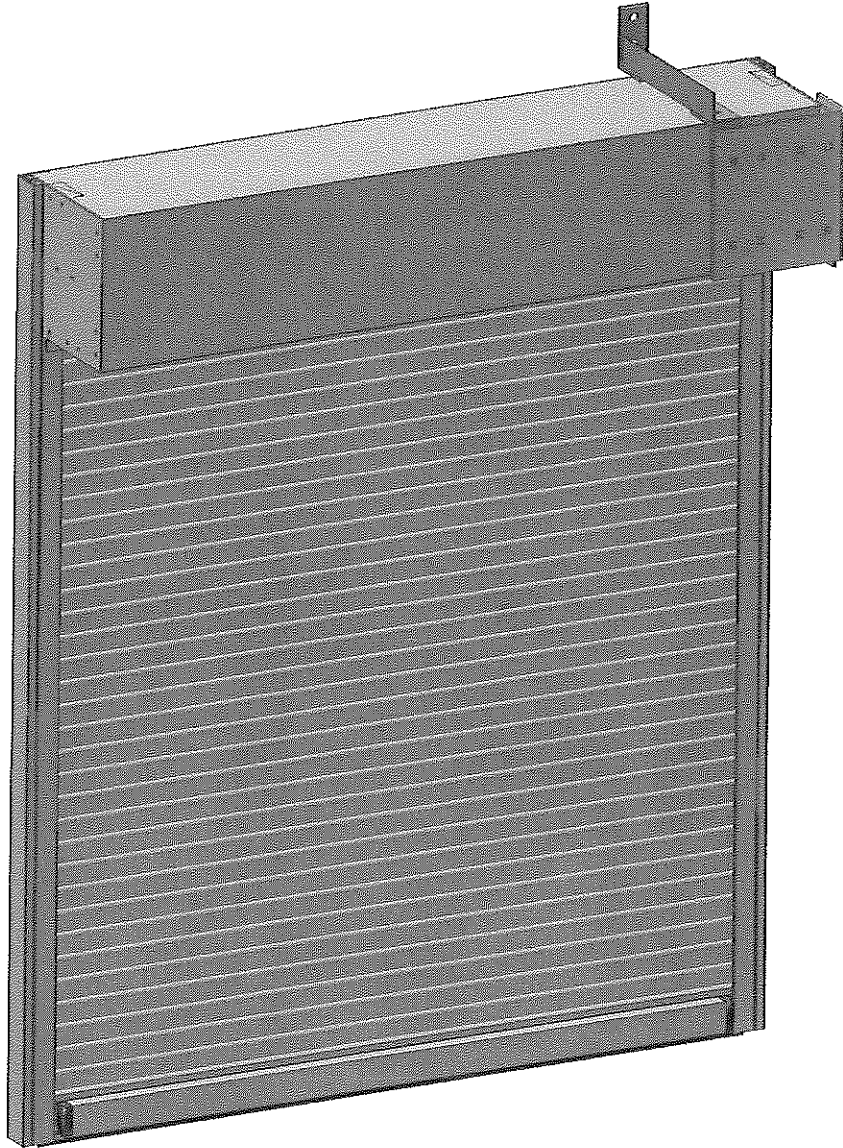


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CORNELL
SAFE AND SECURE



Service Shutter
Motor and Push-up Operation
INSTRUCTION MANUAL

CORNELL IRON WORKS, 24 Elmwood Avenue, Mountain Top, PA 18707
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SECTION 1. *Introduction:*

Service Shutter:

Service shutters are specifically designed closure systems that are engineered to protect people, prevent property damage, and seal openings off from admittance, sight, and the elements. All the components of the Service Shutter kit that you have received are engineered to work in unison. Compromising any components by modifying them or installing them improperly will not only void the manufacturers warranty, but also effect the doors ability to withstand the hostile environment and may effect shutter operation.

Read these instructions carefully and understand the assembly procedure. Proper installation, maintenance, and operational checks will assure the shutter is operating to design specifications and meeting the customers expectations.

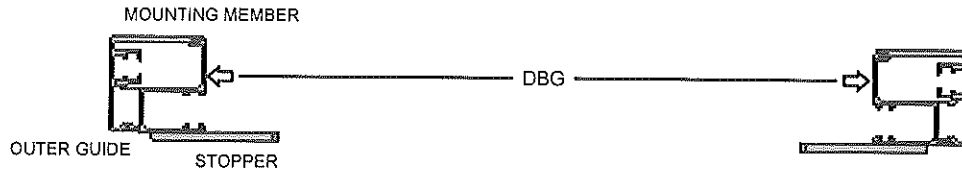
Fastener Summary:

Service Shutters are sold in kit form including all of the hardware to secure the unit to the surrounding construction specified during the ordering and approval process. Particular care must be taken to place the proper fasteners with the corresponding components. Wall fasteners may not be the same as bracket fasteners. Identify the fastener and area of placement using the hardware sheet and follow these instructions for quick and proper assembly.

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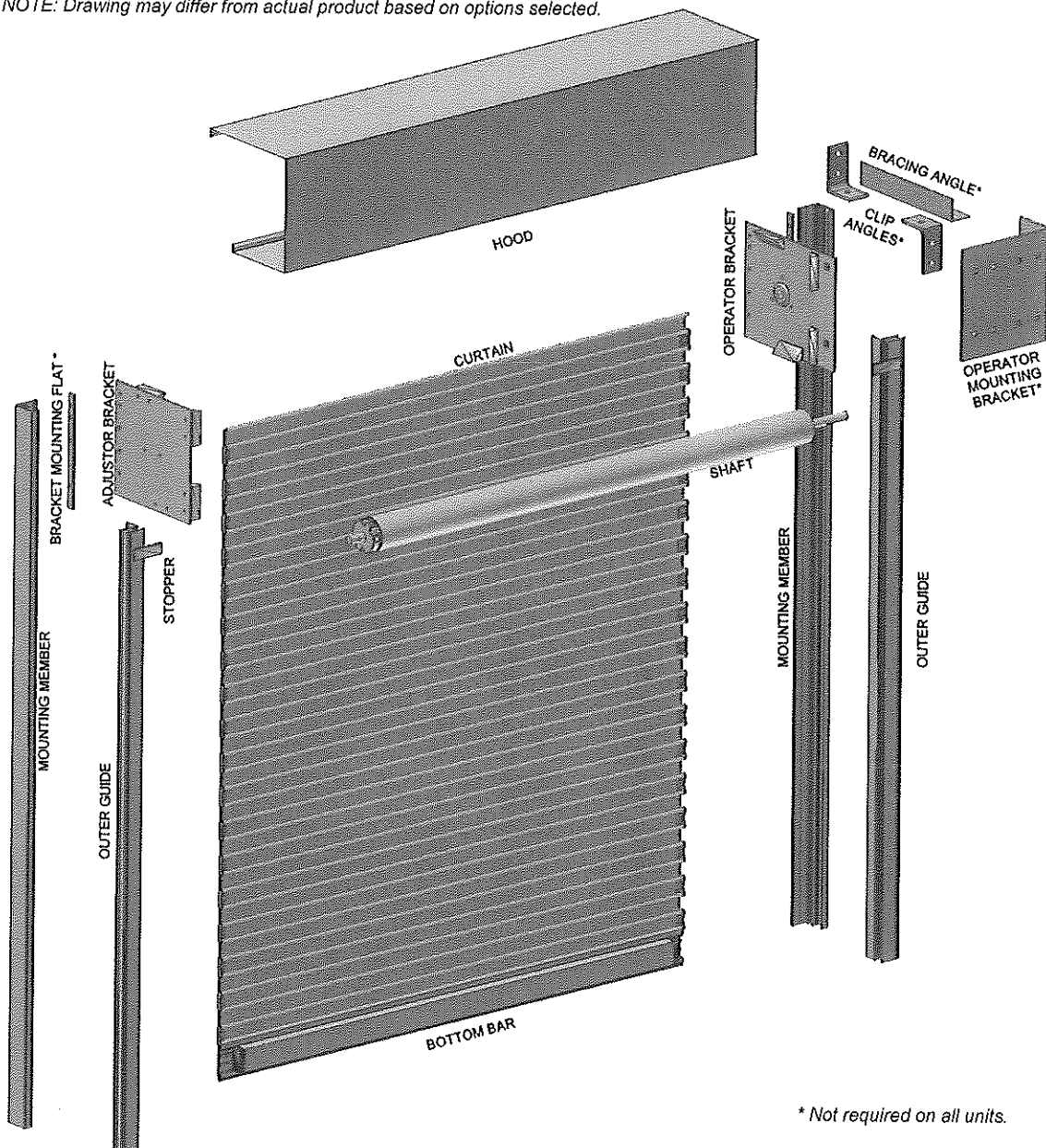
SECTION 2. Illustrations

TOP VIEW



ASSEMBLY VIEW

NOTE: Drawing may differ from actual product based on options selected.



* Not required on all units.

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SECTION 3. Component Inspection:

Inspecting the shutter components prior to installation will assure that the proper parts and hardware were ordered and received, saving time during installation in the event of a discrepancy. It also allows the installer to become familiar with the components and perform the necessary preparation to ensure an efficient and safe installation.

The following steps are recommended:

- Verify that the information on the shop sheet reflects the product ordered.
- Check the number of rings (if applicable) and compare it to the number listed on the shop sheet.
- Examine the operator drive chain for length (if applicable).
- Verify the hardware supplied corresponds with the construction of the opening.
- Verify the operation type and orientation.
- Some important information will be marked on the shaft: such as the number of spring turns required in both the open and closed position and the direction in which the turns should be applied. It may be beneficial to mark this information down. It will be needed later in the installation and the shaft may not be accessible.

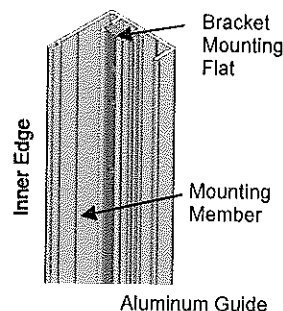
SECTION 4. Guide Installation:

1. Clean the opening of construction debris and inspect the jambs for square, plumb, and rough surfaces. *NOTE: If the floor is not level, begin by installing the mounting member on the high side first. The lower guide will then be shimmed level with the high guide.*
2. Measure and mark the center of the opening on the floor.
3. Using the supplied shop sheet and drawings, determine the Distance Between Guides (DBG).
4. Starting from the center mark of the opening, measure off **half the DBG** in either direction and mark this distance on the jamb. Repeat this process in the other direction.
5. Locate the LH and RH Mounting Members.

If unit utilizes aluminum guides:

- Slide a Bracket Mounting Flat into the top of each Mounting Member with the three holes closest to the end.
- Secure the Bracket Mounting Flat by inserting and tightening a set screw in the third hole from the top. The Bracket Mounting Flat should be flush with top of the Mounting Member.

7. Align the inner edge of each Mounting Member with the marked DBG on the jamb. Plumb the Mounting Member. Reference **TOP VIEW** in **Section 2** for orientation.
8. Mark the mounting holes of each mounting member onto the jamb.
9. Prepare the mounting holes on the jamb for the fasteners supplied in the kit.
10. Place the fasteners in the mounting holes, snug, plumb the mounting members, and tighten.
11. Install the Outer Guides on the Mounting Member. *(For aluminum guides, install the snap-in outer guide piece flush with the bottom of the mounting member.)*



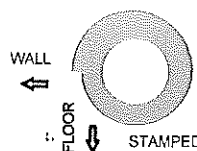
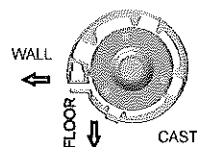
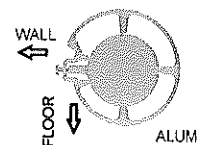
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For units with Tube Motor operation, refer to **Appendix A** at this point.

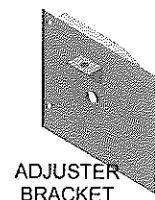
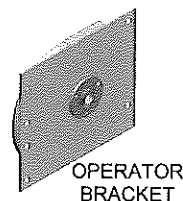
SECTION 5. *Shaft and Bracket Installation:*

1. Locate the rings (if applicable) and the curtain attachment hardware. There are (4) attachment methods available: Aluminum Rings, Cast Rings, Stamped Rings and Direct Attachment.

- For Aluminum Rings, slide the rings onto the shaft as shown in the diagram. Position each ring near one of the studs on the shaft.
- For Cast Rings, slide the rings onto the shaft as shown. A screwdriver can be used to pry open the gap in the ring for easier sliding. Align the dimple on the inside of the ring with one of the $\varnothing 7/16"$ holes in the pipe, then clamp the rings in place using the supplied hardware.
- For Stamped Rings, slide the rings onto the shaft as shown and align them with the predrilled holes in the shaft. Fasten using the provided hardware.
- For Direct Attachment units, no rings are required.

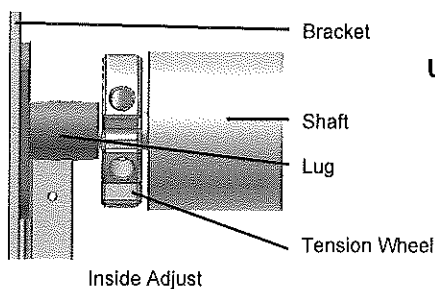


2. The adjuster side of the shaft will be marked. Install each bracket on their corresponding sides. The clip angles on the bracket should face in.
3. For outside adjust units, install the tension wheel on the adjuster side of the shaft (as shown below) and attach using the provided hardware.
4. Slide the operator bracket down the shaft until it is 1-1/2" inches from the outer shaft and set the lock collar. Be sure to tighten the lock collar set screws sufficiently.
5. The shaft will be marked either LH or RH Adjust. Use this information when orientating the shaft to the opening.
6. Lift the entire assembly up to the top of the mounting members with the shaft and brackets aligned with their corresponding sides. Use the marked lift point of the shaft as a reference to balance the assembly when lifting.

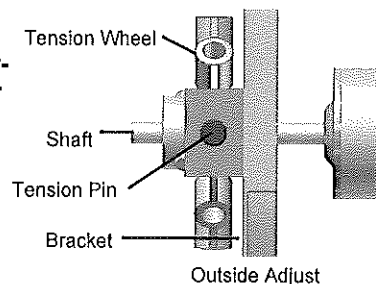


CAUTION: The assembly weight will be bias towards the adjuster side. Use caution when lifting.

7. Move the assembly into position aligning the mounting holes in the brackets with the holes in the Bracket Mounting Flats at the top of the guides.
8. Verify the shaft is level and tighten the mounting hardware.



Use these diagrams to determine which type of adjuster your unit has.



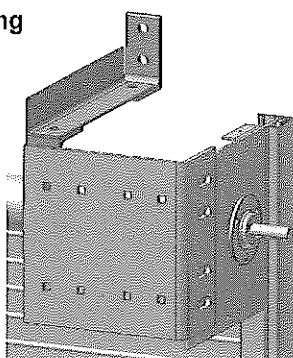
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*For units with Push-Up Operation, Skip to **Section 8** at this point.*

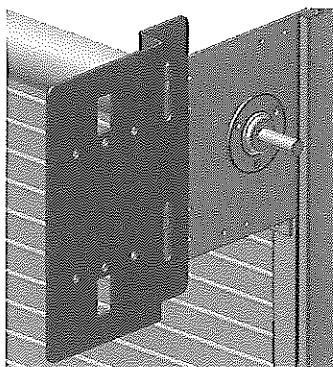
SECTION 6. Operator Installation:

1. Identify the operator and hand of operation using the shop sheet.
2. Unpack the operator and bracket for the motor box and examine the shop drawings for specific mounting conditions. Operator mounting can be ordered to accommodate specific construction needs, see the shop sheet and drawings for details.
3. Use the supplied hardware to mount the operator mounting bracket.
4. If bracing angle(s) are supplied:
 - Attach a clip angle to the operator mounting bracket.
 - Bolt the bracing angle to the clip angle on the operator mounting bracket.
 - Attach a clip angle to the end of the bracing angle opposite the operator.
 - Swing the bracing angle towards the adjacent construction.
 - Square the clip angle with the construction and mark the mounting hole location. Be sure the slots in the bracing angle allow for operator bracket adjustment and chain tensioning.
5. Unpack the operator and fasten it to the operator bracket with the supplied hardware.
6. Place the shaft sprocket supplied in the hardware box on the shaft and align it with the operator sprocket.
7. Insert the shaft key and tighten the set screws in the sprocket.
8. Place the drive chain around the sprockets and insert the master link. The chain may need to be shortened. Adjust accordingly.
9. Set the chain tension and full tighten all mounting bolts.

Operator Mounting



LiftMaster



US Gear

SECTION 7. Operator Wiring:

- All wiring will be done per the operator wiring diagram.
- Added options will be wired to auxiliary inputs on the operator's terminal strip.
- Follow the instructions for each electrical option and operator combination.

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SECTION 8. *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. It may 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. Install the curtain:

Smaller Units (If the curtain can be lifted by hand) and all Push-Up Units:

- Carefully unroll the curtain until the bottom bar is exposed. The beads of the curtain should be facing up. Lift the bottom bar and feed it over the shaft and into the guides, taking care not damage the curtain on the floor, brackets, or the components of the shaft.
- Continue feeding the curtain into the shaft until the bottom bar reaches the ground, and then fasten the fastening sections to shaft using the corresponding method listed in **Step 4**.

Larger Units:

- Remove the outer guides.
 - 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 8A**. Uncoil the curtain enough for the fastening sections to reach the attachment points on the shaft; fasten them using the corresponding method listed in **Step 4**.
 - For units with operators, use the hand chain, crank or other override feature of the operator to rotate the shaft in the "open" direction. Be sure not to overrun the limits of the operators. The upper operator limit may have to be adjusted to reel the entire curtain onto the shaft. For Outside-Adjust Push-Up units, turns can be added to the adjusting wheel in order to rotate the shaft. Keeping count of the turns added to the spring at this stage will save installation time in **SECTION 8**. Refer to **SECTION 8** for guidelines on adding turns.
 - 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. Replace the outer guides. Feed the bottom bar into the guides and lower the curtain until the bottom bar is below the stoppers.
4. Secure the curtain to the shaft with the packaged fastening section bolts provided.
 - For Aluminum Rings, insert the provided hardware through the fastening section, through the hole drilled into the guide, and into the stud.
 - For Cast Rings, Stamped Rings and Direct Attachment, align the fastening section with the hole in the ring or shaft respectively, and fasten using the provided hardware.
 5. Replace the stoppers.

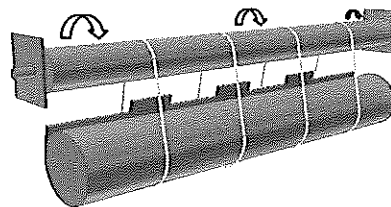


FIGURE 8A. *Curtain in Slings*

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For units with Tube Motors, skip to **Section 10** at this point.

SECTION 9. *Setting Spring Tension:*

1. The required spring turns and the direction in which they should be applied will be marked on the shaft. If the shaft is not accessible, the turns required will also be listed on the shop sheet provided with the door, and the direction in which the turns should be applied is always in the "opening" direction.
2. Locate the tension pin, hairpin cotter pin and adjustor bars. It is recommended that and (2) 1/2" diameter bars be used as adjustor bars.
3. The tension can be added to the shaft with the door in the open or closed position, though the process will be quicker and easier when the door is in the open position. Insert the adjustor bars into the adjusting wheel and add spring turns in direction to open the door.

CAUTION: Do not stand directly in front of adjusting wheel while charging springs; stand off to the side on firm footing. Sever injury can result should a rod slip during the spring charging process.

4. Whether in the open or closed position, continue adding turns until the corresponding quantity is reached. Align the nearest adjusting wheel with the hole in the clip angle attached to the bracket. While holding the adjustor bar in position, slide the tension pin through the clip angle and into the adjusting wheel. Ensure that the pin is securely in place before releasing the adjusting bar.
5. Insert the hairpin cotter pin to lock the tension in place.
6. The operator limits can now be set. Refer to the operator instruction for details.

SECTION 10. *Installing the Hood:*

1. Take the supplied hood out of the packaging.
2. Align the ends of the hood with the angles mounted to the inside of each bracket.
3. Square the hood with the brackets and the wall.
4. Fasten the hood to the angles with the supplied Tek screws starting with the top angles closest to the wall and working towards the lower mounts.

SECTION 11. *Operational Testing:*

1. Run the shutter up and down cycling it to verify operation.
2. The shutter should:
 - Coil smoothly up onto the shaft.
 - Maintain square throughout operation.
 - Coil centered in the guides.
 - Lock easily with the slide bolts, when properly equipped.
 - Sense an object in the opening and raise, when properly equipped.
 - Not flex the operator bracket excessively.

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Appendix A. Tube Motor Installation

Shaft and Bracket Installation

1. Install operator bracket:

For 3" Shaft Assemblies (Type 5 & 6 Tube Motors)

- Position the angle bracket kit onto the outside face or the operator bracket as shown in **Figure A1** or **A2** and fasten using the (4) 1/4-20 x 5/8 socket head screws and nuts. Refer to the shop sheet for coil size. Slide the operator bracket over the motor head. Position bracket so that crank shaft is vertical and opposite the wall side. Align the (4) holes in the angle bracket kit with the corresponding holes in the tube motor and fasten using the provided hardware.

For 4" Shaft Assemblies (Type 8 Tube Motors)

- Reference motor instructions if LH operating is required. Attach lower mounting angle to bracket using provided hardware. Slide operator bracket over motor head, position the lower mounting stud into the angle, making sure that the bushing is positioned between the motor and the angle. Install the upper angle and bushing.

2. Locate the idler bracket and cotter pin. Slide the idler bracket onto the idler end shaft until it clears the 1/8" hole. Insert the provided cotter pin into the 1/8" hole and bend (1) leg along end shaft, as to not interfere with the bearing.
3. Install crank eye kit so that the crank eye is towards the floor. Fasten using the provided hardware.
4. Position the assembly on the ground in the opening so that the mounting holes in the brackets are facing the wall. Use this time to ensure that the Tube Motor is oriented as ordered (LH or RH) and that the hand crank is located away from the wall.
5. Lift the entire assembly so that the top of the bracket is flush with the top of the mounting members. The center of balance for the assembly will be marked as the '**Lifting Point**' on the shaft for reference.
6. Move the assembly into position by aligning the mounting

NOTICE

The assembly will be biased towards the operator side. Use caution when lifting.

holes in the brackets with the holes in the Bracket Mounting Flats at the top of the guides. The brackets should mount on the inside of the mounting members.

7. Verify that the shaft is level and tighten the mounting hardware and set screws in the idler bracket bearing.

Return to **Section 7: Operator Wiring** at this point.



FIGURE A1. 12" Coil Angle Bracket Kit



FIGURE A2. 11" Coil Angle Bracket Kit

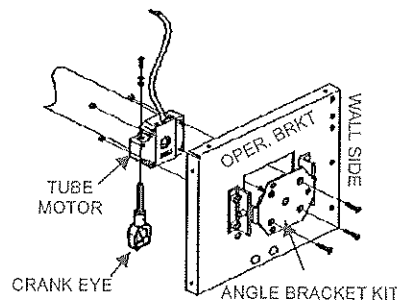


FIGURE A3. 3" Shaft Assembly

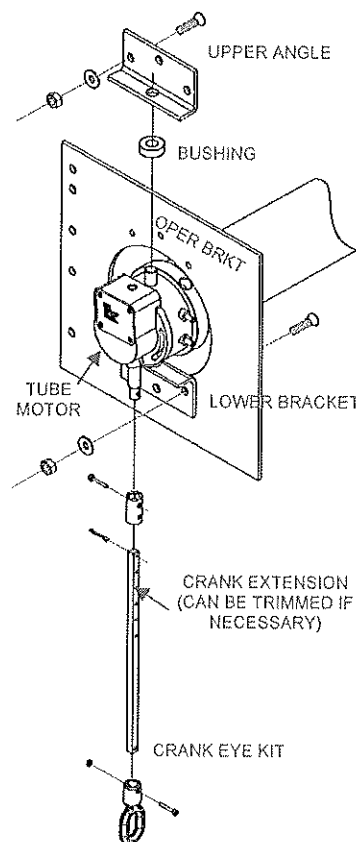


FIGURE A4. 4" Shaft Assembly