

# Operations & Maintenance Manual

## Project Name

Wenatchee Waste Water Treatment  
Plant Improvements

## Owner

City of Wenatchee

## Section:

08332 – Steel Rolling Overhead Doors

<b>Overhead Doors Subcontractor:</b> <b>Continental Door Co.</b> 8622 E. Rockwell Spokane, WA 99212 (509) 921-2260	<b>Engineer:</b> <b>HDR Engineering, Inc.</b> 2805 St. Andrews Loop, Suite A Pasco, WA 99301 (509) 546-2040
<b>Overhead Doors Manufacturer:</b> <b>Cornell Iron Works</b> 24 Elmwood Avenue Crestwood Industrial Park Mountaintop, PA 18707 (800) 233-8366	<b>General Contractor:</b> <b>Apollo, Inc.</b> 1133 West Columbia Drive Kennewick, WA 99336 (509) 586-1104



**Equipment Data and Spare Parts Summary**

Project Name: Wenatchee Waste Water Treatment Plant Improvements	Specification Section: 08332
Equipment Name: Cornell GH50 NEMA 7/9	Year Installed: 2012

Project Equipment Tag No(s): J2012 132988

Equipment Manufacturer: Cornell Iron Works	Project/Order No.: 132988
Address: 24 Elmwood Ave., Crestwood Industrial Park, Mountaintop, PA 18707	Phone: 1.800.233.8366
Fax: 1.800.526.0841	Web Site: www.cornelliron.com
	E-mail: cdeluca@cornelliron.com

Local Vendor/Service Center: Continental Door Co.
Address: 8622 E. Rockwell, Spokane, WA 99212
Phone: 509.921.2260
Fax: 509.921.5099
Web Site:
E-mail: tjohnson@continentaldoorco.com

**MECHANICAL NAMEPLATE DATA**

Equip.		Serial No.		
Make		Model No.		
ID No.	Frame No.	HP	RPM	Cap.
Size	TDH	Imp. Sz.	CFM	PSI
Other:				

**ELECTRICAL NAMEPLATE DATA**

Equip. Explosion Proof Operator		Serial No. 3612N1089						
Make Cornell Iron Works		Model No. GH50						
ID No.	Frame No.	HP 1/2	V. 460	Amp.	HZ 60	PH 3	RPM 1725	SF
Duty	Code	Ins. Cl.	Type Cont. Duty	NEMA 7/9	C Amb.	Temp. Rise	Rating	
Other:								

**SPARE PARTS PROVIDED PER CONTRACT**

Part No.	Part Name	Quantity
	N/A	

**RECOMMENDED SPARE PARTS**

Part No.	Part Name	Quantity
	N/A	

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Lubrication Summary

Equipment Description	Cornell GH50 Operator	Project Equip. Tag No(s)	J2012 132988
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Lubricant Point Drive Chain						
Lubricant Type	Manufacturer		Product	AGMA #	SAE #	ISO
	1	Various		Oil		30
2						
3						
4						
5						

Lubricant Point Bearing and Shafts						
Lubricant Type	Manufacturer		Product	AGMA #	SAE #	ISO
	1	Various		Oil		30
2						
3						
4						
5						

Lubricant Point						
Lubricant Type	Manufacturer		Product	AGMA #	SAE #	ISO
	1					
2						
3						
4						
5						

Lubricant Point						
Lubricant Type	Manufacturer		Product	AGMA #	SAE #	ISO
	1					
2						
3						
4						
5						

Lubricant Point						
Lubricant Type	Manufacturer		Product	AGMA #	SAE #	ISO
	1					
2						
3						
4						
5						

Lubricant Point						
Lubricant Type	Manufacturer		Product	AGMA #	SAE #	ISO
	1					
2						
3						
4						
5						

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# CORNELL

***Service Door***  
***(Insulated and ~~Non-~~***  
***~~Insulated)~~***  
***Installation Instructions***

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Rolling doors are large, movable objects. They move with the help of electric motors or manual operators (chain, crank, push up, etc), and most have springs under high tension. These items and their components can cause injury. In order to avoid injury to yourself and others, please follow the instructions in this manual.

- Review the potential hazards and preventative measures listed below:

Potential Hazard	Preventative Measure
	<p><b>⚠ DANGER</b> Pinned or crushed by closing door.</p> <ul style="list-style-type: none"> <li>• Keep yourself and others clear of opening while door is in motion.</li> <li>• Do not allow children to play near or operate door.</li> <li>• Do not operate if door becomes jammed or broken.</li> </ul>
	<p><b>⚠ WARNING</b> Struck by adjusting wheel bar while applying spring turns.</p> <ul style="list-style-type: none"> <li>• Be sure bar is adequate in strength and long enough to allow installer to apply the necessary torque.</li> <li>• Make sure bar is fully seated into the adjusting wheel slot before applying pressure.</li> <li>• Use two bars while applying turns to the adjusting wheel.</li> </ul>
	<p><b>⚠ WARNING</b> Electrical shock.</p> <ul style="list-style-type: none"> <li>• Make sure electrical operator is properly grounded.</li> <li>• Turn off source power completely prior to servicing the motor.</li> <li>• Make sure wires are clear of any moving or potentially moving parts.</li> <li>• Avoid pinching wires when installing the motor cover.</li> </ul>
	<p><b>⚠ WARNING</b> Pinched by moving components.</p> <ul style="list-style-type: none"> <li>• Make sure the motor is turned off and unplugged before working with moving parts such as roller chain and sprockets, drop-out mechanisms, adjusting wheels, etc.</li> <li>• Locate the possible pinch-points of the unit (Drive chain, coil area, bottom bar, etc.) Do not operate the door while someone is near these areas.</li> </ul>

*Table 2.1 - Potential hazards and Preventative Measures*

- Check the following during installation and before leaving the job site:
  - a. If the unit has tension springs, be sure the proper amount of tension is applied to the torsion springs, in order to properly counterbalance the weight of the curtain.
  - b. Securely fasten the tension adjusting wheel in place with the appropriate hardware provided.
  - c. Check that the keys and/or cotter pins have been set in place and fit properly at all sprockets or gears.
  - d. Check that the setscrews in each sprocket or gear (one over the key and one offset from the key) have been tightened properly.
  - e. Check all fasteners holding the unit to the building structures.
  - f. Check all fasteners used to assemble the components of the unit together.
  - g. Instruct owner or representative in the proper method of operating the door.

- **Upon delivery, check condition of components for damage.**
- **If damage occurred in transit, the installation should not proceed without authorization.**

**NOTICE**

If the installation proceeds, neither the carrier nor the manufacturer will assume responsibility for replacing the damaged material.

- **If the installation is stopped due to damage, do the following:**
  1. Take pictures of the damage.
  2. Do not move material from point of delivery to other premises once the damaged components are discovered.
  3. Do not unpack, if the damage is visible prior to removing packaging, until an inspection is made.
  4. If the damage is found while removing contents from packaging, the packaging material must be saved until inspection is made.
  5. Container and packaging should be retained by consignee until inspection is made.
  6. Have components inspected by carrier's representative within 15 days from date of delivery.
  7. Consignee must obtain a copy of the Inspection Report.
- **Returning damaged components:**
  1. Obtain permission from carrier to return.
  2. Route the return shipment via the identical carrier(s) involved in the original shipment.
  3. Notify the manufacturer when shipment is returned to manufacture plant.
- **Verify that all components have arrived. Look for the following:**
  1. Job construction drawings featuring different views (elevation, section, plan, etc.)
  2. (2) Guide assemblies; check for guide weathering if included in order
  3. Barrel assembly
  4. Curtain assembly with bottom bar attached
  5. (2) Bracket assemblies
  6. Operator; if not attached to bracket
  7. Operator cover; may not be included in order
  8. Adjusting wheel; if the barrel assembly contains springs
  9. Inertia brake; typically on units with springless barrel assemblies
  10. Hood and hood supports; may not be included in order
  11. Hardware
  12. Misc. items (Reelite, lintel seal, hood baffle, etc.)
  13. Verify material/finish/color of components matches what is listed on the job construction drawings and/or what was ordered.
- **If the delivery is incomplete:**
  1. Make note on delivery receipt.
  2. Note should be verified by driver's signature.
  3. Notify carrier and manufacturer.

- **Read entire instruction manual thoroughly. The manufacturer will not be held responsible for any charges incurred due to improperly installed components.**
  - a. Only trained door systems technicians should perform installation, maintenance, etc.
  - b. Each unit comes with an individual item number. If the job contains multiple units, be sure to locate all the components for each item and separate each.

### **⚠ WARNING**

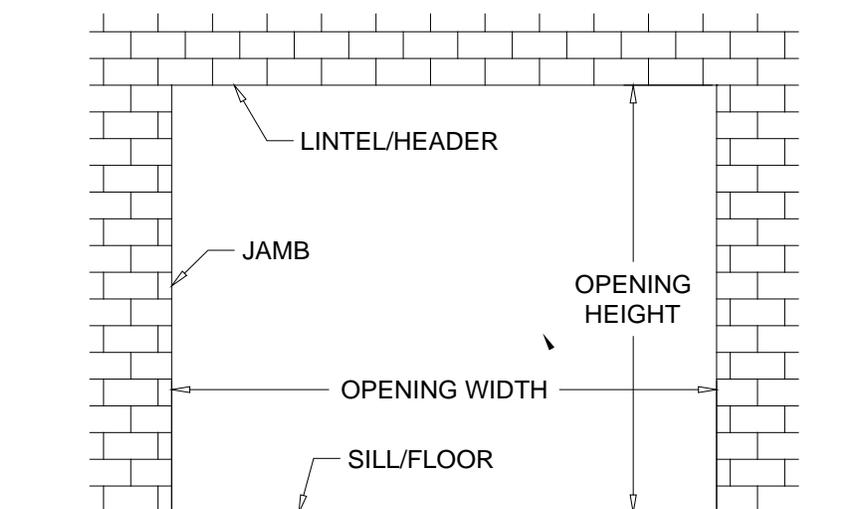
**Do not** interchange parts from one door to another.

- c. Find the job construction drawings for the unit being installed and check the dimensions of the opening against those on the drawings. See **Figure 4.1** below.
- d. If the opening dimensions differ from those on the drawings, **do not proceed**, check with distributor/manufacturer to be sure the correct door is being installed.
- e. Check the jambs of the opening for plumb. Check the head/lintel and floor for level. If the unit is to be free standing, for example mounted to tubes, check the floor and ceiling for level and for adequate mounting areas at the top and bottom.

**Note:** The floor may not be level if a pitched bottom bar is specified.

### ▪ **Work Area:**

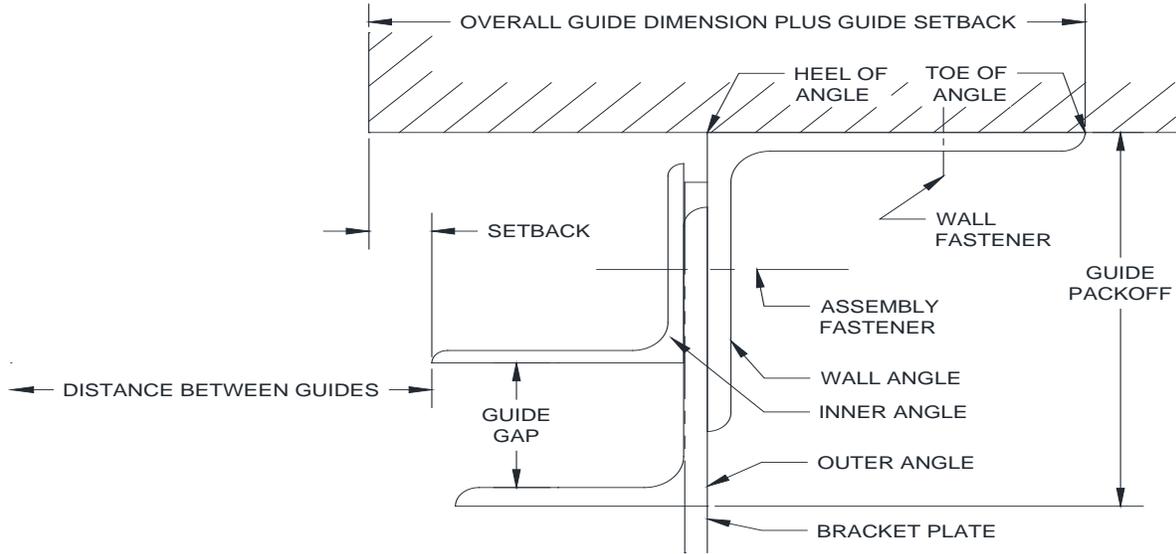
- a. The key to a smooth installation is a clean and well-prepared work environment. Once the components have been inspected and the job construction drawings have been reviewed; lay out the components in the order of installation.
- b. The opening for the door should be cleaned and inspected for rough surfaces and construction debris.
- c. Lastly the mounting hardware supplied with the door should correspond with the surface and construction features of the opening.
- d. The basic assembly sequence is as follows: guides, barrel w/ rings or tapped holes, brackets, motor operator (if applicable), curtain, bellmouth, stoppers, weather stripping, hood, and operator/adjustor/idler covers.



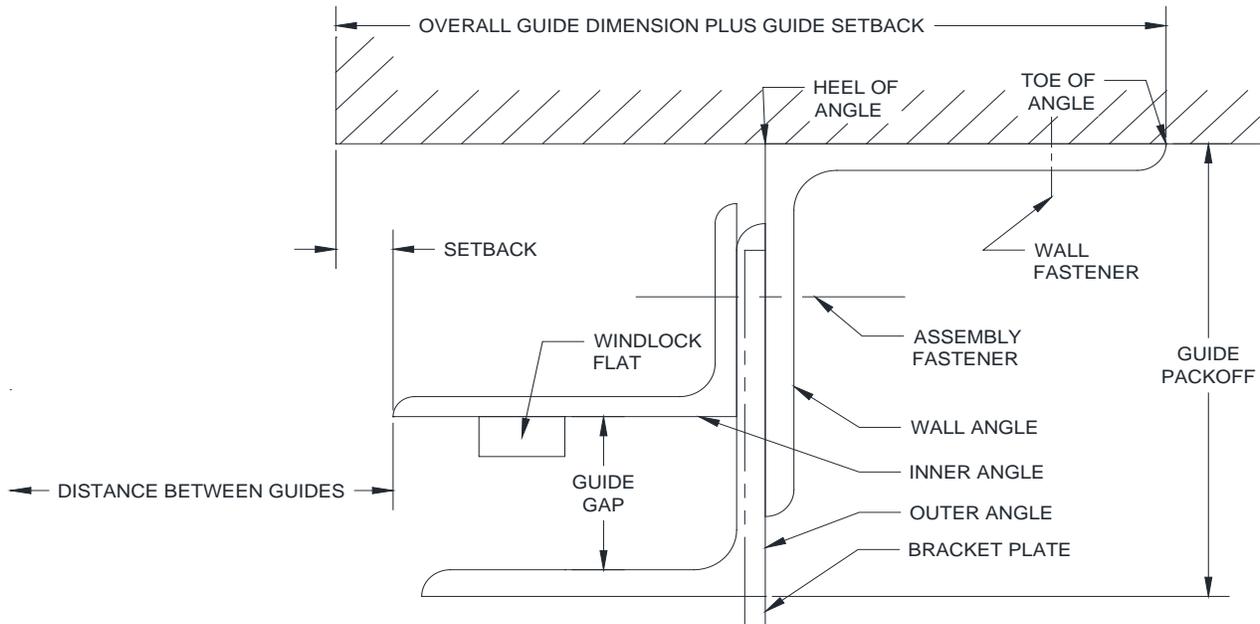
**Figure 4.1 - Opening Dimensions and Designations**

▪ **Face of Wall Units (Figures 5.1 - 5.5):**

**Note:** Determine which guide assemblies are utilized on the unit from the job construction drawings and compare to the diagrams below.<sup>1</sup>



*Figure 5.1 – Face of Wall “Z” Guide*



*Figure 5.2 – Face of Wall “Z” Guide with Windlock Flat*

<sup>1</sup> The guide assembly may differ from the right to left hand side of the unit. In these cases, follow the directions for each particular guide assembly, as well as the job construction drawings provided with the unit.

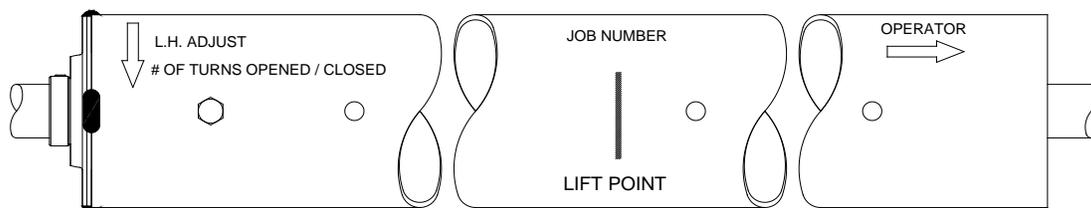
▪ **Preparation of the Barrel and Brackets**

**Note:** Check to see if a hood support will be required. If so, refer to the **“Hood Support Installation”** section before proceeding to the barrel and brackets.

1. Refer to the job construction drawings to determine the “coil side” of the opening, or the side of the opening on which the coil is to be installed. Then determine which jamb wall is your “operator side”, or side on which the operator is to be installed. The following instructions refer to these directional cues.

**Note:** Units **without** operators (such as push-up units) are still considered to have an “operator” side. The shaft and job drawings will be marked with “operator” side regardless of the operation of the door so that it can be used as a directional cue.

2. Unpack the barrel assembly. Note the markings on the barrel, see **Figure 6.1** below.

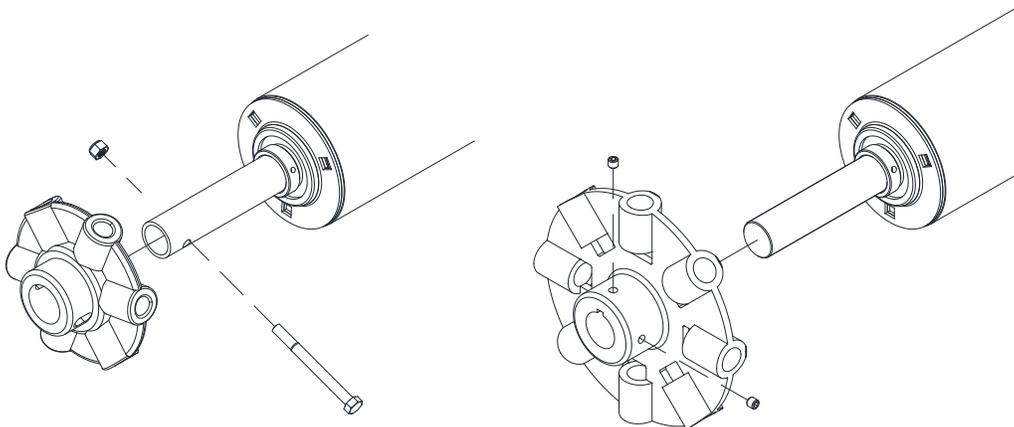


**Figure 6.1 – Barrel Markings (left hand adjust shown)**

3. Position the barrel assembly on the coil side of the opening, with the end marked “operator” towards the “operator side” of the opening. In order to alleviate the ring and bracket installation, place the barrel assembly on blocks or spacers such that it is elevated off the ground.

**Note:** Choose sufficiently sized blocks. The barrel assembly should be elevated off the ground enough that the brackets can be installed without contacting the floor.

4. Check to make sure the required number of turns is noted on the barrel, as shown in **Figure 6.1**. Consult the distributor or the manufacturer if you cannot locate this information. Check that these numbers match the information provided on the job information. Take note of these numbers, as access to this information may be obstructed once the curtain is installed.
5. Typically the adjusting wheel is not shipped attached to the barrel. However, if the adjusting wheel *is* attached to the barrel, remove by loosening the bolt or set screws that secure the adjusting wheel to the barrel and sliding the wheel off the inner shaft. See **Figure 6.2**.

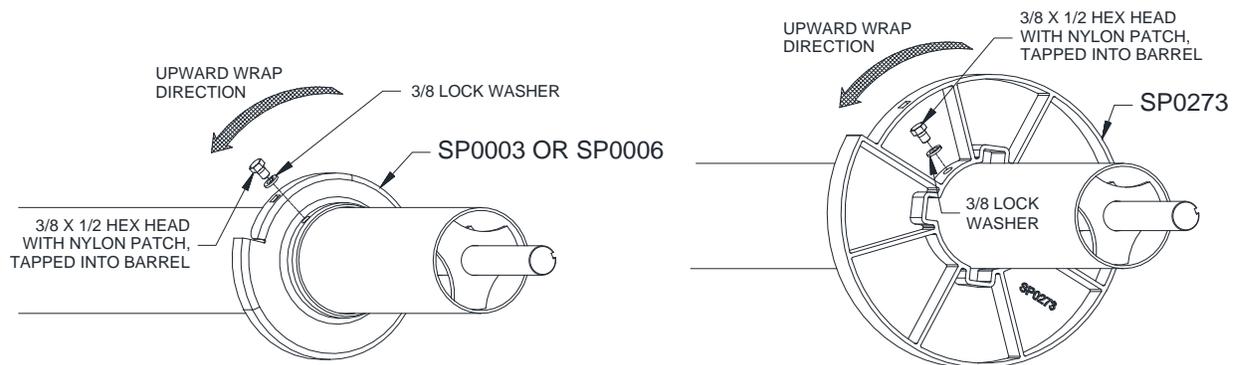


**Figure 6.2 – Removal of adjustor from barrel assembly**

6. Refer to the job information provided with the door to determine the correct ring type and quantity. If the unit does not require rings, skip to *Step 9*. Many larger diameter (8", 10", 12", etc.) barrel assemblies do not require rings for curtain attachment.
7. Locate the rings in the hardware bag/box provided. Check that you were supplied the correct type and quantity. (Use **Figure 6.3** as a visual aid.)
8. Use the information in **Figure 6.3** to install the rings.

**Note:** It is critical that the rings are installed correctly in relation to the coiling direction, or the direction of wrap as the door travel upward. The rings act as graduated spacers, meaning they increase in diameter such that the curtain wraps in a consistent and smooth manner. Use the arrows on the figures below to determine the correct orientation of the rings in relation to the coiling direction.

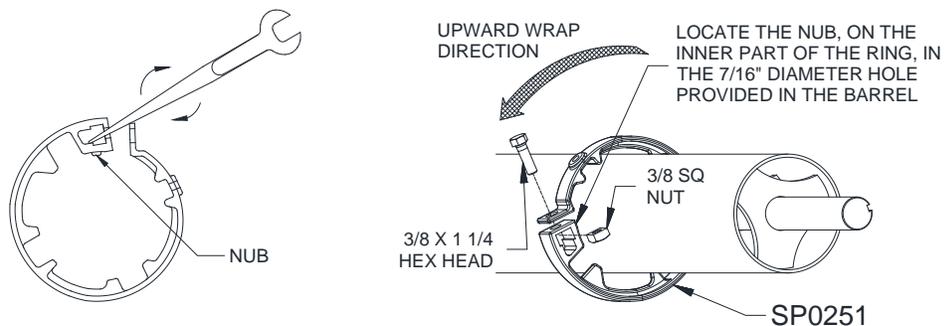
**SP0003 (for 4" barrels) and SP0006 (for 6" barrels) Stamped Rings, and SP0273 Cast Rings:**



**Installation:**

- Slip the rings over the barrel, noting direction of wrap, and place over tapped hole in barrel. Insert the 3/8" x 1/2" hex bolt (with nylon patch on threads) through the ring into the tapped hole in barrel.
- Be sure rings sit straight on barrel and tighten the fasteners to minimum 20 ft lbs of torque.

**SP0251 Cast Rings:**



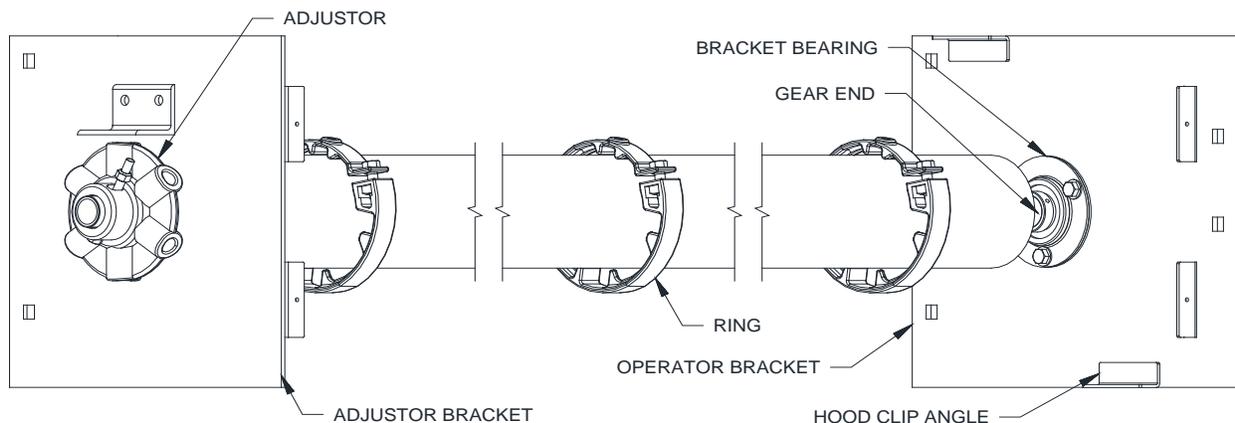
**Installation:**

- Use a small pry bar or large standard screwdriver to spread the gap in the ring by prying between bolt flange and the nut cradle of the casting (see above).
- Slide the ring over the barrel, noting direction of wrap, and rotate the ring so the locating nub in the casting aligns with the locating hole in the barrel.
- Insert the 3/8 square nut into the nut cradle of the casting and the 3/8" x 1-1/4" hex bolt through the bolt flange in the casting and tighten to minimum 20 ft lbs of torque.
- Be sure ring sits straight on barrel.

**Figure 6.3 – Ring Installation**

9. Locate the brackets. Determine the “operator” and “adjustor” brackets by referring to **Figure 6.4**. The “operator” bracket may vary significantly based on the operation of the door. The “adjustor” bracket will contain a label with spring adjustment instructions.
10. Remove the adjusting wheel if you haven’t previously, and slide the adjustor bracket over the inner shaft of the barrel assembly. Install the adjusting wheel (see **Figure 6.2**).
11. Slide the operator bracket over the gear end until the inside face of the bracket is approximately 3 inches from the edge of the outer shaft. Do not tighten the set screws at this point, as you may need to adjust the position of the bracket. You may choose to install the drive sprocket (if present) at this point.

**Note:** Do not install the operator until the barrel and bracket assembly is hoisted into position and securely fastened to the guides. Installing the operator at this stage will cause the assembly to be lopsided and cumbersome, making it difficult and potentially dangerous to hoist into position.



**Figure 6.4 – Brackets and Barrel Prior to Installation**

▪ **Hoisting and Installing Barrel Assembly**

1. The following methods can be used for hoisting them into place:
  - **Crane Hoisting:** Place a sling or lifting agent under the barrel assembly at the “lift point” provided on the barrel, see **Figure 6.1**.
  - **Forklift Hoisting:** Space the forks evenly under the “lift point” provided on the barrel, see **Figure 6.1**. Ensure that the barrel assembly is positioned close enough to the tips of the forks that the fastening holes in the bracket can be aligned with those of the guides without the forks contacting the wall. Secure the barrel assembly to avoid the slipping off the tip of the forks.

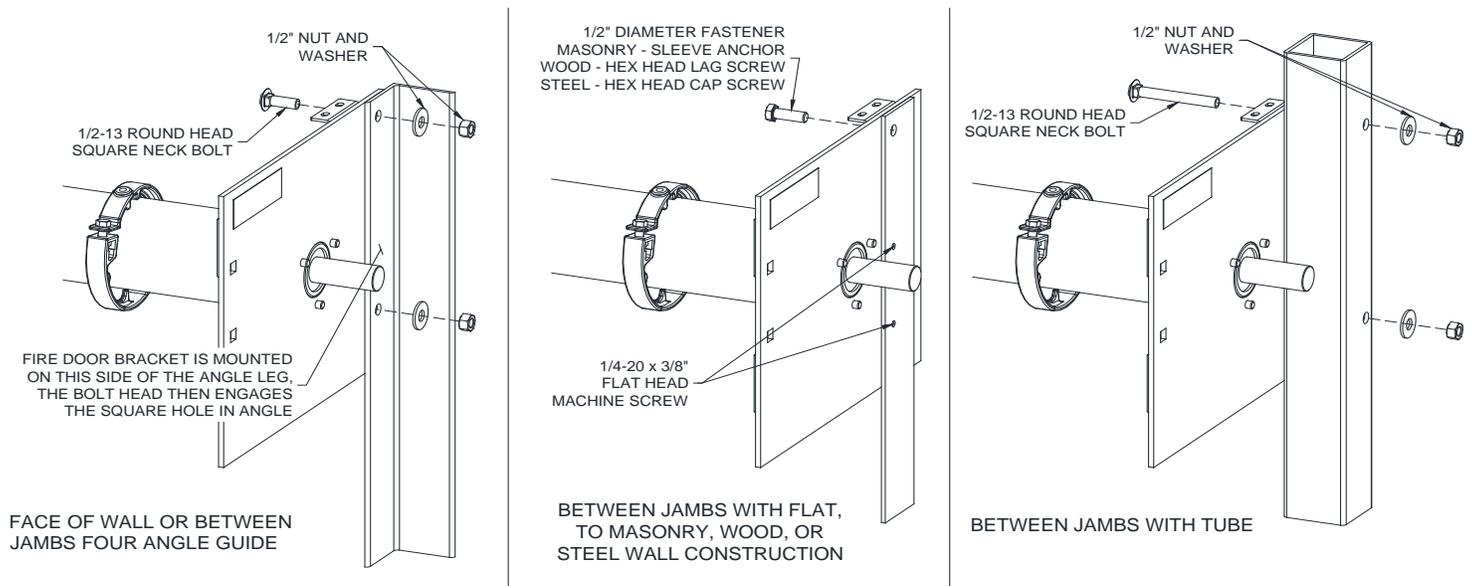
**WARNING**

The addition of brackets may offset the balance slightly from when the “lift point” was marked. Check to make sure the assembly is properly balanced before hoisting.

2. Before hoisting, refer to the hardware sheet and ensure that the proper type and quantity of fasteners were provided for the bracket installation. Measure the distance between the brackets and compare that to your wall angles (or between mounting angles if tubes are present). Readjust the brackets as needed before hoisting.
3. Center the barrel assembly between the guides, keeping approximately 2 feet of clearance between the barrel assembly and wall/guides.
4. Raise the barrel assembly up to the approximate bracket mounting level. The brackets should be clear of the outer and inner guide angles.

**Note:** Position the brackets in the upright position, with the mounting holes facing the wall, before moving the assembly towards the wall. It may be difficult to rotate the bracket when in close to the wall.

5. Slowly maneuver the barrel assembly towards the guide, and align the mounting holes of the brackets with those of the wall angles (or mounting angles if tubes are present).
6. Insert the specified bolts and snug tighten, see **Figure 6.5**.



**Figure 6.5 – Bracket Mounting Configurations and Hardware**

7. Check to see that the barrel is positioned properly between the brackets. That is, so that the proper amount of space is allowed between the barrel and the brackets. Typically the space is equal at both the operator and adjustor side. Adjust as necessary.
8. Place a level in the center of the barrel. If the shaft is **not** level:
  - Check the dimensions of the brackets from the top of the bracket to the center of the barrel.
  - Verify that the bracket mounting fasteners are the same distance from the top of the bracket.
    - a. If the dimensions **are not** correct, contact the Service Department.
    - b. If the dimensions **are** correct, the floor may be out of level, causing the bracket mounting holes in the guides to be out of alignment.
9. Fully tighten mounting bolts to the torque specifications in this manual. See *Torque Specification Tables* in **Section 12**.

**NOTICE**

Proper pretension of the bracket mounting bolts will benefit the life of the bolts and brackets.

10. If the adjusting wheel was not previously installed, install it now. Do not install the adjustor pin yet.

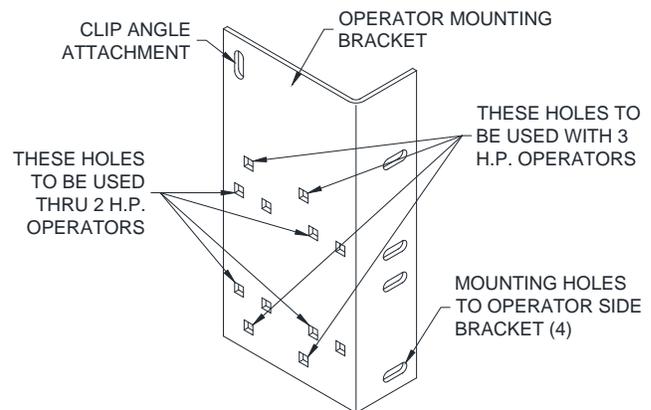
▪ **Motor Operator Installation (if required):**

1. Unpack the motor operator from the shipping box and retrieve the *Operator Mounting Bracket* and bolts provided in the kit.
2. There are several motor mounting configurations that can be formed with the supplied components. Refer to the shop drawings and components supplied with the kit in order to identify the specific style of mounting ordered for the unit. Some of the types of mounting are:
  - Vertical Bracket
  - Vertical Bracket Mounting With Tight Headroom
  - Wall Mounting
  - Horizontal Top of Coil
  - Horizontal Front of Coil
  - Horizontal Upside Down Front of Coil
  - Vertical Tube Mounting
  - Vertical Tube Top of Coil
3. Mount the operator mounting bracket to the operator using the supplied fasteners.
4. Mount the operator mounting bracket to the operator bracket according to the shop drawings using the supplied fasteners.
5. Install controls and wire the operator. Refer to the wiring diagram provided with the operator for proper connections and voltages. The controls should be installed in an area from which the door/opening is clearly visible. This will allow an individual operating the unit to make a visual inspection of the opening for any obstacles or other potential hazards before setting the door into motion.

**Note:** Do not attempt to set the upper and lower limits until the curtain is installed.

▪ **Attaching Additional Bracing (if required):**

1. Attach a clip angle to the operator mounting bracket and the bracing angle to the clip angle. Snug all bolts.
2. Mount the other supplied clip angle to the bracing angle and swing the bracing angle to the wall or structural support.
3. Align the mounting face of the clip angle with the face of the wall, mark and drill a mounting hole for the size of the supplied mounting fastener, and secure the clip angle to the wall with the fastener.
4. Square the operator-mounting bracket, adjusting the bracing angle as necessary, and fully tighten all the mounting bolts.
5. Lift the motor operator into position on the mounting bracket and align it with the appropriate hole pattern. **See figure below for operator mounting details.**
6. Insert the fasteners included in the kit from the bracket side first into the mounting foot of the operator and tighten the nuts with lock washers.



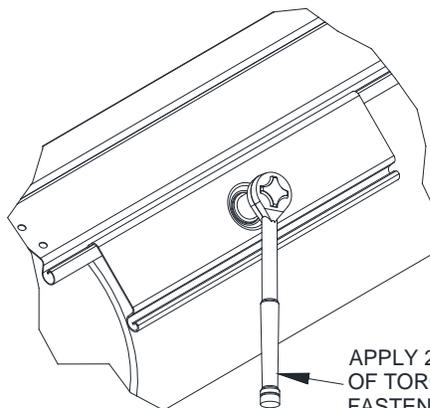
**Figure 7.1 - Additional Operator Bracing**

**Note:** All mounting bolts are supplied with nuts and lock washers.

▪ **Curtain Installation**

1. Remove the stoppers from the guides, or position them so they do not protrude into the opening.
2. Open the curtain packaging. Leave the plastic straps that keep the curtain from uncoiling in place. It may also be beneficial to leave some of the packaging under the curtain to protect the finish during installation.
3. The coil will be provided with the top of the curtain on the outside, thus leaving the fastening sections exposed. Position the coil on the floor between the guides so that the open end of the fastening sections is facing up and nearer the wall.

4. Remove the outer guides.
5. Locate the curtain attachment hardware provided with the unit. Refer to the job information to ensure you have the correct type and quantity.
6. Lift the coil until it is just below the shaft. Using appropriately rated ropes or straps, sling the coil from the shaft as shown in **Figure 8.2**. Remove the plastic strapping securing the coil at this point.
7. Uncoil the curtain enough for the fastening sections to reach the attachment points on the shaft. Fasten them by aligning the fastening section with the hole in the ring or shaft respectively, and fasten using the provided hardware (See **Figure 8.1**). If the curtain is too heavy to uncoil by hand, use the method described in the following step to get the fastening sections in position.



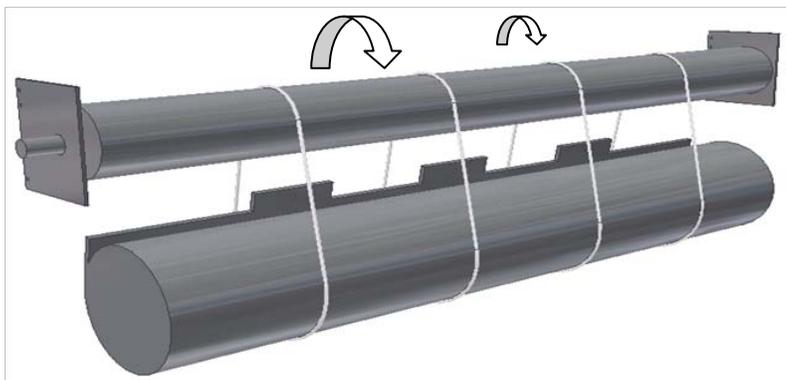
*Figure 8.1 - Installing the Fastening Section*

8. Uncoiling a slung curtain using the operator/adjusting wheel:
  - For units with operators, use the hand chain, crank or override feature of the motor to rotate the shaft in the “open” direction. Be sure not to overrun the limits of the motor. The upper motor limit may have to be adjusted to reel the entire curtain onto the shaft. Make sure the adjusting wheel is **not** pinned in place for this operation and that the shaft spins freely, so as to **not** backwind the springs.
  - For push-up units, turns can be added to the adjusting wheel in order to assist in rotating the shaft. Keeping count of the turns added to the spring at this stage will save installation time later.

9. Continue to rotate the shaft, reeling the curtain out of the sling and onto the shaft until the bottom bar reaches the bottom of the bracket.
10. Replace the outer guides.
11. Feed the bottom bar into the guides and lower the curtain until the bottom bar is below the stopper location.

12. Since there is no spring tension holding the curtain open, the curtain may fall if released. If the operator cannot be used to hold the curtain in the open position, place C-clamps or vice grips, see **Figure 8.4**, on the guides just below the bottom bar -or- rest the bottom bar on the slings used to hang the shaft in the previous steps to hold the door open.

13. Replace the stoppers.



*Figure 8.2 - Slinging the Curtain*

▪ **Applying Spring Turns (not including chain sprocket adjusters):**

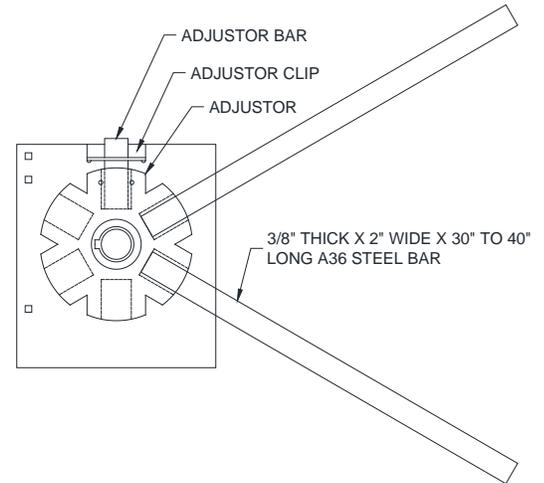
**NOTICE**

Applying more turns on the springs than is recommended will reduce spring life and can cause failure. **Do not** exceed the recommended number of turns stated on the barrel or job construction sheets.

1. Refer to the job information or markings on the shaft for the number of spring turns required on the unit.
2. To apply spring charge, remove cotter and stop pin from adjusting wheel.

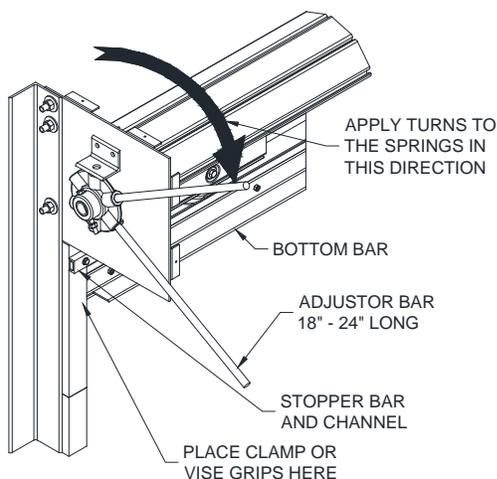
**Note:** SA0005 adjusters require the use of an adjustor bar as a stop as well as a 3/8" thick x 2" wide x 30" to 40" long A36 steel bars to apply spring torque. See **Figure 8.3**.

3. Using two 1/2" diameter (or greater depending on the adjusting wheel) steel rods, approximately 18"-24" long, apply spring torque by inserting both rods into adjustor wheel one above the other.
4. Rotate wheel in a direction of raising the curtain. Maintain applied torque with upper rod, while removing lower rod. RE-insert this rod above the other and continue applying torque one notch at a time using this hand over hand procedure until the specified number of spring turns has been applied.
5. Replace stop pin or bar into adjustor wheel as shown in **Figure 8.5** and insert the cotter pin to hold it in place.
6. The spring should now hold the door in the open position. Remove any devices applied to hold the door in the open position (clamps, slings, vice grip, etc.)
7. Check curtain for ease of operation. If the door operates correctly, skip to the next section, if not, continue to the next step.
8. Final spring tension adjustment, if necessary, should be increased or decreased with the curtain in the fully open position. Insert one [two if necessary] 1/2" diameter steel rods into adjustor wheel.
9. Remove cotter pin and stop pin from adjustor wheel and begin to increase or decrease tension.
  - To increase tension, rotate the wheel in the direction of raising the curtain.
  - To decrease tension, carefully rotate the wheel in the direction of lowering the curtain.
10. Recheck the balance in one notch increments (one notch at a time). Re-insert stop pin and cotter pin.

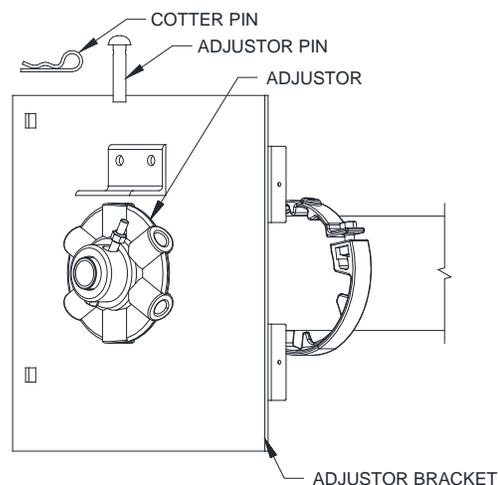


**Figure 8.3 – SA0005 Spring Adjustor**

**Note:** If you have difficulty balancing the door, or the number of turns required to balance the door varies significantly from the quantity provided, contact the **Service Department**.



**Figure 8.4 – Clamping the Guides, Applying Turns.**

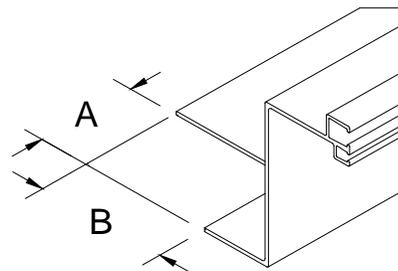


**Figure 8.5 – Pinning the Adjusting Wheel**

▪ "Z" Shaped Seal

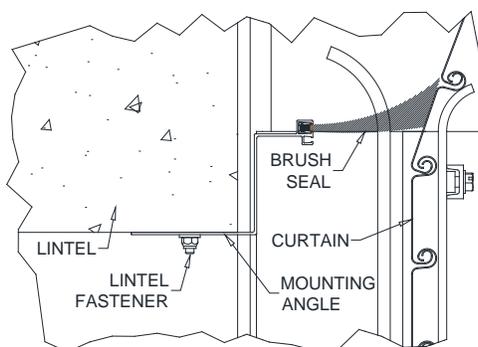
**Note:** The Lintel Seal should be installed before the hood and fascia, and after all other door components are installed and operational.

1. Clean and inspect the top of the opening where the Lintel Seal will be installed. See shop drawings for details.
2. Make the "A" & "B" cutouts to the ends of the extrusion(s) according to the dimensions on the shop sheet to allow for the guide setbacks and pack-off. (See **Figure 9.1**)



**Figure 9.1 - "Z" Shaped Lintel Seal Cutout**

3. Mark and drill the mounting holes in the extrusion. Ensure the mounting holes allow sufficient clearance for the fasteners being used to attach the lintel seal. The mounting holes should be spaced at a maximum of 24 inches apart. Position the holes equally between the front edge of the lintel and the back edge of the extrusion.
4. Place the lintel seal at the bottom of the lintel with the brush contacting the curtain (in the closed position) with the bristles pushed to about a 45-degree angle. (See **Figure 9.2**)



**Figure 9.2 - "Z" Shaped Lintel Seal**

**Note:** Check the lintel brush for proper contact on the door curtain at the edges and in the middle when the door is both open and closed (mounting extrusion will not sit flush with the corner of the lintel in most cases). On large doors, toward the center, the multi-piece Lintel Seals may have to be angled inward and trimmed on the edges to follow the bow of the door curtain when closed. (Make sure that the brush stays in contact with the door and that the door does not hit the extrusion when it is fully opened.)

5. Once you determine the correct mounting position of the lintel seal, mark the mounting hole locations on the header using the previously drilled holes in the mounting extrusion as a template.
6. Remove the lintel seal and prepare the mounting hole locations for the proper fasteners supplied with the unit.
7. Replace the lintel seal in the opening and insert the fasteners. Make any adjustments the Lintel Seal and properly orient the multi-piece lintel seal (if present) and tighten the fasteners.
8. Operate the door and ensure that the lintel seal sustains sufficient contact with the curtain (The curtain should always touch the Lintel Seal and not hit the extrusion).

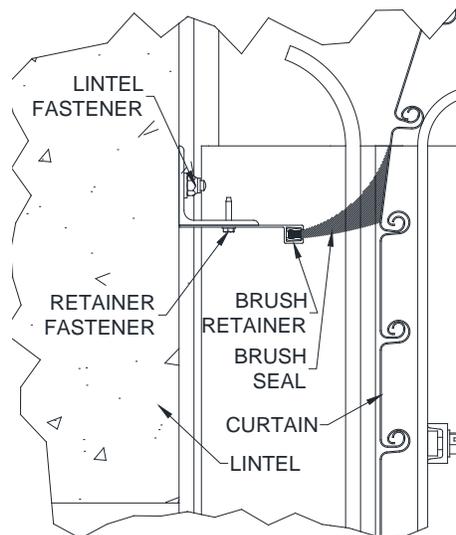
- "L" Shaped Seal

**Note:** The Lintel Seal should be installed before the hood and fascia, and after all other door components are installed and operational.

1. Clean and inspect the top of the opening where the *Lintel Seal* will be installed. See shop drawings for details.
2. Mount the angle to the lintel with the correct fasteners according to the wall construction. (Refer to the job information for the correct location of the angle from the lintel.)

**Note:** Check the lintel brush for proper contact on the door curtain at the edges and in the middle when the door is both open and closed. On large doors, toward the center, the multi-piece Lintel Seals may have to be angled inward and trimmed on the edges to follow the bow of the door curtain when closed. (Make sure that the brush stays in contact with the door and that the door does not hit the extrusion when it is fully opened)

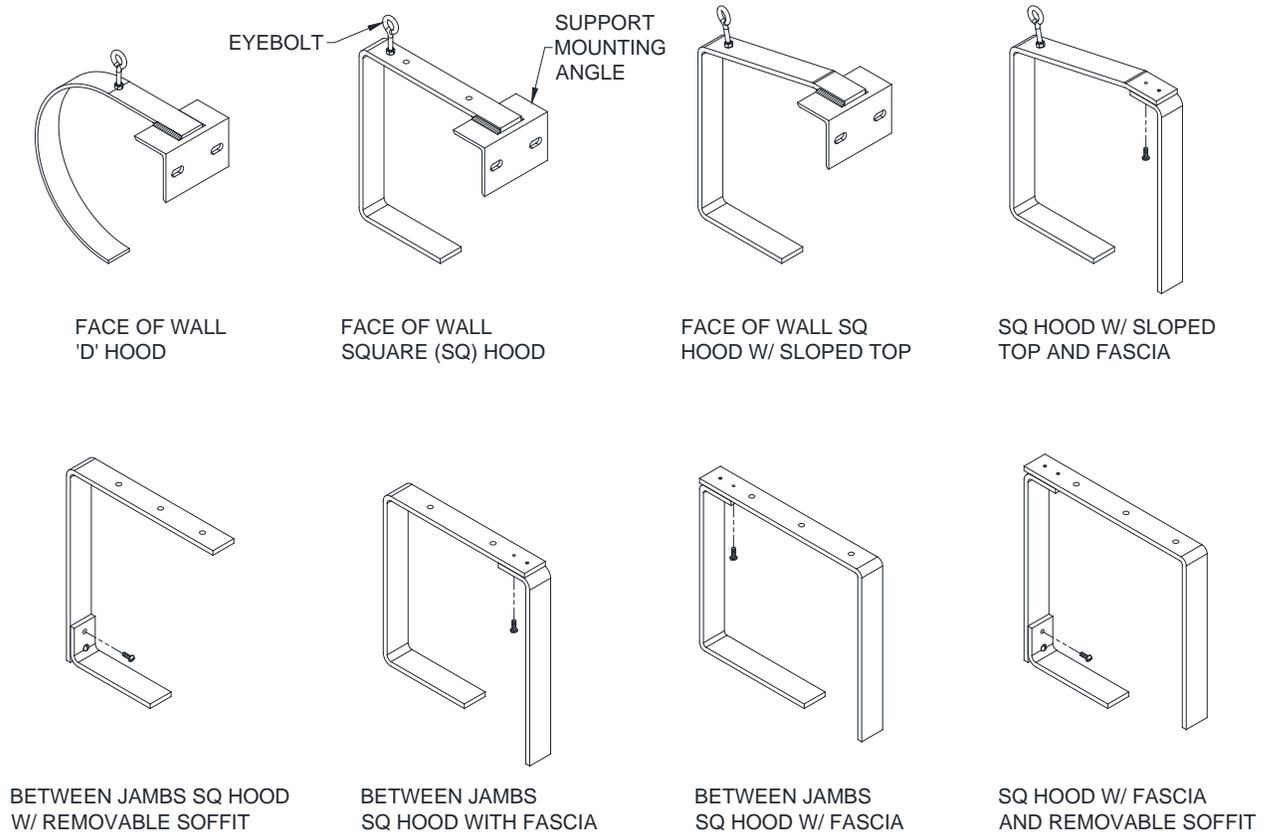
3. Place the brush extrusion in place on the mounting angle so the brush makes contact with the door in the closed position. (Brush should be at about a 45-degree angle) Mark the mounting holes locations. Before removing the lintel seal, scribe a line on the back edge of the extrusion and mounting angle. This will help ensure the lintel seal is replaced in the correct location.
4. Remove the lintel seal. Drill the required pilot/clearance holes in the mounting extrusion. The mounting holes should be spaced at a maximum of 24 inches apart. Position the holes equally between the front and the back edges of the extrusion, or as needed to line up with the mounting angle.
5. Replace the lintel seal on the angle using the scribed line as a guide. Mark the mounting holes on the angle using the previously drilled holes in the mounting extrusion as a template. Remove lintel seal and drill the required pilot/clearance holes.
6. Attach the extrusion to the mounting angle with the proper fasteners.
7. Operate the door and ensure that the lintel seal sustains sufficient contact with the curtain (The curtain should always touch the Lintel Seal and not hit the extrusion).



*Figure 9.3 - "L" Shaped Lintel Seal*

▪ **Hood Support installation:**

1. Refer to the job information to determine the type and quantity of hood supports required for your door. Hood supports will be noted on the elevation view of the job construction drawings. See **Figure 10.1** for hood support types.



**Figure 10.1 - Hood Supports**

2. Determine where the support(s) will be located between the guides.
  - a. If multiple supports are required, see the job construction drawings to determine the centerline of each.
  - b. If a single support is required, it will be located at the center of the unit.
3. Mark a line on the lintel or ceiling (for units without a lintel) at the centerline of each support.
4. Check the construction at the support locations to be sure it is strong enough to handle the weight of the hood.

**Note:** If the construction is not strong enough, do not proceed until rectified.

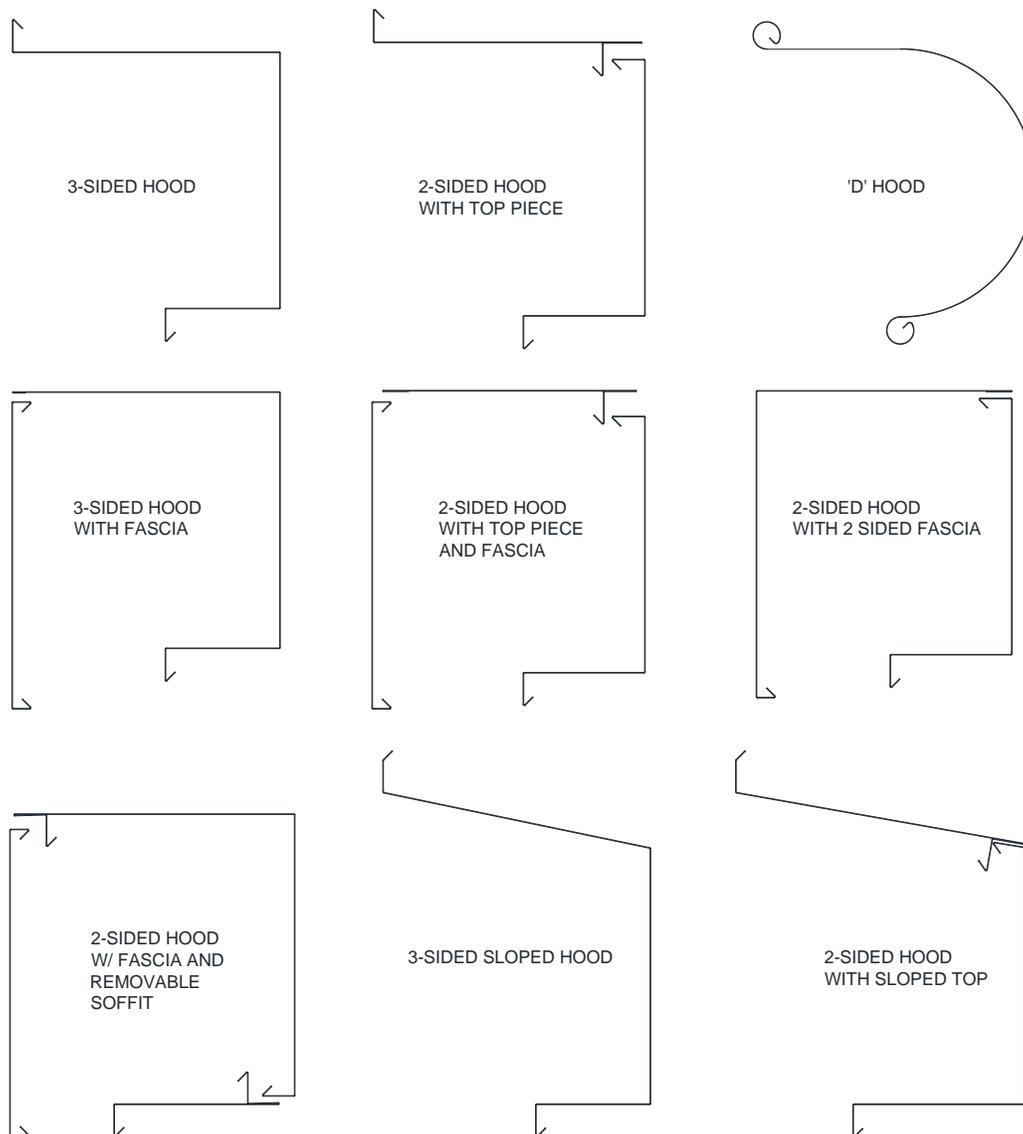
5. The term “top of the coil” refers to the top edge of the brackets and hood which house the curtain (The curtain in the fully open position is referred to as the “coiled curtain”. The top of the coiled curtain is not actually located at the “top of the coil”, it is lower than the top of the coil) Locate the “top of the coil”:
  - a. This is typically at the top of the wall angle or intermediate angle.
  - b. If there is no wall or intermediate angle, see the job construction drawings for the distance from the bottom of the unit to the top of the coil.
  - c. If there is a ceiling at the top of the coil, skip the next step.
6. Mark a line at the top of the coil at both guides of the unit. Project the lines together to make a continuous line.
  - a. This will help locate the top of the hood support which will keep the hood level.
7. If there is no lintel/header, the hood support will be located based on the fascia side of the guide.
  - a. If the unit is between jambs with 4-angle guides, a fascia mounting channel is typically provided.
  - b. If the unit is between jambs with 2-angle guides mounted to a tube, a fascia mounting channel is not provided, and the fascia is mounted to the fascia side of the tube.
8. Project a line from the fascia mounting location (fascia mounting channel or fascia side of the tube) from one guide to the other.

9. Mark a line at the support centerline along the fascia line.
10. Prepare the location of the attachment point of the support(s) prior to installing the barrel. This will make installing the support much easier when the time comes to attach it to the lintel/header or ceiling.
  - a. Hold the support in place at the determined location and mark the mounting hole locations.
  - b. Drill holes in the construction.
11. Attach the hood support to the lintel/header or ceiling to be sure the mounting holes were located properly.
12. Remove the hood support and proceed to the ***"Barrel and Brackets"*** section.
13. Once the barrel, brackets, curtain are installed, and necessary testing was done on the unit, re-install the hood support.

▪ **Hood and Fascia installation:**

1. Determine what type of hood was provided. This can be done by:
  - Looking for a 'D' hood strap or clip angles welded to the brackets.
  - Looking in the hood box and comparing to the job construction drawings.
2. If a square hood is provided, check the job construction drawings to see if it has multiple parts (such as a two sided hood with a removable soffit, two sided hood without a top piece, two sided hood with a sloped top, etc). See **Figure 11.1** for possible hood configurations.
3. Fasten the hood and fascia accordingly using the fasteners provided. Ensure hoods with multiple sections overlap correctly.
  - 'D' hoods end between the brackets.
  - Square hoods end flush with the outer edge of the brackets.
4. If there is a hood support:
  - 'D' hood sections overlap the centerline of the hood support by 1/2".
  - Square hood sections do **not** overlap at the hood support. They butt against each other and a hood splice cover is provided to cover the joint, see **Figure 11.2**.

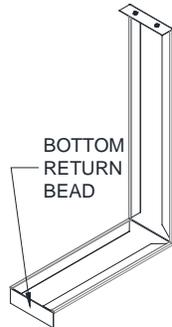
**Note:** If there is a hood support, pre-drill holes in it to ease hood attachment. A #21 drill size is recommended.



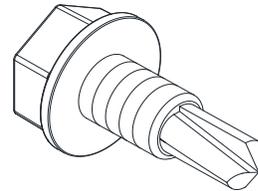
**Figure 11.1 - Hood Configurations**

**Hood Splice Cover:**

1. Hood splice covers are provided for square hoods only. Prior to installing the splice cover, operate the door a few times once you've installed the hood, to verify that the hood is not interfering with the door.
2. Install the splice cover at this time.
3. Slip the bottom return bead on the splice cover into the soffit return on the hood, and then attach the top of the splice cover with the fasteners provided.
4. If there is no return bead on the soffit of the hood, fasten the bottom of the splice cover to the soffit.



*Figure 11.2 - Hood Splice*



*Figure 11.3 – Hood and Cover Screw (#10-16 x 1/2")*

**Cover installation:**

1. Once the unit is installed and operating correctly, the covers can be installed.
2. Hood screws may have to be removed and reinstalled to install covers properly.
3. If the cover mounts to the side of the door bracket, pre-drill holes in the bracket to ease installation. A #21 drill size is recommended.
4. If an operator or adjuster cover is provided, individual installation instructions are provided with each cover along with the necessary hardware to attach the cover.
5. Once the cover is installed, operate the door a few more times to be sure there is no interference between the moving components inside the cover and the cover itself.
6. If the door is mounted on the exterior of the building, a bead of silicone sealant should be applied around the entire perimeter of the cover, as it will provide additional protection to the door components.

### Torque Specifications

Bolt size/type	Torque (ft lbs) <sup>a</sup>
1/4-20 Grade 2 steel bolt	6
5/16-18 Black Oxide Socket Cap	25
3/8-16 18-8 stainless steel bolt	20
3/8-16 Grade 2 steel bolt	20
3/8-16 Grade 5 steel bolt	31
1/2-13 Grade 5 steel bolt	75
1/2-13 Grade 8 steel bolt	107
5/8-11 Grade 8 steel bolt	212
3/4-10 Grade 8 steel bolt	376

<sup>a</sup> The recommended torque for steel bolts is based on a plated bolt that has not been lubricated.

*Table 12.1 – Torque Recommendations for Guide Assembly and Wall Fasteners*

Anchor Size (nominal)	Manufacturer/Torque (ft lbs) <sup>a</sup>	
	Simpson Wedge-All	Hilti-Kwik Bolt 3
3/8	30	20
1/2	60	40
5/8	90	85
3/4	150	150

<sup>a</sup> Torque values for grout filled block are different, reference bolt manufacturer for these values.

*Table 12.2 - Torque Recommendations for Solid Masonry Wall Anchors*

### Maintenance Schedule

▪ **Maintenance Schedule:**

**Note:** If any of the following problems exist, **do not** operate the door until repaired.

Component	What to look for and how often the components must be inspected:	Weekly	Monthly	Quarterly	What to do if problem exists:
Curtain & Bottom Bar	Are any curtain components damaged (slats, endlocks, etc.)?	X			Contact Service about replacing damaged parts.
	Is bottom bar damaged?	X			Contact Service about replacing damaged parts.
	Are bottom bar fasteners in place and properly tightened?		X		Fasteners must be inspected/replaced and properly tightened.
	Are fasteners attaching curtain to the barrel in place and properly tightened?		X		Fasteners must be inspected/replaced and properly tightened.
	Do you notice any hang-ups, jamming or other problems preventing the door from moving smoothly throughout the opening?	X			Check for external issues, if none exist, contact Service.
	Do you notice any odd or excessive noise when the door is operated?	X			Check for external issues, if none exist, contact Service.
	If there is a bottom seal, is it damaged?		X		Contact Service about replacing damaged parts.
	If there is locking, does it function properly?	X			Check for external issues, if none exist, contact Service.
Brackets	Are brackets plumb and perpendicular with wall?			X	Contact Service.
	Are bracket fasteners in place and properly tightened?			X	Fasteners must be inspected/replaced and properly tightened.
	Do you notice signs of excessive wear on the bearings (i.e. binding, excessive noise, etc.)?		X		If there is a grease fitting, apply grease, if not, contact Service.
	Is adjusting wheel & pin secure?			X	Contact Service.
	Is drive chain sufficiently lubricated?			X	Apply chain lube.
	Is drive chain in need of tightening?			X	Contact Service for instructions on how to tension the chain.
	Is drive or driven sprocket damaged?		X		Contact Service about replacing damaged parts.
Guides	Are wall fasteners in place and properly tightened?		X		Fasteners must be inspected/replaced and properly tightened.
	Are guide assembly fasteners in place and properly tightened?		X		Fasteners must be inspected/replaced and properly tightened.
	Is guide gap dimension correct?		X		Check job construction drawings and adjust gap as required. If job construction drawings are not available, contact Service.
	Are any of the guide parts bent or damaged?		X		Contact Service.
	Are stoppers loose, damaged, or missing?		X		Stoppers must be inspected/replaced and properly tightened.
Hood and Fascia	Is hood/fascia dented or damaged?			X	Remove hood/fascia. Repair if possible. If not leave hood/fascia off and contact Service.
	Is curtain rubbing against the hood/fascia?	X			Hood/fascia may have been damaged. Contact Service.
	Is hood/fascia level?			X	Check fasteners, they may be loose or missing. Replace as soon as possible.
	Are guide assembly fasteners in place and properly tightened?		X		Fasteners must be inspected/replaced and properly tightened.
	Is hood support level?			X	Check fasteners, they may be loose or missing. Replace as soon as possible.

Door operation	Does the door require excessive force to open?		X		Check for hang-ups or obstructions. Ensure spring tension is set correctly. Contact Service.
	If the door contains locking, does the locking mechanism function properly and securely hold the door in the closed position?		X		Check for damage and other external issues. Contact Service.
	If there is a sensing edge, does it function properly?	X			Cut power and check for loose wires. Contact Service for further instruction.
Motor Operator	Are the fasteners attaching the motor-to-the mounting bracket, and mounting bracket-to-the door bracket secure?			X	Fasteners must be inspected/replaced and properly tightened. Contact Service for replacement hardware.
	Are the sprockets properly aligned?			X	Realign the sprockets as secure using the set screws. Recheck chain tension.
	Are the sprocket keys properly aligned with sprockets and securely fastened with the set screws?			X	Reposition the keys so they fully engage the keyway in the sprocket. Tighten the set screws.
	Is the door stopping correctly at the open (before bottom bar contacts the stoppers) and closed (as soon as the bottom bar contacts the floor) positions?		X		Limits may have to be adjusted in the motor operator. Refer to the operator owner's manual or contact Service.
	Is the operator functioning normally?		X		Refer to the <i>Operator Troubleshooting Table</i> on the following page to diagnose the problem.

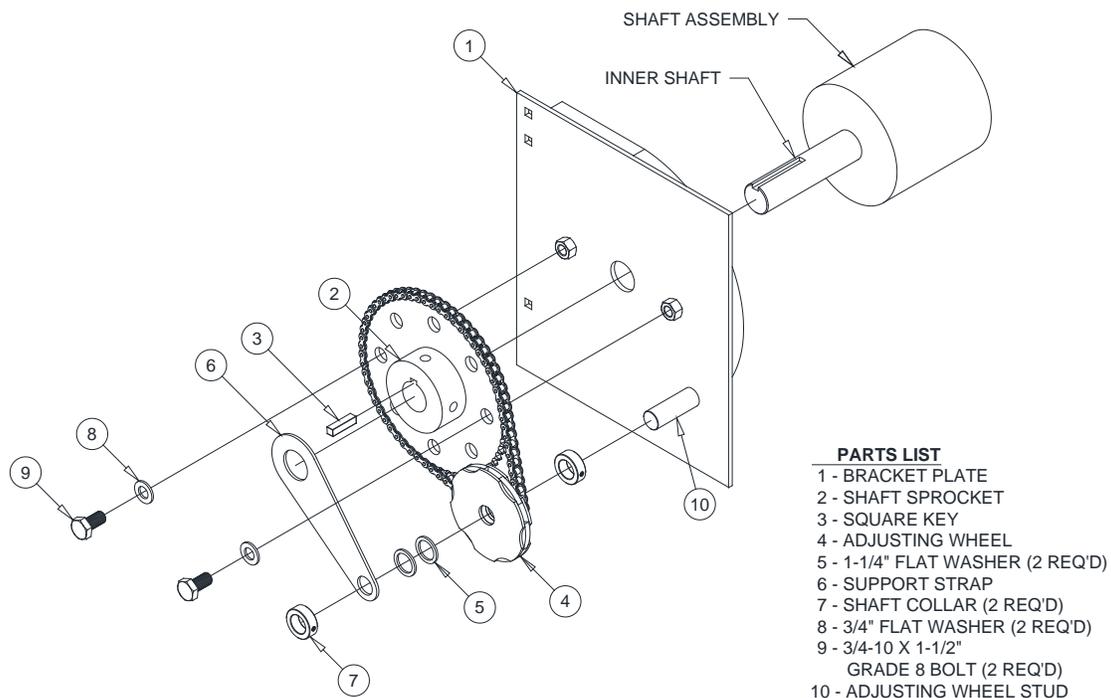
▪ **Operator Troubleshooting:**

**Note:** If you suspect you are having an issue with your operator, use the following table to determine the potential causes. If the provided solution does not eliminate the issue, or the table does not address your particular problem, contact the Service Department.

Component	Problem	Potential Cause	Solution
Motor Operator	Motor Operator does not run when OPEN or CLOSE button is pushed	The circuit breaker may be flipped or fuse blown.	Reset breaker or replace fuse. Contact Service if replacement fuse is needed.
		The thermal overload may be tripped.	Reset thermal overload.
		Manual interlock switch is open (on units with emergency operator).	Close manual interlocks.
		External interlock may be opened.	Close external interlock.
	Motor operator runs but the door does not move	Sprocket key may be missing or drive chain may be broken.	Contact Service for repair parts. Install key or replace chain.
		Clutch may be slipping.	Adjust if possible. Contact Service otherwise.
	Motor hums but does not run	Door or drive chain may be jamming.	Check for hang-ups or obstructions. Try to operate manually. If issue persists, contact Service.
		Dead phase in 3 phase system.	Check power supply.
		Brake does not release.	Check power to brake solenoid.
		Open motor winding.	Check that all connections are secure.
	Motor operator runs in wrong direction and limits do not function	3 phase operator power supply is out of phase.	Interchange any 2 power leads to unit.
	Door drifts when motor shuts off	Brake may be improperly adjusted or broken.	Check brake components. Contact Service for replacement parts or adjust instructions.
	Motor operator does not shut off at full OPEN or at full CLOSE position	Limits may need adjustment.	Refer to the operator owner's manual to readjust limits.
		Sprocket on limit shaft may be slipping or limit drive chain may be broken.	Ensure sprocket key is correctly installed and set screws are tightened. Contact Service for replacement chain if broken.
Limit switch may be defective.		Contact Service.	
Limit Switches	Limit switch does not hold setting	Drive chain may be too loose, allowing the chain to jump sprocket teeth.	Adjust chain to proper tension. Contact Service for additional information.
		Limit nut retainer not engaging slots in limit nuts.	Be sure retainer is securely engaged in slots of both limit nuts.
		Limit nuts binding on screw threads, allowing them to jump position on retainer.	Lube screw thread. Check that limit nuts turn freely.

▪ **Chain Sprocket Adjustor:**

1. Loosen the shaft collar set screws. Remove the shaft collar and support strap from the adjusting wheel stud.
2. Place the bracket plate onto the inner shaft.
3. After the shaft sprocket is on the inner shaft, remove the 3/4"-10 x 1-1/2" bolts.
4. Install the square key into the shaft sprocket and inner shaft key seat.
5. Align the shaft sprocket with the sprocket on the adjusting wheel.
6. Tighten the set screws on the shaft sprocket to secure it to the inner shaft.
7. Place the support strap onto the adjusting wheel stud and over the inner shaft. Be sure that the washers are between the support strap and the adjusting wheel.
8. Replace the shaft collar on the adjusting wheel stud and tighten the set screws. When replacing shaft collar, allow clearance (.030") so that the adjusting wheel can rotate freely.



*Figure 14.1 – Chain Sprocket Adjustor Assembly*

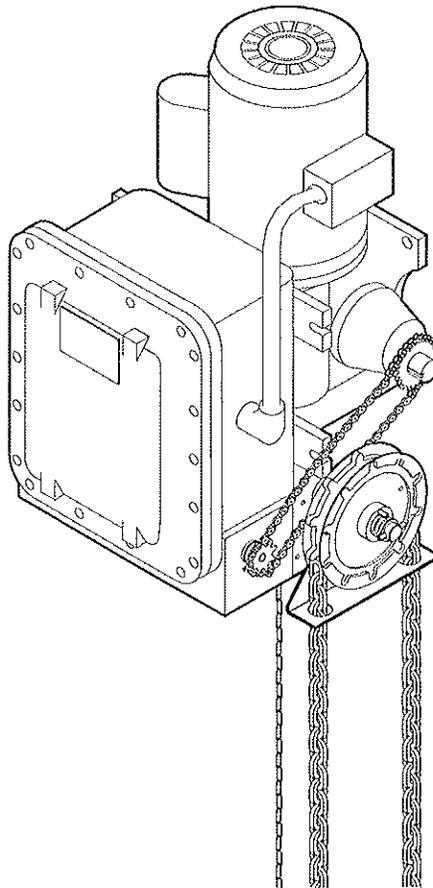
**⚠ WARNING**

Apply tension with door in the fully open position only. Do not operate door from the fully open position without first installing both 3/4"-10 x 1-1/2" grade 8 bolts. Roller chain is not intended to hold extreme loads and could break causing property damage and serious injury or death.

9. To apply spring turns, be sure the 3/4"-10 x 1-1/2" grade 8 bolts are removed from the shaft sprocket.
10. Use a 1-1/8" high x 3/8" thick x 40" long ASTM A36 minimum bar to apply spring torque. See the job construction drawing (elevation view) for the number of initial spring turns to apply to the small adjusting wheel and the direction of rotation.
11. After the correct quantity of spring turns has been applied, use the 3/4"-10 x 1-1/2" Grade 8 bolts to fasten the shaft sprocket to the bracket plate. Torque bolts to 365 - 375 ft-lbs.

## OWNER'S MANUAL

# HAZARDOUS (NEMA 7/9) INDUSTRIAL DUTY COMMERCIAL DOOR OPERATOR



**2 YEAR WARRANTY**

Serial # Box \_\_\_\_\_

Installation Date \_\_\_\_\_

Wiring Type \_\_\_\_\_

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### **WARNING**

**Mechanical**

### **WARNING**

**Electrical**

### **CAUTION**

When you see these Safety Symbols and Signal Words on the following pages, they will alert you to the possibility of **serious injury** or **death** if you do not comply with the warnings that accompany them. The hazard may come from something mechanical or from electric shock. Read the warnings carefully.

When you see this Signal Word on the following pages, it will alert you to the possibility of damage to your door and/or the door operator if you do not comply with the cautionary statements that accompany it. Read them carefully.

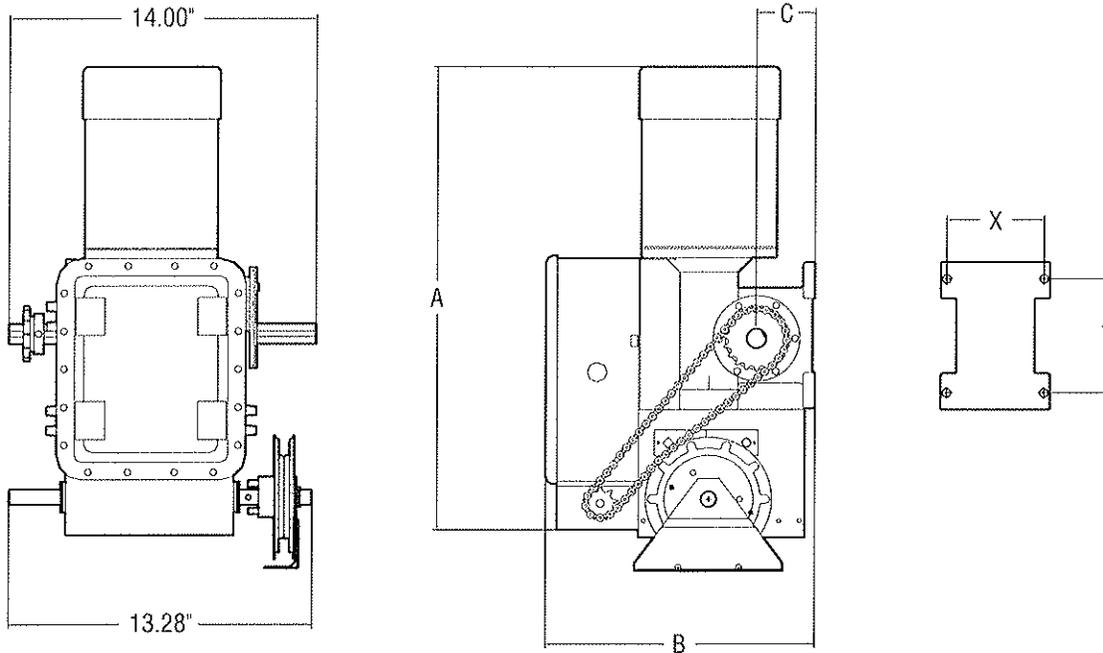
#### **IMPORTANT NOTES:**

- *BEFORE attempting to install, operate or maintain the operator, you must read and fully understand this manual and follow all safety instructions.*
- *DO NOT attempt repair or service of your commercial door and gate operator unless you are an Authorized Service Technician.*

# OPERATOR DIMENSIONS

## WEIGHTS AND DIMENSIONS

HANGING WEIGHT: 207 LBS.



### NOTES:

1. Output Shaft with 1" x 1/4" Key
2. Mounting Centers:  $x = 4\text{-}3/4"$ ;  $y = 5\text{-}1/2"$
3. Hand Chain Wheel extends 1-5/8" beyond operator in vertical mounting position as shown.

HP	PHASE	DIMENSIONS		
		A	B	C
1/2	1	25-3/4	12-63/64	3
3/4	1	26-3/4	12-63/64	3
1	1	27	12-63/64	3
1-1/2	1	27	13-63/64	3-1/2
1/2	3	25-1/4	12-63/64	3
3/4	3	25-1/4	12-63/64	3
1	3	26-1/4	12-63/64	3
1-1/2	3	26-3/4	13-63/64	3-1/2
2	3	27	13-63/64	3-1/2

# OPERATOR SPECIFICATIONS

## MOTOR

TYPE: ..... Continuous Duty  
HORSEPOWER: ..... 1/2, 3/4, 1 and 1-1/2 HP  
Single or Three Phase  
2 HP Three Phase  
SPEED: ..... 1725 RPM  
VOLTAGE: ..... 115/220/230V 1 Phase  
230/460V 3 Phase  
CURRENT: ..... See Motor Nameplate

## ELECTRICAL

TRANSFORMER: ..... 24Vac  
CONTROL STATION: ..... NEMA 1-Button Station  
Open/Close/Stop  
WIRING TYPES: ..... B2 (Standard)  
Momentary contact to OPEN/CLOSE/STOP plus wiring for  
sensing device to reverse and auxiliary devices to open and  
close with open override.  
LIMIT ADJUST: ..... Linear driven, fully adjustable screw  
type cams. Adjustable to 30°.

## MECHANICAL

DRIVE REDUCTION: ..... 45:1 Reduction  
Heavy duty bronze worm gear reducer  
OUTPUT SHAFT SPEED: ..... 43 RPM  
DOOR SPEED: ..... 4 - 10" per second depending on door  
BRAKE: ..... Dynamic Brake  
HOIST WHEEL: ..... Standard mounting on left or right side

## SAFETY

DISCONNECT: ... Floor level chain hoist with electrical interlock  
for emergency manual door operation.  
REVERSING EDGE (Optional): ..... Electric or pneumatic sensing  
device attached to the bottom edge of door.  
**A reversing edge is strongly recommended for ALL  
commercial operator installations. REQUIRED when the  
3-button control station is out of sight of door or ANY other  
control (automatic or manual) is used.**

# PREPARATION

It is imperative that the wall or mounting surface provide adequate support for the operator.

This surface must:

- Be rigid to prevent play between operator and door shaft.
- Provide a level base.
- Permit the operator to be fastened securely and with the drive shaft parallel to the door shaft.

The safety and wear of the operator will be adversely affected if any of the above requirements are not met. For metal buildings, fasten 2" x 2" x 3/16" (or larger) angle iron frames to the building purlins. Retain 5-1/2" (13.97 cm) between frames.

The N9GH operator may be mounted on either the right (standard) or left side of door, and in either a vertical (standard) or horizontal mounting position. Refer to the steps below if you require the hand chain and/or disconnect chain to be on the opposite side of the operator; or if the operator is being mounted in a horizontal position.

## HAND CHAIN RIGHT/LEFT CONVERSION

Remove the two snap rings (1 piece outer, 1 piece inner) on hand chain shaft assembly. Position roll-pin to fit through cutout in frame and slide complete shaft assembly through housing and bevel gear. Insert shaft assembly on opposite side of housing, and replace bevel gear, bearing, hardware, and snap rings on the opposite side of shaft in the same manner.

## DISCONNECT LEVER RIGHT/LEFT CONVERSION

Remove cotter pins on the ends of the disconnect shaft (square shaft), move the disconnect lever arm to the opposite side, and replace the cotter pins. Be sure to keep two (2) 12 gauge washers on the side without the lever arm.

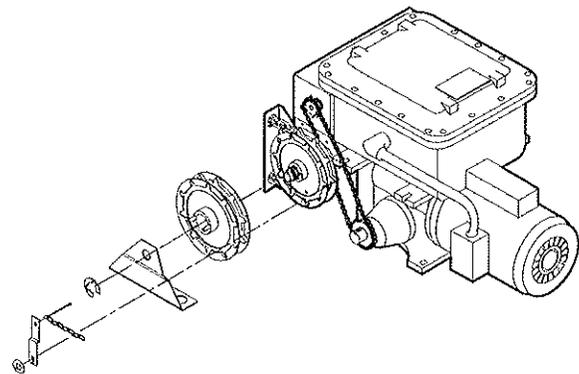
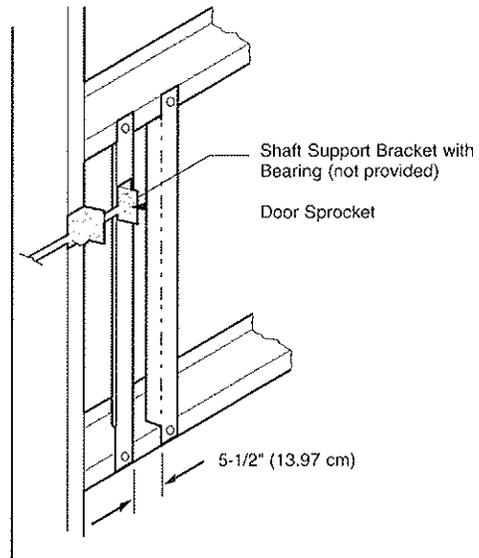
## HORIZONTAL MOUNTING CONVERSION

Remove cotter pins on the ends of the disconnect shaft (square shaft), and remove lever. Replace lever using square hole on opposite end of lever. Reposition sash chain to opposite end of lever also. Replace cotterpins.

## **WARNING**

To prevent possible **SERIOUS INJURY** or **DEATH**:

- **DO NOT** connect electric power until instructed to do so.
- If the door lock needs to remain functional, install an interlock switch.
- **ALWAYS** call a trained professional door serviceman if door binds, sticks or is out of balance. An unbalanced door may not reverse when required.
- **NEVER** try to loosen, move or adjust doors, door springs, cables, pulleys, brackets or their hardware, **ALL** of which are under **EXTREME** tension and can cause **SERIOUS** personal **INJURY**.
- Disable **ALL** locks and remove **ALL** ropes connected to door **BEFORE** installing and operating door operator to avoid entanglement.



# INSTALLATION

**IMPORTANT NOTE:** Before your operator is installed, be sure the door has been properly aligned and is working smoothly. The operator may be wall mounted or mounted on a bracket or shelf. If necessary, refer to the preparation on page 5. Refer to the illustrations and instructions below that suit your application.

## MOUNT THE OPERATOR

1. **Wall Mount:** The operator should generally be installed below the door shaft, and as close to the door as possible (Figure 1).

**Bracket Shelf Mounting:** The operator may be mounted either above or below the door shaft (Figure 2).

**IMPORTANT:** The shelf or bracket must provide adequate support, prevent play between operator and door shaft, and permit operator to be fastened securely and with the drive shaft parallel to the door shaft.

**NOTE:** The optimum distance between the door shaft and operator drive shaft is between 12-15" (30.48-38.1 cm).

2. Place door sprocket on the door shaft. Do not insert the key at this time.
3. Place drive sprocket on the appropriate side of the operator. Do not insert the key at this time.
4. Wrap drive chain around door sprocket and join roller chain ends together with master link.
5. Raise operator to approximate mounting position and position chain over operator sprocket.
6. Raise or lower operator until the chain is taut (not tight). Make sure the operator output shaft is parallel to door shaft and sprockets are aligned. When in position, secure the operator to wall or mounting bracket.
7. Align sprockets and secure (Figure 3).

### 8. Install Hand Chain

Place hand chain around hand chain wheel. Be sure to pass it through both openings in the chain guide. Remove enough links so chain hangs approximately 2' (.61 m) above the floor.

### 9. Mount Chain Keeper/Keyhole Bracket

Using suitable hardware mount the chain keeper approximately 4' (1.22 m) above the floor, near the free hanging chain.

Remove disconnect sash chain from bag and place the end through the keyhole in the the chain keeper. Remove excess links if necessary.

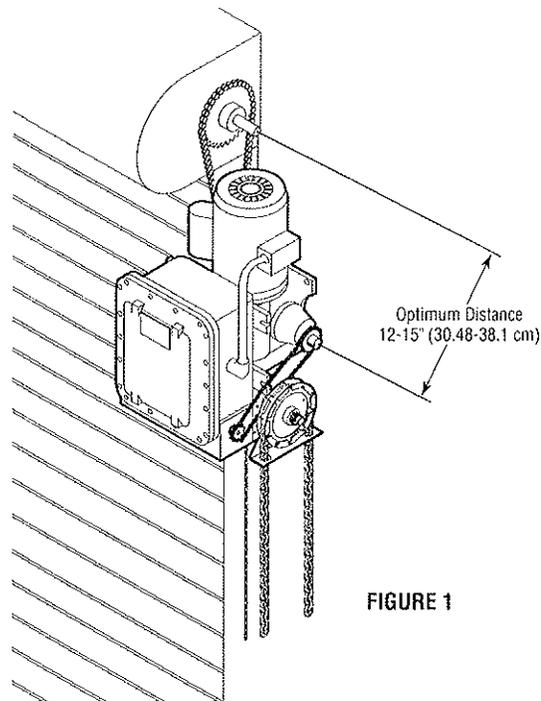


FIGURE 1

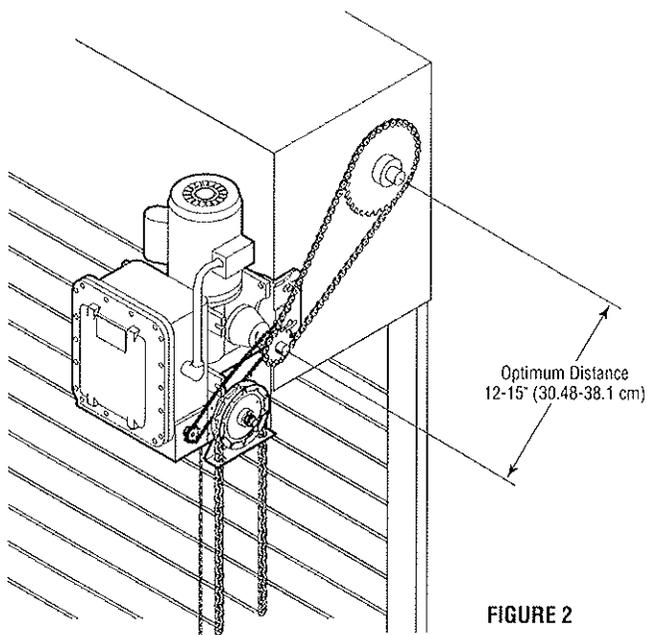


FIGURE 2

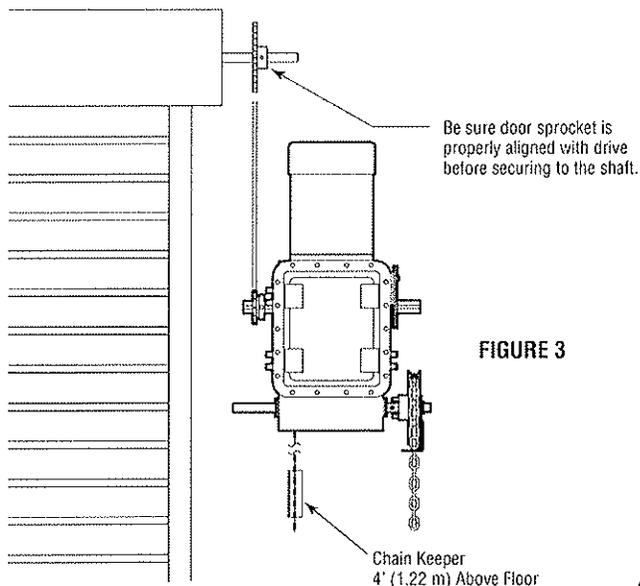


FIGURE 3

# INSTALLATION

## ENTRAPMENT PROTECTION ACCESSORIES (OPTIONAL)

### PHOTO EYES & SENSING EDGES

Sensing devices provided for door industry type operators with an isolated normally open (N.O.) dry contact output are compatible with your operator. This includes pneumatic and electric edges, and through beam and retro reflective photo eyes. If you would like to order or receive more information on safety devices, please contact your local Authorized Dealer.

If not pre-installed by the door manufacturer, mount the sensing edge on the door according to the instructions provided with the edge. The sensing edge may be electrically connected by either coiled cord or take-up reel.

#### **Important Notes:**

- a. *Proceed with limit switch adjustments described on page 8 before making any sensing edge wiring connections to operator.*
- b. *Electrician must hardwire the junction box to the operator electrical box in accordance with local codes.*

### WIRING

For wiring of your sensing device to the operator, refer to the wiring diagram provided with your operator. See field connection terminals identified as Sensing Device or Safety Edge.

### TAKE-UP REEL

Take-up reel should be installed 12" (30.48 cm) above the top of the door.

### COIL CORD

Connect operator end of coil cord to junction box (not provided) fastened to the wall approximately halfway up the door opening.

## **WARNING**

To prevent possible SEVERE INJURY or DEATH, install reversing sensors when:

- The radio is used.
- The 3-button control station is out of sight of the door.
- Or ANY other control (automatic or manual) is used.

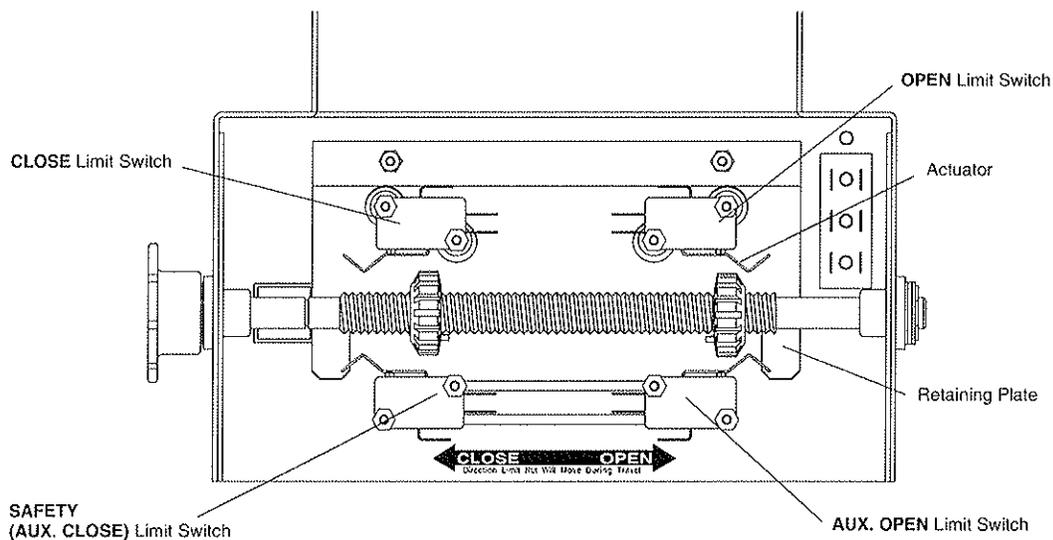
Reversing devices are recommended for ALL installations.

# ADJUSTMENT

## LIMIT SWITCH ADJUSTMENT

**NOTE:** Make sure the limit nuts are positioned between the limit switches before proceeding with adjustments.

1. Depress retaining plate to allow nut to spin freely. After adjustment, release plate and move nut back and forth to ensure it is fully seated in slot.
2. To **increase** door travel, spin nut **away** from limit switch. To **decrease** door travel, spin limit nut **toward** limit switch.
3. Adjust open limit nut so that door will stop in open position with the bottom of the door even with top of door opening.
4. Repeat steps 1 and 2 for close cycle. Adjust close limit nut so that the limit switch is engaged as door fully seats at the floor.



## ⚠️ WARNING

To avoid **SERIOUS** personal **INJURY** or **DEATH** from electrocution, disconnect electric power **BEFORE** manually moving limit nuts.

## CONNECTING THE REVERSING EDGE DEVICE

### 2 WIRE

The operator has been pre-wired to accept connection of a reversing edge device. A cut-off switch will de-activate the safety device during the last few inches of the door's downward travel. Refer to the wiring diagram provided with the operator for connections.

### 4 WIRE

The standard operator is capable of being reconfigured for failsafe safety edges. This requires a 4 wire connection. Refer to field wiring section of schematics on pages 12-15 for connection points and jumper removal.

## ⚠️ WARNING

If the control station cannot be installed where door is visible, or if any device other than the control station is used to activate the door, A **REVERSING EDGE MUST BE INSTALLED ON THE BOTTOM OF THE DOOR**. Failure to install a reversing edge under these circumstances may result in **SERIOUS PERSONAL INJURY** or **DEATH** to persons trapped beneath the door.

**NOTICE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

# ADJUSTMENT

## MANUAL OPERATION

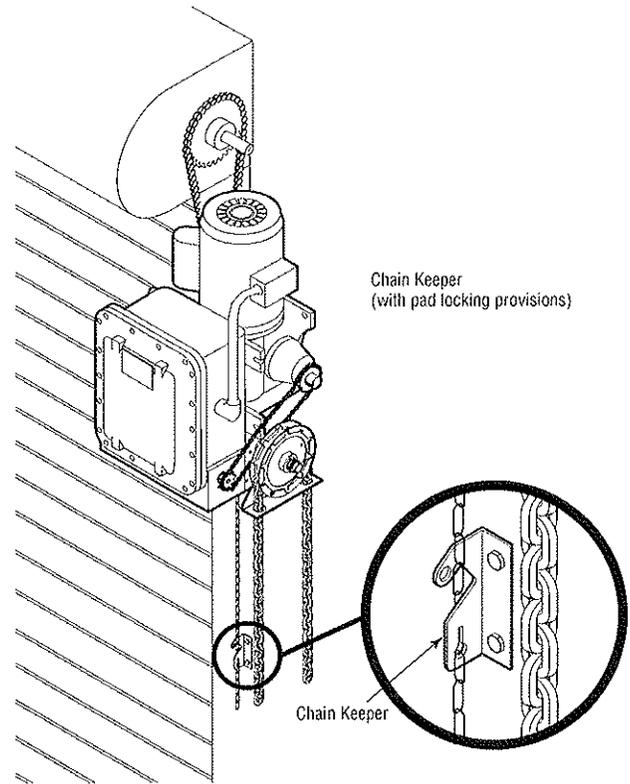
This operator has provisions for manually operating the door in case of emergency or power failure. This model operator is equipped with a manual hoist. An electrical interlock will disable the electrical controls when the hoist is used.

To operate the hoist:

1. Pull the disconnect chain (small chain) to engage the hoist mechanism. The disconnect chain may be locked in position by slipping the end through the keyhole of the chain keeper mounted on the wall.
2. Operate the door in the desired direction by pulling on one side or the other of the continuous loop hoist chain (large chain).
3. The disconnect chain must be released from the chain keeper before the door will operate again electrically.

## **⚠** WARNING

To prevent possible **SERIOUS INJURY** from a moving chain, **ENGAGE** interlock **BEFORE** manually operating your door.



# POWER WIRING & GROUND WIRING

## WARNING

To reduce the risk of SEVERE INJURY or DEATH:

- ANY maintenance to the operator or in the area near the operator MUST NOT be performed until disconnecting the electrical power and locking-out the power via the operator power switch. Upon completion of maintenance the area MUST be cleared and secured, at that time the unit may be returned to service.
- Disconnect power at the fuse box BEFORE proceeding. Operator MUST be properly grounded and connected in accordance with local electrical codes. The operator should be on a separate fused line of adequate capacity.

- ALL electrical connections MUST be made by a qualified individual.
- DO NOT install ANY wiring or attempt to run the operator without consulting the wiring diagram. We recommend that you install an optional reversing edge BEFORE proceeding with the control station installation.
- ALL power wiring should be on a dedicated circuit and well protected. The location of the power disconnect should be visible and clearly labeled.
- ALL power and control wiring MUST be run in separate conduit.

## POWER WIRING CONNECTIONS

Remove the cover from the electrical enclosure. Inside this enclosure you will find the wiring diagram(s) for your unit. Refer to the diagram (on the inside of the cover in packing list envelope) for all connections described below. If this diagram is missing, call the number on the back of this manual. DO NOT INSTALL ANY WIRING OR ATTEMPT TO RUN THIS OPERATOR WITHOUT CONSULTING THE WIRING DIAGRAM.

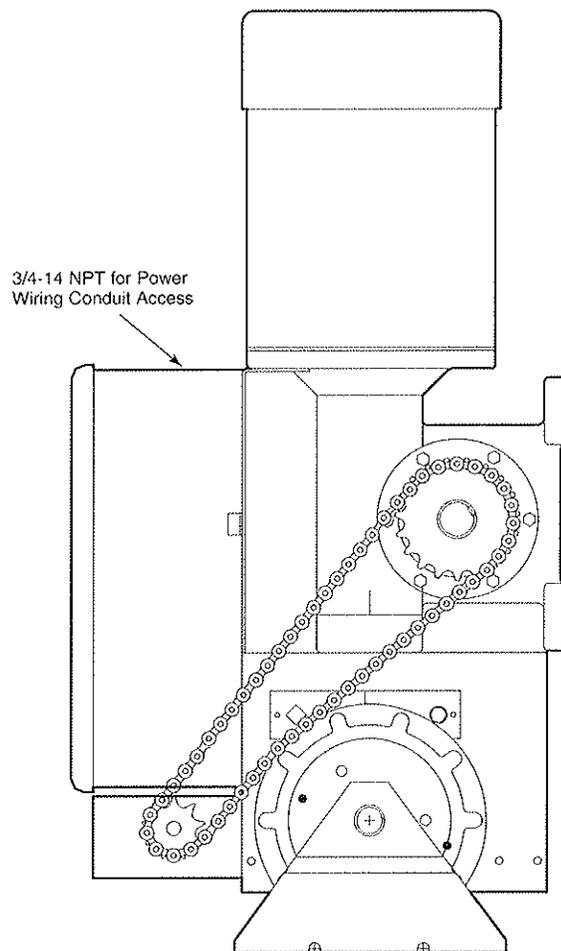
1. Be sure that the power supply is of the correct voltage, phase, frequency, and amperage to supply the operator. Refer to the operator nameplate on the cover.
2. Using the 3/4-14 NPT conduit access as shown below, bring supply lines to the operator and connect wires to the terminals indicated on the WIRING CONNECTIONS DIAGRAM.

**NOTE:** Do not turn power on until you have finished making all power and control wiring connections and have completed the limit switch adjustment procedure.

## GROUND WIRING CONNECTIONS

1. Connect earth ground to the chassis ground screw in the electrical box enclosure.
2. Use same conduit entry into the electrical box as the power wiring.

**IMPORTANT NOTE:** This unit must be properly grounded. Failure to properly ground this unit could result in electric shock and serious injury.



# CONTROL STATION WIRING AND INSTALLATION

**IMPORTANT NOTE:** If your wiring diagram is missing or you are unsure of the wiring type for your operator, contact the customer service department at 1-800-528-2806.

## LOCATING THE CONTROL STATION

All operators are provided with some type of control station. Generally a 3-button station (OPEN/CLOSE/STOP) is provided. A two-position key switch or control station (OPEN/CLOSE) may be added or substituted when requested at the time of order. Mount the control station near the door.

## ADDITIONAL ACCESS CONTROL EQUIPMENT

Locate any additional access control equipment as desired (but so that the door will be in clear sight of the person operating the equipment), and connect to the terminal block in the electrical enclosure as shown on the FIELD WIRING CONNECTIONS diagram. Any control with a normally (N.O.) isolated output contact may be connected in parallel with the OPEN button. More than one device may be connected in this manner. Use 16 gauge wire or larger for all controls.

## EXTERNAL INTERLOCK SWITCH

The operator has a terminal connection for an external interlock switch. This switch must be a normally closed (N.C.) two-wire device with a contact rating of at least 3 amps @ 24Vac. When such a switch is connected as shown on the FIELD WIRING CONNECTIONS diagram, the control circuit will be disabled when the switch is actuated, thereby preventing electrical operation of the door from the control devices.

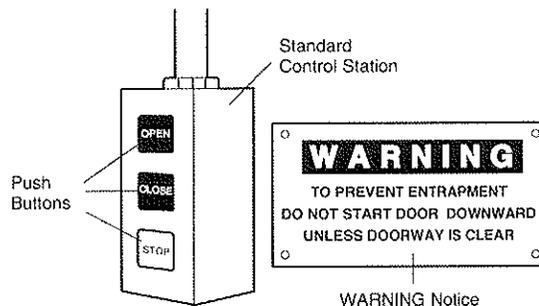
## MOUNTING INSTRUCTIONS

1. Mount WARNING NOTICE beside or below the control station.
2. Mount MAINTENANCE ALERT label to either side of control station.
3. Mount control station(s) within line of sight of door(s).

## WARNING

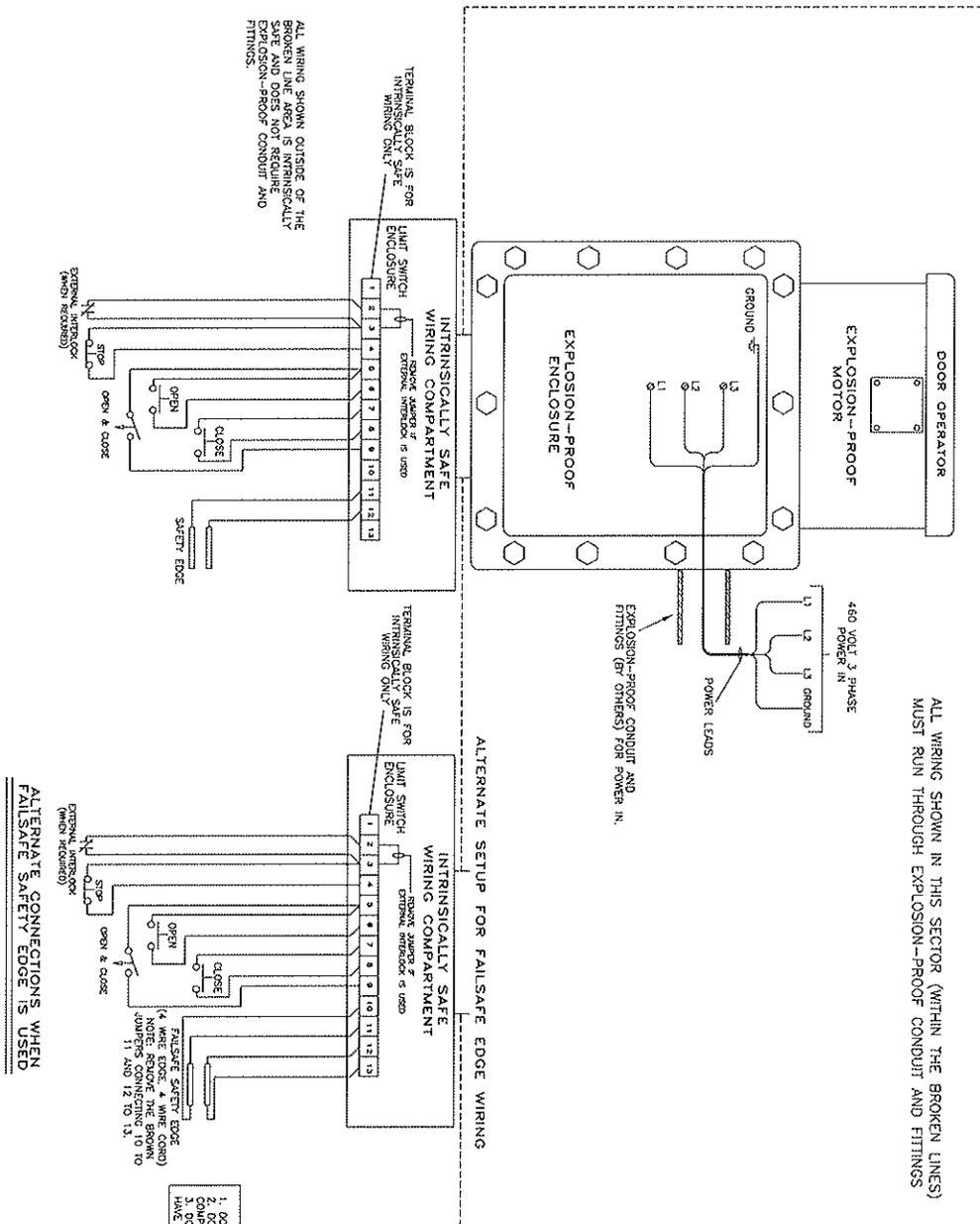
To prevent possible SEVERE INJURY or DEATH, install reversing sensors when:

- The radio is used.
  - The 3-button control station is out of sight of the door.
  - Or ANY other control (automatic or manual) is used.
- Reversing devices are recommended for ALL installations.





# 460V 3 PHASE SCHEMATIC/FIELD WIRING DIAGRAM



## FIELD WIRING

- NOTES:
1. BRING POWER WIRES INTO THE EXPLOSION-PROOF ENCLOSURE THROUGH CONDUIT AND FITTINGS AND CONNECT TO TERMINALS LABELED L1, L2, L3 AND THE GROUND SCREW AS SHOWN.
  2. WIRE CONTROL DEVICES TO THE TERMINAL BLOCKS IN OPERATION WITH SWITCH ENCLOSURE AS SHOWN.
  3. USE 16 GA. OR HEAVIER WIRE FOR ALL CONTROL WIRING.
  4. THIS EQUIPMENT, WHEN WIRED AS SHOWN, MEETS STANDARDS FOR CLASS I AND II, DIVISION 1 AND II, GROUPS D, E, AND G.

**WARNING**

1. DO NOT RUN INTRINSICALLY-SAFE WIRING IN CONDUIT WITH ANY OTHER WIRING. INTRINSICALLY-SAFE WIRING MUST BE SEPARATELY IDENTIFIED BY COLOR, LABELING OR MARKING. REPAIRS AND REPLACEMENT OF INTRINSICALLY-SAFE WIRING MUST BE MADE BY QUALIFIED PERSONNEL.

2. DO NOT CONNECT ANY DEVICES THAT GENERATE ELECTRICAL ENERGY OR THAT HAVE THEIR OWN POWER SOURCES TO THE INTRINSICALLY-SAFE WIRING.

## TEST THE SYSTEM

Turn on power. Test all controls and safety devices to make sure they are working properly. It will be necessary to refer back to page 8 for fine adjustment of the limit switches.

### IMPORTANT NOTES:

- Do not leave operator power on unless all safety and entrapment protection devices have been tested and are working properly.
- Be sure you have read and understand all Safety Instructions included in this manual.
- Be sure the owner or person(s) responsible for operation of the door have read and understand the Safety Instructions, know how to electrically operate the door in a safe manner, and know how to use the manual disconnect operation of the door operating system.

### **WARNING**

To avoid **SERIOUS PERSONAL INJURY** or **DEATH** from electrocution, disconnect **ALL** electric power **BEFORE** performing **ANY** maintenance.

## MAINTENANCE SCHEDULE

Check at the intervals listed in the following chart:

ITEM	PROCEDURE	EVERY 3 MONTHS OR 5,000 CYCLES	EVERY 6 MONTHS OR 10,000 CYCLES	EVERY 12 MONTHS OR 20,000 CYCLES
Drive Chain	Check for excessive slack. Check and adjust as required. Lubricate.	••		◆
Sprockets	Check set screw tightness.	•		◆
Fasteners	Check and tighten as required.		•	◆
Manual Disconnect	Check and operate.		•	◆
Bearings and Shafts	Check for wear and lubricate.	••		◆

### **WARNING**

To avoid **SERIOUS PERSONAL INJURY** or **DEATH** from electrocution, disconnect **ALL** electric power **BEFORE** performing **ANY** maintenance.

- ◆ **Use SAE 30 Oil (Never use grease or silicone spray).**  
Do not lubricate motor. Motor bearings are rated for continuous operation.
  - ◆ **Repeat ALL procedures.**
  - Inspect and service whenever a malfunction is observed or suspected.
- WARNING:** Before servicing, always disconnect operator from power supply.

### HOW TO ORDER REPAIR PARTS

OUR LARGE SERVICE ORGANIZATION SPANS AMERICA

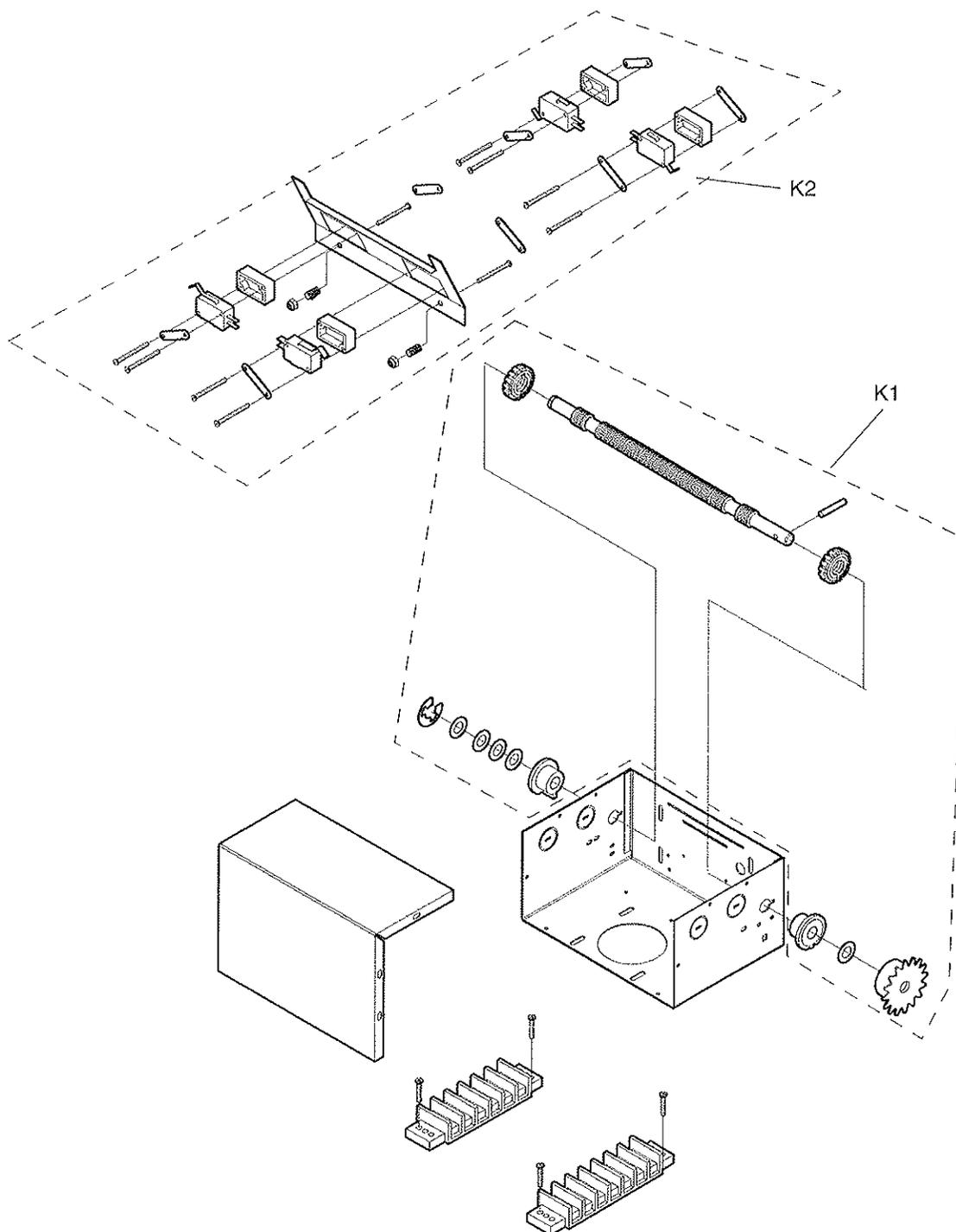
Installation and service information are available.  
Call our TOLL FREE number:

**1-800-528-2806**

[www.liftmaster.com](http://www.liftmaster.com)

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# LIMIT BOX

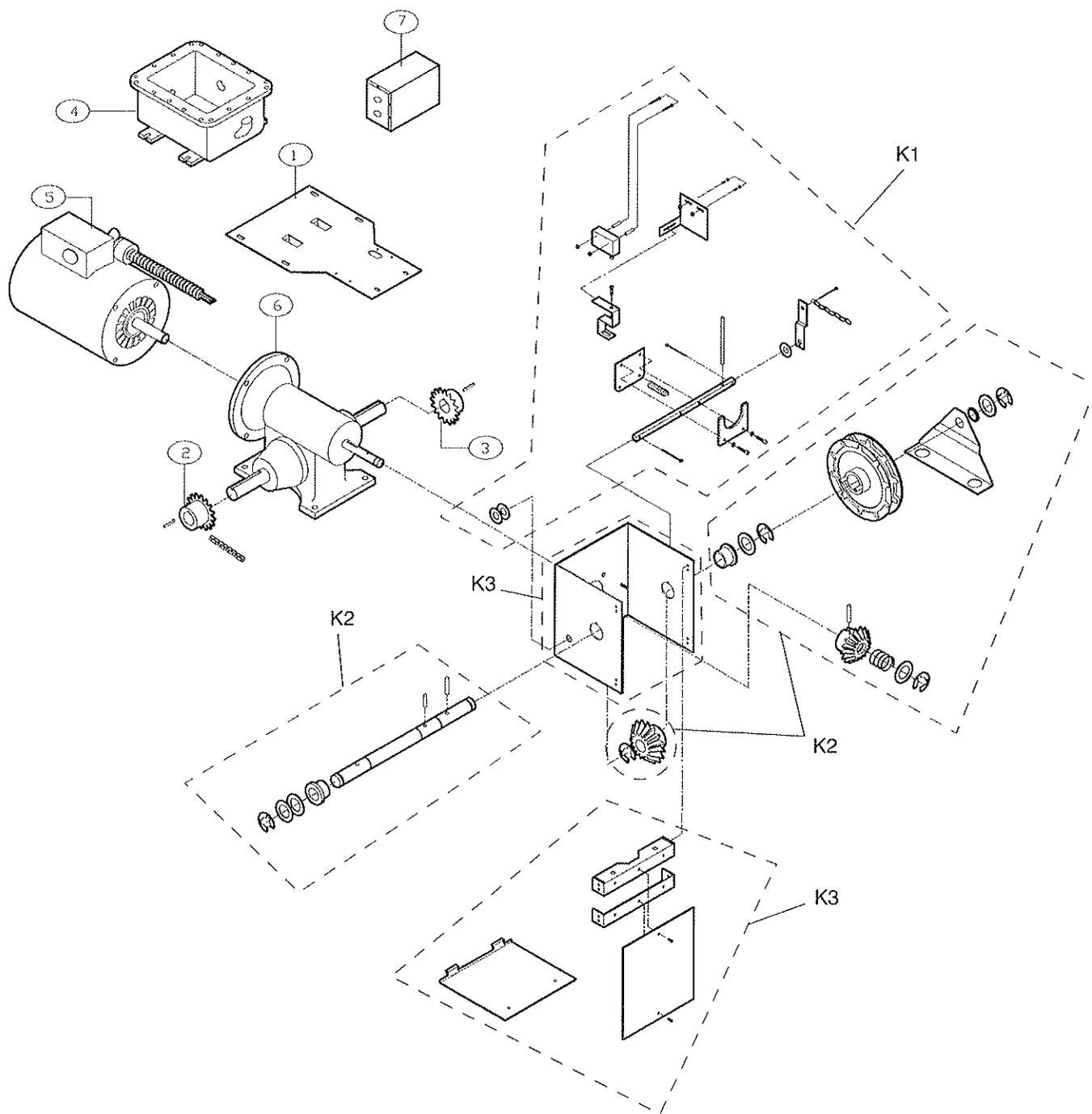


## REPAIR PARTS KITS

### SERVICE KITS

ITEM	PART #	DESCRIPTION
K1	K72-14130	Limit shaft assembly kit Complete with: Limit shaft, flange bearings, limit nuts, sprocket 48B9 x 38" bore, shim washers, roll pin and e-ring.
K2	K75-12511	Limit switch assembly kit Complete with: Depress plate, switch plates, backup plates, depress plate springs, limit switch, screws and locknuts.

# MODEL N9GH



## REPAIR PARTS KITS - MODEL N9GH

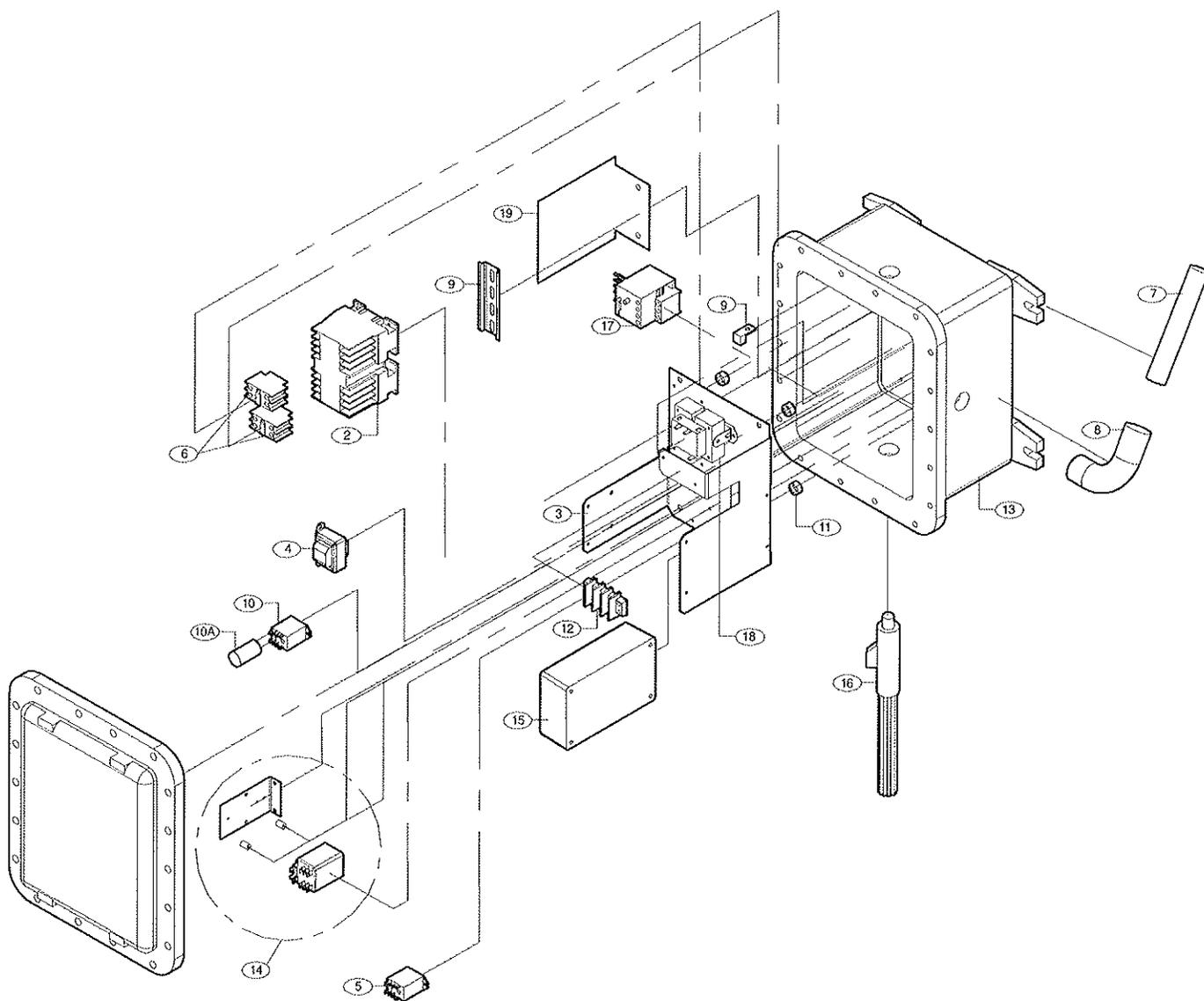
### INDIVIDUAL PARTS

ITEM	PART #	DESCRIPTION	QTY
1	10-11045	Electrical Box Mounting Plate	1
2	15-48B18LGE	Sprocket, 48B18 LGE	1
3	15-50B12LGH	Sprocket, 50B12 LGH	1
4	See Page 27	Electrical Box	1
5	K20-1050C2X	Motor - Models N9GH5011, N9GH5021	
	K20-3050C4X	Motor - Models N9GH5023, N9GH5043	
	K20-1075C2X	Motor - Models N9GH7511, N9GH7521	
	K20-3075C4X	Motor - Models N9GH7523, N9GH7543	
	K20-1100C2X	Motor - Models N9GH1011, N9GH1021	
	K20-3100C4X	Motor - Models N9GH1023, N9GH1043	
	K20-1150C2X	Motor - Models N9GH1511, N9GH1521	
	K20-3150C4X	Motor - Models N9GH1523, N9GH1543	
	K20-3200C4X	Motor - Models N9GH2023, N9GH2043	
	6	32-11009	
32-11010		Gear Reducer (1 1/2-2HP Operators, 45:1)	1
7	See Page 23	Limit Box	1

### K75-12783 • DISCONNECT ASSEMBLY KIT

ITEM	PART #	DESCRIPTION
K1	K75-12783	Disconnect Assembly Kit
		Complete with: GH disconnect lever, bevel gear yoke, brake release, actuator bracket, switch actuator, disconnect shaft, GH tension spring, 12ft. of sash chain, screws, nuts, USS flatwashers, lockwashers, cotter pins, roll pin, interlock switch, spacers, locknuts.
K2	K72-12789	Hand Chain Shaft Kit
	K72-13379	Complete with: Bevel gears, hand chain guide, hand chain shaft, bearings, nyloner bearing, compression spring, chain wheel assembly, shim washers, washer, roll pins, e-rings.
K3	K75-17991	Gear Reducer Housing Kit
		Complete with: Housing support brackets, gear brake housing, housing cover, bottom cover.
		K7512788
	K72-12789	Hand Chain Shaft Kit

# ELECTRICAL BOX



## REPAIR PARTS KITS - ELECTRICAL BOX

### INDIVIDUAL PARTS

ITEM	PART #	DESCRIPTION	QTY
1		Din Rail	1
2	03-8024-D	Contactor	1
3		Mounting Plate	1
4	21-17524	Transformer (Not Used on 115Vac)	1
5	24-24-1	Relay, 24V	1
6	27-8002-D	Auxiliary Contact Block	2
7		Flex Conduit	1
8		Elbow	1
9		Ground Lug	2
10	24-264-4	Relay, 24Vdc DPDT	1
10A	71-18369	Timer Delay Assembly	1
11		Spacer	4
12		Terminal Block, 3 Pole	1
13		Enclosure	1
14		3 Phase, Dynamic Brake	1
		1 Phase, Dynamic Brake	1
15	K74-17561	Intrinsically Safe Assembly	1
16		Bulk Head Assembly	1
17	25-4001-5D	Overload 1.0-1.6 amp -Model N9GH5043M	
	25-4002-5D	Overload 1.5-2.0 amp - Models N9GH1043M, N9GH1053M, N9GH7543M	
	25-4004-D	Overload 2.5-4.0 amp - Models N9GH1543M, N9GH2043M, N9GH5023M, N9GH7523M	
	25-4006-D	Overload 4.0-6.0 amp - Model N9GH1023M	
	25-4008-D	Overload 5.5-8.0 amp - Models N9GH1523M, N9GH2023M	
18	21-5115	Transformer, 115V Operators	1
	21-5230	Transformer, 230V Operators	1
	21-5460	Transformer, 380-460V Operators	1
19	41-18367	Insulator	1

\* To order a complete electrical box replacement kit, add a K-prefix to the model number of your operator. For example:  
N9GH5011M (Operator) = K-N9GH5011M (Elec. Box Kit)



Date: October 31, 2012

Cornell Job Number: J2012 132988

Project Name: Wenatchee WTP

Cornell Iron Works, Inc. warrants its products against defects in material or workmanship for a period of 24 months from the date of shipment. Cornell Iron Works agrees to repair or replace, at Cornell's discretion, any parts which are determined, by Cornell, to be defective. This warranty does not include repair or replacement parts, or labor due to site condition changes, incorrect installation, lack of maintenance, ordinary wear, abuse or neglect.

Job specific warranties, or warranties with obligations in addition to those listed above must be stated in writing and signed by Cornell.

Cornell Iron Works, Inc.

**AN ISO 9001:2000 REGISTERED COMPANY**



## Warranty

We, the undersigned, Continental Door Company, Subcontractor for **Apollo Inc.** do hereby provide a special guarantee for a period of one (1) year from substantial completion or acceptance of the project that portion of the work performed by us and those particular materials furnished by us, more specifically outlined in our Subcontractor Agreement with the above mentioned General Contractor, and in the plans and specifications for that certain project identified as:

FOR: **Overhead Coiling Door**  
Manufactured by Cornell Iron Works

JOB: **Wenatchee WTP**

We will remedy at our expense any defects appearing during that period due to poor materials and/or poor workmanship and will pay for correction of any damage to other work resulting from occurrence of these defects or their correction.

This Guarantee shall not be interpreted as holding this subcontractor liable for any deterioration of the work due to normal use or the abuse of the work by the owner or others.

**Continental Door Company, LLC**

By:   
Norm V. Morse  
President

Date of Substantial Completion: 10/31/2012