DOOR CLOSERS

A Door Closer is a device to close the door in a controlled manner, regulating how far the door can open, how long it stays open, how fast it closes, and finally ensuring that it firmly closes. Properly adjusted, Closers avoid slamming, reduce door and frame damage and make the door easier and safer to use. A closer should provide a smooth, controlled closing action once the door has been opened and released.

The intention of this article is to give you a basic understanding of door closers, so that you can decipher manufacturers' descriptions and charts. This article focuses on what Hull Supply has in stock, too, so you may need to look for more references to fill out your knowledge of special order items.

Closers are classified into two basic categories: Surface and Concealed. This is because some features and configurations are fully dependent on whether the closer is mounted on the Surface of the door and frame, or Concealed from view in a recess in the door, frame, or floor.

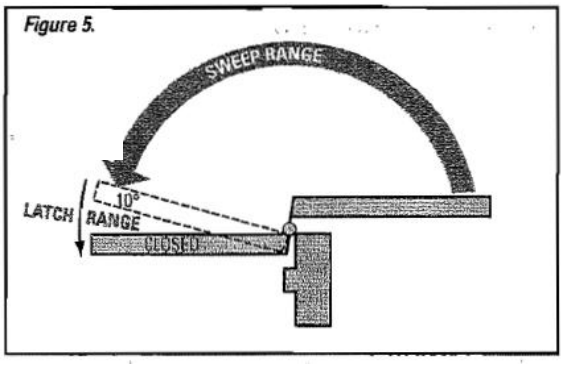
Why do we Need Door Closers?

Doors need to be self-closing to

- meet **fire door** codes, providing life safety for occupants by preventing the spread of fire and to limit the passage of smoke. Fire-rated doors must be in the closed and latched position to enable them to function. NFPA 80 requires a closing device to be installed on every fire door so that is self- closing or automatic-closing.
- Provide **safe access** for persons with disabilities.
- provide **security** when doors must always close and relock to maintain the integrity of the security system.
- Provide **energy efficiency and environmental control,** preserving heat or cooling loss between spaces.
- **contain sound**; closed doors reduce the level of sound that can pass through an opening.
- **provide privacy,** such as in public restrooms.

Actions: Sweep, Latch Range, Backcheck Delay Range

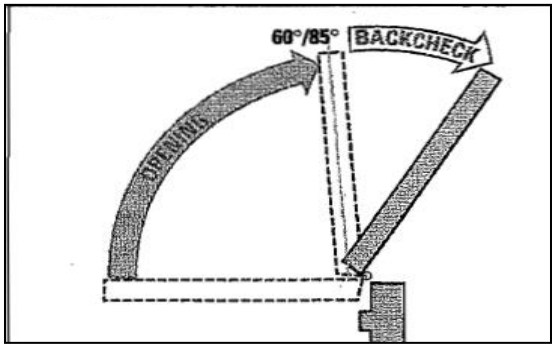
There are two basic controls for the closing cycle: **Sweep** and **Latch**. Adding **Back Check** and **Delay Range** can add considerably to the safe use of the door.



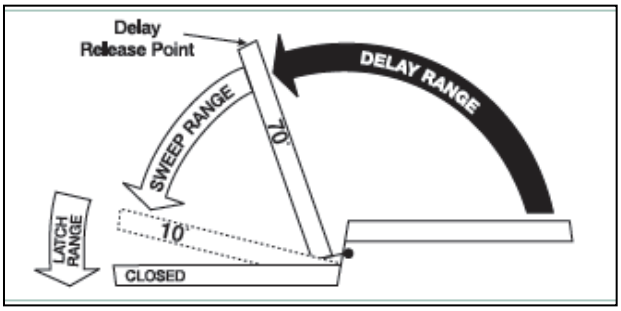
Sweep: occurs between the fully opened position to approximately 6" from the closed position. During the sweep period, the door moves gradually toward the closed position.

The **Latch Range** period occurs from an open position of approximately 6" to the full closed position. During the latch period, the door moves quickly to close, overcoming the friction of the latch bolt and environmental conditions of the opening, allowing the door to fully close.

Backcheck controls the Opening of the door by slowing it down as it approaches fully opened position—it keeps the door from slamming open. It's desirable for three reasons: it reduces the hazard to people who may be struck by the swinging door, it reduces the possibility of damage to the door or adjacent wall, and it reduces the stress on door hardware.
Backcheck is standard on many models of closers but optional on others. Typically it engages when the door is opened beyond 85°. Some models offer an adjustable back check so you can control the position when it engages.



A **Delay Range** is an optional control that holds the door open for a short period of time before beginning the closing cycle. Delayed Action provides more time to move through the opening before the door begins to close, and is useful when there is frequent traffic from carts, dollies, wheelchairs, or slow-moving people such as the elderly or children. Typically the Delay period is adjustable to suit the needs of the occupants.



Other features relate to the style of the Arm, such as Stops and Hold Opens. Here are a few:
Hold Open feature is a mechanism to hold the door open at 90° or more. When the closer is manually pulled from the hold-open point it will close in its normal fashion.
Positive Stop, which holds the door open at an exact degree
Selective Hold Open, which permits the door to be held in an open position until manually released, usually only available in a floor closer..

Power = "Size"

How much power does the closer need to move the door? The weight and size of the door, where it's located and the subjective use, as well as wind or draft conditions affect how much power is needed. When discussing closers, the term **SIZE** refers to the **closing Power**. It does not necessarily refer to how large the closer body is.
Closers are sized 1 through 6—with 6 being the most powerful, and is measured in pounds of closing force. The width of the door in particular determines how many pounds of closing force is needed. Manufacturers size closers according to ANSI standards and Underwriters Laboratories (UL) listings, and provide a chart for selecting the proper size.
Multi-sized closers are adjustable to meet a range of power. A handicapped installation will use a multi-size closer that will reduce the opening resistance.

Size and Efficiency

Closers as a rule have about a 60% efficiency ratio between the force required to open the door and the force required to close the door. If a closer requires 8 foot pounds of force to open, it will have only about 5 foot pounds of force during the closing cycle.

The efficiency ratio drops another 25% if the closer is mounted with Parallel or Track arms, so you have even less force available to close the door. Manufacturers often recommend using the next larger size of closer if it is mounted with the Parallel or Track arm.

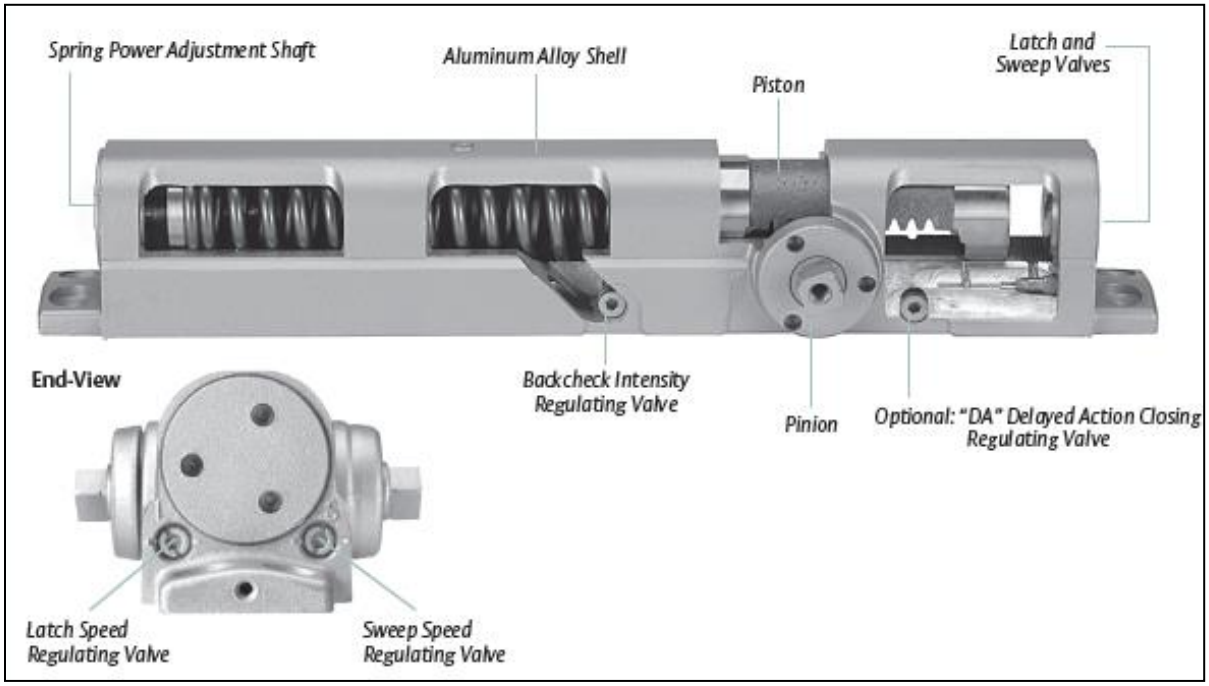
Components & how a door closer works

Door closers operate on the same fundamental principles. While designs between manufacturers vary, they are made up of three basic elements:

DRIVE—usually the arm, it links the closer body to the door and frame.
SPRING—stores energy as the door is opened and provides closing force or power when the door is released. (The power of the spring is what is Sized.) Housed in the closer body.
CHECKING MECHANISM—provides closing speed control, often with a piston and cylinder. The rate of fluid passing through the valve determines the closing speed. Housed in the closer body.

The closer arm (drive) transmits motion to the piston in the mechanism by means of a rack and pinion gear within the closer housing. The spring is compressed in a cylinder filled with hydraulic fluid.. The force generated by the compressed spring is controlled in its release by how fast the piston in the checking mechanism moves. Valves for Backcheck intensity, Sweep Speed and Latch Speed determine how fast the hydraulic fluid passes through the valves of the cylinder, thereby regulating when and how much power is released by the spring.

Here's a cutaway view of a **Norton 8000 series closer.**



ARMS for Surface Closers

The choice for arm depends on how/where the closer is installed; you select the arm for the installation application. Either the arm or body of a Surface closer can be mounted on the jamb or the door. As you study manufacturer brochures you'll see that they can be categorized into six basic mounting application categories:

Regular Arm	Corner Bracket
Top Jamb	Track arm (pull side)
Parallel Arm	Track arm (push side)

Regular Arm: On the Pull Side of the opening, the body is attached to the face of the door and the arm is attached to the face of the frame. The arm is installed 90° perpendicular to the face of the door, and permits the door to travel a full 180°.

8301 - slim cover

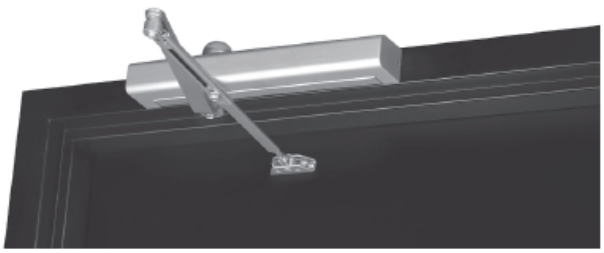
Regular Arm

This is the only pull-side application where a double lever arm is used. It is the most power-efficient application for a door closer. Sufficient frame, door and/or ceiling clearance must be considered.

8501 - full cover

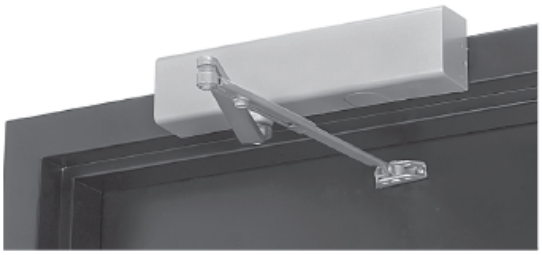
Since the arm assembly projects directly out from the frame, this application may present an aesthetics issue or be prone to vandalism.

Top Jamb: On the Push side of the opening, the closer body is attached to the face of the frame and the arm is attached to the face of the door. It is installed with the arm of the closer placed at 90° perpendicular to the face of the door. Depending on installation, it permits doors to travel up to 180°.



Top Jamb

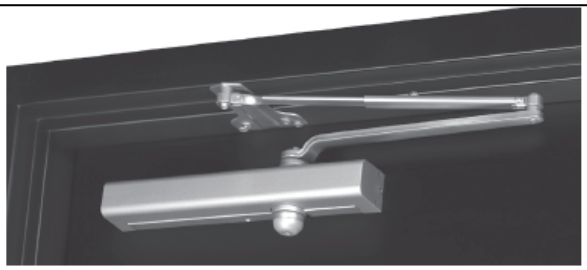
For efficiency reasons this application provides the best alternative to the regular arm application. There must be sufficient frame face and/or ceiling clearance for this application. It requires a top rail on the door of just 2-1/4" (57mm). This application provides the best door control for doors in exterior walls that swing out of a building.

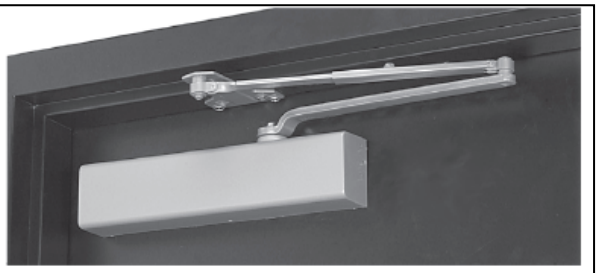


The entire door closer and arm assembly project from the frame, similar to the regular arm application, where matters of appearance and malicious abuse can be of concern. Consideration must be given to depth of frame reveal.

In a Top jamb installation the length of the arm is determined by the distance from the face of the closed door to the face of the frame (the reveal). A deep reveal will need a long arm.

Parallel Arm: on the Push side of the opening, a parallel closer has the body attached to the face of the door and the arm attached to the soffit of the frame. The arm of the closes is placed parallet to the face of the closed door. It permits the door to travel a full 180°. If the door has a narrow top rail, an adapter plate is used to attach the closer. A Parallel arm permits the door to travel 180°.





Parallel Arm

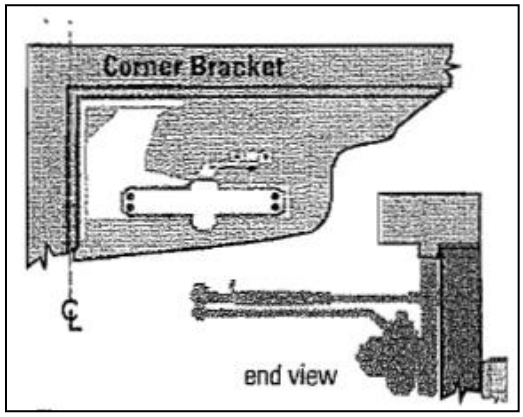
This application provides the most appealing design appearance for a surface-mounted door closer having a double lever arm. This also makes it beneficial in vandalism-prone areas. It is on the push side of the door and the arm assembly extends almost parallel to the door. In the closed position, there is very little or no hardware projecting beyond the frame face in most situations.

Due to the geometry of the arm it is approximately 25% less power efficient than a regular arm application. The entire closer and arm assembly are mounted below the frame stop. Top rail clearance dimensions will vary based on the type of cover used. (See pg.15)

Corner Bracket: on the Push side, the corner bracket is attached to the soffit of the hinge jamb of the frame. The closer body is then mounted to the bracket and the arm is attached to the face of the door.

This application is more often found in older buildings with a pot-type closer. It is not commonly used, because the bracket drops down into the opening about 8" and can cause problems with headroom clearance.

They are sometimes used when the door has an angled or arched top rail. Allows the door to open 180°.



Track Arm (pull side) & Track Arm (push side)

The Track Arm has a track formed by a metal channel, and a roller assembly that slides along the length of the track. One end of the arm is attached to the body of the closer and the other end to the roller assembly, so it only has a single lever. It is the most vandal-resistant application for Surface mounted closers. A Pull side installation has the track mounted on the Face of the Frame; a Push side installation has the track mounted to the soffit of the frame. Both installations have the body mounted on the door. Track arms typically limit the door travel to about 110°.

Pull Side

Push Side

PLATES, DROP PLATES, AND SHOES

Depending on the closer you choose, you may need an adaptor plate or shoe for the installation so that the arm has support and clearance to operate correctly. For example, when the frame or the door stile is very narrow, a plate to position the device and reinforce the supporting surface is required. The main types of plates are Soffit Plate, Narrow Frame Back Plate, Narrow Rail Drop Plate, and Offset Parallel Arm Shoe.

ACCESSORY ARMS

Non-Hold-Open

HD – **Heavy Duty**, for high volume areas or potentially abusive situations

DS - **Dead Stop:** has a positive mechanical stop and non-adjustable forearm assembly for high volume traffic and potentially abusive traffic. Prevents the door from being opened beyond a certain point. HO -Hold-Open

HO/DS- Hold Open with Dead Stop

RUO

UH

EN

EB

CUSH

SNB1

RWPA: Regular with Parallel Arm shoe: Adjustable Double arm with a shoe for mounting a parallel arm. The double arm has a main arm and an adjustable slide arm.

Rigid Parallel

Double Egress Arms