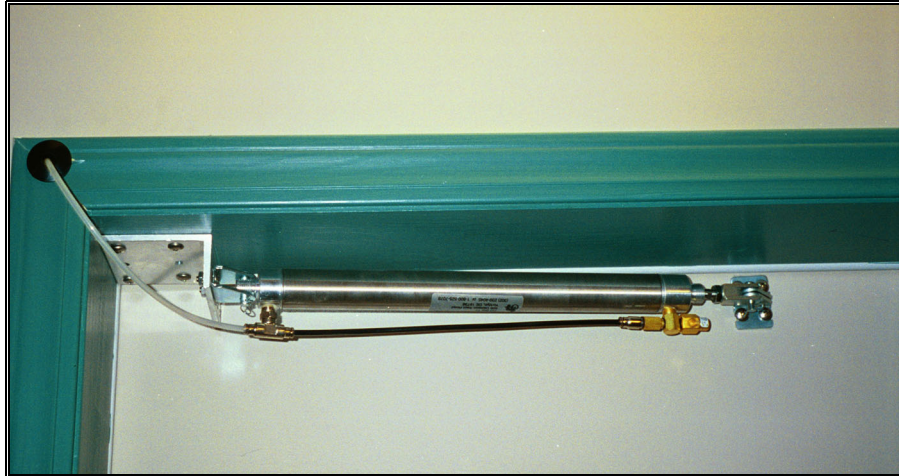


Disability Systems, Inc.

Installation and Operating Instructions for Swing Door Operators



Distributed by Disability Systems, Inc.

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Setup and Preparation

Safety

PROPERLY ADJUSTED, THIS OPENER WILL NOT BREAK THE SKIN OF AN APPLE CLOSED IN THE DOOR. AN OPENING DOOR SHOULD BE EASY TO STOP WITH YOUR LITTLE FINGER. EXCESSIVE OPENING SPEED OR POWER MAY DAMAGE THE PNEUMATIC PISTON AND THE DOOR COMPONENTS. THESE ADJUSTMENTS CANNOT BE MADE AT THE FACTORY AND ARE YOUR RESPONSIBILITY.

We also recommended you:

Install a manual deadbolt on the door for added security. Shut off air supply to the door opener and unplug the remote module when you will be away from the house for extended periods of time. Pay particular attention to the mounting location of the closer as discussed in these instructions.

Introduction

This product is designed to unlatch and open residential doors remotely while maintaining normal operation. This system allows the door, the door components and the lock and existing key to continue to function manually without fear of damage to any of the components in the opening system.

These instructions are written to help and instruct installers of different levels of skill. The pictures in each section give the major information in brief to save time for an experienced or talented installer. The remaining text discusses this brief info in more detail. Installation time will vary from 2 hours to all day depending on the condition of your door and the talent and experience of the installer.

Special tools required: a long drill bit approximately $\frac{1}{4}$ inch in diameter, a sharp $\frac{3}{4}$ inch wood chisel, a variable speed reversible drill motor suitable for use to drive screws, although not necessary, will greatly speed installation.

Guarantee

DISABILITY SYSTEMS warrants your complete satisfaction for 90 days from the date of purchase. Additionally, all components are warranted to be free from defects when installed correctly and in normal use for one year from the date of purchase.

DISABILITY SYSTEMS shall not be liable for neither incidental nor consequential damages nor labor charges, which shall result from any defect in the product or breach of this warranty. This warranty shall not apply to any or part or parts which have been subject to accident, negligence, contraindicated alterations, abuse or misuse. No warranty will apply if the product is not installed or maintained in accordance with the instructions.

WARNING the first two steps, prep work and planning are critical to successful completion of this project. If you cannot complete these steps do not proceed with installation. This product will not make a faulty door operate correctly.

Please address all comments and concerns to:

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6834 South University Blvd. #222
Littleton, CO 80122-1515

Or call Toll Free: 1-877-258-7423

Prep Work

A properly operating door meets all the following conditions: Fits exactly flush in its opening, in other words, the top and sides of the door contact stop molding or weather stripping evenly without gaps. No pushing of the door, in other words, bending is required to get the door to seat properly. The door cannot rub, stick, or bind in its frame during opening or closing. There is approximately 1/8-inch clearance between the edges of the door and the frame. Hinge edge of door does not contact frame when door is closed. The hinges are not loose but are firmly attached to the door and the frame.

The doorframe itself is securely attached to the underlying framing and cannot move. The threshold or its weather sealing components do not rub or bind.

Correction of these problems is critical to the successful completion of this installation. If you cannot complete or understand this work do not proceed with this installation. Some methods you may have to use to obtain the desired conditions include:

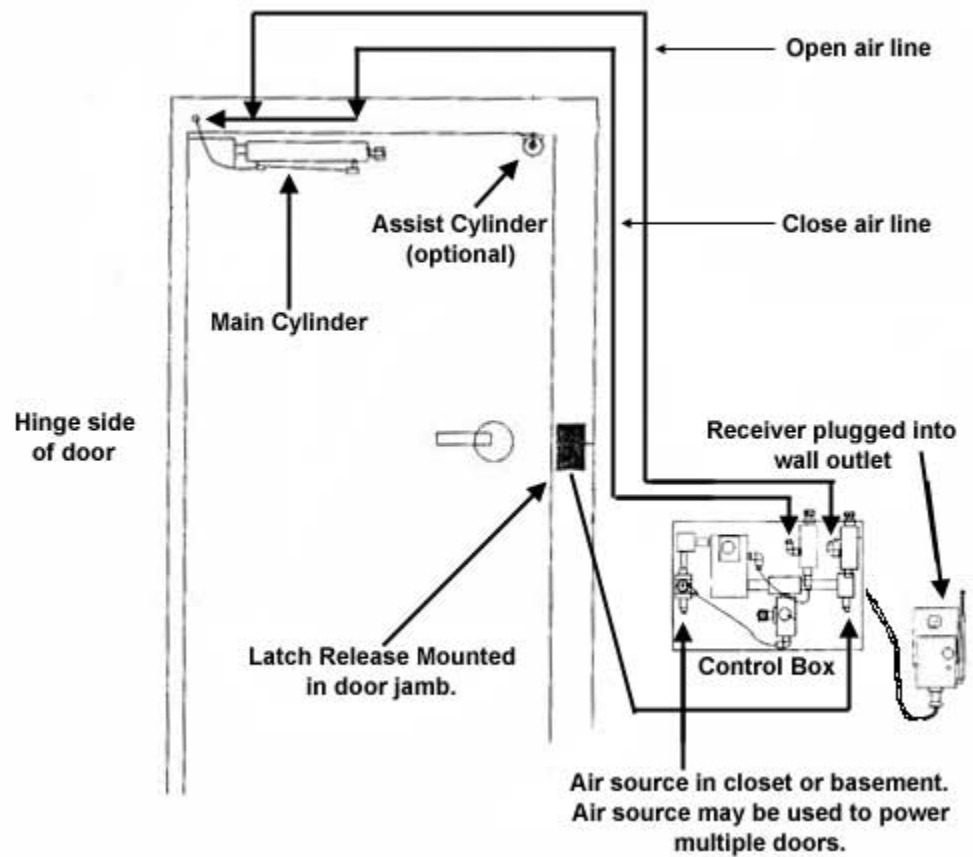
Tightening or replacing hinge screws with longer ones into framing to increase stability or adjust clearance.

Removing and repositioning stop molding

Removal, replacement or adjustment of weather stripping.

Grinding of door edges to obtain proper clearance.

The use of these methods and others usually require subsequent touch up although the installation of the Disability Systems Kit itself generally does not.



Blueprint of Install of a Double Acting Door Operator

Planning

Overview of Typical Installation

Assuming the decision of whether a compressor or CO2 cylinder is used as a power source has already been made, decide where you will locate these components. Popular choices for a compressor are basements and garages. Popular choices for CO2 cylinders include closets, in bathroom or kitchen cabinets, basement or crawl space and attics. Keep in mind that this cylinder must remain vertical and should be secured in this position.

It is best to mount the receiver and solenoid control valve close to the door and in an easily accessible place if you wish to take advantage of the emergency exit feature. Otherwise, any electrical outlet within the range of the transmitter will work.

The regulator must be positioned anyplace between the latch release and the opening cylinder. Consider the ease, length and appearance of all tubing runs when making the above decisions.

Installation of the Operator

Latch Release

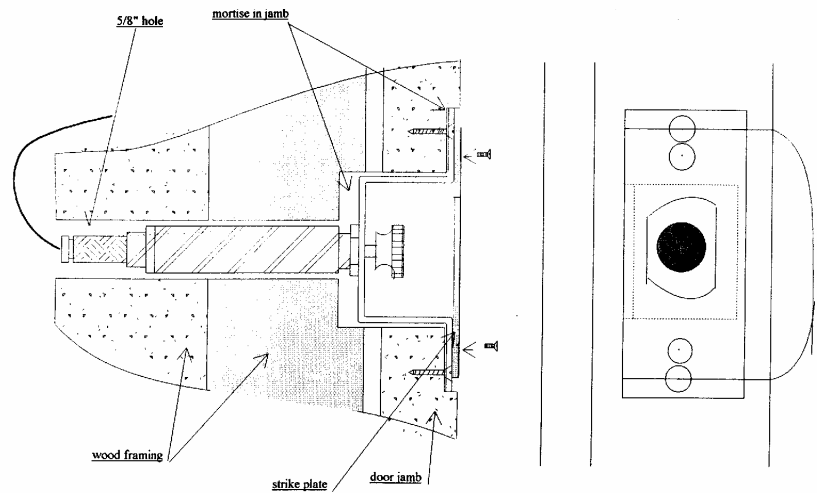


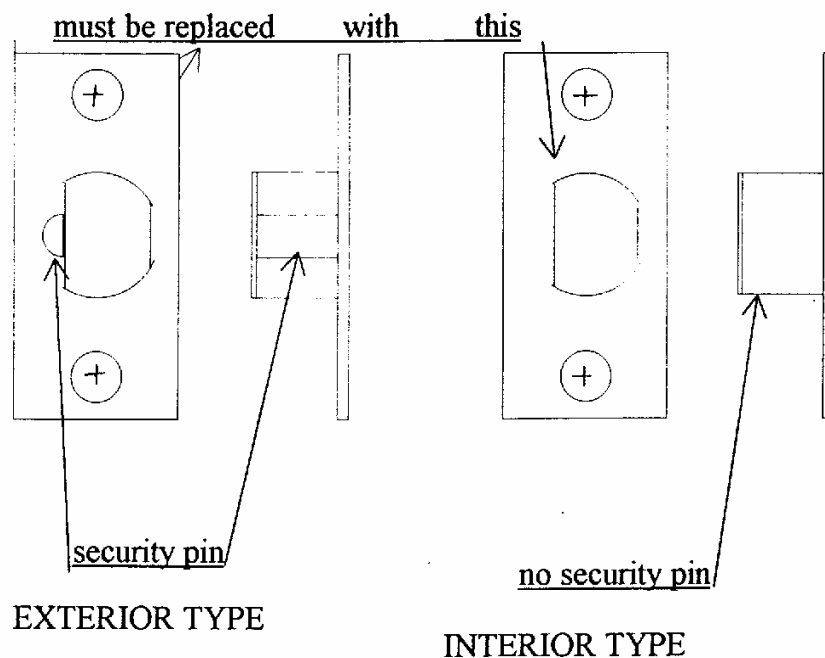
Diagram of Door Latch Release Installation

Determine how much if any, the existing strike plate needs to move to allow the existing door to latch perfectly. Mark the location of the new set of holes for the strike plate. Then:

1. Remove and save the existing strike plate
2. Remove and save the 2 special stainless steel screws from the latch release assembly.
3. Line up the tapped holes in the latch release assembly with the existing holes in the doorjamb left by the strike plate screws or the new holes as marked above.
4. Be sure to use the holes that will line the strike plate up for a perfect latch fit as discussed above.
5. Mark the outline of the strike release BOX. (Note: Do not start to drill yet.)
6. Hold the latch release assembly sideways and mark the outline of the wood to be removed to allow the strike release box to recess into the door jamb
7. Drill 4 holes using a 5/8-inch drill bit in the corners of the outline and deep enough to accommodate the strike release box.

8. Using a sharp wood chisel slowly cut out and removes the wood between the holes. Note the box should fit slightly snug so that the assembly may be firmly attached to the jamb and the original strike plate reattached. When installed this assembly should be hardly noticeable.
9. Drill another 5/8^{-inch} hole in the center for the newly cut rectangular opening. The pneumatic cylinder mounted to the strike release box will recess into this hole. This hole must extend past all framing and into the hollow wall chamber.
10. Trial fit the strike release assembly. Chisel or drill to allow the assembly to easily slide into position.
11. Mark the “ears” of the latch release assembly both above and below the mounting hole. With a sharp chisel, carefully remove a thin section of wood so that when the latch release assembly is installed the original strike plate will mount on top and will be flush with the doorjamb.
12. Drill a 3/8-inch hole in the wall approximately 5 inches from the doorjamb face and in line with the hole for the latch release cylinder. This hole must extend into the same hollow wall as the cavity as the cylinder hole. Its purpose is to accommodate the tubing, which will connect the back of the latch release cylinder. The position of this hole is not as critical as long as a common hollow wall cavity is accessed. The location may be adjusted as necessary.
13. “Fish” the tubing from this hole through the hole in the doorjamb. A short piece of copper electrical wire works well. A hook or loop bent into the end of the wire may help.
14. Push the tubing firmly into the fitting on the end of the strike release cylinder, feeling for the tubing to “bottom out”. The tubing should insert about 3/8 of an inch into the fitting. Test by pulling backwards on the tubing, it should hold even with a firm tug. Note: Do not Crimp the tubing. Crimps in the tubing restrict the airflow and interfere with the operation of the door.
15. Insert the strike release into the prepared cavity while pulling firmly on the tubing fed through the wall. Secure the Strike Release with the 2 screws, which formerly were used for the original strike plate.
16. Attach the strike plate to the strike release box using the 2 special screws saved from the initial step. After attaching the plate, make sure that the door still latches easily. Make any adjustments to the plate or door as necessary.
17. Consult the tubing diagram and measure the necessary length. Cut the tubing.
18. Slip the grommet onto the tubing so that it may be pushed into the 3/8-inch hole in the wall to protect the tubing and to protect the hole drilled into the wall.

Latch



If existing latch is of the interior type shown at right, no further action is required. If existing latch is of the exterior type shown at left, it must be replaced with an interior type (i.e. without security pin) of the proper backset.

Additional Information – Upon examination of the two latches pictured you will notice the presence of a small pin which when depressed, prohibits the latch itself from being depressed. This pin provides a small measure of security against break in by offering resistance against movement by a credit card, screwdriver, or similar object. This is exactly what the latch release is designed to do so an exterior type latch is incompatible with this system.

Generally, latches are of two sizes or “Backsets”. The distance from the edge of the door to the center of the doorknob designates the sizes. The two common sizes are 2 3/8 inches and 2 3/4 inches. If you need to replace the existing latch it must be with one of not only the same manufacturer but also of the correct size or backset. Please note that some modern latches are of the adjustable type and can be used as either 2 3/8 or 2 3/4 sizes. If you understand the previous information and you know the manufacturer of the existing lockset you can probably buy the correct latch form your local hardware store or trade latches with another door in the house. If this information confuses you, remove the latch and lockset and bring both to your local hardware store along with this page of these instructions. The most expensive possible solution to this problem will be that you have to buy a new lockset with an exterior latch and an additional lockset with the proper latch and backset and combine the two. Approximate cost of these solutions should be less than 40 dollars.

Closer

Instructions for the installation of the closer are contained in its package. Use method described as standard or pull side of door. A small amount of adhesive caulk, RTV or silicone between the components and the door and frame will make mounting more secure especially on hollow doors where not all fasteners will bed into solid wood.

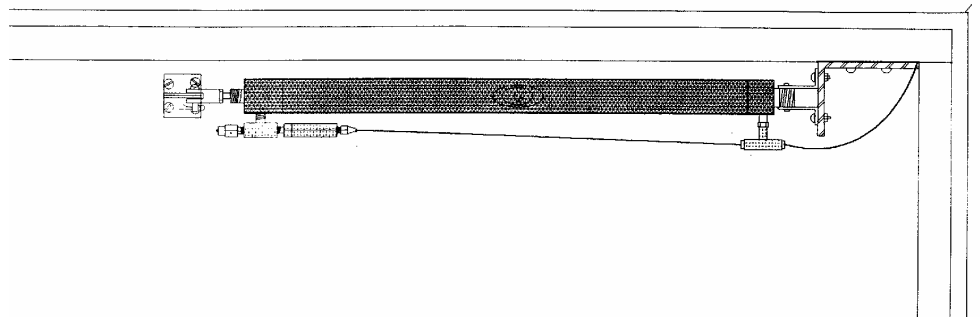
It is necessary that the mounting position of this device be moved approximately 2 inches closer to the hinges to decrease the latching force. Follow adjustment procedures before proceeding. Ideal conditions are 5 seconds to close the first 80 degrees and an additional 3 seconds to close the last 10 degrees.

Several of our customers have experienced a symptom where a door will open partially (a few inches) and then stall. This is the fault of the geometry of the closer arm and can be eliminated by careful adjustment of the closer arm length. This aspect is not discussed in the closer instructions.

The opener system is compatible with many other door closers and spring hinges. Spring hinges, although more attractive, rely on speed and momentum to latch the door and therefore are not as inherently safe as closers which dampen and control closing forces. A modification is available from us that will help but not eliminate this condition. Door closers that make the door difficult to open can be a problem because of the large forces involved.

Safety is of concern if a door, depending on size and weight, closed in less than 5 seconds or exerts a force of greater than 20 pounds to stop its motion at any point on the door during the closing cycle.

Opening Cylinder



Bracket End

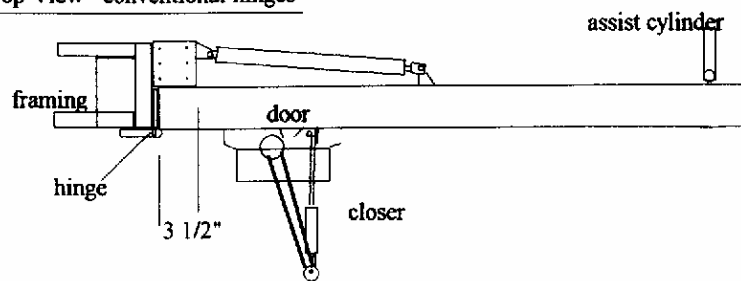
The cylinder-mounting bracket is screwed to the top doorjamb on the push side of the door such that the cylinder mounting face is 3 ½ inches from the center of the hinge pins. Allow a slight clearance between the edge of the bracket and the face of

the door. Note: as a check, the distance from the hinge pin to the pivot pin should be $4\frac{3}{4}$ to 5 inches measured perpendicular to the closed door face.

General information

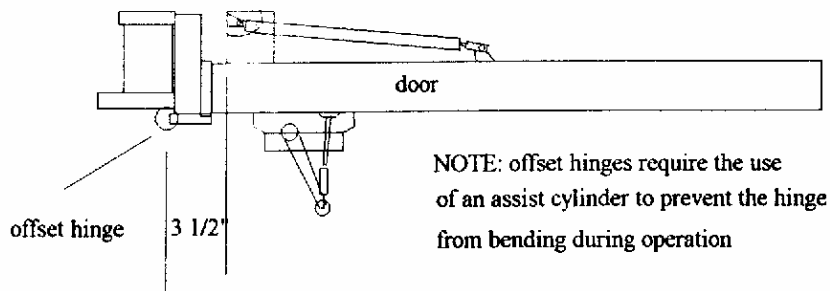
To determine if the cylinder is attached to its bracket in the correct set of holes for your door, hold the bracket and cylinder assembly in the upper corner farthest from the doorknob on the push side of the door. The following conditions must exist: the cylinder end brackets must be mounted in the set of 2 holes farthest from the door. This bracket has a straight side and an angled side. The straight side must face the door. Make these corrections, if necessary, by removing the two #10 machine screws. Use loctite to permanently hold screws in final assembly.

Top View - conventional hinges



Top View - offset hinges

Position of bracket mounting face and closer move to compensate for distance of offset



Offset hinges: This is a special modification that permits a door to open entirely outside its frame. The purpose being to make the opening wider for the passage of wheelchairs. If these hinges are used, the mounting bracket must be reversed as shown in order to maintain $2\frac{1}{2}$ inches from the center of hinge pin to cylinder mounting face. Here again the mounting bracket will work with both left and right hand doors. If these hinges are used, we strongly recommend that an optional pusher assist be used to compensate for the fact that offset hinges bend more when the opening cycle is initiated.

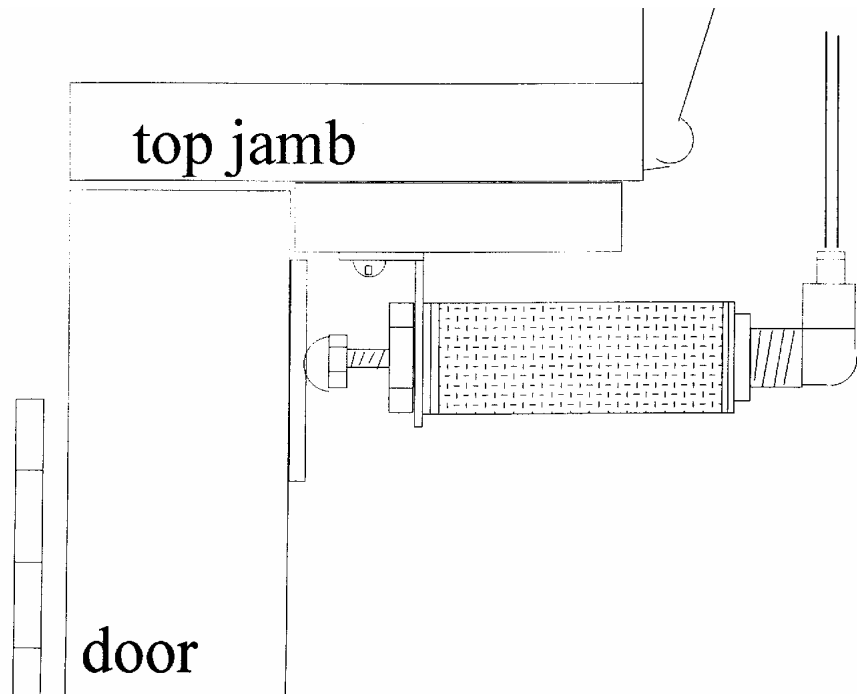
Door Stop Moldings

Generally there are two principal types of doorstop moldings in common use. If your door is equipped with type "A", flush, simply screw the bracket onto the face. If type "B" is used, the molding will be formed in layers, which interfere with the bracket, remove a 2-½ inch portion to permit the bracket to mount securely to the top doorjamb itself.

Clevis End of the Cylinder

After pivot end bracket is attached to top jamb, hold the cylinder parallel with top jamb, extend the rod approximately 1/8" so that the piston rod will not bottom out before the door is fully closed, and carefully mark the location of the four mounting screws. Note that some adjustment is possible after installation by screwing the operating rod in or out of the clevis. Small amounts of adhesive caulk, RTV, or adhesive foam tape especially if your door is of hollow construction where only two of the mounting screws will bed firmly in wood. Before permanent attachment, insure that this location will permit a full 90-degree opening. A doorstop should be installed so that the bracket itself will not be stressed when the door is fully opened.

Optional Assist Cylinder for Exterior Doors



Assist Cylinder Installation

This device is used to overcome the holding power of magnetic weather seals or the force of heavy doors. It mounts on the same side as the opening cylinder, close to the corner above the doorknob. Mount the cylinder securely to the doorjamb or stop

molding. Mount the square rub plate to the door face so that the cylinder strikes the plate, not the door.

Adjustment of Single Acting Operator

Adjustment

Set the compressor pressure to at least 70 PSI (not critical) if you are using a CO2 cylinder instead of a compressor the CO2 regulator is preset and is not adjustable. Inspect the gasket inside the regulator and make sure it is properly seated. Thread the regulator into the CO2 cylinder. Once the system is fully connected, slowly open the large valve on top of the cylinder.

Activate the system and adjust the small brass regulator so that the door will just fully open. Adjust the vent on the opening cylinder to further refine opening speed and gentleness. The same 5-sec/20lb rule discussed in step 2 or 3 applies here also. Properly adjusted the door will start to open slowly, speed up and then finish the last 10 degrees slowly and gently.

Leak Check

After tubing is connected and the system is operational, leak check all fittings. Dilute bubble soap or dishwashing soap will immediately show any leaks in an activated system by blowing “bubbles”. Tighten any fittings that leak and push in hard on any tubing connections that leak. A leak free system will provide the maximum life for the CO2 cylinder powering the system or if an air compressor is being used it will minimize the amount of time the compressor needs to run, prolonging the life of the motor.

Maintenance

The remote does require fresh batteries to maintain maximum range. If after a period of time the door fails to close completely, coat the striker plate and latch with a water resistant lubricant such as Vaseline or car wax. Friction points such as the hinges and clevis should receive a drop of machine oil about once a year. The clevis where the main opening cylinder is attached to the door is designed to be the weakest point in the system. If excessive opening pressures are used the mount may fail. Properly adjusted however this should not need attention.

This system may be used to hold the door open for extended periods of time with out incurring any problems.

Replacing the CO2 Cylinder

Close the large valve on top of the cylinder, and then unscrew the brass regulator. Make sure the gasket inside the regulator is still properly seated. Exchange the empty cylinder for a full one at your local gas supplier.

Adjustment for the Double Acting Door Operator

Overview

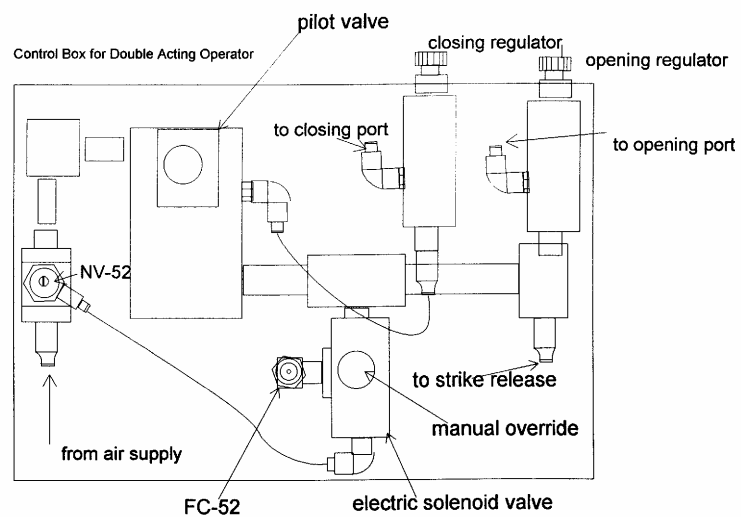


Diagram of Control Box for Double Acting Door Operator

There are a total of four possible adjusting points on the control unit, three of which have a direct effect on each other. The sequence in which these adjustments are made is very important.

Starting Positions

Both throttle valves should be cracked open approximately $\frac{1}{2}$ turn.
Both pressure regulators should be set for little or no pressure.

Supply pressure from the compressor should be set to at least 70PSI but no more than 110 PSI.

Step 1 Activate the system using either the remote or the manual override. The only action that should occur at this point is that the latch will release.

Adjustment of opening and closing forces

Step 2 – Increase pressure at the opening regulator until the door starts to open.

Step 3 – Increase pressure at closing regulator until the door starts to close.

Step 4 – Slowly increase the pressure at the opening regulator until the door moves to the fully open position.

Note: At this point both sides of the cylinder are under pressure but the opening side pressure is somewhat higher, causing the door to open. When this pressure is allowed to decrease to the point where the closing pressure is the greater of the two, the door will close.

Adjustment of Stopping Sensitivity

Step 5 – Deactivate System

This will allow air to slowly vent at the throttle valve to be mounted into port #3 of the opening solenoid valve. This air must vent fast enough to allow the door to close, but not so fast as to allow the residual pressure in the cylinder and lines to drop below the point required to hold open the closing pilot valve (10 PSI). Make adjustments until a closing door will close at least to the point where the latch touches the strike plate. Note: This step is similar to the adjustment of our sliding door operator. Don't worry if the door closed but won't latch, that is our next step.

Adjustment of Latching Force

Note: For the purposes of understanding the operation of the system, let's assume at this point that the following conditions are true:

When being held open, the pressure supplied to the opening side is 31 PSI.

When being held open, the pressure supplied to the closing side is 20 PSI.

The differential of 11 PSI is being used to open and hold open the door.

The closing pilot valve will remain open, supplying 20 PSI as long as the air pressure being exerted by a closing door remains above 10 PSI (true fact). Therefore, at any point during the closing cycle that the door stops moving, including but not limited to the point where latching occurs, the pressure supplied will be 10PSI (20 PSI closing pressure minus the 10 PSI required to keep the closing valve open).

To increase latching force, increase the pressure on both the opening and closing regulators about ¼ turn. Repeat Step 5 if necessary.

Note: Let's now assume that the opening pressure has been increased 5 PSI to 36 PSI and that the closing pressure has also been increased 5 PSI to 25 PSI. Notice that we have the same differential i.e. 11PSI, being used to open the door but at the point

where the door stops the differential is now 15 PSI (25 PSI closing pressure minus the same 10 PSI required to keep the closing valve open).

Caution: Do not increase the latching force any more than necessary as you are also increasing the force that will be required to stop a moving door if an object or person is encountered.

Adjustment of Opening Speed

Increasing the pressure of the opening regulator will increase opening speed and or opening the throttle valve marked NV-52 or 32 on the port 1 manifold. This throttle valve should be adjusted so that it has slowing effect on the opening cycle. The purpose is to limit the speed and rebound when the system is activated when the door is in the opening position.

Adjustment of Closing Speed

Slightly opening the throttle valve mounted into port 3 of the solenoid valve will permit air to escape more quickly thereby permitting the door to close faster. Obviously, you cannot go beyond the point necessary to maintain the required 10-PSI.

To rely on the speed of a closing door i.e. momentum, to accomplish latching is a crude solution and does not take advantage of the elegance of this product. This is the fun part of the job. Take your time and experiment. You can always start over at the initial settings.