



Surface Door Closers

Why are door closers necessary? Doors need to be self-closing for a number of reasons:

- *Fire doors* — NFPA 80 requires that a closing device shall be installed on every fire door.
- *Security* — Doors to secured areas must always close and relock.
- *Energy loss* — Helps prevent energy loss for air-conditioned or heated facilities, particularly on exterior doors.
- *Sound containment* — Minimizes sound intrusion through open doors.
- *Push/Pull doors where the door is not self-latching* — Public toilets or serving doors.

How a Door Closer Works:

A door closer should provide a smooth, controlled closing action once the door has been opened and released. The closer arm transmits motion to the piston by means of a rack and pinion gear within the closer housing. The force generated by the compressed spring is controlled by adjustment of the hydraulic valves that regulate the flow of fluid.

Mounting a Door Closer:

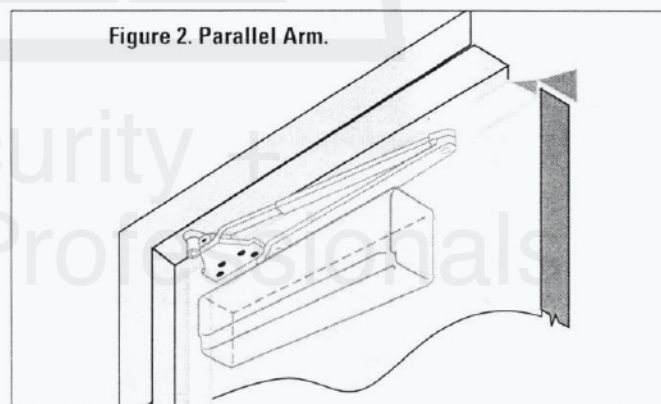
Door closers may be mounted on either the pull side (hinge

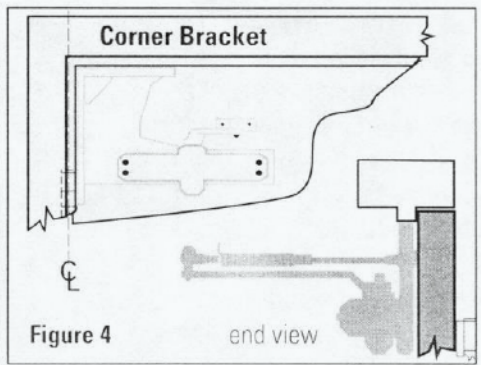
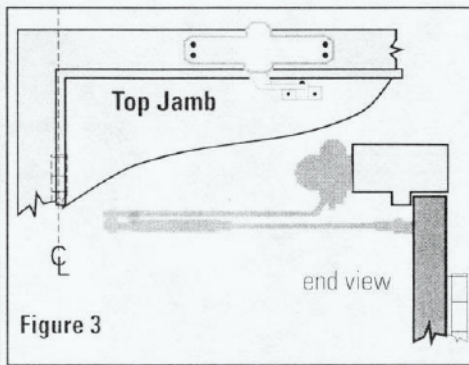
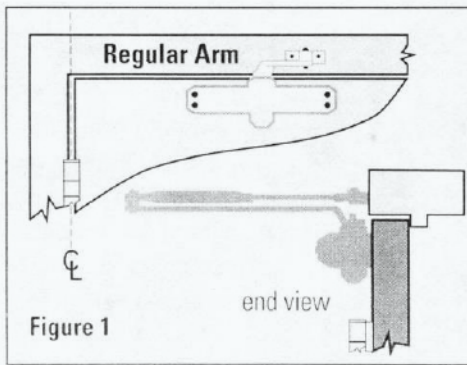
side) or push side of the door. In either case, door closers should always be mounted on the inside of a building (out of the weather) and usually on the inside of a room for aesthetics.

If the door opens in — into a building or room — the closer would be installed in "regular arm" application (figure 1). If the door opens out — to the outside of a building or room — one of three applications may be selected. Use Parallel arm, Top Jamb or Corner Bracket closers.

1. *Parallel arm application*

This application can help prevent vandalism since the arm is protected under the door frame. It is less likely that someone would reach up and pull down on the arm. This application (figure 2) is very common in schools. Since the arm is parallel to the door, power efficiency is reduced: Power is 25 percent less than regular arm application.





2. Top jamb application

This application is very common on aluminum glass doors, such as those used on storefronts (figure 3). The 1 11/16" flat frame face allows easy installation of the door closer body while the limited space on the top rail of the door still allows for the attachment of the arm. This application also allows for good power efficiency. Power efficiency is very important on exterior outswing doors that open past 110°.

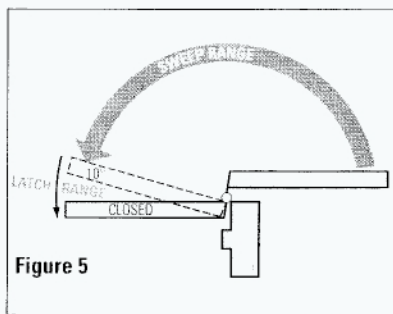
3. Corner bracket application

This application is more commonly found in older buildings where the traditional or "pot" type door closer may have been installed (figure 4). Corner brackets were originally developed as the only alternative to installing the door closer on the push side of the door. Because of improvements made to modern day door closers, which are generally installed either parallel arm or top jamb, the use of the corner bracket application has been virtually eliminated.

Although some door closer manufacturers still offer corner brackets, this application should be used with caution. The bracket drops down into the opening approximately 8", which seriously reduces head room clearance. For this reason, the corner bracket application is often referred to as a "head knocker."

Door closer features may be standard or optional depending on the closer selected. Optional features must be specified when ordering the closer and are added to the basic price of the closer.

Door Closer Features:



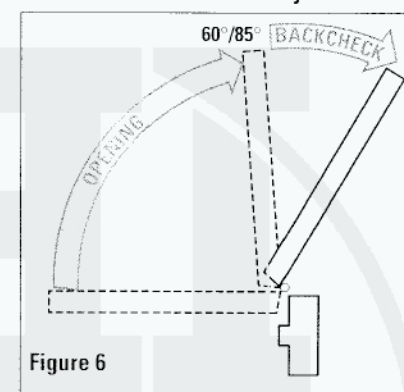
Sweep/latch speed

This feature is standard on all closers. The sweep adjustment valve will control the closing speed from fully open to approximately 10° (6 - 10") of closing (figure 5).

Generally, the

speed of the door should be six seconds from fully open to 10° of closing. This may vary depending on conditions.

Doors used by the elderly should be slowed down while exterior doors may require a faster speed to overcome wind conditions. The second adjustment will be the latch speed (10° to closed).

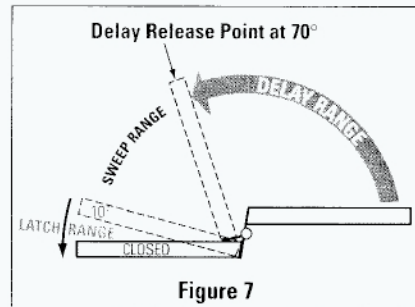


This adjustment assures positive latching of the lock or exit device without undue slamming. On doors with no latch (push/pull doors on restrooms, etc.) the door should move slowly so that it closes as quietly as possible.

Back check

This feature is standard on commercial (medium priced) or institutional (top-of-the-line) closers and optional on industrial or imported closers. Back check occurs during the opening cycle, typically at 60 to 85° of opening (figure 6). Back check provides a cushion or buffer so that when the closer reaches the designated degree of opening it slows the door to prevent damage to the door, the frame or an adjacent wall.

While most closers have the back check feature, it is most often not adjusted properly at installation. The strength of the back check may be adjusted by turning the valve clockwise (in) for stronger resistance or counterclockwise (out) for lighter resistance. Never use back check to act as a door stop. This



will cause undue pressure buildup within the closer. When back check is properly set you will feel the resistance but not so much that you cannot continue to push the door to its fully open position.

Institutional (top-

of-the-line) grade closers have two valves controlling back check. The adjustable back-check cushioning valve (previously described) and the adjustable backcheck positioning valve, which controls the position at which back check takes effect, allowing adjustment between 72° and 92°. Doors that open to only 90° will require back check sooner than doors opening past 90°.

Delayed action

This optional feature (figure 7) allows the adjustable closing speed to be slowed down between fully open and 70° (prior to the sweep speed adjustment). The feature was originally designed for handicapped use to allow individuals in wheelchairs to move through openings. It also has applications in industrial areas, hospitals, or warehouses where equipment and supplies must move through an opening.

Sizing

The size of the closer doesn't necessarily mean the physical size of the body. It means the size or strength of the spring contained within the body, thus the strength of the door closer.

| | | | | | |
|------------------------------------|---|---|---|----|----|
| ANSI Door Closer Size | 2 | 3 | 4 | 5 | 6 |
| ANSI Minimum Closing Force* | 3 | 5 | 8 | 11 | 14 |

* in pounds

Manufacturers size closers according to ANSI standards and Underwriters Laboratories (UL) listings, which require a minimum closing force between 3" to 1/2 of closing. All door closer manufacturers provide a sizing chart in their catalogs for selecting the proper sized closer. The sizing chart is based primarily upon door width.

Other considerations are usage on interior or exterior doors, wind or draft conditions, door openings beyond 150° and excessive door height or weight.

Sized closers can also be specified with a spring power adjustment that allows a 50% increase to the minimum force. So, a Size 4 closer that has 8 lbs. of closing force can be increased up to 12 lbs. of closing force.

Multi-sized closers are another option, and they are adjustable in a Size 2 through Size 6 range. These closers can be installed and adjusted to conform to the power requirements of conventional sized closers. Generally, they are non handed and boxed as either regular arm, parallel arm, or top jamb installations. They are very desirable for inventory since they cover virtually all applications.

A special multi-size closer is available for barrier-free applications. This closer reduces the opening resistance for handicapped installations. The closer is adjustable in a range of Size 1 through Size 4, allowing the spring power to be set with minimum opening resistance. Handicap barrier-force requirements under ANSI A117.1 call for a maximum opening resistance of 8 1/2 lbs on exterior doors and 5 lbs. on interior doors. In this case the spring must be carefully adjusted within the opening resistance requirement with enough force to close

and latch the door.

A number of door closer arms and accessories are available for special applications.

Arms

The non-hold-open arm is the most common application; however, hold-open arms are available when specified (figure 8). A friction arrangement allows adjustable hold-open between 90° and 180°. The hold-open feature is available for regular arm, parallel arm or top jamb mounting.

Since the parallel arm application does not need an adjustable forearm, manufacturers offer a rigid heavy-duty forearm which is recommended for school work or where heavy use is anticipated. This rigid parallel arm application is available as hold-open or non hold open.

A stop arm or stop and hold-open arm is also available, used only with the parallel arm application, and only with a door opening range of 85° to 110° (figure 9). In the opening cycle, the main arm makes contact with a stop detent which is riveted or cast into the soffit shoe. Back check is a must in order to slow the opening cycle before the arm and detent make contact. This positive stop overrides the need for an auxiliary door stop where doors are not subject to violent opening forces. The optional hold-open feature is offered with engage/disengage actuated by a thumbturn.

Slide track arms are available for pull side and push side mounting (Figure 10). They present an unobtrusive narrow profile installation. Since the arm does not project when the door is closed, it provides a deterrent to vandalism. On pull side mounting the track mounts to the face of the frame. On push side mounting, the track mounts to the soffit (underside of the door stop). The slide track features a spring cushion assembly to assist in bringing the door to a controlled dead stop. Auxiliary stops should be used in high traffic areas. Also, be cautioned that slide track arms limit the swing of the door, so check your manufacturer's catalog for the degree of opening allowable.

Proprietary information from

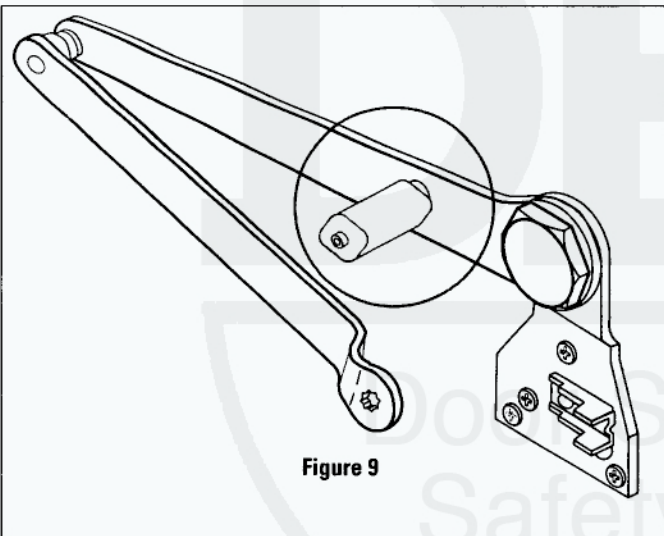
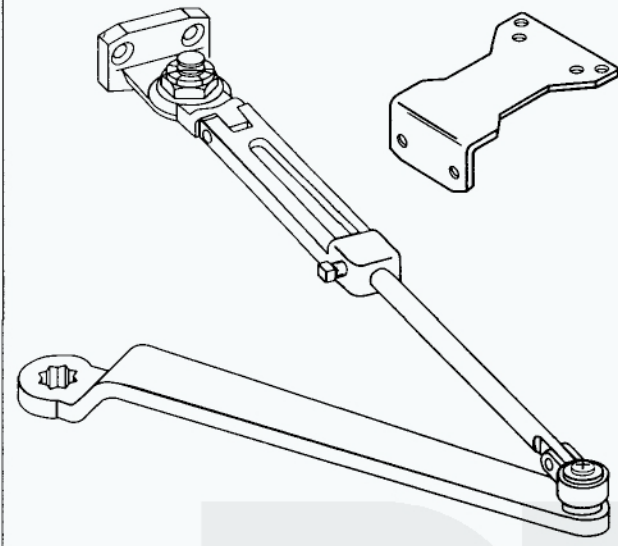


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Figure 8. Typical Hold-Open Arm.



Since the arm is parallel to the door, power efficiency is reduced, so check the manufacturer's catalog for information on door size and application restrictions.

Points to Consider:

Stile and Rail Doors: Regular arm (hinge side) mounted closers require a minimum top rail of approximately 4". Drop plates are available where the narrow top rail prevents the closer from being mounted directly to the door surface.

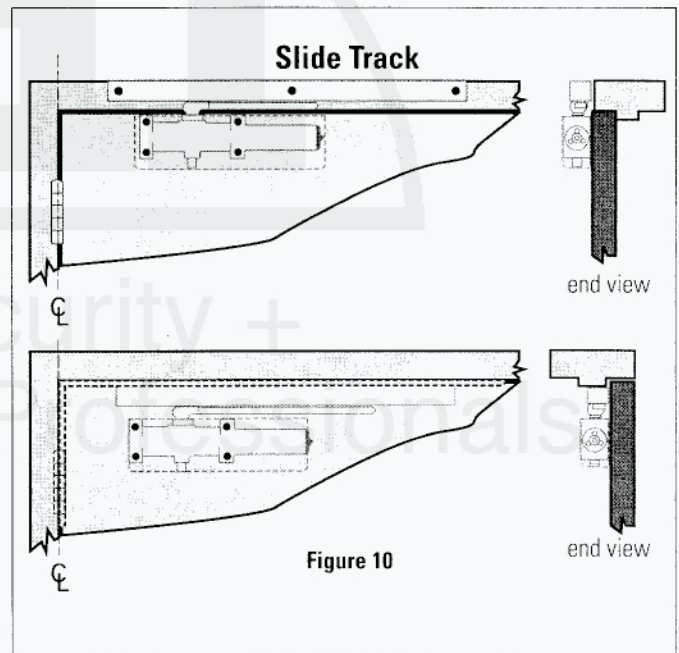
Deep Reveals: The reveal is the measurement between the inside surface of the door when closed and the inside face of the frame. Top jamb mounted closers can accommodate reveals of up to approximately 3". Where the reveal is greater, special arms are required. Deep reveals may also limit the degree of opening (Figure 11).

Low Ceiling Clearance or Overhead Door Holder: Where the ceiling clearance is so low to the face of the frame, or where a surface or concealed overhead door holder prevents normal top jamb mounting, a drop plate is available. This plate drops the closer on the frame face so as to clear the low ceiling or to allow the arm mounting screws to clear the bottom of the door holder (Figure 12).

Extra Clearance for Parallel Mounting: An offset soffit plate mounts to the frame soffit to provide additional clearance for a, separate overhead door holder or soffit applied weather stripping (Figure 13).

Molded/Bull Nose Trim: Special brackets for regular arm application are available for installation beneath the uneven surfaces of decorative moldings (Figure 14).

All of the above are detailed in your door closer manufacturer's literature.



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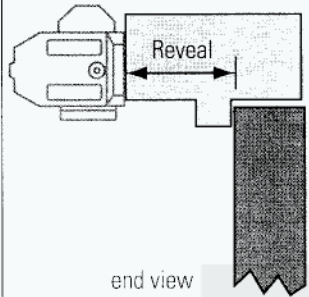


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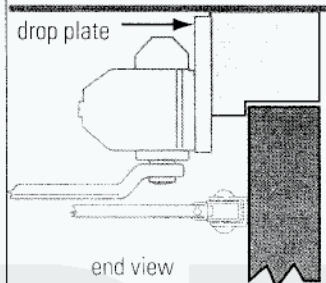
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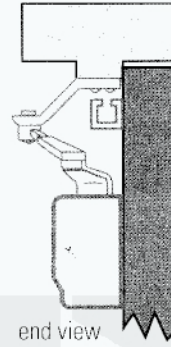
**Figure 11.
Deep Reveals.**



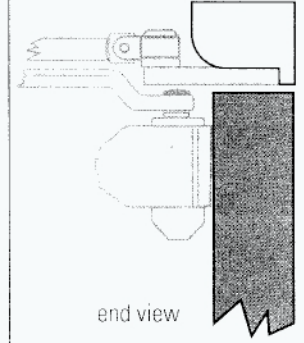
**Figure 12.
Low Ceiling Clearance.**



**Figure 13. Parallel Arm/
Extra Clearance.**



**Figure 14.
Molded/Bull Nose Trim.**



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