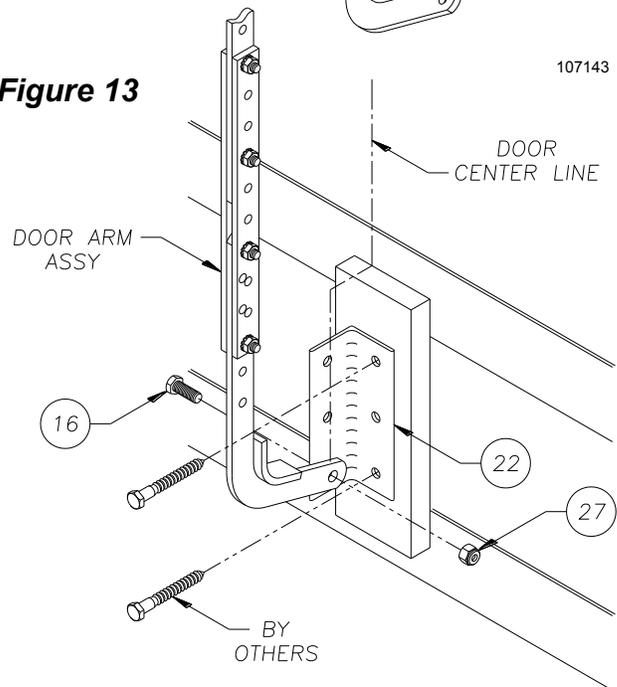


**Figure 12**

9) Fully close the door and move the trolley to within 2 inches of the idler sprocket. Using Figure 12 as a guide, connect the release arm (Item 19) to the trolley. Connect the two extension arms (Item 20) and the door curved arm (Item 21) to the door release arm with 5/16 inch bolts and keps nuts (Items 28 & 29).

10) Refer to Figure 13. Attach the door bracket (Item 22) to the curved arm using a 3/8 bolt and locknut (Items 16 & 27). Tighten the bolt until snug then back off 1/4 to 1/2 turns so as to allow the arm to pivot on the bolt freely. Position the door bracket to the scribed center line on the door. Use suitable hardware to attach the door bracket to the door.

**Figure 13**



## IMPORTANT

**TO AVOID DAMAGE TO THE DOOR TOP SECTION REINFORCE THE CENTER STILE WITH A VERTICAL BRACE. ADDITIONAL BRACING/REINFORCEMENT MAY BE REQUIRED WHEN THE DOOR IS CONTROLLED BY AN AUTOMATIC DOOR OPERATOR; CONSULT THE DOOR MANUFACTURER FOR INSTRUCTIONS.**

## NOTE

**BEFORE PROCEEDING RECHECK ALL BOLTS, NUTS AND LAG SCREWS AND ENSURE THEY ARE TIGHT.**


WARNING

**TO PREVENT THE RISK OF PERSONAL INJURY OR DEATH :**

- DISCONNECT POWER AT THE FUSE BOX BEFORE PROCEEDING.
- ELECTRICAL CONNECTIONS MUST BE MADE BY A QUALIFIED INDIVIDUAL.
- OBSERVE LOCAL ELECTRICAL CODES WHEN WIRING THE OPERATOR.


WARNING

**RISK OF ENTRAPMENT THAT MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH. DISCONNECT POWER TO THE OPENER BEFORE AND DURING INSTALLATION OF AN ACCESSORY REVERSING DOOR EDGE OR PHOTOELECTRIC DEVICE. DO NOT RECONNECT POWER TO OPENER UNTIL INSTRUCTED TO DO SO. ENSURE DOORWAY IS CLEAR BEFORE STARTING TESTING OF UNIT.**

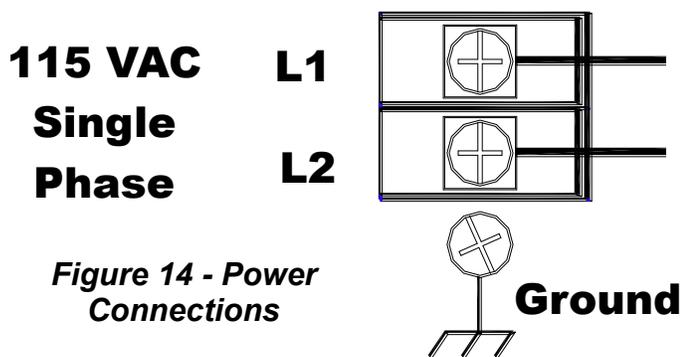
WARNING: M-Series operators have been designed and constructed for use with 115 Volts AC single phase, see Figure 14 below. Check the operator nameplate label on the control box cover for the proper voltage and phase. The application of an improper input voltage or phase will result in catastrophic failure to the internal electrical components.

Observe local electrical codes when wiring the operator.

When hard wiring, observe state and local electrical codes. A wiring diagram is attached to the inside of the control box cover. Connect the appropriate voltage and phase power leads to the appropriate terminals as per the wiring diagram and connect a ground wire to the grounding screw.

The wiring diagram attached inside the cover of the control box details all of the field wiring terminal connections for the operator. Always connect the wires to the push-button controls and auxiliary devices exactly as shown.

Warning: Control voltage of the operator is 5 volts DC, Class 2. Do not run the power leads and control circuit wiring in the same electrical conduit.



**Figure 14 - Power Connections**

Note: M-Series model operators are pre-wired for entrapment protection devices. To operate in Momentary Contact To Close mode and comply with the UL325 Entrapment Protection requirements effective Aug. 29, 2010, an approved external entrapment device as described on Page 3 must be installed and connected to the operator. Refer to Figure 15 and the manufacturer’s instructions to install and connect one of the approved door edge devices. One or more contact sensors shall be located at the bottom edge of a vertically moving door. Refer

to the instructions on Page 11 for the Linear photoelectric system installation and wiring.

If the external entrapment protection device is connected, the selector switches are set properly (Page 15) and the device detects an obstruction or becomes inactive, an opening door continues to open and a closing door stops, pauses and starts open. While in this mode, if a problem is detected while the operator is stopped, a close will require constant activation of the control Close button. If an entrapment protection device as described above is attached and is properly working for 1 second, it will be *auto detected and the monitored function will be turned on*. Once the monitoring function is active, it will remain active even if the power is removed and the entrapment protection device is disconnected and power is restored. While in this mode, if a problem is detected while the operator is stopped, a close will require constant activation.

Operators which are equipped with an entrapment protection device as described above may have one or more additional means of control which should be wired in accordance with the diagram supplied in the operator and also illustrated in Figure 16. To add a second three button station, refer to Figure 18.

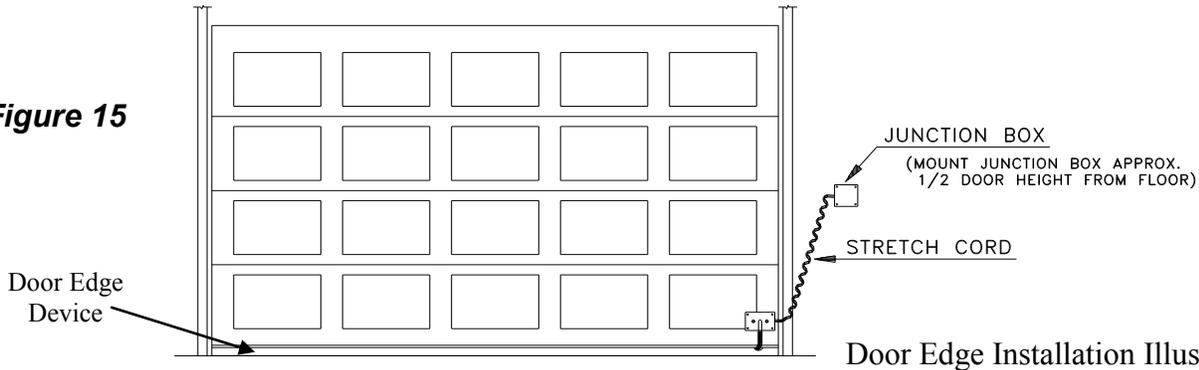
Number 18 gauge wire or heavier must be used for wiring the control stations and auxiliary control devices to the operator. Smaller gauge wire may cause operational problems, especially when multiple push-button stations are used or during summer months.


WARNING

**TO PREVENT THE RISK OF PERSONAL INJURY AND/OR DAMAGE TO DOOR OR PROPERTY, ONLY OPERATE DOOR CONTROL WHEN DOOR IS IN CLEAR VIEW. IF ANY OTHER DEVICE IS USED TO CONTROL THE DOOR AN AUXILIARY ENTRAPMENT DEVICE (DOOR EDGE OR PHOTOELECTRIC) MUST BE CONNECTED.**

Note: See the door edge manufacturer's installation instructions for the complete installation procedure. See Figure 16 for connecting the edge to the operator. See Page 15 for proper setting of the selector switches. These switches must be properly set and an approved photoelectric device or approved door edge device connected to the operator to obtain B2 Mode of Operation, Momentary Contact to Close.

Figure 15



Door Edge Installation Illustration

## Install the Safety Beam

**WARNING**  
Persons, particularly children, could be killed by a closing garage door without a properly installed and adjusted safety beam optical obstacle sensing system.

► **NOTE:** The safety beam's infrared light beam must not be obstructed by the door, or by any part of the door hardware. Use wooden spacers between the beam brackets and wall if necessary to create proper clearance.

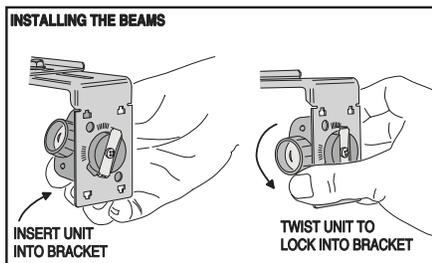
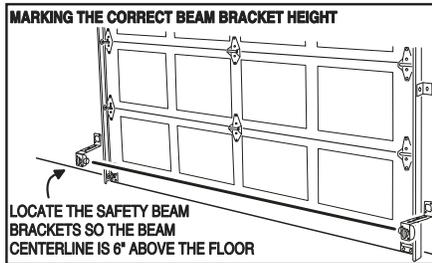
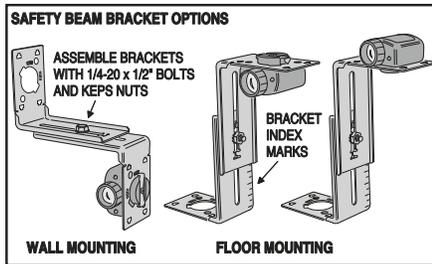
1 Assemble the two safety beam brackets from the four L-shaped brackets using two 1/4-20 x 3/4" bolts and 1/4-20 keps nuts (one nut & bolt for each bracket).

**WARNING**  
To protect small children, do not install the safety beam higher or lower than instructed.

2 Position the assembled brackets on each side of the door so the center line of the safety beam lenses will be 6" above the floor. Use the index marks on the brackets to make the bracket assemblies equal lengths. Mark the locations for the bracket mounting screws (the brackets can be wall or floor mounted).

► **NOTE:** The safety beam receiver (the unit with two indicators) should be located on the "shady" side of the door to prevent sunlight from shining directly into the receiver's lens.

3 Drill two 3/16" pilot holes for lag screws at marks. Mount the brackets with two 1/4" x 1-1/4" lag screws and tighten with a 7/16" socket (or use proper concrete fasteners if floor mounting).



4 Insert the sender and receiver into the bracket holes so the lenses of the units will face each other. Twist the units until the spring clips lock into a detent mark on the brackets. To protect the units from being bumped after installation, it is recommended to mount the sender and receiver inside the brackets as shown.

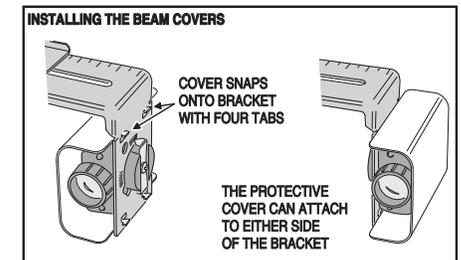
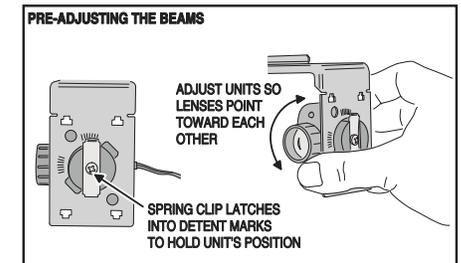
5 Install the two safety beam protective covers over the beam units to protect them from damage.

► **IMPORTANT:** Be careful to route the safety beam wiring away from any moving parts of the door or operator.

6 For non-prewired installations, route the wires from the sender and receiver, up the wall above the door hardware, then over to the center of the door, then along the top of the rail (or ceiling), and back to the operator head. Cut the wires about 6" longer than needed to reach the operator terminals. Strip back 1/2" of insulation from the ends of the wires.

7 For non-prewired installations, secure all the wires to the wall and ceiling with insulated staples (not supplied). Staples must straddle both wires to prevent shorts.

8 At the operator, twist one wire from each pair together, then twist the other wire from each pair together.



9. See Figure 16 for connecting the photoelectric device to the operator. See Page 15 for proper setting of the selector switches.

These switches must be properly set and an approved photoelectric device or approved door edge device connected to the operator to obtain B2 Mode of Operation, Momentary Contact to Close.

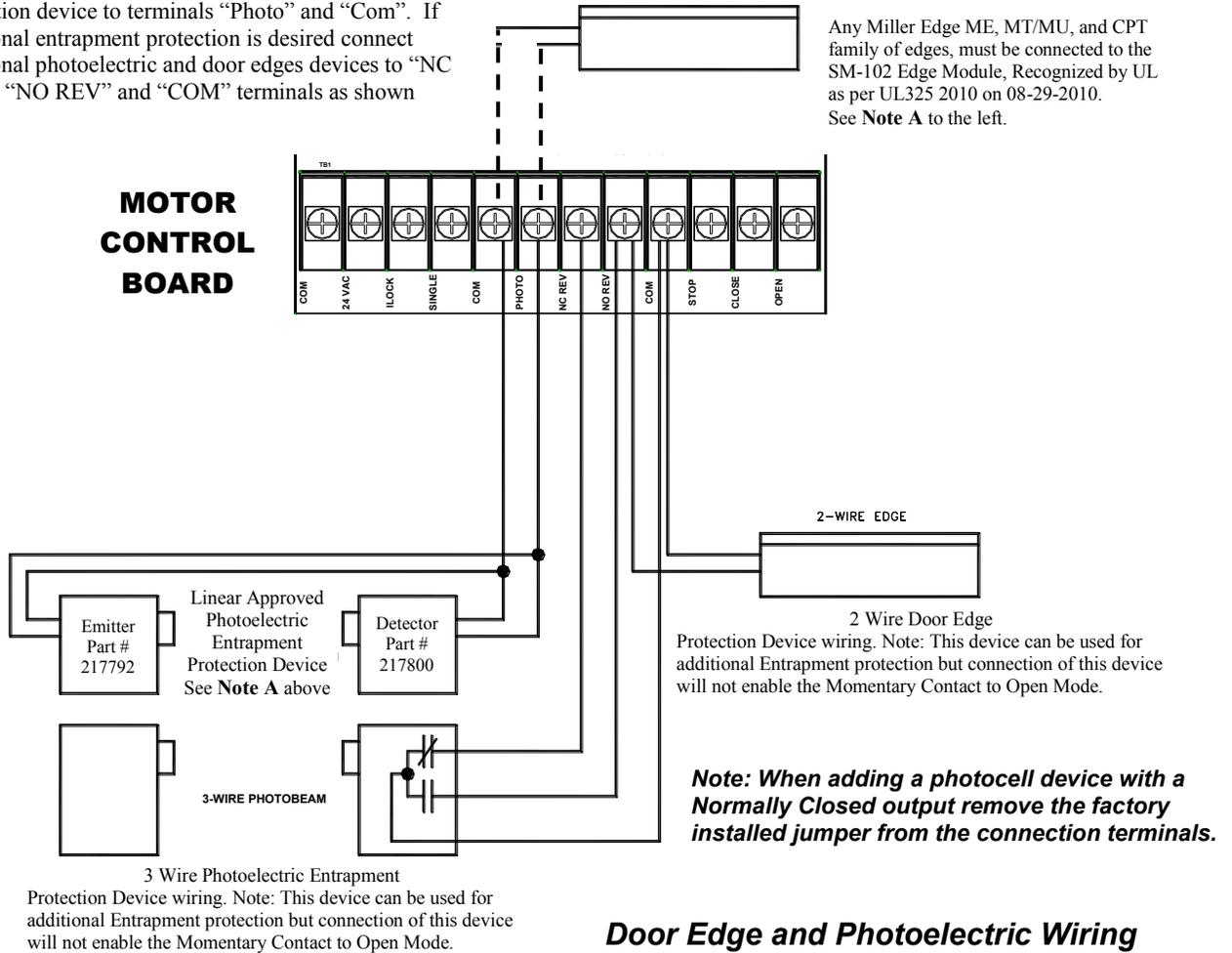
**CAUTION**  
TO AVOID DAMAGE TO DOOR AND OPERATOR ENSURE ALL DOOR LOCKS ARE DISABLED.  
USE AN INTERLOCK SWITCH IF A LOCK IS REQUIRED TO RETAIN FUNCTIONALTY.

**ENTRAPMENT PROTECTION DEVICES WIRING INSTRUCTIONS**

**Note A:** Connect only **one (1)** approved entrapment protection device to terminals “Photo” and “Com”. If additional entrapment protection is desired connect additional photoelectric and door edges devices to “NC REV”, “NO REV” and “COM” terminals as shown here.

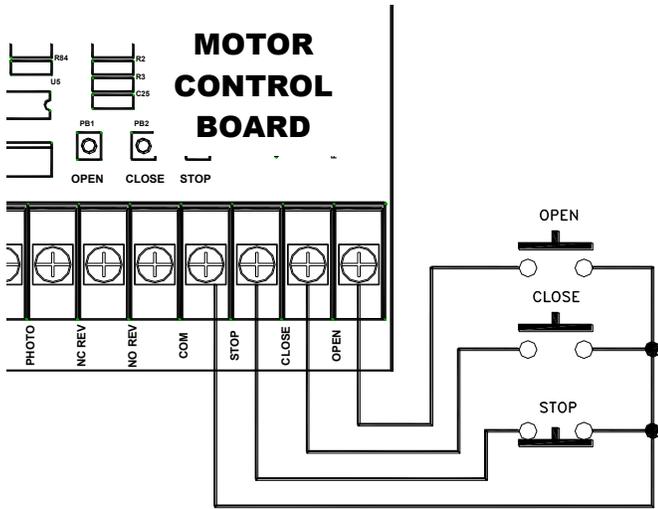
Any Miller Edge ME, MT/MU, and CPT family of edges, must be connected to the SM-102 Edge Module, Recognized by UL as per UL325 2010 on 08-29-2010. See **Note A** to the left.

Figure 16

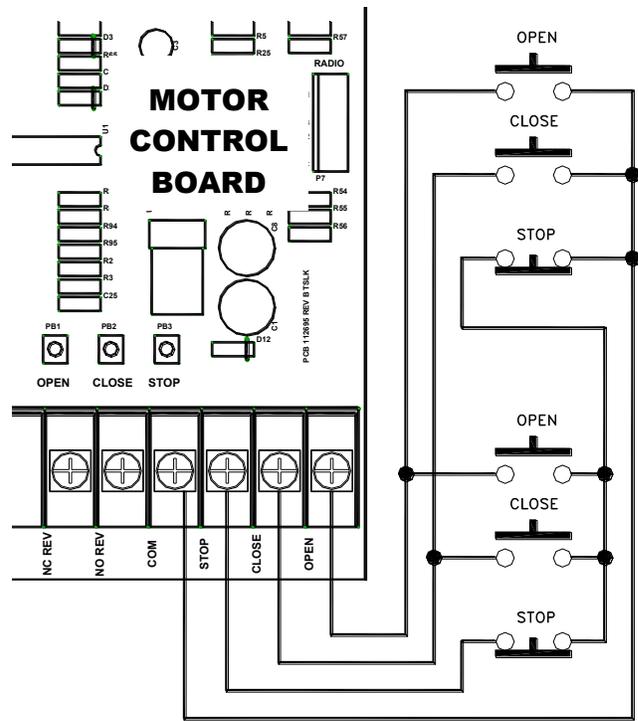


**Door Edge and Photoelectric Wiring**

After properly connecting an approved Entrapment Protection Device (see above and Page 3) to the operator, see Page 15 for setting of the selector switches. These switches must be properly set and an approved photoelectric device or approved door edge device connected to the operator to obtain B2 Mode of Operation, Momentary Contact to Close.



Single 3 Button Station Figure 17



Multiple 3 Button Station Figure 18

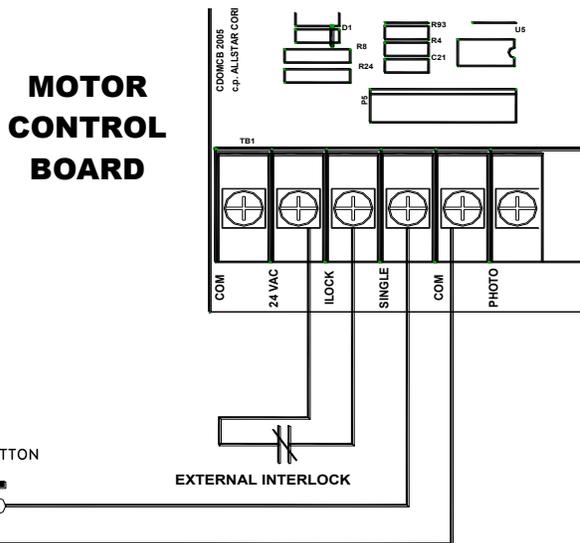


Figure 19

Single Button and External Interlock Wiring

**Note:** When adding an External Interlock remove the factory installed jumper from the connection terminals.

## TURNING ON THE POWER TO THE OPERATOR

**NOTE:** It is now necessary to turn on the power in order to change the Operating Mode (if applicable), program any changes desired to the operator's other settings, check for proper performance of all the operator's features to include the brake (if applicable) and clutch (adjusting settings if necessary); and to set then finalize any adjustments to the limit settings. Before doing so, ensure that all mounting hardware are installed and properly tightened, that all electrical connections are per local code requirements, and that proper wiring practices have been followed. Also, double-check that all ropes have been removed from the door and that the doorway is clear.

## IMPORTANT SAFETY INSTRUCTIONS FOR OWNER



### WARNING

**TO REDUCE THE RISK OF SEVERE INJURY OR DEATH:**

## READ AND FOLLOW ALL INSTRUCTIONS!

- Understand all of the operating features of your door control system at the time of its installation. Your installing dealer will demonstrate them for you.
- NEVER let children operate or play with door controls. Keep the Remote Control (where provided) away from children.
- Personnel should keep away from a door in motion and keep the moving door in sight until the door is completely closed or opened. **NO ONE SHOULD CROSS THE PATH OF A MOVING DOOR.**
- TEST THE DOOR OPENER'S SAFETY FEATURES AT LEAST ONCE A MONTH. After adjusting either the force setting or the limit of travel, ALWAYS RETEST the Operator's safety features. Failure to ADJUST THE OPERATOR PROPERLY may cause SEVERE INJURY OR DEATH.
- DO NOT over adjust the force setting to compensate for a poorly working door.
- To prevent the motor protector from tripping - Do not exceed 10 door cycles per hour.
- **IMPORTANT:** The hardware box contains a caution label which states: "This door is operated by a light duty operator. To prevent the motor protector from tripping - Do not exceed 10 door cycles per hour." Permanently install this label adjacent to the door, near the push button station, at the eye height of the average adult, approximately six feet above the floor). Do not paint over this label.
- If possible, USE THE MANUAL RELEASE only when the door is closed. Use caution when using this release when the door is open. **WEAK OR BROKEN SPRINGS MAY ALLOW THE DOOR TO CLOSE RAPIDLY, CAUSING SEVERE INJURY OR DEATH.**
- KEEP THE GARAGE DOOR PROPERLY BALANCED. See the door manufacturer's owner's manual. An improperly balanced door **COULD CAUSE SEVERE INJURY OR DEATH.** Have a TRAINED DOOR SYSTEMS TECHNICIAN MAKE REPAIRS TO CABLES, SPRING ASSEMBLIES AND OTHER HARDWARE.
- Inspect and maintain your door system as described in this manual.
- SAVE THESE INSTRUCTIONS



### WARNING

**AVOID ELECTROCUTION:  
DO NOT ROUTE LOW VOLTAGE WIRES IN  
SAME CONDUIT AS HIGH VOLTAGE  
WIRES. FOLLOW ALL LOCAL  
ELECTRICAL CODES OR THE NATIONAL  
ELECTRICAL CODE.**



### WARNING

**FAILURE TO TEST REVERSING  
SYSTEM COULD RESULT IN DEATH  
OR SERIOUS INJURY. TEST THIS  
SYSTEM ONCE A MONTH.**

**SETTING THE SWITCH SELECTABLE OPERATING MODES**

**Changing the Switch Selectable Operation Modes**

The following modes are selected by setting the on-board dip switches, Figure 20 at right shows where the switches are located on the operator control board. For each Operational Mode, the switches are set to either ON or OFF according to the table at right below. For all the modes, if an approved entrapment protection (EP) reversing device as described on page 3 of this manual is attached to the input labeled “Photo”, it will function as noted. Once an approved EP device is recognized by the control board it is monitored for correct operation. If the device becomes inactive then the mode will default to constant pressure activation for close regardless of the dip switch setting. In order for any of the Momentary Contact to Close operation modes (B2, TS, T) to become active an approved Entrapment Protection (EP) Reversing device (see Page 3) must be properly installed and connected to the operator. The switches must be set to *one* of the six Operational Mode combinations for the operator to function. In order for the NO (Normally Open) Reverse on NC (Normally Close) Reverse inputs to function, you must first install an operational approved Entrapment Protection (EP) Reversing Device.

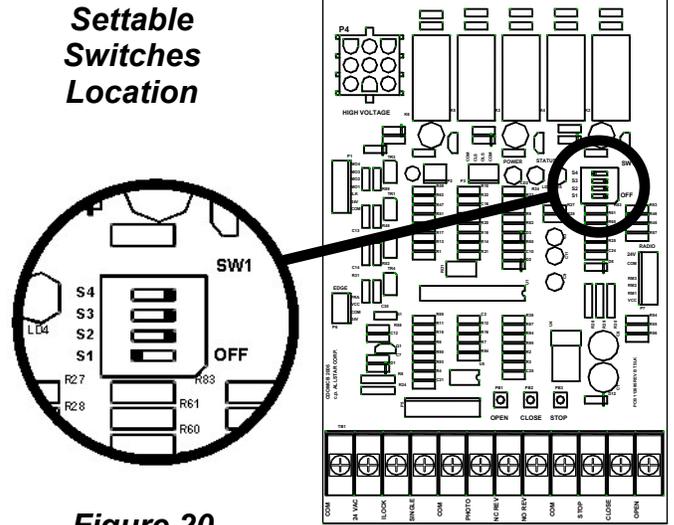


Figure 20

MOTOR CONTROL BOARD

**B2 Operation (Factory default)**

*Open Button:* Momentary activation; open override of closing door.

*Close Button:* Momentary activation.

*Stop Button:* Momentary activation; stops open, close or reverse action.

*Single Button:* Momentary activation to open; open override of closing door, closes door from mid-stop or open limit.

*EP Reverse (Photo Input):* Momentary activation will reverse a closing door, reverse to full open (ignores mid-stop) unless stopped by stop pushbutton input.

*Mid-Stop:* Activation stops an opening door; momentary contact of open button at mid stop will restart door to full open position; if door is moving open, constant pressure on open button will bypass mid-stop.

*Auto Close Timer:* N/A.

**C2 Operation**

*Open Button:* Momentary activation; open override of closing door.

*Close Button:* Constant activation, door will stop when button is released.

*Stop Button:* Momentary activation; stops open, close or reverse action.

*Single Button:* Momentary activation to open; open override of closing door.

*EP Reverse (Photo Input):* Momentary activation will reverse a closing door, reverse to full open (ignores mid-stop) unless stopped by stop pushbutton input.

*Mid-Stop:* Activation stops an opening door; momentary contact of open button at mid stop will restart door to full open position; if door is moving open, constant pressure on open button will bypass mid-stop.

*Auto Close Timer:* N/A.

Operating Mode	Switch 1	Switch 2	Switch 3	Switch 4
B2 Operation	ON	OFF	OFF	OFF
C2 Operation	OFF	OFF	OFF	OFF
D1 Operation	OFF	ON	OFF	OFF
E2 Operation	ON	ON	OFF	OFF
TS Operation	OFF	OFF	ON	OFF
T Operation	ON	OFF	ON	OFF

**D1 Operation**

*Open Button:* Constant activation; open override of closing door.

*Close Button:* Constant activation, door will stop when button is released.

*Stop Button:* Momentary activation; stops open, close or reverse action (not required).

*Single Button:* N/A.

*EP Reverse (Photo Input):* Momentary activation will stop a closing door.

*Mid-Stop:* Activation stops an opening door; after the door stops at the mid stop, constant contact of open button at mid stop will restart door to full open position.

*Auto Close Timer:* N/A.

**E2 Operation (roll-back)**

*Open Button:* Momentary activation; open override of closing door.

*Close Button:* Constant activation, door will reverse to full open (ignores mid-stop) when button is released.

*Stop Button:* Momentary activation; stops open, close or reverse action.

*Single Button:* N/A.

*EP Reverse (Photo Input):* Momentary activation to reverse a closing door, reverse to full open (ignores mid-stop) unless stopped by stop pushbutton input.

*Mid-Stop*: Activation stops an opening door; momentary contact of open button at mid stop will restart door to full open position; if door is moving open, constant pressure on open button will bypass mid-stop.

*Auto Close Timer*: N/A

### **TS Operation**

*Open Button*: Momentary activation; open override of closing door.

*Close Button*: Momentary activation.

*Stop Button*: Momentary activation; stops open, close or reverse action.

*Single Button*: Momentary activation to open; open override of closing door, closes door from mid-stop or open limit.

*EP Reverse (Photo Input)*: Momentary activation will reverse a closing door, reverse to full open (ignores mid-stop) unless stopped by stop pushbutton input.

*Mid-Stop*: Activation stops an opening door; momentary contact of open button at mid stop will restart door to full open position; if door is moving open, constant pressure on open button will bypass mid-stop.

*Auto Close Timer*: Closes door from mid-stop or open limit after pre-set time. Stop will deactivate the auto close timer. Open will reactivate the auto close timer or reset the auto close timer when the door is at the mid-stop or open limit. Single button will reset the auto close timer from the mid-stop or open limit. Reverse will reactivate the auto close timer or reset the auto close timer when the door is at the mid-stop or open limit.

### **T Operation, Dip-Switch Setting**

*Open Button*: Momentary activation; open override of closing door.

*Close Button*: Momentary activation.

*Stop Button*: Momentary activation; stops open, close or reverse action.

*Single Button*: Momentary activation to open; open override of closing door, closes door from mid-stop or open limit.

*EP Reverse (Photo Input)*: Momentary activation will reverse a closing door, reverse to full open (ignores mid-stop) unless stopped by stop pushbutton input.

*Mid-Stop*: Activation stops an opening door; momentary contact of open button at mid stop will restart door to full open position; if door is moving open, constant pressure on open button will bypass mid-stop.

*Auto Close Timer*: Closes door from mid-stop or open limit after pre-set time. Stop will deactivate the auto close timer. Open will reactivate the auto close timer or reset the auto close timer when the door is at the open limit. Single button will reset the auto close timer from the mid-stop or open limit. Reverse deactivates the auto close timer if the door is closing. Reverse will reset the auto close timer at the mid-stop or open limit if the auto close timer has not been previously deactivated.

## SETUP MODES

### **Setup Modes**

Various operating characteristics can be modified via the setup modes. The operator is moved to the close limit position and the on-board dip switches (see Figure 20, page 15) are **TEMPORARILY** set according to the table at right to enter a Setup Mode. The on board OPEN and STOP buttons are used to modify the characteristic. Once set, the values are stored in non-volatile memory.

These values are set to factory defaults that should be satisfactory for many applications. **ALL VALUES AS DESCRIBED HERE CAN BE RESET TO THE FACTORY DEFAULTS AS FOLLOWS:**

Remove 24 VAC power from the control board.

Press and hold the on-board stop button.

Re-apply 24 VAC while holding the on-board stop button.

After completing the procedure to modify the operating characteristic the switches must be returned to the originally set Operating Mode setting (see section previous).

### **Delay on Reverse Setup**

To help prevent stress on the door components, this feature allows for a delay time between the door stopping and reversing when a command to reverse is received as the door is closing. The factory default time is 0.75 seconds; the minimum time is 0.4 seconds; the maximum time is 2 seconds.

After moving the door to the close position and **temporarily** setting the switches to the appropriate settings in the table, pressing STOP will reset the time to the minimum setting. Every time OPEN is pressed, 200 mS is added to the time (up to the maximum).

Setup Mode	Switch 1	Switch 2	Switch 3	Switch 4
Delay on Reverse	ON	ON	ON	ON
Close Limit Delay	OFF	ON	ON	ON
Mid-Stop Limit	ON	OFF	ON	ON
Auto Close Timer	OFF	OFF	ON	ON
Maximum Run Time	OFF	ON	OFF	ON

Changing the dip-switch setting to any other setting will save the new time. Return the dip switches to the originally set Operating Mode setting (see section previous).

### **Close Limit Delay Setup**

To provide for irregularities in the floor, this feature allows for the door to continue to travel down after the Reverse Cutout Limit is activated. The factory default time is 0.32 seconds; the minimum time is 0.12 seconds; the maximum time is 0.66 seconds.

After moving the door to the close position and **temporarily** setting the switches to the appropriate settings in the table, pressing STOP will reset the time to the minimum setting. Every time OPEN is pressed, 0.02 seconds are added to the time (up to the maximum).

Changing the dip-switch setting to any other setting will save the new time. Return the dip switches to the originally set Operating Mode setting (see section previous).

**Mid-Stop:** Activation stops an opening door; momentary contact of open button at mid stop will restart door to full open position; if door is moving open, constant pressure on open button will bypass mid-stop.

**Auto Close Timer:** N/A

### Mid-Stop Limit Setup

This feature provides a timing function to stop a door as it is traveling open at a Mid Stop position instead of the full open position. The door can then be moved to the full open position if desired by pressing the Open button. A single button input when the door is at the mid stop position will cause the door to begin moving in the close direction. The factory default is not set; the minimum run time to mid-stop limit is 6 seconds.

After moving the door to the close position and **temporarily** setting the switches to the appropriate settings in the table, pressing STOP will remove the mid-stop limit setting.

Pressing OPEN will start the door open. When the door reaches the desired mid-stop position, press STOP.

Changing the dip-switch setting to any other setting will save the mid-stop limit position. Return the dip switches to the originally set Operating Mode setting (see section previous).

*Note: The door must move a sufficient distance to fully disengage the Reverse Cutout Limit nut from the Reverse Cutout Limit switch to set the mid-stop limit.*

### Auto Close Timer Setup

This feature allows for a modification of the amount of time between the door reaching either the Mid Stop or the Full Open position and automatically starting in the close direction. The

Auto Close feature is only active when the operator is set to the T or TS Operating Mode (see section previous). The factory default is 30 seconds; the minimum time is 5 seconds; the maximum time is 5 minutes.

After moving the door to the close position and **temporarily** setting the switches to the appropriate settings in the table, pressing STOP will clear and turn off the auto close timer.

Every time OPEN is pressed, 5 seconds is added to the time. Changing the dip-switch settings to any other settings will save the new time. Return the dip switches to the originally set Operating Mode setting (see section previous).

### Maximum Run Time Setup

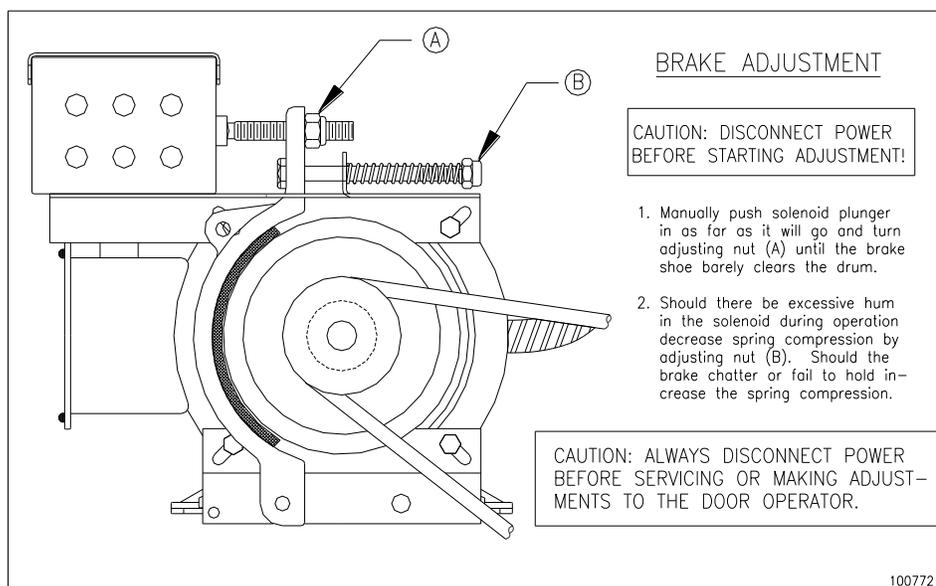
This feature provides for a maximum amount of time the motor will be energized after an input is recognized. The factory default time is 30 seconds; the maximum time is 60 seconds.

After moving the door to the close position and **temporarily** setting the switches to the appropriate settings in the table, pressing STOP will reset the time to the factory default setting.

Pressing OPEN will start the door open. The run time will be recorded when the door reaches the open limit. To prevent nuisance problems, 0.75 seconds are added to this time. Pressing stop before the door reaches the open limit will stop the door and reset the time to the factory default.

Changing the dip-switch setting to any other setting will save the new time. Return the dip switches to the originally set Operating Mode setting (see section previous).

## BRAKE ADJUSTMENT (Brake is Optional on M Series Drawbar Models)



Restore power after adjustments have been completed.

**Figure 21**

## CLUTCH ADJUSTMENT



### WARNING

**RISK OF ENTRAPMENT THAT MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH. DISCONNECT POWER TO THE OPENER BEFORE SERVICING OR MAKING ADJUSTMENTS. ENSURE DOORWAY IS CLEAR BEFORE STARTING TESTING OF UNIT.**

The clutch serves to protect the door, the electric operator and other equipment from undue stress or damage caused by starting forces and/or an obstruction to the door. It should be set no tighter than is necessary to smoothly and consistently move the door throughout its full range of travel. When properly set, it will slip freely if the door should encounter an obstruction, and it should be possible to stop the travel of the door by hand.

**WARNING:** Before adjustment remove power to the operator.

To adjust the clutch, loosen the jamb nut, and turn the adjusting nut, as shown at right. Make adjustments in 1/4 turn increments. Always re-tighten the jamb nut against the adjusting nut before running the operator to prevent clutch from changing its setting.

### CAUTION

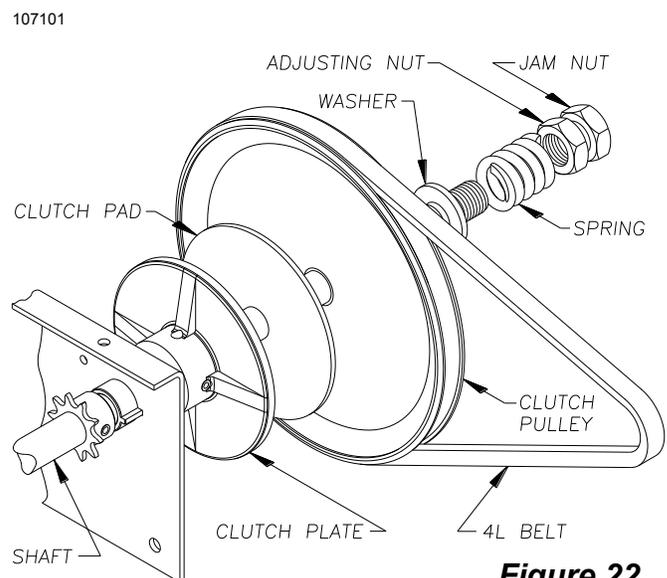
**NEVER COMPRESS CLUTCH SPRING BEYOND THE POINT LIMITED BY THE DESIGN OF THE OPERATOR OR REPLACE IT WITH A HEAVIER SPRING**

Due to changing conditions of the door and normal wear, it may be necessary to occasionally readjust the clutch to obtain dependable operation.

**WARNING:** BEFORE DOING SO BE CERTAIN THAT THE DOOR IS IN GOOD WORKING CONDITION, PROPERLY COUNTERBALANCED AND THAT THE CLUTCH IS NOT SLIPPING BECAUSE OF LOOSE OR MISSING HARDWARE, BINDING IN THE TRACK, RUBBING AGAINST THE DOOR STOPS OR DEFECTIVE OR MISADJUSTED SPRINGS. ANY SERVICE REQUIRED TO THE DOOR, DOOR SPRINGS OR DOOR OPERATOR MUST BE PREFORMED BY A QUALIFIED PROFESSIONAL DOOR INSTALLER.

The fiber disk will wear during normal operation and should be replaced when it becomes difficult or impossible to sufficiently tighten the clutch to obtain smooth operation of the door when it is in good working condition. To replace the fiber disk, first loosen the motor mounting bolts and remove the V-belt then the clutch adjusting nuts, spring and clutch pulley. Check condition of V-belt before reassembly and replace if required. After reassembly, adjust clutch as described previous.

Restore power after adjustments have been completed.



**Figure 22**



### WARNING

**IMPROPER ADJUSTMENT OF CLUTCH SETTING COULD CAUSE ENTRAPMENT, INJURY OR DEATH.**

**SET CLUTCH ADJUSTMENT FOR JUST ENOUGH FORCE TO OPERATE THE DOOR RELIABLY, BUT NO STRONGER. Contact a service professional to correct any binding, sticking or other door problems. DO NOT OVER-ADJUST CLUTCH SETTING TO COMPENSATE FOR A POORLY WORKING DOOR.**



**WARNING**

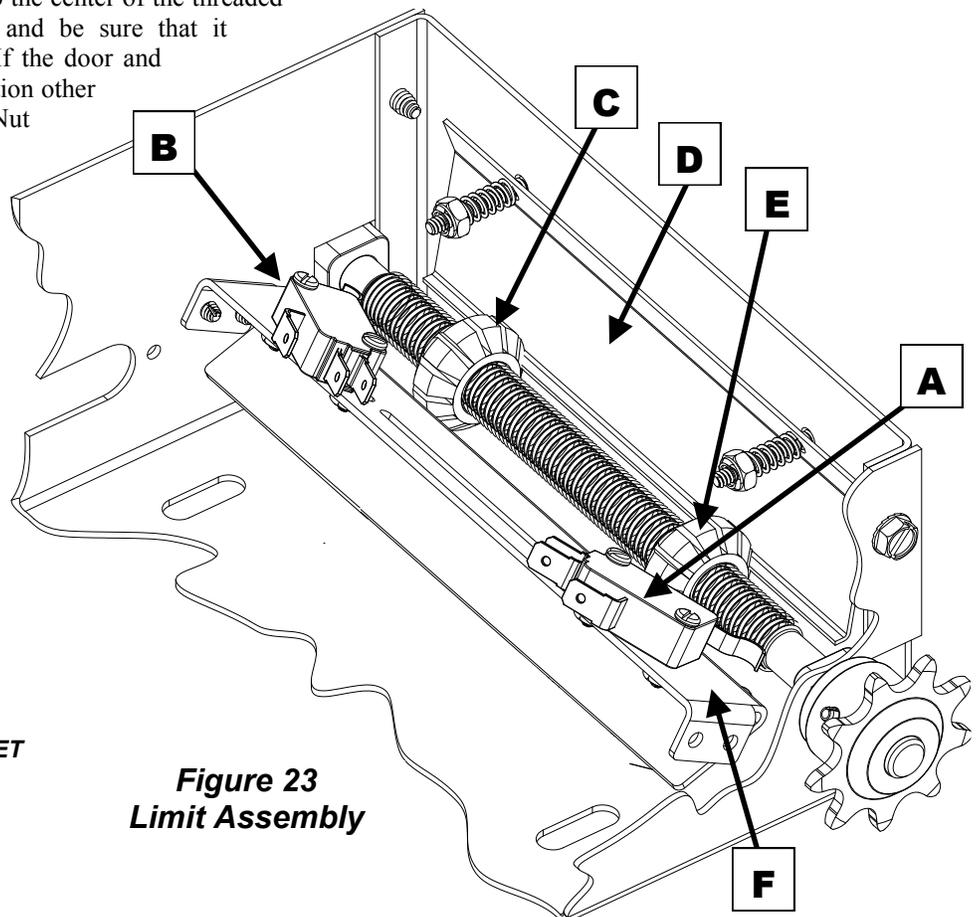
**TO AVOID RISK OF ENTRAPMENT AND POSSIBLE DAMAGE TO THE DOOR AND OPERATOR THE CLUTCH MUST BE ADJUSTED AND ANY ENTRAPMENT PROTECTION DEVICES CONNECTED BEFORE APPLYING POWER TO THE OPERATOR TO SET THE LIMITS.**

- 4) Depress the limit nut retaining plate (D) so it disengages from the slots in the limit nuts. Turn the OPEN limit nut (C) on the shaft until it engages the Open Limit Switch (B). You will need to listen for an audible click. Release the retaining bracket and be sure that it engages in slots of both limit nuts.
- 5) With all due care use the built-in three button station on the motor control board or the wall mounted three button station to lower the door to the fully closed position and repeat Step #4 with the Reverse Cutout Limit nut (E) and the Reverse Cutout Limit switch (A). The actual Close Limit position is a timed function whereas the door continues to run for a certain period of time after the Reverse Cutout Limit switch is activated. This amount of time (Close Limit Delay) is factory set to 0.32 seconds and will provide reversing cutout of approximately 4 inches from the floor for a door traveling at 12 inches per seconds. If the door fails to reverse when an object at least four inches high is placed in its path (see Testing, page 21) it may be necessary to adjust the Close Limit Delay time, see procedure on page 16.
- 6) Move the door to the fully open position then the fully closed position and observe the stopping position. Reset the Limit Nut(s) per above instructions if desired.
- 7) A fine adjustment can be done by loosening the screws holding the Limit Switches to the V bracket and moving the switch within the slots on the bracket.

**SETTING THE LIMIT SWITCHES**

- 1) With the cover open on the electrical enclosure, reference Figure 23 below. There are two (2) switches (A and B) mounted to the 'V' bracket (F). The switches are activated by the two limit nuts (C and E) on the threaded shaft which move laterally along the shaft as the operator opens and closes the door. When a limit nut nears the end of the shaft it activates a switch, that send a message back to the motor control board to stop the door.
- 2) For original installation setting, the door and operator trolley should be positioned at the fully closed position. If this is the case, depress the Limit Nut Retention Plate (D) so it disengages from the slots in the limit nuts and move the Reverse Cutout Limit Nut (E) on the shaft until it engages the Reverse Cutout Limit Switch (A) (see Step 5 for an explanation of the Reverse Cutout function). You will need to listen for an audible click. Move the Open Limit Nut (C) to the center of the threaded shaft. Release the retaining bracket and be sure that it engages in slots of both limit nuts. If the door and operator trolley are at some other position other than fully closed, depress the Limit Nut Retention Plate (D) so it disengages from the slots in the limit nuts and move the both the Limit nuts to the center of the threaded shaft. Release the retaining bracket and be sure that it engages in slots of both limit nuts.
- 3) With all due care use the built-in three button station on the motor control board or the wall mounted three button station to raise the door to the fully open position. You will need to remember to use the STOP button to stop the door at the Fully Open Position.

- A - REVERSE CUTOUT SWITCH
- B - OPEN LIMIT SWITCH
- C - OPEN LIMIT NUT
- D - LIMIT NUT RETAINING BRACKET
- E - REVERSE CUTOUT LIMIT NUT
- F - "V" BRACKET



**Figure 23  
Limit Assembly**

### Aligning the Infrared Safety Beam

The safety beam has two components, a sender and a receiver. The sender produces a narrow infrared beam that travels across the bottom of the door opening to the infrared receiver. If an object blocks the infrared beam while the door is closing, the door will stop, then reverse and fully open.

As a safety feature, the operator will inhibit close commands if the door is open and the infrared safety beam is blocked or out of alignment. In this case, the door can be forced closed by pressing and holding the wall station's CLOSE pushbutton (be sure the door area is in clear view).

**! WARNING !**  
**STAY CLEAR OF THE DOOR DURING THESE TESTS!**

#### Safety Beam Test

- 1 Check that the operator has power. The green lights on the sender and receiver should be lit.
- 2 If the receiver's green light is on, but the red light is off, the receiver has power but is not detecting the infrared beam from the sender. The red light might flash when the beam is partially detected. This can be caused by mis-alignment or something blocking the beam. Adjust the safety beam sender and receiver while watching the receiver's red light (stay out of the beam while aligning it). When the red light stays on, the beam is aligned.

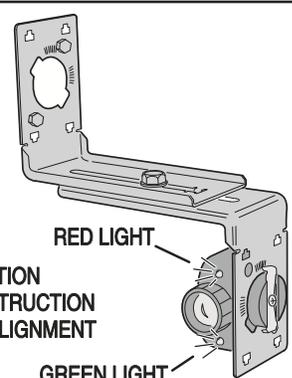
SAFETY BEAM INDICATOR TABLE	
GREEN ON	POWER ON
GREEN OFF	POWER OFF
RED ON	BEAM OK - NO BLOCKAGE
RED OFF	BEAM BLOCKED OR MIS-ALIGNED
RED FLASHING	BEAM ALIGNED POORLY

➤ **NOTE:** If the receiver's red light remains off, check for: 1) Dirt on the receiver's lens, 2) Sunlight shining into the receiver's lens, 3) A short in the safety beam wiring (from staples or at the operator terminals).

- 3 If the door is closed, press the wall station's OPEN button to fully open the door.
- 4 Push the wall station's CLOSE button. While the door is moving to the close position, CAREFULLY block the safety beam. **THE DOOR MUST STOP, THEN REVERSE TO THE OPEN POSITION.**
- 5 Place an object in the path of the safety beam. Check that constant pressure is required on the wall station's CLOSE button to cause the door to move toward the close position. Release the pushbutton before the operator stops; check that the door returns to the up position.

**! WARNING !**  
 Serious injury or death from a closing garage door may result because of failure to test and adjust the safety reverse system. Repeat this test monthly and adjust as needed.

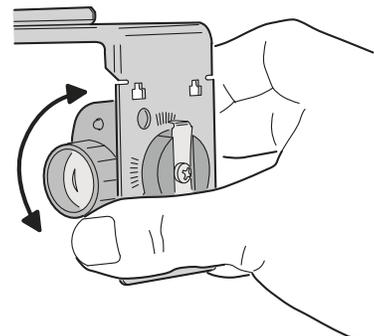
**SAFETY BEAM INDICATORS**



**GREEN LIGHT**  
 ON = POWER ON  
 OFF = POWER OFF

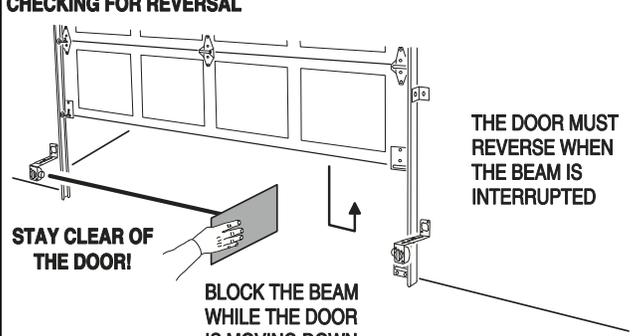
**RED LIGHT**  
 ON = BEAM ALIGNED, NO OBSTRUCTION  
 OFF = BEAM NOT ALIGNED, OR OBSTRUCTION  
 BLINKING = BEAM NEEDS BETTER ALIGNMENT

**ADJUSTING THE BEAM**



ADJUST THE SENDER AND RECEIVER UNTIL THE RED INDICATOR LIGHTS SOLID

**CHECKING FOR REVERSAL**

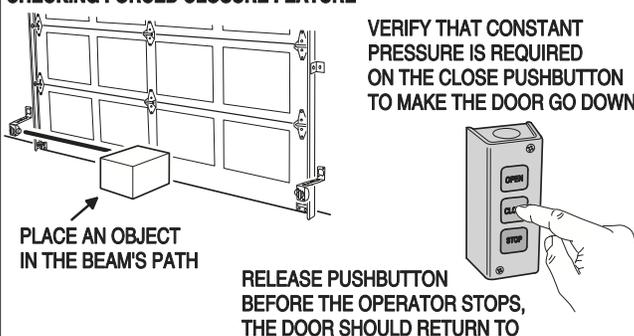


STAY CLEAR OF THE DOOR!

BLOCK THE BEAM WHILE THE DOOR IS MOVING DOWN

THE DOOR MUST REVERSE WHEN THE BEAM IS INTERRUPTED

**CHECKING FORCED CLOSURE FEATURE**



PLACE AN OBJECT IN THE BEAM'S PATH

VERIFY THAT CONSTANT PRESSURE IS REQUIRED ON THE CLOSE PUSHBUTTON TO MAKE THE DOOR GO DOWN

RELEASE PUSHBUTTON BEFORE THE OPERATOR STOPS, THE DOOR SHOULD RETURN TO THE UP POSITION

**TESTING**

Following installation, the operator **MUST** be tested and respond correctly to all controls as specified on the wiring diagram. **KEEP** personnel and equipment clear of the area beneath the door when performing the tests. When testing the 3-button wall station, first observe that each directional button operates the door in the direction indicated and that the STOP button performs that function. With the door stopped at its full open position, the OPEN button should be inoperative. This should be verified and, likewise, the CLOSE button should be inoperative with the door fully closed.

Certain operator control circuits use only a single button or a two button control station and may be designed to function differently than the more common three-button circuit described above. Test the controls in accordance with the description of operation as indicated on the wiring diagram.

Observe the door when traveling in each direction for smoothness of operation. Test the setting of the clutch by restraining the door by hand. The clutch should slip. Re-check the limit settings. The door should close tightly at the floor without excessive impact. Likewise, it should fully clear the door opening without the trolley striking the stops on the rail.

The MS Series operators are equipped with a reversing circuit and to allow for Momentary Close Contact operation an approved entrapment protection device as described on Page 3 needs to be properly installed and connected to the operator. To test it for proper reversal, place an object beneath the leading

edge of the door. The door should stop, pause and reverse when it comes into contact with the object provided the height of the object exceeds the cut out point set for the Reversing Cutout Limit switch (approximately four inches).

**CAUTION**  
**DO NOT STAND UNDER DOOR**  
**TO TEST REVERSING FEATURE.**  
**USE A STURDY CORRUGATED BOX**  
**OR OTHER SIMILAR OBJECT.**

If the operator is equipped with other means of control, such as additional 3 button stations or radio controls, test each of these separately for proper operation.

**MANUAL OPERATION**

To test the manual disconnect **FIRST MOVE THE DOOR TO THE FULLY CLOSED POSITION.** Then disconnect the power to the operator. Manual door operation is engaged when the release chain on the connecting arm is pulled to release the door arm from the trolley. The door can then be manually opened or closed by physically moving the door. If it is difficult to pull the release chain and/or the door arm appears to be under excessive compression, reset the CLOSE limit slightly to reduce the door travel in the close direction.

**WARNING**

**FAILURE TO TEST REVERSING SYSTEM  
 COULD RESULT IN DEATH OR SERIOUS  
 INJURY. TEST THIS SYSTEM ONCE A MONTH.**

**WARNING**

**ALWAYS DISCONNECT POWER TO  
 THE OPERATOR BEFORE SERVICING,  
 CONNECTING ACCESSORY DEVICES  
 OR MAKING ADJUSTMENTS.**

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**MAINTENANCE**

Normally, very little maintenance is required. A monthly visual inspection must be made for loose or missing hardware and for excessive slack in the V-Belt and jackshaft chain. The clutch must be tested periodically and adjustments made if necessary (see Figure 22, page 18). The brake is adjusted at the factory and may need periodic adjustment for wear. When adjustment becomes necessary see Figure 21 on page 17 for the adjustment procedure.

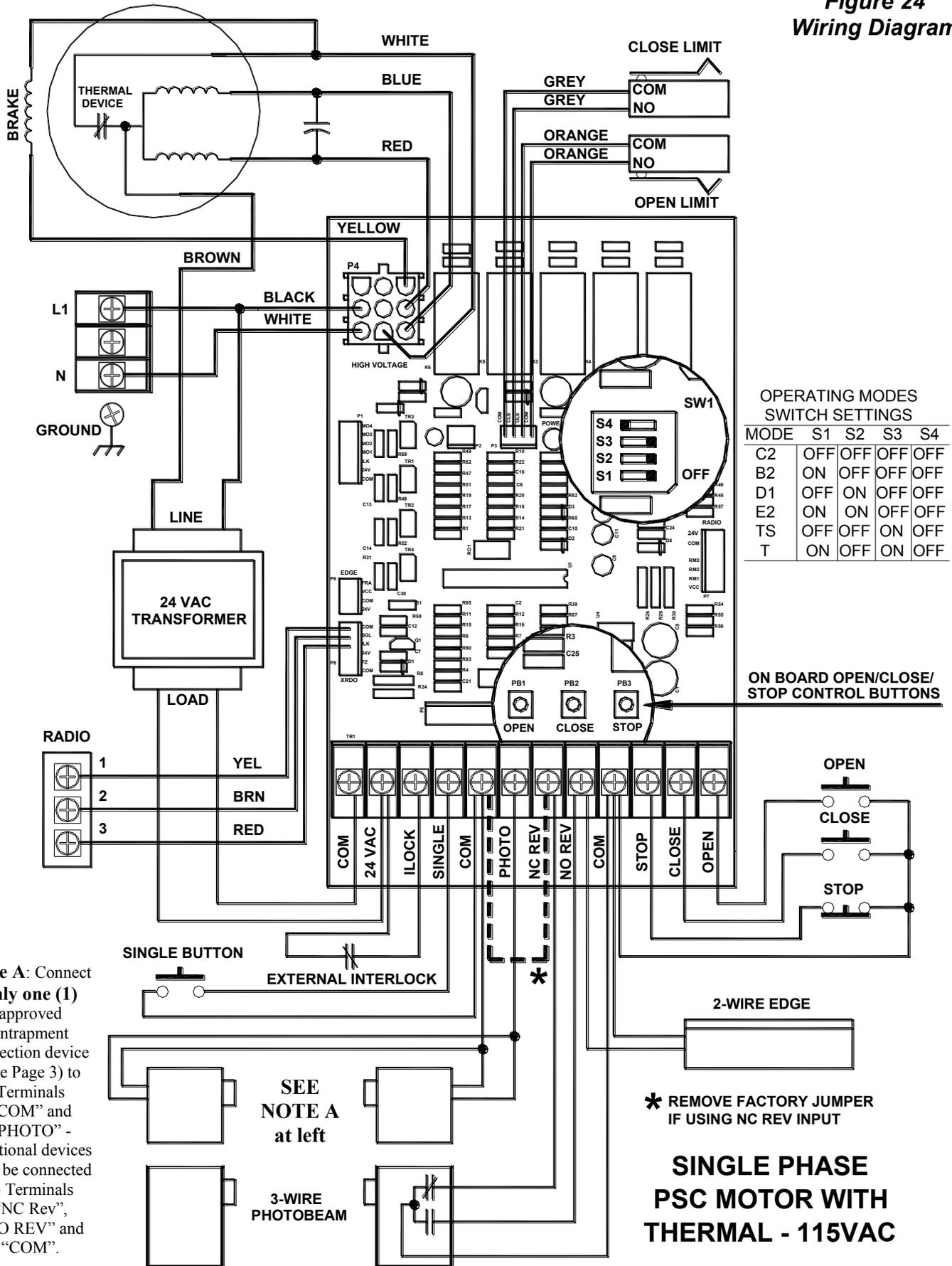
Test the reversing circuit at least once a month by permitting the door to contact an obstruction while closing.

**CAUTION**  
**DO NOT STAND UNDER DOOR TO TEST REVERSING**  
**EDGE - USE A CORRUGATED BOX**  
**OR OTHER SIMILAR OBJECT**

Lubrication of the operator is not required. It is important, for trouble free service from the operator, that the door be kept free from binding, properly counter balanced and periodically lubricated. **An annual inspection of the door by a qualified overhead door professional is recommended.**

**Warning:** Repairs and adjustments to the door and operator should be performed only by someone qualified to service commercial overhead doors and operators.

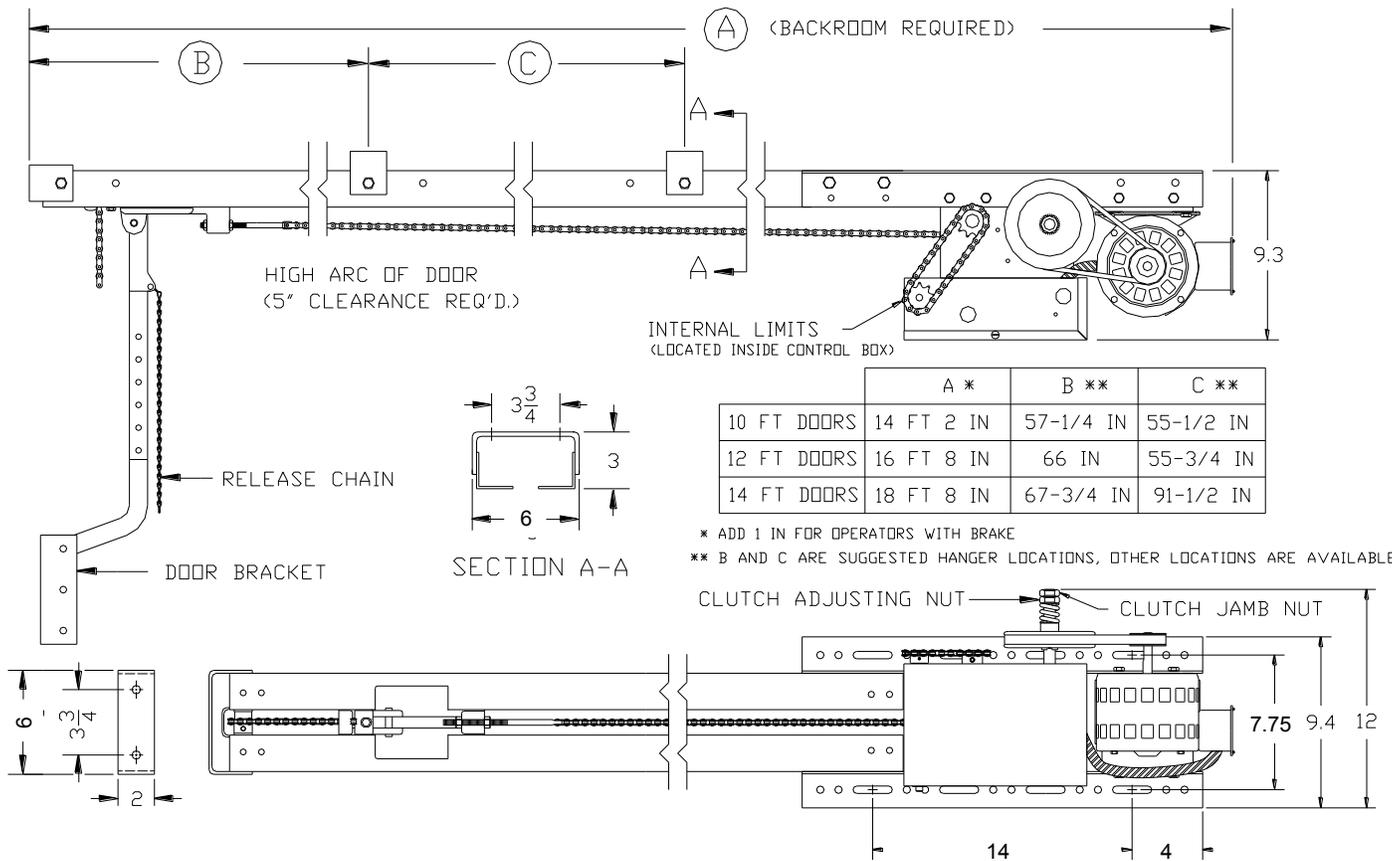
Figure 24  
Wiring Diagram



**Note A:** Connect **only one (1)** approved entrapment protection device (see Page 3) to Terminals "COM" and "PHOTO" - additional devices may be connected to Terminals "NC Rev", "NO REV" and "COM".

SEE NOTE A at left

3-WIRE PHOTOBEAM



**NOTES**

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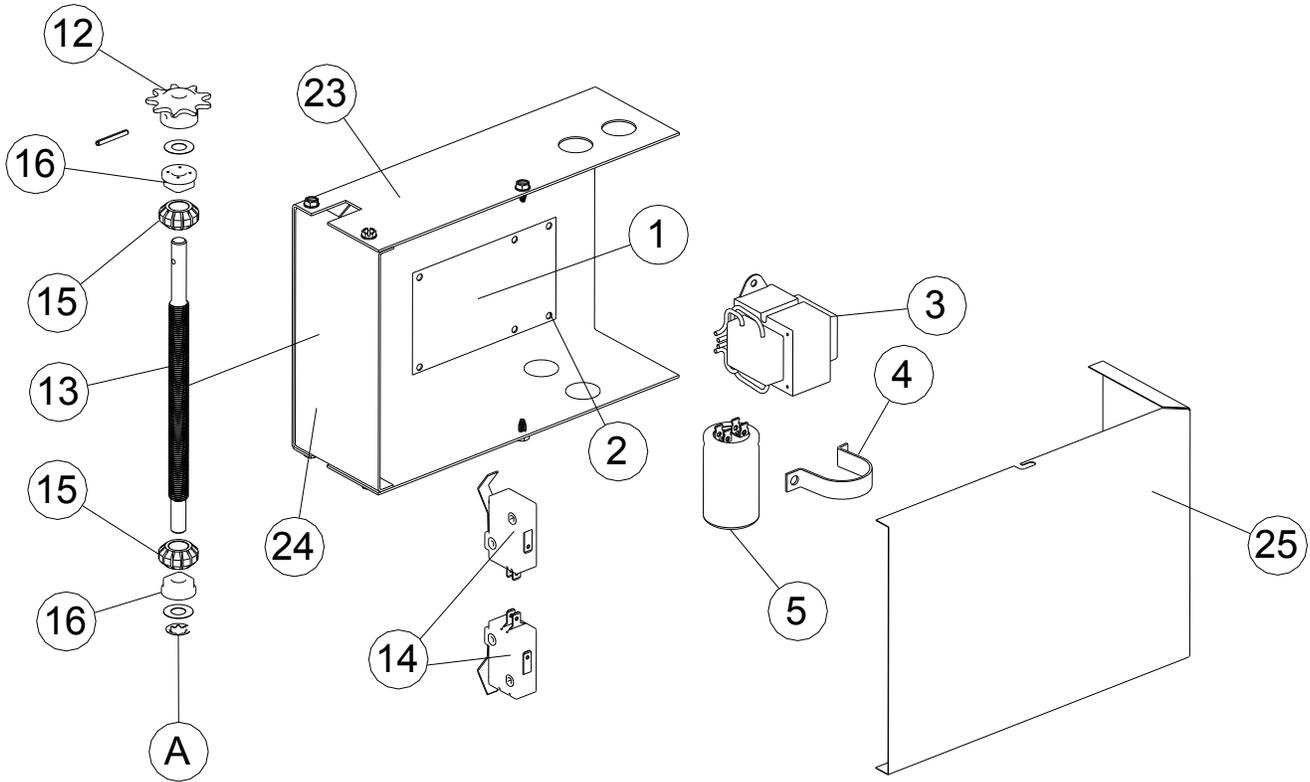
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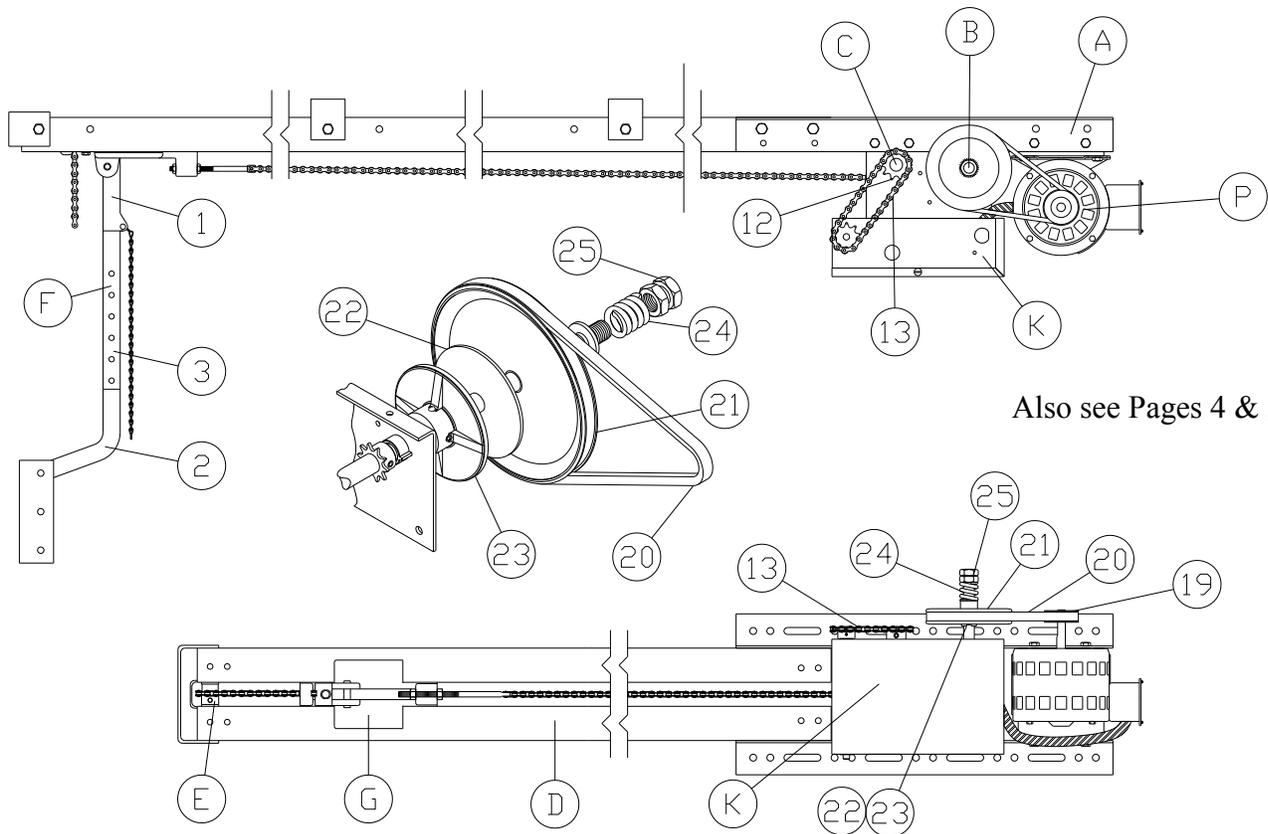


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Also see Pages 4 & 5

Ref	Part #	Description
Parts		
1	230405	MCB,CDO,PSC Motor,2 RELAY (Without Brake)
1a	230404	MCB,CDO,PSC Motor,5 RELAY (With Brake)
2	157149	Standoff, PCB, 3/4IN
3	112999	XFMR,120V-24V, 60 Hz, Class 2, 15VA
4	100059	Clamp, Capacitor, Small
5	100731	Motor Capacitor, 250 VAC, 64-77 MFD
12	101473	Limit Sprocket, 65B9, 3/8" Bore
13	105211	Limit Shaft, 1/2 - 20 Threads
14	112032	Switch,SPDT,15A/250V,SIMUL Roller Lever,KW3A
15	105453	Limit Nut, 1/2 - 20
16	105491	Limit Shaft Flange Bearing, 3/8" Bore x 5/8" Sq. Flange
23	113007	CONT Box w/o Ends, M-Series, MCB
24	107915	End, Control Box, M
25	113118	Cover, Control Box, M Series, MCB
A	105598	Limit Shaft Assembly



Also see Pages 4 & 5

Ref	Part #	Description
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Assemblies

A	100758	Frame Assembly w/Shafts, MD
B	101531	Clutch Shaft Assembly, MD
C	101487	Output Shaft Assembly, MD
E	106265	Front Idler Assembly
F	100174	Door Arm Assembly
G	100512	Trolley Assembly
	100747	Brake Assembly, MD, 115 VAC (optional)
		Control Box Parts - See Page 22
K	Call	Control Box Assembly Complete
O	Call	Track and Chain Packages

Motors

P	104301	Motor, 1/2 HP, 48 FRM, ODP, PSC, 115 VAC, 1 Phase

Ref	Part #	Description
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Parts

1	100513	Straight Arm with Disconnect
2	108877	Curved Arm
3	100236	Arm Extension (2 Required)
5	101694	Flange Bearing, 5/8" ID
6	008071	Flange Bearing, 3/4" ID
7	105813	Snap Ring, 5/8"
8	105549	Snap Ring, 3/4"
10	106814	Sprocket, 65B10, 3/4" Bore
11	106815	Sprocket, 65B27, 3/4" Bore
12	106813	Sprocket, 65B9, 5/8" Bore
13	015692	Limit Chain, #65, 15" with Master Link
14	009244	Primary Chain, #65, 18" with Master Link
16	100879	Brake Solenoid, 115 VAC (Optional)
17	100144	Brake Shoe w/Lining (Optional)
18	100486	Brake Hub (Optional)
19	015633	Motor Pulley, 4L
20	100727	V Belt, 4L230
21	107313	Clutch Pulley with Bushing
22	009256	Clutch Fiber Disk
23	015619	Clutch Plate
24	009050	Clutch Spring
25	106648	Clutch Adjustment Nut (2 required)

### SPECIFICATIONS

MODEL: MD5011S      HP: 1/2 HP

VOLTS: 115 VAC      PHASE: SINGLE

- UL AND CANADIAN UL LISTED
- RIGID BASE PSC, 1/2 HORSEPOWER MOTOR
- MOTOR OVERLOAD PROTECTION
- HIGH AMP, INDUCTIVE LOAD RATED RELAYS
- SOLID STATE MOTOR CONTROL CIRCUITRY WITH ADVANCED OPERATIONAL FEATURES STANDARD
- CLASS 2 (24 VOLT) CONTROL CIRCUIT
- THREE BUTTON CONTROL OPEN, CLOSE, STOP
- ACCEPTS AND MONITORS ACCESS ALLIANCE PHOTOELECTRIC DEVICES
- ACCEPTS REVERSING EDGE INPUT
- HEAVY GAGE, POWDER COATED STEEL FRAME RAILS AND CONTROL BOX
- V-BELT PRIMARY REDUCTION, FULL ROLLER CHAIN SECONDARY REDUCTION
- ALL SPROCKETS AND PULLEYS PINNED OR KEYED, SOLID STEEL DRIVE SHAFTS
- FULLY ADJUSTABLE FRICTION CLUTCH
- MANUAL DOOR DISCONNECT
- FULLY ADJUSTABLE, INTERNAL, SHAFT DRIVEN LIMITS
- OPTIONAL SOLENOID BRAKE

### LINEAR LIMITED WARRANTY

This Linear product is warranted against defects in material and workmanship for 2 years. This warranty extends only to wholesale customers who buy direct from Linear or through Linear's normal distribution channels. Linear does not warrant this product to consumers. Consumers should inquire from their selling dealer as to the nature of the dealer's warranty, if any. There are no obligations or liabilities on the part of Linear LLC for consequential damages arising out of or in connection with use or performance of this product or other indirect damages with respect to loss of property, revenue, or profit, or cost of removal, installation, or reinstallation. All implied warranties, including implied warranties for merchantability and implied warranties for fitness, are valid only until the warranty expires. This Linear LLC Warranty is in lieu of all other warranties express or implied.

All products returned for warranty service require a Return Product Authorization Number (RPA#). Contact Linear Technical Services at 1-800-421-1587 for an RPA# and other important details.