

Door Closer

Introduction

Door Closer

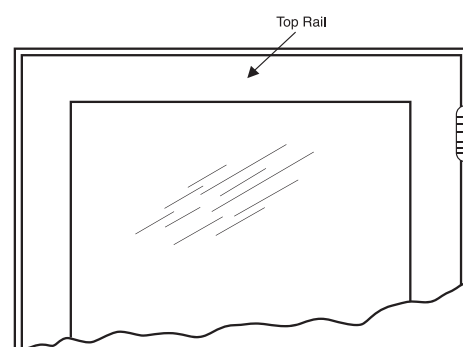
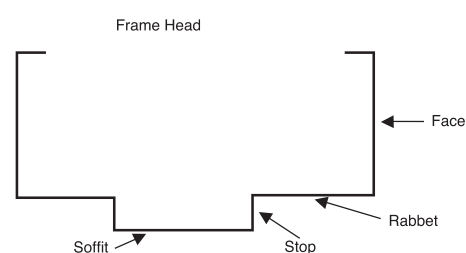
Description:

Since man invented doors, he has improvised various methods and mechanisms for closing them, not only for privacy and security, but also to control the environment. Self-closing door mechanisms function automatically. Properly adjusted, they avoid slamming, reduce door and frame damage and make the door easier and safer to use.

The first serious attempt to mass produce a door closing device was made in 1882 by Louis C. Norton. He perfected a spring-operated device that controlled the door closing speed. His device consisted of a coil spring and an air cylinder. The cylinder filled with air as the door opened. When the door was released, the spring provided closing energy and escaping air provided a cushioning control. The door's closing speed was dictated by the number and size of air holes in the cylinder. The closer, however, was not adjustable.

Since that time, there have been many modifications and improvements to Norton's concept. Originally, the basic problem to overcome was the need to provide control to the opening and closing cycle. Today, the need for energy conservation, safety code requirements, security, flexibility with other products and handicapped needs make closing devices a necessity rather than a convenience.

Product Guide



Top Rail

The horizontal rail at the top of the door connecting the lock stile with the hinge stile.

Head

The horizontal frame member at the top of the door opening.

Rabbet

The section of the door frame recessed to receive the door.

Soffit

The underside of the frame stop at the head.

Stop

The part of the frame against which the door closes.

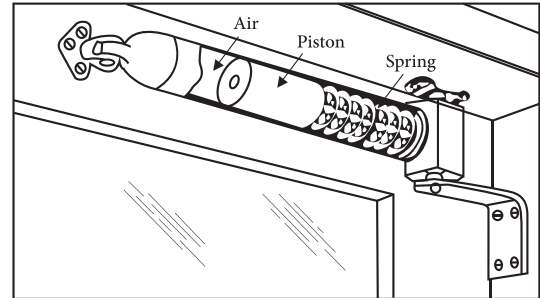
Face

The part of the frame against which the door closes.

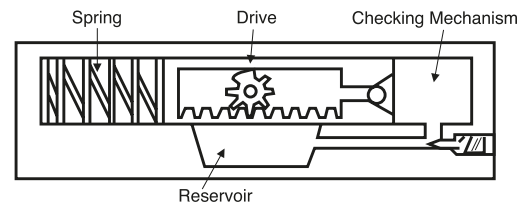
Door Closer

Introduction

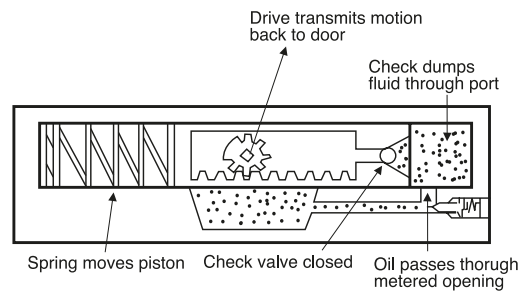
Door Closer Operation Door closers are made up of three basic elements: spring, checking mechanism and drive. The combination of spring, checking mechanism and drive vary widely among several manufacturers and products, but all door closers operate on the same basic principle.



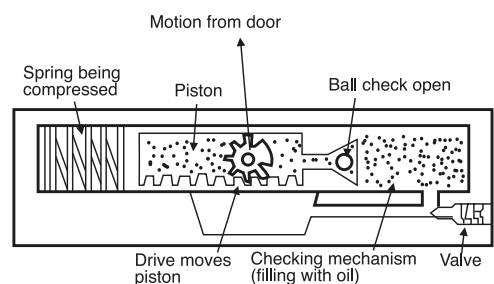
Today, most door closers utilize a checking mechanism involving a rack and pinion arrangement with a liquid, such as oil, rather than air.



**CLOSER ELEMENTS
SPRING/CHECKING/DRIVE**



The following drawing shows how these three elements work together in a door closer.

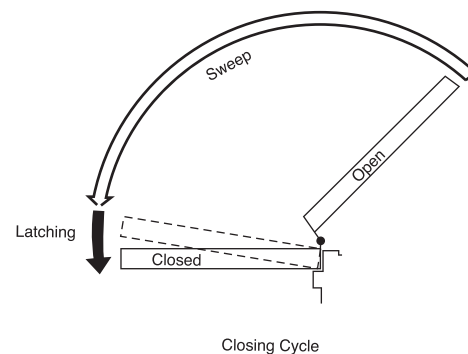


Door Closer

Introduction

Speed Control

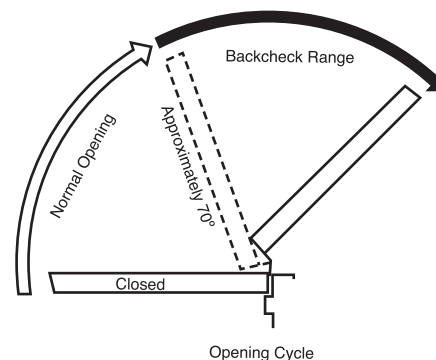
Many door closers provide two control areas for the closing cycle. The sweep is the arch of the door closing from a fully open position to within approximately 6" of latching. The latch involves the door movement during those last few inches of closing. Generally, both areas of travel controlled through a valve arrangement. Sometimes it is desirable to have the door close quickly to within those last few inches, then finish the cycle slowly to prevent slamming. In other cases, it may be more desirable to have the door close slowly to within those last few inches, then speed-up so as to assure enough force to securely engage the latch in the strike. When a closer can be adjusted in both manners described, independent controls are an advantage. The means that either speed can be adjusted separately without affecting the other.



**SWEEP SPEED
LATCH SPEED**

Backcheck Control

Often closers will feature a means of slowing the swing of a door as it reaches the end of its opening cycle. This control is desirable for three reasons: (1) To minimize the possibility of damage to the door or adjacent wall; (2) To minimize the stress on the door hardware (hinges for example); or (3) To minimize the hazard to people who may be struck by the door swinging open uncontrolled. This control is called "backcheck" and is usually adjustable. Remember that the purpose of backcheck is to absorb energy and slow the door in its opening cycle. It is not intended to act in place of a door stop.



CLOSER BACKCHECK

Sizing

Doors come in a variety of widths and heights, and are used in many types of locations and environments. To allow for these varying conditions, door closers are built in different sizes. This means they have different levels of closing power and may have different size components to match this variation. When the door closer size is matched properly to the door size and location, it will operate properly, thus opening easily and closing correctly. Door closer sizes are generally classified by number. For example, #2 thru #6, with the lowest number being the closer with the least power and smallest size. Naturally, the highest number would indicate the closer that is strongest. The closer size may or may not be

marked on the closer body. Exterior doors require stronger closers than interior doors of the same size. The reason is because they must compensate for wind, drafts and the difference of pressures between the inside of the building and the exterior. Most door closers are sized based upon 7-foot-high doors. Exterior doors of extremely large height may require an even stronger closer. Closer manufacturers list their catalogs sizing charts that show their recommendations for sizing their closers under different conditions. Other factors that may affect sizing include unusual wind conditions, high-frequency usage and some mounting styles.

Hold Open

In some areas of a building, it is desirable to have a door stand open during a certain times of the day as may be dictated by traffic, convenience or ventilation. Most door closers can be specified with a feature called “hold open”. This is usually a mechanism that is built into the arm of the closer and can hold the door open at 90 degrees or more. When the closer is manually pulled from this hold-open point, it will close normally. If the closer is opened to less than the hold-open point, it also will close in its normal fashion.

Most building codes require that products intended for use on fire-labeled doors be listed with Underwriters Laboratories (UL) or an equivalent testing agency.

A labeled fire door must be equipped with a door-closing device to insure that the closer always returns the door to a closed position and positive latching. However, there are instances when it may be necessary for a

fire door to be equipped with an automatic-releasing device.

At one time, this was accomplished through a fusible-link arrangement in the hold-open mechanism. The link would melt when air temperature reached a high level. As such, the fusible-link arrangement did not compliment the need for life safety and quick response.

Today, the building codes require an electrically operated system that permits the door to close upon activation of a fire or smoke detector or in case of power failure. Most often this mechanism is built into the working components of the closer. The unit also may have the detector built in as well.

In some cases a non-hold-open closer may be applied using a separate wall or floor magnet to accomplish the hold-open function. Those magnets then are wired into the alarm system.

Hold Open

On hospital patient room doors, it often is desirable for the purpose of ventilation, privacy and convenience, to have the door held partially open at 15 to 45 degrees. To satisfy this need, closers are available with a feature that allows them to be held open at the normal 90+ degrees plus the partially open position outlined above.

Delayed Action

When doors are located in areas where carts, beds or other such equipment frequently is moved through the opening, a delayed action closer often is used. The closer holds the door open for a select period of time before automatically closing. It can also be useful in situations that might involve the passage of handicapped persons through an opening.

Types of Door Closers

Door closers are available in many and varied configurations but may be classified into two basic mounting types:

- Surface
- Concealed.

Door Closer

Surface Door

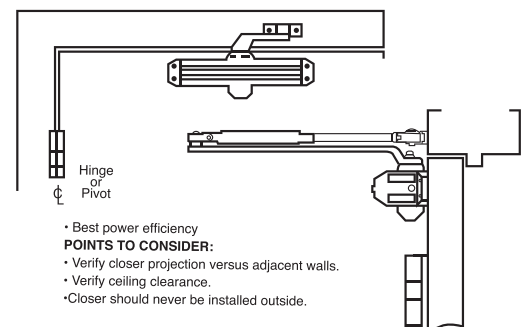
Surface Door Closers

Surface door closers mount to the surface of the door and frame and close the door through an arm linkage. Surface door closers are popular because they are easy to install and service. Surface closers have four basic mounting applications:

- Regular Arm
- Top Jamb
- Parallel Arm
- Corner Bracket

Regular arm

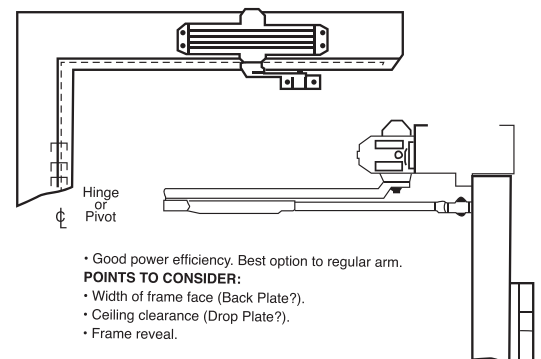
Regular arm application places the closer on the hinge side of the door. As the door opens, motion is transmitted through the arm, which compresses the closer spring. When the door is released, the power stored in the spring closes the door by transmitting the motion back through the arm, which is attached to the frame.



Top Jamb

With the top jamb application, the door closer is attached to the frame face above the door on the side opposite the hinges (stop side). The closer arm is attached to the door. The mechanical operation is similar to that of a regular arm closer.

This type of mounting frequently is used for the sake of appearance, when it is preferred to have the closer inside a room rather than in a hall or corridor into which the door closer inside the building rather than outside where it would be exposed to the elements.



Door Closer

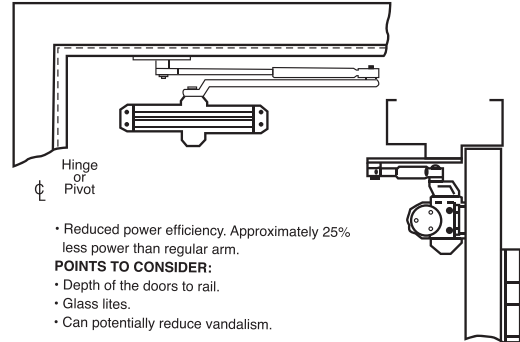
Surface Door

ASSA ABLOY

Parallel Arm

Parallel arm closers also mount on the side of the door opposite from the hinge side (stop side). Different from the top jamb style, they actually mount on the door. The closed arm position is parallel to the door, which is the reason for its name.

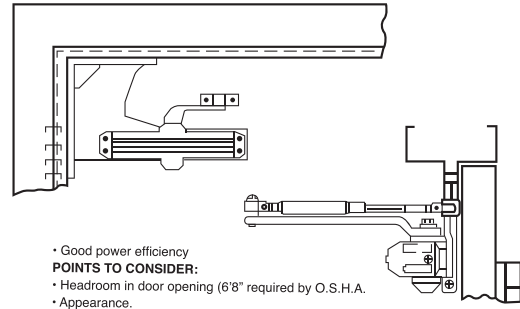
Also, note that the closer being mounted on the stop side results in all the advantages as outlined under the top jamb application.



Corner Bracket

The corner bracket application also may be used when it is necessary to apply the closer to the inside of the opening (stop side). Here again the purpose may be for appearance or to afford protection from the environment.

With this application, the closer is mounted on a special bracket that extends into the actual opening, even when the doors open. This may be considered to be a disadvantage and may even be hazardous.



Door Closer

Concealed Door

Concealed Door Closers

There are three basic types of concealed door closers:

- Concealed in the door
- Concealed in the overhead frame
- Concealed in the floor

Note: that in the door closer terminology, the word “concealed” refers only to the fact that the body of the closer is concealed. Variations in arm applications include both concealed and exposed.