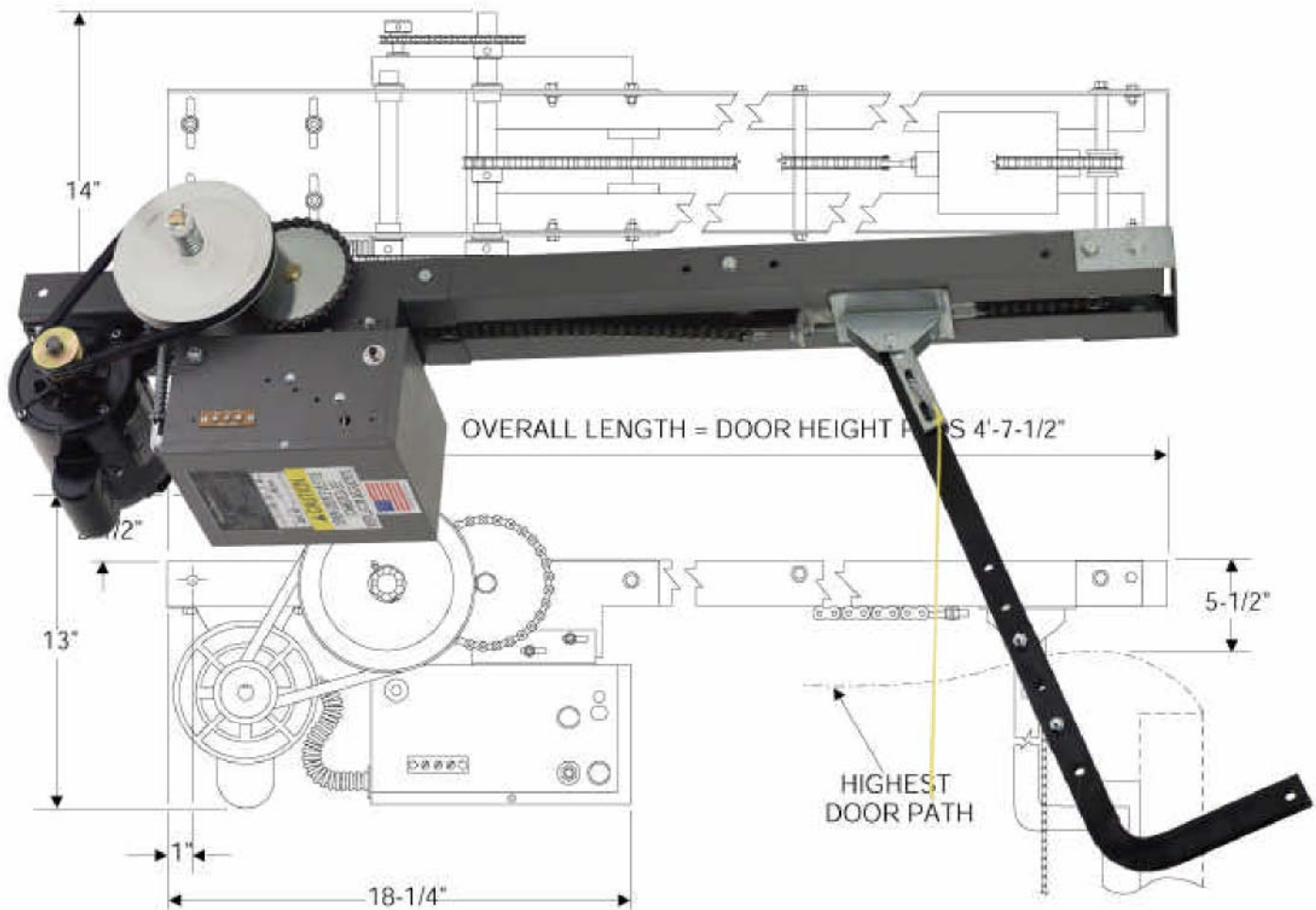


INSTALLATION AND OWNER'S MANUAL

Trolley Operators

PowerMaster



Serial #:

Date Installed:

Your Dealer:

READ THIS MANUAL CAREFULLY
BEFORE INSTALLATION OR USE.
SAVE THESE INSTRUCTIONS



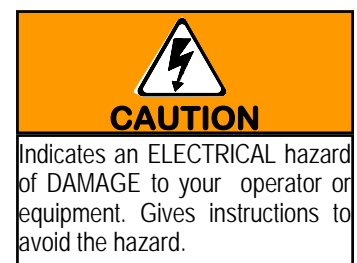
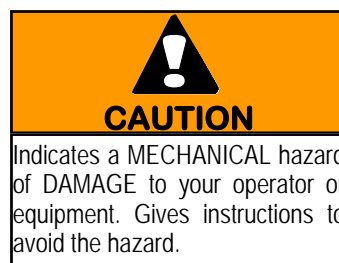
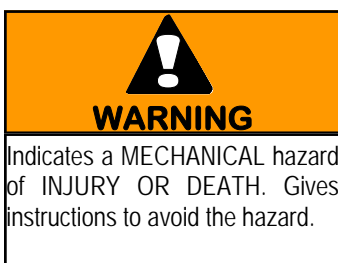
LISTED

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

Model T Drawbar Operator Applications– Product Features	3
Preparation	4-7
Component Identification Pictorial - Figure 1	4
Important Installation Notes (Things To Do Before/During Installation).....	5
Component Identification Listing - Table 1	5
Rail/Chain Assembly Instructions - Figure 2	6
Trolley Assembly Instructions - Figure 3	6-7
Operator Assembly Instructions Figure 4,5, & 6	7
Operator Installation	8-14
Operator Installation Figure 7 & 8.....	8
Preparing Mounting Pad - Figure 9.....	9
Hanging Power Head - Figure 10	10
Assembling Door Arm - Figure 11	11
Attaching Door Arm to Door - Figure 12.....	11
Setting The Limits - Figure 13	12
Electrical Wiring Instructions.....	13
Pneumatic Door Edge Installation - Figure 14.....	14
Field Wiring - Figure 15.....	14
Operation and Adjustment Instructions.....	15-17
Important Safety Instructions for Owner.....	15
Wiring Terms.....	15
Clutch Adjustment - Figure 16	16
Testing.....	17
Maintenance	18
Trouble Shooting.....	19
Wiring Diagram - Single Phase 331-3	20
Wiring Diagram - Three Phase 333-3	21
Wiring Diagram - Single Phase 1331-3	22
Wiring Diagram - Three Phase 1333-3	23
Warranty.....	24

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.



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

NOTE: 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.

NOTE: 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:

Limit Switches: Rotary 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. The Model T is equipped with a door arm disconnect to aid in manual operation. Use of this feature will not affect the limit switch adjustment.

Control Circuit: Standard three button open, close and stop. 24 Volts AC.

Connections For Auxiliary Entrapment Protection Devices: Use with pneumatic reversing door edge components or a photoelectric beam (across the opening) device.

Constant Contact To Close: Standard operation.

Momentary Contact To Close: Feature can be

activated by simply moving a wire on the terminal strip.

Model T Drawbar Operator Applications

Drawbar operators are intended for commercial and industrial use on sectional overhead doors which use horizontal track with normal radius. A drawbar operator is not suitable for doors with high lift or vertical lift doors. The installation requires a minimum clearance of 8 inches above the highest point of the door at any point in its travel. Please refer to Figure 10, on page 10 for back room requirements.

A drawbar operator when properly installed will effectively lock the door in the closed position.

Model T Drawbar operators are used in the following applications:

- Continuous Duty, Indoor Commercial installations only
- Up to 22 foot high doors with a maximum area of 480 square feet for 3/4 HP, 360 square feet for 1/2 HP and 270 square feet for 1/3 HP - maximum area slightly higher for lighter doors - consult factory.
- Use with foam/pneumatic reversing door edge or photoelectric device - REQUIRED where the 3-button station is out of sight of the door, or any other 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

Digital Timer to Close: Adjustable from 0 to 17 minutes in one second intervals.

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



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.

and phase are in accordance with electrical power provided at the job site. The rails are shipped separately from the power head.

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.

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, employ a qualified technician to 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



WARNING

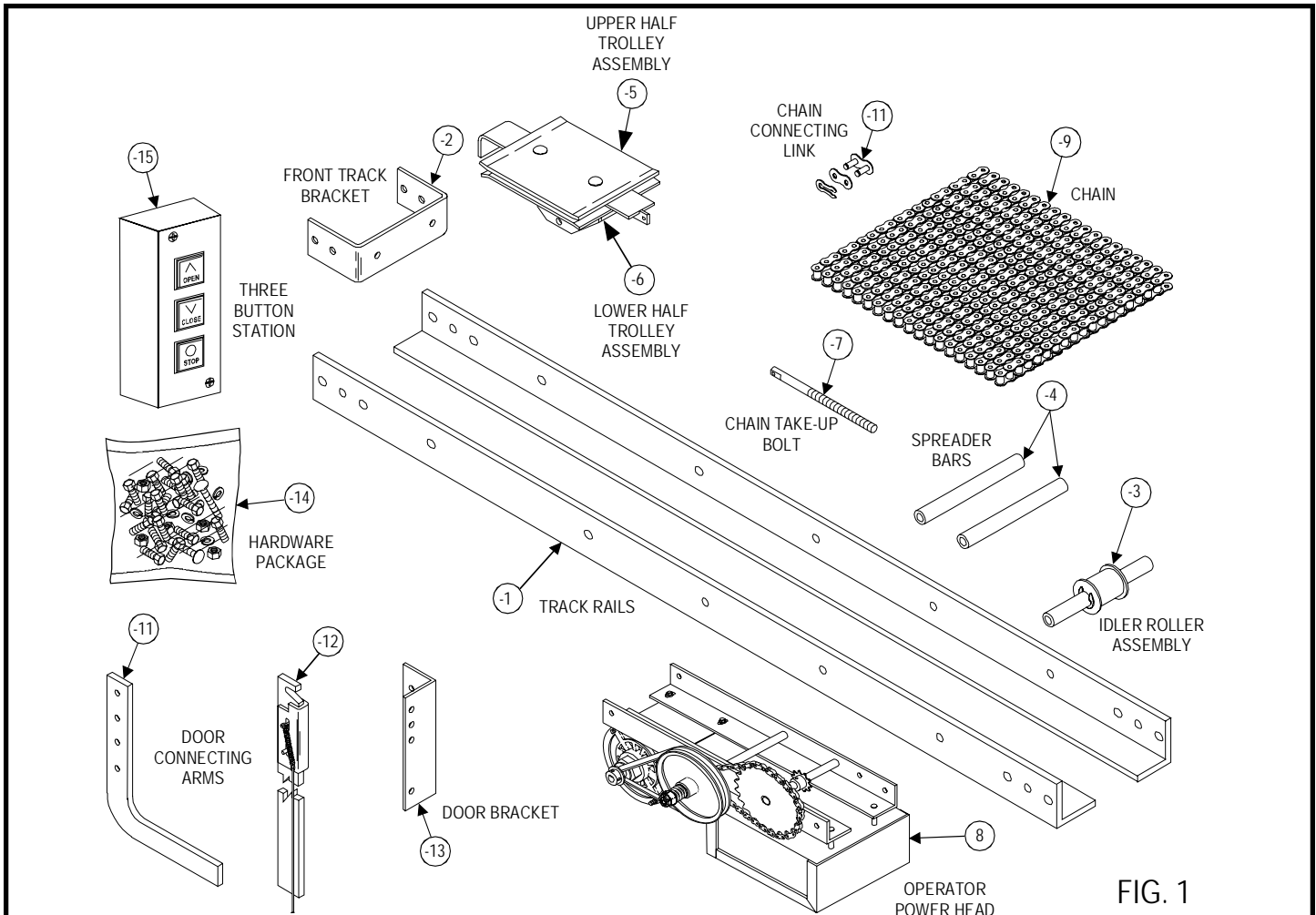
SPRINGS ARE SUBJECT TO VERY HIGH FORCES AT ALL TIMES AND ADJUSTMENTS MUST BE MADE ONLY BY A QUALIFIED PROFESSIONAL DOOR INSTALLER.



WARNING

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

FIGURE 1 - COMPONENT IDENTIFICATION





WARNING

TO REDUCE THE RISK OF SEVERE INJURY OR DEATH: READ AND FOLLOW ALL INSTALLATION INSTRUCTIONS!

- Install only on a properly balanced garage door. An improperly balanced door could cause severe injury. Have a qualified service person make repairs to cables, spring assemblies and other hardware before installing the opener.
- Remove all 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 of a Reinforcement Kit.
- PowerMaster Model T Drawbar operators are Commercial Vehicular Door Operators and as such are 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) as part of the complete operator system.
- 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 opener at least 8 feet or more above the floor.
- 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 and;
 - b) at a minimum height of five feet above the floor and;
 - c) away from all moving parts of the door.
- Do not overtighten the clutch adjustment to compensate for a poorly working door.
- Securely attach any WARNING signs or placards to either the door or above the control station as directed (see page 11).
- After installing the opener, all safety features must be tested for proper operation (see page 17).

TABLE 1 - COMPONENT IDENTIFICATION LISTING

Item #	Description	Qty.	Item #	Description	Qty.
1	Track Rails	2	9	Drive Chain	1
2	Front Track Bracket	1	10	Chain Connecting Link	1
3	Idler roller assembly	1	11	Curved door Arm	1
4	Track spreader bars	2	12	Straight Arm w/Disconnect	1
5	Upper Half of Trolley Assembly	1	13	Door bracket	1
6	Lower Half of Trolley Assembly	1	14	Hardware package	1
7	Chain Take-Up Bolt	1	15	3 Button Station	1
8	Operator Power head	1			

**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.

Track Assembly

1. Lay Track Angles (1) on work surface as shown in Figure #2.
2. Install front track Bracket (2) and Front Idler Roller Assembly (3) to one end of track using 3/8 x 3/4 long hex head bolts and 3/8 lock washers, as shown in Figure #2.
3. Install two track spreader bars (4), evenly spaced over length of track using 3/8 x 3/4 long hex head bolts and 3/8 lock washers, as shown in Figure #2.

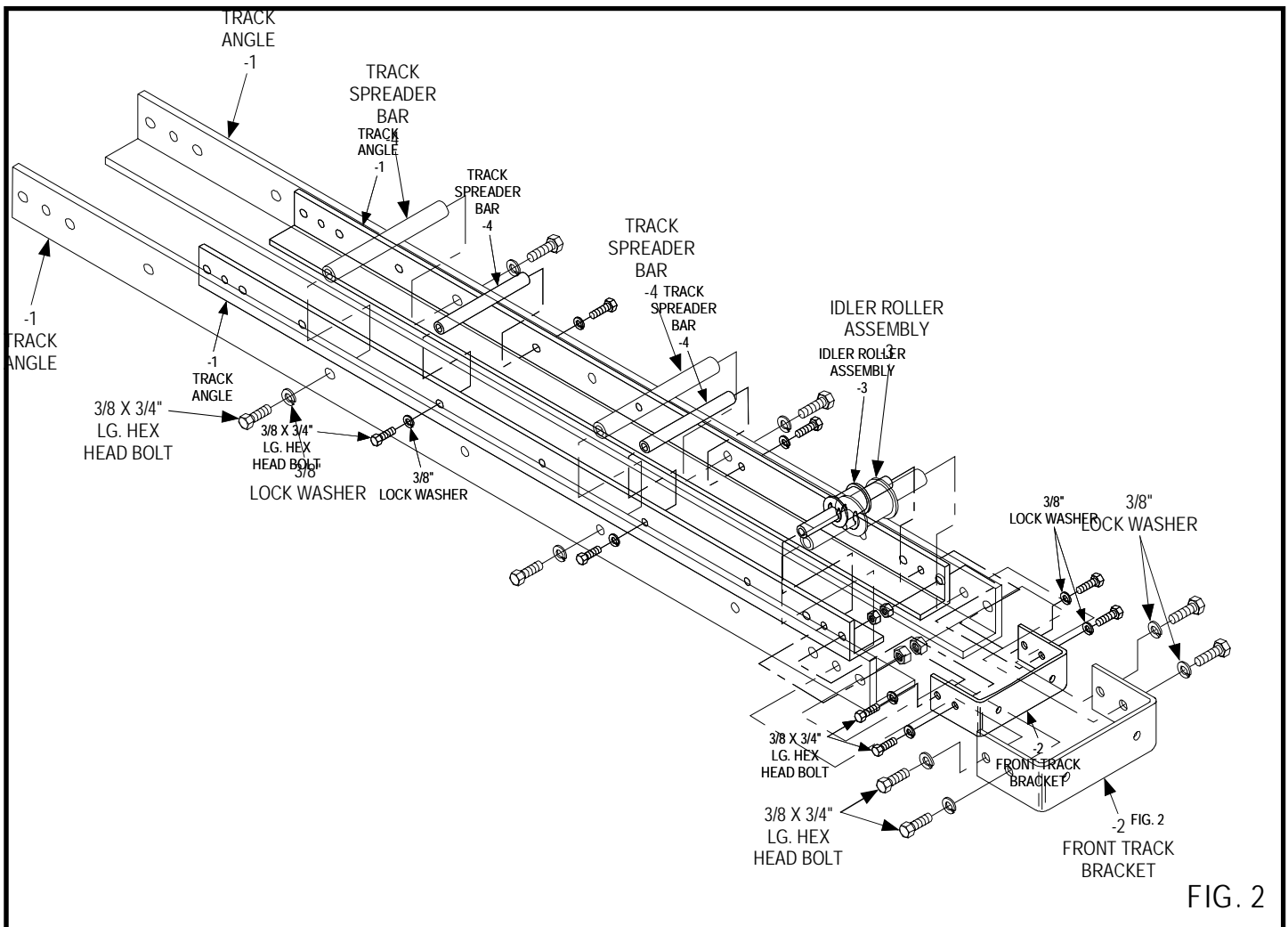


FIG. 2

Trolley Assembly

1. Assemble upper half of trolley to lower half of trolley (6) using two 5/16 x 1 1/4 carriage bolts, two 5/16 lock washers and two 5/16 hex nuts as shown in Figure # 3.
2. Install 3/8 chain take-up bolt (7) into trolley assembly using one 3/8 lock washer and two 3/8 hex nuts as shown in Figure # 3. (DO NOT TIGHTEN NUTS)
3. Install 3/8 x 2" long hex head bolt through ears on lower half of trolley (6) and secure in position with 3/8 lock washer and 3/8 hex nut.

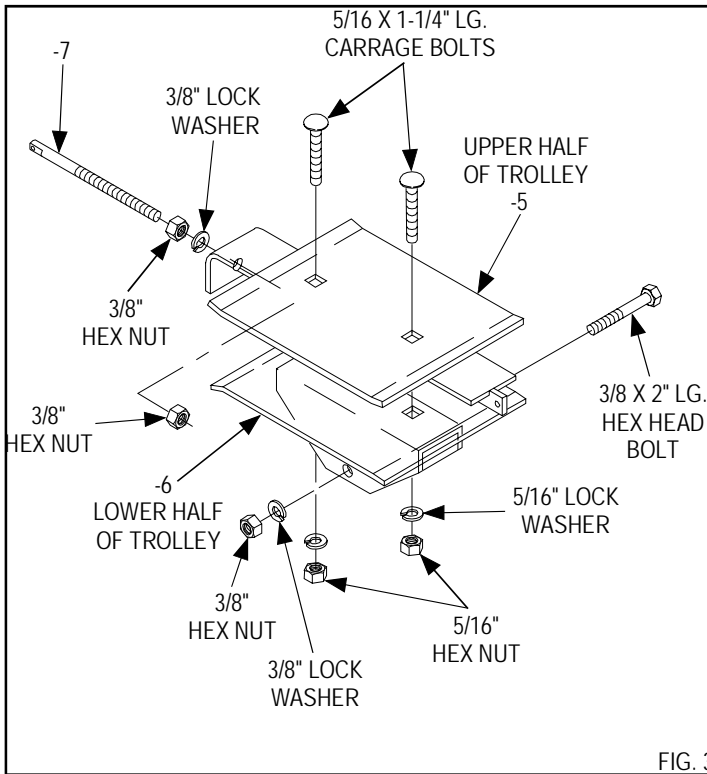


FIG. 3

9. Adjust chain tension using chain adjusting nut, to remove excess slack. See Figure # 5
10. Lock in adjustment using lock washer and lock nut on chain take up bolt (7). See Figure # 5.

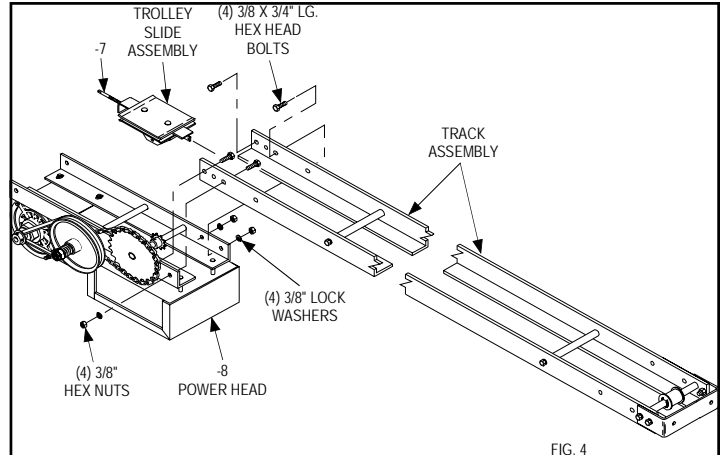


FIG. 4

Operator Assembly

1. Install trolley slide assembly on track assembly with chain take-up bolt (7) pointing towards end of track where power head (8) will be mounted as shown in Figure # 4.
2. Mount power head to track assembly using four 3/8 x 3/4 long hex head bolts, four 3/8 lock washers and four 3/8 hex nuts, as shown in Figure # 4.
3. Turn operator assembly over and back off chain adjustment nut to the end of the threads on chain take-up bolt (7). See Figure # 5.
4. Layout drive chain (9) next to operator assembly work surface.
5. Thread one end of the operator drive chain around operator drive sprocket and connect to the chain take-up bolt (7) on trolley assembly with a chain connecting link. See Figure # 5 and Figure # 6.
6. Thread the other end of the drive chain (9) around the idler roller assembly (3). See Figure #6.
7. Pull drive chain (9) tight up to trolley traveler assembly; mark link that lines with drive tab on traveler assembly and cut drive chain to length.
8. Attach cut end of drive chain (9) to drive tab on trolley traveler assembly with a chain connecting link. See Figure # 5.

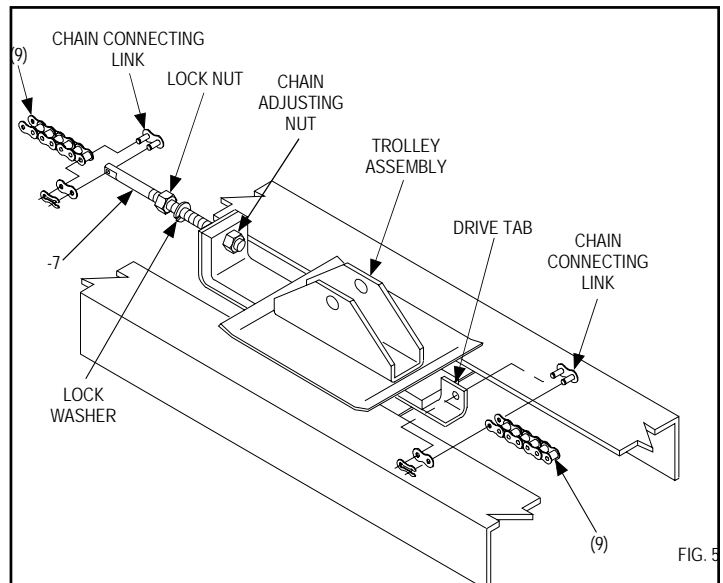


FIG. 5

Unit is shown in the inverted position to facilitate assembly of trolley track and traveler. When properly installed the power head and trolley assembly should face the floor. Note: Install drive chain so Trolley Assembly is located near front idler as shown.

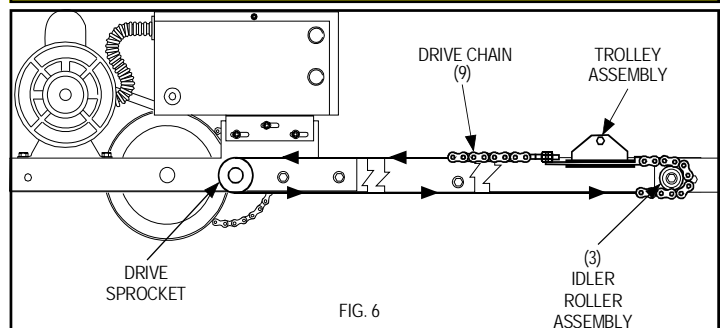


FIG. 6



WARNING

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.

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 7.

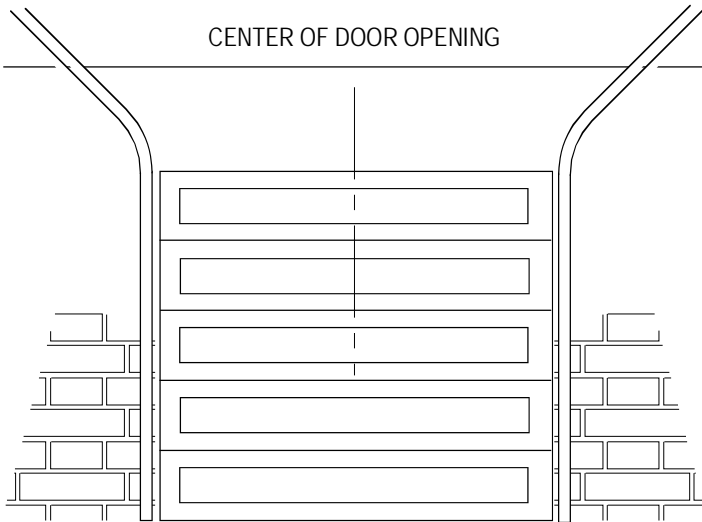


Figure 7

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 8.

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 7. Ensure the block or angle iron used will provide a sound and secure mounting pad for the operator track front mounting bracket, see warning below. Drill the required holes for mounting the operator track front mounting bracket as shown in Figure 9 on following page.

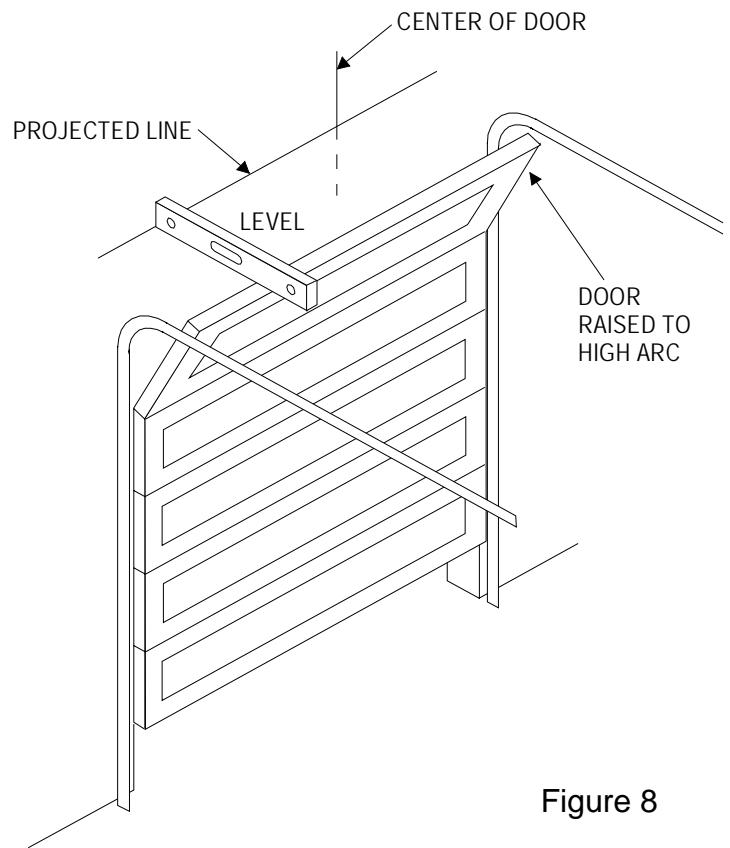


Figure 8

**WARNING**

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

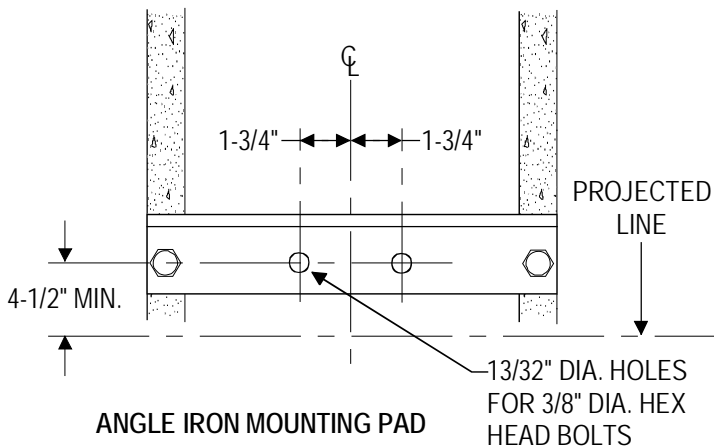
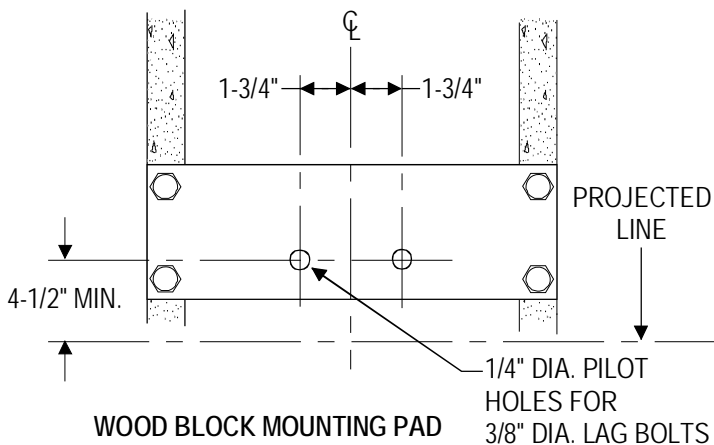


Figure 9



4. Raise operator and track assembly into mounting position, as shown in Figure #10. Temporarily support by suspending from ceiling with suitable ropes or chains or supporting from floor to operator.
5. Secure track front bracket to predrilled wood or angle iron mounting pad as shown in Figure # 10 . Insure that operator track assembly is level, and secure power head to ceiling structure as shown.

Note. Figure #10 on page 10, depicts a typical method of hanging the power head of the

operator from the ceiling. Each installation will vary due to the difference in building structures. Side braces should always be used to further support the power head.

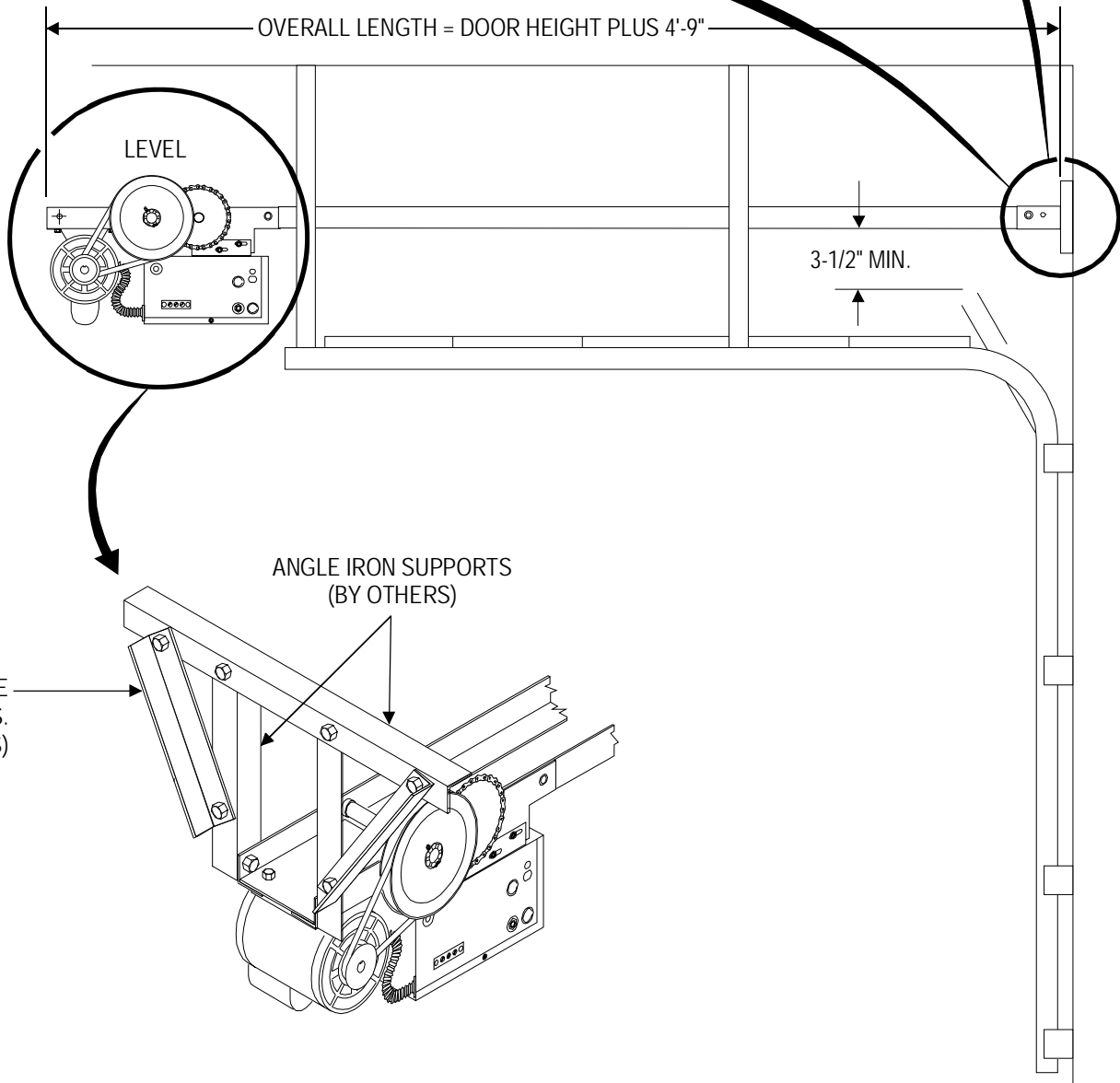
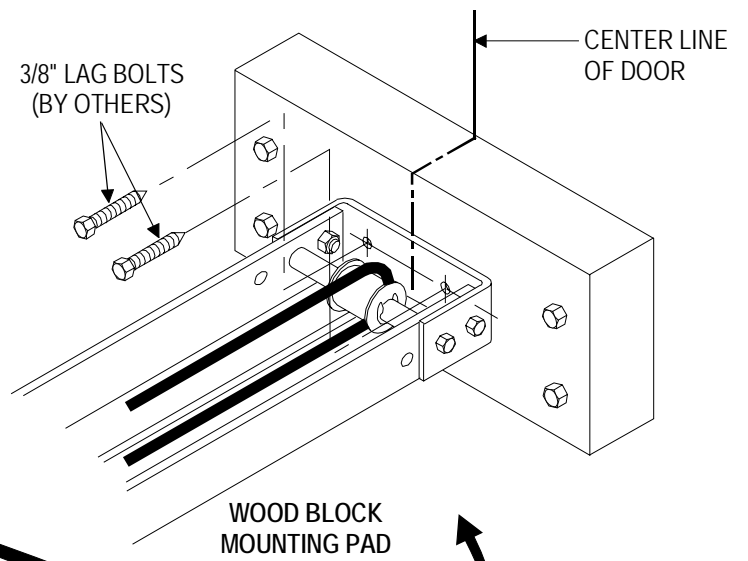
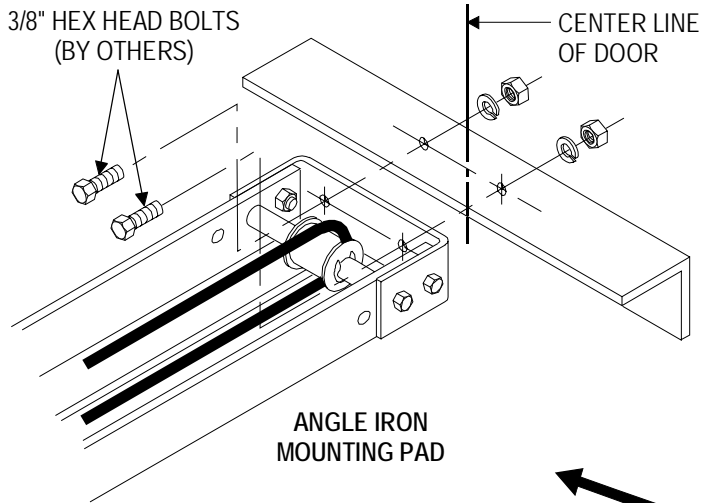
6. Fully close the door and move the trolley to within 2 inches of the front idler roller. Using Figure #11 on page 11, as a guide, connect the release arm (Item #12) to the trolley . Connect the door curved arm (Item 11) to the door release arm with (2) 3/8 x 1-1/4 " bolts , lock washers, and nuts.
7. Refer to Figure #12, page 11. Attach the door bracket (Item #13) to the curved arm using a 3/8 x 1-1/4 " bolt (2) 3/8 hex nuts. Install the nuts until snug and then back off leaving 1/16" clearance to allow the arm to pivot on the bolt freely. Secure adjustment by locking nuts against each other. Position the door bracket to the scribed center line on the door. Attach to door with (2) 5/16 x 2-1/2 long carriage bolts, lock washers and nuts.

**CAUTION**

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: RE-CHECK ALL BOLTS, NUTS AND LAG SCREWS AND ENSURE THEY ARE TIGHT!



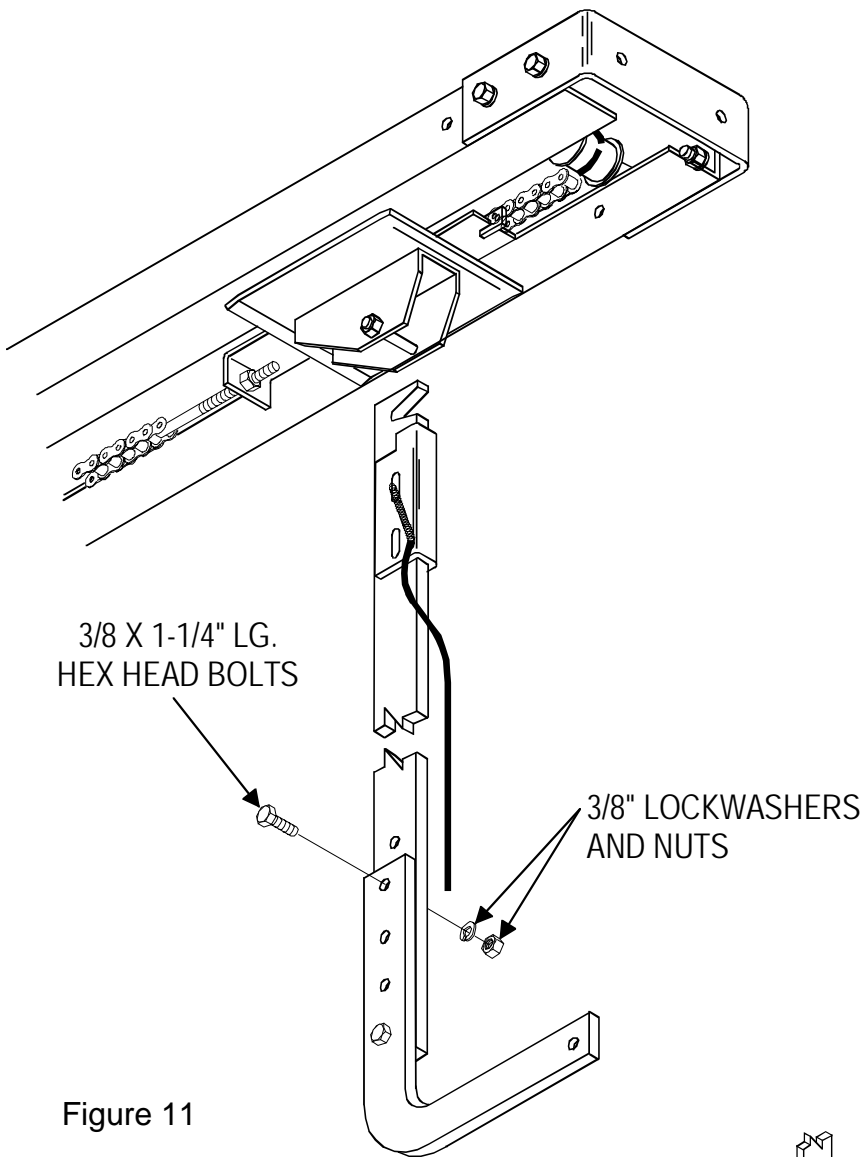


Figure 11

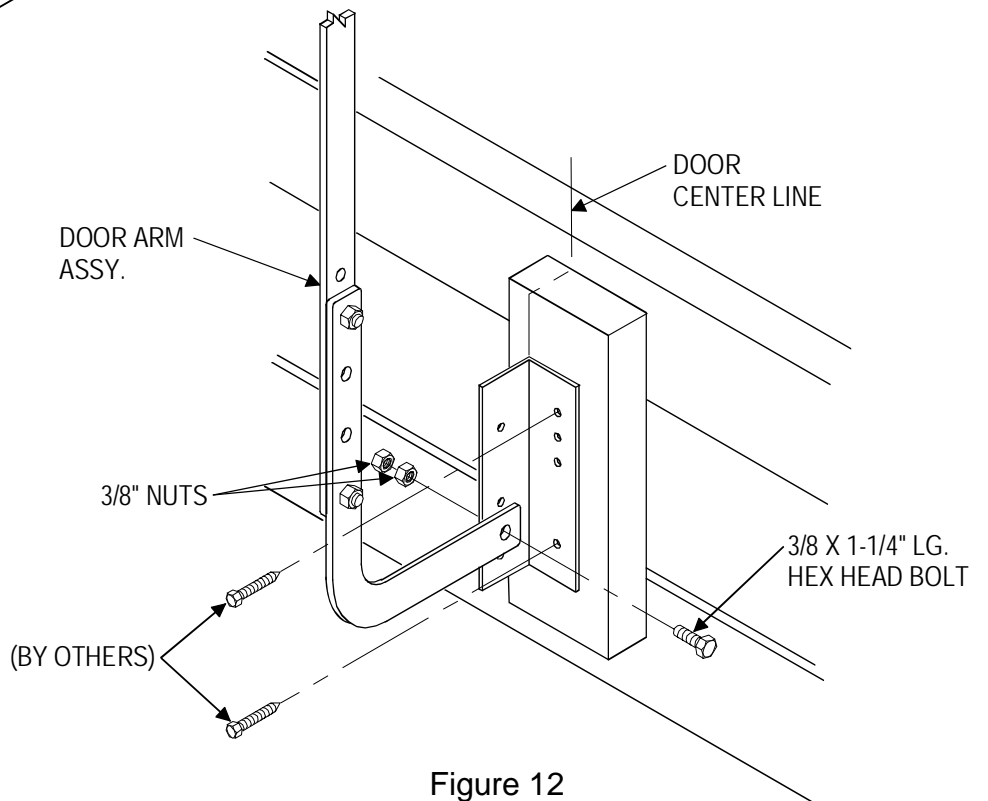


Figure 12



WARNING

TO AVOID RISK OF ENTRAPMENT AND POSSIBLE DAMAGE TO THE DOOR AND OPERATOR THE LIMITS MUST BE ADJUSTED BEFORE APPLYING POWER TO THE OPERATOR.

SETTING THE LIMIT SWITCHES

1. Remove the cover on the electrical enclosure. There are two limit nuts on the threaded limit shaft that 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 (set of) switch(es). The OPEN limit switch is on the LEFT and the CLOSE limit switch is on the RIGHT. Auxiliary switches may also be present, they are used to control other functions. These are mounted on a separate bracket and should not be confused with the the OPEN and CLOSE Limit Switches which are mounted on a bracket secured to the base of the electrical enclosure box and are somewhat hidden from view.
2. Manually set the door to a nearly closed position.
3. Refer to Figure 8. Depress the limit nut retaining bracket away from the slots in the limit nuts. Turn the CLOSE limit nut on the shaft until it engages the CLOSE Limit Switch. The switch will sound an audible "click" when engaged. If there are auxiliary present, the limit switch will be the second "click". Release the retaining bracket and be sure that it engages in slots of both limit nuts.
4. Manually raise the door to a nearly OPEN position and repeat Step #3 with the OPEN limit nut and switch.
5. If auxiliary switches are present, the limit nut will actuate them just prior to activating the open or close limit switch. (This is preset at the factory.)
6. Manually move the door to a half open position to avoid door damage due to incorrect power supply phasing. On three phase units the door may initially run in the wrong direction when power is first applied. With the door in a mid position there will be time to stop the door before damage can happen if incorrect phasing occurs.
7. A final limit adjustment will be necessary after the connection of the power supply in order to ensure the door stops at the proper Open and Close positions.

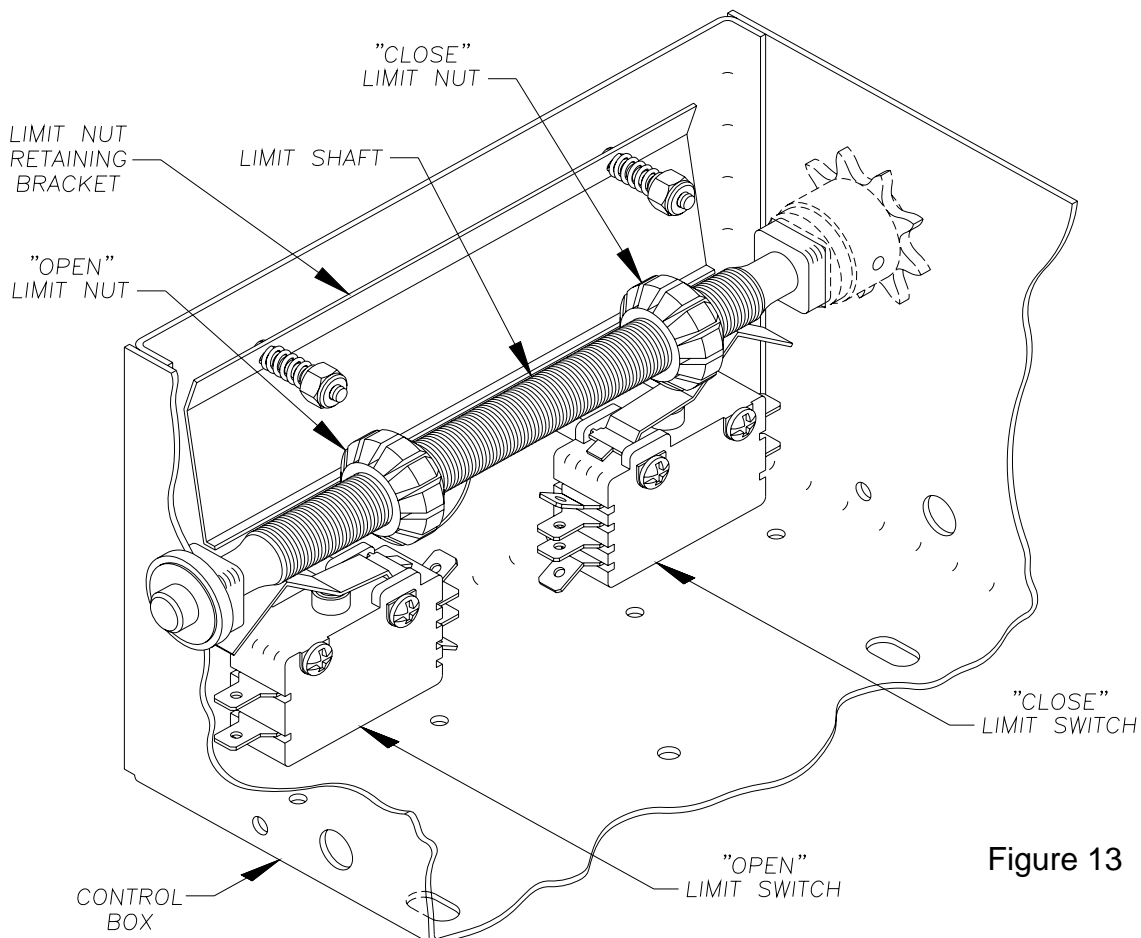


Figure 13

**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.

NOTE: PowerMaster T Drawbar operators have been designed and constructed for use with voltages from 115 Volts AC to 575 Volts AC, in single or three phase. 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. On three phase units, incorrect phasing of the power supply will cause the motor to rotate in the wrong direction (open when CLOSE button is pushed and vice versa). To correct this, interchange any two of the incoming three phase conductors.

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 24 volts AC, Class 2. Do not run the power leads and control circuit wiring in the same electrical conduit.

Note: All T operators are pre-wired to accept reversing edge components. To comply with UL requirements, one of these systems must be installed and wired to the operator. Refer to **Figures 9 and 10** for Edge component wiring and installation.

For operator models not installed with reversing edge components or photoelectric device, **ONLY ONE THREE BUTTON STATION OR A CONTROL WIRED FOR CONSTANT PRESSURE TO CLOSE MAY BE USED TO CONTROL THE OPERATOR. THIS IS TO COMPLY WITH UL SAFETY REQUIREMENTS. IN THIS CASE THE CONTROL STATION MUST BE LOCATED WITHIN CLEAR SIGHT OF THE DOOR ADJACENT TO A PLACARD (SUPPLIED WITH THE OPERATOR) WITH THIS WORDING:**

WARNING TO PREVENT ENTRAPMENT DO NOT START DOOR DOWNWARD UNLESS DOOR WAY IS CLEAR

Operators which are equipped with a reversing edge circuit may have one or more additional means of control which should be wired in accordance with the diagram supplied in the operator. Refer to **Figure 10**.

**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 CONTROL STATION CANNOT BE LOCATED WHERE THE DOOR IS VISIBLE OR IF ANY OTHER DEVICE IS USED TO CONTROL THE DOOR AN AUXILIARY ENTRAPMENT DEVICE (DOOR EDGE OR PHOTOELECTRIC) MUST BE CONNECTED.

**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.

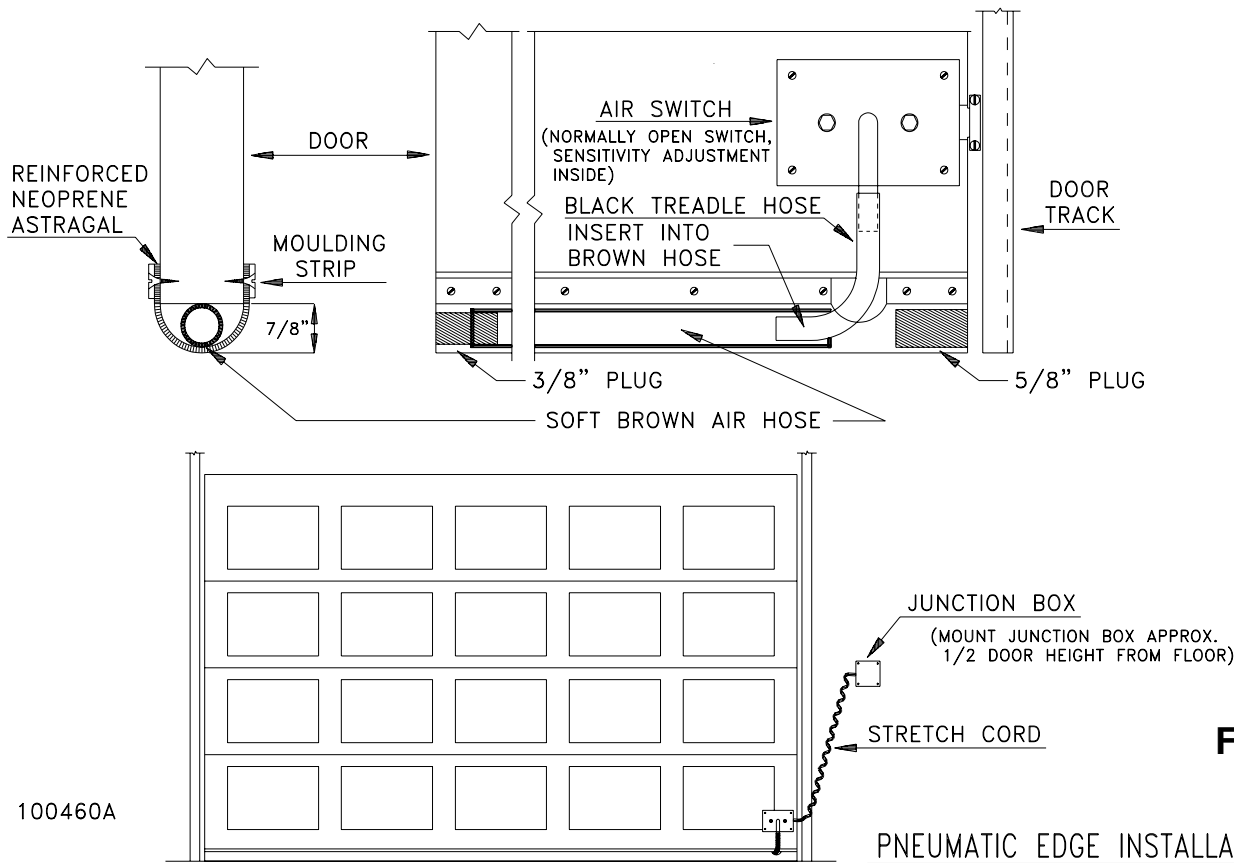
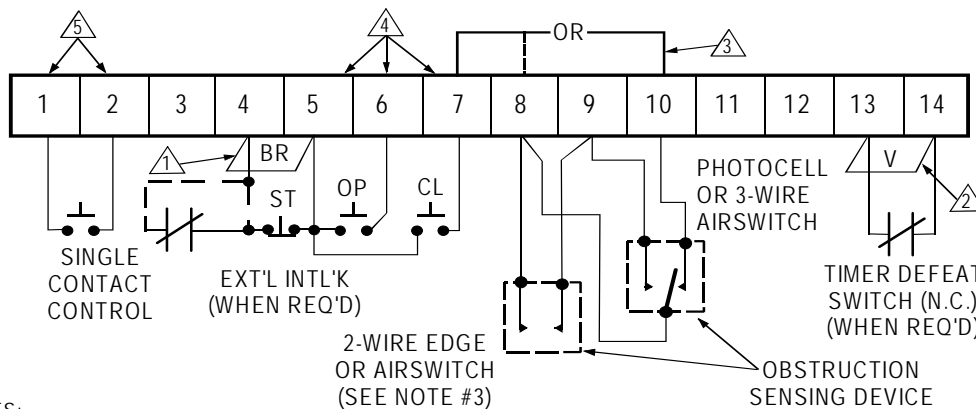


Figure 14



NOTES:

- ① - INSTALL BROWN JUMPER WIRE IF THERE IS NO STOP BUTTON OR EXTERNAL INTERLOCK SWITCH CONNECTED TO TERMINAL STRIP.
- ② - REMOVE VIOLET JUMPER WIRE WHEN TIMER DEFEAT SWITCH IS USED.
- ③ - INTERNAL ORANGE JUMPER.
- MOVE THIS JUMPER FROM TERMINAL #7 TO #8 IF ALL OBSTRUCTIONS SENSORS ARE 2-WIRE TYPE.
- REMOVE JUMPER IF 3-WIRE DEVICES ARE USED.
- ④ - TREADLES, PULL SWITCHES, KEY SWITCHES, PHOTO-ELECTRIC DEVICES, ETC. MAY BE CONNECTED TO TERMINALS INDICATED.
- ⑤ - REMOTE CONTROL UNITS (EXCLUDING TREADLES AND PHOTO-ELECTRIC UNITS). PULL SWITCHES AND SINGLE CONTACT CONTROL STATIONS MAY BE CONNECTED TO TERMINALS INDICATED.

FIGURE 15

IMPORTANT SAFETY INSTRUCTIONS FOR OWNER



WARNING

TO REDUCE THE RISK OF SEVERE INJURY OR DEATH: READ AND FOLLOW ALL INSTRUCTIONS!

- **NEVER** let children operate or play with door controls. Keep the Remote Control away from children.
- **ALWAYS** keep a moving door in sight and keep people and objects away from the door area until the door is completely closed. **NO ONE SHOULD CROSS THE PATH OF A MOVING DOOR.**
- **TEST THE DOOR OPENER'S REVERSING FEATURE** (where applicable) **MONTHLY**. The door **MUST** reverse upon contact with a 4" high object on the floor.
- After adjusting the force setting, if equipped with a clutch, or the limit of travel, **ALWAYS RETEST** the Opener. Failure to **ADJUST THE OPENER PROPERLY** may result in **SERIOUS INJURY OR DEATH**.
- **DO NOT** over adjust the force setting (clutch) to compensate for a poorly working door. See page 16 & 17 for procedure to check the door operation and for proper clutch adjustment.
- **KEEP THE GARAGE DOOR PROPERLY BALANCED.** (See the door owner's manual.)
- **AN IMPROPERLY BALANCED DOOR MAY CAUSE SEVERE INJURY OR DEATH.**
- Have a **QUALIFIED SERVICE PERSON MAKE REPAIRS TO CABLES, SPRING ASSEMBLIES AND OTHER HARDWARE.**
- **SAVE THIS INSTRUCTION MANUAL AND GIVE TO THE END USER.**

NOTE: It is now necessary to turn on the power in order to run the Opener to check for proper operation and 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.**

WIRING TERMS



WARNING

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

MOMENTARY CONTACT: Button can be pushed and then released and door will keep moving or stop without maintaining pressure on the button.

CONSTANT PRESSURE: Constant pressure is required on the button in order for continued door movement. When the button is released the door will stop and possibly reverse to full open depending on wiring type.



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 (NEC).

DOOR EDGE/PHOTOELECTRIC INPUT: The operator wiring provides for input from an optional pneumatic or electric door bottom edge or photoelectric device that will cause a closing door to stop and may reverse it to open depending on the wiring type.

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.



CAUTION

ALWAYS DISCONNECT POWER TO OPERATOR BEFORE SERVICING OR MAKING ADJUSTMENTS.

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.

1. Remove cotter pin from slotted hex nut and clutch shaft.
2. Back off slotted hex nut until there is insufficient tension on clutch spring to permit clutch to drive door.
3. Tighten slotted hex nut gradually until there is just enough tension on spring to permit operator to move door smoothly, but to allow clutch to slip if door is obstructed.
4. Be sure cotter pin is reinstalled each time operator is tested for clutch adjustment and that it is locked in place on completion of adjustment.

CAUTION NEVER COMPRESS CLUTCH SPRING BEYOND 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 clutch pad 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 clutch pad, 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.

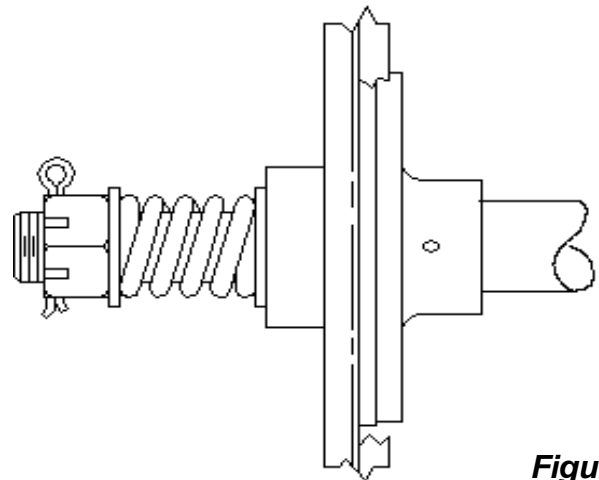


Figure 16



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.

TESTING



WARNING

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

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 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 proper response for your installation.

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 traveler coming too close to the power head.

To test it for proper reversal, place an object beneath the leading edge of the door. The door should instantly reverse when it comes into contact with the object provided the height of the object exceeds the cut out point built into the close limit switch (approximately four inches).

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

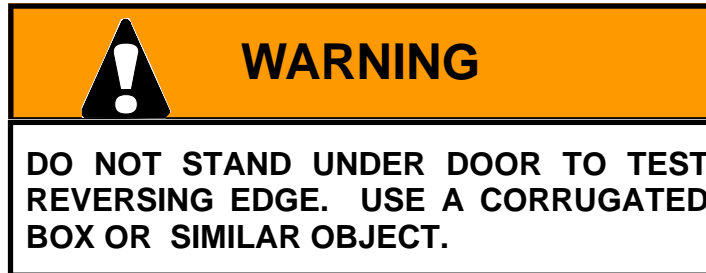
To test the manual disconnect first move the door to the fully closed position. Then disconnect the power to the operator. Manual door operation is possible when the release cord is pulled and the door arm assembly releases from the trolley traveler. If it is difficult to disengage or engage the door arm assembly at the closed position because the chain appears to be under compression, reset the CLOSE limit slightly to reduce the door travel in the close direction.



WARNING

DO NOT STAND UNDER DOOR TO TEST REVERSING EDGE. USE A CORRUGATED BOX OR SIMILAR OBJECT.

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 checked periodically and adjustments made if necessary. (See page 16)



Test the reversing edge circuit or components (where applicable) at least once a month by permitting the door to contact an obstruction while closing. (See Testing Section.)

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.**

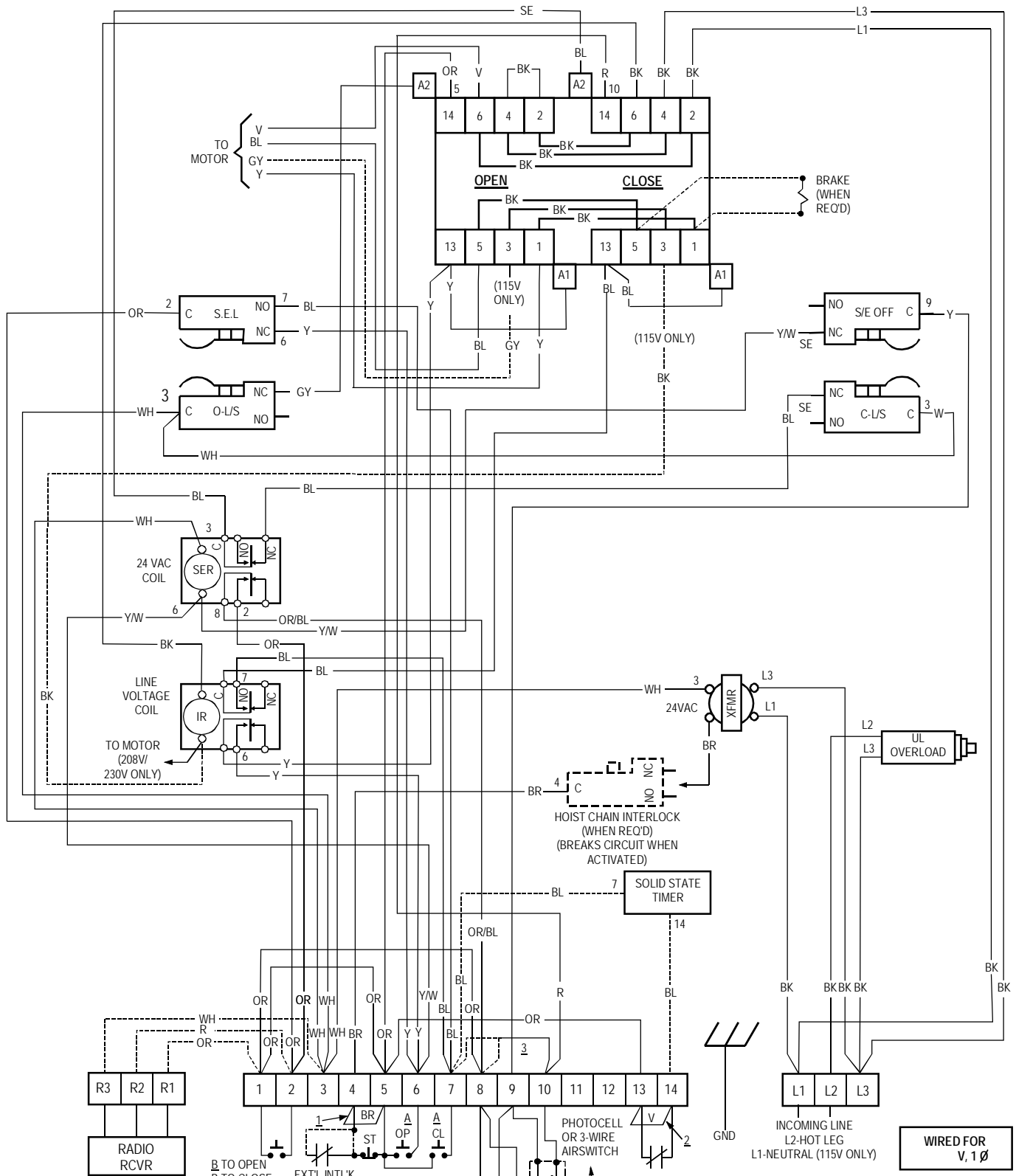
* Door must be in good operating condition. An electrical door operator cannot move a garage door that is in poor condition. The door must operate freely in the track, with no binding or obstructions, and must be well balanced. Check the spring balance of your door by bringing the door to a half-open position and leaving it there. If the door stays in that position, it is well balanced. If it moves more than a few inches the springs possibly need adjustment. Call a qualified door service company.

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

We constantly strive to maintain and improve the quality of our products. Therefore, the components shown in the illustrations were accurate at time of printing but are subject to change without notice as quality improvements are made.

<u>SYMPTOM</u>	<u>POSSIBLE CAUSE</u>	<u>SOLUTION</u>
Motor runs but door does not move	Door jammed or obstructed.	Check manual operation of door.
	Trolley disconnected from drive with door arm release.	Reconnect door arm to trolley traveler.
	Clutch slipping/v-Belt slipping	Check clutch adjustment. (Pg 16) Check belt for wear and proper tension.
Limit switches do not hold setting	Drive chain too loose; permits chain to jump teeth on sprocket.	Adjust chain to proper tension.
	Limit sprocket slipping on limit shaft.	Check set screws for tightness.
	Limit nut retaining bracket not engaging notches in nuts.	Set nuts and be sure bracket is in notch on each nut. See Figure 13.
Door drifts when operator shuts off.	If equipped with brake, brake not functioning properly.	Check stroke and spring pressure on brake arm. Adjust if necessary.
	Door spring tension incorrect.	Disconnect operator and check operation of door.
Motor hums — does not run.	Dead phase (on 3 phase).	Check power supply.
	Brake (if equipped) does not release.	Check wires to brake solenoid, check adjustment.
	*Door locked or jammed.	Check door. Try manual operation.
Motor does not run when open or close wall button is pressed.	Building fuse blown or circuit breaker tripped.	Check power supply fuses, circuit breakers, disconnect switch, check for cause.
	Overload protector tripped.	Reset and check for cause.
	NOTE: To isolate cause, operate contactor solenoid plunger manually. If motor runs, cause is in push button circuit.	Check control wiring. Contact Tech Support at 1-800-243-4476
	Interlock switch broken or inoperative.(Only applies to units with manual hoist chain option.)	Check that disconnect pin is not making contact with interlock switch located inside base frame. Check wiring to switch and switch function. Normally closed for operation electrically and normally open for hand chain operation.
	IR Relay not functioning (1Phase)	Relay is on when power first applied, drops out when motor runs.
Operator closes door when "Open" button is pressed, and limit switches do not function properly.	On three phase operators power supply is connected incorrectly. (Out of Phase)	Interchange connections of any two power supply leads. (See wiring diagrams)
	Operator controls not wired correctly, or unit is mounted upside down..	Check control wiring connections on wiring diagram, and check orientation of unit. Contact Tech Support at 1-800-243-4476
Operator fails to shut off at fully Open or Closed position.	On three phase operators power supply is connected out of phase.	Check phase as above.
	Limit nuts not adjusted properly.	See limit adjustments page 12.
	Defective limit switch.	Check continuity. Replace limit switch if necessary.
	Limit switch not being activated.	Check that limit nuts are moving correctly when operator runs and that they activate limit switch.
	Limit drive chain broken or too loose.	Replace chain, check limit screw for rotating.
	1 phase unit with motor rotation wrong	Usually occurs after motor replacement. Check for correct type motor, motor wiring, and correct operator mounting.

WIRING DIAGRAM - SINGLE PHASE 331-3

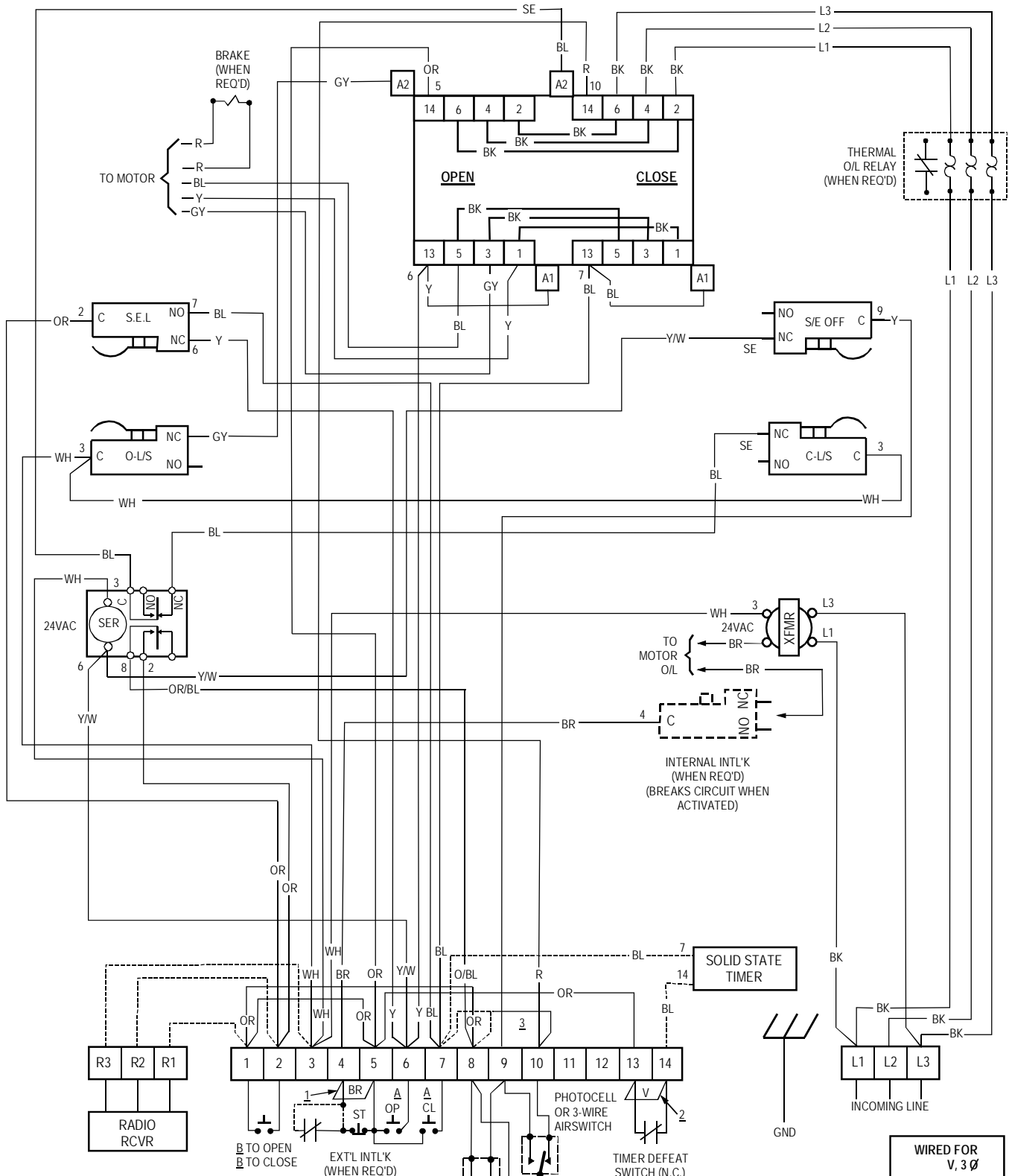


NOTES:

- 1- WIRE-NOT FURNISHED WHEN EXTERNAL INT'LK SWITCH IS USED.
- NOT FURNISHED WHEN STOP BUTTON IS USED.
- 2- WIRE-NOT FURNISHED WHEN TIMER DEFEAT SWITCH IS USED.
- 3a- MOVE THIS JUMPER FROM #7 TO #8 IF ALL OBSTRUCTIONS SENSORS ARE 2-WIRE TYPE.
- 3b- REMOVE JUMPER IF ANY 3-WIRE DEVICES ARE USED.
- A- TREADLES, PULL SWITCHES, KEY SWITCHES, PHOTO-ELECTRIC DEVICES, ETC. MAY BE CONNECTED TO TERMINALS INDICATED.
- B- REMOTE CONTROL UNITS (EXCLUDING TREADLES AND PHOTO-ELECTRIC UNITS), PULL SWITCHES AND SINGLE CONTACT CONTROL STATIONS, MAY BE CONNECTED TO TERMINALS INDICATED.

WIRING TYPE: SAFETY EDGE TO REVERSE WITH OPTIONAL TIMER	
MTR/CNTR: 1 Ø	
DATE: 10-31-02	REV. 15
BY: F.S.	
SPECIAL: OPTIONAL TIMER CIRCUIT IN DASHED LINES	
WIRING DIAGRAM NO. 331-3	
© Copyright PowerMaster 1997 No portion of this diagram may be reproduced without the expressed written permission of the manufacturer.	

WIRING DIAGRAM - THREE PHASE 333-3

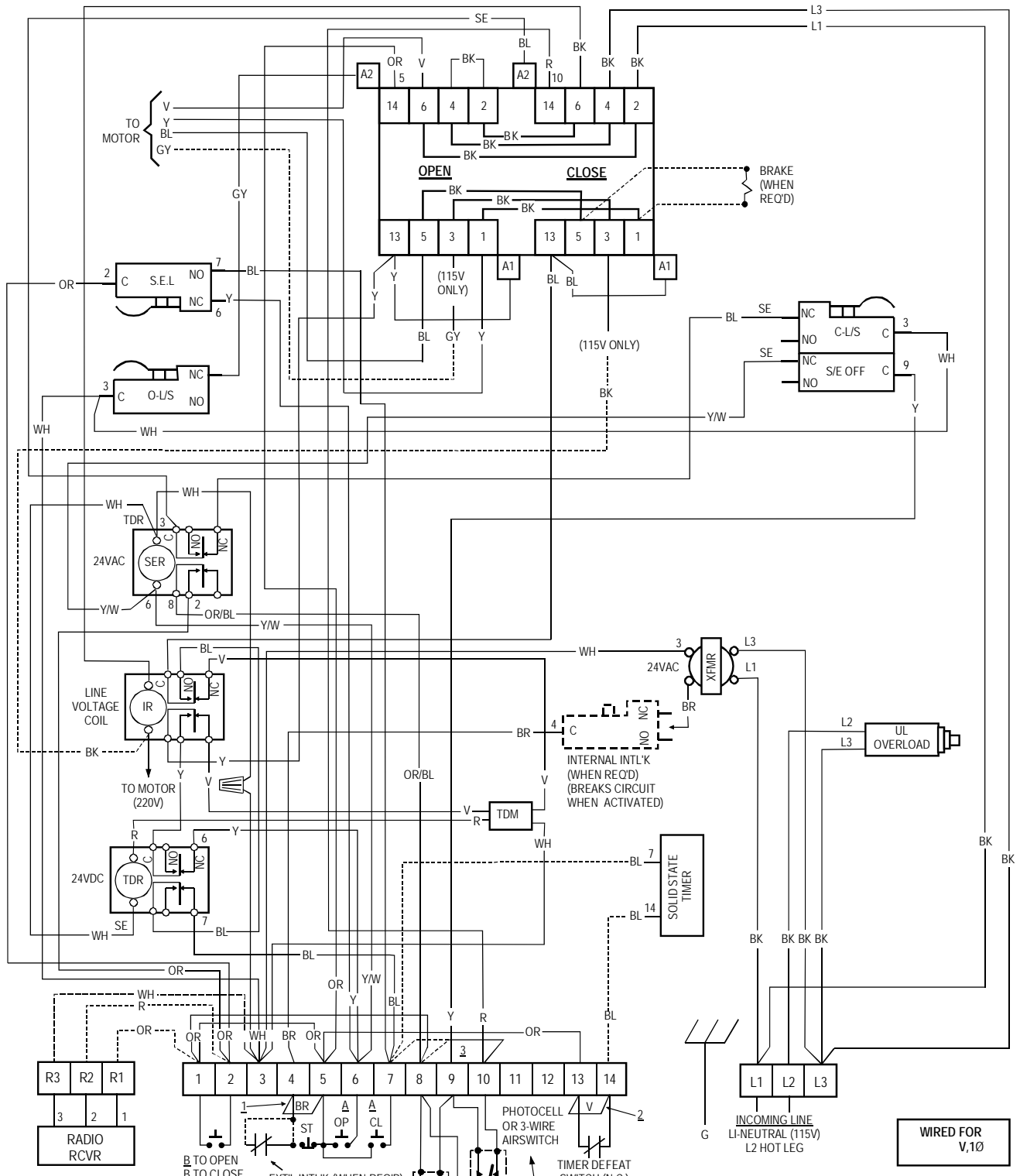


NOTES:

- 1- WIRE-NOT FURNISHED WHEN EXTERNAL INT'LK SWITCH IS USED.
- NOT FURNISHED WHEN STOP BUTTON IS USED.
- 2- WIRE-NOT FURNISHED WHEN TIMER DEFEAT SWITCH IS USED.
- 3a- MOVE THIS JUMPER FROM #7 TO #8 IF ALL OBSTRUCTIONS SENSORS ARE 2-WIRE TYPE.
- 3b- REMOVE JUMPER IF ANT 3-WIRE DEVICES ARE USED.
- A- TREADLES, PULL SWITCHES, KEY SWITCHES, PHOTO-ELECTRIC DEVICES, ETC. MAY BE CONNECTED TO TERMINALS INDICATED.
- B- REMOTE CONTROL UNITS (EXCLUDING TREADLES AND PHOTO-ELECTRIC UNITS), PULL SWITCHES AND SINGLE CONTACT CONTROL STATIONS, MAY BE CONNECTED TO TERMINALS INDICATED.

WIRED FOR V, 3 Ø	
WIRING TYPE: SAFETY EDGE TO REVERSE WITH OPTIONAL TIMER	
MTR/CNTR: 3 Ø	
DATE: 10-31-02	REV. 11
BY: F.S.	
SPECIAL: OPTIONAL TIMER CIRCUIT IN DASHED LINES	
WIRING DIAGRAM NO. 333-3	
© Copyright PowerMaster 1997 No portion of this diagram may be reproduced without the expressed written permission of the manufacturer.	

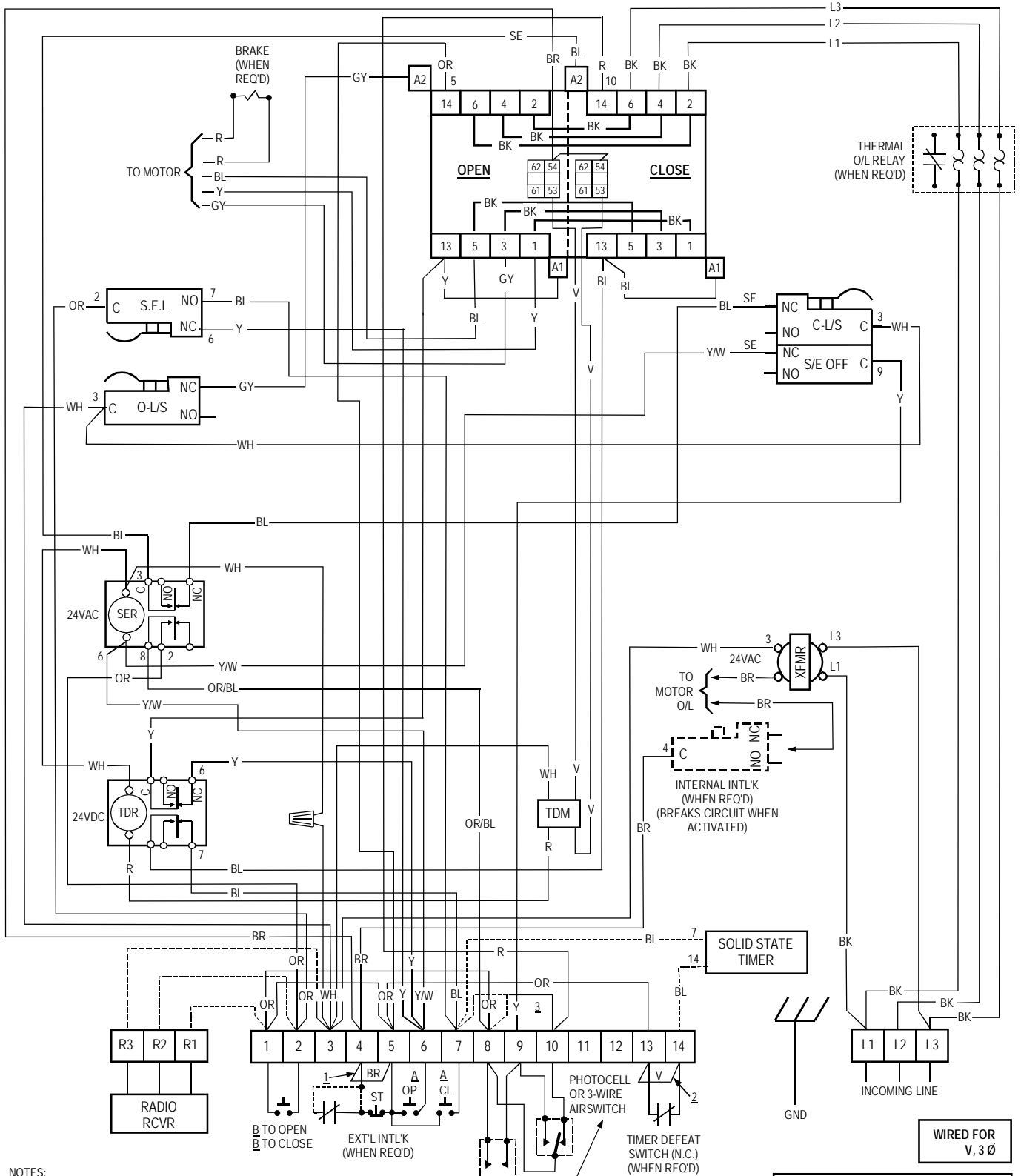
WIRING DIAGRAM - SINGLE PHASE 1331-3



- NOTES:
- 1- WIRE-NOT FURNISHED WHEN EXTERNAL INT'L K SWITCH IS USED. NOT FURNISHED WHEN STOP BUTTON IS USED.
 - 2- WIRE-NOT FURNISHED WHEN TIMER DEFEAT SWITCH IS USED.
 - 3a- MOVE THIS JUMPER FROM #7 TO #8 IF ALL OBSTRUCTIONS SENSORS ARE 2-WIRE TYPE.
 - 3b- REMOVE JUMPER IF ANY 3-WIRE DEVICES ARE USED.
 - A- TREADLES, PULL SWITCHES, KEY SWITCHES, PHOTO-ELECTRIC DEVICES, ETC. MAY BE CONNECTED TO TERMINALS INDICATED.
 - B- REMOTE CONTROL UNITS (EXCLUDING TREADLES AND PHOTO-ELECTRIC UNITS). PULL SWITCHES AND SINGLE CONTACT CONTROL STATIONS, MAY BE CONNECTED TO TERMINALS INDICATED.

WIRING TYP: SAFETY EDGE 1 Ø TO REVERSE WITH OPTIONAL TIMER	
MTR/CNTR: 1 Ø	
DATE: 10/31/02	REV. 12
BY: F.S.	
SPECIAL: OPTIONAL TIMER CIRCUIT IN DASHED LINES. DELAY ON REVERSE	
WIRING DIAGRAM NO. 1331-3	
© Copyright PowerMaster 1997 No portion of this diagram may be reproduced without the expressed written permission of the manufacturer.	

WIRING DIAGRAM - THREE PHASE 1333-3



NOTES:

- 1- WIRE-NOT FURNISHED WHEN EXTERNAL INT'LK SWITCH IS USED. - NOT FURNISHED WHEN STOP BUTTON IS USED.
- 2- WIRE-NOT FURNISHED WHEN TIMER DEFEAT SWITCH IS USED.
- 3a- MOVE THIS JUMPER FROM #7 TO #8 IF ALL OBSTRUCTION SENSORS ARE 2-WIRE TYPE.
- 3b- REMOVE JUMPER IF ANY 3-WIRE DEVICES ARE USED.
- A- TREADLES, PULL SWITCHES, KEY SWITCHES, PHOTO-ELECTRIC DEVICES, ETC.. MAY BE CONNECTED TO TERMINALS INDICATED.
- B- REMOTE CONTROL UNITS (EXCLUDING TREADLES AND PHOTO-ELECTRIC UNITS), PULL SWITCHES AND SINGLE CONTACT CONTROL STATIONS, MAY BE CONNECTED TO TERMINALS INDICATED.

- 2-WIRE EDGE OR AIR SWITCH (SEE NOTE #3)
- OBSTRUCTION SENSING DEVICE
- TIMER DEFEAT SWITCH (N.C.) (WHEN REQ'D)

**WIRED FOR
V, 3 Ø**

WIRING TYPE: SAFETY EDGE TO REVERSE WITH OPTIONAL TIMER	
MTR/CNTR: 3 Ø	
DATE: 10-31-02	REV. 12
BY: F.S.	
SPECIAL: OPTIONAL TIMER CIRCUIT IN DASHED LINES.	
WIRING DIAGRAM 1333-3	
© Copyright PowerMaster 1997 No portion of this diagram may be reproduced without the expressed written permission of the manufacturer.	

PowerMaster

Limited 2 Year Warranty

PowerMaster warrants all door operators to be free of defects in materials and workmanship for a period of two (2) years from date of purchase. If any part is found to be defective during this period, new parts will be furnished free of charge. Failure of this product due to misuse, improper installation, alterations, vandalism, or lack of maintenance is not covered under this warranty, and voids any other implied warranties herein.

PowerMaster is not responsible for any labor charges incurred in connection with the installation of warranted parts.

In order to activate this warranty, the registration form on opposite page MUST be completed and returned within THIRTY CALENDER DAYS FROM DATE OF PURCHASE VIA CERTIFIED MAIL, fax (631-951-3934) or via email PMTECH@optonline.net If registration is not activated, a one year warranty will apply.

Model _____

Date Installed _____

Serial # _____

Installer's Information

Company Name _____

Company Address _____

Company Address _____

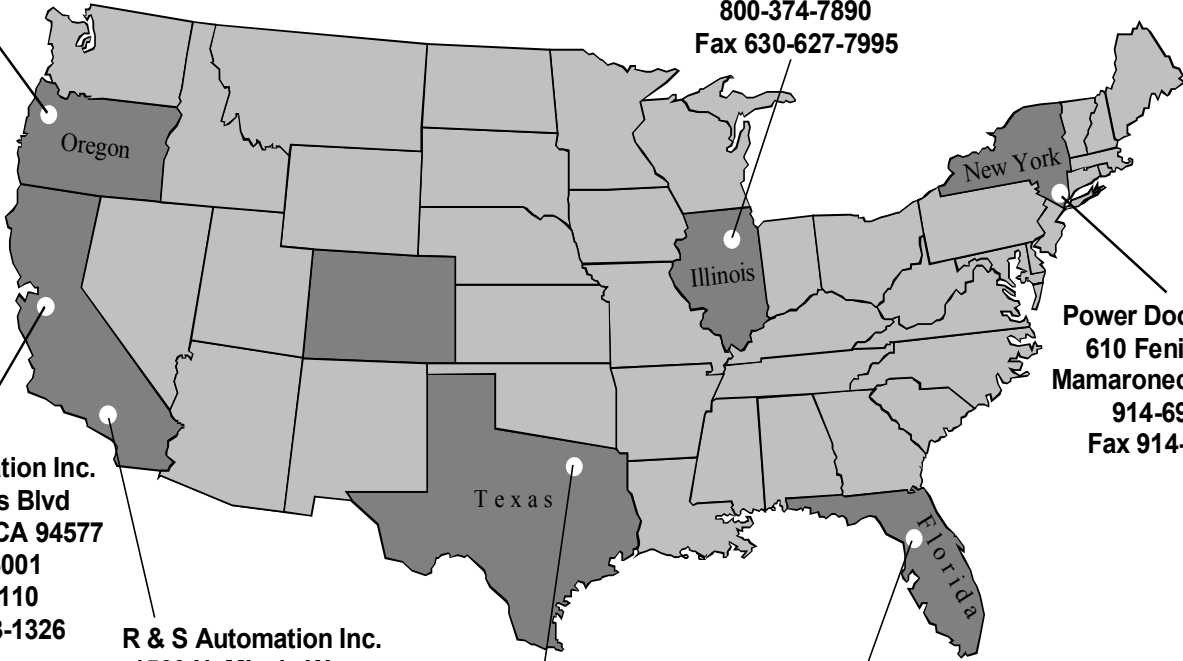
Company Address _____

Company Telephone # _____

Company Contact _____

R&S Automation
7200 E. 92nd Avenue
Unit A
Portland, OR 97266
877-388-4001
503-771-4685
Fax 503-774-6708

John Greene Corp.
2807 Center Circle Drive
Downers Grove, IL 60515
800-374-7890
Fax 630-627-7995



R & S Automation Inc.
15075 Wicks Blvd
San Leandro, CA 94577
800-543-6001
510-357-4110
Fax 510-483-1326

R & S Automation Inc.
1560 N. Missile Way
Anaheim, CA 92801
800-963-3111
714-449-1645
Fax 714-449-1679

John Greene Corp.
3024 Avenue E. East
Arlington, Tx 76011
800-925-7890
Fax 817-633-5735

John Greene Corp.
3516 E. Norvell Bryant Hwy.
Hernando, FL 34442
800-323-3674
Fax 352-726-8999

Power Door Products
610 Fenimore Rd.
Mamaroneck, NY 10543
914-698-5083
Fax 914-698-6866

Toll Free technical support @ 1-800-243-4476
Email to techsupport@power-master.net



**Call 1- 800 - 323 - 3674
to order or to find a distributor near you**

Standard Two Year Warranty
**Warehouses across the country w/
factory trained managers**
Prompt delivery from stock
**Special operators normally ship
within 7 days**

06-0922 MG